
**User's
Manual**

**Ethernet Module
WE7051**

IM 707051-01E
3rd Edition

Thank you for purchasing the Ethernet Module WE7051 for the PC-based measurement instruments, WE7000.

This User's Manual contains useful information about the function, connection to the measuring station, operations of the software on the PC, and troubleshooting of the WE7051. This manual assumes that you will be using the WE7000 Control Software that is included with the measuring station. To ensure the correct use of the module, please read this manual thoroughly before operation.

Keep this manual in a safe place for quick reference in the event a question arises.

The manual listed below contains general information about the WE7000 (primarily describes the measuring station, the optical interface module/card, and the WE7000 Control Software) and is included with the measuring station. Read the manual listed below along with this manual.

Manual Title	Manual No.
WE7000 User's Manual	IM707001-01E

Notes

- **The contents of this manual describe WE7000 Control Software Ver. 4.0.2.0 and module software Ver 3.01. If you are using another version of the software, the operating procedures or the figures given in this manual may differ from the actual software.**
- The contents of this manual are subject to change without prior notice as a result of continuing improvements to the instrument's performance and functions.
- Every effort has been made in the preparation of this manual to ensure the accuracy of its contents. However, should you have any questions or find any errors, please contact your nearest YOKOGAWA dealer.
- Copying or reproducing any or all of the contents of this manual without YOKOGAWA's permission is strictly prohibited.

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- Other product names are trademarks or registered trademarks of their respective holders.

Revisions

1st Edition: January 1999

2nd Edition: July 1999

3rd Edition: August 2000

Checking the Contents of the Package

Unpack the box and check the contents before operating the instrument. If the contents are not correct or missing or if there is physical damage, contact the dealer from which you purchased them.

Measurement Module

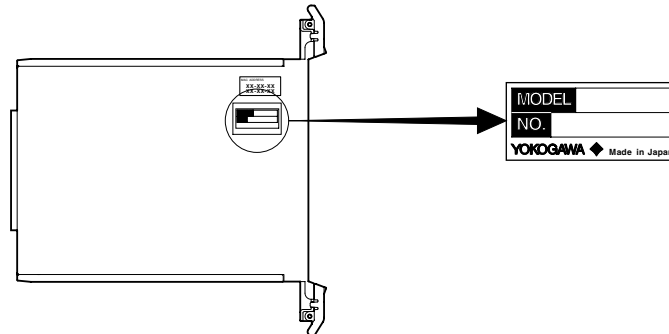
Check that the model name given on the name plate matches those on the order.

MODEL

Model	Suffix Code	Description
707051		WE7051 Ethernet Module

NO.

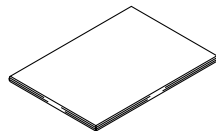
When contacting the dealer from which you purchased the instrument, please quote the instrument No.



Standard Accessories

The following standard accessories are supplied with the instrument. Make sure that all items are present and undamaged.

User's Manual (1)
IM707051-01E



Optional Accessories (Sold Separately)

Name	Model	Description
Serial interface cable	707801	9 pin-9 pin, length: 2 m

How to Use This Manual

Structure of the Manual

This User's Manual consists of the following five chapters and an index.

Chapter	Title	Description
1	Explanation of Functions	Explains the system configuration and functions.
2	Hardware Preparation	Explains how to install the module into the measuring station and how to connect the input/output.
3	Software Operation	Explains how to operate the software on the PC.
4	Troubleshooting and Maintenance	Explains the procedures for troubleshooting and self testing.
5	Specifications	Explains the specifications of the module.
	Index	Index of contents.

Conventions Used in This Manual

Unit

k Denotes 1000. Example: 100 kHz

K Denotes 1024. Example: 720 K

Displayed characters

Alphanumeric characters enclosed with [] usually refer to characters or settings that are displayed on the screen.

Symbols

The following symbol marks are used to attract the operator's attention.



Affixed to the instrument. Indicates danger to personnel or to the instrument. The operator must refer to the User's Manual. The symbol is used in the User's Manual to indicate the reference.

WARNING

Describes precautions that should be observed to prevent injury or death to the user.

CAUTION

Describes precautions that should be observed to prevent minor or moderate injury, or damage to the instrument.

Note

Provides information that is important for operating the instrument properly.

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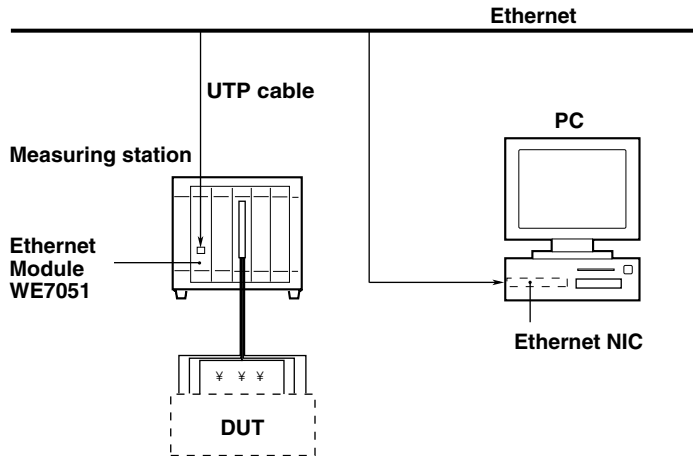
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1.1 System Configuration

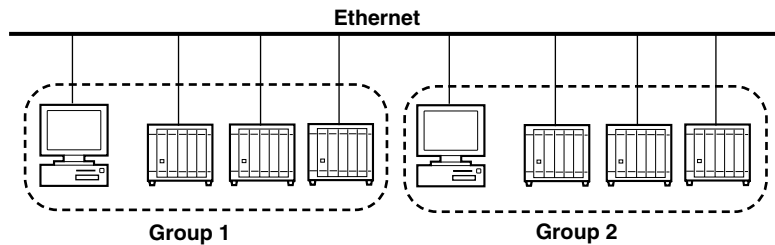
System Configuration

The following is an example in which the Ethernet Module WE7051 is installed into the measuring station and the measuring station and a PC are both connected to an Ethernet network.

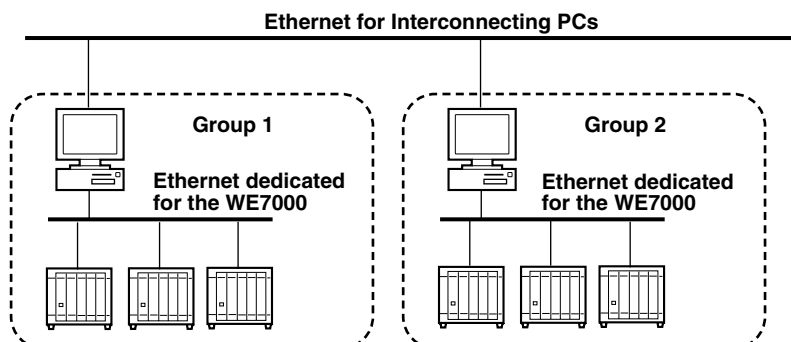


Network Configuration

With the current version of the WE7051 Ethernet Module, up to three measuring stations can be connected to each PC existing in the same subnet. Each PC and the measuring stations with which it will be communicating, are configured as one group. If there are multiple PCs that need to communicate with different triplet groups of measuring stations over the same Ethernet segment, multiple groups can be set. Communication is possible only within the same group.



To reduce the amount of network traffic on a public use Ethernet network, the PC and the measuring stations can be connected via their own independent network. In this case, the PC and the measuring stations should be in the same IP subnet. For example, as shown in the following figure, each PC has two Ethernet NICs, one for connecting with other PCs and one dedicated for use with the WE7000 measuring stations. The two cards are configured with different IP addresses.



1.2 Ethernet Configuration

IP Address

Specify the IP address to assign to the measuring station. The default IP address is "192.168.21.3."

Subnet Mask

Specify the mask that is used to determine the network address from the IP address. The default setting is "255.255.255.0."

Default Gateway

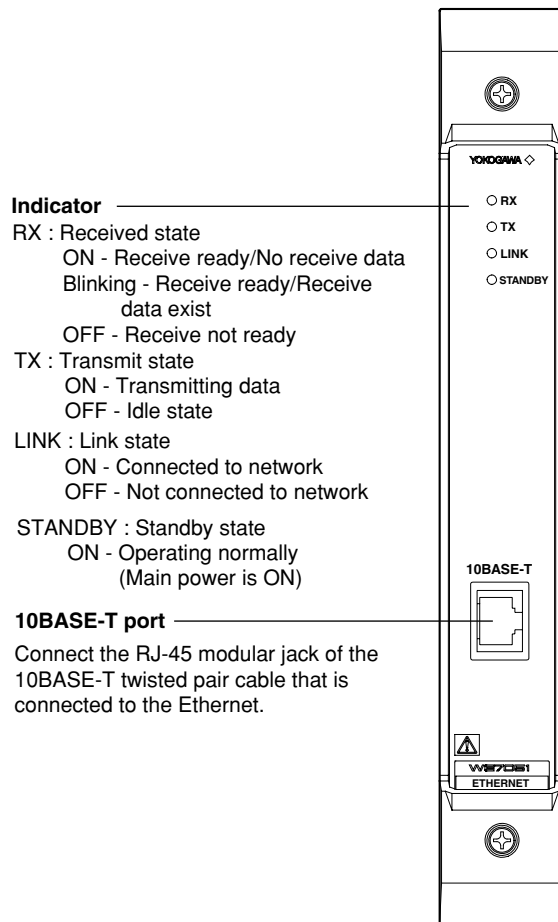
Specify the IP address of the default gateway that is used when communicating with other devices on a different network. Specify "0.0.0.0" when there is no gateway. The default setting is "0.0.0.0."

Port Number

Specify the port number of the process that receives UDP (User Datagram Protocol) packets of file transfers. The default setting is "34191."

1.3 Names and Functions of Sections

Front Panel

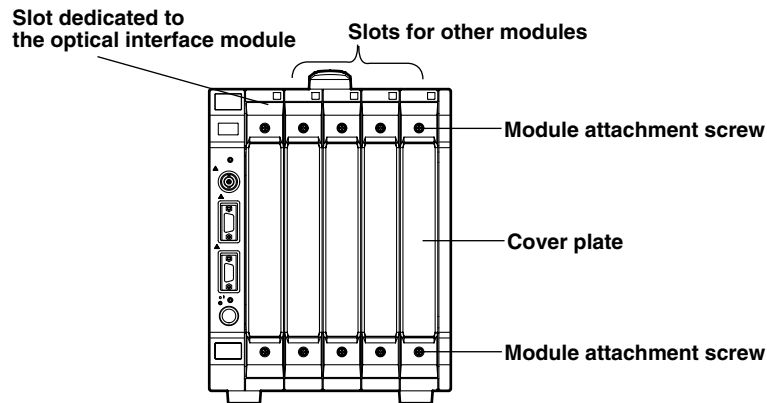


2.1 Installing the Module into the Measuring Station

Preparing to Install the Module

When the measuring station is first purchased, each slot is covered with a cover plate as shown in the figure below. Verify that the power supply is not connected to the measuring station, then loosen the module attachment screws (2 locations) and remove the cover plate from the slot on the left end. The slot on the left end is dedicated to the communication module.

* The following figure shows an example of the measuring station WE400.



Installing the Digitizer Module



WARNING

- Make sure to fasten the top and bottom attachment screws. If you connect the input signal cable without fastening the attachment screws, the protective grounding of the Measurement module provided by the power cord is compromised and may cause electric shock.



CAUTION

- To avoid damaging the instrument when installing modules, make sure to turn OFF the standby power switch of the measuring station.
- Be careful not to get your fingers caught in the ejection lever when inserting the module. In addition, do not put your hand inside the slot, because there are protrusions along the module guide that may injure your fingers.
- Do not remove the cover plates from unused slots. It can cause overheating and malfunction. The cover plates are also needed to minimize the influence of electromagnetic interference.

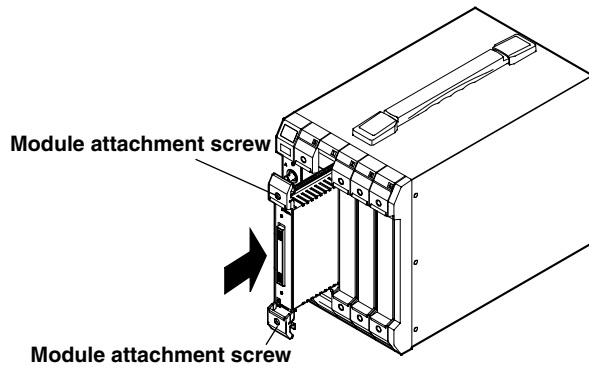
Insert the module along the guide rail of the slot from which you removed the cover plate. Insert the module until it clicks into the connector. Be careful not to get your fingers caught in the ejection lever while inserting the module.

When the module is securely inserted, fasten the module attachment screws (tightening torque: 0.6 to 0.7 N·m).

To remove the module, loosen the module attachment screws and pull the ejection lever from the inside to the outside. This will force the module out of the slot.

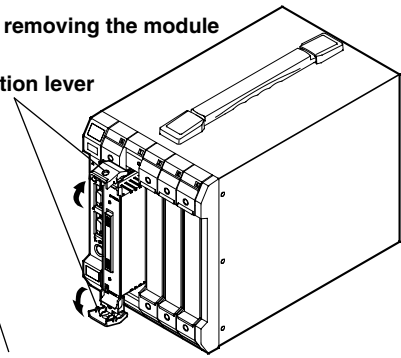
<There is an illustration on the next page.>

2.1 Installing the Module into the Measuring Station



• When removing the module

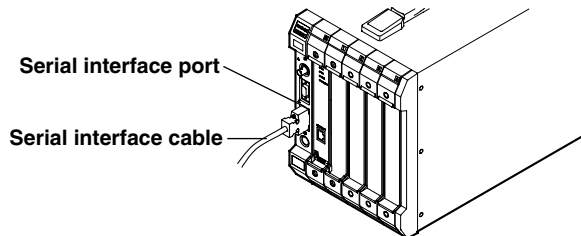
Ejection lever



2.2 Connecting the cable

Initial Connection for Configuring the Ethernet Module

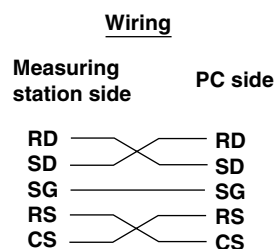
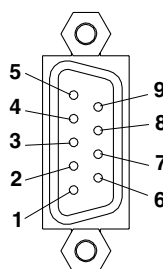
The communication settings such as the IP address are set initially by connecting a serial interface cable (sold separately, model: 707801) between the PC and the measuring station.



If you are going to use your own serial interface cable, use a cable that complies with the following specifications.

Pin Assignments

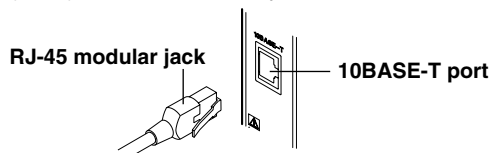
Pin No.	Signal Name
1	Not used
2	RD (Received Data)
3	SD (Send Data)
4	Not used
5	SG (Signal Ground)
6	Not used
7	RS (Request send)
8	CS (Clear Send)
9	Not used



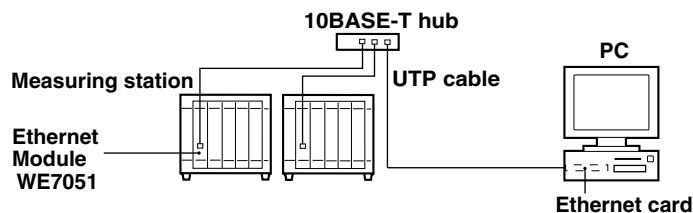
For the procedures on configuring the communication parameters, see section 3.1 “Configuring the Ethernet Communication Parameters of the Measuring Station Using Serial Communication” (page 3-1).

Connecting the UTP (Unshielded Twisted-Pair) Cable

Connect the RJ-45 modular jack of the UTP cable that is connected to the network (HUB) to the 10BASE-T port of the Ethernet Module.



You need a hub to connect a PC and the measuring station.



Note

- Make sure to use a category 3, 4, or 5 UTP cable.
- Do not directly connect a PC and the Ethernet Module WE7051 without using a hub. Operations are not guaranteed for communications using direct connection.

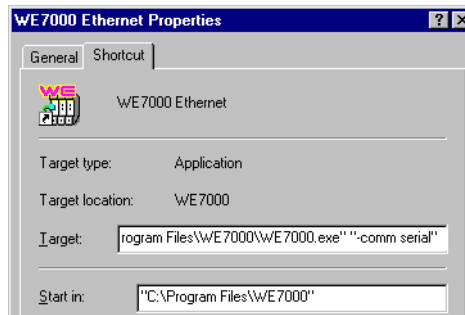
3.1 Configuring the Ethernet Communication Parameters of the Measuring Station Using Serial Communication

Before continuing, follow the instructions given in the section “Initial Connection for Configuring the Ethernet Module” on page 2-3 to connect the PC and measuring station with a serial interface cable. In addition, the WE7000 Control Software must be installed before going to step 1. See Chapter 3 in the “PC-Based Measurement Instruments WE7000 User’s Manual” (IM707001-01E) for details.

Note

The IP address of the Ethernet Module WE7051 cannot be obtained dynamically from the DHCP server.

1. Select the [WE7000] shortcut icon and click the right mouse button.
2. Select [Properties] and click the [Shortcut] tab in the displayed property window.
3. In the [Target] textbox, enter a space after [WE7000.exe] followed by [“-comm serial”]. The default communication setting is as follows: “Serial port: COM1, baud rate: 38400, hardware handshaking: ON(CTS-RTS).” If these parameters need to be changed, enter the appropriate start parameter after [“-comm serial] according to the syntax given below. Separate each parameter with a space or a tab and close the parenthesis at the end. The parameters are not case-sensitive.
 - Serial port: COM=serial port name (Example: COM2)
 - Baud rate: BAUDRATE=baud rate (9600, 19200, or 38400)
 Example: “-comm serial COM=COM2 BAUDRATE=9600”



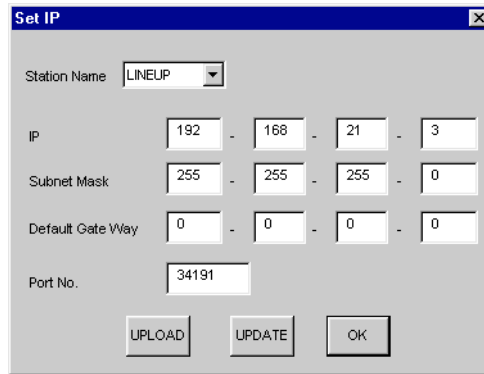
4. Click the [OK] button.
5. Turn ON both the main power switch and the standby power switch of the measuring station and double-click the [WE7000] shortcut icon that you have created for serial communication.
6. Using the menu bar that appears, select [Set IP] from the [Network] menu to open the communication settings dialog box.



<Continues on next page>

3.1 Configuring the Ethernet Communication Parameters of the Measuring Station Using Serial Communication

7. Check that the appropriate station name is displayed in the [Station Name] list box.



The screenshot shows a 'Set IP' dialog box with the following fields and values:

Field	Value
Station Name	LINEUP
IP	192 - 168 - 21 - 3
Subnet Mask	255 - 255 - 255 - 0
Default Gate Way	0 - 0 - 0 - 0
Port No.	34191

Buttons: [UPLOAD] [UPDATE] [OK]

8. Set each parameter and click the [UPDATE] button.

The default value of each parameter is as follows:

- IP address: 192.168.21.3
- Subnet mask: 255.255.255.0
- Default gateway: 0.0.0.0
- Port No.: 34191 (Selectable range: 0 to 65535)

Clicking the [UPLOAD] button displays the current settings.

Clicking the [OK] button closes the dialog box.

To activate the changes, you must power cycle the measuring station using the main power switch.

Note

The IP address is used to distinguish between the various devices connected to the Internet which communicate using the TCP/IP protocol. The address is a 32-bit value normally expressed in four octets (each 0 to 255), each separated by a period as in 192.168.1.1.

The IP addresses that are used over the Internet are managed by InterNIC. However, if the PC and measuring stations are connected over their own independent network as indicated in the bottom figure in section 1.1, "Network Configuration," then IP addresses can be assigned arbitrarily within that network. The following three numerical ranges of IP addresses are provided for such use.

- 192.168.0.0 to 192.168.255.255
- 172.16.0.0 to 172.31.255.255
- 10.0.0.0 to 10.255.255.255

By factory default, the WE7051 Ethernet Module is set to use "192.168.21.0 to 192.168.21.255" which is contained in the first of the IP address ranges just described. If there are no preexisting devices that use IP addresses in the range "192.168.21.0 to 192.168.21.255," and the PC and measuring stations are connected over their own independent network, then the factory default settings can be used.

Carry out the following procedures. Then, follow the procedures described in the next section the next time you connect to the Ethernet.

1. Select [Exit] from the [File] menu to exit the WE7000 Control Software.
2. Remove the serial interface cable and connect the UTP cable.

3.2 Communication Configuration after Connecting to the Ethernet

After configuring the Ethernet communication parameters via serial communication and connecting the UTP cable according pages 3-1 and 3-2, follow the procedures below to carry out additional configurations necessary for Ethernet communication.

TCP/IP Settings for the PC

For Ethernet connection, communication parameters such as the IP address must also be set on the PC side. The communication parameters are set for each Ethernet NIC installed in the PC. In this section, the settings for the Ethernet NIC that connects to the measuring station will be described.

If the IP address and other parameters are to be obtained dynamically using the DHCP server, the following settings are not necessary. In this case, select [Obtain an IP address automatically] under the [IP Address] tab of the [TCP/IP Properties] dialog box.

For example, if the PC and measuring stations are to be connected over their own independent network, the communication parameters are configured as shown in the following table.

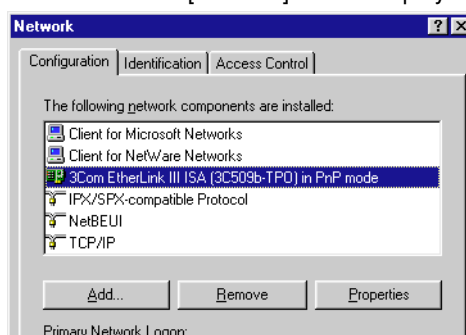
Parameter	Value	Note
IP address	192.168.21.128	
Subnet mask	255.255.255.0	Set the same value as was used as the subnet mask for the measuring station.
Gateway	None	
DNS	Disable	
WINS	Disable	

Note

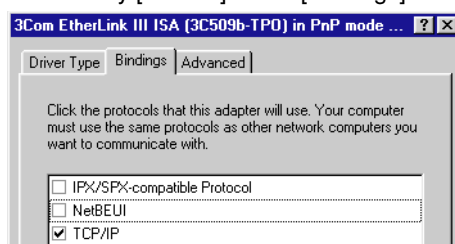
The IP address of the Ethernet Module WE7051 cannot be obtained dynamically from the DHCP server.

The following procedure describes the steps for Windows 95/98. Carry out similar steps for Windows NT/2000 Pro.

1. Select [Settings]-[Control Panel] from the [Start] menu to open the Control Panel folder.
2. Double-click the [Network] icon to display the following network setting dialog box.

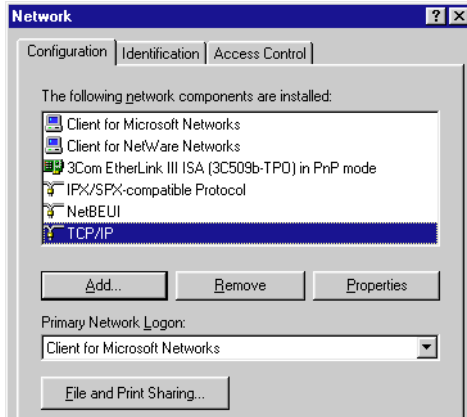


3. Select the Ethernet NIC that is connected to the measuring station and click [Properties] to display the Ethernet NIC setting dialog box.
4. Check only [TCP/IP] under [Bindings] and click [OK].

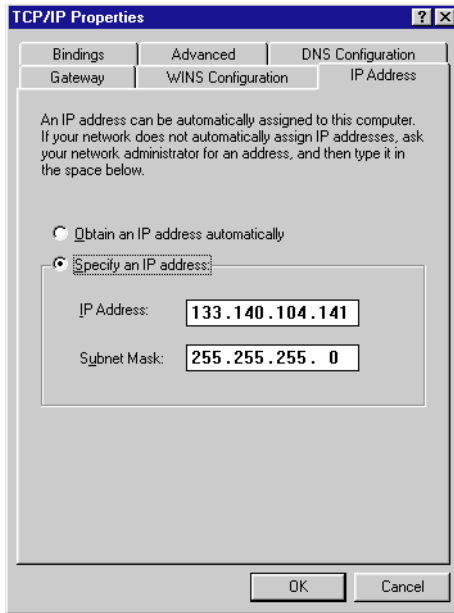


3.2 Communication Configuration after Connecting to the Ethernet

5. Select the [TCP/IP] corresponding to the Ethernet NIC that is connected to the measuring station and click [Properties] to display the TCP/IP properties setting dialog box.



6. Set the various parameters according to the table on the previous page and click [OK].

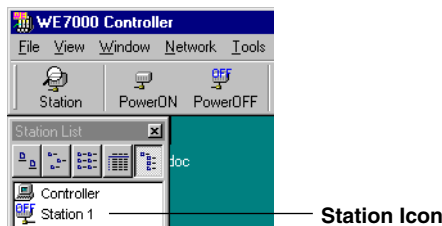


3.3 Operations after Configuring Ethernet Communications

This section will describe the operation of the WE7000 Control Software as relating to the Ethernet module after connecting to the Ethernet. For other operations, see the “PC-Based Measurement Instruments WE7000 User’s Manual” (IM707001-01E).

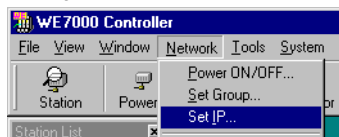
Checking Whether Communication Is Possible

1. Double-click the [WE7000] shortcut icon to start the WE7000 Control Software.
2. With the main power switch of the measuring station connected to the Ethernet network turned ON, check that the station icon appears in the station list window.

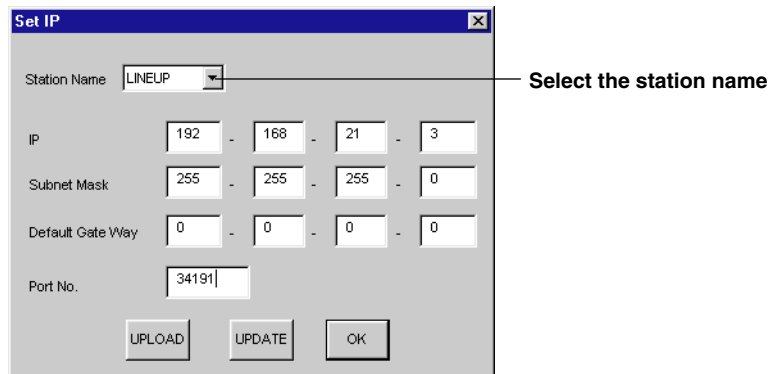


Changing the Ethernet Configuration

1. After turning ON the standby power switch of the measuring station, select [Set IP] from the [Network] menu of the WE7000 Control Software to open the communication setting dialog box.



2. Display the desired measuring station from the [Station Name] list box.



3. Click [UPLOAD] to recall the configuration.
4. Change the values of the appropriate parameters, then click [UPDATE].
You must reset the main power switch of the measuring station in order for the new settings take effect.

Changing the Group Number of the Measuring Station

1. After turning ON the standby power switch of the measuring station, select [Set Group] from the [Network] menu of the WE7000 Control Software to open the group setting dialog box.



3.3 Operations after Configuring Ethernet Communications

2. Click the icon of the measuring station for which you wish to change the group number.



3. Enter the new number in the [Group No.] entry box.

The range of group numbers is from "0 to 32767." The default value is "0."

In the group setting dialog box, the measuring stations of the group that was specified by the start parameter (Group 1 in the above figure), the measuring stations belonging to another group without a running PC*, and the measuring stations belonging to the undefined group (factory default setting) are displayed. If the WE7000 Control Software is started without specifying a group number using the start parameter or if the group number is set to "0" using the start parameter, then the measuring stations not belonging to groups without a running PC and those belonging to the undefined group are shown as [Group 0].

* For example, if a measuring station is connected to a PC in 'Group 2,' the measuring station appears in the group setting dialog box of the "Group 2" PC.

Note

You cannot change the group number of the PC (Controller) using the group setting dialog box. It can only be changed via the start parameter of the WE7000 Control Software.

4. Click [Update].

You must power cycle the measuring station using the main power switch that had its group number changed so that all PCs recognize the new group number.

Refresh

When connected to the Ethernet, the WE7000 Control Software does not automatically detect changes in the configuration of the measuring stations such as the addition or deletion of measuring stations from the Ethernet network, and the OFF state of the main power switch of measuring stations. Only by selecting [Refresh] from the [View] menu of the WE7000 Control Software, are the most current configurations of the measuring stations identified and updated in the display.

4.1 Troubleshooting

- If servicing is necessary, or if the instrument is not operating correctly after performing the following corrective actions, contact your nearest YOKOGAWA dealer.
- To verify that the module is operating correctly, perform the self test as described on the next page.

Problem	Probable Cause/Corrective Action	Reference
Cannot communicate with the measuring station.	If the "STANDBY" LED on the Ethernet module is not lit, check to see that the power cord is plugged in correctly, that the main power switch is turned ON, and that the Ethernet module is connected securely in the slot.	1-3, *
	If the "STANDBY" LED is lit, check whether the "LINK" LED on the Ethernet module is lit. If it is not lit, check that the UTP cable is connected securely to the Ethernet module as well as to the PC. Also, check whether the hub's power is turned ON.	1-3, 2-3
	Check that the IP address, subnet mask, port number, and group number settings of the measuring station (Ethernet module WE7051) are correct.	3-1, 3-2
	Check whether the IP address, subnet mask, port number, and group number specified at the [WE7000] shortcut icon properties are correct.	3-3
	Check to see that the Ethernet interface of the PC is operating properly. Check that the TCP/IP protocol is installed on the PC and that the TCP/IP settings are correct.	3-3, 3-4

* See the WE7000 User's Manual (IM 707001-01E).

4.2 Self Test

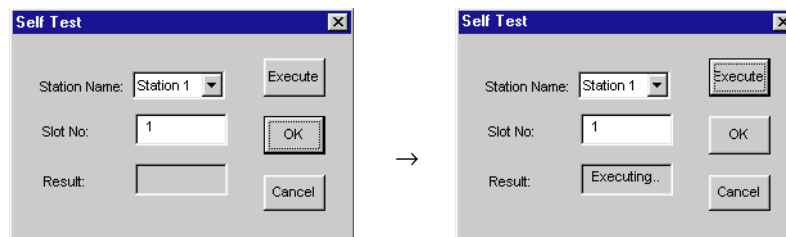
If you believe that the module is not operating correctly, perform the self test according to the following steps.

Executing Self Test

1. Select [Self Test] from the [System] menu of the WE7000 Control Software.



2. In the [Self Test] dialog box that appears, select the station name and enter the slot number corresponding to the module, and click the [Execute] button. "Executing..." is displayed in the [Result] display box.



Note

This module performs the self test immediately after the main power switch of the measuring station is turned ON. The operations shown above display the result of this test. Therefore, if you wish to execute the self test again, power cycle the measuring station before carrying out the steps above.

Verifying Test Results

If a value other than "0" is displayed in the "Result" display box of the "Self Test" dialog box, the module is probably malfunctioning. Please contact your nearest YOKOGAWA dealer.

4.3 Maintenance

Maintenance of Parts

There are no parts in this module that require periodic replacement.

5.1 Specifications

Number of Communication Ports

1

Media

Ethernet (10BASE-T)

Transfer Rate

10 Mbps

Communication Protocol

UDP/IP

Number of Measuring Stations That Can Be Controlled from a Single PC

3 stations or less

LED Indication

Communication status, power status of the measuring station

General Specifications

Safety standards

Complies with CSA C22.2 No.1010.1 and EN61010-1, conforms to JIS C1010-1

- Overvoltage Category CAT I and II^{*1}
- Pollution Degree 1 and 2^{*2}

EMC standards

Emission

Complying Standard

EN55011 Group 1 Class A

This product is a Class A (for commercial environment) product. Operation of this product in a residential area may cause radio interference in which case the user is required to correct the interference.

Immunity

Complying Standard

EN50082-2

Operating conditions

Same as those of the measuring station

Storage conditions

Temperature: -20 to 60 °C

Humidity: 20 to 80%RH (no condensation)

Power consumption

Approx. 4 VA (Typical value at 100 V/50 Hz ^{*3})

External dimensions

Approx. 33(W) × 243(H) × 232(D) mm (projections excluded)

Weight

Approx. 0.6 kg

Number of used slots

1

Standard accessories

User's Manual (1)

^{*1} Overvoltage Categories define transient overvoltage levels, including impulse withstand voltage levels.

Overvoltage Category I: Applies to equipment supplied with electricity from a circuit containing an overvoltage control device.

Overvoltage Category II: Applies to equipment supplied with electricity from fixed installations like a distribution board.

5.1 Specifications

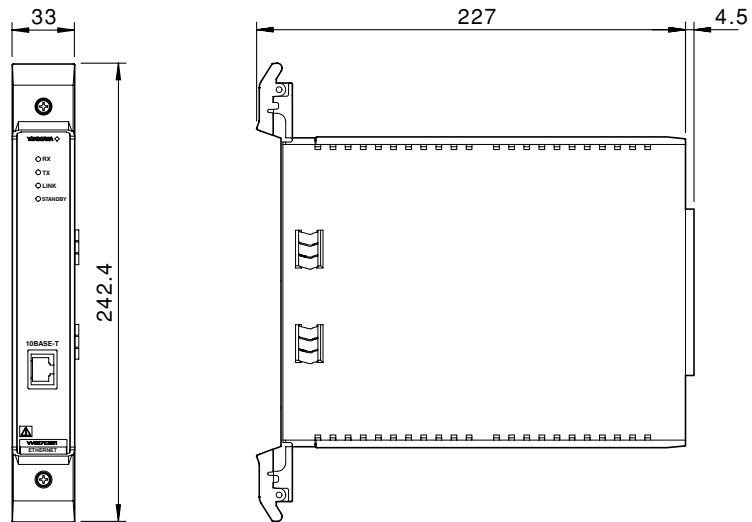
- ^{*2} Pollution Degree: Applies to the degree of adhesion of a solid, liquid, or gas which deteriorates withstand voltage or surface resistivity.
- Pollution Degree 1: Applies to closed atmospheres (with no, or only dry, non-conductive pollution).
- Pollution Degree 2: Applies to normal indoor atmospheres (with only non-conductive pollution).

^{*3} Typical value represents a typical or average value. It is not strictly guaranteed.

5.2 Dimensional Drawings

Unit: mm

Ethernet Module (WE7051)



If not specified, the tolerance is $\pm 3\%$. However, in cases of less than 10 mm, the tolerance is ± 0.3 mm.

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