

# Chapter 16 Modbus TCP

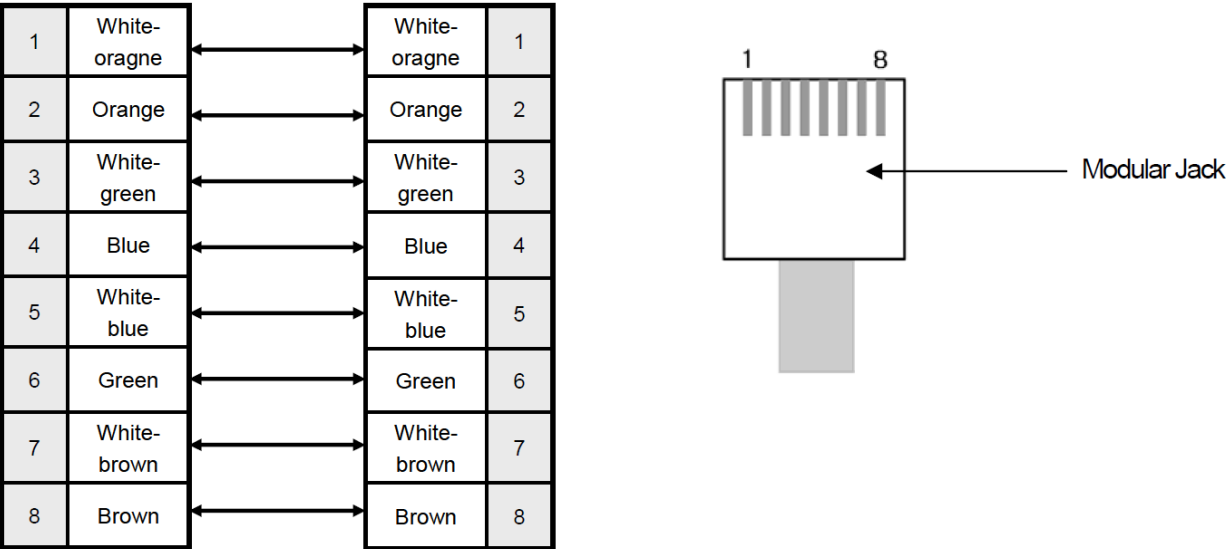
## 16.1 PLC allowed to be connected

InfoU can be communicated with the device that adopts MODBUS TCP/IP protocol. MODBUS protocol that is the specified open protocol used for server-client is operated by data reading/writing based on function code. The communication that adopts MODBUS protocol applies server-client function dealt with only one client.

## 16.2 Wiring Diagram

Ethernet cable gets specified into 2 cables according to its type.  
When communicating through LAN, connected to network equipment like a hub, direct cable is used. (In case of hub-node connection) Direct connection is available among equipments and in this case, cross cable is used.

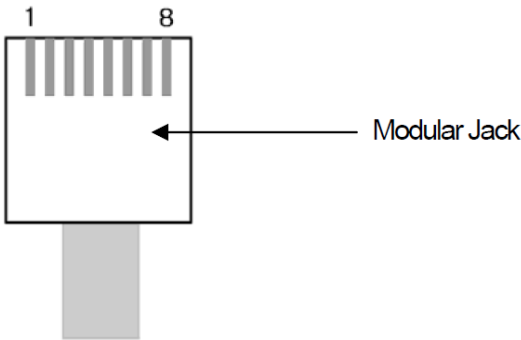
Method for wiring a direct cable is as follows.



'White-yellow', 'White-green', 'White-blue', 'White-brown' from above figure is indicated on the coating of the cable. For example, 'white-blue' has blue stripes on white coating.

Method for wiring of cross cable is as follows.

1	White-orange	↔	White-green	1
2	Orange	↔	Green	2
3	White-green	↔	White-orange	3
4	Blue	↔	Blue	4
5	White-blue	↔	White-blue	5
6	Green	↔	Orange	6
7	White-brown	↔	White-brown	7
8	Brown	↔	Brown	8



Notice

- ☞ Use according to the connection method.
- ☞ Wire the cable by using a modular tool. Bad connection may occur.
- ☞ If the lock part of the modular jack gets damaged, it may not get fixed to the RJ45 connector (Ethernet connector) and bad connection may occur.
- ☞ The UTP cable is made out of solid wire material. Therefore, it may break when heavily bent or shaken.
- ☞ It is advisory to use a plug cover when wiring cables.

## 16.3 I/O Driver Setting

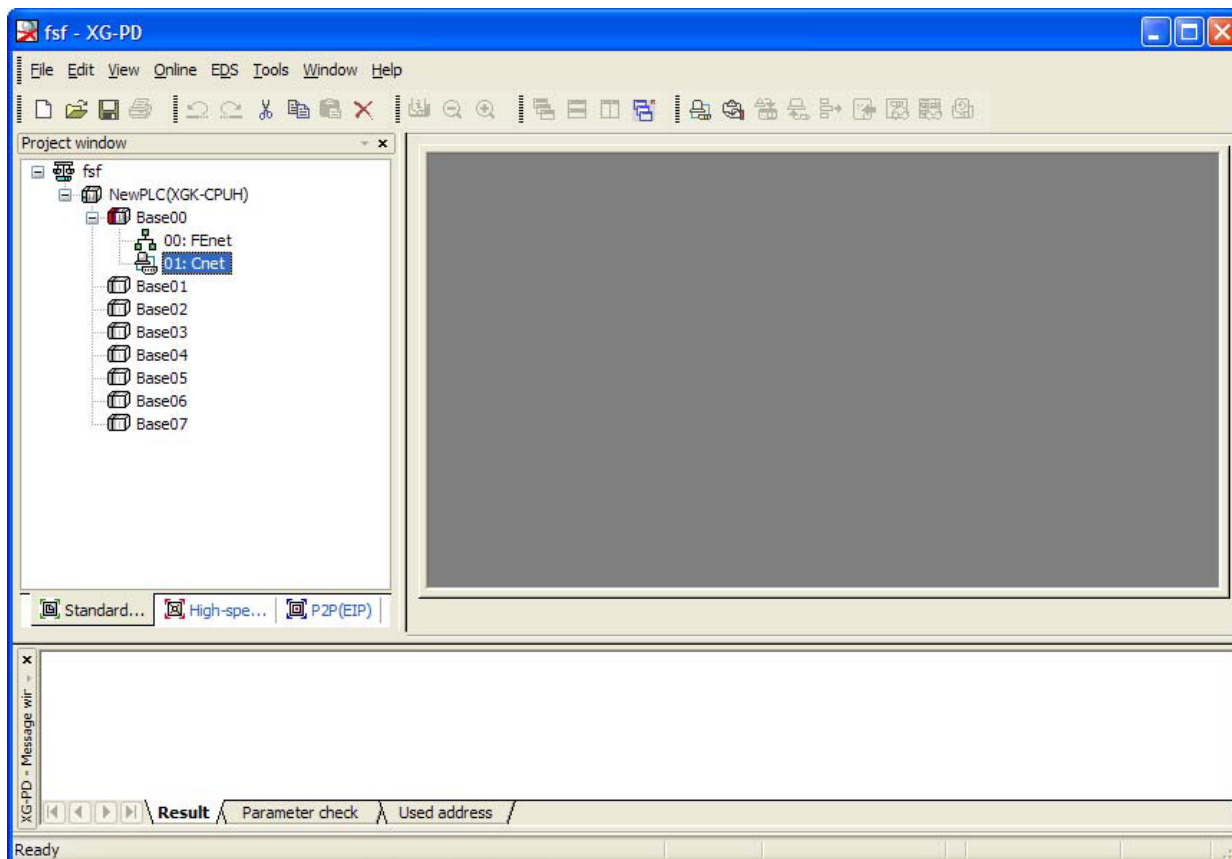
InfoU can be connected through various kinds of devices that adopt MODBUS(TCP/IP) communication MODBUS protocol.

Setting methods are different depending on the manufacturer so for more details, refer to each device manual.

For example, description on XGK PLC will be provided hereupon.

### 16.3.1 PLC Setting

The communication parameter of PLC(XGK) is set at XG-PD.

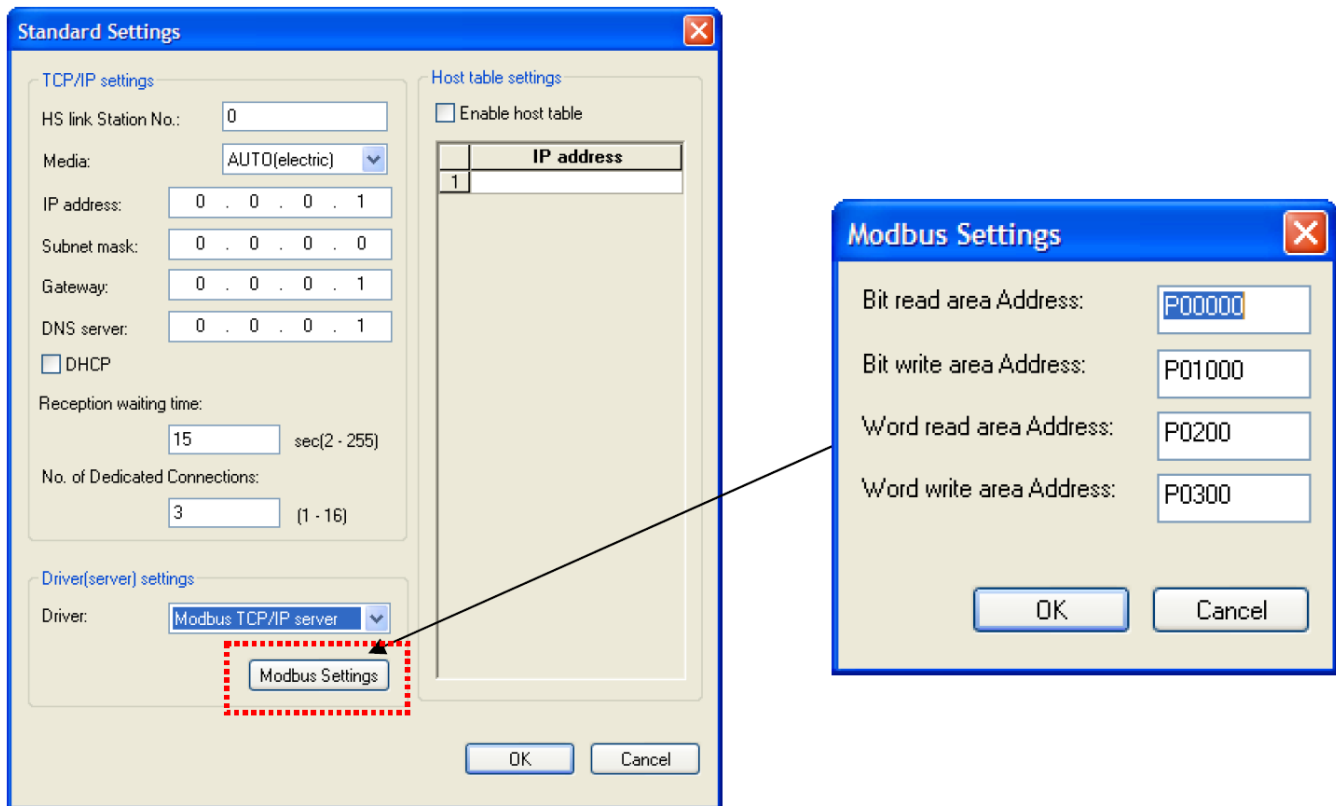


#### (1) Connection Setting

- Select [Online] → [Connection Setting].
- After setting connection options for user environment, click Connection.

#### (2) Reading I/O Data

- Select [Online] → [Reading I/O Data] to read the information of module embedded in the current base.



### (3) Basic setting

- Click the related FEnet I/F module to execute basic setting screen and establish IP address, subnet mask, gateway, DNS Server at connection setting menu and select TCP/IP Server for operation mode.

### (4) Operation mode

- If MODBUS TCP/IP Server is selected for operation mode, MODBUS setting is active.

### (5) Setting MODBUS

- Starting address of bit reading area : Indicates the starting address of bit reading area with 5 digits. The former 4 digits indicate word value and the remaining 1 digit means bit value.  
Ex.) In the case of M00000 : The 0th bit of 0th word of M device is set as starting address of bit reading area.
- Starting address of bit writing area : Indicates the starting address of bit writing area with 5 digits. The former 4 digits indicate word value and the remaining 1 digit means bit value.  
Ex.) In the case of M00100: The 0th bit of 10th word of M device area is set as starting address of bit reading area.
- Starting address of word reading area: Indicates the starting address of word reading area with 4 digits.  
Ex.) In the case of M00200: The 200th word of M device area is set as starting address of word reading area.
- Starting address of word writing area: Indicates the starting address of word writing area with 4 digits.

Ex.) In the case of M00300: The 300th word of M device area is set as starting address of word writing area.

(6) Writing Parameter

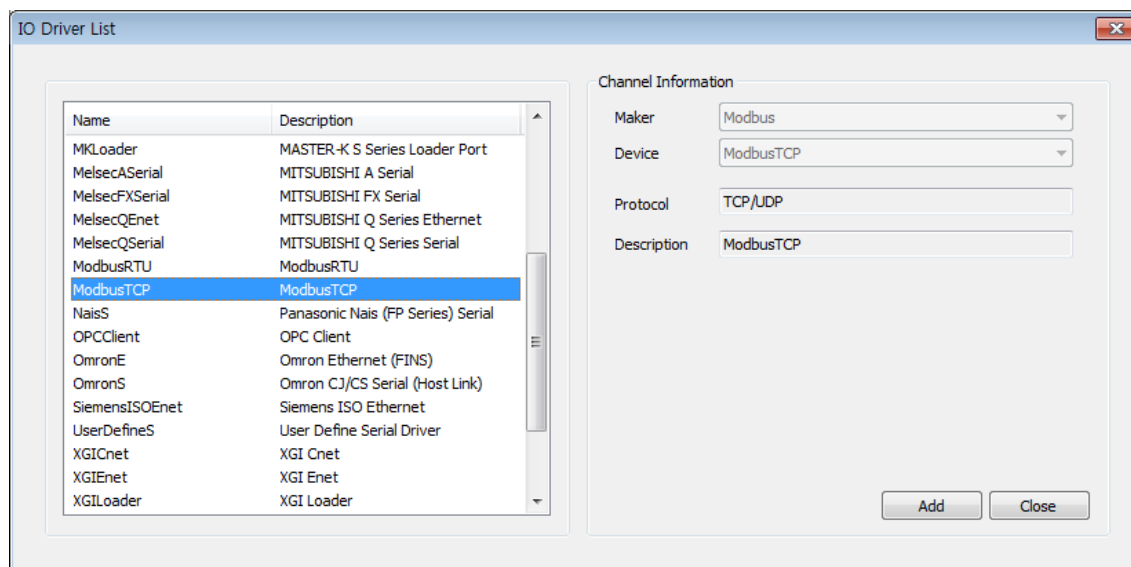
- Click [Online] → [Writing parameter].
- After clicking the module whose basic setting is completed at basic setting, click OK button.
- After clicking OK button, complete Parameter Writing and reset the module individually.

(7) Checking operation

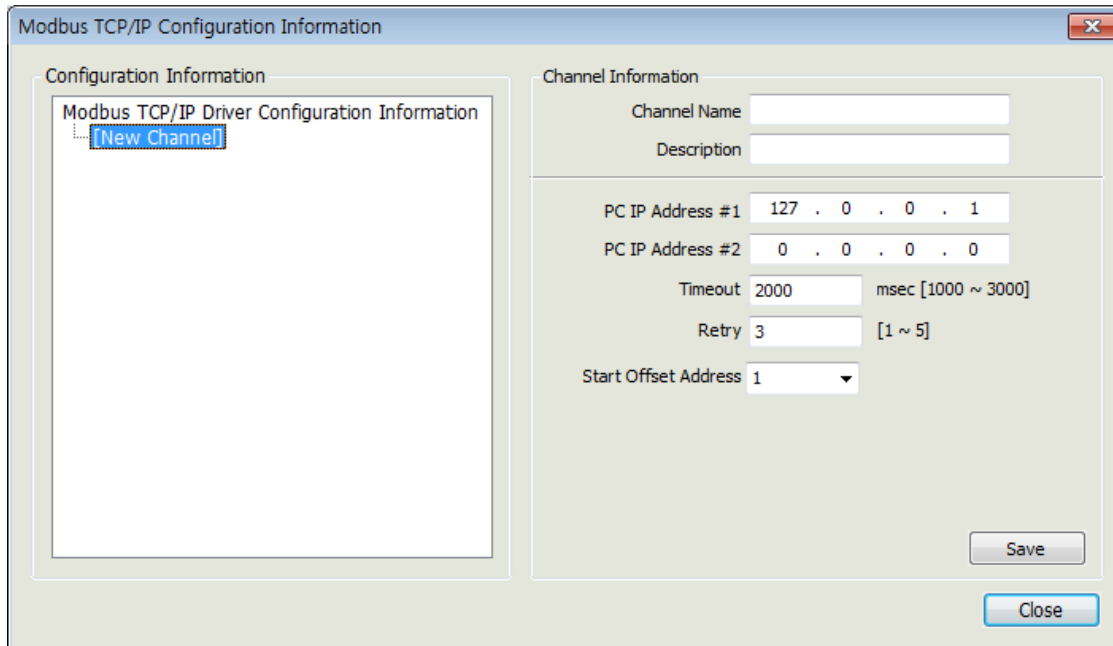
- Click [Online] → [System Diagnosis].
- After clicking the related module, press the right mouse button for frame monitoring and status by services to check whether communication is normal or not.

### 16.3.2 InfoU Setting: ModbusTCP

(1) Add Channel



Select “ModbusTCP” from the I/O driver list and press “Add”.



The dialog box is titled "Modbus TCP/IP Configuration Information". It is divided into two main sections: "Configuration Information" on the left and "Channel Information" on the right.

**Configuration Information:** This section contains a tree view labeled "Modbus TCP/IP Driver Configuration Information". A single item, "[New Channel]", is listed and highlighted with a blue selection box.

**Channel Information:** This section contains several input fields for configuring a channel:

- Channel Name:** A text input field.
- Description:** A text input field.
- PC IP Address #1:** A field with four segments containing the values "127", "0", "0", and "1", separated by dots.
- PC IP Address #2:** A field with four segments containing the values "0", "0", "0", and "0", separated by dots.
- Timeout:** A text input field containing "2000", followed by the unit "msec [1000 ~ 3000]".
- Retry:** A text input field containing "3", followed by the range "[1 ~ 5]".
- Start Offset Address:** A dropdown menu currently showing the value "1".

At the bottom right of the "Channel Information" section, there are two buttons: "Save" and "Close".

- Channel Name: Input a channel name.
- Description: Input some information on the channel
- Serve IP: Input PC's IP Address.
- Server IP Address #2: If Line Redundancy will be used, input the second IP Address to be used.
- Time Out: It refers to a certain time period during which any response to the request for data is not made and after passing such a time period, the system will declare timeout to move on to the next process. The time period to be set will be a base to judge communication errors.
- Retry: Set up the number of times to retry when communication fails.
- Start Offset Address: Select either 0 or 1. It sets up whether to start from either 0 or 1.
- Save: If 'Save' button is pressed, Channel information will be saved and the saved information will add to the left "Configuration Information" tree.

The dialog box is titled "Modbus TCP/IP Configuration Information". It has two main sections: "Configuration Information" on the left and "Channel Information" on the right.

**Configuration Information:** A tree view showing the hierarchy: "Modbus TCP/IP Driver Configuration Information" > "[New Channel]" > "ModbusTCP" (selected) > "[New Station]".

**Channel Information:**

- Channel Name: ModbusTCP
- Description: (empty)
- PC IP Address #1: 127 . 0 . 0 . 1
- PC IP Address #2: 0 . 0 . 0 . 0
- Timeout: 2000 msec [1000 ~ 3000]
- Retry: 3 [1 ~ 5]
- Start Offset Address: 1 (dropdown)

Buttons: "Save" and "Close".

## (2) Add Station

The dialog box is titled "Modbus TCP/IP Configuration Information". It has two main sections: "Configuration Information" on the left and "Station Information" on the right.

**Configuration Information:** A tree view showing the hierarchy: "Modbus TCP/IP Driver Configuration Information" > "[New Channel]" > "ModbusTCP" > "[New Station]" (selected).

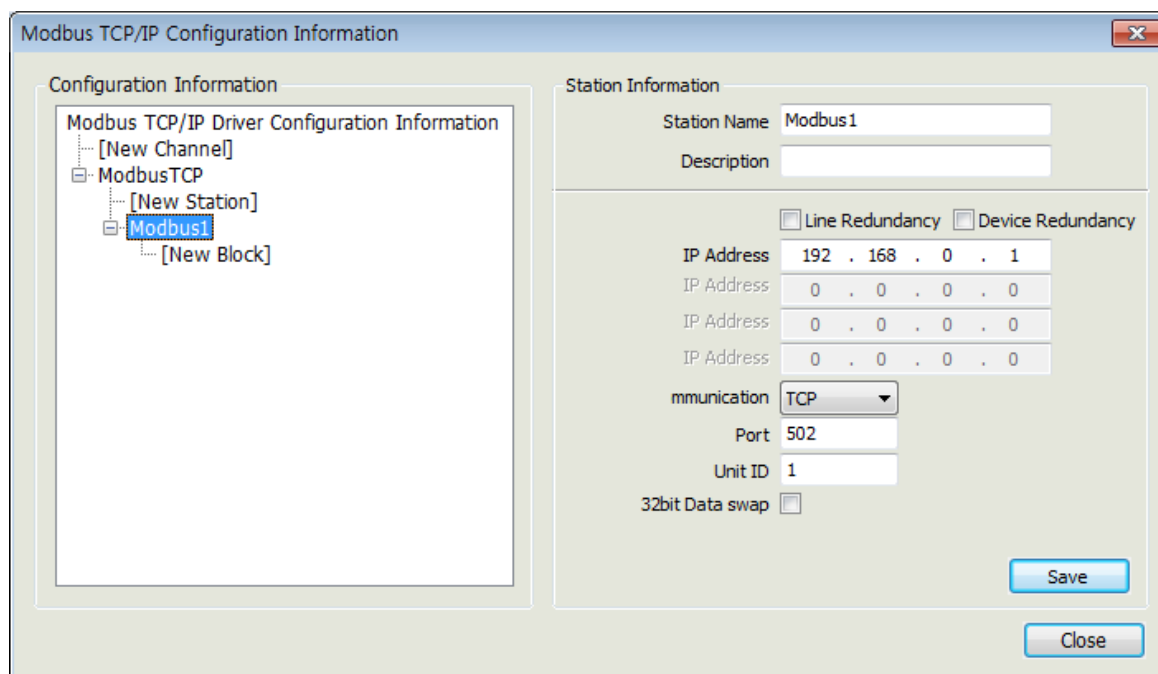
**Station Information:**

- Station Name: (empty)
- Description: (empty)
- ☐ Line Redundancy ☐ Device Redundancy
- IP Address #1: 0 . 0 . 0 . 0
- IP Address #2: 0 . 0 . 0 . 0
- IP Address #3: 0 . 0 . 0 . 0
- IP Address #4: 0 . 0 . 0 . 0
- Communication: TCP (dropdown)
- Port: 502
- Unit ID: 1
- 32bit Data swap: ☐

Buttons: "Save" and "Close".

- Select [New Station] from "Configuration Information" tree.
- Station Name: Input a station name.
- Description: Input some information on the station.
- Line Redundancy: Check ☒ in the box to use Line Redundancy.
- Device Redundancy: Check ☒ in the box to use Device Redundancy.
- PLC IP Address #1-1: Input PLC's IP Address.
- PLC IP Address #1-2: Input PLC's IP Address. Input the address when using Device Redundancy.

- PLC IP Address #2-1: Input PLC's IP Address. Input the address when using Device Redundancy.
- PLC IP Address #2-2: Input PLC's IP Address. Input the address when using Line Redundancy along with Device Redundancy.
- Communication Type: Select either TCP or UDP.
- Port: The port number is automatically inputted according to the selected communication type.
- Unit ID: Input the ID of the Modbus TCP device the user wants to communicate.
- 32bit Data Swap: 32bit can be expressed in the combination of [Upper level word + Lower level word] or [Lower level word + Upper level word] and for this, it is available to use swap of upper level word and lower level word.
- Save: If 'Save' button is pressed, Station information will be saved and the saved information will add to the left "Configuration Information" tree.



The image shows a software window titled "Modbus TCP/IP Configuration Information". It is divided into two main sections: "Configuration Information" on the left and "Station Information" on the right.

**Configuration Information:** This section contains a tree view showing the hierarchy of the configuration. The root is "Modbus TCP/IP Driver Configuration Information", which has a sub-item "[New Channel]". Under "[New Channel]" is "ModbusTCP", which in turn has "[New Station]" and "Modbus1". "Modbus1" is currently selected and highlighted in blue. Below "Modbus1" is "[New Block]".

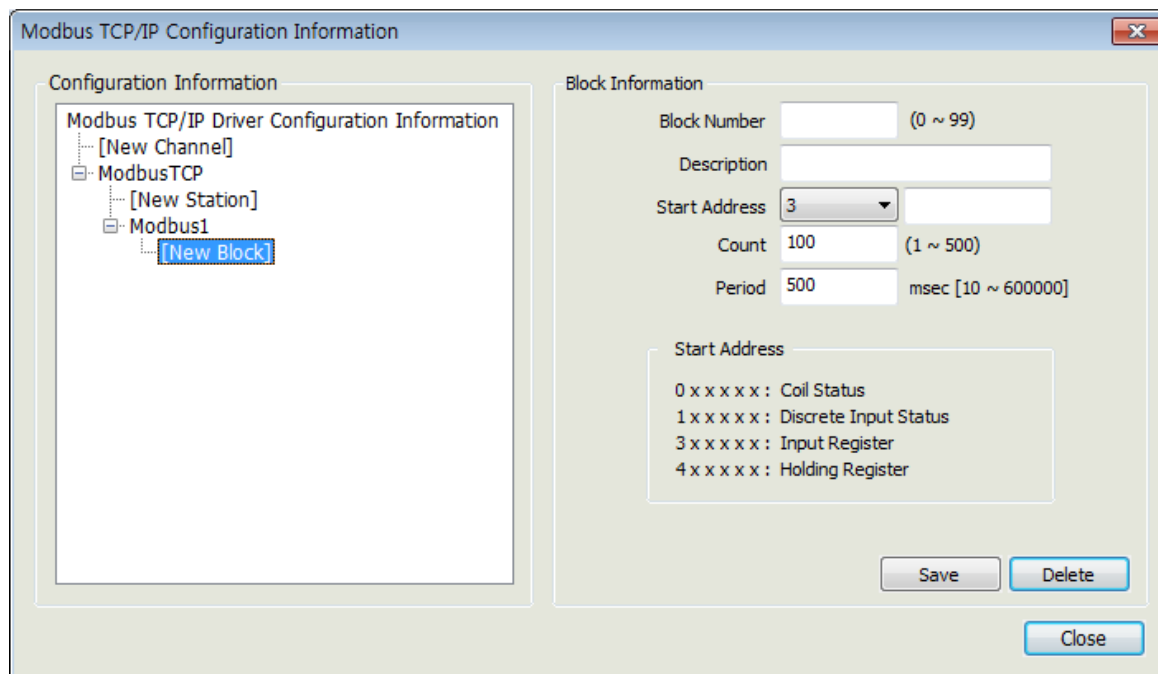
**Station Information:** This section contains fields for configuring the selected station, "Modbus1".
 

- Station Name:** A text field containing "Modbus1".
- Description:** An empty text field.
- Redundancy:** Two checkboxes are present: "Line Redundancy" (unchecked) and "Device Redundancy" (unchecked).
- IP Address:** Four text fields for entering the IP address. The first field contains "192", the second "168", the third "0", and the fourth "1". Below these are three more identical fields, each containing "0 . 0 . 0 . 0".
- Communication:** A dropdown menu currently set to "TCP".
- Port:** A text field containing "502".
- Unit ID:** A text field containing "1".
- 32bit Data swap:** An unchecked checkbox.

At the bottom right of the "Station Information" section, there are two buttons: "Save" and "Close".



## (3) Add Block



- Select [New Block] from “Configuration Information” tree.
- Block Number: This number is a unique code of the block. The user needs to designate a different code to each block.
- Description: Input some information on the block.
- Start Address: Input the Block’s Start Address. There are four kinds and each address is designated as the following ways respectively:
  - Address delimiter 0(Coil Status), 1(Discrete Input Status), 3(Input Register), 4(Holding Register)
  - Its address is 0~65536 and if “Start Offset Address” is set up to start from 1 in the configuration information , it will be 1~65536
- Period: Input an interval to collect data of the relevant block (unit: msec).
- Count: A number to read for each corresponding delimiter.
- Save: If ‘Save’ button is pressed, Block information will be saved and the saved information will add to the left “Configuration Information” tree.
- Delete: If “Delete” button is pressed, the currently selected Block will be deleted.

## (4) I/O Address

## 1) Analog

Delimiter (3 or 4) +0~65535

(if “Start Offset Address” is set up to start from 1 in the configuration information , it will be 1~65536)

Example 1) If the user wants to read 0th(0 of 0~65535) of No. 3 (Input Register: Read only),

Set up 300000 or 30 if 0 is selected for “Start Offset Address”

Set up 300001 or 31 if 1 is selected for “Start Offset Address”

Example 2) If the user wants to read 17th(17 of 0~65535) of No. 4 (Holding Register),

Set up 400017 or 417 if 0 is selected for "Start Offset Address"

Set up 400018 or 418 if 1 is selected for "Start Offset Address"

### 2) Digital

Delimiter (0 or 1, or 3 or 4) +0~65535

(if "Start Offset Address" is set up to start from 1 in the configuration information , it will be 1~65536)

Example 1) If the user wants to read 0th(0 of 0~65535) of No. 0 (Coil Status : Read/Write),

Set up 000000 or 00 if 0 is selected for "Start Offset Address"

Set up 000001 or 01 if 1 is selected for "Start Offset Address"

Example 2) If the user wants to read 17th(17 of 0~65535) of No. 1 (Discrete Input Status: Read only),

Set up 100017 or 117 if 0 is selected for "Start Offset Address"

Set up 100018 or 118 if 1 is selected for "Start Offset Address"

Example 3) If the user wants to read 10th bit of 17th(17 of 0~65535) of No. 3 (Input Register: Read only),

Set up 300017.A or 317.A if 0 is selected for "Start Offset Address"

Set up 300018.A or 318.A if 1 is selected for "Start Offset Address"

Example 4) If the user wants to read 15th bit of 0th(0 of 0~65535) of No. 4 (Holding Register),

Set up 300000.F or 30.F if 0 is selected for "Start Offset Address"

Set up 300001.F or 31.F if 1 is selected for "Start Offset Address"

16.4 Available Device

The available device for InfoU is as below.

Device	Area allowed for connection			Remarks
	Available range	Reading (function code)	Writing (function code)	
Output contacts	0 - 65535	Available (01)	Available (05)	-
Input contacts	0 - 65535	Available (02)	Available (05)	-
Output register	0 - 65535	Available (03)	Available (06,16)	-
Input register	0 - 65535	Available (04)	Available (06,16)	-

Notice

- ☞ For the details on device, refer to MODBUS Protocol manual of Schneider.
- ☞ Use it within device area.
- ☞ The maximum device value may be different depending on PLC so refer to the PLC manual to be connected.