

Models GX10/GX20/GP10/GP20

**Paperless Recorder
Communication Command
User's Manual**

vigilantplant®

Introduction

Thank you for purchasing the SMARTDAC+ GX10/GX20/GP10/GP20 (hereafter referred to as the GX and GP) Series.

This manual explains the dedicated commands for the GX/GP. 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.
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How to Use This Manual

This manual explains the dedicated communication commands for the GX/GP and how to use them. For details on the features of the GX/GP and how to use it, see the following manuals.

- Models GX10/GX20/GP10/GP20 Paperless Recorder First Step Guide (IM 04L51B01-02EN)
- Models GX10/GX20/GP10/GP20 Paperless Recorder User's Manual (IM 04L51B01-01EN)

Conventions Used in This Manual

Unit

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

Markings



WARNING	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."
CAUTION	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.
Note	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.
	Calls attention to information that is important for the proper operation of the instrument.

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1.1 Operations over an Ethernet Network

You can control the GX/GP 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

GX/GP Configuration

Configure the GX/GP to connect to the Ethernet network that you want to use. For instructions on how to configure the GX/GP, see section 1.16, “Configuring the Ethernet Communication Function” in the *Models GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN).

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 GX/GP, it will return a response. You can control the GX/GP 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 commands “FSnap.GET” from your PC to the GX/GP, the GX/GP will return the snapshot data of its screen.

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 GX/GP.

- **When Using the Login Function**

Log in to the GX/GP using a system administrator account or a normal user account that is registered in the GX/GP. Log in by connecting to the GX/GP and then sending the “CLogin” command.

1.2 Operations over the Serial Interface

You can control the GX/GP 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,” or section 1.2.4, “RS-422/485 Connection Procedure.”

GX/GP Configuration

Configure the GX/GP to use serial communication. For instructions on how to configure the GX/GP, see section 1.17, “Configuring the Serial Communication Function (/C2 and /C3 options)” in the *Models GX10/GX20/GP10/GP20 Paperless Recorder User’s Manual* (IM 04L51B01-01EN).

PC

The PC that you will use must meet the following requirements.

- The PC is connected to the GX/GP 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 GX/GP, it will return a response. You can control the GX/GP 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 commands “FSnap,GET” from your PC to the GX/GP, the GX/GP will return the snapshot data of its screen.

For details on commands and responses, see chapter 2, “Commands and Responses.”

Notes on Creating Programs

- **For RS-232**

When you connect a PC to the GX/GP through the serial interface, the GX/GP 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 GX/GP receives a connection-close command (ESC C).
- When another device is opened.

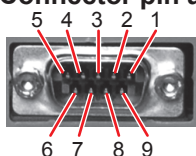
Example: If you open the device at address 1 and then open the device at address 2, the connection with the device at address 1 will be closed automatically.

1.2.3 RS-232 Connection Procedure

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

Connection

- Connector pin arrangement and signal names

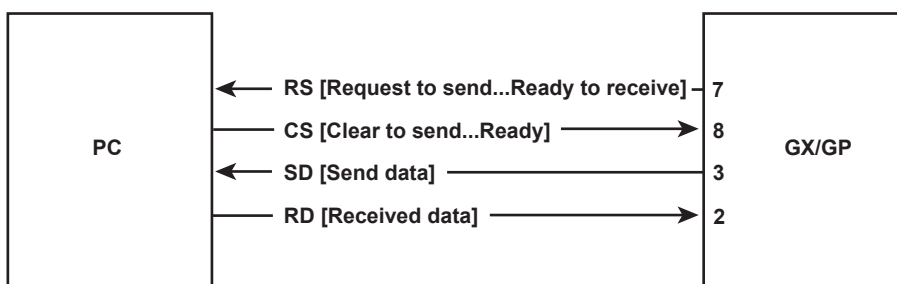


Each pin corresponds to the signal indicated below. The following table shows the signal name, RS-232 standard, JIS, and ITU-T standard signals.

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.

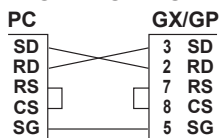
¹ Pins 1, 4, 6, and 9 are not used.

- Signal direction

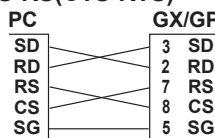


- Connection example

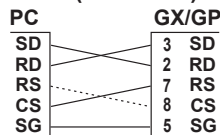
• OFF-OFF/XON-XON



• CS-RS(CTS-RTS)



• XON-RS(XON-RTS)



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 area of the received buffer used reaches to 192 bytes, the GX/GP sends an “X-OFF” code. When the amount of area decreases to 64 bytes, 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 area of the received buffer used reaches to 192 bytes, the GX/GP sets “RS=False.” When the amount of area decreases to 64 bytes, 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.

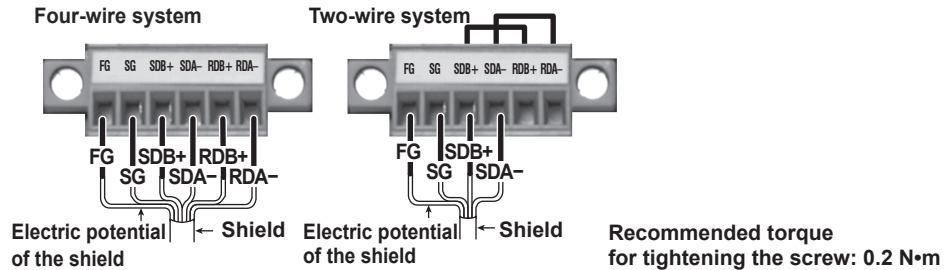
1.2.4 RS-422/485 Connection Procedure

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.



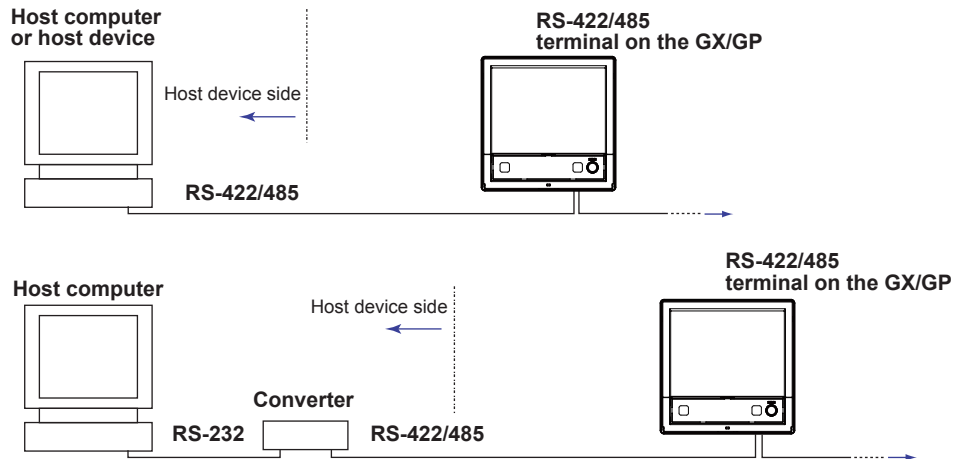
- **Signal names**

Each terminal corresponds to the signal indicated below.

Signal Name	Meaning
FG	Frame ground of the GX/GP.
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 GX/GP 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

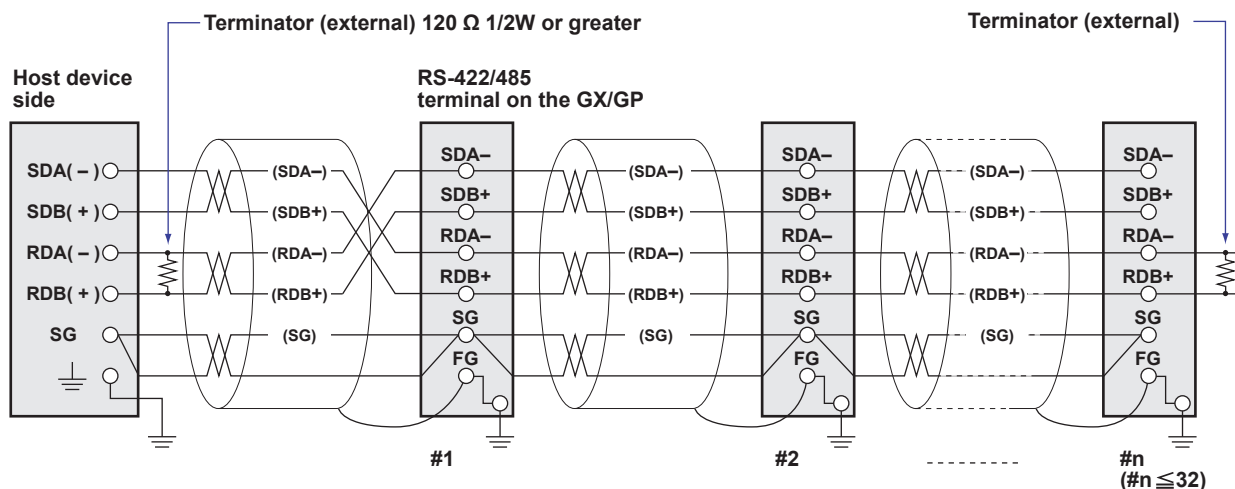
A connection can be made with a host device having a RS-232, RS422, or RS-485 port. In the case of RS-232, a converter is used. See the connection examples below for a typical converter terminal. For details, see the manual that comes with the converter.

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

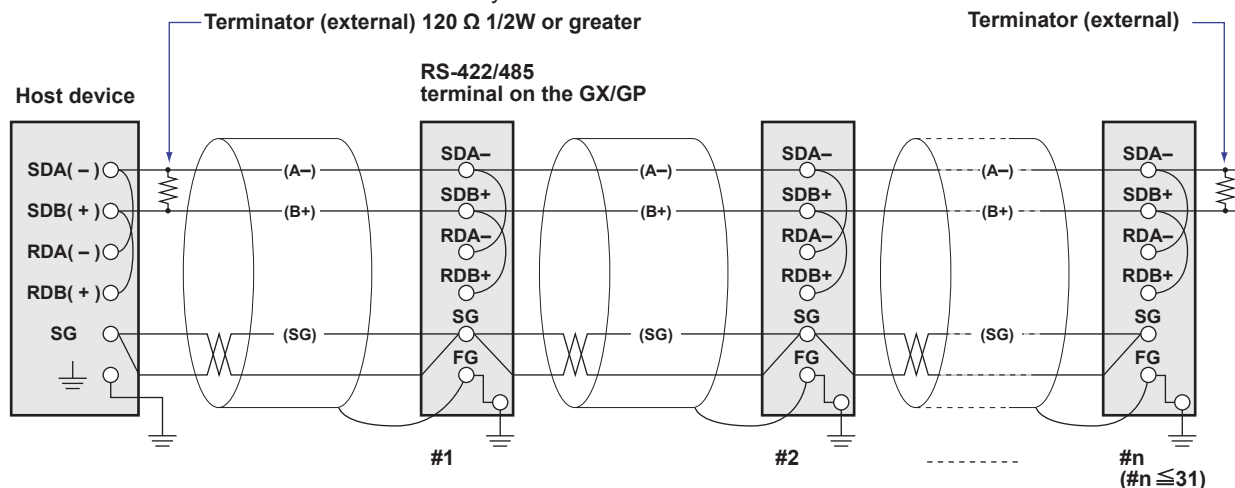
Generally, a four-wire system is used to connect to a host device. In the case of a four-wire system, the transmission and reception lines need to be crossed over.



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 GX/GP's ground (one-sided grounding). This is effective when there is a difference in the electric potential between the computer's ground and the GX/GP'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 GX/GP'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



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 GX/GP 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 GX/GPs 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 μ R, 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 GX/GP if the GX/GP is connected to the end of the chain. Do not connect a terminator to a GX/GP 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.

2.1 Command Transmission and GX/GP Responses

2.1.1 General Communication

The GX/GP 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

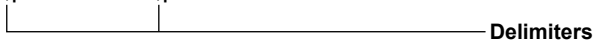
The following types of commands are available. The first character of command names represents the command type. For example, in the command “SRangeAI,” “S” represents the command type. The second and subsequent characters represent the contents of commands.

Type	Description
Operation commands Example: OSetTime	Commands that start with “O.” These commands are used to operate the GX/GP.
Setting commands Example: SRangeAI	Commands that start with “S.” These commands change the GX/GP settings.
Output commands Example: FData	Commands that start with “F.” These commands cause the GX/GP 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 GX/GP.
Instrument information output commands Example: _MFG	Commands that start with an underscore. These commands cause the GX/GP 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.

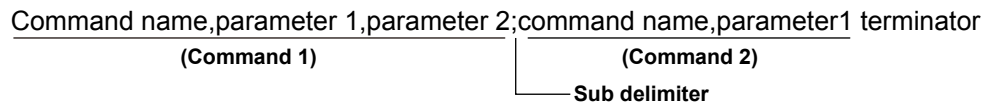
Command name,parameter 1,parameter 2 terminator


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


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 GX/GP settings. To send a query, append a question mark to the command name or parameter. When the GX/GP 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,2Vterminator`

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 GX/GP Responses

The GX/GP returns the following responses to commands.

- If the GX/GP successfully completes the processing of a received output request command, it outputs the requested data.
- If the GX/GP 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 GX/GP outputs a negative response.

For each command the GX/GP 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 GX/GP 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

Command	Setup Item (Required Options)	Page
Measurement Operation Setting Commands		
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SScanGroup	Scan group	2-9
SModeAI	AI module	2-9
SModeDI	DI module	2-9
SScaleOver	Detection of values that exceed the scale	2-9
Recording Basic Setting Commands		Page
SMemory	Recording mode	2-10
SDispData	Display data recording	2-10
SEventData	Event data recording	2-10
Recording Channel Setting Commands		Page
SRecDisp	Channel for recording display data	2-10
SRecEvent	Channel for recording event data	2-11
SRecManual	Channel for recording manual sampled data	2-11
Batch Setting Commands		Page
SBatch	Batch function	2-11
STextField	Batch text	2-11
Data Save Setting Commands		Page
SDirectory	Name of directory to save data	2-11
SFileHead	File header	2-12
SFileName	File naming rule	2-12
SMediaSave	Automatic data file saving	2-12
SFileFormat	Display/event data file format	2-12
I/O Channel (AI/DI/DO) Setting Commands		Page
SRangeAI	Measurement range of AI channel	2-13
SRangeDI	Measurement range of DI channel	2-14
SRangeDO	DO channel operation	2-14
SMoveAve	Moving average	2-15
SBurnOut	Behavior when a sensor burns out	2-15
SRjc	Reference junction compensation method	2-15
SAlarmIO	Alarm	2-15
SAlmHysIO	Alarm hysteresis	2-16
SAlmDlyIO	Alarm delay time	2-16
STagIO	Tag	2-16
SColorIO	Channel color	2-16
SZoneIO	Waveform display zone	2-17
SScaleIO	Scale display	2-17
SBarIO	Bar graph display	2-17
SPartialIO	Partial expanded display	2-17
SBandIO	Color scale band	2-17
SAlmMarkIO	Alarm mark	2-18
SValueIO	Upper/lower limit display characters	2-18
SCalibIO	Calibration correction	2-18

Math Channel Setting Commands		Page
SMathBasic	Math action (/MT)	2-19
SKConst	Constant (/MT)	2-20
SRangeMath	Computation expression (/MT)	2-20
STlogMath	TLOG (/MT)	2-20
SRolAveMath	Rolling average (/MT)	2-20
SAlarmMath	Alarm (/MT)	2-20
SAlmHysMath	Alarm hysteresis (/MT)	2-21
SAlmDlyMath	Alarm delay time (/MT)	2-21
STagMath	Tag (/MT)	2-21
SColorMath	Channel color (/MT)	2-21
SZoneMath	Waveform display zone (/MT)	2-21
SScaleMath	Scale display (/MT)	2-21
SBarMath	Bar graph display (/MT)	2-22
SPartialMath	Partial expanded display (/MT)	2-22
SBandMath	Color scale band (/MT)	2-22
SAlmMarkMath	Alarm mark (/MT)	2-22
Communication Channel Setting Commands		Page
SRangeCom	Measurement range (/MC)	2-23
SValueCom	Preset operation (/MC)	2-23
SWDCom	Watchdog timer (/MC)	2-23
SAlarmCom	Alarm (/MC)	2-24
SAlmHysCom	Alarm hysteresis (/MC)	2-24
SAlmDlyCom	Alarm delay time (/MC)	2-24
STagCom	Tag (/MC)	2-24
SColorCom	Channel color (/MC)	2-25
SZoneCom	Waveform display zone (/MC)	2-25
SScaleCom	Scale display (/MC)	2-25
SBarCom	Bar graph display (/MC)	2-25
SPartialCom	Partial expanded display (/MC)	2-25
SBandCom	Color scale band (/MC)	2-25
SAlmMarkCom	Alarm mark (/MC)	2-26
Alarm Setting Commands		Page
SAlmLimit	Rate-of-change alarm interval	2-26
SAlmSts	Alarm display hold/nonhold	2-26
Time Setting Commands		Page
STimer	Timer	2-26
SMatchTimer	Match time timer	2-27
Event Action Setting Commands		Page
SEventAct	Event action	2-27
Report Setting Commands		Page
SReport	Report type (/MT)	2-28
SRepData	Report data (/MT)	2-28
SRepTemp	Report output (/MT)	2-29
SRepCh	Report channel (/MT)	2-29
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SLcd	LCD	2-29
SViewAngle	View angle	2-29
SBackColor	Screen background color	2-30
SGrpChange	Automatic group switching time	2-30
SAutoJump	Jump default display operation	2-30
SCalFormat	Calendar display format	2-30
SBarDirect	Bar graph display direction	2-30

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SChgMonitor	Value modification from the monitor	2-30
STrdWave	Trend waveform display	2-30
STrdScale	Scale	2-30
STrdLine	Trend line width, grid	2-31
STrdRate	Trend interval switching	2-31
STrdKind	Trend type	2-31
STrdPartial	Partial expanded trend display	2-31
SMsgBasic	Message writing	2-31
SGroup	Display group	2-31
STripLine	Display group trip line	2-32
SSclBmp	Scale bitmap image usage	2-32
SMessage	Message	2-32
System Setting Commands		Page
STimeZone	Time zone	2-32
SDateBasic	Gradual time adjustment	2-32
SDateFormat	Date format	2-32
SDst	Daylight saving time	2-33
SLang	Language	2-33
STemp	Temperature unit	2-33
SDPoint	Decimal point type	2-33
SFailAct	Fail relay (DO channel) operation (/FL)	2-33
SFailSts	Instrument status to output (/FL)	2-34
SPrinter	Printer	2-34
SLed	LED indicator operation	2-34
SSound	Sound	2-34
SInstruTag	Instruments tag	2-34
SConfCmt	Setting file comment	2-34
SUsbInput	USB input device	2-34
Internal Switch Setting Commands		Page
SSwitch	Internal switch operation	2-34
Serial Communication Setting Commands		Page
SSerialBasic	Serial communication basics (/C2 or /C3)	2-35
SModMaster	Modbus master (/C2/MC or /C3/MC)	2-35
SModMcmd	Modbus master transmission command (/C2/MC or /C3/MC)	2-35
Ethernet Communication Setting Commands		Page
SIpAddress	IP address information	2-36
SClient	Client function	2-36
SDns	DNS information	2-36
SDhcp	DHCP client	2-36
SFtpKind	File to transfer via FTP	2-37
SFtpTime	FTP transfer time shift	2-37
SFtpCnct	FTP client connection destination server	2-37
SSmtpLogin	SMTP user authentication	2-37
SSmtpCnct	SMTP client connection destination server	2-37
SMailHead	Mail header (recipient address)	2-37
SMailBasic	Common section of the mail body	2-38
SMail	Destination and behavior for each mail type	2-38
SMailAlarm	Alarm notification mail target channels	2-38

SMailTime	Scheduled transmission times	2-38
SSntpCnct	SNTP client	2-39
SModClient	Modbus client operation (/MC)	2-39
SModCList	Modbus client connection destination server (/MC)	2-39
SModCCmd	Modbus client transmission command (/MC)	2-39
SServer	Server function	2-40
SKeepAlive	Keepalive	2-40
STimeout	Communication timeout	2-40
SFtpFormat	FTP server directory output format	2-40
SModDelay	Modbus server delay response	2-40
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SModList	IP address to allow connection to Modbus server	2-40
Security Setting Commands		Page
SSecurity	Security function	2-40
SOpePass	Password to unlock operation	2-41
SOpeLimit	Operation lock details	2-41
SUser	User settings	2-41
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SMonitor	Monitor screen display information	2-41
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SHomeMonitor	Standard display information	2-42
SHomeKind	Standard display	2-43
SFavoriteMonitor	Favorite screen display information	2-43
SFavoriteKind	Favorite screen	2-43

2.2.2 Output Commands

Command	Description	Page
FData	Outputs the most recent channel data	2-44
FRelay	Outputs the most recent relay (DO channel) and internal switch status	2-44
FFifoCur	Outputs channel FIFO data	2-44
FSnap	Takes a snapshot	2-44
FUser	Outputs the user level	2-44
FAddr	Outputs the IP address	2-45
FStat	Outputs the GX/GP status	2-45
FLog	Outputs the log	2-45
FMedia	Outputs external storage medium and internal memory information	2-45
FCnf	Outputs setting data	2-46
FChInfo	Outputs decimal place and unit information	2-46
FSysConf	Queries the system configuration and reconfigures modules	2-46

2.2.3 Operation Commands

Command	Description	Page
OSetTime	Sets the time	2-47
ORec	Starts or stops recording	2-47

OAlarmAck	Clears alarm output (alarm acknowledgement)	2-47
OExecRec	Generates a manual trigger, executes manual sample, takes a snapshot, or causes a timeout	2-47
OExecSNTP	Queries the time using SNTP	2-47
OMessage	Writes a message	2-47
OPassword	Changes the password	2-48
OMath	Starts, stops, or resets computation or clears the computation dropout status display	2-48
OSaveConf	Saves setting data	2-48
OCommCh	Sets a communication channel to a value	2-48
OEMail	Starts or stops the e-mail transmission function	2-48
OMBRestore	Recovers Modbus manually	2-48
ORTReset	Resets a relative timer	2-48
OMTReset	Resets the match time timer	2-49
OCmdRelay	Outputs the DO channel and internal switch status	2-49
OBatName	Sets a batch name	2-49
OBatComment	Sets a batch comment	2-49
OBatText	Sets a batch text	2-49
ODispRate	Switches the trend interval	2-49
OLoadConf	Loads setting data	2-50
OSeriApply	Applies serial communication settings	2-50
OIPApply	Applies the IP address	2-50
OInit	Clears measured data and initializes setting data	2-50

2.2.4 Communication Control Commands

Command	Description	Page
CCheckSum	Sets the checksum	2-51
CSFilter	Sets the status filter	2-51
CLogin	Log in via communication	2-51
CLogout	Log out via communication	2-51
ESC O	Opens an instrument (RS-422/485 only)	2-51
ESC C	Closes an instrument (RS-422/485 only)	2-51

2.2.5 Instrument Information Commands

Command	Description	Page
_MFG	Outputs the instrument manufacturer	2-52
_INF	Outputs the instrument's product name	2-52
_COD	Outputs the instrument's basic specifications	2-52
_VER	Outputs the instrument's firmware version information	2-52
_OPT	Outputs the instrument's option installation information	2-52

_TYP	Outputs the instrument's temperature unit, and daylight saving time installation information	2-52
_ERR	Outputs the instrument's error number information	2-52
_UNS	Outputs the instrument's unit configuration information	2-52
_UNR	Outputs the instrument's unit configuration information	2-52
_MDS	Outputs the instrument's module configuration information	2-52
_MDR	Outputs the instrument's module configuration information	2-52

2.2.6 Conditions for Executing Commands

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

- The GX/GP is not in a condition to accept the operation.
For example, if the GX/GP is not recording, you cannot write a message.
- If the GX/GP does not have the function or is not using the function.

The "Setup Item" column in section 2.2.1, "Setting Commands" contains the GX/GP suffix codes that are required for using the commands.

- Operation lock or 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
Message	OMessage
Batch	OBatName, OBatComment, OBatText
AlarmACK	OAlarmAck
Comm	OEMail, OIPApply
DispOpe	SHomeKind, SHomeMonitor, SFavoriteKind, SFavoriteMonitor, Smonitor, SMultiPattern, SMultiKind, ODispRate
DateSet	OExecSNTP, OSetTime
ChangeSet	Sxxxx*1, OLoadConf
File	OLoadConf, OSaveConf, Fmedia

*1 Setting commands except for SHomeKind, SHomeMonitor, SFavoriteKind, SFavoriteMonitor, Smonitor, SMultiPattern, and SMultiKind

- The command is not applicable to the model. The following commands can be used only on certain models.

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

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
AI channel	Specify as "unit number+module number+channel."
DI channel	
DO 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 For SGroup and SMailAlarm commands, insert "A" in front. Example A001
Communication channel	GX20/GP20: 001 to 300 GX10/GP10: 001 to 050 For SGroup and SMailAlarm commands, insert "C" in front. Example C001
Number of channels for recording display data	GX20/GP20: 001 to 500 GX10/GP10: 001 to 100
Number of channels for recording event data	GX20/GP20: 001 to 500 GX10/GP10: 001 to 100

Type	Notation and Range of Values
Number of report channels	GX20/GP20: 1 to 60 GX10/GP10: 1 to 50
Number of display groups	GX20/GP20: 1 to 50 GX10/GP10: 1 to 30
Number of channels that can be registered to display groups	GX20/GP20: 20 GX10/GP10: 10
Modbus command number	GX20/GP20: 1 to 100 GX10/GP10: 1 to 50

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.

SScanGroup

Scan Group

Registers a measurement channel in scan group 1.

Syntax `SScanGroup, p1, p2, p3`
 p1 Unit number (0)
 p2 Module number (0 to 9)
 p3 Scan group (1)
 1 Scan group 1

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

Example Set the module 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.

Syntax `SModeAI, p1, p2, p3, p4`
 p1 Unit number (0)
 p2 Module number (0 to 9)
 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 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.
- 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

SModeDI

DI Module

Sets the mode of a DI module.

Syntax `SModeDI, p1, p2, p3`
 p1 Unit number (0)
 p2 Module number (0 to 9)
 p3 Mode (Normal, Remote)
 Normal DI input
 Remote Remote control input

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.

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 $\pm 105\%$ 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.

2.4 Setting Commands

- 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.

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 GX/GP will record for the specified time and stop.

RepeatTrigger After a trigger event occurs, the GX/GP will record for the specified time and stop. Then, the GX/GP 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).

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

- 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

- 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', 'RECORD  
ER1'
```

Description

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

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

2.4 Setting Commands

- 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\$
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 (Off, On)
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.

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 output (Zero, Linear)

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 output (Zero, Linear)
 p14 Low-cut point (0 to 50)

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

- 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.
- The settable items for p3 are shown below.

2.4 Setting Commands

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		
	WRe26	Pt25		
	N14	Pt50		
	XK	Pt200WEED		
		Cu10G		
		Cu50G		
		Cu100G		
		Pt46G		
		Pt100G		

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 or Scaling

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)

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.

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. |

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, Energize, 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.

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)
 p5 Value
 p6 Detection (Off, On)

2.4 Setting Commands

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)
 p5 Value
 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)		
		Sqrt	(2)	(4)	
	DI	Off	0, 1	1	
DI channel	DI	Delta	(1)	(3)	(5)
		Scale	(2)	(4)	
		Same as the DI input of AI channels			

- Within the measurement range
- 5% to 105% of the scale but within -999999 to 999999 excluding the decimal point
- 1 digit to (measurement upper limit - measurement lower limit)
- 1 digit to (scale upper limit - scale lower limit) but within 1 to 999999 excluding the decimal point
- Within the difference measurement range

- 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

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.

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).

SStagIO

Tag

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

Syntax `SStagIO, p1, p2, p3`

p1 Channel number

p2 Tag (up to 32 characters, UTF-8)

p3 Tag number (up to 16 characters, ASCII)

Query `SStagIO[, p1]?`

Example Set the channel 0001 tag to "SYSTEM1" and the tag number to "TI002."

`SStagIO, 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
Brown	153	51	0	
Orange	255	153	51	
Yellow green	153	204	51	GX10/GP10
	170	221	51	GX20/GP20
Light blue	119	170	221	GX10/GP10
	153	204	255	GX20/GP20
Violet	204	102	204	GX10/GP10
	221	153	221	GX20/GP20
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
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
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

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**

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**

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.
- 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 lower limit to span upper limit)

2.4 Setting Commands

p7 Lower limit of the color scale band display (span lower limit to span upper limit)

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.

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.

```
S-CalibIO,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	<code>SMathBasic,p1,p2,p3,p4</code>	
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. <ul style="list-style-type: none"> • 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	
	Off	Computation does not start even when recording starts.
	Start/Stop	Computation starts when recording starts.
	Reset+	Computation resets and starts when recording starts.
	Start/Stop	Computation starts when recording starts.

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.
- The math function is an option (/MT).

SKConst

Constant (/MT)

Sets a constant for use in computations.

Syntax SKConst, p1, p2
 p1 Constant number (1 to 100)
 p2 Value (–9.999999E+29 to –1E–30, 0, 1E–30 to 9.999999E+29, seven 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]?

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)

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)

2.4 Setting Commands

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)

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.
- 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)

p16 R value of the RGB mark colors for alarm 5 (0 to 255)

p17 G value of the RGB mark colors for alarm 5 (0 to 255)

p18 B value of the RGB mark colors for alarm 5 (0 to 255)

p19 R value of the RGB mark colors for alarm 6 (0 to 255)

p20 G value of the RGB mark colors for alarm 6 (0 to 255)

p21 B value of the RGB mark colors for alarm 6 (0 to 255)

p22 R value of the RGB mark colors for alarm 7 (0 to 255)

p23 G value of the RGB mark colors for alarm 7 (0 to 255)

p24 B value of the RGB mark colors for alarm 7 (0 to 255)

p25 R value of the RGB mark colors for alarm 8 (0 to 255)

p26 G value of the RGB mark colors for alarm 8 (0 to 255)

p27 B value of the RGB mark colors for alarm 8 (0 to 255)

p28 R value of the RGB mark colors for alarm 9 (0 to 255)

p29 G value of the RGB mark colors for alarm 9 (0 to 255)

p30 B value of the RGB mark colors for alarm 9 (0 to 255)

p31 R value of the RGB mark colors for alarm 10 (0 to 255)

p32 G value of the RGB mark colors for alarm 10 (0 to 255)

p33 B value of the RGB mark colors for alarm 10 (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)

2.4 Setting Commands

- 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)

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)

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.

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.

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 31, depends on the month)
 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, Repeat`

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 Alarm level (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)

2.4 Setting Commands

p3 Event Type	Value	P4 Source Element Number	p5 Alarm Level	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
Timer	Timer	1 to 4	-	Edge
Match time timer	MatchTimeTimer	1 to 4	-	Edge

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	-
	Math (math channel)	Math	-	Start, Stop, Reset	-
	Display rate switch	RateChange	1, 2	-	-
	Flag	Flag	1 to 20	-	-
	Manual sample	ManualSample	-	-	-
	Alarm ACK	AlarmACK	-	-	-
	Snapshot	Snapshot	-	-	-
	Time adjustment	TimeAdjust	-	-	-
	Display data save	SaveDisplay	-	-	-
	Event data save	SaveEvent	1	-	-
	Event trigger	Trigger	1	-	-
	Message	Message	1 to 100	All, Select	1 to 50
	Display group change	GroupChange	1 to 50	-	-
	Relative timer reset	TimerReset	1 to 4	-	-
	Settings load	ConfigLoad	1 to 3	-	-
	Favorite screen display	PlayList	1 to 20	-	-
Both	Recording start/stop	MemoryStartStop	-	-	-
	Math start/stop	MathStartStop	-	-	-
	Display rate switch 1/2	RateChange1_2	-	-	-
	Flag On/Off	FlagOn_Off	1 to 20	-	-

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 *Models GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN).
- 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).
- 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 (10min, 15min, 30min, 1h)

Day Custom Reports

Syntax `SReport,p1,p2,p3,p4,p5`
`p1` Type (Custom)
`p2` Recording interval (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.

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

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

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

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

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

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`

SFormat

Calendar Display Format

Sets the calendar display format.

Syntax `SFormat,p1`
 p1 1st weekday (Sun, Mon)

Query `SFormat?`

Example Set the first weekday to Monday.
`SFormat,Mon`

SBarDirect

Bar Graph Display Direction

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

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

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

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

Syntax `STrdLine, p1, p2`

<code>p1</code>	Line width	
	Thick	Thick
	Normal	Normal
	Thin	Thin
<code>p2</code>	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

Sets the trend interval switching.

Syntax `STrdRate, p1, p2`

<code>p1</code>	Trend interval switching	
	Off	Not switch
	On	Switch
<code>p2</code>	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.

STrdKind

Trend Type

Sets the type of trend waveform to display.

Syntax `STrdKind, p1`

<code>p1</code>	Type
	Fixed to "T-Y"

Query `STrdKind?`

Example Display using rectangular coordinates.

```
STrdKind, T-Y
```

STrdPartial

Partial Expanded Trend Display

Enable or disable the partial expanded trend display.

Syntax `STrdPartial, p1`

<code>p1</code>	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`

<code>p1</code>	Message writing method	
	Common	Write messages to all display groups.
	Separate	Write messages to only the groups that are displayed.
<code>p2</code>	Power failure message (Off, On)	
<code>p3</code>	Change message (Off, On)	

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`

<code>p1</code>	Group number
<code>p2</code>	Enable or disable (Off, On)
<code>p3</code>	Group name (up to 16 characters, UTF-8)
<code>P4</code>	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

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

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.
SDateFormat,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 GX/GP may restart.

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 (DO Channel) Operation (/FL)

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)

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`
 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)

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.
`SPrinter, 192.168.111.24, A3, Horizontal, 600, 2, On`

SLed

LED Indicator Operation

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

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

Specifies the USB input device.

Syntax `SUsbInput, p1`
 p1 USB input device type
 Japanese_109 Japanese keyboard
 English_104 English keyboard

Query `SUsbInput?`

Example Specify the English keyboard.
`SUsbInput, English_104`

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.

SSerialBasic

Serial Communication Basics (/C2 or /C3)

Sets basic serial communication parameters.

Not Use

Syntax SSerialBasic,p1
p1 Function (Off)

Normal

Syntax SSerialBasic,p1,p2,p3,p4,p5,p6,p7
p1 Function (Normal)
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 GXs/GPs that have the /MC option.
- The settings specified with this command takes effect with the **OSeriApply** command. The GX/GP serial settings do not change until you send the OSeriApply command.

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)
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

2.4 Setting Commands

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 *Models GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN).

SlpAddress

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 GX/GP 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)
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.

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 GX/GP 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 GX/GP 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	
	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.
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).

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, 'Administrator1', 'password1', 'directory1', 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 (Recipient Address)

Sets the mail header including the recipient address.

Syntax SMailHead, p1, p2, p3, p4

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

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- 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
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

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)

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'

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)
 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 (1 to 16)
 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 (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 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 *Models GX10/GX20/GP10/GP20 Paperless Recorder User's Manual* (IM 04L51B01-01EN).

SServer

Server Function

Enables or disables the server function.

Syntax SServer, p1, p2, p3
 p1 Server type (FTP, HTTP, SNMP, MODBUS, GENE)
 p2 Operation (Off, On)
 p3 Port number (1 to 65535)

Query SServer[, p1]?

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

Description

- You cannot specify a port number that is used by another function.
- The settings specified with this command takes effect with the [OIPApply](#) command.

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

SSecurity

Security Function

Sets the security function.

Syntax SSecurity, p1, p2, p3, p4
 p1 Operations on the GX/GP (Off, Login, Operate)
 p2 Operations via communication (Off, Login)
 p3 Auto logout (Off, 1min, 2min, 5min, 10min)
 p4 Operation without login (Off, On)

Query SSecurity?

Example Use the login function when operating the GX/GP 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).

SOpePass

Password to Unlock Operation

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

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

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 (1 to 50)
 p2 User level

Off	Not Use
Admin	Administrator level
User	User level

p3 Login mode

Key	Log in using keys
Comm	Log in via communication (including Web)
Key+Comm	Log into using keys 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 keys, 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.
- 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).

SUserLimit

Authority of User

Sets user operation limitations.

Syntax `SUserLimit, p1, p2, p3`
 p1 User limitation number (1 to 10)
 p2 Authority of user (see p1 of the [SOpeLimit](#) command)
 p3 Free/Lock (Free, 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).

SMonitor

Monitor Screen Display Information

Sets the monitor screen display information.

Syntax `SMonitor, p1, p2`
 p1 Information type (see the table below)
 p2 Status (see the table below)

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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
Message_Sort	Message sort item	Datetime, 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
DigitalPos	Digital display position	Default, Top, Bottom, Left, Right
DigitalLabel	Display string display	Off, On
Modbus_M	Modbus master status display type	Overview, List
Modbus_C	Modbus client status display type	Overview, List

Query SMonitor[,p1]?

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

Description

- Modbus_M and Modbus_C are an option (/MC).

SMultiPattern

Multi Panel Division

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

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
 Modbus-C Modbus client 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).

SHomeMonitor

Standard Screen Information

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

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
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

p2 Display group number (Multi panel registration number if p3=Multi)

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).
- Multi is a GX20/GP20 display.

SFavoriteMonitor

Favorite Screen Display Information

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

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)
 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,'Favorite01'`

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	C300	A001 to A100, C001 to C300
C001	A100	Not allowed (will result in error)
A001	0001	Not allowed (will result in error)

- For the ASCII output format, see [page 2-57](#).
- For the binary output format, see [page 2-83](#).

FRelay

Outputs the Most Recent Relay (DO Channel) 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 2-58](#) or [page 2-59](#).

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 9999999999)
-1 The most recent read position
p6 Read end position (-1, 0 to 9999999999)
-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 2-86](#).

FSnap

Snapshot

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 2-55](#)).

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 2-60](#).

FAddr

Outputs the IP Address

Outputs the GX/GP 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 GX/GP IP address information.
`FAddr, IP`

Description

- For the ASCII output format, see [page 2-62](#).

FStat

Outputs the GX/GP Status

Outputs the GX/GP status.

Syntax `FStat, p1`
 p1 Status output (0)

Example Output the GX/GP status.
`FStat, 0`

Description

- For the ASCII output format, see [page 2-63](#).

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
Other than those above.	1 to 50

Example Output 600 alarm summary entries.
`FLog, ALARM, 600`

Description

- For the ASCII output format, see [page 2-64](#).

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 GX/GP 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 2-75](#).

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 GX/GP 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 GX/GP internal communication buffer allows) will be output.
- The file data will be stored in the data block of the binary output file (see [page 2-55](#)).

2.5 Output Commands

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 2-75](#).

FCnf

Outputs Setting Data

Outputs the GX/GP 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.
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` and the corresponding commands.

p1	Command
IO	<code>SModeAI, SModeDI, SScaleOver, SRangeAI, SRangeDI, SRangeDO, SMoveAve, SBurnOut, SRjc, SAlarmIO, SAlmHysIO, SAlmDlyIO, STagIO, SColorIO, SZoneIO, SScaleIO, SBarIO, SPartialIO, SBandIO, SAlmMarkIO, SValueIO, SCalibIO</code>
MATH	<code>SMathBasic, SKConst, SWconst, SRangeMath, STlogMath, SRolAveMath, SAlarmMath, SAlmHysMath, SAlmDlyMath, STagMath, SColorMath, SZoneMath, SScaleMath, SBarMath, SPartialMath, SBandMath, SAlmMarkMath</code>
COMM	<code>SRangeCom, SValueCom, SWDCom, SAlarmCom, SAlmHysCom, SAlmDlyCom, STagCom, SColorCom, SZoneCom, SScaleCom, SBarCom, SPartialCom, SBandCom, SAlmMarkCom</code>
GROUP	<code>SGroup, STripLine, SSc1Bmp</code>
IP	<code>SIpAddress, SDns, SDhcp</code>
SECURITY	<code>SSecurity, SOpePass, SOpeLimit, SUser, SUserLimit</code>

- For the output format, see [page 2-76](#).

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 2-76](#).

FSysConf

Queries the System Configuration and Reconfigures Modules

Queries the system configuration and reconfigures modules.

Query the System Configuration

Syntax `FSysConf`

Example Query the System Configuration.
`FSysConf`

Description

- For the output format, see [page 2-77](#).

Reconfigures Modules

Aligns the module configuration settings that are recognized by the GX/GP and the actual module configuration.

Syntax `FSysConf, p1`

`p1` Module reconfiguration (1)

Example Reconfigure the modules.

`FSysConf, 1`

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 GX/GP 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`

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` Alarm output clearance type (0)
- 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`

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 50 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 50 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" in display groups 3, 8, and 11.
`OMessage,FREE,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', 'WORD005'`

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 GX/GP is saving or loading setup data.

OSaveConf

Saves Setting Data

Saves the GX/GP setting data to the GX/GP external storage medium.

Syntax `OSaveConf, p1, p2, p3`
 p1 File name (up to 240 characters, ASCII)
 Specify the path and file name, excluding the extension.
 p2 Medium
 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, SD, 'SETFILE1'`

Description

- If you omit p3, the default setting file comment will be added. You can edit the default setting file comment from the GX/GP front panel.

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.

OMTReset, 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 (up to 8 digits, ASCII)

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

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 GX/GP external storage medium into the GX/GP.

Syntax `OLoadConf, p1, p2, p3`
 p1 File name (up to 240 characters, ASCII)
 Specify the path and file name, excluding the extension.
 p2 Medium
 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

Example Load all settings from the setting file "SETTING1" on the SD memory card.

```
OLoadConf, 'SETTING1', SD, ALL
```

Description

- If you omit parameter p2, the medium is set to the SD memory card.
- If you omit parameter p3, all settings will be loaded.
- If you change the language with this command, the GX/GP may restart.

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 GX/GP 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 GX/GP 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`
 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, and all logs
 OTHERS Settings other than security settings
 ALL All measured data and settings
 You can specify multiple items at once. To do so, separate items with a colon.

Example Delete the measured data, summary, and logs in the internal memory.

```
OInit, MEMORY
```


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 GX/GP 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](#).

CLogout

Log Out over a Communication Path

Logs out over a communication path.

Syntax CLogout

Example Logs out from the GX/GP.
 CLogout

ESC O

Opens an Instrument (RS-422/485 command)

Starts communication with the GX/GP. ESC in ASCII code is 0x1B. For details, see [Appendix 1](#).

Syntax ESC O p1
 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.
- If you execute ESC O, any instrument that is already open will be automatically closed.
- Use a capital "O."
- For this command, use CR+LF for the terminator.
- For the responses to this command, see [page 2-56](#).

ESC C

Closes an Instrument (RS-422/485 command)

Ends communication with the GX/GP. ESC in ASCII code is 0x1B. For details, see [Appendix 1](#).

Syntax ESC C p1
 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 2-56](#).

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 2-78](#).

_INF

Outputs the Instrument's Product Name

Outputs the instrument's product name.

Syntax `_INF`

Description

- For the ASCII output format, see [page 2-78](#).

_COD

Outputs the Instrument's Basic Specifications

Outputs the instrument's basic specifications.

Syntax `_COD`

Description

- For the ASCII output format, see [page 2-78](#).

_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 2-79](#).

_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 2-79](#).

_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 2-80](#).

_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 GX/GP 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 2-80](#).

_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 2-81](#).

_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 2-82](#).

2.9 Responses to Commands

This section explains the responses that GX/GP 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 GX/GP 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 GX/GP 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 GX/GP 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 GX/GP 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 GX/GP 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 GX/GP outputs 0.

If errors occur in multiple parameters, the GX/GP 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 GX/GP 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 GX/GP 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 GX/GP 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

```
EACRLF  
ASCII string data . . . . . CRLF  
ASCII string data . . . . . CRLF  
|  
ASCII string data . . . . . CRLF  
ENCRLF
```

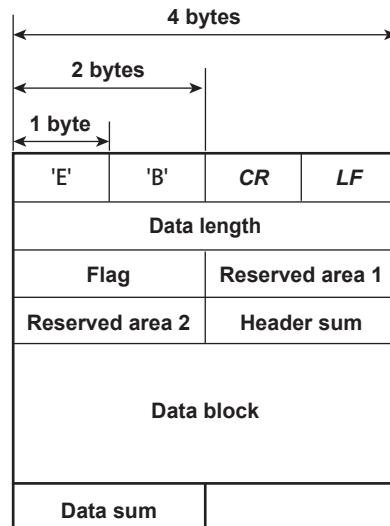
The GX/GP adds a header (EA) in front of the ASCII string output data and a footer (EN) at the end. The GX/GP adds the two characters `CRLF` to the end of headers, footers, and ASCII string data.

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 GX/GP 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.



EBCRLF

The EBCRLF 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 <u> </u> <i>xxCRLF</i> (<u> </u> : Space)	Opens an instrument	<ul style="list-style-type: none"> Response from the destination instrument <i>ESC OxxCRLF</i> If there is no instrument at the address specified by the command* No response
ESC C <u> </u> <i>xxCRLF</i> (<u> </u> : Space)	Closes an instrument	<ul style="list-style-type: none"> Response from the destination instrument <i>ESC CxxCRLF</i> 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.
- If you open an instrument with the ESC O command, any instrument that is already open will be automatically closed.
- 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_ ccca1a2a3a4uuuuuuufdddddddE-pp<crLf>
s_ ccca1a2a3a4uuuuuuufdddddddE-pp<crLf>
...
s_ ccca1a2a3a4uuuuuuufdddddddE-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
uuuuuu	Unit (fixed to 10 characters. Output flush left. Unused character positions are filled with spaces.)
	mV_ _ _ _ mV

	$\begin{array}{c} \text{V} \quad \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \quad \text{V} \\ \text{^} \text{C} \quad \text{=} \quad \text{=} \quad \text{=} \quad \text{=} \quad \text{^} \text{C} \\ \text{---} \quad \text{---} \quad \text{---} \quad \text{---} \end{array}$
f	Sign (+ or -)
ddddddd	Mantissa (00000000 to 99999999; 8 digits) For erroneous data (data status is E), the mantissa is 99999999. If the data status is O (\pm 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)

2.10.2 Most Recent (DO Channel) Status (FRelay)

The output in response to the command "FRelay,0" is shown below.

Syntax

```
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>
```

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:aaaaaaaaa<crLf>
S011-020:aaaaaaaaa<crLf>
S021-030:aaaaaaaaa<crLf>
S031-040:aaaaaaaaa<crLf>
S041-050:aaaaaaaaa<crLf>
S051-060:aaaaaaaaa<crLf>
S061-070:aaaaaaaaa<crLf>
S071-080:aaaaaaaaa<crLf>
S081-090:aaaaaaaaa<crLf>
S091-100:aaaaaaaaa<crLf>
EN<crLf>
```

aaa... 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_uuuuuuuuuuuuuuuuuuuuuu_abcdefghijk<crLf>
EN<crLf>
```

p	Login mode
	M Via general communication
	W Via Web (HTTP server)
	F Via FTP server
	S RS-232 or RS-422/485
	D Via front panel
l	User level
	A Administrator
	U User
uuuuuuuuuuuuuuuuuuuuuu	User name (fixed to 20 characters. Unused character positions are filled with spaces.)
abcdefghijk	Authority of user
	F Free
	L Lock
	a through k represent actions.
	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

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_uuuuuuuuuuuuuuuuuuuuuuu_abcdefghijk<crLf>
p_l_uuuuuuuuuuuuuuuuuuuuuuu_abcdefghijk<crLf>
p_l_uuuuuuuuuuuuuuuuuuuuuuu_abcdefghijk<crLf>
p_l_uuuuuuuuuuuuuuuuuuuuuuu_abcdefghijk<crLf>
EN<crLf>
```

p	Login mode
	M Via general communication
	W Via Web (HTTP server)
	F Via FTP server
	S RS-232 or RS-422/485
	D Via front panel
l	User level
	A Administrator
	U User
uuuuuuuuuuuuuuuuuuuuuu	User name (fixed to 20 characters. Unused character positions are filled with spaces.)
abcdefghijk	Authority of user
	F Free
	L Lock
	a through k represent actions.
	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

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_ _ _ _ _ :zzzzzzzzzzzzzzzzzzzz...<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.)

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	-	-
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 there is any command that is blocking Modbus master or Modbus client communication.

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	-	-
5	-	-
6	-	-
7	-	-

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
    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
```

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_YYY/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
YYY	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)
YYY/MO/DD_HH:MM:SS	Data position where message was written
YYY	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
	REM Remote
	COM Ethernet communication
	SER Serial communication
	ACT Event action
	SYS System
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
	REM	Remote
	COM	Ethernet communication
	SER	Serial communication
	ACT	Event action
	SYS	System
sss...s	Event string (fixed to 16 characters. Unused character positions are filled with spaces.)	
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 GX/GP cannot accept the IP address obtained from the DHCP server, the GX/GP will reject the address and immediately return a response to the DHCP server.

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_fm...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)
	e0	Ethernet connection #0 (general)
	e1	Ethernet connection #1 (general)
	e2	Ethernet connection #2 (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 GX/GP)
	<	Rx (Response: GX/GP to connected instrument)
mmm...m	Message (fixed to 40 characters. Unused character positions are filled with spaces.)	
	The GX/GP 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)

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

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
                        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).
BAD_ADDR	The address of the response message is invalid (does not match the command).

Detail*	Meaning
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.

* “_” 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>
yyyymm/dd_hh:mm:ss_XXXXXXXX_k_fff...<crLf>
...
EN<crLf>
```

yyyymm/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)

XXXXXXXX

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

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_XXXXXXXXXX<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
XXXXXXXXXX               Detailed code (fixed to 9 characters)
SUCESS _ _              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
ELINK _ _              Ethernet cable not connected
```

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

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
TCP/IP_ = = = =   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

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_XX.XXX.XXX.XXX_mmmmmmmmm_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
mmmmmmmmmm         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

2.10.19 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_l11...l_fff...<crlf>
yy/mm/dd_hh:mi:ss_<DIR>_ddddddd...<crlf>
EN<crlf>
```

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)
l11...l	File size (fixed to 10 characters. Unused character positions are filled with spaces.)
fff...	File name

Time of file generation

For directories, <DIR> is output.

2.10.20 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)
---------	-----------------

2.10.21 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.

2.10.22 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)
uuuuu...	Unit information (fixed to 10 characters. Unused character positions are filled with spaces.)
pp	Decimal place (00 to 05)

2.10.23 System Configuration (FSysConf)

The output in response to the command "FSysConf" is shown below.

Syntax

```
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>
```

```
cccccccccccccccc      Module models that are actually installed
                        ----- Module not installed (16 hyphens)
                        GX90XA-10-U2 Analog input module
                        GX90XD-16-11 Digital input module
                        GX90YD-06-11 Digital output module

uuuuuuuuuuuuuuuuuuu  Module models recognized by the GX
                        ----- Module not installed (16 hyphens)
                        GX90XA-10-U2 Analog input module
                        GX90XD-16-11 Digital input module
                        GX90YD-06-11 Digital output module

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 (-)
```

2.10.24 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>
```

2.10.25 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
123456789	Product serial number
xx-xx-xx-xx-xx-xx	MAC address (xx's are hexadecimals)
Rx.xx.xx	Firmware version

2.10.26 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
	1 When the product name is GP10/GP20
M	Power cord
	Blank When the product name is GX10/GX20
	M PSE cable
	D UL/CSA cable
	F VDE cable
	R AS cable
	Q BS cable
	H GB cable
	N NBR cable

2.10.27 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)

2.10.28 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>
/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
/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)
/UX ₁ X 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 ₁ Y 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

2.10.29 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

2.10.30 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>
```

2.10.31 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',123456789,xx-xx-xx-xx-xx-xx,R1.01,/MT /C2,0,10,0
<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. Fixed to “Main.”
p2	0,1	Unit address number. Fixed at 0.
p3	'GX20-1J', 'COMM-LAN'	Unit name (model name). Enclosed in single quotation marks.
p4	123456789	Product serial number.
p5	xx-xx-xx- xx-xx-xx	MAC address.
p6	R1.01	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	10	Maximum number of installable modules. If there are not installable modules, 0 is output.
p10	0	Unit status. The unit status is output in a character string.

2.10.32 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,0,0,'AI',1234567,R1.02,,0,10,0,xxx<crLf>
Main,0,1,'DO',1234567,R1.01,,0,0,16,xxx<crLf>
EN<crLf>
```

One line (p1 to p10) contains configuration information of a single module.

p _n	Value	Description
p1	Main, Sub	Unit dependency (main or sub) information. Fixed to “Main.”
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	'AI', 'DO', 'DI'	Module name (model name). Enclosed in single quotation marks.
p5	1234567	Product serial number.
p6	R1.01, R1.02	Module firmware version. The output format is “R+version.”
p7	HS	Options. Codes of installed options delimited by spaces.
p8	0	Fixed at 0.
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	xxx	Module status. The module status is output in a character string.

2.11 Format of the Data Block of Binary Output

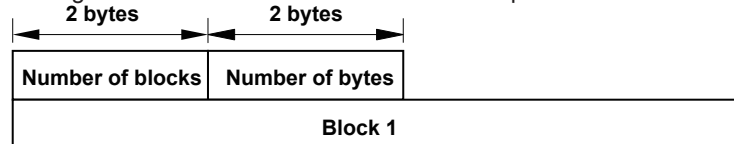
This section explains the data that is stored in the data block in the binary output of data output response.

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)

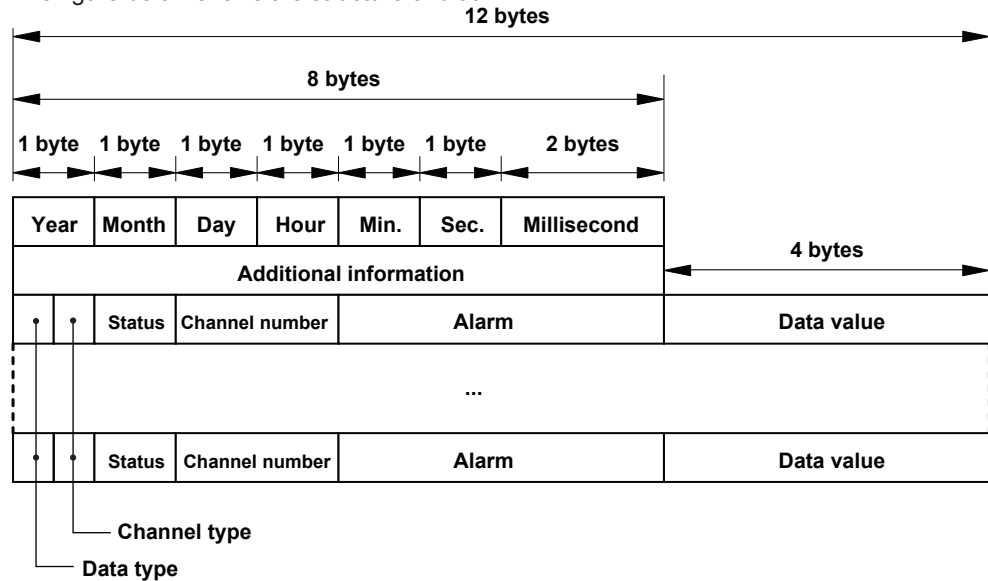
Always 1.

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)

Channel Type (4 bits)

Indicates the channel type.

Value	Channel Type
1	I/O channel
2	Math channel
3	Communication channel

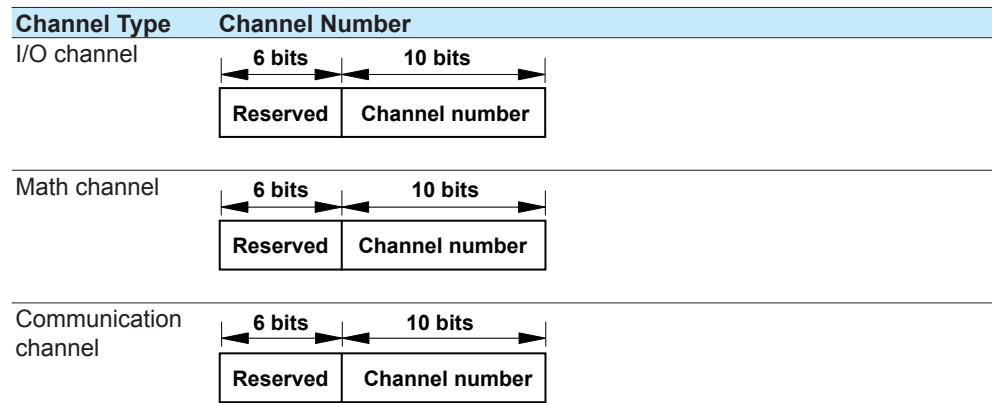
Status (8 bits)

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

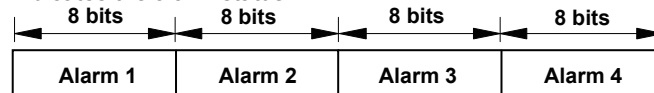
Channel Number (16 bits)

Indicates the channel number. Stored in the following manner depending on the channel type.



Alarm (32 bits)

Indicates the alarm status.



The eight bit values of alarm 1 to alarm 4 are described in the table below.

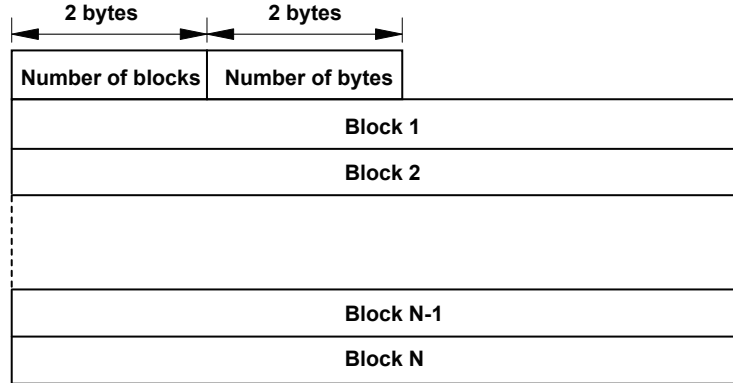
Bit	Value	Description
0 to 5	0	No alarm
	1	High limit alarm
	2	Low limit alarm
	3	Difference high limit alarm
	4	Difference low limit alarm
	5	High limit on rate-of-change alarm
	6	Low limit on rate-of-change alarm
	7	Delay high limit alarm
	8	Delay low limit alarm
6	0	No alarm is activated.
	1	An alarm 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.



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 9999999999)
The read position of the most recent data in the FIFO (1 to 9999999999)

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.

Blank

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

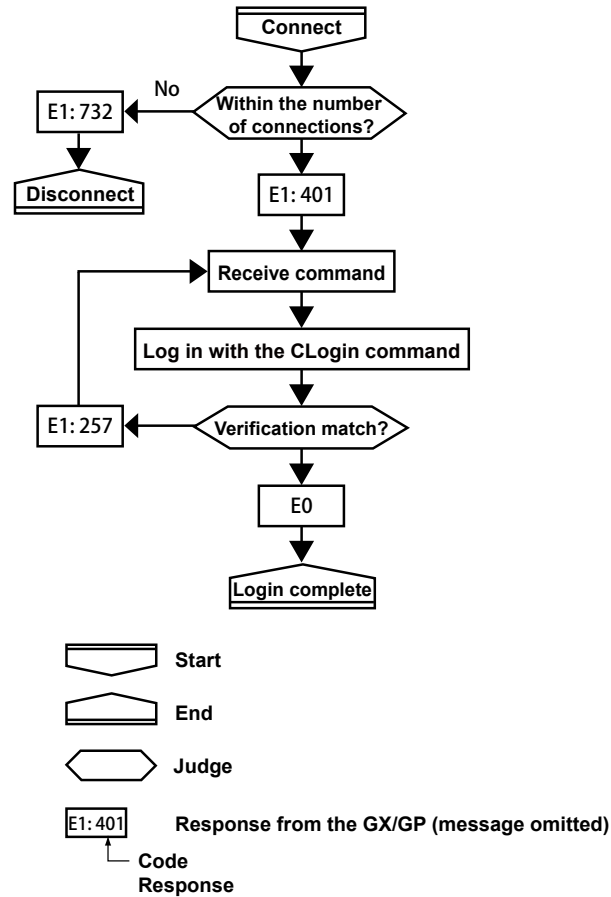
The table below shows the characters that can be used in user-defined character strings (tags, tag No., messages, etc.).

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.

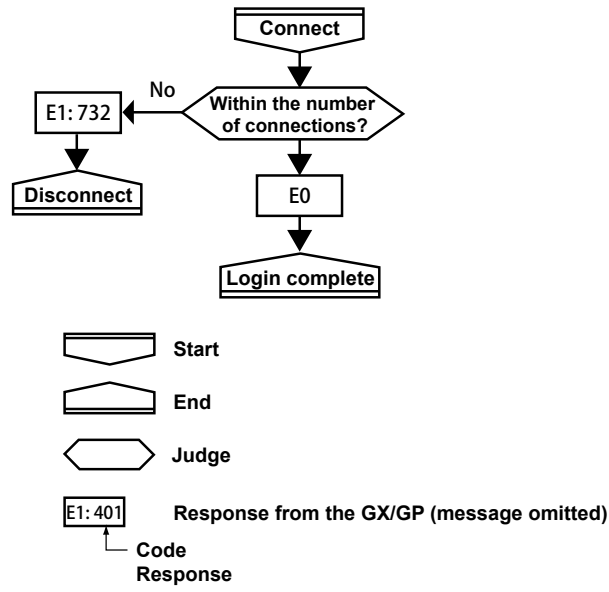
Appendix 2 Login Procedure

To communicate using the general communication feature, you must log in to the GX/GP 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



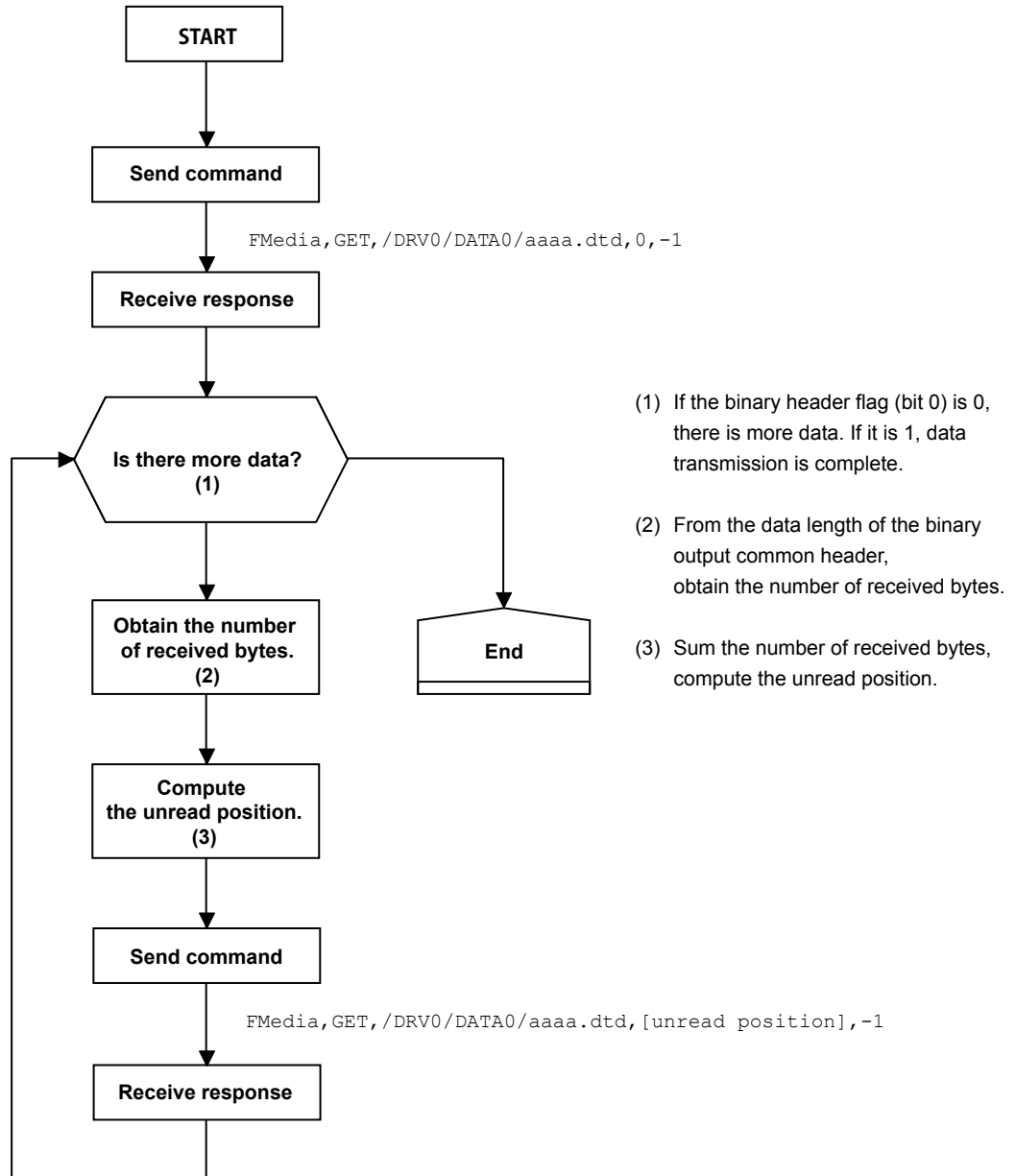
When Not Using the Login Function



Appendix 3 Output Flow Chart of External Storage Medium Files and File Lists

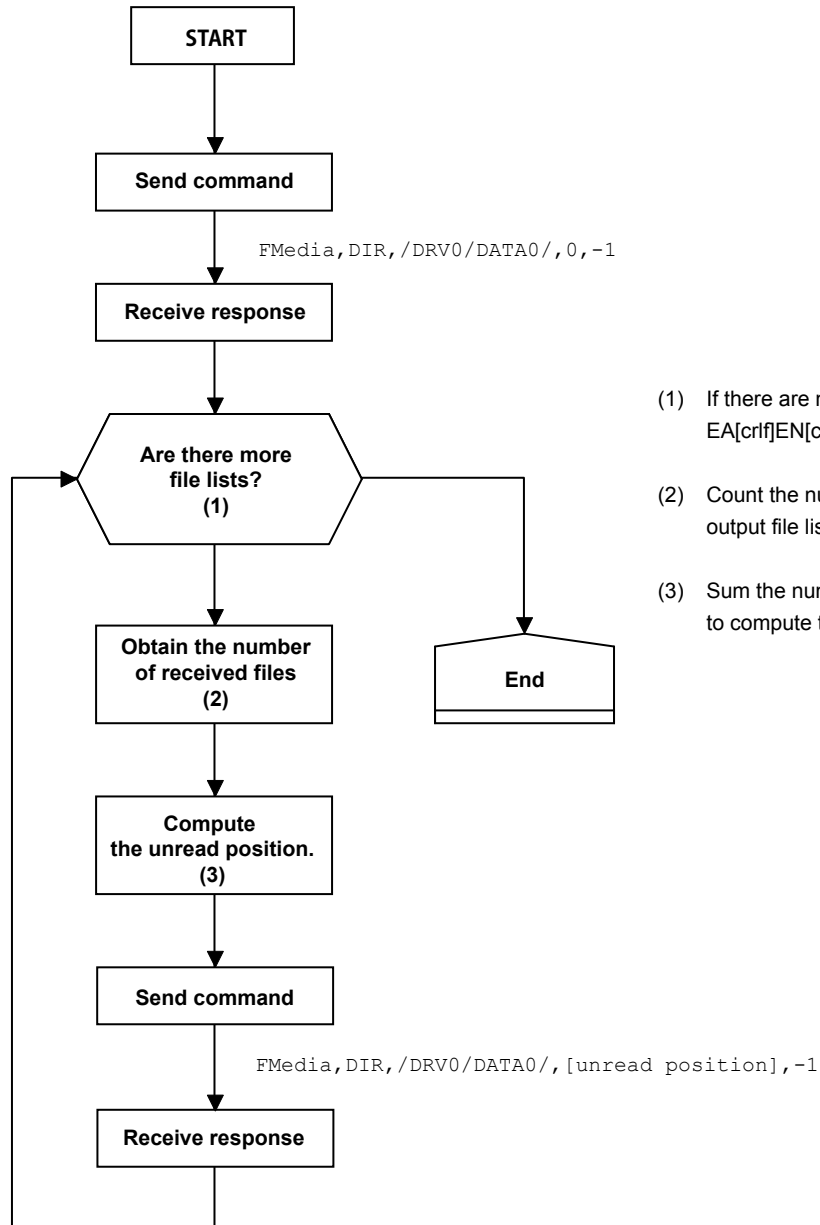
Example for Outputting File `aaaa.dtd`

The flow chart for outputting file `aaaa.dtd` in the `DATA0` directory on the external storage medium is shown below.



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.



- (1) If there are no more files, EA[crf]EN[crf] 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 GX/GP 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.

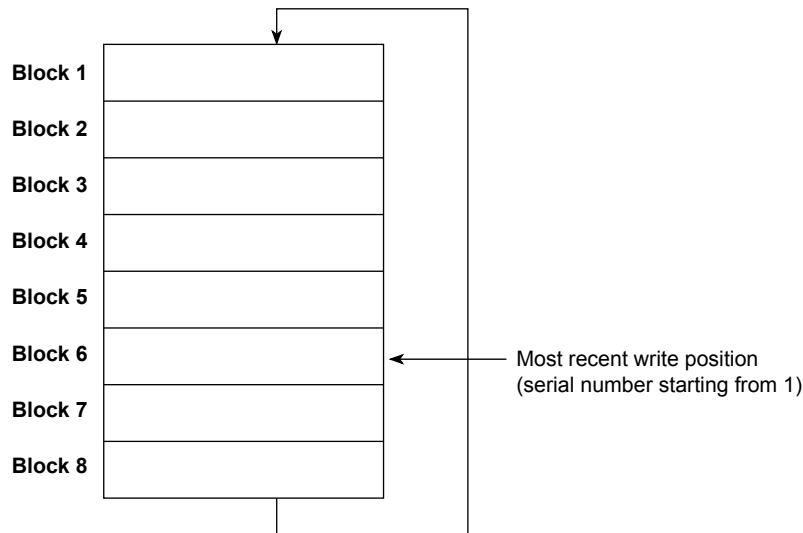
Data entries = $2000000 \div \{16 + (12 \times [\text{number of channels}])\}$ (fractions truncated)

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.



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);
}
```

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