

RCON-GWG-NCN Gateway

First Step Guide First 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-NCN system is a driver non-connected RCON gateway unit (Hereinafter, RCON-NCN gateway or gateway unit), and it is a network system that connects the controller of our product (ACON/DCON/PCON/SCON series) by SIO communication.

For the handling of each unit, refer to the respective First Step Guide and User's Manual.

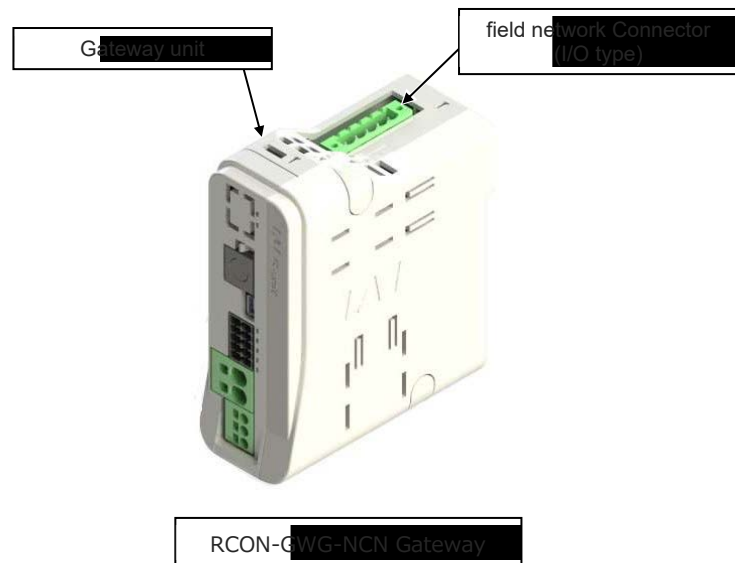
The RCON-NCN gateway is a unit for connecting the field network master unit of a high-level programmable logic controller (hereinafter referred to as PLC) to the controller of the RCON-NCN system, which is a subnetwork.

All data exchanged between each field network and Modbus communication protocol SIO communication network is stored once in the internal memory of the gateway unit and transmitted cyclically. The Gateway Unit is treated from the PLC side as

It is treated as a remote I/O.

Seven types of field networks are supported: CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS-DP, and PROFINET IO.

This manual describes the handling of the RCON-NCN Gateway



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	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)
3	Dummy Plug	DP-5	1	For the safety category compliant type
4	Termination resistor with e-CON connector	-		Resistance values: 220 Ω, 0.5W
5	CC-Link Connector (Enclosed for CC-Link Type)	MSTB2.5/5-STF-5.08 AU (Manufactured by PHOENIX CONTACT)	1	Terminal Resistance (130Ω/110Ω) enclosed one unit each Recommended Cable Size 0.3mm ² (AWG22)
6	DeviceNet Connector (Enclosed for DeviceNet Type)	MSTB2.5/5-STF-5.08 AU M (Manufactured by PHOENIX CONTACT)	1	Recommended Cable Size 0.3mm ² (AWG22)
7	First Step Guide	ME0457	1	This Manual
8	Safety Guide	M0194	1	

(2) System I/O Connector (3) Dummy Plug (4) Termination resistor with e-CON connector



(5) CC-Link Connector (6) DeviceNet Connector



2. Teaching Tool (Please purchase separately)

The following teaching tools are required to make settings such as gateway parameters.

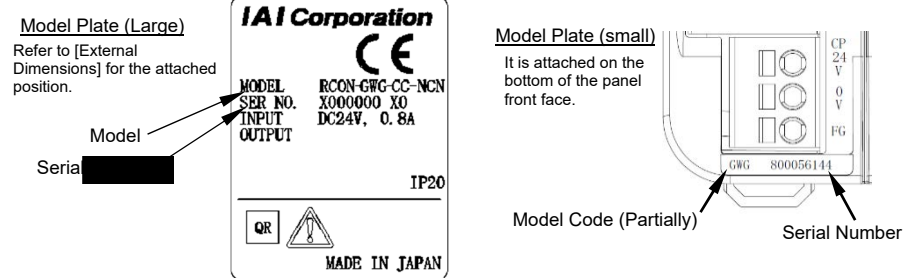
No.	Part Name	Model
1	PC Software IA-OS (Includes USB Exchange Adapter + USB Cable + Peripheral Communication Cable)	IA-OS

3. Instruction manuals related to this product

No.	Name	Manual No.
1	Fast Step Guide	ME0457
2	RCON gateway unit driver non-connection specification instruction manual	ME0456
3	PCON-CB/CBP Instruction Manual	ME0342
4	ACON-CB / DCON-CB Instruction Manual	ME0343
5	SCON-CB Instruction Manual	ME0340
6	PCON-CYB/PLB/POB Instruction Manual	ME0353
7	ACON_DCON-CYB/PLB/POB Instruction Manual	ME0354
8	IA-OS First Step Guide	ME0391
9	PSA-24 Instruction Manual	ME0379

* IA-OS is the only teaching tool that can be connected to the RCON-NCN gateway.

4. How to read the model plate



Mark	Explanation of Mark
	Use IAI specified cables only.

5. How to read the model code

RCON - GWG - PRT - NCN - **	
<Series>	<Identification for IAI use only> * There is no identification in some cases
<Type>	GW : Standard Type GWG : Safety Category Compliant Type LC : PLC Feature Equipped Type LCG : Safety Categories Complying PLC Feature Equipped Type
<Option>	NCN : Equipped with Ethernet (Note 1)
<I/OType>	CC : CC-Link Connection Type DV : DeviceNet Connection Type EC : EtherCAT Connection Type PR : PROFIBUS-DP Type CIE : CC-Link IE Field Connection Type EP : EtherNet/IP Connection Type PRT : PROFINET IO Connection Type

Note 1 Specifications other than NCN options cannot be selected.

Basic Specifications

1. Specifications of Power Supply

Item	state of affairs
Power Input Voltage Range	DC24V±10
Current Amperage	0.8A
Instantaneous Power Outage Endurance	By 24V power supply
Protection Function against Electric Shock	Class III

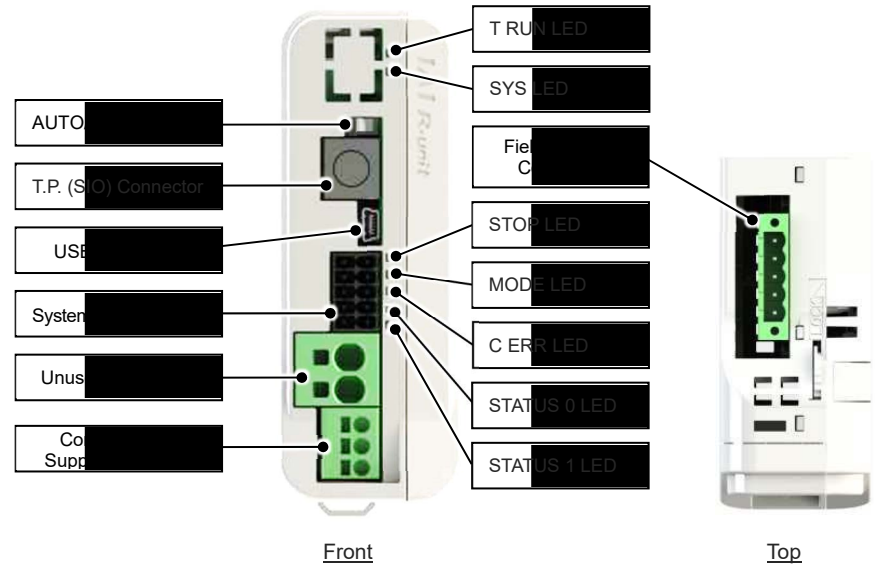
2. Specifications of Control Part

Item	state of affairs	
Number of Controlled Axes	1 to 16 axes (depending on the operation mode)	
Data storage	FRAM 256kbit	
PIO network interface	CC-Link, CC-Link IE Field, DeviceNet, EtherCAT, EtherNet/IP, PROFIBUS-DP, PROFINET IO	
Pulse train type	Uncontrollable	
SIO Interface (T. P. Connector)	Communication system	RS-485
	Band speed	9.6/19.2/38.4/57.6/115.2/230.4 kbps (Initial value is 115.2 kbps)
SIO Interface (USB Connector)	communication system	USB
	Band speed	12Mbps
SIO interface (between Gateway and Controller)	communication system	RS-485 (half-duplex communication)
	Band speed	230.4 kbps
	Communication cable length	Total cable length: 100m max.
	transmission path configuration	Our exclusive multi-drop differential communication
	synchronous idle	Asynchronous
Applied Safety Category	Safety category applicable type is capable to achieve 4 with external circuit	
stop input	B contact input	
stop action	Servo OFF + drive source shutdown, control communication to controller stopped	
Operation at Heavy Failure Alarm	Stop communication with controller	
LED Display	Refer to [Troubleshooting (LED Display)]	
Enable Input	None	
T.P. Enable Input	None	
Enable action	Servo OFF	
Dimensions	Refer to [Dimensions].	
Mass	Refer to [Dimensions].	
Overseas Certification	CE marking	

3. Environmental Specifications

Item		Specification
Environment	Environment of Use	Pollution Degree 2
	Surrounding Air Temperature	0 to 40°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/s² 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 10MΩ or more	

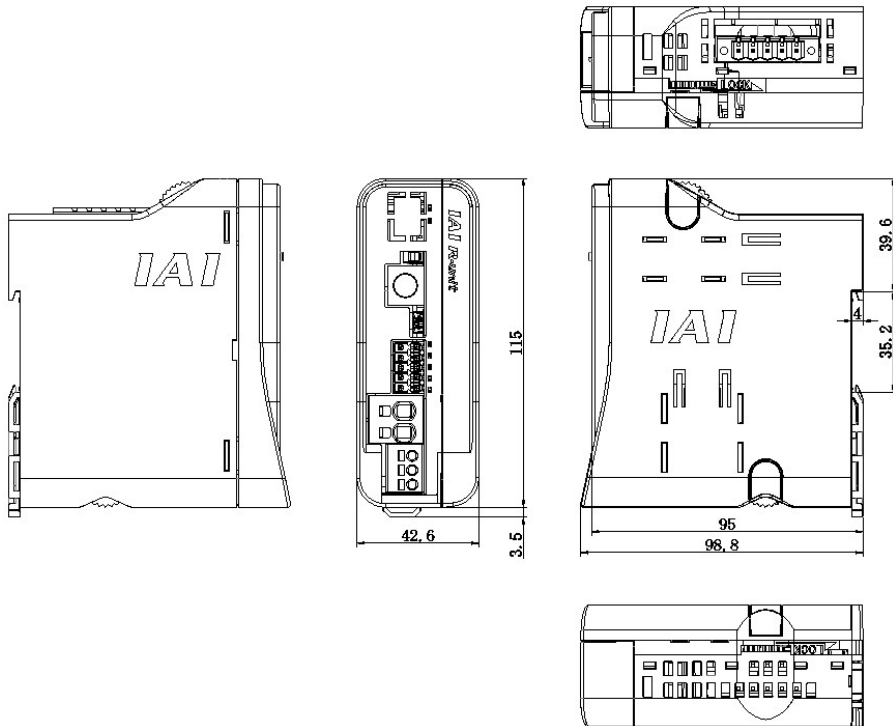
Names for Each Part



External Dimensions

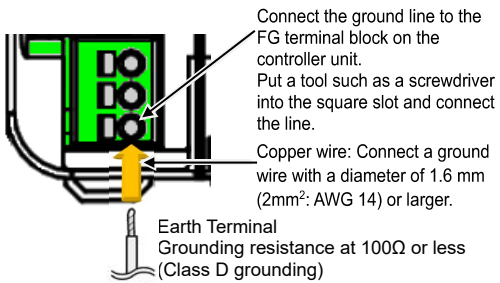
1. Gateway Unit

Item	Specification
External Dimensions	W42.6 × H115H × D95 [mm]
Mass	Approx. 190g



Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)



2. Precautions regarding wiring method

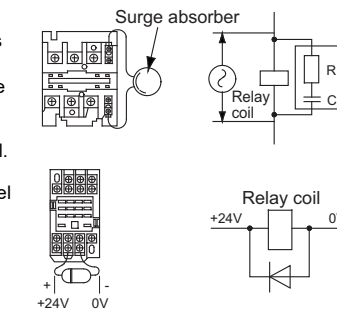
- 1) Wire is to be twisted for the 24V DC power supply.
- 2) Separate the signal and encoder lines from the power supply and power lines.

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.

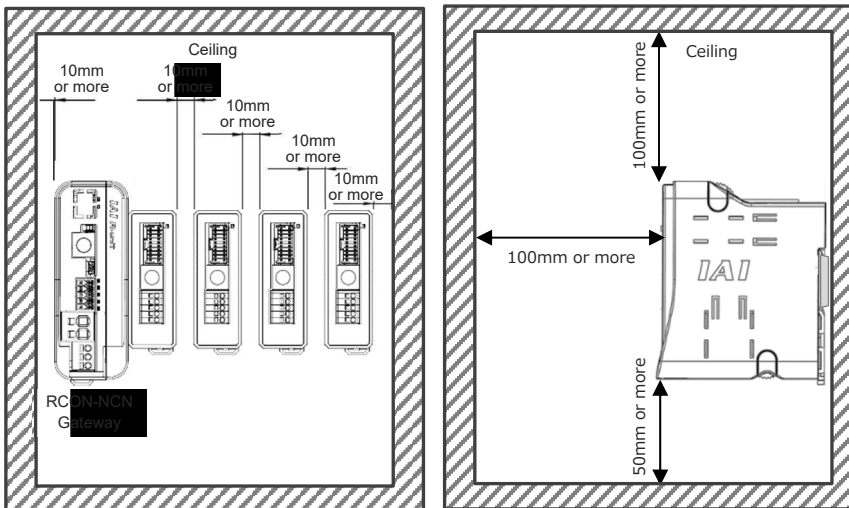
- 1) AC solenoid valves, magnet switches and relays
[Measure] Install a Surge absorber parallel with the coil.
- 2) DC solenoid valves, magnet switches and relays
[Measure] Consider whether to attach a diode in parallel to the coil or to use a diode built-in type.



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 40°C
Installation Method	Attached on DIN Rails		
Installation Condition	See figure below	Grounding	Class D grounding



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.

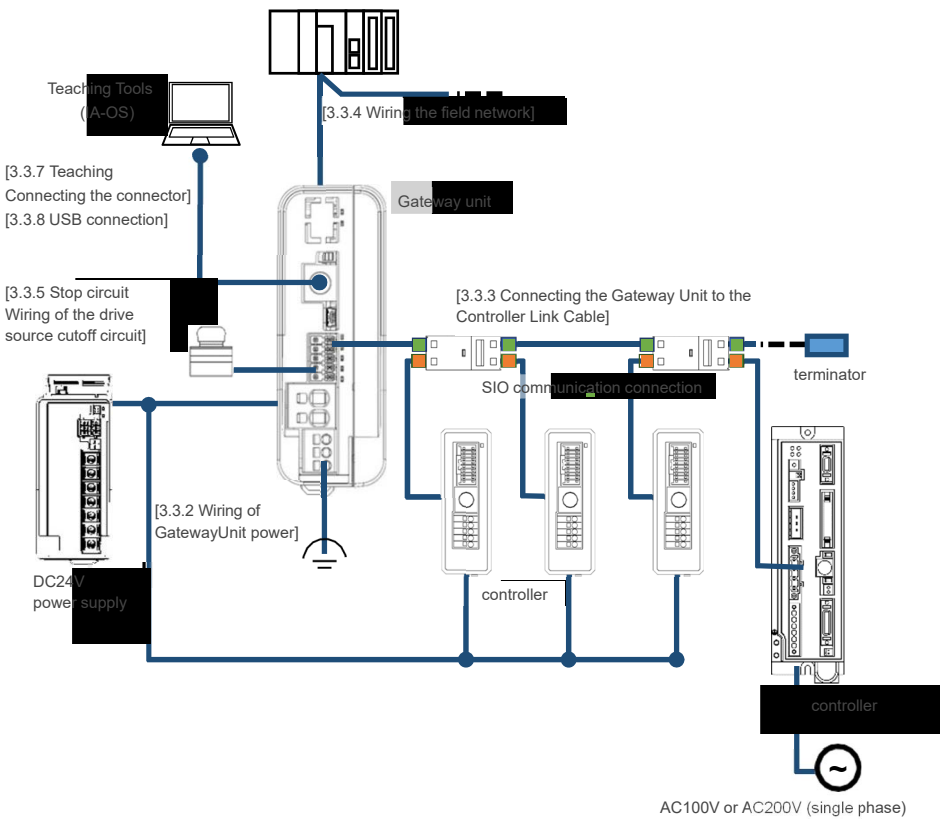
- Location subject to electrostatic noise
- Location where high electrical or magnetic field is present
- Location with the mains or power lines passing nearby

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.

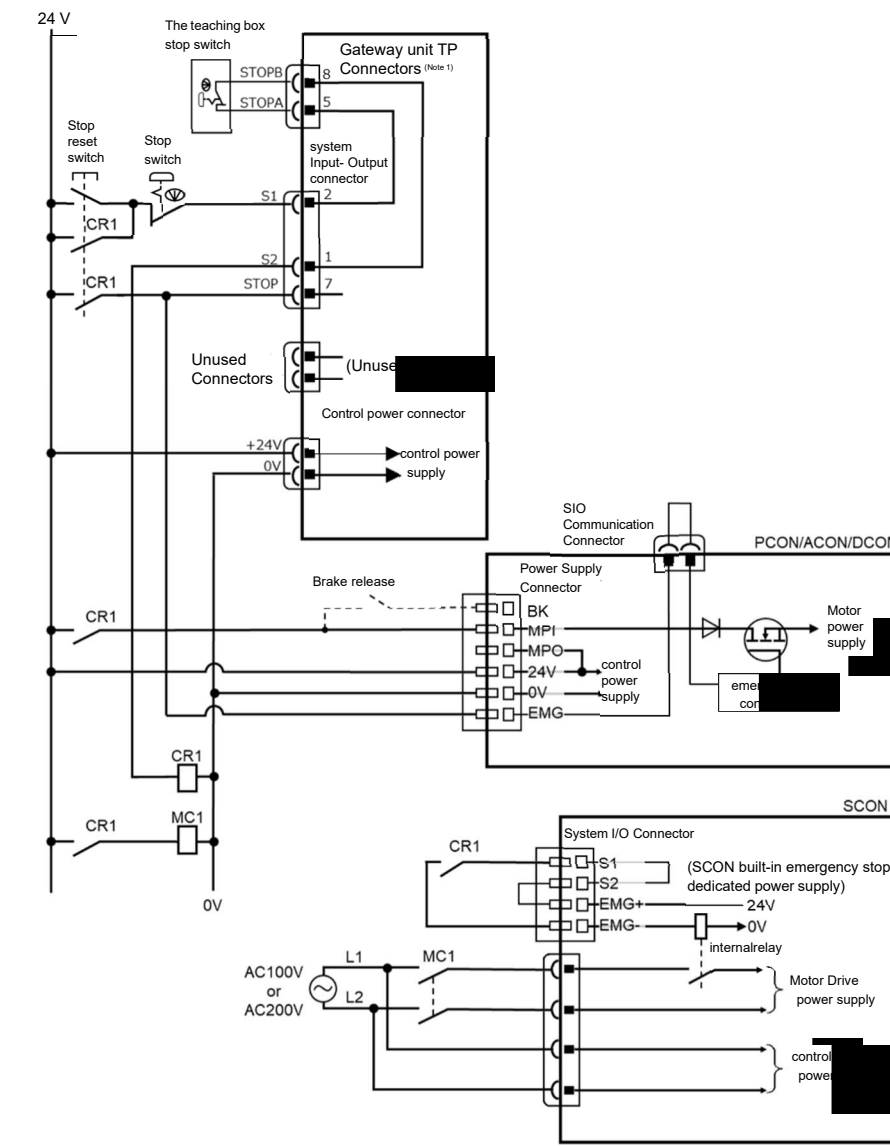
Connection to Peripheral Devices (Overall Wiring Diagram)



Power Supply and Stop Circuit (Example)

The circuit related to the drive source cutoff of the RCON-NCN system is shown below.

The RCON-NCN system supplies power to each controller connected to the RCON-NCN gateway. Therefore, the circuit related to the drive source cutoff must be installed for each controller.



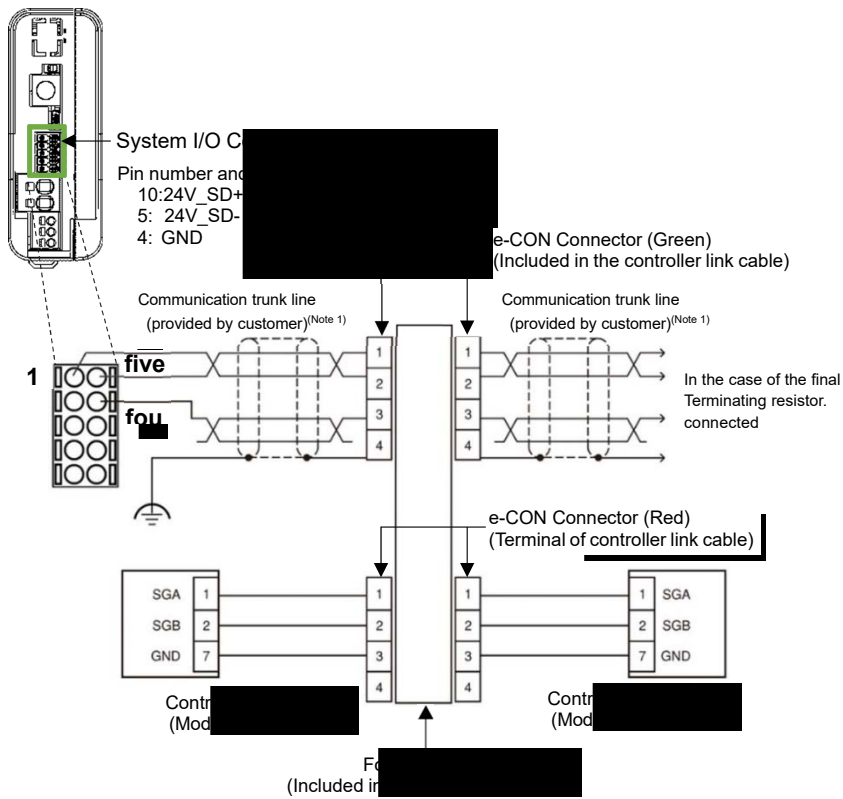
Note 1 The Gateway Unit is not equipped with a relay that automatically recognizes that a communication connection cable is inserted into the T.P. connector and switches the wiring. Therefore, when a teaching tool is not connected, it is necessary to connect a dummy plug (DP-5) to the T.P. connector.

- *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: The stop signal of the RCON-NCN gateway does not instantly stop the operation of the connected controller actuators. Provide an emergency stop relay or drive source shutdown relay separately.

Link wiring between gateway unit and controller

Controller link cable is available as an option. However, the communication trunk line must be provided by the customer.



Note 1 ...Prepare a 2-pair shielded cable.

Recommended cable: HK-SB/20276XL 2P x AWG22 (manufactured by Taiyo Cable Tec Co., Ltd.)

When using a cable other than the recommended cable, use a cable with a core wire equivalent to vinyl wire for control equipment (KIV) with a wire sheath outer diameter of 1.35 to 1.60 mm. If a wire with an outside diameter other than that specified is used, contact failure may occur..

[Controller link cable and accessories (Model: CB-RCBR-CTL002)]

This product is an option for the controller. Please purchase it separately.



	name of product	shape	number	note
accessory	Four-wayjunction		1	Single item type: 5-1473574-4 (made by AMP)
	e-CON Connector		1	Single item type: 4-1473562-4 (made by AMP) Green

Field Network Wirings and Settings

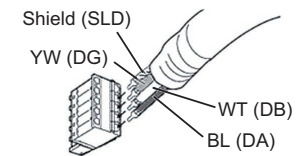
The field network connector is allocated on the top of the gateway unit. Refer to [Names for Each Part].

1. CC-Link (RCON-GWG-CC-NCN)

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



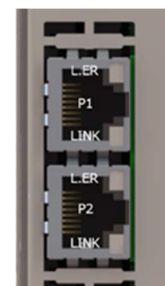
Top view of
Connector on
Controller side



Connector Name	CC-Link Connector	Remarks
Cable Side	MSTB2.5/5-STF-5.08 AU (Manufactured by PHOENIX CONTACT)	Enclosed in standard package
Controller Side	MSTB2.5/5-GF-5.08 AU (Manufactured by PHOENIX CONTACT)	

2. CC-Link IE Field (RCON-GWG-CIE-NCN)

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



Top view of
Connector on
Controller side



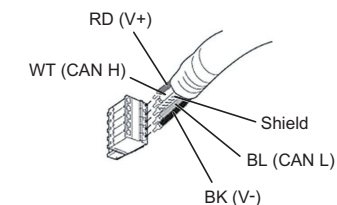
Connector Name	CC-Link IE Field Connector	Remarks
Cable Side	Ethernet ANSI/TIA/EIA-568-B Category 5e and above 8P8C modular plug equipped with shield (RJ-45)	Please prepare separately
Controller Side	Ethernet ANSI/TIA/EIA-568-B Category 5e and above 8P8C modular Jack equipped with shield (RJ-45)	

3. DeviceNet (RCON-GWG-DV-NCN)

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



Top view of
Connector on
Controller side



Connector Name	DeviceNet Connector	Remarks
Cable Side	MSTB2.5/5-STF-5.08 AU M (Manufactured by PHOENIX CONTACT)	Enclosed in standard package
Controller Side	MSTB2.5/5-GF-5.08 AU (Manufactured by PHOENIX CONTACT)	

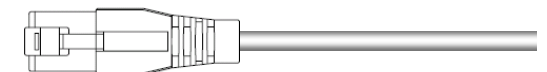
4. EtherCAT (RCON-GWG-EC-NCN)

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



Link / Activity

Top view of
Connector on
Controller side



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

5. EtherNet/IP (RCON-GWG-EP-NCN)

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



Top view of Connector on Controller side



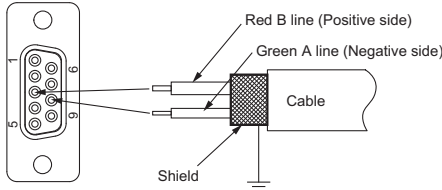
Connector Name	EtherNet/IP, PROFINET IO Connector	Remarks
Cable Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular plug equipped with shield (RJ-45)	Please prepare separately
Controller Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular Jack equipped with shield (RJ-45)	

6. PROFIBUS-DP (RCON-GWG-PR-NCN)

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



Top view of Connector on Controller side



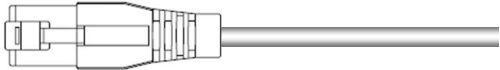
Connector Name	PROFIBUS-DP Connector	Remarks
Cable Side	9-pin D-sub Connector (Male)	Please prepare separately
Controller Side	9-pin D-sub Connector (Female)	

7. PROFINET IO (RCON-GWG-PRT-NCN)

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



Top view of Connector on Controller side



Connector Name	EtherNet/IP, PROFINET IO Connector	Remarks
Cable Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular plug equipped with shield (RJ-45)	Please prepare separately
Controller Side	Ethernet ANSI/TIA/EIA-568-B Category 5 and above 8P8C modular Jack equipped with shield (RJ-45)	

Operation Mode Selected

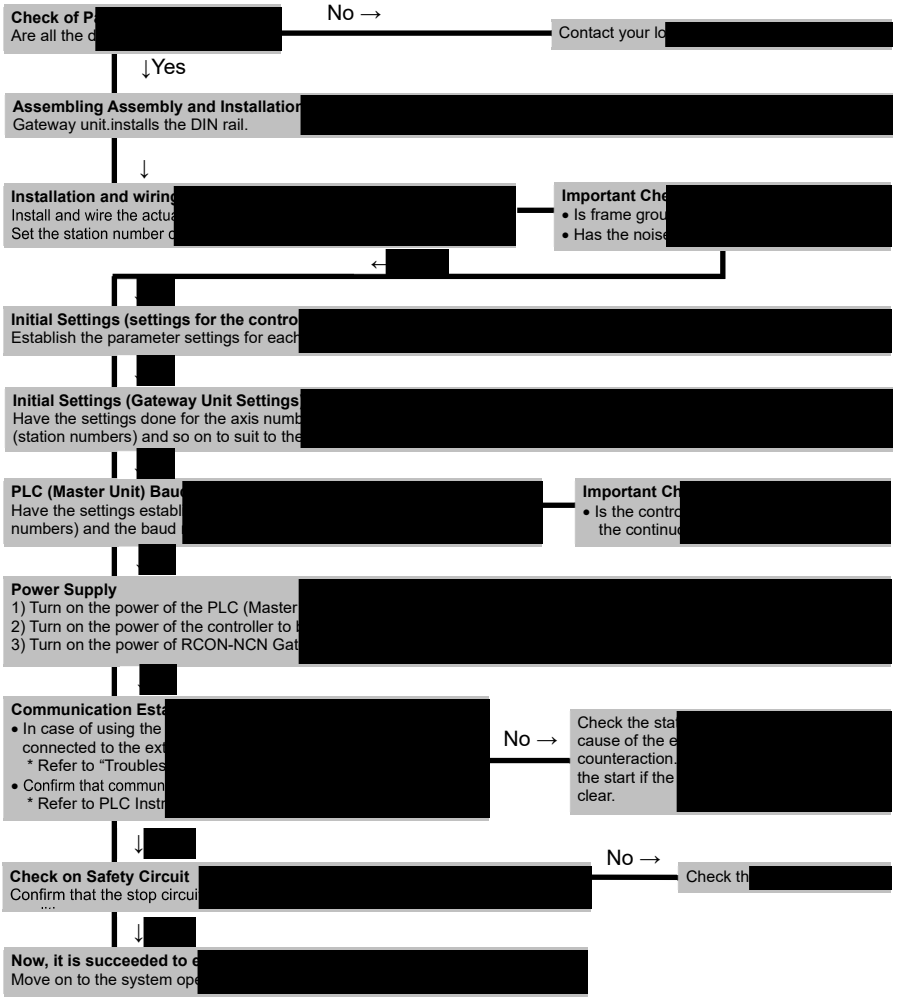
In this controller, it is available to select six types of operation modes individually for each axis as the field network type. Settings are made on IA-OS.

Operation Mode	Contents
Direct Indication Mode	The target position, speed, acceleration/deceleration and pressing current limit can be indicated with inputting a number. Monitoring of not only the current position, but also the current speed and indicated current are available.
Simple Direct Mode	The target position can be indicated directly by inputting a value. Also, monitoring of the current position is available in 0.01mm unit. Those other than the target position are to be indicated in the position table, and the setting can be done for 768 points at maximum.
Positioner 1 Mode	The 768 points of position data can be registered at the maximum and is able to stop at the registered positions. Also, monitoring of the current position is available in 0.01mm unit.
Positioner 2 Mode	This is the operation mode of the position data of 768 points at maximum set in the position table. The monitoring of the current position is not available. This mode is that the transferred data is reduced from Positioner 1 Mode.
Positioner 3 Mode	This is the operation mode of the position data of 256 points at maximum set in the position table. The monitoring of the current position is not available. This is the mode to control with the minimized number of signals to perform the positioning operation by reducing the amount of sent and received data from Positioner 2 Mode.
Positioner 5 Mode	This is the operation mode of the position data of 16 points at maximum set in the position table. It is a mode that enabled to monitor the current position in 0.1mm unit by reducing the number of position table from Positioner 2 Mode.

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-NCN Gateway unit. 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	OR	ILLuminating	Inside bus communication in error
		OFF	Operating in normal conditions
STOP	RD	ILLuminating	Confirmed STOP Signal input (driver unit drive source being cut off)
		OFF	No STOP Signal input confirmed
MODE	GN	ILLuminating	In AUTO (automatic operation) Mode
		OFF	In MANU (manual operation) Mode
C ERR	OR	ILLuminating	Error occurred in field network
		OFF	Field network operating in normal conditions
STATUS 0	-	-	Differs depending on field network (Refer to [Field Network Communication Conditions from 1 to 7])
STATUS 1	-	-	Differs depending on field network (Refer to [Field Network Communication Conditions from 1 to 7])

[Field Network Communication Conditions]

1. CC-Link (RCON-GWG-CC-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	RUN	GN	ILLuminating	Succeeded in refresh and polling reception after getting into network, or succeeded in refresh reception
			OFF	1. Not in network 2. Carrier detected for channel 3. Timeover 4. In hardware reset
STATUS 1	ERR	GN	ILLuminating	1. CRC Error 2. Station number setting error at reset release (65 stations or more including 0 or occupied station number) 3. Baud rate setting error at reset release
			FLashing (Flash for 0.4sec)	Numbers changed from station numbers and baud rate setting numbers at reset release
			OFF	1. Communication in normal conditions 2. In hardware reset

2. CC-Link IE Field (RCON-GWG-CIE-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	MS	GN	ILLuminating	Operation in normal conditions
			OFF	Hardware error occurred
STATUS 1	NS	OR	ILLuminating	Error being occurred
			OFF	Operation in normal conditions
			OFF	Operation in normal conditions
STATUS 1	NS	GN	ILLuminating	Cyclic transmission in process
			FLashing	Cyclic transmission paused
			OFF	Cyclic transmission not conducted, parallel off
LINK	-	OR	ILLuminating	Received data in error
			OFF	Received data in normal conditions
L.ER	-	GN	ILLuminating	Linkup in process
			OFF	Link-down in process
L.ER	-	OR	ILLuminating	Received data in error
			OFF	Received data in normal conditions

3. DeviceNet (RCON-GWG-DV-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	MS	GN	Illuminating	Operation in normal conditions
			Flashing (1Hz)	There is no configuration information, or not complete, device trial run necessary
		OR	Illuminating	Malfunction with no opportunity for recovery
			Flashing (1Hz)	Malfunction with opportunity for recovery
		GN/OR	Illuminated by turns	Self - diagnosis
STATUS 1	NS	GN	Illuminating	Online, Connection established
			Flashing (1Hz)	Online, No connection established
		OR	Illuminating	Critical Error
			Flashing (1Hz)	Connection Timeout
		RD/GN	Illuminated by turns	Self - diagnosis
			OFF	Offline

4. EtherCAT (RCON-GWG-EC-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	ERR	OR	Illuminating	Communication component (module) error
			Flashing (continuously)	Construction information (setting) error ON: 200ms / OFF: 200ms
			Flashing (twice)	Communication part circuit error ON: 200ms × 2 / OFF: 1000ms
			OFF	In initializing process
STATUS 1	RUN	GN	Illuminating	In normal operation (OPERATION)
			Flashing (continuously)	In PRE-OPERATION condition ON: 200ms / OFF: 200ms
			Flashing (once)	In SAFE-OPERATION condition ON: 200ms / OFF: 1000ms
		OR	Flashing	Communication component (module) error

5. EtherNet/IP (RCON-GWG-EP-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	MS	GN	Illuminating	Operation in normal conditions
			Flashing	There is no configuration information, or scanner in idol condition
		OR	Illuminating	Malfunction with no opportunity for recovery
			Flashing	Malfunction with opportunity for recovery
STATUS 1	NS	GN	Illuminating	Online, connection established
			Flashing	Online, No connection established
		OR	Illuminating	Critical error, IP address duplicated error
			Flashing	Connection Timeout
		GN/OR	OFF	No IP address

6. PROFIBUS-DP (RCON-GWG-PR-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	MS	GN	Illuminating	Initialization completed
			Flashing	Initialization completed, there is a diagnosis event
		RD	Illuminating	Exception error
		GN/RD	OFF	Not initialized
STATUS 1	NS	GN	Illuminating	Online, data exchange
			Flashing	Online, cleared
		RD	Illuminating	Parameter error
			Flashing	Configuration error
		GN/RD	OFF	Offline

7. PROFINET IO (RCON-GWG-PRT-NCN)

Name	Panel Display	Color	Status	Explanation
STATUS 0	MS	GN	Illuminating	Communication in normal conditions
			Flashing (once)	In network diagnosis
			Flashing (twice)	Engineering tools identifying nodes
		OR	Illuminating	Exception error occurred (malfunction of hardware)
			Flashing (once)	Mismatch of setting an actual network construction
			Flashing (twice)	IP address not established
			Flashing (three times)	Station name not established
			Flashing (four times)	Internal error occurred
		GN/RD	OFF	In initializing process
		STATUS 1	GN	Online (communication in normal conditions: RUN)
				Online (STOP)
STATUS 1	NS	GN/OR	OFF	No connection



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