User's Manual

SMARTDAC+™

Model GX10/GX20/GP10/GP20/GM10
GX90NW

PROFINET Communication User's Manual

YOKOGAWA
Yokogawa Electric Corporation

IM 04L51B01-22EN
2nd Edition

Introduction

Thank you for purchasing the SMARTDAC+ GX10/GX20/GP20/GM10 (hereafter referred to as the GX, GP, or GM) and the Network Module GX90NW-02-PN (hereafter referred to as the PROFINET module).
This manual explains how to use the GX/GP/GM PROFINET communication function.
To use the PROFINET communication function, a GX/GP/GM main unit (version R5.02 and later) and the PROFINET module are required (hereinafter, the GX/GP/GM main unit and the PROFINET module are jointly referred to as the “SMARTDAC+”).
To ensure correct use, please read this manual thoroughly before beginning operation.
Please use this manual in conjunction with the GX, GP, or GM User’s Manual (GX/GP: IM 04L51B01-01EN, GM: IM 04L55B01-01EN).
The following manuals are provided for the GX/GP/GM.

• Paper manuals

Model	Manual title	Manual No.	Description
GX/GP	Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide	IM 04L51B01-02EN	Explains the basic operations of the GX/GP.
GM	Data Acquisition System GM First Step Guide	IM 04L55B01-02EN	Explains the basic operations of the GM.
GX/GP GM	Precaution on the use of SMARTDAC+	IM 04L51B01-91EN	Provides precautions common to the SMARTDAC+ series.
	Regarding the Downloading and Installing / the Usage of Open Source Software for the Software, Manuals and Labels	IM 04L61B01-11EN	Explains where software applications and electronic manuals common to the SMARTDAC+ series can be downloaded from and how to install the software applications.

• Downloadable electronic manuals

You can download the latest manuals from the following website.
www.smartdacplus.com/manual/en/

Model	Manual title	Manual No.	Description
GX/GP	Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide	IM 04L51B01-02EN	This is the electronic version of the paper manual.
	Model GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual	IM 04L51B01-01EN	Describes how to use the GX/GP. The communication control commands and some of the options are excluded.
	Model GX10/GX20/GP10/GP20 Advanced Security Function (/AS) User’s Manual	IM 04L51B01-05EN	Describes how to use the advanced security function (/AS option).
GM	GM Data Acquisition System First Step Guide	IM 04L55B01-02EN	This is the electronic version of the paper manual.
	GM Data Acquisition System User’s Manual	IM 04L55B01-01EN	Describes how to use the GM. The communication control commands and some of the options are excluded.
	GM Data Acquisition System Advanced Security Function (/AS) User’s Manual	IM 04L55B01-05EN	Describes how to use the advanced security function (/AS option).
GX/GP GM	Model GX10/GX20/GP10/GP20/GM10 Communication Commands User’s Manual	IM 04L51B01-17EN	Describes how to use command control communication functions.
	SMARTDAC+STANDARD Universal Viewer User’s Manual	IM 04L61B01-01EN	Describes how to use Universal Viewer, which is a software that displays GX/GP/GM measurement data files.
	SMARTDAC+STANDARD Hardware configuration User’s Manual	IM 04L61B01-02EN	Describes how to use the PC software for creating setting parameters for various GX/GP/GM functions.
	Model GX10/GX20/GP10/GP20/GM10 Multi Batch Function (/BT) User’s Manual	IM 04L51B01-03EN	Describes how to use the multi batch function (/BT option).
	Model GX10/GX20/GP10/GP20/GM10 Log Scale (/LG) User’s Manual	IM 04L51B01-06EN	Describes how to use the log scale (/LG option).
	Model GX10/GX20/GP10/GP20/GM10 EtherNet/IP Communication (/E1) User’s Manual	IM 04L51B01-18EN	Describes how to use the communication functions through the EtherNet/IP (/E1 option).
	Model GX10/GX20/GP10/GP20/GM10 WT Communication (/E2) User’s Manual	IM 04L51B01-19EN	Describes how to use WT communication (/E2 option).
	Model GX10/GX20/GP10/GP20/GM10 OPC-UA Server (/E3) User’s Manual	IM 04L51B01-20EN	Describes how to use the OPC-UA server function (/E3 option).
	Model GX10/GX20/GP10/GP20/GM10 SLMP Communication (/E4) User’s Manual	IM 04L51B01-21EN	Describes how to use the SLMP communication function (/E4 option).
	Model GX10/GX20/GP10/GP20/GM10 Loop Control Function, Program Control Function (/PG Option) User’s Manual	IM 04L51B01-31EN	Describes how to use the PID control module, loop control function, and program control function (/PG option).

Continued on next page

2nd Edition: May 2023 (YK)

Model	Manual title	Manual No.	Description
GX/GP	DXA170 DAQStudio User's Manual	IM 04L41B01-62EN	Describes how to create custom displays (/CG option).

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.
- Copying or reproducing all or any part of the contents of this manual without the permission of YOKOGAWA is strictly prohibited.

QR code

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Using open source software

This product uses open source software.
For details on using open source software, see *Regarding the Downloading and Installing for the Software, Manuals and Labels* (IM 04L61B01-11EN).

Revisions

September 2022 1st Edition May 2023 2nd Edition

Conventions used in this manual

Unit

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

Note

Improper handling or use can lead to injury to the user or damage to the SMARTDAC+. This symbol appears on the SMARTDAC+ 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 SMARTDAC+.

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	

What this manual explains

This manual assumes communication between the SMARTDAC+ and the Programmable Logic Controller (PLC). For instructions on how to use the PLC, see the user's manual for your PLC.
This manual is intended for persons who have previously used PROFINET.

Recorder version described in this manual

The contents of this manual apply to the GX/GP/GM10 with the following release number (see the STYLE S number) and later and style number (see the STYLE H number) and later.

Model	Release Number	Style Number
GX10	5	5
GP10		
GX20		3
GP20		4
GM10		1

Edition	Product	Description
1	GX/GP: Version 5.02 and later	—
	GM: Version 5.02 and later	
	GX90NW: Version 1.01.01	

Contents

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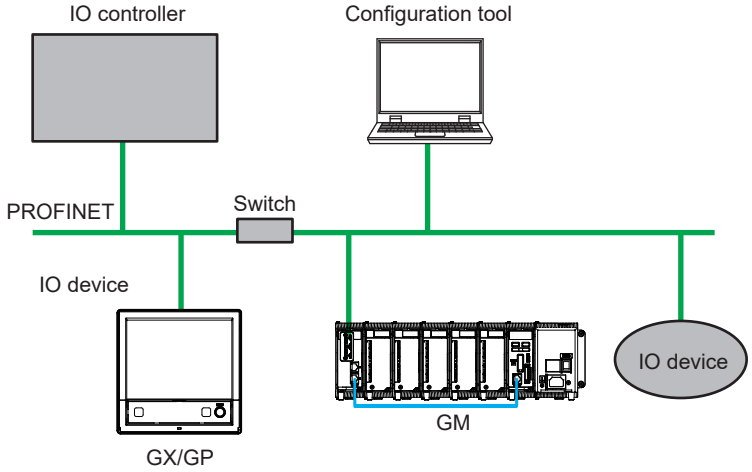
Introduction of Features

PROFINET

PROFINET is an Ethernet-based industrial network communication protocol created by PI (Profibus & Profinet International). By using Ethernet-based communication, you can meet the requirements of high-speed input/output data communication and equipment parameter monitoring and configuration.
Devices that support PROFINET are available from many vendors. Our GX, GP, and GM support communications with PROFINET IO controllers, such as PLCs, by incorporating a PROFINET communication function (PROFINET module).

Component devices

- IO controller
  The IO controller is a controller such as a PLC with a control program. Data exchange is performed to the specified IO device when configuring the system.
- IO device
  An IO device is a device that the IO controller accesses to read and write data to.
  The SMARTDAC+ is an IO device.
- Configuration tool
  A tool to configure the system. The PC or software that the configuration software is installed on.
- Switch
  A network repeater.
- Cables
  Use a PROFINET communication-compatible cable.



Note

For details about PROFINET, please refer to the information issued by PROFIBUS and PROFINET International.

What the SMARTDAC+ can do

The SMARTDAC+ provides the following functions.

- It can participate in a PROFINET network as an IO device.
- It can communicate with an IO controller (PLC, etc.).
- It supports both cyclic and acyclic communication.
- PLCs can access internal data of the SMARTDAC+.

Data	Access
I/O channel measured value	Read
Math channel[1] measured value	Read
Communication channel[2] measured value	Writable
AO channel, DO channel output value	Write (acyclic communication)
Each channel status information	Read

*1 /MT option
*2 /MC option

The following are examples of use.

- Data from devices on the network can be recorded to the SMARTDAC+ by PLCs.
- PLCs can acquire the data measured by the SMARTDAC+.

PROFINET communication setup

Equipment needed

- GX/GP/GM main unit and GX90NW-02-PN
- PLC to act as IO controller (Siemens PLC S7-1200, S7-1500, etc.)
- PC with configuration tool (such as TIA Portal) installed
- PROFINET-compatible switches (as needed)
- PROFINET-compatible communication cables

SMARTDAC+ setup

1. Reconfigure the PROFINET module
2. SMARTDAC+ configuration

PROFINET equipment configuration

Use a configuration tool (such as the TIA Portal) to configure cyclic communication between the PLC and the SMARTDAC+.
In addition, acyclic communication is performed by creating a ladder program.

Cyclic communication

1. Creating a New Project
2. Install the GSDML file on the SMARTDAC+
3. Select a connected device (PLC, SMARTDAC+, etc.) from the catalog
4. Set the network configuration of the IO device and the IO controller (PLC, etc.), including the SMARTDAC+
5. Set the station name and IP address of the IO device including the PLC and the SMARTDAC+
6. Set the configuration tool and the PLC online to reflect the settings of the PLC and the SMARTDAC+

Acyclic communication

1. Open the project
2. Creating ladder programs (defining tags, creating programs)
3. Set the configuration tool and PLC online to download the ladder program created in the PLC

List of settings

GX/GP/GM Configuration

GX/GP/GM Ethernet Communication (Server)	DHCP ON setting
	IP address
	Subnet mask
	Default gateway
	Modbus Server Settings (On/Off, Port Number, Delayed Response)
PROFINET Module Ethernet Communication (Client)	IP address
	Data interval
	Maximum number of update cycles without data

Configuring PROFINET with the configuration tool

The settings are downloaded to the PLC.

Configuration information	
IO controller (PLC) settings	Station name
	DHCP ON/OFF setting (OFF fixed)
	IP address
	Subnet mask
	Default gateway
IO device #1 setting	Station name
	DHCP ON/OFF setting (OFF fixed)
	IP address
	Subnet mask
	Default gateway
:	:
IO device #N settings	Station name
	DHCP ON/OFF setting (OFF fixed)
	IP address
	Subnet mask
	Default gateway

Ladder program

SMARTDAC+ access

The SMARTDAC+ is passive on PROFINET. The SMARTDAC+ cannot initiate a request. The IO controller (PLC) initiates a request to the SMARTDAC+.

Preparation of the SMARTDAC+

PROFINET module installation

GX10 and GP10

Install the PROFINET module into slot 2.

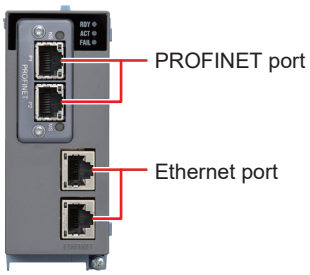
GX20 and GP20

Install the PROFINET module into slot 9.

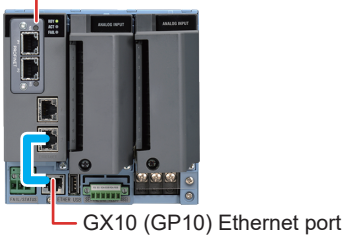
GM

For the main unit, link the PROFINET module to the left end as seen from the front.

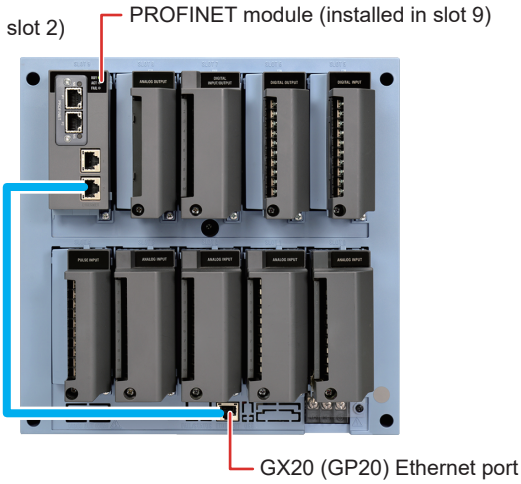
PROFINET Module



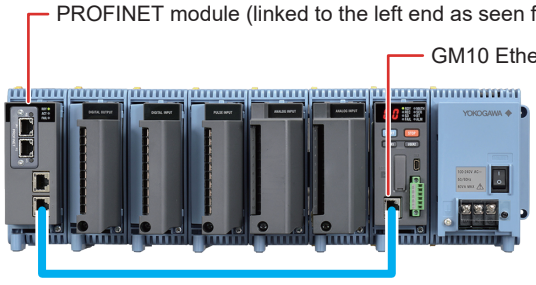
GX10 (GP10) rear panel



GX20 (GP20) rear panel



GM main unit



Note

If the installation position of the PROFINET module is incorrect, the PROFINET module will not be recognized when the SMARTDAC+ is reconfigured.

Cable connection

Connect the Ethernet port of the GX/GP/GM main unit and the Ethernet port of the PROFINET module (either one of the two ports) with an Ethernet cable (STP cable, CAT 5 or higher)[1].

- Communication between the GX/GP/GM main unit and the PROFINET module is performed using the Modbus protocol.
  1: We recommend an Ethernet cable length of 1 m or less.
- You can connect to the Ethernet network from the other Ethernet port of the PROFINET module.
  ▶ There are limitations on the link detection operation of the GX/GP/GM main unit.See “Restriction on link detection operation of the GX/GP/GM main unit when connecting to an Ethernet network” on page 7.

Connect the PROFINET communication cable to the PROFINET port of the PROFINET module to connect to the PROFINET network.

Do not use an Ethernet cable whose plug does not comply with FCC specifications. Doing so can cause a malfunction.

SMARTDAC+ configuration

Reconfiguring the PROFINET module

Reconfiguration is performed to recognize the PROFINET module installed in the main unit. For details on the reconfiguration, see below.

- ▶ GX/GP: Section 1.29.4, “Reconfiguring the GX/GP” in the User's Manual (IM 04L51B01-01EN)
- ▶ GM: Section 2.29.4, “Reconfiguring the GM” in the User's Manual (IM 04L55B01-01EN)

Ethernet communication function settings

Set the DHCP On/Off, IP address, subnet mask, and default gateway.

Modbus server setting

Set the Modbus to On, and set the port number and the Modbus delay response.

For details on the Ethernet communication function settings and the Modbus server settings, see below.

- ▶ GX/GP: Section 1.21, “Configuring the Ethernet Communication Function” in the User’s Manual (IM 04L51B01-01EN)
- ▶ GM: Section 2.22, “Configuring the Ethernet Communication Function” in the User’s Manual (IM 04L55B01-01EN)

PROFINET module settings

Path

GX/GP: MENU key > Browse tab > Setting > Setting menu Network module settings
Web browser: **Setting** tab > **Network module settings**
Hardware configurator: **Network module settings**

Description

Network module settings

Settings	Selectable range or options	Initial value
IP address	0.0.0.0 to 255.255.255.255	0.0.0.0
Data interval	100ms/200ms/500ms/1s/2s/5s/10s	1s
Maximum number of update cycles without data	Off/1/2/5/10/20/50/100	10

IP address

The IP address of the PROFINET module's Ethernet port (for Modbus clients).

- When the GX/GP/GM main unit setting is set to DHCP **On**, DHCP is also enabled for the module, and the setting is disabled.
- Make sure that the IP address of the GX/GP/GM main unit does not overlap with the default gateway and that it is the same subnet mask as the IP address of the GX/GP/GM main unit.

Data interval

The interval at which the data is updated.

Maximum number of update cycles without data

Depending on the load of the GX/GP/GM main unit and the network status of the Ethernet, data may not be updated. If data is not updated continuously for a set number of times, the diagnostic information is sent to the IO controller. When the data is updated, the transmission to the IO controller is stopped.

- While the diagnostic information is being transmitted, the module status LED blinks green.
  ▶ See "Troubleshooting" on page 26.

Obtain/release the IP address of the PROFINET module when using DHCP

GX/GP

Display the network information screen and perform the following operation.
MENU key > Context tab > Obtain IP address or Release IP address

GM

Using the IP address setting software, select **Obtain IP address automatically** or the **Release** button.

Limitations when using the PROFINET module

Module limitations

- The PROFINET module can only be used with one module of the GX/GP/GM main unit.
- The PROFINET module and the expansion module (GX90EX) cannot be used simultaneously.
- The extended unit (GX60) and GM sub units cannot be used.

In addition, the following limitations apply to each model of the SMARTDAC+.

GX10 and GP10

- A single module can be installed with either GX90UT or GX90YA.
- GX10 and GP10 cannot be installed to the GP10 of the power supply voltage specification code "2" (12 V DC).

GX20 and GP20

- When GX90UT is included, up to 7 modules can be installed, including GX90NW.
- When GX90XA-10-T1 is included, up to 8 modules can be installed, including GX90NW.

GM main unit

- When GX90XA or GX90YA is included, up to 6 modules can be connected, including GX90NW.

Modbus server function limitations

- Number of Modbus server connections: Max 2

Limitations when using communication channels

In PROFINET cyclic communication, the following communication channels are always written from the PLC.

Model	Communication channel
GX10/GP10	From C001 to C020
GX20/GP20/GM10	From C001 to C050

If you want to use the communication channel with other functions, check whether the above channels are used. If the writing conflicts, change the setting to avoid conflicts.

- When using the wireless input unit GX70SM (for GX20/GP20/GM10)
  Conflicting channels C001 to C050 correspond to wireless input unit numbers 1 to 10. When using wireless input unit numbers 1 to 10, the unit number must be changed (wireless input unit reconfiguration). For details on wireless input unit reconfiguration, see below.
  ▶ GX70SM Wireless Input Unit User's Manual (IM 04L57B01-01EN)

Restriction on link detection operation of the GX/GP/GM main unit when connecting to an Ethernet network

- The status of the link between the PROFINET module and the Ethernet network cannot be checked on the general log screen of the GX/GP/GM main unit.
- The following messages are not displayed even if the Ethernet network link status changes.
  "821 Ethernet cable connected."
  "822 Ethernet cable disconnected."
- When using DHCP, the IP address acquisition/release operation is not performed when connecting to/disconnecting from the Ethernet network after powering on.
  - When the IP address is not obtained, the GX/GP/GM main unit and the PROFINET module do not obtain the IP address even when connected to an Ethernet network.
  - When obtaining the IP address, the GX/GP/GM main unit and the PROFINET module do not release the IP address even when disconnected from the Ethernet network.

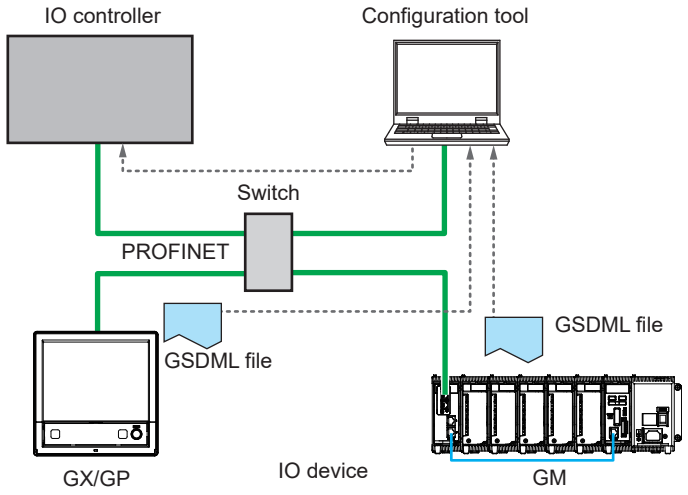
  ▶ If you need to obtain/release the IP address,See "Obtain/release the IP address of the PROFINET module when using DHCP" on page 6.
- When using an email/FTP client, if the cable of the Ethernet network is disconnected, the following error message is displayed.
  "658 Could not connect to SMTP server."
  "692 FTP control connection error."

PLC Preparation

GSDML file

Installation

To join the SMARTDAC+ to the network, you must first install the SMARTDAC+ device profile (GSDML file, General Station Description Markup Language) in the configuration tool. The PLC communicates with the SMARTDAC+ based on the information in the GSDML file. For instructions on how to use the configuration tool, see the Configuration Tools User's Manual.



How to obtain the GSDML file

Please obtain it from our website.
URL: www.smartdacplus.com/software/en/

GSDML file format

File name	Description
GSDML-V2.42-Yokogawa-SMARTDACplus-YYYYMMDD.xml (YYYYMMDD: The file release date (e.g., 20220401))	Device profile of the SMARTDAC+
GSDML-0037-0400-SMARTDACplus.bmp	Icon image file referenced from the GSDML file

System configuration

Sets the communication contents in the configuration tool.
For details on how to use the configuration tool and PLC, see the relevant User's Manual.

Data Access via Cyclic Communication

After PROFINET configuration, the PLC can exchange data according to the information in the GSDML file of the SMARTDAC+.

Action

After Modbus communication between the GX/GP/GM main unit and the PROFINET module is started, PROFINET communication with the PLC starts automatically.

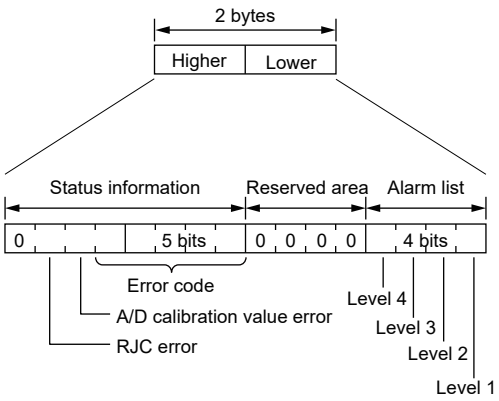
Accessible channels

Channel type	Model	Accessible channels
I/O	GX10/GP10	0001 to 0010, 0101 to 0110
	GX20/GP20/GM10	0001 to 0010, 0101 to 0110, 0201 to 0210, 0301 to 0310, 0401 to 0410
Math[1]	GX10/GP10 GX20/GP20/GM10	From A001 to A050
Communication[2]	GX10/GP10	From C001 to C020
	GX20/GP20/GM10	From C001 to C050

*1 On models with computation (/MT option)
*2 On models with communication channel function (/MC option)

Readable data: I/O channel, math channel measured value and status information
Communication channel status information
Writable Data: Communication channel measured value

Status information



Error code	Function
0	No error
1	Skip
2	+Over
3	–Over
4	+Burnout
5	–Burnout
6	A/D error
7	Invalid data
16	Math error
17	Communication error

▶When the I/O channel is a PID control module, see “Appendix” on page 28.

Data mapping

The following data can be accessed.
Device Access Point (DAP) Name: GX90NW

Module name	Direction	Data type	Quantity	Description
IO_CH_Value	Read	INT32	50	Reads the measured value of an accessible I/O channel.
MATH_CH_Value	Read	INT32	50	Reads the measured value of an accessible math channel.
IO_CH_Status	Read	INT16	50	Reads the status of an accessible I/O channel.
MATH_CH_Status	Read	INT16	50	Reads the status of an accessible math channel.
COM_CH_Status	Read	INT16	50	Reads the status of an accessible communication channel.
Update_Counter	Read	UINT32	1	The data update counter. Increments each time you refresh.
COM_CH_Value	Write	INT32	50	Writes the measured value of the accessible communication channel.

Watchdog timer of a communication channel

When writing a communication channel, we recommend that you use the communication channel's watchdog timer.

- When the data of the communication channel is not updated due to a network communication failure, etc., the data can be detected as not updated and replaced with preset values or final values based on the watchdog timer settings.

Data Access via Acyclic Communication

By creating a ladder program on the PLC, data exchange and control operations are possible.

Action

The PLC reads and writes each data by specifying the corresponding number (INDEX). If a command error or Modbus timeout (communication error) occurs, notify the PLC by returning an error response.

Accessible channels

All I/O channels, all math channels (/MT) and all communication channels (/MC) can be accessed, except for the ext. channel.

Readable data: Measured values and status information for all types of channels *
Writable data: Communication channel measured values and AO channel, DO channel output values

* For details on status information, see “Data access via cyclic communication.”

Write to the I/O channel in units of 1CH (INDEX10001 to 10950).

Control operation

The following controls are possible.

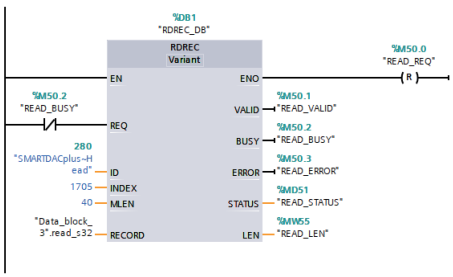
- Start/stop recording
- Math computations
- Writing Messages
- Write batch information
- Read and write alarm settings
- Alarm ACK

Note

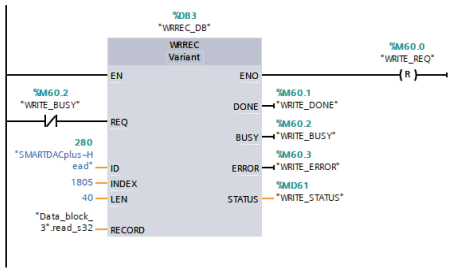
The following operations are not possible: Read control alarm status, read/write control alarm settings, control alarm ACK.

Ladder program example

Read



Write



Data mapping

The following data can be accessed.

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
101	Alarm setting (channel type)	Read/Write	12	INT16	0	1: I/O channel 2: Math channel 3: Communication channel	(Write) Write alarm settings (Read) Read next INDEX channel, alarm level setpoint
	Alarm setting (channel number)				1	I/O channel: 1 to 6932 Math channel: 1 to 200 Communication channel: 1 to 500	
	Alarm setting (alarm level)				2	1 to 4: Alarm level	
	Alarm type				3	0: OFF 1: High limit alarm 2: Low limit alarm 3: High limit on rate-of-change alarm 4: Low limit on rate-of-change alarm 5: Delay high limit alarm 6: Delay low limit alarm 7: Difference high limit alarm 8: Difference low limit alarm 10: Profile upper limit alarm 11: Profile lower limit alarm	
	Alarm setpoint				4	Lower word of alarm value	
					5	Upper word of alarm value	
102	Alarm setting (channel type)	Read/Write	6	INT16	0	1: I/O channel 2: Math channel 3: Communication channel	Specify the channel and level from which to read alarm settings
	Alarm setting (channel number)				1	I/O channel: 1 to 6932 Math channel: 1 to 200 Communication channel: 1 to 500	
	Alarm setting (alarm level)				2	1 to 4: Alarm level	
103	Alarm delay setting (channel type)	Read/Write	8	INT16	0	1: I/O channel 2: Math channel 3: Communication channel	(Write) Write alarm delay setting (Read) Read next INDEX channel setpoint
	Alarm delay setting (channel number)				1	I/O channel: 1 to 6932 Math channel: 1 to 200 Communication channel: 1 to 500	
	Alarm delay				2	Alarm delay seconds lower word	
					3	Alarm delay seconds upper word	
104	Alarm delay setting (channel type)	Read/Write	4	INT16	0	1: I/O channel 2: Math channel 3: Communication channel	Specify the channel from which to read alarm delay setting
	Alarm delay setting (channel number)				1	I/O channel: 1 to 6932 Math channel: 1 to 200 Communication channel: 1 to 500	

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
113	Batch, lot number (multi batch support)	Read/Write	58	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0	(Write) Write batch, lot number setting (Read) Setpoint reading of the next INDEX batch group number If there is no multi batch, the batch group number is “1”
					1	Lower bytes of the lot number When reading, the lot number corresponding to the above batch group number 0 if there is no corresponding batch group number	
					2	Higher bytes of the lot number When reading, the lot number corresponding to the above batch group number 0 if there is no corresponding batch group number	
					3	Batch number UTF-8 characters (2 characters) Up to 32 characters [attach the terminator '\0' at the end] When reading, the batch number corresponding to the above batch group number NULL character if there is no corresponding batch group number	
					:	:	
					28	Batch number UTF-8 characters (2 characters) Up to 32 characters [attach the terminator '\0' at the end] When reading, the batch number corresponding to the above batch group number NULL character if there is no corresponding batch group number	
114	Batch, lot number (multi batch support)	Read/Write	2	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0	Specify batch group number to read batch, lot number

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
115	Batch Comment	Read/Write	56	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	(Write) Write batch comment setting (Read) Setpoint reading of the next INDEX batch group number
					1	Batch comment number When reading, the batch comment number that performed writing previously Default value: 0	
					2	Comment string UTF-8 characters (2 characters) Up to 50 characters [attach the terminator '\0' at the end] When reading, the batch comment text corresponding to the above batch group number and batch comment number NULL character if there is no corresponding batch group number or batch comment number	
					:	:	
					27	Comment string UTF-8 characters (2 characters) Up to 50 characters [attach the terminator '\0' at the end] When reading, the batch comment text corresponding to the above batch group number and batch comment number NULL character if there is no corresponding batch group number or batch comment number	(Write) Write batch comment setting (Read) Setpoint reading of the next INDEX batch group number
116	Batch Comment	Read/Write	4	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	Specify the batch group number and batch comment number to read the batch comment
					1	Batch comment number When reading, the batch comment number that performed writing previously Default value: 0	

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
117	Text field title	Read/Write	56	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	(Write) Write batch text field title setting (Read) Setpoint reading of the next INDEX batch group number If there is no multi batch, the batch group number is 1
					1	Batch Text Text field number When reading, the batch text field number that performed writing previously Default value: 0	
					2	Text field title UTF-8 characters (2 characters) Up to 20 characters [attach the terminator '\0' at the end] When reading, the batch field title text corresponding to the above batch group number and batch text field number NULL character if there is no corresponding batch group number or batch text field number	
					:	:	
					27	Text field title UTF-8 characters (2 characters) Up to 20 characters [attach the terminator '\0' at the end] When reading, the batch field title text corresponding to the above batch group number and batch text field number NULL character if there is no corresponding batch group number or batch text field number	
118	Text field title	Read/Write	4	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	Specify the batch group number and text field number to read batch text field title
					1	Batch Text Text field number When reading, the batch text field number that performed writing previously Default value: 0	

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
119	Batch text field characters	Read/Write	56	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	(Write) Write batch text field characters setting (Read) Setpoint reading of the next INDEX batch group number
					1	Batch Text Text field number When reading, the batch text field number that performed writing previously Default value: 0	
					2	Text field string UTF-8 characters (2 characters) Up to 30 characters [attach the terminator '\0' at the end] When reading, the batch field text corresponding to the above batch group number and batch text field number NULL character if there is no corresponding batch group number or batch text field number	
					:	:	
					27	Text field string UTF-8 characters (2 characters) Up to 30 characters [attach the terminator '\0' at the end] When reading, the batch field text corresponding to the above batch group number and batch text field number NULL character if there is no corresponding batch group number or batch text field number	
120	Batch text field characters	Read/Write	4	INT16	0	1 to 12: Batch group number When reading, the batch group number that performed writing previously Default value: 0 Without multi batch: 1	Specify the batch group number and text field number to read batch text characters
					1	Batch Text Text field number When reading, the batch text field number that performed writing previously Default value: 0	

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
131	Write message (specify the write method)	Read/Write	60	INT16	0	0: Fixed at 0 when reading 1: Write a preset message 2: Write a free message	
	Write message (Message number)				1	0: Fixed at 0 when reading Preset: 1 to 100 Free: 1 to 10	
	Write message (specify the write destination)				2	0:All display groups; fixed at “0” when reading 1 or greater: The specified display group	
	Write message (batch group number)				3	0: Fixed at 0 when reading 1 or greater: Batch group number	
	Write message (free message)				4	0: Fixed at 0 when reading UTF-8 characters (2 characters) Up to 32 characters Ignored for preset messages Attach a terminator at the end	
	:				:	:	
	Write message (free message)				29	0: Fixed at 0 when reading UTF-8 characters (2 characters) Up to 32 characters Ignored for preset messages Attach a terminator at the end	
132	Write message	Read/Write	8	INT16	0	0: Fixed at 0 when reading 1: Write a preset message	Preset message only
	Write message (Message number)				1	0: Fixed at 0 when reading 1-100: Preset message	
	Write message (specify the write destination)				2	0:All display groups; fixed at “0” when reading 1 or greater: The specified display group	
	Write message (batch group number)				3	0: Fixed at 0 when reading 1 or greater: Batch group number	
141	All alarm ACK	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Clear alarm output	
142	Individual alarm ACK	Read/Write	6	INT16	0	Alarm ACK channel type specification 0: Fixed at 0 when reading 1: I/O channel 2: Math channel 3: Communication channel	
					1	Alarm ACK channel number specification 0: Fixed at 0 when reading I/O channel: 1 to 6932 Math channel: 1 to 200 Communication channel: 1 to 500	
					2	Alarm ACK alarm level specification 0: Fixed at 0 when reading 1: Alarm level 1 ACK 2: Alarm level 2 ACK 3: Alarm level 3 ACK 4: Alarm level 4 ACK	
301	Starts or stops recording (without multi batch)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording	

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information
302	Starts or stops recording (multi batch number 2)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
303	Starts or stops recording (multi batch number 3)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
304	Starts or stops recording (multi batch number 4)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
305	Starts or stops recording (multi batch number 5)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
306	Starts or stops recording (multi batch number 6)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
307	Starts or stops recording (multi batch number 7)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
308	Starts or stops recording (multi batch number 8)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
309	Starts or stops recording (multi batch number 9)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
310	Starts or stops recording (multi batch number 10)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
311	Starts or stops recording (multi batch number 11)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
312	Starts or stops recording (multi batch number 12)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start recording 2: Stop recording
351	Computation operation (without multi batch or multi batch number 1)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
352	Computation operation (multi batch number 2)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
353	Computation operation (multi batch number 3)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
354	Computation operation (multi batch number 4)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information
355	Computation operation (multi batch number 5)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
356	Computation operation (multi batch number 6)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
357	Computation operation (multi batch number 7)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
358	Computation operation (multi batch number 8)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
359	Computation operation (multi batch number 9)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
360	Computation operation (multi batch number 10)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
361	Computation operation (multi batch number 11)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
362	Computation operation (multi batch number 12)	Read/Write	2	INT16	0	0: Fixed at 0 when reading 1: Start computation (all) 2: Stop computation (all) 3: Reset computation (by batch) 4: Clear the computation dropout status display (all)
1000	Slot 0 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0001 : 0010
:		:	:	:	:	:
1004		Read/Write	40	INT32	0 : 9	0041 : 0050

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information
1010	Slot 1 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0101 : 0110
:		:	:	:	:	:
1014		Read/Write	40	INT32	0 : 9	0141 : 0150
1020	Slot 2 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0201 : 0210
:		:	:	:	:	:
1024		Read/Write	40	INT32	0 : 9	0241 : 0250
1030	Slot 3 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0301 : 0310
:		:	:	:	:	:
1034		Read/Write	40	INT32	0 : 9	0341 : 0350
1040	Slot 4 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0401 : 0410
:		:	:	:	:	:
1044		Read/Write	40	INT32	0 : 9	0441 : 0450
1050	Slot 5 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0501 : 0510
:		:	:	:	:	:
1054		Read/Write	40	INT32	0 : 9	0541 : 0550
1060	Slot 6 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0601 : 0610
:		:	:	:	:	:
1064		Read/Write	40	INT32	0 : 9	0641 : 0650
1070	Slot 7 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0701 : 0710
:		:	:	:	:	:
1074		Read/Write	40	INT32	0 : 9	0741 : 0750

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information
1080	Slot 8 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0801 : 0810
:		:	:	:	:	:
1084		Read/Write	40	INT32	0 : 9	0841 : 0850
1090	Slot 9 I/O channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	0901 : 0910
:		:	:	:	:	:
1094		Read/Write	40	INT32	0 : 9	0941 : 0950
1700	Math channel measured value (Access in 10CH units) (Read Only)	Read	40	INT32	0 : 9	A001 : A010
:		:	:	:	:	:
1719		Read	40	INT32	0 : 9	A191 : A200
1800	Communication channel measured value (Access in 10CH units)	Read/Write	40	INT32	0 : 9	C001 : C010
:		:	:	:	:	:
1849		Read/Write	40	INT32	0 : 9	C491 : C500
2000	Slot 0 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0001 : 0010
:		:	:	:	:	
2004		Read	20	INT16	0 : 9	0041 : 0050
2010	Slot 1 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0101 : 0110
:		:	:	:	:	:
2014		Read	20	INT16	0 : 9	0141 : 0150
2020	Slot 2 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0201 : 0210
:		:	:	:	:	:
2024		Read	20	INT16	0 : 9	0241 : 0250

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information
2030	Slot 3 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0301 : 0310
:		:	:	:	:	:
2034		Read	20	INT16	0 : 9	0341 : 0350
2040	Slot 4 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0401 : 0410
:		:	:	:	:	:
2044		Read	20	INT16	0 : 9	0441 : 0450
2050	Slot 5 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0501 : 0510
:		:	:	:	:	:
2054		Read	20	INT16	0 : 9	0541 : 0550
2060	Slot 6 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0601 : 0610
:		:	:	:	:	:
2064		Read	20	INT16	0 : 9	0641 : 0650
2070	Slot 7 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0701 : 0710
:		:	:	:	:	:
2074		Read	20	INT16	0 : 9	0741 : 0750
2080	Slot 8 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0801 : 0810
:		:	:	:	:	:
2084		Read	20	INT16	0 : 9	0841 : 0850
2090	Slot 9 I/O channel status (Access in 10CH units)	Read	20	INT16	0 : 9	0901 : 0910
:		:	:	:	:	:
2094		Read	20	INT16	0 : 9	0941 : 0950
2700	Math channel status (Access in 10CH units)	Read	20	INT16	0 : 9	A001 : A010
:		:	:	:	:	:
2719		Read	20	INT16	0 : 9	A191 : A200

Continued on next page

INDEX	Data	Direction	Size (byte)	Data type	Array	Supplementary information	
2800	Communication channel status (Access in 10CH units)	Read	20	INT16	0 : 9	C001 : C010	
:		:	:	:	:	:	
2849		Read	20	INT16	0 : 9	C491 : C500	
10001	I/O channel measured value (Access in 1CH units)	Read/Write	4	INT32	0	0001	Read/Write follows the attributes of each channel. The AO/DO channels and some of the PID channels are writeable. All other channels are Read only.
:		:	:	:	:	:	
10950		Read/Write	4	INT32	0	0950	
17001	Math channel measured value (Access in 1CH units)	Read	4	INT32	0	A001	
:		:	:	:	:	:	
17200		Read	4	INT32	0	A200	
18001	Communication channel measured value (Access in 1CH units)	Read/Write	4	INT32	0	C001	
:		:	:	:	:	:	
18500		Read/Write	4	INT32	0	C500	

I&M function

INDEX	Name	Direction	Description
0xAFF0	I&M0	Read	Vendor ID Order ID Serial number Hardware version Software version (Major. Minor. Build)
0xAFF1	I&M1	Read/Write	Tag name (32 bytes) Location (22 bytes)
0xAFF2	I&M2	Read/Write	Launch date (16 bytes)
0xAFF3	I&M3	Read/Write	Comment (54 bytes)

PROFINET module specifications

This is the basic specification of the PROFINET module.

PROFINET specifications

Specifications	Description
Type	PROFINET IO device
Application	General
Real-time class	RT_CLASS_1, RT_CLASS_UDP
Communication in use	Cyclic communication, acyclic communication, diagnostic communication
Conformance class	B
Netload class	III
PROFINET port	2 ports (supports ring connection (MRP client))
Product name	SMARTDACplus
Vendor	Yokogawa Electric Corporation
Vendor ID	0x0037
Device ID	0x0400
Order number	GX90NW-02-PN

Output action in specific situations

Condition	Output action
When IOPS = BAD	Gives notice that the I/O data of the IOPS = BAD sub-module has been replaced with zero. The module input data is not updated.
When the connection is interrupted	Gives notice to the network that the I/O data of all sub-modules has been replaced with zero. The module input data is not updated.
At power on	Gives notice to the network that the I/O data of all sub-modules has been replaced with zero. The module input data is not updated.

Hardware specifications

PROFINET port

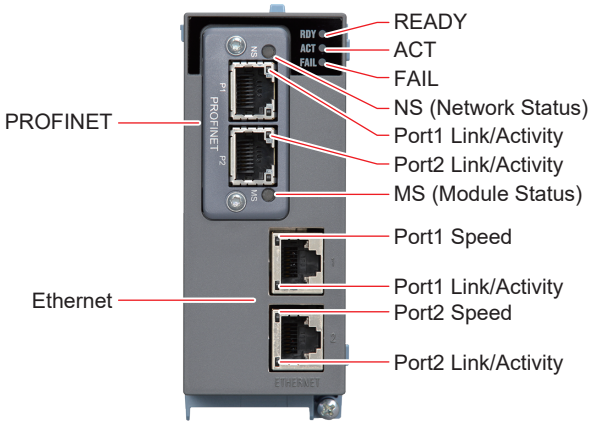
Specifications	Description
Communication speed	10BASE-T/100BASE-TX (Auto)
Number of ports	2 ports
MDI	MDI/MDI-X (Auto)
Connection cable	Communication cable compatible with PROFINET *
Maximum communication distance	100 m
Connector	RJ-45

* For details, see the PROFINET cable guidelines published by "PROFIBUS and PROFINET International".

Ethernet port

Specifications	Description
Communication speed	10BASE-T/100BASE-TX (Auto)
Number of ports	2 ports
MDI	MDI/MDI-X (Auto)
Connection cable	STP cable, CAT 5 or higher
Maximum communication distance	100m
Connector	RJ-45

Names of the PROFINET modules



Name		LED	Description
READY		Green	Lit when CPU is normal
ACT		Green	Lit when PROFINET is normal
FAIL		Red	Lit during system error
PROFINET (Port1/ Port2)	NS (Network Status)	Green	Lit when establishing communication with the IO controller
		Red	Blinks when PROFINET communication settings are not set
	MS (Module Status)	Green	Normal (when the module is started)
		Red	PROFINET error
	Link/Activity	Green	Lit when LINK is active, blinks when communicating
Ethernet (Port1/ Port2)	Speed	Orange	Lit for 100 Mbps, Off for 10 Mbps
	Link/Activity	Green	Lit when LINK is active, blinks when communicating

Troubleshooting

PROFINET module operation and description

PROFINET module operation					Description and corrective action
READY	ACT	FAIL	NS	MS	
Green solid/ Off	Green solid/ Off	Red solid	Off	Off	The CPU is abnormal. If reboot occurs repeatedly, contact your nearest YOKOGAWA dealer.
Off	Off	Red solid	Off	Off	Failed to read firmware file. Contact your nearest YOKOGAWA dealer.
Green solid	Off	Blinking red	Off	Off	Unable to start correctly. Contact your nearest YOKOGAWA dealer.
Off	Off	Red solid	Off	Off	RAM failure. Contact your nearest YOKOGAWA dealer.
Green solid	Green solid	Blinking red	Off	Off	Not in Normal mode. Contact your nearest YOKOGAWA dealer.
Off	Blinking green	Red solid	Off	Off	Failed to read firmware file. Retry updating the firmware. If the system does not return to the normal state, contact your nearest YOKOGAWA dealer.
Off	Green solid	Blinking red	Off	Off	Not in Normal mode. Contact your nearest YOKOGAWA dealer.
Blinking green	Green solid	Red solid	Off	Off	System data error. Contact your nearest YOKOGAWA dealer.
Blinking green	Green solid	Red solid	Off	Off	Hardware error. Contact your nearest YOKOGAWA dealer.
Off	Off	Blinking red	Off	Off	PROFINET module installation problem. Check whether the PROFINET module is installed in the correct slot position in the main unit.
Green solid	Off	Off	Off	Off	The PROFINET module has not been reconfigured or the Ethernet connection between the main unit and the PROFINET module is abnormal. •If it has not been reconfigured, please reconfigure it. •Check the Ethernet cable and Ethernet IP address setting.
*	*	*	*	Red solid	Module problem. If the module reboots repeatedly, contact your nearest YOKOGAWA dealer.
Green solid	Green solid	Off	Off	Green solid	The PLC is not connected. Check the power supply of the PLC and the wiring to the PLC. Check the configuration settings, such as the GSDML file, the PROFINET IP address, and the station name.
Green solid	Green solid	Off	Blinking green	Green solid	Connected to the PLC and in the STOP status. Check the PLC status (STOP/RUN).
Green solid	Green solid	Off	Green solid	Green solid	The PLC is connected and in the RUN status.
Green solid	Green solid	Off	Blinks 3 times green	*	Blinks green when a command to identify the device is received.
Green solid	Green solid	Off	*	Blinking green	Diagnostic information is being sent. If this occurs frequently, check whether there is a problem with the main unit load or the status of the network. If the response does not improve, adjust the read cycle and the maximum number of update cycles without data.

Continued on next page

PROFINET module operation					Description and corrective action
READY	ACT	FAIL	NS	MS	
Green solid	Green solid	Off	Blinking red	*	The PROFINET station name is not set. Set the station name of the PROFINET module.
Green solid	Green solid	Off	Blinks 2 times red	*	The PROFINET IP address is not set.
Green solid	Green solid	Off	Blinks 3 times red	*	The slot/subslot configuration of the instrument is different from what is expected. The GDSML file may be incorrect.
Blinking green	Blinking green	Off	*	*	Downloading firmware.
Blinking green	Blinking green	Blinking red	*	*	Firmware download error. Please download again. Do not remove the module during downloading.

*: Optional

Error messages and corrective actions

These are the error messages that are displayed when using GX/GP/GM. For error messages not listed here, see the User's Manual of the main unit.

Code	Messages	Description and corrective action
108	The network part of the IP address is not the same as that of the main IP address.	Check the IP address.
109	The set IP address is the same as that of the main unit or the default gateway.	Check the IP address.
553	Unrecognized module.	Check that the module is installed correctly. Check that the main unit version is R5.02 or later. If the same message continues to appear even after you perform the procedure above, contact your nearest YOKOGAWA dealer.

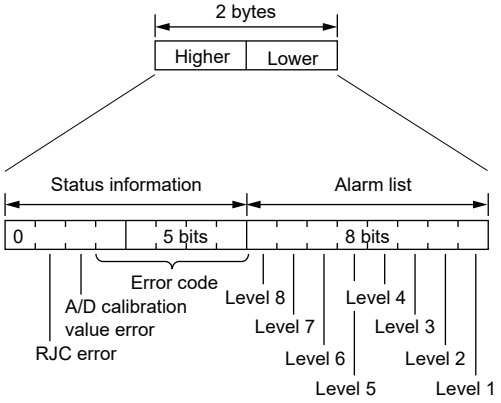
Appendix

Register configuration of PID control module channels

The following table shows the register configuration when a PID control module is installed in unit 0 (main unit) slot 0.

Channel number	Description	Remarks
0001	PV of loop 1	PID computation data
0002	SP of loop 1	
0003	OUT of loop 1	
0004	PV of loop 2	
0005	SP of loop 2	
0006	OUT of loop 2	
0007	Input 1 data	Physical channel data
0008	Input 2 data	
0009	Output 1 data	
0010	Output 2 data	
0011	DI1 data	
0012	DI2 data	
0013	DI3 data	
0014	DI4 data	
0015	DI5 data	
0016	DI6 data	
0017	DI7 data	
0018	DI8 data	
0019	DO1 data	
0020	DO2 data	
0021	DO3 data	
0022	DO4 data	
0023	DO5 data	
0024	DO6 data	
0025	DO7 data	
0026	DO8 data	
0027 | 0034	—	
0035	Alarms 1 to 4 of loop 1	Lower 8 bits
0036	Alarms 1 to 4 of loop 2	Lower 8 bits
0037	Auto/manual/cascade switching of loop 1	1: Auto 2: Manual 3: Cascade
0038	Auto/manual/cascade switching of loop 2	1: Auto 2: Manual 3: Cascade
0039	Run/stop switching of loop 1	1: Run 2: Stop
0040	Run/stop switching of loop 2	1: Run 2: Stop
0041	Remote/local switching of loop 1	1: Local 2: Remote
0042	Remote/local switching of loop 2	1: Local 2: Remote
0043	Target setpoint number (SP number) selection of loop 1	1 to 8
0044	Target setpoint number (SP number) selection of loop 2	1 to 8
0045	PID number selection of loop 1	Read only
0046	PID number selection of loop 2	Read only
0047	Auto-tuning status of loop 1	Read only
0048	Auto-tuning status of loop 2	Read only
0049	Alarm ACK of loop 1	1: Alarm ACK 0 when read
0050	Alarm ACK of loop 2	1: Alarm ACK 0 when read

Status information



Error code	Function
0	No error
1	Skip
2	+Over
3	–Over
4	+Burnout
5	–Burnout
6	A/D error
7	Invalid data
16	Math error
17	Communication error

Blank