Overview

This is an explanation of the procedure for entering settings for Modbus communications with the DAQMASTER MW100. This manual describes the procedure for data transmission and reception based on a configuration in which two MW100s are connected for Modbus communications (Modbus/TCP) over an Ethernet. Note that the MATH function (/M1 option) is required to use the Modbus client function.

Setup Procedure

The following shows the procedures for entering settings, from connecting to the Ethernet to applying the data acquired via Modbus communications. For detailed instructions and specifications on each function, see the MW100 Data Acquisition Unit user’s manual.

Example System

In this example, the system comprises one client MW100 and one server MW100 connected via Ethernet.

The MW100 set up as the client in the above system diagram is referred to as the MW100 client. Likewise, the MW100 set up as the server is referred to as the MW100 server.
Setup Example

Data is sent and received between the MW100 client and MW100 server. The MW100 client loads and displays measured data from measurement channels 001 to 004 of the MW100 server, and also writes that data to the MW100 server. The following is an example in which the data written to the MW100 server is displayed.

* Com. input ch. : Communication input channel

Data in the Example

The data that is sent and received in this setting example is as follows.

1. Measured data from measurement channels 001 to 004 of the MW100 server are written to communication input channels C001 to C004 of the MW100 client as 32-bit floating point (float) type data.

For READ (client loads data from server)

<table>
<thead>
<tr>
<th>MW100 Client</th>
<th>MW100 Server</th>
</tr>
</thead>
<tbody>
<tr>
<td>Communication Input Channel</td>
<td>Input Register</td>
</tr>
<tr>
<td>C001</td>
<td>31001</td>
</tr>
<tr>
<td>C002</td>
<td>31002</td>
</tr>
<tr>
<td>...</td>
<td>...</td>
</tr>
<tr>
<td>C004</td>
<td>31004</td>
</tr>
</tbody>
</table>

Lower byte of measured data of measurement channel 001
Upper byte of measured data of measurement channel 001
Lower byte of measured data of measurement channel 002
Upper byte of measured data of measurement channel 002
Lower byte of measured data of measurement channel 004
Upper byte of measured data of measurement channel 004

Input register numbers starting from 31001 are specified to acquire 32-bit floating point type measured data.

"Float-Little" is selected for the register data type because the 32-bit floating point type measured data is received in the order lower byte, upper byte.
2. Computed data from MATH channels A001 to A004 of the MW100 client are written to communication input channels C001 to C004 of the MW100 server.

For WRITE (client writes data to the server)

**MW100 Client**

**MW100 Server**

<table>
<thead>
<tr>
<th>MATH Channel</th>
<th>Hold Register</th>
</tr>
</thead>
<tbody>
<tr>
<td>A001</td>
<td>40001</td>
</tr>
<tr>
<td>A002</td>
<td>40002</td>
</tr>
<tr>
<td>...</td>
<td>40003</td>
</tr>
<tr>
<td>A004</td>
<td>40004</td>
</tr>
<tr>
<td>...</td>
<td>40007</td>
</tr>
<tr>
<td>...</td>
<td>40008</td>
</tr>
</tbody>
</table>

Lower byte of communication input channel C001
Upper byte of communication input channel C001
Lower byte of communication input channel C002
Upper byte of communication input channel C002
Lower byte of communication input channel C004
Upper byte of communication input channel C004

"Float-Little" is selected for the register data type because the MATH channel data is received in the order lower byte, upper byte.

**Client/Server Settings for READ**

**Server-Side Settings**

**Server Settings**

Set the MW100 server as the server device.

- **Application timeout setting**
  Set as needed. Timeout time for the Modbus server is fixed to 30 s.

- **Turn on Action on the server**
  Turn the MODBUS server action "ON."

- **Enter the server port number**
  Enter the Modbus server port number. Use the default value unless otherwise necessary. In the example, the default value is "502."

**Client-Side Settings**

**Client Setting 1**

Set the MW100 client as the client device.

- **Select**
  The setting is applied on the client device.

- **Set according to network environment**
  - **Cycle:** Select a cycle appropriate for the unit's performance.
  - **Connection:**
    - **Connection Timeout:** Enter the time to wait before disconnecting.
    - **Wait Time:** Enter the time to wait between disconnection and sending of commands.
Client Setting 2
Enter settings for the destination server.

<table>
<thead>
<tr>
<th>No.</th>
<th>Server</th>
<th>Port</th>
<th>Unit</th>
</tr>
</thead>
<tbody>
<tr>
<td>01</td>
<td>192.168.1.101</td>
<td>502</td>
<td>255</td>
</tr>
<tr>
<td>02</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>03</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>04</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>05</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>06</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>07</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>08</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>09</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
<tr>
<td>10</td>
<td>502</td>
<td>255</td>
<td></td>
</tr>
</tbody>
</table>

Enter the IP address of the server
Enter the IP address or host name of the destination server. In the example, an IP address of “192.168.1.101” is entered.

Enter the server unit number
Only Modbus/TCP connections are used in the example, therefore the default unit number of “255” is used.

Enter the server port number
Enter the port number of the destination server. In the example, “502” is entered.

Client Setting 3
Enter settings for registers to be used for receiving data. For data types, see “Register Data Types.”

Select the register function (read or write)
If the client will be reading from the server, select “Read.”

Enter the number of the destination server
Enter the number set in Client Setting 2. In the example, “1” is entered.

Enter the communication input channels on which to read by the client
In the example, the client will read on communication input channels “C001” to “C004.”

Select the data type for the registers on the destination server that will be read.
In the example, “Float-Little” is entered indicating that the register data type is 32-bit floating point and the order is lower byte, upper byte.

Enter the number of the first input register on the destination server that will be read.
In the example, “31001” is entered since the measured data read out from measurement channels 001 to 004 is of the 32-bit floating point type.

MATH Channel Settings
In order to display data loaded to the communication input channels from the MW100 server, enter the communication input channel numbers in the MATH channel expression entry area.

<table>
<thead>
<tr>
<th>No.</th>
<th>Expression</th>
<th>Start</th>
<th>Length</th>
<th>Repeat</th>
<th>Data</th>
</tr>
</thead>
<tbody>
<tr>
<td>A001</td>
<td>C001</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A002</td>
<td>C002</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A003</td>
<td>C003</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>A004</td>
<td>C004</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
Client/Server Settings for WRITE

Server-Side Settings

Server Settings
Set the MW100 server as the server device. These are the same as the server-side settings for READ.

MATH Channel Settings
In order to display data written to the hold registers from the MW100 client, enter the communication input channel numbers in the MATH channel expression entry area. These are the same as the MATH channel settings for READ.

Client-Side Settings

Client Setting 1
Set the MW100 client as the client device. These are the same as the client-side settings for READ.

Client Setting 2
Enter settings for the destination server. These are the same as the client-side settings for READ.

Client Setting 3
Enter settings for registers to be used for sending data.

• for Write
- Enter the number of the destination server
  In the example, “1” is entered.
- Enter the channels on the client that will be written to the destination server
  In the example, “A001” to “A004” is entered since computed data from MATH channels 001 to 004 are written.
- Enter the number of the first hold register that is written to on the destination server
  In the example, “40001” is entered since the client will write to communication input channels C001 to C004 on the server.
- Select the register function (read or write)
  If the client will be writing to the server, select Write.
- Select the data type for the hold registers of the destination server.
  In the example, “Float-Little” is entered indicating that the register data type is 32-bit floating point.
Starting Communication

Starting Measurement and Computation
MATH channels must be displayed to show transmitted data. After starting measurement, start computation.

Displaying Data
When data is sent/received via Modbus communication, the following waveform is displayed on the monitor screen of a Web browser.

- Displaying MW100 Client Data (Trend)

- Displaying MW100 Server Data (Trend)
Checking the Communication Status

You can view log information to check the status of Modbus communications.

Modbus communication log information
You can check the status of communication and other information by selecting items here.
For information about displayed contents, see the MW100 Communication Command Manual (IM MW100-17E).

Register Data Types

The figure below describes specification of data types for registers used during Modbus communications. Registers are fixed to 16-bits in length. Data longer than 16 bits are stored using multiple registers. In this case, the data sequence (Endian) must be specified. The MW100 can process 32-bit data. Specify “Little” to store data from the least significant byte, and “Big” to store data from the most significant byte.

<table>
<thead>
<tr>
<th>Register</th>
<th>Assignment</th>
<th>Data Type</th>
<th>Data Type Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>30001</td>
<td>Signed integer</td>
<td>Int16</td>
<td>--- Int16</td>
</tr>
<tr>
<td>30001</td>
<td>Unsigned integer</td>
<td>UInt16</td>
<td>--- UInt16</td>
</tr>
<tr>
<td>30001</td>
<td>Signed integer</td>
<td>Int32 - Little</td>
<td>--- Int32 - Little</td>
</tr>
<tr>
<td>30002</td>
<td>(Lower 16bit)</td>
<td>Int32</td>
<td>--- Int32 - Big</td>
</tr>
<tr>
<td>30001</td>
<td>Signed integer</td>
<td>Int32 - Big</td>
<td>--- Int32 - Big</td>
</tr>
<tr>
<td>30002</td>
<td>(Upper 16bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>30001</td>
<td>Unsigned integer</td>
<td>Int32 - Little</td>
<td>--- Int32 - Little</td>
</tr>
<tr>
<td>30002</td>
<td>(Lower 16bit)</td>
<td>Int32</td>
<td>--- Int32 - Big</td>
</tr>
<tr>
<td>30001</td>
<td>Unsigned integer</td>
<td>Int32 - Big</td>
<td>--- Int32 - Big</td>
</tr>
<tr>
<td>30002</td>
<td>(Upper 16bit)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31001</td>
<td>Floating point</td>
<td>Float - Little</td>
<td>--- Float - Little</td>
</tr>
<tr>
<td>31002</td>
<td>real number</td>
<td></td>
<td></td>
</tr>
<tr>
<td>31001</td>
<td>Floating point</td>
<td>Float - Big</td>
<td>--- Float - Big</td>
</tr>
<tr>
<td>31002</td>
<td>real number</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

* MW100 data are all Little Endian, and assigned to Modbus registers. When loading MW100 data, specify “Little.”

For the available MW100 register numbers, Modbus protocol specifications, and other information, see chapter 5 of the MW100 User's Manual (IM MW100-01E).