Cat. No. W489-E1-01

GQ-CRM21

CompoNet Gateway Unit for CC-Link

OPERATION MANUAL

OMRON

About this Manual

Thank you for purchasing a GQ-CRM21 CompoNet Gateway Unit for CC-Link.
This manual contains information required to use a GQ-CRM21 CompoNet Gateway Unit for CC-Link.
Please read this manual carefully and be sure you understand the information provided before attempting to use the CompoNet Gateway Unit.
After reading this manual, keep it in a safe and convenient location for future reference.

Intended Audience

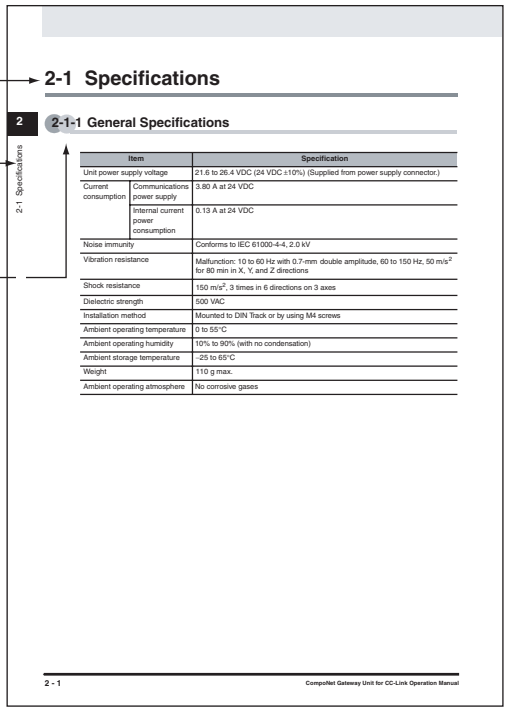
This manual is intended for the following personnel, who must also have knowledge of electrical systems (an electrical engineer or the equivalent).

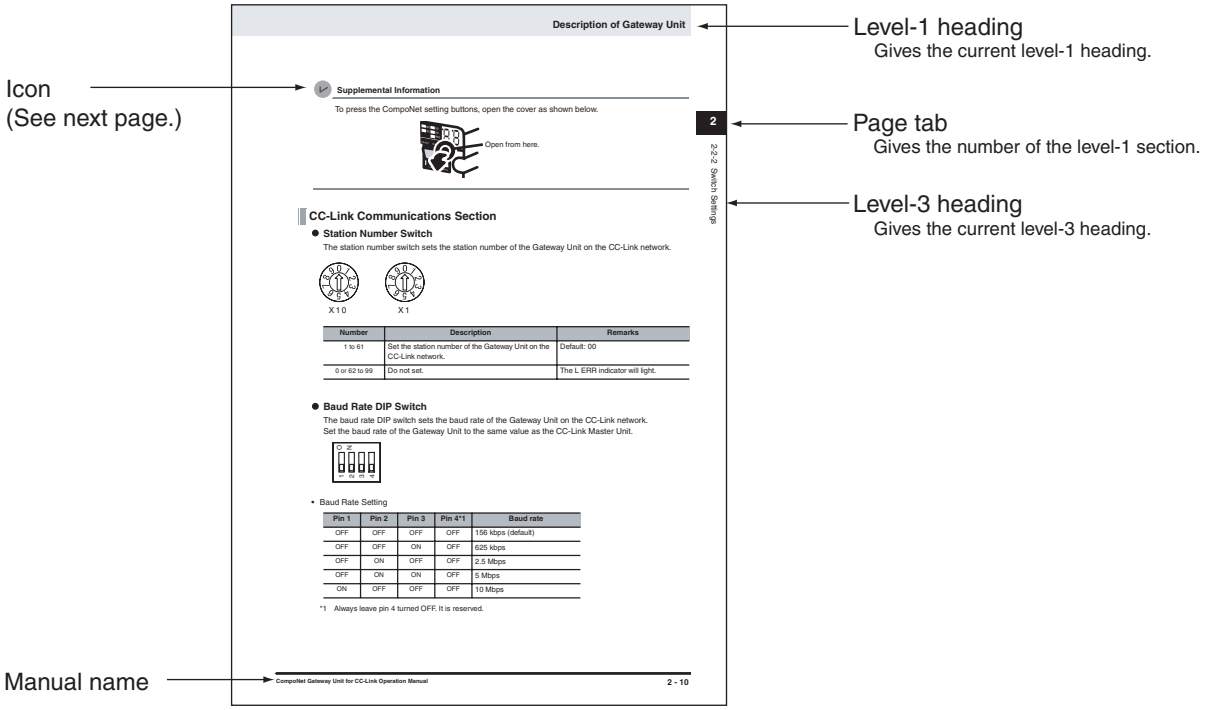
- Personnel in charge of installing FA systems
- Personnel in charge of designing FA systems
- Personnel in charge of managing FA systems and facilities

Using this Manual

Page Structure

The following page structure is used in this manual.





This illustration is provided only as a sample.
The page shown in the illustration does not necessarily appear in this manual.

Icons

The following icons are used in this manual.

Precautions for Safe Use

Precautions on what to do and what not to do to ensure using the product safely.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Supplemental Information

Supplemental information to increase understanding.

Additional Information

Additional information or information for reference in product application.

Read and Understand this Manual

Please read and understand this manual before using the product. Please consult your OMRON representative if you have any questions or comments.

Warranty and Limitations of Liability

WARRANTY

OMRON's exclusive warranty is that the products are free from defects in materials and workmanship for a period of one year (or other period if specified) from date of sale by OMRON.

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OMRON SHALL NOT BE RESPONSIBLE FOR SPECIAL, INDIRECT, OR CONSEQUENTIAL DAMAGES, LOSS OF PROFITS OR COMMERCIAL LOSS IN ANY WAY CONNECTED WITH THE PRODUCTS, WHETHER SUCH CLAIM IS BASED ON CONTRACT, WARRANTY, NEGLIGENCE, OR STRICT LIABILITY.

In no event shall the responsibility of OMRON for any act exceed the individual price of the product on which liability is asserted.

IN NO EVENT SHALL OMRON BE RESPONSIBLE FOR WARRANTY, REPAIR, OR OTHER CLAIMS REGARDING THE PRODUCTS UNLESS OMRON'S ANALYSIS CONFIRMS THAT THE PRODUCTS WERE PROPERLY HANDLED, STORED, INSTALLED, AND MAINTAINED AND NOT SUBJECT TO CONTAMINATION, ABUSE, MISUSE, OR INAPPROPRIATE MODIFICATION OR REPAIR.

Application Considerations

SUITABILITY FOR USE

OMRON shall not be responsible for conformity with any standards, codes, or regulations that apply to the combination of products in the customer's application or use of the products.

At the customer's request, OMRON will provide applicable third party certification documents identifying ratings and limitations of use that apply to the products. This information by itself is not sufficient for a complete determination of the suitability of the products in combination with the end product, machine, system, or other application or use.

The following are some examples of applications for which particular attention must be given. This is not intended to be an exhaustive list of all possible uses of the products, nor is it intended to imply that the uses listed may be suitable for the products:

- Outdoor use, uses involving potential chemical contamination or electrical interference, or conditions or uses not described in this manual.
- Nuclear energy control systems, combustion systems, railroad systems, aviation systems, medical equipment, amusement machines, vehicles, safety equipment, and installations subject to separate industry or government regulations.
- Systems, machines, and equipment that could present a risk to life or property.

Please know and observe all prohibitions of use applicable to the products.

NEVER USE THE PRODUCTS FOR AN APPLICATION INVOLVING SERIOUS RISK TO LIFE OR PROPERTY WITHOUT ENSURING THAT THE SYSTEM AS A WHOLE HAS BEEN DESIGNED TO ADDRESS THE RISKS, AND THAT THE OMRON PRODUCTS ARE PROPERLY RATED AND INSTALLED FOR THE INTENDED USE WITHIN THE OVERALL EQUIPMENT OR SYSTEM.

PROGRAMMABLE PRODUCTS

OMRON shall not be responsible for the user's programming of a programmable product, or any consequence thereof.

Disclaimers

CHANGE IN SPECIFICATIONS

Product specifications and accessories may be changed at any time based on improvements and other reasons.

It is our practice to change model numbers when published ratings or features are changed, or when significant construction changes are made. However, some specifications of the products may be changed without any notice. When in doubt, special model numbers may be assigned to fix or establish key specifications for your application on your request. Please consult with your OMRON representative at any time to confirm actual specifications of purchased products.

DIMENSIONS AND WEIGHTS

Dimensions and weights are nominal and are not to be used for manufacturing purposes, even when tolerances are shown.

PERFORMANCE DATA

Performance data given in this manual is provided as a guide for the user in determining suitability and does not constitute a warranty. It may represent the result of OMRON's test conditions, and the users must correlate it to actual application requirements. Actual performance is subject to the OMRON Warranty and Limitations of Liability.

ERRORS AND OMISSIONS

The information in this manual has been carefully checked and is believed to be accurate; however, no responsibility is assumed for clerical, typographical, or proofreading errors, or omissions.

Safety Precautions

Definition of Precautionary Information

The following notation is used in this manual to provide precautions required to ensure safe usage of the CompoNet Gateway Unit for CC-Link.
The safety precautions that are provided are extremely important to safety. Always read and heed the information provided in all safety precautions.

⚠ WARNING	Indicates a potentially hazardous situation which, if not avoided, will result in minor or moderate injury, or may result in serious injury or death. Additionally there may be significant property damage.
⚠ Caution	Indicates a potentially hazardous situation which, if not avoided, may result in minor or moderate injury, or property damage.

Precautions for Safe Use

Precautions on what to do and what not to do to ensure using the product safely.

Precautions for Correct Use

Precautions on what to do and what not to do to ensure proper operation and performance.

Symbols

The circle and slash symbol indicates operations that you must not do.

The specific operation is shown in the circle and explained in text.
The symbol at the left means "do not disassemble."

The triangle symbol indicates precautions (including warnings).

The specific operation is shown in the triangle and explained in text.
The symbol at the left is for a general precaution.

The filled circle symbol indicates operations that you must do.

The specific operation is shown in the circle and explained in text.
The symbol at the left shows a general precaution for something that you must do.

⚠ WARNING

Always input the voltage and current to the Unit within the specified ranges.
Using a voltage or current outside the specified range may result in malfunction or fire.

Do not touch any part of the terminal section or disassemble the Unit and touch internal parts while the power is being supplied.
Do not apply power while the cover is open.
Doing so may result in electric shock.

Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes. Serious accidents may result from abnormal operation if proper measures are not provided.

Provide safety measures in external circuits (i.e., not in the Programmable Controller), including the following items, to ensure safety in the system if an abnormality occurs due to malfunction of the PLC or an external factor affecting the PLC operation.
Serious accidents may result from abnormal operation if proper measures are not provided.

- Emergency stop circuits, interlock circuits, limit circuits, and similar safety measures must be provided in external control circuits (i.e., not in Slave Units or Repeater Units).
- The outputs from Slave Units or Repeater Units may remain ON or OFF due to deposits on or burning of the output relays, or destruction of the output transistors. As a countermeasure for such problems, external safety measures (i.e., not in Slave Units or Repeater Units) must be provided to ensure safety in the system.
- When the 24-VDC output (service power supply) from a Slave Unit or Repeater Unit is overloaded or shortcircuited, the voltage may drop and result in the outputs being turned OFF. As a countermeasure for such problems, external safety measures (i.e., not in Slave Units or Repeater Units) must be provided to ensure safety in the system.

⚠ Caution

Confirm safety at the destination slave device before changing or transferring parameters to another node. Changing or transferring parameters without confirming safety may result in unexpected equipment operation.

The output status from a slave device when problems occur in communications will depend on the specifications of the slave device. When using devices with outputs, confirm operating specifications for communications error and implement suitable safety measures.

Precautions for Safe Use

Observe the following precautions when using a CompoNet Gateway Unit for CC-Link.

● Power Supply

- Always use the power supply voltages specified in this manual.
- Take appropriate measures to ensure that the specified power with the rated voltage and frequency is supplied. Be particularly careful in places where the power supply is unstable.
- Always turn OFF the power supply to the PLC, Gateway Unit, Slave Units, and communications before attempting any of the following.
  - Mounting or dismounting any Units
  - Assembling Units
  - Setting rotary switches
  - Connecting or wiring cables
  - Connecting or disconnecting connectors

● Installation

- Install and wire Units correctly as described in this manual.
- Before touching a Unit, be sure to first touch a grounded metallic object in order to discharge any static build-up.
- Make sure that the terminal blocks, connectors, communications cables, and other items with locking devices are properly locked into place.
- When mounting Units to DIN Track or mounting brackets, mount them securely.
- Make sure that all the Unit mounting screws and cable connector screws are tightened to the torque specified in this manual.
- Use only the specified communications cables and connectors.
- Use correct wiring parts and wiring tools when wiring the cables in the CC-Link and CompoNet systems.

● Wiring

- Wire Units correctly as described in this manual.
- Double-check all wiring and switch settings before turning ON the power supply.
- Confirm polarity before wiring terminals.
- Observe the following precautions when wiring communications cables.
  - Separate the communications cables from power lines and high-tension lines.
  - Do not fold communications cables.
  - Do not pull on the communications cables or bend them past their natural bending radius.
  - Always lay communications cable inside ducts.
- Observe voltage specifications when wiring communications paths and power supplies and when wiring I/O crossovers. Incorrect wiring may result in malfunctions.
- Do not apply voltages or connect loads to the Output Units in excess of the maximum switching capacity.
- When using Flat Cable I (standard or sheathed) or Flat Cable II (sheathed) for more than one CompoNet system, do not bundle the Flat Cables and separate them from each other by at least 5 mm.
- Do not apply power while the cover is open.
- Use only the specified communications cables and connectors.
- Observe the connection distance specifications when connecting communications cables.
- Make sure that metal scraps do not enter a Unit when wiring or processing it.

● Handling

- Use the special packing box when transporting a Unit. Also, protect the Unit from being exposed to excessive vibration or impact during transportation.
- Do not drop the Units or expose them to excessive vibration or impact. Doing so may result in failure or malfunction.
- Check the user program for proper execution before actually running it on the Unit.
- Do not attempt to dismantle the Unit for repairs or modify it in any way.
- Confirm that no adverse effect will occur in the system before attempting any of the following.
  - Changing the operating mode of the PLC
  - Starting or stopping the user program
  - Force-setting/force-resetting any bit in memory
  - Changing the present value of any word or any set value in the user program
  - Performing I/O tests
  - Using the user compensation functions for an Output Unit
- Do not use organic thinners to clean the Unit. Use commercially available alcohol.

● External Circuits

- Install external breakers and take other safety measures against short-circuiting in external wiring.
- Fail-safe measures must be taken by the customer to ensure safety in the event of incorrect, missing, or abnormal signals caused by broken signal lines, momentary power interruptions, or other causes.
- Construct the control circuits so that the power supply to the CompoNet Gateway Unit turns ON only after the power supply to I/O Slave Units. If the power supply to I/O Slave Units is turned ON after the power supply to the CompoNet Gateway Unit, normal operation may be temporarily inhibited.

Precautions for Correct Use

- Follow the instructions in this manual to correctly perform installation.
  The Unit may fail if it is not installed correctly.
- Observe the voltage specifications when wiring the power supply. An incorrect voltage may result in malfunctions.
- Take appropriate and sufficient countermeasures when using the Unit in the following locations:
  - Locations subject to static electricity or other forms of noise
  - Locations subject to strong electromagnetic fields
  - Locations subject to possible exposure to radioactivity
  - Locations close to power supplies
- Do not install the Unit in the following locations:
  - Locations subject to direct sunlight
  - Locations subject to temperatures or humidity outside the range specified in the specifications
  - Locations subject to condensation as the result of severe changes in temperature
  - Locations subject to corrosive or flammable gases
  - Locations subject to dust (especially iron dust) or salts
  - Locations subject to exposure to water, oil, or chemicals
  - Locations subject to shock or vibration
- Take appropriate and sufficient countermeasures when installing the Unit in the following locations:
  - Locations subject to static electricity or other forms of noise
  - Locations subject to strong electromagnetic fields
  - Locations subject to possible exposure to radioactivity
  - Locations close to power supplies

Conformance to EC Directives

Applicable Directives

- EMC Directive

Concepts

● EMC Directive

The CompoNet Gateway Unit is an electrical device that is built into other machines. To enable more easily building it into other machines, it has been checked for conformity to EMC standards.* EMC-related performance of the Unit will vary depending on the configuration, wiring, and other conditions of the equipment or control panel on which it is installed. Whether the products conform to the standards in the system used by the customer, therefore, must be checked by the customer.

* Applicable EMC (Electromagnetic Compatibility) standards are as follows: EMS (Electromagnetic Susceptibility): EN 61131-2 and EN 61000-6-2, EMI (Electromagnetic Interference): EN 61131-2 and EN 61000-6-4 (Radiated emission: 10-m regulations).

● Conformance to EC Directives

The CompoNet Gateway Unit complies with EC Directives. To ensure that the machine in which the Unit is used complies with EC Directives, the Unit must be installed as follows:

- The Unit must be installed within a control panel.
- You must use reinforced insulation or double insulation for the DC power supplies for communications, internal power, and I/O. The DC power supplies must provide stable power even when a momentary power interruption of 10 ms occurs in the input. *
- Products complying with EC Directives also conform to the emission standards (EN 61131-2 and EN 61000-6-4). Radiated emission characteristics (10-m regulations) may vary depending on the configuration of the control panel used, other devices connected to the control panel, wiring, and other conditions.
- Compliance was confirmed for I/O wiring of less than 30 m.

* EMC standard compliance was confirmed with an OMRON S82J Power Supply.

- This is a Class A product (designed for industrial environments). Radio interference may occur if it is used in a residential area. If that occurs, suitable countermeasures will be required.

Trademarks

- “CC-Link” is a registered trademark of Mitsubishi Electric Corporation.
- “GX-Developer” is a registered trademark of Mitsubishi Electric Corporation.
- “CompoNet” is a registered trademark of the ODVA (Open DeviceNet Vendors Association, Inc.).

Other system names and product names that appear in this manual are the trademarks or registered trademarks of their respective companies.

Related Manuals

The following manuals are related to CompoNet. Use them together with this manual whenever required.

Cat. No.	Manual name	Contents
W489 (this manual)	CompoNet Gateway Unit for CC-Link Operation Manual	Specifications and wiring procedures for the GQ-CRM21 CompoNet Gateway Unit for CC-Link.
W484	CompoNet Analog I/O Slaves with Numerical Indicator Operation Manual	Specifications for the CRT1-VAD02SD, CRT1-VAD02MLD, CRT1-VDA02SD, and CRT1-VDA02MLD CompoNet Analog I/O Slaves.
W456	CS/CJ-series CompoNet Master Unit Operation Manual	CompoNet network overview, communications specifications, and wiring procedures for CS/CJ-series CompoNet Master Units.
W457	CompoNet Slave Units and Repeater Unit Operation Manual	Specifications for CompoNet Slaves Units and Repeater Units.

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Overview

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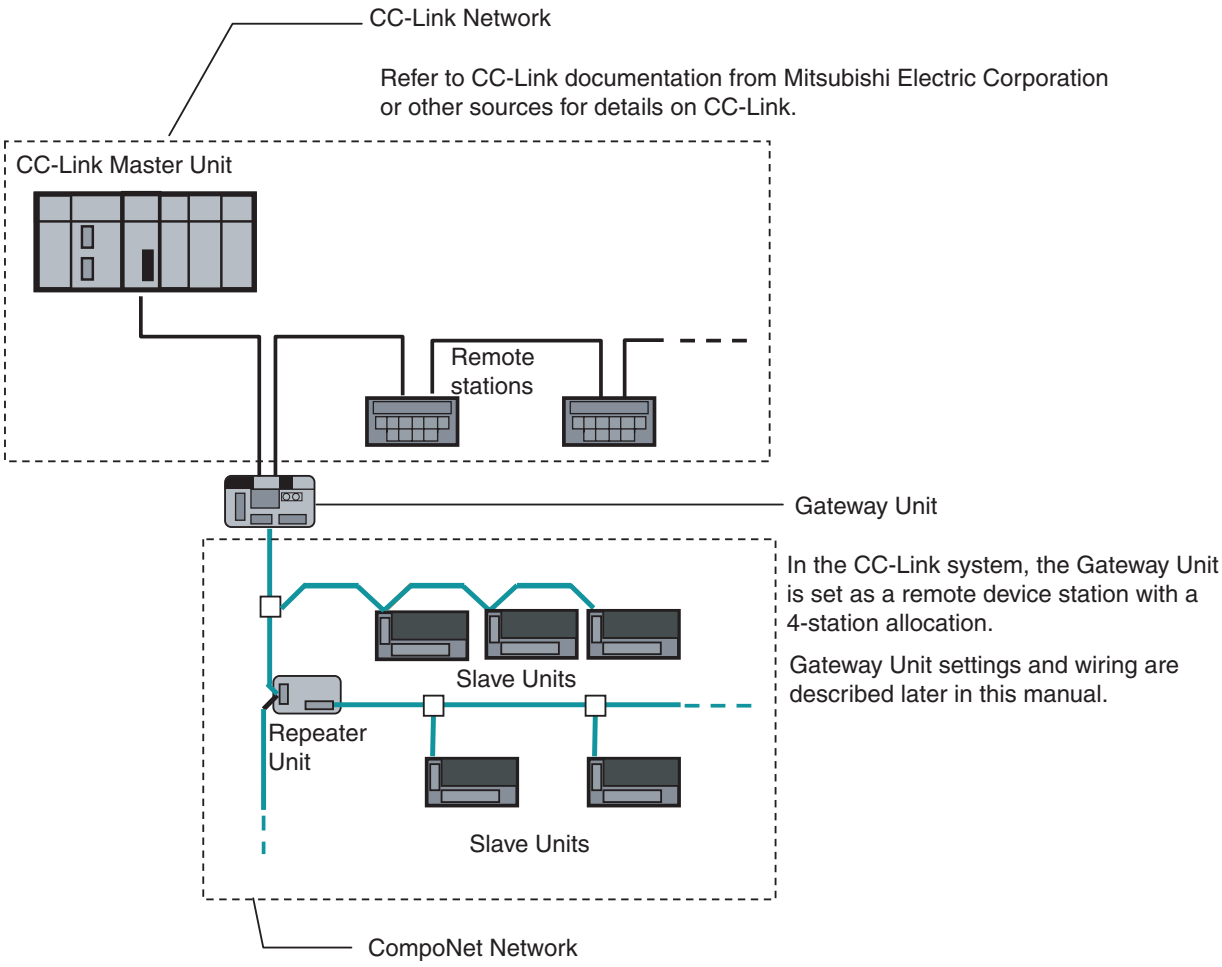
1-1 Overview

1-1-1 Overview of Gateway Unit

The GQ-CRM21 CompoNet Gateway Unit for CC-Link provides one CC-Link port and one CompoNet port. It cyclically transfers I/O data between the CompoNet Slave Units and the CC-Link Master Unit.
The GQ-CRM21 CompoNet Gateway Unit for CC-Link is referred to as the “Gateway Unit” in this manual.



Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for the specifications of CompoNet networks.
Refer to documentation for individual Slave Units and Repeater Units for details on those Units.

1-1-2 Gateway Unit Features

A Gateway Unit can be used to take advantage of CompoNet features to simplify wiring.

● A Selection of Communications Cables

The following communications cables can be used with CompoNet systems: Round Cable I (2-conductor), Round Cable II (4-conductor), Flat Cable I (standard), and Flat Cable II (sheathed).

Note: Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for details on cable types.

● Multinode Connections

CompoNet systems can be used for multinode, high-density remote I/O communications.

Maximum I/O capacity: 2,560 points
Maximum nodes: 384 nodes per Gateway Unit

Up to 6,144 CompoNet Slave Units can be connected to a CC-Link Master Unit. (Communications mode 4 must be set.)

● Bit-level Distribution

CompoNet Slave Units with industry-standard e-CON connectors, clamping terminal blocks, or small connectors can be used to distribute I/O at the bit level. This enables distributed control in distributed devices, such as sensors and other devices located over a wide area on conveyors or in warehouses.

● Easy Installation and Setup

CompoNet systems can be easily installed and set up.

- Seven-segment Display
  The number of connected CompoNet Slave Units is shown on the seven-segment display. This enables easily checking system operation.
- Participation Flags and Communications Error Flags
  The network participation status of CompoNet Slave Units can be checked at the PLC.
  When a CompoNet Slave Unit joins the network, a Participation Flag that corresponds to the node address of the Unit turns ON. If a CompoNet Slave Unit that was participating in the network is disconnected from the network, a Communications Error Flag that corresponds to the node address of the Unit turns ON. (Communications mode 0 to 3 must be set.)
- Automatic Baud Rate Detection
  The CompoNet Slave Units will automatically detect and use the baud rate that is set in the Gateway Unit. Setting the baud rate is not necessary for any of the CompoNet Slave Units.

● Repeater Units for Greater Flexibility

Repeater Units can be used in a CompoNet network to enable the following network expansions.

- Extending the cable length
- Increasing the number of nodes
- Branching from the trunk line
- Changing the type of cable

Repeater Units can be used to extend up to two segment layers (called sub-trunk lines) from the trunk line. Up to 64 Repeater Units can be connected per Gateway Unit and up to 32 Repeater Units can be connected per segment.

Note: Supply communications power to a sub-trunk line from the Repeater Unit.
Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for detailed wiring methods.

● Easy Maintenance with Complete System Monitoring Functions

The CompoNet Network is constantly monitored to enable confirming system safety by quickly identifying errors and checking communications status.

- Gateway Unit Detection of Network Participation, Errors, and Status
  When a CompoNet Slave Unit joins the network, a Participation Flag that corresponds to the node address of the Unit turns ON. If a CompoNet Slave Unit that was participating in the network is disconnected from the network, a Communications Error Flag that corresponds to the node address of the Unit turns ON.
  Network status, such as communications errors and duplicated Slave Unit node addresses, and Slave Unit diagnostic results are detected by the Gateway Unit and displayed on the seven-segment display on the front panel and reflected in the Status Flags. (Communications mode 0 to 3 must be set.)

- Registration Table
  A table of the Slave Units that should be participating at the nodes (including the node addresses and corresponding Slave Unit model numbers) can be registered to verify the Slave Units actually participating in the network and prevent unregistered Slave Units from participating in the network.

- Communications Status on Gateway Unit Seven-segment Display
  The seven-segment display on the front of the Gateway Unit can be used to check communications status. The number of connected nodes is normally displayed, but if an error occurs, the error code is displayed in hexadecimal and the error node address is displayed in decimal.

2

Description of Gateway Unit

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2-1 Specifications

2-1-1 General Specifications

Item		Specification
Unit power supply voltage		21.6 to 26.4 VDC (24 VDC±10%) (Supplied from power supply connector.)
Current consumption	Communications power supply	3.80 A at 24 VDC
	Internal current power consumption	0.13 A at 24 VDC
Noise immunity		Conforms to IEC 61000-4-4, 2.0 kV
Vibration resistance		Malfunction: 10 to 60 Hz with 0.7-mm double amplitude, 60 to 150 Hz, 50 m/s^2 for 80 min in X, Y, and Z directions
Shock resistance		150 m/s^2, 3 times in 6 directions on 3 axes
Dielectric strength		500 VAC
Installation method		Mounted to DIN Track or by using M4 screws
Ambient operating temperature		0 to 55°C
Ambient operating humidity		10% to 90% (with no condensation)
Ambient storage temperature		–25 to 65°C
Weight		110 g max.
Ambient operating atmosphere		No corrosive gases

2-1-2 CC-Link Communications Specifications

Item	Specification
Version	CC-Link version 1.10 or 2.00 (Selected using mode switch.)
Baud rate	156 kbps, 625 kbps, 2.5 Mbps, 5 Mbps, or 10 Mbps
Communications method	Broadcast polling
Synchronization method	Frame synchronization
Encoding	NRZI
Transmission path	Bus (Conforms to RS-485.)
Transmission format	Conforms to HDLC.
Communications media	CC-Link cable (shielded, 3-core twisted-pair cable)
Number of connected nodes	Must meet specifications of the Master Unit.
Remote stations	1 to 61 (Four station numbers are allocated starting from the specified station number.)
Error control	CRC ($X^{16} + X^{12} + X^5 + 1$)
RAS functions	Automatic recovery function, slave cutoff, data link status checks, offline testing
Allocated station numbers	Allocated four stations numbers as a remote device station

2-1-3 CompoNet Communications Specifications

Item			Specification						
Communications protocol			CompoNet protocol						
Baud rate			93.75 kbps, 1.5 Mbps, 3 Mbps, or 4 Mbps*1 *1 A baud rate of 4 Mbps is not supported for branch lines and thus cannot be used for Slave Units with Cables.						
Modulation			Baseband						
Coding			Manchester code						
Error control			Manchester code rules, CRC						
Communications media			Round Cable I (2-conductor cable, JIS C3306) Round Cable II (4-conductor cable, JIS C3306) Flat Cable I (DCA4-4F10 Standard Flat Cable) Flat Cable II (DCA5-4F10 Sheathed Flat Cable)						
Communications distance	Baud rate		Max. segment length	Branch length per segment	Total branch length per segment	Branch location restriction	Connected nodes per branch	Max. sub-trunk length per segment	Total sub-trunk length per segment
	4 Mbps*		30 m (90 m)	0 m	0 m	---	---	---	---
	3 Mbps*		30 m (90 m)	0.5 m	8 m	3 branches/m	1	0 m	0 m
	1.5 Mbps (Round Cable I)*	No branches	100 m (300 m)	---	---	---	---	---	---
		Branches	30 m (90 m)	2.5 m	25 m	3 branches/m	3	---	---
	1.5 Mbps (Round Cable II or Flat Cable I/II)		30 m (90 m)	2.5 m	25 m	3 branches/m	3	0.1 m	2 m
	93.75 kbps (Round Cable I)		500 m (1,500 m)	6 m	120 m	3 branches/m	3	---	---
	93.75 kbps (Round Cable II or Flat Cable I/II)		Unrestricted wiring is enabled for a total length of 200 m per segment.						
Maximum I/O capacity			Word Slave Units: 1,024 inputs and 1,024 outputs (2,048 I/O points total) Bit Slave Units: 256 inputs and 256 outputs (512 I/O points total) When the Gateway Unit is used, I/O capacities are as follows depending on the CompoNet communications mode.						
Max. number of connected nodes			Word Slave Units: 64 input nodes and 64 output nodes Bit Slave Units: 128 input nodes and 128 output nodes When the Gateway Unit is used, the maximum number of connected nodes is as follows depending on the CompoNet communications mode.						
Max. number of connected nodes per trunk line or sub-trunk line			32 nodes (number of Slave Unit and Repeater Unit nodes)						

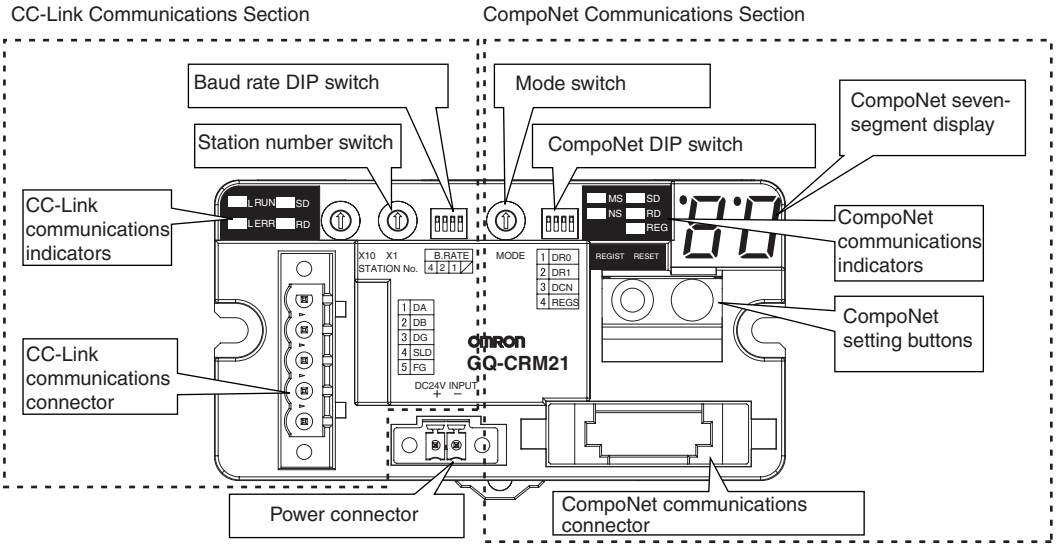
	Communications mode 0 or 4	Communications mode 1 or 5	Communications mode 2 or 6	Communications mode 3
Word Slave Units	1,024 inputs and 1,024 outputs	512 inputs and 512 outputs	256 inputs and 256 outputs	128 inputs and 128 outputs
Bit Slave Units	256 inputs and 256 outputs	192 inputs and 192 outputs	96 inputs and 96 outputs	32 inputs and 32 outputs

	Communications mode 0 or 4	Communications mode 1 or 5	Communications mode 2 or 6	Communications mode 3
Word Slave Units	IN0 to IN63 and OUT0 to OUT63	IN0 to IN31 and OUT0 to OUT31	IN0 to IN15 and OUT0 to OUT15	IN0 to IN7 and OUT0 to OUT7
Bit Slave Units	IN0 to IN127 and OUT0 to OUT127	IN0 to IN95 and OUT0 to OUT95	IN0 to IN47 and OUT0 to OUT47	IN0 to IN15 and OUT0 to OUT15

* Lengths given in parentheses are for when two Repeater Units are used.

2-2 Component Names and Functions

The Gateway Unit is separated into sections, one for CC-Link communications and one for CompoNet communications.



Part		Description	Reference
CC-Link communications section	CC-Link communications indicators	Used to check CC-Link data link status.	2-2-1 Indications
	Station number switch	Sets the station number of the Gateway Unit on the CC-Link network.	2-2-2 Switch Settings
	Baud rate DIP switch	Sets the baud rate of the Gateway Unit on the CC-Link network.	2-2-2 Switch Settings
	CC-Link communications connector	Connects to the CC-Link cable.	2-2-3 Terminal Arrangement
CompoNet communications section	CompoNet communications indicators	Used to check the communications status of CompoNet remote I/O.	2-2-1 Indications
	CompoNet seven-segment display	Normally shows the number of connected CompoNet Slave Units. An error code is displayed if a communications error occurs.	2-2-1 Indications
	Mode switch	Sets the CompoNet communications mode.	2-2-2 Switch Settings
	CompoNet DIP switch	Enables or disables the baud rate setting and registration table on the CompoNet network.	2-2-2 Switch Settings
	CompoNet setting buttons	Creates the registration table on the CompoNet network, resets the Gateway Unit, etc.	2-2-2 Switch Settings
	CompoNet communications connector	Connects the CompoNet network cable.	2-2-3 Terminal Arrangement
Power connector		Connects to the power supply for the Gateway Unit.	2-2-3 Terminal Arrangement

2-2-1 Indications

Indications of both CompoNet and CC-Link status are provided on the Gateway Unit.

CompoNet Communications Section

● CompoNet Communications Indicators

The following LED indicators are provided for CompoNet communications.

MS (Module Status): Shows the status of the node itself (two colors: green and red).
NS (Network Status): Shows the status of communications (two colors: green and red).
SD (Send Data): Shows the transmission status from the Gateway Unit to CompoNet (one color: yellow).
RD (Receive Data): Shows the reception status from CompoNet to the Gateway Unit (one color: yellow).
REG (Registration): Shows if the registration table is enabled or disabled (one color: green).

Indicator	Status	Status definition	Meaning
MS	Lit green	Normal	The Unit is operating normally.
	Lit red	Fatal error	Unit hardware error, such as a watchdog timer error (WDT)
	Not lit	Power OFF/Preparing	Power OFF, resetting, or initializing
NS	Lit green	Online with remote I/O communications in progress	Power is being supplied, remote I/O communications have started, there are no communications errors at any Slave Unit or Repeater Unit, there are no registration table errors, and there are no node address duplication errors for Slave Units or Repeater Units.
	Flashing green	Online with no remote I/O communications in progress	Remote I/O communications have not started or have stopped.
	Flashing red	Non-fatal communications error	A communications error has occurred at one or more Slave Units or Repeater Units. A verification error (non-existent or unregistered Slave Unit) has occurred at one or more Slave Units. Communications have stopped due to a communications error, an illegal configuration error (number of Repeater Units) has occurred, or an address duplication error has occurred at one or more Slave Units or Repeater Units.
	Not lit	Power OFF/Preparing	Power OFF, resetting, or initializing
SD	Lit yellow	Normal transmission	Frames are being sent normally from the Gateway Unit to CompoNet.
	Not lit	No transmission	Data is not being sent by the Gateway Unit
RD	Lit yellow	Normal reception	Frames are being received normally from CompoNet Slave Units.
	Not lit	No reception	Data is not being received by the Gateway Unit.
REG	Lit green	Registration table enabled	The registration table has been created and is enabled. The registration table has been created.
	Flashing green	Registration table creation	The registration table is being created.
	Not lit	Registration table disabled	The registration table is disabled or has not been created.

CompoNet Seven-segment Display

The display operates as shown below during normal operation and when an error occurs.
The information shown on the display during normal operation can be changed by setting pin 3 on the CompoNet DIP switch (pin 3: DCN (details of connected nodes).

Status		Displayed contents	Description
Normal	CompoNet DIP switch pin 3 (DCN (details of connected nodes)): OFF (default)	Number of connected nodes	Displays the number of Slave Units connected to CompoNet. If more than 99 Slave Units are connected, the value of the 100s digit is shown by the dot indicators.
			100s digit = 1 Only the left dot is lit.  (Display example for 123)
			100s digit = 2 Only the right dot is lit.  (Display example for 233)
			100s digit = 3 Both the left and right dots are lit.  (Display example for 323)
	CompoNet DIP switch pin 3 (DCN (details of connected nodes)): ON	Detailed connection information • Baud rate • Number of nodes for each Unit type	• The display will change in the following order. Baud rate ↓ Total number of nodes ↓ Number of Word Slave Units i** (Word Input Slave Units) → o** (Word Output Slave Units) → ↓ Number of Bit Slave Units bi** (Bit Input Slave Units) → bo** (Bit Output Slave Units) → ↓ Baud rate • The baud rate is indicated as follows: "_0": 4 Mbps "_1": 3 Mbps "_2": 1.5 Mbps "_3": 93.75 kbps • The display of the number of connected nodes is the same as when pin 3 on the CompoNet DIP switch is OFF.

Status		Displayed contents	Description					
Error	Initialization error	Error code	The error code is shown on the display in hexadecimal.					
	Communications error	The error code, node type, and applicable node address are displayed in order.	Error code (2-digit hexadecimal) → Slave Unit type → Node address (3-digit decimal: 100s digit is indicated with 1 bit dot) are displayed in order (for each error cause). Note: Error codes are different for inputs and outputs.					
			Example	Error code		Slave Unit type		
				Display	Display appearance	Display	Display appearance	Meaning
			Communications error	d9		i		IN
						o		OUT
						bi		Bit Input Unit
						bo		Bit Output Unit
						r		Repeater Unit
			Node address duplication	d0		Same as above.		
			Verification error: Slave Unit missing.	d5		Same as above.		
			Verification error: Unregistered Slave Unit	d6		Same as above.		
	Operating error Note: "Operating errors" are all errors except for communications errors that occur during Unit operation.	Error code	The error code is shown on the display in 2-digit hexadecimal.					
			Example	Error code		---		
				Display	Display appearance			
			Illegal registration table	E8		---		

CC-Link Communications Section

● CC-Link Communications Indicators

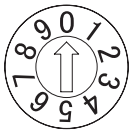
Indicator	Status	Status definition
L RUN	Lit green	CC-Link data links are active.
	Not lit	Communications for CC-Link data links have been interrupted.
L ERR	Lit red	• A CC-Link data link communications error has occurred or the baud rate of the Gateway Unit is different from the baud rate of the CC-Link Master Unit. • The station number switch is set out of range.
	Flashing red	The setting of the baud rate DIP switch or station number switch was changed while power was ON.
SD	Lit yellow	Data is being transmitted normally.
	Not lit	No data is being transmitted.
RD	Lit yellow	Data is being received normally.
	Not lit	No data is being received.

2-2-2 Switch Settings

CompoNet Communications Section

● Mode Switch

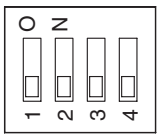
This switch sets the communications mode number for the Gateway Unit. It is set to between 0 and 6 on a decimal rotary switch. The expanded cyclic setting (a network parameter set with the GX-Developer) in the station information must be set according to the communications mode as shown below.



Mode number	Name	Connectable node addresses	Control points	CC-Link version and expanded cyclic setting
0 (default)	Communications mode 0	Word Slave Unit: IN0 to IN63 and OUT0 to OUT63 Bit Slave Unit: IN0 to IN127 and OUT0 to OUT127	Word Slave Unit: 1,024 inputs and 1,024 outputs Bit Slave Unit: 256 inputs and 256 outputs	Version 2, octuple (default)
1	Communications mode 1	Word Slave Unit: IN0 to IN31 and OUT0 to OUT31 Bit Slave Unit: IN0 to IN95 and OUT0 to OUT95	Word Slave Unit: 512 inputs and 512 outputs Bit Slave Unit: 192 inputs and 192 outputs	Version 2, quadruple
2	Communications mode 2	Word Slave Unit: IN0 to IN15 and OUT0 to OUT15 Bit Slave Unit: IN0 to IN47 and OUT0 to OUT47	Word Slave Unit: 256 inputs and 256 outputs Bit Slave Unit: 96 inputs and 96 outputs	Version 2, double
3	Communications mode 3	Word Slave Unit: IN0 to IN7 and OUT0 to OUT7 Bit Slave Unit: IN0 to IN15 and OUT0 to OUT15	Word Slave Unit: 128 inputs and 128 outputs Bit Slave Unit: 32 inputs 32 outputs	Version 1
4	Communications mode 4	Word Slave Unit: IN0 to IN63 and OUT0 to OUT63 Bit Slave Unit: IN0 to IN127 and OUT0 to OUT127	Word Slave Unit: 1,024 inputs and 1,024 outputs Bit Slave Unit: 256 inputs and 256 outputs	Version 2, quadruple
5	Communications mode 5	Word Slave Unit: IN0 to IN31 and OUT0 to OUT31 Bit Slave Unit: IN0 to IN95 and OUT0 to OUT95	Word Slave Unit: 512 inputs and 512 outputs Bit Slave Unit: 192 inputs and 192 outputs	Version 2, double
6	Communications mode 6	Word Slave Unit: IN0 to IN15 and OUT0 to OUT15 Bit Slave Unit: IN0 to IN47 and OUT0 to OUT47	Word Slave Unit: 256 inputs and 256 outputs Bit Slave Unit: 96 inputs and 96 outputs	Version 1
7 to 9	Reserved	---	---	---

Note: Do not set communications mode numbers 7 to 9. They are reserved.

● DIP Switch



- **Baud Rate Setting**

Pin 1	Pin 2	Description
DR0	DR1	
OFF	OFF	4 Mbps (default)
ON	OFF	3 Mbps
OFF	ON	1.5 Mbps
ON	ON	93.75 kbps

The CompoNet Slave Units will automatically detect and use the baud rate that is set on pin 1 (DR0) and pin 2 (DR1). Setting the baud rate is not necessary for any of the Slave Units.

- **Details of Connected Nodes**

Pin	Name	ON	OFF
3	Details of Connected Nodes (DCN)	Details of the connected nodes will be displayed.	The total number of connected nodes will be displayed.

If pin 3 (DCN) is turned ON, details on the connected nodes (baud rate, total number of connected nodes, numbers of I/O Word Slave Units, and numbers of I/O Bit Slave Units) will be displayed on the seven-segment display. If pin 3 is turned OFF, only the total number of connected nodes will be displayed.
Refer to *2-2-1 Indications* for information on the displays for the details of connected nodes.

- **Registration Table Enable Setting**

Pin	Name	ON	OFF
4	Registration Table Enable Setting (REGS)	Registration table enabled.	Registration table disabled.

If pin 4 (REGS) is ON, the registration table that was created with the REGIST CompoNet setting button will be enabled when the power supply is turned ON. Only registered Slave Unit will participate in the network. Registered Slave Units will be compared with the connected Slave Units. If they do not agree, the Registration Table Verification Error Flag at status bit 01 will turn ON.
Refer to *4-1-2 Confirming Normal Slave Unit Operation in Communications Modes 0 to 3* for information on the registration table.

● CompoNet Setting Buttons (REGIST and RESET Buttons)

- **REGIST Button**

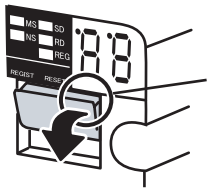
If the REGIST Button is pressed for at least 2 seconds while pin 4 on the DIP switch is OFF, the Slave Unit configuration that is currently connected to the CompoNet network will be registered in the registration table.
The REGS indicator will flash while the table is being created and then light when creating the table has been finished.

- **RESET Button**

If the RESET Button is pressed for at least 2 seconds, the Gateway Unit will be reset.
To enable the registration table that was created with the REGIST button, turn ON the registration table enable setting (pin 4) and reset the Gateway Unit.

Supplemental Information

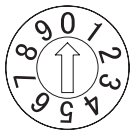
To press the CompoNet setting buttons, open the cover as shown below.

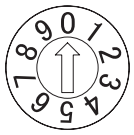


CC-Link Communications Section

● Station Number Switch

The station number switch sets the station number of the Gateway Unit on the CC-Link network.

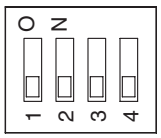

X10


X1

Number	Description	Remarks
1 to 61	Set the station number of the Gateway Unit on the CC-Link network.	Default: 00
0 or 62 to 99	Do not set.	The L ERR indicator will light.

● Baud Rate DIP Switch

The baud rate DIP switch sets the baud rate of the Gateway Unit on the CC-Link network.
Set the baud rate of the Gateway Unit to the same value as the CC-Link Master Unit.



- Baud Rate Setting

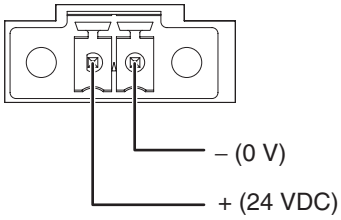
Pin 1	Pin 2	Pin 3	Pin 4*1	Baud rate
OFF	OFF	OFF	OFF	156 kbps (default)
OFF	OFF	ON	OFF	625 kbps
OFF	ON	OFF	OFF	2.5 Mbps
OFF	ON	ON	OFF	5 Mbps
ON	OFF	OFF	OFF	10 Mbps

*1 Always leave pin 4 turned OFF. It is reserved.

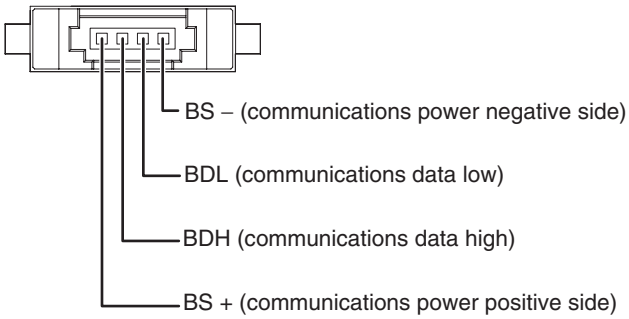
2-2-3 Terminal Arrangement

Gateway Unit/Communications Power Connector

This connector supplies power to the Gateway Unit.
Depending on the type of communications cable that is used for CompoNet, it also supplies power to Slave Units and Repeater Units on the trunk line connected to the CompoNet communications connector.



CompoNet Communications Connector



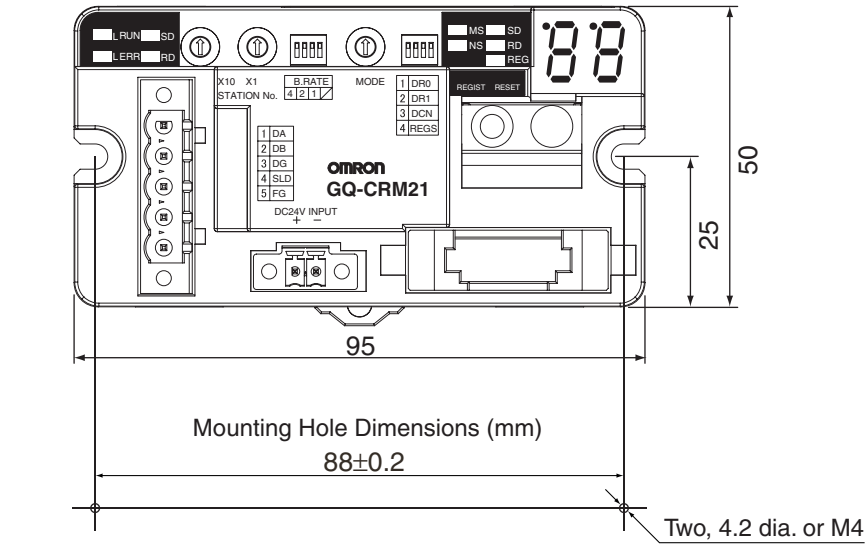
Note: BS – and BS + terminals output the communications power that is supplied from the power connector. (They also supply power to Slave Units and Repeater Units on the trunk line.)

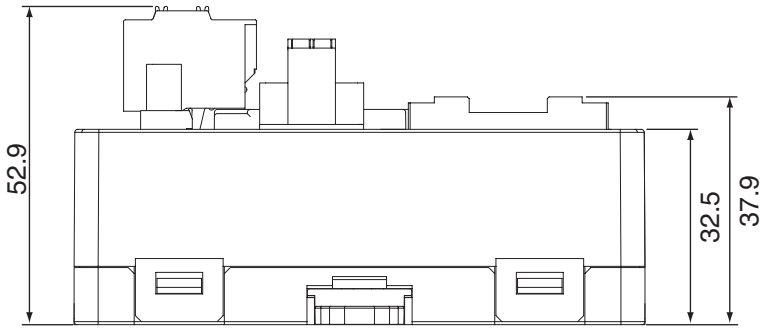
CC-Link Communications Connector

Terminal name	Signal type	Signal line color
DA	Signal line	Blue*1
DB	Signal line	White*1
DG	Communications ground	Yellow
SLD*2	Communications cable shield	---
FG*2	Frame ground	---

*1 Insert terminating resistance at the last station.
*2 SLD and FG are connected inside the Unit.

2-2-4 Dimensions





(Unit: mm)

3

Wiring and Settings

3-1 Overview of Operating Procedures 3-1
3-2 Installation Method 3-4
3-3 Wiring 3-5
3-4 Wiring the Power Supply 3-6
3-5 Wiring the CompoNet Network 3-10
3-6 Wiring the CC-Link Network 3-11
3-7 Communications Settings 3-13

3-1 Overview of Operating Procedures

3-1-1 Basic Startup Procedures

The basic steps required to use the Gateway Unit are given below.

1) Mounting and Wiring — **Refer to 3-2 to 3-6.**

Network Wiring and Power Supply Wiring
- Use the special CC-Link cables.
- Use compliant cables for CompoNet.

▼

2) Setting the Station Number — **Refer to 2-2-2.**

Use the station number switch in the CC-Link communications section to set the station number of the Gateway Unit on the CC-Link network.

▼

3) Setting the Network Baud Rate — **Refer to 2-2-2.**

Use pins 1 to 3 on the baud rate DIP switch in the CC-Link communications section to set the baud rate of the CC-Link network.
Set the baud rate of the Gateway Unit to the same value as the CC-Link Master Unit.
Use pin 1 (DR0) and pin 2 (DR1) on the CompoNet DIP switch to set the baud rate of the CompoNet network.

▼

4) Setting the Communications Mode — **Refer to 2-2-2.**

Select the communications mode based on the system response speed and number of CompoNet Slave Units that are connected.

▼

5) Setting the Node Addresses of the CompoNet Slave Units

▼

6) Power Application

The CompoNet system will start and the number of CompoNet Slave Units that are connected will be displayed on the seven-segment display on the Gateway Unit.
If pin 3 (DCN) on the CompoNet DIP switch is turned ON, detailed connection information will be displayed.

▼

7) Settings from the GX-Developer ---**Refer to 3-7-2.**

Set up the Gateway Unit using the network parameters and write the parameters to the PLC.

▼

8) Confirming Operation

- Confirming CC-Link Network Communications ---**Refer to** 2-2-2**.**
  Check the communications status using the indicators and displays on the CC-Link Master Unit and Gateway Unit.
- Confirming Participation of CompoNet Slave Units ---**Refer to** 4-1-2**.**
  Check the Participation Flags. ---**Refer to** 4-1-3**.**
  If the registration table is being used, also check the Registration Table Verification Error Flag. ---**Refer to** 4-1-3**.**

▼

9) Operation

3-1-2 Procedure for Using the Registration Table

Use the following procedure to register the CompoNet Slave Units in the registration table.

1. Turn OFF pin 4 (REGS) on the CompoNet DIP switch and press the REGIST CompoNet setting button for at least 2 seconds.
   The Slave Unit configuration in the CompoNet system will be registered in the registration table.
2. Turn ON pin 4 (REGS) on the CompoNet DIP switch.
3. Press the RESET CompoNet setting button for at least 2 seconds.
   The Gateway Unit will be reset and the registration table will be enabled.

Precautions for Correct Use

When using a communications mode between 4 to 6, start the Gateway Unit in the communications mode between 0 and 2 that has the same number of control points, confirm participation of the CompoNet Slave Units, and then register the CompoNet Slave Units.

3-2 Installation Method

3-2-1 Mounting to a Control Panel

- When using a DIN Track to mount the Gateway Unit in the control panel, use End Plates (PFP-M, sold separately) to secure the Gateway Unit on the DIN Track.
- When using screws to mount the Gateway Unit in the control panel, open mounting holes in the control panel and tighten the specified size of screws to a suitable torque to secure the Gateway Unit. Use M4 screws and tighten them to between 0.6 and 0.98 N·m.
- There are no restrictions in the mounting orientation of the Gateway Unit.

3-3 Wiring

3-3-1 General Wiring Precautions

- Always turn OFF the power supply before performing any wiring operations on the Gateway Unit. The external devices that are connected to the Gateway Unit may operate in an unexpected manner if the Gateway Unit is wired while the power supply is ON.
- Be careful not to pinch your fingers when attaching connectors.
- Incorrect wiring will reduce safety functions. Perform all wiring correctly and confirm operation before using the Gateway Unit.

3-3-2 Special Connector Tools

Special Screwdrivers

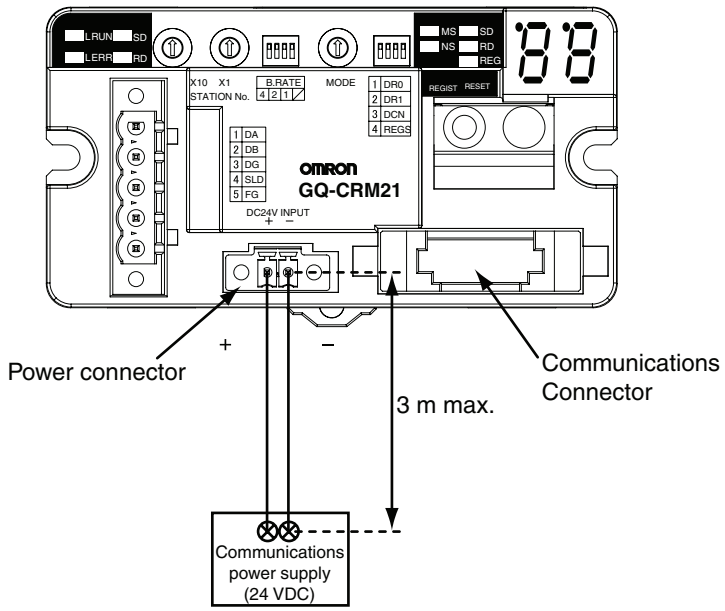
We recommend using the following Special Screwdrivers to tighten wiring screws when wiring the power supply or connecting connector cables to connect accessories.

Model	Manufacturer (supplier)
XW4Z-00C	OMRON
SZF-1	Phoenix Contact

3-4 Wiring the Power Supply

3-4-1 Wiring the Power Supply to the Gateway Unit

Power (24 VDC) is supplied directly from a power source to the Gateway Unit.



Precautions for Correct Use

Do not allow the wiring between the Gateway Unit and the power supply to exceed 3 m.

● Selecting a DC Power Supply

The DC power supply must satisfy the following conditions.

Item	Specification
Output voltage	24 VDC ± 10%
Output ripple	600 mVp-p
Output current	The capacity of the power supply must be equal to the sum of the following current consumptions or greater. • Current consumptions of all Word Slave Units and Repeater Units • Current consumptions of all Bit Slave Units plus the current consumptions of the external I/O
Isolation	The output must be isolated from both the AC power supply and the case ground.

For Slave Units with network power supply, the power for external I/O is also supplied from the power supply connected to the Gateway Unit (through the Flat Cable). When determining the output current of the power supply, always include the actual load currents and the current consumptions of the external I/O.

Refer to documentation for each Slave Unit for information on Slave Unit current consumptions.

3-4-2 Power Supply Wiring for CompoNet Slave Units and the CompoNet Network

The following power supplies are required to operate the CompoNet network.

- Communications power supply: Required for Slave Unit communications and internal operation.
- I/O power supply: Required for external I/O operation for the Slave Units.

The power supply method for communications and I/O depends on the cables and the Slave Units that are used, as shown below.

Slave Unit Power Supply Types and Cables

The cables that can be used for each type of Slave Unit power supply are given in the following table. Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for details on cable types.

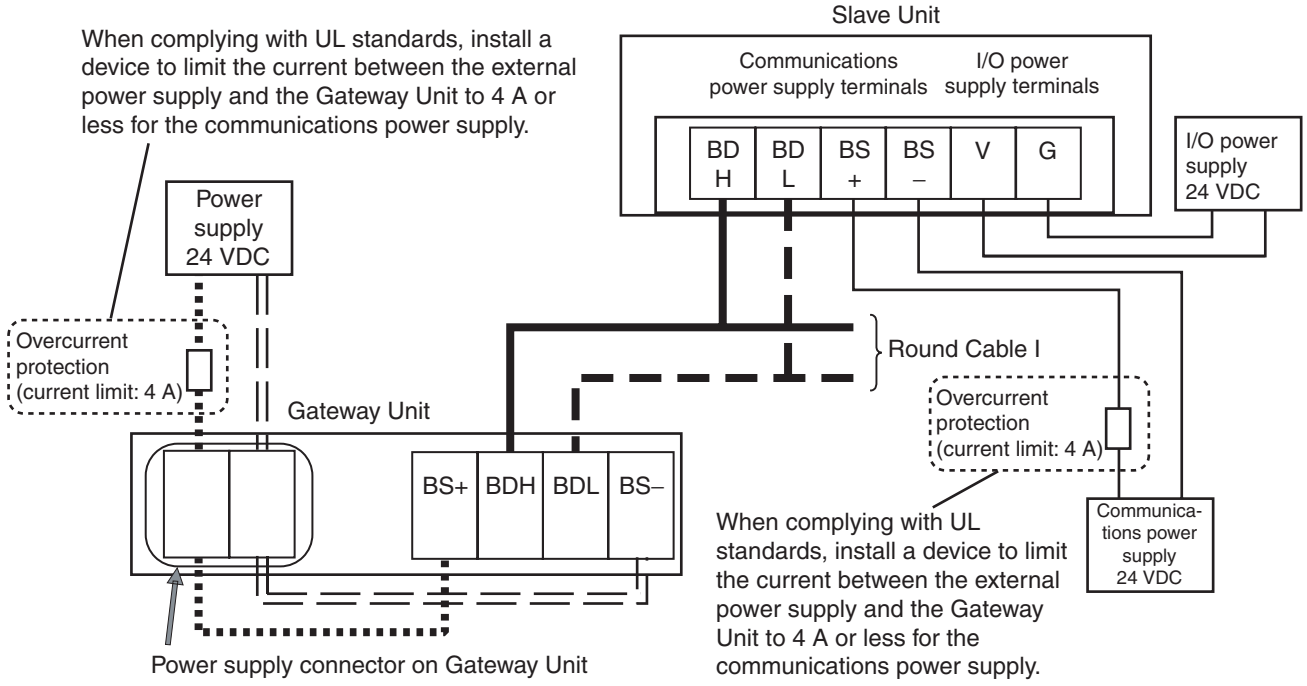
Slave power supply types	Cable types	
	Round Cable I	Round Cable II, Flat Cable I, or Flat Cable II
Multi-power supply	Can be used.	Can be used.
Network power supply	Cannot be used.	Can be used.

Power Supply Methods According to Slave Unit Power Supply Types

An overview of the power supply methods for each Slave Unit power supply type is given in this section. Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for details on wiring methods.

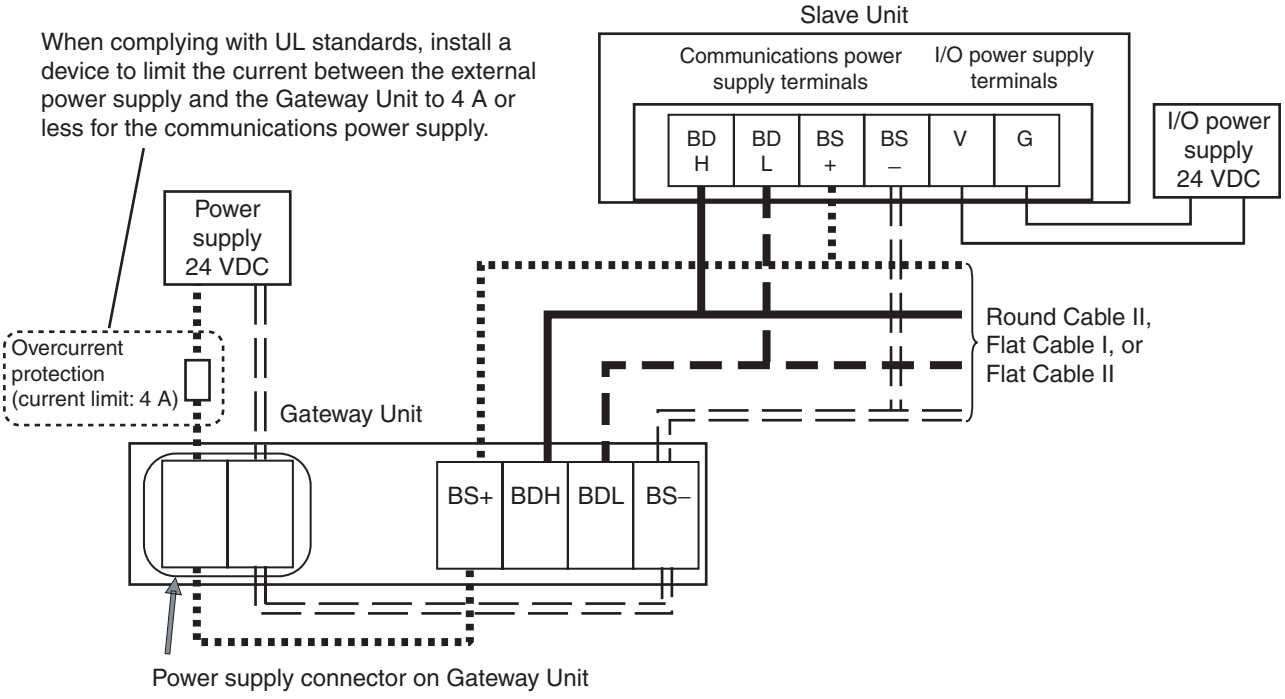
● Multi-power Supply (Round Cable I)

Supply power separately to the communications power terminals (BS+ and BS–) and the I/O power terminals (V+ and G–) on each Slave Unit.



● Multi-power Supply (Round Cable II, Flat Cable I, or Flat Cable II)

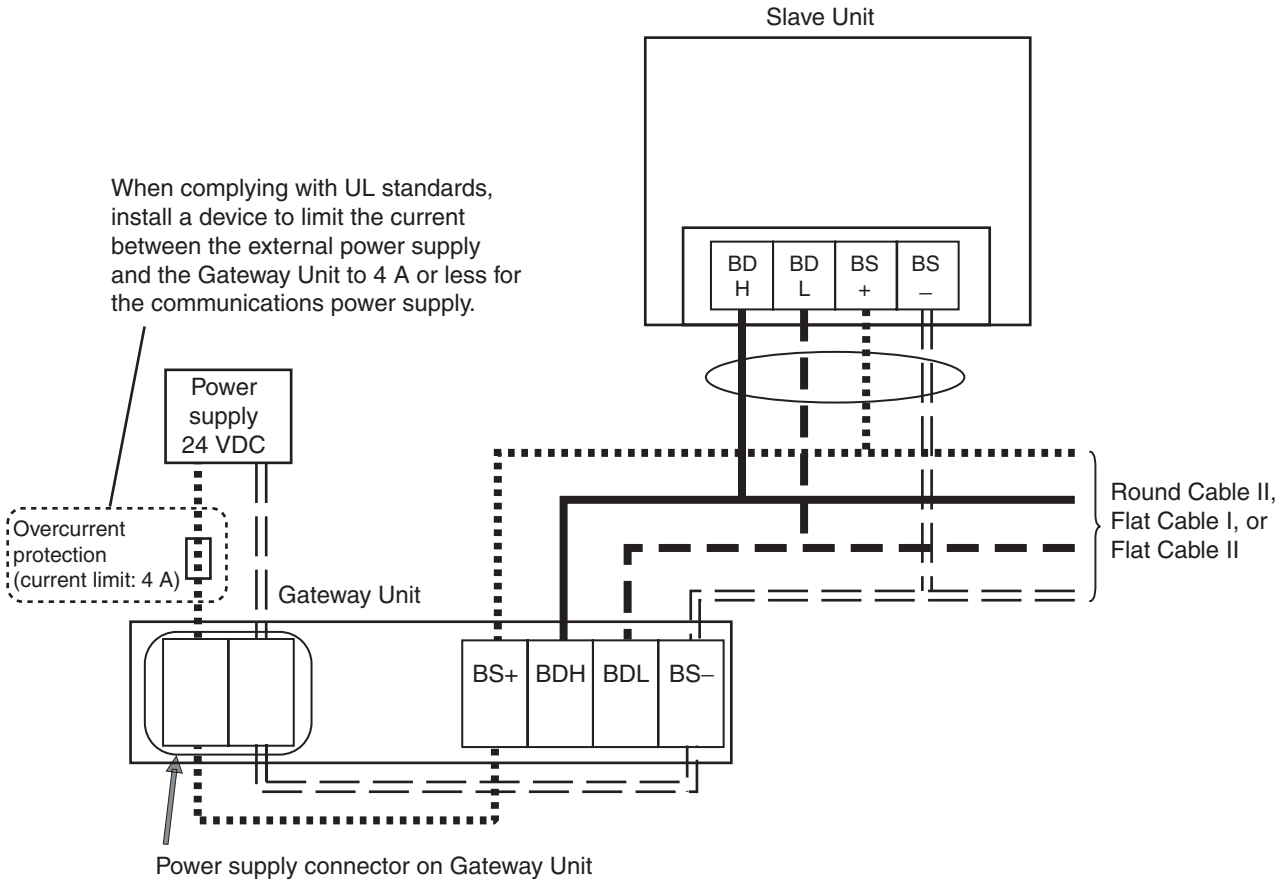
Communications power (BS+ and BS–) is supplied from the Gateway Unit.
I/O power (V+ and G–) is supplied separately.



● Network Power Supply

The communications power (BS+ and BS–) and the I/O power (V and G) are supplied together. They do not have to be supplied separately.

Both communications power and I/O power are supplied from the Gateway Unit.



3-5 Wiring the CompoNet Network

3-5-1 Wiring Methods for the CompoNet Network

Refer to the *CompoNet Slave Unit and Repeater Unit Operation Manual* (Cat. No. W457) for basic wiring specifications, cable wiring methods, cable processing and mounting methods, and cable types.

3-6 Wiring the CC-Link Network

The Gateway Unit is treated as a remote device station in the CC-Link network. To connect the Gateway Unit to the CC-Link network, refer to documentation for the CC-Link Master Unit and the *CC-Link Cable Wiring Manual*.

3-6-1 Recommended Materials and Tools

After stripping the special CC-Link cable, attach ferrules.

● Special CC-Link Cable (Version 1.10)

Refer to documentation for the CC-Link Master Unit and the *CC-Link Cable Wiring Manual* for specifications and processing methods (including stripping methods) for the special CC-Link cable.

● Ferrules

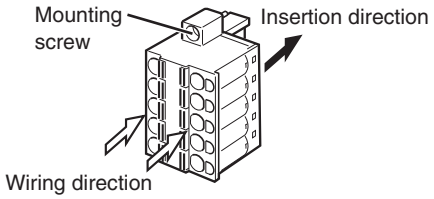
Use ferrules with insulative covers that conform to DIN 46228-4 standards. If non-complaint ferrules are used, they may not be suitable for the terminal block on the Gateway Unit even if they have the same shape.
(The wire size is a guideline only. Check compatibility in advance.)

Manufacturer	Model	Conductor cross-section area (mm^2)
Phoenix Contact	AI0.75-10WH	0.5

● Ferrule Crimper

Manufacturer	Model
Phoenix Contact	CRIMPFOX UD6

● Gateway Connector (Enclosed)

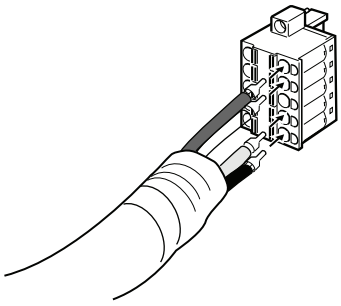


(Made by Phoenix Contact*1)
TFKC2.5/5-STF-5.08AU

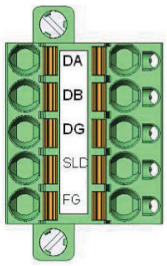
*1 The enclosed Gateway Unit connector is made by Phoenix Contact.
Contact Information
Phoenix Contact

3-6-2 Wiring the Connector

Strip the wires in the CC-Link cable, attach ferrules, and insert them into the connector.
To insert a ferrule, hold the orange tab in and insert the ferrule all the way to the back of the connector. Then release the orange tab and pull lightly on the wire to confirm that the wire is securely connected.



The communications connector is labeled with the terminal names. Align the colors of the communications wires with the terminal names on the connector to ensure that the wires are connected correctly.



Terminal name	Signal	Signal line color
DA	Signal line	Blue*1
DB	Signal line	White
DG	Communications ground	Yellow
SLD*2	Communications cable shield	—
FG*2	Frame ground	—

*1 Insert terminating resistance at the last station.
*2 The SLD and FG terminals are connected inside the Unit.

Precautions for Correct Use

If the Gateway Unit is at the end of the CC-Link network, be sure to connect the terminating resistance.
Refer to documentation on the CC-Link Master Unit for information on connecting the terminating resistance.

3-7 Communications Settings

3-7-1 CompoNet Settings

Setting the Communications Mode

Set the communications mode to between 0 and 6 on the mode switch according to the number of Word Slave Units, Bit Slave Units, and control points connected to the Gateway Unit. (Refer to *2-2-2 Switch Settings* for details.)

The range of buffer memory allocated to the Gateway Unit in the CC-Link Master Unit will depend on the communications mode. (Refer to *4-2 Memory Map* for details.)

The expanded cyclic setting (a network parameter for the GX-Developer) in the CC-Link station information will have to be changed according to the communications mode.

CompoNet DIP Switch Settings

Set the following items on the CompoNet DIP switch.

Refer to *2-2-2 Switch Settings* for details.

Setting	Description
Baud rate	Set the CompoNet baud rate.
Display method for the number of connected nodes	The node connection information displayed on the seven-segment display can be switched to display more detailed information.
Registration table enable setting	Set whether to use the registration table to ensure that all of the registered Slave Units and only the registered Slave Units participate in the CompoNet network.

Creating the Registration Table

To register the current Slave Unit configuration in a registration table, press the REGIST CompoNet setting button.

Refer to *4-1-3 Registration Table* for information on the registration table.

3-7-2 CC-Link Settings

Setting the Unit Station Number

Set the station number of the Gateway Unit on the CC-Link network.

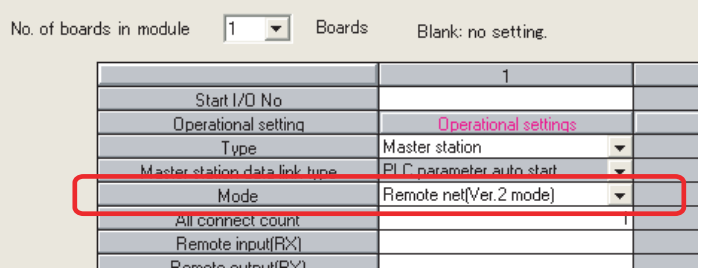
Baud Rate Setting

Set the baud rate of the Gateway Unit on the CC-Link network using the baud rate DIP switch.

Settings from the GX-Developer

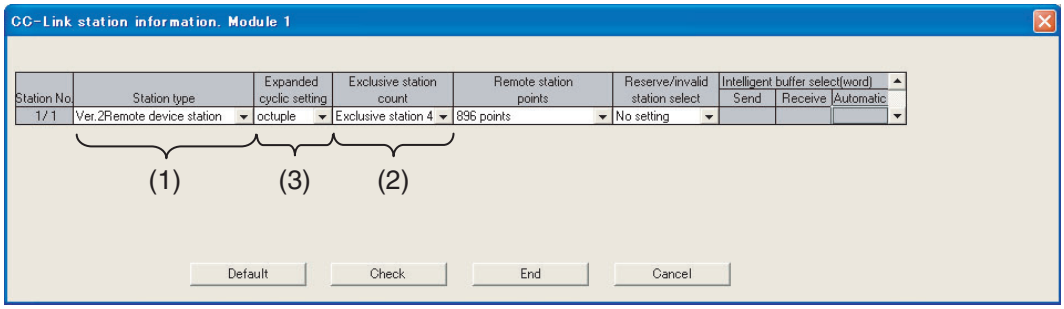
Set the Gateway Unit in the network parameters of the GX-Developer to a 4-station remote device station using the following procedure.

1. Set the *Mode* parameter in the CC-Link network parameters as shown below.



- **CompoNet communications mode 0, 1, 2, 4, or 5**
  Remote net (Ver. 2 mode)
- **CompoNet communications mode 3 or 6**
  Remote net (Ver. 2 mode) or Remote net (Ver. 1 mode)

2. Make the following settings on the CC-Link Station Information Dialog Box.



- CompoNet communications mode 0, 1, 2, 4, or 5
  (1) Set the station type to *Ver. 2 Remote device station*.
  (2) Set the exclusive station count to *Exclusive station 4*.
  (3) Set the expanded cyclic setting as shown below according to the communication mode that was set on the mode DIP switch.

Communication mode	CC-Link expanded cyclic setting
Communications mode 0	Octuple
Communications mode 1	Quadruple
Communications mode 2	Double
Communications mode 4	Quadruple
Communications mode 5	Double

- CompoNet communications mode 3 or 6
  (1) Set the station type to *Ver. 1 Remote device station* or *Remote device station*.
  (2) Set the exclusive station count to *Exclusive station 4*.

4

Remote I/O Communications

4-1 Exchanging Data..... 4-1
4-2 Memory Map..... 4-8
4-3 Remote I/O Communications Performance..... 4-22

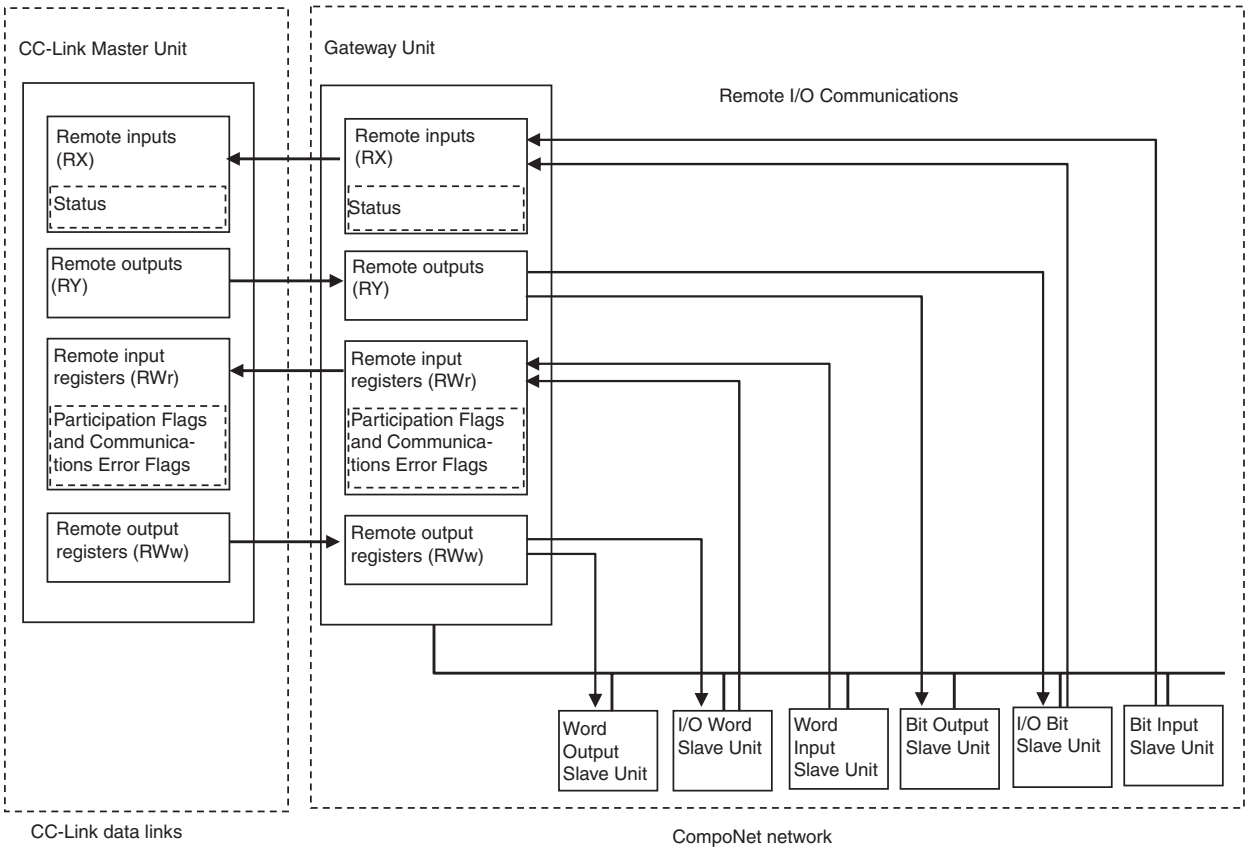
4-1 Exchanging Data

4-1-1 Basic Communications Operations

Data Exchange between CC-Link and CompoNet Networks

Bit input and bit output data for Bit Slave Units on the CompoNet network and input and output data for Word Slave Units on the CompoNet network are shared with the Gateway Unit using remote I/O communications.

If data links are executed between the Gateway Unit and CC-Link Master Unit, this I/O data will be refreshed in buffer memory (RX, RY, RWr, and RWw) in the CC-Link Master Unit.



- The Slave Units on the CompoNet network are assigned to buffer memory in the CC-Link Master Unit as follows:

Bit Input Slave Units	: Remote input (RX) area
Bit Output Slave Units	: Remote output (RY) area
I/O Bit Slave Unit	: Remote input (RX) area and remote output (RY) area
Word Input Slave Unit	: Remote input register (RWr) area
Word Output Slave Unit	: Remote output register (RWw) area
I/O Word Slave Unit	: Remote output register (RWw) area and remote input register (RWr) area

CompoNet Network Start/Stop Conditions

- The CompoNet network will start when the power supply to the Gateway Unit and the communications power supply to the Slave Units are turned ON.

Note: Overall communications will not stop even if there is a verification error for the registration table or a duplicated slave address.

- If data links cannot operate on the CC-Link network (i.e., if the Error Status Flag in CC-Link Status is ON), remote I/O communications for the CompoNet network will also stop.
  If data links start on the CC-Link network, remote I/O communications for the CompoNet network will also start.

Communications Errors on the CompoNet Network

A communications error occurs when a Slave Unit cannot respond normally to a communications request from the Gateway Unit. The main causes of communications errors are given below.

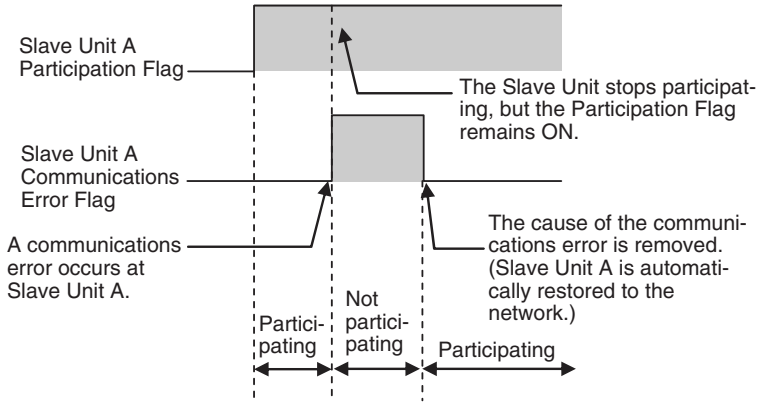
- Failure of the Slave Unit
- Disconnected communications cable to the Slave Unit
- Communications power interruption
- Noise or other factor that prevents normal data reception from the Slave Unit

If a communications error occurs for a Slave Unit, the NS indicator on the front of the Gateway Unit will flash red and “d9” will be displayed on the seven-segment display. Also, the Communications Error Flag (bit 00 in the Status Area) will turn ON.

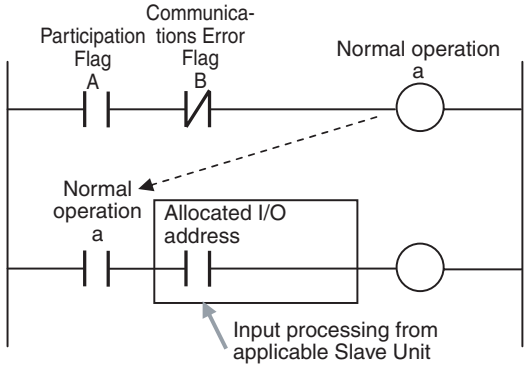
4-1-2 Confirming Normal Slave Unit Operation in Communications Modes 0 to 3

Participation Flags and Communications Error Flags

- To check whether Slave Units are normally participating in the network, the Participation Flags and Communications Error Flags in the Status Area are used.
  - Participation Flags:
    A Participation Flag turns ON once the corresponding Slave Unit starts participating in the network after the system is started (i.e., when the power is turned ON). It remains ON even if the Slave Unit stops participating due to a communications error.
  - Communications Error Flags:
    A Communications Error Flag turns ON if the applicable Slave Unit cannot communicate with the Master Unit for any reason after the Slave Unit has joined the network (i.e., if the Participation Flag is ON). It turns OFF when the error is removed.



Therefore, in the ladder program, the applicable Slave Unit has stopped participating when both the Participation Flag and the Communications Error Flag are ON. Similarly, the applicable Slave Unit is operating normally when the Participation Flag is ON and the Communications Error Flag is OFF.
Example: This example shows executing I/O with the applicable Slave Unit when the Participation Flag and Communications Error Flag are combined and taken as a condition to confirm that operation is normal.



- The operation of the Participation Flags and Communications Error Flags depends on the status of pin 4 (REGS) on the CompoNet DIP switch on the front of the Gateway Unit.

Pin 4 (REGS) of CompoNet DIP switch on front of Gateway Unit	Applicable Participation Flags and Communications Error Flags
OFF (Registration table disabled.)	Flags for all Slave Units
ON (Registration table enabled.)	Only flags for registered Slave Units. Participation Flags and Communications Error Flags for unregistered Slave Units will not operate.

- One bit is allocated for each node address. Participation Flags and Communications Error Flags are allocated for each node type (Word Input Slave Units, Word Output Slave Units, Bit Input Slave Units, and Bit Output Slave Units). One word is allocated for each 16 Slave Units.

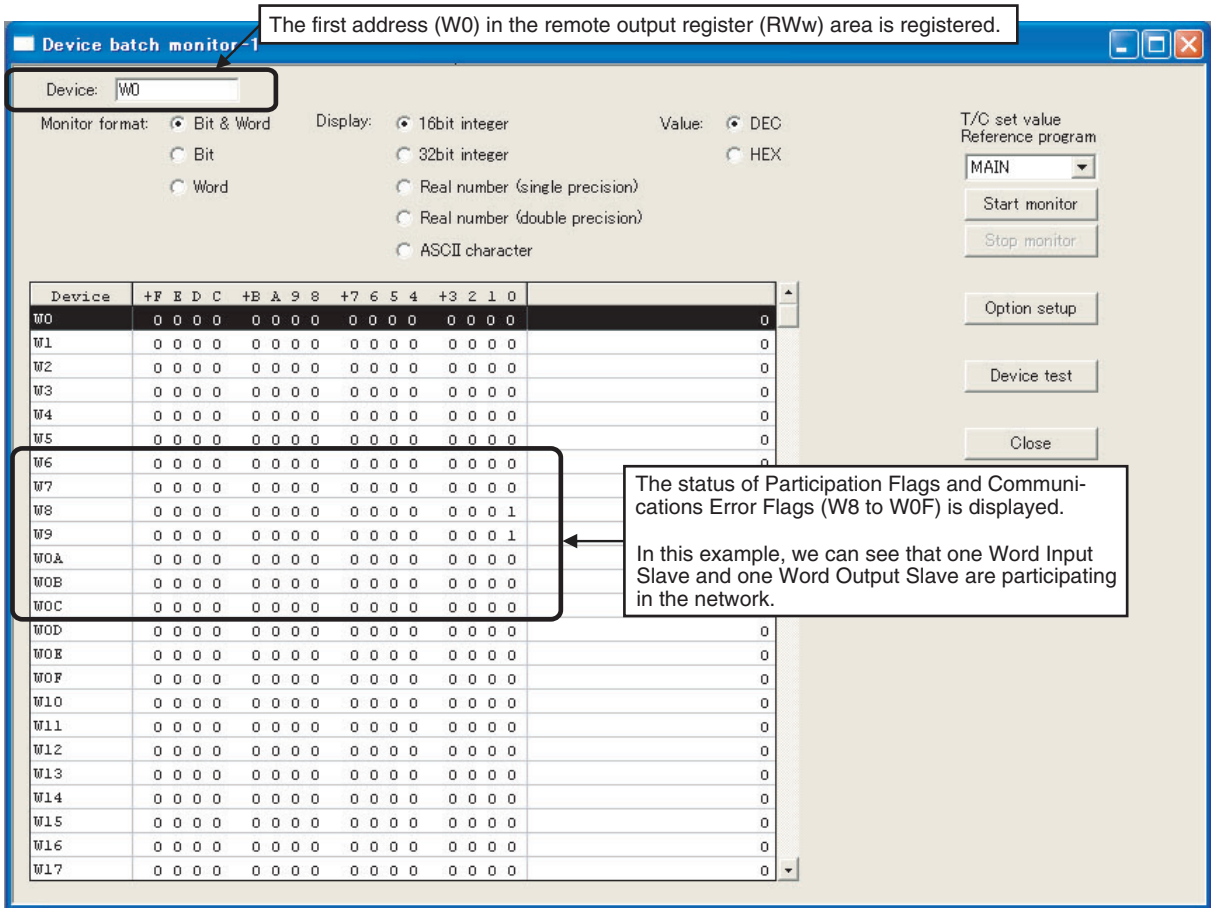
Note: For I/O Slave Units, Participation Flags and Communications Error Flags are allocated to the Unit only as an Input Slave Unit.

Checking the Status of Participation Flags and Communications Error Flags

The status of buffer memory allocated to Participation Flags and Communications Error Flags can be monitored from the GX-Developer.

1. Select ***Online*** – ***Monitor*** – ***Device batch*** from the menu.
2. The Device Batch Monitor Dialog Box will be displayed and monitor conditions can be set as shown below.

Example: The following example is for the following settings: Communications mode 3, First remote output register (RWw) address: 0, Gateway Unit with station number 1.



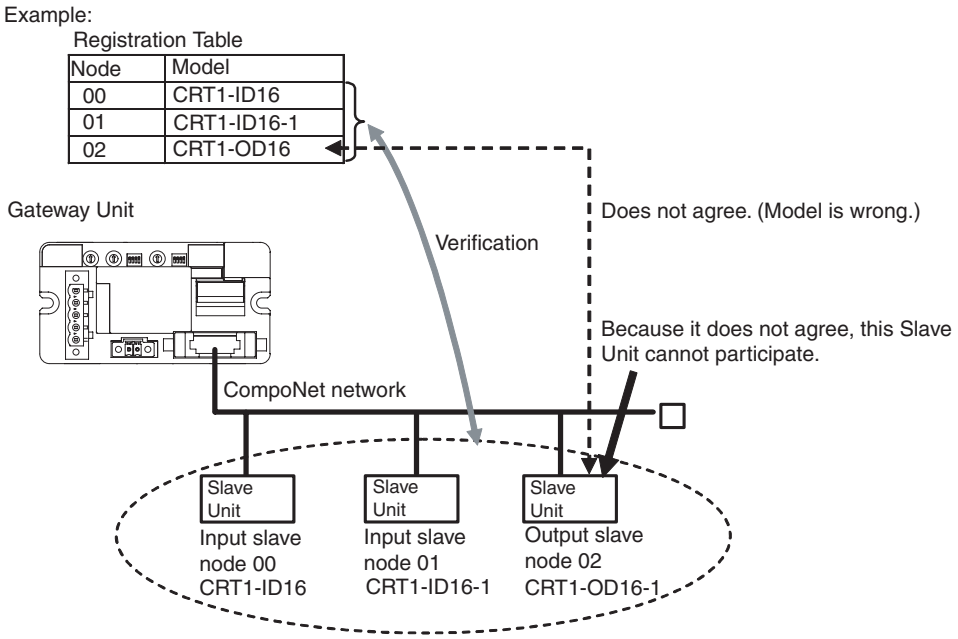
Supplemental Information

Write the ladder program so that it monitors the Gateway Unit and data link operating status to check for errors on the CC-Link network.
Refer to documentation on the CC-Link Master Unit for details.

4-1-3 Registration Table

Overview

A registration table is used to register Slave Units that are intended to participate at particular node addresses (along with the models corresponding to the node addresses) to enable verifying that they actually are participating. At the same time, using the registration table prevents unregistered Slave Units and Slave Units of the wrong node addresses or models from participating in the network.



This function is enabled only in Registration Table Enable Mode, i.e., when pin 4 (REGS) is ON on the Gateway Unit when the power is turned ON and the registration table data is normal. It can be used in any communications mode.

If a Slave Unit is found to be not in agreement during the verification, the Registration Table Verification Error Flag (status bit 01) will turn ON.

Operation

The operation for each case is as follows:

- If all registered Slave Units are participating within the Registered Slave Unit Participation Monitoring Time*1 after the power is turned ON, the All Registered Slave Units Participating Flag (status bit 06) will turn ON.
  - If no unregistered Slave Units are participating, the Registration Table Verification Error Flag will turn OFF.
  - If any unregistered Slave Unit is participating, a verification error (unregistered Slave Unit) will occur and the Registration Table Verification Error Flag will turn ON. At the same time, the NS indicator on the front of the Gateway Unit will flash red and the seven-segment display will show "d6."
- If all registered Slave Units are not participating within the Registered Slave Unit Participation Monitoring Time*1 after the power is turned ON, a verification error (non-existent Slave Unit) will occur and the Registration Table Verification Error Flag will turn ON. At the same time, the NS indicator on the front of the Gateway Unit will flash red and the seven-segment display will show "d5." If the applicable Slave Unit subsequently starts participating, the Registration Table Verification Error Flag will turn OFF and the error display will be cleared.

Note: Remote I/O communications will not operate if pin 4 (REGS) is ON on the Gateway Unit when the power is turned ON and the registration table data is not valid. The MS indicator on the front of the Gateway Unit will flash red, and the seven-segment display will show "E8."
If that occurs, create the registration table again.

*1 The Registered Slave Unit Participation Monitoring Time depends on the CompoNet baud rate as follows:
- 1.5 Mbps, 3 Mbps, or 4 Mbps: 20 seconds
- 93.75 kbps: 140 seconds

Creating the Registration Table

1. Start the CompoNet network and get the Slave Units to participate in the CompoNet network.

2. Make sure that pin 4 (REGS) is ON on the CompoNet DIP switch and press the REGIST CompoNet setting button for at least 2 seconds.
   The REG indicator in the CompoNet communications section will flash while the registration table is being created.
   The REG indicator will light after the registration table has been completed.

3. Turn ON pin 4 (REGS) on the CompoNet DIP switch and press the RESET CompoNet setting button for at least 2 seconds.
   The registration table will be enabled and will operate. The Registration Table Mode Flag (status bit 10) will turn ON (Registration Table Enable Mode).

Slave Unit Address Duplication Error

In any of the following cases, a Slave Unit address duplication error will occur and the Address Duplication Error Flag (status bit 03) will turn ON for the Slave Unit that joined the network later.

At the same time, the NS indicator on the front of the Gateway Unit will flash red and the seven-segment display will show “d0.” Remote I/O communications will not stop.

- There is another Slave Unit for which the same node address is set.
  (For example, both Slave Units are set to node address N.)

Note: An address duplication error will occur if the same node address is set for two Slave Units in the same allocation area. This applies only if both are Input Slave Units or both are Output Slave Units.

- Different node addresses are set, but the allocated memory areas overlap.
  (For example, a Slave Unit that is set to node address 0 has 24 inputs and a Slave Unit that is set to node address 1 has 16 inputs. In this case both Slave Units will be set to use the Input 1 Area.)

Note: As long as the allocated areas themselves are not duplicated between nodes, Slave Units set for different node addresses can be allocated remote input registers (RWr) and remote output registers (RWw) in the same node address area.
(For example, a Slave Unit set for node address 1 can be allocated 16 outputs in the Output 1 Area, while an Expansion Slave Unit set for node address 0 can be allocated 16 inputs in the Input 1 Area.)

- A Slave Unit was removed and then a Slave Unit of a different type started participating at the same node address.
- CompoNet communications become unstable.

Illegal Configuration Error

If the permitted number of Repeater Unit segments is exceeded, the NS indicator on the front of the Gateway Unit will flash red and the seven-segment display will show “E5.”

4-2 Memory Map

This section describes how the CompoNet network data is assigned to buffer memory in the CC-Link Master Unit.

4-2-1 Overview

Buffer memory in the CC-Link Master Unit is allocated to Slave Unit I/O information and status information through the Gateway Unit.
The area ranges depend on the communications mode, and the bits that can be used by each Slave Unit depend on the node address that is set for the Slave Unit and the number of control points of the Slave Unit.

4-2-2 I/O Memory Allocations According to Communications Modes

The range of buffer memory allocated to the Gateway Unit in the CC-Link Master Unit depends on the communications mode as shown below.

Buffer memory in CC-Link Master Unit	Remote I/O data in CompoNet network	Communications mode						
		6	5	4	3	2	1	0
Remote inputs (RX)	Bit Slave Unit inputs	6 words	12 words	16 words	2 words	6 words	12 words	16 words
	Status	1 word	1 word	1 word	1 word	1 word	1 word	1 word
	CC-Link status	1 word	1 word	1 word	1 word	1 word	1 word	1 word
	(Reserved by system.)	5 words	13 words	25 words	0 words	5 words	13 words	25 words
Remote outputs (RY)	Bit Slave Unit outputs	6 words	12 words	16 words	2 words	6 words	12 words	16 words
	CC-Link status	1 word	1 word	1 word	1 word	1 word	1 word	1 word
	(Reserved by system.)	6 words	14 words	26 words	5 words	6 words	14 words	26 words
Remote input registers (RWr)	Word Slave Unit inputs	16 words	32 words	64 words	8 words	16 words	32 words	64 words
	Participation Flags and Communications Error Flags	---	---	---	8 words	16 words	32 words	64 words
Remote output registers (RWw)	Word Slave Unit outputs	16 words	32 words	64 words	8 words	16 words	32 words	64 words
	(Reserved by system.)	---	---	---	8 words	16 words	32 words	64 words

4-2-3 Memory Map for Each Communications Mode

The following allocations assume that the first refresh device is set to 0.

Communications mode	Expanded cyclic setting	Bit Slave Unit inputs	Status	Bit Slave Unit outputs	Word Slave Unit inputs	Participation Flags and Communications Error Flags	Word Slave Unit outputs
0	Octuple	RX0000 to RX00FF	RX0100 to RX010F	RY0000 to RY00FF	RWr00 to RWr3F	RWr40 to RWr6F	RWw00 to RWw3F
1	Quadruple	RX0000 to RX00BF	RX00C0 to RX00CF	RY0000 to RY00BF	RWr00 to RWr1F	RWr20 to RWr3F	RWw00 to RWw1F
2	Double	RX0000 to RX005F	RX0060 to RX006F	RY0000 to RY005F	RWr00 to RWr0F	RWr10 to RWr1F	RWw00 to RWw0F
3	Single	RX0000 to RX001F	RX0020 to RX002F	RY0000 to RY001F	RWr00 to RWr07	RWr08 to RWr0F	RWw00 to RWw07
4	Quadruple	RX0000 to RX00FF	RX0100 to RX010F	RY0000 to RY00FF	RWr00 to RWr3F		RWw00 to RWw3F
5	Double	RX0000 to RX00BF	RX00C0 to RX00CF	RY0000 to RY00BF	RWr00 to RWr1F		RWw00 to RWw1F
6	Single	RX0000 to RX005F	RX0060 to RX006F	RY0000 to RY005F	RWr00 to RWr0F		RWw00 to RWw0F

4-2-4 Status Area Allocations

The Status Area consists of the following two items.

- Status: The status of the network and of the Gateway Unit
- Participation Flags and Communications Error Flags: Participation and error flags for applicable Slave Units

Status

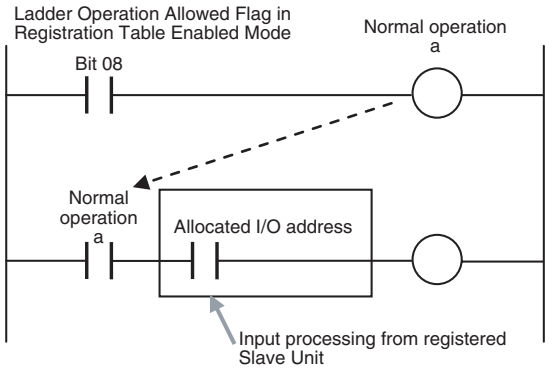
The status of the Gateway Unit and the entire network are stored here.

Bit address (See note 1)	Name	Description
RXn0	Communications Error Flag	OFF: Normal ON: Error Turns ON when a communications error occurs at even one applicable Slave Unit.*1 *1 This applies to all Slave Units if pin 4 (REGS) on the Gateway Unit is OFF when the power is turned ON. If pin 4 is ON when the power is turned ON, then this applies to registered Slave Units only.
RXn1	Registration Table Verification Error Flag	Enabled only in Registration Table Enable Mode, i.e., when pin 4 (REGS) is ON on the Gateway Unit when the power is turned ON. OFF: Normal ON: Verification error Turns ON if even one Slave Unit node address and corresponding Slave Unit model do not agree with the information in the registration table when the power is turned ON. Note: Remote I/O communications will start even if this flag turns ON.
RXn2	Reserved.	Do not use.
RXn3	Slave Unit Duplicated Address Error Flag	OFF: Normal ON: Error (The same node address is set for more than one Slave Unit, the same node address area is being used by more than one Slave Unit, or a different type of Slave Unit is participating at the same address after the original Slave Unit left the network.) Note: Remote I/O communications will start even if this flag turns ON.
RXn4	Repeater Unit Communications Error Flag	OFF: Normal ON: Error Note: Remote I/O communications will start even if this flag turns ON.
RXn5	Repeater Unit Node Duplicated Address Error Flag	OFF: Normal ON: Error Note: Remote I/O communications will start even if this flag turns ON.

Bit address	Name	Description
RXn6	All Registered Slave Units Participating Flag	Enabled only in Registration Table Enable Mode, i.e., when pin 4 (REGS) is ON on the Gateway Unit when the power is turned ON. OFF: A Slave Unit is not participating. (Not all Slave Units in the registration table are participating.) ON: All Slave Units in the registration table are participating. Note 1: This flag turns ON when all Slave Units in the registration table are participating, even if an unregistered Slave Unit is also participating. 2: Remote I/O communications will be stopped while this flag is OFF. They start when it turns ON.
RXn7	Remote I/O Communications Started Flag	OFF: Remote I/O communications are stopped. ON: Remote I/O communications are operating.
RXn8	Ladder Operation Allowed Flag in Registration Table Enabled Mode	OFF: Ladder program operations are not possible. (The ladder program should not be used in relation to remote I/O communications.) ON: Ladder program operations are possible. (The ladder program can be used in relation to remote I/O communications.) Note: Flag status is determined by a logical AND of the status of bit 06 (all registered Slave Units participating), bit 07 (remote I/O communications operation), and the reverse status of bit 00 (no communications error).
RXn9	Reserved.	Do not use.
RXnA	Registration Table Mode Flag	OFF: Registration Table Disable Mode. Pin 4 (REGS) on the Gateway Unit was OFF when the power was turned ON, or the registration table data is illegal. ON: Registration Table Enable Mode. Pin 4 (REGS) on the Gateway Unit was ON when the power was turned ON, and the registration table data is not illegal.
RXnB to RXnF	Reserved.	Do not use.

Note 1: "n" depends on the communications mode as shown below when the first refresh device address in the remote input (RX) area is 0 and the station number of the Gateway Unit is 1.
Communications mode 0 or 4: 10, Communications mode 1 or 5: C, Communications mode 2: 6, or Communications mode 3: 2.
2: Bits 0, 1, and 3 output a logical OR of the status of all Slave Units other than Repeater Units; bits 4 and 5 output an OR of Repeater Unit status only; and bit 2 outputs an OR of the status of all Slave Units and Repeater Units.

Example: In this example, operation is considered normal when all registered Slave Units are participating, there are no communications errors at any registered Slave Units, and remote I/O communications are operating.



Participation Flags and Communications Error Flags (Communications Mode 0 to 3 Only)

These flags indicate nodes participating in the network and nodes where errors have occurred after participation has started.

Flag name	Description
Participation Flag	ON: The applicable Slave Unit is participating or has participated in the network. OFF: Power has been interrupted or a restart has been executed. Note: A Participation Flag turns ON once the corresponding Slave Unit starts participating in the network after the system is started (i.e., when the power is turned ON). (It remains ON even if the Slave Unit stops participating due to a communications error.)
Communications Error Flag	ON: A communications error occurred at the applicable Slave Unit when it was participating in the network. OFF: A communications error has not occurred at the applicable Slave Unit while it was participating in the network. Note: A Communications Error Flag turns ON if the applicable Slave Unit cannot communicate with the Gateway Unit for any reason after the Slave Unit has joined the network (i.e., if the Participation Flag is ON). It turns OFF when the error is removed.

Refer to *A-2 Status Area Allocations According to Communications Modes* for Slave Unit allocations.

Note: With a Contact I/O Unit, only the Input Flags for the input node are allocated.
The portion of memory that can be used for Slave Units is allocated in I/O memory in the CPU Unit. (For example, in communications mode 3, there are eight nodes each for inputs and outputs, so words +0 and +1 are used.)

CC-Link Status

- Remote Inputs (RX)

Bit address*1	Name
RXn0	Initial Data Processing Request Flag*2
RXn1	Initial Data Setting Completed Flag*2
RXn2	Error Status Flag*3
RXn3	Remote Station Ready Flag*4
RXn4	Reserved.
RXn5	
RXn6	
RXn7	Defined by OS.

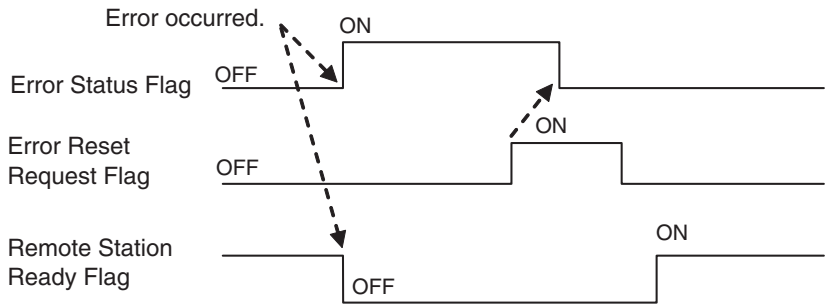
- Remote Outputs (RY)

Bit address*1	Name
RYn0	Initial Data Processing Completed Flag*2
RYn1	Initial Data Setting Request Flag*2
RYn2	Error Reset Request Flag*3
RYn3	Reserved.
RYn4	
RYn5	
RYn6	Defined by OS.
RYn7	

*1 "n" depends on the communications mode as shown below when the first refresh device address in the remote input (RX) area or remote output (RY) area is 0 and the station number of the Gateway Unit is 1. Communications mode 0 or 4: 10, Communications mode 1 or 5: C, Communications mode 2: 6, or Communications mode 3: 2.

*2 These flags are disabled because the Gateway Unit does not require initialization.

*3 The Error Status Flag will not automatically turn OFF even if the cause of the error is removed. Remove the cause of the error, and then turn ON the Error Reset Request Flag.



*4 This flag turns ON when the power supply is turned ON or after resetting with the reset switch.

4-2-5 Node Address Types on the CompoNet Network

There are three types of node addresses on a CompoNet network.

- Node address
- Bit node address
- Repeater Unit node address

Node address type	Node name		Node address name	Address range	Applicable Slave Units	Abbreviation on Gateway Unit
Node address	Word Slave Units	Contact Input Unit	IN	0 to 63	Input Slave Units with 4, 8, or 16 points per node address.	WORD NODE ADR
		Contact Output Unit	OUT	0 to 63	Output Slave Units with 4, 8, or 16 points per node address.	WORD NODE ADR
		Contact I/O Unit	IN/OUT	0 to 63	I/O Slave Units with 4, 8, or 16 points per node address. They have the same number for the input word node address and output word node address.	WORD NODE ADR
Bit node address	Bit Slave Units	Contact Input Unit	BIT IN	0 to 127	Input Slave Units with 2 points per node address.	BIT NODE ADR
		Contact Output Unit	BIT OUT	0 to 127	Output Slave Units with 2 points per node address.	BIT NODE ADR
		Contact I/O Unit	BIT IN/ OUT	0 to 127	I/O Slave Units with 2 points per node address. They have the same number for the input word node address and output word node address.	BIT NODE ADR
Repeater Unit node address	Repeater Units		Repeater node	0 to 63	Repeater Unit	RPT NODE ADR

4-2-6 Data Allocations for Word Slave Units

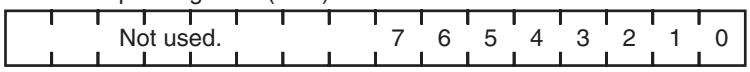
Memory is allocated to Word Slave Units in units of 16 bits (1 word).
Slave Units requiring fewer than 16 bits are sill allocated one word per node (the allocation for the set node address). (See note.)

Note: Even 8-point Slave Units are allocated 1 word. The bits are allocated in the lower byte and the upper byte is not used.

Slave Units requiring more than 16 bits and 32 bits or less are allocated two words per node (the allocation for the set node address and the next node address).
In the same way, multiple words are allocated to other Slave Units according to the I/O capacity of the Slave Unit (including the word for the allocated node address and following words).

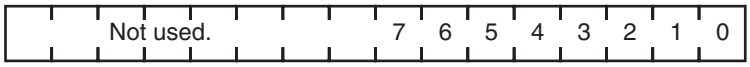
- **Eight-point Input Slave Units**

Remote Input Registers (RWr)



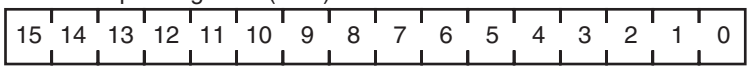
- **Eight-point Output Slave Units**

Remote Output Registers (RWw)



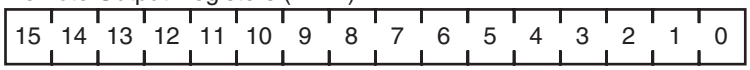
- **Sixteen-point Input Slave Units**

Remote Input Registers (RWr)



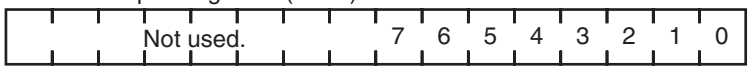
- **Sixteen-point Output Slave Units**

Remote Output Registers (RWw)

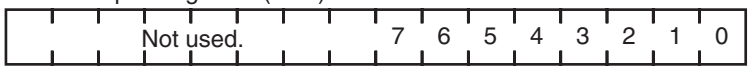


- **Sixteen-point I/O Slave Units**

Remote Output Registers (RWw)

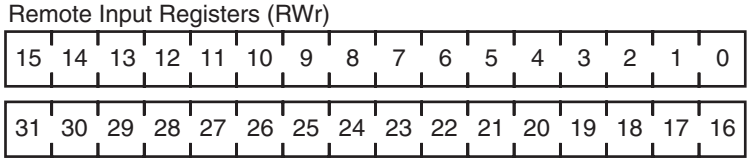


Remote Input Registers (RWr)



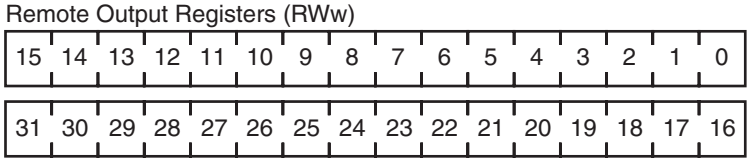
- **Thirty-two-point Input Slave Units**

Remote Input Registers (RWr)



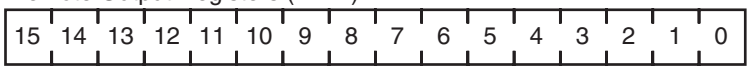
- **Thirty-two-point Output Slave Units**

Remote Output Registers (RWw)

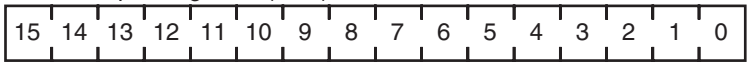


- **Thirty-two-point I/O Slave Units**

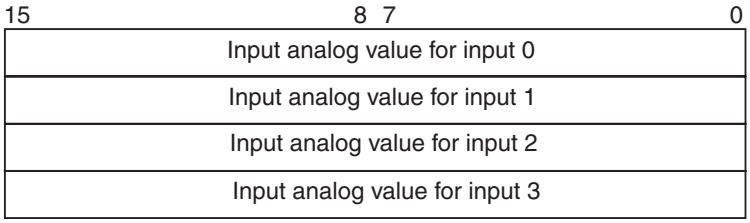
Remote Output Registers (RWw)



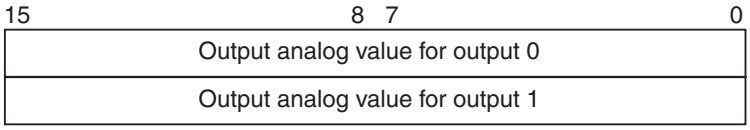
Remote Input Registers (RWr)



- **Analog Input Units**
  Only the input analog values are selected as I/O data. The data is allocated four words (eight bytes) in the remote input register (RWr) area of the CC-Link Master Unit.



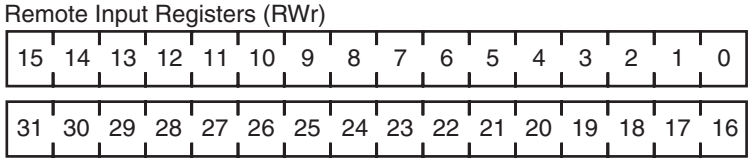
- **Analog Output Units**
  Analog Output Units have one type of output data. The output data is allocated by default, so no settings are required.
  Two words (four bytes) of output data are allocated. The data is handled as two's complement data.



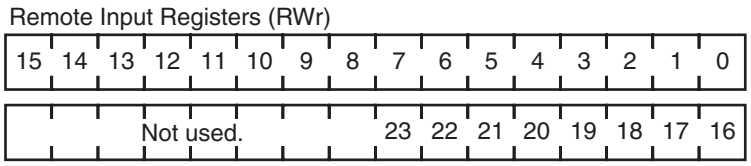
Data Allocations for Word Slave Units with Expansion Units

When an Expansion Unit is used, data is allocated for a Slave Unit that includes the remote input register (RWr) and remote output register (RWw) data size of the Expansion Unit.

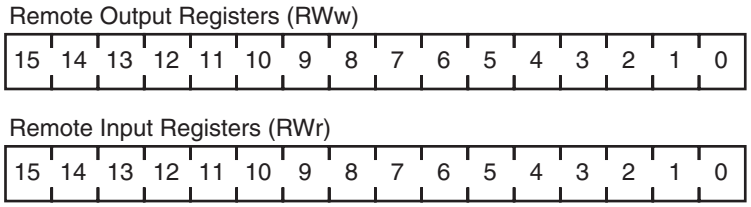
- **Sixteen-point Input Slave Unit with Sixteen-point Input Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote input registers (RWr) and node address m+1 of the remote input registers (RWr).



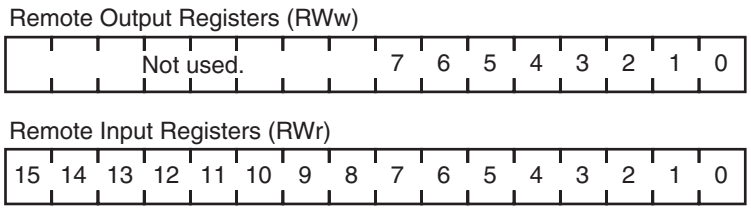
- **Sixteen-point Input Slave Unit with Eight-point Input Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote input registers (RWr) and node address m+1 of the remote input registers (RWr).



- **Sixteen-point Input Slave Unit with Sixteen-point Output Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote input registers (RWr) and node address m of the remote output registers (RWw).



- **Sixteen-point Input Slave Unit with Eight-point Output Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote input registers (RWr) and node address m of the remote output registers (RWw).



- **Sixteen-point Output Slave Unit with Sixteen-point Output Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote output registers (RWw) and node address m+1 of the remote output registers (RWw).

Remote Output Registers (RWw)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
31	30	29	28	27	26	25	24	23	22	21	20	19	18	17	16

- **Sixteen-point Output Slave Unit with Eight-point Output Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote output registers (RWw) and node address m+1 of the remote output registers (RWw).

Remote Output Registers (RWw)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0
Not used.								23	22	21	20	19	18	17	16

- **Sixteen-point Output Slave Unit with Sixteen-point Input Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote output registers (RWw) and node address m of the remote input registers (RWr).

Remote Output Registers (RWw)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Remote Input Registers (RWr)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

- **Sixteen-point Output Slave Unit with Eight-point Input Expansion Unit**
  The allocations for two nodes are assigned, including node address m of the remote output registers (RWw) and node address m of the remote input registers (RWr).

Remote Output Registers (RWw)

15	14	13	12	11	10	9	8	7	6	5	4	3	2	1	0

Remote Input Registers (RWr)

Not used.								7	6	5	4	3	2	1	0

- **I/O Expansion for Word Slave Units**

  The number of I/O points for Word Slave Units in a CompoNet network can be increased by using Expansion Units.

  The following table shows the Slave Unit and Expansion Unit models that can be used.

Basic Unit	Expansion Unit	Inputs	Outputs
CRT1-ID16/ID16-1	None	16	0
	XWT-ID08/ID08-1	24	0
	XWT-OD08/OD08-1	16	8
	XWT-ID16/ID16-1	32	0
	XWT-OD16/OD16-1	16	16
CRT1-OD16/OD16-1 CRT1-ROS16/ROF16	None	0	16
	XWT-ID08/ID08-1	8	16
	XWT-OD08/OD08-1	0	24
	XWT-ID16/ID16-1	16	16
	XWT-OD16/OD16-1	0	32

- **I/O Allocations when Expansion Units Are Used**

  Memory is allocated to a Basic Unit with an Expansion Unit in the same way as it would be allocated to a Slave Unit of the same size as the combination of the sizes of the Basic Unit and the Remote Input Registers (RWr) and remote output registers (RWw) of the Expansion Unit.

  The following examples show the allocations when an Expansion Unit is connected to a Basic Unit at node address m (m = 0, 1, 2,...).

Additional Information

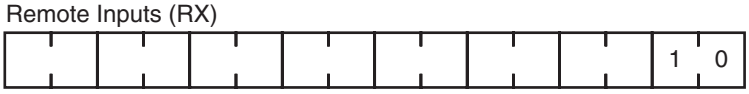
For Slave Units with both inputs and outputs*1, the remote input register (RWr) node address is used as the Slave Unit node address. Therefore, the Participation Flag and Communications Error Flag correspond to the bits for the remote input register (RWr) node address.

*1: A Word Slave that combines a Basic Unit and Expansion Unit to provide both inputs and outputs, or a CRT1B-MD Bit Slave, which provides both inputs and outputs.

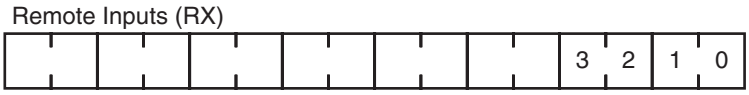
4-2-7 Data Allocations for Bit Slave Units

Bit Slave Units are allocated data in units of two bits (two points).
For example, eight Slave Units with two points each would be allocated one word. Likewise, four Slave Units with two points each and two Slave Units with four points each would be allocated one word.
A Slave Unit with two points is allocated two bits in the node address area for the node address set for the Unit.
A Slave Unit with four points is allocated four bits, two bits in the node address area for the node address set for the Unit and two bits in the next node address area.

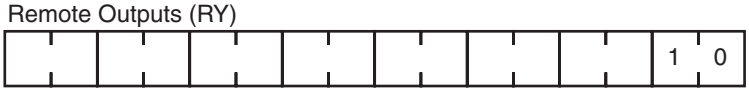
- **Two-point Input Slave Units**



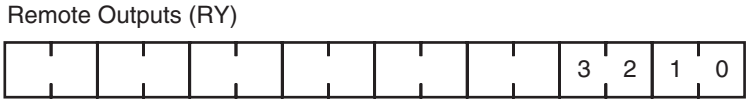
- **Four-point Input Slave Units**



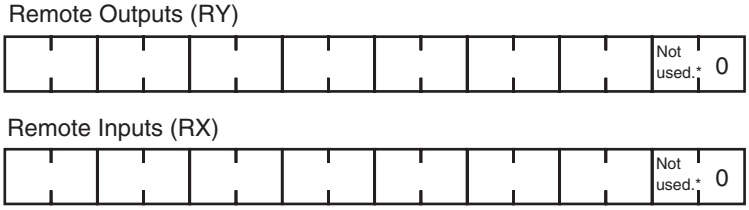
- **Two-point Output Slave Units**



- **Four-point Output Slave Units**

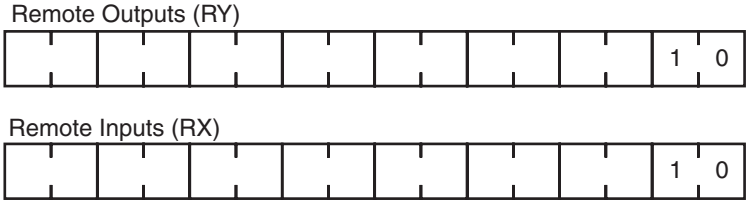


- **Two-point I/O Slave Units**



* The upper bits for two-bit I/O Units (marked "not used") are not used. The status of unused bits is as follows:
- Unused remote output (RY) bits: Do not turn ON these bits.
- Unused remote input (RX) bits: These bits will be OFF.

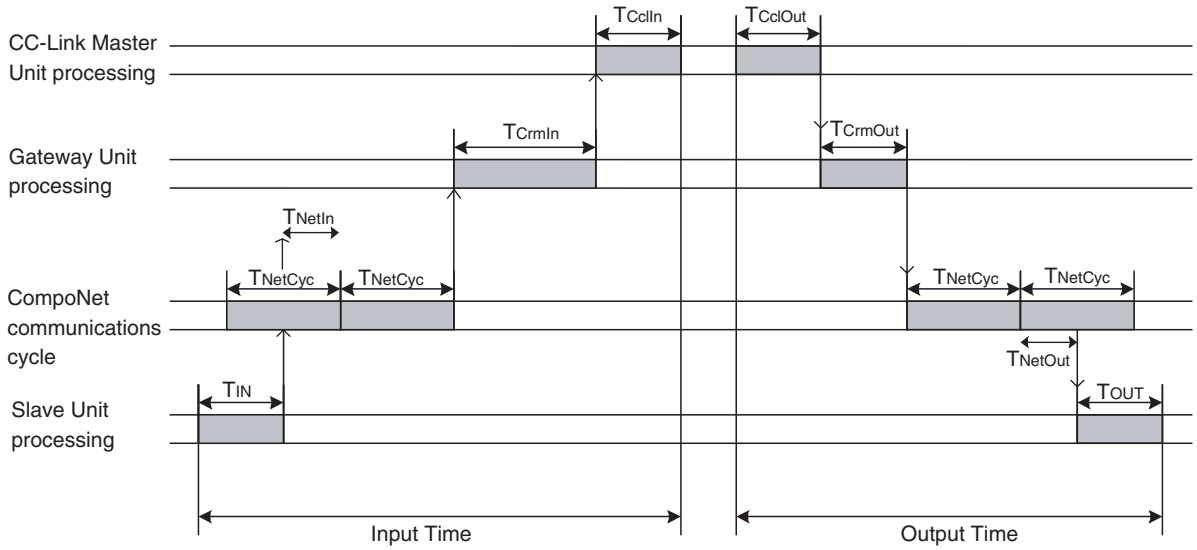
- **Four-point I/O Slave Units**



For Bit Slave Units, node address areas are used consecutively without spaces.
For example, one word would be allocated for eight Slave Units with two points each. Likewise, four Slave Units with two points each and two Slave Units with four points each would be allocated one word.

4-3 Remote I/O Communications Performance

Maximum Input Time =T_{IN}+T_{NetIn}+T_{NetCyc}+T_{CrmIn}+T_{CclIn}
Maximum Output Time =T_{CclOut}+T_{CrmOut}+T_{NetCyc}+T_{NetOut}+T_{OUT}



T_{CclIn}: CC-Link input delay
T_{CcOut}: CC-Link output delay
T_{CrmIn}: Maximum input processing time for Gateway Unit
T_{CrmOut}: Maximum output processing time for Gateway Unit
T_{NetCyc}: CompoNet communications cycle
T_{NetIn}: Input frame time in communications cycle
T_{NetOut}: Output frame time in communications cycle
T_{OUT}: Output Slave Unit output delay
T_{IN}: Input Slave Unit input delay

T_{CclIn}/ T_{CcOut}: CC-LINK Input and Output Delay Times
Refer to documentation on the CC-Link Master Unit.

T_{CrmIn}: Maximum Input Processing Time for Gateway Unit for CC-Link

Communications mode 0	0.5
Communications mode 1	0.3
Communications mode 2	0.2
Communications mode 3	0.2
Communications mode 4	0.4
Communications mode 5	0.3
Communications mode 6	0.2

(Unit: ms)

T_{CrmOut}: Maximum Output Processing Time for Gateway Unit

Communications mode 0	0.2
Communications mode 1 to 6	0.1

(Unit: ms)

T_{NetCyc}: CompoNet Communications Cycle

	4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	4.3	5.3	11.8	138.7
Communications mode 1	2.8	3.5	8.0	92.1
Communications mode 2	1.5	1.8	4.0	53.1
Communications mode 3	0.8	0.9	1.8	23.2
Communications mode 4	4.3	5.3	11.8	138.7
Communications mode 5	2.8	3.5	8.0	92.1
Communications mode 6	1.5	1.8	4.0	53.1

(Unit: ms)

T_{NetIn}: Input Frame Time in Communications Cycle

	4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	3.2	4.0	9.1	109.7
Communications mode 1	2.1	2.6	5.8	69.2
Communications mode 2	1.1	1.3	2.9	32.9
Communications mode 3	0.5	0.6	1.2	13.1
Communications mode 4	3.2	4.0	9.1	109.7
Communications mode 5	2.1	2.6	5.8	69.2
Communications mode 6	1.1	1.3	2.9	33.9

(Unit: ms)

T_{NetOut}: Output Frame Time in Communications Cycle

	4 Mbps	3 Mbps	1.5 Mbps	93.75 kbps
Communications mode 0	0.4	0.5	0.9	14.2
Communications mode 1	0.2	0.3	0.5	8.1
Communications mode 2	0.1	0.2	0.3	4.3
Communications mode 3	0.1	0.1	0.2	2.2
Communications mode 4	0.4	0.5	0.9	14.2
Communications mode 5	0.2	0.3	0.5	8.1
Communications mode 6	0.1	0.2	0.3	4.3

(Unit: ms)

T_{OUT}/T_{IN}: Input and Output Slave Unit I/O Delays
Refer to documentation on the Slave Units.

5

Troubleshooting

5-1 Troubleshooting CompoNet Network Errors 5-1
5-2 Troubleshooting CC-Link Network Errors..... 5-5

5-1 Troubleshooting CompoNet Network Errors

This section describes how to handle errors that may occur in the CompoNet network.

5-1-1 CompoNet Network Errors

This section describes the meanings of the indicators and seven-segment display when errors occur in the CompoNet network. It also provides countermeasures for handling the errors.

Meanings of Gateway Unit Indicators and Procedure for Handling Errors

If an error occurs, the general location of the error is shown by the status of the indicators.
With the Gateway Unit, in addition to these indicators, a seven-segment display shows the location and content of errors.

5-1-2 Troubleshooting Sequence When an Error Occurs

1. Determine the general location of the error.
   Check the pattern in which the indicators are lit to determine whether the error occurred in the Gateway Unit or in the network.

↓

2. Determine the details.
   Check the seven-segment display and the remote inputs (RX) in the Status Area to determine the location and content of the error.

↓

3. Determine the cause of the error.
   Consider the onsite conditions in relation to the circumstances of the error, and determine and remove the cause of the error.

↓

4. Take countermeasures.
   Check the system status in the *Unit operation after error detection* column, check the required operations in the *Countermeasures* column, and restore system operation to normal.

The CompoNet error detection functions, operations following error detection, and countermeasures are described on the following pages.

Initialization Errors

MS	NS	Seven-segment display	Item	Probable cause of error	Unit operation after error detection	Countermeasures
❍ Red	●	H3	Hardware test error, CC-Link ASIC test	An error was detected while checking the CC-Link ASIC in the Gateway Unit.	The Gateway Unit stops operating and goes into standby mode.	Replace the Gateway Unit.
●	❍ Red	H3	Hardware test error, CompoNet ASIC test	An error was detected while checking the CompoNet ASIC in the Gateway Unit.		
❍ Red	❍ Red	H3	Hardware test error, RAM test	An error was detected while checking the RAM in the Gateway Unit.		
✳ Red	●	H4	Communications mode setting error	An illegal rotary switch setting was detected for the communications mode (i.e., the switch is set to 7, 8, or 9).		Correct the communications mode setting, and then restart the Gateway Unit.

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

Exception Processing

MS	NS	Seven-segment display	Item	Probable cause of error	Unit operation after error detection	Countermeasures
❍ Red	●	Not lit	Unit-related error	A hardware error occurred.	WDT refreshing is stopped and the Gateway Unit completely stops.	There may be some noise or other interference occurring. Eliminate the source of the noise and then turn ON the power to the Gateway Unit again.
❍ Red	●	Not lit	Unit WDT error	There was a WDT timeout for the Unit.	The Gateway Unit completely stops.	

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

Errors in Remote I/O Communications

The following indicator patterns show that an error related to the CompoNet network has occurred. Errors can basically be identified by the NS indicator flashing red and the seven-segment display showing "d*."

MS	NS	Seven-segment display	Item	Probable cause of error	Unit operation after error detection	Countermeasures
---	✳ Red	d9 ↓ yy ↓ zzz	Communications error	A Slave Unit disconnection was detected.	System operations continue. Participation of the disconnected Slave Unit is awaited. When the cause of the error is removed, normal operation is restored. (The NS indicator lights green.)	Either of the following may be the cause of the error. 1. Communications had to be continually retried for the applicable Slave Unit due to noise, until the specified number of retries was exceeded. 2. Responses to communications from the Gateway Unit are not possible because of a malfunction, line disconnection, or communications power supply interruption at the Slave Unit itself. Inspect the Slave Unit where the disconnection was detected, and remove the cause of the error. There is no need to restart the Gateway Unit.
---	✳ Red	d0 ↓ yy ↓ zzz	Address duplication error	An address duplication error was detected for a Slave Unit attempting to participate. Or, an error was detected in Slave Unit communications.	The duplication error is registered in the error history. System operations continue.	A Slave Unit or Repeater Unit in the same network is set for the same node. Use the following procedure: 1. Turn OFF the power to the Gateway Unit and the Slave Unit. 2. Change the duplicate node number to the correct value. 3. Turn ON the power to the Gateway Unit and the Slave Unit. If the error persists, it is safe to assume that a communications error caused the problem. Check for noise entering the network, disconnected cables, and loose connectors or signal wires, and make sure the network is installed according to specifications.
---	✳ Red	E5	Illegal Configuration Error	It was detected that the Slave Units and Repeater Units requesting to participate in the network exceeded the permitted number of Repeater Unit segments (two).	Subsequent Slave Unit participation is prohibited from the point where it is detected that the permitted number of Repeater Unit segments has been exceeded in the participation processing. Other system operations continue. After normal status is restored, the Unit recovers when it is restarted.	The maximum number of Repeater Unit segments is registered to two in the Gateway Unit and cannot be changed. This error thus indicates that there are three or more Repeater Unit segments. Correct the wiring and restart the Gateway Unit.
---	✳ Red	d5 ↓ yy ↓ zzz	Verification error, nonexistent Slave Unit	It was detected that a Slave Unit registered in the registration table is not participating within a fixed time after power is turned ON to the Gateway Unit.	System operations continue, and remote I/O operations start. Participation of the Slave Unit where the error occurred continues to be monitored. When Slave Unit participation is completed, normal status is restored. (The NS indicator lights green.)	If the error does not clear, check the Slave Unit that is not participating.
---	✳ Red	d6 ↓ yy ↓ zzz	Verification error, unregistered Slave Unit	Participation of an unregistered Slave Unit was detected.	All other system operations continue without allowing the participation of the unregistered Slave Unit. Recovery is attained by restoring normal status and restarting the Unit.	Check and correct the status of the unregistered Slave Unit, and then restart the Gateway Unit.

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

yy: Indicates the Slave Unit type, as shown below.

yy	Actual display	Slave Unit type
i		Input (including I/O Slaves)
o		OUT
bi		Bit input
bo		Bit output
r		Repeater Unit

zzz: Node address where the error occurred (2-digit decimal) (Note: The 100s digit is displayed with dots.)

Errors in Memory Access Processing

The following indicator patterns show that an error has occurred in the Gateway Unit.

MS	NS	Seven-segment display	Item	Probable cause of error	Unit operation after error detection	Countermeasures
✳ Red	---	E8	Registration table logic error	1. The registration setting (REGS) is set to enable the registration table even though the registration table is not enabled. 2. The registration table is corrupted.	The error is registered in the error history.	Either turn OFF the registration setting (REGS) or press the RESET CompoNet setting button to restart the Gateway Unit.
✳ Red	---	E9	Memory access error	One of the following errors occurred when the non-volatile memory in the Unit was accessed: 1. Not all 64 records could be used during initialization or when registering an error in the error history. 2. An error history reading or writing error occurred. 3. An identity information reading failure occurred during initialization. 4. A registration table information reading or writing failure occurred during initialization.	For 1) or 2): Further access to the EEPROM is stopped. All other normal operations continue. For 4): Normal operations are executed. When reading for 4): Other operations continue without starting the communications cycle. When writing for 4): Further access to the EEPROM is stopped. All other normal operations continue.	Reset the Gateway Unit. If the same error occurs again, replace the Gateway Unit.

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

5-2 Troubleshooting CC-Link Network Errors

The communications status on the CC-Link network can be checked on the CC-Link communications indicators on the Gateway Unit.
Refer to this information when troubleshooting.
To troubleshoot errors in the CC-Link network, refer to documentation for the CC-Link Master Unit.

Indicator				Operating status
L RUN	L ERR	SD	RD	
❍ Green	●	✳ Yellow	❍ Yellow	Normal transmission
❍ Green	✳ Red (inconsistent intervals)	✳ Yellow	❍ Yellow	Normal data communications is being performed, but noise is occasionally causing CRC errors.
❍ Green	✳ Red (consistent intervals)	✳ Yellow	❍ Yellow	The station number setting of the Gateway Unit was changed while the power was ON.
❍ Green	✳ Red (inconsistent intervals)	●	❍ Yellow	Reception data is causing CRC errors and a response is not possible.
❍ Green	●	●	❍ Yellow	Data cannot be received by the local station.
●	✳ Red (inconsistent intervals)	✳ Yellow	❍ Yellow	A polling response was performed, but CRC errors occurred during refresh reception, so a send response is not possible.
●	✳ Red (inconsistent intervals)	●	❍ Yellow	CRC errors occurred for data that was sent to the local station.
●	●	✳ Yellow	❍ Yellow	CC-Link data links are not started.
●	●	●	❍ Yellow	There is no data for the local station, or noise prevented the local station from receiving the data.
●	●	●	●	Communications for CC-Link data links have been interrupted.
●	❍ Red	●	---	The station number setting or baud rate setting is not correct.

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

MS	NS	Seven-segment display	Item	Probable cause of error	Unit operation after error detection	Countermeasures
✳ Red	---	H2	Version compatibility error	The protocol versions are different.	Links are not started when the power supply is turned ON. If this error occurs when links are active, the links remain active and only the error display is performed. When the correct frame is received, the error display is cleared and the links are started.	---

Indicators: ❍: Lit, ✳: Flashing, ●: Not lit, ---: Not applicable

Appendices

A-1 Allocations According to Communications Modes A-1
A-2 Status Area Allocations According to Communications Modes ... A-12

A-1 Allocations According to Communications Modes

● Allocations for Communications Mode 0

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX00FC		Node 126	RY00FC		Node 126
RX00FD			RY00FD		
RX00FE		Node 127	RY00FE		Node 127
RX00FF			RY00FF		
RX0100	Status		RY0100	Reserved by system.	
to			to		
RX010F					
RX0110	Reserved by system.				
to					
RX0379			RY0379		
RX037A	Error Status Flags		RY037A	Error Reset Request Flags	
RX037B	Remote Ready Flags		RY037B	Reserved.	
RX037C	Reserved.		RY037C		
RX037D			RY037D		
RX037E	Defined by OS.		RY037E	Defined by OS.	
RX037F			RY037F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

- Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr3D		Node 61	RWw3D		Node 61
RWr3E		Node 62	RWw3E		Node 62
RWr3F		Node 63	RWw3F		Node 63
RWr40	Input Slave Units Participating Flags		RWw40	Reserved by system.	
to					
RWr43					
RWr44	Output Slave Units Participating Flags				
to					
RWr47					
RWr48	Bit Input Slave Units Participating Flags				
to					
RWr4F					
RWr50	Bit Output Slave Units Participating Flags				
to					
RWr57					
RWr58	Input Slave Units Communications Error Flags				
to			to		
RWr5B					
RWr5C	Output Slave Units Communications Error Flags				
to					
RWr5F					
RWr60	Bit Input Slave Units Communications Error Flags				
to					
RWr67					
RWr68	Bit Output Slave Units Communications Error Flags				
to					
RWr6F					
RWr70	Reserved by system.				
to					
RWr7F			RWw7F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

A

● Allocations for Communications Mode 1

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	BIT IN	Node 0	RY0000	BIT OUT	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX00BC		Node 94	RY00BC		Node 94
RX00BD			RY00BD		
RX00BE		Node 95	RY00BE		Node 95
RX00BF			RY00BF		
RX00C0	Status		RY00C0	Reserved by system.	
to			to		
RX00CF			RY00CF		
RX00D0	Reserved by system.		RY00D0		
to			to		
RX01B9			RY01B9		
RX01BA	Error Status Flags		RY01BA	Error Reset Request Flags	
RX01BB	Remote Ready Flags		RY01BB	Reserved.	
RX01BC	Reserved.		RY01BC		
RX01BD			RY01BD		
RX01BE	Defined by OS.		RY01BE	Defined by OS.	
RX01BF			RY01BF		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

- Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr1D		Node 29	RWw1D		Node 29
RWr1E		Node 30	RWw1E		Node 30
RWr1F		Node 31	RWw1F		Node 31
RWr20	Input Slave Units Participating Flags		RWw20	Reserved by system.	
to			to		
RWr21					
RWr22	Output Slave Units Participating Flags				
to					
RWr23					
RWr24	Bit Input Slave Units Participating Flags				
to					
RWr29					
RWr2A	Bit Output Slave Units Participating Flags				
to					
RWr2F					
RWr30	Input Slave Units Communications Error Flags				
to					
RWr31					
RWr32	Output Slave Units Communications Error Flags				
to					
RWr33					
RWr34	Bit Input Slave Units Communications Error Flags				
to					
RWr39					
RWr3A	Bit Output Slave Units Communications Error Flags				
to					
RWr3F			RWw3F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

● Allocations for Communications Mode 2

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX005C		Node 46	RY005C		Node 46
RX005D			RY005D		
RX005E		Node 47	RY005E		Node 47
RX005F			RY005F		
RX0060	Status		RY0060	Reserved by system.	
to			to		
RX006F			RY006F		
RX0070	Reserved by system.		RY0070		
to			to		
RX00D9			RY00D9		
RX00DA	Error Status Flags		RY00DA	Error Reset Request Flags	
RX00DB	Remote Ready Flags		RY00DB	Reserved.	
RX00DC	Reserved.		RY00DC		
RX00DD			RY00DD		
RX00DE	Defined by OS.		RY00DE	Defined by OS.	
RX00DF			RY00DF		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

- Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr0D		Node 13	RWw0D		Node 13
RWr0E		Node 14	RWw0E		Node 14
RWr0F		Node 15	RWw0F		Node 15
RWr10	Input Slave Units Participating Flags		RWw10	Reserved by system.	
RWr11	Output Slave Units Participating Flags		to		
RWr12	Bit Input Slave Units Participating Flags				
to					
RWr14					
RWr15	Bit Output Slave Units Participating Flags				
to					
RWr17					
RWr18	Input Slave Units Communications Error Flags				
RWr19	Output Slave Units Communications Error Flags				
RWr1A	Bit Input Slave Units Communications Error Flags				
to					
RWr1C					
RWr1D	Bit Output Slave Units Communications Error Flags				
to					
RWr1F			RWw1F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

A

● Allocations for Communications Mode 3

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX001C		Node 14	RY001C		Node 14
RX001D			RY001D		
RX001E		Node 15	RY001E		Node 15
RX001F			RY001F		
RX0020	Status		RY0020	Reserved by system.	
to			to		
RX002F			RY002F		
RX0030	Reserved by system.		RY0030		
to			to		
RX0039			RY0039		
RX003A	Error Status Flags		RY003A	Error Reset Request Flags	
RX003B	Remote Ready Flags		RY003B	Reserved.	
RX003C	Reserved.		RY003C		
RX003D			RY003D		
RX003E	Defined by OS.		RY003E	Defined by OS.	
RX003F			RY003F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

- Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr05		Node 5	RWw05		Node 5
RWr06		Node 6	RWw06		Node 6
RWr07		Node 7	RWw07		Node 7
RWr08	Input Slave Units Participating Flags		RWw08	Reserved by system.	
RWr09	Output Slave Units Participating Flags		to		
RWr0A	Bit Input Slave Units Participating Flags				
RWr0B	Bit Output Slave Units Participating Flags				
RWr0C	Input Slave Units Communications Error Flags				
RWr0D	Output Slave Units Communications Error Flags				
RWr0E	Bit Input Slave Units Communications Error Flags				
RWr0F	Bit Output Slave Units Communications Error Flags		RWw0F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

A

● Allocations for Communications Mode 4

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX00FC		Node 126	RY00FC		Node 126
RX00FD			RY00FD		
RX00FE		Node 127	RY00FE		Node 127
RX00FF			RY00FF		
RX0100	Status		RY0100	Reserved by system.	
to			to		
RX010F					
RX0110	Reserved by system.				
to					
RX01B9			RY01B9		
RX01BA	Error Status Flags		RY01BA	Error Reset Request Flags	
RX01BB	Remote Ready Flags		RY01BB	Reserved.	
RX01BC	Reserved.		RY01BC		
RX01BD			RY01BD		
RX01BE	Defined by OS.		RY01BE	Defined by OS.	
RX01BF			RY01BF		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

• Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr3D		Node 61	RWw3D		Node 61
RWr3E		Node 62	RWw3E		Node 62
RWr3F		Node 63	RWw3F		Node 63

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

● Allocations for Communications Mode 5

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX00BC		Node 94	RY00BC		Node 94
RX00BD			RY00BD		
RX00BE		Node 95	RY00BE		Node 95
RX00BF			RY00BF		
RX00C0	Status		RY00C0	Reserved by system.	
to			to		
RX00CF			RY00CF		
RX00D0	Reserved by system.		RY00D0		
to			to		
RX00D9			RY00D9		
RX00DA	Error Status Flags		RY00DA	Error Reset Request Flags	
RX00DB	Remote Ready Flags		RY00DB	Reserved.	
RX00DC	Reserved.		RY00DC		
RX00DD			RY00DD		
RX00DE	Defined by OS.		RY00DE	Defined by OS.	
RX00DF			RY00DF		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

• Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr1D		Node 29	RWw1D		Node 29
RWr1E		Node 30	RWw1E		Node 30
RWr1F		Node 31	RWw1F		Node 31

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

A

● Allocations for Communications Mode 6

• Remote I/O (RX and RY)

Remote inputs (RX)			Remote outputs (RY)		
RX0000	Bit input data	Node 0	RY0000	Bit output data	Node 0
RX0001			RY0001		
RX0002		Node 1	RY0002		Node 1
RX0003			RY0003		
to			to		
RX005C		Node 46	RY005C		Node 46
RX005D			RY005D		
RX005E		Node 47	RY005E		Node 47
RX005F			RY005F		
RX0060	Status		RY0060	Reserved by system.	
to			to		
RX006F			RY006F		
RX0070	Reserved by system.		RY0070		
to			to		
RX0179			RY0179		
RX017A	Error Status Flags		RY017A	Error Reset Request Flags	
RX017B	Remote Ready Flags		RY017B	Reserved.	
RX017C	Reserved.		RY017C		
RX017D			RY017D		
RX017E	Defined by OS.		RY017E	Defined by OS.	
RX017F			RY017F		

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

• Remote I/O Registers (RWr and RWw)

Remote Input Registers (RWr)			Remote Output Registers (RWw)		
RWr00	Word input data	Node 0	RWw00	Word output data	Node 0
RWr01		Node 1	RWw01		Node 1
RWr02		Node 2	RWw02		Node 2
to			to		
RWr0D		Node 13	RWw0D		Node 13
RWr0E		Node 14	RWw0E		Node 14
RWr0F		Node 15	RWw0F		Node 15

Note: These allocations assume that the first refresh device number is set to 0 and that the Gateway Unit is station 1.

A-2 Status Area Allocations According to Communications Modes

● Communications Mode 0

Word (See note 1.)	Bits															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
+40	Input Slave Units Participating Flags (0 to 15)															
+41	Input Slave Units Participating Flags (16 to 31)															
+42	Input Slave Units Participating Flags (32 to 47)															
+43	Input Slave Units Participating Flags (48 to 63)															
+44	Output Slave Units Participating Flags (0 to 15)															
+45	Output Slave Units Participating Flags (16 to 31)															
+46	Output Slave Units Participating Flags (32 to 47)															
+47	Output Slave Units Participating Flags (48 to 63)															
+48	Bit Input Slave Units Participating Flags (0 to 15)															
+49	Bit Input Slave Units Participating Flags (16 to 31)															
+4A	Bit Input Slave Units Participating Flags (32 to 47)															
+4B	Bit Input Slave Units Participating Flags (48 to 63)															
+4C	Bit Input Slave Units Participating Flags (64 to 79)															
+4D	Bit Input Slave Units Participating Flags (80 to 95)															
+4E	Bit Input Slave Units Participating Flags (96 to 111)															
+4F	Bit Input Slave Units Participating Flags (112 to 127)															
+50	Bit Output Slave Units Participating Flags (0 to 15)															
+51	Bit Output Slave Units Participating Flags (16 to 31)															
+52	Bit Output Slave Units Participating Flags (32 to 47)															
+53	Bit Output Slave Units Participating Flags (48 to 63)															
+54	Bit Output Slave Units Participating Flags (64 to 79)															
+55	Bit Output Slave Units Participating Flags (80 to 95)															
+56	Bit Output Slave Units Participating Flags (96 to 111)															
+57	Bit Output Slave Units Participating Flags (112 to 127)															
+58	Input Slave Units Communications Error Flags (0 to 15)															
+59	Input Slave Units Communications Error Flags (16 to 31)															
+5A	Input Slave Units Communications Error Flags (32 to 47)															
+5B	Input Slave Units Communications Error Flags (48 to 63)															
+5C	Output Slave Units Communications Error Flags (0 to 15)															
+5D	Output Slave Units Communications Error Flags (16 to 31)															
+5E	Output Slave Units Communications Error Flags (32 to 47)															
+5F	Output Slave Units Communications Error Flags (48 to 63)															
+60	Bit Input Slave Units Communications Error Flags (0 to 15)															
+61	Bit Input Slave Units Communications Error Flags (16 to 31)															
+62	Bit Input Slave Units Communications Error Flags (32 to 47)															
+63	Bit Input Slave Units Communications Error Flags (48 to 63)															
+64	Bit Input Slave Units Communications Error Flags (64 to 79)															
+65	Bit Input Slave Units Communications Error Flags (80 to 95)															
+66	Bit Input Slave Units Communications Error Flags (96 to 111)															
+67	Bit Input Slave Units Communications Error Flags (112 to 127)															
+68	Bit Output Slave Units Communications Error Flags (0 to 15)															
+69	Bit Output Slave Units Communications Error Flags (16 to 31)															
+6A	Bit Output Slave Units Communications Error Flags (32 to 47)															
+6B	Bit Output Slave Units Communications Error Flags (48 to 63)															
+6C	Bit Output Slave Units Communications Error Flags (64 to 79)															
+6D	Bit Output Slave Units Communications Error Flags (80 to 95)															
+6E	Bit Output Slave Units Communications Error Flags (96 to 111)															
+6F	Bit Output Slave Units Communications Error Flags (112 to 127)															

Note: These allocations assume that "+0" is the first refresh device number in the remote input register (RWr) area and that it is set to 0.

● Communications mode 1

Word (See note 1.)	Bits															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
+20	Input Slave Units Participating Flags (0 to 15)															
+21	Input Slave Units Participating Flags (16 to 31)															
+22	Output Slave Units Participating Flags (0 to 15)															
+23	Output Slave Units Participating Flags (16 to 31)															
+24	Bit Input Slave Units Participating Flags (0 to 15)															
+25	Bit Input Slave Units Participating Flags (16 to 31)															
+26	Bit Input Slave Units Participating Flags (32 to 47)															
+27	Bit Input Slave Units Participating Flags (48 to 63)															
+28	Bit Input Slave Units Participating Flags (64 to 79)															
+29	Bit Input Slave Units Participating Flags (80 to 95)															
+2A	Bit Output Slave Units Participating Flags (0 to 15)															
+2B	Bit Output Slave Units Participating Flags (16 to 31)															
+2C	Bit Output Slave Units Participating Flags (32 to 47)															
+2D	Bit Output Slave Units Participating Flags (48 to 63)															
+2E	Bit Output Slave Units Participating Flags (64 to 79)															
+2F	Bit Output Slave Units Participating Flags (80 to 95)															
+30	Input Slave Units Communications Error Flags (0 to 15)															
+31	Input Slave Units Communications Error Flags (16 to 31)															
+32	Output Slave Units Communications Error Flags (0 to 15)															
+33	Output Slave Units Communications Error Flags (16 to 31)															
+34	Bit Input Slave Units Communications Error Flags (0 to 15)															
+35	Bit Input Slave Units Communications Error Flags (16 to 31)															
+36	Bit Input Slave Units Communications Error Flags (32 to 47)															
+37	Bit Input Slave Units Communications Error Flags (48 to 63)															
+38	Bit Input Slave Units Communications Error Flags (64 to 79)															
+39	Bit Input Slave Units Communications Error Flags (80 to 95)															
+3A	Bit Output Slave Units Communications Error Flags (0 to 15)															
+3B	Bit Output Slave Units Communications Error Flags (16 to 31)															
+3C	Bit Output Slave Units Communications Error Flags (32 to 47)															
+3D	Bit Output Slave Units Communications Error Flags (48 to 63)															
+3E	Bit Output Slave Units Communications Error Flags (64 to 79)															
+3F	Bit Output Slave Units Communications Error Flags (80 to 95)															

Note: These allocations assume that “+0” is the first refresh device number in the remote input register (RWr) area and that it is set to 0.

● Communications mode 2

Word (See note 1.)	Bits															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
+10	Input Slave Units Participating Flags (0 to 15)															
+11	Output Slave Units Participating Flags (0 to 15)															
+12	Bit Input Slave Units Participating Flags (0 to 15)															
+13	Bit Input Slave Units Participating Flags (16 to 31)															
+14	Bit Input Slave Units Participating Flags (32 to 47)															
+15	Bit Output Slave Units Participating Flags (0 to 15)															
+16	Bit Output Slave Units Participating Flags (16 to 31)															
+17	Bit Output Slave Units Participating Flags (32 to 47)															
+18	Input Slave Units Communications Error Flags (0 to 15)															
+19	Output Slave Units Communications Error Flags (0 to 15)															
+1A	Bit Input Slave Units Communications Error Flags (0 to 15)															
+1B	Bit Input Slave Units Communications Error Flags (16 to 31)															
+1C	Bit Input Slave Units Communications Error Flags (32 to 47)															
+1D	Bit Output Slave Units Communications Error Flags (0 to 15)															
+1E	Bit Output Slave Units Communications Error Flags (16 to 31)															
+1F	Bit Output Slave Units Communications Error Flags (32 to 47)															

Note: These allocations assume that “+0” is the first refresh device number in the remote input register (RWr) area and that it is set to 0.

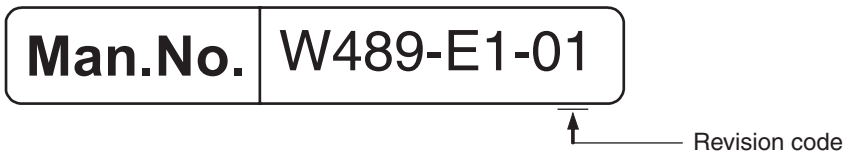
● Communications mode 3

Word (See note 1.)	Bits															
	F	E	D	C	B	A	9	8	7	6	5	4	3	2	1	0
+8	—								Input Slave Units Participating Flags (0 to 7)							
+9	—								Output Slave Units Participating Flags (0 to 7)							
+A	Bit Input Slave Units Participating Flags (0 to 15)															
+B	Bit Output Slave Units Participating Flags (0 to 15)															
+C	—								Input Slave Units Communications Error Flags (0 to 7)							
+D	—								Output Slave Units Communications Error Flags (0 to 7)							
+E	Bit Input Slave Units Communications Error Flags (0 to 15)															
+F	Bit Output Slave Units Communications Error Flags (0 to 15)															

Note: These allocations assume that “+0” is the first refresh device number in the remote input register (RWr) area and that it is set to 0.

Revision History

A manual revision code appears as a suffix to the catalog number on the front cover of the manual.



Revision code	Date	Revised content
01	May 2010	Original production

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