User's Manual

SMARTDAC+

Model   GX10/GX20/GP10/GP20/GM10

Communication Command User's Manual

vigilantplant.

Introduction

Thank you for purchasing the SMARTDAC+ GX10/GX20/GP10/GP20/GM10 Series (hereafter referred to as the recorder, GX, GP, or GM).
This manual explains the dedicated commands for the recorder. To ensure correct use, please read this manual thoroughly before beginning operation.

Notes

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

December 2012   1st Edition
February 2013   2nd Edition
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Recorder Version and Functions Described in This Manual

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

Edition	Product	Explanation
1	GX/GP: Version 1.01 and later	—
2	GX/GP: Version 1.02 and later	Feature additions.
3	GX/GP: Version 1.03 and later	Electromagnetic relay type analog input modules have been added.
		Feature additions.
4	GX/GP: Version 2.01 and later	Support for GX20/GP20 large memory type and expandable I/O has been added.
		Support for new modules (current (mA) input, low withstand voltage relay, and DI/DO) has been added.
		Feature additions. Advanced security function (/AS option) Custom display function (/CG option) EtherNet/IP communication (/E1 option) WT communication (/E2 option) Log scale function (/LG option) Etc.
5	GX/GP: Version 2.02 and later GM: Version 2.02 and later	Describes the GM.
		Feature additions. Bluetooth communication (/C8 option) [GM] USB communication [GM] Pulse input (DI module)
6	GX/GP: Version 2.02 and later GM: Version 2.03 and later	Advanced security function (/AS option) is added to the GM.

How to Use This Manual

This manual explains the dedicated communication commands for the recorder and how to use them. For details on the features of the recorder and how to use it, see the following manuals.
- Model GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide (IM 04L51B01-02EN)
- Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual (IM 04L51B01-01EN)
- Data Acquisition System GM First Step Guide (IM 04L55B01-02EN)
- Data Acquisition System GM User's Manual (IM 04L55B01-01EN)

Conventions Used in This Manual

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

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

Contents

Appendix

1.1   Operations over an Ethernet Network

You can control the recorder by sending commands from a PC over an Ethernet network. There are various types of commands: setting commands, output commands, operation commands, communication control commands, and instrument information output commands.

1.1.1   Preparing the Instrument

Recorder Configuration

Configure the recorder to connect to the Ethernet network that you want to use. For instructions on how to configure the recorder, see section 1.16, "Configuring the Ethernet Communication Function" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 2.17, "Configuring the Ethernet Communication Function," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

PC

The PC that you will use must meet the following requirements.
• The PC is connected to the Ethernet network that you want to use.
• The PC can run programs that you have created (see section 1.1.2, "Sending Commands and Receiving Responses," below).

1.1.2   Sending Commands and Receiving Responses

Programs

When you send a command to the recorder, it will return a response. You can control the recorder by writing a program that sends commands and processes responses and then executing the program. You need to create the programs.
Example: If you send the command "FData,0,0001,0020" from your PC to the recorder, the recorder will return the most recent data of channels 0001 to 0020 in ASCII code.
For details on commands and responses, see chapter 2, "Commands and Responses."

Notes on Creating Programs

• **When Not Using the Login Function**

   You can start using commands immediately after communication is established with the recorder.

• **When Using the Login Function**

   Log in to the recorder using a system administrator account or a normal user account that is registered in the recorder. Log in by connecting to the recorder and then sending the "CLogin" command.

• **Port Number**

   The defaul port number is "34434." You can change the port number using the **SServer** command.

1.2 Operations over the Serial Interface (RS-232, RS-422/485, USB, Bluetooth)

You can control the recorder by sending commands from a PC through the serial interface. There are various types of commands: setting commands, output commands, operation commands, communication control commands, and instrument information output commands. Except for a few special commands, the commands are the same as those used over an Ethernet network.

1.2.1 Preparing the Instrument

Connection

See section 1.2.3, "RS-232 Connection Procedure," section 1.2.4, "RS-422/485 Connection Procedure," section 1.2.5, "USB Connection Procedure," or section 1.2.6, "Bluetooth Connection Procedure."

Recorder Configuration

Configure the recorder to use serial communication. For instructions on how to configure the recorder, see section 1.17, "Configuring the Serial Communication Function (/C2 and /C3 options)" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 2.18, "Configuring the Serial Communication Function (/C3 option)," section 2.19, "Configuring the USB Communication Function," or section 2.20, "Configuring the Bluetooth Communication Functions," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

PC

The PC that you will use must meet the following requirements.
- The PC is connected to the recorder through the serial interface.
- The PC can run programs that you have created (see section 1.2.2, "Sending Commands and Receiving Responses," below).

1.2.2 Sending Commands and Receiving Responses

Programs

When you send a command to the recorder, it will return a response. You can control the recorder by writing a program that sends commands and processes responses and then executing the program. You need to create the programs.
Example: If you send the command "FData,0,0001,0020" from your PC to the recorder, the recorder will return the most recent data of channels 0001 to 0020 in ASCII code.
For details on commands and responses, see chapter 2, "Commands and Responses."

Notes on Creating Programs

- **For RS-232 (GX/GP), USB communication (GM), Bluetooth (GM, /C8 option)**

  When you connect a PC to the recorder through the serial interface, the recorder will be ready to receive commands.

- **For RS-422/485**

  The device that receives an open command (ESC O) from a PC will be ready to receive commands. The connection will close in the following situations.
  - When the recorder receives a connection-close command (ESC C).

1.2.3　RS-232 Connection Procedure (GX/GP)

Connect a cable to the 9-pin D-sub RS-232 connector.

Connection

• **Connector pin arrangement and signal names**

1 2 3 4 5

6 7 8 9
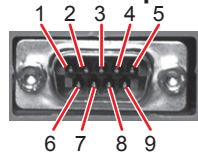
Each pin corresponds to the signal indicated below. The following table shows the signal name, RS-232 standard, JIS, and ITU-T standard signals.

Pin[1]	Signal Name			Name	Meaning
	JIS	ITU-T	RS-232		
2	RD	104	BB(RXD)	Received data	Input signal to the GX/GP.
3	SD	103	BA(TXD)	Transmitted data	Output signal from the GX/GP.
5	SG	102	AB(GND)	Signal ground	Signal ground.
7	RS	105	CA(RTS)	Request to send	Handshaking signal when receiving data from the PC. Output signal from the GX/GP.
8	CS	106	CB(CTS)	Clear to send	Handshaking signal when receiving data from the PC. Input signal to the GX/GP.

1 Pins 1, 4, 6, and 9 are not used.

• **Signal direction**

PC		GX/GP
	← RS [Request to send...Ready to receive]	7
	CS [Clear to send...Ready] →	8
	← SD [Send data]	3
	RD [Received data] →	2
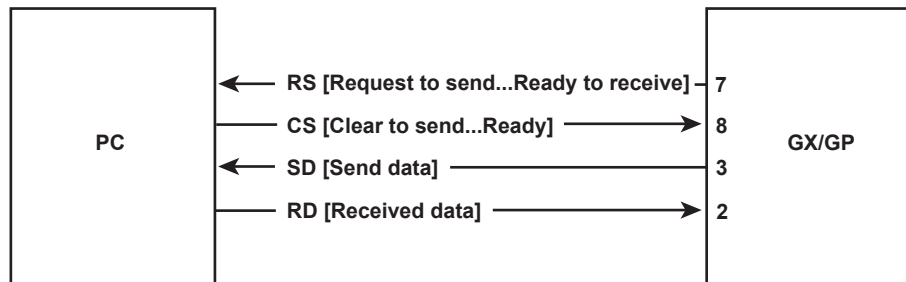
• **Connection example**

• OFF-OFF/XON-XON

PC		GX/GP
SD		3 SD
RD		2 RD
RS		7 RS
CS		8 CS
SG		5 SG

• CS-RS(CTS-RTS)

PC		GX/GP
SD		3 SD
RD		2 RD
RS		7 RS
CS		8 CS
SG		5 SG

• XON-RS(XON-RTS)

PC		GX/GP
SD		3 SD
RD		2 RD
RS		7 RS
CS		8 CS
SG		5 SG
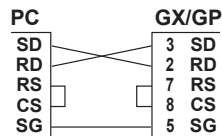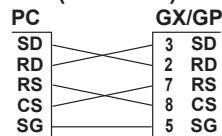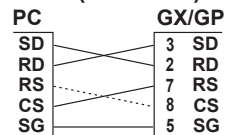
The connection of RS on the PC and CS on the GX/GP is not necessary. However, we recommend that you wire them so that the cable can be used in either direction.

Handshaking

When using the RS-232 interface for transferring data, it is necessary for equipment on both sides to agree on a set of rules to ensure the proper transfer of data. The set of rules is called handshaking. Because there are various handshaking methods that can be used between the GX/GP and the PC, you must make sure that the same method is chosen by both the GX/GP and the PC.

You can choose any of the four methods on the GX/GP in the table below.

Hand-shaking	Data transmission control (Control used when sending data to a PC)			Data Reception Control (Control used when receiving data from a PC)		
	Software Handshaking	Hardware Handshaking	No handshaking	Software Handshaking	Hardware Handshaking	No handshaking
OFF-OFF			Yes			Yes
XON-XON	Yes[1]			Yes[3]		
XON-RS	Yes[1]				Yes[4]	
CS-RS		Yes[2]			Yes[4]	

Yes   Supported.
1   Stops transmission when X-OFF is received. Resume when X-ON is received.
2   Stops sending when CS (CTS) is false. Resumes when it is true.
3   Sends X-OFF when the receive data buffer is 3/4 full. Sends X-ON when the receive data buffer is 1/4th full.
4   Sets RS (RTS) to False when the receive data buffer is 3/4 full. Sets RS (RTS) to True when the receive data buffer becomes 1/4 full.

- **OFF-OFF**

  Data transmission control

  There is no handshaking between the GX/GP and the PC. The "X-OFF" and "X-ON" signals received from the PC are treated as data, and the CS signal is ignored.

  Data reception control

  There is no handshaking between the GX/GP and the PC. When the received buffer becomes full, all of the data that overflows are discarded.
  RS = True (fixed).

- **XON-XON**

  Data transmission control

  Software handshaking is performed between the GX/GP and the PC. When an "X-OFF" code is received while sending data to the PC, the GX/GP stops the data transmission. When the GX/GP receives the next "X-ON" code, the GX/GP resumes the data transmission. The CS signal received from the PC is ignored.

  Data reception control

  Software handshaking is performed between the GX/GP and the PC. When the amount of used area in the received buffer reaches to 3/4 full (192 bytes for R2.01 and earlier; 6144 bytes for R2.02 and later), the GX/GP sends an "X-OFF" code. Then, when the amount of used area decreases to 1/4 bytes (64 bytes for R2.01 and earlier; 2048 bytes for R2.02 and later), the GX/GP sends an "X-ON" code.
  RS = True (fixed).

- **XON-RS**

  Data transmission control

  The operation is the same as with XON-XON.

  Data reception control

  Hardware handshaking is performed between the GX/GP and the PC. When the amount of used area in the received buffer reaches to 3/4 full (192 bytes for R2.01 and earlier; 6144 bytes for R2.02 and later), the GX/GP sets "RS=False." Then, when the amount of used area decreases to 1/4 bytes (64 bytes for R2.01 and earlier; 2048 bytes for R2.02 and later), the GX/GP sets "RS=True."

• **CS-RS**

Data transmission control

Hardware handshaking is performed between the GX/GP and the PC. When the CS signal becomes False while sending data to the PC, the GX/GP stops the data transmission. When the CS signal becomes True, the GX/GP resumes the data transmission. The "X-OFF" and "X-ON" signals are treated as data.

Data reception control

The operation is the same as with XON-RS.

Note

• The PC program must be designed so that the received buffers of both the GX/GP and the PC do not become full.
• If you select XON-XON, send the data in ASCII format.

1.2.4 RS-422/485 Connection Procedure

Connect a cable to the terminal.

Connection

• **Connecting the Cable**

As shown in the figure below, remove approximately 6 mm of the covering from the end of the cable to expose the conductor. Keep the exposed section from the end of the shield within 5 cm.
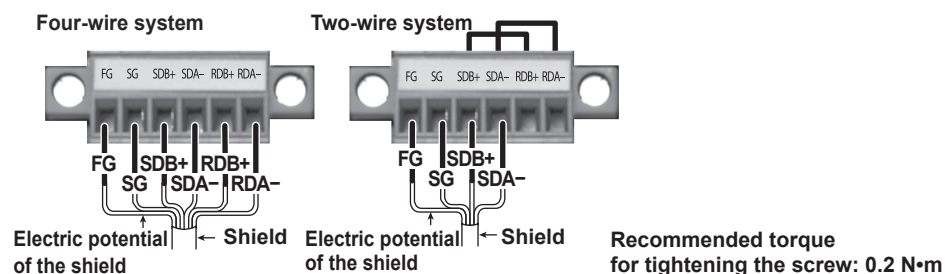
• **Signal names**

Each terminal corresponds to the signal indicated below.

Signal Name	Meaning
FG	Frame ground of the recorder.
SG	Signal ground.
SDB+	Send data B (+).
SDA–	Send data A (–).
RDB+	Receive data B (+).
RDA–	Receive data A (–).

Connecting to the host device

The figure below illustrates the connection of the recorder to a host device. If the port on the host device is an RS-232 interface, connect a converter.
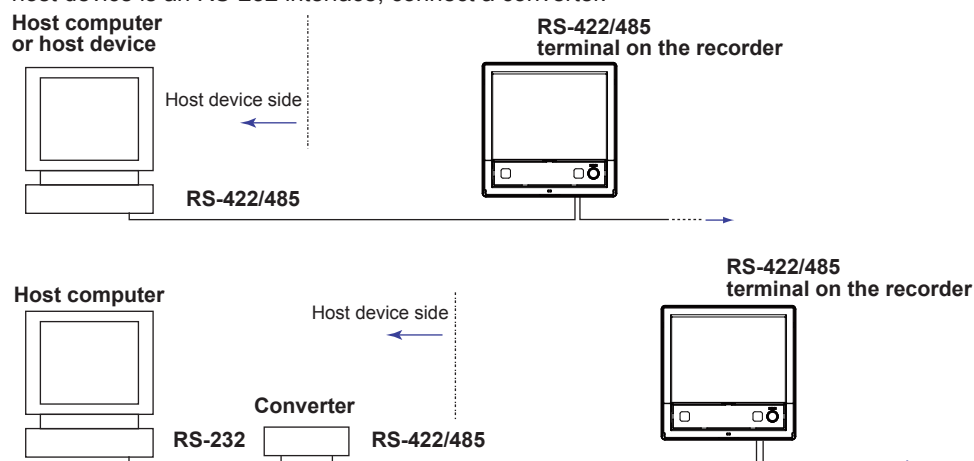
Connection example to the host device

A connection can be made with a host device having a RS-232, RS422, or RS-485 port. In the case of RS-232, a converter is used. See the connection examples below for a typical converter terminal. For details, see the manual that comes with the converter.

RS-422/485 Port	Converter
SDA(–)	TD(–)
SDB(+)	TD(+)
RDA(–)	RD(–)
RDB(+)	RD(+)
SG	SHIELD
FG	EARTH

There is no problem of connecting a 220-Ω terminator at either end if YOKOGAWA's PLCs or temperature controllers are also connected to the communication line.

- **Four-wire system**

  Generally, a four-wire system is used to connect to a host device. In the case of a four-wire system, the transmission and reception lines need to be crossed over.

Do not connect terminators to #1 through #n-1.
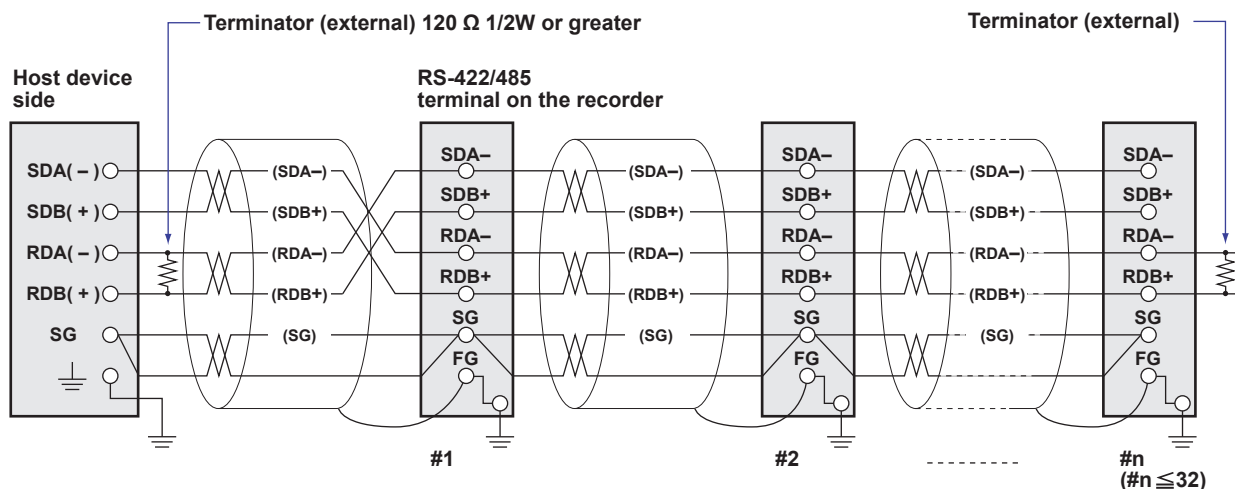
- **Two-wire system**

  Connect the transmission and reception signals with the same polarity on the RS-422/485 terminal block. Only two wires are used to connect to the external device.

Do not connect terminators to #1 through #n-1.
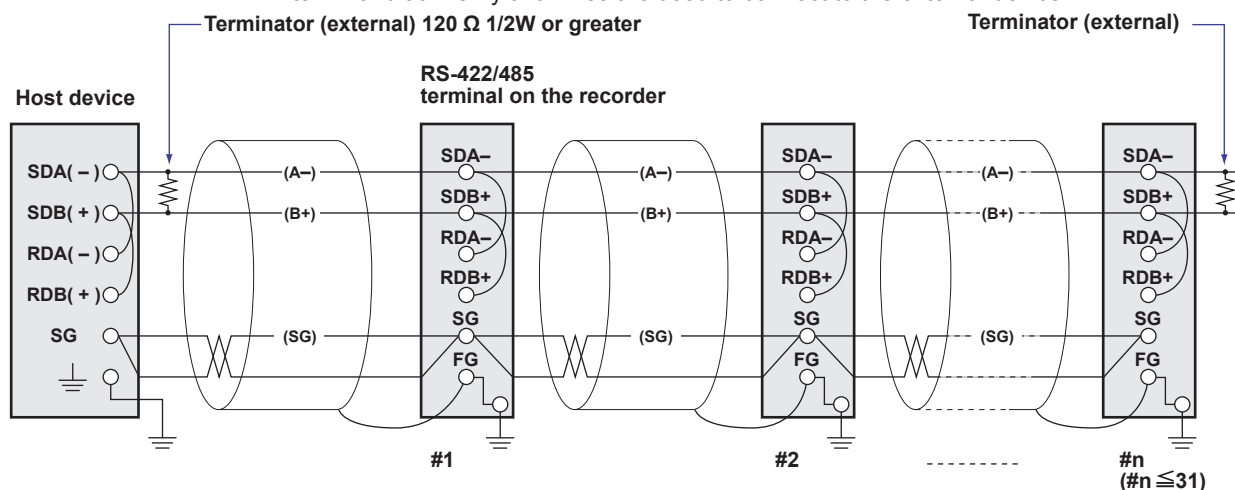
Note

- The method used to eliminate noise varies depending on the situation. In the connection example, the shield of the cable is connected only to the recorder's ground (one-sided grounding). This is effective when there is a difference in the electric potential between the computer's ground and the recorder's ground. This may be the case for long distance communications. If there is no difference in the electric potential between the computer's ground and the recorder's ground, the method of connecting the shield also to the computer's ground may be effective (two-sided grounding). In addition, in some cases, using two-sided grounding with a capacitor connected in series on one side is effective. Consider these possibilities to eliminate noise.
- When using the two-wire interface (Modbus protocol), the 485 driver must be set to high impedance within 3.5 characters after the last data byte is sent by the host computer.

Serial interface converter

The recommended converter is given below.
SYSMEX RA CO.,LTD./MODEL RC-770X, LINE EYE/SI-30FA, YOKOGAWA/ML2

CAUTION

Some converters not recommended by Yokogawa have FG and SG pins that are not isolated. In this case, do not follow the diagram on the previous page (do not connect anything to the FG and SG pins). Especially in the case of long distance communications, the potential difference that appears may damage the recorder or cause communication errors. For converters that do not have the SG pin, they can be used without using the signal ground. For details, see the manual that comes with the converter.

On some non-recommended converters, the signal polarity may be reversed (A/B or +/- indication). In this case, reverse the connection.

For a two-wire system, the host device must control the transmission driver of the converter in order to prevent collisions of transmit and received data. When using the recommended converter, the driver is controlled using the RS (RTS) signal on the RS-232.

When instruments that support only the RS-422 interface exist in the system

When using the four-wire system, up to 32 recorders can be connected to a single host device. However, this may not be true if instruments that support only the RS-422 interface exist in the system.

When YOKOGAWA's recorders that support only the RS-422 interface exist in the system

The maximum number of connection is 16. Some of YOKOGAWA's conventional recorders (HR2400 and μR, for example) only support the RS-422 driver. In this case, only up to 16 units can be connected.

> **Note**
>
> In the RS-422 standard, 10 is the maximum number of connections that are allowed on one port (for a four-wire system).

Terminator

When using a multidrop connection (including a point-to-point connection), connect a terminator to the recorder if the recorder is connected to the end of the chain. Do not connect a terminator to a recorder in the middle of the chain. In addition, turn ON the terminator on the host device (see the manual of the host device). If a converter is being used, turn ON its terminator. The recommended converter is a type that has a built-in terminator.
Select the appropriate terminator (120 Ω), indicated in the figure, according to the characteristic impedance of the line, the installation conditions of the instruments, and so on.

1.2.5 USB Connection Procedure (GM)

The procedure to connect a GM to the PC via USB is shown below. For instructions on how to use the PC, see the user's manual for your PC.

Configuring the GM

Turn the USB communication function on (default value is on). For the procedure, see section 2.19, "Configuring the USB Communication Function," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

Connecting the GM to the PC

Connect a USB cable to the USB port.

USB port (USB mini B type)
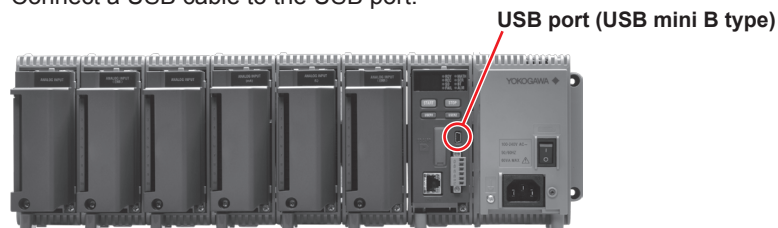
If the PC is connected to a network environment, a USB driver will be automatically installed. If it does not, check the download link for the driver at our website below, and install the driver.

http://www.smartdacplus.com/en/support/software/index.html

When the USB driver installation is complete, a COM port will be assigned.

Connect using the following communication conditions.
- Baud rate: 115200
- Parity: None
- Data length: 8 bits
- Stop bits: 1 bit
- Handshake: Off:Off

1.2.6   Bluetooth Connection Procedure (GM, /C8 option)

The procedure to connect a GM to the PC via Bluetooth is shown below. For instructions on how to use the PC, see the user's manual for your PC.

Configuring the GM

Turn the Bluetooth function on (default value is on). For the procedure, see section 2.20, "Configuring the Bluetooth Communication Function," in the *Data Acquisition System GM User's Manual* (IM 04L55B01-01EN).

Connecting the GM to the PC

1   Check whether the BT LED in the GM status display area is on. If the LED is off, hold down the GM USER1 key for at least 3 seconds.
The BT LED in the GM status display area is turns on, the GM enters the connection standby state.

BT LED
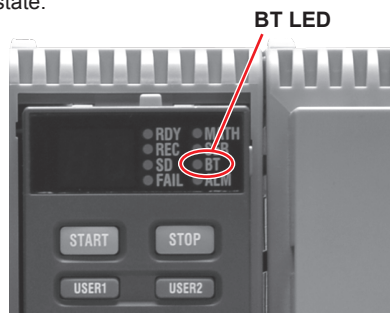
2   Perform a pairing operation from the PC.

A 6-digit authentication code appears on the GM's 7 segment LED. Check that this authentication code matches that shown on the PC, and pair the devices. When pairing is complete, a COM port will be assigned.

Note

The GM stores up to eight entries of pairing information. This information is retained even when the power is turned off.
The pairing operation is not necessary in subsequent connections.

3   Perform the operation for connecting from the PC to the GM.
See "Appendix 7 Bluetooth Communication Connection Flow Chart" and section "2.2.7 How to Use Commands".

2.1 Command Transmission and Recorder Responses

2.1.1 General Communication

The recorder can work with various applications through the use of commands. The communication that is achieved through commands is referred to as "general communication."

2.1.2 Command Types and Functions

The following types of commands are available. The first character of command names represents the command type. For example, in the command "SRangeAI," "S" represents the command type. The second and subsequent characters represent the contents of commands.

Type	Description
Operation commands Example: `OSetTime`	Commands that start with "O." These commands are used to operate the recorder.
Setting commands Example: `SRangeAI`	Commands that start with "S." These commands change the recorder settings.
Output commands Example: `FData`	Commands that start with "F." These commands cause the recorder to output measured data and other types of data.
Communication Control commands Example: `CCheckSum`	Commands that start with "C." These commands control the communication with the recorder.
Instrument information output commands Example: `_MFG`	Commands that start with an underscore. These commands cause the recorder to output its instrument information.

2.1.3 Command Syntax

A Single Command

A single command consists of a command name, parameters, delimiters, and terminator. The command name is written in the beginning, and parameters follow. Delimiters are used to separate the command name from parameters and between each parameter. A delimiter is a symbol that indicates a separation. A terminator is attached to the end of a command.

Command name,parameter 1,parameter 2 terminator

Delimiters

Example of a Command

`SRangeAI,0001,VOLT,2V,OFF,-15000,18000,0`

Commands in a Series (Setting commands only)

You can send multiple setting commands in a series. When writing a series of commands, separate each command with a sub delimiter. A sub delimiter is a symbol that indicates a separation. A terminator is attached to the end of the series. The maximum number of bytes that can be sent at once is 8000 bytes (8000 characters).

Command name,parameter 1,parameter 2;command name,parameter1 terminator

(Command 1)   **(Command 2)**

Sub delimiter

Notes on Writing Commands in a Series
- Only setting commands can be written in a series.
- Queries (see the next section) cannot be written in a series.
- If there is an error in one of the commands in a series, the commands before it are canceled, and those after it are not executed.

Example of a Command

`SRangeAI,0001,VOLT,2V,OFF,-15000,18000,0;SRangeAI,0002,SKIP`

Queries

Queries are used to inquire the recorder settings. To send a query, append a question mark to the command name or parameter. When the recorder receives a query, it returns the relevant setting as a character string in an appropriate syntax. Queries can be used on some of the available setting and operation commands.

Command name? terminator

Command name,parameter1? terminator

Examples of Queries and Responses

Query	Example of Responses
SRangeAI?	SRangeAI,0001,VOLT,2V,OFF,–20000,20000,0
	SRangeAI,0002,..
	....
SRangeAI,0001?	SRangeAI,0001,VOLT,2V,OFF,–20000,20000,0

Command Names

A command name is a character string consisting of up to 16 alphanumeric characters. The first character represents the command type.

Notes on Writing Commands Names
- Command names are not case sensitive.
- Spaces before the character string are ignored.

Parameters

Parameters are characteristic values that are attached to commands.

Notes on Writing Parameters
*   Write parameters in their appropriate order.
*   Spaces around and in the middle of parameters are ignored. Exception is the character strings that users specify.
*   You can omit the setting command parameters that do not need to be changed from their current settings. If you omit parameters, write only the delimiters.
    Example: `SRangeAI,0001,,,,,1800,0` terminator
*   If parameters are omitted and there are multiple delimiters at the end of the command, those delimiters can be omitted.
    Example: `SRangeAI,0001,VOLT,2V,,,,` terminator -> `SRangeAI,0001,VOLT, 2V`terminator

There are two types of parameters: predefined expressions and user-defined character strings.

How to Write User-Defined Character Strings (Parameters)
*   Enclose user-defined character strings in single quotation marks.
    Example   The command for setting the channel 0001 tag to "SYSTEM1" is shown
                 below.
      `STagIO,0001,'SYSTEM1'`
*   There are two types of user-defined character strings depending on the type of characters that can be used.
    Character Strings Consisting Only of Characters in the ASCII Code Range (0x00 to 0x7f)

    In this manual, applicable parameters are indicated with "ASCII."
    Example   p3   Tag number (up to 16 characters, ASCII)

    You can use alphanumeric characters and some of the symbols. For the ASCII characters that you can use, see appendix 1.

    Character Strings Consisting of Characters in the UTF-8 Code Range
    In this manual, applicable parameters are indicated with "UTF-8."
    Example   p2   Tag (up to 32 characters, UTF-8)

    UTF-8 codes include ASCII codes. You can use UTF-8 characters, including the ASCII characters above. For the ASCII characters that you can use, see appendix 1.

Delimiters

Commas are used as delimiters.

Sub delimiters

Semicolons are used as sub delimiters.

Terminators

"CR+LF" is used as a terminator, meaning "CR" followed by "LF." Expressed in ASCII code, it is 0x0d0x0a.

2.1.4   Recorder Responses

The recorder returns the following responses to commands.
* If the recorder successfully completes the processing of a received output request command, it outputs the requested data.
* If the recorder successfully completes the processing of a received command that is not an output request command, it outputs an affirmative response.
* If a command syntax error, setting error, or other error occurs, the recorder outputs a negative response.

For each command the recorder receives, it returns a single response. The controller (PC) side must process commands and responses in accordance with this command-response rule. If the command-response rule is not followed, the operation of the recorder is not guaranteed. For details on the response syntax, see **2.9 Responses to Commands**.

2.2 List of Commands

2.2.1 Setting Commands

2.2.2 Output Commands

2.2.3 Operation Commands

2

Commands and Responses

`OBTClearList`	Clears the Bluetooth connection list (/C8) [GM]	**2-67**
`OLoginAssist`	Assists login [GX/GP]	**2-67**
`OSendValue`	Assists touch panel operation Input [GX/GP]	**2-67**
`OUserLockACK`	User locked ACK (/AS)	**2-67**
`OKeyLock`	Key lock on/off [GM]	**2-67**
`OErrorClear`	Clears the error display [GM]	**2-67**

2.2.4 Communication Control Commands

Command	Description (Required Options) [Applicable Models]	Page
`CCheckSum`	Sets the checksum	**2-68**
`CSFilter`	Sets the status filter	**2-68**
`CLogin`	Log in via communication	**2-68**
`CLogout`	Log out via communication	**2-68**
`CBTConnect`	Starts Bluetooth communication (/C8) [GM]	**2-68**
`ESC O`	Opens an instrument : RS-422/485 command	**2-69**
`ESC C`	Closes an instrument : RS-422/485 command	**2-69**

2.2.5 Instrument Information Commands

Command	Description	Page
`_MFG`	Outputs the instrument manufacturer	**2-70**
`_INF`	Outputs the instrument's product name	**2-70**
`_COD`	Outputs the instrument's basic specifications	**2-70**
`_VER`	Outputs the instrument's firmware version information	**2-70**
`_OPT`	Outputs the instrument's option installation information	**2-70**
`_TYP`	Outputs the instrument's temperature unit, and daylight saving time installation information	**2-70**
`_ERR`	Outputs the instrument's error number information	**2-70**
`_UNS`	Outputs the instrument's unit configuration information	**2-70**
`_UNR`	Outputs the instrument's unit configuration information	**2-70**
`_MDS`	Outputs the instrument's module configuration information	**2-70**
`_MDR`	Outputs the instrument's module configuration information	**2-70**

2.2.6 Conditions for Executing Commands

A command can be executed only when the recorder can execute the setting change or operation that the command specifies. Commands are invalid in the following circumstances.

- The recorder is not in a condition to accept the operation.
  For example, if the recorder is not recording, you cannot write a message.
- If the recorder does not have the function or is not using the function.
  The "Description" column in section 2.2.1, "Setting Commands" contains the recorder suffix codes that are required for using the commands.
- If the login function is in use, the command cannot be used at the user level that the user is logged in at.
- User restriction is placed on the operation.
  The following table lists the commands that are invalid according to the limitation types (p1 of the SOpeLimit command or p2 of the SUserLimit command).

Limitation Type	Invalid Command
`Memory`	`ORec`
`Math`	`OMath`
`DataSave`	`OExecRec`, `OMTReset`
`Message`	`OMessage`
`Batch`	`OBatName`, `OBatComment`, `OBatText`
`AlarmACK`	`OAlarmAck`
`Comm`	`OEMail`, `OIPApply`, `OMBRestore`
`DispOpe`	`SHomeKind`, `SHomeMonitor`, `SFavoriteKind`, `SFavoriteMonitor`, `Smonitor`, `SMultiPattern`, `SMultiKind`, `ODispRate`
`DateSet`	`OExecSNTP`, `OSetTime`
`ChangeSet`	`Sxxxx`[*1], `OLoadConf`
`File`	`OLoadConf`, `OLoadConfAll`, `OSaveConf`, `OSaveConfAll`, `Fmedia`
`System`	`OInit`, `FSysConf` (when p1 is specified)
`Out`	`OCmdRelay`, `OCommCh`
`CalibSet`[*2]	`SCalibIO`

*1 Setting commands except for SHomeKind, SHomeMonitor, SFavoriteKind, SFavoriteMonitor, Smonitor, SMultiPattern, SMultiKind, and SCalibIO[(Note)]
(Note) Only when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.
*2 Can be specified with the SUserLimit command when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.

- The command is not applicable to the model.
  For commands that can be used only on certain models, the models are listed in the "Description" column in section 2.2.1, "Setting Commands," to section 2.2.4, "Communication Control Commands." (Examples: [GX/GP], [GM])
  The applicable models for the following commands are further reduced.

Command	Applicable Models
`SViewAngle`	GX10, GP10
`SMultiPattern`	GX20, GP20
`SMultiKind`	GX20, GP20

2.2.7 How to Use Commands

When Using Ethernet

• When not using the login function
  When you connect a PC to the recorder, the recorder will be ready to receive commands.
• When using the login function
  Establish communication with the recorder, and log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).

When Using RS-232 (GX/GP)

• When you wire and connect a PC to the GX/GP, the GX/GP will be ready to receive commands.
• When using the login function, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).

When Using RS-422/485

• The device that is opened with an open command (ESC o) will be ready to receive commands.
• When using the login function, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command).
• To close the connection, send the close command (ESC c).

When Using USB Communication (GM)

• When not using the login function
  When you connect a PC to the GM, the GM will be ready to receive commands.
• When using the login function
  Log in using a registered user account (CLogin command) to establish a connection. After you finish the operation, log out (CLogout command). You can also use the auto logout function (SUsbAutoLOut command).
• To remove a GM, perform a device removal procedure on the PC to disconnect, and then remove the cable.

When Using Bluetooth (GM, /C8 option)

• When not using the login function
  When the Bluetooth password function is enabled, use a command to start communication (CBTConnect) to send the password. When a connection is established, the GM will be ready to receive commands.
• When using the login function
  In addition to the procedure above, log in using a registered user account (CLogin command). After you finish the operation, log out (CLogout command). You can also use the auto logout function (SBTTimeOut command).
• To disconnect, perform a device removal procedure on the PC.

Note

• For the login operation, see appendix 2, "Login Procedure."
• For details on Bluetooth connection, see appendix 7, "Bluetooth Communication Connection Flow Chart."

2.2.8 Device Nomenclature in Command Descriptions

The following nomenclature is used in the command descriptions in section 2.4 to distinguish the devices.

Nomenclature	Device
Recorder	Both GX/GP and GM
Main unit	Both GX/GP and GM main units
GX/GP main unit	GX/GP main unit
GM main unit	GM main unit
Expandable I/O	GX/GP Expandable I/O
Sub unit	GM sub unit

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Commands and Responses

2.3 Parameters

This section describes parameters.

2.3.1 Measuring Range Parameters

AI Channel Span

Specify the span using an integer.

Example   If the range is -2.0000 V to 2.0000 V and you want to set the span lower limit to 0.5000 V and the span upper limit to 1.8000 V, set the parameters to 5000 and 18000, respectively.

`SRangeAI,0001,VOLT,2V,FF,5000,18000,0`

Scaling

Scaling is possible on AI and DI channels. Scaling is specified by a mantissa and decimal place.

Example   To set the scaling to -10.00 to 20.00, set the scaling lower limit to -1000, scaling upper limit to 2000, and the decimal place to 2. The decimal place value represents the number of digits to the right of the decimal point.

Math Channel and Communication Channel Span

Set the span of math channels and communication channels using a mantissa and decimal place.

Example   To set the span to 1.000 to 2.000, set the scaling lower limit to 1000, scaling upper limit to 2000, and the decimal place to 3.

2.3.2 Parameter Notation and Range

The table below shows the principle parameter notations and ranges of values.

Type	Notation and Range of Values	
[GX/GP] Unit number	No expandable I/O	0
	Expandable I/O installed	0 to 6
[GX/GP] Module number	When the unit is GX10/GP10	0 to 2
	When the unit is GX20/GP20	0 to 9
	When the unit is an expandable I/O	0 to 6
[GM] Unit number	No sub unit	0
	Sub unit installed	0 to 6
[GM] Module number	Main unit	0 to 9
	Sub unit	0 to 6
AI channel DI channel DO channel	Specify as "unit number+module number+channel." Example The AI channel whose unit number is 0, module number is 1, and channel number is 02 is 0102.	
Math channel	GX20/GP20: 001 to 100	
	GX10/GP10: 001 to 050	
	GM10: 001 to 100	
	For SGroup and SMailAlarm commands, insert "A" in front. Example A001	

Type	Notation and Range of Values
Communication channel	GX10/GP10: 001 to 050 GX20-1/GP20-1: 001 to 300 GX20-2/GP20-2: 001 to 500
	GM10-1: 001 to 300 GM10-2: 001 to 500
	For SGroup and SMailAlarm commands, insert "C" in front. Example C001
Number of channels for recording display data	GX10/GP10: 001 to 100 GX20-1/GP20-1: 001 to 500 GX20-2/GP20-2: 001 to 1000
	GM10-1: 1 to 500 GM10-2: 1 to 1000
Number of channels for recording event data	GX10/GP10: 001 to 100 GX20-1/GP20-1: 001 to 500 GX20-2/GP20-2: 001 to 1000
	GM10-1: 1 to 500 GM10-2: 1 to 1000
Number of channels for recording manual sampled data	GX10/GP10/GX20-1/GP20-1: 1 to 50 GX20-2/GP20-2: 1 to 100
	GM10-1: 1 to 50 GM10-2: 1 to 100
Number of report channels	GX10/GP10: 1 to 50 GX20/GP20: 1 to 60
	GM10: 1 to 60
Number of display groups	GX10/GP10: 1 to 30 GX20-1/GP20-1: 1 to 50 GX20-2/GP20-2: 1 to 60
	GM10-1: 1 to 50 GM10-2: 1 to 60
Number of channels that can be registered to display groups	GX10/GP10: 10 GX20/GP20: 20
	GM10: 20
Modbus server setting number	GX10/GP10/GX20-1/GP20-1: 1 to 16 GX20-2/GP20-2: 1 to 32
	GM10-1: 1 to 16 GM10-2: 1 to 32
Modbus command number (Ethernet)	GX10/GP10: 1 to 50 GX20-1/GP20-1: 1 to 100 GX20-2/GP20-2: 1 to 200
	GM10-1: 1 to 100 GM10-2: 1 to 200
Modbus command number (serial communication)	GX10/GP10: 1 to 50 GX20/GP20: 1 to 100
	GM10: 1 to 100
Server setting number for WT communication	GX10/GP10: 1 to 8 GX20/GP20: 1 to 16
	GM10: 1 to 16
Communication channel allocation number for WT communication	GX10/GP10: 1 to 50 GX20/GP20: 1 to 300
	GM10: 1 to 300
Number of users that can be registered (user number)	Advanced security function (/AS) not installed or disabled: 1 to 50
	Advanced security function (/AS) enabled: 1 to 100

2.3.3 Specifying a Range

When specifying consecutive channel numbers or group numbers in a setting command, you can specify them using a range instead of specifying each number one by one.

- Use a hyphen to separate the first number and the last number. For I/O channels, you can specify a range that spans over multiple slots that modules are installed in.
- You can specify the minimum number by omitting the number before the hyphen and the maximum number by omitting the number after the hyphen. If you want to specify all numbers from the first number to the last number, specify only the hyphen.

Example 1

To specify 3 to 10: "3-10"
To specify 3 to the maximum number: "3-"
To specify the first number to 10: "-10"
To specify all numbers: "-"

Example 2

A command that sets the channel ranges of AI modules installed in slots 0 to 2 to Skip.
`SRangeAI,0001-0210,Skip` or
`SRangeAI,-0210,Skip`
If a different module is installed in slot 1, queries will work, but setting commands will result in error.

2.4 Setting Commands

▌SScan

Scan Interval

Sets the scan interval.

Syntax	`SScan,p1,p2`
	`p1` Scan group (1)
	`p2` Scan interval (100ms, 200ms, 500ms, 1s, 2s, 5s)
Query	`SScan[,p1]?`
Example	Set the scan interval to 1 second.
	`SScan,1,1s`

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 a low withstand voltage relay type analog input module is installed, scan interval less than or equal to 200 ms cannot be specified.
- If an electro-magnetic relay type analog input module is installed, scan interval less than or equal to 500 ms cannot be specified.

▌SScanGroup

Scan Group

Registers a measurement channel in scan group 1.

Syntax	`SScanGroup,p1,p2,p3`
	`p1` Unit number
	`p2` Module number
	`p3` Scan group (1)
	`1` Scan group 1
Query	`SScanGroup[,p1[,p2]]?`
Example	Set the module installed in the main unit, whose module number is 2 in scan group 1.
	`SScanGroup,0,2,1`

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.

▌SModeAI

AI Module

Sets the mode and A/D integration time of an AI module (excluding current input type AI modules).

Syntax	`SModeAI,p1,p2,p3,p4`
	`p1` Unit number
	`p2` Module number
	`p3` Mode
	`2CH` 2 channel mode
	`10CH` 10 channel mode
	`p4` AD integration time (Auto, 50Hz, 60Hz, Common)

Query `SModeAI[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the mode to 10CH and the AD integration time to Auto.
`SModeAI,0,2,10CH,Auto`

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.
- Scan intervals shorter than 1 s cannot be specified if an electro-magnetic relay type (Type suffix code: -T1) analog input module is in use (set up).
- Fixed to 10 channel mode if an electro-magnetic relay type or low withstand voltage relay type analog input module is in use.
- You can set the parameters in the following combinations.

Scan Interval	Mode (p3)	Integration time (p4)			
		Auto	50Hz	60Hz	Common
100ms	2CH	Yes	Yes	Yes	No
	10CH	Yes	No	No	No
200ms	2CH	Yes	Yes	Yes	No
	10CH	Yes	No	No	No
500ms	—	Yes	Yes	Yes	No
1s	—	Yes	Yes	Yes	Yes*
2s	—	Yes	Yes	Yes	Yes
5s	—	Yes	Yes	Yes	Yes

* "No" if low withstand voltage relay type analog input module is in use.

▌SModeAICurrent

Current Input Type AI Module

Sets the mode and A/D integration time of an current input type AI module.

Syntax `SModeDICurrent,p1,p2,p3,p4`
    `p1` Unit number
    `p2` Module number
    `p3` Mode
      `2CH` 2 channel mode
      `10CH` 10 channel mode
    `p4` AD integration time (Auto, 50Hz, 60Hz, Common)
Query `SModeAICurrent[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the mode to 10CH and the AD integration time to Auto.
`SModeAICurrent,0,2,10CH,Auto`

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.
- There are limitations on the allowable combinations of scan interval and p3 and p4. See the explanation for the SModeAI command.

▌SBOLmtAI

Upper and Lower Burnout Limits of AI Module

Sets the burnout limits for the general signal range of an AI module (excluding current input type AI modules).

Syntax `SBOLmtAI,p1,p2,p3,p4`
    `p1` Unit number
    `p2` Module number
    `p3` Lower burnout limit for the general signal range. Percentage of the specified span (−20.0 to −5.0)
    `p4` Upper burnout limit for the general signal range. Percentage of the specified span (105.0 to 120.0)
Query `SBOLmtAI[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the lower burnout limit for the general signal range to -10% and the upper burnout limit for the general signal range to 110%.
`SBOLmtAI,0,2,-10.0,110.0`

▌SBOLmtAICurrent

Upper and Lower Burnout Limits of Current Input Type AI Module

Sets the burnout limits for the general signal range of a current input type AI module.

Syntax `SBOLmtAICurrent,p1,p2,p3,p4`
    `p1` Unit number
    `p2` Module number
    `p3` Lower burnout limit for the general signal range. Percentage of the specified span (−20.0 to −5.0)
    `p4` Upper burnout limit for the general signal range. Percentage of the specified span (105.0 to 120.0)
Query `SBOLmtAICurrent[,p1[,p2]]?`
Example For the module installed in the main unit, whose module number is 2, set the lower burnout limit for the general signal range to -10% and the upper burnout limit for the general signal range to 110%.
`SBOLmtAICurrent,0,2,-10.0,110.0`

▌SModeDI

DI Module

Sets the mode of a DI module.

Syntax
/MT `SModeDI,p1,p2,p3`
No /MT `SModeDI,p1,p2,p3,p4`
    `p1` Unit number
    `p2` Module number
    `p3` Mode (Normal, Remote)
      `Normal` DI input
      `Remote` Remote control input
    `p4` Filter for pulse input (On, Off)
Query `SModeDI[,p1[,p2]]?`
Example Set the module whose module number is 2 as a remote control input module.
`SModeDI,0,2,Remote`

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.
- Only one module can be set to remote. If different modules are set to remote numerous times, the last module will be the remote module.
- For modules installed in an expandable I/O or sub unit, p3 is fixed to Normal.
- Pulse input is valid on products with the math function (/MT option).

SScaleOver

Detection of Values That Exceed the Scale

Sets how to detect measurement over-range.
Syntax SSclOver,p1
/P1 How to detect values that exceed the scale
FREE Assume scale over-range when the measurement range is exceeded.
OVER Assume scale over-range when ±105% of the scale is exceeded.
Query SSclOver?
Example Assume scale over-range when the measurement range is exceeded.
SSclOver,FREE

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.
- The setting specified with this command is valid if at least one module is installed.

SMemory

Recording Mode

Sets the type of data to record.
Syntax SMemory,p1
p1 Recording mode
D Display data
D+E1 Display data and event data
E1 Event data
Query SMemory?
Example Record display data.
SMemory,D

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.
- When the advanced security function (/AS) is enabled, p1=D+E1 cannot be specified.

SMemKeyConfirm

Record Confirmation Action [GX/GP]

Sets the record confirmation action.
Syntax SMemKeyConfirm,p1
p1 Enable or disable confirmation screen (Off, On)
Query SMemKeyConfirm?
Example Show the confirmation screen.
SMemKeyConfirm,On

SDispData

Display Data Recording

Sets the display data recording mode.
Syntax SDispData,p1,p2
p1 Recording interval (5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min, 1h, 2h, 4h, 10h)/div.
p2 File save interval (10min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h,1day, 2day, 3day, 5day, 7day, 14day, 31day)
Query SDispData?
Example Set the recording interval to 1 minute and file save interval to 12 hours.
SDispData,1min,12h

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.
- You cannot choose a recording interval that is shorter than the scan interval.
- You cannot choose a recording interval that is not an integer multiple of the scan interval.
- File save interval is valid when display data recording is enabled (recording mode of the **SMemory** command).

SEventData

Event Data Recording

Sets the event data recording mode.

Syntax SEventData,p1,p2,p3,p4,p5,p6
    p1 Scan group (1)
    p2 Recording interval (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s, 15s, 20s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min)
    p3 Operation mode

Free	Starts recording at recording start and stops recording at recording stop.
SingleTrigger	After a trigger event occurs, the recorder will record for the specified time and stop.
RepeatTrigger	After a trigger event occurs, the recorder will record for the specified time and stop. Then, the recorder will enter the trigger-wait state.

    p4 Data length (10min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h, 1day, 2day, 3day, 5day, 7day, 14day, 31day)
    p5 Pre-trigger (0, 5, 25, 50, 75, 95, 100) [%]
    p6 Trigger source key (Off, On)
Query SEventData[,p1]?
Example Record event data in Free mode at a recording interval of 1 second. Separate the data into different files every 2 hours.
    SEventData,1,1s,Free,2h

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.
- You cannot choose a recording interval that is shorter than the scan interval.
- You cannot choose a recording interval that is not an integer multiple of the scan interval.
- This setting is valid when event data recording is enabled (recording mode of the **SMemory** command).
- When the advanced security function (/AS) is enabled, p3 is fixed to Free.

SRecDisp

Channel for Recording Display Data

Sets the channel for recording display data.

Syntax SRecDisp,p1,p2,p3
    p1 Number (see "Description")
    p2 Channel type
        Off   Do not record display data.
        IO   I/O channel
        Math Math channel
        Com   Communication channel
    p3 Channel number
Query SRecDisp[,p1]?
Example Assign the display data of I/O channel 0005 to number 10 and record.
    SRecDisp,10,IO,0005

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.
- There is a limit to the number of recording channels depending on the recording interval (**SDispData** command).

Recording Interval	Number of Recording Channels
5 s/div	100
10 s/div	200
15 s/div or higher	500

For the large memory type (GX20-2/GP20-2/GM10-2), the following table applies.

Recording Interval	Number of Recording Channels	
	When recording only display data	When recording display data and event data
5s/div	200	100
10s/div	500	200
15s/div	1000	500
30s/div or more	1000	1000

- You cannot set a channel more than once.

SRecEvent

Channel for Recording Event Data

Sets the channel for recording event data.

Syntax SRecEvent,p1,p2,p3,p4
    p1 Scan group (1)
    p2 Number (see "Description")
    p3 Channel type
        Off   Do not record event data.
        IO   I/O channel
        Math Math channel
        Com   Communication channel
    p4 Channel number
Query SRecEvent[,p1[,p2]]?
Example Assign the event data of I/O channel 0006 to number 11 and record.
    SEventData,1,11,IO,0006

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 p3=Off, you cannot set p4.
- This setting is valid when event data recording is enabled (recording mode of the **SMemory** command).
- There is a limit to the number of recording channels depending on the recording interval (**SEventData** command).

Recording Interval	Number of Recording Channels
100 ms	100
200 ms	200
500 ms or more	500

For the large memory type (GX20-2/GP20-2/GM10-2), the following table applies.

Recording Interval	Number of Recording Channels	
	When recording only event data	When recording display data and event data
100ms	500	100
200ms	500	200
500ms	1000	500
1s or more	1000	1000

- You cannot set a channel more than once.

SRecManual

Channel for Recording Manual Sampled Data

Sets the channel for recording manual sampled data.

Syntax SRecManual,p1,p2,p3
  p1 Number (1 to 50)
  p2 Channel type
   Off Do not record manual sampled data.
   IO I/O channel
   Math Math channel
   Com Communication channel
  p3 Channel number

Query SRecManual[,p1]?

Example Assign the manual sampled data of I/O channel 0003 to number 2 and record.
  SRecManual,2,IO,0003

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.
- You cannot set a channel more than once.

SBatch

Batch Function

Configures the batch function's basic settings.

Syntax SBatch,p1,p2,p3
  p1 Enable or disable (Off, On)
  p2 Number of lot number digits (Off, 4, 6, 8)
   Off Do not use lot numbers.
   4 4-digit lot number
   6 6-digit lot number
   8 8-digit lot number
  p3 Auto increment (Off, On)

Query SBatch?

Example Enable the batch function. Use 4-digit lot numbers. Automatically increment the lot number in the next operation.
  SBatch,On,4,On

Description

- You cannot use this command to configure settings while recording is in progress.

STextField

Batch Text

Sets a batch text.

Syntax STextField,p1,p2,p3
  p1 Field number (1 to 24)
  p2 Title (up to 20 characters, UTF-8)
  p3 Character string (up to 30 characters, UTF-8)

Query STextField[,p1]?

Example For field number 3, set the field title to "OPERATOR" and the character string to "RECORDER1."
  STextField,3,'OPERATOR','RECORDER1'

Description

- You cannot use this command to configure settings while recording is in progress.

2

Commands and Responses

■ SDirectory

Name of Directory to Save Data

Sets the name of the directory to save data.

Syntax   SDirectory,p1
        p1   Directory name (up to 20 characters, ASCII)
Query   SDirectory?
Example   Set the directory name to "DATA0."
        SDirectory,'DATA0'

Description
- For the characters that you can use in the directory name (p1), see **Appendix 1**.
- The following character strings cannot be used for directory names.

Character String
AUX
CON
PRN
NUL
CLOCK
CLOCK$
COM0 to COM9
LPT0 to LPT9

- You cannot use a character string that starts or ends with a period or space for directory names.

■ SFileHead

File Header

Sets the file header character string.

Syntax   SFileHead,p1
        p1   File header (up to 50 characters, UTF-8)
Query   SFileHead?
Example   Set the file header to "GX_DATA."
        SFileHead,'GX_DATA'

■ SFileName

File Naming Rule

Sets the file naming rule for data files.

Syntax   SFileName,p1,p2
        p1   File naming rule

           Date   Date
           Serial   Serial number
           Batch   Batch name

        p2   Specified file name (up to 16 characters, ASCII)
Query   SFileName?
Example   Set the file naming rule to "Date." Set the specified file name to "Recorder1_data."
        SSFileName,Date,'Recorder1_data'

Description
- If the batch setting is disabled (SBatch: p1=Off), you cannot specify p1=Batch.
- If p1=Batch, p2 is invalid.
- For the characters that you can use in the specified file name (p2), see **Appendix 1**.

■ SMediaSave

Automatic Data File Saving

Sets the auto saving of data files to an external storage medium.

Syntax   SMediaSave,p1,p2
        p1   Auto saving to an external storage medium
           (GX/GP: Off, On)
           (GM: Off, On, Fixed to On when the advanced security function (/AS) is enabled and the log in via communication is enabled.)
        p2   Media FIFO (Off, On)
Query   SMediaSave?
Example   Enable the auto saving to the external storage medium and media FIFO.
        SMediaSave,On,On

■ SFileFormat

Display/Event Data File Format

Sets the file format of display data files and event data files.

Syntax   SFileFormat,p1
        p1   File format (Binary, Text)
Query   SFileFormat?
Example   Create files in text format.
        SFileFormat,Text

Description
- The types of data that you can set file formats for are display data and event data.
- The file saving methods that the specified file format is applied to are auto saving, saving of unsaved data, manual saving, and FTP data transfer.
- When the advanced security function (/AS) is enabled, p1 is fixed to Binary.

SRangeAI

Measurement Range of AI Channel

Sets the measurement range of an AI channel.

Unused Channels

Syntax `SRangeAI,p1,p2`
- `p1` Channel number
- `p2` Input type (Skip)

Channels Whose Input Type Is DI and No Math

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6`
- `p1` Channel number
- `p2` Input type (DI)
- `p3` Range (see "Description.")
- `P4` Calculation type (Off)
- `p5` Span lower limit
- `p6` Span upper limit

Channels Whose Input Type Is Volt, TC, or RTD and No Calculation

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7`
- `p1` Channel number
- `p2` Input type (Volt, TC, RTD)
- `p3` Range (see "Description.")
- `P4` Calculation type (Off)
- `p5` Span lower limit
- `p6` Span upper limit
- `p7` Bias (–999999 to 999999)

Delta Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8`
- `p1` Channel number
- `p2` Input type (Volt, TC, RTD, DI)
- `p3` Range (see "Description.")
- `P4` Calculation type (Delta)
- `p5` Span lower limit
- `p6` Span upper limit
- `p7` Bias (–999999 to 999999) (can be set when p2 is not set to DI)
- `p8` Reference channel number

Scaling Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`
- `p1` Channel number
- `p2` Input type (Volt, TC, RTD, DI)
- `p3` Range (see "Description.")
- `P4` Calculation type (Scale)
- `p5` Span lower limit
- `p6` Span upper limit
- `p7` Bias (–999999 to 999999) (can be set when p2 is not set to DI)
- `p8` Decimal Place (0 to 5)
- `p9` Scaling lower limit
- `p10` Scaling upper limit
- `p11` Unit (up to 6 characters, UTF-8)

Unified Signal Input Channels (Input Type Is GS)

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13`
- `p1` Channel number
- `p2` Input type (GS)
- `p3` Range (see "Description.")
- `P4` Calculation type (Scale)
- `p5` Span lower limit
- `p6` Span upper limit
- `p7` Bias (–999999 to 999999)
- `p8` Decimal Place (0 to 5)
- `p9` Scaling lower limit
- `p10` Scaling upper limit
- `p11` Unit (up to 6 characters, UTF-8)
- `p12` Low-cut function (Off, On)
- `p13` Low-cut point (0 to 50)

Square Root Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14`
- `p1` Channel number
- `p2` Input type (Volt, GS)
- `p3` Range (see "Description.")
- `P4` Calculation type (Sqrt)
- `p5` Span lower limit
- `p6` Span upper limit
- `p7` Bias (–999999 to 999999)
- `p8` Decimal Place (0 to 5)
- `p9` Scaling lower limit
- `p10` Scaling upper limit
- `p11` Unit (up to 6 characters, UTF-8)
- `p12` Low-cut function (Off, On)
- `p13` Low-cut point (0 to 50)
- `p14` Low-cut output (Zero, Linear)

Log Scale (/LG) Channels

Syntax `SRangeAI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`
- `p1` Channel number
- `p2` Input type (Volt)
- `p3` Range (see "Description.")
- `P4` Calculation type (LogT1, LogT2, LogT3)
  - `LogT1` Log input
  - `LogT2` Pseudo Log Input
  - `LogT3` Linear-log input
- `p5` Span lower limit (see "Description.")
- `p6` Span upper limit (see "Description.")
- `p7` Bias (–999999 to 999999)
- `p8` Decimal place of mantissa (1, 2)
- `p9` Scaling lower limit (exponential notation, 1.00E-15 to 1.00E15) (see "Description.")
- `p10` Scaling upper limit (exponential notation, 1.00E-15 to 1.00E15) (see "Description.")
- `p11` Unit (up to 6 characters, UTF-8)

Query `SRangeAI[,p1]?`

Example Measure -0.5000 to 1.0000 V on channel 0002. No scaling. No bias.
`SRangeAI,0002,Volt,2V,Off,-5000,10000,0`

Description

2

Commands and Responses

- 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=TC/RTD/DI, you cannot specify p4=Sqrt.
- If p2=GS, you cannot specify p4=Off/Delta.
- If p2=DI, you cannot set p7.
- If an electro-magnetic relay type or low withstand voltage relay type analog input module is in use, you cannot specify p2=RTD.
- The settable items for p3 are shown below.

p2=Volt	p2=TC	p2=RTD	p2=GS	p2=DI
20mV	R	Pt100	1-5V	Level
60mV	S	Pt100-H	0.4-2V	DI
200mV	B	JPt100		
1V	K	JPt100-H		
2V	K-H	Cu10GE		
6V	E	Cu10LN		
20V	J	Cu10WEED		
50V	T	Cu10BAILEY		
	N	Cu10a392		
	W	Cu10a393		
	L	Cu25		
	U	Cu53		
	PLATINEL	Cu100		
	PR20-40	J263B		
	WRe3-25	Ni100SAMA		
	KpvsAu7Fe	Ni100DIN		
	NiNiMo	Ni120		
	WWRe26	Pt25		
	N14	Pt50		
	XK	Pt200WEED		
		Cu10G		
		Cu50G		
		Cu100G		
		Pt46G		
		Pt100G		

- If p4=LogT1 on a Log scale channel, set the value in the following range.
  - p5<p6
  - p9, p10
    p9<p10. The maximum span is 15 decades.
    If the mantissa of p9 is 1.00, the minimum span is 1 decade.
    If the mantissa of p9 is not 1.00, the minimum span is 2 decades.
- If p4=LogT2 or LogT3 on a Log scale channel, set the value in the following range.
  - p5<p6
  - p9, p10
    The maximum span is 15 decades; the minimum is 1 decade.
    If the mantissa of p9 is not 1.00, the exponent is +14 or less, and the maximum span is 14 decades.

SRangeAICurrent

Measurement Range of Current Input Type AI Channel

Sets the measurement range of an current input type AI channel.

Unused Channels

Syntax   SRangeAICurrent,p1,p2
  p1 Channel number

p2 Input type (Skip)

Channels Whose Input Type is Current and No Math

Syntax   SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7
  p1 Channel number
  p2 Input type (Current)
  p3 Range (0-20mA)
  p4 Math type (Off)
  p5 Span lower limit
  p6 Span upper limit
  p7 Bias (–999999 to 999999)

Delta Channels

Syntax   SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8
  p1 Channel number
  p2 Input type (Current)
  p3 Range (0-20mA)
  P4 Math type (Delta)
  p5 Span lower limit
  p6 Span upper limit
  p7 Bias (–999999 to 999999)
  p8 Reference channel number

Scaling Channels

Syntax   SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11
  p1 Channel number
  p2 Input type (Current)
  p3 Range (0-20mA)
  P4 Math type (Scale)
  p5 Span lower limit
  p6 Span upper limit
  p7 Bias (–999999 to 999999)
  p8 Decimal place (0 to 5)
  p9 Scaling lower limit
  p10 Scaling upper limit
  p11 Unit (up to 6 characters, UTF-8)

Scaling Channels (General Signal 4-20 mA Input)

Syntax   SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13
  p1 Channel number
  p2 Input type (GS)
  p3 Range (4-20mA)
  P4 Math type (Scale)
  p5 Span lower limit
  p6 Span upper limit
  p7 Bias (–999999 to 999999)
  p8 Decimal place (0 to 5)
  p9 Scaling lower limit
  p10 Scaling upper limit
  p11 Unit (up to 6 characters, UTF-8)
  p12 Low-cut function (Off, On)
  p13 Low-cut point (0 to 50)

Square Root Channels

Syntax   SRangeAICurrent,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14

p1 Channel number
p2 Input type (Current, GS)
p3 Range
    `0-20mA`   When p2 = Current
    `4-20mA`   When p2 = GS
P4 Math type (Sqrt)
p5 Span lower limit
p6 Span upper limit
p7 Bias (–999999 to 999999)
p8 Decimal place (0 to 5)
p9 Scaling lower limit
p10 Scaling upper limit
p11 Unit (up to 6 characters, UTF-8)
p12 Low-cut function (Off, On)
p13 Low-cut point (0 to 50)
p14 Low-cut output (Zero, Linear)

Query `SRangeAICurrent[,p1]?`
Example Measure 0.000 to 10.000 mA on channel 0002. No scaling. No bias.
`SRangeAICurrent,0002,Current,0-20mA,Off,0,10000,0`

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=GS, you cannot specify p4=Off/Delta.
- Specify p5 and p6 within the range shown in the following table.

Range (p3)	Value (p5, p6)
0-20mA	0.000 to 20.000
4-20mA	3.200 to 20.800

SRangeDI

Measurement Range of DI Channel
Sets the measurement range of a DI channel.

Unused Channels
Syntax `SRangeDI,p1,p2`
p1 Channel number
p2 Input type (Skip)

Channels That Are Not Delta, Scaling, Pulse Input
Syntax `SRangeDI,p1,p2,p3,p4,p5,p6`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Off)
p5 Span lower limit (0 to 1)
p6 Span upper limit (0 to 1)

Delta Channels
Syntax `SRangeDI,p1,p2,p3,p4,p5,p6,p7`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Delta)
p5 Span lower limit (0 to 1)

p6 Span upper limit (0 to 1)
p7 Reference channel number

Scaling Channels
Syntax `SRangeDI,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10`
p1 Channel number
p2 Input type (DI)
p3 Fixed at "-."
P4 Calculation type (Scale)
p5 Span lower limit (0 to 1)
p6 Span upper limit (0 to 1)
p7 Decimal Place (0 to 5)
p8 Scaling lower limit
p9 Scaling upper limit
p10 Unit (up to 6 characters, UTF-8)

Pulse Input Channels
Syntax `SRangeDI,p1,p2,p3,p4,p5,p6`
p1 Channel number
p2 Input type (Pulse)
p3 Fixed at "-."
P4 Math type (Off)
p5 Span lower limit (0 to 999999)
p6 Span upper limit (0 to 999999)

Query `SRangeDI[,p1]?`
Example Measure 0 to 1 on channel 0103. No scaling.
`SRangeDI,0103,DI,-,Off,0,1`

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.
- p2=Pulse can be specified when the math function (/MT) is installed.
- If p2=Pulse, p4=Delta or Scale cannot be specified.
- p2=Pulse cannot be specified when the operation mode of the DI module is set to Remote.

SRangeDO

DO Channel Operation
Sets the DO channel operation.

Alarm Output
Syntax `SRangeDO,p1,p2,p3,p4,p5,p6,p7,p8,p9`
p1 Channel number
p2 Output type (Alarm)
p3 Span lower limit (0 to 1)
P4 Span upper limit (0 to 1)
p5 Unit (up to 6 characters, UTF-8)
p6 Energize or de-energize
    `Energize`   Energize the relay (DO channel) during output.
    `De_energize`   De-energize the relay (DO channel) during output.
p7 Operation

And   Operate when all set alarms are in the alarm state.

Or   Operate when any of the set alarms are in the alarm state.

p8   Hold or nonhold

Hold   Hold output until an alarm ACK operation.

Nonhold   Clear output when the alarm is cleared.

p9   Relay (DO channel) action on acknowledge (Normal, Reset)

Alarm Output (Reflash)

Syntax   `SRangeDO,p1,p2,p3,p4,p5,p6,p7,p8,p9`

p1   Channel number

p2   Output type (Alarm)

p3   Span lower limit (0 to 1)

P4   Span upper limit (0 to 1)

p5   Unit (up to 6 characters, UTF-8)

p6   Energize or de-energize

Energize   Energize the relay (DO channel) during output.

De_energize   De-energize the relay (DO channel) during output.

p7   Action (Reflash)

p8   Reflash time (500ms, 1s, 2s)

p9   Relay (DO channel) action on acknowledge

Manual Output

Specifies the output value.

Syntax   `SRangeDO,p1,p2,p3,p4,p5,p6`

p1   Channel number

p2   Output type (Manual)

p3   Span lower limit (0 to 1)

P4   Span upper limit (0 to 1)

p5   Unit (up to 6 characters, UTF-8)

p6   Energize or de-energize

Energize   Energize the relay (DO channel) during output.

De_energize   De-energize the relay (DO channel) during output.

Fail Output (GM10 only)

Syntax   `SRangeDO,p1,p2,p3,p4,p5,p6`

p1   Channel number

p2   Output type (Fail)

p3   Span lower limit (0 to 1)

p4   Span upper limit (0 to 1)

p5   Unit (up to 6 characters, UTF-8)

p6   Fixed to De_energize

De_energize   De-energize the relay (DO channel) during output.

Query   `SRangeDO[,p1]?`

Example Output an alarm on channel 0203. Set the span lower limit to 0 and span upper limit to 1. Specify energize operation, logic or operation, and hold operation. Set the action on ACK to Normal. Set the unit to "Unit."

```
SRangeDO,0203,Alarm,0,1,Unit,Energ
ize,Or,Hold,Normal
```

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=Manual, you cannot set p7 or subsequent parameters.
- If p7=And or Or, you cannot set the reflash time.
- If individual alarm ACK is enabled (SIndivAlmACK command), p9 is fixed to Reset.

█SMoveAve

Moving Average

Sets the moving average of an AI channel.

Syntax   `SMoveAve,p1,p2,p3`

p1   Channel number

p2   Enable or disable (Off, On)

p3   Number of samples (2 to 100)

Query   `SMoveAve[,p1]?`

Example Set the number of moving average samples for channel 0002 to 12.

```
SMoveAve,0002,On,12
```

█SBurnOut

Behavior When a Sensor Burns Out

Sets the behavior for when a burnout occurs on an AI channel.

Syntax   `SBurnOut,p1,p2`

p1   Channel number

p2   Burnout processing (Off, Up, Down)

Query   `SBurnOut[,p1]?`

Example Set the measured result to positive overflow (Up) when a burnout is detected on channel 0001.

```
SBurnOut,0001,Up
```

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.

█SRjc

Reference Junction Compensation Method

Sets the reference junction compensation method of an AI channel.

Syntax   `SRjc,p1,p2,p3`

p1   Channel number

p2   Mode

Internal   Use the internal compensation function.

External   Use an external compensation device.

p3   Compensation temperature

−200 to 800	−20.0 to 80.0°C
−40 to 1760	−40 to 1760°F
2531 to 3532	253.1 to 353.2K

Query   SRjc[,p1]?

Example Perform reference junction compensation of channel 0003 using the internal compensation circuit.

SRjc,0003,Internal

Perform reference junction compensation of channel 0004 using an external compensation device. Set the compensation temperature to -2.3°C.

SRjc,0004,External,-23

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=Internal, p3 is invalid.

SAlarmIO

Alarm

Sets the alarm for AI and DI channels.

Do Not Set Alarms

Syntax   SAlarmIO,p1,p2,p3
    p1   Channel number
    p2   Alarm number (1 to 4)
    p3   Alarm on or off (Off)

Do Not Output Alarms

Syntax   SAlarmIO,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, DH, DL, RH, RL, TH, TL)
          For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), p4 is H, L, TH, or TL.
    p5   Value
          For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p5 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).
    p6   Detection (Off, On)
    p7   Output (Off)

Output Alarms

Syntax   SAlarmIO,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, DH, DL, RH, RL, TH, TL)
          For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), p4 is H, L, TH, or TL.
    p5   Value

For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p5 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).
    p6   Detection (Off, On)
    p7   Output
          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   SAlarmIO[,p1[,p2]]?

Example Set a high limit alarm (H) on alarm number 2 of channel 0001. Set the alarm value to 1.8000V. Use the alarm detection function. When an alarm occurs, output to the relay (DO channel) at number 0205.

SAlarmIO,0001,2,On,H,18000,On,DO,
0205

Description
*   You cannot set this on a "Skip" channel.
*   If p3=Off, you cannot set p4 or subsequent parameters.
*   If p7=Off, you cannot set p8.
*   For the alarm values of p5, use the values in the following table.

Channel Type	Input Type	Calculation Type	Alarm Type H, L, TH, TL	RH, RL	DH, DL
AI channel	Volt, GS, TC, RTD	Off	(1)	(3)	
		Delta	(1)	(3)	(5)
		Scale	(2)	(4)	
		Sqrt	(2)	(4)	
		LogT1 LogT2 LogT3	(6)		
	DI	Off	0, 1	1	
		Delta	(1)	(3)	(5)
		Scale	(2)	(4)	
DI channel	DI	Same as the DI input of AI channels			
	Pulse	Off	0 - 999999	1 - 999999	Off

(1)   Within the measurement range
(2)   −5% to 105% of the scale but within −999999 to 999999 excluding the decimal point
(3)   1 digit to (measurement upper limit – measurement lower limit)
(4)   1 digit to (scale upper limit – scale lower limit) but within 1 to 999999 excluding the decimal point
(5)   Within the difference measurement range
(6)   Log scale range that corresponds to -5% to 105% of the span

*   You cannot set DO channels or internal switches whose output type is set to Manual as output destination numbers.

▌SAlmHysIO

Alarm Hysteresis

Sets the alarm hysteresis for AI and DI channels.

Syntax SAlmHysIO,p1,p2,p3
     p1 Channel number
     p2 Alarm number (1 to 4)
     p3 Hysteresis

Alarm Type	Hysteresis Range
H, L, DH, DL	0.0% to 5.0% of the span or scale width However, this is fixed to 0 for DI channels.
Delta	0 to 5.0% of the measurement range
Linear scaling, Square root	0 to 100000
Log scale (/LG)	Fixed to 0.

Query SAlmHysIO[,p1[,p2]]?
Example Set a 0.5% hysteresis on alarm 3 of channel 0002.
     SAlmHysIO,0002,3,5

Description

• Hysteresis specified for delay high and low limit alarms (TH and TL) and high and low limits on rate-of-change alarms (RH and RL) do not apply.

• When the input type of a DI channel is Pulse, hysteresis is fixed at 0.

▌SAlmDlyIO

Alarm Delay Time

Sets the alarm delay time for an AI or DI channel.

Syntax SAlmDlyIO,p1,p2,p3,p4
     p1 Channel number
     p2 Hour (0 to 24)
     p3 Minute (0 to 59)
     P4 Second (0 to 59)
Query SAlmDlyIO[,p1]?
Example Set the channel 0001 alarm delay time to 2 minutes 30 seconds.
     SAlmDlyIO,0001,0,2,30

Description

• Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

▌STagIO

Tag

Sets a tag to an AI, DI, or DO channel.

Syntax STagIO,p1,p2,p3
     p1 Channel number
     p2 Tag (up to 32 characters, UTF-8)
     p3 Tag number (up to 16 characters, ASCII)
Query STagIO[,p1]?
Example Set the channel 0001 tag to "SYSTEM1" and the tag number to "TI002."
     STagIO,0001,'SYSTEM1','TI002'

▌SColorIO

Channel Color

Sets the color an AI, DI, or DO channel.

Syntax SColorIO,p1,p2,p3,p4
     p1 Channel number
     p2 R value of RGB display colors (0 to 255, see "Description.")
     p3 G value of RGB display colors (0 to 255, see "Description.")
     P4 B value of RGB display colors (0 to 255, see "Description.")
Query SColorIO[,p1]?
Example Set the channel 0001 display color to red.
     SColorIO,0001,255,0,0

Description

• The RGB values for different colors are indicated in the following table.

Color	R	G	B	Note
Red	255	0	0	
Green	0	153	51	
Blue	0	51	255	
Blue violet	119	51	204	GX10/GP10
	102	51	204	GX20/GP20 GM10
Brown	153	51	0	
Orange	255	153	51	
Yellow green	153	204	51	GX10/GP10
	170	221	51	GX20/GP20 GM10
Light blue	119	170	221	GX10/GP10
	153	204	255	GX20/GP20 GM10
Violet	204	102	204	GX10/GP10
	221	153	221	GX20/GP20 GM10
Gray	153	153	153	
Lime	102	255	0	
Cyan	0	255	255	
Dark blue	0	0	153	
Yellow	255	255	0	
Light gray	204	204	204	
Purple	153	0	153	GX10/GP10
	136	0	136	GX20/GP20 GM10
Black	0	0	0	
Pink	255	17	153	
Rosy brown	204	153	153	
Pale green	153	255	153	GX10/GP10
	187	255	153	GX20/GP20 GM10
Dark gray	102	102	102	
Olive	153	153	0	
Dark cyan	0	153	153	
Spring green	0	204	153	GX10/GP10
	0	221	119	GX20/GP20 GM10

▌SZoneIO

Waveform Display Zone

Sets the waveform display zone of an AI, DI, or DO channel.

Syntax SZoneIO,p1,p2,p3

p1   Channel number
p2   Zone lower limit [%] (0 to 95)
p3   Zone upper limit [%] (5 to 100)
Query   `SZoneIO[,p1]?`
Example   Set the waveform zone of channel 0001 waveform to 0% to 30%.
    `SZoneIO,0001,0,30`

▌SScaleIO

Scale Display [GX/GP]
Sets the scale display of an AI, DI, or DO channel.

Syntax   `SScaleIO,p1,p2,p3`
p1   Channel number
p2   Scale display position (Off, 1 to 10)
p3   Number of scale divisions (4 to 12, C10)
Query   `SScaleIO[,p1]?`
Example   Display the channel 0001 scale at display position 1. Display four equally spaced main scale marks.
    `SScaleIO,0001,1,4`

▌SBarIO

Bar Graph Display
Sets the bar graph display of an AI, DI, or DO channel.

Syntax   `SBarIO,p1,p2,p3`
p1   Channel number
p2   Bar display base position
    `Lower`   Lower
    `Center`   Center
    `Upper`   Upper
p3   Number of scale divisions (4 to 12)
Query   `SBarIO[,p1]?`
Example   Display the measured values of channel 0001 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
    `SBarIO,0001,Center,4`

▌SPartialIO

Partial Expanded Display [GX/GP]
Sets the partial expanded display of an AI channel waveform.

Syntax   `SPartialIO,p1,p2,p3,p4`
p1   Channel number
p2   Partial expanded On/Off (On, Off)
p3   Partial expanded boundary position [%] (1 to 99)
P4   Partial expanded boundary value (span lower limit + 1 digit to span upper limit - 1 digit)
Query   `SPartialIO[,p1]?`
Example   For channel 0001 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
    `SPartialIO,0001,On,50,7500`

Description

- You cannot set this on a "Skip" channel. p2 is fixed to Off.
- You cannot set this on a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3). p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

▌SBandIO

Color Scale Band
Sets the color scale band of an AI channel.

Syntax   `SBandIO,p1,p2,p3,p4,p5,p6,p7`
p1   Channel number
p2   Color scale band (Off, In, Out)
p3   R value of the color scale band RGB colors (0 to 255)
P4   G value of the color scale band RGB colors (0 to 255)
p5   B value of the color scale band RGB colors (0 to 255)
p6   Upper limit of the color scale band display (Span or scale lower limit to span or scale upper limit)
    For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p6 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).
p7   Lower limit of the color scale band display (Span or scale lower limit to span or scale upper limit)
    For a channel set to Log scale (/LG) (if p4 of SRangeAI is LogT1, LogT2, or LogT3), specify p7 using exponential notation (e.g. 1.23E10, where the number of digits of the mantissa is as specified by p8 of the SRangeAI command).
Query   `SBandIO[,p1]?`
Example   For channel 0001, set a blue band in the range of -0.5000 to 1.0000.
    `SBandIO,0001,In,0,0,255,5000,10000`

Description

- You cannot set this on a "Skip" channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see "Description" of the **SColorIO** command.

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Commands and Responses

▍SAlmMarkIO

Alarm Mark
Sets the display of the marker that indicates the specified alarm position of an AI or DI channel.

Syntax SAlmMarkIO,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15
- p1 Channel number
- p2 Whether to display the alarm mark on the scale (Off, On)
- p3 Alarm mark type
  - Alarm Display the default alarm mark
  - Fixed Display the mark with the specified color
- P4 R value of the RGB mark colors for alarm 1 (0 to 255)
- p5 G value of the RGB mark colors for alarm 1 (0 to 255)
- p6 B value of the RGB mark colors for alarm 1 (0 to 255)
- p7 R value of the RGB mark colors for alarm 2 (0 to 255)
- p8 G value of the RGB mark colors for alarm 2 (0 to 255)
- p9 B value of the RGB mark colors for alarm 2 (0 to 255)
- p10 R value of the RGB mark colors for alarm 3 (0 to 255)
- p11 G value of the RGB mark colors for alarm 3 (0 to 255)
- p12 B value of the RGB mark colors for alarm 3 (0 to 255)
- p13 R value of the RGB mark colors for alarm 4 (0 to 255)
- p14 G value of the RGB mark colors for alarm 4 (0 to 255)
- p15 B value of the RGB mark colors for alarm 4 (0 to 255)

Query SAlmMarkIO[,p1]?

Example Display the alarm marks for alarms 1 to 4 of channel 0001 in fixed colors red, brown, orange, and yellow, respectively.
SAlmMarkIO,0001,On,Fixed,255,0,0, 165,42,42,255,165,0,255,255,0

Description
- For details on RGB values, see "Description" of the **SColorIO** command.

▍SValueIO

Upper/Lower Limit Display Characters
Sets the upper/lower limit display characters of DI channel or DO channel.

Syntax SValueIO,p1,p2,p3
- p1 Channel number
- p2 Lower limit display string (up to 8 characters, UTF-8)
- p3 Upper limit display string (up to 8 characters, UTF-8)

Query SValueIO[,p1]?

Example For channel 0001, set the lower limit to "OFF" and the upper limit to "ON."
SValueIO,0001,'OFF','ON'

▍SCalibIO

Calibration Correction
Sets the calibration correction for AI channels.

Disable Calibration Correction
Syntax SCalibIO,p1,p2
- p1 Channel number
- p2 Linearizer mode (Off)

Use Calibration Correction
Syntax SCalibIO,p1
- p1 Channel number
- p2 Linearizer mode
  - Appro Linearizer approximation
  - Bias Linearizer bias
- p3 Number of set points (2 to 12)
- P4 Input value of set point 1
- p5 Output value of set point 1
- p6 Input value of set point 2
- p7 Output value of set point 2
- p8 Input value of set point 3
- p9 Output value of set point 3
- p10 Input value of set point 4
- p11 Output value of set point 4
- p12 Input value of set point 5
- p13 Output value of set point 5
- p14 Input value of set point 6
- p15 Output value of set point 6
- p16 Input value of set point 7
- p17 Output value of set point 7
- p18 Input value of set point 8
- p19 Output value of set point 8
- p20 Input value of set point 9
- p21 Output value of set point 9
- p22 Input value of set point 10
- p23 Output value of set point 10
- p24 Input value of set point 11
- p25 Output value of set point 11
- p26 Input value of set point 12
- p27 Output value of set point 12

Query SCalibIO[,p1]?

Example Set three set points on channel 0001 (measurement range: 0 to 1.0000 V). Set the set points as follows: when the input value is 0 V, the output value is 0.0010 V; when the input value is 0.5000 V, the output value is 0.5020 V; when the input value is 1.0000 V, the output value is 0.9970 V.
SCalibIO,0001,Appro,3,0,10,5000, 5020,10000,9970

Description
- If p2=Off, you cannot set p3 or subsequent parameters.
- You cannot specify set points beyond the number of points specified by p3.
- If the AI channel input type (p2 of **SRangeAI**) is set to Skip or DI, you cannot specify anything other than p2=Off.

SMathBasic

Math Action (/MT)

Sets the basic operation of math channels.

Syntax
GX/GP   SMathBasic,p1,p2,p3,p4
GM   SMathBasic,p1,p2,p3,p4,p5,p6

   p1   Indication on computation error

   +Over   Display the computed value as +Over.

   −Over   Display the computed value as −Over.

   p2   SUM and AVE computation when overflow data is detected

   Error   Sets the computation result to computation error.

   Skip   Discards the data that overflowed and continues the computation.

   Limit   Computes by substituting upper or lower limit values in the data that overflowed.

   • For channels that do not have linear scaling specified, the upper or lower limit of the measuring range
   • For channels that have linear scaling specified, the scaling upper or lower limit
   • For math channels, the specified span upper or lower limit.

   p3   MAX, MIN, and P-P computation when overflow data is detected

   Over   Computes using data that overflowed.

   Skip   Discards the data that overflowed and continues the computation.

   P4   START/STOP key action
        (GX/GP: Off, Start/Stop, Reset+Start/Stop)
        (GM: Off)

   Off   Computation does not start even when recording starts.

   Start/Stop   Computation starts when recording starts.

   Reset+Start/Stop   Computation resets and starts when recording starts.

   P5   START key action (Off, Start, Reset+Start)

   Off   Recording starts but not computation.

   Start   Computation starts when recording starts.

   Reset+Start   Computation resets and starts when recording starts.

   P6   STOP key action (Off, Stop)

   Off   Recording stops but not computation.

   Stop   Computation stops when recording stops.

Query   SMathBasic?
Example   Set the indication on computation error to "+Over," computation when overflow data is detected to "Skip," and start computation when recording starts.
SMathBasic,+Over,Skip,Skip,Start/
Stop

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.
• p5 and p6 are invalid parameters for the GX/GP.

SKConst

Constant (/MT)

Sets a constant for use in computations.

Syntax   SKConst,p1,p2
   p1   Constant number (1 to 100)
   p2   Value (−9.9999999E+29 to −1E−30, 0, 1E−30 to 9.9999999E+29, eight significant digits)

Query   SKConst[,p1]?
Example   Set constant number 12 to 1.0000E−10.
SKConst,12,1.0000E-10

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.

SRangeMath

Computation Expression (/MT)

Sets the computation expression of a math channel.

Unused Channels
Syntax   SRangeMath,p1,p2
   p1   Channel number
   p2   Computation expression on/off (Off)

Used Channels
Syntax   SRangeMath,p1,p2,p3,p4,p5,p6,p7,p8
   p1   Channel number
   p2   Computation expression on/off (On)
   p3   Math channel type (Normal)
   P4   Expression (up to 120 characters, ASCII)
   p5   Decimal Place (0 to 5)
   p6   Span lower limit (−9999999 to 99999999)
   p7   Span upper limit (−9999999 to 99999999)
   p8   Unit (up to 6 characters, UTF-8)

Query   SRangeMath[,p1]?

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Commands and Responses

Example Set expression 0001+0002 in math channel
015. Set the measurement range is 0.0 to
100.0%.
```
SRangeMath,015,On,Normal,0001+
0002,1,0,1000,'%'
```

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.
- A blank character string cannot be used in
  expressions.
- You cannot set the span upper and lower limits to the
  same value.

STlogMath

TLOG (/MT)
Sets the TLOG of a math channel.
Syntax `STlogMath,p1,p2,p3,p4,p5`
    p1 Channel number
    p2 Timer Type
        `Timer`   Timer
        `MatchTimeTimer` Match time timer
    p3 Timer number (1 to 4)
    P4 Sum scale (Off, /sec, /min, /hour)
    p5 Reset (On, Off)
Query `STlogMath[,p1]?`
Example Assign timer 2 to math channel 015. Set the
sum scale to Off and disable reset.
```
STlogMath,015,Timer,2,Off,Off
```

Description
- You cannot use this command to configure settings
  while computation is in progress.

SRolAveMath

Rolling Average (/MT)
Sets rolling average on a math channel.
Syntax `SRolAveMath,p1,p2,p3,p4`
    p1 Channel number
    p2 Enable or disable (Off, On)
    p3 Sample interval (1 to 6s, 10s, 12s, 15s,
        20s, 30s, 1 to 6min, 10min, 12min, 15min,
        20min, 30min, 1h)
    P4 Number of samples (1 to 1500)
Query `SRolAveMath[,p1]?`
Example On math channel 015, take the rolling average
of 30 data values over 1 minute intervals and
use the results as the computed values.
```
SRolAveMath,015,On,1min,30
```

SAlarmMath

Alarm (/MT)
Sets the alarm of a math channel.
Do Not Set Alarms
Syntax `SAlarmMath,p1,p2,p3`
    p1 Channel number

    p2 Alarm number (1 to 4)
    p3 Alarm on or off (Off)
Do Not Output Alarms
Syntax `SAlarmMath,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)
    p5 Alarm value (within the span range)
    p6 Detection (Off, On)
    p7 Output (Off)
Output Alarms
Syntax `SAlarmMath,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)
    p5 Alarm value (within the span range)
    p6 Detection (Off, On)
    p7 Output
        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 `SAlarmMath[,p1]?`
Example Set a high limit alarm (H) on alarm number 2 of
math channel 015. Set the alarm value to 85.0.
When an alarm occurs, output to the relay (DO
channel) at number 0105.
```
SAlarmMath,015,2,On,H,850,On,
DO,0105
```

Description
- You cannot set this on a "Off" channel.
- If p3=Off, you cannot set p4 or 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.

SAlmHysMath

Alarm Hysteresis (/MT)
Sets the alarm hysteresis for a math channel.
Syntax `SAlmHysMath,p1,p2,p3`
    p1 Channel number
    p2 Alarm number (1 to 4)
    p3 Hysteresis

Alarm Type	Hysteresis Range
H, L	0 to 100000

Query `SAlmHysMath[,p1[,p2]]?`
Example Set a hysteresis on alarm 3 of math channel
015.

```
          SAlmHysMath,015,3,10
```

Description

• Hysteresis specified for delay high and low limit alarms (TH and TL) does not apply.

■ SAlmDlyMath

Alarm Delay Time (/MT)

Sets the alarm delay time for a math channel.

Syntax `SAlmDlyMath,p1,p2,p3,p4`
    p1   Channel number
    p2   Hour (0 to 24)
    p3   Minute (0 to 59)
    P4   Second (0 to 59)

Query `SAlmDlyMath[,p1]?`
Example Set the math channel 015 alarm delay time to 2 minutes 30 seconds.
    `SAlmDlyMath,015,0,2,30`

Description

• Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

■ STagMath

Tag (/MT)

Sets the tag of a math channel.

Syntax `STagMath,p1,p2,p3`
    p1   Channel number
    p2   Tag (up to 32 characters, UTF-8)
    p3   Tag number (up to 16 characters, ASCII)

Query `STagMath[,p1]?`
Example Set the math channel 015 tag to "SYSTEM1" and the tag number to "TI002."
    `STagMath,015,'SYSTEM1','TI002'`

■ SColorMath

Channel Color (/MT)

Sets the color of a math channel.

Syntax `SColorMath,p1,p2,p3,p4`
    p1   Channel number
    p2   R value of RGB display colors (0 to 255)
    p3   G value of RGB display colors (0 to 255)
    P4   B value of RGB display colors (0 to 255)

Query `SColorMath[,p1]?`
Example Set the math channel 015 display color to red.
    `SColorMath,015,255,0,0`

Description

• For details on RGB values, see "Description" of the **SColorIO** command.

■ SZoneMath

Waveform Display Zone (/MT)

Sets the waveform display zone of a math channel.

Syntax `SZoneMath,p1,p2,p3`
    p1   Channel number
    p2   Zone lower limit [%] (0 to 95)

    p3   Zone upper limit [%] (5 to 100)

Query `SZoneMath[,p1]?`
Example Set the waveform zone of math channel 015 waveform to 0% to 30%.
    `SZoneMath,015,0,30`

■ SScaleMath

Scale Display (/MT) [GX/GP]

Sets the scale display of a math channel.

Syntax `SScaleMath,p1,p2,p3`
    p1   Channel number
    p2   Scale display position (Off, 1 to 10)
    p3   Number of scale divisions (4 to 12, C10)

Query `SScaleMath[,p1]?`
Example Display the math channel 015 scale at display position 1. Display four equally spaced main scale marks.
    `SScaleMath,015,1,4`

■ SBarMath

Bar Graph Display (/MT)

Sets the bar graph display of a math channel.

Syntax `SBarMath,p1,p2,p3`
    p1   Channel number
    p2   Bar display base position
        `Lower`   Lower
        `Center`   Center
        `Upper`   Upper
    p3   Number of scale divisions (4 to 12)

Query `SBarMath[,p1]?`
Example Display the computed values of math channel 015 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
    `SBarMath,015,Center,4`

■ SPartialMath

Partial Expanded Display (/MT) [GX/GP]

Sets the partial expanded display of a math channel waveform.

Syntax `SPartialMath,p1,p2,p3,p4`
    p1   Channel number
    p2   Partial expanded On/Off (On, Off)
    p3   Partial expanded boundary position [%] (1 to 99)
    P4   Partial expanded boundary value

Query `SPartialMath[,p1]?`
Example For channel 015 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
    `SPartialMath,015,On,50,7500`

Description

• You cannot set this on a "Off" channel. p2 is fixed to Off.
• If p2=Off, you cannot set p3 or subsequent parameters.

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Commands and Responses

- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

▌SBandMath

Color Scale Band (/MT)

Sets the color scale band of a math channel.

Syntax SBandMath,p1,p2,p3,p4,p5,p6,p7
- p1 Channel number
- p2 Color scale band (Off, In, Out)
- p3 R value of the color scale band RGB colors (0 to 255)
- P4 G value of the color scale band RGB colors (0 to 255)
- p5 B value of the color scale band RGB colors (0 to 255)
- p6 Upper limit of the color scale band display (span lower limit to span upper limit)
- p7 Lower limit of the color scale band display (span lower limit to span upper limit)

Query SBandMath[,p1]?

Example For math channel 015, set a blue band in the range of -0.5000 to 1.0000.
SBandMath,015,In,0,0,255,5000, 10000

Description
- You cannot set this on a "Off" channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see "Description" of the **SColorIO** command.

▌SAlmMarkMath

Alarm Mark (/MT)

Sets the display of the marker that indicates the specified alarm position of a math channel.

Syntax SAlmMarkMath,p1,p2,p3,p4,p5,p6,p7, p8,p9,p10,p11,p12,p13,p14,p15
- p1 Channel number
- p2 Whether to display the alarm mark on the scale (Off, On)
- p3 Alarm mark type
  - Alarm Display the default alarm mark
  - Fixed Display the mark with the specified color
- P4 R value of the RGB mark colors for alarm 1 (0 to 255)
- p5 G value of the RGB mark colors for alarm 1 (0 to 255)
- p6 B value of the RGB mark colors for alarm 1 (0 to 255)
- p7 R value of the RGB mark colors for alarm 2 (0 to 255)
- p8 G value of the RGB mark colors for alarm 2 (0 to 255)
- p9 B value of the RGB mark colors for alarm 2 (0 to 255)
- p10 R value of the RGB mark colors for alarm 3 (0 to 255)
- p11 G value of the RGB mark colors for alarm 3 (0 to 255)
- p12 B value of the RGB mark colors for alarm 3 (0 to 255)
- p13 R value of the RGB mark colors for alarm 4 (0 to 255)
- p14 G value of the RGB mark colors for alarm 4 (0 to 255)
- p15 B value of the RGB mark colors for alarm 4 (0 to 255)

Query SAlmMarkMath[,p1]?

Example Display the alarm marks for alarms 1 to 4 of math channel 015 in fixed colors red, brown, orange, and yellow, respectively.
SAlmMarkMath,015,On,Fixed,255,0,0, 165,42,42,255,165,0,255,255,0

Description
- For details on RGB values, see "Description" of the **SColorIO** command.

■ SRangeCom

Measurement 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 to 5)
  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 0.00 to 100.00% on communication channel 025.
  SRangeCom,025,On,2,0,10000,'%'

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 or subsequent parameters.
- You cannot set the span upper and lower limits to the same value.

■ SValueCom

Preset Operation (/MC)

Sets the preset operation of a communication channel.

Syntax   SValueCom,p1,p2,p3
  p1 Channel number
  p2 Value at power-on (Preset, Last)
  p3 Preset value (–9.999999E+29 to –1E–30, 0, 1E–30 to 9.999999E+29)

Query   SValueCom[,p1]?

Example At power-on, replace the communication channel 025 value with the preset value of 0.5.
  SValueCom,025,Preset,0.5

■ SWDCom

Watchdog Timer (/MC)

Sets the watchdog timer of a communication channel.

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 Value at timer expired (Preset, Last)

Query   SWDCom[,p1]?

Example Set the watchdog timer of communication channel 025 to 60 seconds. Replace the communication channel 025 value with its preset value at watchdog timer expiration.
  SWDCom,025,On,60,Preset

Description
- If p2=Off, you cannot set p3 or subsequent parameters.

■ 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)
  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)
  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]?

Example Set a high limit alarm (H) on alarm number 2 of communication channel 025. Set the alarm value to 85.0%. When an alarm occurs, output to the relay (DO channel) at number 0105.
  SAlarmCom,025,2,On,H,850,On, DO,0105

Description
- You cannot set this on a "Off" communication channel.

- If p3=Off, you cannot set p4 or 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.

SAlmHysCom

Alarm Hysteresis (/MC)

Sets the alarm hysteresis for a communication channel.

Syntax SAlmHysCom,p1,p2,p3
p1 Channel number
p2 Alarm number (1 to 4)
p3 Hysteresis

Alarm Type	Hysteresis Range
H, L	0 to 100000

Query SAlmHysCom[,p1]?
Example Set a hysteresis on alarm 3 of communication channel 025.
SAlmHysCom,025,3,10

Description
- Hysteresis specified for delay high and low limit alarms (TH and TL) does not apply.

SAlmDlyCom

Alarm Delay Time (/MC)

Sets the alarm delay time for a communication channel.

Syntax SAlmDlyCom,p1,p2,p3,p4
p1 Channel number
p2 Hour (0 to 24)
p3 Minute (0 to 59)
P4 Second (0 to 59)
Query SAlmDlyCom[,p1]?
Example Set the communication channel 025 alarm delay time to 2 minutes 30 seconds.
SAlmDlyCom,025,0,2,30

Description
- Set the delay time so that it is an integer multiple of the scan interval (**SScan** command).

STagCom

Tag (/MC)

Sets the tag of a communication channel.

Syntax STagCom,p1,p2,p3
p1 Channel number
p2 Tag (up to 32 characters, UTF-8)
p3 Tag number (up to 16 characters, ASCII)
Query STagCom[,p1]?
Example Set the communication channel 025 tag to "SYSTEM1" and the tag number to "TI002."
STagCom,025,'SYSTEM1','TI002'

SColorCom

Channel Color (/MC)

Sets the color of a communication channel.

Syntax SColorCom,p1,p2,p3,p4
p1 Channel number
p2 R value of RGB display colors (0 to 255)
p3 G value of RGB display colors (0 to 255)
P4 B value of RGB display colors (0 to 255)
Query SColorCom[,p1]?
Example Set the communication channel 025 display color to red.
SColorCom,025,255,0,0

Description
- For details on RGB values, see "Description" of the **SColorIO** command.

SZoneCom

Waveform Display Zone (/MC)

Sets the waveform display zone of a communication channel.

Syntax SZoneCom,p1,p2,p3
p1 Channel number
p2 Zone lower limit [%] (0 to 95)
p3 Zone upper limit [%] (5 to 100)
Query SZoneCom[,p1]?
Example Set the waveform zone of communication channel 025 waveform to 0% to 30%.
SZoneCom,025,0,30

SScaleCom

Scale Display (/MC) [GX/GP]

Sets the scale display of a communication channel.

Syntax SScaleCom,p1,p2,p3
p1 Channel number
p2 Scale display position (Off, 1 to 10)
p3 Number of scale divisions (4 to 12, C10)
Query SScaleCom[,p1]?
Example Display the communication channel 025 scale at display position 1. Display four equally spaced main scale marks.
SScaleCom,025,1,4

SBarCom

Bar Graph Display (/MC)

Sets the bar graph display of a communication channel.

Syntax SBarCom,p1,p2,p3
p1 Channel number
p2 Bar display base position
Lower Lower
Center Center
Upper Upper
p3 Number of scale divisions (4 to 12)
Query SBarCom[,p1]?

Example Display the values of communication channel 025 on a bar graph with the center set as the base position (Center). Display four equally spaced main scale marks.
`SBarCom,025,Center,4`

■ SPartialCom

Partial Expanded Display (/MC) [GX/GP]

Sets the partial expanded display of a communication channel waveform.

Syntax `SPartialCom,p1,p2,p3,p4`
    p1 Channel number
    p2 Partial expanded On/Off (On, Off)
    p3 Partial expanded boundary position [%] (1 to 99)
    P4 Partial expanded boundary value
Query `SPartialCom[,p1]?`
Example For channel 025 whose measurement range is 0 to 1.0000 V, display the measured value of 0.7500 V at the 50% position.
`SPartialCom,025,On,50,7500`

Description
- You cannot set this on a "Off" channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- P2=On can be specified when the difference between the span upper and lower limits is 2 digits or greater.

■ SBandCom

Color Scale Band (/MC)

Sets the color scale band of a communication channel.

Syntax `SBandCom,p1,p2,p3,p4,p5,p6,p7`
    p1 Channel number
    p2 Color scale band (Off, In, Out)
    p3 R value of the color scale band RGB colors (0 to 255)
    P4 G value of the color scale band RGB colors (0 to 255)
    p5 B value of the color scale band RGB colors (0 to 255)
    p6 Upper limit of the color scale band display (span lower limit to span upper limit)
    p7 Lower limit of the color scale band display (span lower limit to span upper limit)
Query `SBandCom[,p1]?`
Example For communication channel 025, set a blue band in the range of -0.5000 to 1.0000.
`SBandCom,025,In,0,0,255,5000,10000`

Description
- You cannot set this on a "Off" channel. p2 is fixed to Off.
- If p2=Off, you cannot set p3 or subsequent parameters.
- For details on RGB values, see "Description" of the **SColorIO** command.

■ SAlmMarkCom

Alarm Mark (/MC)

Sets the display of the marker that indicates the specified alarm position of a communication channel.

Syntax `SAlmMarkCom,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11,p12,p13,p14,p15`
    p1 Channel number
    p2 Whether to display the alarm mark on the scale (Off, On)
    p3 Alarm mark type
        Alarm Display the default alarm mark
        Fixed Display the mark with the specified color
    P4 R value of the RGB mark colors for alarm 1 (0 to 255)
    p5 G value of the RGB mark colors for alarm 1 (0 to 255)
    p6 B value of the RGB mark colors for alarm 1 (0 to 255)
    p7 R value of the RGB mark colors for alarm 2 (0 to 255)
    p8 G value of the RGB mark colors for alarm 2 (0 to 255)
    p9 B value of the RGB mark colors for alarm 2 (0 to 255)
    p10 R value of the RGB mark colors for alarm 3 (0 to 255)
    p11 G value of the RGB mark colors for alarm 3 (0 to 255)
    p12 B value of the RGB mark colors for alarm 3 (0 to 255)
    p13 R value of the RGB mark colors for alarm 4 (0 to 255)
    p14 G value of the RGB mark colors for alarm 4 (0 to 255)
    p15 B value of the RGB mark colors for alarm 4 (0 to 255)
Query `SAlmMarkCom[,p1]?`
Example Display the alarm marks for alarms 1 to 4 of communication channel 025 in fixed colors red, brown, orange, and yellow, respectively.
`SAlmMarkCom,025,On,Fixed,255,0,0,165,42,42,255,165,0,255,255,0`

Description
- For details on RGB values, see "Description" of the **SColorIO** command.

▌SAlmLimit

Rate-of-Change Alarm Interval

Sets the rate-of-change interval of the rate-of-change alarm.

Syntax `SAlmLimit,p1,p2`

    `p1` Interval for the low limit on rate-of-change alarm

        `1 to 32`   Integer multiple of the scan interval

    `p2` Interval for the high limit on rate-of-change alarm

        `1 to 32`   Integer multiple of the scan interval

Query `SAlmLimit?`

Example Set the intervals for the low limit on rate-of-change alarm and high limit on rate-of-change alarm to 10 times and 20 times the scan interval, respectively.

    `SAlmLimit,10,20`

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.

▌SIndivAlmACK

Individual Alarm ACK

Enables or disables the individual alarm ACK function.

Syntax `SIndivAlmACK,p1`

    `p1` Enable or disable (Off, On)

Query `SIndivAlmACK?`

Example Enable the individual alarm ACK function.

    `SIndivAlmACK,On`

▌SAlmSts

Alarm Display Hold/Nonhold

Sets the alarm display hold/nonhold operation.

Syntax `SAlmSts,p1`

    `p1` Operation

        `Hold`

        `NonHold`

Query `SAlmSts?`

Example Hold the alarm display until an alarm ACK operation.

    `SAlmSts,Hold`

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 the individual alarm ACK is enabled (**SIndivAlmACK** command), p1 is fixed to Hold.

▌STimer

Timer

Sets a timer.

Do Not Use Timers

Syntax `STimer,p1,p2`

    `p1` Timer number (1 to 4)

    `p2` Timer type (Off)

Relative Timer

Syntax `STimer,p1,p2,p3,p4,p5,p6`

    `p1` Timer number (1 to 4)

    `p2` Timer type (Relative)

    `p3` Interval: Days (0 to 31)

    `P4` Interval: Hours (HH) (00 to 23)

    `p5` Interval: Minutes (MM) (00 to 59)

    `p6` Reset on Math start (Off, On)

Absolute Timer

Syntax `STimer,p1,p2,p3,p4,p5`

    `p1` Timer number (1 to 4)

    `p2` Timer type (Absolute)

    `p3` Interval (1min, 2min, 3min, 4min, 5min, 6min, 10min, 12min, 15min, 20min, 30min, 1h, 2h, 3h, 4h, 6h, 8h, 12h, 24h)

    `P4` Reference time: Hours (HH) (00 to 23)

    `p5` Reference time: Minutes (MM) (00 to 59)

Query `STimer[,p1]?`

Example Set timer number 2 to relative timer at 6 hours 30 minutes. Reset the timer when computation starts.

    `STimer,2,Relative,0,6,30,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.
- If p2=Off, you cannot set p3 or subsequent parameters.
- If p2=Relative and p3=0, you cannot set "00:00" (for p4 and p5).

▌SMatchTimer

Match Time Timer

Sets a match time timer.

Do Not Use Match Time Timers

Syntax `SMatchTimer,p1,p2`

    `p1` Match time timer number (1 to 4)

    `p2` Type (Off)

Match Time Timer That Synchronizes Once a Year

Syntax `SMatchTimer,p1,p2,p3,p4,p5,p6,p7`

    `p1` Match time timer number (1 to 4)

    `p2` Type (Year)

    `p3` Start time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

    `P4` Start time: Day (1 to 31, depends on the month)

    `p5` Interval: Hours (HH) (00 to 23)

p6 Interval: Minutes (MM) (00 to 59)

p7 Timer action

Single Single shot

Repeat Repeat

Match Time Timer That Synchronizes Once a Month

Syntax SMatchTimer,p1,p2,p3,p4,p5,p6

p1 Match time timer number (1 to 4)

p2 Type (Month)

p3 Start time: Day (1 to 28)

P4 Interval: Hours (HH) (00 to 23)

p5 Interval: Minutes (MM) (00 to 59)

p6 Timer action

Single Single shot

Repeat Repeat

Match Time Timer That Synchronizes Once a Week

Syntax SMatchTimer,p1,p2,p3,p4,p5,p6

p1 Match time timer number (1 to 4)

p2 Type (Week)

p3 Start time: Day of week

Sun

Mon

Tue

Wed

Thu

Fri

Sat

P4 Interval: Hours (HH) (00 to 23)

p5 Interval: Minutes (MM) (00 to 59)

p6 Timer action

Single Single shot

Repeat Repeat

Match Time Timer That Synchronizes Once a Day

Syntax SMatchTimer,p1,p2,p3,p4,p5

p1 Match time timer number (1 to 4)

p2 Type (Day)

p3 Interval: Hours (HH) (00 to 23)

P4 Interval: Minutes (MM) (00 to 59)

p5 Timer action

Single Single shot

Repeat Repeat

Query SMatchTimer[,p1]?

Example Sets match time timer number 2 to a timer that operates on 21 hours 30 minutes on April 17 every year.

SMatchTimer,2,Year,Apr,17,21,30,Re
peat

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 or subsequent parameters.

▌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

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 (see the table below)

p8 Source element number (see the table below)

p9 Action detail 1 (see the table below)

p10 Action detail 2 (see the table below)

p3 Event Type	Value	P4 Source Element Number	p5 Event details	p6 Operation mode
Internal Switch	SW	1 to 100	-	Rising, Falling, Both
Remote control input	DI	Channel number	-	Rising, Falling, Both
Relay (DO channel)	DO	Channel number	-	Rising, Falling, Both
Alarm (I/O channel)	AlarmIO	Channel number	1 to 4	Rising, Falling, Both
Alarm (math channel)	AlarmMath	Channel number	1 to 4	Rising, Falling, Both
Alarm (communication channel)	AlarmCom	Channel number	1 to 4	Rising, Falling, Both
Alarm	AlarmAll	-	-	Rising, Falling, Both
Device status	Status	-	Memory (Record)	Rising, Falling, Both
			Math (Math)	
Device status[1]	Status	-	UserLock (User lock out)	
Device status [GX/GP][1]	Status	-	Login (When logged in)	
Device status	Status	-	MemMediaErr (Memory/Media error)	
			MeasureErr (Measurement error)	
			CommErr (Communication error)	
Timer	Timer	1 to 4	-	Edge
Match time timer	MatchTimeTimer	1 to 4	-	Edge
User function	User function	1 to 2	-	Edge

1 Valid when the advanced security function (/AS) is enabled.

Conditions p6	p7 Action Type	Value	p8 Source Element Number	p9 Action Detail 1	p10 Action Detail 2
Rising, Falling, Edge	Recording	Memory	-	Start, Stop, Reset	-
	Math (math channel)	Math	-	Start, Stop, Reset	-
	Display rate switch [GX/GP]	RateChange	1, 2	-	-
	Flag	Flag	1 to 20	-	-
	Manual sample	ManualSample	-	-	-
	DO output[1]	DO	Channel number	Off, On	-
	Output to an internal switch[2]	SW	Channel number	Off, On	-
	Alarm ACK	AlarmACK	-	-	-
	Snapshot [GX/GP]	Snapshot	-	-	-
	Time adjustment	TimeAdjust	-	-	-
	Display data save	SaveDisplay	-	-	-
	Event data save	SaveEvent	1	-	-
	Event trigger[3]	Trigger	1	-	-
	Message	Message	1 to 100	All, Select	1 to 50 1 to 60 (for GX20-2/GP20-2/GM10-2)
	Display group change [GX/GP]	GroupChange	1 to 50	-	-
	Relative timer reset	TimerReset	1 to 4	-	-
	Settings load	ConfigLoad	1 to 10	-	-
	Settings save [GM]	ConfigSave	1 to 10	-	-
	Favorite screen display [GX/GP]	PlayList	1 to 20	-	-
Both	Recording start/stop	MemoryStartStop	-	-	-
	Math start/stop	MathStartStop	-	-	-
	Display rate switch 1/2 [GX/GP]	RateChange1_2	1 or 2	-	-
	Flag On/Off	FlagOn_Off	1 to 20	-	-
	DO On/Off[1]	DOOn_Off	Channel number	-	-
	Internal switch on/off[2]	SWOn_Off	Channel number	-	-

1   Can be output only to DO whose type is set to Manual.
2   Can be output only to SW whose type is set to Manual.
3   Valid when the advanced security function (/AS) is disabled.

Query   SEventAct[,p1]?
              Invalid parameters are returned as blanks in queries.

Example Execute memory start on the rising edge of the remote control input (channel 0101). Use event action number 2.
              SEventAct,2,On,DI,0101,,Rising,Memory,,Start

Description
- There are limitations to event and action combinations. For details, see section 1.14 in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 2.15, "Configuring the Event Action Function," in the *Data Acquisition System GM User's Manual (IM 04L55B01-01EN).*
- Write only delimiters (commas) for irrelevant parameters (invalid even if a value is specified).
- Event type "DI" is the channel of the DI module that has been set to remote module (**SModeDI** command).
- You can specify p3 = Status and p6 = Both when an item that can be specified as an action (flag, DO channel, or internal switch) is valid.
- Math channel and flag are an option (/MT).
- Communication channels are an option (/MC).

SReport

Report Type (/MT)
Sets the type of report to create.

No Reports
Syntax   SReport,p1
      p1   Type (Off)

Hourly and Daily Reports
Syntax   SReport,p1,p2
      p1   Type (Hour+Day)
      p2   Time to create reports: Hour (HH) (00 to 23)

Daily and Weekly Reports
Syntax   SReport,p1,p2,p3
      p1   Type (Day+Week)
      p2   Day to create reports (Mon, Tue, Wed, Thu, Fri, Sat, Sun)
      p3   Time to create reports: Hour (HH) (00 to 23)

Daily and Monthly Reports
Syntax   SReport,p1,p2,p3
      p1   Type (Day+Month)
      p2   Day to create reports (1 to 28)
      p3   Time to create reports: Hour (HH) (00 to 23)

Batch Reports
Syntax   SReport,p1,p2
      p1   Type (Batch)
      p2   Recording interval (2min, 3min, 4min, 5min, 10min, 15min, 30min, 1h)

Day Custom Reports
Syntax   SReport,p1,p2,p3,p4,p5
      p1   Type (Custom)
      p2   Recording interval (2min, 3min, 4min, 5min, 10min, 15min, 30min, 1h)
      p3   File creation interval (4h, 6h, 8h, 12h, 24h)
      P4   Time to create reports: Hour (HH) (00 to 23)
      p5   Time to create reports: Minute (MM) (00 to 59)

Query   SReport[,p1]?
Example Create daily reports at 09:00 every day and monthly reports at 09:00 on the first day of each month.
              SReport,Day+Month,1,09

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 p1=Off, you cannot set p2 or subsequent parameters.

SRepData

Report Data (/MT)
Sets the data type and file type of reports.
Syntax   SRepData,p1,p2,p3,p4,p5,p6

p1	Data type 1 (Max, Min, Ave, Sum, Inst)
p2	Data type 2 (Off, Max, Min, Ave, Sum, Inst)
p3	Data type 3 (Off, Max, Min, Ave, Sum, Inst)
P4	Data type 4 (Off, Max, Min, Ave, Sum, Inst)
p5	Data type 5 (Off, Max, Min, Ave, Sum, Inst)

	Off	No
	Max	Maximum value
	Min	Minimum value
	Ave	Average value
	Sum	Integrated value
	Inst	Instantaneous value
p6	File type	
	Combine	1 file
	Separate	Separate

Query `SRepData?`

Example Record the maximum, minimum, and average values in daily and monthly reports. Generate the daily and monthly reports in a single file.
`SRepData,Max,Min,Ave,Off,Combine`

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.

▌SRepTemp

Report Output (/MT)

Sets the report output mode.

Syntax `SRepTemp,p1,p2,p3`

p1	EXCEL template	
	Off	Disabled
	On	Enabled
p2	PDF output (Off, On)	
p3	Printer output (Off, On)	

Query `SRepTemp?`

Example Generate reports that use the Excel template.
`SRepTemp,On,Off,Off`

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.

▌SDigitalSign

Electronic Signature Inclusion (/MT)

Sets whether to include an electronic signature in report template output PDF files.

Syntax `SDigitalSign,p1,p2`

p1	Signature target (PDF)
p2	Electronic signature inclusion (Off, On)

Query `SDigitalSign[p1]?`

Example Include an electronic signature in report template output PDF files.

`SDigitalSign,PDF,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.

▌SRepCh

Report Channel (/MT)

Assigns a channel to a report channel.

Not Assign a Channel

Syntax `SRepCh,p1,p2`

p1	Report Channel Number
p2	Usage (Off)

Assign a Channel

Syntax `SRepCh,p1,p2,p3,p4`

p1	Report Channel Number	
p2	Usage	
	IO	I/O channel
	Math	Math channel
	Com	Communication channel
p3	Channel number	
P4	Sum scale (Off, /sec, /min, /hour, /day)	

Query `SRepCh[,p1]?`

Example Assign I/O channel 0002 to report channel 1. Set the sum scale to Off.
`SRepCh,001,IO,0002,Off`

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 or subsequent parameters.
- Communication channels are an option (/MC).

SLcd

LCD [GX/GP]

Sets the brightness and backlight saver of the LCD.

Syntax `SLcd,p1,p2,p3,p4`

    `p1` Brightness (1 to 6)

    `p2` Backlight saver mode

`Off`	Not used
`Dimmer`	Dimmer
`TimeOff`	Off

    `p3` Backlight saver saver time (1min, 2min, 5min, 10min, 30min, 1h)

    `P4` Backlight saver restore

`Key+Touch`	Key or touchscreen
`Key+Touch+Alarm`	Key, touchscreen, or alarm

Query `SLcd?`

Example Set the LCD brightness to 3 and the screen backlight saver type to DIMMER. Set the amount time of until the GX/GP switches to saver mode to 5 minutes and the event that causes the GX/GP to return from saver mode to the pressing of a key and tapping of the touchscreen.

    `SLcd,3,Dimmer,5min,Key+Touch`

Description

- p3 and subsequent parameters are valid when p2=Off.

SViewAngle

View Angle [GX/GP]

Set the view angle.

Syntax `SViewAngle,p1`

    `p1` View Angle

`Upper`	Easy to view from above
`Lower`	Easy to view from below

Query `SViewAngle?`

Example Set the view angle so that it is easy to view from above.

    `SViewAngle,Upper`

Description

- This command is valid for the GX10/GP10.

SBackColor

Screen Background Color [GX/GP]

Sets the screen background color.

Syntax `SBackColor,p1,p2,p3`

    `p1` R value of RGB background colors (0 to 255)

    `p2` G value of RGB background colors (0 to 255)

    `p3` B value of RGB background colors (0 to 255)

Query `SBackColor?`

Example Set the background color to black.

    `SBackColor,0,0,0`

Description

- For details on RGB values, see "Description" of the **SColorIO** command.

SGrpChange

Automatic Group Switching Time [GX/GP]

Sets the time for automatically switching between display groups.

Syntax `SGrpChange,p1`

    `p1` Automatic group switching time (5s, 10s, 20s, 30s, 1min)

Query `SGrpChange?`

Example Set the switching time to 1 minute.

    `SGrpChange,1min`

SAutoJump

Jump Default Display Operation [GX/GP]

Sets the amount of time that must elapse until the GX/GP returns to the specified screen (standard screen) when there is no user interaction.

Syntax `SAutoJump,p1`

    `p1` Jump default display operation (Off, 1min, 2min, 5min, 10min, 20min, 30min, 1h)

Query `SAutoJump?`

Example Set the automatic return time to 5 minutes.

    `SAutoJump,5min`

SCalFormat

Calendar Display Format [GX/GP]

Sets the calendar display format.

Syntax `SCalFormat,p1`

    `p1` 1st weekday (Sun, Mon)

Query `SCalFormat?`

Example Set the first weekday to Monday.

    `SCalFormat,Mon`

SBarDirect

Bar Graph Display Direction [GX/GP]

Sets the bar graph display direction.

Syntax `SBarDirect,p1`

    `p1` Direction

`Horizontal`	Horizontal
`Vertical`	Vertical

Query `SBarDirect?`

Example Display bar graphs horizontally.

    `SBarDirect,Horizontal`

SChgMonitor

Value Modification from the Monitor

Enables or disables the feature that allows values to be changed from the monitor.

Syntax `SChgMonitor,p1`

p1   Disable or enable (Off, On)
Query   `SChgMonitor?`
Example   Enable the feature that allows values to be changed from the monitor.
`SChgMonitor,On`

█ STrdWave

Trend Waveform Display [GX/GP]

Sets the trend waveform display mode.

Syntax   `STrdWave,p1,p2`
    p1   Waveform display direction
        `Horizontal`   Horizontal
        `Vertical`   Vertical
    p2   Trend clear
        `Off`   Do not clear
        `On`   Clear
Query   `STrdWave?`
Example   Set the trend waveform to horizontal display and clear the waveform when recording is started.
`STrdWave,Vertical,On`

█ STrdScale

Scale [GX/GP]

Set the scale.

Syntax   `STrdScale,p1,p2,p3`
    p1   Number of digits to display for scale values.
        `Normal`   Normal
        `Fine`   Fine
    p2   Current value display
        `Mark`   Mark
        `Bar`   Bar graph
    p3   Number of digits to display for channels that are added to the current value mark
        `0-digit`   0 digits (not show channel numbers)
        `3-digit`   3 digits
        `4-digit`   4 digits
Query   `STrdScale?`
Example   Set the number of digits to display for scale values to "Fine," display the value indicators on a bar graph, and set the number of digits to display for channels that are added to the current value mark to 4 digits.
`STrdScale,Fine,Bar,4-digit`

█ STrdLine

Trend Line Width, Grid [GX/GP]

Sets the trend waveform line width and the grid in the display area.

Syntax   `STrdLine,p1,p2`
    p1   Line width
        `Thick`   Thick

        `Normal`   Normal
        `Thin`   Thin
    p2   Grid
        `Auto`   Auto
        `4 to 12`   Number of grid lines
Query   `STrdLine?`
Example   Set the trend waveform line width to "Thin" and the number of grid lines to 10.
`StrdLine,Thin,10`

█ STrdRate

Trend Interval Switching [GX/GP]

Sets the trend interval switching.

Syntax   `STrdRate,p1,p2`
    p1   Trend interval switching
        `Off`   Not switch
        `On`   Switch
    p2   Second trend interval (5s, 10s, 15s, 30s, 1min, 2min, 5min, 10min, 15min, 20min, 30min, 1h, 2h, 4h, 10h).
Query   `STrdRate?`
Example   Set the second trend interval to 30 seconds.
`STrdRate,On,30s`

Description

- You cannot set parameter p1 while recording is in progress.
- You cannot set parameter p1 while computation is in progress.
- p2 is valid only when p1=On.
- You cannot choose a second trend interval that is shorter than the scan interval.
- Trend intervals shorter than 30 s cannot be specified if an electro-magnetic relay type analog input module is in use (set up).

█ STrdKind

Trend Type [GX/GP]

Sets the type of trend waveform to display.

Syntax   `STrdKind,p1`
    p1   Type
        `Fixed to "T-Y"`
Query   `STrdKind?`
Example   Display using rectangular coordinates.
`STrdKind,T-Y`

█ STrdPartial

Partial Expanded Trend Display [GX/GP]

Enable or disable the partial expanded trend display.

Syntax   `STrdPartial,p1`
    p1   Disable or enable (Off, On)
Query   `STrdPartial?`
Example   Enable the partial expanded trend display.
`STrdPartial,On`

SMsgBasic

Message Writing

Sets the message writing operation.

Syntax SMsgBasic,p1,p2,p3
  p1 Message writing method
      (GX/GP: Common, Separate)
      (GM: Common)
      Common   Write messages to all display
                groups.
      Separate Write messages to only the
                groups that are displayed.
  p2 Power failure message (Off, On)
  p3 Change message (Off, On)
      (GX/GP: On, Off)
      (GM: On, Off, Fixed to Off when the
      advanced security function (/AS) is
      disabled)
Query SMsgBasic?
Example Write messages to only the groups that are
      displayed. Enable the power failure message
      and change message.
      SMsgBasic,Separate,On,On

SGroup

Display Group

Sets the display group.

Syntax SGroup,p1,p2,p3,p4
  p1 Group number
  p2 Enable or disable (Off, On)
  p3 Group name (up to 16 characters, UTF-8)
  P4 Channel string
      • Specify using channel numbers. 4-digit
        numbers for I/O channels. Numbers
        that start with "A" for math channels
        (A015). Numbers that start with "C" for
        communication channels (C020). The
        maximum number of characters per
        channel is 4.
      • Use periods to separate channel
        numbers (see example).
Query SGroup[,p1]?
      The channel string is output exactly as it is
      specified.
Example Assign channels 0001, 0003, 0005, A001, and
      C023 to group 2 and name it "GROUP A."
      SGroup,2,On,'GROUP A','1.3.5.A1.
      C23'

STripLine

Display Group Trip Line

Sets a trip line for a display group.

Syntax STripLine,p1,p2,p3,p4,p5,p6,p7,p8
  p1 Group number
  p2 Trip line number (1 to 4)
  p3 Enable or disable (Off, On)
  P4 Display position [%] (1 to 100)
  p5 R value of RGB display colors (0 to 255)

  p6 G value of RGB display colors (0 to 255)
  p7 B value of RGB display colors (0 to 255)
  p8 Line width
      (GX/GP: Thin, Normal, Thick)
      (GM: Normal)
      Thin   Thin
      Normal   Normal
      Thick   Thick
Query STripLine[,p1[,p2]]?
Example Display trip line 2 using a thick line in red at the
      80% position of group 2.
      STripLine,2,2,On,80,255,0,0,Thick

Description

• p4 and subsequent parameters are valid only when
  p3=On.
• For details on RGB values, see "Description" of the
  SColorIO command.

SSclBmp

Scale Bitmap Image Usage [GX/GP]

Sets whether to display a bitmap scale image in the trend
display of a display group.

Syntax SSclBmp,p1,p2
  p1 Group number
  p2 Enable or disable (Off, On)
Query SSclBmp[,p1]?
Example Use a bitmap scale image on display group 3.
      SSclBmp,3,On

Description

• Specify the bitmap file to use from the front panel of
  the GX/GP.

SMessage

Message

Sets messages.

Syntax SMessage,p1,p2
  p1 Message number (1 to 100)
  p2 Message string (up to 32 characters,
      UTF-8)
Query SMessage[,p1]?
Example Assign character string "MESSAGE77" to
      message number 77.
      SMessage,77,'MESSAGE77'

STimeZone

Time Zone

Sets the time zone.

Syntax STimeZone,p1,p2

    p1   Time zone: Hour (-13 to 13)

    p2   Time zone: Minute (0 to 59)

Query STimeZone?

Example Set the time offset to 9 hours ahead of GMT.

    STimeZone,9,0

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.

SDateBasic

Gradual Time Adjustment

Sets the gradual time adjustment feature.

Syntax SDateBasic,p1,p2

    p1   Boundary value for gradually adjusting the time (Off, 5s, 10s, 15s)

    p2   Action to take when the boundary value for gradually adjusting the time is exceeded.

       NotChange   Do not change

       Change   Change

Query SDateBasic?

Example Set the boundary value to 15 seconds. When the offset exceeds the boundary value, do not change the time.

    SDateBasic,15s,NotChange

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.

SDateFormat

Date Format

Sets the date format.

Syntax SDateFormat,p1,p2,p3

    p1   Date format

       YYMMDD   Year, month, day

       MMDDYY   Month, day, year

       DDMMYY   Date, month, year

    p2   Delimiter

       /   Slash

       .   Dot (period)

       −   Hyphen

    p3   Month display

       Digit   Display the month using numerals (1 to 12)

       Letter   Display the month using characters (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

Query SDateFormat?

Example Set the date format to "year, month, day," and display the month using numerals.

    SDaeFormat,YYMMDD,/,Digit

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.

SDst

Daylight Saving Time

Set the daylight saving time.

Syntax SDst,p1,p2,p3,p4,p5,p6,p7,p8,p9

    p1   Enable or disable (Use, Not)

    p2   Start time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

    p3   Start time: Week (1st, 2nd, 3rd, 4th, Last)

    P4   Start time: Weekday (Sun, Mon, Tue, Wed, Thu, Fri, Sat)

    p5   Start time: Hour (0 to 23)

    p6   End time: Month (Jan, Feb, Mar, Apr, May, Jun, Jul, Aug, Sep, Oct, Nov, Dec)

    p7   End time: Week (1st, 2nd, 3rd, 4th, Last)

    p8   End time: Weekday (Sun, Mon, Tue, Wed, Thu, Fri, Sat)

    p9   End time: Hour (0 to 23)

Query SDst?

Example Switch to daylight saving time at hour 0 on the first Sunday of June and switch back at hour 0 on the first Sunday of December.

    SDst,On,Jun,1st,Sun,0,Dec,1st,Sun,0

SLang

Language

Sets the language to use.

Syntax SLang,p1

    p1   Language (Japanese, English, German, French, Chinese, Russian, Korean)

Query SLang?

Example Set the language to Japanese.

    SLang,Japanese

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 you change the language with this command, the recorder may restart.

2

Commands and Responses

▌STemp

Temperature Unit

Sets the temperature unit.

Syntax `STemp,p1`
　　p1　Temperature unit
　　　　C　　Celsius
　　　　F　　Fahrenheit
Query `STemp?`
Example Set the temperature unit to Celsius.
　　`STemp,C`

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.

▌SDPoint

Decimal Point Type

Sets the decimal point type.

Syntax `SDPoint,p1`
　　p1　Decimal point type
　　　　`Point`　　Use points.
　　　　`Comma`　　Use commas.
Query `SDPoint?`
Example Use a comma for the decimal point.
　　`SDPoint,Comma`

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.

▌SFailAct

Fail Relay Operation (/FL) [GX/GP]

Sets the fail relay (DO channel) operation.

Syntax `SFailAct,p1`
　　p1　Operation
　　　　`Fail`　　Output fail information.
　　　　`Status`　　Output instrument information.
Query `SFailAct?`
Example Output fail signals from the fail relay (DO channel).
　　`SFailAct,Fail`

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.

▌SFailSts

Instrument Status to Output (/FL) [GX/GP]

Sets the instrument status to output from the fail relay (DO channel).

Syntax `SFailSts,p1,p2,p3,p4,p5`
　　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)
Query `SFailSts?`
Example Output all information.
　　`SFailSts,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.

▌SPrinter

Printer

Sets the printer.

Syntax `SPrinter,p1,p2,p3,p4,p5,p6,p7`
　　p1　IP address (0. 0. 0. 0 to 255. 255. 255. 255)
　　p2　Paper size (A4, A3, Letter)
　　p3　Paper orientation (Horizontal, Vertical)
　　P4　Resolution [dpi] (300, 600)
　　p5　Number of copies (1 to 10)
　　p6　Snapshot (Off, On)
　　　　(GX/GP: Off, On)
　　　　(GM: Off)
　　p7　Fit to page during snapshot printing (Off, On)
　　　　(GX/GP: Off, On)
　　　　(GM: Off)
Query `SPrinter?`
Example Set the IP address to "192.168.111.24," the paper size to A3, the paper orientation to horizontal, the resolution to 600, the number of copies to 2, and snapshot to On. Print by fitting to page.
　　`Sprinter,192.168.111.24,A3,Horizontal,600,2,On,On`

▌SLed

LED Indicator Operation [GX/GP]

Sets the operation of the LED indicators on the front panel.

Syntax `SLed,p,p2`
　　p1　Type (Function)
　　p2　Operation
　　　　`Off`　　Power state

```
        AlarmAll  Alarm
```
Query   SLed?
Example Set the LED indicator operation to "Alarm."
```
        SLed,Function,AlarmAll
```

█ SSound

Sound [GX/GP]

Sets touch and warning sounds.

Syntax   SSound,p1,p2
    p1   Touch sound (Off, On)
    p2   Warning sound (Off, On)
Query   SSound?
Example Enable touch and warning sounds.
```
        SSound,On,On
```

█ SInstruTag

Instruments Tag

Sets tags.

Syntax   SInstruTag,p1,p2
    p1   Tag (up to 32 characters, UTF-8)
    p2   Tag number (up to 16 characters, ASCII)
Query   SInstruTag?
Example Set the tag to assign to the GX/GP to "GX" and
the tag number to "12345."
```
        SInstruTag,'GX','12345'
```

█ SConfCmt

Setting File Comment

Sets the setting file comment.

Syntax   SConfCmt,p1
    p1   Setting file comment (up to 50 characters,
        UTF-8)
Query   SConfCmt?
Example Set "SETTING FILE COMMENT."
```
        SConfCmt,'SETTING FILE COMMENT'
```

█ SUsbInput

USB Input Device [GX/GP]

Specifies the USB input device.

Syntax   SUsbInput,p1
    p1   USB input device type
        Japanese_109 Japanese keyboard
        English_104   English keyboard
        Barcode   Bar-code reader
Query   SUsbInput?
Example Specify the English keyboard.
```
        SUsbInput,English_104
```

Description

• This command is valid on models with the /UH USB interface option.

• For the communication commads that you can execute using a bar-code reader, see section 1.18.11, "Setting USB Input Devices (/UH option)" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN).

█ SSetComment

Configuration Changes Comment (/AS)

Sets whether to enter comments when settings are changed.

Syntax   SSetComment,p1
    p1   Enable/disable configuration changes
        comment
        On   Enter comments when settings are
            changed.
        Off   Do not enter comments when
            settings are changed.
Query   SSetComment?
Example Enter comments when settings are changed.
```
        SSetComment,On
```

█ SSwitch

Internal Switch Operation

Sets the internal switch operation.

Syntax   SSwitch,p1,p2,p3
    p1   Internal switch number (1 to 100)
    p2   Output type
        Alarm   Output alarms
        Manual Specify the output value
    p3   Operation
        And   Operate when all set alarms are
            in the alarm state.
        Or   Operate when any of the set
            alarms are in the alarm state.
Query   SSwitch[,p1]?
Example Output an alarm on internal switch 3. Use "OR" logic.
```
        SSwitch,3,Alarm,Or
```

Description

• p3 is valid when p2=Alarm.

2

Commands and Responses

▌SSerialBasic

Serial Communication Basics (/C2 or /C3)

Sets basic serial communication parameters.

Not Use

Syntax   SSerialBasic,p1
    p1   Function (Off)

Normal/Bar-code

Syntax   SSerialBasic,p1,p2,p3,p4,p5,p6,p7
    p1   Function (Normal)
       (GX/GP: Normal, Barcode, Darwin)
       (GM: Normal, Darwin)
    p2   Address (1 to 99)
    p3   Baud rate [bps] (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200)
    P4   Parity (Odd, Even, None)
    p5   Stop bits (1, 2)
    p6   Data length [bit] (7, 8)
    p7   Handshaking (Off:Off, XON;XON, XON:RS, CS:RS)

Modbus Master and Modbus Slave

Syntax   SSerialBasic,p1,p2,p3,p4,p5
    p1   Function (Master, Slave)
    p2   Address (1 to 247)
    p3   Baud rate [bps] (1200, 2400, 4800, 9600, 19200, 38400, 57600, 115200)
    P4   Parity (Odd, Even, None)
    p5   Stop bits (1, 2)

Query   SSerialBasic?

Example   Set the baud rate to 9600, the data length to 8, the parity check to ODD, the stop bits to 1, the handshaking to OFF:OFF, the address to 02, and the protocol to NORMAL.
    SSerialBasic,Normal,2,9600,Odd,1,8,Off:Off

Description

- You can set p1=Master only on recorders that have the /MC option.
- The settings specified with this command takes effect with the **OSeriApply** command. The recorder serial settings do not change until you send the OSeriApply command.
- For the communication commads that you can execute using a bar-code reader, see section 1.18.11, "Setting USB Input Devices (/UH option)" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN).

▌SModMaster

Modbus Master (/C2/MC or /C3/MC)

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, 20s, 30s, 1min)
    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 500ms, the communication timeout to 250ms, the gap between messages to 10ms, the retransmission to 2, and the recovery wait time to 5min.
    SModMaster,On,500ms,250ms,2,5min

▌SModMCmd

Modbus Master Transmission Command (/C2/MC or /C3/MC)

Sets a transmit command of the Modbus master.

Syntax   SModMCmd,p1,p2,p3,p4,p5,p6,p7,p8
    p1   Command number (1 to 100)
    p2   Command type
       Off   Disable command
       Write   Write a value to a Modbus register of another device
       Read   Read a value from a Modbus register of another device
    p3   Slave number (1 to 247)
    P4   Data type
       BIT   Bit String data
       INT16   16-bit signed integer
       UINT16 16-bit unsigned integer
       INT32_B 32-bit signed integer (big endian)
       INT32_L 32-bit signed integer (little endian)
       UINT32_B 32-bit unsigned integer (big endian)
       UINT32_L 32-bit unsigned integer (little endian)
       FLOAT_B 32-bit floating point (big endian)
       FLOAT_L 32-bit floating point (little endian)
    p5   Register (1 to 465535)
    p6   Channel type
       IO   I/O channel
       Math   Math channel
       Com   Communication channel
    p7   First channel
    p8   Last channel

Query   SModMCmd[p1]?

Example Register the following command in command number 2: read the 32-bit signed integer data that is assigned to registers 30003 (upper 16 bits) and 30004 (lower 16 bits) in the slave device assigned to address 5 into channel C002.

```
SModMCmd,2,Read,5,INT32_B,30003,
Com,002,002
```

Description

- If p2=Read, set the communication channel in p6, p7, and p8.
- Set the same type of channel in p7 and p8.
- Math channels are an option (/MT).
- For details on data types, registers, and channel types, see section 4.5.1, "Modbus Client and Master Function" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 4.5.1, "Modbus Client/Master Function," in the *Data Acquisition System GM User's Manual (IM 04L55B01-01EN).*

█SSerialAutoLOut

Auto Logout for Serial Communication (/ C2 or /C3)

Sets the auto logout function for serial communication.

Syntax `SSerialAutoLOut,p1`
   p1 Auto logout function (Off, 1min, 2min, 5min, 10min)
Query `SSerialAutoLOut?`
Example Set the auto logout time for users logged in through serial communication to 1 minute.
```
SSerialAutoLOut,1min
```

Description

- Auto logout is applied to users logged in through serial communication when the communication security function is set to Login (p2 of the **SSecurity** command) and the receiver function setting in the basic serial settings (p1 of the **SSerialBasic** command) is set to Normal.

█SIpAddress

IP Address Information

Sets the IP address information.

Syntax `SIpAddress,p1,p2,p3`
   p1 IP address (0.0.0.0 to 255.255.255.255)
   p2 Subnet mask (0.0.0.0 to 255.255.255.255)
   p3 Default gateway (0.0.0.0 to 255.255.255.255)
Query `SIpAddress?`
Example Set the IP address to 192.168.111.24, the subnet mask to 255.255.255.0, and the default gateway to 192.168.111.20.
```
SIpAddress,192.168.111.24,255.255.
255.0,192.168.111.20
```

Description

- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

█SClient

Client Function

Sets the client function.

Syntax `SClient,p1,p2`
   p1 Client type (FTP, SMTP, SNTP, MODBUS, WATT)
   p2 Client Function (Off, On)
Query `SClient[p1]?`
Example Use the FTP client function.
```
SClient,FTP,On
```

Description

- Modbus client is valid on models with the /MC communication channel option.
- WT connection client is valid on models with the /E2 WT communication option and the /MC communication channel option.

█SClientEncrypt

Client Communication Encryption

Sets whether to encrypt FTP client communication and SMTP client communication.

Syntax `SClientEncrypt,p1,p2,p3`
   p1 Client type (FTP, SMTP)
   p2 Encryption (Off, On)
   p3 Verification of certificate (Off, On)
Query `SClientEncrypt[p1]?`
Example Encrypt FTP client communication. Check that the certificate in the recorder matches the certificate received from the server.
```
SClientEncrypt,FTP,On,On
```

2

Commands and Responses

▌SDns

DNS Information

Sets the DNS information.

Host (GX)

Syntax SDns,p1,p2,p3
- p1 Setting type (Host)
- p2 Host name (up to 64 characters, ASCII)
- p3 Domain name (up to 64 characters, ASCII)

DNS Server

Syntax SDns,p1,p2,p3
- p1 Setting type (Server)
- p2 Primary DNS server (0.0.0.0 to 255.255.255.255)
- p3 Secondary DNS server (0.0.0.0 to 255.255.255.255)

Suffix Setup

Syntax SDns,p1,p2,p3
- p1 Setting type (Suffix)
- p2 Primary domain suffix (up to 64 characters, ASCII)
- p3 Secondary domain suffix (up to 64 characters, ASCII)

Query SDns[p1]?

Example Set the IP address of the primary DNS server to 192.168.111.1 and the IP address of the secondary DNS server to 192.168.111.10
SDns,Server,192.168.111.1,192.168.111.10

Description
- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

▌SDhcp

DHCP Client

Sets the DHCP client.

Do Not Obtain the IP Address Automatically

Syntax SDhcp,p1
- p1 Automatic IP address assignment (Off)

Obtain the IP Address Automatically

Syntax SDhcp,p1,p2,p3
- p1 Automatic IP address acquisition (On)
- p2 DNS information acquisition (Off, On)
- p3 Automatic host name registration (Off, On)

Query SDhcp?

Example Automatically obtain the IP address and DNS information and automatically register the host name.
SDhcp,On,On,On

Description
- The settings specified with this command takes effect with the **OIPApply** command. The recorder IP address does not change until you send the OIPApply command.

▌SFtpKind

File to Transfer via FTP

Sets the file to transfer via FTP.

Syntax SFtpKind,p1,p2
- p1 Setting type
  (GX/GP: Data, Report, Snapshot, AlarmSummary, ManualSample, Setting)
  (GM: Data, Report, AlarmSummary, ManualSample, Setting)

Data	Automatically transfer display and event data files when files are generated.
Report	Automatically transfer report data files when files are generated.
Snapshot	Automatically transfer snapshot data files when files are generated.
AlarmSummary	Transfer alarm summaries
ManualSample	Automatically transfer manual sampled data files when manual sampling is executed.
Setting	Automatically transfer the setting file when settings are changed.

- p2 Enable or disable transfer (Off, On)

Query SFtpKind[p1]?

Example Automatically transfer display and event data files.
SFtpKind,Data,On

Description
- The report function is an option (/MT).
- p1 can be set to Setting when the advanced security function (/AS) is enabled.

▌SFtpTime

FTP Transfer Time Shift

Sets the amount of time to shift file transfers that are carried out by the FTP client function.

Syntax SFtpTime,p1,p2
- p1 Setting type

Data	Display and event data files
Report	Report files

- p2 Transfer shift time [minutes] (0 to 120)

Query SFtpTime[p1]?

Example Shift (delay) FTP transfers of report data files by 30 minutes.
SFtpTime,Report,30

Description
- The report function is an option (/MT).

█ SFtpCnct

FTP Client Connection Destination Server

Sets the FTP client connection destination server

Syntax   `SFtpCnct,p1,p2,p3,p4,p5,p6,p7`

    `p1` Server

        `Primary`   Primary

        `Secondary` Secondary

    `p2` Server name (up to 64 characters, ASCII)

    `p3` Port number (1 to 65535)

    `P4` User name (up to 32 characters, ASCII)

    `p5` Password (up to 32 characters, ASCII)

    `p6` Directory name (up to 64 characters, ASCII)

    `p7` PASV mode (Off, On)

Query   `SFtpCnct[p1]?`

The password is displayed using asterisks.

Example   For the primary server, assign the name "server1" and port number 21. Set the user name to "Administrator1," the password to "password1," and the directory to "directory1." Set PASV mode to Off.

`SFtpCnct,Primary,'server1',21,'Adm inistrator1','password1','director y1',Off`

█ SSmtpLogin

SMTP User Authentication

Sets the SMTP user authentication method.

Syntax   `SSmtpLogin,p1`

    `p1` User authentication type

        `Off`   Not use authentication.

        `Auth-Smtp` Use Authentication SMTP.

        `POP3`   Use POP Before SMTP (unencrypted).

        `APOP`   Use POP Before SMTP (encrypted).

Query   `SSmtpLogin?`

Example   Do not use authentication.

`SSmtpLogin,Off`

█ SSmtpCnct

SMTP Client Connection Destination Server

Sets the SMTP client connection destination server

Syntax   `SSmtpCnct,p1,p2,p3,p4,p5`

    `p1` Destination server type (SMTP, POP)

    `p2` Server name (up to 64 characters, ASCII)

    `p3` Port number (1 to 65535)

    `P4` User name (up to 32 characters, ASCII)

    `p5` Password (up to 32 characters, ASCII)

Query   `SSmtpCnct[p1]?`

The password is displayed using asterisks.

Example   Connect to SMTP server "SMTPserver1." Set the port number to 25, the user name to "administrator1," and the password to "password1."

`SSmtpLogin,SMTP,'SMTPserver1',25,' administrator1','password1'`

█ SMailHead

Mail Header

Sets the mail header including the recipient address.

Syntax   `SMailHead,p1,p2,p3,p4`

    `p1` Sender address (up to 64 characters, ASCII)

    `p2` Recipient address 1 (up to 150 characters, ASCII)

    `p3` Recipient address 2 (up to 150 characters, ASCII)

    `P4` Character string to add to the subject (up to 32 characters, ASCII)

Query   `SMailHead?`

Example   Set the sender address to "recorder1@data. com" and the recipient address to "pc1@data. com." Add "part1" to the subject.

`SMailHead,'recorder1@data.com', 'pc1@data.com',,'part1'`

█ SMailBasic

Common Section of the Mail Body

Sets the items that are common to the body of all mails.

Syntax   `SMailBasic,p1,p2`

    `p1` Header string (up to 128 characters, UTF-8)

    `p2` Include source URL (Off, On)

Query   `SMailBasic?`

Example   Set the header to "recorder1," and include the source URL.

`SMailBasic,'recorder1',On`

█ SMail

Destination and Behavior for Each Mail Type

Sets the destination and behavior for each mail type.

Alarm Notification

Syntax   `SMail,p1,p2,p3,p4,p5,p6`

    `p1` Setting type (Alarm)

    `p2` Recipient (Off, 1, 2, 1+2)

        `Off`   Not send

        `1`   Send to recipient 1

        `2`   Send to recipient 1

        `1+2`   Send to recipient 1 and 2

    `p3` Inclusion of instantaneous data (Off, On)

    `P4` Alarm action

        `On`   Send mails when alarms occur

        `On+Off` Send mails when alarms occur and when they are cleared

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Commands and Responses

p5 Inclusion of tag number or channel number in subject (Off, On)

Scheduled Transmission

Syntax `SMail,p1,p2,p3`
    p1 Setting type (Time)
    p2 Recipient (Off, 1, 2, 1+2)
    p3 Inclusion of instantaneous data (Off, On)

Report Notification (/MT)

Syntax `SMail,p1,p2`
    p1 Setting type (Report)
    p2 Recipient (Off, 1, 2, 1+2)

Media Alarm Notification

Syntax `SMail,p1,p2`
    p1 Setting type (Media)
    p2 Recipient (Off, 1, 2, 1+2)

Power failure notification

Syntax `SMail,p1,p2`
    p1 Setting type (Power)
    p2 Recipient (Off, 1, 2, 1+2)

System Error Notification

Syntax `SMail,p1,p2`
    p1 Setting type (System)
    p2 Recipient (Off, 1, 2, 1+2)

User Lockout Notification (/AS)

Syntax `SMail,p1,p2`
    p1 Setting type (UserLock)
    p2 Recipient (Off, 1, 2, 1+2)

Query `SMail[p1]?`

Example Send alarm notifications to recipient 1 when alarms occur and when they are cleared. Include instantaneous data at the time of transmission, and include the tag number or channel number in the subject.
`SMail,Alarm,1,On,On+Off,On`

Description

• The report function is an option (/MT).

SMailAlarm

Alarm Notification Mail Target Channels

Detects the alarm status of the specified channels and sends alarm notifications.

Syntax `SMailAlarm,p1`
    p1 Channel string (up to 249 characters, up to 50 channels)
        • Use channel number to specify the channels. 4-digit numbers for I/O channels. Numbers that start with "A" for math channels (A015). Numbers that start with "C" for communication channels (C020). The maximum number of characters per channel is 4.
        • Use periods to separate channel numbers (see example).
        • To specify all channels from the first channel to the last channel, delimit the channels with a hyphen. An error will occur if there are no valid channels in the hyphen designated channels.

Query `SMailAlarm?`
The channel string is output exactly as it is specified.

Example Set the target channels to channels 0001 to 0021, 0101, A025, and C003.
`SMailAlarm,'1-21.101.A25.C3'`

SMailAlarmLevel

Alarm Notification Mail Target Alarm levels

Detects the alarm status of the specified alarm levels and sends alarm notification mails.

Syntax `SMailAlarmLevel,p1,p2,p3,p4`
    p1 Alarm level 1 (On, Off)
    p2 Alarm level 2 (On, Off)
    p3 Alarm level 3 (On, Off)
    P4 Alarm level 4 (On, Off)

Query `SMailAlarmLevel?`

Example Set the target alarm levels 1 and 2 to On, 3 and 4 to Off.
`SMailAlarmLevel,On,On,Off,Off`

SMailAlarmDetect

Alarm Notification Mail Target Alarm Detection Method

Sets the alarm detection method for the alarm notification mail.

Syntax `SMailAlarmDetect,p1`
    p1 Detection method (Ch, Level)

Query `SMailAlarmDetect?`

Example Use alarm levels to specify the target alarms.
`SMailAlarmDetect,Level`

Description

• When p1=Ch, use SMailAlarm command to set the target channels. When p1=Level, use SMailAlarmLevel command to set the target levels.

SMailTime

Scheduled Transmission Times

Sets the scheduled transmission times.

Syntax `SMailTime,p1,p2,p3,p4`
    p1 Recipient (1 or 2)
    p2 Reference time: Hours (HH) (00 to 23)
    p3 Reference time: Minutes (MM) (00 to 59)
    P4 Interval (1h, 2h, 3h, 4h, 6h, 8h, 12h, 24h)

Query `SMailTime[,p1]?`

Example Send mail to recipient 1 every day at 08:30.
`SMailTime,1,08,30,24`

SSntpCnct

SNTP Client

Sets the SNTP client operation and the connection destination server.

Syntax `SSntpCnct,p1,p2,p3,p4,p5,p6,p7`

p1   Server name (up to 64 characters, ASCII)
p2   Port number (1 to 65535)
p3   Reference time: Hours (HH) (00 to 23)
P4   Reference time: Minutes (MM) (00 to 59)
p5   Access interval (6h, 12h, 24h)
p6   Timeout (10s, 30s, 90s)
p7   Time adjust on start action (Off, On)

Query   `SSntpCnct?`
Example   Set the server name to "sntpserver1," the port number to "123," the timeout to 30s. Query the time every day at 12:00 and at memory start.
`SSntpCnct,'sntpserver1',123,12,00,24,30s,On`

SModClient

Modbus Client Operation (/MC)

Sets the Modbus client operation.

Syntax   `SModClient,p1,p2,p3,p4`
p1   Read cycle (100ms, 200ms, 500ms, 1s, 2s, 5s, 10s 20s, 30s, 1min)
p2   Recovery wait time (Off, 5s, 10s, 30s, 1min, 2min, 5min)
p3   Keep connection (Off, On)
P4   Connection timeout [s] (1 to 10)

Query   `SModClient?`
Example   Set the read cycle to 100ms, the recovery wait time to Off, and the connection timeout to 1 second.
`SModClient,100ms,off,on,1`

Description

- This command is valid on models with the /MC communication channel option.

SModCList

Modbus Client Connection Destination Server (/MC)

Sets the Modbus client connection destination server.

Syntax   `SModCList,p1,p2,p3`
p1   Registration number
p2   Server name (up to 64 characters, ASCII)
p3   Port number (1 to 65535)

Query   `SModCList[,p1]?`
Example   Assign server name "recorder1" and port number "502" to registration number 1.
`SModClient,1,'recorder1',502`

SModCCmd

Modbus Client Transmission Command (/MC)

Sets the Modbus client transmission command.

Syntax   `SModCCmd,p1,p2,p3,p4,p5,p6,p7,p8,p9`
p1   Command number
p2   Command type
     `Off`   Disable command

     `Write`   Write a value to a Modbus register of another device.
     `Read`   Read a value from a Modbus register of another device.
p3   Server number (1 to 16)
P4   Unit number (1 to 255)
p5   Data type
     `BIT`   Bit String data
     `INT16`   16-bit signed integer
     `UINT16`   16-bit unsigned integer
     `INT32_B`   32-bit signed integer (big endian)
     `INT32_L`   32-bit signed integer (little endian)
     `UINT32_B`   32-bit unsigned integer (big endian)
     `UINT32_L`   32-bit unsigned integer (little endian)
     `FLOAT_B`   32-bit floating point (big endian)
     `FLOAT_L`   32-bit floating point (little endian)
p6   Register (1 to 465535)
p7   Channel type
     `IO`   I/O channel
     `Math`   Math channel
     `Com`   Communication channel
p8   First channel
p9   Last channel

Query   `SModCCmd[p1]?`
Example   Register the following command in command number 2: read the 32-bit signed integer data that is assigned to registers 30003 (upper 16 bits) and 30004 (lower 16 bits) in the server device assigned to address 5 and unit number 1 into channel C002.
`SModCCmd,2,Read,5,1,INT32_B,30003,Com,C002,C002`

Description

- If p2=Read, set the communication channel in p7, p8, and p9.
- Set the same type of channel in p8 and p9.
- Math channels are an option (/MT).
- For details on data types, registers, and channel types, see section 4.5.1, "Modbus Client and Master Function" in the *Model GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN) or section 4.5.1, "Modbus Client/Master Function," in the *Data Acquisition System GM User's Manual (IM 04L55B01-01EN)*.

SServer

Server Function

Enables or disables the server function.

Syntax   `SServer,p1,p2,p3`
p1   Server type (FTP, HTTP, SNTP, MODBUS, GENE, EtherNetIP, DARWIN)
     GENE   General communication
p2   Operation (Off, On)
p3   Port number (1 to 65535)

Query   `SServer[,p1]?`

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Commands and Responses

Example Use the FTP server function.
```
SServer,FTP,On,21
```

Description

- You cannot specify a port number that is used by another function.
- p3 cannot be set to 44818, 2222, 34150, or 34151.
- p3 is invalid when p1 = DARWIN (Darwin compatible communication) or when p1 = EtherNetIP.
- The default port numbers are listed below.

Server type (p1)	Default port number
FTP	21
HTTP	80
SNTP	123
MODBUS	502
GENE	34434

- p1 = EtherNetIP is an option (/E1).
- The settings specified with this command takes effect with the **OIPApply** command.

SServerEncrypt

Server Communication Encryption
Sets server communication encryption.

Syntax `SServerEncrypt,p1,p2`
　　　`p1` Server type (FTP, HTTP)
　　　`p2` Encryption (Off, On)
Query `SServerEncrypt[p1]?`
Example Encrypt FTP server communication.
```
SServerEncrypt,FTP,On
```

SKeepAlive

Keepalive
Sets the keepalive function.

Syntax `SKeepAlive,p1`
　　　`p1` Operation (Off, On)
Query `SKeepAlive?`
Example Use keepalive.
```
SKeepAlive,On
```

STimeOut

Communication Timeout
Sets the communication timeout function.

Syntax `STimeOut,p1,p2`
　　　`p1` Timeout function (Off, On)
　　　`p2` Timeout value [minutes] (1 to 120)
Query `STimeOut?`
Example Enable the communication timeout, and set the timeout value to 3 minutes.
```
STimeOut,On,3
```

SFtpFormat

FTP Server Directory Output Format
Sets the FTP server directory output format.

Syntax `SFtpFormat,p1`
　　　`p1` FTP server directory output format (MS-DOS, UNIX)
Query `SFtpFormat?`
Example Specify MS-DOS.
```
SFtpFormat,MS-DOS
```

SModDelay

Modbus Server Delay Response
Sets the Modbus server delay response.

Syntax `SModDelay,p1`
　　　`p1` Delay response (Off, 10ms, 20ms, 50ms)
Query `SModDelay?`
Example Specify no delay response.
```
SModDelay,Off
```

SModLimit

Modbus Server Connection Limit
Enables or disables the Modbus server connection limit function.

Syntax `SModLimit,p1`
　　　`p1` Connection limit (Off, On)
Query `SModLimit?`
Example Enable connection limit.
```
SModLimit,On
```

SModList

IP Address to Allow Connection to Modbus Server

Sets the IP address to allow connection to Modbus server.

Syntax `SModList,p1,p2,p3`
- p1   Registration number (1 to 10)
- p2   Enable or disable registration (Off, On)
- p3   IP address (0.0.0.0 to 255.255.255.255)

Query `SModList[,p1]?`

Example Register IP address "192.168.111.24" to registration number 1.
`SModList,1,On,192.168.111.24`

SWattList

WT Communication Connection Server (/E2)

Sets the WT communication connection server.

Syntax `SWattList,p1,p2,p3,p4`
- p1   Registration number
- p2   Enable or disable (On, Off)
- p3   Server name (up to 64 characters, ASCII)
- p4   Model (WT300, WT500, WT1800)

Query `SWattList[,p1]?`

Example Register model WT1800 and server name "Watt01" in registration number 1.
`SWattList,1,On,Watt01,WT1800`

SWattClient

WT Communication Operation (/E2)

Sets the WT communication operation.

Syntax `SWattClient,p1,p2`
- p1   Read cycle (500ms, 1s, 2s, 5s, 10s, 20s, 30s)
- p2   Recovery wait time (5s, 10s, 30s, 1min, 2min, 5min)

Query `SWattClient?`

Example Set the read cycle to 10 seconds and recovery wait time to 2 minutes.
`SWattClient,10,2min`

SWattData

WT Data Allocation to Communication Channel (/E2)

Allocates WT data to a communication channel.

Syntax `SWattData,p1,p2,p3,p4,p5,p6,p7`
- p1   Allocation No
- p2   Enable or disable specification (On, Off)
- p3   Communication channel
- p4   Server registration number
- p5   Data group name (see "Description" and Appendix 6.)
- p6   Data name (see Appendix 6.)
- p7   Exponential scaling (-9 to 18), default value 0

Query `SWattData[,p1]?`

Example In allocation number 1, allocate the RMS voltage of element 1 of the WT1800 assigned to server registration number 2 to communication channel 003.
`SWattData,1,On,003,2,Element1,URMS`

Description

- The available data groups (p5) vary depending on the model.

p5	Description	Supported Item		
		WT1800	WT500	WT300
Off	Unspecified	Yes	Yes	Yes
Element1	Element 1 data	Yes	Yes	Yes
Element2	Element 2 data	Yes	Yes	Yes
Element3	Element 3 data	Yes	Yes	Yes
Element4	Element 4 data	Yes	—	—
Element5	Element 5 data	Yes	—	—
Element6	Element 6 data	Yes	—	—
ElemHrm1	Element 1 harmonic data	Yes	Yes	Yes
ElemHrm2	Element 2 harmonic data	Yes	Yes	Yes
ElemHrm3	Element 3 harmonic data	Yes	Yes	Yes
ElemHrm4	Element 4 harmonic data	Yes	—	—
ElemHrm5	Element 5 harmonic data	Yes	—	—
ElemHrm6	Element 6 harmonic data	Yes	—	—
SigmaA	First wiring unit data	Yes	Yes	Yes
SigmaB	Second wiring unit data	Yes	—	—
SigmaC	Third wiring unit data	Yes	—	—
Other	Other types of data	Yes	Yes	Yes
DeltaA	First wiring unit delta math data	Yes	—	—
DeltaB	Second wiring unit delta math data	Yes	—	—
DeltaC	Third wiring unit delta math data	Yes	—	—
Delta	Delta math data	—	Yes	—
Motor	Motor option data	Yes	—	—
Aux	Auxiliary input option data	Yes	—	—
Phase	Phase difference data	—	Yes	—

SKdcCnct

KDC Connection Destination (/AS)

Sets the KDC server for the password management.

Syntax `SKdcCnct,p1,p2,p3`
- p1   Connection destination (Primary, Secondary)
  - `Primary`   Primary server
  - `Secondary`   Secondary server
- p2   KDC server name (up to 64 characters, ASCII)
- p3   Port number (1 to 65535)

Query `SKdcCnct[,p1]?`

Example For the primary KDC server, assign the server name "KdcControl1" and port number 88.
`SKdcCnct,Primary,KdcControl1,88`

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Commands and Responses

▌SAuthKey

Certification Key (/AS)

Sets the certification key that is used during password management authentication.

Syntax　`SAuthKey,p1,p2,p3,p4`
　　　`p1`　Host principal (up to 20 characters, ASCII)
　　　`p2`　Realm name (up to 64 characters, ASCII)
　　　`p3`　Password (up to 20 characters, ASCII)
　　　`p4`　Encryption (ARC4, AES128, AES256)
Query　`SAuthKey?`
Example　Set the password of host principal "GX10_001" realm "REALM01" to "gDcbwT5," and the encryption (the same as the server) to AES128.
　　　`SAuthKey,GX10_001,REALM01,gDcbwT5,`
　　　`AES128`

Description

- Slashes and ampersands cannot be used in p1 or p2.

▌SDarwinCnvCh

Darwin Channel Conversion (Darwin compatible communication)

Replace Darwin channels with recorder channels.

Syntax　`SDarwinCnvCh,p1`
　　　`p1`　Darwin model
　　　　　`Standalone`　Stand-alone type
　　　　　`Extension`　Extended type
Query　`SDarwinCnvCh?`
Example　Replace DA100 stand-alone type channels to recorder channels.
　　　`SDarwinCnvCh,Standalone`

▌SSecurity

Security Function

Sets the security function.

Syntax　`SSecurity,p1,p2,p3,p4,p5,p6`
　　　`p1`　Operations on the recorder
　　　　　(GX/GP: Off, Login, Operate)
　　　　　(GM: Off)
　　　　　`Off`　　　　Disables the security function
　　　　　`Login`　　Enables the login function
　　　　　`Operate`　Enables the function that prohibits touch screen operation
　　　`p2`　Operations via communication (Off, Login)
　　　`p3`　Auto logout
　　　　　(GX/GP: Off, 1min, 2min, 5min, 10min)
　　　　　(GM: Off)
　　　`P4`　Operation without login
　　　　　(GX/GP: Off, On)
　　　　　(GM: Off)
　　　`P5`　Password retry (Off, 3, 5)
　　　`P6`　Enable or disable user ID (On, Off)
Query　`SSecurity?`
Example　Use the login function when operating the recorder directly or via communication. When logged in, automatically log out if there is no user activity for 5 minutes. The screen can be changed even when logged out.
　　　`SSecurity,Login,Login,5min,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.
- You cannot use this command to configure settings when logged in as a user (when the user level is User).
- p1 cannot be set to Operate when the advanced security function (/AS) is enabled.
- p5 and p6 are valid when the advanced security function (/AS) is enabled.

▌SKdc

Password Management (/AS)

Sets the password management.

Syntax　`SKdc,p1,p2`
　　　`p1`　Enable disable password management (On, Off)
　　　`p2`　Root user password (between 6 and 20 characters, ASCII)
Query　`SKdc?`
Example　Enable password management. Set the root user password to "root3210."
　　　`SKdc,On,root3210`

▌SOpePass

Password to Unlock Operation [GX/GP]

Sets the password that is used to release the operation lock.

Syntax `SOpePass,p1`
p1 Password (up to 20 characters, ASCII)

Query `SOpePass?`
The password is displayed using asterisks.

Example Set the password to "password1."
`SOpePass,'password1'`

Description

• You cannot use this command to configure settings when logged in as a user (when the user level is User).

■ SOpeLimit

Operation Lock Details [GX/GP]

Sets which operations to lock.

Syntax `SOpeLimit,p1,p2`
p1 Authority of user

`Memory`	Memory
`Math`	Computations
`DataSave`	Data save
`Message`	Message
`Batch`	Batch
`AlarmACK`	Alarm ACK
`Comm`	Communication
`DispOpe`	Touch operation
`ChangeSet`	Setting operation
`DateSet`	Date/time settings
`File`	File operation
`System`	System operation
`Out`	Output operation

p2 Free/Lock
`Free` Not lock
`Lock` Lock

Query `SOpeLimit[,p1]?`

Example Prohibit operations for changing settings.
`SOpeLimit,ChangeSet,Lock`

Description

• You cannot use this command to configure settings when logged in as a user (when the user level is User).

■ SUser

User Settings

Register users.

Syntax `SUser,p1,p2,p3,p4,p5,p6,p7`
p1 User number
p2 User level

`Off`	Not Use
`Admin`	Administrator level
`User`	User level

p3 Login mode
(GX/GP: Key, Comm, Key+Comm)
(GM: Comm)

`Key`	Log in using touch operation
`Comm`	Log in via communication (including Web)
`Key+Comm`	Log in using touch operation and via communication.

P4 User name (up to 20 characters, ASCII)
p5 Password (up to 20 characters, ASCII)
p6 Enable or disable user limitation (Off, On)
p7 User limitation number (1 to 10)

Query `SUser[,p1]?`
The password of p5 are displayed using asterisks.

Example Register a user-level user to user number 3. Set the user name to "user10" and the password to "pass012." Allow login only using touch operation, and specify user limitation number 5.
`SUser,3,User,Key,'user10','pass012','On,5`

Description

• If p1=1, p2 is fixed to Admin. In addition, you cannot set p3 to Comm on the GX/GP.
• If p2=Admin, p6 is fixed to Off.
• You cannot enter NULL or spaces in p4 or p5.
• For the characters that you can use in the specified password (p5), see **Appendix 1**.
• You cannot use this command to configure settings when logged in as a user (when the user level is User).

When Using the Advanced Security Function (/AS)

Syntax `SUser,p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11`
p1 User number
p2 User level

`Off`	Not use
`Admin`	Administrator level
`User`	User level
`Monitor`	Monitor level

p3 Login method

`Key`	Log in using touch operation
`Comm`	Log in via communication commands (including Web)
`Key+Comm`	Log in using touch operation and via communication.

P4 User name (up to 20 characters, ASCII)
p5 Password (between 6 and 20 characters, ASCII)
p6 Enable or disable user limitation (Off, On)
p7 User limitation number (1 to 10)
p8 User ID (up to 20 characters, ASCII)
Specify a user ID and password combination that have not been registered in the past.
p9 Password expiration (Off, 1Month, 3Month, 6Month)
p10 Enable or disable sign in property (Off, On)
p11 Sign in property number (1 to 8)

Query `SUser[,p1]?`
The password of p5 and user ID of p8 are displayed using asterisks.

Example Register a user-level user to user number 3. Set the user name to "user10." Allow login only using touch operation, and specify user limitation number 5.
`SUser,3,User,Key,'user10',,On,5`

Description

- If p1=1, p2 is fixed to Admin. In addition, you cannot set p3 to Comm.
- If p2=Admin, p6 and p10 are fixed to Off.
- If p2=Monitor, p6, p9, and p10 are fixed to Off.
- You cannot enter NULL or spaces in p4 or p5.
- Setting to enable password management (SKdc command)
  - If p2=Off, Admin, or User, p5 is invalid. The response to a query will be blank.
  - p9 is fixed to Off.
- You can specify p5 only when p2=Monitor. When p2=Admin or User, you cannot specify p5 and the default password is enabled. For the default password, see section 2.3.1, "Logging In" in the Model GX10/GX20/GP10/GP20 Advanced Security Function (/AS) User's Manual (IM 04L51B01-05EN) or section 2.3.1, "Logging In" in the Data Acquisition System GM Advanced Security Function (/AS) User's Manual (IM 04L55B01-05EN).
- For the characters that you can use in the specified password (p5), see **Appendix 1**.
- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SUserLimit

Authority of User

Sets user operation limitations.

Syntax `SUserLimit,p1,p2,p3`
    p1   User limitation number (1 to 10)
    p2   Authority of user

Memory	Memory
Math	Computations
DataSave	Data save
Message	Message
Batch	Batch
AlarmACK	Alarm ACK
Comm	Communication
DispOpe	Touch operation (cannot be specified on the GM.)
ChangeSet	Setting operation
DateSet	Date/time settings
File	File operation
System	System operation
Out	Output operation

CalibSet	Calibration correction settings (valid only when the advanced security function (/AS option) is in use on instruments whose version is 2.02 or later.)

    p3   Free/Lock
        Free   Not lock
        Lock   Lock

Query `SUserLimit[,p1]?`
Example Set user limitation number 1 so that changing settings is prohibited.
`SUserLimit,1,ChangeSet,Lock`

Description

- You cannot use this command to configure settings when logged in as a user (when the user level is User).

SSignIn

Sign In (/AS)

Sets the sign in record for the measured data file.

Syntax `SSignIn,p1,p2,p3`
    p1   Sign in type (Batch, File)
    p2   Sign in at record stop
        (GX/GP: On, Off)
        (GM: Fixed to Off)
    p3   FTP transfer timing
        (GX/GP: DataSave, SignIn)
        (GM: Fixed to DataSave)

Query `SSignIn?`
Example When the recording of measured data of a batch process is stopped, switch to the screen for signing in.
`SSignIn,Batch,On,Signin`

SSignInTitle

Sign In Title (/AS)

Sets the sign in title.

Syntax `SSignInTitle,p1,p2,p3`
    p1   Sign in 1 title (up to 16 alphanumeric and symbol characters)
    p2   Sign in 2 title (same as above)
    p3   Sign in 3 title (same as above)

Query `SSignInTitle?`
Example Set the sign in 1, 2, and 3 titles to "Operator 1," "Supervisor 1," and "Manager 1," respectively.
`SSignInTitle, 'Operator 1',`
`'Supervisor 1', 'Manager 1'`

SSignInLimit

Sign In Property (/AS)

Sets the sign in property.

Syntax `SSignInLimit,p1,p2,p3,p4`
    p1   Sign in property number (1 to 8)
    p2   Sign in 1 free/lock (Free, Lock)
    p3   Sign in 2 free/lock (Free, Lock)

p4   Sign in 3 free/lock (Free, Lock)
Query   `SSignInLimit[,p1]?`
Example   Set a sign in property number 2 to allow the execution of only sign in 1.
`SSignInLimit,1,Free,Lock,Lock`

SBTPassword

Bluetooth Password (/C8) [GM]

Sets the Bluetooth password.
Syntax   `SBTPassword,p1,p2`
p1   Password usage (On, Off)
p2   Password (up to 20 characters, ASCII)
Query   `SBTPassword?`
The password is displayed using asterisks.
Example   Set the password to "PaSswoRD2."
`SBTPPassword,On,'PaSswoRD2'`

Description

• You cannot use this command to configure settings when logged in as a user (when the user level is User).

SSessionSecurity

Web Session Security Function (/AS) [GM]

Sets the web session security function.
Syntax   `SSessionSecurity,p1`
p1   Session security (On, Off)
Query   `SSessionSecurity?`
Example   Use the session security function.
`SSessionSecurity,On`

Description

• This command can be executed only when the user is logged in as an administrator.

SWebTimeOut

Web Auto Logout (/AS) [GM]

Sets the auto logout time for web screen.
Syntax   `SWebTimeOut,p1`
p1   Auto logout time (Off, 10 min, 20 min, 30 min)
Query   `SWebTimeOut?`
Example   Set the auto logout time to 10 minutes.
`SWebTimeOut,10min`

Description

• This command can be executed only when the user is logged in as an administrator.

SMonitor

Monitor Screen Display Information [GX/GP]

Sets the monitor screen display information.
Syntax   `SMonitor,p1,p2`
p1   Information type (see the table below)
p2   Status (see the table below)

Information Type		Status
p1	**Description**	**p2**
`Digital`	Digital value display	`Off, On`
`Scroll`	Auto scroll	`Off, On`
`Message`	Message display	`Stream, List`
`Trend`	All channel/group display	`Group, All`
`Axis`	Time axis on historical trend	`1, 2, 3, 4, 5, 6, 7, 8`
`Value`	Digital value display on historical trend	`4Value, Max, Min`
`Data`	Historical data type	`Disp, Event1`
`DigitalWave`	Digital waveform display	`Off, On`
`Alarm`	Alarm display	`Watch, List`
`Alarm_Sort`	Alarm sort item	`Time, Channel, Level, Type`
`Alarm_Order`	Alarm sort order	`Ascending, Descending`
`Alarm_Time`	Detailed alarm time	`Off, On`
`Message_Sort`	Message sort item	`Datatime, WriteTime, Message, Group, User`
`Message_Order`	Message sort order	`Ascending, Descending`
`Memory_Data`	Memory data type	`Disp, Event1`
`Overview`	Overview display	`Grouping, All`
`Multi_No`	Multi panel number	`1 to 20`
`Custom_No`	Customized display screen number (/CG)	`1 to 30`
`DigitalPos`	Digital display position	`Default, Top, Bottom, Left, Right`
`DigitalLabel`	Display string display	`Off, On`
`Modbus_M`	Modbus master status display type (/MC)	`Overview, List`
`Modbus_C`	Modbus client status display type (/MC)	`Overview, List`
`Watt`	WT communication status display type (/E2)	`Overview, List`
`Switch`	Internal switch/DO status display	`All, 1, 2, 3, 4`

Query   `SMonitor[,p1]?`
Example   Set the trend display to all-channel display.
`SMonitor,Trend,All`

Description

• Custom_No is an option (/CG).
• Modbus_M and Modbus_C are an option (/MC).
• Watt is an option (/E2).
• When p1 = Switch, p2 = 3 or 4 is valid only for the GX10/GP10.

SMultiPattern

Multi Panel Division [GX/GP]

Sets the multi panel multi panel pattern.

Syntax `SMultiPattern,p1,p2,p3`
  `p1` Registration number (1 to 20)
  `p2` Multi panel pattern

`Wide2`	Split 2 Wide
`Tall2`	Split 2 Tall
`Wide3`	Split 3 Wide
`Tall3`	Split 3 Tall
`Split4`	Split 4 Even
`Even5`	Split 5 Even
`Odd5`	Split 5 Odd
`Even6`	Split 6 Even
`Odd6`	Split 6 Odd

  `p3` Multi panel name (up to 16 characters, UTF-8)

Query `SMultiPattern[,p1]?`

Example Set the panel of registration number 1 to "Split 2 Wide." Set the multi panel name to "Monitor1."
  `SMultiPattern,1,Wide2,'Monitor1'`

Description

• This command is only valid for the GX20/GP20.

SMultiKind

Multi Panel [GX/GP]

Set the screens to display on the multi panel.

Syntax `SMultiKind,p1,p2,p3,p4`
  `p1` Registration number (1 to 20)
  `p2` Screen position (1 to 6)
  `p3` 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
`Mosbus-C`	Modbus client status
`Watt`	WT communication status
`Switch`	Internal switch 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
`Network`	Network information

  `P4` Display group number

Query `SMultiKind[,p1[,p2]]?`

Example Display the bar graph of display group 8 in screen position 3 of the registration number 1 panel.
  `SMultiKind,1,3,Bar,8`

Description

• This command is only valid for the GX20/GP20.
• Report is an option (/MT).
• Modbus-M and Modbus-C are an option (/MC).
• Watt is an option (/E2).
• Custom display screen (/CG) cannot be shown in a multi panel.

SHomeMonitor

Standard Screen Information [GX/GP]

Sets the standard screen display information.

Syntax `SHomeMonitor,p1,p2`
  `p1` Information type (see the table of the **SMonitor** command)
  `p2` Status (see the table of the **SMonitor** command)

Query `SHomeMonitor[,p1]?`

Example Set the trend display to all-channel display.
  `SHomeMonitor,Trend,All`

SHomeKind

Standard Screen [GX/GP]

Set the standard screen.

Syntax `SHomeKind,p1,p2`
  `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
`Mosbus-C`	Modbus client status
`Watt`	WT communication status
`Switch`	Internal switch 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
              Network       Network information
              Setting       Settings
              SaveLoad      Save load
              SystemInfo    System information
              Multi         Multi panel
              Custom        Customized display screen
              Display
```

p2　Display group number
Multi panel registration number (1 to 20) when p1=Multi
Custom display number (1 to 30) when p1 = CustomDisplay

Query　`SHomeKind?`
Example　Set the standard screen to trend of display group 1.
`SHomeKind,Trend,1`

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.

SFavoriteMonitor

Favorite Screen Display Information [GX/GP]

Sets the favorite screen display information.

Syntax　`SFavoriteMonitor,p1,p2,p3`
p1　Favorites number (1 to 20)
p2　Information type (see the table of the **SMonitor** command)
p3　Status (see the table of the **SMonitor** command)

Query　`SFavoriteMonitor[,p1[,p2]]?`
Example　Set the trend display to all-channel display.
`SFavoriteMonitor,1,Trend,All`

SFavoriteKind

Favorite Screen [GX/GP]

Set the favorite screen.

Syntax　`SFavoriteKind,p1,p2`
p1　Favorites number (1 to 20)
p2　Enable or disable (Off, On)
p3　Screen type (see p1 of the **SHomeKind** command)
P4　Display group number (multi panel registration number if p3=Multi, custom display number if p3 = CustomDisplay)
p5　Favorite screen name (up to 16 characters, UTF-8)

Query　`SFavoriteKind[,p1]`
Example　Register the trend display of display group 2 to favorites screen number 1. Set the screen name to "Favorite01."
`SFavoriteKind,1,On,Trend,2,'Favori te01'`

▌SBluetooth

Bluetooth Communication Function (/C8) [GM]

Sets the Bluetooth communication function.

Syntax SBluetooth,p1
  p1 Bluetooth function On/Off (On, Off)
       On   Use
       Off   Not Use

Query SBluetooth?
Example Use the Bluetooth communication function.
       SBluetooth,On

Description

• The settings specified with this command take effect with the **OBTApply** command. The settings do not change until you send the OBTApply command.

▌SBTID

Bluetooth Communication ID (/C8) [GM]

Sets the Bluetooth communication ID.

Syntax SBTID,p1
  p1 Local device name (GM's Bluetooth device name)
       Up to 30 characters, ASCII

Query SBTID?
Example Set the local device name to "SMARTDAC+ GM."
       SBTID,'SMARTDAC+ GM'

▌SBTTimeOut

Bluetooth Communication Timeout (/C8) [GM]

Sets the Bluetooth communication timeout.

Syntax SBTTimeOut,p1
  p1 Timeout function (Off, 1min, 2min, 5min, 10min)

Query SBTTimeOut?
Example Set the Bluetooth communication timeout value to 5 minutes.
       SBTTimeOut,5min

Description

• If the login function is in use, users that are logged in are automatically logged out when a timeout occurs.

▌SUsbFunction

USB Communication Function [GM]

Configures USB communication function settings.

Syntax SUsbFunction,p1
  p1 USB communication function On/Off (On, Off)
       On   Use
       Off   Not Use

Query SUsbFunction?
Example Use the USB communication function.
       SUsbFunction,On

Description

• The settings specified with this command take effect with the **OUsbFApply** command. The settings do not change until you send the OUsbFApply command.

▌SUsbAutoLOut

USB Communication Auto Logout [GM]

Sets the auto logout for USB communication.

Syntax SUsbAutoLOut,p1
  p1 Auto logout function (Off, 1 min, 2 min, 5 min, 10 min)

Query SUsbAutoLOut?
Example Set the USB communication's auto logout time to 2 minutes.
       SUsbAutoLOut,2min

Description

• Users logged in via USB communication can be automatically logged out.

2

█ SWebCustomMenu

Web Monitor Screen

Sets the contents displayed on the monitor screens.

Syntax	`SWebCustomMenu,p1,p2,p3,p4,p5`
	`p1` User level (User, Monitor)
	`p2` Status display category (On, Off)
	`p3` Log category (On, Off)
	`p4` System category (On, Off)
	`p5` File category (On, Off)
Query	`SWebCustomMenu?`
Example	Display the log category and file category contents on the monitor screen when a user whoes user level is User accessed.
	`SWebCustomMenu,User,Off,On,Off,On`

Description

• This command can be executed only when the user is logged in as an administrator.

• p1=Monitor is valid when the advanced security function (/AS) is enabled.

2.5 Output Commands

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 in ASCII format.

  FData,0,0001,0020

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	A100	0001 to 9999, A001 to A100
A001	C500	A001 to A100, C001 to C500
C001	A100	Not allowed (will result in error)
A001	0001	Not allowed (will result in error)

- For the ASCII output format, see **page 2-75**.
- For the binary output format, see **page 2-110**.

FRelay

Outputs the Most Recent Relay and Internal Switch Status

Outputs the most recent relay (DO Channel) and internal switch status.

Syntax FRelay,p1

- p1 Output information
  - 0 The most recent relay (DO channel) status in ASCII format
  - 1 The most recent internal switch status in ASCII format

Example Output the relay (DO channel) status.

  FRelay,0

Description

- For the output format, see **page 2-76** or **page 2-78**.

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)
- p3 First channel
- P4 Last channel
- p5 Read start position (-1, 0 to 99999999999)
  - -1 The most recent read position
- p6 Read end position (-1, 0 to 99999999999)
  - -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)

Example Acquire the current readable range.

  FFifoCur,1,1

Description

- For the binary output format, see **page 2-113**.

FSnap

Snapshot [GX/GP]

Outputs a snapshot data (screen image data) file.

Syntax FSnap,p1

- p1 Screen image data output (GET)

Example Acquire screen image data.

  FSnap,GET

Description

- A PNG image file will be stored in the data block of the binary output file (see **page 2-73**).

FUser

Outputs the User Level

Outputs information about the users who are currently logged in.

Syntax FUser,p1

- p1 Information about the users who are currently logged in
  - 0 Refer to your own user information.
  - 1 Refer to information about all users who are currently logged in.

Example Refer to information about all users who are currently logged in.

  FUser,1

Description

- For the ASCII output format, see **page 2-79**.

FAddr

Outputs the IP Address

Outputs the recorder IP address information.

Syntax FAddr,p1

p1   Address output (IP)

Output address information that includes the IP address, subnet mask, default gateway, and DNS server as well as the host name and domain name.

Example Output the recorder IP address information.

`FAddr,IP`

Description

• For the ASCII output format, see **page 2-81**.

█FStat

Outputs the Recorder Status

Outputs the recorder status.

Syntax   `FStat,p1`

p1   Status output (0)

Example Output the recorder status.

`FStat,0`

Description

• For the ASCII output format, see **page 2-82**.

█FLog

Outputs the Log

Outputs the alarm summary, message summary, error log, etc.

Syntax   `FLog,p1,p2`

p1   Status output (0)

`ALARM`	Alarm summary
`MSG`	Message summary
`EVENT`	Event log
`ERROR`	Error log
`DHCP`	Ethernet address setting log
`GENERAL`	General communication log
`MODBUS`	Modbus log
`FTP`	FTP client log
`SNTP`	SNTP client log
`MAIL`	E-mail log
`WEB`	Web 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)
Other than those above.	1 to 50

Example Output 600 alarm summary entries.

`FLog,ALARM,600`

Description

• For the ASCII output format, see **page 2-84**.

█FEventLog

Outputs a Detail Event Log(/AS)

Outputs an event log. You can specify the event, user, etc.

Syntax   `FEventLog,p1,p2,p3,p4`

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. Events will be searched using a prefix search.

P4   Maximum number of output (1 to 400)

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 the event strings of p3, see section **2.10.19 Detail Event Log Output (FEventLog) (/AS)**."

█FMedia

Outputs External Storage Medium and Internal Memory Information

Outputs external storage medium and internal memory information.

File list

Syntax   `FMedia,p1,p2,p3,p4`

p1   Output type (DIR)

p2   Path name (up to 100 characters)

Path name for outputting the file list

p3   File list output start position (1 to 99999999)

P4   File list output end position (1 to 99999999, -1)

Last position for outputting the file list. If you specify -1, the maximum possible number of files (as large as the recorder internal communication buffer allows) will be output.

Example Output all the file lists in the DRV0 directory.

`FMedia,DIR,/DRV0/`

Output the file lists of items 10 to 20 in the DRV0 directory.

`FMedia,DIR,/DRV0/,10,20`

Description

• Path names (p2) for the internal memory and the external media are listed below. Set the path name using a full path.
Internal memory: /MEMO/DATA/

SD memory card: /DRV0/

USB flash memory: /USB0/

- If you omit p3 and p4, the maximum possible number of files (as many as the GX internal communication buffer allows) will be output.
- For the ASCII output format, see **page 2-100**.

Data in Files

Syntax   FMedia,p1,p2,p3,p4

    p1 Output type (GET)

    p2 Path name (up to 100 characters)

        Path name of the file for outputting data

    p3 Data output start position (in bytes) (0 to 2147483647)

    P4 Data output end position (in bytes) (0 to 2147483647, -1)

        The last data output position. If you specify -1, the maximum file size (as large as the recorder internal communication buffer allows) will be output.

Example Output all the data in file xyz in the DRV0/ DATA0 directory.

    FMedia,GET,/DRV0/DATA0/xyz

Description

- If you omit p3 and p4, the maximum file size (as large as the recorder internal communication buffer allows) will be output.
- The file data will be stored in the data block of the binary output file (see **page 2-73**).

Free Space on the External Storage Medium

Syntax   FMedia,p1

    p1 Output type (CHKDSK)

Example Output the free space on the external storage medium.

    FMedia,CHKDSK

Description

- For the ASCII output format, see **page 2-100**.

▍FCnf

Outputs Setting Data

Outputs the recorder setting data.

Syntax   FCnf,p1

    p1 Operation

ALL	Read all settings.
IO	Read I/O settings.
MATH	Read Math settings.
COMM	Read communication settings.
GROUP	Read display group settings.
IP	Read IP address settings.
SECURITY	Read security settings.
CALIB	Read calibration correction settings.
ETH_SERVER	Read Ethernet server related settings.
INSTRUMENT	Read instrument information related settings.

    OTHERS   Read settings other than above.

You can specify multiple items in the list above. Separate each item with a colon (see the example).

Example Read I/O and Math settings.

    FCnf,IO:MATH

Description

- If you omit p1, all settings will be read.
- The setting data is output as the responses to the command queries. The following table lists p1 values (setting category) and the corresponding commands.

Setting Category and Target Commands

Setting category	Command
IO	SModeAI, SModeAICurrent, SModeDI, SScaleOver, SBOLmtAI, SBOLmtAICurrent, SRangeAI, SRangeAICurrent, SRangeDI, SRangeDO, SMoveAve, SBurnOut, SRjc, SAlarmIO, SAlmHysIO, SAlmDlyIO, STagIO, SColorIO, SZoneIO, SScaleIO, SBarIO, SPartialIO, SBandIO, SAlmMarkIO, SValueIO
MATH	SMathBasic, SKConst, SWconst, SRangeMath, STlogMath, SRolAveMath, SAlarmMath, SAlmHysMath, SAlmDlyMath, STagMath, SColorMath, SZoneMath, SScaleMath, SBarMath, SPartialMath, SBandMath, SAlmMarkMath, SReport, SRepData, SRepTemp, SRepCh, SDigitalSign
COMM	SRangeCom, SValueCom, SWDCom, SAlarmCom, SAlmHysCom, SAlmDlyCom, STagCom, SColorCom, SZoneCom, SScaleCom, SBarCom, SPartialCom, SBandCom, SAlmMarkCom
GROUP	SGroup, STripLine, SSclBmp
IP	SIpAddress, SDns, SDhcp
SECURITY	SKdc, SSecurity, SOpePass, SOpeLimit, SUser, SUserLimit, SSignIn, SSignInTitle, SSignInLimit, SBTPassword, SWebCustomMenu, SWebTimeOut, SSessionSecurity
CALIB	SCalibIO
ETH_SERVER	SServerEncrypt, SServer, SDarwinCnvCh
INSTRUMENT	SBTID, SInstruTag

- For the output format, see **page 2-101**.

▍FChInfo

Outputs Decimal Place and Unit Information

Outputs decimal place and unit information.

Syntax   FChInfo,p1,p2

    p1 First channel

    p2 Last channel

Example Output the decimal place and unit information of channels 0001 to 0003.
FChInfo,0001,0003

Description

• If you omit p1 and p2, all channels will be output.

• For the output format, see **page 2-101**.

▌FSysConf

Queries the System Configuration and Reconfigures Modules

Queries the System Configuration, Reconfigures Modules, and Performs Activation.

Query the System Configuration

Syntax FSysConf

Example Query the System Configuration.
FSysConf

Description

• For the output format, see **page 2-102**.

Reconfigures Modules

Aligns the module configuration settings that are recognized by the recorder and the actual module configuration.

Syntax FSysConf,p1

p1   Module reconfiguration (1)

Example Reconfigure the modules.
FSysConf,1

Activate module

Modules need to be activated when the firmware in installed modules is updated or when modules are recalibrated.

Syntax FSysConf,p1

p1   Activate module (3)

Example Activate modules.
FSysConf,3

Description

• When the advanced security function (/AS) is disabled, this commands will result in error.

▌FBTDevInfo

Bluetooth Device Information Output [GM]

Outputs the Bluetooth device information of the recorder.

Syntax FBTDevInfo,p1

p1   Bluetooth device information output (0)

Example Output the Bluetooth device information of the connected device.
FBTDevInfo,0

Description

• p1 can be omitted.

• For the output format, see **page 2-104**.

2

Commands and Responses

2.6 Operation Commands

OSetTime

Sets the Time

Sets the time.

Syntax OSetTime,p1

    p1 Time to set
        "YYYY/MO/DD_HH:MI:SS" (the
        underscore denote a space), "YYYY/MO/
        DD", or "HH:MI:SS."

        YYYY Year (2001 to 2035)
        MO   Month (01 to 12)
        DD   Day (01 to 31)
        HH   Hour (00 to 23)
        MI   Minute (00 to 59)
        SS   Second (00 to 59)

Query OSetTime?
The OSetTime query outputs the recorder current time.

Example Set the time to 23:00:00 on May 24, 2013.
OSetTime,2013/05/24 23:00:00

ORec

Starts or Stops Recording

Starts or stops recording.

Syntax ORec,p1

    p1 Recording start or stop
        0   Start
        1   Stop

Query ORec?

Example Start recording.
ORec,0

OAlarmAck

Clears Alarm Output

Clears alarm output (performs an alarm ACK).

Syntax OAlarmAck,p1

    p1 Alarm output clearance (0)

Example Clear the alarm output.
OAlarmAck,0

Individual alarm ACK

Syntax OAlarmAck,p1,p2,p3

    p1 Individual alarm output clearance (1)
    p2 Channel number
    p3 Alarm level (1 to 4)

Example Clear the alarm output of alarm 3 of channel 0001.
OAlarmAck,1,0001,3

Description

- If you send an individual alarm ACK command when the individual alarm ACK function is not in use, no action is taken, and a normal response is returned.

OExecRec

Generates a Manual Trigger, Executes Manual Sample, Takes a Snapshot, or Causes a Timeout

Generates a manual trigger, executes manual sample, takes a snapshot, or divides the data being recorded into separate files.

Syntax OExecRec,p1

    p1 Action type
        (GX/GP: 0, 1, 2, 3, 4)
        (GM: 0, 1, 3, 4)
        0   Execute manual sampling.
        1   Generate a manual trigger.
        2   Take a snapshot.
        3   Cause a display data timeout (divide files).
        4   Cause an event data timeout (divide files).

Example Execute manual sampling.
OExecRec,0

Description

- Manual trigger (p1 = 1) cannot be executed when the advanced security function (/AS) is enabled.
- If a manual sample is executed (p1 = 0) when there are no source channels for manual sampling, a file without any source channels will be created.

OExecSNTP

Queries the Time Using SNTP

Queries the time using SNTP.

Syntax OExecSNTP,p1

    p1 Time query execution (0)

Example Query the time using SNTP.
OExecSNTP,0

OMessage

Message Writing

Writes a message.

Write a Preset Message

Syntax OMessage,p1,p2,p3

    p1 Action type (PRESET)
    p2 Message number (1 to 100)
    p3 Display group number
        ALL   Write to all display groups
        1 to 60 Write to specified groups
        You can specify multiple groups at once. To do so, separate display groups with a colon.

Example Write the message in preset message number 8 to display groups 1 and 2.

```
OMessage,PRESET,8,1:2
```

Write a Free Message

Syntax   `OMessage,p1,p2,p3,p4`

p1   Action type (FREE)

p2   Message number (1 to 10)

p3   Display group number

ALL   Write to all display groups

1 to 60   Write to specified groups

You can specify multiple groups at once. To do so, separate display groups with a colon.

P4   Message string to write (up to 32 characters, UTF-8)

Example   Write a free message "MARK" as message number 2 in display groups 3, 8, and 11.

```
OMessage,FREE,2,3:8:11,'MARK'
```

█ OPassword

Changes the Password

Changes the password.

Syntax   `OPassword,p1,p2,p3`

p1   Old password (up to 20 characters, ASCII)

p2   New password (up to 20 characters, ASCII)

p3   New password (enter the same password as p2)

Example   Change the password from "PASS001" to "WORD005."

```
OPassword,'PASS001','WORD005','WO
RD005'
```

Description

• For the characters that you can use for the password, see **Appendix 1**.

█ OMath

Starts, Stops, or Resets Computation or Clears the Computation Dropout Status Display

Starts or stops computation, resets computed values, or clears the computation dropout status display.

Syntax   `OMath,p1`

p1   Action type (0)

0   Start computation

1   Stop computation

2   Reset computation

3   Clear the computation dropout status display

Query   `OMath?`

Example   Start computation.

```
OMath,0
```

Description

• You cannot use this command while the recorder is saving or loading setup data.

█ OSaveConf

Saves Setting Data

Saves the recorder setting data to the recorder's external storage medium.

Syntax   `OSaveConf,p1,p2,p3`

p1   File name (up to 80 characters, ASCII)

Specify the path and file name, excluding the extension.

p2   Medium

(GX/GP: SD, USB)

(GM: SD)

SD   SD memory card

USB   USB flash memory

p3   Setting file comment (up to 50 characters, UTF-8)

Example   Save setting data to a file named "SETFILE1" to the SD memory card.

```
OSaveConf,'SETFILE1',SD
```

Description

• If you omit p3, the default setting file comment will be added. You can edit the default setting file comment from the recorder front panel.

█ OSaveConfAll

Saves Setting Data at Once [GM]

Saves the GM setting data to the specified folder in the external storage medium.

Syntax   `OSaveConfAll,p1,p2`

p1   Folder name (up to 80 characters, ASCII)

Specify the folder name as "path name+folder name."

p2   Medium (SD)

SD   SD card

Example   Save the setting data collectively to the "CONFIG0" folder.

```
OSaveConfAll,'CONFIG0',SD
```

Description

• If you omit parameter p2, the medium is set to the SD card.

• The following items are saved. File names are indicated in parentheses.

• Setting data file (Config.GNL or Config.GSL)

• Report template (Report_YY.xlsx, Report_YY.xlsm, or Report_YY.tpl)

YY is the report type.

• Trusted certificate

A "Client" folder is created in the specified folder (p1), and the data is saved there.

• Server certificate

A "Server" folder is created in the specified folder (p1), and the data is saved there.

OCommCh

Sets a Communication Channel to a value

Sets a communication channel to a value.

Syntax OCommCh,p1,p2
- p1 Communication channel
- p2 Value
  The setting range is as follows:
  –9.9999999E+29 to –1.0000000E–30, 0,
  1.0000000E-30 to 9.9999999E+29
  The number of significant digits is 8.

Query OCommCh[,p1]?

Example Set communication channel C001 to 2.5350.
  OCommCh,C001,2.5350

OEMail

Starts or Stops the E-mail Transmission Function

Starts or stops the e-mail transmission function.

Syntax OEMail,p1
- p1 Action type
  - 0 Start the e-mail transmission function.
  - 1 Stop the e-mail transmission function.

Example Start the e-mail transmission function.
  OEMail,0

OMBRestore

Recovers Modbus manually

Resumes command transmission from Modbus client or Modbus master to devices in which communication errors have occurred.

Syntax OMBRestore,p1
- p1 Action type
  - 0 Modbus client (Ethernet)
  - 1 Modbus master (serial)

Example Manually recover the Modbus client.
  OMBRestore,0

ORTReset

Resets a Relative Timer

Resets a relative timer.

Syntax ORTReset,p1
- p1 Timer type
  - 0   All timers
  - 1 to 4 Timer number

Example Reset relative timer 2.
  ORTReset,2

OMTReset

Resets the Match Time Timer

Resets the match time timer

Syntax OMTReset,p1
- p1 Timer type
  - 0   All timers
  - 1 to 4 Timer number

Example Reset match time timer 2.
  OMTReset,2

OCmdRelay

Outputs the DO Channel and Internal Switch Status

Outputs the DO channel and internal switch status.

Syntax OCmdRelay,p1
- p1 Specification of a setting
  - Express the setting. Set a channel status as follows: [channel number]-[status]. Use a hyphen as a separator.
  - You can specify the following values for the channel number.
    DO channel number
    Internal switch number
  - You can specify the following values for the status.
    Off: Off status
    On: On status
  - You can specify the status of multiple channels at once. To do so, use a semicolon to separate channels as follows: [channel number]-[status]:[channel number]-[status]:. . . You can specify up to a total of 32 channels that consist of DO channels and internal switches.

Example Set channels 0101, 0102, and 0103 to On and internal switches S001 and S002 to Off.
  OCmdRelay,0101-On:0102-On:0103-On:S001-Off:S002-Off

Description
- If any of the channels that you specify do not exist or are not set to manual output (**SRangeDO** command), the settings of all channels are canceled, and a command error results.

OBatName

Sets a Batch Name

Sets a batch name.

Syntax OBatName,p1
- p1 Always set this to 1.
- p2 Batch number (up to 32 characters, ASCII)
- p3 Lot number (0 to 99999999, up to eight digits, depending on Lot-No. digit)

Query OBatName?

Example Set the batch name structure to batch number
"PRESSLINE" and the lot number 007.
```
OBatName,1,'PRESSLINE',007
```

Description

- For the characters that you can use in the specified batch number (p2), see **Appendix 1**.
- The character limitations on the batch number (p2) are the same as those for directory names. See the explanation for the **SDirectory** command.

OBatComment

Sets a Batch Comment

Sets a batch comment.

Syntax `OBatComment,p1,p2,p3`
- p1 Always set this to 1.
- p2 Comment number (1 to 3)
- p3 Comment string (up to 50 characters, UTF-8)

Query `OBatComment?`

Example Set comment number 2 to "THIS PRODUCT IS COMPLETED."
```
OBatComment,1,2,'THIS PRODUCT IS
COMPLETED'
```

OBatText

Sets a Batch Text

Sets a batch text.

Syntax `OBatText,p1,p2,p3,p4`
- p1 Always set this to 1.
- p2 Field number (1 to 24)
- p3 Field title (up to 20 characters, UTF-8)
- P4 Field string (up to 30 characters, UTF-8)

Query `OBatText?`

Example For field number 1, set the title to "Ope" and the character string to "GX."
```
OBatText,1,'Ope','GX'
```

ODispRate

Switches the Trend Interval [GX/GP]

Switches between first trend interval (normal trend interval) and second trend interval.

Syntax `ODispRate,p1`
- p1 Trend interval
  - NORMAL First trend interval (normal trend interval)
  - SECOND Second trend interval

Example Switch from first trend interval to second trend interval.
```
ODispRate,SECOND
```

Description

- Set the second trend interval with the **STrdRate** command.

OLoadConf

Loads Setting Data

Loads a setting data file from the recorder external storage medium into the recorder.

Syntax `OLoadConf,p1,p2,p3,p4`
- p1 File name (up to 80 characters, ASCII)

  Specify the path and file name, excluding the extension.
- p2 Medium

  (GX/GP: SD, USB)
  (GM: SD)
  - SD SD memory card
  - USB USB flash memory
- p3 Settings to load
  - ALL All settings
  - SECURITY Security settings only
  - IP IP address settings only
  - OTHERS All settings except for security and IP address settings

  Multiple options can be selected for p3. To do so, separate items with a colon.
- p4 Setting items to be excluded from the items specified by p3=OTHERS.
  - SERVER Server related settings
  - CALIB Calibration correction setteings
  - INSTRU Instrument information settings

  Multiple options can be selected for p4. To do so, separate items with a colon.

Example Load all settings from the setting file "SETTING1" on the SD memory card.
```
OLoadConf,'SETTING1',SD,ALL
```

Load security and IP address settings from a setting file named "SETTING1" from the SD memory card.
```
OLoadConf,'SETTING1',SD,SECURITY:
IP
```
Load settings excluding IP address settings, server related setings, and instrument information, from a setting file named "SETTING1" from the SD memory card.
```
OLoadConf,'SETTING1',SD,SECURITY:O
THERS,SERVER:INSTRU
```

Description

- If you omit parameter p2, the medium is set to the SD memory card.
- For p3 and p4 values (setting category) and target commands, see **Setting Category and Target Commands on page 2-60.**
- If you omit parameter p3, all settings will be loaded.
- If you omit parameter p4, no setting will be excluded.
- If you change the language with this command, the recorder may restart.

▌OLoadConfAll

Loads Setting Data at Once [GM]

Loads all settings into the GM from the specified folder of the GM's external storage medium.

Syntax   OLoadConfAll,p1,p2

    p1 Folder name (up to 80 characters)

        Specify the folder name as "path name+folder name."

    p2 Medium (SD)

        SD   SD card

Example   Load all settings from the "CONFIG0" folder of the SD card.

    OLoadConfAll,'CONFIG0',SD

Description

- The following items are loaded into the GM. File names are indicated in parentheses.
  - Setting data file (Config.GNL or Config.GSL)
  - Report template (Report_YY.xlsx, Report_YY.xlsm, or Report_YY.tpl)
    YY is the report type.
  - Trusted certificate
    The certificate file in the "Client" folder in the specified folder (p1) is loaded.

▌OSeriApply

Applies Serial Communication Settings

Applies serial communication settings.

Syntax   OSeriApply,p1

    p1 Apply the settings (0).

Example   Apply serial communication settings.

    OSeriApply,0

Description

- This command applies the serial communication settings specified by the **SSerialBasic** command.
- When you send this command, the serial communication settings take effect when the recorder returns a response. After this process, the connection will be cut off.

▌OIPApply

Applies the IP Address

Applies Ethernet communication settings.

Syntax   OIPApply,p1

    p1 Apply the settings (0).

Example   Apply the IP address settings.

    OIPApply,0

Description

- This command applies the IP address settings specified by the **SIpAddress**, **SDhcp**, **SDns**, and **SServer** commands.
- When you send this command, the IP address settings take effect when the recorder returns a response. After this process, the connection will be cut off. This includes Ethernet connections to other devices (Modbus server, FTP server, etc.).

▌OInit

Clears Measured Data and Initializes Setting Data

Clears the measured data in internal memory. The command also initializes setting data.

Syntax   OInit,p1,p2

    p1 The types of data to be initialized and cleared

        SECURITY Security settings

        Memory   Display data, event data, manual sampled data, report data, alarm summary, message summary

        OTHERS   Settings other than those above

        ALL   All measured data and settings

        You can specify multiple items at once. To do so, separate items with a colon.

    p2 Setting items to be excluded from the items specified by p1=OTHERS.

        IP   IP address settings

        SERVER Server related settings

        CALIB   Calibration correction setteings

        INSTRU Instrument information settings

        You can specify multiple items at once. To do so, separate items with a colon.

Example   Delete the measured data and summary from the internal memory.

    OInit,MEMORY

    Initialize the settings excluding IP address settings and instrument information.

    OInit,MEMORY:SECURITY:OTHERS,IP:INSTRU

Description

- IP address settings are those set with the **SIpAddress, SDns, SDhcp**, and SDhcp commands
- For p1 and p2 values (setting category) and target commands, see **Setting Category and Target Commands on page 2-60.**
- If you omit parameter p2, no setting will be excluded.

▌OUsbFApply

Applies USB Communication Settings [GM]

Applies USB communication settings.

Syntax   OUsbFApply,p1

    p1 Apply the settings

Example   Apply the USB communication On/Off setting specified with the SUsbFunction command.

    OUsbFApply,0

▌OBTApply

Applies Bluetooth Communication

Settings (/C8) [GM]

Applies Bluetooth communication settings.

Syntax OBTApply,p1
p1 Apply the settings (0)

Example Apply the Bluetooth communication On/Off setting specified with the SBluetooth command.
OBTApply,0

█ OBTClearList

Clears the Bluetooth Connection List (/C8) [GM]

Clears the Bluetooth connection list.

Syntax OBTClearList
(No parameters)

Example Clear the connected Bluetooth connection list.
OBTClearList

█ OLoginAssist

Assists Login [GX/GP]

Assists logging in to the recorder, during bar-code input.

Syntax OLoginAssist,p1,p2,p3
p1 Input type (1, 2)
1 User name input
2 User name and user ID input
p2 User name
p3 User ID

Example Log in with the user name "User01."
OLoginAssist,1,'User01'

Description

• When this command is executed, the recorder shows the login screen and waits for a user password and user ID input.
• p1 = 2 is valid when the advanced security function (/AS) is enabled.
• p3 is valid when p1 = 2. However, when the user ID is not used, p3 is invalid.
• This command is valid when the serial communication function (the **SSerialBasic** command) is set to Barcode or the USB input device (the **SUsbInput** command) is set to Barcode.

█ OSendValue

Assists Touch Panel Operation Input [GX/GP]

Assists text input during touch panel operation.

Syntax OSendValue,p1,p2
p1 Fixed to 0.
p2 Character string (up to 64 characters, UTF-8)

Example On the message settings screen, enter the message "START" (display the message settings screen and select the text box for entering the message string in advance).

OSendValue,0,'START'

Description

• Input into a text area that displays asterisks (*****) is not possible.
• This command is valid when the serial communication function (the **SSerialBasic** command) is set to Barcode or the USB input device (the **SUsbInput** command) is set to Barcode.

█ OUserLockACK

User Locked ACK (/AS)

Clears the user locked display.

Syntax OUserLockACK

Example Clears the user locked display.
OUserLockACK

Description

• This command can be executed only when the user is logged in as an administrator.
• If there are no locked users, nothing will take place.

█ OKeyLock

Key Lock On/Off [GM]

Turns key lock on or off.

Syntax OKeyLock,p1
p1 Key lock on/off (On, Off)
On Locks the keys
Off Releases the key lock

Example Release the key lock.
OKeyLock,Off

Description

• Turning the key lock on will lock the START, STOP, USER1, and USER2 keys. You cannot lock the key individually.
• Only administrator level users can turn key lock on and off.
• This command is invalid when the advanced security function (/AS) is enabled and the log in via communication is enabled.

█ OErrorClear

Clears the Error Display [GM]

Clears the error display status from the 7 segment LED.

Syntax OErrorClear,p1
p1 Error display clear type
0 Error display clear

Example Clear the error display status from the 7 segment LED.
OErrorClear,0

2.7 Communication Control Commands

CCheckSum

Sets the Checksum
Sets the presence or absence of checksum.

Syntax CCheckSum,p1
  p1 Checksum usage
    0 Do not compute
    1 Compute

Query

Example Enable the checksum.
  CCheckSum,1

CSFilter

Sets the Status Filter
Sets the filter used when outputting the recorder status.

Syntax CSFilter,p1
  p1 Filter values for status information numbers 1 to 4 (0.0.0.0 to 255.255.255.255)

Query CSFilter?

Example Set the status filter value to 255.127.63.31.
  CSFilter,255.127.63.31

Description
• The status filter is applied to each communication connection.

CLogin

Log in over a Communication Path
Logs in over a communication path.

Syntax CLogin,p1,p2
  p1 User name
  p2 password

Example Log in using the user name "admin" and password "password."
  CLogin,admin,password

Description
• For the characters that you can use for the password, see **Appendix 1**.

When Using the Advanced Security Function (/AS)
Syntax CLogin,p1,p2,p3,p4,p5
  p1 User name
  p2 User ID
  p3 Password
  p4 The new password when the password has expired
  p5 The new password when the password has expired for confirmation

Example Log in using the user name "admin01" and password "password01."
  CLogin,admin01,,password01

Description
• If p4 and p5 are not specified, normal login will be used.
• Even if the password has not expired, you can enter a new password in p4 in p5 to change the password and log in.
• If p4 and p5 are not the same, an error will occur.
• You cannot change to the same password (if p3 is the same as p4 and p5, an error will occur).
• If the user ID is not used, p2 is invalid.
• When using the password management, you cannot specify p4 and p5.
• For the characters that you can use for the password, see **Appendix 1**.

CLogout

Log Out over a Communication Path
Logs out over a communication path.

Syntax CLogout

Example Logs out from the recorder.
  CLogout

CBTConnect

Starts Bluetooth Communication (/C8) [GM]
Starts Bluetooth communication.

Syntax CBTConnect,p1
  p1 Bluetooth password of the device you want to connect to

Example Connect to the device whose Bluetooth password is "PaSswoRD2."
  CBTConnect,'PaSswoRD2'

Description
• This command is valid only when a Bluetooth password request has been received via Bluetooth communication. If the command is invalid, error 352, "Unknown command," will occur.

ESC O

Opens an Instrument : RS-422/485 Command

Starts communication with the recorder. ESC in ASCII code is 0x1B. For details, see **Appendix 1**.

Syntax ESC O_p1
           _   Space
          p1 Instrument address (01 to 99)

Example Open the instrument at address 99.
          ESC O 99

Description

- Specify the address of the instrument that you want to communicate with.
- You can only open one instrument at any given time.
- Use a capital "O."
- For this command, use CR+LF for the terminator.
- For the responses to this command, see **page 2-74**.

ESC C

Closes an Instrument : RS-422/485 Command

Ends communication with the recorder. ESC in ASCII code is 0x1B. For details, see **Appendix 1**.

Syntax ESC C_p1
           _   Space
          p1 Instrument address (01 to 99)

Example Close the instrument at address 77.
          ESC C 77

Description

- This command closes the connection to the instrument you are communicating with.
- Use a capital "C."
- For this command, use CR+LF for the terminator.
- For the responses to this command, see **page 2-74**.

2

Commands and Responses

2.8 Instrument Information Output Commands

_MFG

Outputs the Instrument Manufacturer
Outputs the instrument manufacturer.

Syntax `_MFG`

Description

- For the ASCII output format, see **page 2-104**.

_INF

Outputs the Instrument's Product Name
Outputs the instrument's product name.

Syntax `_INF`

Description

- For the ASCII output format, see **page 2-104**.

_COD

Outputs the Instrument's Basic Specifications
Outputs the instrument's basic specifications.

Syntax `_COD`

Description

- For the ASCII output format, see **page 2-105**.

_VER

Outputs the Instrument's Firmware Version Information
Outputs the instrument's firmware version information.

Syntax `_VER`

Description

- For the ASCII output format, see **page 2-105**.

_OPT

Outputs the Instrument's Option Installation Information
Outputs the instrument's option installation information.

Syntax `_OPT`

Description

- For the ASCII output format, see **page 2-106**.

_TYP

Outputs the Instrument's Temperature Unit and Daylight Saving Time Installation Information
Outputs whether the instrument's Fahrenheit temperature unit and daylight saving time setting is enabled or disabled.

Syntax `_TYP`

Description

- For the ASCII output format, see **page 2-106**.

_ERR

Outputs the Instrument's Error Number Information
Outputs the error description that corresponds to the error number.

Syntax `_ERR,p1,p2,...`
Write the details of the negative response returned from the recorder in p1, p2, etc.

Example Output the error description when negative response `"E1,10:1:2,500:2:5"` is returned.
`_ERR,10:1:2,500:2:5`

Description

- For the ASCII output format, see **page 2-107**.

_UNS or _UNR

Outputs the Instrument's Unit Configuration Information
Outputs the instrument's unit configuration information.

Syntax `_UNS` Outputs the status that is recognized by the device.
`_UNR` Outputs the installation status.

Description

- For the ASCII output format, see **page 2-107**.

_MDS or _MDR)

Outputs the Instrument's Module Configuration Information
Outputs the instrument's module configuration information.

Syntax `_MDS` Outputs the status that is recognized by the device.
`_MDR` Outputs the installation status.

Description

- For the ASCII output format, see **page 2-108**.

2.9 Responses to Commands

This section explains the responses that recorder returns in response to commands. There are three types of responses: affirmative response, negative response, and data output response.

2.9.1 Affirmative Response (For commands other than output request commands)

If the recorder successfully completes the processing of a received command that is not an output request command, it returns an affirmative response.

Syntax

`E0CRLF`

"*CRLF*" is the terminator that the recorder uses. "*CRLF*" will be used in the explanation of the syntax. In the response examples, "*CRLF*" will be omitted.

2.9.2 Negative Response

If a command syntax error, setting error, or other error occurs, the recorder returns a negative response.

Syntax

`E1,p,p,•••,pCRLF`

p   Error number and the position of error occurrence
     The detailed format of p is indicated below. The recorder outputs the error number, the position of the command where the error occurred, and the position of the parameter where the error occurred, each separated by a colon.
     `en:cp:pp`
       en   Error number.
       cp   A value indicating the command position where the error occurred. The position is numbered in order with the first command as 1. For a single command, the recorder outputs 1.
       pp   A value indicating the parameter position where the error occurred. The position is numbered in order with the first parameter in each command as 1. For errors that pertain to the entire command (for example, error in the command name), the recorder outputs 0.
                 If errors occur in multiple parameters, the recorder outputs numbers separated by commas in ascending order.

Response Example 1

If error number 3 occurs in the second parameter of a single command, the recorder outputs:

`E1,3:1:2`

Response Example 2

If error number 1 occurs in the third parameter and error number 100 occurs in the fifth parameter of a single command, the recorder outputs:

`E1,1:1:3,100:1:5`

Response Example 3

In a string of two commands, if error number 10 occurs in the second parameter of the first command and error number 500 occurs in the fifth parameter of the second command, the recorder outputs:

`E1,10:1:2,500:2:5`

Error Messages

You can use the "instrument's error number information output command" (_ERR) to output the error message that corresponds to an error number of a negative response.

2.9.3 Data Output Response

There are two types of data output: ASCII and binary.

ASCII Output

The responses to the following commands are in ASCII.
*   Queries for operation commands and setting commands
*   ASCII data output requests of output commands

Syntax

EA*CRLF*
ASCII string data • • • • • • • • *CRLF*
ASCII string data • • • • • • • • *CRLF*
  |
ASCII string data • • • • • • • • *CRLF*
EN*CRLF*

The recorder adds a header (EA) in front of the ASCII string output data and a footer (EN) at the end. The recorder adds the two characters *CRLF* to the end of headers, footers, and ASCII string data.

Binary Output

The responses to output commands consisting of binary data output requests are in binary.

Format

The following figure shows the binary output format. The recorder adds a header to the front of binary output data and a checksum at the end. The request data is entered in the data block.

```
|<--------------- 4 bytes --------------->|
|<---- 2 bytes ---->|
|<- 1 byte ->|
+------+------+---------+---------+
| 'E'  | 'B'  |   CR    |   LF    |
+------+------+---------+---------+
|        Data length              |
+-----------------+---------------+
|     Flag        | Reserved area 1 |
+-----------------+---------------+
| Reserved area 2 |  Header sum    |
+-----------------+---------------+
|                                 |
|         Data block              |
|                                 |
+-----------------+---------------+
|   Data sum      |
+-----------------+
```
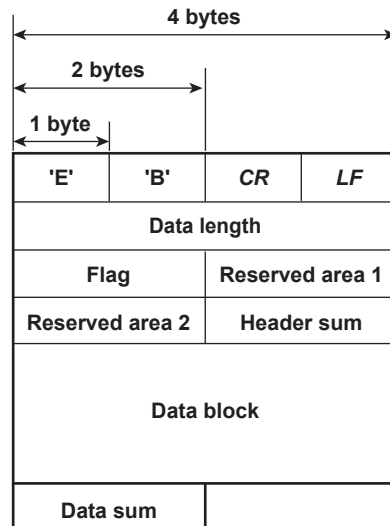
EB*CRLF*

The EB*CRLF* block stores ASCII code "E," ASCII code "B," followed by "*CR*" "*LF.*" This indicates that the output data is binary.

Data length (32 bits, big endian)

The data length block indicates the length of "flag + reserved area 1 + reserved area 2 + header sum + data block + data sum" in bytes.

Flag (16 bits, big endian)

The flag block indicates information of the entire data block.

Bit	Flag Value		Flag Meaning
	0	**1**	
15	Always zero		Not used
14	No	Yes	Data sum inclusion
13	Always zero		Not used
:			
1			
0	Intermediate data	Last data	If the output data is continuous data, this flag indicates whether the last value in the data block is intermediate data or last data.

Reserved area 1 (16 bits), reserved area 2 to (16 bits)

Not used

Header sum (16 bits, big endian)

The header sum block indicates the sum of "data length + flag + reserved area 1 + reserved area 2."

Data Block

The actual output data. The format varies depending on the output content. For details, see section **2.11**, "**Format of the Data Block of Binary Output**."

Data sum (16 bits, big endian)

The data sum block indicates the sum of the data block. Use the CCheckSum command to specify whether to include data sum. By default, check sum is set to "No." Whether data sum is included is expressed by a flag in the header block. If the data sum block is not included, the area itself will not be included. For the check sum calculation method, see **Appendix 5 Check Sum Calculation Method**.

2.9.4　Output in Response to RS-422/485 Commands

The table below shows the responses to the ESC O command and ESC C command. ESC in ASCII code is 0x1B. For details, see **Appendix 1 ASCII Character Codes**.

Syntax	Meaning	Response
ESC O_xx*CRLF* (_: Space)	Opens an instrument	• Response from the destination instrument 　ESC O*xxCRLF* • If there is no instrument at the address specified by the command[*] 　No response
ESC C_xx*CRLF* (_: Space)	Closes an instrument	• Response from the destination instrument 　ESC C*xxCRLF* • If there is no instrument at the address specified by the command[*] 　No response

*　Some possible reasons why the condition "there is no instrument at the address specified by the command" occurs are command error, the address assigned to the instrument is different, the instrument is not turned on, and the instrument is not connected through serial interface.

- "xx" in the table represents the instrument address. You can specify any address within the range of 01 to 99 and within the addresses assigned to the communication target instruments.
- You can only open one instrument at any given time.
- When you open an instrument with the ESC O command, you can send commands to it.
- Use CR+LF for the terminator.

2.10 ASCII Output Format

This section explains the ASCII output format.
- In the following format descriptions, the terminator is denoted by "<crlf>."
- One space (ASCII code : 0x 20) is denoted by an underscore (_). Consecutive spaces are denoted by alternating underscores (_) and overscores (‾).
- An I/O channel is expressed as a four-digit number (e.g., 0102), a math channel is expressed as "A" followed by a three-digit number (e.g., A015), and a communication channel is expressed as "C" followed by a three-digit number (e.g., C120).

2.10.1 Most Recent Channel Data (FData)

The output in response to the command "FData,0" is shown below.

Syntax

```
EA<crlf>
DATE_yy/mo/dd<crlf>
TIME_hh:mm:ss.mmmt<crlf>
s_cccca₁a₂a₃a₄uuuuuuuuuufdddddddddE-pp<crlf>
s_cccca₁a₂a₃a₄uuuuuuuuuufdddddddddE-pp<crlf>
…
s_cccca₁a₂a₃a₄uuuuuuuuuufdddddddddE-pp<crlf>
EN<crlf>
```

yy/mo/dd	Data time (year, month, day)	
	yy	Year (00 to 99)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
hh:mm:ss.mmmt	Data time (hour, minute, second, millisecond)	
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
	mmm	Millisecond (000 to 999)
	A period is inserted between the minute and millisecond.	
t	Reserved (space)	
s	Data status	
	N	Normal
	D	Differential input
	S	Skip
	O	Over
	E	Errors
	B	Burnout
	C	Communication channel error
cccc	Channel number (I/O channel, math channel, communication channel)	
a₁a₂a₃a₄	a₁	Alarm status (level 1)
	a₂	Alarm status (level 2)
	a₃	Alarm status (level 3)
	a₄	Alarm status (level 4)
	a₁, a₂, a₃, and a₄ 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
	Space	No alarm
uuuuuuuuuu	Unit (fixed to 10 characters. Output flush left. Unused character positions are filled with spaces.)	

mV_‾_‾_‾_‾ mV
V_‾_‾_‾_‾_ V

°C_ ‾ ‾ ‾   °C

f	Sign (+ or -)
dddddddd	Mantissa (00000000 to 99999999; 8 digits)
	For erroneous data (data status is E), the mantissa is 99999999.
	If the data status is O (±over), the mantissa is 99999999 (+over) or –99999999 (–over).
	If the data status is B (burnout), the mantissa is 99999999 (+burnout) or –99999999 (–burnout).
pp	Exponent (00 to 05)
	On channels set to Log scale (/LG), pp is a two digit integer, and the sign before pp is + or -. If the data status is E, O, or B, this value will be +99, including the sign.

2.10.2 Most Recent (DO Channel) Status (FRelay)

The output in response to the command "FRelay,0" is shown below.

Syntax

When no expandable I/O is connected

```
EA<crlf>
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
EN<crlf>
```

When an expandable I/O or sub unit is connected

Only the information of detected units will be output.

```
EA<crlf>
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
 :
Unit:nnf
M00:aaa…<crlf>
M01:aaa…<crlf>
M02:aaa…<crlf>
M03:aaa…<crlf>
M04:aaa…<crlf>
```

```
M05:aaa…<crlf>
M06:aaa…<crlf>
M07:aaa…<crlf>
M08:aaa…<crlf>
M09:aaa…<crlf>
EN<crlf>
```

nn   Unit number
f   *   Main unit
            (Space)   Expandable I/O or sub unit
aaa…   Outputs the relay (DO channel) status of module numbers 00 to 09.
            If the module installed in the corresponding module number is not a DO module,
            a hyphen is output.
            If the module installed in the corresponding module number is a DO module, "1"
            or "0" is output for the number of channels in the module in ascending order by
            channel number.
            "1" indicates relay (DO channel) ON state, and "0" indicates relay (DO channel)
            OFF state.

2.10.3   Internal Switch Status (FRelay)

The output in response to the command "FRelay,1" is shown below.

Syntax

```
EA<crlf>
S001-010:aaaaaaaaaa<crlf>
S011-020:aaaaaaaaaa<crlf>
S021-030:aaaaaaaaaa<crlf>
S031-040:aaaaaaaaaa<crlf>
S041-050:aaaaaaaaaa<crlf>
S051-060:aaaaaaaaaa<crlf>
S061-070:aaaaaaaaaa<crlf>
S071-080:aaaaaaaaaa<crlf>
S081-090:aaaaaaaaaa<crlf>
S091-100:aaaaaaaaaa<crlf>
EN<crlf>
```

aaa…a   The most recent internal switch status is output.
The internal switch status is output 10 channels per line over 10 lines.
"1" indicates that the internal switch is ON, and "0" indicates that the internal switch is OFF.

2.10.4 Users Who Are Currently Logged In (FUser)

The output in response to the command "FUser,0" is shown below.

Syntax

```
EA<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
EN<crlf>
```

`p`	Login mode	
	`M`	Via general communication
	`W`	Via Web (HTTP server)
	`F`	Via FTP server
	`S`	RS-232, RS-422/485, USB communication, or Bluetooth
	`D`	Via front panel
`l`	User level	
	`A`	Administrator
	`U`	User
	`M`	Monitor
		(only when the advanced security function (/AS) enabled)
`uuuuuuuuuuuuuuuuuuuu`	User name (fixed to 20 characters. Unused character positions are filled with spaces.)	
`abcdefghijkmnpqrstuvwxy`	Authority of user	
	`F`	Free
	`L`	Lock
	a through y represent actions. p through y are output only when the advanced security function (/AS) is enabled.	
	`a`	Memory
	`b`	Math
	`c`	Data save
	`d`	Message
	`e`	Batch
	`f`	Alarm ACK
	`g`	Communication
	`h`	Touch operation
	`i`	Time set
	`j`	Setting operation
	`k`	External media
	`m`	System operation
	`n`	Output operation
	`p`	Calibration correction setting operation
	`q` to `y`	Not used (Spaces)

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2.10.5   All Users Who Are Currently Logged In (FUser)

The output in response to the command "FUser,1" is shown below.

Syntax

```
EA<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
p_l_uuuuuuuuuuuuuuuuuuuu_abcdefghijkmnpqrstuvwxy<crlf>
EN<crlf>
```

p		Login mode
	M	Via general communication
	W	Via Web (HTTP server)
	F	Via FTP server
	S	RS-232, RS-422/485, USB communication, or Bluetooth
	D	Via front panel
l		User level
	A	Administrator
	U	User
	M	Monitor
		(only when the advanced security function (/AS) enabled)
uuuuuuuuuuuuuuuuuuuu		User name (fixed to 20 characters. Unused character positions are filled with spaces.)
abcdefghijkmnpqrstuvwxy		Authority of user
	F	Free
	L	Lock
		a through y represent actions. p through y are output only when the advanced security function (/AS) is enabled.
	a	Memory
	b	Math
	c	Data save
	d	Message
	e	Batch
	f	Alarm ACK
	g	Communication
	h	Touch operation
	i	Time set
	j	Setting operation
	k	External media
	m	System operation
	n	Output operation
	p	Calibration correction setting operation
	q to y	Not used (Spaces)

2.10.6   Instrument Address (FAddr)

The output in response to the command "FAddr,IP" is shown below.

Syntax

```
EA<crlf>
IP_Address    :xxx.xxx.xxx.xxx<crlf>
Subnet_Mask   :xxx.xxx.xxx.xxx<crlf>
Default_Gateway :xxx.xxx.xxx.xxx<crlf>
Primary_DNS   :xxx.xxx.xxx.xxx<crlf>
Secondary_DNS :xxx.xxx.xxx.xxx<crlf>
Host          :yyyyyyyyyyyyyyyyyyyy…<crlf>
Domain        :zzzzzzzzzzzzzzzzzz…<crlf>
EN<crlf>
```

xxx   IP address number (0 to 255)
yyy...   Host name (fixed to 64 characters. Unused character positions are filled with spaces.)
zzz...   Domain name (fixed to 64 characters. Unused character positions are filled with spaces.)

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2.10.7   GX status (FStat)

The output in response to the command "FStat,0" is shown below.

Syntax

```
EA<crlf>
aaa.bbb.ccc.ddd<crlf>
EN<crlf>
```

aaa	Status information 1 (see table below)
bbb	Status information 2 (see table below)
ccc	Status information 3 (see table below)
ddd	Status information 4 (see table below)

Status Information 1

Bit	Name	Description
0	-	-
1	Memory sampling	Set to 1 during recording
2	Computing	Set to 1 while computation is in progress.
3	Alarm activated	Set to 1 when an alarm is activated.
4	Accessing medium	Set to 1 while the SD medium is being accessed.
5	E-mail started	Set to 1 while the e-mail transmission has been started.
6	Buzzer activated	Set to 1 when the buzzer is activated.
7	-	-

Status Information 2

Bit	Name	Description
0	-	-
1	-	-
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	-	-
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, or WT communication error has occurred.

Status 3 and 4 are edge operations. They are cleared when read.

Status Information 3

Bit	Name	Description
0	Computation dropout	Set to 1 when computation cannot keep up.
1	Decimal and unit information setting	Set to 1 when the decimal or unit information is changed.
2	Command error	Set to 1 when there is a command syntax error.
3	Execution error	Set to 1 when there is a command execution error.
4	SNTP error at startup	Set to 1 when SNTP time synchronization fails at startup.
5	-	-
6	-	-
7	-	-

Status Information 4

Bit	Name	Description
0	-	
1	Medium access complete	Set to 1 when a display, event, manual-sample, report, or screen-image data file is saved to the external storage medium. Set to 1 when settings have been successfully saved or loaded.
2	Report generation complete	Set to 1 when report generation is complete.
3	Timeout	Set to 1 when a timer expires.
4	Saving or loading complete	Set to 1 when the saving or loading of setting parameters, report template, scale image, and custom display settings is complete.
5	-	-
6	-	-
7	-	-

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2.10.8   Alarm Summary (FLog)

The output in response to the command "FLog,ALARM" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss.ttt_kkk_cccc_lss<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss.ttt`	Time of alarm occurrence	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
	`ttt`	Millisecond (000 to 999)
		A period is inserted between the minute and millisecond.
`kkk`	Alarm cause	
	`OFF`	Alarm release
	`ON_`	Alarm occurrence
	`ACK`	All channel alarm ACK, Individual alarm ACK
	`ALL`	All channel alarm OFF
`cccc`	Channel number (set to four spaces if the alarm cause is "ACK" or "ALL")	
`l`	Alarm level (1 to 4)	
`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

If the cause of alarm is "all channel alarm ACK" or "all channel alarm OFF," the channel number, alarm level, and alarm type will be blank.
If the cause of alarm is "individual alarm ACK," the alarm type will be blank.

2.10.9   Message Summary (FLog)

The output in response to the command "FLog,MSG" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_YYYY/MO/DD_HH:MM:SS_t_mmm…m_zzz_ggg…g_uuu…
u<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time when the message was written	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`YYYY/MO/DD_HH:MM:SS`	Data position where message was written	
	`YYYY`	Year (1900 to 2099)
	`MO`	Month (01 to 12)
	`DD`	Day (01 to 31)
	`HH`	Hour (00 to 23)
	`MM`	Minute (00 to 59)
	`SS`	Second (00 to 59)
`t`	Message type	
	`N`	Normal message
	`H`	Freehand message
`mmm…m`	Message (fixed to 48 characters. Unused character positions are filled with spaces.) For freehand message, the string "(image)" is output.	
`zzz`	Operation property (3 characters)	
	`KEY`	Touchscreen operation, key operation
	`REM`	Remote
	`COM`	Ethernet communication
	`SER`	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)
	`ACT`	Event action
	`SYS`	System
	`EXT`	Operation from an external device (e.g. Modbus)
	`WEB`	Operation from web pages (GM, only when the advanced security function (/AS) is enabled)
`ggg…g`	Target group (multiple groups are expressed using dot delimiters) (fixed to 16 characters. Unused character positions are filled with spaces.)	
	`ALL`	All display groups
	`aa.bb.cc.dd…`	Multiple display groups
`uuu…u`	User name (fixed to 20 characters. Unused character positions are filled with spaces.)	

2.10.10   Event log (FLog)

The output in response to the command "FLog,EVENT" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_zzz_-sss…s_uuu…u<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss Time of event occurrence

	yyyy	Year (1900 to 2099)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
zzz		Event cause
	KEY	Touchscreen operation, key operation
	REM	Remote
	COM	Ethernet communication
	SER	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)
	ACT	Event action
	SYS	System
	EXT	Operation from an external device (e.g. Modbus)
	WEB	Operation from web pages (GM, only when the advanced security function (/AS) is enabled)
sss…s		Event string (fixed to 16 characters. Unused character positions are filled with spaces.)
		See section **"2.10.19 Detail Event Log Output (FEventLog) (/AS)"**.
uuu…u		User name (fixed to 20 characters. Unused character positions are filled with spaces.)

2.10.11   Error Log (FLog)

The output in response to the command "FLog,ERROR" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nnn_uuu…u<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss Time of error occurrence

	yyyy	Year (1900 to 2099)
	mo	Month (01 to 12)
	dd	Day (01 to 31)
	hh	Hour (00 to 23)
	mm	Minute (00 to 59)
	ss	Second (00 to 59)
nnn		Error code (001 to 999)
uuu…u		Error message (fixed to 80 characters. Unused character positions are filled with spaces.)

2.10.12 Address Setting Log (FLog)

The output in response to the command "FLog,DHCP" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_kkk…k_mmm…m<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of occurrence	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`kkk…k`	Type (fixed to 15 characters. Unused character positions are filled with spaces. See table below.)	
`mmm…m`	Message (fixed to 20 characters. Unused character positions are filled with spaces. See table below.)	

Type	Message	Error Message
`LINK`	`ON`	Ethernet connection detected
	`OFF`	Ethernet disconnection detected
`SET`	Address (e.g., 10.0.122.3)	IP address set
`DHCP`	`OFF`	DHCP disabled
	`ON`	DHCP enabled
	`RENEWING`	Acquired IP address renewing
	`RELEASING`	Acquired IP address releasing
	`REJECTING`	Acquired IP address rejecting*
	`RENEWED`	IP address renewed
	`RELEASED`	IP address released
	`EXTENDED`	IP address extension application complete
	`ESEND`	DHCP message transmission failed
	`ESERVER`	DHCP server search failed
	`ESERVFAIL`	DHCP server response failed (reception timeout)
	`ERENEWED`	IP address renewal failed
	`ERELEASED`	IP address release failed
	`EEXTENDED`	IP address extension application failed
	`EEXPIRED`	IP address lease expiration
`DNS`	`UPDATED`	DNS host name registration complete
	`REMOVED`	DNS host name removal complete
	`EFORMERR`	DNS message syntax error
	`ESERVFAIL`	DNS server processing error
	`ENXDOMAIN`	DNS server query rejected (domain does not exist)
	`EREFUSED`	DNS server query rejected (process not allowed)
	`EYXDOMAIN`	DNS server query rejected (record exists)
	`EYXRESET`	DNS server query rejected (record exists)
	`ENXRESET`	DNS server query rejected (record does not exist)
	`ENOTAUTH`	DNS server query rejected (not authenticated)
	`ENOTZONE`	DNS server query rejected (query error)
	`ENOTIMP`	DNS server query rejected (The command is not implemented.)
	`ENONAME`	Tried to register an blank host name to the DNS server.

* If the recorder cannot accept the IP address obtained from the DHCP server, the recorder will reject the address and immediately return a response to the DHCP server.

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2.10.13 General Communication Log (FLog)

The output in response to the command "FLog,General" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nn_uuu…u_fdmmm…m<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of command Tx/Rx	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`nn`	Connection ID	
	`s0`	Serial (general)
	`s1`	Bluetooth connection
	`s2`	USB connection
	`e0`	Ethernet connection #0 (general)
	`e1`	Ethernet connection #1 (general)
	`e2`	Ethernet connection #2 (general)
	`e3`	Ethernet connection #3 (general)
`uuu…u`	User name (fixed to 20 characters. Unused character positions are filled with spaces.)	
`f`	Multiple command flag	
	Space	Single command
	`*`	Multiple commands
`d`	Tx/Rx	
	`>`	Tx (command: connected instrument to recorder)
	`<`	Rx (Response: recorder to connected instrument)
`mmm…m`	Message (fixed to 40 characters. Unused character positions are filled with spaces.)	
	The recorder normally outputs the data that has been transmitted or received as-is, but it sometimes outputs special messages. Special messages are shown below.	
	`(output)`	Data output
	`(Over length)`	Command length too long
	`(timed out)`	Timeout
	`(disconnected)`	Disconnection (occurs when an Ethernet connection is disconnected)

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2.10.14 Modbus Communication Log (FLog)

The output in response to the command "FLog,Modbus" is shown below.

Syntax
```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_c_xxxxxx_kkk…k_nnn_d<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of error occurrence	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`c`	Communication type	
	`M`	Modbus master
	`C`	Modbus client
`xxxxxx`	Event that occurred (fixed to 6 characters)	
	`ACTIVE`	Activated
	`READY_`	Command ready state
	`CLOSE_`	Disconnected
	`HALT__`	Command halted
	`_____`	Other than those above
`kkk…k`	Details (fixed to 15 characters. Unused character positions are filled with spaces. See table below.)	
`nnn`	Command number (0 to 999)	
`d`	Command type	
	`R`	Read
	`W`	Write
	`O`	Write immediately (write from the custom display)
	`N`	Miscellaneous

Detail[*]	Meaning
`SKIP`	Command not set.
`INVALID`	Command cannot be executed.
`WAITING`	Server/slave communication recovery wait.
`CLOSED`	Server/slave connection closed.
`RESOLVING`	Server/slave connection being established (resolving address).
`CONNECTING`	Server/slave connection being established (requesting connection).
`UNREACH`	Server/slave connection failed (peer not found).
`TIMEDOUT`	Server/slave connection failed (timeout occurred).
`BROKEN`	Response message corrupt (CRC error).
`ERR_FC`	Response message was an illegal function message.
`ERR_ADDR`	Response message was an illegal data address message.
`ERR_VALUE`	Response message was an illegal data value message.
`ERR_DEVICE`	Response message was a slave device failure message
`ERR_ACK`	Response message was an acknowledge message.
`ERR_BUSY`	Response message was a slave device busy message.
`ERR_NEGATIVE`	Response message was a negative acknowledge message.
`ERR_GATE_PATH`	Response message was a gateway path unavailable message.
`ERR_GATE_TARGET`	Response message was a gateway target device failed to respond message.
`BAD_SLAVE`	The slave address of the response message is invalid (does not match the command).
`BAD_FC`	The function code of the response message is invalid (does not match the command).

Detail[*]	Meaning
BAD_ADDR	The address of the response message is invalid (does not match the command).
BAD_NUM	The register of the response message is invalid (does not match the command).
BAD_CNT	The number of registers in the response message is invalid (does not match the command).
NO_DATA	Data has not yet been received once.
BAD_DATA	Data conversion of the response message failed.
VALID	Data is being acquired normally.
DROP_OUT	Communication dropout occurred due to the inability to keep up.
STALE	The response from the connected device is slow relative to the read cycle.
START	Modbus or communication settings were changed.
STOP	Modbus or communication settings were changed.

* "_" expresses an underscore.

2.10.15 FTP Client Log (FLog)

The output in response to the command "FLog,FTP" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_xxxxxxxxx_k_fff…f<crlf>
…
EN<crlf>
```

yyyy/mo/dd_hh:mm:ss Time of error occurrence

yyyy	Year (1900 to 2099)
mo	Month (01 to 12)
dd	Day (01 to 31)
hh	Hour (00 to 23)
mm	Minute (00 to 59)
ss	Second (00 to 59)

xxxxxxxxx Detailed code (fixed to 9 characters)

TCPIP_ _ _	Internal processing error
HOSTADDR_	IP address not set
HOSTNAME_	Unable to resolve server host name
UNREACH_ _	Unable to connect to server
CONNECT_ _	Unable to connect to data port
SEND_ _ _ _	Transmission to data port failed
RECV_ _ _ _	Reception from data port failed
REPLY_ _ _	Received reject response from server
SERVER_ _	Invalid server response
CMDSEND_	Error in sending command to control port
CMDRECV_	Error in receiving command from control port
USER_ _ _ _	Invalid user name
PASS_ _ _ _	Invalid password
ACCT_ _ _ _	Internal processing error
TIMEOUT_	Response timeout
LINK_ _ _ _	Ethernet cable not connected
FILE_ _ _ _	File access failed
NOFD_ _ _ _	Internal processing error
NOID_ _ _ _	Internal processing error
PARAM_ _ _	Internal processing error
CERT_ _ _ _	Certificate verification error
SSL_ _ _ _	Encryption communication error

k	Server type (P, S)
fff…f	File name (fixed to 51 characters including extension. Unused character positions are filled with spaces.)

2.10.16   SNTP (Time Adjustment) Client Log (FLog)

The output in response to the command "FLog,SNTP" is shown below.

Syntax
```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_nnn_xxxxxxxxx<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of error occurrence
`yyyy`	Year (1900 to 2099)
`mo`	Month (01 to 12)
`dd`	Day (01 to 31)
`hh`	Hour (00 to 23)
`mm`	Minute (00 to 59)
`ss`	Second (00 to 59)
`nnn`	Error code
`xxxxxxxxx`	Detailed code (fixed to 9 characters)
`SUCCESS_`	Success
`EOVER_ _`	Adjustment limit exceeded
`EDORMANT_`	Internal processing error
`EHOSTNAME`	Host name lookup failed
`ETCPIP_ _`	Internal processing error
`ESEND_ _`	Packet transmission failed
`ETIMEDOUT`	Response timeout occurred
`EBROKEN_`	Response packet corrupt
`ERECV_ _`	Reception error
`EINVALID_`	Internal processing error
`ENOID_ _`	Internal processing error

2.10.17   E-Mail Client Log (FLog)

The output in response to the command "FLog,MAIL" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_ffffff_eeeeeeeeeeee_n_uuu…u<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of transmission	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`ffffff`	Cause (fixed to 6 characters)	
	`ALARM_`	Alarm mail
	`TIMER_`	Scheduled mail
	`POWER_`	Power-on, power failure recovery
	`Memory`	Low external storage memory
	`ERROR_`	Error notification
	`REPORT`	Report file
	`TEST_`	Test mail
	`PASSWD`	User lock out
`eeeeeeeeeeee`	Detailed error code (fixed to 12 characters)	
	`HOSTADDR_ _ _`	IP address not set
	`HOSTNAME_ _`	Unable to resolve server host name
	`TIMEOUT_ _ _ _`	Communication with server timed out
	`LINK_ _ _ _ _`	Ethernet cable not connected
	`UNREACH_ _ _ _`	Unable to connect to server
	`HELO_ _ _ _ _ _`	Server rejected greeting message
	`MAILFROM_ _ _`	Server rejected sender
	`RCPTTO_ _ _ _ _`	Server rejected recipient
	`DATA_ _ _ _ _`	Server rejected the data transmission command
	`TCPIP_ _ _ _ _`	Internal processing error
	`INVAL_ _ _ _ _`	Internal processing error
	`SMTPAUTH_ _`	SMTP AUTH authentication failed
	`ANOTSUPPORT_`	Unsupported authentication method
	`POP3UNREACH_`	Unable to connect to POP3 server
	`POP3TIMEOUT_`	POP3 server connection timed out
	`POP3HOSTNAME`	Unable to resolve POP3 host name
	`POP3AUTH_ _ _`	POP3 server authentication failed
	`CERT_ _ _ _ _`	Certificate verification error
	`SSL_ _ _ _ _ _`	Encryption communication error
`n`	recipient	
	`1`	Recipient 1
	`2`	Recipient 2
	`+`	Recipient 1+2
`uuu…u`	Recipient mail address (fixed to 30 characters. Unused character positions are filled with spaces.) The user name section of the recipient mail address (the "XXXX" section of "XXXX@abc.def.ghi") is output.	

2.10.18   Web Log (FLog)

The output in response to the command "FLog,WEB" is shown below.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_xxX.xxx.xxx.xxx_mmmmmmmm_uuu…u_ccc_nnn…<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of error occurrence	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`xxx.xxx.xxx.xxx`	Source IP address	
`mmmmmmmm`	HTTP query method	
	`GET`	GET method
	`POST`	POST method
`uuu…u`	Access destination URL (fixed to 24 characters. Unused character positions are filled with spaces.)	
`ccc`	HTTP response code (fixed to 32 characters. Unused character positions are filled with spaces. See table below.)	
`nnn…`	Error message (see table below)	

HTTP Response Code	Error Message
`100`	Continue
`101`	Switching Protocols
`201`	Created
`202`	Accepted
`203`	Non-Authoritative Information
`204`	No Content
`205`	Reset Content
`206`	Partial Content
`400`	Bad Request
`401`	Unauthorized
`403`	Forbidden
`404`	Not Found
`405`	Method Not Allowed
`406`	Not Acceptable
`407`	Proxy Authentication Required
`408`	Request Time-out
`409`	Conflict
`410`	Gone
`411`	Length Required
`412`	Precondition Failed
`413`	Request Entity Too Large
`414`	Request-URI Too Large
`415`	Unsupported Media Type
`500`	Internal Server Error
`501`	Not Implemented
`502`	Bad Gateway
`503`	Server Unavailable
`504`	Gateway Time-out
`505`	HTTP Version Not Supported

2

Commands and Responses

2.10.19 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.

Syntax

```
EA<crlf>
yyyy/mo/dd_hh:mm:ss_zzz_sss…s_uuu…u_ddd…<crlf>
…
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of event occurrence	
	`yyyy`	Year (1900 to 2099)
	`mo`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mm`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`zzz`	Event cause	
	`KEY`	Touchscreen operation, key operation
	`REM`	Remote
	`COM`	Ethernet communication
	`SER`	Serial communication (RS-232, RS-422/485, USB communication, or Bluetooth)
	`ACT`	Event action
	`SYS`	System
	`EXT`	Operation from an external device (e.g. Modbus)
	`WEB`	Operation from web pages (GM, only when the advanced security function (/AS) is enabled)
`sss…s`	Event string (fixed to 16 characters. Unused character positions are filled with spaces. See the table below.)	
`uuu…u`	User name (fixed to 20 characters. Unused character positions are filled with spaces.)	
`ddd…`	Detailed information (see table below)	

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 advanced security function (/AS) is enabled.

Operation	Event string Information is included in ###	### information and detailed information Blue text indicates the detailed information output format.		
Error				
Error occurrence	Error###	###	Error number (output in the event string)	
A/D calibration operation				
A/D calibration	ExecA/DCal	Unit:uu,Slot:ss		
			uu	Unit
			ss	Slot
Login				
Power off*	POWER OFF	—		
Power on*	POWER ON	—		
Login*	LOGIN	—		
Logout*	LOGOUT	—		
User lock out	UserLocked	User:UUU		
			UUU	User number
Control				
Mode change	ChgMode	ss•••		
			ss•••	Mode [Operate, A/Dcal, FirmUpdate]
Time change*	TIME CHANGE	—		
New time*	NEW TIME	—		

Operation	Event string	### information and detailed information		
Start time adjustment*	TIME ADJ START	amm:ss:xxx.yyy		
			Difference	
			a	Sign (- lag, + lead)
			mm	Minute
			ss	Second
			xxx	Millisecond
			yyy	Microsecond
			Example: +00:01:000.000	
Stop time adjustment*	TIME ADJ END	—		
SNTP time change*	SNTP ADJUST	—		
DST start*	DST START	—		
DST end*	DST END	—		
Password change	ChgPasswd	User:UUU		
			UUU	User number
User locked ACK	UserLockedACK	—		
Alarm ACK	AlarmACK	Channel:cc•••,Level:ll•••		
			cc•••	Channel (ALL for all ACK)
			ll•••	Level (ALL for all ACK)
Message writing	Message###	###	Message number (output in the event string)	
			Normal messages: 001 to 100	
			Free messages: F01 to F10	
			Freehand message: Hnd	
		<Detailed information>		
		Data Time:tt•••		
			tt•••	Data timestamp (only for add messages. Not output for other messages.) The format is the same as the time section of the FLog command output.
			Example: Data Time:2012/03/13 10:25:28	
Recording start	Record Start	—		
Recording stop	Record Stop	—		
Manual sample	ManualSample	—		
Math start	MathStart	—		
Math stop	MathStop	—		
Math reset	MathRST	—		
Acknowledge math dropout	MathACK	—		
Mail start	MailStart	—		
Mail stop	MailStop	—		
Modbus manual recovery	RefModbus	ss•••		
			ss•••	Type [Client, Master]
Display data saved	SaveDisp	—		
Event data saved	SaveEvent	—		
Manual data saved	ManualSave	ss•••		
			ss•••	Data type [Data, Report, ManualSample, AlarmSummary]. [All] for all data. [Cancel] if canceled.
Snapshot	Snapshot	—		
Set batch number	SetBatchNo	—		
Set lot number	SetLotNo	—		
Batch text Field setting	SetTextField	No:nn		
			nn	Text field number

Operation	Event string	### information and detailed information		
Display update rate change	ChgRate	ss•••		
			ss•••	Trend interval string
			Example: 1min/div	
Timer reset	TimerRST	Timer:tt•••		
			tt•••	Timer number (ALL for all timers)
Match time timer reset	MTimerRST	Timer:tt•••		
			tt•••	Timer number (ALL for all timers)
Communication channel write (screen operation only)	WriteComm	kk•••,CCCC=dd•••		
			kk•••	Write type [Internal,External]
			C	Communication channel
			dd•••	Value
			Example: Internal,C001=1.234	
DO channel write (for manual operation) (screen operation/ general communication command only)	WriteDO	CCCC=dd•••		
			C	DO channel
			dd•••	Value [ON, OFF]
			Example: 0901=OFF	
SW channel write (for manual operation) (screen operation/general communication command only)	WriteSW	CCCC=dd•••		
			C	Internal switch
			dd•••	Value [ON, OFF]
			Example: S001=ON	
Settings saved	Save#########	##•#	Save type (output in the event string)	
			Report	Report
			Scale	Scale image
			Custom	Custom display
			Parameter	Setting parameter
			Cert	Certificate
			All	All settings
			<Detailed information>	
			---- When ### = Report ----	
			cc•••,rr•••	
			cc•••	Report format [EXCEL, PDF]
			rr•••	Report type [Hour, Day, Week, Month, Hour+Day, Day+Week, Day+Month, Batch, Custom]
			---- When ### = Scale ----	
			Group:gg	
			gg	Group number
			---- When ### = Custom ----	
			No:nn•••	
			nn•••	Display number (ALL for all custom display screen)
Settings loaded	Load##########	##•#	Load type (output in the event string)	
			Report	Report
			Scale	Scale image
			Custom	Custom display
			Parameter	Setting parameter
			Cert	Certificate
			All	All settings
			<Detailed information>	
			---- When ### = Report ----	
			cc•••,rr•••	
			cc•••	Report format [EXCEL, PDF]

Operation	Event string	### information and detailed information	
		rr•••	Report type [Hour, Day, Week, Month, Hour+Day, Day+Week, Day+Month, Batch, Custom]
		---- When ### = Scale ----	
		Group:gg	
		gg	Group number
		---- When ### = Custom ----	
		No:nn•••	
		nn•••	Display number (ALL for all custom display screen)
		---- When ### = Parameter ----	
		ss•••	
		ss•••	Loaded settings [Security, IP, Other, All, w/o-SERVER, w/o-CALIB, w/o-INSTRU]
Create a key	GeneKey######	##•#	Action (output in the event string)
		Start	Start
		Done	Complete
		Cancel	Cancel
Installation of certificate	InstallServCert	ss•••,kk•••	
		ss•••	Certification type: Main/Middle [Main, Chained]
		kk•••	Purpose: SSL, PDF [COM, PDF]
		Example: Main,PDF	
Certificate creation	CreateCert	—	
Touch screen calibration reset	ExecTouchCal	—	
Initialize	Initialize	ss•••	
		Initialize type [Security, Other, Data, w/o-IP, w/o-SERVER, w/o-CALIB, w/o-INSTRU]]	
		(List of initialized settings. All for all settings.)	
		Example: Security, Other, Data	
Sign in	Sign In	l,ss•••	
		l	Level (1 to 3)
		ss•••	File name
Lock the keys	Keylock ON	—	
Release the key lock	Keylock OFF	—	
Turn on the Bluetooth function	Bluetooth ON	—	
Turn off the Bluetooth function	Bluetooth OFF	—	
Clear the Bluetooth connection list	BTListClear	—	
Fixed IP address mode	FixedIPMode	—	
Saving of unsaved data	DiffAutoSave	—	
Module			
Reconfiguration	ConfigModule	—	
Module disconnection	RemoveModule	Unit:uu,Slot:ss,mm•••,ii•••,vv•••	
		u	Unit
		s	Slot
		mm•••	Module name
		ii•••	Serial number

Operation	Event string	### information and detailed information	
		vv•••	Version number
		Example:	
		Unit00,Slot:01,GX90XA-	
		10-U2,0000,1,00.00	
Modules installed	AttachModule	Unit:uu,Slot:ss,mm•••,ii•••,vv•••	
		u	Unit
		s	Slot
		mm•••	Module name
		ii•••	Serial number
		vv•••	Version number
Module information	InfoModule	Unit:uu,Slot:ss,dd•••,UU•••	
		u	Unit
		s	Slot
		dd•••	Calibration date (same format as the log date)
		UU•••	Calibration user
		Example:	
		Unit00,Slot:01,2013/06/05,User01	
Module activation	ApplyModule	—	
Module update	UpdateModule	Unit:uu,Slot:ss,mm•••,ii•••,vv•••	
		u	Unit
		s	Slot
		mm•••	Module name
		ii•••	Serial number
		vv•••	Version number
Setting changes during recording			
Alarm setting change	SetAlarm	cccc:l:(s,typ,val,hys,l,Otyp,Ono)=(b1,b2,b3,b4,b5,b6,b7)->(a1,a2,a3,a4,a5,a6,a7)	
		c	Channel
		l	Level
		b1,•••,b7	Before change
		a1,•••,a7	After change
		The following settings (those that have been changed among the following seven settings)	
		s	On/Off [ON, OFF]
		typ	Type [H,L,R,r,h,l,T,t]
		val	Alarm value
		hys	Hysteresis
		l	Logging [ON, OFF]
		Otyp	Output type [OFF,DO,SW]
		Ono	Output number
		Example 1:	
		0001:1:(s,typ,val,hys,l,Otyp,Ono)=(off,TH,off,-2.000,0.0005,DO,0001)->(off,TL,off,-2.000,0.0005,SW,001)	
		Example 2:	
		0002:2:(val)=(-2.000)->(-1.000)	
Alarm delay setting change	SetAlmDelay	cccc:(hour,min,sec)=(b1,b2,b3)->(a1,a2,a3)	
		cccc	Channel
		b1,b2,b3	Before change
		a1,a2,a3	After change
		The following settings (those that have been changed among the following three settings)	
		hour	Delay hour
		min	Delay minute
		sec	Delay second
		Example:	
		A100:(hour,min,sec)=(00,00,00)->(01,02,03)	

Operation	Event string	### information and detailed information	
Calibration correction/set point change	SetCCModePnt	cccc:(mode,num)=(b1,b2)->(a1,a2)	
		c	Channel
		b1,b2	Before change
		a1,a	After change
		The following settings (those that have been changed among the following two settings)	
		mode	Mode [OFF, Bias, Appro]
		num	Number of set points
		Example:	
		0001:(mode,num)=(OFF,3)->(Appro,12)	
Calibration correction value change	SetCCValue	cccc:pp:(input,output)=(b1,b2)->(a1,a2)	
		c	Channel
		p	Set number
		b1,b2	Before change
		a1,a2	After change
		The following settings (those that have been changed among the following two settings)	
		input	Calibration correction value
		output	Output calibration value
		Example:	
		0001:02:(output)=(1.234)->(2.234)	
Save directory change	SetDirectory	(b1)->(a1)	
		Folder name	
		Example:	
		(DATA0)->(DATA1)	
Recipient address change	SetRecipient	Recipient:l	
		l	Recipient number [1, 2]
		Example:	
		Recipient:1	
Source address change	SetSender	—	
Subject change	SetSubject	—	
Login change	SetLogin	User:UUU	
		UUU	User number
Change while recording is stopped			
Setting change	SetParameter	ss•••:kk•••	
		ss•••	Setting file name
		kk•••	Setting change type [Security,Comm,I/OCh,MathCh,CommCh,Other] (list of changed settings)
		Example:	
		000111_131219_095412.GSL:Security, Comm,I/OCh,MathCh,CommCh,Other	
Updating			
Other updates	Update###	###	Action (output in the event string)
		Web	Web application
		<Detailed information>	
		vv•••	
		vv...	Version number

2.10.20 External Storage Medium and Internal Memory File List (FMedia)

The output in response to the command "FMedia,DIR" is shown below.

Syntax

```
EA<crlf>
yy/mm/dd_hh:mi:ss_lll…l_fff…<crlf>
yy/mm/dd_hh:mi:ss_<DIR>_dddddddd…<crlf>
EN<crlf>
```

`yyyy/mo/dd_hh:mm:ss`	Time of file generation	
	`yy`	Year (1900 to 2099)
	`mm`	Month (01 to 12)
	`dd`	Day (01 to 31)
	`hh`	Hour (00 to 23)
	`mi`	Minute (00 to 59)
	`ss`	Second (00 to 59)
`lll…l`	File size (fixed to 10 characters. Unused character positions are filled with spaces.) For directories, <DIR> is output.	
`fff…`	File name	

2.10.21 External Storage Medium Free Space (FMedia)

The output in response to the command "FMedia,CHKDSK" is shown below.

Syntax

```
EA<crlf>
zzzzzzz_Kbytes_free<crlf>
EN<crlf>
```

`zzzzzzz`	Free space (KB)

2.10.22 Setting Data (FCnf)

The output in response to the command "FCnf" is shown below.

Syntax

```
EA<crlf>
<Response to a setting query>
EN<crlf>
```

The setting data is output in the format of the response to a setting query.

2.10.23 Decimal Place and Unit Information (FChInfo)

The output in response to the command "FChInfo" is shown below.

Syntax

```
EA<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
s_cccc_uuuuuuuuuu,pp<crlf>
EN<crlf>
```

s	Data status
	N Normal
	D Differential input
	S Skip
cccc	Channel number (I/O channel, math channel, communication channel)
uuuuuuuuuu	Unit information (fixed to 10 characters. Unused character positions are filled with spaces.)
pp	Decimal place (00 to 05)
	The decimal place of the mantissa on channels set to LOG scale (/LG)

2.10.24 System Configuration (FSysConf)

The output in response to the command "FSysConf" is shown below.

Syntax

When no expandable I/O is connected

```
EA<crlf>
Unit:00
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
EN<crlf>
```

When an expandable I/O or sub unit is connected

```
EA<crlf>
U00f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U01f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U02f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U03f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U04f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U05f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
U06f:cccccccccccccccc_uuuuuuuuuuuuuuuu_DEFGHIJKLMNOPQRS<crlf>
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
:
Unit:nn
00:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
01:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
02:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
03:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
04:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
05:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
06:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
07:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
08:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
09:cccccccccccccccc_uuuuuuuuuuuuuuuu_defghijklmnopqrs<crlf>
EN<crlf>
```

Output example when an expandable I/O or sub unit is connected
- The unit information area (e.g. U00) will contain the expansion module name. All seven units are output regardless of whether expansion modules are available.
- The module information area (after Unit) will contain I/O module names. Only the units that have modules installed will be output.

```
EA
U00*:GX20-1J         GX20-1J          ----------------
U01 :GX90EX-02-TP1   GX90EX-02-TP1    ----------------
U02 :---------------- ---------------- ----------------
U03 :---------------- ---------------- ----------------
U04 :---------------- ---------------- ----------------
U05 :---------------- ---------------- ----------------
U06 :---------------- ---------------- ----------------
Unit:00
00:GX90XA-10-U2      GX90XA-10-U2     ----------------
01:GX90XA-10-U2      GX90XA-10-U2     ----------------
02:---------------- ---------------- ----------------
03:---------------- ---------------- ----------------
04:---------------- ---------------- ----------------
05:---------------- ---------------- ----------------
06:---------------- ---------------- ----------------
07:---------------- ---------------- ----------------
08:---------------- ---------------- ----------------
09:---------------- ---------------- ----------------
Unit:01
00:GX90XA-10-U2      GX90XA-10-U2     ----------------
01:---------------- ---------------- ----------------
02:---------------- ---------------- ----------------
03:---------------- ---------------- ----------------
04:---------------- ---------------- ----------------
05:---------------- ---------------- ----------------
06:---------------- ---------------- ----------------
07:---------------- ---------------- ----------------
08:---------------- ---------------- ----------------
09:---------------- ---------------- ----------------
EN
```

cccccccccccccccc	Module models that are actually installed
	-------------------- Module not installed (16 hyphens)
	Displays the module model code.
uuuuuuuuuuuuuuuu	Module models recognized by the GX
	-------------------- Module not installed (16 hyphens)
	Displays the module model code.
defghijklmnopqrs	Module status
	– Normal
	X Error
	d to s express the following items.

	d	System data error
	e	Calibration value error
	f	Parameter error
	g	Reserved (-)
	h	FRAM error
	i	Reserved (-)
	j	Reserved (-)
	k	Reserved (-)
	l	A/D error
	m	RJC error
	n	Reserved (-)
	o	Reserved (-)
	p	Reserved (-)
	q	Reserved (-)
	r	Reserved (-)
	s	Reserved (-)

nn	Unit number	
f	*	GX/GP or GM main unit

2

Commands and Responses

```
                              (Space)     Expandable I/O or sub unit
    DEFGHIJKLMNOPQRS          Expansion module status
                                D to S express the following items.
                                D       System data error (-: normal, X: error)
                                E       Ethernet error (-: normal, X: error)
                                F to S Reserved (-)
```

2.10.25 Bluetooth Device Information (FBTDevInfo)

The output in response to the command "FBTDevInfo" is shown below.

Syntax

```
EA<crlf>
(BD address),(module information)<crlf>
EN<crlf>
```

```
(BD address)          Format: xx:xx:xx:xx:xx:xx
(module information)  xxxx  (user-defined character string)
```

Before the Bluetooth function is turned on after power-on, the xx of the BD address area will be spaces, and the module information area will be empty (no characters).

2.10.26 Instrument Manufacturer (_MFG)

The output in response to the command "_MFG" is shown below. Outputs the instrument manufacturer.

Output Example

```
EA<crlf>
YOKOGAWA<crlf>
EN<crlf>
```

2.10.27 Instrument's Product Name (_INF)

The output in response to the command "_INF" is shown below.

Output Example

```
EA<crlf>
'GX20/GP20',123456789,xx-xx-xx-xx-xx-xx,Rx.xx.xx <crlf>
EN<crlf>
```

```
'GX20/GP20'           Product name ('GX20/GP20', 'GX10/GP10', or 'GM10')
123456789             Product serial number
xx-xx-xx-xx-xx-xx     MAC address (xx's are  hexadecimals)
Rx.xx.xx              Firmware version
```

2.10.28 Instrument's Basic Specifications (_COD)

The output in response to the command "_COD" is shown below.

Output Example

```
EA<crlf>
'GX20',-1,J,1,M <crlf>
EN<crlf>
```

'GX20'	Model
-1	Type
	-1 100 channels
	-2 500 channels
J	Display language
	J Japanese
	E English
	C Chinese
1	Supply voltage
	Blank (when the product name is GX10, GX20, or GM10)
	1 100 VAC, 240 VAC (when the product name is GP10 or GP20)
M	Power cord
	Blank (when the product name is GX10, GX20, or GM10)
	M PSE cable
	D UL/CSA cable
	F VDE cable
	R AS cable
	Q BS cable
	H GB cable
	N NBR cable

2.10.29 Instrument's Firmware Version Information (_VER)

The output in response to the command "_VER" is shown below.

Output Example

```
EA<crlf>
B999999,Rx.xx.xx,'Main Program'<crlf>
B999999,Rx.xx.xx, 'Web Program'<crlf>
EN<crlf>
```

B999999	Firmware part number (first line), Web program part number (second line)
Rx.xx.xx	Firmware version (first line), Web program version (second line)

2.10.30 Instrument's Option Installation Information (_OPT)

The output in response to the command "_OPT" is shown below.

Output Example

```
EA<crlf>
/C2,'RS-232'<crlf>
/C3, 'RS-422/485'<crlf>
/C8, 'Bluetooth'<crlf>
/D5, 'VGA output'<crlf>
/FL, 'Fail output (1 point) '<crlf>
/MT,'Mathematical function (with report function) '<crlf>
/MC, 'Communication channel function'<crlf>
/P1, '24 VDC/AC power supply'<crlf>
/UH, 'USB interface (Host 2 ports) '<crlf>
/U__0,'Model pre-installed with analog (universal) input
module(s)'<crlf>
/CR__,'Model pre-installed with digital output module(s) and/or
digital input module(s)'<crlf>
EN<crlf>
```

/C2	RS-232
/C3	RS-422/485
/C8	Bluetooth
/D5	VGA output
/FL	Fail output, 1 point
/MT	Math (including the report function)
/MC	Communication channel function
/P1	24VDC/AC power supply
/UH	USB interface (host 2 ports)
/AS	Advanced security function (Part 11 compliant)
/E1	EtherNet/IP communication
/E2	WT communication
/CG	Custom display function
/LG	Log scale
/U$X_1X_2$0	Model pre-installed with analog (universal) input modules

X_1 Terminal type
     S   Screw terminal
     C   Clamp terminal
X_2 Number of analog (universal) input modules installed
     1, 2, 3, 4, 5, 6, 7, 8, 9, A (where A represents 10)

/CRY_1Y_2 Model pre-installed with digital output modules and/or digital input modules
     Y_1 Number of digital output (C contact) modules installed
       1,2,3,4,5
     Y_2 Number of digital input modules installed
       1,2

2.10.31 Instrument's Temperature Unit and Daylight Saving Time Installation Information (_TYP)

The output in response to the command "_TYP" is shown below.

Output Example

```
EA<crlf>
DST,'Summer time/Winter time'<crlf>
DEGF,'degF'<crlf>
EN<crlf>
```

DST	Daylight saving time enabled
DEGF	Fahrenheit temperature unit enabled

2.10.32 Instrument's Error Number Information (_ERR)

The output in response to the command "_ERR" is shown below.

Output Example

```
EA<crlf>
10:1:2,'Dram Error'<crlf>
500:2:5,'Media Error'<crlf>
EN<crlf>
```

2.10.33 Instrument's Unit Configuration Information (_UNS or _UNR)

The output in response to the command "_UNS" or "_UNR" is shown below.

Syntax

```
EA<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10<crlf>
...
EN<crlf>
```

Output Example

```
EA<crlf>
Main,0,'GX20-1J',1234567,xx-xx-xx-xx-xx-xx,R1.01.01,/MT /C2,0,10,--
--------------<crlf>
Sub,1,'GX90EX-02-ET1',1234567,xx-xx-xx-xx-xx-xx,R1.01.01,,0,6,-----
-----------<crlf>
EN<crlf>
```

One line (p1 to p10) contains configuration information of a single unit.

p$_n$	Value	Description
p1	Main, Sub	Unit dependency (main or sub) information.
		Main: Main unit (Only a single one exists in a system. GX/GP or GM main unit)
		Sub: Sub unit (Units other than the main unit. GX/GP expandable I/O or GM sub unit)
p2	0,1	Unit address number. The address number of the main unit is 0.
p3	'GX20-1J', 'GX90EX-02-ET1'	Unit name (model name). Enclosed in single quotation marks. The main unit model or expansion module model in the expandable I/O unit or sub unit
P4	1234567	Product serial number.
p5	xx-xx-xx-xx-xx-xx	MAC address. xx = hexadecimal
p6	R1.01.01	Firmware version. The output format is "R+version."
p7	/MT /C2	Options. Codes of installed options delimited by spaces.
p8	0	Fixed at 0.
p9	6, 10	Maximum number of installable modules. If there are not installable modules, 0 is output.
p10	----------- ------	Unit status. The unit status is output in a character string. See the **Expansion module status** in section 2.10.24, "System Configuration (FSysConf)."

The main unit and expansion module information is output (indicated in green below).

2

Commands and Responses
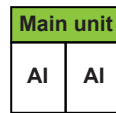
Without an expandable I/O or sub unit   **With an expandable I/O or sub unit**
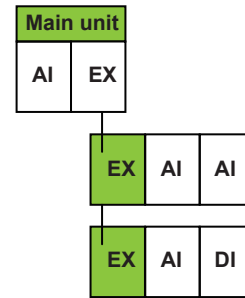
EX: Expansion module
AI, DI, etc.: I/O module

2.10.34 Instrument's Module Configuration Information (_MDS or MDR)

The output in response to the command "_MDS" or "_MDR" is shown below.

Syntax

```
EA<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11<crlf>
p1,p2,p3,p4,p5,p6,p7,p8,p9,p10,p11<crlf>
…
EN<crlf>
```

Output Example

```
EA<crlf>
Main,0,1,'GX90YD-06-11',1234567,R1.01.01,,0,0,6,----------------
<crlf>
Main,0,9,'GX90EX-02-ET1'1234567,R1.01.01,,0,0,0,----------------
<crlf>
Sub,1,0,'GX90XA-10-U2',1234567,R1.01.01,,0,10,0,----------------
<crlf>
Sub,1,1,'GX90XA-10-U2',1234567,R1.01.01,,0,10,0,----------------
<crlf>
Sub,1,2,'GX90XA-10-U2',1234567,R1.02.01,,0,10,0,----------------
<crlf>
Sub,2,0,'GX90XA-10-U2',1234567,R1.02.01,,0,10,0,----------------
<crlf>
Sub,2,1,'GX90XD-16-11',1234567,R1.01.01,,0,16,0,----------------
<crlf>
EN<crlf>
```

One line (p1 to p11) contains configuration information of a single module.

p$_n$	Value	Description
p1	Main, Sub	Unit dependency (main or sub) information. Main: Main unit (Only a single one exists in a system. GX/GP or GM main unit) Sub: Sub unit (Units other than the main unit. GX/GP expandable I/O or GM sub unit)
p2	0, 1, 2	Address number of the unit that the module is installed in. Fixed at 0.
p3	0, 1, 2	Slot number of the unit that the module is installed in (0 reference).
P4	'GX90YD-06-11', 'GX90EX-02-ET1', 'GX90XA-10-U2', 'GX90XD-16-11'	Module name (model name). Enclosed in single quotation marks. • All modules installed in the main unit • A module installed in an expandable I/O or sub unit (excluding the expansion module)
p5	1234567	Product serial number.
p6	R1.01.01, R1.02.01	Module firmware version. The output format is "R+version."
p7	Space	Options. Codes of installed options delimited by spaces.
p8	0	Fixed at 0.

p_n	Value	Description
p9	0, 10, 8	Maximum number of input channels allowed on the module. If there are no inputs, 0 is output.
p10	0, 16	Maximum number of output channels allowed on the module. If there are no outputs, 0 is output.
p11	---------------	Module status. The **Module status** is output in a character string.

The I/O module information is output (indicated in green below).

Without an expandable I/O or sub unit　　　**With an expandable I/O or sub unit**

Main unit
AI	AI

Main unit
AI	EX

EX	AI	AI

EX	AI	DI

EX:　　　　　**Expansion module**
AI, DI, etc.:　**I/O module**

2

Commands and Responses
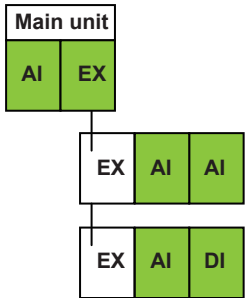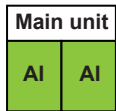
2.11 Format of the Data Block of Binary Output

This section explains the data that is stored in the data block in the binary output of data output response.

2.11.1 Most Recent Channel Data (FData)

The output in response to the command "FData,1" is shown below. Outputs the most recent I/O channel, math channel, and communication channel data.

Configuration

The figure below shows the structure of the output data. Data is stored in "Block 1."
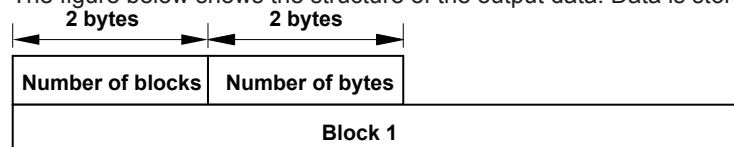
Number of Blocks (16 bits)

Always 1.

Number of Bytes (16 bits)

Stores the number of bytes of block 1.

Block 1

The figure below shows the structure of block 1.
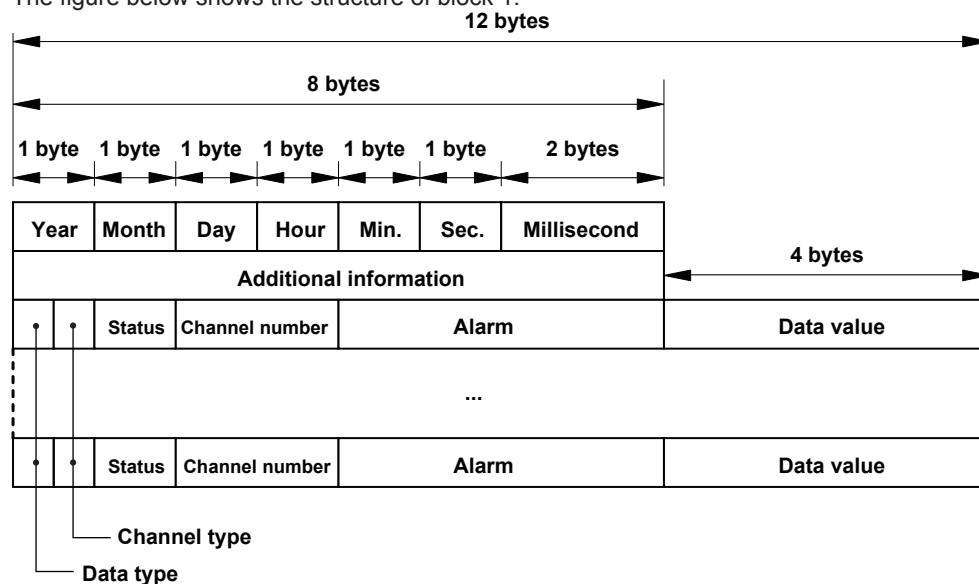
Data Time

Item (Number of Bits)	Value
Year (8 bits)	0 to 99
Month (8 bits)	1 to 12
Day (8 bits)	1 to 31
Hour (8 bits)	0 to 23
Minute (8 bits)	0 to 59
Second (8 bits)	0 to 59
Millisecond (16 bits)	0 to 999

Additional Information (64 bits)

Bit 0: Daylight saving time (0: standard time; 1: daylight saving time)

Data Type (4 bits)

Indicates the data type. (1: 32 bit integer; 2: 32 bit floating point)
Data values for channels set to Log scale (/LG) are 32-bit floating-point type.

Channel Type (4 bits)

Indicates the channel type.

Value	Channel Type
1	I/O channel
2	Math channel
3	Communication channel

Status (8 bits)

Indicates the channel status.

Value	Channel Status
0	No error
1	Skip
2	+Over
3	-OVER
4	+Burnout
5	-Burnout
6	A/D error
7	Invalid data
16	Math result is NaN.
17	Communication error

Channel Number (16 bits)

Indicates the channel number. Stored in the following manner depending on the channel type.

Channel Type	Channel Number
I/O channel	**6 bits** / **10 bits** — Reserved | Channel number
Math channel	**6 bits** / **10 bits** — Reserved | Channel number
Communication channel	**6 bits** / **10 bits** — Reserved | Channel number

Alarm (32 bits)

Indicates the alarm status.

8 bits	8 bits	8 bits	8 bits
Alarm 1	Alarm 2	Alarm 3	Alarm 4
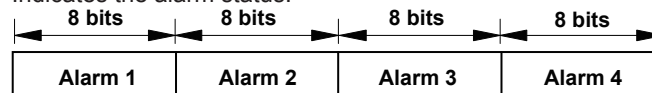
The eight bit values of alarm 1 to alarm 4 are described in the table below.

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
6	0	No alarm is activated.
	1	An alarm is activated.
7	0	Alarm nonhold state
	1	Alarm hold state

2.11.2 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.

Configuration

Data is stored in "Block 1" shown below.

2 bytes	2 bytes
Number of blocks	Number of bytes

Block 1
Block 2
Block N-1
Block N

Number of Blocks (16 bits)

Number of stored blocks. Stores the number of blocks that can be output within the range specified by the read start position and end position.

Number of Bytes (16 bits)

Stores the number of bytes per block.

Block

The content of the block is the same as that of "Block 1" described in section **"2.11.1 Most Recent Channel Data (FData)"**.

2.11.3   FIFO Data Read Range (FFifoCur)

The output in response to the command "FFifoCur,1" is shown below. Outputs FIFO data read position information.

8 bytes

Additional information (always 0)
The read position of the oldest data in the FIFO (1 to 99999999999)
The read position of the most recent data in the FIFO (1 to 99999999999)

The read position of the oldest data in the FIFO

This is the oldest data number within the readable data range.

The read position of the most recent data in the FIFO

This is the most recent data number within the readable data range.

Appendix 1 ASCII Character Codes

The ASCII character code table is shown below.

		Upper 4 Bits							
		0	1	2	3	4	5	6	7
Lower 4 Bits	0			SP (space)	0	@	P	`	p
	1			!	1	A	Q	a	q
	2			"	2	B	R	b	r
	3			#	3	C	S	c	s
	4			$	4	D	T	d	t
	5			%	5	E	U	e	u
	6			&	6	F	V	f	v
	7			'	7	G	W	g	w
	8			(	8	H	X	h	x
	9			)	9	I	Y	i	y
	A	LF (line feed)		*	:	J	Z	j	Z
	B		ESC	+	;	K	[	k	{
	C			,	<	L	\	l	|
	D	CR (return)		-	=	M	]	m	}
	E			•	>	N	^	n	~
	F			/	?	O	_	o	

Characters Used in Commands

In addition to alphanumeric characters, the following characters are used: commas as delimiters, semicolons as sub delimiters, question marks as query symbols, single quotation marks to indicate user-defined character strings, and "CR" (return) "LF" (line feed) as terminators.

Characters That Can Be Used in User-Defined Character Strings

The table below shows the characters that can be used in user-defined character strings (tags, tag No., messages, etc.).

Item	Command and Parameter	Description
Directory name	p1 of the SDirectory command	The characters other than those in blue cells and those in thick frames can be used.
File name	p2 of the SFileName command	
Batch number	p2 of the OBatName command	
Password	p5 of SUser p1, p2, and p3 of OPassword p2 of CLogin	The characters other than those in blue cells and SP (space) can be used.
Character strings that users specify other than those above		The characters other than those in blue cells can be used.

App

Appendix

Appendix 2 Login Procedure

To communicate using the general communication feature, you must log in to the recorder from your PC. If you complete the procedure successfully up to "Login complete" in the following figure, you will be able to use the commands.

When Using the Login Function

For Bluetooth, the Bluetooth connection flow chart is inserted here (see appendix 7).

Start

End

Judge

E1: 401   Response from the recorder (message omitted)
            └─ Code
               Response
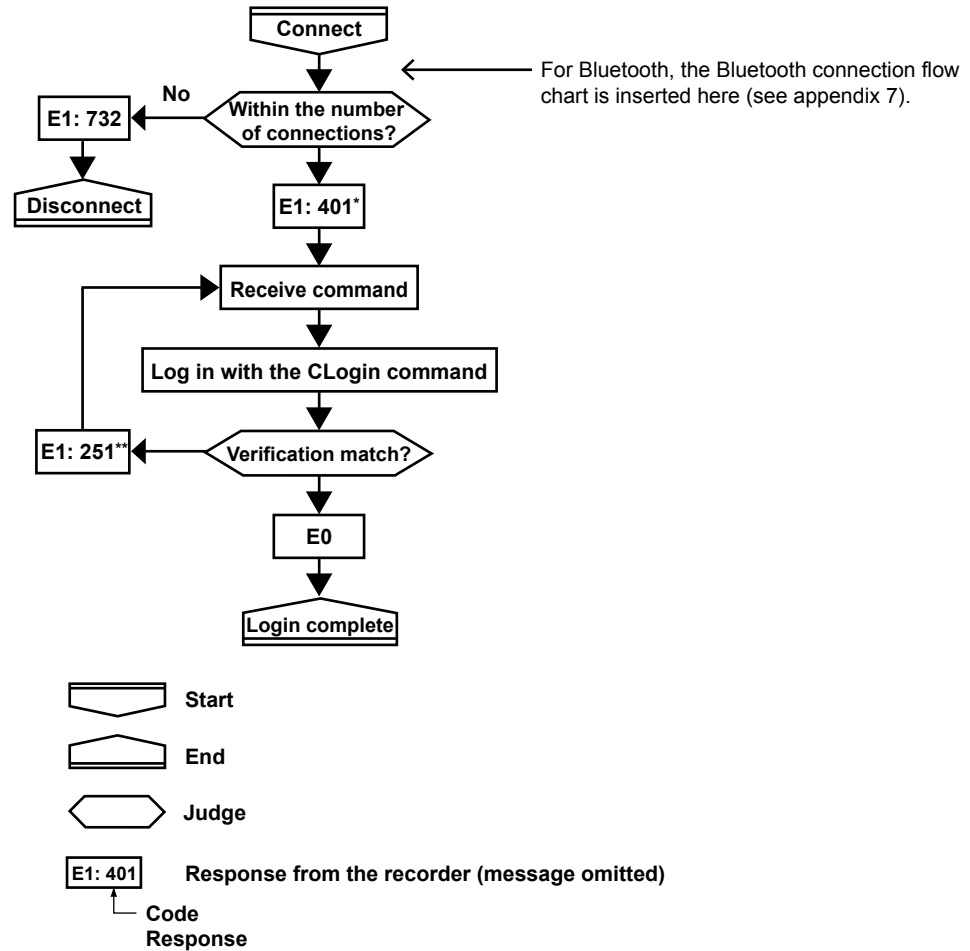
* "E1:402" is returned when the advanced security function (/AS) is enabled.
** If the format of the CLogin command is not correct, verification is not performed, and an error code indicating the error is returned.
   The following error code is returned when the advanced security function (/AS) is enabled.
   251, 262, 263, 264, 265, 272, 273, 767
   When the password management is in use, the following error code is returned in addition to the error code above.
   004,252,261,651,657,760,761,762,763,764,765,766,768,769,770,771,772,773,774,775
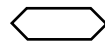
When Not Using the Login Function

| Connect |

For Bluetooth, the Bluetooth connection flow chart is inserted here (see appendix 7).

No ← Within the number of connections? → E1: 732 → Disconnect

↓ E0 → Login complete

Start

End
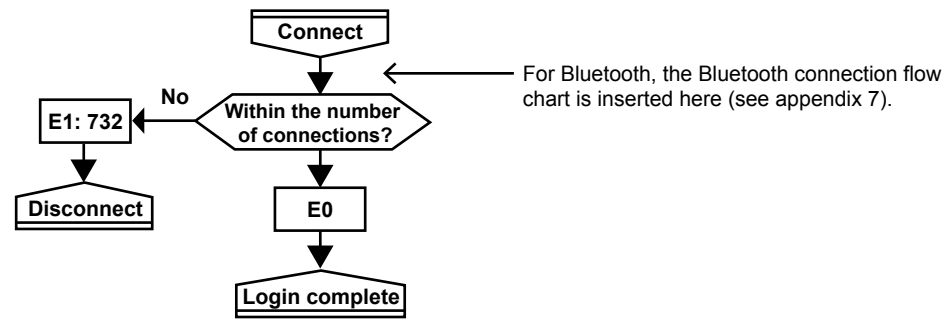
Judge

E1: 401   Response from the recorder (message omitted)
Code
Response

App

Appendix

Appendix 3 Output Flow Chart of External Storage Medium Files and File Lists

Example for Outputting File aaaa.dtd

The flow chart for outputting file aaaa.dtd in the DATA0 directory on the external storage medium is shown below.

```
                    START
                      |
                      v
              +----------------+
              | Send command   |
              +----------------+
                      |
         FMedia,GET,/DRV0/DATA0/aaaa.dtd,0,-1
                      |
              +----------------+
              | Receive response|
              +----------------+
                      |
                      v
              < Is there more data? >------+
              <       (1)           >      |
                      |                    v
                      v            +----------------+
              +----------------+   |      End       |
              | Obtain the number| +----------------+
              | of received bytes.|
              |      (2)        |
              +----------------+
                      |
                      v
              +----------------+
              | Compute        |
              | the unread position.|
              |      (3)        |
              +----------------+
                      |
                      v
              +----------------+
              | Send command   |
              +----------------+
                      |
      FMedia,GET,/DRV0/DATA0/aaaa.dtd,[unread position],-1
                      |
              +----------------+
              | Receive response|
              +----------------+
```

(1) If the binary header flag (bit 0) is 0, there is more data. If it is 1, data transmission is complete.

(2) From the data length of the binary output common header, obtain the number of received bytes.

(3) Sum the number of received bytes, compute the unread position.

Example for Outputting a File List

The flow chart for outputting the list of files in the DATA0 directory on the external storage medium is shown below.

```
                    ┌─────────────┐
                    │    START    │
                    └─────────────┘
                           │
                           ▼
                    ┌─────────────┐
                    │ Send command│
                    └─────────────┘
                           │
                    FMedia,DIR,/DRV0/DATA0/,0,-1
                           │
                           ▼
                    ┌──────────────┐
                    │   Receive    │
                    │   response   │
                    └──────────────┘
                           │
                           ▼
                    ╱──────────────╲
                   ╱  Are there more ╲
                   ╲  file lists?    ╱
                    ╲     (1)       ╱
                     ╲─────────────╱
                           │
                           ▼
                    ┌──────────────┐
                    │ Obtain the   │
                    │ number of    │
                    │ received     │
                    │ files (2)    │
                    └──────────────┘
                           │
                           ▼
                    ┌──────────────┐
                    │   Compute    │
                    │ the unread   │
                    │ position.(3) │
                    └──────────────┘
                           │
                           ▼
                    ┌──────────────┐
                    │ Send command │
                    └──────────────┘
                           │
              FMedia,DIR,/DRV0/DATA0/,[unread position],-1
                           │
                           ▼
                    ┌──────────────┐
                    │   Receive    │
                    │   response   │
                    └──────────────┘
```

End

(1) If there are no more files, EA[crlf]EN[crlf] is output.

(2) Count the number of lines in the output file list.

(3) Sum the number of lines in the file lists to compute the unread position.
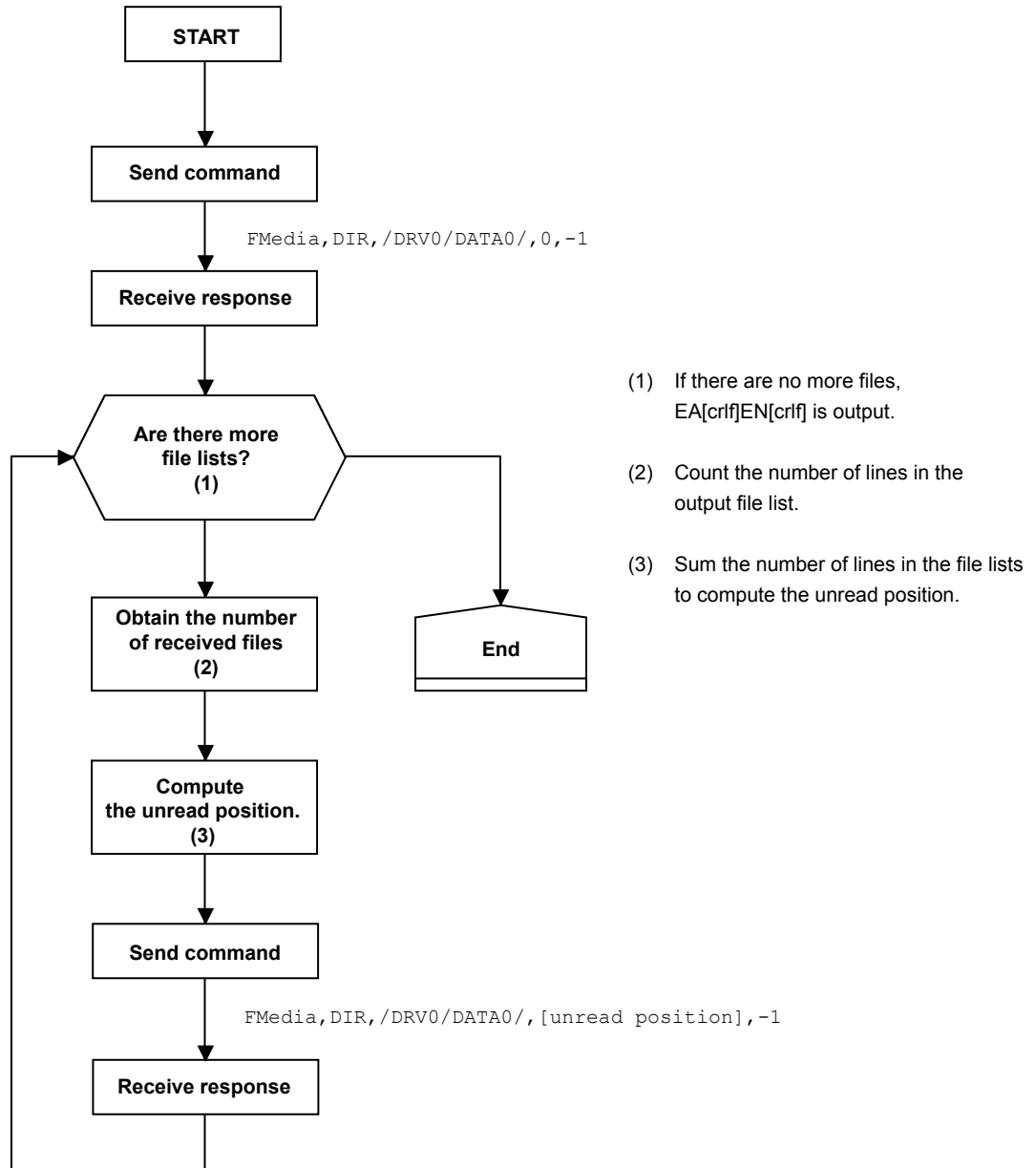
Appendix 4 FIFO Data Output Flow Chart

Overview of the FIFO Buffer

The recorder internal memory is equipped with a dedicated FIFO (First-In-First-Out) buffer for outputting measured data. Measured data is written to the buffer at every scan interval. The PC can continuously retrieve the most recent measured data from the FIFO buffer. The size of the internal memory allocated for the FIFO buffer varies depending on the model. The number of data entries that the FIFO buffer can store varies depending on the number of channels and scan interval. The number of data entries that the FIFO buffer can store and the data length can be determined with the following formula.

Data entries = 2000000 ÷ {16 + (12 × [number of channels])} (fractions truncated)
Data length = [data entries] × [scan interval]

Example   If there are 10 I/O channels, 10 math channels, and 10 communication channels, and the scan interval is 100 ms, the number data entries will be 5319, and the data length will be 531.9 seconds or 8.865 minutes.

Example of FIFO Buffer Operation

The following example shows the case when the scan interval is 1 second and the FIFO internal memory size is for 8 scan intervals.

Block 1
Block 2
Block 3
Block 4
Block 5
Block 6 ← Most recent write position (serial number starting from 1)
Block 7
Block 8
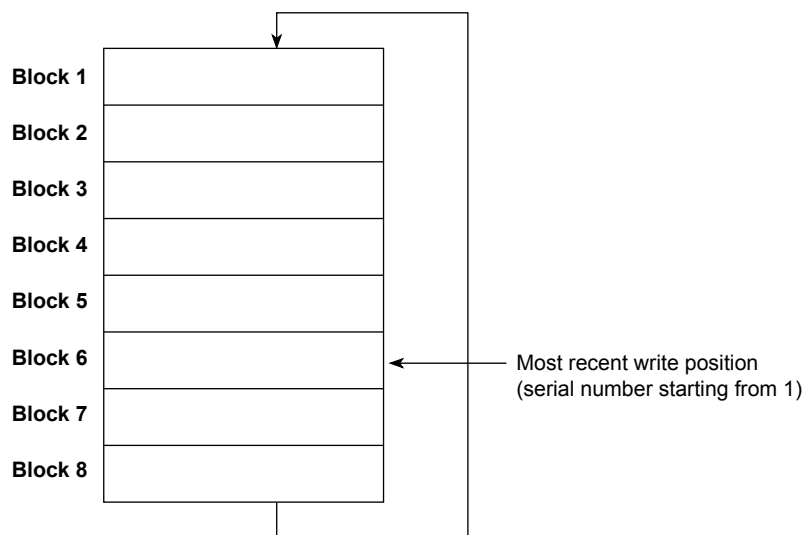
Writing of Measured Data in the FIFO Buffer

Writing to the FIFO buffer takes place every scan interval. If measured data is written to block 8, the most recent value will be written to block 1 in the next scan interval, overwriting the old value. This is called FIFO wraparound.

On the other hand, the most recent write position is managed using serial numbers starting with 1. The serial number does not return to 1 even when a FIFO wraparound occurs.

Reading Measured Data

The FFifoCur,0 command is used to read measured data. The read start position and read end position are specified using serial numbers. You can use the FFifoCur,1 command to read the serial numbers for the positions that data can be read from.

Appendix 5 Check Sum Calculation Method

The check sum of binary data is calculated using an algorithm like the one shown below.

```
int CalcSum(unsigned char *buf, int len)
{
  int    odd;
  unsigned long    sum;
  unsigned char    *p;

  sum = 0;
  odd = len & 1;
  len >>= 1;

  for (p = buf ; len ; len --, p += 2)
  {
    sum += (*p << 8) | *(p + 1);
  }

  if (odd)   sum += (*p << 8);

  sum = (sum & 0xffff) + ((sum >> 16) & 0xffff);
  if (sum > 0xffff)                sum = sum - 0xffff;

  return ((~sum) & 0xffff);
}
```

Appendix 6 Data Group Name and Data Name for WT Communication

The table below shows the parameters p5 (Data Group Name) and p6 (Data Name) for SWattData Command.

Parameters p5 (Data Group Name) and p6 (Data Name) for SWattData Command

WT1800

p5 (Data group name)	p6 (Data name)	Description	WT Function mark
Off	-	Data assignment is disabled.	-
ELEMENT1 to ELEMENT6	URMS	True rms voltage	Urms
	UMN	Rectified mean voltage calibrated to the rms value	Umn
	UDC	Simple voltage average	Udc
	IRMS	True rms current	Irms
	IMN	Rectified mean current calibrated to the rms value	Imn
	IDC	Simple current average	Idc
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBda	Power factor	λ
	PHI	Phase difference	φ
	FU	voltage frequency	fU
	FI	current frequency	fI
	TIME	Integration time	Time
	WH	sum of watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q–
ElemHrm1 to ElemHrm6	UK_1	RMS voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_1	RMS current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
SigmaA to SigmaC	URMS	True rms voltage	Urms Σ [1]
	UMN	Rectified mean voltage calibrated to the rms value	Umn Σ
	IRMS	True rms current	Irms Σ
	IMN	Rectified mean current calibrated to the rms value	Imn Σ
	P	Active power	P Σ
	S	Apparent power	S Σ
	LAMBda	Power factor	λΣ
	PHI	Phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ

Data group name	Data name	Description	WT Function mark
Other	ETA1	Efficiency 1	η 1
	ETA2	Efficiency 2	η 2
	ETA3	Efficiency 3	η 3
	ETA4	Efficiency 4	η 4
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
	F9	User-defined function 9	F9
	F10	User-defined function 10	F10
	F11	User-defined function 11	F11
	F12	User-defined function 12	F12
	F13	User-defined function 13	F13
	F14	User-defined function 14	F14
	F15	User-defined function 15	F15
	F16	User-defined function 16	F16
	F17	User-defined function 17	F17
	F18	User-defined function 18	F18
DeltaA to DeltaC	DU1	Delta computation voltage 1	Δ U1
	DU2	Delta computation voltage 2	Δ U2
	DU3	Delta computation voltage 3	Δ U3
	DUS	Delta computation wiring voltage	Δ U Σ
	DI	Delta computation current	Δ I
	DP1	Delta computation power 1	Δ P1
	DP2	Delta computation power 2	Δ P2
	DP3	Delta computation power 3	Δ P3
	DPS	Delta computation wiring power	Δ P Σ
Motor	SPEED	Motor rotating speed	Speed
	TORQUE	Motor torque	Torque
	SYNCSP	Synchronous speed	SyncSp
	SLIP	Slip (%)	Slip
	PM	Mechanical output of the motor (mechanical power)	Pm
Aux	Aux1	Auxiliary input 1	Aux1
	Aux2	Auxiliary input 2	Aux2

1 Will become ΣA, ΣB, or ΣC depending on the WT1800 wiring type.

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WT500

Data group name	Data name	Description	WT Function mark
Off	-	Data assignment is disabled.	–
ELEMENT to ELEMENT3	URMS	True rms voltage	Urms
	UMN	Rectified mean voltage calibrated to the rms value	Umn
	UDC	Simple voltage average	Udc
	URMN	Rectified mean voltage	Urmn
	UAC	AC component	Uac
	IRMS	True rms current	Irms
	IMN	Rectified mean current calibrated to the rms value	Imn
	IDC	Simple current average	Idc
	IRMN	Rectified mean current	Irmn
	IAC	AC component	Iac
	P	Active power	P
	S	Apparent power	S
	Q	Reactive power	Q
	LAMBda	Power factor	λ
	PHI	Phase difference	φ
	FU	Voltage frequency	fU
	FI	Current frequency	fI
	UPPeak	Maximum voltage	U+pk
	UMPeak	Minimum voltage	U-pk
	IPPeak	Maximum current	I+pk
	IMPeak	Minimum current	I-pk
	CFU	Voltage crest factor	CfU
	CFI	Current crest factor	CfI
	TIME	Integration time	Time
	WH	Sum of positive and negative watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q-
	WS	Volt-ampere hours	WS
	WQ	Var hours	WQ
ElemHrm1 to ElemHrm3	UK_0	Rms voltage of harmonic order 0	U(0)
	UK_1	Rms voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_0	Rms current of harmonic order 0	I(0)
	IK_1	Rms current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	PK_0	Active power of harmonic order 0	P(0)
	PK_1	Active power of harmonic order 1	P(1)
	PK_T	Active power	P(Total)
	SK_0	Apparent power of harmonic order 0	S(0)
	SK_1	Apparent power of harmonic order 1	S(1)
	SK_T	Total apparent power	S(Total)
	QK_0	Reactive power of harmonic order 0	Q(0)
	QK_1	Reactive power of harmonic order 1	Q(1)
	QK_T	Total reactive power	Q(Total)
	LAMBDA0	Power factor of harmonic order 0	λ (0)
	LAMBDA1	Power factor of harmonic order 1	λ (1)
	LAMBDAT	Total power factor	λ (Total)
	PHIK_1	Phase difference between the voltage and current of harmonic order 1	φ (1)
	PHIK_T	Total phase difference	φ (Total)

Data group name	Data name	Description	WT Function mark
ElemHrm1 to ElemHrm3	PHIUk3	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	φ U(3)
	PHIIk3	Phase difference between harmonic current I(3) and the fundamental signal I(1).	φ I(3)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	PTHD	Ratio of the total harmonic active power to P(1) or P(Total)	Pthd
SigmaA	URMS	True rms voltage	Urms Σ
	UMN	Rectified mean voltage calibrated to the rms value	Umn Σ
	UDC	Simple voltage average	Udc Σ
	URMN	Rectified mean voltage	Urmn Σ
	UAC	AC component	Uac Σ
	IRMS	True rms current	Irms Σ
	IMN	Rectified mean current calibrated to the rms value	Imn Σ
	IDC	Simple current average	Idc Σ
	IRMN	Rectified mean current	Irmn Σ
	IAC	AC component	Iac Σ
	P	Active power	P Σ
	S	Apparent power	S Σ
	Q	Reactive power	Q Σ
	LAMBda	Power factor	λΣ
	PHI	Phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ
	WS	Integrated value of SΣ	WS Σ
	WQ	Integrated value of QΣ	WQ Σ
Other	ETA1	Efficiency 1	η 1
	ETA2	Efficiency 2	η 2
	F1	User-defined function 1	F1
	F2	User-defined function 2	F2
	F3	User-defined function 3	F3
	F4	User-defined function 4	F4
	F5	User-defined function 5	F5
	F6	User-defined function 6	F6
	F7	User-defined function 7	F7
	F8	User-defined function 8	F8
Delta	DELTA1	Delta computation 1	Δ F1
	DELTA2	Delta computation 2	Δ F2
	DELTA3	Delta computation 3	Δ F3
	DELTA4	Delta computation 4	Δ F4
Phase	PHI_U1U2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 2, U2(1)	φ U1-U2
	PHI_U1U3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental voltage of element 3, U3(1)	φ U1-U3
	PHI_U1I1	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 1, I1(1)	φ U1-I1

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Data group name	Data name	Description	WT Function mark
Phase	PHI_U1I2	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 2, I2(1)	φ U1-I2
	PHI_U1I3	The phase difference between the fundamental voltage of element 1, U1(1), and the fundamental current of element 3, I3(1)	φ U1-I3

WT300

Data group name	Data name	Description	WT Function mark
Off	-	Data assignment is disabled.	–
ELEMENT1 to ELEMENT3	U	voltage	U
	I	current	I
	P	active power	P
	S	apparent power	S
	Q	reactive power	Q
	LAMBda	power factor	λ
	PHI	phase difference	φ
	FU	voltage frequency	fU
	FI	current frequency	fI
	UPPeak	Maximum voltage	U+pk
	UMPeak	Minimum voltage	U-pk
	IPPeak	Maximum current	I+pk
	IMPeak	Minimum current	I-pk
	PPPeak	Maximum active power	P+pk
	PMPeak	Minimum active power	P-pk
	TIME[1]	Integration time	Time
	WH	sum of watt hours	WP
	WHP	Sum of positive P (consumed watt hours)	WP+
	WHM	Sum of negative P (watt hours returned to the power supply)	WP-
	AH	Sum of positive and negative ampere hours	q
	AHP	Sum of positive I (ampere hours)	q+
	AHM	Sum of negative I (ampere hours)	q-
ElemHrm1 to ElemHrm3	UK_1	RMS voltage of harmonic order 1	U(1)
	UK_T	Rms voltage	U(Total)
	IK_1	RMS current of harmonic order 1	I(1)
	IK_T	Rms current	I(Total)
	PK_1	Active power of harmonic order 1	P(1)
	PK_T	Active power	P(Total)
	LAMBDA1	Power factor of harmonic order 1	λ (1)
	PHIK_1	Phase difference between the voltage and current of harmonic order 1	φ (1)
	PHIUk3	Phase difference between harmonic voltage U(3) and the fundamental signal U(1).	φ U(3)
	PHIIk3	Phase difference between harmonic current I(3) and the fundamental signal I(1).	φ I(3)
	UTHD	Ratio of the total harmonic voltage to U(1) or U(Total)	Uthd
	ITHD	Ratio of the total harmonic current to I(1) or I(Total)	Ithd
	Uhdf_1	relative harmonic content of harmonic voltage of order 1	Uhdf(1)
	Ihdf_1	relative harmonic content of harmonic current of order 1	Ihdf(1)
	Phdf_1	relative harmonic content of harmonic power of order 1	Phdf(1)
	FPLL[2]	Current frequency or voltage frequency of PLL source	fPLL

Data group name	Data name	Description	WT Function mark
SigmaA	U	voltage	U Σ
	I	current	I Σ
	P	active power	P Σ
	S	apparent power	S Σ
	Q	reactive power	Q Σ
	LAMBda	power factor	λΣ
	PHI	phase difference	φΣ
	WH	Sum of positive and negative watt hours	WP Σ
	WHP	Sum of positive P (consumed watt hours)	WP+ Σ
	WHM	Sum of negative P (watt hours returned to the power supply)	WP- Σ
	AH	Sum of positive and negative ampere hours	q Σ
	AHP	Sum of positive I (ampere hours)	q+ Σ
	AHM	Sum of negative I (ampere hours)	q- Σ
Other	MATH	Computed value, such as efficiency	Math

1 "TIME" is valid only when the data group is "ELEMENT1."
2 "PFLL" is valid only when the data group is "ElemHrm1."

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Appendix

Appendix 7 Bluetooth Communication Connection Flow Chart
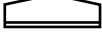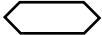
To compose the complete Bluetooth communication connection flow chart, in appendix 2, insert the following flow chart after "Connect" in the flow chart shown under "When Using the Login Function" when the communication login function is in use or "When Not Using the Login Function" when the function is not in use.

```
                          ( Addition start )
                                 │
              No                 ▼
         ┌──────────────< Password required?¹ >
         │                       │
         │                      Yes
         │                       ▼
         │           ┌──────────────────┐
         │    ┌─────▶│ E1: 403          │  (Password input request)
         │    │      └──────────────────┘
         │    │                 │
         │    │                 ▼
         │    │      ┌──────────────────┐
         │    │      │ Receive command² │
         │    │      └──────────────────┘
         │    │                 │
         │    │                 ▼
         │    │  ┌──────────────────────────────────┐
         │    │  │ Send password with CBTConnect command │
         │    │  └──────────────────────────────────┘
         │    │                 │
         │    │                 ▼
         │    └────< CBTConnect command? >
         │                      │
         │                      ▼                    ┌──────────┐
         │           < Verification match? >───────▶ │ E1:266³  │
         │                      │                     └──────────┘
         │                      │                          │
         └──────────────────────┤                          ▼
                                ▼                    ┌──────────────┐
                       ( Addition end⁴ )             │ Disconnect   │
                                                     └──────────────┘
```
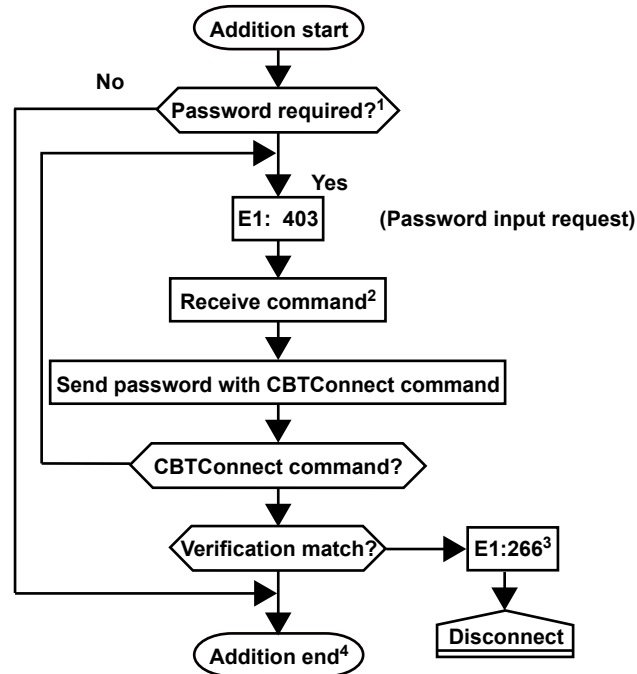
```
  ⬡         Start
  ⬡         End
  ⬡         Judge

┌────────┐
│ E1: 401│   Response from the recorder (message omitted)
└────────┘
    └─ Code
```

1 A Bluetooth password is required when the first terminal tries to establish a connection when the password usage is enabled.
2 If no input is received within 2 minutes of a password input request (E403), Bluetooth communication will be disconnected.
3 If an error occurs during the CBTConnect command check (the number of parameters, whether the command is a query, etc.), the flow chart sequence follows the same path as when the password verification fails.
4 The above sequence between "Addition start" and "Addition end" is not recorded in the general log.