User's Manual

SMARTDAC+™

Model GX70SM

Wireless Input Unit User's Manual

YOKOGAWA
Yokogawa Electric Corporation

IM 04L57B01-01EN
8th Edition

Introduction

Thank you for purchasing the SMARTDAC+ Series Wireless Input Unit GX70SM (hereafter referred to by its product or model name (e.g., GX70SM)).
This manual describes the configuration, management, and maintenance of the GX70SM and the wireless input unit function of the GX20 (/CM2 or /CM3)/GP20 (/CM2 or /CM3) Paperless Recorders (hereafter referred to as the GX20 or GX and GP20 or GP) and GM10 (/CM2 or /CM3) Data Acquisition Unit (hereafter referred to as the GM).

For notes on using the GX70SM and details on its installation and wiring, see the GX70SM Wireless Input Unit First Step Guide (Notes about Using This Product) (IM 04L57B01-02EN).

For details on the various settings and the operation of the GX/GP/GM, see also the following manuals.

Model	Manual Title	Manual No.
GX/GP	Paperless Recorder User's Manual	IM 04L51B01-01EN
GM	GM Data Acquisition System User's Manual	IM 04L55B01-01EN
Common to GX/GP/GM	Communication Command User's Manual	IM 04L51B01-17EN

For details on the 920 MHz wireless communication of the GX/GP/GM, see the following manual.

Model	Manual Title	Manual No.
Common to GX/GP/GM	920 MHz Wireless Communication, MH920 Console International	IM 04L51B01-41EN

To ensure correct use, please read this manual thoroughly before beginning operation.
The following manuals are provided for the GX70SM.

● Paper Manuals

Manual Title	Manual No.	Description
Model GX70SM Wireless Input Unit First Step Guide (Notes about Using This Product)	IM 04L57B01-02EN	Provides notes on using the GX70SM and describes its installation, wiring, and the like.

● Downloadable Electronic Manuals

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

Manual Title	Manual No.	Description
Model GX70SM Wireless Input Unit User's Manual	IM 04L57B01-01EN	Describes how to use the GX70SM.
Model GX70SM Wireless Input Unit First Step Guide (Notes about Using This Product)	IM 04L57B01-02EN	This is the electronic version of the paper manual.

The GX70SM's 920 MHz wireless communication (suffix code Area: A) can only be used in the US.

The GX70SM's 920 MHz wireless communication (suffix code Area: K) can only be used in the Republic of Korea.

8th Edition: June 2022 (YK)

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 YOKOGAWA's permission is strictly prohibited.

Compliance with Radio Laws of Various Countries

• FCC Approval

FCC CAUTION
Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

Note:
This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

This transmitter must not be co-located or operated in conjunction with any other antenna or transmitter.

This equipment complies with FCC radiation exposure limits set forth for an uncontrolled environment and meets the FCC radio frequency (RF) Exposure Guidelines.
This equipment has very low levels of RF energy that is deemed to comply without testing of specific absorption rate(SAR).

• Korea Certification (Radio Waves Act)

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Revisions

June 2018	1st Edition
September 2018	2nd Edition
March 2019	3rd Edition
April 2019	4th Edition
April 2021	5th Edition
May 2021	6th Edition
May 2022	7th Edition
June 2022	8th Edition

Main Unit Version and Functions Described in This Manual

The contents of this manual correspond to GX70SM release number 1 (see the STYLE S number on the nameplate) and style number 1 (see the STYLE H number on the nameplate).

GX70SM Versions and Functions

The GX70SM consists of a wireless communication module and input module.
▶ For the procedure to check the version, see the following sections.
“2.9.2 Wireless Communication Module Firmware” on page 2-52
“2.9.3 Input Module Firmware” on page 2-53

Edition	Product		Addition and Change	Remarks
	Module	Version		
1	Wireless communication module	vd1.0.1	—	
	Input module	R1.01.01	—	
2	Wireless communication module	Ditto	—	Section 4.12 Modbus Function and Register Assignments is added.
	Input module	Ditto	—	
3	Wireless communication module	vd1.1	Support for the Korean version	
	Input module	R1.02	Linear scaling function has been added.	“2.6.4 Configuring the Universal Input and Built-in Humidity Sensor” on page 2-26
4	Wireless communication module	vd1.2	Fixed target device function has been added.	“2.5 Configuring the Wireless Settings of the Wireless Input Unit” on page 2-15
	Input module	Ditto	—	
5	Wireless communication module	vd1.4	—	
	Input module	R1.03	Added enhanced data backup function (/DB option)	“1.2.14 Enhanced Data Backup Function(/DB option)” on page 1-11
6	Wireless communication module	Ditto	—	
	Input module	Ditto	—	
7	Wireless communication module	Ditto	—	
	Input module	Ditto	—	

Wireless Input Unit Configurator Versions and Functions

Edition	Function	Version	Addition and Change	Remarks
3	Wireless settings	R1.01	Added country selection	“2.4 Environment Configuration of the Wireless Input Unit Configurator” on page 2-13
	Input settings	R1.02	Linear scaling function has been added.	“2.6.4 Configuring the Universal Input and Built-in Humidity Sensor” on page 2-26
4	Wireless settings	R1.02	Fixed target device setting has been added.	“2.5 Configuring the Wireless Settings of the Wireless Input Unit” on page 2-15
	Input settings	Ditto	—	
5	Wireless settings	Ditto		
	Input settings	R2.01	Support for enhanced data backup function (/DB option).	“1.2.14 Enhanced Data Backup Function(/DB option)” on page 1-11
6	Wireless settings	Ditto	—	
	Input settings	Ditto	—	
7	Wireless settings	Ditto	—	
	Input settings	Ditto	—	
8	Wireless settings	Ditto	—	
	Input settings	R2.03	Change to the specification for output of WLC files even if there is no data dropout period.	

Note

When connecting to input modules R1.02 and later, use Input Configurator R1.02 or later.
Input Configurator R1.01 does not support linear scaling. Therefore, when you execute the following functions, inconsistency may occur in the range information and measurement results.
・Execute meas
・Read/save the logging data

Auto Backfill Tool Versions and Functions

Edition	Function	Version	Addition and Change	Remarks
5	Auto-Backfill Tool	R2.01	New addition	"2.13 Configuring the Auto Backfill Tool" on page 2-62
6	Auto-Backfill Tool	Ditto	—	
7	Auto-Backfill Tool	R2.02	—	
8	Auto-Backfill Tool	R2.03	Extension of the backfill data folder. Support for Windows Serevr 2016, Windows Serevr 2019.	

GX/GP/GM Main Unit Version Supporting the Wireless Input Unit

GX/GP/GMs with release number 4.02 and later support the wireless input unit.
If you want to connect a wireless input unit to a GX/GP/GM with release number 4.01 or earlier, contact your nearest YOKOGAWA dealer.
GX/GP/GM coordinator, router (repeater) wireless communication modules that support wireless input units are version v4.2.0 and later.
Connection is not possible with wireless communication modules that are version v4.1.x and earlier, so be sure to update them.
Use the GX/GP/GM version that corresponds to the version and functions of the wireless input unit.
If you have an old version of GX/GP/GM, you may not be able to use the functions of GX70SM.
GX/GP/GMs with wireless communication module version number v4.4.0 and later support the wireless data retrieval.

Wireless Input Unit Support Function of the GX/GP/GM

Edition	Version	Addition and Change	Remarks
3	R4.06	Battery status disply has been added.	
		Preset value at time-out has been added.	"3.4.5 Unit Timeout Settings" on page 3-23
		Wireless input unit status has been added for modbus input register.	"4.12 Modbus Function and Register Assignments" on page 4-24
		Communication commands has been added (FWUnitStat, SWUnitTOPreset).	"6.1 Added and Changed Commands" on page 6-1
4	Ditto	—	
5	R4.09	Added wireless data retrieval (Support for Enhanced data backup function (/DB option) of GX70SM).	
6	Ditto	Error message (E624) has been added.	"4.8 Messages" on page 4-9
7	R5.01	Added equipment/quality prediction.	
8	Ditto	—	

How to Use This Manual

How to Use

This chapter describes the configuration, management, and maintenance of the wireless input unit as well as the wireless input unit support function of the GX/GP/GM (/CM2 or /CM3, coordinator) and its configuration and operation.
The GX (GP) screens are used as examples in the descriptions, but similar screens are available on the Web application that you can also use.
When the screens are particularly different, the Web application screen is also described.

The description of the wireless input unit support function of the GX/GP/GM details the functions, settings, and operations that are different from the standard functions of the GX/GP/GM.
For details on the functions, settings, and operations of the standard GX/GP/GM, see the respective user's manuals.

For details on the optional functions of the GX/GP/GM and the Universal Viewer and Hardware Configurator software applications, see the respective manuals.

The following terms are used for references to other manuals:

Notation	Description
GX/GP User's Manual	Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual Refers to the IM 04L51B01-01EN.
GX/GP First Step Guide	Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide Refers to the IM 04L51B01-02EN.
GM User's Manual	GM Data Acquisition System User's Manual Refers to the IM 04L55B01-01EN.
GM First Step Guide	GM Data Acquisition System First Step Guide Refers to the IM 04L55B01-02EN.
Communication Command Manual	Model GX10/GX20/GP10/GP20/GM10 Communication Command User's Manual Refers to the IM 04L51B01-17EN.
Universal Viewer Manual	SMARTDAC+ STANDARD Universal Viewer User's Manual Refers to the IM 04L61B01-01EN.
Hardware Configurator Manual	SMARTDAC+ STANDARD Hardware Configurator User's Manual Refers to the IM 04L61B01-02EN.
GX/GP Advanced Security Manual	Model GX10/GX20/GP10/GP20 Advanced Security Function (/AS) User's Manual Refers to the IM 04L51B01-05EN.
GM Advanced Security Manual	Data Acquisition System GM Advanced Security Function (/AS) User's Manual Refers to the IM 04L55B01-05EN.

This manual contains six chapters and an appendix.

Chapter	Title and Description
1	**Overview and Functions** This chapter provides an overview of the GX70SM wireless input unit and describes its functions.
2	**How to Use the Wireless Input Unit Tool (Application software)** This chapter describes how to configure the input settings and wireless settings of the GX70SM, how to retrieve logging data, how to perform maintenance, and so on using the Wireless Input Unit Configurator. This chapter describes the automatic backfill of the GX/GP/GM recording data file and wirelessly retrieved data file using the Auto Backfill Tool.
3	**Reconfiguring and Managing the Wireless Input Unit (GX/GP/GM)** This chapter describes the wireless input unit support function of the GX/GP/GM (coordinator). It explains the auto assignment of the GX70SM and the channel assignment and management of received data, and so on that take place when the wireless input unit is reconfigured.
4	**Functions Added with Wireless Input Unit Support (GX/GP/GM, Hardware Configurator)** This chapter describes the functions that are added with the GX70SM support of the GX/GP/GM.
5	**Displaying Logging Data, Wirelessly retrieved data and Combined Data, Backfilled Data (Universal Viewer)** This chapter describes how to display logging data, wirelessly retrieved data, combined data and backfilled data of the GX70SM using Universal Viewer.
6	**GX/GP/GM Communication Commands** This chapter describes the commands that have been added or changed from those of the standard GX/GP/GM (/CM2, /CM3).
Appendix	This chapter describes communication channel assignments based on GX70SM station numbers. It also provides reference information related to the GX70SM.

Conventions Used in This Manual

Unit

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

Notes

	*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: **Voltage**
Operation	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	

Contents

Appendix

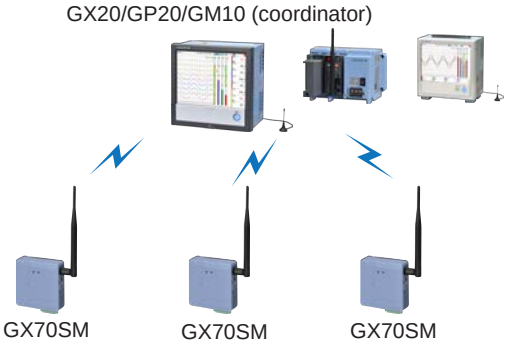
GX70SM General Specifications (For the US)

GX70SM General Specifications (For the Republic of Korea)

1.1 Overview

1.1.1 GX70SM Wireless Input Unit

The GX70SM is a compact, battery-driven analog input unit that uses 920 MHz specified low power radio. Because it is battery-driven, it can collect data in a variety of locations.
It connects to a SMARTDAC+ GX20, GP20, or GM10 coordinator over a multi-hop wireless link, and allows data collection and status display of the GX70SM on the GX20/GP20/GM10. If you turn off the wireless function, you can use the GX70SM as a standalone data logger and collect data. This will extend the battery life.



Wireless network (PAN)
Max. 96 devices*

* Four repeaters are required.

Features

- 2 channels of universal inputs, 1 channel of humidity measurement (/RH option)
- The universal input allows thermocouples, RTDs, DC voltages, analog standard signals, and digital inputs to be configured freely. Input calibration is also possible.
- Measurement is possible at a high speed of 1-second intervals.
- The level of wireless (radio level) can be confirmed.
- A given period of logging data (4500 points or 9000 points (with /DB option)) are stored.
- Wireless terminal authentication function blocks unauthorized access. In addition, communication encryption prevents tampering and wiretapping.
- The battery life is about 5 years or about 4 years (with /DB option) when the scan interval is set to 5 minutes (standard operating conditions,[1] standard mode). Power can also be supplied through the USB port.[2]
  1 For the standard operating conditions, see the GX70SM Wireless Input Unit General Specifications (GS 04L57B01-01EN).
  2 When supplying power through USB, use a USB cable that meets the product specifications. Otherwise, wireless communication and measuring accuracy may be affected.
- Extensive self-diagnostics function is available. Device errors, such as drop in the battery voltage and errors in the input, can be detected.
- Wireless Input Unit Configurator (software application) can be used to configure and perform maintenance on the GX70SM. In addition, GX70SM logging data can be inserted into sections where data could not be acquired within a GX20/GP20/GM10 event data file due to errors in communication with the GX70SM.
- Enhanced Data Backup Function (/DB option)
  The logging data has been increased to 9,000 points.
  It sends the data within the specified range according to the request of the wirelessly retrieved data (missing data) from GX20/GP20/GM10.

Maximum Number of Connections*

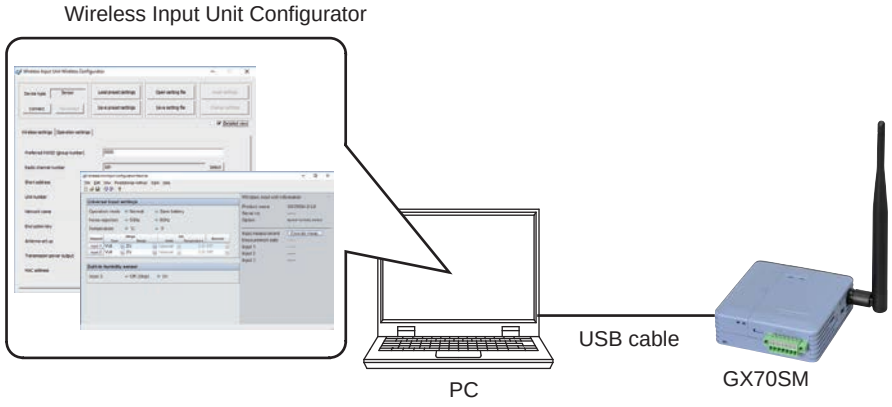
Model	Measurement mode (GX/GP/GM)			
	Normal		High speed	Dual interval
	Wireless data retrieval Off	Wireless data retrieval On		
GX20-1/GP20-1/GM10-1	50	30	50	30
GX20-2/GP20-2/GM10-2	96	50	96	50

* The number of technically possible connections varies depending on the wireless environment condition and the measurement/transmission interval.
The wireless data retrieval function can be used when the advanced security function (/AS option) is enabled. (However, it cannot be used when the multi-batch function (/BT option) is enabled.) Measurement modes High speed and Dual interval cannot be used when the advanced security function (/AS option) is enabled.

1.1.2 Wireless Input Unit Tool

Wireless Input Unit Configurator

Wireless Input Unit Configurator is a software application for configuring and performing maintenance on the GX70SM.
Input configuration, wireless configuration, input calibration, and firmware updating are possible by connecting to the GX70SM through USB.



Logging data stored in the GX70SM can be retrieved and saved as a file* in the PC.

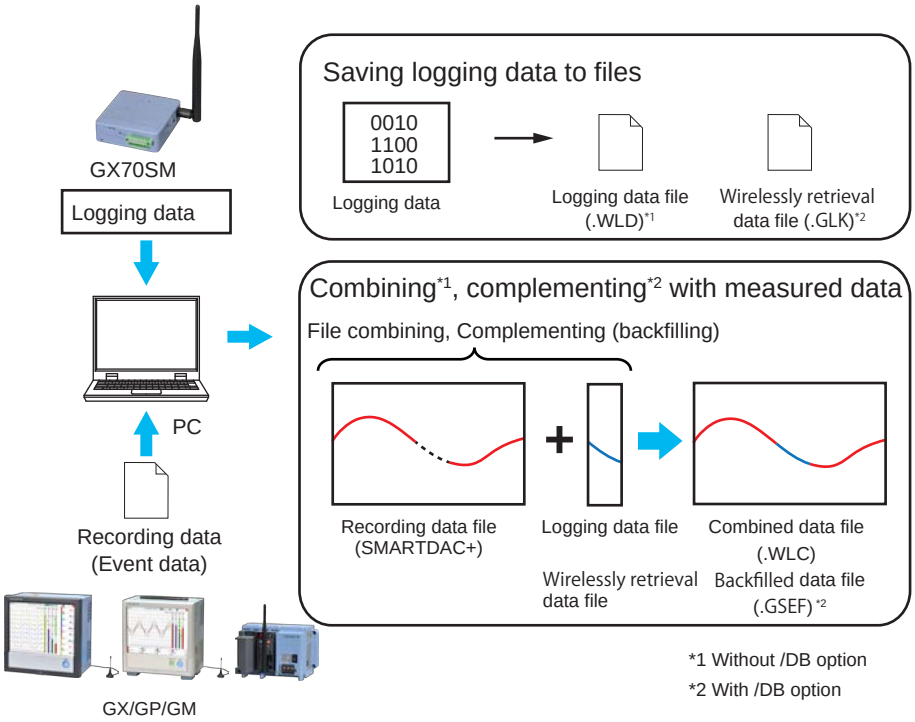
* Wirelessly retrieved data file with the /DB option; and logging data file without it.

When GX/GP/GM fails to acquire the GX70SM measurement data because the communication with GX70SM and GX/GP/GM is disconnected or because of some other reason, a logging data file can be combined with the GX/GP/GM recording data (event data). The data file combined with the logging data file can be used to confirm the data from the period during which the data could not be acquired.
GX/GP/GM recording data (event data) and wirelessly retrieved data can be combined (backfilled) using the Auto Backfill Tool. Data files that were filled in using the Auto Backfill Tool can be used as proper data.

Note: There are certain GX/GP/GM settings that need to be configured to combine data. See section 2.7, “Saving Logging Data to a File and Combining Logging Data.”

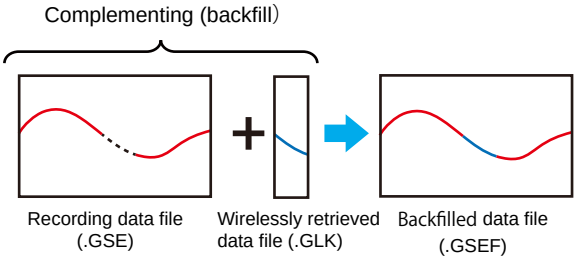
▶ For details on setting the type of data to record, see the following manuals.

GX/GP User’s Manual	1.12.1, “Setting the Type of Data to Record (Display or event data) and Recording Conditions”
GM User’s Manual	2.13.1, “Setting the Type of Data to Record (Display or event data) and Recording Conditions”



Auto Backfill Tool

It is an application software that is used to automatically backfill the missing sections of GX/GP/GM recording data files (event data) with wirelessly retrieved data files.



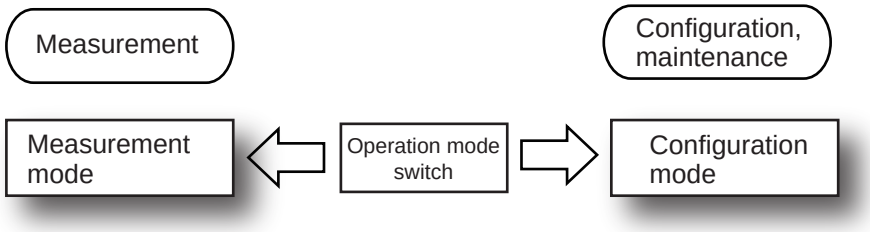
1.2 Functions

1.2.1 Operation mode

The GX70SM has the following two operation modes:

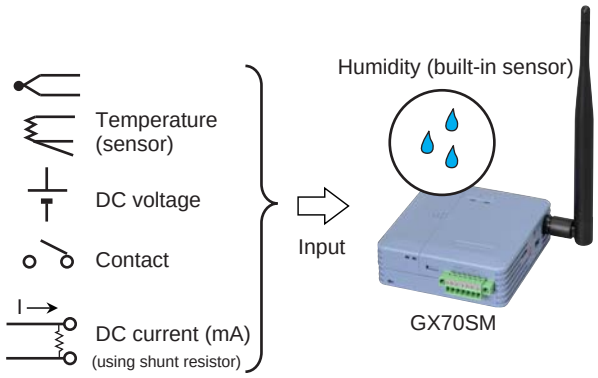
- **Measurement mode**
- **Configuration mode**

Measurement mode is used to perform measurement.
Configuration mode is used to configure input settings and wireless settings, retrieve logging data, calibrate the input, and so on.
You can change the operation mode using the GX70SM operation mode switch.
▶ See section 1.5, “Setting the Operation Mode of Wireless Input Units” on page 1-17.



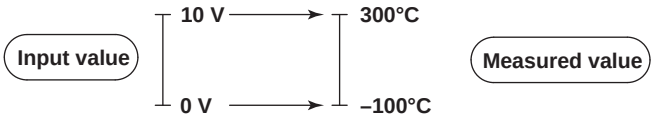
1.2.2 Measurement

With two universal input channels, the GX70SM can measure temperature (thermocouple, RTD sensor input), DC voltage, DC current (using a shunt resistor), and digital input (contact, voltage).
With linear scaling, you can scale the DC voltage signal from various types of sensors and measure it.(Input module version R1.02 and later.
In addition, the built-in humidity sensor (/RH option) can be used to measure one channel of humidity.



Linear scaling function

Converts the unit to obtain the measured value.



Range Details

Type	Range setting	Range	Notes
TC	K	-200.0°C to 1370.0°C -328 °F to 2498 °F	Type K
	J	-200.0°C to 1100.0°C -328.0 °F to 2012.0 °F	Type J
	T	-200.0°C to 400.0°C -328.0 °F to 752.0 °F	Type T
	B	0.0°C to 1820.0°C 32 °F to 3308 °F	Type B
	S	0.0°C to 1760.0°C 32 °F to 3200 °F	Type C
	R	0.0°C to 1760.0°C 32 °F to 3200 °F	Type R
	N	-270.0°C to 1300.0°C -454 °F to 2372 °F	Type N
	E	-200.0°C to 800.0°C -328.0 °F to 1472.0 °F	Type E
	WRe3-25	0.0 °C to 2400.0 °C 32 °F to 4352 °F	Type WRe (WRe3-25)
RTD	Pt100	-200.0°C to 600.0°C -328.0 °F to 1112.0 °F	
	JPt100	-200.0°C to 550.0°C -328.0 °F to 1022.0 °F	
Voltage	20mV	-20.000 mV to 20.000 mV	
	60mV	-60.00 mV to 60.00 mV	
	200mV	-200.00 mV to 200.00 mV	
	2V	-2.0000 V to 2.0000 V	
	6V	-6.000 V to 6.000 V	
	10V	-10.000 V to 10.000 V	
GS	0.4-2V	0.3200 V to 2.0800 V	
	1-5V	0.800 V to 5.200 V	
DI	LVL	On (1)/Off (0) (voltage)	Threshold level (Vth=2.4 V)
	DI	On (1)/Off (0) (contact)	
Humidity	—	0.0 to 90.0% RH	

1.2.3 Measurement Mode

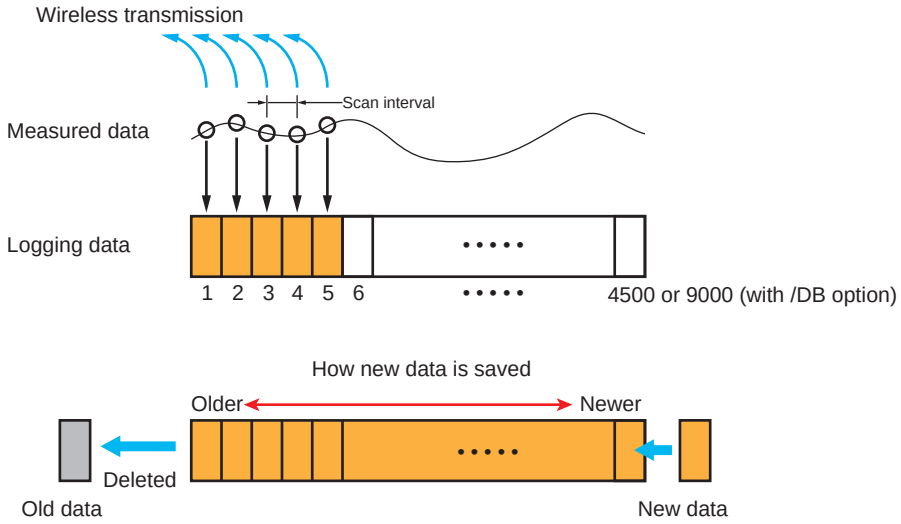
There are two measurement modes.

Standard mode	Power frequency noise riding on the measured signal is rejected. Select the power frequency for your region using the Wireless Input Unit Configurator. The battery life (running time on battery) is shorter than in battery-save mode.
Battery-save mode	Power frequency noise riding on the measured signal is not rejected. Depending on the measuring range, measurement errors will be large due to the effects of noise, and the values may fluctuate. The battery life (running time on battery) is 1.3 times longer or 1.3 times longer (with /DB option) than in standard mode.

1.2.4 Measurement Data Logging

Measurement data of each scan interval is sent to the GX/GP/GM as well as saved in the GX70SM as logging data (up to 4500 points or 9000 points (with /DB option) per channel).
When the data becomes full, the oldest data is deleted to save new data.
Even when an error occurs in the wireless communication with the GX/GP/GM, measurement data is backed up for a certain period.
Logging data* can be retrieved using the Wireless Input Unit Configurator and saved as a file in the PC.

* If the unit has the /DB option, logging data is treated as wirelessly retrieved data and it can be retrieved as wirelessly retrieved data using the Wireless Input Unit Configurator.



1.2.5 Low Battery Warning

When the GX70SM battery voltage becomes low, a low battery warning is indicated with an LED.
The GX/GP/GM can monitor the GX70SM battery status and generate a warning output (relay output) when appropriate.
A low battery warning may occur temporarily when the GX70SM is in the process of joining a wireless network.

1.2.6 LED Display

Configuration and calibration modes, data transmission, and battery status are indicated with green and red LEDs.
Battery life can be extended by using a wireless input unit and turning of the LED display.
▶ For instructions on how to turn on and off the LED display, see section 2.5, “Configuring the Wireless Settings of the Wireless Input Unit” on page 2-15.

Green Red

Status		LED
Configuration mode		Green and red blinking in sync at 2 second intervals
Configuration change and during calibration		Green and red blinking quickly in sync
During measurement or data transmission	When network is normal	Green blinking (about 0.2 second intervals), red off
	Not joined the network	Red blinking (about 0.2 second intervals), green off
Low battery warning		Repeats the sequence of green lit (0.1 s), all off (1.9 s), red lit (0.1 s), all off (1.9 s) twice, all off 10 s
Input error		Red lit for 0.1 seconds at about 5 second intervals, green off
Mode setting error*		Repeats the sequence of green and red lit in sync (0.1 seconds) and all off (0.9 seconds) three times, turns off for 2 seconds, and repeats the entire sequence.*
Joined the network	Joining the network	Green blinking (1 second intervals)
	When network join authentication is successful	Green blinks 5 times (0.5 second intervals) and turns off
	When network join authentication fails	Red blinks 5 times (0.5 second intervals) and turns off
Input error (over, burnout)		Repeats the sequence of green lit (0.1 seconds), red lit (0.1 seconds) and all off (1.8 seconds) three times, turns off for 10 seconds, and repeats the entire sequence.*
During the operation check after the test switch is pressed		Repeats green blinking at 0.3 second intervals twice, all off for 3 s, and then then turns off red. This sequence is repeated while the switch is held down.

* For example, configuring in a mode other than measurement mode when there is no USB connection.

1.2.7 Input Calibration

You can perform input calibration to adjust the accuracy such as when the GX70SM measuring accuracy drifts outside the specifications.
Input calibration enables measurement accuracy to be maintained and managed.
Input calibration is performed using the Wireless Input Unit Configurator.

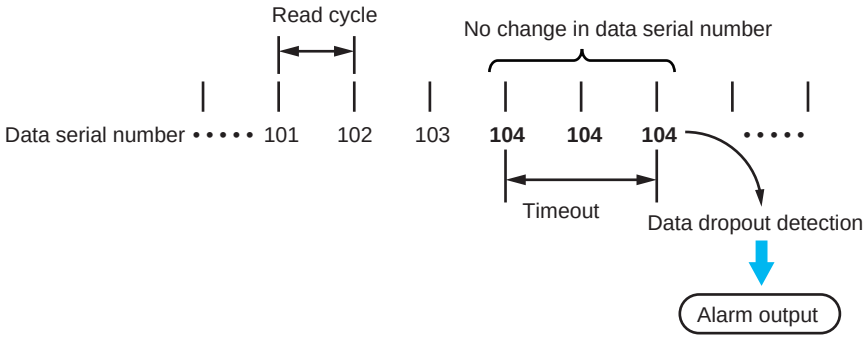
1.2.8 Firmware Updating

The GX70SM input firmware and wireless firmware can be updated.
Updating is performed using the Wireless Input Unit Configurator.

1.2.9 Data Dropout Detection (GX/GP/GM)

When several GX70SMs perform wireless communication with a single coordinator, there is a slight possibility that data loss may occur due to collision of data transmitted simultaneously from the GX70SMs to the coordinator.
In addition, communication errors may occur due to operating environment conditions such as electromagnetic interference from other devices.
The GX/GP/GM can detect GX70SM data acquisition dropouts caused by communication errors or the like by collecting the GX70SM data serial numbers.* When the data serial number received from the GX70SM does not change over a specified period, the GX/GP/GM decides that a data dropout has occurred.
The occurrence of data dropouts can be output and recorded as alarms.
You can view the alarms that have occurred on the monitor view. Further, they can be used to trigger internal switches, relay output, and e-mail transmission.
When data loss is detected, values can be replaced with preset values.(version R4.06 and later)

* Serial numbers assigned to data entries sampled by the GX70SM



Number of connectible GX70SMs and recommended send (scan) interval

When considering preventing data omissions, we recommend the following send (scan) interval.

The number of connected GX70SM	Send (scan) interval
2 (without repeater)	10 sec or more
5 (without repeater)	20 sec or more
10 (without repeater)	30 sec or more
20 (without repeater)	60 sec or more
30 (with repeater)	2 min or more
50 (with repeater)	5 min or more
50 or more (with repeater)	10 min or more

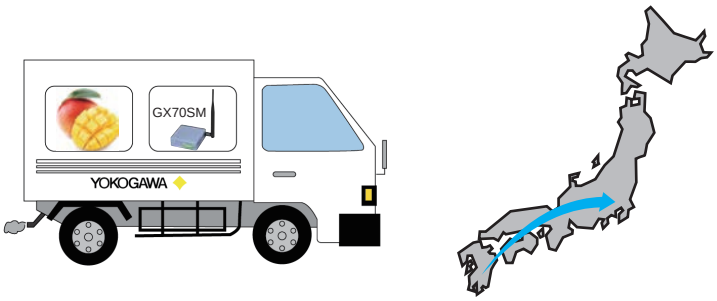
Note 1) The values in the table are guidelines for preventing continuous data loss. Arrival of data is not guaranteed.
Note 2) Use the following as a guide for the setting: Timeout time of the data loss alarm > Send (scan) interval × 2.
Note 3) This can change depending on the number of repeaters and other conditions.
Note 4) The table is a guide based on wireless communication module vd1.2.

1.2.10 Device Information Output for Wireless Input Unit Errors (GX/GP)

When a battery error, operation error, communication disconnection, or the like occurs on the GX70SM, device information can be output using a FAIL relay (/FL1 option).

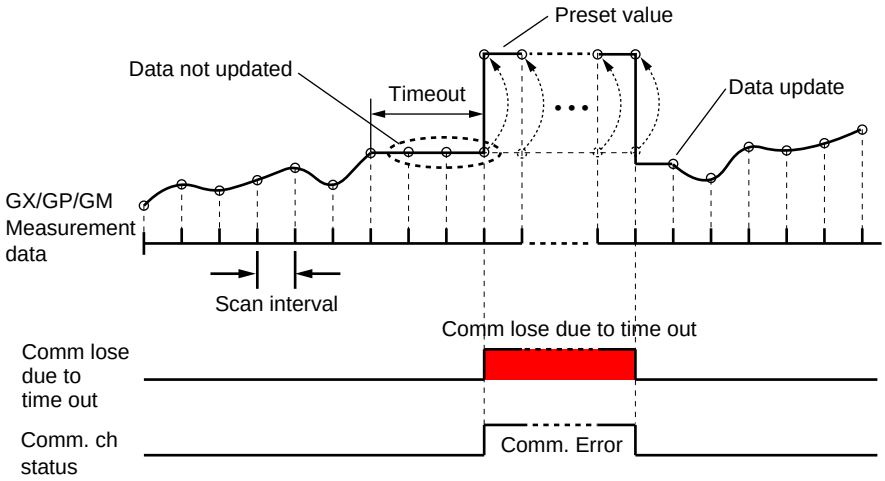
1.2.11 Using the GX70SM as a Standalone Data Logger

The GX70SM can be used as a standalone data logger.
By mounting the GX70SM in a vehicle, it can be used to record the temperature, humidity, and the like when transporting fresh foods, art objects, and so on in a truck.
When using the GX70SM as a standalone data logger, turn off the wireless function.



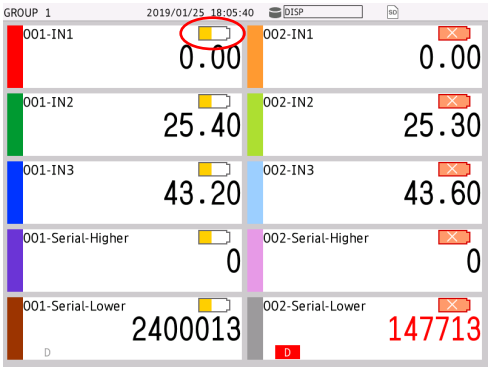
1.2.12 Preset value function for communication disconnection (GX/GP/GM) (version R4.06 and later)

If the GX70SM data is not updated even when the timeout value is exceeded (when data loss is detected), values can be replaced with preset values.
The communication channel status will indicate communication error.

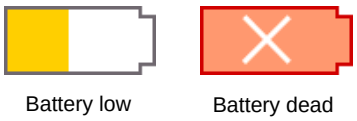


1.2.13 Battery status display function (version R4.06 and later)

The GX70SM battery alarm status (low battery, dead battery) is shown on the trend, digital, bar graph, overview, multi panel, and custom display (/CG option).



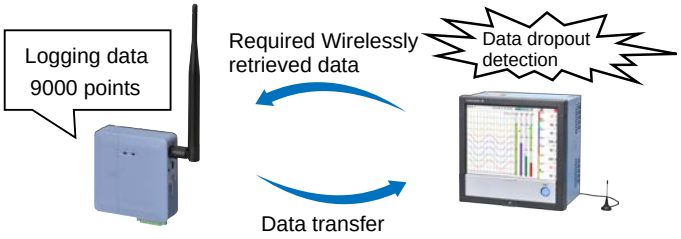
Digital display example



Battery low Battery dead

1.2.14 Enhanced Data Backup Function(/DB option)

The logging data has been increased to 9,000 points.
Logging data can be retrieved using the Wireless Input Unit Configurator and saved as a wirelessly retrieved data file.
If the GX70SM send (scan) interval is five minutes, you can back up data for one month.
It also sends the data within the specified range according to the request of the wirelessly retrieved data (missing data) from GX/GP/GM.
GX/GP/GM can automatically create wirelessly retrieved data files without retrieving them from GX70SM.

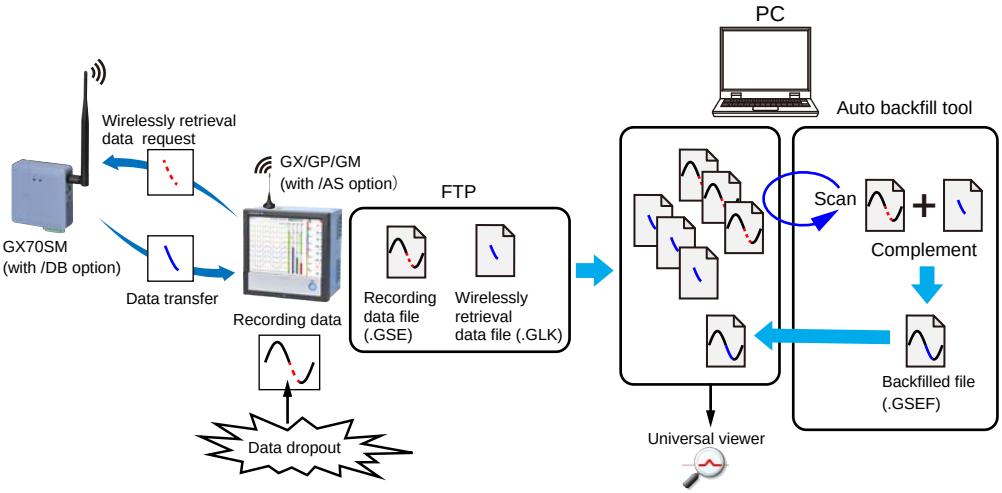


1.2.15 Backfill Function

Backfilling is made possible with the wireless data retrieval function and Auto Backfill Tool (application software) in GX70SM (/DB option) and GX/GP/GM (/AS option).
The backfill function is a function that fills in the missing data in the GX/GP/GM recording data (GSE files) using the Auto Backfill Tool.
If the communication with GX70SM is interrupted when recording with GX/GP/GM and some data is missing, the missing data is collected from GX70SM via wireless communication and a wirelessly retrieved data file (GLK file) is created. In Auto Backfill Tool, the sections missing from the recording data file (GSE file) is filled in using the wirelessly retrieved data file (GLK file) and a backfill file (GSEF file) is created. The backfill file (GSEF file) can be displayed on the Universal Viewer. The process to fill in the missing data using the Auto Backfill Tool looks for the scope of data to be filled in and the data position as needed.
Unlike conventional combined files, you can attach signatures to backfill files as well.

Note

This function does not apply to all missing data.
This function fills in missing data caused by a temporary interruption in the communication while recording under a stable condition, with the assumption that the wireless connection of GX/GP/GM and GX70SM is stable normally.



Limitations and conditions of the backfill process

Mandatory conditions

- The data is missing as a result of the recording.
- GX/GP/GM (with /AS option)
  - The file type is event data.
  - The wireless data retrieval function is enabled. (Version 4.09 and later)
  - The advanced security function is enabled while the multi-batch function is disabled (or without /BT option).
  - The product is not in maintenance mode.
  - The communication channel assigned to GX70SM (/DB option) is set as the recording channel.
  - The firmware version of the new GX/GP/GM wireless communication module is v4.4.0 and later.
  - Data dropout alarm has been set.
- GX/GP/GM recording interval ≤ GX70SM send (scan) interval
- GX70SM (with /DB option)
  - The firmware version of the wireless communication module is vc1.4 and later.
  - The GX70SM send (scan) interval is 30 seconds and more.
- Auto backfill tool
  - The data file (GSE file) and the wirelessly retrieved data file (GLK file) are stored in the same directory.
  - The ON/OFF setting of the data dropout alarm is recorded as a pair in the alarm summary.
  - The calculation block for backfill* is in the retrieved data file.

    * The calculation block for backfill refers to the following:
    Starting point: Changes in the data number before the data dropout alarm is turned ON.
    Ending point: Changes in the data number after the data dropout alarm is turned OFF.

Recommended conditions

- GX/GP/GM
  - Timeout time > Send (scan) interval x 2
  - The product is equipped with an SD card.

Note

The backfill function has the following limitations:

- Backfill cannot be performed if the wireless input unit is broken or faulty.
- Backfill cannot be performed when the wireless input unit machine is being changed. If you are changing the machine, save the event data before doing so.
- You may not be able to perform backfill if the wireless connection is bad and data is often missing. Use the product with a stable wireless connection.
- Backfill cannot be performed if GX/GP/GM is turned off when the data is missing. Do not turn off GX/GP/GM when recording.
- Backfill cannot be performed if GX70SM is rebooted when the data is missing. Do not reboot the product if there is missing data.
- Backfill cannot be performed if the recording is stopped before the collection of wirelessly retrieved data has been completed. Stop the recording only after the collection of wirelessly retrieved data has been completed.
- Do not change the timeout setting for the Wireless Input Unit Set when there is missing data. Backfill may not be able to be performed if changes are made.
- Do not change the calibration correction setting of the communication channel assigned by the Wireless Input Unit when there is missing data. Backfill cannot be performed if changes are made.
- Backfill cannot be performed on signed files.
- There may be discrepancies in the backfill result. Even if the conditions for backfill are met, the calculation may cause discrepancies of ± 1 data set. Depending on the extent of the missing data, the discrepancy may be bigger.

Note

If there are remaining data blocks in the displayed backfill log of the Auto Backfill Tool, “In progress” appears as the status. Thus, the status also appears as “In progress” if there is GX70SM without / DB option but no wirelessly retrieved data file (GLK file) and the missing block cannot be repaired.

Setting for wireless data retrieval

▶ Refer to section 3.3.1, “Wireless Data Retrieval Settings and Displaying the Wireless Input Unit Reconfiguration Screen” on page 3-6.

Setting for auto backfill tool

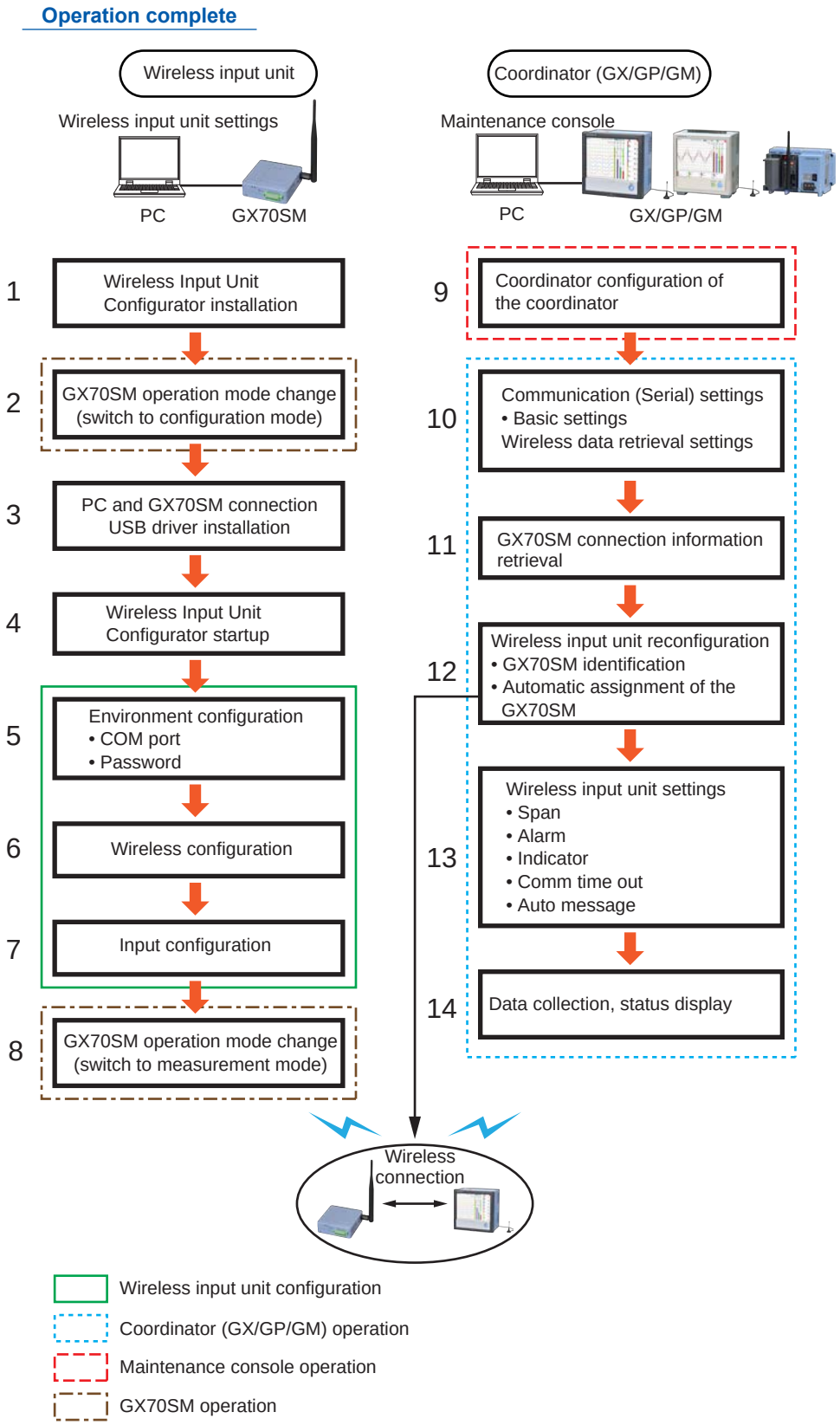
▶ Refer to section 2.13, “Configuring the Auto Backfill Tool” on page 2-62.

1.3 Procedure from Wireless Input Unit Configuration to Data Acquisition and Status Display

This section describes how to connect the GX70SM to a GX/GP/GM, collect data, and display the status.

1. Download the Wireless Input Unit Configurator (software application), and install it in a PC.
   ▶ See section , “2.2 Installation”
2. Switch the GX70SM operation mode to configuration mode.
   ▶ See section , “1.5.1 Setting the Operation Mode”
3. Connect the GX70SM to the PC using a USB cable. Install the USB driver.
   ▶ See section , “2.3.1 Connection Configuration for Wireless Input Unit Configurator”
4. Start the Wireless Input Unit Configurator.
   ▶ See section , “2.3.2 Starting and Closing the Wireless Input Unit Configurator”
5. Configure the environment using the Wireless Input Unit Configurator.
   ▶ See section , “2.4 Environment Configuration of the Wireless Input Unit Configurator”
6. Configure the GX70SM wireless settings using the Wireless Input Unit Configurator.
   ▶ See section , “2.5 Configuring the Wireless Settings of the Wireless Input Unit”
7. Configure the GX70SM input settings using the Wireless Input Unit Configurator.
   ▶ See section , “2.6 Configuring the Input Settings of the Wireless Input Unit”
8. Switch the GX70SM operation mode to measurement mode.
   ▶ See section , “1.5.1 Setting the Operation Mode”
9. Perform coordinator configuration on the GX/GP/GM (coordinator) using the maintenance console (by Oki Electric).
   ▶ For details on the coordinator configuration of the GX/GP/GM (coordinator), see the following manual.
   920 MHz Wireless Communication, MH920 Console International User’s Manual (IM 04L51B01-41EN)
10. On the GX/GP/GM, under Basic configuration of Communication (Serial) settings, set the receiver function to Wireless Input Unit, and wireless data retrieval settings.
    ▶ See section , “3.2.2 Communication (Serial) Configuration”
11. On the GX/GP/GM, obtain the connection information of the GX70SM.
    ▶ See section , “3.3 Reconfiguring the Wireless Input Unit and Automatically Assigning It”
12. On the GX/GP/GM, reconfigure the wireless input unit. The GX70SM identification and auto assignment are performed.
    ▶ See section , “3.3 Reconfiguring the Wireless Input Unit and Automatically Assigning It”
13. Configure the GX70SM data channel settings using the GX/GP/GM Wireless Input Unit Configurator.
    ▶ See section , “3.4 Configuring the Settings for Wireless Input Unit Data”

14. The GX/GP/GM is now ready to collect data and display the status.



1.4 Procedure When Wireless Input Units and Routers Are Present

When GX70SMs and routers are present, configure the routers after performing the wireless input unit configuration (step 13) described in section , “1.3 Procedure from Wireless Input Unit Configuration to Data Acquisition and Status Display”.
Otherwise, the communication channel settings will be initialized.
This section describes the procedure after configuring the wireless input unit.

1. Perform router configuration on the GM (router) using the maintenance console (by Oki Electric).

▶ For details on the router configuration of the GM (coordinator), see the following manual.
920 MHz Wireless Communication, MH920 Console International User’s Manual (IM 04L51B01-41EN)

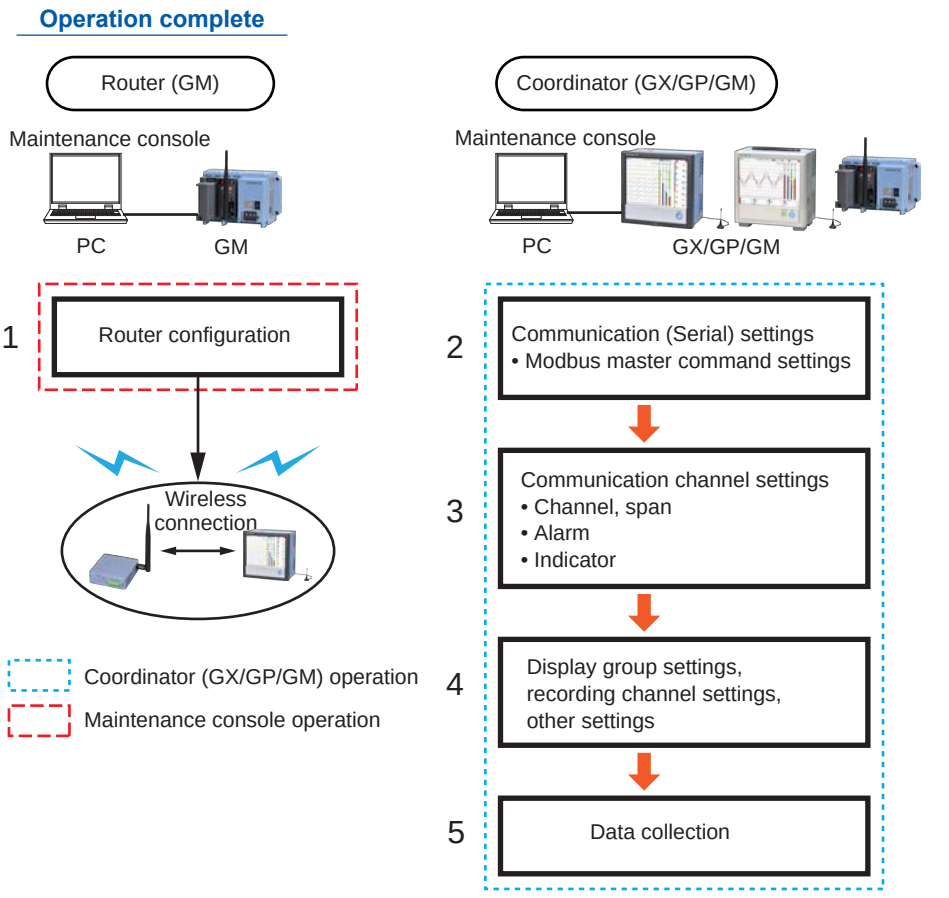
2. Using the Modbus master settings in the Communication (Serial) settings of the GX/GP/GM (coordinator), specify the command settings.

Note: For the communication channel, do not use the communication channel assigned to the GX70SM.

3. Configure the GX/GP/GM communication channel settings.

4. Configure the GX/GP/GM display group settings, recording channel settings, and other settings necessary for data collection according to your application.

5. The GX/GP/GM is now ready to collect data and display the status.



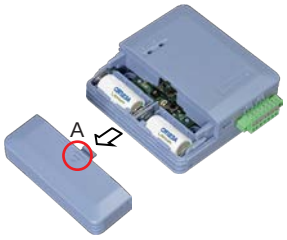
1.5 Setting the Operation Mode of Wireless Input Units

1.5.1 Setting the Operation Mode

Change the GX70SM operation mode as required.

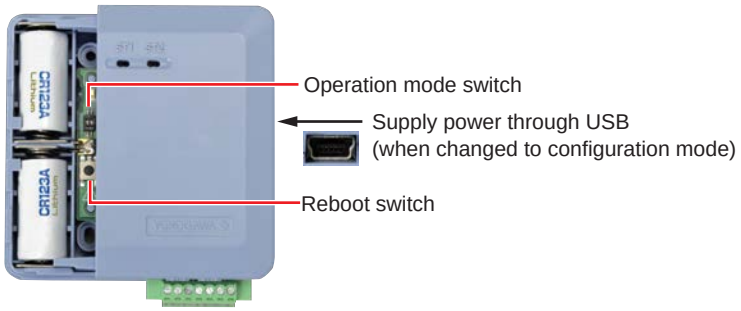
Operation mode	Description
Measurement mode	Use this mode to make measurements.
Configuration mode	Use this mode to configure, retrieve logging data, perform maintenance, and so on.

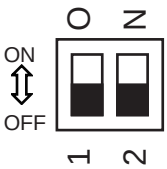
1 Remove the battery case cover by sliding the cover while pressing on the part marked A in the following figure.



2 Set the operation mode switch to measurement or configuration.

When switching to configuration mode, supply power through USB.
If you change to the configuration mode without supplying power through the USB, measurement starts in measurement mode after you press the reboot switch.
To switch to Configuration mode while measuring in Measurement mode, hold down the Reboot switch while setting Operation mode switch.





Operation mode	SW1
Measurement mode	**OFF**
Configuration mode	**ON**

Wireless function	SW2
On	**OFF**
Off	**ON**

3 Press the reboot switch.
The GX70SM changes to the specified operation mode.

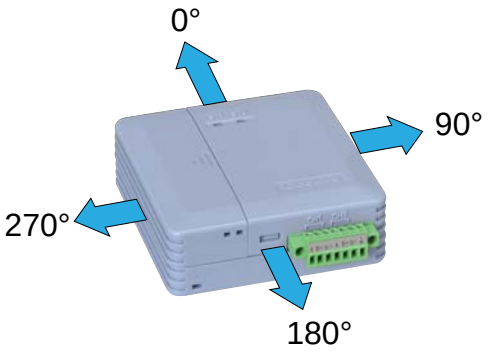
Operation complete

1.5.2 Configuring the Wireless Function

When using the GX70SM as a standalone data logger, turn off the wireless function.
For details on setting the wireless function, see section , “1.5.1 Setting the Operation Mode”.

1.6 Directivity of the Internal Antenna of the Wireless Input Unit

The internal antenna of the GX70SM has directivity.
As shown in the following figure, the field intensity in the 0° and 180° directions is weak, so the installation direction needs to be considered carefully.
Avoid facing the coordinators and routers toward the 0° or 180° direction.



1.7 Modbus Register Map

To access the GX70SM as a Modbus slave device, refer to the following register assignments.

Register assignments of the GX70SM

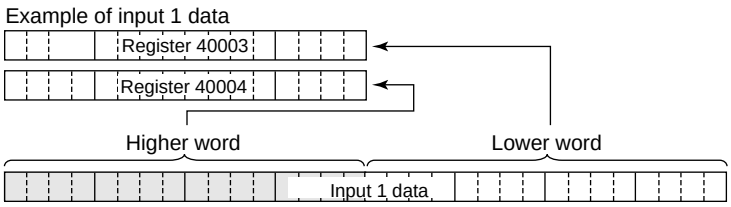
Data	Register number	Data type	Read/Write	Description
Data serial number	40001	UINT32_L	R	
Input 1 data	40003	FLOAT_L		
Input 2 data	40005			
Input 3 data	40007			Humidity data When the /RH option is installed
Input 1 status	40009	UINT16		
Input 2 status	40010			
Input 3 status	40011			Humidity status information When the /RH option is installed
Input status	40012			
Device serial number	40013 to 40017	UINT16		UTF-8 string. 2 characters for one register
Device status	40018	UINT16		
RSSI value (dBm)	40019	INT16		Received signal strength on the coordinator (repeater)
Elapsed time (s)	40020	UINT16		Elapsed time on the coordinator*

* An approximate reference value.

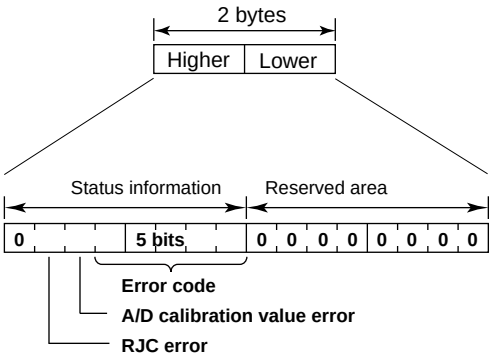
Data type

Symbol	Description
INT16	16-bit signed integer
UINT16	16-bit unsigned integer
UINT32_L	32-bit unsigned integer (little endian)
FLOAT_L	32-bit floating point (little endian)

Structure of the Data Serial Number and Input 1 to 3 Data Registers

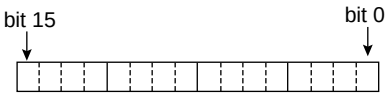


Structure of the input 1 to 3 status registers



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

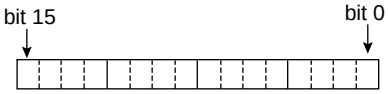
Structure of the input status register



bit	Content	Description
15	Humidity sensor (/RH option) availability	1: Option available 0: Option not available
14	—	
13	Enhanced data backup function (/DB option) availability	1: Option available 0: Option not available
12 to 11	—	
10	Memory	1: Enhanced (9000 data) 0: Standard (4500 data)
9	Configuration error	1: Configuration not complete (LED display: Mode setting error)
8	—	
7	Critical Low Battery	1: Battery flat
6	Low Battery	1: Low battery (LED display: Low battery warning)
5	OVER	1: Detection of input outside the measurable range
4	Burnout	1: Burnout detection
3	Calibration value error	1: Detection of an error in the calibration value (LED display: Input error)
2, 1	Hardware error	A value other than 00: Detection of a hardware error (LED display: Input error)
0	Memory error	1: Detection of an error in the setting information or logging data (LED display: Mode setting error)

* For details on the LED display, see section 1.2.6, “LED Display” on page 1-8.

Structure of the device status register



bit	Content	Description
15 to 3	—	—
2	USB connection	1: USB connection present
1	Mode setting error	1: Mismatch between the current status and the operation mode at startup (LED display: Mode setting error)
0	Input error	1: Input error detection (LED display: Input error)

* For details on the LED display, see section 1.2.6, “LED Display” on page 1-8.

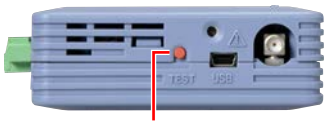
1.8 Troubleshooting Based on the LED Display Status

Status		LED display	Cause	Handling
During measurement or data transmission	When network is normal	Green blinking (about 0.2 second intervals), red off	—	—
	Not joined the network	Red blinking (about 0.2 second intervals), green off	Have not joined a network.	Check the network configuration and installation location.
Low battery warning		Repeats the sequence of green lit (0.1 seconds), all off (1.9 seconds), red lit (1.9 seconds) and all off (1.9 seconds) twice, turns off for 10 seconds, and repeats the entire sequence.	Low battery	Replace the battery.
Input error		Red lit for 0.1 seconds at about 5 second intervals, green off	Malfunction or calibration value error	Check the error information in the input settings of the Wireless Input Unit Configurator.*
Mode setting error		Repeats the sequence of green and red lit in sync (0.1 seconds) and all off (0.9 seconds) three times, turns off for 2 seconds, and repeats the entire sequence.*	• Mode mismatch • Configuration error • Memory error	• Restart the GX70SM. • Check the error information in the input settings of the Wireless Input Unit Configurator.*
Input error (over, burnout)		Repeats the sequence of green lit (0.1 seconds), red lit (0.1 seconds) and all off (1.8 seconds) twice, turns off for 10 seconds, and repeats the entire sequence.	Out of measuring range, disconnection	Check the input, and set the measuring range to the optimal range.
Test switch held down in measurement mode	When normal	Repeats green blinking at 0.3 second intervals twice, all off for 3 s, and then then turns off red.	—	—
	When in error	Off	Flat battery or malfunction	Replace the battery.

* For the corrective action for the error you have checked, see section 2.12, “GX70SM Error Information” on page 2-57.

Test Switch

When you press the test switch in measurement mode, the LEDs blink for you to check the operation.
For details on the LED blinking status, see the above table.



Test switch

Replace the battery.

After replacing the battery, check that the GX70SM is running in measurement mode, and press the test switch. Check that the green (ST1) LED blinks. If it does not blink, press the reboot switch, and then check the operation using the test switch.

1.9 Replacing Devices

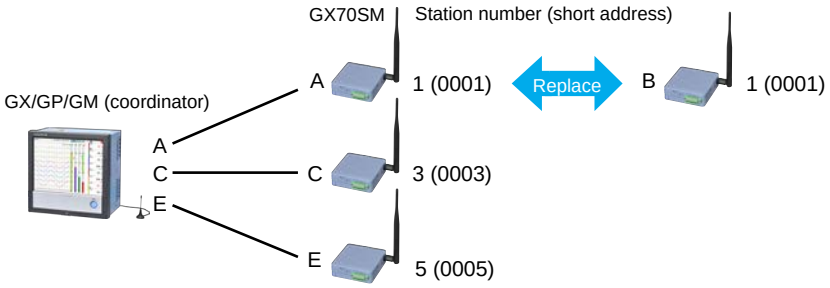
This section explains what happens when wireless input unit A, which is currently participating in the network, is replaced with wireless input unit B using the same wireless settings.

When A is disconnected from the network, it takes about 90 minutes for the coordinator to detect the disconnection. Because the coordinator assumes that A is participating in the network during this period, B cannot join the network. There are two ways for B to join the network.

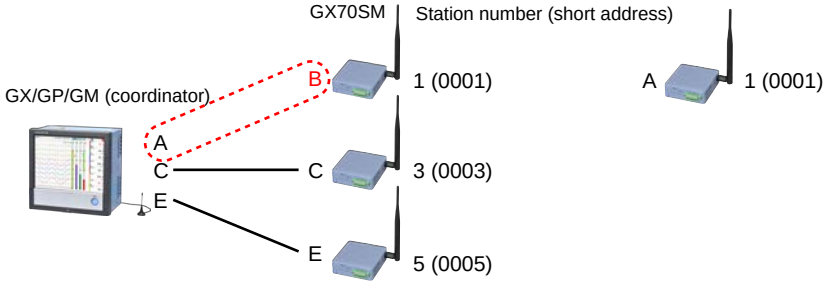
- Wait for the coordinator to detect the disconnection of A and allow B to join the network (this takes about 90 minutes).
- If you want B to immediately join the network, press the GX/GP/GM wireless communication module's reboot switch, or restart the GX/GP/GM (note that in this case, the network is reconfigured).

Device replacement illustration

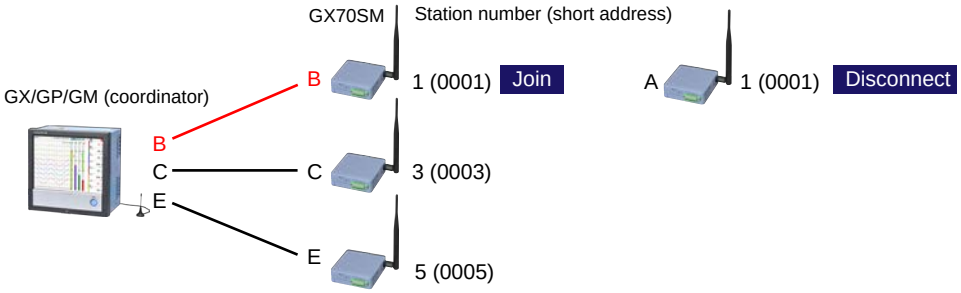
1. In this example, short address A is replaced with B with the same station number.



2. The coordinator does not detect the disconnection of A until about 90 minutes elapse.



3. After about 90 minutes, the coordinator detects the disconnection of A, and B joins the network.



2.1 Overview of the Wireless Input Unit Tool

The Wireless Input Unit Tool is made up of the following two software applications.
- Wireless Input Unit Configurator
- Auto Backfill Tool

2.1.1 Configuration Function of the Wireless Input Unit Configurator

The Wireless Input Unit Configurator is a application software used to configure the GX70SM, retrieve logging data, and perform maintenance.

Creating and Editing Setup Data

You can create setup data.
You can also edit existing setup data.

Saving and Loading Setup Data

You can save the setup data that you create to your PC and load setup files that have been saved from your PC.

Sending and Receiving Setup Data

You can send setup data to and receive data from the GX70SM through a USB cable.

Retrieving the GX70SM Information

You can retrieve the GX70SM device information through a USB cable.

Wireless Configuration

You can set maintenance settings and various terminal information of the GX70SM.

Input Configuration

You can load and save the input configuration and logging data of the GX70SM.

Environment Configuration

You can set the operating environment of the Wireless Input Unit Configurator including the USB COM port for connecting the GX70SM to the PC, the GX70SM password, and the default folder for saving setup data.

Calibrating and Adjusting the Universal Inputs and Built-in Humidity Sensor

You can calibrate and adjust the universal inputs and built-in humidity sensor.
To maintain the measurement accuracy of the GX70SM, we recommend that you calibrate it once a year.

Firmware Updating

The GX70SM consists of a wireless communication module and input module. You can update the firmware of the wireless communication module and input module.

Saving Logging Data to Files

You can retrieve logging data from the GX70SM and save it as a file.

Without /DB option: Logging data file (WLD file)
With /DB option: Wirelessly retrieval data (GLK file)*
* Version R2.01 and later

Combining Logging Data (without /DB option)

You can insert a logging data file (WLD file) into a GX20/GP20/GM10 event data file (GEV or GSE file) and save it as a combined data file (WLC file).

Note

There are certain GX/GP/GM settings that need to be configured to combine data. See section 2.7, “Saving Logging Data to a File and Combining Logging Data” on page 2-31.

2.1.2 Function of the Auto Backfill Tool (Version R2.01 and later)

It is an application software that is used to automatically backfill sections in a GX/GP/GM recording data file (event data) that are missing from the GX70SM data with the wirelessly retrieved data file (missing data) collected from GX70SM, and to create a backfill file.

The folder (backfill data folder) where GX/GP/GM recording data files and wirelessly retrieved data files are stored is scanned; and if there are files that can be backfilled, backfilling is performed automatically and a backfill file (GSEF file) is created and stored in the folder.
You can scan the folder at any time or at the specified interval.

Files subject to the backfill process

- Event data files (GSE files) with the advanced security function (/AS)
- Wirelessly retrieved data files (GLK files)

Limitations and conditions of the backfill process

- Only corrections to the input values and information on measurement data and event data are backfilled. Alarm and other information for the period with the missing data are not backfilled.
- Wirelessly retrieved data files collected while GX70SM was rebooted during the period with the missing data cannot be backfilled.
- Wirelessly retrieved data files collected from GX70SM that have been replaced cannot be backfilled.

Configuration Function

Backfill Settings

Specify the folder to save the files to be backfilled and the interval to run the backfill.

Running backfill at any time

You can run backfill at any time.

Display of Information

The tool status, backfill status, etc., are displayed.

2.2 Installation

2.2.1 System Requirements

PC

A PC running Windows 10, Windows Server 2016, Windows Server 2019

CPU and main memory

PC configuration	System requirements
CPU	Core2 Duo E6300 or faster x64 or x86 processor
Internal memory	2 GB or more
Hard disk	Free space of at least 100 MB (depending on the amount of data, you may need more memory). NTFS recommended.
Mouse	Mouse compatible with the OS
Display	OS compatible display with a resolution of 1024×768 dots or higher and High Color or higher
Communication port	USB port

Operating System

Wireless Input Unit Configurator

OS	Edition	Service Pack	32bit/64bit
Windows 10	Home		32-bit edition or 64-bit edition
	Pro		32-bit edition or 64-bit edition

Auto Backfill Tool

OS	Edition	Service Pack	32bit/64bit
Windows 10	Home		32-bit edition or 64-bit edition
	Pro		32-bit edition or 64-bit edition
Windows Server 2016	Standard		64-bit edition
Windows Server 2019	Standard		64-bit edition

Other Operating Conditions

- Microsoft .NET Framework 4.6.1 or later is required to connect to the GX70SM and run the application.
- Visual C++ 2010 Redistributable Package (x86) is required.
- To view the user's manual of this software, you need to use Adobe Acrobat Reader by Adobe Systems (the latest version recommended).
- Microsoft Internet Explorer 11 is required to download the firmware files.

2.2.2 Installing the Wireless Input Unit Tool

Download the latest installer from YOKOGAWA's website to install the software.
URL: http://www.smartdacplus.com/software/en/

Procedure

1. Double-click the downloaded file to extract the files.
   The folder opens, and the installer (InstallE.exe) appears.

2. Right-click InstallE.exe, and click **Run as administrator**.
   The installation wizard starts.

3. Follow the instructions on the screen to install the software.

4. Enter the user name and company name, and then click **Next**.

5. If you do not want to change the default installation destination, click **Next**.
   The installation process begins.
   The default save destination is (drive name):\Program Files\Yokogawa Electric Corporation\SMARTDAC+ STANDARD Wireless Input Unit Tool.
   If the OS is a 64-bit edition, the destination is (drive name):\Program Files (x86)\Yokogawa Electric Corporation\SMARTDAC+ STANDARD Wireless Input Unit Tool.

6. Select a feature to install. You can select the wireless input unit configurator and the automatic backfill tool. To install both, click **Next**.

7. Click Install.

8. When the installation is complete, click Finish.
   SMARTDAC+STANDARD > Wireless Input Unit Configurator and Auto Backfill Tool will be registered under All Programs in the Windows Start menu.

Operation complete

Note

- Before installing the software, check that your PC is not infected by a virus.
- Close all other software applications before installing this software.
- To reinstall the software, uninstall the current software first.
- The user's manual is installed with the software. You can view it by selecting Input settings > Help > User's Manual on the Wireless Input Unit Configurator, or from the Start menu, selecting All Programs > SMARTDAC+ STANDARD > User's Manual. Use Adobe Acrobat Reader to view the manual.

2.3 Connection and Startup

2.3.1 Connection Configuration for Wireless Input Unit Configurator

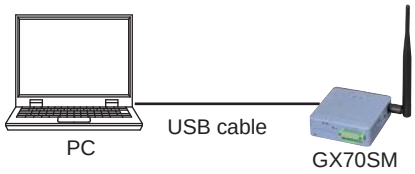
Connect the GX70SM to a PC.

Connection Procedure

Procedure

1 Set the GX70SM operation mode to configuration mode.
For details on operation mode, see section 1.5.1, “Setting the Operation Mode”.

2 Connect the GX70SM to a PC using a USB cable.
Then, press the GX70SM reboot switch. The Windows Device Manager will recognize the GX70SM connection.

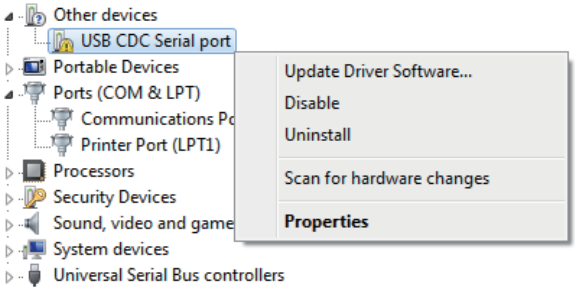


If you connect using the USB cable for the first time, device driver installation will start. Regardless of whether the device driver installation is successful, proceed to step 3, and complete the installation of the USB driver.

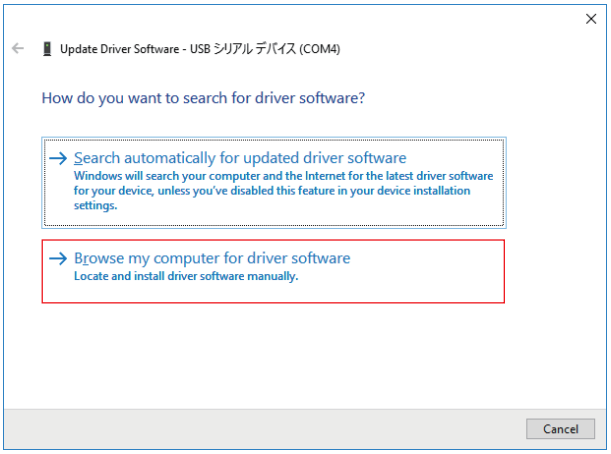
3 Start Windows Device Manager.
The procedure to start Device Manager varies depending on the OS that you are using. For details, see the PC user’s manual, support website, or the like.

4 Under Other devices, right-click USB CDC Serial port,* and click **Update Driver Software**.

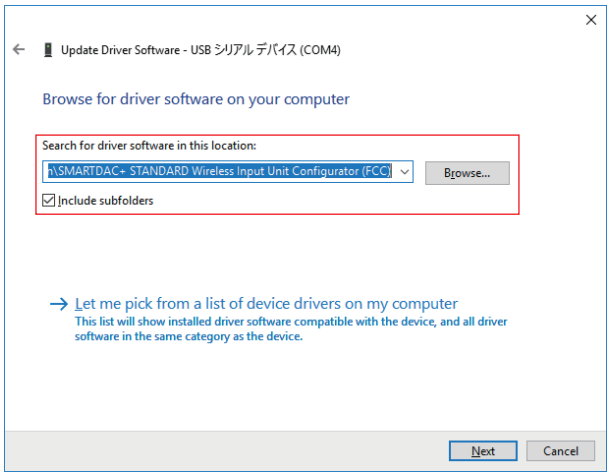
* It may appear as one of the following names.
- OKI USB CDC Serial port
- USB Serial Device



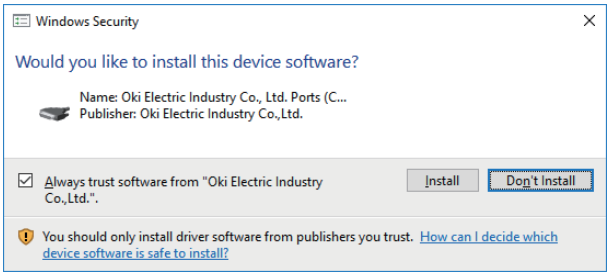
5 Click **Browse my computer for driver software**.



6 Click **Browse**, select the USB_Driver folder in the installation folder of the Wireless Input Unit Configurator, and click **OK**.



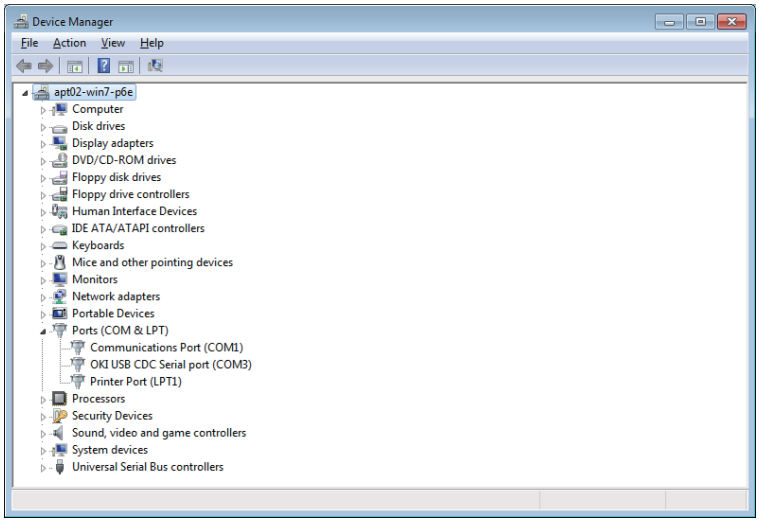
7 Click **Install**.



8 When the installation is complete, click ✕.

9 With Device Manager, check that OKI USB CDC Serial port* (COMxx) is shown under Ports (COM & LPT).

* Check that the name shown in step 4 and “COMxx)” are shown.



Hereafter, this COMxx will be referred to as “the COM port that the GX70SM communicates with.”

Operation complete

Note

- Power supply from USB is required to configure the GX70SM. Use a powered USB cable.
- Do not disconnect the USB cable or turn off the power when the Wireless Input Unit Configurator is connected to the GX70SM. If you perform these acts while data is being written to the GX70SM (during firmware updating or configuration), the configuration information may become corrupted.

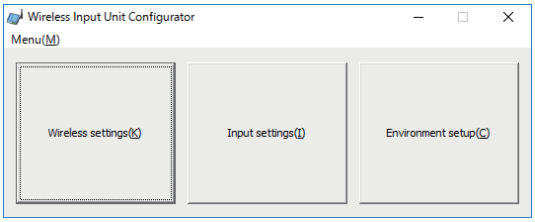
2.3.2 Starting and Closing the Wireless Input Unit Configurator

Starting the Software

Procedure

1 From the **Start** menu, select All **Programs** > **SMARTDAC+STANDARD** > **Wireless Input Unit Configurator**.
If a Windows Security Alert dialog box appears when you start the software for the first time after installation, select Allow access.

The Wireless Input Unit Configurator starts, and the main window appears.



Operation complete

Note

If a Microsoft .NET Framework warning appears the first time you start the Wireless Input Unit Configurator, install Microsoft .NET Framework 4.6.1 or later. For details on installing Microsoft.NET Framework, visit the Microsoft support site.

Closing the Software

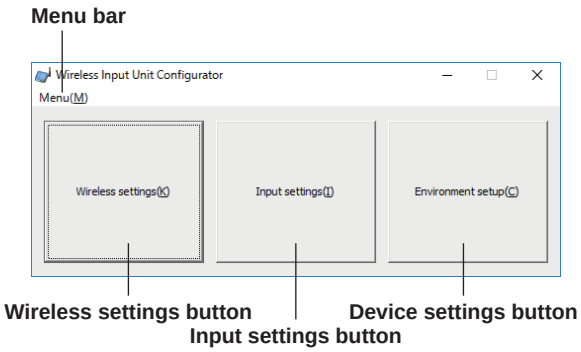
Procedure

1 Click ✕.

Operation complete

2.3.3 Main Window of the Wireless Input Unit Configurator

The main window of the Wireless Input Unit Configurator consists of a menu bar and three buttons as shown in the following figure.



Menu Bar

The main window has the following menus.

Item		Description
Menu	Exit	Closes the main window.

Wireless settings button

This button opens a wireless setting window of the GX70SM.

Procedure: ▶section 2.5, “Configuring the Wireless Settings of the Wireless Input Unit”

Input settings button

This button opens an input setting window of the GX70SM.

Procedure: ▶section 2.6, “Configuring the Input Settings of the Wireless Input Unit”

Device settings button

This button opens a window for setting the operating environment of the Wireless Input Unit Configurator.

Procedure: ▶section 2.4, “Environment Configuration of the Wireless Input Unit Configurator”

2.3.4 Starting and Closing the Auto-Backfill Tool

Note

To perform continuous operation using auto backfill interval, do not sign out of the Windows screen of the PC used for driving. Be sure not to let the system enter the sleep mode automatically. The Auto Backfill Tool stops running if you sign out or enter the sleep mode. If you do not want to display the Windows screen during continuous operation, use Windows "Lock" to lock the screen.

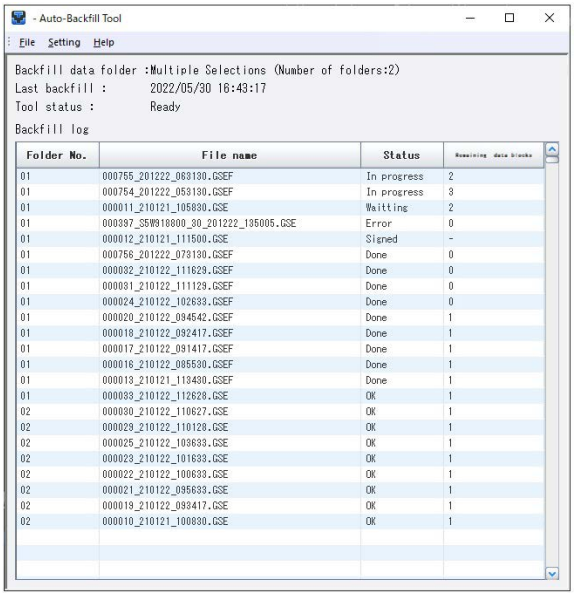
Starting the Software

Procedure

1. From the **Start** menu, select All **Programs** > **SMARTDAC+STANDARD** > **Auto-Backfill Tool**.

   If a Windows Security Alert dialog box appears when you start the software for the first time after installation, select Allow access.

   The Auto Backfill Tool starts, and the main window appears.
   When you start the program, backfill is run at the specified interval.



Operation complete

Closing the Software

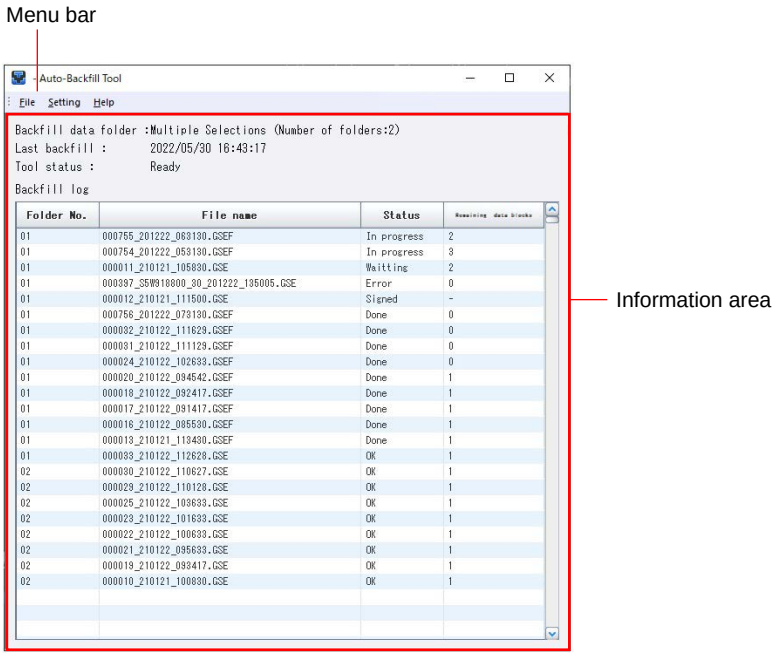
Procedure

1. Click **File** > **Close** or ✕.

Operation complete

2.3.5 Main Window of the Auto Backfill Tool

The main window of the Auto Backfill Tool consists of a menu bar and information area as shown in the following figure.



Menu bar

The main window has the following menus.

Item		Description
File	Backfill	Run backfill manually.
	Exit	Closes the auto-backfill tool.
Settings	Change settings	Opening a setting dialog box.
Help	Version	Shows the version information of auto-backfill tool and user information.

Information area

Backfill data folder
The specified folder path is displayed.
If multiple folders are specified, displays the number of specified folders.
If a folder has not been specified, the following message appears.

"Select a folder to backfill."

If an invalid path is specified, the path or number of specified folders is displayed in red.
The backfill process is not performed on the invalid folders.
Specify a valid backfill data folder.

Last backfill

The date and time on which the last backfill was run is displayed.
If you selected multiple backfill data folders, displays the time backfill processing was completed on all folders.

Tool Status

Displays tool status.

Display	Description
Ready	Backfill is not run. You can change the settings and run backfill manually.
Scanning	The files in the backfill data folder are being scanned. You cannot change the settings and run backfill manually.
Backfilling	The system is running backfill. You cannot change the settings and run backfill manually.

Backfill Log

The file name, status, and remaining data blocks are displayed.
Files that have not been backfilled are displayed in order from the top.
Up to 3000 files can be displayed. If there are more than 3000 files, backfilled files are deleted from the display from the oldest one first.
If multiple backfill data folders are selected, the maximum number of displayed files per folder is "3000/number of selected folders".
You can sort by clicking the an item title, and switch between ascending and descending order each time you click.

Item	Description
Folder No.	Displays the folder number set in the Change settings dialog box.
File name	The names of recording data files to be backfilled and of files that have been backfilled are displayed.
Status	Displays the process status.
Remaining data blocks	The number of missing data blocks for which backfill has not been performed is displayed.

Display	Description
OK*	Files with no missing section
Done	Files that have been backfilled
In progress	Files that have several missing sections, of which only some have been backfilled
Waitting	Files that have not been backfilled
Error	Files that could not be backfilled because an error occurred during the backfill process
Signed	Signed files that are not backfilled

* If there is no item to backfill when the backfill function starts, the file is indicated as "OK" on the screen.
However, if all of the data in one file is missing and no recovered data file is found from the missing data afterwards, it is also indicated as "OK" on the screen. For files that have been marked as "OK" in this way, if the recovered data file is found from the missing data during the next backfill, the status changes to "Waiting," "In progress," "Done," and so on.

Note

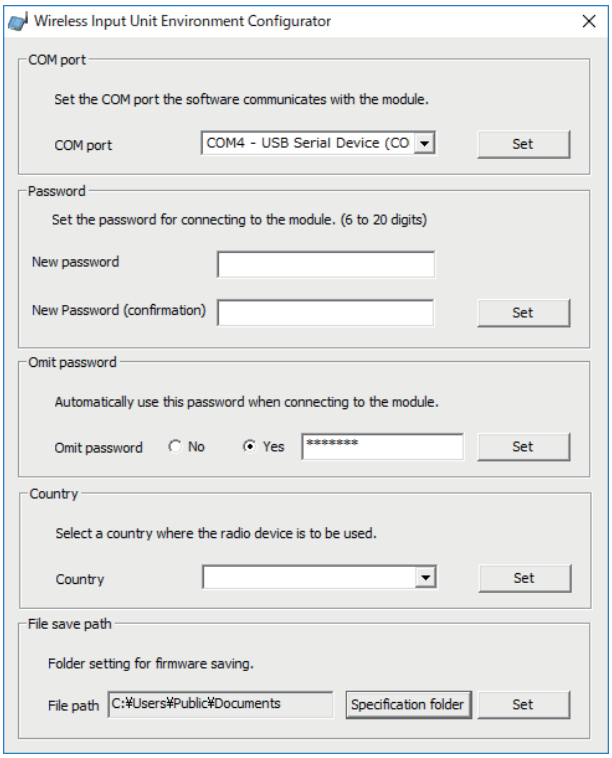
If there are many files and data on which to perform auto backfill, "No response" may be displayed on the Auto Backfill Tool screen. The backfill function continues to operate even when this message appears, so do not close the Auto Backfill Tool screen and wait a while until the operation is completed.

2.4 Environment Configuration of the Wireless Input Unit Configurator

On the Configuration window, set the operating environment of the Wireless Input Unit Configurator. You can set the COM port that the Wireless Input Unit Configurator and GX70SM communicate, set a password to prevent unauthorized access, and so on.

How to open this window:

- On the main window, click **Environment setup**.



Item		Description
COM port	COM port	Select the COM port for the Wireless Input Unit Configurator to communicate with the GX70SM.
	Set	Click Set to save the COM port setting in the Wireless Input Unit Configurator.
Password	New password	Enter the password for connecting to the GX70SM from the Wireless Input Unit Configurator (6 to 20 alphanumeric characters).
	New password (confirmation)	Enter the password you entered in New password again for confirmation.
	Set	Click **Set** to set the entered password in the GX70SM. From this point, enter this password when connecting to the GX70SM. * To apply the settings to the GX70SM, press the reboot switch to restart the GX70SM. * The default password is “default”.

Continued on next page

Item		Description
Omit password	Omit password	If you select this option, you can omit entering the password for connecting to the GX70SM from the Wireless Input Unit Configurator. No: You will need to enter the password every time you connect to the GX70SM. Yes: You will not need to enter the password for connecting to the GX70SM. If you select Yes, enter the password for connecting to the GX70SM from the Wireless Input Unit Configurator in the box on the right.
	Set	Click Set to save the Omit password settings in the Wireless Input Unit Configurator. * If the same PC is used to control multiple GX70SMs, the specified password is used to connect to all of them. Therefore, if you want to use this function, we recommend that you assign the same password to all applicable GX70SMs.
Country	Country	Set the country that the GX70SM will be used in.
	Set	Click Set to set the country that the GX70SM will be used in.
File save path	File path	Shows the default folder for saving files.
	Specification folder	Click Specification folder to show a window for selecting the default folder for saving files. * The setup file is saved to the specified folder.
	Set	Click Set to save the File path setting in the Wireless Input Unit Configurator.

Note

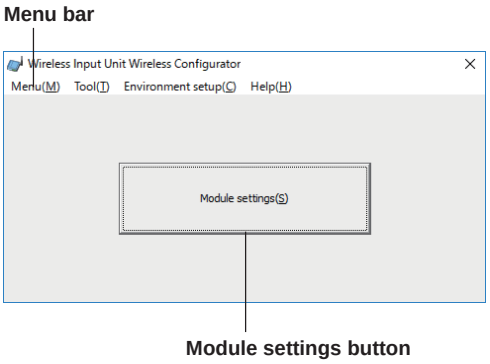
If you forget the password for connecting to the GX70SM from the Wireless Input Unit Configurator, you cannot reset the password from the Wireless Input Unit Configurator. If you forget the password, servicing will be required. Contact your nearest YOKOGAWA dealer.

2.5 Configuring the Wireless Settings of the Wireless Input Unit

The Wireless settings window consists of a menu bar and a Module settings button as shown in the following figure.

How to open this window:

- On the main window, click **Wireless settings**.



Menu Bar

The Wireless settings window has the following menus.

Item		Description
Menu	Exit	Closes the Wireless settings window, and returns to the main window.
Tool	Firmware update	Updates the firmware of the GX70SM wireless communication module.
	Restore factory preset	Restores the GX70SM settings to their factory defaults.
Environment setup		Shows the Environment Configurator window.
Help	Version	Shows the version information of Wireless settings program.

Module settings button

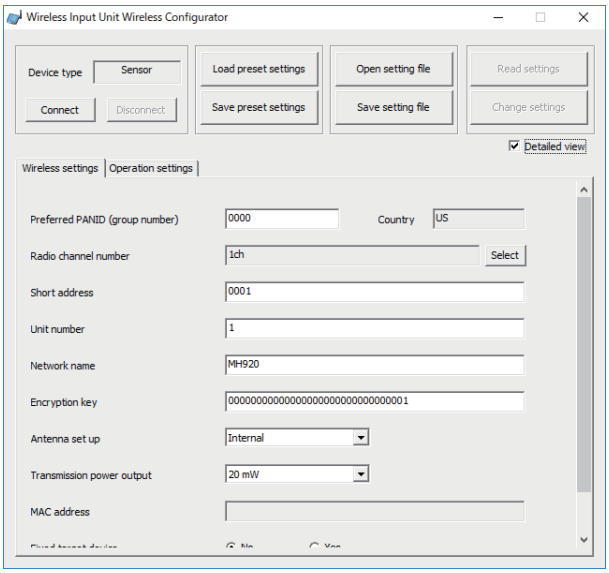
This button opens a wireless setting window of the GX70SM.

Wireless Configurator Window (hereafter referred to as the wireless detailed settings window)

On the wireless detailed settings window that appears when you click Module settings on the Wireless Configurator window, you can configure the GX70SM wireless settings, load and save presets, and open and save setup files.

How to open this window:

- Click **Wireless settings** on the main window > click **Wireless settings** on the Wireless Configurator window > select the **Detailed view** check box



In the top area of the wireless detailed settings window, the following buttons are available.

Item	Description
Connect	Click Connect to connect to the GX70SM.
Disconnect	Click Disconnect to disconnect from the GX70SM.
Load preset settings	Click Load preset settings to show for each setup item the preset values used when the Wireless Input Unit Configurator starts.
Save preset settings	Click Save preset settings to save the values shown for each setup item as preset values used when the Wireless Input Unit Configurator starts.
Open Setting File	Click Open Setting File to show for each setup item the values from the setup file. To open a configuration file without an extension (csv), set the file type to “All files (*.*).”
Save Setting File	Click Save Setting File to save the values shown for each setup item to a setup file. The setup file is saved in the folder specified by File save path on the Wireless Input Unit Configuration window. If you save the file without an extension (csv), no extension will be added to the name of the file saved.
Read Setting File from Unit	If you click **Connect** and then **Read Setting File from Unit**, the current values read from the GX70SM are shown in each setup item.
Send Setting File to Unit	If you click **Connect** and then **Send Setting File to Unit**, the values shown for each setup item are applied to the GX70SM.

The bottom area of the wireless detailed settings window has the following tabs. Click the tabs to configure the various settings.

- Wireless settings
- Operation settings

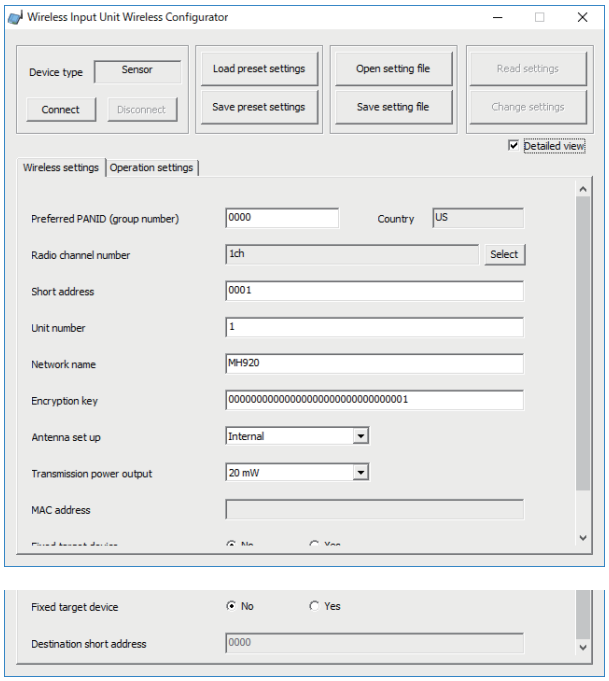
It also has a Detailed view check box to change the setup item view. If you remove the Detailed view check box, only the items with a check mark in the Simple view column of the next table are displayed.

Note

* To apply the settings entered on the tabs of the Wireless Configurator window to the GX70SM, click **Send Setting File to Unit**, and then restart the GX70SM by pressing the reboot switch.

Wireless settings tab

Configure the GX70SM wireless settings.



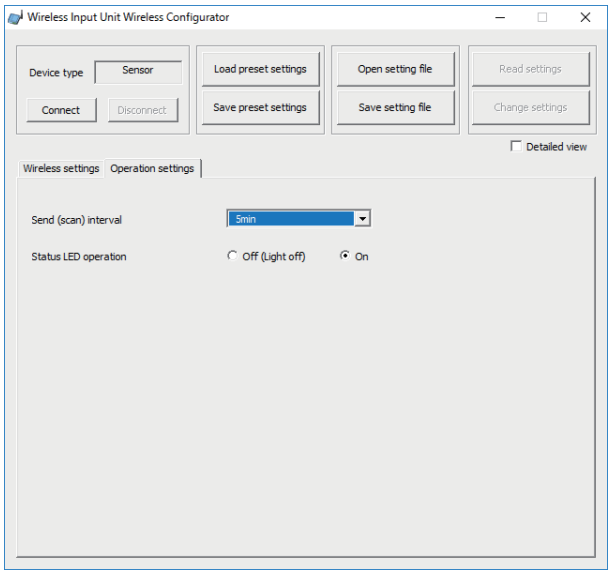
Item	Description	Simple view
Preferred PAN ID (group number)	Enter the preferred PAN ID (0000 to FFFE) to connect to. • To not specify the preferred PAN ID, enter “0000”.	○
Country	The country that the GX70SM will be used in is displayed.	○
Radio channel number	Select the channel number. Country / Selectable Range US (Suffix code Area: A) / 1ch to 43 ch KR (Suffix code Area: K) / 1ch to 14 ch • Up to 10 channels can be selected.	○
Short address	Enter a different short address (0001 to FFFD) for each GX70SM. • Select a short address that does not overlap with the short addresses of other devices. • For the GX70SMs, do not set the address to 0000.	○
Station number	Enter a different station number (1 to 96) for each GX70SM.	
Network name	Enter a network name (up to 16 alphanumeric characters).	
Encryption key	Enter the network encryption key (hexadecimal: 32 digits).	
Antenna setup	Select the antenna to use. You can select from the following values. • Internal • External	

Continued on next page

<table>
<tr><th>Item</th><th>Description</th><th>Simple view</th></tr>
<tr><td>Transmitter power output</td><td>Select the signal level for radio transmission.
<table>
<tr><th>Country</th><th>Selectable Range</th></tr>
<tr><td>US (Suffix code Area: A)</td><td>0.16 mW, 1 mW, 20 mW</td></tr>
<tr><td>KR (Suffix code Area: K)</td><td>1 to 7 ch: 0.16 mW, 1 mW, 5 mW
8 to 14ch: 0.16 mW, 1 mW, 5 mW, 12.5 mW
(excluding antenna gain.)</td></tr>
</table></td><td></td></tr>
<tr><td>MAC address</td><td>The 64 bit MAC address of the GX70SM is displayed. You cannot change this value.</td><td></td></tr>
<tr><td>Fixed target device</td><td>You can specify the destination coordinator and router (repeater). You can fix a wireless route by selecting Enable and then specifying the destination short address.</td><td></td></tr>
<tr><td>Destination short address</td><td>Specify the destination short address that you want to fix.</td><td></td></tr>
</table>

Operation settings

Configure the GX70SM operation settings.



Item	Description
Send (scan) interval	Set the interval for transmitting to the coordinator (1 s, 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min, 5 min, 10 min, 20 min, 30 min, 60 min). This setting also applies to the input scan interval, and logging data interval.
Status LED Indication	Select whether to indicate the GX70SM status using the status LEDs. For details on the status LED, see section 1.2.6, “LED Display” on page 1-8.

Note

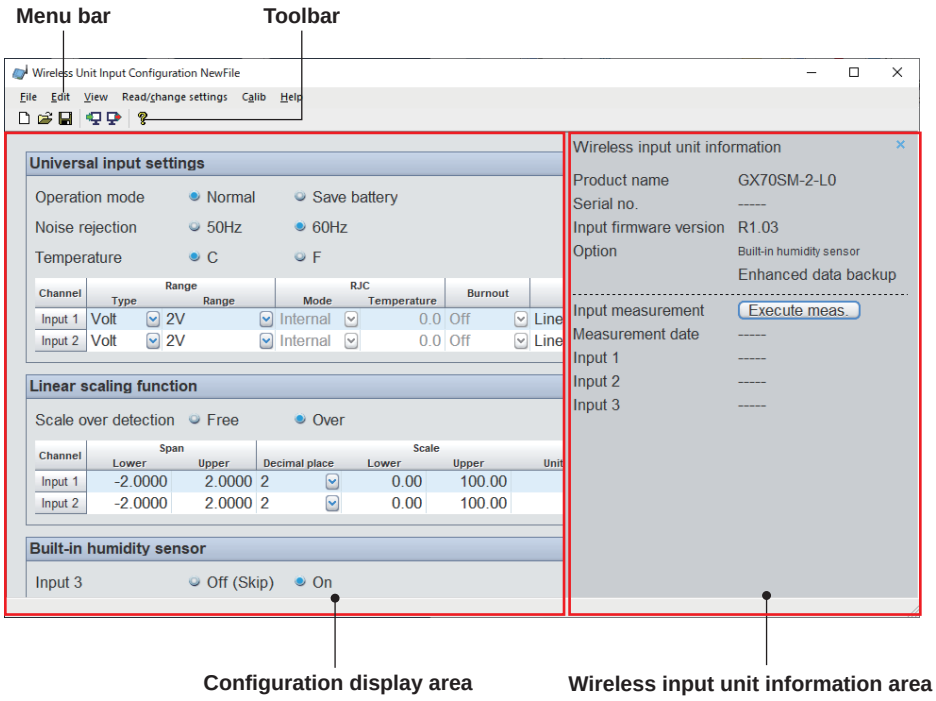
Regarding the recommended send interval when considering preventing data omissions, see ”section , “Number of connectible GX70SMs and recommended send (scan) interval” on page 1-9

2.6 Configuring the Input Settings of the Wireless Input Unit

The Wireless Unit Input Configuration window consists of a menu bar, toolbar, configuration display area, and wireless input unit information area.
The title bar of the Wireless Unit Input Configuration window shows the name of the input setup file (WPN file).

How to open this window:

- On the main window, click **Input settings**.



Menu Bar

The Wireless Unit Input Configuration window has the following menus.

Item		Description
File	New	Creates new GX70SM input settings.
	Open Input setting file	Loads an input setup file (WPN file) stored in the PC.
	Save (overwrite) input setting file	Overwrites loaded input setup file (WPN) file) with the values in the Input Configuration window.
	Save as (Input setting file)	Saves the values in the Input Configuration window to the PC in a new input setup file (WPN file) with the specified name.
	Read/save the logging data[1]	Retrieves logging data from the GX70SM and saves it as a logging data file (WLD file).
	Read/save the wireless retrieved data[2]	Retrieves logging data from the GX70SM and saves it as a wirelessly retrieved data file (GLK file).
	Combine data files	Inserts a logging data file (WLD file) into a GX/GP/GM event data and saves it as a combined data file (WLC file).
	Data file information	Shows information about the logging data file (WLD file), wirelessly retrieved data file (GLK file) and combined data file (WLC file).
	(Recent files)	Loads an input setup file (WPN file) that was used recently.
	Exit	Closes the Input Configuration window, and returns to the main window.

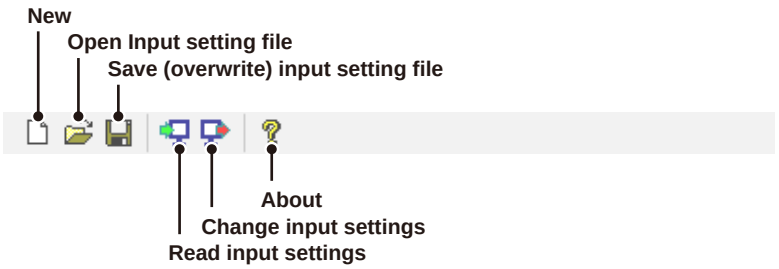
Continued on next page

Item		Description
Edit	Cut	Cuts settings when editing them.
	Copy	Copies settings when editing them.
	Paste	Pastes settings when editing them.
	Delete	Deletes settings when editing them.
	Initialize settings being edited	Initializes the settings.
View	Wireless input unit information	Shows or hides the wireless input unit information area.
Read/ change settings	Read input settings	Reads values from the GX70SM.
	Change input settings	Applies the values in the Input Configuration window to the GX70SM.
	Input settings change log	Shows the times when values were applied to the GX70SM, serial numbers, input setting change numbers, and comments on changing settings.
Calib	Calibrate input	Calibrates the GX70SM.
	Input firmware update	Updates the firmware of the GX70SM input module.
	Restore factory preset	Initializes the GX70SM input settings and logging data to their factory default conditions. The data serial number is not initialized.
Help	User's manual	Shows the user's manual (this manual).
	Version	Shows the version information of Input settings program.
	Web to update	Shows the firmware update website.

1 You cannot choose Read/save the logging data if you set the /DB option to On.
2 You cannot choose Read/save the wireless retrieved data if you set the /DB option to Off.

Toolbar

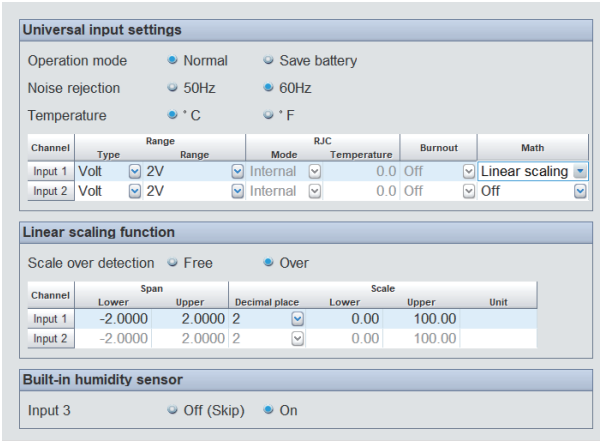
The toolbar in the Wireless Unit Input Configuration window has the following buttons.



Item	Description
New	Creates new GX70SM input settings.
Open Input setting file	Loads an input setup file (WPN file) stored in the PC.
Save (overwrite) input setting file	Overwrites the input setup file (WPN) file) with the values in the Input Configuration window.
Read input settings	Reads values from the GX70SM.
Change input settings	Applies the values in the Input Configuration window to the GX70SM.
Version	Shows the version information of Input settings program.

Configuration display area

This area is used to configure the GX70SM input.



Item				Description
Universal input settings	Measurement mode			Sets the GX70SM operation mode. Normal: Power frequency noise riding on the measured signal is rejected. Select the power frequency for your region. The battery life (running time on battery) is shorter than in save battery mode. Use standard mode to supply power through the USB cable. When supplying power through USB, use a USB cable that meets the product specifications. Otherwise, wireless communication and measuring accuracy may be affected. When supplying power through USB, it is not possible to make measurements that include the ground potential. To make such measurements, apply proper isolation before applying the signal to the instrument. Save battery: Power frequency noise riding on the measured signal is not rejected. Depending on the measuring range, measurement errors will be large due to the effects of noise, and the values may fluctuate. The battery life (running time on battery) is 1.3 times longer or 1.2 times longer (with /DB option) than in normal mode.
	Noise rejection			Sets the power frequency for rejecting power frequency noise when the operation mode is standard. 50Hz: 50 Hz noise is rejected. 60Hz: 60 Hz noise is rejected.
	Temperature unit			Sets the temperature unit for TC and RTD types.
	Channel (Input 1, Input 2)	Range setting	Type	Set the input signal type.
			Range	Sets the input signal range.
		RJC	Mode	Sets the reference junction compensation method of the thermocouple.
			Temperature	When the mode is set to external, set the compensation temperature.
		Burnout		Sets burnout detection.
		Math*		When performing calculation, set the calculation type.
Linear scaling function*	Scale over detection			Set how to detect over-range values for linear scaling.
	Channel (Input 1, Input 2)	Span	Lower	Set the span lower.
			Upper	Set the span upper.
		Scale	Decimal place	Set the decimal place of the scale.
			Lower	Set the scale lower.
			Upper	Set the scale upper.
			Unit	Set the unit.
Built-in humidity sensor	Input 3 (Humidity)			Sets the built-in humidity sensor (/RH option).

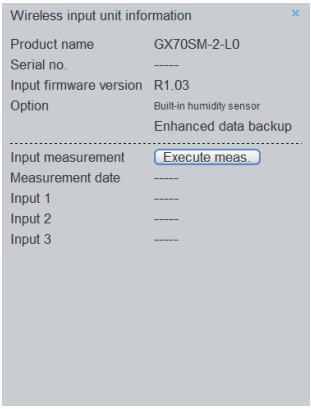
* Input module firmware version R1.02 and later.

Note

If you change the Range or Type settings of Channel (Input 1, Input 2) or the Input 3 (Humidity) setting, the logging data before the change cannot be saved to a file. If necessary, save the logging data before applying the changes to the input settings.

Wireless input unit information area

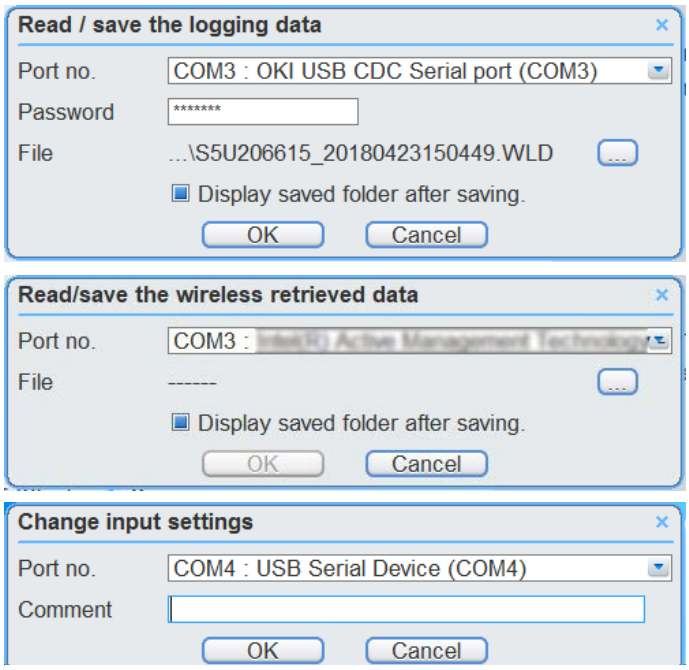
This area shows the GX70SM's product name, serial number, and so on.



Item	Description
Product Name	Shows the GX70SM's product name.
Serial no.	Shows the GX70SM's serial number.
Input firmware version	Shows the input module firmware version.
Option	Shows whether the built-in humidity sensor (/RH option) , enhanced data backup function (/DB option) are available.
Input measurement	Click **Execute meas.** to refresh the measurement date and inputs 1 to 3 information. * If a connection is not established with the GX70SM, specify the COM port that the GX70SM is connected to. If a password box appears, enter the password for connecting to the GX70SM from the Wireless Input Unit Configurator.
Measurement date	Shows the PC's date when Execute meas. was previously clicked.
Input 1	Shows the measured value (math value) or data status of input 1.
Input 2	Shows the measured value (math value) or data status of input 2.
Input 3	Shows the measured value of the built-in humidity sensor (/RH option) or the data status. * This appears when the built-in humidity sensor is available.
Error information	The GX70SM error information is displayed. For details on error information, see section 2.12, "GX70SM Error Information" on page 2-57. * This appears when error information is available.

2.6.1 Communication Information Input Dialog Box

When you use a function that requires communication with the GX70SM, a dialog box appears for entering the information required for the communication.



Item	Description
Port no.	Specify the COM port that the target GX70SM is connected to.
Password	Enter the password for connecting to the GX70SM from the Wireless Input Unit Configurator. * This appears only when Omit password is set to No in the Wireless Input Unit Configuration window.
Comment	Set the comment that is entered in the input settings change log when settings are changed. * This appears only when the information set in the Input Configuration window is applied to the GX70SM.
File	Click the **...** button, and specify the save destination folder and the name of the logging data file (WLD file) or wirelessly retrieved data file (GLK fie). The default file name is as follows: aaa_bbb.WLD (Logging data file) aaa_bbb.GLK (Wirelessly retrieved data file) aaa: Serial number of the connected GX70SM bbb: Current date and time on the PC * This appears only when retrieving and saving logging data, wirelessly retrieved data.
Display saved folder after saving.	Select this check box to show the save destination folder when a logging data file (WLD file), wirelessly retrieved data (GLK file) is saved. * This appears only when retrieving and saving logging data, wirelessly retrieved data.

2.6.2 Creating a New Input Setup File

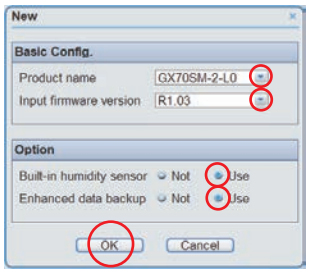
This section explains how to create a new input setup file (WPN file) for configuring the GX70SM. Before editing the input signal settings, you need to create a file suitable for the GX70SM.

How to open this window:

- On the main window, click **Input settings** > on the Input settings window, click **New** on the **File** menu

Procedure

1 Select the GX70SM's product name, input firmware version, the availability of the built-in humidity sensor (/RH option), and enhanced data backup function (/DB option) and click **OK**.



Set the input firmware version of the relevant GX70SM correctly.

Note

- From Wireless Input Unit Configurator R1.02.01, the last two digits (hereafter sub revision) in the input firmware version of a GX70SM are no longer displayed. However, if it is received from a GX70SM or a configuration file is read, the sub revision is displayed without omission. (Example: R1.02.01).
- Enhanced data backup function (/DB option) is displayed version R2.01 and later)

2 Set the operation mode and noise rejection.
Procedure: see the explanation of the configuration area in ▶section 2.6, "Configuring the Input Settings of the Wireless Input Unit" on page 2-19.

3 Configure the universal input and built-in humidity sensor.
Procedure: ▶section 2.6.4, "Configuring the Universal Input and Built-in Humidity Sensor"

4 On the **File** menu, click **Save as (Input setting file)**.

5 Specify the folder to save the input setup file (WPN file) to and the file name, and click **Save**.
The input setup file (WPN file) is saved, and the file name appears in the title bar of the Input Configuration window.

Operation complete

Note

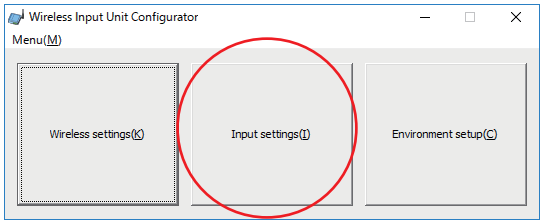
- Simply creating a new input setup file (WPN file) does not apply the settings to the GX70SM. Procedure: ▶section 2.6.5, "Applying the Input Settings to the Wireless Input Unit"
- Use up to 64 characters to specify the file name.

2.6.3 Editing a Input Setup File

This section explains how to edit an input setup file (WPN file) for configuring the GX70SM.

Procedure

1. On the main window, click **Input settings**.



The Input Configuration window appears.

2. On the **File** menu, click **Open Input setting file**.
An Open dialog box appears.

3. Select the input setup file (WPN file) you want to edit, and click **Open**.

4. Set the operation mode and noise rejection.
Procedure: see the explanation of the configuration area in ▶section 2.6, “Configuring the Input Settings of the Wireless Input Unit” on page 2-19.

5. Configure the universal input and built-in humidity sensor.
Procedure: ▶section 2.6.4, “Configuring the Universal Input and Built-in Humidity Sensor”

6. On the **File** menu, click **Save (overwrite) input setting file**.
The input setup file (WPN file) is saved.
To save by assigning another name, on the **File** menu, click **Save as (Input setting file)**.

Operation complete

Note

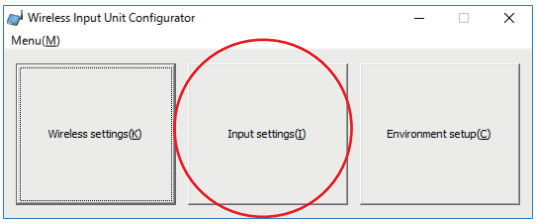
Use up to 64 characters to specify the file name.

2.6.4 Configuring the Universal Input and Built-in Humidity Sensor

This section explains how to configure the universal input and built-in humidity sensor operation.

Procedure

1 On the main window, click **Input settings**.



The Input Configuration window appears.

2 For inputs 1 and 2, specify the Type, Range, Mode, Temperature, and Burnout, math settings.

Item		Description
Range	Type	Set the input signal type. Skip: Not measured. The input is not saved in the logging data file (WLD file). TC: Measures temperature using a thermocouple. RTD: Measures temperature using an RTD. Volt: Measured DC voltage. GS: Measures 1-5V (4 to 20 mA) analog standard signal. DI: Measures digital input (ON, OFF).
	Range	Sets the input signal range. * See “Range Details.”
RJC	Mode	Sets the reference junction compensation method of the thermocouple. Internal: Uses the reference junction compensation function of the GX70SM. External: Uses an external reference junction compensation function. * You can set this when the type is set to TC.
	Temperature	When the mode is set to external, set the compensation temperature.
Burnout		Sets burnout detection. Off: Does not detect burnouts in the sensor. Up: When the sensor burns out, the measured result is set to +over range. Down: When the sensor burns out, the measured result is set to –over range. * This appears when the range type is TC, RTD, or GS.
Math		Set the calculation. Off: Calculation is not performed. Linear scaling: Linear scaling is set.

3 Set the calculation. (when calculation is available)

Linear Scaling function

Set Scale over detection and Span and Scale of inputs 1 and 2.

Item		Description
Scale over detection		Set how to detect scale over values on linearly scaled channels. In either case, +over range occurs if the value excluding the decimal point exceeds 999999 and –over range if it falls below –999999. Free: A -overrange occurs at less than -5% of the range and a +overrange at higher than 105% (if the range type is TC or RTD, a overrange occurs at less than -10°C and a +overrange at higher than +10°C). For selectable range, refer to range details in section 1.2.2, “Measurement” Over: The value is set to –over range if the value is less than –5% of the ~~scale~~ span setting and +over range if the value is greater than 105%. Example: If the linear scaling scale is 0.0 to 200.0, a value less than –10.0 results in a –over range, and a value greater than 210.0 results in a +over range.
Span	Lower	Set the span lower. Setting range: Values less than the span upper limit in the range (excluding the upper limit of the range). For selectable range, refer to Range Details in section 1.2.2, “Measurement” on page 1-5 on .
	Upper	Set the span upper. Setting range: Values greater than the span lower limit in the range (excluding the lower limit of the range). For selectable range, refer to Range Details in section 1.2.2, “Measurement” on page 1-5.
Scale	Decimal place	Set the decimal place of scale. Selectable Range:0/1/2/3/4/5
	Lower	Set the scale lower. Selectable Range: –999999 to 999999
	Upper	Set the scale upper. Selectable Range: –999999 to 999999
	Unit	Set the unit. Up to 6 characters.

4 When a built-in humidity sensor (/RH option) is installed, set Input 3 (Humidity) to Off (Skip) or On.

Off (Skip): Humidity is not measured. The input is not saved in the logging data file (WLD file).
On: Humidity is measured with the built-in humidity sensor (/RH option).

▶ For details on the range, see section 1.2.2, “Measurement” on page 1-5.

Note

Inputs set to Skip are not saved in logging data files.

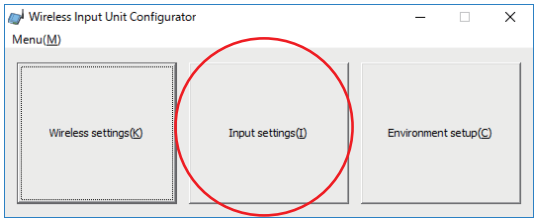
Operation complete

2.6.5 Applying the Input Settings to the Wireless Input Unit

This section explains how to apply the values set in the Input Configuration window to the GX70SM. Here, the procedure to open an input setup file and apply it directly to the GX70SM is explained.
Note that it is also possible to edit the settings in the Input Configuration window and apply them to the GX70SM.
The same input settings can be applied to multiple GX70SMs.

Procedure

1 On the main window, click **Input settings**.



The Input Configuration window appears.

2 On the **File** menu, click **Open Input setting file**.
An Open dialog box appears.

3 Select the input setup file (WPN file) you want to edit, and click **Open**.
Input settings are displayed.

4 On the **Read/change settings** menu, click **Change input settings**.
A communication information input dialog box appears.

5 Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, “Communication Information Input Dialog Box”
A Change input settings dialog appears.

6 Click **OK**.
The input settings are applied. When the process is finished, a Change input settings dialog box appears.

7 Click **OK**.
To check whether measurements can be performed correctly with the applied input settings, click **Execute meas.** in the wireless input unit information area.
To apply the same input settings to other GX70SMs, switch the GX70SM, and repeat the procedure from step 4.

Operation complete

Note

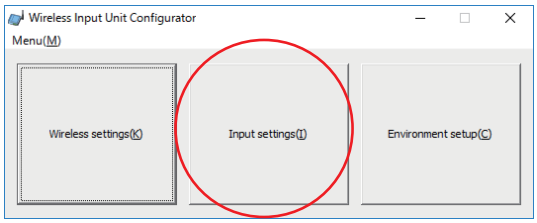
If the input firmware version displayed on the Wireless Input Unit Configurator is newer than the input firmware version of the target GX70SM, a warning message (W8118) may appear when the settings are applied.

2.6.6 Retrieving Input Settings from the Wireless Input Unit

This section explains how to retrieve the input settings from the GX70SM and show them on the Input Configuration window.
After editing the input settings on the Input Configuration window, you can save them to an input setup file (WPN file) or apply them to the GX70SM.

Procedure

1 On the main window, click **Input settings**.



The Input Configuration window appears.

2 On the **Read/change settings** menu, click **Read input settings**.
A communication information input dialog box appears.

3 Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, “Communication Information Input Dialog Box”
A Read input settings dialog appears.

4 Click **OK**.
The input settings are retrieved. When the process is finished, a Read input settings dialog box appears.

5 Click **OK**.
The input settings retrieved from the GX70SM and the wireless input unit information are shown on the Input Configuration window.
The title bar of the Input Configuration window shows “NewFile (Hardware),” which indicates a new file created by retrieving the settings.
After editing the input settings on the Input Configuration window, you can save them to an input setup file (WPN file) or apply them to the GX70SM.

Operation complete

Note

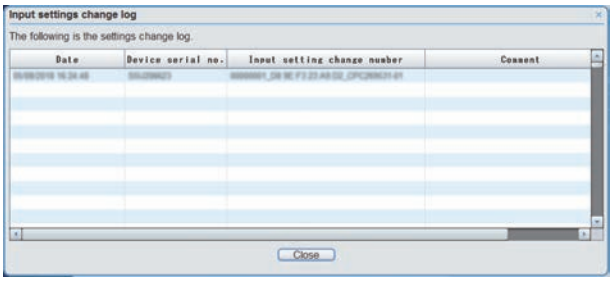
If settings are retrieved using a Wireless Input Unit Configurator with a version older than the GX70SM input firmware version, the settings are handled as an earlier version in the input settings.

2.6.7 Viewing the Change History of Input Settings

This section explains how to view the time when input settings were applied to the GX70SM from the Wireless Input Unit Configurator, the serial number of the GX70SM, and so on.

How to open this window:

- On the main window, click **Input settings** > on the Input settings window, click **Input settings change log** on the **Read/change settings** menu



Item	Description
Date	Shows the dates when input settings were applied to the GX70SM.
Device serial no.	Shows the GX70SM's serial number.
Input setting change number	Shows the following number. aaa_bbb_ccc aaa: 8-digit serial number bbb: MAC address of the PC used to apply the input settings ccc: Name of the PC used to apply the input settings
Comment on changing settings	Shows the comment that was entered when the input settings were applied.
Settings	Click Open to show the input settings that were applied to the GX70SM in an Input Configuration window.

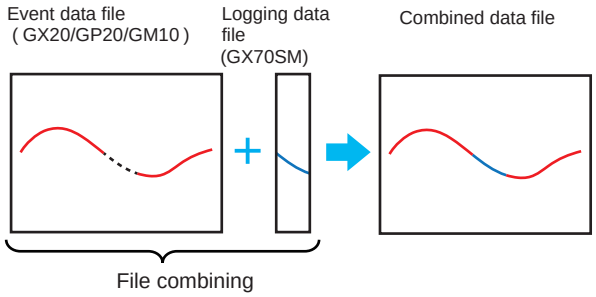
Note

The input settings change log is saved in the PC's hard disk. If you change the PC or initialize it, you will no longer be able to show the log.

2.7 Saving Logging Data to a File and Combining Logging Data

You can retrieve logging data that is saved in the GX70SM and save it as a logging data file (WLD file) or wirelessly retrieved data file (GLK file). A logging data file (WLD file) can be inserted into a section where GX70SM data could not be acquired* within a GX/GP/GM event data file (GEV or GSE file) to create a combined data file (WLC file).
A logging data file (WLD file) can be combined with the section where the GX70SM data could not be acquired within a GX/GP/GM event data file (GEV or GSE file). (A combined data file (WLC file) with continuous measurement values can be created.)
A wirelessly retrieved data file (GLK file) can be automatically complemented with the section where the GX70SM data could not be acquired within a GX/GP/GM event data file (GSE file) using the Auto Backfill Tool. (A backfilled data file (GSEF file) with continuous measurement values can be created.)

* Environmental fluctuations and effects from other wireless devices may cause a communication error and data collection dropout.



Note

- There are certain GX/GP/GM settings that need to be configured in advance to combine data.
  ▶ See “Notes before Starting to Record” in section 2.7.2, “Combine Data Files” on page 2-35

2.7.1 Saving Logging Data (without /DB option), Wirelessly Retrieved Data (with /DB option) to Files

Description of Logging Data, Wirelessly Retrieved Data

As explained in section 1.2.4, “Measurement Data Logging” on page 1-7, the GX70SM saves up to 4500 points or 9000 points (with /DB option) of the latest data measured according to the send (scan) interval.
Using Read/save the logging data under Input settings, you can retrieve the logging data from the GX70SM (without /DB option) and save it as a logging data file (WLD file) in the PC.
Using Read/save the wireless retrieved data under Input settings, you can retrieve the logging data from GX70SM (with /DB option) and save it as wirelessly retrieved data (GLK file) in the PC.

The following applies when a logging data file, wirelessly retrieved data file is shown in Universal Viewer (chapter 5).

- Data date
  Logging data, wirelessly retrieved data does not have data time information.
  The data start and stop times of a logging data file , wirelessly retrieved data are assigned based on the PC time when the file was saved.
- Inputs 1, 2, and 3 (only when the /RH option is installed) channel numbers and display
  In Universal Viewer, these are shown as follows.

Name on the GX70SM	Universal Viewer				
	Channel number	Scale	Decimal point	Unit string	Color
Input 1 (universal input)	CH0001	According to the range setting or scale setting in Input settings.			Red
Input 2 (universal input)	CH0002	According to the range setting or scale setting in Input settings.			Green
Input 3 (humidity)	CH0003	0.0 to 100.0	1	%RH	Blue

* Inputs set to Skip in Input settings are not shown.
* Logging data, wirelessly retrieved data does not have a data alarm function. Alarm indication is not available.

- Inputs 1, 2, and 3 (only when the /RH option is installed) channel data
  Measured data values are shown.
- Inputs 1, 2, and 3 (only when the /RH option is installed) channel status
  These are shown as follows.

Status	Universal Viewer
Over	+OVER, -OVER
Burnout	BURNOUT
Invalid	INVALID
A/D error	LACK

- File status
  If the logging data file, wirelessly retrieved data contains corrupt or tampered data, Universal Viewer shows Error for the File status.

How to open this window:

- On the main window, click **Input settings** to open the Input settings window

Procedure

Logging Data

1. On the **File** menu, click **Read/save the logging data**.
   A communication information input dialog box appears.

2. Set the communication information, and click **OK**.
   Procedure: ▶section 2.6.1, “Communication Information Input Dialog Box”
   The logging data file (WLD file) is saved.

Operation complete

Wirelessly Retrieved Data

1. On the **File** menu, click **Read/save the wireless retrieved data**.
   A communication information input dialog box appears.

2. Set the communication information, and click **OK**.
   Procedure: ▶section 2.6.1, “Communication Information Input Dialog Box”
   The wirelessly retrieved data file (GLK file) is saved.

Operation complete

How Files Are Stored after Logging Data, Wirelessly Retrieved Data Is Saved

- The name of the file when it is saved consists of the specified file name and an automatically assigned character string that represents the following information.

Assigned character string	Description
1 to 30s, 1 to 60min	This represents the send (scan) interval of the logging data, wirelessly retrieved data. “s” denotes seconds and “min” minutes.
Conf	This indicates that the following range change occurred in the GX70SM Input settings immediately before the logging data, wirelessly retrieved data was measured. • Input 1, 2 range type • Input 1, 2 range • Input 3 (humidity) (only when the /RH option is installed) On/Off
Reboot	This indicates that the GX70SM was restarted immediately before the logging data was measured. This is assigned only when the unit is restarted as a result of a reboot or the like when there is no change to the send (scan) interval or range setting described above.

- Data may be split and saved in several files.
  • Data during logging periods with different send (scan) intervals are split and saved.
  • Data before and after a restart (reboot) are split and saved.
- If data is split and saved, a new folder is created automatically with the following name, and the logging data files or wirelessly retrieval data are saved in this folder.
  aaa.WLD Files, aaa.GLK Files
  aaa: Specified file name
- If a setting change described in “Conf” above is made to the GX70SM, logging data or wirelessly retrieval data before the change is not saved to a file. If necessary, save the logging data or wirelessly retrieval data before applying the changes to the input settings.

The following is an example showing how logging data files are saved when “LoggingData” is specified for the file name.

- Send (scan) interval: 5 minutes, no restarting, no range setting change
  LoggingData (5min).WLD
- Send (scan) interval: 5 minutes, restarting twice, no range setting change
  LoggingData.WLD Files folder
  - LoggingData_0001 (5min).WLD
  - LoggingData_0002 (5min,Reboot).WLD
  - LoggingData_0003 (5min,Reboot).WLD
- Send (scan) interval change from 5 to 10 minutes
  LoggingData.WLD Files folder
  - LoggingData_0001 (5min).WLD
  - LoggingData_0002 (10min).WLD
- Send (scan) interval range setting change
  LoggingData.WLD Files folder
  - LoggingData_0001 (5min,Conf).WLD
  - LoggingData_0002 (5min,Reboot).WLD

2.7.2 Combine Data Files

You can insert a logging data file (WLD file) into a GX/GP/GM event data file (GEV or GSE file) and save it as a combined data file (WLC file).

Note

Event data files (GSE files) and wirelessly retrieved data files (GLK files) cannot be combined. Use the Auto Backfill Tool to complemet (backfill) them.

Features of Data Combine

▶ As described in section 1.2.9, “Data Dropout Detection (GX/GP/GM)” on page 1-9, GX70SM data loss period* may occur in the GX/GP/GM depending on the wireless communication status while the GX70SM is acquiring data.

The data combine function can be used to insert GX70SM logging data into a GX/GP/GM data file that has a data dropout period so that the GX70SM measurement data during that period can be viewed.

The combined data is saved as a new combined data file (WLC file) in the PC and can be viewed using SMARTDAC+ Universal Viewer.

* This indicates the period from when the alarm “D: Comm lose due to time out” is set to on until it is set to off on the GX/GP/GM. This period is hereafter referred to as the data loss period.

Explanation of Data Combine

The data combine function combines data using the following data file information.

- Determination of the GX/GP/GM data loss period
  ▶ The data loss period is determined according to the alarm occurrence status as described in section 1.2.9, “Data Dropout Detection (GX/GP/GM)” on page 1-9.
- Determination of the GX/GP/GM Data Time at Which Logging Data Will Be Combined
  For the data loss period, the data serial number recorded in the GX/GP/GM wireless input unit “Higher/Lower data serial” and the data serial number in the logging data are compared to determine the GX/GP/GM data time to be combined.

Notes before Starting to Record

There are certain GX/GP/GM settings that need to be configured in advance to combine data.
If the settings are not appropriate, combining of data will not be possible on the relevant recording data file.
Check the settings before starting to record.

The necessary settings are shown below.
Items with “Yes” marked in the Auto setup column in the table are set appropriately by the GX/GP/GM’s wireless input unit reconfiguration.[1, 2]

Item			Required setting and operation	Auto setup
Wireless input unit settings	On/Off, Span	On/Off	Set Higher/Lower data serial to On for the target unit’s inputs 1, 2, and 3.[3]	Yes
	Alarm	On/Off Type	Set any Higher/Lower data serial to On, “D: Comm lose due to time out” for the target unit’s inputs 1, 2, and 3.[4]	Yes
	Timeout	On/Off	Set the target unit to On.	Yes
Recording basic settings		File type	Select Event or Display+Event.	—[5]
Recording channel settings		Channel number assigned to the target unit of “Event data”	Set recording to On.	Yes
Data save settings		File format	Set to Binary.	—[6]

The following setting and operation are not necessary but helps in the operation after combining the data.

Item			Required setting and operation	Auto setup
Wireless input unit settings	On/Off, Span	On/Off Span lower, upper, decimal point, unit string	Set Span Lower, Span Upper, Decimal place, and Unit of the target units’ inputs 1, 2, and 3 according to the GX70SM input setting range.[3]	—

1 See section 3.3, “Reconfiguring the Wireless Input Unit and Automatically Assigning It.”
2 See section 3.5, “Auto Setup.”
3 Input 3 is applicable only when the GX70SM has a built-in humidity sensor.
4 Allowed if the alarm level is set to any value between 1 and 4.
5 The default value on the GP20 or when the advanced security function is on is Event.
6 The default value is Binary.

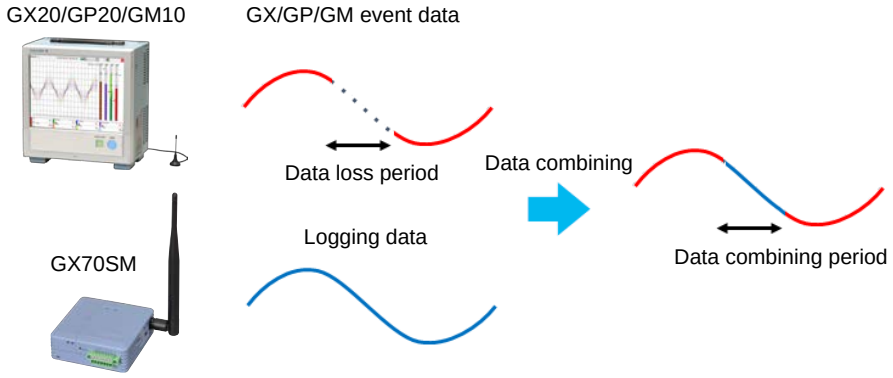
Notes When Recording

If you perform any of the following operations while recording on the GX/GP/GM, data dropout will not be detected or recorded, and you may not be able to combine the data.

- Changing the GX70SM’s alarm settings (On/Off, Type)
- Using Time-out detection of Maintenance in the Wireless input unit info window

Content of the Combined Data

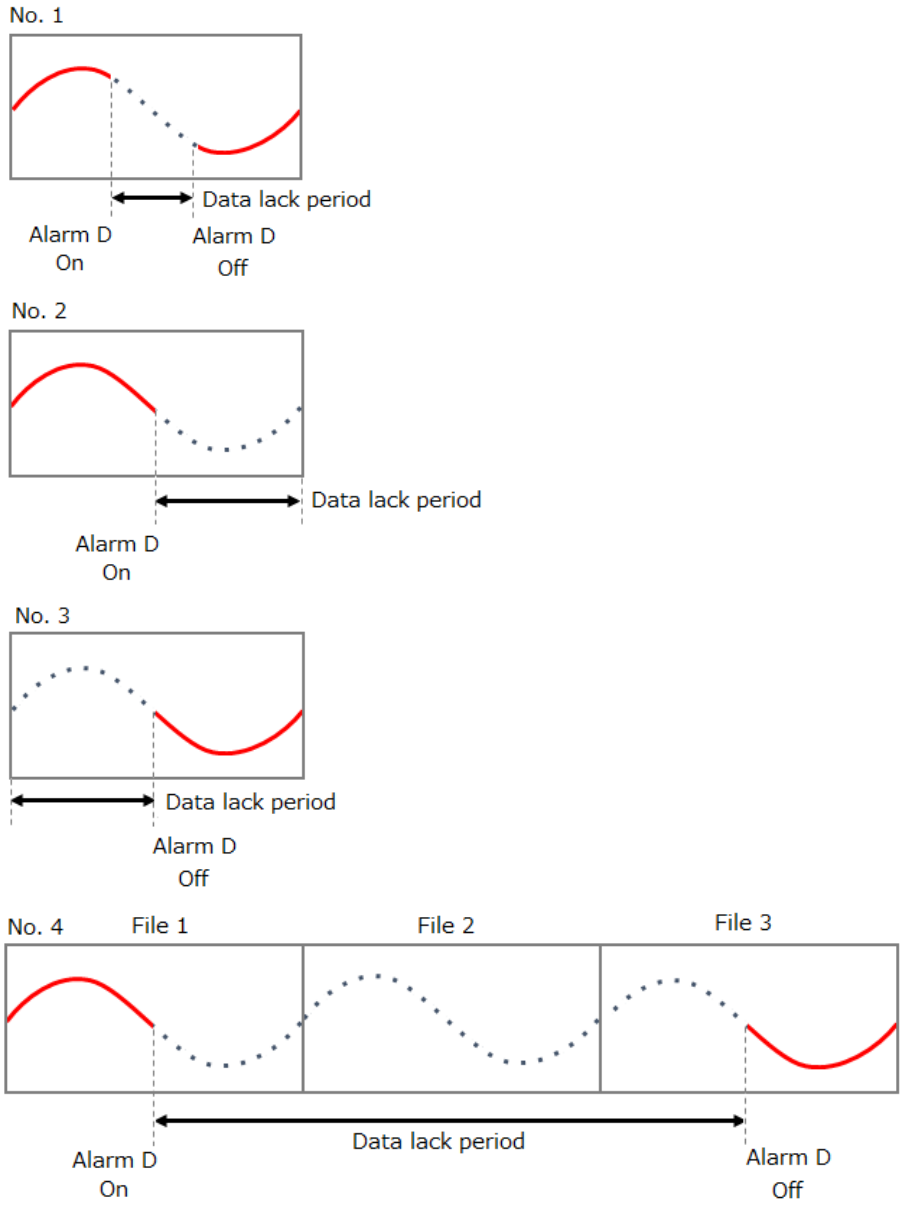
For the data loss period, measured values of communication channels and the values whose status is logging data are combined and overwritten.



As a general rule, the condition of data loss period is defined by the occurrence and release of alarm D (loss data) on the communication channel assigned to the target unit on the GX/GP/GM.
However, data loss period may be assumed even when there is no occurrence and release. (Condition numbers 2 to 4)

No.	Alarm D		Preceding recording file*	Description	Data loss start time	Data loss end time
	Occurrence	Release				
1	Yes	Yes	Irrelevant	Normal determination.	Time of alarm occurrence	Time of alarm release
2	Yes	No	Irrelevant	Determination when a file is saved with data loss.	Time of alarm occurrence	Last data time
3	No	Yes	Irrelevant	Determination when there is a data loss at the beginning of the data.	First data time	Time of alarm release
4	No	No	Yes	Determination when there is data loss over the entire period with data loss at the beginning of the data and saved to files among the divided files of continuously recorded data. To combine data in this condition, a preceding file with condition number 2 is required.	First data time	Last data time
5	No	No	No	Determined as outside the data loss period.	—	—

* Indicates the previous data file among the divided files of continuously recorded data.



Note

- Data is combined without consideration to the GX/GP/GM communication channel/alarm settings.
- If a power failure occurs during recording, the GX/GP/GM resumes recording by dividing the file when the power recovers, but the data combining is not performed for the data during the power failure.
- If calibration correction is changed during GX/GP/GM recording, the calibration correction may be different between the file combining section and other sections.
- In R2.03 and later, the WLC file is output even if there is no data dropout period in continuous data files.

Contents That Are Changed as a Result of Data Combining

Combined data files will have the following changes in comparison with the original GX/GP/GM data files.

- The indication of File Information > Model* on the SMARTDAC+ Universal Viewer will be “WIU Configurator.”
- If the original GX/GP/GM data file is of an advanced security function (GSE file), the signature function cannot be used on the combined data file.
  The signature function on SMARTDAC+ Universal Viewer will be unavailable.

* In the original GX/GP/GM data file, the model name (e.g., GX20) that performed the recording is displayed.

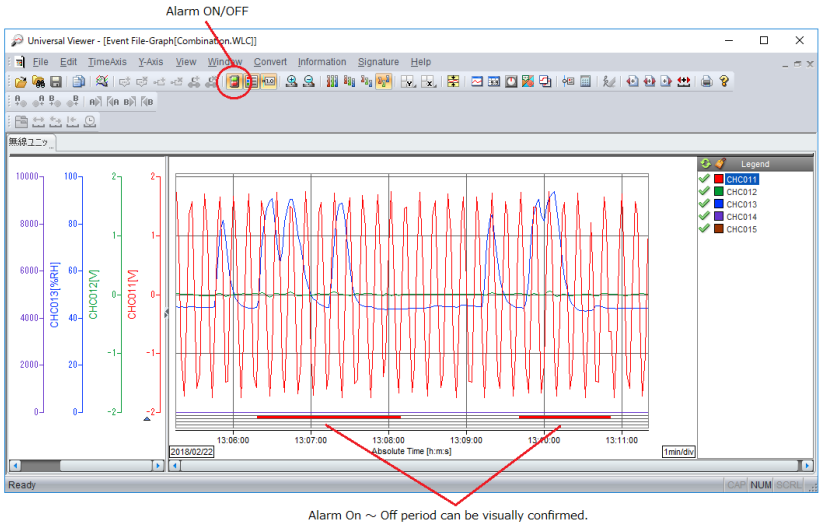
Data Contents That Retain Their Original Conditions

The original GX/GP/GM data contents other than those described in “Content of the Combined Data” and “Contents That Are Changed as a Result of Data Combining” retain their original conditions.
Of the data contents that are retained, those that are distinctive are described below.
Here, the original GX/GP/GM data will be referred to as the original data.

- Data outside the data loss period
  The original data is retained during the period in which data loss has not occurred.
- Alarm occurrence status
  The alarm occurrence status of the original data is retained.
- Calibration correction settings
  If calibration correction is performed on the GX/GP/GM, the logging data is corrected and combined.

Note

If the alarm show/hide function of Universal Viewer is set to Show when displaying a combined data file in SMARTDAC+ Universal Viewer, the data loss period becomes more intuitive.



- Channel display settings (scale, decimal point, color, etc.)
  Information related to the channel scale and display of the original data is retained.

Note

If the decimal places between the logging data and GX/GP/GM data are not matched, the decimal place in the logging data is adjusted to match that of the GX/GP/GM data.
Example:
If logging data input 1 is set to 2 V range (-2.0000 to 2.0000) and the GX communication channel setting is -200.00 to 200.00, logging data 1.9876 will be adjusted to 1.99 according to the number of decimal places (2 digits) on the GX side before it is combined.

- Data encryption status (only when the original data is an advance security GSE file)
  A combined data file is created and saved retaining the data encryption status.
- File status (normal, error)
  If the original data is damaged or tampered, data combining may not be possible, or even if the data is combined, it is saved in the abnormal file condition. Data combining never changes an abnormal file into a normal one.
- Recording serial number information
  If the original data is continuous data and saved in divided files, the recording serial number information will be retained when the data is combined.
  When viewing a combined data file in SMARTDAC+ Universal Viewer, the file link function for continuous data can be used in the same manner as GX/GP/GM data files.

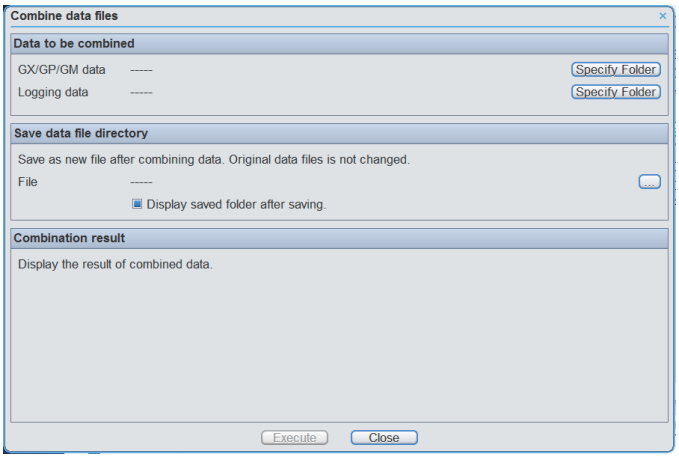
Preparing Original Data Files for Combining

Place the data files you want to combine in appropriate folders by following “How to open this window.”
In data combining, the contents (device serial number, file division information, etc.) of the data files are automatically searched for, and data that meets the conditions for combining is combined and saved.

Even when there are multiple original data files for combining or the GX70SM configuration is unknown, you can check whether data combining is possible by placing the data files that are assumed to be necessary in the specified folders and looking at the results.

How to open this window:

- On the main window, click **Input settings** > on the Input settings window, click **Combine data files** on the **File** menu



Procedure

1 Click **Specify Folder** next to GX/GP/GM data, and specify the folder that contains GX/GP/GM event data files (GEV or GSE files).

2 Click **Specify Folder** next to Logging data, and specify the folder that contains logging data files (WLD files) or the folder that contains “aaa.WLD Files” (where aaa is the name of the file you specified when the files were saved).

Note

Logging data files are also searched down to the lowest sub folders of the specified folder. Therefore, even when logging data is saved in divided files, there is no need to manually move the logging data files if the “aaa.WLD Files” folder is in the folder you specify here.

3 Click the **...** button, and specify the save destination folder and the name of the combined data files (WLC files).
When you specify the file name, the file path is shown in the Save data file directory area.

4 Click **Execute**.
The combined data file (WLC file) will be saved.

Operation complete

How Files Are Stored after Data Combining

After the data is combined, the combined data files are saved in the specified folder.
When the files are saved, certain character strings are automatically added to the specified combined data file name.
The file names and conditions vary depending on the number of original GX/GP/GM data files there are for combining.

- When there is a single original GX/GP/GM data file for combining
  A single file is saved.[1]

  Name of the saved file: aaa (bbb).WLC

  aaa: Specified file name
  bbb: Original GX/GP/GM data file name[2]

- When there are multiple original GX/GP/GM data files for combining
  The same number of files as the original GX/GP/GM data files is saved.[1]
  The combination numbers are assigned by taking into account the recording serial numbers of the original GX/GP/GM data files.

  Name of the saved file: aaa_bbb (ccc).WLC

  aaa: Specified file name
  bbb: Combination number 0001 and up
  ccc: Original GX/GP/GM data file name[2]

1 This excludes the case when the file is not saved because data combining is not successful (described later).
2 If the name is longer than 20 characters, an abbreviation (...) is assigned.

The following is an example showing how combined data files are saved when “Combined” is specified for the file name.

When there is a single original data file

Item	File name
Original GX/GP/GM file	GX20_Rec.GEV
Name of the saved file	Combined
Combined data file that is saved	Combined (GX20_Rec).WLC

When there are multiple divided files containing continuous data (the order of file names and recordings is aligned)

Item	File name
Original GX/GP/GM file	GX20_Rec_001.GEV 1st recording file GX20_Rec_002.GEV 2nd recording file GX20_Rec_003.GEV 3rd recording file GX20_Rec_004.GEV 4th recording file
Name of the saved file	Combined
Combined data file that is saved	Combined_0001 (GX20_Rec_001).WLC Combined_0002 (GX20_Rec_002).WLC Combined_0003 (GX20_Rec_003).WLC Combined_0004 (GX20_Rec_004).WLC

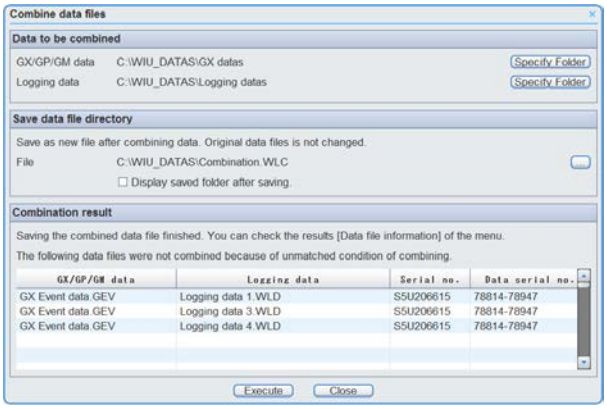
When there are multiple divided files containing continuous data (the order of file names and recordings is not aligned)

Item	File name
Original GX/GP/GM file	aaa.GEV 3rd recording file bbb.GEV 1st recording file ddd.GEV 4th recording file ccc.GEV 3rd recording file The above file names are assumed to be sorted in order in the PC folder.
Name of the saved file	Combined
Combined data file that is saved	Combined_0001 (bbb).WLC Combined_0002 (ccc).WLC Combined_0003 (aaa).WLC Combined_0004 (ddd).WLC As shown above, the file names after combining take into account the order of the recordings.

Checking the Result of Data Combining

When all the original data files are combined successfully, “Saving the combined data file finished” is displayed.

If some logging data files are not combined, “The following logging data files were not combined because of unmatched condition of combining” is displayed as well as a list of those files.
This list will contain logging data files that none of their data was combined with the original GX/GP/GM data files.



If data combining fails even when GX/GP/GM is configured appropriately or if the result is not what you assumed, check the following:

Items to Check	Remarks
Check the GX70SM configuration of the GX/GP/GM data files.	GX70SM logging data not configured for GX/GP/GM will not be combined. You can check the following using **Input settings** > **Data file information** of the Wireless Input Unit Configurator. • GX/GP/GM data files List of device serial numbers of the GX70SM that was configured in the GX/GP/GM during recording • Logging data files Device serial numbers
Check that alarm “D” is in the alarm summary recording in the GX/GP/GM data files.	You can check using **List** > **Alarm List** of the SMARTDAC+ Universal Viewer.
If you are combining to a file that is missing data over the entire period, check that the preceding divided recording data files are included.	If preceding recording data files are not available, loss of data cannot be detected, and data will not be combined.

Continued on next page

Items to Check	Remarks
Check that there are no data corruption or tampering in the data files.	• If information necessary for data combining is corrupt or tampered with, data will not be combined or saved. • If information not related to data combining is corrupt or tampered with, data will be combined or saved, but Damage Check will be shown as Damaged. • You can check using **About Document** > **Damage Check** of the SMARTDAC+ Universal Viewer.
If a warning message (Wxxxx), error message (Exxxx) is displayed, see “Description, Corrective Action, Ref. Section” in section 2.11, “Messages.”	—

2.8 Calibrating the Universal Inputs and Built-in Humidity Sensor

Periodically check the operating status of the GX70SM to use it in a good condition.
To maintain the measurement accuracy, we recommend that you calibrate it once a year.
YOKOGAWA dealers can provide calibration servicing. For details, contact your nearest YOKOGAWA dealer.

2.8.1 Calibrating the Universal Inputs and Built-in Humidity Sensor

You can calibrate the universal inputs and built-in humidity sensor.

Required Instruments

To calibrate the universal inputs and built-in humidity sensor, you need references with the following accuracy and resolution.

Recommended Instruments

DC voltage standard	:	Must meet the following specifications (M/9100 by FLUKE or equivalent) Voltage output range: 20 mV to 10 V Output accuracy of output range: ±(0.01%+1 µV) or better
• Resistance standard	:	Must meet the following specifications (ADR3204 by Alpha Electronics or equivalent) Resistance setting range (resolution): 0.2 to 1999 Ω (0.001 Ω) Resistance accuracy of the resistance setting range: ± (0.01% of + 2 mΩ) or better
• 0°C standard temperature device	:	ZC-114/ZA-10 by Coper Electronics or equivalent Main specifications Standard temperature stability accuracy: ±0.05°C
• Temperature and humidity sensor	:	Must meet the following specifications (Rotronic temperature and humidity sensor HC2 series and indicating measuring instrument or equivalent) Humidity accuracy: ±0.8%RH (at 23°C) Temperature accuracy: ±0.1°C (at 23°C)

For information on purchasing these calibrators, contact your nearest YOKOGAWA dealer.

Universal Input Calibration Procedure

Procedure

1. Wire the GX70SM and the calibrator as shown in the following figure, and adequately warm up the instruments.
   Note: The wiring diagram is an example for the universal, 3-wire RTD/resistor type. For details on wiring, see “Installation and Wiring” in the First Step Guide (IM 04L57B01-02EN).

2. Check that the operating environment such as ambient temperature and humidity is within the standard operating conditions (see “General Specifications”).

3. Set the GX70SM operation mode to measurement mode.
   For details on operation mode, see section 1.5.1, “Setting the Operation Mode”.

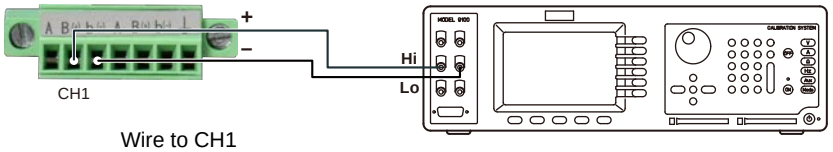
4 Apply appropriate input signals corresponding to 0, 50, and 100% of the input range and calculate the errors from the readings.
When the error is outside the measuring accuracy specifications, adjustment is possible.
Procedure: ▶section 2.8.2, “Adjusting the Universal Inputs and Built-in Humidity Sensor”

Operation complete

Note

For thermocouple inputs, you must measure the temperature of the input terminal and apply a voltage taking into account the reference junction temperature.

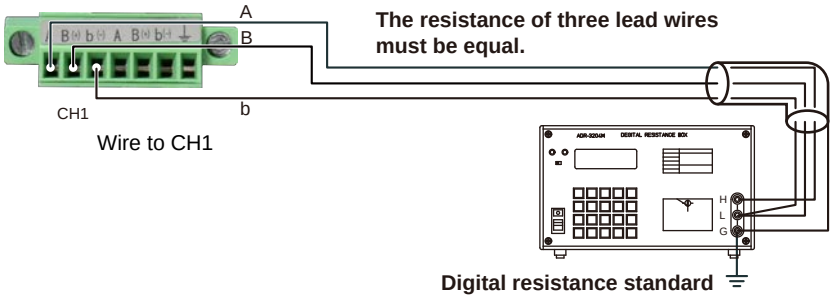
DC Voltage Measurement



Wire to CH1

DC voltage/current standard

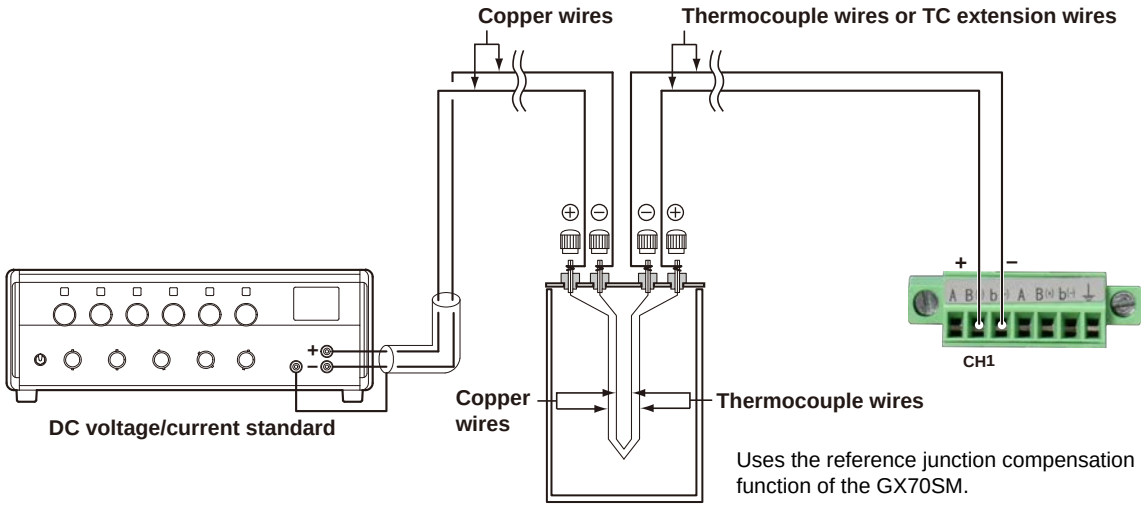
Temperature or Resistance Measurement Using an RTD



Wire to CH1

Digital resistance standard

Temperature Measurement Using a Thermocouple



DC voltage/current standard

Uses the reference junction compensation function of the GX70SM.

(0°C standard temperature device ZC-114/ZA-10 by Coper Electronics)

RJC of TC Input

As the measurement terminal of the GX70SM is generally at room temperature, the actual output of the thermocouple is different from the values given on the thermoelectromotive force table based on 0°C. The GX70SM performs compensation by measuring the temperature at the input terminal and adding the corresponding thermoelectromotive force to the actual output of the thermocouple. Therefore, when the measurement terminal is shorted (equivalent to the case when the detector tip is 0°C), the measured value indicates the temperature of the input terminal.
When calibrating the GX70SM, this compensation voltage (thermoelectromotive force of 0°C reference corresponding to the input terminal temperature) must be subtracted from the output of the standard generator before application. As shown in the figure, by using the 0°C standard temperature device to compensate the reference junction at 0°C, you can input the thermoelectromotive force of 0°C reference from the DC voltage standard and perform the calibration.

Built-in Humidity Sensor Calibration Procedure

Procedure

1. Warm up the reference device sufficiently.

2. In an environment where the temperature and humidity do not drastically change, such as in a thermostat chamber, arrange the reference and the GX70SM's built-in humidity sensor close to each other as shown in the following figure.

3. Determine the error from the difference between the humidity value of the reference and that of the GX70SM.
   When the error is outside the measuring accuracy specifications, adjustment is possible.
   Procedure: ▶section 2.8.2, "Adjusting the Universal Inputs and Built-in Humidity Sensor"

2.8.2 Adjusting the Universal Inputs and Built-in Humidity Sensor

This section explains how to adjust the universal input and built-in humidity sensor operation.

Built-in Humidity Sensor Adjustment Procedure

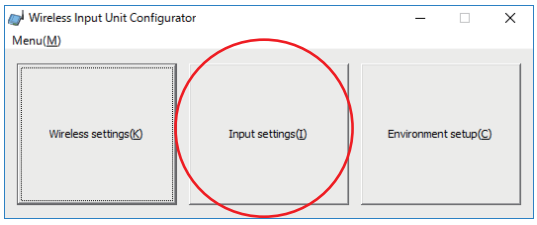
Procedure

1 In an environment where the temperature and humidity do not drastically change, such as in a thermostat chamber, arrange the reference and the GX70SM's built-in humidity sensor close to each other as shown in the following figure. Then leave them until the temperature and humidity of the instruments balance with the environment.
Do not connect a USB cable to the GX70SM yet.
Calibration is possible when the humidity of the reference is within the 35 to 75%RH range and the humidity difference between the reference and the built-in humidity sensor is within ±7%RH.

2 Set the GX70SM operation mode to configuration mode.
For details on operation mode, see section 1.5.1, "Setting the Operation Mode".

3 Connect a USB cable to the GX70SM to supply power, and press the reboot switch to restart the GX70SM.
In measurement mode, the operation is intermittent, but in configuration mode, it is continuous. In configuration mode, the internal temperature rises slightly, and this difference causes an increase in error. Therefore, adjust the built-in humidity sensor quickly after starting to supply power.

4 On the main window, click **Input settings**.



The Input Configuration window appears.

5 On the **Calib** menu, click **Calibrate input**.
A communication information input dialog box appears.

6 Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, "Communication Information Input Dialog Box"
An Calibrate input window appears.

7 Enter the humidity and temperature values of the reference in the **Reference humidity** and **Reference temperature** boxes, and click **Execute**.
An Information dialog box appears.

8 Click **OK**.
 appears next to the Execute button.

9 When the calibration of the built-in humidity sensor is complete, click **Save**.
A Save calibration values dialog box appears.

Note

If a calibration error is occurring, calibrate the universal input range and the built-in humidity sensor (/RH option) beforehand, and then click **Save**.

10 Click **OK**.
An Information dialog box appears.

11 Click **OK**.

Operation complete

Note

- If an error occurs in the GX70SM, the measured values of each channel after executing may show "*****."
- If the above error is a calibration error, restarting the GX70SM (pressing the reboot switch) after clicking Save may clear the error and cause the measured values to appear.
- If a calibration error occurs, calibrate all ranges of the universal input, perform a humidity calibration, save the values, and restart.
  (Perform humidity calibration only when the built-in humidity sensor option is available.)

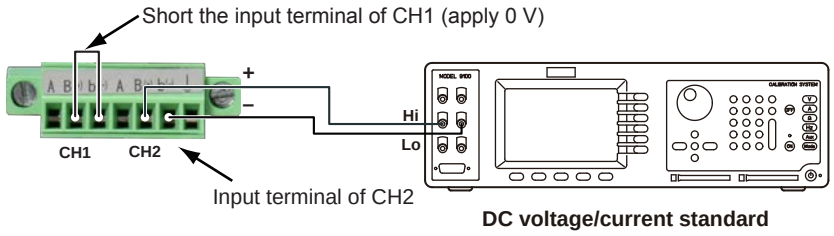
Universal Input Range Adjustment Procedure

Procedure

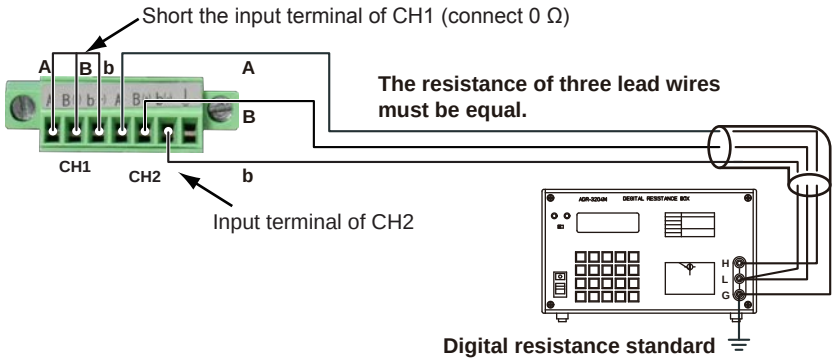
1 Set the GX70SM operation mode switch to configuration mode. Connect a USB cable to supply power, and change to configuration mode by pressing the reboot switch.

2 Wire the GX70SM and the reference as shown in the following figure, and adequately warm up the instruments.

Wiring for DC voltage range

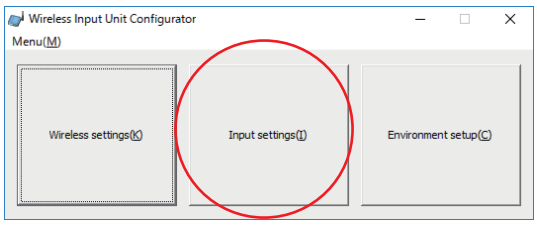


Wiring for RTD range



3 Check that the GX70SM's operating environment such as ambient temperature and humidity is within the standard operating conditions specified in the General specifications (GS 04L57B01-01EN).

4 On the main window, click **Input settings**.

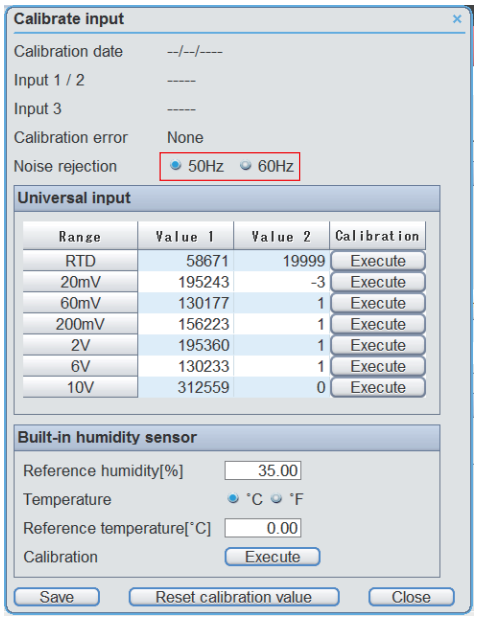


The Input Configuration window appears.

5 On the **Calib** menu, click **Calibrate input**.
A communication information input dialog box appears.

6 Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, “Communication Information Input Dialog Box”
An Calibrate input window appears.

7 To reject power frequency noise, click **50Hz** or **60Hz** according to the power frequency.



8 For each universal input range to be calibrated, apply the reference value from the reference according to the following table.

Range	Value 1 (CH1)	Value 2 (CH2)
RTD	0 Ω (short)	300 Ω
20mV	0 mV (short)	20 mV
60mV	0 mV (short)	60 mV
200mV	0 mV (short)	200 mV
2V	0 V (short)	2 V
6V	0 V (short)	6 V
10V	0 V (short)	10 V

You can click **Reset calibration value** to reset the calibration values of the universal inputs and built-in humidity sensor to the factory default condition.

9 Click **Execute** of the range you want to calibrate.
When the calibration is complete, an Information dialog box appears.

10 Click **OK**.
The calibrate value and  appears in the Calibrate input window.

11 Repeat steps 8 to 10 for each range to be calibrated.

12 When calibration of each range is complete, Click **Save**.
A Save calibration values dialog box appears.

Note

If a calibration error is occurring, calibrate the universal input range and the built-in humidity sensor (/RH option) beforehand, and then click **Save**.

13 Click **OK**.
An Information dialog box appears.

14 Click **OK**.
The calibration values will be saved to the GX70SM, and  disappears. While the values are being saved, the GX70SM LED (green and red) blinks rapidly.

15 Click **Close**.

Note

If a calibration error occurs, “Exists” is shown next to Calibration error.

Operation complete

2.9 Updating the Firmware

The GX70SM consists of a wireless communication module and input module. The firmware of each module is updated separately.

2.9.1 Downloading the Firmware Files

You can download the firmware files for the wireless communication module and input module from the following update website.

URL: http://www.smartdacplus.com/software/en/

Accessing the update website from the software

How to open the window:

- On the main window, click **Input settings** > on the Input settings window, click **Web to update** on the **Help** menu

Procedure

1 Download the firmware file according to the displayed instructions on the page.

Operation complete

2.9.2 Wireless Communication Module Firmware

This section describes how to update the firmware of the GX70SM wireless communication module.

Note

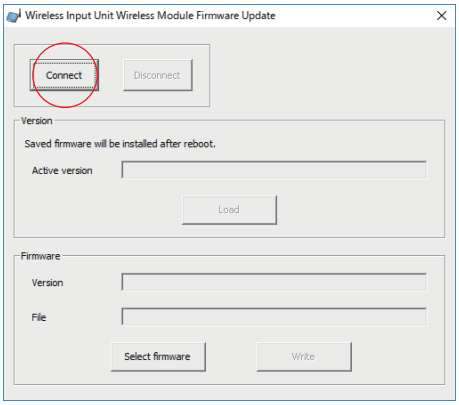
Save the configuration file of wireless settings before updating the firmware.

How to open this window:

- In the main window, click **Wireless settings**. In the Wireless Configurator window, click **Firmware update** on the **Tool** menu.

Procedure

1 Click **Connect**.
If a dialog box appears prompting you to enter the password, enter the password for connecting to the GX70SM, and click **Connect**.



2 Click **Load**.
The current firmware version of the wireless communication module is shown in the Active version box.

3 Click **Select firmware file**, and specify the firmware update file.
Check that the name of the firmware file for updating the wireless communication module is "WIU-Module_IN_dxxxxxx.dat."
If you specify a correct file, the version of the file is shown in the Version box and the file path in the File box.

4 Click **Write**.
The firmware is transferred to the wireless communication module, the module restarts, and the firmware is updated.

5 When writing is complete, press the reboot switch to restart.
The wireless communication module is restarted, and then the firmware is updated.
If the updated firmware is earlier than the firmware version used before, to delete the added functions, reset the firmware to the factory default condition.
Procedure: ▶section 2.10.4, "Restoring the Wireless Settings to Their Factory Default Condition"

Operation complete

Note

Do not remove the USB cable until the writing of the firmware is complete. Doing so may damage the instrument.

2.9.3 Input Module Firmware

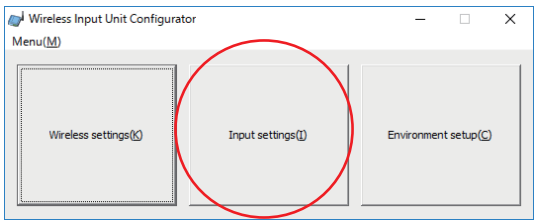
This section describes how to update the input module firmware.

Note

Save the configuration file of input settings before updating the firmware.

Procedure

1 On the main window, click **Input settings**.



The Input Configuration window appears.

2 On the **Calib** menu, click **Input firmware update**.
A communication information input dialog box appears.

3 Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, "Communication Information Input Dialog Box"
An Input firmware update window appears.

4 Click **Open**, and specify the firmware update file.
Check that the name of the firmware file for updating the input module is "XXXXXXXX.wom."
If you specify a correct file, the version of the file is shown in the Version box.
The firmware version of the input module appears.

5 Click **Next**.
An Input firmware update dialog box (W8111) appears.

6 Click **OK**.
The firmware is transferred to the input module, and an Input firmware update dialog box (M8204) appears.

7 Click **OK**.

8 When updating is complete, press the reboot switch to restart the GX70SM.

Note

- Input settings are initialized after the input module firmware is updated.
- Do not remove the USB cable until the writing of the firmware is complete. Doing so may damage the instrument.

Operation complete

2.10 Other Operations

2.10.1 Viewing the Version Information

This section describes how to show the version information of Input settings program.

How to open this window:

- On the main window, click **Input settings** > on the Input settings window, click **Version** on the **Help** menu

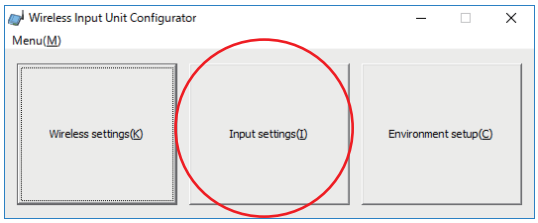
2.10.2 Viewing the Data File Information

The following data file information is shown.

- Logging data file (WLD file)
- Wirelessly retrieved data (GLK file)
- Combined data file (WLC file)
- GX/GP/GM event data file (GEV file, GSE file)

Procedure

1. On the main window, click **Input settings**.



The Input Configuration window appears.

2. On the **File** menu, click **Data file information**.
A file selection window appears.

3. Select the data file that you want to open, and click Open.

Operation complete

2.10.3 Resetting the Input Settings and Logging Data to Their Factory Default Conditions

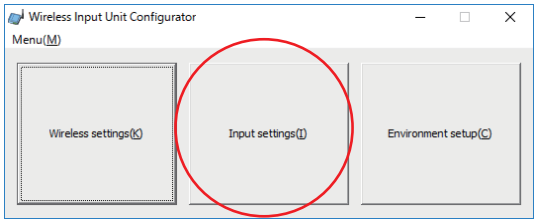
This section describes how to reset the GX70SM's input settings and logging data to their factory default conditions.

Note

- When you initialize the input settings, logging data, the logging data stored in the GX70SM will be deleted, and you will not be able to save it to a logging data file (WLD file) and wirelessly retrieved data (GLK file). If necessary, save the logging data or wirelessly retrieved data beforehand.
- To initialize the displayed content of the Input settings window, click **Initialize settings being edited** on the **Edit** menu. This initialization does not affect the GX70SM that is connected through the USB cable.

Procedure

1. On the main window, click **Input settings**.

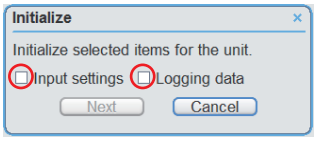


The Input Configuration window appears.

2. On the **Calib** menu, click **Initialize**.
A communication information input dialog box appears.

3. Set the communication information, and click **OK**.
Procedure: ▶section 2.6.1, "Communication Information Input Dialog Box"
A Initialize window appears.

4. Select the items you want to initialize, and click **Next**.



A Initialize dialog box appears.

5. Click **OK**.

Operation complete

2.10.4 Restoring the Wireless Settings to Their Factory Default Condition

You can restore the settings of the connected GX70SM wireless communication module to their factory default condition.

Note

When you execute **Restore factory preset**, all the current values are cleared. Save the settings to a configuration file in advance.

How to open this window:

- In the main window, click **Wireless settings**. On the Wireless Configurator window, click **Restore factory preset** on the **Tool** menu.

Procedure

1. Click **Yes**.
   A message appears for confirming the execution.

2. Click **OK**.
   The wireless communication module restarts, and the settings return to their factory default condition.

3. Configure the GX70SM wireless settings.
   Procedure: ▶section 2.5, “Configuring the Wireless Settings of the Wireless Input Unit”

Operation complete

2.11 Messages

2.11.1 Error Message

Code	Message	Description, Corrective Action, Ref. Section
E8001	Failed to connect to the wireless input unit.	A communication error occurred with the wireless input unit. Check the following. • Check the USB cable connection. • Check that the USB driver is installed. ▶See section 2.3.1, “Connection Configuration for Wireless Input Unit Configurator” on page 2-5. • With Device Manager, check that the USB COM port is recognized.
E8002	Password is incorrect.	If Omit password in the Environment Configurator window is set to No, the password that you just entered does not match that set in the wireless input unit. Enter the correct password. If Omit password in the Environment Configurator window is set to Yes, the password entered to the right of Yes does not match that set in the wireless input unit. Enter the correct password, or consolidate the password between wireless input units. If you forget the password for connecting to the GX70SM from the Wireless Input Unit Configurator, you cannot reset the password from the Wireless Input Unit Configurator. If you forget the password, servicing will be required. Contact your nearest YOKOGAWA dealer.
E8004	Failed to execute.	This appears when the execution of an operation on a unit results in error.
E8005	Failed to save the file.	Failed to save the file. Check the folder, file properties, and file access privileges.
E8006	Failed to read the file.	Failed to open the file. Check the file name.
E8008	Access to the file is denied.	Check the access privileges to the file. Check whether the file system limit has been exceeded.
E8009	The disk is full.	Check the free space in the save destination.
E8010	The directory is full.	Check the number of files in the save destination.
E8011	The file is invalid.	A file format error.
E8012	Sharing violation occurred.	The file is already opened in another application. Close the file.
E8013	The directory does not exist.	The directory may have been deleted.
E8014	This file of the wireless input unit settings is not supported.	You opened a configuration file of a wireless input unit not supported by the Wireless Input Unit Configurator. The specified configuration file cannot be used.
E8015	Bad file path is specified.	You specified a control character that cannot be used in a file name on Windows. Change the file name.
E8016	Failed to start PDF Reader.	• Check that Adobe Acrobat Reader is installed. • Check that PDF files are associated with Adobe Acrobat Reader.
E8017	Calibration error.	Calibration error. Check the following. • Check that the reference value is correct. • Check that the wiring is correct. • Check that the USB cable has not been disconnected before the execution results became available. If none of these is the cause of the problem, contact your nearest YOKOGAWA dealer.
E8018	Failed to save calibration value.	Failed to save calibration value. Check that the USB cable has not been disconnected before the execution results became available. If this is not the cause of the problem, contact your nearest YOKOGAWA dealer.
E8019	Failed to read calibration value.	Failed to read calibration value. Check that the USB cable has not been disconnected before the execution results became available. If this is not the cause of the problem, contact your nearest YOKOGAWA dealer.

Continued on next page

Code	Message	Description, Corrective Action, Ref. Section
E8020	No data available to be read.	Because there is no valid logging data or wirwlessly retrival data, the logging data file (WLD file) or wirwlessly retrival data file (GLK file) cannot be created.
E8021	Failed to start Internet Explorer.	Install Internet Explorer.
E8022	No data available to be combined. -Logging data has been initialized.	The logging data was initialized, and there is no data that can be retrieved. Initialization is performed at the following times. • When logging data is initialized using Initialize on the Calib menu • When Input firmware update on the Calib menu is executed.
E8023	No data available to be combined. -No logging data after last changing setting.	If you change the channel settings of an input module, you will no longer be able to retrieve the logging data before the change. No measurement has been made after this change, so there is no data that can be retrieved.
E8024	This version of the wireless input unit is not supported. Please update this setting program.	Please update the software to the latest version.
E8025	Unable to execute. Please create a matching option configuration by selecting File > New or Read/change settings > Read input settings.	The action is not performed because the model and option are not supported. The enhanced data backup function (/DB option) status does not comply with the requirements when acquiring or saving logging data or wirelessly retrieved data.

2.11.2 Warning Messages

Code	Message	Description, Corrective Action, Ref. Section
W8101	Read input settings from connected unit. Clear the current content?	This is a confirmation for the input settings. To continue, click **OK**. To cancel, click **Cancel**.
W8102	Change the input setting.	This is a confirmation for applying the input settings. To continue, click **OK**. To cancel, click **Cancel**.
W8105	Edited content will be discarded, is it OK?	This is a confirmation for discarding the input settings. To continue, click **OK**. To cancel, click **Cancel**.
W8106	Connected unit and the edited configurations don't match. Execute the operation?	This is a message that appears during input calibration when you try to execute calibration, save calibration values, or reset calibration values on a unit with a device serial number different from that of the unit that was identified when the unit was connected. Clicking OK executes the command.
W8107	Reset the values being edited back to default. The current edited content will be discarded.	This is a confirmation for discarding the input settings. To continue, click **OK**. To cancel, click **Cancel**.
W8108	Save calibration value?	This is a confirmation for saving the calibration value. To continue, click **OK**. To cancel, click **Cancel**.
W8109	The calibration value is reset to the factory default value. Abort calibration without saving?	This is a confirmation for discarding the calibration value. To continue, click **OK**. To cancel, click **Cancel**.
W8110	The value being calibrated has not been saved, is it OK? Please restart the unit to finish.	This is a confirmation for discarding the calibration value. To continue, click **OK**. To cancel, click **Cancel**.
W8111	Update the input firmware?	This is a confirmation for updating the firmware of the input module. To continue, click **OK**. To cancel, click **Cancel**.
W8112	Execute initialization? • Logging Data archived before this change won't be retrieved. Please obtain and/or save the logging data accordingly.	This is a confirmation for initializing the wireless input unit. To continue, click **OK**. To cancel, click **Cancel**.
W8114	Input setting has not been changed. Retry changing or initialize input setting.	The input settings have not been applied completely because of the USB cable being disconnected or some other reason while input settings were being applied to the input module. Apply the input settings again, or initialize the settings.
W8115	Updating the input firmware has not been completed. Retry updating the input firmware.	The updating of the input module's firmware is incomplete because of the USB cable being disconnected or some other reason while the firmware was being updated. Retry updating the input module's firmware.
W8116	Change the input setting. Connected unit and the edited configurations don't match. Execute the operation?	This is a confirmation for applying the input settings. This appears when you try to apply the settings to a unit with a serial number different from that loaded in the current configuration window. To continue, click **OK**. To cancel, click **Cancel**.

Continued on next page

Code	Message	Description, Corrective Action, Ref. Section
W8117	Same file name exists, overwrite?	This is a confirmation for overwriting a file with the same name. This appears when there is a file with the same name that will be overwritten in the save destination. To continue, click **OK**. To cancel, click **Cancel**.
W8118	Some items not set.	This appears when some of the items cannot be applied when applying the input settings. • Examples when there are invalid settings for the relevant unit due to differences in the system configuration. Example 1: If the humidity option is set to available in the local settings and sent to a unit without the humidity option. Example 2: If temperature unit °C is sent to a Japanese model from the English version of Wireless Input Unit Configurator English.
W8119	Change the input setting. • Logging Data archived before this change won't be retrieved. Please obtain and/or save the logging data accordingly.	This is a confirmation for applying the input settings. This indicates that it will not be possible to save previous logging data after changing this setting. If necessary, save the logging data. To continue, click **OK**. To cancel, click **Cancel**.
W8120	Change the input setting. • Connected unit and the edited configurations don't match. Execute the operation? • Logging Data archived before this change won't be retrieved. Please obtain and/or save the logging data accordingly.	This is a confirmation for applying the input settings. This appears when conditions of W8116 and W8119 are met simultaneously. If necessary, save the logging data. To continue, click **OK**. To cancel, click **Cancel**.

2.11.3 Information Messages

Code	Message	Description, Corrective Action, Ref. Section
M8201	Executed successfully.	The process finished successfully.
M8202	Receiving the input settings finished.	The input settings have been received successfully.
M8203	Changing the input settings finished.	The input settings have been applied successfully.
M8204	Updated input firmware successfully. After rebooting the unit, firmware will be changed.	The updating of the input module firmware has finished successfully. To continue operating, press the reboot switch to restart the GX70SM.
M8205	Reading the logging data from the unit, and saving a logging data file finished.	The logging data file (WLD file) has been saved successfully.
M8206	Reading the logging data from the unit, and saving some logging data files finished.	The logging data file (WLD file) has been saved successfully. The data has been divided into several files.
M8207	This software is able to combine Logging Data archived in GX70SM with the original data files which has lacking data on GX20, GP20 and GM10 due to communication failure. To make the GX20/GP20/GM10 recording data combinable, configure the GX20/GP20/GM10 appropriately.	This appears when Wireless Input Unit Configurator is started for the first time after this software is newly installed or after an update is installed.

2.12 GX70SM Error Information

Error information display	Corrective action
Calibration value error	There is an error in the calibration value. Adjust the universal input and built-in humidity sensor (when the option is available), and write the calibration value. Then, restart the GX70SM. If the error persists after restarting, contact your nearest YOKOGAWA dealer.
A/D error 1	There is a hardware error. Contact your nearest YOKOGAWA dealer.
A/D error 2	
Hardware error	
Configuration error “input”	There is an error in the input settings. Configure the input settings. Then, restart the GX70SM.
Configuration error “wireless”	There is an error in the wireless settings. Configure the wireless settings. Then, restart the GX70SM.
Memory error (1)	There is an error in the settings. Configure the input and wireless settings. Then, restart the GX70SM.
Memory error (2)	There is an error in the logging data. Initialize the logging data. Then, restart the GX70SM.

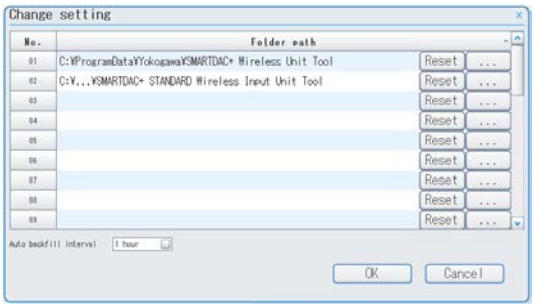
2.13 Configuring the Auto Backfill Tool

2.13.1 Setting Backfill Data Folder and Auto Backfill Interval

Procedure

1. On the, **Setting menu**, click **Change settings**.
   The Change settings dialog box opens.

2. Click [...] to specify the save destination for files to be backfilled.
   You can specify up to 30 folders.
   The folder path specified for the backfill data folder appears.



   If the folder name is too long and cannot be displayed fully, only the first and last directories of the path are displayed and "..." is used to indicate the directories in between.

Note

You can specify a network folder, but we do not recommend doing so.

3. From the Auto backfill interval pull-down menu, select the interval to run backfill.

   You can choose from the following setting values: 1 hour, 2 hours, 3 hours, 6 hours, 12 hours, or 24 hours.

4. Click **OK**.
   Backfill is run at the specified interval.

   If you change the auto backfill interval setting, the timer is reset when you save the changes.
   A scan is done once the new modified amount of time has elapsed; and if there are files that can be backfilled, the backfill process is run.

Operation complete

2.13.2 Running backfill manually

You can run backfill at any time.

Procedure

1. On the **File** menu, click **Backfill**.
   Backfill is run.

   If the tool status in the folder is Scanning or Backfilling, the process cannot be run. Check that the tool status is Ready before running backfill.

Operation complete

2.13.3 Viewing the Version Information

This section describes how to show the version information of Auto-Backfill tool program.

1. On the **Help** menu, click **Version**.
   The version information window appears.

Operation complete

2.13.4 Error Message

Code	Message	Description, Corrective Action, Ref. Section
E8001	Duplicate backfill data folders selected.	In the backfill data folders specified in the Change settings dialog box, there may be duplicate folders specified. Check for duplicates, then change or reset the data folders.

Blank

3.1 GX/GP/GM's Wireless Input Unit Functions (Release number 4.02 and later)

The GX/GP/GM (/CM2, /CM3 option) (coordinator) has the following functions for the GX70SM.

GX70SM Management

The connected GX70SM can be placed under control by reconfiguring the wireless input unit, and various information about the GX70SM, such as the GX70SM status and communication channels acquiring data, can be confirmed.

- GX70SM information can be controlled centrally.
- The status of GX70SMs can be monitored.
- Wireless input units are reconfigured on the Wireless input unit reconfiguration screen.

Auto Wireless Configuration

Configuration to acquire GX70SM data (e.g., communication channel settings) can be performed automatically by reconfiguring the wireless input unit.
Configuration can be performed on all units collectively or specific units.

Wireless Data Dropout Detection

▶ See section 1.2.9, "Data Dropout Detection (GX/GP/GM)" on page 1-9.

Loop Calibration

Calibration correction (loop calibration) can be performed on the communication channels acquiring GX70SM data.

GX70SM Maintenance

To perform maintenance on GX70SM's internal logging data acquisition and the like, the data dropout time-out detection from the GX70SM can be temporarily paused.
Further, a GX70SM disconnected from the wireless network can be restored manually.
You can pause and resume the data dropout time-out detection on the Wireless input unit reconfiguration screen. You can manually restore a GX70SM disconnected from the wireless network on the Wireless input unit info screen.

Wireless Data Retrieval (Version 4.09 and later)

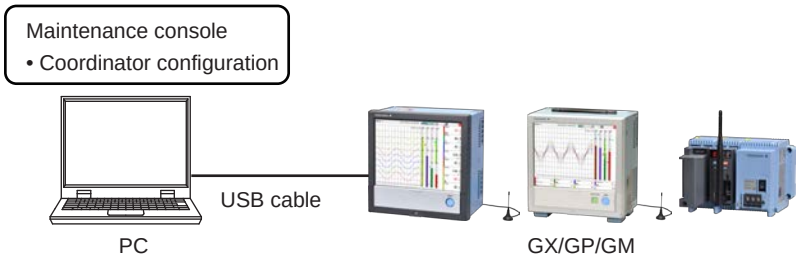
▶ Refer to section 1.2.15, "Backfill Function" on page 1-11.

3.2 Configuring to Automatically Connect Wireless Input Units to the GX/GP/GM (Coordinator)

3.2.1 GX/GP/GM Coordinator Configuration

From the maintenance console (by Oki Electric), configure the coordinator settings of the GX/GP/GM (coordinator).

▶ For details on the configuration, see the 920 MHz Wireless Communication, MH920 Console International User's Manual (IM 04L51B01-41EN).



3.2.2 Communication (Serial) Configuration

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > **Communication (Serial) settings** > **Basic settings**
Web application: **Config.** tab > **Communication (Serial) settings** > **Serial basic settings**
Hardware configurator*: **Communication (Serial) settings** > **Serial basic settings**

* Indicates the SMARTDAC+ Hardware Configurator. The same applies hereafter.

Description

Receiver

Setup Item	Selectable Range or Options	Default Value
Function	Off, Modbus master, Wireless input unit	Modbus master
Address*	1 to 247	1

* If Function is set to Wireless input unit, you cannot set the address.

Function

To connect to a GX70SM, select **Wireless input unit**.

Note

If the function is change to anything other than Wireless input unit, the following changes take place.

- For the communication interval in Basic settings of Communication (Serial) settings, 5 min to 1 h settings are changed to 1 s.
- For the Alarm settings of Communication channel settings, the type "D: Comm lose due to time out" is changed to Off.

Address

When the function is set to Modbus master, set the GX/GP/GM (coordinator) address.

Data transfer

Item	Value
Baud rate	115200 (bps)
Parity bit	None
Stop bit	1bit

Baud rate, Parity bit, Stop bit

Data transfer settings are fixed. They cannot be changed.

3.2.3 Communication Interval and Recovery Action of Modbus Master

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > **Communication (Serial) settings** > **Modbus master** > **Basic settings**
Web application: **Config.** tab > **Communication (Serial) settings** > **Modbus master Basic settings**
Hardware configurator: **Communication (Serial) settings** > **Modbus master Basic settings**

Description

Master function

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

On/Off

In the Receiver settings, if the function is set to Wireless input unit, the Module master function is fixed at On.
When the function is set to Modbus master, set this to On.

Communication

Setup Item	Selectable Range or Options	Default Value
Interval	100 ms, 200 ms, 500 ms, 1s , 2 s, 5 s, 10 s, 20 s, 30 s, 1 min, 2 min*, 5 min*, 10 min*, 20 min*, 30 min*, 1 h*	1s
Communication timeout	100 ms, 200 ms, 250 ms, 500 ms, 1 s, 2 s, 5 s, 10 s, 1 min	1s
Gap between messages	Off, 5 ms, 10 ms, 20 ms, 50 ms, 100 ms	Off

* If the receiver function is set to Modbus master, these values are not available.

Interval

Set the interval for communicating with the GX70SM.
We recommend the interval be set about half the send (scan) interval of the GX70SM.
Example:
GX70SM send (scan) interval = 1 (min)
Communication interval: 30 s

Communication timeout

Set the timeout value for the response from the specified slave when a command is sent from the GX/GP/GM.

Gap between messages

Set the amount of time to wait after receiving a response to a command to send the next command.

Recovery action

Setup Item	Selectable Range or Options	Default Value
Retry	Off, Once, Twice, 3 times, 4 times, 5 times, 10 times, 20 times	Once
Wait time	Off, 5 s, 10 s, 30 s, 1 min, 2 min, 5 min	5 s

Retry

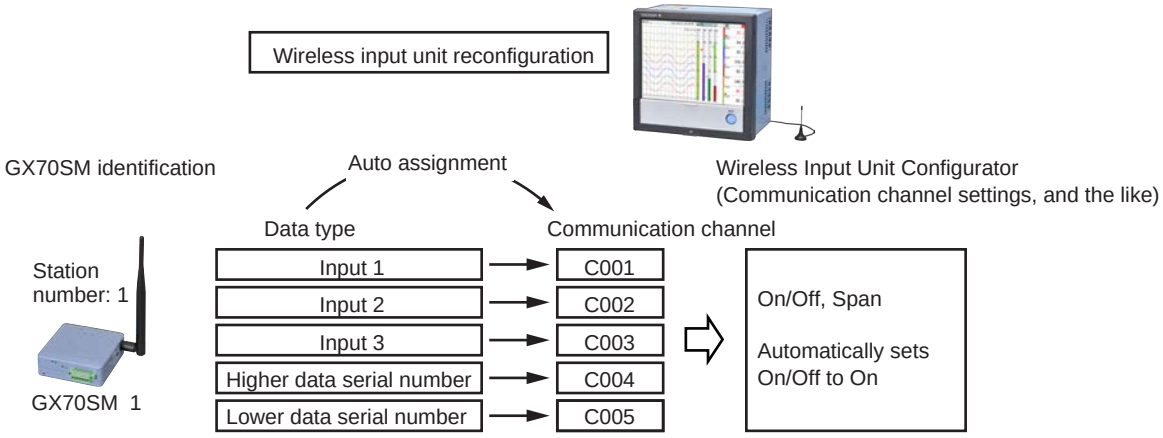
Set the number of retransmissions when there is no response from the slave device.

Wait time

Set the auto recovery time from communication halt.

3.3 Reconfiguring the Wireless Input Unit and Automatically Assigning It

You can reconfigure the wireless input units on the GX/GP/GM to automatically assign the GX70SM data to communication channels and configure other settings related to data acquisition.
Communication channels are assigned based on the station numbers assigned to the GX70SMs. A single GX70SM uses five communication channels.
Assignment of station numbers and communication channels



Data serial number: Serial number assigned to each data value measured by the GX70SM

Unit Numbers (Station Numbers) and Communication Channels

Unit number (station number)	Communication channel	Description
1	C001	Input 1
	C002	Input 2
	C003	Input 3
	C004	Higher data serial number
	C005	Lower data serial number
2	C006	Input 1
	C007	Input 2
	C008	Input 3
	C009	Higher data serial number
	C010	Lower data serial number
:	:	:
50	C246	Input 1
	C247	Input 2
	C248	Input 3
	C249	Higher data serial number
	C250	Lower data serial number
:	:	:
95	C471	Input 1
	C472	Input 2
	C473	Input 3
	C474	Higher data serial number
	C475	Lower data serial number
96	C476	Input 1
	C477	Input 2
	C478	Input 3
	C479	Higher data serial number
	C480	Lower data serial number

3.3.1 Wireless Data Retrieval Settings and Displaying the Wireless Input Unit Reconfiguration Screen

Path

GX/GP: **MENU** key > **Browse** tab > **Init/Calib** > menu **Wireless input unit reconfiguration**
Web application:[1] **Calib** tab > **Wireless input unit reconfiguration**
Hardware configurator:[2] **Operation** tab > **Wireless input unit reconfiguration**

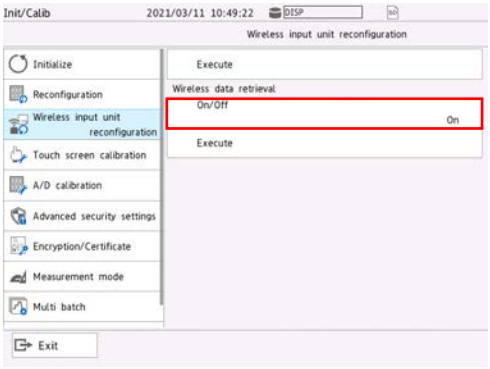
1 Wireless input unit reconfiguration using the Web application is only possible for the GM10.
2 Wireless input unit reconfiguration of the hardware configurator only supports the GM10. Wireless input unit reconfiguration of the hardware configurator performs Update all connection info and Reconfiguration all units at once. It is not possible to perform only Update all connection info, only Reconfiguration all units, or individual unit operation.

Wireless Data Retrieval Settings (Version 4.09 and later)

Enables or disables the wireless data retrieval function.
You must reconfigure the wireless input unit if you change the settings.
The default value for the wireless data retrieval function is Off. If you do not want to enable the wireless data retrieval function, refer to “Displaying the Wireless Input Unit Reconfiguration Screen” and subsequent pages.

Procedure

1 Select On for the On/Off setting to enable the wireless data retrieval function, and OFF to disable it.



- You cannot change the settings during the start of recording or computing.
- You cannot change the settings if the currently logged in user has restrictions.

User level	Limitations
Second Administrator	Reconfiguration is locked under Admin property
User	System operation is locked User property

2 Select **Execute** for the wireless data retrieval.
A confirmation dialog box appears.

3 Select **OK**.
The settings are changed and a wireless input unit reconfiguration screen appears.

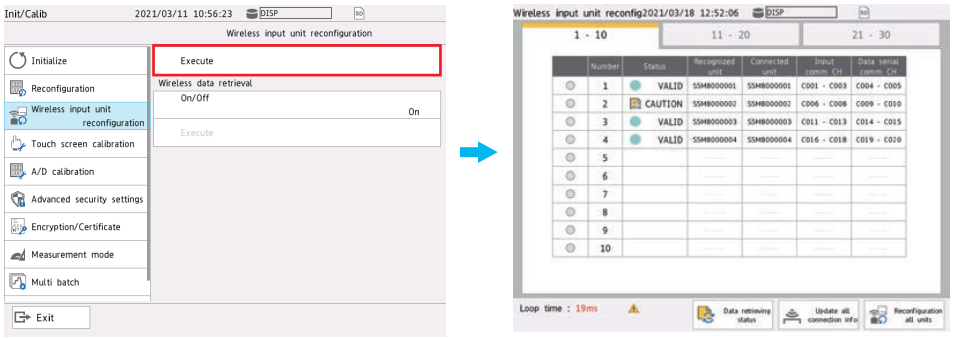
Operation complete

Displaying the Wireless Input Unit Reconfiguration Screen

Switch to the wireless input unit reconfiguration screen.

Procedure

1 Select **Execute**.
A Wireless input unit reconfiguration screen appears.

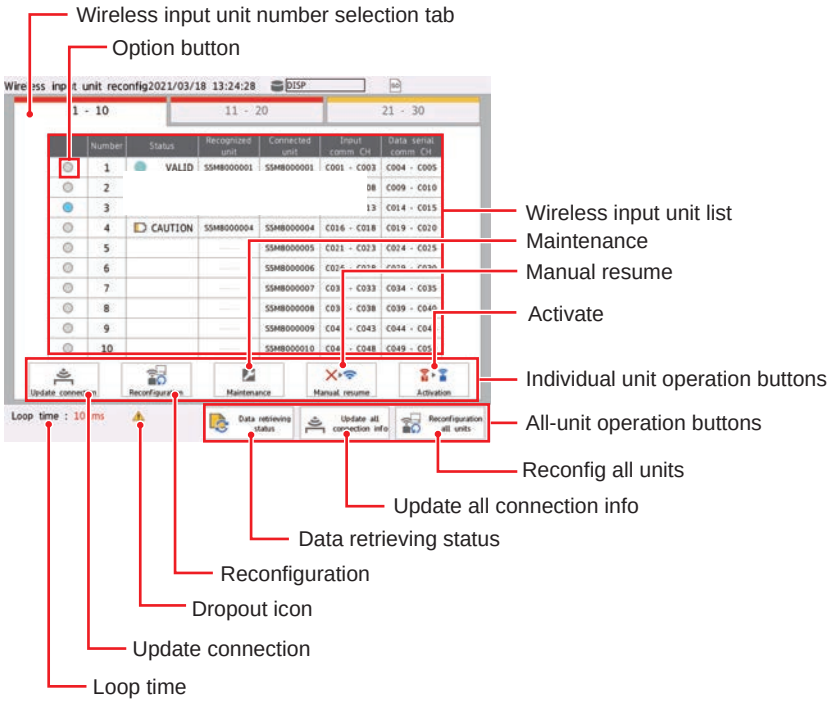


Operation complete

Note

- In the following situations, the wireless input unit reconfiguration screen cannot be displayed or registered to favorite and standard screens.
  - Under Basic configuration of Communication (Serial) settings, the receiver function is set to something other than Wireless input unit
  - When system operation is restricted in security settings
  - When the user is logged out or when a monitor user is logged in (/AS)
- The Wireless input unit reconfiguration screen cannot be registered to the multi panel screen.

Description of the Wireless Input Unit Reconfiguration Screen



Setup Items and Descriptions

Item	Description
Wireless input unit number selection tab	Tap to change the units to show in the wireless input unit list. The tabs are shown with a color corresponding to the status of the GX70SMs contained in the tab. ▶ See “Details of the Status Display” (explained later).
Wireless input unit list	Lists the GX70SMs that are currently connected. Tap to show detailed information. **Information shown in the wireless input unit list** Item / Description: No. — GX70SM station number Status — GX70SM status Recognized unit — Serial number of the reconfigured GX70SM Connected unit — Serial number of the wireless input unit that can be reconfigured Input comm CH — Communication channel number (input 1, input 2, humidity) where the GX70SM measurement data will be stored Data serial comm CH — Communication channel number (input 1, input 2, humidity) where the GX70SM measurement data serial number will be stored (higher, lower)
Update all connection info	Displays all reconfigurable GX70SMs under Connected unit.
Reconfiguration all units	Reconfigures all GX70SMs based on the acquired connection information. Automatically assigns GX70SMs to communication channels and configures settings.
Data retrieving status	The collection status of the wirelessly retrieved data is displayed.
Option button	Selects the GX70SM. When you select a GX70SM, the individual unit operation buttons become available.
Update connection	If the selected GX70SM is reconfigurable, it is shown under Connected unit.
Reconfiguration	Reconfigures the selected GX70SM.

Continued on next page

Item	Description
Maintenance	Pauses or resumes the timeout detection operation on the selected GX70SM. Use this button if you do not want the wireless data dropout alarm to go off during the GX70SM maintenance.
Manual resume	Resumes the communication with a disconnected GX70SM.
Activation (/AS option)	Enables data to be collected when a reconfigured device is changed to another device.
Loop time	Shows the total execution time of all Modbus commands. If this time is longer than the specified communication interval, change the interval value. If the total execution time exceeds the communication interval at any time, the loop time turns red, and a dropout icon appears. Tap the icon to return to the previous display.* * Click in the case of the Web application.

Details of the Status Display

Status display	Wireless status	Sub status*	Description	Priority	Color of the wireless input unit number selection tab
VALID	VALID	—	Communicating normally	Low	
OPENED	OPENED	—	Trying to collect data • Retransmitting command after a communication failure • Before successfully receiving data after reconfiguration		
CAUTION	CAUTION	BAD_COMM	Communication response error		
CAUTION		LOW_BATTERY	Low GX70SM battery level warning		
CAUTION		RETRIEVE	Creating a wirelessly retrieved data file This is displayed for the duration of the file creation.		
CAUTION		DATA_LOST	GX70SM data dropout detection		
MAINT		MAINT	GX70SM timeout detection operation paused		
CAUTION		UNIT_CHANGE	A GX70SM with a serial number different from the one that has been reconfigured is connected (/AS option)		
CAUTION		DEAD_ BATTERY	Dead GX70SM battery warning		
ERROR		ERROR	GX70SM operation error (a condition in which a connection is required between the GX70SM and PC) • Setting, calibration value error • A/D error • Hardware, CPU error • FLASH/FRAM sum value error • Mode setting error • Burnout		
FAILED	FAILD	—	Disconnected status This occurs when there is no communication with the GX70SM for about 90 minutes.	High	

* If the GX70SM has several sub statuses, only the one with the highest priority is shown. You can check the details of the sub status with the sub status description provided in the detailed information.

Display when the sub status is LOW_BATTERY or DEAD_BATTERY

GX70SM USB power supply status	Displayed location	
	Status	Detailed information
USB power being supplied	Not displayed	Displayed
USB power not being supplied	Displayed	Displayed

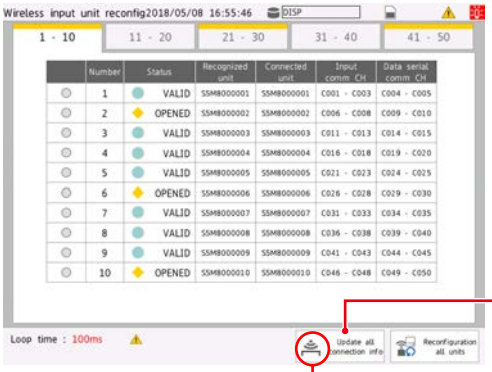
Maintenance (MAINT) Display

A GX70SM under maintenance is indicated with a blinking icon.*

* Only a solid icon is displayed on the Web application (no blinking).

3.3.2 Retrieving the Wireless Input Unit Connection Information

Use the Wireless input unit reconfiguration screen.
Before performing wireless input unit reconfiguration, reconfigurable GX70SMs must be retrieved. When you execute Update connection, information of the GX70SMs that the GX/GP/GM can reconfigure is updated.



* There is no icon display on the Web application.
A waiting indication is shown while connection information is being retrieved.

Retrieving Connection Information of All GX70SMs

Connection information of all GX70SM in the wireless network can be retrieved.

Procedure

1. Select **Update all connection info**.
   Connection information of all GX70SM in the wireless network is retrieved.

   Then, reconfigurable GX70SMs are listed in the Connected unit column.

Note

The information of the GX70SMs that are currently connected is simply retrieved. This does not perform wireless input unit reconfiguration.

Operation complete

Retrieving Connection Information of Individual GX70SMs

Connection information of only the selected GX70SM can be retrieved.

Procedure

1. Select the option button for the GX70SM you want to retrieve the information of.
   Individual operation buttons become available.

2. Select **Update connection**.
   The connection information of the selected GX70SM is retrieved.

   Then the information is displayed.

Operation complete

3.3.3 Reconfiguring Wireless Input Units

Use the Wireless input unit reconfiguration screen.

Note

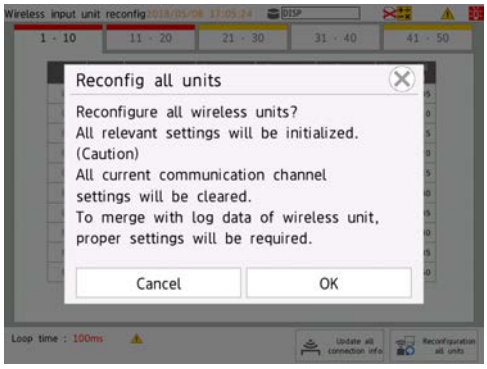
- Reconfiguration is not possible when the system operation is locked, setting operation is locked, while connection information is being retrieved, while recording, while computing, or while the system is being controlled.
- When Reconfiguration all units is executed, all communication channel settings will be initialized.

▶ There are certain GX/GP/GM settings that need to be configured to combine data. See section 2.7, “Saving Logging Data to a File and Combining Logging Data” on page 2-31.

Reconfiguring All GX70SMs

Reconfiguration can be performed on all GX70SMs that can be reconfigured by the GX/GP/GM.
Establish wireless connections with the GX70SMs, have the GX70SMs recognized by the GX/GP/GM.
Reconfigure all GX70SMs after having retrieved the connection information.

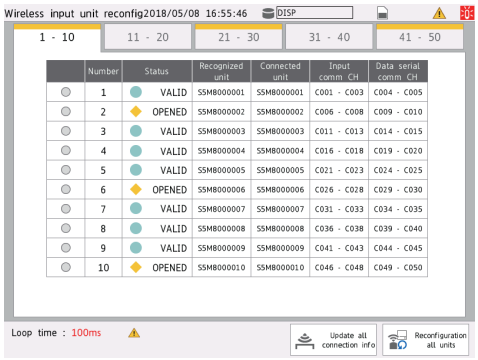
1 Select **Reconfiguration all units**.
A confirmation dialog box appears.



▶ For settings that are required for data combining, see “Notes before Starting to Record” in section 2.7.2, “Combine Data Files” on page 2-35

2 Select **OK**.
Reconfiguration is performed.

Then, GX70SMs that have been reconfigured are listed in the Recognized unit column.



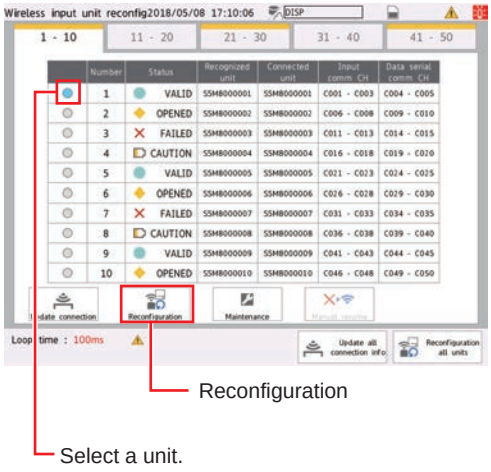
Operation complete

Reconfiguring Individual GX70SMs

Only the selected GX70SM can be reconfigured.

Procedure

1. Select the option button for the GX70SM you want to reconfigure.
   Individual operation buttons become available.



2. Select **Reconfiguration**.
   A confirmation dialog box appears.

3. Select **OK**.
   The selected GX70SM is reconfigured.

   Then, the GX70SM that has been reconfigured is listed in the Recognized unit column.

Operation complete

3.4 Configuring the Settings for Wireless Input Unit Data

This section explains how to configure various settings for the data retrieved from the GX70SM.
Settings that are shared with communication channels are applied to the channels.

3.4.1 Enabling Channels and Setting the Span, Decimal Point, Unit, and the Like

Set the span, decimal point, unit and the like for the GX70SM data.

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **On/Off, Span**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **On/Off, Span**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **On/Off, Span**

Description

Setup Item	Selectable Range or Options	Default Value
First unit number	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 96	1
Last unit number	Same as the first unit number	1
Data type	Input 1, Input 2, Input 3, Higher data serial, Lower data serial	Input 1

First unit number, Last unit number

Select the target unit numbers.
Only the unit numbers of GX70SMs that the GX/GP/GM has recognized can be selected.

Data type

Select the GX70SM data type.

Options	Description
Input 1	Channel 1 data.
Input 2	Channel 2 data.
Input 3*	Channel 3 data. (Humidity sensor)
Upper data serial	Higher data serial number.
Lower data serial	Lower data serial number.

* This appears even if the /RH option is not installed.

On/Off, Span

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	On
Decimal place*	0/1/2/3/4/5	0
Span Lower*	-9999999 to 99999999	0
Span Upper*	-9999999 to 99999999	100
Unit*	Character string (up to 6 characters, Aa#1)	—

* Appears when the On/Off settings is set to On.

On/Off

Select **On** when you want to set the data type for the selected GX70SM (unit number).
When wireless input unit reconfiguration is executed, the On/Off settings of recognized GX70SMs are set to On.

Decimal place

Set the decimal place for span lower and span upper.
Set the decimal places of Input 1 to Input 3 the same as the decimal places of the ranges set on the wireless input units.
This is fixed to 0 when the data type is set to Higher data serial or Lower data serial.

Span Lower, Span Upper

Set the lower and upper span values.

Unit

Set the unit.

At Power on*

Setup Item	Selectable Range or Options	Default Value
Value at power on	Last value, Preset value	Last value

* Appears when On/Off is set to **On**.

Value at power on

Set the value to replace the communication channel value at power-on.

Preset value*

Setup Item	Selectable Range or Options	Default Value
Preset value	-9.999999E+29 to 9.999999E+29 -9.9999999E+29 to -1.0000000E-30,0, 1.0000000E-30 to 9.9999999E+29	0

* Appears when On/Off is set to **On**.

Preset value

Set the value for when Value at power on is set to Preset value or Preset value at time-out is set to on.

3.4.2 Alarm Settings

This section explains how to set alarms for the data retrieved from the GX70SM.
The settings are applied to the alarm settings of the communication channels.

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **Alarm**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **Alarm**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **Alarm**

Description

Setup Item	Selectable Range or Options	Default Value
First unit number	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 96	1
Last unit number	Same as the first unit number	1
Data type	Input 1, Input 2, Input 3, Higher data serial, Lower data serial	Input 1

First unit number, Last unit number

Select the target unit numbers.
Only the unit numbers of GX70SMs that the GX/GP/GM has recognized can be selected.

Data type

Select the GX70SM data type.

Options	Description
Input 1	Channel 1 data.
Input 2	Channel 2 data.
Input 3*	Channel 3 data. (Humidity sensor)
Upper data serial	Higher data serial number.
Lower data serial	Lower data serial number.

* This appears even if the /RH option is not installed.

Level 1, Level 2, Level 3, Level 4

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	Off
Type[1]	H: High limit, L: Low limit, T: Delay high limit, t: Delay low limit, D: Comm lose due to time out, F: Profile high limit [5], f: Profile low limit [5]	H: High limit
Alarm value[1, 4, 6]	-9999999 to 99999999	0.00
Hysteresis[1, 3, 4, 6]	Numeric value (0 to 100000)	0.00
Logging[1]	On/Off	On
Output type[1]	Off, Relay, Internal switch	Off
Output No.[2]	DO channel or internal switch	—

1 You can set this when a On/Off is set to **On**.
2 You can set this when Output type is not set to **Off**.
3 You can set this when the type is set to **H:High limit** or **L:Low limit**.
4 You cannot set this when Type is set to **D: Comm lose due to time out**.
5 Release number 5 and later. You can set this when profile trend settings is set to **On**.
6 You cannot set this when the type is set to **Profile high limit** or **Profile low limit**.

On/Off

Set this to **On** to set alarms.

Type

Set the alarm type.
When the alarm type is Comm lose due to time out, set the time for judging data loss according to section 3.4.5, “Unit Timeout Settings” on page 3-23.

Options	Description
H: High limit	An alarm is activated when the measured value is greater than or equal to the alarm value.
L: Low limit	An alarm is activated when the measured value is less than or equal to the alarm value.
T: Delay high limit	An alarm is activated if measured values remain greater than or equal to the alarm value for a specified time period (delay period).
T: Delay low limit	An alarm is activated if measured values remain less than or equal to the alarm value for a specified time period (delay period).
D: Comm lose due to time out	An alarm is activated if a data dropout occurs in the communication with the GX70SM.
F: Profile high limit	An alarm is activated when the measured value is greater than or equal to the profile high limit value.
f: Profile low limit	An alarm is activated when the measured value is less than or equal to the profile low limit value.

▶ For details on the alarm types, see the following manuals.

GX/GP User’s Manual Explanation in section 1.2.2, “Setting Alarms.”
GM User’s Manual Explanation in section 2.3.2, “Setting Alarms.”

Alarm value

Set the alarm value for the specified alarm type. However, there is no alarm value setting for D: Comm lose due to time out, F: Profile high limit, f: Profile low limit.

Options	Alarm value
H, L	within -9999999 to 99999999 excluding the decimal point.
T, t	Same as H and L

Hysteresis

Set this to establish an offset between the value used to activate and release alarms. However, there is no setting for D: Comm lose due to time out, F: Profile high limit, f: Profile low limit.

Detection

Set this **On** to display an alarm (notify you) when an alarm occurs. If set to **Off**, when an alarm occurs, signals are output to alarm output DO channels or internal switches, but the alarm is not displayed. Alarms are also not recorded in the alarm summary.

Output type

Set the alarm output destination.

Output No.

Set the number of the DO channel or internal switch to output alarms to.

Profile channel (Release number 5 and later)

Setup Item	Selectable Range or Options	Default Value
Upper	Off, Communication channel	Off
Reference	Same as Upper	Off
Lower	Same as Upper	Off

Upper

Sets the communication channel through which the upper data of the profile trend is loaded.

Reference

Sets the communication channel through which the reference data of the profile trend is loaded.

Lower

Sets the communication channel through which the lower data of the profile trend is loaded.

Note

- You must load the profile trend in advance to read the waveform data.
- Set the profile channel to the same channel as the channel number of the loaded profile trend.
- You can only set this when On/Off is set to the **On** communication channel.

Alarm delay (for delay high/low limit alarms)*

Setup Item	Selectable Range or Options	Default Value
Hour	1 to 24	0
min.	0 to 59	0
Second	0 to 59	10

* You can set this when Level 1, Level 2, Level 3, or Level 4 is **On**.

Hour, Minute, and Second

Set the alarm delay. These values are valid when the delay high limit or delay low limit alarm is in use.

3.4.3 Display Settings

This section explains how to set the display settings for the various GX70SM data.
The settings are applied to the display settings of the communication channels.

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **Display settings**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **Display settings**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **Display settings**

Description

Setup Item	Selectable Range or Options	Default Value
First unit number	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 96	1
Last unit number	Same as the first unit number	1
Data type	Input 1, Input 2, Input 3, Higher data serial, Lower data serial	Input 1

First unit number, Last unit number

Select the target unit number.
Only the unit numbers GX70SMs that the GX/GP/GM has recognized can be selected.

Data type

Select the GX70SM data type.

Options	Description
Input 1	Channel 1 data.
Input 2	Channel 2 data.
Input 3*	Channel 3 data. (Humidity sensor)
Upper data serial	Higher data serial number.
Lower data serial	Lower data serial number.

* This appears even if the /RH option is not installed.

Tag

Setup Item	Selectable Range or Options	Default Value
Characters	Character string (up to 32 characters, Aa#1)	—
No.	Character string (up to 16 characters, Aa#1)	—

Characters

Set the tag.
Not all characters may be displayed due to space constraints.

No.

Set the tag number.

Color

Setup Item	Selectable Range or Options	Default Value
Color	24 colors (red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, cyan, dark blue, yellow, light gray, purple, black, pink, light brown, light green, dark gray, olive, dark cyan, and spring green) and a user-defined color (1 color)	—

Color

Set channel display colors. The colors apply to the trend display, digital display, and bar graph display.

▶ For instructions on how to set user-defined colors, see the following manual.

GX/GP User's Manual Section 1.2.3, "Setting the Display"
GM User's Manual "Operation example 2" in section 2.1.6, "Changing the Settings"

Zone

Setup Item	Selectable Range or Options	Default Value
Lower	0 to 95%	0
Upper	5 to 100% input	100

Lower and Upper

Set these values when you want to divide the waveform displays of channels into separate zones so that waveforms do not overlap. Set the **Lower** and **Upper** positions as percentages of the maximum display width. Set **Lower** to a value less than **Upper**, and set the zone width (**Upper** – **Lower**) to be 5% or greater.

▶ For zone display examples, see the following manual.

GX/GP User's Manual Section 1.2.3, "Setting the Display"
GM User's Manual Section 2.1.6, "Changing the Settings"

Scale (GX/GP only)

Setup Item	Selectable Range or Options	Default Value
Position	Off/1/2/3/4/5/6/7/8/9/10	1
Division	4/5/6/7/8/9/10/11/12/C10	10

Position

Set the scale display position of the trend display. Set this to **Off** to not display scales.

Division

Set the number of divisions to make with the main scale marks.
C10: The scale is equally divided into 10 sections by main scale marks, and scale values are indicated at 0, 30, 50, 70, and 100% positions.

▶ For scale display examples, see the following manual.

GX/GP User's Manual Section 1.2.3, "Setting the Display"

Bar graph

Setup Item	Selectable Range or Options	Default Value
Base position	Lower, Center, Upper	Lower
Division	4/5/6/7/8/9/10/11/12	10

Base position

Set the bar graph base position.
This setting is applied when you are displaying the current value on the scale as a bar graph on the bar graph and trend displays.

▶ For bar graph display examples, see the following manual.

GX/GP User's Manual	Section 1.2.3, "Setting the Display"
GM User's Manual	Section 2.3.3, "Setting the Display"

Division

Set the number of divisions to make with the main scale marks.

Partial (GX/GP only)*

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	Off
Position	1 to 99(%)	50%
Boundary	Span lower limit + 1 digit to span upper limit – 1 digit	0.01

* Appears when in the **Display settings** of the setting menu, the trend partial expansion **On/Off** is set to **On**.

On/Off

Set this to **On** to enable partial expanded display of waveforms.
▶ For details on the function, see the following manual.

GX/GP User's Manual	Section 1.10.4, "Setting Trend Display Conditions"

Position

Set at which position to display the value specified by **Boundary** within the display width. Specify a percentage.

Boundary

Set the value that is to be the boundary between the reduced section and the expanded section in the range of "minimum span value + +1 digit to maximum span value – 1 digit." For channels that are set to linear scaling, the selectable range is "minimum scale value + +1 digit to maximum scale value – 1 digit."

Example: Span: 0 to 100. Expand: 30. Boundary: 50
The 0 to 50 range is displayed in the 0% to 30% range, and the 50 to 100 range is displayed in the 30% to 100% range.

Color scale band

Setup Item	Selectable Range or Options	Default Value
Band area	Off, In, Out	Off
Color	24 colors (red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, cyan, dark blue, yellow, light gray, purple, black, pink, light brown, light green, dark gray, olive, dark cyan, and spring green) and a user-defined color (1 color)	—
Display position Lower	Span (scale) lower limit to span (scale) upper limit	0.00
Display position Upper	Span (scale) lower limit to span (scale) upper limit	1.00

Band area

Displays a specified section of the measurement range using a color band on the scale. This setting is shared with the bar graph display.

Options	Description
Off	Disables the function.
In	Displays the area inside using the color band.
Out	Displays the area outside using the color band.

Color

Set the display color.

Upper display position limit, Lower display position limit

Set the display position. Set a value within the span range.

Alarm point mark

Setup Item	Selectable Range or Options	Default Value
Indicate on Scale	Off/On	On
Mark type	Alarm, Fixed	Alarm
Alarm 1 color to Alarm 4 color*	24 colors (red, green, blue, blue violet, brown, orange, yellow-green, light blue, violet, gray, lime, cyan, dark blue, yellow, light gray, purple, black, pink, light brown, light green, dark gray, olive, dark cyan, and spring green) and a user-defined color (1 color)	

* Appears when the Mark kind is set to **Fixed**.

Indicate on Scale

Set this to **On** to display alarm point marks on the scale. Set this to **Off** to not display them. This setting is shared with the bar graph display.

Mark type

Options	Description	Mark Shape
Alarm	Displayed normally in green. Displayed in the specified color when an alarm occurs.	or
Fixed	Displayed with a fixed color.	

Alarm 1 color to Alarm 4 color

When Mark kind is set to **Fixed**, set the display colors of point marks for alarm levels 1 to 4.

3.4.4 Setting Calibration Correction (Linearizer Approximation, Linearizer Bias, Correction Factor)

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **Calibration correction**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **Calibration correction**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **Calibration correction**

Description

Setup Item	Selectable Range or Options	Default Value
First unit number	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 96	1
Last unit number	Same as the first unit number	1
Data type	Input 1, Input 2, Input 3	Input 1

First unit number, Last unit number

Select the target unit number.
Only the unit numbers of GX70SMs that the GX/GP/GM has recognized can be selected.

Data type

Select the GX70SM data type.

Options	Description
Input 1	Channel 1 data.
Input 2	Channel 2 data.
Input 3*	Channel 3 data. (Humidity sensor)

* This appears even if the /RH option is not installed.

On/Off

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

On/Off

Select **On** to perform calibration correction on the GX70SM data.*

* This is fixed to Off for channels with data serial numbers assigned in communication channel settings.

Mode

Setup Item	Selectable Range or Options	Default Value
Mode	Linearizer Approximation, Linearizer Bias, and Correction factor	Linearizer Approximation
Number of set points	2 to 12	2

Mode

Set the correction type.

Number of set points

Set the number of points that make up the segments (including the start and end points).

1 to 12 (When the mode is set to linearizer approximation or linearizer bias)*

Setup Item	Selectable Range or Options	Default Value
Linearizer input	-9999999 to 99999999	—
Linearizer output	-9999999 to 99999999	—

* The number of displayed points varies depending on the number of set points.

Linearizer input, Linearizer output

Enter the value of the set point. For linearizer input, set a value that is greater than the previous value.

1 to 12 (When the mode is set to correction factor) (only for the /AH option)*

Setup Item	Selectable Range or Options	Default Value
Uncorrected value	-9999999 to 99999999	—
Instrument correction factor	-9999999 to 99999999	—
Sensor correction factor	-9999999 to 99999999	—

* The number of displayed points varies depending on the number of set points.

Uncorrected value

Enter the uncorrected value. Set a value that is greater than the previous value.

Instrument correction factor

Set the instrument-dependent correction factor.

Sensor correction factor

Set the sensor-dependent correction factor.

3.4.5 Unit Timeout Settings

Set the time for determining data dropouts and the function used to replace measured values with preset values when data dropouts occur.

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **Comm time out settings**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **Comm time out settings**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **Comm time out settings**

Description

Setup Item	Selectable Range or Options	Default Value
First unit number	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 96	1
Last unit number	Same as the first unit number	1

First unit number, Last unit number

Select the target unit number.
Only the unit numbers of GX70SMs that the GX/GP/GM has recognized can be selected.

Setup Item	Selectable Range or Options	Default Value
On/Off	Off/On	On
Comm time out (sec) [1]	1 to 7200 (s)	600
Preset value at time-out [2]	Off/On	Off

1 You can set this when On/Off is set to On.
2 Version R4.06 and later.

On/Off

Set this to **On** to set a timeout.

Comm time out (sec)

Set the time for judging data loss.
The guideline is at least twice the send (scan) interval of the GX70SM.

Preset value at time-out

Set this to On to replace measured values with preset values when data dropouts occur.
The replacement value is the preset value set using On/Off, Span.

▶ For details on setting the preset value, see section 3.4.1, “Enabling Channels and Setting the Span, Decimal Point, Unit, and the Like” on page 3-14.

3.4.6 Auto Message Printout Setting

A message can be automatically written whenever there is a change in the communication status between the GX/GP/GM and GX70SM.
The auto message printout setting applies to all GX70SMs.

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **Wireless input unit settings** > **Auto message**
Web application: **Config.** tab > **Wireless input unit settings** > **Unit number** > **Auto message**
Hardware configurator: **Wireless input unit settings** > **Unit number** > **Auto message**

Description

Setup Item	Selectable Range or Options	Default Value
Status change	Off/On	On

Status change

Set this to **On** to enable auto message printout.
A message is printed when a change occurs in the following operation or status.

Operation/Status change	Description	Display example
Timeout detection operation pause	A message is written when the timeout detection operation changes from resume to pause.	“18:24:09 Wireless TOut Halt XXX:SSSSSSSSSS”
Timeout detection operation resume	A message is written when the timeout detection operation changes from pause to resume.	“18:33:48 Wireless TOut Resume XXX:SSSSSSSSSS”
Device change status detection	A message is written when a unit with a serial number different from the one that has been reconfigured is connected (/AS option).	“18:33:48 Wireless Change XXX:SSSSSSSSSS”
Disconnected status detection	A message is written when communication is disconnected.	“18:33:48 Wireless Failed XXX:SSSSSSSSSS”
Connection recovery detection	A message is written when a manual recovery operation is executed or when an auto recovery takes place.	“18:33:48 Wireless Resume XXX:SSSSSSSSSS”

XXX: Station number (001 to 096)
SSSSSSSSSS: GX70SM device serial number

3.4.7 Recording Channel Settings

When wireless input unit reconfiguration is executed, communication channel that were automatically assigned to the GX70SMs are automatically assigned to the recording channels.
If necessary, reassign them according to your needs.

▶ For details on setting recording channels, see the following manuals.
GX/GP User’s Manual Section 1.12.2, “Configuring Recording Channels”
GM User’s Manual Section 2.13.2, “Configuring Recording Channels”

3.5 Auto Setup

This section describes the settings that are automatically set when a wireless input unit reconfiguration is executed.

3.5.1 Auto Setup through Reconfiguration of All Units

Setup Menu	Setup Item	Description
Recording settings	Recording channel settings Display data Event data	All communication channels that GX70SMs are assigned to are set to On except when there are no empty recording channels.
Display settings (without multi batch function)	Group settings Group settings On/Off Measurement group number (for dual interval) Channel set	The group settings of group numbers set to Off are set to On, and communication channels that GX70SMs are assigned to in channel settings are set. The settings of communication channels that are already assigned to groups are not changed.
Batch settings (with multi batch function)	Individual batch settings > Group settings Group settings On/Off Channel set	The group settings of group numbers set to Off are set to On, and communication channels that GX70SMs are assigned to in channel settings are set. The settings of communication channels that are already assigned to groups are not changed.
Communication channel settings	On/Off, Span On/Off, Span On/Off Decimal place Watchdog timer On/Off Alarm Level 1 to 4 On/Off Type Display settings Tag Characters	All communication channel settings are initialized. The communication channel that GX70SM is assigned to is set to On. The decimal place of the data serial number communication channel is set to 0. The watchdog timer of the communication channel that the GX70SM is assigned to is fixed at Off. The serial low-digit channel in Alarm On/Off setting is set to On. The serial low-digit channel in Alarm type is set to D. The tag string in display settings is set separately by input type (e.g., 001-IN1).
Wireless input unit settings	Calibration correction Comm time out settings	The settings of all GX70SMs are initialized.

3.5.2 Auto Setup through Reconfiguration of Individual Units

Setup Menu	Setup Item	Description
Recording settings	Recording channel settings Display data, trend Event data	The communication channel that the selected GX70SM is assigned to is set to On except when there are no empty recording channels.
Display settings (without multi batch function)	Group settings Channel set On/Off Measurement group number (for dual interval) Channel set	The group settings of group numbers set to Off are set to On, and the communication channel that the selected GX70SM is assigned to in channel settings is set. The settings of communication channels that are already assigned to groups are not changed.
Batch settings (with multi batch function)	Individual batch settings > Group settings Group settings On/Off Channel set	The group settings of group numbers set to Off are set to On, and the communication channel that the selected GX70SM is assigned to in channel settings is set. The settings of communication channels that are already assigned to groups are not changed.
Communication channel settings	On/Off, Span On/Off, Span On/Off Decimal place Watchdog timer On/Off Alarm Level 1 to 4 On/Off Type Display settings Tag Characters	The settings of the communication channel that the selected GX70SM is assigned to are initialized. The communication channel is set to On. The decimal place of the data serial number communication channel is set to 0. The watchdog timer of the communication channel that the GX70SM is assigned to is fixed at Off. The serial low-digit channel in Alarm On/Off setting is set to On. The serial low-digit channel in Alarm type is set to D. The tag string in display settings is set separately by input type (e.g., 001-IN1).
Wireless input unit settings	Calibration correction	The settings of the selected GX70SM are initialized.
	Comm time out settings	The settings of the selected GX70SM are initialized.

Tag settings

Tags are set as follows:

Data type	Tag settings
Input 1	XXX-IN1
Input 2	XXX-IN2
Input 3	XXX-IN3
Higher data serial number	XXX-Serial-Higher
Lower data serial number	XXX-Serial-Lower

XXX: Unit number (001 to 096)

3.6 Other Settings

3.6.1 GX/GP/GM Configuration

In addition to the auto configuration through wireless input unit reconfiguration and wireless input unit settings, configure various settings such as the GX/GP/GM measurement settings and data save settings.

▶ For details on the various GX/GP/GM settings, see the following manual.

GX/GP User's Manual	IM 04L51B01-01EN
GM User's Manual	IM 04L55B01-01EN

Notes on Configuration

Combining of the portion of data that could not be acquired in the GX70SM logging data is possible only for measurement data (GEV file, GSE file) whose GX/GP/GM file type is set to Event.
Only event measurement data (GSE file) recorded using the advanced security function (/AS) can be filled in with wirelessly retrieved data.

▶ There are certain GX/GP/GM settings that need to be configured to combine data.
See "Notes before Starting to Record" in section 2.7.2, "Combine Data Files" on page 2-35

▶ For details on setting the type of data to record, see the following manuals.

GX/GP User's Manual	Section 1.12.1, "Setting the Type of Data to Record (Display or event data) and Recording Conditions"
GM User's Manual	2.13.1, "Setting the Type of Data to Record (Display or event data) and Recording Conditions"

3.6.2 Event Action Function

"Wireless input unit error" is added to the device status of event type.
Wireless input unit error can be used as an event to trigger an action such as internal switches and relay output.

▶ For details on the event action function, see the following manual.

GX/GP User's Manual	Section 1.19, "Configuring the Event Action Function"
GM User's Manual	Section 2.20, "Configuring the Event Action Function"

Description

Setup Item	Selectable Range or Options	Default Value
Event action number	1 to 50	1

Event action number

Select the event action number to assign an event action.

Event action

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

On/Off

Select **On** to use the event action function.

Event[1]

Setup Item	Selectable Range or Options	Default Value
Type	Status	Internal switch
Event details	Wireless input unit error	Recording
Operation mode	Rising edge, Falling edge, Rising/Falling edge	Rising edge

1 You can set this when Event action is set to **On**.

Type

Set the device status as an event condition.

Event type	Description
Status	Select the status.

Event details

Set Wireless input unit error as the device status information.

Details	Description
Wireless input unit error	Battery error, operation error, disconnected status

Operation mode

Set the edge type for performing actions.

Operation mode	Description
Rising edge	The action is executed when the event changes from off to on.
Falling edge	The action is executed when the event changes from on to off.
Rising/Falling edge	When the event changes from off to on, the action is changed from off to on. When the event changes from on to off, the action is changed from on to off.

Operation Modes That Can Be Specified Depending on the Event

The settings with ✓ marks in the table below are possible.

Event	Rising edge	Falling edge	Rising/Falling edge	edge
Status	✓	✓	✓	

Action

Setup Item	Selectable Range or Options	Default Value
Type	**When the operation mode is rising edge or falling edge** Flag, Message, Relay, Internal switch **When the operation mode is Rising/Falling edge** Flag On/Off, Relay On/Off, Internal switch On/Off	—
Number	Depends on the type	
Detail[1]	All groups[2], Specified group[2], On[3], Off[3]	—
Group number[4]	GX20-1/GP20-1/GM10-1: 1 to 50 GX20-2/GP20-2/GM10-2: 1 to 60	

1 Appears when the type is set to **Message** or **Relay**.
2 Appears when the type is set to **Message**.
3 Appears when the type is set to **Relay**.
4 Appears when the type is set to **Message** and Detail is set to **Specified group**.

Type

Set the action to execute when an event occurs.

When the Event Operation Mode Is Rising Edge or Falling Edge

Options	Description
Flag	Sets the flag to 1 (On). (/MT option)
Relay	Sets the relay output to On or Off. DO channels of PID control modules are applicable. However, this is available only when the type is set to Manual.
Message	Writes a message. Specify the message number and the message write destination. Set the destination to all groups, or specify a write destination group number. You can execute this while recording is in progress.
Internal switch	Sets the internal switch to On or Off. However, this is available only when the type is set to Manual.

When the Event Operation Mode Is Rising/Falling Edge

Options	Description
Flag On/Off	Repeats the operation of setting the flag to 1 (On) and 0 (Off) on every event occurrence.
Relay On/Off	Repeats the operation of setting the relay to On and Off on every event occurrence.

Number

Set the target number when the type is Flag, Relay, Message, or Internal switch.

Operation Mode	Type	Setup Items
Rising edge, Falling edge	Flag	Flag number 1 to 20
	Relay	DO channel number
	Message	Message number 1 to 100
	Internal switch	Internal switch number 1 to 100
Rising/Falling edge	Flag On/Off	Flag number 1 to 20
	Relay On/Off	DO channel number
	Internal switch On/Off	Internal switch number 1 to 100

Details

Set the details when the action type is set to **Relay**, **Message**, or **Internal switch**.

When Set to Relay or Internal switch

Options	Description
On	Sets to On.
Off	Sets to Off.

When Set to Message

Options	Description
All groups	Writes the message to all groups.
Specified group	Writes the message to the specified group. Set the destination by specifying a group number.

Group number

Set the display group number to write the message to when **Specified group** is specified.

Note

Do not manually operate the output status of a relay assigned to a status event.

Limitations on the Combinations of Events and Actions

The combinations that are indicated with ✓ marks in the table below can be used.

Action \ Event	Status
Recording	
Recording start/stop	
Computation	
Computation start/stop	
Manual sample	
Alarm ACK	
Snapshot (GX/GP only)	
Save display data	
Save event data	
Event trigger	
Message	✓
Switch the display group (GX/GP only)	
Reset the relative timer	
Load settings	
Load program pattern	
Adjust the time	
Show the favorite display (GX/GP only)	
Switch the display rate (GX/GP only)	
Switch the display rate 1/2 (GX/GP only)	
Flag	✓
Flag On/Off[1]	✓
Relay output[2]	✓
Relay On/Off[1, 2]	✓
Internal switch	✓
Internal switch On/Off[1]	✓
Load profile trend	
Load predictive detection model	
Predictive detection section	
HOLD profile trend	
Predictive detection section start/stop	
HOLD profile trend On/Off	

1 When the operation mode is Rising/Falling edge.
2 Action can be set to Relay output, Relay On/Off, Internal switch, or Internal switch On/Off only when the DO channel range type and internal switch type is set to Manual.

Event action examples

Example 1: Generating a DO Output When a Wireless Input Unit Error Occurs

Turns DO channel 0301 on when a wireless input unit error occurs.
This example assumes that a DO module is installed in slot 2 of the GX/GP/GM main unit.
Event action number 1 will be used.

Configuring the Event Action

- **Setup Screen**

  MENU key > **Browse** tab > **Setting** > Setting menu **Event action**
- **Setup Items**

Setup Item		Value
Event action number		1
Event action	On/Off	On
Event	Type	Status
	Event details	Wireless input unit error
	Operation Mode	Rising edge
Action	Type	Relay
	Number	0301
	Details	On

Other Settings

Set DO channel 0301.

- **Setup Screen**

  MENU key > **Browse** tab > **Setting** > Setting menu **DO channel settings**
  Range
- **Setup Items**

Setup Item		Value
First-CH		0301
Last-CH		0301
Range	Type	Manual
	Span lower	0
	Span Upper	1
	Unit	—
Action	Energize, De-energize	Energize

▶ For details on setting DO channels, see the following manuals.

GX/GP User's Manual	Section 1.6, "Configuring DO Channels (Digital output channels)"
GM User's Manual	Section 2.7, "Configuring DO Channels (Digital output channels)"

Example 2: Writing a Message When a Wireless Input Unit Error Occurs

Writes the message “Wireless input unit error” to group 1 when a wireless input unit error occurs. Event action number 2 will be used.

Configuring the Event Action

- **Setup Screen**

  MENU key > **Browse** tab > **Setting** > Setting menu **Event action**
- **Setup Items**

Setup Item		Value
Event action number		2
Event action	On/Off	On
Event	Type	Status
	Event details	Wireless input unit error
	Operation Mode	Rising edge
Action	Type	Message
	Number	1
	Details	Specified group
	Group number	1

Other Settings

Register “Wireless input unit error” in message number 1.

- **Setup Screen**

  MENU key > **Browse** tab > **Setting** > Setting menu **Display settings** > **Message settings**
- **Setup Items**

Setup Item		Value
Message number		1–10
Message	Message 1	Wireless input unit error

▶ For details on setting messages, see the following manuals.

GX/GP User’s Manual	Section 1.10.3, “Setting messages”
GM User’s Manual	Section 2.11.3, “Setting messages”

3.6.3 Setting the Instrument Information Output (/FL option) (GX/GP only)

You can add “Wireless input unit error” to the instrument information output of the fail relay. When a wireless input unit error occurs, a fail relay output can be generated.

▶ For details on the instrument information output, see the following manual.
GX/GP User’s Manual Section 1.23.6, “Setting the FAIL Relay and Instrument Information Output (/FL option)”

Path

GX/GP: **MENU** key > **Browse** tab > **Setting** > Setting menu **System settings** > **Status relay**
Web application: **Config.** tab > **System settings** > **Status relay**
Hardware configurator: **System settings** > **Status relay**

Description

Setup Item	Selectable Range or Options	Default Value
Fail relay	Fail, Status	Fail
Wireless input unit error*	Off/On	Off

* Appears when fail relay is set to **Status**.

Fail relay

Set whether to output CPU errors to the relay or the instrument status to the relay.

Options	Description
FAIL	Outputs failures.
Status	Outputs instrument information.

Wireless input unit error

Set this to **On** to output the wireless input unit error status.

Explanation

Status

The status below is output with a relay contact signal. You can select whether the status is output to the relay. The relay is energized when the status occurs.
You cannot change this behavior.

Status	Description	Corrective Action
Wireless input unit error	Battery error.	The wireless input unit’s battery level is low. Replace the batteries.
	Operation error.	An error is occurring in the wireless input unit. Check the wireless input unit status.
	Device change occurred (/AS only)	A device change occurred. Check the wireless input units, and activate them.
	Disconnected status.	The wireless communication was disconnected. Check the wireless input unit status.

3.6.4 Configuration When Routers Are Also Present

When GX70SMs and routers are present, configure the routers after reconfiguring the wireless input units.
Otherwise, the communication channel settings will be initialized.
When configuring routers, make sure the communication channels do not overlap with those assigned to the GX70SMs.

▶ For the procedure when GX70SMs and routers are present, see section 1.4, “Procedure When Wireless Input Units and Routers Are Present” on page 1-16.

3.6.5 FTP Settings for Wireless Retrieving Data File (Version 4.09 and later)

In the settings for the FTP client function, wirelessly retrieved data files are also transferred if Display & Event data has been set for transfer files.
The FTP transfer process for wirelessly retrieved data files is run when the files are created. This is not dependent on the transfer wait time.

The data is resent for a specified number of times if the FTP transfer fails.
This includes power outages during the transfer.

▶ For configuring the FTP client function, see the following manual.

GX/GP User's Manual	Section 1.21.2, "Configuring the FTP Client Function"
GM User's Manual	Section 2.22.2, "Configuring the FTP Client Function"

3.7 Controlling Wireless Input Units

You can view the GX70SM status on the Wireless input unit info screen.

3.7.1 Displaying the Wireless Input Unit Info Screen

This section explains how to switch to the Wireless input unit info screen.
The Wireless input unit info shows the status of the currently connected GX70SM.
You can stop or resume time-out detection, manually resume, and activate the GX70SM.
You cannot establish a connection with the GX70SM from this screen.
To do so, use the Wireless input unit reconfiguration screen.
▶ For details on wireless input unit reconfiguration, see section 3.3.3, “Reconfiguring Wireless Input Units” on page 3-12.

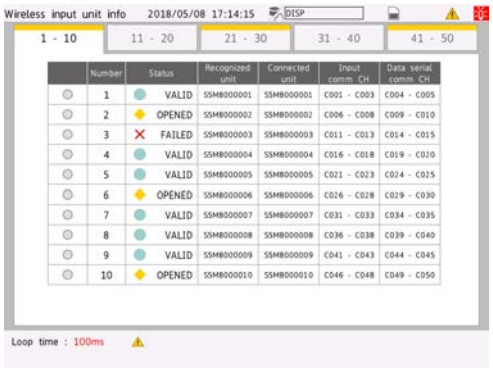
Path

GX/GP: **MENU** key > **Browse** tab > **Init/Calib** > menu **Wireless input unit info**
Web application: **Data** tab > **Wireless input unit info**

Procedure

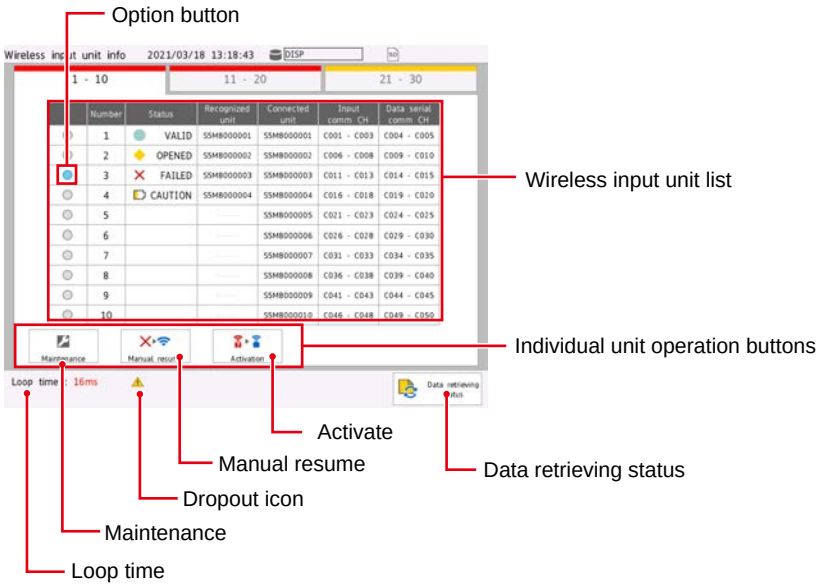
1 Press **MENU**.
The menu screen appears.

2 Select the **Browse** tab and then **Wireless input unit info**.
A Wireless input unit info screen appears.



Operation complete

Description of the Wireless Input Unit Info Screen



Setup Items and Descriptions

See section 3.3.1, “Wireless Data Retrieval Settings and Displaying the Wireless Input Unit Reconfiguration Screen” on page 3-6.

Note

- The Wireless input unit info screen cannot be registered to the multi panel screen.
- In the following situations, the wireless input unit info screen cannot be displayed or registered to favorite and standard screens.
  - Under Basic configuration of Communication (Serial) settings, the receiver function is set to something other than Wireless input unit

3.7.2 Monitoring the Wireless Network Status

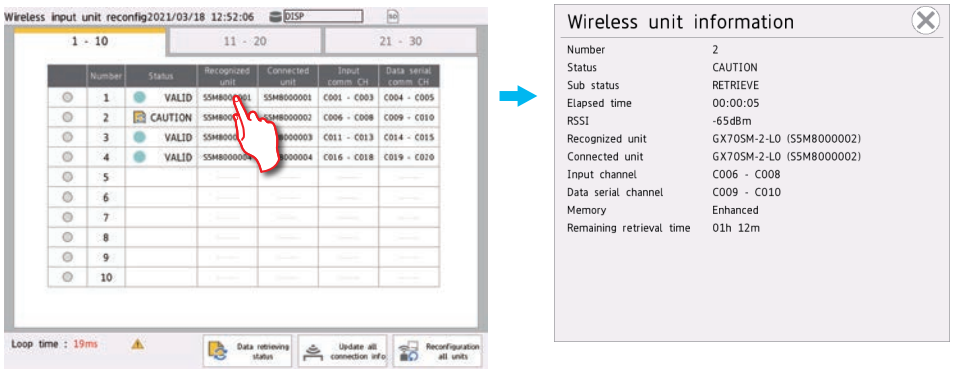
You can view the GX70SM status.

Displaying the Detailed Wireless Input Unit Information

This section explains how to show the detailed wireless input unit information.

Procedure

1. Select the wireless input unit list of the GX70SM you want to view the details of.
   A Wireless unit information dialog box appears.



Contents of the Detailed Wireless Input Unit Information

Item	Description	Indicator
No.	GX70SM station number	Number
Status Sub status	The GX70SM device status ▶ For details, see “Details of the Status Display” on section 3.3.3, “Reconfiguring Wireless Input Units” on page 3-12.	
Elapsed time	The time elapsed since the wireless coordinator received the GX70SM data	HH:MM:SS
RSSI*	The GX70SM RSSI value	***dBm
Recognized unit	Model of the recognized GX70SM	[Blank] GX70SM-2-L0
	Serial number of the recognized GX70SM	Characters
Connected unit	Model of the connected GX70SM	[Blank] GX70SM-2-L0
	Serial number of the connected GX70SM	Characters
Input channel	Communication channel number corresponding to the GX70SM measurement data	First channel - Last channel
Data serial channel	Communication channel number corresponding to the GX70SM data serial number	First channel - Last channel
Memory	Presence or absence of /DB option	Standard (without /DB option) Enhanced (with /DB optiuon)
Remaining retrieval time	Time left until the collection of wirelessly retrieved data is complete (approximate value)	xxh xxm When data is not being collected: “---”

* Received Signal Strength Indication
The term refers to the circuit or signal used to measure the intensity of signals that wireless communication devices receive. It is used for controlling the transmission range of wireless communication.

Operation complete

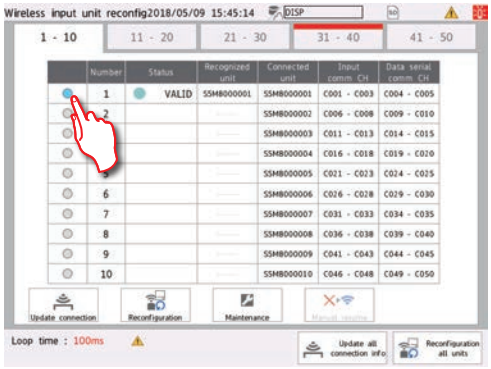
3.7.3 Pausing and Resuming Timeout Detection

This section explains how to temporarily pause or resume the data serial number update time-out detection during maintenance work, such as when retrieving logging data from the GX70SM.
Data dropout alarm (D) is not detected on GX70SMs whose time-out detection is paused. Data dropout alarm detection resumes when you resume the data dropout timeout after finishing the maintenance work.

Procedure

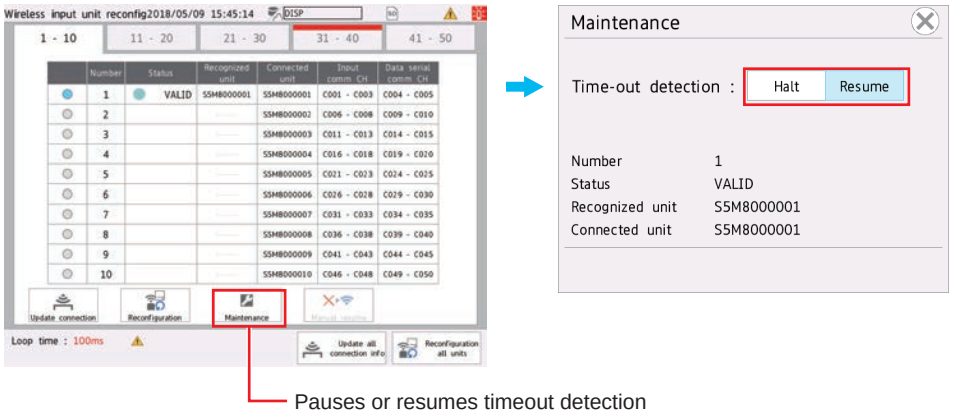
Operation is possible on the Wireless input unit reconfiguration screen and Wireless input unit info screen.
▶ For details on how to switch to the Wireless input unit reconfiguration screen, see section 3.3.1, “Wireless Data Retrieval Settings and Displaying the Wireless Input Unit Reconfiguration Screen” on page 3-6.

1 Select the option button for the GX70SM you want to maintenance.
The GX70SM individual operation buttons become available.



2 Select **Maintenance**.
A maintenance dialog box appears.

Example of a reconfiguration screen



3 Select **Halt** or **Resume** next to Time-out detection.
The time-out detection will be paused or resumed.

Operation complete

Note

Maintenance is not possible while connection information is being updated.

3.7.4 Manual Resume

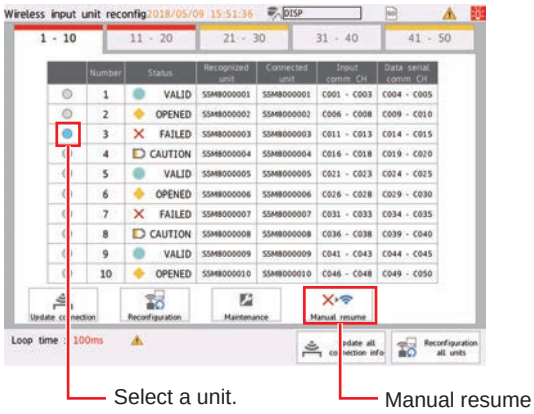
This section explains how to manually resume communication when a GX70SM disconnected from the GX/GP/GM is reconnected.

Procedure

Operation is possible on the Wireless input unit reconfiguration screen and Wireless input unit info screen.

▶ For details on how to switch to the Wireless input unit reconfiguration screen, see section 3.3.1, “Wireless Data Retrieval Settings and Displaying the Wireless Input Unit Reconfiguration Screen” on page 3-6.

1 Select the option button for the GX70SM you want to manually resume.
The GX70SM individual operation buttons become available.



2 Select **Manual resume**.
A confirmation dialog box appears.

3 Select **OK**.
The GX70SM disconnected from the wireless network will be restored.

Operation complete

Note

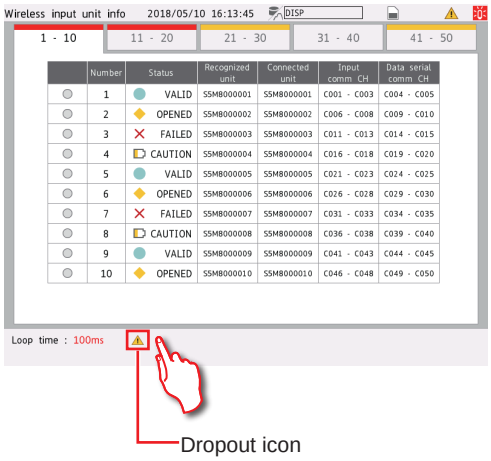
Manual resume is not possible while connection information is being updated or when the GX70SM communication is not disconnected.

3.7.5 Acknowledging Communication Command Dropouts

This section explains how to clear the Modbus communication command dropout state.*

* A state in which the execution of a Modbus command could not be finished within the read cycle.

1 Select the data dropout icon.
The dropout is acknowledged, and the dropout icon disappears.



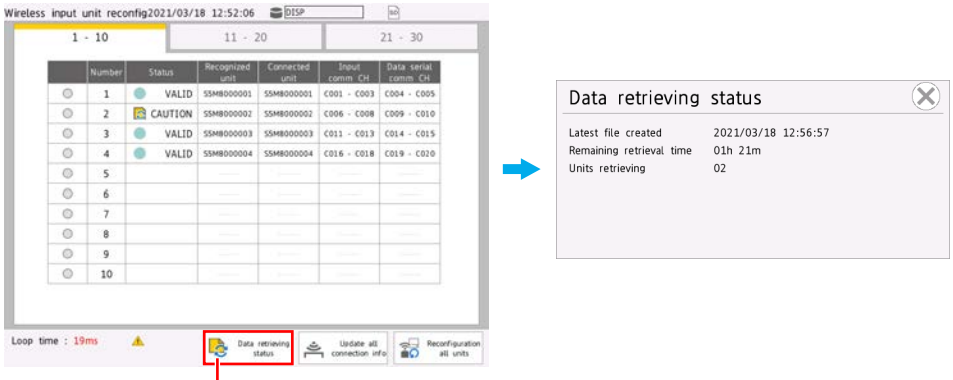
Operation complete

3.7.6 Display of the collection status of wirelessly retrieved data

The collection status of the wirelessly retrieved data is displayed.

Procedure

1 Select the **Data retrieving status**.
A data retrieving status dialog box appears.



There is no unit that is collecting data.

There is a unit that is collecting data.

Detail on data retrieving status

Item	Description	Display
Latest file created	Last creation time of wirelessly retrieved data files	YYYY/MM/DD HH:MM:SS When no file has been created: "---"
Remaining retrieval time	Time left to finish creating the wirelessly retrieved data Longest time in all of GX70SM	xxh xxm If there is no unit that is collecting data: "---"
Units retrieving	Number of the GX70SM unit that is collecting wirelessly retrieved data	nn, nn, nn nn：Unit number If there is no unit that is collecting data: "---"

Operation complete

3.7.7 Saving Wirelessly Retrieved Data Files to an SD Memory Card or USB Flash Memory

Procedure

1. Select the **MENU** key.
   A wireless retrieving data information dialog box appears.
2. Select the **Context** tab and then **Save retrieved data**.
   The save wirelessly retrieved data screen appears.
3. Set the save destination, and select **OK**.
   Wirelessly retrieved data file is saved to the SD memory card or USB flash memory.

Operation complete

The file format of the wirelessly retrieved data is GLK.
Wirelessly retrieved data files are also saved when you run All save for memory summary.

▶ For all save, see the following manual.

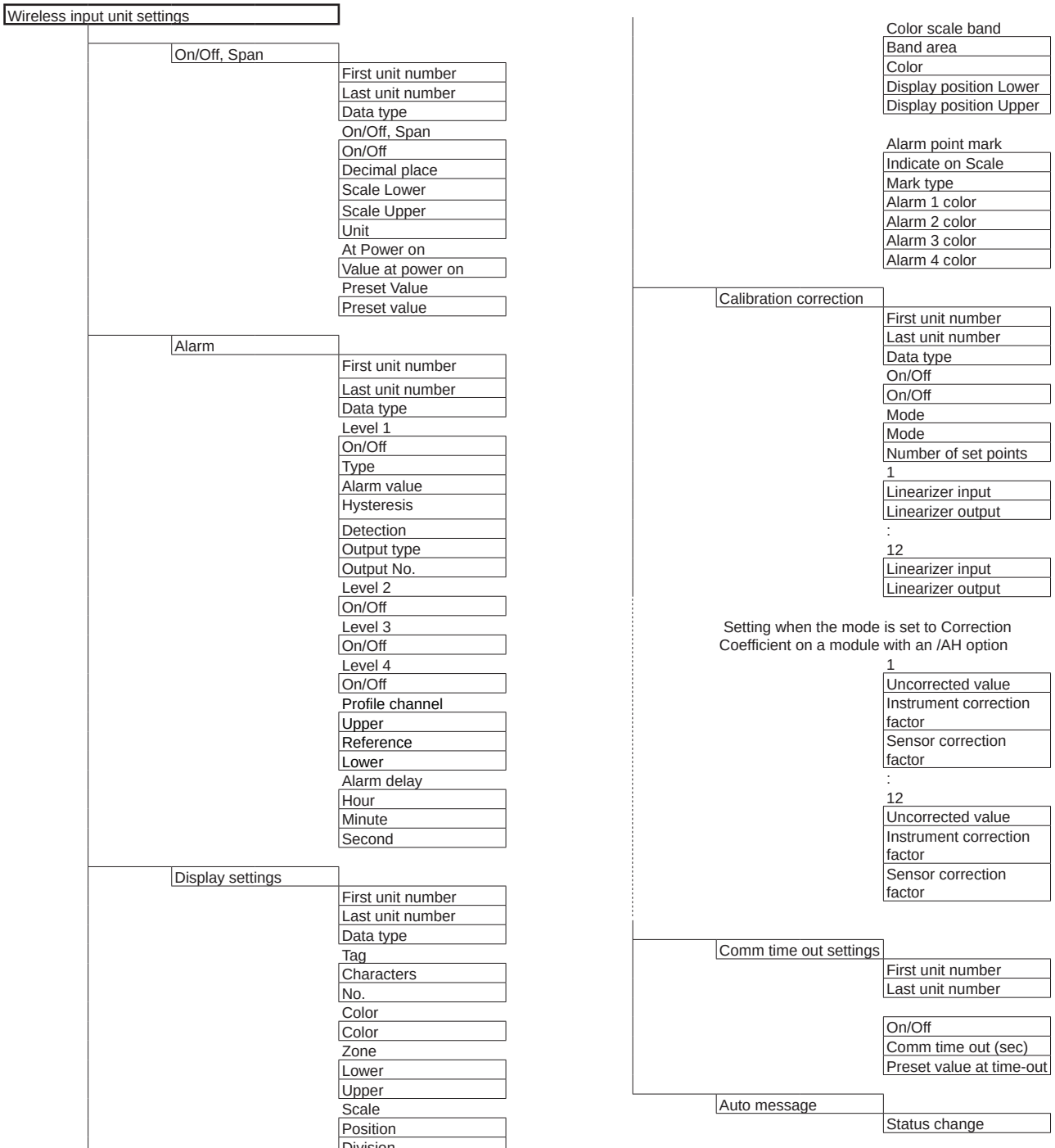
GX/GP User's Manual	Section 2.3.3, "Displaying a List of Data Files in the Internal Memory and Saving Data (Memory summary)"
GM User's Manual	Section 2.28.7, "Saving All the Data in the Internal Memory"

Note

If you are using the web application, the files can only be saved to an SD card.

3.8 Setup Menu Map

The figure below shows the setup menu that is added in the GX20/GP20/GM10 with the 920 MHz Wireless Communication (/CM2, /CM3 option).
Depending on setting parameter values, some items may be hidden.



On the Web application and Hardware Configurator, the following setting screens are displayed separately for each unit.

- On/Off, Span
- Alarm
- Display settings
- Calibration correction

4.1 Alarm Function

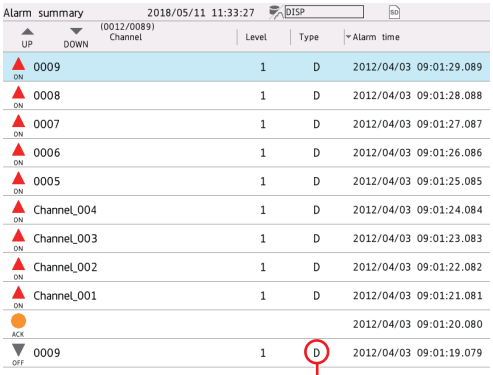
4.1.1 Data dropout alarm

Data dropout alarm is displayed as “D” on various screens and information dialog boxes.

Display Examples of Data Dropout Alarms

Example of a digital display and channel information dialog box

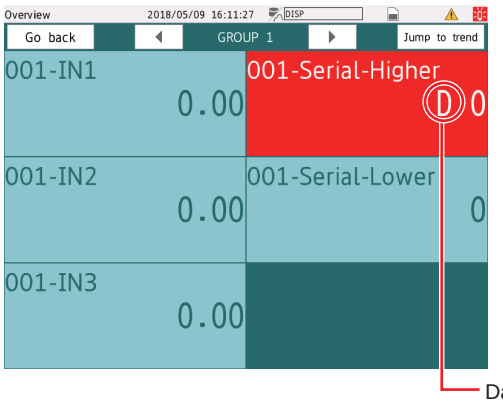
Example of an alarm summary



▶ For details on alarm summaries, see the following manuals.

GX/GP User’s Manual	Section 2.3.1, “Listing the Log of Alarm Occurrences and Releases”
GM User’s Manual	Section 3.1.2, “Monitoring the GM Data and Controlling the GM from the Monitor Screen”

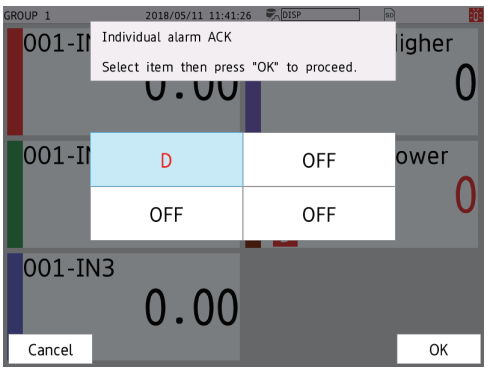
Example of an overview



4.1.2 Individual Acknowledge of Data Dropout Alarms

Individual alarm ACK is possible on data dropout alarms.

Individual alarm ACK dialog box



▶ For details on individual alarm ACK, see the following manuals.

GX/GP User's Manual	Section 2.4.1, "Releasing Alarm Output (Alarm ACK and individual alarm ACK operation)"
GM User's Manual	"Individual Alarm ACK" in section 3.1, "Controlling the GM"

4.1.3 Alarm Notification Mail

Data dropout alarm "D" is added to alarm types.

Alarm Notification Mail Format

- Syntax

`lq`	Alarm level (1 to 4) Alarm type (H, L, R, r, T, t, h, l, D, F, f) H (high limit alarm), L (low limit alarm), R (high limit on rate-of-change alarm), r (low limit on rate-of-change alarm), T (delay high limit alarm), t (delay low limit alarm), h (difference high limit alarm), l (difference low limit alarm), D (data dropout), F (profile high limit alarm), f (profile low limit alarm)

▶ For details on alarm notification mail, see the following manuals.

GX/GP User's Manual	Section 1.21.4, "Setting E-mail Transmission Conditions (When the SMTP client function is on)"
GM User's Manual	Section 2.22.4, "Setting E-mail Transmission Conditions (When the SMTP client function is on)"

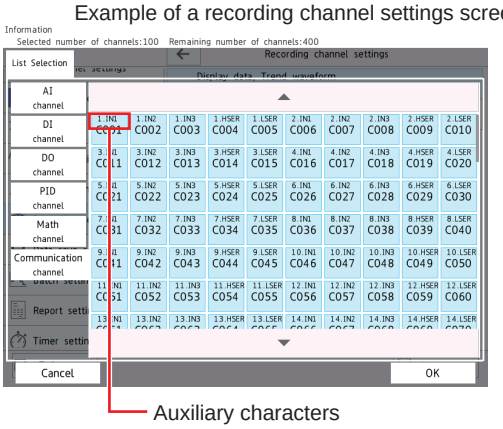
▶ For details on the alarm notification mail format, see the following manuals.

GX/GP User's Manual	"Alarm Notification Mail Format" in section 3.2.5, "E-mail Format"
GM User's Manual	"Alarm Notification Mail Format" in section 3.2.5, "E-mail Format"

4.2 Auxiliary Character Display in Communication Channel Number Displays

When there is a recognized GX70SM, auxiliary characters are displayed in channel number displays on the communication channel setup screen of each setup screen.
On the Web application, auxiliary characters appear when you move the cursor over the selected component.

Example of a recording channel settings screen in recording settings



Auxiliary Characters

Data type	Auxiliary characters
Input 1	###.IN1
Input 2	###.IN2
Input 3 (humidity sensor)	###.IN3
Higher data serial number	###.HSER
Lower data serial number	###.LSER

###: Unit number (1 to 96)

4.3 Saving and Loading Settings

The following table describes the saving and loading of GX70SM settings.

Setup Item	Description
Save settings	Settings for wireless input units and wireless input unit system information (reconfigured information) are saved to configuration files.
Load settings	Settings for wireless input units are loaded. However, the wireless input unit system information and wireless data retrieval are not loaded. Before loading the settings, reconfigure the GX70SM.

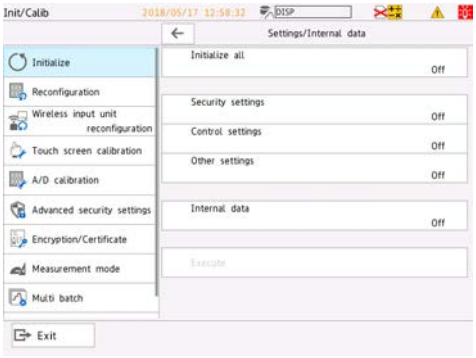
▶ For details on saving and loading settings, see the following manuals.

GX/GP User's Manual	Section 1.25, "Loading Settings"
	Section 1.26, "Saving Setting Parameters"
GM User's Manual	Section 2.28, "Saving and Loading Settings"

▶ For details on reconfiguring the GX70SM, see section 3.2.3, "Communication Interval and Recovery Action of Modbus Master" on page 3-3.

4.4 Initialization

Initialization is equivalent to auto setup through reconfiguration all units.
▶ For details on auto setup, see section 3.5, “Auto Setup” on page 3-25.



GX/GP initialization screen

Initialization of Wireless Input Unit Settings

The following table describes the initialization of wireless input unit settings.

Details of the Initialization of Wireless Input Unit Settings

Setup Item	Initialization Item					
	Initialize all	Initialize all except communication settings (GM10 only)	Security settings	Control settings	Other settings	Internal data
Wireless input unit info (wireless input unit reconfiguration info)	✓	✓	—	—	✓*1	—
Wireless input unit settings	✓	✓	—	—	✓*1	—
Wireless data retrieval*2	—	—	—	—	—	—

*1 Includes calibration correction settings, timeout settings, and auto message printout settings.
*2 It does not change to the default value even if you update the firmware.

Note

When Initialize all is executed, all the wireless input unit info will be cleared.
After initialization, perform wireless input unit reconfiguration.

Screen for executing initialize all

▶ For details on other types of initialization, see the following manual.
GX/GP User’s Manual Section 1.29.1, “Initializing the Settings and the Internal Memory”
GM User’s Manual Section 2.29.1, “Initializing the Settings and the Internal Memory”

4.5 File Size of Display Data and Event Data

In regards to the GX/GP/GM data file size, the size of information other than sampled data will include the size of the wireless input unit system information.

▶ For details on the display data and event data file sizes, see the following manual.

GX/GP User's Manual	Appendix 1, "File Size of Display Data and Event Data"
GM User's Manual	Appendix 1, "File Size of Display Data and Event Data"

Size of Information Other Than the Sampled Data

Item	Size (Bytes)
File format identification block	48
File information block	112
Event information block	304
Time zone information block	48
Alarm block	104 + 56 × the number of alarms (5000 max.)
Message block	72 + 200 × the number of messages
Control information block	136 + 72 × number of loops + 40 × number of program patterns
Control summary block	104 + 64 × number of control summaries
Control alarm summary block	104 + 64 × number of control alarm summaries
Batch information block	2360
Display information block	224
Group information block	24 + 264 × the number of groups
Channel information block	24 + 328 × the number of recording channels
Calibration correction block	24 + (40 + 16 × the number of set points) × the number of recording channels (excluding math channels)
Wireless input unit system information	24 + 56 × the number of wireless input units
Time change information block	280
Measurement data information block	96
Measurement data scan information block	40 + 16 × the number of recording channels

The number of recording channels is the total of all the channels that are recording.
The number of set points is set unit of channels. (When correction mode is off, the number of set points is zero.)
The number of wireless input units is the number of recognized units.

Example 1: When recording measurement data for 50 communication channels, 30 calibration correction points (4 points/ch), 10 wireless input units, and 10 groups Here we assume that there are no messages, alarms, loops, program patterns, control summaries, or control alarms.

48 + 112 + 304 + 48 + 104 + 72 + 136 + 104 + 104 + 2360 + 224 + (24 + 264×10)
+ (24 + 328 × 50) + (24 + (40 + 16 × 4) × 30) + (40 + 16 × 0) × 20)
+ (24 + 56 × 10) + 280 + 96 + (40 + 16 × 50)
= 28,448 bytes

4.6 Security

Security Restrictions on Operation

The following table shows the operations that have security restrictions on the Wireless input unit reconfiguration and Wireless input unit info screens.

Restricted item	Updating connection information	Reconfiguring GX70SMs	Manual resuming of disconnected GX70SMs	Maintenance (Pausing and resuming timeout detection)	Exchanged GX70SM Activation (/AS option)	Displaying detailed information dialog boxes	Communication dropout ACK
Configuration		Not allowed					
System operation	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed		

Operation Restrictions When Logged In

The following table shows the operation restrictions on the Wireless input unit reconfiguration and Wireless input unit info screens when logged in.

Logged in status	Updating connection information	Reconfiguring GX70SMs	Manual resuming of disconnected GX70SMs	Maintenance (Pausing and resuming timeout detection)	Exchanged GX70SM Activation (/AS option)	Displaying detailed information dialog boxes	Communication dropout ACK
Logged out*	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed
Monitor user (/AS option)	Not allowed	Not allowed	Not allowed	Not allowed	Not allowed		Not allowed

* When Operation without Login is set to On in the security basic settings.
If set to Off, the only operation that is accepted is logging in.

▶ For details on security settings, see the following manuals.
GX/GP User's Manual Section 1.24, "Configuring the Security Functions"
GM User's Manual Section 2.27, "Configuring the Security Functions"

4.7 System Error Notification Mail

Error number 848 (The wireless input unit was changed) is added to system error notification mail.

System Error Notification Mail Format

- Syntax

  `fff` Error number (234, 501, 502, 507, 511, 611, 612, 619, 692, 693, 695, 696, 698, 699, 848, 921)

▶ For details on the system error notification format, see the following manuals.

GX/GP User's Manual	"System Error Notification Mail Format" in section 3.2.5, "E-mail Format"
GM User's Manual	"System Error Notification Mail Format" in section 3.2.5, "E-mail Format"

4.8 Messages

The following messages will be added.

Errors Related to Parameter Settings

• Operation Errors

Code	Messages	Description, Corrective Action, Ref. Section
616	Wireless unit is disconnected. Please check the wireless communication status.	Check the communication status, and perform a manual resume.
617	Wireless unit battery is low.	The wireless input unit's battery level is low. Replace the batteries.
618	Activation required for attached wireless unit.	The wireless input unit was changed. Activate it.
619	Wireless unit battery is dead.	The wireless input unit's batteries are dead. Replace the batteries.
620	Changed the wireless unit. Please readjust reminder settings.	The wireless input unit was changed. Activate it, and reconfigure the calibration reminder settings.
621	Some units failed to start wireless data retrieval.	The wireless environment is bad, so there are many missing data in the wireless input unit. Check the environment again.
622	Failed to retrieve data. Cannot create file. This unit does not support retrieving.	This error occurs if the wireless input unit is faulty, or if you change to a wireless input unit that does not have the /DB option. Replace the wireless input unit.
623	Failed to retrieve data. Cannot create file.	This error occurs under the following conditions: • The missing data covers a long period of time, so the collection of wirelessly retrieved data cannot be completed. • There was an error (CRC error) in the collected wirelessly retrieved data. • The wireless input unit was changed when collecting the wirelessly retrieved data. The wireless environment is bad, so check the environment again. Before changing the machine, check whether the unit is collecting wirelessly retrieved data.
624	Invalid firmware version of wireless module.	Please update the wireless communication module firmware to the latest version.

Status Messages

Code	Messages
846	Wireless input unit reconfiguration in progress.
847	Some items have not been automatically set.
848	Wireless unit has been changed.
849	Wireless data retrieval in progress. If you stop recording, retrieval will be cancelled.
870	If you stop recording, retrieval will be cancelled. Alarms not acknowledged.

Messages That the Web Application Generates

• Warning Messages

Code	Title Messages	Description and Corrective Action
W8149	Initialize Initialize?	Appears when Initialize is executed from the menu bar. (GM only)
W8150	Reconfig all units Reconfigure all wireless units ? All relevant settings will be initialized. (Caution) All current communication channel settings will be cleared. (Caution) Proper setting is required, when combining Logging Data created by wireless input unit with the original data files.	Appears when Reconfiguration all units is executed from the Wireless input unit reconfiguration screen. (GM only)

Code	Title	Description and Corrective Action
	Messages	
W8151	Reconfiguration of selected units	Appears when Reconfiguration for individual units is executed from the Wireless input unit reconfiguration screen. (GM only)
	The selected unit to be reconfigured. All relevant settings will be initialized.	
W8153	Manual resume	
	Resume selected wireless unit?	Appears when Manual resume for individual units is executed from the Wireless input unit info or Wireless input unit reconfiguration screen.
W8154	Activation	Appears when Activation for individual units is executed from the Wireless input unit reconfiguration screen. (GM only) (/AS option only)
	Activate selected wireless unit?	
W8157	Are you sure you want to update the configuration? Wireless unit reconfiguration is required.	Appears when the On/Off setting of the wireless data retrieval function is changed.

▶ For details on messages, see the following manuals.

GX/GP User's Manual	Section 5.2.1, "Messages"
GM User's Manual	Section 5.2.1, "Messages"

4.9 Functions Available When the Advanced Security Function (/AS option) Is Enabled

This section explains the wireless input unit functions that are available when the advanced security function (/AS option) is enabled.

▶ For details on the advanced security function (/AS option), see the following manuals.

GX/GP Advanced Security Manual IM 04L51B01-05EN
GM Advanced Security Manual IM 04L55B01-05EN

4.9.1 Event Log

Changes to the Existing Event Log

Data dropout “D” is added to alarm types of alarm setting change operation.

Added Event Logs

The following event logs will be added.

Event Logs

Operation	Display	Details
Control		
Changing the GX70SM time-out detection operation	WUMaint###	Unit number serial number Time-out detection (pause, resume)
Wireless input unit reconfiguration (1 unit, all units)	WUReconfig###	Unit number Serial number * Serial numbers are not displayed for operation events that take place on all units.
Disconnection from GX70SMs (The GX/GP/GM detects this automatically.)	WUFailed###	Unit number Serial number
Manual resuming of disconnected GX70SMs	WUResume###	Unit number Serial number
GX70SM device change (The GX/GP/GM detects this automatically.)	WUChange###	Unit number Serial number (before and after change)
Exchanged GX70SM activation	WUActiv###	Unit number
Manual data save (Wirelessly retrieved data) (version 4.09 and later)	Manual save	Data type Wirelessly retrieved data
		###: Unit number
Setting changes during recording		
Changes to calibration correction/set point	SetC-CCMode*	Unit number Serial number Data type Channel number (communication channel number) Mode (before and after change) Number of set points (before and after change)
Changes to the calibration correction value	SetC-CCValue*	Unit number Serial number Data type Channel number (communication channel number) Correction position (1 to 12) Linearizer input (before and after change) Linearizer output (before and after change)

Continued on next page

Operation	Display	Details
Setting changes during recording		
Changes to the correction factor	SetC-CFactor*	Unit number Serial number Data type Channel number (communication channel number) Correction position (1 to 12) Uncorrected value (before and after change) Instrument correction coefficient (before and after change) Sensor correction coefficient (before and after change)
Changes to timeout settings	SetWUTOut	Unit number Serial number On/Off (before and after change) Timeout (before and after change)
Wireless unit data retrieving start (version 4.09 and later)	WURStart ###	Unit number Number of data
Wireless unit data retrieving end (version 4.09 and later)	WUREnd ###	Unit number Numeber of data File name
Wireless unit data retrieving error (version 4.09 and later)	WURError ###	Unit number Erroe No.
Wireless unit data retrieving cancel (version 4.09 and later)	WURCancel	—
Wireless data retrieval On (version 4.09 and later)	WURFuncOn	—
Wireless data retrieval Off (version 4.09 and later)	WURFuncOff	—

###: Unit number

* If the settings of a communication channel no related to a wireless input unit are changed, C-*** setting event will not show the unit number, serial number, or data type.

▶ For details on the event log, see the following manual.

GX/GP Advanced Security Manual	Appendix 1, “Event Log Contents”
GM Advanced Security Manual	Appendix 1, “Event Log Contents”

▶ For details on the event log, see the following manual.

GX/GP User’s Manual	Section 2.3.5, “Displaying Logs”
GM User’s Manual	Section 3.1.2, “Monitoring the GM Data and Controlling the GM from the Monitor Screen”

4.9.2 Saving Setup Data

If any of the wireless input unit settings shown below is changed when recording is paused, a setup data file is saved in the “SET0” folder in the GX/GP/GM SD memory.
The history is recorded in an event log, and a new setting file is saved to an SD memory card.

Settings	
Wireless input unit settings	On/Off, Span
	Alarm
	Display settings
	Calibration correction
	Comm time out settings
	Auto message

Note

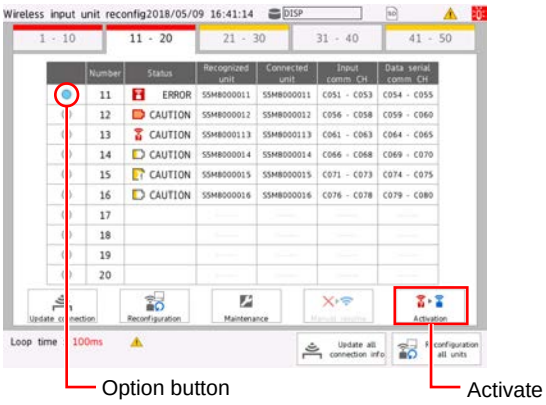
A setup data file is created also when auto configuration takes place through wireless input unit reconfiguration. Have the SD memory card inserted in the slot when you perform wireless input unit reconfiguration. Wireless input unit reconfiguration is not possible if a setup data file cannot be saved.

4.9.3 Activating Wireless Input Units (When wireless input units are changed)

If you exchange a GX70SM after wireless input unit reconfiguration, measurement data will be in error. You can clear the error and make measurement data valid by performing an activation.
Activation is possible on the Wireless input unit reconfiguration screen and Wireless input unit info screen.

Procedure

1 Select the option button for the GX70SM you want to activate.



2 Select **Activation**.
A confirmation dialog box appears.

3 Select **OK**.
The GX70SM is activated.

Operation complete

Note

- Activation is possible while connection information is being updated or when the GX70SM has not been exchanged.

4.10 Aerospace Heat Treatment (/AH option)

From the notification screen or **Due date setting** of a reminder, you can perform calibration correction on communication channels that GX70SMs are assigned to.

▶ For details on the aerospace heat treatment (/AH option), see the following manual.

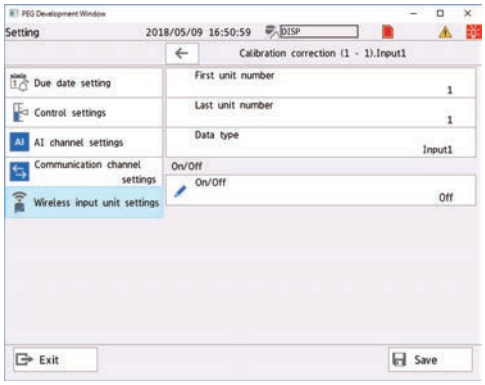
GX/GP User's Manual	Section 1.32, "Using the Aerospace Heat Treatment (/AH option) (Release number 3 and later)"
GM User's Manual	Section 2.32, "Using the Aerospace Heat Treatment (/AH option) (Release number 3 and later)"

4.10.1 Performing Calibration Correction

Procedure

1. Select **Wireless input unit settings** on the setting menu.
   A wireless input unit setting screen appears.

2. Select **Calibration correction**.
   The calibration correction settings are displayed.



3. Set the first unit number, last unit number, and data type.

4. If necessary, set the mode and the number of set points.

5. Set the calibration correction of each set point.

   ▶ For details on the settings, see the following manual.

GX/GP User's Manual	Section 1.2.4, "Setting Calibration Correction (Linearizer Approximation, Linearizer Bias, Correction Factor* (release number 3 and later))"
GM User's Manual	Section 2.3.4, "Setting Calibration Correction (Linearizer Approximation, Linearizer Bias, Correction Factor* (release number 3 and later))"

Operation complete

4.11 Hardware Configurator (Version R4.02 and later)

Hardware Configurator (Version R4.02 and later) supports GX20/GP20/GM10s (Version R4.02 and later).
This section explains the wireless input unit functions of the Hardware Configurator.
Only the parts that are different from the standard functions are explained.
Use a version that corresponds to the GX20/GP20/GM10 version for Hardware Configurator.

▶ For details on the Hardware Configurator, see also the Hardware Configurator User's Manual (IM 04L51B01-02EN).

4.11.1 Window and Menu Configuration

Wireless input unit reconfig is added to the main unit's Operation tab.

▶ See section 1.3.1, "Window and Menu Configuration" in the Hardware Configurator User's Manual.

Tab and Menu

Tab	Menu	Purpose
Recorder operation	Wireless input unit reconfig	Performing GM's wireless input unit reconfiguration

4.11.2 System Configuration

Option

920 MHz wireless communication (coordinator) function and 920 MHz wireless communication (router) function are added to the system configuration options.

▶ See step 7 in section 2.1.1, "Creating a File in Accordance with System Configuration" of the Hardware Configurator User's Manual.

Option name	GX/GP		GM	
	Default value	Firmware version and display	Default value	Firmware version and display
920 MHz wireless communication (coordinator) function	None	Displayed on R4.02.01 and later	None	Displayed on R4.02.01 and later
920 MHz wireless communication (router) function	—	—	None	Displayed on R4.02.01 and later

Option Detail

Added Wireless data retrieval On/Off to Option Detail in System Configuration. (Version 4.09 and later)
920 MHz wireless communication (coordinator) function and 920 MHz wireless

Item	Options	Initial Value	Description
Wireless data retrieval On/Off	On, Off	Off	To enable the wireless data retrieval, select On.

Display Conditions

The conditions to display Wireless data retrieval On/Off are as follows.

Item		Display Conditions
Basic configuration	Version	R4.09 and later
	Model	GX20-1/GG20-2/GP20-1/GP20-2 GM10-1/GM10-2

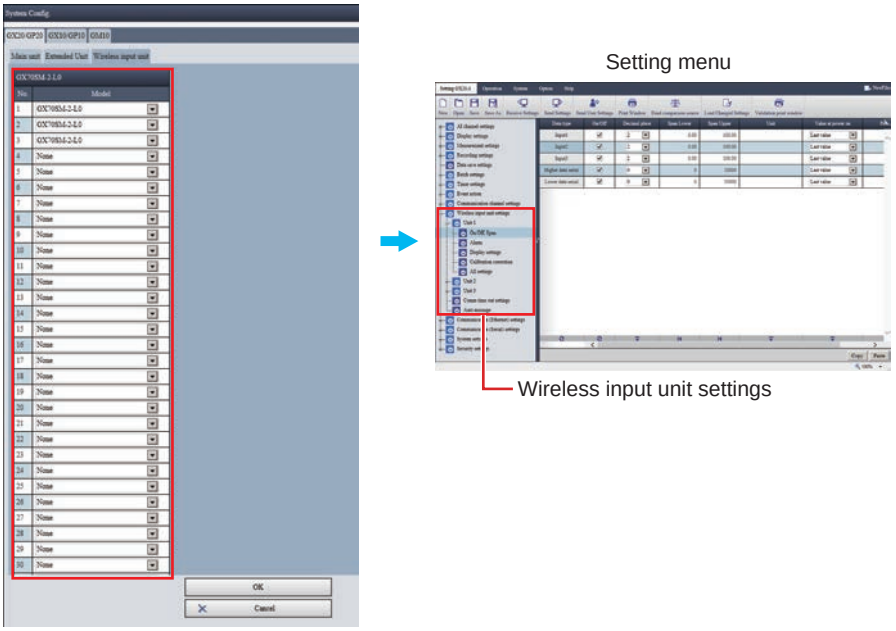
Conditions to enable the function

The conditions to enable the wireless data retrieval function are as follows.

Item		Conditions
Option	920 MHz wireless communication (coordinator) function	Use
Option detail	Advanced security function On/Off	On
	Multi batch function On/Off	Off

Wireless Input Unit

Wireless input unit is added to the System Config. tab.
When you set the wireless input unit to be connected, you can configure the wireless input unit settings of each wireless input unit.

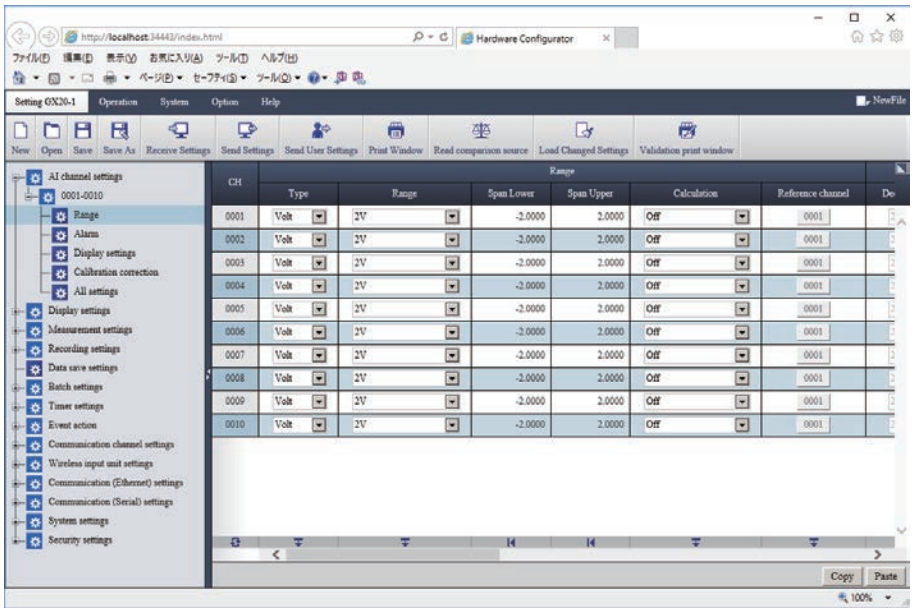


4.11.3 Creating a Configuration File in Accordance with System Configuration

This section explains how to create a new data file for configuring various GX/GP/GM functions. Before editing the channel and display settings, first create a file in accordance with the main unit's system configuration.

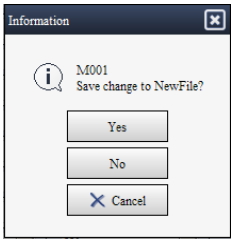
Procedure

1 Start the Hardware Configurator.
The setting screen appears.

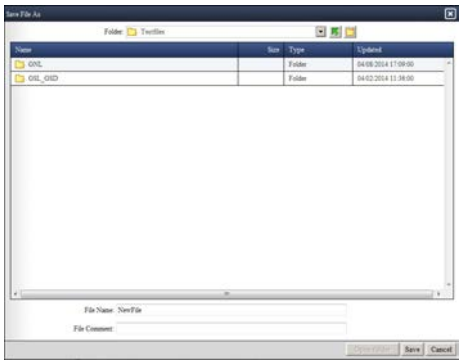


2 Click the **Setting** tab and then **New**.

A confirmation message is displayed that asks whether you want to save the displayed setup file.



3 To save the file, click **Yes**; otherwise, click **No**.
If you click **Yes**, a dialog box for saving the file (see the figure below) appears.
How to save files: ▶ section 2.4, “Saving Setup Data” in the Hardware Configurator Manual.

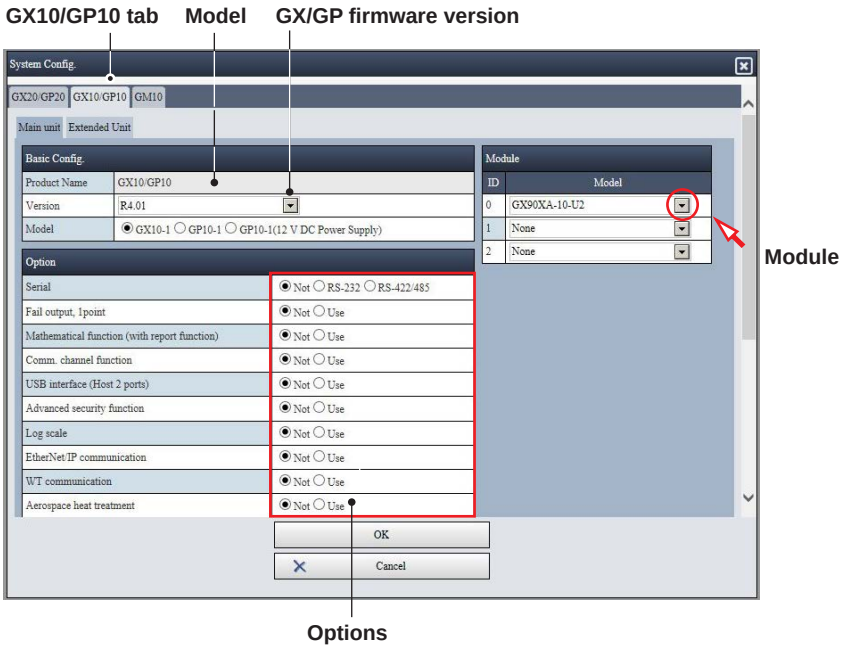


If you select **No**, the System Config. dialog box, shown in step 4, appears.

Note

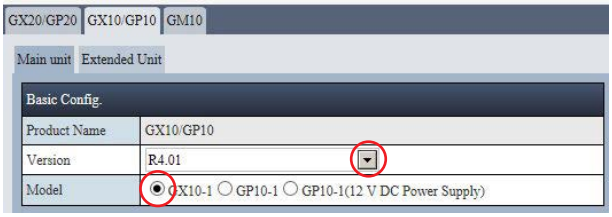
- When creating a configuration file, set the system configuration in accordance with the instrument first. The System Config. window can also be opened from **System Config** on the **System** tab.
- If you change the system configuration, the setup items that you have edited up to that point will be initialized.

4 Set the main unit’s system configuration.



5 Click the **GX20/GP20** or **GM10** tab depending on the main unit that you are using.

6 Under Basic Config., set the Product Name, Version, and Model.



The following table shows the Basic Config. settings of each tab page.

Tabbed page name	Item name	Displayed value	Default value
GX20/GP20	Product name (fixed)	GX20/GP20	GX20/GP20
	Version	R5.01, R4.09, R4.08, R4.07, R4.06, R4.04, R4.03, R4.02, R4.01, R3.02, R3.01, R2.02, R2.01, R1.03, R1.02 , R1.01	R5.01
	Model	GX20-1, GX20-2, GP20-1, GP20-2	GX20-1
GM10	Product name (fixed)	GM10	GM10
	Version	R5.01, R4.09, R4.07, R4.06, R4.05, R4.04, R4.03, R4.02, R4.01, R3.02, R3.01, R2.03, R2.02	R5.01
	Model	GM10-1, GM10-2	GM10-1

Note

From Hardware Configurator R4.01.01, the bottom two digits of the main unit's firmware version (sub revision) are no longer displayed. However, if settings are received from the main unit or a configuration file created by the main unit is loaded, the sub revision is displayed (is not omitted). (Example: R4.01.01)

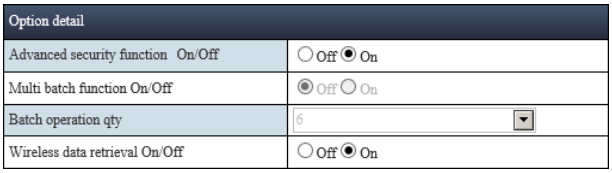
7 Set the items under **Option**.

Option	
Serial	Not / RS-422/485
Mathematical function (with report function)	Not / Use
Comm. channel function	Not / Use
Advanced security function	Not / Use
Log scale	Not / Use
EtherNet/IP communication	Not / Use
WT communication	Not / Use
Bluetooth	Not / Use
Aerospace heat treatment	Not / Use
Multi-batch function	Not / Use
OPC-UA server	Not / Use
SLMP communication	Not / Use
Program control	Not / Use
920MHz wireless communication(master)	Not / Use
920MHz wireless communication(slave)	Not / Use

The following table shows the 920 MHz wireless communication (/CM2, /CM3) options.
For details on the support for other options, see the Hardware Configurator User's Manual (IM 04L61B01-02EN).

Option name	GX/GP		GM	
	Default value	**Firmware version and display**	**Default value**	**Firmware version and display**
920 MHz wireless communication (coordinator) function	None	Displayed on R4.02.01 and later	None	Displayed on R4.02.01 and later
920 MHz wireless communication (router) function	—	—	None	Displayed on R4.02.01 and later

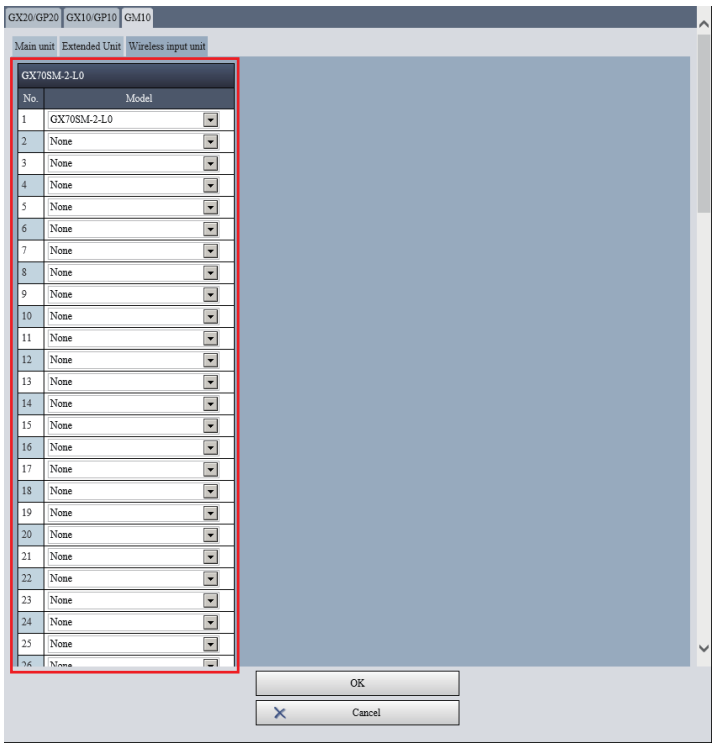
8 In the option settings, if you set the advanced security function or multi batch function or wireless data retrieval function to "Use," choose whether to enable or disable the function in Option detail.



Item	**Options**		**Initial Value**	**Description**
Advanced security function On/Off	On, Off		Off	On a GX/GP/GM with the advanced security function (/AS), to enable the function, select On.
Multi batch function On/Off	On, Off		Off	On a GX/GP/GM with the multi batch function (/BT), to enable the function, select On.
Batch operation qty	GX10-1 GX20-1 GM10-1	2 ot 6	6	If you set the function to On, you can click ▼ to select the number of batches.
	GX20-2 GM10-2	2 to 12	12	
Wireless data retrieval On/Off	On、Off		Off	To enable the wireless data retrieval, select On. (when /CM2 or /CM3 option)

9 Set the wireless input units you want to connect.

Wireless Input Unit Setting Screen



10 The rest of the procedure is the same as with the standard function. See the following manual.

Hardware Configurator Manual	From step 8 in section 2.1.1, “Creating a File in Accordance with System Configuration”

The Wireless Input Unit Configurator menu appears when the receiver function is set to Wireless Input Unit under Basic configuration of Communication (Serial) settings.
▶ Refer to section 3.2.2, “Communication (Serial) Configuration” on page 3-2

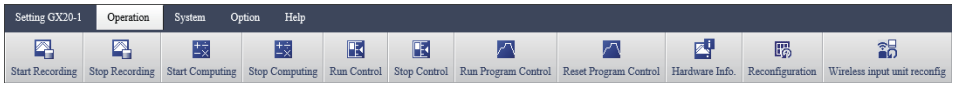
When you confirm the system configuration by clicking OK, the default values related to the wireless input units will be the same as those shown in section 3.5.1, “Auto Setup through Reconfiguration of All Units” on page 3-25.

Operation complete

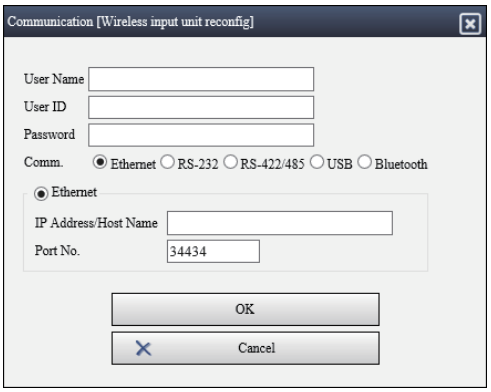
4.11.4 Executing Wireless Input Unit Reconfiguration

You can execute GM's wireless input unit reconfiguration from the Hardware Configurator. There are limitations to users that can perform reconfiguration.

1 Click the **Operation** tab > **Wireless input unit reconfiguration**.



A Communication dialog box appears.



2 Enter the communication information, and click **OK**.
When a connection is established with the GM, a reconfiguration confirmation message appears.

Wireless input unit reconfiguration of the Hardware Configurator only supports the GM10.
Wireless input unit reconfiguration of the Hardware Configurator performs Update all connection info and Reconfiguration all units at once. It is not possible to perform only Update all connection info, only Reconfiguration all units, or individual unit operation.

3 Click **OK**.
When the wireless input unit reconfiguration is complete, a message appears.

Operation complete

Note

- If user permission is set on the GM main unit, only the following users can perform wireless input unit reconfiguration.
  - Admin users
  - Users whose System operation of User property is set to Free
- If you do not have permission to perform wireless input unit reconfiguration or if the main unit is not in a condition to be reconfigured, the error message “E021 This function is not possible at this time” appears.
  Related topic: Section 3.2.6, “About Limitations on Operations by the Status of GX/GP/GM.”

4.11.5 Warning Messages

The following warning messages will be added.

Warning Messages

Code	Messages	Description and Corrective Action
W037	Reconfigure wireless input units? [Auxiliary Message (always displayed)] • (Caution) All current communication channel settings will be cleared. • (Caution) Proper setting is required, when combining Logging Data created by wireless input unit with the original data files.	A confirmation displayed before execution when you click **Wireless input unit reconfig** on the **Operation** menu bar.

4.12 Modbus Function and Register Assignments

The “wireless input unit status” register is added to the main unit status of the GX/GP/GM input register.
The status of connected GX70SMs can be read.
Wireless input unit error occurs if an error occurs in any of the connected wireless input units.
In addition, a status register is added for each wireless input unit. (version R4.06 and later)

- For wireless input unit error status, see the following manual.
- For modbus function and register assignments, see the following manual.

GX/GP User’s Manual	Section 4.5, “Modbus Function and Register Assignments”
GM User’s Manual	Section 4.5, “Modbus Function and Register Assignments”

Input Registers (Shared with the Modbus server/slave function)

GX/GP/GM Status

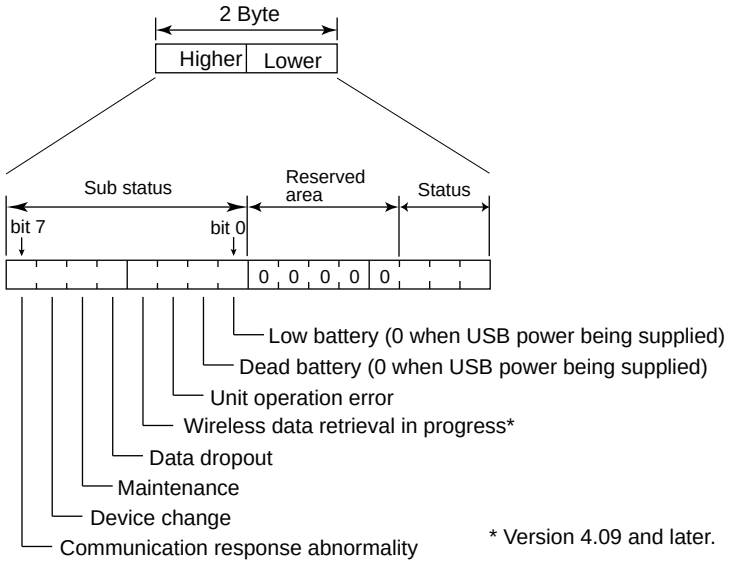
Data	Register	Description	Data Type
Wireless input unit status	308009	0: Wireless input unit normal 1: Wireless input unit error	16-bit signed integer

Wireless Input Unit Status (version R4.06 and later)

Unit Number	Register	Description	Data Type
1	308501	Wireless input unit number 1 status	16-bit signed integer
2	308502	Wireless input unit number 2 status	
:	:	:	
96	308596	Wireless input unit number 96 status	

If you access a non-existing unit number, the response will be zero (such as accessing unit number 96 of a GX20-1).

Format



* Version 4.09 and later.

Status

Value	Description	Meaning	Sub status
0	NODATA	Not used (not connected)	0
1	CLOSED	Connection stopped (not recognized)	0
2	OPENED	Connected	Zero or other than zero
3	FAILED	Disconnecting	Zero or other than zero
4	VALID	Normal communication	0
5	CAUTION	Warning activated	Other than zero

4.13 Wireless Data Retrieving (/AS option) (version R4.09 and later)

When some GX70SM data is missing from the GX/GP/GM recording data (event data) and it is a one-time incident, the missing data is collected from GX70SM.
The collected data is saved in the internal memory and SD card as a wirelessly retrieved data file (GLK file).
You can automatically backfill the recording data file and the wirelessly retrieved data file using the Auto Backfill Tool (application software) and fill in the missing sections.

Conditions to operate the wireless data retrieval function

The conditions to operate the wireless data retrieval function are as follows.

Item	Condtion
Advanced security function (/AS)	Enable
Multi-batch function (/BT)	Disable
Wireless data retrieving function	Enable
File type	Event data (GSE file)
Target channnel	The channel registered in the recording channel is used.
Alarm settings	Data dropout alarm is set. *A wirelessly retrieved data file is still created even if you have not configured the data dropout alarm, but the file is not backfilled by the Auto Backfill Tool.
Communication timeout for	GX70SM send (scan) interval x 2 (standard)
Recording data file	A data serial number that is smaller than the one from when the missing data is detected is registered before the start of the missing data, and the data serial number signaling the end of the missing data is also registered.
SD card	Equipped (recommended) * The function still works even if an SD card is not attached, but we recommend doing so to prevent data loss when the internal memory is overwritten.
Send (scan) interval of GX70SM	30 second and more * The function does not work if the interval is shorter than 30 seconds.

Note

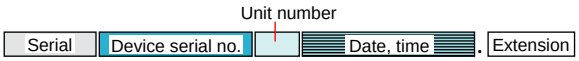
When the recording stops, the collection of wirelessly retrieved data also stops. The wirelessly retrieved data that is being collected is discarded.

Wirelessly Retrieved Data File

This file is created if missing data is found after the start of the GX/GP/GM recording, and if the collection of wirelessly retrieved data is completed during the GX/GP/GM recording.

File name

The name of the wirelessly retrieved data file is as follows.



Example: 000123_AAAAAAAAA_NN_210319_123456.GLK

Item	Description	
Serial	6-digit number + 1-character delimiter	
	6-digit number	A number that indicates the file's order of occurrence. The number ranges from 000001 to 999999. If the number reaches 999999, it returns to 000000.
	1-character delimiter	Starts with ' _' and takes on the following values: A to Z and 0 to 9. If a file with the same name exists in the specified directory, the file is saved by changing the delimiter to prevent overwriting. Example: If a file named "000123_AAAAAAAAAAA.GDS" already exists, the file is saved to the name "000123AAAAAAAAAAA.GDS."
Device serial number	xxxxxxxxx_	xxxxxxxxx: GX70SM serial number (9 strings)
Unit number	NN_	NN:
Date, time	YYMMDD_hhmmss	YY: Year (lower two digits), MM: Month, DD: Day, hh: Hour, mm: minute, ss: Second
Extension	GLK	

Save Destination

The wirelessly retrieved data file is saved in the internal memory and SD card.

- Number of files that can be saved in the internal memory

Model	Number of files that can be saved in the internal memory
GX20-1/GP20-1/GM10-1	10
GX20-2/GP20-1/GM10-2	20

If the number of wirelessly retrieved data files is more than the number of files that can be saved in the internal memory, the files are overwritten from the oldest file.

Note

Attach an SD card to prevent the loss of wirelessly retrieved data when the internal memory is overwritten.

- SD card
  Wirelessly retrieved data files are saved in the following directory.

Save Destination: "WUR0" in SD card

Note

Do not place a file named "WUR0" in the SD card.

Display of Wirelessly Retrieval Data File

Wirelessly retrieved data files can be displayed on the Universal Viewer.
They cannot be displayed on GX/GP itself or the Web application (GM10).

Operation for media FIFO

Media FIFO	Action
On	You can save up to 100 wirelessly retrieved data files. If there are more than 100 files, the files are deleted from the oldest one first and new files are saved.
Off	If there is insufficient free space in the SD card, the wirelessly retrieved data file is not saved and an error occurs. Replace the SD card to save the wirelessly retrieved data file. ▶ Refer to section 3.7.7, “Saving Wirelessly Retrieved Data Files to an SD Memory Card or USB Flash Memory” on page 3-41

Error when the collection of wirelessly retrieved data fails

Every error is stored in the error log.

- If there are more than 60 missing sections throughout GX70SM that is connected to GX/GP/GM (or 100 for the large memory model of GX/GP/GM), the oldest wirelessly retrieved data is discarded and wirelessly retrieved data files are not created.
- If malfunction or other status is received from GX70SM when collecting wirelessly retrieved data, the collection of wirelessly retrieved data is not performed for that GX70SM thereafter.
- If GX70SM is replaced with one that does not have the /DB option when collecting wirelessly retrieved data, the collection of wirelessly retrieved data is not performed for that GX70SM thereafter.
- If a CRC error occurs in some of the wirelessly retrieved data that was collected from GX70SM, wirelessly retrieved data is not created for that period of missing data.

Process when an error occurs

- If GX70SM is rebooted when data is missing from it, a wirelessly retrieved data file is still created, but the file cannot be backfilled with the recording data file using the Auto Backfill Tool.
- If data missing occurs when GX70SM is in maintenance mode or GX70SM is changed to maintenance mode when data is missing from it, a wirelessly retrieved data file is not created for that period.
- If GX/GP/GM is rebooted or the power is turned On/Off, a wirelessly retrieved data file is not created for the missing data from or around that period.

Behavior when the machine is replaced

Behavior when the machine is replaced
If GX70SM is replaced when wirelessly retrieved data is being collected, a wirelessly retrieved data file is not created. (Display message E623)
If GX70SM is replaced after wirelessly retrieved data is collected, the file cannot be backfilled with the recording data file using the Auto Backfill Tool.
If data is missing from GX70SM that has been replaced, you may not be able to create a wirelessly retrieved data file.

5.1 Wireless Input Unit Functions of the Universal Viewer (Version R3.05 and later)

The Universal Viewer (Version R3.05 and later) can be used to view the GX70SM logging data files, wirelessly retrieved data combined data files and backfilled files.
This section explains the wireless input unit functions of the Universal Viewer.
Only the parts that are different from the standard functions are explained.
*1 Version R3.11 and later.
*2 Backfilled files (GSEF files) can be created using the Auto Backfill Tool from version R3.11 and later.

▶ For details on Universal Viewer, see the following manual.
Universal Viewer Manual (IM 04L61B01-01EN).

5.1.1 Files That Can Be Displayed and Their Extensions

Logging data files (WLD file) and combined data files (WLC file) can be displayed on Universal Viewer version R3.05 and later.
Wirelessly retrieved data file (GLK file) and backfilled files (GSEF file) can be displayed on Universal Viewer version R3.11 and later.

If you are using an older version, update to the latest version.

▶ For details on updating the Universal Viewer, see the following manual.
Universal Viewer Manual — Section 1.1.4, “Installation and Version Updating”

GX20, GP20, GM10

Display Type \ File Type (Extension)		Logging Data File	Combined Data File	Wirelessly Retrieval Data File	Backfilled File
		*.WLD	*.WLC	*.GLK	*.GSEF
Waveform display		✓	✓	✓	✓
Digital display		✓	✓	✓	✓
Circular display		✓	✓	✓	✓
List display	Alarm list	—	✓	—	✓
	Mark list	—	✓	—	✓
	Image mark list	—	✓	—	✓
	Event list	—	—	—	—
	Control alarm list	—	✓	—	✓
	Control mode list	—	✓	—	✓
	Operation log list	—	—	—	—

▶ For details on the files that can be displayed and their extensions, see the following manual.
Universal Viewer Manual — Section 1.1.1, “Files That Can Be Displayed and Their Extensions”

File Selection Area

The following options have been added when opening a data file.

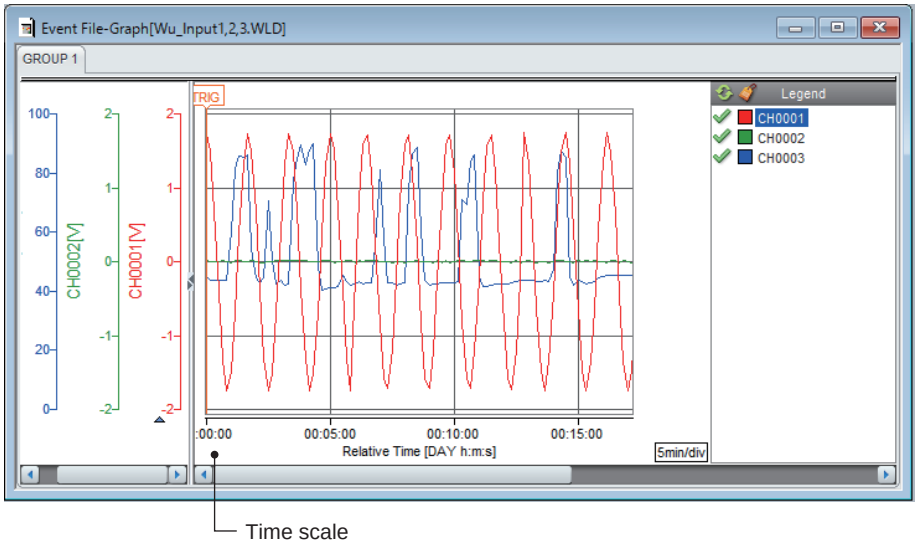
Option	Description
Backfill (.GSEF)	Displays only backfilled files that have been backfilled.
920Config (.GLK)	Displays only wirelessly retrieved data files.

▶ For detail on the file selection area, see the following manual.
Universal Viewer Manual — Section 2.2.1, “Specifying a File Name and Opening the Data File”

5.1.2 Waveform Display of Logging Data, Wirelessly retrieved data

When logging data or wirelessly retrieved data is displayed as a waveform, the default time axis value is set to Relative Time.
When the time axis is changed to Absolute Time, the following applies.
Data end time: Time on the PC when the logging data file or wirelessly retrieved data was created
Data start time: Time corresponding to scan interval × number of data points before the above end time

Example of a Window Showing Waveform Data



▶ For details on the waveform display, see the following manual.
Universal Viewer Manual — Section 3.1, “Displaying Waveforms”

▶ For details on the circular display, see the following manual.
Universal Viewer Manual — Section 3.2, “Displaying Waveforms on a Circular Chart”

▶ For details on the digital display, see the following manual.
Universal Viewer Manual — Section 3.3, “Displaying Digital Values”

▶ For details on the list display, see the following manual.
Universal Viewer Manual — Section 3.4, “Displaying a List of Alarms, Marks, and Image Marks”

▶ For details on the superimposed display, see the following manual.
Universal Viewer Manual — Section 3.1.16, “Displaying Waveforms Using Superimposed Display”

▶ For details on the logging data, wirelessly retrieved data display, see also section 2.7.1, “Saving Logging Data (without /DB option), Wirelessly Retrieved Data (with /DB option) to Files” on page 2-32 in this manual.

5.1.3 Waveform Display of Combined Data and Backfilled Data

The waveform display of combined data and backfilled data are the same as the waveform data display of the GX/GP/GM.
You can switch the time axis display between absolute time and relative time.

▶ For details on the time axis setting, see the following manual.

Universal Viewer Manual	Section 3.1.3, “Setting the Time Axis”

▶ For details on the waveform display, see the following manual.

Universal Viewer Manual	Section 3.1, “Displaying Waveforms”

▶ For details on the circular display, see the following manual.

Universal Viewer Manual	Section 3.2, “Displaying Waveforms on a Circular Chart”

▶ For details on the digital display, see the following manual.

Universal Viewer Manual	Section 3.3, “Displaying Digital Values”

▶ For details on the list display, see the following manual.

Universal Viewer Manual	Section 3.4, “Displaying a List of Alarms, Marks, and Image Marks”

▶ For details on the superimposed display, see the following manual.

Universal Viewer Manual	Section 3.1.16, “Displaying Waveforms Using Superimposed Display”

▶ For details on the combined data display, see also section 2.7.2, “Combine Data Files” on page 2-35 in this manual.

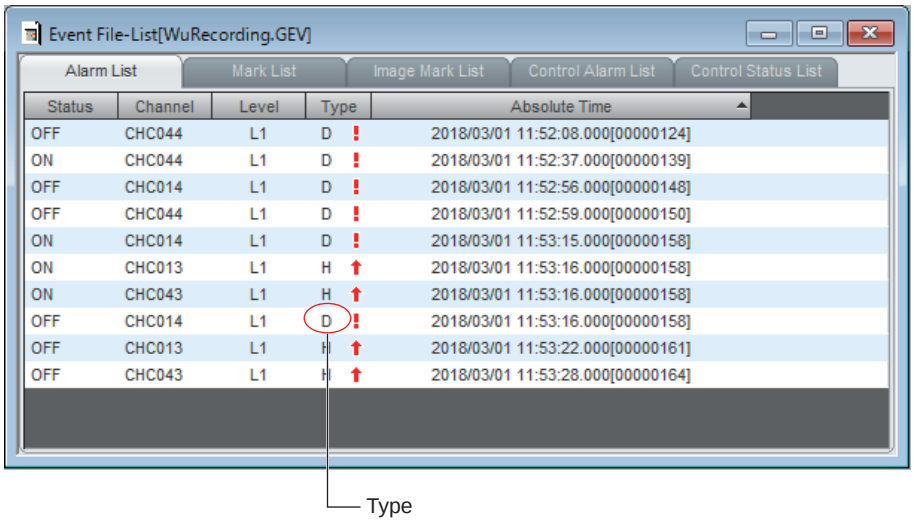
Note

When combining, if a combinable GSE file and a GSEF file that includes it exist in the same folder, the GSEF file is given priority and combined as the connection target.

5.1.4 Alarm List Display

In the alarm list display, data dropout alarms are indicated as “D.”

Alarm To tabbed page



▶ For details on the alarm list display, see the following manual.

Universal Viewer Manual — Section 3.4, “Displaying a List of Alarms, Marks, and Image Marks”

5.1.5 Signing Data Files

You can include signatures (approval information) in backfill files (GSEF files). However, you cannot run backfill using the Auto Backfill Tool on signed files.

▶ For details on the signing data files, see the following manual.

Universal Viewer Manual — Section 2.5, “Signing Data Files”

5.1.6 Listing the Operation Log

The following items are added to the operation log.

▶ For details on the operation log list, see the following manual.

Universal Viewer Manual — Section 3.6, “Listing the Operation Log (DX100P/DX200P, DX1000/DX1000N/DX1000T/DX2000/DX2000T with the /AS1 option, or GX10/GX20/GP10/GP20/GM10 with the /AS option)”

List of Operations by Model

GX20/GP20/GM10, with /AS option

Wireless input unit disconnection	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**
Wireless input unit resume	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**
Wireless input unit activation	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**
Wireless input unit maintenance	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**

Continued on next page

Operation	What Appears on the Screen (Bold words are displayed on the screen. Non-bold words are explanations.)
Wireless input unit standard	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**
Wireless input unit reconfig	**Unit number [**All, 1 to 96**]**
	Serial number [serial number**]**
	Type[disconnect, manual resume, activation, maintenance, maintenance release, reconfiguration**]**
Wireless input unit device change	**Unit number [**All, 1 to 96**]**
	Serial number [serial number before change > serial number after change**]**
Calibration correction mode/point change (for wireless unit)	**Unit number [**All, 1 to 96**]**
	Data type [data 1, data 2, data 3**]**
	Serial number [serial number**]**
	Channel number [CHC001 to CHC096**]**
	Mode/Points Mode: **[**mode before change > mode after change**]** Points: **[**points before change > points after change**]**
Calibration correction mode/point change (for wireless unit)	**Unit number [**All, 1 to 96**]**
	Data type [data 1, data 2, data 3**]**
	Serial number [serial number**]**
	Channel number [CHC001 to CHC096**]**
	Correction position [1 to 12**]**
	Correction mode (linearizer approximation, linearizer bias, and correction factor) **[**value before change > value after change**]**
Timeout setting change (wireless unit)	**Unit number [**1 to 96**]**
	Serial number [serial number**]**
	On, Off [On, Off**]**
	Time out [value before change > value after change**]**
Wireless unit data retrieving start (version R3.11)	**Unit number [**1 to 50**]**
	Number of data [0 to 9000**]**
Wireless unit data retrieving end (version R3.11)	**Unit number [**1 to 50**]**
	Number of data [0 to 9000**]**
	File name [File name**]**
Wireless unit data retrieving error (version R3.11)	**Unit number [**1 to 50**]**
	Error No. [Error number**]**
Wireless unit data retrieving cancel (version R3.11)	—
Wireless data retrieval On (version R3.11)	—
Wireless data retrieval Off (version R3.11)	—
Backfill (version R3.11)	—

Blank

6.1 Added and Changed Commands

This chapter describes the commands that have been added or changed on the GX/GP/GM with the 920 MHz Wireless Communication (/CM2, /CM3 option) from those of the standard GX/GP/GM.
For details on communication commands, see also the Communication Interface User's Manual (IM 04L51B01-17EN).

6.1.1 Added and Change Commands and References to the Communication Command Manual

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Classification	Category	Command	Description	Reference to the Communication Command Manual
Added	Setting	SWUnitTimeOut	Wireless input unit timeout setting	—
	Setting	SWUnitTOPreset	Wireless input unit preset value at time-out setting	—
	Setting	SWUnitAutoMsg	Wireless input unit auto message setting	—
	Setting	SCalibUseCom	Calibration correction use on/off Calibration correction use on communication channels on/off	2.2.6 Conditions for Executing Commands
	Setting	SCalibCom	Calibration correction settings Sets the calibration correction on communication channels.	2.2.6 Conditions for Executing Commands
	Output	FWUnitConf	Wireless input unit configuration output	—
		FWUnitStat (version R4.06 and later)	Wireless input unit status output	—
Changed	Setting	SRangeCom	Measuring range (/MC) Sets the measurement range of communication channels. If the data type of channels assigned to GX70SMs is data serial number, the decimal place is fixed to zero.	2.4 Setting Commands SRangeCom
	Setting	SWDCom	Watchdog timer (/MC) Sets the watchdog timer of a communication channel. The watchdog timer of channels that wireless input units are assigned to is fixed to Off.	2.4 Setting Commands SWDCom
	Setting	SAlarmCom	Alarm (/MC) Sets the alarm of a communication channel. Data dropout alarm (D) is added to the alarm types of channels that GX70SMs are assigned to.	2.4 Setting Commands SAlarmCom
	Setting	SEventAct	Event Action Sets an event action. Wireless input unit error is added to the event details of device status.	2.4 Setting Commands SEventAct
	Setting	SFailSts	Instrument information to output (/FL) [GX/GP] Sets the instrument information to output from the fail relay (DO channel). Wireless input unit error is added to instrument information.	2.4 Setting Commands SFailSts
	Setting	SSerialBasic	Serial Communication Basics (/C2 or /C3) Sets basic serial communication parameters. "WirelessUnit" is added to receiver functions.	2.4 Setting Commands SSerialBasic
	Setting	SModMaster	Modbus master settings (/C2/MC or /C3/MC) Sets the Modbus master operation. When receiver function is "WirelessUnit," the following intervals are added to the read cycle. 2 min/5 min/10 min/20 min/30 min/1 h	2.4 Setting Commands SModMaster

Continued on next page

Classification	Category	Command	Description	Reference to the Communication Command IM
Changed	Setting	SMultiKind	Multi panel [GX/GP] Set the screens to display on the multi panel. Wireless input unit info and wireless input unit reconfiguration screens cannot be assigned to the multi panel.	2.4 Setting Commands SMultiKind
	Setting	SHomeKind	Standard display [GX/GP] Set the screen to display on the standard display. Wireless input unit info and wireless input unit reconfiguration screens can be assigned to the standard display.	2.4 Setting Commands SHomeKind
	Setting	SFavoriteKind	Favorite screen [GX/GP] Sets the favorite screen. Wireless input unit info and wireless input unit reconfiguration screens can be assigned to the favorite screen.	2.4 Setting Commands SFavoriteKind
	Setting	SMltMultiKind	Multi panel type Sets the multi panel pattern for multi batch. Wireless input unit info and wireless input unit reconfiguration screens cannot be assigned to the multi panel.	2.4 Setting Commands SMltMultiKind
	Output	FData	Outputs the most recent channel data Outputs the most recent I/O channel, math channel, and communication channel data. Wireless input unit data dropout (D) is added to the alarm types.	2.5 Output Commands FData
	Output	FFifoCur	Outputs channel FIFO data Outputs the I/O channel, math channel, and communication channel FIFO data. Wireless input unit data dropout (D) is added to the alarm types.	2.5 Output Commands FFifoCur
	Output	FStat	Outputs the recorder status Outputs the recorder status. Wireless error detected and Wireless data retrieval in progress are added to status information 2.	2.5 Output Commands FStat
	Output	FLog	Outputs the log Outputs the alarm summary, message summary, error log, etc. Wireless input unit data dropout (D) is added to the alarm types. GX70SM operation is added to the detail event log.	2.5 Output Commands FLog
	Output	FEventLog	Outputs a Detail Event Log(/AS) Outputs an event log. You can specify the event, user, etc. GX70SM operation is added to the detail event log.	2.5 Output Commands FEventLog
	Output	FCnf	Outputs setting data The following commands are added to the COMM category. • SCalibUseCom • SCalibCom • SWUnitTimeOut • SWUnitTOPreset • SWUnitAutoMsg The following commands are added to the CALIB category. • SCalibUseCom • SCalibCom	2.5 Output Commands FCnf
	Output	_OPT	Outputs the instrument's option installation information Outputs the instrument's option installation information. 920 MHz wireless communication option (/CM2, /CM3, /CS2, /CS3) is added to the instrument's option information.	2.8 Instrument Information Output Commands _OPT

Continued on next page

Classification	Category	Command	Description	Reference to the Communication Command IM
Changed	Output	_UNS, _UNR	Outputs the Instrument's Unit Configuration Information Outputs the instrument's unit configuration information. /CM and /CS are added to the unit option information output.	2.8 Instrument Information Output Commands _UNS or _UNR

6.2 List of Commands

6.2.1 Setting Commands

Command	Description (Required Options) [Applicable Models]	Page
Wireless Input Unit Setting Commands		
SWUnitTimeOut	Wireless input unit timeout setting	6-5
SWUnitTOPreset	Wireless input unit preset value at time-out setting	6-5
SWUnitAutoMsg	Wireless input unit auto message printout setting	6-5
Communication Channel Setting Commands		**Page**
SRangeCom	Measuring range (/MC)	6-5
SWDCom	Watchdog timer (/MC)	6-5
SAlarmCom	Alarm (/MC)	6-6
SCalibUseCom	Calibration correction use on/off	6-7
SCalibCom	Calibration correction	6-7
Event Action Setting Commands		**Page**
SEventAct	Event action	6-8
System Setting Commands		**Page**
SFailSts	Instrument information to output (/FL) [GX/GP]	6-8
Serial Communication Setting Commands		**Page**
SSerialBasic	Serial Communication Basics (/C2 or /C3)	6-8
SModMaster	Modbus master (/C2/MC or /C3/MC)	6-9
Local Setting Commands		**Page**
SMultiKind	Multi panel [GX/GP]	6-9
SHomeKind	Standard display [GX/GP]	6-9
SFavoriteKind	Favorite screen [GX/GP]	
Multi Batch Setting Commands (/BT)		**Page**
SMltMultiKind	Multi panel type	6-10

6.2.2 Output Commands

Command	Description (Required Options) [Applicable Models]	Page
SWUnitConf	Wireless input unit configuration output	6-11
FData	Outputs the most recent channel data	6-11
FFifoCur	Outputs channel FIFO data	6-11
FStat	Outputs the recorder status	6-12
FLog	Outputs the log	6-12
FEventLog	Outputs a Detail Event Log(/AS)	6-12
FWUnitStat	Wireless input unit status output	6-13

6.2.3 Instrument Information Commands

Command	Description	Page
_OPT	Outputs the instrument's option installation information	6-13
_UNS	Outputs the instrument's unit configuration information	6-13
_UNR	Outputs the instrument's unit configuration information	6-13

6.3 Setting Commands

SWUnitTimeOut

Wireless Input Unit Timeout

Sets the GX70SM timeout.

Syntax `SWUnitTimeOut,p1,p2`
- `p1` Wireless input unit number
  GX20-1/GP20-1/GM10-1: 01 to 50
  GX20-2/GP20-2/GM10-2: 01 to 96
- `p2` On/Off (On, Off)
- `p3` Timeout value (1 to 7200) seconds

Query `SWUnitOut[,p1]?`

Example Set the timeout of the GX70SM with unit number 2 to 30 seconds.
`SWUnitOut,02,On,30`

Description
- Setting and output are possible only on wireless unit numbers of recognized wireless units.

SWUnitTOPreset

Wireless Input Unit Preset Value at Time-out

Set the preset value behavior when the GX70SM times out.

Syntax `SWUnitTOPreset,p1,p2`
- `p1` Wireless input unit number
  GX20-1/GP20-1/GM10-1: 01 to 50
  GX20-2/GP20-2/GM10-2: 01 to 96
- `p2` On/Off (On, Off)

Query `SWUnitTOPreset?`

Example Set the preset value at time-out of the GX70SM with unit number 2 to On.
`SWUnitTOPreset,02,On`

Description
- Setting and output are possible only on wireless unit numbers of recognized wireless units.
- For preset valu, refer to **SValueCom** command in Communication command manual.

SWUnitAutoMsg

Wireless Input Unit Auto Message Printout

Sets the GX70SM's auto message printout.

Syntax `SWUnitAutoMsg,p1`
- `p1` Wireless input unit status change (Off, On)

Query `SWUnitAutoMsg?`

Example Set the status change of auto message printout to On.
`SWUnitAutoMsg,On`

Description
- Setting and output are possible only when the GX70SM is recognized.

SRangeCom

Measuring range (/MC)

Sets the measurement range of a communication channel.

Unused Channels

Syntax `SRangeCom,p1,p2`
- `p1` Channel number
- `p2` Enable or disable (Off)

Used Channels

Syntax `SRangeCom,p1,p2,p3,p4,p5,p6`
- `p1` Channel number
- `p2` Enable or disable (On)
- `p3` Decimal place (0)
- `p4` Span lower limit (-9999999 to 99999999)
- `p5` Span upper limit (-9999999 to 99999999)
- `p6` Unit (up to 6 characters, UTF-8)

Query `SRangeCom[,p1]?`

Example Measure 0 to 10000 on communication channel 004 (higher data serial).
`SRangeCom,004,On,0,0,10000`

Description
- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- If p2=Off, you cannot set p3 and subsequent parameters.
- You cannot set the span upper and lower limits to the same value.
- For serial data of a channel on which the GX70SM is recognized, p3 is fixed to 0.
- For the correspondence between channel numbers, wireless unit's unit numbers, and data types, see Appendix 1, "Communication Channel Assignments Based on Station Numbers and Data Types" on page App-1.

SWDCom

Watchdog timer (/MC)

Sets the watchdog timer of a communication channel.

▶ For the correspondence between channel numbers, unit numbers, and data types, see appendix 1, "Communication Channel Assignments Based on Station Numbers and Data Types."

Channels That Do Not Use Watchdog Timers

Syntax `SWDCom,p1,p2`
- `p1` Channel number
- `p2` Watchdog timer usage (Off)

Channels That Use Watchdog Timers

Syntax `SWDCom,p1,p2,p3,p4`
- `p1` Channel number
- `p2` Watchdog timer usage (On)
- `p3` Watchdog timer (1 to 120) [s]
- `p4` Operation at timer expiration (Preset, Last)

Query SWDCom[,p1]?
Example Set the watchdog timer of communication channel 001 to 60 seconds. Replace the communication channel 001 value with its preset value at watchdog timer expiration.
SWDCom,001,On,60,Preset

Description
- If p2=Off, you cannot set p3 and subsequent parameters.
- For a channel on which the GX70SM is recognized, p2 is fixed to Off.
- For the correspondence between channel numbers, wireless unit's unit numbers, and data types, see Appendix 1, "Communication Channel Assignments Based on Station Numbers and Data Types" on page App-1.

SAlarmCom

Alarm (/MC)

Sets the alarm of a communication channel.

No Alarm Setting

Syntax SAlarmCom,p1,p2,p3
- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (Off)

Do Not Output Alarms

Syntax SAlarmCom,p1,p2,p3,p4,p5,p6,p7
- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (On)
- p4 Alarm type (H, L, TH, TL, D, FH, FL)
- p5 Alarm value (within the span range)
- p6 Detection (Off, On)
- p7 Output (Off)

Output Alarms

Syntax SAlarmCom,p1,p2,p3,p4,p5,p6,p7,p8
- p1 Channel number
- p2 Alarm number (1 to 4)
- p3 Alarm on or off (On)
- p4 Alarm type (H, L, TH, TL, D, FH, FL)
- p5 Alarm value (within the span range)
- p6 Detection (Off, On)
- p7 Output (Off)
  - DO — Output to a relay (DO channel)
  - SW — Output to an internal switch
- p8 Number
  - If p7=DO — Relay (DO channel) number
  - If p7=SW — Internal switch number (001 to 100)

Query SAlarmCom[,p1[,p2]]?
Example Set alarm number 2 of communication channel 004 (higher data serial) to data dropout alarm (D). When an alarm occurs, output to the relay (DO channel) at number 0105.
SAlarmCom,004,2,On,D,,On,DO,0105

Description
- You cannot set this on a "Off" communication channel.
- If p3=Off, you cannot set p4 and subsequent parameters.
- If p7=Off, you cannot set p8.
- You cannot set DO channels or internal switches whose output type is set to Manual as output destination numbers.
- p4=D can only be set on a channel on which the GX70SM is recognized.
- For the correspondence between channel numbers, wireless unit's unit numbers, and data types, see Appendix 1, "Communication Channel Assignments Based on Station Numbers and Data Types" on page App-1.
- Set the p5 to 0 when alarm type (p4) is set to FH, FL.

SCalibUseCom

Calibration correction use on/off

Sets the calibration correction use of a communication channel to on or off.

Syntax `SCalibUseCom,p1,p2`

`p1` Channel number

`p2` Enable or disable (Off)

Off	Not Use
On	Use

Query `SCalibUseCom[,p1]?`

Example Enable the calibration correction on communication channel 001.
`SCalibUseCom,001,On`

Description

- There is a limitation on the number of channels that p2 can be set to On.

Model	GX10 GP10	GX20-1 GP20-1 GM10-1	GX20-2 GP20-2 GM10-2
Number of channels that can be set to On	50	150	300

- If p2=Off in the communication channel on/off setting (SRangeCom), p2 is fixed to Off.
- For details on communication channels, see section 2.3.2, “Parameter Notation and Range” in the Communication Command Manual.

SCalibCom

Calibration correction

Sets the calibration correction on communication channels.

Disable Calibration Correction

Syntax `SCalibCom,p1,p2`

`p1` Channel number

`p2` Linearizer mode (Off)

Use Calibration Correction (Linearizer approximation, linearizer bias)

Syntax `SCalibCom,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15,p16,p17,p18,p19p,20p,p21,p22,p23,p24,p25,p26,p27`

`p1` Channel number

`p2` Mode

`Appro`	Linearizer approximation
`Bias`	Linearizer bias

`p3` Number of correction points (2 to 12)
`p4` Input value of correction point 1
`p5` Output value of correction point 1
`p6` Input value of correction point 2
`p7` Output value of correction point 2
`p8` Input value of correction point 3
`p9` Output value of correction point 3
`p10` Input value of correction point 4
`p11` Output value of correction point 4
`p12` Input value of correction point 5
`p13` Output value of correction point 5
`p14` Input value of correction point 6
`p15` Output value of correction point 6
`p16` Input value of correction point 7
`p17` Output value of correction point 7
`p18` Input value of correction point 8
`p19` Output value of correction point 8
`p20` Input value of correction point 9
`p21` Output value of correction point 9
`p22` Input value of correction point 10
`p23` Output value of correction point 10
`p24` Input value of correction point 11
`p25` Output value of correction point 11
`p26` Input value of correction point 12
`p27` Output value of correction point 12

Use Calibration Correction (Correction coefficient) (/AH)

Syntax `SCalibCom,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15,p16,p17,p18,p19p,20p,p21,p22,p23,p24,p25,p26,p27,p28,p29,p30,p31,p32,p33,p34,p35,p36,p37,p38,p39`

`p1` Channel number

`p2` Mode

`Correct`	Correction Factor

`p3` Number of correction points (2 to 12)
`p4` Input value of uncorrected value 1
`p5` Instrument correction coefficient 1
`p6` Sensor correction coefficient 1
`p7` Input value of uncorrected value 2
`p8` Instrument correction coefficient 2
`p9` Sensor correction coefficient 2
`p10` Input value of uncorrected value 3
`p11` Instrument correction coefficient 3
`p12` Sensor correction coefficient 3
`p13` Input value of uncorrected value 4
`p14` Instrument correction coefficient 4
`p15` Sensor correction coefficient 4
`p16` Input value of uncorrected value 5
`p17` Instrument correction coefficient 5
`p18` Sensor correction coefficient 5
`p19` Input value of uncorrected value 6
`p20` Instrument correction coefficient 6
`p21` Sensor correction coefficient 6
`p22` Input value of uncorrected value 7
`p23` Instrument correction coefficient 7
`p24` Sensor correction coefficient 7
`p25` Input value of uncorrected value 8
`p26` Instrument correction coefficient 8
`p27` Sensor correction coefficient 8
`p28` Input value of uncorrected value 9
`p29` Instrument correction coefficient 9
`p30` Sensor correction coefficient 9
`p31` Input value of uncorrected value 10
`p32` Instrument correction coefficient 10
`p33` Sensor correction coefficient 10
`p34` Input value of uncorrected value 11
`p35` Instrument correction coefficient 11
`p36` Sensor correction coefficient 11
`p37` Input value of uncorrected value 12
`p38` Instrument correction coefficient 12
`p39` Sensor correction coefficient 12

Query `SCalibCom[,p1]?`

Example Set three correction points on communication channel 001 (measurement range: 0.0 to 100.0). Set the correction points as follows: when the input value is 0.0, the output value is 0.1; when the input value is 50.0 V, the output value is 50.2 V; when the input value is 100.0 V, the output value is 99.7 V.
`SCalibCom,001,Appro,3,0,1,50,502,1000,997`

Description

- If p2=Off, you cannot set p3 and subsequent parameters.
- If calibration correction use on/off (p2 of the ScalibUseCom command) is set to Off, p2 is fixed to Off.
- You cannot set correction points beyond the number of points specified by p3.
- The correction value is not affected by the range span. It is valid in the range of -9999999 to 99999999.

SEventAct

Event action

Sets an event action.

Syntax
`SEventAct,p1,p2,p3,p4,p5,p6,p7`
`SEventAct,p1,p2,p3,p4,p5,p6,p7,p8`
`SEventAct,p1,p2,p3,p4,p5,p6,p7,p8,p9`
`SEventAct,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10`
`SEventAct,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`

- `p1` Event action number (1 to 50)
- `p2` Type (Off, On)
- `p3` Event type (see the table below)
- `p4` Source element number (see the table below)
- `p5` Event details (see the table below)
- `p6` Operation mode (see the table below)
- `p7` Action type*
- `p8` Source element number*
- `p9` Action detail 1*
- `p10` Action detail 2*
- `p11` Action detail 3*

p3 Event Type	Value	p4 Source Element Number	p5 Event details	p6 Operation Mode
Device status	Status	-	WUnitErr (Wireless input unit error)	Rising, Falling, Both

* For details on p7 to p11, see the Communication Command Manual.

SFailSts

Instrument information to output (/FL) (/CM2, /CM3) [GX/GP]

Sets the instrument information to output from the fail relay (DO channel).
Wireless input unit error is added to instrument information.

Syntax `SFailSts,p1,p2,p3,p4,p5,p6`

- `p1` Memory/media status (Off, On)
- `p2` Measurement error (Off, On)
- `p3` Communication error (Off, On)
- `p4` Recording stop (Off, On)
- `p5` Alarm (Off, On)
- `p6` Wireless input unit error (Off, On)

Query `SFailSts?`
Example Output all information.
`SFailSts,On,On,On,On,On,On`

Description

- You cannot use this command to configure settings while recording is in progress.
- You cannot use this command to configure settings while computation is in progress.
- Wireless input unit error can be set on a GX20/GP20/GM20/GM10 with the /CM2 or /CM3 option.

SSerialBasic

Serial Communication Basics (/CM2, /CM3, /CS2, /CS3)

Sets basic serial communication parameters.

Not Use

Syntax `SSerialBasic,p1`

- `p1` Function (Off)

Modbus master, Wireless input unit, Modbus slave

Syntax `SSerialBasic,p1,p2,p3,p4,p5`

- `p1` Function (Master, WirelessUnit, Off Slave)
- `p2` Address (1 to 247)
- `p3` Baud rate [bps] (115200)
- `p4` Parity (None)
- `p5` Stop bits (1)

Query `SSerialBasic?`
Example Set the function to “WirelessUnit.”
`SSerialBasic,WirelessUnit`

Description

- For /CM2, /CM3
  p1=Off or Master or Wireless Unit
- For /CS2, /CS3
  p1=Off or Slave
- p3 and later parameters are fixed as follows:
  p3=115200
  p4=None
  p5=1
- If p1=WirelessUnit, p2 is invalid.

Under the following conditions, p1=Wireless cannot be changed to other options.

Conditions that allow changing the setting while the function receiver is recording

Before change	After change (After confirmation)	Change allowed?	
		Security function not available	Security function available
Off	Off, Master	Yes	No
Master			
WirelessUnit	Other than WirelessUnit	No	No

- The settings specified with this command take effect with the **OSeriApply** command. The recorder serial settings do not change until you send the OSeriApply command.

SModMaster

Modbus master (/CM2, /CM3, /CS2, /CS3)

Sets the Modbus master operation.

Syntax `SModMaster,p1,p2,p3,p4,p5,p6`

- `p1` Master function (Off, On)
- `p2` Read cycle (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 15s, 20s, 30s, 1min, 2min, 5min, 10min, 20min, 30min, 30min, 1h)
- `p3` Communication timeout (100ms, 200ms, 250ms, 500ms, 1s, 2s 5s, 10s, 1min)
- `p4` Gap between messages (Off, 5ms, 10ms, 20ms, 50ms, 100ms)
- `p5` Recovery action: retransmission (Off, 1, 2, 3, 4, 5, 10, 20)
- `p6` Recovery action: wait time (Off, 5s, 10s, 30s, 1min, 2min, 5min)

Query `SModMaster?`

Example Set the read cycle to 5min, the communication timeout to 250ms, the gap between messages to 10ms, the retransmission to 2, and the recovery wait time to 5min.

```
SModMaster,On,5min,250ms,2,5min
```

Description

- If the receiver function is set to WirelessUnit (wireless input unit), Modbus master is fixed at On.
- When receiver function is “WirelessUnit,” you can specify the following read cycles.
  2min, 5min, 10min, 20min, 30min, 1h

SMultiKind

Multi Panel Division [GX/GP]

Wireless input unit reconfiguration and wireless input unit info screens cannot be assigned to the multi panel.

SHomeKind

Standard display [GX/GP]

Set the screen to display on the standard display.

For Multi Panel

Syntax `SHomeKind,p1,p2,p3`

- `p1` Screen type (Multi)
- `p2` Multi panel number (1 to 20)
- `p3` Batch group number (1 to the number used)
  p3 is valid when the multi batch function (/BT) is enabled.

For Screens other than Multi Panel

Syntax `SHomeKind,p1,p2,p3`

`p1` Screen type

`Trend`	Trend
`Digital`	Digital
`Bar`	Bar graph
`Overview`	Overview
`Alarm`	Alarm summary
`Message`	Message summary
`Memory`	Memory summary
`Report`	Report summary
`Modbus-M`	Modbus master status
`Modbus-C`	Modbus client status
`Watt`	WT communication status
`Switch`	Internal switch/relay status
`Action-Log`	Event log
`Error-Log`	Error log
`Commu-Log`	Communication log
`Ftp-Log`	FTP log
`Web-Log`	Web log
`Mail-Log`	Mail log
`Modbus-Log`	Modbus log
`Sntp-Log`	SNTP log
`Dhcp-Log`	DHCP log
`SLMP-Log`	SLMP log (/E4)
`Health-Log`	Health monitor log
`Network`	Network information.
`SLMP-C`	SLMP client status (/E4)
`Reminder`	Reminder (/AH)
`Setting`	Setting
`ControlGroup`	Control group
`ControlSummary`	Control summary
`ControlAlarmSummary`	Control alarm summary
`ControlOverview`	Control overview
`SaveLoad`	Save load
`SystemInfo`	System information
`CustomDisplay`	Customized display screen
`Batch`	Batch overview (/BT)
`Overview`	
`Tuning`	Tuning

	`ProgramSelect`	Program selection (/PG)
	`ProgramRun`	Program operation (/PG)
	`WirelessInfo`	Wireless input unit information
	`Wireless Reconf`	Wireless input unit reconfiguration
`p2`		Display group number (when p1 is not CustomDisplay) Customized display screen number (1 to 30) (when p1 is CustomDisplay) Control group number (1 to 10) (If p1=ControlGroup) Program pattern number (1 to 99) (If p1=ProgramSelect)
`p3`		Batch group number (All, 1 to the number used) p3 is valid when the multi batch function (/BT) is enabled.

Query `SHomeKind?`

Example Set the standard display to wireless input unit information.
`SHomeKind,WirelessInfo`

Description

- Report is an option (/MT).
- Modbus-M and Modbus-C are an option (/MC).
- Watt is an option (/E2).
- CustomDisplay is an option (/CG).
- Multi is a GX20/GP20 display.
- p3 is valid when the multi batch function (/BT) is enabled.
- When the multi batch function (/BT) is not available, p3 is fixed to 1.
- p1 cannot be set to BatchOverview when p3 is 1 to 12.
  When p3=All, P1 cannot be set to Trend, Digital, Bar, Alarm, Message, Memory, or Multi.
- When p1 is set to Trend, Digital, Bar, Alarm, Message, Memory, or Multi, p3 cannot be set to All.
  p3 cannot be set to 1 to 12 when p1 is set to BatchOverview.
- ControlGroup, ControlSummary, ControlAlarmSummary, ControlOverview, and Tuning are valid when the PID control module is installed.
- ProgramSelect and ProgramRun are options (/PG).

SFavoriteKind

Favorite screen [GX/GP]

Sets the favorite screen.

For the screen types, see p1 of the "SHomeKind" command.

▶ See section 2.4, "Setting commands" in the communication command manual.

SMltMultiKind

Multi panel type

Wireless input unit reconfiguration and wireless input unit info screens cannot be assigned to the multi panel.

▶ See section 2.4, "Setting commands" in the communication command manual.

6.4 Output Commands

FWUnitConf

Wireless input unit configuration output

Retrieves the wireless input unit configuration and performs reconfiguration, maintenance, restore, and activation.

Syntax `FWUnitConf,p1,p2`

`p1` Retrieve, reconfigure, maintenance, restore, activate

- `0` Retrieve
  - Sets the GX70SM assigned to the coordinator to the connected GX70SM.
- `1` Reconfigure
  - Sets the connected GX70SM to the recognized unit.
- `2` Maintenance (pause)
  - Pauses time-out detection.
- `3` Maintenance (resume)
  - Resumes time-out detection.
- `4` Restore
  - Manual restores the disconnected state.
- `5` Activate
  - Aligns the content of the connected GX70SMs with the recognized GX70SMs.

`p2` Wireless input unit number
GX20-1/GP20-1/GM10-1: 01 to 50
GX20-2/GP20-2/GM10-2: 01 to 96

Example Output the unit configuration of wireless input unit number 1.
`FWUnitConf,0,01`

Description

- Omitting p2 is equivalent to specifying all GX70SMs.
- p5 is valid when the advanced security function (/AS) is enabled.
- When recording, computing, controlling, or user restricted state, reconfiguration (0) does not work.
- For the ASCII output format, see section 6.6.1, “Wireless Input Unit Configuration Output (FWUnitConf)” on page 6-14.

FData

Outputs the most recent channel data

Outputs the most recent I/O channel, math channel, and communication channel data.

Syntax `FData,p1,p2,p3`

`p1` Output format

- `0` The most recent data in ASCII format
- `1` The most recent data in binary format

`p2` First channel
`p3` Last channel

Example Output the most recent data of channels 0001 to 0020.
`FData,0,C001,C005`

Description

- If you omit p2 and p3, all channels will be output.
- Channel ranges whose first channel and end channel are different channel types are interpreted as follows:

First channel	Last channel	Setting
0001	A200	0001 to 9999, A001 to A200
A001	C500	A001 to A200, C001 to C500
C001	A200	Not allowed (will result in error)
A001	0001	Not allowed (will result in error)

- For the ASCII output format, see section 6.6.2, “Most Recent Channel Data (FData)” on page 6-15.
- For the binary output format, see section 6.7.1, “Most Recent Channel Data (FData)” on page 6-23.

FFifoCur

Outputs channel FIFO data

Outputs the I/O channel, math channel, and communication channel FIFO data.

Acquire the FIFO Data

Syntax `FFifoCur,p1,p2,p3,p4,p5,p6,p7`

`p1` FIFO data output (0)
`p2` Scan group (1 or 2)
`p3` First channel
`p4` Last channel
`p5` Read start position (-1, 0 to 999999999999)

- `–1` The most recent read position

`p6` Read end position (-1, 0 to 999999999999)

- `–1` The most recent read position

`p7` Maximum number of blocks to read (1 to 9999)

Example Read the measured data of channels 0001 to 0020. Set the read start position to 180 and the read end position to the most recent position. Set the maximum number of blocks to read to 9999.
`FFifoCur,0,1,0001,0020,180,-1,9999`

Acquire the FIFO Data Read Range

Syntax `FFifoCur,p1,p2`

`p1` FIFO read range output (1)
`p2` Scan group (1 or 2)

Example Acquire the current readable range.
`FFifoCur,1,1`

Description

- For the binary output format, see section 6.7.2, “Channel FIFO Data (FFifoCur)” on page 6-23.
- p2 = 2 is valid when the measurement mode is set to dual interval.

FStat

Outputs the recorder status

Outputs the recorder status.

Syntax `FStat,p1`

`p1` Status output (0,1)

`0`	Status 1 to 4 output
`1`	Status 1 to 8 output

Example Outputs the recorder status.
```
FStat,0
```

Description

- For the ASCII output format, see section 6.6.3, “GX status (FStat)” on page 6-16.

FLog

Outputs the log

Outputs the alarm summary, message summary, error log, etc.

Syntax `FLog,p1,p2,p3`

`p1` Status output (0)

`ALARM`	Alarm summary
`MSG`	Message summary
`EVENT`	Event log
`ERROR`	Error log
`DHCP`	Ethernet address setting log
`GENERAL`	General log
`MODBUS`	Modbus log
`FTP`	FTP client log
`SNTP`	Time adjustment log
`MAIL`	E-mail log
`WEB`	Web log
`SLMP`	SLMP log
`CALARM`	Control alarm summary log
`CTRL`	Control summary log
`HELMONI`	Health monitor log

`p2` Maximum log readout length

p1	Read range
ALARM	1 to 1000
MSG	1 to 500
GENERAL	1 to 200
MODBUS	1 to 50 (1 to 200 for the GX20-2/GP20-2)
CALARM	1 to 500
CTRL	1 to 1000
HELMONI	1 to 100
Other than those above	1 to 50

`p3` Batch group number

`All`	All batch group numbers
`1 to the number used`	Batch group number

Example Output 600 alarm summary entries.
```
FLog,ALARM,600
```

Description

- For the ASCII output format, see section 6.6.4, “Alarm Summary (FLog)” on page 6-16.
- p3 is valid when multi batch is in use and p1={alarm, msg, event}. Omitting it is equivalent to specifying all batch groups.

FEventLog

Outputs a Detail Event Log(/AS)

Outputs an event log. You can specify the event, user, etc.

Syntax `FEventLog,p1,p2,p3,p4,p5`

`p1` Output format

`0`	The same output format as Flog, EVENT (no detailed information).
`1`	Include detailed information

`p2` User name
Up to five user names can be specified by separating each user with a colon.

`p3` Event specification (specified with an event string)
Up to five events can be specified by separating each user with a colon.
Forward-matching search is used for the event name.

`p4` Maximum number of output (1 to 400)

`p5` Batch group number

`All`	All batch group numbers
1 to the number used	Batch group number

Example Output the log of up to 10 “message001” writing operations by User01.
```
FEventLog,1,User01,Message001,10
```

Description

- Omitting p2 is equivalent to specifying all users.
- If more than five users are specified by p2, only the first five users will be valid.
- Omitting p3 is equivalent to specifying all events.
- If more than five events are specified by p3, only the first five events will be valid.
- For details on the even string of p3, see section 6.6.6, “Detail Event Log Output (FEventLog) (/AS)” on page 6-17.
- This command can be used only when the multi batch function (/BT) is enabled. Omitting p5 is equivalent to specifying all batch groups.

FWUnitStat

Outputs the Wireless input unit status

Outputs the wireless input unit status.

Syntax `FWUnitStat`

Description

- For the ASCII output format, see section 6.6.9, “Wireless Input Unit Status Output (FWUnitStat)” on page 6-22

6.5 Instrument Information Output Commands

_OPT

Outputs the instrument’s option installation information

Outputs the instrument’s option installation information.

Syntax `_OPT`

Description

- For the ASCII output format, see section 6.6.7, “Instrument’s Option Installation Information (_OPT)” on page 6-21.

_UNS or _UNR

Outputs the instrument’s unit configuration information

Outputs the instrument’s unit configuration information. 920 MHz wireless communication option (/CM, /CS) is added to the unit configuration information of the instrument.

Syntax

`_UNS`	Outputs the status that is recognized by the device.
`_UNR`	Outputs the installation status.

Description

- For the ASCII output format, see section 6.6.8, “Instrument’s Unit Configuration Information (_UNS or _UNR)” on page 6-21.

6.6 ASCII Output Format

6.6.1 Wireless Input Unit Configuration Output (FWUnitConf)

The output in response to the command "FWUnitConf,0" is shown below.

When there are no parameters

Syntax

```
EA<crlf>
000:ccccccccccccccc_uuuuuuuuuuuuuuuu<crlf>
001:ccccccccccccccc_uuuuuuuuuuuuuuuu<crlf>
:
nnn:ccccccccccccccc_uuuuuuuuuuuuuuuu<crlf>
:
095:ccccccccccccccc_uuuuuuuuuuuuuuuu<crlf>
096:ccccccccccccccc_uuuuuuuuuuuuuuuu<crlf>
EN<crlf>
```

nnn	Wireless input unit number	
ccccccccccccccc	Model name of the wireless input unit that is actually connected	
	----------	Wireless unit not installed (“-” 16 characters)
	GX70SM	Wireless input unit
uuuuuuuuuuuuuuuu	Model name of the wireless input unit that is recognized in the settings	
	----------	Wireless unit not installed (“-” 16 characters)
	GX70SM	Wireless input unit

Output Example

When wireless input unit 77 is output

```
EA<crlf>
077:S1M2345678_S8M7654321<crlf>
EN<crlf>
```

6.6.2 Most Recent Channel Data (FData)

The output in response to the command "FData,0" is shown below.
GX70SM data dropout alarm (D) is added.
▶ See section 2.10.1, “Most Recent Channel Data (FData)” in the Communication Command Manual.

Syntax

$a_1a_2a_3a_4$

a_1 Alarm status (level 1)
a_2 Alarm status (level 2)
a_3 Alarm status (level 3)
a_4 Alarm status (level 4)

a_1, a_2, a_3, and a_4 is set to one of the following:

H	High limit alarm
L	Low limit alarm
h	Difference high limit alarm
l	Difference low limit alarm
R	High limit on rate-of-change alarm
r	Low limit on rate-of-change alarm
T	Delay high limit alarm
t	Delay low limit alarm
D	Wireless input unit data dropout alarm
F	Profile high limit alarm
f	Profile low limit alarm
Space	No alarm

The alarm statuses of control alarms (when a PID control module is installed) are all set to zero.

6.6.3 GX status (FStat)

The output in response to the command "FStat,0" is shown below.
The status “wireless error detected” is added to status information 2.
▶ See section 2.10.8, “Recorder status (FStat)” in the Communication Command Manual.

Status Information 2

Bit	Name	Description
0	-	-
1	Wireless data retrieval in progress	Set to 1 when the wireless data retrieval in progress (version 4.09 and later)
2	Memory end	Set to 1 when the free space in the external memory is low.
3	Touch operation login	Set to 1 when a user is logged in through touch operation.
4	User lock out present	Set to 1 when a user lock out occurs, and remains at 1 until user locked ACK is issued (only when the advanced security function (/AS) enabled).
5	Wireless error detected	Set to 1 only when an error is detected on the GX70SM. Error details: Low battery, dead battery, operation error, recovery wait
6	Measurement error	Set to 1 while measurement errors are detected on an AI module or when a burnout has occurred.
7	Communication error	Set to 1 when a Modbus master, Modbus client, WT communication, or SLMP communication error has occurred.

6.6.4 Alarm Summary (FLog)

The output in response to the command "FLog,ALARM" is shown below.
Wireless input unit data dropout is added to the alarm types.
▶ See section 2.10.9, “Alarm Summary (FLog)” in the Communication Command Manual.

Syntax

ss	Alarm type	
	H_	High limit alarm
	h_	Difference high limit alarm
	L_	Low limit alarm
	l_	Difference low limit alarm
	R_	High limit on rate-of-change alarm
	r_	Low limit on rate-of-change alarm
	T_	Delay high limit alarm
	t_	Delay low limit alarm
	D_	Wireless input unit data dropout alarm
	F_	Profile high limit alarm
	f_	Profile low limit alarm

6.6.5 Operation log (FLog)

The output in response to the command "FLog,EVENT" is shown below.
The event log has been changed.
See “Detail Output (FEventLog) (/AS).”
▶ See section 2.10.11, “Event log (FLog)” in the Communication Command Manual.

Syntax

sss...s	Operation string (fixed to 16 characters. Unused character positions are filled with spaces.) **See section 6.6.6, “Detail Event Log Output (FEventLog) (/AS)” on page 6-17**.

6.6.6 Detail Event Log Output (FEventLog) (/AS)

The output in response to the command "FEventLog" is shown below. Output is possible when the advanced security function (/AS) is enabled.
The GX70SM calibration correction log is added.
▶ See section 2.10.23, “Detail Event Log Output (FEventLog) (/AS)” in the Communication Command Manual.

Event string, detailed information

Operations that are marked with an asterisk will be logged regardless of whether the advanced security function is enabled or disabled. All other operations are logged only when the offense security function (/AS) is enabled.

Operation	**Event string** Information is included in ###	**### information and detailed information** Blue text indicates the detailed information output format.		
Control operations				
Manual data save (Version 4.09 and later)	**ManualSave**	ss•••		
			ss•••	Date type [Data, Report, ManualSample, AlarmSummary, WirelessRetrieval, HealthScore] [All] for all data. [Cancel] if canceled.
Setting changes during recording				
Calibration correction/ set point change (for communication channels)	SetComCCMode Pnt	uuu:dd:cccc:sssssssss(mode,num)=(b1,b2)->(a1,a2)		
			u	Unit number (0: No GX70SM assignment)
			d	Data type (1,2,3) (0: No GX70SM assignment)
			c	Communication channel number
			s,•••s	Serial number (Null: No GX70SM assignment)
			b1,b2	Before change
			a1,a2	After change
			The following settings (those that have been changed among two settings)	
			mode	Mode (before and after change) [OFF, Bias, Appro, Corr]
			num	Number of set points (before and after change)
			Example: 001:01:C001:S12345678(mode,num)=(OFF,3)->(Appro,12)	

Continued on next page

Operation	Event string Information is included in ###	### information and detailed information Blue text indicates the detailed information output format.
Calibration correction value change (for communication channels)	SetCom #######	Action (output in the event string) ###: CCValue: linearizer approximation, linearizer bias uuu:pp:dd:cccc:sssssssss:(input,output)=(b1,b2) ->(a1,a2) u Unit number (0: No GX70SM assignment) p Set number d Data type (1,2,3) (0: No GX70SM assignment) c Communication channel s,•••s Serial number (Null: No GX70SM assignment) b1,b2 Before change a1,a2 After change The following settings (those that have been changed among two settings) input Calibration correction (before change) output Output calibration value (before and after change) Example: 001:02:03:C001:S12345678:(output)=(1.234)->(2.234)
Calibration correction value change (for communication channels)	SetCom ######	Action (output in the event string) ###: CFactor: Correction factor uuu:pp:dd:cccc:sssssssss(uncorrected,instru,sensor)=(b1,b2,b3)->(a1,a2,a3) u Unit number (0: No GX70SM assignment) p Correction value d Data type (1,2,3) (0: No GX70SM assignment) c Communication channel s,•••s Serial number (Null: No GX70SM assignment) b1,b2,b3 Before change a1,a2,a3 After change The following settings (those that have been changed among two settings) Uncorrected value (before and after change) Instrument correction coefficient (before and after change) Sensor correction coefficient (before and after change) Example: 001:02:02:C001:S12345678:(sensor)=(1.234)->(2.234)

Continued on next page

Operation	Event string Information is included in ###	### information and detailed information Blue text indicates the detailed information output format.
Changes to timeout settings (GX70SM)	SetWUTimeout	uuu:sssssssssss:(s,sec)=(b1,b2)->(a1,a2) u Unit number (0: No GX70SM assignment) s,•••s Serial number (Null: No GX70SM assignment) s On/Off [ON, OFF] sec Timeout period (before and after change) b1,b2 Before change a1,a2 After change The following settings (those that have been changed among two settings) On/Off (before and after change) Timeout value (before and after change) Example: 001:S12345678:(s,sec)=(OFF,0)->(ON,60)
Wireless input unit		
Wireless input unit reconfiguration	WU#####uuu	### Action (output in the event string) Reconfig, uuu unit number uuu:s,•••s u Unit number (ALL for all units) s Serial number
Wireless input unit mode		### Action (output in the event string) MaintHalt, uuu unit number uuu:s,•••s u Unit number (ALL for all units) s Serial number
Wireless input unit mode		#### Action (output in the event string) MaintResume, uuu unit number uuu:s,•••s u Unit number (ALL for all units) s Serial number
Wireless input unit activation	WU#####uuu	#### Action (output in the event string) Apply, uuu unit number uuu:s,•••s u Unit number (ALL for all units) s Serial number
Wireless input unit resume		#### Action (output in the event string) Resume, uuu unit number uuu:s,•••s u Unit number (ALL for all units) s Serial number
Wireless input unit disconnection		#### Action (output in the event string) Disconnect, uuu unit number uuu:s,•••s uuu,dddd Unit number (ALL for all units) s Serial number
Wireless input unit device change	WUChangeuuu	uuu Unit number (output in the event string) uuu:(s,•••s)->(t,•••t) u Unit number (ALL for all units) s Serial number before change t Serial number after change

Continued on next page

Operation	**Event string** Information is included in ###	**### information and detailed information** Blue text indicates the detailed information output format.
Wireless data retrieval start (version 4.09 and later)	WURStartuuu	uuu Unit number (output in the event string) uuu,dddd u Unit number (output in the event string) d Number of data
Wireless data retrieval end (version 4.09 and later)	WUREnduuu	uuu Unit number (output in the event string) uuu,dddd u Unit number (output in the event string) d Number of data s Wirelessly retrieved data file name
Wireless data retrieval error (version 4.09 and later)	WURErruuu	uuu Unit number (output in the event string) uuu,eee u Unit number e Error No.
Wireless data retrieval cancel (version 4.09 and later)	WURCancel	—
Wireless data retrieval On (version 4.09 and later)	WURFuncOn	—
Wireless data retrieval Off (version 4.09 and later)	WURFuncOff	—

6.6.7 Instrument's Option Installation Information (_OPT)

The output in response to the command "_OPT" is shown below.
The installation information of the 920 MHz wireless communication (/CM, /CS) option is added.
▶ See section 2.10.43, "Instrument's Option Installation Information (_OPT)" in the Communication Command Manual.

Output Example

```
EA<crlf>
/CM*, 'Wireless communication function (master)'<crlf>
/CS*, 'Wireless communication function (slave)'<crlf>
EN<crlf>
```

/CM*	920 MHz wireless communication (coordinator) function
/CS*	920 MHz wireless communication (router) function

6.6.8 Instrument's Unit Configuration Information (_UNS or _UNR)

The output in response to the command "_UNS" or "_UNR" is shown below.
The installation information of the 920 MHz wireless communication (/CM, /CS) option is added to the unit option information output.
▶ See section 2.10.46, "Instrument's Unit Configuration Information (_UNS or _UNR)" in the Communication Command Manual.

Output Example

```
EA<crlf>
Main,0,'GX20-1J',1234567,xx-xx-xx-xx-xx-xx,R4.02.01,/MC /CM*,0,10,-
---------------<crlf>
Sub,1,'GX90EX-02-ET1',1234567,xx-xx-xx-xx-xx-xx,R1.01.01,,0,6,-----
----------<crlf>
EN<crlf>
```

6.6.9 Wireless Input Unit Status Output (FWUnitStat)

The output in response to the command “FWUnitStat” is shown below.

Syntax

```
EA<crlf>
001:pppp,sssssssss,t···,r···,b···,w···<crlf>
:
nnn:pppp,sssssssss,t···,r···,b···<crlf>
:
096:pppp,sssssssss,t···,r···,b···<crlf>
EN<crlf>
```

nnn	Wireless input unit number (001 to 096)	
pppp	Wireless type (Hexadecimal display)	
	0000	No wireless input unit
	7FFD	Wireless input unit
sssssssss	Wireless input unit status (fixed to 10 characters)	
	_ _ _ _ _ _	No wireless input unit
	NODATA_ _ _	Not used (not connected)
	CLOSED_ _ _	Connection stopped (not recognized)
	OPENED_ _ _	Connected
	FAILED_ _ _	Disconnecting
	VALID_ _ _	Normal communication
	CAUTION_ _ _	Warning activated
t···	Wireless input unit sub status (Decimal number display)	
	Fixed to zero when there is no wireless input unit	
	0 bit	Low GX70SM battery level warning
	1 bit	Dead GX70SM battery warning
	2 bit	GX70SM operation error warning
	3 bit	Wireless data retrieval in progress (version 4.09 and later)
	4 bit	GX70SM data dropout warning
	5 bit	Maintenance warning
	6 bit	Device change warning
	7 bit	Communication response abnormality warning
r···	Elapsed time (s)	
	Fixed to zero when there is no wireless input unit	
b···	RSSI (dBm)	
	Fixed to zero when there is no wireless input unit	
w···	Time left until the collection of wirelessly retrieved data is complete	
	When data is being collected: Format “xxh:xxm”	
	When data is not being collected: “---”	
	When the no wireless data retrieval: Hidden	

Output Example

```
EA<crlf>
001:7FFD,VALID          ,3,30,-90,01h:20m
:
048:0000,NODATA ,0,0,0,---
049:7FFD,CAUTION ,1,120,-70
:
096:7FFD,FAILED ,2,60,-80
EN<crlf>
```

6.7 Format of the Data Block of Binary Output

6.7.1 Most Recent Channel Data (FData)

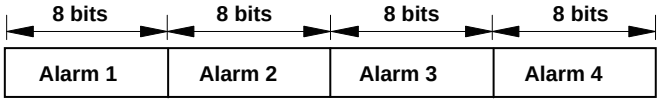
Wireless input unit data dropout is added to the alarm (32 bits).

▶ See section 2.11.1, “Most Recent Channel Data (FData)” in the Communication Command Manual.

Block 1

Alarm (32 bits)

Indicates the alarm status.



The eight bit values of alarm 1 to alarm 4 are described in the table below.

Bit	Value	Description
0 to 5	0	No alarm
	1	High limit alarm
	2	Low limit alarm
	3	Difference high limit alarm
	4	Difference low limit alarm
	5	High limit on rate-of-change alarm
	6	Low limit on rate-of-change alarm
	7	Delay high limit alarm
	8	Delay low limit alarm
	9	Wireless input unit data dropout alarm
	10	Profile high limit alarm
	11	Profile low limit alarm
6	0	No alarm is activated.
	1	An alarm is activated.
7	0	Alarm nonhold state
	1	Alarm hold state

6.7.2 Channel FIFO Data (FFifoCur)

The output in response to the command "FFifoCur,0" is shown below. Outputs the I/O channel, math channel, and communication channel FIFO data.
Wireless input unit data dropout is added to alarms.

▶ See section 2.11.2, “Channel FIFO Data (FFifoCur)” in the Communication Command Manual.

Block

The content of the block is the same as that of “Block 1” described in section 6.7.1, “Most Recent Channel Data (FData).”

Blank

Appendix 1 Communication Channel Assignments Based on Station Numbers and Data Types

Table of Communication Channel Assignments Based on Station Numbers and Data Types

Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Description
1	C001	11	C051	21	C101	Input 1
	C002		C052		C102	Input 2
	C003		C053		C103	Input 3
	C004		C054		C104	Higher data serial number
	C005		C055		C105	Lower data serial number
2	C006	12	C056	22	C106	Input 1
	C007		C057		C107	Input 2
	C008		C058		C108	Input 3
	C009		C059		C109	Higher data serial number
	C010		C060		C110	Lower data serial number
3	C011	13	C061	23	C111	Input 1
	C012		C062		C112	Input 2
	C013		C063		C113	Input 3
	C014		C064		C114	Higher data serial number
	C015		C065		C115	Lower data serial number
4	C016	14	C066	24	C116	Input 1
	C017		C067		C117	Input 2
	C018		C068		C118	Input 3
	C019		C069		C119	Higher data serial number
	C020		C070		C120	Lower data serial number
5	C021	15	C071	25	C121	Input 1
	C022		C072		C122	Input 2
	C023		C073		C123	Input 3
	C024		C074		C124	Higher data serial number
	C025		C075		C125	Lower data serial number
6	C026	16	C076	26	C126	Input 1
	C027		C077		C127	Input 2
	C028		C078		C128	Input 3
	C029		C079		C129	Higher data serial number
	C030		C080		C130	Lower data serial number
7	C031	17	C081	27	C131	Input 1
	C032		C082		C132	Input 2
	C033		C083		C133	Input 3
	C034		C084		C134	Higher data serial number
	C035		C085		C135	Lower data serial number
8	C036	18	C086	28	C136	Input 1
	C037		C087		C137	Input 2
	C038		C088		C138	Input 3
	C039		C089		C139	Higher data serial number
	C040		C090		C140	Lower data serial number
9	C041	19	C091	29	C141	Input 1
	C042		C092		C142	Input 2
	C043		C093		C143	Input 3
	C044		C094		C144	Higher data serial number
	C045		C095		C145	Lower data serial number
10	C046	20	C096	30	C146	Input 1
	C047		C097		C147	Input 2
	C048		C098		C148	Input 3
	C049		C099		C149	Higher data serial number
	C050		C100		C150	Lower data serial number

Continued on next page

Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Description
31	C151	41	C201	51	C251	Input 1
	C152		C202		C252	Input 2
	C153		C203		C253	Input 3
	C154		C204		C254	Higher data serial number
	C155		C205		C255	Lower data serial number
32	C156	42	C206	52	C256	Input 1
	C157		C207		C257	Input 2
	C158		C208		C258	Input 3
	C159		C209		C259	Higher data serial number
	C160		C210		C260	Lower data serial number
33	C161	43	C211	53	C261	Input 1
	C162		C212		C262	Input 2
	C163		C213		C263	Input 3
	C164		C214		C264	Higher data serial number
	C165		C215		C265	Lower data serial number
34	C166	44	C216	54	C266	Input 1
	C167		C217		C267	Input 2
	C168		C218		C268	Input 3
	C169		C219		C269	Higher data serial number
	C170		C220		C270	Lower data serial number
35	C171	45	C221	55	C271	Input 1
	C172		C222		C272	Input 2
	C173		C223		C273	Input 3
	C174		C224		C274	Higher data serial number
	C175		C225		C275	Lower data serial number
36	C176	46	C226	56	C276	Input 1
	C177		C227		C277	Input 2
	C178		C228		C278	Input 3
	C179		C229		C279	Higher data serial number
	C180		C230		C280	Lower data serial number
37	C181	47	C231	57	C281	Input 1
	C182		C232		C282	Input 2
	C183		C233		C283	Input 3
	C184		C234		C284	Higher data serial number
	C185		C235		C285	Lower data serial number
38	C186	48	C236	58	C286	Input 1
	C187		C237		C287	Input 2
	C188		C238		C288	Input 3
	C189		C239		C289	Higher data serial number
	C190		C240		C290	Lower data serial number
39	C191	49	C241	59	C291	Input 1
	C192		C242		C292	Input 2
	C193		C243		C293	Input 3
	C194		C244		C294	Higher data serial number
	C195		C245		C295	Lower data serial number
40	C196	50	C246	60	C296	Input 1
	C197		C247		C297	Input 2
	C198		C248		C298	Input 3
	C199		C249		C299	Higher data serial number
	C200		C250		C300	Lower data serial number

Continued on next page

Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Station number (Unit number)	Comm. CH	Description
61	C301	71	C351	81	C401	Input 1
	C302		C352		C402	Input 2
	C303		C353		C403	Input 3
	C304		C354		C404	Higher data serial number
	C305		C355		C405	Lower data serial number
62	C306	72	C356	82	C406	Input 1
	C307		C357		C407	Input 2
	C308		C358		C408	Input 3
	C309		C359		C409	Higher data serial number
	C310		C360		C410	Lower data serial number
63	C311	73	C361	83	C411	Input 1
	C312		C362		C412	Input 2
	C313		C363		C413	Input 3
	C314		C364		C414	Higher data serial number
	C315		C365		C415	Lower data serial number
64	C316	74	C366	84	C416	Input 1
	C317		C367		C417	Input 2
	C318		C368		C418	Input 3
	C319		C369		C419	Higher data serial number
	C320		C370		C420	Lower data serial number
65	C321	75	C371	85	C421	Input 1
	C322		C372		C422	Input 2
	C323		C373		C423	Input 3
	C324		C374		C424	Higher data serial number
	C325		C375		C425	Lower data serial number
66	C326	76	C376	86	C426	Input 1
	C327		C377		C427	Input 2
	C328		C378		C428	Input 3
	C329		C379		C429	Higher data serial number
	C330		C380		C430	Lower data serial number
67	C331	77	C381	87	C431	Input 1
	C332		C388		C432	Input 2
	C333		C383		C433	Input 3
	C334		C384		C434	Higher data serial number
	C335		C385		C435	Lower data serial number
68	C336	78	C386	88	C436	Input 1
	C337		C387		C437	Input 2
	C338		C388		C438	Input 3
	C339		C389		C439	Higher data serial number
	C340		C390		C440	Lower data serial number
69	C341	79	C391	89	C441	Input 1
	C342		C392		C442	Input 2
	C343		C393		C443	Input 3
	C344		C394		C444	Higher data serial number
	C345		C395		C445	Lower data serial number
70	C346	80	C396	90	C446	Input 1
	C347		C397		C447	Input 2
	C348		C398		C448	Input 3
	C349		C399		C449	Higher data serial number
	C350		C400		C450	Lower data serial number

Continued on next page

Station number (Unit number)	Comm. CH	Description
91	C451	Input 1
	C452	Input 2
	C453	Input 3
	C454	Higher data serial number
	C455	Lower data serial number
92	C456	Input 1
	C457	Input 2
	C458	Input 3
	C459	Higher data serial number
	C460	Lower data serial number
93	C461	Input 1
	C462	Input 2
	C463	Input 3
	C464	Higher data serial number
	C465	Lower data serial number
94	C466	Input 1
	C467	Input 2
	C468	Input 3
	C469	Higher data serial number
	C470	Lower data serial number
95	C471	Input 1
	C472	Input 2
	C473	Input 3
	C474	Higher data serial number
	C475	Lower data serial number
96	C476	Input 1
	C477	Input 2
	C478	Input 3
	C479	Higher data serial number
	C480	Lower data serial number

General Specifications

Model GX70SM

Wireless Input Unit

SMARTDAC+

For the US

GS 04L57B01-01EN

■ Overview

The wireless input unit is a compact, battery-driven analog input unit that uses 920 MHz specified low power radio.

It connects to a SMARTDAC+ GX20, GP20, or GM10 coordinator over a multi-hop wireless link, and allows data collection and status display of the wireless input unit on the GX20/GP20/GM10.

Because it is battery-driven, it can collect various types of data in a variety of locations.

(This product can only be used in the US.)

- 2 channels of universal inputs, 1 channel of humidity measurement (/RH option)
- The universal input allows thermocouples, RTDs, DC voltages, analog standard signals, and digital inputs to be configured freely.

  With linear scaling, you can scale the DC voltage signal from various types of sensors and measure it. (Input module version R1.02 and later)

  Input calibration is also possible.
- Measurement is possible at a high speed of 1-second intervals.
- The level of wireless (radio level) can be confirmed.
- A given period of logging data (4500 points or 9000 points (with /DB option)) are stored.
- Wireless terminal authentication function blocks unauthorized access. In addition, communication encryption prevents tampering and wiretapping.
- The battery life is 5 years or 4 years (with /DB option) when the scan interval is set to 5 minutes (standard operating conditions, standard mode). Power supply through the USB port is also possible.
- Extensive self-diagnostics function is available. Device errors, such as drop in the battery voltage and errors in the input, can be detected.
- Wireless Input Unit Configurator (software) can be used to configure and perform maintenance on wireless input units.

  Logging data from the wireless input unit can be saved to a file.
- The enhanced data backup function (/DB option) increases the logging data to 9,000 points.

  It also sends the data within the specified range according to the request of the wirelessly retrieved data (missing data) from GX20/GP20/GM10.

  Wirelessly retrieved data files created using GX20/GP20/GM10 can be combined with missing sections of the GX20/GP20/GM10 recording data (event data) using the Auto Backfill Tool (application software).

  Wirelessly retrieved data files and the backfill files created using the Auto Backfill Tool can be displayed on the SMARTDAC+ Universal Viewer. Signatures can also be attached to backfill files.

  Note) Only data files measured using the advanced security function (/AS option) and whose file type is event can be combined.

■ Wireless Input Unit Specifications

Measuring Function

- Number of inputs: 2 universal inputs, 1 built-in humidity sensor (/RH option)
- Input types: Universal input (DC voltage, thermocouple, RTD, DI (voltage, contact), DC current (using shunt resistor)
- Linear scaling:
  - Span range: Within the measurement range
  - Scale range: -999999 to 999999
  - Decimal place: 0, 1, 2, 3, 4, 5
  - Unit: Up to 6 characters
  - Value on over-range: Free, Over
- Input format: Floating unbalanced, isolation between channels (except the A terminal)
- Send (scan) interval: 1, 2, 5, 10, 20, 30 s, 1, 2, 5, 10, 20, 30, 60 min
- Measurement mode:* Standard, battery-save

  * In standard mode, power frequency noise is rejected.
  Power frequency noise is not rejected in battery-save mode, but the battery lasts 1.3 or 1.2 (with /DB option) times longer than in standard mode.

GS 04L57B01-01EN

10th Edition Jun. 24, 2022 (YK)

• Measuring range/accuracy:* See the table below.

* Performance at standard operating conditions: 23 ± 2°C, 55 ±10%RH, normal operating conditions for other parameters.
Reference junction temperature compensation accuracy is not included for thermocouples.
No vibrations or other hindrances to performance.

Input type	Range setting	Physical range	Measuring accuracy[6]		Resolution
			Standard mode	Battery-save mode	
Thermocouple	K [1]	-200.0 to 1370.0°C	± (0.15%of rdg + 0.7°C) Except -200.0 to -100.0°C: ±(0.15% of rdg + 1.0°C)	±(0.2%of rdg + 3.5°C) Except -200.0 to -100.0°C: ±(0.2% of rdg + 6.0°C)	0.1°C
	E [1]	-200.0 to 800.0°C	± (0.15%of rdg + 0.5°C) Except -200.0 to -100.0°C: ±(0.15% of rdg + 0.7°C)	± (0.2%of rdg + 2.5°C) Except -200.0 to -100.0°C: ±(2% of rdg + 5.0°C)	
	J [1]	-200.0 to 1100.0°C			
	T [1]	-200.0 to 400.0°C			
	R [1]	0.0 to 1760.0°C	±(0.15% of rdg + 1.0°C) However, For R, S 0.0 to 100.0°C: ±3.7°C 100.0 to 300.0°C: ±1.5°C For B 400.0 to 600.0°C: ±2.0°C Accuracy not guaranteed for temperatures less than 400.0°C	±(0.2% of rdg + 4.0°C) However, For R, S 0.0 to 100.0°C: ±10.0°C 100.0 to 300.0°C: ±5.0°C For B 400.0 to 600.0°C: ±7.0°C Accuracy not guaranteed for temperatures less than 400.0°C	
	S [1]	0.0 to 1760.0°C			
	B [1]	0.0 to 1820.0°C			
	N [1]	-270.0 to 1300.0°C	± (0.15% of rdg + 0.7°C) However, -200.0 to 0.0°C: ±(0.35% of rdg + 0.7°C) Accuracy not guaranteed for temperatures less than -200.0°C	±(0.3%of rdg + 3.5°C) However, -200.0 to 0.0°C: ±(0.7% of rdg + 3.5°C) Accuracy not guaranteed for temperatures less than -200.0°C	
	WRe3-25 [2]	0.0 to 2400.0°C	±(0.2% of rdg + 2.5°C) Except 0.0 to 200.0°C: ±4.0°C	±(0.3% of rdg + 10.0°C) Except 0.0 to 200.0°C: ±18.0°C	
RTD	Pt100 [3]	-200.0 to 600.0°C	± (0.15% of rdg + 0.3°C)	±(0.3% of rdg +1.5°C)	
	JPt100 [4]	-200.0 to 550.0°C			
DC voltage	20 mV	-20.000 to 20.000 mV	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	1 µV
	60 mV	-60.00 to 60.00 mV	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	10 µV
	200 mV	-200.00 to 200.00 mV			
	2 V	-2.0000 to 2.0000 V	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	100 µV
	6 V	-6.000 to 6.000 V	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	1 mV
	10 V	-10.000 to 10.000 V			
Standard signal	0.4-2 V	0.3200 to 2.0800 V	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	100 µV
	1-5 V	0.800 to 5.200 V	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	1 mV
DI	Level		Threshold level (Vth = 2.4 V) accuracy ± 0.1 V		-
	Contact [5]		1 kΩ or less: 1 (ON), 100 kΩ or more: 0 (OFF) (parallel capacitance of 0.01 µF or less)		-

rdg: Reading value

1 R, S, B, K, E, J, T, N: IEC60584-1, DIN EN60584, JIS1602
2 WRe3-25: W-3%Re/W-25%Re (Hoskins Mfg.Co.) ASTM E988
3 Pt100: JIS C 1604, IEC 60751, DIN EN60751
4 JPt100: JIS C1604, JIS C1606
5 DI contact detection current value: approx. 10 µA
6 Use standard mode to supply power through the USB connector.

Measurement accuracy at scaling:

measurement accuracy at scaling (digits) = measurement accuracy (digits) × scaling span (digits) /measurement span (digits) + 1 digit

* Rounding up decimal places

- RJC
  Accuracy: Measuring 0°C or more and when the input terminal temperature is balanced (standard mode) (ambient temperature of the device in parentheses)
  Type K, E, J, T, N:
  ±0.5°C (23±2°C), ±0.7°C (0 to 50°C),
  ±1.0°C (-20 to 70°C)

  Type R, S, WRe3-25:
  ±1.0°C (23±2°C), ±1.4°C (0 to 50°C),
  ±2.0°C (-20 to 70°C)

  Type B: Reference junction compensation is fixed at 0°C.
  Mode: Internal or external switchable (each channel) (set the compensation temperature when set to external)
- Temperature unit: °C or °F switchable
- Burnout detection: Upscale, downscale, and off can be specified (for each channel).
  Detectable inputs: Thermocouple, resistance temperature detector, standard signal
  <Detection conditions>
  Thermocouple:
  Normal: 2 kΩ or less
  Broken: 200 kΩ or less (parallel capacitance 0.01μF or more, detection current: approx. 10μA)

  RTD:
  Normal: Wiring resistance specifications or less
  Broken: 200 kΩ or less (parallel capacitance 0.01μF or more, detection current: approx. 10μA)
  Standard signal:
  Normal: Within the measuring range
  Broken: Less than 0.1 V
- Input bias current: ±10 nA or less (except when burnout detection is set)
- Measurement current (RTD): approx. 500μA
- Input resistance:
  10 MΩ or more for thermocouple/DC voltage (200 mV range or lower)
  Approx. 1 MΩ for voltage (2 V range or higher)/ standard signal
- Allowable signal source resistance: 2 kΩ or less for thermocouple/voltage (200 mV range or less)
- Effect of signal source resistance:
  ±10 μV/1 kΩ or less for thermocouple/DC voltage (200 mV range or less)
  ±0.15% of rdg/1 kΩ or less for voltage (2 V range or higher)/standard signal
- Allowable wiring resistance: 10 Ω or less per line (the same resistance for all three lines) for RTD
- Effect of wiring resistance: ±0.1°C/10 Ω (the same resistance for all three lines) for RTD
- Effects of ambient temperature: Fluctuation per 10°C change
  DCV, TC range: Within ±(0.1% of rdg + 0.05% of range) (reference junction compensation accuracy not included)
  RTD range: Within ±(0.1% of rdg + 0.2°C)
- Allowable input voltage:
  ±10 VDC for thermocouple, DC voltage (200 mV range or lower), RTD, DI (contact input)
  ±30 VDC for voltage (2 V range or higher), DI (level)
- Noise rejection ratio (50/60 Hz)
  Can be specified by the measurement mode and power frequency. Select the power frequency for your region.

Measurement mode	Normal mode	Common mode
Standard[1]	40 dB or more[2, 3]	120 dB or more[2, 4]
Battery-save mode	No rejection	80 dB or more[2, 4]

1 Changed with the frequency setting.
2 The RTD range is a value converted to voltage when running the measurement current.
3 50/60 Hz±0.1%.
4 50/60 Hz±0.1%, 500 Ω unbalanced, between the negative measurement terminal and ground

- Normal mode voltage
  Thermocouple, DC voltage, DI (voltage): 1.2 times the range rating or less
  Standard signal:
  0.4-2 V range: 2.4 V
  1-5 V range: 6 V
  RTD: 5 mV peak
  * 50/60 Hz, peak value including the signal component.
- Maximum common mode noise voltage between measurement input channels: 30 VAC rms (50/60 Hz) or ±60 VDC
- Effects of magnetic field: Fluctuation in response to a magnetic field of AC (50/60 Hz) 400 A/m is ±(0.1% of rdg + 0.1% of range) or less
- Input calibration value
  Factory default input calibration value is stored. The value can be returned to the factory default input calibration value from the user setting.

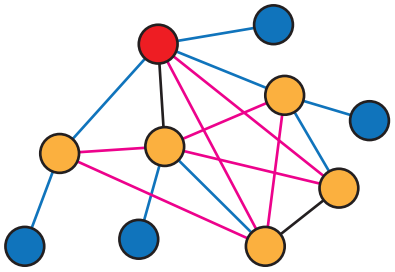
Option

- Humidity measurement (/RH)
  Measurement accuracy: ±4%RH (23±2°C, 55 ±10%RH, with the temperature and humidity balanced)
  Measuring range: 0 to 90%RH
  Hysteresis: ±2%RH
  Resolution: 0.1%RH

- Enhanced data backup function (/DB)
  Number of data logging points: Max 9000 data
  Send (scan) interval: Fastest 30 seconds
  Data transmission: It sends the data within the specified range according to the request of the wirelessly retrieved data from GX20/GP20/GM10.

Wireless Function Specifications

- Carrier frequency band: 902.1 MHz to 927.9 MHz
- Frequency band: 600 KHz
- Number of wireless channels: 43ch
- Maximum transmission output: 20 mW
- Wireless data rate: approx. 100 kbps
- Modulation method: GFSK
- Communication format:
  Mesh (connect up to 100 units including routers (repeaters) *)
  Communication route can be set.
  * Up to 20 wireless input units can be connected to a coordinator or repeater. Up to 96 wireless input units can be connected by connecting 4 repeaters to a coordinator.
  However, Up to 50 wireless input units can be connected when the GX70SM with /DB option.
  However, the number of technically possible connections varies depending on the wireless communication condition and the measurement/transmission interval.



Mesh type

Mesh function	Compatible products
Coordinator	GX20, GP20, GM10
Router/repeater	GM10, UT32A, UT52A
Router (sensor)	GX70SM

- Security function: AES 128 bit encryption
- Send (scan) interval: Same as the scan interval
- Wireless communication configuration: Configured using dedicated software (Wireless Input Unit Configurator)
  Wireless configuration interface: USB 2.0 mini-B type
- Antenna: Internal or external antenna (antenna sold separately)
  SMA connector
- Communication distance [1]:
  Internal antenna: Line-of-sight approx. 300 m
  External antenna: Line-of-sight distance: approx. 800 m
  1 At an antenna height of 1.5 m or more off the ground. Communication distance varies depending on the installation location and environment.
- Firmware version of connectable coordinator and router (repeater) wireless modules: V 4.2.0 and later
  Note) If the firmware version of the coordinator or router (repeater) wireless module is not compatible with the wireless input unit, you need to update it.

- Dedicated external antenna (sold separately)

Item	Type	
	Sleeve antenna	Roof top antenna
Part No.	A1061ER	A1062ER
Installation environment	Indoors	Indoors and outdoors
Cable length	—	2.5 m
Antenna type	Dipole	Monopole
Maximum gain	3 dBi or less	
Directivity	No	
Connector	SMA-R	
Operating temperature range	-20 to 65°C	
Waterproof property	Not waterproof	Water resistant (IPX6)
Dimensions	196 mm (including the connector)	83 mm (including the base stand)
		

Note 1) Can only be used in combination with the dedicated antenna.
Note 2) When using an external antenna, we recommend aligning the direction of the antenna of the peer device and the direction of the antenna of this device to maintain communication quality.
Note 3) To bring out the full performance of the roof top antenna, install it on top of a metal rectangle board that is at least 10 x 20 cm long.
Note 4) Install antennas as far as possible from metal objects and other obstacles. The communication quality may deteriorate if they are close.

Number of Connectible GX70SMs and Recommended Send (scan) Interval

When considering preventing data omissions, we recommend the following send (scan) interval.

The number of connected GX70SM	Send (scan) interval
2 (without repeater)	10 sec or more
5 (without repeater)	20 sec or more
20 (without repeater)	30 sec or more
50 (with repeater)	1 min or more
51 or more (with repeater)	2 min or more

Note 1) The values in the table are guidelines for preventing data loss. Arrival of data is not guaranteed.
Note 2) Use the following as a guide for the setting: Timeout time of the data loss alarm > Send (scan) interval × 2.
Note 3) This can change depending on the number of repeaters and other conditions.
Note 4) The table is a guide based on wireless communication module vd1.3 (coordinator, router vf4.4).

Power Supply

- Battery-driven
  Compatible battery: CR123A, CR17345 (Lithium primary battery, 3.0 V/1,400 mAh or more) x 2 pieces
  Note: Batteries are not included. Please obtain them separately (recommended battery manufacturer: Panasonic).

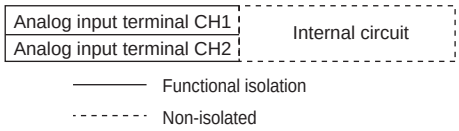
Estimated battery life
Under the following conditions, the battery runs for about 5 years or about 4 years (with /DB option) in standard mode and about 7 years or about 5 years (with /DB option) in battery-save mode.*

Conditions: Ambient temperature 23±2°C
Send (scan) interval: 5 minutes
LED display: Off
* The battery life varies depending on the environmental conditions such as ambient temperature and vibration.

- USB power
  Compatible USB AC/DC adapter: 5 V DC±5% / 500 mA
  Connector: USB2.0 mini-B connector

Isolation

- Withstand voltage
  Functional isolation between channels: 200 V AC (50/60 Hz) (except the A terminal)
- Isolation diagram



Standards Compliance

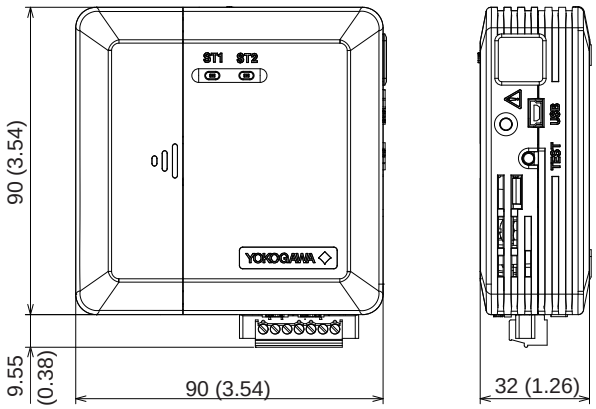
- US: FCC Part15 Subpart C compliant (15.247)
- Wireless communication standard: IEEE 802.15.4g
- CSA C22.2 No. 61010-1,
  CSA-C22.2 No. 61010-2-030
  Overvoltage Category I, Pollution Degree 2,
  Measurement Category O
- UL 61010-1, UL Std. No. 61010-2-030 (CSA NRTL/C)
  Overvoltage Category I, Pollution Degree 2,
  Measurement Category O

Construction

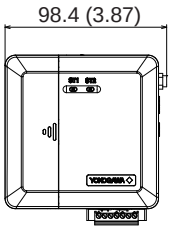
- Case: Polycarbonate
- Degrees of protection: IP20
- Connector: 7-pin clamp terminal
- Installation methods: Wall mount (fastened with screws), hooked, on a desktop, mounted with the magnet
- Color: Smoke gray (Munsell 4.1PB 6.0/4.5 equivalent)
- External dimensions: 90 (W) x 90 (H) x 32 (D) mm
- Weight: Approx. 300 g

External Dimensions

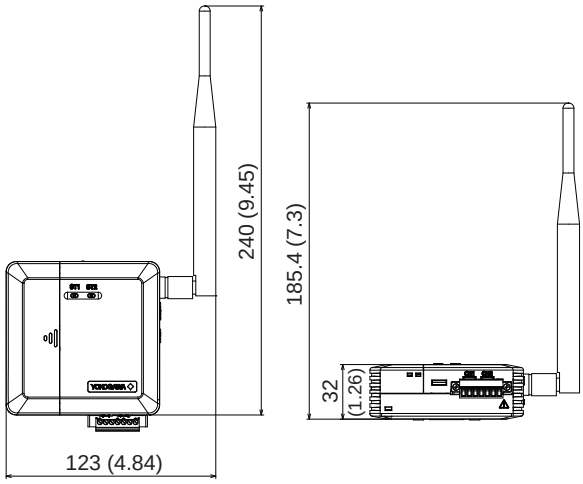
Unit: mm
Unless otherwise specified, tolerance is ±3 %
(however, tolerance is ±0.3 mm when below 10 mm).

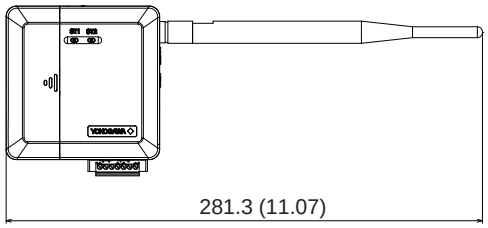


When using the roof top antenna



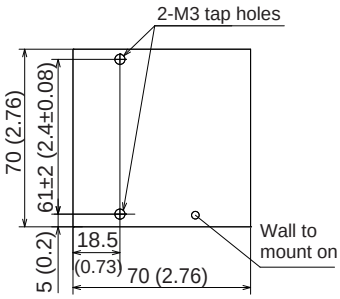
When using the sleeve antenna



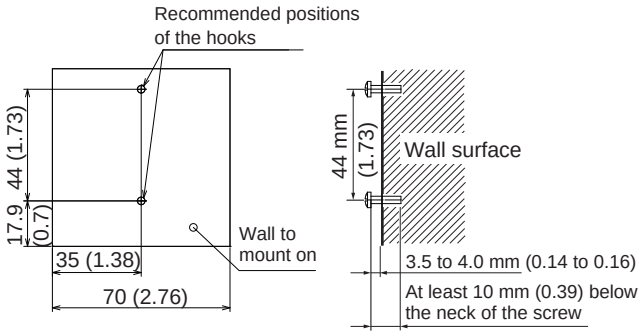


Wall mount hole dimensions

Mounted on a wall



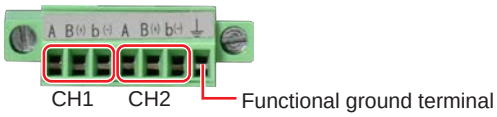
Hooked on a wall



Installation Dimensions

- Wall mount (fastened with screws)
  M3 screw, thread length 12 mm or more
  Tightening torque: 0.6 to 0.7 N•m
- Hooked
  Round wood screw: M3.5
  At least 10 mm below the neck of the screw
  Amount of screw showing from the wall surface to the screw head: 3.5 to 4.0 mm
- On a desktop
- Mounted with the magnet
  Minimum installation area: 50×70 mm

Terminal Arrangement



Symbol						
CH1			CH2			
A	B (+)	b (–)	A	B (+)	b (–)	

Recommended wire: AWG14-28

Recommended tightening torque: Approx. 0.2 N•m or less

Other Functional Specifications

- Status display
  Configuration mode, data transmission, and battery status are indicated with LEDs (green and red). (Indication can be turned off.)

Status		LED	
		Green (ST1)	Red (ST2)
Configuration mode		Green and red blinking in sync at 2 second intervals	
Configuration change and during calibration		Green and red blinking quickly in sync	
During measurement or data transmission	Network authentication	Blinking (about 0.2 second intervals)	Off
	No network authentication	Off	Blinking (about 0.2 second intervals)
Low battery warning		Green lit (0.1 seconds), all off (1.9 seconds) Red lit (0.1 seconds), all off (1.9 seconds) The above sequence is repeated twice, and then the LEDs are off for 10 seconds.	
Input error		Off	Lit for 0.1 seconds at about 5 second intervals
Mode setting error *		Repeats the sequence of green and red lit in sync (0.1 seconds) and all off (0.9 seconds) three times, turns off for 2 seconds, and repeats the entire sequence.	

* For example, configuring in a mode other than measurement mode when there is no USB connection.

- Self-diagnosis function
  Transmits the following device status to the coordinator
  - Low battery warning: Low battery voltage detected.
  - Critical low battery warning: Minimum drive voltage detected. Batteries must be replaced quickly.
  - Input error:
    Calibration value error
    A/D error
    Hardware error
    Memory error
    Process error
  - Wireless communication error: Configuration mismatch, ambient radio environment detection
- Firmware upload
  Firmware can be updated using the Wireless Input Unit Configurator.
- Operation mode
  Change between measurement and configuration mode with a switch.
- Wireless function*
  The wireless function can be turned on and off with a switch.
  * When using the GX70SM as a standalone data logger, you can turn off the wireless function to prolong the battery life.
- Data logging function
  Saves up to 4500 or 9000 (with /DB option) data points per channel.

Normal Operating Conditions

- Ambient temperature: -20 to 70°C
- Temperature change rate: 10°C/h or less
- Ambient humidity: 0 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less (DC and 50/60 Hz)
- Vibration:
  5 ≤ f < 8.4 Hz amplitude 3.5 mm (peak)
  8.4 ≤ f ≤ 160 Hz acceleration 9.8 m/s^2 or less
  (excluding hooking and magnet mount)
- Shock:
  Power supply on, 500 m/s^2 or less, approx. 11 ms
  6 directions (± X, ± Y, ± Z) three times each
  Power supply off, 98 m/s^2 or less, approx. 11 ms
  6 directions (± X, ± Y, ± Z) three times each
- Altitude: 2000 m or less
- Installation location: Indoors

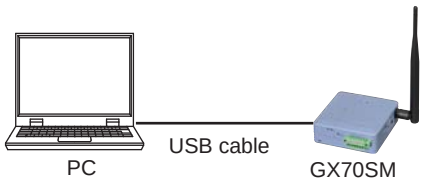
Transport and Storage Conditions

- Ambient temperature: -25 to 70°C
- Ambient humidity: 5 to 95% RH (no condensation)
- Vibration: 10 to 60 Hz, 4.9 m/s^2 or less
- Shock: 392 m/s^2 maximum (in packaged condition)

■ Wireless Input Unit Tool Specifications

Wireless Input Unit Configurator

A software application for configuring and performing maintenance on wireless input units.



Features

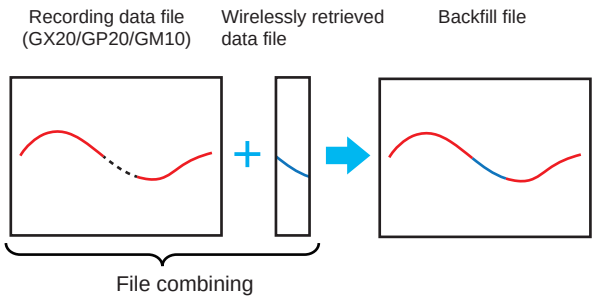
- Wireless configuration: Wireless communication, Send (scan) interval, LED settings, etc.
- Input configuration: Input range, linear scaling, measurement mode, etc. Modification history management is possible.
- Input calibration: Input calibration is possible.
- Firmware updating: Wireless and input firmware can be updated.
- Logging data function:
  The logging data held by the wireless input unit can be saved to a file.*
  Wirelessly retrieved data files created using GX20/GP20/GM10 can be combined with missing sections of the GX20/GP20/GM10 recording data (event data) using the Auto Backfill Tool (application software).

  * Wirelessly retrieved data file when collecting data from GX70SM (with /DB option)

  Note: Power supply form USB is required during wireless input unit configuration. Use a powered USB cable.

Auto-Backfill Tool

It is an application software that is used to automatically combine any GX20/GP20/GM10 recording data (event data) that is missing from the GX70SM data with the wirelessly retrieved data (missing data).



Features

- It automatically combines GX20/GP20/GM10 recording data files with wirelessly retrieved data files, and creates backfill files with the missing data filled in.
- Recording data files can also be combined manually with wirelessly retrieved data files at any time.
- Backfill files can be displayed on the SMARTDAC+ Universal Viewer and signatures can be attached to them.

PC System Requirements

OS:

Wireless Input Unit Configurator

OS	Type
Windows 10	Home (32- or 64-bit edition)
	Pro (32- or 64-bit edition)

Auto-Backfill Tool

OS	Type
Windows 10	Home (32- or 64-bit edition)
	Pro (32- or 64-bit edition)
Windows Server 2016	Standard (64-bit edition)
Windows Server 2019	

Yokogawa will also stop supporting OSs that Microsoft Corporation no longer supports.

Processor and main memory:

OS	CPU and main memory
Windows 10	Intel Core2 Duo E6300 or faster x64 or x86 processor At least 2GB.
Windows Server 2016	
Windows Server 2019	

Hard disk:
100MB or more of free space (depending on the amount of data, you may need more memory), NTFS recommended.

Display:
OS compatible display with a resolution of 1024×768 dots or higher and High Color or higher

Mouse:
Mouse compatible with the OS

Communication port:
USB port

Other:
Microsoft .NET Framework 4.6.1 or later*

* Required to connect and operate the wireless input unit.

■ Wireless Input Unit Support Function of the GX20/GP20/GM10 (/CM2 option) (version R4.02.01 and later)

Data collection and status monitoring of wireless input units are possible.

Supported Functions

• Number of GX70SM connections*

Model	Measurement mode (GX/GP/GM)			
	Normal		High speed	Dual interval
	Wireless data retrieval Off	Wireless data retrieval On		
GX20-1/GP20-1 /GM10-1	Max. 50 devices	Max. 30 devices	Max. 50 devices	Max. 30 devices
GX20-2/GP20-2 /GM10-2	Max. 96 devices	Max. 50 device	Max. 96 devices	Max. 50 devices

* The number of technically possible connections varies depending on the wireless communication condition and the measurement/transmission interval.
The wireless data retrieval function can be used when the advanced security function (/AS option) is enabled. (However, it cannot be used when the multi-batch function (/BT option) is enabled.)
Measurement modes High speed and Dual interval cannot be used when the advanced security function (/AS option) is enabled.

• Auto configuration function
Automatically configures the wireless input unit data collection settings.
• Wireless data dropout detection function
Detects data collection dropouts due to wireless communication errors or the like.
• Management, monitoring, and maintenance functions
Displays wireless input unit information.
Status monitoring and maintenance period management are available.
• Loop calibration function
Wireless input data correction using the calibration correction function
• Web application and Hardware Configurator also support wireless input unit functions.
• Wireless data retrieval (version 4.09 and later)[1 2]
It is a function that is used to detect if there is any missing data from the data collected by GX70SM (with /DB option), collect the missing data from GX70SM automatically, and create a file for it (wirelessly retrieved data file). The file that was created can be saved to an SD memory card and transferred via FTP.
Wirelessly retrieved data files can be combined with missing sections of the GX20/GP20/GM10 recording data using the Auto Backfill Tool.

1 It is enabled for GX70SM with /DB option.
2 Only available when the advanced security function (/AS option) is enabled. However, it cannot be used when the multi-batch function (/BT option) is enabled.
Also wireless communication module version is v4.4.0 and later.

■ Model and Suffix Codes

Model	Suffix code	Optional suffix code	Description
GX70SM			Wireless Input Unit
Number of channels	-2		2 channels
Type	-L0		Universal input, scanner type (isolation between channels)
—	N		Always N
Terminal type	-C		Clamp terminal
Area	A		For the USA, FCC Approval
Option		/DB	Enhanced data backup function*
		/RH	Built-in humidity sensor, 1 channel

* A new GX20, GP20, or GM10 meeting the following conditions is required to use the backfill function.
- Firmware version R4.09 or later
- Wireless communications module version v4.4.0 or later
- With /AS option

■ Standard Accessories

Name	Quantity
Manual (First Step Guide IM 04L57B01-02EN)	1

■ Optional Accessories (Sold separately)

Name	Model or Part
Sleeve antenna (indoor use)	A1061ER
Roof top antenna (indoor and outdoor use, cable length: 2.5 m)	A1062ER
Input terminal block	A2226JT
Shunt resister for clamp terminal (250 Ω ± 0.1 %)	438920
Shunt resister for clamp terminal (100 Ω ± 0.1 %)	438921
Shunt resister for clamp terminal (10 Ω ± 0.1 %)	438922

Test certificate (QIC), calibration certificate (sold separately)
Test certificate and calibration certificate can be purchased.

■ Application Software

SMARTDAC+ STANDARD
- Hardware Configurator
- Universal Viewer
- Wireless Input Unit Tool
  Wireless Input Unit Configurator/Auto Backfill Tool

Download the latest version of the software from the following URL.

URL: www.smartdacplus.com/software/en/

■ Notes on 920 MHz Wireless Communication

This equipment is designed for use in the US only and cannot be used in any other country.

- **The radio signal may become weaker due to the operating environment, such as radio interference and obstacles in the communication route, leading to a communication error with the wireless communication temporarily disrupted.**
  If the radio signal continues to weaken, the communication error may continue for a long period of time.
- **Communication may not be possible in the following locations due to the surrounding environment.**
  - Where strong magnetic field, static electricity, or radio interference occurs.
  - Rooms with metallic walls (including concrete containing metal reinforcement material), cases, shelves, gratings, windows with metal mesh, and walls with thick concrete.
  - Within warehouses for liquid containers.
- **The backfill function may not work properly if you use it in an environment with bad wireless connection, or if you do not configure or operate it in the right way.**
- **If another wireless device using the same radio frequency band as this product is present in the communication area of this product, data rate degradation or communication errors may occur, preventing normal communication.**
- **This product has obtained FCC marking. As such, the following acts may be punishable by law.**
  - Disassembling or altering the product.
  - Removing the certification label.
  - Using an antenna other than the specified option.
- **Because this product uses radio signals, bear in mind that communication may be intercepted by third parties.**

■ Liability

YOKOGAWA assumes no liability to any party for any loss or damage, direct or indirect, caused by lost or missing data due to interrupted wireless or cable communication, or the use of the product outside the design, specifications, or handling conditions.

Except for the matters stipulated in the warranty of this product, YOKOGAWA does not guarantee any measurement data and operation taken when there is a failure, erroneous operation, and problem with the product.

■ Basic Conditions and Individual Contracts at the Time of Purchase

The warranty for this product is defined in the basic conditions and individual contracts at the time of purchase.
The individual conditions are as follows.

- **Validation**
  Yokogawa does not guarantee the final outcome of validation work even if there is a defect in the product.
  For the warranty of validation services, please contact the company that performed the validation work.
- **Warranty period of firmware**
  The firmware warranty period is one year.
  Please refer to the following URL for the procedure to update the firmware and the method to download the firmware.
  https://partner.yokogawa.com/global/

User's Manual
You can download the product user's manuals from the following URL. You will need Adobe Acrobat Reader (latest version recommended) by Adobe Systems.

URL: www.smartdacplus.com/manual/en/

920 MHz wireless communication devices

Coordinator:	GX20 Paperless Recorder (/CM2/MC option): GS 04L51B01-01EN GP20 Paperless Recorder (/CM2/MC option): GS 04L52B01-01EN GX20/GP20 (/CM2/MC option) GM (/CM2/MC and /CS2 options) 920MHz Wireless Communication GS 04L51B01-42EN
Coordinator, router (repeater):	GM10 Data Acquisition System (/CM2/MC, /CS2 option): GS 04L55B01-01EN GX20/GP20 (/CM2/MC option) GM (/CM2/MC and /CS2 options) 920MHz Wireless Communication GS 04L51B01-42EN
GX/GP/GM I/O module:	GX90XA/GX90XD/GX90YD/GX90WD/GX90XP/GX90YA I/O Module GS 04L53B01-01EN
Router (repeater):	UT35A/MDL, UT32A/MDL Controller (DIN rail mounting type): GS 05P01D81-01EN UT55A/MDL, UT52A/MDL Controller (DIN rail mounting type) GS 05P01C81-01EN

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General Specifications

Model GX70SM

Wireless Input Unit

SMARTDAC+

For the Republic of Korea

GS 04L57B01-43EN

■ Overview

The wireless input unit is a compact, battery-driven analog input unit that uses 920 MHz specified low power radio.

It connects to a SMARTDAC+ GX20, GP20, or GM10 coordinator over a multi-hop wireless link, and allows data collection and status display of the wireless input unit on the GX20/GP20/GM10.

Because it is battery-driven, it can collect various types of data in a variety of locations.

(This product can only be used in the Republic of Korea.)

- 2 channels of universal inputs, 1 channel of humidity measurement (/RH option)
- The universal input allows thermocouples, RTDs, DC voltages, analog standard signals, and digital inputs to be configured freely.

  With linear scaling, you can scale the DC voltage signal from various types of sensors and measure it. (Input module version R1.02 and later)

  Input calibration is also possible.
- Measurement is possible at a high speed of 1-second intervals.
- The level of wireless (radio level) can be confirmed.
- A given period of logging data (4500 points or 9000 points (with /DB option)) are stored.
- Wireless terminal authentication function blocks unauthorized access. In addition, communication encryption prevents tampering and wiretapping.
- The battery life is 5 years or 4 years (with /DB option) when the scan interval is set to 5 minutes (standard operating conditions, standard mode). Power supply through the USB port is also possible.
- Extensive self-diagnostics function is available. Device errors, such as drop in the battery voltage and errors in the input, can be detected.
- Wireless Input Unit Configurator (software) can be used to configure and perform maintenance on wireless input units.

  Logging data from the wireless input unit can be saved to a file.
- The enhanced data backup function (/DB option) increases the logging data to 9,000 points.

  It also sends the data within the specified range according to the request of the wirelessly retrieved data (missing data) from GX20/GP20/GM10.

  Wirelessly retrieved data files created using GX20/GP20/GM10 can be combined with missing sections of the GX20/GP20/GM10 recording data (event data) using the Auto Backfill Tool (application software).

  Wirelessly retrieved data files and the backfill files created using the Auto Backfill Tool can be displayed on the SMARTDAC+ Universal Viewer. Signatures can also be attached to backfill files.

  Note) Only data files measured using the advanced security function (/AS option) and whose file type is event can be combined.

■ Wireless Input Unit Specifications

Measuring Function

- Number of inputs: 2 universal inputs, 1 built-in humidity sensor (/RH option)
- Input types: Universal input (DC voltage, thermocouple, RTD, DI (voltage, contact), DC current (using shunt resistor)
- Linear scaling:
  - Span range: Within the measurement range
  - Scale range: -999999 to 999999
  - Decimal place: 0, 1, 2, 3, 4, 5
  - Unit: Up to 6 characters
  - Value on over-range: Free, Over
- Input format: Floating unbalanced, isolation between channels (except the A terminal)
- Send (scan): 1, 2, 5, 10, 20, 30 s,
  1, 2, 5, 10, 20, 30, 60 min
- Measurement mode:* Standard, battery-save
  - * In standard mode, power frequency noise is rejected.
    Power frequency noise is not rejected in battery-save mode, but the battery lasts 1.3 or 1.2 (with /DB option) times longer than in standard mode.

7th Edition Jun. 24, 2022 (YK)

• Measuring range/accuracy:* See the table below.

* Performance at standard operating conditions: 23 ± 2°C, 55 ±10%RH, normal operating conditions for other parameters.
Reference junction temperature compensation accuracy is not included for thermocouples.
No vibrations or other hindrances to performance.

Input type	Range setting	Physical range	Measuring accuracy[6]		Resolution
			Standard mode	Battery-save mode	
Thermocouple	K [1]	-200.0 to 1370.0°C	± (0.15%of rdg + 0.7°C) Except -200.0 to -100.0°C: ±(0.15% of rdg + 1.0°C)	±(0.2%of rdg + 3.5°C) Except -200.0 to -100.0°C: ±(0.2% of rdg + 6.0°C)	0.1°C
	E [1]	-200.0 to 800.0°C	± (0.15%of rdg + 0.5°C) Except -200.0 to -100.0°C: ±(0.15% of rdg + 0.7°C)	± (0.2%of rdg + 2.5°C) Except -200.0 to -100.0°C: ±(2% of rdg + 5.0°C)	
	J [1]	-200.0 to 1100.0°C			
	T [1]	-200.0 to 400.0°C			
	R [1]	0.0 to 1760.0°C	±(0.15% of rdg + 1.0°C) However, For R, S 0.0 to 100.0°C: ±3.7°C 100.0 to 300.0°C: ±1.5°C For B 400.0 to 600.0°C: ±2.0°C Accuracy not guaranteed for temperatures less than 400.0°C	±(0.2% of rdg + 4.0°C) However, For R, S 0.0 to 100.0°C: ±10.0°C 100.0 to 300.0°C: ±5.0°C For B 400.0 to 600.0°C: ±7.0°C Accuracy not guaranteed for temperatures less than 400.0°C	
	S [1]	0.0 to 1760.0°C			
	B [1]	0.0 to 1820.0°C			
	N [1]	-270.0 to 1300.0°C	± (0.15% of rdg + 0.7°C) However, -200.0 to 0.0°C: ±(0.35% of rdg + 0.7°C) Accuracy not guaranteed for temperatures less than -200.0°C	±(0.3%of rdg + 3.5°C) However, -200.0 to 0.0°C: ±(0.7% of rdg + 3.5°C) Accuracy not guaranteed for temperatures less than -200.0°C	
	WRe3-25 [2]	0.0 to 2400.0°C	±(0.2% of rdg + 2.5°C) Except 0.0 to 200.0°C: ±4.0°C	±(0.3% of rdg + 10.0°C) Except 0.0 to 200.0°C: ±18.0°C	
RTD	Pt100 [3]	-200.0 to 600.0°C	± (0.15% of rdg + 0.3°C)	±(0.3% of rdg +1.5°C)	
	JPt100 [4]	-200.0 to 550.0°C			
DC voltage	20 mV	-20.000 to 20.000 mV	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	1 µV
	60 mV	-60.00 to 60.00 mV	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	10 µV
	200 mV	-200.00 to 200.00 mV			
	2 V	-2.0000 to 2.0000 V	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	100 µV
	6 V	-6.000 to 6.000 V	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	1 mV
	10 V	-10.000 to 10.000 V			
Standard signal	0.4-2 V	0.3200 to 2.0800 V	± (0.05% of rdg + 12 digits)	± (0.1% of rdg + 40 digits)	100 µV
	1-5 V	0.800 to 5.200 V	± (0.05% of rdg + 3 digits)	± (0.1% of rdg + 15 digits)	1 mV
DI	Level		Threshold level (Vth = 2.4 V) accuracy ± 0.1 V		-
	Contact [5]		1 kΩ or less: 1 (ON), 100 kΩ or more: 0 (OFF) (parallel capacitance of 0.01 µF or less)		-

rdg: Reading value

1 R, S, B, K, E, J, T, N: IEC60584-1, DIN EN60584, JIS1602
2 WRe3-25: W-3%Re/W-25%Re (Hoskins Mfg.Co.) ASTM E988
3 Pt100: JIS C 1604, IEC 60751, DIN EN60751
4 JPt100: JIS C1604, JIS C1606
5 DI contact detection current value: approx. 10 µA
6 Use standard mode to supply power through the USB connector.

Measurement accuracy at scaling:

measurement accuracy at scaling (digits) = measurement accuracy (digits) × scaling span (digits) /measurement span (digits) + 1 digit

* Rounding up decimal places

- RJC
  Accuracy: Measuring 0°C or more and when the input terminal temperature is balanced (standard mode) (ambient temperature of the device in parentheses)
  Type K, E, J, T, N:
  ±0.5°C (23±2°C), ±0.7°C (0 to 50°C),
  ±1.0°C (-20 to 70°C)

  Type R, S, WRe3-25:
  ±1.0°C (23±2°C), ±1.4°C (0 to 50°C),
  ±2.0°C (-20 to 70°C)

  Type B: Reference junction compensation is fixed at 0°C.
  Mode: Internal or external switchable (each channel) (set the compensation temperature when set to external)
- Temperature unit: °C or °F switchable
- Burnout detection: Upscale, downscale, and off can be specified (for each channel).
  Detectable inputs: Thermocouple, resistance temperature detector, standard signal
  <Detection conditions>
  Thermocouple:
  Normal: 2 kΩ or less
  Broken: 200 kΩ or less (parallel capacitance 0.01μF or more, detection current: approx. 10μA)

  RTD:
  Normal: Wiring resistance specifications or less
  Broken: 200 kΩ or less (parallel capacitance 0.01μF or more, detection current: approx. 10μA)

  Standard signal:
  Normal: Within the measuring range
  Broken: Less than 0.1 V
- Input bias current: ±10 nA or less (except when burnout detection is set)
- Measurement current (RTD): approx. 500μA
- Input resistance:
  10 MΩ or more for thermocouple/DC voltage (200 mV range or lower)
  Approx. 1 MΩ for voltage (2 V range or higher)/ standard signal
- Allowable signal source resistance: 2 kΩ or less for thermocouple/voltage (200 mV range or less)
- Effect of signal source resistance:
  ±10 μV/1 kΩ or less for thermocouple/DC voltage (200 mV range or less)
  ±0.15% of rdg/1 kΩ or less for voltage (2 V range or higher)/standard signal
- Allowable wiring resistance: 10 Ω or less per line (the same resistance for all three lines) for RTD
- Effect of wiring resistance: ±0.1°C/10 Ω (the same resistance for all three lines) for RTD
- Effects of ambient temperature: Fluctuation per 10°C change
  DCV, TC range: Within ±(0.1% of rdg + 0.05% of range) (reference junction compensation accuracy not included)
  RTD range: Within ±(0.1% of rdg + 0.2°C)
- Allowable input voltage:
  ±10 VDC for thermocouple, DC voltage (200 mV range or lower), RTD, DI (contact input)
  ±30 VDC for voltage (2 V range or higher), DI (level)
- Noise rejection ratio (50/60 Hz)
  Can be specified by the measurement mode and power frequency. Select the power frequency for your region.

Measurement mode	Normal mode	Common mode
Standard[1]	40 dB or more[2, 3]	120 dB or more[2, 4]
Battery-save mode	No rejection	80 dB or more[2, 4]

  1 Changed with the frequency setting.
  2 The RTD range is a value converted to voltage when running the measurement current.
  3 50/60 Hz±0.1%.
  4 50/60 Hz±0.1%, 500 Ω unbalanced, between the negative measurement terminal and ground
- Normal mode voltage
  Thermocouple, DC voltage, DI (voltage): 1.2 times the range rating or less
  Standard signal:
  0.4-2 V range: 2.4 V
  1-5 V range: 6 V
  RTD: 5 mV peak
  * 50/60 Hz, peak value including the signal component.
- Maximum common mode noise voltage between measurement input channels: 30 VAC rms (50/60 Hz) or ±60 VDC
- Effects of magnetic field: Fluctuation in response to a magnetic field of AC (50/60 Hz) 400 A/m is ±(0.1% of rdg + 0.1% of range) or less
- Input calibration value
  Factory default input calibration value is stored. The value can be returned to the factory default input calibration value from the user setting.

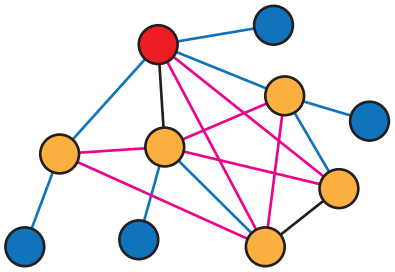
Option

- Humidity measurement (/RH)
  Measurement accuracy: ±4%RH (23±2°C, 55 ±10%RH, with the temperature and humidity balanced)
  Measuring range: 0 to 90%RH
  Hysteresis: ±2%RH
  Resolution: 0.1%RH

- Enhanced data backup function (/DB)
  Number of data logging points: Max 9000 data
  Send (scan) interval: Fastest 30 seconds
  Data transmission: It sends the data within the specified range according to the request of the wirelessly retrieved data from GX20/GP20/GM10.

Wireless Function Specifications

- Carrier frequency band: 920.6 MHz to 923.4 MHz
- Frequency band: 200 KHz
- Number of wireless channels: 14ch
- Maximum transmission output:
  10 mW EIRP (920.6 to 922.0 MHz)*
  25 mW EIRP (922.0 to 923.4 MHz)*
  * Equivalent Isotropic Radiated Power: Radiated power including the antenna
- Wireless data rate: approx. 100 kbps
- Modulation method: GFSK
- Communication format:
  Mesh (connect up to 100 units including routers (repeaters)*)
  Communication route can be set.
  * Up to 20 wireless input units can be connected to a coordinator or repeater. Up to 96 wireless input units can be connected by connecting 4 repeaters to a coordinator.
  However, up to 50 wireless input units can be connected when the GX70SM with /DB option.
  However, the number of technically possible connections varies depending on the wireless communication condition and the measurement/transmission interval.



Mesh type

Mesh function	Compatible products
Coordinator	GX20, GP20, GM10
Router/repeater	GM10, UT32A, UPM100
Router (sensor)	GX70SM

- Security function: AES 128 bit encryption
- Send (scan) interval: Same as the scan interval
- Wireless communication configuration: Configured using dedicated software (Wireless Input Unit Configurator)
  Wireless configuration interface: USB 2.0 mini-B type
- Antenna: Internal or external antenna (antenna sold separately)
  SMA connector
- Communication distance [1]:
  Internal antenna: Line-of-sight approx. 250 m
  External antenna: Line-of-sight distance: approx. 700 m
  1 At an antenna height of 1.5 m or more off the ground. Communication distance varies depending on the installation location and environment.
- Firmware version of connectable coordinator and router (repeater) wireless modules: V 4.2.0 and later
  Note) If the firmware version of the coordinator or router (repeater) wireless module is not compatible with the wireless input unit, you need to update it.

- Dedicated external antenna (sold separately)

Item	Type	
	Sleeve antenna	Roof top antenna
Part No.	A1061ER	A1062ER
Installation environment	Indoors	Indoors and outdoors
Cable length	—	2.5 m
Antenna type	Dipole	Monopole
Maximum gain	3 dBi or less	
Directivity	No	
Connector	SMA-R	
Operating temperature range	-20 to 65°C	
Waterproof property	Not waterproof	Water resistant (IPX6)
Dimensions	196 mm (including the connector)	83 mm (including the base stand)
		

Note 1) Can only be used in combination with the dedicated antenna.
Note 2) When using an external antenna, we recommend aligning the direction of the antenna of the peer device and the direction of the antenna of this device to maintain communication quality.
Note 3) To bring out the full performance of the roof top antenna, install it on top of a metal rectangle board that is at least 10 x 20 cm long.
Note 4) Install antennas as far as possible from metal objects and other obstacles. The communication quality may deteriorate if they are close.

Number of Connectible GX70SMs and Recommended Send (scan) Interval

When considering preventing data omissions, we recommend the following send (scan) interval.

The number of connected GX70SM	Send (scan) interval
2 (without repeater)	10 sec or more
5 (without repeater)	20 sec or more
20 (without repeater)	30 sec or more
50 (with repeater)	1 min or more
51 or more (with repeater)	2 min or more

Note 1) The values in the table are guidelines for preventing data loss. Arrival of data is not guaranteed.
Note 2) Use the following as a guide for the setting: Timeout time of the data loss alarm > Send (scan) interval × 2.
Note 3) This can change depending on the number of repeaters and other conditions.
Note 4) The table is a guide based on wireless communication module vd1.3 (coordinator, router vf4.4).

Power Supply

- Battery-driven
  Compatible battery: CR123A, CR17345 (Lithium primary battery 3.0 V/1,400 mAh or more) x 2 pieces
  Note: Batteries are not included. Please obtain them separately (recommended battery manufacturer: Panasonic).

Estimated battery life
Under the following conditions, the battery runs for about 5 years or about 4 years (with /DB optuion) in standard mode and about 7 years or about 5 years (with /DB option) in battery-save mode.*

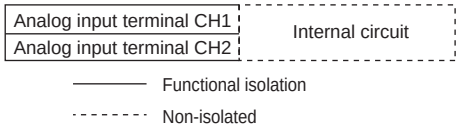
Conditions: Ambient temperature 23±2°C
Send (scan) interval: 5 minutes
LED display: Off

* The battery life varies depending on the environmental conditions such as ambient temperature and vibration.

• USB power
Compatible USB AC/DC adapter: 5 V DC±5% / 500 mA
Connector: USB2.0 mini-B connector

Isolation

• Withstand voltage
Functional isolation between channels: 200 V AC (50/60 Hz) (except the A terminal)
• Isolation diagram



Standards Compliance

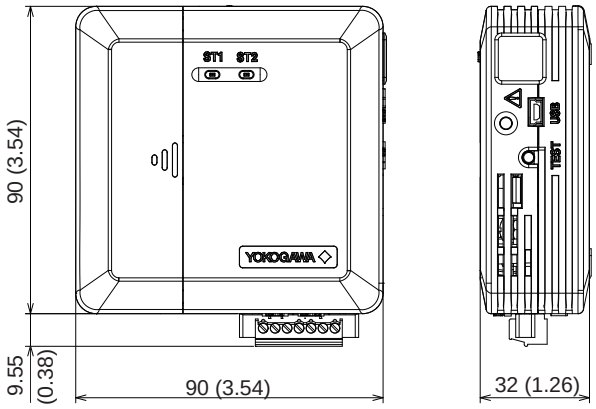
• KC mark
KN 301 489-1/-3, KN 11, KN 61000-6-2
• Wireless communication standard: IEEE 802.15.4g

Construction

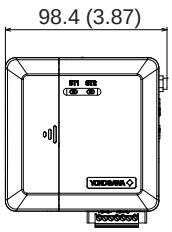
• Case: Polycarbonate
• Degrees of protection: IP20
• Connector: 7-pin clamp terminal
• Installation methods: Wall mount (fastened with screws), hooked, on a desktop, mounted with the magnet
• Color: Smoke gray (Munsell 4.1PB 6.0/4.5 equivalent)
• External dimensions: 90 (W) x 90 (H) x 32 (D) mm
• Weight: Approx. 300 g

External Dimensions

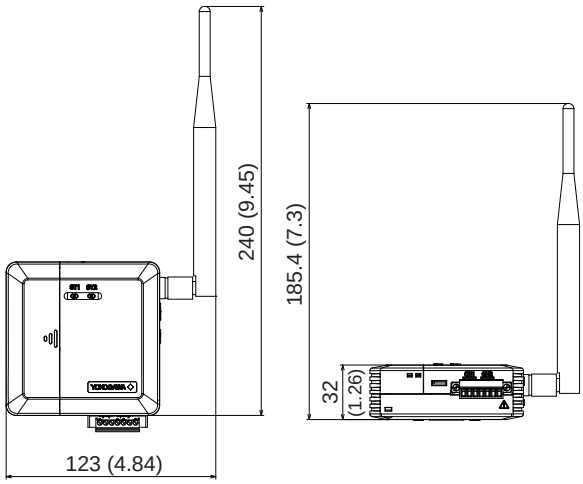
Unit: mm
Unless otherwise specified, tolerance is ±3 %
(however, tolerance is ±0.3 mm when below 10 mm).

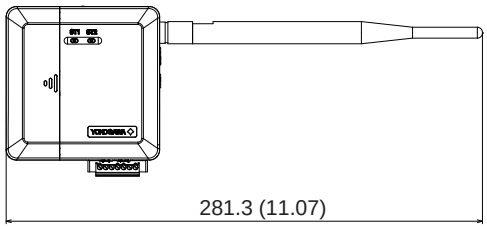


When using the roof top antenna



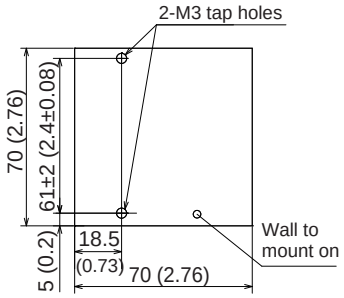
When using the sleeve antenna



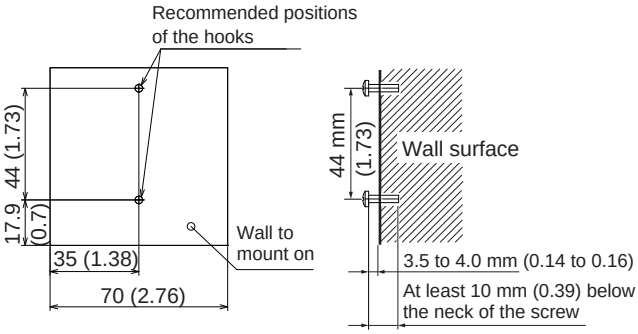


Wall mount hole dimensions

Mounted on a wall



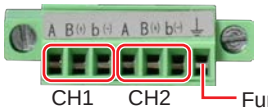
Hooked on a wall



Installation Dimensions

- Wall mount (fastened with screws)
  M3 screw, thread length 12 mm or more
  Tightening torque: 0.6 to 0.7 N•m
- Hooked
  Round wood screw: M3.5
  At least 10 mm below the neck of the screw
  Amount of screw showing from the wall surface to the screw head: 3.5 to 4.0 mm
- On a desktop
- Mounted with the magnet
  Minimum installation area: 50×70 mm

Terminal Arrangement



CH1 CH2 Functional ground terminal

Symbol						
CH1			CH2			
A	B (+)	b (–)	A	B (+)	b (–)	

Recommended wire: AWG14-28

Recommended tightening torque: Approx. 0.2 N•m or less

Other Functional Specifications

- Status display
  Configuration mode, data transmission, and battery status are indicated with LEDs (green and red). (Indication can be turned off.)

Status		LED	
		Green (ST1)	Red (ST2)
Configuration mode		Green and red blinking in sync at 2 second intervals	
Configuration change and during calibration		Green and red blinking quickly in sync	
During measurement or data transmission	Network authentication	Blinking (about 0.2 second intervals)	Off
	No network authentication	Off	Blinking (about 0.2 second intervals)
Low battery warning		Green lit (0.1 seconds), all off (1.9 seconds) Red lit (0.1 seconds), all off (1.9 seconds) The above sequence is repeated twice, and then the LEDs are off for 10 seconds.	
Input error		Off	Lit for 0.1 seconds at about 5 second intervals
Mode setting error *		Repeats the sequence of green and red lit in sync (0.1 seconds) and all off (0.9 seconds) three times, turns off for 2 seconds, and repeats the entire sequence.	

* For example, configuring in a mode other than measurement mode when there is no USB connection.

- Self-diagnosis function
  Transmits the following device status to the coordinator
  - Low battery warning: Low battery voltage detected.
  - Critical low battery warning: Minimum drive voltage detected. Batteries must be replaced quickly.
  - Input error:
    Calibration value error
    A/D error
    Hardware error
    Memory error
    Process error
  - Wireless communication error: Configuration mismatch, ambient radio environment detection
- Firmware upload
  Firmware can be updated using the Wireless Input Unit Configurator.
- Operation mode
  Change between measurement and configuration mode with a switch.
- Wireless function*
  The wireless function can be turned on and off with a switch.
  * When using the GX70SM as a standalone data logger, you can turn off the wireless function to prolong the battery life.
- Data logging function
  Saves up to 4500 or 9000 (with /DB option) data points per channel.

Normal Operating Conditions

- Ambient temperature: -20 to 70°C
- Temperature change rate: 10°C/h or less
- Ambient humidity: 0 to 90% RH (no condensation)
- Magnetic field: 400 A/m or less (DC and 50/60 Hz)
- Vibration:
  5 ≤ f < 8.4 Hz amplitude 3.5 mm (peak)
  8.4 ≤ f ≤ 160 Hz acceleration 9.8 m/s^2 or less
  (excluding hooking and magnet mount)
- Shock:
  Power supply on, 500 m/s^2 or less, approx. 11 ms 6 directions (± X, ± Y, ± Z) three times each
  Power supply off, 98 m/s^2 or less, approx. 11 ms 6 directions (± X, ± Y, ± Z) three times each
- Altitude: 2000 m or less
- Installation location: Indoors

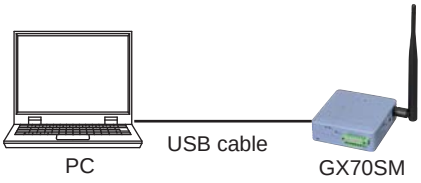
Transport and Storage Conditions

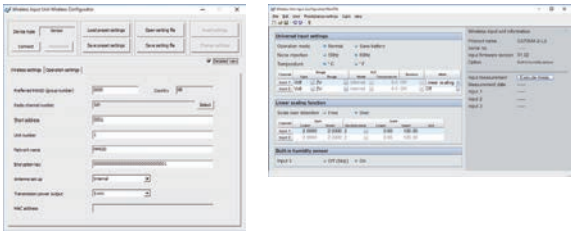
- Ambient temperature: -25 to 70°C
- Ambient humidity: 5 to 95% RH (no condensation)
- Vibration: 10 to 60 Hz, 4.9 m/s^2 or less
- Shock: 392 m/s^2 maximum (in packaged condition)

■ Wireless Input Unit Tool Specifications

Wireless Input Unit Configurator

A software application for configuring and performing maintenance on wireless input units.





Features

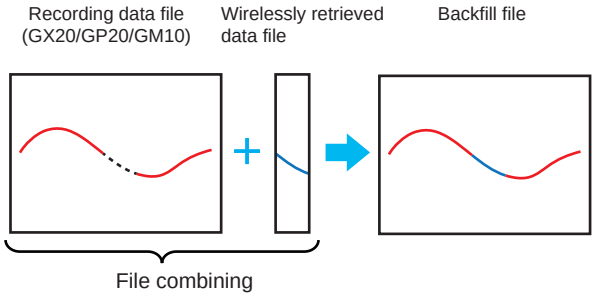
- Wireless configuration: Wireless communication, Send (scan) interval, LED settings, etc.
- Input configuration: Input range, linear scaling, measurement mode, etc. Modification history management is possible.
- Input calibration: Input calibration is possible.
- Firmware updating: Wireless and input firmware can be updated.
- Logging data function:
  The logging data held by the wireless input unit can be saved to a file.*
  Wirelessly retrieved data files created using GX20/GP20/GM10 can be combined with missing sections of the GX20/GP20/GM10 recording data (event data) using the Auto Backfill Tool (application software).

  * Wirelessly retrieved data file when collecting data from GX70SM (with /DB option)

Note: Power supply form USB is required during wireless input unit configuration. Use a powered USB cable.

Auto-Backfill Tool

It is an application software that is used to automatically combine any GX20/GP20/GM10 recording data (event data) that is missing from the GX70SM data with the wirelessly retrieved data (missing data).



Features

- It automatically combines GX20/GP20/GM10 recording data files with wirelessly retrieved data files, and creates backfill files with the missing data filled in.
- Recording data files can also be combined manually with wirelessly retrieved data files at any time.
- Backfill files can be displayed on the SMARTDAC+ Universal Viewer and signatures can be attached to them.

PC System Requirements

OS:

Wireless Input Unit Configurator

OS	Type
Windows 10	Home (32- or 64-bit edition)
	Pro (32- or 64-bit edition)

Auto-Backfill Tool

OS	Type
Windows 10	Home (32- or 64-bit edition)
	Pro (32- or 64-bit edition)
Windows Server 2016	Standard (64-bit edition)
Windows Server 2019	

Yokogawa will also stop supporting OSs that Microsoft Corporation no longer supports.

Processor and main memory:

OS	CPU and main memory
Windows 10	Intel Core2 Duo E6300 or faster x64 or x86 processor At least 2GB.
Windows Server 2016	
Windows Server 2019	

Hard disk:
100MB or more of free space (depending on the amount of data, you may need more memory), NTFS recommended.

Display:
OS compatible display with a resolution of 1024×768 dots or higher and High Color or higher

Mouse:
Mouse compatible with the OS

Communication port:
USB port

Other:
Microsoft .NET Framework 4.6.1 or later*

* Required to connect and operate the wireless input unit.

■ Wireless Input Unit Support Function of the GX20/GP20/GM10 (/CM3 option) (version R4.06.01 and later)

Data collection and status monitoring of wireless input units are possible.

Supported Functions

• Number of GX70SM connections*

Model	Measurement mode (GX/GP/GM)			
	Normal		High speed	Dual interval
	Wireless data retrieval Off	Wireless data retrieval On		
GX20-1/GP20-1 /GM10-1	Max. 50 devices	Max. 30 devices	Max. 50 devices	Max. 30 devices
GX20-2/GP20-2 /GM10-2	Max. 96 devices	Max. 50 device	Max. 96 devices	Max. 50 devices

* The number of technically possible connections varies depending on the wireless communication condition and the measurement/transmission interval.
The wireless data retrieval function can be used when the advanced security function (/AS option) is enabled. (However, it cannot be used when the multi-batch function (/BT option) is enabled.)
Measurement modes High speed and Dual interval cannot be used when the advanced security function (/AS option) is enabled.

• Auto configuration function
Automatically configures the wireless input unit data collection settings.
• Wireless data dropout detection function
Detects data collection dropouts due to wireless communication errors or the like.
• Management, monitoring, and maintenance functions
Displays wireless input unit information.
Status monitoring and maintenance period management are available.
• Loop calibration function
Wireless input data correction using the calibration correction function
• Web application and Hardware Configurator also support wireless input unit functions.
• Wireless data retrieval[1 2]
It is a function that is used to detect if there is any missing data from the data collected by GX70SM (with /DB option), collect the missing data from GX70SM automatically, and create a file for it (wirelessly retrieved data file). The file that was created can be saved to an SD memory card and transferred via FTP.
Wirelessly retrieved data files can be combined with missing sections of the GX20/GP20/GM10 recording data using the Auto Backfill Tool.

1 It is enabled for GX70SM with /DB option.
2 Only available when the advanced security function (/AS option) is enabled. However, it cannot be used when the multi-batch function (/BT option) is enabled.
Also wireless communication module version is v4.4.0 and later.

■ Model and Suffix Codes

Model	Suffix code					Optional suffix code	Description
GX70SM							Wireless Input Unit
Number of channels	-2						2 channels
Type		-L0					Universal input, scanner type (isolation between channels)
—			N				Always N
Terminal type				-C			Clamp terminal
Area					K		For the Republic of Korea, KC mark Approval
Option						/DB	Enhanced data backup function*
						/RH	Built-in humidity sensor, 1 channel

* A new GX20, GP20, or GM10 meeting the following conditions is required to use the backfill function.
- Firmware version R4.09 or later
- Wireless communications module version v4.4.0 or later
- With /AS option

■ Standard Accessories

Name	Quantity
Manual (First Step Guide IM 04L57B01-02EN)	1

Test certificate (QIC), calibration certificate (sold separately)
Test certificate and calibration certificate can be purchased.

■ Optional Accessories (Sold separately)

Name	Model or Part
Sleeve antenna (indoor use)	A1061ER
Roof top antenna (indoor and outdoor use, cable length: 2.5 m)	A1062ER
Input terminal block	A2226JT
Shunt resister for clamp terminal (250 Ω ± 0.1 %)	438920
Shunt resister for clamp terminal (100 Ω ± 0.1 %)	438921
Shunt resister for clamp terminal (10 Ω ± 0.1 %)	438922

■ Application Software

SMARTDAC+ STANDARD
- Hardware Configurator
- Universal Viewer
- Wireless Input Unit Tool
  Wireless Input Unit Configurator/Auto Backfill Tool

Download the latest version of the software from the following URL.

URL: www.smartdacplus.com/software/en/

■ Notes on 920 MHz Wireless Communication

This equipment is designed for use in the Republic of Korea only and cannot be used in any other country.

- **The radio signal may become weaker due to the operating environment, such as radio interference and obstacles in the communication route, leading to a communication error with the wireless communication temporarily disrupted.**

  If the radio signal continues to weaken, the communication error may continue for a long period of time.
- **Communication may not be possible in the following locations due to the surrounding environment.**
  - Where strong magnetic field, static electricity, or radio interference occurs.
  - Rooms with metallic walls (including concrete containing metal reinforcement material), cases, shelves, gratings, windows with metal mesh, and walls with thick concrete.
  - Within warehouses for liquid containers.
- **The backfill function may not work properly if you use it in an environment with bad wireless connection, or if you do not configure or operate it in the right way.**
- **If another wireless device using the same radio frequency band as this product is present in the communication area of this product, data rate degradation or communication errors may occur, preventing normal communication.**
- **This product has obtained KC marking. As such, the following acts may be punishable by law.**
  - Disassembling or altering the product.
  - Removing the certification label.
  - Using an antenna other than the specified option.
- **Because this product uses radio signals, bear in mind that communication may be intercepted by third parties.**

■ Liability

YOKOGAWA assumes no liability to any party for any loss or damage, direct or indirect, caused by lost or missing data due to interrupted wireless or cable communication, or the use of the product outside the design, specifications, or handling conditions.

Except for the matters stipulated in the warranty of this product, YOKOGAWA does not guarantee any measurement data and operation taken when there is a failure, erroneous operation, and problem with the product.

■ Basic Conditions and Individual Contracts at the Time of Purchase

The warranty for this product is defined in the basic conditions and individual contracts at the time of purchase.
The individual conditions are as follows.

- **Validation**
  Yokogawa does not guarantee the final outcome of validation work even if there is a defect in the product.
  For the warranty of validation services, please contact the company that performed the validation work.
- **Warranty period of firmware**
  The firmware warranty period is one year.
  Please refer to the following URL for the procedure to update the firmware and the method to download the firmware.
  https://partner.yokogawa.com/global/

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User's Manual

You can download the product user's manuals from the following URL. You will need Adobe Acrobat Reader (latest version recommended) by Adobe Systems.

URL: www.smartdacplus.com/manual/en/

920 MHz wireless communication devices

Coordinator:	GX20 Paperless Recorder (/CM3/MC option): GS 04L51B01-01EN GP20 Paperless Recorder (/CM3/MC option): GS 04L52B01-01EN GX20/GP20 (/CM3/MC option) GM (/CM3/MC and /CS3 options) 920 MHz Wireless Communication GS 04L51B01-43EN
Coordinator, router (repeater):	GM10 Data Acquisition System (/CM3/MC, /CS3 option): GS 04L55B01-01EN GX20/GP20 (/CM3/MC option) GM (/CM3/MC and /CS3 options) 920 MHz Wireless Communication GS 04L51B01-43EN
GX/GP/GM I/O module:	GX90XA/GX90XD/GX90YD/GX90WD/GX90XP/GX90YA I/O Module GS 04L53B01-01EN
Router (repeater):	UT32A/MDL Controller (DIN rail mounting type): GS 05P01D81-43EN
	UPM100 Universal Power Monitor GS 77C01H01-43EN