IAI
Quality and Innovation

ROBO NET

GatewayR Unit   RGW
First Step Guide   Sixth 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

No.	Part Name		Model	Reference
1	Controller Main Body			Refer to "How to read the model plate", "How to read the model"
Accessories				
2	Connector for Emergency Stop		MC1.5/2-STF-3.81 (Supplier : PHOENIX CONTACT)	Recommended Cable Size 0.5 to 1.25mm² (AWG20 to 16)
3	Fieldbus Connector	DeviceNet type	MSTB2.5/5-ST-5.08ABGYAU (Supplier : PHOENIX CONTACT)	
		CC-Link type		
		PROFIBUS type	Prepare Dsub 9-pin (female) connector.	
		SIO (RS485 conformance)	MC1.5/4-ST-3.5 (Supplier : PHOENIX CONTACT)	Recommended Cable Size 0.3mm² (AWG22)
4	Fieldbus Terminal Resistor	DeviceNet type	Use a termination resistor with the last in the DeviceNet trunk.	121Ω ±1% 1/4W
		CC-Link type	130Ω1/2W, 110Ω1/2W enclosed one unit each	
		PROFIBUS type	Prepare it if the controller comes to the end	220Ω1/4W × 1, 390Ω1/4W × 2
		SIO (RS485 conformance)	Built-in terminal resistance (220Ω)	
5	Terminal Resistance PCB		TN-1	ROBONET Terminal Resistor Circuit Board
6	First Step Guide			
7	Instruction Manual (CD/DVD)			
8	Safety Guide			

2. Teaching Tool (to be purchased separately)
There are two software programs required to commission a ROBONET system. To edit controller parameters, use "ROBO CYLINDER PC Software". To configure the gateway parameters, use "ROBONET Gateway Parameter Setting Tool", which is available for download from the Intelligent Actuator.com website.
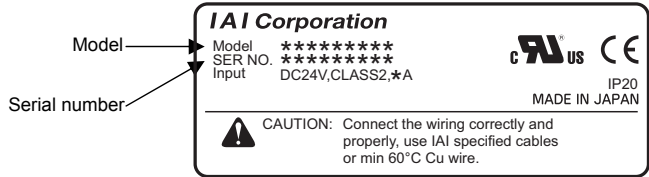
No.	Part Name	Model
1	PC Software (RS232C converter adapter and external equipment communication cable are included)	RCM-101-MW
2	PC Software (USB converter adapter, USB cable and external equipment communication cable are included)	RCM-101-USB
3	Touch Panel Teaching	CON-PT
4	Touch Panel Teaching (with 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

Model ————
Serial number ————

IAI Corporation
Model ********
SER NO. ********
Input DC24V,CLASS2,★A
IP20
MADE IN JAPAN

⚠ CAUTION: Connect the wiring correctly and properly, use IAI specified cables or min 60°C Cu wire.

5. How to read the model

RGW-DV : GatewayR Unit DeviceNet Type
RGW-CC : GatewayR Unit CC-Link Type
RGW-PR : GatewayR Unit PROFIBUS Type
RGW-SIO : GatewayR Unit SIO Type

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.
Gateway R Unit is a communication unit to be connected to the field network and must be located on the most left side of the ROBONET system.

GatewayR Unit
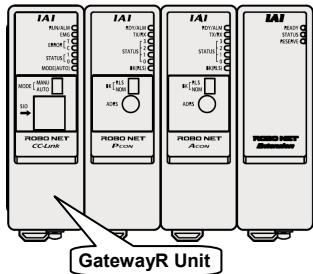
1. RGW-DV

	Item	Specifications			
DeviceNet type	Communication Protocol	DeviceNet2.0 (certified interface)			
	For Communication	Master/Slave Connection		Bit Strobe	
				Polling	
				Cyclic	
	Baud Rate	500k/250k/125kbps			
	Communication Cable Length[Note 1]	Baud Rate	Max. Network Length	Max. Branch Line Length	Total Branch Line Length
		500kbps	100m	6m	39m
		250kbps	250m		78m
		125kbps	500m		156m
		(Note) When DeviceNet dedicated thick cable is used			
	Number of Occupied Nodes	1 node			
	Communication Power Supply	Voltage 24V DC Current Consumption 60mA Externally Supplied (Supplied from DeviceNet communication cable side)			
	Communications Cable	DeviceNet dedicated cable			

Note 1 Refer to the instruction manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.

2. RGW-CC

	Item	Specifications				
CC-Link type	Communication Protocol	CC-Link Ver.1.10/Ver.2[Note 1] (certified)				
	Baud Rate	10M/5M/625k/156kbps				
	Communication System	Broadcast polling system				
	Synchronization System	Frame synchronization system				
	Transmission Path Format	Bus format (EIA RS485 conformance 3-line type)				
	Error Control System	CRC (X[16] + X[12] + X[5] + 1)[*1]				
	Number of Occupied Stations	Remote Device Station [Refer to Field Network Wirings and Settings Section]				
	Communication Cable Length[Note 2]	Baud Rate	10Mbps	5Mbps	2.5Mbps	625kbps	156kbps
		Total Cable Length	100m	160m	400m	900m	1200m
	Communications Cable	CC-Link dedicated cable				

Note 1 If the host CC-Link master unit is Ver. 1, RGW-CC is 4-pole occupied remote device station, thus a limitation to the number of controllable axes occurs. Refer to Instruction Manual (CD/DVD) for the details.
Note 2 Refer to the instruction manuals for the master unit and the mounted programmable logic controller (stated as PLC from now on) when a T-junction communication is to be conducted.
*1 CRC : Cyclic Redundancy Check   It is a data error detection method often used for the synchronous transmission

3. RGW-PR

	Item	Specifications				
PROFIBUS type	Communication Protocol	PROFIBUS DP-V1				
	Interface Specifications	PROFIBUS DP Slave Type (RS-485 Insulation Type)				
	Baud Rate	12M/6M/3M/1.5M/500k/187.5k/93.75k/45.45k/19.2k/9.6kbps				
	Communication Cable Length	Baud Rate	12/6/3Mbps	1.5Mbps	500kbps	187.5kbps	93.75/45.45/ 19.2/9.6kbps
		Total Cable Length	100m	200m	400m	1000m	1200m
	Connector Specification	9-pin D-sub female connector				
	Address Range	1 to 125				

4. RGW-SIO

	Item	Specifications				
SIO for communication (host side)	Communication Protocol	RS485 conformance				
	Communication System	Start-Stop Synchronization System Half-Duplex Communication				
	Transmission Mode	Modbus RTU				
	Communication Mode (SW selection)	Modbus gateway mode	SIO Thru Mode			
	Slave ID	Fixed to 63 (3FH)	1 ≤ N ≤ 16 (Axis No. + 1)			
	Baud Rate[Note 1]	9.6kbps	19.2kbps	38.4kbps	57.6kbps	115.2kbps	230.4kbps
	Delay Time between Frames	t3.5 (character)	Fixed to 1.75ms			
	Data Transfer Buffer Max. Length	160bytes				
	Bit Length	8bits				
	Start Bit	1bit				
	Stop Bit	1bit				
	Parity	None				
	Communications Cable	Twisted-pair shielded cable (Recommended : Taiyo Cabletec Corporation HK-SB/20276 × Length [m] 2P × AWG22)				
	Cable Length	MAX. 100m				

Note 1 It is recommended to have 230.4kbps that is in common with the baud rate of ROBONET main unit. 9.6kbps cannot be applied in SIO Thru Mode. It causes a communication error.

5. Common Specifications

	Item	Specifications
	Power Supply	24V DC±10%
	Current Consumption	Total current consumption of all the connected units [Refer to current consumption and heat generation of each unit stated below.]
	Heat Generation	Total heat generation consumption of all the connected units [Refer to current consumption and heat generation of each unit stated below.]
	Number of Max. Controllable Axes	16-axis (Controllable range in Modbus Gateway Mode could be 5 to 10 axes at maximum depending on the way to use.)
For Communication	Communication Protocol	RS485 conformance
	Communication System	Start-Stop Synchronization System Half-Duplex Communication
	Baud Rate	230.4kbps
	Error Control System	Non parity bit, CRC[*1]
	Communication Cable Length	Total Cable Length 30m or less (when extension unit is used)
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
	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

*1 CRC : Cyclic Redundancy Check   It is a data error detection method often used for the synchronous transmission

[Current Consumption and Heat Generation of Each Unit]

Unit		Current Consumption				Heat Generation
GatewayR Unit		MAX. 600mA				6W
	Motor Type	Standard Type / High Accel/Decel Type		Low Power Consumption Type		
		Rated	MAX.[Note 1]	Rated	MAX.[Note 1]	
RACON Unit	10, 20	1.3A	4.4A	1.3A	2.5A	8.4W
	30	1.3A	4.0A	1.3A	2.2A	
	20S RCA-RA3□/RGS3□/RGD3□, RCA2-SA4□/TA5□	1.7A	5.1A	1.7A	3.4A	
	2 (RCL)	0.8A	4.6A	—	—	
	5 (RCL)	1.0A	6.4A	—	—	
	10 (RCL)	1.3A	6.4A	—	—	
	Motor Type	Rated		MAX.[Note 2]		
RPCON Unit	20P, 28P, 28SP	0.4A		2.0A		9.6W
	35P, 42P, 56P	1.2A		2.0A		
Simple Absolute R Unit		MAX. 300mA				7.2W
Extension Unit		MAX. 100mA				2.5W

Note 1 The current becomes maximum when the excitation phase of the servo-motor is detected, which is performed during the initial servo-motor ON processing after the power is injected (Normal: Approx. 1 to 2sec, Max.: 10sec).
Note 2 The current is maximized at the excitation phase detection conducted in the first servo ON process after the power is supplied (ordinary 100ms). However, approximately 6A current flows at the recovery (when the drive power is supplied) from an emergency stop (approx. 1 to 2ms).

<Calculation of 24V DC Power Capacity>
(1) Current Consumption of Actuator Controller
= RACON Rated Current × Number of Connected Controller to RACON (≥ 1) + RPCON Rated Current × Number of Connected Controller to RPCON (≥ 1)···1)
(2) Current Consumption of Other Units
= 0.6A (Gateway R Unit) + 0.3A × Number of Simple Absolute R Units + 0.7A × Number of Extension Units + Current of Controllers Connected to Extension Unit···2)
For the current of the controller connected to the extension unit, refer to Instruction Manual of the connected controller. The value of 1) + 2) should equal to the load current of the whole ROBONET.
(3) Current Consumption at Excitation Phase Detection
= RACON Max. Current × Number of RACON Units to Turn Servo ON at the Same Time (≥ 1) + RPCON Max. Current × Number of RPCON Units to Turn Servo ON at the Same Time (≥ 1)···3)
Usually, the rated current is to be approximately 1.3 times higher than 1) + 2) above considering approximately 30% of margin to the load current. However, considering the current of 3), even though it is a short time, select a power supply with "peak load corresponding" type or that with enough capacity. Also pay attention to the peak current stated in "Note 2" at the bottom of the table above for RPCON.

Left Column

\<Selection of Power Supply Protection Circuit Breaker\>

(1) It is recommended that the power supply protection is conducted on the primary side (AC power side) of the 24V DC power supply unit.
   24V DC Power Supply Unit can be selected only considering the in-rush current.
   It is not necessary to consider the in-rush current from RACON or RPCON.
   (Note) In-rush current is not a guaranteed value. It also may vary depending on the impedance of the power line.

(2) When having a circuit breaker to the AC power supply side, pay attention to the in-rush current to the DC power supply unit and the rated interrupting current of the circuit breaker.
   • Rated Interrupting Current > Short Circuit Current ≒ Primary Side Power Capacity / Power Supply Voltage
   • (Reference) In-rush Current of IAI Power Supply Unit PS241 ≒ 50 to 60A, 3ms

6. Operation Modes and Main Functions (Excluding the RGW-SIO)
   The modes can be selected with ROBONET Gateway Parameter Setting Tool in PC software.
   Positioner 2 Mode is available when the parameter setting tool version is Ver. 1.0.3.0 or later and the firmware version of Gateway R Unit is Ver. 000B or later.
   Electromagnetic Valve Mode 1 and 2 are available when the parameter setting tool version is Ver. 1.0.4.0 or later and the firmware version of Gateway R Unit is Ver. 000F or later.

Main Functions	Positioner 1 Mode	Simple Direct Mode	Direct Numeric Specification Mode	Positioner 2 Mode	Electromagnetic Valve Mode 1	Electromagnetic Valve Mode 2
Position Number Specification	○	○	×	○	○	○
Number of Registered Positions	768 points/ 1-axis	768 points/ 1-axis	-	768 points/ 1-axis	7 points/ 1-axis	3 points/ 1-axis
Position Data Direct Specification Movement	△ (Note 1)	○	○	△ (Note 1)	△ (Note 1)	△ (Note 1)
Velocity, Acceleration and Deceleration Direct Designation	△ (Note 1)	△ (Note 1)	○	△ (Note 1)	△ (Note 1)	△ (Note 1)
Pressing Operation	○	○	○	○	○	○
Completed Position Number Monitor (Read)	○	○	×	○	○	○
Current Position Monitor (Read)	×	×	○	×	×	×
Velocity Monitor (Read)	×	×	○	×	×	×
Current Value Monitor (Read)	×	×	○	×	×	×
Max. Value for Position Data Specification (Note 2) (mm or deg)	Position Table Setting	9999.99	9999.99	Position Table Setting	Position Table Setting	Position Table Setting

Note 1 Although an operation cannot be performed with specifying values directly, it is available to operate by rewriting the data on the position table from the write command.
   Please note, however, that the EEPROM has a 100,000 write limitation. Consider the effect of this mode with regard to product lifespan.

Note 2 The maximum value for the direct specification of the position data and writing with the write command is 9999.99. This is the maximum value that can be written to the data field; however, the maximum value input should not exceed the actuator stroke.
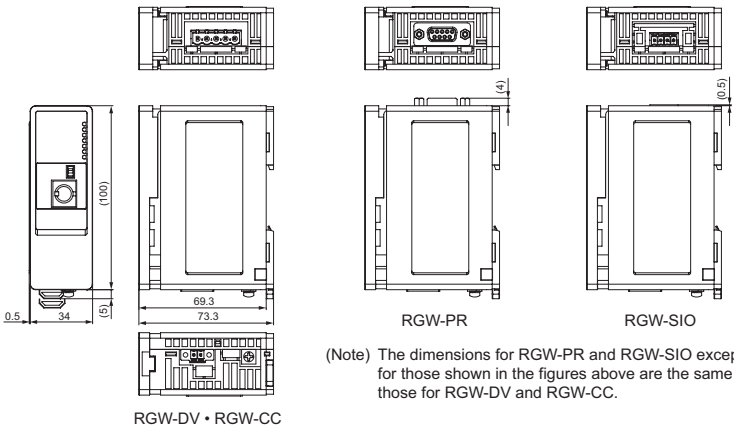
7. RGW-SIO Functions
   It is available in RGW-SIO to perform a control using Modbus Protocol, and there are Modbus Gateway Mode and SIO Thru Mode.
   The control is performed with Read/Write command for both cases.
   Regarding Read/Write command, refer to ROBONET Instruction Manual for Modbus Gateway Mode and that of Serial Communication [for Modbus] for SIO Thru Mode.

External Dimensions

RGW-PR   RGW-SIO

(Note) The dimensions for RGW-PR and RGW-SIO except for those shown in the figures above are the same as those for RGW-DV and RGW-CC.

RGW-DV • RGW-CC

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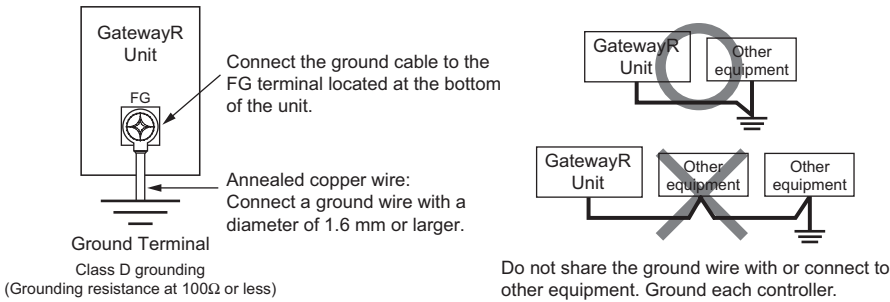   • Location subject to electrostatic noise
   • Location where high electrical or magnetic field is present
   • Location with the mains or power lines passing nearby

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 absorbency 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.

Middle Column

Installation and Noise Elimination

1. Noise Elimination Grounding (Frame Ground)

Connect the ground cable to the FG terminal located at the bottom of the unit.

Annealed copper wire:
Connect a ground wire with a diameter of 1.6 mm or larger.

Ground Terminal
Class D grounding
(Grounding resistance at 100Ω or less)

Do not share the ground wire with or connect to other equipment. Ground each controller.

2. Precautions regarding wiring method
   1) Twist the wires for the 24V DC power unit.
   2) Separate the communication line from the power line.
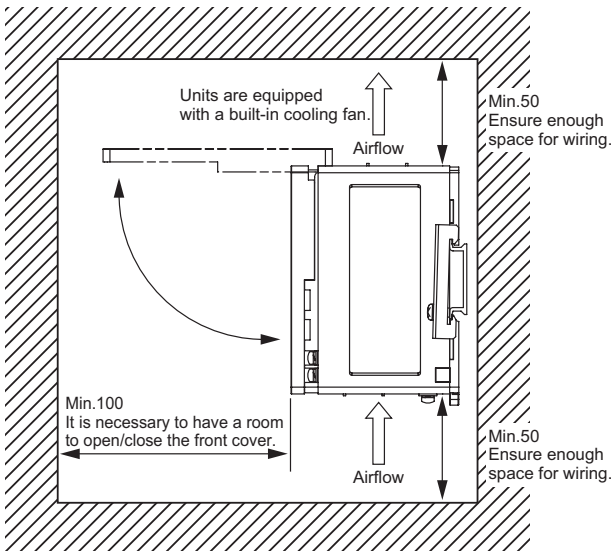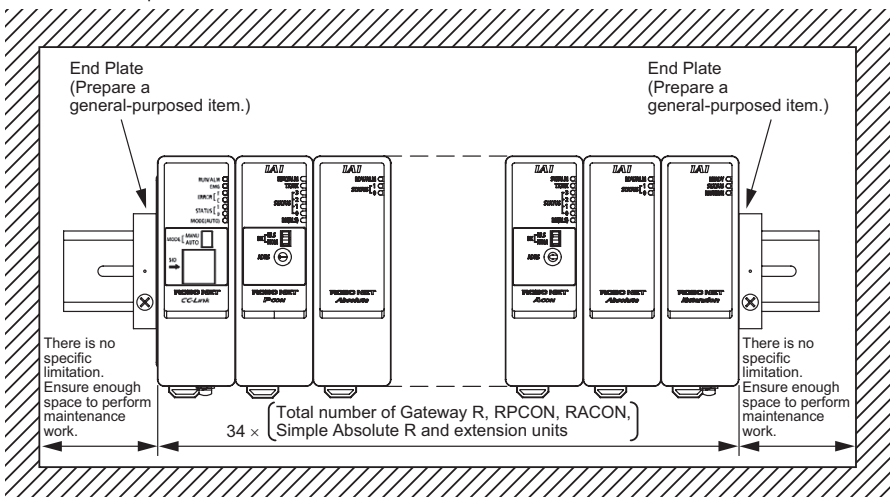
3. Noise Sources and Elimination
   Carry out noise elimination measures for power devices on the same power path and in the same equipment.
   The following are examples of measures to eliminate noise sources.
   1) AC solenoid valves, magnet switches and relays
      [Measure] Install a Surge absorber 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.
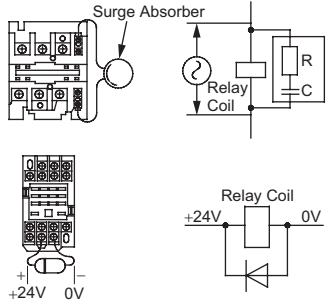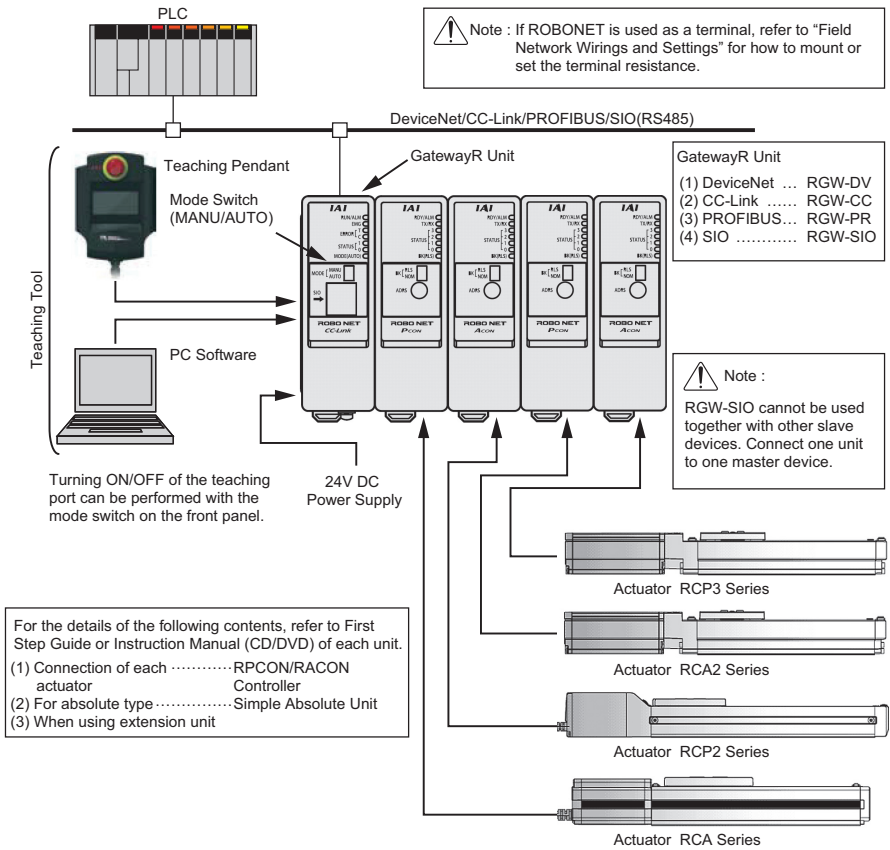

4. Heat Radiation and Installation
   Design and Build the system considering the size of the controller box, location of the controller and cooling factors to keep the ambient temperature around the controller below 40°C.

End Plate (Prepare a general-purposed item.)

There is no specific limitation. Ensure enough space to perform maintenance work.

34 × Total number of Gateway R, RPCON, RACON, Simple Absolute R and extension units

Units are equipped with a built-in cooling fan.
Airflow

Min.50 Ensure enough space for wiring.

Min.100 It is necessary to have a room to open/close the front cover.

Min.50 Ensure enough space for wiring.

Airflow

Right Column

System Configuration (Example)

PLC

Note : If ROBONET is used as a terminal, refer to "Field Network Wirings and Settings" for how to mount or set the terminal resistance.

DeviceNet/CC-Link/PROFIBUS/SIO(RS485)

Teaching Pendant

GatewayR Unit

GatewayR Unit
(1) DeviceNet … RGW-DV
(2) CC-Link …… RGW-CC
(3) PROFIBUS… RGW-PR
(4) SIO ………… RGW-SIO

Mode Switch (MANU/AUTO)

PC Software

Note :
RGW-SIO cannot be used together with other slave devices. Connect one unit to one master device.

Turning ON/OFF of the teaching port can be performed with the mode switch on the front panel.

24V DC Power Supply

Actuator RCP3 Series
Actuator RCA2 Series
Actuator RCP2 Series
Actuator RCA Series

For the details of the following contents, refer to First Step Guide or Instruction Manual (CD/DVD) of each unit.
(1) Connection of each actuator ·············· RPCON/RACON Controller
(2) For absolute type ················ Simple Absolute Unit
(3) When using extension unit

Power Supply and Emergency Stop Circuit (Example)

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.

[Refer to First Step Guide or Instruction Manual (CD/DVD) for Extension Unit REXT if the extension unit is used.]

⚠ Warning : Note that the teaching pendant cannot have an emergency stop for the system side even though it can have an emergency stop for all the actuators connected to RPCON/RACON unit.

Emergency Stop Reset   Emergency Stop Switch

CR

TP Connector

Teaching pendant

GatewayR Unit

ROBONET communication connection PCB JB-1

RACON/RPCON Unit   RACON/RPCON Unit

RY2

24V TP connection detection circuit

EMG Connector

Drive-source cutoff signal (TP Enable Switch)

Motor driving source   Motor driving source

EMG−

CR

EMG+

Driving Source Wiring Interruption Relay   Driving Source Interruption Relay

Power Input Terminal Block

Power connection board PP-1
Power connection board PP-1

Power supply 24V DC±10%

+24V

0V

CR Contact Capacity : 24V DC 160mA or more
CR Load Current   : 160mA ≥ 10mA (current consumption caused by emergency stop circuit of each unit) × Total Number of RPCON/RACON Units

[Refer to First Step Guide or Instruction Manual (CD/DVD) for Extension Unit REXT if the extension unit is used.]

Have the front cover open when wiring the power line.
It is possible to connect up to a 2mm² (AWG14) conductor, at a maximum, when an appropriate solderless terminal is applied. However, it is also possible to use multiple conductors by applying terminal to each side of the terminal block.
It is recommended to have the power to be supplied from both ends with the cables of the same thickness so the power supply can be evenly allocated to each unit if the thickness is 1.25mm² (AWG16) or more on one end.
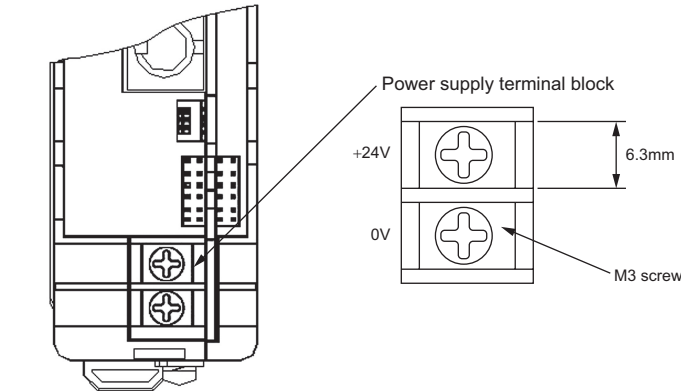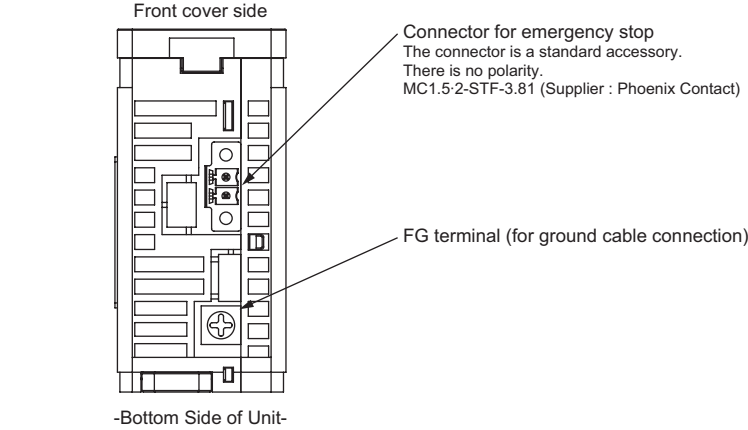
Power supply terminal block
+24V
0V
6.3mm
M3 screw

-Bottom Side of Unit-

Connect the cable for the emergency stop circuit to the connector located at the bottom side of the unit.
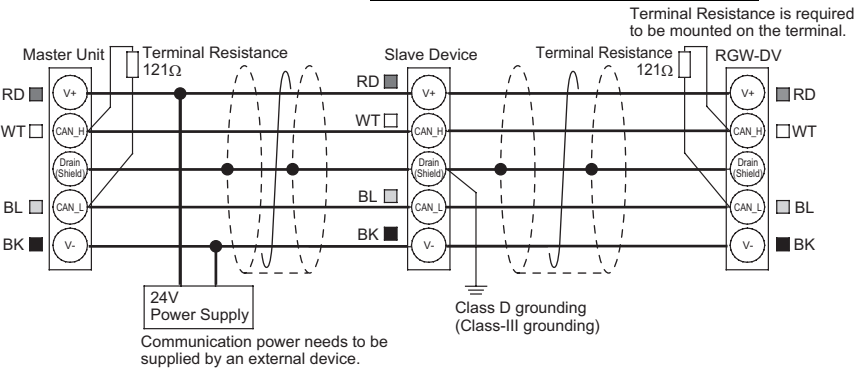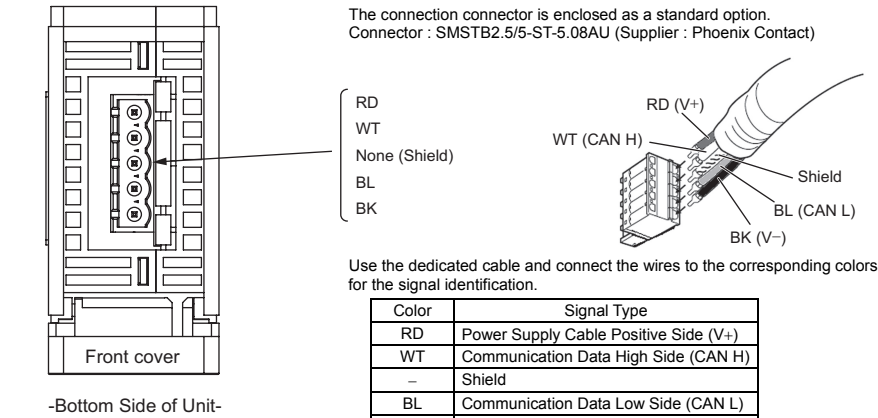Apply a vinyl cable for electrical devices with AWG20 to 16 (0.5 to 1.25mm²) or equivalent for the wiring.

Front cover side

Connector for emergency stop
The connector is a standard accessory.
There is no polarity.
MC1.5-2-STF-3.81 (Supplier : Phoenix Contact)

FG terminal (for ground cable connection)

-Bottom Side of Unit-

Field Network Wirings and Settings

1. DeviceNet (RGW-DV)

[1] Wiring
For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

The connection connector is enclosed as a standard option.
Connector : SMSTB2.5/5-ST-5.08AU (Supplier : Phoenix Contact)

RD
WT
None (Shield)
BL
BK

RD (V+)
WT (CAN H)
Shield
BL (CAN L)
BK (V−)

Front cover

-Bottom Side of Unit-

Use the dedicated cable and connect the wires to the corresponding colors for the signal identification.

Color	Signal Type
RD	Power Supply Cable Positive Side (V+)
WT	Communication Data High Side (CAN H)
−	Shield
BL	Communication Data Low Side (CAN L)
BK	Power Supply Cable Negative Side (V−)

Terminal Resistance is required to be mounted on the terminal.

Master Unit — Terminal Resistance 121Ω — Slave Device — Terminal Resistance 121Ω — RGW-DV

RD
WT
Drain Shield
BL
BK

24V Power Supply
Communication power needs to be supplied by an external device.

Class D grounding (Class-III grounding)

[2] Setting of User Setting Switch
Turn OFF the power before performing this operation. Open the front cover when operating and checking the user setting switch.

User setting switch

SW No.	OFF	ON
SW4	Always OFF (Setting them ON forbidden)	
SW3		
SW2		
SW1	Teaching pendant Enable switch signal inactive	Teaching pendant Enable switch signal activated

The user setting switch is ON when it is on the right and OFF when on the left.

[3] Gateway Parameter Setting
"ROBONET Gateway Parameter Setting Tool" is used to perform the settings for the node address (MAC ID), number of axes, axis number, operation modes, etc.. Refer to ROBONET Instruction Manual (CD/DVD) for the details of how to use the tool.
In an ordinary case, the node address for the master unit is set to 63. The addresses for the slave units are set one to another in the range of 00 to 62. For the settings of such as the data address on the occupied PLC side or the parameters, refer to ROBONET Instruction Manual and those of the master unit and the mounted PLC.
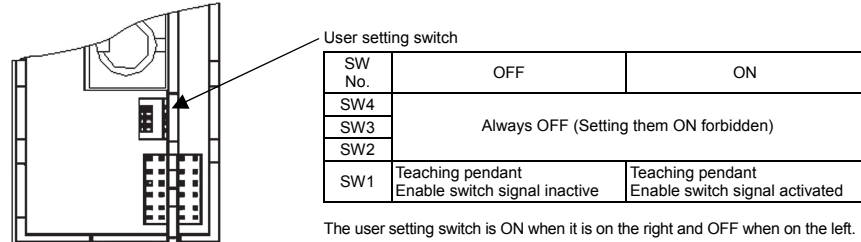
2. CC-Link (RGW-CC)

[1] Wiring
For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

The connection connector is enclosed as a standard option.
Connector : SMSTB2.5/5-ST-5.08AU (Supplier : Phoenix Contact)

FG (connection is not required)
SLD (Shield)
DG (YW)
DB (WT)
DA (BL)

Shield (SLD)
YW (DG)
WT (DB)
BL (DA)

Front cover

-Bottom Side of Unit-

Use the dedicated cable and connect the wires to the corresponding colors for the signal identification.

Color	Signal Type
BL	Communication Line A (DA)
WT	Communication Line B (DB)
YW	Communication Ground Line (DG)
−	Shield (SLD)

Terminal Resistance is required to be mounted on the terminal.

Master Unit — Terminal Resistance — Slave Device — Terminal Resistance — RGW-CC

DA
DB
DG
SLD
FG

Class D grounding (Class-III grounding)

The terminal resistor differs depending on the type of the dedicated cable for CC-Link.
• Cable FANC-SBH⋯130Ω1/2W (High Performance Cable dedicated for CC-Link)
• Cable FANC-SB⋯110Ω1/2W (CC-Link Dedicated Cable)

SLD and FG are internally connected.

[2] Setting of User Setting Switch
Turn OFF the power before performing this operation. Open the front cover when operating and checking the user setting switch.
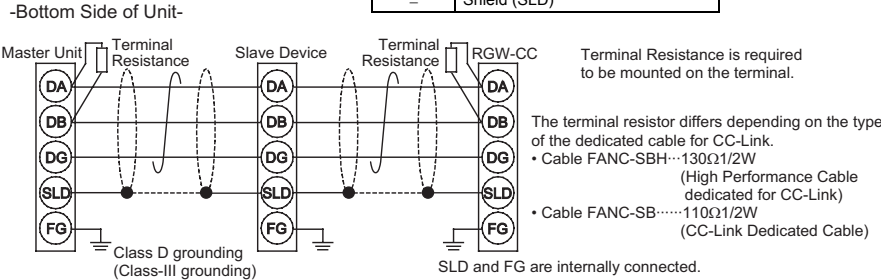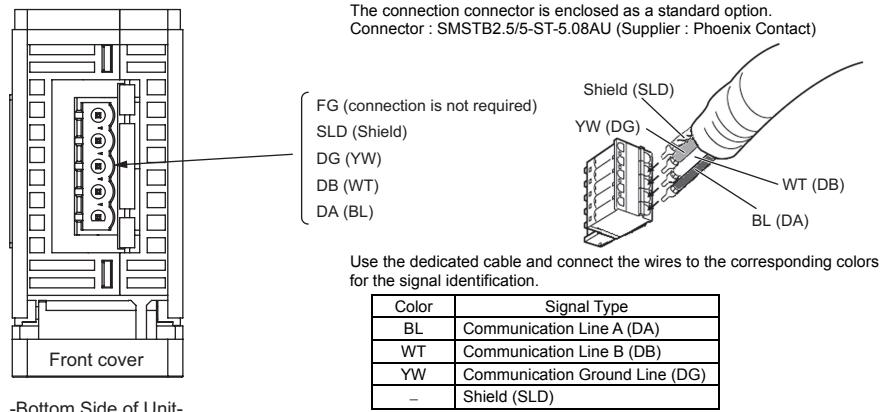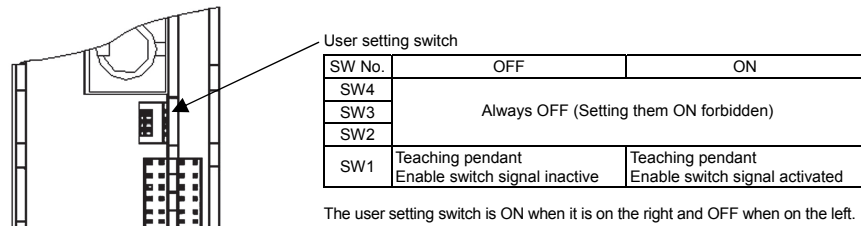
User setting switch

SW No.	OFF	ON
SW4	Always OFF (Setting them ON forbidden)	
SW3		
SW2		
SW1	Teaching pendant Enable switch signal inactive	Teaching pendant Enable switch signal activated

The user setting switch is ON when it is on the right and OFF when on the left.

[3] Gateway Parameter Setting
"ROBONET Gateway Parameter Setting Tool" is used to perform the settings for the station number, number of axes, axis number, operation modes, etc.. Refer to ROBONET Instruction Manual (CD/DVD) for the details of how to use the tool.
In an ordinary case, the node address is set to 00 for the station number of the master unit. The addresses for the slave units are set in the range of 01 to 64 considering the number of occupied stations. For the settings of such as the data address on the occupied PLC side or the parameters, refer to ROBONET Instruction Manual and those of the master unit and the mounted PLC.

3. PROFIBUS (RGW-PR)

[1] Wiring
For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

Use the type A cable for PROFIBUS DP (EN5017).

Red B line (Positive side)
Green A line (Negative side)
Cable
Shield

Front cover

-Bottom Side of Unit-

Use D-Sub 9-pin (female) type of PROFIBUS DP Standard (recommended for EN5017) for the connector.

Pin No.	Signal Name	Detail
1	NC	Unconnected
2	NC	Unconnected
3	B-Line	Communication line B (Positive side)
4	NC	Unconnected
5	GND	Signal grounding
6	+5V	+5V output
7	NC	Unconnected
8	A-Line	Communication line A (Negative side)
9	NC	Unconnected
Housing	Shield	Cable Shield

Terminal Resistance is required to be mounted on the terminal.

Master Unit — Slave Device — RGW-PR

+5V
A-Line
B-Line
GND
390Ω
220Ω
390Ω

Class D grounding (Class-III grounding)

[2] Setting of User Setting Switch
Turn OFF the power before performing this operation. Open the front cover when operating and checking the user setting switch.
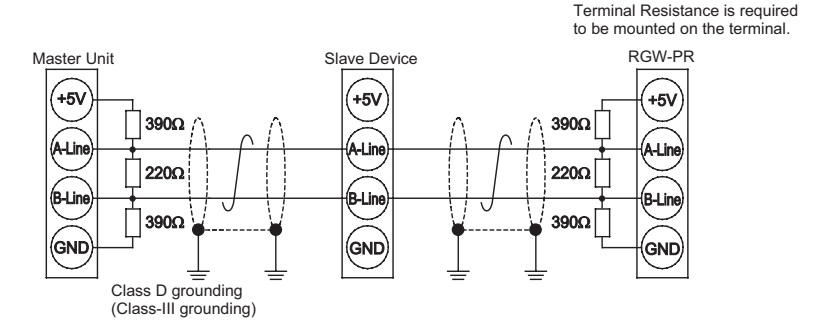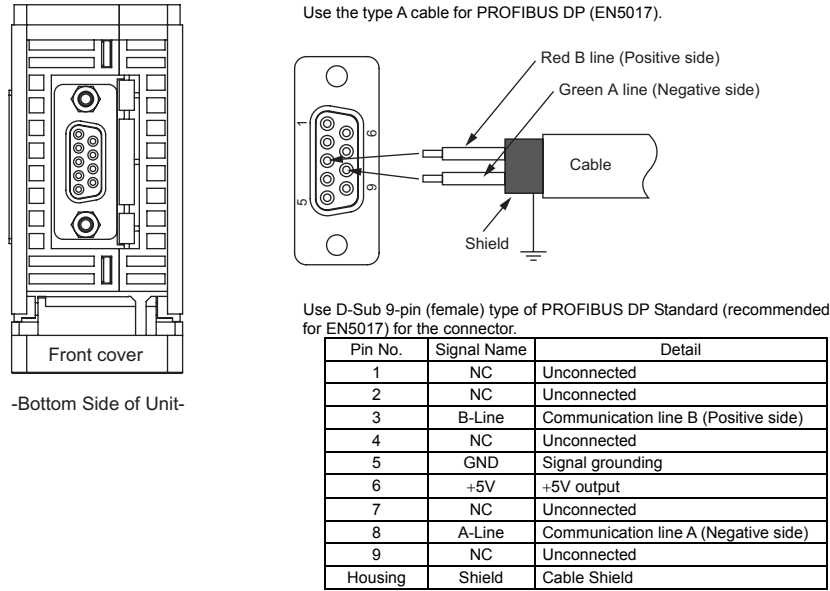
User setting switch

SW No.	OFF	ON
SW4	Always OFF (Setting them ON forbidden)	
SW3		
SW2	Selecting Big Endian	Selecting Little Endian
SW1	Teaching pendant Enable switch signal inactive	Teaching pendant Enable switch signal activated

The user setting switch is ON when it is on the right and OFF when on the left.

[3] Gateway Parameter Setting
"ROBONET Gateway Parameter Setting Tool" is used to perform the settings for the node address, number of axes, axis number, operation modes, etc.. Refer to ROBONET Instruction Manual (CD/DVD) for the details of how to use the tool.
In an ordinary case, the node address for the master unit is set to 02. Node address 00 is either for the monitor or for the inspection functions while 01 is for monitoring devices. Set the slave unit numbers within the range up to 125 at the maximum in the order of 03, 04, 05, … from the closer to the further from the master unit. For the settings of such as the data address on the occupied PLC side or the parameters, refer to ROBONET Instruction Manual and those of the master unit and the mounted PLC.

4. SIO (RGW-SIO)
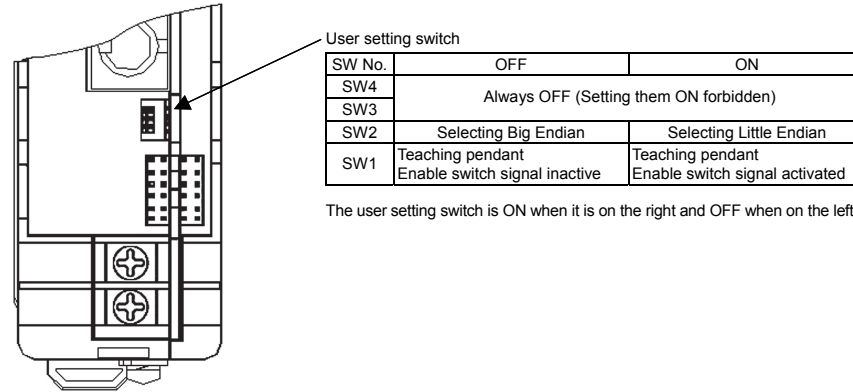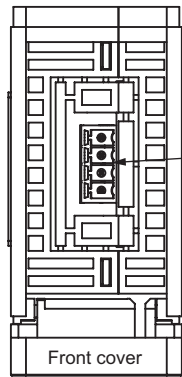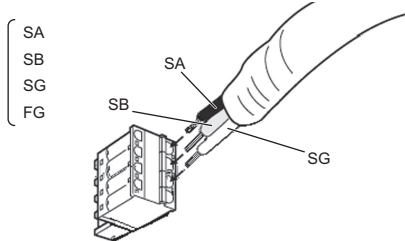
[1] Wiring

For details, refer to the Instruction Manuals of the master unit and PLC in which in the master unit is installed.

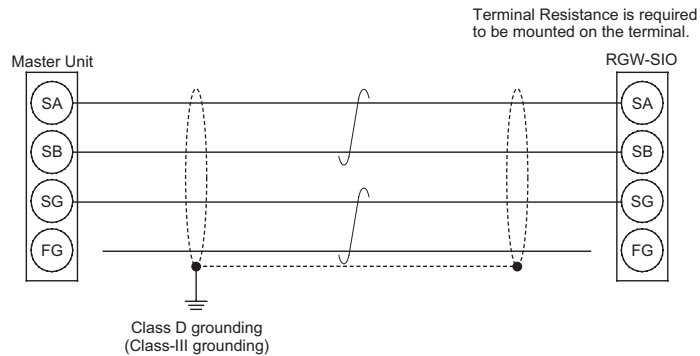The connection connector is enclosed as a standard option.
Connector : MC1.5/4-ST-3.5 (Supplier : Phoenix Contact)

| SA |
| SB |
| SG |
| FG |

-Bottom Side of Unit-

Apply a STP cable with 2 pairs of harnesses (AWG22).
Recommended Cable : HK-SB/20276 × L [m] 2P × AWG22 (Taiyo Cabletec Corporation)

| Signal Name	Signal Type
SA	Communication line A (Positive side)
SB	Communication line B (Negative side)
SG	Signal grounding
FG	Frame Ground (connected to the body frame)

⚠ Note : RGW-SIO cannot be used together with other slave devices. Connect one unit to one master device.

Terminal Resistance is required to be mounted on the terminal.

Master Unit / RGW-SIO

| SA — SA |
| SB — SB |
| SG — SG |
| FG — FG |

Class D grounding (Class-III grounding)

[2] Setting of User Setting Switch

Turn OFF the power before performing this operation. Open the front cover when operating and checking the user setting switch.
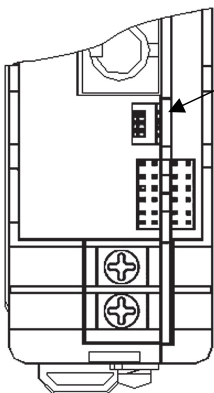
User setting switch

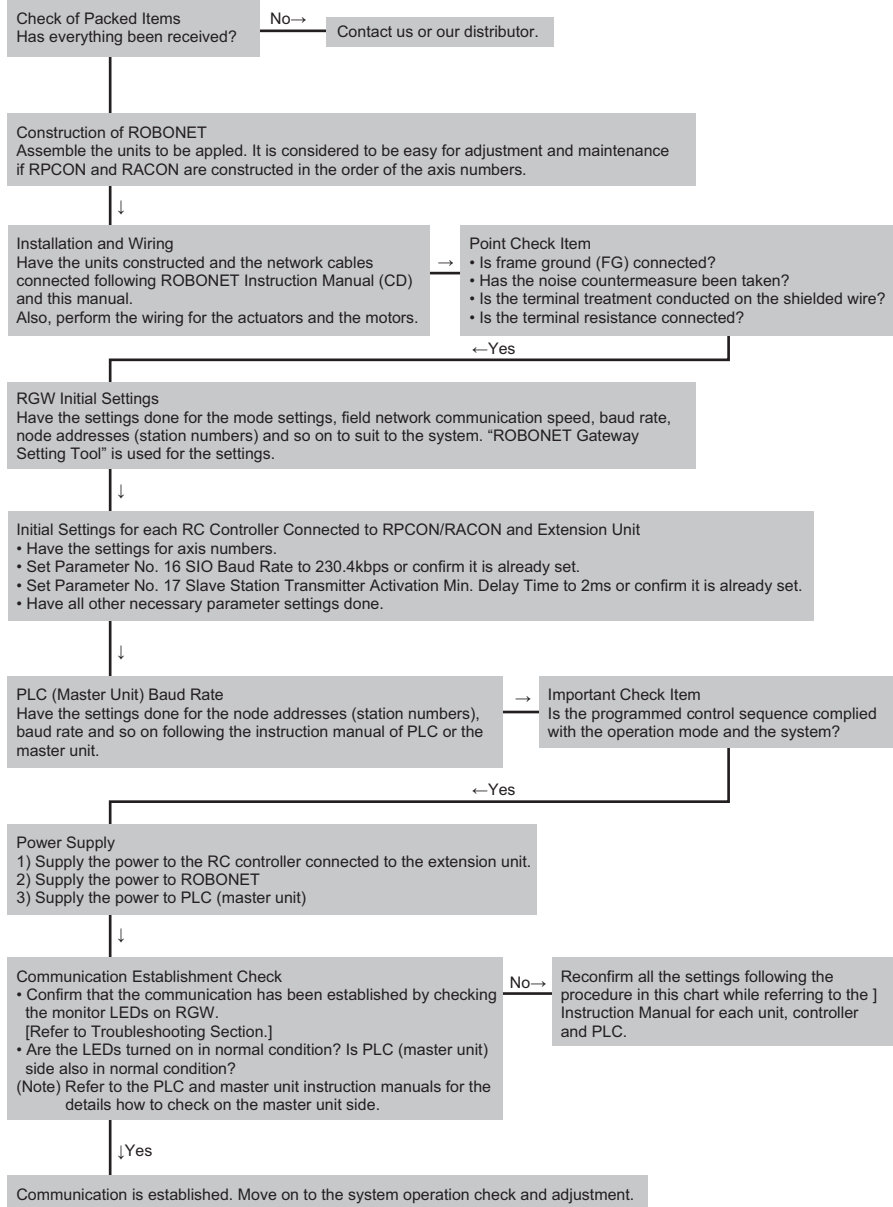| SW No.	OFF	ON
SW4	Always OFF (Setting them ON forbidden)	
SW3		
SW2	Modbus Gateway Mode	SIO Thru Mode
SW1	Teaching pendant Enable switch signal inactive	Teaching pendant Enable switch signal activated

The user setting switch is ON when it is on the right and OFF when on the left.

[3] Gateway Parameter Setting

The operation is performed with the SIO communication function of the host controller (PLC). Therefore, there is no such notion of node address or station numbers for the master and slave that the ordinary field network has. The host controller directly controls each controller that has the axis number via GatewayR Unit.

"ROBONET Gateway Parameter Setting Tool" is used to perform the settings number of axes, axis number, operation modes, etc.. Refer to ROBONET Instruction Manual (CD/DVD) for the details of how to use the tool.

For the settings of such as the data address on the occupied PLC side or the parameters, refer to ROBONET Instruction Manual and those of the master unit and the mounted PLC.
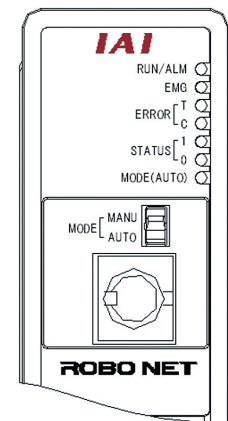

Starting Procedures

When using this product for the first time, pursue work while making sure to avoid omission and incorrect wiring by referring to the procedure below. "PC" stated in this section means "PC software".
This section explains the procedure for starting up the RGW Unit. Follow the instructions in Instruction Manual (CD/DVD) for the installation and wiring of other devices, controllers and actuators that are connected to the network.

Check of Packed Items
Has everything been received? — No→ — Contact us or our distributor.

↓

Construction of ROBONET
Assemble the units to be appled. It is considered to be easy for adjustment and maintenance if RPCON and RACON are constructed in the order of the axis numbers.

↓

Installation and Wiring
Have the units constructed and the network cables connected following ROBONET Instruction Manual (CD) and this manual.
Also, perform the wiring for the actuators and the motors.
→ Point Check Item
• Is frame ground (FG) connected?
• Has the noise countermeasure been taken?
• Is the terminal treatment conducted on the shielded wire?
• Is the terminal resistance connected?

←Yes

RGW Initial Settings
Have the settings done for the mode settings, field network communication speed, baud rate, node addresses (station numbers) and so on to suit to the system. "ROBONET Gateway Setting Tool" is used for the settings.

↓

Initial Settings for each RC Controller Connected to RPCON/RACON and Extension Unit
• Have the settings for axis numbers.
• Set Parameter No. 16 SIO Baud Rate to 230.4kbps or confirm it is already set.
• Set Parameter No. 17 Slave Station Transmitter Activation Min. Delay Time to 2ms or confirm it is already set.
• Have all other necessary parameter settings done.

↓

PLC (Master Unit) Baud Rate
Have the settings done for the node addresses (station numbers), baud rate and so on following the instruction manual of PLC or the master unit.
→ Important Check Item
Is the programmed control sequence complied with the operation mode and the system?

←Yes

Power Supply
1) Supply the power to the RC controller connected to the extension unit.
2) Supply the power to ROBONET
3) Supply the power to PLC (master unit)

↓

Communication Establishment Check
• Confirm that the communication has been established by checking the monitor LEDs on RGW.
[Refer to Troubleshooting Section.]
• Are the LEDs turned on in normal condition? Is PLC (master unit) side also in normal condition?
(Note) Refer to the PLC and master unit instruction manuals for the details how to check on the master unit side.
— No→ — Reconfirm all the settings following the procedure in this chart while referring to the] Instruction Manual for each unit, controller and PLC.

↓Yes

Communication is established. Move on to the system operation check and adjustment.

Troubleshooting

On GatewayR Unit (RGW), there are the monitor LEDs for the field network and SIO communication. You can confirm the communication establishment and also communication errors on these LEDs.

LED		Color	Description
RUN/ALM		GN	The machine is in the normal operation.
		OR	Error is being occurred.
EMG		RD	In emergency stop.
ERROR	T	OR	• The axes configuration set on the PLC side does not match with the actual axes configuration (axis numbers). • There is one or more RC controller connected to RPCON/RACON or extension unit that is not in the standby condition. • Internal bus communication error is being occurred.
	C	OR	A communication error is occurred on the field network.
STATUS	1	GN/OR	This LED shows the communication status of the field network.
	0	GN/OR	[Refer to the following table for the details.]
MODE (AUTO)		GN	AUTO is selected on the mode switch.

[Field Network Communication Status Display]

1. DeviceNet (RCM-GW-DV)

LED	Color	Indication	Description	
STATUS-1 (NS)	GN	Illuminating	The connection has been established and the communication is being performed normally.	
		Flashing	Online but network connection is not yet established. Communication Stop (Network is normal). Check the scan list.	
	OR	Illuminating	A communication error has occurred. The communication cannot be established due to a duplication of node addresses or a Busoff (communication stop due to frequent data error detection).	Check the node address settings, baud rate setting, communication line wiring connections, terminal resistance connections, communication power supply, noise prevention, etc.
		Flashing	A communication error has occurred. (Communication time-out is detected.)	
	GN/OR	Illuminated by turns	In self-checking process.	
	—	OFF	The machine is not on-line. The power to the DeviceNet is not supplied.	
STATUS-0 (MS)	GN	Illuminating	The machine is in the normal operation.	
		Flashing	Connection to the master is not established. Check if it has been registered in the master's scanning list.	
	OR	Illuminating	A hardware error occurred. Board must be replaced. Please contact us.	
		Flashing	There is an error occurred, but is not critical such like a configuration error or unmatched baud rate setting. It can be recovered with a rebuild of the settings.	
	GN/OR	Illuminated by turns	In self-checking process.	
	—	OFF	Power is not supplied.	

2. CC-Link (RCM-GW-CC)

LED	Color	Indication	Description
STATUS-1 (ERR)	OR	Illuminating	A CRC[*1] error is detected in data sent to the station. Check the noise elimination treatment, etc.
			Baud rate or station number setting is not correct.
		Flashing	The baud rate or station number setting is changed while in communication.
		OFF	The machine is in the normal operation.
STATUS-0 (RUN)	GN	Illuminating	The machine is in the normal operation. (Starts flashing with the communication start)
		OFF	Not in the network or timeout. The illumination is turned off if the communication is shut off for a certain time. Check for wire breakage and condition of connector joint

*1 CRC : Cyclic Redundancy Check   It is a data error detection method often used for the synchronous transmission

3. SIO (RCM-GW-PR)

LED	Color	Indication	Description
STATUS-1	GN (LINE-ON)	Illuminating	The connection has been established and the communication is being performed normally.
		Flashing	Online, in the initializing process.
	RD (ERR)	Illuminating	Parameter error, the parameter is not appropriate.
		Flashing	There is a configuration error. (Example) The setting in the configurator does not match with the actual connection.
	(LINE-OFF)	OFF	The status is offline or the power is OFF.
STATUS-0	GN (LINE-ON)	Illuminating	Online, initializing is completed.
		Flashing	Online, in initializing complete error checking process.
	RD (ERR)	Illuminating	Initializing error of the communication board, If the condition does not recover after a reboot, please contact us.
	(LINE-OFF)	OFF	The status is offline or the power is OFF.

4. PROFIBUS (RCM-GW-SIO)

LED	Color	Indication	Indication Description (Meaning)
STATUS-1 (TxD)	GN	Flashing	Data is being sent (from RGW to RC controllers connected to RPCON/RACON and extension unit).
		OFF	Data sending is being stopped (from RGW to RC controllers connected to RPCON/RACON and extension unit).
STATUS-1 (RxD)	GN	Flashing	Data is being received (from RC controllers connected to PRCON/RACON and extension unit to RGW).
		OFF	Data receiving is being stopped (from RC controllers connected to PRCON/RACON and extension unit to RGW).

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