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\* FASTUS is a product brand of OPTEX FA.

## CC-Link Communication Unit UC1-CL11

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# User's Manual



**OPTEX FA CO., LTD.**

Thank you for purchasing the **UC1-CL11 CC-Link communication unit**.

This manual contains the information necessary for using the **UC1-CL11 CC-Link communication unit**.

Read this manual thoroughly before using the product to ensure correct product use with full understanding of the functions and performance of the product.

Also, after you have finished reading this manual, store it safely for future reference.



# Safety Precautions

This manual uses the following symbols to display safety precautions for ensuring safe operation of the UC1-CL11 CC-Link communication unit.









Precautions listed here describe important information about safety. Make sure to follow them accordingly.

## ■ Safety Symbols



The safety symbols and their meanings are as follows.

 <b>Warning</b>	Indicates that any improper operation or handling may result in moderate or minor injury, and in rare cases, serious injury or death. Also indicates a risk of serious property damage.
 <b>Caution</b>	Indicates that any improper operation or handling may sometimes result in moderate or minor injury or property damage.











## ■ Notes

 <b>Warning</b>	
	Do not disassemble, repair, modify, deform under pressure, or attempt to incinerate this product. Doing so may cause injury or fire.
	Do not use this product in water or in a location where it may be exposed to water. Do not use this product if wet. Doing so may cause a fire or damage the product.
	This product is not explosion-proof and should not be used around flammable or explosive gases or liquids. Doing so may cause ignition resulting in an explosion or fire.
	Do not use air dusters or any spray that uses flammable gas around the product or on the inside of the product. Doing so may cause ignition resulting in an explosion or fire.
	Do not use this product in a non-industrial setting. Doing so may cause induction or radiation interference.
	Do not install this product or its cables in any of the following locations. Doing so may cause a fire, damage, or a malfunction. <ol style="list-style-type: none"> <li>1. Locations where dust, salt, iron powder, or vapor (steam) is present.</li> <li>2. Locations subjected to corrosive gases or flammable gases.</li> <li>3. Locations where water, oil, or chemical splashes may occur.</li> <li>4. Locations where heavy vibrations or impacts may occur.</li> <li>5. Locations where the ambient temperature exceeds the rated range.</li> <li>6. Locations subject to rapid temperature changes (or where condensation occurs).</li> <li>7. Locations with strong electric or magnetic fields.</li> <li>8. Outdoor locations or locations subject to direct light.</li> </ol>
	Do not use the product at voltages or with AC power supplies that exceed the rated voltage. Doing so may cause a fire or damage the product.












## ⚠ Warning

	<p><b>What to do in the event of a malfunction such as smoke being emitted from the product</b></p> <p>If you detect any malfunction including emission of smoke, abnormal smells or sounds, or the body becoming very hot, immediately stop operating the product and turn off its power. Failure to do so may cause a fire.</p> <p>Repairing the product is dangerous and should in no way be performed by the customer. Contact an Optex FA sales representative for repairs.</p>
	<p><b>What to do if water enters the product</b></p> <p>If water or any other liquid enters the product or the cables, immediately stop operating the product and turn off its power. Using the product in this condition may cause a fire.</p>

## ⚠ Caution

	Do not touch the product or the cables with wet hands. Doing so may damage the product.
	Follow the instructions in this manual or the specified instruction manual to wire the product correctly. Incorrect wiring can damage the product or cause a malfunction.
	Use a CC-Link-specified cable to connect to the product. Use of anything other than a CC-Link-specified cable may cause a malfunction or damage the product.
	Route wiring separately from high-voltage circuits and power circuits. If the wires are routed together, induction may occur, which can cause a malfunction or damage the product. If this is unavoidable, use a conductive object such as a properly grounded conduit as a shield.
	Install this product as far away as possible from high-voltage equipment, power equipment, equipment that generates large switching surges, welders, inverter motors, or any equipment that can be a source of noise.
	Before using the product, use the included end plate to attach the product to a DIN rail. Ensure that any lock mechanisms available have been locked before use.
	Tighten mounting screws to the torque specified in this manual.
	Do not twist or apply stress to the cables. Doing so may damage the cables or their connectors. After pulling the communication cable out of the product, fix this cable in place with a length of 30 cm or less and in a position such that no load is applied to the body of the product.
	Do not drop the product or subject the product to strong impacts or vibrations. Doing so may damage the product.
	During operation, this product becomes very hot. Do not touch it for long periods of time. Doing so may cause a low-temperature burn.

## Caution

	Use the product within the rated ranges.
	Do not turn the power off during communication.
	Make sure to turn the power off before connecting or disconnecting the cables. Connecting or disconnecting cables while the product is energized may damage it.
	When connecting or disconnecting the cables, make sure to hold them by the connector portion, and do not apply excessive force to the cables.
	When disconnecting the connectors, be careful not to touch the terminals inside the connectors, and do not allow foreign objects to enter the connectors.
	The frame ground (FG) terminal is grounded through the DIN rail, so use a conductive DIN rail.
	When using a power cable or a commercially available switching regulator, make sure to ground the frame ground (FG) terminal.
	Avoid using the product when it is in the transient state when the power is turned on (for approx. 2 seconds after the power is turned on).
	Make sure to remove the flange before removing the CC-Link connector or power connector from the product.
	Make sure to use an isolation transformer with a DC power supply.
	If surges occur in the used power supply, use a surge absorber with the source of the surges.

## ■ Maintenance

Do not use thinners, benzene, acetone, or kerosene to clean the devices.

## ■ Handling Precautions

1. After carefully considering the intended use, required specifications, and usage conditions, install and use the product within the specified ranges.
2. Due to advances in technology, published content—including the hardware, software, and system information published in this user's manual—is subject to change without notice.
3. When using this product, it is the responsibility of the customer to ensure necessary safety designs in hardware, software, and systems in order to prevent any threat to life, physical health, and property due to product malfunction or failure.
4. This product is not intended for use with nuclear power, railways, aviation, vehicles, medical equipment, food-handling equipment, or any application where particular safety measures are required. Absolutely do not use this product for any of these fields.
5. This product cannot be used in applications that directly or indirectly detect human bodies for the purpose of ensuring safety. Do not use this product as a detection device for protecting the human body.
6. Do not use this product for the development of weapons of mass destruction, for military use, or for any other military application. Moreover, if this product is to be exported, comply with all applicable export laws and regulations, including the "Foreign Exchange and Foreign Trade Act" and the "Export Administration Regulations," and carry out the necessary procedures pursuant to the provisions therein.
7. For more details on conformity to the Restriction of Hazardous Substances Directive for this product, please contact an Optex FA sales representative.

Before using this product, fully examine the applicable environmental laws and regulations, and operate the product in conformity to such laws and regulations.

Optex FA does not assume any responsibility for damages or losses occurring as a result of noncompliance with applicable laws and regulations.

## ■ Trademarks

- CC-Link is a registered trademark of Mitsubishi Electric Corporation. This trademark is administered by the CC-Link Partner Association.
- GX Works2 is a registered trademark of Mitsubishi Electric Corporation.
- Other company names, system names, and product names in this manual are trademarks or registered trademarks of their respective companies.

## ■ Notes Regarding International Regulations and Standards

### ● CE mark

The product conforms to the following EN standards of the EMC Directive.

EMC directive (2014/30/EU)

EN 61000-6-2, EN 55011

When using the product as a product that complies with EN standards, make sure to follow the installation specifications given below.

- Install the product within a conductive enclosure (such as a control panel).
- Use a power cable with a length of 30 m or less.

# Related Manuals

The related manuals are shown below. Read the related manuals together with this one.

Manual name	Document number	Details
D3RF Series Digital Fiber Amplifier Instruction Manual	0539832	This is the instruction manual included with the D3RF series digital fiber amplifier (the model that supports field network). Read this manual when inter-connecting this unit to the D3RF series.
CDA Series General-purpose Amplifier Unit Instruction Manual	0800230	This is the instruction manual included with the CDA series general-purpose amplifier unit. To inter-connect this unit to CD22 series compact laser displacement sensors or to TD1 series through-beam edge sensors, the CDA series must be used as a relay.
CD22 Series Compact Laser Displacement Sensor Instruction Manual	0568212	This is the instruction manual included with the CD22 series compact laser displacement sensor (the model that supports RS-485 communication). Read this manual when inter-connecting this unit to the CD22 series.
TD1 Series Through-beam Edge Sensor Instruction Manual	0806101	This is the instruction manual included with the TD1 series through-beam edge sensor. Read this manual when inter-connecting this unit to the TD1 series.
TD1 Series Through-beam Edge Sensor User's Manual	TD1_UM■*1	This is the user's manual for the TD1 series through-beam edge sensor. It contains details on how to configure the TD1 series connected to the CDA. Read this manual together with the instruction manual when inter-connecting this unit to a CDA.
CDA Series General-purpose Amplifier Unit User's Manual	CDA_UM00■*1	This is the user's manual for the CDA series general-purpose amplifier unit. It contains details on how to configure the compatible sensors connected to the CDA. Read this manual together with the instruction manual when inter-connecting this unit to a CDA.

\*1 The mark "■" indicates the revision number of the user's manual.





# Manual Composition

This manual is composed of the following details.

<b>1. Before Use</b>	This chapter provides an overview of the UC1-CL11 unit. First check the included items.
<b>2. Installation and Settings</b>	This chapter explains how to inter-connect the UC1-CL11 unit and the compatible sensors and how to configure CC-Link communication settings.
<b>3. Communication</b>	This chapter explains the composition of the data handled by the UC1-CL11 unit during CC-Link communication. This chapter also explains communication examples.
<b>4. Specifications</b>	This chapter explains the specifications of the UC1-CL11 unit.
<b>5. Appendix</b>	The appendix contains information, such as troubleshooting, that is useful to know during operation of the UC1-CL11 unit.

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5

# Contents

Safety Precautions .....	i
Related Manuals.....	v
Manual Composition.....	vii
Expressions Used in This Manual .....	xii

## 1 Before Use

1-1	Product Overview .....	1-2
1-2	Checking the Included Items .....	1-3
1-3	Names and Functions of Parts .....	1-4

## 2 Installation and Settings

2-1	Basic Procedure .....	2-2
2-2	Installation.....	2-3
2-2-1	Compatible Sensors and Number of Connectable Units .....	2-3
2-2-2	Assigning ID Numbers for Compatible Sensors.....	2-5
2-2-3	Inter-connection Configuration for the UC1-CL11 and Compatible Sensors.....	2-6
2-2-4	Installation on a DIN Rail .....	2-8
2-3	Wiring.....	2-10
2-3-1	Wiring the CC-Link Cable .....	2-10
2-3-2	Wiring the Power Cable .....	2-13

2-4	Setting CC-Link Communication.....	2-16
2-4-1	Setting the UC1-CL11 Unit.....	2-16
2-4-2	Setting the Master Station in GX Works2 .....	2-17
2-4-3	iQSS Compatibility .....	2-25
2-4-4	Dealing With Unexpected Configuration Changes.....	2-42

## 3 Communication

3-1	CC-Link Operations and Memory Composition .....	3-2
3-1-1	Overview .....	3-2
3-1-2	I/O Data Assignment.....	3-3
3-2	Communication Method and Timing Charts.....	3-12
3-2-1	Reading the ON/OFF Output of a Compatible Sensor.....	3-12
3-2-2	Changing the Settings of a Compatible Sensor .....	3-13
3-2-3	Teaching a Compatible Sensor .....	3-15
3-2-4	Disabling Key Operations on a Compatible Sensor.....	3-16
3-2-5	Operation When an Internal Error Occurs .....	3-17
3-3	Parameter Lists.....	3-18
3-3-1	Meaning of Each Item .....	3-18
3-3-2	UC1-CL11 Unit Parameters .....	3-18
3-3-3	Parameters of D3RF (Field Network Supporting Models).....	3-20
3-3-4	CDA Parameters .....	3-23
3-3-5	Parameters of CD22 (RS-485 models).....	3-26
3-3-6	TD1 Parameters.....	3-29

3-4	Sample Program.....	3-31
3-4-1	Acquiring and Writing Parameters .....	3-31

## 4 Specifications

4-1	Specifications.....	4-2
4-2	Data Processing Time.....	4-3
4-3	Dimensions .....	4-5

## 5 Appendix

5-1	Troubleshooting .....	5-2
5-1-1	LED Lighting Specifications .....	5-2
5-1-2	Reading Error Information.....	5-3
5-1-3	Error Code Lists .....	5-6
5-1-4	Correcting the Number of Compatible Sensors Inter-connected Setting.....	5-8
Index	.....	5-9



# Expressions Used in This Manual

This section explains the expressions used in this manual.

## Caution

Indicates an item that requires special attention during operation.

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## MEMO

Indicates information that is useful to know during operation.

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## ■ Expressions on GX Works2 Screens

[CC-Link]:Items enclosed in square brackets ([ ]) as shown here indicate screen titles, items displayed on screens, and operation buttons.



## **Before Use**

This chapter provides an overview of the UC1-CL11 unit. First check the included items.

# 1-1 Product Overview

This unit is a communication unit that operates as a CC-Link system remote device station to be connected with a connectable Optex FA sensor and CC-Link master station sold by a third party.

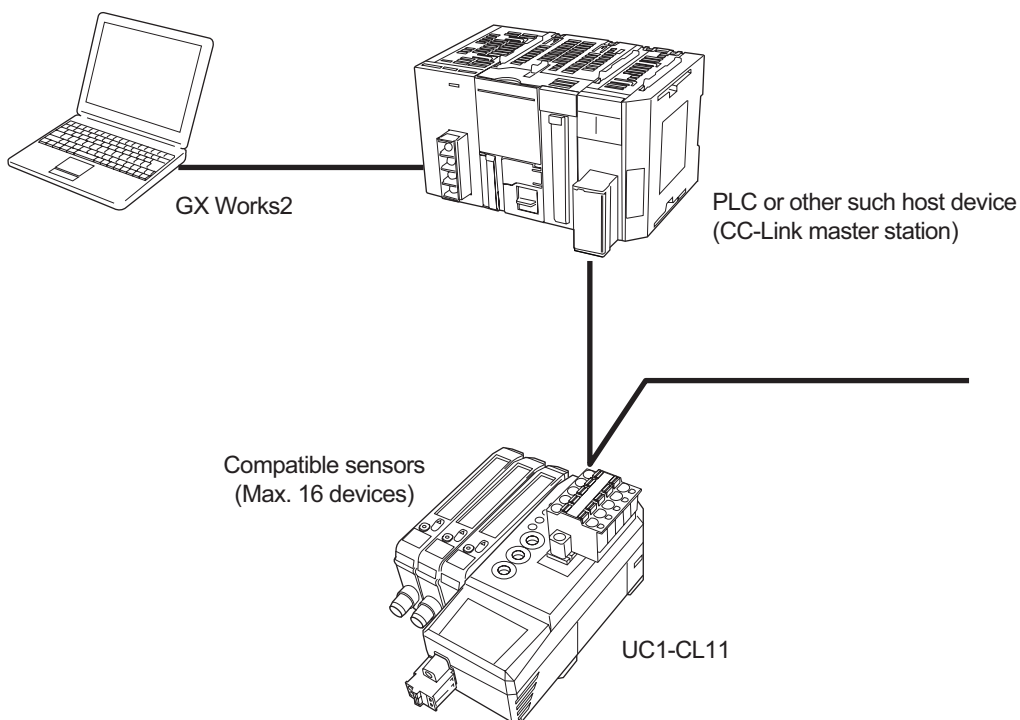
The CC-Link system master station connected to this unit can acquire the status of the following items for the compatible sensors.

- Output status
- Receiving light level and measured values
- Settings

The master station can also perform the following operations on the compatible sensors.

- Executing teaching
- Writing settings

## ■ CC-Link System Configuration Example



Up to 16 supported sensor devices can be connected with a UC1-CL11 unit.

The maximum number of inter-connectable sensors varies depending on the models of the compatible sensors.

For details, refer to “2-2-1 Compatible Sensors and Number of Connectable Units” (page 2-3).

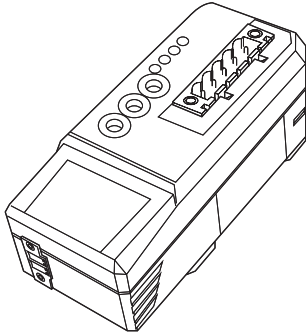


# 1-2 Checking the Included Items

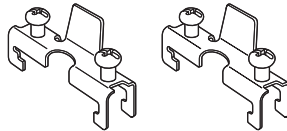
Before use, check the items included with this unit. If any items are defective or broken, contact the Optex FA customer support center (refer to the back of this manual).

## ■ Items Included With the UC1-CL11 Unit

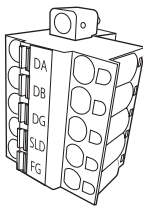
UC1-CL11 × 1



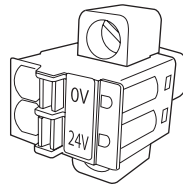
End plate × 2



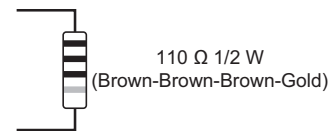
CC-Link connector × 1



External power connector × 1



Termination resistor (110 Ω)



Instruction manual

## ■ Other Required Items

### ● Recommended cables

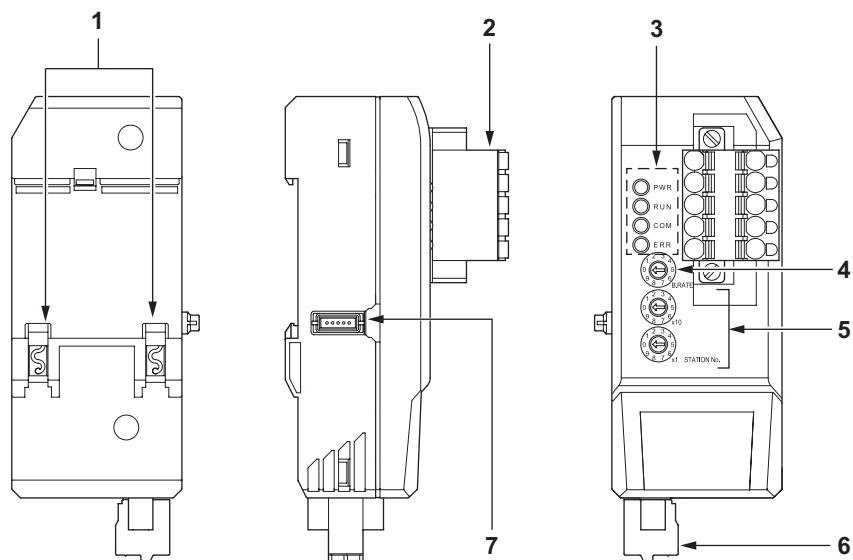
The following cables are recommended when using this unit.

Classification	Specifications
CC-Link cable	<ul style="list-style-type: none"> <li>• CC-Link dedicated cable compatible with version 1.10 (twisted-pair shielded cable)</li> <li>• Use single wires or twisted wires with the following sizes for the lead wires. 0.2 to 2.5 mm<sup>2</sup> (AWG24 to AWG12)</li> <li>• Recommended pin terminal: Phoenix Contact A series (compatible wire cross-sectional area: 0.25 to 2.5 mm<sup>2</sup>)/AI series (compatible wire cross-sectional area: 0.25 to 1.5 mm<sup>2</sup>) crimping terminal</li> </ul>
Power cable	<ul style="list-style-type: none"> <li>• Use single wires or twisted wires with the following sizes for the lead wires. 0.2 to 1.0 mm<sup>2</sup> (AWG26 to AWG16)</li> <li>• Recommended pin terminal: Phoenix Contact A series (compatible wire cross-sectional area: 0.25 to 1.5 mm<sup>2</sup>)/AI series (compatible wire cross-sectional area: 0.25 to 0.5 mm<sup>2</sup>) crimping terminal</li> </ul>

# 1-3 Names and Functions of Parts

This section explains the names and functions of parts.

## ■ UC1-CL11 Unit

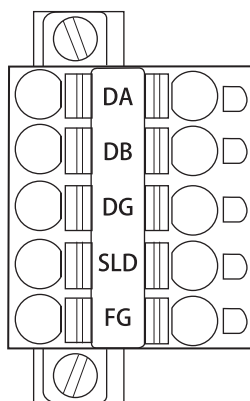


Number	Name	Function
1	DIN rail mounting hooks	Hooks for securing this unit to a DIN rail.
2	CC-Link connector	Connector for connecting a dedicated CC-Link cable.
3	LED indicators	Displays the status of this unit and the communication status. For details on the LED displays, refer to “5-1-1 LED Lighting Specifications” (page 5-2).
4	Baud rate setting switch	Sets the baud rate for CC-Link communication. 0: 156 kbps (default) 1: 625 kbps 2: 2.5 Mbps 3: 5 Mbps 4: 10 Mbps 5 to 9: Reserved
5	Station number setting switches	Set the station number of this unit on the CC-Link network. The default value is 01, and the settable range is 01 to 63. ×10: Tens digit of the station number (7 to 9: Reserved) ×1: Ones digit of the station number
6	External power connector	Connects to an external power source.
7	Inter-connection connector	Connects to compatible sensors.

## ■ CC-Link Connector

Use the following product for the CC-Link connector.

- Phoenix Contact TFKC 2, 5/5-STF-5, 08

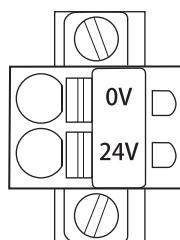


Terminal name	Function
DA	CC-Link communication signal (+)
DB	CC-Link communication signal (-)
DG	CC-Link communication (GND)
SLD	Connects to the shielded wire of a dedicated CC-Link cable.
FG	FG terminal. Perform Class D grounding through the FG.

## ■ External Power Connector

Use the following product for the external power connector.

- Phoenix Contact FK-MCP 1, 5/2-STF-3, 5



Terminal name	Function
0V	0 V terminal for the external power input.
24V	12 to 24 VDC terminal for the external power input. The allowable current is 2 A or less.





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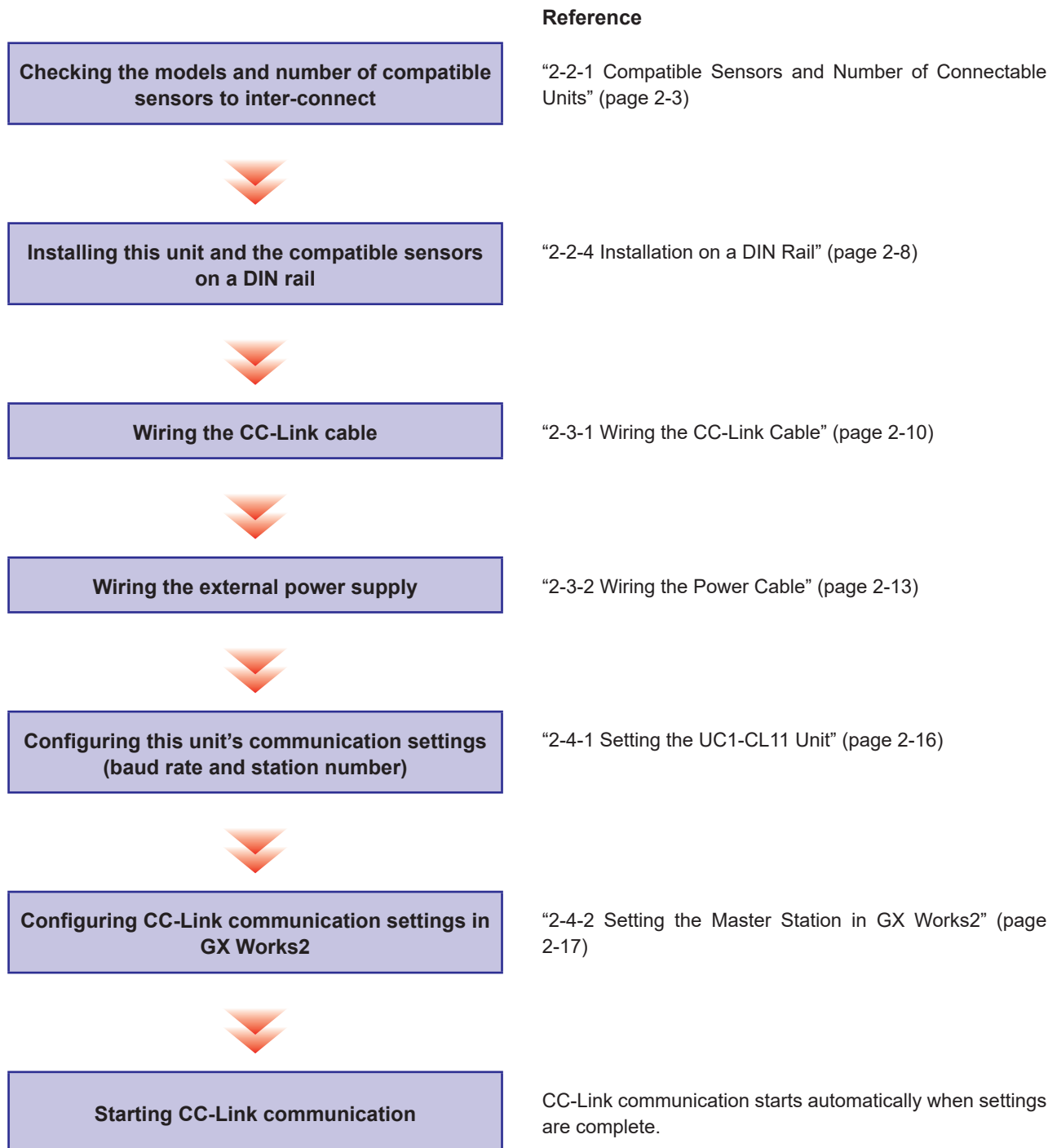
# 2

## **Installation and Settings**

This chapter explains how to inter-connect the UC1-CL11 unit and the compatible sensors and how to configure CC-Link communication settings.

# 2-1 Basic Procedure

The flow from installing and setting this unit to starting CC-Link communication is shown below.



# 2-2 Installation

This section explains how to install this unit on a DIN rail and how to inter-connect the compatible sensors.

## 2-2-1 Compatible Sensors and Number of Connectable Units

The compatible sensors that can be inter-connected to this unit for CC-Link network connection are listed below.

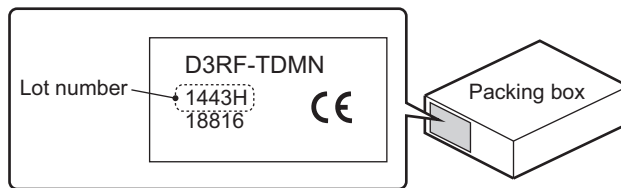
### MEMO

For the inter-connection configuration for this unit and compatible sensors and precautions related to this system, refer to “2-2-3 Inter-connection Configuration for the UC1-CL11 and Compatible Sensors” (page 2-6)

### Digital Fiber Amplifiers

Product name	Model <sup>*1*2</sup>	Number of occupied stations <sup>*3</sup>	Max. number of inter-connectable units <sup>*4</sup>
Digital fiber amplifier (models that support field network)	Cable type • <Master unit/1 output> D3RF-TM□ • <Master unit/2 outputs> D3RF-TDM□ • <Slave unit/1 output> D3RF-TS□ • <Slave unit/2 outputs> D3RF-TDS□ Connector type • <Master unit/1 output> D3RF-TMC□4 • <Master unit/2 outputs> D3RF-TDMC□4 • <Slave unit/1 output> D3RF-TSC□4 • <Slave unit/2 outputs> D3RF-TDSC□4	2 to 4	16

\*1 Units from lot number 1443■ (“■” can be any alphabet character) or later are compatible with this product. Only some functions are supported for products with old lot numbers. The D3RF lot number is written on the packing box.



\*2 The “□” in the model is “N” for NPN specifications and “P” for PNP specifications. Depending on when models were sold, even the models listed here may not be supported, so contact an Optex FA sales representative.

\*3 Each set of four sensors connected with a UC1-CL11 unit occupies four stations on a CC-Link network. A UC1-CL11 unit occupies two stations at a minimum.

\*4 The maximum number of inter-connectable units varies according to the ambient temperature.

Ambient temperature (°C)	-25°C to +55°C	-25°C to +50°C	-25°C to +45°C
Maximum number of inter-connectable D3RF units (models that support field network)	1 to 3	4 to 8	9 to 16

## ■ Compact Laser Displacement Sensors/Edge Sensors

To connect CD22 compact laser displacement sensors or TD1 through-beam edge sensors, use a CDA general-purpose amplifier unit in combination with the sensors.

Product name	Model	Number of occupied stations	Max. number of inter-connectable units
General-purpose amplifier unit	Cable type <ul style="list-style-type: none"> <li>• &lt;Master unit&gt; CDA-DM2, CDA-M<sup>*1</sup></li> <li>• &lt;Slave unit&gt; CDA-S</li> </ul>	2 to 4	8 <sup>*2</sup>
Compact laser displacement sensor (models that support RS-485 communication)	Pig tail type CD22-15-485M12 CD22-35-485M12 CD22-100-485M12		16
Through-beam edge sensor	TD1-010M8		

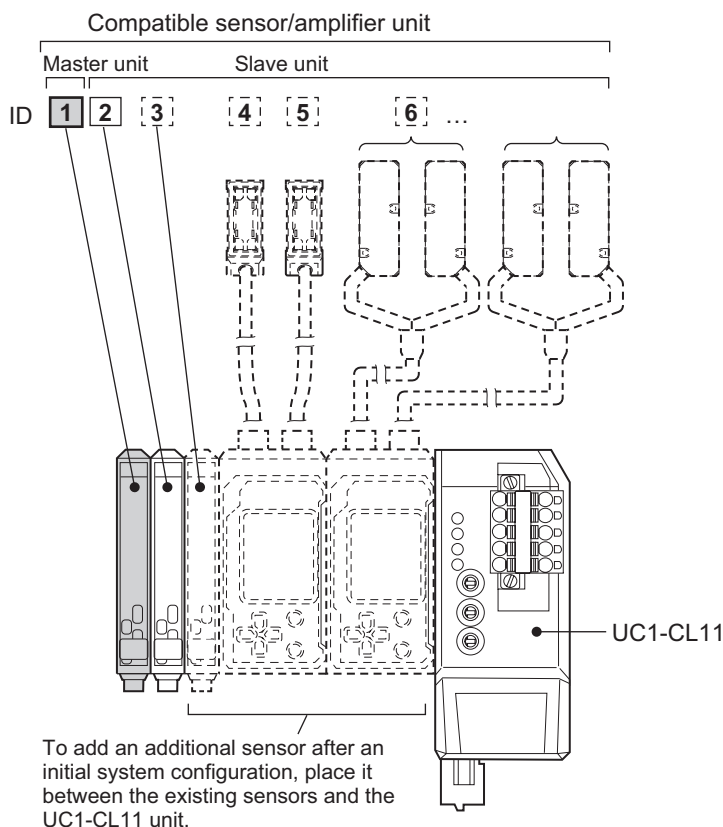
- \*1 Use the CDA-DM2 or CDA-M unit when constructing the system only with sensors that are compatible with the CDA. When also inter-connecting digital fiber amplifiers in the system, make sure to select a CDA-S slave unit.
- \*2 A maximum of two compatible sensors can be connected to each general-purpose amplifier unit. Even when one laser displacement sensor is connected with a CDA amplifier and then with UC1-CL11 unit, the node set occupies two stations of the CC-Link network. For edge sensors, the emitter and receiver combination is viewed as a single unit.



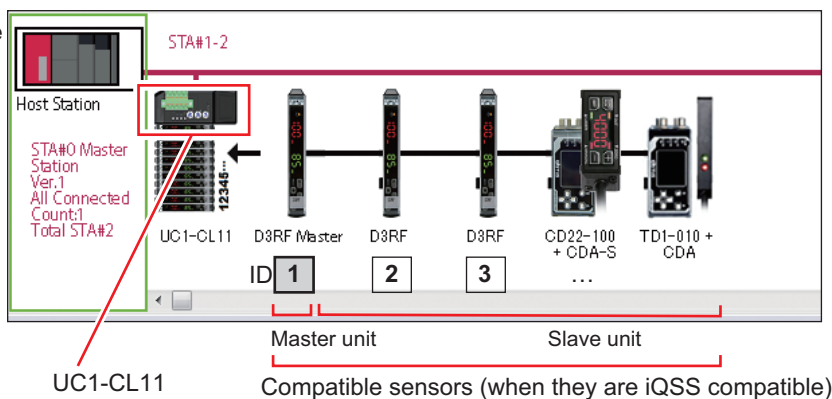
## 2-2-2 Assigning ID Numbers for Compatible Sensors

ID numbers are assigned to the compatible sensors inter-connected to a UC1-CL11 unit with ID 1 assigned to the left-most sensor (the sensor farthest away from this unit) and then incremented for each unit toward the UC1-CL11.

### Connection example



### Display example in GX Works2



### MEMO

- When adding compatible sensors to the system, inter-connect them between the existing sensors and this unit. Adding a compatible sensor on the left of the existing sensors will change the assignment of the ID numbers of the existing sensors. Consider the sensor configuration and the control program by thinking about this issue in advance. Depending on the combination of compatible sensors to inter-connect, caution is required in selecting and determining the inter-connection order of the master unit and slave units when adding new sensors to the system. For details, refer to "2-2-3 Inter-connection Configuration for the UC1-CL11 and Compatible Sensors" (page 2-6)
- When an iQSS-compatible sensor is connected to this unit, the compatible sensors are displayed in ID number order in the configuration diagram in GX Works2. For details on iQSS compatibility, refer to "2-4-3 iQSS Compatibility" (page 2-25)
- If the maximum number of compatible sensors that can be inter-connected is exceeded, an error will occur, and communication will not be possible.

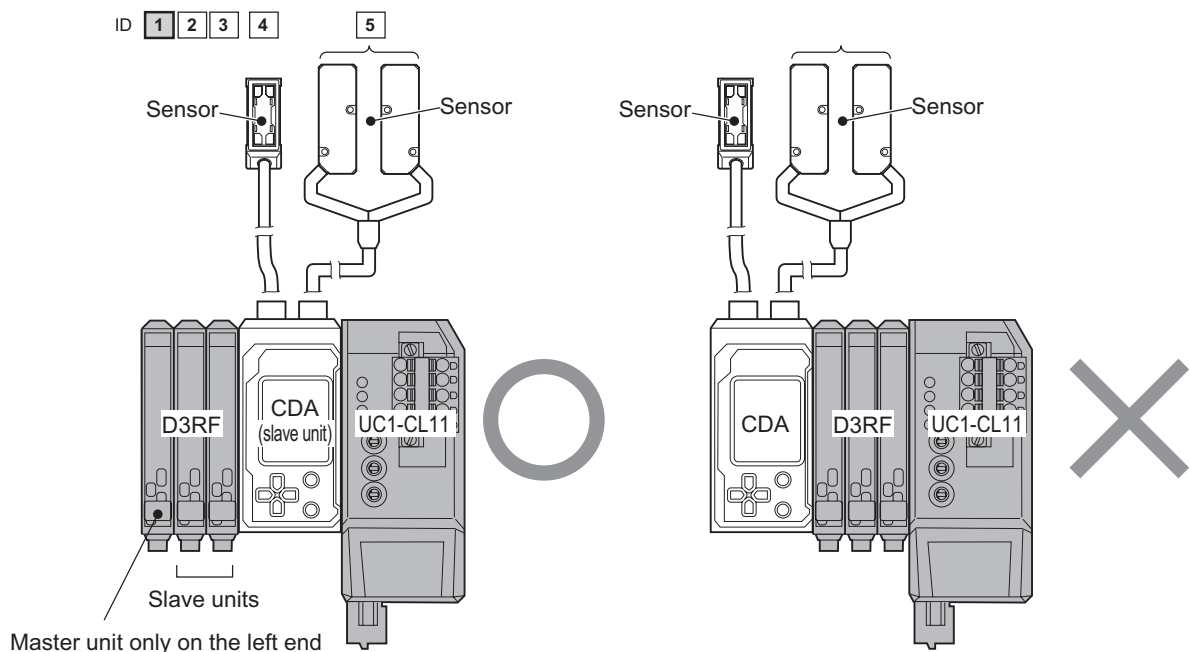
## 2-2-3 Inter-connection Configuration for the UC1-CL11 and Compatible Sensors

This section explains the inter-connection configuration for this unit and compatible sensors.

### ■ Mixed Configurations Containing Digital Fiber Amplifiers, General-purpose Amplifier Units, and Compatible Sensors

In this configuration, this unit, D3RF digital fiber amplifiers, and a CDA general-purpose amplifier unit are inter-connected in a mixed combination, and the displacement sensors are connected to the CDA.

- Make sure to inter-connect all the D3RF units as a group on the left of the system.
- For this connection, the slave unit of the CDA is required. A D3RF master unit must be connected on the far left.
- A maximum of two displacement sensors\*1 can be connected to each CDA. Also, even when only one sensor is connected, two ID numbers are occupied on the CDA unit.
- Do not connect an external power supply to the D3RF units. However, an external power supply must be connected to the CDA. For details, refer to “2-3-2 Wiring the Power Cable” (page 2-13).

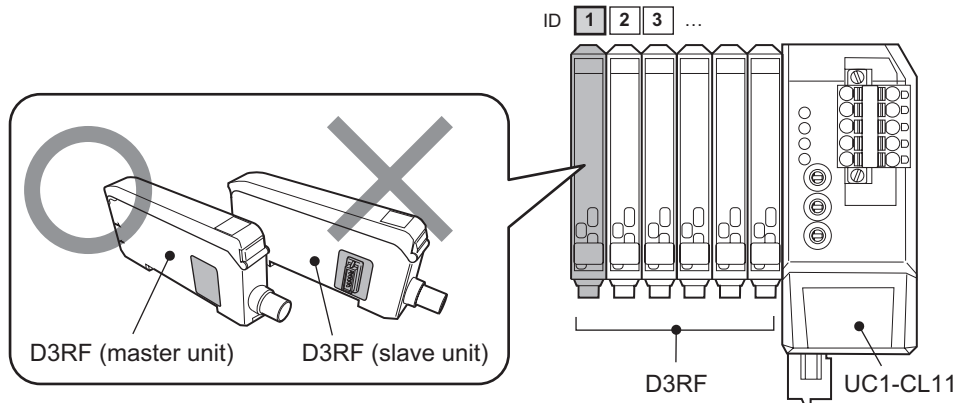


\*1 For the TD1 series, the emitter and receiver combination is viewed as a single unit.

## Inter-connection Configuration Using Only Digital Fiber Amplifiers

In this configuration, only a UC1-CL11 unit and D3RF digital fiber amplifiers are inter-connected.

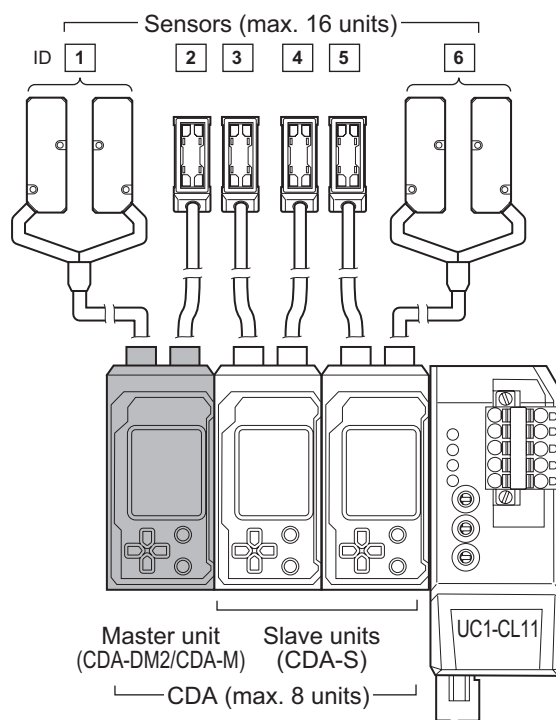
- Make sure to inter-connect the master unit on the left end (ID = 1). If a slave unit is inter-connected on the left end, the inter-connection connector will be exposed, causing interference with the end plate. Also, fouling on or damage to the inter-connection connector may damage the D3RF units.
- Do not connect an external power supply to the D3RF units. For details, refer to “2-3-2 Wiring the Power Cable” (page 2-13).



## Inter-connection Configuration Using Only General-purpose Amplifier Units and Compatible Sensors

In this configuration, only CDA general-purpose amplifier units are inter-connected to this unit, and the CDA units are then connected to sensors (the CD22 or the TD1).

- Make sure to inter-connect the master CDA unit on the left end. If a slave unit is inter-connected on the left end, the inter-connection connector will be exposed, causing interference with the end plate. Also, fouling on or damage to the inter-connection connector may damage the CDA.
- A maximum of two sensors\*1 can be connected to each CDA. Also, even when only one sensor is connected, it occupies two IDs on the CDA.
- An external power supply must be connected to the each unit of the connected CDA. For details, refer to “2-3-2 Wiring the Power Cable” (page 2-13).



\*1 For the TD1 series, the emitter and receiver combination is viewed as a single unit.

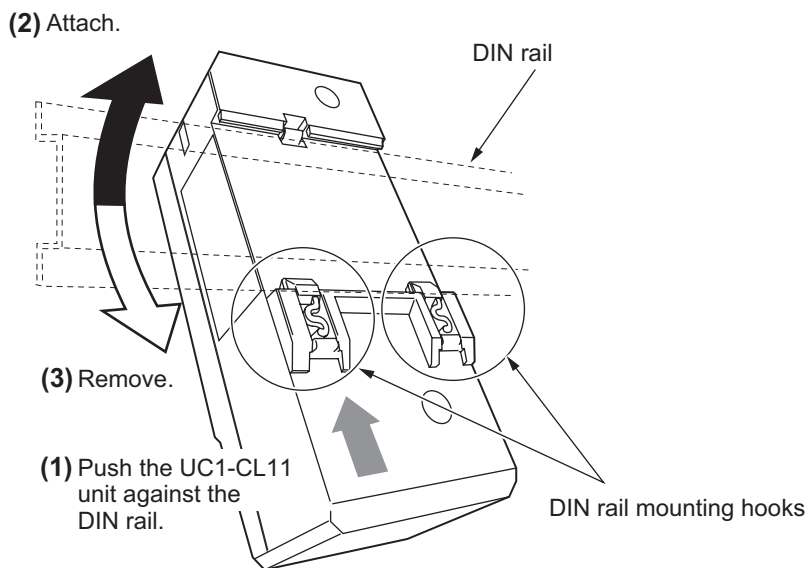
## 2-2-4 Installation on a DIN Rail

Install the UC1-CL11 unit on the DIN rail, and in the same way, install the compatible sensors and inter-connect them.

### MEMO

- Remove the power cable before proceeding with installation. In particular, make sure there is no power being transmitted when inter-connecting and disconnecting compatible sensors to and from this unit.
- Here, only D3RF units (models that support field network) are inter-connected to this unit, but the procedure is the same when inter-connecting CDA units.

- 1** Align the DIN rail mounting hooks on the lower part of the back of this unit with the bottom of the DIN rail, and while pushing against the DIN rail in the direction indicated in (1) below, set this unit onto the rail as indicated in (2).

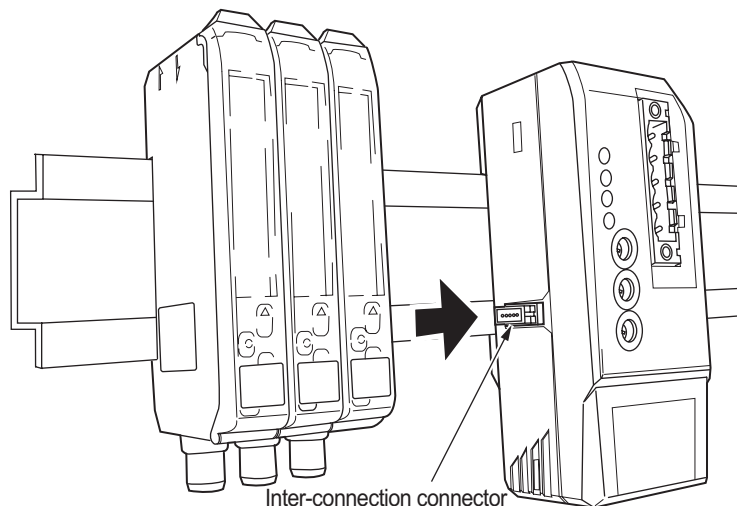


\*If the installation on the DIN rail is incomplete, defects may occur in the inter-connections with compatible sensors and in the connection to the FG terminal. Check whether the DIN rail mounting hooks are firmly locked and whether this unit is securely mounted on the DIN rail.

### MEMO

To remove this unit from the DIN rail, push the unit against the DIN rail in the direction indicated with (1) and tilt the unit in the direction indicated with (3).

- 2** Mount the compatible sensors on the DIN rail in the same way, and inter-connect them to this unit.



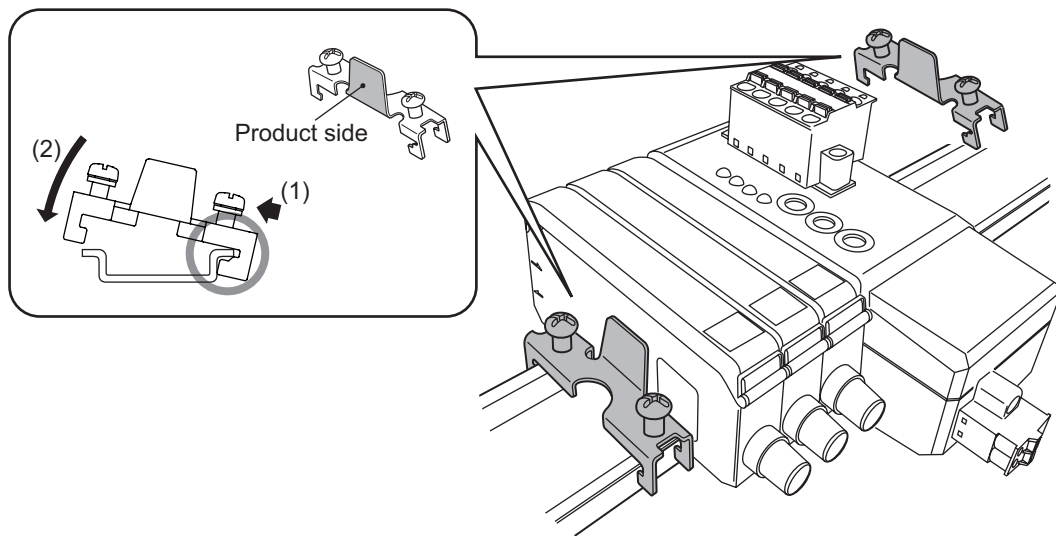
**Caution**

Securely connect this unit and the compatible sensors using the inter-connection connector. If the inter-connection connector is diagonal or is not inserted firmly all the way, this unit or the compatible sensors may be damaged when the power is turned on.

### 3 Place an end plate on each side of the connected products, and then tighten the screws to fix them on the DIN rail.

The tightening torque is 0.9 N•m or less.

Orient the end plates on each end of this unit and the compatible sensors so that the product side of each end plate faces the units (refer to the following diagram), which means the right and left end plates face the opposite direction. Attach the end plates by hooking the notched side on the DIN rail first, as shown in the following diagram.



# 2-3 Wiring

This section explains how to wire the CC-Link cable and the power cable.

## MEMO

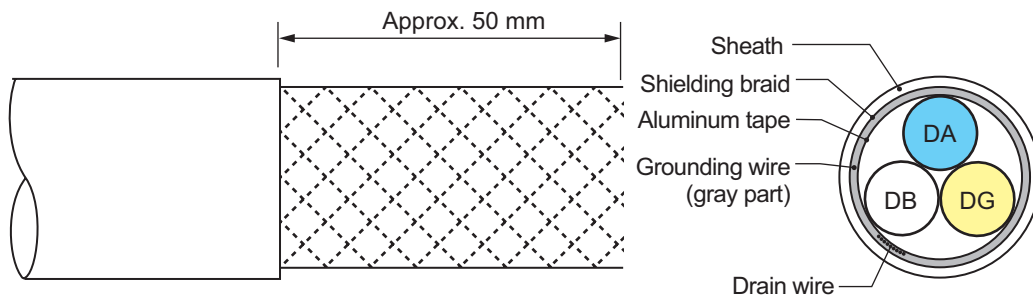
- Make sure the power is off before changing the wiring.
- Use a recommended cable compatible with CC-Link version 1.10 as the CC-Link cable for this unit.
- Refer to the CC-Link installation manual published by the CC-Link Partner Association and the manual of the CC-Link master station for cable lengths and wiring of the CC-Link network.

## 2-3-1 Wiring the CC-Link Cable

This section explains how to wire the CC-Link cable.

### Processing the Cable

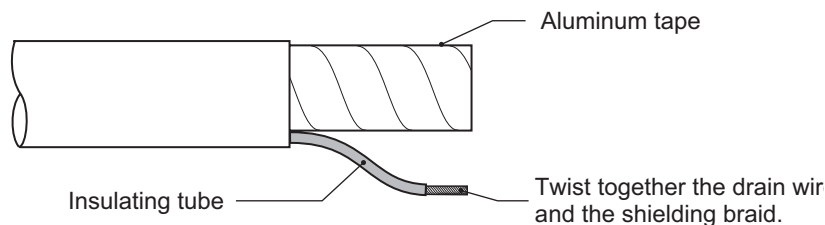
- 1 Peel off approx. 50 mm of the sheath from the end of the CC-Link cable.**  
The shielding braid is exposed.



## MEMO

When peeling off the sheath, do not damage the cable's shielding braid.

- 2 Carefully unravel the shielding braid, twist the drain wire and the shielding braid together, and then cover this combination with the insulating tube.**

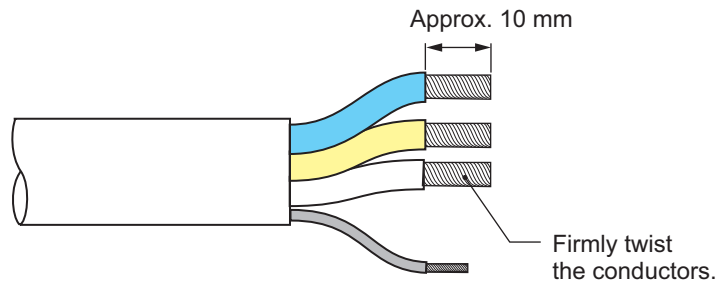


## MEMO

The dedicated CC-Link cable comes in two types of products: one in which the drain wire and the shielding braid are already twisted together and one in which the drain wire and the shielding braid are separate. In either case, twist together the drain wire and the shielding braid at this step.

### 3 Remove the aluminum tape, and then peel off 10 mm of the coating from the end of each signal wire.

Firmly twist the exposed conductors.



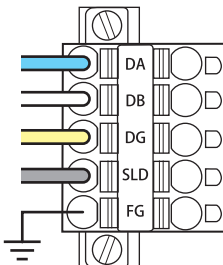
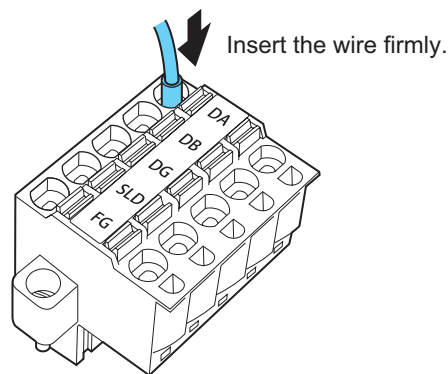
#### MEMO

- When peeling off the coating, exercise caution to avoid damaging the conductors.
- The recommended pin terminal is shown below.  
Phoenix Contact A series (compatible wire cross-sectional area: 0.25 to 2.5 mm<sup>2</sup>)/AI series (compatible wire cross-sectional area: 0.25 to 1.5 mm<sup>2</sup>) crimping terminal
- When using a pin terminal, process the wiring to match the specifications of the used pin terminal.
- Do not perform preliminary soldering or otherwise apply solder to the end caps of the processed cable.

## Connecting the Cable

### 1 Connect a CC-Link cable with twisted wire end or attached pin terminal with the CC-Link connector.

Insert a wire end or attached pin terminal firmly through the bottom of the hole.

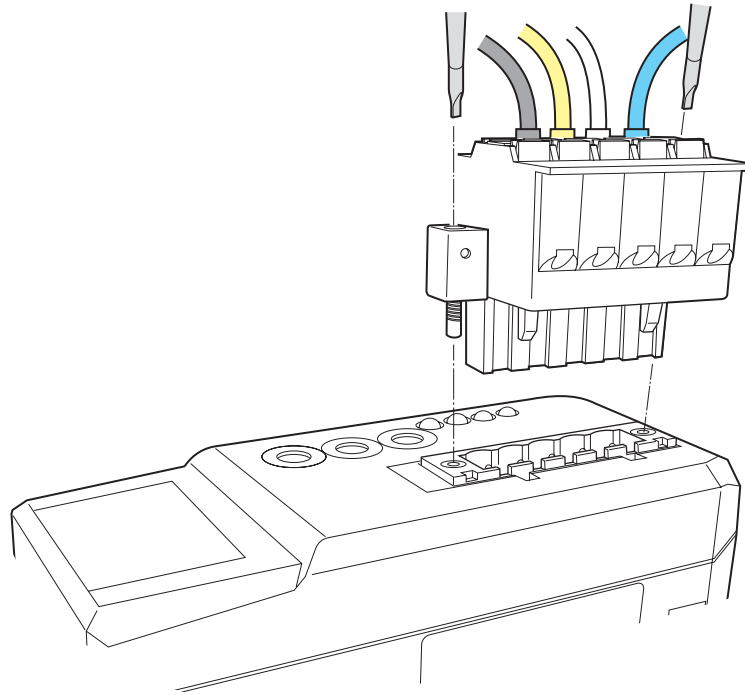


Terminal name	Function
DA	CC-Link communication signal (+)
DB	CC-Link communication signal (-)
DG	CC-Link communication (GND)
SLD	Connects to the shielded wire of a dedicated CC-Link cable.
FG	FG terminal. Perform Class D grounding through the FG.

#### MEMO

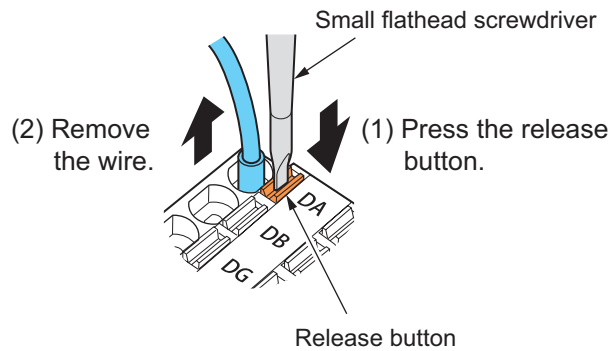
The UC1-CL11 unit is connected to the FG through the DIN rail, so use a conductive DIN rail. If a conductive DIN rail cannot be used, use the FG terminal and connect it to the frame ground of the metal housing, chassis, or similar object.

- 2** Plug the CC-Link connector into the UC1-CL11 unit and secure the connector with screws.  
The tightening torque for the screws is 0.2 to 0.3 N•m.



**MEMO**

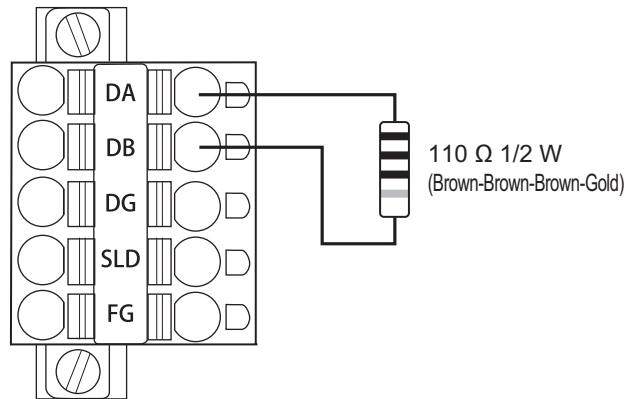
To remove the CC-Link cable, remove the CC-Link connector from this unit, and then pull out the individual wires while using a small flathead screwdriver to press the release button next to each terminal hole.





## ■ Installation of Termination Resistor

Installation of a UC1-CL11 unit at the end of CC-Link network trunk requires connecting a termination resistor to the DA and DB terminals on its CC-Link connector, as shown in the figure below.



### 2-3-2 Wiring the Power Cable

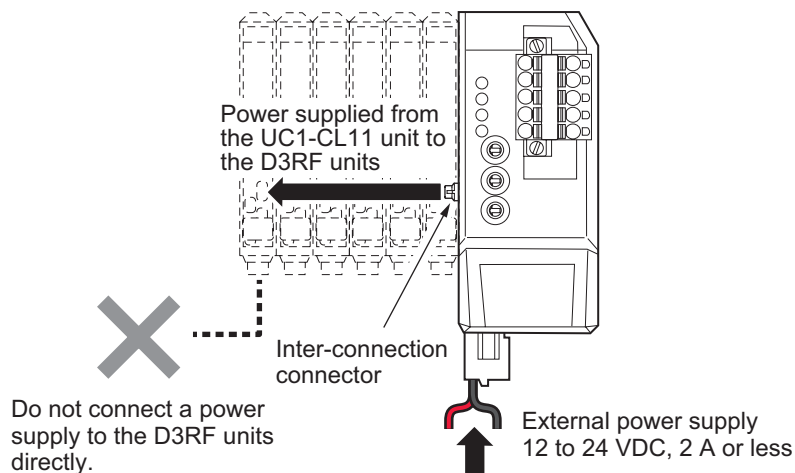
This unit requires a power input (12 to 24 VDC) connected to the external power connector. Make sure to check the wiring to the power supply device because incorrect wiring may cause a fire or damage the product.

#### ●●● MEMO ●●●

Ensure that the length of the power cable to this unit is 30 m or less.

## ■ Supplying Power to D3RF Digital Fiber Amplifiers

As shown in the following diagram, power is supplied from this unit to the D3RF units.

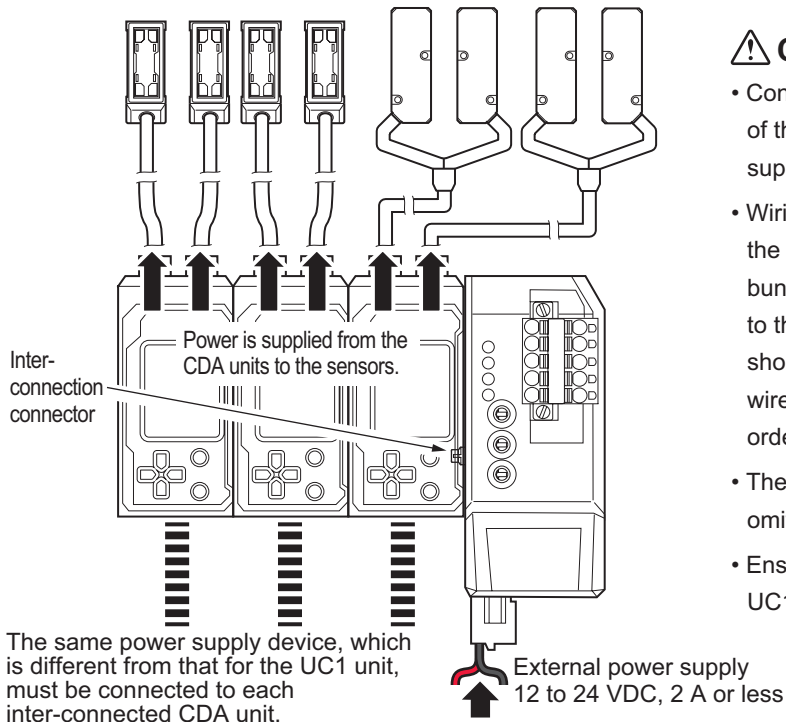


#### ●●● MEMO ●●●

Also, when D3RF and CDA units are both inter-connected, power is supplied from this unit to the D3RF units. Regardless of the inter-connection configuration, do not connect an external power supply to the D3RF units.

## ■ Supplying Power to CDA General-purpose Amplifier Units and Sensors (the CD22 or TD1)

In case of the following configuration, a separate power input to each of the CDA units in parallel with the same power supply device connected to the UC1-CL11 unit is required. The power is supplied to connected sensors through the CDA units.



### ⚠ CAUTION

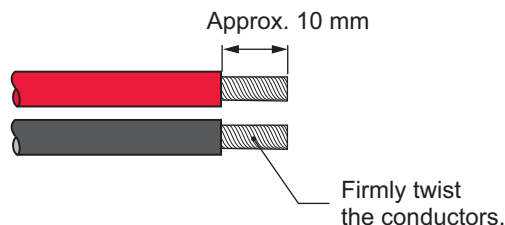
- Connect all the power supply wires (brown/blue) of the inter-connected CDA to the same power supply device.
- Wiring the external power supply to the UC1 with the factory default status (in which the wires are bundled) without wiring the external power supply to the CDA (when inter-connected to the UC1) will short-circuit the CDA. To prevent short-circuits, wire the external power supply in the following order: (1) CDA, (2) UC1.
- The external power supply to the UC1 can be omitted.
- Ensure that the length of the power cable to the UC1 and to the CDA series is 30 m or less.

### ●●● MEMO ●●●

Also, when D3RF and CDA units are both inter-connected, each CDA must be connected to an external power supply.

## ■ Processing the Cable

- 1** Peel off approx. 10 mm of the coating from the end of the power cable.  
Firmly twist the exposed conductors.

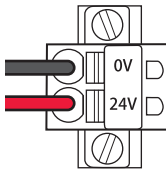
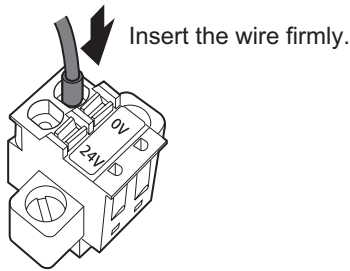


### ●●● MEMO ●●●

- The recommended cable size is AWG26 to AWG16.
- When peeling off the coating, exercise caution to avoid damaging the conductors.
- The recommended pin terminal is shown below.  
Phoenix Contact A series (compatible wire cross-sectional area: 0.25 to 1.5 mm<sup>2</sup>)/AI series (compatible wire cross-sectional area: 0.25 to 0.5 mm<sup>2</sup>) crimping terminal
- When using a pin terminal, process the wiring to match the specifications of the used pin terminal.
- Do not perform preliminary soldering or otherwise apply solder to the end caps of the processed cable.

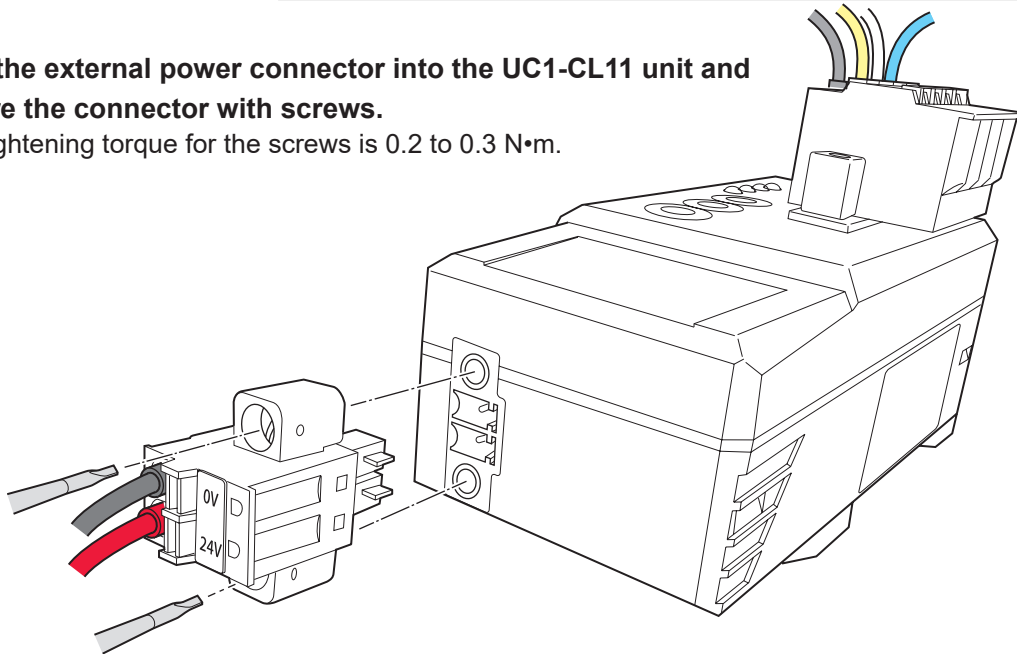
## ■ Connecting the Cable

- 1 **Connect the power cable with twisted wire end or attached pin terminal with the external power connector.**  
Insert a wire end or attached pin terminal firmly through the bottom of the hole.



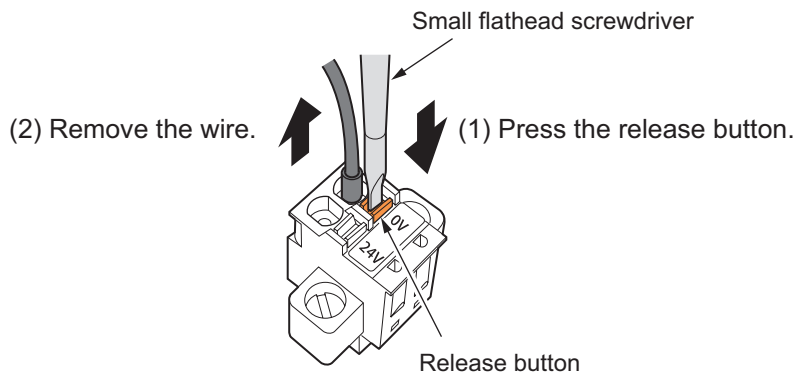
Terminal name	Function
0V	0 V terminal for the external power input.
24V	12 to 24 VDC terminal for the external power input. The allowable current is 2 A or less.

- 2 **Plug the external power connector into the UC1-CL11 unit and secure the connector with screws.**  
The tightening torque for the screws is 0.2 to 0.3 N·m.



### ●●● MEMO ●●●

To remove the power cable, remove the external power connector from this unit, and then pull out the individual wires while using a small flathead screwdriver to press the release button next to each terminal hole.



## 2-4 Setting CC-Link Communication

To connect the UC1-CL11 unit to a CC-Link system, communication settings are required on both the UC1 unit and CC-Link master station.

This section explains the communication settings.

### MEMO

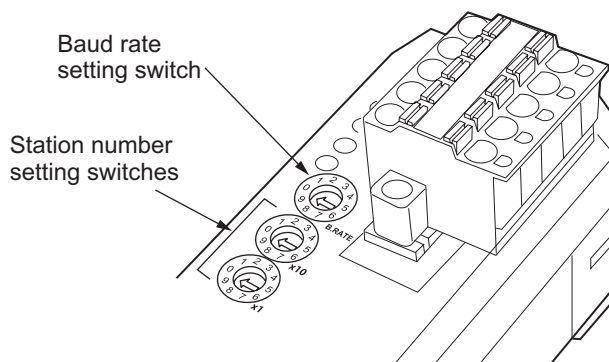
In this manual, the method explained for configuring the settings on the CC-Link master station is using a CSP+ file in GX Works2 to configure the basic settings on this unit. For further detailed settings, or when using a setting tool other than GX Works2, please refer to the manual for that tool or device for configuration of the CC-Link master device or controller.

### 2-4-1 Setting the UC1-CL11 Unit

This section explains how to use switch operations on the UC1-CL11 unit to set the baud rate and station number.

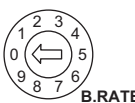
### MEMO

The baud rate and station number must be set to the same values as the settings in GX Works2.



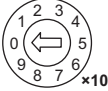

### ■ Setting the Baud Rate

Use the baud rate setting switch to select the baud rate as shown below.

Baud rate setting switch	Number	Baud rate (bps)
	0	156 k (default)
	1	625 k
	2	2.5 M
	3	5 M
	4	10 M
	5 to 9	Reserved

## ■ Setting the Station Number

Use the station number setting switches to set the station number (slave ID) assigned to this unit.

Station number setting switch (tens digit)	Setting
	0 to 6 (default: 0) 7 to 9: Reserved
Station number setting switch (ones digit)	Setting
	0 to 9 Setting range: 1 (default) to 63

This completes the procedure for configuring the settings of this unit. Next, use GX Works2 to configure the CC-Link settings on the master station side.

## 2-4-2 Setting the Master Station in GX Works2

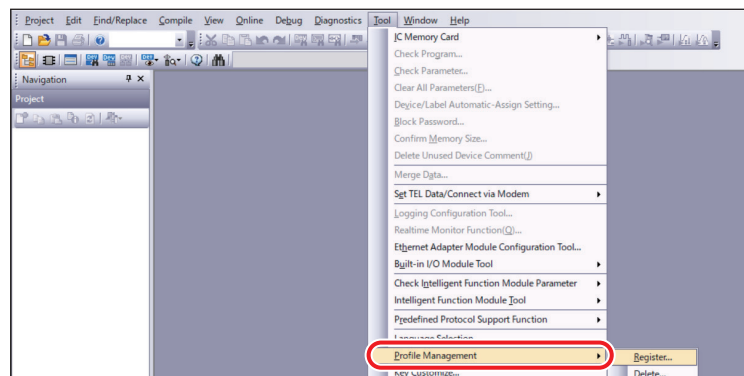
You can easily set the parameters for each UC1-CL11 unit using the CSP+ file provided with the UC1-CL11. This section explains how to read a CSP+ file from GX Works2 and how to set CC-Link communication.

### ●●● MEMO ●●●

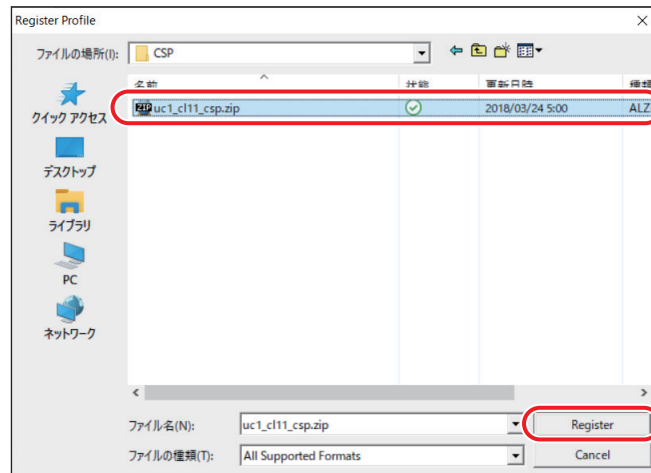
- You can acquire a CSP+ file for this unit from the following URL.  
<https://www.optex-fa.com/download/products/uc1/>
- Importing the CSP+ file on GX Works2 completes its registration.
- The setup method in GX Works2 that is explained here is for the basic settings of this unit. If you require detailed settings, refer to the manuals for the CC-Link master device and GX Works2.

## ■ Reading CSP+ Files

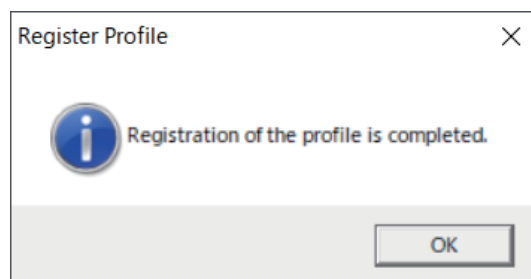
- 1 Start GX Works2.**
- 2 On the [Tool] menu, select [Profile Management].**  
The [Register Profile] screen is displayed.



### 3 Select the CSP+ file you prepared in advance, and then click [Register].



When the registration is completed correctly, the following message is displayed.

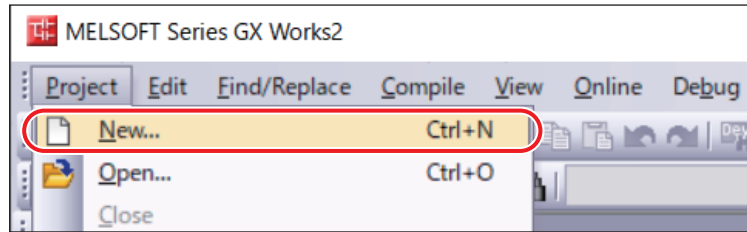


### 4 Click [OK] to close the message.

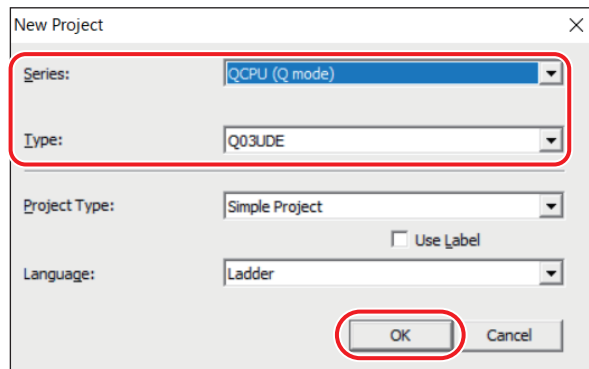
This completes the procedure for reading the CSP+ file. Next, create a new project.

## ■ Creating a Project

- 1 On the [Project] menu, select [New].  
The [New Project] dialog box is displayed.



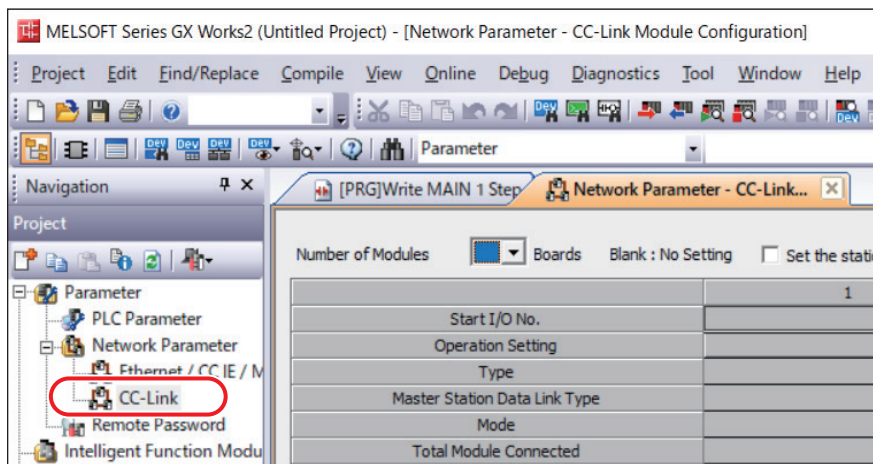
- 2 Select the [Series] and [Type] to match the master station to connect with a UC1-CL11 unit, and then click [OK].



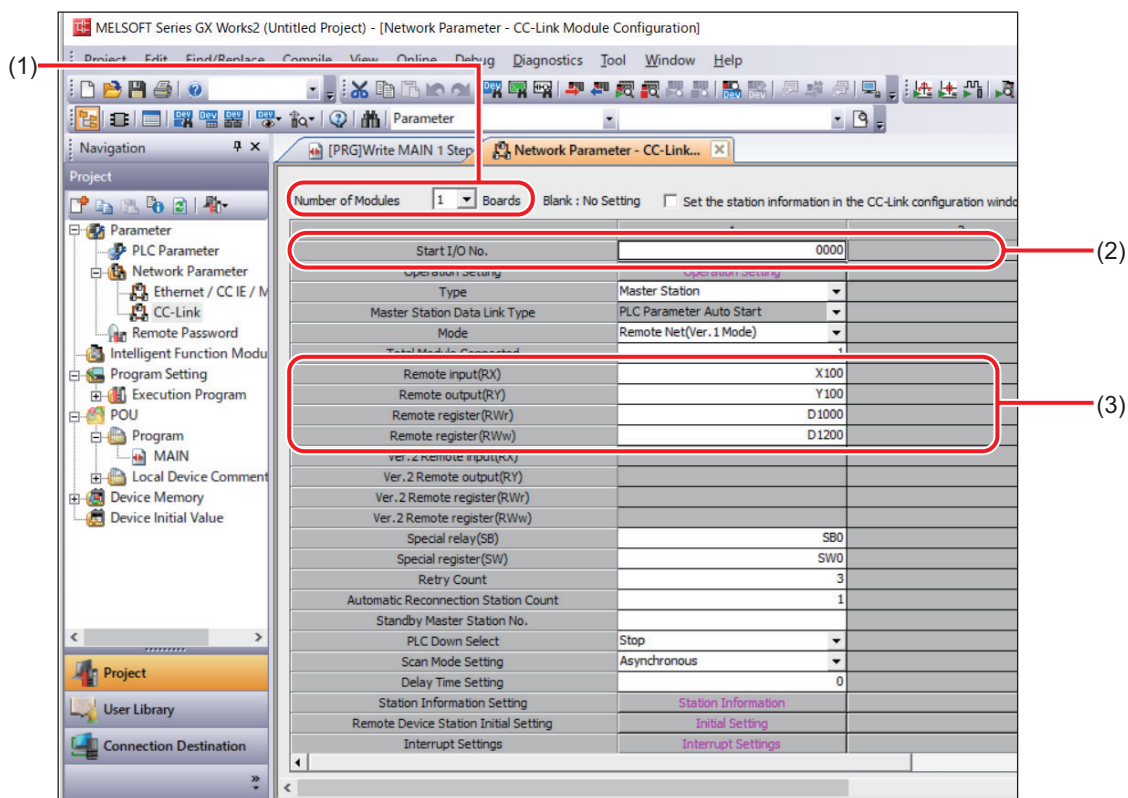
This completes the procedure for creating the project. Next, set the CC-Link network parameters.

## ■ Setting CC-Link Network Parameters

- 1 In the GX Works2 navigation window, from the project view, select [Parameter] > [Network Parameter] > [CC-Link].  
The display switches to the [Network Parameter - CC-Link Module Configuration] screen.



- 2 Configure the necessary settings.



No.	Setting item	Details
(1)	Number of Modules	Sets the number of CC-Link master stations and remote device stations, including the UC1-CL11 unit.
(2)	Start I/O No.	Sets the starting address.
(3)	Remote input (RX) Remote output (RY) Remote register (RWr) Remote register (RWw)	Set a starting address for each device.

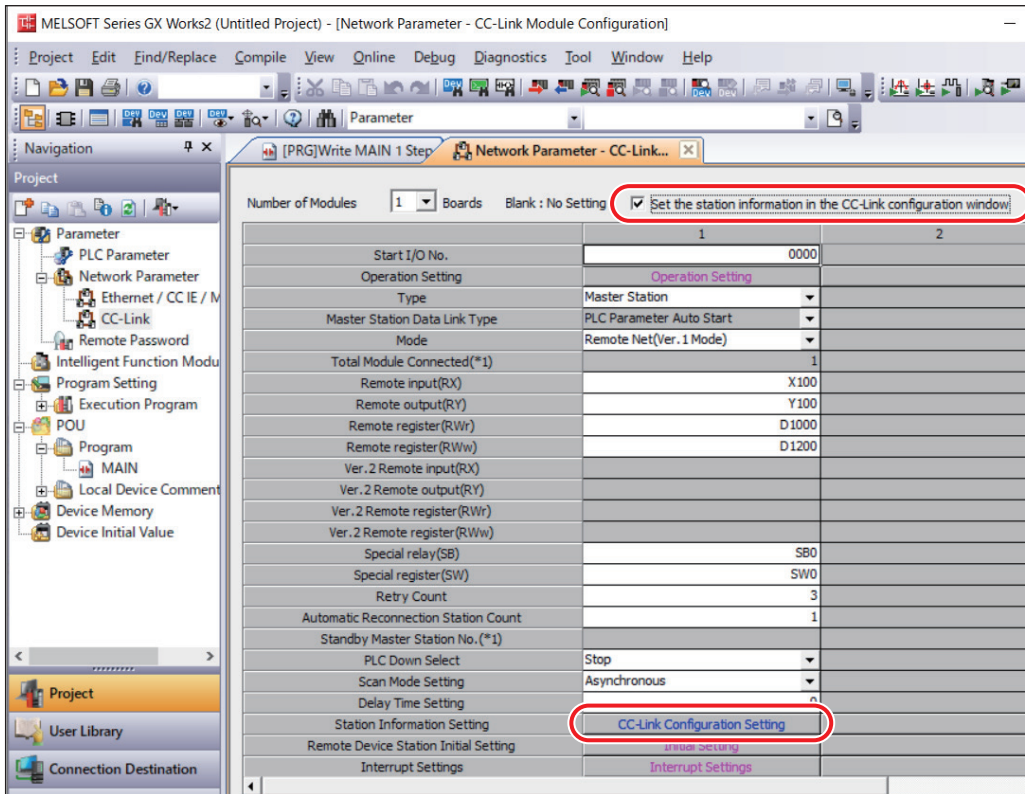


Next, set the CC-Link configuration.

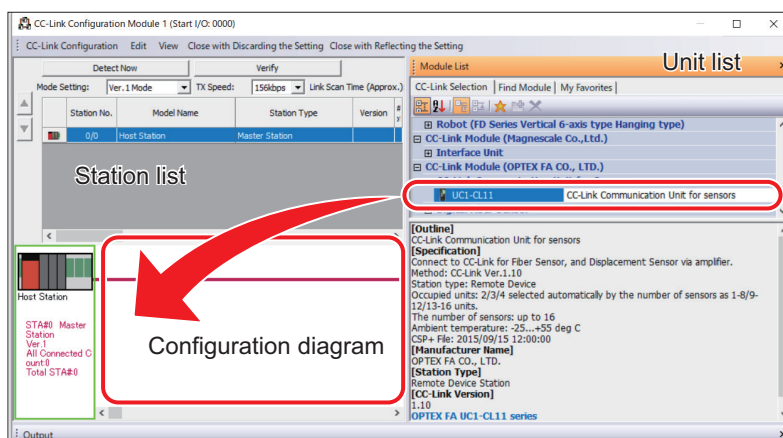
## ■ Setting the CC-Link Configuration

- 1 On the [Network Parameter - CC-Link Module Configuration] screen, select the [Set the station information in the CC-Link configuration window] check box, and then click [CC-Link Configuration Setting].

The CC-Link configuration window is displayed.



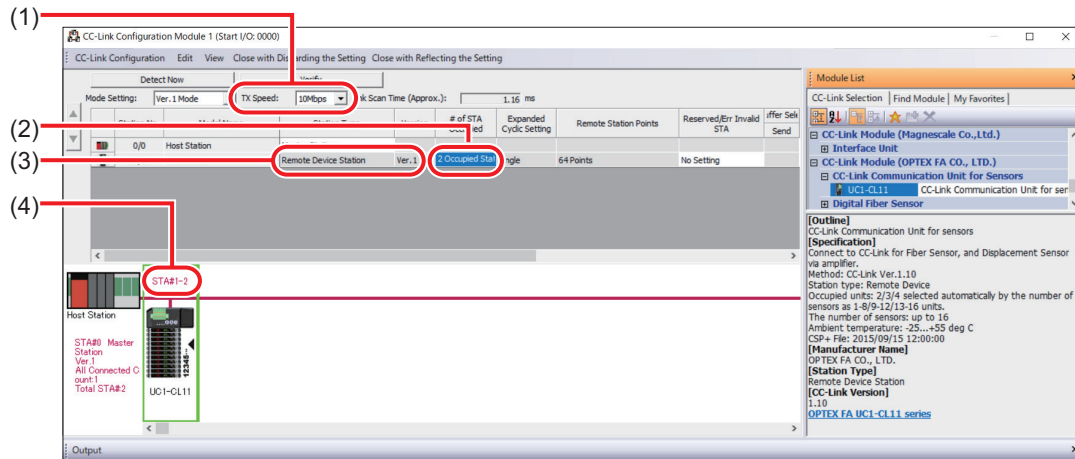
- 2 From the unit list, drag the required unit to the configuration diagram. In the configuration diagram, configure the CC-Link system that includes this unit.



### MEMO

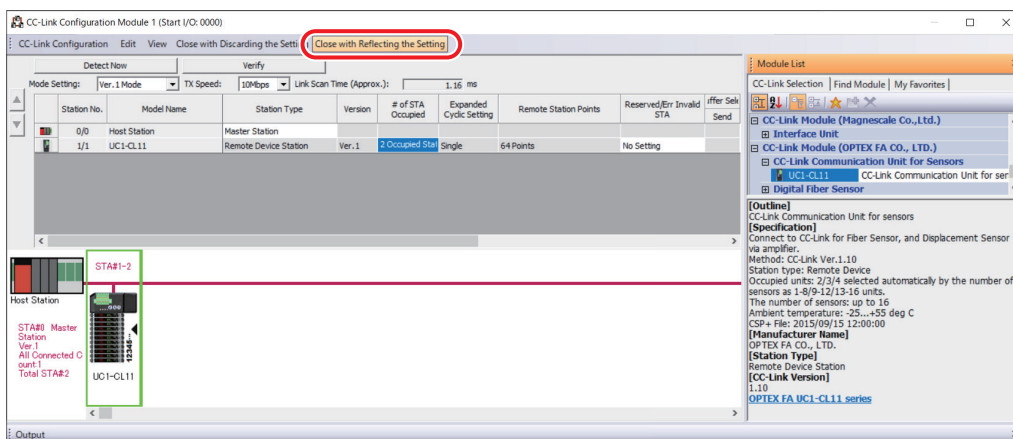
The dragged unit is also displayed in the station list.

### 3 Set the required parameters for the units that compose the CC-Link system. Configure the settings of this unit as shown below.



No.	Setting item	Details
(1)	TX Speed	Select the baud rate to use in communication with this unit. Select the same value as that set with the baud rate setting switch on this unit.
(2)	# of STA Occupied	Select this value according to the number of compatible sensors to inter-connect. * Example: D3RF digital fiber amplifiers • [2 Occupied Stations]: 8 or fewer compatible sensors can be inter-connected. • [3 Occupied Stations]: 9 to 12 compatible sensors can be inter-connected. • [4 Occupied Stations]: 13 to 16 compatible sensors can be inter-connected.
(3)	Station Type	Remote Device Station (set automatically)
	Version	Ver.1 (set automatically)
(4)	STA#	This value is assigned automatically. Check whether the value is the same as that set with the station number setting switches on this unit. "2-4-1 Setting the UC1-CL11 Unit" (page 2-16)

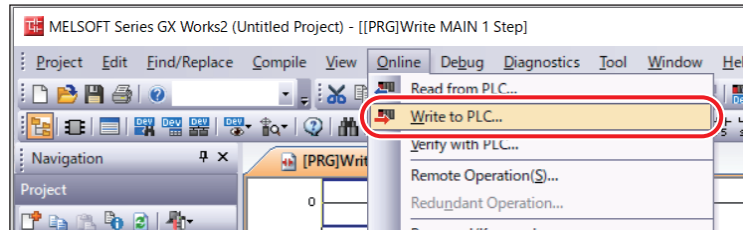
### 4 Click [Close with Reflecting the Setting].



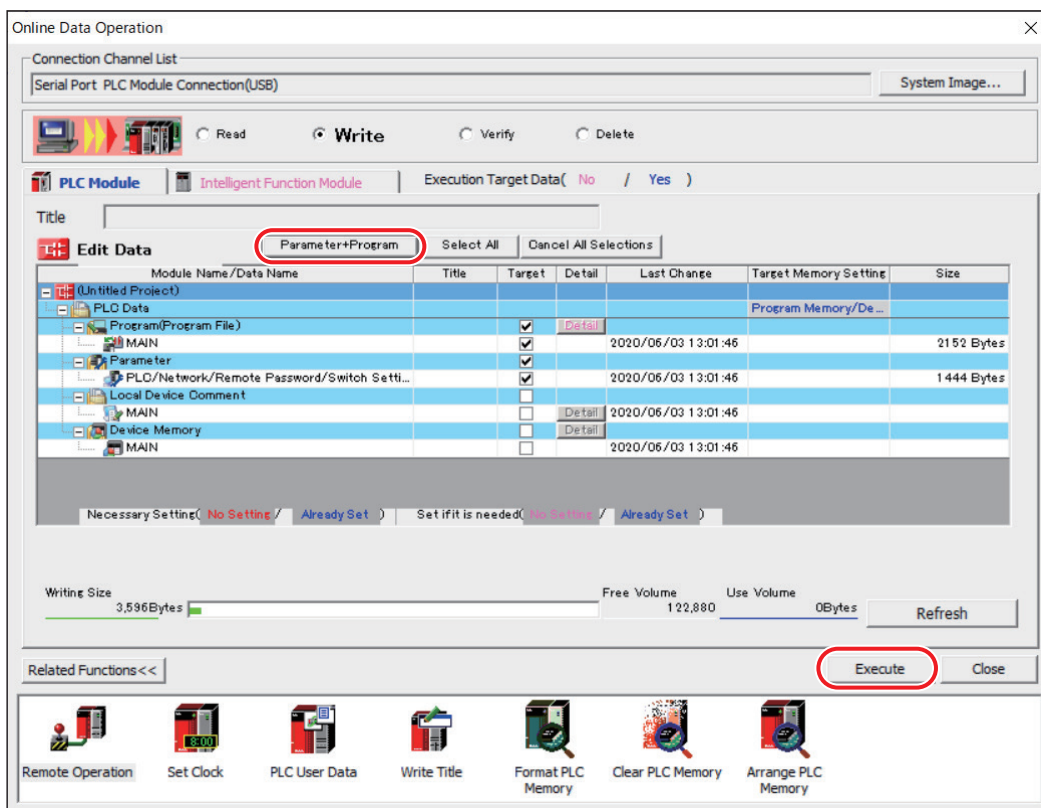
This completes the procedure for entering the information required for CC-Link communication. At this point, settings have only been configured on the PC, so, next, it is necessary to write the setting details to the CC-Link master station.

## ■ Writing the Setting Details to the Master Station

- 1 On the [Online] menu, select [Write to PLC].  
The online data creation window is displayed.



- 2 Click [Parameter+Program], and then click [Execute].



This completes the procedure for configuring the CC-Link settings on the master station side.

---

 **MEMO**

- When setting details are written to the master station, it must be reset.
  - If CC-Link communication does not start, check the mode setting of this unit in GX Works2.
  - If the COM indicator on this unit does not light in green even after the settings have been configured, check the settings configured in GX Works2 and the settings on this unit once more.
  - If communication is not possible even after checking all the above items, refer to the CC-Link master device manual.
-

## 2-4-3 iQSS Compatibility

The UC1-CL11 unit is compatible with iQ Sensor Solution (iQSS) of Mitsubishi Electric Corporation. The operations listed below can be made configured on GX Works2 for sensors connected with a UC1-CL11 unit, without modifying settings on the sensor directly.

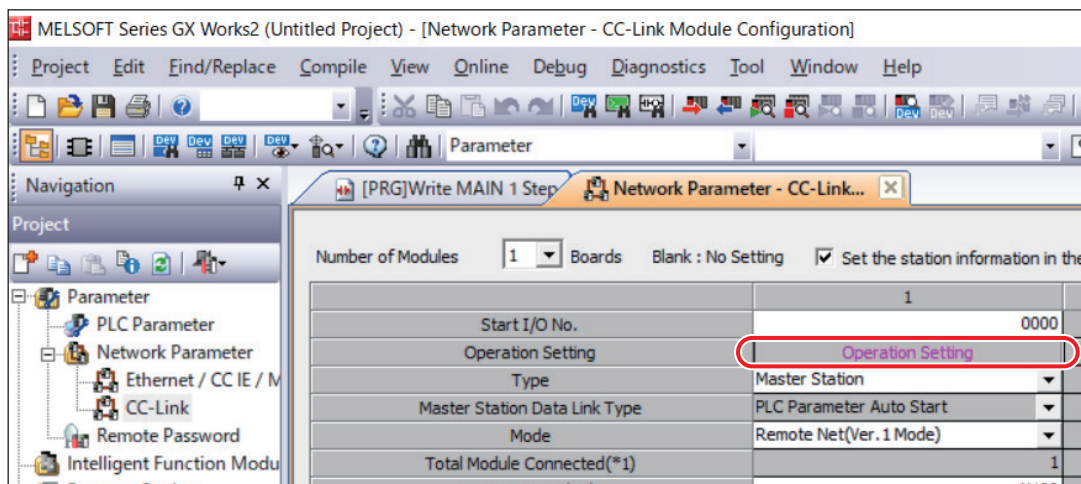
- Automatic detection of compatible sensors inter-connected to the UC1-CL11 unit
- Monitoring of the operation status of compatible sensors
- Writing/reading settings of compatible sensors
- Backing up/restoring settings of compatible sensors

### ■ Settings for Using iQSS

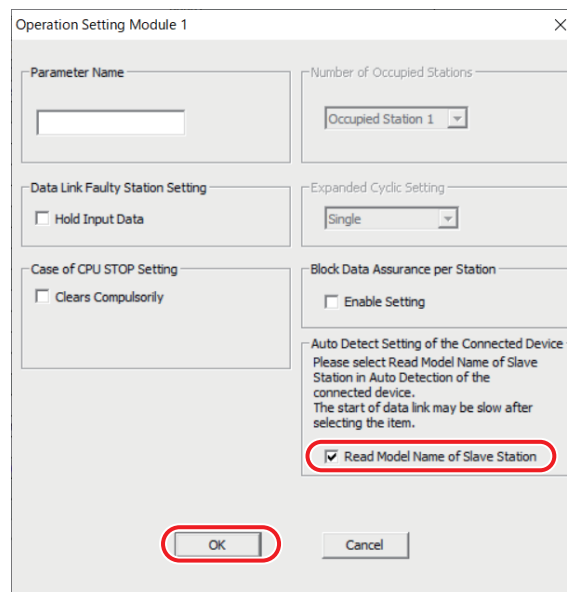
Configure the settings for using sensors compatible with iQSS in GX Works2.

- 1 On the [Network Parameter - CC-Link Module Configuration] screen, click [Operation Setting].

The [Operation Setting] dialog box is displayed.



- 2 Select the [Read Model Name of Slave Station] check box, and then click [OK].



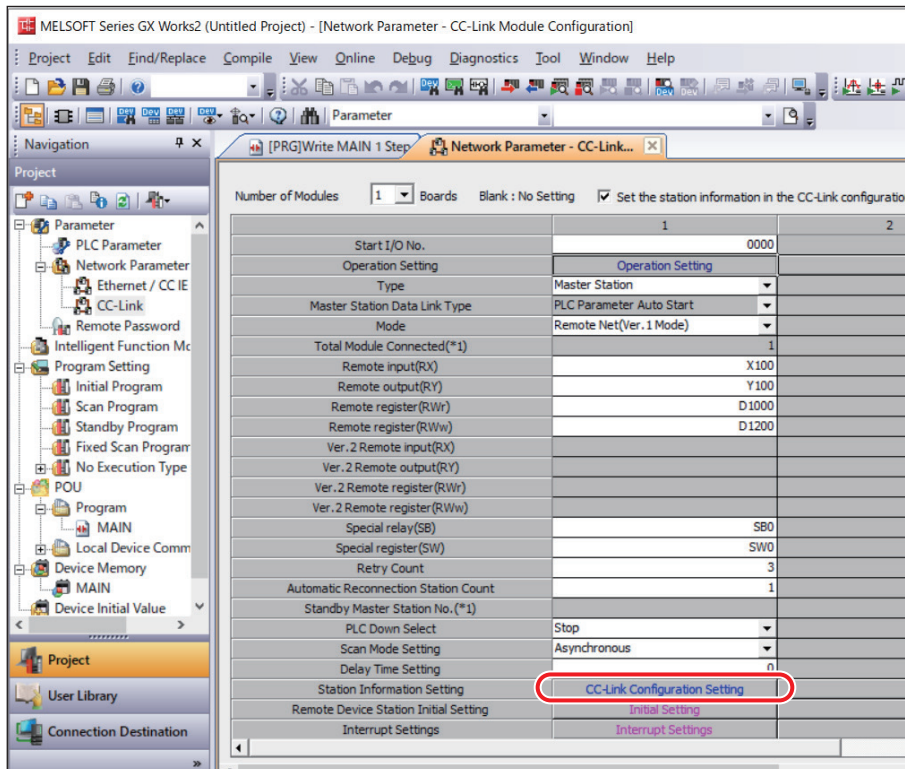
This completes the procedure for configuring the settings.

## Automatic Detection of Compatible Sensors

With this function, compatible sensors inter-connected to this unit are automatically detected and saved to the project in GX Works2.

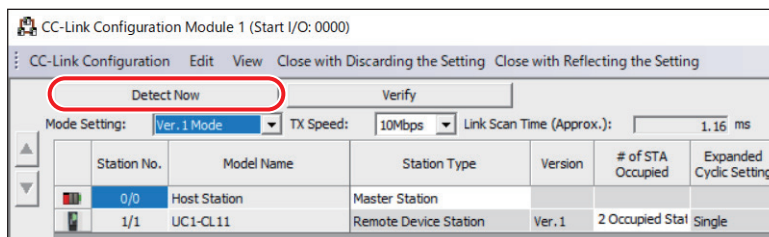
- 1 On the [Network Parameter - CC-Link Module Configuration] screen, click [CC-Link Configuration Setting].

The CC-Link configuration window is displayed.

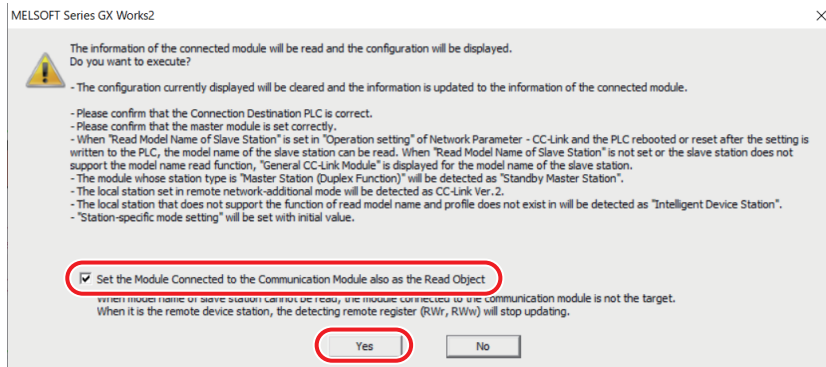


- 2 Click [Detect Now].

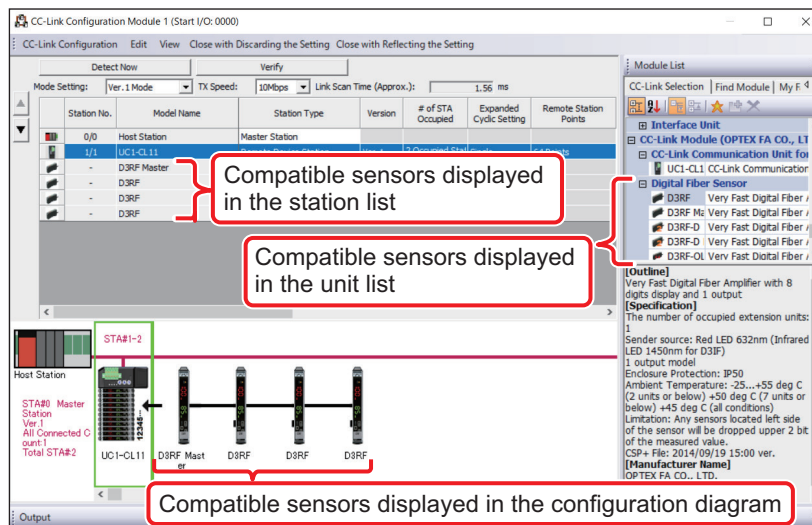
A dialog box is displayed.



- 3** Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].

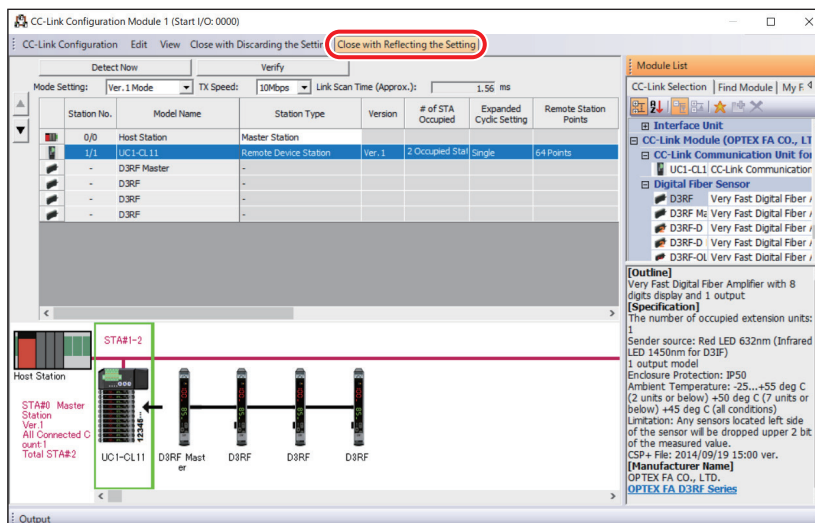


The compatible sensors connected to this unit are displayed in the CC-Link configuration window.



- 4** Click [Close with Reflecting the Setting].

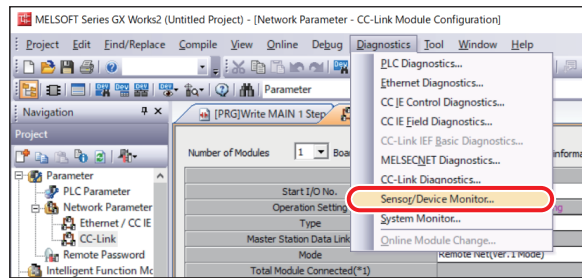
The automatically detected compatible sensors are saved to the project.



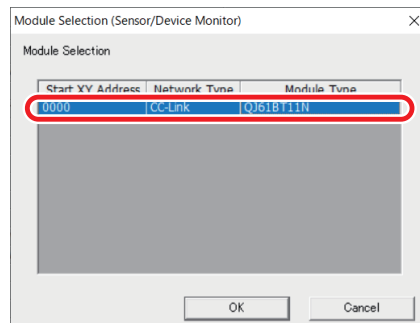
## ■ Monitoring the Operation Status of Compatible Sensors

From GX Works2, monitor the measured values of the compatible sensors connected to the UC1-CL11 unit.

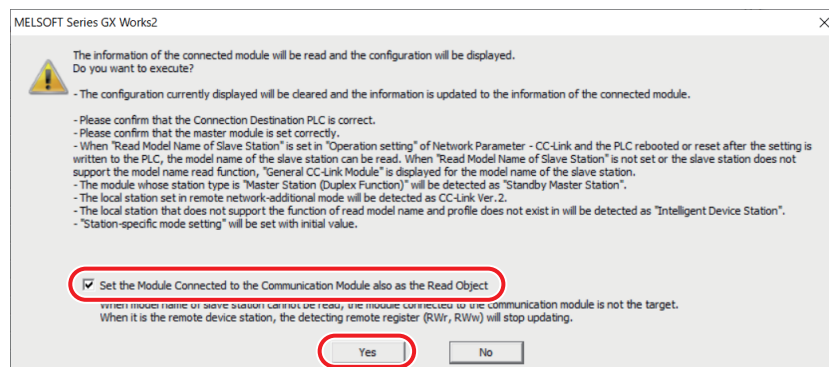
- 1 On the [Diagnostics] menu, select [Sensor/Device Monitor].**  
The [Module Selection (Sensor/Device Monitor)] dialog box is displayed.



- 2 Select UC1-CL11.**  
A dialog box is displayed.

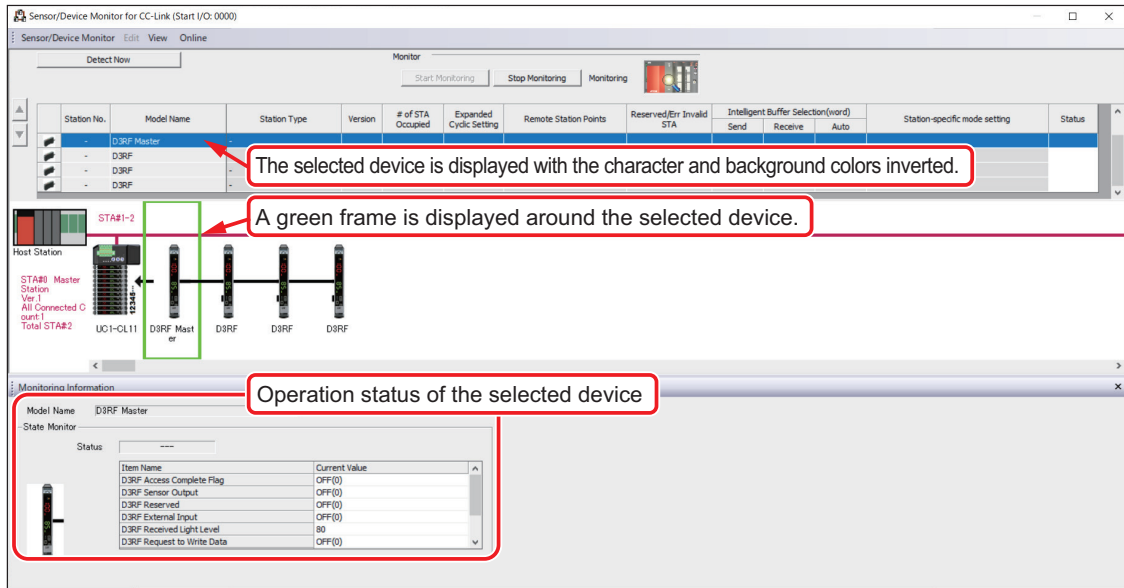


- 3 Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].**  
The [Sensor/Device Monitor for CC-Link] window is displayed.



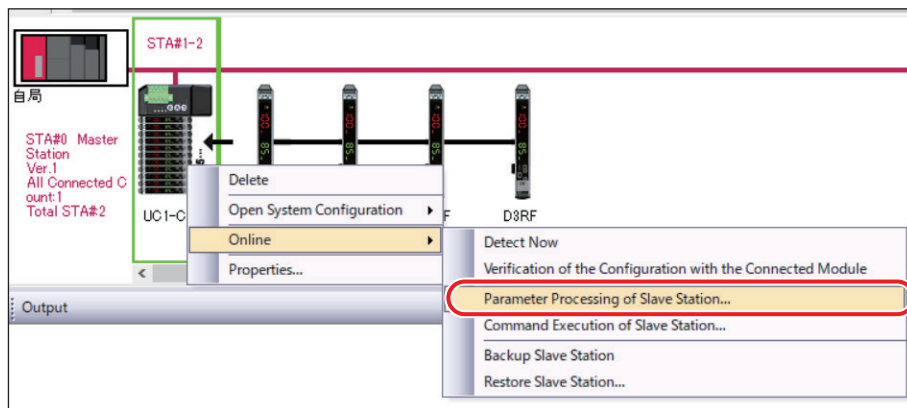


- 4** From the configuration diagram, click the compatible sensor that you want to monitor. The operation status of the compatible sensor is displayed in the [Monitoring Information] field.



**MEMO**

iQSS-compatible functions can also be used by right-clicking the graphical display of this unit in the CC-Link configuration window and selecting [Online] > [Parameter Processing of Slave Station].



## Read and Write Setting Data to Compatible Sensors

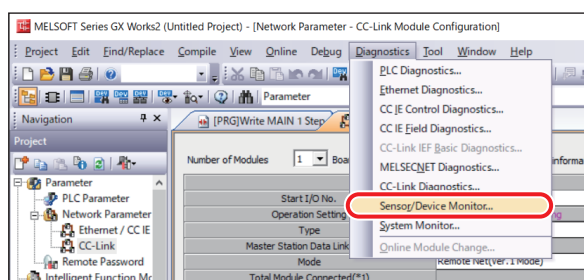
In GX Works2, read the settings of the compatible sensors connected to this unit. Also write the settings.

### MEMO

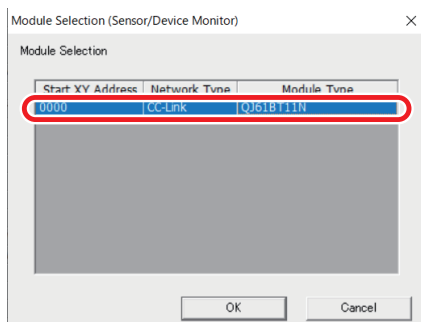
The CPU unit must be in the STOP status when reading/writing the settings of the compatible sensors. If the CPU unit is in the RUN status, set the RUN/STOP/RESET switch on the CPU unit to the [STOP] position or set the CPU unit to the STOP status from GX Works2.

## Operation Example: Reading the Lower Threshold from the Third Compatible Sensor

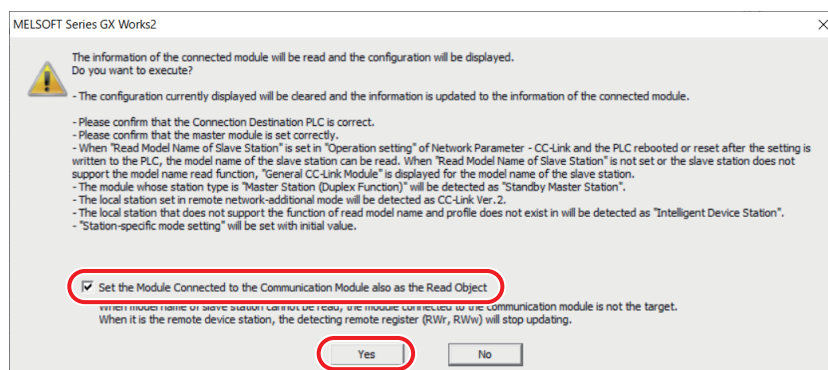
- 1 On the [Diagnostics] menu, select [Sensor/Device Monitor].  
The [Module Selection (Sensor/Device Monitor)] dialog box is displayed.



- 2 Select UC1-CL11.  
A dialog box is displayed.

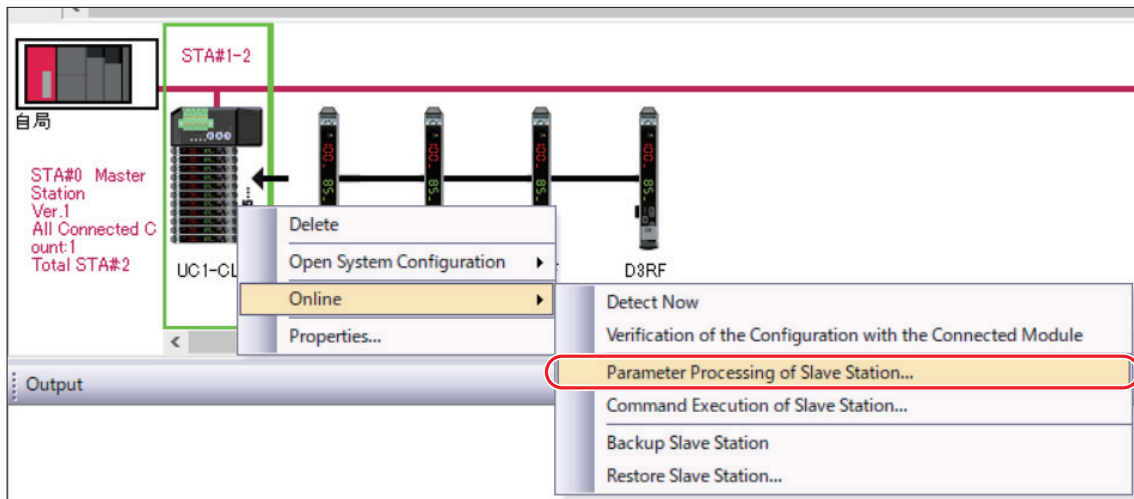


- 3 Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].  
The [Sensor/Device Monitor for CC-Link] window is displayed.

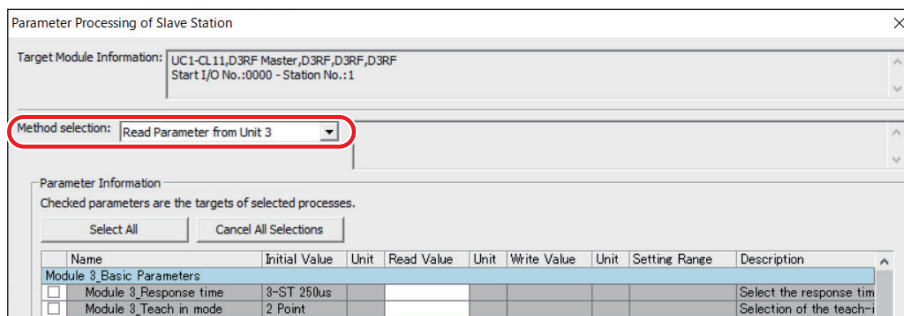


#### 4 Right-click UC1-CL11 displayed in the configuration diagram, and then select [Parameter Processing of Slave Station].

A message prompting you to set the CPU unit to the STOP status is displayed.

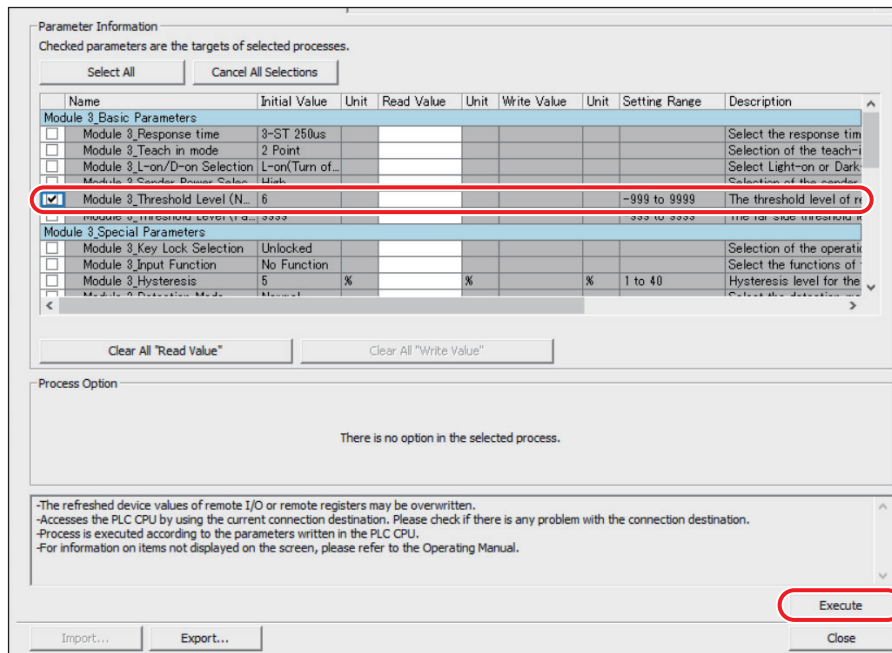


#### 5 From the [Method selection] list, select [Read Parameter from Unit 3].



## 6 From the list of settings displayed under [Parameter Information], select the [Module 3\_ Threshold Level (Near)] check box, and then click [Execute].

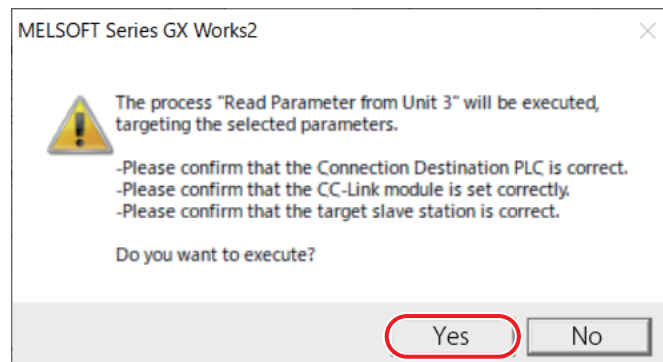
A message asking you to confirm that you want to execute the reading operation is displayed.



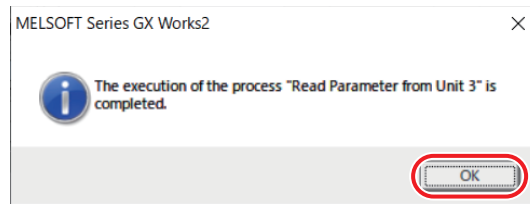
## 7 Click [Yes].

The reading of the specified setting starts.

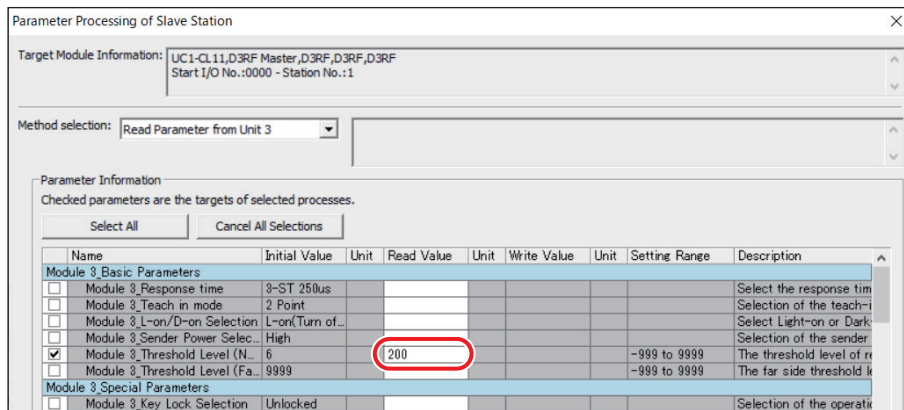
When the execution of the reading is completed correctly, a completion message is displayed.



## 8 Click [OK].

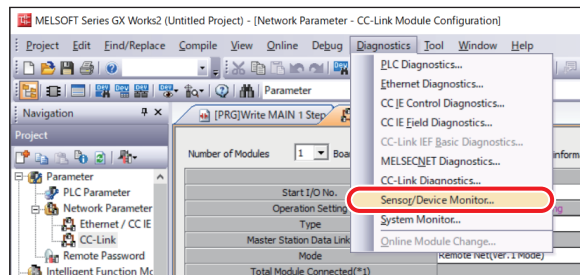


This completes the procedure for reading a setting. The read setting is displayed in the [Read Value] column of the settings list displayed under [Parameter Information] in the [Parameter Processing of Slave Station] dialog box.

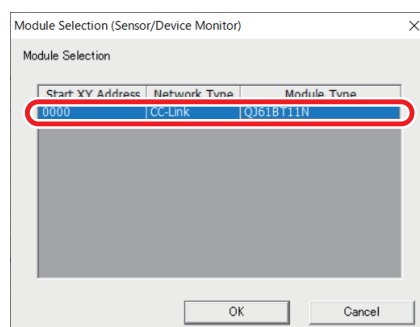


## ● Operation Example: Writing the Lower Threshold to the Third Compatible Sensor to Change This Setting

- 1 On the [Diagnostics] menu, select [Sensor/Device Monitor].  
The [Module Selection (Sensor/Device Monitor)] dialog box is displayed.

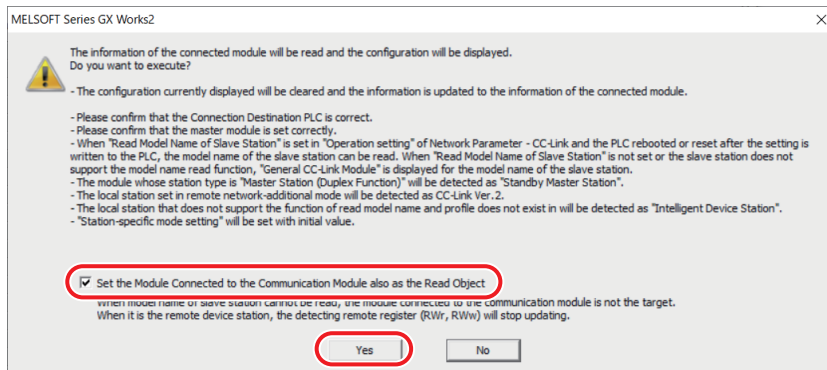


- 2 Select UC1-CL11.  
A dialog box is displayed.



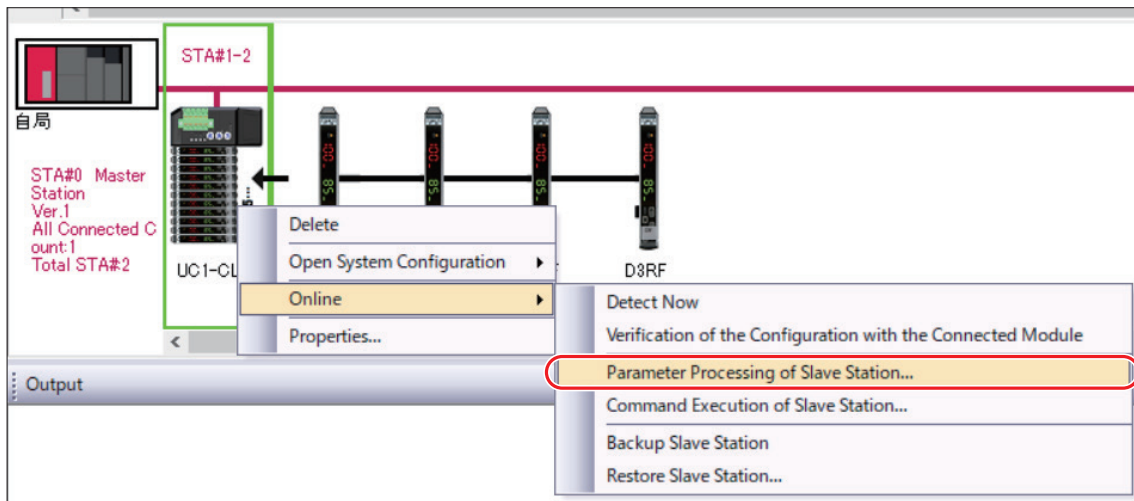
### 3 Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].

The [Sensor/Device Monitor for CC-Link] window is displayed.



### 4 Right-click UC1-CL11 displayed in the configuration diagram, and then select [Parameter Processing of Slave Station].

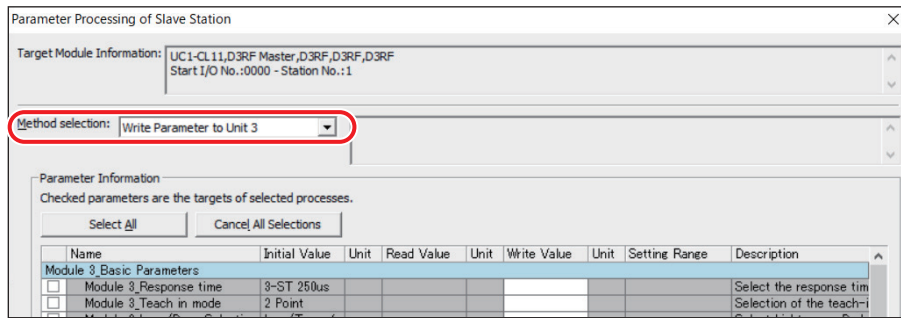
A message prompting you to stop the CPU unit is displayed.



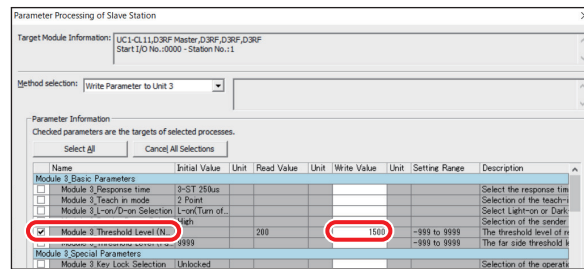
### 5 Click [OK].

The [Parameter Processing of Slave Station] dialog box is displayed.

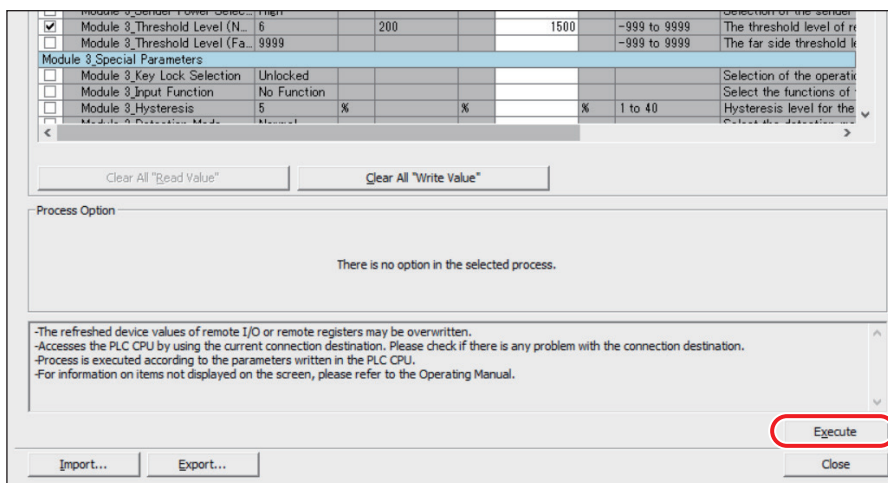
- 6 From the [Method selection] list, select [Write Parameter to Unit 3].



- 7 From the list of settings displayed under [Parameter Information], select the [Module 3\_Threshold Level (Far)] check box, and then click the value in the [Write Value] column for [Module 3\_Threshold Level (Far)] to enter the setting.



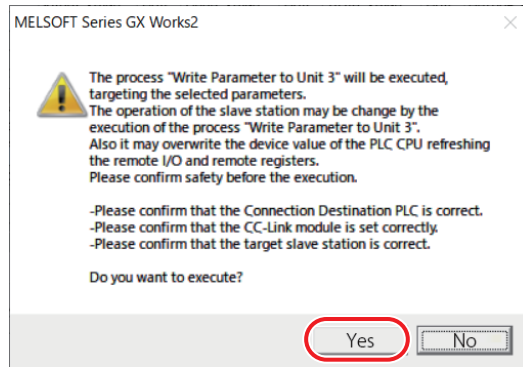
- 8 After entering the setting, click [Execute].  
A message asking you to confirm that you want to execute the writing operation is displayed.



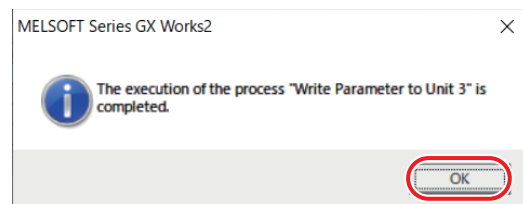
## 9 Click [Yes].

The writing of the specified setting starts.

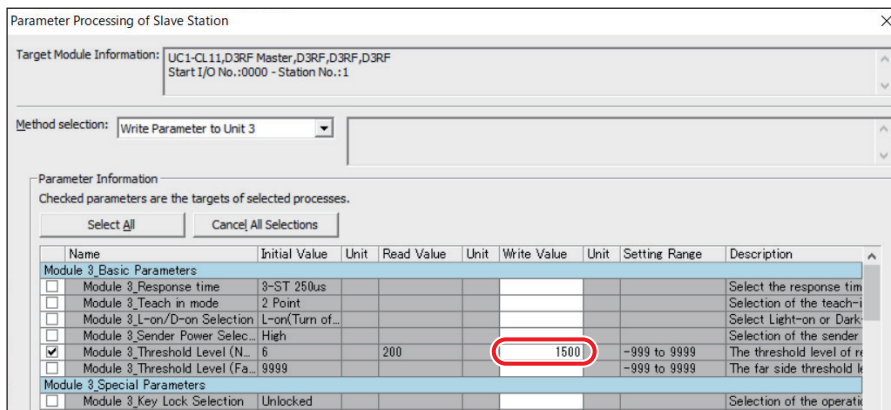
When the execution of the writing is completed correctly, a completion message is displayed.



## 10 Click [OK].



This completes the procedure for writing a setting. You can check the written setting by reading it.





## Backup and Restore Compatible Sensors

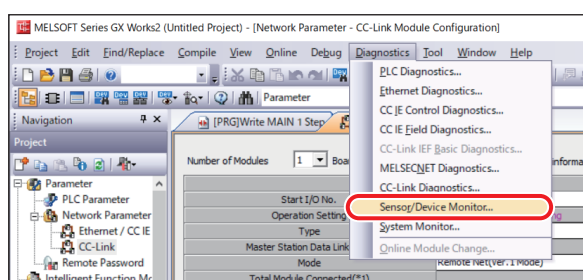
In GX Works2, back up the settings of compatible sensors connected to the UC1-CL11 unit and restore the settings that have been backed up.

### MEMO

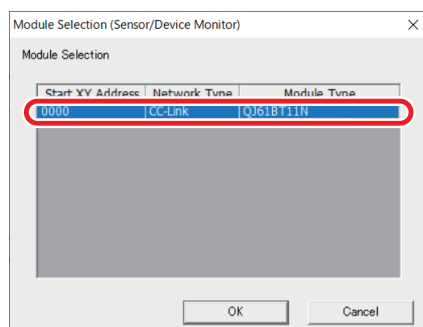
- To back up/restore the settings of a compatible sensor, you have to insert an SD card into the CPU unit. For details on the SD cards that are compatible with the CPU unit, refer to the manual of the CPU unit you are using.
- Before backing up settings, check the free space on the SD card.
- It may take time to restore settings depending on factors such as the number of compatible sensors connected to this unit.

## Backing Up Settings

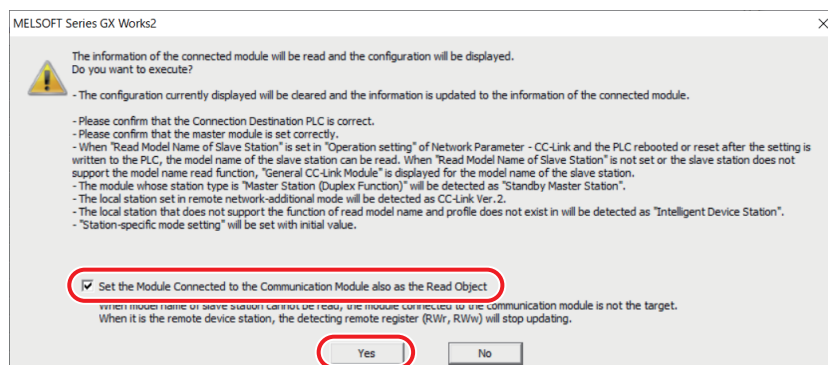
- 1 On the [Diagnostics] menu, select [Sensor/Device Monitor].  
The [Module Selection (Sensor/Device Monitor)] dialog box is displayed.



- 2 Select UC1-CL11.  
A dialog box is displayed.

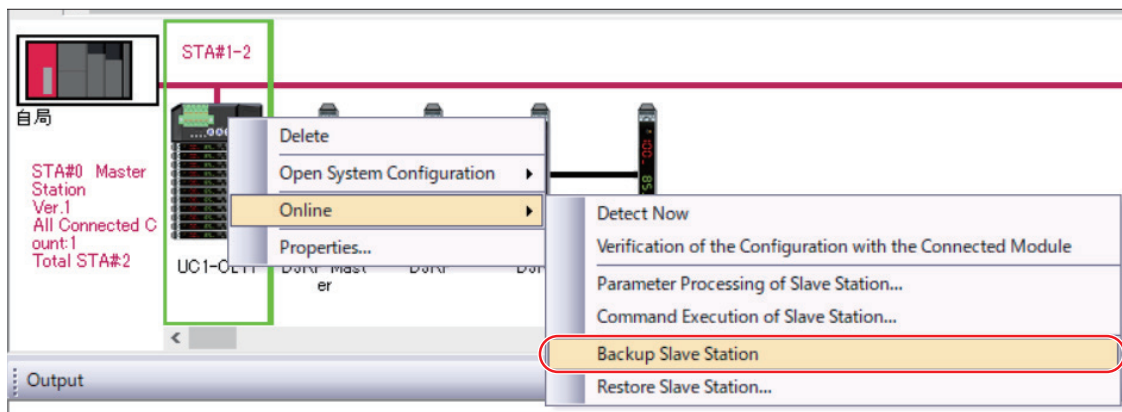


- 3 Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].  
The [Sensor/Device Monitor for CC-Link] window is displayed.



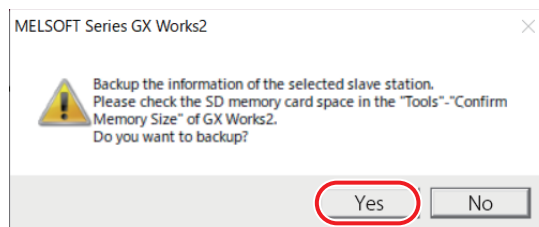
#### 4 Right-click UC1-CL11 displayed in the configuration diagram, and then select [Backup Slave Station].

A message asking you to confirm that you want to back up the settings is displayed.

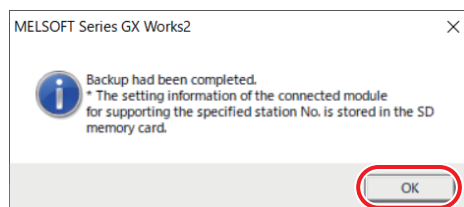


#### 5 Click [Yes].

The backing up of the settings of all the compatible sensors connected to this unit starts. When the backing up of the settings is completed, a completion message is displayed.



#### 6 Click [OK].



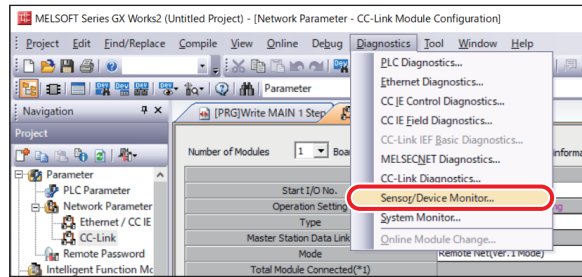
This completes the procedure for backing up the settings.

### MEMO

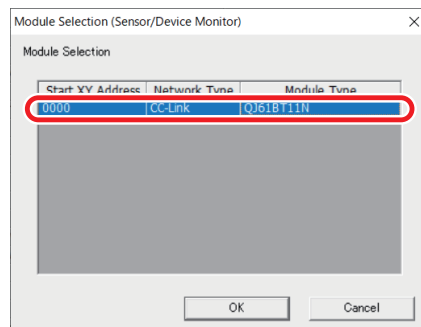
- Backed up data is saved on the SD card in separate folders arranged by creation date.
- Names are automatically assigned to folders in the following format: "yyyy\_mm\_dd\_xx" ("xx" is a sequence number).
- If a backup is performed again on the same date, a folder with a different sequence number is created, and the time when the backup was performed is also saved inside the folder. When restoring settings, the folder name and the time when the settings were saved are both displayed.

## Restoring Settings

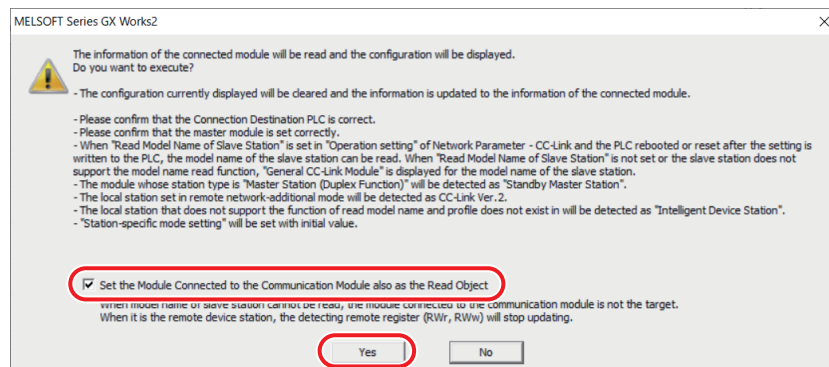
- 1 On the [Diagnostics] menu, select [Sensor/Device Monitor].  
The [Module Selection (Sensor/Device Monitor)] dialog box is displayed.



- 2 Select UC1-CL11.  
A dialog box is displayed.

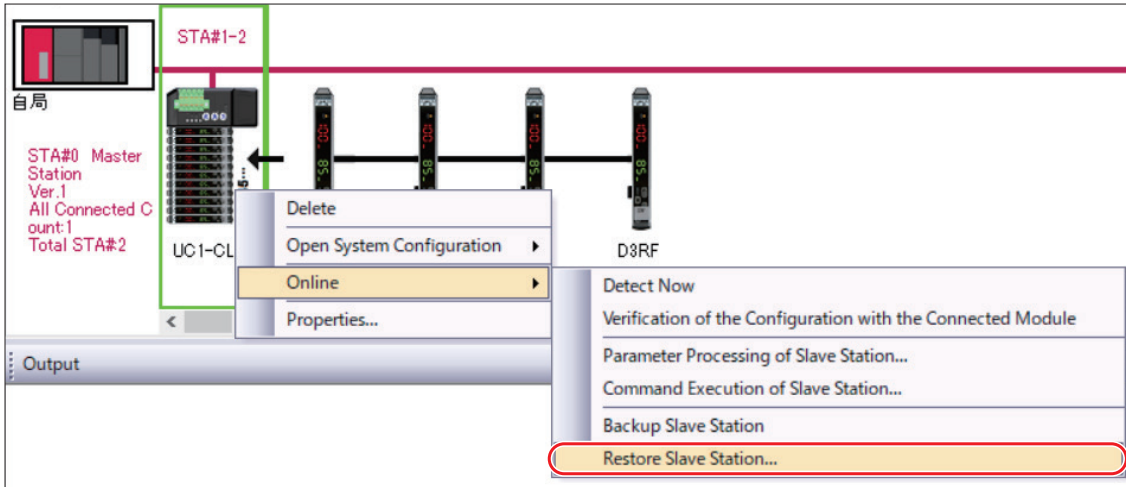


- 3 Select the [Set the Module Connected to the Communication Module also as the Read Object] check box, and then click [Yes].  
The [Sensor/Device Monitor for CC-Link] window is displayed.



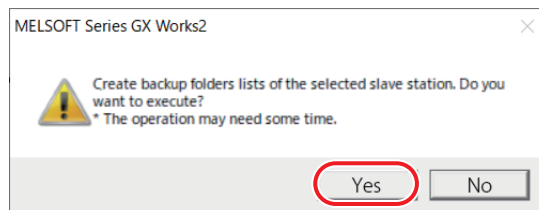
**4 Right-click UC1-CL11 displayed in the configuration diagram, and then select [Restore Slave Station].**

A message asking you to confirm that you want to display the list of data that can be used in the restoration is displayed.

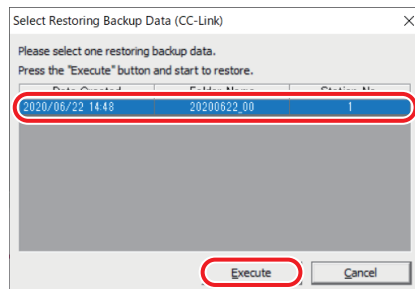


**5 Click [Yes].**

The [Select Restoring Backup Data (CC-Link)] dialog box is displayed.

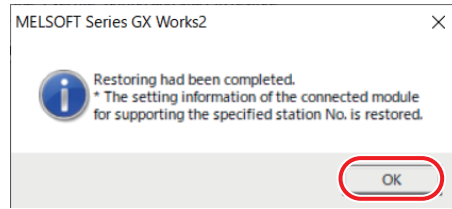


**6 Select the backup data to use in the restoration, and then click [Execute].**



The restoration starts with the selected backup data.  
When the restoration is completed, a completion message is displayed.

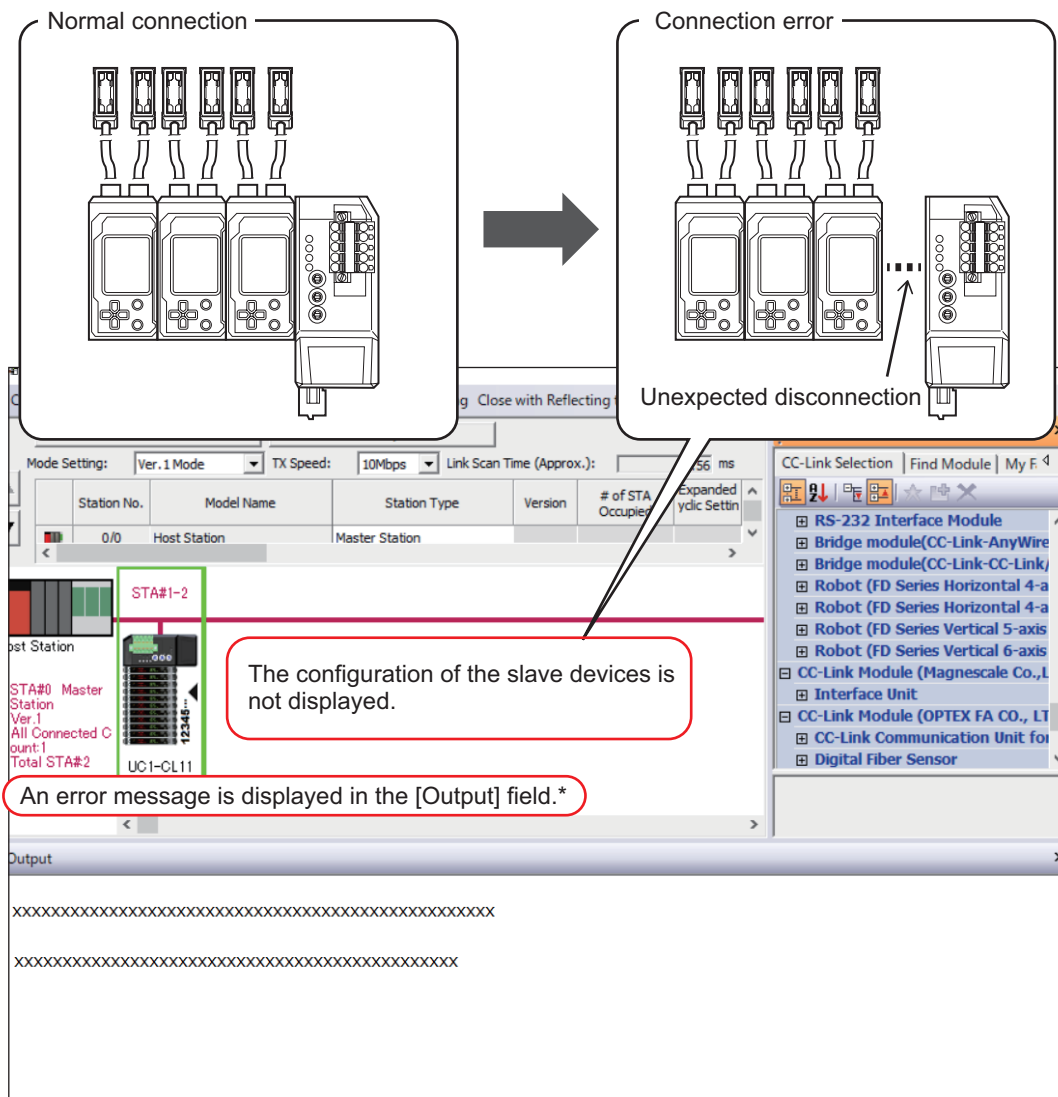
## 7 Click [OK].



This completes the procedure for restoring settings.

## ■ Display When Changing the Configuration of Slave Devices

When [Detect Now] is executed from the [CC-Link Configuration Setting] screen or the [Sensor/Device Monitor] screen, the configuration may be recognized as being different from the actual one if there is an error in the connections of the slave devices connected to this unit due to causes such as device errors and defective connector contacts. To prevent incorrect configurations due to a connection error during reading, settings on GX Works2 can be made to recognize these errors. For the setting method, refer to the next section.

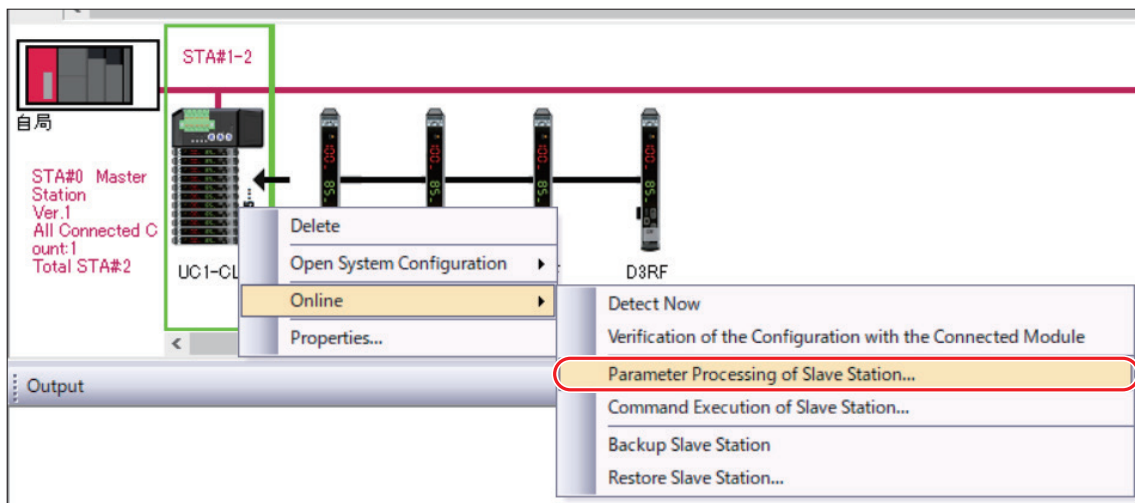


## 2-4-4 Dealing With Unexpected Configuration Changes

In advance, write the setting for the number of connected slave devices to the UC1-CL11 unit. Doing so makes it possible to recognize the difference between the actual configuration of the slave devices connected to this unit and the configuration automatically recognized by GX Works2 as an error and to display a notification of this error in GX Works2.

### 1 Right-click UC1-CL11 displayed in the configuration diagram, and then select [Parameter Processing of Slave Station].

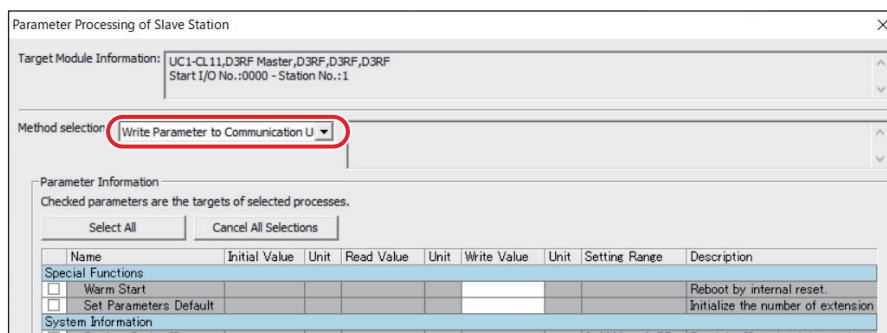
For the operations up to the configuration diagram, refer to “2-4-3 iQSS Compatibility” (page 2-25). When you select [Parameter Processing of Slave Station], a message prompting you to set the CPU unit to the STOP status is displayed.



### 2 Click [OK].

The [Parameter Processing of Slave Station] dialog box is displayed.

### 3 From the [Method selection] list, select [Write Parameter to Communication Unit].



- 4** From the list of settings displayed under [Parameter Information], select the [Extension Unit Number] check box.

Parameter Information  
Checked parameters are the targets of selected processes.

Select All Cancel All Selections

Name	Initial Value	Unit	Read Value	Unit	Write Value	Unit	Setting Range	Description
<b>Special Functions</b>								
<input type="checkbox"/> Warm Start								Reboot by internal reset.
<input type="checkbox"/> Set Parameters Default								Initialize the number of extension
<b>System Information</b>								
<input type="checkbox"/> Product Series ID							0x0000 to 0xFF...	Read the ID code of the product s
<input type="checkbox"/> Firmware Version							0x0000 to 0xFF...	Read the firmware version number
<input type="checkbox"/> Operation Status								Read the operation status of the i
<input checked="" type="checkbox"/> Extension Unit Number					Four			Check actual number to detect en
<input type="checkbox"/> Error Status								Read the error information of the

Clear All "Read Value" Clear All "Write Value"

Process Option  
There is no option in the selected process.

-The refreshed device values of remote I/O or remote registers may be overwritten.  
-Accesses the PLC CPU by using the current connection destination. Please check if there is any problem with the connection destination.  
-Process is executed according to the parameters written in the PLC CPU.  
-For information on items not displayed on the screen, please refer to the Operating Manual.

Execute

Import... Export... Close

- 5** In the [Write Value] column for [Extension Unit Number], use the list to select the number of units to add, and then click [Execute].

Parameter Information  
Checked parameters are the targets of selected processes.

Select All Cancel All Selections

Name	Initial Value	Unit	Read Value	Unit	Write Value	Unit	Setting Range	Description
<b>Special Functions</b>								
<input type="checkbox"/> Warm Start								Reboot by internal reset.
<input type="checkbox"/> Set Parameters Default								Initialize the number of extension
<b>System Information</b>								
<input type="checkbox"/> Product Series ID							0x0000 to 0xFF...	Read the ID code of the product s
<input type="checkbox"/> Firmware Version							0x0000 to 0xFF...	Read the firmware version number
<input type="checkbox"/> Operation Status								Read the operation status of the i
<input checked="" type="checkbox"/> Extension Unit Number					Four			Check actual number to detect en
<input type="checkbox"/> Error Status								Read the error information of the

Clear All "Read Value" Clear All "Write Value"

Process Option  
There is no option in the selected process.

-The refreshed device values of remote I/O or remote registers may be overwritten.  
-Accesses the PLC CPU by using the current connection destination. Please check if there is any problem with the connection destination.  
-Process is executed according to the parameters written in the PLC CPU.  
-For information on items not displayed on the screen, please refer to the Operating Manual.

Execute

Import... Export... Close

A message asking you to confirm that you want to execute the writing operation is displayed. Check the details to write, and then click [Yes] to execute the writing operation. When the writing completion message is displayed, click [OK].

This completes the procedure for writing a setting. You can check the written setting by reading it.

## MEMO

When you have written the [Extension Unit Number] setting to this unit in advance, a message is displayed in the [Output] field if the number of connected devices that is automatically recognized differs from the setting. (Refer to "■ Display When Changing the Configuration of Slave Devices" (page 2-41).







---

# 3

## **Communication**

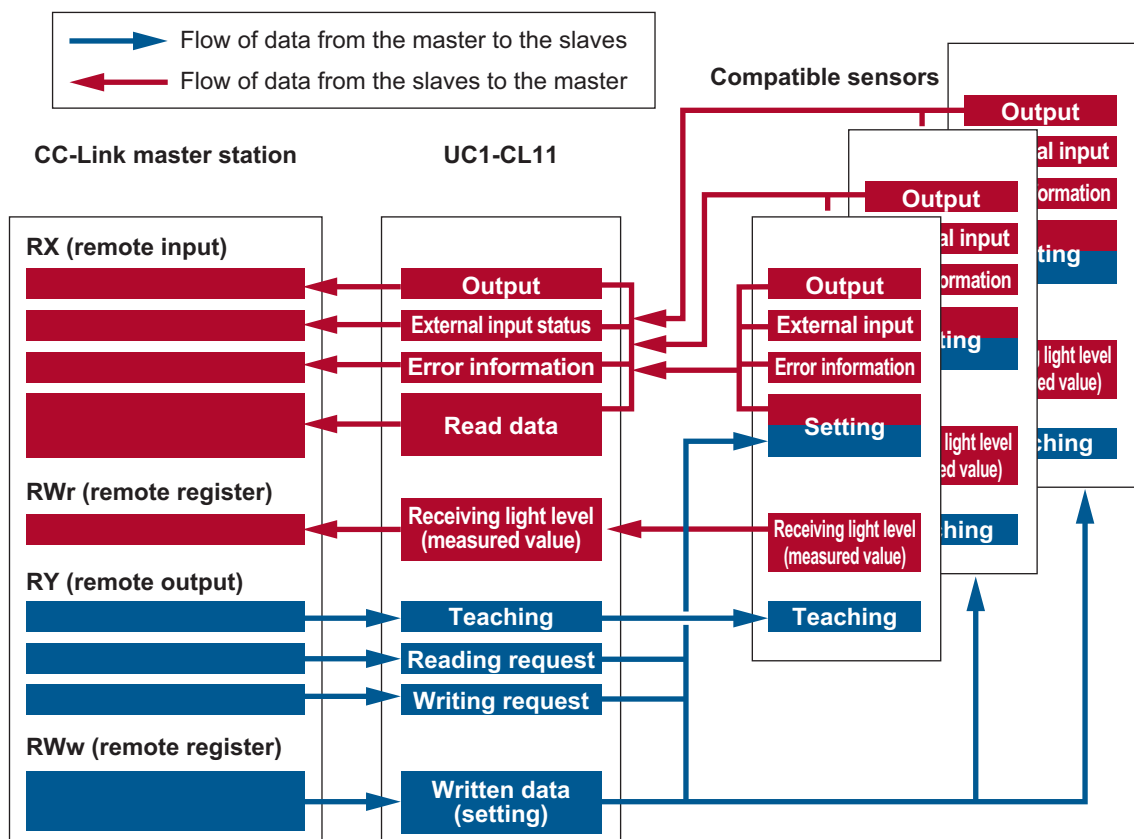
This chapter explains the composition of the data handled by the UC1-CL11 unit during CC-Link communication. This chapter also explains communication examples.

# 3-1 CC-Link Operations and Memory Composition

This section explains the data that the UC1-CL11 unit can input and output with CC-Link communication.

## 3-1-1 Overview

This unit can use cyclic transmission to acquire the ON/OFF signals, error status, and current values of the compatible sensors as well as to execute external input on these sensors. Also, remote input RX and remote output RY can be used to perform detailed data communication such as executing teaching and other such operation instructions on the compatible sensors and reading/writing the settings and status of the compatible sensors.



## 3-1-2 I/O Data Assignment

This section explains the device maps of the data that the UC1-CL11 unit reads/writes during CC-Link communication. The device map varies depending on the number of compatible sensors inter-connected to this unit.

### MEMO

In the device maps, reserved areas are indicated with the color gray. Set these areas to 0 (off) at all times.

### Read Data (RX/RWr) Assignment

This unit assigns the data read from the compatible sensors as shown below and sends this data to the master station.

#### 2 Occupied Stations (D3RF: 1 to 8 Units Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Remote input	Read data (16 bits)															
	Index number when an error occurs								Error code when an error occurs							
	Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1			
	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
Remote input	Sensor ID 8				Sensor ID 7				Sensor ID 6				Sensor ID 5			
	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
Remote input	CC-Link system reserved												UC1-CL11			
					Remote ready	Error flag	Error status							Error		Complete
Read word	RWr00 Receiving light level (16 bits) sensor ID 1															
	RWr01 Receiving light level (16 bits) sensor ID 2															
	RWr02 Receiving light level (16 bits) sensor ID 3															
	RWr03 Receiving light level (16 bits) sensor ID 4															
	RWr04 Receiving light level (16 bits) sensor ID 5															
	RWr05 Receiving light level (16 bits) sensor ID 6															
	RWr06 Receiving light level (16 bits) sensor ID 7															
	RWr07 Receiving light level (16 bits) sensor ID 8															

## ● 2 Occupied Stations (CD22 or TD1: 1 to 8 Units Inter-connected)

★: Function that can be used with the TD1

Assignment		Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0			
Remote input	RX00 to RX0F	Read data (16 bits)																		
		Index number when an error occurs								Error code when an error occurs										
	RX10 to RX1F	Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1						
		Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output
RX20 to RX2F	Sensor ID 8				Sensor ID 7				Sensor ID 6				Sensor ID 5							
	Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output	★ Complete	Hi output	output	Lo output	Go output	★ Complete
RX30 to RX3F	CC-Link system reserved										UC1-CL11									
						Remote ready	Error status flag								Error		Complete			
Read word	RWr00	Measured value, calculated value (16 bits) sensor ID 1																		
	RWr01	Measured value, calculated value (16 bits) sensor ID 2																		
	RWr02	Measured value, calculated value (16 bits) sensor ID 3																		
	RWr03	Measured value, calculated value (16 bits) sensor ID 4																		
	RWr04	Measured value, calculated value (16 bits) sensor ID 5																		
	RWr05	Measured value, calculated value (16 bits) sensor ID 6																		
	RWr06	Measured value, calculated value (16 bits) sensor ID 7																		
	RWr07	Measured value, calculated value (16 bits) sensor ID 8																		

● 3 Occupied Stations (D3RF: 9 to 12 Units Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Remote input	Read data (16 bits)															
	Index number when an error occurs								Error code when an error occurs							
	Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1			
	External input				Output 2				Output 1				Complete			
	External input				Output 2				Output 1				Complete			
	External input				Output 2				Output 1				Complete			
External input				Output 2				Output 1				Complete				
External input				Output 2				Output 1				Complete				
External input				Output 2				Output 1				Complete				
External input				Output 2				Output 1				Complete				
Unit where the error occurred (1 to 16, 17)*1								Latest error information								
CC-Link system reserved																
UC1-CL11																
Error status flag																
Remote ready																
Error																
Complete																
Read word	RWr00 Receiving light level (16 bits) sensor ID 1															
	RWr01 Receiving light level (16 bits) sensor ID 2															
	RWr02 Receiving light level (16 bits) sensor ID 3															
	RWr03 Receiving light level (16 bits) sensor ID 4															
	RWr04 Receiving light level (16 bits) sensor ID 5															
	RWr05 Receiving light level (16 bits) sensor ID 6															
	RWr06 Receiving light level (16 bits) sensor ID 7															
	RWr07 Receiving light level (16 bits) sensor ID 8															
	Rwr08 Receiving light level (16 bits) sensor ID 9															
	Rwr09 Receiving light level (16 bits) sensor ID 10															
	Rwr0A Receiving light level (16 bits) sensor ID 11															
	Rwr0B Receiving light level (16 bits) sensor ID 12															

\*1 1 to 16 are ID numbers of D3RF units in which an error occurs. 17 means that an error has occurred on the UC1-CL11 unit.

### ● 3 Occupied Stations (CD22 or TD1: 9 to 12 Units Inter-connected)

★: Function that can be used with the TD1

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Remote input	Read data (16 bits)																
	Index number when an error occurs								Error code when an error occurs								
	Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1				
	RX10 to RX1F	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete
	Sensor ID 8				Sensor ID 7				Sensor ID 6				Sensor ID 5				
	RX20 to RX2F	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete
Sensor ID 12				Sensor ID 11				Sensor ID 10				Sensor ID 9					
RX30 to RX3F	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	Hi output	Lo output	Go output	★ Complete	
RX40 to RX4F	Unit where the error occurred (1 to 16, 17)*1								Latest error information								
RX50 to RX5F	CC-Link system reserved								UC1-CL11								
					Remote ready	Error status flag								Error		Complete	
Read word	RWr00 Measured value, calculated value (16 bits) sensor ID 1																
	RWr01 Measured value, calculated value (16 bits) sensor ID 2																
	RWr02 Measured value, calculated value (16 bits) sensor ID 3																
	RWr03 Measured value, calculated value (16 bits) sensor ID 4																
	RWr04 Measured value, calculated value (16 bits) sensor ID 5																
	RWr05 Measured value, calculated value (16 bits) sensor ID 6																
	RWr06 Measured value, calculated value (16 bits) sensor ID 7																
	RWr07 Measured value, calculated value (16 bits) sensor ID 8																
	Rwr08 Measured value, calculated value (16 bits) sensor ID 9																
	Rwr09 Measured value, calculated value (16 bits) sensor ID 10																
	Rwr0A Measured value, calculated value (16 bits) sensor ID 11																
Rwr0B Measured value, calculated value (16 bits) sensor ID 12																	

\*1 1 to 16 are ID numbers of D3RF units in which an error occurs. 17 means that an error has occurred on the UC1-CL11 unit.

#### ● 4 Occupied Stations (D3RF: 13 to 16 Units Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Remote input	Read data (16 bits)																
	RX00 to RX0F	Index number when an error occurs								Error code when an error occurs							
	RX10 to RX1F	Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1			
		External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
	RX20 to RX2F	Sensor ID 8				Sensor ID 7				Sensor ID 6				Sensor ID 5			
		External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
	RX30 to RX3F	Sensor ID 12				Sensor ID 11				Sensor ID 10				Sensor ID 9			
		External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
	RX40 to RX4F	Sensor ID 16				Sensor ID 15				Sensor ID 14				Sensor ID 13			
		External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete	External input	Output 2	Output 1	Complete
RX50 to RX5F	Unit where the error occurred (1 to 16, 17)*1								Latest error information								
RX60 to RX6F	Unit where the error occurred (1 to 16, 17)*1								Previous error information								
RX70 to RX7F	CC-Link system reserved								UC1-CL11								
					Remote ready	Error status flag								Error		Complete	
Read word	RWr00	Receiving light level (16 bits) sensor ID 1															
	RWr01	Receiving light level (16 bits) sensor ID 2															
	RWr02	Receiving light level (16 bits) sensor ID 3															
	RWr03	Receiving light level (16 bits) sensor ID 4															
	RWr04	Receiving light level (16 bits) sensor ID 5															
	RWr05	Receiving light level (16 bits) sensor ID 6															
	RWr06	Receiving light level (16 bits) sensor ID 7															
	RWr07	Receiving light level (16 bits) sensor ID 8															
	Rwr08	Receiving light level (16 bits) sensor ID 9															
	Rwr09	Receiving light level (16 bits) sensor ID 10															
	Rwr0A	Receiving light level (16 bits) sensor ID 11															
	Rwr0B	Receiving light level (16 bits) sensor ID 12															
	Rwr0C	Receiving light level (16 bits) sensor ID 13															
	Rwr0D	Receiving light level (16 bits) sensor ID 14															
	Rwr0E	Receiving light level (16 bits) sensor ID 15															
	Rwr0F	Receiving light level (16 bits) sensor ID 16															

\*1 1 to 16 are ID numbers of D3RF units in which an error occurs. 17 means that an error has occurred on the UC1-CL11 unit.

## ● 4 Occupied Stations (CD22 or TD1: 13 to 16 Units Inter-connected)

★: Function that can be used with the TD1

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0					
Remote input	Read data (16 bits)																				
	RX00 to RX0F	Index number when an error occurs								Error code when an error occurs											
		Sensor ID 4				Sensor ID 3				Sensor ID 2				Sensor ID 1							
	RX10 to RX1F	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete
		Sensor ID 8				Sensor ID 7				Sensor ID 6				Sensor ID 5							
	RX20 to RX2F	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete
		Sensor ID 12				Sensor ID 11				Sensor ID 10				Sensor ID 9							
	RX30 to RX3F	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete
Sensor ID 16				Sensor ID 15				Sensor ID 14				Sensor ID 13									
RX40 to RX4F	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	Hi output	Lo output	output	Go	★ Complete	
	Unit where the error occurred (1 to 16, 17)*1								Latest error information												
RX50 to RX5F	Unit where the error occurred (1 to 16, 17)*1								Previous error information												
RX60 to RX6F	CC-Link system reserved								UC1-CL11												
					Remote ready	Error status flag									Error		Complete				
Read word	RWr00	Measured value, calculated value (16 bits) sensor ID 1																			
	RWr01	Measured value, calculated value (16 bits) sensor ID 2																			
	RWr02	Measured value, calculated value (16 bits) sensor ID 3																			
	RWr03	Measured value, calculated value (16 bits) sensor ID 4																			
	RWr04	Measured value, calculated value (16 bits) sensor ID 5																			
	RWr05	Measured value, calculated value (16 bits) sensor ID 6																			
	RWr06	Measured value, calculated value (16 bits) sensor ID 7																			
	RWr07	Measured value, calculated value (16 bits) sensor ID 8																			
	Rwr08	Measured value, calculated value (16 bits) sensor ID 9																			
	Rwr09	Measured value, calculated value (16 bits) sensor ID 10																			
	Rwr0A	Measured value, calculated value (16 bits) sensor ID 11																			
	Rwr0B	Measured value, calculated value (16 bits) sensor ID 12																			
	Rwr0C	Measured value, calculated value (16 bits) sensor ID 13																			
	Rwr0D	Measured value, calculated value (16 bits) sensor ID 14																			
	Rwr0E	Measured value, calculated value (16 bits) sensor ID 15																			
	Rwr0F	Measured value, calculated value (16 bits) sensor ID 16																			

\*1 1 to 16 are ID numbers of D3RF units in which an error occurs. 17 means that an error has occurred on the UC1-CL11 unit.



## ■ Written Data (RY/RWw) Assignment

The UC1-CL11 unit writes input data to connected sensors as addressed below on the CC-Link master station.

### ● MEMO ●

- The written data assignment is common regardless of the models of the compatible sensors that are inter-connected.
- Requesting an error clear deletes the latest error that has occurred on this unit. If the same error occurs again within the sensor, this error is not updated as the latest error information.
- If a dual output type compatible sensor is inter-connected, teaching is performed on the output selected on the sensor.

### ● 2 Occupied Stations (1 to 8 Compatible Sensors Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Remote output	RY00 to RY0F	Subindex number				Index number											
	RY10 to RY1F	Sensor ID 4			Sensor ID 3			Sensor ID 2			Sensor ID 1						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	
	RY20 to RY2F	Sensor ID 8			Sensor ID 7			Sensor ID 6			Sensor ID 5						
Teaching		Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing		
RY30 to RY3F	CC-Link system reserved										UC1-CL11						
						Error reset request flag								Error clear	Reading	Writing	
Written word	RWw00	Written data (16 bits) sensor ID 1/UC1-CL11															
	RWw01	Written data (16 bits) sensor ID 2															
	RWw02	Written data (16 bits) sensor ID 3															
	RWw03	Written data (16 bits) sensor ID 4															
	RWw04	Written data (16 bits) sensor ID 5															
	RWw05	Written data (16 bits) sensor ID 6															
	RWw06	Written data (16 bits) sensor ID 7															
	RWw07	Written data (16 bits) sensor ID 8															

### ● 3 Occupied Stations (9 to 12 Compatible Sensors Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Remote output	Ry00 to Ry0F	Subindex number						Index number									
	Ry10 to Ry1F	Sensor ID 4			Sensor ID 3			Sensor ID 2			Sensor ID 1						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing				
	Ry20 to Ry2F	Sensor ID 8			Sensor ID 7			Sensor ID 6			Sensor ID 5						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing				
	Ry30 to Ry3F	Sensor ID 12			Sensor ID 11			Sensor ID 10			Sensor ID 9						
Teaching		Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing					
Ry40 to Ry4F																	
Ry50 to Ry5F	CC-Link system reserved										UC1-CL11						
						Error reset request flag							Error clear	Reading	Writing		
Written word	RWw00	Written data (16 bits) sensor ID 1/UC1-CL11															
	RWw01	Written data (16 bits) sensor ID 2															
	RWw02	Written data (16 bits) sensor ID 3															
	RWw03	Written data (16 bits) sensor ID 4															
	RWw04	Written data (16 bits) sensor ID 5															
	RWw05	Written data (16 bits) sensor ID 6															
	RWw06	Written data (16 bits) sensor ID 7															
	RWw07	Written data (16 bits) sensor ID 8															
	RWw08	Written data (16 bits) sensor ID 9															
	RWw09	Written data (16 bits) sensor ID 10															
	RWw0A	Written data (16 bits) sensor ID 11															
	RWw0B	Written data (16 bits) sensor ID 12															

### ● 4 Occupied Stations (13 to 16 Compatible Sensors Inter-connected)

Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0	
Remote output	Ry00 to Ry0F	Subindex number				Index number											
	Ry10 to Ry1F	Sensor ID 4			Sensor ID 3			Sensor ID 2			Sensor ID 1						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	
	Ry20 to Ry2F	Sensor ID 8			Sensor ID 7			Sensor ID 6			Sensor ID 5						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	
	Ry30 to Ry3F	Sensor ID 12			Sensor ID 11			Sensor ID 10			Sensor ID 9						
		Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	
	Ry40 to Ry4F	Sensor ID 16			Sensor ID 15			Sensor ID 14			Sensor ID 13						
Teaching		Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing	Teaching	Reading	Writing		
Ry50 to Ry5F																	
Ry60 to Ry6F																	
Ry70 to Ry7F	CC-Link system reserved												UC1-CL11				
						Error reset request flag								Error clear	Reading	Writing	
Written word	RWw00	Written data (16 bits) sensor ID 1/UC1-CL11															
	RWw01	Written data (16 bits) sensor ID 2															
	RWw02	Written data (16 bits) sensor ID 3															
	RWw03	Written data (16 bits) sensor ID 4															
	RWw04	Written data (16 bits) sensor ID 5															
	RWw05	Written data (16 bits) sensor ID 6															
	RWw06	Written data (16 bits) sensor ID 7															
	RWw07	Written data (16 bits) sensor ID 8															
	RWw08	Written data (16 bits) sensor ID 9															
	RWw09	Written data (16 bits) sensor ID 10															
	RWw0A	Written data (16 bits) sensor ID 11															
	RWw0B	Written data (16 bits) sensor ID 12															
	RWw0C	Written data (16 bits) sensor ID 13															
	RWw0D	Written data (16 bits) sensor ID 14															
	RWw0E	Written data (16 bits) sensor ID 15															
RWw0F	Written data (16 bits) sensor ID 16																

## 3-2 Communication Method and Timing Charts

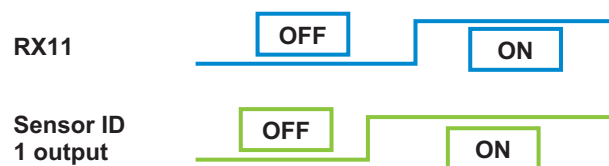
### MEMO

- Before turning the reading or writing request bit ON, check that the complete bit of the corresponding unit is OFF. If the request bit is turned ON while the complete bit is ON, error 10 will occur.
- If the writing request and reading request are turned ON at the same time, reading will be performed after writing. This phenomenon can be used to check whether settings have actually been written by the writing request.
- Writing requests can be made on multiple units at the same time. If an error occurs, the last error is stored in RX00 to RX0F.
- If an error occurs during a reading or writing request, the error bit turns ON and the error code is stored in the read data.

### 3-2-1 Reading the ON/OFF Output of a Compatible Sensor

Read the bit status of the corresponding sensor from the device map.

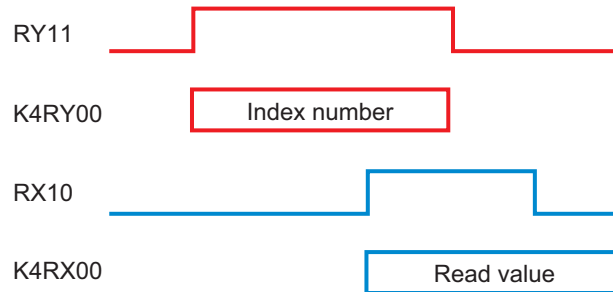
As an example, the timing chart for reading the ON/OFF output of the sensor with ID 1 is shown here.



## 3-2-2 Changing the Settings of a Compatible Sensor

### ■ Reading Settings

As an example, this section explains how to read the settings of the sensor with ID 1.



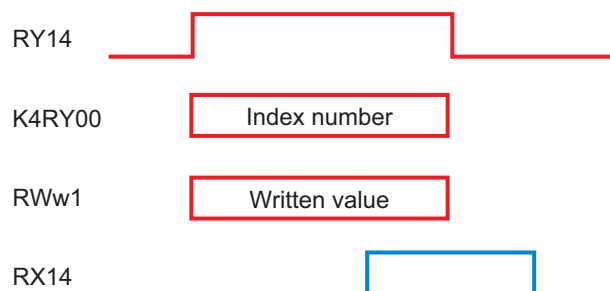
- 1** Store the index number that you want to read in K4RY00.
- 2** Turn RY11 ON.  
When reading is complete, RX10 turns ON.
- 3** Check that RX10 is ON, and then read the value of K4RX00.
- 4** Turn RY11 OFF.  
When you turn RY11 OFF, RX10 also turns OFF automatically.

#### ●●● MEMO ●●●

- K4RY00, K4RX11, and other such addresses that start with K4 indicate 4 × 4-bit (16-bit) areas from addresses written after K4. For details, refer to Mitsubishi Electric PLC manuals.
- The read setting (the value of K4RX00) is retained until a different setting is read.

### ■ Writing Settings

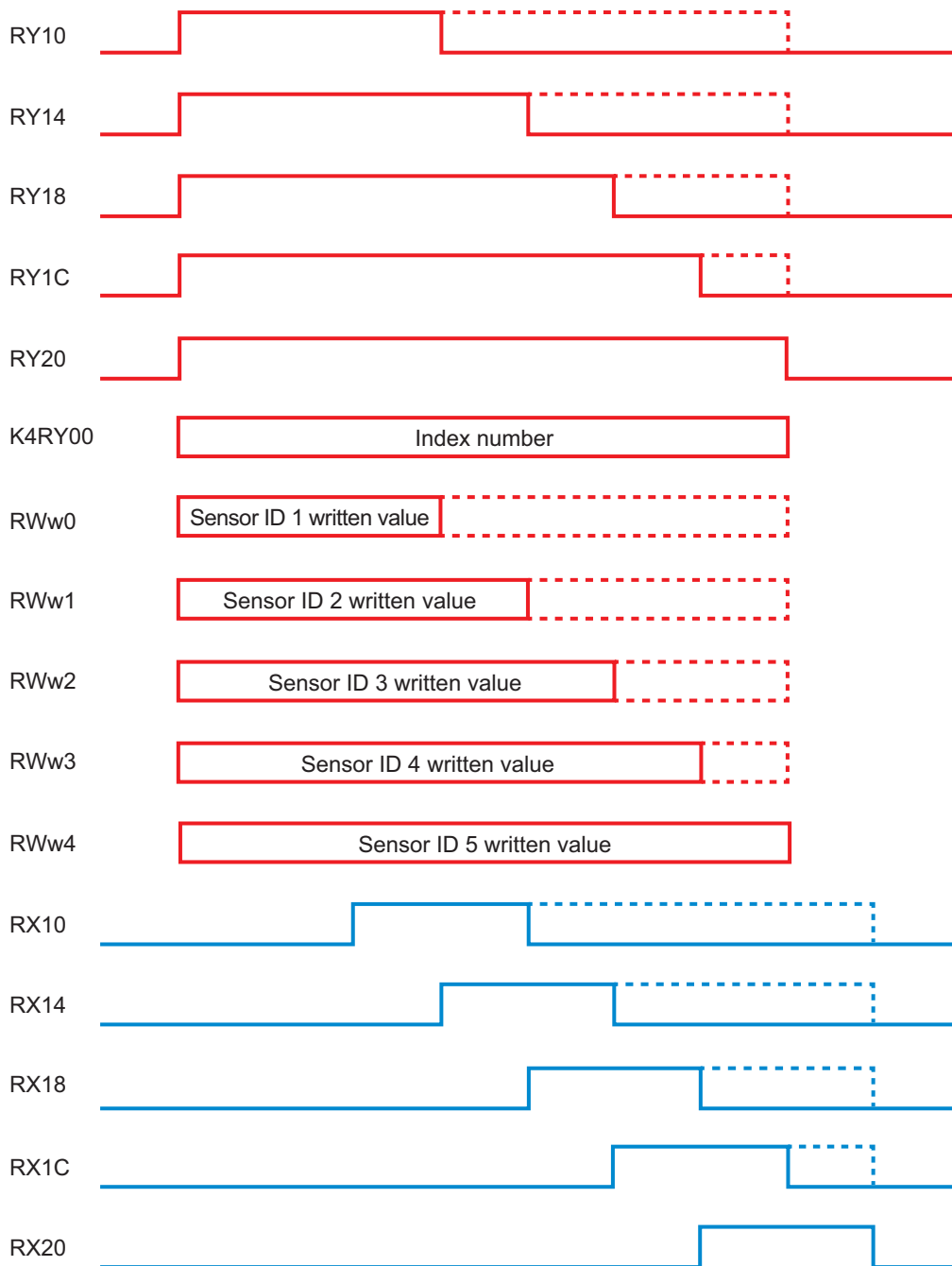
As an example, this section explains how to write settings to the sensor with ID 2.



- 1** Store the index number that you want to write in K4RY00.
- 2** Store the setting to write in RWw1.
- 3** Turn RY14 ON.  
When writing is complete, RX14 turns ON.
- 4** Check that RX14 is ON, and then turn RY14 OFF.  
When you turn RY14 OFF, RX14 also turns OFF automatically.

## ■ Writing Settings to Multiple Compatible Sensors at the Same Time

For the same setting item, different settings can be written to multiple sensors at the same time.  
The timing chart when writing the settings of sensors with IDs 1 to 5 at the same time is shown below.



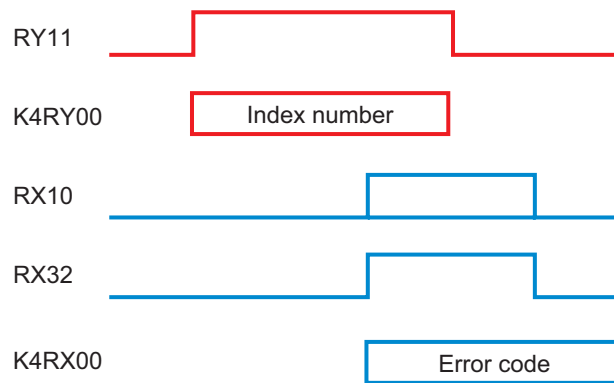
The writing of settings is processed in ID number order starting with the smallest number.

Two different methods are available.

- (1) After checking that the corresponding writing complete (RX) bits are ON, perform processing to turn each writing request (RY) bit OFF. (The parts with solid lines for RX and RY.)
- (2) After checking that all the writing complete (RX) bits are ON, turn all the writing request (RY) bits OFF. (The parts with dotted lines for RX and RY.)

## ■ Reading/Writing Failure Example

If the error bit turns ON when a reading/writing request bit is turned ON, the reading/writing failed.



Possible causes include:

- The specified compatible sensor is not inter-connected to this unit.
- The specified index number does not exist.
- The setting that you attempted to write is out of range.

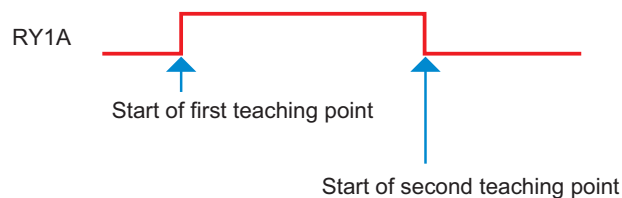
Refer to “5-1-3 Error Code Lists” (page 5-6) and check the read error code value.

### ●●● MEMO ●●●

- If the specified compatible sensor is not inter-connected to this unit, the complete bit will not turn ON and the error bit will turn ON.
- When writing is successful, the error code remains (it is not cleared).

## 3-2-3 Teaching a Compatible Sensor

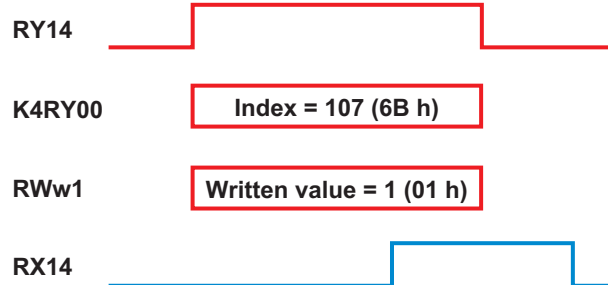
As an example, this section explains how to teach sensor ID3.



- 1 Turn RY1A ON.**  
The first teaching point is performed on the rising edge of RY1A.
- 2 Turn RY1A OFF.**  
The second teaching point is performed on the falling edge of RY1A.

## 3-2-4 Disabling Key Operations on a Compatible Sensor

Disable key operations on a compatible sensor inter-connected to this unit by writing a setting. As an example, this section explains how to disable key operations on the D3RF digital fiber amplifier recognized with ID 2.

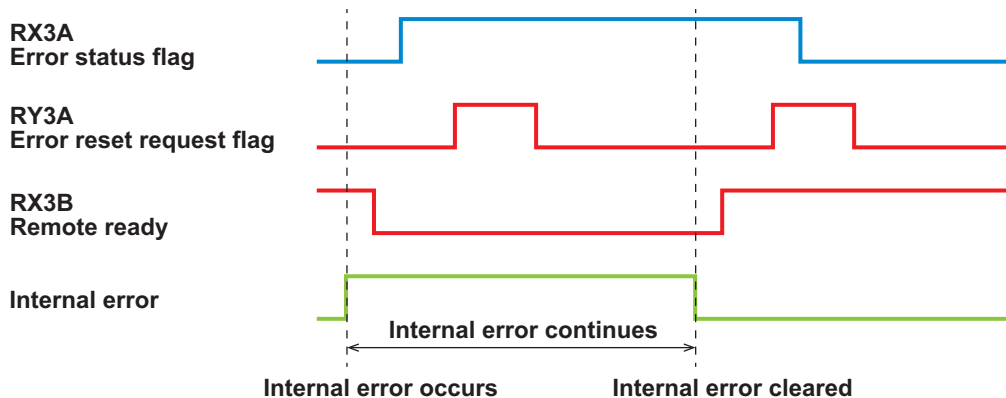


- 1 Write index number 107 to K4RY00.**  
Index number 107 (6B h) is the command operation parameter for setting the lock level on the D3RF.
- 2 Write the setting “1” to RWw1.**  
Setting “1” (01 h) sets the D3RF lock level to lock level 1 (all locked).
- 3 Turn RY14 ON.**  
Turn RY14 ON at the same time that parameters and settings are written or after writing these items. When writing is complete, RX14 turns ON.
- 4 Check that RX14 is ON, and then turn RY14 OFF.**  
When you turn RY14 OFF, RX14 also turns OFF automatically.



## 3-2-5 Operation When an Internal Error Occurs

As an example, the timing chart when an internal error occurs with two stations occupied (eight or less compatible sensors inter-connected) is shown below.



**1**

### Internal error occurs

When an internal error occurs, communication is interrupted and remote ready turns OFF. Also, the error status flag turns ON.

**2**

### Internal error continues

Until the internal error is cleared, the error status flag and the remote ready status do not change even if the error reset request flag is turned ON.

**3**

### After internal error cleared

When the internal error is cleared and the system returns to the communication possible status, remote ready turns ON. If the error reset request flag is turned ON with remote ready ON, the error status flag turns OFF.

## 3-3 Parameter Lists

This section provides lists of the parameters of the UC1-CL11 unit and of the compatible sensors to interconnect.

### 3-3-1 Meaning of Each Item

The meanings of the parameter items are shown below.

<b>Index/subindex</b>	Indicates the index and subindex of the setting. The left side of the index is displayed in decimal, and the right side of the index is displayed in hexadecimal. For system reserved items and other such items where the index column is not split into left and right columns, the index is expressed in decimal.
<b>Setting name</b>	The name of the setting.
<b>Access</b>	Indicates whether the data is readable or writable. RO: Only reading is supported. R/W: Reading and writing are both supported. WO: Only writing is supported.
<b>Default value</b>	Setting details at the time of purchase.
<b>Setting range</b>	Indicates the range of values for the setting.

### 3-3-2 UC1-CL11 Unit Parameters

#### ■ Product Information

These parameters are related to the product information of the UC1-CL11 unit.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
0	00 h	0	Product series	RO	2502h	
1	01 h	0	Product type		0002h	
2	02 h	0	Firmware version		0001h	
3	03 h	0	Protocol version		1	
4	04 h	0	Product revision		1	
5	05 h	0 to 3	Vendor name		"OPTEX FA"	
6	06 h	0 to 3	Product name		"UC1-CL11"	
7	07 h	0 to 3	Product number		"19387"	
8	08 h	0 to 15	User tag name	R/W	Space	
10	0A h	0	Vendor ID	RO	1338h	
11	0B h	0 to 14	Network profile		"Fieldbus Adapter CC-Link V1.1"	
12 to 96		Reserved				

## ■ Unit Status

These parameters are related to the status of this unit.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
9	09 h	0	Operation status	RO	—	2: Operation in progress
97	61 h	0	Number of compatible sensors inter-connected*1	R/W	0	0: Not registered (no error detection) 1 to 16: Number of compatible sensors inter-connected
98	62 h	0 1 to 7	Error information*2		0	Error code of the latest error Error codes of past errors
99		Reserved				

\*1 An error occurs if this differs from the actual number of compatible sensors inter-connected.

The RUN LED turns off, and data transmission stops.

\*2 For details on error codes, refer to “5-1-3 Error Code Lists” (page 5-6).

## ■ Parameters for Compatible Sensors Inter-connected to the UC1-CL11 Unit

Index	Subindex	Setting name	Access	Default value	Setting range
100 to 199	For inter-connected sensors				

## ■ Parameters for Command Operation

These parameters are related to the operation of this unit.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
200 to 209		Reserved				
210	D2 h	0	Restart instruction	WO	—	3: Execute restart
211		Reserved				
212	D4 h	0	Setting initialization*1	WO	—	3: Execute initialization
99		Reserved				

\*1 The following setting details are initialized.

- User tag name (index 08)
- Number of compatible sensors inter-connected (index 97)

## 3-3-3 Parameters of D3RF (Field Network Supporting Models)

### ■ Product Information

These parameters are related to the product information of the D3RF.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
0	00 h	0	Product series	RO	2101h	Dual output type: 2102h
1	01 h	0	Product type		0012h	
2	02 h	0	Firmware version		0200h	
3	03 h	0	Protocol version		1	
4	04 h	0	Product revision		1	
5	05 h	0 to 3	Vendor name		"OPTEX FA"	
6	06 h	0 to 1	Product name		"D3RF"	
7	07 h	0 to 1	Product number		"N/A"	
8	08 h	0 to 15	User tag name		"N/A"	
10		Reserved				
11	0B h	0 to 14	Network profile	RO	0	
12	0C h	0	Backup/restore compatibility		1	—
13	0D h	0	Total number of setting bytes		56	
14 to 97		Reserved				

### ■ Unit Status

These parameters are related to the status of the D3RF.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
9	09 h	0	Operation status	RO	—	1: Teaching in progress 2: Operation in progress 3: User operation in progress
98	62 h	0	Error information	R/W	0	Error code* <sup>1</sup>
99		Reserved				

\*1 For details on error codes, refer to "5-1-3 Error Code Lists" (page 5-6).

## Parameters for Command Operation

These parameters are related to the settings and operation of the D3RF. For details on each parameter, refer to the D3RF (the model that supports field network) instruction manual.

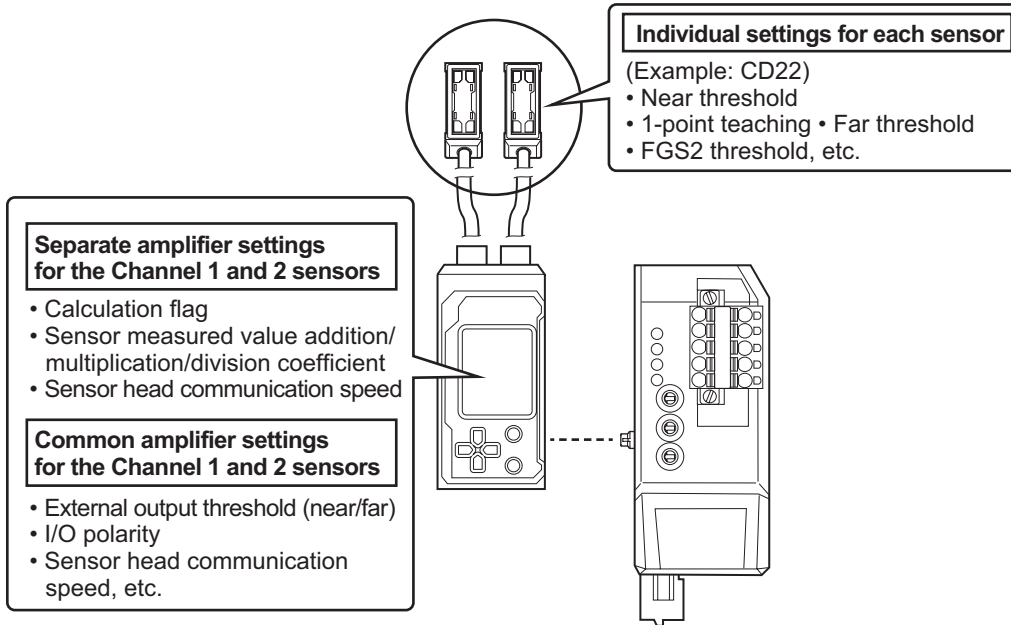
Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
100	64 h	0	Display mode	R/W	0	0: Digital mode 1: Bar display model 2: Percentage mode
101	65 h	0	Detection mode	R/W	0	0: Normal operation 1: Rising edge detection 2: Falling edge detection 3: Differential detection with left unit
102	66 h	0	Teaching mode	R/W	0	0: 2-point teaching 1: 1-point teaching 2: Through teaching 3: Zone teaching
103	67 h	0	Output 2 teaching mode	R/W	0	4: Auto-teaching 5: Percent teaching 6: Zero percent teaching
104	68 h	0	Response speed setting	R/W	2	0: 1-HS (22 $\mu$ s) 1: 2-FS (85 $\mu$ s) 2: 3-ST (250 $\mu$ s) 3: 4-LG (1 ms) 4: 5-PL (2 ms) 5: 6-UL (4 ms) 6: 7-EL (8 ms)
105	69 h	0	Emitted light power setting	R/W	2	0: Low power 1: Medium power 2: High power
106	6A h	0	External input setting	R/W	5	0: External teaching input 1: Emitting off input 2: Synchronous input 3: Counter reset input 4: All sensor teaching input 5: Disabled
107	6B h	0	Lock level setting	R/W	0	0: Unlock 1: Lock level 1 (all locked) 2: Lock level 2 (partially locked)
108	6C h	0	Operation mode	R/W	0	0: L-on (light ON) 1: D-on (dark ON)
109	6D h	0	Output 2 operation mode	R/W		
110	6E h	0	Lower threshold (Far) setting	R/W	6	-999 to 9999 The range that can be written varies depending on the operation mode.
111	6F h	0	Upper threshold (Near) setting	R/W	-1	-999 to 9999 This can only be accessed in zone teaching mode.
112	70 h	0	Output 2 lower threshold (Far) setting	R/W	9999	-999 to 9999 The range that can be written varies depending on the operation mode.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
113	71 h	0	Output 2 upper threshold (Near) setting	R/W	-1	-999 to 9999 This can only be accessed in zone teaching mode.
114	72 h	0	One-shot timer specification	R/W	0	0: OFF delay timer 1: One-shot timer
115	73 h	0	Output 2 one-shot timer specification	R/W		
116	74 h	0	OFF delay timer time	R/W	0	0 to 9999: 0 to 9999 ms -1 to -9: 0.1 to 0.9 ms
117	75 h	0	ON delay timer time			
118	76 h	0	Output 2 OFF delay timer time			
119	77 h	0	Output 2 ON delay timer time			
120	78 h	0	Output 2 counter setting	R/W	0	0: Disabled 1: Up counter 2: Down counter
121	79 h	0	Counter setting	R/W	2	2 to 9999
122	7A h	0	Counter current value	R/W	—	0 to 9998
123	7B h	0	Hysteresis setting	R/W	5	1 to 40
124	7C h	0	Edge detection filter setting	R/W	0	0: 1000 Hz 1: 200 Hz 2: 50 Hz 3: 20 Hz 4: 5 Hz
125	7D h	0	ASC setting (Automatic Sensitivity Correction)	R/W	0	0: Disabled 1: Standard 2: Fast 3: Fastest
126	7E h	0	Eco mode setting	R/W	0	0: Disabled 1: Sub-display off 2: Doubled emitting cycle 3: All display off and doubled emitting cycle
127	7F h	0	Display rotation setting	R/W	0	0: Disabled 1: 180-degree rotation
128 to 199		Reserved				
200	C8 h	0	Execute zero reset	WO	—	1: Standard output 1 teaching 2: Output 2 teaching
201	C9 h	0	Clear zero reset	WO		
202	CA h	0	First point teaching	WO		
203	CB h	0	Second point teaching	WO		
204 to 209		Reserved				
210	D2 h	0	Restart instruction	WO	—	3: Execute restart
211	D3 h	0	Return to top menu	WO		
212	D4 h	0	Setting initialization	WO		3: Execute initialization (only permitted when unlocked)

## 3-3-4 CDA Parameters

When inter-connecting compatible sensors to this unit through the CDA, the assigned parameters are broadly classified as shown below.

- CDA parameters
- Common parameters of the up to two compatible sensors that can be connected to the CDA
- Parameters independently owned by each of the two compatible sensors connected to the CDA



### ■ Product Information

These parameters are related to the product information of the CDA.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
129	81	0	Product series	RO	H2503	—
		1	Version information		H0101	Lower order byte: Firmware version Higher order byte: FPGA version
		2	Subversion information		H0100	Display CPU version

## ■ Parameters for Command Operation

These parameters are related to the settings and operation of the CDA. For details on each parameter, refer to the CDA instruction manual.

### ● Common Parameters for the Channel 1 and 2 Sensors

These common parameters for the connected sensors are held as settings on the CDA.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
100	64	0	External output threshold (near)	R/W	-50	-32768 to 32767
101	65	0	External output threshold (far)		50	
102	66	0	External output hysteresis		10	0 to 32767
107	6B	0	Calculated value monitor		0	0: Sensor 2 measured value, 1: Calculated value
108	6C	0	Sensor 1 measured value calculation		0	0: None, 1: Addition, 2: Subtraction, 3: Absolute difference
109	6D	0	Sensor 2 measured value calculation		0	
110	6E	0	Left sensor 1 measured value calculation		0	
111	6F	0	Left sensor 2 measured value calculation		0	
112	70	0	I/O polarity		1	0: PNP (N.O.), 1: NPN (N.O), 2: PNP (N.C.), 3: NPN (N.C)
113	71	0	External output 1 function selection		11	0: No output, 1: Within calculated value threshold range (GO), 2: Outside of calculated value near range (LO), 3: Outside of calculated value far range (HI), 4: Within sensor 1 threshold range (GO), 5: Outside of sensor 1 near range (LO), 6: Outside of sensor 1 far range (HI), 7: Within sensor 2 threshold range (GO), 8: Outside of sensor 2 near range (LO), 9: Outside of sensor 2 far range (HI)
114	72	0	External output 2 function selection		11	
115	73	0	External output 3 function selection		11	
116	74	0	External input selection	0	0: No function, 1:Teaching (far side on rising edge, near side on falling edge), 2: BGS/FGS teaching, 3: Zero reset, 4: Laser emitter off	
117	75	0	Analog output selection	3	0: None, 1: Calculated value, 2: Sensor 1, 3: Sensor 2	
118	76	0	Analog scaling	0	0: Without scaling, 1: With scaling	
119	77	0	Analog scaling max	10000	-32768 to 32767	
120	78	0	Analog scaling min	-10000		



Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
122 to 128		Reserved				
210	D2	0	Restart instruction	WO	—	3: Execute the corresponding command on the compatible sensors that are connected.
211	D3	0	Return to top menu			
212	D4	0	Setting initialization			

### ● Separate Parameters for the Channel 1 and 2 Sensors

The parameters for individual settings of up to two sensors are stored on the CDA.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
103	67	0	Calculation flag	R/W	0	0: Without calculation, 1: With calculation
104	68	0	Sensor measured value addition coefficient (A)		0	-10000 to 10000
105	69	0	Sensor measured value multiplication coefficient (M)		1	-10000 to 10000
106	6A	0	Sensor measured value division coefficient (D)		1	1 to 32767
121	79	0	Sensor head communication speed		10	0: No connection, (unit for the following values: bps) 1: 9.6 k, 2: 19.2 k, 3: 38.4 k, 4: 57.6 k, 5: 115.2 k, 6: 230.4 k, 7: 312.5 k, 8: 468.75 k, 9: 500 k, 10: 625 k, 11: 833.3 k, 12: 937.5 k, 13: 1250 k

## 3-3-5 Parameters of CD22 (RS-485 models)

### Product Information

The following are product information parameters for an individual CD22 unit connected to the CDA.

Index		Subindex	Setting name	Access	Default value			Setting range		
Dec	Hex				CD22-15-485	CD22-35-485	CD22-100-485	CD22-15-485	CD22-35-485	CD22-100-485
0	00	0	Product series	RO	H2301	H2302	H2303	When sensor not connected: H2500		
1	01	0	Product type		H0011					
2	02	0	Firmware version		H0001					
3	03	0	Protocol version		0					
4	04	0	Product revision		0					
5	05	0 to 3	Vendor name		"OPTEX FA"					
6	06	0 to 15	Product name		"CD22-15-485"	"CD22-35-485"	"CD22-100-485"			
7	07	0 to 15	Product number							
8	08	0 to 15	User tag name		Blank					
10 to 11		Reserved								
12	0C	0	Backup/restore compatibility	RO	1			1: Compatible 0: Not compatible		
13	0D	0	Total number of setting bytes		112					
14 to 97		Reserved								

### Unit Status

The following are status parameters for an individual CD22 unit connected to the CDA.

Index		Subindex	Setting Name	Access	Default value			Setting range		
Dec	Hex				CD22-15-485	CD22-35-485	CD22-100-485	CD22-15-485	CD22-35-485	CD22-100-485
9	09	0	Operation status	RO	—			1: Teaching in progress 2: Operation in progress 3: User operation in progress		
98	62	0	Error information	R/W	H0011			Error code*1		
99		Reserved								

\*1 For details on error codes, refer to "5-1-3 Error Code Lists" (page 5-6).

## Parameters for Command Operation

The following are settings and operation parameters for an individual CD22 unit connected to the CDA. For details on each parameter, refer to the CD22 (the model that supports RS-485 communication) instruction manual.

Index		Subindex	Setting name	Access	Default value			Setting range					
Dec	Hex				CD22-15-485	CD22-35-485	CD22-100-485	CD22-15-485	CD22-35-485	CD22-100-485			
130	82	0	Judgment output, near threshold	R/W	-1000	-300	-1000	-7499 to 7499 (unit: 1 μm)	-2249 to 2249 (unit: 10 μm)	-7499 to 7499 (unit: 10 μm)			
131	83	0	Judgment output, far threshold		1000	300	1000						
132	84	0	Judgment output, FGS2 set distance		0	0	0						
133	85	0	Judgment output, FGS2 operation range		1000	300	1000						
134	86	0	Moving averaging		2						0: 1 time, 1: 8 times, 2: 64 times, 3: 512 times		
135	87	0	Teaching mode		0						0: 2-point teaching, 1: 1-point teaching, 2: FGS2		
136	88	0	Sampling period		0						0: 500 μs, 1: 1 ms, 2: 2 ms, 3: 4 ms, 4: Automatic		
137	89	0	Key lock function		0						0: Without lock 1: With lock		
138	8A	0	Output polarity selection		0						0: Light ON (ON when within the range) 1: Dark ON (ON when outside the range)		
139	8B		Near end distance		R/W	-5000	-1500				-5000	-7499 to 7499 (unit: 1 μm)	-2249 to 2249 (unit: 10 μm)
140	8C		Far end distance	5000		1500	5000						
141	8D	0	Alarm operation selection	0			0: Clamp: Output error value (H7FFF) 1: Hold: Hold previous valid measured value						
142	8E	0	Alarm hold count	0			0 to 9999						
143		Reserved											
144	90	0	Zero reset value	RO	0			-7499 to 7499 (unit: 1 μm)	-2249 to 2249 (unit: 10 μm)	-7499 to 7499 (unit: 10 μm)			
145 to 147		Reserved											
148	94	0	Measurement point waveform selection	R/W	0			0: Waveform with the strongest receiving light level, 1: Point closest to the sensor, 2: Second closest point to the sensor, 3: Third closest point to the sensor, 4: Fourth closest point to the sensor, 5: Fifth closest point to the sensor,					
149 to 150		Reserved											

Index		Subindex	Setting name	Access	Default value			Setting range		
Dec	Hex				CD22-15-485	CD22-35-485	CD22-100-485	CD22-15-485	CD22-35-485	CD22-100-485
151	97	0	Hysteresis	R/W	50			-7499 to 7499 (unit: 1 μm)	-2249 to 2249 (unit: 10 μm)	-7499 to 7499 (unit: 10 μm)
152	98	0	Sensitivity		0			0: Automatic adjustment, 1: Min., 2: Low, 3: Middle, 4: Middle high, 5: High, 6: Max.		
153	99	0	Threshold		0			0: Lowest level 1: Lower level 2: Middle level 3: Upper level		
154		Reserved								
155	9B	0	Display	R/W	0			0: On even when locked, 1: Off when locked		
156 to 199		Reserved								
200	C8	0	Execute offset	WO	—					
201	C9	0	Clear offset							
202	CA	0	Far side teaching							
203	CB	0	Near side teaching	WO	—					
204	CC	0	FGS2 teaching							
205	CD	0	Teaching, far end specification							
206	CE	0	Teaching, near end specification							
207 to 209		Reserved								
210	D2	0	Restart instruction	WO	—			3: Execute the corresponding command with the instruction from the amplifier.		
211	D3	0	Return to top menu							
212	D4	0	Setting initialization							
213 to 255		Reserved								

## 3-3-6 TD1 Parameters

### Product Information

The following are product information parameters for an individual TD1 unit connected to the CDA.

Index		Subindex	Setting name	Access	Value/default value	Setting range
Dec	Hex					
0	00	0	Product series	RO	H2321	Indicates that this is a TD1 series through-beam edge sensor. If a sensor is not connected, the amplifier Product ID will be returned. H2503 (CDA-M/S), H2506 (CDA-DM), H250A (CDA-DM2)
1	01	0	Product type		H0011	Fixed value
2	02	0	Firmware version		Hx0xx	Indicates the program version of this product.
3	03	0	Protocol version		H0000	Indicates the version of the protocol for communicating with external devices.
4	04	0	Product revision		H0000	Indicates the version number of the product's hardware.
5	05	0 to 3	Vendor name		"OPTEX FA"	Manufacturer name
6	06	0 to 15	Product name		"TD1-010M8"	Product model (max. 32 alphanumeric characters)
7	07	0 to 15	Product number			Product code/stock number (max. 32 alphanumeric characters)
8	08	0 to 15	User tag name	R/W	Blank	An arbitrary tag name can be written for each product (max. 32 alphanumeric characters).
9 to 13		Reserved				
14	0E	0	Serial number	RO		Product serial number
15 to 97		Reserved				

### Unit Status

The following are status parameters for an individual TD1 unit connected to the CDA.

Index		Subindex	Setting name	Access	Value/default value	Setting range
Dec	Hex					
98	62	0	Error information	R/W	0	Reads the error information. Error information is cleared with the writing operation.
99		Reserved				

For details on error codes, refer to "5-1-3 Error Code Lists" (page 5-6).

## ■ Command Operation Parameters

The following are settings and operation parameters for an individual TD1 unit connected to the CDA. For details on each parameter, refer to the TD1 instruction manual and user's manual.

Index		Subindex	Setting name	Access	Value/default value	Setting range
Dec	Hex					
134	86	0	Moving averaging	R/W	1	1 to 128 Number of times over which to perform the moving average of the measured values.
135	87		Measure type		0	0: Positive edge 1: Negative edge 2: Width Measurement type and measurement direction
136	88		Sampling period	RO	0	0: 500 $\mu$ s
137 to 142		Reserved				
143	8F	0	Measure Direction	R/W	0	0: Top, 1: Bottom
144	90		Zeroing value			
144 to 151		Reserved				
152	98	0	Sensitivity	R/W	1	0: Minimum, 1: 2nd, 2: 3rd, 3: 4th, 4: Maximum, 5: Adjusted value Sensitivity of light receiving element
153 to 199		Reserved				
200	C8	0	Zeroing offset	WO	—	Sets the current measurement distance to 0 (as a relative value).
201	C9		Reset zeroing			Clears the zeroing to return to the normal measurement distance.
202	CA		Translucent teach			Executes Translucent teach
204 to 211		Reserved				
212	D4		Reset settings	WO		3: Execute on amplifier Resets all the settings with their default values.
213 to 255		Reserved				

## 3-4 Sample Program

This section provides an example of a sequence program when using MELSEC-Q series and MELSEC-L series general-purpose PLCs made by Mitsubishi Electric for the master station.

### 3-4-1 Acquiring and Writing Parameters

This section provides an example of a program for acquiring parameters from and writing parameters to compatible sensors connected to this unit.

It is presupposed that the settings have been configured as shown below in GX Works2.

Start I/O No.	0000 (I/O assignment from the CPU unit)
Type	Master Station
Master Station Data Link Type	PLC Parameter Auto Start
Mode	Remote Net (Ver.1 Mode)
Total Module Connected	1
Remote input (RX)	X100
Remote output (RY)	Y100
Remote register (RWr)	D1000
Remote register (RWw)	D1200

The PLC devices used in this program example are shown below.

#### ● Input Devices

X200	Trigger bit to read from a sensor amplifier
X201	Trigger bit to write to a sensor amplifier
X202	Error reset bit
X203	Write data verify bit

#### ● Output Devices

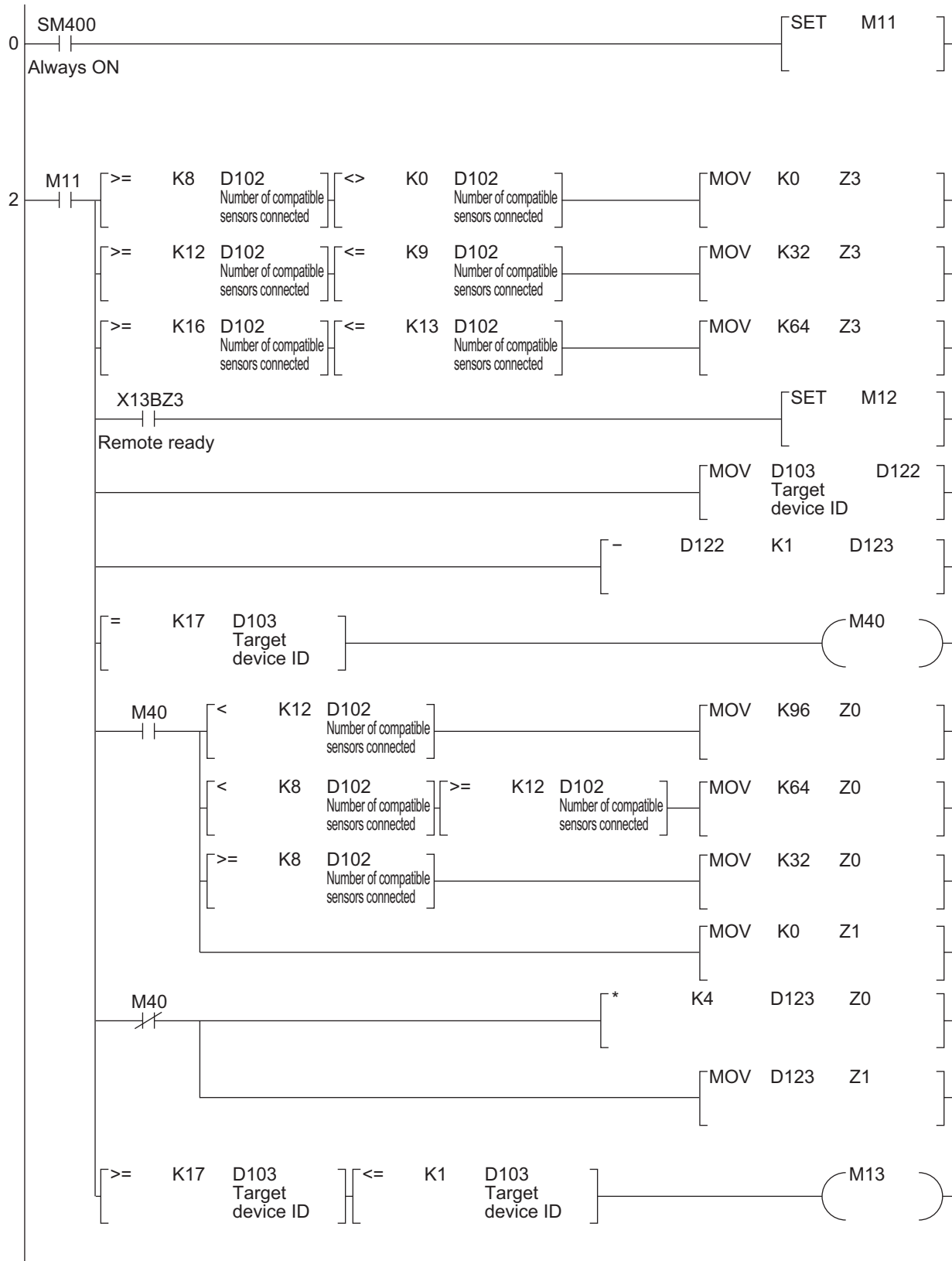
Y200	Set data access completion bit
Y201	Set data access error bit

#### ● Data Setting Devices

D100	Index number
D101	Subindex number
D102	Number of compatible sensors connected
D103	ID of the sensor to read from and write to
D104	Number of words of the read data

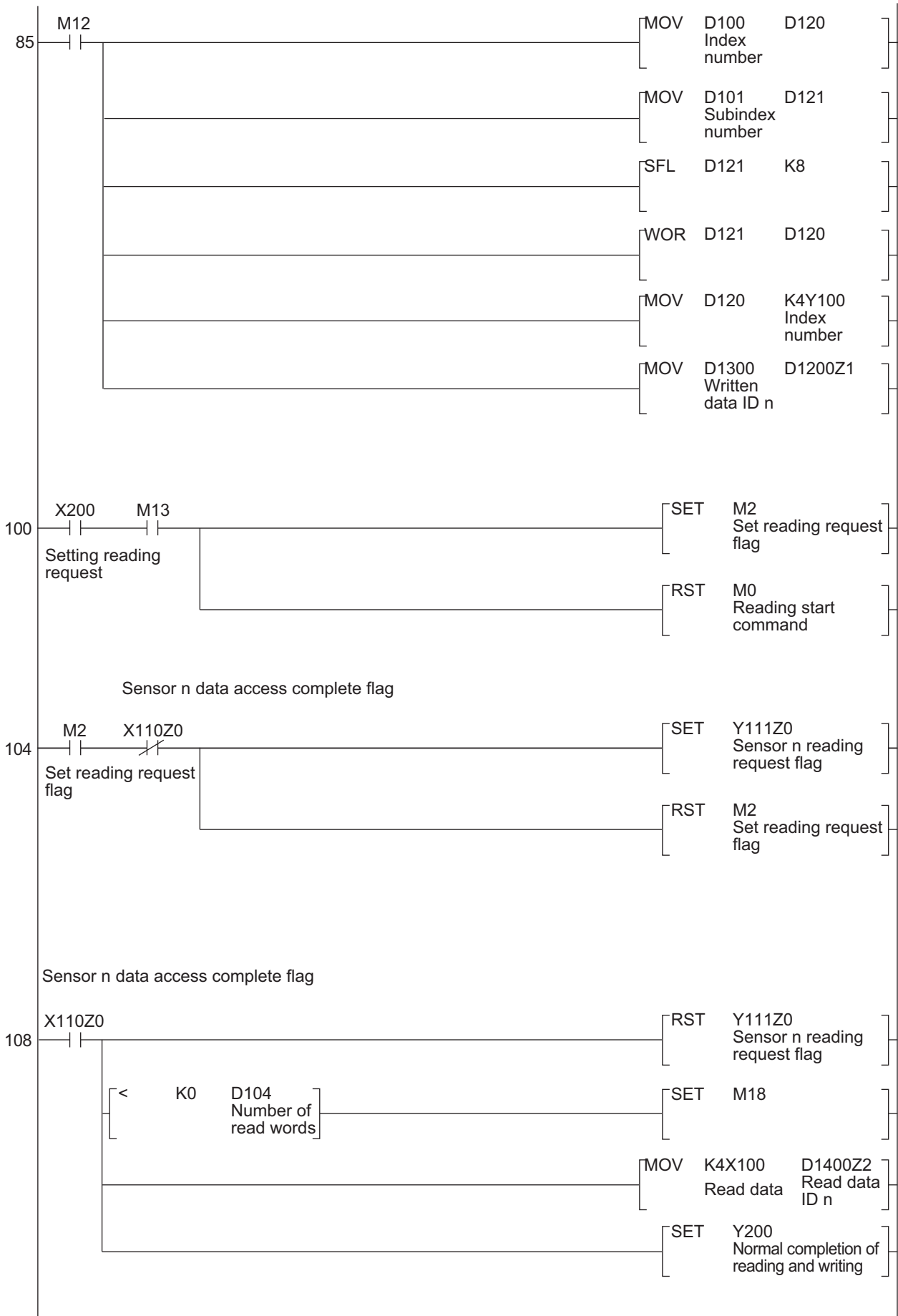
## ● Data Storage Devices

D1300	Setting data to write
D1400	Read setting data

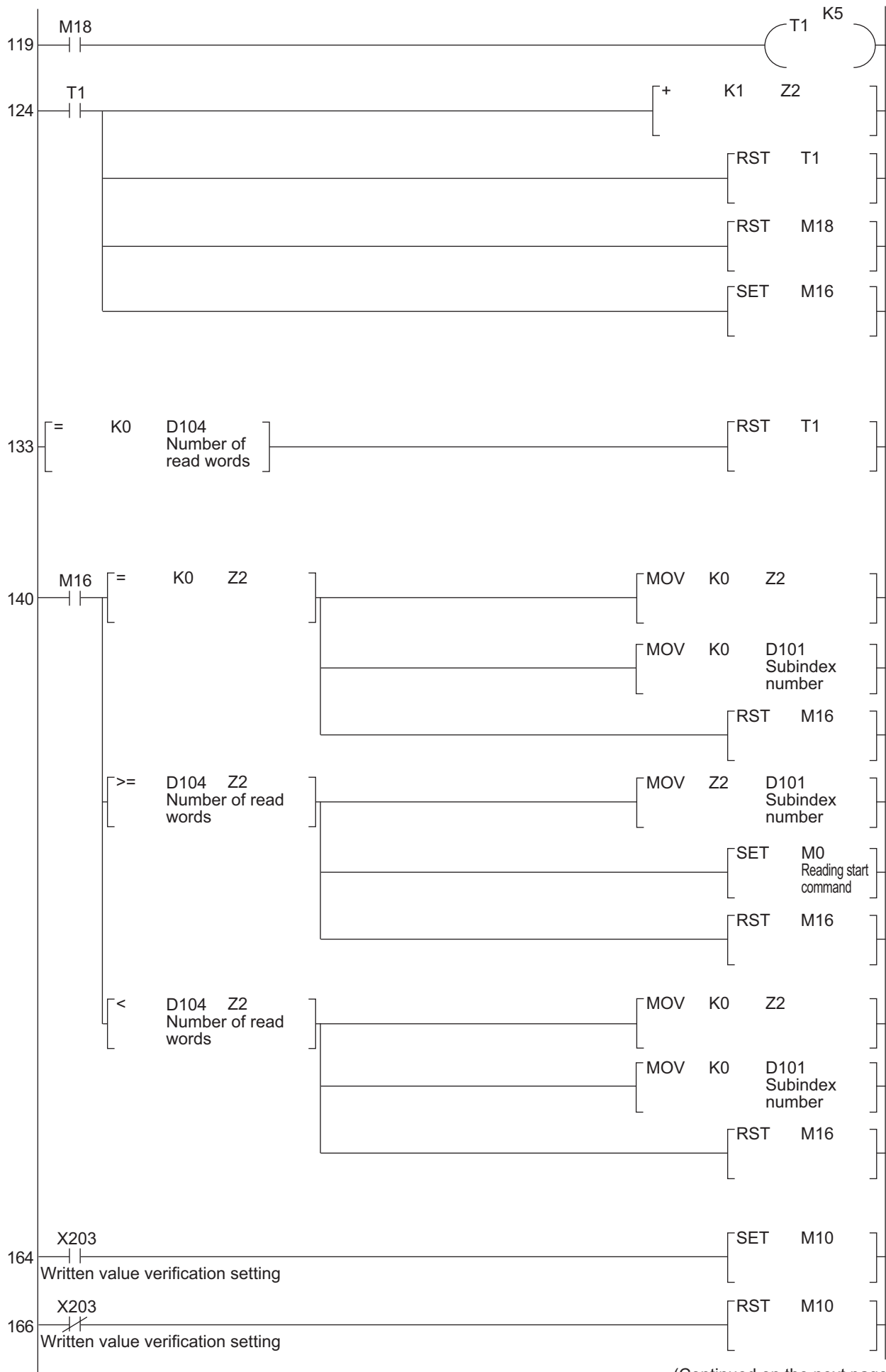


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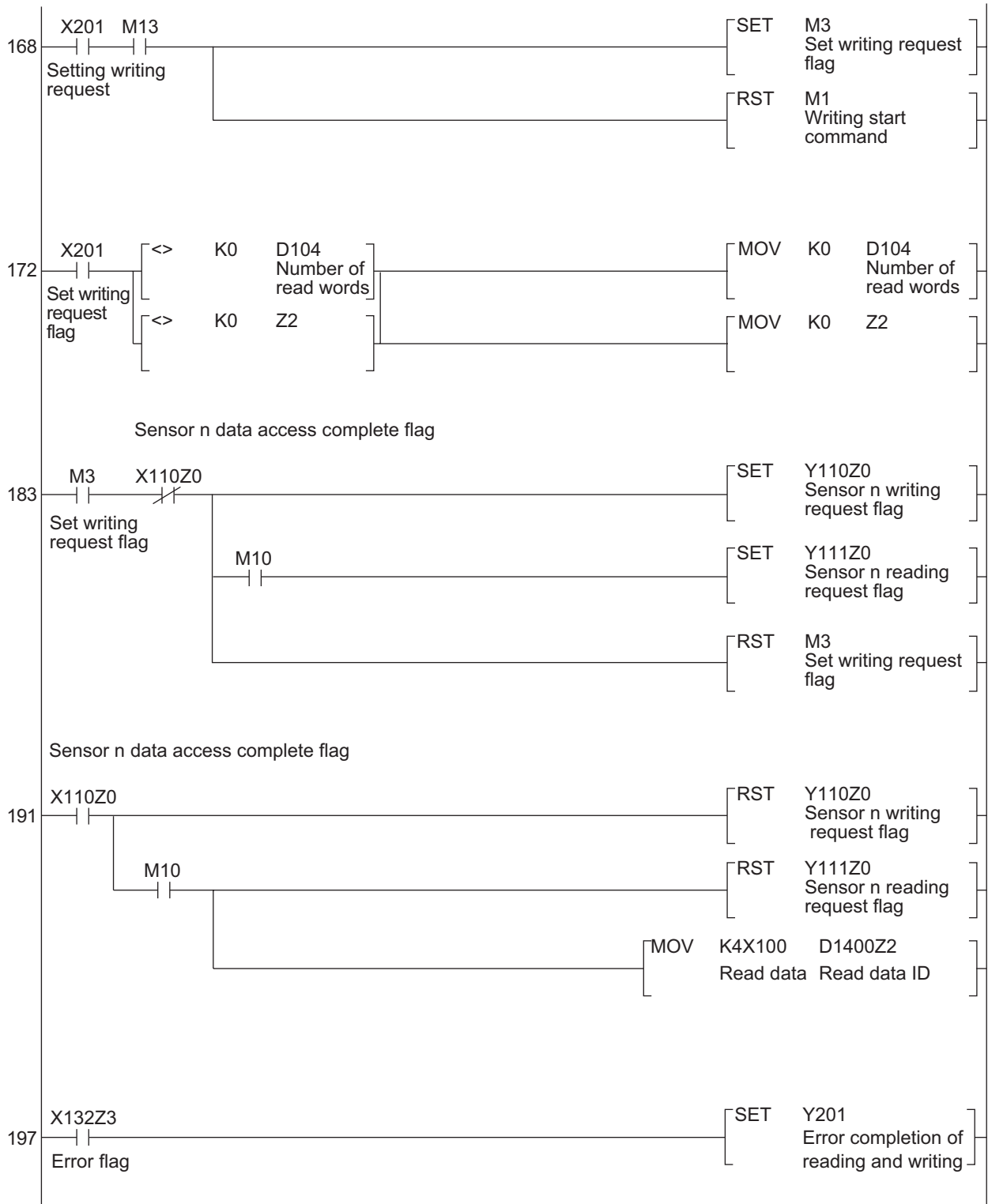




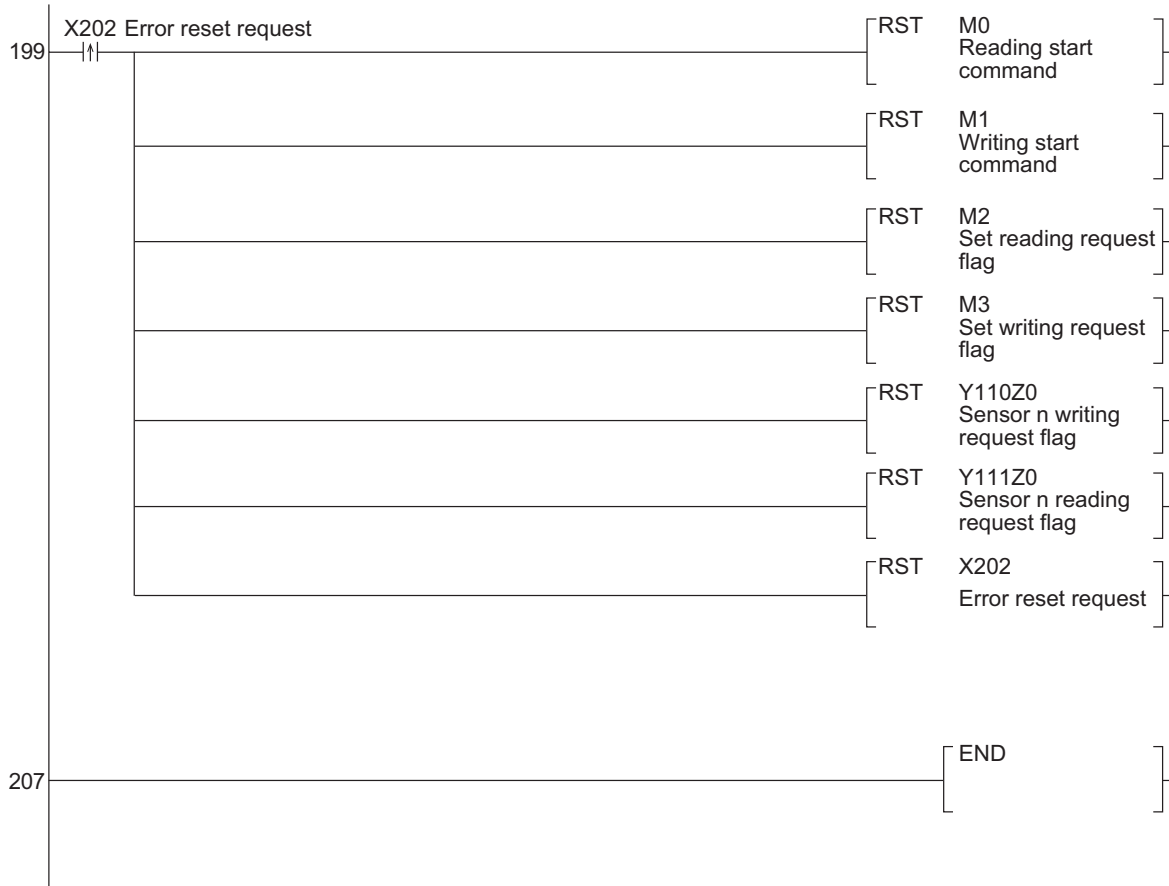
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To use this program to read the threshold of the sensor with ID 2 in a configuration where four compatible sensors are connected to this unit, execute the program as shown below.

### 1 Set the data setting devices as shown below.

Device	Details	Setting
D100	Index number	110 (6E h)
D101	Subindex number	0 (00 h)
D102	Number of compatible sensors connected	4 (04 h)
D103	ID of the sensor to read from and write to	2 (02 h)
D104	Number of words of the read data	0 (00 h)

### 2 Turn reading request bit X200 ON.

The threshold of the sensor with ID 2 is read.  
The read value is stored in data storage device D1400.



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# 4

## **Specifications**

This chapter explains the specifications of the UC1-CL11 unit.

# 4-1 Specifications

<b>Model</b>		UC1-CL11				
<b>CC-Link specifications</b>	<b>CC-Link version</b>	Ver. 1.10				
	<b>Number of occupied stations</b>	2/3/4 (switches automatically according to number of compatible sensors that are inter-connected)				
	<b>Station type</b>	Remote device station				
	<b>Baud rate (bps)</b>	156 k	625 k	2.5 M	5 M	10 M
	<b>Overall length (m)</b>	1,200	600	200	150	100
<b>Number of inter-connectable units</b>	<b>Compatible sensor*1</b>	Max. 16				
<b>Indicators</b>	<b>PWR (power supply)</b>	Lit in green				
	<b>RUN (communication with connected part)</b>					
	<b>COM (CC-Link communication)</b>					
	<b>ERR (error)</b>	Lit in red				
<b>Settings</b>	<b>Station number setting</b>	10-digit rotary switch × 2				
	<b>Communication speed</b>	10-digit rotary switch × 1				
<b>Inter-connection connector shape</b>		5-pin connector for inter-connection (functions as an inter-connection end unit)				
<b>Ratings</b>	<b>Power supply voltage</b>	12 to 24 VDC, including 10% ripple (p-p)				
	<b>Current consumption</b>	160 mA or less (at 12 V)				
<b>Environmental resistance</b>	<b>Protection circuit</b>	Reverse connection protection				
	<b>Degree of protection</b>	IP50				
	<b>Ambient temperature/humidity</b>	-25 to +55°C/35 to 85%RH (no freezing or condensation)				
	<b>Storage ambient temperature/humidity</b>	-40 to +70°C/35 to 85%RH (no freezing or condensation)				
	<b>Vibration resistance</b>	10 to 55 Hz; double amplitude 1.5 mm; 2 hours in each of the X, Y, and Z directions				
	<b>Shock resistance</b>	500 m/s <sup>2</sup> (approx. 50 G); 3 times in each of the X, Y, and Z directions				
<b>Applicable regulations</b>		EMC directive (2014/108/EC)				
<b>Applicable standards</b>		EN 61000-6-2, EN 55011				
<b>Company standards</b>		Noise resistance: Feilen Level 3 cleared				
<b>Mounting</b>		35 mm DIN rail				
<b>Material</b>		Polycarbonate				
<b>Weight</b>		Main unit: Approx. 90 g (incl. connector); Packaged: Approx. 155 g				

\*1 For details on compatible sensors, refer to "2-2-1 Compatible Sensors and Number of Connectable Units" (page 2-3).

## 4-2 Data Processing Time

A length of time found by totaling the processing times listed below is required from the point that a compatible sensor performs detection to the point that the CC-Link master station actually processes the data.

- Data processing time of the compatible sensor and amplifier unit
- Data processing time of this unit
- CC-Link network scan time between the CC-Link master station and this unit
- Internal processing time of the CC-Link master station

This section shows the data processing time of this unit and of the compatible sensors and amplifier units.

### MEMO

For details on the CC-Link network scan time and the internal processing time of the CC-Link master station, refer to the CC-Link master device manual.

### ■ Data Processing Time of the UC1-CL11 Unit

A time of (0.5 seconds × the number of inter-connected compatible sensors) is required to update the error information of the compatible sensors when an error occurs on such sensors in an operation other than reading or writing.

### ■ Data Processing Time of the D3RF

The D3RF digital fiber amplifier writes to EPROM the setting data requested through this unit before sending the response. Therefore, the time until the response is sent varies depending on the setting data.

Index number	Setting name	Conditions	Number of written words	Writing time (ms) <sup>*1</sup>
100	Receiving light level display mode		1	5
101	Detection mode		1	5
102	Teaching mode		1	5
103	Output 2 teaching mode		1	5
104	Response time	Single output type	8	40
		Single output zone teaching	10	50
		Dual output type	10	50
		Dual output zone (either)	12	60
		Dual output zone (both)	14	70
105	Emitted light power		4	20
106	External input function		3	15
107	Key lock		1	5
108	Operation mode		1	5
109	Output 2 operation mode		1	5
110	Receiving light level lower threshold (far side)	Edge detection	1	5
		Other than edge detection	2	10

\*1 There may be fluctuations of a few milliseconds due to the network scan time.

Index number	Setting name	Conditions	Number of written words	Writing time (ms) <sup>*1</sup>
111	Receiving light level upper threshold (near side)		2	10
112	Output 2 lower threshold (far side)		2	10
113	Output 2 upper threshold (near side)		2	10
114	One-shot timer specification		2	10
115	Output 2 one-shot timer specification		2	10
116	OFF delay timer time		2	10
117	ON delay timer time		2	10
118	Output 2 OFF delay timer time		2	10
119	Output 2 ON delay timer time		2	10
120	Output 2 counter function		2	10
121	Counter setting		1	5
122	Counter current value		0	0
123	Hysteresis	Single output type	2	10
		Single output zone teaching	3	15
		Dual output type	3	15
		Dual output zone (either)	4	20
		Dual output zone (both)	5	25
124	Differential operation response frequency		1	5
125	Automatic threshold adjustment		1	5
126	Power consumption control		3	15
127	Display inversion		1	5

\*1 There may be fluctuations of a few milliseconds due to the network scan time.

## ■ Response Time of the CD22/TD1

With the CD22 compact laser displacement sensor/TD1 edge sensor, the time until the response is sent varies depending on the communication speed setting.

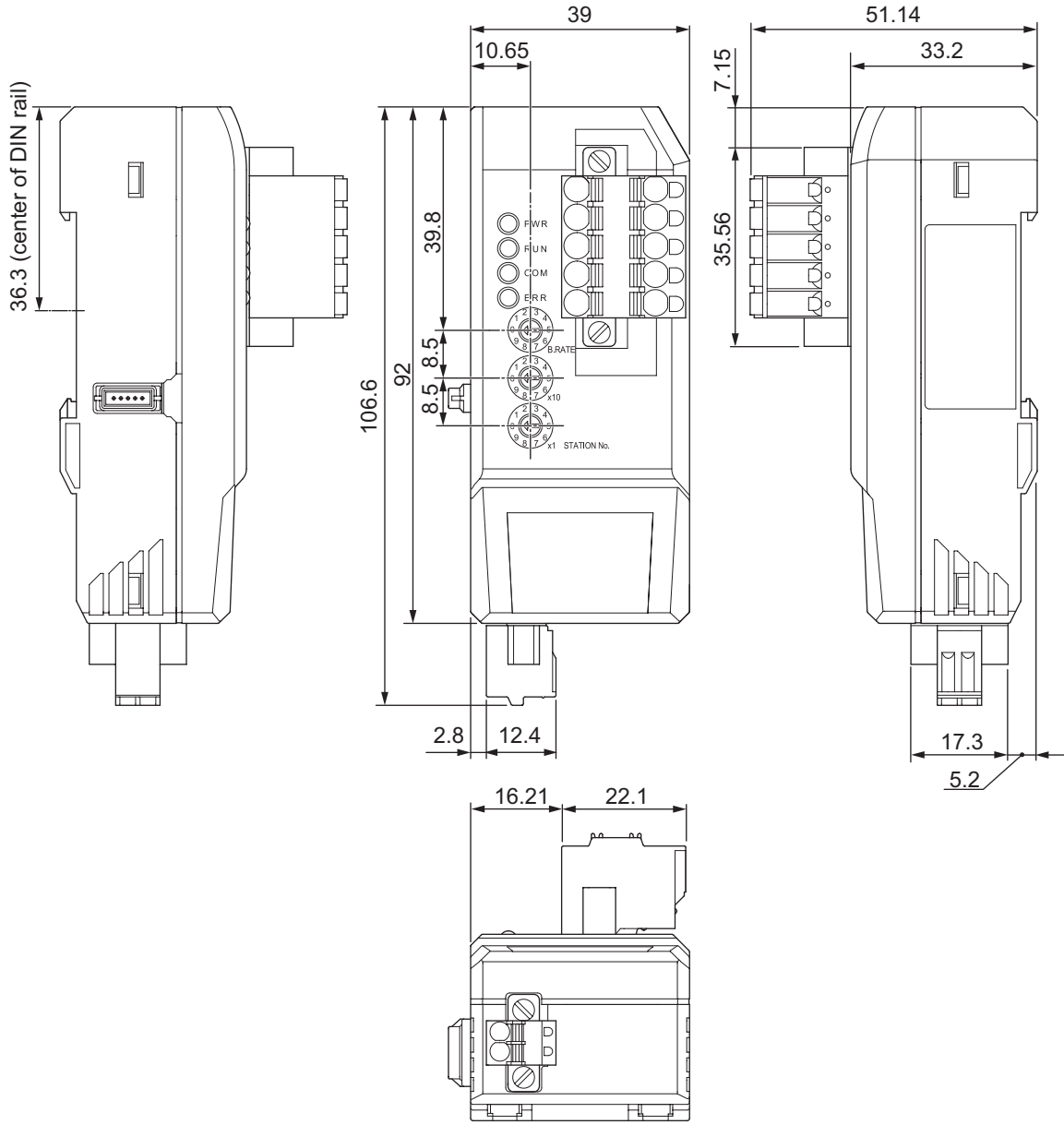
Communication speed (bps)	Writing time (ms)
9.6 k	20
19.2 k	10
A value other than those listed above (38.4 k to 1250 k)	5

## ● Data Processing Time of the CDA

The CDA general-purpose amplifier unit writes to EPROM the CDA parameter (indexes 100 to 129) requested through this unit before sending the response. The time until the response is sent is 5 ms.



# 4-3 Dimensions







---

5

**Appendix**

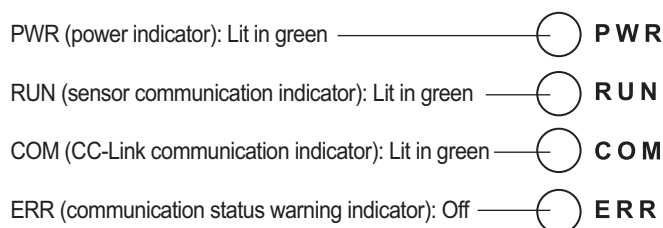
# 5-1 Troubleshooting

This section explains how to check for problems such as the case where normal CC-Link communication is not possible.

## 5-1-1 LED Lighting Specifications

The cause of and solution for errors can be checked from the LED indicators.

### LED Display During Normal Operation



#### ● PWR (Power Indicator)

Indicates whether this unit is on.

LED status	UC1-CL11 unit status	Countermeasure	Reference
Lit in green	Power is being supplied normally.	—	—
Off	No power is being supplied to the UC1-CL11 unit.	Check whether the power cable is correctly connected to the external power connector.	2-13

#### ● RUN (Sensor Communication Indicator)

Indicates whether communication is being performed normally between this unit and the compatible sensors.

LED status	UC1-CL11 unit status	Countermeasure	Reference
Lit in green	Communication is normal.	—	—
Off	Communication is not possible.	Check whether this unit and the compatible sensors are correctly inter-connected.	2-8

#### ● COM (CC-Link Communication Indicator)

Indicates whether this unit has been connected correctly to the CC-Link system.

LED status	UC1-CL11 unit status	Countermeasure	Reference
Lit in green	Communication is normal.	—	—
Off	Disconnected from the CC-Link system.	Check whether the dedicated cable is correctly connected to the CC-Link connector.	2-10
		Check whether the communication settings have been configured correctly.	2-16

## ● ERR (Communication Status Warning Indicator)

Indicates whether the communication settings are correct.

LED status	UC1-CL11 unit status	Countermeasure	Reference
Off	No problem with communication settings.	—	—
Lit in red	Problem found with communication settings.	The communication settings on this unit and the communication settings configured using GX Works2 must be the same.	2-9 2-16

## 5-1-2 Reading Error Information

If an error occurs on this unit or on a compatible sensor, you can acquire information related to the error as shown below.

### ■ Acquiring the Error Code From Remote Input (RX)

If the number of compatible sensors that are inter-connected is nine or more, you can acquire the error code with remote input (RX).

#### ● When 13 to 16 Compatible Sensors Are Inter-connected

- The error code of the latest error can be acquired with RX50 to RX5F at all times.
- The previous error code can be acquired with RX60 to RX6F at all times.

	Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Remote input	RX50 to RX5F	Unit where the error occurred (1 to 16, 17)*1									Latest error information						
	RX60 to RX6F	Unit where the error occurred (1 to 16, 17)*1									Previous error information						

\*1 The numbers 1 to 16 for the unit where the error occurred indicate the ID of the compatible sensor. The number 17 indicates that an error occurred on this unit.

#### ● When 9 to 12 Compatible Sensors Are Inter-connected

The latest error code can be acquired with RX40 to RX4F at all times.

	Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Remote input	RX40 to RX4F	Unit where the error occurred (1 to 16, 17)*1									Latest error information						

\*1 The numbers 1 to 16 for the unit where the error occurred indicate the ID of the compatible sensor. The number 17 indicates that an error occurred on this unit.

## ■ Acquiring the Error Code From the UC1-CL11 Unit Parameters

If the number of compatible sensors that are inter-connected is eight or less, you can acquire the error code with the following index.

### ● When 8 or Less Compatible Sensors Are Inter-connected

The error code can be acquired with index 98 of the UC1-CL11 unit parameters.

The past errors can be acquired with the subindexes.

Index	Subindex	Setting name	Access	Default value	Setting range
98	0	Error information	R/W	0	Error code of the latest error
	1 to 7		R/W	0	Error codes of past errors

## ■ Reading Error Codes

You can reference error information from the master station by reading error codes from this unit.

This section explains the procedure for reading the error code of the latest error from index 98 of this unit parameters when the number of compatible sensors that are inter-connected is eight or less.

### 1 Store 0x62 in RY00 to RY0F.

This specifies that the subindex number is 0 and the index number is 98 (thereby specifying the error code of the latest error).

	Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
				0	0	0	0	0	0	0	0	0	1	1	0	0	0
Remote input	RY00 to RY0F	Subindex = 0								Index = 98							

### 2 Turn RY31 ON.

When reading is performed normally, RX30 turns ON.

	Assignment	Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
																	0
Remote input	RY30 to RY3F	CC-Link system reserved										UC1-CL11 unit					
								Error reset request flag							Error clear	Reading	Writing

### 3 Check that RX30 is ON, and then read the error code stored in RX00 to RX0F.

Assignment		Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
															1	0	1
Remote input	RX30 to RX3F	CC-Link system reserved											UC1-CL11 unit				
							Remote ready	Error status flag								Error	



Assignment		Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
Remote input	RX00 to RX0F	Read data (16 bits)															
		Index number when an error occurs								Error code when an error occurs							

### 4 Turn RY31 OFF.

Assignment		Bit 15	Bit 14	Bit 13	Bit 12	Bit 11	Bit 10	Bit 9	Bit 8	Bit 7	Bit 6	Bit 5	Bit 4	Bit 3	Bit 2	Bit 1	Bit 0
															0	0	0
Remote input	RY30 to RY3F	CC-Link system reserved											UC1-CL11 unit				
							Error reset request flag								Error clear	Reading	Writing

#### MEMO

- If an error occurs when reading or writing is executed using an index number, as shown above, the error bit turns ON. At the same time, the error code and the index number that caused the error are stored in RX00 to RX0F.
- The device to which the error bit is mapped varies depending on the number of compatible sensors that are inter-connected.

Number of compatible sensors inter-connected	8 or less	9 to 12	13 to 16
Error relay	RX32	RX52	RX72

## 5-1-3 Error Code Lists

### ■ UC1-CL11 Unit Error Codes

Field bus adapter error information		Value read from index 98		Details
Higher order byte	Lower order byte	Higher order byte	Lower order byte	
Corresponding index number	0	17	0	No error.
	1		1	Non-compatible index number.
	2		2	Non-compatible subindex number.
	3		3	Non-compatible amplifier unit number.
	4		4	An unexpected header was returned from the CC-Link interface.
	5		5	There was no reply in data communication with the CC-Link interface.
	6		6	Communication with the amplifier unit timed out.
	7		7	The written data is out of range.
	8		8	The number of inter-connected amplifiers decreased.
	9		9	The registered number of expansion units differs from the actual number of expansion units.
	10		10	The reading, writing, or error clear request relay was turned ON while the complete relay was ON.



## Compatible Sensor Error Codes

### D3RF Error Codes

Field bus adapter error information		Value read from index 98		Details
Higher order byte	Lower order byte	Higher order byte	Lower order byte	
Sensor ID (1 to 16)	1	Corresponding index number	1	The index number is out of range.
	2		2	Non-compatible subindex number.
	3	0	3	An attempt was made to write a setting to a compatible sensor while it was in the all locked status or to initialize a compatible sensor while it was locked.
	4		4	The target output specification value (1 or 2) of teaching was incorrect.
	5		5	The second teaching operation does not exist in the teaching mode, or the first teaching operation has not yet been executed.
	6		6	The execution specification value (3) for restarting or initialization was incorrect.
	7		Corresponding index number	7
	8	8		The setting writing operation failed. (An attempt was made to write to a read-only setting.)
	9	0	9	An attempt was made to teach to output 2 while output 2 was set to counter mode.
	11		11	The receiving light level during teaching was too low.
	12		12	The receiving light level during teaching was saturated.
	13		13	The receiving light level difference during 2-point teaching was too small.
	14		14	An attempt was made to execute teaching other than auto-teaching in differential operation mode.
	19		19	A hardware error has been detected.

### CD22/TD1 Error Codes

Field bus adapter error information		Value read from index 98		Details
Higher order byte	Lower order byte	Higher order byte	Lower order byte	
Sensor ID (1 to 16)	1	Corresponding index number	1	The index number is out of range.
	2		2	Non-compatible subindex number.
	3		3	The command string ETX code is illegal.
	4		4	Checksum error.
	5		5	The command code is illegal.
	6		6	An unexpected parameter was specified.
	7		7	An out-of-range value was specified.
	8		8	Reserved
	9		9	

## ● CDA Error Codes

Field bus adapter error information		Value read from index 98		Details
Higher order byte	Lower order byte	Higher order byte	Lower order byte	
Connected sensor ID (1 to 16)	10	0	10	An error occurred during the reading of settings, causing startup to fail.
	11		11	An error occurred during communication with the display substrate.
	12	Corresponding index number	12	An out-of-range value was specified.
	13	0	13	Communication with the CD22 or TD1 timed out.
	14		14	An illegal writing request procedure was detected.
	15		15	An attempt was made to configure settings on a sensor to which communication has not been established.

### 5-1-4 Correcting the Number of Compatible Sensors Inter-connected Setting

If you use [Extension Unit Number] in the [Parameter Processing of Slave Station] dialog box to register the number of slave devices to connect to this unit, a message will be displayed to notify you of any inconsistencies between the actual number of connected devices and the registered number of devices as well as any inconsistencies in the number of occupied stations (refer to “2-4-4 Dealing With Unexpected Configuration Changes” (page 2-42)). However, if an inconsistency in the setting for the number of occupied stations occurs in relation to the actual number of connected devices and the registered number of devices after setting the number of connected slave devices, you will not be able to correct or clear the registered number of devices in the [Parameter Processing of Slave Station] dialog box.

In this situation, follow the “■ Reading Settings” and “■ Writing Settings” procedures under “3-2-2 Changing the Settings of a Compatible Sensor” (page 3-13) to correct or reset the UC1-CL11 unit parameters (refer to the following diagram) with a function such as [Device/Buffer Memory Batch Monitor] in GX Works2.

Index		Subindex	Setting name	Access	Default value	Setting range
Dec	Hex					
97	61 h	0	Number of compatible sensors inter-connected	R/W	0	0: Not registered (no error detection) 1 to 16: Number of compatible sensors inter-connected

# Index

## #

- 0V terminal ..... 1-5, 2-15
- 24V terminal ..... 1-5, 2-15

## A

- Automatic detection of compatible sensors ..... 2-26

## B

- Backing up settings of compatible sensors ..... 2-37
- Baud rate ..... 2-16, 2-22, 4-2
- Baud rate setting switch ..... 1-4, 2-16

## C

- CC-Link cable ..... 1-3, 2-10
- CC-Link communication settings ..... 2-16, 2-17
- CC-Link connector ..... 1-4, 1-5
- Changing compatible sensor settings ..... 2-30, 3-13
- COM (CC-Link communication indicator) ..... 5-2
- Command operation parameters (CD22) ..... 3-27
- Command operation parameters (CDA) ..... 3-24
- Command operation parameters (D3RF) ..... 3-21
- Command operation parameters (TD1) ..... 3-30
- Command operation parameters (UC1-CL11 unit) ..... 3-19
- Compatible sensor ..... 2-3
- Compatible sensor parameters ..... 3-19
- CSP+ file ..... 2-17

## D

- DA terminal ..... 1-5, 2-11
- DB terminal ..... 1-5, 2-11
- DG terminal ..... 1-5, 2-11
- DIN rail ..... 2-8
- DIN rail mounting hooks ..... 1-4, 2-8
- Disabling key operations on a compatible sensor ..... 3-16

## E

- End plate ..... 2-9
- ERR (communication status warning indicator) ..... 5-3
- Error codes (CD22/TD1) ..... 5-7

- Error codes (CDA) ..... 5-8
- Error codes (D3RF) ..... 5-7
- Error codes (UC1-CL11 unit) ..... 5-6
- External power connector ..... 1-4, 1-5

## F

- FG terminal ..... 1-5, 2-11

## I

- ID number ..... 2-5
- Inter-connecting only D3RF units ..... 2-7
- Inter-connection connector ..... 1-4
- Inter-connection with the CD22 or TD1 ..... 2-7
- iQSS ..... 2-25

## M

- Master unit ..... 2-3
- Mixed inter-connection with the CD22 or TD1 and the D3RF ..... 2-6
- Monitoring compatible sensors ..... 2-28

## N

- Number of inter-connectable units ..... 2-3, 2-22, 3-19, 4-2, 5-8
- Number of occupied stations ..... 2-3, 2-22, 4-2

## O

- Operation when an internal error occurs ..... 3-17

## P

- Pin terminal ..... 1-3, 2-11, 2-14
- Power cable ..... 1-3, 2-13
- Product information parameters (CDA) ..... 3-23
- Product information parameters (CD22) ..... 3-26
- Product information parameters (D3RF) ..... 3-20
- Product information parameters (TD1) ..... 3-29
- Product information parameters (UC1-CL11 unit) ..... 3-18
- PWR (power indicator) ..... 5-2

## R

- Read data (RX/RWr) assignment ..... 3-3
- Reading error codes ..... 5-3

Reading the output of a compatible sensor.....	3-12
Restoring settings of compatible sensors.....	2-39
RUN (sensor communication indicator).....	5-2

## **S**

Settings in GX Works2 .....	2-17, 2-25
SLD terminal.....	1-5, 2-11
Station number .....	2-17, 2-22
Station number setting switches.....	1-4, 2-17

## **T**

Teaching a compatible sensor .....	3-15
Termination resistor .....	2-13

## **U**

Unit status parameters (CD22).....	3-26
Unit status parameters (D3RF).....	3-20
Unit status parameters (TD1) .....	3-29
Unit status parameters (UC1-CL11 unit) .....	3-19

## **W**

Written data (RY/RWw) assignment.....	3-9
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**Attention: Not to be Used for Personnel Protection.**

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Never use these products as sensing devices for personnel protection. Doing so could lead to serious injury or death. These sensors do not include the self-checking redundant circuitry necessary to allow their use in personnel safety applications. A sensor failure or malfunction can cause either an energized or de-energized sensor output condition. Please consult our distributors about safety products which meet OSHA, ANSI and IEC standards for personnel protection.

- Specifications are subject to change without prior notice.
- Specifications and technical information not mentioned here are written in Instruction Manual. Or visit our website for details.
- All the warnings and cautions to know prior to use are given in Instruction Manual.

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