

EPSON

ROBOT CONTROLLER

RC700 / RC700-A

Rev.25

EM19ZC4205F

ROBOT CONTROLLER RC700 / RC700-A Rev.25

ROBOT CONTROLLER

RC700 / RC700-A

Rev.25

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FOREWORD

Thank you for purchasing our robot products.

This manual contains the information necessary for the correct use of the robot controller.

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 contact the supplier of your region 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.

TRADEMARKS

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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

NOTE



Do not connect the followings to the TP/OP port of RC700 / RC700-A. Connecting to the followings may result in malfunction of the device since the pin assignments are different.

OPTIONAL DEVICE dummy plug

Operation Pendant OP500

Operator Pendant OP500RC

Jog Pad JP500

Teaching Pendant TP-3**

Operator Panel OP1

NOTE



For RC700 / RC700-A, be sure to install the EPSON RC+7.0 to the development PC first, then connect the development PC and RC700 / RC700-A with the USB cable.

If RC700 / RC700-A and the development PC are connected without installing the EPSON RC+7.0 to the development PC, [Add New Hardware Wizard] appears. If this wizard appears, click the <Cancel> button.

NOTE



Concerning the security support for the network connection:

The network connecting function (Ethernet) on our products assumes the use in the local network such as the factory LAN network. Do not connect to the external network such as Internet.

In addition, please take security measure such as for the virus from the network connection by installing the antivirus software.

NOTE



Security support for the USB memory:

Make sure the USB memory is not infected with virus when connecting to the Controller.

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Safety

This section contains information for safety of the Robot System.




1. Safety

Installation and transportation of Manipulators and robotic equipment shall be performed by qualified personnel and should conform to all national and local codes.

Please read this manual and other related manuals before installing the robot system or before connecting cables. Keep this manual in a handy location for easy access at all times.

2. 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. |

3. Safety Precautions

Only trained personnel should design and install the robot system.

Trained personnel are defined as those who have taken robot system training class 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.


The following items are safety precautions for qualified design or installation personnel:




WARNING



- Personnel who design and/or construct the robot system with this product must read the Safety chapter in User's Guide to understand the safety requirements before designing and/or constructing the robot system. Designing and/or constructing the robot system without understanding the safety requirements is extremely hazardous, may result in serious bodily injury and/or severe equipment damage to the robot system, and may cause serious safety problems.
- The Manipulator and the Controller must be used within the environmental conditions described in their respective manuals. This product has been designed and manufactured strictly for use in a normal indoor environment. Using the product in an environment that exceeds the specified environmental conditions may not only shorten the life cycle of the product but may also cause serious safety problems.
- The robot system must be used within the installation requirements described in the manuals. Using the robot system outside of the installation requirements may not only shorten the life cycle of the product but also cause serious safety problems.
- The interlock of the Safety Door must be functioning when the robot system is operated. Do not operate the system under the condition that the switch cannot be turned ON/OFF. (I.E. the condition where the switch is disabled) (Example: Tape is put around the switch to hold it closed.) Operating the robot system when the switch is not functioning properly is extremely hazardous and may cause serious safety problems as the Safety Door input cannot fulfill its intended function.
- Connect input signal wires for Emergency Stop and Safety Door to the EMERGENCY connector so that the Emergency Stop switch in the Teach Pendant connected to the TP port always functions. (Refer to the typical application diagram in Setup & Operation 9.4 Circuit Diagrams.)

The following items are safety precautions for qualified design or installation personnel: (cont.)

| | |
|--|--|
|  WARNING | <ul style="list-style-type: none"> ■ Do not open the cover(s) of the Controller except while maintaining it. Opening the cover(s) of the Controller is extremely hazardous and may result in electric shock even when its main power is OFF because of the high voltage charge inside the Controller. ■ Make sure that the power to the Controller is turned OFF before connecting or disconnecting any cables. Connecting or disconnecting any cables with the power ON is extremely hazardous and may result in electric shock and/or malfunction of the Controller. ■ Be sure to connect the cables 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 a contact failure is extremely hazardous and may result in electric shock and/or improper function of the system. ■ When connecting the plug to fit the outlet in your factory, make sure that it is done by qualified personnel. When connecting the plug, be sure to connect the earth wire of the AC power cable colored green/yellow on the Controller to the earth terminal of the factory power supply. The equipment must be grounded properly at all times to avoid the risk of electric shock. Always use a power plug and receptacle. Never connect the Controller directly to the factory power supply. (Field wiring) |
|--|--|

| | |
|--|--|
|  CAUTION | <ul style="list-style-type: none"> ■ The serial number of the Manipulator that should be connected is indicated on the Connection Check Label on the Controller. Connect the Controller and the Manipulator correctly. Improper connection between the Controller and the Manipulator may cause improper function of the robot system and also safety problems. ■ When using remote I/O, always make sure of the following. Using the robot system under unsatisfactory conditions may cause malfunction of the system and/or safety problems. <ul style="list-style-type: none"> - Assign remote functions to inputs/outputs correctly and wire correctly when setting up remote I/O signals. - Make sure that the functions correspond to the correct input/output signals before turning ON the system. - When verifying the robot system operation, prepare for failures with initial settings or wiring. If the Manipulator functions unusually by the failures with initial settings or wiring, press the Emergency Stop switch immediately to stop the Manipulator. |
|--|--|

The following items are safety precautions for qualified operator personnel:

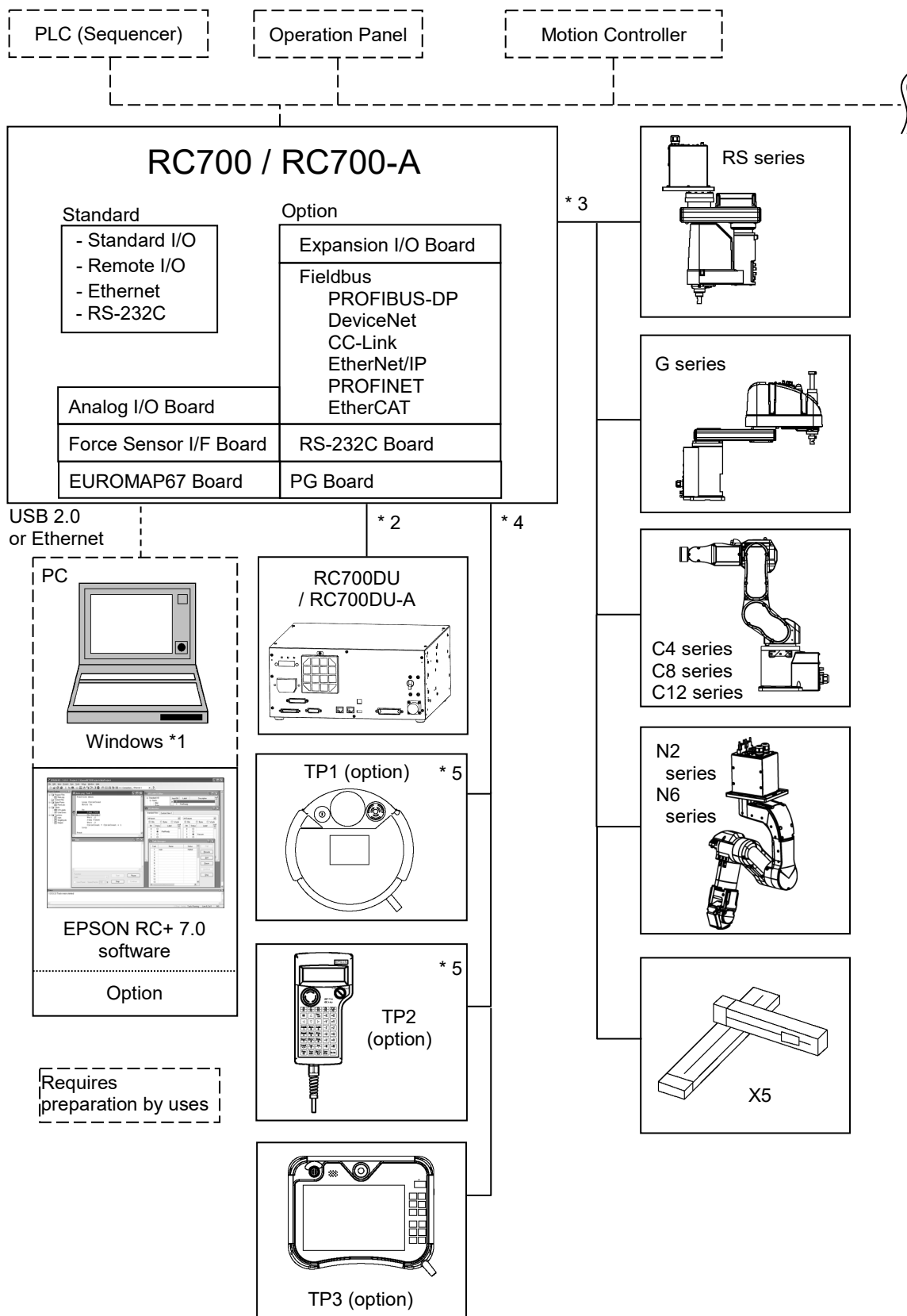
| | |
|--|---|
|  <p>WARNING</p> | <ul style="list-style-type: none">■ The interlock of the Safety Door must be functioning when the robot system is operated. Do not operate the system under the condition that the switch cannot be turned ON/OFF. (I.E. the condition where the switch is disabled) (Example: Tape is put around the switch to hold it closed.) Operating the robot system when the switch is not functioning properly is extremely hazardous and may cause serious safety problems as the Safety Door input cannot fulfill its intended function. |
|  <p>WARNING</p> | <ul style="list-style-type: none">■ Do not open the cover(s) of the Controller except while maintaining it. Opening the cover(s) of the Controller is extremely hazardous and may result in electric shock even when its main power is OFF because of the high voltage charge inside the Controller. |

Setup & Operation

This section contains information for setup and operation of the Robot Controller.

1. Specifications

1.1 System Example



- *1 EPSON RC+ 7.0 supports the following OS.
 Windows 7 Professional Service Pack 1
 Windows 8.1 Pro (EPSON RC+ 7.0 Ver.7.1.0 or later)
 Windows 10 Pro (EPSON RC+ 7.0 Ver.7.2.0 or later)

- *2 Up to three Drive Units can be connected.
 For details, refer to following manual.
 Robot Controller / Drive Unit RC700DU / RC700DU-A

- *3 Any one of the Manipulators can be controlled.
 Available combinations are as follows. (✓: connectable)

| | C4 | C8 | C12 | G | RS | N2 | N6 | X5 |
|---------|----|----|-----|---|----|----|----|----|
| RC700 | ✓ | - | - | - | - | - | - | - |
| RC700-A | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ | ✓ |

- *4 Any one of the Teach pendant can be controlled.
 TP3 cannot be connected to RC700.
- *5 When connecting to RC700-A, a dedicated conversion cable is required.

1.2 Standard Specifications

| Item | Specification | | |
|--|---|---|--|
| Model | Robot Controller RC700 / RC700-A | | |
| CPU | 32 bits Micro Processor | | |
| Controllable axes | 6 AC servo motors | | |
| Robot Manipulator control | Programming language and Robot control software | EPSON RC+ 7.0 (a multi-tasking robot language) | |
| | Joint Control | Up to 6 joints simultaneous control Software AC servo control | |
| | Speed Control | PTP motion : Programmable in the range of 1 to 100% CP motion : Programmable (Actual value to be manually entered.) | |
| | Acceleration/ deceleration control | PTP motion : Programmable in the range of 1 to 100%; Automatic CP motion : Programmable (Actual value to be manually entered.) | |
| Positioning control | PTP (Point-To-Point control) CP (Continuous Path control) | | |
| Memory capacity | Maximum Object Size : 4 MB Point data area : 1000 points (per file) Backup variable area : Max. 100 KB (Includes the memory area for the management table.) Approx. 1000 variables (Depends on the size of array variables.) | | |
| Teaching method | Remote Direct MDI (Manual Data Input) | | |
| External input/output signals (standard) | Standard I/O | Input : 24 Output : 16 | Including 8 inputs, 8 outputs with remote function assigned Assignment change allowed |
| | R I/O | Input : 2 Output : 2 | - |
| | Standard I/O (Drive Unit) | Input : 24 Output : 16 | Per 1 Drive Unit |
| Communication interface (standard) | Ethernet | 1 channel | |
| RS-232C port | 1 port | | |

| Item | Specification | | |
|---------------------------|--|--|---|
| Options (Max. 4 slots) | Expansion I/O | Input : 24 per board Output : 16 per board | Addition of 4 boards allowed |
| | Communication interface | RS-232C : 2ch per board | Addition of 2 boards allowed *2 |
| | | Fieldbus I/O : 1ch per board PROFIBUS-DP, DeviceNet, CC-Link, EtherNet/IP, PROFINET EtherCAT | Addition of 1 board from the left allowed |
| | | Force Sensor I/F: 1ch/port | Addition of 1 board allows |
| | PG | Controllable joints 4 joints/board | Addition of 4 boards allowed |
| | Analog I/O | SKU1 Output: 1ch | Addition of 4 board from the left allowed |
| | | SKU2 Output: 2ch Input: 2ch | |
| EUROMAP67 | Input : 15 Output : 16 | Addition of 2 boards allowed | |
| Safety features | <ul style="list-style-type: none"> - Emergency stop switch - Safety door input - Low power mode - Dynamic brake - Motor overload detection - Irregular motor torque (out-of-control Manipulator) detection - Motor speed error detection - Positioning overflow - servo error - detection - Speed overflow - servo error - detection - CPU irregularity detection - Memory check-sum error detection - Overheat detection at the Motor Driver Module - Relay welding detection - Over-voltage detection - AC power supply voltage reduction detection - Temperature error detection - Fan error detection | | |
| Power Source | 200 VAC to 240 VAC Single phase 50/60 Hz | | |
| Maximum Rated Capacity | 2.5 kVA (Depending on the Manipulator model) | | |
| Insulation Resistance | 100 MΩ or more | | |
| Rated Ambient Temperature | 5 to 40 °C | | |
| Rated Relative Humidity | 20% to 80% (with no condensation) | | |
| Mass *1 | 11 kg | | |

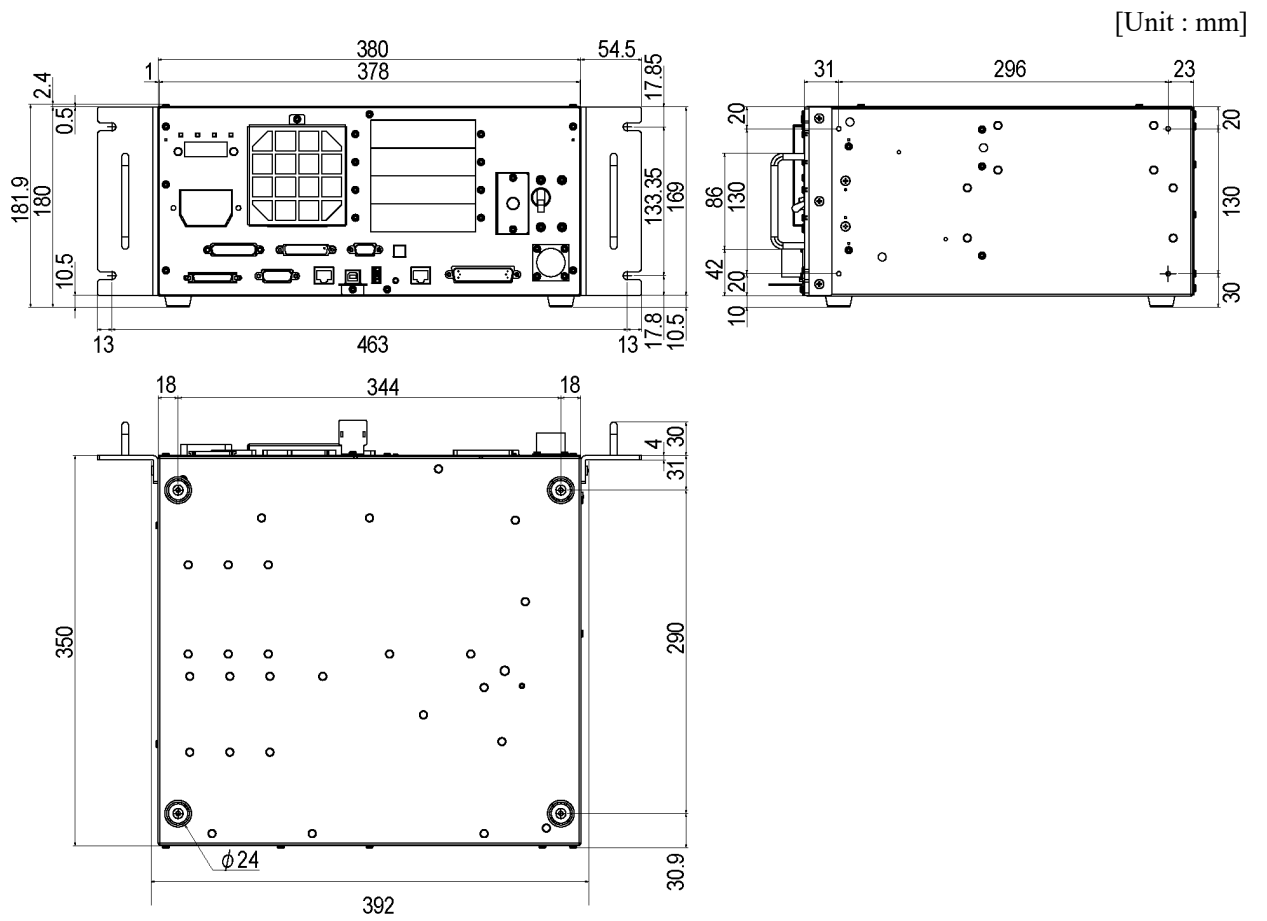
*1 Mass of the unit is indicated on the Controller itself.

Make sure to check the mass before units transfer or relocation and prevent throwing out your back at holding the unit.

Also, make sure to keep your hands, fingers, and feet safe from being caught or serious injury.

*2 When using the Force Sensor I/F board, a maximum of one board/two ports expansion is available for RS-232C board.

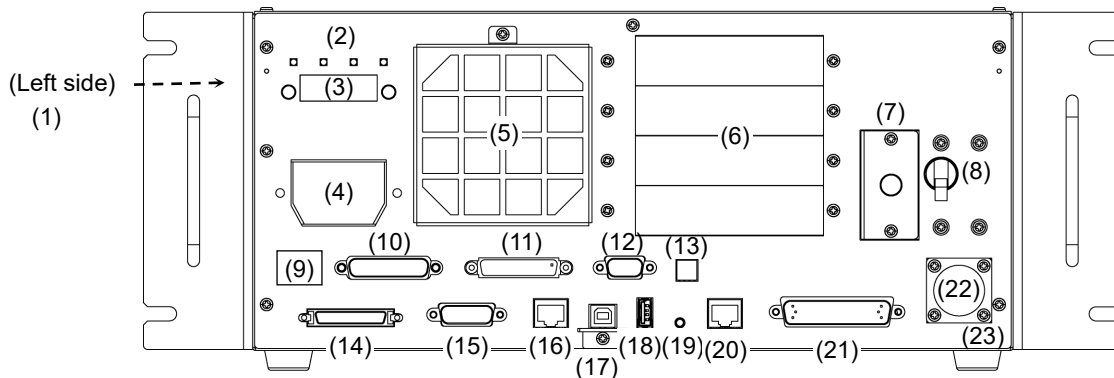
1.3 Outer Dimensions



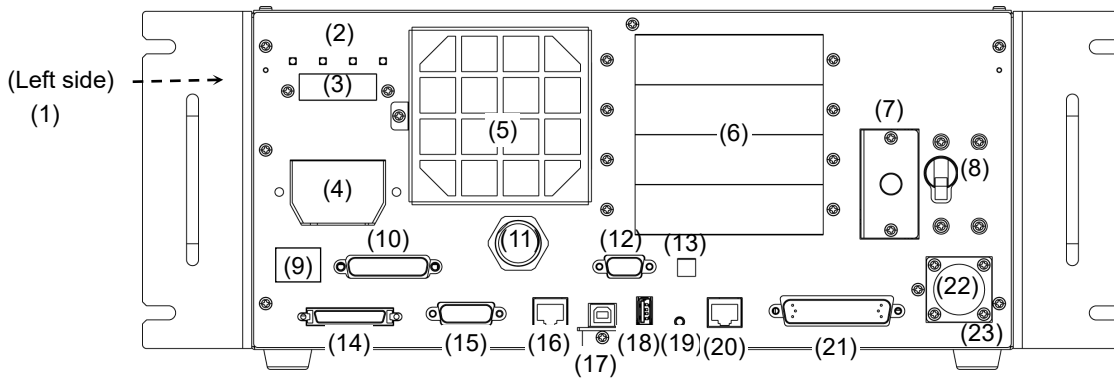
(Figure: RC700)

2. Part Names and Functions

RC700



RC700-A



- (1) **Controller Number label**
The serial number of the Controller is indicated.
- (2) **LED**
The LED indicates current operation mode (TEST, TEACH, AUTO, or PROGRAM mode).
For details, refer to *Setup & Operation 2.1 LED and Seven-segment LED*.
- (3) **Seven-segment Display**
Four-digit seven-segment LED displays the line number and the status of the Controller (error number, warning number, status of Emergency Stop and Safety Door). For details, refer to *Setup & Operation 2.1 LED and Seven-segment LED*.
- (4) **M/C POWER connector**
A connector for the Manipulator power source.
Connect the dedicated power cable attached to the Manipulator.
- (5) **Fan Filter**
A protective filter is installed in front of the fan to filter out dust.
Check the condition of the filter regularly and clean it when necessary. A dirty filter may result in malfunction of the robot system due to temperature rise of the Controller.

(6) Option slot

Option boards such as expansion I/O board, Fieldbus I/O board, RS-232C board, PG board, Analog I/O board, and Force Sensor I/F board can be installed. Four slots are available.

For details, refer to *Setup & Operation 13. Option Slots*.

(7) Battery

A lithium battery for data backup.

(8) POWER switch

Turns ON or OFF the Controller.

(9) Connection Check label

The details of the Manipulator to be connected are recorded on the label as shown in the right. The label indicates the Manipulator model and Manipulator serial number.

| MANIPULATOR | |
|-------------|-------|
| C4-A600S | 00001 |

(10) EMERGENCY connector

This connector is used for input/output from/to Emergency Stop and Safety Door switches. For details, refer to the *Setup & Operation 9. EMERGENCY*.

(11) TP port

Connects Teach Pendant TP1, TP2, TP3 (Option) and TP bypass plug. Note that the shape of the TP port differs between RC700 and RC700-A.

For details, refer to *Setup & Operation 8. TP Port*.



Do not connect the following to the TP port of RC700/RC700-A. It may result in malfunction of the device since the pin assignments are different.

- OPTIONAL DEVICE dummy plug
- Operation Pendant OP500
- Operator Pendant OP500RC
- Jog Pad JP500
- Teaching Pendant TP-3**
- Operator Panel OP1

(12) Standard RS-232C port

This port is used for the RS-232C communication with external devices.

For details, refer to *Setup & Operation 10. Standard RS-232C Port*.

(13) Encoder Voltage Adjustment Switch

Use this switch to adjust voltage according to length of M/C cable. (adjusted as a factory default)

Wrong setting may result in Robot system malfunction.

| Switch | M/C Cable Length |
|--------|------------------|
| 1 | 3 m |
| 2 | 5 m |
| 3 | 10 m |
| 4 | 15, 20 m |

(14) M/C SIGNAL connector

This connector is used for signals such as the Manipulator's motor position detector, etc. Connect the Manipulator's dedicated signal cable.

(15) R-I/O connector

This connector is for the input signals used for the real time I/O function.

(16) RC700: DU OUT connector / RC700-A: OUT connector

The connector for Drive Unit.

(17) Development PC connection USB port

This port connects the Controller and the Development PC using a USB cable.

Do not connect other devices except the Development PC.

For details, refer to *Setup & Operation 5. Development PC Connection USB Port*.

(18) Memory port

This port connects the common USB memory for Controller backup function. Do not connect other USB devices except the USB memory.

For details, refer to *Setup & Operation 6. Memory Port*.

(19) Trigger Switch

This switch is for Controller backup function using the USB memory.

For details, refer to *Setup & Operation 6. Memory Port*.

(20) LAN (Ethernet communication) port

This port connects the Controller and the Development PC using an Ethernet cable.

100BASE-TX / 10BASE-T communication are available.

For details, refer to *Setup & Operation 7. LAN (Ethernet communication) Port*.

(21) I/O connector

This connector is used for input/output device. There are 24 inputs and 16 outputs.

For details, refer to *Setup & Operation 11. I/O Connector*.

(22) AC IN

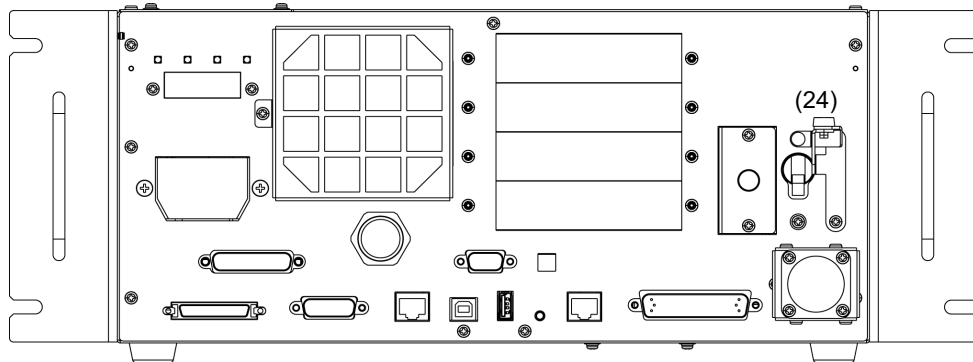
The connector for 200VAC power input.

For details, refer to *Setup & Operation 3.3.2 AC Power Cable*.

(23) Signature label

The serial number of the Controller and other information are shown.

RC700-A-UL



UL-Compliant Controller (RC700-A-UL):

(24) Lock out feature

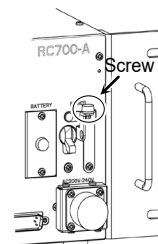
This feature is used to lock out the power switch when working with the power off such as maintenance.

A padlock for lockout should be prepared by users.

Applicable shackle diameter: 4.0 to 6.5 mm

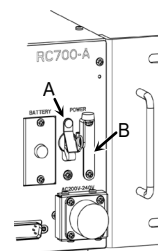
Perform lockout using the following procedure.

- (1) Remove a fixing screw of lockout bracket A by hand.

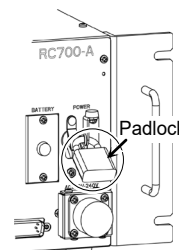


- (2) Rotate the lockout bracket A.

- (3) Set the screw removed in the step (1) to the lockout bracket B so as not to lose it.



- (4) Put a padlock through the holes of the lockout brackets A and B to lock.



2.1 LED and Seven-segment LED

2.1.1 LED and Seven-segment LED Display

There are four LEDs and a four-digit seven-segment LED display located on the front panel of the Controller.

LED : LED (TEST, TEACH, AUTO, PROGRAM) turns ON according to the current operation mode (TEST, TEACH, Auto, Program).

Seven-segment : Indicates the line number and Controller status (error number, warning number, Emergency Stop or Safeguard status).

From turning ON the Controller to completing startup


LED : All four LEDs blink.

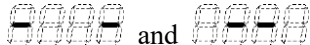







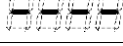
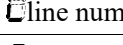
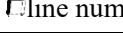
Seven-segment : All four LED digits turn OFF the lights.

After Controller Startup

LED : LED (TEST, TEACH, AUTO, PROGRAM) turns ON according to the current operation mode (TEST, TEACH, Auto, Program).

Seven-segment : Display changes according to the Controller status.

When several Controller statuses occurred at one time, the status indicated earlier on the following table is displayed. For an example, when both Emergency Stop and Safeguard statuses occurred at one time,  is displayed.

| Controller status | Display of seven-segment |
|--|---|
| Execute Controller status storage function to the USB memory | Displays  and  repeatedly. |
| Complete Controller status storage to USB memory | Displays  (for 2 seconds) |
| Failure of Controller status storage to USB memory | Displays  (for 2 seconds) |
| Error | Displays four-digit error number (0.5 sec) and  (0.5 sec) repeatedly. *1 |
| Warning | Displays four-digit warning number (0.5 sec) and  (0.5 sec) repeatedly. *1 |
| Emergency Stop |  Blink |
| Safety Door |  Blink |
| READY |  Blink |
| START |  line number Blink *2 |
| PAUSE |  line number Blink *2 |

*1 For error numbers, refer to *EPSON RC+ 7.0 SPEL+ Language Reference*, or *Online Help*.






*2 In initial status, execution line of task number 1 is displayed in three-digit.

Use Ton statement to change the displayed task number.

For details, refer to *EPSON RC+ 7.0 SPEL+ Language Reference*, or *Online Help*.

2.1.2 Particular Status Display

When particular status occurs, seven-segment displays the followings.

| Seven-segment | Controller status |
|---|--|
|  | Controller startup failure *1 |
|  | Controller startup failure |
|  | Controller in Recovery mode Refer to <i>Maintenance 4. Backup and Restore.</i> |
|  | AC power supply drop is detected and software shut down. |
|  | Software shut down is specified from the EPSON RC+ 7.0 (software) or the Teach Pendant (option). |

*1 When the Initialize Error occurs, reboot the Controller. If the Initialize Error is displayed again after the Controller is rebooted, please contact the supplier of your region.

2.2 Safety Features

The robot control system supports safety features described below. However, it is recommended to strictly follow the proper usage of the robot system by thoroughly reading the attached manuals before using the system. Failure to read and understand the proper usage of the safety functions is highly dangerous.

Among the following safety features, the Emergency Stop Switch and Safety Door Input are particularly important. Make sure that these and other features function properly before operating the robot system.

For details, refer to *Setup & Operation 9. EMERGENCY*.

Emergency Stop Switch

The EMERGENCY connector on the Controller has expansion Emergency Stop input terminals used for connecting the Emergency Stop switches.

Pressing any Emergency Stop switch can shut off the motor power immediately and the robot system will enter the Emergency Stop condition.

Stop category of Emergency Stop input: Category 0 (refer to Safety Standard IEC60204-1)

Safety Door Input

In order to activate this feature, make sure that the Safety Door Input switch is connected to the EMERGENCY connector at the Controller.

When the safety door is opened, normally the Manipulator immediately stops the current operation, and the status of Manipulator power is operation-prohibited until the safety door is closed and the latched condition is released. In order to execute the Manipulator operation while the safety door is open, you must change the mode selector key switch on the Teach Pendant to the “Teach” mode. Manipulator operation is available only when the enable switch is on. In this case, the Manipulator is operated in low power status.

Stop category of Safety door input: Category 1 (refer to Safety Standard IEC60204-1)

Low Power Mode

The motor power is reduced in this mode.

Executing a power status change instruction will change to the restricted (low power) status regardless of conditions of the safety door or operation mode. The restricted (low power) status ensures the safety of the operator and reduces the possibility of peripheral equipment destruction or damage caused by careless operation.

Dynamic Brake

The dynamic brake circuit includes relays that short the motor armatures. The dynamic brake circuit is activated when there is an Emergency Stop input or when any of the following errors is detected: encoder cable disconnection, motor overload, irregular motor torque, motor speed error, servo error (positioning or speed overflow), irregular CPU, memory check-sum error and overheat condition inside the Motor Driver Module.

Overload Detection

The dynamic brake circuit is activated when the system detects the overload status of the motor.

Irregular Torque (out-of-control Manipulator) Detection

The dynamic brake circuit is activated when irregular motor torque (motor output) is detected.

Motor Speed Error Detection

The dynamic brake circuit is activated when the system detects that the motor is running at incorrect speed.

Positioning Overflow –Servo Error- Detection

The dynamic brake circuit is activated when the system detects that the difference between the Manipulator's actual position and commanded position exceeds the margin of error allowed.

Speed Overflow –Servo Error- Detection

The dynamic brake circuit is activated when the Manipulator's actual speed is detected to mark an overflow (the actual speed is outside the nominal range) error.

CPU Irregularity Detection

Irregularity of CPU that controls the motor is detected by the watchdog timer. The system CPU and the motor controlling CPU inside the Controller are also designed to constantly check each other for any discrepancies. If a discrepancy is detected, the dynamic brake circuit is activated.

Memory Check-sum Error Detection

The dynamic brake circuit is activated when a memory check-sum error is detected.

Overheat Detection at the Motor Driver Module

The dynamic brake circuit is activated when the temperature of the power device inside the Motor Driver module is above the nominal limit.

Relay Deposition Detection

The dynamic brake circuit is activated when relay deposition, junction error, or open fault is detected.

Over-Voltage Detection

The dynamic brake circuit is activated when the voltage of the Controller is above the normal limit.

AC Power Supply Voltage Drop Detection

The dynamic brake circuit is activated when the drop of the power supply voltage is detected.

Temperature Anomaly Detection

The temperature anomaly is detected.

Fan Malfunction Detection


Malfunction of the fan rotation speed is detected.

3. Installation

3.1 Unpacking

| | |
|--------------------------|---------|
| TP/OP Bypass Plug | 1 unit |
| EMERGENCY Port Connector | 1 set |
| I/O Connector | 1 set |
| Rack-Mount Plate | 1 set |
| Power Cable | 1 cable |
| USB Cable Clamp | 1 set |

3.2 Environmental Requirements

| | |
|---|--|
|  WARNING | <ul style="list-style-type: none"> ■ The Manipulator and the Controller must be used within the environmental conditions described in their manuals. This product has been designed and manufactured strictly for use in a normal indoor environment. Using the product in the environment that exceeds the conditions may not only shorten the life cycle of the product but also cause serious safety problems. |
|---|--|

3.2.1 Environment

In order to optimize the robot system’s performance for safety, the Controller must be placed in an environment that satisfies the following conditions:

NOTE


- The Controller is not designed for clean-room specification. If it must be installed in a clean room, be sure to install it in a proper enclosure with adequate ventilation and cooling.
- Install Controller in a location that allows easy connection / disconnection of cables.

| Item | Condition |
|-----------------------------|---|
| Ambient temperature | 5 to 40 °C (with minimal variation) |
| Ambient relative humidity | 20% to 80% (with no condensation) |
| First transient burst noise | 2 kV or less (Power supply wire) 1 kV or less (Signal wire) |
| Electrostatic noise | 4 kV or less |
| Base table | Use a base table that is at least 100 mm off the floor. Placing the Controller directly on the floor could allow dust penetration leading to malfunction. |

If the Controller must be used in an environment that does not fulfill the conditions mentioned above, take adequate countermeasures. For example, the Controller may be enclosed in a cabinet with adequate ventilation and cooling.

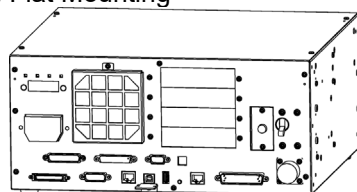
- Install indoors only.
- Place in a well-ventilated area.
- Keep away from direct sunlight and radiation heat.
- Keep away from dust, oily mist, oil, salinity, metal powder or other contaminants.
- Keep away from water.
- Keep away from shocks or vibrations.
- Keep away from sources of electronic noise
- Keep away from strong electric or magnetic fields.

3.2.2 Installation

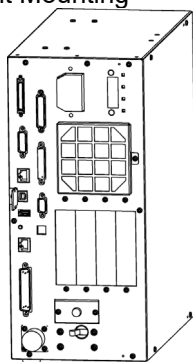
Install the Controller on a flat surface such as wall, floor, and Controller box in the direction shown from (A) to (C).

(A) Flat Mounting

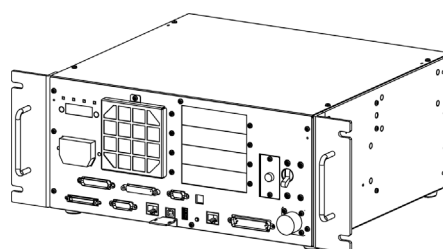
(Figure: RC700)



(B) Upright Mounting



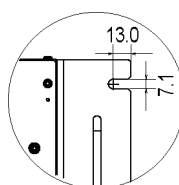
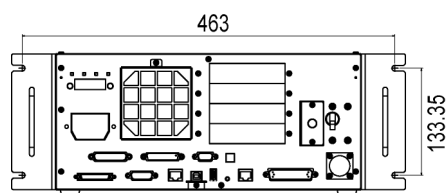
(C) Rack Mounting



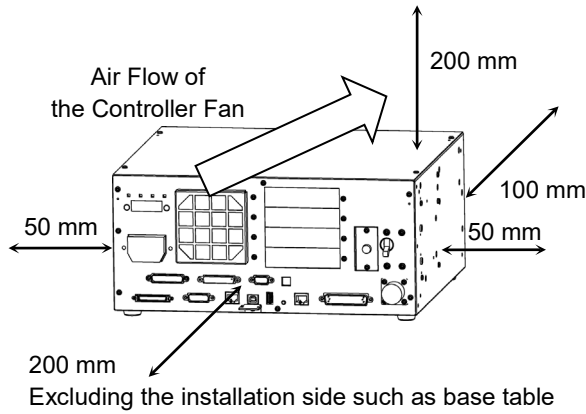
* A plate for rack mounting is required.

* The rubber foot needs to be replaced.

NOTE For Controller installation to the Controller box or the base table, process screw holes as follows.



- Ensure the draft around the in/out and prevent the other equipment, walls and install the Controller by keeping the distance as follows for maintenance.



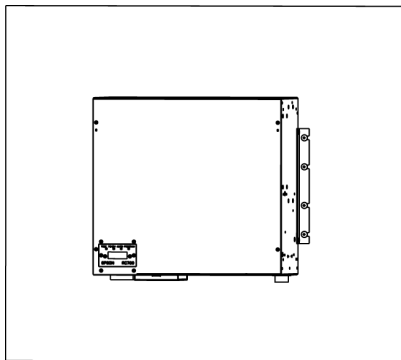
- Hot air with higher temperature than the ambient temperature (about 10 °C) comes out from the Controller. Make sure that heat sensitive devices are not placed near the outlet.
- Arrange the cables in front of the Controller so that you can pull the Controller forward.

3.2.3 Wall Mounting Option

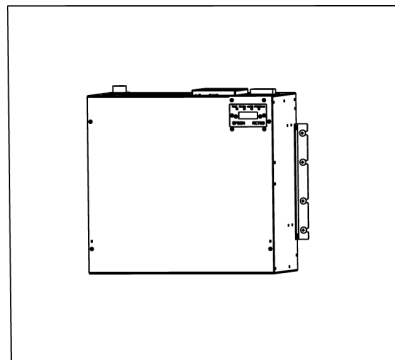
The control unit has a wall mounting option. This section describes the installation procedure.

(Figure/Picture: RC700)

Wall mounting with the front side down

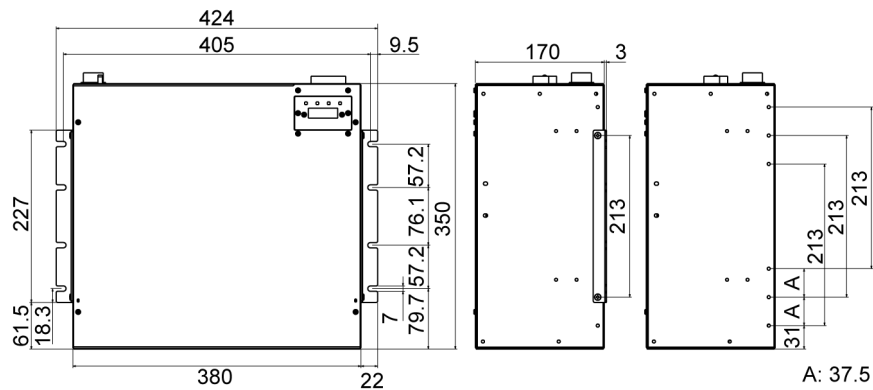


Wall mounting with the front side up



Controller outer dimensions when using the wall mounting option


Dimensions of the mounting holes for the wall



(Unit: mm)

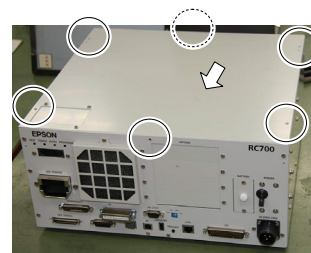
Included items of the wall mounting option

| | |
|--------------------------|------------|
| WALL FIXING BRACKET | 2 brackets |
| LED DISPLAY FIXING PLATE | 1 plate |
| LED DISPLAY PLATE | 1 plate |
| Screw (M3 × 6 mm) | 4 screws |
| Screw (M4 × 8 mm) | 4 screws |

| | |
|---|---|
|  WARNING | <ul style="list-style-type: none"> ■ Before installing the Controller with this option, always make sure that the main power of the Controller is turned OFF and that the power plug is disconnected. Performing any installation procedure while the main power is ON or the high voltage charged area is not discharged completely is extremely hazardous and may result in electric shock and/or cause serious safety problems. ■ When opening the front side, make sure to disconnect the power plug. Touching the power supply terminal block inside the Controller while the power supply is ON is extremely hazardous and may result in electric shock and/or cause serious safety problems. |
|---|---|

- NOTE
- Be careful not to damage the cables.
 - Be careful not to drop any screws into the Controller.

(1) Remove the Top Cover Mounting screws of the Controller
(Mounting screw×6)



(2) Remove the Top Cover.

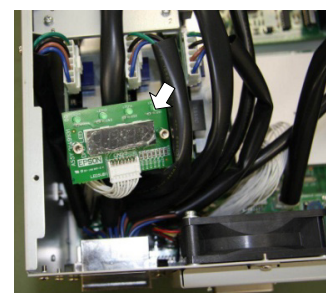
(3) Remove the screws fixing the seven segment display.
(Controller front side: Mounting screw×2)



(4) Remove the LED/7 segment board from the Controller.

NOTE

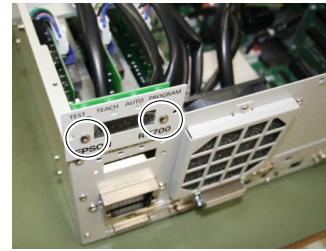
For RC700-A:
 The LED/7 segment board has the ferrite code
 (Reference: *Maintenance*
 7.8.2 *DMB-LED Board (RC700-A)*)
 If the LED DISPLAY PLATE is installed with
 “wall mounting with the front side up” described
 in the step (7) below, the cable which passes the
 ferrite core will be an opposite direction.
 Remove the latch of the ferrite core and change
 the cable direction, and then install the ferrite
 core again.



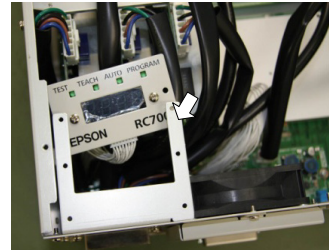
- (5) Mount the LED DISPLAY PLATE to the LED/7 segment board. (Mounting screw×2)



When installing the LED DISPLAY PLATE, be careful not to drop any screw inside the Controller.



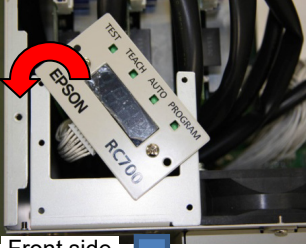
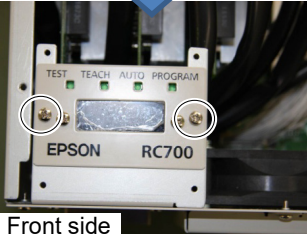
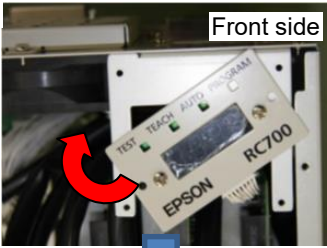
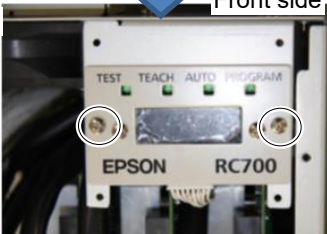
- (6) Mount the LED DISPLAY FIXING PLATE to the Controller. (Mounting screw×2)



- (7) Mount the LED DISPLAY PLATE to the LED DISPLAY FIXING PLATE. (Mounting screw×2)

There are two installation methods.

Turn the LED DISPLAY PLATE horizontally to the Top Cover in the direction indicated by a red arrow.

| | |
|---|---|
| <p>Wall mounting with the front side down</p> <p>(1) </p> <p>Front side</p> <p>(2) </p> <p>Front side</p> | <p>Wall mounting with the front side up</p> <p>(1) </p> <p>Front side</p> <p>(2) </p> <p>Front side</p> |
|---|---|



Be careful not to pull the cable.

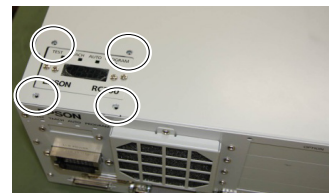
- (8) Remove the plate from the Top Cover.
(Mounting screw×4)



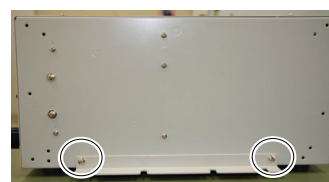
NOTE


The removed plate is not necessary when using this option.
The plate may be needed when the installation type is changed.
Please keep the plate for future use.

- (9) Mount the Top Cover.
(Mounting screw×6)



- (10) Fix the Top Cover to the LED DISPLAY FIXING PLATE.
(Mounting screw×4)



- (11) Mount the WALL FIXING BRACKET.
(Mounting screw×2 on both sides)



NOTE


The bracket has 6 screw holes.
There are three ways of installation.

- (12) Remove the rubber hoot on the Controller's back side.
(Mounting screw×4)



NOTE


The removed rubber foot is not necessary when using this option.
The rubber foot may be needed when the installation type is changed.
Please keep the rubber foot for future use.

- (13) Mount the Controller to the wall. (Mounting screw×8 M5 × 8 mm or longer)
Tightening torque 80 to 110 N·cm

3.3 Power Supply

3.3.1 Specifications


Ensure that the available power meets following specifications.

| Item | Specification |
|---------------------------|--|
| Voltage | 200 to 240 VAC (Input voltage should be within $\pm 10\%$ of the rated voltage.) |
| Phase | Single phase |
| Frequency | 50/60 Hz |
| Momentary Power Interrupt | 10 ms or less |
| Rated Capacity | <p>Maximum : 2.5 kVA Actual power consumption depends on the model, motion, and load of the Manipulator. For approximate power consumption of each model, refer to the following values.</p> <ul style="list-style-type: none"> C4 : 1.7 kVA C8 : 2.5 kVA C12 : 2.5 kVA N2 : 0.6 kVA N6 : 2.2 kVA G1 : 0.5 kVA G3 : 1.1 kVA G6 : 1.5 kVA G10 : 2.4 kVA G20 : 2.4 kVA RS3 : 1.2 kVA RS4 : 1.4 kVA <p>Refer to the Manipulator manual for rated capacity of the Manipulator motor. Rated capacity of X5 varies depending on the Manipulator model. For details, please contact the supplier of your region.</p> |
| Peak Current | When power is turned ON : approximately 85 A (2 ms.) When motor is ON : approximately 75 A (2 ms.) |
| Leakage Current | Max. 10 mA |
| Ground Resistance | 100 Ω or less |

Install an earth leakage circuit breaker in the AC power cable line at 15 A or less rated. Both should be a two-pole disconnect type. If you install an earth leakage circuit breaker, make sure to use an inverter type that does not operate by induction of a 10 kHz or more leakage current. If you install a circuit breaker, please select one that will handle the above mentioned “peak current”.

The power receptacle shall be installed near the equipment and shall be easily accessible.



3.3.2 AC Power Cable

| | |
|---|---|
|  WARNING | <ul style="list-style-type: none"> ■ Make sure that operations are done by a qualified personal. ■ Be sure to connect the earth wire (green/yellow) of the AC power cable to the earth terminal of the factory power supply. The equipment must be grounded properly at all times to avoid the risk of electric shock. ■ Always use a power plug or a disconnecting device for power connecting cable. Never connect the Controller directly to the factory power supply. ■ Select the plug or a disconnecting device which conform safety standards for nations. |
|---|---|

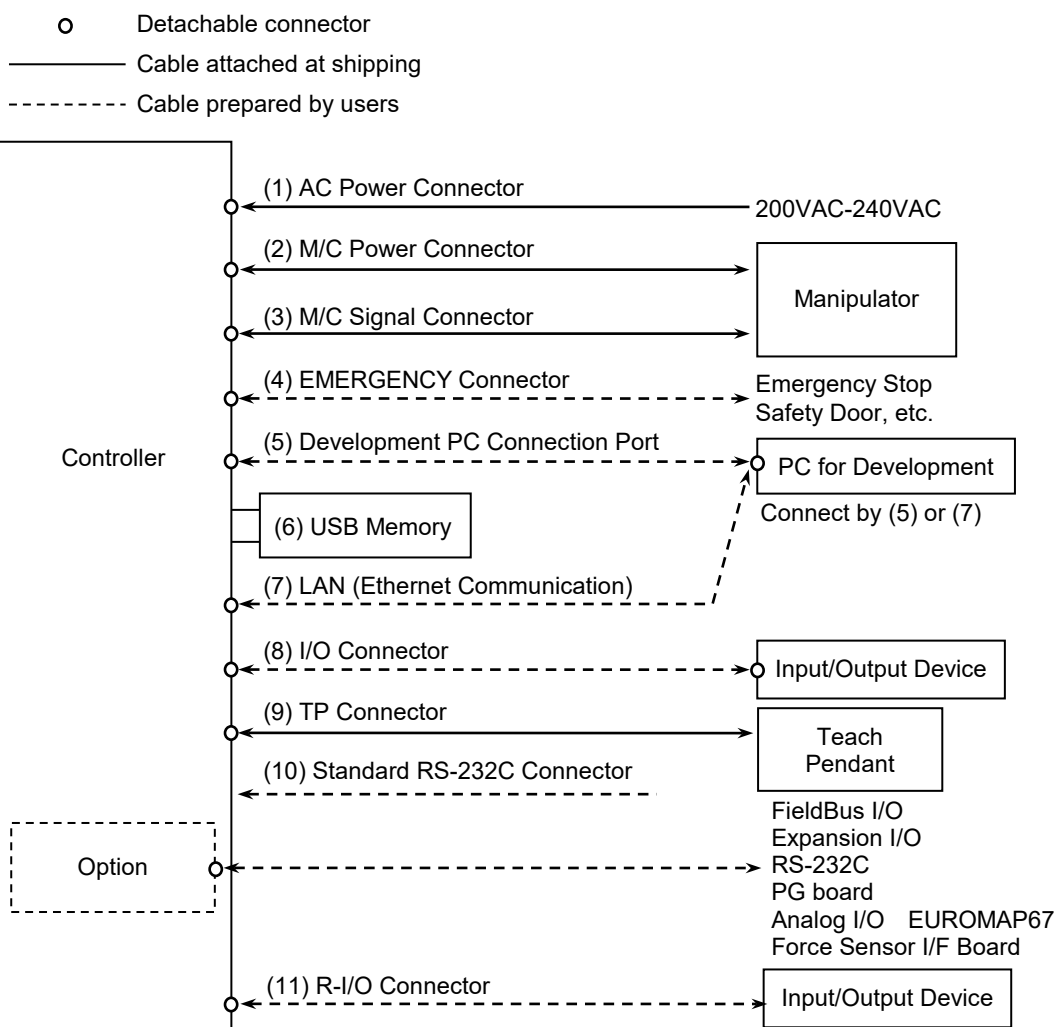
Make sure to insert the plug of the AC power cable firmly when connecting to the Controller.

| Item | Specification |
|--------------------------|---------------------------------|
| AC power wire (2 cables) | Black, Black or Black, White |
| Ground wire | Green / Yellow |
| Cable length | 3 m |
| Terminal | M4 round solderless terminal |

3.4 Cable Connection

| | |
|--|--|
|  <p>WARNING</p> | <ul style="list-style-type: none">■ Make sure that the power to the Controller is turned OFF and the power plug is disconnected before connecting or disconnecting any cables. Connecting or disconnecting any cables with the power ON is extremely hazardous and may result in electric shock and malfunction of the Controller.■ Be sure to connect the cables 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. |
|  <p>CAUTION</p> | <ul style="list-style-type: none">■ The serial number of the Manipulator that should be connected is indicated on the Connection Check Label on the Controller. Connect the Controller and the Manipulator correctly. Improper connection between the Controller and the Manipulator may cause not only improper function of the robot system but also safety problems.■ Before connecting the connector, make sure that the pins are not bent. Connecting with the pins bent may damage the connector and result in malfunction of the robot system. |



3.4.1 Typical Cable Connection



- (1) **AC Power Connector**
Connector for 200VAC power input to the Controller.
- (2) **M/C Power cable**
The cable with connector on the Controller side.
Connect the Manipulator and the M/C POWER connector on the Controller.
Insert the connectors until you hear a “click”.
- (3) **M/C Signal cable**
The cable with connector on the Controller side.
Connect the Manipulator and the M/C SIGNAL connector on the Controller.
- (4) **EMERGENCY**
The EMERGENCY connector has inputs to connect the Emergency Stop switch and the Safety Door switch. For safety reasons, connect proper switches for these input devices.
For details, refer to the *Setup & Operation 9. EMERGENCY*.
- (5) **PC for development**
Connect the PC for development.
For details, refer to the *Setup & Operation 5. Development PC Connection USB Port*.
- (6) **USB memory**
Connect the USB memory.
For details, refer to the *Setup & Operation 6. Memory Port*.
- (7) **LAN (EtherNet Communication)**
Connect the EtherNet cable.
For details, refer to the *Setup & Operation 7. LAN (Ethernet Communication) Port*.
- (8) **I/O connector**
This connector is used for input/output devices of the user.
When there are input/output devices, use this connector.
There are I/O cable (option) and terminal block (option) for the I/O connector.
For details, refer to the *Setup & Operation 11. I/O Connector*.
- (9) **TP cable**
Connect the option Teach Pendant.
For details, refer to the *Setup & Operation 8. TP Port*.
- (10) **Standard RS-232C port**
This port is used for the RS-232C communication with external devices.
For details, refer to *Setup & Operation 10. Standard RS-232C Port*.
- (11) **R-I/O Connector**
This connector is used for connecting with input signals necessary for real time I/O function.
For details, refer to the *Setup & Operation 13. R-I/O Connector*.

3.4.2 Connecting Manipulator to Controller

Connect the Manipulator to the Controller by using the Power cable and the Signal cable.

| | |
|---|--|
|  WARNING | <ul style="list-style-type: none"> ■ Make sure that the power to the Controller is turned OFF before connecting or disconnecting any cables. Connecting or disconnecting any cables with the power ON is extremely hazardous and may result in electric shock and malfunction of the Controller. ■ Be sure to connect the cables 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. |
|  CAUTION | <ul style="list-style-type: none"> ■ The serial number of the Manipulator that should be connected is indicated on the Connection Check Label on the Controller. Connect the Controller and the Manipulator correctly. Improper connection between the Controller and the Manipulator may cause not only improper function of the robot system but also safety problems. ■ When connecting the Manipulator to the Controller, make sure that the serial numbers on each equipment match. Improper connection between the Manipulator and Controller may not only cause improper function of the robot system but also serious safety problems. The connection method varies with the Controller used. For details on the connection, refer to the Controller manual. |

The configuration data for the Manipulator and Manipulator model are stored in the Controller. Therefore the Controller should be connected to the Manipulator whose serial number is specified in the Connection Check label attached on the front of the Controller.



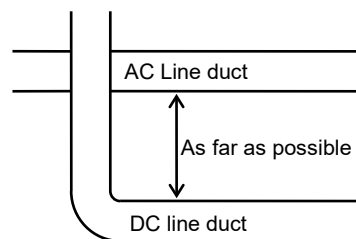
The Manipulator's serial number is indicated on the signature label on the back of the Manipulator.

3.5 Noise Countermeasures

To minimize electrical noise conditions, the following items must be observed in the system's cable wiring:

To minimize electrical noise condition, be sure of followings for wiring.

- The earth wire of the power supply should be grounded. (Ground resistance: 100 Ω or less) It is important to ground the frame of Controller not only for prevention from electric shock, but also for reducing the influence of electric noise around the Controller. Therefore, be sure to connect the earth wire (yellow/green) of the Controller's power cable to the ground terminal of the factory power supply. For details about the plug and AC power cable, refer to the *Setup & Operation 3.3 Power Supply*.
- Do not tap power from a power line that connects to any equipment which may cause noise.
- When you tap power for the Controller and the single-phase AC motor from the same power line, change the phase of one or the other. Ensure that they will not be the same phase.
- Use a twisted pair motor power line.
- Do not run AC power lines and DC power lines in the same wiring duct, and separate them as far as possible. For example, separate the AC motor power line and the Controller power line as far as possible from the sensor or valve I/O lines; and do not bundle both sets of wiring with the same cable tie. If more than one duct/cable must cross each other, they should cross perpendicularly. The preferable example is shown in the right figure.
- Wire as short as possible to the I/O connector and EMERGENCY connector. Use a shielded cable and clamp the shield to the attached connector interior. Make sure to keep away from the peripheral noise source as far as possible.
- Make sure that the induction elements used to connect to the Controller's I/O (such as relays and solenoid valves) are noise suppression parts. If an induction element without protection against noise is used, make sure to connect a noise suppression part such as a diode located at the induction element in parallel with it. In selecting noise suppression parts, make sure that they can handle the voltage and current incurred by the induction load.
- To start and change revolutions of the conveyer's (or the like's) AC motor (ex: an induction motor or three-phase induction motor) regularly or abruptly, make sure to install a spark suppressor between the wires. The spark suppressor is more effective when placed closer to the motor.
- As they are easily influenced by noise, keep cable such as USB, Ethernet, RS-232C, or fieldbus away from peripheral noise sources.



4. Operation Mode (TEACH/AUTO/TEST)

4.1 Overview

The Robot system has three operation modes.

TEACH mode This mode enables point data teaching and checking close to the Robot using the Teach Pendant.
In this mode the Robot operates in Low power status.

AUTO mode This mode enables automatic operation (program execution) of the Robot system for the manufacturing operation, and also programming, debug, adjustment, and maintenance of the Robot system.
This mode cannot operate the Robots or run programs with the Safety Door open.

TEST mode

(T1) 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.
This mode can operate the specified Function 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.

NOTE



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

4.2 Switch Operation Mode

Change the operation mode using the mode selector key switch on the Teach Pendant.

To change to TEST operation mode:

TP1, TP2 : Push the function key in TEACH mode.

TP3 : Tap the [Test] tab on the touch panel in TEACH mode.

TEACH mode Turn the mode selector key switch to “TEACH” for TEACH mode.
 Pauses the executing program when operation mode is switched to TEACH mode.
 The operating Robot stops by Quick Pause.

AUTO mode Turn the mode selector key switch to “AUTO” and change the latch release input signal to ON position for AUTO mode.

TEST mode

TP1, TP2 Turn the mode selector key switch to “TEACH” for “TEACH” mode.
 Push <F1> key-[Test Mode] in [Jog & Teach] dialog of TEACH mode. The mode will be changed to TEST.

TP3 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] tab to change the mode to T2.

NOTE



The 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 on how to release latch, refer to *Setup & Operation 9.1 Safety Door Switch and Latch Release Switch*.

NOTE



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

4.3 Program Mode (AUTO)

4.3.1 What is Program Mode (AUTO)?

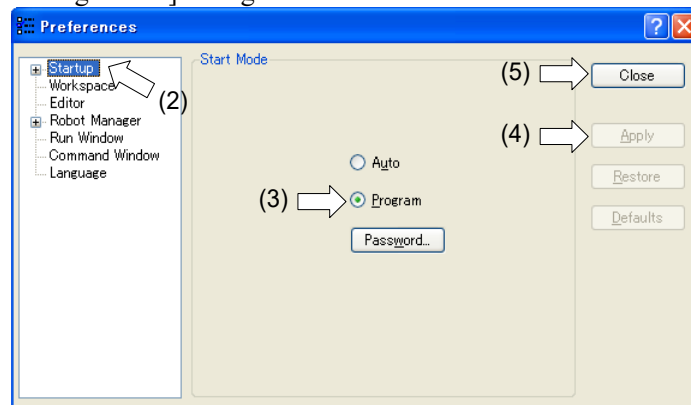
Program mode is for programming, debug, adjustment, and maintenance of the Robot system.

Follow the procedures below to switch to the Program mode.

4.3.2 Setup from EPSON RC+

Switch the mode to Program mode from the EPSON RC+.

- (1) Select EPSON RC+ menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select [Startup]-[Start mode].
- (3) Select <Program> button.
- (4) Click the <Apply> button.
- (5) Click the <Close> button.

4.4 Auto Mode (AUTO)

4.4.1 What is Auto mode (AUTO)?

Auto mode (AUTO) is for automatic operation of the Robot system.

Procedures for switching to the Auto mode (AUTO) are the followings.

A : Set the start mode of the EPSON RC+ to “Auto” and start the EPSON RC+.

(Refer to *Setup & Operation 4.4.2 Setup from EPSON RC+.*)

B : Offline the EPSON RC+.



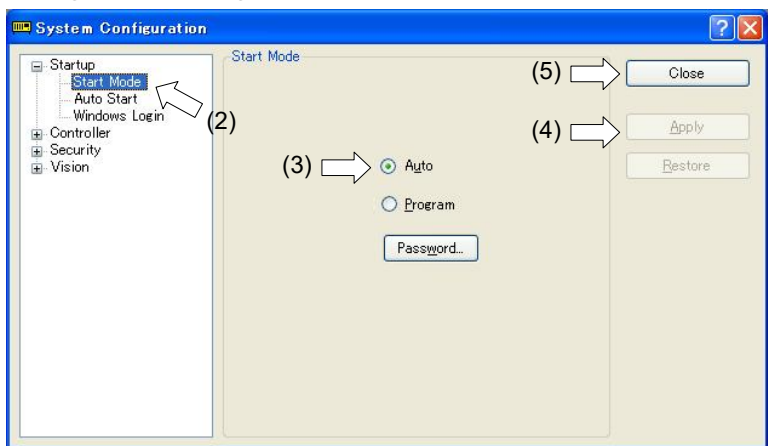
Execute and stop the program from the control device specified by the EPSON RC+.

(Refer to *Setup & Operation 4.4.3 Setup Control Device.*)

4.4.2 Setup from EPSON RC+

Switch the mode to Auto mode (AUTO) from the EPSON RC+.

- (1) Select EPSON RC+ menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select [Startup]-[Start Mode].

- (3) Select <Auto> button.

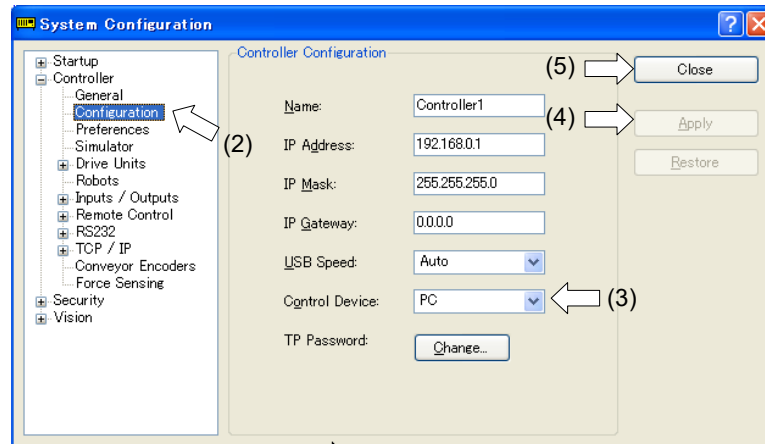
- (4) Click the <Apply> button.

- (5) Click the <Close> button.

4.4.3 Setup from Control Device

Set the control device from EPSON RC+.

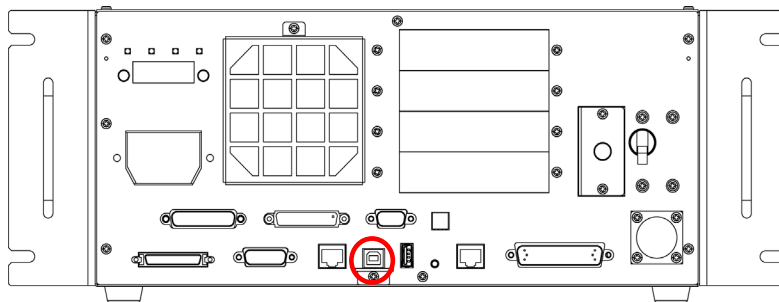
- (1) Select EPSON RC+ menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select [Controller]-[Configuration].
- (3) Select [Setup Controller]-[Control Device] to select the control device from the following two types.
 - PC
 - Remote (I/O)
- (4) Click the <Apply> button.
- (5) Click the <Close> button.

5. Development PC Connection USB Port

Development PC connection USB port (USB B series connector)



Development PC connection USB Port

(Figure: RC700)



For other details of development PC and Controller connection, refer to *EPSON RC+ 7.0 User's Guide 5.12.1 PC to Controller Communications Command*.

For RC700 / RC700-A, be sure to install the EPSON RC+ 7.0 to the development PC first, then connect the development PC and RC700 / RC700-A with the USB cable.

If RC700 / RC700-A and the development PC are connected without installing the EPSON RC+ 7.0 to the development PC, [Add New Hardware Wizard] appears. If this wizard appears, click the <Cancel> button.

5.1 About Development PC Connection USB Port

The development PC connection port supports the following USB types.

- USB2.0 HighSpeed/FullSpeed (Speed auto selection, or FullSpeed mode)
- USB1.1 FullSpeed

Interface Standard: USB specification Ver.2.0 compliant
 (USB Ver.1.1 upward compatible)

Connect the Controller and development PC by a USB cable to develop the robot system or set the Controller configuration with the EPSON RC+ 7.0 software installed in the development PC.

Development PC connection port supports hot plug feature. Cables insert and remove from the development PC and the Controller is available when the power is ON.

However, stop occurs when USB cable is removed from the Controller or the development PC during connection.

5.2 Precaution

When connecting the development PC and the Controller, make sure of the following:

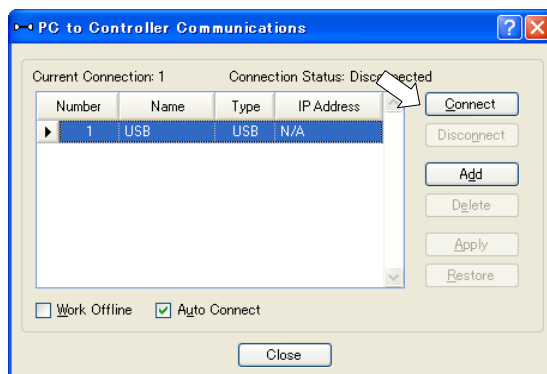
- Connect the development PC and the Controller with a 5 m or less USB cable.
Do not use the USB hub or extension cable.
- Make sure that no other devices except the development PC are used for development PC connection port.
- Use a PC and USB cable that supports USB2.0 HighSpeed mode to operate in USB2.0 HighSpeed mode.
- Do not pull or bend the cable strongly.
- Do not allow unnecessary strain on the cable.

- When the development PC and the Controller are connected, do not insert or remove other USB devices from the development PC. Connection with the Controller may be lost.

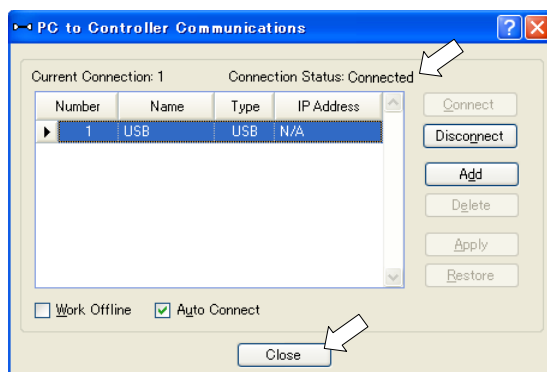
5.3 PC and Controller Connection Using Development PC Connection USB Port

Connection of the development PC and the Controller is indicated.

- (1) Make sure that software EPSON RC+ 7.0 is installed to the Controller connected to the development PC.
(Install the software when it is not installed.)
- (2) Connect the development PC and the Controller using a USB cable.
- (3) Turn ON the Controller.
- (4) Start EPSON RC+ 7.0.
- (5) Select the EPSON RC+ 7.0 menu-[Setup]-[PC to Controller Communications] to display the [PC to Controller Communications] dialog.



- (6) Select “No.1 USB” and click the <Connect> button.
- (7) After the development PC and the Controller connection has completed, “Connected” is displayed at [Connection status]. Make sure that “Connected” is displayed and click the <Close> button to close the [PC to Controller Communications] dialog.



The connection between the development PC and the Controller is completed. Now the robot system can be used from EPSON RC+ 7.0.

5.4 Disconnection of Development PC and Controller

This section describes how to disconnect the development PC and the Controller communication.

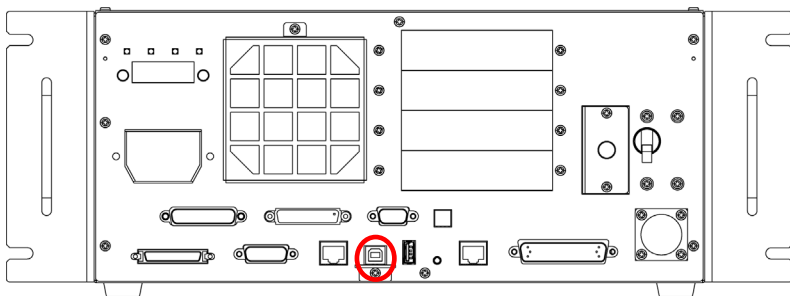
- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[PC to Controller Communications] to display the [PC to Controller Communications] dialog.
- (2) Click the <Disconnect> button.
Communication between the Controller and the development PC is disconnected and the USB cable can be removed.



If the USB cable is removed when the Controller and the development PC are connected, the Robot will stop. Be sure to click the <Disconnect> button in the [PC to Controller Communications] dialog before USB cable is removed.

5.5 How to Fix USB Cable

This section describes how to fix USB cables.



Development PC connection USB Port



(Figure: RC700)

- (1) Unscrew the screw below the USB port.
- (2) Secure the fixing clamp (attached) using the screw in Step (1).
- (3) Connect the USB cable to the USB port.
- (4) Get an attached cable tie through a hole of the fixing clamp in Step (2) and fix the USB cable.
- (5) Adjust the length of the cable tie by cutting it.

6. Memory Port

Connect a commercial USB memory to the Controller memory port to use the Controller backup function to the USB memory.

6.1 What is Backup Controller Function?

This function saves various kinds of Controller data to the USB memory with one push. Data saved in the USB memory is loaded to EPSON RC+ 7.0 to get the status of the Controller and the program simply and accurately. The saved data can also be used for restoring the Controller.

6.2 Before Using Backup Controller Function

6.2.1 Precautions



CAUTION

- Backup Controller function is available at any time and in any Controller status after starting the Controller. However, operations from the console including stop and pause are not available while executing this function. Also, this function influences the robot cycle time and the communication with EPSON RC+ 7.0. Other than only when it is necessary, do not execute this function when operating the robot.

- Make sure that the USB port is used only for USB memory even though the port on the Controller is a universal USB port.
- Insert the USB memory directly into the Controller memory port. Connection with cables or hubs between the Controller and the USB memory is not assured.
- Insert and remove the USB memory slowly and surely.
- Do not edit the saved files by the editor. Operation of the robot system after data restoration to the Controller is not assured.

6.2.2 Adoptable USB Memory

Use USB memory that meets following conditions.

- USB2.0 supported
- Without security function
USB memory with password input function cannot be used.
- No installation of a driver or software is necessary for Windows 7, Windows 8, or Windows 10.
(For supported operating systems for the EPSON RC+ 7.0, refer to *Setup & Operation 1.1 System Example*.)

6.3 Backup Controller Function

6.3.1 Backup Controller with Trigger Button



- Controller status storage function is available at any time and in any Controller status after starting the Controller.
However, operations from the console including stop and pause are not available when executing this function.
Also, this function influences the robot cycle time and the communication with the EPSON RC+ 7.0. Do not execute this function while operating the robot except when it is necessary.

Use the following procedure to backup the Controller settings to USB memory.

- (1) Insert the USB memory into the memory port.
- (2) Wait approximately 10 seconds for USB memory recognition.
- (3) Press the trigger button on the Controller.

The seven-segment displays and repeatedly during the data transfer. Wait until the display returns back to the former display. (Transfer time differs depending on the amount of data, such as the project size.)

- (4) When the storage has been completed, is displayed on the seven-segment for two seconds.

When the storage has failed, is displayed on the seven-segment for two seconds.

- (5) Remove the USB memory from the Controller.



USB memory with LED is recommended to check the status changes in procedure (2).

When storage is executed during Motor ON status, it may fail to store the status. Use another USB memory or execute the storage during Motor OFF status.

6.3.2 Load Data with EPSON RC+ 7.0

The procedure to read the data stored in the USB memory by EPSON RC+ 7.0 and display the Controller status is described in the following manual.

EPSON RC+ 7.0 User's Guide 5.11.8 [Controller] Command (Tools Menu)

6.3.3 Transfer with E-mail

Follow this procedure to transfer the data by e-mail that was saved to the USB memory.

- (1) Insert the USB memory to a PC that supports sending of e-mail.
- (2) Make sure that the USB memory has following folders.
B_Controller type_serial number_backup date
→ Example: B_RC700_12345_2013-10-29-092951
- (3) Compress the folders checked in Step (2), then send them by e-mail.



Delete files that do not relate to the project before transfer.

This function is used to send the data to the system director and EPSON from the end users for problem analysis.


6.4 Details of Data

The following data files are created by the Controller backup function.

| File Name | Outline | |
|--|--------------------------------------|--|
| Backup.txt | Information file for restore | File with information for Controller restore. |
| CurrentMnp01.PRM | Robot parameter | Saves information such as ToolSet. |
| CurrentStatus.txt | Save status | Saves program and I/O status. |
| ErrorHistory.csv | Error history | |
| InitFileSrc.txt | Initial setting | Saves various settings of the Controller. |
| MCSys01.MCD | Robot setting | Saves information of connected robot. |
| SrcmcStat.txt | Hardware information | Saves installation information of hardware. |
| ProjectName.obj | OBJ file | Result of project build. Prg file is not included. |
| GlobalPreserves.dat | Global Preserve variables | Saves values of Global Preserve variables. |
| MCSRAM.bin MCSYSTEMIO.bin MCTABLE.bin MDATA.bin SERVOSRAM.bin VXDWORK.bin | Inner information of Robot operation | |
| WorkQueues.dat | WorkQue information | Saves information of Queues information of the WorkQue. |
| All files related to project except ProjectName.obj *1 | Project | Select EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog. When [Include project files when status exported] check box is checked in [Controller]-[Preferences], the project file is stored. Includes program files. |

*1 Storage of “All files related to project except ProjectName.obj” can be specified by a setting.

7. LAN (Ethernet Communication) Port

- NOTE  - Refer to *EPSON RC+ 7.0 User's Guide 5.12.1 PC to Controller Communications Command (Setup Menu)* for other details for the development PC and Controller connection.
- For Ethernet (TCP/IP) communication with robot application software, refer to *EPSON RC+ 7.0 Online Help* or *User's Guide 14. TCP/IP Communications*.

7.1 About the LAN (Ethernet Communication) Port

Ethernet communication port supports 100BASE-TX / 10 BASE-T.

This port is used for two different purposes.

Connection with development PC


LAN (Ethernet communication) port is used for connection of the Controller and the development PC.

Equivalent operation is available to connect between the Controller and the development PC with the development PC connection port.

(Refer to *Setup & Operation 5. Development PC Connection USB Port*)

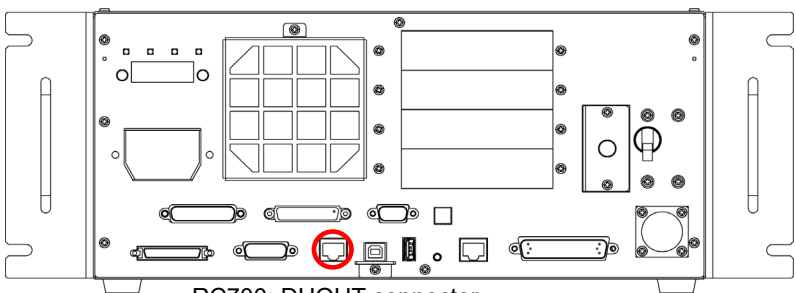
Connection with other Controller or PC

The LAN (Ethernet communication) port can be used as an Ethernet (TCP/IP) communication port to communicate between multiple controllers from robot application software.



CAUTION

■ RC700: DUOUT connector / RC700-A: OUT connector is not a LAN (Ethernet communication) port. Do not connect a cable.



RC700: DUOUT connector
RC700-A: OUT connector

(Figure: RC700)

7.2 IP Address

Set the proper IP address or subnet mask depending on the Controller and development PC configuration to use the LAN port.

Do not input a random value for the IP address of the network configured TCP/IP. This is the only address that specifies the computer using an Internet connection.

The IP address is assigned from the company or organization that has control of IP address.

Use an address from the following Internet private environment such as P2P or line. Make sure that the address is not redundantly assigned inside the closed network.

Private Address List

| | | |
|-------------|----|-----------------|
| 10.0.0.1 | to | 10.255.255.254 |
| 172.16.0.1 | to | 172.31.255.254 |
| 192.168.0.1 | to | 192.168.255.254 |

The following is the configuration of the Controller at delivery.

IP Address : 192.168.0.1
 IP Mask : 255.255.255.0
 IP Gateway : 0.0.0.0

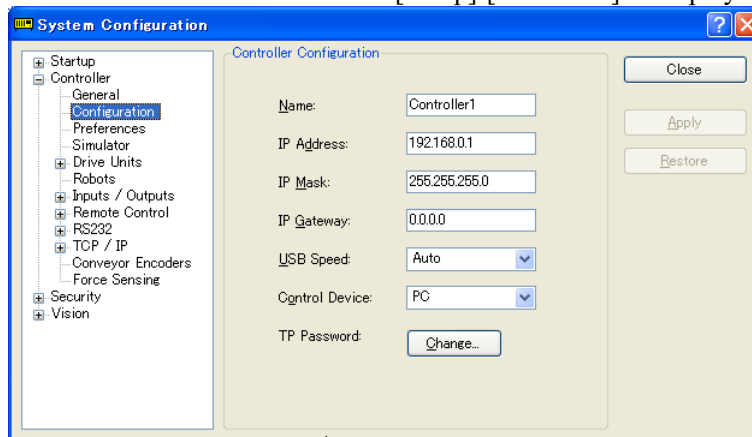
Set separate IP addresses in the same subnet for PC and the Controller.

PC : 192.168.0.10
 Controller : 192.168.0.1

7.3 Changing Controller IP Address

This section describes the procedure to change the Controller IP address.

- (1) Connect between the development PC and the Controller using the USB cable by referring to *Setup & Operation 5. Development PC Connection USB Port*.
- (2) Select the EPSON RC+ 7.0 menu-[Setup]-[Controller] to display the following dialog.

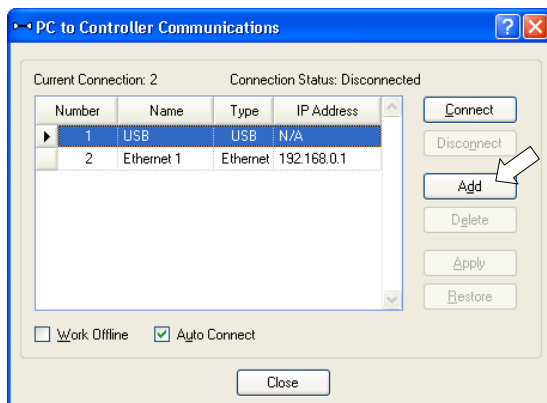


- (3) Select [Controller]-[Configuration].
- (4) Enter the proper IP address and subnet mask and click the <Apply> button.
- (5) Click the <Close> button. The Controller reboots automatically.
 IP address configuration is completed and the Controller reboot dialog disappears.

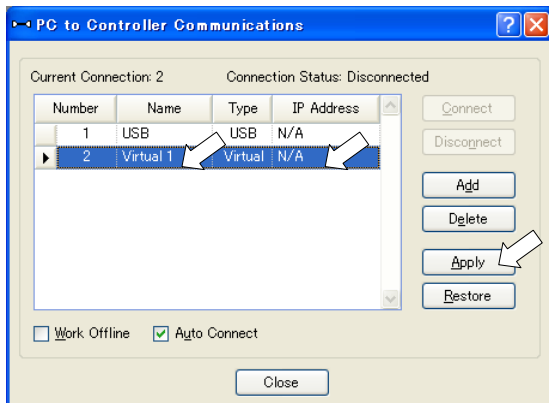
7.4 Connection of Development PC and Controller with Ethernet

Connection between the development PC and the Controller is shown below.

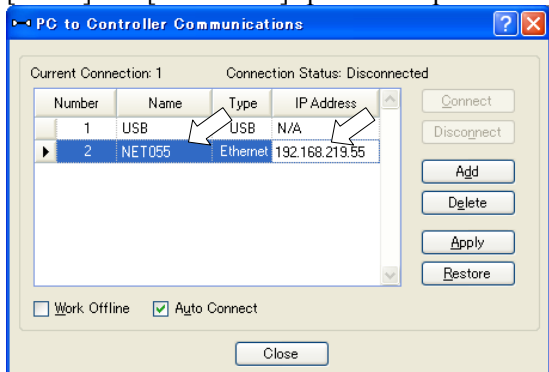
- (1) Connect the development PC and the Controller using the Ethernet cable.
- (2) Turn ON the Controller.
- (3) Start EPSON RC+ 7.0.
- (4) Display the [PC to Controller Communication] dialog from [Setup] in EPSON RC+ 7.0 menu.
- (5) Click the <Add> button.



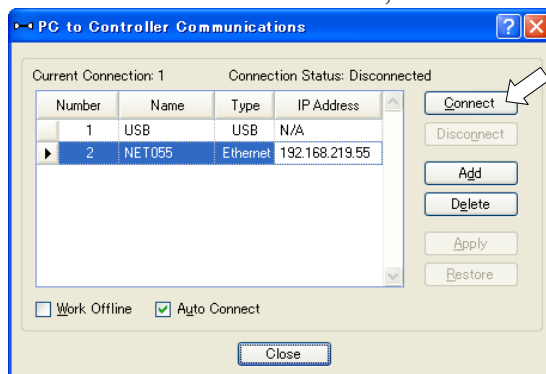
- (6) Connection “No.2” is added. Set the following and click the <Apply> button.
 Name : Valid value to identify the Controller to connect
 IP Address : IP address for Controller to connect



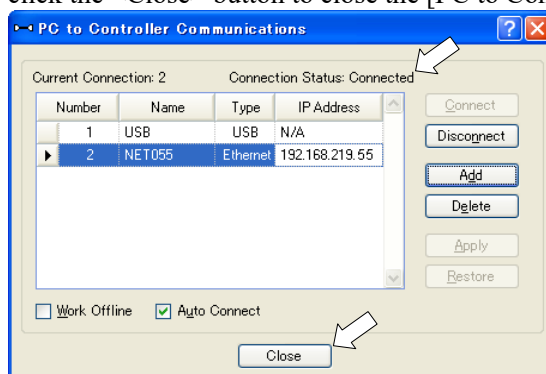
- (7) [Name] and [IP Address] specified in procedure (6) is displayed.



- (8) Make sure that “No.2” is selected, and click the <Connect> button.



- (9) After the development PC and Controller connection is completed, “Connected” is displayed in the [Connection status:]. Make sure that “Connected” is displayed and click the <Close> button to close the [PC to Controller Communications] dialog.



Connection between the development PC and the Controller is complete. Now the robot system can be used via an Ethernet connection from EPSON RC+ 7.0.

7.5 Disconnection of Development PC and Controller with Ethernet

Disconnection of the development PC and the Controller is shown below.

- (1) Display [PC-Controller Connection] dialog from [Setup] in EPSON RC+ 7.0 menu.
- (2) Click the <Disconnect> button.

Communication between the Controller and the development PC is disconnected and the Ethernet cable can be removed.



If the Ethernet cable is removed when the Controller and the development PC is connected, Emergency Stop occurs and the Robot stops. Be sure to click the <Disconnect> button in the [PC to Controller Communications] dialog before the Ethernet cable is removed.

8. TP Port

8.1 What is the TP Port?

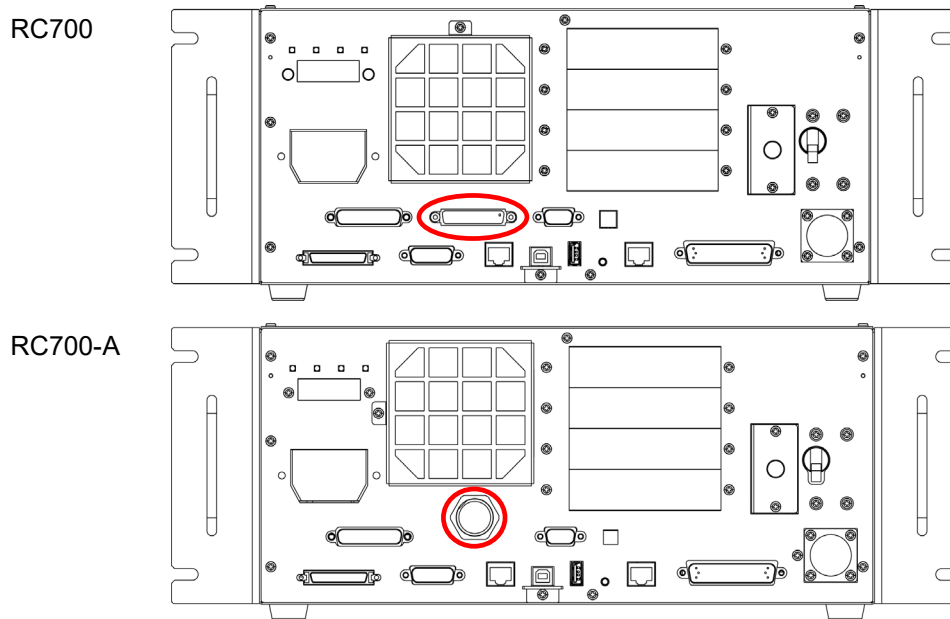
The TP port connects the Teach Pendant TP1, TP2, and TP3* to the Controller.

When connecting TP1 and TP2 to RC700-A, the RC700-A conversion cable is necessary.

If you need the conversion cable, please contact the supplier of your region.

* RC700-A TP Exchange Cable : R12NZ900L6

TP3 cannot be connected to RC700.



NOTE



When nothing is connected to the TP port, Emergency Stop status occurs in the Controller.
When the Teach Pendant is not connected, connect the TP bypass plug.

Do not connect the following devices to the TP port of / RC700-A. Connecting these devices may result in malfunction of the device since the pin assignments are different.

OPTIONAL DEVICE dummy plug
 Operation Pendant OP500
 Operator Pendant OP500RC
 Jog Pad JP500
 Teaching Pendant TP-3**
 Operator Panel OP1

8.2 Teach Pendant Connection

A cable for connection to the RC700 / RC700-A Controller is attached to the Teach Pendant. Connect this cable connector to the TP/OP port.

Communication is set automatically. Enable the Teach Pendant by one of the following procedures.

- Insert the Teach Pendant connector to the Controller and turn ON the Controller.
- Insert the Teach Pendant connector while the Controller is turned ON.

NOTE



Teach Pendant connection and disconnection from the Controller are allowed 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 in the “Teach” position, the operation mode will remain in the TEACH mode. The operation mode cannot be switched to AUTO mode. Be sure to remove the Teach Pendant after switching the operation mode to “Auto” mode.


For details, refer to the following manuals:


Robot Controller RC700/RC90 Option Teach Pendant TP1

Robot Controller RC700/RC90 Option Teach Pendant TP2

Robot Controller RC700-A Option Teach Pendant TP3


9. EMERGENCY

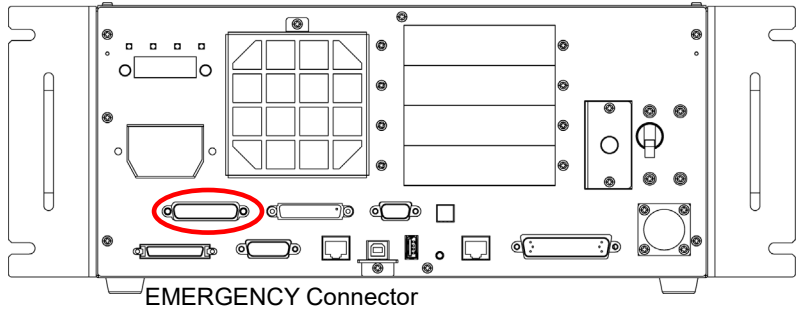
NOTE  The details of safety requirements for this section are described in the *User's Guide 2. Safety*. Please refer to them to keep the robot system safe.

| | |
|---|---|
|  CAUTION | <ul style="list-style-type: none"> ■ Make sure that the emergency stop and safety door work properly before using the system, not only when setting up the system, but also when the use environment is changed. |
|---|---|

Connect a safeguard switch or Emergency Stop switch to the Controller EMERGENCY connector for safety.

When nothing is connected to the EMERGENCY connector, the robot system does not operate normally.

| | |
|---|--|
|  CAUTION | <ul style="list-style-type: none"> ■ Before connecting the connector, make sure that the pins are not bent. Connecting with the pins bent may damage the connector and result in malfunction of the robot system. |
|---|--|



(Figure: RC700)


9.1 Safety Door Switch and Latch Release Switch

The EMERGENCY connector has input terminals for the Safety Door switch and the Emergency Stop switch. Be sure to use these input terminals to keep the system safe.

| Connector | Standard |
|--|--|
| EMERGENCY connector (Controller side) | D-sub 25 male pin Screwlock #4 - 40 |

* The E-STOP BOX, EMERGENCY connector cable, terminal block, and EMERGENCY connector kit are offered as options.

9.1.1 Safety Door Switch

| | |
|---|---|
|  WARNING | <ul style="list-style-type: none"> ■ The interlock of the Safety Door must be functioning when the robot system is operated. Do not operate the system under the condition that the switch cannot be turned ON/OFF (e.g. The tape is put around the switch.). Operating the robot system when the switch is not functioning properly is extremely hazardous and may cause serious safety problems as the Safety Door input cannot fulfill its intended function. |
|---|---|

In order to maintain a safe working zone, a safeguard must be erected around the Manipulator. The safeguard must have an interlock switch at the entrance to the working zone. The Safety Door that is described in this manual is one of the safeguards and an interlock of the Safety Door is called a Safety Door switch. Connect the Safety Door switch to the Safety Door input terminal on the EMERGENCY connector.

The Safety Door switch has safety features such as temporary hold-up of the program or the operation-prohibited status that are activated whenever the Safety Door is opened.

Observe the followings in designing the Safety Door switch and the Safety Door.

- For the Safety Door switch, select a switch that opens as the Safety Door opens, and not by the spring of the switch itself.
- The signal from the Safety Door (Safety Door input) is designed to input to two redundant signals. If the signals at the two inputs differ by two seconds or more, the system recognizes it to be a critical error. Therefore, make sure that the Safety Door switch has two separate redundant circuits and that each connects to the specified pins at the EMERGENCY connector on the Controller.
- The Safety Door must be designed and installed so that it does not close accidentally.

9.1.2 Latch Release Switch

The Controller software latches these conditions:

- The safety door is open.
- The operation mode is set to "TEACH".

The EMERGENCY connector has an input terminal for a latch release switch that cancels the latched conditions.

Open : The latch release switch latches conditions that the safety door is open or the operation mode is "TEACH".

Closed : The latch release switch releases the latched conditions.



When the latched TEACH mode is released while the safety door is open, the status of Manipulator power is operation-prohibited because the safety door is open at that time.

To execute a Manipulator operation, close the safety door again, and then close the latch release input.

9.1.3 Checking Latch Release Switch Operation

After connecting the safety door switch and latch release switch to the EMERGENCY connector, be sure to check the switch operation for safety by following the procedures described below before operating the Manipulator.

- (1) Turn ON the Controller while the safety door is open in order to boot the Controller software.
- (2) Make sure that “Safety” is displayed on the main window status bar.
- (3) Close the safety door, and turn ON the switch connecting to the latch release input. Make sure that the “Safety” is dimmed on the status bar.

The information that the safety door is open can be latched by software based on the latch release input condition. To cancel the condition, close the safety door, and then close the safety door latch release input.

Open : The latch release switch latches the condition that the safety door is open.

Closed : The latch release switch does not latch the condition that the safety door is open.

NOTE



The latch release input also functions to acknowledge the change of to TEACH mode.

In order to change the latched condition of TEACH mode, turn the mode selector key switch on the Teach Pendant to “Auto”. Then, close the latch release input.

9.2 Emergency Stop Switch Connection

9.2.1 Emergency Stop Switch

If it is desired to add an external Emergency Stop switch(es) in addition to the Emergency Stop on the Teach Pendant and Operator Panel, be sure to connect such Emergency Stop switch(es) to the Emergency Stop input terminal on the EMERGENCY connector.

The Emergency Stop switch connected must comply with the related safety standards (such as IEC60947-5-5) and the following:

- It must be a push button switch that is “normally closed”.
- A button that does not automatically return or resume.
- The button must be mushroom-shaped and red.
- The button must have a double contact that is “normally closed”.

NOTE



The signal from the Emergency Stop switch is designed to use two redundant circuits. If the signals at the two circuits differ by two seconds or more, the system recognizes it as a critical error. Therefore, make sure that the Emergency Stop switch has double contacts and that each circuit connects to the specified pins on the EMERGENCY connector at the Controller. Refer to the *Setup & Operation 9.4 Circuit Diagrams*.

9.2.2 Checking Emergency Stop Switch Operation

Once the Emergency Stop switch is connected to the EMERGENCY connector, continue the following procedure to make sure that the switch functions properly. For the safety of the operator, the Manipulator must not be powered ON until the following test is completed.

- (1) Turn ON the Controller to boot the Controller software while pressing the Emergency Stop switch.
- (2) Make sure that E-STOP LED of the Controller is lighting.
- (3) Make sure that “EStop” is displayed on the status bar on the main window.
- (4) Release the Emergency Stop Switch.
- (5) Execute the RESET command.
- (6) Make sure that E-STOP LED is turned OFF and that “EStop” is dimmed on the main window status bar.

9.2.3 Recovery from Emergency Stop

To recover from the emergency stop condition, follow the procedure of safety check as required by the system.

After safety check, the operations below are required to recover from the emergency stop condition.

- Release the Emergency Stop Switch
- Execute the RESET command


9.3 Pin Assignments

The EMERGENCY connector pin assignments are as follows:

| Pin No. | Signal | Function | Pin No. | Signal | Function |
|---------|----------|--------------------------------------|---------|----------|--------------------------------------|
| 1 | ESW11 | Emergency Stop switch contact (1) *3 | 14 | ESW21 | Emergency Stop switch contact (2) *3 |
| 2 | ESW12 | Emergency Stop switch contact (1) *3 | 15 | ESW22 | Emergency Stop switch contact (2) *3 |
| 3 | ESTOP1+ | Emergency Stop circuit 1 (+) *4 | 16 | ESTOP2+ | Emergency Stop circuit 2 (+) *4 |
| 4 | ESTOP1- | Emergency Stop circuit 1 (-) *4 | 17 | ESTOP2- | Emergency Stop circuit 2 (-) *4 |
| 5 | Not Used | *1 | 18 | SDLATCH1 | Safety Door Latch Release |
| 6 | Not Used | *1 | 19 | SDLATCH2 | Safety Door Latch Release |
| 7 | SD11 | Safety Door input (1) *2 | 20 | SD21 | Safety Door input (2) *2 |
| 8 | SD12 | Safety Door input (1) *2 | 21 | SD22 | Safety Door input (2) *2 |
| 9 | 24V | +24V output | 22 | 24V | +24V output |
| 10 | 24V | +24V output | 23 | 24V | +24V output |
| 11 | 24VGND | +24V GND output | 24 | 24VGND | +24V GND output |
| 12 | 24VGND | +24V GND output | 25 | 24VGND | +24V GND output |
| 13 | Not Used | | | | |

- *1 Do not connect anything to these pins.
- *2 A critical error occurs if the input values from the Safety Door 1 and Safety Door 2 are different for two or more seconds. They must be connected to the same switch with two sets of contacts.
- *3 A critical error occurs if the input values from the Emergency Stop switch contact 1 and Emergency Stop switch contact 2 are different for two or more seconds. They must be connected the same switch with two sets of contacts.
- *4 Do not apply reverse voltage to the Emergency Stop circuit.

| | | |
|--|---|----------------|
| Emergency Stop switch output rated load | +30 V 0.3 A or under | 1-2, 14-15 pin |
| Emergency Stop rated input voltage range Emergency Stop rated input current | +24 V ±10% 37.5 mA ±10% /+24 V input | 3-4, 16-17 pin |
| Safety Door rated input voltage range Safety Door rated input current | +24 V ±10% 10 mA/+24 V input | 7-8, 20-21 pin |
| Latch Release rated input voltage range Latch Release rated input current | +24 V ±10% 10 mA/+24 V input | 18-19 pin |

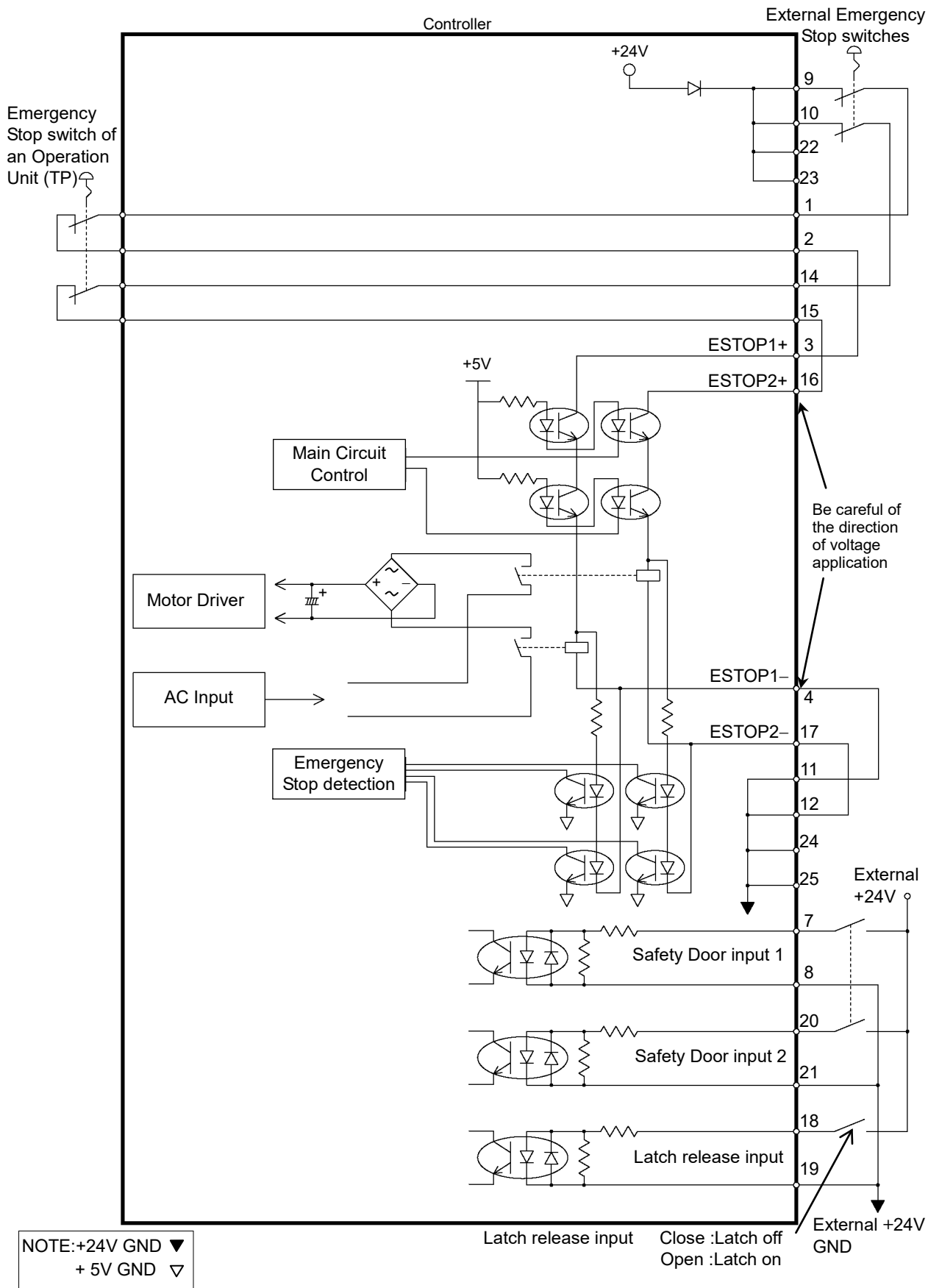
NOTE  The total electrical resistance of the Emergency Stop switches and their circuit should be 1 Ω or less.



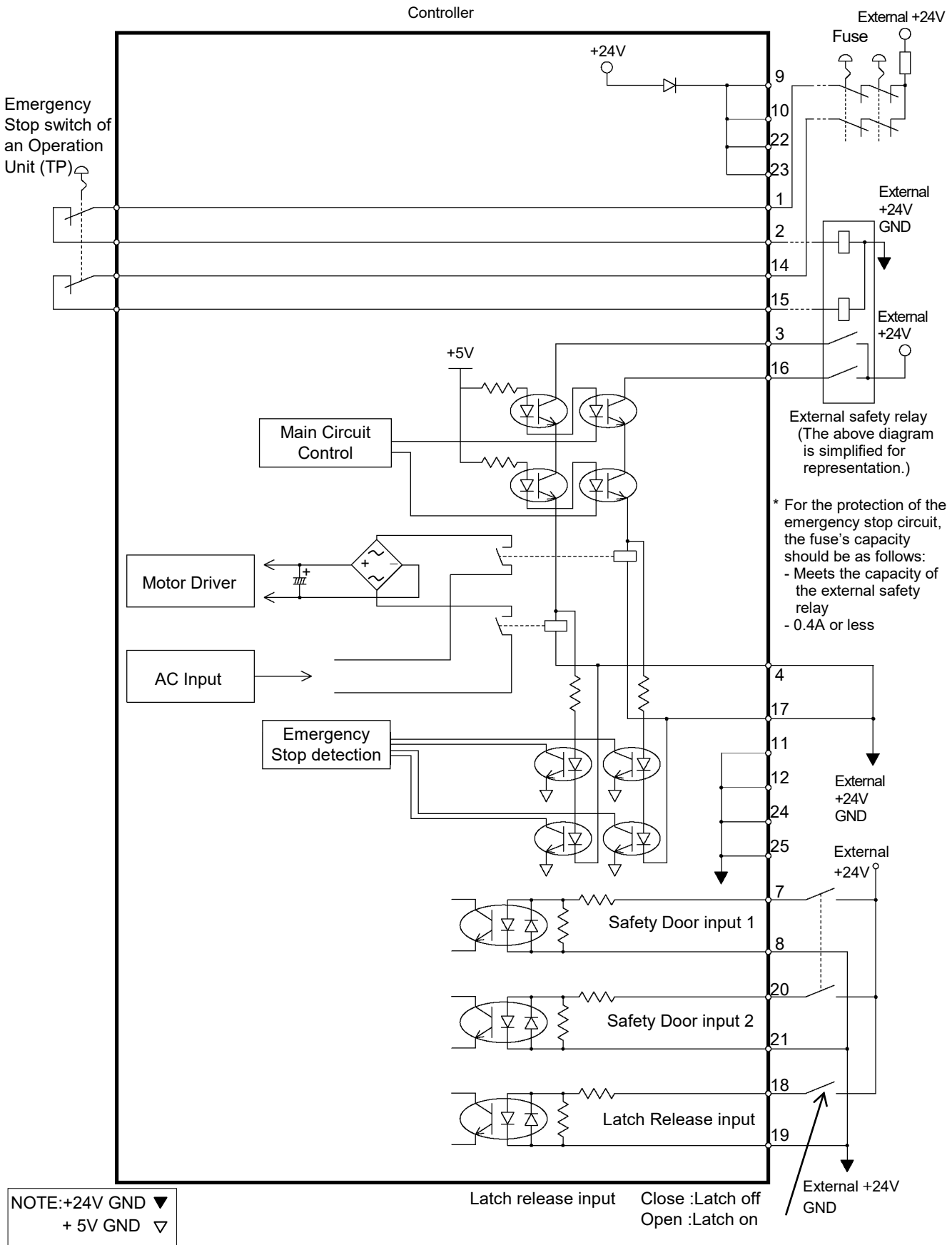
- The 24 V output is for emergency stop. Do not use it for other purposes. Doing so may result in system malfunction.
- Do not apply reverse voltage to the Emergency Stop circuit. Doing so may result in system malfunction.

9.4 Circuit Diagrams

9.4.1 Example 1: External emergency stop switch typical application



9.4.2 Example 2: External safety relay typical application



10. Standard RS-232C Port

10.1 RS-232C Port

A standard RS-232C port is available with the Controller.

Mount the RS-232C board(s) in the option slot to communicate with external equipment with two or more RS-232C ports.

For the details of the expansion port, refer to *Setup & Operation 14.4 RS-232C Board*.

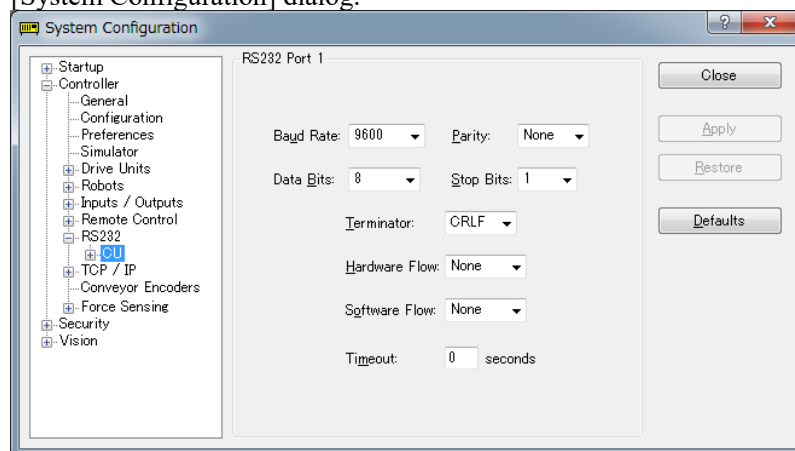
Port numbers are assigned as follows.

| Port No. | Supported hardware |
|----------|------------------------------------|
| #1 | Standard RS-232C connector |
| #2 | First expansion RS-232C board CH1 |
| #3 | First expansion RS-232C board CH2 |
| #4 | Second expansion RS-232C board CH1 |
| #5 | Second expansion RS-232C board CH2 |

10.2 Confirmation with EPSON RC+ 7.0 (RS-232C)

When an RS-232C board is mounted in as option unit, the Controller software automatically identifies the RS-232C board. Therefore, no software configuration is needed. Correct identification can be confirmed from EPSON RC+ 7.0.

- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select the [RS232]-[CU].

10.3 RS-232C Software Communication Setup (RS-232C)

Available communication settings are as follows.

| Item | Specification |
|-----------------|---|
| Baud Rates | 110, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 |
| Data bit length | 7, 8 |
| Stop bit length | 1, 2 |
| Parity | Odd, even, NA |
| Terminator | CR, LF, CRLF |

Refer to *EPSON RC+ 7.0 Online Help* or *Users Guide – 13. RS-232C Communications* for RS-232C communication from the Robot application.

10.4 Communication Cable (RS-232C)

Prepare a communication cable as described in this section.

| Connector | Standard |
|--|---------------------------------------|
| RS-232C Connector (Controller side) | D-sub 9 male pin Screwlock #4 - 40 |

NOTE



Use twisted pair cable for shielded wire.

Clamp the shield to the hood for noise prevention.

Pin assign of the RS-232C connector is as follows.

| Pin No | Signal | Function | Signal Direction |
|--------|--------|---------------------|------------------|
| 1 | DCD | Data carrier detect | Input |
| 2 | RXD | Receive data | Input |
| 3 | TXD | Send data | Output |
| 4 | DTR | Terminal ready | Output |
| 5 | GND | Signal ground | - |
| 6 | DSR | Data set ready | Input |
| 7 | RTS | Request to send | Output |
| 8 | CTS | Clear to send | Input |
| 9 | RI | Ring indicator | Input |

11. I/O Connector

The I/O connector is for connecting your input/output equipment to the system.

| | | Pins | Bit number |
|--------------|--------|------|------------|
| Control Unit | Input | 24 | 0 to 23 |
| | Output | 16 | 0 to 15 |
| Drive Unit 1 | Input | 24 | 32 to 55 |
| | Output | 16 | 32 to 47 |
| Drive Unit 2 | Input | 24 | 256 to 279 |
| | Output | 16 | 256 to 271 |
| Drive Unit 3 | Input | 24 | 288 to 311 |
| | Output | 16 | 288 to 303 |

Refer to *Setup & Operation 14.2. Expansion I/O board.*

For cable wiring, refer to the *Setup & Operation 3.5 Noise Countermeasures* in order to prevent noise.

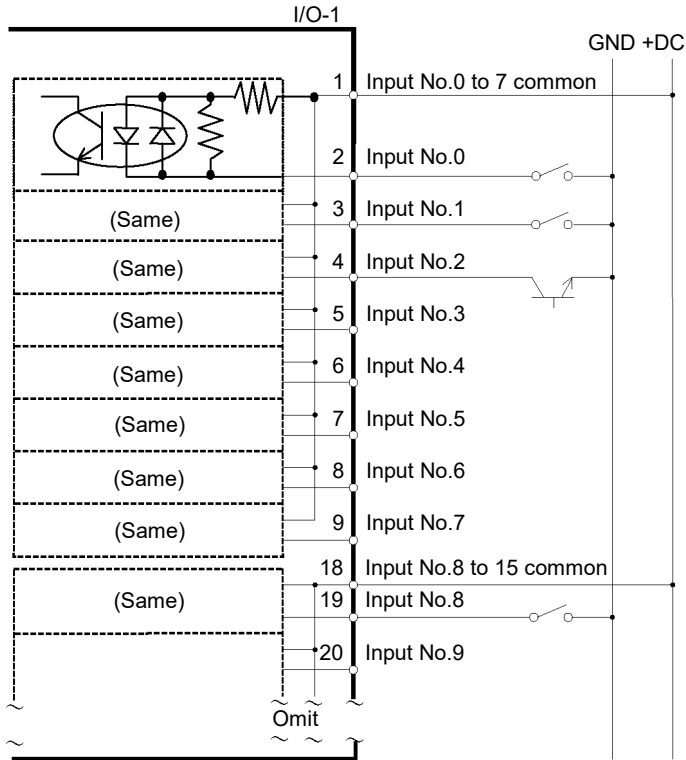
Remote function is initially assigned to both input and output from 0 to 7. For further details, refer to *Setup & Operation 12. I/O Remote Settings.*

11.1 Input Circuit

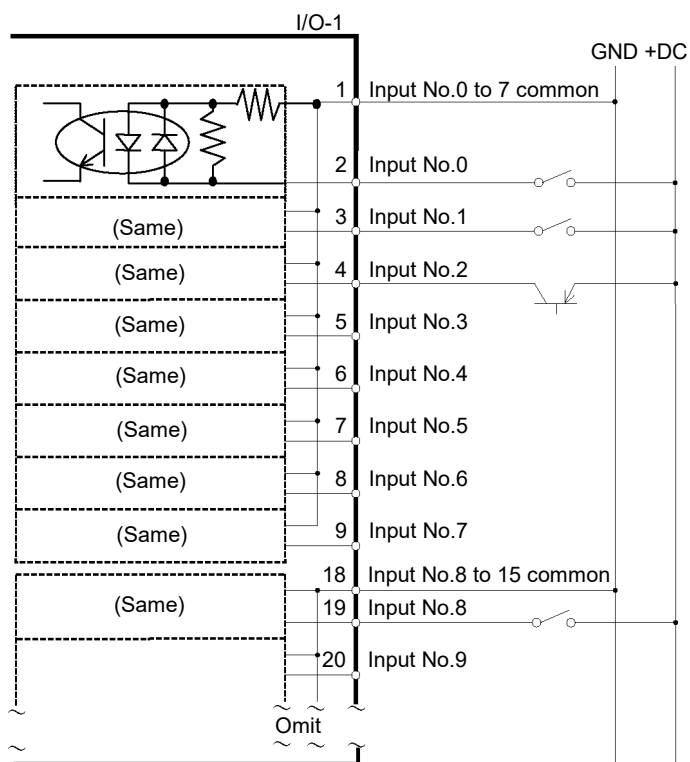
- Input Voltage Range : +12 to 24 V ±10%
- ON Voltage : +10.8 V (min.)
- OFF Voltage : +5 V (max.)
- Input Current : 10 mA (TYP) at +24 V input

Two types of wiring are available for use with the two-way photo coupler in the input circuit.

Typical Input Circuit Application 1



Typical Input Circuit Application 2

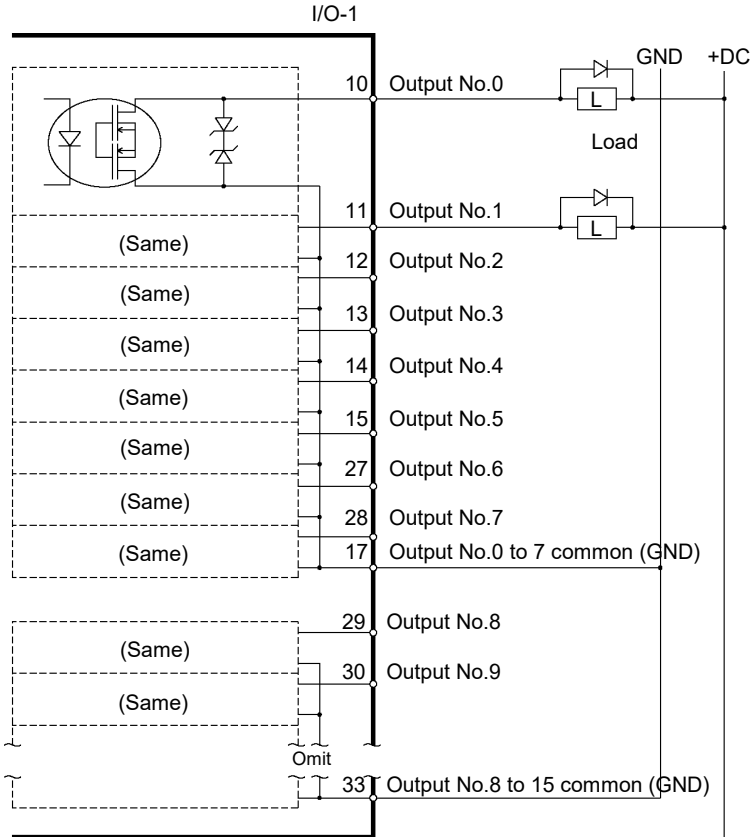


11.2 Output Circuit

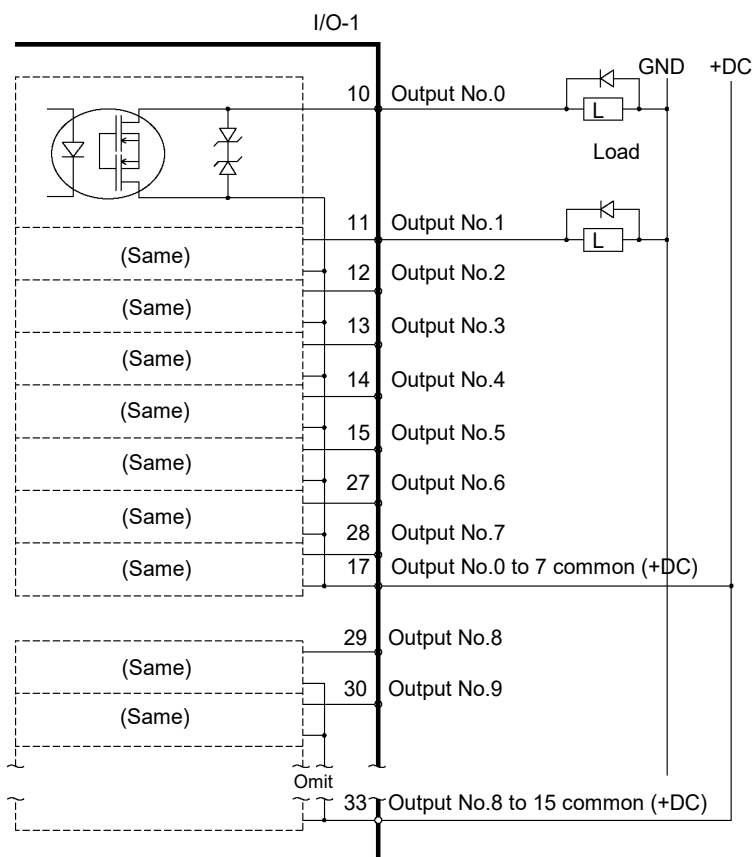
- Rated Output Voltage : +12 V to 24 V ±10%
- Maximum Output Current : TYP 100 mA/1 output
- Output Driver : PhotoMOS Relay
- On-State Resistance (average) : 23.5 Ω or less

Two types of wiring are available for use with the nonpolar PhotoMOS relay in the output circuit.

Typical Output Circuit Application 1



Typical Output Circuit Application 2



11.3 Pin Assignments

| Pin No. | Signal Name | Pin No. | Signal Name | Pin No. | Signal Name |
|---------|----------------------------|---------|---------------------------|---------|---------------------------|
| 1 | Input common No. 0 to 7 | 18 | Input common No. 8 to 15 | 34 | Input common No. 16 to 23 |
| 2 | Input No. 0 (Start) | 19 | Input No. 8 | 35 | Input No. 16 |
| 3 | Input No. 1 (SelProg1) | 20 | Input No. 9 | 36 | Input No. 17 |
| 4 | Input No. 2 (SelProg2) | 21 | Input No. 10 | 37 | Input No. 18 |
| 5 | Input No. 3 (SelProg4) | 22 | Input No. 11 | 38 | Input No. 19 |
| 6 | Input No. 4 (Stop) | 23 | Input No. 12 | 39 | Input No. 20 |
| 7 | Input No. 5 (Pause) | 24 | Input No. 13 | 40 | Input No. 21 |
| 8 | Input No. 6 (Continue) | 25 | Input No. 14 | 41 | Input No. 22 |
| 9 | Input No. 7 (Reset) | 26 | Input No. 15 | 42 | Input No. 23 |
| 10 | Output No. 0 (Ready) | 27 | Output No. 6 (SError) | 43 | Output No.11 |
| 11 | Output No. 1 (Running) | 28 | Output No. 7 (Warning) | 44 | Output No.12 |
| 12 | Output No. 2 (Paused) | 29 | Output No. 8 | 45 | Output No.13 |
| 13 | Output No. 3 (Error) | 30 | Output No. 9 | 46 | Output No.14 |
| 14 | Output No. 4 (EstopOn) | 31 | Output No.10 | 47 | Output No.15 |
| 15 | Output No. 5 (SafeguardOn) | 32 | Not Used | 48 | Not Used |
| 16 | Not Used | 33 | Output common No. 8 to 15 | 49 | Not Used |
| 17 | Output common No. 0 to 7 | | | 50 | Not Used |

Remote function inside () in the table above is initially assigned to both input and output from 0 to 7. For further details, refer to 12. I/O Remote Settings.

| Connector | Standard |
|---------------------------------|--|
| I/O Connector (Controller side) | D-sub 50 male pin Screwlock #4 - 40 |

* The I/O connector, I/O cable, and terminal block are offered as options.

* I/O connector is included with shipment.

12. I/O Remote Settings

This section describes the functions and timings of input and output signals.

The remote functions may be assigned to your standard I/O board(s), expansion I/O board(s), or fieldbus I/O board(s) to enhance robot system control - either from an operational unit of your choice or a sequencer.

Remote function is initially assigned to both input and output from 0 to 7.

To accept external remote inputs, assign the remote function and the control device is remote.

The user defines the I/O number that a remote function is assigned to using software configuration.

For details about communication with external equipment, refer to *EPSON RC+ 7.0 User's Guide – 12. Remote Control*.



CAUTION

- When using remote I/O, always make sure of the followings. Using the robot system under unsatisfactory conditions may cause malfunction of the system and/or safety problems.
 - Assign remote functions to inputs/outputs correctly and wire correctly when setting up remote I/O signals.
 - Make sure that the functions correspond to the correct input/output signals before turning ON the system.
 - When verifying the robot system operation, prepare for failures with initial settings or wiring. If the Manipulator functions unusually by the failures with initial settings or wiring, press the Emergency Stop switch immediately to stop the Manipulator.

NOTE



Remote function is available when virtual I/O is enabled.

When you set up a remote I/O signal, please either keep a written record of the settings or store the data in a file for later reference.

When you set up a fieldbus I/O signal to the remote function, response depends on the baud rate of the fieldbus. For details of fieldbus response, refer to the following manual:

Robot Controller RC700/RC90 option Fieldbus I/O

12.1 I/O Signal Description

Remote function is initially assigned to both input and output from 0 to 7.

To change the function assignment from the initial setting, use EPSON RC+ 7.0.

To use all signals, you will need to add Expansion I/O or Fieldbus I/O board(s).

12.1.1 Remote Input Signals

Remote inputs are used to control the Manipulators and start programs. Certain conditions must be met before inputs are enabled, as shown in the table below.

To accept external remote inputs, assign the remote function and set remote to the control device. When external remote input is available, “AutoMode output” turns ON.

Except “SelProg”, the signals execute each function when the signal starts in input acceptance condition. The function executes automatically. Therefore, no special programming is needed.

NOTE



When an error occurs, you must execute a “Reset” to clear the error condition before any other remote input commands can be executed. Use the “Error output” and “Reset input” to monitor the error status and clear error conditions from the remote device.

| Name | Default | Description | Input Acceptance Condition (*1) |
|---------------|---------|---|--|
| Start | 0 | Execute function selected at SelProg. (*2) | Ready output ON Error output OFF EStopOn output OFF SafeguardOn output OFF Pause input OFF Stop input OFF |
| SelProg1 | 1 | Specify the executing Main function number. (*2) | |
| SelProg2 | 2 | | |
| SelProg4 | 3 | | |
| SelProg8 | Not Set | | |
| SelProg16 | Not Set | | |
| SelProg32 | Not Set | | |
| Stop | 4 | All tasks and commands are stopped. | |
| Pause | 5 | All tasks are paused. (*3) | Running output ON |
| Continue | 6 | Continue the paused task. | Paused output ON Pause input OFF Stop input OFF |
| Reset | 7 | Reset emergency stop and error. (*4) | Ready output ON |
| Shutdown | Not Set | Terminates the system. | |
| ForcePowerLow | Not Set | Operates as the forced low power function. The robot is operated in the low power mode. Power High control from the command is not accepted. Executes the following according to the Controller preferences. Stops or temporarily stops all the tasks and commands. (*12) | Any time This input is acceptable even AutoMode output is OFF. |

| Name | Default | Description | Input Acceptance Condition (*1) |
|--|---------|---|--|
| SelRobot | Not Set | Changes the output condition of MotorsOn, AtHome, PowerHigh, and MCalReqd. (*9) | |
| SelRobot1 SelRobot2 SelRobot4 SelRobot8 SelRobot16 | Not Set | Specify the number of robot which executes a command. (*5) | |
| SetMotorOn | Not Set | Turn ON robot motors. (*5) (*6) | Ready output ON EStopOn output OFF SafeguardOn output OFF SetMotorOff input OFF |
| SetMotorOff | Not Set | Turn OFF robot motors. (*5) | Ready output ON |
| SetPowerHigh | Not Set | Set the robot power mode to High (*5) | Ready output ON EStopOn output OFF SafeguardOn output OFF SetPowerLow input OFF |
| SetPowerLow | Not Set | Set the robot power mode to Low. (*5) | Ready output ON |
| Home | Not Set | Move the Robot Arm to the home position defined by the user. | Ready output ON Error output OFF EStopOn output OFF SafeguardOn output OFF MotorsOn output ON Pause input OFF Stop input OFF |
| MCal | Not Set | Execute MCal (*5) (*7) | Ready output ON Error output OFF EStopOn output OFF SafeguardOn output OFF MotorsOn output ON Pause input OFF Stop input OFF |
| Recover | Not Set | After the safeguard is closed, recover to the position where the safeguard is open. | Paused output ON Error output OFF EStopOn output OFF SafeguardOn output OFF RecoverReqd output ON Pause input OFF Stop input OFF |
| ResetAlarm | Not Set | Cancel the alarm (*11) | |
| SelAlarm1 SelAlarm2 SelAlarm4 SelAlarm8 | Not Set | Specify the alarm number to cancel (*10) | |
| ALIVE | Not Set | Input signal for alive monitoring of the Controller. Same signal as the input will be output to ALIVE output. The master equipment can perform alive monitoring of the Controller by switching the input periodically and checking the output signal. | |

(*1) “AutoMode output” ON is omitted from the table. This is an input acceptance condition for all functions.

(*2) “Start input” executes Function specified by the following six bits: SelProg 1, 2, 4, 8, 16, and 32.

| Function | SelProg1 | SelProg2 | SelProg4 | SelProg8 | SelProg16 | SelProg32 |
|----------|----------|----------|----------|----------|-----------|-----------|
| Main | 0 | 0 | 0 | 0 | 0 | 0 |
| Main1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Main2 | 0 | 1 | 0 | 0 | 0 | 0 |
| Main3 | 1 | 1 | 0 | 0 | 0 | 0 |
| ⋮ | | | | | | |
| Main60 | 0 | 0 | 1 | 1 | 1 | 1 |
| Main61 | 1 | 0 | 1 | 1 | 1 | 1 |
| Main62 | 0 | 1 | 1 | 1 | 1 | 1 |
| Main63 | 1 | 1 | 1 | 1 | 1 | 1 |

0=OFF, 1=ON

(*3) “NoPause task” and “NoEmgAbort task” do not pause.

For details, refer to EPSON RC+ 7.0 *Online Help* or *Pause* in *SPEL+ Language Reference*.

(*4) Turns OFF the I/O output and initializes the robot parameter.

For details, refer to EPSON RC+ 7.0 *Online Help* or *Reset* in *SPEL+ Language Reference*.

(*5) The values specified by “SelRobot1, 2, 4, 8, and 16” correspond to the robot numbers.

| Robot number | SelRobot1 | SelRobot2 | SelRobot4 | SelRobot8 | SelRobot16 |
|--------------|-----------|-----------|-----------|-----------|------------|
| 0(All) | 0 | 0 | 0 | 0 | 0 |
| 1 | 1 | 0 | 0 | 0 | 0 |
| 2 | 0 | 1 | 0 | 0 | 0 |
| 3 | 1 | 1 | 0 | 0 | 0 |
| ⋮ | | | | | |
| 13 | 1 | 0 | 1 | 1 | 0 |
| 14 | 0 | 1 | 1 | 1 | 0 |
| 15 | 1 | 1 | 1 | 1 | 0 |
| 16 | 0 | 0 | 0 | 0 | 1 |

0=OFF, 1=ON

(*6) Initializes the robot parameter.

For details, refer to EPSON RC+ 7.0 *Online Help* or *Motor* in *SPEL+ Language Reference*.

(*7) For details, refer to EPSON RC+ 7.0 *Online Help* or *MCal* in *SPEL+ Language Reference*.

(*8) This is for experienced users only. Make sure that you fully understand the input specification before using.

CmdRunning output and CmdError output will not change for this input.

“NoEmgAbort task” will not stop by this input.

When the input changes from ON to OFF, all tasks and commands will stop.

(*9) This function changes the output condition of MotorsOn, AtHome, PowerHigh, and MCalReqd.

By setting this signal with the condition selected using SelRobot1 - SelRobot16, you can switch the output condition.

Once you select the condition, it will be kept until you change it or turn OFF / restart the Controller.

All Manipulators are selected as default.

(*10) The values specified by “SelAlarm1, 2, 4, and 8” correspond to the alarm numbers.

| Alarm # | Target | SelAlarm1 | SelAlarm2 | SelAlarm4 | SelAlarm8 |
|---------|---------------------------------------|-----------|-----------|-----------|-----------|
| 1 | Controller battery | 1 | 0 | 0 | 0 |
| 2 | Battery of the robot connected to CU | 0 | 1 | 0 | 0 |
| 3 | Grease of the robot connected to CU | 1 | 1 | 0 | 0 |
| 4 | Battery of the robot connected to DU1 | 0 | 0 | 1 | 0 |
| 5 | Grease of the robot connected to DU1 | 1 | 0 | 1 | 0 |
| 6 | Battery of the robot connected to DU2 | 0 | 1 | 1 | 0 |
| 7 | Grease of the robot connected to DU2 | 1 | 1 | 1 | 0 |
| 8 | Battery of the robot connected to DU3 | 0 | 0 | 0 | 1 |
| 9 | Grease of the robot connected to DU3 | 1 | 0 | 0 | 1 |

0=OFF, 1=ON

The following parts are subject to grease up.

6-axis robot: Bevel gear on the Joint #6

SCARA, RS series: Ball screw spline unit on the Joint # 3

(*11) The specified alarm can be canceled by selecting the conditions using SelAlarm1-SelAlarm8 and setting this signal.

(*12) Operation of all tasks and commands, power mode of the robot, and PowerHigh command by the setting of the Controller preferences.

Preferences (1): “Motor power low when ForcePowerLow signal OFF”

Preferences (2): “ForcePowerLow signal change pauses all tasks”

For details of the Controller preferences, refer to *EPSON RC+ 7.0 User’s Guide [Setup]-[System Configuration]-[Controller]-[Preferences]* in 5.12.2 *[System Configuration] Command (Setup Menu)*.

| Preferences (1) | Preferences (2) | ForcePowerLow | All tasks and commands | Power mode | PowerHigh |
|-----------------|-----------------|---------------|------------------------|------------|------------|
| 0 | 0 | 1→0 | Stop | Low only | Accept |
| 0 | 0 | 0→1 | Stop | Low only | Not accept |
| 0 | 1 | 1→0 | Continue | High/Low | Accept |
| 0 | 1 | 0→1 | Temp. stop | Low only | Not accept |
| 1 | 0 | 1→0 | Stop | Low only | Not accept |
| 1 | 0 | 0→1 | Stop | Low only | Accept |
| 1 | 1 | 1→0 | Temp. stop | Low only | Not accept |
| 1 | 1 | 0→1 | Continue | High/Low | Accept |

12.1.2 Remote Output Signals

Remote outputs provide status for the Manipulator and Controller.

Remote outputs provide the assigned function using with any control device. The outputs execute automatically. Therefore, no special programming is needed.

| Name | Initial | Description |
|--|---------|--|
| Ready | 0 | Turns ON when the Controller startup completes and no task is running. |
| Running | 1 | Turns ON when task is running. However, turns OFF when "Paused output" is ON. |
| Paused | 2 | Turns ON when pause task exists. |
| Error | 3 | Turns ON when an error occurs. Use "Reset input" to recover from the error. |
| EStopOn | 4 | Turns ON at Emergency Stop. |
| SafeguardOn | 5 | Turns ON when the safeguard is open. |
| SError | 6 | Turns ON when critical error occurs. When a critical error occurs, "Reset input" does not function. Reboot the Controller to recover. |
| Warning | 7 | Turns ON when warning occurs. The task runs as normal with the warning. However, be sure to eliminate the cause of the warning as soon as possible. |
| MotorsOn | Not set | Turns ON when the robot motor is ON. (*5) |
| AtHome | Not set | Turns ON when the robot is in the home position. (*5) |
| PowerHigh | Not set | Turns ON when the robot's power mode is High. (*5) |
| MCalReqd | Not set | Turns ON when the robot hasn't executed MCal. (*5) |
| RecoverReqd | Not set | Turns ON when at least one robot is waiting for Recover after the safeguard is closed. |
| RecoverInCycle | Not set | Turns ON when at least one robot is executing Recover. |
| CmdRunning | Not set | Turns ON when an input command is executing. |
| CmdError | Not set | Turns ON when an input command cannot be accepted. |
| CurrProg1 CurrProg2 CurrProg4 CurrProg8 CurrProg16 CurrProg32 | Not set | Indicates the running or the last main function number (*1) |
| AutoMode | Not set | Turns ON in remote input acceptable status. (*2) |
| TeachMode | Not set | Turns ON in TEACH mode. |
| ErrorCode1 ⋮ ⋮ ErrorCode8192 | Not set | Indicates the error number. |
| InsideBox1 ⋮ ⋮ InsideBox15 | Not set | Turns ON when the robot is in the approach check area. (*3) |
| InsidePlane1 ⋮ ⋮ InsidePlane15 | Not set | Turns ON when the robot is in the approach check plane. (*4) |
| Alarm | Not set | Turns ON when any of the alarms is occurring. (*9) |
| Alarm1 | Not set | Turns ON when a battery alarm of the Controller is occurring. |

| Name | Initial | Description |
|-----------|---------|---|
| Alarm2 | Not set | Turns ON when a battery alarm of the robot connected to CU is occurring. |
| Alarm3 | Not set | Turns ON when a grease alarm of the robot connected to CU is occurring. (*10) |
| Alarm4 | Not set | Turns ON when a battery alarm of the robot connected to DU1 is occurring. |
| Alarm5 | Not set | Turns ON when a grease alarm of the robot connected to DU1 is occurring. (*10) |
| Alarm6 | Not set | Turns ON when a battery alarm of the robot connected to DU2 is occurring. |
| Alarm7 | Not set | Turns ON when a grease alarm of the robot connected to DU2 is occurring. (*10) |
| Alarm8 | Not set | Turns ON when a battery alarm of the robot connected to DU3 is occurring. |
| Alarm9 | Not set | Turns ON when a grease alarm of the robot connected to DU3 is occurring. (*10) |
| PositionX | Not set | Outputs current X coordinate in the World coordinate system (*6) (*7) |
| PositionY | Not set | Outputs current Y coordinate in the World coordinate system (*6) (*7) |
| PositionZ | Not set | Outputs current Z coordinate in the World coordinate system (*6) (*7) |
| PositionU | Not set | Outputs current U coordinate in the World coordinate system (*6) (*7) |
| PositionV | Not set | Outputs current V coordinate in the World coordinate system (*6) (*7) |
| PositionW | Not set | Outputs current W coordinate in the World coordinate system (*6) (*7) |
| Torque1 | Not set | Outputs the current torque value of Joint #1 (*6) (*7) |
| Torque2 | Not set | Outputs the current torque value of Joint #2 (*6) (*7) |
| Torque3 | Not set | Outputs the current torque value of Joint #3 (*6) (*7) |
| Torque4 | Not set | Outputs the current torque value of Joint #4 (*6) (*7) |
| Torque5 | Not set | Outputs the current torque value of Joint #5 (*6) (*7) |
| Torque6 | Not set | Outputs the current torque value of Joint #6 (*6) (*7) |
| CPU | Not set | Outputs the CPU load factor of the user program (*8) |
| ESTOP | Not set | Outputs how many times emergency stops have been executed. |
| ALIVE | Not set | Output signal for alive monitoring of the Controller. The signal input by ALIVE input will be output. The master equipment can perform alive monitoring of the Controller by switching the input periodically and checking the output signal. |

(*1) Outputs the current or the last function number of CurrProg1, 2, 4, 8, 16, or 32.

| Function | CurrProg1 | CurrProg2 | CurrProg4 | CurrProg8 | CurrProg16 | CurrProg32 |
|----------|-----------|-----------|-----------|-----------|------------|------------|
| Main | 0 | 0 | 0 | 0 | 0 | 0 |
| Main1 | 1 | 0 | 0 | 0 | 0 | 0 |
| Main2 | 0 | 1 | 0 | 0 | 0 | 0 |
| Main3 | 1 | 1 | 0 | 0 | 0 | 0 |
| ⋮ | | | | | | |
| Main60 | 0 | 0 | 1 | 1 | 1 | 1 |
| Main61 | 1 | 0 | 1 | 1 | 1 | 1 |
| Main62 | 0 | 1 | 1 | 1 | 1 | 1 |
| Main63 | 1 | 1 | 1 | 1 | 1 | 1 |

0=OFF, 1=ON

(*2) Remote function is available in the followings conditions.

- The setting is Auto mode and the control device is remote.
- The setting is Program mode and Remote I/O is enabled.

(*3) For details, refer to EPSON RC+ 7.0 *Online Help* or *Box* in *SPEL+ Language Reference*.

(*4) For details, refer to EPSON RC+ 7.0 *Online Help* or *Plane* in *SPEL+ Language Reference*.

(*5) Manipulator status is output as follows, according to the condition selected in SelRobot.

Wait at least 40 ms before inputting the signal after changing the condition in SelRobot.

| Name | (SelRobot1- SelRobot16) condition when inputting SelRobot | |
|-----------|---|---|
| | 0: All robots are selected | 1 - 16: Particular robot number is selected |
| MotorsOn | Turns ON when at least one motor is ON. | Turns ON when the motor of the selected robot is ON. |
| AtHome | Turns ON when all robots are in the home position. | Turns ON when the selected robot is in the home position. |
| PowerHigh | Turns ON when at least one robot's power mode is High. | Turns ON when the selected robot's power mode is High. |
| MCalReqd | Turns ON when at least one robot hasn't executed MCal | Turns ON when the selected robot hasn't executed MCal. |

(*6) Outputs information of the selected robot when SelRobot1, SelRobot2, SelRobot4, SelRobot8, and SelRobot16 are set. If not, information of Robot 1 will be output.

(*7) Outputs information in Real format.

(*8) Outputs the total load factor of the user created tasks. For details on the CPU load factor, refer to the task manager.

(*9) The signal turns ON when the alarm occurs either in the Controller alarm information or the robot alarm information.

(*10) The following parts are subject to grease up.

6-axis robot: Bevel gear on the Joint #6

SCARA, RS series: Ball screw spline unit on the Joint # 3

12.2 Timing Specifications

12.2.1 Design Notes for Remote Input Signals

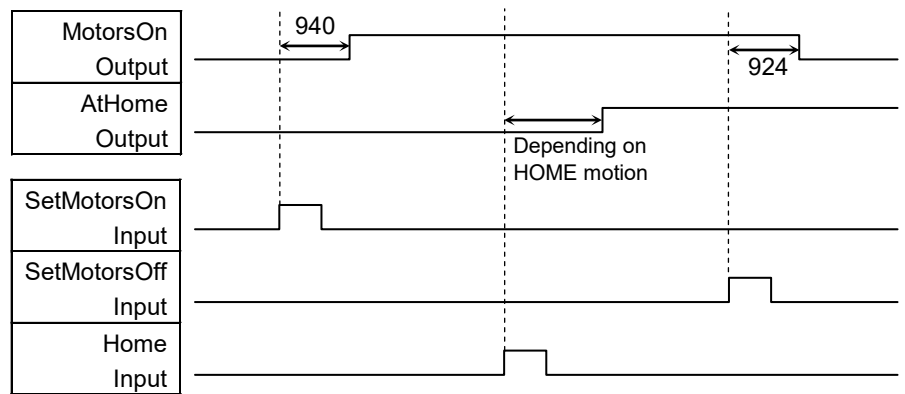
The following charts indicate the timing sequences for the primary operations of the Controller.

The indicated time lapses (time durations) should be referred to only as reference values since the actual timing values vary depending on the number of tasks running, as well as CPU speed of the Controller. Check carefully and refer to the following charts for the timing interrelation when you enter an input signal.

During system design, make sure that you actuate only one remote input operation at a time, otherwise an error will occur.

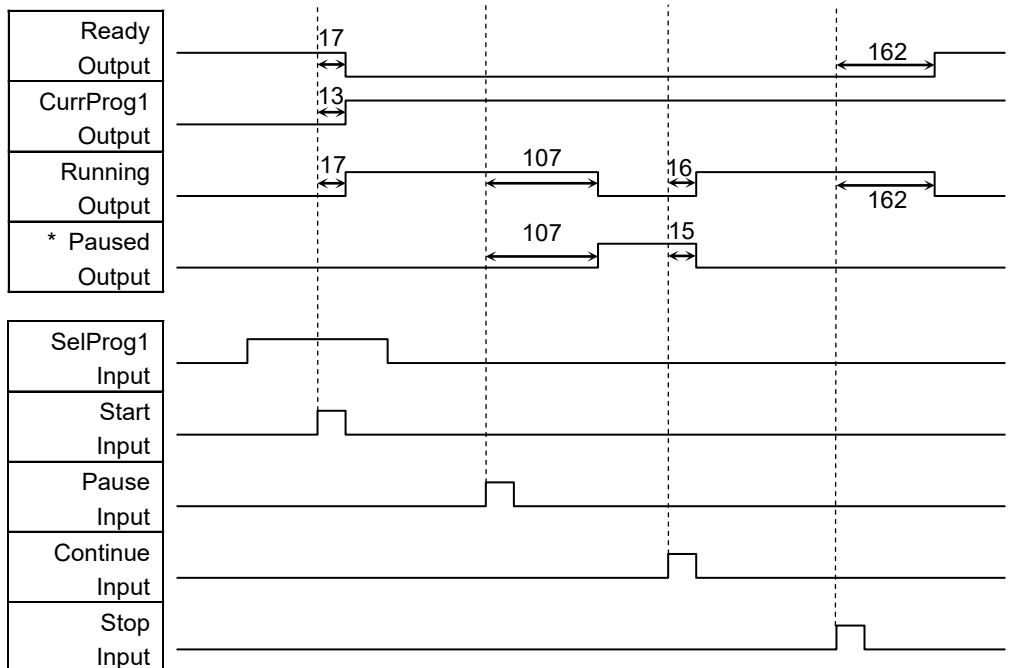
The pulse width of an input signal must be 25 or more milliseconds to be detected.

12.2.2 Timing Diagram for Operation Execution Sequence



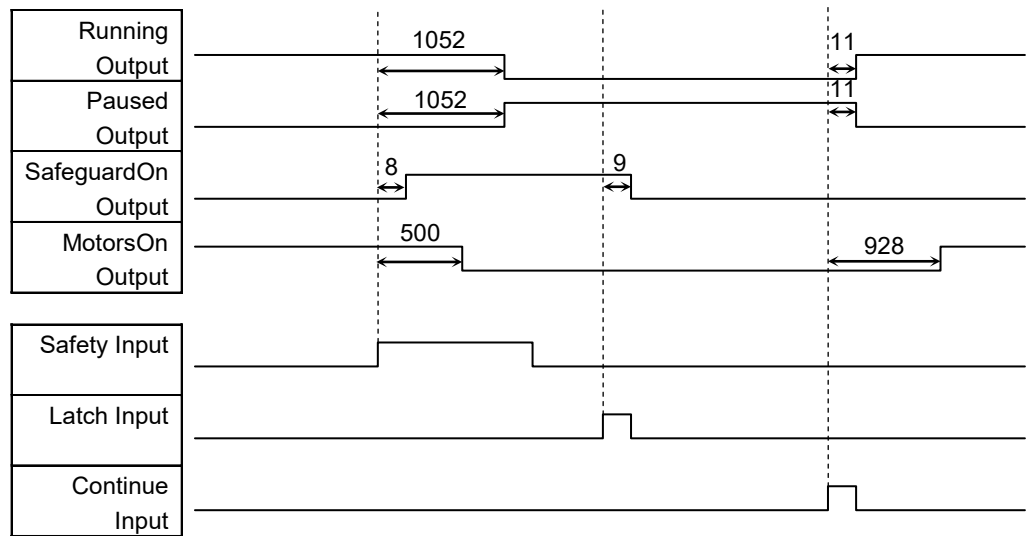
[Unit: msec]

12.2.3 Timing Diagram for Program Execution Sequence



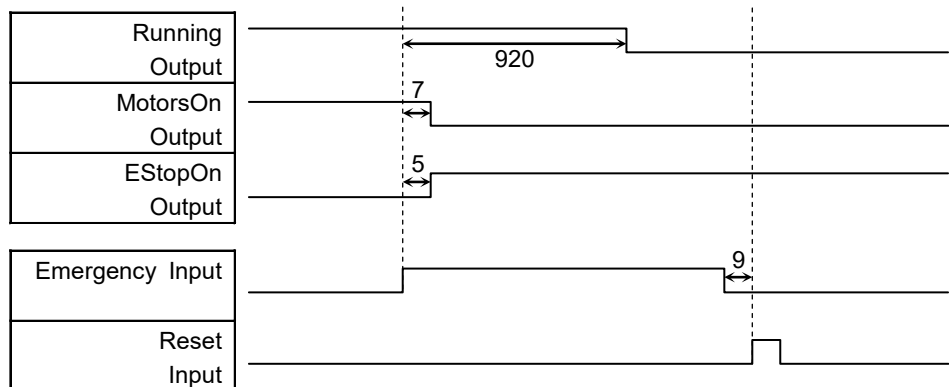
* The duration varies depending on the Quick Pause (QP) setting and the program's operating status at the time of Pause input [Unit: msec]

12.2.4 Timing Diagram for Safety Door Input Sequence



[Unit: msec]

12.2.5 Timing Diagram for Emergency Stop Sequence



[Unit: msec]

13. R-I/O Connector

The R-I/O connector is for connecting the input signals of the real time I/O function.

| | | Pins | Bit number |
|--------------|-------|------|------------|
| Control Unit | Input | 2 | 24, 25 |
| Drive Unit 1 | Input | 2 | 56, 57 |
| Drive Unit 2 | Input | 2 | 280, 281 |
| Drive Unit 3 | Input | 2 | 312, 313 |

By inputting trigger signals to the R-I/O, you can keep and get the operating robot position when trigger is detected. If you use this function with Vision, you can create an application of parts pickup, alignment, and assembly by robots without stopping.

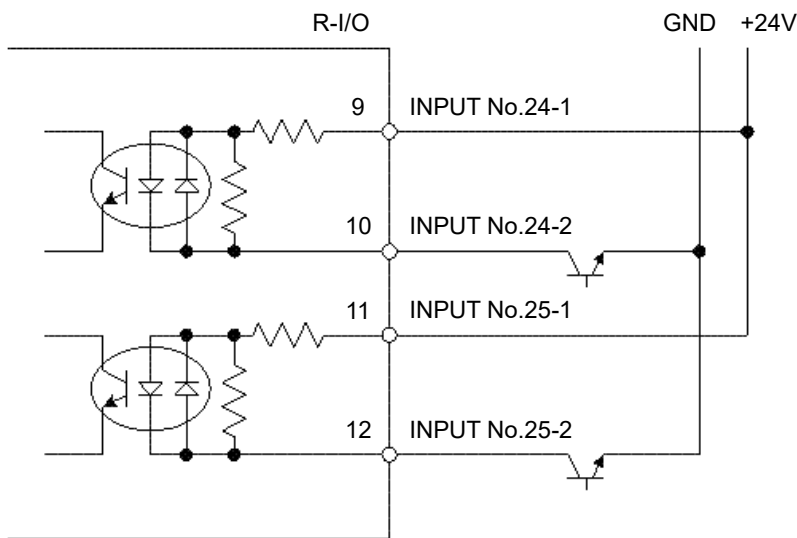
For details, refer to *EPSON RC+7.0 Users Guide – 20. Real time I/O.*

13.1 Input Circuit

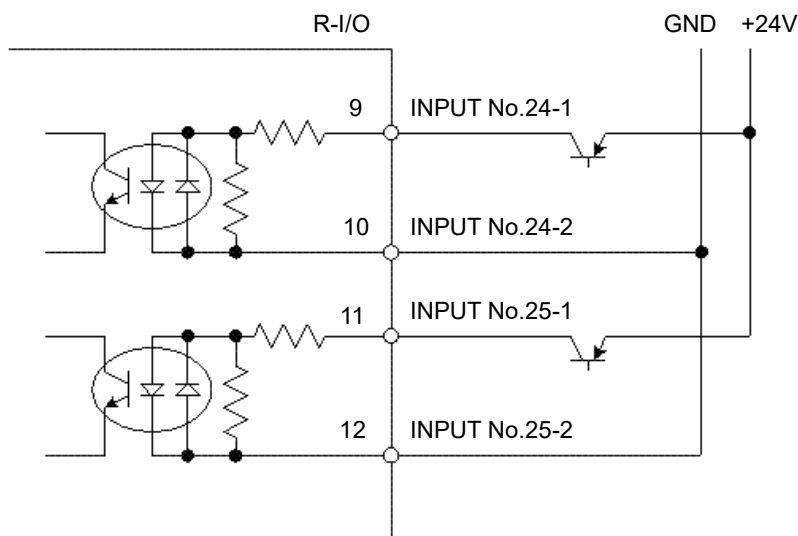
- Input Voltage Range : +24 V ±10%
- Input Current : 10 mA (TYP) at +24 V input

The following two types of wiring are available in the input circuit.

Typical Input Circuit Application 1



Typical Input Circuit Application 2




13.2 Pin Assignments

| Pin No. | Signal Name |
|-------------------|--------------|
| 9 | INPUT No24-1 |
| 10 | INPUT No24-2 |
| 11 | INPUT No25-1 |
| 12 | INPUT No25-2 |
| 1 to 8, 13 to 15* | Not Used |

* For the pins 1 to 8 and 13 to 15, do not connect anything.

| Connector | Standard |
|-----------------------------------|--|
| R-I/O Connector (Controller side) | D-sub 15 male pin Screwlock #4 - 40 |



CAUTION

■ When using R-I/O connector, be careful of the following points. If you use the R-I/O connector without meeting the necessary conditions, it may cause the system failure and/or safety problems.

- Use a shielded cable and route the cables as far from the surrounding noise sources as possible.
For details, refer to *Setup & Operation: 3.5 Noise Countermeasures*.
- Make sure to check the cable routing before turning ON the power supply.

14. Option Slots

14.1 About Option Slots

Use the Option Slot to install the optional boards of RC700 / RC700-A Controller.

Up to four option boards can be installed in the Controller. The types of the option boards are as follows:

- 14.2 Expansion I/O Board
- 14.3 Fieldbus I/O Board
- 14.4 RS-232C Board
- 14.5 PG Board
- 14.6 Analog I/O Board
- 14.7 Force Sensor I/F Board
- 14.8 EUROMAP67 Board

14.2 Expansion I/O Board

14.2.1 Expansion I/O Board

Each additional expansion I/O board provides 24 inputs and 16 outputs.

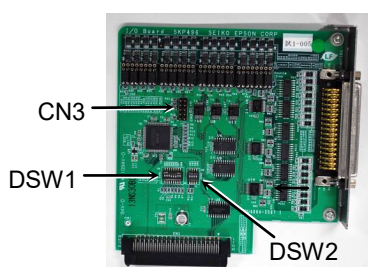
You can install up to four expansion I/O boards in the Controller.

The input and output bit numbers are assigned as follows. (Bit number is assigned from CN1.)

| Input Bit # | Output Bit # | Applicable Hardware |
|-------------|--------------|---|
| 0 to 23 | 0 to 15 | STANDARD I/O |
| 64 to 87 | 64 to 79 | The 1 st Expansion I/O board |
| 96 to 119 | 96 to 111 | The 2 nd Expansion I/O board |
| 128 to 151 | 128 to 143 | The 3 rd Expansion I/O board |
| 160 to 183 | 160 to 175 | The 4 th Expansion I/O board |

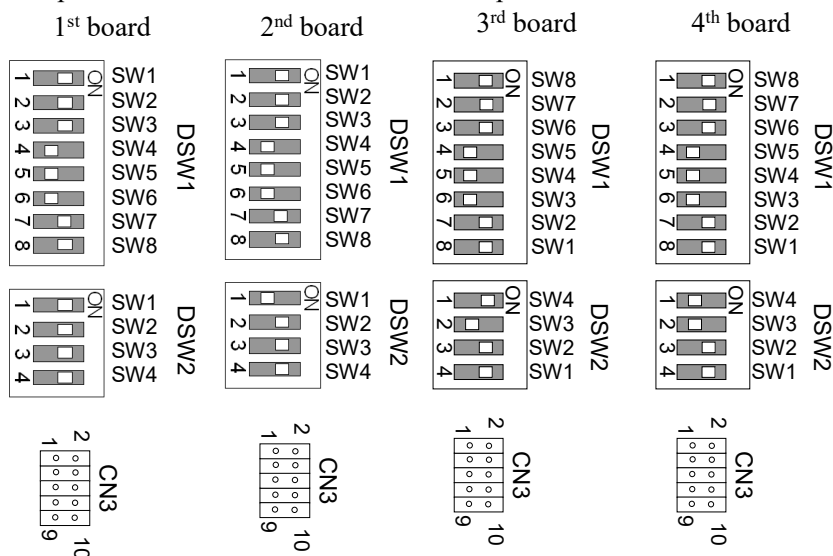
14.2.2 Board Configuration (Expansion I/O Board)

Board Appearance



Switch and Jumper Configuration

Setup the DSW1 and DSW2. CN3 is all open.

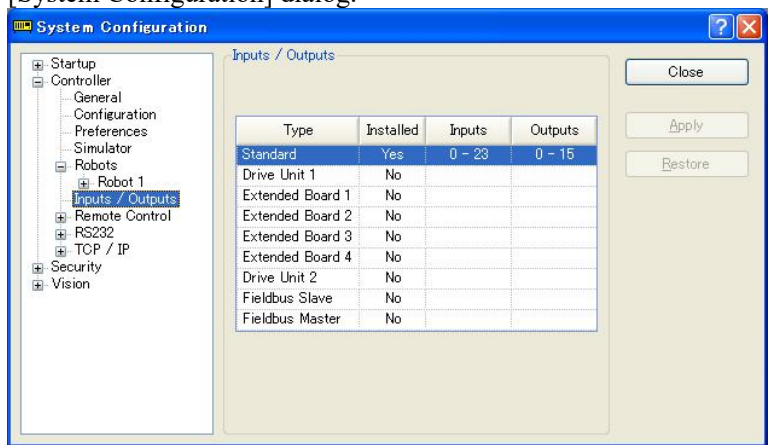


14.2.3 Confirmation with EPSON RC+ 7.0 (Expansion I/O Board)

When an expansion I/O board is mounted to the option unit, the Controller software automatically identifies the expansion I/O board. Therefore, no software configuration is needed.

Correct identification can be confirmed from EPSON RC+ 7.0.

- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



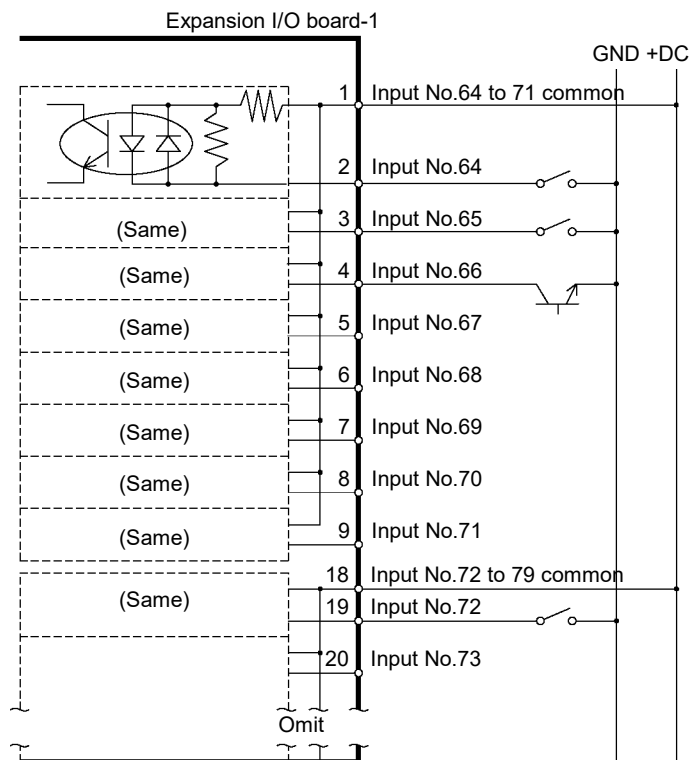
- (2) Select [Controller]-[Inputs / Outputs].
- (3) Make sure that “Yes” is displayed in the Installed column.
The expansion I/O board is identified by the Controller software. Corresponding Input and Output is available.

14.2.4 Input Circuit

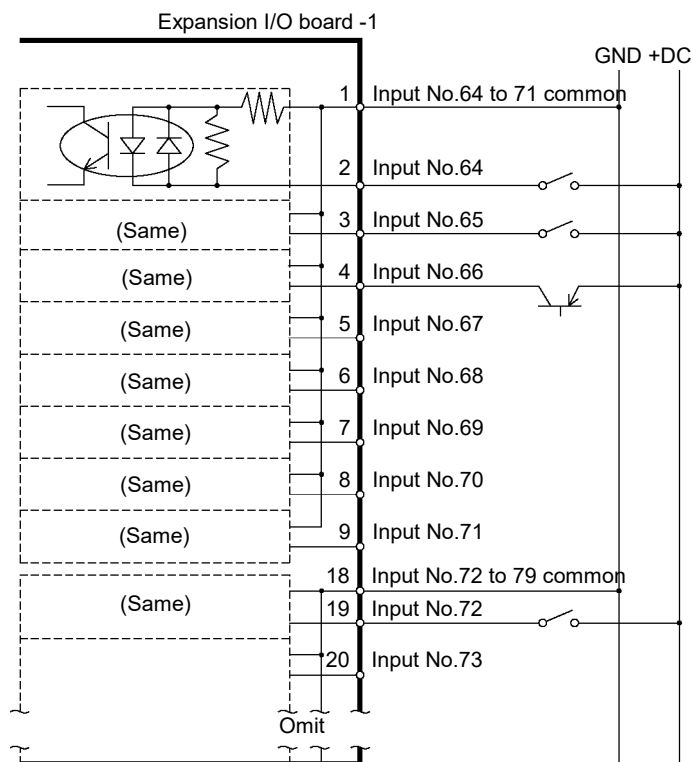
- Input Voltage Range : + 12 V to 24 V \pm 10%
- ON Voltage : + 10.8 V (Min.)
- OFF Voltage : + 5 V (Max.)
- Input Current : 10 mA (TYP) at + 24 V input

Two types of wiring are available for use with the two-way photo coupler in the input circuit.

Protected Expansion I/O Board Typical Input Circuit Application 1



Protected Expansion I/O Board Typical Input Circuit Application 2



14.2.5 Output Circuit

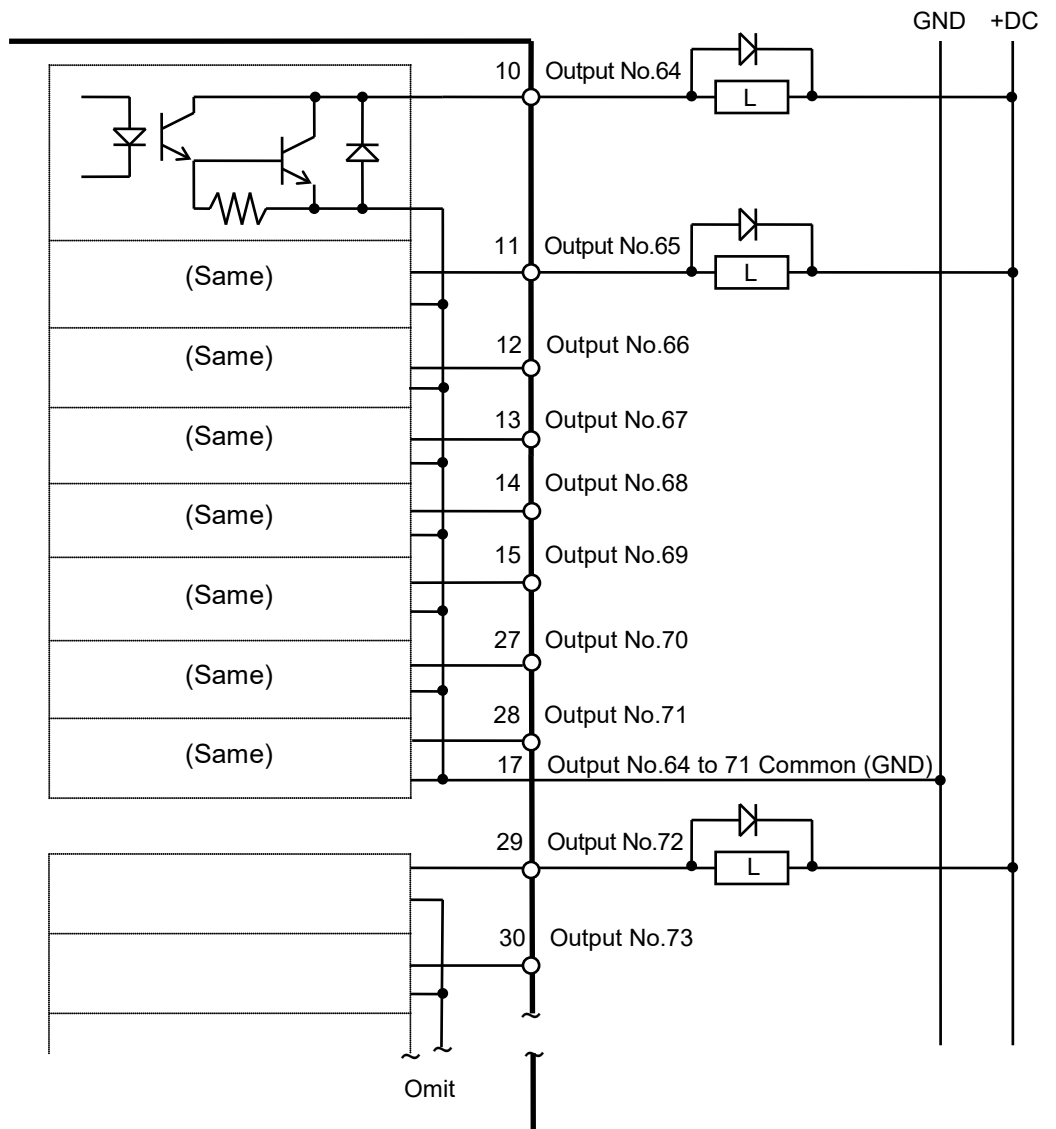
Rated Output Voltage : +12 V to 24 V \pm 10%
 Maximum Output Current : TYP 100 mA/1 output
 Output Driver : Photo coupler



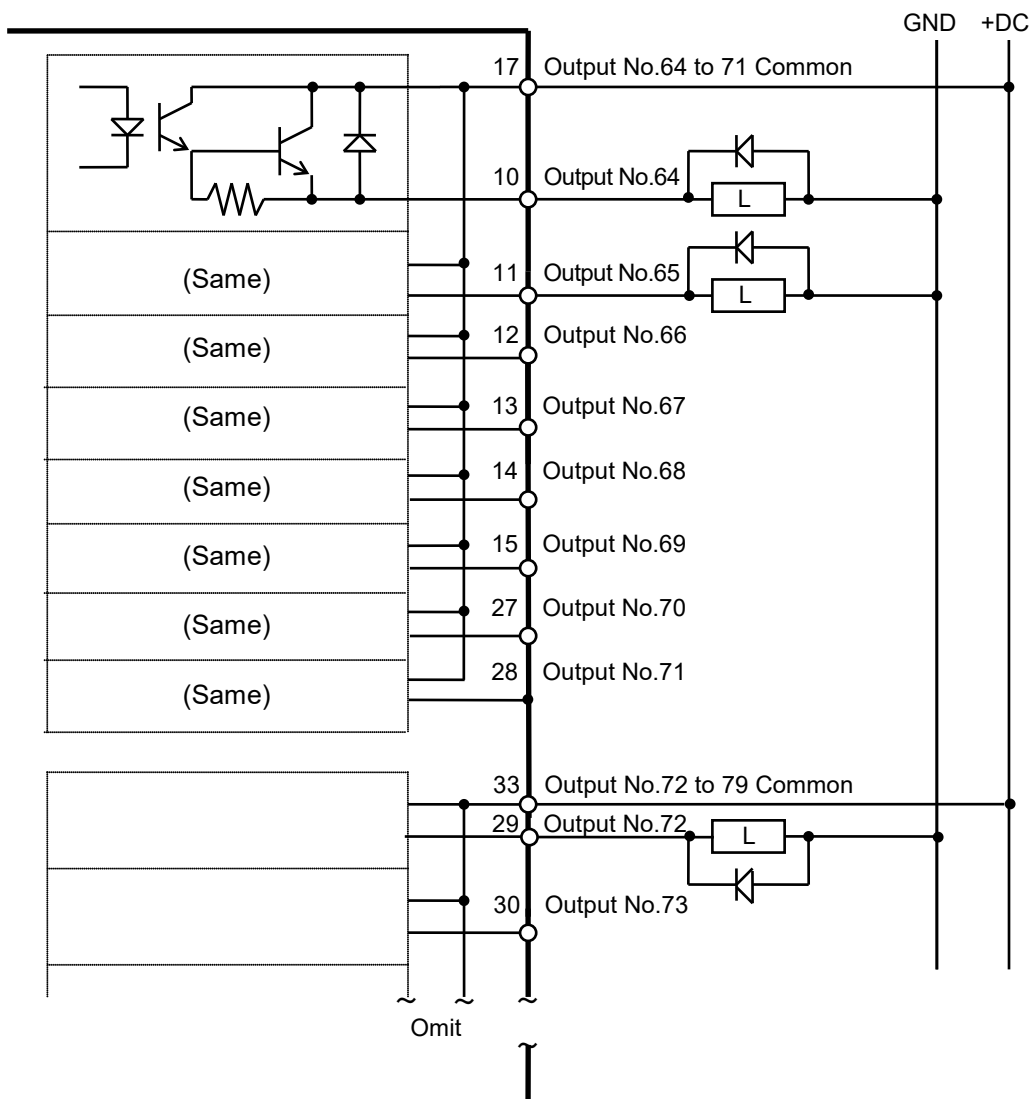
CAUTION

- The output circuit has two types: Sink type and Source type. The either type has been configured in the Controller before the shipment. Before routing the cables, make sure that the I/O output type of your Controller conforms to the external connection devices.
 If you route the cables with wrong output type, the parts on the board will be broken and the robot system won't operate normally.
- Use the wiring diagram of 2: *Source Type* for CE conformance. Be sure to wire correctly. Improper wiring may cause safety problems as it may make the Manipulator move unusually.
- Be sure to wire the output circuit properly because it has no protection circuitry for short-circuit and reverse-connection. Improper wiring may cause malfunction of the parts on the board and then improper function of the robot system.

Typical Output Circuit Application 1: Sink Type



Typical Output Circuit Application 2: Source Type



14.2.6 Pin Assignments (Expansion I/O Board)

Pin Assignment table of the 1st Expansion I/O board.

Connector 1 Pin Assignments

| Pin No. | Signal Name | Pin No. | Signal Name | Pin No. | Signal Name |
|---------|---------------------------|---------|---------------------------|---------|--------------------------|
| 1 | Input common No.64 to 71 | 18 | Input common No.72 to 79 | 34 | Input common No.80 to 87 |
| 2 | Input No.64 | 19 | Input No.72 | 35 | Input No.80 |
| 3 | Input No.65 | 20 | Input No.73 | 36 | Input No.81 |
| 4 | Input No.66 | 21 | Input No.74 | 37 | Input No.82 |
| 5 | Input No.67 | 22 | Input No.75 | 38 | Input No.83 |
| 6 | Input No.68 | 23 | Input No.76 | 39 | Input No.84 |
| 7 | Input No.69 | 24 | Input No.77 | 40 | Input No.85 |
| 8 | Input No.70 | 25 | Input No.78 | 41 | Input No.86 |
| 9 | Input No.71 | 26 | Input No.79 | 42 | Input No.87 |
| 10 | Output No.64 | 27 | Output No.70 | 43 | Output No.75 |
| 11 | Output No.65 | 28 | Output No.71 | 44 | Output No.76 |
| 12 | Output No.66 | 29 | Output No.72 | 45 | Output No.77 |
| 13 | Output No.67 | 30 | Output No.73 | 46 | Output No.78 |
| 14 | Output No.68 | 31 | Output No.74 | 47 | Output No.79 |
| 15 | Output No.69 | 32 | Not Used | 48 | Not Used |
| 16 | Not Used | 33 | Output common No.72 to 79 | 49 | Not Used |
| 17 | Output common No.64 to 71 | | | 50 | Not Used |

| Connector | Standard |
|---------------------------------|--|
| I/O Connector (Controller side) | D-sub 50 male pin Screwlock #4 - 40 |

* The I/O connector, I/O connector cable, terminal block, and I/O connector kit are offered as options.

Pin Assignment table of the 2nd Expansion I/O board.

Connector 1 Pin Assignments

| Pin No. | Signal Name | Pin No. | Signal Name | Pin No. | Signal Name |
|---------|----------------------------|---------|-----------------------------|---------|----------------------------|
| 1 | Input common No.96 to 103 | 18 | Input common No.104 to 111 | 34 | Input common No.112 to 119 |
| 2 | Input No.96 | 19 | Input No.104 | 35 | Input No.112 |
| 3 | Input No.97 | 20 | Input No.105 | 36 | Input No.113 |
| 4 | Input No.98 | 21 | Input No.106 | 37 | Input No.114 |
| 5 | Input No.99 | 22 | Input No.107 | 38 | Input No.115 |
| 6 | Input No.100 | 23 | Input No.108 | 39 | Input No.116 |
| 7 | Input No.101 | 24 | Input No.109 | 40 | Input No.117 |
| 8 | Input No.102 | 25 | Input No.110 | 41 | Input No.118 |
| 9 | Input No.103 | 26 | Input No.111 | 42 | Input No.119 |
| 10 | Output No.96 | 27 | Output No.102 | 43 | Output No.107 |
| 11 | Output No.97 | 28 | Output No.103 | 44 | Output No.108 |
| 12 | Output No.98 | 29 | Output No.104 | 45 | Output No.109 |
| 13 | Output No.99 | 30 | Output No.105 | 46 | Output No.110 |
| 14 | Output No.100 | 31 | Output No.106 | 47 | Output No.111 |
| 15 | Output No.101 | 32 | Not Used | 48 | Not Used |
| 16 | Not Used | 33 | Output common No.104 to 111 | 49 | Not Used |
| 17 | Output common No.96 to 103 | | | 50 | Not Used |

| Connector | Standard |
|---------------------------------|--|
| I/O Connector (Controller side) | D-sub 50 male pin Screwlock #4 - 40 |

* The I/O connector, I/O connector cable, terminal block, and I/O connector kit are offered as options.

Pin Assignment table of the 3rd Expansion I/O board.

Connector 1 Pin Assignments

| Pin No. | Signal Name | Pin No. | Signal Name | Pin No. | Signal Name |
|---------|-----------------------------|---------|-----------------------------|---------|----------------------------|
| 1 | Input common No.128 to 135 | 18 | Input common No.136 to 143 | 34 | Input common No.144 to 151 |
| 2 | Input No.128 | 19 | Input No.136 | 35 | Input No.144 |
| 3 | Input No.129 | 20 | Input No.137 | 36 | Input No.145 |
| 4 | Input No.130 | 21 | Input No.138 | 37 | Input No.146 |
| 5 | Input No.131 | 22 | Input No.139 | 38 | Input No.147 |
| 6 | Input No.132 | 23 | Input No.140 | 39 | Input No.148 |
| 7 | Input No.133 | 24 | Input No.141 | 40 | Input No.149 |
| 8 | Input No.134 | 25 | Input No.142 | 41 | Input No.150 |
| 9 | Input No.135 | 26 | Input No.143 | 42 | Input No.151 |
| 10 | Output No.128 | 27 | Output No.134 | 43 | Output No.139 |
| 11 | Output No.129 | 28 | Output No.135 | 44 | Output No.140 |
| 12 | Output No.130 | 29 | Output No.136 | 45 | Output No.141 |
| 13 | Output No.131 | 30 | Output No.137 | 46 | Output No.142 |
| 14 | Output No.132 | 31 | Output No.138 | 47 | Output No.143 |
| 15 | Output No.133 | 32 | Not Used | 48 | Not Used |
| 16 | Not Used | 33 | Output common No.136 to 143 | 49 | Not Used |
| 17 | Output common No.128 to 135 | | | 50 | Not Used |

| Connector | Standard |
|---------------------------------|--|
| I/O Connector (Controller side) | D-sub 50 male pin Screwlock #4 - 40 |

* The I/O connector, I/O connector cable, terminal block, and I/O connector kit are offered as options.

Pin Assignment table of the 4th Expansion I/O board.

Connector 1 Pin Assignments

| Pin No. | Signal Name | Pin No. | Signal Name | Pin No. | Signal Name |
|---------|-----------------------------|---------|-----------------------------|---------|----------------------------|
| 1 | Input common No.160 to 167 | 18 | Input common No.168 to 175 | 34 | Input common No.176 to 183 |
| 2 | Input No.160 | 19 | Input No.168 | 35 | Input No.176 |
| 3 | Input No.161 | 20 | Input No.169 | 36 | Input No.177 |
| 4 | Input No.162 | 21 | Input No.170 | 37 | Input No.178 |
| 5 | Input No.163 | 22 | Input No.171 | 38 | Input No.179 |
| 6 | Input No.164 | 23 | Input No.172 | 39 | Input No.180 |
| 7 | Input No.165 | 24 | Input No.173 | 40 | Input No.181 |
| 8 | Input No.166 | 25 | Input No.174 | 41 | Input No.182 |
| 9 | Input No.167 | 26 | Input No.175 | 42 | Input No.183 |
| 10 | Output No.160 | 27 | Output No.166 | 43 | Output No.171 |
| 11 | Output No.161 | 28 | Output No.167 | 44 | Output No.172 |
| 12 | Output No.162 | 29 | Output No.168 | 45 | Output No.173 |
| 13 | Output No.163 | 30 | Output No.169 | 46 | Output No.174 |
| 14 | Output No.164 | 31 | Output No.170 | 47 | Output No.175 |
| 15 | Output No.165 | 32 | Not Used | 48 | Not Used |
| 16 | Not Used | 33 | Output common No.168 to 175 | 49 | Not Used |
| 17 | Output common No.160 to 167 | | | 50 | Not Used |

| Connector | Standard |
|---------------------------------|--|
| I/O Connector (Controller side) | D-sub 50 male pin Screwlock #4 - 40 |

* The I/O connector, I/O connector cable, terminal block, and I/O connector kit are offered as options.

14.3 Fieldbus I/O Board

The Fieldbus I/O board has the following six types.

- DeviceNet
- PROFIBUS-DP
- PROFINET
- CC-LINK
- EtherNet/IP
- EtherCAT

For the details, refer to the *Robot Controller RC700/RC90 Controller Option Fieldbus I/O manual*.

14.4 RS-232C Board

14.4.1 About the RS-232C Board

One standard RS-232C port is not available with the Controller.

You need to mount the RS-232C board in the Option Slot to communicate with external equipment using two or more port RS-232C.

The RS-232C board accepts two ports expansion per board. A maximum of two boards/four ports expansion is available for RS-232C board.

When using the Force Sensor I/F board, a maximum of one board/two ports expansion is available for RS-232C board.

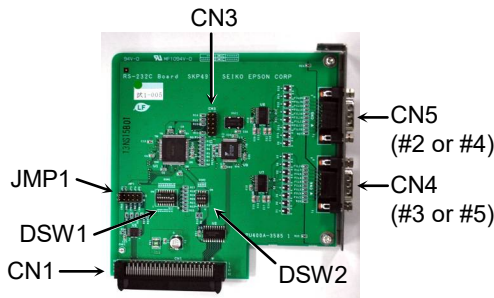
Port Number

Port numbers are assigned as follows.

| Port No. | Supported hardware |
|----------|----------------------|
| #2, #3 | First RS-232C board |
| #4, #5 | Second RS-232C board |

14.4.2 Board Setup (RS-232C)

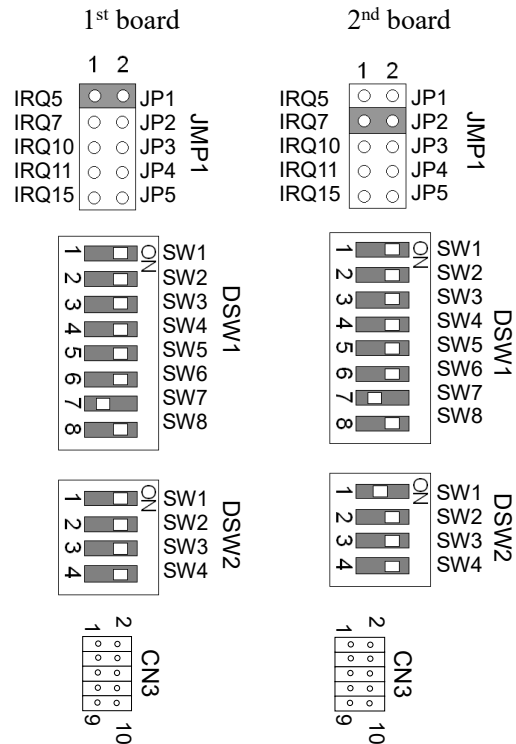
Board Appearance



Switch and Jumper Configuration

Set DSW1, DSW2 and JMP1.

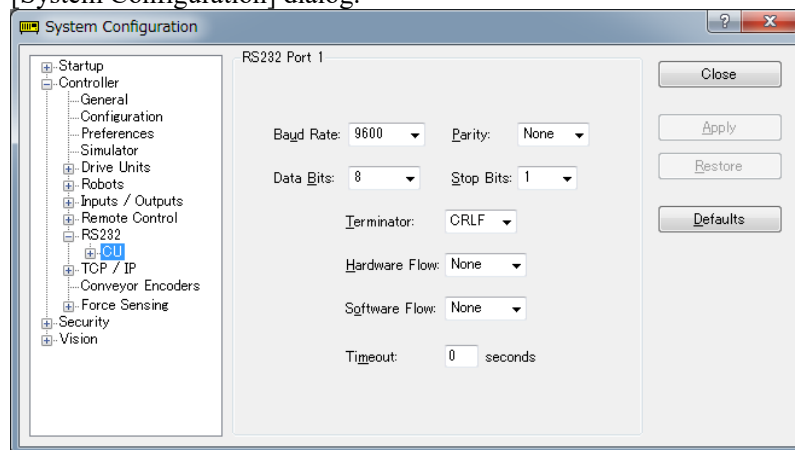
CN3 is all open.



14.4.3 Confirmation with EPSON RC+ (RS-232C)

When an RS-232C board is mounted in as option unit, the Controller software automatically identifies the RS-232C board. Therefore, no software configuration is needed. Correct identification can be confirmed from EPSON RC+.

- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select the [RS232]-[CU].

14.4.4 RS-232C Software Communication Setup (RS-232C)

Available communication settings are as follows.

| Item | Specification |
|-----------------|---|
| Baud Rates | 110, 300, 600, 1200, 2400, 4800, 9600, 14400, 19200, 38400, 57600, 115200 |
| Data bit length | 7, 8 |
| Stop bit length | 1, 2 |
| Parity | Odd, even, NA |
| Terminator | CR, LF, CRLF |

Refer to *EPSON RC+ 7.0 Online Help* or *Users Guide – 13. RS-232C Communications* for RS-232C communication from the Robot application.

14.4.5 Communication Cable (RS-232C)

Prepare a communication cable as described in this section.

| Connector | Standard |
|-------------------------------------|---------------------------------------|
| RS-232C Connector (Controller side) | D-sub 9 male pin Screwlock #4 - 40 |

NOTE



Use twisted pair cable for shielded wire.

Clamp the shield to the hood for noise prevention.

Pin assign of the RS-232C connector is as follows.

| Pin No | Signal | Function | Signal Direction |
|--------|--------|---------------------|------------------|
| 1 | DCD | Data carrier detect | Input |
| 2 | RXD | Receive data | Input |
| 3 | TXD | Send data | Output |
| 4 | DTR | Terminal ready | Output |
| 5 | GND | Signal ground | - |
| 6 | DSR | Data set ready | Input |
| 7 | RTS | Request to send | Output |
| 8 | CTS | Clear to send | Input |
| 9 | RI | Ring indicator | Input |

14.5 PG Board

The PG board has the following two types of usage. For details, refer to the related manuals.

When using as the conveyor encoder:

Refer to *EPSON RC+ 7.0 User's Guide 16. Conveyor Tracking*

When using as a PG motion system:

Refer to *Robot Controller RC700/RC90 option PG Motion System*

14.6 Analog I/O Board

14.6.1 About Analog I/O Board

Analog input/output function is available when mounting analog I/O board to the option slot. You can install a maximum of four analog I/O boards in the option slot.

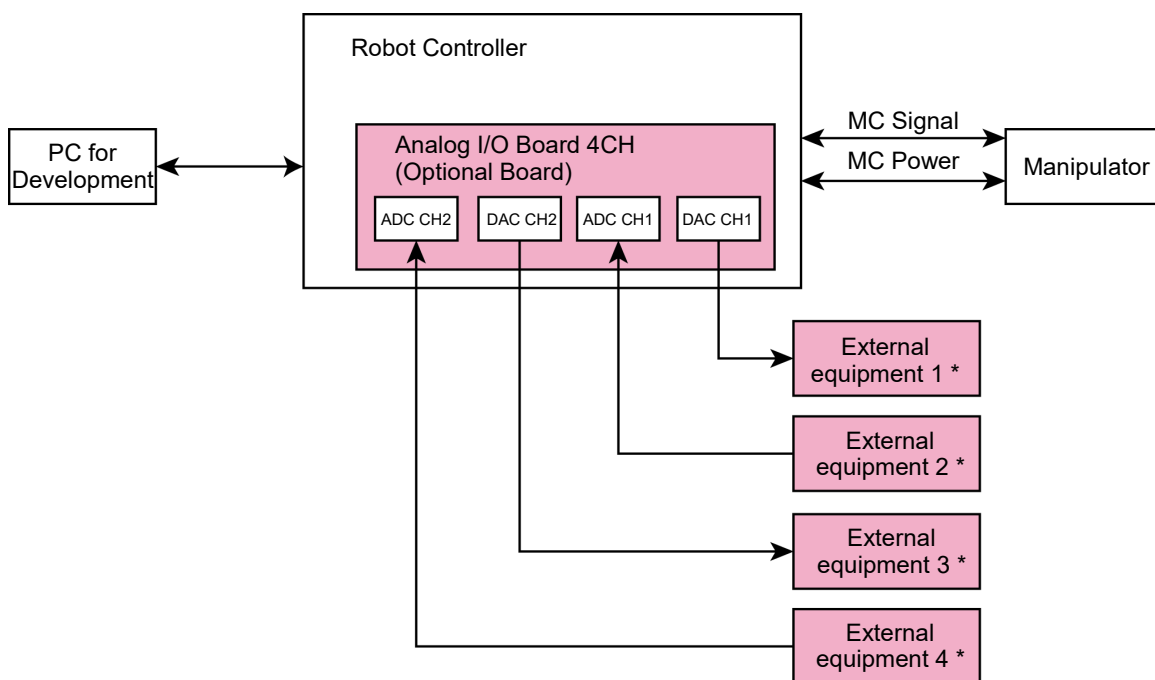
Analog I/O Board (1CH): “DAC: 1ch” is available for one board.

Analog I/O Board (4CH): “DAC: 2ch, ADC: 2ch” is available for one board.

DAC: Analog signal output (voltage/current)

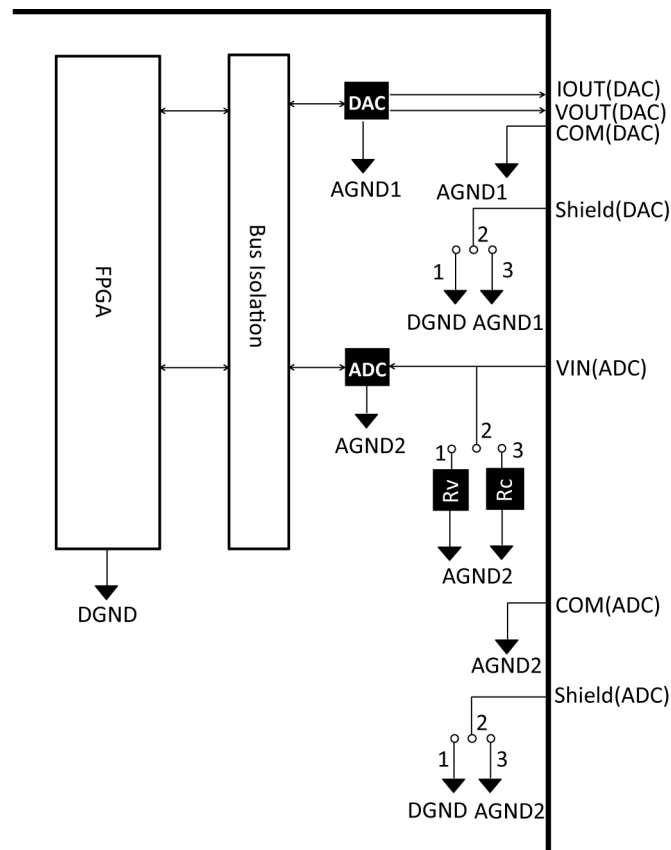
ADC: Analog signal input (voltage/current)

Connection Example of Analog I/O Board (4CH)



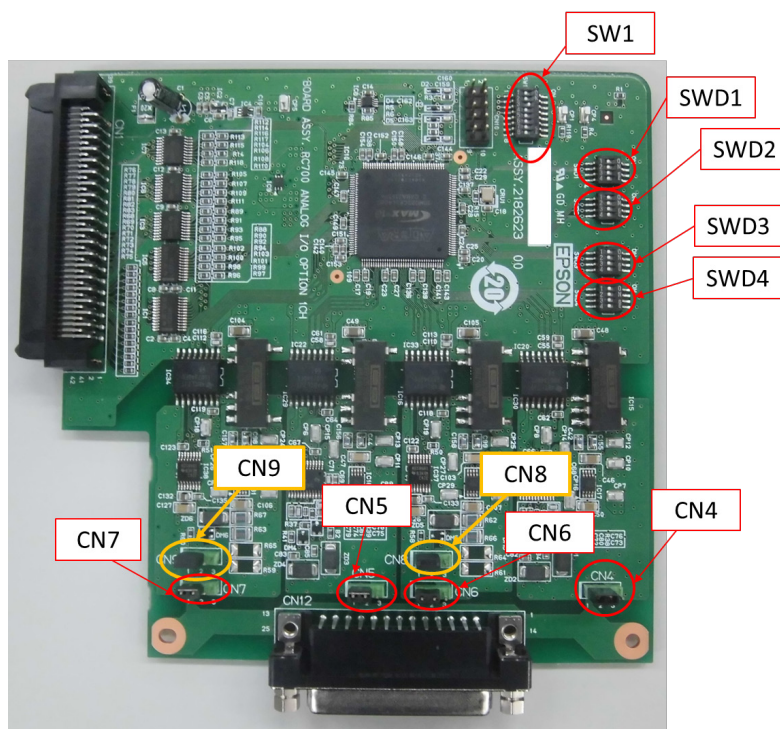
*: Voltage/Current Input

Overview of Analog I/O Board Circuit



Rv: Voltage Input Terminating Resistance (100kΩ),
 Rc: Current Input Terminating Resistance

14.6.2 Board Configuration (Analog I/O Board)



Configuration of Switch and Jumper

(1) Address Configuration (SW1): Address of the option board

| Configuration | S1 | S2 | S3 | S4 | S5 | S6 | S7 | S8 |
|------------------|-----|-----|-----|-----|-----|-----|-----|-----|
| The first board | Off | Off | On | Off | Off | Off | Off | Off |
| The second board | Off | On | Off | Off | Off | Off | Off | Off |
| The third board | On | Off | Off | Off | Off | Off | Off | Off |
| The fourth board | Off | Off | Off | Off | Off | Off | Off | Off |

SW1

S1
S2
S3
S4
S5
S6
S7
S8

S5 to S8: Not used. Please turn them OFF.

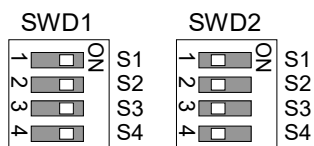
(2) Analog Output: Configuration

Voltage Current Switching Switch (SWD1): Voltage/current output

Range Switching Switch (SWD2): Output range

| Channel | Output Mode | Range Configuration | SWD1 (voltage current switching) | | | | SWD2 (range switching) | | | |
|---------|---------------------|---------------------|----------------------------------|---------|---------|---------|------------------------|---------|---------|---------|
| | | | S1 | S2 | S3 | S4 | S1 | S2 | S3 | S4 |
| DAC 1ch | Voltage output mode | ±5V | On | Not Use | Not Use | Not Use | On | On | Not Use | Not Use |
| | | ±10V | On | | | | On | Off | | |
| | | 0~5V | On | | | | Off | On | | |
| | | 0~10V * | On | | | | Off | Off | | |
| | Current output mode | 0~20mA | Off | | | | On | On | | |
| | | 4~20mA | Off | | | | Off | Off | | |
| DAC 2ch | Voltage output mode | ±5V | Not Use | On | Not Use | Not Use | Not Use | Not Use | On | On |
| | | ±10V | | On | | | | | On | Off |
| | | 0~5V | | On | | | | | Off | On |
| | | 0~10V * | | On | | | | | Off | Off |
| | Current output mode | 0~20mA | | Off | | | | | On | On |
| | | 4~20mA | | Off | | | | | Off | Off |

*: Default: DAC default configuration (voltage output: 0 to 10V)



(3) Analog Input: Configuration

Voltage Current Switching Jumper (CN8/CN9): Current input/voltage input
 1-2 pin short: Voltage input configuration
 2-3 pin short: Current input configuration

Voltage Current Switching Switch (SWD1): Voltage/current input

Range Switching Switch (SWD3): Input range

| Channel | Input Mode | Range Configuration | SWD1(voltage current switching) | | | | CN8 (voltage current switching) | CN9 (voltage current switching) |
|---------|--------------------|---------------------|---------------------------------|-----------|----|---------|---------------------------------|---------------------------------|
| | | | S1 | S2 | S3 | S4 | | |
| ADC 1ch | Voltage Input Mode | ±5.12V | Not Use | Not Use | On | Not Use | 1-2 short | Not Use |
| | | ±10.24V | | | On | | 1-2 short | |
| | | 0 to 5.12V | | | On | | 1-2 short | |
| | | 0 to 10.24V * | | | On | | 1-2 short | |
| | Current Input Mode | 0 to 24mA | Off | 2-3 short | | | | |
| ADC 2ch | Voltage Input Mode | ±5.12V | Not Use | Not Use | On | Not Use | 1-2 short | |
| | | ±10.24V | | | On | | 1-2 short | |
| | | 0 to 5.12V | | | On | | 1-2 short | |
| | | 0 to 10.24V * | | | On | | 1-2 short | |
| | Current Input Mode | 0 to 24mA | Off | 2-3 short | | | | |

| Channel | Input Mode | Range Configuration | SWD3 (range switching) | | | | SWD4 |
|---------|--------------------|---------------------|------------------------|---------|---------|---------|------|
| | | | S1 | S2 | S3 | S4 | |
| ADC 1ch | Voltage Input Mode | ±5.12V | On | On | Not Use | Not Use | Off |
| | | ±10.24V | On | Off | | | |
| | | 0 to 5.12V | Off | On | | | |
| | | 0 to 10.24V * | Off | Off | | | |
| | Current Input Mode | 0 to 24mA | Off | On | | | |
| ADC 2ch | Voltage Input Mode | ±5.12V | Not Use | Not Use | On | On | Off |
| | | ±10.24V | | | On | Off | |
| | | 0 to 5.12V | | | Off | On | |
| | | 0 to 10.24V * | | | Off | Off | |
| | Current Input Mode | 0 to 24mA | Off | On | | | |

SWD4: Not used. Please turn them OFF.

*: Default: ADC default configuration (voltage input: 0 to 10.24V)



(4) Shield Configuration

- “Frame Ground” and “User Ground” of the shield: CN4, CN5, CN6, and CN7
 - 1-2 pin short : Frame ground (FG) shield configuration.
When you want to spread the shield noise to the robot Controller side.
 - 2-3 pin short : User ground (UG) shield configuration.
When you want to insulate the shield by external connection device and robot Controller.
Or when you want to spread the shield noise to the external connection device side.

User Ground (UG): Analog ground (AGND) on the external connection device side.

Frame Ground (FG): Digital ground (DGND) inside the robot Controller.

| Channel | Configuration | CN4 | CN5 | CN6 | CN7 |
|---------|---------------|-----------|-----------|-----------|-----------|
| DAC1ch | FG Shield* | 1-2 short | Not Use | Not Use | Not Use |
| | UG Shield | 2-3 short | | | |
| DAC2ch | FG Shield * | Not Use | 1-2 short | Not Use | Not Use |
| | UG Shield | | 2-3 short | | |
| ADC1ch | FG Shield * | Not Use | Not Use | 1-2 short | Not Use |
| | UG Shield | | | 2-3 short | |
| ADC2ch | FG Shield * | Not Use | Not Use | Not Use | 1-2 short |
| | UG Shield | | | | 2-3 short |

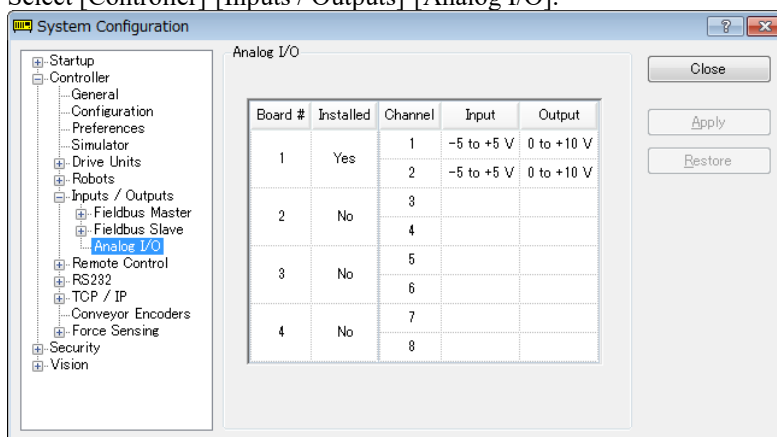
*: Default

14.6.3 Confirmation with EPSON RC+ (Analog I/O Board)

The Controller software automatically identifies the analog I/O board when mounting analog I/O board to the optional unit of the Controller. Therefore, no software configuration is needed.

Correct identification can be confirmed from EPSON RC+.

- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.
- (2) Select [Controller]-[Inputs / Outputs]-[Analog I/O].



14.6.4 Input Circuit (Analog I/O Board)

| | |
|--------------------------------------|--|
| Input resolution | : 16 bit |
| Input range | : voltage input: 0 to 5.12V, 0 to 10.24V, $\pm 5.12V$, $\pm 10.24V$ current input: 0 to 24mA |
| Input impedance (Voltage/Current) | : Applox.100k Ω /Applox.422 Ω |
| Absolute rated voltage of input pins | : $\pm 11V$ |
| Insulation specification | : insulation between channels, bus insulation |

14.6.5 Output Circuit (Analog I/O Board)

| | |
|---|---|
| Output resolution | : 16 bit |
| Output range | : voltage output: 0 to 5V, 0 to 10V, $\pm 5V$, $\pm 10V$ current output: 0 to 20mA, 4 to 20mA |
| Output impedance (Voltage/Current) | : Applox.17 Ω /Applox.50M Ω |
| Absolute rated voltage of output pins | : $\pm 11V$ |
| Load resistance/capacity (@voltage output) | : 1k Ω or more/5nF or less |
| Load resistance /inductance (@voltage output) | : 300k Ω or more/50mH or less |
| Insulation specification | : insulation between channels, bus insulation |



- Analog input/output may not function properly if performing improper wiring or configuration.
- Operating under external noise may affect to the analog input/output. Make sure the noise environment such as weather the shield is securely removed.
- Use the shield/twist cable.
- Never apply a voltage or current which is out of input/output range to the analog input/output pin. Applying a voltage more than $\pm 11V$ may result in malfunction of the board.
- Improper wiring or short circuit may cause malfunction of the parts on the board and then improper function of the robot system.

14.6.6 Pin Assignments (Analog I/O Board)

1CH Specifications

| Signal | Signal | Signal | Signal |
|--------|------------------|--------|------------------|
| 1 | VOUT (DAC 1ch) | 20 | Shield (DAC 1ch) |
| 2 | COM (DAC 1ch) | 21 | IOUT (DAC 1ch) |
| 3 | Shield (DAC 1ch) | 22 | COM (DAC 1ch) |
| 4 | Not Used | 23 | Not Used |
| 5 | Not Used | 24 | Not Used |
| 6 | Not Used | 25 | Not Used |
| 7 | Not Used | 26 | Not Used |
| 8 | Not Used | 27 | Not Used |
| 9 | Not Used | 28 | Not Used |
| 10 | Not Used | 29 | Not Used |
| 11 | Not Used | 30 | Not Used |
| 12 | Not Used | 31 | Not Used |
| 13 | Not Used | 32 | Not Used |
| 14 | Not Used | 33 | Not Used |
| 15 | Not Used | 34 | Not Used |
| 16 | Not Used | 35 | Not Used |
| 17 | Not Used | 36 | Not Used |
| 18 | Not Used | 37 | Not Used |
| 19 | Not Used | | |

4CH Specifications

| Signal | Signal | Signal | Signal |
|--------|------------------|--------|------------------|
| 1 | VOUT (DAC 1ch) | 20 | Shield (DAC 1ch) |
| 2 | COM (DAC 1ch) | 21 | IOUT (DAC 1ch) |
| 3 | Shield (DAC 1ch) | 22 | COM (DAC 1ch) |
| 4 | Not Used | 23 | Not Used |
| 5 | Not Used | 24 | Not Used |
| 6 | Not Used | 25 | Not Used |
| 7 | VIN (ADC 1ch) | 26 | Shield (ADC 1ch) |
| 8 | COM (ADC 1ch) | 27 | Not Used |
| 9 | Not Used | 28 | Not Used |
| 10 | Not Used | 29 | Not Used |
| 11 | VOUT (DAC 2ch) | 30 | Shield (DAC 2ch) |
| 12 | COM (DAC 2ch) | 31 | IOUT (DAC 2ch) |
| 13 | Shield (DAC 2ch) | 32 | COM (DAC 2ch) |
| 14 | Not Used | 33 | Not Used |
| 15 | Not Used | 34 | Not Used |
| 16 | Not Used | 35 | Not Used |
| 17 | Not Used | 36 | Not Used |
| 18 | VIN (ADC 2ch) | 37 | Shield (ADC 2ch) |
| 19 | COM (ADC 2ch) | | |

14.7 Force Sensor I/F Board

14.7.1 About Force Sensor I/F Board

You need to mount the Force Sensor I/F board in the option slot to communicate with the Force Sensor.

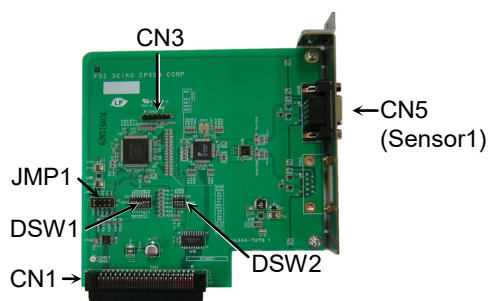
Force Sensor I/F board has one port for the connector to connect to Force Sensor and only one board is available.

When using the Force Sensor I/F board, one board expansion is available for RS-232C board.

Force Sensor can connect to all S250 series.

14.7.2 Board Configuration (Force Sensor I/F Board)

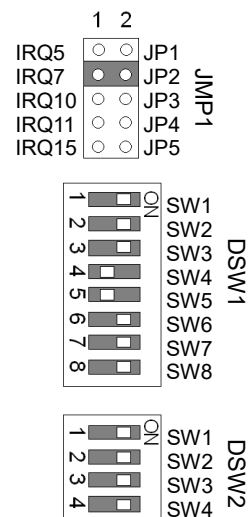
Board Appearance



CN3 is all open.

Switch and Jumper Configuration

Do not change the following DSW1, DSW2, and JMP1 configurations.

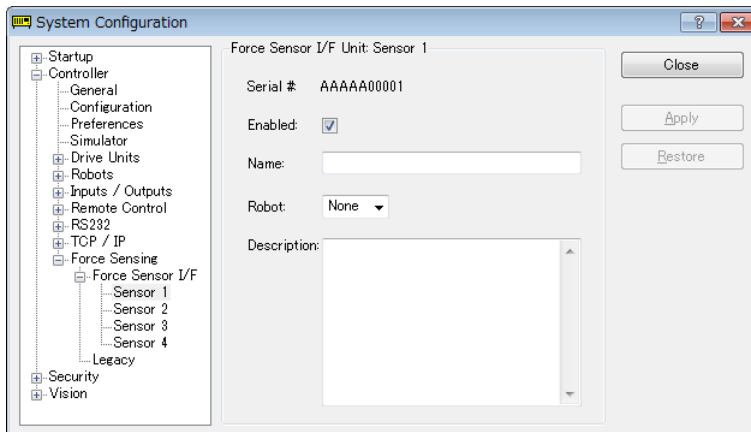


14.7.3 Confirmation with EPSON RC+ (Force Sensor I/F Board)

The Controller software automatically identifies the Force Sensor I/F board when mounting Force Sensor I/F board to the optional slot of the Controller.

Correct identification can be confirmed from EPSON RC+.

- (1) Select the EPSON RC+ 7.0 menu-[Setup]-[System Configuration] to display the [System Configuration] dialog.



- (2) Select [Force Sensing]-[Force Sensor I/F Unit].

For the setting method of the Force Sensor I/F unit, refer to the following.

EPSON RC+ 7.0 Online Help

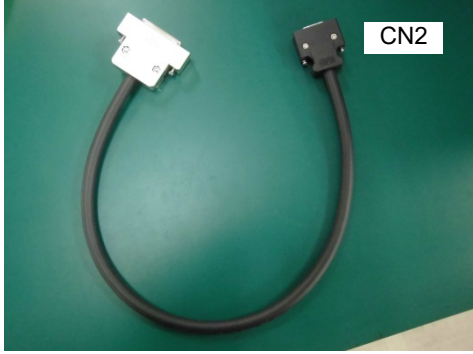
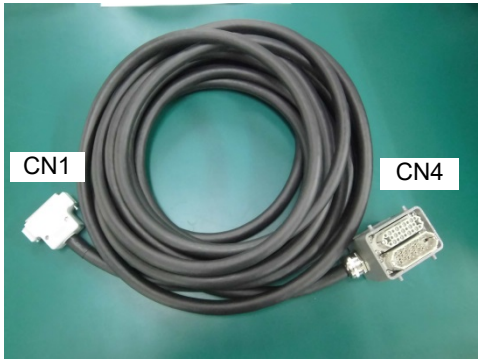
EPSON RC+ 7.0 Option Force Guide 7.0 Manual

Software 1.1 *Configuring the Force Sensor I/F Unit*

14.8 EUROMAP67 Board

EUROMAP67 is a standardized interface for communications between Western-manufactured injection molding machines (IMM) and robots.

List of accessories

| Parts Code | Parts | Note |
|------------|---|--|
| 2194667 | EUROMAP67 Cable1  | Emergency Stop cable (CN2) |
| 2194667 | EUROMAP67 Cable2  | Connection cable Robot Controller(CN1) - IMM(CN4) |
| 2165789 | EUROMAP67Emergency Connector Plug | For emergency stop switch wiring Soldering plug (CN3) |
| 2194882 | EUROMAP67Emergency Connector Shell | For emergency stop switch wiring Shell kit (CN3) |

Wire the emergency stop switch wiring connector (CN3).

Reference: *Setup & Operation 9. EMERGENCY*

The connector signal placement is described below.

Setup & Operation 14.8.11 Emergency stop connector Pin Assignments

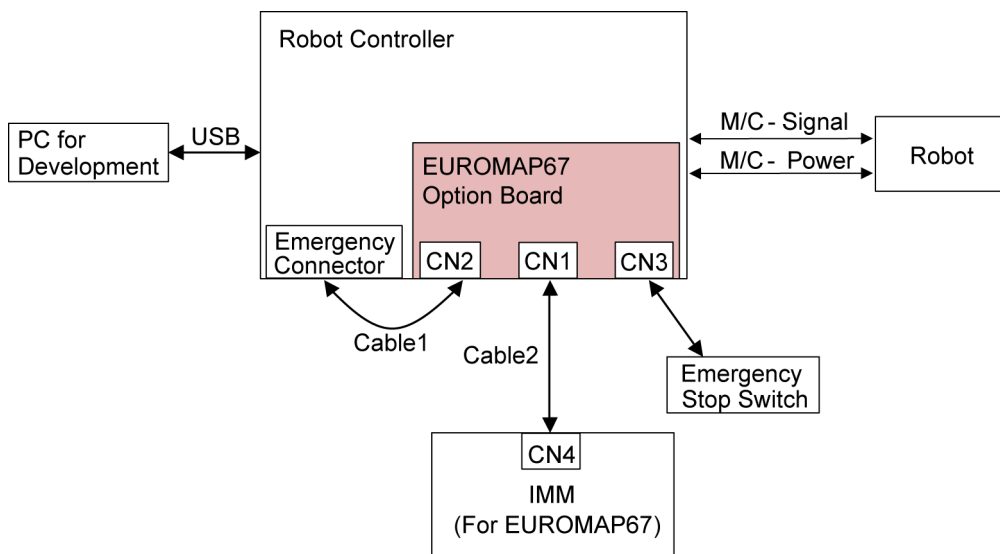
List of connectors used

| Connector No. | Manufacturer | Model |
|-----------------|--------------|---|
| CN1 | JAE | DD-50PF-N |
| CN2 | 3M | 10126-3000PE, 10326-52K0-008 |
| CN3 (accessory) | 3M | 10136-3000PE, 10336-52K0-008 |
| CN4 | Tyco | T1319320125-000 / T2020252201-000 / T2020252101-000 |

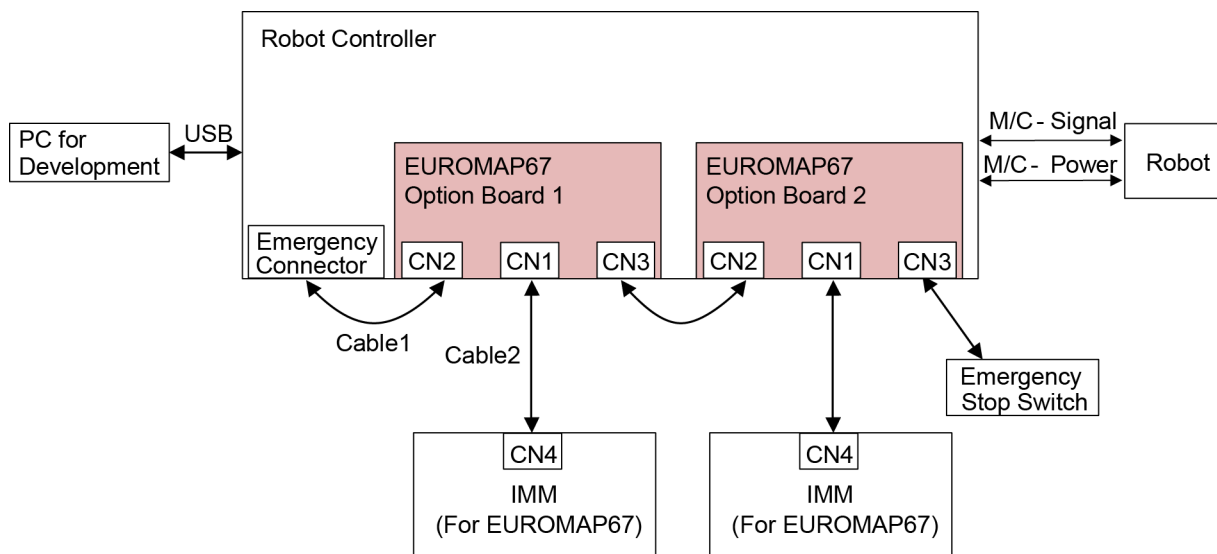
Connection outline

(IMM: Injection Molding Machine)

One EUROMAP67 board:



Two EUROMAP67 boards:



14.8.1 Notes on the EUROMAP67 Board

The EUROMAP67 board contains 15 inputs and 16 outputs on a single substrate.

You can install up to two EUROMAP67 board in the Controller.

The input and output bit numbers are assigned as follows.

| Input Bit # | Output Bit # | Supported Hardware |
|-------------|--------------|-------------------------------------|
| 192 to 206 | 192 to 208 | The 1 st EUROMAP67 board |
| 224 to 238 | 224 to 240 | The 2 nd EUROMAP67 board |

Outputs No.205 and No.237 are not used. However, the EUROMAP standard describes that they may potentially be used in the future.

EUROMAP67 pin definitions

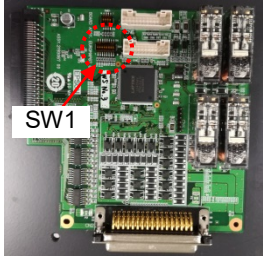
| EUROMAP connector (CN4) Pin No. | Signal Name | Note |
|---------------------------------|---|-------------------------|
| ZA1 ZC1 | Emergency stop of machine channel1 | |
| ZA2 ZC2 | Emergency stop of machine channel2 | |
| ZA3 ZC3 | Safety devices of machine channel1 | |
| ZA4 ZC4 | Safety devices of machine channel2 | |
| ZA5 | Reject | I/O Input (*1) |
| ZA6 | Mold closed | I/O Input (*1) |
| ZA7 | Mold open position | I/O Input (*1) |
| ZA8 | Intermediate mold opening position | I/O Input (*1) |
| ZA9 | Supply from handling device / robot | 24V DC (Robot → IMM) |
| ZB2 | Enable operation with handling device / robot | I/O Input (*1) |
| ZB3 | Ejector back position | I/O Input (*1) |
| ZB4 | Ejector forward position | I/O Input (*1) |
| ZB5 | Core pullers 1 in position 1 | I/O Input (*1) |
| ZB6 | Core pullers 1 in position 2 | I/O Input (*1) |
| ZB7 | Core pullers 2 in position 1 | I/O Input (*1) |
| ZB8 | Core pullers 2 in position 2 | I/O Input (*1) |
| ZC5 | Reserved for future use by EUROMAP | I/O Input (*1) |
| ZC6 | Reserved for future use by EUROMAP | I/O Input (*1) |
| ZC7 | Reserved for future use by EUROMAP | I/O Input (*1) |
| ZC8 | Not fixed by EUROMAP, manufacturer dependent | I/O Input (*1) |
| ZC9 | Supply from handling device / robot | 0V (Robot → IMM) |
| A1 C1 | Emergency stop of robot channel1 | |
| A2 C2 | Emergency stop of robot channel2 | |
| A3 C3 | Mold area free | |
| A4 C4 | Reserved for future use by EUROMAP | |

| EUROMAP connector (CN4) Pin No. | Signal Name | Note |
|---------------------------------|---|---------------------------|
| A5 | Not fixed by EUROMAP, manufacturer dependent | I/O Input (*1) |
| A6 | Enable mold closure | I/O Input (*1) |
| A7 | Enable full mold opening | I/O Input (*1) |
| A8 | Reserved for future use by EUROMAP | I/O Input (*1) |
| A9 | Supply from IMM | 24V DC (IMM → Robot) (*1) |
| B2 | Robot operation mode | I/O Input (*1) |
| B3 | Enable ejector back | I/O Input (*1) |
| B4 | Enable ejector forward | I/O Input (*1) |
| B5 | Enable movement of core pullers 1 to position 1 | I/O Input (*1) |
| B6 | Enable movement of core pullers 1 to position 2 | I/O Input (*1) |
| B7 | Enable movement of core pullers 2 to position 1 | I/O Input (*1) |
| B8 | Enable movement of core pullers 2 to position 2 | I/O Input (*1) |
| C5 | Not fixed by EUROMAP, manufacturer dependent | I/O Input (*1) |
| C6 | Reserved for future use by EUROMAP | I/O Input (*1) |
| C7 | Reserved for future use by EUROMAP | I/O Input (*1) |
| C8 | Not fixed by EUROMAP, manufacturer dependent | I/O Input (*1) |
| C9 | Supply from IMM | 0V (IMM → Robot) |

*1: DO NOT input a voltage which exceeds 24V. Board may get damage and burnout.

14.8.2 Board Settings (EUROMAP67 Board)

Configure DIP-Switch (SW1) to enable the robot Controller to recognize the EUROMAP67 board.

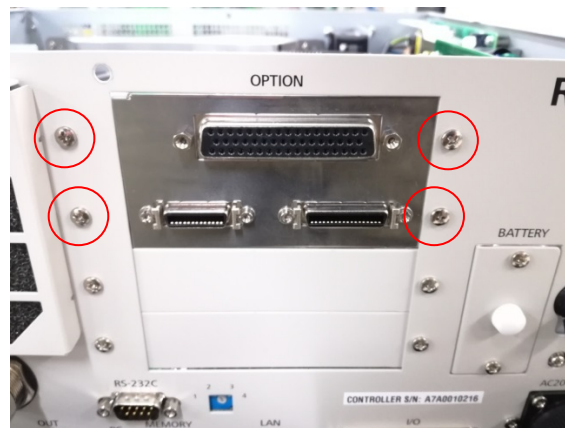
| Board Appearance | Switch setting: Setup the DSW1 | |
|---|--------------------------------|-------------------------------|
| | 1 st board | 2 nd board |
|  | 1 <input type="checkbox"/> ON | 1 <input type="checkbox"/> ON |
| | 2 <input type="checkbox"/> ON | 2 <input type="checkbox"/> ON |
| | 3 <input type="checkbox"/> ON | 3 <input type="checkbox"/> ON |
| | 4 <input type="checkbox"/> ON | 4 <input type="checkbox"/> ON |
| | 5 <input type="checkbox"/> ON | 5 <input type="checkbox"/> ON |
| | 6 <input type="checkbox"/> ON | 6 <input type="checkbox"/> ON |
| | 7 <input type="checkbox"/> ON | 7 <input type="checkbox"/> ON |
| | 8 <input type="checkbox"/> ON | 8 <input type="checkbox"/> ON |

14.8.3 Installation (EUROMAP67 Board)

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)
- (4) Insert the EUROMAP67 board into either slots 1, 2 or 3. (Slot 4 cannot be used.)
- (5) Use four screws to fix the EUROMAP67 board in place.

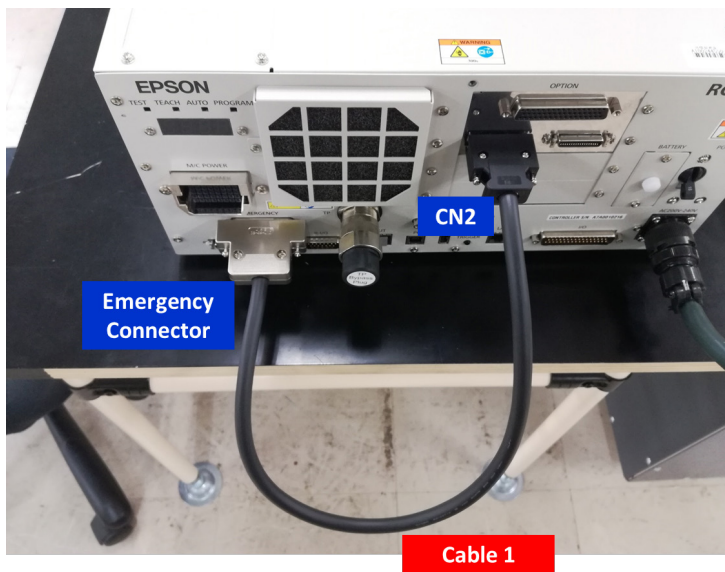
First, temporarily fasten the four screws in place. Next, fully tighten screws located diagonally opposite each other.

Take care not to damage the thread holes when doing so.



- (6) Connect “Cable1 CN2”.

Use a cross-point screwdriver to fasten the connector (CN2).

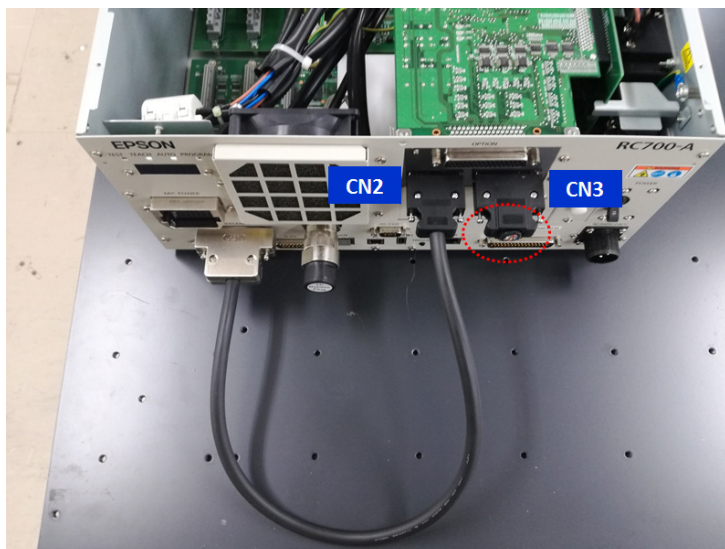


- (7) Refer to the following to connect CN3 to the emergency stop switch (emergency stop, safety door, latch).

Setup & Operation 9. EMERGENCY

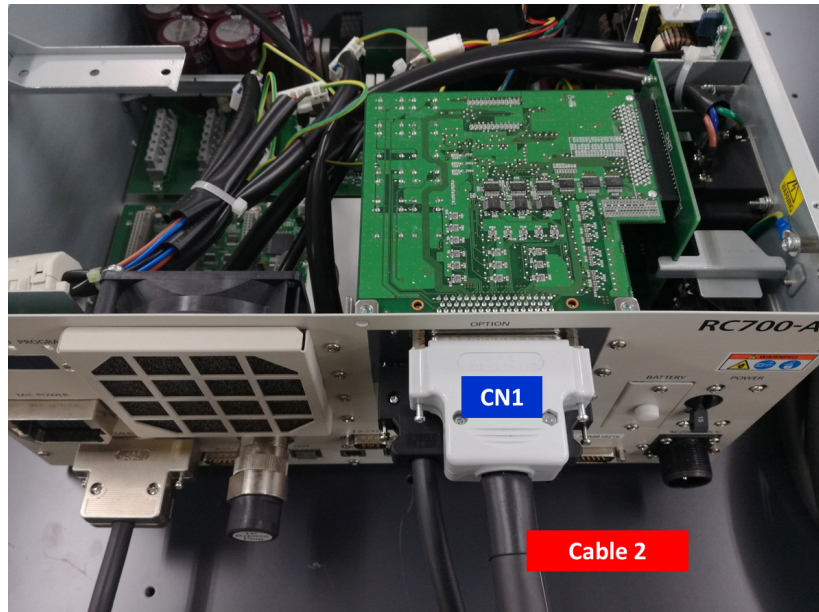
- (8) Connect “CN3”.

Use a cross-point screwdriver to fasten the connector (CN3).



- (9) Connect “Cable2 CN1”.

Use a cross-point screwdriver to fasten the connector (CN1).



- (10) Mount the Top Panel. (Mounting screw ×6)

- (11) Connect “Cable2 CN4” to the IMM.

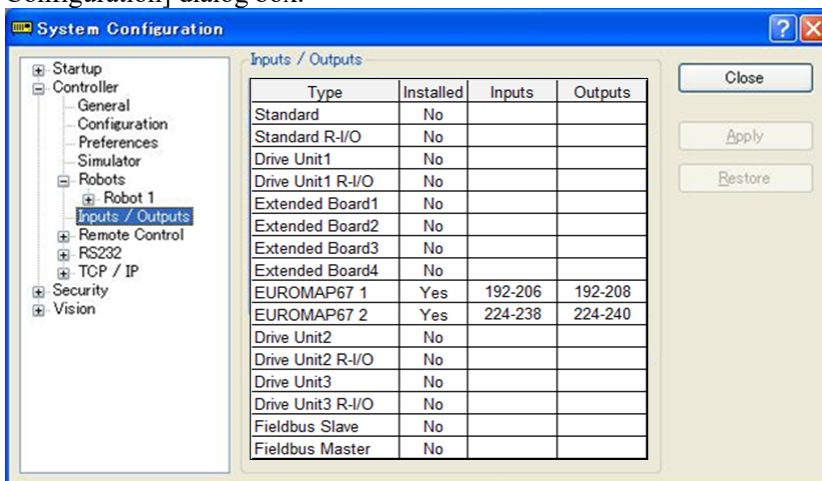
- (12) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

14.8.4 Confirming with EPSON RC+ 7.0 (EUROMAP67 Board)

The Controller software will automatically recognize the EUROMAP67 board when attaching it to the optional unit. This eliminates the need to configure software settings.

You can check whether the software has correctly recognized the EUROMAP67 board on the EPSON RC+ 7.0 screen.

- (1) Select EPSON RC+ 7.0 menu - [Setup] - [System Configuration] to display the [System Configuration] dialog box.



- (2) Select [Controller] - [Input/Output].
- (3) Check that the [Installed] is “Yes”.
The EUROMAP67 board has been recognized by the Controller software.
You can now select the compatible inputs and outputs to use.

14.8.5 Sample Project (EUROMAP67 Board)

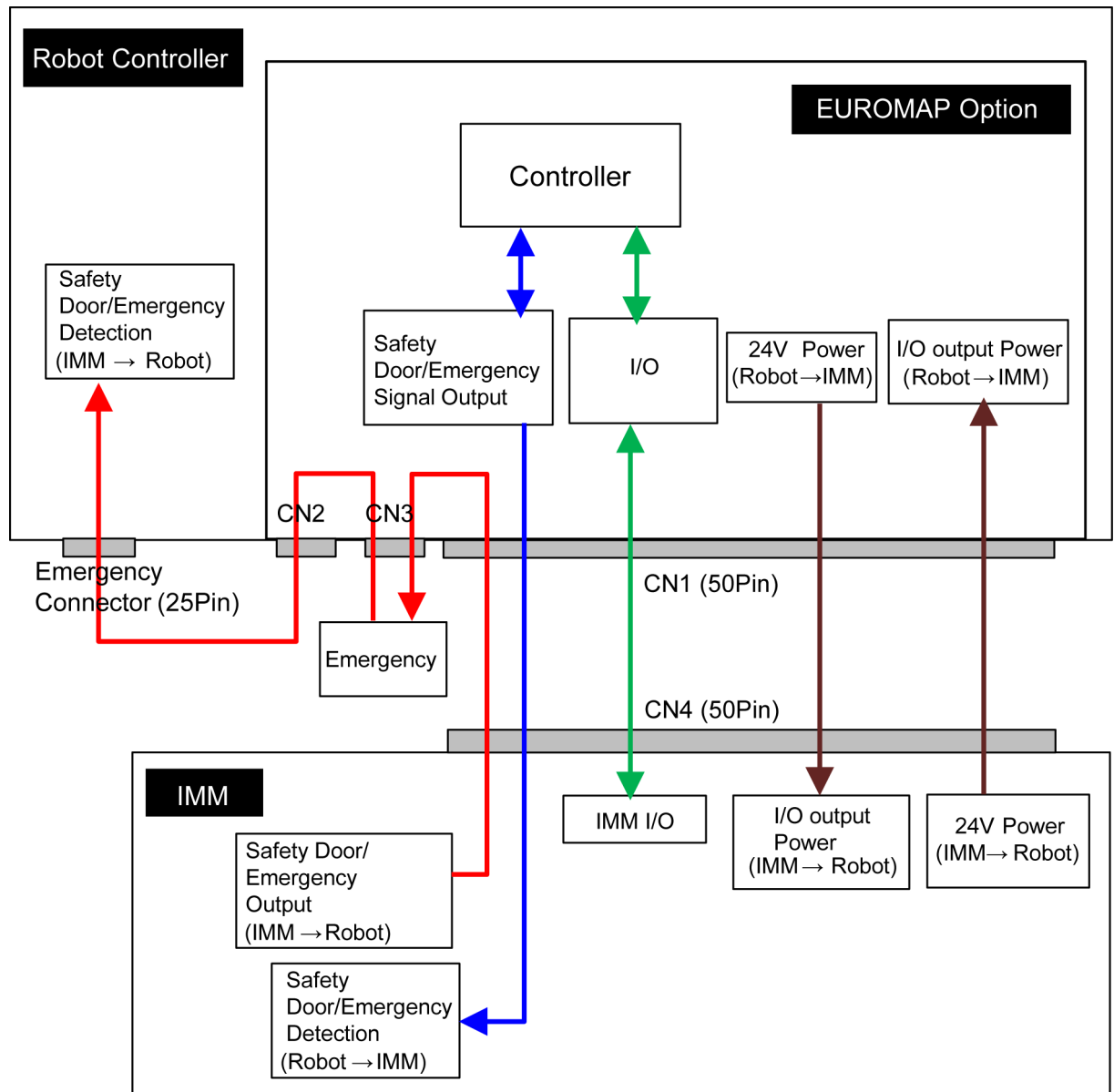
You can use a sample project of EUROMAP 67 board.

The following describes procedures to use the sample project.

- (1) Select EPSON RC+ 7.0 menu - [Project]-[Open..].
- (2) Select [Projects] - [Samples] - [Euromap67Demo1].
- (3) Click the <Open> button.
- (4) Modify the project depending on the IMM.

14.8.6 Circuit Overview (EUROMAP67 Board)

EUROMAP67 Board: System diagram



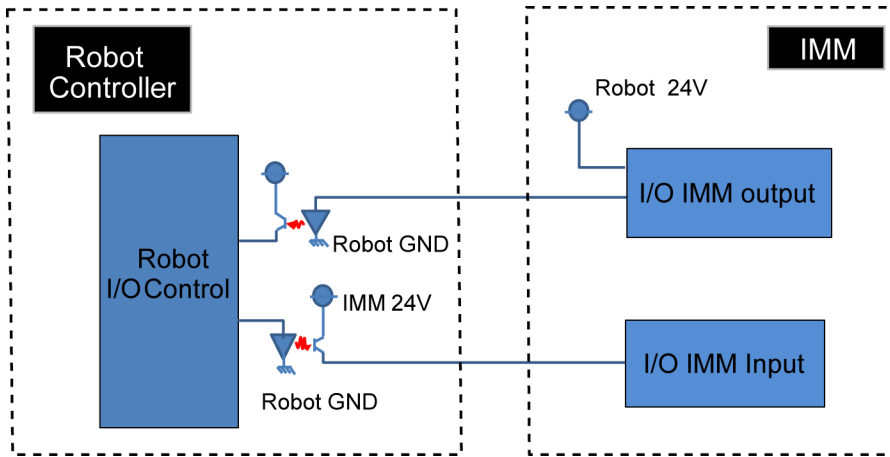
14.8.7 Input Circuit (EUROMAP67 Board)


Input Voltage Range : + 12 to 24 V ±10 %
 ON Voltage : + 10.8 V (MIN.)
 OFF Voltage : + 5 V (MAX.)
 Input Current : 10 mA TYP / + 24 V input

14.8.8 Output Circuit (EUROMAP67 Board)

Rated Output Voltage : + 12 V to 24 V ± 10 %
 Maximum Output Current : TYP 100 mA / 1 output
 Output Driver : PhotoMOS relay
 On-resistance (average) : 23.5Ω or less

EUROMAP67 board input/output circuit overview



| | |
|--|--|
|  CAUTION | <ul style="list-style-type: none"> ■ Input/output circuits do not have a built-in protection circuit to prevent short circuits or reverse connections. Take care to avoid wiring mistakes. Wiring mistakes may damage board parts and prevent the robot system from functioning properly. ■ Do not use a higher than rated voltage or current. Doing so may damage board parts and prevent the robot system from functioning properly. ■ Note that the I/O logic for controlling the IMM will vary depending on the molding machine. Confirm the proper logic to use before creating programs. |
|--|--|

14.8.9 Emergency Stop, Safeguard (EUROMAP67 Board)

When the emergency stop switch is held down on the robot Controller:

A function is used to communicate the emergency stop instruction to the IMM.

The emergency stop instruction is communicated using a safety relay. A deposition detection function is also provided.

→ When deposition is detected, the robot Controller will set the emergency stop instruction communicated to the IMM to OPEN.

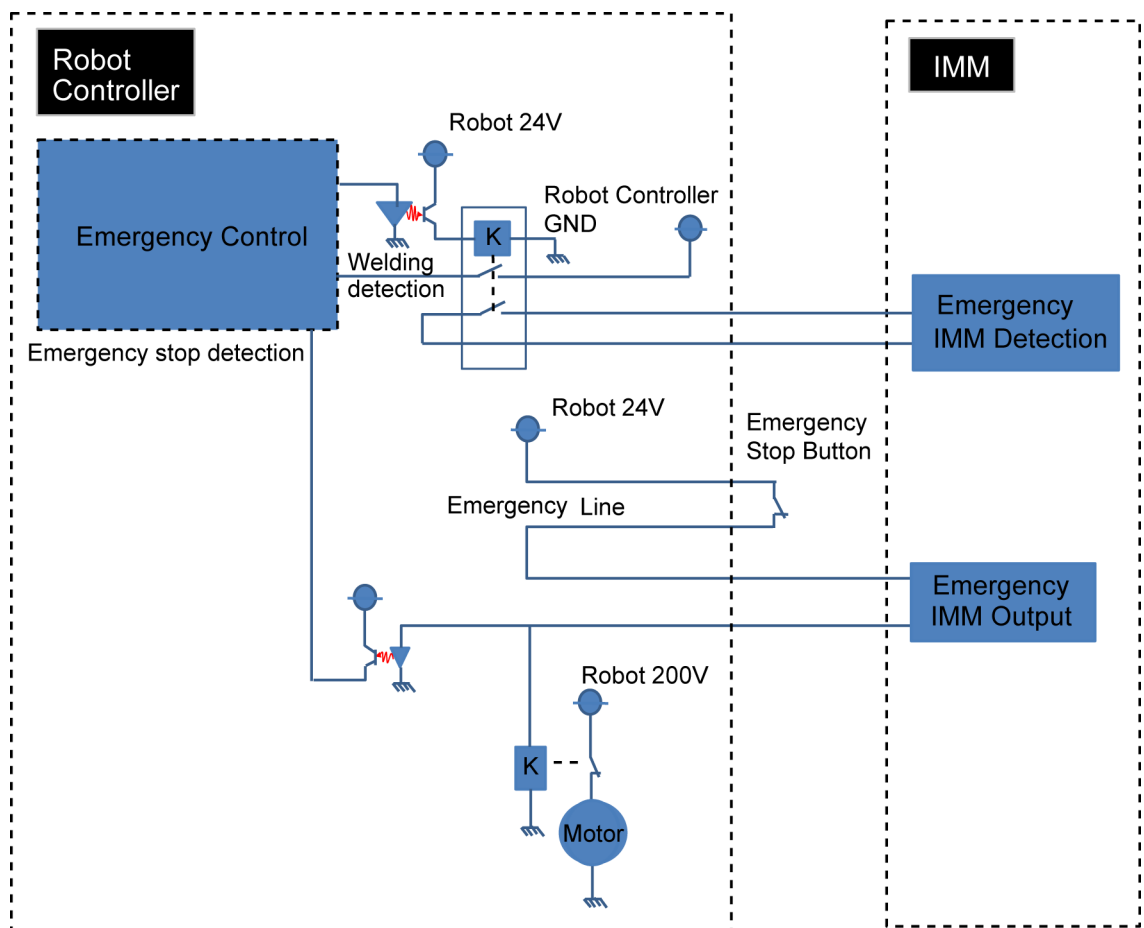
When an emergency stop occurs on the IMM side:

A function is used to communicate the emergency stop instruction to the robot Controller.

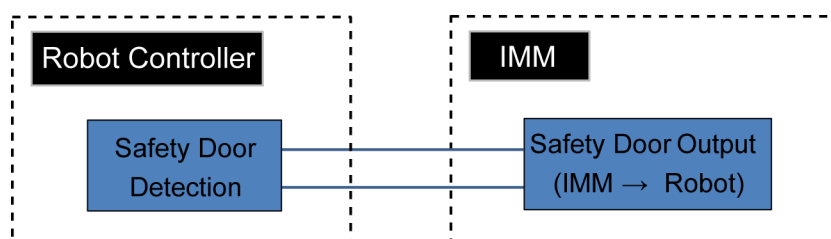
When the safety door has been opened on the IMM side:

A function is used to communicate the open safeguard instruction to the robot Controller.

EUROMAP67 Board: Overview of Emergency stop circuit



EUROMAP67 Board: Overview of Safety Door circuit



14.8.10 I/O Pin Assignments (EUROMAP67 Board)

I/O Pin Assignment table of the 1st EUROMAP67 board.

| Signal Name | D-Sub connector (CN1) Pin No. | EUROMAP67 connector (CN4) Pin No. |
|-----------------------------|----------------------------------|--------------------------------------|
| Input No.192 | 33 | ZA5 (*1) |
| Input No.193 | 32 | ZA6 (*1) |
| Input No.194 | 50 | ZA7 (*1) |
| Input No.195 | 49 | ZA8 (*1) |
| Input No.196 | 48 | ZB2 (*1) |
| Input No.197 | 47 | ZB3 (*1) |
| Input No.198 | 31 | ZB4 (*1) |
| Input No.199 | 30 | ZB5 (*1) |
| Input No.200 | 15 | ZB6 (*1) |
| Input No.201 | 14 | ZB7 (*1) |
| Input No.202 | 46 | ZB8 (*1) |
| Input No.203 | 45 | ZC5 (*1) |
| Input No.204 | 29 | ZC6 (*1) |
| Input No.205 | 28 | ZC7 (*1) |
| Input No.206 | 13 | ZC8 (*1) |
| Output No.192 | 41 | A6 (*1) |
| Output No.193 | 7 | A7 (*1) |
| Output No.194 | 8 | A8 (*1) |
| Output No.195 | 24 | B2 (*1) |
| Output No.196 | 25 | B3 (*1) |
| Output No.197 | 42 | B4 (*1) |
| Output No.198 | 43 | B5 (*1) |
| Output No.199 | 9 | B6 (*1) |
| Output No.200 | 10 | B7 (*1) |
| Output No.201 | 26 | B8 (*1) |
| Output No.202 | 27 | C6 (*1) |
| Output No.203 | 11 | C7 (*1) |
| Output No.204 | 4/3 | A3/C3 (ModuleArea+/ModuleArea-) |
| Output No.205 (Not Used) | 37/36 | A4/C4 (Not Used) |
| Output No.206 | 12 | C8 (*1) |
| Output No.207 | 40 | A5 (*1) |
| Output No.208 | 44 | C5 (*1) |
| 24V (IMM) | 1 | A9 (*1) |
| GND (IMM) | 2 | C9 (*1) |
| Emergency1 (IMM) | 39/38 | ZA1/ZC1 |
| Emergency2 (IMM) | 21/20 | ZA2/ZC2 |
| Safety1 (IMM) | 6/5 | ZA3/ZC3 |
| Safety2 (IMM) | 23/22 | ZA4/ZC4 |
| 24V (Robot) | 17 | ZA9 |
| GND (Robot) | 16 | ZC9 |
| Emergency1 (Robot) | 35/34 | A1/C1 |
| Emergency2 (Robot) | 19/18 | A2/C2 |

*1: DO NOT input a voltage which exceeds 24V. Board may get damage and burnout.

I/O Pin Assignment table of the 2nd EUROMAP67 board.

| Signal Name | D-Sub connector (CN1) Pin No. | EUROMAP67 connector (CN4) Pin No. |
|-----------------------------|----------------------------------|--------------------------------------|
| Input No.224 | 33 | ZA5 (*1) |
| Input No.225 | 32 | ZA6 (*1) |
| Input No.226 | 50 | ZA7 (*1) |
| Input No.227 | 49 | ZA8 (*1) |
| Input No.228 | 48 | ZB2 (*1) |
| Input No.229 | 47 | ZB3 (*1) |
| Input No.230 | 31 | ZB4 (*1) |
| Input No.231 | 30 | ZB5 (*1) |
| Input No.232 | 15 | ZB6 (*1) |
| Input No.233 | 14 | ZB7 (*1) |
| Input No.234 | 46 | ZB8 (*1) |
| Input No.235 | 45 | ZC5 (*1) |
| Input No.236 | 29 | ZC6 (*1) |
| Input No.237 | 28 | ZC7 (*1) |
| Input No.238 | 13 | ZC8 (*1) |
| Output No.224 | 41 | A6 (*1) |
| Output No.225 | 7 | A7 (*1) |
| Output No.226 | 8 | A8 (*1) |
| Output No.227 | 24 | B2 (*1) |
| Output No.228 | 25 | B3 (*1) |
| Output No.229 | 42 | B4 (*1) |
| Output No.230 | 43 | B5 (*1) |
| Output No.231 | 9 | B6 (*1) |
| Output No.232 | 10 | B7 (*1) |
| Output No.233 | 26 | B8 (*1) |
| Output No.234 | 27 | C6 (*1) |
| Output No.235 | 11 | C7 (*1) |
| Output No.236 | 4/3 | A3/C3 (ModuleArea+/ModuleArea-) |
| Output No.237 (Not Used) | 37/36 | A4/C4 (Not Used) |
| Output No.238 | 12 | C8 (*1) |
| Output No.239 | 40 | A5 (*1) |
| Output No.240 | 44 | C5 (*1) |
| 24V (IMM) | 1 | A9 (*1) |
| GND (IMM) | 2 | C9 (*1) |
| Emergency1 (IMM) | 39/38 | ZA1/ZC1 |
| Emergency2 (IMM) | 21/20 | ZA2/ZC2 |
| Safety1 (IMM) | 6/5 | ZA3/ZC3 |
| Safety2 (IMM) | 23/22 | ZA4/ZC4 |
| 24V (Robot) | 17 | ZA9 |
| GND (Robot) | 16 | ZC9 |
| Emergency1 (Robot) | 35/34 | A1/C1 |
| Emergency2 (Robot) | 19/18 | A2/C2 |

*1: DO NOT input a voltage which exceeds 24V. Board may get damage and burnout.

14.8.11 Emergency stop connector Pin Assignments (EUROMAP67 Board)

Emergency stop connector (CN2) Pin Assignment table of the EUROMAP67 board.

| Emergency stop connector (CN2) Pin No. | Signal Name | Function |
|--|-------------|-------------------------------|
| 1 | ESW11 | Emergency Stop switch contact |
| 2 | ESW12 | Emergency Stop switch contact |
| 3 | ESTOP1+ | Emergency Stop circuit 1+ |
| 4 | ESTOP1- | Emergency Stop circuit 1- |
| 5 | Not Used | - |
| 6 | Not Used | - |
| 7 | SD11 | Safety Door input 1 |
| 8 | SD12 | Safety Door input 1 |
| 9 | 24V | 24V output |
| 10 | 24V | 24V output |
| 11 | 24VGND | 24VGND output |
| 12 | 24VGND | 24VGND output |
| 13 | Not Used | - |
| 14 | ESW21 | Emergency Stop switch contact |
| 15 | ESW22 | Emergency Stop switch contact |
| 16 | ESTOP2+ | Emergency Stop circuit 2+ |
| 17 | ESTOP2- | Emergency Stop circuit 2- |
| 18 | SDLATCH1 | Safety Door Latch Release |
| 19 | SDLATCH2 | Safety Door Latch Release |
| 20 | SD21 | Safety Door input 2 |
| 21 | SD22 | Safety Door input 2 |
| 22 | 24V | 24V output |
| 23 | 24V | 24V output |
| 24 | 24VGND | 24VGND output |
| 25 | 24VGND | 24VGND output |
| 26 | Not Used | - |


Emergency stop connector (CN3) Pin Assignment table of the EUROMAP67 board.


| Emergency stop connector (CN3) Pin No. | Signal Name | Function |
|--|-------------|-------------------------------|
| 1 | ESW11 | Emergency Stop switch contact |
| 2 | ESW12 | Emergency Stop switch contact |
| 3 | ESTOP1+ | Emergency Stop circuit 1+ |
| 4 | ESTOP1- | Emergency Stop circuit 1- |
| 5 | Not Used | - |
| 6 | Not Used | - |
| 7 | SD11 | Safety Door input 1 |
| 8 | SD12 | Safety Door input 1 |
| 9 | 24V | 24V output |
| 10 | 24V | 24V output |
| 11 | 24VGND | 24VGND output |
| 12 | 24VGND | 24VGND output |
| 13 | Not Used | - |
| 14 | ESW21 | Emergency Stop switch contact |
| 15 | ESW22 | Emergency Stop switch contact |
| 16 | ESTOP2+ | Emergency Stop circuit 2+ |
| 17 | ESTOP2- | Emergency Stop circuit 2- |
| 18 | SDLATCH1 | Safety Door Latch Release |
| 19 | SDLATCH2 | Safety Door Latch Release |
| 20 | SD21 | Safety Door input 2 |
| 21 | SD22 | Safety Door input 2 |
| 22 | 24V | 24V output |
| 23 | 24V | 24V output |
| 24 | 24VGND | 24VGND output |
| 25 | 24VGND | 24VGND output |
| 26 | Not Used | - |
| 27 | Not Used | - |
| 28 | Not Used | - |
| 29 | Not Used | - |
| 30 | Not Used | - |
| 31 | Not Used | - |
| 32 | Not Used | - |
| 33 | Not Used | - |
| 34 | Not Used | - |
| 35 | Not Used | - |
| 36 | Not Used | - |


Maintenance


This section contains maintenance procedures for the Robot Controller.


1. Safety Precautions on Maintenance

| | |
|--|---|
|  WARNING | <ul style="list-style-type: none"> ■ 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. ■ 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. ■ Make sure to use only dedicated/specified maintenance parts especially for the optional boards or any other parts in the Controller to be replaced. Using non-specified parts may cause serious damage to the robot system and/or serious safety problems. ■ Do not remove any parts that are not covered in this manual. Follow the maintenance procedure strictly as described in this manual. Do not proceed using any methods other than described in this manual when you do replace a part or maintain the equipment. Improper removal of parts or improper maintenance may cause not only improper function of the robot system but also serious safety problems. |
|--|---|

| | |
|--|---|
|  WARNING | <ul style="list-style-type: none"> ■ Before performing any maintenance procedure, always make sure that the main power of the Controller is turned OFF, disconnect the power supply, and that the high voltage charged area is completely discharged. Performing any maintenance procedure while the main power is ON or the high voltage charged area isn't discharged completely is extremely hazardous and may result in electric shock and/or cause serious safety problems. |
|--|---|

| | |
|--|--|
|  CAUTION | <ul style="list-style-type: none"> ■ Do not touch the Motor Driver modules and Switching Power Supply directly in the Controller. The metal resistance of these can become very hot and may result in a burn. If you maintain them, examine the surface temperatures and wear protective gloves if necessary. ■ Do not shock, shake, or drop any parts during maintenance. When the parts related with data are shocked physically, they may be damaged and may also cause data loss during data loading/saving. |
|--|--|

| | |
|--|--|
|  <p>CAUTION</p> | <ul style="list-style-type: none">■ Do not lose the screws removed at maintenance. When the screw is dropped into the Controller, be sure to take it out. Leaving the screw in the Controller may cause short circuit and may result in equipment damage to the parts and/or robot system.■ Make sure that the power rating (wattage) of a new Motor Driver module is correct. Using a Motor Driver module with improper power rating (wattage) in the Controller may cause improper function of the robot system and errors.■ The serial number of the Manipulator that should be connected is indicated on the Connection Check Label on the Controller. Connect the Controller and the Manipulator correctly. Improper connection between the Controller and the Manipulator may cause not only improper function of the robot system but also serious safety problems. |
|--|--|

NOTE  Before performing maintenance on the Controller, all the data must be copied as a backup. The details of data backup/restore are described in the *Maintenance 4. Backup and Restore*.

2. Regular Maintenance Inspection

Performing regular maintenance inspection properly is essential for preventing trouble and maintaining safety. This chapter describes the schedules for maintenance inspection and procedures.

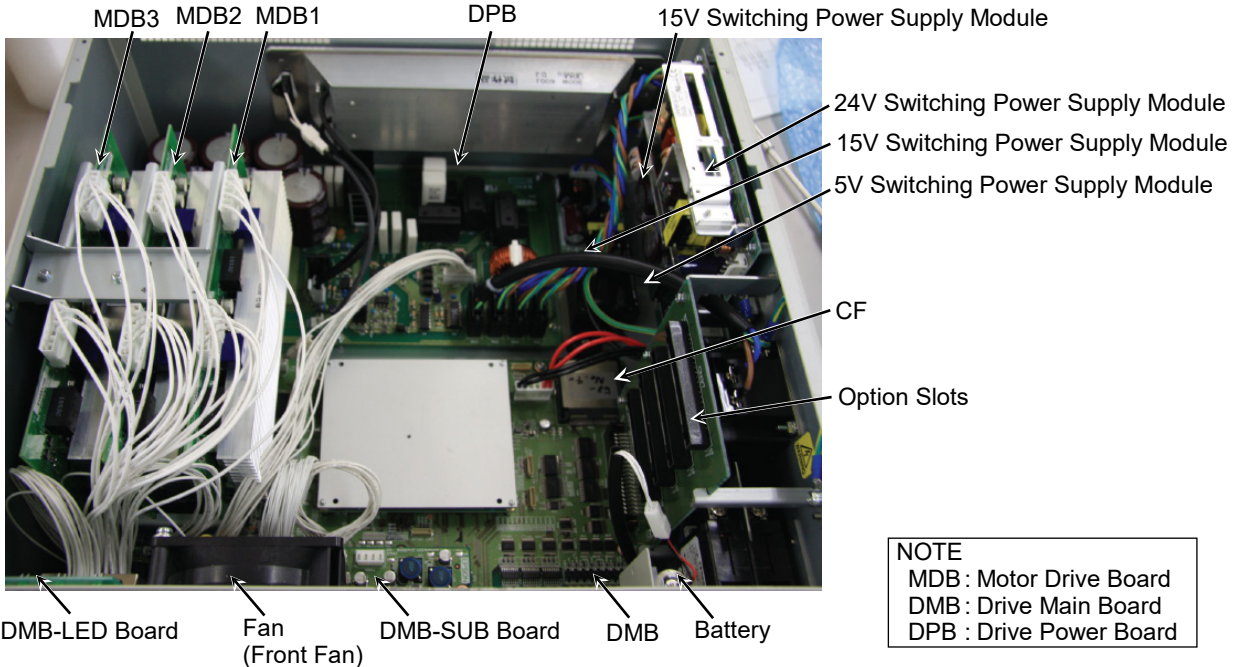
Be sure to perform the maintenance inspections in accordance with the schedules.

| Part | Fan filter | | Fan (Front) | Fan (Rear) | Battery |
|--|---|--|--|--|--|
| Content | Cleaning | Replacement | Replacement | Replacement | Replacement |
| Code | - | R13N865021 2195106 | R13B060510 | R13B060510 | R13B060003 |
| Quantity | - | 1 | 1 | 1 | 1 |
| Maintenance interval | More than once a month is recommended | When the filter gets deteriorated | When the error 515 occurs, or when the abnormal noise occurs | When the error 516 occurs, or when the abnormal noise occurs | Every 5 years, or when the error 511 occurs |
| Possible malfunction if maintenance is not performed | The temperature inside the Controller may get too high and the robot system may not operate properly. The error may occur due to reduction of the fan rotation. | The robot system may not operate properly due to dust or the like. | The error 9015 occurs and the robot system may stop. | The error 9016 occurs and the robot system may stop. | The error 9011 occurs and the robot system may stop. |
| Duration (reference) | 5 minutes | 5 minutes | 20 minutes | 15 minutes | 5 minutes |
| Reference: Maintenance | 7.1 <i>Fan Filter</i> | 7.1 <i>Fan Filter</i> | 7.2.1 <i>Front Fan</i> | 7.2.2 <i>Regenerative Fan(RC700-A only)</i> | 7.3 <i>Battery</i> |
| Expected product life | - | - | 30,000 hours | 30,000 hours | - |

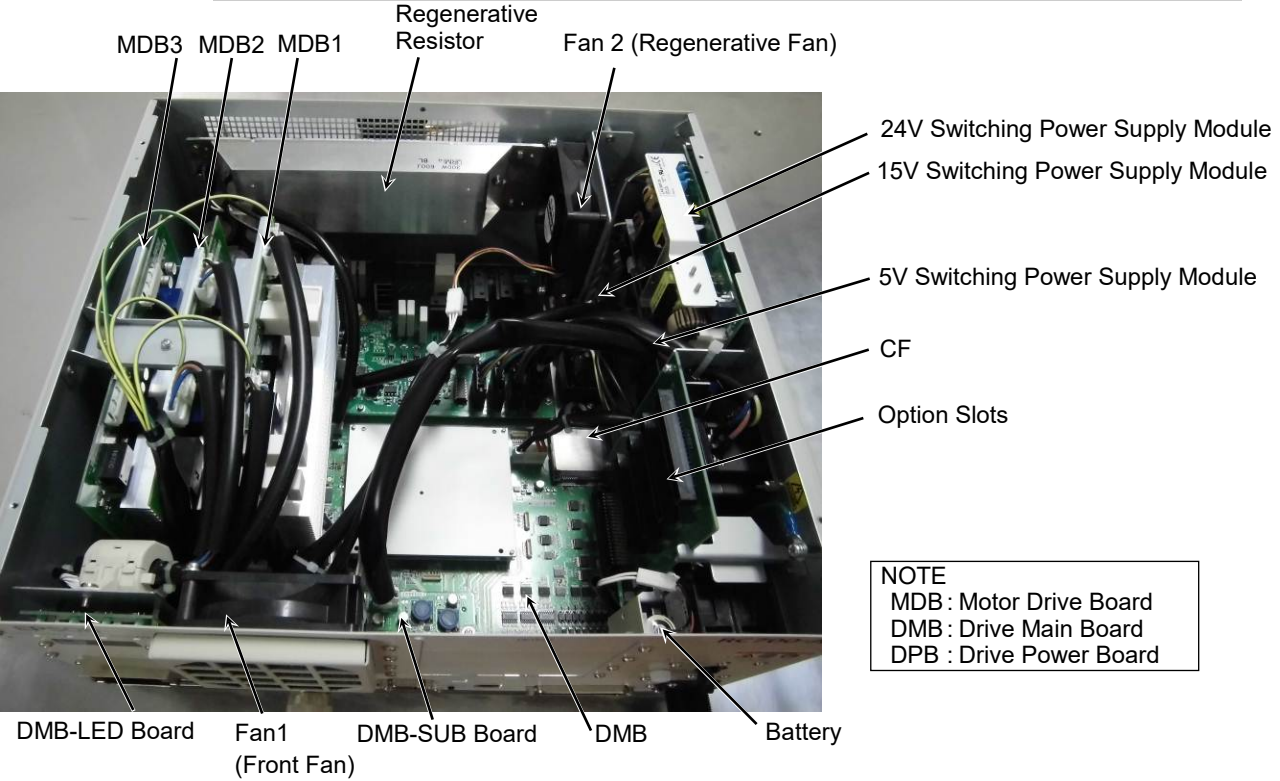
3. Controller Structure

3.1 Location of Parts

3.1.1 RC700



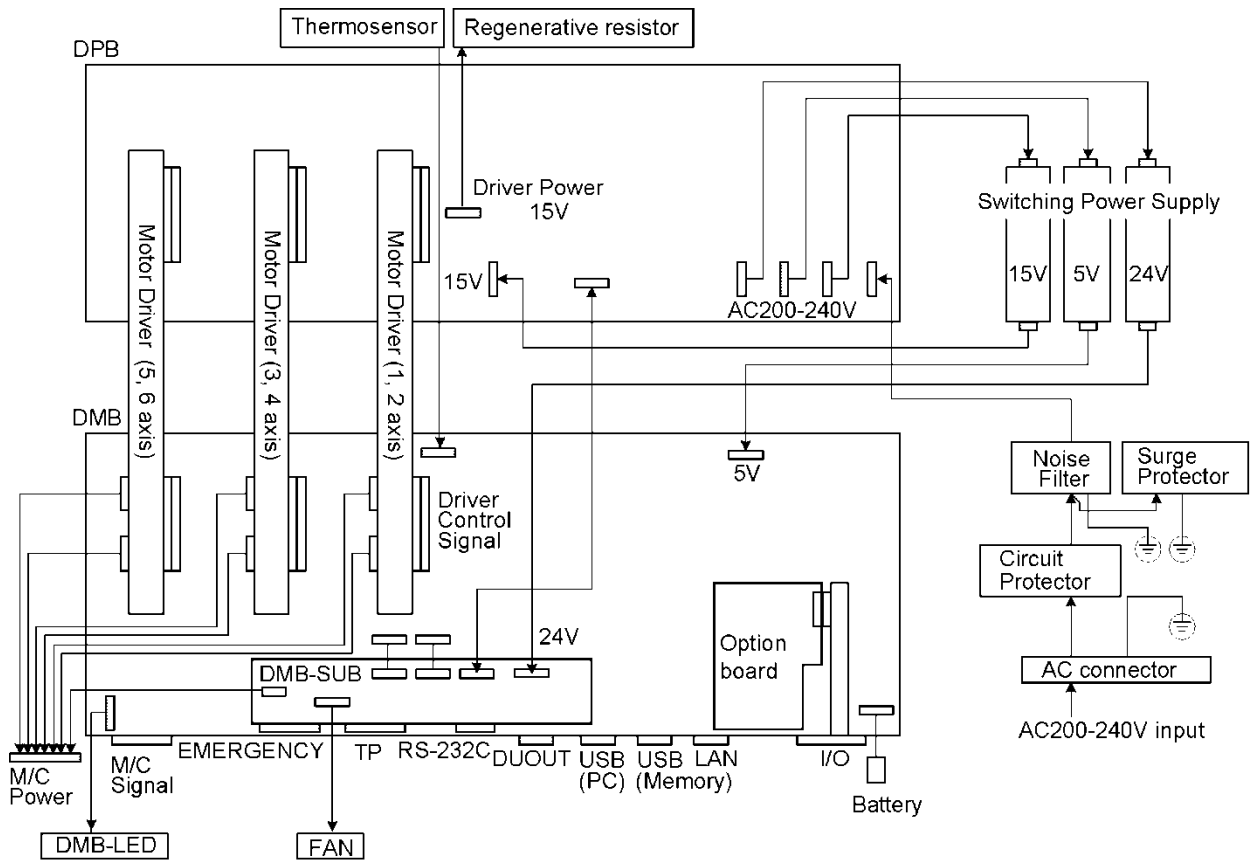
3.1.2 RC700-A



* MDB3 is not supplied for G1, G3, G6, G10, G20, and RS.

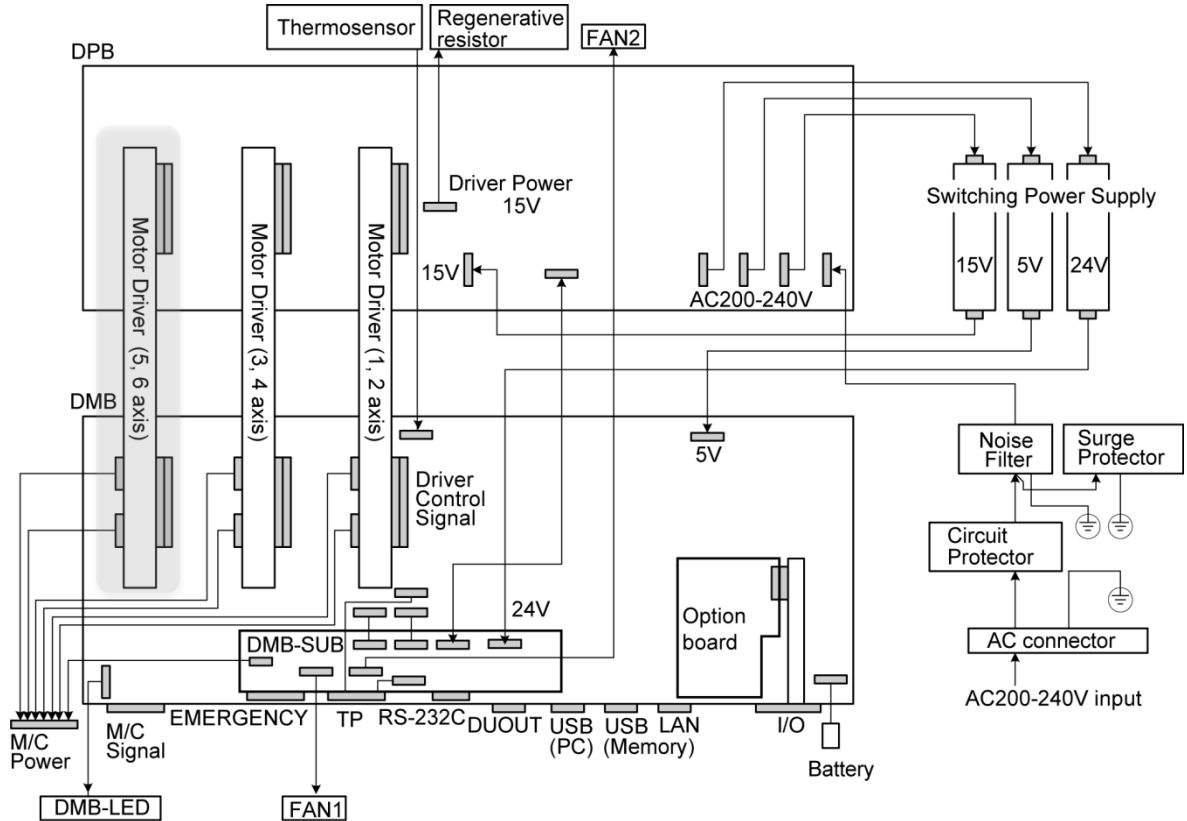
3.2 Diagram of Cable Connections

3.2.1 RC700



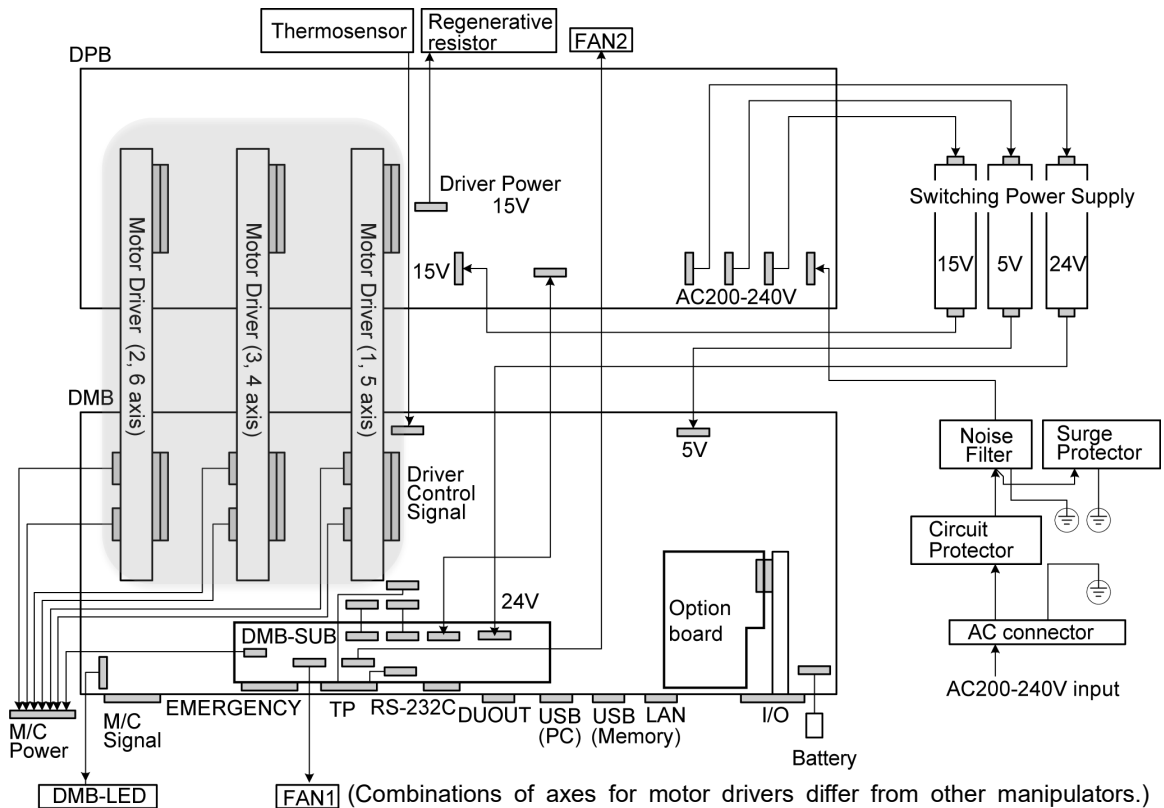
3.2.2 RC700-A

C4, C8, C12, G1, G3, G6, G10, G20, RS, X5



(Motor Driver (5, 6 axis) is not supplied for G1, G3, G6, G10, G20, RS and X5.)

N2, N6



(Combinations of axes for motor drivers differ from other manipulators.)

4. Backup and Restore


4.1 What is the Backup Controller Function?

The Controller configuration set by EPSON RC+ 7.0 can be stored with the “Backup Controller” function.

The Controller settings can be restored easily using the data previously stored with “Backup Controller” after a configuration mistake or Controller problem.

Be sure to execute “Backup Controller” before changing the Controller setup, before maintenance, or after teaching.

For some problems, backup may not be available before maintenance has to be performed. Be sure to backup the data after making changes, before problems occur.

NOTE  “Controller status storage function” is one of the RC700 / RC700-A functions. It saves the Controller setup data same as “Backup Controller.”

There data can be used as the backup data at restoring.

The methods for “Controller Status Storage” are as follows:

A : “Controller backup to the USB memory”

For details, refer to *Setup & Operation 6. Memory Port*.

B : “Export Controller backup function” in EPSON RC+ 7.0.

For details, refer to *EPSON RC+ 7.0 User’s Guide 5.9.9 Import Command (Project Menu)*.

4.2 Backup Data Types

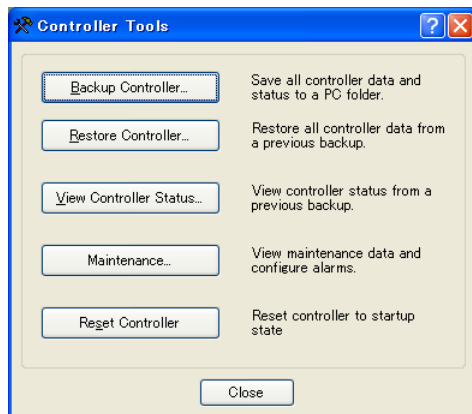
The table below shows the files created with “Backup Controller”.

| File Name | Overview | |
|----------------------------------|------------------------------|---|
| Backup.txt | Information file for restore | File including information for restoring the Controller. |
| CurrentMnp01.PRM | Robot parameters | Stores information such as TlSet. |
| InitFileSrc.txt | Initial configuration | Stores various Controller parameters. |
| MCSys01.MCD | Robot configuration | Stores connected Robot information. |
| All the files related to Project | Project related | All the project files transferred to the Controller. Includes program files when EPSON RC+ 7.0 is configured to transfer source code to the Controller. |
| GlobalPreserves.dat | Global Preserve variables | Saves values of Global Preserve variables. |
| WorkQueues.dat | WorkQue information | Saves information of Queues information of the WorkQue. |

4.3 Backup

Backup the Controller status from the EPSON RC+ 7.0.

- (1) Select EPSON RC+ 7.0 menu-[Tools]-[Controller] to display the [Controller Tools] dialog.



- (2) Click the <Backup Controller...> button to display the [Browse For Folder] dialog.



- (3) Specify the folder to save the backup data. Create a new folder if desired.
- (4) Click the <OK> button. A folder is created in the specified folder containing the backup data with a name in the following format.


B_ RC700_ serial number_ date status was saved
 → Example: B_ RC700_ 12345_ 2013-10-29-092951



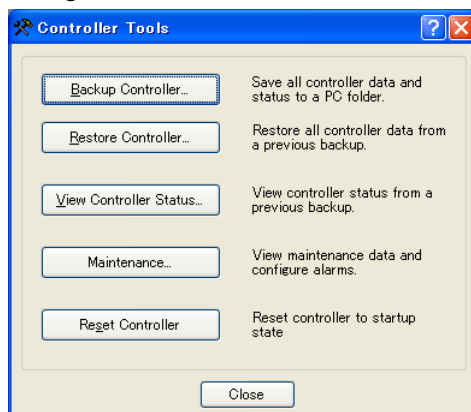
- Do not edit the backup files. Otherwise, operation of the robot system after data restoration to the Controller is not assured.

4.4 Restore

Restore the Controller status from the EPSON RC+ 7.0.

| | |
|---|---|
|  CAUTION | <ul style="list-style-type: none"> ■ Make sure that the data used for restore was saved previously for same Controller. ■ Do not edit the backup files. Otherwise, operation of the robot system after data restoration to the Controller is not assured. |
|---|---|

- (1) Select the EPSON RC+ 7.0 menu-[Tools]-[Controller] to display the [Controller Tools] dialog.



- (2) Click the <Restore Controller...> button to display the [Browse For Folder] dialog.



- (3) Specify the folder that contains the backup data. Backup data folders are named using the following format:

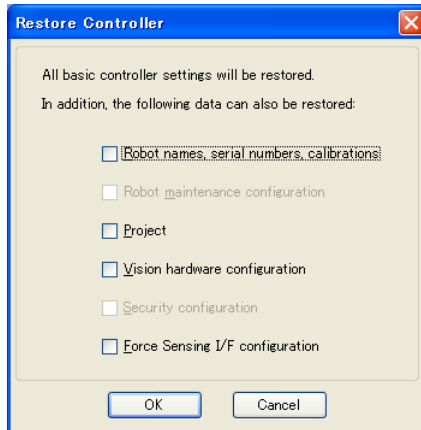
B_RC700_ serial number_ date status was saved

→ Example: B_RC700_12345_2011-04-03_092941



Data saved to the USB memory by the Backup Controller function can also be specified for restore.

- (4) Click the <OK> button to display the dialog to select the restore data.



Robot name, serial #, calibration

This checkbox allows you to restore the robot name, robot serial number, Hofs data, and CalPIs data. Make sure that the correct Hofs data is restored. If the wrong Hofs data is restored, the robot may move to wrong positions.

The default setting is unchecked.

Robot maintenance configuration

This checkbox allows you to restore the robot alarm related files.

For details, refer to *Maintenance 6 Alarm*.

This is not checked by the default setting.

Project

This checkbox allows you to restore the files related to projects.

The default is unchecked.

When a project is restored, the values of Global Preserve variables are loaded.

For details about Global Preserve variable backup, refer to *EPSON RC+ 7.0 User's Guide 5.10.10 Display Variables Command (Run Menu)*.

Vision hardware configuration

This checkbox allows you to restore the vision hardware configuration.

For details, refer to *EPSON RC+ 7.0 option Vision Guide 7.0*.

This is not checked by the default setting.

Security configuration checkbox

This checkbox allows you to restore the security configuration.

For details, refer to *EPSON RC+ 7.0 User's Guide 15. Security*.

This is not checked by the default setting.

Force Sensing I/F configuration

This checkbox allows you to restore the Force Sensing I/F configuration.

For details, refer to *EPSON RC+ 7.0 option Force Guide 7.0*.

This is not checked by the default setting.

- (5) Click the <OK> button to restore the system information.



Restore the system configuration saved using Backup Controller only for the same system.

When different system information is restored, the following warning message appears.



Click the <No> button (do not restore data) except for special situations such as Controller replacement.



When restoring the backup which includes the data of the robot configured to the Drive Unit, be sure to restore the data while the Drive Unit is connected and turned ON.



When restoring the backup including unsupported robot information to the target Controller, an error occurs.

5. Firmware Update

This chapter describes the firmware upgrade procedure and data file initialization when firmware or Robot configuration errors cause Controller startup or operation failure.

5.1 Updating Firmware

Firmware (software stored in non-volatile memory) and data files necessary to control the Controller and the Robot are preinstalled in the Controller. Controller configuration set from EPSON RC+ 7.0 is always saved in the Controller.

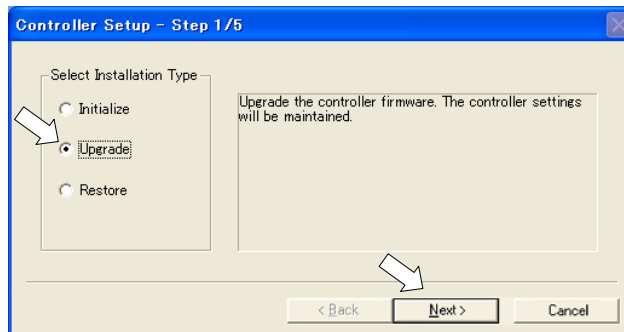
Controller firmware is supplied by CD-ROM as needed. Please contact the supplier of your region for information.

You must use a PC running EPSON RC+ 7.0 connected to a Controller with USB to update the Controller firmware. Firmware cannot be updated with an Ethernet connection.

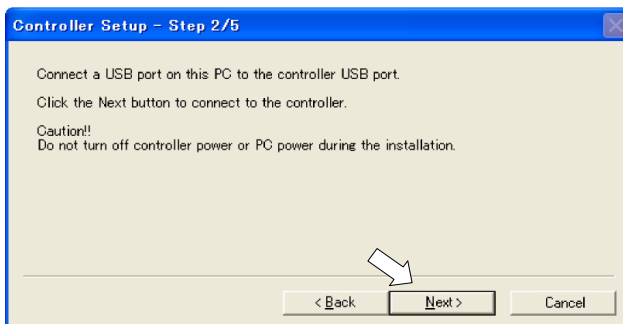
5.2 Firmware Upgrade Procedure

The firmware upgrade procedure is described as follows:

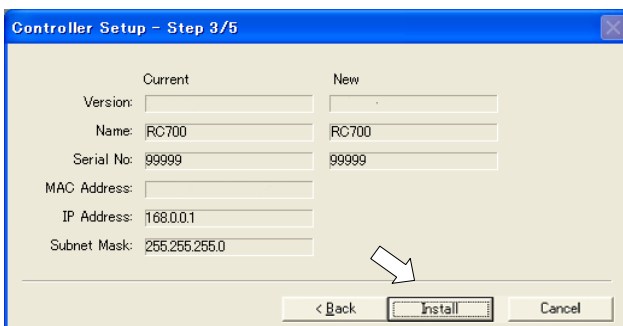
- (1) Connect the development PC and the Controller with a USB cable (the firmware cannot be changed with an Ethernet connection).
- (2) Turn ON the Controller. (Do not start the development software EPSON RC+ 7.0 until the firmware upgrade is completed.)
- (3) Insert the “firmware CD-ROM” in the development PC CD-ROM drive.
- (4) Execute “Ctrlsetup70.exe”. The following dialog appears.
- (5) Select the <Upgrade> option button and click the <Next> button.



- (6) Make sure that the development PC is connected to the Controller with a USB cable and Click the <Next> button.

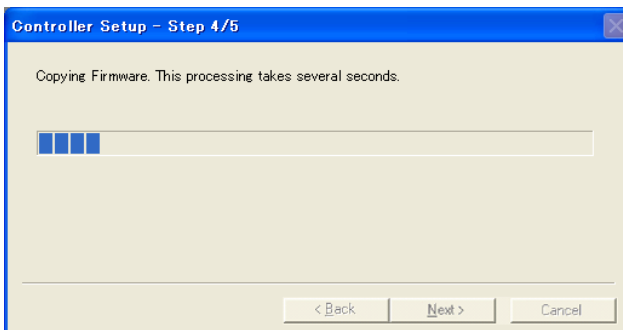


- (7) Check the current firmware version and the new firmware version and click the <Install> button.

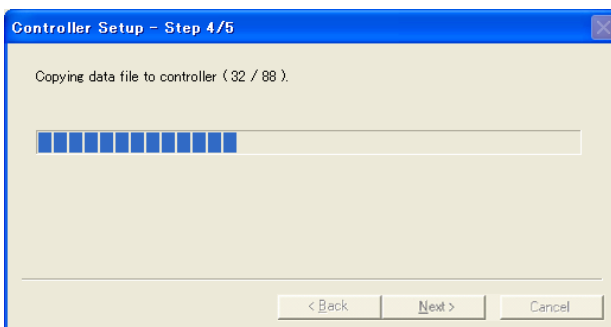


NOTE

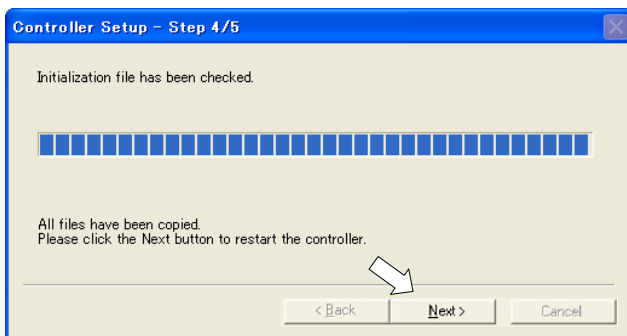

- (8) The firmware upgrade starts. It takes several minutes to complete. Do not disconnect the USB cable during transfer or turn OFF the Controller or the development PC.



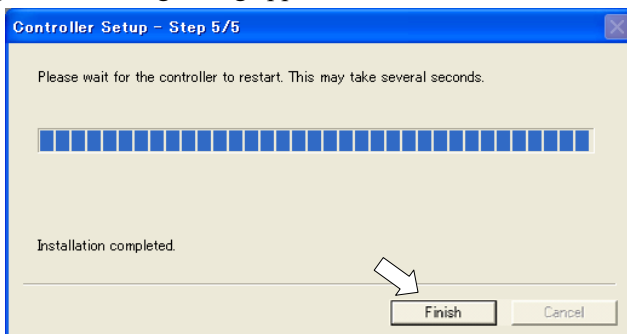
- (9) Continuous data file transfer starts.



(10) The following dialog appears when transfer has completed. Click the <Next> button to reboot the Controller.



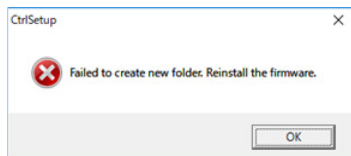
(11) The following dialog appears after the Controller reboot. Click the <Finish> button.



The firmware upgrade is complete.

NOTE


When you install the firmware (Ver.7.4.0.2 or later) on the Controller which the firmware (before Ver.7.4.0.2) has been installed, the following message is displayed.



When the message is displayed, re-install the firmware.

5.3 Controller Recovery

If the Controller becomes inoperable, use the procedures described in this section to recover.



Controller Backup is recommended for easy recovery of the Controller operation. For details of Controller Backup, refer to *Maintenance 4. Backup and Restore*.

The following two conditions describe the Controller error status after turning ON the Controller.

Condition A The Controller automatically changes to Recovery mode and the LED of ERROR, TEACH, and PROGRAM are lighting. You are able to communicate with the development PC though the Controller does not operate properly.

Condition B The LED of TEACH, AUTO, and PROGRAM do not blink.
Cannot communicate with the Controller using the development PC.

Countermeasure for the error status is as follows.

Condition A Follow *Maintenance 5.4 Firmware Initialization Procedure* to initialize the firmware.

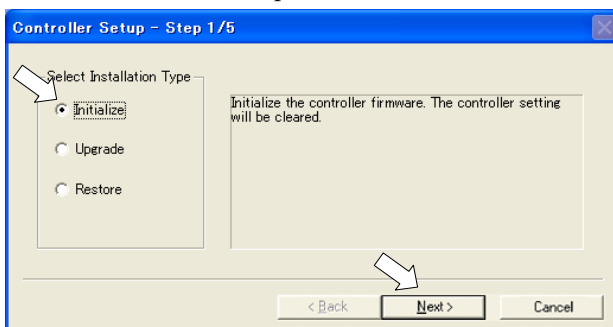
Condition B Execute the following steps:

- (1) Turn OFF the Controller.
- (2) Push the trigger button located on the front side of the Controller and while holding the button in, turn ON the Controller. Continue to hold in the trigger button for 30 seconds. This will cause the Controller to start in Recovery mode.
- (3) Make sure that the LED of ERROR, TEACH, and PROGRAM are lighting.
- (4) Follow the procedure in *Maintenance 5.4 Firmware Initialization Procedure* from step (3) to initialize the firmware.

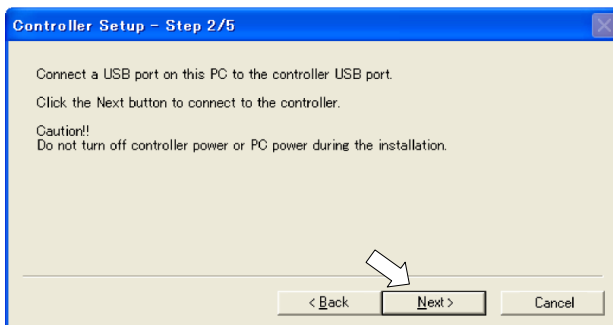
5.4 Firmware Initialization Procedure

The firmware initialization procedure described in this section.

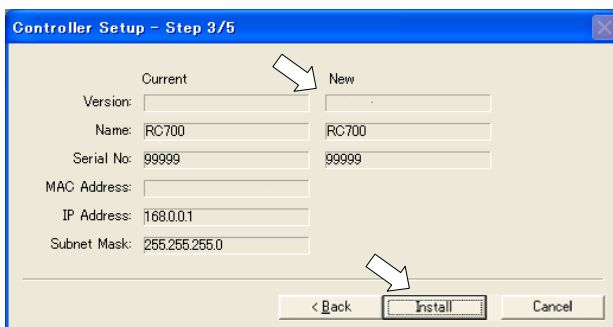
- (1) Connect the development PC to the Controller with a USB cable (the firmware cannot be changed with an Ethernet connection).
- (2) Turn ON the Controller. Do not start the development software EPSON RC+ 7.0 until firmware initialization is complete.
- (3) Insert the “firmware CD-ROM” in the development PC CD-ROM drive.
- (4) Execute “Ctrlsetup.exe”.
- (5) Select the <Initialize> option button and click the <Next> button.



- (6) Make sure that the development PC is connected to the Controller with a USB cable and Click the <Next> button.



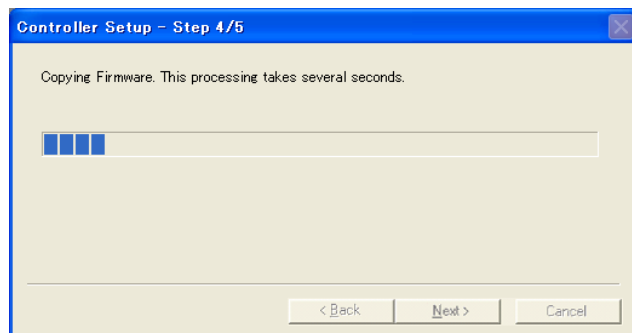
- (7) Check the version information and click the <Install> button.



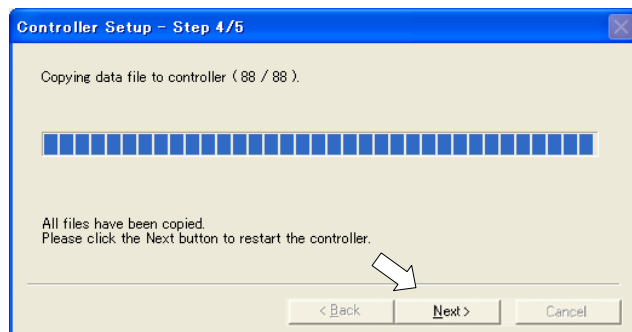
Firmware and data file transfer starts. It takes several minutes to complete.

NOTE

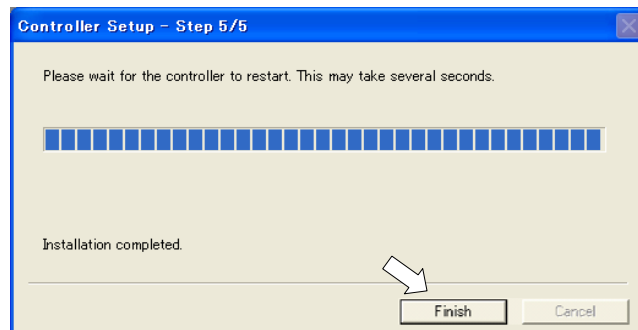

Do not disconnect the USB cable during transfer or turn OFF the Controller or the development PC.



- (8) The following dialog appears when transfer is completed. Click the <Next> button to reboot the Controller.



- (9) The following dialog appears after the Controller reboot. Click the <Finish> button.



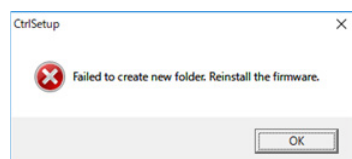
The firmware upgrade is completed.

Start EPSON RC+ 7.0 and restore the Controller settings.

For details of restoring the operating system, refer to *Maintenance 4. Backup and Restore*.

NOTE


When you install the firmware (Ver.7.4.0.2 or later) on the Controller which the firmware (before Ver.7.4.0.2) has been installed, the following message is displayed.



When the message is displayed, re-install the firmware.

6. Alarm

When the batteries (lithium batteries) for the Controller and the Manipulator drain, an alarm warning voltage reduction occurs. However, the alarm does not guarantee the battery lives until replacement, and it is necessary to replace the batteries immediately. If you run out the batteries, the robot parameters will be lost and recalibration of the robot will be required.

In addition, the parts for the Manipulator joints may cause accuracy decline or malfunction due to deterioration of the parts resulting from long term use. If the robot breaks down due to deterioration of the parts, it will take significant time and cost for repair.

The following sections describe the alarm function which announces the following maintenance timings in order to perform maintenance well ahead of time before the warning error.

The maintenance timings to be announced differ depending on the Controller firmware version.


Refer to the section according to the firmware version of your Controller.

| Controller firmware Ver. | Maintenance items |
|--------------------------|---|
| Before Ver.7.1.8.x | <ul style="list-style-type: none"> - Controller battery replacement - Robot battery replacement - Grease up |
| Ver.7.2.0.x or later | <ul style="list-style-type: none"> - Controller battery replacement - Robot battery replacement - Grease up - Replacement of the timing belt - Replacement of the motor - Replacement of the reduction gear unit - Replacement of the ball screw spline unit |

6.1 Before Controller Firmware Ver.7.1.8.x

6.1.1 Alarm Configuration

The alarm can be configured to announce the maintenance timings of robot battery/grease, and Controller battery. Expiration time of the alarm is set one month prior to the maintenance timing if setting the parts replacement date or grease up timing.

| | |
|---|---|
|  CAUTION | <ul style="list-style-type: none"> ■ Make sure that the date and time on the Controller are set correctly. The alarm cannot function properly with improper date and time setting. ■ If the CPU board or CF is replaced, the alarm information may be lost. When you replaced these parts, confirm the date and time of the Controller and alarm information. |
|---|---|

6.1.1.1 Robot Battery and Grease Up

When the robot is configured or changed, an alarm for the battery replacement and grease up will be configured automatically.


The following parts are subject to grease up:


6-axis robot: Bevel gear on the Joint #6


SCARA (including RS series): Ball screw spline unit on the Joint # 3


When the robot is deleted from the configuration, the alarm will also be automatically deleted.

For details on the robot configuration, refer to *the EPSON RC+ 7.0 User's Guide 10.1 Setting the Robot Model*.

| | |
|---|--|
|  CAUTION | <ul style="list-style-type: none"> ■ Changing of the robot should be done carefully. The alarm setting will be reset when the robot is changed. |
|---|--|

NOTE  The first alarm for the robot battery replacement and grease up after purchase may occur earlier than originally scheduled.

NOTE  If you are using the Controller with the firmware version before 7.1.0.x, the alarm information is not configured. In such case, edit the alarm information.
For details on the alarm information editing, refer to *Maintenance 6.1.3 How to Edit the Alarm Information*.

NOTE  The alarm information for the robot battery replacement and grease up depends on the Controller where the robot is configured to. If the robot is replaced with the other robot with a different serial number, the alarm will not function properly. When you replace the robot, edit the alarm information.
For details on the alarm information editing, refer to *Maintenance 6.1.3 How to Edit the Alarm Information*.

6.1.1.2 Controller Battery

The Controller battery is automatically configured at the first connection with the EPSON RC+7.0 after upgrading to the firmware version 7.1.0.x and later.



If you are using the Controller before the version upgrade, there may be a difference in the alarm information. In such case, edit the alarm information. For details on the alarm information editing, refer to *Maintenance 6.1.3 How to Edit the Alarm Information*.

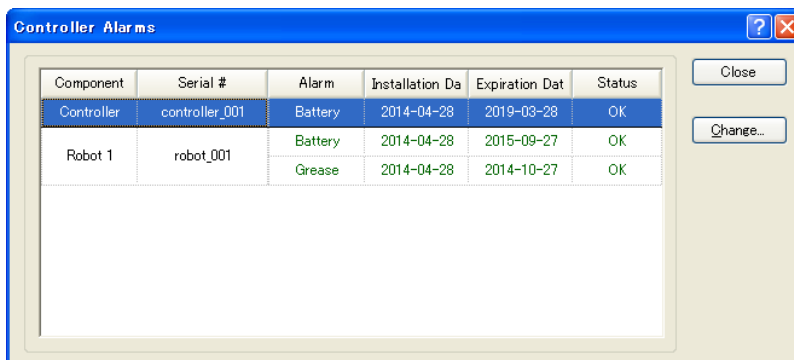
6.1.2 How to View the Alarm Information

The configured alarm information can be checked in the EPSON RC+ 7.0.

- (1) Select the EPSON RC+ 7.0 menu-[Tools]-[Maintenance] to display the [Controller Tools] dialog box.



- (2) Click the <Controller Alarms> button and display the [Controller Alarms] dialog box.



There are three states of the alarm.

| Display | Status |
|---------|--|
| OK | An alarm is configured. An alarm is not occurring. |
| Expired | An alarm is occurring. Replacement is required. |
| Not set | An alarm is not configured. |

6.1.3 How to Edit the Alarm Information

The configured alarm information can be edited in the EPSON RC+ 7.0.

- (1) Select EPSON RC+ 7.0 menu-[Tools]-[Maintenance] to display the [Controller Tools] dialog box.
- (2) Select the alarm to be changed and click the <Change> button.
- (3) Display the [Change Alarm] dialog box and enter any of the followings.
 - Purchase or replacement date of the battery
 - Date of grease up



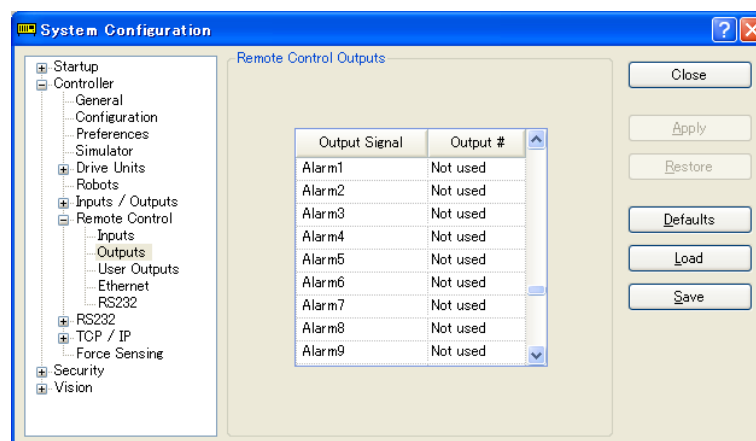
- (4) Click the <OK> button and change the specified alarm information.

6.1.4 Alarm Notifying Method

The alarm notifying method needs to be configured by the output bit of the Remote I/O.

The Remote I/O can be configured in the EPSON RC+ 7.0- [Setup] - [System Configuration] - [Controller] - [Remote Control].

For details, refer to *the EPSON RC+ 7.0 User's Guide 12.1 Remote I/O*.



NOTE The Controller does not enter the error or warning state even if an alarm occurs.

6.1.5 How to Cancel the Alarm

An alarm occurs when it reaches the set expiration time.

There are following two methods to cancel the alarm.

- From the [Change Alarm] dialog box
- By the input bit of the Remote I/O



The alarm cannot be canceled by executing the Reset command or restarting the Controller.

6.1.5.1 Alarm Cancellation Dialog

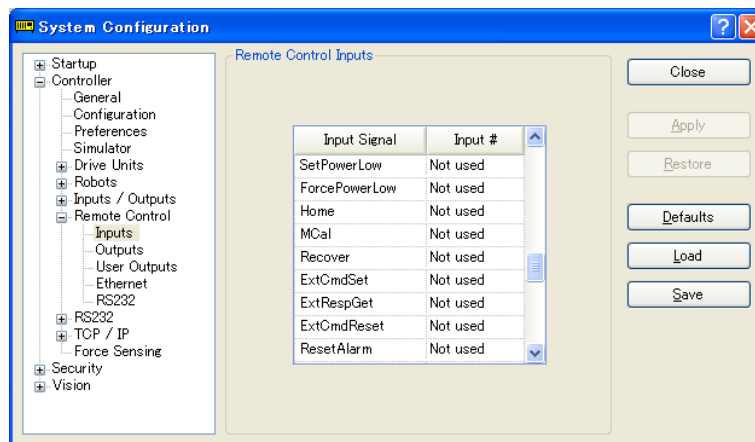
The alarm can be canceled from the EPSON RC+ 7.0.

By referring to *Maintenance 6.1.3 How to Edit the Alarm*, change the alarm information in the same steps.



6.1.5.2 Remote Input

The alarm can be canceled by the input bit of the Remote I/O.



For details, refer to the EPSON RC+ 7.0 *User's Guide 12.1 Remote I/O*.

6.2 Controller Firmware Ver.7.2.0.x or later

NOTE



X5 series cannot use this function.

6.2.1 Maintenance

The recommended replacement time can be configured for the Controller batteries, robot batteries/grease, timing belts, motors, reduction gear units, and ball screw spline units.



- Make sure that the date and time on the Controller are set correctly.
The maintenance cannot function properly with improper date and time setting.
- If the CPU board or CF is replaced, the maintenance information may be lost.
When you replaced these parts, confirm the date and time of the Controller and the maintenance information.

NOTE



Setting of the maintenance vary depending on installation methods to update from the firmware version 7.1.0.x or earlier to 7.2.0.x or later.

Initial installation : Maintenance is enabled.

Upgrade : Maintenance inherits the previous data.
(Disables as default)

For details for enabling or disabling the maintenance, refer to the *EPSON RC+ 7.0 User's Guide 5.12.2 [System Configuration] Command (Setup Menu) - [Setup]-[System Configuration]-[Controller]-[Preferences] Page.*

NOTE



Maintenance is enabled at shipment.

6.2.1.1 Robot Maintenance Information

If enabled, the maintenance information for the battery, timing belts, motors, reduction gear units, ball screw spline unit, and grease up will be configured automatically when the robot is configured or changed.

The following parts are subject to grease up:

SCARA (including RS series): Ball screw spline unit on the Joint # 3

When the robot is deleted from the configuration, the maintenance information will also be automatically deleted.

For details on the robot configuration, refer to *the EPSON RC+ 7.0 User's Guide 10.1 Setting the Robot Model.*




- Changing of the robot should be done carefully. The alarm setting will be reset when the robot is changed.

NOTE



If you are using the Controller with the firmware version before 7.1.0.x, the maintenance information is not configured. In such case, edit the information.


For details on the maintenance information editing, refer to *Maintenance 6.2.3 How to Edit the Maintenance Information.*

NOTE  The robot maintenance information depends on the Controller where the robot is configured to. If the robot is replaced with the other robot with a different serial number, the maintenance information will not function properly. When you replace the robot, edit the maintenance information.

For details on the maintenance information editing, refer to *Maintenance 6.2.3 How to Edit the Maintenance Information*.

6.2.1.2 Controller Maintenance Information

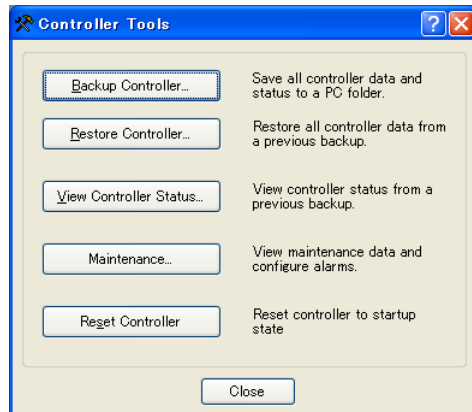
If the maintenance is enabled, the Controller battery is automatically configured at the first connection with the EPSON RC+7.0 after upgrading to the firmware version 7.2.0.x and later.

NOTE  If you are using the Controller before the version upgrade, there may be a difference in the maintenance information. In such case, edit the information. For details on the maintenance information editing, refer to *Maintenance 6.2.3 How to Edit the Maintenance Information*.

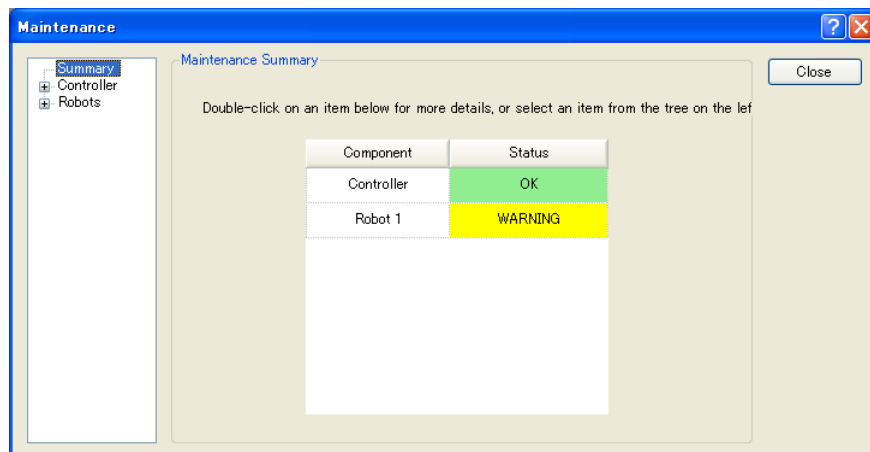
6.2.2 How to View the Maintenance Information

The configured maintenance information can be checked in the EPSON RC+ 7.0 Ver.7.2.x or later.

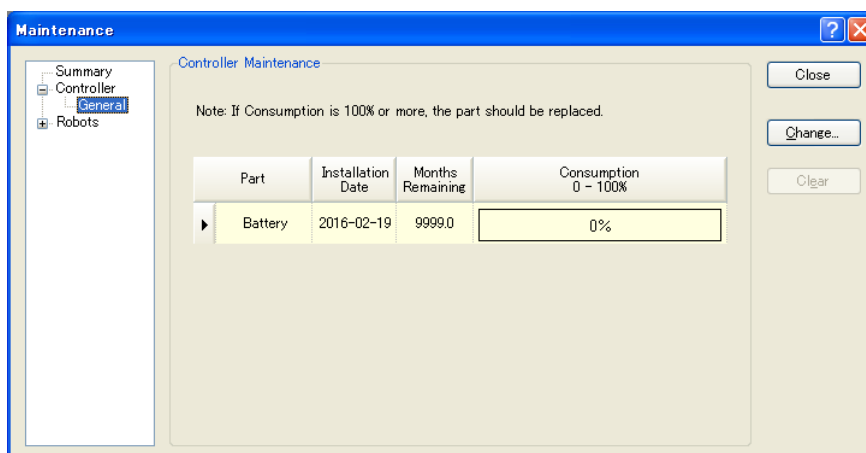
- (1) Select the EPSON RC+ 7.0 menu-[Tools]-[Maintenance] to display the [Controller Tools] dialog box.



- (2) To check the Controller maintenance information, click the <Maintenance> button and display the [Maintenance] dialog box.



- (3) Select “General” or specify the axis from the tree to display information of the target parts.



NOTE


The recommended replacement time for the battery is calculated based on the battery capacity and the Controller ON time. The battery may run out if it passes the recommended replacement time.

The recommended replacement time for the grease is calculated based on the elapsed days since date of grease up. The replacement time may be shorter or longer depending on usage condition, such the load applied on the robot.

The recommended replacement time for the parts (timing belts, motors, reduction gear units, and ball screw spline unit) is when it reaches the L10 life (time until 10% failure probability). In the dialog window, the L10 life is displayed as 100%.

Remaining months is calculated based on the past operation conditions. Enable to set the period for calculation by “HealthCalcPeriod” command. (Default: seven days of the Controller ON time)

Remaining months may not be calculated properly until the period for the calculation passed.

6.2.3 How to Edit the Maintenance Information

The configured maintenance information can be edited in the EPSON RC+ 7.0 Ver.7.2.x or later.

- (1) Select the EPSON RC+ 7.0 menu-[Tools]-[Maintenance] to display the [Controller Tools] dialog box.
- (2) To edit the maintenance information, display the [Maintenance] dialog box.
- (3) Select “General” or specify the axis from the tree to display information of the target parts.
- (4) Select the alarm to be changed and click the <Change> button.
- (5) Display the [Change Alarm] dialog box and enter any of the followings.



Purchase or replacement date of the battery

Date of grease up

Purchase or replacement date of the timing belt

Purchase or replacement date of the motor

Purchase or replacement date of the reduction gear unit

Purchase or replacement date of the ball screw spline unit

- (6) Click the <OK> button and change the specified alarm information.



The offset can be set for the consumption rate of already installed parts.

Follow the steps below to calculate a rough offset setting value.

1. Measure the usable months for the past operation by HealthRBA analysis.
2. Confirm the past Motor ON time in the Controller status viewer.
3. Calculate a rough offset value with the following formula.

$$\text{Offset} = 100 \times \frac{\text{Motor On time}}{24 \times 30.4375 \times \text{Usable months}}$$

For details, refer to the following manual.

EPSON RC+ 7.0 SPEL+ Language Reference

6.2.4 Alarm Notifying Method

The Controller status becomes warning and displays warning message if any parts required to perform replacement or grease up.

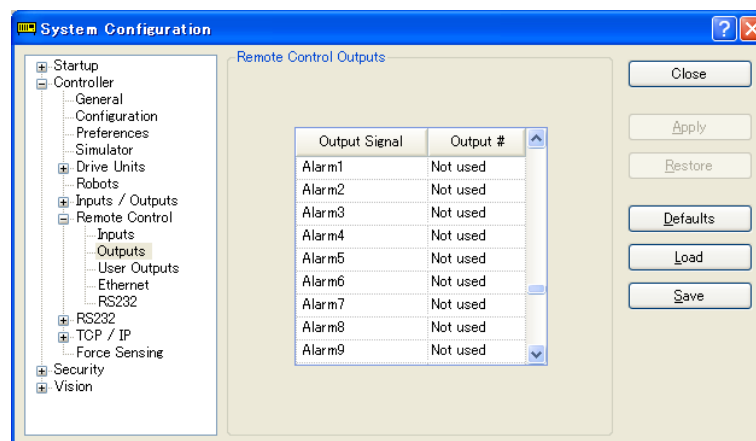
For details, refer to the following manual.

Maintenance 9.1 Error Code Table

The alarm notifying method can be configured by the output bit of the Remote I/O.

The Remote I/O can be configured in the EPSON RC+ 7.0- [Setup] - [System Configuration] - [Controller] - [Remote Control].

For details, refer to *EPSON RC+ 7.0 User's Guide 12.1 Remote I/O*.



NOTE



The Controller enters the warning state if an alarm occurs.

6.2.5 How to Cancel the Alarm

An alarm occurs when the consumption rate of the parts reaches 100%.

NOTE



The alarm cannot be canceled by executing the Reset command or restarting the Controller.

The alarm can be canceled by following methods.


EPSON RC+ 7.0 [Maintenance] dialog box.

HealthCtrlReset Command

HealthRBReset Command

Refer to *Maintenance 6.2.3 How to Edit the Maintenance Information* to change the alarm information in the same steps.

7. Maintenance Parts Replacement Procedures

| | |
|---|---|
|  WARNING | <ul style="list-style-type: none"> ■ Before performing any maintenance procedure, always make sure that the main power of the Controller is turned OFF and that the high voltage charged area is completely discharged. Performing any maintenance procedure while the main power is ON or the high voltage charged area is not discharged completely is extremely hazardous and may result in electric shock and/or cause serious safety problems. ■ When opening or closing the front side, make sure that the 200 V power supply for the Controller is OFF. Performing procedure to the power supply terminal block inside the Controller while the power supply is ON is extremely hazardous and may result in electric shock and/or cause serious safety problems. |
|---|---|

- NOTE**
- Be careful not to damage cables. Be sure not to drop any screws into the Controller.
 - Installing the front cover using the wrong screws may result in a cable being damaged and/or malfunction of the Controller.

7.1 Fan Filter

Inspect the fan filter periodically and clean it when needed. The temperature inside the Controller may get too high and the Controller may not operate properly if the filter is not kept clean.

Fan Filter Removal

- (1) Turn OFF the Controller.
- (2) Remove one screw of the fan filter.



- (3) Remove the fan filter cover.
- (4) Detach the fan filter.

Clean the fan filter as needed.

Fan Filter Installation

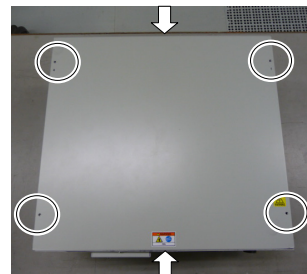
- (1) Set the fan filter to the fan filter cover.
- (2) Mount the fan filter cover with the screw.
- (3) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.2 Fan

7.2.1 Front Fan

Front Fan Removal

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Cover. (Mounting screw ×6)



- (4) Remove the fan cable from the DMB-SUB.
Connector: CN22



- (5) Remove the screws of the fan (×2).
- (6) Remove the fan.



Front Fan Installation

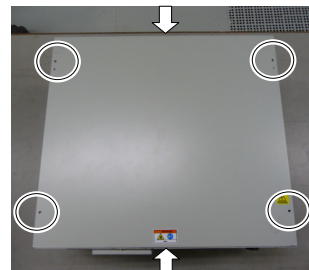
- (1) Mount a new fan with two screws.
At this point, tighten the screws diagonally. Be careful of the mounting direction.
- (2) Connect the fan cables to the DMB-SUB.
Connector: CN22
- (3) Mount the Top Panel. (Mounting screw ×6)
- (4) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

* Pay attention to the right and wrong sides of the fan when installing it.

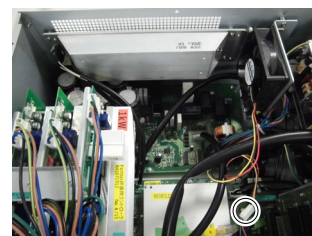
7.2.2 Regenerative Fan (RC700-A only)

The regenerative fan is installed only in RC700-A.

- Regenerative Fan removal (RC700-A only)
- (1) Turn OFF the Controller.
 - (2) Disconnect the power plug.
 - (3) Remove the Top Cover. (Mounting screw ×6)



- (4) Remove the cable tie binding the 15 V power supply cable and fan cable.
- (5) Remove the fan extension connector.

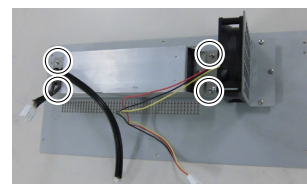


- (6) Remove the regenerative module connector from the DMB.
- (7) Remove the regenerative module connector from the DPB.

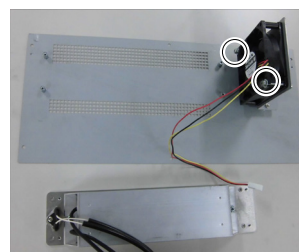
- (8) Remove the rear plate from the body.
(Mounting screw ×5)



- (9) Remove the regenerative resistance from the rear plate.
(Mounting screw ×4)



- (10) Remove the fan from the fan fixing plate.
(Mounting screw ×2)



Regenerative Fan(1) Fix the new fan to the fan fixing plate. (Mounting screw ×2)

Installation

(RC700-A only)

At this point, tighten the screws diagonally. Be careful of the mounting direction.

(2) Mount the regenerative resistance to the rear plate. (Mounting screw ×2)

Be careful of the mounting direction.

(3) Mount the rear plate to the body. (Mounting screw ×5)

(4) Connect the regenerative module connector to the DMB.

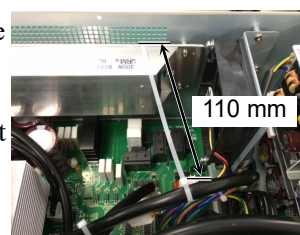
(5) Connect the regenerative module connector to the DPB.

(6) Connect the fan extension connector.

(7) Bind the 15 V power supply cable and fan cable. by the cable tie (AB150).

Leave 110 mm from the end of the cable tie in order not to tighten the cables too much.

Cut the excess part of the tie.




(8) Mount the Top Panel. (Mounting screw ×6)

(9) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

* Pay attention to the right and wrong sides of the fan when installing it.



7.3 Battery

| | |
|--|--|
|  CAUTION | <ul style="list-style-type: none"> ■ Use meticulous care when handling the lithium battery. Improper handling of the lithium battery as mentioned below is extremely hazardous, may result in heat generation, leakage, explosion, or inflammation, and may cause serious safety problems. <ul style="list-style-type: none"> • Battery Charge • Disassembly • Incorrect Installation • Exposing to Fire • Forced Discharge • Deformation by Pressure • Short-circuit (Polarity; Positive/Negative) • Heating (85°C or more) • Soldering the terminal of the lithium battery directly ■ Be sure to use the battery supplied as maintenance part from EPSON (Refer to 10. Maintenance Parts List). ■ When disposing of the battery, consult with the professional disposal services or comply with the local regulation. Spent battery or not, make sure the battery terminal is insulated. If the terminal contacts with the other metals, it may short and result in heat generation, leakage, explosion, or inflammation. |
|--|--|

NOTE



Turn ON the Controller for approximately one minute before replacing the battery.
Finish the replacement within 10 minutes to prevent data loss.

Battery Removal

- (1) Backup the Controller data.
Refer to *Maintenance 4. Backup and Restore*.
- (2) Turn OFF the Controller.
- (3) Disconnect the power plug.
- (4) Remove the battery bracket. (Mounting screw ×2)



- (5) Pull out the battery bracket.
- (6) Disconnect the battery cable.
- (7) Remove the battery straight upward.



Battery

- (1) Set a new battery.

Installation

NOTE



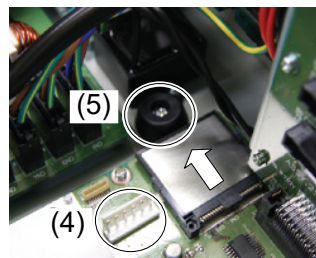
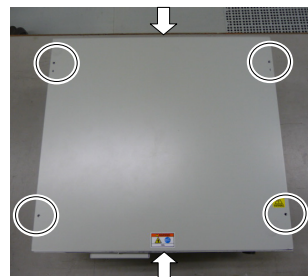
Secure the battery with the mounting tab.

- (2) Connect the battery cables.
- (3) Insert the battery bracket and secure it with the screws. (Mounting screw ×2)
- (4) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.4 CF (Compact Flash)

CF Removal

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)
- (4) Remove the connector (CN39).
- (5) Remove the CF mounting screw and the rubber.
- (6) Pull the CF toward the direction of the arrow in the picture.

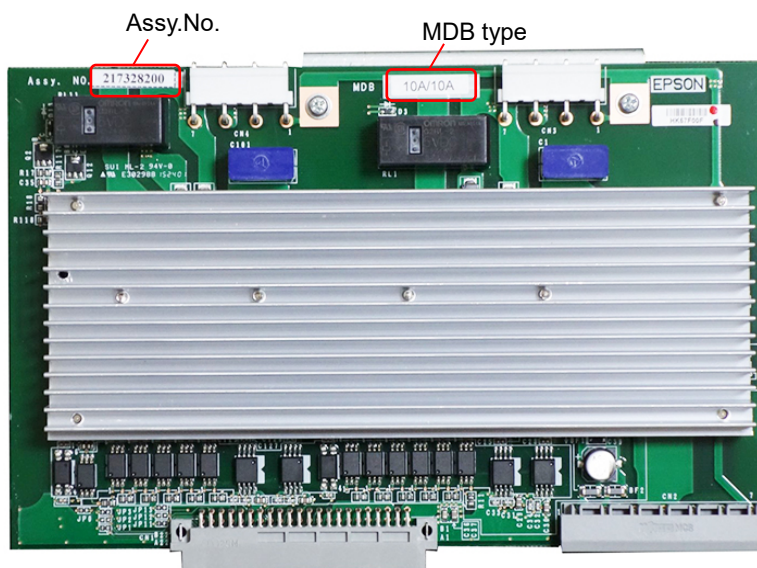


CF Installation

- (1) Insert a new CF toward the opposite direction of the arrow in the picture above.
- (2) Tighten the CF mounting screw (×1) and the rubber.
- (3) Connect the connector (CN39).
- (4) Mount the Top Panel. (Mounting screw ×6)
- (5) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.5 MDB

MDB identification method There are types of the MDB and it can be identified by “Assy. No.” or “MDB type” printed on the board.



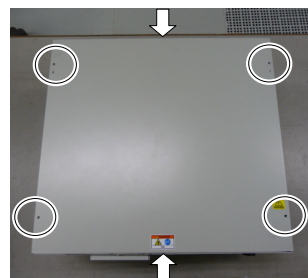
| Controller | Manipulator | Joint #1, #2 | Joint #3, #4 | Joint #5, #6 | Remarks |
|------------|-------------|--------------|------------------------|------------------------|-----------|
| RC700 | C4 | 15A/15A | 10A/10A | | MDB type |
| | | 2149935** | 2145517** 2157372** | | Assy. No. |
| RC700-A | C4 | 15A/15A-2 | 10A/10A | | MDB type |
| | | 2166640** | 2145517** | | Assy. No. |
| | | 2171936** | 2157372** | | |
| RC700-A | C8 C12 | 50A/30A | 15A/15A-2 | 10A/10A | MDB type |
| | | 2169285** | 2166640** 2171936** | 2145517** 2157372** | Assy. No. |

| Controller | Manipulator | Joint #1, #5 | Joint #3, #4 | Joint #2, #6 | Remarks |
|------------|-------------|---------------------|---------------------|---------------------|-----------------------|
| RC700-A | N2 | 5A/5A | | | MDB type |
| | | 2175610** | | | Assy. No. |
| | N6 | 30A/5A 2186906** | 15A/5A 2186907** | 30A/5A 2186906** | MDB type Assy. No. |

| Controller | Manipulator | Joint #1, #2 | Joint #3, #4 | Remarks | |
|------------------------|----------------|------------------------|--------------|-----------|-----------|
| RC700-A | G1 G3 | 10A/10A | | MDB type | |
| | | 2145517** 2157372** | | Assy. No. | |
| | G6 RS X5 | 15A/15A-2 | 10A/10A | | MDB type |
| | | 2166640** | 2145517** | | Assy. No. |
| | | 2171936** | 2157372** | | |
| | G10 G20 | 30A/30A | 15A/15A-2 | | MDB type |
| 2146123** 2153723** | | 2166640** 2171936** | | Assy. No. | |

MDB
Removal

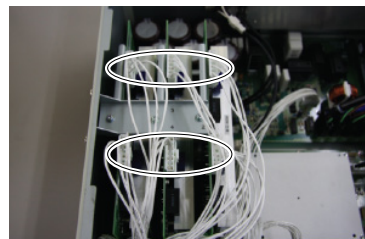
- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)



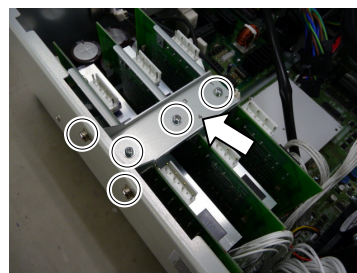
- (4) Remove the output cables of each axis of the MDB.

NOTE


Before removing the cables, check positions of the boards and the cables. Install them to the same positions after the replacement.



- (5) Remove the MDB clamp 1. (Mounting screw ×5)



- (6) Remove the MDB clamp 2. (Mounting screw ×2)



- (7) Pull out the MDBs in the direction shown in the picture.

NOTE


When removing the MDBs, make sure to remember the position of each board. Install the boards to the same positions after replacement.



- (8) Remove the MDB clamp 3. (Mounting screw ×2)



MDB
Installation

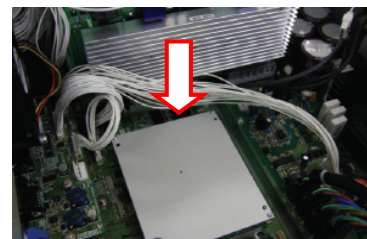
- (1) Install the MDB clamp 3.
(Mounting screw ×2)



- (2) Insert the MDBs in the direction shown in the picture.

NOTE


Be careful not to misplace the boards.

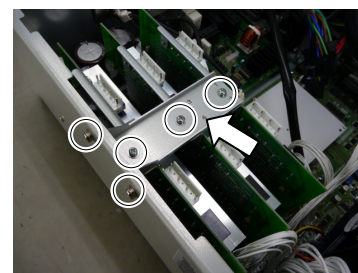


- (3) Install the MDB clamp 2.
(Mounting screw ×2)

Set the MDB clamp so that the grooves fit to MDBs.



- (4) Mount the MDB clamp 1.
(Mounting screw ×5)



- (5) Mount the output cable of each axis of the MDBs.

NOTE


When mounting the output cables, make sure that the numbers on the MDB clamp 1 and on the connectors are the same.



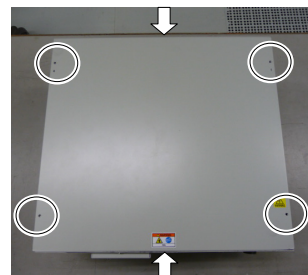
- (6) Mount the Top Panel. (Mounting screw ×6)

- (7) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.6 DMB

DMB Removal

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)

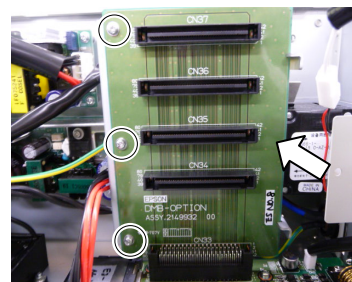


- (4) Remove the cables connected to the following connectors.

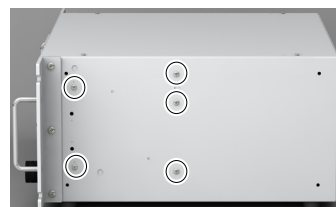
| | |
|----------------------|---------------------|
| M/C Signal Connector | EMERGENCY Connector |
| TP Connector | USB Connector |
| USB Memory | Ethernet Connector |
| I/O Connector | RS-232C Connector |
| R-I/O Connector | DU OUT Connector |

- (5) Remove the MDBs.
Refer to *Maintenance: 7.5 MDB*.

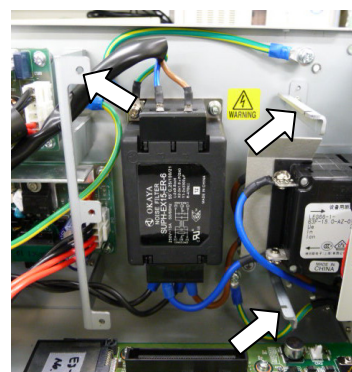
- (6) Remove the DMB-OPTION board.
(Mounting screw ×3)



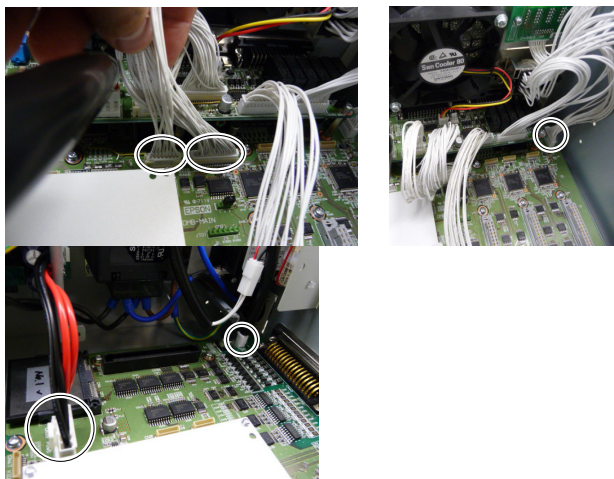
- (7) Remove five screws on the side of the chassis.



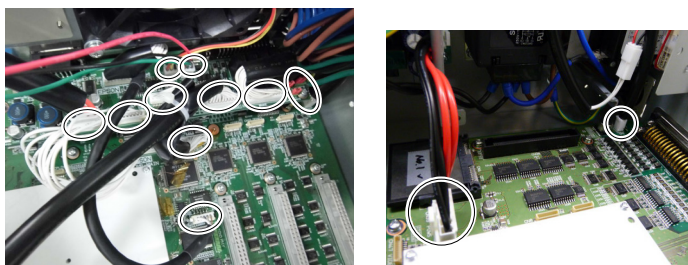
- (8) Remove the fixing plate of the DMB-OPTION board.



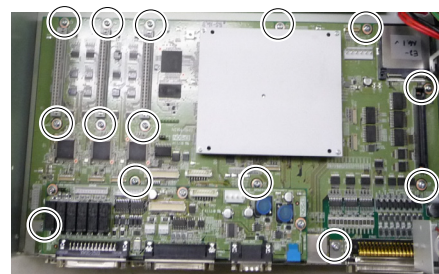
(9) RC700: Remove the five connectors from the DMB.



RC700-A: Remove the twelve connectors from the DMB.



(10) Remove the DMB mounting screws (×14).



(11) Remove the fan.

Refer to *Maintenance: 7.2 Fan*.

(12) Remove the DMB from the chassis.

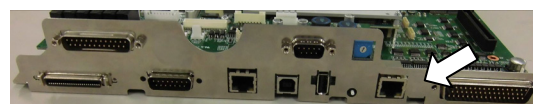
At this point, be careful not to touch the chassis and other parts.

(13) Remove the plate fixing the connectors on the front side from the DMB and the DMB-SUB boards.

RC700

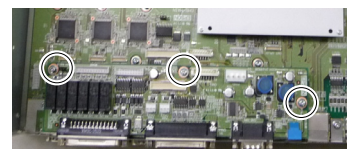


RC700-A



(14) Remove the DMB-SUB board from the DMB.

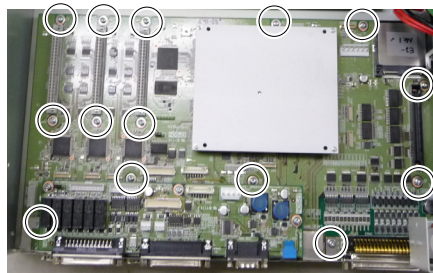
(Mounting screw ×3)



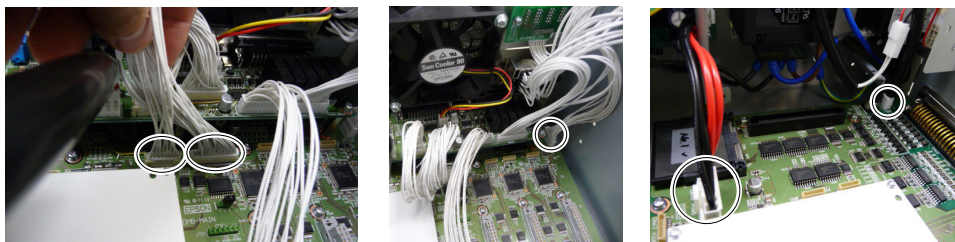
DMB
Installation

- (1) Install the DMB-SUB board to the new DMB. (Mounting screw ×3)
- (2) Install the plate that secures the connectors on the front side to the DMB and the DMB-SUB boards.
- (3) Insert the DMB into the chassis.
At this point, be careful not to touch the chassis and other parts.

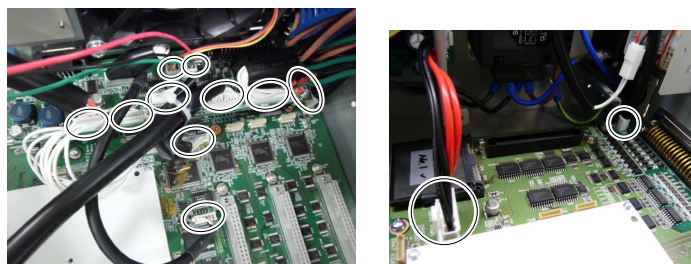
- (4) Mount the fan.
Refer to *Maintenance: 7.2 Fan*.
- (5) Tighten the DMB mounting screw (×14).



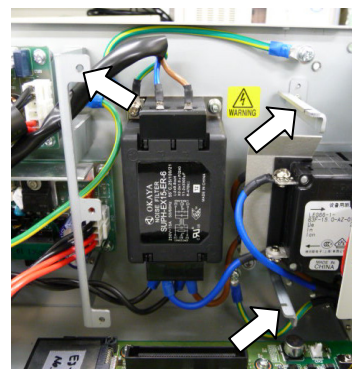
- (6) RC700: Connect the five connectors to the DMB.



RC700-A: Connect the twelve connectors to the DMB.



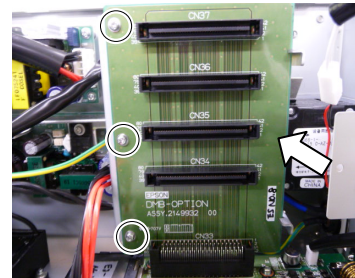
- (7) Mount the fixing plate of the DMB-OPTION board.



(8) Mount the five screws on the side of the chassis.



(9) Mount the DMB-OPTION board.
(Mounting screw ×3)



(10) Mount the MDB.

Refer to *Maintenance: 7.5 MDB*.

(11) Install the cables to the following connectors.

| | |
|----------------------|---------------------|
| M/C Signal Connector | EMERGENCY Connector |
| TP Connector | USB Connector |
| USB Memory | Ethernet Connector |
| I/O Connector | RS-232C Connector |
| R-I/O Connector | DU OUT Connector |

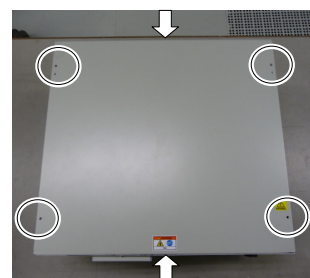
(12) Mount the Top Panel. (Mounting screw ×6)

(13) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.7 DMB-SUB Board

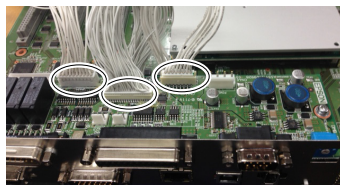
DMB-Sub Board Removal

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)

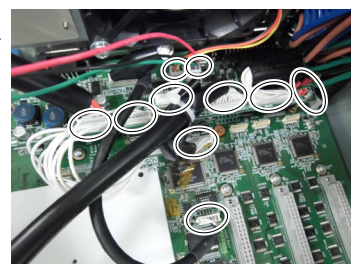


- (4) Remove the cables from the DMB-SUB board.

RC700



RC700-A



- (5) Remove the screws fixing the DMB-SUB board to the front side plate.

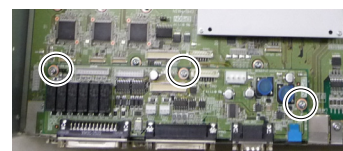
RC700



RC700-A



- (6) Remove the DMB-SUB Board from the DMB.
(Mounting screws ×3)



DMB-Sub Board Installation

- (1) Mount the plate that secures the connectors on the front side to the DMB-SUB board.
- (2) Mount the DMB-SUB Board to the DMB. (Mounting screws ×3)
- (3) Connect the cables to the DMB-SUB Board.
- (4) Mount the Top Panel. (Mounting screw ×6)
- (5) Set the Encoder Voltage Adjustment Switch.

Set the Encoder Voltage Adjustment Switch according to the length of the M/C cable.

Refer to: *Setup & Operation 2. Part Names and Functions*
(14) Encoder Voltage Adjustment Switch

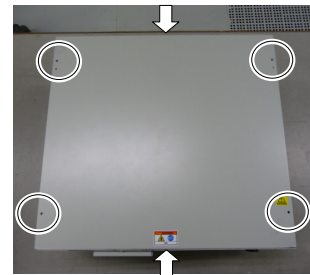
- (6) Connect the power plug. Turn ON the Controller and make sure that the Controller starts properly without any vibration or abnormal noise.

7.8 DMB-LED Board

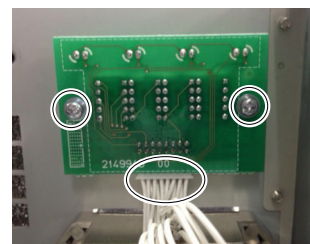
7.8.1 DMB-LED Board (RC700)

DMB-LED Board
Removal
(RC700)

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)



- (4) Disconnect the cables connected to the DMB-LED board.
- (5) Remove the DMB-LED board. (Mounting screw ×2)



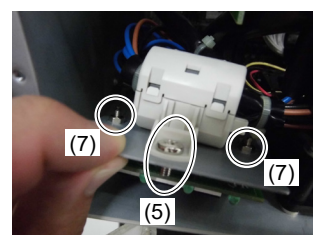
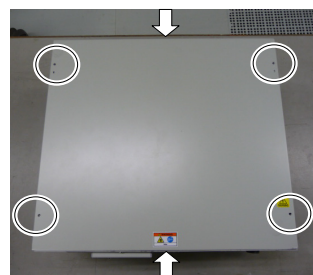
DMB-LED Board
Installation
(RC700)

- (1) Mount the DMB-LED board. (Mounting screw ×2)
- (2) Connect the cables to the DMB-LED board.
- (3) Mount the Top Panel. (Mounting screw ×6)
- (4) After connecting the power plug, turn ON the Controller and check it works normally without vibration and abnormal sound.

7.8.2 DMB-LED Board (RC700-A)

DMB-LED Board Removal (RC700-A)

- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)
- (4) Remove the DMB-LED board from the front panel. (Mounting screw ×2)
- (5) Remove the ferrite core from the Support plate. (Mounting screw ×1)
- (6) Disconnect the cables connected to the DMB-LED board.
- (7) Remove the DMB-LED board from the support plate. (Nut ×2)
- (8) Remove the stud bolt from the DMB-LED board. (Stud bolt ×4)



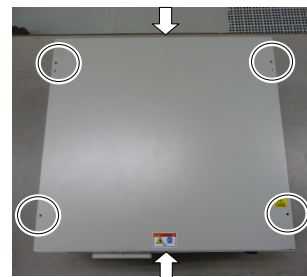
DMB-LED Board Installation (RC700-A)

- (1) Mount the stud bolt to the DMB-LED board. (Stud bolt ×4)
- (2) Mount the DMB-LED board to the support plate. (Nut ×2)
- (3) Connect the cable to the DMB-LED board.
- (4) Mount the ferrite core to the support plate. (Mounting screw ×1)
- (5) Mount the DMB-LED board to the front panel. (Mounting screw ×4)
- (6) Mount the Top Panel. (Mounting screw ×6)
- (7) After connecting the power plug, turn ON the Controller and check it works normally without vibration and abnormal sound.

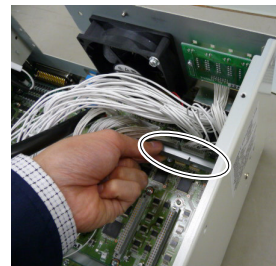
7.9 DPB

DPB
Removal

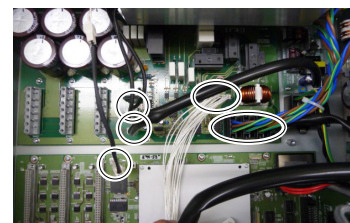
- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)
- (4) Remove the MDB.
Refer to: Maintenance 7.5 MDB



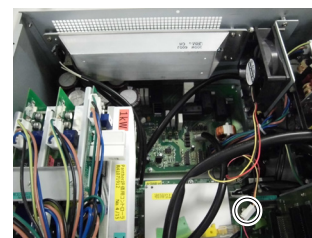
- (5) Remove the MDB clamp 3.
(Mounting screw ×2)



- (6) Remove eight connectors from the DPB.



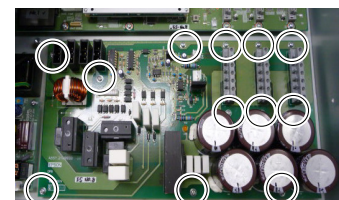
- (7) RC700-A only:
Remove the regenerative fan extension connector.



- (8) RC700-A only:
Remove the rear plate from the body.
(Mounting screw ×5)



- (9) Remove the DPB mounting screws.



- (10) Remove the DPB from the chassis.

DPB
Installation

- (1) Insert the DPB to the chassis.
- (2) Fix the DPB with screws.
- (3) RC700-A only: Mount the rear plate. (Mounting screw ×5)
- (4) RC700-A only: Connect the regenerative fan extension connector.
- (5) Connect the eight connectors to the DPB.
- (6) Mount the MDB clamp 3. (Mounting screw ×2)
- (7) Mount the DMB.
Refer to: Maintenance 7.6 DMB
- (8) Mount the top plate. (Mounting screw ×6)
- (9) After connecting the power plug, turn ON the Controller and check it works normally without vibration and abnormal sound.

7.10 Option Board

RC700



Option Slot

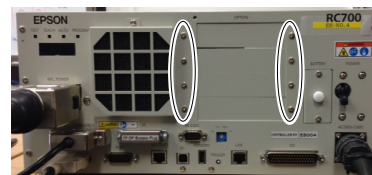
RC700-A



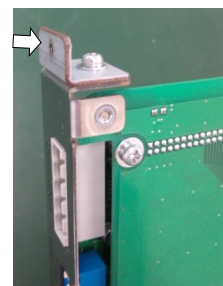
Option Slot

Option Board Addition

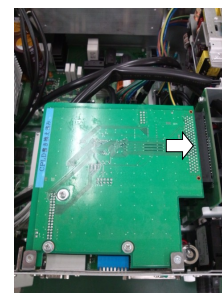
- (1) Turn OFF the Controller.
- (2) Disconnect the power plug.
- (3) Remove the Top Panel. (Mounting screw ×6)
- (4) Remove the screws of the Option Slot Panels.
Remove as many Option Panels as the Option Boards to add.



- (5) Mount the L-shaped plate to the Option Board.



- (6) Install the Option Board as shown in the picture.
Insert the board to the Option Slot.
(in the direction of an arrow)



- (7) Mount the attachment L-shaped plate with a screw from the front side.
At this point, one screw for the Option Slot Panel is left unused.




- (8) Mount the Top Panel. (Mounting screws ×6)


- (9) After connecting the power plug, turn ON the Controller and check it works normally without vibration and abnormal sound.

8. Verifying Robot System Operation




When maintenance has been performed for either the Manipulator or the Controller, including replacing any parts in those units, items must be checked according to the procedures in this section to ensure proper operation.

- (1) Connect all the necessary cables for the system.

| | |
|--|--|
|  WARNING | <ul style="list-style-type: none"> ■ When verifying the robot system operation, prepare for failures with initial settings or wiring. If the Manipulator operates abnormally because of incorrect initial settings or wiring, press the Emergency Stop switch immediately to stop the Manipulator. <p>Verify the robot system operation in the restricted mode (low speeds and low power) status. Verifying the robot system operation at high speeds may damage the robot system and/or cause serious safety problems as the Manipulator cannot stop operating immediately in case of abnormal operation of the Manipulator.</p> |
|--|--|

| | |
|--|---|
|  CAUTION | <ul style="list-style-type: none"> ■ The serial number of the Manipulator that should be connected is indicated on the Connection Check Label on the Controller. Connect the Controller and the Manipulator correctly. Improper connection between the Controller and the Manipulator may cause not only improper function of the robot system but also serious safety problems. |
|--|---|

- (2) Check the LED status during the time from the Controller is turned ON until the Controller boots up by referring to the list below.

| | From power-on to boot | While running | |
|-----------|-----------------------|--|----------------|
| LED | All blink | LED for current operation mode (TEST, TEACH, AUTO, PROGRAM) turns ON. | |
| 7 segment | All lights out |  | READY (Normal) |
| | |  | Emergency Stop |
| | |  | Safeguard |
| | | Four digits | Error |

For details of the display, refer to *Setup & Operation 2.1.1 LED and Seven-segment LED*.

For error numbers, refer to *Maintenance 9.1 Error Code Table*.

- (3) Execute MOTOR ON and check the following:
 - No error is displayed.
 - There is servo excitation and the Manipulator operates normally.
- (4) Execute various motion commands (such as JUMP, etc.). The Manipulator must operate accordingly and normally without vibration or unusual sounds.

9. Troubleshooting

9.1 Error Code Table

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|--|--|---|---------------------|
| 1 | Controller control program started. | - | | |
| 2 | Termination due to low voltage of the power supply. | - | | |
| 3 | Controller control program has completed. | Stores this log when the controller is rebooted from EPSON RC+ or TP1. | | |
| 4 | Preserve variables save area has been cleaned. | - | | |
| 5 | Function Main started. | - | | |
| 6 | Function Main started. Later same logs are skipped. | Skip the log "Function Main started." to prevent system history space run out. | | |
| 7 | Serial number has been saved. | - | | |
| 8 | System backup has been executed. | - | | |
| 9 | System restore has been executed. | - | | |
| 10 | Robot parameters have been initialized. | - | | |
| 11 | Offset pulse value between the encoder origin and the home sensor (HOFs) is changed. | - | Value after change | Value before change |
| 17 | Message saving mode activated. Uncommon event. | - | | |
| 18 | Conversion of Robot Parameter file has been executed. | - | | |
| 19 | DU firmware has been installed. | - | | |
| 20 | Enable setting in Teach mode has been saved. | - | | |
| 21 | Enable setting in Teach mode has been changed. | - | | |
| 23 | EStop has been executed. | - | Robot number executing motion command | Controller status |
| 24 | Safeguard has opened. | - | Robot number executing motion command | Controller status |
| 25 | Robot setting has changed. | - | | Robot number |
| 26 | Alarm setting has changed. | - | Alarm number | |
| 50 | The battery alarm for the controller was reset. | - | | |
| 51 | The battery alarm for the robot was reset. | - | Robot number | |
| 52 | The grease alarm for the robot was reset. | - | Robot number | |
| 100 | Device connected to Controller. | - | | |
| 101 | Console device has changed. | - | 20: TP3 21:RC+ 22:Remote I/O 26: Remote Ethernet 29: Remote RS232 | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|--|--|---|------------------------------|
| 102 | Display device has changed. | - | | |
| 103 | Working mode has changed. | - | | |
| 104 | Cooperative mode has changed. | - | 0: Independent 1: Cooperative | |
| 110 | Controller firmware has been installed. | - | 1: Setup 2: Initialize 3: Upgrade 4: Recover | |
| 111 | IP address has been restored. | May store this log when the controller firmware is installed. | | |
| 112 | Controller rebooted | - | | |
| 120 | RC+ connected to the Controller. | - | 1: Ethernet 2: USB | |
| 121 | TP connected to the Controller. | - | | |
| 123 | RC+ disconnected from the Controller. | - | | |
| 124 | TP disconnected from the Controller. | - | | |
| 126 | Working mode changed to AUTO. | - | | |
| 127 | Working mode changed to Program. | - | | |
| 128 | Working mode changed to Teach. | - | | |
| 129 | Remote Ethernet connected to the Controller | - | | |
| 130 | Remote Ethernet disconnected to the Controller | - | | |
| 131 | Remote Com connected to the Controller | - | | |
| 132 | Remote Com disconnected to the Controller | - | Logout status 0: Normal 1: Abnormal (Time-out) | |
| 133 | Working mode changed to Test. | - | | |
| 400 | The battery alarm for the controller occurred. Replace the battery and reset the alarm. | Replace the battery and reset the alarm. | | |
| 401 | The battery alarm for the robot occurred. Replace the battery and reset the alarm. | Replace the battery and reset the alarm. | Robot number | |
| 402 | The grease alarm occurred. Grease the robot and reset the alarm. | Grease the robot and reset the alarm. | Robot number | |
| 410 | The battery alarm for the controller occurred. Replace the battery and reset the alarm. | Replace the battery. After replacing the battery, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 411 | The battery alarm for the robot occurred. Replace the battery and reset the alarm. | Replace the battery. After replacing the battery, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 412 | The belt alarm occurred. Replace the belt and reset the alarm. | Replace the timing belt. After replacing the timing belts, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 413 | The grease alarm for the ball screw spline occurred. Grease the ball screw spline units and reset the alarm. | Grease up the ball screw spline. After greasing up, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|--|--|--------------------------------|------------------------------|
| 414 | The motor alarm occurred. Replace the motor and reset the alarm. | Replace the motor. After replacing the motor, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 415 | The gear alarm occurred. Replace the gear units and reset the alarm. | Replace the gear units. After replacing the gear units, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 416 | The ball screw spline alarm occurred. Replace the ball screw spline and reset the alarm. | Replace the ball screw spline. After replacing the ball screw spline, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 420 | The battery alarm for the controller occurred. Replace the battery and reset the alarm. | Replace the battery. After replacing the battery, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 421 | The battery alarm for the robot occurred. Replace the battery and reset the alarm. | Replace the battery. After replacing the ball screw spline, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 422 | The belt alarm occurred. Replace the belt and reset the alarm. | Replace the timing belt. After replacing the timing belts, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 423 | The grease alarm for the ball screw spline occurred. Grease the ball screw spline and reset the alarm. | Grease up the ball screw spline. After greasing up, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 424 | The motor alarm occurred. Replace the motor and reset the alarm. | Replace the motor. After replacing the motor, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 425 | The gear alarm occurred. Replace the gear units and reset the alarm. | Replace the gear units. After replacing the gear units, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 426 | The ball screw spline alarm occurred. Replace the ball screw spline and reset the alarm. | Replace the ball screw spline. After replacing the ball screw spline, reset the alarm in EPSON RC+ 7.0-[Tools]-[Controller]-[Maintenance]. | 1000 times of consumption rate | 1000 times of boundary value |
| 501 | Trace history is active. | Effects system performance if trace history is active. | | |
| 502 | Memory has been initialized. | When this error occurs, the value of the Global Preserve variable will be initialized. Replace the CPU board battery. Replace the CPU board. | | |
| 503 | Found Hard disk error. You should replace the hard disk ASAP. | This is a warning of the hard disk failure. Replace the hard disk as soon as possible. | | |
| 504 | An Error occurred on a Background Task. | Make sure there are no problems in the system and continue the operation. | | |
| 505 | Controller was rebooted. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|---|---|----------------------------|-----------------------------|
| 507 | The controller is started by using the previous initial setting file since the initial setting file is corrupted. Check the settings. | Setting changes from the previous start may not be saved. Please check the settings. | | |
| 511 | Battery voltage of the CPU board backup is lower than the allowed voltage. Replace the CPU board battery. | Replace the CPU board battery immediately. Keep the power to the controller ON as far as possible until you replace the battery. | 100 times of current value | 100 times of boundary value |
| 512 | 5V input voltage for the CPU board is lower than the allowed voltage. | If normal voltage is not generated by a 5V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 513 | 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by a 24V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 514 | Internal temperature of the Controller is higher than the allowed temperature. | Stop the controller as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 515 | Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 516 | Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 518 | 54V input voltage for the CPU board is lower than the allowed voltage. | If normal voltage is not generated by a 54V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 519 | 3.3V input voltage for the CPU board is lower than the allowed voltage. | If normal voltage is not generated by a 3.3V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 520 | DC input voltage for the CPU board is lower than or bigger than the allowed voltage. | If normal voltage is not generated by a DC power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 517 | Internal temperature of the Controller is higher than the allowed temperature. | Stop the controller as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 521 | DU1 3.3V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 1 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 522 | DU1 5V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 1 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 523 | DU1 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 1 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 524 | DU1 Internal temperature of the Controller is higher than the allowed temperature. | Stop Drive Unit 1 as soon as possible and check whether the ambient temperature of Drive Unit 1 is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|--|--|----------------------------|-----------------------------|
| 525 | DU1 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of Drive Unit 1 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 526 | DU1 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of Drive Unit 1 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 531 | DU2 3.3V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 2 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 532 | DU2 5V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 2 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 533 | DU2 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 2 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 534 | DU2 Internal temperature of the Controller is higher than the allowed temperature. | Stop Drive Unit 2 as soon as possible and check whether the ambient temperature of Drive Unit 2 is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 535 | DU2 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of Drive Unit 2 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 536 | DU2 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of Drive Unit 2 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 541 | DU3 3.3V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 3 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 542 | DU3 5V input voltage for the board is lower than the allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 3 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 543 | DU3 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 3 power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 544 | DU3 Internal temperature of the Controller is higher than the allowed temperature. | Stop Drive Unit 3 as soon as possible and check whether the ambient temperature of Drive Unit 3 is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 545 | DU3 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of Drive Unit 3 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 546 | DU3 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of Drive Unit 3 is not clogged up. If the warning is not cleared after the controller is rebooted, replace the fan. | Current value | Boundary value |
| 550 | Communication with the Compact Vision is disconnected. Check the network wiring. | Check the connection between the controller and the compact vision. | Camera No. | |

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|---|--|------------|-----------------------------|
| 551 | Compact Vision CPU fan RPM has decreased. Clean the fan filter and / or replace the fan. | Check whether the fan filter of the compact vision is not clogged up. If the warning is not cleared after the controller and the compact vision are rebooted, replace the CPU fan. | Camera No. | Current value |
| 552 | Compact Vision CPU fan RPM has decreased. Clean the fan filter and / or replace the fan. | Replace the CPU fan of the compact vision. | Camera No. | Current value |
| 553 | Compact Vision chassis fan RPM has decreased. Replace the fan. | Check whether the fan filter of the compact vision is not clogged up. If the warning is not cleared after the controller and the compact vision are rebooted, replace the system fan. | Camera No. | Current value |
| 554 | Compact Vision chassis fan RPM has decreased. Replace the fan. | Replace the system fan of the compact vision. | Camera No. | Current value |
| 555 | Compact Vision CPU temperature is too high. Check the installation environment (ventilation, ambient temperature, etc.) | Check whether the fan filter of the compact vision is not clogged up. If the warning is not cleared after the controller and the compact vision are rebooted, check the installation environment (surrounding space, ambient temperature) of the compact vision. | Camera No. | 1000 times of current value |
| 556 | Compact Vision CPU temperature is too high. Check the installation environment (ventilation, ambient temperature, etc.) | Check whether the fan filter of the compact vision is not clogged up. If the warning is not cleared after the controller and the compact vision are rebooted, check the installation environment (surrounding space, ambient temperature) of the compact vision. | Camera No. | 1000 times of current value |
| 557 | Compact Vision backup battery voltage is low. Replace the battery. | Replace the backup battery of the compact vision. | Camera No. | 1000 times of current value |
| 558 | Compact Vision backup battery voltage is low. Replace the battery. | Replace the backup battery of the compact vision. | Camera No. | 1000 times of current value |
| 559 | Compact Vision process was terminated abnormally. Restart the Compact Vision unit. | If the warning is not cleared after the controller and the compact vision are rebooted, initialize the compact vision. | Camera No. | |
| 560 | Compact Vision available memory is low. Restart the Compact Vision unit. | If the warning is not cleared after the controller and the compact vision are rebooted, initialize the compact vision. | Camera No. | Current value |
| 561 | Compact Vision available disk space is low. Reduce the number of objects that use models (Geometric, Correlation, DefectFinder, etc.) | Check the vision sequence if it has unnecessary models which can be reduced. Consider to use the USB memory. | Camera No. | Current value |
| 562 | A critical hardware error occurred in the Compact Vision unit. Check the hardware condition such as internal wiring. | If the warning is not cleared after the controller and the compact vision are rebooted, initialize the compact vision. | Camera No. | |
| 563 | A critical hardware error occurred in the Compact Vision unit. Check the hardware condition such as internal wiring. | If the warning is not cleared after the controller and the compact vision are rebooted, replace the LED/SW board. | Camera No. | |
| 569 | Communication with the Compact Vision recovered. | - | Camera No. | |

| No. | Message | Remedy | Note 1 | Note 2 |
|-----|--|--|--------|--------|
| 597 | The PTP motion to avoid the singularity point has completed. | PTP motion for the singularity avoidance was completed. Clicking the same jog button will operate the robot in the normal jog motion. | | |
| 598 | Robot stopped due to collision detection | Move the manipulator to the direction avoiding collision | | |
| 599 | Jogging attempted near singularity point. | The robot could not jog in the CP motion (default). Clicking the same jog button will operate the robot in the PTO motion. | | |
| 700 | Motor driver type does not match the current robot model. Check the robot model. Replace the motor driver. | Check the robot model. | | |
| 736 | Encoder has been reset. Reboot the controller. | Reboot the controller. | | |
| 737 | Low voltage from the encoder battery. Replace the battery. | Turn OFF the controller and replace the battery. For the battery replacement procedure, refer to <i>Maintenance</i> in the Manipulator manual. | | |
| 752 | Servo alarm D. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 1001 | Operation Failure. Command parameter is invalid. | - | | |
| 1002 | Requested data cannot be accessed. The data is not set up or the range is invalid. | Check whether the target I/O, variables, and tasks exist. | | |
| 1003 | The password is invalid | Enter the correct password. | | |
| 1004 | Cannot execute with unsupported version. | Use the correct version file. | | |
| 1005 | Cannot execute with invalid serial number. | Use the backup data for the same controller to restore the controller configuration. | | |
| 1006 | Cannot execute with invalid Robot model. | Use the backup data for the same controller to restore the controller configuration. | | |
| 1007 | Cannot execute with invalid Controller. | Use the supported installer. | | |
| 1010 | Remote setup error. Cannot assign R-IO input number to remote input. | Specify the input number excluding the R-IO input number. | | |
| 1011 | Remote setup error. Cannot assign a bit number which does not exist to a remote I/O signal. Check the fieldbus slave size. | Check the fieldbus slave size. | | |
| 1012 | Remote setup error. Cannot assign a bit number which does not exist to a remote I/O signal. Check the fieldbus master size. | Check the fieldbus master size. | | |
| 1013 | Fieldbus slave failure. Cannot change the size because it currently includes a remote I/O signal. | - | | |
| 1014 | Fieldbus master failure. Cannot change the size because it currently includes a remote I/O signal. | - | | |
| 1015 | Remote setup error. Cannot assign Hand-IO input/output number to remote input. | - | | |
| 1020 | Cannot execute in recovery mode. | Boot the controller as normal. | | |
| 1021 | Cannot execute due to controller initialization failure. | Restore the controller configuration. | | |
| 1022 | Cannot execute without the project being open. | Open a project. | | |
| 1023 | Cannot execute while the project is open. | Rebuild the project. | | |
| 1024 | Cannot activate from remote. | Enable the remote input. | | |
| 1025 | Execution in Teach mode is prohibited. | Change to the AUTO mode. | | |
| 1026 | Cannot execute in Teach mode except from TP. | Change to the AUTO mode. | | |
| 1027 | Cannot execute in Auto mode. | Change to the Program mode. | | |
| 1028 | Cannot execute in Auto mode except from the main console. | Change to the Program mode. | | |
| 1029 | Cannot execute from OP. | Enable the OP input. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 1030 | Does not allow Operation mode to be changed. | Change to the Auto mode with a console in the Program mode. | | |
| 1031 | Cannot execute while tasks are executing. | Stop the task and then execute. | | |
| 1032 | Cannot execute while the maximum number of tasks are executing. | Stop the task and then execute. | | |
| 1033 | Cannot execute during asynchronous motion command. | Execute after the motion ends. | | |
| 1034 | Asynchronous command stopped during operation. | The asynchronous command already stopped when the controller received a stop command. | | |
| 1035 | Cannot execute when Remote I/O enabled except from the remote device. | The command cannot be executed by the console except the remote I/O when AutoMode output of the remote I/O is ON. | | |
| 1037 | Cannot execute when Remote Ethernet enabled except from the remote Ethernet device. | The command cannot be executed by the console except the remote Ethernet when Auto flag of the remote Ethernet is ON. | | |
| 1039 | Execution is prohibited. | Prohibited command was executed while executing the program. Stop the program, and then execute the command. | | |
| 1041 | Cannot execute during Emergency Stop status. | Cancel the Emergency Stop status. | | |
| 1042 | Cannot execute while the safeguard is open. | Close the safeguard. | | |
| 1043 | Cannot execute during error condition. | Cancel the error condition. | | |
| 1044 | Cannot execute when the remote pause input is ON. | Change the remote pause input to OFF. | | |
| 1045 | Input waiting condition is the only available condition to input. | The controller received an input while it was not in the Input waiting condition. | | |
| 1046 | Cannot execute during file transfer. | Execute after the file transmission. | | |
| 1047 | Cannot cancel the command executed from other devices. | Cancel the motion command from the device the command was issued from. | | |
| 1048 | Cannot execute after low voltage was detected. | Reboot the controller. | | |
| 1049 | Other devices are in program mode. | Check connection of other devices. | | |
| 1050 | Password is too long. | Enter the password that is less than 16 characters. | | |
| 1051 | Export Controller Status failed. | <ol style="list-style-type: none"> 1. Retry using the same USB memory. 2. Retry using another USB memory. 3. Retry after rebooting the controller. | | |
| 1052 | Export Controller Status busy. | Execute the command after completing the controller status backup. | | |
| 1053 | Execution in Test mode is prohibited | Execute in other modes. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 1054 | Cannot execute in TEST mode except from TP. | - | | |
| 1055 | Cannot execute the Background Task. | Confirm that no background task is running. Rebuild the project. | | |
| 1056 | Cannot execute from OP. | Enable the TP3 input. | | |
| 1057 | Cannot execute when TP3 enabled except from the TP3. | The command cannot be executed from other consoles when TP3 is enabled. | | |
| 1058 | Cannot execute excluding T2 mode. | Switch to <Teach/T2> key. | | |
| 1059 | Cannot change to T2 mode. | T2 mode cannot be used on RC700-A Controllers complying with UL standards. | | |
| 1100 | File failure. Cannot access the file. | 1. Reboot the controller. 2. Reinstall the firmware. 3. Replace the CF. | | |
| 1102 | File failure. Read and write failure of the registry | 1. Reboot the controller. 2. Replace the CF. | | |
| 1103 | File is not found. | Check whether the file exists. | | |
| 1104 | Project file was not found. | Rebuild the project. | | |
| 1105 | Object file was not found. | Rebuild the project. | | |
| 1106 | Point files were not found. | Rebuild the project. | | |
| 1107 | The program is using a feature that is not supported by the current controller firmware version. | Check the compiler version in the EPSON RC+ 7.0-[Project]-[Properties]-[Compiler]. | | |
| 1108 | One or more source files are updated. Please build the project. | Rebuild the project. | | |
| 1109 | Not enough storage capacity. | Increase free space of the USB memory. | | |
| 1110 | File is not found. | - | | |
| 1111 | Conveyor file was not found. | - | | |
| 1112 | Force files were not found. Rebuild the project. | Rebuild the project. | | |
| 1114 | Cannot create the project in the controller. | There is a possibility that the folder is full or the project name is duplicated. Check it by the application selection. | | |
| 1120 | File failure. Setting file is corrupt. | Restore the controller configuration. | | |
| 1121 | File failure. Project file is corrupt. | Rebuild the project. | | |
| 1122 | File failure. Point file is corrupt. | Rebuild the project. | | |
| 1123 | File failure. I/O label file is corrupt. | Rebuild the project. | | |
| 1124 | File failure. User error file is corrupt. | Rebuild the project. | | |
| 1126 | File failure. Software option information is corrupt. | 1. Reboot the controller. 2. Reinstall the firmware. 3. Reconfigure the option. | | |
| 1127 | File failure. Vision file is corrupt. | Rebuild the project. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 1128 | File failure. Backup information file is corrupt. | The specified backup information cannot be restored. Acquire the backup information again, and then restore the file. | | |
| 1130 | Error message failure. No item is found in the error history. | No error history exists. Reboot the controller. | | |
| 1131 | Cannot access the USB memory. | Insert the USB memory properly. When this error still occurs after the USB memory is inserted properly, the memory may be unrecognizable to controller. Insert another memory to check the operation. | | |
| 1132 | File failure. Failed to copy the file. | - | | |
| 1133 | File failure. Failed to delete the file. | - | | |
| 1134 | File failure. GUI Builder file is corrupt. | Rebuild the project. | | |
| 1138 | File failure. Force Guide file is corrupt. | Rebuild the project. | | |
| 1140 | File failure. Failed to open the object file. | Rebuild the project. | | |
| 1141 | File failure. Failed to open the project file. | Rebuild the project. | | |
| 1142 | File failure. Failed to read the project file. | Rebuild the project. | | |
| 1143 | File failure. Failed to open the condition save file. | 1. Retry using the same USB memory. 2. Retry using another USB memory. 3. Retry after rebooting the controller. | | |
| 1144 | File failure. Failed to write the condition save file. | 1. Retry using the same USB memory. 2. Retry using another USB memory. 3. Retry after rebooting the controller. | | |
| 1145 | File failure. Failed to open the conveyor file. | Rebuild the project. | | |
| 1146 | File failure. Failed to read the conveyor file. | Rebuild the project. | | |
| 1150 | File failure. Error history is invalid. | 1. Reboot the controller. 2. Replace the CF. | | |
| 1151 | File failure. Failed to map the error history. | 1. Reboot the controller. 2. Replace the CF. | | |
| 1152 | File failure. Failed to open the error history file. | 1. Reboot the controller. 2. Replace the CF. | | |
| 1153 | File failure. Failed to write the error history file. | 1. Reboot the controller. 2. Replace the CF. | | |
| 1155 | File failure. Failed to open the settings file. | Restore the controller configuration. | | |
| 1156 | File failure. Failed to save the settings file. | Restore the controller configuration. | | |
| 1157 | File failure. Failed to read the settings file. | Restore the controller configuration. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 1158 | File failure. Failed to write the settings file. | Restore the controller configuration. | | |
| 1160 | MCD failure. Failed to open the MCD file. | Restore the controller configuration. | | |
| 1161 | MCD failure. Failed to read the MCD file. | Restore the controller configuration. | | |
| 1163 | MCD failure. Failed to save the MCD file. | Restore the controller configuration. | | |
| 1165 | MPD failure. Failed to open the MPD file. | - | | |
| 1166 | MPD failure. Failed to read the MPD file. | - | | |
| 1168 | MPD failure. Failed to save the MPD file. | - | | |
| 1170 | MPL failure. Failed to open the MPL file. | 1. Reboot the controller. 2. Reinstall the firmware. | | |
| 1181 | PRM failure. Failed to replace the PRM file. | 1. Reboot the controller. 2. Reconfigure the robot. | | |
| 1185 | File failure. Failed to open the backup information file. | - | | |
| 1186 | File failure. Failed to read the backup information file. | - | | |
| 1187 | File failure. Failed to write the backup information file. | - | | |
| 1188 | File failure. Failed to save the backup information file. | - | | |
| 1189 | The backup data was created by an old version. | Cannot restore the controller configuration in the specified procedure for using old backup data. Check the backup data. | | |
| 1190 | The backup data was created by a newer version. | - | | |
| 1191 | There is no project in the backup data. | - | | |
| 1192 | Cannot execute with invalid robot number. | Check that the Backup data is same as current robot number. | | |
| 1193 | Cannot execute with invalid robot information. | Check that the Backup data is same as current robot number. | | |
| 1194 | Cannot execute with invalid drive unit number. | - | | |
| 1195 | File failure. Failed to map the health history. | Reboot the controller. | - | - |
| 1196 | File failure. Failed to open the health history file. | Reboot the controller. | - | - |
| 1197 | File failure. Failed to write the health history file. | Reboot the controller. | - | - |
| 1198 | Restore failure. The project is invalid. Restore the project together if restoring Vision hardware configuration. | Restore the project together if restoring Vision hardware configuration. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 1200 | Compile failure. Check the compile message. | This error occurs during compilation from TP. Correct where the error occurred. | | |
| 1201 | Link failure. Check the link message. | This error occurs during compilation from TP. Correct where the error occurred. | | |
| 1250 | User Outputs failure. The Name is empty. | - | | |
| 1251 | User Outputs failure. The Condition is empty. | - | | |
| 1252 | User Outputs failure. Robot number is out of the available range. | - | | |
| 1260 | Alarm Setting failure. Robot does not exist. | - | | |
| 1261 | Alarm Setting failure. Failed to get the expiration date. | - | | |
| 1262 | Alarm Setting failure. Failed to set the alarm. | - | | |
| 1263 | Alarm Setting failure. Specified alarm number is out of the allowable range. | - | | |
| 1264 | Alarm Setting failure. Specified alarm number is not enabled. | - | | |
| 1290 | Force monitor number is out of the allowable range. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 1291 | The force monitor is already used on another device. Close the force monitor on another device, and then run the force monitor. | Check whether another PC is using the force monitor. | | |
| 1292 | Failed to set/load information of FG sequence and object. | | | |
| 1400 | Force Guide file error. | | | |
| 1401 | Invalid Force Guide file path. | | | |
| 1402 | Failed to open Force Guide file. | | | |
| 1403 | Do not open Force Guide file. | | | |
| 1404 | Invalid Force Guide sequence number. | | | |
| 1405 | Invalid Force Guide object number. | | | |
| 1406 | Invalid Force Guide sequence property. | | | |
| 1407 | Invalid Force Guide object property. | | | |
| 1408 | Invalid Force Guide object type. | | | |
| 1409 | Invalid parameter. | | | |
| 1410 | Invalid Force Guide file version. | | | |
| 1411 | Force Guide Incorrect property is existing. Confirm the property. | Confirm the Force Guide property. | | |
| 1412 | Cannot set Decision object to top of Force Guide sequence. Confirm Force Guide sequence. | Cannot set Decision object to top of a sequence. Confirm Force Guide sequence. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|---|
| 1413 | Specified Force Guide object as ConditionObject is disabled. Confirm the settings. | Confirm the settings of Force Guide object. | | |
| 1420 | Failed to convert program. Execute rebuild. | | | |
| 1421 | Initialization failure. Cannot allocate memory. | | | |
| 1422 | Finalization failure. Failed to finalization of controller. | | | |
| 1423 | Invalid conversion file path. | | | |
| 1424 | Invalid Prg file path. | | | |
| 1425 | Invalid Command file path. | | | |
| 1426 | Invalid conversion file. | | | |
| 1427 | Invalid Command file. | Update from Ver.7.4.0.2 or earlier to Ver7.4.0.2 or later may fail. Reinstall the firmware. | | |
| 1428 | Failed to execute conversion of program. Execute rebuild. | Rebuild the project. | | |
| 1429 | Failed to write Prg file. | | | |
| 1500 | Communication error. | - | | |
| 1501 | Command did not complete in time. | Execute the command again after a while. Check the connection between the EPSON RC+7.0 and controller. | | |
| 1502 | Communication disconnection between RC+ and Controller. Re-establish communication. | Check the connection between the EPSON RC+7.0 and controller. | | 1: Communication timeout 2: USB cable disconnection 3: USB reception failure 4: USB communication shutdown |
| 1503 | Disconnection while executing a task. | Check the connection between the console device and controller. | | |
| 1504 | Communication disconnection between Remote Ethernet and Controller. Re-establish communication. | Check the connection between the Remote Ethernet device and controller. | | |
| 1505 | Communication disconnection between Remote RS232 and Controller. Re-establish communication. | Check the connection between the Remote RS232 device and controller. | | |
| 1506 | Communication disconnection between TP3 and Controller. Re-establish communication. | Check the connection between TP3 and controller. | | |
| 1510 | Out of IP Address range. | Check the IP address setting of the controller. | | |
| 1511 | Reserved IP Address. | The IP address is reserved. Set the other IP address. | | |
| 1512 | Reserved IP Gateway. | The gateway address is reserved. Set the other gateway address. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 1521 | Vision communication. Failed to initialize Ethernet. | Reboot the controller. | | |
| 1522 | Vision communication. Failed to terminate Ethernet. | - | | |
| 1523 | Vision communication. Failed to create the socket handle. | Reboot the controller. | | |
| 1524 | Vision communication. Failed to connect. | Check the connection between the camera and controller. | | |
| 1526 | Vision communication. Failed to send to the server. | Check the connection between the camera and controller. | | |
| 1527 | Vision communication. Failed to read from the server. | Check the connection between the camera and controller. | | |
| 1528 | Vision communication. Failed to set option. | - | | |
| 1529 | Vision communication. Ethernet has not been initialized yet. | Reboot the controller. | | |
| 1530 | Vision communication. Connection is not completed. | Check the connection between the camera and controller. | | |
| 1531 | Vision communication. All sockets are used. | - | | |
| 1532 | Vision communication. Sending time-out. | Check the connection between the camera and controller. | | |
| 1533 | Vision communication. Receiving time-out. | Check the connection between the camera and controller. | | |
| 1534 | Vision communication. Communication error. | Check the connection between the camera and controller. | | |
| 1550 | Communication failure. Ethernet initialization error. | Reboot the controller. Check the connection of the Ethernet cable. | | |
| 1551 | Communication failure. USB initialization error. | Reboot the controller. Check the connection of the USB cable. | | |
| 1552 | Communication failure. Controller internal communication error. | Reboot the controller. | | |
| 1553 | Communication failure. Invalid data is detected. | - | | |
| 1555 | Ethernet transmission error. | Check the connection between the EPSON RC+7.0 and controller. | | |
| 1556 | Ethernet reception error. | Check the connection between the EPSON RC+7.0 and controller. If the router is used between the PC and controller, confirm that the DHCP function is disabled. | | |
| 1557 | USB transmission error. | Check the connection between the EPSON RC+7.0 and controller. | | |
| 1558 | USB reception error. | Check the connection between the EPSON RC+7.0 and controller. | | |
| 1559 | Communication failure. Failed to allocate memory | - | | |
| 1580 | Parser communication failure. Communication error. | 1. Reboot the controller. 2. Upgrade the firmware. | | |
| 1581 | Parser communication failure. Time-out occurred during communication. | 1. Reboot the controller. 2. Reinstall the firmware. | | |
| 1582 | Parser communication failure. Transmission error. | Reboot the controller. Rebuild the project. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 1583 | Parser communication failure. Initialization error. | Reboot the controller. | | |
| 1584 | Parser communication failure. Connection error. | Reboot the controller. | | |
| 1585 | Parser communication failure. Parameter is invalid. | Reboot the controller. Rebuild the project. | | |
| 1586 | Parser communication failure. Busy | - | | |
| 1587 | Parser communication failure. Invalid data is detected. | Upgrade the firmware. | | |
| 1700 | Initialization failure. Failed to initialize TP. | - | | |
| 1701 | Initialization failure. Failed to initialize TP. | - | | |
| 1702 | Initialization failure. Failed to initialize TP. | - | | |
| 1703 | File failure. Failed to read the screen data file. | - | | |
| 1704 | Failed to read the setting file. | - | | |
| 1706 | Failed to open the TP port. | - | | |
| 1708 | Failed to read the key table for TP. | - | | |
| 1709 | Failed to change the language. | - | | |
| 1710 | Failed to display the screen. | - | | |
| 1800 | The controller is already connected to RC+. | Only one RC+ 7.0 can be connected to the controller. | | |
| 1802 | The command was attempted without being connected to a controller. | Connect to the controller. | | |
| 1803 | Failed to read or write the file on the PC. | - | | |
| 1804 | Initialization failure. Failed to allocate memory on the PC. | - | | |
| 1805 | Connection failure. Check the controller startup and connection of the communication cable. | - | | |
| 1806 | Timeout during connection via Ethernet. | - | | |
| 1807 | Timeout during connection via USB. | - | | |
| 1808 | USB driver is not installed. | Failed to install EPSON RC+ 7.0. Install EPSON RC+ 7.0 again. | | |
| 1809 | Initialization failure. Failed to initialize PC daemon. | Reboot the System. | | |
| 1810 | PC daemon error. Uncommon error. | 1. Reboot the EPSON RC+7.0. 2. Reboot the PC. | | |
| 1812 | Connection failure. The connected controller is not supported in EPSON RC+ 7.0. Please use EPSON RC+ 5.0. | Connected controller is RC180 or RC90 compatible with EPSON RC+ 5.0. Check the connection between the PC and controller. | | |
| 1852 | System error. Uncommon error. | 1. Reboot the EPSON RC+7.0. 2. Reboot the PC. 3. Reinstall the EPSON RC+ 7.0. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 1861 | Initialization failure. Failed to initialize SimulatorMNG. | 1. Reboot the EPSON RC+ 7.0. 2. Reboot the PC. 3. Reinstall the EPSON RC+ 7.0. | | |
| 1862 | Initialization failure. Failed to initialize WBProxy. | 1. Reboot the EPSON RC+ 7.0. 2. Reboot the PC. 3. Reinstall the EPSON RC+ 7.0. | | |
| 1863 | The parameter is invalid. | - | | |
| 1864 | Initialization failure. Virtual controller does not exist. | Installation of the EPSON RC+ 7.0 failed. Reinstall the software. | | |
| 1865 | Initialization failure. Failed to start virtual controller. | 1. Retry after a while. 2. Reboot the PC. | | |
| 1867 | Cannot execute because it is not dry run mode. | Dry run mode is invalid. Enable the dry run. | | |
| 1868 | Initialization failure. Directory cannot be found. | Installation of the EPSON RC+ 7.0 failed. Reinstall the software. | | |
| 1872 | Connection failure. Files for simulator that used real controller cannot be found. | - | | |
| 1873 | Connection failure. Files for simulator that used virtual controller cannot be found. | - | | |
| 1874 | Virtual Controller cannot be added. | Installation of the EPSON RC+ 7.0 failed. Reinstall the software. | | |
| 1875 | Simulator Object failure. Cannot load data for the simulator object. | - | | |
| 1876 | Simulator Object failure. Cannot read data for the simulator object. | - | | |
| 1877 | Simulator Object failure. Cannot remove data from the simulator object. | - | | |
| 1878 | Simulator Object failure. Cannot update data for the simulator object. | - | | |
| 1879 | Other virtual controllers are starting. | Other virtual controllers may be used in the EPSON RC+ 5.0. Or, the virtual controller may be already used in another EPSON RC+7.0. | | |
| 1880 | Cannot execute during controller reset. | - | | |
| 1901 | Unsupported. Unsupported command was attempted. | Update the firmware. | | |
| 1902 | Unsupported. Unsupported parameter was specified. | - | | |
| 1903 | System error. | - | | |
| 1910 | System error. Failed to write the reboot file. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 2000 | Unsupported. Unsupported command was attempted. | Rebuild the project. | | |
| 2001 | Unsupported. Unsupported motion command was attempted. | Rebuild the project. | | |
| 2003 | Unsupported. Unsupported Function argument was specified. | Rebuild the project. | | |
| 2004 | Unsupported. Unsupported Function return value was specified. | Rebuild the project. | | |
| 2005 | Unsupported. Unsupported condition was specified. | Rebuild the project. | | |
| 2006 | Unsupported. Unsupported I/O command was specified. | Rebuild the project. | | |
| 2007 | Unsupported condition was specified. | Cannot jog in the CP motion (default). | | |
| 2008 | Unsupported. Unknown error number. | Clicking the same jog button will operate the robot in the PTP motion. | | |
| 2009 | Unsupported. Invalid Task number. | Cannot jog in the CP motion (default). | | |
| 2010 | Object file error. Build the project. Out of internal code range. | Rebuild the project. | | |
| 2011 | Object file error. Build the project. Function argument error. | Rebuild the project. | | |
| 2012 | Object file error. Build the project. Command argument error. | Rebuild the project. | | |
| 2013 | Object file error. Build the project. Cannot process the code. | Rebuild the project. | | |
| 2014 | Object file error. Build the project. Cannot process the variable type code. | Rebuild the project. | | |
| 2015 | Object file error. Build the project. Cannot process the string type code. | Rebuild the project. | | |
| 2016 | Object file error. Build the project. Cannot process the variable category code. | Rebuild the project. | | |
| 2017 | Object file error. Build the project. Cannot process because of improper code. | Rebuild the project. | | |
| 2018 | Object file error. Build the project. Failed to calculate the variable size. | Rebuild the project. | | |
| 2019 | Object file error. Cannot process the variable wait. Build the project. | Rebuild the project. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 2020 | Stack table number exceeded. Function call or local variable is out of range. | Check whether no function is called infinitely. Reduce the Call function depth. | | |
| 2021 | Stack area size exceeded. Stack error. Function call or local variable is out of range. | If using many local variables, especially String type, replace them to global variables. | | |
| 2022 | Stack failure. Required data not found on the stack. | Rebuild the project. | | |
| 2023 | Stack failure. Unexpected tag found on the stack. | Rebuild the project. | | |
| 2024 | Stack area size exceeded. Local variable is out of range. | Change the size of the Local variable. | | |
| 2031 | System failure. Robot number is beyond the maximum count. | Restore the controller configuration. | | |
| 2032 | System failure. Task number compliance error. | Rebuild the project. | | |
| 2033 | System failure. Too many errors. | Remedy the errors occurring frequently. | | |
| 2040 | Thread failure. Failed to create the thread. | Reboot the controller. | | |
| 2041 | Thread failure. Thread creation timeout. | Reboot the controller. | | |
| 2042 | Thread failure. Thread termination timeout. | Reboot the controller. | | |
| 2043 | Thread failure. Thread termination timeout. | Reboot the controller. | | |
| 2044 | Thread failure. Daemon process timeout. | Reboot the controller. | | |
| 2045 | Thread failure. Task continuance wait timeout. | Reboot the controller. | | |
| 2046 | Thread failure. Task stop wait timeout. | Reboot the controller. | | |
| 2047 | Thread failure. Task startup wait timeout. | Reboot the controller. | | |
| 2050 | Object file operation failure. Object file size is beyond the allowable size. | Rebuild the project. | | |
| 2051 | Object file operation failure. Cannot delete the object file during execution. | Reboot the controller. | | |
| 2052 | Object file operation failure. Cannot allocate the memory for the object file. | Reboot the controller. | | |
| 2053 | Object file operation failure. Object file cannot be accessed while it is updating. | Perform the same processing after a while. Rebuild the project. | | |
| 2054 | Object file operation failure. Function ID failure. Rebuild the project. | Synchronize the files of the project. Rebuild the project. | | |
| 2055 | Object file operation failure. Local variable ID failure. Rebuild the project. | Synchronize the files of the project. Rebuild the project. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------------|-------------------------------|
| 2056 | Object file operation failure. Global variable ID failure. Rebuild the project. | Synchronize the files of the project. Rebuild the project. | | |
| 2057 | Object file operation failure. Global Preserve variable ID failure. Rebuild the project. | Synchronize the files of the project. Rebuild the project. | | |
| 2058 | Object file operation failure. Failed to calculate the variable size. | Synchronize the files of the project. Rebuild the project. | | |
| 2059 | Exceed the global variable area. Cannot assign the Global variable area because it failed to allocate memory. | Reduce the number of Global variables to be used. | | |
| 2070 | SRAM failure. SRAM is not mapped. | Replace the CPU board. | | |
| 2071 | SRAM failure. Cannot delete when Global Preserve variable is in use. | Perform the same processing after a while. Rebuild the project. | | |
| 2072 | Exceed the backup variable area. Cannot assign the Global Preserve variable area because it failed to allocate memory. | Reduce the number of Global Preserve variables to be used. | Maximum size | The size you attempted to use |
| 2073 | SRAM failure. Failed to clear the Global Preserve variable area. | Rebuild the project. | | |
| 2074 | SRAM failure. Failed to clean up the Global Preserve variable save area. | Reboot the controller. | | |
| 2100 | Initialization failure. Failed to open the initialization file. | Restore the controller configuration. | | |
| 2101 | Initialization failure. Duplicated initialization. | Reboot the controller. | | |
| 2102 | Initialization failure. Failed to initialize MNG. | Reboot the controller. | | |
| 2103 | Initialization failure. Failed to create an event. | Reboot the controller. | | |
| 2104 | Initialization failure. Failed to setup a priority. | Reboot the controller. | | |
| 2105 | Initialization failure. Failed to setup the stack size. | Reboot the controller. | | |
| 2106 | Initialization failure. Failed to setup an interrupt process. | Reboot the controller. | | |
| 2107 | Initialization failure. Failed to start an interrupt process. | Reboot the controller. | | |
| 2108 | Initialization failure. Failed to stop an interrupt process. | Reboot the controller. | | |
| 2109 | Initialization failure. Failed to terminate MNG. | Reboot the controller. | | |
| 2110 | Initialization failure. Failed to allocate memory. | Reboot the controller. | | |
| 2111 | Initialization failure. Failed to initialize motion. | Restore the controller configuration. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 2112 | Initialization failure. Failed to terminate motion. | Reboot the controller. | | |
| 2113 | Initialization failure. Failed to map SRAM. | Replace the CPU board. | | |
| 2114 | Initialization failure. Failed to register SRAM. | Replace the CPU board. | | |
| 2115 | Initialization failure. Fieldbus board is beyond the maximum count. | Check the number of fieldbus boards. | | |
| 2116 | Initialization failure. Failed to initialize fieldbus. | Reboot the controller. Check the fieldbus board. Replace the fieldbus board. | | |
| 2117 | Initialization failure. Failed to terminate fieldbus. | Reboot the controller. | | |
| 2118 | Initialization failure. Failed to open motion. | Restore the controller configuration. | | |
| 2119 | Initialization failure. Failed to initialize conveyor tracking. | Make sure the settings of conveyor and encoder are correct. | | |
| 2120 | Initialization failure. Failed to allocate the system area. | Reboot the controller. | | |
| 2121 | Initialization failure. Failed to allocate the object file area. | Reboot the controller. | | |
| 2122 | Initialization failure. Failed to allocate the robot area. | Reboot the controller. | | |
| 2123 | Initialization failure. Failed to create event. | Reboot the controller. | | |
| 2124 | Initialization failure. An unsupported Fieldbus module is installed. | Install the Fieldbus module purchased from SEC. | | |
| 2126 | The settings are initialized since the initial setting file is corrupted. Restore the system. | Since the initial setting file has significantly corrupted, the initial setting file of factory-default is used. | | |
| 2130 | MCD failure. Failed to open the MCD file. | Restore the controller configuration. | | |
| 2131 | MCD failure. Failed to map the MCD file. | Restore the controller configuration. | | |
| 2132 | PRM failure. PRM file cannot be found. | Restore the controller configuration. | | |
| 2133 | PRM failure. Failed to map the PRM file. | Restore the controller configuration. | | |
| 2134 | PRM failure. PRM file contents error. | Restore the controller configuration. | | |
| 2135 | PRM failure. Failed to convert the PRM file. | Reboot the controller. | | |
| 2136 | PRM failure. Failed to convert the PRM file. | Reboot the controller. | | |
| 2137 | PRM failure. Failed to convert the PRM file. | Reboot the controller. | | |
| 2140 | DU Initialization Error. Cannot use drive units. | Communication with drive units is not available for the virtual controllers. Return the configuration file to original setting if it was changed. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 2141 | DU Initialization Error. Failed to initialize drive units. | Check the connection with drive units. | | |
| 2142 | DU Initialization Error. Failed to initialize drive units. | Check the connection with drive units. | | |
| 2143 | DU Initialization Error. Timeout during initialization of drive units. | Check the connection with drive units. | | |
| 2144 | DU Initialization Error. No data to download to drive units. | Reboot the control unit and drive units. | | |
| 2145 | DU Initialization Error. Failed to start communication with drive units. | Reboot the control unit and drive units. | | |
| 2146 | DU Initialization Error. Timeout when starting communication with drive units. | Reboot the control unit and drive units. | | |
| 2147 | DU Initialization Error. Failed to update the drive units software. | Review the software update setting. Check the connection with the Drive Unit. | | |
| 2148 | DU Initialization Error. Failed to update the drive units software. | Check the file name. Check the update file. | | |
| 2149 | DU Initialization Error. Failed to update the drive units software. | Check the Drive Unit power and connection. Reboot the Controller. | | |
| 2150 | Operation failure. Task number cannot be found. | Reboot the Controller. | | |
| 2151 | Operation failure. Executing the task. | Reboot the Controller. | | |
| 2152 | Operation failure. Object code size failure. | Reboot the Controller. | | |
| 2153 | Operation failure. Jog parameter failure. | Reboot the Controller. | | |
| 2154 | Operation failure. Executing jog. | Reboot the Controller. | | |
| 2155 | Operation failure. Cannot execute the jog function. | Reboot the Controller. | | |
| 2156 | Operation failure. Jog data is not configured. | Reboot the Controller. | | |
| 2157 | Operation failure. Failed to change the jog parameter. | Reboot the Controller. | | |
| 2158 | Operation failure. Failed to allocate the area for the break point. | Reboot the Controller. | | |
| 2159 | Operation failure. Break point number is beyond the allowable setup count. | Reduce the break points. | | |
| 2160 | Operation failure. Failed to allocate the function ID. | Reboot the Controller. | | |
| 2161 | Operation failure. Failed to allocate the local variable address. | Reboot the Controller. | | |
| 2162 | Operation failure. Not enough buffer to store the local variable. | Review the size of the Local variable. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 2163 | Operation failure. Value change is available only when the task is halted. | Halt the task by the break point. | | |
| 2164 | Operation failure. Failed to allocate the global variable address. | Review the size of the global variable. | | |
| 2165 | Operation failure. Not enough buffer to store the global variable. | Review the size of the global variable. | | |
| 2166 | Operation failure. Failed to obtain the Global Preserve variable address. | Review the size of the global preserve variable. | | |
| 2167 | Operation failure. Not enough buffer to store the Global Preserve variable. | Review the size of the global preserve variable. | | |
| 2168 | Operation failure. SRAM is not mapped. | Reboot the Controller. | | |
| 2169 | Operation failure. Cannot clear the Global Preserve variable when loading the object file. | Reboot the Controller. | | |
| 2170 | Operation failure. Not enough buffer to store the string. | Check the size of the string variable. | | |
| 2171 | Operation failure. Cannot start the task after low voltage was detected. | Check the controller power. Reboot the Controller. | | |
| 2172 | Operation failure. Duplicated remote I/O configuration. | Reboot the Controller. | | |
| 2173 | Remote setup error. Cannot assign non-existing input number to remote function. | Check the I/O input number. | | |
| 2174 | Remote setup error. Cannot assign non-existing output number to remote function. | Check the I/O output number. | | |
| 2175 | Operation failure. Remote function is not configured. | Reboot the Controller. | | |
| 2176 | Operation failure. Event wait error. | Reboot the Controller. | | |
| 2177 | Operation failure. System backup failed. | Reboot the Controller. Install the Controller firmware. | | |
| 2178 | Operation failure. System restore failed. | Reboot the Controller. Install the Controller firmware. | | |
| 2179 | Remote setup error. Cannot assign same input number to some remote functions. | Check the remote setting. | | |
| 2180 | Remote setup error. Cannot assign same output number to some remote functions. | Check the remote setting. | | |
| 2181 | Operation failure. Task number has not been reserved for RC+ API. | Set the number of RC+API tasks. | | |
| 2190 | Cannot calculate because it was queue data. | Review the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--|--------|
| 2191 | Cannot execute AbortMotion because robot is not running from a task. | If you don't operate the robot from a program, you cannot use AbortMotion. | | |
| 2192 | Cannot execute AbortMotion because robot task is already finished. | Task is completed. Review the program. | | |
| 2193 | Cannot execute Recover without motion because AbortMotion was not executed. | Execute AbortMotion in advance to execute Recover WithoutMove. | | |
| 2194 | Conveyor setting error. | Make sure the settings of conveyor and encoder are correct. | | |
| 2195 | Conveyor setting error. | Make sure the settings of conveyor and encoder are correct. | | |
| 2196 | Conveyor number is out of range. | Make sure the settings of conveyor and encoder are correct. | | |
| 2197 | Command parameter prohibited for conveyor tracking motion was used. | Delete LJM. | | |
| 2200 | Robot in use. Cannot execute the motion command when other tasks are using the robot. | The motion command for the robot cannot be simultaneously executed from more than one task. Review the program. | | |
| 2201 | Robot does not exist. | Check whether the robot setting is performed properly. Restore the controller configuration. | | |
| 2202 | Motion control module status failure. Unknown error was returned. | Rebuild the project. | | |
| 2203 | Cannot clear local number '0'. | The Local number 0 cannot be cleared. Review the program. | | |
| 2204 | Cannot clear an arm while in use. | The Arm cannot be cleared while it is in use. Check whether the Arm is not used. | The Arm number you attempted to clear | |
| 2205 | Cannot clear arm number '0'. | The Arm number 0 cannot be cleared. Review the program. | | |
| 2206 | Cannot clear a tool while in use. | The Tool cannot be cleared while it is in use. Check whether the Tool is not used. | The Tool number you attempted to clear | |
| 2207 | Cannot clear tool number '0'. | The Tool number 0 cannot be cleared. Review the program. | | |
| 2208 | Cannot clear ECP '0'. | The ECP number 0 cannot be cleared. Review the program. | | |
| 2209 | Cannot clear an ECP while in use. | The ECP cannot be cleared while it is in use. Check whether the ECP is not used. | The ECP number you attempted to clear | |
| 2210 | Cannot specify '0' as the local number. | The command processing the Local cannot specify the Local number 0. Review the program. | | |
| 2216 | Box number is out of range. | Available Box numbers are from 1 to 15. Review the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|---|-------------------------|
| 2217 | Box number is not defined. | Specified Box is not defined. Review the Box number. | | |
| 2218 | Plane number is out of range. | Available Box numbers are from 1 to 15. Review the program. | | |
| 2219 | Plane number is not defined. | Specified Plane is not defined. Review the Plane number. | | |
| 2220 | PRM failure. No PRM file data is found. | Reboot the controller. Restore the controller configuration. | | |
| 2221 | PRM failure. Failed to flash the PRM file. | Reboot the controller. Restore the controller configuration. | | |
| 2222 | Local number is not defined. | Check the Local setting. Review the program. | The specified Local number | |
| 2223 | Local number is out of range. | Available Local number is from 1 to 15. Review the program. | The specified Local number | |
| 2224 | Unsupported. MCOFS is not defined | - | | |
| 2225 | CalPIs is not defined. | Check the CalPIs setting. | | |
| 2226 | Arm number is out of range. | Available Arm number is from 0 to 3. Depending on commands, the Arm number 0 is not available. Review the program. | The specified Arm number | |
| 2227 | Arm number is not defined. | Check the Arm setting. Review the program. | The specified Arm number | |
| 2228 | Pulse for the home position is not defined. | Check the HomeSet setting. | | |
| 2229 | Tool number is out of range. | Available Tool number is from 0 to 3. Depending on commands, the Tool number 0 is not available. Review the program. | The specified Tool number | |
| 2230 | Tool number is not defined. | Check the Tool setting. Review the program. | The specified Tool number | |
| 2231 | ECP number is out of range. | Available Tool number is from 0 to 15. Depending on commands, the Tool number 0 is not available. Review the program. | The specified ECP number | |
| 2232 | ECP number is not defined. | Check the ECP setting. Review the program. | The specified ECP number | |
| 2233 | Axis to reset the encoder was not specified. | Be sure to specify the axis for encoder reset. | | |
| 2234 | Cannot reset the encoder with motor in the on state. | Turn the motor power OFF before reset. | | |
| 2235 | XYLim is not defined. | Check the XYLim setting. Review the program. | | |
| 2236 | PRM failure. Failed to set up the PRM file contents to the motion control status module. | Reboot the controller. Restore the controller configuration. | | |
| 2237 | Pallet number is out of range. | Available Pallet numbers are from 0 to 15. Review the program. | | |
| 2238 | Pallet is not defined. | Check the Pallet setting. | | |
| 2240 | Array subscript is out of user defined range. Cannot access or update beyond array bounds. | Check the array subscript. Review the program. | The dimensions exceeding the definition | The specified subscript |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------------------------------|--|
| 2241 | Dimensions of array do not match the declaration. | Check the array's dimensions. Review the program. | | |
| 2242 | Zero '0' was used as a divisor. | Review the program. | | |
| 2243 | Variable overflow. Specified variable was beyond the maximum allowed value. | Check the variable type and calculation result. Review the program. | | |
| 2244 | Variable underflow. Specified variable was below the minimum allowed value. | Check the variable type and calculation result. Review the program. | | |
| 2245 | Cannot execute this command with a floating point number. | This command cannot be executed for Real or Double type. Review the program. | | |
| 2246 | Cannot calculate the specified value using the Tan function. | Check the specified value. Review the program. | The specified value | |
| 2247 | Specified array subscript is less than '0'. | Check the specified value. Review the program. | The specified value | |
| 2248 | Array failure. Redim can only be executed for an array variable. | You attempted to Redim the variable that is not array. Rebuild the project. | | |
| 2249 | Array failure. Cannot specify Preserve for other than a single dimension array. | Other than a single dimension array was specified as Preserve for Redim. Rebuild the project. | | |
| 2250 | Array failure. Failed to calculate the size of the variable area. | Rebuild the project. | | |
| 2251 | Cannot allocate enough memory for Redim statement. | Reduce the number of subscripts to be specified for Redim. Perform Redim modestly. | | |
| 2252 | Cannot allocate enough memory for ByRef. | Reduce the number of array's subscripts to be seen by ByRef. | | |
| 2253 | Cannot compare characters with values. | Check whether the string type and the numeric data type are not compared. Review the program. | | |
| 2254 | Specified data is beyond the array bounds. Cannot refer or update beyond the array bounds. | Check the number of array's subscripts and data. Review the program. | The number of array subscripts | The number of data to be referred or updated |
| 2255 | Variable overflow or underflow. Specified variable is out of value range. | The value that exceeds the range of Double type is specified. Review the program. | | |
| 2256 | Specified array subscript is beyond the maximum allowed range. | Reduce the number of subscripts to be specified. For available subscripts, see the online help. | | |
| 2257 | Cannot specify Int64 variable or UInt64 variable. | Int64 variable or UInt64 variable cannot be specified. Correct the program. | | |
| 2260 | Task number is out of the available range. | For available task number, see the online help. Review the program. | The specified task number | |
| 2261 | Specified task number does not exist. | Review the program. | The specified task number | |
| 2262 | Robot number is out of the available range. | The available Robot number is 1. Review the program. | The specified robot number | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|---------------------------------|--|
| 2263 | Output number is out of the available range. The Port No. or the Device No. is out of the available range. | For available output number, see the online help. Review the program. | The specified output number | |
| 2264 | Command argument is out of the available range. Check the arguments. Added data 1: Passed value. Added data 2: argument order. | For available range of argument, see the online help. Review the program. | The Added value | What number argument? |
| 2265 | Joint number is out of the available range. | Available Joint number is from 1 to 6. Review the program. | The specified joint number | |
| 2266 | Wait time is out of available range. | Available wait time is from 0 to 2147483. Review the program. | The specified wait time | |
| 2267 | Timer number is out of available range. | Available timer number is from 0 to 15. Review the program. | The specified timer number | |
| 2268 | Trap number is out of available range. | Available trap number is from 1 to 4. Review the program. | The specified trap number | |
| 2269 | Language ID is out of available range. | For available language ID, see the online help. Review the program. | The specified language ID | |
| 2270 | Specified D parameter value for the parallel process is out of available range. | Available D parameter value is from 0 to 100. Review the program. | The specified D parameter value | |
| 2271 | Arch number is out of available range. | Available arch number is from 0 to 7. Review the program. | The specified arch number | |
| 2272 | Device No. is out of available range. | The specified number representing a control device or display device is out of available range. For available device number, see the online help. Review the program. | The specified device number | |
| 2273 | Output data is out of available range. | Available output data value is from 0 to 255. Review the program. | Output data | What number byte data is out of range? |
| 2274 | Asin argument is out of available range. Range is from -1 to 1. | Review the program. | | |
| 2275 | Acos argument is out of available range. Range is from -1 to 1. | Review the program. | | |
| 2276 | Sqr argument is out of available range. | Review the program. | | |
| 2277 | Randomize argument is out of available range. | Review the program. | | |
| 2278 | Sin, Cos, Tan argument is out of available range. | Review the program. | | |
| 2280 | Timeout period set by the TMOUt statement expired before the wait condition was completed in the WAIT statement. | Investigate the cause of timeout. Check whether the set timeout period is proper. | Timeout period | |
| 2281 | Timeout period set by TMOUt statement in WaitSig statement or SyncLock statement expired. | Investigate the cause of timeout. Check whether the set timeout period is proper. | Signal number | Timeout period |
| 2282 | Timeout period set by TMOUt statement in WaitNet statement expired. | Investigate the cause of timeout. Check whether the set timeout period is proper. | Port number | Timeout period |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|-------------------------------------|--------|
| 2283 | Timeout. Timeout at display device setting. | Reboot the controller. | | |
| 2290 | Cannot execute a motion command. | Cannot execute the motion command after using the user function in the motion command. Review the program. | | |
| 2291 | Cannot execute the OnErr command. | Cannot execute OnErr in the motion command when using user function in the motion command. Review the program. | | |
| 2292 | Cannot execute an I/O command while the safeguard is open. Need Forced. | I/O command cannot be executed while the safeguard is open. Review the program | | |
| 2293 | Cannot execute an I/O command during emergency stop condition. Need Forced. | I/O command cannot be executed during emergency stop condition. Review the program. | | |
| 2294 | Cannot execute an I/O command when an error has been detected. Need Forced. | I/O command cannot be executed while an error occurs. Review the program. | | |
| 2295 | Cannot execute this command from a NoEmgAbort Task and Background Task. | For details on in executable commands, refer to the online help. Review the program. | | |
| 2296 | One or more source files are updated. Please build the project. | Rebuild the project. | | |
| 2297 | Cannot execute an I/O command in TEACH mode without the Forced parameter. | I/O command cannot be executed in TEACH mode. Review the program. | | |
| 2298 | Cannot continue execution in Trap SGClose process. | You cannot execute Cont and Recover statements with processing task of Trap SGClose. | | |
| 2299 | Cannot execute this command. Need the setting [enable the advance task control commands] from RC+ controller preference settings. | Enable the [enable the advance task control commands] from RC+ to execute the command. | | |
| 2300 | Robot in use. Cannot execute the motion command when other task is using the robot. | The motion command for the robot cannot be simultaneously executed from more than one task. Review the program. | Task number that is using the robot | |
| 2301 | Cannot execute the motion command when the Enable Switch is OFF. | Execute the motion command with the enable switch gripped. | | |
| 2302 | Cannot execute a Call statement in a Trap Call process. | Another function cannot be called from the function called by Trap Call. Review the program. | | |
| 2303 | Cannot execute a Call statement in a parallel process. | Review the program. | | |
| 2304 | Cannot execute an Xqt statement in a parallel process. | Review the program. | | |
| 2305 | Cannot execute a Call statement from the command window. | Execute Call from the program. | | |
| 2306 | Cannot execute an Xqt statement from the task started by Trap Xqt. | Review the program. | | |
| 2307 | Cannot execute this command while tasks are executing. | Check whether all tasks are completed. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 2308 | Cannot turn on the motor because of a critical error. | Find the previously occurring error in the error history and resolve its cause. Then, reboot the controller. | | |
| 2309 | Cannot execute a motion command while the safeguard is open. | Check the safeguard status. | | |
| 2310 | Cannot execute a motion command while waiting for continue. | Execute the Continue or Stop and then execute the motion command. | | |
| 2311 | Cannot execute a motion command during the continue process. | Wait until the Continue is complete and then execute the motion command. | | |
| 2312 | Cannot execute a task during emergency stop condition. | Check the emergency stop status. | | |
| 2313 | Cannot continue execution immediately after opening the safeguard. | Wait 1.5 seconds after the safeguard is open, and then execute the Continue. | | |
| 2314 | Cannot continue execution while the safeguard is open. | Check the safeguard status. | | |
| 2315 | Cannot execute Cont and Restart command in resume operation. | Wait until the Continue is completed. | | |
| 2316 | Cannot continue execution after an error has been detected. | Check the error status. | | |
| 2317 | Cannot execute the task when an error has been detected. | Reset the error by Reset and then execute the task. | | |
| 2318 | Cannot execute a motion command when an error has been detected. | Execute the motion command after resetting the error by Reset. | | |
| 2319 | Cannot execute an I/O command during emergency stop condition. | Check the emergency stop status. | | |
| 2320 | Function failure. Argument type does not match. | Rebuild the project. | | |
| 2321 | Function failure. Return value does not match to the function. | Rebuild the project. | | |
| 2322 | Function failure. ByRef type does not match. | Rebuild the project. | | |
| 2323 | Function failure. Failed to process the ByRef parameter. | Rebuild the project. | | |
| 2324 | Function failure. Dimension of the ByRef parameter does not match. | Rebuild the project. | | |
| 2325 | Function failure. Cannot use ByRef in an Xqt statement. | Rebuild the project. | | |
| 2326 | Cannot execute a Dll Call statement from the command window. | Execute Dll Call from the program. | | |
| 2327 | Failed to execute a Dll Call. | Check the DLL. Review the program. | | |
| 2328 | Cannot execute the task before connection with RC+. | You need to connect with RC+ before executing the task. | | |
| 2329 | Cannot execute an Eval statement in a Trap Call process. | Check the program. | | |
| 2330 | Trap failure. Cannot use the argument in Trap Call or Xqt statement. | Check the program. | | |
| 2331 | Trap failure. Failed to process Trap Goto statement. | Rebuild the project. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|---------------------|--------------------------|
| 2332 | Trap failure. Failed to process Trap Goto statement. | Rebuild the project. | | |
| 2333 | Trap failure. Trap is already in process. | Rebuild the project. | | |
| 2334 | Cannot execute an Eval statement in a Trap Finish or a Trap Abort process. | Check the program. | | |
| 2335 | Cannot continue execution and Reset Error in TEACH mode. | Check the program. | | |
| 2336 | Cannot use Here statement with a parallel process. | Go Here :Z(0) ! D10; MemOn(1) ! is not executable. Change the program to: P999 = Here Go P999 Here :Z(0) ! D10; MemOn(1) ! | | |
| 2337 | Cannot execute except from an event handler functions of GUI Builder. | Review the program. | | |
| 2338 | Cannot execute Xqt, data input, and output for TP in a TEST mode. | Cannot execute in TEST mode. Review the program. | | |
| 2339 | Cannot execute in stand-alone mode. | Change the setting to "cooperative mode" and execute. | | |
| 2340 | Specified value in InBCD function is an invalid BCD value. | Review the program. | Tens digit | Units digit |
| 2341 | Specified value in the OpBCD statement is an invalid BCD value. | Review the program. | The specified value | |
| 2342 | Cannot change the status for output bit configured as remote output. | Check the remote I/O setting. | I/O number | 1: bit, 2: byte, 3: word |
| 2343 | Output time for asynchronous output commanded by On or Off statement is out of the available range. | Review the program. | The specified time | |
| 2344 | I/O input/output bit number is out of available range or the board is not installed. | Review the program. Check whether the expansion I/O board and Fieldbus I/O board are correctly detected. | Bit number | |
| 2345 | I/O input/output byte number is out of available range or the board is not installed. | Review the program. Check whether the expansion I/O board and Fieldbus I/O board are correctly detected. | Byte number | |
| 2346 | I/O input/output word number is out of available range or the board is not installed. | Review the program. Check whether the expansion I/O board and Fieldbus I/O board are correctly detected. | Word number | |
| 2347 | Memory I/O bit number is out of available range. | Review the program. | Bit number | |
| 2348 | Memory I/O byte number is out of available range. | Review the program. | Byte number | |
| 2349 | Memory I/O word number is out of available range. | Review the program. | Word number | |
| 2350 | Command allowed only when virtual I/O mode is active. | The command can be executed only for virtual I/O mode. | | |
| 2353 | Specified command cannot be executed from the Command window. | Execute specified command from the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|------------------------|--------|
| 2354 | Cannot execute the I/O output command when the Enable Switch is OFF. | Execute the I/O output command with the enable switch gripped. | | |
| 2360 | File failure. Failed to open the configuration file. | Restore the controller configuration. | | |
| 2361 | File failure. Failed to close the configuration file. | Restore the controller configuration. | | |
| 2362 | File failure. Failed to open the key of the configuration file. | Restore the controller configuration. | | |
| 2363 | File failure. Failed to obtain a string from the configuration file. | Restore the controller configuration. | | |
| 2364 | File failure. Failed to write in the configuration file. | Restore the controller configuration. | | |
| 2365 | File failure. Failed to update the configuration file. | Restore the controller configuration. | | |
| 2370 | The string combination exceeds the maximum string length. | The maximum string length is 255. Review the program. | Combined string length | |
| 2371 | String length is out of range. | The maximum string length is 255. Review the program. | The specified length | |
| 2372 | Invalid character is specified after the ampersand in the Val function. | Review the program. | | |
| 2373 | Illegal string specified for the Val function. | Review the program. | | |
| 2374 | String Failure. Invalid character code in the string. | Review the program. | | |
| 2380 | Cannot use ' 0 ' for Step value in For...Next. | Check the Step value. | | |
| 2381 | Relation between For...Next and GoSub is invalid. Going in or out of a For...Next using a Goto statement. | Review the program. | | |
| 2382 | Cannot execute Return while executing OnErr. | Review the program. | | |
| 2383 | Return was used without GoSub. Review the program. | Review the program. | | |
| 2384 | Case or Send was used without Select. Review the program. | Review the program. | | |
| 2385 | Cannot execute EResume while executing GoSub. | Review the program. | | |
| 2386 | EResume was used without OnErr. Review the program. | Review the program. | | |
| 2400 | Curve failure. Failed to open the Curve file. | Reboot the controller. Create a Curve file again. | | |
| 2401 | Curve failure. Failed to allocate the header data of the curve file. | Reboot the controller. Create a Curve file again. | | |
| 2402 | Curve failure. Failed to write the curve file. | Reboot the controller. Create a Curve file again. | | |
| 2403 | Curve failure. Failed to open the curve file. | Reboot the controller. Create a Curve file again. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|-------------|-----------|
| 2404 | Curve failure. Failed to update the curve file. | Reboot the controller. Create a Curve file again. | | |
| 2405 | Curve failure. Failed to read the curve file. | Reboot the controller. Create a Curve file again. | | |
| 2406 | Curve failure. Curve file is corrupt. | Reboot the controller. Create a Curve file again. | | |
| 2407 | Curve failure. Specified a file other than a curve file. | Reboot the controller. Create a Curve file again. | | |
| 2408 | Curve failure. Version of the curve file is invalid. | Reboot the controller. Create a Curve file again. | | |
| 2409 | Curve failure. Robot number in the curve file is invalid. | Reboot the controller. Create a Curve file again. | | |
| 2410 | Curve failure. Cannot allocate enough memory for the CVMove statement. | Reboot the controller. | | |
| 2411 | Specified point data in the Curve statement is beyond the maximum count. | The maximum number of points specified in the Curve statement is 200. Review the program. | | |
| 2412 | Specified number of output commands in the Curve statement is beyond the maximum count. | The maximum number of output commands specified in the Curve statement is 16. Review the program. | | |
| 2413 | Curve failure. Specified internal code is beyond the allowable size in Curve statement. | Reboot the controller. | | |
| 2414 | Specified continue point data P(:) is beyond the maximum count. | The maximum number of points specified continuously is 200. Review the program. | Start point | End point |
| 2415 | Curve failure. Cannot create the curve file. | Reboot the controller. Create a Curve file again. | | |
| 2416 | Curve file does not exist. | Check whether the specified Curve file name is correct. | | |
| 2417 | Curve failure. Output command is specified before the point data. | Check whether no output command is specified before the point data. | | |
| 2430 | Error message failure. Error message file does not exist. | Reboot the controller. | | |
| 2431 | Error message failure. Failed to open the error message file. | Reboot the controller. | | |
| 2432 | Error message failure. Failed to obtain the header data of the error message file. | Reboot the controller. | | |
| 2433 | Error message failure. Error message file is corrupted. | Reboot the controller. | | |
| 2434 | Error message failure. Specified a file other than the error message file. | Reboot the controller. | | |
| 2435 | Error message failure. Version of the error message file is invalid. | Reboot the controller. | | |
| 2440 | File Error. File number is already used. | Check the file number. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 2441 | File Error. Failed to open the file. | Make sure the file exists and you specified the file correctly. | | |
| 2442 | File Error. The file is not open. | Open the file in advance. | | |
| 2443 | File Error. The file number is being used by another task. | Check the program. | | |
| 2444 | File Error. Failed to close the file. | Check the file. | | |
| 2445 | File Error. File seek failed. | Review the program. Check the pointer setting. | | |
| 2446 | File Error. All file numbers are being used. | Close unnecessary files. | | |
| 2447 | File Error. No read permission. | Use ROpen or UOpen that has read access to the file. | | |
| 2448 | File Error. No write permission. | Use WOpen or UOpen that has write access to the file. | | |
| 2449 | File Error. No binary permission. | Use BOpen that has binary access to the file. | | |
| 2450 | File Error. Failed to access the file. | Check the file. | | |
| 2451 | File Error. Failed to write the file. | Check the file. | | |
| 2452 | File Error. Failed to read the file. | Check the file. | | |
| 2453 | File Error. Cannot execute the command for current disk. | The specified command is not available in the current disk (ChDisk). | | |
| 2454 | File Error. Invalid disk. | Review the program. | | |
| 2455 | File Error. Invalid drive. | Review the program. | | |
| 2456 | File Error. Invalid folder. | Review the program. | | |
| 2460 | Database Error. The database number is already being used. | Review the program. Specify the number of other database. Close the database. | | |
| 2461 | Database Error. The database is not open. | Review the program. Open the database. | | |
| 2462 | Database Error. The database number is being used by another task. | Review the program. | | |
| 2470 | Windows Communication Error. Invalid status. | Reboot the Controller. Rebuild the project. | | |
| 2471 | Windows Communication Error. Invalid answer. | Reboot the Controller. Rebuild the project. | | |
| 2472 | Windows Communication Error. Already initialized. | Reboot the Controller. | | |
| 2473 | Windows Communication Error. Busy. | Reboot the Controller. Rebuild the project. | | |
| 2474 | Windows Communication Error. No request. | Reboot the Controller. Rebuild the project. | | |
| 2475 | Windows Communication Error. Data buffer overflow. | Reduce the data volume. Review the program. | | |
| 2476 | Windows Communication Error. Failed to wait for event. | Reboot the Controller. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|---------------------------|-----------|
| 2477 | Windows Communication Error. Invalid folder. | Make sure the specified folder is correct. | | |
| 2478 | Windows Communication Error. Invalid error code. | Rebuild the project. | | |
| 2500 | Specified event condition for Wait is beyond the maximum count. | The maximum number of event conditions is 8. Review the program. | | |
| 2501 | Specified bit number in the Ctr function was not initialized with a CTRreset statement. | Review the program. | The specified bit number | |
| 2502 | Task number is beyond the maximum count to execute. | The available number of tasks that can be executed simultaneously is 32 for normal tasks, and 16 for background tasks. Review the program. | | |
| 2503 | Cannot execute Xqt when the specified task number is already executing. | Review the program. | The specified task number | |
| 2504 | Task failure. Specified manipulator is already executing a parallel process. | Rebuild the project. | | |
| 2505 | Not enough data for Input statement variable assignment. | Check the content of communication data. Review the program. | | |
| 2506 | Specified variable for the Input statement is beyond the maximum count. | For OP, only one variable can be specified. For other devices, up to 32 variables can be specified. | | |
| 2507 | All counters are in use and cannot initialize a new counter with CTRreset. | The available number of the counters that can be set simultaneously is 16. Review the program. | | |
| 2508 | OnErr failure. Failed to process the OnErr statement. | Rebuild the project. | | |
| 2509 | OnErr failure. Failed to process the OnErr statement. | Rebuild the project. | | |
| 2510 | Specified I/O label is not defined. | The specified I/O label is not registered. Check the I/O label file. | | |
| 2511 | SyncUnlock statement is used without executing a previous SyncLock statement. Review the program. | Review the program. | Signal number | |
| 2512 | SyncLock statement was already executed. | The SyncLock statement cannot be executed for the second time in a row. Review the program. | Signal number | |
| 2513 | Specified point label is not defined. | The specified point label is not registered. Check the point file. | | |
| 2514 | Failed to obtain the motor on time of the robot. | Reboot the controller. | | |
| 2515 | Failed to configure the date or the time. | Check whether a date and time is set correctly. | | |
| 2516 | Failed to obtain the debug data or to initialize. | Reboot the controller. | | |
| 2517 | Failed to convert into date or time. | Check the time set on the controller. Reboot the controller. | | |
| 2518 | Larger number was specified for the start point data than the end point data. | Specify a larger number for the end point data than that for the start point data. | Start point | End point |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 2519 | Invalid format syntax for FmtStr\$. | Check the format. | | |
| 2520 | File name is too long. | Check whether the specified point file name is correct. The maximum string length of the file name is 32. | | |
| 2521 | File path is too long. | Check whether the specified point file name is correct. | | |
| 2522 | File name is invalid. | Make sure you don't use improper characters for file name. | | |
| 2523 | The continue process was already executed. | Review the program. | | |
| 2524 | Cannot execute Xqt when the specified trap number is already executing. | Review the program. | | |
| 2525 | Password is invalid. | Check whether a password is set correctly. | | |
| 2526 | No wait terms. | Rebuild the project. | | |
| 2527 | Too many variables used for global variable wait. | Review the program. | | |
| 2528 | The global variable that was not able to be used for the wait command was specified. | Review the program. | | |
| 2529 | Cannot use ByRef if the variable is used for global variable wait. | Review the program. | | |
| 2530 | Too many point files. | Check the point file. | | |
| 2531 | The point file is used by another robot. | Review the program. | | |
| 2532 | Cannot progress to the point position because there is undefined data. | Check the point data. | | |
| 2533 | Error on INP or OUTP. | Review the program. | | |
| 2534 | No main function to start for Restart statement. | Without executing main function, Restart is called. | | |
| 2535 | Does not allow Enable setting in Teach mode to be changed. | Setup the authority. | | |
| 2536 | Failed to change Enable setting in Teach mode. | Reboot the Controller. | | |
| 2537 | Count of point data P(:) is not correct or format of parameter is not correct. | Review the program. | | |
| 2538 | Force_GetForces failure. Failed to process Force_GetForces statement. | Review the program. | | |
| 2539 | Password is invalid. | Check the password. | | |
| 2540 | Not connected to RC+. | Connect to the RC+. | | |
| 2541 | Duplicate parameter. | Same robot number was specified. Check the parameter. | | |
| 2542 | The specified work queue number is invalid. | Available work queue number s are from 1 to 16. Review the program. | | |
| 2543 | Invalid sequence was specified. | Specified sequence name cannot be found. Review the sequence name. | | |
| 2544 | Invalid object was specified. | Specified object name cannot be found. Review the object name. | | |
| 2545 | Invalid calibration was specified. | Specified calibration name cannot be found. Review the calibration name. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|----------------------------|--------|
| 2546 | Cannot turn on the motor immediately after opening the safeguard. | Wait 1.5 seconds after the safeguard is open, and then execute the motor on. | | |
| 2548 | Too many force files. Delete the force files or use the existing force files. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 2549 | The force file which is not associated with the robot cannot be specified. Specify the correct force file. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 2550 | Specified command is not supported for joint type robot and cartesian type robot. | Specified robot is not supported. Check the robot configuration. | | |
| 2551 | Failed to Get the health information. | Reboot the controller. | | |
| 2552 | Does not allow setting in UL mode to be changed. | Setup the authority. | | |
| 2553 | Failed to change setting in UL mode. | Reboot the Controller. | | |
| 2557 | An error occurred in Trap. Note 1: Detailed error information Following the detailed error information, take a relevant countermeasure. | An error occurred in Trap. Check the corresponding error code in the system history and take countermeasures. | Detailed error information | |
| 2558 | Argument parameter is too long. | Confirm a parameter of the argument. | | |
| 2559 | Cannot execute when the motor is in the off state. | Change to the state to motor on and execute. | | |
| 2560 | The current robot number and the robot number of the force guide sequence property do not match. Please check the robot number. | Confirm the current robot number and the robot number of the force guide sequence. | Robot number | |
| 2561 | The current robot type and the robot type of the force guide sequence property do not match. Reconfigure the RobotNumber property. | Confirm the current robot number and the robot number of the force guide sequence property. Reconfigure the RobotNumber property. | | |
| 2562 | The current tool number and the robot tool of the force guide sequence property do not match. Please check the tool number. | Confirm the current tool number and the robot tool of the force guide sequence property. | Tool number | |
| 2563 | The point file being loaded does not match the point file of the force guide sequence property. Please check the point file. | Confirm the loaded point file and the the point file of the force guide sequence. | | |
| 2564 | An instruction that cannot be executed during torque control was executed. | Turn OFF the torque control and execute. | | |
| 2565 | Prohibited command while tracking was executed. | Delete Prohibited commands from the program. | | |
| 2566 | Cannot execute the FGRun command for same robot. | Cannot execute the FGRun command for same robot. End the FGRun command or execute it in other robot | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|-----------------|--------|
| 2567 | Cannot execute the FGGet command for the running force guide sequence. | Cannot execute the FGGet command for the running force guide sequence. Execute it after the force guide sequence ends. | | |
| 2568 | An instruction that cannot be executed by parallel processing was executed. Review the program. | Review the program. | | |
| 2569 | Cannot get the force guide sequence property. | Reboot the Controller. | | |
| 2570 | Sequence number is out of range. Please check the specified sequence number. | Sequence number is from 1 to 64. Confirm the specified sequence number. | Sequence number | |
| 2571 | Object number is out of range. Please check the specified object number. | Object number is from 1 to 16. Confirm the specified object number. | Object number | |
| 2572 | Cannot clear the result of the force guide. | Reboot the Controller. | | |
| 2573 | Cannot set the result of the force guide. | Reboot the Controller. | | |
| 2574 | Cannot get the result of the force guide. | Reboot the Controller. | | |
| 2575 | Storing the force guide sequence result in a variable failed. | Reboot the Controller. | | |
| 2576 | Force Sequence name that does not exist was specified. | Confirm the specified force sequence name. | | |
| 2577 | Force Object name that does not exist was specified. | Confirm the specified force object name. | | |
| 2578 | Cannot execute the FGGet command for the unexecuted force guide sequence. | Confirm the specified force guide sequence. | | |
| 2600 | Mass Property Object number is out of the allowable range. Check the range of numbers. | The MassProperties numbers that can be specified are from 1 to 15. Please review the program. | | |
| 2601 | Mass Property Object is not defined. Check the setting. | Please confirm the setting of MassProperties. Please review the program. | | |
| 2602 | Cannot clear Mass Property Object while in use. Specify another Mass Property Object before clearing the previous object. | MP cannot be cleared while in use. Please confirm whether MP is in use. | | |
| 2603 | Cannot clear Mass Property Object number '0' | MP-number 0 cannot be cleared. Please review the program. | | |
| 2840 | Failed in the confirmation of the DU connection count. | Check whether the Drive Unit is connected properly. | | |
| 2841 | Failed in the acquisition of the DU connection count. | Check whether the Drive Unit is connected properly. | | |
| 2842 | Failed in the confirmation of the DU connection information. | Check whether the Drive Unit is connected properly. | | |
| 2843 | Failed in the acquisition of the DU connection information. | Check whether the Drive Unit is connected properly. | | |
| 2844 | There is a missing number or repetition in the dip switch setting of DU. | Check the dip switches of the Drive Unit | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--|--------|
| 2845 | The drive unit (DU) used by the robot is not connected. | Check whether the Drive Unit is connected properly. | Delete the robot registration or connect the DU with the manipulator registered. | |
| 2846 | Because the increase and decrease of the drive unit was recognized, the controller unit is rebooted. | The controller was rebooted due to change of connection with the Drive Unit. | | |
| 2847 | The dip switch setting of the Force Sensor I/F unit is improper. | It is necessary to change the dip switch setting. Please inquire with us. | | |
| 2848 | The Force Sensor I/F unit to which the Force Sensor is registered is not connected. Check connection. | Please confirm whether it is possible to connect it with Force Sensor I/F unit correctly. | | |
| 2849 | Failed to initialize the Force Sensor I/F unit. Check connection. | Please confirm whether it is possible to connect it with Force Sensor I/F unit correctly. | | |
| 2850 | Failed to initialize the Force Sensor I/F unit. Check connection. | Please confirm whether it is possible to connect it with Force Sensor I/F unit correctly. | | |
| 2851 | The Force Sensor which is different from the registered sensor is connected. Check connection or review the setting. | The serial number of the sensor connected with the registered sensor is not corresponding. Please exchange it for a new sensor after confirming the connection, returning to the connected sensor, or invalidating the sensor. In case of intended replacement, configure the connection settings again in the sensor setting. | | |
| 2852 | The registered Force Sensor is not connected. Check connection. | Please confirm whether it is possible to connect it with the registered sensor correctly. Please invalidate the sensor when you do not connect the sensor. | | |
| 2853 | Failed to update the Force Sensor I/F unit software. Review the update procedure. | Please review the soft update setting. Please confirm the connection with Force Sensor I/F unit. | | |
| 2854 | Failed to update the Force Sensor I/F unit software. Review the update procedure. | Please confirm the file name. Please confirm the update file. | | |
| 2855 | Failed to update the Force Sensor I/F unit software. Review the update procedure. | Please confirm the power supply and the connection of Force Sensor I/F unit. Reboot the controller. | | |
| 2856 | The Force Sensor I/F unit with an old version is connected. Update the Force Sensor I/F unit software. | The version of the connected Force Sensor I/F unit needs to be updated. Update the Force Sensor I/F unit. For update procedures, please inquire with us. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 2857 | The robot registered to the Force Sensor I/F unit is not connected. Review the robot registration or the Force Sensor configuration. | The robot that relates to the sensor is not registered. Please review the registration of the robot or invalidate the robot connection. | | |
| 2858 | Failed to allocate memory for the force monitor. | Reboot the controller. Please inquire with us if a similar error occurs after rebooting it. | | |
| 2859 | Failed to allocate memory for the force log. | Reboot the controller. Please inquire with us if a similar error occurs after rebooting it. | | |
| 2860 | The force monitor object specified in the force log is in use. Specify another force monitor object. | The same FM number cannot be specified. Please specify a different FM number. | | |
| 2861 | The maximum number of the force logs is executed. Review the log timing. | The greatest log number is used. Please confirm the number of logs. | | |
| 2862 | Failed to allocate memory of force function. | Reboot the controller. Please inquire with us if a similar error occurs after rebooting it. | | |
| 2863 | Execution of force guide sequence, RecordStart, FCMStart and LogStart cannot be executed at the same time. Please review the program. | Execute after the LogStart property ends by LogEnd property. | | |
| 2864 | Execution of force guide sequence, RecordStart, FCMStart and force monitor cannot be executed at the same time. Please quit either. | Execute after quitting the Force Monitor. | | |
| 2865 | Execution of force guide sequence, RecordStart, FCMStart and LogStart cannot be executed at the same time. Please review the program. | Execute the LogStart property after the RecordStart property ends by force guide sequence, force control monitor, or the RecordEnd property. | | |
| 2866 | Execution of force guide sequence, RecordStart, FCMStart and force monitor cannot be executed at the same time. Please quit either. | Execute the force monitor after quitting the RecordStart property by force guide sequence, force control monitor, or the RecordEnd property. | | |
| 2867 | The specified channel in use. Specify another channel. | The same channel cannot be specified. Specify a different channel to execute. | | |
| 2868 | The force monitor object being used is specified. Please specify another force monitor object. | The same FM number cannot be specified. Specify a different FM number to execute. | | |
| 2869 | The specified duration of measurement is smaller than the specified measurement interval. Check the parameter. | Specify the measurement time larger than the measurement interval to execute. | | |
| 2870 | The product of the specified duration of measurement and the specified measurement interval is out of allowable range. Check the parameter. | Check the measurement time and interval. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 2871 | Execution of force guide sequence, RecordStart, FCMStart, force monitor cannot be used more than three at the same time. | To execute newly, make sure to quit either of the two running items and execute. | | |
| 2872 | Force monitor cannot be launched twice. | To start force monitor newly, quit the running force monitor and start a new one. | | |
| 2880 | Failed to initialize the Force Sensor I/F board. Check connection. | Check connection of the controller and Force Sensor I/F board. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 2881 | Failed to initialize the Force Sensor I/F board. Check connection. | Check connection of the controller and Force Sensor I/F board. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 2882 | Detected two boards: Force Sensor I/F board and RS-232C board. If using the Force Sensor I/F board, RS-232C board is available up to one board. | Remove the Force Sensor I/F board or the second board of RS-232C board. | | |
| 2883 | Detected two boards: Force Sensor I/F board and RS-232C board with the second board setting. If using the Force Sensor I/F board, return the setting to the first board of RS-232C board. | Return the setting to the first board of RS-232C board. | | |
| 2884 | Failed to initialize the Force Sensor I/F board. Check connection. | Check connection of the controller and Force Sensor I/F board. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 2885 | Sensor 3 and 4 of Force Sensors are enabling. If using Force Sensor I/F board, disable the sensor 3 and 4 of Force Sensors. | Disable the sensor 3 and 4 of the Force Sensor. | | |
| 2886 | Failed to communicate with Force Sensor I/F board and Force Sensor. Check connection of the Force Sensor. | Check connection of the Force Sensor I/F board and Force Sensor. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 2887 | Detected Force Sensor I/F board and Force Sensor I/F unit. Remove either Force Sensor I/F board or Force Sensor I/F unit. | Unable to use the Force Sensor I/F board and Force Sensor I/F unit at the same time. Remove the Force Sensor I/F board or Force Sensor I/F unit. | | |
| 2888 | Unsupported Force Sensor is set. Check the configuration. | Check the configuration. Firmware version may be old. Check whether the firmware version is supported and update it as necessary. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--|--------|
| 2900 | Failed to open as server for the Ethernet port. | Check whether the Ethernet port is set properly. Check whether the Ethernet cable is connected properly. | | |
| 2901 | Failed to open as client for the Ethernet port. | Check whether the Ethernet port is set properly. Check whether the Ethernet cable is connected properly. | | |
| 2902 | Failed to read from the Ethernet port. | Check whether the port of communication recipient is not close. | | |
| 2904 | Invalid IP Address was specified. | Review the IP address. | | |
| 2905 | Ethernet failure. No specification of Server/Client. | Review the program. | | |
| 2906 | Ethernet port was not configured. | Check whether the Ethernet port is set properly. | Port number | |
| 2907 | Ethernet port was already in use by another task. | A single port cannot be used by more than one task. | Port number | |
| 2908 | Cannot change the port parameters while the Ethernet port is open. | The port parameters cannot be changed while the port is open. | Port number | |
| 2909 | Ethernet port is not open. | To use the Ethernet port, execute the OpenNet statement. | Port number | |
| 2910 | Timeout reading from an Ethernet port. | Check the communication. | Timeout value | |
| 2911 | Failed to read from an Ethernet port. | Check the communication. | | |
| 2912 | Ethernet port was already open by another task. | A single port cannot be used by more than one task. | Port number | |
| 2913 | Failed to write to the Ethernet port. | Check whether the Ethernet port is set properly. Check whether the Ethernet cable is connected properly. | Port number | |
| 2914 | Ethernet port connection was not completed. | Check whether the port of communication recipient is open. | Port number | |
| 2915 | Data received from the Ethernet port is beyond the limit of one line. | The maximum length of a line is 255 bytes. | The number of bytes in a received line | |
| 2916 | Failed to process a dummy file of virtual Ethernet port | Check the content of the dummy file. | Port number | |
| 2920 | RS-232C failure. RS-232C port process error. | Check whether the RS-232C board is correctly detected. | | |
| 2921 | Failed to read from the RS-232C port. | Check the parameter and communication. | | |
| 2922 | Failed to read from the RS-232C port. Overrun error. | Slow down data transfer or reduce data size. | | |
| 2926 | The RS-232C port hardware is not installed. | Check whether the RS-232C board is correctly detected. | Port number | |
| 2927 | RS-232C port is already open by another task. | A single port cannot be used by more than one task. | Port number | |
| 2928 | Cannot change the port parameters while the RS-232C port is open. | The port parameters cannot be changed while the port is open. | Port number | |
| 2929 | RS-232C port is not open. | To use the RS-232C port, execute the OpenCom statement. | Port number | |
| 2930 | Timeout reading from the RS-232C port. | Check the communication. | Timeout value | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--|--------|
| 2931 | Failed to read from the RS-232C port. | Check the communication. | | |
| 2932 | RS-232C port is already open by another task. | A single port cannot be used by more than one task. | Port number | |
| 2933 | Failed to write to the RS-232C port. | Check the communication. | Port number | |
| 2934 | RS-232C port connection not completed. | Check the RS-232C port. | | |
| 2935 | Data received from the RS-232C port is beyond the limit of one line. | The maximum length of a line is 255 bytes. | The number of bytes in a received line | |
| 2936 | Failed to process a dummy file of virtual RS-232C port | Check the content of the dummy file. | Port number | |
| 2937 | Cannot execute while Remote RS-232C are using. | Specified port is currently used. Specify another port. | | |
| 2938 | Cannot execute while ModBus are using. | Specified port is currently used. Specify another port. | | |
| 2950 | Daemon failure. Failed to create the daemon thread. | Reboot the Controller. | | |
| 2951 | Daemon failure. Timeout while creating the daemon thread. | Reboot the Controller. | | |
| 2952 | TEACH/AUTO switching key input signal failure was detected. | Set the TP key switch to TEACH or AUTO properly. Check whether the TP is connected properly. | | |
| 2953 | ENABLE key input signal failure was detected. | Check whether the TP is connected properly. | | |
| 2954 | Relay weld was detected. | Overcurrent probably occurred due to short-circuit failure. Investigate the cause of the problem and take necessary measures and then replace the DPB. | | |
| 2955 | Temperature of regeneration resistor was higher than the specified temperature. | Check whether the filter is not clogged up and the fan does not stop. If there is no problem on the filter and fan, replace the regenerative module. | | |
| 2970 | MNG failure. Area allocate error. | Reboot the Controller. | | |
| 2971 | MNG failure. Real time check error. | Reboot the Controller. | | |
| 2972 | MNG failure. Standard priority error. | Reboot the Controller. | | |
| 2973 | MNG failure. Boost priority error. | Reboot the Controller. | | |
| 2974 | MNG failure. Down priority error. | Reboot the Controller. | | |
| 2975 | MNG failure. Event wait error. | Reboot the Controller. | | |
| 2976 | MNG failure. Map close error. | Reboot the Controller. | | |
| 2977 | MNG failure. Area free error. | Reboot the Controller. | | |
| 2978 | MNG failure. AddIOMem error. | Reboot the Controller. | | |
| 2979 | MNG failure. AddInPort error. | Reboot the Controller. | | |
| 2980 | MNG failure. AddOutPort error. | Reboot the Controller. | | |
| 2981 | MNG failure. AddInMemPort error. | Reboot the Controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 2982 | MNG failure. AddOutMemPort error. | Reboot the Controller. | | |
| 2983 | MNG failure. IntervalOutBit error. | Reboot the Controller. | | |
| 2984 | MNG failure. CtrReset error. | Reboot the Controller. | | |
| 2997 | Collision Detection | If you use the simulator, check if the object is placed in the direction of the robot motion. | | |
| 2998 | AbortMotion attempted when robot was not moving | See Help for AbortMotion. | | |
| 2999 | AbortMotion attempted when robot was moving | See Help for AbortMotion. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3000 | OBJ file size is large. TP1 may not be able to build this project. | When it is necessary to build the project from TP1, consider to reduce the program. | | |
| 3001 | The number of variables which is using Wait command is near the maximum allowed. | The number of variables which is using Wait command is exceeding 56 (the maximum is 64). Check if there are unnecessary variables. | | |
| 3002 | DLL file cannot be found. | Check if the DLL file exists in either of the following folders: - Project folder - Windows system folder - Configuration folder of environment variable PATH | | |
| 3003 | DLL function cannot be found. | Check the name of the specified function. Also check the DLL file if the specified function exists in the DLL. | | |
| 3050 | Main function is not defined. | Declare a Main function. | | |
| 3051 | Function does not exist. | Declare an unresolved function. | | |
| 3052 | Variable does not exist. | Declare an unresolved variable. | | |
| 3100 | Syntax error. | Correct the syntax error. | | |
| 3101 | Parameter count error. | The number of parameters is excess or deficiency. Correct the parameters. | | |
| 3102 | File name length is beyond the maximum allowed. | Shorten the file name. | | |
| 3103 | Duplicate function definition. | Change the function name. | | |
| 3104 | Duplicate variable definition ' ** '. | Change the variable name. | | |
| 3105 | Global and Global Preserve variables cannot be defined inside a function block. | Declare the Global and Global Preserve variables outside the function block. | | |
| 3106 | An undefined function was specified. | Specify a valid function name. | | |
| 3107 | Both While and Until for Do...Loop was specified. | The While/Until statement is specified for both Do statement and Loop statement. Delete either While/Until statement. | | |
| 3108 | Specified line number or label ' ** ' does not exist. | Set the line label. | | |
| 3109 | Overflow error. | The direct numerical specification overflows. Reduce the numeric value. | | |
| 3110 | An undefined variable was specified ' ** '. | There is an undefined variable. Declare the variable. | | |
| 3111 | Specified variable is not an array variable. | Specify the array variable. | | |
| 3112 | Cannot change the dimensions of the array variable. | Dimension of the array cannot be changed in Redim statement during the run time. Correct the program. | | |
| 3114 | Specified Next variable does not match the specified For variable. | Correct the variable name. | | |
| 3115 | Cannot use a point expression in the first argument. | Specify a single point for the point flag setting. Do not specify a point expression. | | |
| 3116 | Array number of dimensions does not match the declaration. | Check the number of array dimensions. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3117 | File cannot be found. | The file that configures the project cannot be found. Check the project folder if the file exists. | | |
| 3118 | Corresponding Endlf cannot be found. | The number of Endlf statements that correspond to If and Elself statements is not enough. Add the Endlf statements. | | |
| 3119 | Corresponding Loop cannot be found. | The number of Loop statements that correspond to Do statements is not enough. Add the Loop statements. | | |
| 3120 | Corresponding Next cannot be found. | The number of Next statements that correspond to For statements is not enough. Add the Next statements. | | |
| 3121 | Corresponding Send cannot be found. | The number of Send statements that correspond to Select statements is not enough. Add the Send statements. | | |
| 3123 | On/Off statements are beyond the maximum count. | An upper limit (max. 16) is set on the number of On/Off statements in Curve statement. Check the upper limit and correct the program. | | |
| 3124 | Point number is beyond the maximum count. | An upper limit ("200" for open curves, "50" for closed curves) is set on the available number of points in Curve statement. Check the upper limit and correct the program. | | |
| 3125 | Corresponding If cannot be found. | The number of Endlf statements that correspond to If statements is too many. Delete the unnecessary Endlf. | | |
| 3126 | Corresponding Do cannot be found. | The number of Loop statements that correspond to Do statements is too many. Delete the unnecessary Loop. | | |
| 3127 | Corresponding Select cannot be found. | The number of Send statements that correspond to Select statements is too many. Delete the unnecessary Send. | | |
| 3128 | Corresponding For cannot be found. | The number of Next statements that correspond to For statements is too many. Delete the unnecessary Next. | | |
| 3129 | '_' cannot be used as the first character of an identifier. | Change the first character of the identifier to an alphabetic character. | | |
| 3130 | Cannot specify ROT parameter. | ROT parameter cannot be specified in BGo, Go, TGo, Jump, and Jump3 statements. Correct the program. | | |
| 3131 | Cannot specify ECP parameter. | ECP parameter cannot be specified in BGo, Go, TGo, Jump, Jump3, and Arc statements. Correct the program. | | |
| 3132 | Cannot specify Arch parameter. | Arch parameter cannot be specified in BGo, Go, TGo, Arc, Arc3, BMove, Move, and TMove statements. Correct the program | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3133 | Cannot specify LimZ parameter. | LimZ parameter cannot be specified in BGo, Go, TGo, Jump3, Arc, Arc3, BMove, Move, and TMove statements. Correct the program. | | |
| 3134 | Cannot specify Sense parameter. | Sense parameter cannot be specified in BGo, Go, TGo, Arc, Arc3, BMove, Move, and TMove statements. Correct the program. | | |
| 3135 | Invalid parameter is specified. | Invalid parameter is specified in Xqt, and Call statements. Correct the program. | | |
| 3137 | Cannot specify the array variable subscript. | The array variable subscript cannot be specified. Correct the program. | | |
| 3138 | ByRef was not specified on Function declaration. | Specify ByRef in the parameter list of function declaration that is called by Call statement. | | |
| 3139 | Cannot execute the Xqt statement for a function that needs a ByRef parameter. | The Xqt statement cannot be executed for a function needing a ByRef parameter. Delete the ByRef parameter. | | |
| 3140 | Cannot execute the Redim statement for a ByRef variable. | The Redim statement cannot be executed for a variable specifying ByRef parameter. Delete the ByRef parameter. | | |
| 3141 | OBJ file is corrupt. | - | | |
| 3142 | OBJ file size is beyond the available size after compiling. | The compilation result exceeds the limit value (max. 1 MB per file). Divide the program. | | |
| 3143 | Indent length is beyond the available size. | The available length of the identifier is max. 32 characters for labels and variable names, and 64 characters for function names. Reduce the number of characters so as not to exceed the available length. For details of the available length, refer to <i>EPSON RC+ User's Guide "6.4 Function and Variable Names (Naming restriction)"</i> . | | |
| 3144 | '**' already used for a function name. | Correct the identifier '**' or the function name. | | |
| 3145 | '**' already used for a Global Preserve variable. | Correct the identifier '**' or the Global Preserve variable name. | | |
| 3146 | '**' already used for a Global variable. | Correct the identifier '**' or the Global variable name. | | |
| 3147 | '**' already used for a Module variable. | Correct the identifier '**' or the Module variable name. | | |
| 3148 | '**' already used for a Local variable. | Correct the identifier '**' or the Local variable name. | | |
| 3149 | '**' already used for an I/O label. | Correct the identifier '**' or the I/O label name. | | |
| 3150 | '**' already used for a User Error label. | Correct the identifier '**' or the User Error label name. | | |
| 3151 | Cannot use a function parameter. | Argument cannot be specified for the function that is executed by the Trap statement. Correct the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3152 | Specified elements of the array variable are beyond the available size. | Limit value of the array elements depends on the type of variables. Refer to <i>EPSON RC+7.0 User's Guide</i> "6.7.6 Array" and correct the number of array elements so as not to exceed the limit value. | | |
| 3153 | Parameter type mismatch. | Parameter type does not match in Call, Force_GetForces, and Xqt statements. Correct the parameter type. | | |
| 3154 | '**' is not an Input Bit label. | Specify a valid input bit label. | | |
| 3155 | '**' is not an Input Byte label. | Specify a valid input byte label. | | |
| 3156 | '**' is not an Input Word label. | Specify a valid input word label. | | |
| 3157 | '**' is not an Output Bit label. | Specify a valid output bit label. | | |
| 3158 | '**' is not an Output Byte label. | Specify a valid output byte label. | | |
| 3159 | '**' is not an Output Word label. | Specify a valid output word label. | | |
| 3160 | '**' is not a Memory Bit label. | Specify a valid memory I/O bit label. | | |
| 3161 | '**' is not a Memory Byte label. | Specify a valid memory I/O byte label. | | |
| 3162 | '**' is not a Memory Word label. | Specify a valid memory I/O word label. | | |
| 3163 | Too many function arguments. | The maximum number of the function parameter is 100. Reduce the number of parameters. | | |
| 3164 | Cannot compare with Boolean value. | The size of Boolean values cannot be compared. Correct the program. | | |
| 3165 | Cannot use Boolean value in the expression. | Boolean value cannot be used in the expression. Correct the program. | | |
| 3166 | Cannot compare between Boolean and expression. | The size of Boolean value and the expression cannot be compared. Correct the program. | | |
| 3167 | Cannot store Boolean value to a numeric variable. | Boolean value cannot be used in the numeric variable. Correct the program. | | |
| 3168 | Cannot store numeric value to a Boolean variable. | The numeric value cannot be used in Boolean variable. Correct the program. | | |
| 3169 | Undefined I/O label was specified. | Define a new I/O label or specify the defined I/O label. | | |
| 3170 | Invalid condition expression was specified. | String expression is specified for the right side of the condition expression in Do or Loop statement. Correct the condition expression so that the right side of the expression is Boolean value. | | |
| 3171 | Cannot compare between numeric value and string. | The numeric value and string cannot be compared. Correct the program. | | |
| 3172 | Cannot use a keyword for a variable name. | Some SPEL+ keywords cannot be used as the variable names. Correct the variable name not to overlap with the keywords. | | |
| 3173 | '**' is already used for a line label. | Correct the identifier '**' or the line label name. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3174 | Duplicate line number or label (**). | The line labels with the same name cannot be specified in the same function. Delete the line label ' ** ', or define a new line label and correct the program. | | |
| 3175 | Undefined Point label was specified. | Define a new point label or specify the defined point label. | | |
| 3176 | An undefined variable was specified. | Define a new variable or specify the defined variable. | | |
| 3177 | ' ** ' already used for a Point label. | Correct the identifier ' ** ' or the point label name. | | |
| 3178 | Cannot use the result number. | The result number cannot be specified when a vision object that does not return multiple results is used in VSet and VGet statements. Correct the program. | | |
| 3179 | String literal is beyond the available length. | The limit value of the string length is max. 255 characters. Reduce the string length so as not to exceed the limit value. | | |
| 3180 | Cannot change a calibration property value with the VSet command. | Calibration property cannot be changed in VSet statement. Correct the program. | | |
| 3181 | Array variable should be used with ByRef. | ByVal cannot be specified for the array variable. Specify the ByRef parameter. | | |
| 3182 | Subscription was not specified. | Specify a subscription. | | |
| 3183 | Parameter cannot be omitted. | Add a parameter. | | |
| 3184 | SYNC parameter cannot use with tracking command. | SYNC parameter cannot be specified in tracking commands. Delete the SYNC parameter. | | |
| 3185 | Cannot use Queue data. | Queue data cannot be specified in BGo, BMove, TGo, and TMove statements. Delete the queue data. | | |
| 3186 | Combination between Queue and Point data does not match. | Combination of queue data and point data cannot be specified for coordinate specification of Arc, Arc3, Jump3, and Jump3CP statements. Use either queue data or the point data. | | |
| 3187 | Invalid Point flag value was specified. | Correct the program so that the point flag value is within the range from 0 to 127. | | |
| 3188 | Call command cannot be used in parallel processing. | Call command cannot be used parallel processing. Correct the program. | | |
| 3189 | Local variables cannot be used with the Wait command. | Change of local variable cannot be waited by Wait statement. Correct the program. | | |
| 3190 | Array variables cannot be used with the Wait command. | Change of array variable cannot be waited by Wait statement. Correct the program. | | |
| 3191 | Real variables cannot be used with the Wait command. | Change of real variable cannot be waited by Wait statement. Correct the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3192 | String variables cannot be used with the Wait command. | Change of string variable cannot be waited by Wait statement. Correct the program. | | |
| 3193 | Vision object name is missing. | Vision object name cannot be omitted in VTeach statement. Specify the object name. | | |
| 3194 | Cannot use Boolean value for the timeout value. | Boolean value cannot be used for the timeout value of Wait statement. Correct the program. | | |
| 3196 | Fend statement was not found. | The number of Fend statements that correspond to Function statements is not enough. Add the Fend statements. | | |
| 3197 | Numeric variable name cannot use '\$'. | Numeric variable name cannot use '\$'. Correct the variable name. | | |
| 3198 | String variables must have '\$' suffix. | String variables must have a '\$' suffix. Add a '\$' suffix to the variable name. | | |
| 3199 | Invalid object was specified. | Invalid vision object is specified in Vision Guide commands such as VSet and VGet. Specify the valid vision object. | | |
| 3200 | Value is missing. | Add a value. | | |
| 3201 | Expected ', '. | Add ', '. | | |
| 3202 | Expected ' ('. | Add ' ('. | | |
| 3203 | Expected ') '. | Add ') '. | | |
| 3204 | Identifier is missing. | Specify an identifier. | | |
| 3205 | Point is not specified. | Specify a point. | | |
| 3206 | Event condition expression is missing. | Add an event condition expression. | | |
| 3207 | Formula is missing. | Add a formula. | | |
| 3208 | String formula is missing. | Add a string formula. | | |
| 3209 | Point formula is missing. | Add a point formula. | | |
| 3210 | Line label was not specified. | Check if the specified line label exists in the program. Add a valid line label. | | |
| 3211 | Variable was not specified. | Specify a variable. | | |
| 3212 | Corresponding Fend cannot be found. | The number of Fend statements that correspond to Function statements is not enough. Add the Fend statements. | | |
| 3213 | Expected ' : '. | Add ' : '. | | |
| 3214 | True/False was not specified. | True/False was not specified in the property of Vision Guide/GUI Builder or substitution of logical expression which requires Boolean value setting. Specify True or False. | | |
| 3215 | On/Off was not specified. | On or Off must be specified for the remote output logic setting of Motor, Brake, AutoLJM, SetSw, and Box statements. Specify On or Off. | | |
| 3216 | High/Low was not specified. | High or Low must be specified for the power mode setting of Power statement. Specify High or Low. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3217 | Input bit label was not specified. | Input bit label is not specified in SetSW, CTRreset statement, Sw, and Ctr function. Specify a valid input bit label. | | |
| 3218 | Input byte label was not specified. | Input byte label is not specified in SetIn statement, In, and InBCD function. Specify a valid input byte label. | | |
| 3219 | Input word label was not specified. | Input word label is not specified in SetInW statement, InReal, and InW function. Specify a valid input word label. | | |
| 3220 | Output bit label was not specified. | Output bit label is not specified in On, Off statement, and Oport function. Specify a valid output bit label. | | |
| 3221 | Output byte label was not specified. | Output byte label is not specified in Out, OpBCD statement, and Out function. Specify a valid output byte label. | | |
| 3222 | Output word label was not specified. | Output word label is not specified in OutW, OutReal statement, OutW, and OutReal function. Specify a valid output word label. | | |
| 3223 | Memory bit label was not specified. | Memory bit label is not specified in MemOn, MemOff statement, and MemSw function. Specify a valid memory bit label. | | |
| 3224 | Memory byte label was not specified. | Memory byte label is not specified in MemOut statement and MemIn function. Specify a valid memory byte label. | | |
| 3225 | Memory word label was not specified. | Memory word label is not specified in MemOutW statement and MemInW function. Specify a valid memory word label. | | |
| 3226 | User error label was not specified. | User error label is not specified in Error statement. Specify a valid user error label. | | |
| 3227 | Function name was not specified. | Function name is not specified in the statement that requires function name designation, such as Call and Xqt. Specify a valid function name. | | |
| 3228 | Variable type was not specified. | Variable type is not specified for the parameter definition of Function statement and Preserve parameter specification of Global statement. Specify a correct variable type. | | |
| 3229 | Invalid Trap statement parameter. Use Goto, Call, or Xqt. | Specify either GoTo, Call, or Xqt as a parameter of Trap statement. | | |
| 3230 | Expected For/Do/Function. | Specify either For, Do, or Function as a parameter of Exit statement. | | |
| 3231 | Above/Below was not specified. | Setting value for the elbow orientation is not specified in Elbow statement. Specify either Above or Below. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3232 | Righty/Lefty was not specified. | Setting value for the hand orientation is not specified in Hand statement. Specify either Righty or Lefty. | | |
| 3233 | NoFlip/Flip was specified. | Setting value for the wrist orientation is not specified in Wrist statement. Specify either NoFlip or Flip. | | |
| 3234 | Port number was not specified. | Port number that indicates the file or communication port is not specified in Read, ReadBin, Write, and WriteBin statements. Refer to <i>SPEL+ Language Reference "Read Statement"</i> and specify a proper file number or port number. | | |
| 3235 | String type variable was not specified. | String type variable is not specified in the command that requires specification of string type variable as a parameter. Specify a valid string type variable. | | |
| 3236 | RS-232C port number was not specified. | RS-232C port number is not specified in OpenCom, CloseCom, and SetCom statements. Refer to <i>SPEL+ Language Reference "OpenCom Statement"</i> and specify a proper port number. | | |
| 3237 | Network communication port number was not specified. | Network communication port number is not specified in OpenNet, CloseNet, SetNet, and WaitNet statement. Specify an integer from 201 to 216. | | |
| 3238 | Communication speed was not specified. | Communication speed (baud rate) is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper baud rate. | | |
| 3239 | Data bit number was not specified. | Data bit length is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper data bit length. | | |
| 3240 | Stop bit number was not specified. | Stop bit length is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper stop bit length. | | |
| 3241 | Parity was not specified. | Parity is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper parity. | | |
| 3242 | Terminator was not specified. | Terminator (end of send/receive line) is not specified in SetCom and SetNet statements. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper terminator. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3243 | Hardware flow was not specified. | Hardware flow is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper flow control. | | |
| 3244 | Software flow was not specified. | Software flow is not specified in SetCom statement. Refer to <i>SPEL+ Language Reference "SetCom Statement"</i> and specify a proper flow control. | | |
| 3245 | None was not specified. | "NONE" is not specified for software flow control setting in SetNet statement. Specify "NONE". | | |
| 3246 | Parameter ' O ' or ' C ' was not specified. | Open or close parameter for the end of a curve is not specified in Curve statement. Refer to <i>SPEL+ Language Reference "Curve Statement"</i> and specify a proper open/close parameter. | | |
| 3247 | NumAxes parameter was not specified. | The number of coordinate axes controlled during a curve motion is not specified in Curve statement. Refer to <i>SPEL+ Language Reference "Curve Statement"</i> and specify a proper number of the coordinate axes. | | |
| 3248 | J4Flag value (0-1) was not specified. | Specify 0 or 1, or an expression for J4Flag value. | | |
| 3249 | J6Flag value (0-127) was not specified. | Specify an integer from 0 to 127, or an expression for J6Flag value. | | |
| 3250 | Array variable was not specified. | Array variable is not specified in the statement that requires specification of array variable. Specify a valid array variable. | | |
| 3251 | String Array variable was not specified. | Array which stores a token must be a string array variable in ParseStr statement and ParseStr function. Specify a string array variable. | | |
| 3252 | Device ID was not specified. | Device ID is not specified in DispDev statement or Cls command. Refer to <i>SPEL+ Language Reference "DispDev Statement"</i> and specify a proper device ID. | | |
| 3253 | I/O type was not specified. | I/O type is not specified in IOLabel\$ function. Refer to <i>SPEL+ Language Reference "IOLabel\$ Function"</i> and specify a proper I/O type. | | |
| 3254 | I/O bit width was not specified. | I/O bit size (I/O port width) is not specified in IODef, IOLabel function. Refer to <i>SPEL+ Language Reference "IODef Function"</i> and specify a proper I/O bit size. | | |
| 3255 | ByRef was not specified. | Although the ByRef is specified in the function declaration, no ByRef is specified for calling. Specify the ByRef parameter. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3256 | Variable type was not specified. | Variable type is not specified in Global statement. Specify a proper variable type. | | |
| 3257 | Condition expression does not evaluate to Boolean value. | Condition expression in If, Elseif, Do, and Loop statement must return a Boolean value. Correct the condition expression to return a Boolean value. | | |
| 3258 | RS232C port number was not specified. | RS-232C port number is not specified in ChkCom function. Refer to <i>SPEL+ Language Reference "ChkCom Function"</i> and specify a proper port number. | | |
| 3259 | Network communication port number was not specified. | Network communication port number is not specified in ChkNet function. Refer to <i>SPEL+ Language Reference "ChkNet Function"</i> and specify a proper port number. | | |
| 3260 | Language ID was not specified. | Language ID is not specified in ErrMsg\$ function. Refer to <i>SPEL+ Language Reference "ErrMsg\$ Function"</i> and specify a proper language ID. | | |
| 3261 | Expected '.'. | Add '.'. | | |
| 3262 | Vision Sequence Name was not specified. | Vision sequence name is not specified in Vision Guide commands such as VSet, VGet, and VRun. Add a sequence name. | | |
| 3263 | Vision Sequence Name or Calibration Name was not specified. | Vision sequence name or calibration name is not specified in VSet and VGet statements. Add a sequence name or calibration name. | | |
| 3264 | Vision Property Name or Result Name was not specified. | Vision property name or result name is not specified in VSet and VGet statements. Add a property name or result name. | | |
| 3265 | Vision Property Name, Result Name or Object Name was not specified. | Either of Vision property name, result name, or object name is not specified in VSet and VGet statements. Add either of a property name, result name, or object name. | | |
| 3266 | Vision Calibration Property Name was not specified. | Vision calibration property name is not specified in VSet and VGet statements. Add a property name. | | |
| 3267 | Task type was not specified. | Task type is not specified in Xqt statement. Refer to <i>SPEL+ Language Reference "Xqt Statement"</i> and specify a proper task type. | | |
| 3268 | Form name was not specified. | Form name is not specified in GSet, GGet, GShow, GShowDialog, and GClose statements. Specify a form name. | | |
| 3269 | Property Name or Control Name was not specified. | Property name or control name is not specified in GSet and GGet statements. Specify a property name or control name. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|------------------------------------|---|--------|--------|
| 3270 | Property Name was not specified. | Property name is not specified in GSet and GGet statements. Specify a property name. | | |
| 3271 | BackColorMode was not specified. | BackColorMode property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>BackColorMode Property</i> " and specify a proper setting value. | | |
| 3272 | BorderStyle was not specified. | BorderStyle property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>BorderStyle Property</i> " and specify a proper setting value. | | |
| 3273 | DropDownStyle was not specified. | DropDownStyle property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>DropDownStyle Property</i> " and specify a proper setting value. | | |
| 3274 | EventTaskType was not specified. | EventTaskType property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>EventTaskType Property</i> " and specify a proper setting value. | | |
| 3275 | ImageAlign was not specified. | ImageAlign property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>ImageAlign Property</i> " and specify a proper setting value. | | |
| 3276 | IOType was not specified. | IOType property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>IOType Property</i> " and specify a proper setting value. | | |
| 3277 | FormBorderStyle was not specified. | FormBorderStyle property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>FormBorderStyle Property</i> " and specify a proper setting value. | | |
| 3278 | ScrollBars was not specified. | ScrollBars property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>ScrollBars Property</i> " and specify a proper setting value. | | |
| 3279 | SizeMode was not specified. | SizeMode property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>SizeMode Property</i> " and specify a proper setting value. | | |
| 3280 | StartPosition was not specified. | StartPosition property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual " <i>StartPosition Property</i> " and specify a proper setting value. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|----------------------------------|--|--------|--------|
| 3281 | TextAlign was not specified. | TextAlign property setting value is not specified in GSet statement. This error occurs when the control type cannot be identified because the control is specified by a string variable. Refer to <i>GUI Builder 7.0</i> manual "TextAlign Property" and specify a proper setting value. | | |
| 3282 | TextAlign was not specified. | TextAlign property setting value is not specified in GSet statement. This error occurs when the control is a text box. Refer to <i>GUI Builder 7.0</i> manual "TextAlign Property" and specify a proper setting value. | | |
| 3283 | TextAlign was not specified. | TextAlign property setting value is not specified in GSet statement. This error occurs when the control is other than a text box. Refer to <i>GUI Builder 7.0</i> manual "TextAlign Property" and specify a proper setting value. | | |
| 3284 | WindowState was not specified. | WindowState property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0</i> manual "WindowState Property" and specify a proper setting value. | | |
| 3285 | J1FLAG was not specified. | Specify 0 or 1, or an expression for J1Flag value. | | |
| 3286 | J2FLAG was not specified. | Specify 0 or 1, or an expression for J2Flag value. | | |
| 3287 | Robot ID was not specified. | Specify a robot number. | | |
| 3288 | Robot ID/All was not specified. | Robot number or All is not specified in InsideBox and InsidePlane function. Specify a robot number which performs intrusion detection, or All. | | |
| 3289 | Area ID was not specified. | Area number is not specified in InsideBox and InsidePlane function. Specify an approach check area number which returns status by an integer from 1 to 15. | | |
| 3290 | File number was not specified. | File number is not specified in the command related to file management. Specify a file number by an integer from 30 to 63 or an expression. | | |
| 3292 | Database type was not specified. | Database type is not specified in OpenDB statement. Refer to <i>SPEL+ Language Reference</i> "OpenDB Statement" and specify a proper database type. | | |
| 3293 | Disk type was not specified. | Type of the disk that is subject to file manipulation is not specified in ChDisk statement. Refer to <i>SPEL+ Language Reference</i> "ChDisk Statement" and specify a proper disk type. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3295 | Conveyor area ID was not specified. | Area ID that is subject to count the queue data is not specified in Cnv_QueueLen function. Refer to <i>SPEL+ Language Reference "Cnv_QueueLen Function"</i> and specify a proper area ID. | | |
| 3296 | Database file number was not specified. | Data base number that is subject to operation is not specified in OpenDB, CloseDB, DeleteDB, UpdateDB, and SelectDB function. Refer to <i>SPEL+ Language Reference "OpenDB Statement"</i> and specify a proper database number. | | |
| 3297 | Vision calibration name was not specified. | Calibration name is not specified in VCal statement. Specify a name of calibration that is subject to calibrate. | | |
| 3298 | Vision object type ID was not specified. | Vision object type is not specified in VCreateObject statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference "VCreateObject Statement"</i> and specify a proper object type. | | |
| 3299 | Shutdown mode ID was not specified. | Shutdown mode value is not specified in ShutDown statement and ShutDown function. Refer to <i>SPEL+ Language Reference "Shutdown Statement"</i> and specify a proper mode value. | | |
| 3301 | Version of linked OBJ file does not match. | Not all project files are compiled in the same version. Rebuild the project. | | |
| 3302 | Linked OBJ file does not match the compiled I/O label. | The project configuration has been changed. Rebuild the project. | | |
| 3303 | Linked OBJ file does not match the compiled user error label. | The project configuration has been changed. Rebuild the project. | | |
| 3304 | Linked OBJ file does not match the compiled compile option. | The project configuration has been changed. Rebuild the project. | | |
| 3305 | Linked OBJ file does not match the compiled link option. | The project configuration has been changed. Rebuild the project. | | |
| 3306 | Linked OBJ file does not match the compiled SPEL option. | The project configuration has been changed. Rebuild the project. | | |
| 3307 | Duplicate function. | The same function name is used for more than one file. Correct the program (function name). | | |
| 3308 | Duplicate global preserve variable. | The same global preserve variable name is used for more than one file. Correct the program (variable name). | | |
| 3309 | Duplicate global variable. | The same global variable name is used for more than one file. Correct the program (variable name). | | |
| 3310 | Duplicate module variable. | The same module variable name is used for more than one file. Correct the program (variable name). | | |
| 3311 | File cannot be found. | - | | |
| 3312 | OBJ file is corrupt. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3313 | The specified file name includes character(s) that cannot be used. | - | | |
| 3314 | Cannot open the file. | The file is used for other application. Quit the other application. | | |
| 3315 | '**' is already used for a function name. | Correct the identifier '**' or the function name. Rebuild the project. | | |
| 3316 | '**' is already used for a global preserve variable name. | Correct the identifier '**' or the global preserve variable name. Rebuild the project. | | |
| 3317 | '**' is already used for a global variable name. | Correct the identifier '**' or the global variable name. Rebuild the project. | | |
| 3318 | '**' is already used for a module variable name. | Correct the identifier '**' or the module variable name. Rebuild the project. | | |
| 3319 | Dimension of the array variable does not match the declaration. | Correct the dimension of the array and rebuild the project. | | |
| 3320 | Return value type of the function does not match the declaration. | Correct the return value type of the function and rebuild the project. | | |
| 3321 | '**' is already used with function name. | Correct the identifier '**' or the function name. Rebuild the project. | | |
| 3322 | '**' is already used with Global Preserve name. | Correct the identifier '**' or the global preserve variable name. Rebuild the project. | | |
| 3323 | '**' is already used with Global name. | Correct the identifier '**' or the global variable name. Rebuild the project. | | |
| 3324 | '**' is already used with Module name. | Correct the identifier '**' or the module variable name. Rebuild the project. | | |
| 3325 | '**' is already used with Local name. | Correct the identifier '**' or the local variable name. Rebuild the project. | | |
| 3326 | The number of parameters does not match the declaration. | Check the number of parameters in the function, correct the program, and then rebuild the project. | | |
| 3327 | ByRef was not specified in Function declaration for parameter **. | - | | |
| 3328 | ByRef was not specified for parameter **. | - | | |
| 3329 | Parameter ** type mismatch. | - | | |
| 3330 | Linked OBJ file does not match the compiled Vision Project. | Rebuild the project. | | |
| 3331 | OBJ file size is beyond the available size after linking. | The OBJ file size exceeds the limit value (8MB). Reduce the program. | | |
| 3332 | Variable '***' is redefined. | Variable '***' is overloaded. Delete unnecessary variable definition and rebuild the project. | | |
| 3333 | Linked OBJ file does not match the compiled GUI Builder Project. | Rebuild the project. | | |
| 3334 | The number of variables which is using Wait command is beyond the maximum allowed. | The number of variables which is using Wait command is exceeding the maximum allowed (64). Delete the variables and rebuild the project. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3335 | Call cannot be used in parallel processing. | Call cannot be used in parallel processing. Correct the program and rebuild the project. | | |
| 3336 | Variable was redefined. | Correct the data type of the variable and rebuild the project. | | |
| 3351 | Invalid object index was specified. | | | |
| 3352 | Force Guide Sequence Name was not specified. | | | |
| 3353 | Force Guide Property Name or Result Name was not specified. | | | |
| 3354 | Force Guide Property Name, Result Name or Object Name was not specified. | | | |
| 3355 | Force Guide project file has unsupported file format. | | | |
| 3356 | Linked OBJ file does not match the compiled Force Guide Project. | | | |
| 3400 | Dialog ID was not specified. | Dialog ID is not specified in RunDialog statement. Refer to <i>SPEL+ Language Reference "RunDialog Statement"</i> and specify a dialog ID. | | |
| 3401 | Main function name was not specified. | Name of the main function to execute is not specified in StartMain statement. Specify a main function name (main to main63). | | |
| 3402 | Vision object name was not specified. | Vision object name is not specified in VLoadModel, VSaveModel, VShowModel, VTeach, and VTrain statements. Specify an object name. | | |
| 3403 | Recover mode ID was not specified. | Recover mode is not specified in Recover statement or Recover function. Refer to <i>SPEL+ Language Reference "Recover Statement"</i> and specify a proper mode. | | |
| 3404 | Trap condition was not specified. | Trap number or trap event is not specified in Trap statement. Refer to <i>SPEL+ Language Reference "Trap Statement"</i> and specify a proper trap number or event. | | |
| 3405 | DialogResult was not specified. | DialogResult property setting value is not specified in GSet statement. Refer to <i>GUI Builder 7.0 "DialogResult Property"</i> and specify a proper setting value. | | |
| 3406 | MsgBox_Type was not specified. | Display type is not specified in MsgBox statement. Refer to <i>SPEL+ Language Reference "MsgBox Statement"</i> and specify a proper setting value. | | |
| 3407 | Byte type array variable was not specified. | Byte type array variable is not specified for send or receive data in FbusIO_SendMsg statement. Send/receive data must be specified by Byte type array. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3408 | Single array variable was not specified. | The number of dimensions is not proper in the command where single array variable is only available. Correct the number of dimensions. | | |
| 3409 | Point list is not specified. | Pixel coordinate or robot coordinate is not specified as a continuous point data in VxCalib statement. Specify a continuous point data in the following format: P (start : end) | | |
| 3410 | Code type is not specified. | CodeType property setting value is not specified in VSet statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference</i> "CodeType Property" and specify a proper setting value. | | |
| 3411 | Edge type is not specified. | EdgeType property setting value is not specified in VSet statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference</i> "EdgeType Property" and specify a proper setting value. | | |
| 3412 | ECC type is not specified. | ErrorCorrection property setting value is not specified in VSet statement. This error is for the old RC+6.x. Setting of the old version is possible by compiler version setting. Refer to <i>Vision Guide 6.0 Properties & Results Reference</i> "ErrorCorrection Property" and specify a proper setting value. | | |
| 3413 | ImageColor type is not specified. | ImageColor property setting value is not specified in VSet statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference</i> "ImageColor Property" and specify a proper setting value. | | |
| 3414 | Point type is not specified. | PointType property setting value is not specified in VSet statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference</i> "PointType Property" and specify a proper setting value. | | |
| 3415 | Reference type is not specified. | ReferenceType property setting value is not specified in VSet statement. Refer to <i>Vision Guide 7.0 Properties & Results Reference</i> "ReferenceType Property" and specify a proper setting value. | | |
| 3416 | Edge type is not specified. | Logic (edge type) of the trigger input is not specified in SetLatch statement. Specify either 0 (negative logic) or 1 (positive logic). | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3417 | Port number is not specified. | R-I/O input port number where the trigger input is connected is not specified in SetLatch statement. Refer to <i>SPEL+ Language Reference</i> "SetLatch Statement" and specify a proper port number. | | |
| 3418 | Axis is not specified. | Axis parameter is not specified in Force_GetForce function or Force_SetTrigger statement. Refer to <i>SPEL+ Language Reference</i> "Force_GetForce Function" and specify a proper setting value. | | |
| 3419 | CompareType is not specified. | ComapreType parameter to set judgment condition is not specified in Force_SetTrigger statement. Refer to <i>SPEL+ Language Reference</i> "Force_SetTrigger Statement" and specify a proper parameter. | | |
| 3420 | Integer or Short type array variable is only available. | - | | |
| 3421 | Form name or window ID is not specified. | Form name or system window ID which is subject to operation is not specified in GShow and GClose statements. Specify a valid form name or window ID. For details of window ID, refer to <i>GUI Builder7.0</i> manual "GShow Statement". | | |
| 3422 | Window ID is not specified. | System window ID which is subject to operation is not specified in GShow and GClose statements. Refer to <i>GUI Builder7.0</i> manual "GShow Statement" and specify a proper window ID. | | |
| 3423 | Performance mode ID was not specified. | Performance mode is not specified in PerformMode parameter of PerformMode statement, Go, BGo, TGo, Jump statement. Refer to <i>SPEL+ Language Reference</i> "PerformMode" and specify a proper performance mode. | | |
| 3424 | Protocol type was not specified. | Communication protocol setting is not specified in SetNet statement. Specify UDP or TCP. | | |
| 3425 | I/O type or I/O label was not specified. | I/O type or I/O label is not specified in IODef function. Specify the I/O label or I/O type to check existence of definition. For details of I/O types, refer to <i>SPEL+ Language Reference</i> "IODef Function". | | |
| 3426 | Singularity avoidance mode was not specified. | Singularity avoidance mode is not specified in AvoidSingularity statement. Refer to <i>SPEL+ Language Reference</i> "AvoidSingularity Statement" and specify a proper mode. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3427 | Acceleration value was not specified. | Setting number of acceleration is not specified in AccelR function. Refer to <i>SPEL+ Language Reference "AccelR Function"</i> and specify a proper setting value. | | |
| 3428 | Acceleration value was not specified. | Setting number of acceleration is not specified in Accel function, AccelMax function, AccelS function, and RealAccel function. Refer to <i>SPEL+ Language Reference "Accel Function"</i> and specify a proper number. | | |
| 3429 | Sorting order for work queue data was not specified. | Sorting order for work queue data is not specified in WorkQue_Sort statement. Refer to <i>SPEL+ Language Reference "WorkQue_Sort Statement"</i> and specify a proper sorting order. | | |
| 3430 | Coordinate axes number was not specified. | - | | |
| 3431 | Coordinate axes number was not specified. | - | | |
| 3432 | Point or point expression is not specified. Review the program. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 3433 | Boolean type array variable was not specified. Specify a Boolean type array variable. | Array which stores a value of Enabled or LPF_Enabled property must be a Boolean type array variable in FGet statement. Specify a Boolean array variable. | | |
| 3434 | Real or Double type array variable was not specified. Specify a Real or Double type array variable. | Real or Double type array variable is not specified in FGet or MPGet statement. Specify a real or double type array variable. | | |
| 3435 | Integral type array variable was not specified. Specify an Integral type array variable. | Array which stores a value of Polarities property must be an Integral type array variable in FGet statement. Specify an integral type array variable. | | |
| 3436 | Duration of FCKeep statement is not specified. Specify the duration. | Duration of force control (timeout value) is not specified in FCKeep statement. Specify a proper setting value. | | |
| 3437 | Part kind of controller was not specified. | Specify the controller part type. | | |
| 3438 | Part kind of robot was not specified. | Specify the robot part type. | | |
| 3439 | Part kind of robot was not specified. | Specify the robot part type. | | |
| 3440 | A value other than numerical value is specified for the parameter of the command. Specify a numerical value. | Specify a numerical value for AIO_TrackingSet command 7th parameter. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 3441 | A value other than numerical value is specified for the parameter of the command. Specify a numerical value. | Specify a numerical value for AIO_TrackingSet command 6th parameter. | | |
| 3450 | Force property name or status name is not specified. Add a property name or a status name. | Force property name or status name is not specified in FSet, FGet, MPSet, and MPGet statements. Add a property name or a status name. | | |
| 3451 | Force property name, status name, or object name is not specified. Add either of a property name, status name, or object name. | Either of Force property name, status name, or object name is not specified in FSet, FGet, MPSet, and MPGet statements. Add either of a property name, status name, or object name. | | |
| 3452 | Force object name is not specified. Add a force object name. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 3453 | Mass Property Object is not specified. Specify a Mass Property Object. | Specify a valid Mass Property object. | | |
| 3454 | Force Coordinate System Object is not specified. Specify a Force Coordinate System Object. | Specify a valid Force Coordinate System object. | | |
| 3455 | Force Control Object is not specified. Specify a Force Control Object. | Specify a valid Force Control object. | | |
| 3456 | Force Monitor Object is not specified. Specify a Force Monitor Object. | Specify a valid Force Monitor object. | | |
| 3457 | Force Trigger Object is not specified. Specify a Force Trigger Object. | Specify a valid Force Trigger object. | | |
| 3458 | Force Control Object or Force Coordinate System Object is not specified. Specify a Force Control Object or Force Coordinate System Object. | Force Control data or Force Coordinate System data is not specified in FCSMove statement. Specify a valid Force Control object or Force Coordinate System object. | | |
| 3459 | Force object is not specified. | Specify a Force object. | | |
| 3460 | Force object label is not specified. | Specify a Force object label. | | |
| 3461 | Force object or label is not specified. | Specify a Force object or label. | | |
| 3462 | Force Coordinate System Object or label is not specified. Specify a Force Coordinate System Object or label. | Specify a valid Force Coordinate System object or label. | | |
| 3463 | Force Control Object or label is not specified. Specify a Force Control Object or label. | Specify a valid Force Control object or label. | | |
| 3464 | Force Monitor Object or label is not specified. Specify a Force Monitor Object or label. | Specify a valid Force Monitor object or label. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3465 | Force Trigger Object or label is not specified. Specify a Force Trigger Object or label. | Specify a valid Force Trigger object or label. | | |
| 3466 | Mass Property Object or label is not specified. Specify a Mass Property Object or label. | Specify a valid Mass Property object or label. | | |
| 3467 | Force Coordinate System Object or label is not specified. Specify a Force Coordinate System Object or label. | Specify a valid Force Coordinate System object or label. | | |
| 3468 | Force Control Object label is not specified. Specify a Force Control Object label. | Specify a valid Force Control object label. | | |
| 3469 | Force Monitor Object label is not specified. Specify a Force Monitor Object label. | Specify a valid Force Monitor object label. | | |
| 3470 | Force Trigger Object label is not specified. Specify a Force Trigger Object label. | Specify a valid Force Trigger object label. | | |
| 3471 | Force Sensor Object label is not specified. Specify a Force Sensor Object label. | Specify a valid Force Sensor object label. | | |
| 3472 | Mass Property Object label is not specified. Specify a Mass Property Object label. | Specify a valid Mass Property object label. | | |
| 3473 | Mass Property Object label is not specified. Specify a Mass Property Object label. | Specify a valid Mass Property object label. | | |
| 3474 | Fmag_Axes or Tmag_Axes property setting value is not specified. Specify a proper setting value. | Fmag_Axes or Tmag_Axes property setting value is not specified in FSet statement. Refer to "Fmag_Axes property" or "Tmag_Axes property" and specify a proper setting value. | | |
| 3475 | TriggerMode property setting value is not specified. Specify a proper setting value. | TriggerMode property setting value is not specified in FSet statement. Refer to "TriggerMode property" and specify a proper setting value. | | |
| 3476 | Operator property setting value is not specified. Specify a proper setting value. | Operator property setting value is not specified in FSet statement. Refer to "Operator property" and specify a proper setting value. | | |
| 3477 | Orientation property setting value is not specified. Specify a proper setting value. | Orientation property setting value is not specified in FSet statement. Refer to "Orientation property" and specify a proper setting value. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3478 | Polarity property setting value is not specified. Specify a proper setting value. | Fmag_Polarity, Fx_Polarity, Fy_Polarity, Fz_Polarity, Tmag_Polarity, Tx_Polarity, Ty_Polarity, and Tz_Polarity property setting value is not specified in FSet statement. Specify a proper setting value. | | |
| 3500 | Duplicate macro in #define statement. | Another macro with the same name has been defined. Change the macro name. | | |
| 3501 | Macro name was not specified. | Macro name is not specified in #define, #ifdef, #ifndef, and #undef statements. Add a macro name. | | |
| 3502 | Include file name cannot be found. | Include file name is not specified in #include statement. Add a valid include file name. | | |
| 3503 | Specified include file is not in the project. | The include file that is not registered in the project configuration is specified. Add the include file to the project configuration. | | |
| 3504 | Parameter of the macro function does not match the declaration. | Check the number of parameters and correct the macro function. | | |
| 3505 | Macro has a circular reference. | The macro has a circular reference. Correct the circular reference. | | |
| 3506 | #define, #ifdef, #ifndef, #else, #endif, #undef and variable declaration statements are only valid in an include file. | Check and correct the content of include file. | | |
| 3507 | Over #ifdef or #ifndef nesting level. | Limit of the nesting levels is 7 at the maximum. Correct the program so as not to exceed the limit value. | | |
| 3508 | Cannot find corresponding #ifdef or #ifndef. | The number of #endif statements that correspond to #ifdef and #ifndef statements is too many. Delete #endif statements or add the #ifdef and #ifndef statements. | | |
| 3509 | No #endif found for #ifdef or #ifndef. | The number of #endif statements that correspond to #ifdef and #ifndef statements is not enough. Add the #endif statements. | | |
| 3510 | Cannot obtain the macro buffer. | - | | |
| 3550 | Parameter for the macro function was not specified. | The macro declared as a macro function is called without argument. Correct the program. | | |
| 3600 | Tracking motion command cannot use Sense parameter. | When the queue data is specified in Jump, Jump3, and Jump3CP statements, Sense parameter cannot be specified. Delete the Sense statement. | | |
| 3601 | Parameter type is mismatch for the external function ' ** '. Check all statements where this function is called in this file. | LJM parameter cannot be specified in BGo, TGo, Arc, Arc3, BMove, Move, and TMove statements. Delete the LJM parameter. | | |
| 3602 | The specified motion command cannot use LJM parameter. | InReal function cannot be used with Wait statement. Correct the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 3603 | InReal function cannot be used with Wait statement. | PerformMode parameter cannot be specified in Jump3, Jump3CP, Arc, Arc3, BMove, Move, and TMove statements. Delete the PerformMode parameter. | | |
| 3605 | The specified motion command cannot use PerformMode parameter. | LJM parameter cannot be specified in BGo, TGo, Arc, Arc3, BMove, Move, and TMove statements. Delete the LJM parameter. | | |
| 3606 | Cannot use the index. | Index number cannot be specified except List property in GSet and GGet statements. Correct the program. | | |
| 3607 | Invalid object index was specified. | Invalid index is specified in Objects property of VSet and VGet statements. The index must be larger than 1 and smaller than the number of objects in the specified sequence. Specify a proper index. | | |
| 3608 | Invalid control index was specified. | Invalid index is specified in Controls property of GSet and GGet statements. The index must be larger than 1 and smaller than the number of controls in the specified form. Specify a proper index. | | |
| 3609 | Modifier parameters are duplicated. Review the program. | Force Guide data or CF parameter is duplicated in CVMove, FCKeep or other statement for robot motion. Correct the program. | | |
| 3610 | Cannot use a keyword for a label name. | Keywords such as a command or a function are used for a label name. Change the label name which does not use these keywords. | | |
| 3733 | Vision Sequence Name or Calibration Name was not specified. | Vision sequence name or calibration name is not specified in VSet and VGet statements. Add a sequence name or calibration name. | | |
| 3800 | Compile process aborted. | - | | |
| 3801 | Link process aborted. | - | | |
| 3802 | Compile process aborted. Compile errors reached the maximum count. | Correct the error in the program and rebuild the project. | | |
| 3803 | Link process aborted. Link errors reached the maximum count. | Correct the error in the program and rebuild the project. | | |
| 3804 | Specified command cannot be executed from the Command window. | Declaration of variables and functions, program control statement, preprocessor commands, and some commands cannot be executed from the command window. For details, refer to <i>SPEL+ Language Reference "Appendix A: SPEL+ Command Use Condition List"</i> . | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3805 | Specified command can only be executed from the Command window. | Brake, SysConfig, Where, Cnv_QueueList, and WorlQue_List statements can only be executed from the command window. Delete these statements from the program. | | |
| 3806 | Specified function cannot be executed from the Command window. | LogIn function cannot be executed from the command window even when used with Print statement. Use the function in the program. | | |
| 3808 | Specified syntax cannot be used in the current version. | LJM and PerformMode parameters of motion commands may not be specified depending on the compiler version. LJM parameter: 6.0.x.x or later PerformMode parameter: 7.0.4.x or later Check the compiler version from the project property. | | |
| 3809 | Module variables cannot be used in the command window. | Module variable cannot be accessed from the command window. Check the input command. | | |
| 3812 | Specified function cannot be used with a Remote User Output. | Functions for condition expression of the user defined remote output are limited. Refer to <i>EPSON RC+7.0 User's Guide "11.8 User-defined Remote Output I/O"</i> and specify a valid function. | | |
| 3813 | User defined label, function and variable cannot be used with a Remote User Output. | User defined label, function and variable cannot be used with condition expression of the user-defined remote output. Correct the condition expression. | | |
| 3814 | Object code size is beyond the available size. | A combination of multiple statements is exceeding the available size of the intermediate code which can be executed at once (1024 bytes). Divide the statements. | | |
| 3815 | Parameter cannot be specified for property or status in the command window. Delete the parameter and execute again. | When executing FGet or MPGet statement from a command window, a parameter cannot be specified to a property or status. Delete the parameter and execute again. | | |
| 3850 | File not found. | - | | |
| 3851 | Point file not found. | Failed to read the point file which configures the project. Check the project folder if the file exists. | | |
| 3852 | I/O label file not found. | Failed to read the I/O label file which configures the project. Check the project folder if the file exists. | | |
| 3853 | User error label file not found. | Failed to read the user error label file which configures the project. Check the project folder if the file exists. | | |
| 3854 | Force file does not exist. Check the project folder if the file exists. | Failed to read the force file which configures the project. Check the project folder if the file exists. | | |
| 3860 | I/O label file not supported format. | Regenerate the I/O label file. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 3861 | User error label file has unsupported file format. | Regenerate the user error file. | | |
| 3862 | Point file has unsupported file format. | Regenerate the point file. | | |
| 3863 | Vision project file has unsupported file format. | Regenerate the vision sequence. | | |
| 3864 | GUI Builder project file has unsupported file format. | Regenerate the GUI Builder form. | | |
| 3865 | OBJ file not supported format. | Rebuild the project. | | |
| 3866 | Force file has unsupported file format. Re-create the force file. | Regenerate the force file. | | |
| 3870 | Cannot specify Mass Property Object. Review the program. | Mass Property object cannot be specified in FSet, FGet, FDel, and FList statements, FDef, and FLabel\$ functions. Correct the program. | | |
| 3871 | Cannot specify Force Coordinate System Object. Review the program. | Force coordinate system object cannot be specified in Go, BGo, TGo, Jump, Jump3, Mode, BMove, TMove, Arc, Arc3 statement, MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLabel\$ function. Correct the program. | | |
| 3872 | Cannot specify Force Control Object. Review the program. | Force control object cannot be specified in Go, BGo, TGo, Jump, Jump3 statement, and MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLabel\$ function. Correct the program. | | |
| 3873 | Cannot specify Force Monitor Object. Review the program. | Force monitor object cannot be specified in MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLable\$ function. Correct the program. | | |
| 3874 | Cannot specify Force Trigger Object. Review the program. | Force trigger object cannot be specified in MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLable\$ function. Correct the program. | | |
| 3875 | Cannot specify Force Sensor object. Review the program. | Force Sensor object cannot be specified in FDel, FList statement, FDef, FLabel\$ function, MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLabel\$ function. Correct the program. | | |
| 3876 | Cannot specify Robot object. Review the program. | Robot object cannot be specified in FDel, FList statement, FDef, FLabel\$ function, MPSet, MPGet, MPDel, MPList statement, and MPDef, MPLabel\$ function. Correct the program. | | |
| 3877 | Cannot specify Force Control Object and Force Coordinate System Object at the same time. Review the program. | Force control object and Force coordinate system object cannot be specified at the same time in FCMove statement. Correct the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3878 | Cannot specify CF parameter. Delete the CF parameter. | CF parameter cannot be specified in Go, BGo, TGo, Jump, Jump3. Delete the CF parameter. | | |
| 3879 | Cannot specify Mass Property Object label. Review the program. | Mass property object label cannot be specified in MPDel, and MPList statements. Correct the program. | | |
| 3880 | Cannot specify Force Coordinate System Object label. Review the program. | Force coordinate system object label cannot be specified in FDel and FList statements. Correct the program. | | |
| 3881 | Cannot specify Force Control Object label. Review the program. | Force control object label cannot be specified in FDel and FList statements. Correct the program. | | |
| 3882 | Cannot specify Force Monitor Object label. Review the program. | Force monitor object label cannot be specified in FDel and FList statements. Correct the program. | | |
| 3883 | Cannot specify Force Trigger Object label. Review the program. | Force trigger object label cannot be specified in FDel and FList statements. Correct the program. | | |
| 3884 | Cannot specify Force Sensor Object label. Review the program. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 3885 | Cannot specify Mass Property Object number. Review the program. | Mass property object number cannot be specified in MPNumber function. Correct the program. | | |
| 3886 | Cannot specify Force Coordinate System Object number. Review the program. | Force coordinate system object number cannot be specified in FNumber function. Correct the program. | | |
| 3887 | Cannot specify Force Control Object number. Review the program. | Force control object number cannot be specified in FNumber function. Correct the program. | | |
| 3888 | Cannot specify Force Monitor Object number. Review the program. | Force monitor object number cannot be specified in FNumber function. Correct the program. | | |
| 3889 | Cannot specify Force Trigger Object number. Review the program. | Force trigger object number cannot be specified in FNumber function. Correct the program. | | |
| 3890 | Cannot specify Force Sensor Object number. Review the program. | - | | |
| 3891 | Type of the specified two objects does not match. Specify the same type of the objects. | The data type of the first and the second parameter does not match in FDel, FList, MPDel, MPList statements. Correct the program. | | |
| 3900 | Cannot obtain the internal communication buffer. | - | | |
| 3901 | Buffer size is not enough. | - | | |
| 3910 | Undefined command was specified. | - | | |
| 3911 | Cannot enter the file name in the file name buffer. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 3912 | Cannot obtain the internal buffer. | - | | |
| 3913 | Cannot set priority. | Reboot the controller. | | |
| 3914 | Invalid ICode. | Rebuild the project. | | |
| 3915 | Invalid ICode. | Rebuild the project. | | |
| 3916 | Invalid ICode. | Rebuild the project. | | |
| 3917 | Invalid ICode. | Rebuild the project. | | |
| 3918 | Invalid ICode. | Rebuild the project. | | |
| 3919 | Invalid ICode. | Rebuild the project. | | |
| 3920 | Invalid ICode. | Rebuild the project. | | |
| 3921 | Invalid ICode. | Rebuild the project. | | |
| 3930 | VDefTool Type ID is not specified. | Specify a numerical value for VDefTool command 2nd parameter. | | |
| 3931 | VDefArm Type ID is not specified. | Specify a numerical value for VDefArm command 2nd parameter. | | |
| 3932 | VDefArm ArmSetMode is not specified. | Specify a numerical value for VDefArm command 3rd parameter. | | |
| 3933 | VDefLocal Type ID is not specified. | Specify a numerical value for VDefLocal command 2nd parameter. | | |
| 3934 | VDefLocal CalibPlate Type ID is not specified. | Specify a numerical value for VDefLocal command 3rd parameter. | | |
| 3940 | LatchPos Type ID is not specified. | Specify a numerical value for LatchPos command 1st parameter. | | |
| 3960 | Neither Robot, Object nor ResetCollision were specified. | | | |
| 3961 | Neither Hand nor Property were specified. | | | |
| 3962 | Invalid Property was specified. | | | |
| 3963 | Neither Robot nor Object were specified. | | | |
| 3964 | Invalid Object was specified. | | | |
| 3965 | Invalid Object index was specified. | | | |
| 3990 | Analog I/O TCPSpeed Type is not specified. | Specify a numerical value for AIO_Set command 3rd parameter. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|---------------------------------|
| 4001 | Arm reached the limit of motion range. | Check the point to move, current point, and Range setting. | | |
| 4002 | Specified value is out of allowable range. | Review the setting parameters. | | The parameter causing the error |
| 4003 | Motion device driver failure. Communication error within the motion control module. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4004 | Motion device driver failure. Event waiting error within the motion control module. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4005 | Current point position is above the specified LimZ value. | Lower the Z axis. Increase the specified LimZ value. | | |
| 4006 | Target point position is above the specified LimZ value. | Lower the Z coordinate position of the target point. Increase the specified LimZ value. | | |
| 4007 | Coordinates conversion error. The end/mid point is out of the motion area. Jogging to the outside of the motion area. | Check whether the coordinate out of the motion range is not specified. | | |
| 4008 | Current point position or specified LimZ value is out of motion range. | Change the specified LimZ value. | | |
| 4009 | Motion device driver failure. Timeout error within motion control module. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4010 | Specified Local coordinate was not defined. | Define the Local coordinate system. | | Local number |
| 4011 | Arm reached the limit of XY motion range specified by XYLim statement. | Check the area limited by the XYLim statement. | | |
| 4012 | Upper limit value of Box is smaller than the lower limit value. Change the upper and lower limit values. | Set the upper limit value to be larger than the lower limit value. | | |
| 4013 | Motion control module internal calculation error. | Calculation of the timing of Arch motion failed. Perform either of the following: - Check and modify Arch parameter - Disable Arch | | |
| 4014 | MCAL was not completed. | Execute MCal. Make sure the MCOdr is set for the joint connected to the PG board. | | |
| 4016 | SFree statement was attempted for prohibited joint(s). | Due to robot mechanistic limitation, setting some joint(s) to servo free status is prohibited. Check the robot specifications. | | |
| 4018 | Communication error within the motion control module. Check sum error. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4021 | Point positions used to define the Local are too close. | Set the distance between points more than 1 μ m. | | |
| 4022 | Point coordinate data used to define the Local is invalid. | Match the coordinate data for the points to be specified. | | |
| 4023 | Cannot execute when the motor is in the off state. | Turn the motor power ON and then execute. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 4024 | Cannot complete the arm positioning using the current Fine specification. | Check whether the robot does not generate vibration or all parts and screws are secured firmly. Increase the Fine setting value. | | |
| 4025 | Cannot execute a motion command during emergency stop condition. | Clear the emergency stop condition and execute the motion command. | | |
| 4026 | Communication error within the motion control module. Servo I/F failure. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4028 | Communication error within the motion control module. Device driver status failure. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4030 | Buffer for the average torque calculation has overflowed. Shorten the time interval from Atclr to Atrq. | Shorten the time interval from Atclr to Atrq less than about two minutes. | | |
| 4031 | Cannot execute a motion command when the motor is in the off state. | Turn the motor power ON and then execute the motion command. | | |
| 4032 | Cannot execute a motion command when one or more joints are in SFree state. | Set all joints to the SLock state and execute the motion command. | | |
| 4033 | The specified command is not supported for Pulse Generator Board joints. | The specified command is not permitted for the joints with PG board. | | |
| 4034 | Specified command is not supported for this robot model. | Remove the unsupported command from the program. | | |
| 4035 | Only the tool orientation was attempted to be changed by the CP statement. | Set a move distance between points. Use the ROT modifier, SpeedR statement, and AccelR statement. | | |
| 4036 | Rotation speed of tool orientation by the CP statement is too fast. | Decrease the setting values for the SpeedS and AccelS statements. Use the ROT modifier, SpeedR statement, and AccelR statement. | | |
| 4037 | The point attribute of the current and target point positions differ for executing a CP control command. | Match the point attribute. | | |
| 4038 | Two point positions are too close to execute the Arc statement. | Set the distance between points more than 1 μ m. | | |
| 4039 | Three point positions specified by the Arc statement are on a straight line. | Use the Move statement. | | |
| 4041 | Motion command was attempted to the prohibited area at the backside of the robot. | Check the robot motion range. | | |
| 4042 | Motion device driver failure. Cannot detect the circular format interruption. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4043 | Specified command is not supported for this robot model or this joint type. | Remove the unsupported command from the program. | | |
| 4044 | Curve failure. Specified curve form is not supported. | Create a Curve file again with the Curve statement. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 4045 | Curve failure. Specified mode is not supported. | Specify the Curve mode properly. Create a Curve file again with the Curve statement. | | |
| 4046 | Curve failure. Specified coordinate number is out of the allowable range. | The number of the available coordinate axes is 2, 3, 4, and 6. Create a Curve file again with the Curve statement. | | |
| 4047 | Curve failure. Point data was not specified. | Create a Curve file again with the Curve statement. | | |
| 4048 | Curve failure. Parallel process was specified before the point designation. | Create a Curve file again with the Curve statement. | | |
| 4049 | Curve failure. Number of parallel processes is out of the allowable range. | Create a Curve file again with the Curve statement. | | |
| 4050 | Curve failure. Number of points is out of the allowable range. | The number of available point numbers differs according to the curve form. Check the number of points again. | | |
| 4051 | Curve failure. Local attribute and the point attribute of all specified points do not match. | Match the local and point flag for all the specified points. | | |
| 4052 | Curve failure. Not enough memory to format the curve file. | Reboot the controller. | | |
| 4053 | Curve failure. Failed to format the curve file. | Review the point data. Check whether adjacent two points do not overlap on the specified point line. | | |
| 4054 | Curve failure. Curve file error | The Curve file is broken. Create a Curve file again with the Curve statement. | | |
| 4055 | Curve failure. No distance for curve file movement. | Review the point data. | | |
| 4056 | Curve failure. Point positions for the Curve statement are too close. | Set the distance between two points adjacent to the specified point more than 0.001 mm. | | |
| 4058 | Prohibited command while tracking was executed. | Remove the prohibited command from the program. | | |
| 4059 | Executed encoder reset command while the motor is in the on state. | Turn the motor power OFF. | | |
| 4060 | Executed an invalid command while the motor is in the on state. | Turn the motor power OFF. | | |
| 4061 | Specified parameter is in use. | You attempted to clear the currently specified Arm and Tool. Select other Arm and Tool and execute. | | |
| 4062 | Orientation variation is over 360 degrees. | You attempted to rotate the joint #J6 more than 360 degrees with a CP motion command. | | |
| 4063 | Orientation variation of adjacent point is over 90 degrees. | On the specified point line by the Curve statement, set the orientation variation of U, V, and W coordinate values between two adjacent points to under 90 degrees. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 4064 | Cannot execute the orientation correction automatically. | On the specified point line, a curve cannot be created by automatic orientation correction. Change the specified point line so that the joint #J6 orientation variation decreases. | | |
| 4065 | Attempt to revolve J6 one rotation with the same orientation in CP statement. | You attempted to rotate the joint #J6 more than 360 degrees with a CP motion command. You attempted to revolve the joint 6 one rotation with the same as motion start orientation. Change the target point so that the joint #J6 revolves less than one rotation. | | |
| 4066 | Motion command was attempted in the prohibited area depended on joint combination. | You attempted to move the joints to the robot's interference limited area. | | |
| 4068 | ROT modifier parameter was specified for the CP motion command without orientation rotation. | Delete the ROT from the CP motion command. | | |
| 4069 | Specified ECP without selecting ECP in CP statement. | Specify a valid ECP. | | |
| 4070 | Specified ECP number does not match the ECP number used in curve file creation. | Specify a valid ECP. | | |
| 4071 | Attempted motion command during electromagnetic brake lock condition. | Release the electromagnetic brake | | |
| 4072 | Initialization failure. Hardware monitor was not initialized. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4073 | Orientation variation of adjacent point is over 90 degrees. | Any of U, V, or W changes 90 degrees or more. Change the point or the orientation. | | |
| 4074 | Motor type does not match the current robot setting. | Check whether the specified robot model is connected. | | |
| 4075 | Option is not active. | Enable the option. | | |
| 4076 | Point positions used to define the Plane are too close. | Set the distance between points more than 1 μ m. | | |
| 4077 | Point coordinate data used to define the Plane is invalid. | Match the coordinate data for the points to be specified. | | |
| 4078 | Only the additional ST axis was attempted to be changed by the CP statement. | Use PTP motion commands in order to move the additional axis only. | | |
| 4079 | Speed of additional ST axis by the CP statement is too fast. | Reduce the set values of SpeedS and AccelS. | | |
| 4080 | Cannot execute when the Enable Switch is OFF. | Turn the Enable Switch ON and then execute. | | |
| 4081 | Error was detected during operation. | Check the PG board. Check the connection with the motor driver. Replace the PG board. Replace the controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 4082 | Pulse Generator Board error was detected during operation. | Check the PG board. Check the connection with the motor driver. Replace the PG board. | | |
| 4083 | MCAL did not complete in time. | Set PG parameter so that MCAL can complete within 120 seconds. | | |
| 4084 | Limit Sensor error was detected during operation. | Check the limit sensor. | | |
| 4085 | Failed to change to specified location. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4086 | Cannot execute because it is not dry run mode. | Change to the dry run mode and execute. | | |
| 4087 | Failed to format the playback file. | Check the amount of free space of the computer. Reboot the computer. Reinstall the RC+. Replace the computer. | | |
| 4089 | The time interval from HealthRBStart to HealthRBStop is too long or too short. | Set the time interval from HealthRBStart to HealthRBStop to be within 1 to 3600 seconds. | - | - |
| 4090 | HealthRBStop is executed without HealthRBStart. | Execute HealthRBStop after executing HealthRBStart. This error also occurs when HealthRBStop is executed again without executing HealthRBStart after HealthRBStop. | - | - |
| 4091 | Specified analog I/O channel does not exist. | Check the channel number. Mount the analog I/O option board. | | |
| 4092 | Specified analog output channel is used for a speed data output. | Execute after stopping the speed output of the specified channel. | | |
| 4093 | If the motion is paused during the singularity-avoiding, the motion cannot resume. Abort the motion command. | Abort the motion command. | | |
| 4094 | The current position is out of the motion range. | Either J1 or J2 axis is out of the motion range. Follow the procedures below and move the robot within the motion range. • Use Pulse command and JTran to move the robot within the motion range. • Move the robot within the motion range manually. (This error only occurs in RS series and N series.) | | |
| 4096 | Robot in use. Cannot execute the motion command when other tasks are using the robot. | The motion command for the robot cannot be simultaneously executed from more than one task. Review the program. This error cannot be recovered automatically by OnErr. | | |
| 4099 | Servo error was detected during operation. | Check if a 5000 number error is occurring in the system history. If the error is occurring, take measures for a 5000 number error. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 4100 | Communication error in motion control module. Cannot calculate the current point or pulse. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4101 | Communication error in the motion control module. Cannot calculate the current point or pulse. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4103 | Initialization failure. Motion control module initialization error. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4104 | Positioning timeout of the joint connected to the Pulse Generator Board. | Cannot receive the positioning completion signal (DEND) from the servo motor connected to PG board. | | |
| 4108 | Initialization failure. Motor unit connection error. | Check the wiring of the motor unit. | | |
| 4150 | Redundant input signal failure of the emergency stop. | The input status of the redundant emergency stop input continuously differs for more than two seconds. Check whether no disconnection, earth fault, or short-circuit of the emergency stop input signal exits. Then reboot the controller. | | |
| 4151 | Redundant input signal failure of the safeguard. | The input status of the redundant emergency stop input continuously differs for more than two seconds. Check whether no disconnection, earth fault, or short-circuit of the emergency stop input signal exits. Then reboot the controller. | | |
| 4152 | Relay welding error of the main circuit. | A relay welding error was detected due to power system over current. Replace the controller. Replace the robot. | | |
| 4153 | Redundant input signal failure of the enable switch. | The input status of the redundant enable signal differs continuously for more than two seconds. Check the TP connector connection. Replace the TP. Replace the controller. | | |
| 4154 | Temperature of regeneration resistor was higher than the specified temperature. | Robot's Duty is too high. Lengthen the waiting time or reduce the Accel value. If the error occurs although Duty was lowered, replace the DPB. | | |
| 4180 | Robot initialization failure. Specified robot was is not found | Configure the manipulator. | | |
| 4181 | Robot initialization failure. Specified robot was in use by another task. | Specified manipulator cannot be configured since it is already configured. | | |
| 4182 | Robot initialization failure. Robot name is too long. | Shorten the manipulator name. | | |
| 4183 | Robot initialization failure. Robot data version error. | Reconfigure the manipulator. | | |
| 4187 | Robot initialization failure. Communication error with the module: VSRCMNPk. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 4188 | Robot initialization failure. Joint angle interference matrix is invalid. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4189 | Robot initialization failure. Communication error with the module: VSRCMC. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4191 | Robot initialization failure. Physical-logical pulse transformation matrix is invalid. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4192 | Robot initialization failure. Communication error with the servo module. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4210 | RAS circuit detected a servo system malfunction. Reboot the controller. Check for noise. Replace the controller. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4211 | Servo CPU internal RAM failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4212 | RAM for the main and servo CPU communication failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4213 | Servo CPU internal RAM failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. For T series, it is not DMB but CPU board. | | |
| 4214 | Initialization communication of main CPU and servo CPU failure. Reboot the Controller. Check for noise. Replace DMB. | Reboot the controller, take the measure against noise, or replace the DMB. For T series, it is not DMB but CPU board. | | |
| 4215 | Initialization communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4216 | Communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. For T series, it is not DMB but CPU board. | | |
| 4217 | Communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. For T series, it is not DMB but CPU board. | | |
| 4218 | Servo long time command overrun. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4219 | Servo long time command check sum error. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4220 | System watchdog timer detected a failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. For T series, it is not DMB but CPU board. | | |
| 4221 | Drive unit check failure. | Reboot the controller, take the measure against noise, or replace the DMB. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 4222 | RAM failure of the servo CPU. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller, take the measure against noise, or replace the DMB. | | |
| 4223 | Failure of duplicate circuit of the emergency stop or the safeguard. Check the wiring. | Check the wiring of the emergency stop or the safeguard. | | |
| 4224 | Low voltage of the main circuit power supply is detected. Check the power supply voltage. Reboot the controller. | Check the power supply voltage, or reboot the controller. | | |
| 4225 | Control relay contact of the main circuit power supply is welded. Replace the DPB. | Replace the DPB. | | |
| 4226 | Detect the recognition mismatch of the sub CPU and main CPU. | Reboot the controller, take the measure against noise, or replace the CPU board. | | |
| 4227 | Temperature of regeneration resistor was higher than the specified temperature. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. | | |
| 4228 | Over voltage of the sub CPU. | Replace the DPB board. | | |
| 4230 | Servo real time status failure. Check sum error. | A data checksum error was detected in the controller. Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) Replace the controller. | | |
| 4232 | Servo real time status failure. Free running counter error with the servo. | A free running counter error was detected in the controller. Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) Replace the controller. | | |
| 4233 | Servo real time status failure. Communication error with the servo CPU. | A communication error was detected in the controller. Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) Replace the controller. | | |
| 4240 | Irregular motion control interruption was detected. Interruption duplicate. | A interruption error was detected in the controller. Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) Replace the controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 4241 | Over speed during low power mode was detected. | The robot over speed was detected during low power mode. Check the robot mechanism. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check whether the robot does not interfere with peripheral equipment. (Collision, contact) Replace the motor driver. Replace the motor. (Motor and encoder failure) Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) | | |
| 4242 | Improper acceleration reference was generated. | You attempted to operate the robot with the acceleration reference exceeding the specified value. For a CP motion, decrease the AccelS value. | | |
| 4243 | Improper speed reference was generated in high power mode. | The robot over speed was detected during high power mode. Check the robot mechanism. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check whether the robot does not interfere with peripheral equipment. (Collision, contact) Replace the motor driver. Replace the motor. (Motor and encoder failure) Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency, D-I/O, and Expansion I/O connectors) | | |
| 4248 | The robot collides with itself. Please change the target position. | Set a relay point. Or change the target point. | | |
| 4250 | Arm reached the limit of motion range during the operation. | Check whether a CP motion trajectory is within the motion range. | | |
| 4251 | Arm reached the limit of XY motion range specified by XYLim during the operation. | Check the XYLim setting. | | |
| 4252 | Coordinate conversion error occurred during the operation. | Check whether a CP motion trajectory is within the motion range. | | |
| 4255 | Because SpeedS is too big, the robot cannot pass elbow specific posture | Reduce the SpeedS value. | | |
| 4256 | When a robot passed elbow specific posture, Stop or Pause were carried out | Do not execute Stop or Pause. | | |
| 4257 | The robot cannot pass Singularity Area of Elbow | The robot cannot pass the elbow singularity area. To pass the elbow singularity area, use SING_AVOID of "AvoidSingularity". | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 4261 | The Arm reached the limit of motion range in conveyor tracking. | Place the conveyor inside the motion range. Meanwhile, allow the tracking range for the deceleration when switching from tracking motion to non-tracking. If error occurs during the shift from tracking motion, it may be prevented by increasing the accel speed to complete the tracking motion. | | |
| 4262 | The Arm reached the limit of XY motion range in conveyor tracking. | | | |
| 4263 | The Arm reached the limit of pulse motion range in conveyor tracking. | | | |
| 4267 | Attempt to exceed the J4Flag attribute without indication. | You attempted to exceed the J4Flag attribute during motion without the J4Flag indication. Change the J4Flag for the target point. | | |
| 4268 | Attempt to exceed the J6Flag attribute without indication. | You attempted to exceed the J6Flag attribute during motion without the J6Flag indication. Change the J6Flag for the target point. | | |
| 4269 | Attempt to exceed the particular wrist orientation attribute without indication. | You attempted to exceed the particular wrist orientation attribute during motion without the Wrist indication. Change the Wrist attribute for the target point. Change the target point to avoid a particular wrist orientation. | | |
| 4270 | Attempt to exceed the particular arm orientation attribute without indication. | You attempted to exceed the particular hand orientation attribute during motion without the Hand indication. Change the Hand attribute for the target point. Change the target point to avoid a particular hand orientation. | | |
| 4271 | Attempt to exceed the particular elbow orientation attribute without indication. | You attempted to exceed the particular elbow orientation attribute during motion without the Elbow indication. Change the Elbow attribute for the target point. Change the target point to avoid a particular elbow orientation. | | |
| 4272 | Specified point flag is invalid. | For a CP motion command, the arm form at the target point is different from the point flag specified with the target point. Change the point flag for the target point. | | |
| 4273 | J6Flag switched during the lift motion in conveyor tracking. | Adjust the Tool orientation so that J6Flag will not switch. | | |
| 4274 | Specified J6Flag is not reached. Change J6Flag for target point. | For a CP motion command, the manipulator reached to the target point with J6Flag which differs from the one specified for the target point. Change J6Flag for the target point. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 4275 | Specified J4Flag is not reached. Change J4Flag for target point. | For a CP motion command, the manipulator reached to the target point with J4Flag which differs from the one specified for the target point. Change J4Flag for the target point. | | |
| 4276 | Specified ArmFlag is not reached. Change ArmFlag for target point. | For a CP motion command, the manipulator reached to the target point with ArmFlag which differs from the one specified for the target point. Change ArmFlag for the target point. | | |
| 4277 | Specified Elbow Flag is not reached. Change Elbow Flag for target point. | For a CP motion command, the manipulator reached to the target point with ElbowFlag which differs from the one specified for the target point. Change ElbowFlag for the target point. | | |
| 4278 | Specified WristFlag is not reached. Change WristFlag for target point | For a CP motion command, the manipulator reached to the target point with WristFlag which differs from the one specified for the target point. Change WristFlag for the target point. | | |
| 4279 | Specified J1Flag is not reached. Change J1Flag for target point. | For a CP motion command, the manipulator reached to the target point with J1Flag which differs from the one specified for the target point. Change J1Flag for the target point. | | |
| 4291 | Data sending failure in motion network. | Check the connection of the cable for Drive Unit. | | |
| 4292 | Data receiving failure in motion network. | Check the connection of the cable for Drive Unit. | | |
| 4297 | Data sending failure of Force Sensor I/F board. Check connection of the Force Sensor I/F board and Force Sensor. | Check connection of the Force Sensor I/F board and Force Sensor. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 4298 | Data receiving failure of Force Sensor I/F board. Check connection of the Force Sensor I/F board and Force Sensor. | Check connection of the Force Sensor I/F board and Force Sensor. Reboot the controller. Please inquire with us if a similar error occurs even after rebooting the controller. | | |
| 4301 | The Pulse Generating Board detected a limit signal. | Reset and then execute the next motion. | | |
| 4302 | The Pulse Generating Board detected an alarm signal. | Release the alarm of the pulse motor driver. | | |
| 4401 | The specified conveyor number is invalid. | Review the conveyor number. | | |
| 4402 | The specified conveyor queue is full. | The number of registration reached the upper limit (1000 pcs.) Delete the queue. | | |
| 4403 | Continue operation cannot be done in tracking motion. | Tracking motion cannot be continued after aborted/paused? | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--|---|
| 4404 | The specified conveyor queue data does not exist. | Review the queue number. Or, check whether the queue is registered. | | |
| 4405 | The conveyor is not correctly initialized. | Rebuild the project. Delete the conveyor and then reestablish the setting. | | |
| 4406 | The specified queue data is outside the set area. | The queue outside of the range cannot be tracked. If the specified queue is above the upstream limit, change the program so that tracking does not start until the queue enters the area below the upper limit. If the specified queue is below the downstream limit, change the program to delete the queue data. | | |
| 4407 | The encoder is not correctly assigned. | Set the encoder. | | |
| 4409 | The parameter of the conveyor instruction is invalid. | Review the parameter. | | |
| 4410 | A conveyor coordinates conversion error occurred. | Rebuild the project. Delete the conveyor and then reestablish the setting. | | |
| 4411 | Communication error within the Conveyor Modules. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4413 | Conveyor tracking starting error. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4414 | Conveyor tracking cannot start after motion with CP ON. | Start the conveyor tracking using CP OFF. | | |
| 4415 | The setting of Diagonal Upstream Limit or Diagonal Downstream Limit is not appropriate. | The diagonal downstream limit is above the upstream limit, or the diagonal upstream/downstream limit is horizontal to the conveyor direction. Review the setting of diagonal upstream/downstream limit. | | |
| 4500 | Cannot execute the specified functions at the same time. Note 1, 2: Type of the functions. Review the program. | Review the program. | Type of the functions 1: External control point motion (ECP) 2: Torque control 3: Conveyor tracking 4: Force control function 5: FCSMove 6: Distance tracking function | Type of the functions * Same as Note 1 |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|---|--------|
| 4501 | Device is in use. Note 1: Type of the device. Check whether other commands are using the device. | Check whether the device is used in other task or command. | Type of the device 1: Analog I/O input channel | |
| 4502 | Cannot execute this command during the control function. Note 1: Type of the control function. Exit the control function. | Check whether the control function is executed in other task or command Exit the control function to execute the command. | Type of the control function 1: Distance tracking function | |
| 4503 | An undefined parameter was specified. Note 1: Type of the parameter. Check the parameter. | Check whether the parameter is set. Set the parameter. | Type of the parameter 1: Parameter of the distance tracking function | |
| 4504 | Option is not enabled. Check the option setting. | Enable the option. | | |
| 4601 | Failed to initialize the motion. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4602 | Motion calculation error. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 4603 | Sensor value is out of range. Check the sensor. | Check the measured value by the sensor. Check the status of the sensor. Check the range setting of the sensor. When Note 1 is 1 (sensor used by the distance tracking function), check and adjust the parameter specified by AIO_TrackingStart or AIO_TrackingSet. | Type of the sensor 1: Sensor used by the distance tracking function | |
| 4604 | Approached the singularity point. Avoid the singularity point. | Check whether the coordinates near the singularity is specified. Check whether the robot moves closer to the singularity during the operation. Review the installation position of the robot. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 5000 | Servo control gate array failure. Check the DMB. | Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency and I/O connectors) Replace the DMB. Replace the additional axis unit. For T series, reboot the controller, take the measure against noise, and replace the CPU board and motor unit. | | |
| 5001 | Disconnection of the parallel encoder signal. Check the signal cable connection or the robot internal wiring. | Check the M/C cable signal. Check the robot signal wiring. (Missing pin, disconnection, short-circuit) Replace the motor. Replace the DMB. Check the connector connection in the controller. (Loosening, connecting to the serial encoder terminal on the DMB) Check the model setting. Check the peripheral equipment wiring. (Emergency and I/O) For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5002 | Motor driver is not installed. Install the motor driver. Check the DMB or the motor driver. | Check whether the motor driver is mounted. Check the model setting and hardware setting. Replace the motor driver. Replace the DMB. For T series, check the wiring of the motor unit. | | |
| 5003 | Initialization communication failure of incremental encoder. Check the signal cable connection and the robot setting. | Check the model setting. Replace the motor. (Encoder failure) Replace the DMB. For T series, reboot the controller, take the measure against noise, and replace the CPU board and motor unit. | | |
| 5004 | Initialization failure of absolute encoder. Check the signal cable connection or the robot setting. | Check the model setting. Replace the motor. (Encoder failure) Replace the DMB. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5005 | Encoder division setting failure. Check the robot setting. | Check the model setting. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 5006 | Data failure during absolute encoder initialization. Check the signal cable connection, the controller, or the motor. | Replace the motor. Replace the DMB. (Encoder failure) Check the noise countermeasures. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5007 | Absolute encoder multi-turn is beyond the maximum range. Reset the encoder. | Reset the encoder. Replace the motor. | | |
| 5008 | Position is out of the range. Reset the encoder. | Reset the encoder. Replace the DMB. Replace the motor. | | |
| 5009 | No response from the serial encoder. Check the signal cable connection, the motor, the DMB, or the encoder I/F board. | Check the model setting. (Improperly setting of the parallel encoder model) Check the signal cable connection. Replace the DMB and encoder I/F board. | | |
| 5010 | Serial encoder initialization failure. Reboot the controller. Check the motor, the DMB, or the encoder I/F board. | Check the robot configuration. Check the signal cable connection. Replace the DMB and encoder I/F board. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5011 | Serial encoder communication failure. Reboot the controller. Check the motor, the DMB, or the encoder I/F board. | Check the robot configuration. Check the signal cable connection. Replace the DMB and encoder I/F board. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5012 | Servo CPU watchdog timer failure. Reboot the controller. Check the motor or the DMB. | Replace the DMB. Check the noise countermeasures. For T series, check the connection of the signal cable. Reboot the controller, take the measure against noise, and replace the motor unit. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 5013 | Current control circuit WDT failure. Reboot the controller. Check the controller. | Check the power cable connection. Check the 15V power supply and cable connection. Replace the DMB. Check the noise countermeasures. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5014 | The DMB is not for this robot. | Check robot setting. Replace with the supported DMB. | | |
| 5015 | Encoder is reset. Reboot the controller. | Reboot the controller. | | |
| 5016 | Power supply failure of the absolute encoder. Replace the battery. Check the robot internal wiring. | Reset the encoder. Check the signal cable connection. | | |
| 5017 | Backup data failure of the absolute encoder. Reset the encoder. | Reset the encoder. Check the signal cable connection. | | |
| 5018 | Absolute encoder battery alarm. | Replace the battery. Check the signal cable connection. | | |
| 5019 | Position failure of the absolute encoder. Reset the encoder. Replace the motor. | Reset the encoder. Replace the motor. (Encoder failure) For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 5020 | Speed is too high at controller power ON. Stop the robot and reboot the controller. | Reboot the controller. Reset the encoder. For T series, reboot the controller, take the measure against noise, and replace the motor unit. Check the interference with the other devices. | | |
| 5021 | Absolute encoder overheat. | Lower the motion duty. Wait until the temperature of the encoder decreases. | | |
| 5022 | R/D transducer failure. Reset the encoder. Check resolver board or the robot internal wiring. | Reset the encoder. Check the signal wiring of the manipulator (loose pin, disconnection, short). Replace the resolver board. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 5023 | G sensor communication failure. Check for the signal cable connection or manipulator internal wiring. | Check the signal wiring connection. Check the signal wiring of the manipulator (loose pin, disconnection, short). Check the noise countermeasure. Replace the control board. Replace the DMB. | | |
| 5024 | G sensor data error. Check for the control board. | Replace the control board. | | |
| 5025 | Gap occurred between multi-turn data and R/D conversion data. Encoder reset. | Reset the resolver. Check the noise countermeasure. Replace the resolver board. | | |
| 5026 | Disconnection of the resolver excitation signal. Reset the encoder. Check the resolver board or the robot internal wiring. | Check the signal wiring of the manipulator (loose pin, disconnection, short). Replace the resolver board. | | |
| 5027 | S-DSP detected the communication error in DSP. Check for DMB. | Reboot the controller. Check the noise countermeasure. Replace the DMB. | | |
| 5028 | Current feedback data error is detected. Check for DMB. | Reboot the controller. Check the noise countermeasure. Replace the DMB. For T series, check the short-circuit and earth fault of the power cable. Reboot the controller or replace the motor unit. | | |
| 5029 | D-DSP communication failure. Check the DMB. | Reboot the controller. Check the noise countermeasure. Replace the DMB. | | |
| 5030 | Speed is too high at controller power OFF. Reset the encoder. | Reset the encoder. Replace the motor. | | |
| 5031 | Speed is too high. Reset the encoder. Excess the calculation amount | Reset the encoder. Replace the motor. For T series, reboot the controller and replace the motor unit. | | |
| 5032 | Servo alarm A. | Reboot the controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 5040 | Motor torque output failure in high power state. Check the power cable connection, the robot, the driver or the motor. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |
| 5041 | Motor torque output failure in low power state. Check the power cable connection, robot, brake, driver, or motor. | Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 5042 | Position error overflow in high power state. Check the power cable connection, the robot, the driver and the motor. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |
| 5043 | Position error overflow in low power state. Check the power cable connection, robot, brake, driver, or motor. | Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 5044 | Speed error overflow in high power state. Check the power cable connection, robot, brake, driver, or motor. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |
| 5045 | Speed error overflow in low power state. Check the power cable connection, robot, brake, drive, or motor. | Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 5046 | Over speed in high power state. Check the signal cable connection, robot, brake, driver or motor. | Reduce SpeedS of the CP motion. Change the orientation of the CP motion. Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |
| 5047 | Over speed in low power state. Check the signal cable connection, robot, brake, driver, or motor. | Check the motion in high power state. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. For T series, replace the CPU board and motor unit in addition to the above. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 5048 | Over voltage of the main power circuit. Check the main power voltage or the regeneration module. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. Check the robot power wiring. (Missing pin, disconnection, short-circuit) Check the power supply voltage. (Low power supply voltage) Replace the motor driver. Replace the DMB. Replace the motor. | | |
| 5049 | Over current of the motor driver. Check the power cable connection or the robot internal wiring. | Check the short-circuit and earth fault of the power line. Replace the motor driver. Replace the DMB. For T series, check the short-circuit and earth fault of the power cable. Reboot the controller or replace the motor unit. | | |
| 5050 | Over speed during torque control. Check the work motion speed range. | Check the motion speed during torque control. | | |
| 5051 | 15V PWM drive power supply failure. Reboot the controller. Replace the 15V power supply. | Check the 15V power supply and cable connection. Replace the motor driver. Replace the DMB. | | |
| 5054 | Overload of the motor. Decrease the motion duty and the Accel. | Lower the motion duty. Check the Weight/Inertia setting. Check the robot. (Backlash, large load, loose belt tension, brake) | | |
| 5055 | Overload of the motor. Decrease the operation duty and the Accel. | Lower the motion duty. Check the Weight/Inertia setting. Check the robot. (Backlash, large load, loose belt tension, brake) | | |
| 5056 | G sensor data has changed rapidly. Check the control board. | Check the noise countermeasure. Replace the control board. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 5057 | Collision was detected in High power mode (Detection of robot motion error) | <p>Collision detection (detection of robot motion error) was functioned.</p> <p>The following errors have detected:</p> <ul style="list-style-type: none"> - Collision or contact of the robot arm occurs. - Torque saturation due to little setting of Weight or Inertia. - Torque saturation due to combined motion of multiple joints and throwing around the long object. - Torque saturation due to supply voltage reduction. - Error motion due to hardware error or software malfunction. <p>Countermeasures:</p> <p>Check the there is no collision or contact of the robot arm and change the arrangement to avoid interfere.</p> <p>Confirm that torque saturation is occurred.</p> <p>During torque saturation: check the setting of Weight and Inertia are properly and correct them if necessary.</p> <p>During combined motion: adjust the acceleration and deceleration to avoid torque saturation.</p> <p>Check the power supply voltage and correct them if necessary.</p> <p>If other error occurs at the same time, take a countermeasure for that first.</p> <p>Reference: <i>EPSON RC+ 7.0 User's Guide</i> "6.18.10 Collision Detection Function (Error detection function of robot motion)"</p> | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 5058 | Collision was detected in Low power mode (Detection of robot motion error) | <p>Collision detection (Detection of robot motion error) was functioned.</p> <p>The following errors have detected:</p> <ul style="list-style-type: none"> - Collision or contact of the robot arm occurs. - Torque saturation due to holding a hand or long object that exceeds the weight described in the specifications. - Error motion due to hardware error or software malfunction. <p>Countermeasures: Check the there is no collision or contact of the robot arm and change the arrangement to avoid interfere. Check the hand weight and correct it if necessary.</p> <p>Joint #4 and 5 of 6-axis robot: confirmed that torque saturation is occurred. If torque saturation is occurred: change to hold in high power mode. If other error occurs at the same time, take a countermeasure for that first.</p> <p>Reference: <i>EPSON RC+ 7.0 User's Guide</i> "6.18.10 Collision Detection Function (Error detection function of robot motion)"</p> | | |
| 5072 | Servo alarm B. | Reboot the controller. | | |
| 5080 | Motor is overloaded. Decrease the duty and the Accel. | <p>Lower the motion duty. Check the Weight/Inertia setting. Check the robot. (Backlash, large load, loose belt tension, brake)</p> | | |
| 5098 | High temperature of the encoder. Decrease the duty. Check the reduction gear unit of the robot. | <p>Wait until the temperature of the encoder decreases. Lower the motion duty. Check the Weight/Inertia setting. Check the robot. (Backlash, large load, loose belt tension, brake)</p> | | |
| 5099 | High temperature of the motor driver. Clean the controller fan filter. Check the ambient temperature. Decrease the duty. | <p>Clean the cooling fan filter. Lower the motion duty. Check the Weight/Inertia setting. Lower the ambient temperature.</p> | | |
| 5112 | Servo alarm C. | Reboot the controller. | | |
| 5501 | Failed to initialize the force control. Reboot the controller. | <p>Reboot the controller. Initialize the controller firmware. Replace the controller.</p> | | |
| 5510 | Force control calculation error. Reboot the controller. | <p>Reboot the controller. Initialize the controller firmware. Replace the controller.</p> | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 5511 | Coordinate transformation error in force control. Check whether the robot moves outside of the motion range. | Check whether the coordinate out of the motion range is specified. Check whether the robot moves outside of the motion range during the execution of force control. | | |
| 5520 | Impedance parameter error. Check the combination of Mass, Damper, and Spring | Check the combination of Spring, Damper, and Mass. Check whether the Mass property is too small for the Damper property. | | |
| 5521 | The coordinate system mode other than the custom mode is specified for the Force Sensor which is not associated with the robot. Check configuration of the Force Sensor or the coordinate system mode. | Check association with the robot. Check if the direction other than the Custom coordinate is specified for the Orientation property of the force coordinate system object for the sensor which is not associated with the robot. | | |
| 5522 | Undefined data is selected. Check if the selected data is defined. | Check if the specified parameter is defined. | | |
| 5523 | The parameter which cannot be continued when the CF continues force control is specified. Check the Force Control Object and the Force Coordinate System Object. | Check the force control object and the force coordinate object which are used by the motion commands before and after continuing the force control by the CF parameter. | | |
| 5530 | The specified time has passed after resetting the Force Sensor. Execute the Reset property of the Force Sensor Object. | Execute the Reset property for the Force Sensor object. | | |
| 5531 | Approached the singularity point while executing force control. Avoid the singularity point when using force control. | Check whether the coordinates near the singularity is specified. Check whether the robot moves to the vicinity of the singularity during the execution of force control. Or, review the installation position of the robot. | | |
| 5532 | Buffer for Force Sensor averaging is saturated. Shorten the time interval from AvgForceClear to AvgForce. | Shorten the time interval between AvgForceClear and AvgForce to be shorter than a minute. | | |
| 5533 | The continuing time for CF to execute force control has passed. To continue force control, use FCKeep. | Check whether the interval of the motion commands is one minute or less. | | |
| 5535 | SCARA robot cannot execute force control if the Orientation property of Base, Tool, Local, and FCS objects, or V and W of the current command position are other than 0. Check the parameters. | Set "0" to the Orientation property or V and W of the current command position for Base, Tool, Local, and FCS objects. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 5536 | Force control is not supported for this robot model. Check the robot model and the controller firmware version. | Check if the specified robot is correct. Check if the Controller firmware supports the robot model. | | |
| 5540 | Force Sensor transmission error. Check connection of the Force Sensor I/F unit (board) and Force Sensor. | Execute the Reboot property for the Force Sensor object. Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5541 | Force Sensor reception error. Check connection of the Force Sensor I/F unit (board) and Force Sensor | Execute the Reboot property for the Force Sensor object. Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5542 | Force Sensor in use. Check if other commands are using the Force Sensor. | Check whether the Reset property or Reboot property of the Force Sensor object are executed in another task. | | |
| 5543 | Force Sensor communication error. Execute the Reboot property of the Force Sensor Object. | Execute the Reboot property for the Force Sensor object. Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5544 | Element error of Force Sensor. Check whether force exceeding the rated value is applied to the Force Sensor. Execute the Reset property of the Force Sensor Object. | This error may occur if a long time passed while the Force Sensor is not reset. Execute the Reset property for the Force Sensor object. Check whether force exceeding the rated value is applied to the Force Sensor. Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5545 | Circuit error 1 of Force Sensor. Execute the Reset property of the Force Sensor Object. | Execute the Reset property for the Force Sensor object. Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 5546 | Circuit error 2 of Force Sensor. Execute the Reset property of the Force Sensor Object. | Execute the Reset property for the Force Sensor object. Reboot the Force Sensor and Force Sensor I/F unit (board). If a similar error occurs even after the above countermeasures are taken, check if the tip of the robot arm has a vibration. | | |
| 5547 | High temperature error of the Force Sensor. Check if the ambient temperature is within the rated value and there is no rapid temperature change. Execute the Reset property of the Force Sensor Object. | Execute the Reset property for the Force Sensor object. Check the ambient temperature. Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5548 | Force Sensor detected force exceeding the rated value. Check if force exceeding the rated value is applied. Execute the Reset property of the Force Sensor Object. | Execute the Reset property for the Force Sensor object. Check whether force exceeding the rated value is applied to the Force Sensor. Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5549 | Force Sensor I/F unit (board) is not connected. Check connection of the Force Sensor I/F unit (board) and Force Sensor. | Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 5550 | Force sensing of the Force Sensor is off. Check configuration of the Force Sensor. | Check the configuration of Force Sensor. Reboot the Force Sensor and Force Sensor I/F unit (board). | | |
| 5551 | Unsupported Force Sensor is connected. Check the controller firmware version and connection of the Force Sensor. | Check whether the controller firmware supports the Force Sensor. Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). | | |
| 5552 | Configuration of the force sensor failure. Check the configuration of the force sensor. | Check the configuration of the force sensor. | | |
| 5553 | Unsupported function is executed on the connected force sensor. Review the program. | Check the force sensor settings. Review the program. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--|---|
| 5560 | Drift correction error of Force Sensor. | Check connection of the Force Sensor and Force Sensor I/F unit (board). Reboot the Force Sensor and Force Sensor I/F unit (board). | | |
| 5570 | Force monitor buffer overflow. Reboot the force monitor. | Close and re-open the force monitor. | | |
| 5571 | Force log buffer overflow. Set the data measurement interval longer. | Set the data measuring interval longer. The computer receiving the data may be under heavy load state. | | |
| 5572 | Force control monitor buffer overflow. Reboot the force control monitor. | Close and re-open the Force Control Monitor. | | |
| 5573 | The log data of the force guide sequence overflowed. | Reboot the controller. The computer receiving the data may be under heavy load state. | | |
| 5574 | RecordStart buffer overflowed. Set the data measurement interval longer. | Set the data measuring interval longer. The computer receiving the data may be under heavy load state. | | |
| 5800 | Failed to initialize the force control. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5801 | Force control failed to allocate memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5802 | Force control calculation error. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5803 | Force Sensor failed to connect with the robot. Check connection setting of the Force Sensor. | Check connection setting of the Force Sensor. | | |
| 5810 | Force control parameter error. Check the parameter range. | Check the range of the specified parameter. | | |
| 5811 | Force Control Object parameter is out of the range. Note 1: Property Note 2: Axis Check the parameter. | Check the property of force control object. | 1:Number 2:Coordinate System 3:Enabled 4:Mass 5:Damper 6:Spring 7:TargetForce PriorityMode 8:TargetForce 9:LimitSpeed 10:LimitAccel | 1:Fx 2:Fy 3:Fz 4:Tx 5:Ty 6:Tz or 1:J 2:S 3:R |
| 5812 | LimitSpeed or LimitAccel of the Force Control Object is lower than speed or accel setting of the robot. Check the parameter. | Check the values of Speed, SpeedS, SpeedR, Accel, AccelS, AccelR, LimitSpeed and LimitAccel. | | |
| 5813 | Enabled properties of the Force Control Object are all false. Set true to 1 or more axis. | Enable the "Enabled" property for at least one axis. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--|--|
| 5814 | SCARA robot cannot execute force control if the Orientation property of Base, Tool, Local, and FCS objects, or V and W of the current command position are other than 0, or if Tx_Enabled and Ty_Enabled are not False. Check the parameters. | Disable the enabled state of Tx and Ty. Set "0" to the Orientation property or V and W of the current command position for Base, Tool, Local, and FCS objects. | | |
| 5815 | Force Trigger Object parameter is out of the range. Note 1: Property Note 2: Axis Check the parameter. | Check the property of force trigger object. | 1: Number 2: Force Sensor 3: Coordinate System 4: Trigger Mode 5: Operator 6: Enabled 7: FMag_Axes 8: TMag_Axes 9: Polarity 10: UpperLevel 11: LowerLevel 12: UpperLevel smaller than LowerLevel 13: LPF_Enabled 14: LPF_TimeConstant | 1: Fx 2: Fy 3: Fz 4: Tx 5: Ty 6: Tz 7: Fmag 8: Tmag |
| 5816 | Force Coordinate System Object parameter is out of the range. Note 1: Property Note 2: Axis Check the parameter. | Check the property of force coordinate system object. | 1: Number 2: Position 3: Orientation_Mode 4: Orientation_UVW 5: Orientation_RobotLocal | 1: X 2: Y 3: Z or 1: U 2: V 3: W |
| 5817 | Force Monitor Object parameter is out of the range. Note 1: Property Note 2: Axis Check the parameter. | Check the property of force monitor object. | 1: Number 2: Force Sensor 3: Coordinate System 4: FMag_Axes 5: TMag_Axes 6: LPF_Enabled 7: LPF_TimeConstant | |
| 5818 | Force motion restriction object parameter is out of the range. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|---|--------|
| 5819 | Specified duration of FCKeep is out of the allowable range. Check the duration. | Check whether the specified duration is 600 seconds or less. | | |
| 5830 | Force control cannot resume from the pause. Abort the motion command. | Abort the motion. | | |
| 5831 | Cannot execute this command during force control. Exit force control by FCEnd. | Abort force control. Execute FCEnd command. | | |
| 5832 | Cannot execute the motion command which has no Force Control Object during force control. Exit force control by FCEnd. | Check whether the motion command right after continuing the force control by CT does not contain force control. | | |
| 5833 | Cannot use gravity compensation. Can use only Mass Property object number '0'. | This is the combination of the force sensor and the robot that cannot use gravity compensation Set Mass Property object number '0'. | | |
| 5834 | Unsupported function is executed on the connected force sensor. Review the program. | Check the force sensor settings. Review the program. | | |
| 5840 | Force Sensor in use. Check whether other commands are using the Force Sensor. | Check whether the Reset property or Reboot property of the Force Sensor object are executed in another task. | | |
| 5841 | Failed to reset the force sensor. Reset the force sensor again. Note1: Detailed error information | When the parameter is omitted or FG_RESET_FINE is specified, specify FG_RESET_WAIT_VIBRATION for parameter. When FG_RESET_WAIT_VIBRATION is specified, adjust the reset timing by Wait statement or remove the source of external vibration. | 1: Timeout since Fine condition is not satisfied. 2: Timeout since the vibration did not stop. | |
| 5901 | Force control failed to allocate memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5902 | Force control failed to release memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5903 | The specified robot cannot be found. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5904 | Force control failed to allocate memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5906 | Specified force data number cannot be found. Specify a valid force data number. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5907 | Specified force data number was not defined. Specify a teach force data number. | Specify a defined force data number. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|---|-------------------|
| 5908 | Specified force coordinate system data number was not defined. Specify a teach force coordinate system data number. | Specify a defined force coordinate system data number. | | |
| 5909 | Specified force data can't be updated. | Specified force data cannot be updated nor deleted by FSet, FDel, MPSet, or MPDel statement. | | |
| 5910 | Specified force data value is out of allowable range. | Specify the value within the range. | | |
| 5911 | The Upper level value is smaller than the lower level value. Change the upper and lower level values. | Change the upper and lower level values. | | |
| 5912 | The number of specified command parameters is not correct. Specify a valid number of parameters. | Specify a valid number of parameters. | Number of parameters | |
| 5913 | The number of specified function parameters is not correct. Specify a valid number of parameters. | Specify a valid number of parameters. | Number of parameters | |
| 5914 | The type of a specified command parameter is not correct. Specify valid parameters. | Specify valid parameters. | | |
| 5915 | The type of a specified function parameter is not correct. Specify valid parameters. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5918 | Specified force data label cannot be found. Specify a valid force data label. | Specify a defined valid force data label. | | |
| 5921 | Duplicate force data label. Specified label name is already used. Change the label name. | Change the label name. | | |
| 5924 | Force control of the specified robot failed to allocate memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5927 | Cannot read the force data from the force file. Re-create the force file. | The force data is invalid and cannot be read. Re-create the force file. | 0:FC 1:FCS 2:FT 3:FM 4:MASS | Force data number |
| 5928 | Force control failed to allocate memory. Reboot the controller. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5929 | Specified force file name is not correct. Specify a valid force file name. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 5930 | Specified force data label is beyond the maximum length. Specify a valid force data label. | Specify a valid force data label. Refer to "Label Property" for details. | | |
| 5931 | Description for the specified force data is beyond the maximum length. Specify a valid description. | Specify a valid description. Refer to "Description Property" for details. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------------|--------|
| 5932 | The force file is corrupted. Re-create the force file. | Cannot load the force file because it is corrupted or was edited by tools other than Force Guide 7.0. Re-create the force file. | | |
| 5933 | Specified force file cannot be found. Specify a valid force file name. | Specify a valid force file name. | | |
| 5934 | Cannot save the force file. | Make an enough space to write the force file. | Robot number | |
| 5940 | The force data label is not correct. Specify a valid force data label. | Specify a valid force data label. Refer to "Label Property" for details. | | |
| 5941 | The force data label is not correct. Specify a valid force data label. | Specify a valid force data label. Refer to "Label Property" for details. | | |
| 5943 | Invalid force file version. Update the controller firmware. | Cannot load the force file because it is a newer version. | | |
| 5944 | Failed to read the force file. Re-create the force file. | Cannot load the force file because the format is not supported. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 6001 | Calibration number is out of range. | Correct the calibration number. | | |
| 6002 | Calibration is not defined. | Perform calibration. | | |
| 6003 | Camera orientation is out of range. | Correct the CameraOrientation value. | | |
| 6004 | TwoRefPoints flag is out of range. | Correct the TwoRefPoint value. | | |
| 6005 | Cannot calculate the point position because there is invalid data. | Re-teach the points. | | |
| 6006 | Calibration failed. Cannot calculate because there is invalid data. | Perform point teaching and calibration again. | | |
| 6007 | Coordinate transformation failed. Cannot calculate because there is invalid data. | Reteach the points. | | |
| 6009 | Calibration file name is invalid. | Correct the calibration file name. | | |
| 6010 | Calibration file is not found. | Correct the calibration file name. | | |
| 6012 | Failed to read the calibration file. | Correct the calibration file name. | | |
| 6013 | Failed to write the calibration file. | Check access permission for the project folder. | | |
| 6014 | 9 pixel coordinate points should be specified. | Make sure that at least 9 results are obtained in the vision sequence. | | |
| 6015 | 18 pixel coordinate points should be specified. | Make sure that at least 18 results are obtained in the vision sequence. | | |
| 6016 | 9 robot coordinate points should be specified. | Reteach the points. | | |
| 6017 | 18 robot coordinate points should be specified. | Reteach the points. | | |
| 6018 | 9 robot coordinate points and 1 reference point should be specified. | Perform point teaching and calibration again. | | |
| 6019 | 9 robot coordinate points and 2 reference points should be specified. | Perform point teaching and calibration again. | | |
| 6502 | Vision process Communication error (-3) | Check the connection with the camera (cable, setting). | | |
| 6503 | Vision process Memory error (-11) | Reboot RC+. | | |
| 6506 | Vision process Error at modeling (-14) | Change the target and teach again. | | |
| 6507 | Vision process Recovery error(-15) | Specify the file of appropriate format. | | |
| 6508 | Vision process Invalid number of iterations (-16) | Set a value in the valid range. | | |
| 6509 | Vision process Invalid mode (-17) | Set a valid value. | | |
| 6510 | Vision process Invalid threshold value (-18) | Set a value in the valid range. | | |
| 6511 | Vision process Invalid polarity (-19) | Set a value in the valid range. | | |
| 6512 | Vision process File open failed (-20) | Specify a correct file. | | |
| 6513 | Vision process Initialization error (-21) | Reinstall the RC+. | | |
| 6514 | Vision process Status error (-22) | Check the connection with the camera. | | |
| 6517 | Vision process Invalid image format (-25) | Specify the image file of readable format. | | |
| 6520 | Vision process Invalid property value (-100) | Set a value in the valid range. | | |
| 6521 | Vision process Exposure termination process failed (-201) | Disable Windows Firewall. | | |
| 6533 | Vision process Invalid Blob property ThresholdLow value (-11004) | Set a value in the valid range. | | |
| 6534 | Vision process Invalid Blob property ThresholdHigh value (-11005) | Set a value in the valid range. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---------------------------------|--------|--------|
| 6535 | Vision process Invalid Blob property Polarity value(-11006) | Set a value in the valid range. | | |
| 6536 | Vision process Invalid Blob property NumberToFind value (-11007) | Set a value in the valid range. | | |
| 6537 | Vision process Invalid Blob property MinArea value (-11008) | Set a value in the valid range. | | |
| 6538 | Vision process Invalid Blob property MaxArea value (-11009) | Set a value in the valid range. | | |
| 6539 | Vision process Invalid Blob property RejectOnEdge value (-11010) | Set a value in the valid range. | | |
| 6540 | Vision process Invalid Blob property SizeToFind value (-11011) | Set a value in the valid range. | | |
| 6553 | Vision process Invalid Geom property Accept value (-11504) | Set a value in the valid range. | | |
| 6554 | Vision process Invalid Geom property NumberToFind value (-11505) | Set a value in the valid range. | | |
| 6555 | Vision process Invalid Geom property AngleEnable value (-11506) | Set a value in the valid range. | | |
| 6556 | Vision process Invalid Geom property AngleRange value (-11507) | Set a value in the valid range. | | |
| 6557 | Vision process Invalid Geom property AngleStart value (-11508) | Set a value in the valid range. | | |
| 6558 | Vision process Invalid Geom property ScaleEnable value (-11509) | Set a value in the valid range. | | |
| 6559 | Vision process Invalid Geom property ScaleFactorMax value (-11510) | Set a value in the valid range. | | |
| 6560 | Vision process Invalid Geom property ScaleFactorMin value (-11511) | Set a value in the valid range. | | |
| 6561 | Vision process Invalid Geom property ScaleTarget value (-11512) | Set a value in the valid range. | | |
| 6562 | Vision process Invalid Geom property SeparationMinX value (-11513) | Set a value in the valid range. | | |
| 6563 | Vision process Invalid Geom property SeparationMinY value (-11514) | Set a value in the valid range. | | |
| 6564 | Vision process Invalid Geom property SeparationAngle value (-11515) | Set a value in the valid range. | | |
| 6565 | Vision process Invalid Geom property SeparationScale value (-11516) | Set a value in the valid range. | | |
| 6566 | Vision process Invalid Geom property Confusion value(-11517) | Set a value in the valid range. | | |
| 6567 | Vision process Invalid Geom property ModelOrgAutoCenter value (-11518) | Set a value in the valid range. | | |
| 6570 | Vision process Invalid Geom property DetailLevel value (-11521) | Set a value in the valid range. | | |
| 6571 | Vision process Invalid Geom property Smoothness value (-11522) | Set a value in the valid range. | | |
| 6572 | Vision process Invalid Geom property RejectOnEdge value (-11523) | Set a value in the valid range. | | |
| 6573 | Vision process Invalid Geom property SharedEdges value (-11524) | Set a value in the valid range. | | |
| 6574 | Vision process Invalid Geom property Timeout value (-11525) | Set a value in the valid range. | | |
| 6575 | Vision process Invalid Geom property RejectByArea value (-11526) | Set a value in the valid range. | | |
| 6576 | Vision process Invalid Geom property SearchReversed value (-11527) | Set a value in the valid range. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---------------------------------|--------|--------|
| 6577 | Vision process Invalid Geom property ScaleTargetPriority value (-11528) | Set a value in the valid range. | | |
| 6578 | Vision process Invalid Geom property SearchReducedImage value (-11529) | Set a value in the valid range. | | |
| 6586 | Vision process Invalid Geom Model property DetailLevel value (-11602) | Set a value in the valid range. | | |
| 6587 | Vision process Invalid Geom Model property Smoothness value (-11603) | Set a value in the valid range. | | |
| 6603 | Vision process Invalid Corr property Accept value (-12004) | Set a value in the valid range. | | |
| 6604 | Vision process Invalid Corr property NumberToFind value (-12005) | Set a value in the valid range. | | |
| 6605 | Vision process Invalid Corr property AngleEnable value (-12006) | Set a value in the valid range. | | |
| 6606 | Vision process Invalid Corr property AngleRange value (-12007) | Set a value in the valid range. | | |
| 6607 | Vision process Invalid Corr property AngleStart value (-12008) | Set a value in the valid range. | | |
| 6608 | Vision process Invalid Corr property AngleAccuracy value (-12009) | Set a value in the valid range. | | |
| 6609 | Vision process Invalid Corr property Confusion value (-12010) | Set a value in the valid range. | | |
| 6610 | Vision process Invalid Corr property ModelOrgAutoCenter value (-12011) | Set a value in the valid range. | | |
| 6613 | Vision process Invalid Corr property RejectOnEdge value (-12014) | Set a value in the valid range. | | |
| 6614 | Vision process Invalid Corr property Timeout value (-12015) | Set a value in the valid range. | | |
| 6615 | Vision process Invalid Corr property RejectByArea value (-12016) | Set a value in the valid range. | | |
| 6630 | Vision process Invalid Edge property structure size (-12501) | Set a value in the valid range. | | |
| 6631 | Vision process Invalid Edge result header structure size (-12502) | Set a value in the valid range. | | |
| 6632 | Vision process Invalid Edge result item structure size (-12503) | Set a value in the valid range. | | |
| 6633 | Vision process Invalid Edge property EdgeType value (-12504) | Set a value in the valid range. | | |
| 6634 | Vision process Invalid Edge property NumberToFind value (-12505) | Set a value in the valid range. | | |
| 6635 | Vision process Invalid Edge property Polarity value (-12506) | Set a value in the valid range. | | |
| 6636 | Vision process Invalid Edge property SearchWidth value (-12507) | Set a value in the valid range. | | |
| 6637 | Vision process Invalid Edge property Accept value (-12508) | Set a value in the valid range. | | |
| 6638 | Vision process Invalid Edge property ScoreWeightContrast value (-12509) | Set a value in the valid range. | | |
| 6639 | Vision process Invalid Edge property ContrastTarget value (-12510) | Set a value in the valid range. | | |
| 6640 | Vision process Invalid Edge property ContrastVariation value (-12511) | Set a value in the valid range. | | |
| 6641 | Vision process Invalid Edge property StrengthTarget value (-12512) | Set a value in the valid range. | | |
| 6642 | Vision process Invalid Edge property StrengthVariation value (12513) | Set a value in the valid range. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 6653 | Vision process Code Reader Checksum error (-1010) | Change to the code with a proper checksum. Or, change the setting not to use the checksum. | | |
| 6654 | Vision process Code Reader Invalid quiet zone (-1011) | Ensure a quiet zone (blank margin) around the code. Set the quiet zone narrower. | | |
| 6655 | Vision process Code Reader Message is too long (-1012) | Change the code. | | |
| 6686 | Vision process OCR Recognition dictionary is full (-2132) | Delete the registered characters. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 7003 | The specified robot cannot be found. | Reboot the controller. Initialize the control firmware. | | |
| 7004 | Duplicate allocation of the point data area. | Reboot the controller. Initialize the control firmware. | | |
| 7006 | Specified point number cannot be found. Specify a valid point number. | Check the specified point number. | | |
| 7007 | Specified point number was not defined. Specify a teach point number. | Check whether point data is registered in the specified point. Perform the teaching. | | |
| 7010 | Cannot allocate the memory area for the pallet definition. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7011 | Cannot free the memory area for the pallet definition. | Reboot the controller. Initialize the controller firmware. | | |
| 7012 | Specified pallet number cannot be found. Specify a valid pallet number. | Check the pallet number. | | |
| 7013 | Specified pallet is not defined. Specify a defined pallet or define the pallet. | Check whether the specified pallet is defined by the Pallet statement. Declare the pallet. | | |
| 7014 | Specified division number is beyond the pallet division number definition. Specify a valid division. | Check the specified division number. | | |
| 7015 | Specified coordinate axis number does not exist. | Check the specified coordinate axis number. | | |
| 7016 | Specified arm orientation number does not exist. | Check the specified arm orientation number. | | |
| 7017 | Cannot allocate the required memory. | Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7018 | Specified point label cannot be found. Specify a valid point label. | Check the specified point label. | | |
| 7019 | Parameter setup in the initialization file is invalid. | Reboot the controller. Initialize the controller firmware. | | |
| 7021 | Duplicate point label. Specified label name is already used. Change the label name. | Change the point label. | | |
| 7022 | Specified local coordinate system is not defined. Specify a valid local coordinate system number. | Check the specified local number. Define the Local coordinate system. | | |
| 7024 | Point data memory area for the specified robot is not allocated. | Rebuild the project. | | |
| 7026 | Cannot open the point file. Specify a valid point file name. | Check the point file name. Check whether the point file specified for the project exists. | | |
| 7027 | Cannot read the point data from the point file. | Create the point file again. | | |
| 7028 | Point area is allocated beyond the available point number. | There are too many points. Review the number of points. | | |
| 7029 | Specified point file name is not correct. Specify a valid point file name. | Check the file extension. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 7030 | Specified point label is beyond the maximum length. Specify a valid point label. | Change the point label. | | |
| 7031 | Description for the specified point is beyond the maximum length. Specify a valid description. | Change the comment. | | |
| 7032 | Point file is corrupted. Check sum error. | Create the point file again. | | |
| 7033 | Specified point file cannot be found. Specify a valid point file name. | Check the name of the specified point file. | | |
| 7034 | Cannot save the point file. | Failed to save the point file (create a temporary file). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7035 | Cannot save the point file. | Failed to save the point file (file open). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7036 | Cannot save the point file. | Failed to save the point file (renew the file header). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7037 | Cannot save the point file. | Failed to save the point file (create the file name). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7038 | Cannot save the point file. | Failed to save the point file (copy the file). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7039 | Cannot save the point file. | Failed to save the point file (change the file name). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7040 | The point label is not correct. Specify a valid point label. | The initial character of the point label name is improper. Correct the label name. | | |
| 7041 | The point label is not correct. Specify a valid point label. | Inadequate character is used. Correct the label name. | | |
| 7042 | The pallet cannot be defined. | Undefined flag for pallet data is mixed. Check the point data. Correct the point data. | | |
| 7043 | Invalid point file version. | The point file version is different. Re-create the point file. | | |
| 7044 | The point file format version is unsupported. | The point file is not supported. Re-create the point file. | | |
| 7045 | The specified work queue number is invalid. | Check the specified work queue number. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|---|--|--|--------|--------|
| 7046 | The specified work queue is full. | The work queue is full. Delete the point data from the work queue and register. | | |
| 7047 | The specified work queue data does not exist. | Check the specified index. | | |
| 7048 | The work queue is not correctly initialized. | Failed to initialize the work queue (allocate memory). Reboot the controller. Initialize the controller firmware. Replace the controller. | | |
| 7049 | The parameter of the work queue instruction is invalid. | Check the parameters of the commands related to the work queue. | | |
| 7050 | Cannot execute while work queue data is registered. | Cannot set the work queue since the point data is registered to the work queue. Empty the work queue before setting. | | |
| 7101 | Fieldbus slave. An error occurred during I/O data transform. | The fieldbus slave board is broken or the controller software is damaged. Restore the controller firmware. | 1 | |
| | | | 2 | |
| | | | 3 | |
| | | | 4 | |
| | | | 10 | |
| | | A communication data error was detected during communication. The communication cable has a problem. Check the communication cable and its related units. | 11 | |
| | | | 12 | |
| | | | 13 | |
| | | The fieldbus is broken or the controller software is damaged. Restore the controller firmware. | 14 | |
| | | | 15 | |
| The PLC is not running or not connected. Check the PLC, the communication cable, and peripherals. (If Code 1 is 22 when the CC-Link board is used.) | 22 | | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|-------------|--------|
| 7103 | Fieldbus slave. Timeout error occurred during I/O data transform. | The fieldbus slave board is broken or the controller software is damaged. Restore the controller firmware. | 1 | |
| | | A communication data error was detected during communication. The communication cable has a problem. Check the communication cable and its related units. | 2 3 4 | |
| 7150 | Fieldbus master. Bus is disconnected. | Check the connection of the communication cable for the fieldbus. | | |
| 7151 | Fieldbus master. Bus power is off. | Check whether the communication cable for the fieldbus is powered. | | |
| 7152 | Fieldbus master. Bus status error. | Reboot the controller. Check the fieldbus master board. Replace the fieldbus master board. | | |
| 7200 | Invalid argument. | Check the parameter. | | |
| 7201 | A system error occurred. | - | | |
| 7202 | There is not enough memory. | - | | |
| 7203 | Access is denied. | - | | |
| 7210 | Drive is not ready. | Set the device. | | |
| 7211 | The specified path is invalid. | Make sure the specified path exists. | | |
| 7212 | The specified path already exists. | If the specified directory or file already exists, you cannot execute. | | |
| 7213 | The file specified by path does not exist. | Make sure the specified file exists. | | |
| 7214 | File size is too large. | Specify the file that is less than 2G bytes. | | |
| 7215 | The specified file is open. | The specified file number is already existing. Use another file number. | | |
| 7216 | The open mode is illegal. | Make sure you opened in reading or writing mode. | | |
| 7217 | There is no read data. | Make sure there are data to read. | | |
| 7230 | The specified connection is open. | The specified file number is already existing. Use another file number. | | |
| 7231 | A connection-level error occurred while opening the connection. | Check the access right of database. | | |
| 7232 | The connection is closed. | Use OpenDB and open the database. | | |
| 7233 | An unsupported data type was used. | Convert the data into string or numeric value. | | |
| 7234 | Data size is too large. | Too large data in a line. Specify the query so that necessary field are only retrieved. | | |
| 7235 | The specified file type is not supported. | Check the type of Excel file. | | |
| 7236 | There is no selected data. | Make sure the data you retrieved exists. | | |
| 7250 | No bytes were available to read. | There are no retrieved data. Check the send program. | | |
| 7251 | The port is in an invalid state. | Check the device setting for the specified port. | | |
| 7252 | The specified port is open. | Check the port number to open. | | |
| 7253 | The port is closed | Check the port number to close. | | |
| 7254 | The specified port is not open. | Check the port number to open. | | |
| 7255 | Timeout reading from the port. | Check the port timeout period and update to the appropriate setting. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 7256 | Timeout writing to the port. | Check the port timeout period and update to the appropriate setting. | | |
| 7260 | The checksum in project file is invalid. | Rebuild the project. | | |
| 7261 | Invalid function. | Check the function definition to call. | | |
| 7262 | Invalid parameters. | Check the function definition to call. | | |
| 7263 | Cannot execute while creating DLL. | - | | |
| 7264 | Failed to create DLL. | - | | |
| 7265 | DLL file cannot be found. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 7300 | Vision Communication. Server mode not supported. | - | | |
| 7302 | Vision Communication. Failed to read from the camera. | Check the connection with the camera. | | |
| 7303 | Vision Communication. Read data overflow. | Data exceeding the receive buffer was received. | | |
| 7304 | Vision Communication. Failed to open the Ethernet port. | Check the connection with the camera. | | |
| 7305 | Vision Communication. Invalid IP address of camera. | Rebuild the project. Check the camera configuration. | | |
| 7306 | Vision Communication. No specification of Server or Client. | - | | |
| 7307 | Vision Communication. Failed to send to the camera. | Check the connection with the camera. | | |
| 7308 | Vision Communication. Camera version is old. | The version of the connected camera is old. Update the camera. | | |
| 7321 | Vision Communication. Camera setting has not been set. | Rebuild the project. Check the camera configuration. | | |
| 7322 | Vision Communication. Read timeout. | Check the connection with the camera. | | |
| 7323 | Vision Communication. Read invalid data. | Check the connection with the camera. | | |
| 7324 | Vision Communication. Failed to send to the camera. | Check the connection with the camera. | | |
| 7325 | Vision Communication. Connection is not completed. | Check the connection with the camera. | | |
| 7326 | Vision Communication. Read data is too long. | - | | |
| 7327 | Vision Communication. Undefined vision sequence. | Check the sequence name. | | |
| 7328 | Vision Communication. Camera setting has not been set. | Rebuild the project. Check the camera configuration. | | |
| 7329 | Vision Communication. Vis file was not found. | Rebuild the project. Check the camera configuration. | | |
| 7330 | Vision Communication. Failed to allocate memory. | Reduce the number of sequences, objects, and calibration. | | |
| 7341 | Vision Communication. Out of max camera number. | Review the camera registration. | | |
| 7342 | Vision Communication. Invalid camera number. | Review the camera registration. | | |
| 7343 | Vision Communication. VSet parameter is too long. | Review the names and string variables of sequences, objects, and calibration. | | |
| 7344 | Vision Communication: Too many parameters for VGet. | The number of specified variables is exceeding 32. Reduce the number of parameters. | | |
| 7345 | Vision Communication. Not enough data for VGet statement variable assignment. | Reboot the camera. Check the version of the camera. | | |
| 7346 | Vision Communication. Cannot execute a Vision statement from the command window. | Execute the command from the program. | | |
| 7400 | Matrix determinate too small. | If specifying the virtual camera, specify the real camera. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 7402 | Invalid value for maximum motion distance. | Specify the valid value. | | |
| 7403 | Invalid value for maximum pose difference angle. | Specify the valid value. | | |
| 7404 | Invalid value for LJMMode. | Specify the valid value. | | |
| 7405 | Command aborted by user. | — | | |
| 7406 | Joint 1 angle change exceeded the maximum allowed during calibration. | Adjust the start angle of Joint 1. | | |
| 7407 | Joint 2 angle change exceeded the maximum allowed during calibration. | Adjust the start angle of Joint 2. | | |
| 7408 | Joint 4 angle change exceeded the maximum allowed during calibration. | Adjust the start angle of Joint 4. | | |
| 7409 | Joint 6 angle change exceeded the maximum allowed during calibration. | Adjust the start angle of Joint 6. | | |
| 7410 | Network camera. Timeout during image file transfer from PC. | Check the connection of PC and camera. | | |
| 7411 | No upward camera sequence was specified for mobile calibration with upward reference. | Specify the existing sequence. | | |
| 7412 | The specified upward camera sequence has no calibration. | Set the calibration for upward camera sequence. | | |
| 7413 | The specified upward camera sequence calibration is not complete. | Complete the upward camera sequence calibration. | | |
| 7414 | The target sequence cannot be used when RuntimeAcquire is Strobed. | Set the RuntimeAcquire of target sequence to Stationary. | | |
| 7415 | Invalid calibration reference type. | Selectable ReferenceType is different depending on CameraOrientation. Select again. | | |
| 7416 | Invalid calibration data. Teach the calibration points again. | Need to teach the calibration points again. | | |
| 7417 | Invalid calibration setup. | Try to perform point teach of calibration again. Or check the target sequence. | | |
| 7418 | Invalid calibration target sequence. | Target sequence may not be selected or camera number of the target sequence differs from that of calibration. | | |
| 7419 | The target sequence camera is not the same as the calibration camera. | Set the sequence of the same camera. | | |
| 7420 | The target sequence has no objects. | Add the detection object to target sequence. | | |
| 7421 | Invalid last step for the target sequence. | Check the steps. | | |
| 7422 | Exception occurred when search for the calibration target. | Check the target sequence. | | |
| 7423 | Invalid number of results for calibration target sequence. | Create a sequence to detect results of required number of targets. | | |
| 7424 | Cannot load the calibration points. | Perform calibration point teach again. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 7425 | Invalid camera orientation. | Check the CameraOrientation of calibration. | | |
| 7426 | Distortion correction calibration is incomplete. | Perform distortion correction if it is set. | | |
| 7427 | Invalid vision object was specified. | Invalid vision object is specified in Vision Guide commands such as VSet and VGet. Specify the valid vision object. | | |
| 7428 | V and W coordinates must be zero for the type of robot used. | Set V and W of the Base to 0. | | |
| 7429 | Invalid robot speed specified for the current operation. | Specify the valid value. | | |
| 7430 | Invalid robot acceleration specified for the current operation. | Specify the valid value. | | |
| 7431 | Invalid ShowWarning parameter value. | Specify the valid value. | | |
| 7432 | Cannot create the object using the camera specified in the sequence. | Check the Vision object type. Update the camera firmware. | | |
| 7500 | Network camera. Out of memory. | Initialize the camera. Reduce the project size. | | |
| 7501 | Network camera. Project does not exist. | Rebuild the project. | | |
| 7502 | Network camera. Project has not been set. | Rebuild the project. | | |
| 7503 | Network camera. Vision property or result not supported. | Update the camera firmware. | | |
| 7504 | Network camera. Cannot open project file. | Rebuild the project. | | |
| 7505 | Undefined vision sequence. | Check the sequence name. Rebuild the project. | | |
| 7506 | Undefined vision object. | Check the object name. Rebuild the project. | | |
| 7507 | Network camera. Critical error. | Initialize the camera. Rebuild the project. | | |
| 7508 | Network camera. Invalid command. | Update the camera firmware. | | |
| 7509 | Invalid vision property value. | Check the property value. Update the camera firmware. | | |
| 7510 | Invalid vision property. | Check the property name. Update the camera firmware. | | |
| 7511 | Vision model not trained. | Teach the model. | | |
| 7512 | Undefined vision calibration. | Check the calibration name. Rebuild the project. | | |
| 7513 | Vision model object not Self. | Check the property value. | | |
| 7514 | Invalid vision result. | Check the result name. Update the camera firmware. | | |
| 7515 | Vision object not found. | Check the Found result before obtaining the result. | | |
| 7516 | No vision calibration. | Check the calibration name. | | |
| 7517 | Incomplete vision calibration. | Perform calibration. | | |
| 7518 | Network camera. Cannot connect with camera. | Check the camera connection. | | |
| 7819 | Network camera. Communication error. | Check the camera connection. | | |
| 7520 | Window out of bounds. | Set the window within the bounds. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 7521 | OCR font is invalid. | Register the OCR font. | | |
| 7522 | The specified vision calibration already exists. | Change the calibration name. Delete the existing calibration in advance. | | |
| 7523 | The specified vision sequence already exists. | Change the sequence name. Delete the existing sequence in advance. | | |
| 7524 | The specified vision object already exists. | Change the object name. Delete the existing sequence in advance. | | |
| 7525 | Cannot load vision project. | The project folder may be corrupt. Restore backup data. | | |
| 7526 | Cannot save vision project. | The project folder may be write-protect. Check the access permission for the project folder. | | |
| 7527 | Vision processor. Critical error. | Initialize the camera. Rebuild the project. | | |
| 7528 | Image file not found. | Check the image file. | | |
| 7529 | Camera does not exist. | Check the camera connection. | | |
| 7530 | Acquisition failed. | Check the camera connection. | | |
| 7531 | No objects to train. | Teach the model. | | |
| 7532 | Cannot load image file. | Check the image file. | | |
| 7533 | Camera is not supported by RC+7.0. | SC300/SC1200 is not supported by RC+7.0. Use CV1/CV2. | | |
| 7534 | Camera firmware does not support new functions of RC+7.0. | Update the camera firmware. | | |
| 7535 | Invalid data from network camera. | Initialize the camera. | | |
| 7536 | Network camera export status failed | Initialize the camera. | | |
| 7537 | Invalid ImageSize value. The specified value is not supported by the camera. | ImageSize exceeding the camera resolution cannot be specified. Correct the property value. | | |
| 7538 | Invalid ZoomFactor. The specified value requires data outside of the image area. | Settable values are from 0.1 to 10.0. Correct the property value. | | |
| 7539 | The camera does not support Code Reader. | Update the camera firmware. | | |
| 7540 | The camera does not support OCR. | Update the camera firmware. | | |
| 7541 | Insufficient data for teaching model. | Black or white image cannot be registered as a model. | | |
| 7542 | Model window cannot be outside of image. | Correct the position of the model window. | | |
| 7543 | Calibration points have not been taught. | Teach the calibration point. | | |
| 7544 | Calibration must be fixed upward. | Sequence with the calibration data of the upward fixed camera is only settable. | | |
| 7545 | Point was not defined. | Teach the calibration point. | | |
| 7546 | RobotPlacePos has not been calibrated. | Click CalRobotPlacePos and calibrate RobotPlacePos. | | |
| 7547 | Camera IP address is out of current subnet. | Correct the camera IP address. | | |
| 7548 | Camera was not detected. | Check the wiring of the camera. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 7549 | Invalid Radius. Radius must be \geq RadiusInner and \leq RadiusOuter. | Correct the property value. | | |
| 7550 | OCR character does not exist. | Register the OCR character. | | |
| 7551 | OCR option is not active. | Enable the option. | | |
| 7572 | Invalid sequence name. | Specify a name that begins with an alphabet. Alpha-numeral and under score (_) are available for the name. | | |
| 7573 | Invalid calibration name. | Specify a name that begins with an alphabet. Alpha-numeral and under score (_) are available for the name. | | |
| 7574 | Sequence or calibration name already exists. | Specify another calibration name. | | |
| 7575 | Invalid camera. | Specify valid camera. | | |
| 7576 | The vision target could not be found. | Check the vision sequence to detect the target | | |
| 7577 | Failed to position the vision target within the specified tolerance. | Check the vision sequence to detect the target | | |
| 7578 | No object with a search window was found in the sequence. | Add an object to detect the target in vision sequence. | | |
| 7579 | Invalid initial rotation angle. | Specify the valid value. | | |
| 7580 | Invalid final rotation angle. | Specify the valid value. | | |
| 7581 | Invalid target tolerance. | Specify the valid value. | | |
| 7582 | Invalid tool definition type. | Specify the valid value. | | |
| 7583 | Invalid rotation angle. | Specify the valid value. | | |
| 7584 | Invalid local definition type. | Specify the valid value. | | |
| 7585 | Calibration plate detection failed. | Adjust the focus and exposure time of the lens to show the target clearly. | | |
| 7586 | Focal length detection failed. | Narrow down a lens diaphragm. | | |
| 7587 | Local definition scale detection failed. | Adjust the focus and exposure time of the lens to show the target clearly. | | |
| 7588 | Calibration plate pose detection failed. | Adjust the focus and exposure time of the lens to show the target clearly. | | |
| 7589 | Invalid object name. | Specify a name that begins with an alphabet. Alpha-numeral and under score (_) are available for the name. | | |
| 7590 | Maximum move distance exceeded the limit set by VDefSetMotionRange. | Adjust the start position. Or set the limit value widely. | | |
| 7591 | Maximum pose difference angle exceeded the limit set by VDefSetMotionRange. | Adjust the start position. Or set the limit value widely. | | |
| 7592 | Maximum joint angle difference exceeded the limit set by VDefSetMotionRange. | Adjust the start position. Or set the limit value widely. | | |
| 7596 | Local definition rough camera alignment failed. | Adjust the start position. | | |
| 7597 | Local definition plane could not be calculated. | Adjust the vision sequence to show the calibration plate clearly. | | |
| 7598 | Calibration generates points move distance too small. | Make the search area bigger or the target smaller. | | |
| 7599 | Calibration generate points camera to robot relation error. | If specifying the virtual camera, specify the real camera. | | |

Maintenance 9. Troubleshooting

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 7600 | GUI Builder. Cannot execute a GUI Builder statement from the command window. | - | | |
| 7602 | GUI Builder. GSet parameter is too long. | Correct the parameter to the proper length. | | |
| 7603 | GUI Builder. Too many parameters for GGet. | Check the number of parameters. | | |
| 7604 | GUI Builder. Not enough data for GGet statement variable assignment. | Specify the variable. | | |
| 7610 | GUI Builder. The event task cannot be executed. System in pause state and EventTaskType is Normal. | The system can be operated by changing EventTaskType to "NoPause" | | |
| 7611 | GUI Builder. The event task cannot be executed. Safeguard is open and EventTaskType is Normal. | The system can be operated by changing EventTaskType to "NoEmgAbort" | | |
| 7612 | GUI Builder. The event task cannot be executed. Estop is active and EventTaskType is not NoEmgAbort. | The system can be operated by changing EventTaskType to "NoEmgAbort" | | |
| 7613 | GUI Builder. The event task cannot be executed. System in error state and EventTaskType is not NoEmgAbort. | The system can be operated by changing EventTaskType to "NoEmgAbort" | | |
| 7650 | GUI Builder. Invalid property. | Specify the valid property. | | |
| 7651 | GUI Builder. Invalid form. | Specify the valid form. | | |
| 7652 | GUI Builder. Invalid control. | Specify the valid control. | | |
| 7653 | GUI Builder. The specified form is already open. | Modify the program to avoid double launch. | | |
| 7654 | GUI Builder. Event function does not exist. | Check the function name set for the event. | | |
| 7655 | GUI Builder. Item does not exist. | Specify the valid item. | | |
| 7656 | GUI Builder. Invalid property value. | Check the property value and specify the valid value. | | |
| 7700 | Security. Invalid user. | Contact the administrator to register the user. | | |
| 7701 | Security. Invalid password. | Check the password. | | |
| 7702 | Security. Permission denied. | Contact the administrator to set authority. | | |
| 7703 | Security. Option not active. | Register the options. | | |
| 7710 | Source and destination cannot be the same. | Specify another destination. | | |
| 7711 | Point file name is used by another robot. | Check the point file name. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 7712 | Invalid axis specified. | Check whether the specified axis is valid. Check if the axis is specified correctly. | | |
| 7713 | Option not enabled | Enable the option. | | |
| 7714 | File not found. | Specify the correct file name. | | |
| 7715 | Robot number is out of the available range. | Check the robot number. | | |
| 7716 | Robot does not exist. | Check whether the robot is registered. | | |
| 7717 | File Error. Invalid folder. | Check the folder name. | | |
| 7718 | Cannot write the file. | Check the storage or the write authority. | | |
| 7750 | Simulator. Initialization failure. | Reboot RC+. | | |
| 7751 | Simulator. Failed to save the objects. | Reboot RC+. | | |
| 7752 | Simulator. Failed to load the objects. | Reboot RC+. | | |
| 7753 | Simulator. Failed to mapping of memory. | Reboot RC+. | | |
| 7754 | Simulator. The virtual controller already exists. | Name of the virtual controller may be duplicated. Check the controller name. | | |
| 7755 | Simulator. Failed to create the virtual controller connection information. | Reboot RC+. | | |
| 7756 | Simulator. The copy source of the virtual controller does not exist. | Check the virtual controller name. | | |
| 7757 | Simulator. The copy destination of the virtual controller already exists. | Name of the virtual controller may be duplicated. Check the controller name. | | |
| 7758 | Simulator. Failed to copy the virtual controller connection information. | Reboot RC+. | | |
| 7759 | Simulator. Failed to delete the virtual controller connection information. | Reboot RC+. | | |
| 7760 | Simulator. Failed to delete the controller connection information. | Reboot RC+. | | |
| 7761 | Simulator. Failed to rename the controller connection information. | Check the virtual controller name. | | |
| 7762 | Simulator. The rename source of the virtual controller does not exist. | Check the virtual controller name. | | |
| 7763 | Simulator. The rename destination of the virtual controller already exists. | Check the virtual controller name. | | |
| 7764 | Simulator. Invalid Robot number. | Reboot RC+. | | |
| 7765 | Simulator. Failed to read the Robot definition file. | Check if the definition file exists. | | |
| 7766 | Simulator. Failed to copy the layout objects. | Reboot RC+. | | |
| 7767 | Simulator. Failed to cut the layout objects. | Reboot RC+. | | |
| 7768 | Simulator. Failed to paste the layout objects. | Reboot RC+. | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 7769 | Simulator. Failed to remove the Robot. | Reboot RC+. | | |
| 7773 | Simulator. Robot or Object was not specified. | Specify Robot or Object. | | |
| 7774 | Simulator. Duplicated Robot name or Object name. | Change the Robot name or Object name so that it does not duplicate. | | |
| 7775 | Simulator. Could not find Robot. | Check whether the Robot is set or check the Robot name. | | |
| 7776 | Simulator. Could not find Object. | Check whether the Object is set or check the Object name. | | |
| 7777 | Simulator. Could not find Hand. | Check whether the Hand is set or check the Hand name. | | |
| 7778 | Simulator. The specified object is already registered as a Part object. | Unregister the Part. | | |
| 7779 | Simulator. The specified object is not Part object | Specify the object set for the Part. | | |
| 7780 | Simulator. Could not find the specified Tool. | Specify the set Tool. | | |
| 7781 | Simulator. Child object can not be picked. | Change to parent object. | | |
| 7782 | Simulator. Parent objects can not be specified for Part, Mounted Device, or Mobile Camera | Unregister as Part, Mounted Device or Mobile Camera. | | |
| 7783 | Simulator. Robot can not be specified. | Specify an Object other than Robot. | | |
| 7784 | Simulator. The same object can not be specified as a parent object. | Specify another object. | | |
| 7785 | Simulator. Child object can not be specified as parent object. | Change to parent object. | | |
| 7786 | Simulator. The specified object is already registered as a parent object. | Specify another object. | | |
| 7787 | Simulator. Specified value is invalid. | Check the set value. | | |
| 7788 | Simulator. Specified variable type is invalid. | Check the variable type. | | |
| 7789 | Simulator. Object can not be specified. | Specify the Robot. | | |
| 7790 | Simulator. Hand can not be specified. | Specify an object other than Hand. | | |
| 7791 | Simulator. Camera can not be specified. | Specify an object other than Camera. | | |
| 7800 | Data cannot be changed, because it is not data of PG axis. | - | | |
| 7801 | Invalid joint number was specified. | - | | |
| 7802 | The robot type is invalid. | - | | |
| 7803 | The parameter is invalid. | - | | |
| 7804 | The robot number is invalid. | - | | |
| 7805 | MCD failure. Failed to open the MCD file. | Restore the controller configuration. | | |
| 7806 | MCD failure. Failed to read the MCD file. | Restore the controller configuration. | | |
| 7807 | MCD failure. Failed to save the MCD file. | Restore the controller configuration. | | |
| 7808 | MCD failure. Failed to create the MCD file. | Restore the controller configuration. | | |
| 7809 | MCD failure. Failed to write the MCD file. | Restore the controller configuration. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 7810 | MPL failure. Failed to open the MPL file. | Reinstall the firmware. | | |
| 7811 | MPL failure. Failed to read the MPL file. | Update the firmware. | | |
| 7812 | MPL failure. Failed to write the MPL file. | 1. Reboot the controller. 2. Reinstall the firmware. | | |
| 7815 | IFS failure. Failed to open the IFS file. | Restore the controller configuration. | | |
| 7816 | IFS failure. Failed to read the IFS file. | Restore the controller configuration. | | |
| 7817 | IFS failure. Failed to write the IFS file. | Restore the controller configuration. | | |
| 7822 | MTR failure. Failed to read the MTR file. | 1. Reboot the controller. 2. Reinstall the MT. | | |
| 7824 | MTR failure. Failed to save the MTR file. | Reboot the controller. | | |
| 7825 | PRM failure. Failed to create the PRM file. | Restore the controller configuration. | | |
| 7827 | PRM failure. Failed to read the PRM file. | Restore the controller configuration. | | |
| 7829 | PRM failure. Failed to save the PRM file. | Restore the controller configuration. | | |
| 7830 | File failure. Cannot access the file. | 1. Reboot the controller. 2. Reinstall the firmware. | | |
| 7831 | The motor type is invalid. | Check the motor amplifier. | | |
| 7840 | MCD failure. Area allocate error. | Reboot the controller. | | |
| 7845 | FGI failure. Failed to open the FGI file. | Reboot the controller. Reinstall the firmware. | - | - |
| 7847 | MDL failure. Failed to open the MDL file. | Reboot the controller. Reinstall the firmware. | - | - |
| 7848 | MDL failure. Failed to read the MDL file. | Reboot the controller. Reinstall the latest firmware version. | - | - |
| 7900 | Fieldbus not installed. | - | | |
| 7901 | Fieldbus invalid parameter. | - | | |
| 7902 | Fieldbus line defect. | Check the connection of the communication cable for the fieldbus. Check whether the communication cable for the fieldbus is powered. (if the fieldbus requires power supply) Check the connection of the fieldbus slave. | | |
| 7903 | Fieldbus device not configured. | Check that the fieldbus master board is installed. Reboot the computer where the fieldbus master board is installed. Replace the fieldbus master board. | | |
| 7904 | Fieldbus invalid board. | Check that the fieldbus master board is installed. Reboot the computer where the fieldbus master board is installed. Replace the fieldbus master board. | | |
| 7905 | Fieldbus connection denied. | - | | |

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| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 7906 | Fieldbus invalid device configuration. | Check that the fieldbus master board is installed. Reboot the computer where the fieldbus master board is installed. Replace the fieldbus master board. | | |
| 7907 | Fieldbus general error. | Check that the fieldbus master board is installed. Reboot the computer where the fieldbus master board is installed. Replace the fieldbus master board. | | |
| 7908 | Fieldbus configuration error. | Check the fieldbus master setting. | | |
| 7909 | Fieldbus slaves were not detected. | Register the slave to the fieldbus master by accompanying applicomIO Console application. | | |
| 7910 | Fieldbus configuration file not found. | Import the Fieldbus configuration file as described in the Fieldbus I/O manual. | | |
| 7911 | Fieldbus invalid configuration file. | Import the Fieldbus configuration file as described in the Fieldbus I/O manual. If the problem persists, contact Epson. | | |
| 7912 | Fieldbus invalid device ID. | An invalid device ID parameter was used. Check your program. | | |
| 7913 | Fieldbus invalid service was specified. | An invalid explicit messaging service number was used. Check your program. | | |
| 7914 | Fieldbus cannot open master board driver. | Check that the Fieldbus master board is installed correctly. Check that the drivers for the Fieldbus master board were installed correctly. | | |
| 7915 | Fieldbus cannot open master board channel. | Check that no other application is using the Fieldbus master board. Check that the correct firmware is installed (downloaded) on the board. | | |
| 7916 | Fieldbus host ready timeout. | Check that the drivers for the Fieldbus master board were installed correctly. Reboot and try again. Replace the board. | | |
| 7917 | Fieldbus bus communication timeout. | Check the bus power and slave connections. | | |
| 7950 | Force sensing. Invalid force sensor. | - | | |
| 7951 | Force sensing. Invalid force sensor axis. | - | | |
| 7952 | Force sensing. Sensor read failed. | - | | |
| 7953 | Force sensing. Sensor initialization failed. | - | | |
| 7954 | Force sensing. Sensor not initialized. | - | | |
| 7955 | Force sensing. Force or torque exceeded saturation level. | - | | |
| 7975 | Force Guide. Value out of range. | - | | |
| 7976 | Force Guide. Invalid property value. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|----------------------------|-----------------------------|
| 9001 | Emergency stop circuit failure was detected. Disconnection or other failure was found in one of the redundant inputs. | Check whether no disconnection, earth fault, or short-circuit of the emergency stop input signal exists. Then reboot the controller. | | |
| 9002 | Safeguard circuit failure was detected. Disconnection or other failure was found in one of the redundant inputs. | Check whether no disconnection, earth fault, or short-circuit of the safeguard input signal exists. Then reboot the controller. | | |
| 9003 | Initialization failure. Failed to initialize the firmware. | This is likely because of the controller hardware failure. Check the wiring is correct. If the error is not cleared after the controller is rebooted, contact us. | | |
| 9004 | Initialization failure. Failed to initialize the DU. Check the DU power and the connection. | The number of set Drive Unit(s) disagrees with the number of recognized Drive Unit(s). Check the wirings of power supply and between Control Unit and Drive Unit are correct. If the error is not cleared after the controller is rebooted, contact us. | | |
| 9005 | Initialization failure. Failed to initialize the DU. Check the connection. | This is likely because of the Drive Unit hardware failure. Check the wiring is correct. If the error is not cleared after the controller is rebooted, contact us. | | |
| 9006 | Initialization failure. Failed to initialize the Remote I/O. Check the Remote I/O setting. | Check the Remote I/O setting value | | |
| 9007 | Error of Force Sensor occurs. Note 1: Each error code See each error code to take a relevant countermeasure. | Error of Force Sensor has occurred. Please confirm Note 1 by the system history, and take a relevant countermeasure. | Each error code | |
| 9011 | Battery voltage of the CPU board backup is lower than the specified voltage. Replace the CPU board battery. | Replace the battery for the CPU board immediately. Keep the controller ON as long as possible until the battery is replaced. | 100 times of current value | 100 times of boundary value |
| 9012 | 5V input voltage for CPU board is lower than the specified voltage. | If normal voltage is not generated by 5V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 9013 | 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 9014 | Internal temperature of the Controller is higher than the specified temperature. | Stop the controller as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 9015 | Speed of the controller fan is below the specified speed. (FAN1) | Check whether the filter of the controller is not clogged up. Replace the fan. | Current value | Boundary value |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|----------------------------|-----------------------------|
| 9016 | Speed of the controller fan is below the specified speed. (FAN2) | Check whether the filter of the controller is not clogged up. Replace the fan. | Current value | Boundary value |
| 9017 | Internal temperature of the Controller is higher than the specified temperature. | Stop the controller as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | 100 times of current value | 100 times of boundary value |
| 9018 | 54V input voltage for CPU board is lower than the specified voltage. | If normal voltage is not generated by 54V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 9019 | 3.3V input voltage for CPU board is lower than the specified voltage. | If normal voltage is not generated by 3.3V power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 9020 | DC input voltage for CPU board is lower than or bigger than the specified voltage. | If normal voltage is not generated by DC power supply alone, replace the power supply. | 100 times of current value | 100 times of boundary value |
| 9021 | DU1 3.3V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 1 power supply alone, replace the power supply. | | |
| 9022 | DU1 5V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 1 power supply alone, replace the power supply. | | |
| 9023 | DU1 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 1 power supply alone, replace the power supply. | | |
| 9024 | DU1 Internal temperature of the Controller is higher than the allowed temperature. | Stop the Drive Unit 1 as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | | |
| 9025 | DU1 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of the Drive Unit 1 is not clogged up. Replace the fan. | | |
| 9026 | DU1 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of the Drive Unit 1 is not clogged up. Replace the fan. | | |
| 9031 | DU2 3.3V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 2 power supply alone, replace the power supply. | | |
| 9032 | DU2 5V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 2 power supply alone, replace the power supply. | | |
| 9033 | DU2 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 2 power supply alone, replace the power supply. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 9034 | DU2 Internal temperature of the Controller is higher than the allowed temperature. | Stop the Drive Unit 2 as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | | |
| 9035 | DU2 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of the Drive Unit 2 is not clogged up. Replace the fan. | | |
| 9036 | DU2 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of the Drive Unit 2 is not clogged up. Replace the fan. | | |
| 9041 | DU3 3.3V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 3.3V of Drive Unit 3 power supply alone, replace the power supply. | | |
| 9042 | DU3 5V input voltage for the board is lower than the minimum allowed voltage. | If normal voltage is not generated by 5V of Drive Unit 3 power supply alone, replace the power supply. | | |
| 9043 | DU3 24 V input voltage for the motor brake, encoder and fan is lower than the specified voltage. | If normal voltage is not generated by 24V of Drive Unit 3 power supply alone, replace the power supply. | | |
| 9044 | DU3 Internal temperature of the Controller is higher than the allowed temperature. | Stop the Drive Unit 3 as soon as possible and check whether the ambient temperature of the controller is not high. Check whether the filter is not clogged up. | | |
| 9045 | DU3 Rotating speed of the controller fan is below the allowed speed. (FAN1) | Check whether the filter of the Drive Unit 3 is not clogged up. Replace the fan. | | |
| 9046 | DU3 Rotating speed of the controller fan is below the allowed speed. (FAN2) | Check whether the filter of the Drive Unit 3 is not clogged up. Replace the fan. | | |
| 9100 | Initialization failure. Failed to allocate memory. | Reboot the controller. | | |
| 9101 | Message queue has become full. | - | | |
| 9102 | Initialization failure. Failed to initialize Modbus. | (When RTU is selected) Check whether the selected port is installed. (When TCP is selected) Check whether the selected port number is used by other | | |
| 9103 | Initialization failure. Failed to initialize the user output. | If the manipulator is specified, check whether the specified manipulator is registered. | | |
| 9104 | Remote User Output failure. Specified command cannot be executed. | Check the condition expression. | | |
| 9233 | The Fieldbus I/O driver is in an abnormal state. | The module is broken or the controller software is damaged. Restore the controller firmware. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 9234 | Fieldbus I/O driver initialization failure. | The module is broken or the controller software is damaged. Restore the controller firmware. | | |
| 9610 | RAS circuit detected a servo system malfunction. Reboot the controller. Check for noise. Replace the controller. | Check the noise countermeasures. Replace the DMB. | | |
| 9611 | Servo CPU internal RAM failure. Reboot the controller. Check for noise. Replace the DMB. | Check the noise countermeasures. Replace the DMB. | | |
| 9612 | RAM for the main and servo CPU communication failure. Reboot the controller. Check for noise. Replace the DMB. | Check the noise countermeasures. Replace the DMB. | | |
| 9613 | Servo CPU internal RAM failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller. Check the noise countermeasures. Replace the DMB. For T series, it is not DMB but CPU board. | | |
| 9614 | Initialization communication of main CPU and servo CPU failure. Reboot the Controller. Check for noise. Replace DMB. | Reboot the controller. Check the noise countermeasures. Replace the DMB. For T series, it is not DMB but CPU board. | | |
| 9615 | Initialization communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Check the noise countermeasures. Replace the DMB. | | |
| 9616 | Communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller. Check the noise countermeasures. Replace the DMB. For T series, it is not DMB but CPU board. | | |
| 9617 | Communication of the main and servo CPU failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller. Check the noise countermeasures. Replace the DMB. For T series, it is not DMB but CPU board. | | |
| 9618 | Servo long time command overrun. | Check the noise countermeasures. Replace the DMB. | | |
| 9619 | Servo long time command check sum error. | Check the noise countermeasures. Replace the DMB. | | |
| 9620 | System watchdog timer detected a failure. Reboot the controller. Check for noise. Replace the DMB. | Reboot the controller. Check the noise countermeasures. Replace the DMB. For T series, it is not DMB but CPU board. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|--|--------|--------|
| 9621 | Drive unit check failure. | Check the noise countermeasures. Replace the DMB. | | |
| 9622 | RAM failure of the servo CPU. Reboot the controller. Check for noise. Replace the DMB. | Check the noise countermeasures. Replace the DMB. | | |
| 9623 | Failure of the redundant circuitry for the emergency stop or the safeguard. Check the wiring. | Check the noise countermeasures. Replace the DMB. | | |
| 9624 | Low voltage of the main circuit power supply was detected. Check the power supply voltage. Reboot the controller. | Check the noise countermeasures. Replace the DMB. | | |
| 9625 | Control relay contact of the main circuit power supply is welded closed. Replace the DPB. | Replace the DMB. | | |
| 9626 | Detect the recognition mismatch of the sub CPU and main CPU. | Reboot the controller, take the measure against noise, or replace the CPU board. | | |
| 9627 | Temperature of regeneration resistor was higher than the specified temperature. | Specify the Weight/Inertia setting. Check the load. Check the robot. (Smoothness, backlash, non-smooth motion, loose belt tension, brake) Check the interference with the peripheral equipment. (Collision, contact) Check the model setting. Check the power cable connection. | | |
| 9628 | Over voltage of the sub CPU. | Replace the DPB board. | | |
| 9630 | Servo real time status failure. Check sum error. | Reboot the controller. Replace the DMB. Check the noise countermeasures. | | |
| 9632 | Servo real time status failure. Servo free running counter error | Reboot the controller. Replace the DMB. Check the noise countermeasures. | | |
| 9633 | Servo real time status failure. Servo CPU communication error. | Reboot the controller. Replace the DMB. Check the noise countermeasures. | | |
| 9640 | Irregular motion control interruption was detected. Interruption duplicate. | Reboot the controller. Replace the DMB. Check the noise countermeasures. | | |
| 9691 | Data sending failure in motion network. | Check the connection of the cable for Drive Unit. | | |
| 9692 | Data receiving failure in motion network. | Check the connection of the cable for Drive Unit. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 9697 | Data sending failure of Force Sensor I/F board. Check connection of the Force Sensor I/F board and Force Sensor. | Check connection of the Force Sensor I/F board and Force Sensor. Reboot the controller. Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 9698 | Data receiving failure of Force Sensor I/F board. Check connection of the Force Sensor I/F board and Force Sensor. | Check connection of the Force Sensor I/F board and Force Sensor. Reboot the controller. Please inquire with us if a similar error occurs even after the above countermeasures are taken. | | |
| 9700 | Servo control gate array failure. Check the DMB. | Check the short-circuit and improper connection of the peripheral equipment wiring. (Emergency and I/O connectors) Replace the DMB. Replace the additional axis unit. For T series, reboot the controller, take the measure against noise, and replace the CPU board and motor unit. | | |
| 9701 | Disconnection of the parallel encoder signal. Check the signal cable connection or the robot internal wiring. | Check the M/C cable signal. Check the robot signal wiring. (Missing pin, disconnection, short-circuit) Replace the motor. (Encoder failure) Replace the DMB. (Detection circuit failure) Check the connector connection in the controller. (Loosening, connecting to the serial encoder terminal on the DMB) Check the model setting. (Improperly setting of the parallel encoder) Check the peripheral equipment wiring. (Emergency and I/O) For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9702 | Motor driver is not installed. Install the motor driver. Check the DMB or the motor driver. | Check whether the motor driver is mounted. Check the model setting and hardware setting. Replace the motor driver. Replace the DMB. For T series, check the wiring of the motor unit. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|---|--------|--------|
| 9703 | Initialization communication failure of incremental encoder. Check the signal cable connection and the robot setting. | Check the model setting. Replace the motor. (Encoder failure) Replace the DMB. For T series, reboot the controller, take the measure against noise, and replace the CPU board and motor unit. | | |
| 9704 | Initialization failure of absolute encoder. Check the signal cable connection or the robot setting. | Check the model setting. Replace the motor. (Encoder failure) Replace the DMB. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9705 | Encoder division setting failure. Check the robot setting. | Check the model setting. | | |
| 9706 | Data failure at the absolute encoder initialization. Check the signal cable connection, the controller, or the motor. | Replace the motor. (Encoder failure) Replace the DMB. Check the noise countermeasures. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9707 | Absolute encoder multi-turn is beyond the maximum range. Reset the encoder. | Reset the encoder. Replace the motor. (Encoder failure) | | |
| 9708 | Position is out of the range. Reset the encoder. | Reset the encoder. Replace the DMB. Replace the motor. (Encoder failure) | | |
| 9709 | No response from the serial encoder. Check the signal cable connection, the motor, the DMB, or the encoder I/F board. | Check the model setting. (Improperly setting of the parallel encoder model) Check the signal cable connection. Replace the DMB and encoder I/F board. | | |
| 9710 | Serial encoder initialization failure. Reboot the controller. Check the motor, the DMB, or the encoder I/F board. | Check the robot configuration. Check the signal cable. Replace the DMB and encoder I/F board. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9711 | Serial encoder communication failure. Reboot the controller. Check the motor, the DMB, or the encoder I/F board. | Check the robot configuration. Check the signal cable. Replace the DMB and encoder I/F board. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|---|---|--------|--------|
| 9712 | Servo CPU watchdog timer failure. Reboot the controller. Check the motor or the DMB. | Replace the DMB. Check the noise countermeasures. For T series, check the connection of the signal cable. Reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9713 | Current control circuit WDT failure. Reboot the controller. Check the controller. | Check the power cable connection. Check the 15V power supply and cable connection. Replace the DMB. Check the noise countermeasures. For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9714 | The DMB is not for this robot. | Check robot setting. Replace with the supported DMB. | | |
| 9715 | Encoder is reset. Reboot the controller. | Reboot the controller. | | |
| 9716 | Power supply failure of the absolute encoder. Replace the battery to a new one. Check the robot internal wiring. | Reset the encoder. Check the signal cable connection. | | |
| 9717 | Backup data failure of the absolute encoder. Reset the encoder. | Reset the encoder. Check the signal cable connection. | | |
| 9718 | Absolute encoder battery alarm. | Replace the battery. Check the signal cable connection. | | |
| 9719 | Position failure of the absolute encoder. Reset the encoder. Replace the motor. | Reset the encoder. Replace the motor. (Encoder failure) For T series, reboot the controller, take the measure against noise, and replace the motor unit. | | |
| 9720 | Speed is too high at controller power ON. Stop the robot and reboot the controller. | Reboot the controller. Reset the encoder. For T series, reboot the controller, take the measure against noise, and replace the motor unit. Check the interference with the other devices. | | |
| 9721 | Absolute encoder over heat. | Lower the motion duty. Wait until the temperature of the encoder decreases. | | |
| 9722 | R/D transducer failure. Reset the encoder. Check resolver board or the robot internal wiring. | Resets the encoder. Check the signal wiring of the manipulator (loose pin, disconnection, short). Replace the resolver board. | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|------|--|--|--------|--------|
| 9723 | G sensor communication failure. Check the signal cable connection or the robot internal wiring. | Check for the signal cable connection. Check the signal wiring of the manipulator (loose pin, disconnection, short). Check the noise countermeasure. Replace the control board. Replace the DMB. | | |
| 9724 | G sensor data error. Check for the control board. | Replace the control board. | | |
| 9725 | The multi rotational data and the R/D conversion data is different. Reset the encoder. | Reset the resolver Check the noise countermeasure. Replace the resolver board. | | |
| 9726 | Disconnection of the resolver excitation signal. Reset the encoder. Check the resolver board or the robot internal wiring. | Check the signal wiring of the manipulator (loose pin, disconnection, short). Replace the resolver board. | | |
| 9727 | S-DSP communication failure. Check the DMB. | Reboot the Controller. Check the noise countermeasure. Replace the DMB. | | |
| 9728 | Current feedback data failure. Check the DMB. | Reboot the Controller. Check the noise countermeasure. Replace the DMB. For T series, check the short-circuit and earth fault of the power cable. Reboot the controller or replace the motor unit. | | |
| 9729 | D-DSP communication failure. Check the DMB. | Reboot the Controller. Check the noise countermeasure. Replace the DMB. | | |
| 9730 | Speed is too high at controller power OFF. Reset the encoder. | Reset the encoder. Replace the motor. | | |
| 9731 | Speed is too high. Reset the encoder. | Reset the encoder. Replace the motor. For T series, reboot the controller and replace the motor unit. | | |
| 9732 | Servo alarm A. | - | | |

| No. | Message | Remedy | Note 1 | Note 2 |
|-------|---|--|--------|--------|
| 10000 | Command aborted by user | - | | |
| 10001 | Command timeout. | - | | |
| 10002 | Bad point file line syntax | - | | |
| 10003 | Project could not be built. | - | | |
| 10004 | Cannot initialize Spel class instance. | - | | |
| 10005 | Cannot initialize parser. | - | | |
| 10006 | Cannot initialize wbproxy. | - | | |
| 10007 | Project does not exist. | Check whether the project name and the path are correct. | | |
| 10008 | No project specified. | Specify the project. | | |
| 10009 | Cannot open file. | Check whether the project name and the path are correct. | | |
| 10010 | Cannot create file. | - | | |
| 10011 | File not found | Check whether the project name and the path are correct. | | |
| 10013 | Cannot execute LoadPoints with Robot Manager open. | Close the robot manager and execute. | | |
| 10014 | Project cannot be locked. It is being used by another session. | Terminate other applications. | | |
| 10015 | Project could not be synchronized. | - | | |
| 10016 | Drive not ready | Check whether the drive designation is correct. | | |
| 10017 | Invalid IP address | Check the IP address. | | |
| 10018 | Invalid IP mask | Check the IP mask. | | |
| 10019 | Invalid IP gateway | Check the IP gateway. | | |
| 10020 | IP address or gateway cannot be the subnet address. | Check the IP address. | | |
| 10021 | IP address or gateway cannot be the broadcast address. | Check the IP address. | | |
| 10022 | Invalid DNS address | Check the DNS. | | |
| 10023 | Commands cannot be executed because the project build is not complete. | Execute after the project build is completed. | | |
| 10024 | Invalid task name. | Check the task name. | | |
| 10100 | Command already in cycle. | - | | |
| 10101 | Command aborted by user. | Execute ResetAbort. | | |
| 10102 | Invalid server instance. | Specify the correct instance. | | |
| 10103 | Invalid CommandTask value. | Specify the correct task number. | | |
| 10104 | Cannot change ServerInstance after initialized. | Set ServerInstance before initialization. | | |
| 10501 | Connection aborted. | - | | |
| 10502 | Cannot connect with the controller. | - | | |
| 10503 | Controller firmware is not compatible with this version of RC+. | Upgrade the RC+ version. | | |
| 10504 | USB connection of this system is reserved for the RC620 Controller and cannot be used for RC+7.0. | Install the RC+7.0 to another computer. | | |
| 10505 | The specified connection does not exist. | Check the connection number. | | |
| 10600 | Frame grabber driver not installed. | Install the driver. | | |

9.2 Cannot Connect the Development PC and the Controller using the USB cable



CAUTION

- Do not connect the USB cable to a PC or a Controller without installing Program Development Software EPSON RC+ 7.0 to the PC.
You must install EPSON RC+ 7.0 to control the Controller.
If the USB cable is connected to a PC or a Controller without installing Program Development Software EPSON RC+ 7.0, the [Add New Hardware] wizard appears. Click the <Cancel> button to close the [Add New Hardware] wizard.

- If the following error message appears when connecting the development PC and Controller with the USB cable and connecting the Controller to EPSON RC+ 7.0, Windows may not recognize the Controller properly. Refer to *Maintenance 9.2.1 Confirmation Using Windows Device Manager* to check the connection of the Controller.

“Cannot connect to controller

!! Error: 1805, Connection Failure. Check the controller startup and connection of the communication cable.”

- Displayed driver name varies depending on the Windows OS.
Windows XP 32-bit version: “EPSON Robot Controller RC170”
Other than Windows XP 32-bit version: “EPSON Robot Controller”

This section uses the dialogs and the driver name for Windows XP 32-bit version.

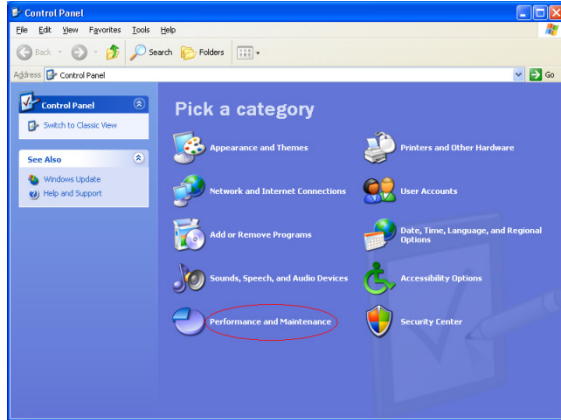
9.2.1 Confirmation Using Windows Device Manager

- (1) Make sure that the development PC and the Controller is connected to the USB cable.

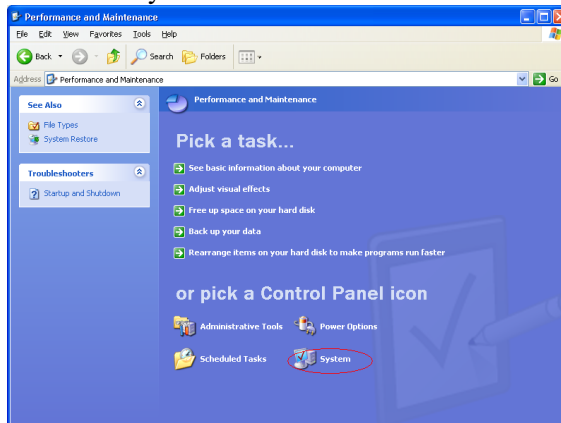
NOTE
☞

When checking the Controller connection using the Windows device manager, the development PC and the Controller must be connected with the USB cable.

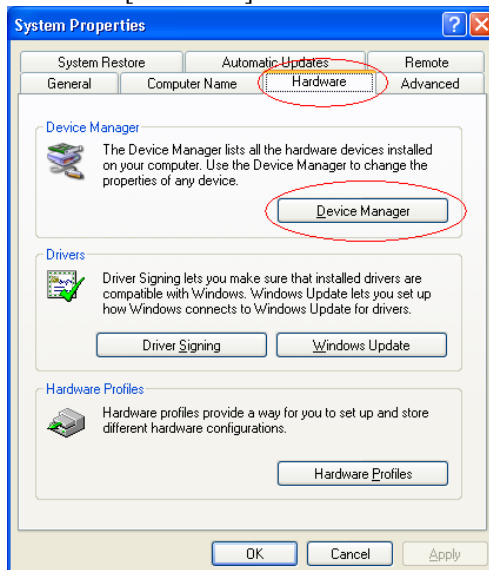
- (2) Click Windows-[Control Panel]-<Performance and Maintenance>.



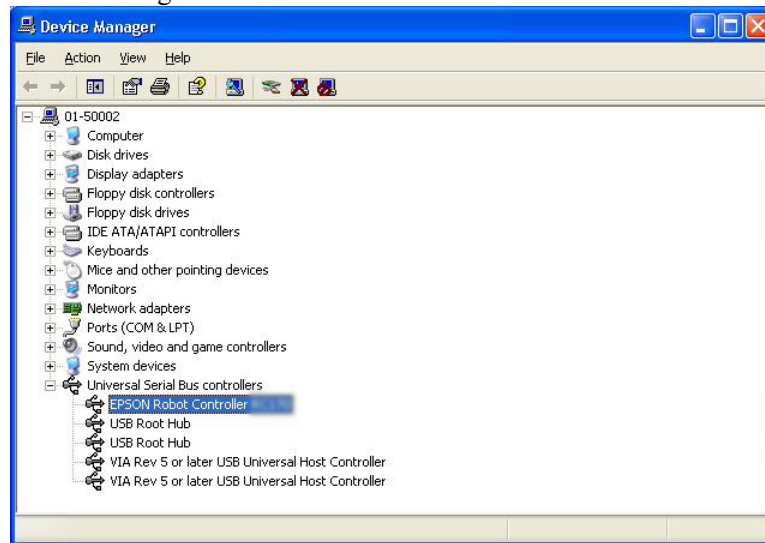
- (3) The [Performance and Maintenance] dialog appears. Click the <System> icon.



- (4) The [System Properties] dialog appears. Select the [Hardware] tab and click the <Device Manager> button.



- (5) The [Device Manager] dialog appears.
Click <Universal Serial Bus controllers> and make sure that “EPSON Robot Controller RC170” is registered.



When “EPSON Robot Controller RC***” is registered and located under “Universal Serial Bus controllers” in step (5), the development PC and the Controller connect properly. If the following error message appears, please contact the supplier of your region.

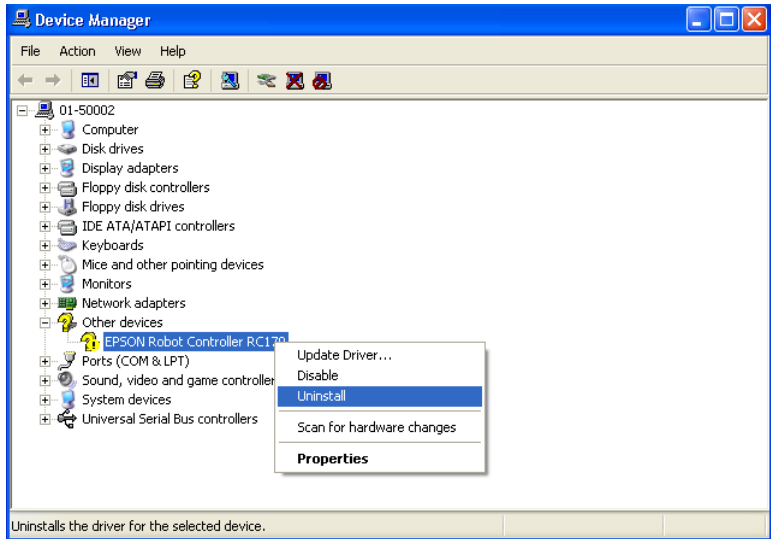
“Cannot connect to controller.

!! Error: 1805, Connection failure, check the controller startup and connection of the communication cable.”

If “EPSON Robot Controller RC170” is not located under “Universal Serial Bus controllers” but located under “Other devices” in step (5), refer to *Maintenance 9.2.2 When recognized under “Other devices” in Windows Device Manager.*

9.2.2 When recognized under “Other devices” in Windows Device Manager

If “EPSON Robot Controller RC170” is recognized under “Other devices” in the Windows device manager as shown in the following dialog, delete “EPSON Robot Controller RC170” from the device manager and connect the USB cable again to correct the problem.



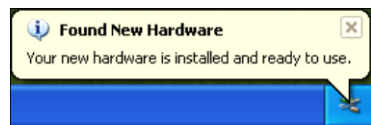
- (1) Select and right click “EPSON Robot Controller RC170” in the [Device Manager] dialog.
- (2) Select [Uninstall].
- (3) The [Confirm Device Removal] dialog appears. Click the <OK> button.



- (4) Remove the USB cable and connect the USB cable again. The following message appears at the right bottom of the Windows screen.



- (5) When the Controller is installed automatically and the following message appears, the communication is available.



NOTE

If the problem is not corrected, please contact the supplier of your region.

10. Maintenance Parts List

| Part Name | | Code | Old Code | Note |
|--------------|-----------|---------|------------|--|
| Fan | | 2157260 | R13B060510 | |
| Fan Filter | | 1596688 | R13N865021 | Black (While stock lasts) |
| | | 2195106 | – | White |
| Battery | | 2113554 | R13B060003 | |
| Motor Driver | 5A/5A | 2176557 | – | See the table below for motor selection |
| | 10A/10A | 2172039 | R13N874011 | |
| | 15A/5A | 2188815 | – | |
| | 15A/15A | 2171247 | R13N874021 | |
| | 15A/15A-2 | 2168582 | – | |
| | 30A/5A | 2188814 | – | |
| | 30A/30A | 2171456 | R13NZ90002 | |
| | 50A/30A | 2171259 | – | |

Motor driver (** A / ** A)

| Controller | Manipulator | Joint #1, #2 | Joint #3, #4 | Joint #5, #6 | Remarks |
|------------|-------------|--------------|--------------|--------------|----------|
| RC700 | C4 | 15A/15A | 10A/10A | | MDB type |
| | | 2171247 | 2172039 | | Code |
| | | R13N874021 | R13N874011 | | Old Code |
| RC700-A | C4 C12 | 15A/15A-2 | 10A/10A | | MDB type |
| | | 2168582 | 2172039 | | Code |
| | | – | R13N874011 | | Old Code |
| | C8 | 50A/30A | 15A/15A-2 | 10A/10A | MDB type |
| | | 2171259 | 2168582 | 2172039 | Code |
| | | – | – | R13N874011 | Old Code |
| | N2 | 5A/5A | | | MDB type |
| | | 2176557 | | | Code |
| | N6 | 30A/5A | 15A/5A | 30A/5A | MDB type |
| | | 2188814 | 2188815 | 2188814 | Code |

| Controller | Manipulator | Joint #1, #2 | Joint #3, #4 | Remarks | |
|------------|----------------|--------------|--------------|----------|----------|
| RC700-A | G1 G3 | 10A/10A | | MDB type | |
| | | 2172039 | | Code | |
| | | R13N874011 | | Old Code | |
| | G6 RS X5 | 15A/15A-2 | 10A/10A | | MDB type |
| | | 2168582 | 2172039 | | Code |
| | | – | R13N874011 | | Old Code |
| | G10 G20 | 30A/30A | 15A/15A-2 | | MDB type |
| | | 2171456 | 2168582 | | Code |
| | | R13NZ90002 | – | | Old Code |

The code of the following parts differs depending on the Controller.
 Also, the code of RC700-A differs depending on the serial number (Note: R7*****).
 If you need the parts, please confirm the Controller type and serial number before contact us.

| Part Name | | Code | Old Code | Note | |
|-------------------|--------------------|--------------|------------|--|---------------------|
| For RC700 | DMB-MAIN | | 2180932 | – | |
| | DMB-SUB | | 2151349 | R13N842021 | |
| | DMB-LED | | 2151351 | R13N842031 | |
| | DPB | | 2171246 | R13N844011 | |
| | TP Bypass Plug | | 2111451 | R13B060705 | |
| | CF (Compact Flash) | | 1605920 | R13N8B6011 | |
| For RC700-A | DMB-MAIN | C4 series | 2180933 | – | R7**00**** |
| | | G series | | | R7**01**** |
| | | RS series | 2189443 | – | R7**02**** |
| | | | | | R7**03**** or later |
| | DMB-MAIN | C8 series | 2182346 | – | R7**00**** |
| | | C12 series | | | R7**01**** |
| | | N series | 2189444 | – | R7**02**** |
| | | X5 series | | | R7**03**** or later |
| | DMB-SUB | C, N series | 2171261 | – | |
| | | G, RS series | 2171816 | – | |
| | | X5 series | 2184586 | – | |
| | DMB-LED | | 2171262 | – | |
| | DPB | | 2171263 | – | |
| | TP Bypass Plug | | 2171258 | – | |
| CF(Compact Flash) | | 1605920 | R13N8B6011 | R7**00**** R7**01**** R7**02**** | |
| | | 2195736 | – | R7**03**** or later | |

11. Option Parts List

| Part Name | Code | Old Code | Note |
|--|------------|------------|--|
| Expansion I/O Board (Source type) | R12NZ9003P | R12B040302 | |
| Expansion I/O Board (Sink type) | R12NZ9003Q | R12B040303 | |
| RS-232C Board | R12NZ9004E | R12B040726 | |
| DeviceNet Board | R12NZ9004F | R12B040727 | DeviceNet module is mounted on the Fieldbus Board. |
| PROFIBUS Board | R12NZ9004H | R12B040729 | PROFIBUS-DP module is mounted on the Fieldbus Board. |
| CC-Link Board | R12NZ9004J | R12B040730 | CC-Link module is mounted on the Fieldbus Board. |
| PROFINET Board | R12NZ900A6 | R12N747051 | PROFINET module is mounted on the Fieldbus Board. |
| EtherNet/IP Board | R12NZ900A7 | R12N747061 | EtherNet/IP module is mounted on the Fieldbus Board. |
| EtherCAT Board | R12NZ900CL | – | EtherCAT module is mounted on the Fieldbus Board. |
| PG Board | R12NZ900A8 | R12N748011 | |
| Analog I/O Board (1CH) | R12NZ900WZ | – | |
| Analog I/O Board (4CH) | R12NZ900X1 | – | |
| Force Sensor I/F Board (FS2) | 2184536 | – | |
| EUROMAP67 Board | R12NZ90104 | – | |
| EUROMAP67 Board (without IMM connection cable) | R12NZ9010A | – | EUROMAP67 without Cable2 |
| EUROMAP67 Cable1 | 2194667 | – | For EUROMAP67 Board Emergency Stop cable |
| EUROMAP67 Cable2 | 2194668 | – | For EUROMAP67 Board IMM Connection cable |
| EUROMAP67 Emergency Connector Plug | 2165789 | – | For EUROMAP67 Board Soldering plug |
| EUROMAP67 Emergency Connector Shell | 2194882 | – | For EUROMAP67 Board Shell kit |

