User's Manual

SMARTDAC+

Model GX10/GP10/GX20/GP20

EtherNet/IP Communication (/E1) User's Manual

vigilantplant®

YOKOGAWA
Yokogawa Electric Corporation

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Introduction

Thank you for purchasing the SMARTDAC+ Series GX10/GX20/GP10/GP20 (hereafter referred to as the GX or GP).
This manual explains the EtherNet/IP communication function (/E1 option) of the GX/GP.
In this manual, the GX20/GP20 standard type and large memory type are distinguished using the following notations.

- Standard type: GX20-1/GP20-1
- Large memory type: GX20-2/GP20-2

To ensure correct use, please read this manual thoroughly before beginning operation.
Please use this manual in conjunction with the GX/GP User's Manual (IM 04L51B01-01EN)

Notes

- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
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Using Open Source Software

- The TCP/IP software of this product and the document concerning the TCP/IP software have been developed/created by YOKOGAWA based on the BSD Networking Software, Release 1 that has been licensed from University of California.

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Conventions Used in This Manual

Unit

K	Denotes 1024. Example: 768K (file size)
k	Denotes 1000.

Markings

	*Improper handling or use can lead to injury to the user or damage to the instrument.* This symbol appears on the instrument to indicate that the user must refer to the user's manual for special instructions. The same symbol appears in the corresponding place in the user's manual to identify those instructions. In the manual, the symbol is used in conjunction with the word "WARNING" or "CAUTION."
WARNING	Calls attention to actions or conditions that could cause serious or fatal injury to the user, and precautions that can be taken to prevent such occurrences.
CAUTION	Calls attention to actions or conditions that could cause light injury to the user or cause damage to the instrument or user's data, and precautions that can be taken to prevent such occurrences.
Note	Calls attention to information that is important for the proper operation of the instrument.

Reference Item

▶	Reference to related operation or explanation is indicated after this mark. Example: ▶ section 4.1

Conventions Used in the Procedural Explanations

Bold characters	Denotes key or character strings that appear on the screen. Example: **Volt**
A a # 1	Indicates the character types that can be used. A uppercase alphabet, a lowercase alphabet, # symbol, 1 numbers
Procedure	Carry out the procedure according to the step numbers. All procedures are written with inexperienced users in mind; depending on the operation, not all steps need to be taken.
Explanation	Explanation gives information such as limitations related the procedure.
Path	Indicates the setup screen and explains the settings.
Description	

Assumption of Explanation

The explanation in this manual assumes that the GX/GP is connected via communications with Rockwell Automation's Programmable Logic Controller (PLC) of the Allen-Bradley brand.The basic items for this configuration are explained. For the operation procedures of Rockwell Automation products, see the user's manuals of these products.
This manual is intended for those who have used an Allen-Bradley PLC and EtherNet/IP.

GX/GP Version Described in This Manual

The contents of this manual correspond to the GX/GP with release number 2 (see the STYLE S number) and style number 1 (see the STYLE H number).

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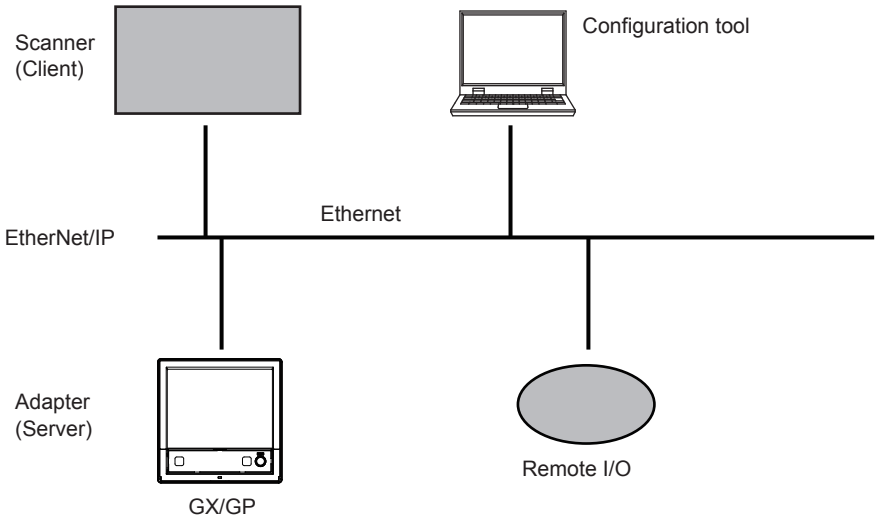
Introduction of Features

EtherNet/IP

EtherNet/IP is a protocol that extends Common Industrial Protocol (CIP) to Ethernet.
The use of Ethernet enables high-speed and periodic exchange of massive control and monitoring data between control devices placed at dispersed locations.
Devices that support EtherNet/IP are available from many vendors. Among them, Rockwell Automation's Programmable Logic Controller (PLC) and Remote I/O of the Allen-Bradley brand are widely used. Yokogawa's GX/GP, equipped with the EtherNet/IP server function, supports communications with these PLCs.

Configuration Components

- Scanner (Client)
  A device that launches a request on EtherNet/IP. This is either a PLC or PC. For the GX/GP, PLCs such as Allen-Bradley PLC-2, PLC-5, SLC 500, MicroLogix, CompactLogix, and ControlLogix represent a Scanner (Client).
- Adapter (Server)
  A remote I/O device that the Scanner (Client) can access to read or write data. The GX/GP is an Adapter (Server).
- Configuration tool
  A tool used to configure the system. This is either a PC on which configuration software has been installed or the software itself. Rockwell Automation RSLogix500 and RSLogix5000 and the communication driver software RSLinx are configuration tools.



Note

For details of EtherNet/IP, see the information supplied by the Open DeviceNet Vender Association (ODVA).

What the GX/GP Can Do

The GX/GP provides the following functions:

- Participate in an EtherNet/IP network as an Adapter (Server).
- Communicate with new and old Allen-Bradley PLCs such as MicroLogix, CompactLogix, ControlLogix, SLC 500, PLC-5, and PLC-2.
- Support both Explicit and I/O messages.
- PLCs can access internal data of the GX/GP.

Data	Access
Input/Output channel data	Read
Computation channel[1] data	Read
Communication channel[2] data	Read/write

1 Option (/MT)
2 Option (/MC)

The following shows examples of usage.

- Data on devices on a network can be recorded by a PLC to the GX/GP.
- Data measured by the GX/GP can be acquired by a PLC.

Settings of the GX/GP

The GX/GP is ready to use after the following settings have been made.

- IP address and other settings required to connect to Ethernet
- Enabling of EtherNet/IP server function

Access to the GX/GP

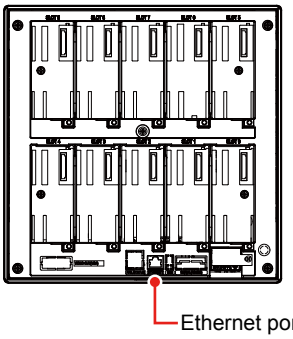
The GX/GP is a passive device on an Ethernet network. The GX/GP cannot launch a request. A PLC launches a request to the GX/GP.
A request is called a “message”. There are two message types: Explicit message and I/O messages (Implicit message). An Explicit message, included in control logic, is used to access the GX/GP, only when required, and transmit data. An I/O message is used to transmit pre-specified GX/GP data at intervals.

The GX/GP can also communicate with PLCs compatible with Programmable Controller Communication Command (PCCC) using conversion of PCCC to EtherNet/IP at the gateway. PCCC refers to serial communications that are also called DF1 communications. The GX/GP supports EtherNet/IP in which PCCC requests are encapsulated. It can communicate also with PLCs that support encapsulated PCCC.

Connection to a Network

Cable Connection

Connect the Ethernet cable to the Ethernet port provided on the back of the GX/GP.



CAUTION

Be sure to connect an Ethernet cable with an FCC-compliant plug. Otherwise, the GX/GP may malfunction.

Settings of the GX/GP

IP Address, Host Information, and DNS Setting, etc.

▶ See User's manual (IM 04L51B01-01EN) section 1.16 Configuring the Ethernet Communication Function.

EtherNet/IP Server Settings

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Communication (Ethernet) settings** > **Server settings** > **Server list**
Web browser: **Config.** tab > **Communication (Ethernet) settings** > **Server list**
Hardware configurator: **Communication (Ethernet) settings** > **Server list**

Description

EtherNet/IP

Setup Item	Selectable Range or Options	Default Value
On/Off	Off, On	Off

On/Off

Specify **On** to enable the EtherNet/IP server.

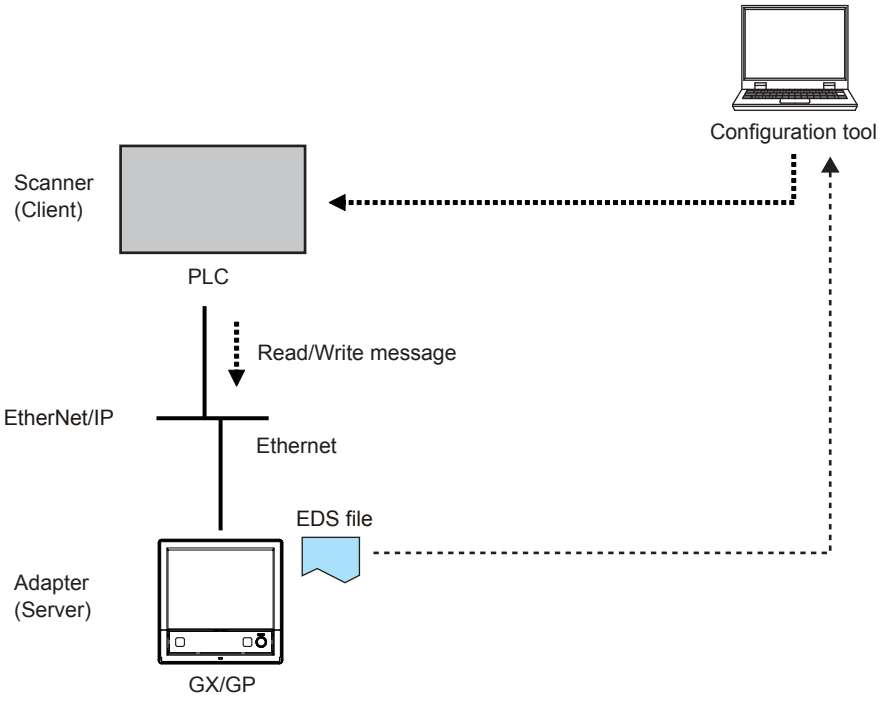
Note

The EtherNet/IP server settings can be checked on the Network Information Screen of the GX/GP. You can open the Network Information Screen by pressing the **MENU** key, tap the **Browse** tab > **Network information**.

Preparation for PLC

EDS File

Installation
To have the GX/GP participate in a network, first install the GX/GP device profile (Electronic Data Sheet; EDS file) in the configuration tool. A PLC communicates with the GX/GP based on the information in the EDS file.
Conduct installation using the “EDS Hardware Installation Tool” of RSLinx. For information on using the configuration tool, see the user’s manual of the configuration tool.



How to Obtain the EDS File

Obtain the EDS file from the Yokogawa Web site:
URL: www.smartdacplus.com/software/en/

System Configuration

Use the configuration tool to make the communication settings.
Use RSLinx, RSLogix500, or RSLogix5000 to make an Explicit message or I/O message, download it to the PLC, and execute it.
For information on using the configuration tool and a PLC, see the user’s manuals of these products.

Explicit Message

An Explicit message is a point-to-point, request/response-type communication.

System Configuration on PLC

Use the configuration tool to code an Explicit message as an MSG instruction in the control logic. In the MSG instruction, set all the information including a target device, target register, and read/write. Download the created control logic to a PLC and execute it.
On the GX/GP, the data count to be accessed per MSG instruction should be 100 or less.

In Case of PLC-2, PLC-5, and SLC

- **Commands**

  When creating an MSG instruction, specify a command. The GX/GP supports the following commands:

Target PLC	Command name
PLC-2	PLC2 Unprotected Read/Write
PLC-5	PLC5 Word Range Read/Write
	PLC5 Typed Read/Write
SLC	SLC Typed Read/Write

- **Specification of data to be accessed**

  Specify which of the data in the GX/GP should be accessed. The PLC-2, PLC-5, and SLC manage data to be accessed in units of “files.”

Command: PLC2 Unprotected Read/Write

Data to be accessed		File number
Type	Number	Data type: INT16
Input/Output channel (GX/GP main unit)	0001 • • • 0050	1000 • • • 1049
	0101 • • • 0150	1050 • • • 1099
	0201 • • • 0250	1100 • • • 1149
	0301 • • • 0350	1150 • • • 1199
	0401 • • • 0450	1200 • • • 1249
	0501 • • • 0550	1250 • • • 1299
	0601 • • • 0650	1300 • • • 1349
	0701 • • • 0750	1350 • • • 1399
	0801 • • • 0850	1400 • • • 1449
	0901 • • • 0950	1450 • • • 1499

Continued on next page

Data to be accessed		File number
Type	Number	Data type: INT16
Input/Output channel Expandable I/O 1	1001 • • • 1050	1500 • • • 1549
	1101 • • • 1150	1550 • • • 1599
	1201 • • • 1250	1600 • • • 1649
	1301 • • • 1350	1650 • • • 1699
	1401 • • • 1450	1700 • • • 1749
	1501 • • • 1550	1750 • • • 1799
(Expandable I/O 2)	2001 • • • 2050	2000 • • • 2049
	2101 • • • 2150	2050 • • • 2099
	2201 • • • 2250	2100 • • • 2149
	2301 • • • 2350	2150 • • • 2199
	2401 • • • 2450	2200 • • • 2249
	2501 • • • 2550	2250 • • • 2299
(Expandable I/O 3)	3001 • • • 3050	2500 • • • 2549
	3101 • • • 3150	2550 • • • 2599
	3201 • • • 3250	2600 • • • 2649
	3301 • • • 3350	2650 • • • 2699
	3401 • • • 3450	2700 • • • 2749
	3501 • • • 3550	2750 • • • 2799

Continued on next page

Data to be accessed		File number
Type	Number	Data type: INT16
Input/Output channel (Expandable I/O 4)	4001 • • • 4050	3000 • • • 3049
	4101 • • • 4150	3050 • • • 3099
	4201 • • • 4250	3100 • • • 3149
	4301 • • • 4350	3150 • • • 3199
	4401 • • • 4450	3200 • • • 3249
	4501 • • • 4550	3250 • • • 3299
(Expandable I/O 5)	5001 • • • 5050	3500 • • • 3549
	5101 • • • 5150	3550 • • • 3599
	5201 • • • 5250	3600 • • • 3649
	5301 • • • 5350	3650 • • • 3699
	5401 • • • 5450	3700 • • • 3749
	5501 • • • 5550	3750 • • • 3799
(Expandable I/O 6)	6001 • • • 6050	4000 • • • 4049
	6101 • • • 6150	4050 • • • 4099
	6201 • • • 6250	4100 • • • 4149
	6301 • • • 6350	4150 • • • 4199
	6401 • • • 6450	4200 • • • 4249
	6501 • • • 6550	4250 • • • 4299

Continued on next page

Data to be accessed		File number
Type	Number	Data type: INT16
Input/Output channel (Continuous channel data area)*	0001 • • • 0010	4500 • • • 4509
	0101 • • • 0110	4510 • • • 4519
	0201 • • • 0210	4520 • • • 4529
	0301 • • • 0310	4530 • • • 4539
	0401 • • • 0410	4540 • • • 4549
	0501 • • • 0510	4550 • • • 4559
	0601 • • • 0610	4560 • • • 4569
	0701 • • • 0710	4570 • • • 4579
	0801 • • • 0810	4580 • • • 4589
	0901 • • • 0910	4590 • • • 4599
Computation channel	A001 • • • A100	5000 • • • 5099
Communication channel (Read/Write)	C001 • • • C500	6000 • • • 6499

"• • •" stands for data in numerical order.

* The "continuous channel data area" is a special area that enables continuous reading by limiting the number of channels of each module to 10.
For the I/O channels only on the GX/GP main unit, this area can be used to read data consecutively.

Commands: PLC5 Word Range Read/Write, PLC5 Typed Read/Write, and SLC Typed Read/Write

Data to be accessed		File number		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (GX/GP main unit)	0001 • • • 0050	N10:00 • • • N10:49	L10:00 • • • L10:49	F10:00 • • • F10:49
	0101 • • • 0150	N10:50 • • • N10:99	L10:50 • • • L10:99	F10:50 • • • F10:99
	0201 • • • 0250	N11:00 • • • N11:49	L11:00 • • • L11:49	F11:00 • • • F11:49
	0301 • • • 0350	N11:50 • • • N11:99	L11:50 • • • L11:99	F11:50 • • • F11:99
	0401 • • • 0450	N12:00 • • • N12:49	L12:00 • • • L12:49	F12:00 • • • F12:49
	0501 • • • 0550	N12:50 • • • N12:99	L12:50 • • • L12:99	F12:50 • • • F12:99
	0601 • • • 0650	N13:00 • • • N13:49	L13:00 • • • L13:49	F13:00 • • • F13:49
	0701 • • • 0750	N13:50 • • • N13:99	L13:50 • • • L13:99	F13:50 • • • F13:99
	0801 • • • 0850	N14:00 • • • N14:49	L14:00 • • • L14:49	F14:00 • • • F14:49
	0901 • • • 0950	N14:50 • • • N14:99	L14:50 • • • L14:99	F14:50 • • • F14:99
(Expandable I/O 1)	1001 • • • 1050	N15:00 • • • N15:49	L15:00 • • • L15:49	F15:00 • • • F15:49
	1101 • • • 1150	N15:50 • • • N15:99	L15:50 • • • L15:99	F15:50 • • • F15:99
	1201 • • • 1250	N16:00 • • • N16:49	L16:00 • • • L16:49	F16:00 • • • F16:49
	1301 • • • 1350	N16:50 • • • N16:99	L16:50 • • • L16:99	F16:50 • • • F16:99
	1401 • • • 1450	N17:00 • • • N17:49	L17:00 • • • L17:49	F17:00 • • • F17:49
	1501 • • • 1550	N17:50 • • • N17:99	L17:50 • • • L17:99	F17:50 • • • F17:99

Continued on next page

Data to be accessed		File number		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Expandable I/O 2)	2001 • • • 2050	N20:00 • • • N20:49	L20:00 • • • L20:49	F20:00 • • • F20:49
	2101 • • • 2150	N20:50 • • • N20:99	L20:50 • • • L20:99	F20:50 • • • F20:99
	2201 • • • 2250	N21:00 • • • N21:49	L21:00 • • • L21:49	F21:00 • • • F21:49
	2301 • • • 2350	N21:50 • • • N21:99	L21:50 • • • L21:99	F21:50 • • • F21:99
	2401 • • • 2450	N22:00 • • • N22:49	L22:00 • • • L22:49	F22:00 • • • F22:49
	2501 • • • 2550	N22:50 • • • N22:99	L22:50 • • • L22:99	F22:50 • • • F22:99
(Expandable I/O 3)	3001 • • • 3050	N25:00 • • • N25:49	L25:00 • • • L25:49	F25:00 • • • F25:49
	3101 • • • 3150	N25:50 • • • N25:99	L25:50 • • • L25:99	F25:50 • • • F25:99
	3201 • • • 3250	N26:00 • • • N26:49	L26:00 • • • L26:49	F26:00 • • • F26:49
	3301 • • • 3350	N26:50 • • • N26:99	L26:50 • • • L26:99	F26:50 • • • F26:99
	3401 • • • 3450	N27:00 • • • N27:49	L27:00 • • • L27:49	F27:00 • • • F27:49
	3501 • • • 3550	N27:50 • • • N27:99	L27:50 • • • L27:99	F27:50 • • • F27:99
(Expandable I/O 4)	4001 • • • 4050	N30:00 • • • N30:49	L30:00 • • • L30:49	F30:00 • • • F30:49
	4101 • • • 4150	N30:50 • • • N30:99	L30:50 • • • L30:99	F30:50 • • • F30:99
	4201 • • • 4250	N31:00 • • • N31:49	L31:00 • • • L31:49	F31:00 • • • F31:49
	4301 • • • 4350	N31:50 • • • N31:99	L31:50 • • • L31:99	F31:50 • • • F31:99
	4401 • • • 4450	N32:00 • • • N32:49	L32:00 • • • L32:49	F32:00 • • • F32:49
	4501 • • • 4550	N32:50 • • • N32:99	L32:50 • • • L32:99	F32:50 • • • F32:99

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Data to be accessed		File number		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Expandable I/O 5)	5001	N35:00	L35:00	F35:00
	• • •	• • •	• • •	• • •
	5050	N35:49	L35:49	F35:49
	5101	N35:50	L35:50	F35:50
	• • •	• • •	• • •	• • •
	5150	N35:99	L35:99	F35:99
	5201	N36:00	L36:00	F36:00
	• • •	• • •	• • •	• • •
	5250	N36:49	L36:49	F36:49
	5301	N36:50	L36:50	F36:50
	• • •	• • •	• • •	• • •
	5350	N36:99	L36:99	F36:99
	5401	N37:00	L37:00	F37:00
	• • •	• • •	• • •	• • •
	5450	N37:49	L37:49	F37:49
	5501	N37:50	L37:50	F37:50
	• • •	• • •	• • •	• • •
	5550	N37:99	L37:99	F37:99
(Expandable I/O 6)	6001	N40:00	L40:00	F40:00
	• • •	• • •	• • •	• • •
	6050	N40:49	L40:49	F40:49
	6101	N40:50	L40:50	F40:50
	• • •	• • •	• • •	• • •
	6150	N40:99	L40:99	F40:99
	6201	N41:00	L41:00	F41:00
	• • •	• • •	• • •	• • •
	6250	N41:49	L41:49	F41:49
	6301	N41:50	L41:50	F41:50
	• • •	• • •	• • •	• • •
	6350	N41:99	L41:99	F41:99
	6401	N42:00	L42:00	F42:00
	• • •	• • •	• • •	• • •
	6450	N42:49	L42:49	F42:49
	6501	N42:50	L42:50	F42:50
	• • •	• • •	• • •	• • •
	6550	N42:99	L42:99	F42:99

Continued on next page

Data to be accessed		File number		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Continuous channel data area)*	0001 • • • 0010	N45:00 • • • N45:09	L45:00 • • • L45:09	F45:00 • • • F45:09
	0101 • • • 0110	N45:10 • • • N45:19	L45:10 • • • L45:19	F45:10 • • • F45:19
	0201 • • • 0210	N45:20 • • • N45:29	L45:20 • • • L45:29	F45:20 • • • F45:29
	0301 • • • 0310	N45:30 • • • N45:39	L45:30 • • • L45:39	F45:30 • • • F45:39
	0401 • • • 0410	N45:40 • • • N45:49	L45:40 • • • L45:49	F45:40 • • • F45:49
	0501 • • • 0510	N45:50 • • • N45:59	L45:50 • • • L45:59	F45:50 • • • F45:59
	0601 • • • 0610	N45:60 • • • N45:69	L45:60 • • • L45:69	F45:60 • • • F45:69
	0701 • • • 0710	N45:70 • • • N45:79	L45:70 • • • L45:79	F45:70 • • • F45:79
	0801 • • • 0810	N45:80 • • • N45:89	L45:80 • • • L45:89	F45:80 • • • F45:89
	0901 • • • 0910	N45:90 • • • N45:99	L45:90 • • • L45:99	F45:90 • • • F45:99
Computation channel	A001 • • • A100	N50:00 • • • N50:99	L50:00 • • • L50:99	F50:00 • • • F50:99
Communication channel (Read/Write)	C001 • • • C500	N60:00 • • • N64:99	L60:00 • • • L64:99	F60:00 • • • F64:99

Specify a data address, for example, as N10:0 (where N is INT16, the file number is 10, and the element number is 0).
Use only N file for command, “PLC5 Word Range Read/Write”
“• • •” stands for data in numerical order.

* The “continuous channel data area” is a special area that enables continuous reading by limiting the number of channels of each module to 10.
For the I/O channels only on the GX/GP main unit, this area can be used to read data consecutively.

In Case of CompactLogix, etc.

- **Command: CIP Data Table Read/Write**

  The GX/GP supports the following commands:

Target PLC	Command name
CompactLogix, etc.	CIP Data Table Read/Write

- **Specifying data to be accessed**

  Specify which of the data in the GX/GP should be accessed. For Logix, data can be accessed by a “tag name”.

Data to be accessed		Tag name		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (GX/GP main unit)	0001 • • • 0050	int[1000] • • • int[1049]	dint[1000] • • • dint[1049]	real[1000] • • • real[1049]
	0101 • • • 0150	int[1050] • • • int[1099]	dint[1050] • • • dint[1099]	real[1050] • • • real[1099]
	0201 • • • 0250	int[1100] • • • int[1149]	dint[1100] • • • dint[1149]	real[1100] • • • real[1149]
	0301 • • • 0350	int[1150] • • • int[1199]	dint[1150] • • • dint[1199]	real[1150] • • • real[1199]
	0401 • • • 0450	int[1200] • • • int[1249]	dint[1200] • • • dint[1249]	real[1200] • • • real[1249]
	0501 • • • 0550	int[1250] • • • int[1299]	dint[1250] • • • dint[1299]	real[1250] • • • real[1299]
	0601 • • • 0650	int[1300] • • • int[1349]	dint[1300] • • • dint[1349]	real[1300] • • • real[1349]
	0701 • • • 0750	int[1350] • • • int[1399]	dint[1350] • • • dint[1399]	real[1350] • • • real[1399]
	0801 • • • 0850	int[1400] • • • int[1449]	dint[1400] • • • dint[1449]	real[1400] • • • real[1449]
	0901 • • • 0950	int[1450] • • • int[1499]	dint[1450] • • • dint[1499]	real[1450] • • • real[1499]
(Expandable I/O 1)	1001 • • • 1050	int[1500] • • • int[1549]	dint[1500] • • • dint[1549]	real[1500] • • • real[1549]
	1101 • • • 1150	int[1550] • • • int[1599]	dint[1550] • • • dint[1599]	real[1550] • • • real[1599]
	1201 • • • 1250	int[1600] • • • int[1649]	dint[1600] • • • dint[1649]	real[1600] • • • real[1649]
	1301 • • • 1350	int[1650] • • • int[1699]	dint[1650] • • • dint[1699]	real[1650] • • • real[1699]
	1401 • • • 1450	int[1700] • • • int[1749]	dint[1700] • • • dint[1749]	real[1700] • • • real[1749]
	1501 • • • 1550	int[1750] • • • int[1799]	dint[1750] • • • dint[1799]	real[1750] • • • real[1799]

Continued on next page

Data to be accessed		Tag name		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Expandable I/O 2)	2001	int[2000]	dint[2000]	real[2000]
	• • •	• • •	• • •	• • •
	2050	int[2049]	dint[2049]	real[2049]
	2101	int[2050]	dint[2050]	real[2050]
	• • •	• • •	• • •	• • •
	2150	int[2099]	dint[2099]	real[2099]
	2201	int[2100]	dint[2100]	real[2100]
	• • •	• • •	• • •	• • •
	2250	int[2149]	dint[2149]	real[2149]
	2301	int[2150]	dint[2150]	real[2150]
	• • •	• • •	• • •	• • •
	2350	int[2199]	dint[2199]	real[2199]
	2401	int[2200]	dint[2200]	real[2200]
	• • •	• • •	• • •	• • •
	2450	int[2249]	dint[2249]	real[2249]
	2501	int[2250]	dint[2250]	real[2250]
	• • •	• • •	• • •	• • •
	2550	int[2299]	dint[2299]	real[2299]
(Expandable I/O 3)	3001	int[2500]	dint[2500]	real[2500]
	• • •	• • •	• • •	• • •
	3050	int[2549]	dint[2549]	real[2549]
	3101	int[2550]	dint[2550]	real[2550]
	• • •	• • •	• • •	• • •
	3150	int[2599]	dint[2599]	real[2599]
	3201	int[2600]	dint[2600]	real[2600]
	• • •	• • •	• • •	• • •
	3250	int[2649]	dint[2649]	real[2649]
	3301	int[2650]	dint[2650]	real[2650]
	• • •	• • •	• • •	• • •
	3350	int[2699]	dint[2699]	real[2699]
	3401	int[2700]	dint[2700]	real[2700]
	• • •	• • •	• • •	• • •
	3450	int[2749]	dint[2749]	real[2749]
	3501	int[2750]	dint[2750]	real[2750]
	• • •	• • •	• • •	• • •
	3550	int[2799]	dint[2799]	real[2799]
(Expandable I/O 4)	4001	int[3000]	dint[3000]	real[3000]
	• • •	• • •	• • •	• • •
	4050	int[3049]	dint[3049]	real[3049]
	4101	int[3050]	dint[3050]	real[3050]
	• • •	• • •	• • •	• • •
	4150	int[3099]	dint[3099]	real[3099]
	4201	int[3100]	dint[3100]	real[3100]
	• • •	• • •	• • •	• • •
	4250	int[3149]	dint[3149]	real[3149]
	4301	int[3150]	dint[3150]	real[3150]
	• • •	• • •	• • •	• • •
	4350	int[3199]	dint[3199]	real[3199]
	4401	int[3200]	dint[3200]	real[3200]
	• • •	• • •	• • •	• • •
	4450	int[3249]	dint[3249]	real[3249]
	4501	int[3250]	dint[3250]	real[3250]
	• • •	• • •	• • •	• • •
	4550	int[3299]	dint[3299]	real[3299]

Continued on next page

Data to be accessed		Tag name		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Expandable I/O 5)	5001 • • • 5050	int[3500] • • • int[3549]	dint[3500] • • • dint[3549]	real[3500] • • • real[3549]
	5101 • • • 5150	int[3550] • • • int[3599]	dint[3550] • • • dint[3599]	real[3550] • • • real[3599]
	5201 • • • 5250	int[3600] • • • int[3649]	dint[3600] • • • dint[3649]	real[3600] • • • real[3649]
	5301 • • • 5350	int[3650] • • • int[3699]	dint[3650] • • • dint[3699]	real[3650] • • • real[3699]
	5401 • • • 5450	int[3700] • • • int[3749]	dint[3700] • • • dint[3749]	real[3700] • • • real[3749]
	5501 • • • 5550	int[3750] • • • int[3799]	dint[3750] • • • dint[3799]	real[3750] • • • real[3799]
(Expandable I/O 6)	6001 • • • 6050	int[4000] • • • int[4049]	dint[4000] • • • dint[4049]	real[4000] • • • real[4049]
	6101 • • • 6150	int[4050] • • • int[4099]	dint[4050] • • • dint[4099]	real[4050] • • • real[4099]
	6201 • • • 6250	int[4100] • • • int[4149]	dint[4100] • • • dint[4149]	real[4100] • • • real[4149]
	6301 • • • 6350	int[4150] • • • int[4199]	dint[4150] • • • dint[4199]	real[4150] • • • real[4199]
	6401 • • • 6450	int[4200] • • • int[4249]	dint[4200] • • • dint[4249]	real[4200] • • • real[4249]
	6501 • • • 6550	int[4250] • • • int[4299]	dint[4250] • • • dint[4299]	real[4250] • • • real[4299]

Continued on next page

Data to be accessed		Tag name		
Type	**Number**	**Data type INT16**	**Data type INT32**	**Data type FLOAT**
Input/Output channel (Continuous channel data area)*	0001 • • • 0010	int[4500] • • • int[4509]	dint[4500] • • • dint[4509]	real[4500] • • • rea[4509]
	0101 • • • 0110	int[4510] • • • int[4519]	dint[4510] • • • dint[4519]	rea[4510] • • • rea[4519]
	0201 • • • 0210	int[4520] • • • int[4529]	dint[4520] • • • dint[4529]	rea[4520] • • • rea[4529]
	0301 • • • 0310	int[4530] • • • int[4539]	dint[4530] • • • dint[4539]	rea[4530] • • • rea[4539]
	0401 • • • 0410	int[4540] • • • int[4549]	dint[4540] • • • dint[4549]	rea[4540] • • • rea[4549]
	0501 • • • 0510	int[4550] • • • int[4559]	dint[4550] • • • dint[4559]	rea[4550] • • • rea[4559]
	0601 • • • 0610	int[4560] • • • int[4569]	dint[4560] • • • dint[4569]	rea[4560] • • • rea[4569]
	0701 • • • 0710	int[4570] • • • int[4579]	dint[4570] • • • dint[4579]	rea[4570] • • • rea[4579]
	0801 • • • 0810	int[4580] • • • int[4589]	dint[4580] • • • dint[4589]	rea[4580] • • • rea[4589]
	0901 • • • 0910	int[4590] • • • int[4599]	dint[4590] • • • dint[4599]	rea[4590] • • • rea[4599]
Computation channel	A001 • • • A100	int[5000] • • • int[5099]	dint[5000] • • • dint[5099]	real[5000] • • • real[5099]
Communication channel (Read/Write)	C001 • • • C500	int[6000] • • • int[6499]	dint[6000] • • • dint[6499]	real[6000] • • • real[6499]

"• • •" stands for data in numerical order.

* The "continuous channel data area" is a special area that enables continuous reading by limiting the number of channels of each module to 10.
For the I/O channels only on the GX/GP main unit, this area can be used to read data consecutively.

Data Type

For a PLC, you can specify the type of read or write data using a file number or tag name in a command. However, the data type is fixed to INT16 for commands "PLC2 Unprotected Read/Write" and "PLC5 Word Range Read/Write."

Data on the GX/GP

The data count on the GX/GP is as follows:

Model	Type (Suffix code)	Input/Output channel		Computation channel		Communication channel	
		Count	**Number**	**Count**	**Number**	**Count**	**Number**
GX10, GP10	Standard (-1)	100	0001 to 6650	50	A001 to A050	50	C001 to C050
GX20-1, GX20-1	Standard (-1)	100	0001 to 6650	100	A001 to A100	300	C001 to C300
GX20-2, GX20-2	Large Memory (-2)	500	0001 to 6650	100	A001 to A100	500	C001 to C500

I/O Messages

System Configuration on PLC

An I/O message is also called an Implicit message. An I/O message is used to transmit pre-specified I/O data at intervals. An I/O message is exchanged via a connection path which is first set in RSLinx and read into RSLogix. A connection path defines the IP address of the GX/GP, communication port of the PLC, and distinction of input/output.

A device, once configured in RSLinx, can be downloaded into an RSLogix project. The GX/GP is configured as a “Generic Ethernet Module” in RSLogix.

Instance ID

Each data on the GX/GP corresponds to the instance ID of an Assembly object. Each data value can be accessed as an INT32 or FLOAT type. In an I/O message, use an instance ID to code the data on the GX/GP to be accessed. The following table lists instance IDs, sizes, and data types.

- **INT32**

Type	Number	Operation type	Instance ID	Size	Data type
Input/Output channel (GX/GP main unit)	0001 to 0050, 0101 to 0150	Producer	101	400 (4 x 100)	INT32
	0201 to 0250, 0301 to 0350	Producer	102	400 (4 x 100)	INT32
	0401 to 0450, 0501 to 0550	Producer	103	400 (4 x 100)	INT32
	0601 to 0650, 0701 to 0750	Producer	104	400 (4 x 100)	INT32
	0801 to 0850, 0901 to 0950	Producer	105	400 (4 x 100)	INT32
(Expandable I/O 1)	1001 to 1050, 1101 to 1150	Producer	106	400 (4 x 100)	INT32
	1201 to 1250, 1301 to 1350	Producer	107	400 (4 x 100)	INT32
	1401 to 1450, 1501 to 1550	Producer	108	400 (4 x 100)	INT32
(Expandable I/O 2)	2001 to 2050, 2101 to 2150	Producer	111	400 (4 x 100)	INT32
	2201 to 2250, 2301 to 2350	Producer	112	400 (4 x 100)	INT32
	2401 to 2450, 2501 to 2550	Producer	113	400 (4 x 100)	INT32
(Expandable I/O 3)	3001 to 3050, 3101 to 3150	Producer	116	400 (4 x 100)	INT32
	3201 to 3250, 3301 to 3350	Producer	117	400 (4 x 100)	INT32
	3401 to 3450, 3501 to 3550	Producer	118	400 (4 x 100)	INT32
(Expandable I/O 4)	4001 to 4050, 4101 to 4150	Producer	121	400 (4 x 100)	INT32
	4201 to 4250, 4301 to 4350	Producer	122	400 (4 x 100)	INT32
	4401 to 4450, 4501 to 4550	Producer	123	400 (4 x 100)	INT32
(Expandable I/O 5)	5001 to 5050, 5101 to 5150	Producer	126	400 (4 x 100)	INT32
	5201 to 5250, 5301 to 5350	Producer	127	400 (4 x 100)	INT32
	5401 to 5450, 5501 to 5550	Producer	128	400 (4 x 100)	INT32

Continued on next page

Type	Number	Operation type	Instance ID	Size	Data type
Input/Output channel (Expandable I/O 6)	6001 to 6050, 6101 to 6150	Producer	131	400 (4 x 100)	INT32
	6201 to 6250, 6301 to 6350	Producer	132	400 (4 x 100)	INT32
	6401 to 6450, 6501 to 6550	Producer	133	400 (4 x 100)	INT32
Input/Output channel (Continuous channel data area)*	0001 to 0010, 0101 to 0110, 0201 to 0210, 0301 to 0310, 0401 to 0410, 0501 to 0510, 0601 to 0610, 0701 to 0710, 0801 to 0810, 0901 to 0910	Producer	136	400 (4 x 100)	INT32
Computation channel	A001 to A100	Producer	137	400 (4 x 100)	INT32
Communication channel (Read/Write)	C001 to C100	Producer / Consumer	138	400 (4 x 100)	INT32
	C101 to C200	Producer / Consumer	139	400 (4 x 100)	INT32
	C201 to C300	Producer / Consumer	140	400 (4 x 100)	INT32
	C301 to C400	Producer / Consumer	141	400 (4 x 100)	INT32
	C401 to C500	Producer / Consumer	142	400 (4 x 100)	INT32
-		Configuration	195	0	-
-		Producer / Consumer	196	0	-

* The “continuous channel data area” is a special area that enables continuous reading by limiting the number of channels of each module to 10.
For the I/O channels only on the GX/GP main unit, this area can be used to read data consecutively.

•FLOAT

Type	Number	Operation type	Instance ID	Size	Data type
Input/Output channel (GX/GP main unit)	0001 to 0050, 0101 to 0150	Producer	148	400 (4 x 100)	FLOAT
	0201 to 0250, 0301 to 0350	Producer	149	400 (4 x 100)	FLOAT
	0401 to 0450, 0501 to 0550	Producer	150	400 (4 x 100)	FLOAT
	0601 to 0650, 0701 to 0750	Producer	151	400 (4 x 100)	FLOAT
	0801 to 0850, 0901 to 0950	Producer	152	400 (4 x 100)	FLOAT
(Expandable I/O 1)	1001 to 1050, 1101 to 1150	Producer	153	400 (4 x 100)	FLOAT
	1201 to 1250, 1301 to 1350	Producer	154	400 (4 x 100)	FLOAT
	1401 to 1450, 1501 to 1550	Producer	155	400 (4 x 100)	FLOAT
(Expandable I/O 2)	2001 to 2050, 2101 to 2150	Producer	158	400 (4 x 100)	FLOAT
	2201 to 2250, 2301 to 2350	Producer	159	400 (4 x 100)	FLOAT
	2401 to 2450, 2501 to 2550	Producer	160	400 (4 x 100)	FLOAT
(Expandable I/O 3)	3001 to 3050, 3101 to 3150	Producer	163	400 (4 x 100)	FLOAT
	3201 to 3250, 3301 to 3350	Producer	164	400 (4 x 100)	FLOAT
	3401 to 3450, 3501 to 3550	Producer	165	400 (4 x 100)	FLOAT
(Expandable I/O 4)	4001 to 4050, 4101 to 4150	Producer	168	400 (4 x 100)	FLOAT
	4201 to 4250, 4301 to 4350	Producer	169	400 (4 x 100)	FLOAT
	4401 to 4450, 4501 to 4550	Producer	170	400 (4 x 100)	FLOAT
(Expandable I/O 5)	5001 to 5050, 5101 to 5150	Producer	173	400 (4 x 100)	FLOAT
	5201 to 5250, 5301 to 5350	Producer	174	400 (4 x 100)	FLOAT
	5401 to 5450, 5501 to 5550	Producer	175	400 (4 x 100)	FLOAT
(Expandable I/O 6)	6001 to 6050, 6101 to 6150	Producer	178	400 (4 x 100)	FLOAT
	6201 to 6250, 6301 to 6350	Producer	179	400 (4 x 100)	FLOAT
	6401 to 6450, 6501 to 6550	Producer	180	400 (4 x 100)	FLOAT

Continued on next page

Type	Number	Operation type	Instance ID	Size	Data type
Input/Output channel (Continuous channel data area)*	0001 to 0010, 0101 to 0110, 0201 to 0210, 0301 to 0310, 0401 to 0410, 0501 to 0510, 0601 to 0610, 0701 to 0710, 0801 to 0810, 0901 to 0910	Producer	183	400 (4 x 100)	FLOAT
Computation channel	A001 to A100	Producer	184	400 (4 x 100)	FLOAT
Communication channel (Read/Write)	C001 to C100	Producer / Consumer	185	400 (4 x 100)	FLOAT
	C101 to C200	Producer / Consumer	186	400 (4 x 100)	FLOAT
	C201 to C300	Producer / Consumer	187	400 (4 x 100)	FLOAT
	C301 to C400	Producer / Consumer	188	400 (4 x 100)	FLOAT
	C401 to C500	Producer / Consumer	189	400 (4 x 100)	FLOAT
-		Configuration	195	0	-
-		Producer / Consumer	196	0	-

* The “continuous channel data area” is a special area that enables continuous reading by limiting the number of channels of each module to 10.
For the I/O channels only on the GX/GP main unit, this area can be used to read data consecutively.

Explanation

- The GX/GP data can be accessed using the INT32 or FLOAT type. Data can be accessed by the type based on the specified instance ID.
- The operation type “Producer” indicates a read-only instance and “Producer/Consumer” indicates a read/write instance.

Data on the GX/GP

See the explanation in the previous section on Explicit messages.

Communication Considerations

About Communication Interval

Data Update

The GX/GP data is updated in a scan interval. Even if a PLC accesses the data at shorter intervals than the GX/GP scan intervals, the data is updated only at scan intervals.

Communication Interval

A PLC should access the GX/GP at intervals of 100 ms or longer.

* This is required to maintain compatibility with other protocols supported by the GX/GP than EtherNet/IP.

Access to Non-existent Data

If non-existent data is accessed, either of the following operations occur.

- 0 is read if non-existent data is read.
- Nothing is done if non-existent data is written.

Special data

Special data will have the following values:

Channel status	Data type	
	Integer (Int)	Floating (Float)
+Over, +Burnout	Maximum expressible value	+∞
–Over, –Burnout	Minimum expressible value	–∞

Example: Channel status is “–Over”

Data type	Output value
Int16	–32768 (0x8000)
Int32	–2147483648 (0x80000000)
Float	–∞ (0xff800000)

Writing Data to the GX/GP

Input value	GX/GP value
More than 99999999	+Over
–9999999 to 99999999	The data is written without change.
Less than –9999999	–Over

Specifications

The following table shows the basic specifications of the EtherNet/IP server function of the GX/GP.

Specification	Description
Implementation level	Level 2 (Message Server + I/O Server)
Maximum number of connections	20 connections (10 sessions)*1*2
Ports used	44818/tcp, 44818/udp, 2222/udp*3
Supported protocols	EIP/PCCC, EIP/native*4
Messaging	Explicit (UCMM, Class 3) + I/O (Class 1)
Object	Assembly, PCCC, Data Table*5
Authentication	File No. 11246.01 (Jan 21, 2014)

*1 A “session,” a framework of connection management in the encapsulation protocol layer of EtherNet/IP, provides similar functions as a TCP connection to carry out message communications.
*2 Although multiple connections can be made in one session, the total number of connections cannot exceed the maximum number of connections.
*3 44818/tcp is used mainly for Explicit messages, 2222/udp for I/O messages, and 44818/udp for communications of response to RSWho of RSLinx.
*4 CSP/PCCC (Allen Bradley Ethernet) is not supported.
*5 The description of common object is omitted.

Example of an Explicit Message Using RSLogix 5000

This is an example of using RSLogix 5000 to configure an Explicit message to be sent to the GX/GP by a PLC supporting the CIP Data Table Read/Write command.
This section assumes that the reader is familiar with the operations of RSLogix 5000 and RSLinx and that RSLogix 5000 can communicate with the target GX/GP via RSLinx.

Tag

Making tags initially will be useful. Go to Controller Organizer (a tree on the left side of the screen) and open Controller Tag to make a tag with Data Type of Message (Name the tag as MSG1). Also, make a tag used to retain data to be written to the GX/GP (Name the tag as DATATransfer and store 10 FLOAT values). Make a bit used to launch a message as WriteMessageBit.

Controller Tags

Name	Data Type
DATATransfer	REAL [10]
MSG1	Message
WriteMessageBit	BOOL

MSG Instruction

Go to the Input/Output tab, then the Ladder Element toolbar to select MSG. The MSG block is inserted as ladder output. Tag MSG1 is assigned to the MSG block.

Make the MSG block settings (Click the ... button in the MSG block). The following shows an example in which the PLC writes data to the communication channel data C001 to C010 on the GX/GP.
Set the Message Type as “CIP Data Table Write,” Source Element as “DATATransfer” (a tag in the PLC described earlier), Number of Element as “10” (which can be set to a larger value if more data should be read or written per message). Set the Destination Element as “real [6000]. “This corresponds to communication channel data C001 on the GX/GP.

Message Configuration

Configuration Tab	
Message Type	CIP Data Table Write
Source Element	DATATransfer
Number Of Element	10
Destination Element	real [6000]

Next, go to the Communication tab and set a connection path to the GX/GP. The path name should consist of the PLC Ethernet port name (LocalENB in this example), comma, 2, comma, and the GX/GP IP address in this order.

Message Configuration

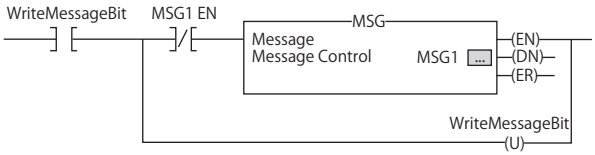
Communication Tab	
Path	LocalENB,2,192.168.1.126

If the connection path to the GX/GP is configured using RSLinx, the connection path is changed to an automatically named pathname (GX of ETHERNET-MODULE GX shown in the figure below in this example). If the GX/GP is not configured, the I/O Configuration tree does not show ETHERNET-MODULE GX. The connection path in the Communication tab is not replaced, either.

I/O Configuration

Message Launch Logic

Lastly, configure the message launch logic. In the example shown in the figure below, the MSG block is launched and writes data to the GXGP when the WriteMessageBit is On. At the same time, the WriteMessageBit is changed to Off and writing is ended.



Example of I/O Message Using RSLogix 5000

Connection with GX/GP

First, define the connection with GX/GP using RSLinx. Go to Communication on the menu bar and select Configure Drivers.

Next, select Ethernet Devices and click Add New....

Enter a driver name. In this example, **GX** is entered but other names can also be entered.

Enter the IP address of GX/GP and click OK.

GX is displayed on the RSWho list of RSLinx.

Configuration of Communication Settings

Open RSLogix 5000 and select a PLC used to communicate with GX/GP. Right-click Ethernet in I/O Configuration and select New Module.

Click + to open the list. Select ETHERNET-MODULE and click OK. An ETHERNETMODULE setup window will open.

The following shows an example of reading data in input/output channels 0001 to 0010 and writing the data to communication channel data C001 to C020. Data can be accessed using the INT32 type.

In the Name field, enter GX (or other communication connection name). Since data is accessed using INT32, keep Comm Format as Data-DINT. In IP Address, enter the IP address of GX/GP.

In Connection Parameter, define the input and output. In Input and Output, enter a respective instance ID and size. In Configuration, enter an instance ID of 195 and a size of 0.

New Module

Name	GX
Comm Format	Data-DINT
Address/Host Name	
IP Address	10.0.232.126

Connection Parameter			
	Assembly Instance	**Size**	
Input	110	10	(32-bit)
Output	130	20	(32-bit)
Configuration	195	0	(8-bit)

Tag

In Controller Tag, the GX:I and GX:O tags to be used in control logic have been made. Click + to expand the tag and see all the points of a size specified in the module definition.

Blank