User's Manual

WX1
GateMODBUS

vigilantplant.®

Foreword

This manual describes the functions and operating procedures of GateMODBUS. To ensure correct use, please read this manual thoroughly before beginning operation. After reading the manual, keep it in a convenient location for quick reference in the event a question arises. GateMODBUS is a software program that uses the Modbus protocol to acquire data from measurement instruments and transfer that data to DAQLOGGER or Remote Monitor.

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Overview of This Manual

Structure of This Manual

This user's manual consists of the following chapters.

Chapter	Title	Description
1	Overview	Gives an overview of the GateMODBUS software.
		Lists the PC requirements for running Gate-MODBUS and gives information about system configuration.
2	Operating Procedure	Gives procedures for entering environment and data logging interval settings, and how to monitor the operational status of the software.
3	Detailed Description of Functions	Provides a detailed description of the functions of GateMODBUS. Lists error messages, their causes, and their corrective actions.
Index		An alphabetical index of the manual's contents.

Scope of This Manual

This manual provides instructions on how perform basic operations with the software when running under Windows XP, Windows 2000, and Windows Vista. For information regarding the basic operations of Windows, see the Windows user's manual.

Conventions Used in This Manual

- Units

  K Denotes 1024.　　　　Example: 10 KB

  M Denotes 1024K.　　　Example: 10 MB

  G Denotes 1024M.　　　Example: 2 GB

- Boldface Type

  Hardware and software controls that the user manipulates such as dialog boxes, buttons, and menu commands are often set in boldface type.

- Subheadings

  On pages in chapters 1 through 3 that describe operating procedures, the following subheadings are used to distinguish the procedure from their explanations.

  Procedure　　This subsection contains the operating procedure used to carry out the function described in the current section. All procedures are written with inexperienced users in mind; experienced users may not need to carry out all the steps.

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

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1.1   Overview of GateMODBUS Functions

GateMODBUS is a software program that uses the Modbus protocol to acquire data from other application software or measuring instruments with data output functions, and transfer the data to DAQLOGGER or Remote Monitor. Using GateMODBUS allows you to monitor data on DAQLOGGER or Remote Monitor that was acquired not only by Yokogawa recorders, but also by other manufacturers' measuring instruments as well. Yokogawa's DAQLOGGER is a software program that allows users to open a connection from their PC to various kinds of Yokogawa recorders (the mR, VR, DARWIN, DX, MV, and CX) and perform data logging and monitoring.
Yokogawa's Remote Monitor is a software program that enables monitoring of data logged by recorders or data logging software.

Features

- Runs as a Windows application.
- Supports the Modbus/RTU (serial) and Modbus/TCP (Ethernet) protocols.
- Allows you to read the input and holding registers from various measuring instruments.
- Measurement can be performed at intervals of up to 0.5 seconds[*].
  - * However, DAQLOGGER's shortest interval is 1 second. Also, the maximum speed of 0.5 seconds may not be attainable depending on the amount of data being read, the response time of the device, and the communication speed.

1.2 System Overview

System

This software can perform data logging when connected with instruments (devices) meeting the following criteria.

- The ability to perform communications using the Modbus/RTU (serial) or Modbus/TCP (Ethernet) protocol.
- For serial communications, the ability to operate under a baud rate of 4800, 9600, 19200, or 38400.
- The ability to read registers using one or both of the following two Modus function codes.
  - Function code 03: read holding registers
    (register numbers: 40001-49999, 400001-465535)
  - Function code 04: read input registers
    (register numbers: 30001-39999, 300001-365535)

Software Requirements

Run DAQWORX under any of the following operating systems.

- Windows 2000 Professional SP4
- Windows XP Home Edition SP2, SP3
- Windows XP Professional SP2, SP3 (excluding Windows XP Professional x64 Edition)
- Windows Vista Home Premium, SP1 (excluding the 64-bit edition)
- Windows Vista Business, SP1 (excluding the 64-bit edition)

The language displayed by the software under different language versions of the OS are as follows.

OS Language	Software Language
Japanese	Japanese
Other	English

Hardware Requirements

The following hardware are required to use GateMODBUS.

- PC: A PC that runs one of the OS above, and that meets the following CPU and memory requirements.
  When Using Windows 2000 or Windows XP
  Pentium 4, 1.6 GHz or faster
  512 MB or more of memory
  When Using Windows Vista
  Pentium 4, 3 GHz or faster
  2GB or more of memory
- Free disk space: 200 MB or more
- Communication device: An Ethernet (when connecting to DAQLOGGER or Remote Monitor), or RS-232 port that is recognized by the operating system. Also required for Ethernet communications with this software's Modbus instruments), or RS-232 port
- CD-ROM drive: Used to install the software
- Peripheral devices: A mouse supported by the operating system
- Monitor: **When Using Windows 2000 or Windows XP**
  A monitor supported by the OS of 1024 × 768 dot or higher and 65,536 colors or more.
  When Using Windows Vista
  A video card recommended for use with Vista and a monitor supported by the OS of 1024 × 768 dot or higher and 65,536 colors or more.

Note

An RS-232 to RS-422-A/RS-485 converter is required to perform communications between the software and another Modbus device via RS-422-A/RS-485 (Yokogawa ML2 RS232C/RS485 converter recommended).

System Configuration
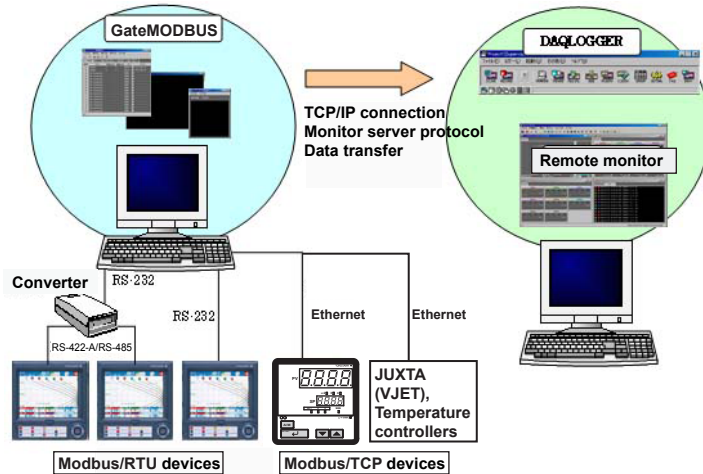
It is recommended that you run GateMODBUS and DAQLOGGER on separate PCs depending on the number of devices that the system supports and other factors affecting the load.

Software Configuration
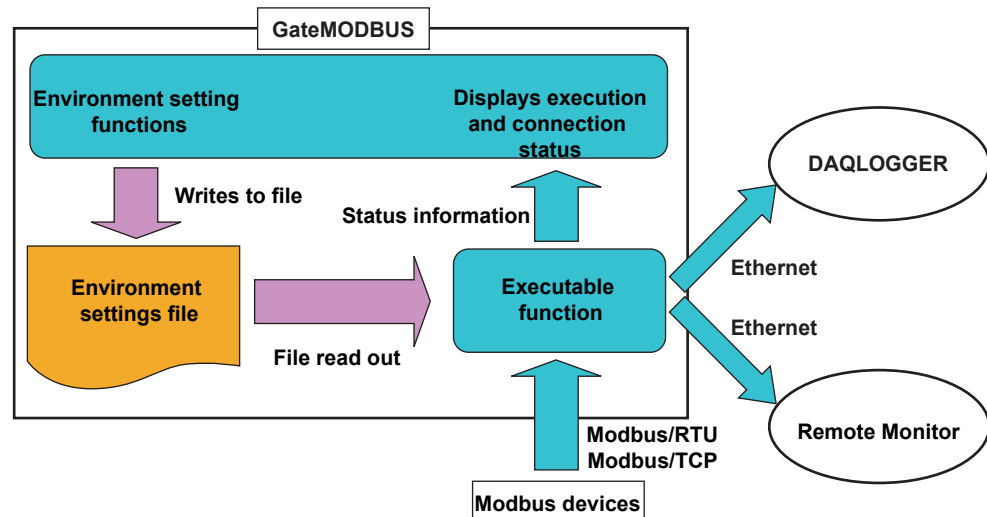
GateMODBUS Configurator consists of two separate software functions. The role of each function within the configurator is as follows:
- **Environment Setting Functions**
  Used to define model names, communication methods, and other parameters required for running the executable function.
  And operates in conjunction with the environment setting functions to display the practice status and connection status of DAQLOGGERs and Remote Monitors.
- **Executable Function**
  The software reads data from the Modbus devices at fixed intervals. It also acts as a monitor server, transferring data to DAQLOGGER and Remote Monitor.

2.1   Running and Exiting GateMODBUS

Running the Software

Procedure

1. From the Windows Start menu, choose **Programs > YOKOGAWA DAQWORX > GateMODBUS > GateMODBUS**.

The GateMODBUS Configurator opens.
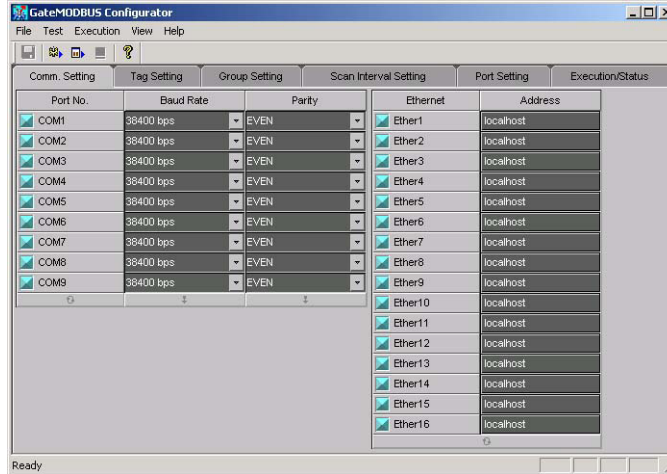
Note

• When you start GateMODBUS, it is restored to the same status that was active during the previous session.

• If the program is closed while a process or service is running, the license will be considered to be "in use." If the message, "Invalid license number. Please reinstall." appears when restarting the program, it may indicate that the user is attempting to run a Gate program in excess of the number of available licenses.

Starting GateMODBUS in Acquisition Start Mode

Procedure

1. From the Windows Start menu, choose **Programs > YOKOGAWA DAQWORX > GateMODBUS > GateMODBUS**, then right-click GateMXMW and select Create Shortcut.

2. Right-click the shortcut icon and select Properties.

3. Choose the Shortcut tab, then add /START to the right of the path in the Target box and click OK.
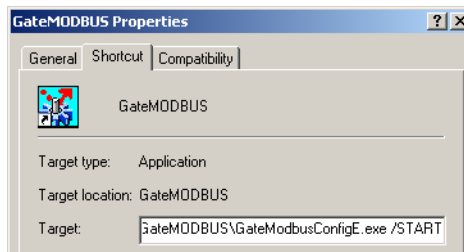
4. Choose the shortcut from the Windows Start menu. The connection status of the previous session is restored, and acquisition begins.

Exiting the Software

Procedure

1. Choose **File > Exit from the menu bar**, or click the X button at the right end of the title bar.

GateMODBUS closes.

2.2   Entering Environment Settings

The following settings can be entered using the configurator.
- Serial port and Ethernet port settings (Serial Setting tab)
- Data acquisition conditions, communication retry (Scan Interval tab)
- Tag settings (Tag Setting tab)
- Group settings (Group Setting tab)
- TCP/IP settings for the monitor server port (Port Setting tab)

Serial Port Settings

Procedure

1. Click the Comm. Setting tab or choose View > Comm. setting from the menu bar.

   The Serial Setting screen in displayed.

   Select/deselect all items

   Drag to select a range of items

   Click to display a list
   Copies the setting in the first item of the selection to all of the items in the selection

   Turns all selected items ON/OFF

   Click to turn a single item ON/OFF

2. Set the port number, baud rate, and parity.

   Port number: ON (blue)/OFF (gray)

   Baud rate: 4800, 9600, 19200, 38400

   Parity: NONE, ODD, EVEN

3. Turn Ethernet ON (blue) or OFF (gray).

4. Click Address. The dialog box below opens.

   Input Address - Ether1

   Ether

   IP address or host name

   localhost

   Port No.   502

   OK   Cancel

2

5. Enter the IP address or host name and port number. (The default port number for Modbus/TCP is 502. Use this port number if no particular setting is required by the instrument.)

Data Acquisition Conditions, Communication Retry

Procedure

1. Click the Scan Interval tab or choose **View > Scan Interval** setting from the menu bar.

| Comm. Setting | Tag Setting | Group Setting | Scan Interval Setting |

Scan Interval	1000	msec
Timeout	1000	msec
Retry Use	○ OFF	○ ON
Retry Interval	30	sec

2. Set the scan interval, timeout time, and number of retries.

Logging interval:　0.5–3600 sec.

Timeout time:　　　1–10 sec.

Retry Use :　　　　Select whether or not to retry communications (ON/OFF).

Retry Interval :　　The interval between communication retries (30–3600 sec.)

Tag Settings

Procedure

> *1.* Click the Tag Setting tab or choose **View > Tag setting** from the menu bar.

Drag to select a range of items (up to 300 channels can be selected)

Click to display a list

Copies the setting in the first item of the selection to all of the items in the selection

Turns all selected items ON/OFF

Register numbers are filled from the first cell in the selection to the last, each line being given a register number 1

Select/deselect all items

Click to turn a single item ON/OFF

> *2.* Enter the following settings.
>
> | | |
> |---|---|
> | Tag number: | ON (blue)/OFF (gray) |
> | Port: | NONE, COM1–COM9, Ether1–Ether16 |
> | Modbus address: | Enter the address for the Modbus device. |
> | Modbus function: | 03 or 04 |
> | Modbus register numbers: | |
> | For Modbus function 03, 40001-49999, 400001-465535 | |
> | For Modbus function 04, 30001-39999, 300001-365535 | |
> | Modbus data type: | Depends on the Modbus device header. (See page 3-8, "Data Type") |
> | Scaling coefficient: | (See page 3-10, "Data Scaling") |
> | Scaling offset: | (See page 3-10, "Data Scaling") |
> | Decimal position: | An integer from 0–4 |
> | Span Lower/Upper: | Setting range varies depending on the decimal position. (See page 3-5, "Upper/Lower Limit of Span") |
> | Unit: | Enter up to 6 alphanumeric characters. |
> | Tag name: | Enter up to 16 alphanumeric characters. |

2

Group Settings

Procedure

1. Click the Group Setting tab or choose **View > Group setting** from the menu bar.

Select/deselect all items

Drag to select a range of items

Click here to display the Tag No. dialog box.

Restore the default color to all tags

Tag numbers are filled from the first cell in the selection to the last, each line being given a tag number 1 higher than the last

Turns all selected items ON/OFF

Click to turn a single item ON/OFF

2. Enter the following settings.

Group name:	Enter up to 30 alphanumeric characters.
No.:	ON (blue)/OFF (gray)
Tag No.:	Select the tag number in the Tag No. dialog box.
Color:	Assign colors to tags.

TCP/IP Settings for the Monitor Server Port

Procedure

1. Click the Port Setting tab or choose **View > Port setting** from the menu bar.
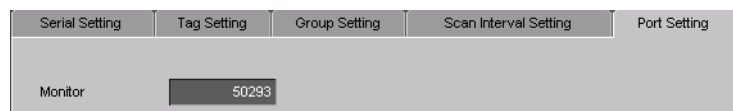
2. Enter the port number used to transfer data loaded from a Modbus device to DAQLOGGER or Remote Monitor. **The port number need not be changed unless a problem occurs.**

2.3 Saving and Restoring Environment Settings

Saving Environment Settings

Procedure

1. Click the Save button or choose **File > Save** from the menu bar.

└ **Save button**

The current settings are saved.

Restoring Environment Settings

This procedure clears all settings currently being entered and restores the most recently saved settings.

Procedure

1. Choose **File > Revert** from the menu bar.

2.4 Reading Data from a Modbus Device and Transferring the Data as the Monitor Server

When you run the executable function, data is read in from the Modbus devices, the PC becomes the monitor server, and data is transferred to DAQLOGGER or Remote Monitor. The executable function can be run as a process or a service. When run as a process, the executable function closes when logging off Windows. When run as a service, the executable function is registered in Windows as an automatically executable service. When run as a service, the executable function continues processing even when the user has logged off of Windows. Also, the executable function is run automatically as soon as the PC is turned ON (prior to log in). However, the software can only be run as a service by a user with Administrator privileges. Services cannot be executed when using Windows Vista.

Note
The maximum number of DAQLOGGERs or Remote Monitors that can be connected at once is 16.

Running the Executable Function

Procedure

   1. Enter environment settings. (See section 2.2, "Entering Environment Settings.")

Running from the Menu Bar

   2. To run the function as a process, click the Process Execution button or choose **Execute > Process** from the menu bar.

└─ **Process execution button**
└─ **Service execution button**
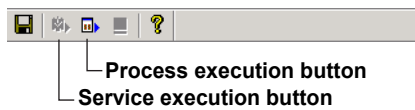
To run the function as a service, click the Service execution button or choose **Execute > Service** from the menu bar.
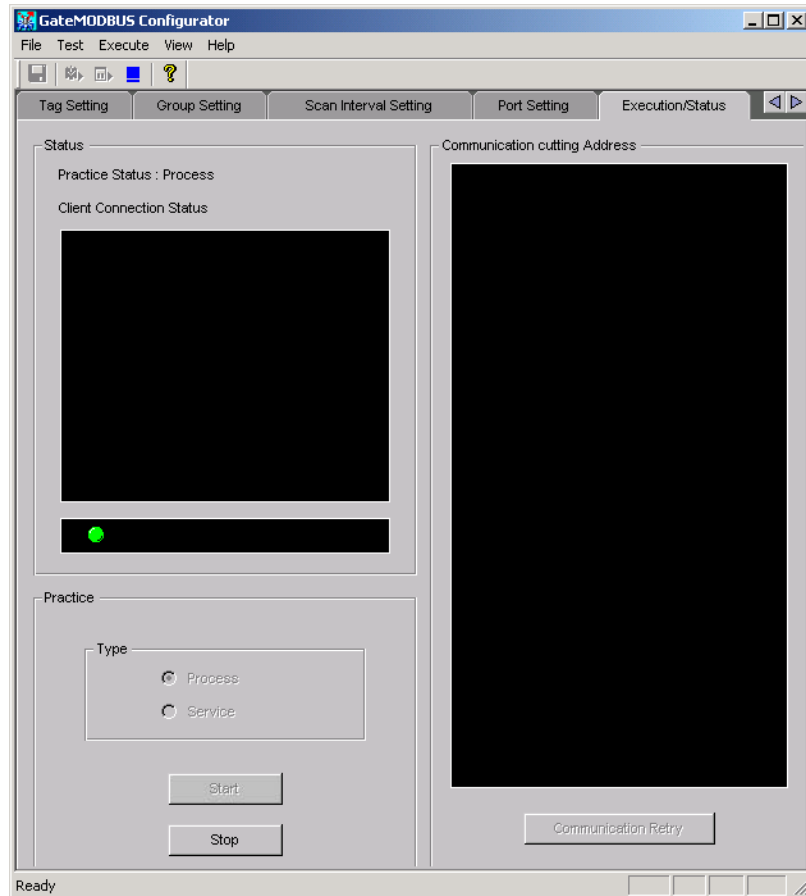
The Practice Status item in the Practice/Status tab displays "Process" or "Service," as well as the name of the connected client, connection status, and the addresses of any disconnected DAQLOGGERS and Remote Monitors.

Running the Executable Function from the Practice/Status Tab

2. Select the type of execution from the Practice/Status tab, then click the Practice button.

The Practice Status item displays "Process" or "Service," as well as the names of connected clients, the connection status, and the addresses of disconnected DAQLOGGERS and Remote monitors.

Stopping the Executable Function

Procedure

Stopping from the Menu Bar

1. Click the Stop button or choose **Execute > Stop** from the menu bar.

Stop button

The Practice Status item shown on the Execution/Status tab displays "Stop."

Stopping the Executable Function from the Execution/Status Tab

1. Click the Stop button on the Execution/Status tab.

"Stop" is displayed for the practice status .

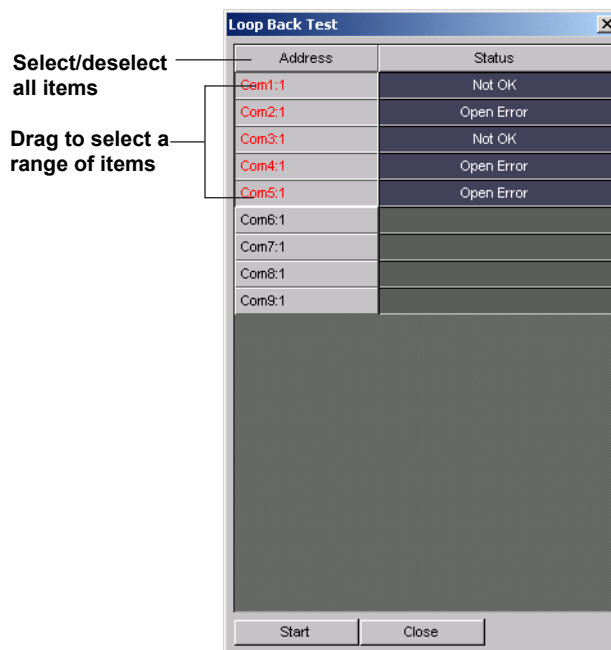# 2.5　Performing the Loop Back Test

Performing the Loop Back Test

Note

The loop back test or service cannot be performed while other processes or a services are running.

Procedure

1. Choose **Test > Loop Back Test** from the menu bar.

The Loop Back Test dialog box opens.

Select/deselect all items

Drag to select a range of items

2. Drag to select the addresses on which you wish to perform the loop back test.

3. Click Practice.

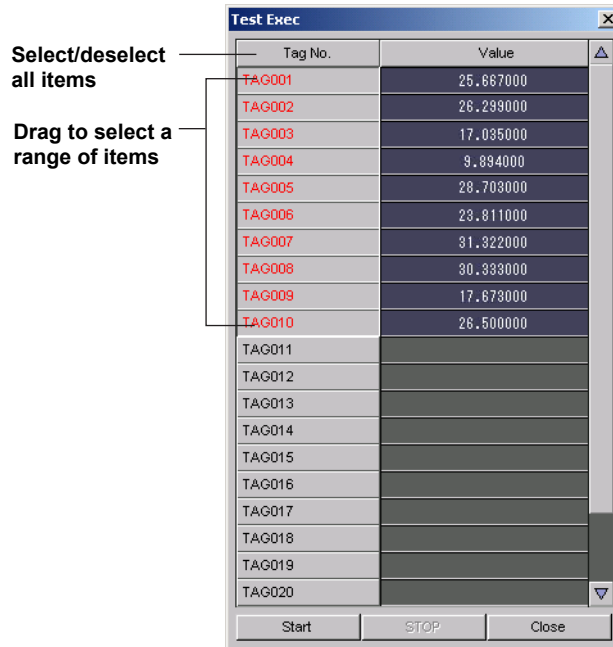The result appears in the status column.

OK: Normal

Not OK: No response

Executing the Test

Procedure

Starting the Test

1. Choose **Test > Test** from the menu bar.

The Test Exec dialog box is displayed.

Select/deselect all items ———

Drag to select a range of items ———

2. Drag to select the tag numbers on which you wish to perform the test.

3. Click Practice.

The scaled result is displayed.

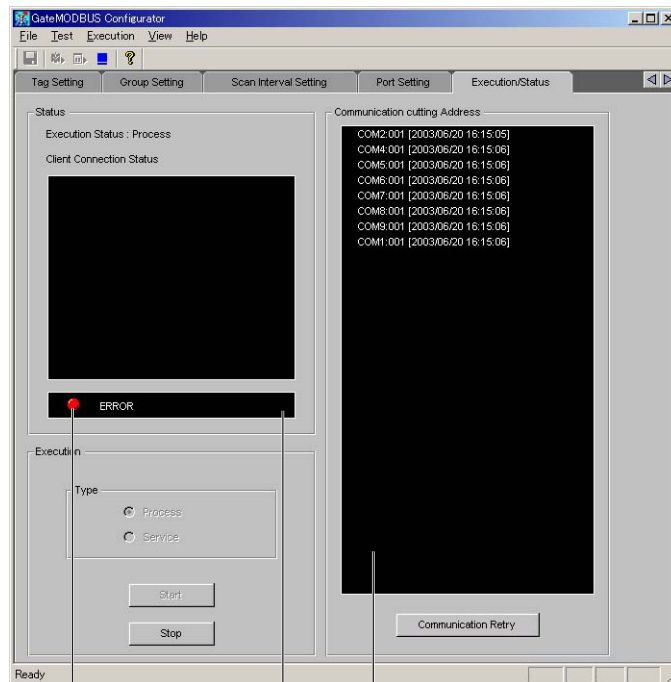### Stopping the Test

4. Click STOP.

The test stops.

2.6 Viewing the Status of the Executable Function and Retrying Communications

Viewing the Status of the Executable Function

Procedure

1. Click the Practice/Status tab or choose **View > Execution/Status** from the menu bar.
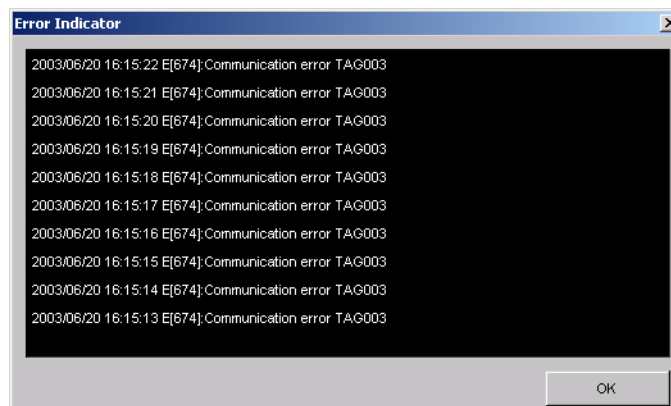
The practice type, practice status (running as process, running as service, or stopped), client connection status, and communication cutting addresses are displayed.

The practice status is displayed using colors
Green: Normal
Gray: Stopped
Blinking red: Error
Yellow: Data dropout occurred and communication is retried (communication paused)

If Use retry is turned OFF on the Scan Interval Setting tab, click here to retry communication if a communication error occurs.

The software retries communication until it is restored and displays up to 200 addresses that ended in a communication error only if Use retry is turned ON the Scan Interval Setting tab

Note

*   Click the Start button to download data from the Modbus devices. The interval at which data is downloaded is determined by the data acquisition conditions (scan interval, timeout time, and number of retries).
*   If a warning message is displayed (code Wxxxx), the lamp that displays the connection status by color does not blink red.
*   When an error occurs and the lamp blinks red, the Error Indicator dialog box appears. If you close the dialog box, the lamp turns green.
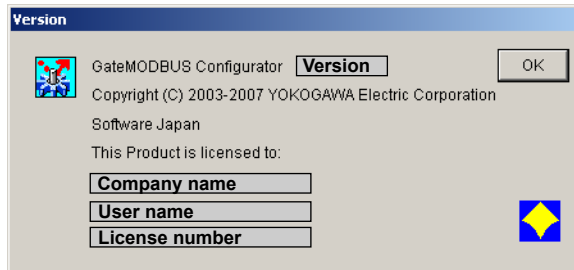
Retrying Communications

1. Click the **Communication Retry** button.

Retries communications. (Retry time)

2.7 Viewing Version Information

Procedure

1. Click the About button or choose **Help > About** from the menu bar.

The Version dialog box opens.

3.1   Overview

GateMODBUS performs serial communications with Modbus devices and acquires data at regular intervals. Through the monitor server function, the acquired data is transferred to DAQLOGGER or Remote Monitor via Ethernet. The following is a list of the features of each software function.

Environment Setting Functions

Environment setting functions are used to enter all environment settings required to run the executable function, and are also used to run/stop the executable function.

*   **Serial Port Settings**
    Baud rate
    Parity
*   **Ethernet port to be used**
    IP address or host name
    Port number
*   **Data Acquisition Conditions**
    Scan interval
    Timeout time
    Retries
*   **Tag Settings**
    Communications port
    Modbus address
    Modbus function
    Modbus register number
    Modbus data type
    Scaling coefficient
    Scaling offset
    Decimal place
    Upper/lower limit of span
    Unit
    Tag name
*   **Group Settings**
    Tag assignments
    Tag colors
    Group name
*   **TCP/IP Settings for the Monitor Server Port**
*   **Running/Stopping Executable Function**
    Running of the executable function as a service
    Running of the executable function as a process
    Stopping the executable function
*   **Performing Tests (Data Acquisition)**
*   **Loop Back Test**
*   **Communication Retry ON/OFF for the Executable Function, Retry Interval, and Reset**
*   **Status Display of Executable Function**
    Practice status display (stopped, running as a service, running as a process)
    The client connection status is displayed if DAQLOGGER or Remote Monitor is the client.

3

Detailed Description Functions

Executable Function

Features of the executable function are as follows:

• Running as a process and as a service is possible.

• Data is acquired from Modbus devices at regular intervals.

• Retries communications.

• Runs as a monitor server if DAQLOGGER or Remote Monitor is the client.

3.2 Detailed Description of Functions

Communication Port

The communications ports available to GateMODBUS are the COM1–COM9 serial (RS-232) ports the Ether1 to Ether16 Ethernet ports. The following items are specified in the Serial Setting tab.

Serial port setting
- Baud rate (4800, 9600, 19200, or 38400 bps)
- Parity (None, Even, or Odd)

Ethernet port setting
- IP address or host name
- Password

Note

The Modbus protocol's RTU (remote terminal unit) mode prescribes stop bit 2 for no parity, and stop bit 1 for odd or even parity.

Modbus Communications

GateMODBUS supports communications using the Modbus/RTU (serial) and Modbus/TCP (Ethernet) protocols. The functions and registers used by GateMODBUS for data logging are as follows:

Function	03	04
Description	Read holding register	Read input register
Register numbers that can be loaded:	40001–49999	400001–465535
	30001–39999	300001–365535

Also, you can execute the following functions on the configurator to display the connection status with Modbus devices.

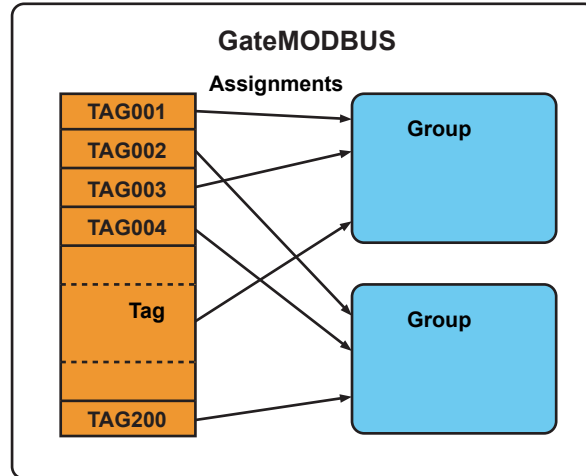| Function	08
Sub-function	00
Description	Loop back test

Note

GateMODBUS does not support the Modbus protocol's Modbus/ASCII mode.

Logical Configuration

Item	Description	Limit
Tag	Indicates one data item.	300
Group	Assigns tags. Up to 32 tags can be assigned to a group.	50

Logical Configuration Diagram

Acquisition Conditions

The following items are included in the acquisition conditions.

- Data scan interval (0.5–3600 sec)
  For information on the data acquisition operation, see page 3-6, "Acquiring Data at Fixed Intervals."
- Timeout time (1–10 sec)
- Retry Use (ON/OFF).
- Retry Interval (30–3600 sec.)

Tag

A tag is a name for a data value. You can use up to 100 tags with GateMODBUS. Data obtained from the Modbus registers is assigned to each tag. The following items are included in tag settings.

- Used serial ports (COM1–COM9) and Ethernet ports (Ether1 to Ether16)
- The read Modbus function (03 or 04)
- Register numbers read
  For Modbus function 03: 40001–49999, 400001–465535
  For Modbus function 04: 30001–39999, 300001–365535
- Data Type
  See page 3-8, "Data Type."
- Scaling variable
  See page 3-10, "Data Scaling."
- Decimal place
- Upper/lower span value
- Tag name
- Unit

Tag Name

Enter a tag name as needed. You can enter up to 16 alphanumeric characters. Tags can be downloaded (tag data is received) using a DAGLOGGER tag software or Remote Monitor that is connected to GateMODBUS.

Unit

Enter a unit as needed. You can enter up to 6 alphanumeric characters. The unit string is the unit string on the DAQLOGGER or Remote Monitor connected to GateMODBUS.

Decimal Place

Enter a decimal place of 0, 1, 2, 3, or 4. This value is the decimal place used when DAQLOGGER or Remote Monitor is connected to Gate-MODBUS for monitoring.

Upper/Lower Limit of Span

Enter the upper and lower limit values of span. The available setting range is as follows:

Decimal Place	Setting Range
0	−10000000000000000 to 10000000000000000
1	−1000000000000000.0 to 1000000000000000.0
2	−100000000000000.00 to 100000000000000.00
3	−10000000000000.000 to 10000000000000.000
4	−1000000000000.0000 to 1000000000000.0000

This value is the default setting used when DAQLOGGER or Remote Monitor is connected to GateMODBUS for monitoring.

Groups

You can combine tags into groups. Up to 50 groups can be created. Up to 32 tags can be assigned to a group. The following items are included in group settings.
- Tag assignments: Up to 32 tags can be assigned to a group.
- Color of assigned tags: The default color when connected to Remote Monitor.
- Group name: Up to 30 alphanumeric characters can be input.

Note

Group settings cannot be used by DAQLOGGER. They are only available when connected to Remote Monitor.

Tag Assignments

Tags can be assigned to groups. Up to 32 tags can be assigned to a group. The tags assigned here are the default values when Remote Monitor is connected to GateMODBUS.

Tag Colors

Specify colors for tags assigned to groups. The tag colors specified here are the default values when Remote Monitor is connected to GateMODBUS.

Group Names

You can assign names to groups. Names can contain up to 30 alphanumeric characters. The group names specified here are the default values when Remote Monitor is connected to GateMODBUS.

Acquiring Data at Fixed Intervals

Using GateMODBUS, data can be acquired concurrently on each port. Therefore data is logged more efficiently when connecting each Modbus device to a separate port rather than connecting several Modbus devices to a single port. Also, registers occurring in a continuous sequence on 1 instrument are read all at once. Therefore, the more sequentially continuous registers there are, the more efficiently data is acquired. However, if a register within the sequence experiences an error, the error applies to all registers in the sequence.

For example, given the three registers below, TAG001–TAG003 are read all at once at each scan interval.

Tag	COM Port	Modbus Address	Register numbers read
TAG001	COM1	1	30001
TAG002	COM1	1	30002
TAG003	COM1	1	30003

Data Dropout

If data is being read at the timing shown below, data is dropped. Data dropout can occur in the following circumstances.

- **If the time required to read the tags is longer than the scan interval**
  In the figure below, by the time the tags at T1 have been read, T2 has already passed and T3 begins. Therefore, the tags to have been read at T2 were dropped.
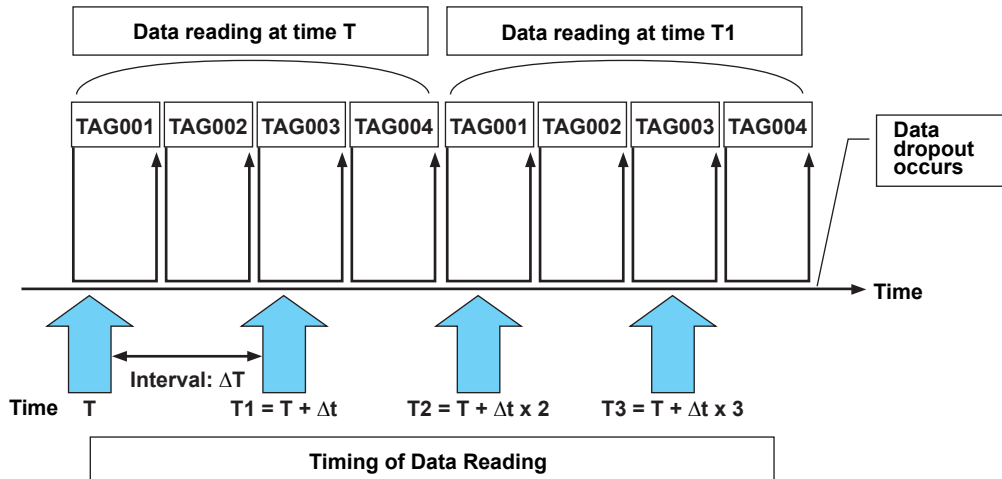
In this case, as much time as possible must be given to interval ∆T to acquire all tags assigned to the port.

- **When data reading times out due to such instances as noise interference during communication, or when a Modbus device's power turns OFF**
  In the figure below, with the data reading at time T, the reading of all tags occurs within the logging interval ∆T, but with data reading at time T1, TAG0003 times out, and data reading at time T2 is dropped.
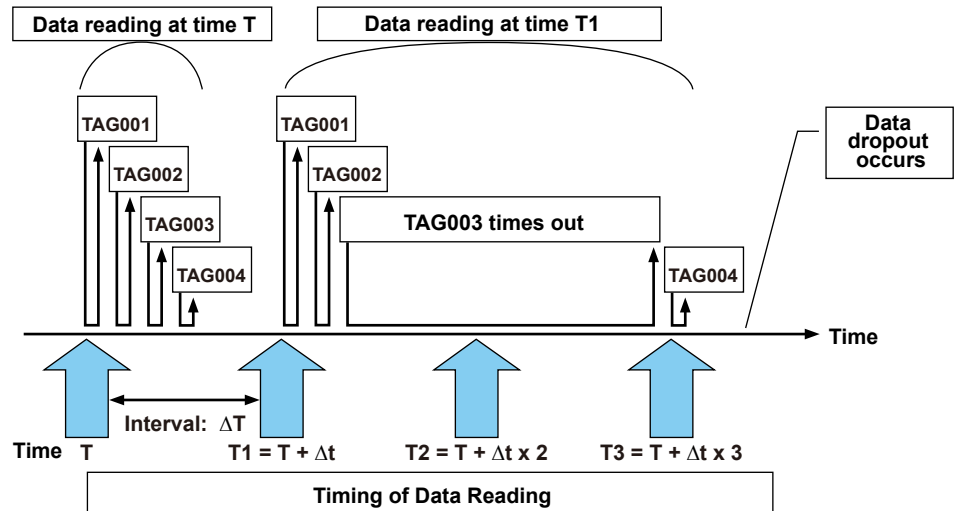
Enter as short of a timeout time as possible, keeping in mind the processing power and baud rate of the Modbus device performing communications with GateMODBUS. As you can see from the figure above, if the timeout time is long data can be dropped not only from tags that timed out, but also from adjacent tags even if they would have responded normally.

Timeout Operation

When reading tag data, after sending a register value request message to the Modbus device, if the message is not received within the specified timeout time that tag is considered to have timed out. When the setting of "Retry Use" is turning on, retrying is executed for tag which have timeout.
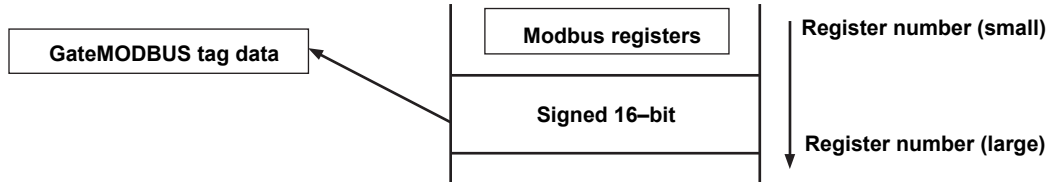
Resetting the Timeout Counter

You can reset the timeout counter for the executable function from the configurator. When resetting the timeout counter, the retries of tags for which data acquisition was stopped due to the executable function having timed out begin again at 1, and data reading is performed.

Data Type

With the Modbus protocol, the data type within the read registers is not defined. Therefore, the data type in the read registers depends on the Modbus device's manufacturer.   GateMODBUS supports the following data types.
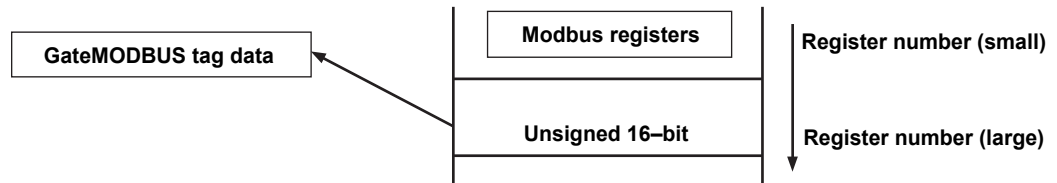
Signed 16–Bit Integer (INT16)

Enter this setting if a signed 16–bit integer is assigned to the Modbus device registers.

| GateMODBUS tag data | ← | Modbus registers | Register number (small) ↓ |
| | | Signed 16–bit | Register number (large) ↓ |

Unsigned 16–Bit Integer (UINT16)

Enter this setting if an unsigned 16–bit integer is assigned to the Modbus device registers.

| GateMODBUS tag data | ← | Modbus registers | Register number (small) ↓ |
| | | Unsigned 16–bit | Register number (large) ↓ |

Signed 32–Bit Integer High/Low (INT32_B)

Enter this setting if a signed 32–bit integer is assigned to the Modbus device registers and the register numbers are assigned from high to low starting with the smallest register.

GateMODBUS tag data	←	Modbus registers	Register number (small) ↓
		Signed 32–bit integer (high)	
		Signed 32–bit integer (low)	Register number (large) ↓

Signed 32–Bit Integer Low/High (INT32_L)

Enter this setting if a signed 32–bit integer is assigned to the Modbus device registers and the register numbers are assigned from low to high starting with the smallest register.

GateMODBUS tag data	←	Modbus registers	Register number (small) ↓
		Signed 32–bit integer (low)	
		Signed 32–bit integer (high)	Register number (large) ↓
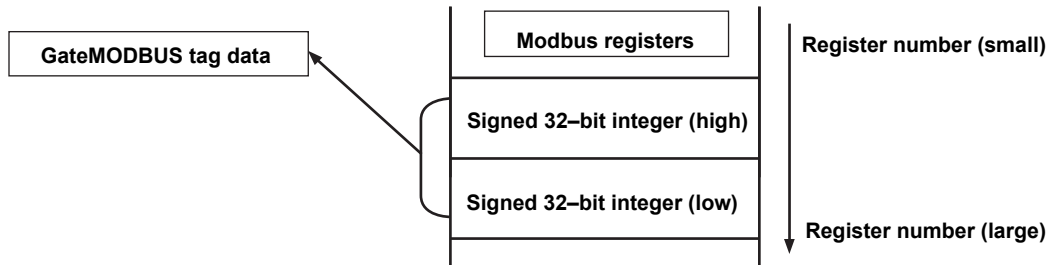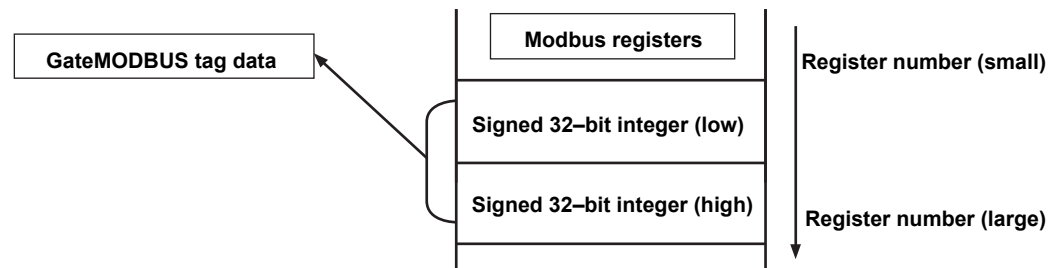
Unsigned 32–Bit Integer High/Low (UINT32_B)

Enter this setting if an unsigned 32–bit integer is assigned to the Modbus device registers and the register numbers are assigned from high to low starting with the smallest register.

GateMODBUS tag data	←	Modbus registers	Register number (small)
		Unsigned 32–bit integer (high)	
		Unsigned 32–bit integer (low)	Register number (large)

Unsigned 32–Bit Integer Low/High (INT32_L)

Enter this setting if an unsigned 32–bit integer is assigned to the Modbus device registers and the register numbers are assigned from low to high starting with the smallest register.
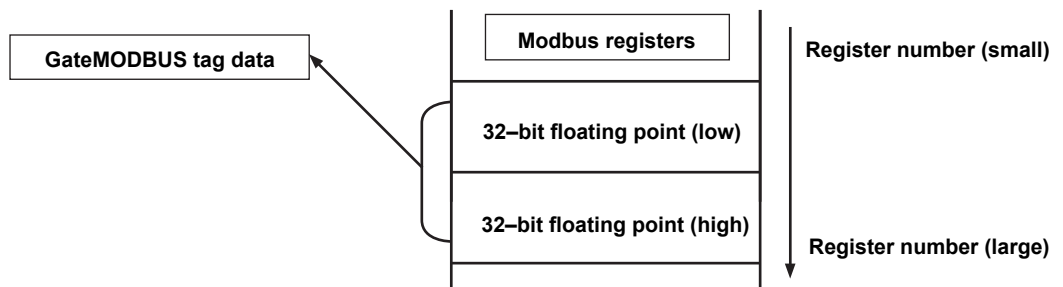
GateMODBUS tag data	←	Modbus registers	Register number (small)
		Unsigned 32–bit integer (low)	
		Unsigned 32–bit integer (high)	Register number (large)
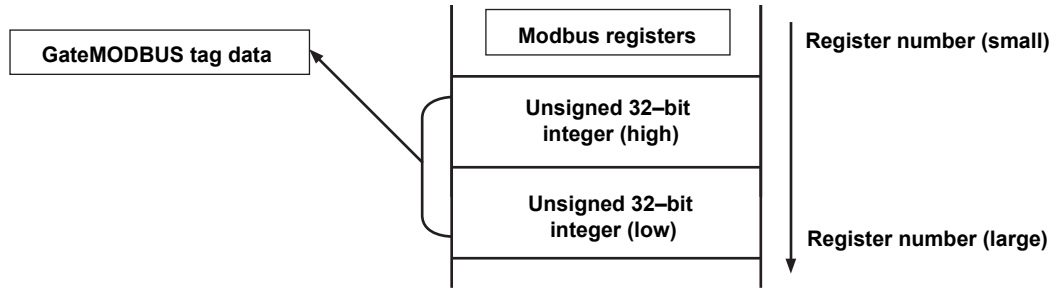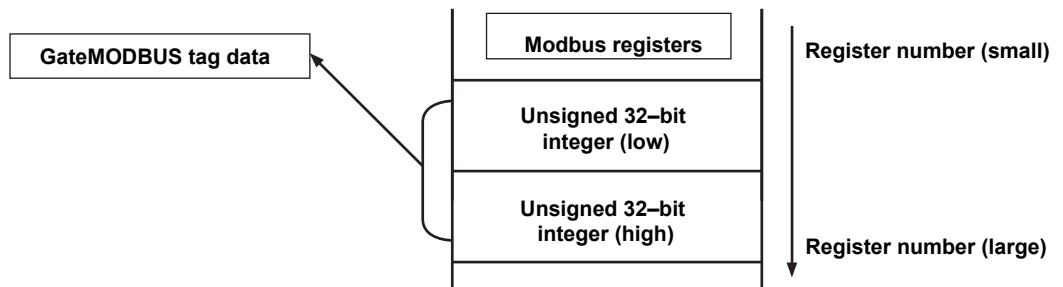
32–Bit Floating Point High/Low (FLOAT_B)

Enter this setting if an unsigned 32–bit floating point is assigned to the Modbus device registers and the register numbers are assigned from high to low starting with the smallest register.

GateMODBUS tag data	←	Modbus registers	Register number (small)
		32–bit floating point (high)	
		32–bit floating point (low)	Register number (large)
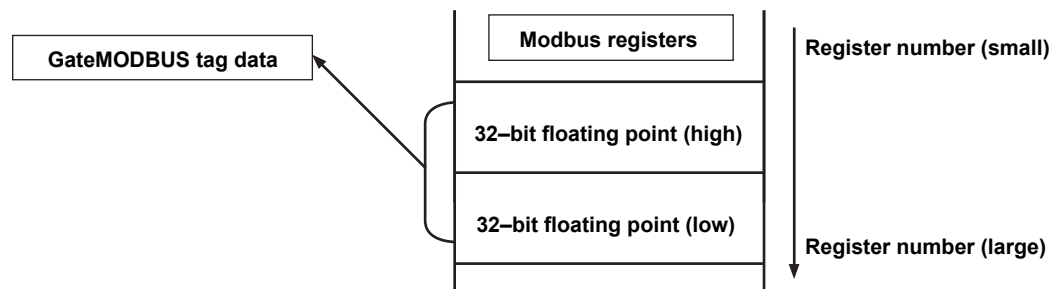
32–Bit Floating Point Low/High (FLOAT_L)

Enter this setting if an unsigned 32–bit floating point is assigned to the Modbus device registers and the register numbers are assigned from low to high starting with the smallest register.

GateMODBUS tag data	←	Modbus registers	Register number (small)
		32–bit floating point (low)	
		32–bit floating point (high)	Register number (large)

3

Detailed Description Functions

Data Scaling

There are times when the values obtained by reading registers during Modbus communication are not physical values.

GateMODBUS performs the following calculations on Modbus register values.

$X = A \cdot x + B$

X: calculated result

x: Modbus register value

A: Coefficient

B: Offset

The user can specify a desired value for coefficient A and offset B above using the configurator.

Running/Stopping Executable Function

The configurator starts and stops the executable function. There are two execution methods, process and service. Process execution starts the application as any normal program. When started as a process, the executable function closes when logging off Windows. When started as a service, the executable function is registered in Windows as an automatically executable service. When started as a service, the executable function continues processing even when the user has logged off of Windows. Also, the executable function is run automatically as soon as the PC is turned ON (prior to log in). However, the function can only be run as a service when using Windows 2000 or Windows XP by a user with Administrator privileges. Services cannot be executed when using Windows Vista.

Loop Back Test

Using the configurator, you can perform the Modbus function 08 loop back test on each Modbus device connected to GateMODBUS. This sub-function is 00, and during normal operation, data having the same contents as data sent to the Modbus device by GateMODBUS is returned from the Modbus device. The result of the loop back test is displayed as either Normal or No Response on the configurator. If the loop back test results in no response, it may indicate a problem with the communication cable, baud rate or parity mismatch, or a wrong Modbus address.

Test Acquisition

You can perform a test acquisition on each tag using the configurator. For the test acquisition, data is read from the registers of the Modbus devices specified for each tag, the results are scaled per specified values and displayed as digital values. From this, you can determine whether the COM port, Modbus address, Modbus register, scaling coefficient, and decimal place for each tag is correct.

Monitor Server Function

GateMODBUS takes data read in from the Modbus devices and utilizes its monitor server functionality to transfer the data to DAQLOGGER or Remote Monitor. The maximum number of DAQLOGGERs or Remote Monitors that can be connected at once is 16.

Status Display of Executable Function

The status display function allows you to display the following status items for the executable function.

• Practice status (stopped, running as a service, running as a process)
• Tags disconnected due to timeout
• PCs connected to DAQLOGGER and Remote Monitor as a monitor server

3.3 Messages and Corrective Actions

Error

No.	Message	Corrective Actions
E211	Cannot write to file.	Check if the disk capacity is sufficient or if the file systems is normal.
E212	Cannot read file.	Check if the file exists and is supported by the software or if the file system is normal.
E213	Cannot open file.	Check if the file exists and is supported by the software or if the file system is normal
E401	Communication error.	Check if the recorder connected for communication is powered on and if the cable is properly connected. Also check the following items according the communication type. • For Ethernet Check if address settings are correct; the TCP/IP protocol is installed in Windows; the Ethernet card is properly installed. • For RS-232 and RS-422-A Check if the baud rate settings match; the port (COM1 to COM9) settings match, the address settings are correct (RS-422-A); the serial port of the PC is active and the appropriate cable is being used.
E402	Communication timeout.	-
E403	Cannot open a communication port.	Same as E401.
E501	Invalid license number. Please reinstall the software.	Install the software again.
E1010	Execution of a process failed.	Check whether an executable function exists, or whether its files are damaged. If this error appears frequently, reinstall the software.
E1011	Execution of a service failed.	Check whether an executable function exists, or whether its files are damaged. If this error appears frequently, reinstall the software.

Message

No.	Message
M1201	Model determination was successful.
M1210	Setting changes saved before execution.

Executable Function Messages

No.	Message	Corrective Actions
W[631]	Data Lack	Reduce the number of acquired data points or connected instruments, or lengthen the scan interval.
E[673]	Cannot open communication	Same as E401.
E[674]	Communication error	Same as E401.
E[675]	Communication time out	Same as E401.
E[800]	CRC check error	A CRC error was detected. Check the communication status.
E[801]	Invalid handle.	Check the communication status.
E[802]	Error respond	Check the communication status.
E[804]	Invalid command	-
I[606]	Recovery Communication	Connection recovered.

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