

RCON-GW/GWG, RCON-GW-TR

Motion Gateway Unit, Terminal Unit

First Step Guide Second Edition

Thank you for purchasing our product.
 Make sure to read the Safety Guide and detailed Instruction Manual as well as this First Step Guide to ensure correct use.
 This Instruction Manual is original.

Warning: Read the instruction manual carefully and follow instruction manual when handling this product.
 Please download instruction manual from our website.
 You can download it free of charge. User registration is required for the first time downloading.
[URL www.iai-robot.co.jp/data_dl/CAD_MANUAL/](http://URL.www.iai-robot.co.jp/data_dl/CAD_MANUAL/)
 Keep a printout of the introduction manual near the equipment in which this product is installed so that it can be checked at all times, or display it on your computer, tablet terminal, etc. so that you can check it immediately.
 If you need a bound copy of the instruction manual, order it from the nearest sales office listed in the First Step Guide or at the end of the instruction manual. It will be provided for a fee.

- 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.

RCON System is constructed not only with the Gateway Unit (RCON-GW/GWG) and Terminal Unit (RCON-GW-TR) that are explained in this manual, but also with Driver Unit (RCON-PC/PCF/AC/DC/SC), Power Supply Unit (RCON-PS2), Simple Absolute Unit (RCON-ABU), Fan Unit (RCON-FU), Extension Unit (RCON-EXT) and SCON Controller (SCON-CB/*-RC) to connect to the extension unit. For RCON-LC/LCG, PIO unit (RCON-NP/PN) and PIO/SIO/SCON extension unit (RCON-EXT-NP/PN) can be connected. Please refer to First Step Guide and Instruction Manual of each device for additional instruction related to that device. Gateway Unit is a communication unit to be connected to the field network and must be located on the left end of the RCON System. The terminal unit is a terminal resistor that should be allocated at the right end of RCON System.



Product Check

This product is comprised of the following parts if it is of standard configuration.
 If you find any fault in the contained model or any missing parts, contact us or our distributor.

1. Parts

No.	Part Name	Model	Number	Remarks
1	RCON Gateway Unit	Refer to "How to read the model plate", "How to read the model code"	1	
Accessories				
2	Terminal Unit (Terminal Resistance)	RCON-GW-TR	1	Select-TRN (with no terminal unit) in the option if it is not necessary
3	Fan Unit	RCON-FU	*1	*1 Indicate number of units in the option
4	System I/O Connector	DFMC1.5/5-ST-3.5 (Manufactured by PHOENIX CONTACT)	1	Recommended Cable Size 0.2 to 1.25mm ² (AWG24 to 16)
5	Dummy Plug	DP-5	1	For the safety category compliant type
6	First Step Guide	ME0433	1	This Manual
7	Safety Guide	M0194	1	

(4) System I/O Connector (5) Dummy Plug



2. Teaching Tool (Please purchase separately)

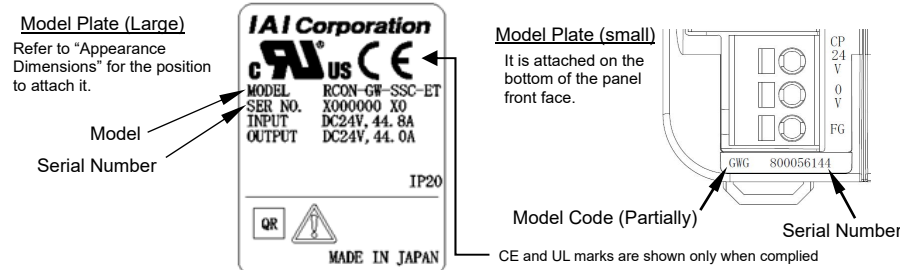
A teaching tool such as PC software is necessary when performing the setup for position setting, parameter setting, etc. that can only be done on the teaching tool. Please prepare either of the following teaching tools.

No.	Part Name	Model
1	PC Software (Includes USB Exchange Adapter + USB Cable + Peripheral Communication Cable)	RCM-101-USB
2	Touch Panel Teaching Pendant TB-02 (Standard/ Dead Man's Switch Mounted)	TB-02/TB-02D
3	Touch Panel Teaching Pendant TB-03	TB-03

3. Instruction Manuals Related to This Product

No.	Name	Manual No.
1	RCON System Instruction Manual	ME0384
2	SCON-CB/CGB/LC/LCG Controller Instruction Manual	ME0340
3	PC Software RCM-101-MW/RCM-101-USB Instruction Manual	ME0155
4	RCON MECHATROLINK-III Instruction Manual	ME0426
5	RCON EtherCAT Motion Instruction Manual	ME0427
6	RCON SSCNET III/H Instruction Manual	ME0428
7	Touch Panel Teaching Pendant TB-02 Applicable for Position Controller Instruction Manual	ME0355
8	Touch Panel Teaching Pendant TB-03 Wired Link Applicable for Position Controller Instruction Manual	ME0376

4. How to read the model plate



Mark	Explanation of Mark
	Use IAI specified cables only.

5. How to read the model code

RCON - GW - ECM - FU4 - **

< Series > **RCON - GW - ECM - FU4 - ****

<Type>
 GW : Standard Type
 GWG : Safety Category Compliant Type

<I/O Type>
 ECM : EtherCAT Motion Connection Type
 ML3 : MECHATROLINK-III Connection Type
 SSN : SSCNET III/H Connection Type

<Option>
 ET : Equipped with Ethernet
 FU* : Equipped with Fan Unit
 (* : Indicate number of units to mount from 1 to 8 after FU)
 TRN : With No Terminal Unit

<Identification for IAI use only>
 * There is no identification in some cases

Basic Specifications

1. Specifications of Power Supply

Item	Specification
Power Input Voltage Range	24V DC $\pm 10\%$
Supply Current	Refer to "Current Amperage" in RCON Driver Unit First Step Guide (ME0383)
Current Amperage	Refer to "Current Amperage" in RCON Driver Unit First Step Guide (ME0383)
In-Rush Current	Refer to "Current Amperage" in RCON Driver Unit First Step Guide (ME0383)
Instantaneous Power Outage Endurance	By 24V power supply
Protection Function against Electric Shock	Class III

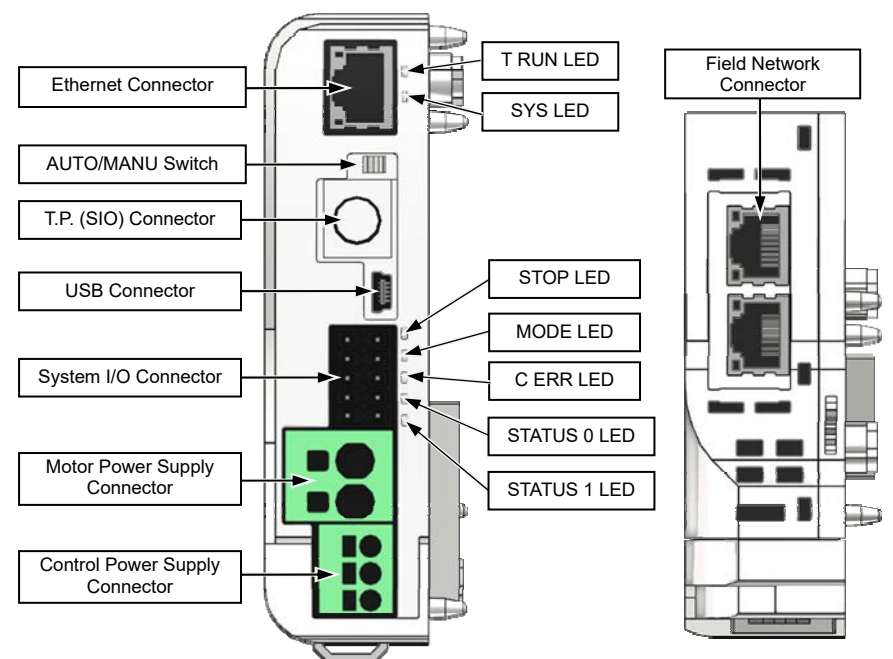
2. Specifications of Control Part

Item	Specification
Number of Controlled Axes	1 to 8 axes
Data Memory System	Parameters are saved in the nonvolatile memory. (There is no limitation in number of writing)
SIO Interface (T. P. Connector)	Communication System: RS-485, Baud Rate: 9.6/19.2/38.4/57.6/115.2/230.4kbps
SIO Interface (USB Connector)	Communication System: USB, Baud Rate: 12Mbps
PIO Interface	None
Conformed Extension I/O Interface (Field Network Interface)	MECHATROLINK-III, EtherCAT Motion, SSCNET III/H
Pulse Train Type	Unavailable to Control
Brake Output Voltage	24V DC $\pm 10\%$
Calendar Feature	Maintained Duration: Approx. 10 days, Charge Time: Approx. 100 hours
Applied Safety Category	B (Safety category applicable type is capable to achieve 4 with external circuit)
Driver Source Cutoff System	Drive source cutoff with semiconductor (Power MOSFET)
Stop Input	Break Contact Input
Stop Action	Turning servo OFF + Drive source cutoff
Enable Input	None
T. P. Enable Input	Available
Enable Action	Turning servo OFF
Protective functions	Overcurrent, temperature error, encoder line breakage and overload
Preventive / Predictive Maintenance Feature	Electrolytic capacitor capacity dropdown and Fan revolution dropdown
LED Display	Refer to section in "Troubleshooting (LED Display)"
Brake Compulsory Release Feature	Brake release switch equipped on driver unit
Jog	Jog switch equipped on driver unit
Oversea Certifications	CE Marking, UL Standard

3. Environmental Specifications

Item	Specification
Environment of Use	Pollution Degree 2
Surrounding Air Temperature	0 to 55°C
Surrounding Humidity	5% RH to 85% RH (Should be no-condensing or freezing)
Peripheral Ambience of Use	Refer to "Installation Environment"
Surrounding Storage Temperature	-20 to 70°C
Vibration Durability	Frequency 10 to 57Hz/Swing width: 0.075mm Frequency 57 to 150Hz/Acceleration: 9.8m/s ² XYZ Each direction Sweep time: 10min. Number of sweep: 10times
Protection Class	IP20
Altitude	1000m
Cooling Method	Natural air-cooling
Dielectric Withstanding Voltage	Between power supply terminal and FG 500V DC 10M Ω or more

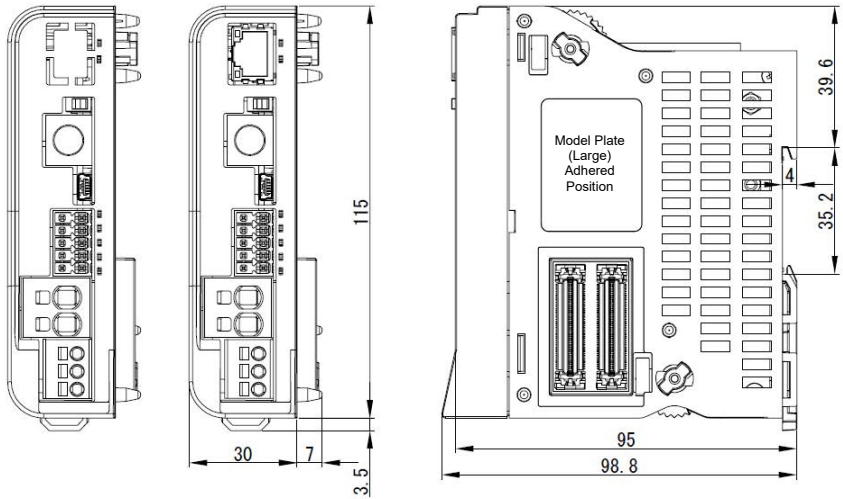
Names for Each Part



External Dimensions

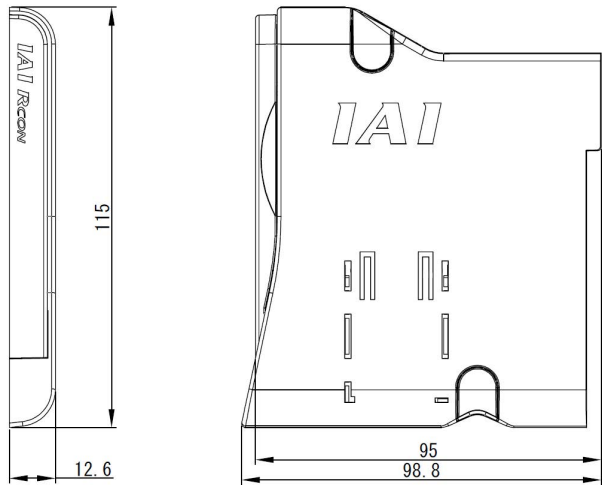
1. Gateway Unit

Item	Specification
External Dimensions	30W × 115H × 95D [mm]
Mass	Approx. 157g



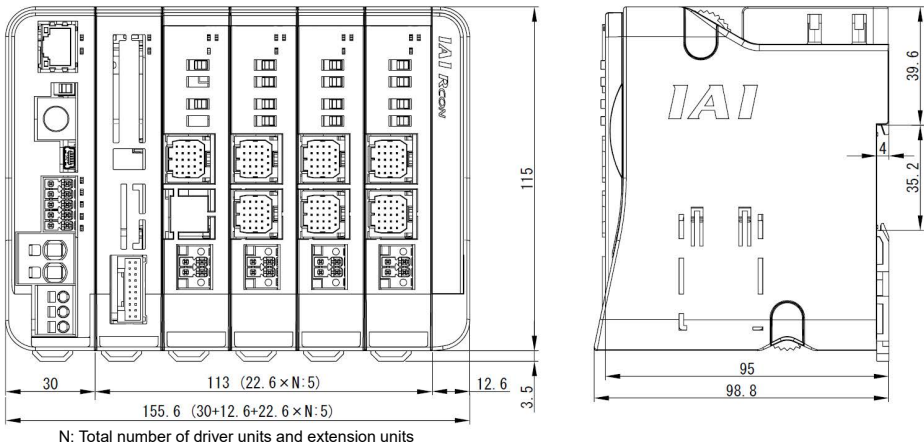
2. Terminal Unit

Item	Specification
External Dimensions	12.6W × 115H × 95D [mm]
Mass	Approx. 49g



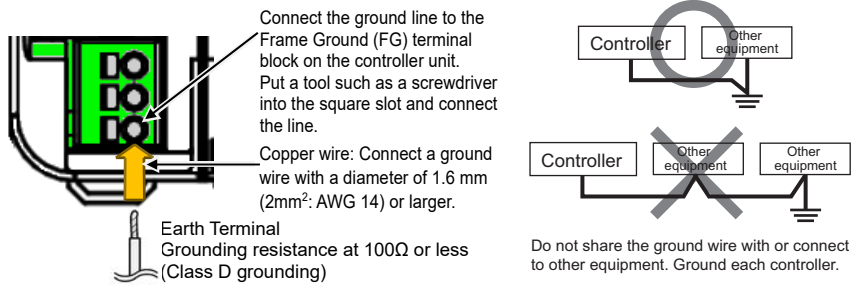
3. Linking Units

Item	Specification
External Dimensions	(42.6 + 22.6 × N) W × 115H × 95D [mm] N: Total number of driver units and extension units
Mass	Approx. (206 + 180 × N1 + 99 × N2) g N1: Number of driver units, N2: Number of extensions units



Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)



2. Precautions regarding wiring method

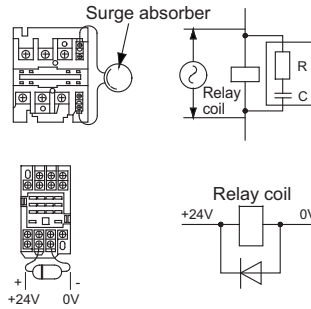
- 1) Wire is to be twisted for the 24V DC power supply.
- 2) Separate the signal and encoder lines from the power supply and power lines.

3. Noise Sources and Elimination

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

The following are examples of measures to eliminate noise sources.

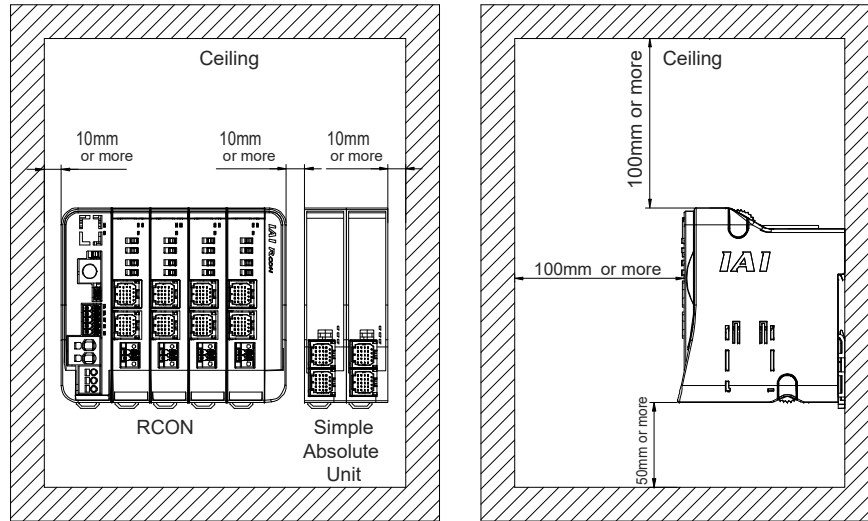
- 1) AC solenoid valves, magnet switches and relays
[Measure] Install a Surge absorber parallel with the coil.
- 2) DC solenoid valves, magnet switches and relays
[Measure] Consider whether to attach a diode in parallel to the coil or to use a diode built-in type.



4. Cooling Factors and Installation

Follow the specifications and dimensions shown below when you design and build a control board.

Item	Specification	Item	Specification
Installation Orientation	Vertical Orientation (Air outlet upwards)	Surrounding Air Temperature	0 to 55°C (Refer to section of "Current Amperage" in ME0383)
Installation Method	Attached on DIN Rails	Derating	equipped when with no fan unit
Installation Condition	See figure below	Grounding	Class D grounding



* Simple absolute units can be installed in close contact with each other.

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 ambient temperature is out of the range between 0 and 55°C (with fan) or 0 and 40°C (with no fan)
- Location where condensation occurs due to abrupt temperature changes
- Location where relative humidity is out of range between 5%RH and 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]
- Place with an altitude of 1,000m or more

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

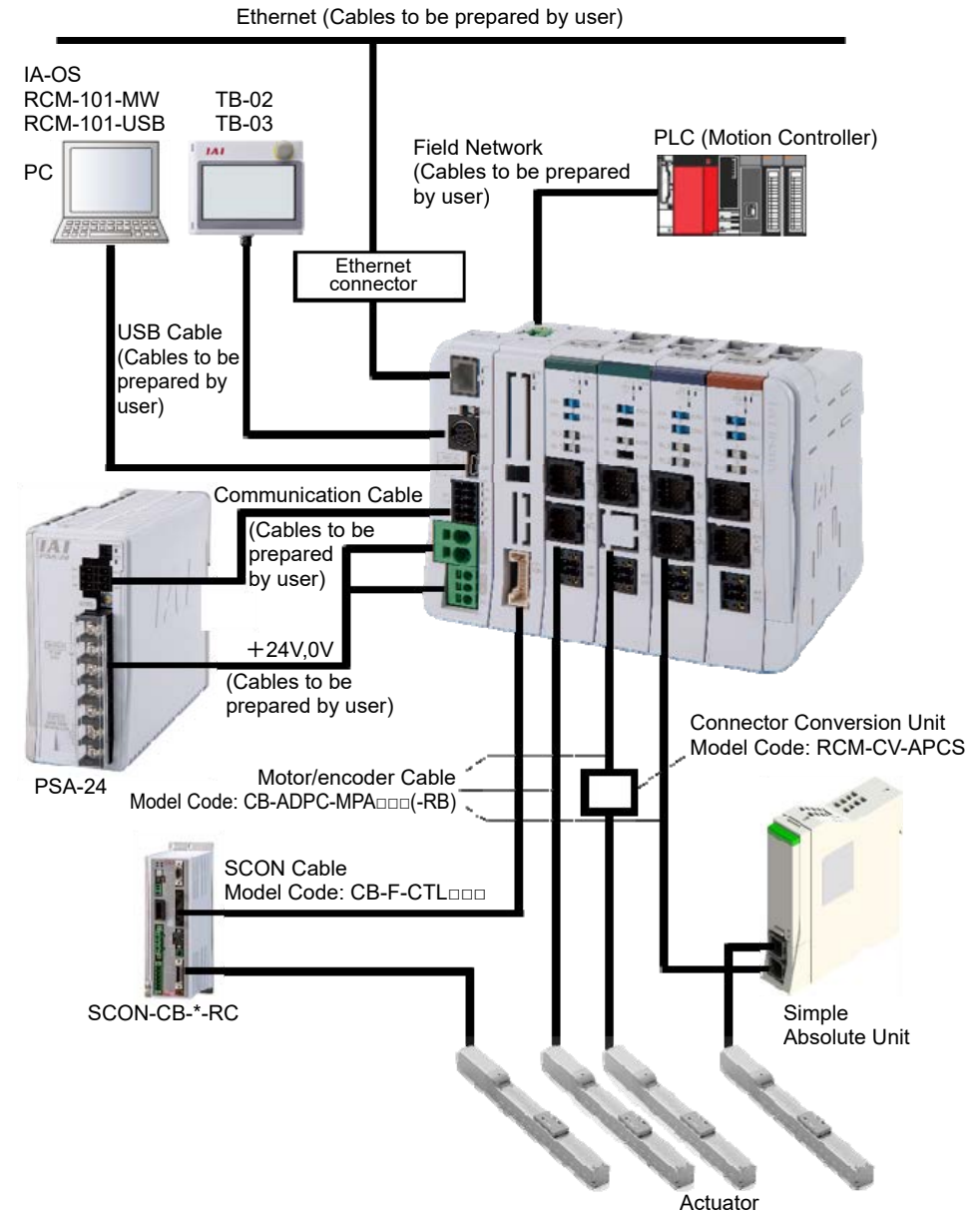
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

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 absorber 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.

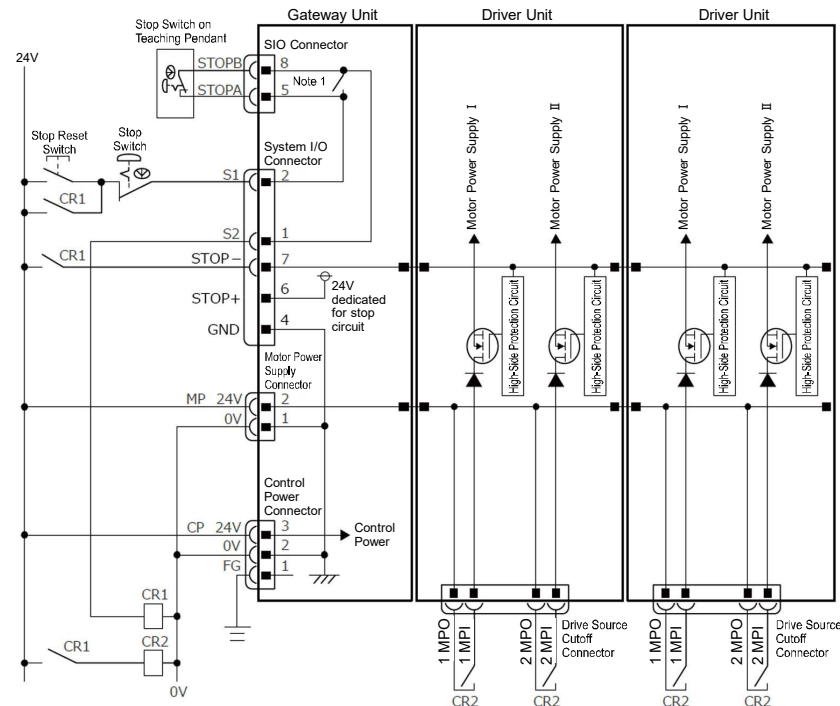
Connection to Peripheral Devices (Overall Wiring Diagram)



Power Supply and Stop Circuit (Example)

In the diagram below shows a circuit related to RCON drive source cutoff. For RCON, motor power is supplied from the gateway unit, but the circuit related to the drive-source cutoff is on the driver unit side.

- Each driver unit possesses an interface (Drive source cutoff connector: MPI/MPO) available for external drive source cutoff prepared for each axis.
- Each driver unit possesses a drive source cutoff circuit by semiconductor prepared for each axis. The motor power should be cut off by STOP Signal. The drive source cutoff circuit by semiconductor possesses features to detect the overcurrent and to limit the in-rush current.



Note 1 RCON-GW : If nothing is connected to the SIO connector, S1 and S2 will be short-circuited in the controller.
RCON-GWG : If nothing is connected to the SIO connector, S1 and S2 will not be short-circuited in the controller.
To short-circuit, connect the supplied dummy plug DP-5 to the SIO connector.

Note

- When externally shutting off the motor drive source to comply with the safety category or the like, connect a contact such as a relay to the wiring between the MPI* and MPO* terminals.
- The rating of the STOP-signal to be turned ON/OFF with the contact CR1 is 24 VDC / 10 mA or less.
- The CR1 coil current must be 0.1 A or less.
- When supplying power by turning ON/OFF 24 VDC, leave 0 V connected and supply/cut off +24 V.

 Warning : Note that the teaching pendant cannot have a stop for the system side even though it can have a stop for all the actuators connected to RCON unit.

Current Amperage

For current amperage, refer to the first step guide for RCON driver unit..

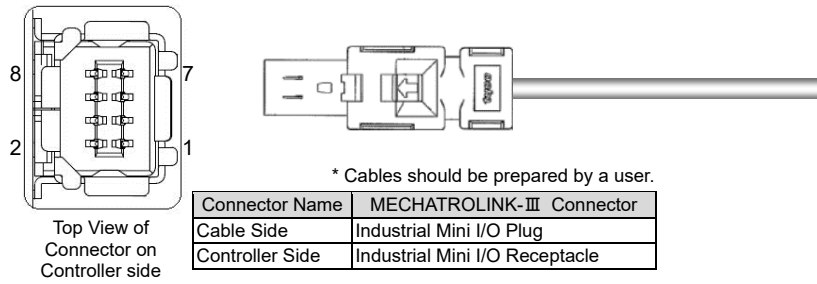
Item	Document Control
RCON 24V Driver Unit, Fan Unit, Simple Absolute Unit and Extension Unit First Step Guide	ME0383
RCON 200V Power Supply Unit, Driver Unit, Fan Unit, Terminal Unit First Step Guide	ME0397

Field Network Wirings and Settings

The field network connector is allocated on the top of the gateway unit. Refer to “Names for Each Part”.

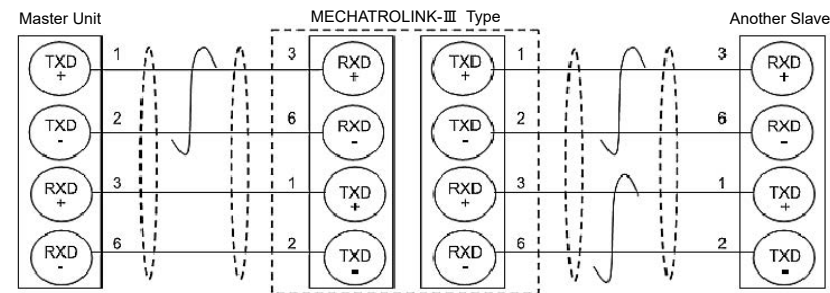
1. MECHATROLINK-III (RCON-GW/GWG-ML3)

Refer to the instruction manuals for the master unit and PLC to connect for the details.



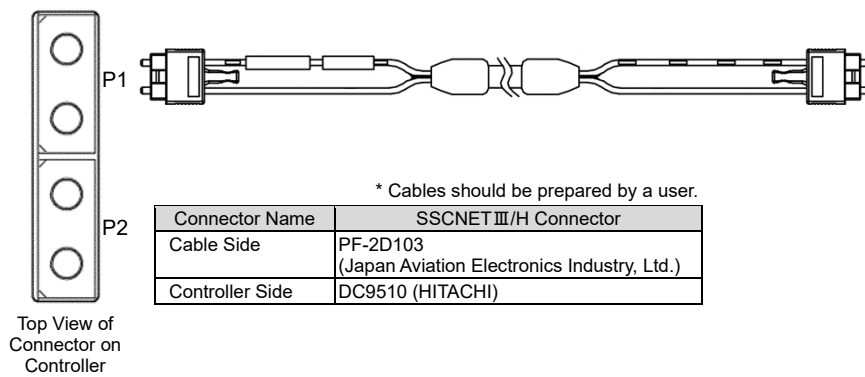
Connector Name	MECHATROLINK-III Connector
Cable Side	Industrial Mini I/O Plug
Controller Side	Industrial Mini I/O Receptacle

Pin No.	Signal Name	Description	Applicable cable diameter
1	TXD+	Data sending+	Dedicated cable for MECHATRO LINK-III
2	TXD-	Data sending-	
3	RXD+	Data receiving+	
4	-	Disconnected	
5	-	Disconnected	
6	RXD-	Data receiving-	
7	-	Disconnected	
8	-	Disconnected	

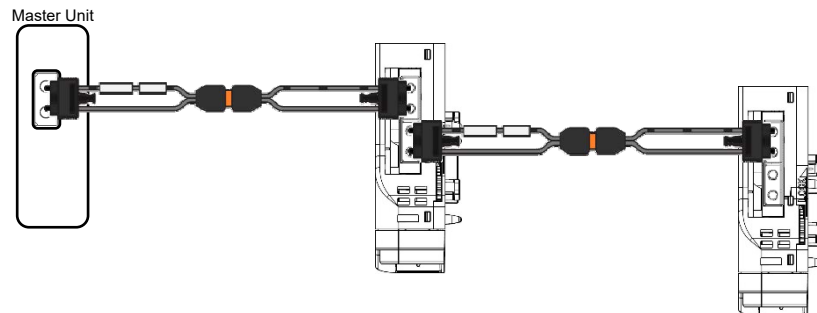


2. SSCNET III/H (RCON-GW/GWG-SSN)

Refer to the instruction manuals for the master unit and PLC to connect for the details.

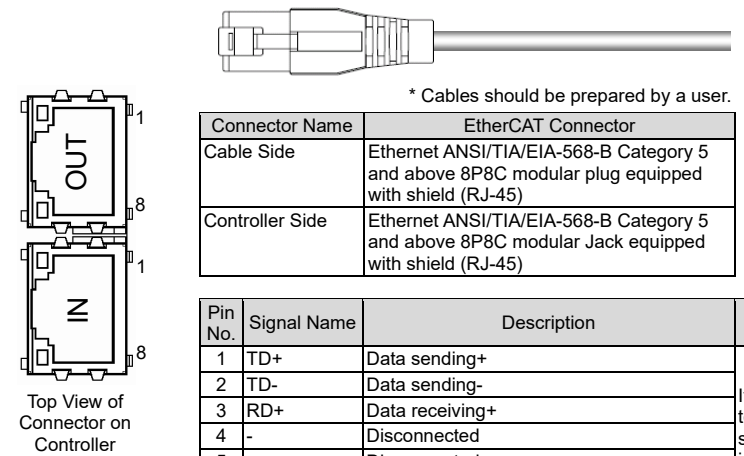


Connector Name	SSCNET III/H Connector
Cable Side	PF-2D103 (Japan Aviation Electronics Industry, Ltd.)
Controller Side	DC9510 (HITACHI)



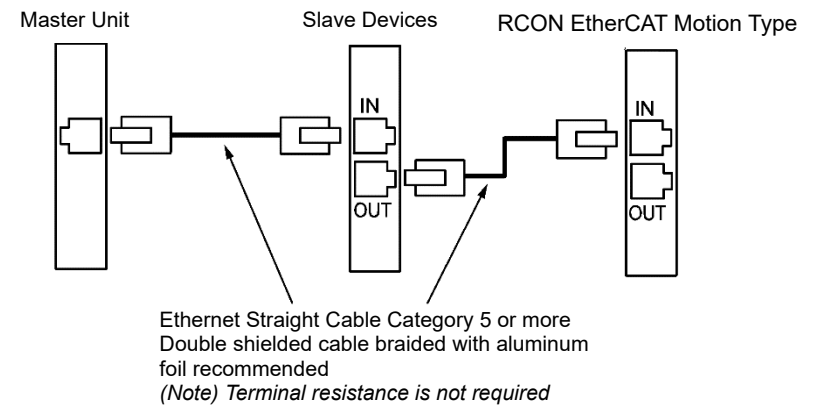
3. EtherCAT Motion (RCON-GW/GWG-ECM)

Refer to the instruction manuals for the master unit and PLC to connect for the details.



Connector Name	EtherCAT Connector
Cable Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular plug equipped with shield (RJ-45)
Controller Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular Jack equipped with shield (RJ-45)

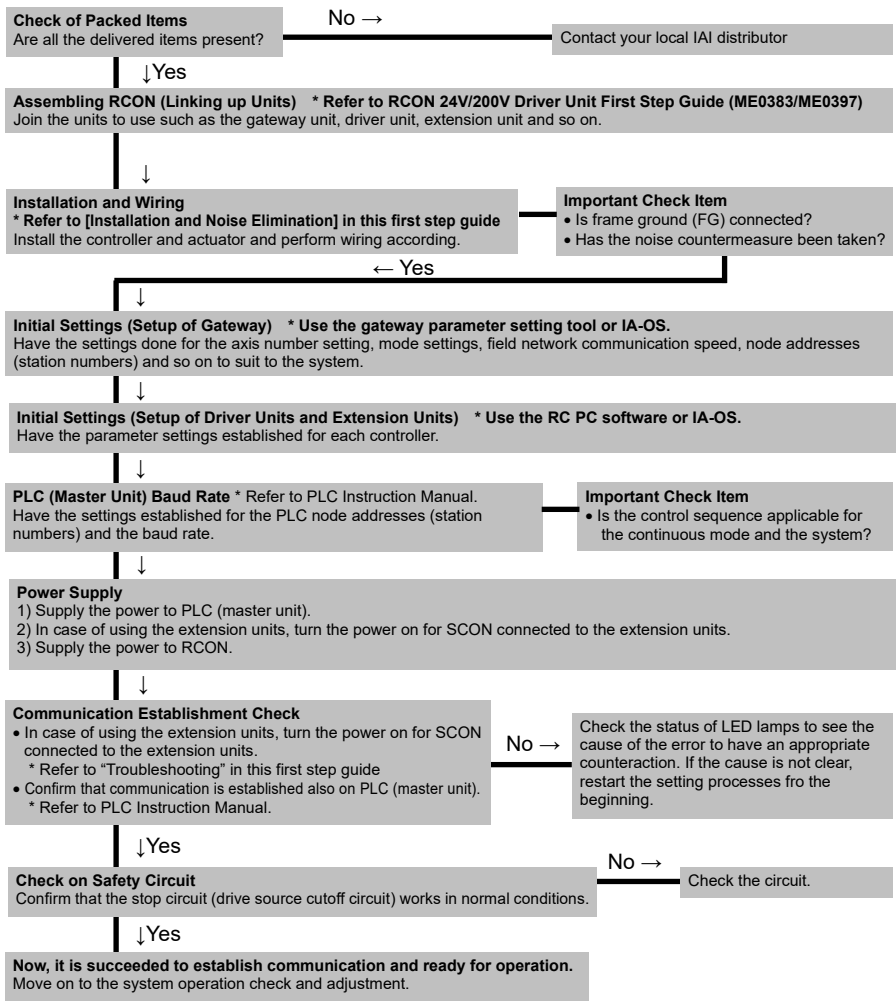
Pin No.	Signal Name	Description	Applicable cable diameter
1	TD+	Data sending+	It is recommended to prepare a straight STP cable in Category 5 or above for the Ethernet cable.
2	TD-	Data sending-	
3	RD+	Data receiving+	
4	-	Disconnected	
5	-	Disconnected	
6	RD-	Data receiving-	
7	-	Disconnected	
8	-	Disconnected	



Ethernet Straight Cable Category 5 or more
Double shielded cable braided with aluminum
foil recommended
(Note) Terminal resistance is not required

Starting Procedures

When using this product for the first time, make sure to avoid mistakes and incorrect wiring by referring to the procedure below.
In this section, explains how to start up especially for RCON controller. Follow an instruction manual for each device for how to link to other devices, controllers and actuators that are linked in the network.



Troubleshooting (LED Display)

On RCON Gateway Unit, there are the monitor LEDs for the field network and communication.
You can confirm the communication establishment and also communication errors on these LEDs.
Refer to "Names for Each Part" for the position and name of each LED lamp.

Panel Display	Color	Status	Explanation
T RUN	GN	Illuminating	Inside bus communication in normal conditions
		Flashing	Waiting for initializing communication
SYS	GN	Illuminating	Inside bus communication in error
	OR	Illuminating	Operating in normal conditions
STOP	RD	Illuminating	Gateway alarm being generated
		OFF	Confirmed STOP Signal input (driver unit drive source being cut off) No STOP Signal input confirmed
MODE	GN	Illuminating	In AUTO (automatic operation) Mode
		OFF	In MANU (manual operation) Mode

[Field Network Communication Conditions]

1. MECHATROLINK-III (RCON-GW/GWG-ML3)

Panel Display	Color	Status	Explanation
C.ERR	OR	Illuminating	Turns on when the communication alarm (warning excluded) occurs. Turns off when the alarm status gets cancelled. * It turns on even with an alarm occurred only on one axis.
		OFF	In normal condition (No communication alarm occurred on any axis)
CON	GN	Illuminating	Turns on when CONNECT received (connected condition with the master (PHASE 2 or higher), and turns off when DISCONNECT received or the controller rebooted. * It turns on even with connection established to one axis.
		OFF	Connection cannot be established with the master.
ERR	GN	Illuminating	Turns on when the command alarm (warning excluded) occurs. Turns off when the alarm status gets cancelled. * It turns on even with an alarm occurred only on one axis.
		OFF	In normal condition (No command alarm occurred on any axis)

2. SSCNET III/H (RCON-GW/GWG-SSN)

Panel Display	Color	Status	Explanation
C.ERR	OR	Illuminating	Turns off when the initial communication state has been finished and gets into the runtime state
RUN	GN	Illuminating	Starts the initial communication state
		OFF	At the network configuration state or lower
ERR	OR	Illuminating	Communication alarm occurred * It turns on even with an alarm occurred only on one axis.
		OFF	In normal condition (No alarm occurred), communication alarm canceled

3. EtherCAT Motion (RCON-GW/GWG-ECM)

Panel Display	Color	Status	Explanation
C.ERR	OR	Illuminating	Fieldbus communication error
RAN	GN	Illuminating	In normal operational condition (EtherCAT communication in operation)
		Flashing (continuously)	EtherCAT communication in pre-operation ON: 200ms / OFF: 200ms
		Flashing (twice)	EtherCAT communication in safe operation ON: 200ms / OFF: 1000ms
		Flickering	EtherCAT communication in "BOOT" condition
	OR	Illuminating	Module Error
ERR	GN/OR	OFF	Initializing in process (EtherCAT communication in initializing process) or power is turned off
		Illuminating	Communication component (module) error
		Flashing (continuously)	Communication setting error (The setting of the information acquired from the master cannot be established) ON: 200ms / OFF: 200ms
		Flashing (twice)	Synchronizing event error ON: 200ms / OFF: 1000ms
		Flashing (twice)	Circuit error on communication part (watchdog timer timeout) ON: 200ms × 2 / OFF: 1000ms
ERR	OR	OFF	No error or power is turned off



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