EPSON

Robot Controller
RC700-A Option
Teach Pendant

TP3

Rev.11 EM198P4023F

Robot Controller RC700-A Option Teach Pendant TP3 Rev.11

Robot Controller RC700-A Option
Teach Pendant

TP3

Rev.11

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FOREWORD

Thank you for purchasing our robot products.
This manual contains the information necessary for the correct use of the Teach Pendant.
Please carefully read this manual and other related manuals before installing the robot system.
Keep this manual handy for easy access at all times.

WARRANTY

The robot system and its optional parts are shipped to our customers only after being subjected to the strictest quality controls, tests, and inspections to certify its compliance with our high performance standards.

Product malfunctions resulting from normal handling or operation will be repaired free of charge during the normal warranty period. (Please ask your Regional Sales Office for warranty period information.)

However, customers will be charged for repairs in the following cases (even if they occur during the warranty period):

1. Damage or malfunction caused by improper use which is not described in the manual, or careless use.
2. Malfunctions caused by customers' unauthorized disassembly.
3. Damage due to improper adjustments or unauthorized repair attempts.
4. Damage caused by natural disasters such as earthquake, flood, etc.

Warnings, Cautions, Usage:

1. If the robot system associated equipment is used outside of the usage conditions and product specifications described in the manuals, this warranty is void.
2. If you do not follow the WARNINGS and CAUTIONS in this manual, we cannot be responsible for any malfunction or accident, even if the result is injury or death.
3. We cannot foresee all possible dangers and consequences. Therefore, this manual cannot warn the user of all possible hazards.

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TRADEMARK NOTATION IN THIS MANUAL

Microsoft® Windows® 7 Operating system
Microsoft® Windows® 8 Operating system
Microsoft® Windows® 10 Operating system
Throughout this manual, Windows 7, Windows 8, and Windows 10 refer to above respective operating systems. In some cases, Windows refers generically to Windows 7, Windows 8, and Windows 10.

NOTICE

No part of this manual may be copied or reproduced without authorization.
The contents of this manual are subject to change without notice.
Please notify us if you should find any errors in this manual or if you have any comments regarding its contents.

MANUFACTURER

SEIKO EPSON CORPORATION

CONTACT INFORMATION

Contact information is described in “SUPPLIERS” in the first pages of the following manual:

Robot System Safety and Installation Read this manual first

Before Reading This Manual

Following descriptions are indicated throughout the manual by these symbols.

NOTE ☞	The "NOTE" sections describe important information to be followed for operating the Robot system.
TIP ☞	The "TIP" sections describe hints for easier or alternative operations.

NOTE ☞ A coordinate point including the arm pose is defined as "position (point)," and the data is called "point data."

Control System Configuration

This option is used with the following combinations of Controllers and software.

Controller / Manipulator	Software
RC700-A	EPSON RC+ 7.0 Ver.7.2.0 or later
T series	EPSON RC+ 7.0 Ver.7.3.1 or later
VT series	EPSON RC+ 7.0 Ver.7.4.3 or later

For T series Manipulator user only

T series Manipulators are Controller integrated Manipulators.

Read "Controller" and "Robot Controller" described in this manual as "T series Manipulator".

For VT series Manipulator user only

VT series Manipulators are Controller integrated Manipulators.

Read "Controller" and "Robot Controller" described in this manual as "VT series Manipulator".

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Functions & Installation

This section contains information about functions and installation of the Teach Pendant to be known before operation and maintenance.

1. Safety

1.1 Conventions

Important safety considerations are indicated throughout the manual by the following symbols. Be sure to read the descriptions shown with each symbol.

WARNING	This symbol indicates that a danger of possible serious injury or death exists if the associated instructions are not followed properly.
WARNING	This symbol indicates that a danger of possible harm to people caused by electric shock exists if the associated instructions are not followed properly.
CAUTION	This symbol indicates that a danger of possible harm to people or physical damage to equipment and facilities exists if the associated instructions are not followed properly.

1.2 Safety Precautions

1.2.1 Safety Precautions

For details of Safety, refer to *Safety* Chapter in the *User's Guide*. Please read and understand the chapter before using the robot system.

WARNING	■ Only trained personnel should design and install the robot system. Trained personnel are defined as those who have taken robot system training and maintenance training classes held by the manufacturer, dealer, or local representative company, or those who understand the manuals thoroughly and have the same knowledge and skill level as those who have completed the training courses. ■ Only authorized personnel who have taken the safety training should be allowed to execute teaching or calibration of the robot system. The safety training is the program for industrial robot operator that follows the laws and regulations of each nation. The personnel who have taken the safety training acquire knowledge of industrial robots (operations, teaching, etc.). The personnel who have completed the robot system-training class held by the manufacturer, dealer, or locally-incorporated company are allowed to maintain the robot system.

WARNING	■ Only authorized personnel who have taken the safety training should be allowed to maintain the robot system. The safety training is the program for industrial robot operator that follows the laws and regulations of each nation. The personnel who have taken the safety training acquire knowledge of industrial robots (operations, teaching, etc.), knowledge of inspections, and knowledge of related rules/regulations. The personnel who have completed the robot system-training and maintenance-training classes held by the manufacturer, dealer, or locally incorporated company are allowed to maintain the robot system. ■ Immediately press the EMERGENCY STOP switch whenever you suspect any danger. The Teach Pendant is equipped with an EMERGENCY STOP switch. Before operating the Teach Pendant, make sure that the EMERGENCY STOP switch on the Teach Pendant functions properly. Operating the Teach Pendant when the switch does not function properly is extremely hazardous and may result in serious bodily injury and/or serious damage to the equipment, as the switch cannot fulfill its intended function in an emergency. When nothing appears on its display window, the Teach Pendant is not connected with the Controller. In this case, the EMERGENCY STOP switch on the Teach Pendant will not function. ■ If the Teach Pendant is not connected to the Controller, DO NOT place it within easy reach during operation. You might press the EMERGENCY STOP switch on the unconnected Teach Pendant by mistake to stop the robot system in an emergency. Pressing the EMERGENCY STOP switch on the disconnected Teach Pendant in an emergency is extremely hazardous and may cause serious safety problems. ■ When entering the safeguarded area for teaching, change the mode of the Teach Pendant to TEACH and take out the key for the mode selector key switch and then enter the safeguarded area with the key. Leaving the key in the mode selector key switch is extremely hazardous and may cause serious safety problems as someone else may inadvertently change the mode to the automatic operation.

WARNING	■ Be sure to connect the cables between the Controller and the Teach Pendant properly. Do not allow unnecessary strain on the cables. (Do not put heavy objects on the cables. Do not bend or pull the cables forcibly.) The unnecessary strain on the cables may result in damage to the cables, disconnection, and/or contact failure. Damaged cables, disconnection, or contact failure is extremely hazardous and may result in electric shock and/or improper function of the system. Do not use the cables near heat or fire.

⚠ CAUTION	■ Do not shock the Teach Pendant physically or place any object on Teach Pendant. A liquid crystal display is used for the Teach Pendant display. If the display is damaged, liquid crystal may leak out. Liquid crystal is harmful. If it sticks on your skin or clothes, immediately wash your skin and clothes thoroughly with clean water and soap immediately. ■ The Teach Pendant must be used within the environmental conditions described in this manual. This product has been designed and manufactured strictly for use in a normal indoor environment. Using this product in the environment that exceeds the conditions may not only shorten the life cycle of the product but also cause serious safety problems. ■ Do not disassemble, repair, or modify the Teach Pendant by yourself. Improper disassembly, repair, or modification of the Teach Pendant may cause not only improper function of the robot system but also serious safety problems.

1.2.2 Safety-related Requirements

Specific tolerances and operating conditions for safety are contained in the manuals for the robot, Controller and other devices. Be sure to read those manuals as well.
Robot systems safety standard and other examples are given in this chapter. Therefore, to ensure that safety measures are complete, please refer to the other standards listed as well.
(Note: The following is only a partial list of the necessary safety standards.)

EN ISO 10218-1	Robots and robotic devices -- Safety requirements for industrial robots -- Part 1: Robots
EN ISO 10218-2	Robots and robotic devices -- Safety requirements for industrial robots -- Part 2: Robot systems and integration
ANSI/RIA R15.06	American National Standard for Industrial Robots and Robot Systems -- Safety Requirements
EN ISO 12100	Safety of machinery -- General principles for design -- Risk assessment and risk reduction
EN ISO 13849-1	Safety of machinery -- Safety-related parts of control systems -- Part 1: General principles for design
EN ISO 13850	Safety of machinery -- Emergency stop -- Principles for design
EN ISO 13855	Safety of machinery -- Positioning of safeguards with respect to the approach speeds of parts of the human body.
EN ISO 13857	Safety of machinery -- Safety distances to prevent hazard zones being reached by upper and lower limbs.
ISO 14120 EN953	Safety of machinery -- Guards -- General requirements for the design and construction of fixed and movable guards
IEC 60204-1 EN 60204-1	Safety of machinery -- Electrical equipment of machines -- Part 1: General requirements
CISPR11 EN 55011	Industrial, scientific and medical (ISM) radio-frequency equipment -- Electromagnetic disturbance characteristics -- Limits and methods of measurement
IEC 61000-6-2 EN 61000-6-2	Electromagnetic compatibility (EMC) -- Part 6-2: Generic standards -- Immunity for industrial environments

1.3 EMERGENCY STOP

⚠ WARNING	■ Immediately press the Emergency Stop switch whenever you suspect any danger. The Teach Pendant is equipped with an Emergency Stop switch. Before operating the Teach Pendant, make sure that the Emergency Stop switch on the Teach Pendant functions properly. Operating the Teach Pendant when the switch does not function properly is extremely hazardous and may result in serious bodily injury and/or serious damage to the equipment, as the switch cannot fulfill its intended function in an emergency. When nothing appears on its display window, the Teach Pendant is not connected with the Controller. In this case, the Emergency Stop switch on the Teach Pendant will not function.

Pressing the Emergency Stop switch stops program execution and stops excitation of the motors on the robot axes. Programs and point data will not be corrupted.
When pushed, the Emergency Stop switch holds the Emergency Stop state mechanically and electrically.

How to reset EMERGENCY STOP

Follow the steps below to reset the Emergency Stop state.

(1) Remove the cause of the Emergency Stop and verify that it is safe to operate the robot again.

(2) Turn the Emergency Stop switch right and release the mechanical hold.

(3) Turn the Teach Pendant mode selector key switch to “TEACH”.

(4) Tap the [Control Panel] tab on the touch panel to display the [Control Panel] panel.

(5) Press the <Reset> button to reset the Emergency Stop.

(6) Check that [Emergency Stop] on the status bar of the touch panel is “OFF”.

1.4 Using Teach Pendant in Safeguarded Area

When the mode selector switch of the Teach Pendant is switched to “TEACH” mode, the operator can jog and move the robot to predefined points in slow speed while the Enable Switch is held down and the safeguard is open.

When the mode is switched to the test mode (T1 or T2), the operator can verify a program while the Enable Switch is held down and the safeguard (including the safety doors) is open.
Person who will be using the Teach Pendant should be thoroughly trained on how to use it.

Follow the guidelines below when using the Teach Pendant in the safeguarded area:

(1) Before entering the safeguarded area to use the Teach Pendant, turn the mode selector key switch to “TEACH”.

(2) Enter the safeguarded area. Perform teaching operations and verify a program in “teaching” or “test” mode.

(3) After teaching is completed, leave the safeguarded area and close the safeguard.

(4) Return the mode selector key switch to “AUTO”.

(5) Input the latch release signal from the EMERGENCY connector to release the latch status.
For details, refer to the following manual.
Robot Controller manual (RC700 / RC700-A).
Setup & Operation 9.3 Pin Assignments

For T series Manipulator
T series Manipulator manual *Setup & Operation 11.3 Pin Assignment*

For VT series Manipulator
VT series Manipulator manual *Setup & Operation 12.3 Pin Assignment*

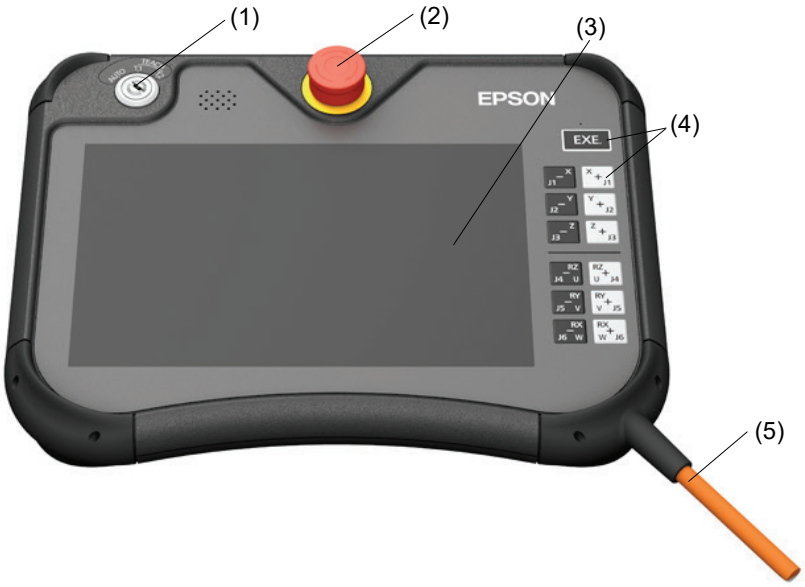
NOTE ☞ The TEACH mode status is latched by software.
To switch the mode from TEACH to AUTO, release the latched condition by inputting the latch release input signal.

⚠ CAUTION	■ Although the Teach Pendant can be operated inside the safeguarded area as described above, operate the robot system while all operators are outside of the safeguarded area wherever possible.

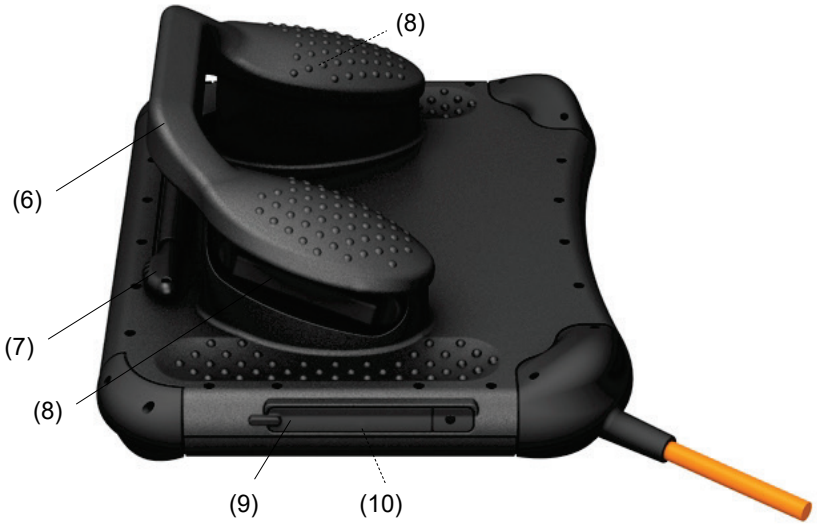
2. Specifications

2.1 Part Names and Functions

Front view



Back view



(1) Mode Selector Key switch

The mode selector key switch is used to change the operation mode between TEACH[*1] and AUTO. The mode can be fixed by pulling out the key.

(*1: For the test mode: T1 and T2)

When the mode is switched while a program is running, the program will be stopped.

To switch the mode from TEACH to AUTO, close the latch.

To change to the test mode, switch the mode selector key switch to TEACH, and tap the [Test] tab on the touch panel.

For details of the operation modes, refer to *Functions & Installation 4 Operation Mode (TEACH, AUTO, TEST)*.

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

(2) EMERGENCY STOP switch

When this switch is pushed, the Emergency Stop state is held both mechanically and electrically. Pushing the switch stops the program, removes power to robot motors and stops the Manipulator motion immediately.

To cancel the Emergency Stop state, first turn the EMERGENCY STOP switch to the right to release the mechanical latch. Switch the mode selector key switch to "Teach". Press the <Reset> key to reset the electrically held Emergency Stop state. The E-STOP lamp goes OFF.

For the procedure to reset the EMERGENCY STOP switch, refer to *Functions & Installation 1.3 EMERGENCY STOP*.

(3) Touch Panel

The touch panel is used to display various kinds of information, select the functions, and enter the setting values.

(4) Jog Key / EXE. Key

The keys are used for teaching operation and command execution.

(5) Connection Cable

This cable is used to connect the Teach Pendant and the Controller.

The connector is attached at the end of the cable.

(6) Handle

The handle is used to support the Teach Pendant by an arm. To hold the handle, grip either one of the parts with raised bumps which are located on right and left of the handle.

(7) Touch pen

The touch pen is used to operate the touch panel.

(8) Enable switch

This is a three-position switch (right-handed/ left-handed). To operate the robot in the TEACH mode, grip either right- or left-hand switch and use the jog keys.

When operating the robot in the test mode, set the switch to ON position.

The switch turns ON when it is at the midpoint, and it turns OFF when it is fully gripped or released.

(9) USB port protection cover

This is a cover for the USB port.

The cover can be removed by holding and lightly pulling the thin part at the tip.

CAUTION	■ Make sure to set the cover to protect the USB port when the USB port is not used.

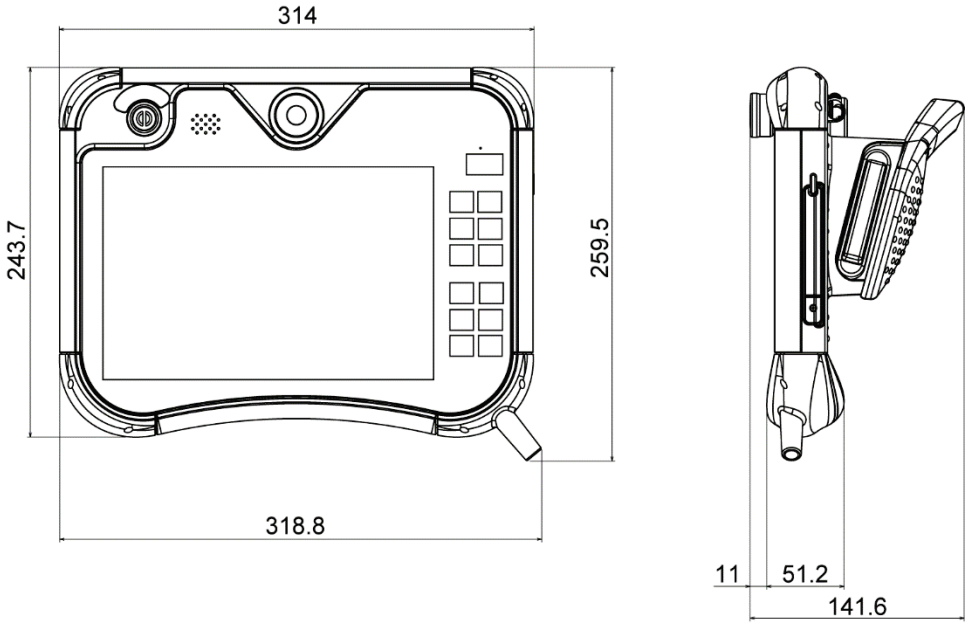
(10) USB port

The port for connecting the USB memories.

2.2 Standard Specifications

Item		Specification
General specifications	Rated voltage	24 VDC
	Electric power consumption	16 W or less
	Weight	Approx. 1.5 kg (excluding cables)
Display specifications	Size	10.1 inches TFT color LCD
	Pixels	1280 × 800

2.3 Outer Dimensions



[Unit: mm]

NOTE

Use the installation metal in the attachment when attaching the Teach Pendant to a panel, or the like.

3. Installation

3.1 Contents

TP1 (with cables) : 1 unit
Mode selector key : 2 units

3.2 Environmental Conditions

The Teach Pendant must be used in an environment that conforms to the following requirements to ensure safe and reliable operation.

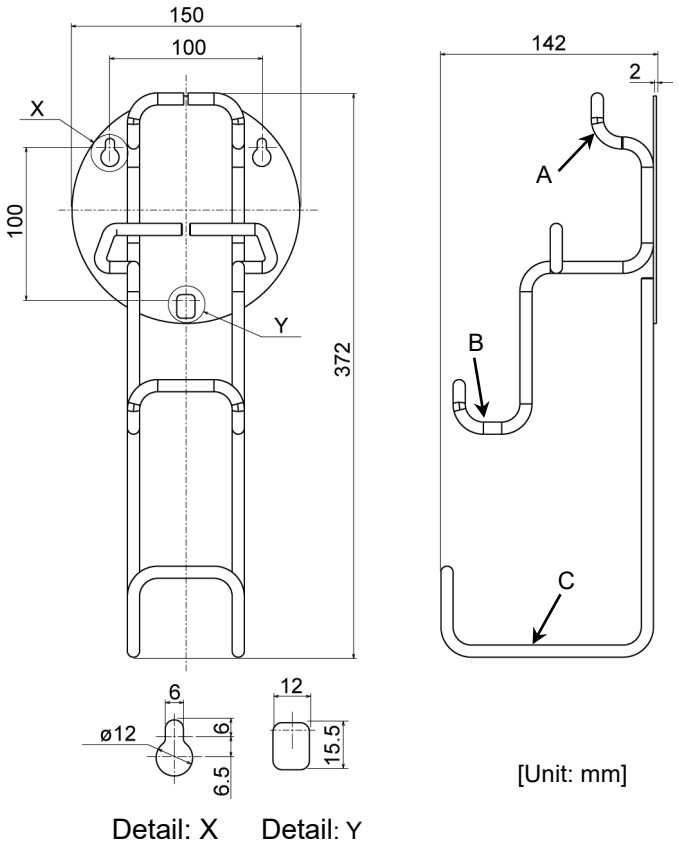
Item	Condition
Ambient temperature	0 to 40 deg C (with minimal variation)
Ambient relative temperature	5 to 95%
Protection structure	IP65
Environment	- Keep away from dust, oily smoke, salinity, metal powder and other contaminants. - Keep away from flammable or corrosive solvents and gases.

3.3 Operating Precautions

CAUTION	■ Do not drop the Teach Pendant or hit hard against other objects to avoid damage, as the case of the Teach Pendant may be damaged since the main body is made of resin. ■ Do not hit the touch panel of the Teach Pendant against a hard object or put excessive pressure on it. The touch panel is made of glass. Therefore, if excessive pressure is put on it, it may be damaged. ■ Do not press or rub the surface of the front panel push buttons with a hard object such as a tool. The surface of the buttons may be damaged as they are easily scratched. ■ Wipe the dirt and oils adhering to the surface of the Teach Pendant display with a soft cloth dampened with neutral detergent or alcohol solvent.

3.4 Wall Bracket (Option)

3.4.1 Outer Dimension



3.4.2 How to Mount and Use the Teach Pendant

To use the Teach Pendant with the wall bracket, follow the steps below.

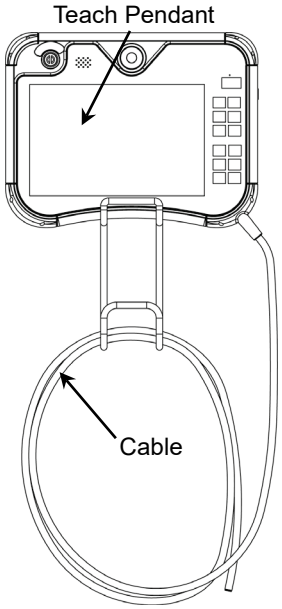
For locations of A, B, C, X, and Y in the following steps, refer to *3.4.1 Outer Dimension*.

(1) Screw the wall bracket and fix it to the wall.
Installation position: X × 2 parts, Y × 1 part
Screw size: M5

(2) Hang the Teach Pendant handle to A.

(3) Place the Teach Pendant to B.

(4) Hang the Teach Pendant cable to C.



3.5 Connection

This section describes the connection of the Controller and the Teach Pendant.

CAUTION	■ Be sure to connect the cables of Controller and Teach Pendant properly. Do not allow unnecessary strain on the cables. (Do not put heavy objects on the cables. Do not bend or pull the cables forcibly.) The unnecessary strain on the cables may result in damage to the cables, disconnection, and/or contact failure. Damaged cables, disconnection, or contact failure is extremely hazardous and may result in improper function of the system. ■ Make sure that the pins are not bent when connecting the connector. Connecting the connector with the pin bent may cause malfunction and result in improper function of the system.

3.5.1 Connection to the Controller

(1) Check that the Controller and the robot are connected properly.

(2) Connect the connector of the Teach Pendant cable to the TP port of the Controller.

Turn the △ mark on the connector of the Teach Pendant upwards and push the connector into the connector on the Controller while aligning to the △ mark.

(3) Turn ON the controller.

NOTE

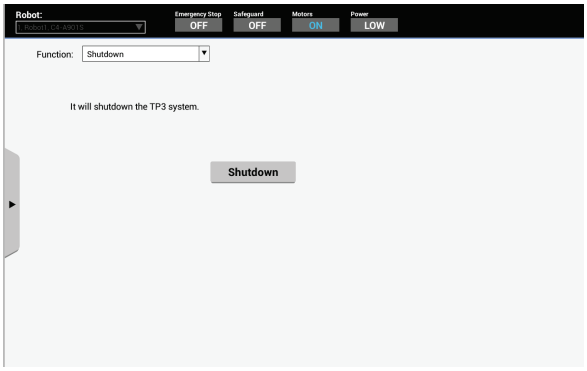
The Teach Pendant can be connected to and removed from the Controller when the Controller power is ON.

- When the Teach Pendant connector is removed from the Controller with the mode selector key switch of the Teach Pendant is in “TEACH” position, the operation mode will remain in TEACH mode. The operation mode cannot be switched to AUTO mode. Make sure to remove the Teach Pendant after switching the operation mode to “AUTO”.
- The Controller enters the Emergency Stop state if nothing is connected to the TP port. Connect the TP bypass plug when the Teach Pendant is not connected.

Removal from the Robot Controller

(1) Switch the mode selector key switch to “AUTO”.

(2) Tap the [Configuration] tab to display the [Configuration] panel.



(3) Select “Shutdown” from the [Function] list.

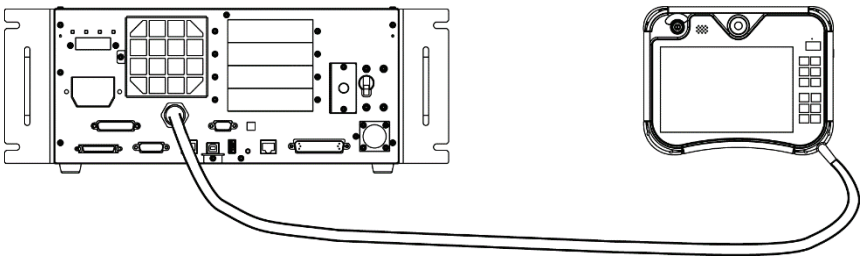
(4) Tap the <Execute> button to shut down the Teach Pendant.
For details, refer to the following section:
Operation 5.3.4 Shutdown

(5) Turn the connector of the Teach Pendant counterclockwise lightly and pull it from the TP port of the Controller.

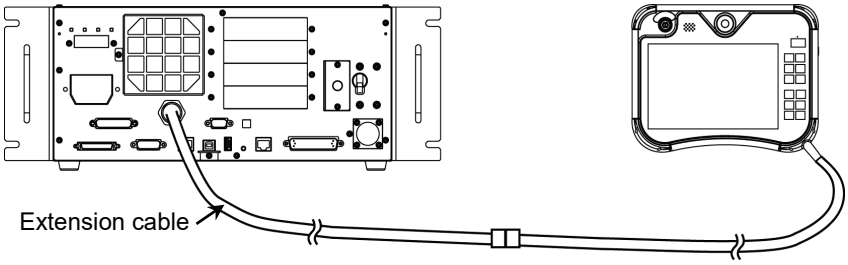
CAUTION	■ Before removing the Teach Pendant connector from the TP port on the Controller, be sure to shut down the Teach Pendant by tapping the <Execute> button on the [Configuration] panel. If the connector is removed without shutting down, the data may not be saved properly.

3.5.2 Connection Examples

When connecting the Teach Pendant to the Controller directly:



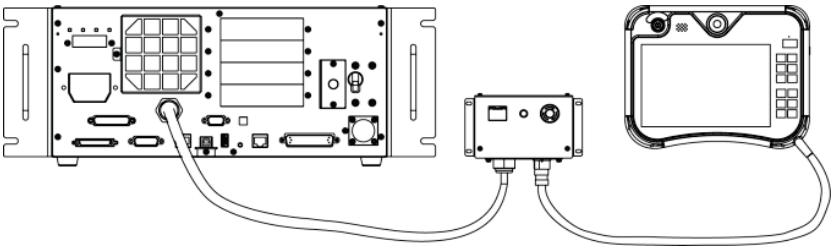
When using an extension cable:



NOTE

To extend the cable, use the extension cable (optional: 10 m or 15 m).

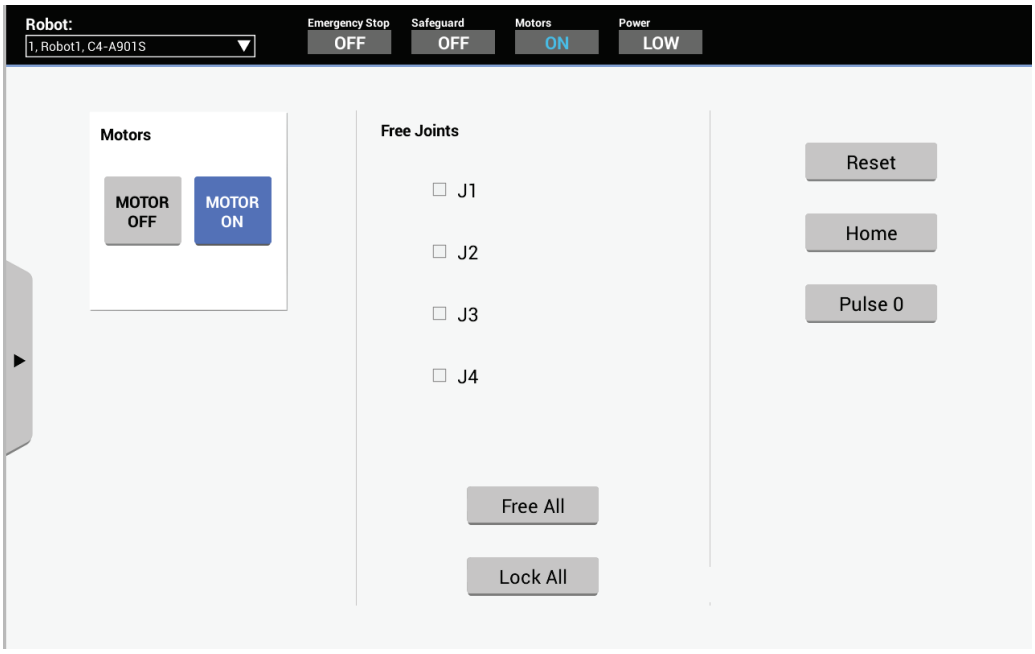
When using Hot Plug Kit (Option):



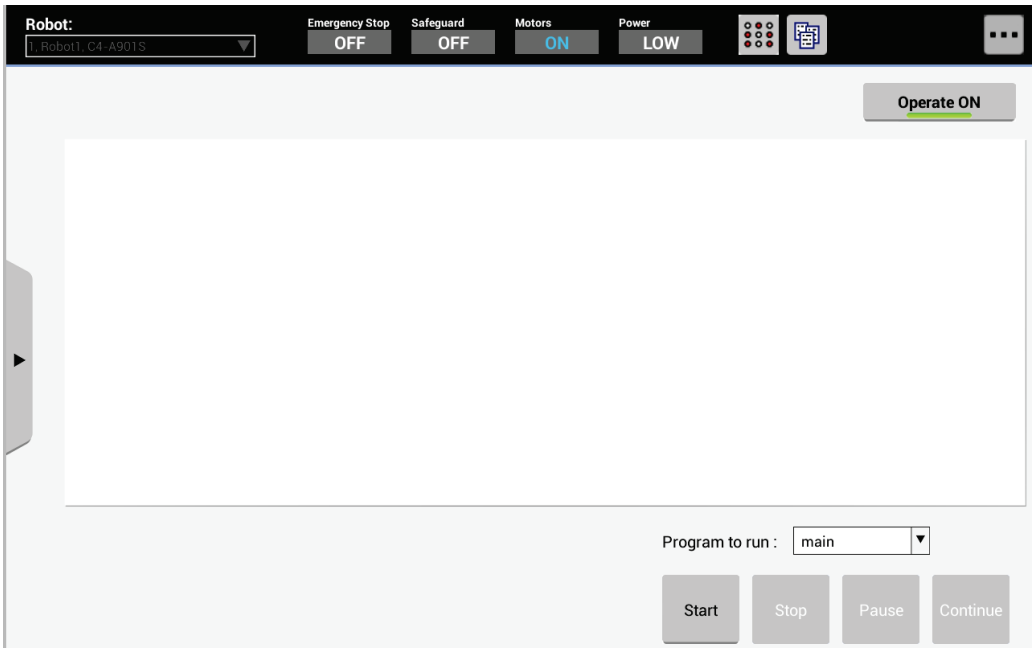
3.6 Power Supply

The power to the Teach Pendant is supplied via the TP connector on the Controller.
After communication between the Controller and the Teach Pendant is established, the following screen will appear on the display of the Teach Pendant.

TEACH mode



AUTO mode



4. Operation Mode (TEACH, AUTO, TEST)

NOTE ☞ A coordinate point including the arm pose is defined as “position (point),” and the data is called “point data.”

4.1 Overview of Operation Modes

The robot system has three operation modes: TEACH, AUTO, and TEST modes.

TEACH mode

This mode enables point data teaching and checking close from the Robot using the Teach Pendant.

Robot operates in Low power status.

AUTO mode

This mode enables automatic operation (program execution) of the Robot system at the factory.

In this mode, robot operation and program execution are not allowed when the safety door is open.

TEST mode

T1 This mode enables program verification while the Enable Switch is held down and the safeguard (including the safety door) is open.

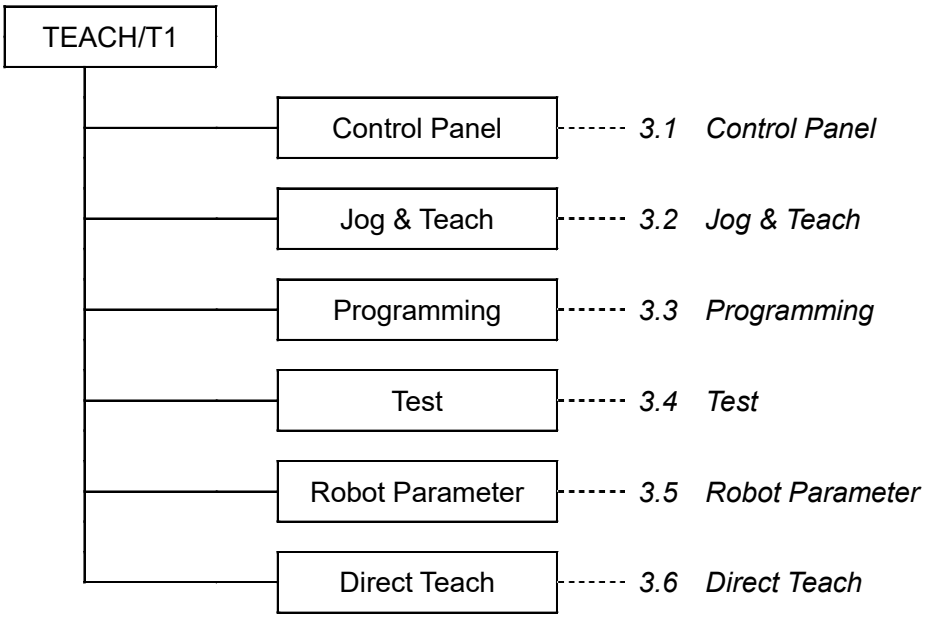
This is a low speed program verification function (T1: manual deceleration mode) which is defined in Safety Standards.

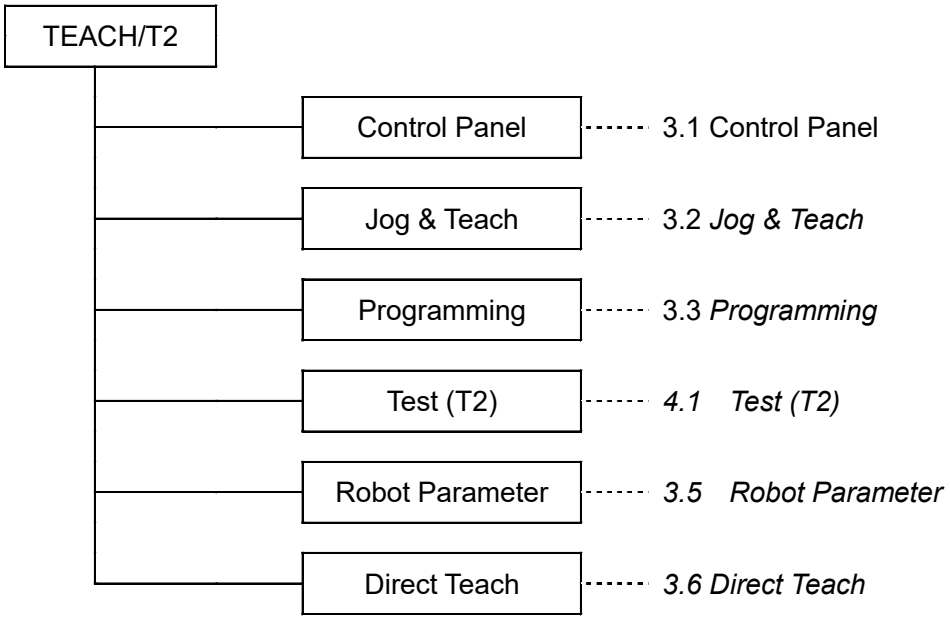
In this mode, the specified Function can be executed with multi-task / single-task, multi-Manipulator / single-Manipulator at low speed.

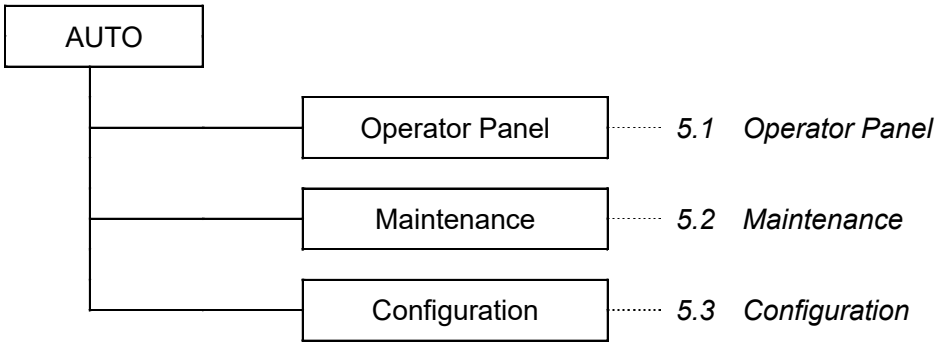
T2 This mode enables program verification while the Enable Switch is held down and the safeguard (including the safety door) is open.

Unlike the TEST/T1, the program verification in a high speed is available in this mode.

In this mode, the specified Function can be executed with multi-task / single-task, multi-Manipulator / single-Manipulator at high speed.







: Panel name
------ : Relevant section

NOTE

☞ T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

4.2 Switching the Operation Modes

The mode selector key switch on the Teach Pendant switches between TEACH mode and AUTO mode.

To change to TEST (T1 or T2) mode, switch the mode selector key switch to TEACH, and then tap the [Test] tab on the touch panel.

TAECH mode

Turn the mode selector key switch to “TEACH” for TEACH mode. (TEACH mode is available when the key switch is either at TEACH/T1 or TEACH/T2)
The running program pauses when the operation mode is switched to TEACH mode.
The running robot stops by Quick Pause immediately.

AUTO mode

To switch to AUTO mode, turn the mode selector key switch to “AUTO” and then turn the latch release input signal to ON by the EMERGENCY connector of the Controller.

TEST mode

T1 Turn the mode selector key switch to “TEACH/T1” for “TEACH” mode. Tap the [Test] tab to change the mode to T1.

T2 Turn the mode selector key switch to “TEACH/T2” for “TEACH” mode. Tap the [Test (T2)] tab to change the mode to T2. Enter the password if it is set.

NOTE ☞ T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

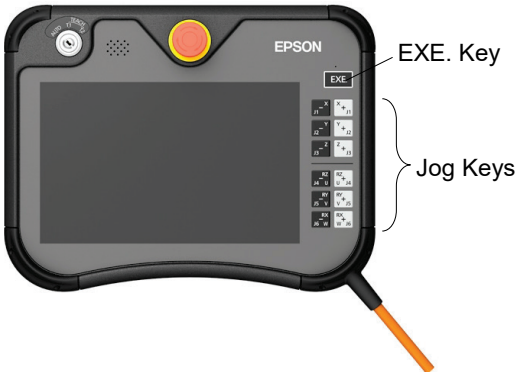
TEACH mode status is latched by software.
To switch the mode from TEACH to AUTO, release the latched condition using the latch release input.

For details, refer to the following manual.
Robot Controller manual (RC700 / RC700-A):
Setup & Operation 9.1 Safety Door Switch and Latch Release Switch

For T series Manipulator
T series Manipulator manual
Setup & Operation 11.1 Safety Door Switch and Latch Release Switch

For VT series Manipulator
VT series Manipulator manual
Setup & Operation 12.1 Safety Door Switch and Latch Release Switch

5. Jog Keys and EXE. Key



EXE. Key	Description
EXE.	To perform the following operations, press the Enable Switch and the <EXE.> key at the same time. To execute the commands in TEACH mode To execute the program in TEST mode

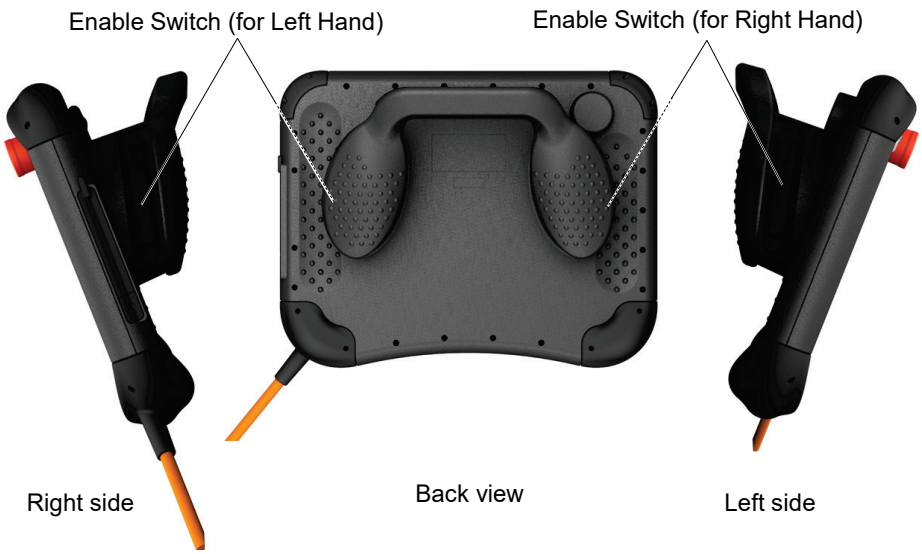
The jog keys are only available in TEACH mode.

Jog Key		Description	
X J1	X + J1	Joint mode	Jogs J1
		Other than Joint mode	Jogs in X direction of the rectangular coordinate system
Y J2	Y + J2	Joint mode	Jogs J2
		Other than Joint mode	Jogs in Y direction of the rectangular coordinate system
Z J3	Z + J3	Joint mode	Jogs J3
		Other than Joint mode	Jogs in Z direction of the rectangular coordinate system
RZ J4 U	RZ + U J4	Joint mode	Jogs J4 or J7
		Other than Joint mode	Rotates the tool coordinate system around the Z axis of the rectangular coordinate system.
RY J5 V	RY + V J5	Joint mode	Jogs J5 or J8 (additional axis)
		Other than Joint mode	Rotates the tool coordinate system around the Y axis of the rectangular coordinate system. Or jogs the S axis (additional axis).
RX J6 W	RX + W J6	Joint mode	Jogs J6 or J9 (additional axis)
		Other than Joint mode	Rotates the tool coordinate system around the X axis of the rectangular coordinate system. Or jogs the T axis (additional axis).

6. Enable Switch

In TEACH mode, some operations require use of the 3-position enable switch located on the back of the Teach Pendant. The enable switch can be operated by either hand.

When operation of the enable switch is required, grip either switch to the center position (ON state). If you grip the switch harder, it will be OFF state and the robot will stop.



How to press the Enable switch

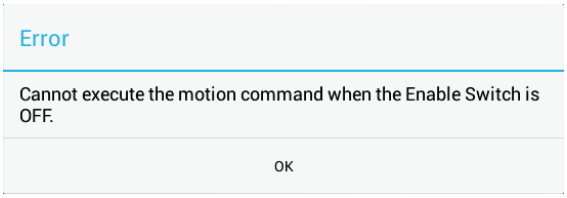
Grip the enable switch by fingers of the hand holding the handler.

Example : When gripping by the left hand

NOTE

Make sure to grip to the center position (ON state) when enabling the enable switch. If the enable switch is not pressed enough to the center position (ON state), an error will occur and the robot will stop due to the enable switch being in the OFF state.

Also, the following error message will appear when an error is occurred.



Restart (supply the power source of the Controller again) of the teaching pendant is required to recover from the error.

7. Touch Panel

7.1 Operating the Touch Panel

The touch panel can be operated by fingers or the attached touch pen. The following actions are required to use the Teach Pendant.

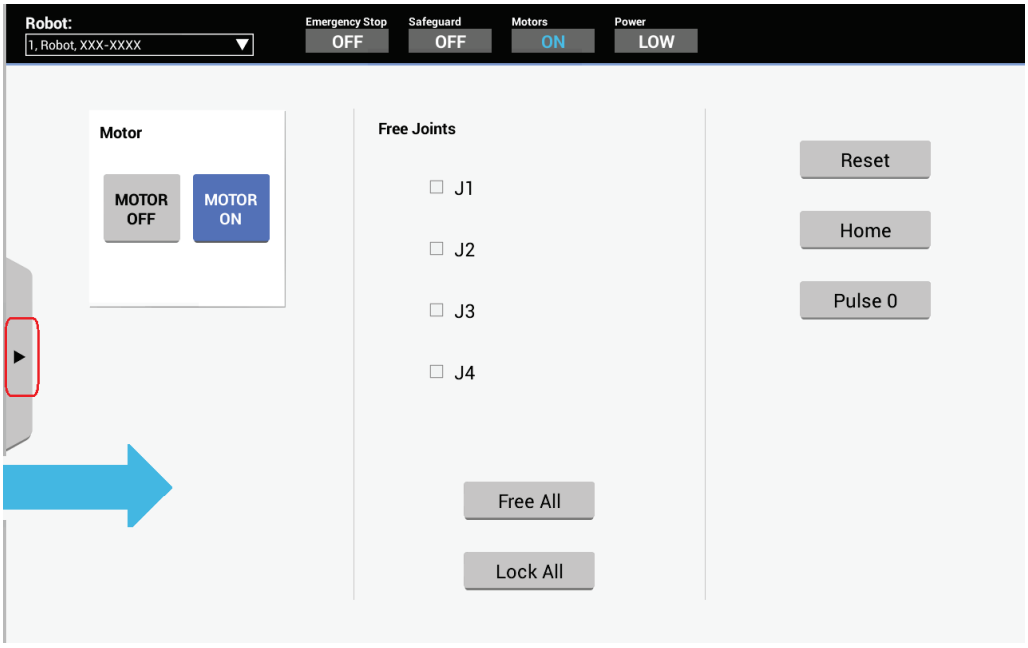
Name	How to operate
Tap	Tap the touch panel as if pressing the button.
Long tap	Keep touching one point on the panel.
Flick	Touch and slide a finger or touch pen in one direction and immediately release.
Swipe	Touch the panel and move a finger or touch pen to one direction while keeping the finger/pen touches the panel.

7.2 Operating the Menu

Tap→

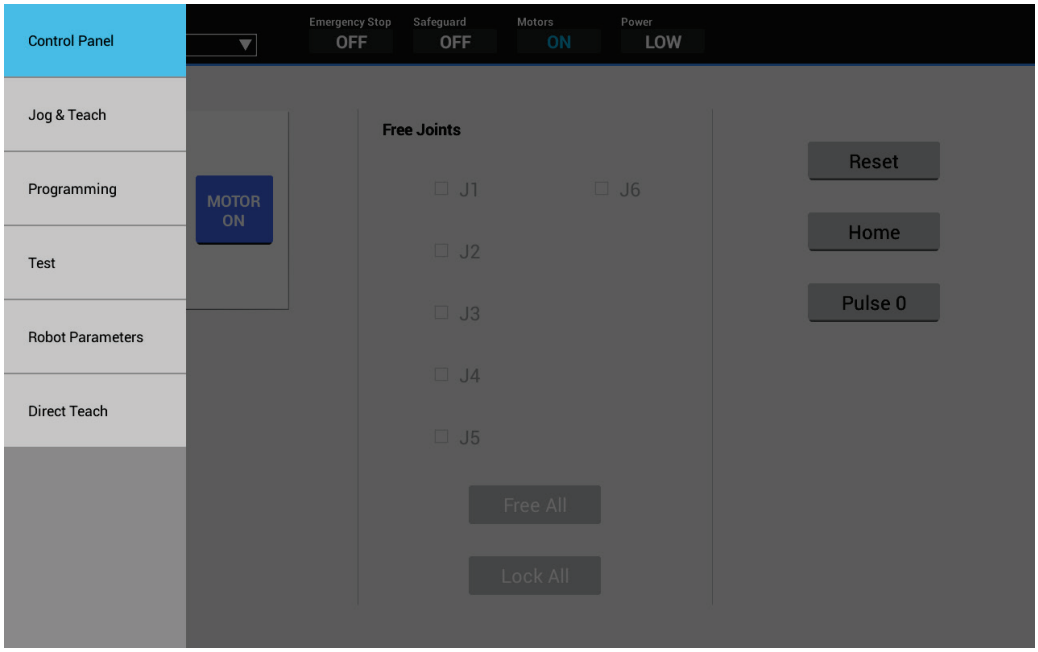
Or

Swipe from left side of the screen→

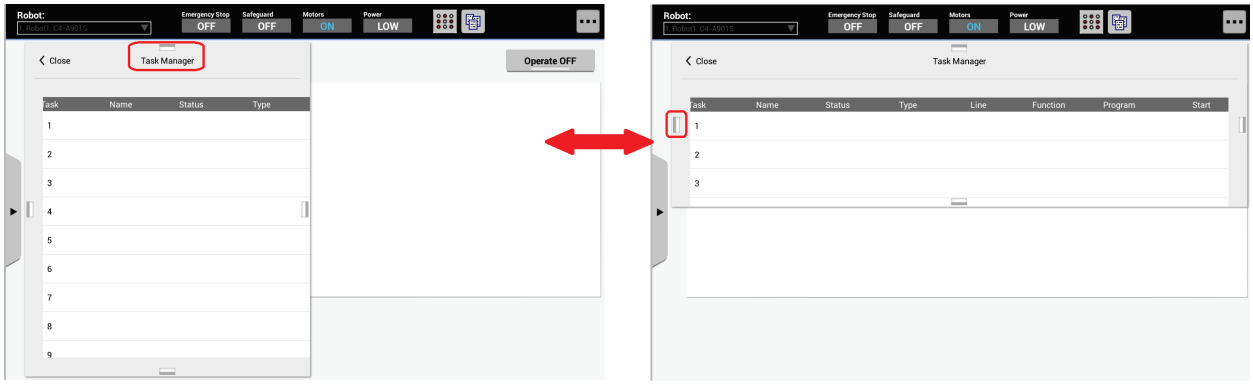


How to display the menu

- Swipe the screen from left side to center.
- Tap the button on the left side of the screen.



7.3 Operating the Panels



The sub menu panels are displayed over the main panel.

The panels with a small square at the middle of all sides can be changed its size and position by taping the squares.

Available sizes are full size, upper half, lower half, left half, and right half.

Example of size change

To change to the right half-size:

Tap the square on the right side of the full-sized window.

To change the right half-size window to full size:

Tap the square on the right end of the window.

To change the position

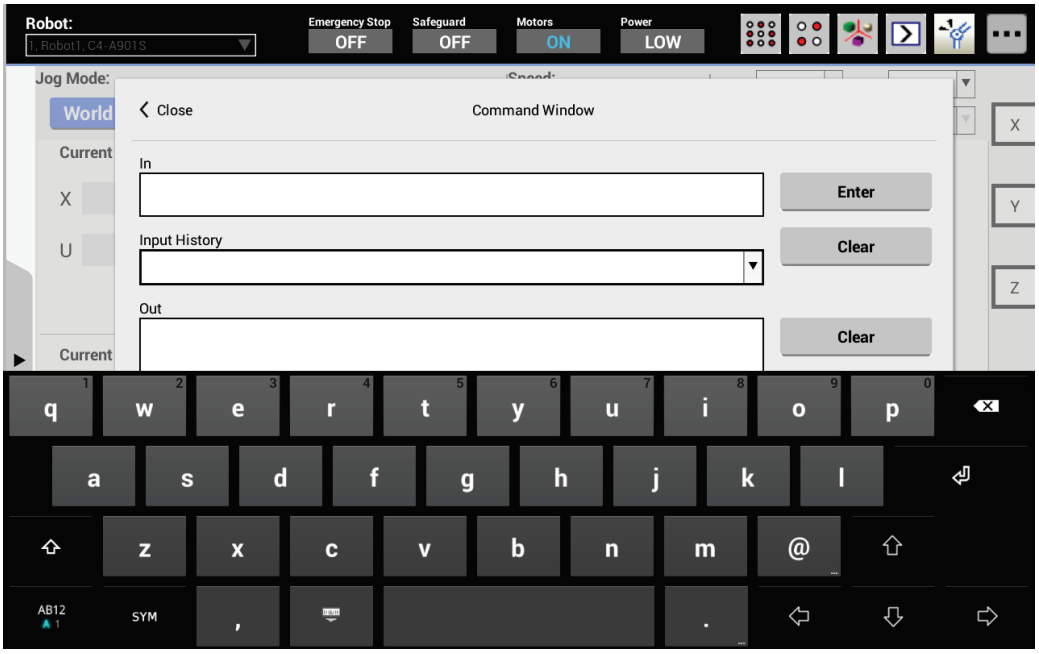
Change the right half-size window to left half-size:

Tap the square on the left end.

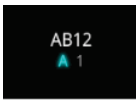
Change the left half-size to upper half-size:

Tap the square on the upper side of the window.

7.4 Operating the Software Keypad



Use the software keypad when input of texts is required. The keypad can be displayed by taping the text input area.

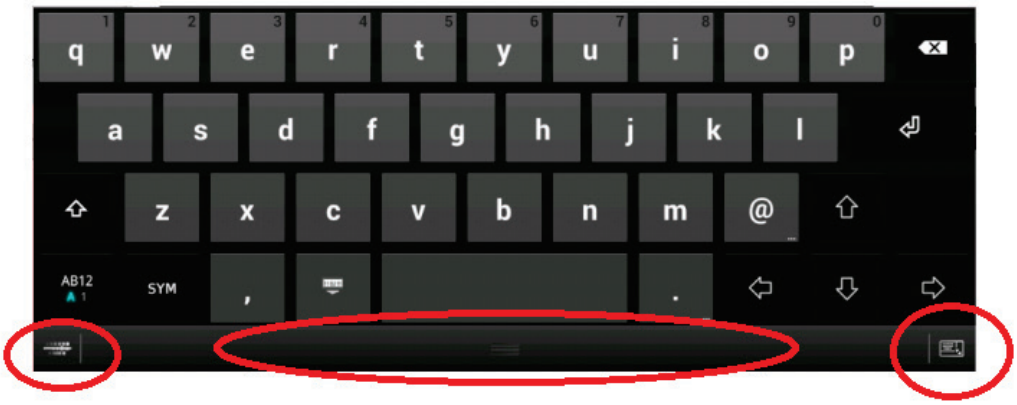
Key	Description
	Closes the keyboard.
	Letter key (AB12 key) To display the menu, long-tap the key.

The following are the menus and functions displayed by long-tapping the letter key.

Item	Description
10 Key <->Full key	Switches the numeric keypad and the full keypad. This function may not be supported depending on the language setting.
Input mode	Input mode can be selected. This function may not be supported depending on the language setting.
Adjust keypad height	Adjusts the height of the keypad. The height can be changed by swiping the bar on the top of the keypad.
Floating mode ON/OFF	Switches the floating mode

7.4.1 Floating mode

In the floating mode, position, size, and transparency can be changed.



Item	Key	Description
Move		Swipe the middle of the bar at the bottom.
Change size		Swipe the size button at the lower right and release at the desired size.
Transparency		Tap the transparency button at the lower left and adjust transparency using the displayed scroll bar.

8. USB Port

Connect a commercial USB flash drive to the TP3 memory port to use the following features.

- Backup Controller information to a USB flash drive.
  (Refer: *Operation 5.2.1 Backup*)
- Restore Controller information from a USB flash drive.
  (Refer: *Operation 5.2.2 Restore*)
- Updating the software (Refer to: *Operation 5.3.3 Update Software)*

8.1 Cautions when using USB flash drive

- Although the port is a universal USB port, never connect anything other than a USB flash drive.
- Insert a USB flash drive directly into the TP3 memory port.
  Operation is not guaranteed when there are cables or hubs between TP3 and a USB flash drive.
- Insert and remove a USB flash drive slowly and surely.
- Do not edit the saved files by the editor.
  Operation of the robot system after data restoration is not guaranteed.
- Do not use two USB flash drives at once.

8.1.1 Available USB Flash Drive

Use a USB flash drive that meets the following conditions.

- USB2.0 supported
- Without security function
  USB flash drive with password input function cannot be used.

9. Warning Sound (Beep)

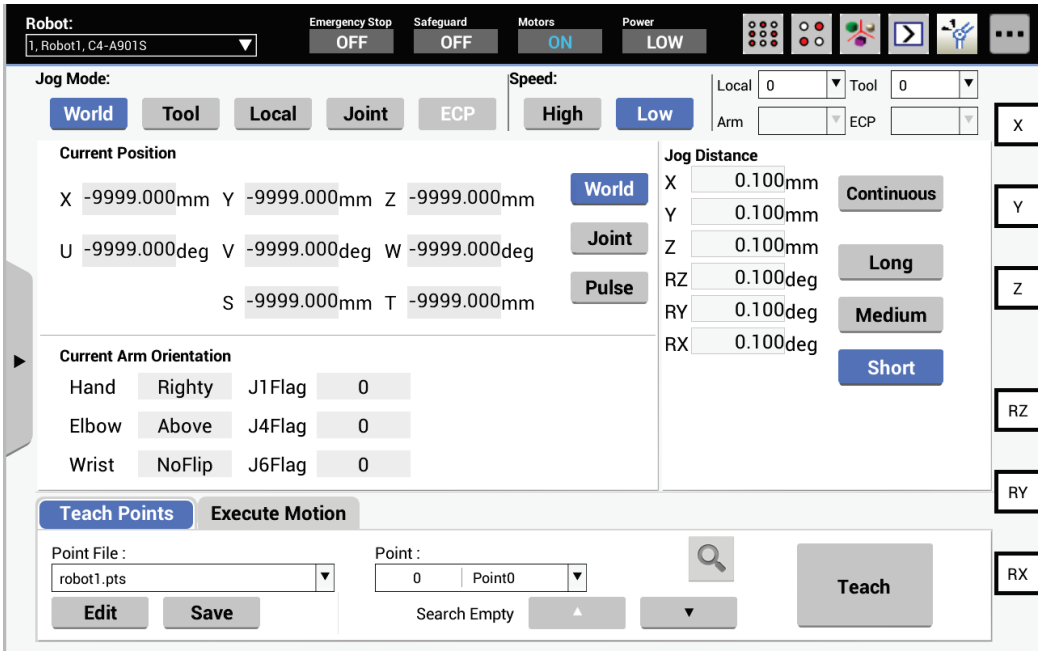
The Teach Pendant beeps when the robot passes the singularity.

Operation

This section contains information about operation of the Teach Pendant and maintenance procedure.

1. Teaching Procedure

This chapter describes basic jog operation and teaching methods using the Teach Pendant. Switching the mode selector key switch to <TEACH/T1> or <TEACH/T2> and selecting the [Jog & Teach] tab displays the following panel.



To change the robot, refer to the following section:

Operation 2.1 Current Robot

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

When you switch the mode to <TEACH/T1> or <TEACH/T2>, the robot's speed setting will be set to the speed (high, low) on the Jog & Teach window.
Motion command after the above operation will be executed at this speed. Set the speed again by the commands such as Motor, Speed, and Accel.

1.1 Jog Operation

The robot can be moved to the teaching position by either of the following operation.

Step Jog operation
Continuous Jog operation

1.1.1 Step Jog Operation

In Step Jog, the robot moves each time the Jog key is pressed.
The jog distance has to be configured in [Jog Distance] beforehand (Long, Medium, and Short).

Reference: *Operation 3.2.6 Jog Distance*

Pressing the Jog key while holding the Enable Switch executes step jogs.

NOTE ☞ In Step Jog, the robot moves in one direction even if two keys are pressed at the same time. The robot does not move if more than three keys are pressed at the same time.

1.1.2 Continuous Jog Operation

In Continuous Jog, the robot moves while pressing the Jog key.
Specify the jog distance to “Continuous” in the [Jog Distance].

Reference: Operation *3.2.6 Jog Distance*

The continuous jog can be executed by pressing the Jog key while gripping the Enable Switch.

NOTE ☞ In Continuous Jog, the jog can be executed by pressing two jog keys at a time.
For example, pressing the “+X” and “+Y” keys together executes a continuous jog diagonally. The robot does not move if more than three keys are pressed at the same time.

1.2 Teaching

Teach the robot position to the specified point number.

(1) Specify the following items in the [Jog & Teach] panel.

[Point File] : Point file name
[Point] : Point number

(2) Tap the <Teach> button.
When the point number is already used, the message asking whether to overwrite the data will appear.

(3) Enter the point label and comment in the displayed message dialog box.

(4) Tap the <OK> button of the message dialog box to temporarily store the robot position.

(5) Press the <Save> button to save your changes.

1.3 Direct Teaching

1.3.1 Direct Teaching of SCARA Robot

"Direct teaching" is a method to teach the point directly by manually moving the SCARA robot while the motor of the joint to teach the point is off.
Teach a position of the manually moved robot to the specified point number.

(1) Select the [Control Panel] tab and move to the [Control Panel] panel.

(2) Turn OFF the motor of the joint to move in the [Free Joints]. De-energized joint can be moved manually.

(3) Select the [Jog & Teach] tab and move to the [Jog & Teach] panel.

(4) Move the robot arm to the position where you want to teach.

(5) Tap the <Teach> button.
If the point number is already used, the message asking whether to overwrite the data will appear.

(6) Enter the point label and comment in the message dialog box.

(7) Tap the <OK> button of the message dialog box to temporarily store the robot position.

(8) Tap the <Save> button to save your changes.

1.3.2 Direct Teaching of Force Sensor

CAUTION	■ Executing the direct teach with improper settings of the Force Sensor, coordinate transformation, and gravity compensation may result in unintended motion. Be careful when configuring the settings and check operation before executing the direct teach. For details of the setting and operation check, refer to the following manual. EPSON RC+ 7.0 Option Force Guide 7.0

NOTE

This function is available when Force Guide 7.0 is setup.
For usage of the Force Guide 7.0, refer to the following manual.
EPSON RC+ 7.0 Option Force Guide 7.0

Apply the Robot position to the specified point number.

(1) Select the [Control Panel] tab and move to [Control Panel] panel.

(2) Tap the <MOTOR ON> button and turn ON the motor.

(3) Select the [Direct Teach] tab and move to [Direct Teach] panel.

(4) Select the [Force Setting] tab and move to [Force Setting] panel.

(5) Select the mass property object.

CAUTION	■ Executing the direct teach with improper settings or the mass property object may result in unintended motion. Be careful when configuring the settings before executing the direct teach

(6) Select the mode.

(7) Select the motion direction.

(8) Select the hardness.

(9) Select the [Teach] tab and display the [Teach] panel.

(10) Reset the Force Sensor.

CAUTION	■ Be sure to reset the Force Sensor with no external force applied to it. If it is reset with an external force applied to it, the state in which an external force applied is “0”. Therefore, if the force applied is removed, the Force Sensor detects a force even if no force is applied. If executing the direct teach in this state, the robot may move unintentionally. Caution is required in this regard.

(11) Tap the <Direct Teach Start> button.
Confirmation panel appears.

(12) Tap the <OK> button on the confirmation panel with turning ON the enable switch.

(13) Move the Robot arm to the position to teach.

CAUTION	■ Executing the direct teach with improper mode or motion direction may result in unintended motion. Be careful when configuring the setting before executing the direct teach. ■ Apply the force to the hand or workpiece which is attached near the tip than the Force Sensor. The Force Sensor cannot detect the force when it is applied to the robot arm or the Force Sensor itself, and it may result in unintended robot motion. Caution is required in this regard.

(14) Tap the <Teach> button.

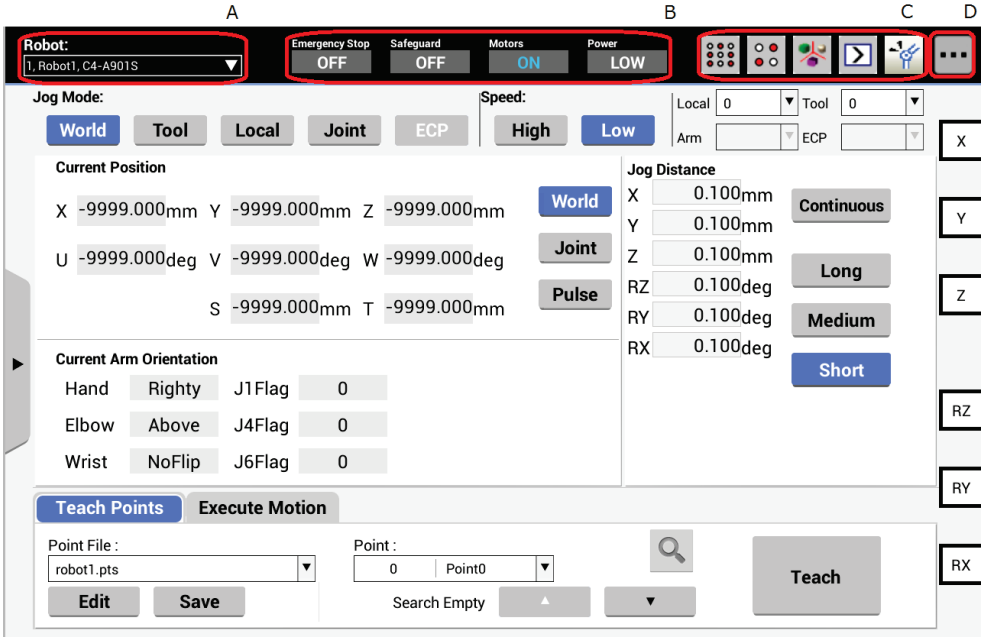
(15) Enter the point label and comment on message dialog.

(16) Tap the <OK> button on the message dialog to save the robot position temporary.

(17) Tap the <Save> button to save the change.

2. Common Functions

This chapter describes common functions for all modes.



A: Selected robot can be checked.
Refer to: *Operation 2.1 Current Robot*

B: Status of emergency stop, safety door, motor, and power can be checked.
Refer to: *Operation 2.2 Status Bar*

C: Tap the icon to display the each tool menu.
Refer to: *Operation 2.3 Tool*

D: Tap the menu button to display the sub menu.
Refer to: *Operation 2.4 Sub menus*

2.1 Current Robot

Current robot number, name, and model are displayed.

To change the robot:

Tap the panel to display the list, and select the robot to change.

The robot cannot be registered to the Robot system by the Teach Pendant.

The robot can be changed in TEACH mode (TEACH/T1, TEACH/T2), but not in AUTO mode.

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

2.2 Status Bar

This area displays the current robot status.

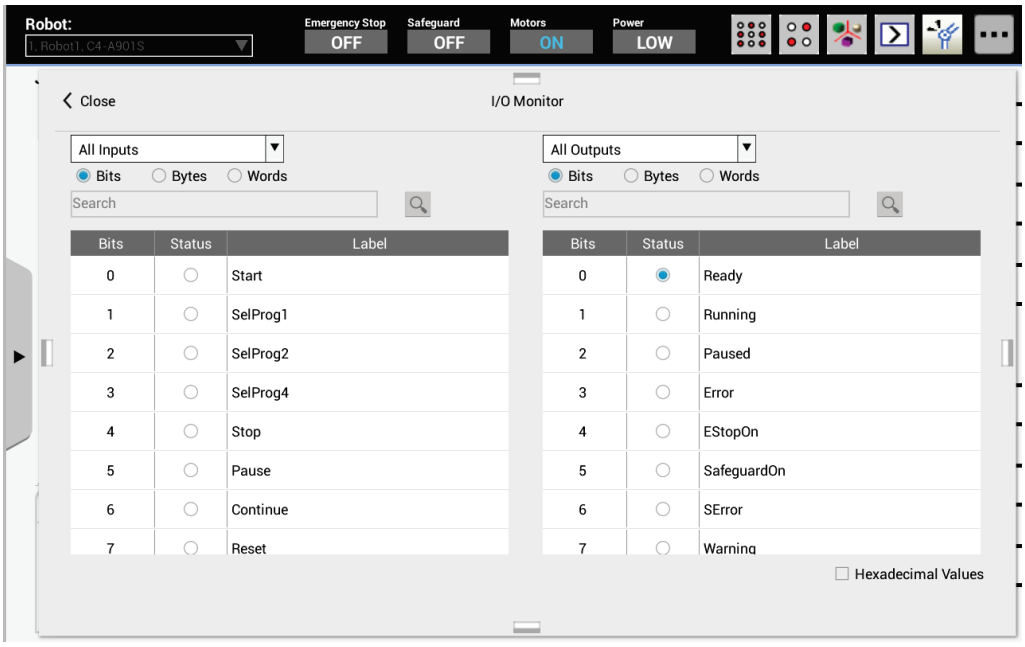
Name	Description	Value
Emergency Stop	Displays the emergency stop status To release the emergency stop state, tap the <Reset> button. Refer to: *Operation 3.1.3 Command Buttons*	ON / OFF
Safeguard	Displays the safety door status	ON / OFF
Motor	Displays the robot motor status	ON / OFF
Power	Displays the robot motor power status	HIGH / LOW

2.3 Tool

Tap the icon button to display the each tool menu.
The displayed icons differ depending on the currently used panel.

2.3.1 I/O Monitor

Tap to display the [I/O Monitor] panel.



Inputs/outputs and memory I/O of the Controller can be monitored.
Inputs and outputs can be displayed at the same time. Bit, Byte, and Word can be selected.

Bit shows the I/O status and labels.
Byte and Word show values and labels.

Checking the [Hexadecimal Values] checkbox displays the byte and word values in hexadecimal notation. Unchecking the checkbox displays the values in decimal notation.

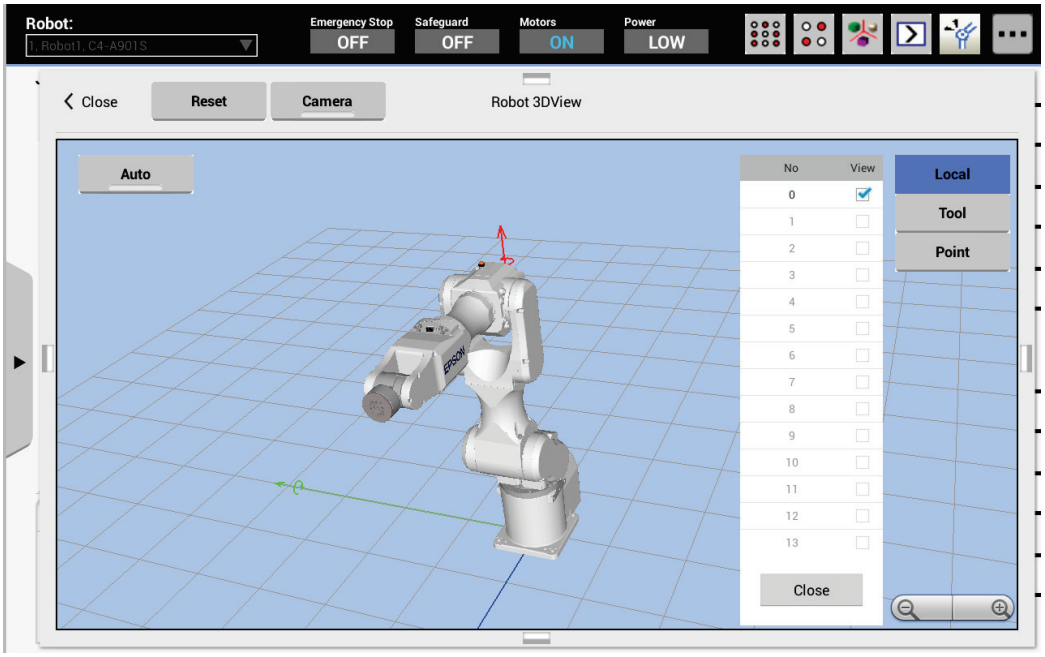
Tapping [Status] of the bit you want to change with the Enable switch ON changes ON/OFF of the output bits. However, ON/OFF cannot be changed if the [I/O Monitor] panel is opened from the following panels:
[Test] panel [Operator Panel] panel

Statuses of the selected inputs are continuously updated, while outputs are updated when the output bits are changed.

The I/O can be searched by the I/O label.
Enter the text to search and tap the search button. You can search through the currently displayed list.

2.3.2 Robot 3D View

Tap to display the [Robot 3D View] panel.



The robot can be displayed in the 3D.

The coordinate axes and points are displayed on the same panel as the robot. This allows you to check the robot posture and motion from various points of view.

Robot Display:

One currently selected robot can be displayed. The display changes as you change the robot.

Coordinate system display:

To display the coordinate system, tap either <Local>, <Tool>, or <ECP> to select the coordinate system you want to display and select the coordinate number. You can select several coordinate numbers.

Coordinate axes are displayed as follows:

X axis: Green
Y axis: Blue
Z axis: Red

Point display:

To display the point, tap the <Point> button and select the point number from the current point file. You can select several points.
The point can be displayed on the 3D display.

Field of View Control:

Enlarge, reduce the panel	:	Tap the <+/–> button on the panel.
Rotate the view	:	Swipe with the <Camera> button OFF.
Scroll the window	:	Swipe with the <Camera> button ON.
Return to default	:	Tap the <Reset> button.

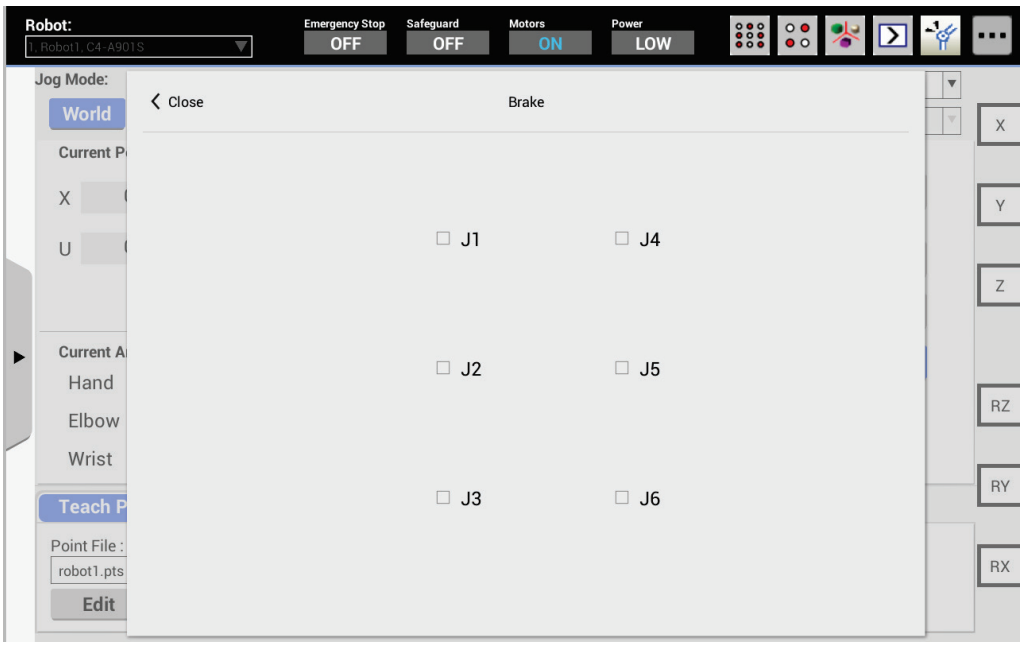
Updating the display

Automatic and manual update can be selected. Tap the Auto/Manual button to switch between automatic update and manual update.

Auto	:	Automatically and periodically updates the display.
Manual	:	The display is updated by tapping the <Refresh> button.

2.3.3 Brake Setting

Tap to display the [Brake] panel.



For the vertical 6-axis robots, the brake of each axis can be turned ON or OFF.

This is not available for non 6-axis robots.

The password entry panel will be displayed if the password is set. Enter the password and tap <OK> to display the [Brake] panel.

Brake ON:

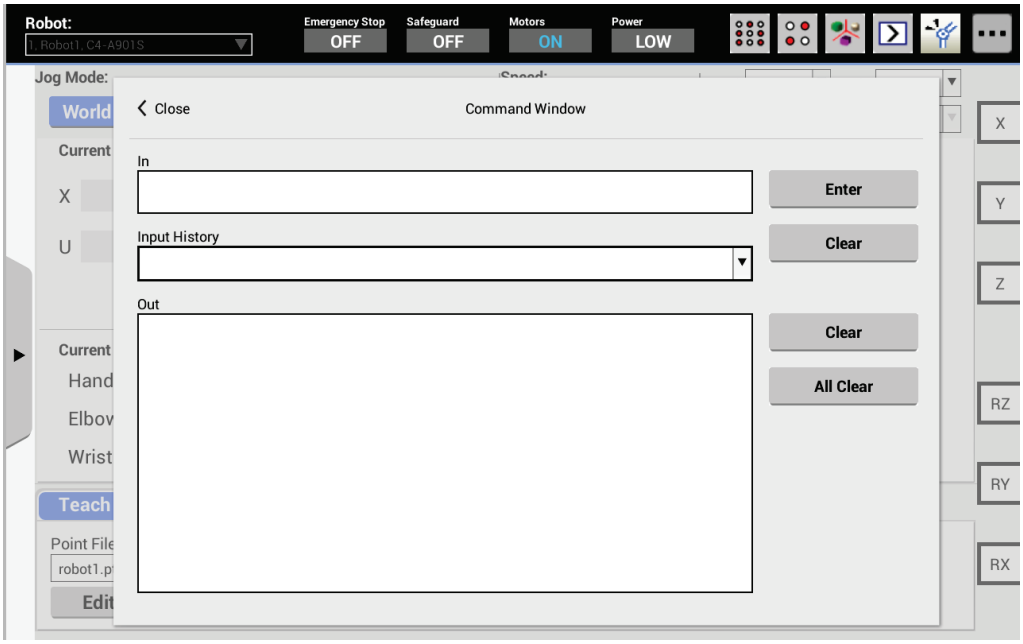
Check the checkboxes of the joints you want to lock the brakes.
The brakes will be locked.

Brake OFF:

Uncheck the checkboxes.
The confirmation massage will appear when you uncheck the checkboxes. Read the message and tap <OK> to release the brakes. The joints can be moved by hands.

2.3.4 Command Window

Tap to display [Command Window] panel.



You can execute SPEL+ commands by the Robot system and check the results.

The panel is divided to Input and Output.
Enter the SPEL+ commands and parameters in [Input] area.
To execute the robot motion commands and I/O output commands, tap the <Enter> button with the Enable Switch ON.

Turning OFF the Enable Switch stops robot motion and returns to the [Command] panel.

To execute the commands other than robot motion commands and I/O output commands, tap the <Enter> button regardless of the Enable Switch status.

For details of the executable commands, refer to the following manual:

EPSON RC+ Language Reference

Appendix A: SPEL+ Command Use Condition List

The error message and error code are displayed in [Output] area in case of error.

The commands can be entered with both uppercase and lowercase characters.

The following are descriptions for the buttons.

<Enter> : Sends the commands to the Robot system.
<Clear> : Clears the strings of either window.
<All Clear> : Clears the strings of both windows.

2.3.5 Task Manager

Tap to display the [Task Manager] panel.

In this panel, task status can be monitored while the program is running. The tasks cannot be operated.

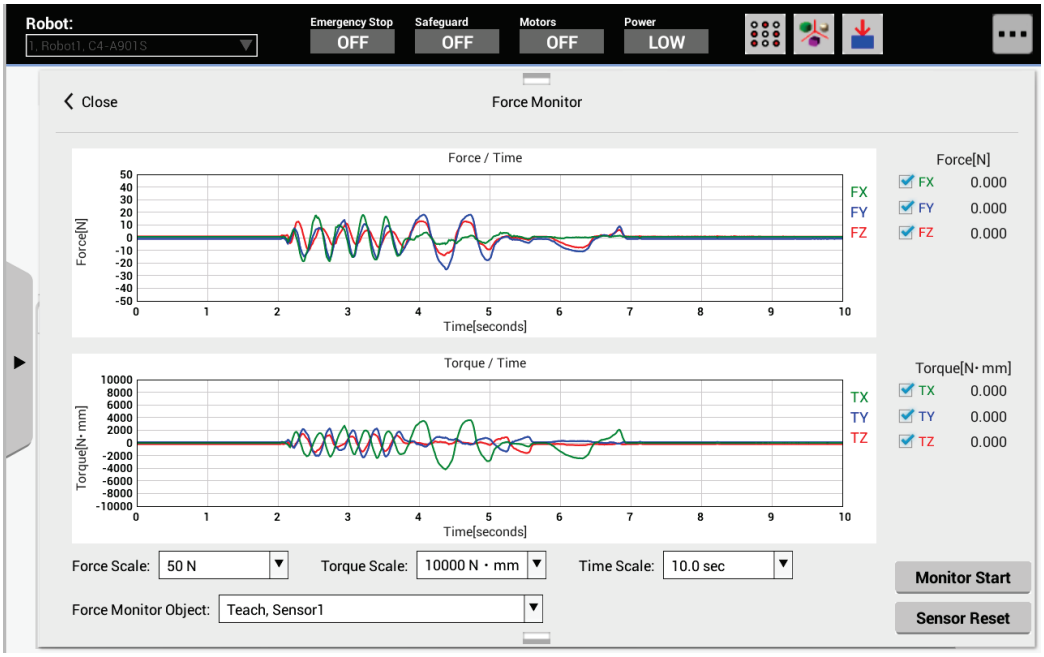
When the [Task Manager] panel is opened, the status information for 32 standard tasks and 11 trap tasks are displayed. If the background tasks are active, the status information for 16 background tasks can be displayed.

Item	Description
Task	Tasks numbered from 1~32 and 11 trap tasks
Name	Task name
Status	Task status: Run, Wait, Halt, Pause, Aborted, Finished
Type	Normal : Normal tasks NoPause : Tasks which do not pause at Pause statement and Pause input signal occurrence and Safety Door open state. NoEmgAbort : Tasks which continue the processing at emergency stop and error occurrence
Line	Task line number
Function	Function name of the task
Program	Program name of the task
Start	Start time of the task
CPU	CPU load rate of each task This function assists problem detection of user-created tasks

2.3.6 Force Monitor

Tap to display the [Force Monitor] panel.

Display the current Force value.



Item	Description
Graph	Display each value on the graph.
Force(N) FX, FY, FZ	Display Force value of Fx, Fy, Fz. Display the final value of the each axis. Data which checked the checkbox is displayed.
Torque (N·mm) TX, TY, TZ	Display the torque value of Tx, Ty, and Tz axes on the graph. Display the final value of the each axis. Data which checked the checkbox is displayed.
Force Scale	Set the vertical axis scale of the force graph.
Torque Scale	Set the vertical axis scale of the torque graph.
Time Scale	Set the horizontal axis scale of the force and torque graph.
Force Monitor Object	Select from defined object (number or label) list. If selecting the force monitor object, force and torque of force coordinate system appear.
Monitor Start	Display the current value on the graph.
Force Sensor Reset	Set force and torque value as “0”.

2.4 Sub Menus

Tap the menu button on the right to display the sub menu.
The displayed sub menu differs depending on the currently operating panel.

2.4.1 Change Jog Key

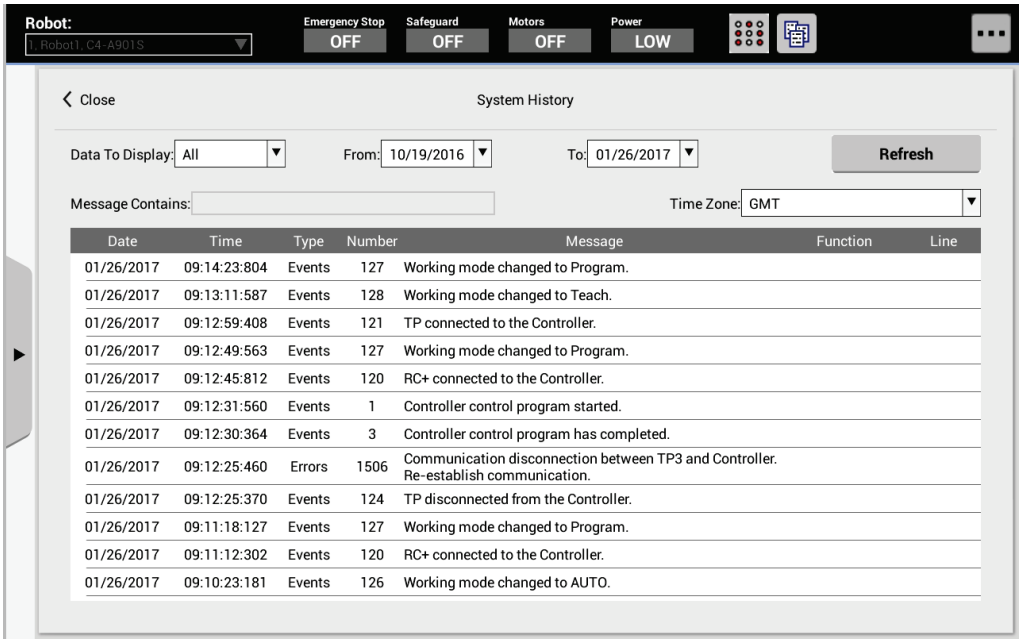
Selecting “Change Jog Key” from the sub menu list enables you to change the axes corresponding to the hardware keys.

When using the 7-axis robot, you can make the lower three sets of keys correspond with different axes. If the keys do not need to be changed, this menu cannot be selected.
After changing the keys, the axes guide display will be updated.

2.4.2 System History

Selecting “System History” from the sub menu list displays the [System History] panel.

Displays events, errors, and warnings recorded in the current Robot system history.



Item	Description
Data to Display	Select the panel to display. (All, Events, Errors, Warnings)
From/To	Select the period to display the data. The default setting is from the history start date to the history end date.
Message Contains	Enter the error message to search and tap the <Refresh> button.
Time Zone	Select the time zone. Time of event, warning, and error occurrence are displayed according to the selected time zone.
Refresh	Load the data from the Robot system.
Date/Time	Date and time of the selected item are displayed according to [Time Zone].
Type	Event : Information of operation and mode changes by the operator.

Item	Description
	Warning : Information of status which requires taking measures while the program execution can be continued. Error : Errors occurred in the program or robot.
Number	Displays the error codes. For details of the codes, refer to the following manual. *EPSON RC+ SPEL+ Language Reference* *: SPEL+ Error Messages*
Message	Function and Line : Displays the function name and line number of the error if the error occurs during program execution. Robot and Axis : Displays robot and axis number of the error occurrence if the error occurs on the robot. Task Number : Displays the task number of the error occurrence if the error occurs in the program. Displays "0" for other cases. Code 1, Code 2 : Displays detailed error causes for some errors. For details, refer to the following manual. *EPSON RC+ SPEL+ Language Reference* *: SPEL+ Error Messages*

2.4.3 Motor

Select the "Motor" from the sub menu to set Motor ON or Motor OFF of all motors of the robot.

Motor ON : Tap the <Motor ON> button with Motor OFF.
The confirmation window will appear. Tap the <OK> button.
The motors will be ON.

Motor OFF : Tap the <Motor OFF> button with Motor ON.
The motors will be OFF immediately.

2.4.4 Reset

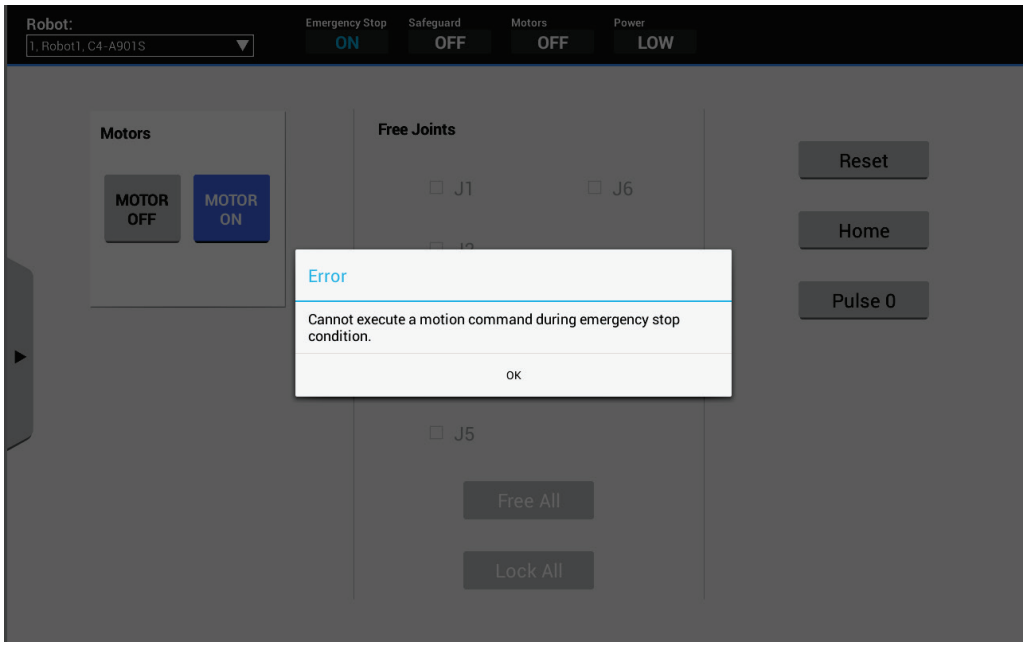
Select the "Reset" from the sub menu to reset the robot servo system and emergency stop status.

2.5 Error Messages

An error message appears when an error occurs.

Example: A message displayed in the panel.

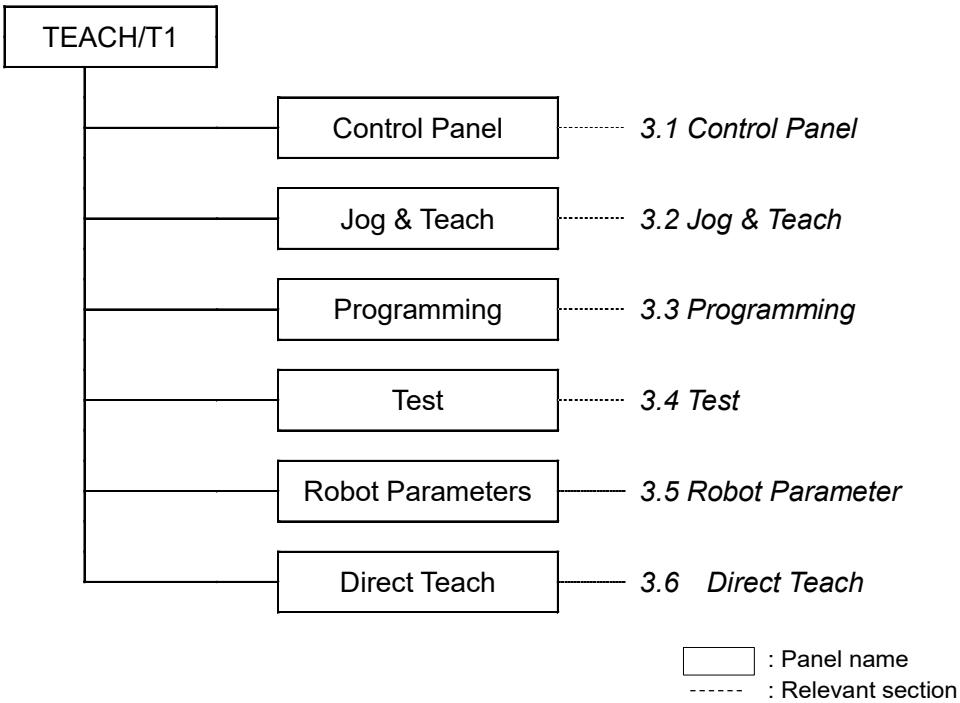
Example: A message displayed in a pop-up window.



Tapping <OK> closes the pop-up window and returns to the original panel.

3. TEACH/T1 Mode

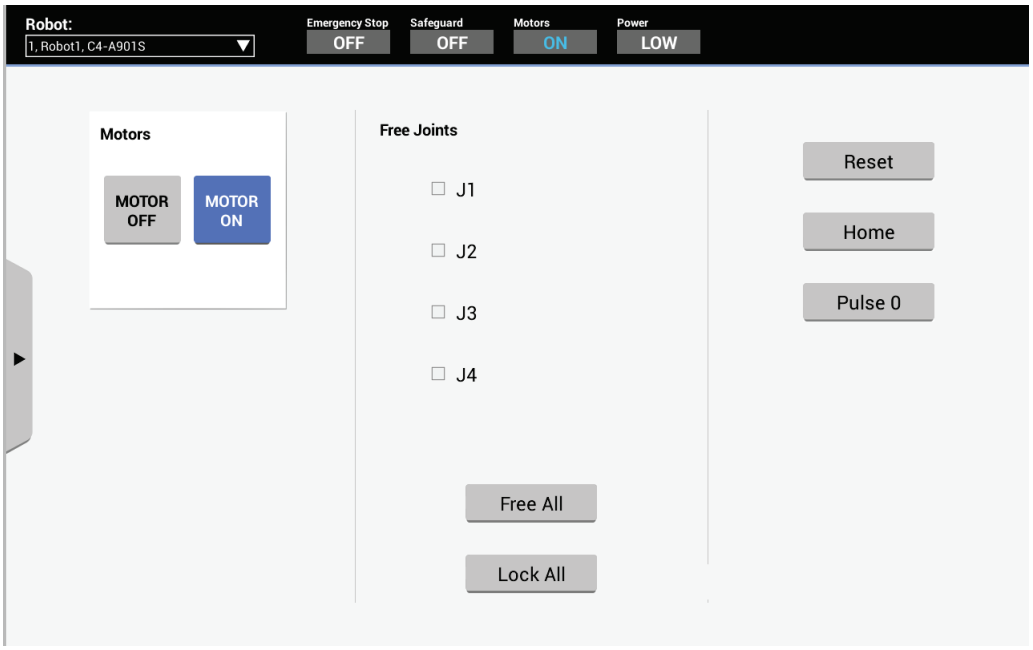
Switching the mode selector key switch to “TEACH/T1” enables TEACH mode. In this mode, basic robot operations, jog, point teaching, programming and verification, and robot parameter setting can be performed.



3.1 Control Panel

In the [Control Panel] panel, basic robot operations such as motor ON/OFF and calibration can be performed.

Switching the mode selector key switch to “TEACH/T1” and tapping the [Control Panel] tab displays the [Control Panel] panel.



3.1.1 Motors

This button is used for turning ON or OFF all motors of the robot.

Motor ON : Tap the <Motor ON> button with Motor OFF.
The confirmation window will appear. Tap the <OK> button.
The motors will be ON.

Motor OFF : Tap the <Motor OFF> button with Motor ON.
The motors will be OFF immediately.

3.1.2 Free Joints

This group is used for turning ON or OFF the motors of joints individually.
When teaching the SCARA robot by the direct teaching, turn OFF the motor of the joint.
This is not available for the vertical 6-axis robots.

The following are descriptions for the buttons.

<J*> : Checking the checkbox of each joint releases the servo control.
Unchecking the checkbox locks the servo control.

<Free All> : Releases the servo control of all joints.

<Lock All> : Locks the servo control of all joints.

3.1.3 Command Buttons

The buttons vary depending on the type of the selected robot.

The following are descriptions for the buttons.

<Reset> : Resets the robot servo system and the emergency stop state.

<Home> : Moves the robot to the point specified by HomeSet command.
This can be executed by pressing the <EXE.> key with the Enable Switch ON while the confirmation dialog is displayed.

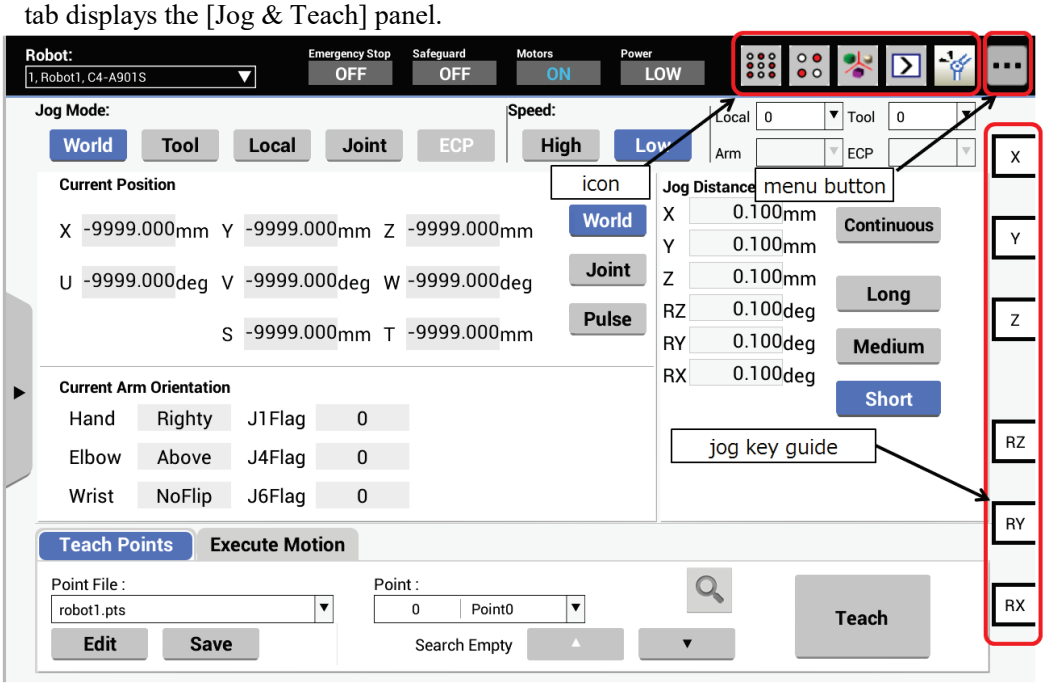
<Pulse0> : Moves each joint to the 0 pulse position.
This can be executed by pressing the <EXE.> key with the Enable Switch ON while the confirmation dialog is displayed.

<MCal> : Performs calibration (detect the mechanical home position).
This can be executed by pressing the <EXE.> key with the Enable Switch ON while the confirmation dialog is displayed.

3.2 Jog & Teach

The [Jog & Teach] panel is used in teaching.

Switching the mode selector key switch to “TEACH/T1” and tapping the [Jog & Teach] tab displays the [Jog & Teach] panel.



Tapping the upper right menu button displays the sub menus.
For details of the panels displayed by selecting the menus, refer to the following.

[I/O Monitor] : *Operation. 2.3.1 I/O Monitor*
[Robot 3D View] : *Operation. 2.3.2 Robot 3D View*
[Brake] : *Operation. 2.3.3 Brake Setting*
[Command Window] : *Operation. 2.3.4 Command Window*
[Change Jog Key] : *Operation. 2.3.5 Change Jog Key*
[Motor] : *Operation. 2.4.3 Motor*
[Reset] : *Operation. 2.4.4 Reset*

In the [Jog & Teach] panel, the guide corresponding to the jog keys is displayed on the right end.

3.2.1 Mode

Select the jog mode.

Some modes may not be available depending on the type of the robot.

Item	Description
World	Jogs in current Local, Tool, arm and ECP coordinate systems.
Tool	Jogs in current Tool coordinate system.
Local	Jogs in current Local coordinate system.
Joint	Jogs each joint of the robot.
ECP	Jogs in the coordinate system of the current external control point. This option is available when the ECP is enabled.

Key operation

World, Tool, Local, ECP:

Jogs the robot along the X, Y, and Z axes.

For robots with 4 DOF (Cartesian coordinate and SCARA), you can also jog U (roll).

For robots with 6 DOF (vertical 6-axis), you can jog rotateZ (roll), rotateY (pitch), and rotateX (yaw)

The guide display of the jog keys changes.

Joint:

Jogs the robot using the keys from J1 (Joint #1) to J** (** is the number of joints).

The guide display of the jog keys change to the joint numbers.

3.2.2 Speed

The speed for jogging and motion commands can be changed by selecting Low or High.

3.2.3 Coordinate System

The coordinate system to perform jogging and teaching can be selected from the user-defined coordinate systems.

Refer to: *Operation 3.5 Robot Parameter*

Item	Description
Local	Defined Local coordinate system 0 is same as the Base coordinate system.
Tool	Defined Tool coordinate system
Arm	Arm coordinate system defined as the additional arm. This is available for the following robots. Rectangular coordinate robots SCARA robots
ECP	Defined coordinate system of the external control point. This is available when the external control point is enabled.

3.2.4 Current Position

This group displays the current position of the robot. There are three ways to display the position.

Some display modes may not be available depending on the type of the robot.

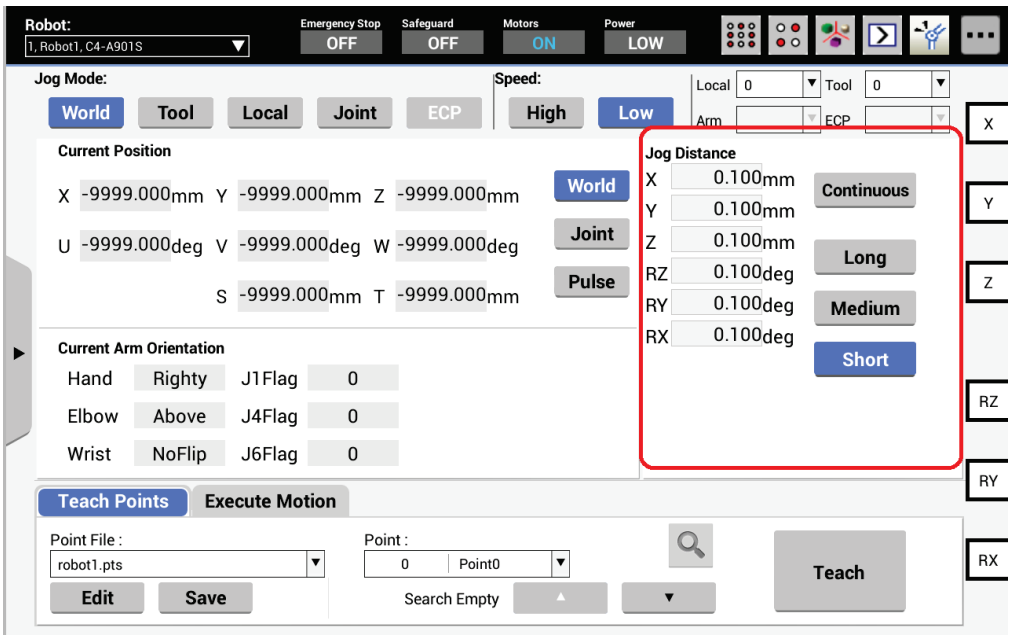
Item	Description
World	Current position and tool orientation in the selected Local coordinate system.
Joint	Current coordinates of the joints
Pulse	Current pulse of the joints

3.2.5 Current Arm Orientation

This group displays the current arm orientation.

Flags representing the arm orientation vary depending on the type of the robot.

3.2.6 Jog Distance



This group is used for specifying the distance (Continuous, Long, Medium, or Short) that each axis moves when its corresponding jog button is pressed.

When “Continuous” is selected:
The robot jogs in continuous mode. The [Jog Distance] text boxes cannot be changed.

When other than “Continuous” is selected:
The robot jogs in the step mode for the distance specified in the [Jog Distance] text box.

[Jog Distance] text box changes according to the jog mode and the robot.

To change the values, select the jog distance to change and enter the new value.

Distance	Set Value*	Default Value
Short	More than 0 to 10	0.1
Medium	More than 0 to 30	1
Long	More than 0 to 180	10

3.2.7 Registering the Robot Position

This group is used for registering the current robot position.

[Point File] : Select a point file.

[Point] : Select a point number.

<Teach> button : Registers the current robot position to the point number of the specified point file. The data will be saved to the memory.

<Save> button : Saves the data to the Robot system.

<Edit> button : Switches to the point data editor where you can edit the points.
Reference: *Operation 3.3.4 Editing the Point Data*

To search points:

Tap the search button to display the search window.

In the search window, partial match search of point label strings and point number search are available.

String search : Enter a text to search, and then tap the downward (↓) or upward (↑) button to search with the point label.

Number search: Select the number search and enter a number to search, and then tap the downward (↓) or upward (↑) button to search with the point number.

In the dead-number search, tapping the downward (↓) or upward (↑) button of the dead-number searches the nearest dead-number.

3.2.8 Command

This group executes the motion commands.

(1) Select the command name and parameters, and then tap the <Execute> button.
The confirmation dialog box will appear.

(2) Press the <EXE.> key with the Enable Switch ON.
The command is executed while the <EXE.> key is being pressed.
The motion stops when either one or both of the Enable Switch and <EXE.> key is released.

3.2.9 Jog Key Guide

The current key assignment of the jog keys can be displayed.

The key assignment changes by a combination of following items, and the display changes accordingly.

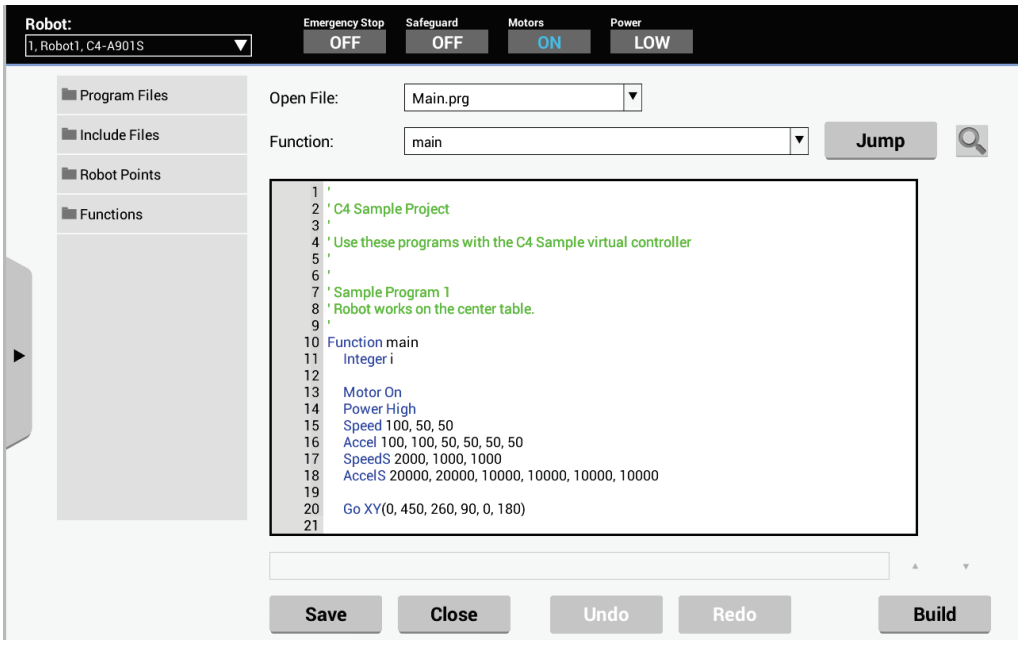
Robot type
Jog Mode
Jog key change

3.3 Programming

The following operations are available in the [Programming] panel.

Project management
Program editing
Point file management
Point data editing

To display the [Programming] panel, switch the mode selector key switch to “TEACH/T1” and tap the [Programming] tab.



3.3.1 Current Project Management

The program files and the include files are displayed in the tree display.

Tapping the file name in the file tree display opens the file.

The edited project can be built.

Tap the <Build> button. The message appears when the project is built properly.

If an error occurs, the error message will be displayed.

3.3.2 Program Editing

The program can be edited. Open, Close, Save, and Edit of the file are available.

To open the file, tap the file name in the file tree. Applicable files are program files (.prg) and include files (.inc).

You can open multiple files but can edit only one at a time.

Item	Description
Close	Closes the active file. The confirmation message appears if the file is being edited.
Save	Save the active file.

3.3.3 Point File Management

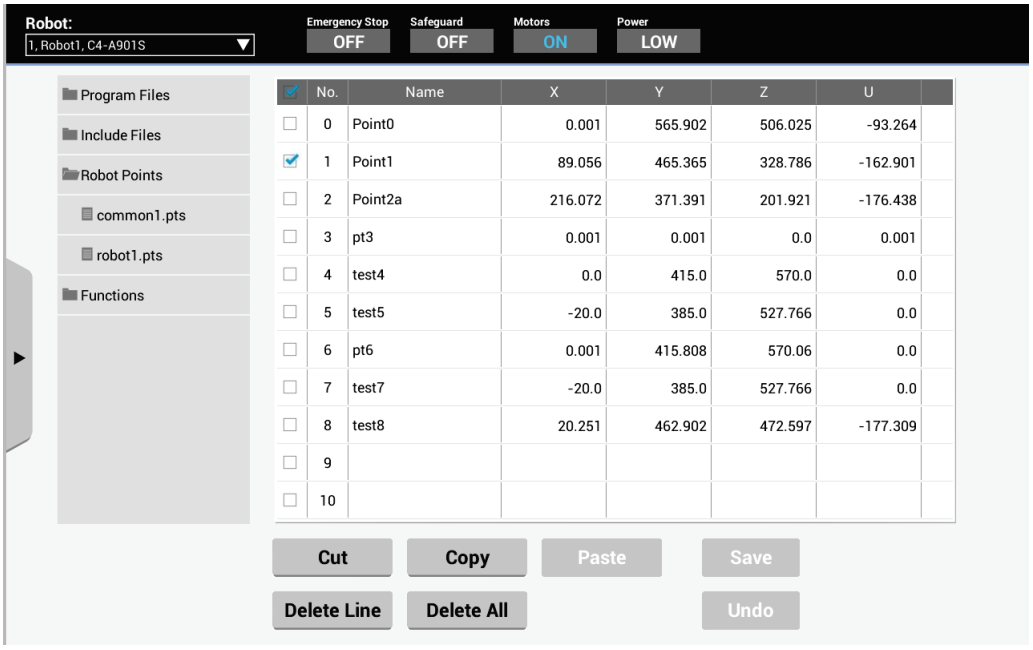
The point fine names are displayed in the tree.

Tapping the point file name in the file tree opens the file.

3.3.4 Point Data Editing

You can edit the point data of the point files.

Select the point file from the file tree to display the list of data.



Change the point data values:

(1) Tap the value to change to display the edit dialog panel.

(2) Enter the value.

(3) Tap <OK> to close the dialog window.

You can copy the value from the edit dialog window and paste it to another window.
The menu of functions, such as copy, can be displayed by long-tapping the text input area of the edit dialog window.

To select the line, check the checkbox. You can select several lines.

To scroll, flick the table up and down.

Item	Description
Cut	Cuts the data of the selected line.
Copy	Copies the data of the selected line.
Paste	Pastes the copied or cut data to the checked lines. The data will be overwritten. If the data copied or cut from the multiple lines are held, these will be pasted to the lines following the checked line.
Delete Line(s)	Deletes the data of the selected lines. If several lines are selected, several point data will be deleted. The point numbers whose data is deleted will be dead-numbers.
Delete All	Deletes all data. The file will be empty.
Save	Saves changes to the Robot system.
Restore	Restores changes. The file will be restored to previous state.

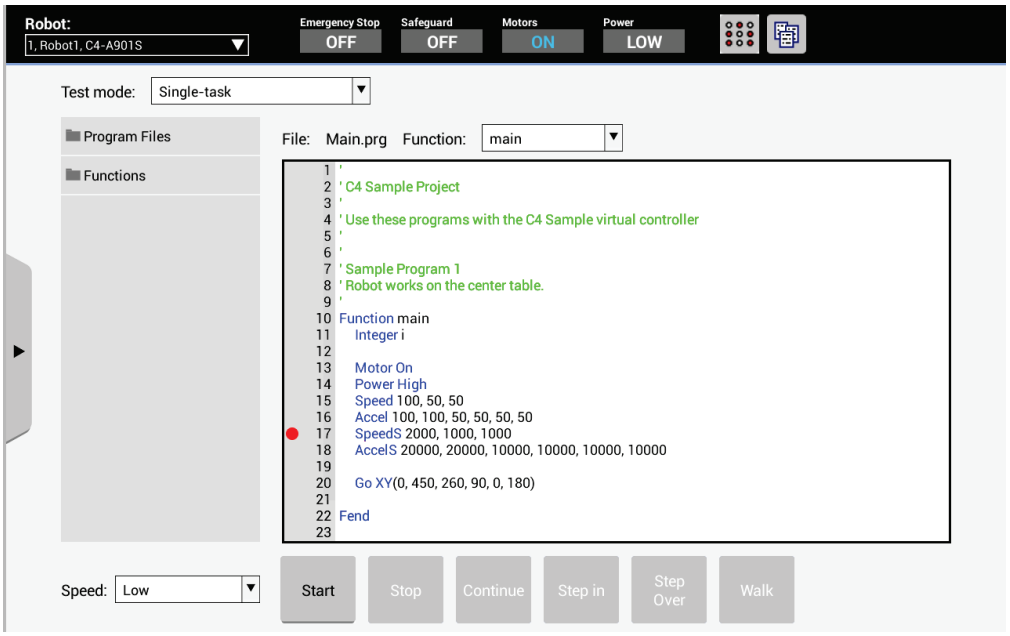
3.4 Test

In the [Test] panel, you can verify the program in TEST mode.

This mode enables program verification while the Enable Switch is held down and the safeguard is open. This is a low speed program verification function (T1: manual deceleration mode) which is defined in Safety Standards.

In this mode, you can execute the specified function with multi-task / single-task, multi-Manipulator / single-Manipulator at low speed.

To display the [Test] panel, switch the mode selector key switch to “TEACH/T1”, and then tap the [Test] tab.



The following panels can be displayed from the sub menu list.

[Task Manager] : Reference *Operation 2.3.5 Task Manager*
[I/O Monitor] : Reference *Operation 2.3.1 I/O Monitor*

The menu button cannot be used during program execution. Open the sub menu panels before starting the program or while it is paused.

3.4.1 Single-task Program Verification

The single-task program verification is used to verify a program in order to check the motion of the robot and peripherals by executing a single task with single- or multi-Manipulators (Cycle / Step execution) while the safeguard is open.
Function can be specified and executed within a speed limit.

To execute the program:

After taping the <Start> key, tap the operation key (Continue, Step In, Step Over, and Walk), and then press the <EXE.> key while the Enable Switch is ON with the confirmation window open.

To stop the program temporarily:

Release the Enable Switch or the <EXE.> key.
The moving robot stops. (Quick Pause)

To resume the program:

Tap the operation key (Continue, Step In, Step Over, and Walk), and then press the <EXE.> key while the Enable Switch is ON with the confirmation window open.
The program will resume from the paused point.

To abort the program:

Press the Emergency Stop switch. The program also aborts if an error occurs.
The moving robot stops. (Quick Pause)

Pause by Open/Close status of the safeguard:

The program pauses according to open/close status of the safeguard.
The moving robot immediately stops. (Quick Pause)

To resume the program paused by Open/Close status of the safeguard:

Release the latched status of the safeguard interlock. Then, tap the operation key (Continue, Step In, Step Over, and Walk) and press the <EXE.> key while the Enable Switch is ON with the confirmation window open.

WARNING	■ Before performing program verification, check that the robot system operates normally by using the EPSON RC+ debug function. For details on the EPSON RC+ debug function, refer to the *EPSON RC+ User's Guide*. If debugging is insufficient, the robot may cause unintended motion. This is extremely hazardous and may cause serious bodily injury or severe damage to the robot. ■ Before performing program verification, make sure that no one is in the robot's operation area. The robot automatically starts moving as the program verification starts. If the operator is in the robot's operation area, it is extremely hazardous and may cause serious bodily injury or severe damage to the robot.

⚠ CAUTION	■ When abnormal operation such as collision with peripherals is predicted, release the <EXE.> key immediately and stop the robot. The robot also can be stopped by releasing the Enable switch, or push the switch harder. ■ After performing program verification, be sure to follow the points below: - Check the changed parts in software before supplying power. - Perform function test to check whether the robot system operates normally.

In TEST mode, a program cannot be changed. To change the program, edit it in the [Programming] panel (Reference: *Operation 3.3 Programming*)

To change the point data, perform the following:

Teach the point in the [Jog & Teach] panel.
Reference: *Operation 3.2 Jog & Teach*

Edit the point data in the [Programming] panel.
Reference: *Operation 3.3 Programming*

Task Behavior during Single Task Program Verification:
Background tasks stop when switching the mode to TEST mode.
The tasks resume when switching to TEACH mode.

Behavior of Events and Tasks

Event	Task Type			Background Task
	Normal	NoPause	NoEmgAbort	
Enable switch is OFF	Pause	*1	*1	*2
<EXE.> key is OFF	Pause	*1	*1	*2
Change Open/Close status of the Safety Door	Pause	*1	*1	*2
Error during a test	Abort	*1	*1	*2
Emergency stop	Abort	*1	*1	*2
Switch a key switch	Abort	*1	*1	*2

*1 Xqt task types (NoPause, NoEmgAbort) cannot be executed.
When these tasks are specified, they are performed the program verification as normal tasks.

*2 When background tasks are specified, they are performed the program verification as normal tasks.

Available Function:

Functions with source not hidden

Robot Motion Speed Setting (when T1 mode):

During the program verification, robots are always operated in Low power mode.

Low power mode:

Speed lower than 250 mm/s

Restrains the motor power output

[Speed] can be changed within a range specified for Low power mode by pressing the <Speed> key.

Low: 25% of speed of Low power mode

Middle: 50% of speed of Low power mode

High: 100% of speed of Low power mode

CAUTION	■ The faster the speed, the longer the free running distance at the emergency stop or pause is. When operating the robot where interference with peripheral equipment is predictable, perform the program verification at low speed while taking the free running distance into consideration.

Execution-restraint Functions and Commands

Power High : T1 mode
Power mode is always set to Low.
Specification function cannot be executed.
T2 mode
Specification function can be executed.

TRAP : Corresponding task cannot be executed even when a condition is met.

XQT : An error occurs and the program execution will be aborted.

INPUT : Input from the console causes an error and aborts the program execution.

PRINT #20 : Output to the Teach Pendant causes an error and aborts the program execution.

3.4.2 Multi-task Program Verification

The multi-task program verification is used to verify a program in order to check the motion of the robot and peripherals by executing a multiple task with single- or multi-Manipulators (Cycle / Step execution) while the safeguard is open.
Function can be specified and executed within a speed limit.

To execute the program:

After tapping the <Start> key, tap the operation key (Continue), and then press the <EXE.> key while the Enable Switch is ON with the confirmation window open.

To stop the program temporarily:

Release the Enable Switch or the <EXE.> key.

The moving robot stops. (Quick Pause)

To resume the program:

Tap the operation key (Continue), and then press the <EXE.> key while the Enable Switch is ON with the confirmation window open.

The program will resume from the paused position.

To abort the program:

Press the Emergency Stop switch. The program is also aborted when an error occurs.

The moving robot stops. (Quick Pause)

Pause by Open/Close status of the safeguard:

The program pauses according to open/close status of the safeguard.

The moving robot immediately stops. (Quick Pause)

To resume the program paused by Open/Close status of the safeguard:

Release the latched status of the safeguard interlock. Then, tap the operation key (Continue) and press the <EXE.> key while the Enable Switch is ON with the confirmation window open.

WARNING	■ Before performing the program verification, check that the robot system operates normally by using the EPSON RC+ debug function. For details on the EPSON RC+ debug function, refer to the EPSON RC+ User's Guide. If debugging is insufficient, the robot may cause unintended motion. This is extremely hazardous and may cause serious bodily injury or severe damage to the robot. ■ Before performing the program verification, make sure that no one is in the robot's operation area. The robot automatically starts moving as the program verification starts. If the operator is in the robot's operation area, it is extremely hazardous and may cause serious bodily injury or severe damage to the robot.

CAUTION	■ When abnormal operation such as collision with peripherals is predicted, release the <EXE.> key immediately and stop the robot. The robot also can be stopped by releasing the Enable Switch, or pushing the switch harder. ■ After performing the program verification, be sure to follow the points below: - Check the changed parts in software before supplying power. - Perform the function test to check whether the robot system operates normally.

In TEST mode, the program cannot be changed. To change the program, edit it in the [Programming] panel (Reference: *Operation 3.3 Programming*)

To change the point data, perform the following:

Teach the point in the [Jog & Teach] panel.
Reference: *Operation 3.2 Jog & Teach*

Edit the point data in the [Programming] panel.
Reference: *Operation 3.3 Programming*

Task Behavior during Multi-Task Program Verification

Background tasks stop when switching the mode to the TEST mode. The tasks run automatically at the start of the program verification and are performed the verification along with specified normal tasks.
These tasks stop when the multi-task program verification stops, and resume when switching to TEACH mode.

Behavior of Events and Tasks

Event	Task Type			Background Task Normal
	Normal	NoPause	NoEmgAbort	
Enable switch is OFF	Pause	Pause	Continue	Continue
<EXE.> key is OFF	Pause	Pause	Continue	Continue
Change Open/Close status of the Safety Door	Pause	Pause	Continue	Continue
Error during a test	Abort	Abort	Abort	Abort
Emergency stop	Abort	Abort	Continue	Abort
Switch a key switch	Abort	Abort	Abort	Continue/Resume

Available Function:

Functions with source not hidden

Root Motion Speed Setting (When T1 mode):

During the program verification, robots are always operated in Low power mode.
Speed lower than 250 mm/s
Restrains the motor power output
[Speed] can be changed within a range specified for Low power mode by pressing the <Speed> key.

Low: 25% of speed of Low power mode
Middle: 50% of speed of Low power mode
High: 100% of speed of Low power mode

CAUTION	■ The faster the speed, the longer the free running distance in the emergency stop or pause is. When operating the robot where interference with peripheral equipment is predictable, perform the program verification at low speed while taking the free running distance into consideration.

Execution-restraint Functions and Commands:

Power High :

: T1 mode

Power mode is always set to Low.

Specification function cannot be executed.

T2 mode

Specification function can be executed.

INPUT : Input from the console causes an error and aborts the program execution.

PRINT #20 : Output to the Teach Pendant causes an error and aborts the program execution.

3.4.3 TEST Mode Operation Method

Select “Single-task/Multi-task” in TEST mode.

To open the file:

Select the program file from [Program Files] tree and tap the file name.

The program cannot be edited.

Verify the program:

Select the “Function” to execute from the [Function] list and tap the <Start> key to start a task. Then, tap the operation key (Continue, Step In, Step Over, and Walk). The confirmation dialog window will appear. Hold the Enable Switch ON and press the <EXE.> key while the dialog window is open.

If you want to execute and confirm a part of the motion, set a breakpoint and stop the program, and then execute the part by <Step In>, <Step Over>, or <Walk> button.

Tapping the line number on the left sets or cancels the breakpoint.

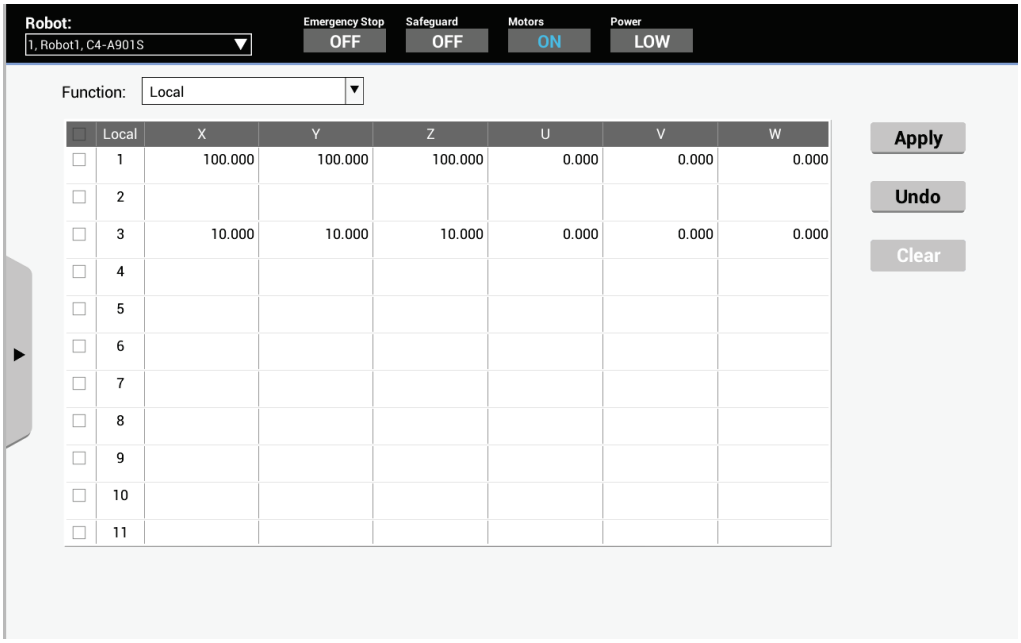
Item	Description
Start	Executes a task.
Stop	Stops the ongoing tasks.
Continue	Continues execution of the paused task from the current line.
Step In	Executes the current line of the paused task and stops at the next line. If the next line is a function call, the program stops at the beginning of the called function. This is available for the single-task program verification.
Step Over	Executes the current line of the paused task and stops at the next line. If the next line is a function call, the program stops after executing the called function. This is available for the single-task program verification.
Walk	Executes until the next motion command or output command, and then stops. You can configure whether to stop the program by the output command in the EPSON RC+. This is available for the single-task program verification.

3.5 Robot Parameters

In the [Robot Parameters] panel, you can define the Local coordinate system and the Tool coordinate system, and configure the additional arms.

3.5.1 Local Coordinate System Setting

This panel is used for setting the Local coordinate system of the robot.



Select “Local” in [Function]. The values of the user-definable 15 Local coordinate systems will be displayed. Local “0” is the base coordinate system and cannot be changed in this panel.

NOTE

The base coordinate system can be changed by executing Base command from the command window.
For details, refer to the following manual.
EPSON RC+ SPEL+ Language Reference

The cells with no Local coordinate system definition are empty. Entering the value to the undefined Local coordinate system sets remaining cells to “0”.
The Local coordinate systems numbering from 1 to 15 can be defined. Tapping the <Apply> button configures the Local coordinate system.

For details of the Local setting, refer to the following manual.
EPSON RC+ SPEL+ Language Reference
: *Local Statement*

Item	Description
X	The X coordinate of the local origin in the base coordinate system.
Y	The Y coordinate of the local origin in the base coordinate system.
Z	The Z coordinate of the local origin in the base coordinate system.
U	Rotation angle of the local about the base Z axis (roll).
V	Rotation angle of the local about the base Y axis (pitch).
W	Rotation angle of the local about the base X axis (yaw).
Apply	Applies the current values.
Restore	Restores the previous values.
Clear	Clears all values for the selected local.

3.5.2 Tool Coordinate System Setting

Select “Tool” in [Function].

The values of the user-definable 15 Tool coordinate systems will be displayed.

The cells with no Tool coordinate system definition are empty. Entering the value to the undefined Tool coordinate system sets remaining cells to “0”.

The Tool coordinate systems numbering from 1 to 15 can be defined. Tapping the <Apply> button configures the Tool coordinate system.

For details of the Tool setting, refer to the following manual.

EPSON RC+ SPEL+ Language Reference

: *TLSet Statement*

Item	Description
X	The X coordinate of the tool.
Y	The Y coordinate of the tool.
Z	Z offset of tool.
U	Rotation angle of the tool about the Z axis (roll).
V	Rotation angle of the tool about the Y axis (pitch).
W	Rotation angle of the tool about the X axis (yaw).
Apply	Sets the current values.
Restore	Restores the previous values
Clear	Clears all values for the selected tool.

3.5.3 Additional Arm setting

Select “Arm” in [Function]. The values of the user-definable 15 Arm will be displayed.
This setting is not available for the vertical 6-axis robots and robots which do not support ArmSet command.
The cells with no Arm definition are empty. Entering the value to undefined Arm sets remaining cells to “0”.
Tapping the <Apply> button configures the additional Arm.

For details of the Arm setting, refer to the following manual.
EPSON RC+ SPEL+ Language Reference
: *ArmSet Statement*

Item	Description
L2 Dist	Distance between the center of Joint #2 and the center of the orientation joint in millimeters.
J2 Offset	Angle of the line from the center of Joint #2 to the center of the orientation joint in degrees.
Z Offset	The Z offset between the new orientation axis and the standard orientation axis.
L1 Dist	Distance between the center of the shoulder joint and the center of the elbow joint in millimeters.
U Offset	The angle offset between the standard orientation zero position and the new orientation axis zero position in degrees.
Apply	Set current values.
Restore	Restore the previous values.
Clear	Clear all values for the selected arm

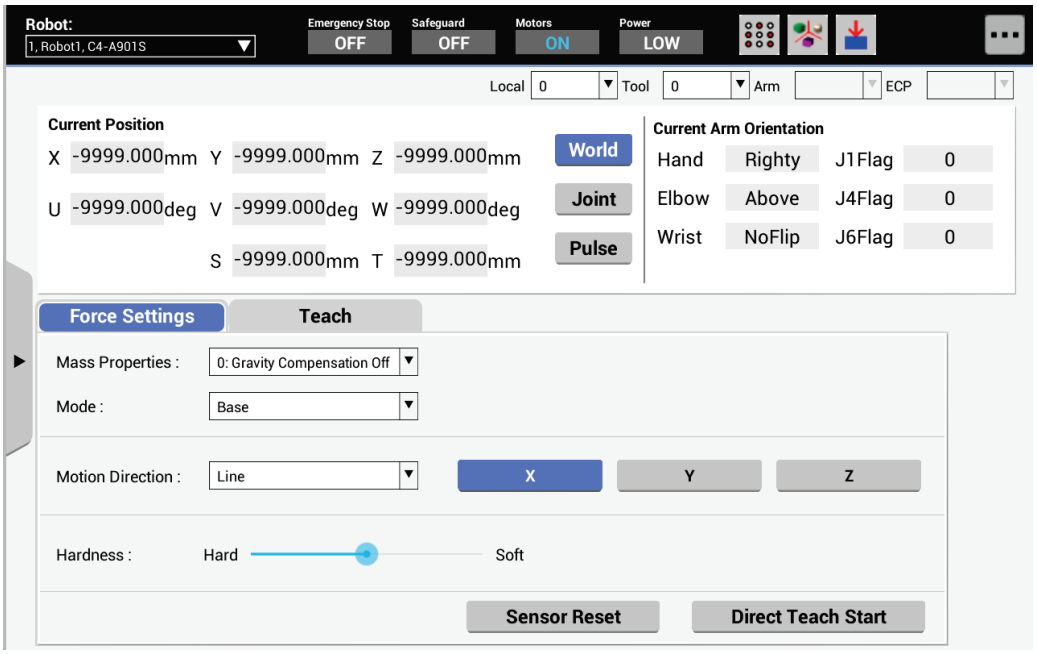
3.6 Direct Teach

CAUTION	■ Executing the direct teaching with improper settings of the Force Sensor, coordinate transformation, and gravity compensation may result in unintended motion. Be careful when configuring the settings and check operation before executing the direct teaching. For details of the setting and operation check, refer to the following manual. EPSON RC+ 7.0 Option Force Guide 7.0

NOTE
This function is available when Force Guide 7.0 is setup.
For usage of the Force Guide 7.0, refer to the following manual.
EPSON RC+ 7.0 Option Force Guide 7.0

Perform direct teaching on [Direct Teach] panel.

To display the [Direct Teach] panel, switch the mode switching key switch to “TEACH/T1” and tap the [Direct Teach] tab.



The following dialogs can be displayed from icon or sub menu.

[I/O Monitor]	: *Operation. 2.3.1 I/O Monitor*
[3D View]	: *Operation. 2.3.2 Robot 3D View*
[Force Monitor]	: *Operation 2.3.6 Force Monitor*
[Motor]	: *Operation 2.4.3 Motor*
[Reset]	: *Operation 2.4.4 Reset*

3.6.1 Coordinate System

The coordinate system to perform teaching can be selected from the user-defined coordinate systems.

For details, refer to *Operation 3.5 Robot Parameter*

Item	Description
Local	Defined Local coordinate system. 0 is the same as the Base coordinate system.
Tool	Defined tool coordinate system
Arm	Arm coordinate system defined as the additional arm. This is available for the following robots. Rectangular coordinate robots SCARA robots

3.6.2 Current Position

This group displays the current position of the robot. There are three ways to display the position.
Some display modes may not be available depending on the type of the robot.

Item	Description
World	Current position and tool orientation in the selected Local coordinate system
Joint	Current coordinate of the joints
Pulse	Current pulse of the joints

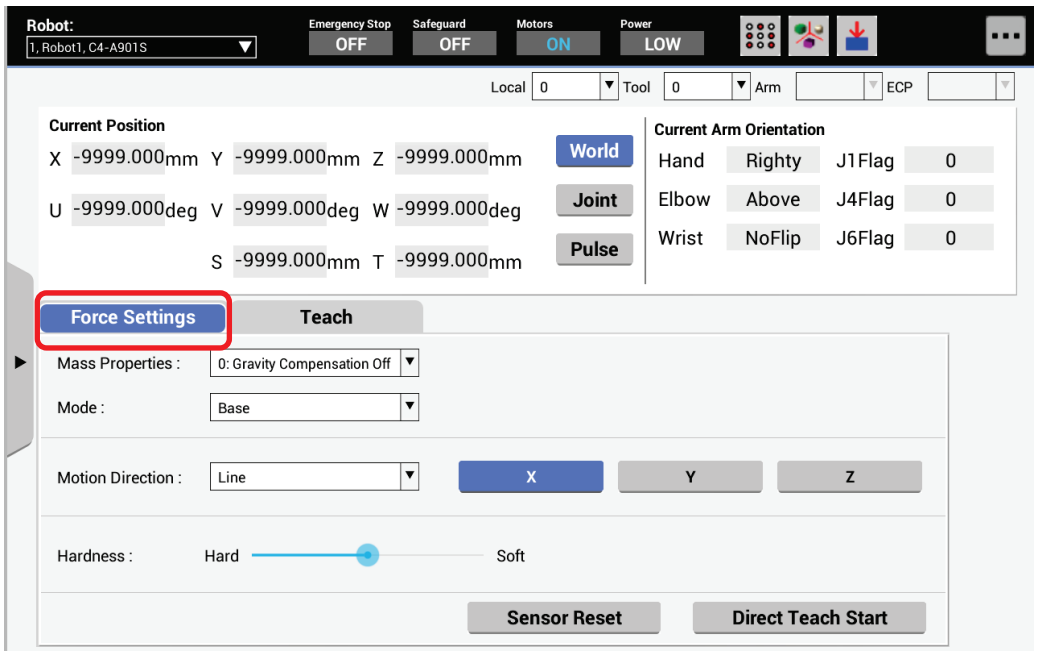
3.6.3 Current Arm Orientation

This group displays the current arm orientation.

Flags representing the arm orientation vary depending on the type of the robot.

3.6.4 Force Setting

Perform the setup for the direct teach on [Force Settings] panel.



Tap the [Force Settings] tab to display the [Force Settings] panel.

[Mass Properties] : Select the mass property object.
The mass property object can be set in [Mass/Gravity] panel of EPSON RC+. For more details about [Mass/Gravity] panel, refer to the following manual.
EPSON RC+ 7.0 *Option Force Guide 7.0*

CAUTION	■ Executing the direct teaching with improper settings of the mass property object may result in unintended motion. Be careful when configuring the settings before executing the direct teaching

[Mode] : Select the mode.

[Motion Direction] : Select the motion direction.

[Hardness] : Select the hardness.

<Sensor Reset> Button:
Reset the Force Sensor.
Our Force Sensor has drift feature. Because of that, it may move without applying force when executing direct teach due to drift error. When the drift error of the sensor accumulates, push the <Sensor Reset> button to reset the sensor.

CAUTION	■ Be sure to reset the Force Sensor with no external force applied to it. If it is reset with an external force applied to it, the state in which an external force applied is “0”. Therefore, if the force applied is removed, the Force Sensor detects a force even if no force is applied. If executing the direct teach in this state, the robot may move unintentionally. Caution is required in this regard.

< Direct Teach Start> button:

Start the direct teach.

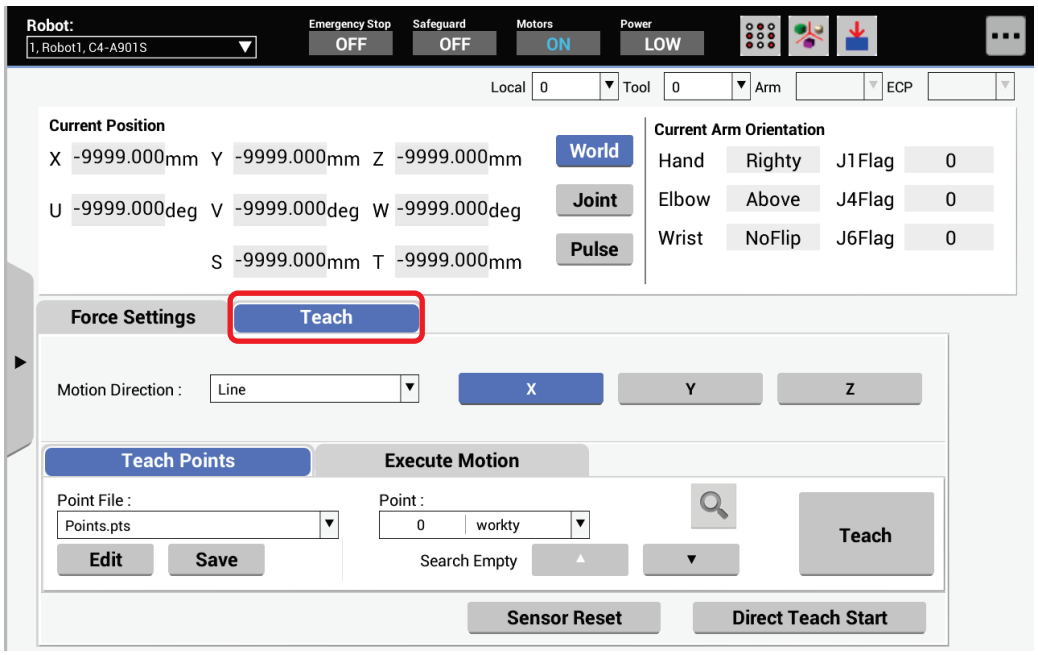
(1) Tap the <Direct Teach Start> button.
Confirmation panel appears.

(2) Tap the <OK> button with turning ON the enable switch.
Execute while pushing the enable switch.
Stop the operation when turn OFF the enable switch.

CAUTION	■ Executing the direct teaching with improper mode or motion direction may result in unintended motion. Be careful when configuring the setting before executing the direct teach. ■ Apply the force to the hand or workpiece which is attached near the tip than the Force Sensor. The Force Sensor cannot detect the force when it is applied to the robot arm or the Force Sensor itself, and it may result in unintended robot motion. Caution is required in this regard.

3.6.5 Teaching

Perform teaching on the [Teach] panel.



Tap the [Teach] tab to display the [Teach] panel.

[Motion Direction] : Select the motion direction.

<Sensor Reset> Button:

Reset the Force Sensor.

Our Force Sensor has drift feature. Because of that, it may move without applying force when executing direct teach due to drift error. When the drift error of the sensor accumulates, push the <Sensor Reset> button to reset the sensor.

⚠ CAUTION	■ Be sure to reset the Force Sensor with no external force applied to it. If it is reset with an external force applied to it, the state in which an external force applied is “0”. Therefore, if the force applied is removed, the Force Sensor detects a force even if no force is applied. If executing the direct teach in this state, the robot may move unintentionally. Caution is required in this regard.

< Direct Teach Start> Button:

Start the direct teach.

(1) Tap the < Direct Teach Start > button.
Confirmation panel appears.

(2) Tap the <OK> button with turning ON the enable switch.
Execute while pushing the enable switch.
Stop the operation when turn OFF the enable switch.

⚠ CAUTION	■ Executing the direct teach with improper force control object or force coordinate system object may result in unintended motion. Be careful when configuring the setting before executing the direct teach. ■ Apply the force to the hand or workpiece which is attached near the tip than the Force Sensor when applying the force to the Force Sensor. The Force Sensor cannot detect the force when it is applied to the robot arm or the Force Sensor itself, and it may result in unintended robot motion. Caution is required in this regard.

When registering the robot position

Tap the [Teach] tab to display the [Teach] panel.

For details about registration of robot position, refer to the following section.

Operation 3.2.7 Registering the Robot Position

When operating the command

Tap the [Command Execute] tab to display the [Command Execute] panel.

For details about command, refer to the following section.

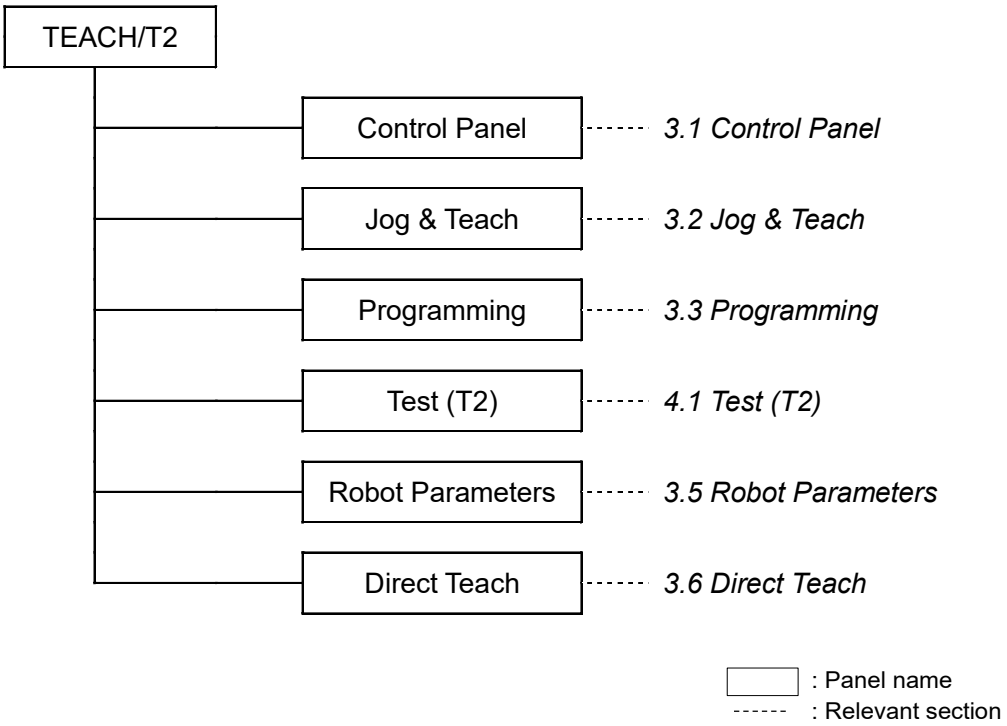
Operation 3.2.8 Command

4. TEACH/T2 Mode

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

In TEACH/T2 mode, program verification in high speed is available in addition to the functions of TEACH/T1 mode.



Functions and operations are common in TEACH/T1 and TEACH/T2 except for "Test (T2)".

This chapter only describes *4.1 Test (T2)*. For other functions and operations, refer to the following sections.

Operation 3.1 Control Panel
Operation 3.2 Jog & Teach
Operation 3.3 Programming
Operation 3.5 Robot Parameters
Operation 3.6 Direct Teach

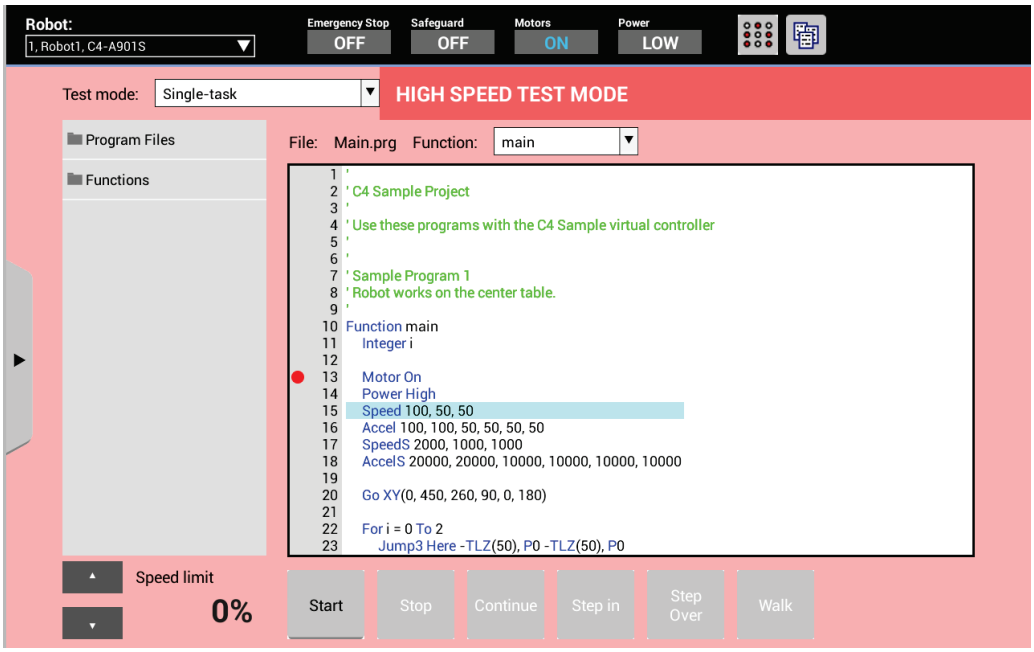
4.1 Test (T2)

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

This mode enables the program verification while the Enable Switch is held down and the safeguard is open.
This is a high speed program verification function (T2: manual acceleration mode) which is defined in Safety Standards.

In this mode, you can execute the specified function with multi-task / single-task, multi-Manipulator / single-Manipulator at high speed. The difference from T1 mode is a limiting speed.



To display the [Test (T2)] panel, switch the mode selector key switch to “TEACH/T2”, and then tap the [Test (T2)] tab. The password authentication window will appear. Enter the password and tap the <OK> button.
Settable limiting speed is from 0 % (low speed) to 100 % (high speed).

The speed is set to low when the [Test (T2)] panel is opened.
Also, the speed will be set to low in the following cases:

-If the Teach Pendant is not operated for a certain time

-If the Enable Switch is changed from ON to OFF while the program is executable by pressing the <Start> button

Other operating procedures are the same as “Test” except for the color of the panel.

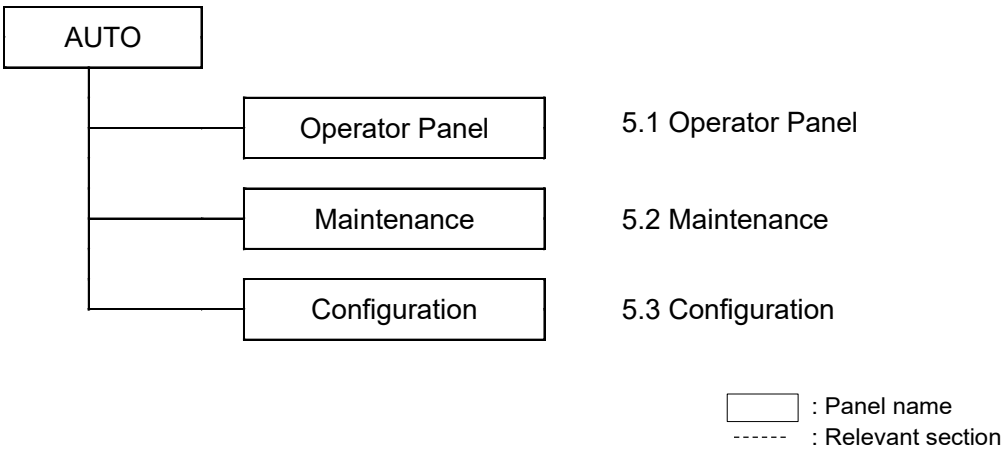
Reference: *Operation 3.4 Test*

The password for Test (T2) cannot be configured on the Teach pendant.
Set the password in the EPSON RC+.

5. AUTO Mode

Switching the mode selector key switch to “AUTO” enables AUTO mode.
AUTO mode is used for the automatic operation (program execution) in on-site operation and state reference of the robot system.
However, the robot cannot be operated and the program cannot be executed while the safety door is open.
The robot cannot be changed.

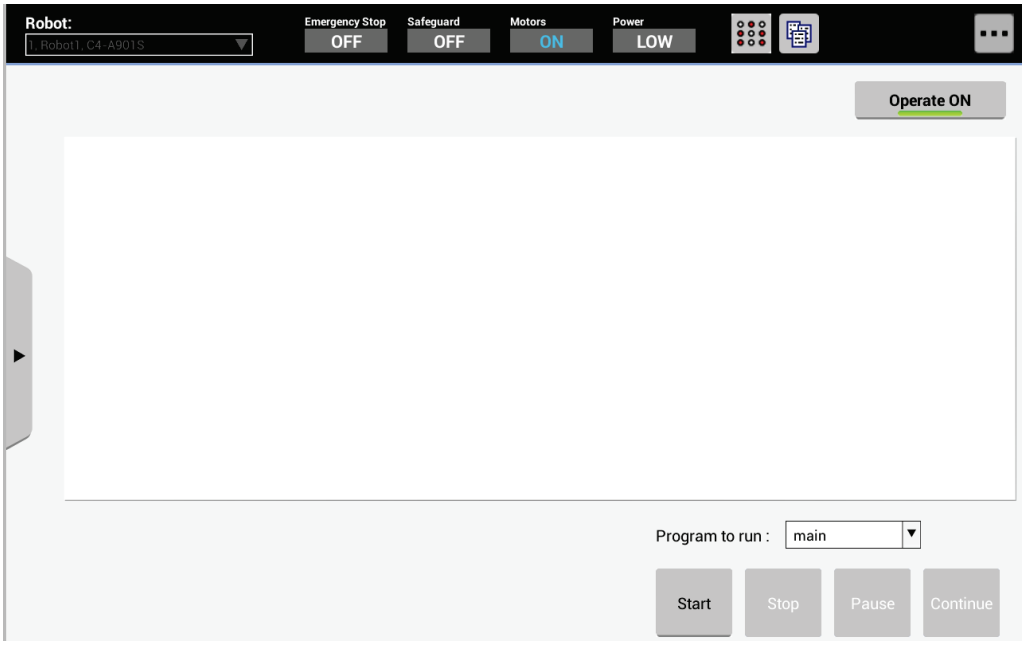
Reference: *Operation 2.1 Current Robot*



5.1 Operator Panel

In the Operator Panel, you can execute and check the programs.

To display the [Operator Panel] panel, switch the mode selector key switch to “AUTO” and tap the [Operator Panel] tab.



You can select the sub menus from the sub menu list which can be displayed by tapping the menu button.
Selecting the sub menu displays the dialog accordingly. For details, refer to the following sections.

I/O Monitor : *Operation 2.3.1 I/O Monitor*
Task Manager : *Operation 2.3.5 Task Manager*
System History : *Operation 2.4.2 System History*

5.1.1 Program Execution

First, select “TP3” in the EPSON RC+ [Controller]-[Configuration]-[Control Device]. Then, turn ON the <Operate> button on the [Operation Panel] of TP3.
Turning ON the button displays and enables the following buttons:
<Start> <Stop> <Pause> <Continue>

Select the program of the current project from the [Program to run] list.
You can operate the program by clicking the <Start>, <Stop>, <Pause>, and <Continue> buttons.
The output window shows the output data. If an error occurs, the error information will be displayed.

Item	Description
Start	Starts execution of the selected program.
Stop	Stops all tasks.
Pause	Stops all tasks which can be temporarily halted.
Continue	Resumes the suspended tasks.

5.2 Maintenance

This panel is used for saving and displaying the data.

To display the [Maintenance] panel, select the mode selector key switch to “AUTO”, and then tap the [Maintenance] tab.

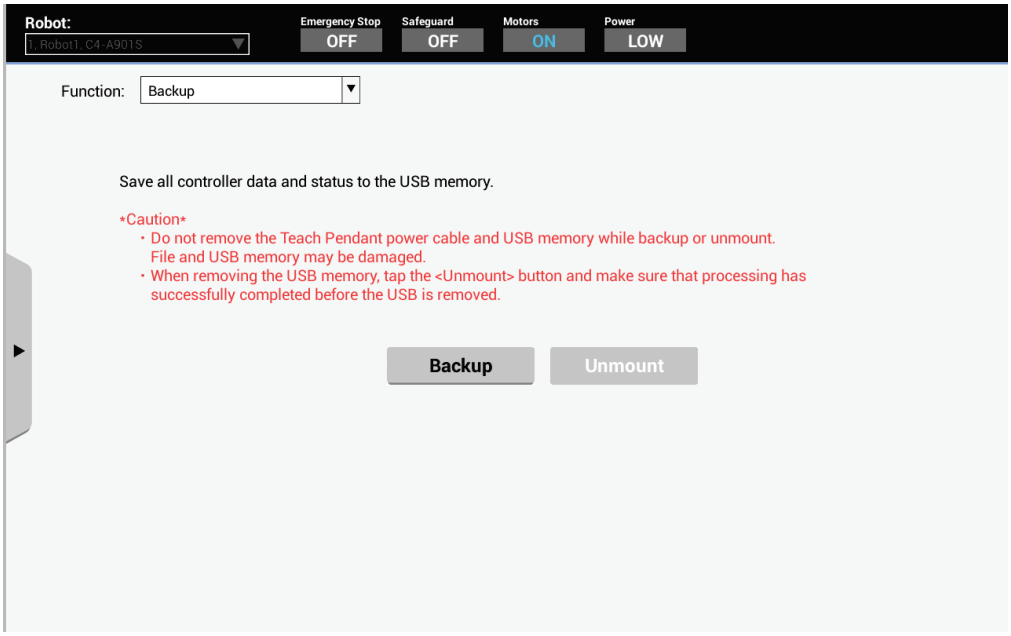
Select either of the following from the [Function] list.

Backup
Restore
Controller Maintenance
Robot Maintenance

The password is required if it is set in the EPSON RC+. Enter the password.

5.2.1 Backup

This panel is used for saving the Controller information to the USB memory.



To save the current status:

Tapping the <Backup> button saves the current state to the USB memory. The status such as Controller setting, task status, I/O status, and robot status are saved. This is useful when reporting the Robot system status to the distributers or our technical support. The data is saved in the folder named “B_serial number_date_time”, which is automatically created under the EPSON folder in the USB memory.

To remove the USB memory:

Tapping the <Unmount> button displays the removal instruction. Remove the USB memory by following the instruction.

For details of cautions for using the USB memory, refer to *Operation 8. USB Port*.

5.2.2 Restore

This panel is used for restoring the Robot system configuration from the backup data saved in the USB memory. The Robot system cannot be restored while the task is being executed.

To restore the Robot system configuration:

(1) Insert the USB memory which contains the data to the Teach Pendant.
(2) Tap the <Restore> button.
The [Browse for folder] panel will appear.
(3) Select the data you want to restore from the [Browse for folder] panel.
(4) Tap the <OK> button.
The [Browse for folder] panel closes and the [Restore Controller] panel will appear.
(5) Check the information to restore in the [Restore Controller] panel.
(6) Tap the <OK> button.
The data restoration will start.

If the current Controller configuration and that of the backup data differ, a warning message will appear. Restoration must be performed on the same system.
The Robot system restarts after restoring the data.

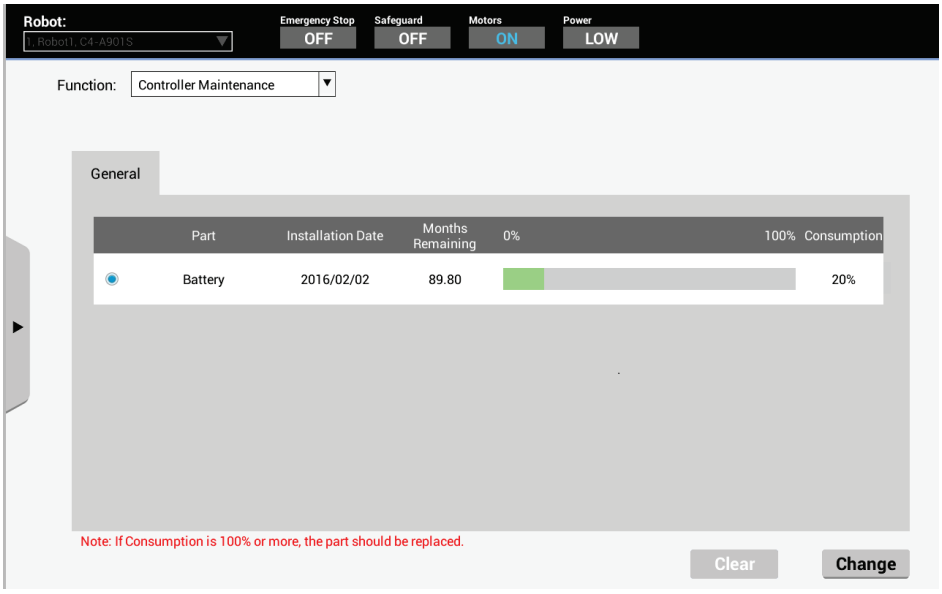
To remove the USB memory:

Tapping the <Unmount> button displays the removal instruction. Remove the USB memory by following the instruction.

For details of cautions for using the USB memory, refer to *Operation 8. USB Port*.

5.2.3 Controller Maintenance

This panel is used for referring and editing the Controller parts information.



To edit information:

Tap the <Change> button, and then set the Installation Date.

To cancel the warning:

Tap the <Clear> button.

For details of the parts consumption management, refer to the following manual.

Robot Controller Manual RC700 / RC700-A

For T series Manipulator, refer to the following manual.

T series Manipulator

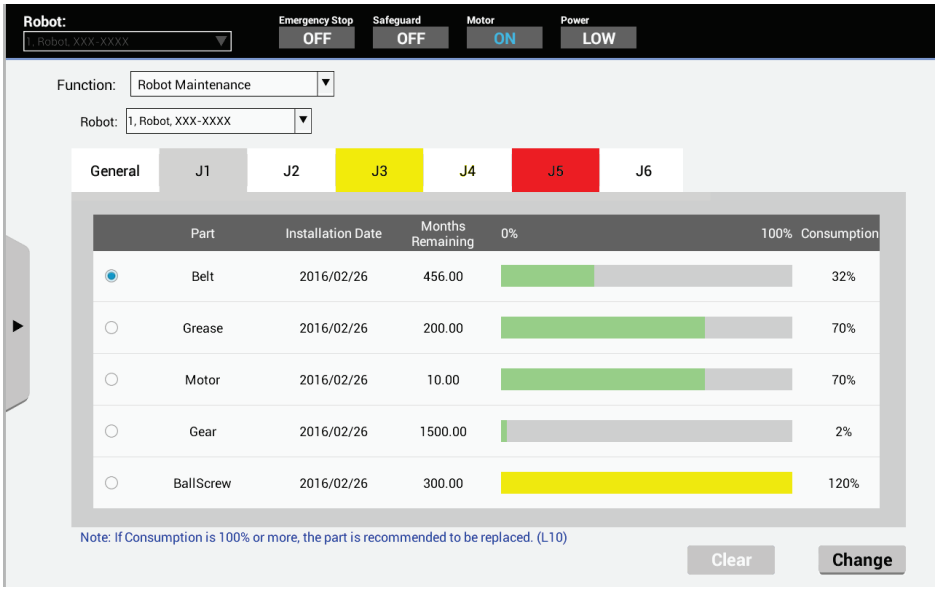
For VT series Manipulator, refer to the following manual.

VT series Manipulator

5.2.4 Robot Maintenance

This panel is used for referring and editing the robot parts information.

This panel may not be displayed depending on the Robot system setting.



To display the parts information

Select the robot in [Robot], and then tap the item to check.

To edit information:

Tap the <Change> button, and then set the Installation Date.

To cancel the warning:

Tap the <Clear> button.

For details of the parts consumption management, refer to the following manual.

Robot Controller Manual RC700 / RC700-A

For T series Manipulator, refer to the following manual.

T series Manipulator

For VT series Manipulator, refer to the following manual.

VT series Manipulator

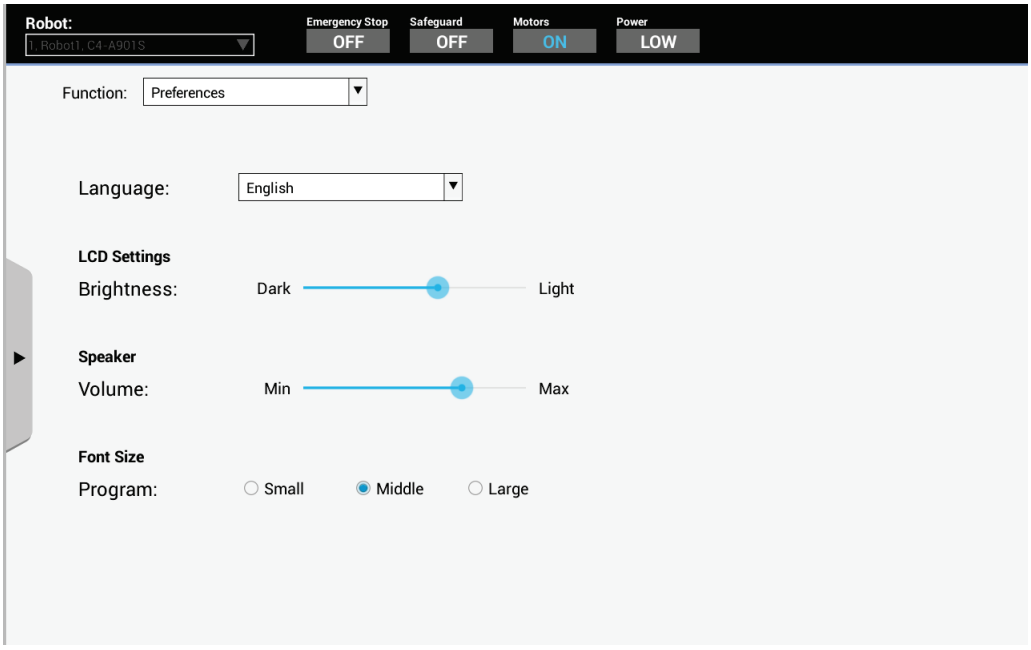
5.3 Configuration

This panel is used for various settings.
To display the [Configuration] panel, switch the mode selector key switch to “AUTO” and tap the [Configuration] tab.

Select either of the following from the [Function] list.

Preferences
System Information
Update Software
Shutdown

5.3.1 Preferences



Following settings are available.

Language	:	Selects the language for the display and keypad. Available languages are Japanese, English, French, German, Simplified Chinese, and Traditional Chinese. The application automatically restarts when the language is changed.
LCD settings	:	Sets brightness of the LCD. Move the slider to set appropriate brightness.
Speaker	:	Sets the speaker volume. Move the slider to set appropriate volume.
Font Size	:	Sets the font size displayed in the file contents display area of the [Programming] panel and [Test] panel. Select from “Small”, “Middle”, or “large”.

5.3.2 System Information

This panel displays information of the Controller, Teach pendant, and license.

Controller information

Controller Name	:	Name of the Controller
Serial Number	:	Controller serial number
Firmware Version	:	Controller firmware version

Terminal device information:

Firmware Version	:	Teach pendant firmware version
Software Version	:	Teach Pendant software version

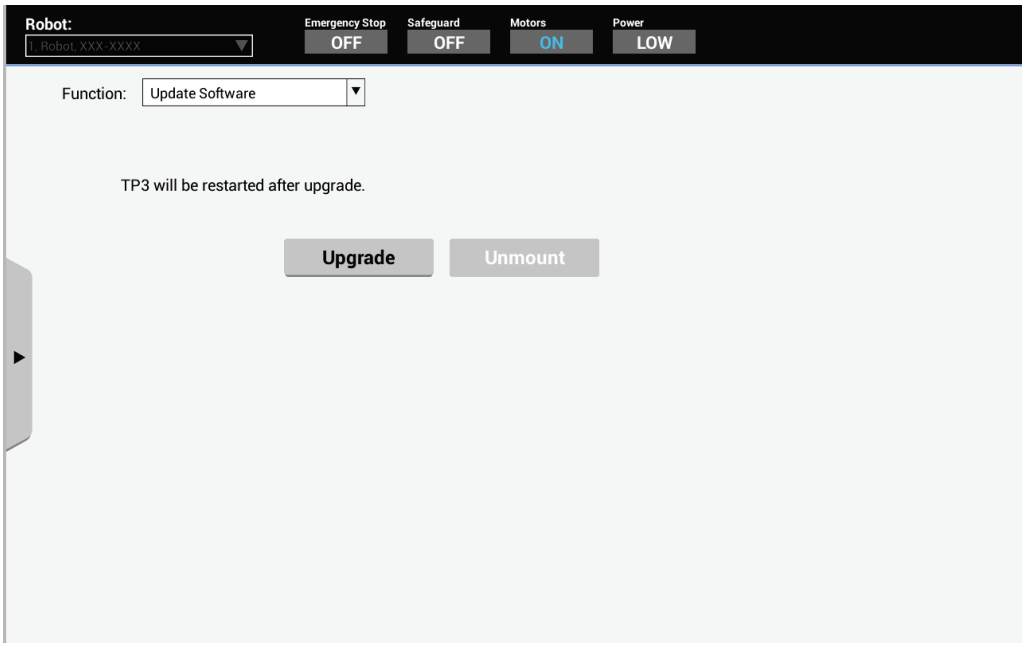
Open source license:

Tapping the <Display> button opens another panel to show the license information.

5.3.3 Update Software

In this panel, you can update the Teach Pendant software.
The following two items are required for updating.

- USB memory with sufficient capacity
- PC to write the update file to the USB memory



Preparation

(1) Insert the USB memory to PC.

(2) Copy the update file from PC to USB memory.

Update

(1) Insert the USB memory to the USB port (lower) on the Teach Pendant.

(2) After the USB memory is recognized, tap the <Upgrade> button of [Configuration] panel.

(3) After the confirmation window is displayed, tap the <OK> button and start update.

Update will complete in a few minutes.
To remove the USB memory, tap the <Unmount> button and follow the instruction.

The current version can be checked in [System Information] - [Terminal device information] - [Software Version].

Reference: *Operation 5.3.2 System Information*

CAUTION	■ Do not remove the Teach Pendant power cable and USB memory while updating software. Teach Pendant and USB memory may be damaged. ■ Do not operate the robot while updating software. The software may be damaged and the system may not start.

For details of cautions for using the USB memory, refer to *Operation 8. USB Port*.

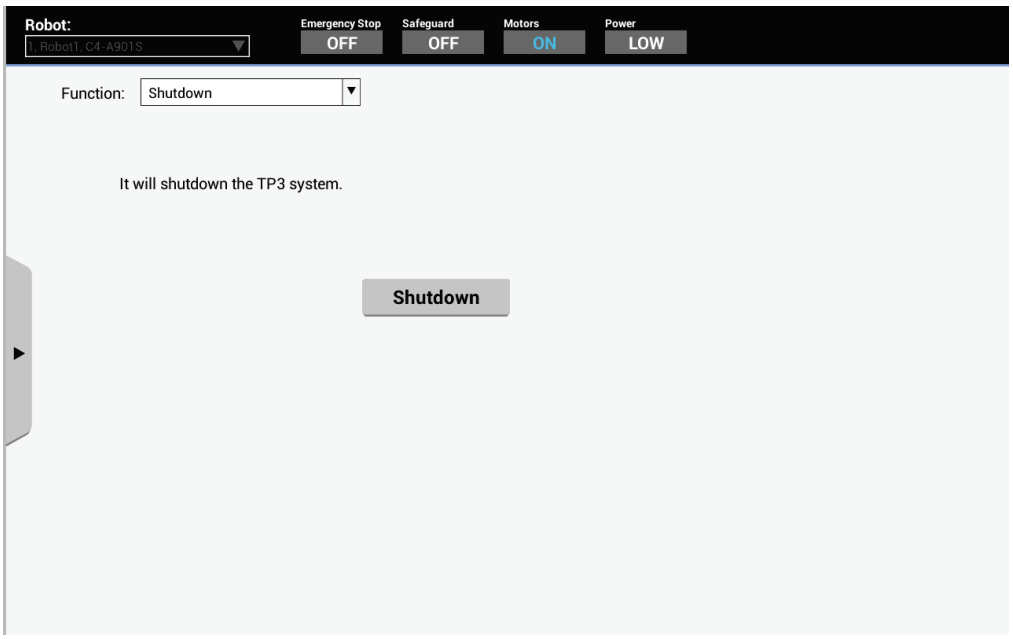
5.3.4 Shutdown

In this panel, you can shut down the Teach Pendant system.
Tapping the <Execute> button starts shutdown processing.

The following operations stop power supply to the Teach Pendant. Before conducting the following operations, make sure to shut down the Teach Pendant system.

When turning off the Controller

When removing the Teach Pendant from the Controller



6. Password Setup

You can set a password to restrict operators to use the following functions.

Brake function (6-axis robot only)

Maintenance

Test (T2) function

Set the password in the EPSON RC+.

NOTE

T2 mode cannot be used on RC700-A Controllers complying with the UL standards.

7. Troubleshooting

If the condition does not change after performing the countermeasure, the unit may have suffered a breakdown.
Please contact the service center or the manufacturer.

Display panel is blank

- The Controller supplies 24VDC.
  Check that the Controller is ON.

- Check that the Controller is connected to the TP port of the Controller properly.

An Error code appears and the Robot does not operate normally

- Please refer to the error code in the following manual.

  EPSON RC+ SPEL+ Language Reference

Robot does not move by pressing the Jog key

- Execute the Motor On command to energize the Robot motor.
  For details, refer to the following manual:
  EPSON RC+ SPEL+ Language Reference: Motor

- Energize the Robot motor.
  For details, refer to the following manual:
  EPSON RC+ SPEL+ Language Reference: SLock

- Short jog distance may be selected.
  Check the value in the [Jog Distance] and change the setting to long distance if needed.
  For details, refer to the following section:
  Operation 3.2.6 Jog Distance

Operation mode does not switch from TEACH mode to AUTO mode

- Turn ON the latch release input of the EMERGENCY connector to release the latch status.

Program list is not displayed in program verification window of TEST mode

- Check for the setting whether it is set to store execution source files to the Controller.

Settings can be confirmed by following steps:

Select EPSON RC+ menu- [Project]-[Properties]-[Source Files In Controller] and check if desired files are checked in [Select source files to store in controller:].

Robot motion will is slow after switching the mode from TEACH to AUTO

Refer to the NOTE in the following section:

Operation: 1. Teaching Procedure

8. Maintenance Parts List

Part Name	Code
TP3-key	2175228

9. Option Parts List

Part Name		Code
Wall Bracket		R12NZ900NH
Extension Cable	5 m	R12NZ90111
	10 m	R12NZ900NJ
	15 m	R12NZ900NK
Hot Plug Kit		R12N2900NL