

JANOME DESKTOP ROBOT

JR3000 Series

JANOME CARTESIAN ROBOT

JC-3 Series

Operation Manual

Teaching Pendant Operation

Thank you for purchasing this Janome Robot.

- Before using your robot, read this manual thoroughly and always make sure you use the robot correctly. In particular, be sure to thoroughly read “For Your Safety” as it contains important safety information.
- After reading this manual, store in a safe place that can be easily accessed at any time by the operator.

Original Instructions

JANOME

PREFACE

This manual covers the JR3200, JR3300, JR3400, JR3500, JR3600, and the JC-3 Series.

There are several manuals pertaining to these robots.

Manual	Details	JR3000	JC-3	JS3
Read This First	<ul style="list-style-type: none"> For Your Safety Be sure to thoroughly read “For Your Safety” as it contains important safety information. Package Contents (JS3 Series only) Check the items included with your robot. CD-ROM Contents Explains the CD-ROM contents. 	✓	✓	✓
Setup (JR3000 / JC-3) Installation (JS3)	<p>Explains how to set up the robot. ■ Make sure you read this manual when installing the robot ■ NOTE: This manual is designed for people who have received safety and installation training regarding the robot.</p>	✓	✓	✓
Maintenance	<p>Explains maintenance procedures for the robot. ■ Make sure you read this manual when performing maintenance ■ NOTE: This manual is designed for people who have received safety and maintenance training regarding the robot.</p>	✓	✓	✓
Basic Instructions	Provides part names, data configurations, and the basic knowledge necessary to operate the robot.	✓ (Common)		✓
Quick Start	Explains the actual operation of the robot by creating and running simple programs.	✓ (Common)		✓
Teaching Pendant Operation	Explains how to operate the robot via the teaching pendant.	✓ (Common)		✓
Functions I	Explains point teaching.	✓ (Common)		
Functions II	Explains commands, variables, and functions.	✓ (Common)		
Functions III	Explains functions such as All Program Common Settings and PLC programs.	✓ (Common)		
Functions IV	Explains Customizing Functions.	✓ (Common)		
External Control (I/O / Fieldbus)	Explains I/O and Fieldbus. Refer to this manual if you are using Fieldbus.	✓	✓	✓
Communication Control (COM/LAN)	Explains COM 1 – 3 and LAN communication control.	✓ (Common)		
Camera & Sensor Functions	Explains the functions of the attachable camera and Z position sensor.	✓ (Common)		

Manual	Details	JR3000	JC-3	JS3
Specifications	Outlines general specifications such as the robot's operating range, mass, etc.	✓	✓	—
Auxiliary Axis Functions	Explains the auxiliary axis functions.	✓ (Common)		
Application Specifications	Explains the specialized functions of the various application specifications.	Standard model: - Application model: ✓		

Warning



Do not handle or operate the robot in ways not covered in the manuals listed here. Contact Janome (listed on the back of this manual) for repairs. Failure to do so can cause electric shock or injury.

Caution



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



If 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.



Before using this robot for the first time, make sure you back up robot data and save the individual configuration information. Individual configuration information is needed when replacing internal circuit boards.
For details on how to back up robot data, refer to "3. Backing Up and Restoring Robot Data" in the operation manual *Setup* for the JR3000 Series, "6.1 Backing Up and Restoring Robot Data" in the operation manual *Setup* for the JC-3 Series.


- The descriptions within this manual are based on standard specifications. The menu item names etc. may vary depending on the model type.
- Menu items related to the Z axis may appear with 2 axis specifications; however any settings made for these items are not applied.
- For information regarding optional additions for this robot, refer to "24. Specifications" in the operation manual *Specifications* for the JR3000 Series, "14. Specifications" in the operation manual *Specifications* for the JC-3 Series. The notation "optional" is not used in the main text of this manual except for diagrams.
- Machine specifications may be modified without prior notice to improve quality.

- Microsoft and Excel are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries.

Remarks:

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

 Operation via the teaching pendant

 Operation via the PC (JR C-Points II)

- Click text that appears blue and is underlined to jump to that section.

Example: Refer to [“1. TEACHING PENDANT.”](#)

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FOR YOUR SAFETY

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











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

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

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

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

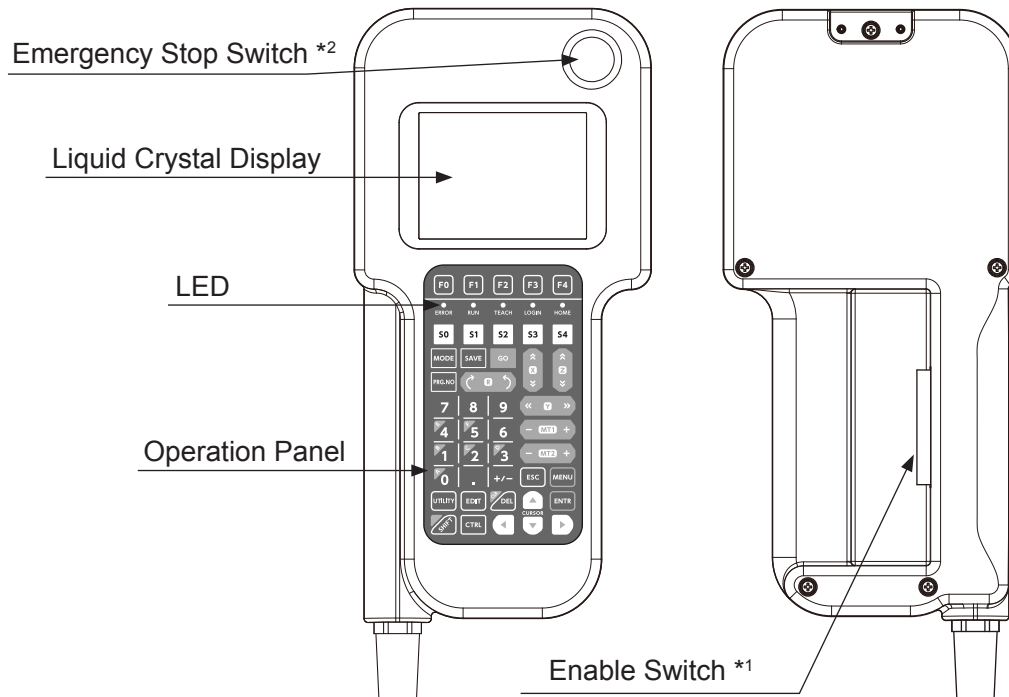
- The following symbols indicate the nature of the danger and any necessary safety precautions to be taken.

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

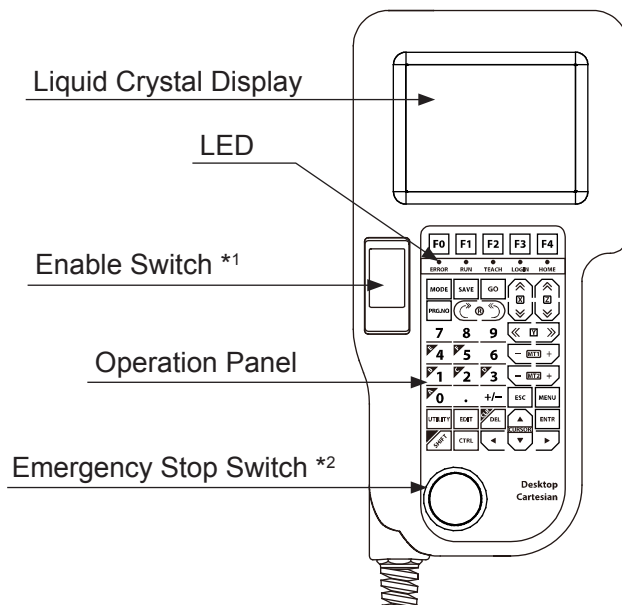
1. TEACHING PENDANT

1.1 Part Names

Teaching Pendant II (New Model)



Teaching Pendant (Conventional Model)



*1: The enable switch is optional. A stop made via the enable-switch is a category 2 stop. The motor is stopped with power left available to the actuators.

*2: The emergency stop switch is optional for the JR3000 Series and standard for the JC-3 Series.

The LEDs on the teaching pendant light up according to the robot's status. However, when running or test running points in Teaching Mode, both the TEACH and RUN LEDs light up.

The teaching pendant is optional. From here onwards, descriptions regarding the teaching pendant being optional are omitted.

LED Names	Color	LED Condition
ERROR	Red	Lights up when an error has occurred.
RUN	Green or Red*	Lights up when in External Run Mode or Switch Run Mode.
TEACH	Green	Lights up when in Teaching Mode.
LOGIN	Green	Lights up when in Customizing Mode or logged in.
HOME	Green	Lights up when the homing operation and/or mechanical initialization is complete.

* Teaching pendant II : Green LED lights up.

Teaching pendant (conventional model) : Red LED lights up.

Caution



Do not plug or remove the teaching pendant while the power is ON. Doing so can damage the device and/or cause a malfunction. Additionally, only connect teaching pendants with/without an emergency switch and/or enable switch to the compatible robot. Connecting an incompatible teaching pendant can cause robot breakdown.

If the screen to the right is displayed when the power is turned ON, make sure the connected teaching pendant and its specifications (whether or not it has an emergency switch and/or enable switch) are compatible with your robot. If you are using the appropriate teaching pendant and this screen is still displayed, the teaching pendant is likely to be faulty. Contact Janome (listed on the back of this manual) or a Janome dealer.

Wrong Teaching Pendant Type
Turn off and Connect the Right
Pendant as follows

Emergency Switch N
Enable Switch N

NOTE: These are example teaching pendant specifications

NOTE: Even if "Hit Any Key" is displayed, do not press any of the keys.

1.2 Teaching Pendant Operation Panel Keys

Key		Function
F0		Executes the functions displayed in the lowest line of the LCD. The functions displayed in the lowest line of the LCD change according to the screen.
F1		
F2		
F3		
F4		
Shortcut Keys	S0	You can assign useful functions to each key such as setting the point type etc, when teaching which you can execute just by pressing the assigned key.
	S1	
	S2	
	S3	
	S4	
MODE		Changes the robot mode.
SAVE		Saves C&T data.
GO		Moves each axis to the coordinates displayed on the LCD.
PRG.NO		Displays the program number input screen.
UTILITY		Displays the utility menu.
EDIT		Displays the point edit menu.
Numerical Input Keys	0 / A	Enters the number 0. Press together with SHIFT to enter the hexadecimal A.
	1 / B	Enters the number 1. Press together with SHIFT to enter the hexadecimal B.
	2 / C	Enters the number 2. Press together with SHIFT to enter the hexadecimal C.
	3 / D	Enters the number 3. Press together with SHIFT to enter the hexadecimal D.
	4 / E	Enters the number 4. Press together with SHIFT to enter the hexadecimal E.
	5 / F	Enters the number 5. Press together with SHIFT to enter the hexadecimal F.
	6	Enters the number 6.
	7	Enters the number 7.
	8	Enters the number 8.
	9	Enters the number 9.
	+ / -	Enters the + / - symbols.
	.	Enters a decimal point.

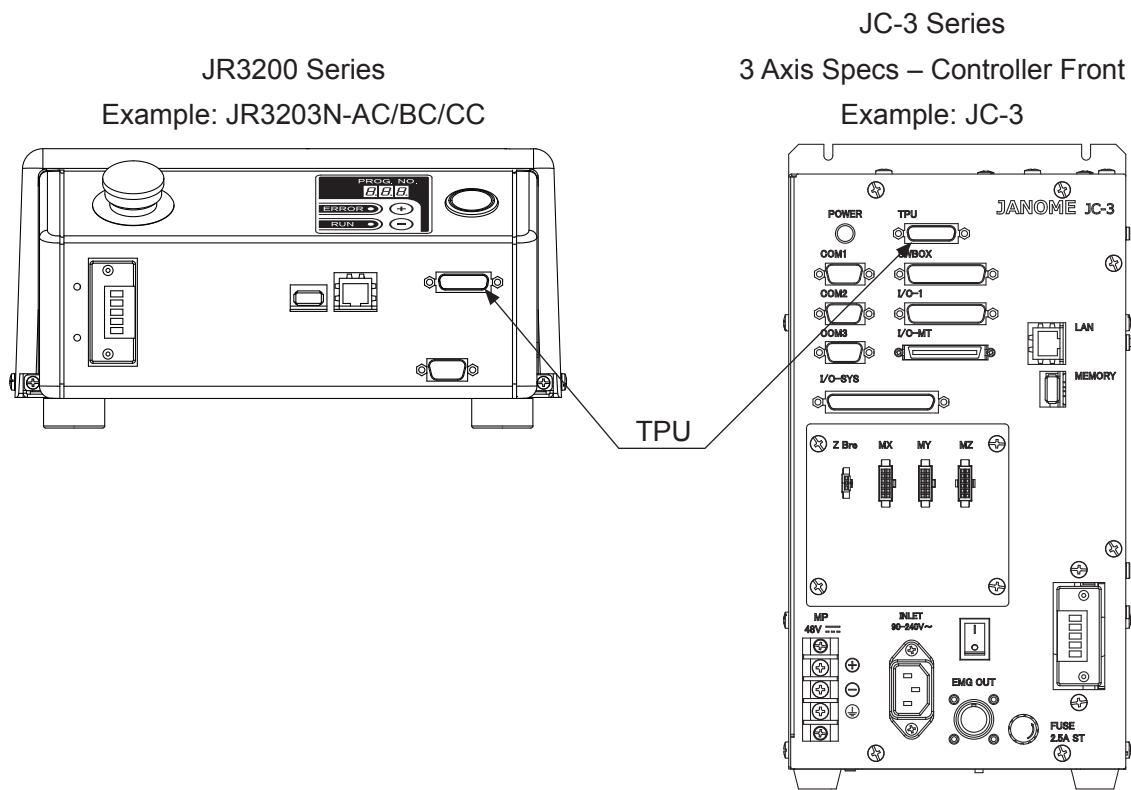
Key		Function
JOG Keys	X ⤴	Moves the X axis in the + direction (JR3000 Series) Moves the X axis in the - direction. (JC-3 Series)
	X ⤵	Moves the X axis in the - direction (JR3000 Series) Moves the X axis in the + direction. (JC-3 Series)
	Y ⤶	Moves the Y axis in the + direction.
	Y ⤷	Moves the Y axis in the - direction.
	Z ⤴	Moves the Z axis in the - direction.
	Z ⤵	Moves the Z axis in the + direction.
	R ⤶)	Rotates the R axis in the + direction*.
	(⤶ R	Rotates the R axis in the - direction*.
	MT1+	Moves the MT1 auxiliary axis in the + direction.
	MT1-	Moves the MT1 auxiliary axis in the - direction.
	MT2+	Moves the MT2 auxiliary axis in the + direction.
	MT2-	Moves the MT2 auxiliary axis in the - direction.
CURSOR ◀		Moves the cursor to the left.
CURSOR ▶		Moves the cursor to the right.
CURSOR ▲		Moves the cursor up.
CURSOR ▼		Moves the cursor down.
MENU		Displays the menu
ESC		Returns to the previous screen.
DEL/CLR		Deletes 1 character from the values entered. Press together with SHIFT to delete all the values entered.
ENTR		Press to apply the values entered or the item selected.
SHIFT		Press this simultaneously with another key to change functions.
CTRL		Press this simultaneously with another key to change functions.

* You can change the type of operation the robot makes when the R keys are used. For further details, refer to [“4.1.5 JOG Function.”](#)

The function of each key varies depending on the mode or status of the robot. For further details refer to the explanations hereafter.

1.3 Connecting a Teaching Pendant

Connect a teaching pendant to the TPU (teaching pendant connector).



Caution



Connect the teaching pendant II if the “caution” sticker around the connector says “Please use TPU II for this product.” Do not use or connect the conventional teaching pendant. Connecting the incompatible teaching pendant can cause unit breakdown.

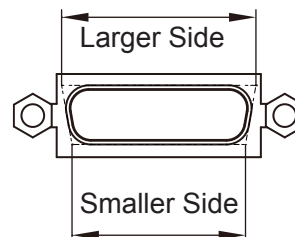


Make sure to **plug the connector into the receptacle the correct side up**. Forcefully connecting a plug into the teaching pendant connector (TPU) on the controller the wrong side up can break it.

The connectors are a rounded trapezoid shape.

Refer to the diagram to the right and make sure the corresponding plug is facing the correct direction.

You can also use the “TPU” marking above the connector on the controller to identify the larger side of the receptacle.



Teaching Pendant Connector

2. CHANGING MODES (MODE)

To change modes, carry out one of the following operations at the base screen of any mode:

Key	Function
MODE	The mode menu is displayed (diagram below). Select the mode you want to change to.
SHIFT + MODE	Press these keys to switch modes in the following order (robots not equipped with a mode switch): Teaching Mode → Switch Run Mode → External Run Mode → Teaching Mode.

- External Run Mode : This mode starts running programs from an external signal (I/O-SYS or COM1).
- Switch Run Mode : This mode starts running programs by pressing the start/stop switch on the front of the robot, or on the switch box.
- Teaching Mode : This mode creates programs.
- Customizing Mode : This mode creates data for composing programs.
- Administration : This mode is for administration and maintenance.

The mode currently in use is indicated by the corresponding LED light on the teaching pendant:

Changing Mode
External Run Mode
Switch Run Mode
Teaching Mode
Customizing Mode
Administration

Mode Menu

When running or test running points in Teaching Mode, both the TEACH and RUN LEDs lights up.

LED Names	Color	LED Condition
ERROR	Red	ON when an error has occurred.
RUN	Green or Red*	ON during External Run Mode or Switch Run Mode.
TEACH	Green	ON during Teaching Mode.
LOGIN	Green	ON when in Customizing Mode and/or logged in.
HOME	Green	ON when the homing operation and/or mechanical initialization is complete.

* Teaching pendant II : Green LED lights up.

Teaching pendant (conventional model) : Red LED lights up.

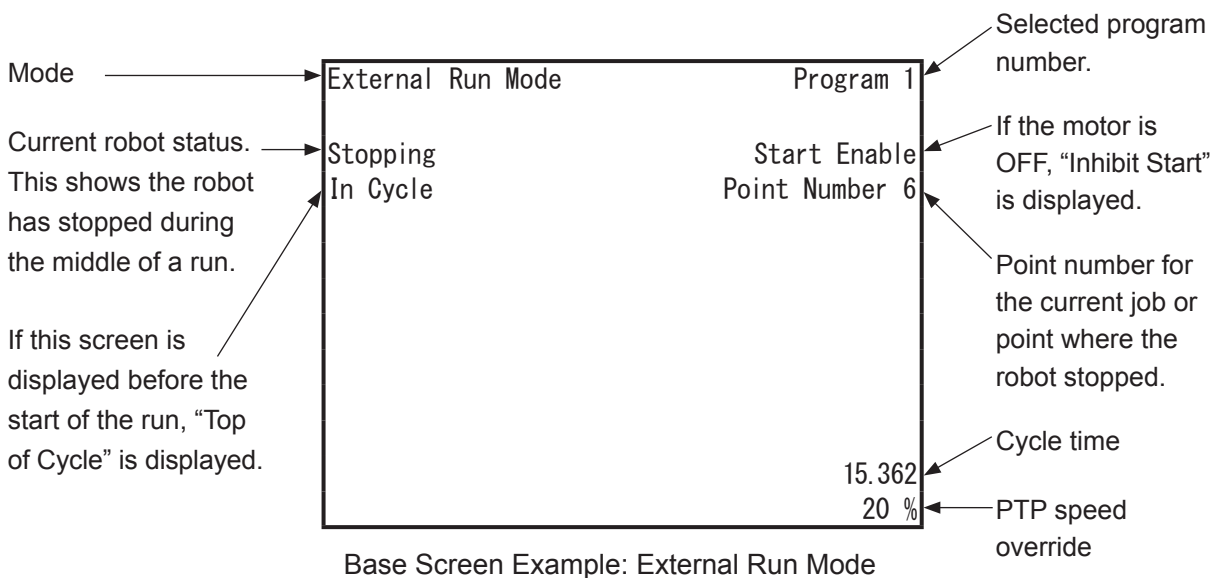
3. BASIC KEY OPERATIONS

This section explains the basic teaching pendant key operations.

3.1 Base Screen

The base screen is the screen which appears immediately after starting up any robot mode (except when there is no teaching data in a program).

3.1.1 External Run Mode/Switch Run Mode



Cycle time is the time it takes to finish a run of one cycle (units displayed in seconds). If the cycle mode is set to "continuous playback", the time is not updated for each cycle; it displays the total time once the "last work" signal is sent and work is complete. However, if the robot stops running due to an error, the time is not displayed.

The PTP speed override reduces the PTP speed by the percentage displayed (this does not affect the CP speed). Note, this is not displayed when set to 100 %.

Operation keys are disabled while the robot is running. Use the keys on the following page when the robot is in a "Stopping" or "Top of Cycle" status.

NOTE: When in Run Mode, the "RUN" LED lights up on the teaching pendant.

Key	Function
MODE	Displays the mode selection screen.
SHIFT + MODE	Press these keys to switch modes in the following order (robots not equipped with a mode switch): Teaching Mode → Switch Run Mode → External Run Mode → Teaching Mode
MENU	Displays the Run Mode menu.
UTILITY	Displays the teaching environment settings menu.
CTRL + UTILITY	Displays the language selection screen.
PRG.NO	Displays the program number entry screen. Here you can change the currently selected program.
SAVE	Saves C & T (customizing & teaching) data.

3.1.2 Teaching Mode

Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

Selected program number → Program 1 P1 ← Point number

Tool for Teaching → Tool Main Tool

Point coordinates → X+23 Y+112 Z+25 R+12

Point type → Type PTP Point

A point job or additional function appears below the point type when set → Job after Moving 6

F0 – F4 key functions are displayed here. → S.MARK E.MARK T.TOOL J.EXEC P.EXEC

Base screen example: Point settings screen

NOTE:

- The point settings screen may have multiple pages depending on the point setting and content.
- When in Teaching Mode, the “TEACH” LED lights up on the teaching pendant. When performing a test run or point run, the “TEACH” and “RUN” LEDs light up.

Key	Function
MODE	Displays the mode selection screen.
SHIFT + MODE	Press these keys to switch modes in the following order (robots not equipped with a mode switch): Teaching Mode → Switch Run Mode → External Run Mode → Teaching Mode

NOTE: If you are using a switchbox with a mode switch, the **MODE** key is disabled.

Key	Function
MENU	Displays the Teaching Mode menu.
UTILITY	Displays the utility menu.
SHIFT + UTILITY	Displays the screen for the tool during teaching.
CTRL + UTILITY	Displays the language selection screen.
PRG.NO	Displays the program number entry screen. Use this key when changing the currently selected program or registering a new program.
SAVE	Saves C&T (customizing & teaching) data.
EDIT	Displays the point editing screen. Every point can be edited individually.
GO	Moves the robot axes to the displayed coordinates.
F0 (S.MARK)	Sets the current point number as the block start number when block editing.
F1 (E.MARK)	Sets the current point number as the block end number when block editing.
F2 (T.TOOL)	You can switch to a different tool for program teaching. Refer to “4.1.6 Tool for Teaching” for further details.
F3 (J.EXEC)	Executes the point job data for the [Point Job Number] set to a given point. Press this after aligning the cursor with the Job After Moving. NOTE: There are items that cannot be executed depending on the command.
F4 (P.EXEC)	Runs the current point, and the screen changes to the settings display for the next point. If the current point is the last point in the program, the work home settings screen appears. However, if the point currently displayed is a CP start point, the robot runs continuously from the CP start point through to the CP end point. Do not make a point run if the point currently displayed is a point halfway through a CP movement (CP Passing Point etc.).

Key	Function								
<p>CURSOR ◀</p>	<p>Displays the settings screen for the previous point. If Point 1 is displayed, the point before this is the work home. There are no points prior to the work home.</p> <p>If the work home for the [Program Individual Settings] is set to [Individual], [Individual Work Home] is displayed, and if set to [Common], [Common Work Home] is displayed.</p>								
<p>CURSOR ▶</p>	<p>Displays the settings screen for the next point. If the next point is not entered, the new point entry screen will appear. This key is invalid when the next point is not yet entered.</p>								
<p>SHIFT + CURSOR ◀</p>	<p>Displays the settings screen for the first point (number 1).</p>								
<p>SHIFT + CURSOR ▶</p>	<p>Displays a new point entry screen for the point after the last registered point.</p>								
<p>CURSOR ▲</p>	<p>Moves the highlight bar one line upwards. This key is invalid if the first item on the first page is already highlighted.</p>								
<p>CURSOR ▼</p>	<p>Moves the highlight bar one line downwards. If the last line is highlighted, the highlight bar moves to the first line of the next page. If the last item on the last page is highlighted, unset but potentially settable point jobs and additional functions for the current point are listed. Here you can select point job data, or additional function data and enter the number to add this data to the current point. (Point job/additional function data number "0" means that no point job/additional function data is registered).</p>								
<p>SHIFT + CURSOR ▲</p>	<p>This highlights the second line of the first page. This key combination is invalid if the second line on the first page is already highlighted or if there is only one page.</p>								
<p>SHIFT + CURSOR ▼</p>	<p>This highlights the item on the bottom of the last page. This key combination is invalid if the item on the bottom of the last page is already highlighted or if there is only 1 page.</p>								
<p>ENTR</p>	<p>Displays the entry or selection screen for the highlighted item.</p> <table border="1" data-bbox="555 1525 1390 1955"> <tbody> <tr> <td data-bbox="555 1525 738 1644">Program numbers and point numbers</td> <td data-bbox="738 1525 1390 1644">Press ENTR to display the point number entry screen. Enter a number here to show the point settings screen for that number.</td> </tr> <tr> <td data-bbox="555 1644 738 1686">Coordinates</td> <td data-bbox="738 1644 1390 1686">Press ENTR to display the coordinate position entry screen.</td> </tr> <tr> <td data-bbox="555 1686 738 1729">Point type</td> <td data-bbox="738 1686 1390 1729">Press ENTR to display the point type selection screen.</td> </tr> <tr> <td data-bbox="555 1729 738 1955">Point Job Additional function data</td> <td data-bbox="738 1729 1390 1955">Press ENTR to display the numerical entry screen for the registered point job/additional function data. If you want to change the point job/additional function data type, enter "0" on a currently registered point job/additional function data, and set new point job/additional function data (CURSOR ▼ key)</td> </tr> </tbody> </table>	Program numbers and point numbers	Press ENTR to display the point number entry screen. Enter a number here to show the point settings screen for that number.	Coordinates	Press ENTR to display the coordinate position entry screen.	Point type	Press ENTR to display the point type selection screen.	Point Job Additional function data	Press ENTR to display the numerical entry screen for the registered point job/additional function data. If you want to change the point job/additional function data type, enter "0" on a currently registered point job/additional function data, and set new point job/additional function data (CURSOR ▼ key)
Program numbers and point numbers	Press ENTR to display the point number entry screen. Enter a number here to show the point settings screen for that number.								
Coordinates	Press ENTR to display the coordinate position entry screen.								
Point type	Press ENTR to display the point type selection screen.								
Point Job Additional function data	Press ENTR to display the numerical entry screen for the registered point job/additional function data. If you want to change the point job/additional function data type, enter "0" on a currently registered point job/additional function data, and set new point job/additional function data (CURSOR ▼ key)								

Key	Function
0 – 9	Each of these keys executes the respective point job data set to them when pressed (keys with no point job data set to them are invalid.)
.	This moves the cursor to the bottommost line.
SHIFT + GO	This executes mechanical initialization.

In this manual, highlighting a certain item and pressing the **ENTR** key is referred to as “selecting” that item.

3.1.3 Customizing Mode

NOTE:

- The screen shown to the right is the Customizing Mode menu after login.
- For further details regarding Customizing Mode, refer to the operation manual *Functions IV (Customizing)*.

Customizing Mode
Teaching Mode Customizing
Account
Point Type Definition
Variable Definition
User Function Definition
Alias Definition
Additional Function Data Settings
Point Job Settings
User Defined Message
PLC Settings
Data Copy, Delete

Base Screen Example: Customizing Mode

Key	Function
MODE	Displays the mode selection screen.
SHIFT + MODE	Press these keys at the base screen to switch modes in the following order (robots not equipped with a mode switch): Switch Run Mode → External Run Mode → Teaching Mode
CTRL + UTILITY	Displays the language selection screen.
SAVE	Saves C&T (customizing & teaching) data.
CURSOR △	Moves the highlight bar one line upward. This key is invalid if the first item on the first page is already highlighted.
CURSOR ▽	Moves the highlight bar one line downward. The highlight bar moves to the first line of the next page if the last line is highlighted. This key is invalid if the last line of the last page is already highlighted.
ENTR	Displays the entry or selection screen for the highlighted item.

3.1.4 Administration

Caution



Diagnostic Mode and Mechanical Adjustment Mode are for maintenance technicians only.

Administration
Administration Settings Mode
Diagnostic Mode
Mechanical Adjustment Mode
Version Information
Error History

Key	Function
MODE	Displays the mode selection screen.
SHIFT + MODE	Press these keys at the Administration Mode base screen to switch modes in the following order (robots not equipped with a mode switch): Switch Run Mode → External Run Mode → Teaching Mode
CTRL + UTILITY	Displays the language selection screen.
SAVE	Saves C&T (customizing & teaching) data.
CURSOR ▲	Moves the highlight bar one line upward. This key is invalid if the first item on the first page is already highlighted.
CURSOR ▼	Moves the highlight bar one line downward. The highlight bar moves to the first line of the next page if the last line is highlighted. This key is invalid if the last line of the last page is already highlighted.
ENTR	Displays the entry or selection screen for the highlighted item. If [Version Information] is selected, the version information appears.

3.2 Selection

Screens such as menu and confirmation screens are classified as selection screens.

“Select” means to highlight an item and set it (by pressing the **ENTR** key.)

The selection screen sometimes covers two or more pages. In the diagram below, the numbers “1/3” in the upper-right corner of the screen indicate that the current page is page 1 of 3.

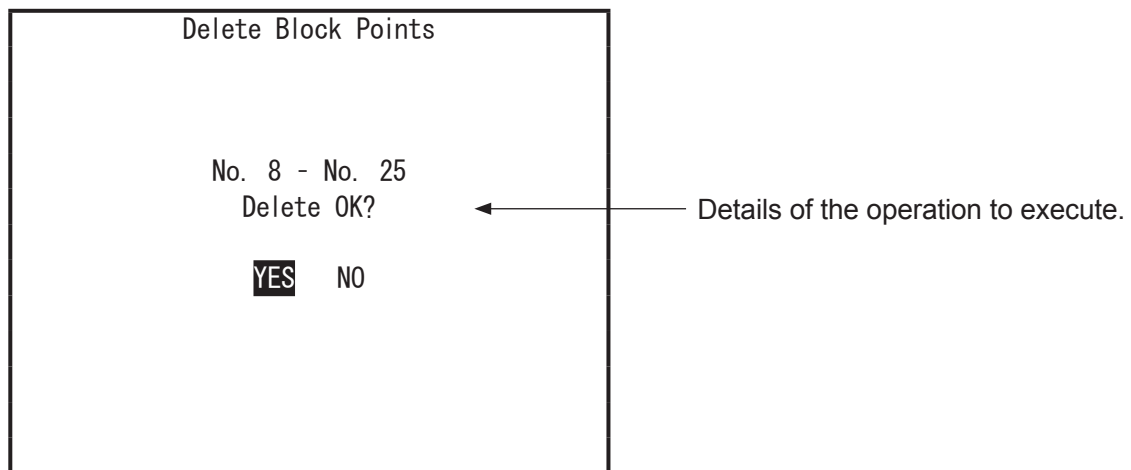
I/O-SYS Function Assignment		1/3
sysIn1	Start	
sysIn2	Free	
sysIn3	Program Number Load	
sysIn4	Program Number 1	
sysIn5	Program Number 2	
sysIn6	Program Number 4	
sysIn7	Program Number 8	
sysIn8	Program Number 16	
sysIn9	Program Number 32	
sysIn10	Program Number 64	
sysIn11	Program Number 128	
sysIn12	Program Number 256	

Selection Screen Example

Key	Function
0 – 9	Press a number key [1] – [9] to move to the corresponding line displayed on the screen. If you want to select line 10 or more, press SHIFT + the number key. (Keys A – C are valid when SHIFT is pressed , allowing you to select lines 10 – 12). If you press the number key [0], the highlight bar moves to the first line of the first page.
CURSOR Δ	Moves the highlight bar one line upward. This key is invalid if the first item on the first page is already highlighted.
CURSOR ∇	Moves the highlight bar one line downward. The highlight bar moves to the first line of the next page if the last line is highlighted. This key is invalid if the last item on the last page is already highlighted.
SHIFT + CURSOR Δ	Displays the preceding page. (This key combination is invalid if there is no preceding page.)
SHIFT + CURSOR ∇	Displays the next page. (This key combination is invalid if there is no next page.)
.	Highlights the last line. (If the menu screen covers multiple pages, the last line of the last page is highlighted.)

Key	Function
ENTR	Sets the highlighted item, displays the settings screen, or displays the related menu for that item. If you enter a new point in Teaching Mode, the entry screen or selection screen for the settings of the next item for that point data appears. (For example, if you set the point type to [CP Start Point], the [Line Speed] entry screen appears next.) If there are no more items to set, the new position entry screen for the next point appears.
ESC	Displays the previous menu or reverts to the base screen. This key is invalid on the program number selection screen if there are no registered programs.
SHIFT + ESC	Reverts to the base screen. These keys are invalid on the program number selection screen if there are no registered programs.

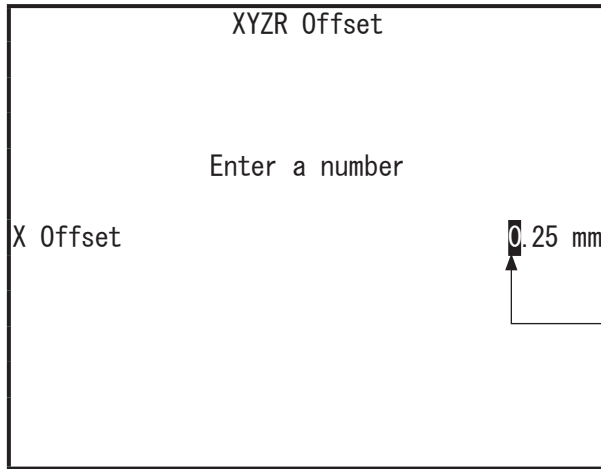
■ Valid keys on a confirmation screen.



Confirmation Screen Example

CURSOR **△** , **CURSOR** **▽** : Switches between highlighting YES and NO.
CURSOR **◀** , **CURSOR** **▶**

3.3 Entering Numbers



The cursor blinks on a character or number.

NOTE: The following key operations do not apply to the entry of position coordinates using numerical keys. In this situation, refer to [“3.5.4 MDI Mode.”](#)

Cursor

Number Entry Screen Example

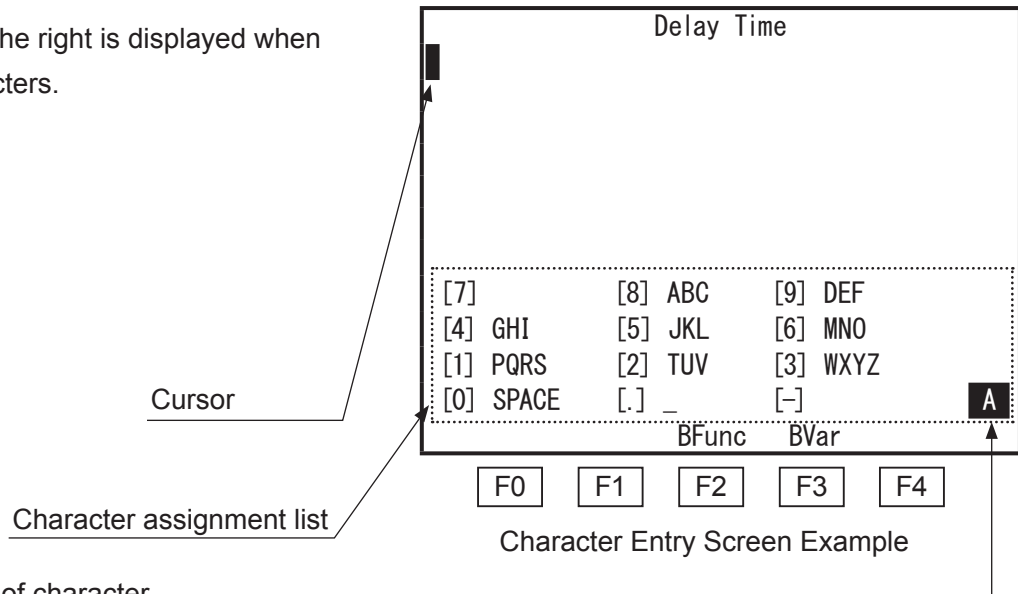
Key	Function
<input type="text" value="CURSOR ▲"/>	Increases the value. If you release this key within 0.5 seconds, the value increases by the minimum increment. If you press this key for more than 0.5 seconds, the value increases every 0.2 seconds.
<input type="text" value="CURSOR ▼"/>	Decreases the value. If you release this key within 0.5 seconds, the value decreases by the minimum increment. If you press this key for more than 0.5 seconds, the value decreases every 0.2 seconds.
<input type="text" value="SHIFT"/> + <input type="text" value="CURSOR ▲"/>	Increases the value at 10 times the rate of the <input type="text" value="CURSOR ▲"/> key.
<input type="text" value="SHIFT"/> + <input type="text" value="CURSOR ▼"/>	Decreases the value at 10 times the rate of the <input type="text" value="CURSOR ▼"/> key.
<input type="text" value="CURSOR ◀"/>	Moves the cursor one digit to the left. This key is invalid if the cursor is on the leftmost digit. If the cursor is hidden, press this key to display the cursor on the bottommost digit.
<input type="text" value="CURSOR ▶"/>	Moves the cursor one digit to the right. If the cursor is on the bottommost digit, pressing this key hides the cursor. This key is invalid if the cursor is hidden.
<input type="text" value="0"/> – <input type="text" value="9"/>	Overwrites the number under the cursor with the number you press. If the cursor is hidden, the digits move one place to the left and the number pressed is entered as the last digit.
<input type="text" value="."/>	Enters a decimal point. This key is invalid if the number already contains a decimal point or no decimal fraction is possible.
<input type="text" value="±"/>	Reverses the plus and minus signs. This key is invalid if a negative (-) number is not possible.
<input type="text" value="SHIFT"/> + <input type="text" value="DEL/CLR"/>	Clears the entire value. The value becomes 0.

Key	Function
DEL/CLR	Deletes the number or decimal point at the cursor's current location. The cursor and the number on the left side of the cursor move one place to the right. However, the decimal point cannot be deleted if the number exceeds the entry range without the decimal point. If the cursor is hidden, the bottommost figure is deleted and the figures move one place to the right.
ENTR	Sets the numerical value and returns the screen to the previous menu or base screen. If you enter a new point, the entry or selection screen for the point data's next settable item appears. If there is no item to be set next, a new position entry screen for the next point appears.
ESC	Returns to the previous menu or the base screen without setting a numerical value. This key is invalid on the program number entry screen if no programs are registered.
SHIFT + ESC	Returns to the base screen without setting a numerical value. These keys are invalid on the program number entry screen if no program is registered.
F4 (EXP)	Switches to the character entry screen. Use this key to enter variables, functions, and expressions. This key is valid when the EXP label is displayed at the bottom right hand side of the screen (above the F4 key).

3.4 Entering Characters and Expressions

You can attach names to registered programs and point job data, etc. Below is the method for operating the character entry screen for entering names. This input method also applies when entering command line expressions for point job data, etc.

The screen to the right is displayed when entering characters.



Type of character —
 A: Roman uppercase, a: Roman lowercase, 1: Numbers, C: Operators, *: Symbols

Key	Function
<div style="display: flex; flex-wrap: wrap; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">0</div> <div style="border: 1px solid black; padding: 2px;">-</div> <div style="border: 1px solid black; padding: 2px;">9</div> <div style="border: 1px solid black; padding: 2px;">+/-</div> <div style="border: 1px solid black; padding: 2px;">.</div> </div>	Characters are entered according to the character assignment list on the screen. In the example above, if you press the 8 key once, the letter “A” is entered. If you press it twice, the letter “B” is entered. If you want to enter the letters “AB”, enter the letter “A” first and press the CURSOR ▷ key to shift the cursor to the right, and then enter “B”. Keys which have no character assigned, such as [7] (above), are invalid.
ESC	Returns to the previous screen (without registering the character string).
ENTR	This registers the character string and finishes character string entry. A name cannot be registered if it exceeds the character number limit. Also, you cannot register a name which includes any unusable characters.
F4	Each time this key is pressed, the character assignment type changes in the following order: Roman uppercase → Roman lowercase → numbers → symbols → operators → Roman uppercase However, when entering names, the operator assignment list does not appear, and when entering variables, the operator and symbol assignment lists do not appear.
<div style="display: flex; align-items: center; gap: 5px;"> <div style="border: 1px solid black; padding: 2px;">SHIFT</div> <div style="font-size: 1.2em;">+</div> <div style="border: 1px solid black; padding: 2px;">F4</div> </div>	Each time these keys are pressed at the same time, the character assignment type changes in the following order: Roman uppercase → Roman lowercase → numbers → symbols → operators → Roman uppercase. However, when entering names, the operators assignment list does not appear, and when entering variables, the operator and symbol assignment lists do not appear.

■ Character Assignment Switching

Uppercase

[7]	[8] ABC	[9] DEF
[4] GHI	[5] JKL	[6] MNO
[1] PQRS	[2] TUV	[3] WXYZ
[0] SPACE	[.] _	[-]

A

Lowercase

[7]	[8] abc	[9] def
[4] ghi	[5] jkl	[6] mno
[1] pqrs	[2] tuv	[3] wxyz
[0] SPACE	[.] _	[-]

a

Numbers

[7] 7	[8] 8	[9] 9
[4] 4	[5] 5	[6] 6
[1] 1	[2] 2	[3] 3
[0] 0	[.] .	[-] -

1













Operators

[7] +	[8] <	[9])
[4] /	[5] =	[6] ,
[1] *	[2] >	[3] (
[0] e	[.] .	[-] -

C

Symbols

[7] [\]	[8] ^ `	[9] { } ~
[4] -./	[5] ::<=	[6] >?@
[1] !"#\$	[2] %&'([3])*+,
[0] SPACE	[.]	[-]

Key	Function
CURSOR 	Moves the cursor upward (in the character string).
CURSOR 	Moves the cursor downward (in the character string).
CURSOR 	Moves the cursor to the left (in the character string).
CURSOR 	Moves the cursor to the right (in the character string).
SHIFT + CURSOR 	Moves the cursor to the top line.
SHIFT + CURSOR 	Moves the cursor to the bottom line.
SHIFT + CURSOR 	Moves the cursor to the top of the character string.
SHIFT + CURSOR 	Moves the cursor to the end of the character string.
DEL / CLR	Deletes the character at the cursor's current location. If the cursor is at the far right of the character string, the last character is deleted.
SHIFT + DEL / CLR	Clears the entire character string.
 (BFunc)	Displays a list of built-in functions (functions built into the robot in advance as operating functions). This key is valid when the sign "BFunc" is displayed on the last line of the screen (above the  key).
 (BVar)	Displays a list of built-in variables (variables built into the robot in advance as operating functions). This key is valid when the sign "BVar" is displayed on the last line of the screen (above the  key).

If you enter character strings for a point job command such as *outCOM*, etc., you can designate the characters using hexadecimal codes after the "%" code. If you want to use the "%" as a symbol, enter "%%". In this case, the quotation marks ("") enclosing the character string are entered automatically.

Example: `outCOM port2,"%0D%0A"` : Outputs CR LF codes.

`outCOM port2,"%%300"` : Outputs %300.

3.5 Position Entry

Position Entry Screen Example

Key	Function
F0 (FUNC)	This changes the functions of F1 – F4 (To change the functions a manual job number is required)
F1 (T.TOOL)	You can switch to a different tool for program teaching. Refer to “4.1.6 Tool for Teaching” for further details.
F2 (JOG)	This changes to JOG Mode. Additionally, the coordinates displayed on the screen switch to the current position coordinates. This is invalid when the robot motor power is OFF. This is the same as when pressing the JOG keys. JOG keys: X \wedge X \vee Y \gg Y \ll R \ll (\gg R) Z \wedge Z \vee
F3 (MDI)	This changes to the MDI Mode. If already in the MDI mode, each time F3 is pressed, a screen for entering coordinates for each axis is displayed in this order: X \rightarrow Y \rightarrow Z \rightarrow R \rightarrow X
F4 (INIT)	Executes mechanical initialization.
F4 (W.HOME)	Absolute encoder models only. The robot returns to the work home with this function. The robot returns to the work home even when the axes are located out of the move area limit.

NOTE: No matter what mode you are using, the following keys are valid while a position entry screen is displayed:

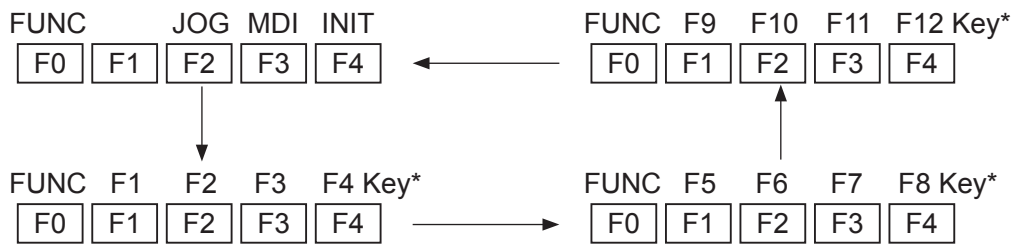
Key	Function
SHIFT + UTILITY	Displays the settings screen for the tool during teaching.
UTILITY	Displays the Teaching Environment Setting menu.
SHIFT + F3	Copies the point coordinate value of the designated number.
CTRL + UTILITY	Displays the language settings.

NOTE: Be careful when switching from MDI mode to JOG mode, as the MDI coordinate values are replaced with the current positions of the axes.

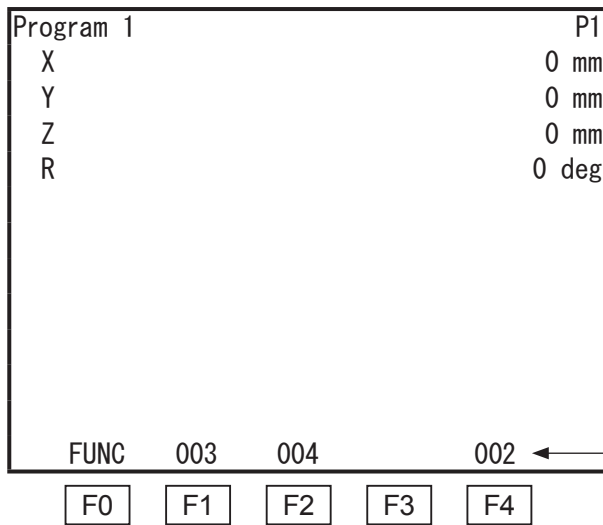
3.5.1 Manual Job

If you set point job numbers to [F1 Key Job Number] – [F12 Key Job Number], you can execute the point job data for the designated numbers on the position entry screen in Teaching Mode. Note however, you cannot use these unless you switchover the functions with the **[F0]** (FUNC) key.

Each time the **[F0]** (FUNC) key is pressed on the position entry screen, the **[F1]**, **[F2]**, **[F3]** and **[F4]** key functions change as follows. However, the function does not change if there is no point job number set to [F1 Key Job Number] – [F12 Key Job Number].



* Before using this function, you need to set the point job data to each of the **[F1]**, **[F2]**, **[F3]** and **[F4]** keys. For details, refer to [“4.1.7 Manual Job Number Setting.”](#)



NOTE: The point job numbers set to each key are displayed on the screen. (003: Point Job Data 3) (The lack of a number indicates that there is no point job data set to this key.)

After switching the screen display, press the **[F1]**, **[F2]**, **[F3]** or **[F4]** key. The robot performs the point job set to the key.

Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

3.5.2 Copying Point Coordinates

With this, you can copy coordinates of an existing point. This function is convenient in situations such as these:

- When entering [Position Setting] in the [2-Points Position Conversion] menu.
- When entering [Robot Coordinate Position] with camera adjustment calibration.

Press the **F3** key while pressing the **SHIFT** key on the position entry screen.

Next, enter and set the point number of the coordinate copy source. The coordinate values of the point number entered are copied. (You can select points only within the currently selected program.)

Enter [0] to copy the work home position coordinates.

3.5.3 JOG Mode

Caution



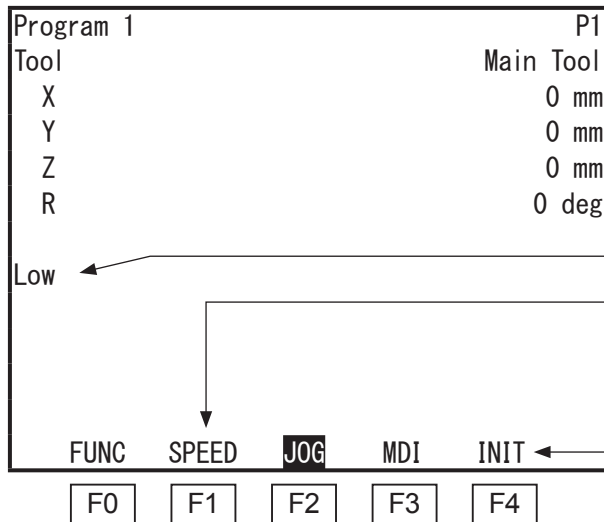
Take care as performing a point job can cause the robot and/or peripheral devices to move.

In JOG Mode, position entry is done by moving the robot axes to the position you want using the JOG keys on the teaching pendant.

The coordinate values of the axes' current position are displayed on the teaching pendant LCD. Note that the "RUN" LED on the teaching pendant does not light up when the robot axes are moved using the JOG keys.

If you want to move the axes using one of the corresponding keys on the teaching pendant when using a teaching pendant with an enable switch (optional), do so by pressing the key which moves the axis you want while holding down the enable switch. The enable switch has three states: lightly pressed, pressed-in, and released. To move the axes using the JOG keys, keep the enable switch in a pressed state. Additionally, you need to keep pressing the enable switch while moving the axes. If you release or press in the enable switch the robot axes will stop moving as a safety measure*.

* The motor is stopped with power left available to the actuators (category 2 stop).



Point coordinates

Current JOG speed*

Changes the movement speed for each axis*
 * Displayed when using a teaching pendant equipped with an enable switch.

The highlighted function is the current position entry mode.

NOTE: INIT appears as W.HOME for JC-3 absolute encoder models.

Key	Function
X ⤴	Moves the X axis in the + direction (JR3000 Series). Moves the X axis in the - direction (JC-3 Series).
X ⤵	Moves the X axis in the - direction (JR3000 Series). Moves the X axis in the + direction (JC-3 Series).
Y ⤶	Moves the Y axis in the + direction.
Y ⤷	Moves the Y axis in the - direction.
Z ⤴	Moves the Z axis in the - direction.
Z ⤵	Moves the Z axis in the + direction.
R ⤷	Rotates the R axis in the + direction*. (4 axis model only)
(⤶ R	Rotates the R axis in the - direction*. (4 axis model only)

Each of the keys on the previous page **X ⤴** – **(⤶ R** are called JOG keys. The distance the axes move from one press, and also the speed at which the axes move when holding down a JOG key, can be set in the teaching environment setting [JOG Function].

* You can change the type of operation the robot makes when the R keys are used. For further details, refer to [“4.1.5 JOG Function.”](#)

NOTE:

- Continuously hold down a jog key to start moving the corresponding axis at low speed. As you continue to hold down the jog key, the axis will gradually increase speed and move at medium speed.

When pressing a JOG key when moving the axis at low/medium speed, also hold the

SHIFT key to gradually increase to high speed. When moving the axes by pressing **SHIFT** + a JOG key, release the **SHIFT** key to gradually reduce to medium speed.

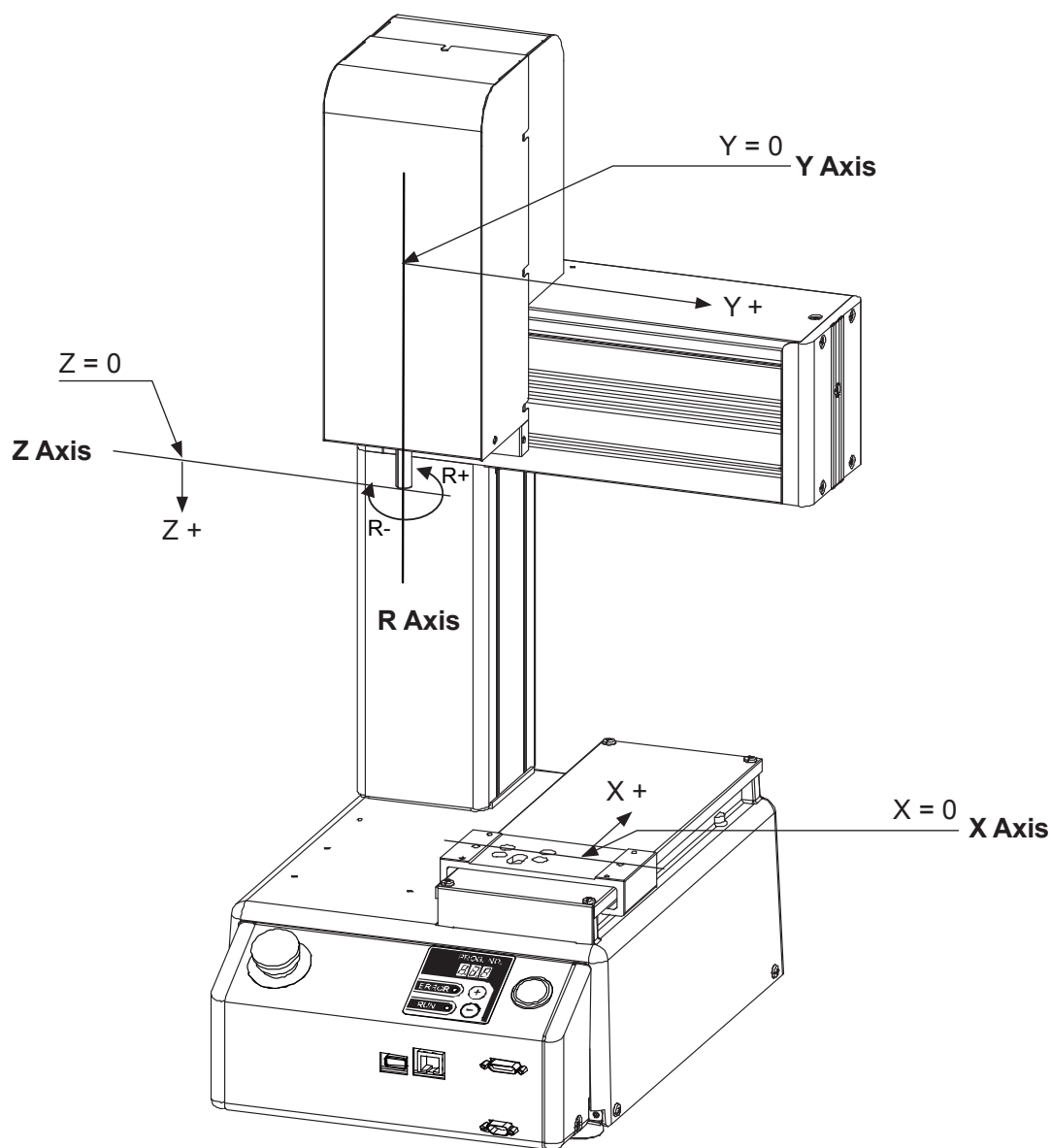
- However, when using a teaching pendant equipped with an enable switch, pressing the **SHIFT** key does not change the axis speed. If using a teaching pendant with an enable switch, press the **F1** (SPEED) key to switch from low → medium → high speed. You can change the moving distance (referred to as a step) and the moving speed for each of the axes with the teaching parameter [JOG Function] (**UTILITY** key).
- The movement of the axes in JOG mode is limited by the move area limit. If an axis is not able to exceed certain coordinates, check [Move Area Limit] in program data.

Key	Function
ESC	This key is invalid when inputting new positions. Returns you to the point settings screen (base screen) when modifying positions.
SHIFT + ESC	Goes to the current point's base screen when editing, and goes to the Point 1 base screen when entering new positions.
F0 (FUNC)	Changes the F1 – F4 key functions. (To change the functions, you must set manual job numbers.)
F3 (MDI)	Switches to MDI Mode*.
F4 (INIT)	Performs mechanical initialization and moves all axes to their absolute coordinates (0, 0)*.

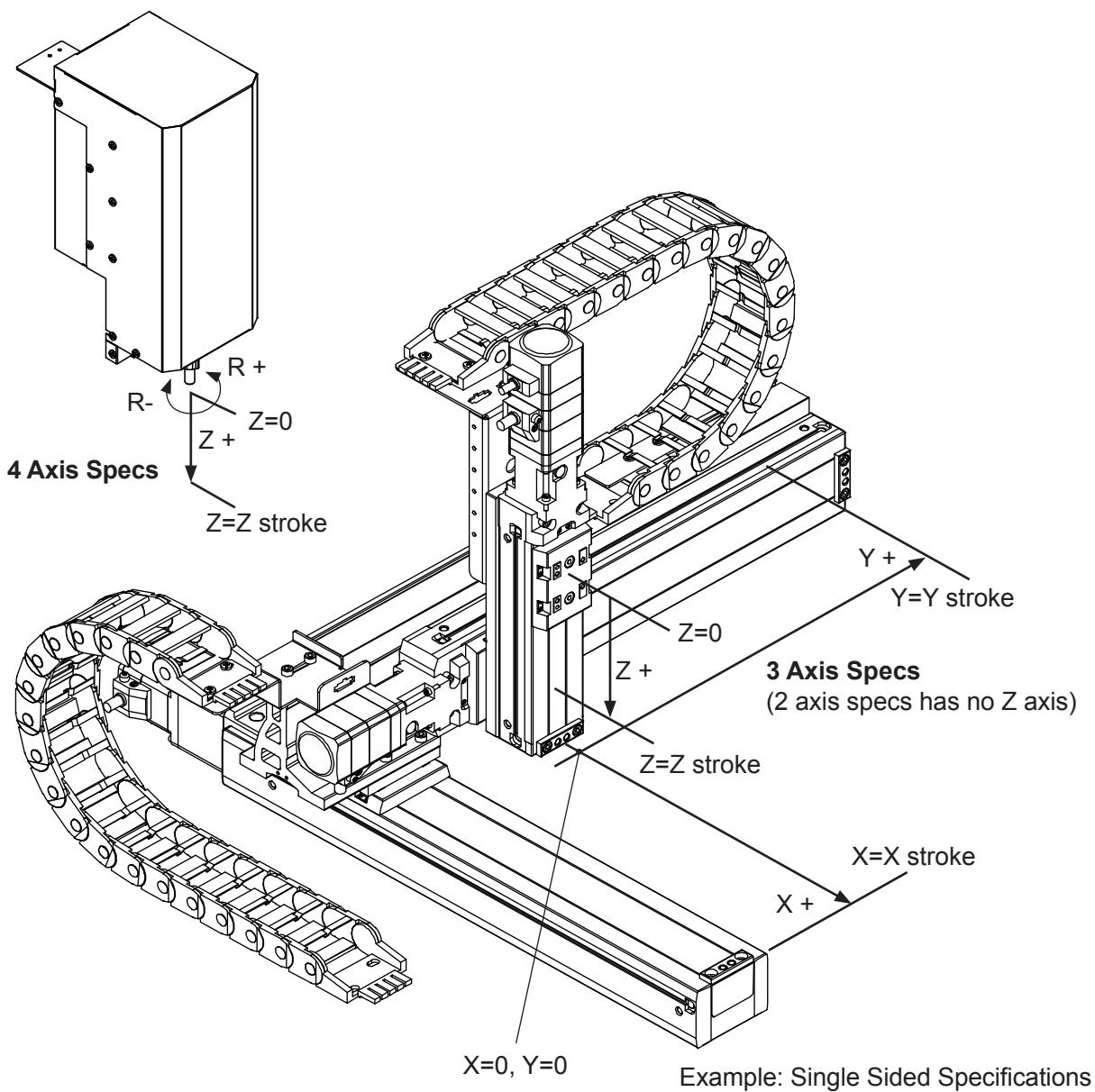
* If you have changed the functions of the **F1** – **F4** keys by pressing the **F0** key, the point jobs assigned to the keys are performed instead. (Manual job)

Key	Function
F4 (W.HOME)	Absolute encoder models only. The robot returns to the work home with this function. The robot returns to the work home even when the axes are located out of the move area limit.
SHIFT + UTILITY	Displays the settings screen for the tool during teaching.
UTILITY	Displays the utility menu.
SHIFT + F3	Copies the specified point number coordinate values.
CTRL + UTILITY	Displays the language selection screen.

■ JR3000 Series Coordinate System
〈Example: JR3204N-AC〉



■ JC-3 Series Coordinate System



(Unit: mm) (Unit: deg)

Robot \ Axis	X Stroke	Y Stroke	Z Stroke	R Axis
2 Axis Single Sided Type	200, 300, 400, 500, 600	200, 300	-	-
2 Axis Double Sided Type	300, 400, 500, 600	300, 400, 500	-	-
3 Axis Single Sided Type	200, 300, 400, 500, 600	200, 300	50, 100, 150, 200	-
3 Axis Double Sided Type	300, 400, 500, 600	300, 400, 500	50, 100, 150, 200	-
4 Axis Double Sided Type	300, 400, 500, 600	300, 400, 500	100, 150	±360

NOTE: The length of each stroke varies depending on robot specifications.

3.5.4 MDI Mode

In MDI Mode, you can enter the coordinate values using the numeric keys. The axes do not move only by entering numerical values. The axes move by pressing the **GO** key.

The screenshot shows the MDI Mode interface. On the left, it displays 'Program 1' and 'Tool' with a cursor '>' on the X-axis. On the right, it shows 'Main Tool' settings for X (0 mm), Y (0 mm), Z (0 mm), and R (0 deg). Below the screen is a control panel with buttons for FUNC, T.TOOL, JOG, MDI (highlighted), and INIT, along with function keys F0 through F4. Annotations explain that values can be entered for items indicated by '>' and that the highlighted indicator (JOG or MDI) is the current mode.

NOTE: INIT appears as W.HOME for JC-3 absolute encoder models.

Key	Function
1 - 0	Overwrites the cursor's current location with the numbers you input. If the cursor is hidden, the digits shift one place to the left and the number pressed is entered as the last digit.
.	Enters a decimal point. This key is invalid if the figure already contains a decimal point or no decimal fraction is possible.
±	Reverses the plus and minus signs. This key is invalid if a negative (-) number is not possible.

NOTE: The above (**1** - **±**) keys, are called numeric keys.

Key	Function
DEL/CLR	Deletes the number or decimal point at the cursor's current location. The cursor and the number on the left side of the cursor move one place to the right. However, the decimal point cannot be deleted if the number exceeds the entry range without the decimal point. If the cursor is hidden, the lowest value is deleted and the values move one place to the right.
SHIFT + DEL/CLR	Clears the entire value. The value becomes 0.
F3	Each time this key is pressed, the cursor line (indicated by ">") switches in the following order: X → Y → Z → R → X.
CURSOR △	Moves the cursor one line upwards.
CURSOR ▽	Moves the cursor one line downwards.
SHIFT + CURSOR △	Moves the cursor to the top most line.

Key	Function
SHIFT + CURSOR ▾	Moves the cursor to the bottom most line.
CURSOR ◀	Moves the cursor one place to the left. If the cursor is hidden, press this key to display the cursor on the rightmost digit. When entering new positions, this moves the cursor to the previous point screen.
CURSOR ▶	Moves the cursor one place to the right. If the cursor is on the lowest digit, pressing this key hides the cursor. This key is invalid if the cursor is hidden.
GO	Moves the axes to the coordinates displayed on the LCD. The “RUN” LED on the teaching pendant does not light up when using the GO key to move the axes.

Caution



Always pay attention to the robot's movements when moving each of the axes with the **GO** key.

Key	Function
ESC	This key is invalid when a new position is entered. Returns to the point settings screen (base screen) when a position is modified.
SHIFT + ESC	Goes to the current point's base screen when editing, and goes to the Point 1 base screen when entering new positions.
F0 (FUNC)	Changes the F1 – F4 key functions. (To change the functions, you must set the manual job numbers.)
F1 (T.TOOL)	You can switch to a different tool for program teaching. Refer to “4.1.6 Tool for Teaching” for further details.
F2 (JOG)	Switches to JOG mode. Also, the coordinates displayed on the LCD are replaced with the current axes position coordinates*.
F4 (INIT)	Performs mechanical initialization and moves the axes to their absolute coordinates (0, 0)*.

* If you have changed the **F1** – **F4** key functions by pressing the **F0** key, the point jobs assigned to the keys are performed instead. (Manual job)

Key	Function
F4 (W.HOME)	Absolute encoder models only. The robot returns to the work home with this function. The robot returns to the work home even when the axes are located out of the move area limit.
SHIFT + UTILITY	Displays the settings screen for the tool during teaching.
UTILITY	Displays the utility menu.
SHIFT + F3	Copies the designated point number coordinate values.
CTRL + UTILITY	Displays the language selection screen.

NOTE:

- Axis movement in MDI Mode is not limited by the move area limit. If a move area limit is required, enter the positions using JOG Mode, or otherwise be careful not to exceed the move area limit.
- If the displayed coordinate values vary from the current axis positions, the coordinate axes (X, Y, Z, or R) which differ are highlighted

4. UTILITY

4.1 Teaching Environment Settings

The environment settings include the following parameters. Press the **UTILITY** key in the Teaching Mode to display the parameters. The three parameters: Screen Contrast, Unit of Measurement, and Display Language, can also be selected in Run Mode, Customizing Mode, and Administration Mode by pressing the **UTILITY** key.

Parameter	Description
Screen Contrast	Adjust the brightness on the teaching pendant LCD.
Unit of Measurement	Select the measurement unit displayed on the LCD: either millimeters [mm] [mm/s] or inches [in] [in/s].
Display Language	Select the LCD display language.
GO Function	Set the moving conditions for each axis when moved by pressing the GO key.
JOG Function	Set the moving speed for each axis when entering positions using the JOG Mode.
Tool for Teaching	Enter the settings for tool data valid only in Teaching Mode.
Manual Job Number Setting	Point jobs set here can be executed in MDI Mode.
Key Click	Select from where a sound is emitted when keys on the operation panel are pressed.
Back Light on Teaching	Disable the teaching pendant LCD backlight in Teaching Mode.
Save on Changing Mode	If you select "Valid" (default), a confirmation screen for saving C&T data is displayed when changing from Teaching Mode to a Run Mode etc.
Coordinates Display	Set this to "Detail" to display coordinates down to their decimal values in the point settings screen.

NOTE: You can select the display language by pressing the **CTRL** + **UTILITY** keys from any mode.

4.1.1 Screen Contrast

Here you can adjust the brightness of the teaching pendant LCD.

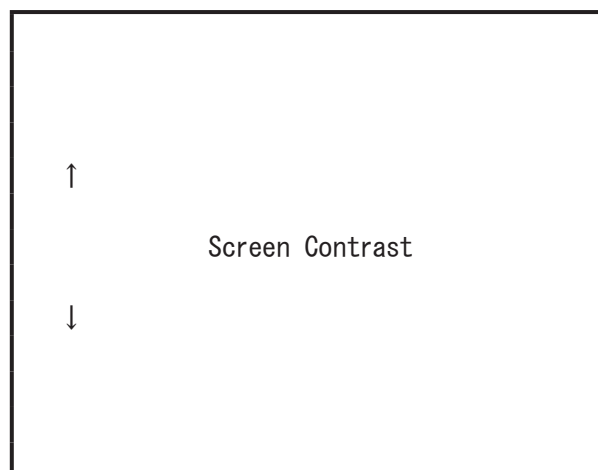
TP **UTILITY** [Teaching Environment]
[Screen Contrast]

CURSOR **△** key: Darker

CURSOR **▽** key: Lighter

ENTR key: Sets the selection

Use the **ENTR** key to select/set selections for all of the items explained hereafter.



4.1.2 Changing the Unit of Measurement

You can select the unit of length displayed on the teaching pendant LCD. Choose from two types: millimeters [mm] [mm/s] or inches [in] [in/s].

TP **UTILITY** [Teaching Environment Settings]
[Unit of Measurement]
[Millimeters [mm] [mm/s]]
[Inches [in] [in/s]]

4.1.3 Changing the Display Language

You can select the language displayed on the teaching pendant LCD from among the following:

TP **UTILITY** [Teaching Environment Settings]
[Display Language]
[English]
[Japanese]
[German]
[Italian]
[Spanish]
[French]
[Korean]
[Simplified Chinese]
[Czech]
[Vietnamese]
[Traditional Chinese]

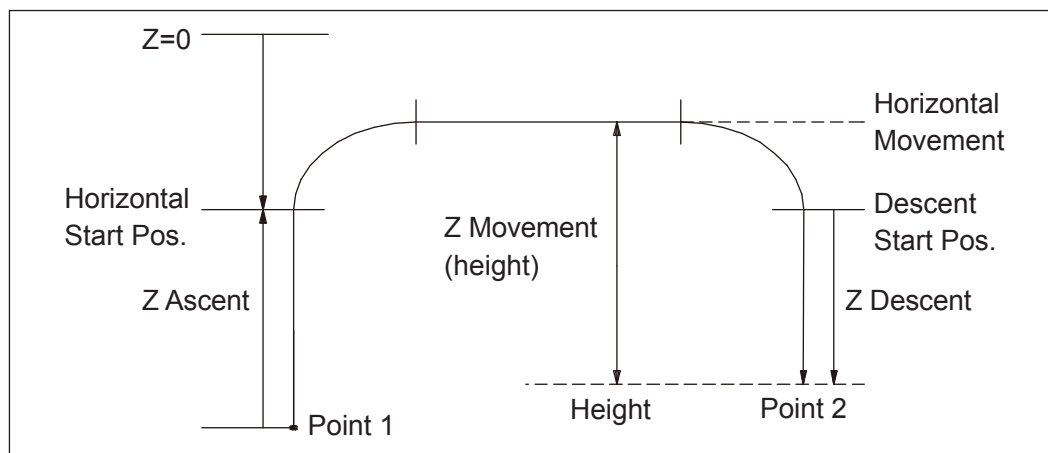
Traditional Chinese can only be displayed on compatible teaching pendants.

With the teaching pendant incompatible with Traditional Chinese, “Unsupported” displays on the right side of the language selection screen. If you select Traditional Chinese, the display language changes to English.

4.1.4 GO Function

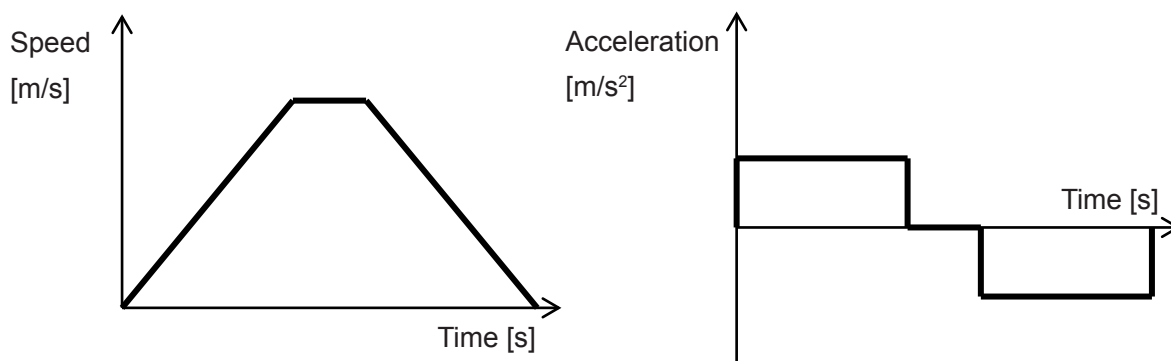
The axes move to the coordinates displayed on the teaching pendant LCD when the **GO** key is pressed while teaching using MDI Mode.

The robot makes a PTP movement with this function. You cannot switch to CP movement. The diagram below is an example of the arch trajectory during this function.



■ JR3000 Series

With the JR3000 Series, the speed and acceleration change (in respect to time) at the start and end of the PTP movement is described in the diagrams below:



TP **UTILITY** [Teaching Environment Settings]
[GO Function]

- [PTP Speed]
- [R-Axis Rotate Speed]
- [R-Axis Acceleration]
- [Relative Mode] / [Absolute Mode]
- [Z Move Height] / [Horizontal Move Pos'n]
- [Z Up Distance] / [Start Horizontal]
- [Z Down Distance] / [Start Down Pos'n]

GO Function		GO Function	
PTP Speed	30 %	PTP Speed	30 %
R-Axis Rotate Speed	15 %	R-Axis Rotate Speed	15 %
R-Axis Acceleration	38 %	R-Axis Acceleration	38 %
	Relative Mode		Absolute Mode
Z Move Height	100 mm	Horizontal Move Pos' n	30 mm
Z Up Distance	100 mm	Start Horizontal	5 mm
Z Down Distance	100 mm	Start Down Pos' n	10 mm

GO Function Selection Screen Example
(when [Relative Mode] is selected)

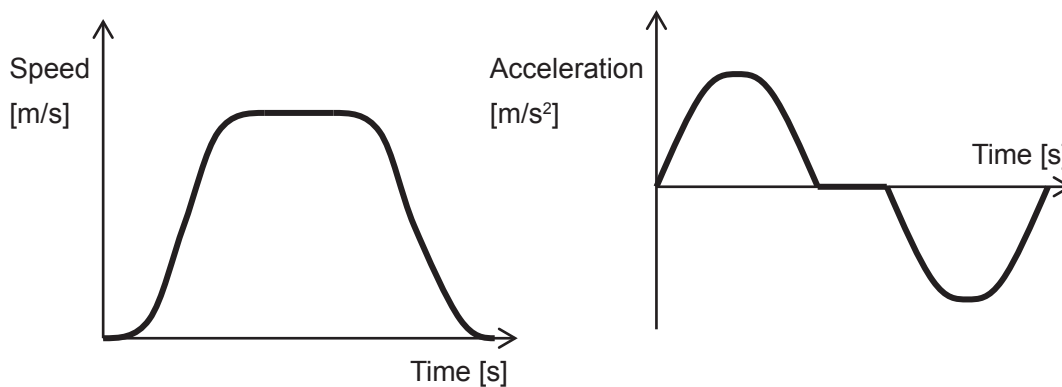
GO Function Selection Screen Example
(when [Absolute Mode] is selected)

Select the item you want to change and then enter the value.

■ JC-3 Series

With the JC-3 Series, you can select the rate of acceleration at the start and end of the PTP movement to occur as either a constant speed or as a smooth transition. If you want the acceleration to change at a constant speed, use the teaching pendant and select [Acceleration Mode] → [Constant]. If you want smooth acceleration, use the teaching pendant and select [Acceleration Mode] → [S-Form].

When [Constant] is selected, the speed and acceleration change (in respect to time) that occurs at the start and end of the PTP movement is the same as with the JR3000 Series. When [S-Form] is selected, the speed and acceleration change (in respect to time) at the start and end of the PTP movement are described in the diagrams below.



[S-Form] PTP Movement (JC-3 only)

Note that if the [PTP Speed] stays the same even if you change the [Acceleration Mode], the arrival time to the target coordinates will be approximately the same.

TP **UTILITY** [Teaching Environment Settings]

[GO Function]

- [PTP Speed]
- [R-Axis Rotate Speed]
- [R-Axis Acceleration]
- [Relative Mode] / [Absolute Mode]
- [Z Move Height] / [Horizontal Move Pos'n]
- [Z Up Distance] / [Start Horizontal]
- [Z Down Distance] / [Start Down Pos'n]
- [Acceleration Mode]

GO Function	
PTP Speed	30 %
R-Axis Rotate Speed	15 %
R-Axis Acceleration	38 %
	Relative Mode
Z Move Height	100 mm
Z Up Distance	100 mm
Z Down Distance	100 mm
Acceleration Mode	S-Form

GO Function Selection Screen Example
(when [Relative Mode] is selected)

GO Function	
PTP Speed	30 %
R-Axis Rotate Speed	15 %
R-Axis Acceleration	38 %
	Absolute Mode
Horizontal Move Pos' n	30 mm
Start Horizontal	5 mm
Start Down Pos' n	10 mm
Acceleration Mode	S-Form

GO Function Selection Screen Example
(when [Absolute Mode] is selected)

Select the item you want to change and then enter the value.

Menu items related to the Z axis may appear for 2 axis specifications; however settings made for these items are not applied.

Reference

With [S-Form] (A_p), the robot moves at a peak acceleration of $\pi/2=1.57$ in comparison to [Constant] (A_c). If the acceleration time is expressed as T_u [s] and the arrival speed is expressed as V_m [m/s], the rate of velocity ($A(t)$ [m/s²]) and the speed $V(t)$ [m/s] can be shown as follows:

$$A(t) = A_c \quad : \text{ Constant}$$

$$A(t) = A_p \cdot \sin(\omega t) \quad : \text{ S-Form}$$

$$\omega = \pi/T_u$$

$$A_p = (\pi/2) \cdot A_c$$

$$V(t) = A_c \cdot t = V_m \cdot (t/T_u) \quad : \text{ Constant}$$

$$V(t) = (V_m/2) \cdot (1 - \cos(\omega t)) \quad : \text{ S-Form}$$

Note that the initial speed is calculated as $V_0=0$ [m/s] for the above calculation.

However, this is not entirely true with actual robot operations, as there is a slight initial speed.

4.1.5 JOG Function

You can select the speed and distance (step) at which the axes move during teaching in JOG Mode. Menu items related to the R axis may appear for 2 axis and 3 axis specifications; however settings made for these items are not applied.

TP UTILITY [Teaching Environment Settings]
[JOG Function]

■ Speed/Distance Settings

Here you can specify the speed and distance.

Select the item for which you want to specify speed/distance from [Low Speed] to [R-Axis High Step]. The number entry screen for the selected item is displayed. Enter and set the speed/distance.

The speed/distance entered here becomes the axes' speed/distance when teaching in JOG Mode.

NOTE:

- You cannot set values higher than the values set in High Speed for Medium Speed, or set values higher than the values set in Medium Speed for Low Speed.
- The X, Y, Z and R Jog Key Direction Reverse functions are only available for the JC-3 Series.

JOG Function		1/2
Low Speed		3 mm/s
Medium Speed		10 mm/s
High Speed		20 mm/s
Low Step		0.05 mm
Middle Step		0.2 mm
High Step		0.5 mm
R-Axis Low Step		0.1 deg
R-Axis Middle Step		0.2 deg
R-Axis High Step		1 deg
X Jog Key Direction Reverse		Invalid
Y Jog Key Direction Reverse		Invalid
Z Jog Key Direction Reverse		Invalid

JOG Function		2/2
R Jog Key Direction Reverse		Invalid
R Axis Key Action	RXY Simultaneous Move	

Example: JC-3 Series

■ JOG Key Direction Reverse Function (JC-3 Series only)

You can use the JOG key direction reverse function to switch the movement direction of each axis by setting the keys to [Reverse].

JOG Key	Setting
X JOG key	Invalid/Reverse
Y JOG key	Invalid/Reverse
Z JOG key	Invalid/Reverse
R JOG key	Invalid/Reverse

■ R Axis Key Action

With this setting you can point the tool tip to a specific point and move the X, Y, R axes simultaneously when you want to rotate the R axis using JOG teaching.

You can use the following two settings with [R Axis Key Action]:

R Single Move: Move only the R axis when rotating the R axis using JOG teaching (default setting).

RXY Simultaneous Move: Move the X, Y, R axes simultaneously with the tool tip pointed to a specific point when rotating the R axis using JOG teaching.

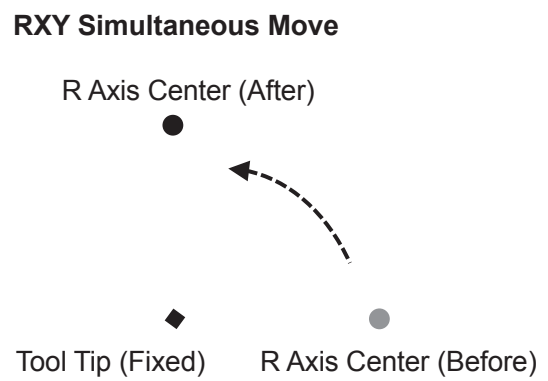
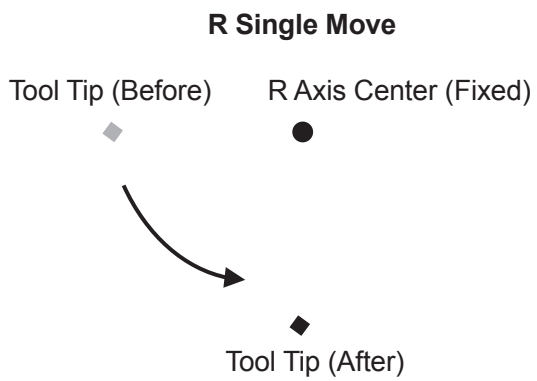
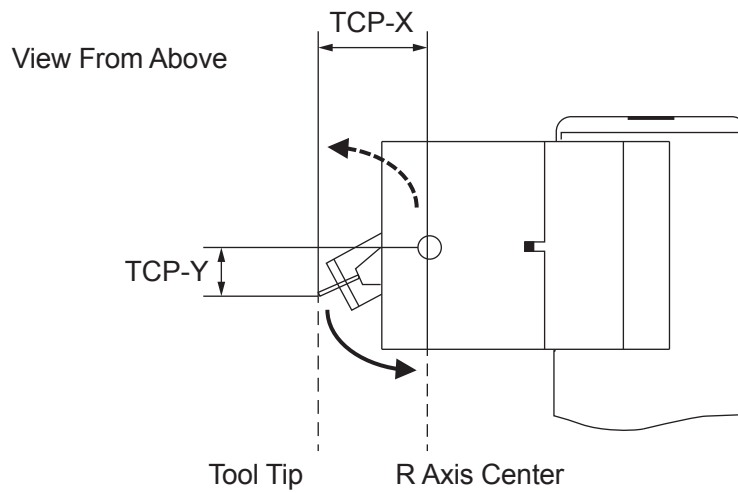
The default setting for [R Axis Key Action] is [R Single Move].

If using [RXY Simultaneous Move], you need to set TCP-X and TCP-Y in advance, as the robot calculates the movement amount for the R, X, Y axes based on the position of the R axis center and tool tip.

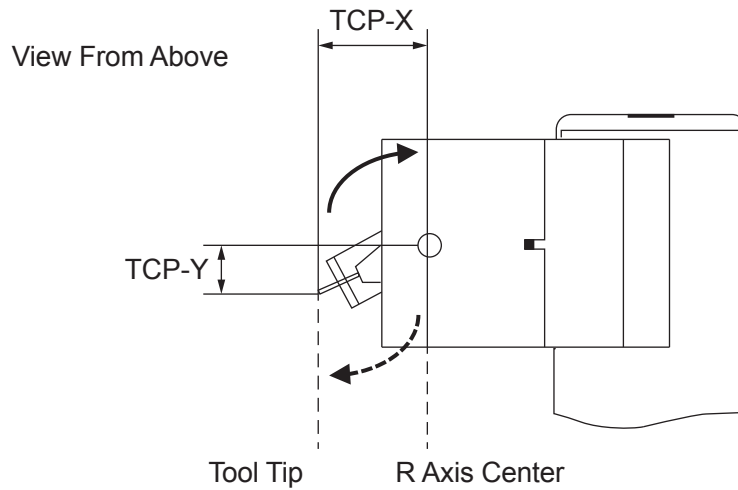
NOTE:

- When set to [RXY Simultaneous Move], the R, X, Y axes operate almost simultaneously which may cause the robot to move slower than the set JOG speed (R-Axis Low/Middle/High Step).
- When set to [RXY Simultaneous Move], the tool tip remains fixed in place at the specified point for the most part, but it may deviate depending on the TCP-X and TCP-Y settings.

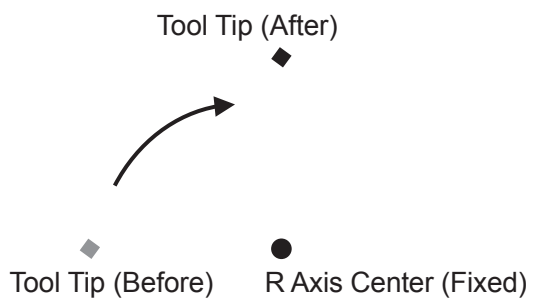
- R+ Direction Key Movement
 [R Single Move] (solid arrow) / [RXY Simultaneous Move] (dotted arrow) when the R axis is rotated in the + direction:



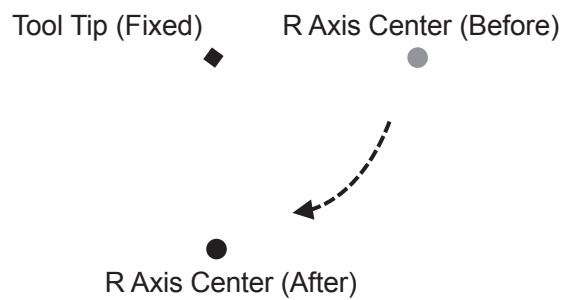
- R – Direction Key Movement
 [R Single Move] (solid arrow) / [RXY Simultaneous Move] (dotted arrow) when the R axis is rotated in the – direction:



R Single Move

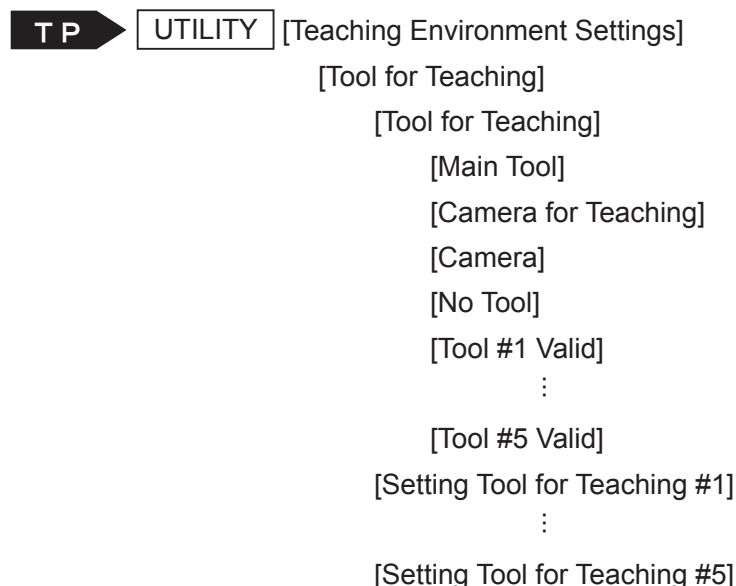


RXY Simultaneous Move



4.1.6 Tool for Teaching

The Tool for Teaching setting is used to specify which tool you are using to teach point positions. Teach positions by first switching the tool for teaching to the appropriate tool. For example, if you want to teach positions using a tool that acts as the main tool for jobs, such as a dispensing syringe or screwdriver, switch Tool for Teaching to [Main Tool] before teaching the positions.



You can change the tool for teaching using the **F2** key (T.TOOL) on the Teaching Mode base screen or the **F1** key (T.TOOL) on the position entry screen.

■ Tool for Teaching Selections

Item	Details
Main Tool	This selects the main tool data and applies the main tool when teaching. Select this if you want to teach points and positions using the main tool (needle, etc) tip as a reference.
Camera for Teaching	Select this when you want to teach while viewing the camera imaging area in JR C-Points II. You do not need to select this when teaching using the teaching pendant.
Camera	This selects the camera tool data and applies the camera tool TCP when teaching. Select and teach with this when you want to check the imaging position used for camera adjustments.
No Tool	The tool data TCP values are all set to zero. Select this if you want to teach a Single Camera Shoot Point or a point without applying a TCP from a tool, such as when configuring the robot and camera.
Tool #1 Valid – Tool #5 Valid	Tools #1 – #5 are used when you want to teach with a tool other than the camera or main tool. If you do not want to attach a tool other than the camera or main tool, there is no need to select this.

■ Corresponding Tool Data for the Teaching Tool

Before teaching with a teaching tool, you need to set each teaching tool with the appropriate tool data.

You can set the tool data using the following screens.

Tool Data	Screen
Camera	Camera Configuration
Main Tool	Main-Tool Configuration
Camera for Teaching	Camera Configuration for Teaching in JR C-Points II
Tool #1 to Tool #5	[Setting Tool for Teaching #1] to [Setting Tool for Teaching #5] in Teaching Environment Setting

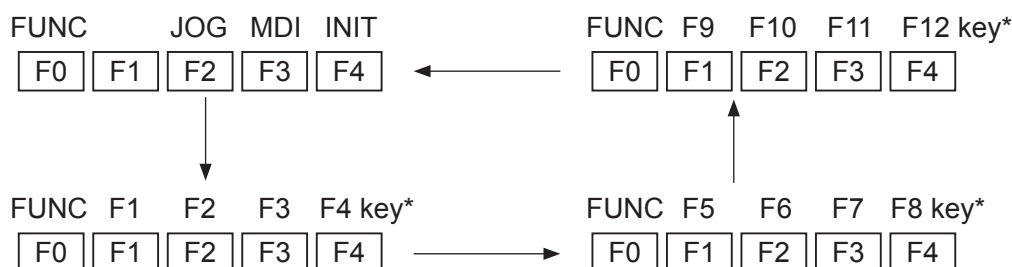
4.1.7 Manual Job Number Setting

You can set up to 3 point job numbers (12 total) for each of the **F1**, **F2**, **F3** and **F4** keys. For example, when teaching a program to perform a pick & place operation, if you set a point job number for closing the hand tool to the **F1** key, you can check during program teaching to see if the hand tool can actually pick up the workpiece at the registered position.

TP **UTILITY** [Teaching Environment Setting Settings]
 [Manual Job Number Setting]
 [F1 Key Job Number]
 :
 [F12 Key Job Number]

Set point job numbers to [F1 Key Job Number] – [F12 Key Job Number] to perform these registered point jobs at the position entry screen in Teaching Mode. Note however, you cannot use these unless you switchover the functions with the **F0** (FUNC) key.

Each time the **F0** (FUNC) key is pressed on the position entry screen, the **F1**, **F2**, **F3** and **F4** key functions change as shown below. However, the function does not change if there is no point job number set to [F1 Key Job Number] – [F12 Key Job Number].



* The screen shows the point job numbers set to each key.

Example: 003 = Point job number 3

Select the key to where you want to set point job data.

Once selected, the Point Job Number entry screen appears.

Enter the point job number you want and set it.

Manual Job Number Setting	
F1 Key Job Number	3
F2 Key Job Number	4
F3 Key Job Number	0
F4 Key Job Number	8
F5 Key Job Number	12
F6 Key Job Number	13
F7 Key Job Number	0
F8 Key Job Number	0
F9 Key Job Number	15
F10 Key Job Number	6
F11 Key Job Number	0
F12 Key Job Number	0

After setting the point job numbers, press the **F0** (FUNC) key on the position entry screen.

The indicators on the last line will change from [FUNC], [JOG], [MDI], and [INIT] to the point job numbers set to the **F1**, **F2**, **F3** and **F4** keys as shown to the right.

Press the **F1**, **F2**, **F3** or **F4** key. The robot performs the point job data set to the corresponding key.

Program 1	P1
X	0 mm
Y	0 mm
Z	0 mm
R	0 deg
FUNC	003 004 008
F0	F1 F2 F3 F4

NOTE:

- If the point job number is set as “0”, this means there is no point job data set and the number does not appear on the position entry screen.
- The **F0** (FUNC) key is invalid if no point job data is set for any of the [F1 Key Job Number] – [F12 Key Job Number] (point job number “0” is set to the keys).

Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

4.1.8 Key Click

With this, you can select the location from where the click sound comes when any key on the operation panel is pressed.

TP **UTILITY** [Teaching Environment Settings]

[Key Click]

[Robot: OFF TP Panel: OFF]

[Robot: ON TP Panel: OFF]

[Robot: OFF TP Panel: ON]

[Robot: ON TP Panel: ON]

- Robot : OFF Panel : OFF : No sound
- Robot : ON Panel : OFF : Emits sound only from the robot
- Robot : OFF Panel : ON : Emits sound only from the teaching pendant
- Robot : ON Panel : ON : Emits sound from both the robot and the teaching pendant

4.1.9 Back Light on Teaching

Select [OFF] to disable the teaching pendant LCD backlight in Teaching Mode.

TP **UTILITY** [Teaching Environment Settings]

[Back Light on Teaching]

[ON]

[OFF]

NOTE: To turn OFF the LCD backlight when in Run Mode refer to [“12. LCD BACKLIGHT ON/OFF.”](#)

4.1.10 Save on Changing Mode

Set these settings to [Valid] (default) to display a confirmation screen for saving C & T data (if there are changes) when changing from Teaching Mode to Ext. Run or Switch Run Mode. Select [YES] to save the data and [NO] to discard the data.

TP UTILITY [Teaching Environment Settings]
 [Save on Changing Mode]
 [Valid]
 [Invalid]

4.1.11 Coordinates Display

Set this setting to [Detailed Display] to have a coordinate value display with one line and up to three decimal places per axis (up to two decimal places for the R axis) on the point settings screen. The default setting is [Normal Display].

TP UTILITY [Teaching Environment Settings]
 [Coordinates Display]
 [Normal Display]
 [Detailed Display]

Program 1				P1
Tool	Main Tool			
X+5	Y+260	Z+20	R+25	
Type	CP Start Point			
Line Speed	50 mm/s			
S.MARK	E.MARK	T.TOOL	J.EXEC	P.EXEC

Point Settings Screen Example
Normal Display

Program 1				P1
X	5.255 mm			
Y	260.352 mm			
Z	20.25 mm			
R	25.36 deg			
Type	CP Start Point			
Line Speed	50 mm/s			
S.MARK	E.MARK	T.TOOL	J.EXEC	P.EXEC

Point Settings Screen Example
Detailed Display

4.2 Test Menu

4.2.1 Check Data

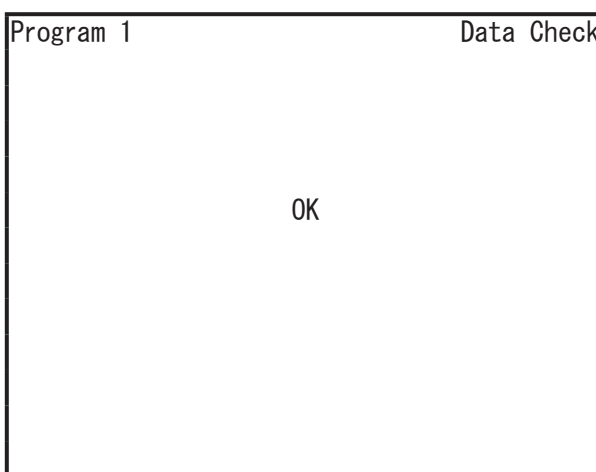
When registering a new program or making adjustments or modifications to programs, always perform [Check Data] before running the program.

TP  **UTILITY** [Test Menu]
[Check Data]

Press the **UTILITY** key to display the test menu. Select [Check Data] from the test menu and a check of the currently selected program starts. Depending on the program, it may take some time to complete the process.

If there is no problem, the screen to the right is displayed. The screen returns to the test menu after a few moments.

NOTE: When an error is detected and you are on the data check results screen, if you press any key other than the **SHIFT**, **CTRL**, or **ESC** keys, the result data for the error point following the current error point is displayed. If there are no error points following the current error point, the screen reverts to the Test Menu. The **SHIFT** and **CTRL** keys are invalid. Pressing the **ESC** key returns you to the Test Menu even if you are not at the end of the result display.



Data Check Results Screen Example

■ Point Type Errors

If there is a problem with the [Type] of the registered point, an error occurs and the message “Point Type Error” is displayed on the screen.

The following describes possible error causes. Check the point types for the points around the error point.

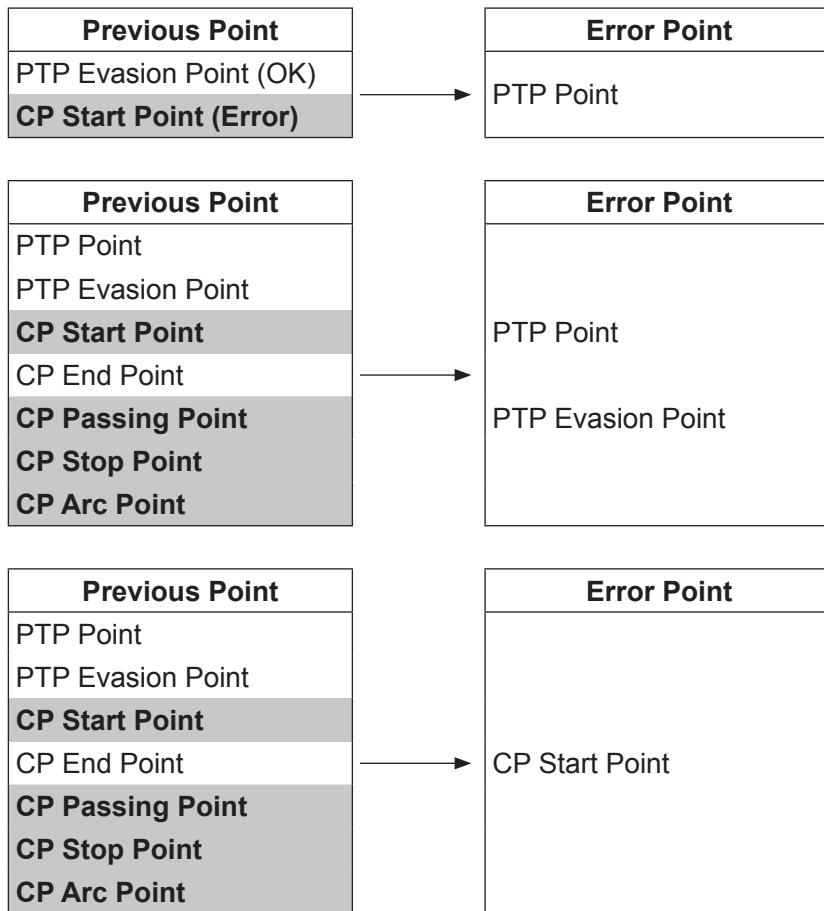
■ Error Causes

If the points are aligned as shown in the highlighted gray () sections on the next page, an error will occur.

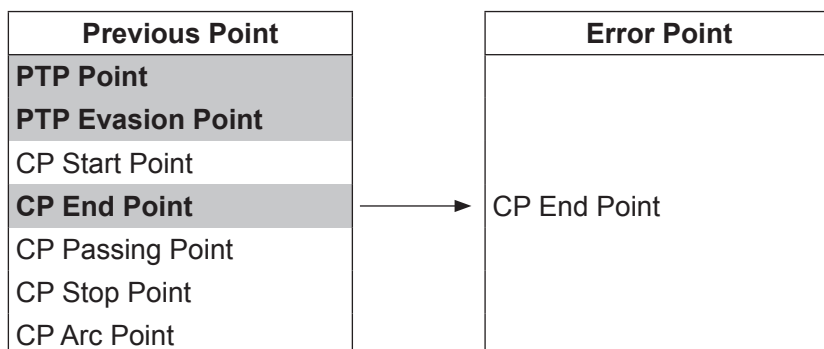
For example, a point type error occurs if a point is set as a PTP point when the previous point is a CP start point. If the previous point is a PTP evasion point, an error will not occur.

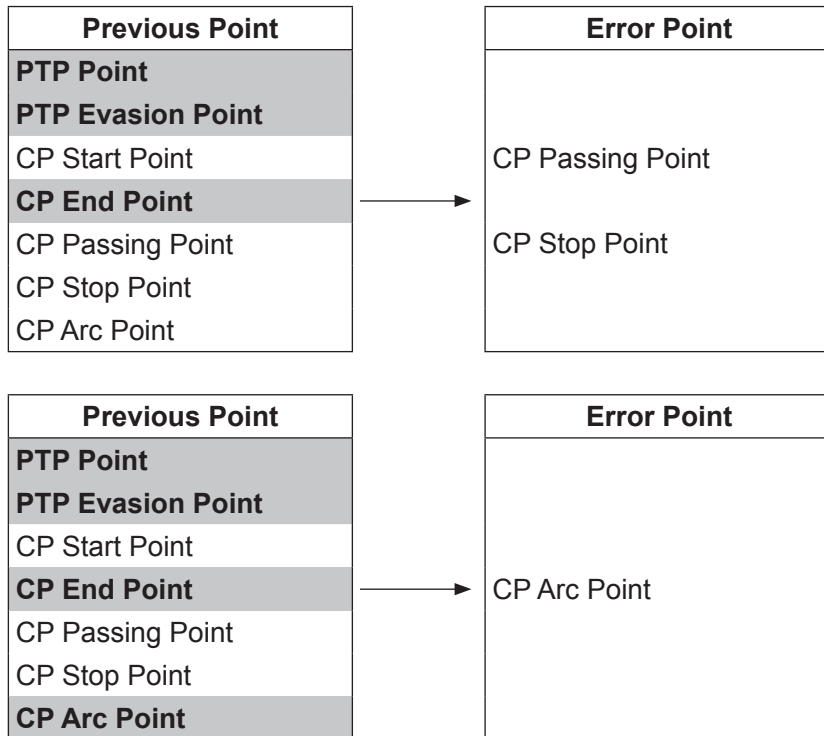
NOTE: For error details, refer to “10. Error Message List” in the operation manual *Maintenance* for the JR3000 Series, “11. Error Message List” in the operation manual *Maintenance* for the JC-3 Series.

Example



If there is no CP End Point before the end of a program that contains a CP Start Point, an error occurs.





To correct these point type errors, change the point type of the previous point or insert a new point if needed.

■ “Position is Out of Range”

If the registered position coordinates exceed the operating range or the move area limit of the robot, an error occurs and the message “Position is Out of Range” is displayed when you perform a data check.

Correct the error by using one of the following procedures:

■ Edit the position coordinates

Display the settings screen for the point where the error occurred and select the coordinates. Enter the new coordinates.

■ Edit the move area limit (if the point exceeds the move area limit)

1. Press the **MENU** key on the base screen for the program that you wish to modify. Select [All Program Common Settings] from the Menu.
2. Select [Move Area Limit].
3. Enter a new move area limit and set it.

NOTE: You cannot set values greater than the default values (maximum values)

4.2.2 Test Run

Select [Test Run] when you want to check the movement for a newly registered or modified program before performing an actual run.

The test run speed is limited so it will not exceed 250 mm/s for safety reasons. However, other than this, the robot performs one cycle of a test run (including the registered point job data and additional function data) the same as for an actual run.

NOTE: If cycle mode is set to [Continuous Playback], the robot runs continuously.

Be sure to execute [Check Data] and then [Test Run] before an actual run when you register a new program or modify a registered program.

Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

TP  **UTILITY** [Test Menu]
[Test Run]

Select [Test Run] from the Test Menu to display the test run standby screen as shown to the right.

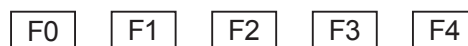
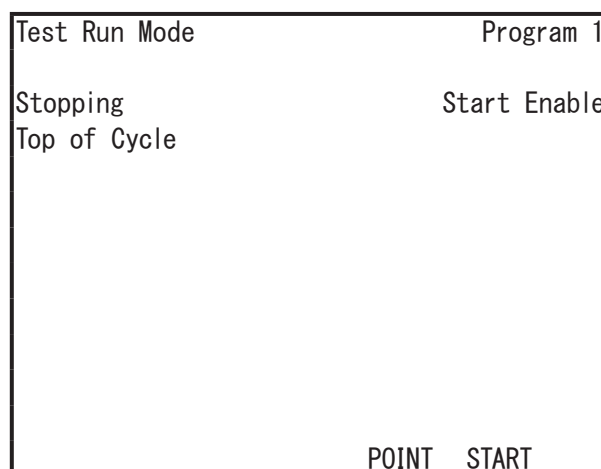
Press the **F4** (START) key. The test run starts.

Check to see whether the program is performed the same as it was entered.

Press the **F3** (POINT) key to perform a point run.

For information on point runs, refer to “12.4 Point Run” in the operation manual *Basic Instructions*.

Refer to [“8.10 Display Point No.”](#) for details regarding displaying the point number during a test run.



Test Run Standby Screen

The **PRG.NO** and **MENU** keys can be used in the same way as with Switch Run Mode and External Run Mode. Press the **PRG.NO** key to select the program you want to confirm.

Press the **MENU** key to set the Run Mode menu.

You can set a PTP speed override in the Run Mode menu. For information on PTP speed override, refer to “10.5 PTP Speed Override” or “11.5 PTP Speed Override” in the operation manual *Basic Instructions*.

NOTE:

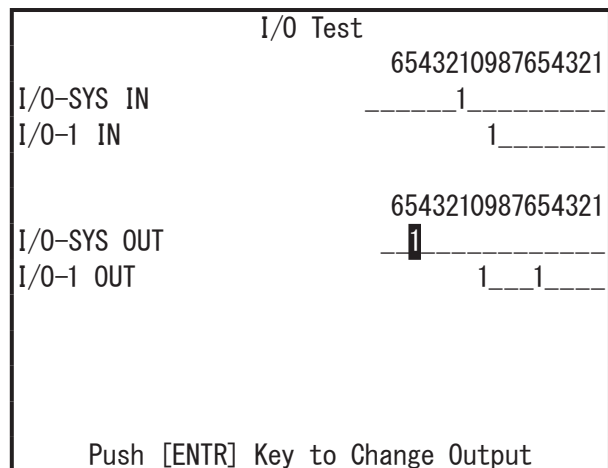
- If [Program Number Switching Method] in [All Program Common Settings] → [I/O Settings] is set to [Load at Start (I/O-SYS)], the I/O-SYS program number settings are applied when a run starts (including test runs).
If you have connected a device to the I/O-SYS that can change program numbers, change the program number settings on the device to the number you want to run before starting the test run.
- Do not set the start/stop switch to invalid if the robot is set to continuous playback, as the only way to stop the robot with this combination is by an emergency stop.

4.2.3 I/O Connection Test

TP **UTILITY** [Test Menu]
[I/O Test]

Select [I/O Test] from the Test Menu to display the I/O-SYS and I/O-1 input/output statuses on the LCD. Check that the input/output statuses are correct. Pressing the **ENTR** key switches the output signal the cursor is on, ON/OFF.

Press the **ESC** key to return to the Test Mode Menu.

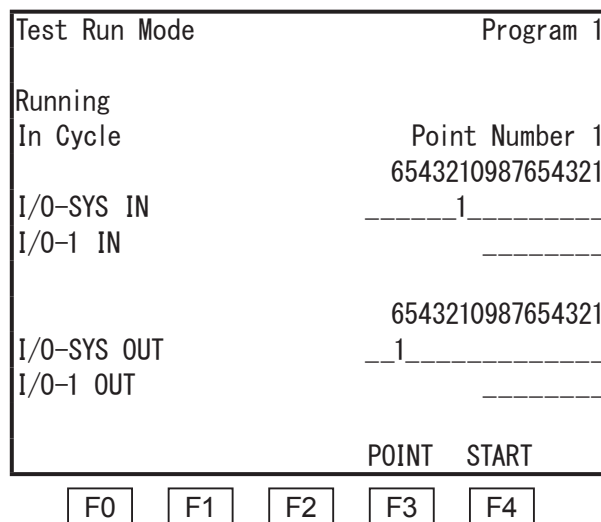


4.2.4 Test Run (Check I/O)

TP **UTILITY** [Test Menu]
[Test Run (Check I/O)]

Select [Test Run (Check I/O)] from the Test Menu to display the Test Run (Check I/O) standby screen. Press the **F4** (START) key to start the test run.

Selecting [Test Run (Check I/O)] displays the test run while also showing the I/O-SYS and I/O-1 input/output statuses on the LCD.



Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

Press the **F3** (POINT) key to perform a point run. For information on point runs, refer to “12.4 Point Run” in the operation manual *Basic Instructions*. The **PRG.NO** and **MENU** keys can be used in the same way as with Switch Run Mode and External Run Mode. Press the **PRG.NO** key to select the program you want to confirm. Press the **MENU** key to set the Run Mode menu. You can set a PTP speed override in the Run Mode menu. For information on PTP speed override, refer to “10.5 PTP Speed Override” or “11.5 PTP Speed Override” in the operation manual *Basic Instructions*.

NOTE:

- If [Program Number Switching Method] in [All Program Common Settings] → [I/O Settings] is set to [Load at Start (I/O-SYS)], the I/O-SYS program number settings apply when a run starts (including test runs).

If you have connected a device to the I/O-SYS that can change program numbers, change the program number settings on the device to the number you want to run before starting the test run.

- Do not set the start/stop switch to invalid if the robot is set to continuous playback, as the only way to stop the robot with this combination is by an emergency stop.

NOTE:

- If [Program Number Switching Method] in [All Program Common Settings] → [I/O Settings] is set to [Load at Start (Fieldbus)], the fieldbus program number settings apply when a run starts (including test runs).

If you have connected a device to the fieldbus that can change program numbers, change the program number settings on the device to the number you want to run before starting the test run.

- Do not set the start/stop switch to invalid if the robot is set to continuous playback, as the only way to stop the robot with this combination is by an emergency stop.

4.2.7 Check I/O (Fieldbus)

TP **UTILITY** [Test Menu]
[Check I/O (Fieldbus)]

Press **UTILITY** select [Test Menu] and then select [I/O Test (Fieldbus)]. The fieldbus input/output statuses are displayed as a unit of word data.

Check that the input/output statuses are correct.

Press the **ESC** key to return to the Test Menu.

	Check I/O (Fieldbus)				1/7
	+0	+1	+2	+3	
100	AAAA	5555	000F	0000	
104	0000	0000	0000	0000	
108	0000	0000	0000	0000	
10C	0000	0000	0000	0000	
110	0000	0000	0000	0000	
114	0000	0000	0000	0000	
118	0000	0000	0000	0000	
11C	0000	0000	0000	0000	
120	0000	0000	0000	0000	
124	0000	0000	0000	0000	
	Bit				
	F1				

CURSOR **△** , **CURSOR** **▽** : Changes to the next/previous page.

SHIFT + **CURSOR** **△** : Moves to the 1st page.

SHIFT + **CURSOR** **▽** : Moves to the 7th page.

NOTE: With the bit data display, there are 10 pages.

If you press the **F1** (Bit) key on the word data display, the screen switches from word data units to bit data units.

Press the **ESC** key to return to the word data display.

NOTE: This function displays all of the fieldbus input/output ranges regardless of the fieldbus modular type and data setting range.

Check I/O (Fieldbus)		1/26
FEDCBA9876543210		
100	1_1_1_1_1_1_1_1_	[AAAA]
101	_1_1_1_1_1_1_1_1	[5555]
102	_____1111	[000F]
103	_____	[0000]
104	_____	[0000]
105	_____	[0000]
106	_____	[0000]
107	_____	[0000]
108	_____	[0000]
109	_____	[0000]

4.3 MEMORY Port

Insert a commercially sold USB memory (Ver. 2.0) into the Memory Port to record robot data. For details regarding precautions when using the memory port, refer to “14.1 USB Memory Usage Precautions” for JR3000 robots or “8.1 USB Memory Usage Precautions” for JC-3 robots in the operation manual *Specifications*.

4.3.1 MEMORY Port Menu

Press the **UTILITY** key on the Teaching Mode base screen. From the Utility menu, move the cursor to MEMORY Port and press the **ENTR** key to display the MEMORY Port menu, as shown to the right.

TP **UTILITY** [MEMORY Port]

Select Item
Write USB Memory
Read USB Memory
Save Error Log to USB Memory
Format USB Memory

Menu Item	Details
Write USB Memory	Writes C&T data stored on the robot to the designated folder on the USB memory device.
Read USB Memory	Reads the C&T data from the designated folder on the USB memory device and copies it to the robot.
Save Error Log to USB Memory	Saves the robot error history to the designated folder on the USB memory device.
Format USB Memory	Formats the USB memory device. Execute this function to delete all of the data on the USB memory device.

NOTE:

- The memory port menu is only displayed when a USB memory device is connected.
- C&T data files written to USB memory can be written to and read using the PC software JR C-Points II.
- Always make sure to insert/remove the USB memory using the MEMORY Port screen. Do not insert/remove the USB memory while the message is displayed and the robot is reading/writing.

4.3.2 Write to USB Memory (C&T Data)

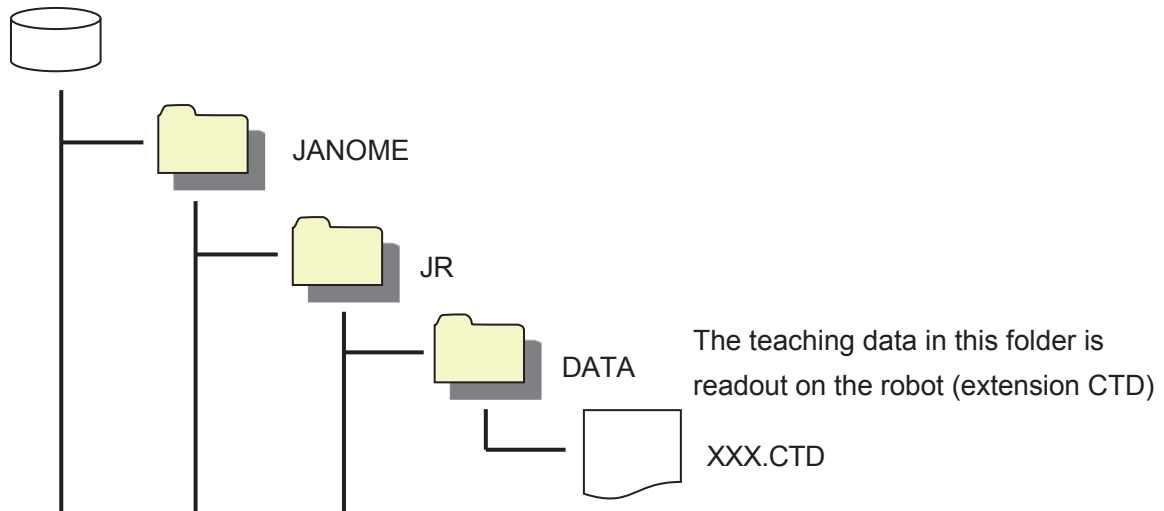
When you execute this function, a screen for entering the save file name is displayed. On this screen, the save file is given a default save file name. You can also change this save file name to a name of your choice.

For further information, refer to “1.1.1 Write Teaching Data to USB Memory” in the operation manual *Maintenance*.

4.3.3 Read from USB Memory (C&T Data)

With this function you can read teaching data from the USB memory.

The teaching data backup file is read from the DATA folder in the following folder configuration:



If there is no data in the DATA folder, an error occurs. Teaching data can be read from the DATA folder if there are 1 or more files contained within the folder. You can select the file you want from among multiple files.

NOTE:

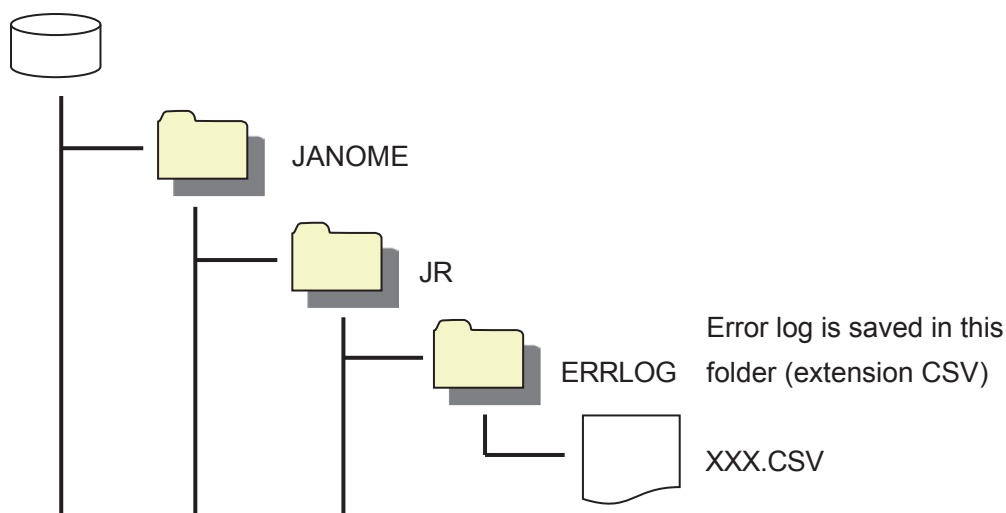
- If you change the folder name, the data cannot be read.
- You can also read teaching data written to USB memory using the PC software JR C-Points II. For details on how to use the PC software, refer to the operation manual *PC Operation*.

4.3.4 Save Error Log to USB Memory

When you execute this function, a screen for entering the save file name is displayed. On this screen, the save file is given a default save file name. You can also change this save file name to a name of your choice. The default name is set with the date and time settings set in Administration Settings Mode. The default status of the save file name is as follows:

“ErrorLog_YYYYMMDD” (Y: year, M: month, D: day)

The following folder configuration is created, in which the error log is recorded:



The saved file can be opened in Microsoft Excel® or a text editor, etc.

4.3.5 Format USB Memory

For devices which are already formatted to the FAT format on a PC, etc., you can format (erase the data) using the robot.

(You cannot do this with USB memory devices in a format other than FAT. Use a PC to format the device to FAT format.)

4.4 Error History

You can view error history by pressing the **UTILITY** key at the base screen of Teaching Mode and selecting [Error History] from the menu.

TP **UTILITY** [Error History]

Error History				Error Description	
2015	1/15	12:20	45	Error No.001	2015 1/15 12:20 45 Error No.001
2015	1/15	15:20	32	Error No.082	
2015	1/16	09:20	20	Error No.082	
				Error No.001 Enter the number of a registered program	

For further details regarding error notification and error history, refer to the operation manual *Maintenance*.

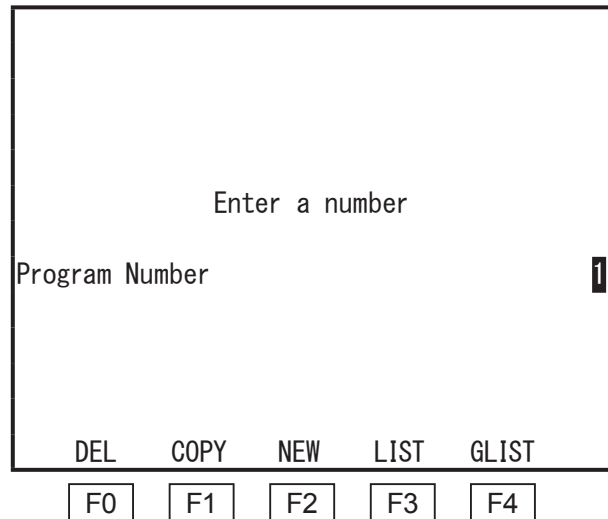
5. PROGRAM SELECTION (PRG.NO)

By calling up and running programs, you can make the robot perform various operations.

Press the PRG.NO key on the base screen either in Teaching, External Run, or Switch Run mode.

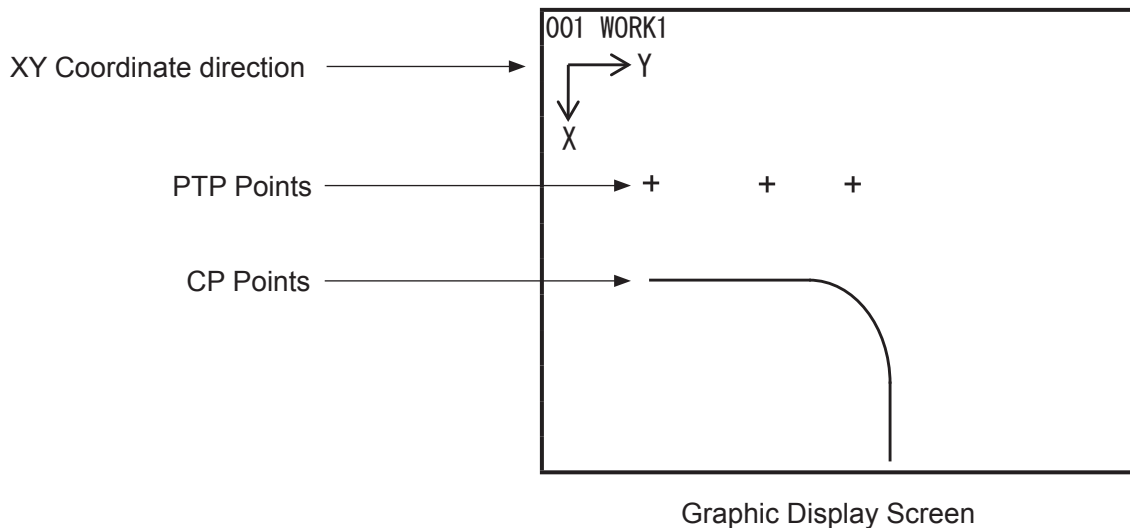
The Program Number entry screen (in Teaching Mode, in this example) shown to the right appears.

Enter a program number to select the program.



NOTE: The F0 (DEL), F1 (COPY), F2 (NEW), and F4 (GLIST) keys are enabled only in Teaching Mode. In External Run Mode and the Switch Run Mode, only the F3 (LIST) key is enabled (the others are invalid and do not appear on the display).

Key	Function
F0 (DEL)	This displays a number entry screen for program deletion. Enter the program number that you want to delete.
F1 (COPY)	This displays a number entry screen for the program copy source number. Enter the source program number and then enter the destination program number. The contents of the source program are copied to the destination program number.
F2 (NEW)	This displays an unregistered program number list. Select a number from the list. The new position entry screen for the first point (Point 1) of the selected program appears.
F3 (LIST)	This displays a registered program number list. Select a number from the list. The settings screen for point 1 of the program appears.
F4 (GLIST)	This displays the program for the currently selected number as a graph. These graphs make it easy to differentiate between individual programs.



NOTE:

- The graphic display screen is a function to allow users to get an overview of the program. Point positions, lines, and arcs may not be displayed correctly; Point positions may appear slightly out of place, and lines and arcs may appear pixelated.
- CP start point to CP end point strings appear as a single line in the graphic display. Also note that dispensing specifications display only the outer circumference of an area which is filled in. For example, if filling in a donut shaped area (an empty center), the shape is displayed not as ● or ⊙ , but as ○ .

■ The keys are enabled as follows in the graphic display screen function.

Key	Function
CURSOR ▾ CURSOR ▸	Displays an existing program for the next largest number from the currently displayed program. This key is disabled if there are no programs following the current one.
CURSOR △ CURSOR ◀	Displays an existing program for the next smallest number from the currently displayed program. This key is disabled if there are no programs preceding the current one.
ENTR	Displays the point settings screen (base screen) for the currently displayed program.
ESC	Returns to the program number entry screen.
SHIFT + CURSOR	Shows the smallest/largest program.

6. POINT RUN

In Teaching Mode, you can run any individual point. (Point Run)

As you can run points at your discretion, you can run a singled point which is in the middle of a given program.

The robot will perform operations such as point jobs and additional functions in exactly the same way as in Ext. Run/Switch Run Mode. This function is useful for checking the “Execute Condition” etc., and in some circumstances, you can check points which are executed in different programs. The maximum speed during a point run is limited to 250 mm/s.

If you set the point job data or PLC program etc. to wait for a start signal from I/O-1, etc., the robot will also wait for a start signal when running points in Teaching Mode.

Caution



Take care as performing a point job can cause the robot and/or peripheral devices to move.

- Press the **F4** (P.EXEC) key on the point settings screen. The robot runs the currently displayed point and the screen changes to the settings screen for the next point.

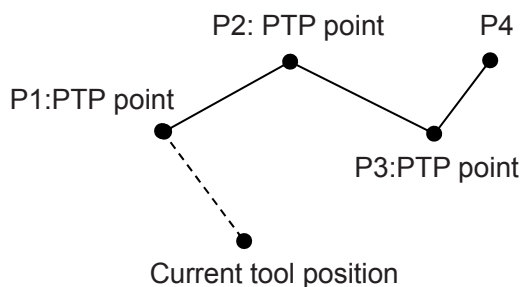
With a CP movement, the robot runs from [CP Start Point] through [CP End Point] as one unit.

If the current point settings screen is displaying a point in the middle of a CP movement (CP Passing Point, etc.), do not perform the point run.

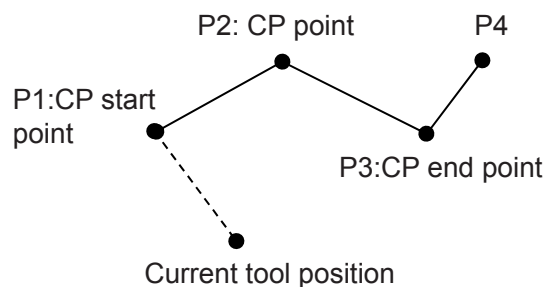
If the point currently displayed is a CP Start Point, the robot runs the program from the CP Start Point continuing through to the CP End Point without stopping at CP Passing Points or CP Arc Points.

If using programs such as the two examples below, press the **F4** (P.EXEC) key on the P1 settings screen once to execute the operations as follows:

Example 1



Example 2



Example1: The robot runs P1 (moves its axes and performs the point jobs and additional functions) and then waits at the P1 position. The screen then changes to the settings screen for P2

Example2: The robot runs P1 → P2 → P3 (moves its axes and performs the point jobs and additional functions) and then stops at the P3 position. The screen then changes to the settings screen for P4.

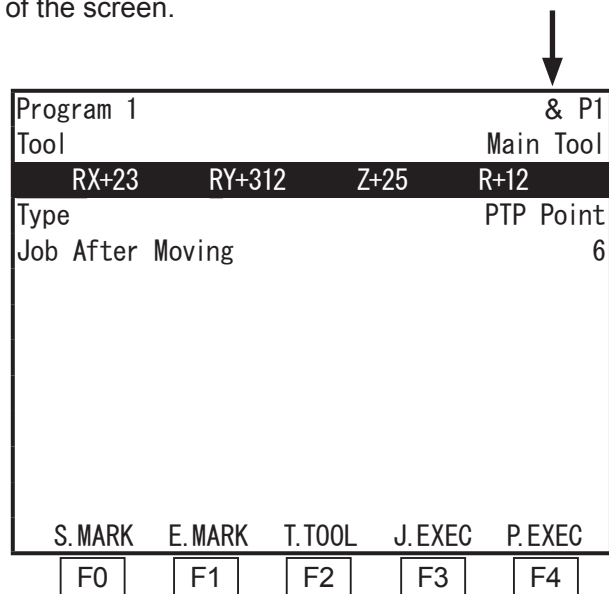
- After running the last point of the program, press the **F4** (P.EXEC) key again to run the work home position or the first point. If the program data [Cycle Mode] is set to [1 Cycle Playback], the robot runs the work home position, if it is set to [Continuous Playback] it runs the first point. However, even when [Cycle Mode] is set to [Continuous Playback], if the last work signal (#sysIn11) is ON, the work home position is run.

Press the **F4** (P.EXEC) key on the point settings screen. The robot runs the currently displayed point and the screen then changes to the settings screen for the next point. At this time, the “&” symbol appears in the first line of the screen.

When the “&” symbol is displayed, press the **F4** (P.EXEC) key to continue to the next point, and run it.

If “&” is not displayed, press the **F4** (P.EXEC) key to run only the point displayed in the current settings.

If running a series of points, the additional function is carried over and used just the same as it was in the run to move to the next point.



- [Pallet Routine] is set.

When running P2, the “&” symbol appears on the settings screen for P2. Each time the **F4** (P.EXEC) key is pressed here, the robot axes move to the next point on the pallet.

NOTE: The “&” symbol disappears if the **MENU**, **CURSOR <**, **CURSOR >**, **MODE**, **PRG.NO** or **UTILITY** key is pressed or when the settings screen for the next point is displayed. Also, the pallet counter is reset if the “&” symbol disappears while running the [Pallet Routine].

NOTE: Depending on your settings, the work home position is run when you press **F4** (P.EXEC) key again after making a point run on the final point in the program. At this time if [Job on End of Cycle in P.EXEC] is set to [Valid], the point job registered in [Job on End of Cycle] is executed. If the program data [Cycle Mode] is set to [Continuous Playback], the point job is executed only when the Last Work signal (#sysIn11) is ON.

When [Job on End of Cycle in P.EXEC] is set to [Valid]

Cycle Mode	Destination After Final Point Run	Job on End of Cycle
1 Cycle run	Work home position	Execute
Continuous playback	Point 1 (work home position if Last Work signal is ON)	Do not execute (Execute if Last Work signal is ON)

TP **MENU** [All Program Common Settings]
 [Job and PLC on Run Mode]
 [Job on End of Cycle]

(Customizing Mode)

TP [Teaching Mode Customizing]
 [Teaching Mode Job, PLC]
 [Job on End of Cycle in P.EXEC]

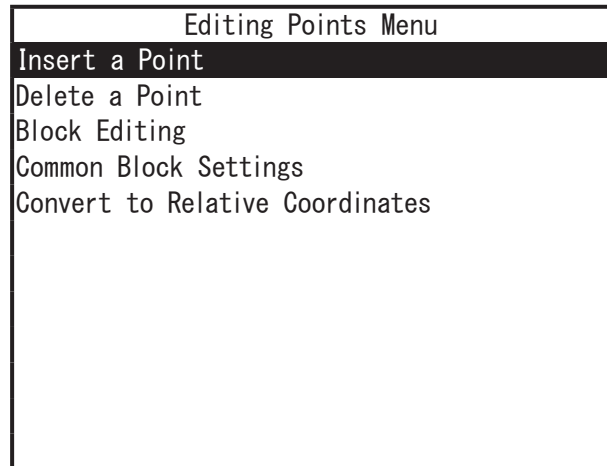
7. EDITING (EDIT)

7.1 Point Editing

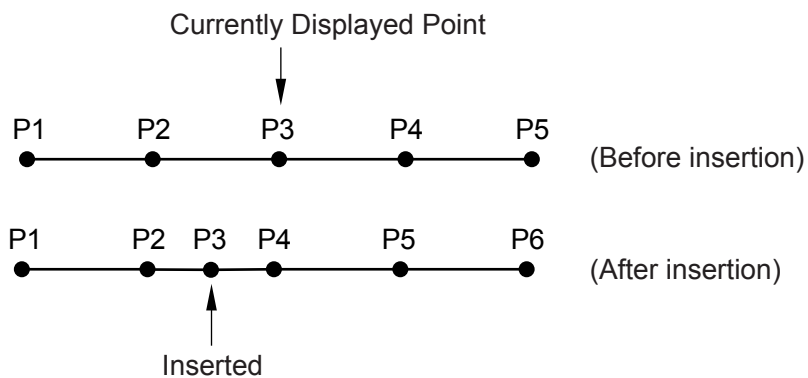
7.1.1 Inserting a Point

Display the point settings screen for the number that will come after you have inserted the point in the place you want.

TP EDIT [Insert a Point]



When you select [Insert a Point], the new position entry screen appears. Enter the position for the point you want to insert and select the point type. Each point that comes after the inserted point increases by one number.

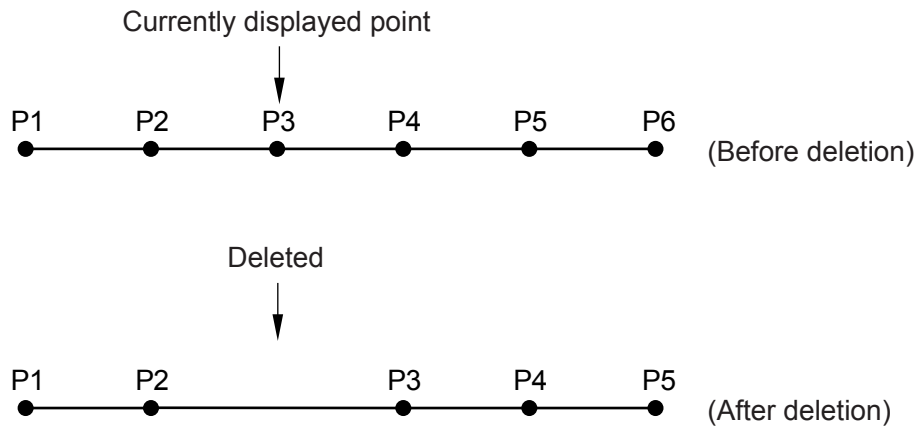


7.1.2 Deleting a Point

Display the settings screen for the point that you wish to delete.

TP  **EDIT** [Delete a Point]

If you select [Delete a Point], the point currently displayed is deleted and the settings screen for the next point appears. Each point that comes after the deleted point decreases by one number.



7.1.3 Block Editing

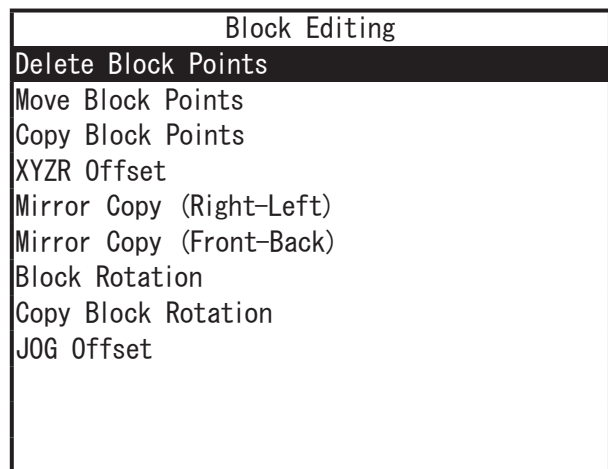
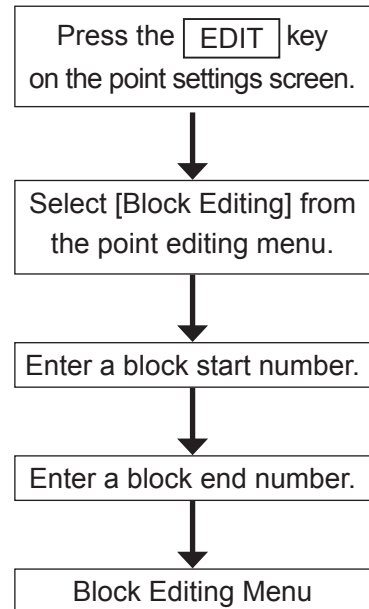
You can edit (delete, move, copy, mirror copy, offset, position data rotation) a block of points between given points in a program.

Display the block editing menu using the following procedure:

Press the **EDIT** key on the point settings screen and select [Block Editing] from the point editing menu.
Enter the start number of the points (block start number) and the end number of the points (block end number) you want to edit.
The block editing menu shown below appears.
Select the item that you want to edit from the menu.

NOTE:

- Press the **F4** (ALL) key on the block start number entry screen to select all points in the program. (The block end number entry screen does not appear.)
Press the **F4** (LAST) key on the block end number entry screen. The last point number in the program is entered.
- You can set default values for the block start numbers and end numbers in advance.
Press the **F0** (S.MARK) key on the point settings screen. The current point number is set as the default block start number.
If you press the **F1** (E.MARK) key, the current point number is set as the default block end number.

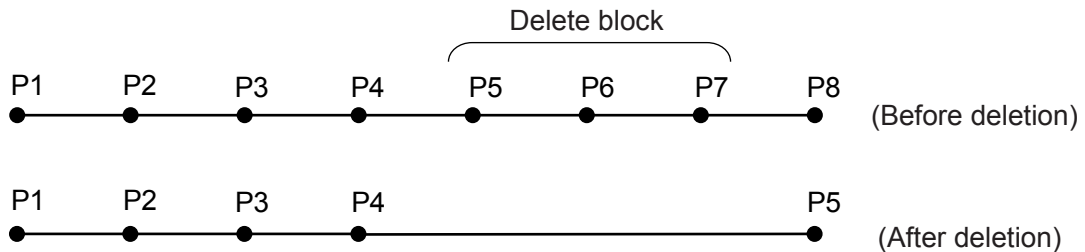


Block Editing Menu

■ Delete Block Points

This deletes a block of points between given points in a program.

Select [Delete Block Points] from the block editing menu. The Delete Block Points confirmation screen appears. Select [YES] if you want to continue with the deletion.



Each point that comes after the deleted points decreases by the number of points deleted.

■ Move Block Points

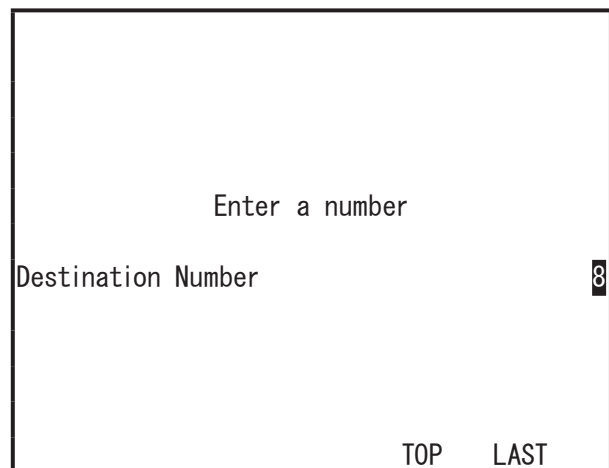
You can move a block of points between given points in a program. However, note that you cannot move these points into other programs.

Select [Move Block Points] from the block editing menu. The destination number entry screen appears.

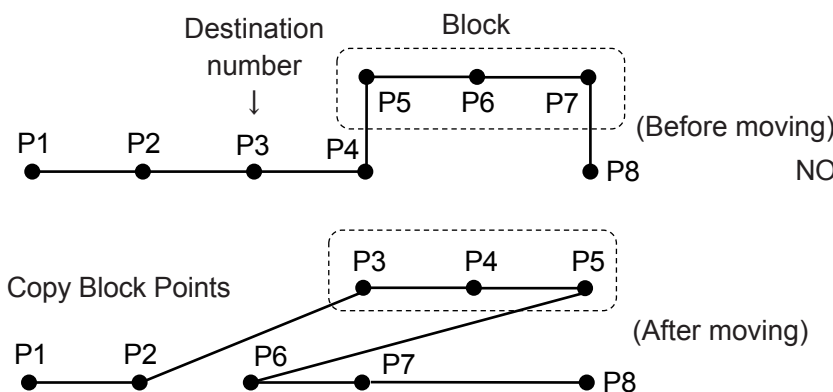
The designated block moves in front of the destination point.
Enter the destination number.

If the **F3** (TOP) key is pressed, 1 is entered as the destination number.

If the **F4** (LAST) key is pressed, the number equal to the last point number plus 1 is entered as the destination number.



Destination Number Entry Screen



NOTE: you cannot select a destination number within the block you are moving.

■ Copy Block Points

This copies a block of points between given points in a program.

You can designate the number of copies and parallel moving distance. However, note that you cannot copy the points into other programs.

Select [Copy Block Points] from the block editing menu. The parallel moving X distance entry screen appears. Enter the parallel moving distance of the copied block (X direction).

After entering the X distance, the parallel moving Y distance entry screen appears. Enter the Y direction moving distance of the copied block.

After entering the Y distance, the copy times entry screen appears. Enter the number of copies you want.

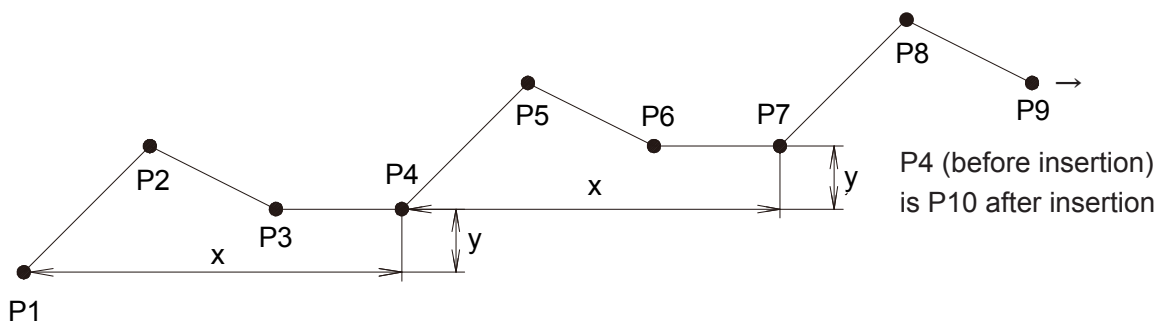
After entering the number of copies, the block is copied and the screen returns to the block editing menu. The copied points are inserted directly behind the original points.

NOTE: The copied point coordinates may exceed the operating range of the robot. After copying the block points, make sure to perform [Check Data] in [Test Menu]

The following example shows the point shift when the Point Block P1 – P3 is copied twice.

The first copy: P4 – P6 are created

The second copy: P7 – P9 are created



■ XYZR Offset

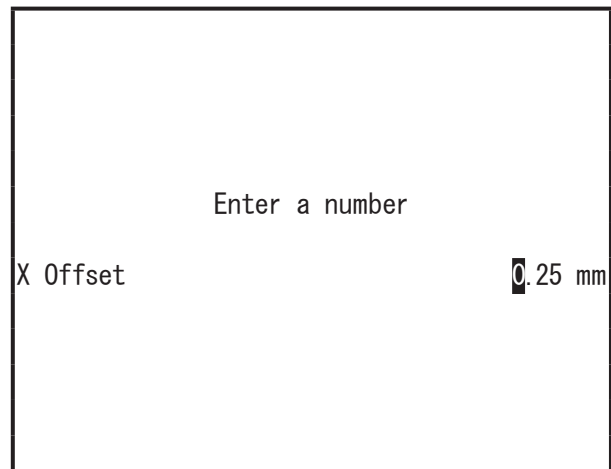
This moves a point coordinate block between certain points in a program.

Select [XYZR Offset] from the block editing menu. The X offset entry screen shown to the right appears.

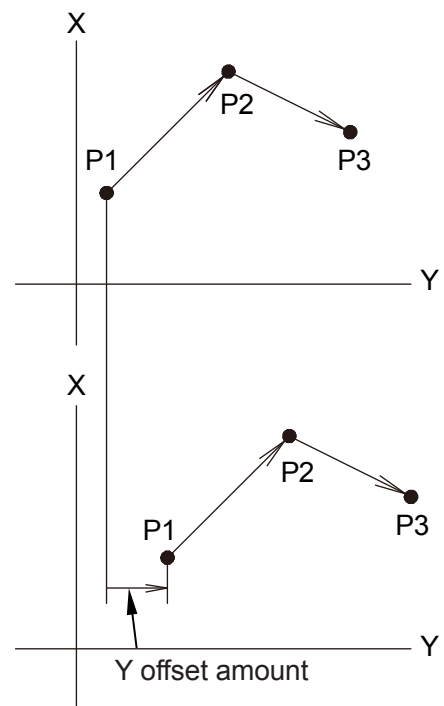
Enter the distance you want to move the coordinates.

After entering the X offset, enter the Y offset, Z offset, and R offset in order.

Enter 0 if you do not want to move the block in a particular direction.



After entering the offset, the offset is added to all points in the block and the screen returns to the point editing menu.

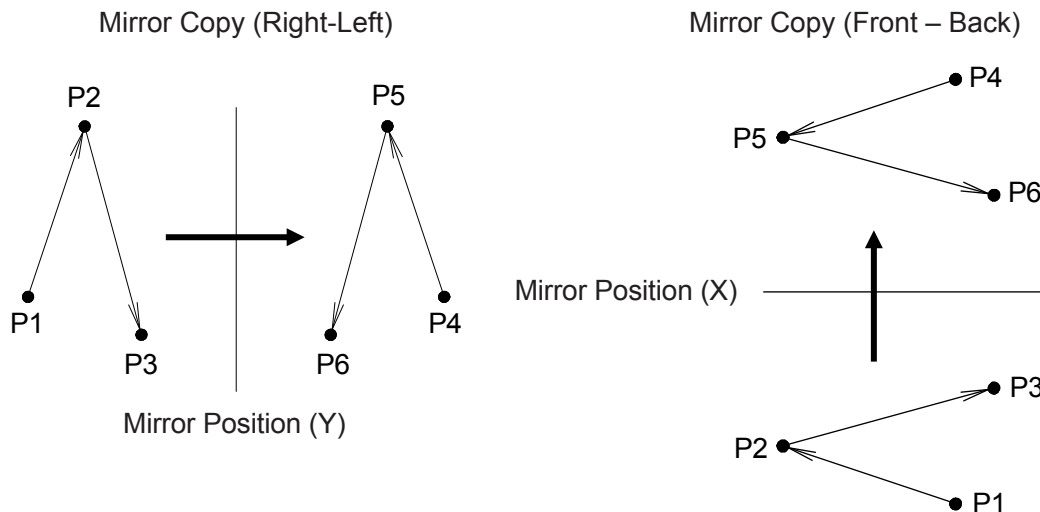


An example of entering only a Y offset

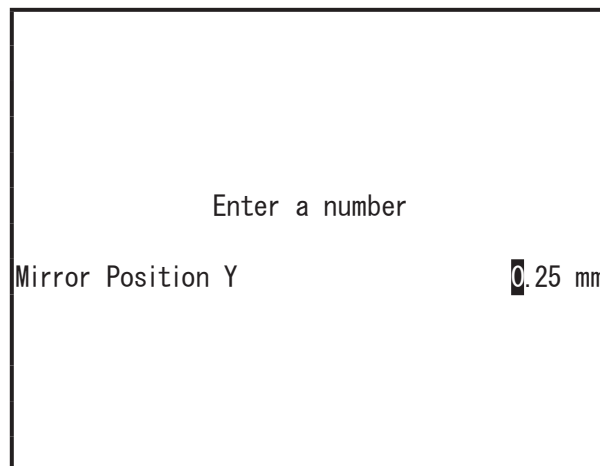
NOTE: After calculation, offset point coordinates may exceed the operating range of the robot. After editing the offset, make sure to perform [Check Data] in [Test Menu].

■ Mirror Copy

This makes a mirror copy of a block of points between given points in a program. However, note that it is not possible to copy the points into other programs.

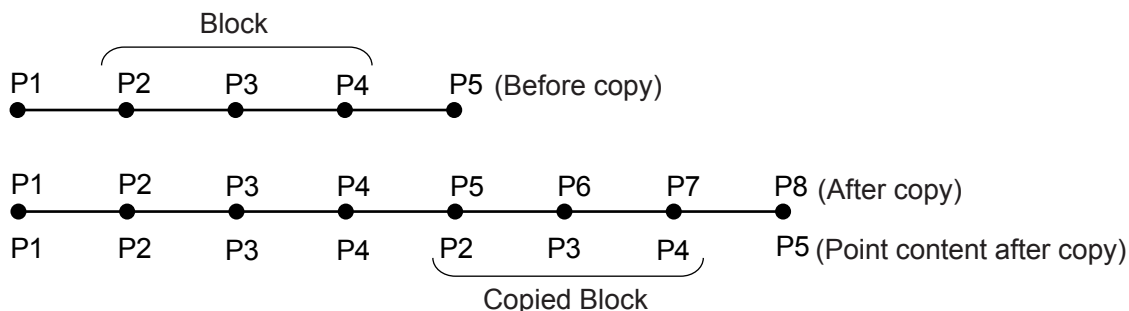


Select [Mirror Copy (Right-Left)] or [Mirror Copy (Front-Back)] from the block editing menu. The mirror position X/Y entry screen shown to the right appears. Enter the coordinates of the mirror position for X or Y. After entering the X/Y mirror position, a mirror copy is made and the screen returns to the block editing menu. The copied points are inserted directly after the original block.



Mirror Position Y Entry Screen Example

NOTE: The coordinates of the copied points may exceed the operating range of the robot. After copying the block points, make sure to perform [Check Data] in [Test Menu].



■ Block Rotation

This rotates the coordinates for a point block between given points in a program.

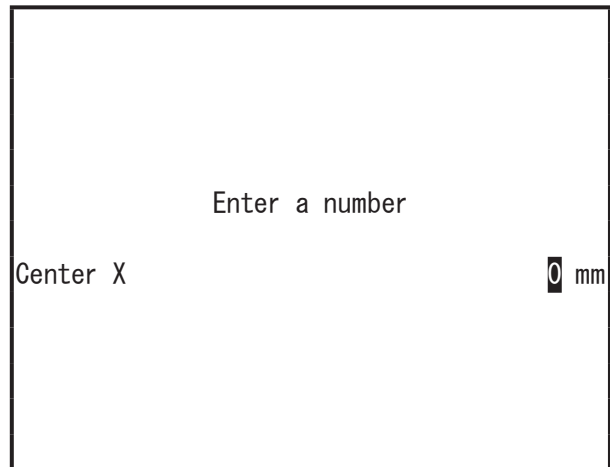
Select [Block Rotation] from the block editing menu.

The center X entry screen shown to the right appears.

Enter the X coordinate for the center of rotation.

After entering the X coordinate, the center Y entry screen appears.

Enter the Y coordinate for the center of rotation.



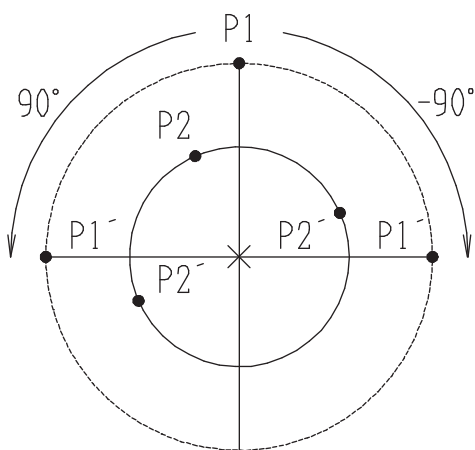
Center X Entry Screen Example

After entering the Y coordinate, the rotate angle entry screen appears. Enter the rotation angle.

After entering the rotation angle, the block is rotated and the screen returns to the block editing menu.

NOTE: Always make sure you perform [Data Check] in [Test Menu].

Example:

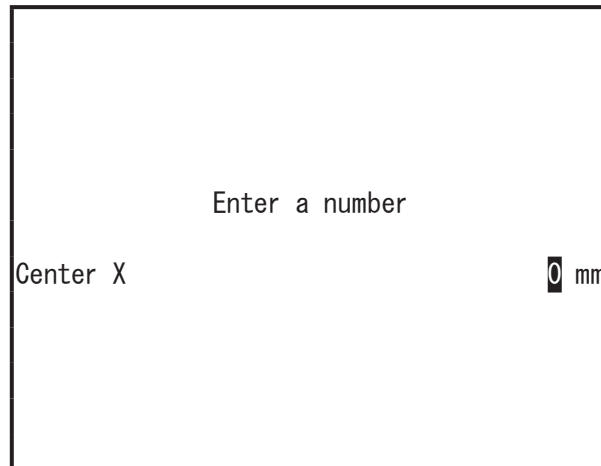


If you rotate Point 01 (P1) and Point 02 (P2) by +90 or -90 degrees, the destinations become P1' and P2' as shown to the left.

■ Copy Block Rotation

This rotates and copies the coordinates for a block of points between given points in a program. The copied points are inserted directly after the original block.

Select [Block Rotation] from the block editing menu. The center X entry screen shown to the right appears. Enter the X coordinate for the center of rotation. After entering the X coordinate, the center Y entry screen appears. Enter the Y coordinate for the center of rotation.



Center X Entry Screen Example

After entering the Y coordinate, the rotate angle entry screen appears. Enter the rotation angle you want.

After entering the rotation angle, the block is rotated and copied, and the screen returns to the block editing menu.

NOTE: Always make sure you perform [Data Check] in [Test Menu].

■ JOG Offset

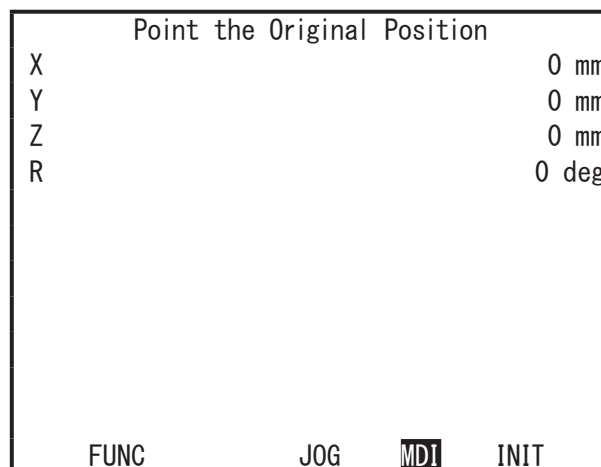
This designates two points, uses the difference between them as an offset amount, and moves a point coordinate block by that amount.

Select [JOG Offset] to display the point number entry screen.

After entering a point number, the position entry screen (MDI Mode) of the coordinates entered for that point number appears.

If the entered number has not been registered, the work home position coordinates are displayed on the position entry screen.

The coordinates entered here become the “Original Position” (the first point) for determining the offset amount.



Press the ENTR key to display the “shift position” (second point) entry screen. The coordinates of the first point are entered on the entry screen for the second point. Enter the coordinates for the second point. The point coordinate block is moved by the position difference (X, Y, Z, R) between the two points ([Original Position] and [Shift Position]). The coordinates with the added offset may exceed the operating limit. Always execute [Check Data] in [Program Test] after entering an offset.

NOTE: After calculation, the offset point coordinates may exceed the operating range of the robot. After editing the offset, make sure to perform [Check Data] in [Test Menu].

7.1.4 Common Block Settings

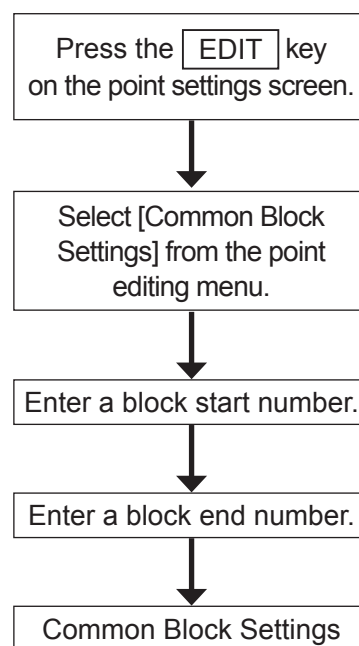
This sets specified additional function numbers to a block of points (between specified points). Any additional functions already set to these points are replaced by the additional functions that are specified in [Common Block Settings]. If the block contains any point that the specified additional function cannot be set to (PTP conditions set to CP points, etc.), that point is not affected.

Press the **EDIT** key on the point settings screen and select [Common Block Settings] from the point editing menu. Enter the start point number (block start number) and end point number (block end number) for the points to where you want to set line speed/additional function data.

The common block settings menu appears.

NOTE:

- Press the **F4** (ALL) key on the block start number entry screen to select all points in the program. (The block end number entry screen does not appear.)
Press the **F4** (LAST) key on the block end number entry screen to enter the last point number.
- With dispensing specifications, you can select [Dispense Time] also.



Common Block Settings
Common Line Speed Settings
Multiple Line Speed
PTP Condition Number
CP Condition Number
Tool Number
Pallet Routine Number
Execute Condition Number
Work Adjustment Number
Dispense Time
Set Common Z Coordinate

Common Block Settings Menu
Example: Dispensing Specifications

■ Common Line Speed Settings

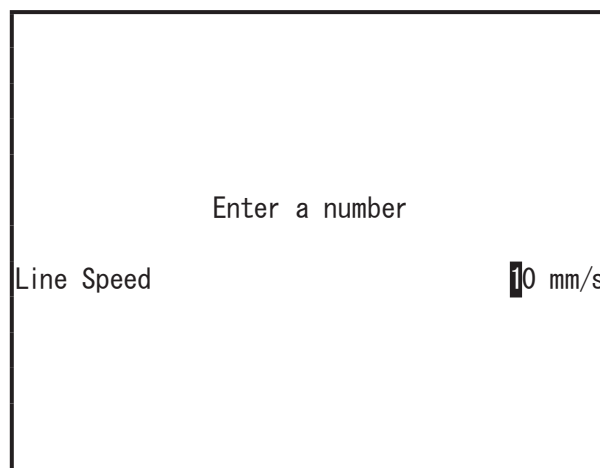
This sets the same line speed between given points in a program. If the block contains any PTP points, those points are not affected.

If the moving distance is too short, etc., and movement is finished before the robot can reach the registered line speed, a “CP Speed Over” error occurs. In this case, set a slow line speed.

Select [Common Line Speed Settings] from the common block settings menu and enter the speed you want.

The maximum line speed is 850 mm/s* (JR3300 – JR3600 Series). If a larger number is entered, the speed is set as 850mm/s*.

* The maximum line speed for the JR3200 Series is 600 mm/s and 999 mm/s for the JC-3 Series.

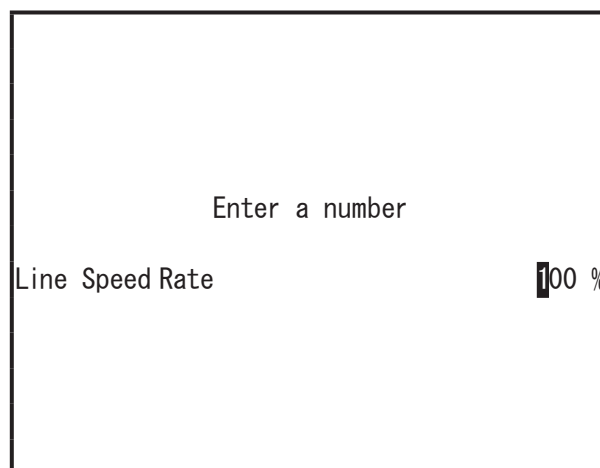


■ Line Speed Rate Settings

This sets the same line speed rate between given points in a program. If the block contains any PTP points, those points are not affected.

Select [Multiple Line Speed] from the common block settings menu and enter the percentage you want.

The maximum line speed rate is 500 %.



■ Setting Type Numbers for Additional Function Data

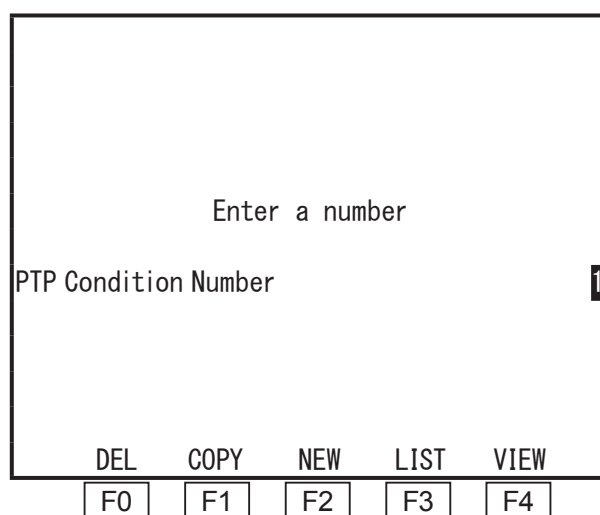
This sets specific numbers for additional function data to a block of points (between given points) in a program.

If any point in the block already has the same additional function data set to it, the additional function data number is replaced with the number specified in common block settings. If the block contains a point where the specified function cannot be set, that point is not affected.

There are 6 types of additional function data:

- PTP Conditions
- CP Conditions
- Point Tool Data
- Pallet Routines
- Execute Conditions
- Workpiece Adjustments

From the common block settings menu, select the additional function data type number (e.g. [PTP Condition Number]) that you want to set, and enter that number.



NOTE: Refer to [“8.4 Additional Function Data”](#) for more information regarding additional function data.

Key	Function
[F0] (DEL)	This displays the delete additional function data number entry screen. Enter the number of the point job/additional function data you want to delete.
[F1] (COPY)	This displays the source additional function data number entry screen. Enter the source number and destination number. The contents of the source point job/additional function data are copied to the destination number.
[F2] (NEW)	This displays the unregistered additional function number list. Select a number from the list. The new additional function data entry or selection screen appears. Enter the commands or parameters. Press the [ESC] key to set the entered additional function data to the point and the display returns to the point settings screen.
[F3] (LIST)	This displays the registered additional function number list. Select a number from the list, and the selected additional function data is set to the point and the display returns to the point settings screen.
[F4] (VIEW)	This displays the settings screen for the currently displayed additional function data number. You can modify the data on this screen.

■ Dispensing Time (Dispensing Specifications Only)

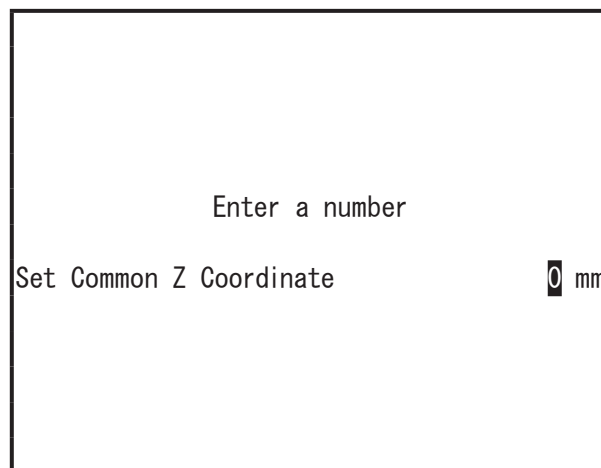
This sets the same dispensing time for dispensing points included within the specified block start number and block end number.

■ Set Common Z Coordinate

This sets a common Z axis coordinate value to points within the program or to points within a block (from a given point to a given point).

From the [Common Block Settings] menu, select [Set Common Z Coordinate] and enter the coordinate value you want to set. If you enter a value that exceeds the Z axis operating range, the Z axis operating range upper limit is entered as this setting value.

Note that the Z axis operating range varies depending on the robot model. For further details refer to the operation manual *Specifications*.



7.1.5 Convert to Relative Coordinates

Select [Convert to Relative Coordinates] to convert all the point coordinates in the currently selected program into relative coordinates.

Specifically, deduct the Point 1 values for the X, Y, Z, and R axes from each of the X, Y, Z and R values of Point 1 – the last point. Set the differences as the relative coordinates for each point. (The coordinates of Point 1 become X: 0, Y: 0, Z: 0, R: 0.)

The coordinates of the work home position and the points that have no number (those included in the program data rather than in the point data) are not converted.

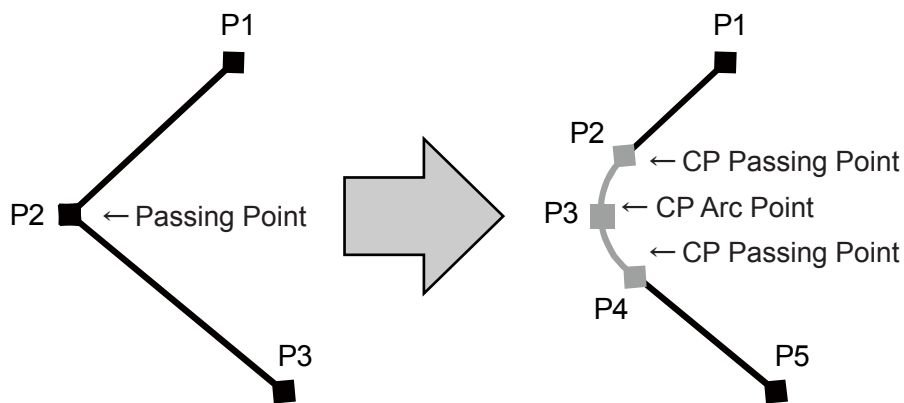
TP  **EDIT** [Convert to Relative Coordinates]

NOTE: You cannot convert point coordinates from relative to absolute coordinates.

7.1.6 Create Arc

This is a function used to round the path angle of an intermediate point (CP Passing Point or CP Stop Point). Select [Create Arc] and enter the radius for the subject point you want to convert to an arc.

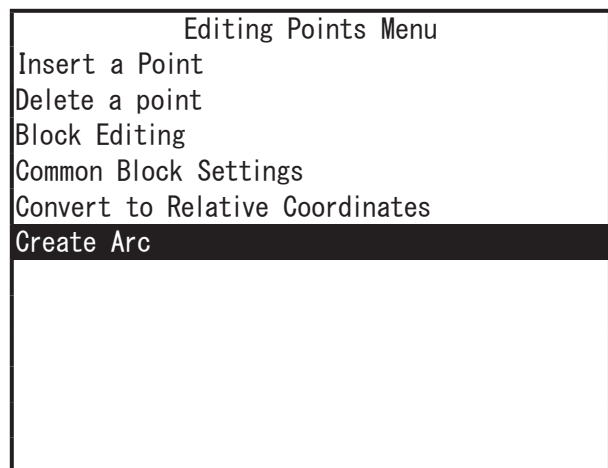
The original intermediate point is converted to 2 CP Passing Points, which define the start and end of the arc, and a CP Arc Point, which is placed in between the 2 passing points at the specified radius (as shown in the example below). Note that the points generated for the arc are set with a height of 0. Review and modify the height setting as necessary.



NOTE: Even if you use the Create Arc function to convert a CP Stop Point to an arc, the arc is created using CP Passing Points and a CP Arc Point. If necessary, change the Line Passing Points to CP Stop Points, etc.

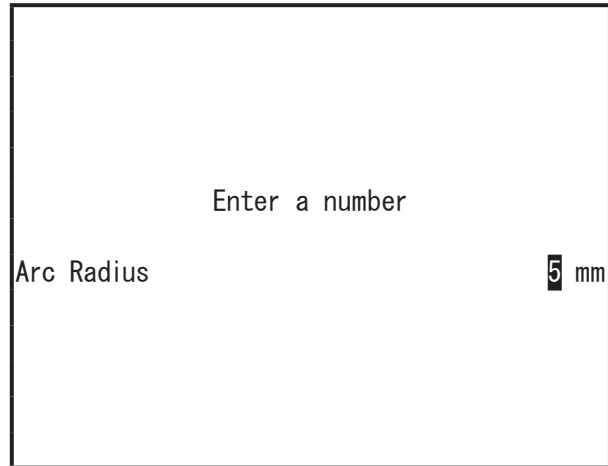
Display the editing screen for the subject point (CP Passing Point or CP Stop Point).

TP → **EDIT** [Create Arc]



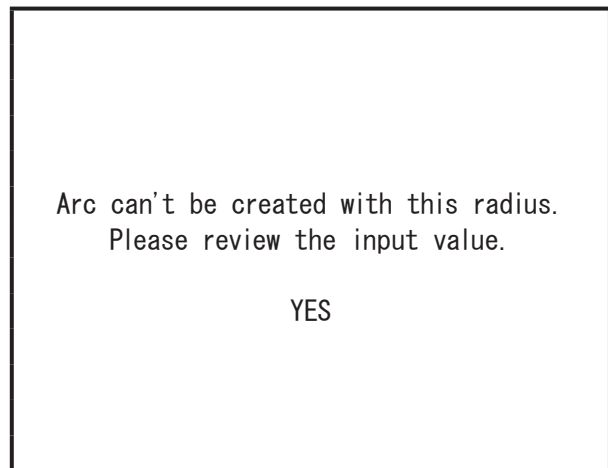
Editing Points Menu

Select [Create Arc] to display the arc radius entry screen (as shown to the right). Enter the arc radius to create the arc.



Arc Radius Entry Screen

If an arc cannot be created from the entered value, the message to the right is displayed. Select "YES" and edit the arc radius value.



NOTE: [Create Arc] is only displayed when you select a point that meets the following conditions:

- The specified point is either a CP passing point or a CP stop point.
- The point before the specified point is either a CP start point, CP passing point, or a CP stop point.
- The point after the specified point is either a CP end point, CP passing point, or a CP stop point.

Also note that the points used to create the arc may vary.

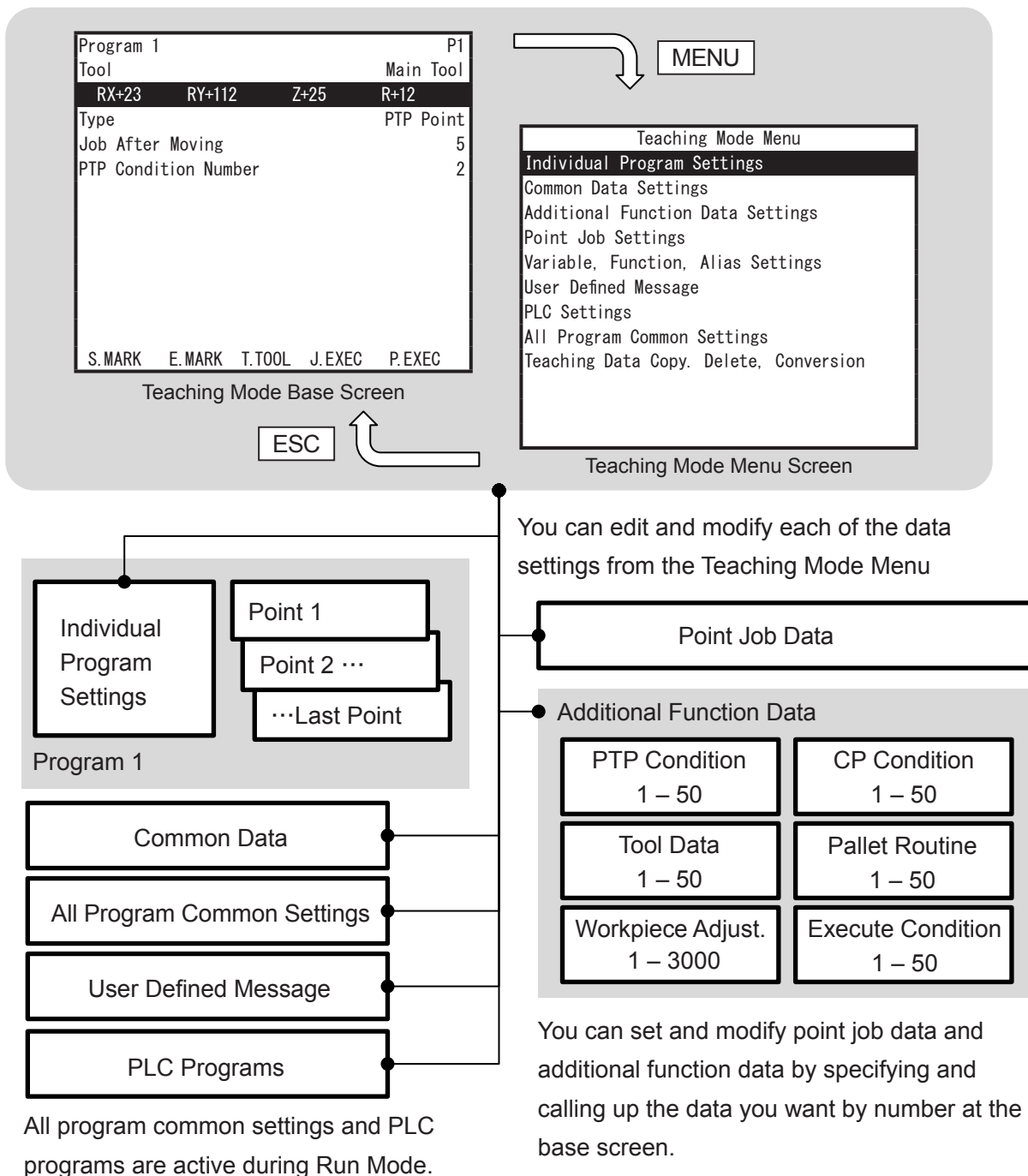
Refer to the application specification manuals below for further details.

Dispensing Specifications	: "10.3 Create Arc"
Dispensing with Camera Specifications	: "12.2.3 Create Arc"
Depaneling Specifications	: "7.8 Create Arc"

8. TEACHING MODE MENU (**MENU**)

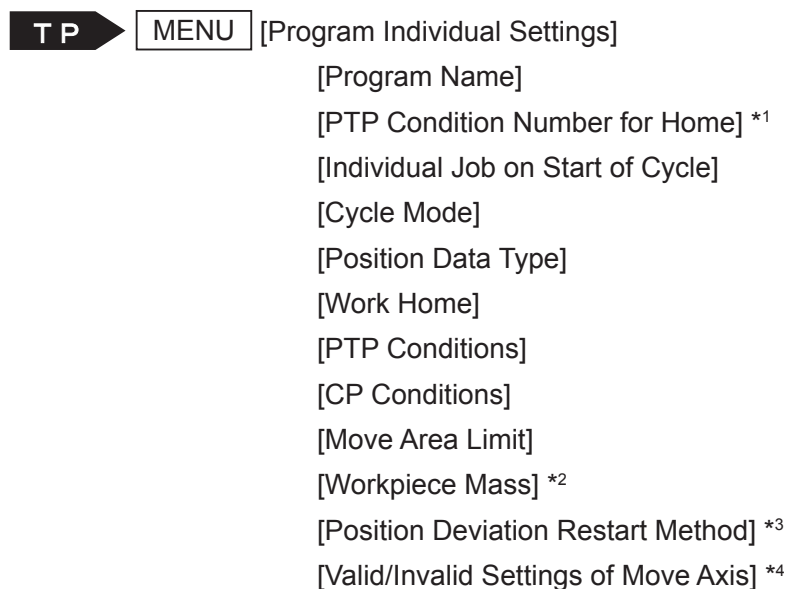
When at the Teaching Mode base screen, press the **MENU** key to bring up the Teaching Mode menu screen. With the Teaching Mode menu you can create and modify program data, point jobs and additional function data.

The diagram below shows the relationship between the Teaching Mode menu and the data you can set.



8.1 Program Individual Settings

Program individual settings are settings to control the programs themselves and can be set individually to each program. For more details refer to the operation manual *Functions I (Point Teaching)*.



*1: JC-3 Series only.

*2: The JC-3 Series does not have the item [Workpiece Mass]. [Workpiece Mass] is fixed at 7 kg for the JR3200 Series.

*3: JR3000E Series only.

*4: Only for robots equipped with auxiliary axis functions.

8.2 Common Data

Common data are defined in Customizing Mode, and the values and items are set in Teaching Mode. The names set in Customizing Mode are displayed in the Teaching Mode menu. Common data settings are common to all programs.

8.3 Condition Data

Condition data are defined in Customizing Mode, and the values and items are set in Teaching Mode. The names set in Customizing Mode are displayed in the Teaching Mode menu. Condition data settings are called and used from points.

8.4 Additional Function Data

This data is used and called up by number from point data as an additional function. When additional function data is called up, its function is set to the point. However, depending on the point type it may not be possible to set the additional function. Additional function data consists of the 6 items below.

You can create additional function data numbers 1 – 50 in Teaching Mode. Additional function data numbers 51 – 100 can be created in Customizing Mode. Workpiece adjustments only can be set up to 1 – 3000. Workpiece adjustments cannot be set in Customizing Mode. For further details, refer to the operation manual *Functions I (Point Teaching)*.

1. PTP Conditions
These have the same contents and items as those which are set in program data. Use these when you want to change the settings between designated points only.
2. CP Conditions
These have the same contents and items as those which are set in program data. Use these when you want to change the settings between designated points only.
3. Tool Data
These have the same contents and items as those which are set in program data. Use these settings when you want to use tool data, different from that set in the program data, between designated points only.
4. Pallet Routine
This is the offset (adjustment with counter) from the coordinates of a reference point.
5. Workpiece Adjustment
You can adjust the position (coordinates) of a particular point by the exact values entered here.
6. Execute Condition
Use this item to determine whether or not to run the registered points. If the point is not run, the robot axes skip the point and move to the next point.

Method 1

TP [Additional Function Data Settings]
Set additional function type number (e.g. [PTP Condition Settings])
Enter the additional function type number.

Method 2

TP On the point settings screen:
Enter the additional function type number (e.g. [PTP Condition Settings])

NOTE: If you highlight the last item of the point settings screen and press the key, further point job data and additional function data content settable to that point are displayed.

In Method 1, if you enter an additional function type number, or select a number from the list, the settings screen of the additional function data for the entered/selected number is displayed.

In Method 2, if you press the **F4** (VIEW) key on the additional function type number entry screen, the additional function data settings screen for the currently displayed number appears.

Key	Function
F0 (DEL)	This displays the delete additional function data number entry screen. Enter a number to delete the additional function data for that number.
F1 (COPY)	This displays the additional function data copy source number entry screen. Enter the source number and destination number. The contents of the source additional function data are copied to the destination number.
F2 (NEW)	This displays the unregistered additional function number list. Select a number from the list to display the additional function data settings screen (with no content entered).
F3 (LIST)	This displays the registered additional function number list. Select a number from the list to display the additional function data settings screen for that number.
F4 (VIEW)	This displays the settings screen for the currently displayed additional function data number. You can modify the data on this screen. (This key is not available with Method 1.)

NOTE:

- Only the additional function data [Execute Condition] is created by entering commands. Methods of inputting, editing, inserting, and deleting commands for [Execute Condition] are exactly the same as for point job data.
- Names can be set to the additional function data [Pallet Routine] and [Workpiece Adjustment]. Press the **EDIT** key on the additional function data settings screen to display the name editing screen.
- For more details on additional function data, refer to the operation manual *Functions I (Point Teaching)*.

8.5 Point Job Data

Point job data are a set of command strings and logic operations performed at job points. Setting numbers to point data allows you to call on the data and use it. However, depending on the point type set to a given point, setting certain data may not be possible.


You can create point job data Nos. 01 – 500 in Teaching Mode. Point job data Nos. 501 – 1000 can be created in the Customizing Mode.

Before teaching new point job data or modifying registered point job data, you need to display the settings screen.

Display the settings screen for the point job data that you wish to modify according to either of the following methods:


Method 1

On the point settings screen:

TP  [Point Job Settings]
Enter the point job number

Method 2

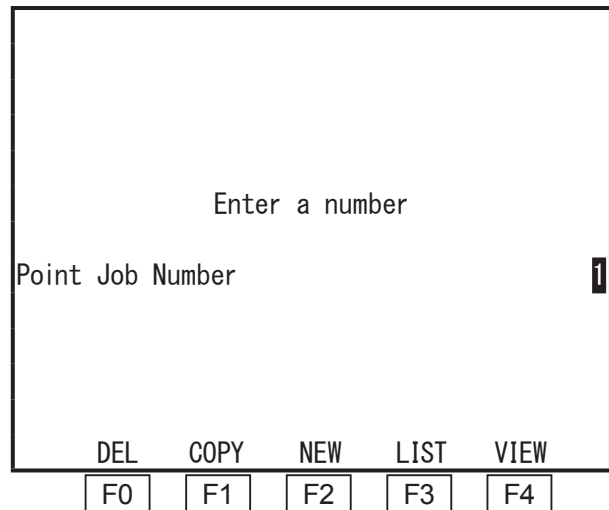
On the point settings screen:

TP  [Job before Moving]
[Job while Moving]
[Job after Moving]
[Job while CP Moving]
Enter the point job number


```

Point Job 1 1/3
001 set #genOut3
002 delay 200
003 if
004   Id #genIn1
005   ani palletFlag(1)
006   ldi m3
007   and #genOut2
008   orb
009 then
010   loopPallet
011   callJob 25
012   pulse #genOut11,250
    
```

Point Job Data Settings Screen Example



Point Job Number Entry Screen Example

NOTE: If you highlight the last item of the point settings screen and press the  key, further point job data and additional function data content settable to that point are displayed.

In Method 1, if you enter a point job number, or select a number from the list, the settings screen of the point job data for the entered/selected number is displayed.

In Method 2, if you press the **F4** (VIEW) key on the point job number entry screen, the point job data settings screen for the currently displayed number appears.

Key	Function
F0 (DEL)	This displays the delete point job number entry screen. Enter the point job number for the data that you want to delete.
F1 (COPY)	This displays the source point job number entry screen. Enter the source number and destination number. The contents of the source point job data are copied to the destination number.
F2 (NEW)	This displays the unregistered point job number list. Select a number from the list. The new entry or selection screen for point job data is displayed. Enter the commands or parameters. With Method 2, pressing the ESC key sets the entered point job data to that point and the display returns to the point settings screen. NOTE: With Method 1, the data is not set to the point.
F3 (LIST)	This displays the registered point job number list. Select a number from the list. With Method 2, the selected point job data is set to that point and the display returns to the point settings screen. NOTE: With Method 1, the command setting screen is displayed.
F4 (VIEW)	This displays the settings screen for the currently displayed point job data number. You can modify the data on this screen. NOTE: With method 1, this key is not available.

NOTE: For further details on point job data, refer to the operation manual *Functions I (Point Teaching)*.

8.5.1 Entering Commands

Point job data entry is performed by adding commands to the tail end of a command string. Select the last command number (a line with only the number and no command content) on the point job data settings screen.

Select a command number on the point job data settings screen.

The point job command category selection screen shown to the right is displayed.

Select the command type (category) that you wish to enter.

Select Category
ON/OFF Output Control
if Branch, Wait Condition
Condition
Delay, Data In, Wait Start
Pallet Control
Execute Flow Control
for, do-loop
Move
LCD Control, 7seg LED
COM Input/Output
Variable, Comment, System Control
Camera, Z Adjustment

Point Job Command Category Selection Screen

Once you select a command category, the selection screen for commands that belong to that category appear, shown to the right.

Select the command that you want to enter.

Once you select a command, the parameter entry or selection screen appears. Depending on the command, there are commands with no parameters and those which require multiple parameters. Enter or select the required parameter(s).

ON/OFF Output Control
set
reset
pulse
invPulse
delaySet
delayReset
onoffBZ
dataOut
dataOutBCD
onoffGLED
onoffRLED

Command Selection Screen Example ON/OFF Output Control

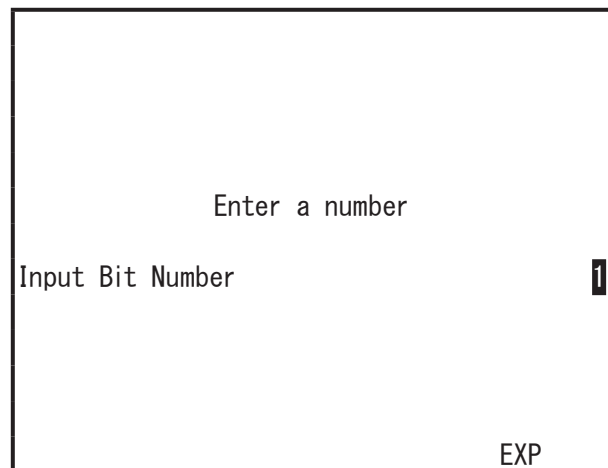
Example: The [set] command requires the [Output Destination] as a parameter.

Depending on the commands, you may need to select the entry method for entering parameters.

Example: Enter a string for the *outLCD* command. Enter a string or an expression for the *eoutLCD* command.

- When entering `outLCD 7,4,"PULSE"`
Displays the string "PULSE" on the teaching pendant LCD. The `outLCD` command requires the display position of the string (column and row on the LCD) and the three string parameters (row, column, and string). After entering the row and the column, the display data entry screen appears. Enter "PULSE". (The quotation marks (" ") which enclose the string are entered automatically.)
- When entering `eoutLCD 7, 4, #sv (24) & #sv (25)`
Displays a combination of the `#sv (24)` and `#sv (25)` character string variable values on the teaching pendant LCD. The `eoutLCD` command requires the display position of the string (column and row on the LCD) and the three parameters for the string variable (row, column, and string). After entering the row and the column, the display data entry screen appears. Enter "`#sv (24) & sv (25)`."

Additionally, when entering a number as a parameter, you can select a variable or an expression instead of a value if "EXP" is displayed at the bottom right of the number entry screen (above the `F4` key). Press the `F4` (EXP) key to display the character entry screen, and enter the variable or expression you want to set.

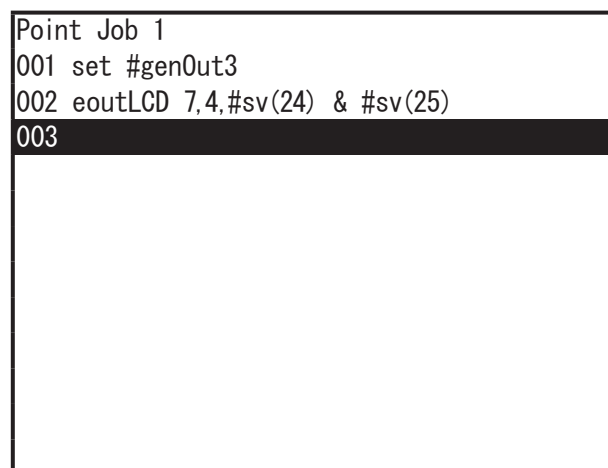


Number Entry Screen Example

After entering or selecting parameter(s), the registered command is entered for the selected command number and the screen returns to the point job data settings screen, shown to the right.

If you want to enter more commands, select the last command number (the line with a number only; it contains no command; 003 in the example to the right).

When you have finished entering commands, press the `ESC` key on the point job data settings screen.



Point Job Data Settings Screen Example

8.5.2 Changing Commands

There are two ways to modify the point job data command: changing the command in the command category (*set* (output command) → *pulse* (output command) etc.), and changing the command category (*set* (output command) → *waitStart* (wait command) etc.).

■ Changing the Command in the Command Category

Select the command that you want to change on the point job data settings screen. The command selection screen appears. Select a new command on the selection screen. The highlighted command is deleted and replaced by the newly selected command.

■ Changing the Command Category

Display the settings screen for the point job data you want to modify and highlight the command that you want to change.

Press the key and select [Change Command]. The command category selection screen appears. Select the command category and the command that you want to change, and enter or select the necessary parameter(s).

8.5.3 Inserting Commands

This inserts a new command in front of the highlighted command. For example, if you want to insert a command after command number 003, highlight the line of command number 004.

 [Insert Command]

Select [Insert Command] to display the Command Category selection screen.

Select the command category and the command that you want to insert, and enter or select the necessary parameter(s).

8.5.4 Deleting Commands

This deletes the currently highlighted command. Highlight the command that you want to delete.

 [Delete Command]

Select [Delete Command]. The highlighted command is deleted and the commands following the deleted command move upward.

8.5.5 Block Editing

- Delete Block

TP  [Block Editing]
[Delete Block Points]

Select [Delete Block Points] to display the block start number entry screen. Select the first number for the command block you want to delete.

After entering the block start number, the block end number entry screen appears. Enter the last number of the command block.

After entering the block end number, the command block is deleted and the screen returns to the settings screen. The commands following the deleted block move upward as shown below.

Point Job 1	Point Job 1
001 set #genOut1	001 set #genOut1
002 delay 100	002 delay 100
003 reset #genOut1	003 reset #genOut2
004 set #genOut2	004
005 delay 200	
006 reset #genOut2	
007	

Before Deletion After Deletion

■ Move Block Points

TP **EDIT** [Edit Block Commands]
 [Move Block Steps]

Select [Move Block Steps] to display the block start number entry screen. Enter the first number of the commands you want to move.

After entering the block start number, the block end number entry screen appears. Enter the last command number of the command block.

After the block end number is entered, the destination number entry screen appears. Enter the destination command number where the command block is to move.

After the destination number is entered, the block is moved in front of the entered number. Once the block is moved, the screen returns to the settings screen.

Point Job 1	Point Job 1
001 set #genOut1	001 set #genOut1
002 delay 100	002 delay 100
003 reset #genOut1	003 reset #genOut1
004 set #genOut2	004 set #genOut3
005 delay 200	005 set #genOut2
006 reset #genOut2	006 delay 200
007 set #genOut3	007 reset #genOut2
008 delay 300	008 delay 300
009 reset #genOut3	009 reset #genOut3
010	010

Before Move

After Move

■ Copy Block Points

TP **EDIT** [Edit Block Commands]
 [Copy Block Steps]

Select [Copy Block Steps] to display the block start number entry screen. Enter the first number of the commands you want to copy.

After the block start number is entered, the block end number entry screen appears. Enter the last command number of the command block.

After the block end number is entered, the destination number entry screen appears. Enter the command number to where you want to copy the block.

After entering the destination number, the block is moved in front of the entered number. Once the block is copied, the screen returns to the settings screen.

Point Job 1	Point Job 1
001 set #genOut1	001 set #genOut1
002 delay 100	002 delay 100
003 reset #genOut1	003 reset #genOut1
004 set #genOut2	004 set #genOut2
005 delay 200	005 delay 200
006 reset #genOut2	006 reset #genOut2
007 set #genOut3	007 set #genOut3
008 delay 300	008 set #genOut2
009 reset #genOut3	009 delay 200
010	010 reset #genOut2
	011 delay 300
	012 reset #genOut3

Before Copy
After Copy

8.5.6 Point Job Name Editing

The following explains how to enter a point job data name.

This process can be used for entering a new name and also for modifying a registered name.

First, display the point job data settings screen.

On the Point Job Data settings screen:

TP **EDIT** [Edit Point Job Name]

Select [Edit Point Job Name] from the edit menu.

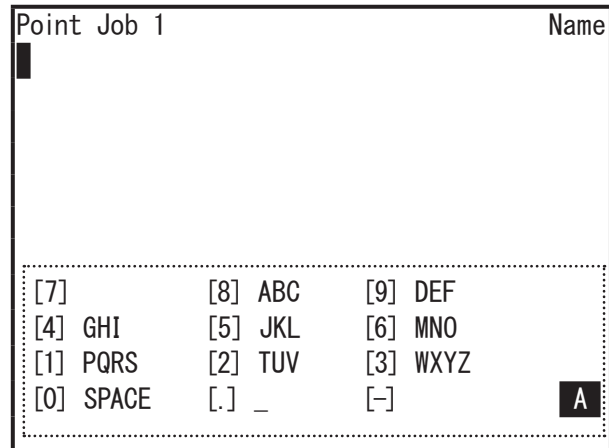
The character entry screen shown to the right appears.

Enter the name you want.

You can set a name with up to 40 – 120 characters depending on the type of characters used. (Up to 120 characters can be entered when using the teaching pendant. When using the PC, the maximum number of characters is 40 depending on the character type.)

However, up to 36 characters* (the maximum number of characters per line) are displayed on the teaching pendant screen. The rest of the characters are not shown.

* If using characters which are those that can be entered using the teaching pendant.



Character Entry Screen Example

8.5.7 Import Merge

Select [Import Merge] from the edit menu to display the copy source point job number entry screen.

After entering the number, the contents of the entered point job data are placed behind the last command line of the currently selected point job data.

TP **EDIT** [Import Merge]

8.5.8 Jumping to a Specified Command Number

This displays the screen which includes the command of the specified number. The cursor moves to the number. Using this function enables you to display the desired command quickly when there are multiple command lines, without needing to press the CURSOR ▾ key over and over.

First, display the settings screen for the point job data that includes the command you want.

TP EDIT [Change Command Number]
[Command Number]

Select [Command Number] to display the change command number entry screen. Enter the command number you want to display.

After you enter the command number, a settings screen which includes the command sections of the entered number is displayed.

8.6 User Defined Messages

User defined messages are data used for registering message character strings.

You can register a character string for each language the robot supports per one message number. You can acquire and display the registered character strings on the teaching pendant using point jobs and the built-in function *getUserMessage()*.

Message character strings acquired with *getUserMessage()* are displayed according to the language settings made in [Teaching Environment Settings].

If you register translated messages for each individual language, a translated message will appear for the language that is set as the display language.

A maximum of 100 user defined messages can be created; message numbers 1 to 50 are created in Teaching Mode and message numbers 51 to 100 are created in Customizing Mode. You can restrict access to message numbers 51 to 100 using Protect Mode settings.

NOTE: There is no need to translate messages for languages that you do not use. We recommend registering English messages, etc., for the language data you do not use.

TP MENU [User Defined Message]
[User Defined Message No.]

Enter the user defined message number or press the F2 (NEW) key and select a number from the displayed list to display the language selection screen. Select a language and enter a message character string. Press the F3 (LIST) key on the user defined message number entry screen to view a list of registered user defined messages. You can edit these messages by selecting a message number from the list.

Key	Function
F0 (DEL)	A number entry screen for deleting user defined messages is displayed. Enter a number to delete the user defined message for that number.
F1 (COPY)	A screen for entering the message number of the copy source is displayed. Enter the copy source number and the copy destination number to copy the user defined message for that the source number to the destination number.
F2 (NEW)	A list of numbers with no user defined messages registered to them is displayed. Select a number from this list to display the language selection screen. Select a language and enter a message character string.
F3 (List)	A list of registered user defined messages is displayed. Select a number from this list to display the language selection screen. Select a language to edit the message character string for that number.

8.7 PLC Programs

A PLC program is a set of logical operation commands for controlling I/O input/output signals, etc. PLC programs are usually activated in Run Mode. For further details regarding teaching for PLC programs etc., refer to the operation manual *Functions III (All Program Common Settings / PLC Programs)*.

You can create PLC program data Nos. 01 – 50 in Teaching Mode.

Use one of the following methods to display the PLC program setting screen.

Method 1

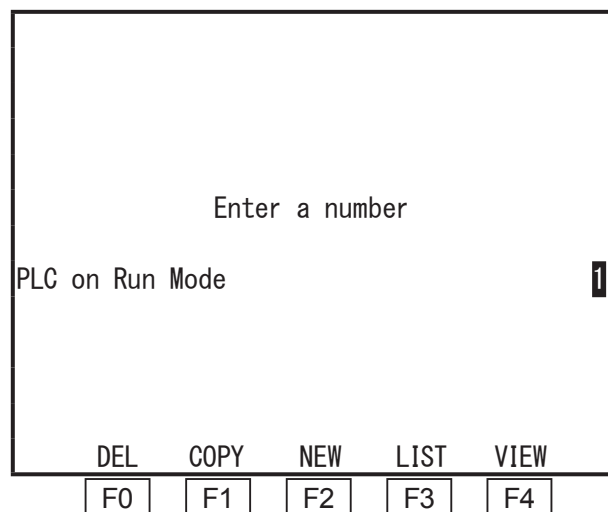
TP → **MENU** [PLC Settings]

Method 2

TP → **MENU** [All Program Common Settings]
 [Job and PLC on Run Mode]
 [PLC Program on Run Mode]

In Method 1, if you enter a PLC program number, or select the number from the list, the settings screen of the PLC program for the entered/selected number is displayed.

In Method 2, if you press the **F4** (VIEW) key on the PLC program number entry screen, the settings screen of the PLC program for the currently displayed number appears.



Example: Method 2
 PLC Program Number Entry Screen

Key	Function
F0 (DEL)	This displays the delete (PLC program) data number entry screen. Enter the PLC program number that you want to delete.
F1 (COPY)	This displays the source (PLC program) data number entry screen. Enter the source number and destination number. The contents of the source PLC program are copied to the destination number.
F2 (NEW)	This displays the unregistered PLC program number list. Select a number from the list. The selected PLC program data settings screen (content not yet entered) appears.
F3 (LIST)	This displays the registered PLC program number list. Select a number from the list. The selected PLC program data settings screen appears.
F4 (VIEW)	This displays the settings screen for the currently displayed PLC program number. You can modify the contents on this screen. NOTE: This key cannot be used with Method 1.

NOTE: The method for entering and editing commands for PLC programs is exactly the same as it is for point job data. Also, the same as with point job data you can set names to PLC programs. Press the **EDIT** key on the PLC program data settings screen to display the name editing screen.

To execute a registered PLC program, you need to set the registered PLC program number to [PLC on Run Mode].

TP **MENU** [All Program Common Settings]
 [Job and PLC on Run Mode]
 [PLC on Run Mode]
 Enter a PLC number

NOTE:

- By entering 0 you can disable (not carry out) the PLC program.
- The registered PLC program is activated once you switch to External Run Mode or Switch Run Mode.

8.8 All Program Common Settings


For details regarding All Program Common Settings refer to the operation manual *Functions III (All Program Common Settings / PLC Programs)*. For operating methods refer to “[3.2 Selection](#)” and “[3.3 Entering Numbers](#)” in this manual.

8.9 Teaching Data Copy, Delete, Conversion

8.9.1 Program List

Use this when you want to check to which program number a certain program is registered.

Key and Item Selection



TP  [Teaching Data Copy, Delete, Conversion]
[Program]
[Program List]

Select [Program List] to display the registered program list.

Unused (unregistered) program numbers will not appear.

Program List	
003	30 Points
007	TEST1
008	20 Points
009	WORK1
016	WORK2
017	TEST55

Registered Program List Example

NOTE: You can press the  key on the base screen and then press the  (LIST) key to select a program.

8.9.2 Copy

When you want to create data similar to an existing program/point job data/additional function data, it can be convenient to make a copy of that data and then edit it accordingly.

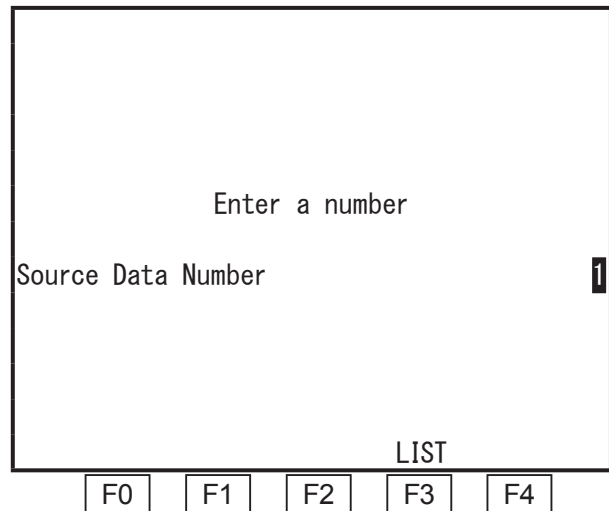
TP **MENU** [Teaching Data Copy, Delete, Conversion]

- [Program]
 - [Copy Program]
 - [Copy Program Data]*
- [PTP Condition Data]
 - [Copy PTP Condition Data]
- [CP Condition Data]
 - [Copy CP Condition Data]
- [Tool Data]
 - [Copy Tool Data]
- [Pallet Routine Data]
 - [Copy Pallet Routine Data]
- [Workpiece Adjustment Data]
 - [Copy Workpiece Adjustment Data]
- [Execute Condition Data]
 - [Copy Execute Condition Data]
- [Point Job Data]
 - [Copy Point Job Data]
- [User Defined Message]
 - [Copy User Defined Message No.]
- [PLC Data]
 - [Copy PLC Data]

* [Copy Program Data] only copies the data content to another program. You cannot use this to create a new program.

Select [Copy xxxx] to display the source number entry screen, as shown to the right.

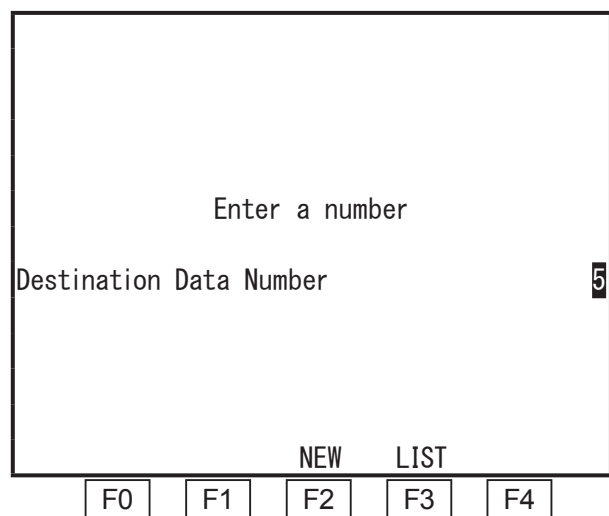
Enter a source number for each data item.



Press the **F3** (LIST) key on the source number entry screen to display a registered program, point job data, or additional function data list. You can select the program/data you want from these lists.

After the source number is entered, the destination number entry screen appears. Enter a destination number for the copy.

On the destination number entry screen, press the **F2** (NEW) key to display the unregistered number list. Press the **F3** (LIST) key to display the registered number list. You can also select the program/data you want from this list.



If the destination number already contains data, a copy confirmation screen appears.

If you select [YES], the data is overwritten.

If you select [NO], the screen returns to the copy destination number entry screen.

Pressing the **ESC** key twice returns you to the copy source number entry screen.

8.9.3 Copy (Multiple)

When you want to create data similar to an existing program/point job data/additional function data, it can be convenient to make a copy of that data and then edit it accordingly.

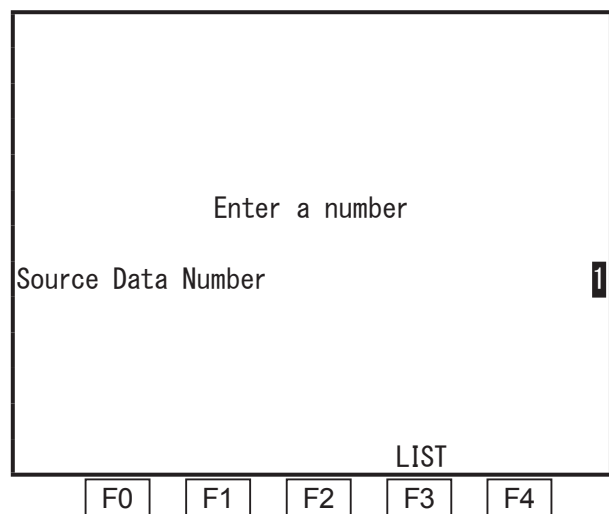
Use the Copy (Many) function to duplicate multiple data sets with one action.

- TP** **MENU** [Teaching Data Copy, Delete, Conversion]
- [PTP Condition]
 - [Copy PTP Condition Data (Many)]
 - [CP Condition]
 - [Copy CP Condition Data (Many)]
 - [Tool Data]
 - [Copy Tool Data (Many)]
 - [Pallet Routine]
 - [Copy Pallet Routine Data (Many)]
 - [Workpiece Adjustment]
 - [Copy Workpiece Adjustment (Many)]
 - [Execute Condition]
 - [Copy Execute Condition Data (Many)]
 - [Point Job]
 - [Copy Point Job Data (Many)]
 - [User Defined Message]
 - [Copy User Def. Message Data (many)]
 - [PLC]
 - [Copy PLC Data (Many)]

Select [Copy xxxx (Many)] to display the source number entry screen, as shown to the right.

Enter a source number for each datum.

Press the **F3** (LIST) key on the source number entry screen to display a registered program, point job data, or additional function data list. You can select the data you want from these lists.

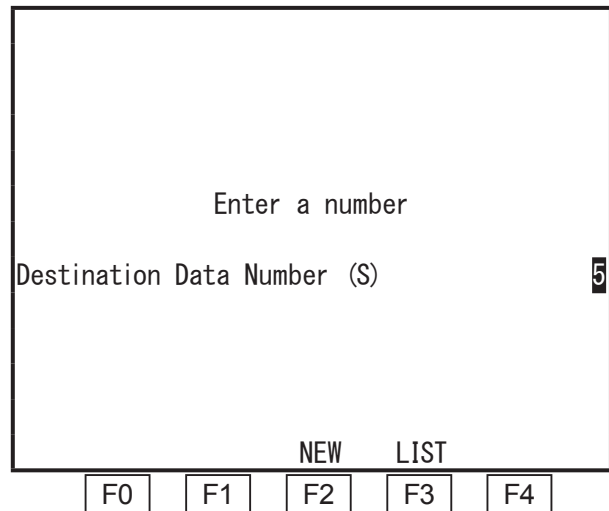


After the source number is entered, the destination data number (S) entry screen appears. Enter the copy start destination number.

NOTE: (S) indicates it is the start number.

On the destination number entry screen, press the **F2** (NEW) key to display the unregistered number list.

Press the **F3** (LIST) key to display the registered number list. You can also select the data you want from this list.

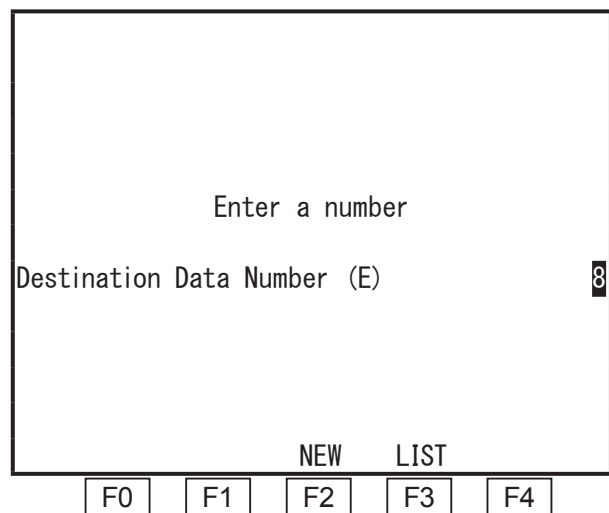


After you enter destination data number (S), the destination data number (E) screen appears.

Enter the copy end destination number.

NOTE: (E) indicates it is the end number.

On the destination number entry screen, press the **F2** (NEW) key to display the unregistered number list. Press the **F3** (LIST) key to display the registered number list. You can also select the data you want from these lists.



The data is copied within the range of destination data number (S) – destination data number (E). The copy source cannot be included in the destination data number (S) – destination data number (E) range.

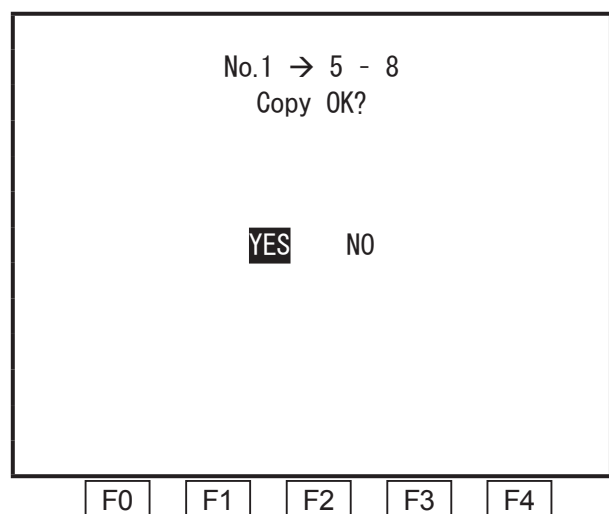
If data is already registered within the destination data number (S) – destination data number (E) range, it is overwritten with the copy source data.

Once you select the copy destination range, a copy confirmation screen appears.

If you select [YES], the data is overwritten.

If you select [NO], the screen returns to the Teaching Data Copy, Delete, Conversion menu.

To change only the destination number, press the **ESC** key on the copy confirmation screen. The screen returns to the previous screen (destination number (E) entry screen).



8.9.4 Delete

This deletes the specified number's program, point job data, or additional function data.

TP **MENU** [Teaching Data Copy, Delete, Conversion]
[Program]
 [Delete Program]
[PTP Condition Data]
 [Delete PTP Condition Data]
[CP Condition Data]
 [Delete CP Condition Data]
[Tool Data]
 [Delete Tool Data]
[Pallet Routine Data]
 [Delete Pallet Routine Data]
[Workpiece Adjustment Data]
 [Delete Workpiece Adjustment Data]
[Execute Condition Data]
 [Delete Execute Condition Data]
[Point Job Data]
 [Delete Point Job Data]
[User Defined Message]
 [Delete User Def. Message Data]
[PLC]
 [Delete PLC Data]

Select [Delete xxx] to display the delete number entry screen, as shown to the right. Enter the number you want to delete.

After the number to delete is entered, the delete confirmation screen appears.

If you select [YES], the program or data is deleted.

If you select [NO], the screen returns to the delete number entry screen.

Enter a number

Delete Number

LIST

F0 F1 F2 F3 F4

Press the **F3** (LIST) key on the delete number entry screen to display a list of all the registered programs. You can also select the number you want to delete from this list.

8.9.5 Delete (Multiple)

This deletes multiple specified program, point job data, or additional function data numbers.

- TP** **MENU** [Teaching Data Copy, Delete, Conversion]
- [PTP Condition]
 - [Delete PTP Condition Data (Many)]
 - [CP Condition]
 - [Delete CP Condition Data (Many)]
 - [Tool Data]
 - [Delete Tool Data (Many)]
 - [Pallet Routine]
 - [Delete Pallet Routine Data (Many)]
 - [Workpiece Adjustment]
 - [Delete Workpiece Adjustment (Many)]
 - [Execute Condition]
 - [Delete Execute Condition Data (Many)]
 - [Point Job]
 - [Delete Point Job Data (Many)]
 - [User Defined Message]
 - [Delete User Def. Message Data (Many)]
 - [PLC]
 - [Delete PLC Data (Many)]

Select [Delete xxxx (Many)]. The delete number entry screen is displayed, as shown to the right.

Enter the start number for the data block you want to delete.

Enter a number

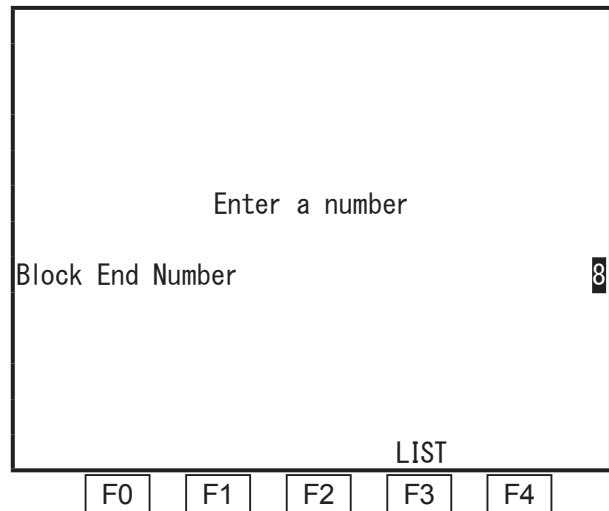
Block Start Number 5

LIST

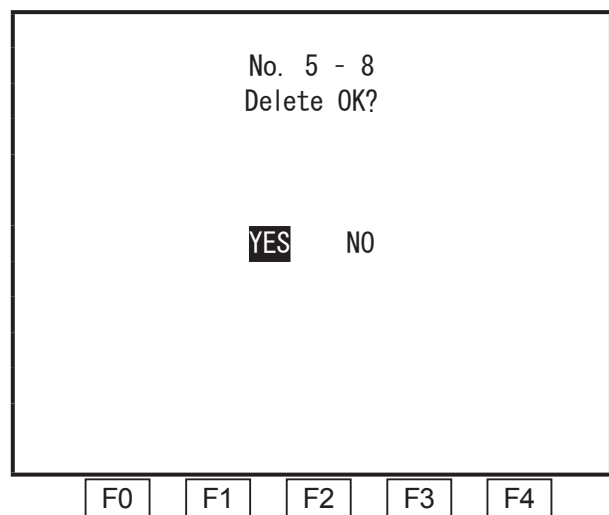
F0 F1 F2 F3 F4

Once the block start number is set, the block end number entry screen is displayed, as shown to the right. Enter the end number of the block you want to delete.

Once the data number range you want to delete is entered, the delete confirmation screen is displayed. Select [YES] to perform the delete operation. Select [NO] to return to the delete number entry screen.



Press the **F3** (LIST) key on the delete number entry screen to display a list of all the registered programs. You can also select the numbers you want to delete from this list.



8.9.6 Change Program Number

This edits the program numbers.

The procedure described below produces the same result as copying a program, giving it a new name, and then deleting the original program.

TP **MENU** Teaching Data Copy, Delete, Conversion]
[Program]
[Change Program Number]

Select [Change Program Number] to display the source program number entry screen, as shown to the right.
Enter the program number you want to change.

After a source program number is entered, the destination program number entry screen appears.
Enter the new program number you want to use.

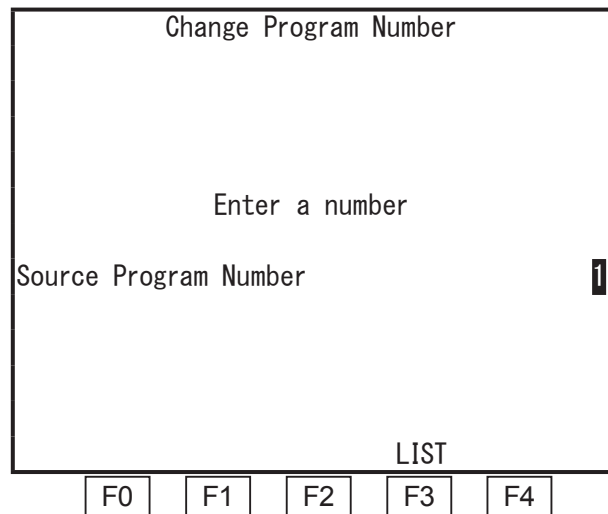
If a program already exists for the selected destination number, the copy confirmation screen appears.

If you select [YES], the program is overwritten.

If you select [NO], the screen returns to the source program number entry screen.

If you want to change only the destination program number, press the **ESC** key on the copy confirmation screen. The screen returns to the previous screen (destination program number entry screen).

Press the **F3** (LIST) key on the source program number or destination program number entry screen to display the registered program list. To display the unregistered program number list, press the **F2** (NEW) key on the destination program number entry screen. You can also select program numbers from these lists.



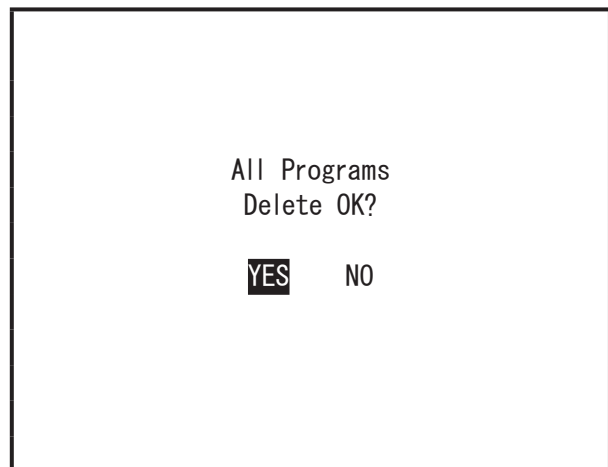
8.9.7 Delete All

This deletes all the registered programs, point job data, or additional function data. (Additional function data is deleted by category.)

- TP** **MENU** [Teaching Data Copy, Delete, Conversion]
- [Program]
 - [Delete All Programs]
 - [PTP Condition Data]
 - [Delete All PTP Condition Data]
 - [CP Condition Data]
 - [Delete All CP Condition Data]
 - [Tool Data]
 - [Delete All Tool Data]
 - [Pallet Routine Data]
 - [Delete All Pallet Routine Data]
 - [Workpiece Adjustment Data]
 - [Delete All Workpiece Adjustment]
 - [Execute Condition Data]
 - [Delete All Execute Condition]
 - [Point Job Data]
 - [Delete All Point Job Data]
 - [User Defined Message]
 - [Delete All User Def. Message Data]
 - [PLC Data]
 - [Delete All PLC Data]

Select [Delete All xxxx] to display the delete all confirmation screen, as shown to the right.
Select [YES], to delete all of the selected data.

NOTE: Point job data numbers 101 and above, and additional function data, PLC programs, user defined messages 51 and above are included in Customizing Data and therefore cannot be deleted by this operation.



Delete All Programs Confirmation Screen Example

8.9.8 Delete All Teaching Data

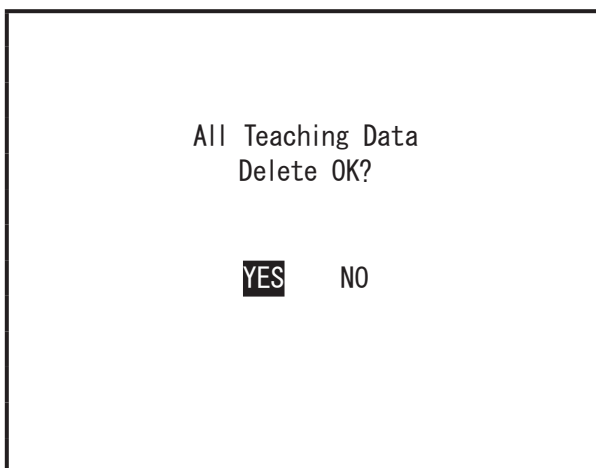
Executing [Delete All Teaching Data] erases all of the following data or returns their set values to their default values:

Data	Delete/Revert to Default Values
All programs	Delete
Point job data (1 – 500)*	Delete
Additional function data (1 – 50), Workpiece adjustments 1 – 3000*	Delete
User defined messages (1 – 50)*	Delete
PLC programs (1 – 50)*	Delete
All condition data	Revert to default values
All common data	Revert to default values
All program common settings	Revert to default values

* Point job data (501 – 1000), additional function data (51 – 100), user defined messages (51 – 100), and PLC programs (51 – 100) are included in Customizing Data. These cannot be deleted through this operation.

TP **MENU** [Teaching Data Copy, Delete, Conversion]
 [Delete All Teaching Data]

Select [Delete All Teaching Data] to display the delete all teaching data confirmation screen, as shown to the right.
 Select [YES].



Delete All Teaching Data Confirmation Screen

8.9.9 Reset Individual Program Settings to Default Values

By executing [Reset Individual Program Settings], all the individual program settings for the selected program number return to their default values.

TP **MENU** [Teaching Data Copy, Delete, Conversion]
[Reset Individual Program Settings]
Enter the program number
[YES]
[NO]

8.9.10 Reset All Program Common Settings to Default Values

Performing the [Reset All Program Common Settings] operation completely resets All Program Common Settings to their defaults.

TP **MENU** [Teaching Data Copy, Delete, Conversion]
[Reset All Program Common Settings]
[YES]
[NO]

■ Default Values

By performing [Delete All Teaching Data], [Reset Individual Program Settings], or [Reset All Program Common Settings], the setting values are reset to their default values. These default values are set in [Default All Program Common Settings].

[Default All Program Common Settings] are set at the factory for each model; but they can also be changed in Customizing Mode. However, the values set in Teaching Mode → **MENU** → [Individual Program Settings] or [All Program Common Settings] take priority and are applied during runs.

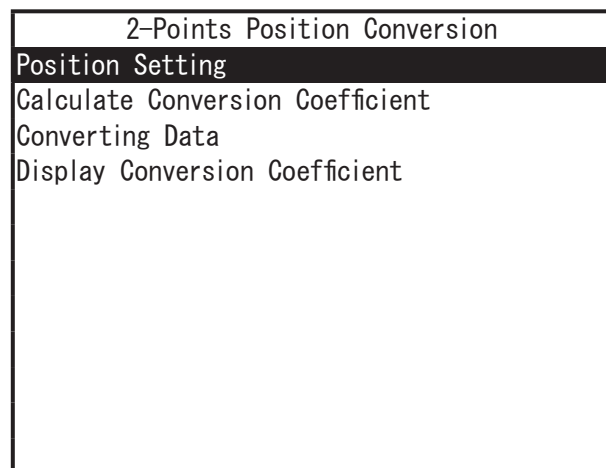
Refer to the operation manual *Functions IV (Customizing)* for more information.

8.9.11 2-Point Position Conversion (Move, Rotate)

By designating two points at the conversion source (standard) and the two corresponding points at the conversion destination, you can perform parallel and rotational coordinate conversions with the X, Y, and Z axes.

You can use this function to match up coordinates when importing teaching data from one robot to multiple robots, or to match up coordinates when importing CAD data via a DXF file, etc. Specifying two points respectively at the conversion source and conversion destination allows you to do the [block edit] operations [offset] and [rotate].

- TP** MENU
- [Teaching Data Copy, Delete, Conversion]
- [2-Points Position Conversion]
- [Position Setting]
- [Calculate Conversion Coefficient]
- [Converting Data]
- [Display Conversion Coefficient]

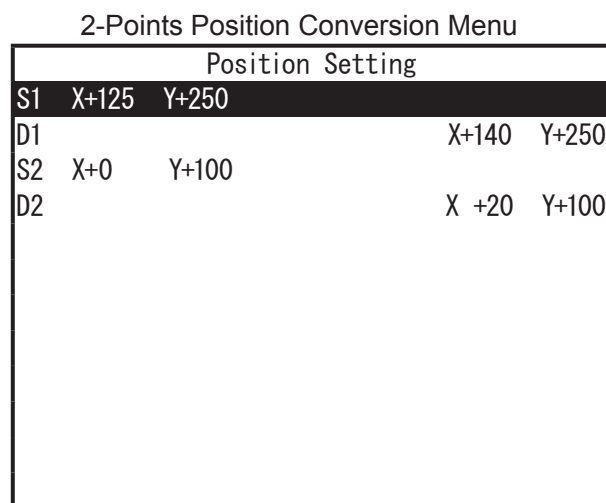


Select [Position Setting] to display the screen on the right.

S1 and S2 are the coordinates of the conversion source. D1 and D2 are the coordinates after conversion.

Select each item and enter the coordinates. (After an item is selected, the position entry screen appears.)

After inputting each coordinate for S1, S2, and D1, D2 (conversion source and conversion destination), press the ESC key. The screen reverts to the 2-point position conversion menu.

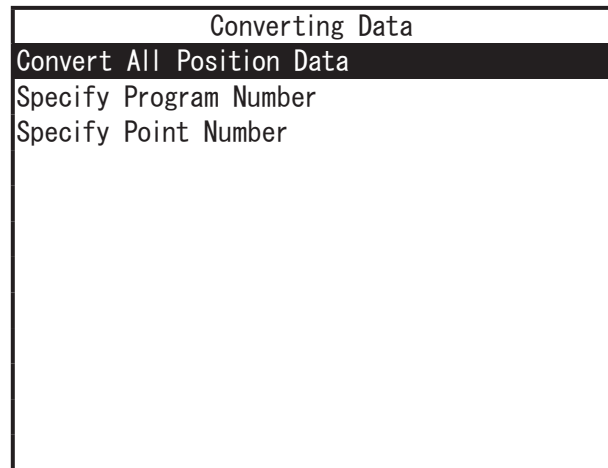


Select [Calculate Conversion Coefficient].

Next, select [Display Conversion Coefficient] to check the conversion coefficient. After confirmation, press the ESC key to return to the 2-point position conversion menu.

Select [Converting Data] from the 2-point position conversion menu.
The screen shown to the right is displayed.

Select the point range that you want to convert.



- Selecting [Convert All Position Data], converts the following coordinates:
 - Position coordinates from Point 1 to the last point in all programs (excluding the [Work Home] position coordinates)
 - Position coordinates for common data items which include coordinate values as parameters
 - Robot calibration coordinates for camera workpiece adjustments
 - Reference mark positions (robot coordinates) for camera workpiece adjustments
 - Coordinates of [Standard (p0)], [Row (pa)], [Column (pb)] and [Tier (pc)] for additional function data, [Pallet Routine]
 - Robot calibration coordinates for camera pallets
 - Reference positions for camera pallets (robot coordinates)

- If you select [Specify Program Number], a program number entry screen appears. Enter the program number and the following coordinates are converted:
 - Position coordinates from Point 1 to the last point in the designated program

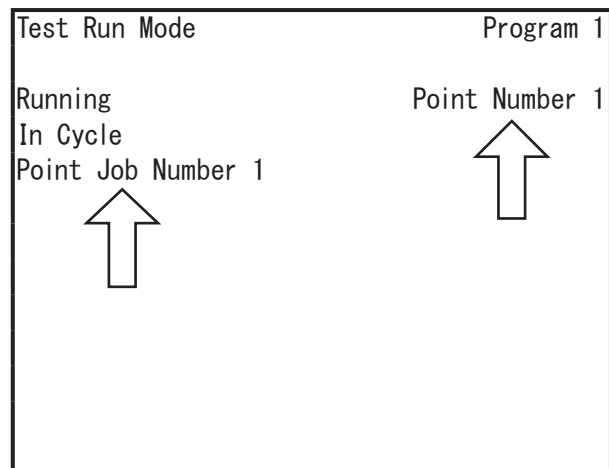
- If you select [Specify Point Number], a block start number entry screen appears. Enter the start number, and the block end number entry screen appears. Once you systematically enter the block start number and the block end number, the following coordinates are converted:
 - The position coordinates of points within the specified block of the currently selected program

8.10 Display Point No.

With this function you can display the point number and point job number for the point the robot moved to during a test run. Use this when you want to confirm the point number while performing test runs.

Enter Teaching Mode, press the **MENU** key and select [Display Point No.]. Select to either enable or disable this function. This is disabled by default.

When [Display Point No.] is enabled, the point number and point job number for the point the robot moved to is displayed during the run, as shown to the right appears.



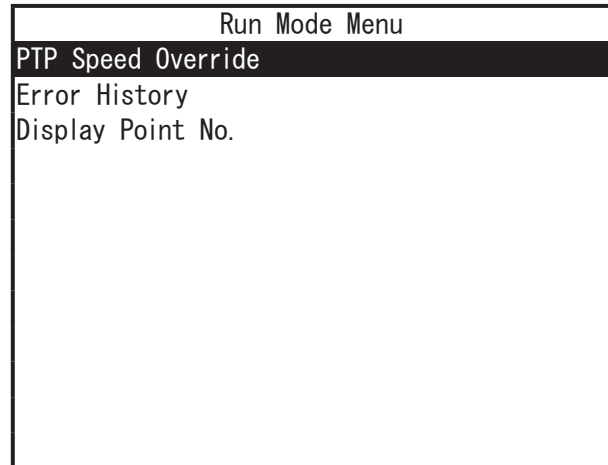
Test Run Screen Example

NOTE: The point job number is displayed on the LCD while the point job is executed. If the processing time of the point job is short, the point job number may not appear on the LCD.

9. RUN MODE MENU (**MENU**)

When at the Run Mode base screen, press the **MENU** key to bring up the Run Mode menu screen. Run Mode menu contains [PTP Speed Override], [Error History], and [Display Point No.].

Use [PTP Speed Override] to reduce the PTP speed during runs, use [Error History] to view the error history log, and use [Display Point No.] to set whether or not point numbers are displayed during runs.

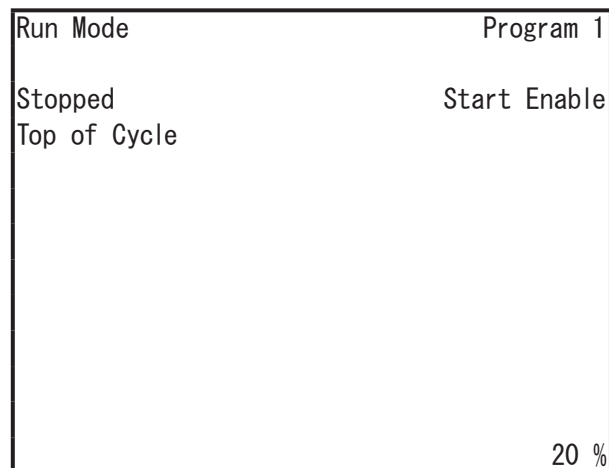


9.1 PTP Speed Override

The PTP speed in Run Mode can be reduced by setting a percentage in the [PTP Speed Override] setting (this does not affect the CP speed). Use this when you want to run a new program initially at a low speed.

When in Run Mode, press the **MENU** key and select [PTP Speed Override].
Enter the speed percentage you want to set.

When you want to set a percentage other than 100 %, the Run Mode base screen, as shown to the right, appears.



9.2 Error History

You can view error history by pressing the **MENU** key at the base screen and selecting [Error History] from the menu.

TP **MENU** [Error History]

Error History					Error Description				
2015	1/15	12:20	45	Error No.001	2015	1/15	12:20	45	Error No.001
2015	1/15	15:20	32	Error No.082					
2015	1/15	09:20	20	Error No.082					
					Error No.001 Enter the number of a registered program				

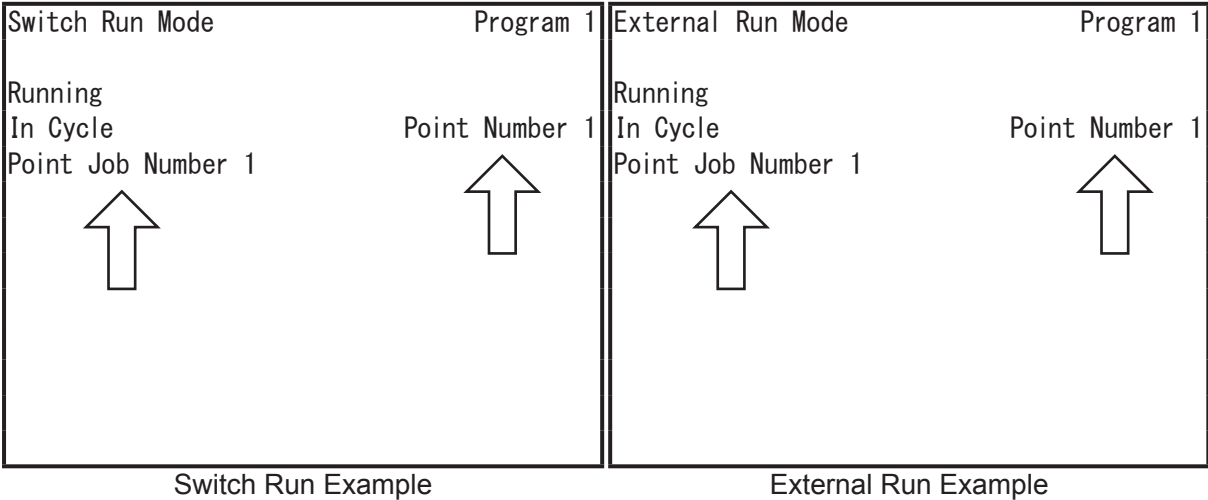
For further details regarding error notification and error history, refer to the operation manual *Maintenance*.

9.3 Display Point No.

With this function you can display the point number and point job number for the point the robot moved to during Switch Run Mode or External Run Mode. Use this when you want to confirm the point number while running the robot.

Enter Switch Run Mode or External Run Mode, press the MENU key and select [Display Point No.]. Select to either enable or disable this function. This is disabled by default.

When [Display Point No.] is enabled, the point number and the point job number the robot moved to during the run is displayed on the teaching pendant, as shown in the diagrams below. If this is disabled, the point number is not displayed.



NOTE: The point job number is displayed on the LCD while the point job is executed. If the processing time of the point job is short, the point job number may not appear on the LCD.

11. DELETE ALL C&T DATA

This deletes all C&T data (customizing data and teaching data) on the robot.

Caution

If you are using a model other than a Standard Specification model, do not perform this operation. Dedicated application data for Screw Tightening, Dispensing etc., is registered as customized data in a specialized account. Performing this operation not only deletes customizing data, but the robot will no longer normally function as a specialized application model.



If the specialized application data is deleted by mistake, refer to “5. Transmitting Robot System Software” in the operation manual *Setup* for the JR3000 Series, or “6.3 Transmitting Robot System Software” in the operation manual *Setup* for the JC-3 Series, and send the system software to the robot.

If using model specifications other than Standard Specifications, use “Delete All Teaching Data” (key).

TP

[Administration]

[Administration Settings Mode]

[Clear All C&T Data]

Perform [Clear All C&T Data] to delete all customizing and teaching data.

Once data has been deleted it cannot be restored. Always confirm whether it is okay to erase the data before deletion. We recommend you backup data before deleting C&T data.

12. LCD BACKLIGHT ON/OFF

When in Run Mode, this turns the backlight of the teaching pendant LCD ON and OFF (the backlight only; information is still displayed). During Teaching Mode this setting does not work; the backlight is permanently lit.

NOTE: The backlight ON/OFF settings for when in Teaching Mode are made from teaching environment settings in Teaching Mode. (Teaching Mode → UTILITY → [Teaching Environment Settings] → [Backlight on Teaching] → [ON/OFF])

Administration Mode

TP MODE [Administration]
 [Administration Settings Mode]
 [Back Light Auto OFF]
 [Auto OFF Invalid]
 [ON with Key or at Start]
 [ON with Key]
 [ON at Start]
 [Always OFF]

Item	Details
Auto OFF Invalid	The backlight does not turn OFF. The backlight is permanently lit.
ON with Key or at Start	The backlight comes ON with a key push or a run start. The backlight is ON for the duration of the run. Other than the time set* while the robot is in standby, if there are no key pushes or run starts, the backlight is OFF.
ON with Key	While the robot is in standby, pushing any key turns the backlight ON. Other than the time set* while the robot is in standby, if there are no key pushes, the backlight is OFF. Keys pushed during a run are not recognized.
ON at Start	If a run is started when the robot is in standby, the backlight comes ON and stays on for the duration of the run. Other than the time set* while the robot is in standby, if there are no run starts, the backlight is OFF.
Always OFF	In Run Mode the backlight is always OFF. This is ON to start with; it turns OFF after the set wait time is exceeded.

* Select [ON with Key or at Start], [ON with Key], [ON at Start], or [Always OFF] and a screen for entering a wait time appears.

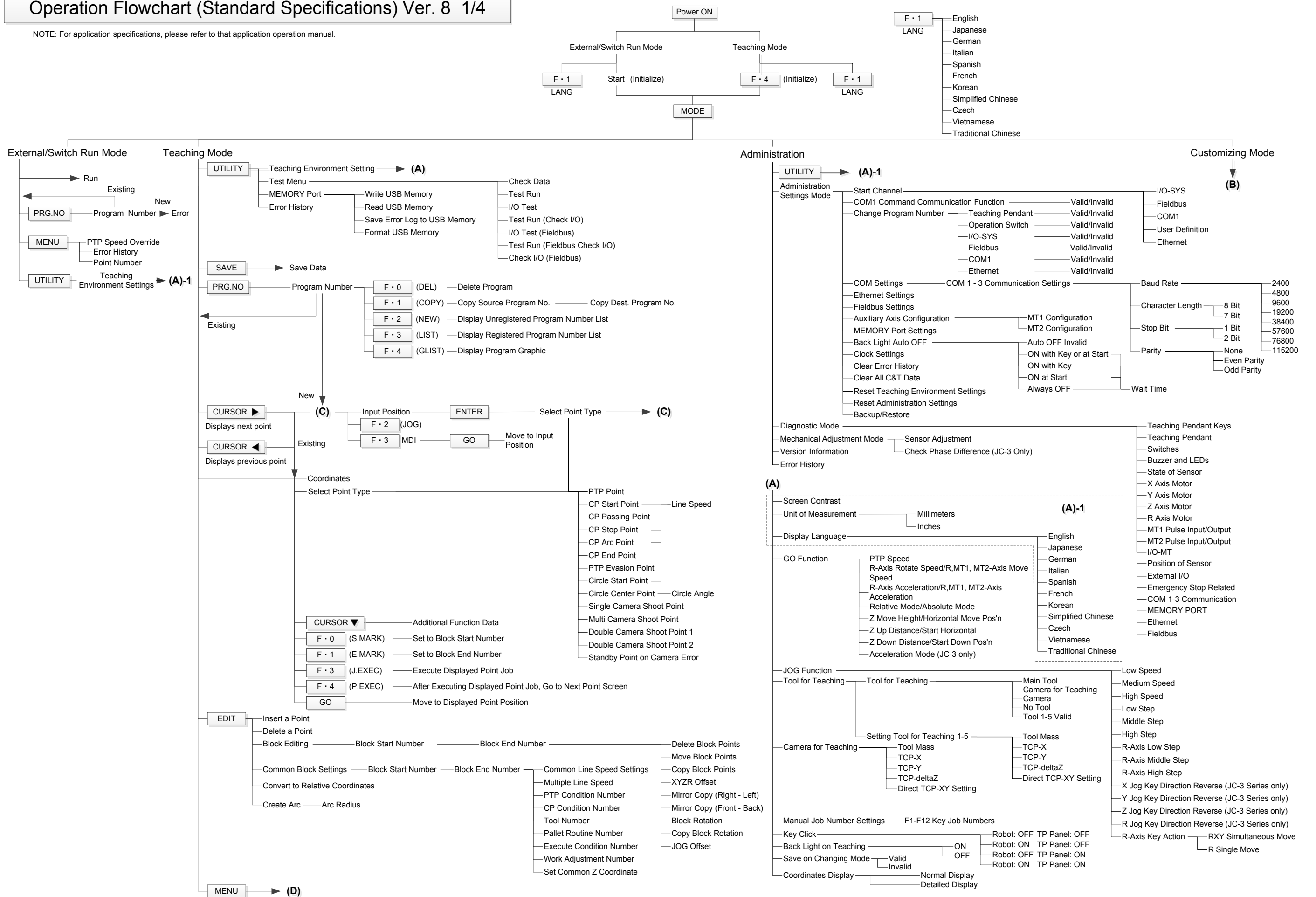
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13. OPERATION FLOWCHART

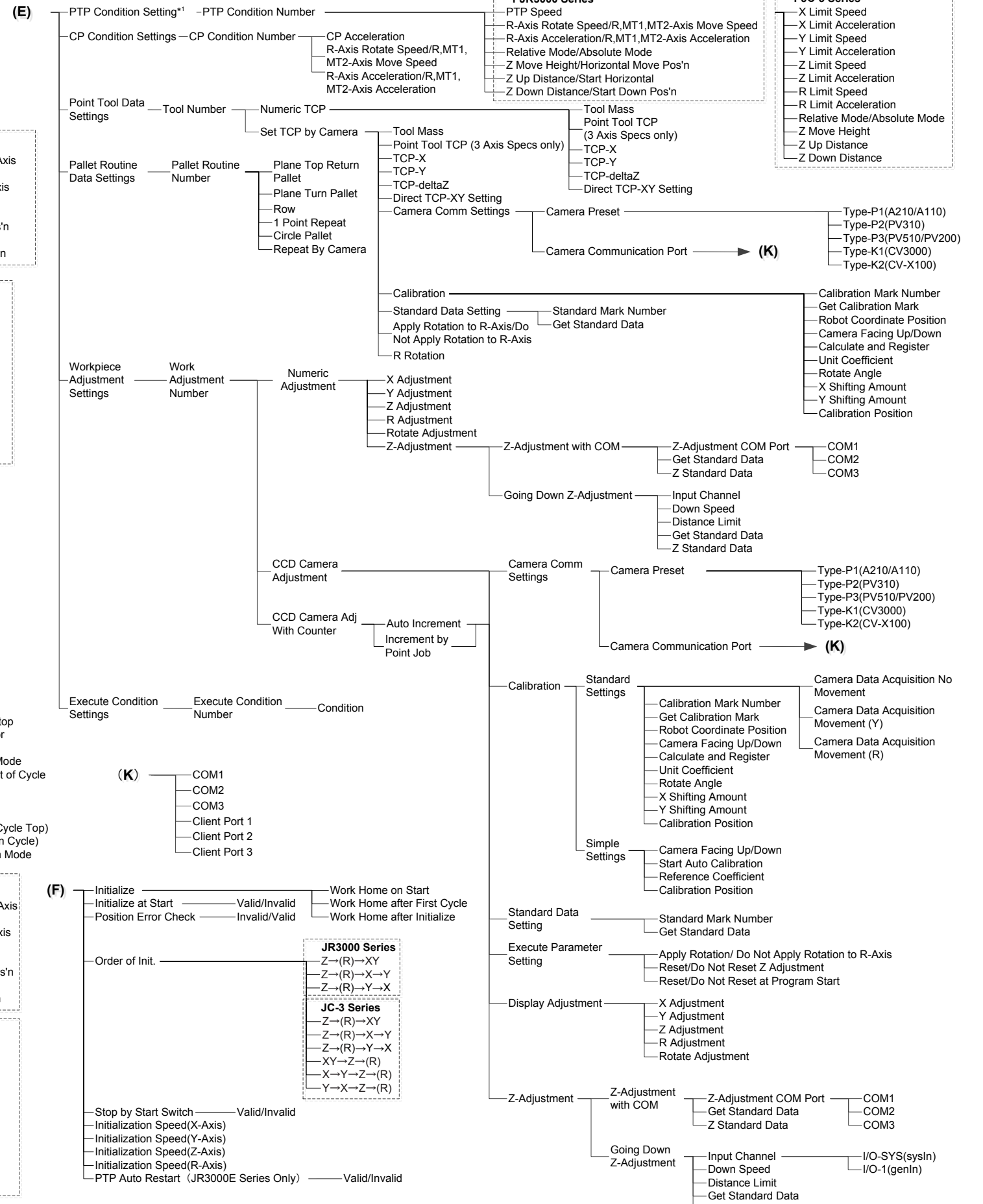
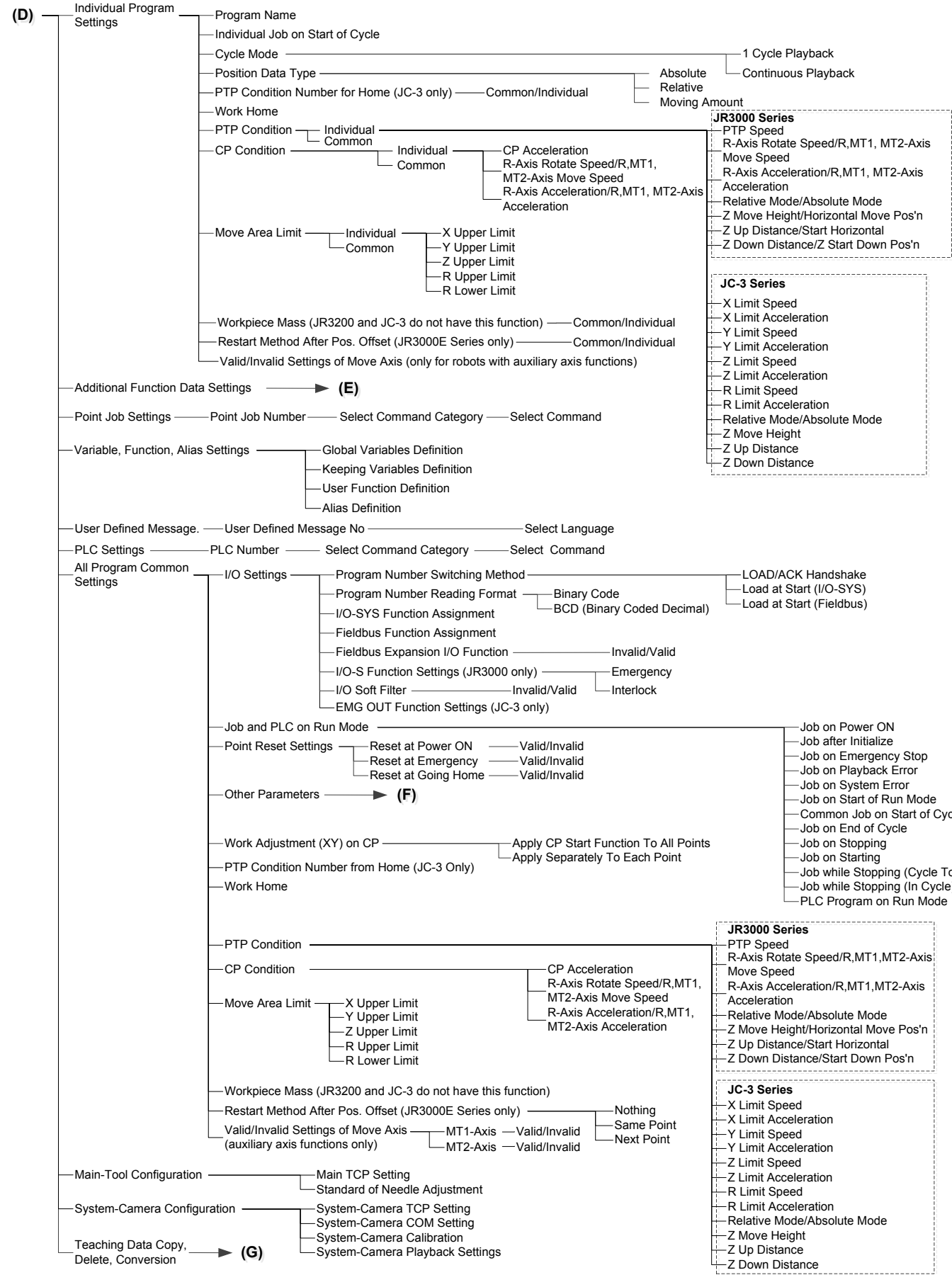
- The menu items displayed may vary depending on the model or functions of your robot.
- Items related to the R-axis are generally only displayed for 4-axis models. Some R-axis related items may be displayed for 2-axis and 3-axis models, however they do not function when set on a 2-axis or 3-axis model.
- Items that include the identifier “MT” are only displayed for models with auxiliary axis functions.

Operation Flowchart (Standard Specifications) Ver. 8 1/4

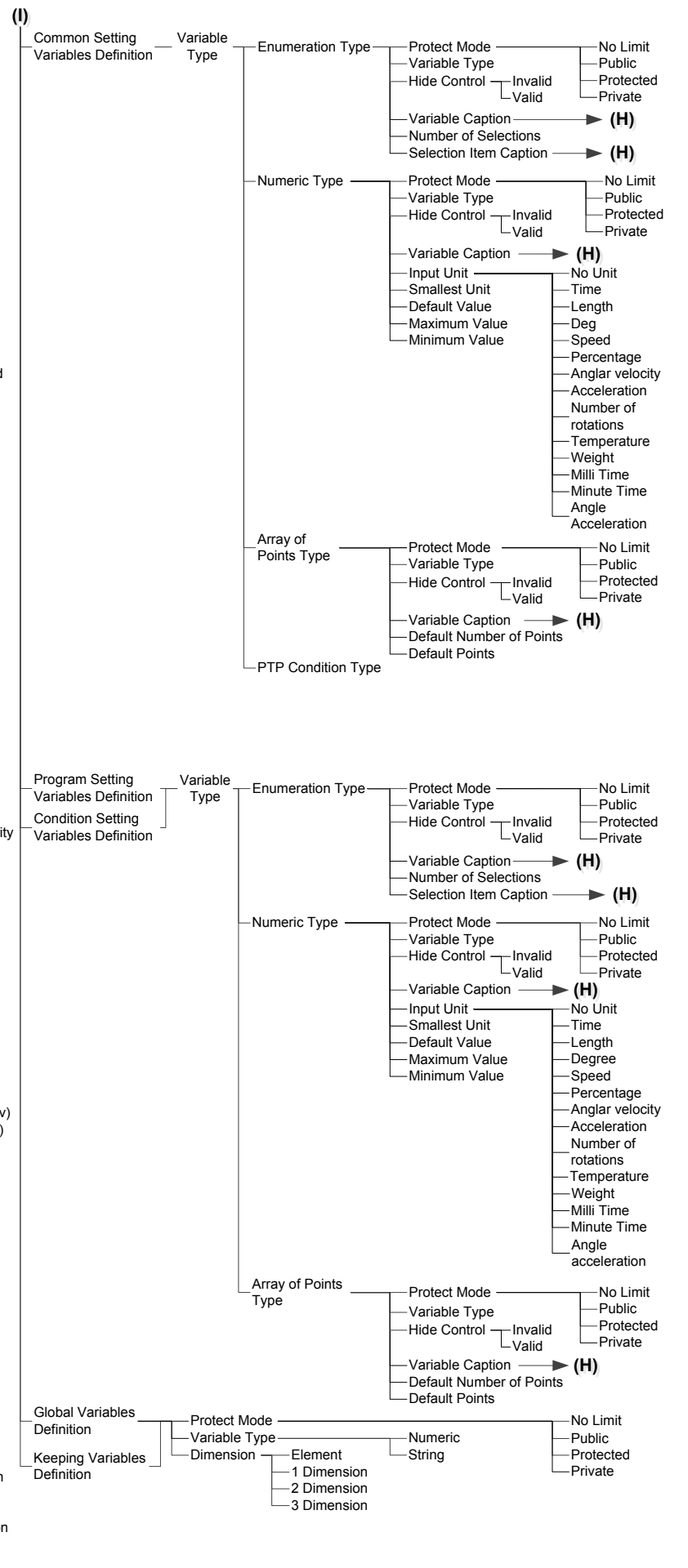
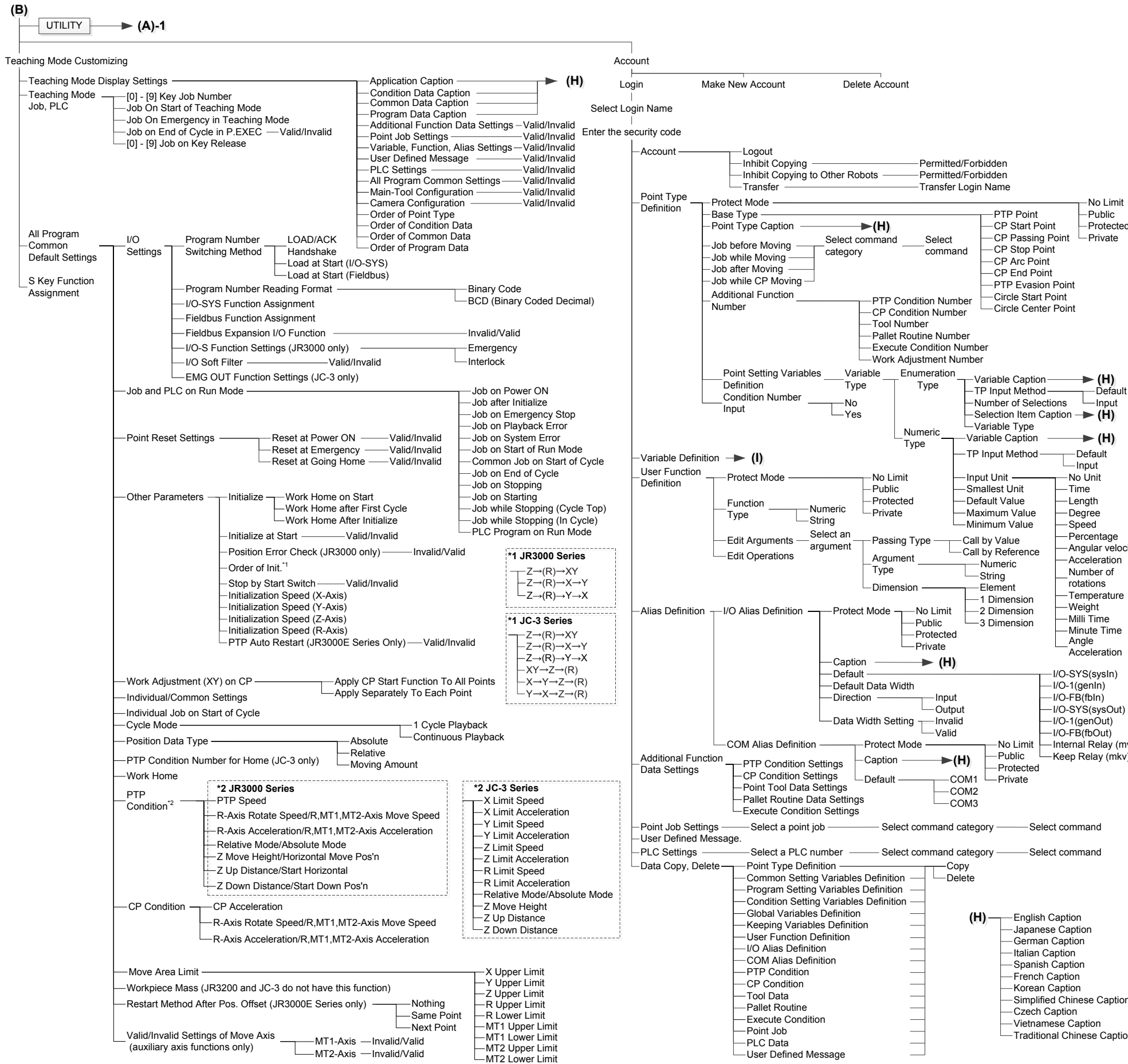
NOTE: For application specifications, please refer to that application operation manual.



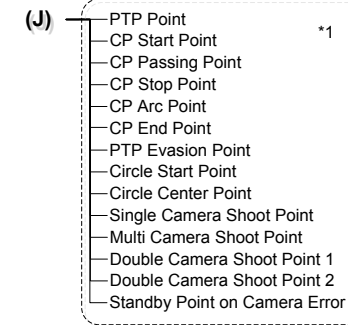
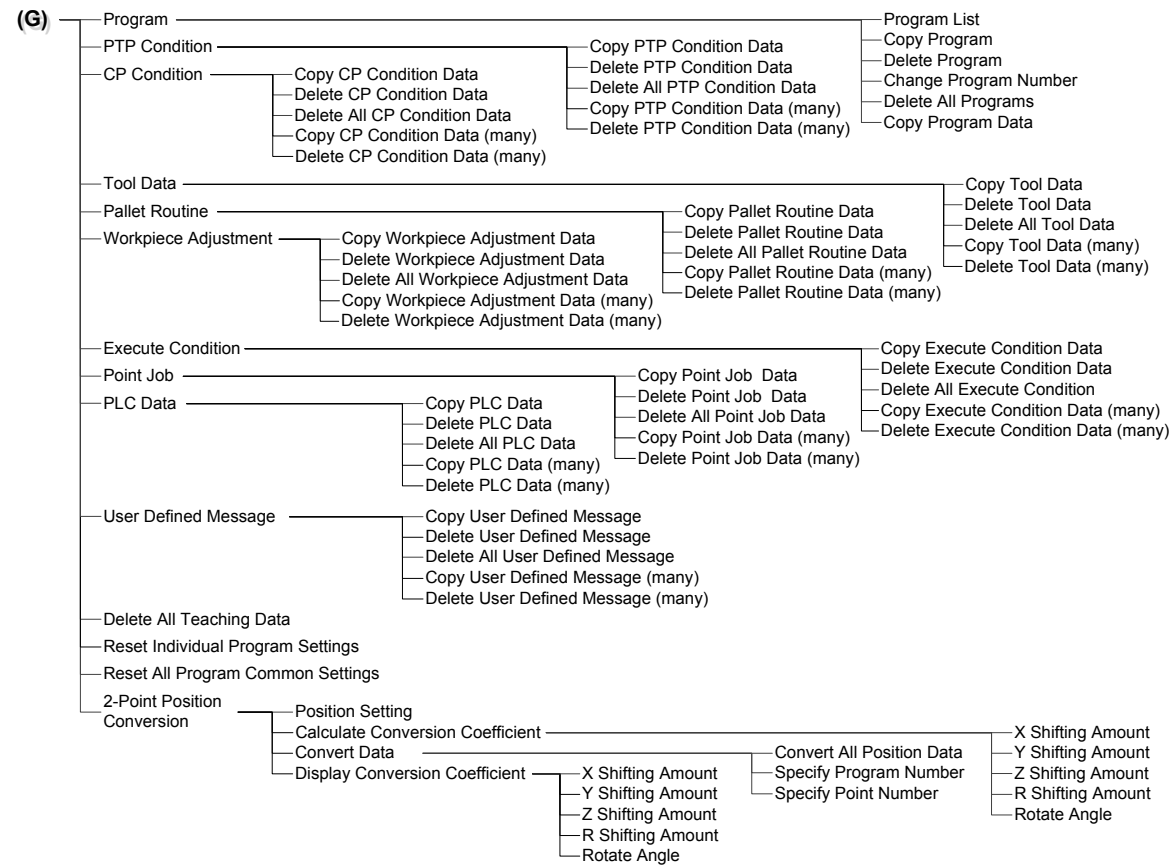
Operation Flowchart (Standard Specifications) Ver. 8 2/4



Operation Flowchart (Standard Specifications) Ver. 8 3/4



Operation Flowchart (Standard Specifications) Ver. 8 4/4



*1: An identifier is listed on the left and the point name is listed on the right. However, the point name may be omitted if the identifier requires the character spacing.

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