EPSON

Epson RC+ 8.0
Visual Programming

Original instructions

© Seiko Epson Corporation 2021 - 2026

Rev.7
ENM269S9037F

Table of Contents

1. FOREWARD 5

1.1 Introduction 6

1.2 Trademarks 6

1.3 Notation 6

1.4 Terms of Use 6

1.5 Manufacturer 6

1.6 Contact Information 6

1.7 About Manuals 7

1.7.1 Symbols 7

1.7.2 About Manuals 7

2. Overview 9

2.1 Visual Programming Features 10

3. Visual Programming Mode 12

3.1 How to Start Visual Programming Mode 13

3.2 Software Screen Configuration 13

3.2.1 Home Screen 13

3.2.2 Program Screen Layout 14

3.2.2.1 Program Editing Screen 14

3.2.2.2 Status Bar 15

3.2.3 Creating a New Program 16

3.2.3.1 Creating Program from a template 16

3.2.3.2 Creating a New Program 17

3.2.4 Executing a Program 18

3.2.4.1 Executing a Program to Check for Problems 18

3.2.4.2 Checking Event Log 20

3.2.5 Editing a Program 21

3.2.5.1 Perform Basic Program Settings 21

3.2.5.2 Command Operation List 21

3.2.5.3 Setting a Program Operation 22

3.2.5.4 Adding a Command 23

3.2.5.5 Undo, Redo 23

3.2.5.6 Save 23

3.2.5.7 Copy and Paste 23
3.2.5.8 Cut and Paste 23
3.2.5.9 Deleting a Command 24
3.2.5.10 Skipping a Command 24
3.3 Creating a Program 24
3.3.1 Operating Robot 24
3.3.1.1 Jog Screen 24
3.3.1.2 Motor 25
3.3.1.3 3D View 25
3.3.1.4 Jog Mode (Easy, Joint, World, Tool) 25
3.3.1.5 Jog Speed & Jog Distance 28
3.3.1.6 Arm Posture 28
3.3.1.7 How to Check the Robot Motion 28
3.3.2 Command Function 29
3.3.2.1 About Command 30
3.3.2.2 Command Function List: 30
3.3.2.2.1 Motor On 32
3.3.2.2.2 Motor Off 32
3.3.2.2.3 Move To 33
3.3.2.2.4 Grip 34
3.3.2.2.5 Release 34
3.3.2.2.6 Container 35
3.3.2.2.7 Pick from 35
3.3.2.2.8 Place at 36
3.3.2.2.9 Move forward 37
3.3.2.2.10 Reset 37
3.3.2.2.11 Output 38
3.3.2.2.12 Wait 38
3.3.2.2.13 Loop 41
3.3.2.2.14 If 41
3.3.2.2.15 Comment 44
3.3.2.2.16 Quit 44
3.3.2.2.17 Ask 44
3.3.2.2.18 Notify 45
3.3.2.2.19 Event Log 45

3.3.2.2.20 SPEL+ Command 45
3.3.2.2.21 Variable 45
3.3.2.2.22 Function 46
3.3.3 Creating New Pallet 46
3.3.4 Editing Point Data 47
3.3.5 Displaying SPEL Codes 47
4. Program Mode 48
4.1 Creating a Visual Program 49
4.2 Using Visual Programs from SPEL Programs 50
5. Appendix 52
5.1 Using the Epson RC+ Express Edition Programs 53

1. FOREWARD

1.1 Introduction

Thank you for purchasing this Epson robot system. This manual provides the information necessary for correctly using the robot system.
Before using the system, please read this manual and related manuals to ensure correct use.
After reading this manual, store it in an easily accessible location for future reference.

Epson conducts rigorous testing and inspection to ensure that the performance of our robot systems meets our standards. Please note that if the Epson robot system is used outside the operating conditions described in the manual, the product will not perform up to its basic performance.

This manual describes potential hazards and problems that are foreseen. To use the Epson robot system safely and correctly, be sure to follow the safety information contained in this manual.

1.2 Trademarks

Microsoft, Windows, and the Windows logo are either registered trademarks or trademarks of Microsoft Corporation in the United States and/or other countries. All other company names, brand names, and product names are registered trademarks or trademarks of their respective companies.

1.3 Notation

Microsoft® Windows® 10 operating system
Microsoft® Windows® 11 operating system
In this manual, the above operating systems are referred to as Windows 10 and Windows 11, respectively. Windows 10 and Windows 11 are sometimes collectively referred to as Windows.

1.4 Terms of Use

No part of this instruction manual may be reproduced or reprinted in any form without express written permission.
The information in this document is subject to change without notice.
Please contact us if you find any errors in this document or if you have any questions about the information in this document.

1.5 Manufacturer

SEIKO EPSON CORPORATION

1.6 Contact Information

Contact information details are listed in the "Supplier" section in the following manual.
Note that the contact information may vary depending on your region.
"Safety Manual - Contact Information"

The Safety Manual is also available at the following site.
URL: https://download.epson.biz/robots/

1.7 About Manuals

1.7.1 Symbols

Each symbol has following meanings.

⚠ WARNING

This symbol indicates an imminently hazardous situation which, if operation is not performed properly, will result in death or serious injury.

⚠ CAUTION

This symbol indicates a potentially hazardous situation which, if operation is not performed properly, may result in an injury or in property damage only.

KEY POINTS

This symbol describes hints or additional explanations for easier or alternative operations.

1.7.2 About Manuals

Viewing manuals

- Select Epson RC+ 8.0 menu-[Help] - [Manual].
- From the desktop, click [Start] - [Program] - [Epson RC+ 8.0] - [Epson Robot Manuals].
- You can also view them from the following website:

  URL: https://download.epson.biz/robots/

This manual contains pages that refer to other manuals.

Manual title	Contents
Safety Manual	Precautions for safety use of the robot system and contact information
Robot Controller Safety Function Manual	About Safety Board or Safety Function Manager and usage

Manual title	Contents
Epson RC+ User's Guide	How to Use and configure robot systems and Epson RC+
SPEL+ Language Reference	Contents of SPEL+ (robot programming language)
Manipulator Manual	Controller specifications, installation, settings and maintenance methods
Controller Manual	Controller specifications, installation, settings and maintenance methods
Robot Controller Option Fieldbus I/O	How to use Fieldbus I/O (controller option)

Regarding the wording in the manual

The illustrations in this manual are for reference only. The screens and illustrations may differ depending on the model you are using, but the operating procedures remain the same.

2. Overview

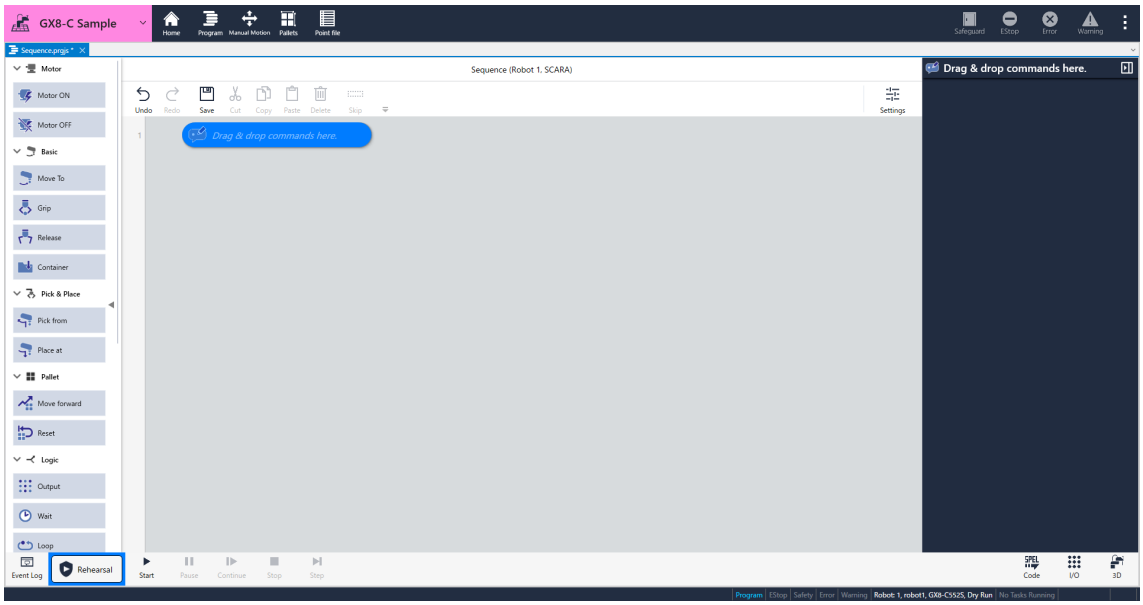
2.1 Visual Programming Features

RC+'s visual programming features allow you to quickly and easily create simple applications, even without specialized robotics knowledge.
The main features are as follows:

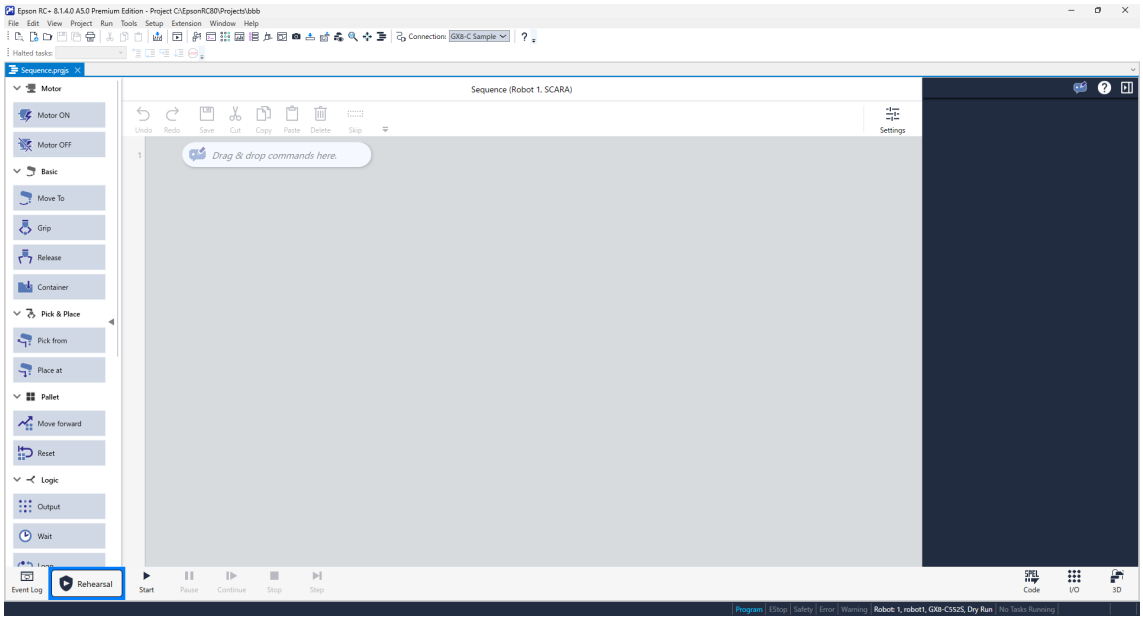
- Creating robot program by drag and drop.
- Operating tablet intuitively with touch UI.

There are two ways to use the visual programming features in RC+:

- Start RC+ in visual programming mode
  The visual programming mode is a dedicated screen for visual programming, allowing you to quickly create simple applications without having to be familiar with SPEL programming.



- Use with RC+ program mode (Standard Edition and higher).
  Visual programming can also be performed from the RC+'s program mode. SPEL programs and visual programs can be linked together, enabling efficient program development and maintenance.



KEY POINTS

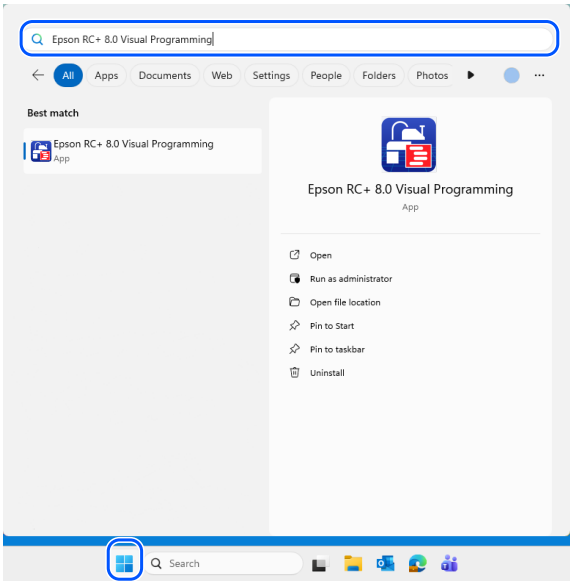
You can convert programs created with Epson RC+ Express Edition into projects that can be used with RC+'s visual programming features.
Refer to the section below for instructions on replacement.
Using the Epson RC+ Express Edition Programs

3. Visual Programming Mode

The visual programming mode allows you to quickly create simple applications without having to be familiar with SPEL programming.

3.1 How to Start Visual Programming Mode

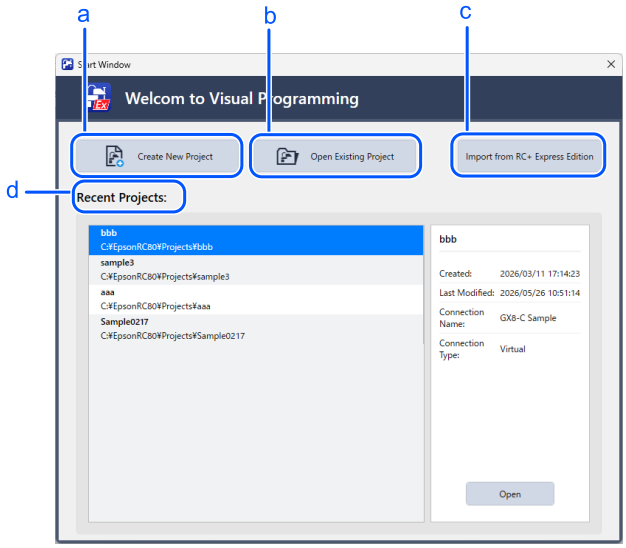
Tap Windows start menu - [Epson RC+ 8.0 Visual Programming].
Alternatively, you can start the dedicated screen for visual programming mode by specifying /VISUALPROG as a startup option for RC+.



3.2 Software Screen Configuration

3.2.1 Home Screen

The home screen of the visual programming mode will be displayed.



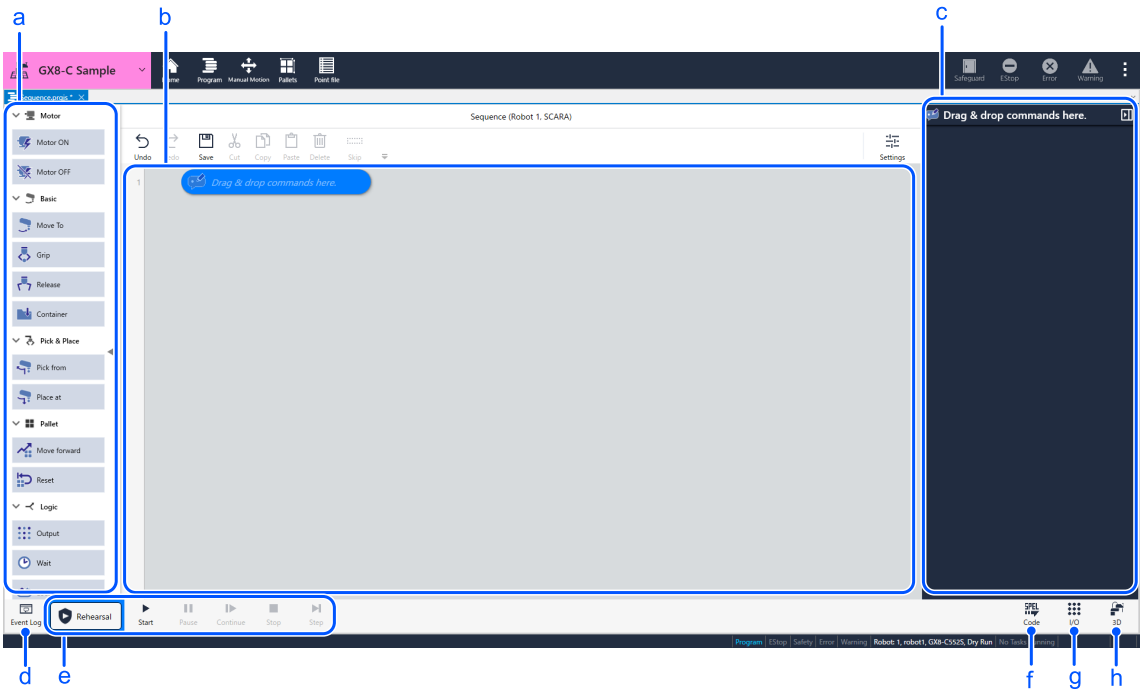
Symbol	Name	Description
a	Create New Project	Create a new project that includes a visual program.
b	Open Existing Project	Open an existing project that includes a visual program.

Symbol	Name	Description
c	Import from RC+ Express Edition	Import the program created with RC+8.0 Express Edition.
d	Recent Projects	Indicates recently used projects and their descriptions. If you select [Open], the project will open.

3.2.2 Program Screen Layout

3.2.2.1 Program Editing Screen

The program editing screen allows you to edit the visual program by arranging the provided commands.



Symbol	Name	Description
a	Command area	The available commands will be displayed. You can add items by dragging and dropping them into the editing area.
b	Editing area	The added commands will be displayed. You can edit commands and configure their operation.
c	Detailed settings area	You can configure the detailed settings for the selected command.
d	Event log	You can check any errors or messages that occurred during program execution.
e	Operation control button	You can start and stop the operation.
f	Spel Code	Displays the SPEL codes converted from visual program.
g	I/O	You can check and change the I/O setting.
h	3D View	You can check the robot’s motion with using a simulator.

3.2.2.2 Status Bar

The status bar at the top of the screen displays the Controller connection name, menus, and the Controller's status.

Symbol	Name
a	Controller connection name
b	Menu
c	Controller status
d	Other menus

Controller connection name

Displays the robot controller connection name and current mode.

Mode	Description
	USB: Connected to the controller.
	Virtual: Connected to the virtual controller.
	Off line: Not connected to the controller.

Menu

Mode	Description
	Home Displays Home screen. You can create new projects or open existing ones.
	Program Displays program editing screen.
	Manual Motion Displays simulator screen and jog panel.
	Pallets Displays the pallet setting of robot manager.
	Point file Displays the point data of robot manager

Controller status

Indicates current status of the robot controller.

Status	Name	Description
	Safetyguard open/close	Lights on when safety door is opened.
	Emergency stop	The robot stops and lights up under the following conditions: - The emergency stop button pressed - The robot operated beyond the speed limit or monitoring area set by the safety manager (RC700-E/RC800-A/RC800L only) Lights on when in emergency stop state. You can check the troubleshooting steps and reset it.
	Error	Lights on when error occurs. You can check error details and reset it.
	WARNING	Lights on when the warning occurs. By touching the lighting icon, available to can check the warning details.

Other menus

Tap to configure the following:

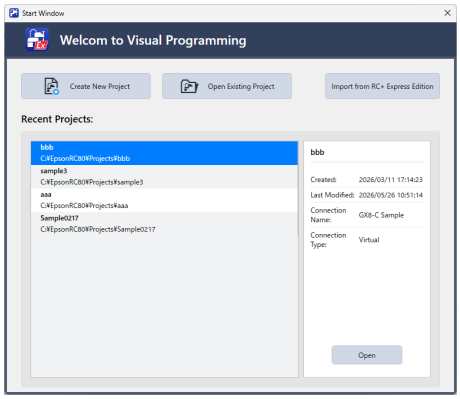
- Robot Manager
  Controlling motors, jog and teach, and changing robot parameters.
- System settings
  Checking and changing settings for controllers, robots, and options.
- Maintenance
  Backup/restoration of the controller data & parts maintenance.
- Language
  Changing languages.
- System History
  Indicates all histories include events, errors, warnings.
  To see details about the error and how to resolve it, tap the error number in the [Number] column.

3.2.3 Creating a New Program

3.2.3.1 Creating Program from a template

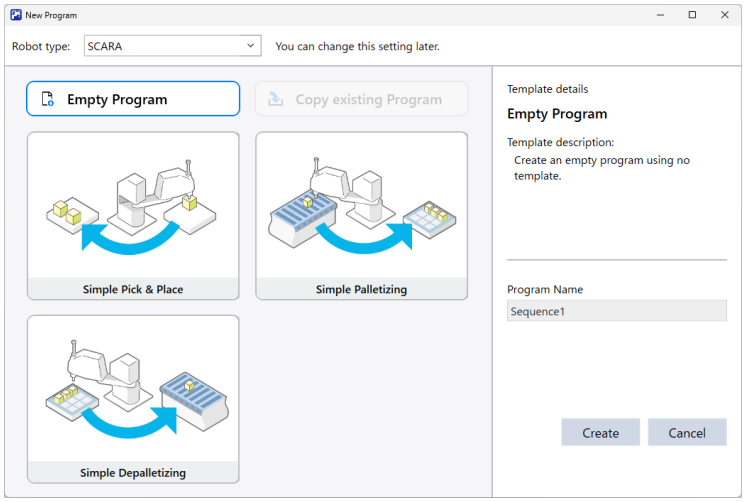
For creating a program easily, we provide templates which contain the general commands to create programs.
The procedure to create a program from a template is described below.

1. Select RC+ menu - [Tools] - [Express Sequence] - [Create New Project].



2. Enter the project name and select [OK].

3. Select robot type.

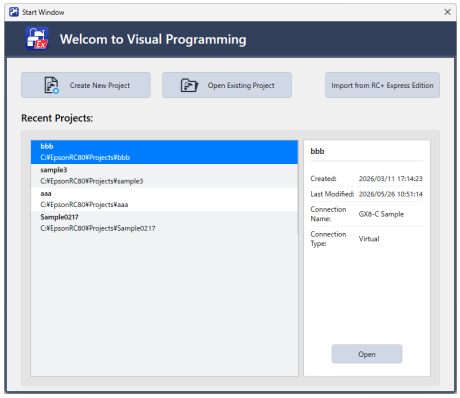


4. Select the template you want to create, enter a sequence name, and select [Create].
   For the details of opening, renaming, or deleting existing projects, refer to the following manual.
   “Epson RC+ 8.0 User’s Guide - [New] Command (Project Menu)”

3.2.3.2 Creating a New Program

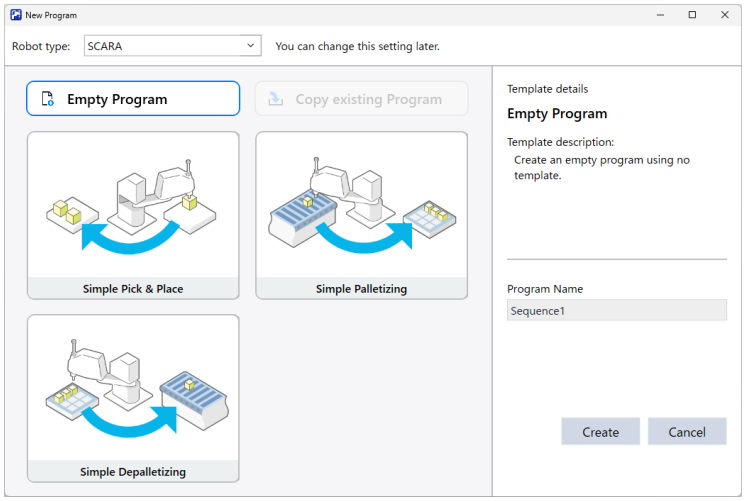
This explains how to create a new project without using a template.

1. Select RC+ menu - [Tools] - [Express Sequence] - [Create New Project].



2. Enter the project name and select [OK].

3. Select robot type.



4. Enter a sequence name and select [Create].
   For the details of opening, renaming, or deleting existing projects, refer to the following manual.
   “Epson RC+ 8.0 User’s Guide - [New] Command (Project Menu)”

3.2.4 Executing a Program

3.2.4.1 Executing a Program to Check for Problems

Once the program is ready, run it using [Rehearse] or [Start] to ensure there are no problems.
Rehearsal is a feature that allows programs to be executed more safely.
It is recommended to use [Rehearsal] when running the program for the first time after creating it.

KEY POINTS

How to check the program is running safely using [Start]:

To check the execution of a command at specific points, set an (breakpoint) at the point where you want to pause.

To remove a breakpoint, pause the program and then tap the (breakpoint).

KEY POINTS

Tapping [Rehearsal] or [Start] will send the program you created to the robot (controller).
Ensure that the communication cable is properly connected.
If the connection is interrupted, the program may become corrupted.

The types of operation buttons are as follows.

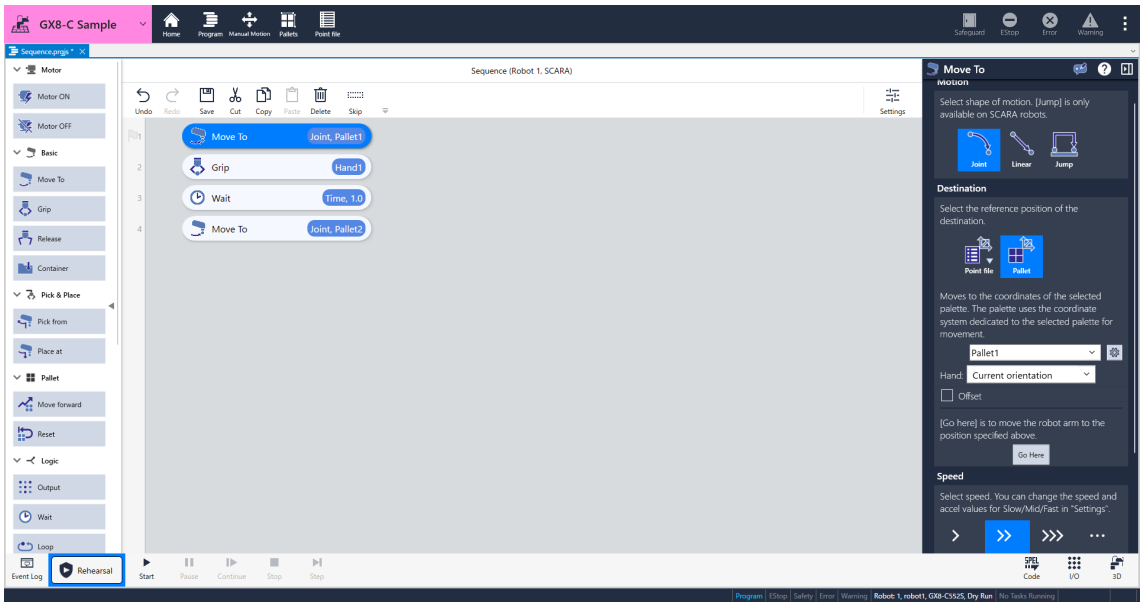
Icon	Description
	Tap to start debugging. You can set a speed limit at the start.
	Tap to pause when a program is running.

Icon	Description
	Tap to resume a program when the program is in break or pause.
	Tap to stop the program.
	Tap to execute commands one by one from a break point.
	The robot's movements are forcibly restricted to low-power mode, and commands are only executed while the [Run] button is pressed.

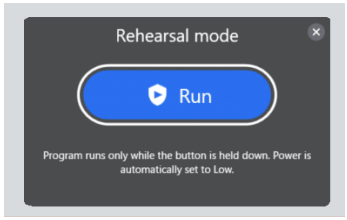
This section explains how to use [Rehearsal] to verify the operation.

Operation procedure

1. Tap the [Rehearsal] button.



2. When the execution confirmation dialog appears, check your surroundings for safety and then tap the [Run] button.
   The motor will be forced into low-power mode.



3. Press and hold the [Run] button.
   The program will run while you hold down the [Run] button.
   When you release the button, the program stops.

KEY POINTS

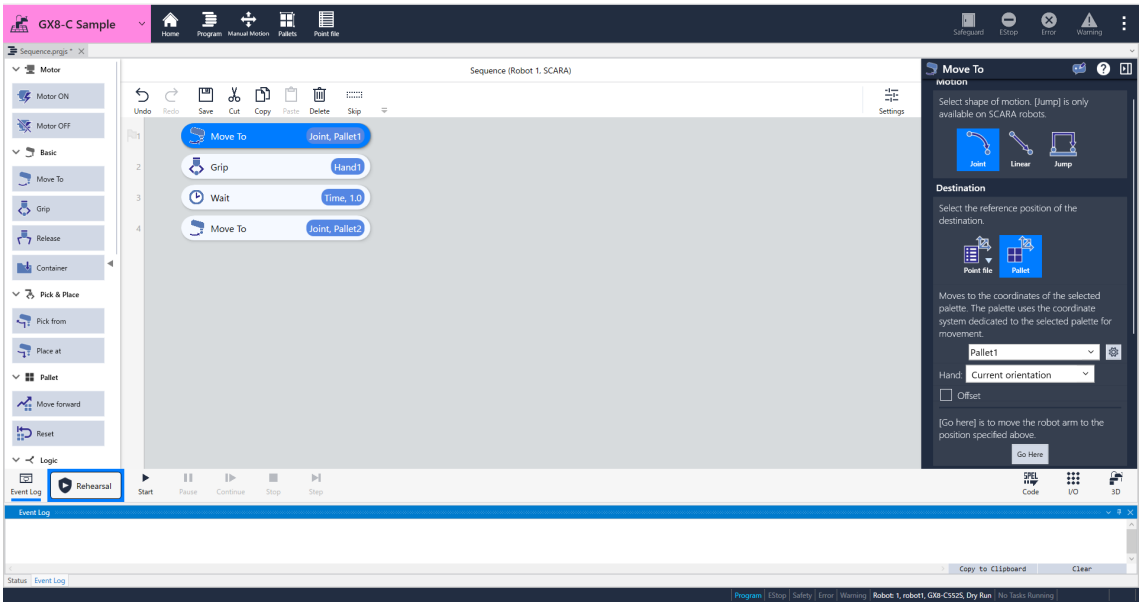
In virtual mode, tap the [3D View] button to display the simulator screen and check the robot's movements.
Refer to the manual below for instructions on how to interpret the screen.
“Epson RC+ 8.0 User’s Guide - [Robot Simulator] window layout“

KEY POINTS

- When connected to a virtual controller, the maximum continuous execution time for a program is one hour.
- You cannot switch screens or edit commands while the program is running.
- If an error occurs during program execution, an [×] mark will appear at the beginning of the command, and the command will flash red. Tap the Error icon to check the message and countermeasure.

3.2.4.2 Checking Event Log

Check Event Log for the details and the occurrence date and time of errors which occurred while a program was running.
Tap Event Log icon to display the event log.
Messages are displayed in black, errors in red, and warnings in blue.



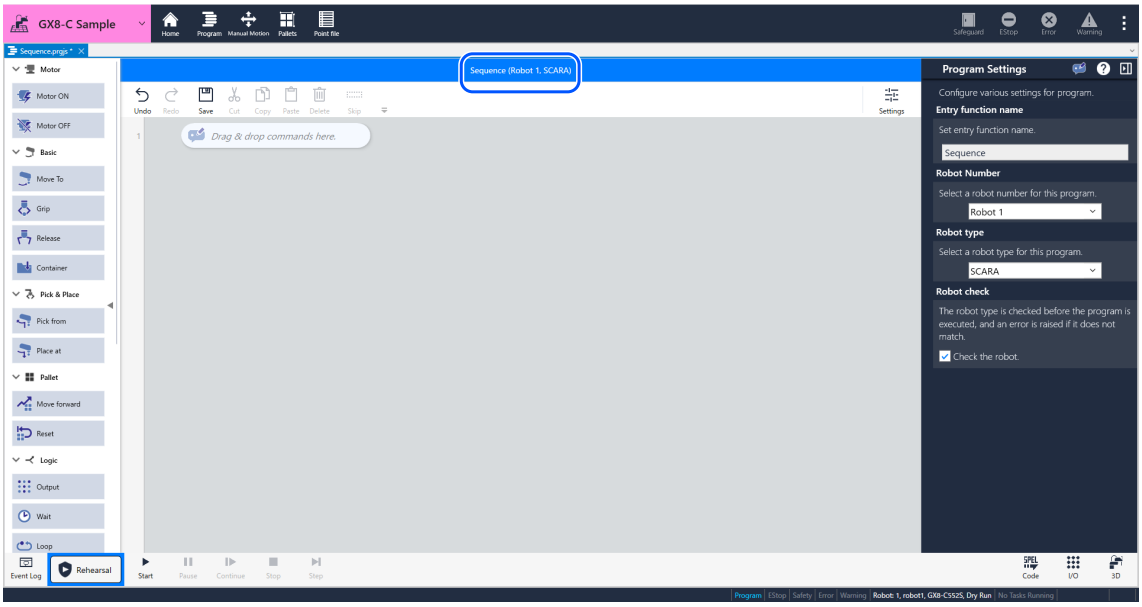
When there are new event logs, a badge will appear above the event log icon.
The badge color varies depending on the type of event.

Icon	Description
	There is no event log.
	There is a new event log. A warning number and message will be displayed. Tapping the warning number will allow you to view the manual.
	There is a error event log. An error number and error message will be displayed. Tapping the error number will allow you to view the manual.

3.2.5 Editing a Program

3.2.5.1 Perform Basic Program Settings

Tap the program name to display the program's basic settings.



Detailed Settings	Description
Entry function name	Set the function name for the visual program. This is used when calling from a SPEL program.
Robot Number	This sets the robot number to be used when running the visual program.
Robot type	This sets the type of robot to use when running the visual program.

3.2.5.2 Command Operation List

A command is an instruction for an action used in programming, such as moving, grasping with a hand, or turning a motor on or off. This page describes how to operate the commands.

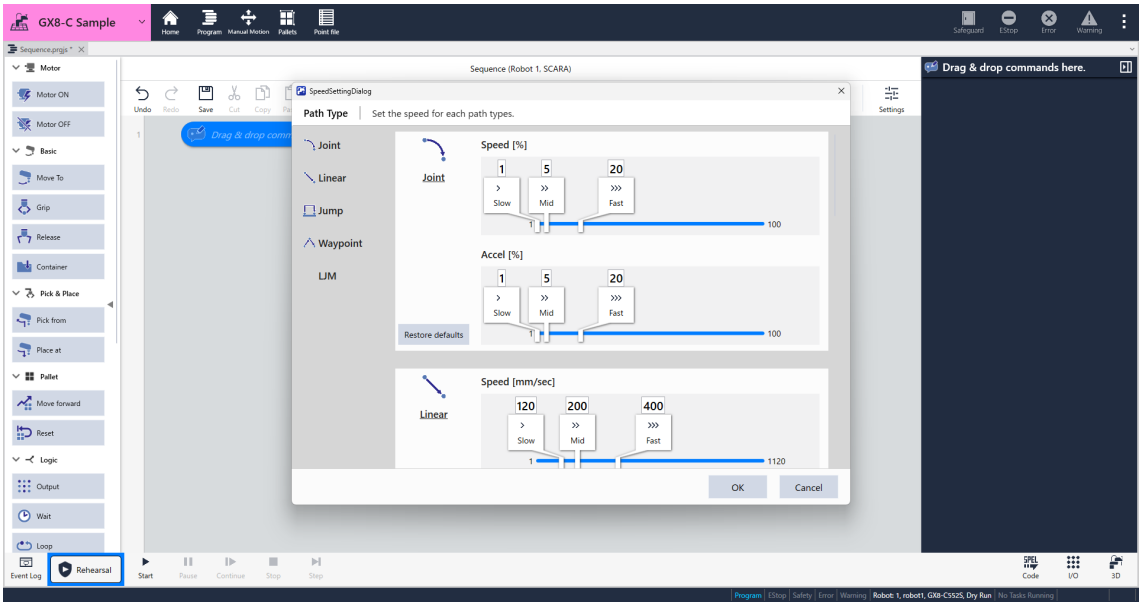
Icon	Description
	Cancels the previous operation if you operate by mistake. **Undo, Redo**
	Cancels [Undo]. **Undo, Redo**
	Saves the edited program. **Save**
	Copies the selected command and then deletes. **Cut and Paste**
	Copies the selected command. **Copy and Paste**

Icon	Description
	Inserts the [Copy] command. **Cut and Paste**
	Deletes the selected command. **Deleting a Command**
	When the program is executed, this will skip that command (prevent it from being executed). The skipped command is displayed in italics. **Skipping a Command**
	Operation buttons are hidden. When there are some buttons not displayed, tap the icon.
	You can set the default value of the speed and acceleration. **Setting a Program Operation**

3.2.5.3 Setting a Program Operation

On this screen, you can set default values such as speed for each path type. The default values set here will be reflected in the move command.

Tap [Settings] to show operation setting screen.



- Joint, Linear, Jump
  You can set the operating speed for each path type.
  Move the knob for the path type you want to set and then set the values for [Speed] and [Acceleration/Deceleration].
  [Jump] is only available when a SCARA robot is selected. Additionally, the [Jump] function allows you to set the LimZ.

- Waypoint
  You can set waypoints when using the pick/place command.
  As you approach your destination, you will pass through the location specified here.

- LJM
  Selecting "Enable short-distance movement" from the dropdown menu will cause the robot to move in a way that

minimizes the change in its posture from its starting position.
If you select "Disable short-distance movement", the robot will move while maintaining its taught posture.

3.2.5.4 Adding a Command

Tap the command you want to add, and once it's added to the editing area, drag and drop it to your desired location to change the order in which the commands are executed.
You can also add commands by directly dragging and dropping them.

KEY POINTS

You can add up to 999 lines of commands.

3.2.5.5 Undo, Redo

To undo the previous action and return to the original state, tap (undo).

To undo an action you just undid, tap (redo).

3.2.5.6 Save

Edit the program and tap (save).

3.2.5.7 Copy and Paste

Operation procedure

1. Select the command you want to copy, then tap (copy).
   The selected command is displayed in blue.
2. Select the command where you want to insert it, and then tap (paste).
   The command is inserted under the selected command.

3.2.5.8 Cut and Paste

Operation procedure

1. Select the command you want to cut, then tap (cut).

2. Select the command at the location where you want to add it, and then tap (paste).
   The command is inserted under the selected command.

3.2.5.9 Deleting a Command

Tap (Delete) with a command selected.

3.2.5.10 Skipping a Command

Tap (Skip) with a command selected. The skipped command is displayed in italics.

KEY POINTS

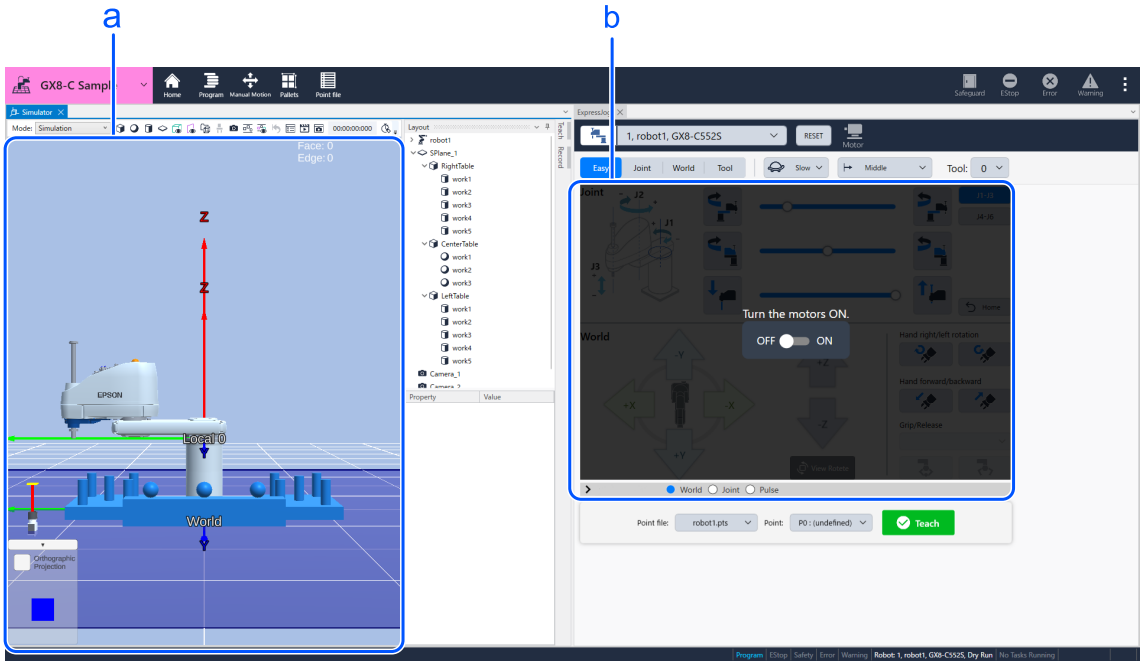
To restore the skipped command, tap [skip] again.

3.3 Creating a Program

3.3.1 Operating Robot

3.3.1.1 Jog Screen

Tap to display the jog screen.
On the jog screen, you can operate the jog panel to check the robot's movements in the simulator.

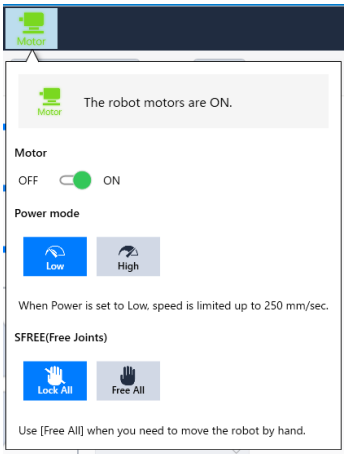


Symbol	Name	Description
a	Simulator	Displays the robot's motion on the simulator screen. - Change the point of view using the [Orthographic projection] button. - Pinch in and pinch out to zoom in and out of the screen.
b	Jog panel	You can operate the robot.

3.3.1.2 Motor

To operate the robot, turn the motor "ON".
Turning the motor "ON" will enable you to operate the jog panel.

Tapping motor icon allows you to configure the following settings:



- Motor: ON/OFF
- Power Mode: Low/High
- SFREE (Free Joint): All joints locked/all joints unlocked

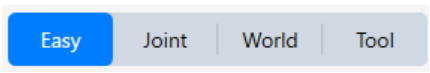
> **KEY POINTS**
>
> SFREE (Free Joints) allows you to move robot by hands by changing all joints locked to free. Available to change setting regardless motor ON/OFF. When the motor is ON and the system is in SFREE mode, will be displayed.

3.3.1.3 3D View

You can check the posture of the currently connected robot in the simulator screen.
Refer to the manual below for instructions on how to interpret the screen.
"Epson RC+ 8.0 User's Guide - [Robot Simulator] window layout"

3.3.1.4 Jog Mode (Easy, Joint, World, Tool)

Choose how to move the arm from the following options.



The following features are common to all modes.

Icon	Description
	Move the direction of the end effector in the specified direction. Tap the icon and follow the on-screen instructions to change the orientation.
	Moves the robot arm to the user defined home position. (Home statement executed)
	Tap or long-press to make the robot's end effector rotate clockwise or counterclockwise.
	Tap or long-press to move the end effector forward or backward.
	You can match the direction of the arrows displayed on the simulator screen with the direction of X, Y, Z, U on the Jog panel. Change the orientation according to the instructions on the screen.

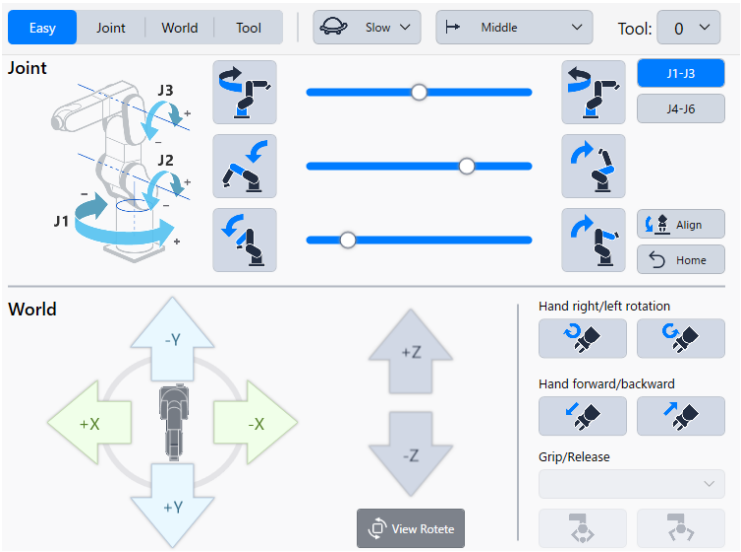
- Easy

This mode allows you to operate Joint, World, and Tool on a single screen. Recommended for beginners.
The Easy jog screen consists of two sections: [Joint] and [World].
[Joint] allows you to roughly move the arm.
Select the mode for the axis you want to move from the options below.

- J1-J3: Modes that operate each of the J1/J2/J3 axes.
- J4-J6: Modes that operate each of the J4/J5/J6 axes.

Check the + and - directions, then tap or long-press the icon.
Refer to the icons for the location of each joint.

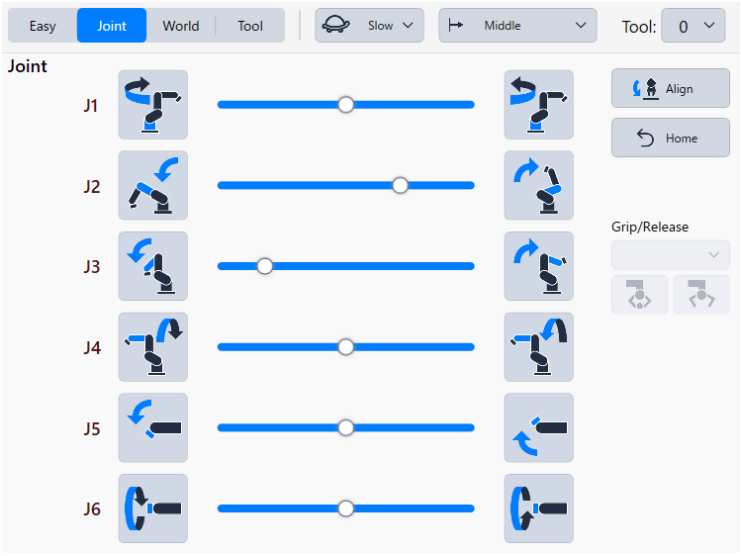
In [World] mode, you can fine-tune the position of the arm.
Check the + and - directions for the X, Y, and Z coordinate axes, then tap or long-press the icon.



- Joint

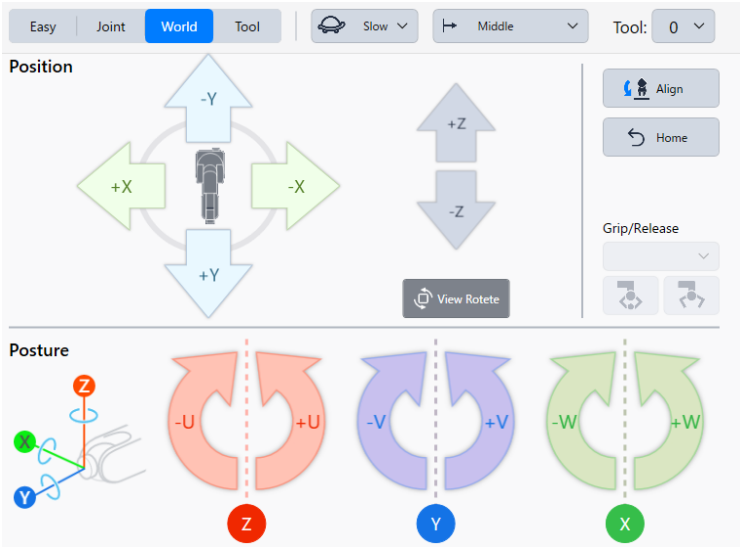
A mode to operate arm by specifying joints. Useful to move the robot to the rough point.

To move each joint of the robot (J1 to J6), check the + and - directions, then tap or long-press the icon.
Refer to the following icons for the location of each joint.



- World

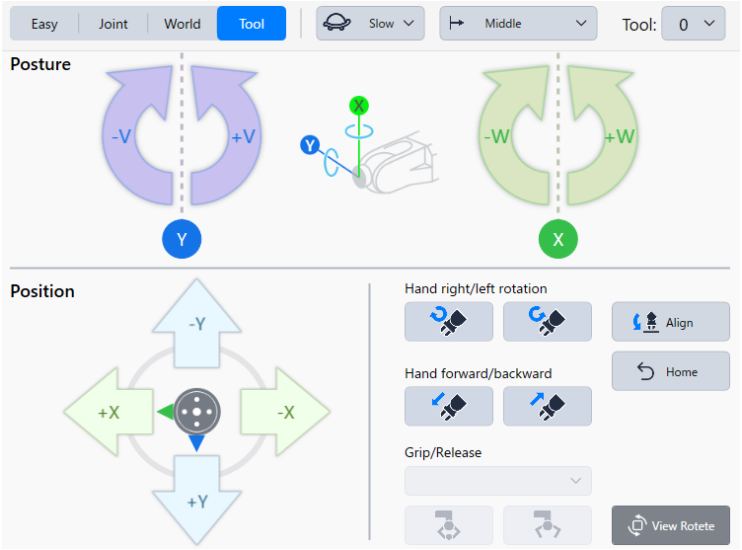
This mode allows you to specify the X, Y, and Z coordinate axes to move the arm. Useful to move the robot to accurate position.
The World jog screen consists of two parts: [Position] and [Posture].
In [Position], check the + and - directions for the X, Y, and Z coordinate axes, and then tap or long-press the icon.
In [Posture], check the + and - directions for the U, V, and W coordinate axes, and then tap or long-press the icon.



- Tool

This mode uses the end of the hand as the coordinate reference point to move the arm. This is useful when working on angled surfaces.
The Tool's jog screen consists of two parts: [Posture] and [Position].
In [Posture], check the + and - directions for the V and W coordinate axes, then tap or long-press the icon.

In [Position], you can move the position of your fingertips.
Check the + and - directions for the X and Y coordinate axes, then tap or long-press the icon.
To move your hand back and forth or rotate it, tap or long-press the following icons.

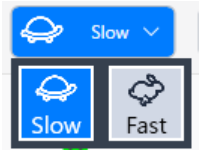


3.3.1.5 Jog Speed & Jog Distance

Setting Jog Speed & Jog Distance.

Jog Speed

Select the speed at which the robot arm moves.



For information on setting the jog speed, including its speed and acceleration/deceleration, please refer to the manual below.
"Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Jog & Teach] Panel"

3.3.1.6 Arm Posture

For detailed information, refer to the following manual.
"Epson RC+ 8.0 User's Guide - Robot Arm Orientations"

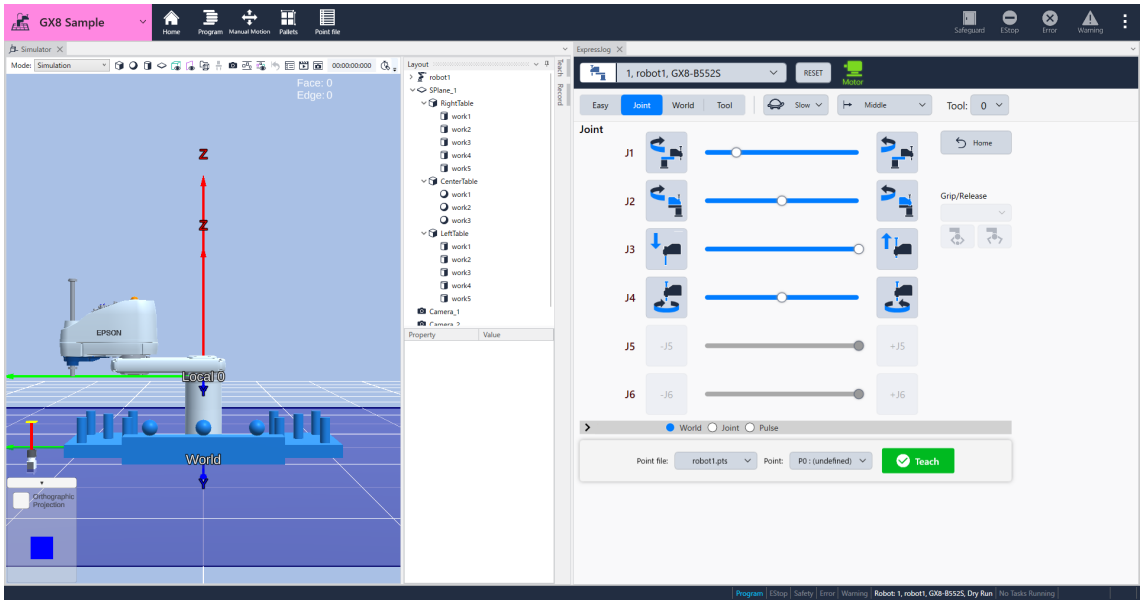
3.3.1.7 How to Check the Robot Motion

This section explains how to operate the robot on the simulator screen and check its movements.

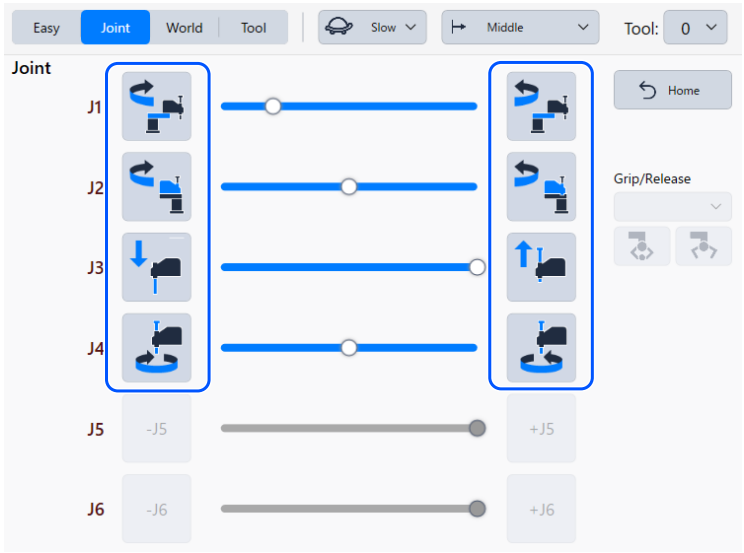
Operation procedure:

1. Turn the motor "On".
   Allows you to operate Jog panel.

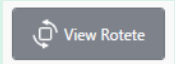
2. Select the jog mode (Easy, Joint, World, Tool).
   In this example, select Joint.
   Jog Mode (Easy, Joint, World, Tool)



3. Tap or long-press the jog panel icon to check the robot's movements.



KEY POINTS

- When "World" is selected, you can align the direction of the arrows displayed on the simulator with the X, Y, and U directions on the jog panel. Tap 

and follow the on-screen instructions to change the orientation.
- If you want to change the speed, change settings of Jog Speed and Jog Distance.
  Jog Speed & Jog Distance
- If you want to operate with hand tool, set up the hand tool. RC+ Menu - [Tools] - [Robot Manager] - [Hands].

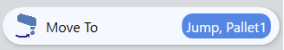
3.3.2 Command Function

3.3.2.1 About Command

Commands are operation instructions such as moving, gripping, and turning the motor ON / OFF. The commands are used in programming.
This page describes functions of the commands.
For details of the way of operating commands, refer to the following:
Command Operation List

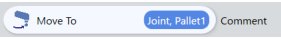
Badge

Simplified settings are displayed on the command line.



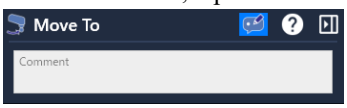
Comment

A function that allows you to input comment of command. The comment indicated out of the command frame.
This function has nothing to do with the program operation.



> **KEY POINTS**
>
> For [Container] and [Comment] command, comments are indicated at the position of command name.
>
>
>

To add comment, tap the command and tap of detail settings then input a comment.



> **KEY POINTS**
>
> You can enter comments up to 1024 characters long. Only two lines can be displayed in the program.

Command manual

Select a command and tap on the upper right side to show the command's description.

3.3.2.2 Command Function List:

This page describes functions of the commands.

Motor

Command		Function
	Motor On	Turn the motor ON, and the robot ready to move.
	Motor Off	Turn the motor OFF, and the robot is non-excitation state.

Basic

Command		Function
	Move To	Moving from current point to destination point.
	Grip	Gripping a work by the hand.
	Release	Releasing a work holding by hand.
	Container	Combines multiple commands in it.

Pick and Place

Command		Function
	Pick from	A series of operations until gripping a work.
	Place at	A series of operations until releasing a work.

Pallet

Command		Function
	Move forward	Moving the current position of the specified pallet to next.
	Reset	Reseting the current position of the specified pallet to the first point (1).

Logic

Command		Function
	Output	To output signal to the specified output.
	Wait	Waiting until whether the specified time elapsed or the specified condition established.
	Loop	Repeating the operation of specified number of times or while the specified conditions are establishing.
	If	Changing the program operation depending on whether the specified conditions are established.
	Comment	Indicating comment or explanation on the program.
	Quit	Stopping the program immediately.

Dialog

Command		Function
	Ask	Displays a question dialog. The user answers OK or Cancel.
	Notify	Displays a notification dialog. The user answers OK to close the dialog.

Log

Command		Function
	Event Log	Input the message to indicate in the event log.

SPEL+ Advanced

Command		Function
	SPEL+ Command	Execute the operation of the directly to input SPEL+ code.

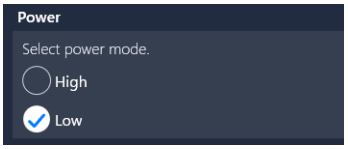
RC+

Command		Function
	Variable	Assign a value to a variable defined within the imported RC+ project.
	Function	Call a SPEL+ function

3.3.2.2.1 Motor On

Turn the motor ON, and the robot ready to move.

Detailed Settings



- Power
  The motor power of the robot is High or Low.

KEY POINTS

When Power is set to Low, operation speed is limited up to , 250 mm/sec.

3.3.2.2.2 Motor Off

Turn the motor OFF, and the robot is non-excitation state.

3.3.2.2.3 Move To

A command for the robot to move to the destination point (PTP motion).

Detailed Settings

- **Motion**
  Select how the robot will move.
  - Joint: PTP motion
  - Linear: CP motion
  - Jump: Gate motion
    * This feature is available only when the robot type in the program is SCARA or RS.

- **Destination**
  Select based point of robot destination.
  - Fixed point
    Move to the destination coordinates set via jog and teach or direct input.
    Steps:

1. Tap the [Jog & Teach] button to set the destination, or directly enter the destination coordinates in X, Y, Z, U, V, W.
   How to Check the Robot Motion

> **KEY POINTS**
>
> Available to name the point (up to 127 characters).
> The names you assign will be displayed on the simulator screen, which is convenient for checking the taught positions.

2. Set the LJM.

> **KEY POINTS**
>
> The [Move to this position] button is useful for checking the starting point of the palette or for verifying the movement after creating a program.

  - Pallet
    Select the palette you want to use, and then enter the relative position (how far away) it is from the selected palette's location.
    You can create and configure palettes from the gear button.
    For details on palette definitions, refer to the manual below.
    Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page
    Steps:

    1. Select the palette to use.
    2. If necessary, directly input the relative position from the selected palette's location into X, Y, Z, U, V, and W.
       Checking the "Offset" option will open the offset input area.
    3. Select LJM from the dropdown menu.

> **KEY POINTS**
>
> Tapping the [Move to this position] button will move the robot to the starting point of the pallet. This is useful for checking the starting point of a palette or confirming its movement.

- Point file
  This will take you to the destination selected in the point file.
  Steps:

  1. Tap the [Point File] at destination.
  2. Select the point to set as your destination from the list of points in the point file.

  > **KEY POINTS**
  >
  > The displayed point coordinates cannot be edited here. You can edit your points on the "Point File" screen.

  3. Set LJM from the dropdown menu.
  4. Set the position offset based on the point position selected in step 3.
     This setting is optional.
     Select either [Tool] or [World] and enter the position offset.
     Jog Mode (Easy, Joint, World, Tool)

- **Speed**
  Set the robot's movement speed.
  The default value in [Settings] is used for “Slow”, “Mid” and “Fast”.
  Setting a Program Operation

  Selecting "Custom" allows you to set "Speed" and "Acceleration/Deceleration" individually.

3.3.2.2.4 Grip

If the robot is equipped with a hand, it can perform a "grasping" operation.
To use this command, you need to configure the hand.

You can perform operation tests using the [Grip] and [Release] buttons in the detailed settings area.
Tap the [Grip] button will grab the workpiece.
Tap the [Release] button will release the workpiece.

3.3.2.2.5 Release

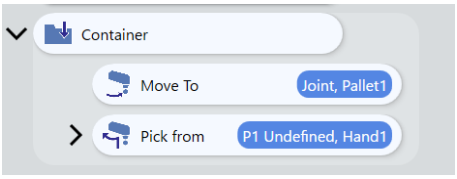
If the robot is equipped with a hand, it can perform a "release" operation.
To use this command, you need to configure the hand.

You can perform operation tests using the [Grip] and [Release] buttons in the detailed settings area.
Tap the [Grip] button will grab the workpiece.
Tap the [Release] button will release the workpiece.

3.3.2.2.6 Container

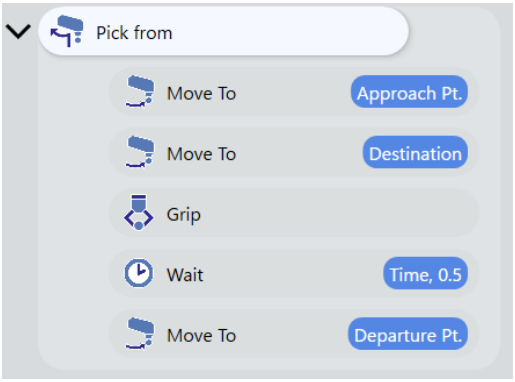
You can group multiple commands together in a box.

Parts of the program are grouped into boxes for a compact display, and these boxes can be moved, deleted, copied, and pasted.



3.3.2.2.7 Pick from

A combined command that moves the robot arm to the destination and gripping a work by hand.



Contents of command

Command	Label	Operation
Move To	Approach Pt.	Move with PTP motion to approaching point
Move To	Destination	Move straight to destination point
Grip	-	Grip a work
Wait	Time, 0.5	Waits 0.5seconds
Move To	Departure Pt.	Move straight to departure point

Detailed Settings

- **Destination**
  Select based point of destination.
  - Fixed point
    Move to the destination coordinates set via jog and teach or direct input.
    How to Check the Robot Motion

> **KEY POINTS**
>
> Available to name the point (up to 127 characters).
> The names you assign will be displayed on the simulator, which is convenient for checking the taught positions.

- Pallet
  Select the palette to use as the reference position from the pull-down list.
  You can create and configure palettes from the gear button.
  For details on palette definitions, refer to the manual below.
  Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page

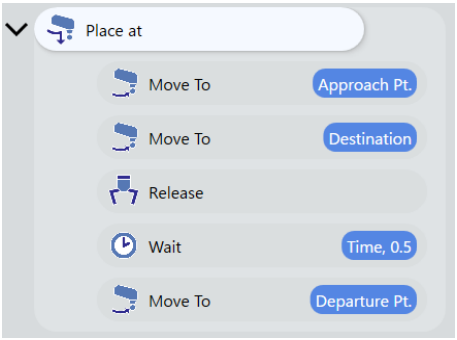
- Point file
  Tap [Point File] and select the point you want to set as your destination from the list of point files.

- **Waypoint**
  This setting determines the distance from the waypoints the robot will pass through when executing the "Pick from" command to the target location.
  When "Use the [Settings] value." is selected from pull down list, the value set in the Settings is used.
  Setting a Program Operation

- **Decompose commands**
  Tapping the [Edit] button allows you to break down a group of "Pick from" commands into a sequence of regular commands.
  This is used when you want to make detailed settings that are not possible with just the "Pick from" command settings.
  Once you tapped [Decompose], and edited commands, you can not restore the original settings.

3.3.2.2.8 Place at

A combined command that moves the robot arm to the destination and releasing a work from hand.



Contents of command

Command	Label	Operation
Move To	Approach Pt.	Move with PTP motion to approaching point
Move To	Destination	Move straight to destination point
Release	-	Release a work
Wait	Time, 0.5	Waits 0.5seconds
Move To	Departure Pt.	Move straight to departure point

Detailed Settings

- **Destination**
  Select based point of destination.

- Point
  Move to the destination coordinates set via jog and teach or direct input.
  How to Check the Robot Motion

KEY POINTS

Available to name the point (up to 127 characters).
The names you assign will be displayed on the simulator, which is convenient for checking the taught positions.

- Pallet
  Select the palette to use as the reference position from the pull-down list.
  You can create and configure palettes from the gear button.
  For details on palette definitions, refer to the manual below.
  Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page

- Point file
  Tap [Point File] and select the point you want to set as your destination from the list of point files.

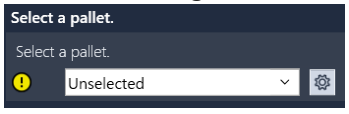
- **Waypoint**
  This setting determines the distance from the waypoints the robot will pass through when executing the "Place at" command to the target location.
  When "Use the [Settings] value." is selected from pull down list, the value set in the Settings is used.
  Setting a Program Operation

  Decompose commands
  Tapping the [Edit] button allows you to break down a group of "Place at" commands into a sequence of regular commands. This is used when you want to make detailed settings that are not possible with just the "Place at" command settings.
  Once you tapped , and edited commands, you can not restore the original settings.

3.3.2.2.9 Move forward

A command to move current position of the pallet to the next.

Detailed Settings

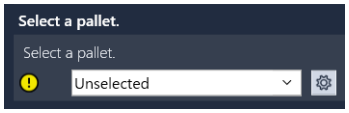


- Pallet
  Select a pallet from setup pallets.
  You can create and configure palettes from the gear button.
  For details on palette definitions, refer to the manual below.
  Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page

3.3.2.2.10 Reset

A command to move current position of the pallet to the first point (1).

Detailed Settings

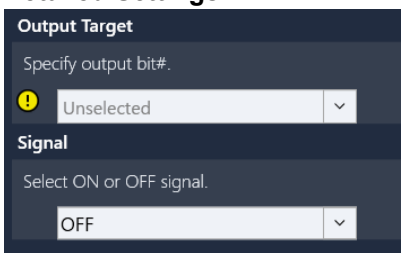


- Pallet
  From the defined palette, select the palette that returns you to the starting point (1).
  You can create and configure palettes from the gear button.
  For details on palette definitions, refer to the manual below.
  Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page

3.3.2.2.11 Output

A command to output ON / OFF signal to the specified output target.

Detailed Settings



- Output Target
  Select an Output signal from the pull down list.
  You can choose the output format from bits, bytes, or words.
  For bytes and words, you can specify a mask value.

KEY POINTS

- Available to select category of outputs and show less as you like by using the filter.
- Bits used in Remote I/O is not shown.

- Signal
  This setting determines whether the output signal is ON or OFF, or a numerical value.

3.3.2.2.12 Wait

A command to wait until whether the specified time elapsed or established the specified conditions.
It's useful when start moving after a while after gripped a work by the hand.

Detailed Settings

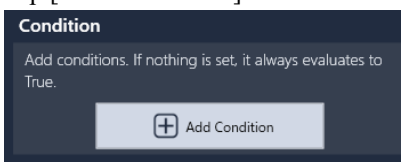
- Wait Target
  Specify what to wait.
  - Time
    The program will pause for the specified time (in seconds).
    The waiting time range is from 0.00 to 2147483.00 seconds (to two decimal places).

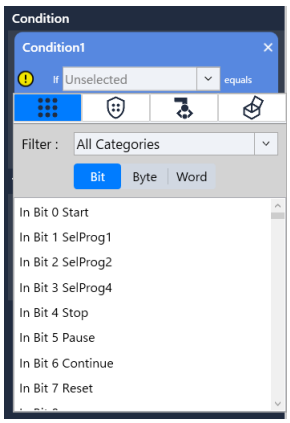
- Condition
  Restarts the program from next command after established the condition of waiting.

KEY POINTS

When some conditions are set, the judgment is made in order from the condition set first. For example, when condition 1, 2 and 3 are set, the condition 1 and 2 is judged first. After that, the result of condition 1, 2 and condition 3 is judged.

Steps to set conditions

1. Tap [+Add Condition].
   

2. Tap the dropdown menu and select the type of condition you want to set.
   

- When setting with (input number)
  Select the number of Input signal and the state of the Input signal like the following.
  - By bit:
    “If (Input bits) equals (state: ON/OFF)”
  - By byte or word:
    “If (Input byte or word & mask) equals (state: numerical value)”

KEY POINTS

Available to select category of Input and show less as you like by using the filter.

- When setting with (hand)
  Judged by whether the hand is gripping a workpiece or not. Input like following below.
  “If (Hand (Gripped / Released)) equals (True / False)”

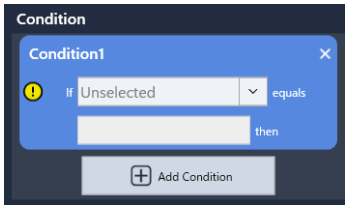
- When setting with (RC+)
  This option is only available if you have configured the settings to import RC+ projects.

The conditions are selected in the following format:
"If (variable label/variable name) is (xx)"

From the list of global variables defined in the imported RC+ project, select the variable to be used for the conditional check.
The format of the condition will vary depending on the variable you select.

Variable type		Options/Input Restrictions	Operators used when setting conditions
Byte	2 byte integer, -128 to +127	Only integers can be entered	= > < >= <= <>
Integer	2 byte integer, -32768 to 32767		
Short	2 byte integer, -32768 to 32767		
Int32	4 byte integer, -2147483648 to 2147483647		
Long	4 byte integer, -2147483648 to 2147483647		
Ubyte	Unsigned 2-byte integer, 0 to 255	0 or a greater integer can be entered	= > < >= <= <>
Ushort	Unsigned 2-byte integer, 0 to 65535		
UInt32	Unsigned 4-byte integer, 0 to 4294967295		

3. If you want to add more conditions, tap the [+] button to add conditions.
   Available to add operators between conditions when there are more than two conditions.
   And: Both condition A and condition B is established.
   Or: Whether condition A or condition B is established.



- Timeout
  If you set a time in the [Conditions] section, you can set a timeout.
  When 0 is selected:
  Waits unconditionally until specified conditions established.
  If a value other than 0 is specified: After the specified timeout period has elapsed, the program will resume regardless of whether the conditions are met.

KEY POINTS

For example, if you want to set the command to wait for 5 seconds until Input is turned ON under the condition, set the wait command as follows:

1. Select [Condition] as the target to wait for.
2. Specify the condition "If input bit 1 is ON".

3. Enter 5.0 seconds in the [Time] field.
   If the condition is not met after 5 seconds, a timeout occurs, the wait is canceled, and the process proceeds to the next step.

3.3.2.2.13 Loop

A command to repeat the operation of specified number of times or while the specified conditions are met.

Detailed Settings

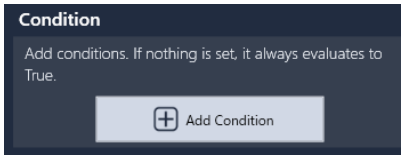
- Loop
  Select the type of the loop.
  - Count
    Specify the number of times to repeat the operation.
  - Condition
    Specify the condition to repeat the operation.
  - Infinite
    Repeats the operation of the command in the container.
- Loop Count
  Tap +, - button to select the repetition (up to 32767).
- Loop Condition
  Tap [+ Add Condition] to set conditions. Repeats the operation while the condition meets.
  For the details of setting conditions, refer to the following:
  If
- Add Exit If
  Add an Exit If command, that breaks the loop immediately. Adding this command, even if the set number of times is not repeated or the set condition is met, the program starts from the next command.
  For the details of Add Exit If, refer to the following:
  If

3.3.2.2.14 If

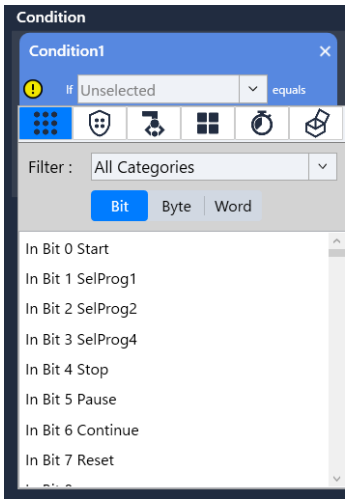
A command to change the program operation depending on whether the specified conditions are met.
When this command is reached, it determines whether the specified conditions, such as the current robot status, palette, and variables, are met.

- When it matches: The program executes the "when true" branch within the box.
- If they don't match: The program executes the "when false" branch within the box.
- When multiple conditions are set: The condition that was set first will be evaluated first.
  - Steps to set conditions

1. Tap [+Add Condition].



2. Tap the dropdown menu and select the type of condition you want to set.



- When setting with (input number)
  This determines whether the input signal is in the specified state.
  - By bit:
    “If (Input bits) equals (state: ON/OFF)”
  - By byte or word:
    “If (Input byte or word & mask) equals (state: numerical value)”

KEY POINTS

Available to select category of Input and show less as you like by using the filter.
For the details of I/O types to show or Input bits, refer to the following.
If you are using an RC700-E/RC800-A/RC800L controller, you can set the input status of safety inputs/outputs as the target of conditional branching.

- When setting with (hand)
  Judged by whether the hand is gripping a workpiece or not. Input like following below.
  “If (Hand (Gripped / Released)) equals (True / False)”

- When setting with (pallet)
  Perform a specific action at the designated position (first / last) on the palette. Input like following below.
  "If (Pallet XX) is (position: first / last)"

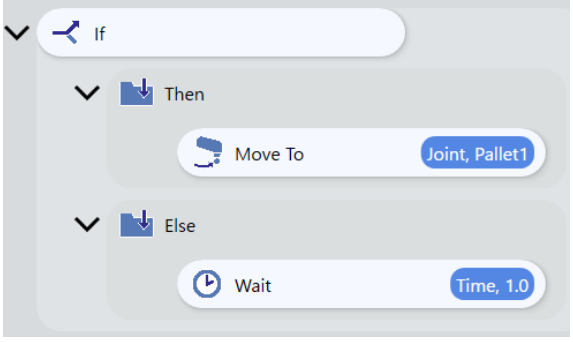
- When setting with (time out)
  Depending on whether the "Grip," "Release," or "Wait" command has timed out, specific actions will be taken. Input like following below.
  "If (Grip/Wait timeout) is (True/False)"
  [Grip time out]
  If you have set a timeout for the "Grip" motion in the hand settings, you can set the timeout as a condition here.
  [Wait time out]

You can set a condition based on whether the last executed "Wait" command timed out.
Wait

- When setting with (RC+)
  This option is only available if you have configured the settings to import RC+ projects.
  The conditions are selected in the following format:
  "If (variable label/variable name) is (xx)"
  Variable
  From the list of global variables defined in the imported RC+ project, select the variable to be used for the conditional check.
  The format of the condition will vary depending on the variable you select.

Variable type		Options/Input Restrictions	Operators used when setting conditions
Boolean	2 byte, True/False	True/False	=
Byte	2 byte integer, -128 to +127	Only integers can be entered	= > < >= <= <>
Integer	2 byte integer, -32768 to 32767		
Short	2 byte integer, -32768 to 32767		
Int32	4 byte integer, -2147483648 to 2147483647		
Int64	8 byte integer, -9223372036854775808 to 9223372036854775807		
Long	4 byte integer, -2147483648 to 2147483647		
Ubyte	Unsigned 2-byte integer, 0 to 255	0 or a greater integer can be entered	= > < >= <= <>
Ushort	Unsigned 2-byte integer, 0 to 65535		
UInt32	Unsigned 4-byte integer, 0 to 4294967295		
UInt64	Unsigned 8-byte integer, 0 to 18446744073709551615		
Real	4-byte real number, significant digits: 6	Only numerical values can be entered	= > < >= <= <>
Double	8-byte real number, significant digits: 14		
String	ASCII characters only, 255 characters max.		= <>

3. Drag and drop a command that you want to add to both [Then] and [Else].



4. If you want to add more conditions, tap the [+] button to add conditions.
   Available to add operators between conditions when there are more than two conditions.
   And: Both condition A and condition B is established.
   Or: Whether condition A or condition B is established.

KEY POINTS

When some conditions are set, the judgment is made in order from the condition set first. For example, when condition 1, 2 and 3 are set, the condition 1 and 2 is judged first. After that, the result of condition 1, 2 and condition 3 is judged.

3.3.2.2.15 Comment

A command to indicate comment or explanation you inputted on the program. This command will not be executed.

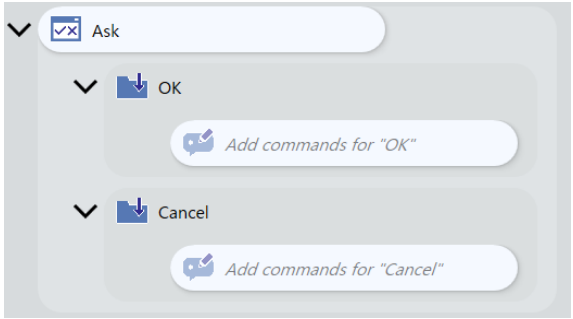
3.3.2.2.16 Quit

When the program reached to this command, the program stops.

3.3.2.2.17 Ask

This is a command to ask a user a question while the program is running and change its operation depending on the answer.
Type a question (within the 122 words) and drag and drop the command to add operation to both [OK] and [Cancel].

When the program reached to this command, the question inputted is shown in the dialog.
Select [OK]: The program will resume from the next command.
Selecting [Cancel]: The program will resume from the branch where [Cancel] was selected.



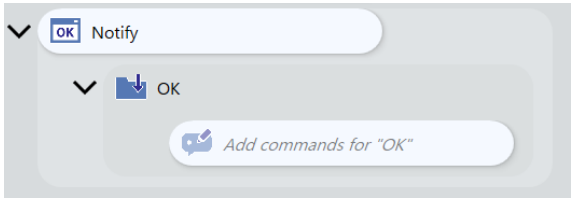
KEY POINTS

Double quotation marks ("") cannot be used in the question.

3.3.2.2.18 Notify

A notice will be displayed to the user, and the program will be temporarily paused. The program will resume when the user responds with [OK].
Enter the content of the announcement (up to 122 characters), drag and drop the command, and add the action to be performed when [OK] is clicked.

When the program reached to this command, message inputted is shown in the dialog.
When answered [OK], restarts the program from next command.



KEY POINTS

Double quotation marks ("") cannot be used.

3.3.2.2.19 Event Log

This is a command to show a message (within the 127 words) into the event log.
When the command is executed, the message inputted is shown in the event log.

KEY POINTS

Double quotation marks ("") cannot be used.

3.3.2.2.20 SPEL+ Command

This is a command to execute the operation of the directly input SPEL+ Command. Cannot break a line.

For details on each SPEL+ command, refer to the following manual.
SPEL+ Language Reference

3.3.2.2.21 Variable

This assigns a value to a global variable defined in the RC+ project.

Detailed Settings

- Variable
  Select a variable from the variable dropdown list.
  In the control that appears below the variable dropdown list, enter the value you want to assign to the selected variable.
  The control used to enter a value will differ depending on the type of variable you select.
  Example: When the type is Boolean
  List box (options are True/False)

Example: When the type is Integer
Text box (integers only)

Variable type		Options/Input Restrictions
Boolean	2 byte, True/False	True/False
Byte	2 byte integer, -128 to +127	Only integers can be entered
Integer	2 byte integer, -32768 to 32767	
Short	2 byte integer, -32768 to 32767	
Int32	4 byte integer, -2147483648 to 2147483647	
Int64	8 byte integer, -9223372036854775808 to 9223372036854775807	
Long	4 byte integer, -2147483648 to 2147483647	
Ubyte	Unsigned 2-byte integer, 0 to 255	0 or a greater integer can be entered
Ushort	Unsigned 2-byte integer, 0 to 65535	
UInt32	Unsigned 4-byte integer, 0 to 4294967295	
UInt64	Unsigned 8-byte integer, 0 to 18446744073709551615	
Real	4-byte real number, significant digits: 6	Only numerical values can be entered
Double	8-byte real number, significant digits: 14	
String	ASCII characters only, 255 characters max.	

3.3.2.2.22 Function

This calls a SPEL function defined in the RC+ project.

Detailed Settings

- Instruction
  Specify how to call the SPEL function from the pull-down list.
- Function
  Select the user function to call.
  The list will only display functions that have built successfully.
- Function argument
  Specify the list of arguments to pass to the function by direct input.
  For the format of the argument list, refer to the following manual.
  "Epson RC+ 8.0 SPEL+ Language Reference - Function...Fend"

3.3.3 Creating New Pallet

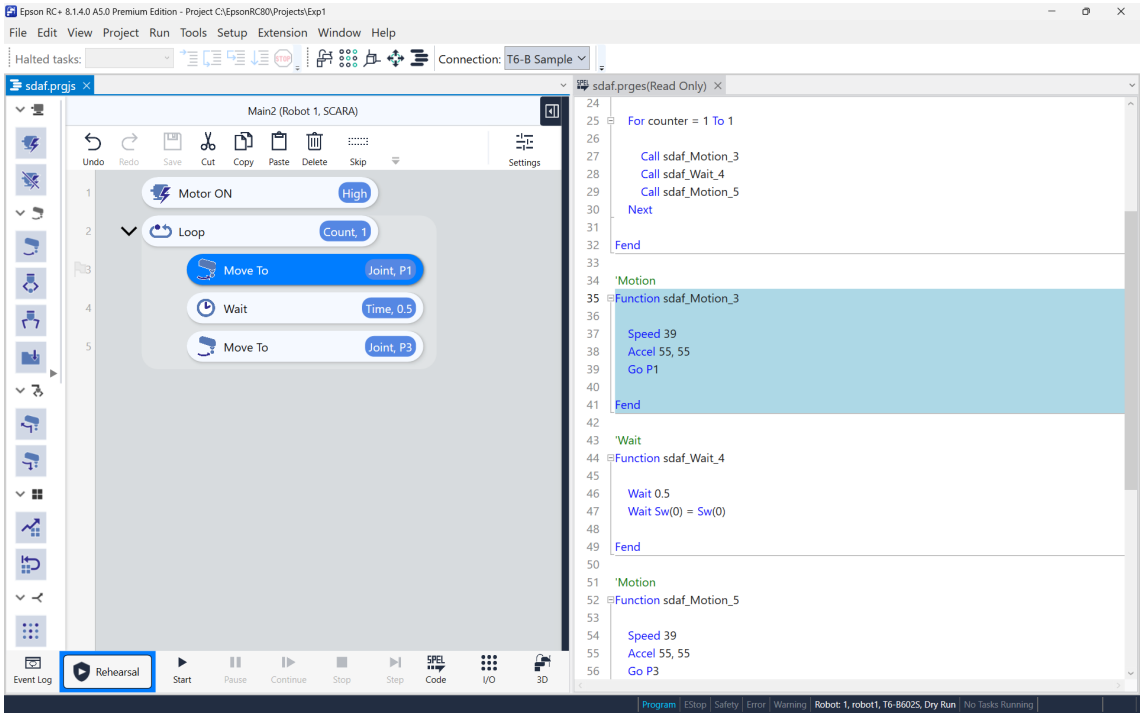
For information on editing pallets, refer to the following manual.
"Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Pallets] Page"

3.3.4 Editing Point Data

For information on editing points, refer to the following manual.
"Epson RC+ 8.0 User's Guide - [Tools]-[Robot Manager]-[Points] Page"

3.3.5 Displaying SPEL Codes

Visual programs can be displayed in a format converted to SPEL+.
When you select a command in the program's editing screen, the corresponding SPEL+ function is highlighted.
Conversely, selecting a SPEL+ function will highlight the corresponding command in the program editing screen.



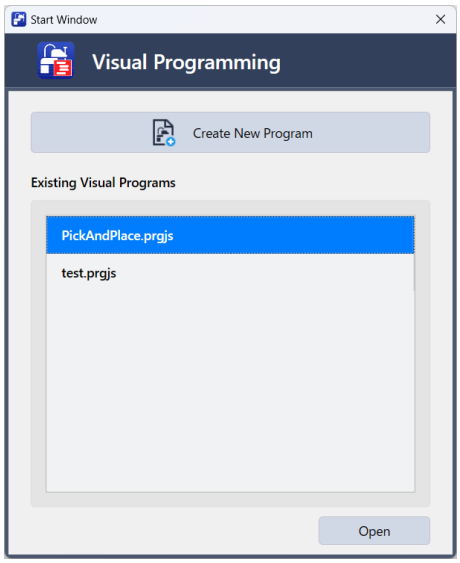
4. Program Mode

You can perform visual programming from the RC+'s program mode. SPEL programs and visual programs can be linked together, enabling efficient program development and maintenance.

To use the visual programming features in RC+'s program mode, you need the Standard or Premium edition.

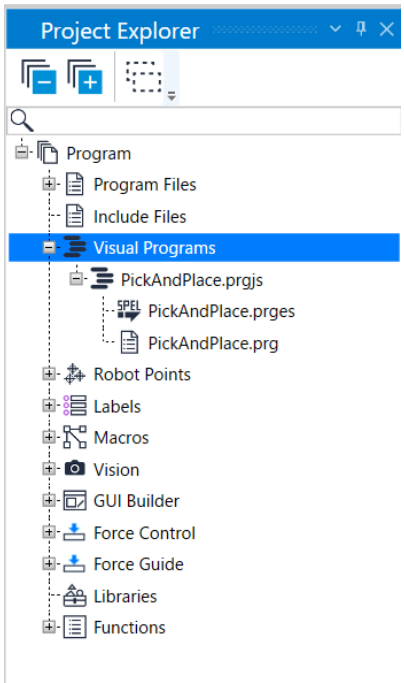
4.1 Creating a Visual Program

Tap the in the Tools menu.
A list of visual programs for the current project will be displayed.
To add a project, tap the [Create New Project] button.
To edit a program you've already created, select it from the list and tap the [Open] button.

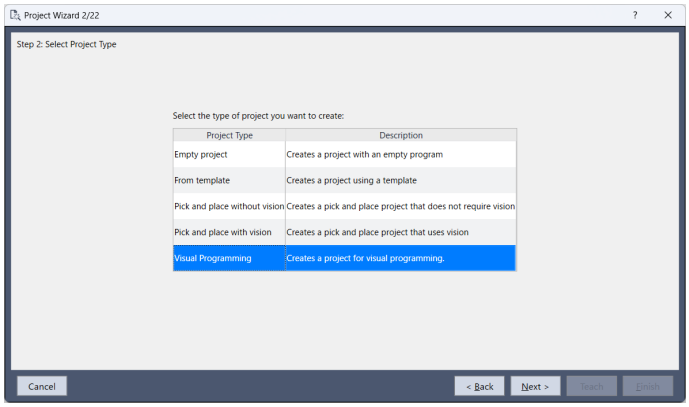


Visual programs added to a project can be opened from the Visual Programs node in the Project Explorer.

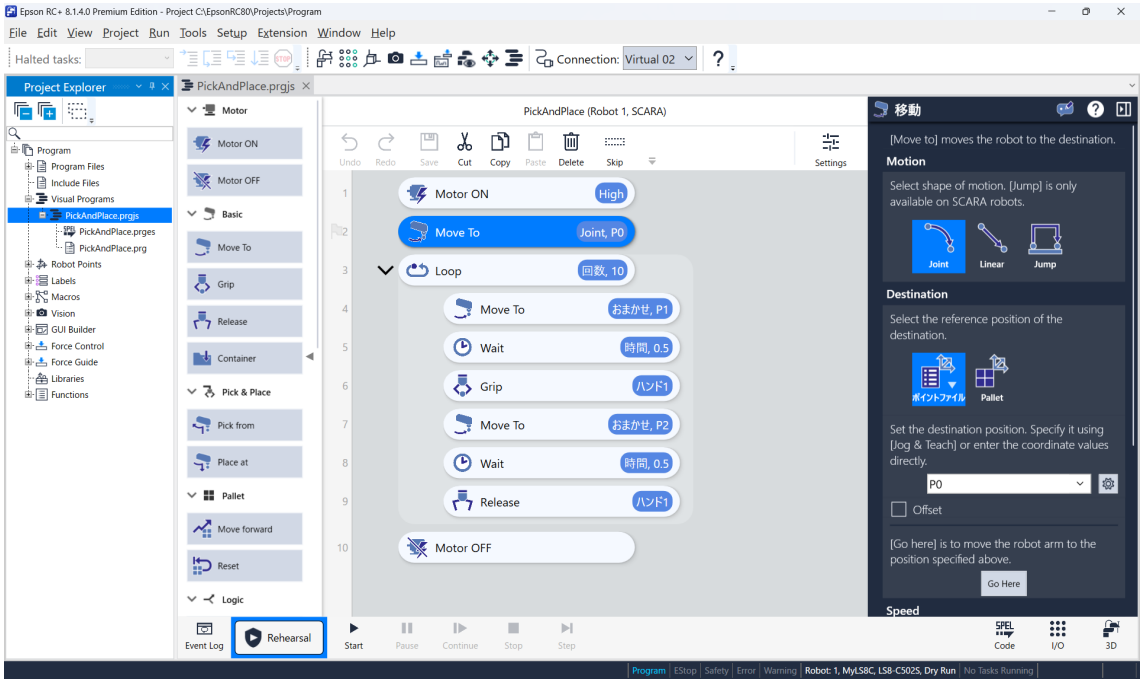
- Program name.prgjs: Main visual program
- Program name.prges: SPEL program converted from a visual program (read only)
- Program name.prg: Function definition for calling from a SPEL program (read only)



Furthermore, if you want to create a new SPEL project that includes a visual program, you can easily do so by selecting the Visual Program template from the Project Wizard.



The method for editing visual programs is the same as in visual programming mode.
Refer to **Editing a Program**.

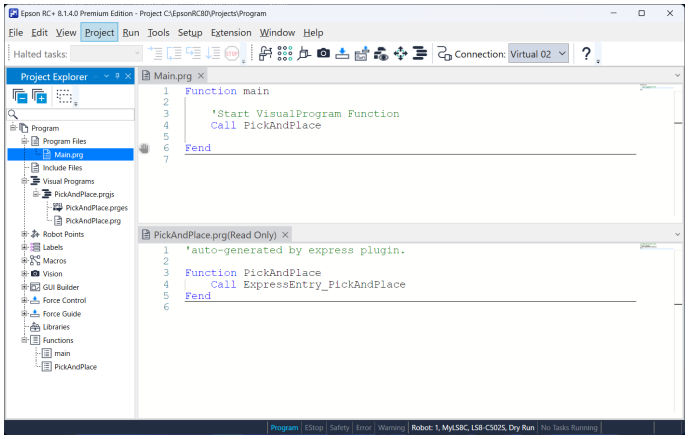


4.2 Using Visual Programs from SPEL Programs

You can call SPEL functions created with a visual program from within an SPEL program.
Function definitions are located in the programname.prg file.

Example:
[Main.prg]
Function Main
  Call VisualFunctionSample
Fend

[VisualFunctionSample.prg]
Function VisualFunctionSample
Call aaaaa
Fend


Epson RC+ 8.1.4.0 Premium Edition - Project C:\EpsonRC80\Projects\Program
File Edit View Project Run Tools Setup Extension Window Help
Halted tasks:
Connection: Virtual 02
Project Explorer
Program
Program Files
Main.prg
Include Files
Visual Programs
PickAndPlace.prgjs
PickAndPlace.prges
PickAndPlace.prg
Robot Points
Labels
Macros
Vision
GUI Builder
Force Control
Force Guide
Libraries
Functions
main
PickAndPlace
Main.prg
Function main
'Start VisualProgram Function
Call PickAndPlace
Fend
PickAndPlace.prg(Read Only)
'auto-generated by express plugin.
Function PickAndPlace
Call ExpressEntry_PickAndPlace
Fend
Program Estop Safety Error Warning Robot: 1, MyLSBC, LSB-C5025, Dry Run No Tasks Running

5. Appendix

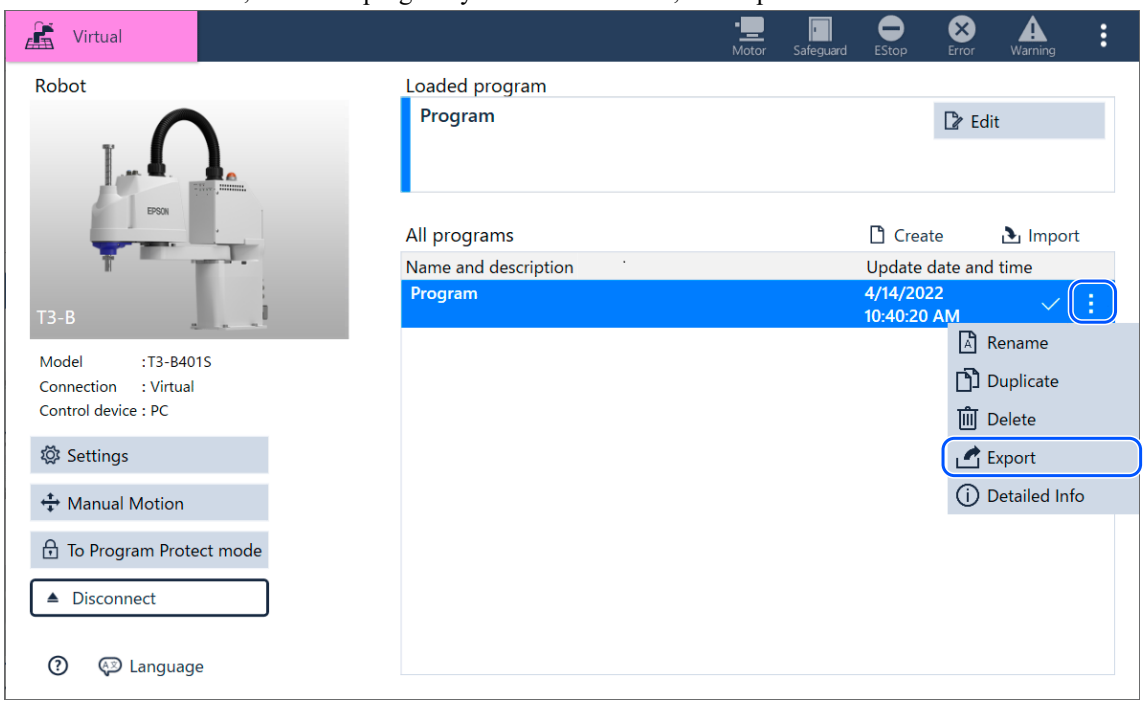
5.1 Using the Epson RC+ Express Edition Programs

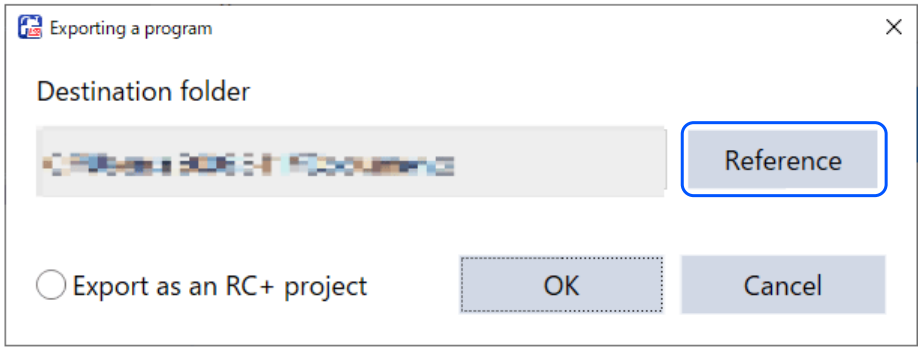
Programs created with Epson RC+ Express Edition can be converted into visual programming projects and used with RC+ 8.0.

Operation procedure

1. Start Epson RC+ Express Edition.

2. Go to the home screen, select the program you want to convert, and export the file.





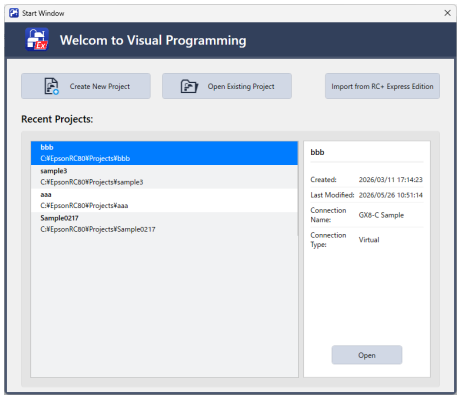
KEY POINTS

Do not check the [Use as RC+ project] option on the export screen.

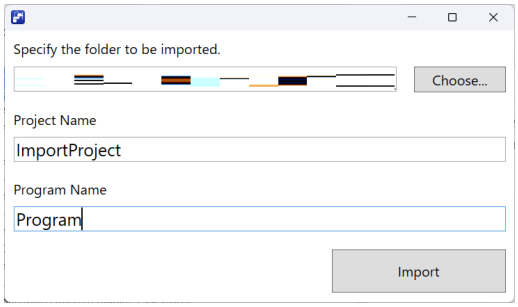
If you check this box, it will be converted into a SPEL program usable with RC+. However, it cannot be converted back to a format usable by visual programs.

3. Start Epson RC+ in visual programming mode.

4. On the home screen, tap the [Import from RC+ Express Edition] button.



5. Enter the following on the import screen.
   - Project to import: Location of the folder exported from RC+ Express Edition
   - Project name: Name of the converted SPEL project
   - Program name: Name of the visual program (prgjs file).



6. Tap the [Convert] button.

7. If the conversion is successful, the converted project will open.