

Quality and Innovation

ROBO NET


Extension Unit

REXT

First Step Guide

Third Edition

Thank you for purchasing our product.
Make sure to read the Safety Guide and detailed Instruction Manual (CD/DVD) included with the product in addition to this First Step Guide to ensure correct use.
This Instruction Manual is original.



Warning : Operation of this equipment requires detailed installation and operation instructions which are provided on the CD/DVD Manual included in the box this device was packaged in. It should be retained with this device at all times.
A hardcopy of the Manual can be requested by contacting your nearest IAI Sales Office listed at the back cover of the Instruction Manual or on the First Step Guide.

- Using or copying all or part of this Instruction Manual without permission is prohibited.
- The company names, names of products and trademarks of each company shown in the sentences are registered trademarks.

Product Check

The standard configuration of this product is comprised of the following parts.
If you find any fault with the product you have received, or any missing parts, contact us or our distributor.

1. Parts

(1) For REXT-SIO (Unit reversing set)			
No.	Part Name	Model	Reference
1	Controller Main Body	Refer to "How to read the model plate", "How to read the model"	2 units / 1 set
Accessories			
2	ROBONET Communication Connection PCB	JB-1	1 pc / 1 set
3	Power Connection Board	PP-1	1 set (2 pc) / 1 set
4	Unit Link Cable	CB-REXT-SIO010	1m × 1 pc / 1 set
5	First Step Guide		
6	Instruction Manual (CD/DVD)		
7	Safety Guide		

(2) For REXT-CTL (Controller connection set)			
No.	Part Name	Model	Reference
1	Controller Main Body	Refer to "How to read the model plate", "How to read the model"	1 unit / 1 set
Accessories			
2	ROBONET Communication Connection PCB	JB-1	1 pc / 1 set
3	Power Connection Board	PP-1	1 set (2 pc) / 1 set
4	Controller Connection Cable	CB-REXT-CTL010	1m × 1 pc / 1 set
5	First Step Guide		
6	Instruction Manual (CD/DVD)		
7	Safety Guide		

2. Teaching Tool (to be purchased separately)

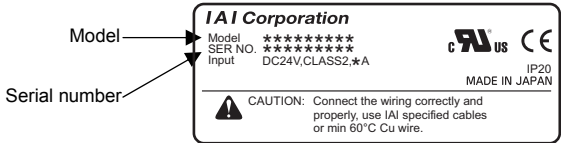
The PC software is required to teach positions and also to edit parameters during initial commissioning.		
No.	Part Name	Model
1	PC Software (RS232C converter adapter and external equipment communication cable are included)	RCM-101-MW
2	PC Software (USB converter adapter, USB cable and external equipment communication cable are included)	RCM-101-USB
3	Touch Panel Teaching	CON-PT
4	Touch Panel Teaching (with deadman switch)	CON-PD
5	Touch Panel Teaching (deadman switch and TP Adapter RCB-LB-TG are included)	CON-PG
6	Teaching Pendant	CON-T
7	Teaching Pendant (deadman switch and TP Adapter RCB-LB-TG are included)	CON-TG
8	Simple Teaching Pendant	RCM-E
9	Data Setter	RCM-P
10	Touch Panel Display	RCM-PM-01

(Note) Other teaching tools than the PC software can be used for individual operations such as position table settings, however they cannot be used for the ROBONET startup settings.

3. Instruction manuals related to this product, which are contained in the Instruction manual (CD/DVD).

No.	Name	Manual No.
1	ROBONET Instruction Manual	ME0208
2	SCON Controller Instruction Manual	ME0161
3	PCON-C/CG/CF Controller Positioner Type Instruction Manual	ME0170
4	ERC2 Actuator with integrated Controller Instruction Manual (SIO type)	ME0159
5	ERC2 Actuator with integrated Controller Instruction Manual (PIO type)	ME0158
6	PC Software RCM-101-MW/ RCM-101-USB Instruction Manual	ME0155
7	Touch Panel Teaching CON-PT/PD/PG Instruction Manual	ME0227
8	Teaching Pendant CON-T/TG Instruction Manual	ME0178
9	Simple Teaching Pendant RCM-E Instruction Manual	ME0174
10	Data Setter RCM-P Instruction Manual	ME0175
11	Touch Panel Display RCM-PM-01 Instruction Manual	ME0182
12	Instruction Manual for the serial communication [for Modbus] (When RGW-SIO is used with SIO Thru Mode)	ME0162

4. How to read the model plate

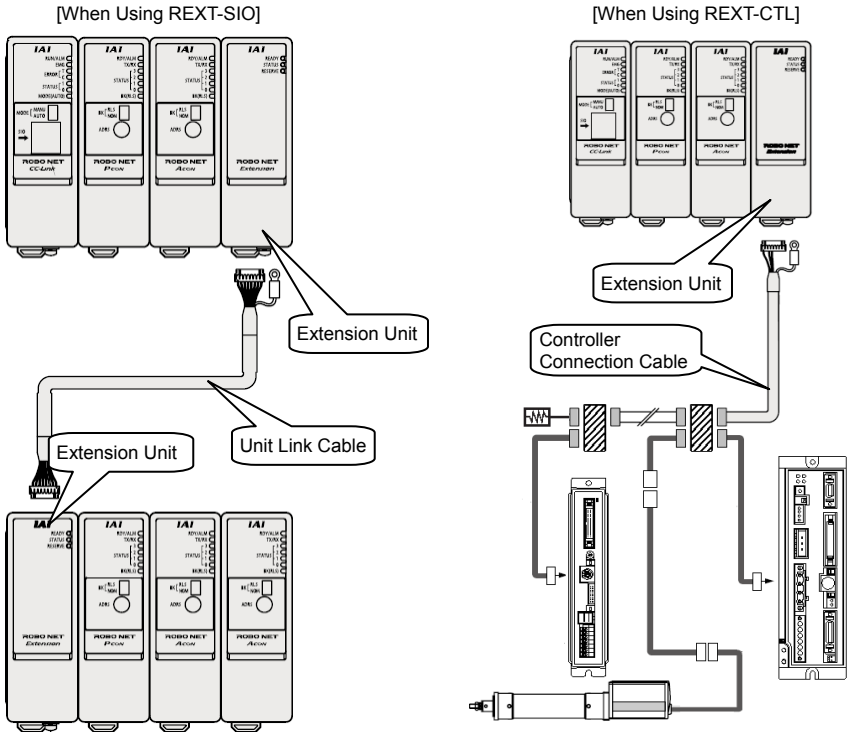


5. How to read the model

REXT-SIO : Multi-row Arrangement
REXT-CTL : External SIO Link

Basic Specifications

A typical ROBONET system is constructed not only with the Gateway R Unit that is explained in this manual, but also with RACON, RPCON, Simple Absolute R Unit, extension unit and ROBO Cylinder Controller to connect to the extension unit. Please refer to First Step Guide and Instruction Manual (CD/DVD) of each device for additional instruction related to that device.
The extension unit is applicable when many units are required to construct ROBONET and there is not enough space to place them, or when it is required to interface with a controller such as SCON or PCON-CF on ROBONET.

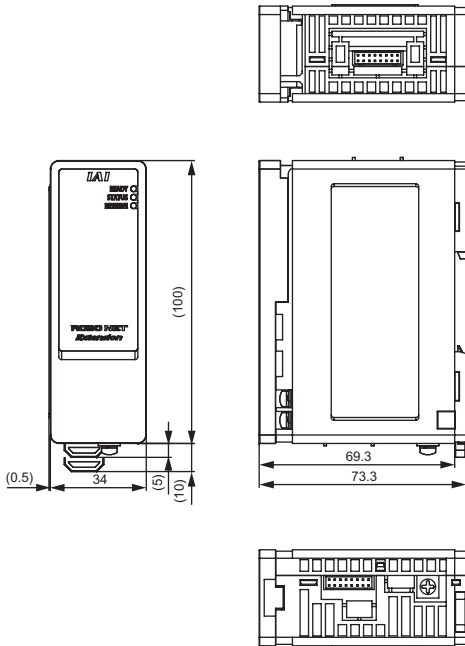


An REXT-CTL unit can also be connected to the end of a ROBONET network which has been expanded using REXT-SIO units.

Item		Specifications
Power Supply		24V DC±10%
Current Consumption		MAX. 100mA
Heat Generation		2.5W
Environment	Surrounding air temperature	0 to 40°C
	Surrounding humidity	95%RH or less (non-condensing)
	Surrounding environment	[Refer to Installation Environment section]
	Surrounding storage temperature	-25 to 70°C
	Surrounding storage humidity	95%RH or less (non-condensing)
	Vibration durability	XYZ Each direction 10 to 57Hz Pulsating amplitude 0.035mm (continuous) 0.075mm (intermittent) 57 to 150Hz 4.9m/s² (continuous) 9.8m/s² (intermittent)
Protection class		IP20
Cooling Method		Natural air-cooling
Insulation Resistance		Between power supply terminal and FG 500V DC 10MΩ or more
Insulation Strength		Between power supply terminal and FG 1500V AC for 1 min
Product Life		(Reference) 5 to 10 years: It varies significantly by the effects of the usage condition (especially temperature).
External Dimensions		34W × 105H × 73.3D [mm]
Weight		Approx. 140g

⚠ Note : The total length of extension using the extension unit should be 30m at maximum. This length should include the ROBONET width and GatewayR unit as the start point. When REXT-CTL is used, the communication cable connected to each controller should also be considered in the length.

External Dimensions



Installation Environment

This product is capable for use in the environment of pollution degree 2*1 or equivalent.
*1 Pollution Degree 2 : Environment that may cause non-conductive pollution or transient conductive pollution by frost. (IEC60664-1)

1. Installation Environment

- Do not use this product in the following environment.
- Location where the surrounding air temperature exceeds the range of 0 to 40°C
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity exceeds 85%RH
- Location exposed to corrosive gases or combustible gases
- Location exposed to significant amount of dust, salt or iron powder
- Location subject to direct vibration or impact
- Location exposed to direct sunlight
- Location where the product may come in contact with water, oil or chemical droplets
- Environment that blocks the air vent [Refer to Installation and Noise Elimination Section]

When using the product in any of the locations specified below, provide a sufficient shield.

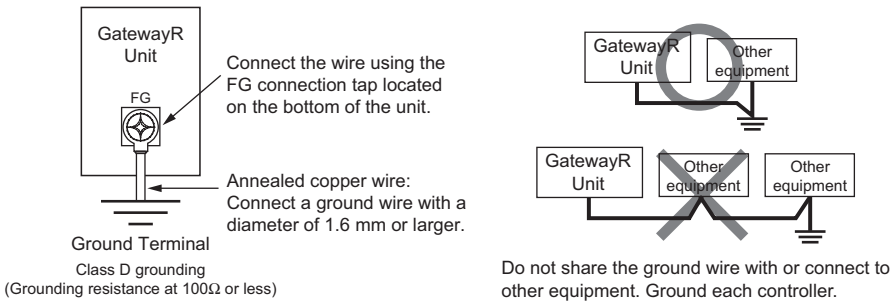
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

2. Storage and Preservation Environment

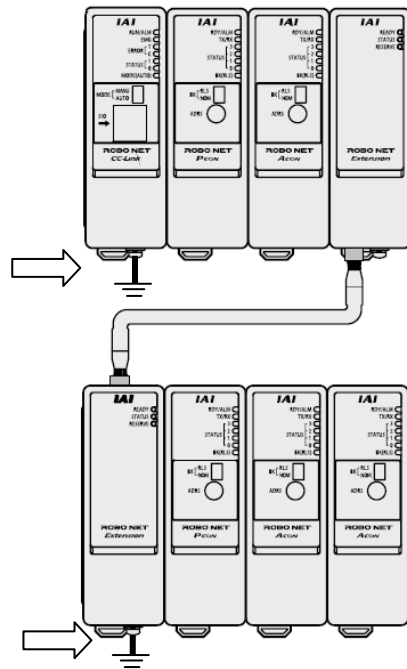
The storage and preservation environment should comply with the same standards as those for the installation environment. In particular, when the machine is to be stored for a long time, pay close attention to environmental conditions so that no condensation forms. Unless specially specified, moisture absorbcency protection is not included in the package when the machine is delivered. In the case that the machine is to be stored and preserved in an environment where condensation is anticipated, take the condensation preventive measures from outside of the entire package, or directly after opening the package.

Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)

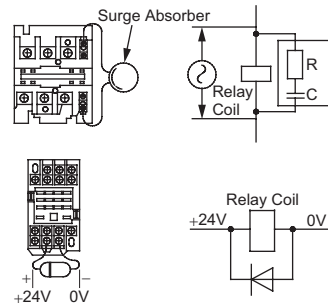


 Note : When using REXT-SIO, make sure to perform the grounding also on the extended side of the units.



2. Precautions regarding wiring method

- 1) Twist the wires for the 24V DC power unit.
- 2) Separate the communication line from the power line.




3. Noise Sources and Elimination

Carry out noise elimination measures for power devices on the same power path and in the same equipment.

The following are examples of measures to eliminate noise sources.

1) AC solenoid valves, magnet switches and relays



The diagram shows a schematic of a relay coil. It consists of a rectangular box with horizontal lines inside, representing the coil. To the right of the box is a label "Relay Coil" with a line pointing to the box. Below the box is a horizontal line with a small vertical tick mark in the center, representing a connection point or terminal.

[Measure] Install a Surge absorber parallel with the coil.

2) DC solenoid valves, magnet switches and relays

[Measure] Install a diode parallel with the coil. Use a DC relay with a built-in diode.

4. Extension Unit Installation

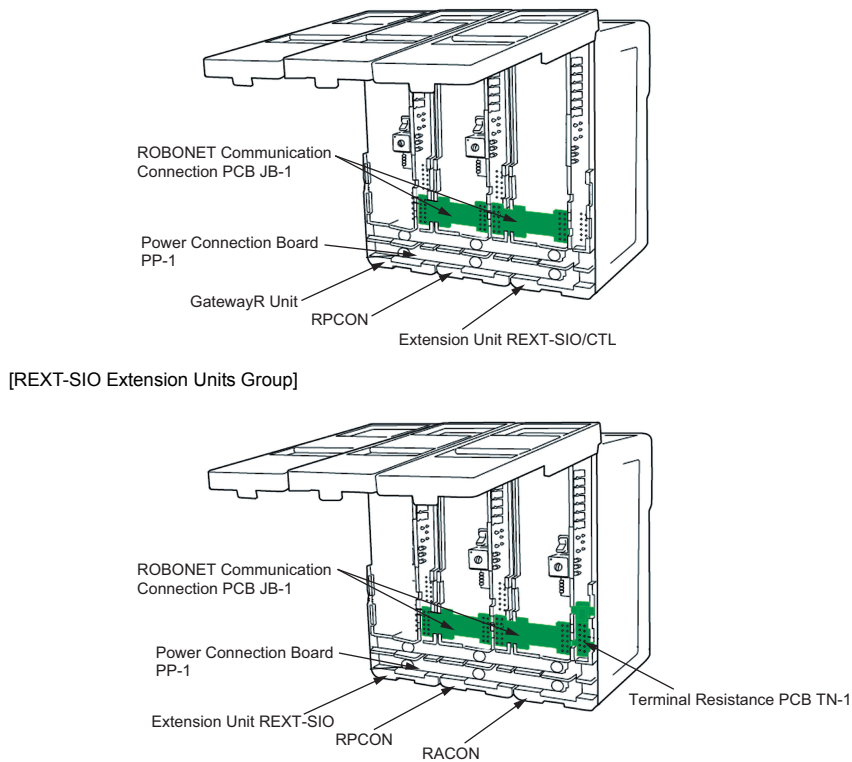
When an extension is required, the extension unit is to be placed on the most right side of the group of the units constructing ROBONET. Use the ROBONET communication connection PCB (JB-1) and the power connection board (PP-1) to connect it.

When using REXT-SIO, the extension unit in the other group of the units is to be installed on the most left side, and RCON and RPCON units are to be connected using the ROBONET communication connection PCB (JB-1) and the power connection board (PP-1).

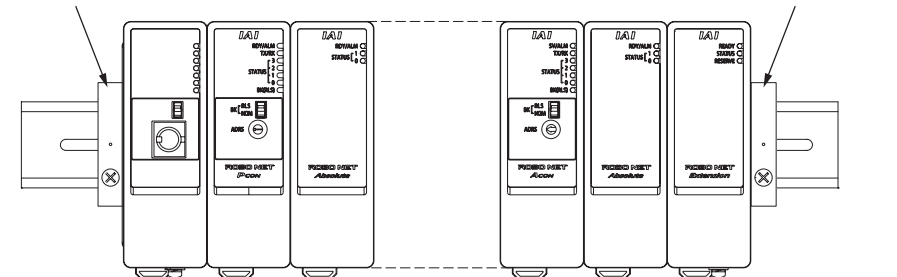
FG line on each unit can be joined by fitting the units closely. Install the units tightly and securely together using (generally purposed) DIN rail end plates at each side of the installation.

When using the extension unit, each group of the units or connected controller needs grounding

When using the extension unit, each group of the units or connected controller needs grounding separately.



End Plate (Prepare a general-purposed item.)

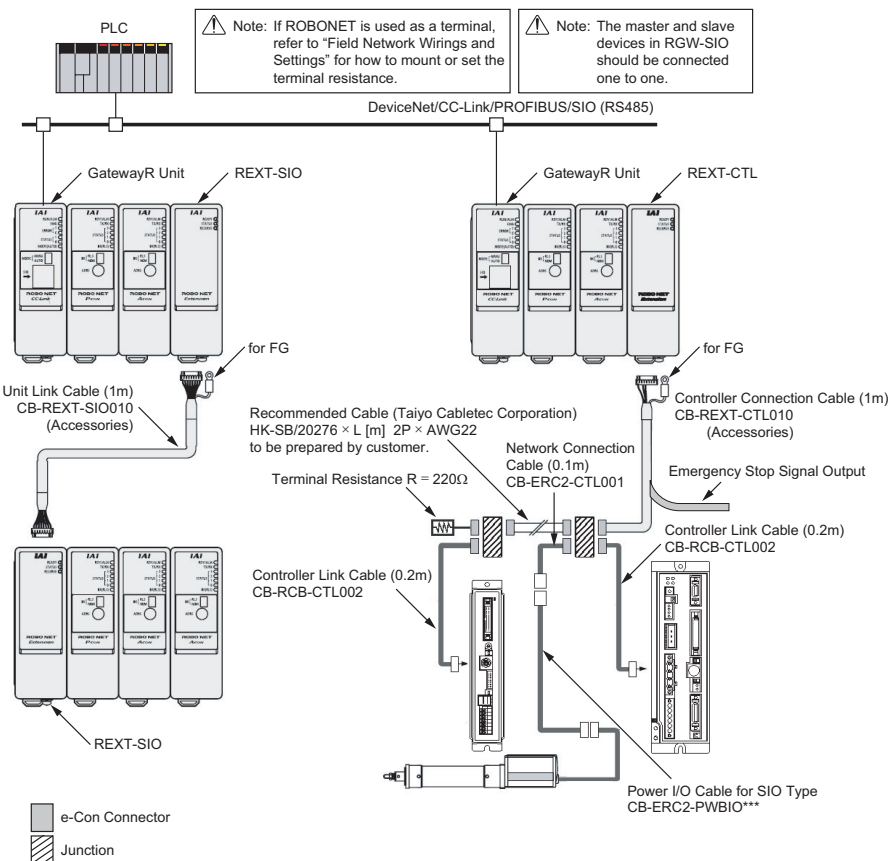


 Note : There may be a communication error occurred on the unit side in the following cases:

- 1) FG line contact is not appropriate (the joint of each unit is not close enough)
- 2) ROBONET communication connection PCB (JB-1) or terminal resistance PCB (TN-1) is not equipped or contacted improperly

Also, if the connection of the power connection board (PP-1) is improper, it may cause an abnormal current or noise generation on the power supply. Make sure to correctly install the unit.

System Configuration (Example)



⚠ Note : Have the 0V line on 24V power supply for each controller in common (to make the electric potential in the same level). (SCON is excluded.)
Unit link cable and controller connection cable are to be connected to output from the bottom of the extension unit and input from top of the extended unit as shown in the figures above. The system would not function if the cable is connected in the opposite way.


For the details of the following contents, refer to First Step Guide or Instruction Manual (CD/DVD) of each unit.

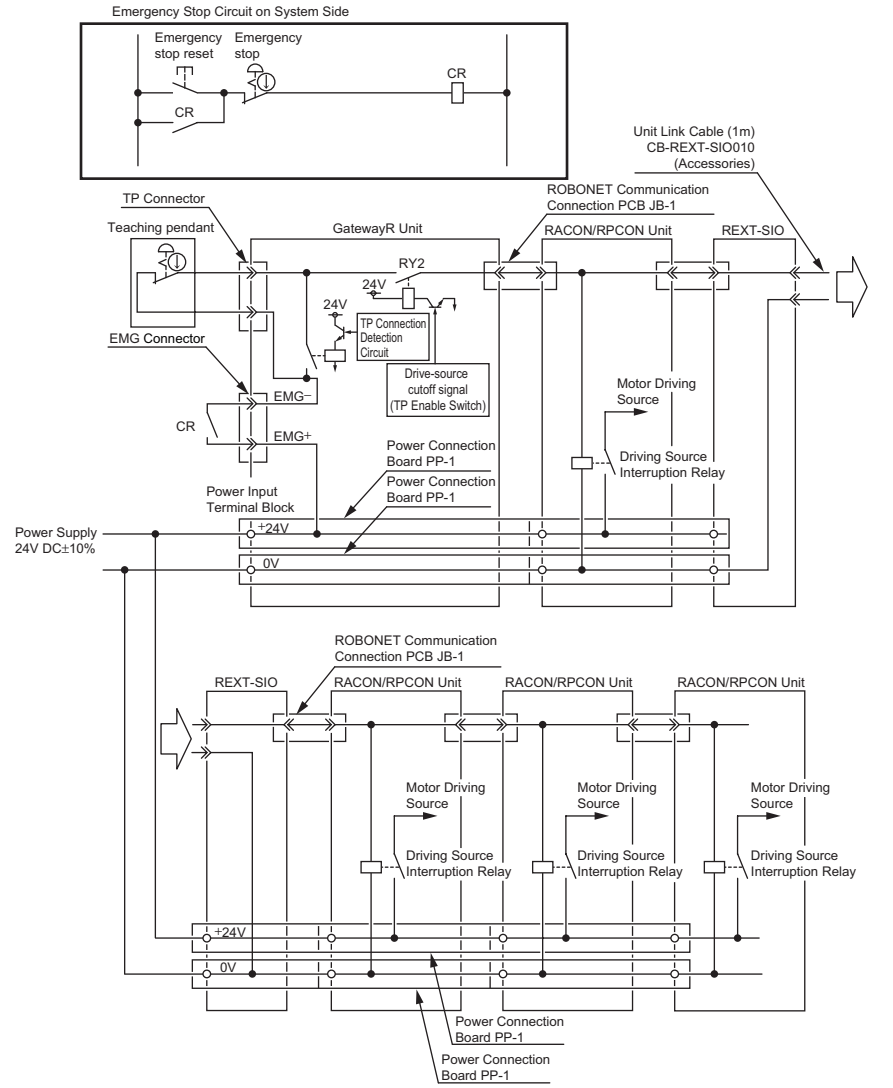
- | | |
|---------------------------------------|---------------------------------|
| (1) Network Connection | GatewayR Unit |
| (2) Connection of each actuator | RPCON/RACON/PCON/ACON/SCON/ERC2 |
| (3) For absolute type | Simple Absolute Unit |

Power Supply and Emergency Stop Circuit

1. When Using REXT-SIO

When having an emergency stop, connect the emergency stop signal on the system side to EMG connector on Gateway R Unit. CR is an emergency stop relay for the entire system.

 Warning : The teaching pendant provides emergency stop functionality for all of the actuators connected to the ROBOTNET, but does not provide an interface to extend this capability to an integrated system.




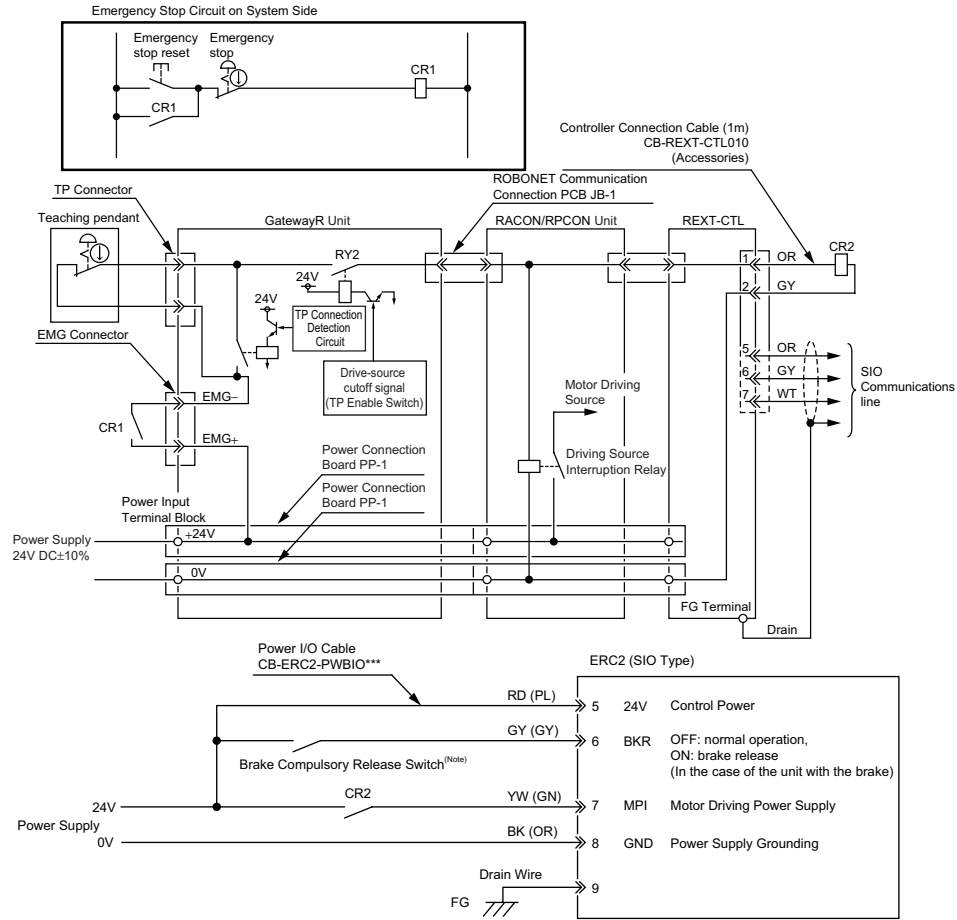
CR Contact Capacity : 24V DC 160mA or more
CR Load Current : $160\text{mA} \geq 10\text{mA} (\text{current consumption caused by emergency stop circuit of each unit}) \times \text{Total Number of RPCON/RACON Units}$

 Note : It is better to have the same power supply applied for GatewayR unit and the extended unit. When it is not possible to have the same power supply, make sure to have 0V line in common (to make the electric potential in the same level).

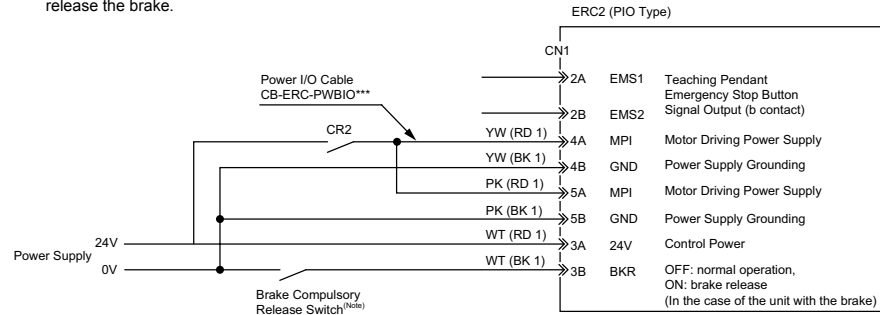
2. When Using REXT-CTL

When having an emergency stop, connect the emergency stop signal on the system side to EMG connector on Gateway R Unit. CR1 is an emergency stop relay for the entire system. Apply Relay CR2 when having an emergency stop for ERC2, PCON-CF or SCON connected to ROBONET executed with the teaching pendant connected to GatewayR unit.

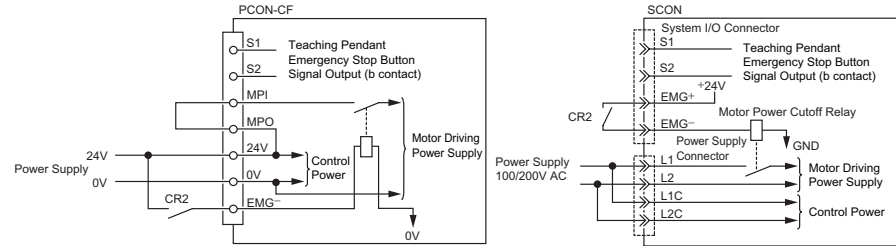
 **Warning :** The teaching pendant provides emergency stop functionality for all of the actuators connected to the ROBOTNET, but does not provide an interface to extend this capability to an integrated system.




The cable colors indicated in brackets are for a robot cable.
(Note) When a compulsory brake release is required, put a switch between BKR and 24V switch it to the ON position to release the brake.



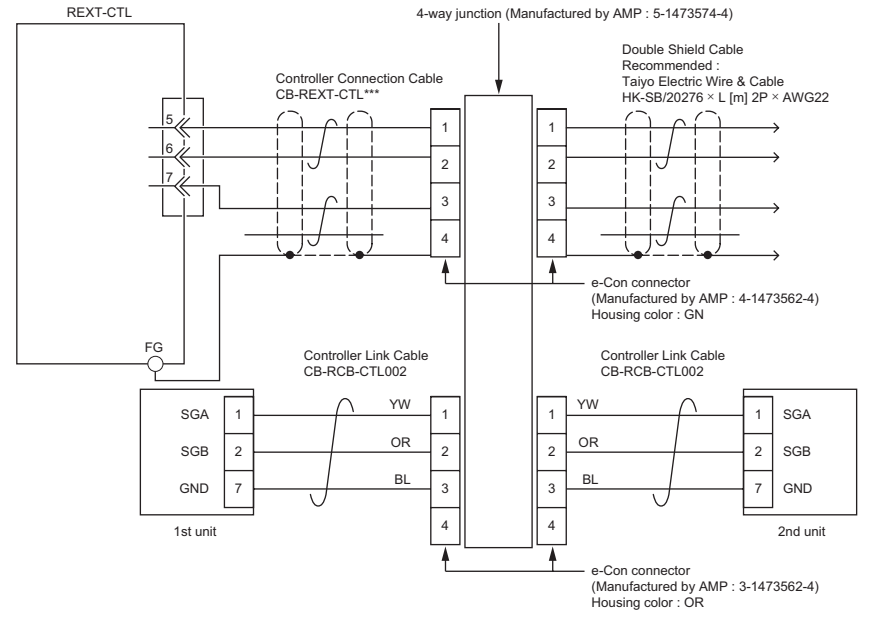
The cable colors should be the same when a robot cable is applied.
(Note) When a compulsory brake release is required, put a switch between BKR and 0V switch it to the ON position to release the brake.



<p>CR1 Contact Capacity : 24V DC 10mA (current consumption caused by emergency stop circuit of each unit) × Total Number of RPCON/RACON Units + CR2 inductor current</p> <p>CR2 Contact Capacity : Refer to the instruction manual (CD/DVD) of each controller for the details of the emergency stop for ERC2, PCON-CF and SCON controllers and the voltage current applied to CR2.</p>


 Note : Have the same power supply applied to GatewayR unit and the extended 24V-related controller. When it is not possible to have the same power supply, make sure to have 0V line in common (to make the electric potential in the same level).

SIO Communication Line Wiring Layout (REXT-CTL)

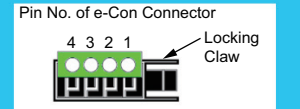
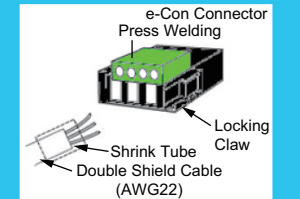
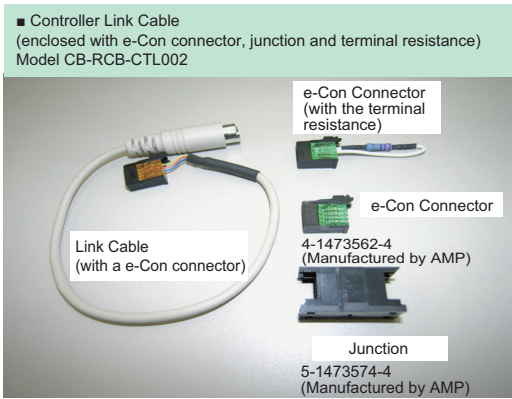


It is permitted to use terminal block connections instead of a 4-way junction.

Use a terminal block connection or direct-joint connection if there is a concern that a faulty connection may occur as a result of using the e-Con connector.

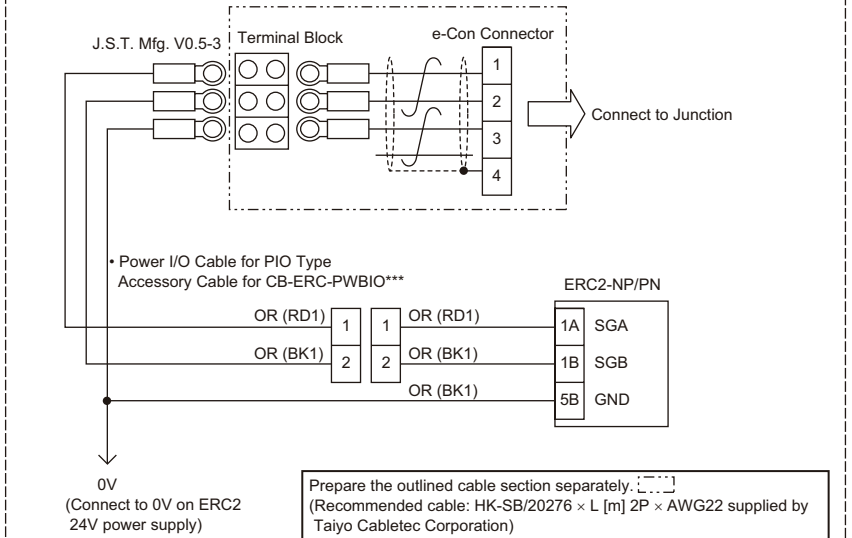


The diagram shows a cross-section of a cable with four conductors being inserted into a green terminal block. The conductors are labeled 1, 2, 3, and 4. The terminal block is labeled 'e-Con Connector Press Welding'.



- Make sure to select the right cable size.
- Do not peel off the sheath.

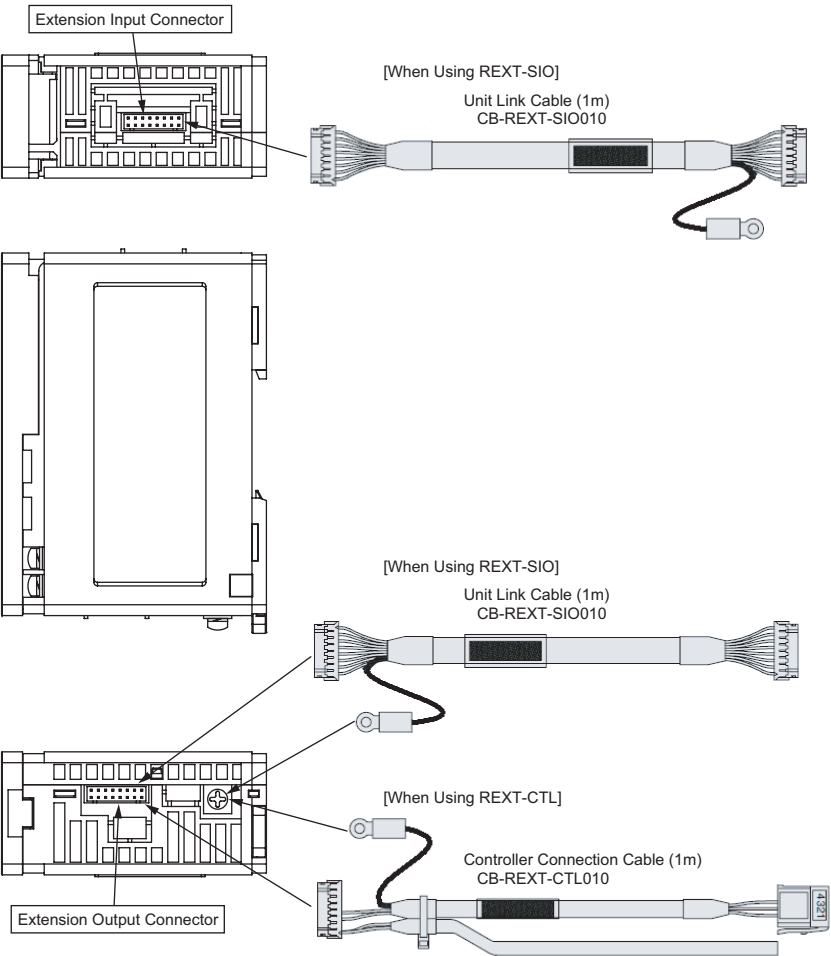
For ERC2 (PIO type)
For SIO Type, connection to a 4-way junction is available with the network connection cable (CB-ERC2-CTL001).
For PIO Type, perform the wiring as shown below with using a device such as a terminal block.



Prepare the outlined cable section separately.

(Recommended cable: HK-SB/20276 × L [m] 2P × AWG22 supplied by Taiyo Cabletec Corporation)

Wiring of Extension Cables



⚠ Note : Unit link cable and controller connection cable are to be connected to output from the bottom of the extension unit and input from top of the extended unit as shown in the figures above. The system would not function if the cable is connected in the opposite way.

Starting Procedures

When using this product for the first time, refer carefully to GatewayR Unit First Step Guide or ROBONET Instruction Manual (CD/DVD) and make sure not to make any omission in check items or wiring layout.

Troubleshooting



LED	Color	Description	
READY	GN	Normal condition	
	OFF	24V DC ROBONET power is not supplied, or an internal power supply error is occurred. Please contact us if the LED does not illuminate even when the 24V DC power is supplied properly.	
STATUS	GN	The extension cable is not connected to the input and output (top and bottom) connectors at the same time.	This LED shows the status of the extension cable connection.
	RD	The extension cable is connected to the input and output (top and bottom) connectors at the same time. (Wiring layout error)	This unit is equipped with connectors for an extension cable on the top and bottom. The connector at the top is used only for REXT-SIO on the extended side while the connector on the bottom is only for REXT on the extension side.
	OFF	The cable is connected to neither of input or output (top or bottom) connector. (Wiring layout error)	
RESERVE	OFF	This LED is not for use. It should be always off.	



IAI Corporation

Head Office: 577-1 Obane Shimizu-KU Shizuoka City Shizuoka 424-0103, Japan
TEL +81-54-364-5105 FAX +81-54-364-2589
website: www.iai-robot.co.jp/

Technical Support available in USA, Europe and China

IAI America, Inc.

Head Office: 2690 W. 237th Street, Torrance, CA 90505
TEL (310) 891-6015 FAX (310) 891-0815
Chicago Office: 1261 Hamilton Parkway, Itasca, IL 60143
TEL (630) 467-9900 FAX (630) 467-9912
Atlanta Office: 1220 Kennestone Circle, Suite 108, Marietta, GA 30066
TEL (678) 354-9470 FAX (678) 354-9471
website: www.intelligentactuator.com

IAI Industrieroboter GmbH

Ober der Röth 4, D-65824 Schwalbach am Taunus, Germany
TEL 06196-88950 FAX 06196-889524

IAI (Shanghai) Co., Ltd.

SHANGHAI JIAHUA BUSINESS CENTER A8-303, 808, Hongqiao Rd. Shanghai 200030, China
TEL 021-6448-4753 FAX 021-6448-3992
website: www.iai-robot.com