

# BASSO-1070TW/ioWiFi

# User Manual



## Revision History

Revision Date	Document Ver.	Pages Revised	Revised/Added/Removed	Details of Revision
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Please be sure to read this manual before using and use the product safely and accurately.

- Pictures and photos in the manual may be different from the physical, and the document is subject to change without notice to improve performance. For the last information, please visit our website ([www.sysbas.com](http://www.sysbas.com)).
- To view frequently asked questions and answers, please visit our website and find Support -Technical Support -FAQ section.
- Documents can be downloaded from the product page or Download section.
- Sellers or users should be aware of the fact that this device is intended for industrial use(Class A), not for residential use.
- This device has a potential for radio interference during use and may receive harmful interference from other devices.
- Warranty policy is included in the product packaging.
- The exchange/return of the device can be handled by the procedure described in the Warranty Policy.
- This product is for domestic(Korea) use and cannot be used overseas with different power/frequency.

## 1. WiFi Technology

WiFi(Wireless Fidelity) is any “Wireless Local Area Network(WLAN)” product based on IEEE(Institute of Electrical and Electronics Engineers) 802.11 standard, mainly using 2.4GHz and 5GHz frequency radio band.

WiFi-compatible devices use the technology to communicate wirelessly with each other over the WLAN network and wireless access points, enabling them to reach approximately 100 meters indoors and further outdoors.

WiFi saves time and money by eliminating the need to lay cables.

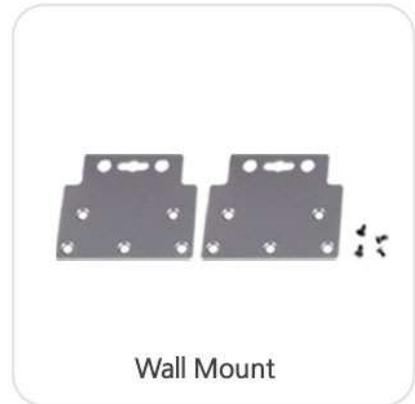
It also supports encryption modes for wireless communication security such as Open, WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise WPA2-Enterprise and so on.



Benefits that users can gain from using WiFi technology are:

- Wireless communication(Up to 100m Indoor) with low installation cost
- Simple access procedures for quick installation and application
- Secure through encrypted communication

## 2. Components



Components	Ordering Information
BASSO-1070TW/ioWiFi(with Ejector pin), 2.5dBi Antenna, Terminal Block, Wall Mount Kit	BASSO-1070TW/ioWiFi

### 3. Product



#### LED

LED	State	Operation
RO	On	Illuminates when Relay Out(RO) signal is detected
	Off	No signal
RTD	On	Blinks when Resistance Thermometer Detector(RTD) operates
	Off	No signal
AI	On	Blinks when Analog In(AI) device operates
	Off	No signal
DI1	On	Illuminates when Digital Input1(DI1) signal is detected
	Off	No signal
DI2	On	Illuminates when Digital Input2(DI2) signal is detected
	Off	No signal
DO1	On	Illuminates when Digital Output1(DO1) signal is detected
	Off	No signal
DO2	ON	Illuminates when Digital Output2(DO2) signal is detected
	Off	No signal

RDY	On	Blinks when the device operates
	Off	No signal
232	On	RS-232 data transmission(Console port for setups)
	Off	No data transmission
485	On	RS-485 data transmission(Communication Port)
	Off	No data transmission
	On	Wireless Data is in transmission
	Off	No data transmission

### Connector

- WiFi Antenna Connector: Connect the Dipole Antenna (Dual band) antenna included with the product.
- Please refer to the APPENDIX for detailed specifications for connectors and pins.

## 4. How to Use

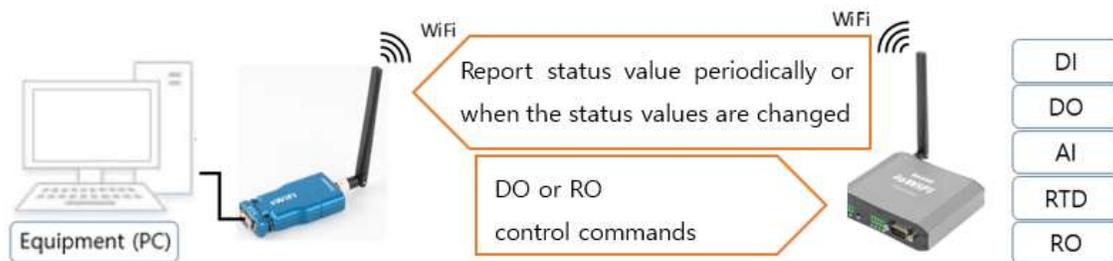
Connect BASSO-1070TW/ioWiFi (hereinafter referred to as ioWiFi) to the serial port of PC or communication device and apply DC 12~48V. When power is applied, it boots and LED will blink. RDY LED is blinked at 0.5 second intervals, and AI, RTD LEDs are blinked at 1 second intervals.

\* Please refer to “3. Product” for more information on LED operation.

ioWiFi does not provide a separate DC adapter. Please apply DC 12~48V, 1A or higher via terminal block.

### ① Sync

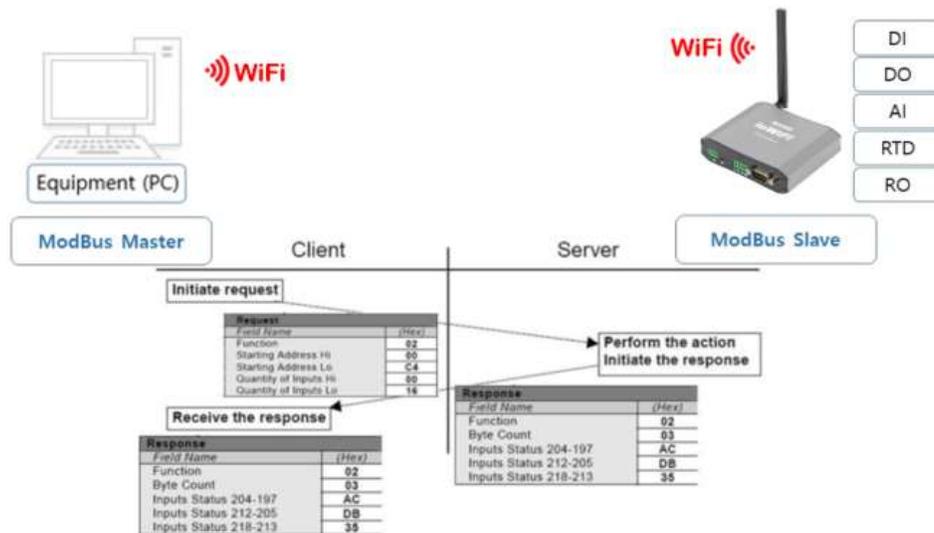
Users can use Sync feature to send status information of each port on the ioWiFi to the other WiFi equipment according to set period or when status changes.



To use the Sync function, it should be set up for each port through the AT Command of ioWiFi.

\* Please refer to “Chapter 7. Settings” for detailed IOWiFi Config information.

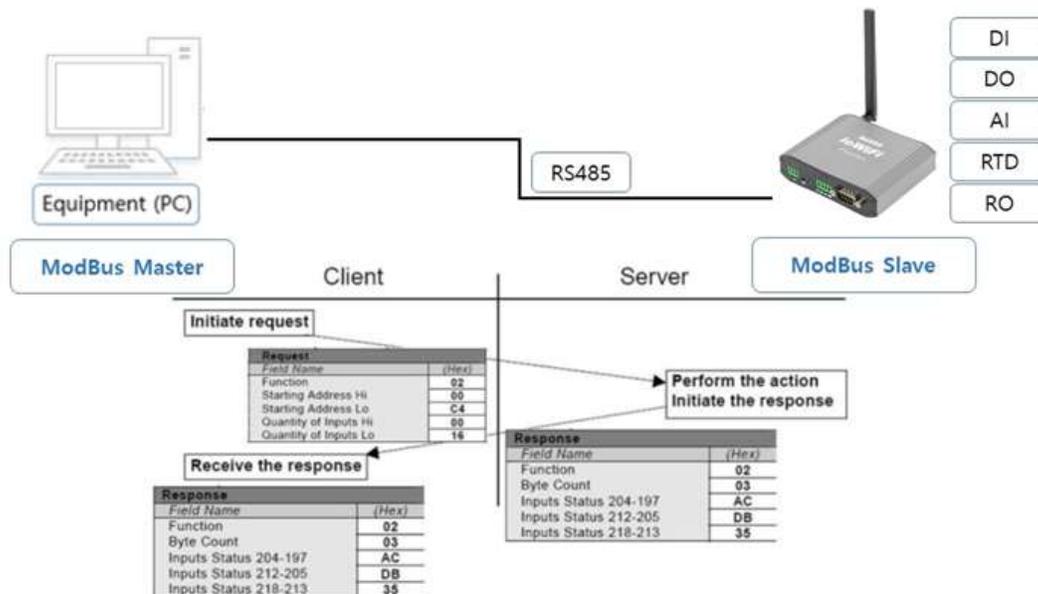
## ② Modbus Communication Over WiFi



WiFi network allows enables communication by Modbus TCP which connects using sockets from equipment and PC, or Modbus RTU/ASCII which connects via serial COMx. To communicate with Modbus via WiFi, you need to set it up through the IOWiFi Config.

\* Please refer to “Chapter 7. Settings” for detailed IOWiFi Config information.

## ③ Modbus Communication Through RS485



Modbus serial communication is available in local area using RS485 connection without using WiFi network.

As shown above, users can use Modbus to acquire IO or sensor data(DI, DO, AI, RTD, RO) and control DO or RO from Modbus Master devices connected to IOWiFi via RS485.

#### ④ I/O Port Control

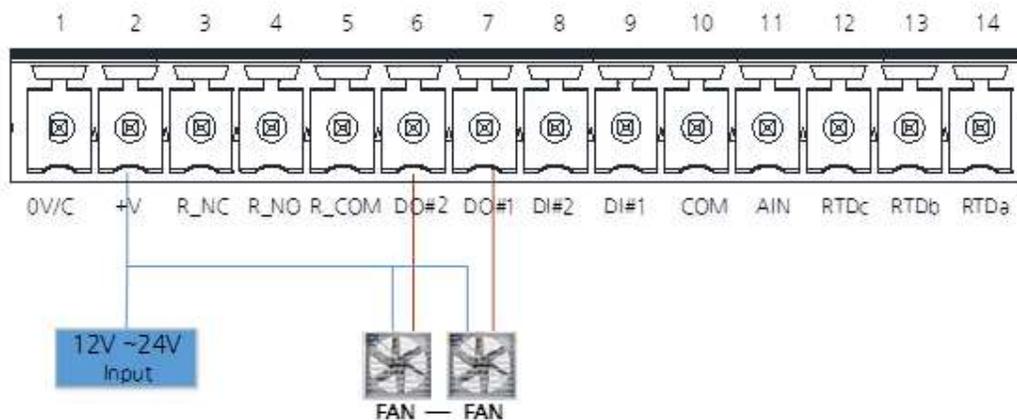
All port included in ioWiFi can Read/Write status values via Modbus.

Users can test all port operations within the ioWiFi on their own via Modbus.

This is a chapter that shows how each port communicates and the set up method is the same. Only the part that controls each port is separately specified.

#### DO(Digital Output) Port

Control external devices through 2 DO ports included in ioWiFi.



It is OFF when the status is 0, ON when the status is 1.

The acceptable voltage of DO is 12 to 36VDC.

DO#1 value address: 40001

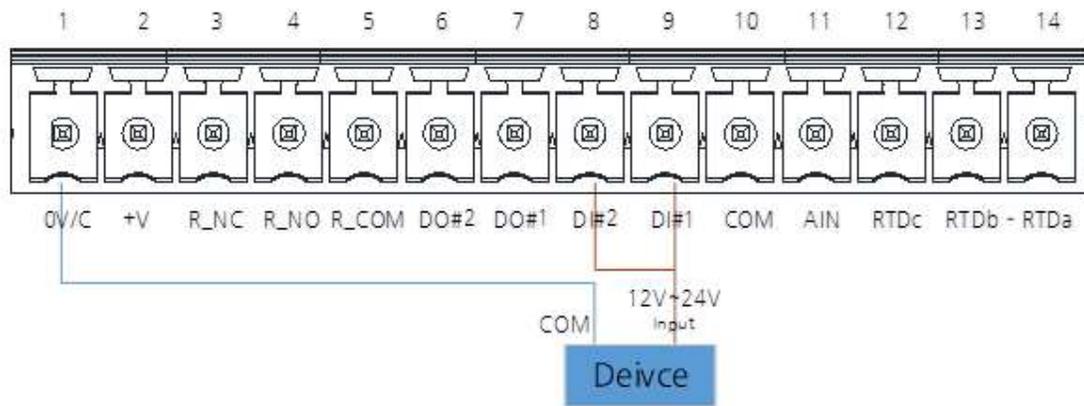
DO#2 value address: 40002

DO#1 status address: 30001

DO#2 status address: 30002

\* Please refer to the APPENDIX for detailed specifications for wiring and specification.

### DI (Digital Input) Port



It is OFF when the status is 0, ON when the status is 1.

DI#1 status address: 30004

DI#2 status address: 30005

DI has NPN and PNP types.

The acceptable voltage of DI is 12 to 26VDC.

In NPN, High is recognized as 6V or higher and Low as 0V.

In PNP, High is recognized as 2.2V or higher and Low is 1.2V or lower.

The selection of NPN and PNP types can be selected by the Jumper.

**\* Please refer to the APPENDIX for detailed specifications for wiring and specification.**

### AI (Analog Input) Port

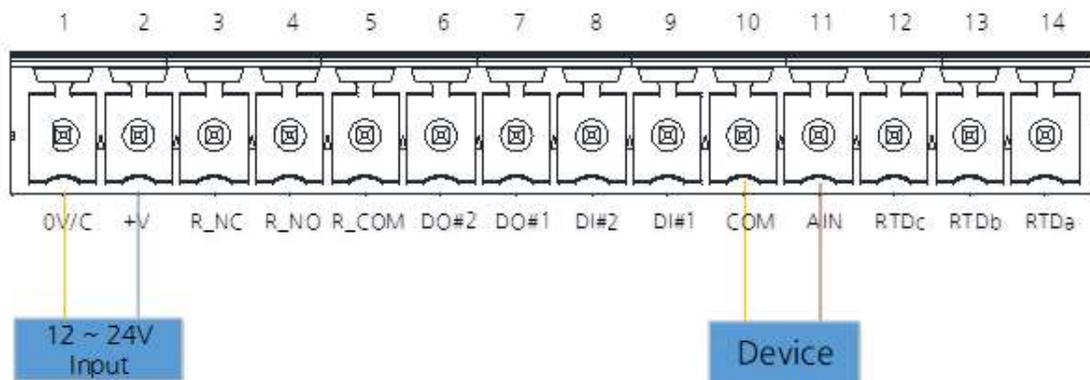
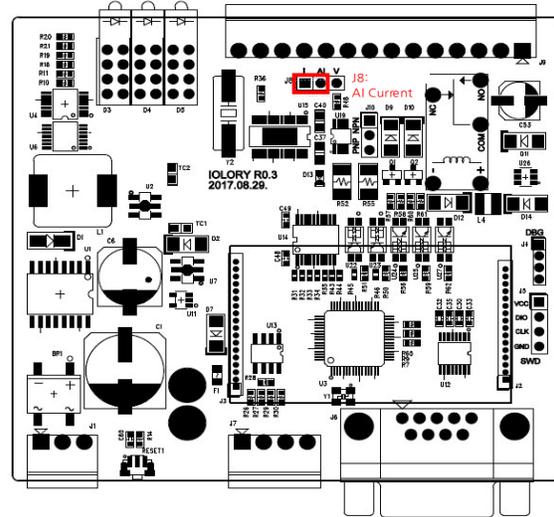
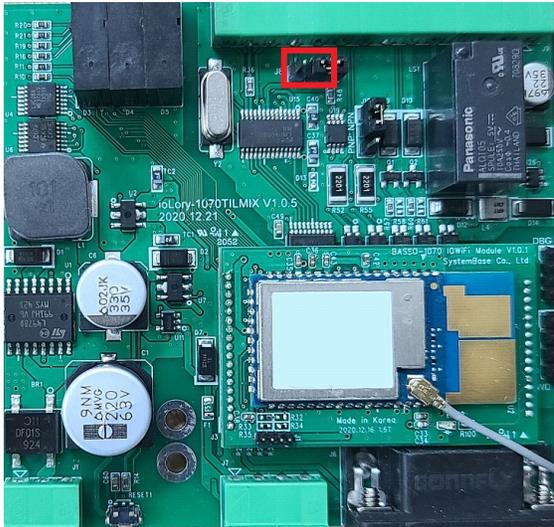
The AI port can measure DC(voltage) and Ampere(current).

The default setting for the J8 Jumper of ioWiFi is connected to DC(voltage).



To measure Ampere(current), two pins must be connected to the left as shown below.

The input-acceptable voltage and current of the AI are from 0(2) to 10VDC or 0(1) to 5VDC, from 0(4) to 20mA.

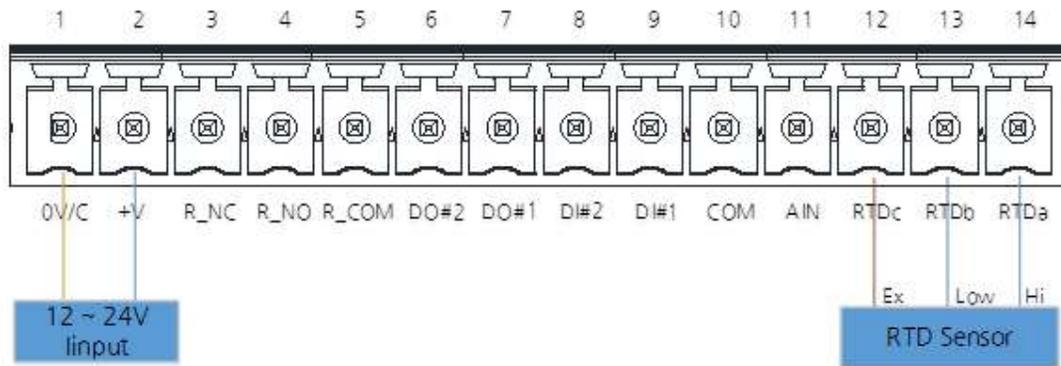


AI status address: 30006

Voltage and current values have been charted for AI value translation. Please refer to “APPENDIX 5. Calibration”.

\* Please refer to the APPENDIX for detailed specifications for wiring and specification.

RTD (Resistance Temperature Detector) Port



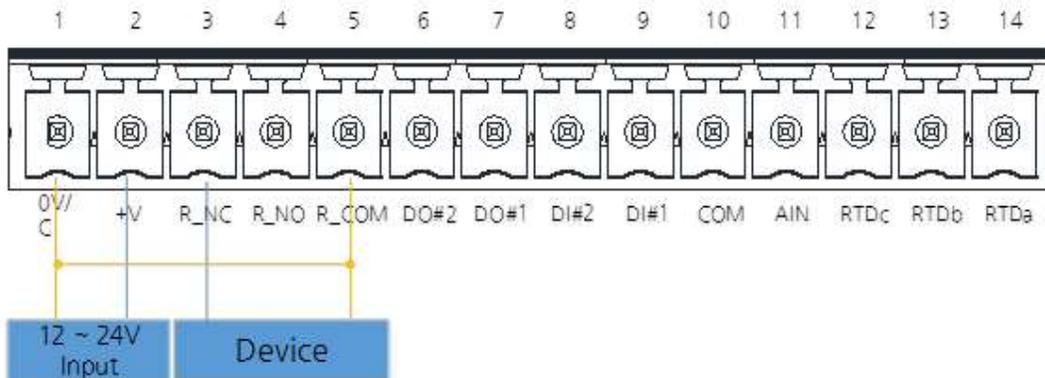
RTD status address: 30007

It has been charted to temperature for RTD value translation. Please refer to “APPENDIX 5. Calibration”.

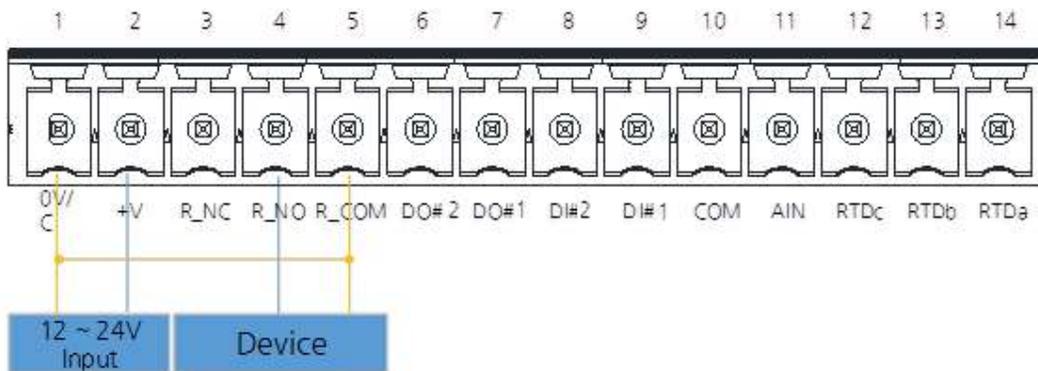
\* Please refer to the APPENDIX for detailed specifications for wiring and specification.

## RO (Relay Out) Port

NC(Normal Closed) Wiring



NO(Normal Open) Wiring



RO value address: 40022

RO status address: 30003

You can use two modes: NC(Normal Closed) mode and NO(Normal Open) mode.

Value 1: Switches to NC state in the default NO state, and switches to NO state in the default NC state.

Value 0: Switches to NO state in the default NC state, and switches to NC state in the default NO state.

**\* Please refer to the APPENDIX for detailed specifications for wiring and specification.**

## 5. Before Using

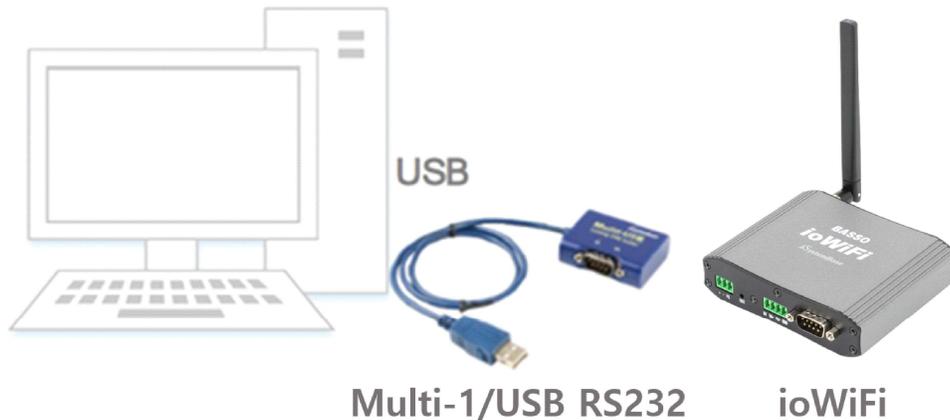
ioWiFi provides Relay output for ON/OFF and RS232/485 which are popular in control area. It is a ODMU(One-Device-Multi-Use) device that provides Digital Input/Output, Analog Input and RTD in accordance with various requirements such as data collection, control and monitoring of a variety of measurement equipment, sensors and actuators in the field.

- Wireless communication distance is 100m(inside),
- IEEE 802.11 a/b/g/n
- 2.4GHz/5GHz dual band
- Infrastructure/Soft AP
- Encryption Features(Open, WEP, WPA-PSK, WPA2-PSK, Enterprise) for secure wireless communication
- RS232(For Configuration Console), RS485(For Modbus) serial port
- Digital Input/Output, Analog Input, Relay, RTD
- Modbus RTU/ASCII, Modbus TCP(RS485/WiFi)
- VCP(Virtual Com Port) features(Com Redirect)
- Industrial Grade Operating Temperature: -40 ~ 85°C(-40 ~ 185°F)

## 6. How to Connect

To view or set up an environment for ioWiFi, IOWiFi Config utility should be used. To use it, you can either directly connect to serial port(RS232) or to the IP address, the network address where ioWiFi is running.

### (1) Connect ioWiFi to RS232/USB port on PC



Place the ioWiFi into setup mode using the RS232 serial communication port(COM port) installed on the PC, then use the IOWiFi Config to Connect to the ioWiFi.

\*Please refer to the APPENDIX “1. SPECIFICAITON” for detailed ioWiFi specifications.

### (2) Search and Connect ioWiFi through the WiFi menu on the PC



To access the setup mode of the ioWiFi over the network, place the ioWiFi in setup mode, connect WiFi from the PC to the ioWiFi, and then use the IOWiFi Config to connect to the ioWiFi.

## 7. Settings

ioWiFi has a setup method using the IOWiFi Config utility program and using Modbus.

(However, the setup method using Modbus is available when the data format is operating in Modbus.)

### Setting via IOWiFi Config

Power the ioWiFi and connect it to the RS232 serial communication port(COM port) on the PC.

Press the RST(Reset) switch to operate in setup mode.

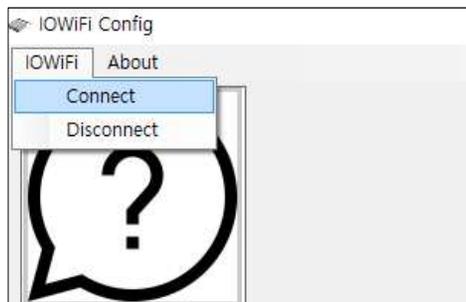
At this time, the RDY LED turns on.

Run the IOWiFi Config utility.

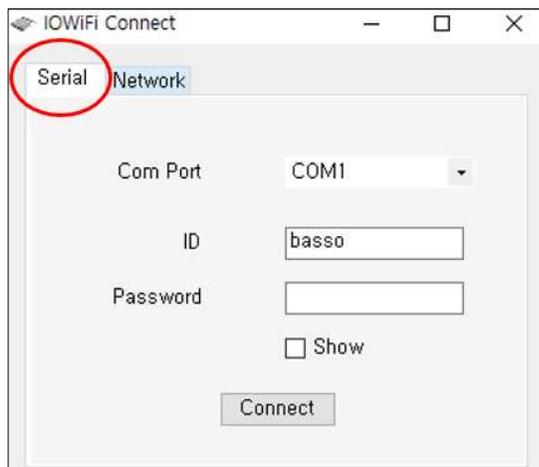


IOWiFi\_Config.exe

Click the IOWiFi → Connect menu from the top menu bar as shown below.



Specify the COM port to which the ioWiFi is connected to the PC.

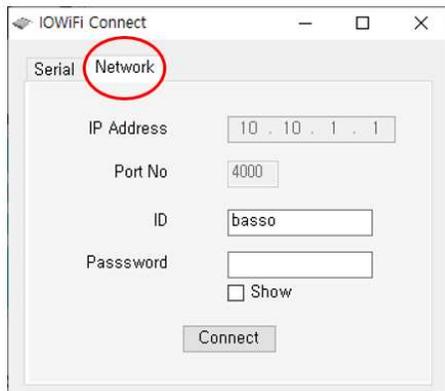


At this time, the initial value of the access ID/Password is “basso/99999999” (basso as a lowercase character).

**\*There are two ways to connect to the ioWiFi: using the RS232 serial port on the PC, and setting it to the "Network" connection described below.**

The second method is the "Network" method that connects Wifi and ioWiFi on the PC and sets it up.

Connect wirelessly to the ioWiFi and access to the ioWiFi's IP 10.10.1.1 address and port number 4000.

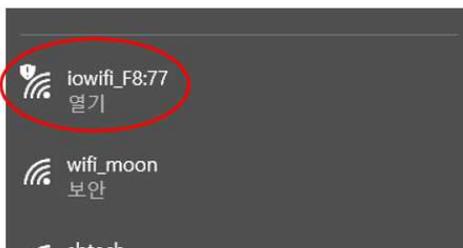


At this time, the initial value of the access ID/Password is “basso/99999999” (basso as a lowercase character).

The ID/Password can be changed in the "Information Menu" on the page below.

**[Caution]** The IP address of the ioWiFi you connect to 10.10.1.1 and the TCP Port No. 4000 remain unchanged. If you are using WiFi and wired LAN at the same time on your PC and if the IP of wired LAN is set to 10.10.1.xxx network, IP conflicts can occur in the same band. So please stop using the wired LAN and then connect WiFi with ioWiFi.

**[Tip]** When connecting using “Network”, if it is the first time you connect from the PC’s WiFi to the ioWiFi, ioWiFi will be searched as “iowifi\_XX:YY” when you search for WiFi on your PC, so please select it and connect. At this time, the password does not exist as it is open. XX:YY is the end of the MAC Address of ioWiFi. After, if Device Name and Encryption settings are changed, please connect to WiFi on your PC with the changed settings.

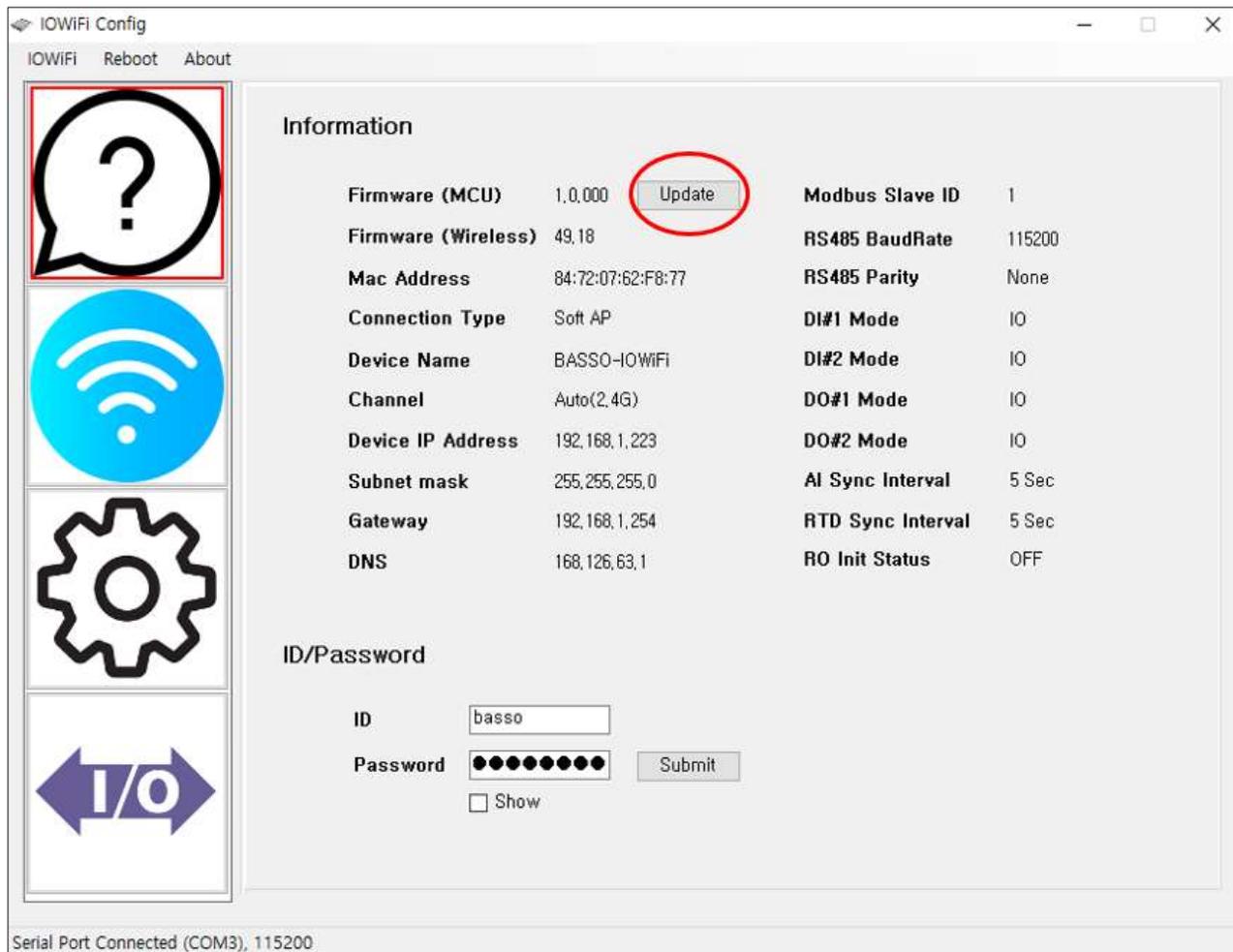


(Screenshot showing ioWiFi in setup mode on your PC)

## Information

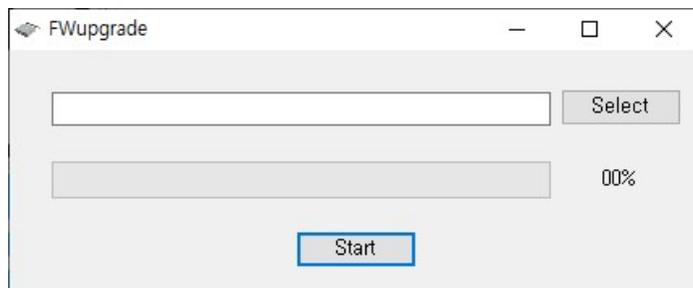
The Information menu outputs the basic setup information of ioWiFi.

In addition to the basic information output, you can also do the firmware update and change the connection ID/PW of ioWiFi.



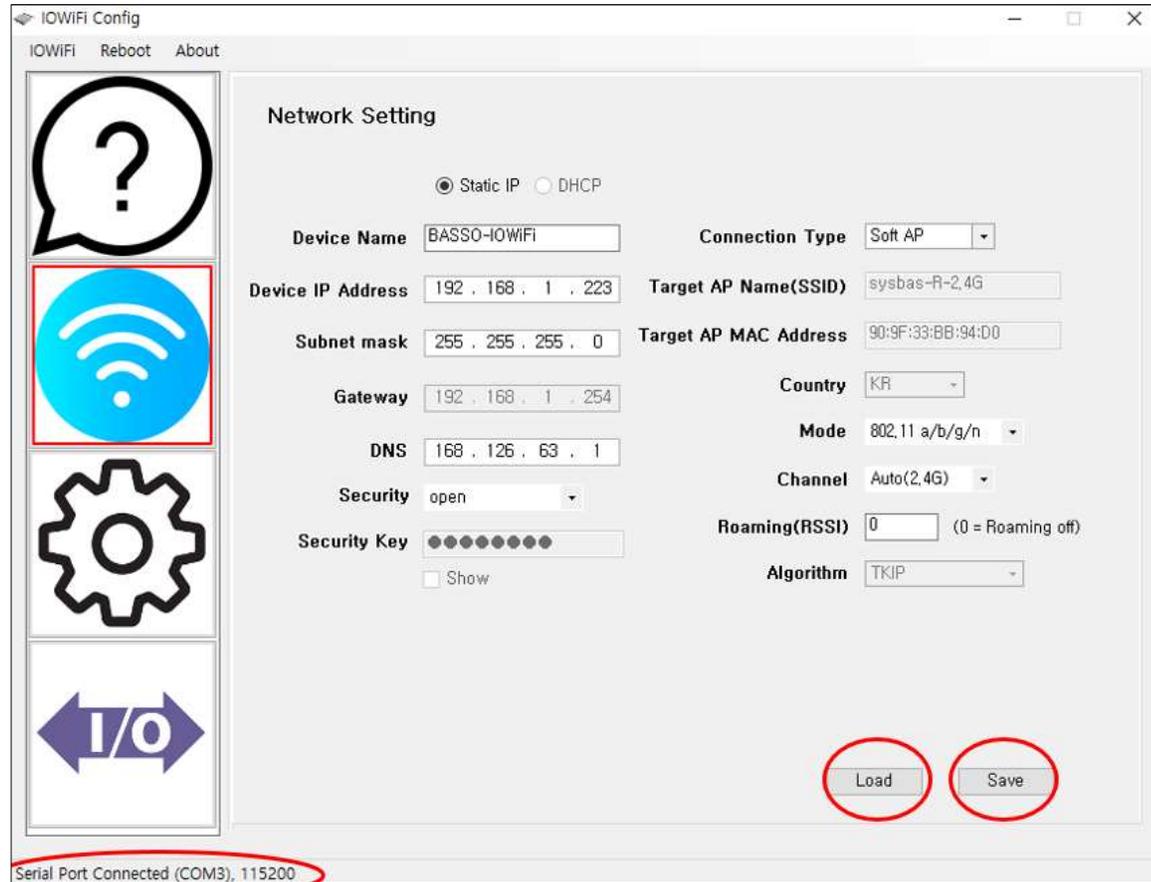
The [Update] button is a button for Firmware Update of ioWiFi.

Press the button, select the firmware file and proceed the update.



## Network Setting

You can set the network-related settings of the ioWiFi in the Network Setting menu.



The bottom left shows the information and status of the connected COM port.

Click the [Load] button to show the status of the currently set value of ioWiFi.

Click the [Save] button to save the setting values of ioWiFi.

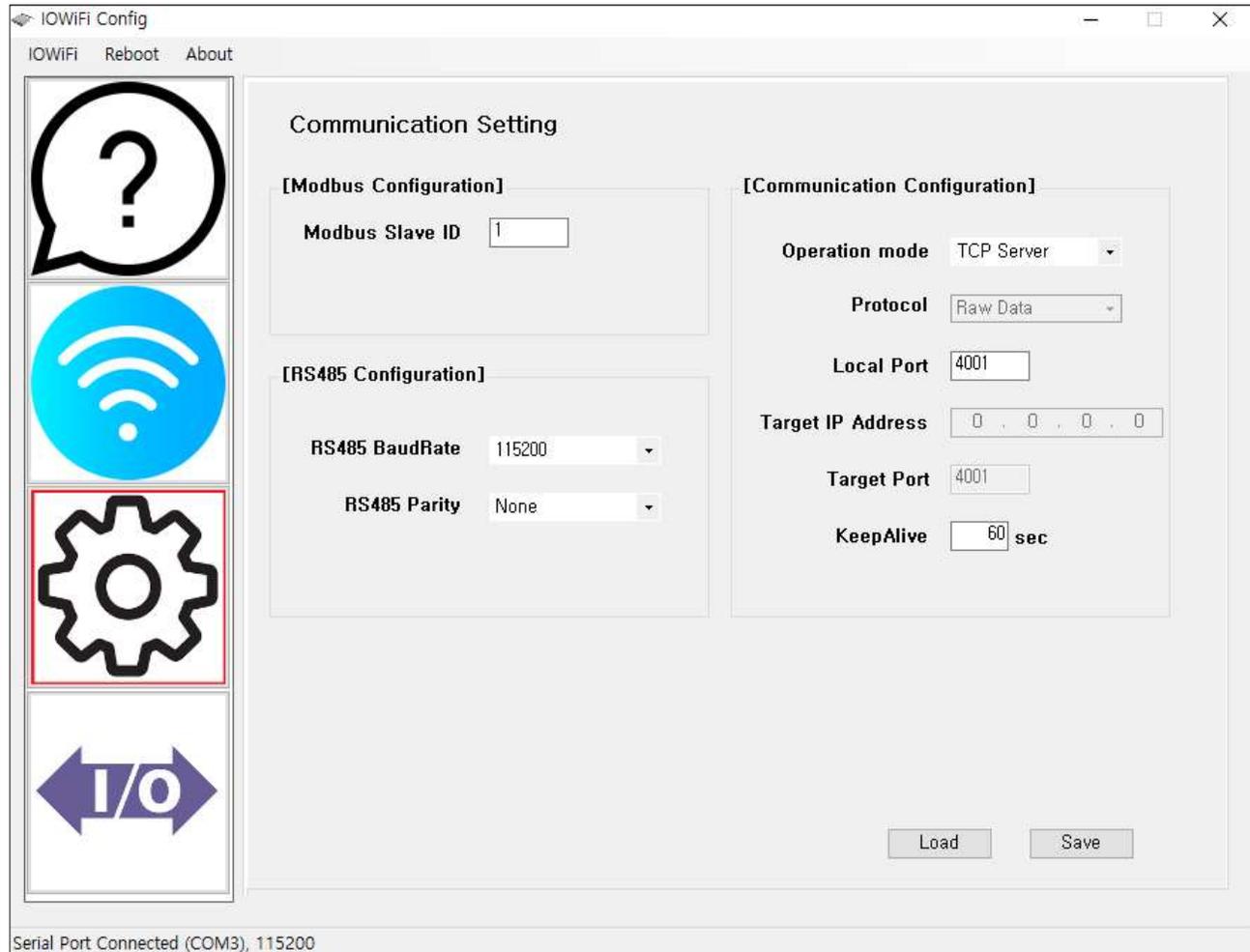
After changing the settings, make sure to press the [Save] button and check that the changed values are reflected in the actual equipment. If you want to check the reset value after reconnecting, you can check it through the [Load] button. If you force the program to exit without saving changes, the changed values will not be saved.

**[Tip]** The SSID of Soft-AP can be changed in the Device Name area. The default Device Name(SSID) is “BASSO-IOWiFi”. When using multiple ioWiFi as Soft-AP, we recommend you to change the Device Name so they can be distinguished easily from each other. For example: BASSO-IOWiFi-AP#1, IOWiFi-AP#1

**\* Please refer to APPENDIX 6. SETUP UTILITY MENU for detailed Network setup information.**

## Communication Setting

You can set the communication-related settings of the ioWiFi in the Communication Setting menu.



Click the [Load] button to show the status of the currently set value.

Click the [Save] button to save the setting values of the changes you made.

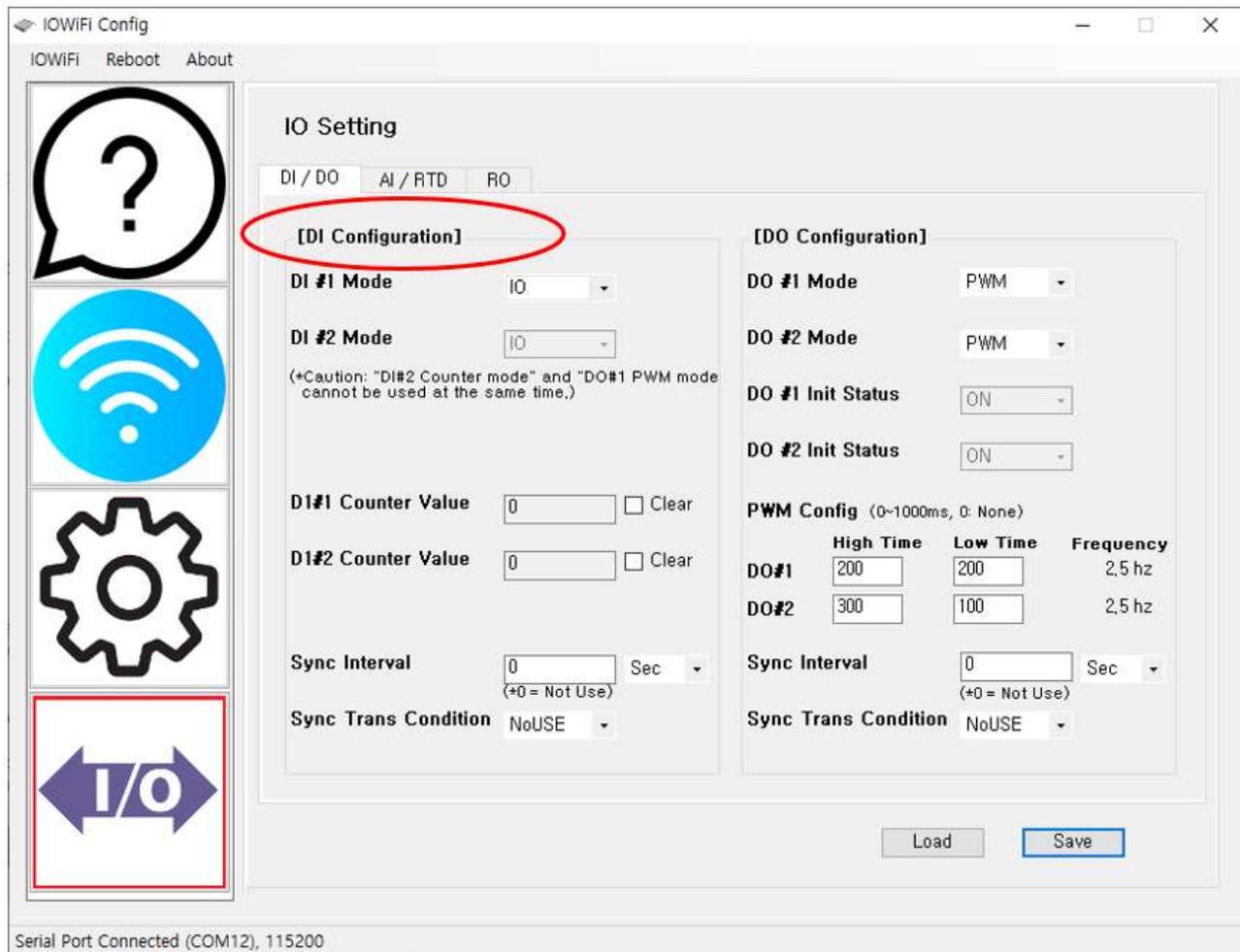
After changing the settings, make sure to press the [Save] button and check that the changed values are reflected in the actual equipment. If you want to check the reset value after reconnecting, you can check it through the [Load] button. If you force the program to exit without saving changes, the changed values will not be saved.

\* Please refer to APPENDIX 6. SETUP UTILITY MENU for detailed communication setup information.

## IO Setting

You can set the I/O-related settings of the ioWiFi in the IO Setting menu.

For your convenience, it consists of three tabs: "DI/DO", "AI/RTD", and "RO".



Click the [Load] button to show the status of the currently set value.

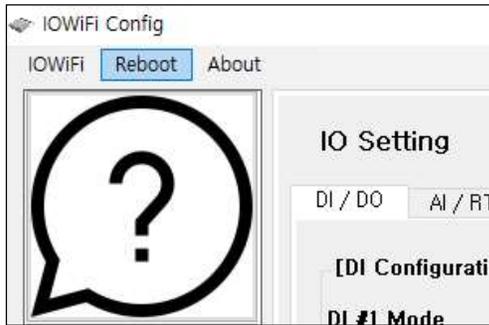
Click the [Save] button to save the setting values of the changes you made.

After changing the settings, make sure to press the [Save] button and check that the changed values are reflected in the actual equipment. If you want to check the reset value after reconnecting, you can check it through the [Load] button. If you force the program to exit without saving changes, the changed values will not be saved.

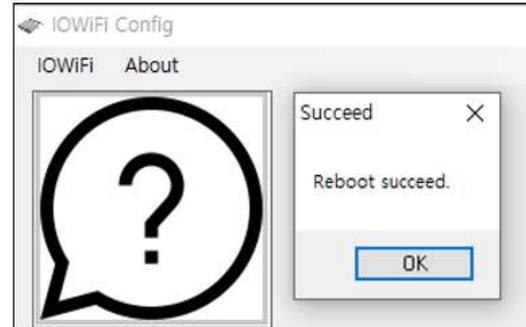
\* Please refer to APPENDIX 6. SETUP UTILITY MENU for detailed IO setup information.

## Reboot

After setting up the ioWiFi, press the [Reboot] button to restart the ioWiFi and change it to operation mode.



Click [Reboot]



Reboot Succeed

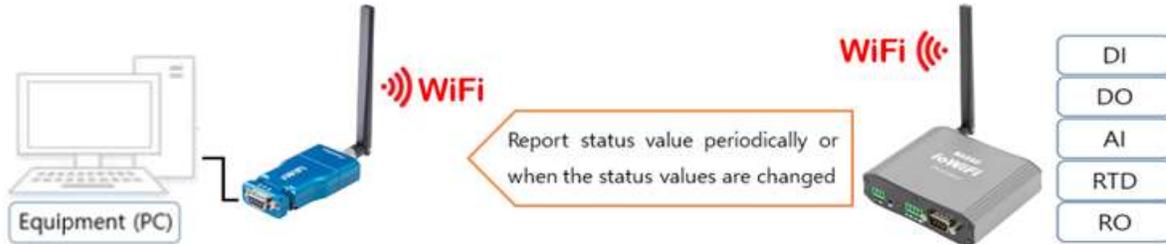
## 8. Example of Settings

### ① Using Sync Function

Sync on ioWiFi shows the status of each port. Sync can either view the status values of each port or set each port differently according to each characteristic. Sync function is a normal mode used when it is not Modbus mode communication. It communicates in a defined packet structure to communicate with the other side of the ioWiFi(WiFi-available PC, sWiFi/all, etc.).

\*Please refer to below for detailed packet structure for each IO port.

#### Report Status Values

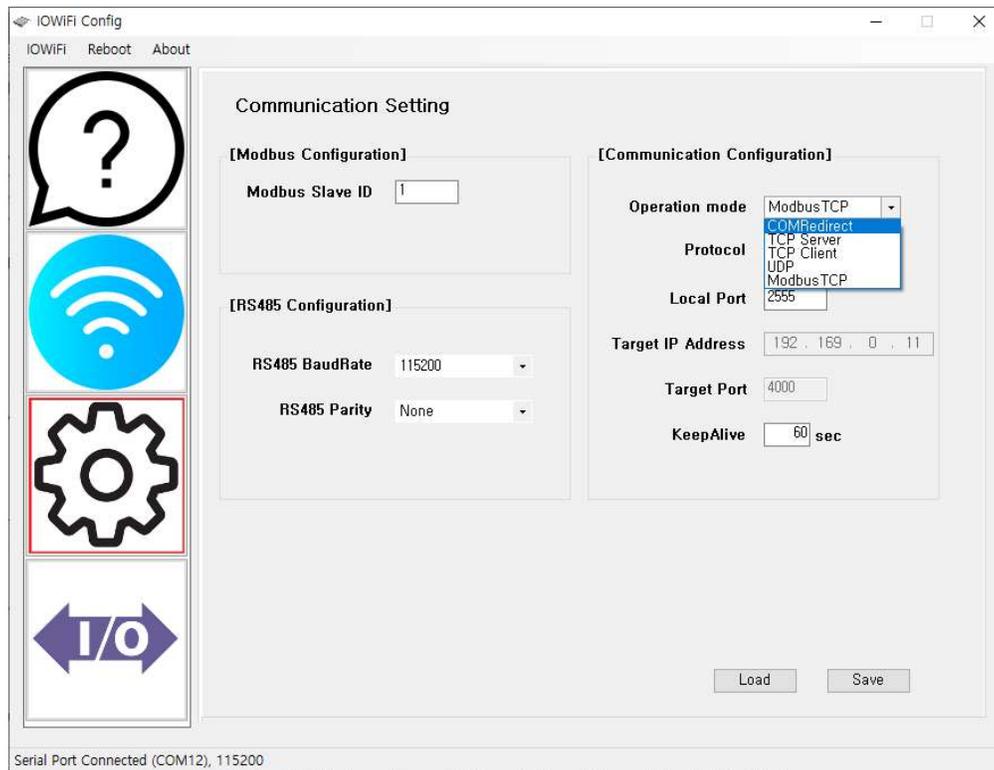


Status information can be reported to the parent periodically or when the status value of the port changes.

The currently set Sync functionality can be found in the IOWiFi Config.

For example, DO port Sync is described below.

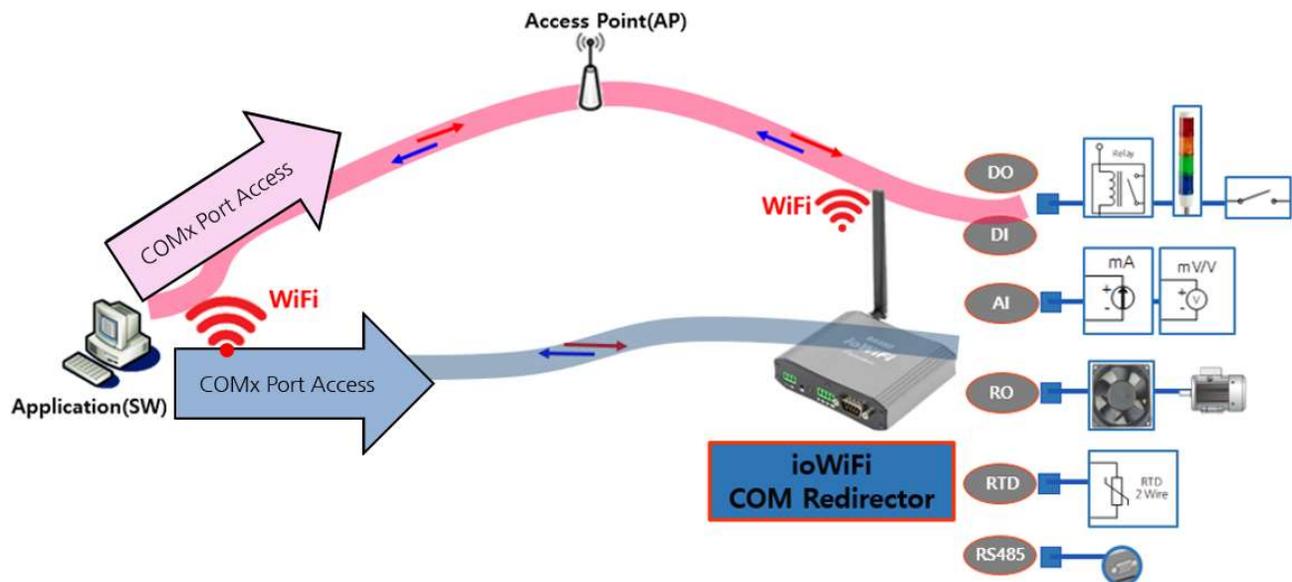
### 1) Check Operation Mode Setting



Sync operation is forwarded over WiFi only, and operates in COMRedirect, TCP Server, TCP Client and UPD mode.

#### COMRedirect Mode

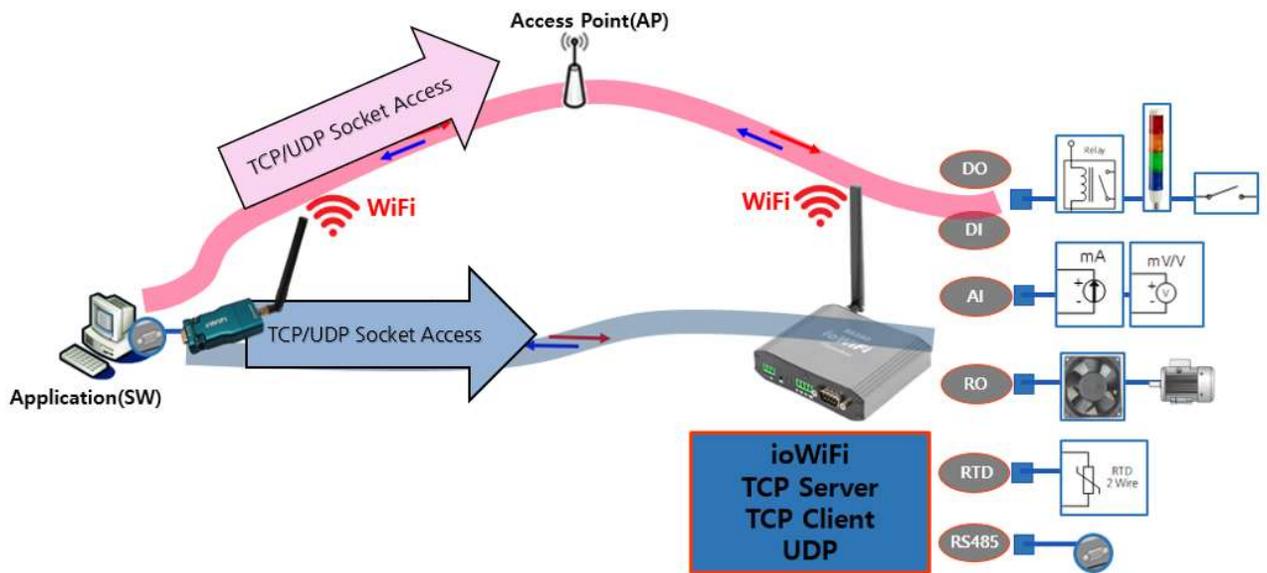
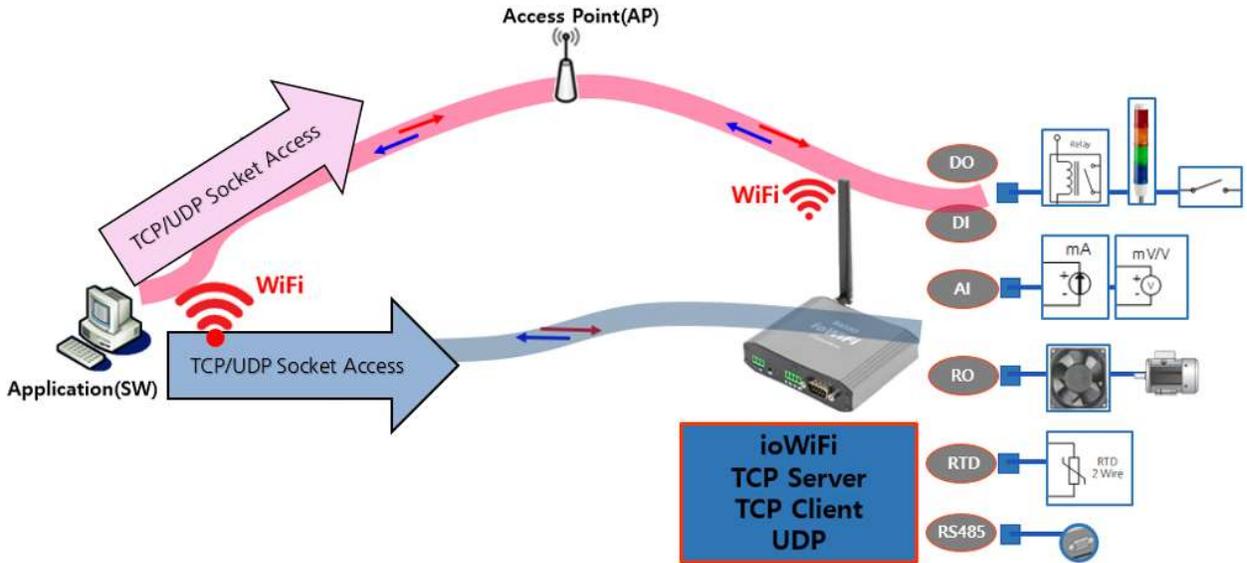
To use COMRedirect Mode, it should be a structure in which the other party can immediately connect the ioWiFi. For example, on a WiFi-equipped PC, use can connect to a VCP(Virtual Com Port) with ioWiFi through AP(Access Point). If there is no AP and the ioWiFi is operating as a Soft AP, user can directly connect WiFi to connect to VCP.



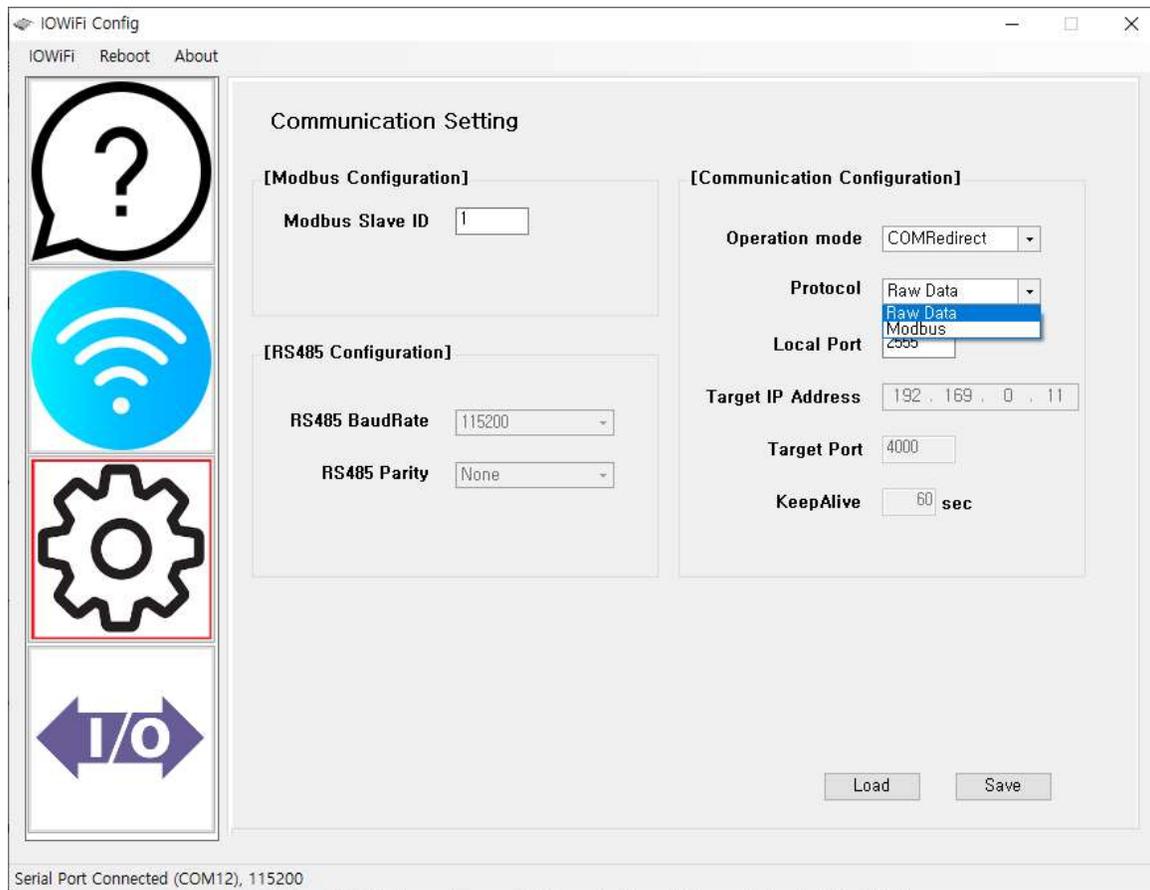
TCP Server, TCP Client, UDP

To use TCP Server, TCP Client, UDP Mode, it should be a structure in which the other party can immediately connect the ioWiFi, or the counterpart device is sWiFi/all so can be connected.

For example, on a WiFi-equipped PC, user can socket-connect to TCP Server, TCP Client, UDP through AP(Access Point). If there is no AP and the ioWiFi is operating as a Soft AP, user can directly connect WiFi to socket-connect TCP Server, TCP Client, UDP. Or user can use with 1:1 device connection such as sWiFi/all.



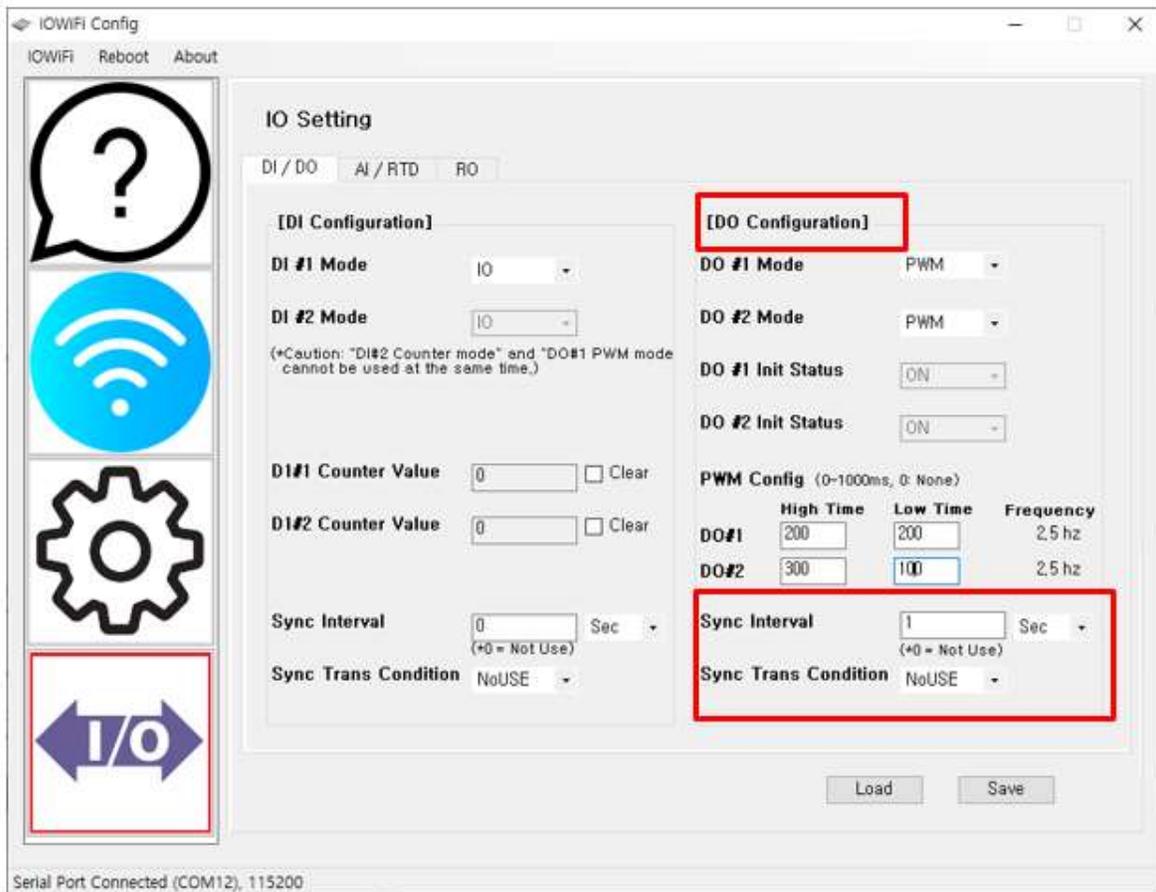
## 2) Check Protocol Setting



The Sync operation only works in Raw Data mode. It does not work in Modbus mode.

To use Modbus Communication(COMx) in Com Redirector mode, user must select Protocol as Modbus.

### 3) Check DO Sync Setting



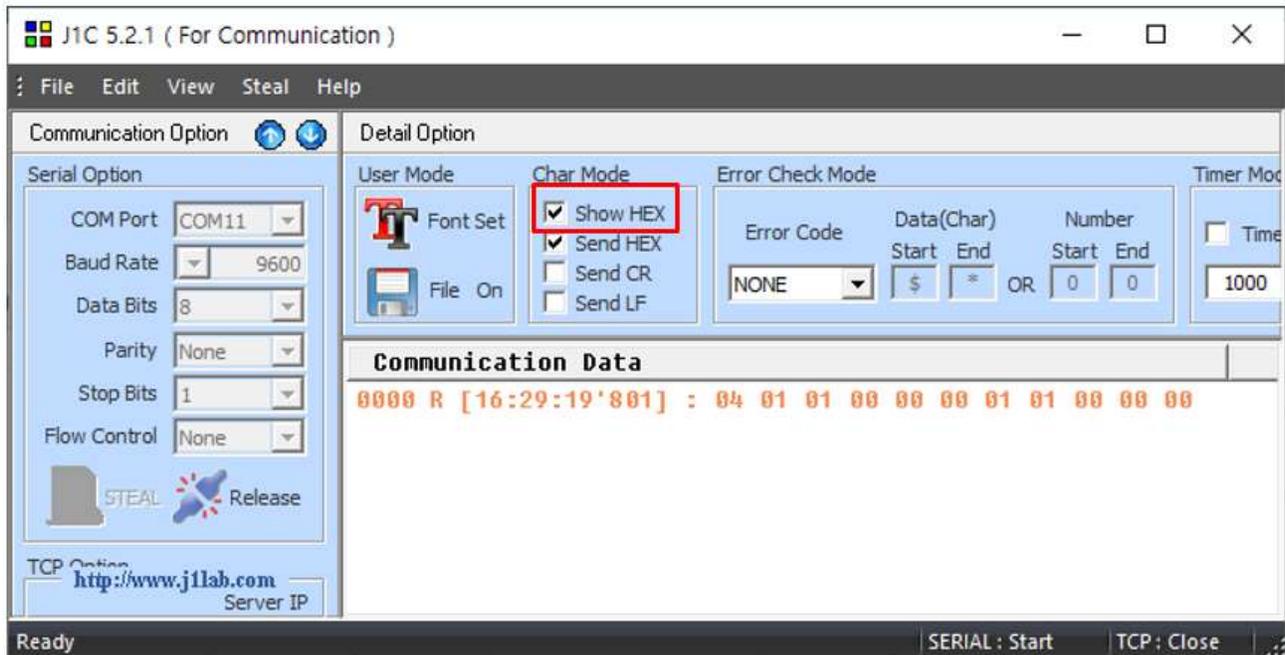
You can check it in the IOWiFi Config as shown above.

Sync Interval: Passes the current state at the specified interval(0~256, SEC/MIN/HOUR/DAY).

Sync Trans Condition: Passes the current state when an event occurs(NoUSE/USE).

#### 4) Check Sync Data Transmission

Sync Data transmitted from the ioWiFi is output to the HEX value from the counterpart equipment(sWiFi, PC, etc.) connected to WiFi.



(This is an example of a J1C program)

For DO ports, you can see that 11 bytes of Sync Data are sent periodically.

With this value, the user can indicate it as a status value in their own application.

Convert the received 11 bytes to the HEX value to view them.

#### < Packet Sample >

If DO#1 and DO#2 are IO mode, **04 01 01 00 00 00 01 01 00 00 00**

04: Port Table Number (refer to the table below)

01: Do#1 Port type (IO Mode)

01: Do#1 Port status (ON)

00: Meaningless in IO Mode

00: Meaningless in IO Mode

00: Meaningless in IO Mode

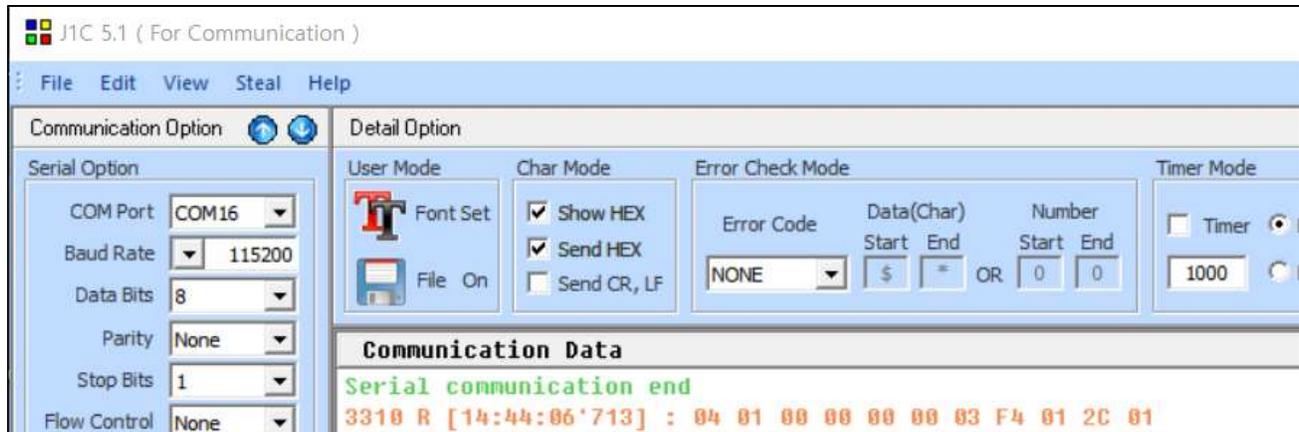
01: Do#2 Port type (IO Mode)

01: Do#2 Port mode(ON)

00: Meaningless in IO Mode

00: Meaningless in IO Mode

00: Meaningless in IO Mode



If DO#1 is IO mode and DO#2 is PWM mode, *04 01 00 00 00 00 03 F4 01 2C 01*

04: Port Table Number (refer to the table below)

01: Do#1 Port type (IO Mode)

00: Do#1 Port status(OFF)

00: Meaningless in IO Mode

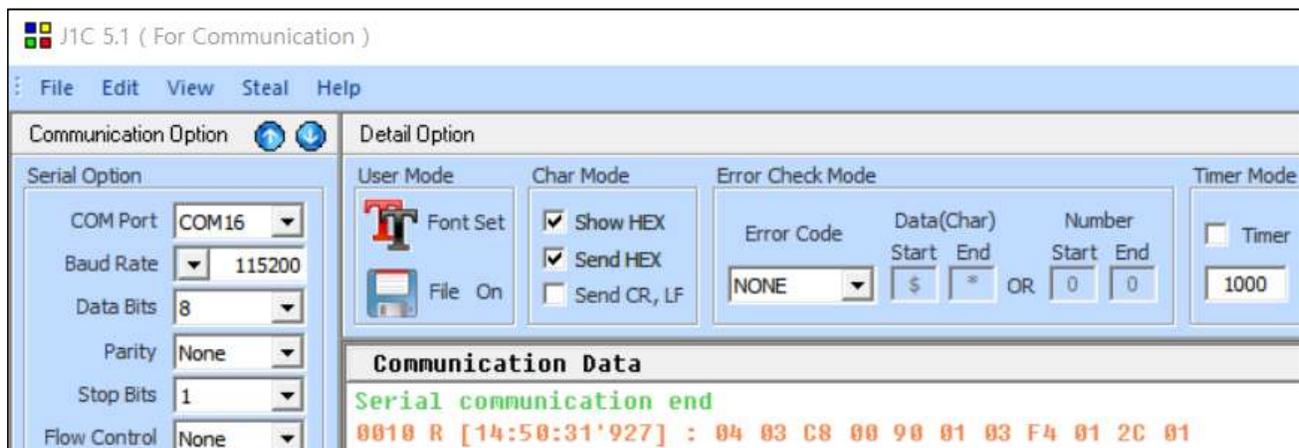
00: Meaningless in IO Mode

00: Meaningless in IO Mode

03: Do#2 Port mode (PWM Mode)

F4 01: PWM High Time of Do#2 Port (0x01F4 = 500) - Little Endian

2C 01: PWM Low Time of Do#2 Port (0x012C = 300) - Little Endian



If DO#1 and DO#2 are PWM mode, *04 03 C8 00 90 01 03 F4 01 2C 01*

04: Port Table Number (refer to the table below)

03: Do#1 Port mode (PWM Mode)

C8 00: PWM High Time of Do#1 Port (0x00C8 = 200) - Little Endian

90 01: PWM Low Time of Do#1 Port (0x0190 = 400) - Little Endian

03: Do#2 Port mode (PWM Mode)

F4 01: PWM High Time of Do#2 Port (0x01F4 = 500) - Little Endian

2C 01: PWM Low Time of Do#2 Port (0x012C = 300) - Little Endian

Since the contents and characteristics of the Sync reporting values of each port are different, the format of the sending data is also different. Please refer to the table below for details.

**DO/DI Packet**

type	
0x1	Input/Output
0x2	Counter
0x3	PWM

data 4bytes (little endian)				
I/O	0 / 1	0x00	0x00	0x00
Counter	value[low]	value[high]	0x00	0x00
PWM	htime[low]	htime[high]	ltime[low]	ltime[high]

**IOLory / IOWiFi**

byte	1	2	3	4~6	7	8	9~11
	Port table Number	#1 상태	#1 data		#2 상태	#2 data	
DO	04	[type]	data 4byte		[type]	data 4byte	
DI	05	[type]	data 4byte		[type]	data 4byte	
AI	06	value					
RTD	07	value					
RO	08	0/1					
RS485	09	1	data				

<Table - Sync Transmission Protocol for each port>

※NOTE: You cannot check the Hex value in TeraTerm, a commonly used communication emulator.

You should use a serial communication program with Hex View enabled.

The above example is a J1C program which is convertible.

\*As shown above, other ports also have their own characteristics settings just like DO, so user can make each state, communication cycle and status changes. Please refer to “Chapter 7. Settings” for Sync functions for ports other than DO port.

## ② To Control DO or RO(Raw Data)

You can also control the status of the output ports, DO(Digital Output) and RO(Relay Output) in Raw Data mode. WiFi products(sWiFi, PC, etc.) which are the counterpart of ioWiFi should be communicated with the structure of commands set by ioWiFi to control DO and RO.



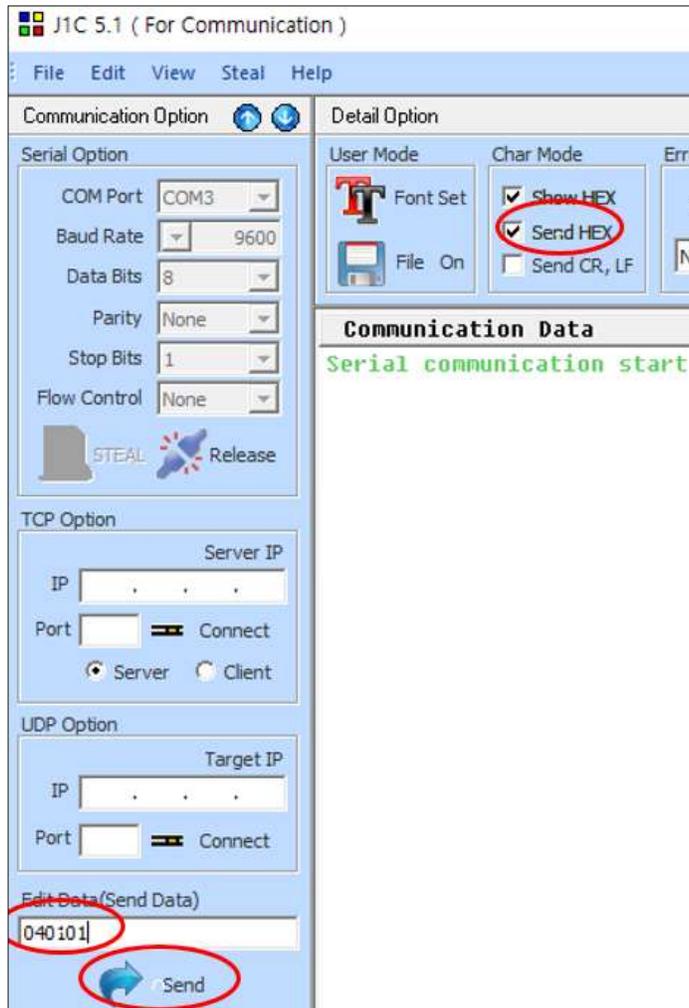
The structure(protocol) of the control command consists of 3bytes and details are as follows:

Number	Contents	Note
1	Port Table Number(0x04 or 0x08)	0x04: DO 0x08: RO
2	Port Number(0x01 or 0x02)	0x01: Port no.1 0x02: Port no.2
3	Status Value to change(0x00 or 0x01)	0x00: OFF 0x01: ON

The 3bytes to be transferred must be converted to the HEX value.

An example of a control request(transmission) packet is as follows:

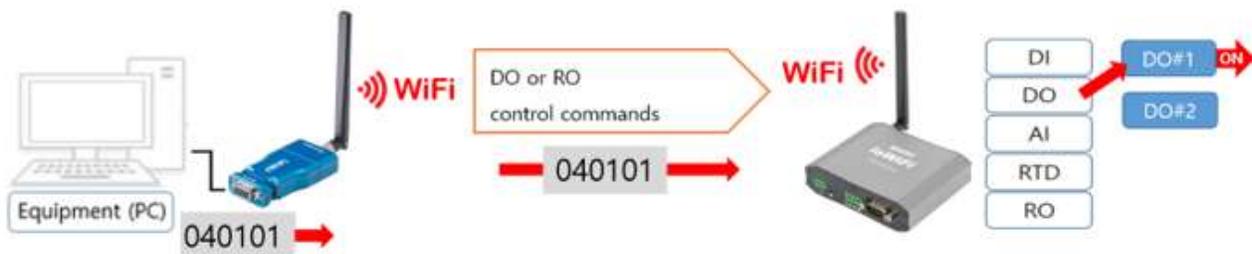
```
0x040x01 0x01 //DO Port no.1 ON
0x040x02 0x00 //DO Port no.2 OFF
0x08 0x01 0x01 //RO Port no.1 ON
0x08 0x01 0x00 //RO Port no.1 OFF
```



(This is an example of a J1C program)

For input, convert to the Hex value and send.

As shown above, if the counterpart WiFi equipment of the ioWiFi sends the HEX value “0x040101”, it changes the status value of that port.



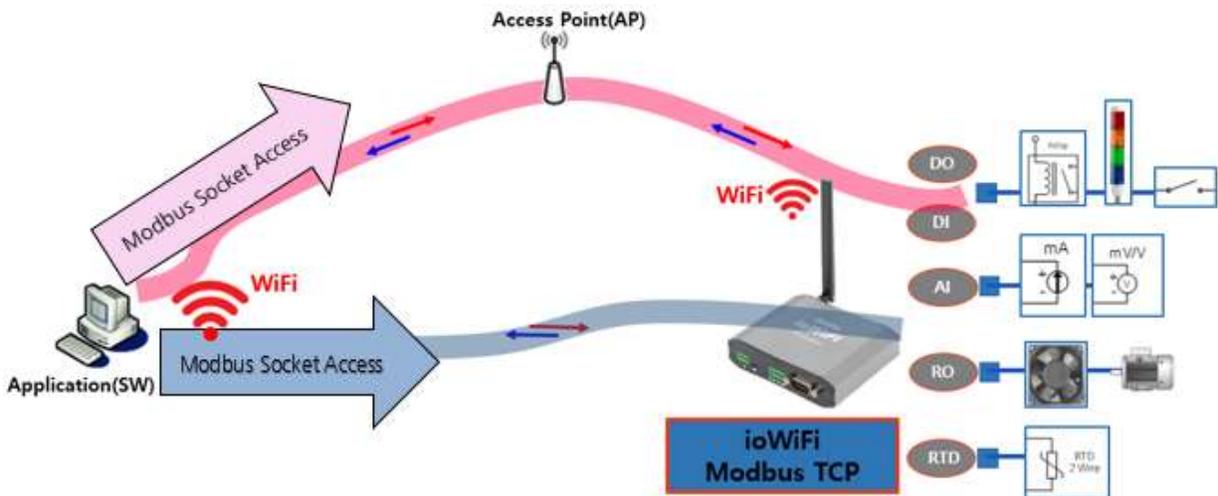
If you interpret “040101”, this is a data that changes DO Port no.1 status to ON.

### ③ Using Modbus Function

ioWiFi supports Modbus. RS485 or WiFi allows user to control or check the status of equipment connected to each port on the ioWiFi from Modbus equipment through Modbus communication.

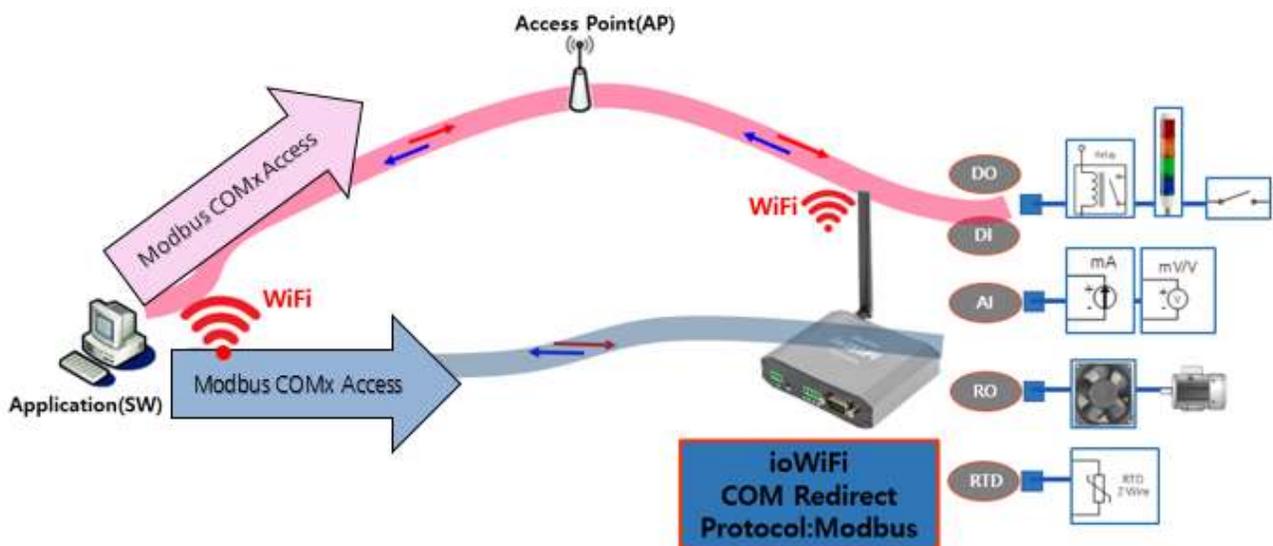
There are two methods of using Modbus: using WiFi and connecting to the RS485 port on the ioWiFi.

To use WiFi, you can access Modbus TCP through socket connection in a structure in which the other party can immediately connect the ioWiFi as shown below.



For example, on a WiFi-equipped PC, user can socket-connect to TCP Server, TCP Client, UPD through AP(Access Point). If there is no AP and the ioWiFi is operating as a Soft AP, user can directly connect WiFi to socket-connect TCP Server, TCP Client, UDP. Or user can use with 1:1 device connection such as sWiFi/all.

You can connect the ioWiFi to VCP(Virtual Com Port) via the access point(AP) on a WiFi-enabled PC. If there is no AP and ioWiFi is operating as a Soft AP, user can directly connect WiFi to VCP through COM port connection via Modbus Serial.



The Modbus Register Map of ioWiFi is as follows:

**[03 : Read Holding Registers] Address 40001~40022**

Addr	Data	R/W	Value	Note
0	DO#1 mode	R/W	1, 3	IO=1, PWM=3
1	DO#2 mode	R/W	1, 3	IO=1, PWM=3
2	DO#1 init	R/W	0~1	Low=0, High=1
3	DO#2 init	R/W	0~1	Low=0, High=1
4	DO#1 value	R/W	0~1	Low=0, High=1
5	DO#2 value	R/W	0~1	Low=0, High=1
6	DO#1 pwm high	R/W	0~1000	PWM=1~1000 , None=0
7	DO#1 pwm low	R/W	0~1000	PWM=1~1000 , None=0
8	DO#2 pwm high	R/W	0~1000	PWM=1~1000 , None=0
9	DO#2 pwm low	R/W	0~1000	PWM=1~1000 , None=0
10	DI#1 mode	R/W	1, 2	IO=1, Counter=2
11	DI#2 mode	R/W	1, 2	IO=1, Counter=2
12	DI#1 value	R/W	0~65535	Counter : clear=0, read=1~65535 IO : On=1, Off=0
13	DI#2 value	R/W	0~65535	Counter : clear=0, read=1~65535 IO : On=1, Off=0
14	AI sampling count	R/W	1~10	sampling=1~10
15	AI filtering min	R/W	0~65535	filtering=0~65535
16	AI filtering max	R/W	0~65535	filtering=0~65535
17	RTD sampling count	R/W	1~10	sampling=1~10
18	RTD filtering min	R/W	0~65535	filtering=0~65535
19	RTD filtering max	R/W	0~65535	filtering=0~65535
20	RO init	R/W	0~1	OFF=0, ON=1
21	RO value	R/W	0~1	OFF=0, ON=1

**[04 : Read Input Registers] Address 30001~30007**

Addr	Function	R/W	Value	Note
0	DO# 1 Status	R	0 ~ 1	Low=0, High=1
1	DO# 2 Status	R	0 ~ 1	Low=0, High=1
2	RO	R	0 ~ 1	OFF=0, ON=1
3	DI#1 Status	R	0 ~ 65535	Low=0, High=1, Counter=0~65535
4	DI#2 Status	R	0 ~ 65535	Low=0, High=1, Counter=0~65535
5	AI value	R	0 ~ 65535	AI value=0~65535
6	RTD value	R	0 ~ 65535	RTD value=0~65535

**Example of a Modbus Transmission/Reception Packet**

**1) Data Read - Request Port Status (FC=04; Read Input Registers)**

Slave device at address 17(0x11) requests the contents of register addresses #30001 to 30007.

(Read current status of all sensor on the ioWiFi)

### 04(0x04) Read Input Register (Read Only)

Request		Response	
Field Name	Hex	Field Name	Hex
Slave Address	11	Slave Address	11
Function Code	04	Function Code	04
Starting Address (High)	00	Byte Count	0E
Starting Address (Low)	00	#30001 Register Value (High)	00
Number of Register (High)	00	#30001 Register Value (Low)	01
Number of Register (Low)	07	#30002 Register Value (High)	00
CRC (High)	B3	#30002 Register Value (Low)	00
CRC (Low)	58	#30003 Register Value (High)	00
		#30003 Register Value (Low)	00
		.	.
		.	.
		#30007 Register Value (High)	FF
		#30007 Register Value (Low)	01
		CRC (High)	0C
		CRC (Low)	CF

#### <Request Packets>

11 03 0000 0007 0698

11: The Slave Address (0x11: Slave ID 17)

04: The Function Code 4 (Read Input Registers); For reading only

0000: The data address of the first register requested.

(0000 hex = 0, + 30001 offset = input # 30001)

0007: Total number of registers requested. (Read 7 registers #30001 to #30007)

B358: CRC for error checking

#### <Response Packets>

11 04 0E 0001 0000 0000 ..... FF01 0CCF

11: The Slave Address (0x11: Slave ID 17)

04: The Function Code 3 (Read Input Registers)

0E: Number of data bytes to follow (7 registers x 2 bytes each = 14 bytes = 0x0E)

0001: Contents of register 30001 (DO#1 port status)

0000: Contents of register 30002 (DO#2 port status)

FF01: Contents of register 30007 (RTD value)

0CCF: CRC for error checking

2) Data Read - Read Port Settings (FC=03: Read Holding Register)

**03(0x03) Read Holding Register (Read/Write)**

Request		Response	
Field Name	Hex	Field Name	Hex
Slave Address	11	Slave Address	11
Function Code	03	Function Code	03
Starting Address (High)	00	Byte Count	2C
Starting Address (Low)	00	#40001 Register Value (High)	00
Number of Register (High)	00	#40001 Register Value (Low)	01
Number of Register (Low)	16	#40002 Register Value (High)	00
CRC (High)	C6	#40002 Register Value (Low)	01
CRC (Low)	94	#40003 Register Value (High)	00
		#40003 Register Value (Low)	01
		.	.
		.	.
		#40022 Register Value (High)	00
		#40022 Register Value (Low)	00
		CRC High	8C
		CRC (Low)	09

<Request Packets>

11 03 0000 0016 C694

11: The Slave Address (0x11: Slave ID 17)

03: The Function Code 6 (Read Holding Register)

0000: The data address of the first register requested.

(0000 hex = 0, + 40001 offset = input # 40001)

0016: Total number of registers requested. (Read 22(0x16) registers #40001 to #40022)

C694: CRC for error checking

<Response Packets>

11 03 2C 0001 0001 0001 ..... FF01 0CCF

11: The Slave Address (0x11: Slave ID 17)

03: The Function Code 3 (Read Input Registers)

2C: Number of data bytes to follow (22 registers x 2 bytes each = 44 bytes = 0x2C)

0001: Contents of register 40001 (DO#1 mode)

0000: Contents of register 40002 (DO#2 mode)

0000: Contents of register 40022 (RO status value)

0CCF: CRC for error checking

3) Write Data - Write Port Settings (FC=06; Write Single Register)

**06(0x06) Write Single Register**

Request		Response	
Field Name	Hex	Field Name	Hex
Slave Address	11	Slave Address	11
Function Code	06	Function Code	06
Data Address (High)	00	Data Address (High)	00
Data Address (Low)	01	Data Address (Low)	01
value to write (High)	00	value written (High)	00
value to write (Low)	01	value written (Low)	01
CRC (High)	1B	CRC (High)	1B
CRC (Low)	5A	CRC (Low)	5A

<Request Packets>

11 06 0001 0001 1B5A

11: The Slave Address (0x11: Slave ID 17)

06: The Function Code 6 (Preset Single Register)

0001: The data address of the register.

(0001 hex = 1, + 40001 offset = register # 40002 (DO#2 mode))

0001: Write Value → Change mode of DO#2 to IO mode

1B5A: CRC for error checking

<Response Packets>

If it is a normal packet, it will receive the transmitted packet afterwards as it is(Eco).

11 06 0001 0001 1B5A

11: The Slave Address (0x11: Slave ID 17)

06: The Function Code 6 (Write Single Register)

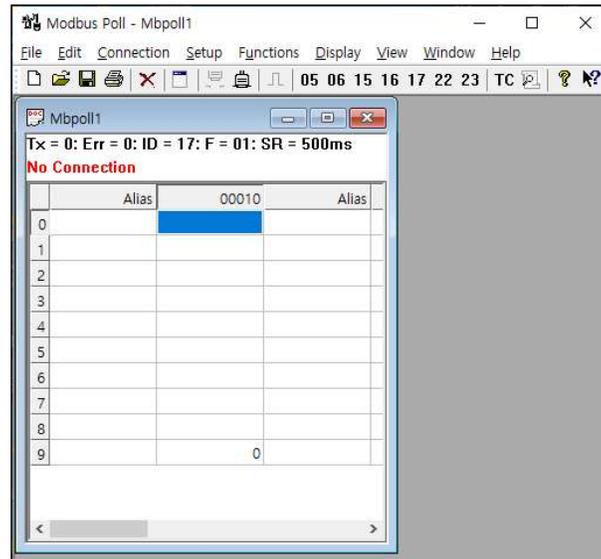
0001: The data address of the register(# 40002-40001 = 1)

0001: Written Value

1B5A: CRC for error checking

## Example of Modbus Communication Using the Modbus Poll Utility

### 1) Run Modbus Poll



### 2) Read/Write Definition

Select Setup → Read/Write Definition from the menu to refer to the ioWiFi Register Map.

- Slave ID: Enter the Slave ID set to IOWiFi Config on ioWiFi.

- Select the Function Code.

\* Select Function: 04 Read Input Registers (3x) to get the status and values for each port.

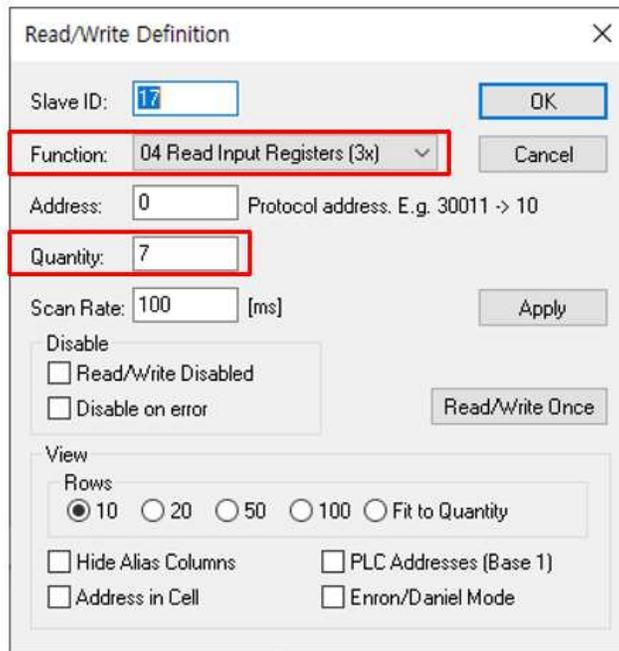
\* Select Function: 03 Read Holding Registers (4x) to get the setting value of the ioWiFi.

- Address: Enter '0' for the start address.

- Quantity: Enter the number of registers to be read.

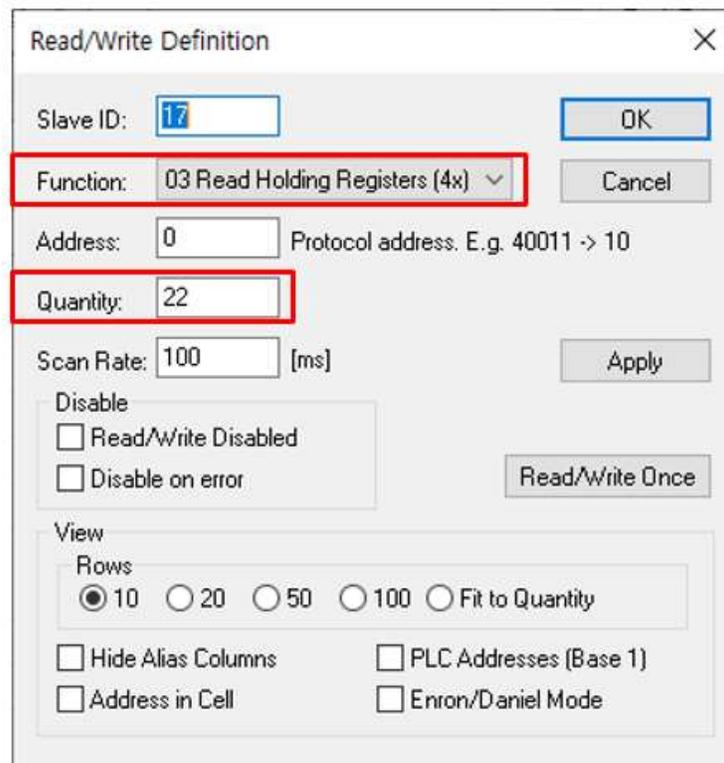
- Set the remaining settings to the Default value.

<Define to get each port state and value(Read Only)>



The screenshot shows the 'Read/Write Definition' dialog box. The 'Slave ID' is set to 17. The 'Function' dropdown is set to '04 Read Input Registers (3x)'. The 'Address' is 0. The 'Quantity' is 7. The 'Scan Rate' is 100 ms. The 'Disable' section has 'Read/Write Disabled' and 'Disable on error' unchecked. The 'View' section has 'Rows' set to 10, 'Hide Alias Columns' unchecked, 'Address in Cell' unchecked, 'PLC Addresses (Base 1)' unchecked, and 'Enron/Daniel Mode' unchecked. Buttons for 'OK', 'Cancel', 'Apply', and 'Read/Write Once' are visible.

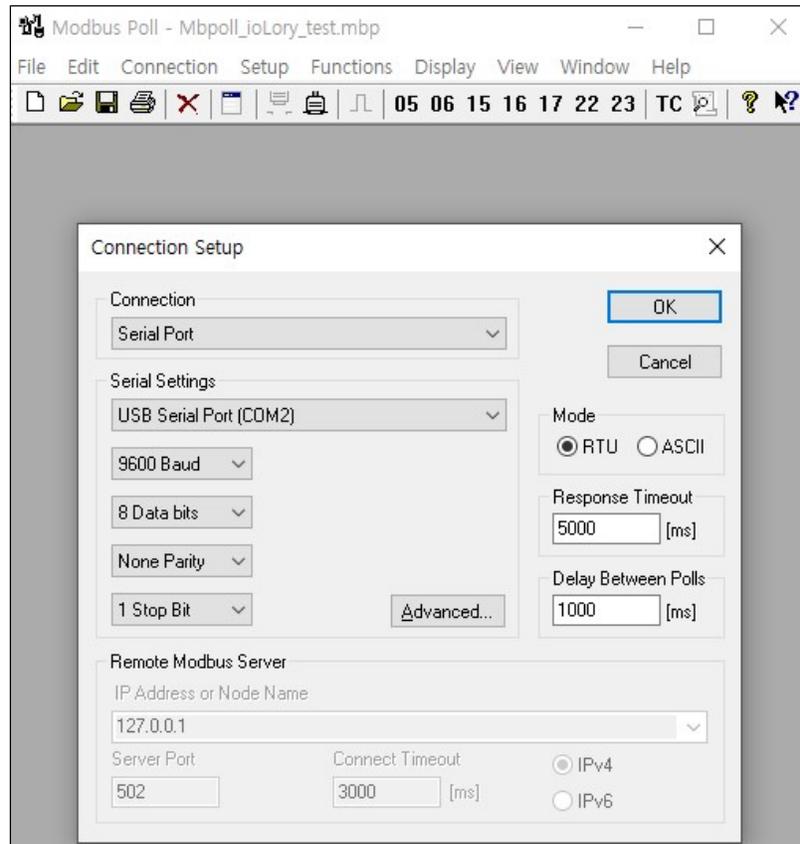
<Define to get value of ioWiFi settings(Read/Write)>



The screenshot shows the 'Read/Write Definition' dialog box. The 'Slave ID' is set to 17. The 'Function' dropdown is set to '03 Read Holding Registers (4x)'. The 'Address' is 0. The 'Quantity' is 22. The 'Scan Rate' is 100 ms. The 'Disable' section has 'Read/Write Disabled' and 'Disable on error' unchecked. The 'View' section has 'Rows' set to 10, 'Hide Alias Columns' unchecked, 'Address in Cell' unchecked, 'PLC Addresses (Base 1)' unchecked, and 'Enron/Daniel Mode' unchecked. Buttons for 'OK', 'Cancel', 'Apply', and 'Read/Write Once' are visible.

### 3) Connection Setup

Select Connection → Connect from the menu to proceed with Modbus connection setup.



- For Connection, select the Serial Port. For Serial Settings, select the Comport that RS485 is connected to, or the Comport which is directly connected via VCP(Com Redirect) and set each settings.

- For WiFi connection, select Modbus TCP/IP and set the IP Address or Node Name, Server Port, Connect Timeout below.

- Select Modbus Mode(RTU/ASCII)

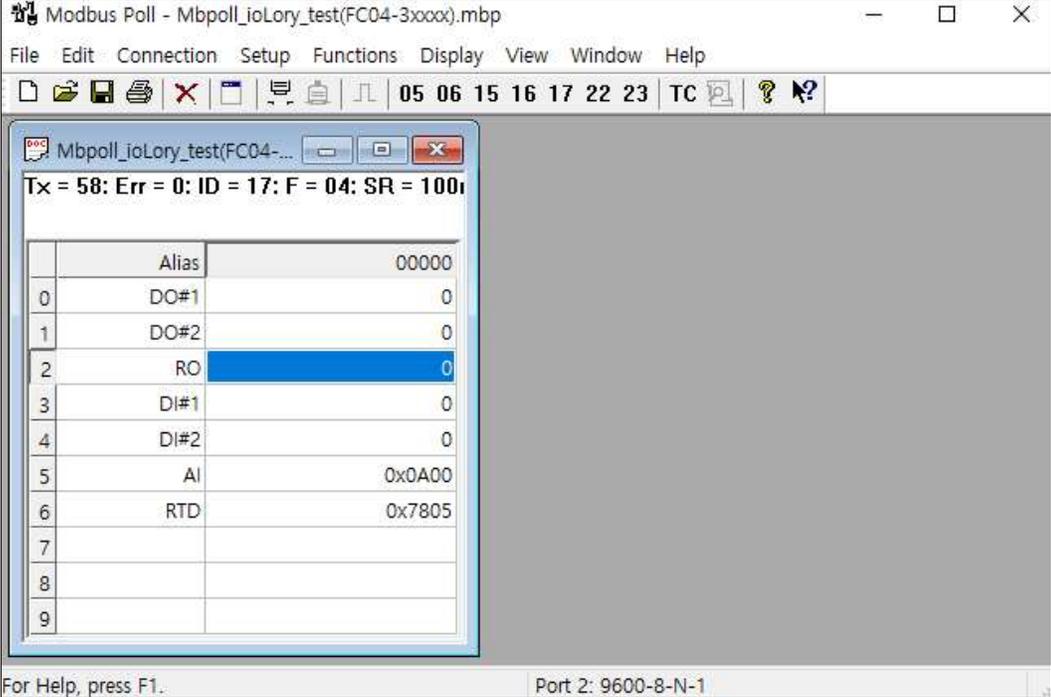
- Sets the Response Timeout setting. If you use WiFi communication, you may receive a late response due to its characteristics, so we recommend to set enough time(more than 5 seconds).

When the setup is complete, press the [OK] button to try connection.

#### 4) Check communication and status value

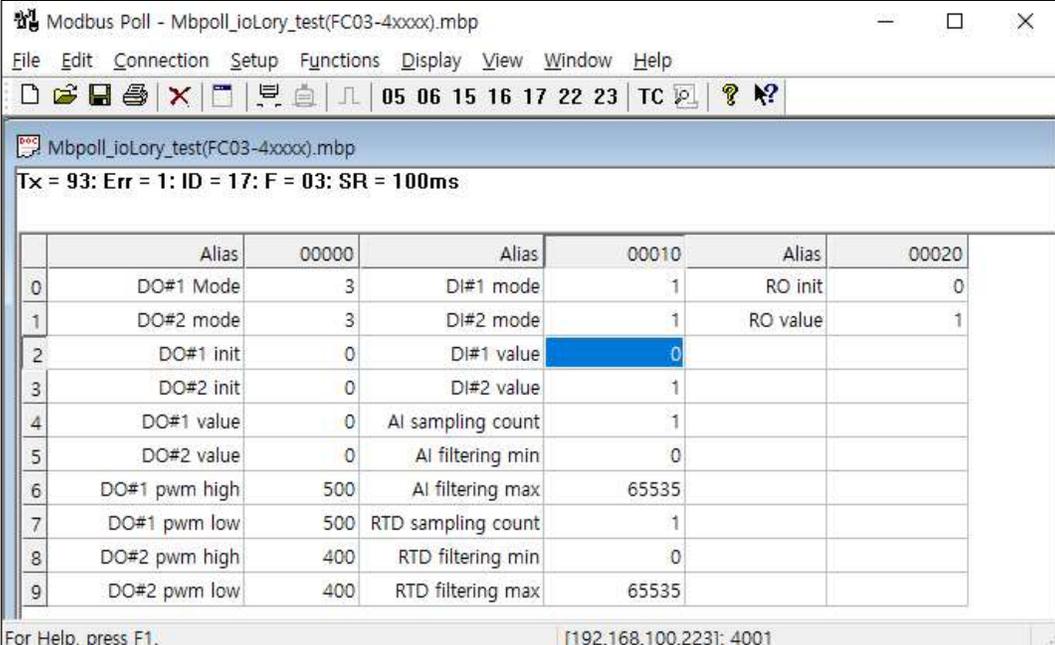
When Modbus communication is normal, you can see the received values as shown below.

#### <FC04 - Results of getting port status information using Read Input Registers>



Register	Alias	Value
0	DO#1	0
1	DO#2	0
2	RO	0
3	DI#1	0
4	DI#2	0
5	AI	0x0A00
6	RTD	0x7805
7		
8		
9		

#### <FC03 - Results of getting ioWiFi setup information using Read Holding Registers>



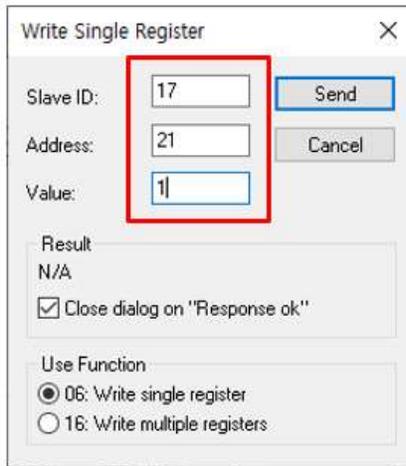
Register	Alias	Value	Alias	Value	Alias	Value
0	DO#1 Mode	3	DI#1 mode	1	RO init	0
1	DO#2 mode	3	DI#2 mode	1	RO value	1
2	DO#1 init	0	DI#1 value	0		
3	DO#2 init	0	DI#2 value	1		
4	DO#1 value	0	AI sampling count	1		
5	DO#2 value	0	AI filtering min	0		
6	DO#1 pwm high	500	AI filtering max	65535		
7	DO#1 pwm low	500	RTD sampling count	1		
8	DO#2 pwm high	400	RTD filtering min	0		
9	DO#2 pwm low	400	RTD filtering max	65535		

\* User input alias in Alias makes it easier to verify.

### 5) How to Write Data

User can control DO#1, DO#2, RO ports through Modbus functionality, and change setting value of the ioWiFi. Select Function → 06: Write Single Register from the menu, write Slave ID, Address, Value and press the [Send] button to send the command to that Slave ID.

Write commands are only available for Holding Register(4xxx) addresses (Not available for Input Register(3xxx)). The example below means that you want to write the#40022(21 Address; RO Value) register value of Slave ID as “1”.



When checked in ‘Close dialog on “Response ok” and normal control is complete, the window will automatically closed and you can confirm that the RO control has been completed(Status changed to “1”).

Modbus Poll - Mbpoll\_ioLory\_test(FC03-4xxxx).mbp

File Edit Connection Setup Functions Display View Window Help

05 06 15 16 17 22 23 TC ? ?

Mbpoll\_ioLory\_test(FC03-4xxxx).mbp

Tx = 6: Err = 0: ID = 17: F = 03: SR = 100ms

	Alias	00000	Alias	00010	Alias	00020
0	DO#1 Mode	3	DI#1 mode	1	RO init	0
1	DO#2 mode	3	DI#2 mode	1	RO value	1
2	DO#1 init	0	DI#1 counter clear	0		
3	DO#2 init	0	DI#2 counter clear	1		
4	DO#1 value	0	AI sampling count	1		
5	DO#2 value	0	AI filtering min	0		
6	DO#1 pwm high	500	AI filtering max	65535		
7	DO#1 pwm low	500	RTD sampling count	1		
8	DO#2 pwm high	400	RTD filtering min	0		
9	DO#2 pwm low	400	RTD filtering max	65535		

For Help, press F1. [192.168.100.223]: 4001

### 6) Debug Communication Status

Users can check the transmission/reception packets by selecting Display → Communication from the menu.



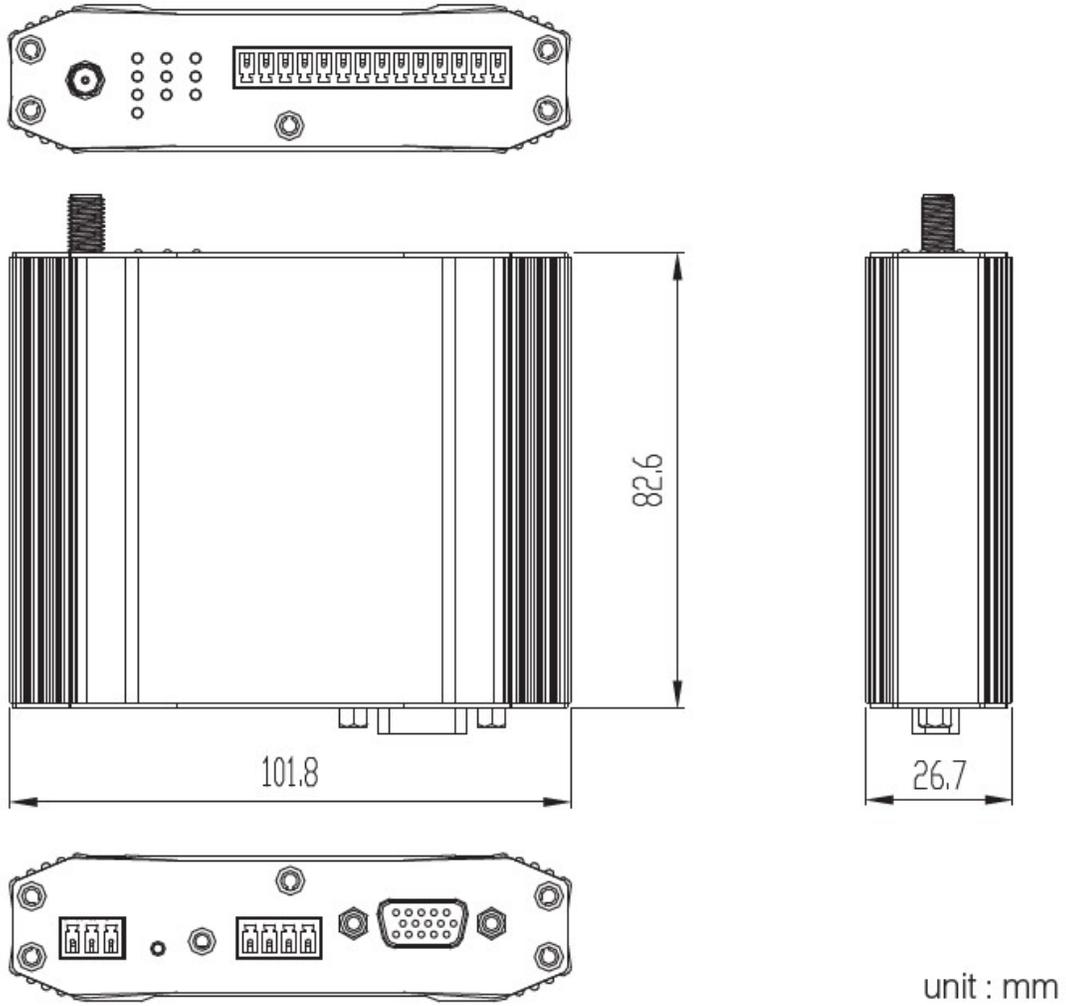
## -----APPENDIX-----

### 1. Specification

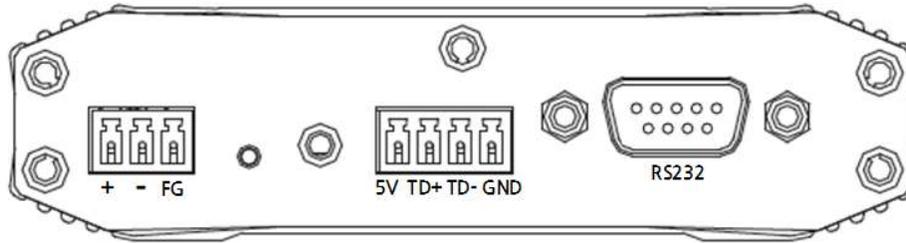
Category		Specification	
Wireless Interface (WiFi)	Frequency Band	2,412 ~2,462 MHz, 5,150 ~ 5,250 MHz, 5,725 ~ 5,850 MHz	
	Protocol	COM Redirect, TCP Server/Client, UDP, Modbus TCP, Modbus RTU/ASCII	
	Security	Open, WEP, WPA-PSK, WPA2-PSK, WPA-Enterprise, WPA2-Enterprise	
	ANT	Dipole Antenna Avg 1.5dBi/2.4GHz, -0.7dBi/5GHz	
Wired Interface	Serial	RS485	For communication, T/B(2). 5V(500mA) power supply available using Pin no.1.
		RS232	For Setup, DB9 male
	DI	Input Voltage Range: 10-26VDC Input Current: 5mA@12VDC 11mA@24VDC	Input Impedance: 2200 ohms
	DO	Maximum Voltage: 12~36VDC Maximum Current: 100mA/ch VceOn: Max. 1.1VDC	Dry Contact, Open Collector Type (Brain Child Type)
	AI	0(2)~10VDC or 0(1)~5VDC 0(4)~20mA	16bit resolution Designed for both AIV type and All type
	RTD	RTD	Resistance Temperature Detector (Temperature Sensor)
	RO	Logic Voltage: 24VDC Logic Current: 42mA Max. Current: 0.5A@220VAC 1A@28VDC	Relay Output (Wet Contact) Relay Type(Form C, SPDT) (3 contact points per port as same as BrainChild products)

Display	LED	RDY, 232, 485, LoRa, DI x2, DO x2, RO, RTD, AI
	Switch	Setup Mode(within 1 second) or Factory Initialization(at least 3 seconds)
Operating Environment	Operating Temperature	-40 ~ 85°C (-40 ~ 185°F)
	Humidity	5~95%
Power	Input Power	DC 12~48V. 1A or higher External Battery Connectable Structure
	Filed Power	DC 12~24V. 1A or higher (2 contact points)
	Isolation	1000~1500Vrms between field and logic
KC Certification		R-R-STB-BASSO1070TW

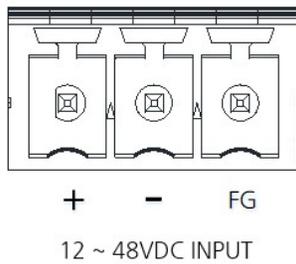
## 2. Dimension



### 3. Connector/Pin Specification



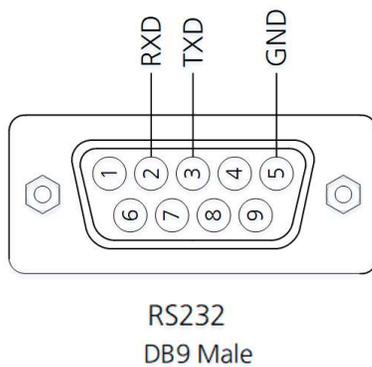
#### Power Port Pin Specification



Pin	Description
V+	Power Input
V-	Power Input
FG	Frame Ground

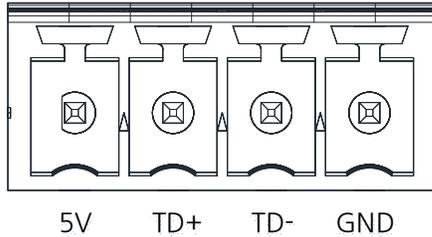
\* Non-polarized terminal

#### RS232 Port Pin Specification



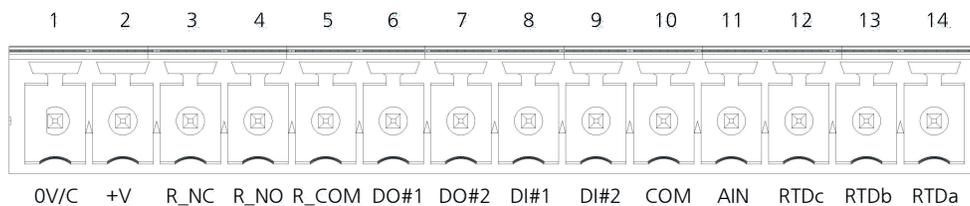
Pin	Description
RXD	Receive Data
TXD	Transmit Data
GND	Ground

### RS485 Port Pin Specification



Pin	Description
5V	5V Output (500mA)
TD+	Transmit/Receive Data +
TD-	Transmit/Receive Data -
GND	Signal Ground

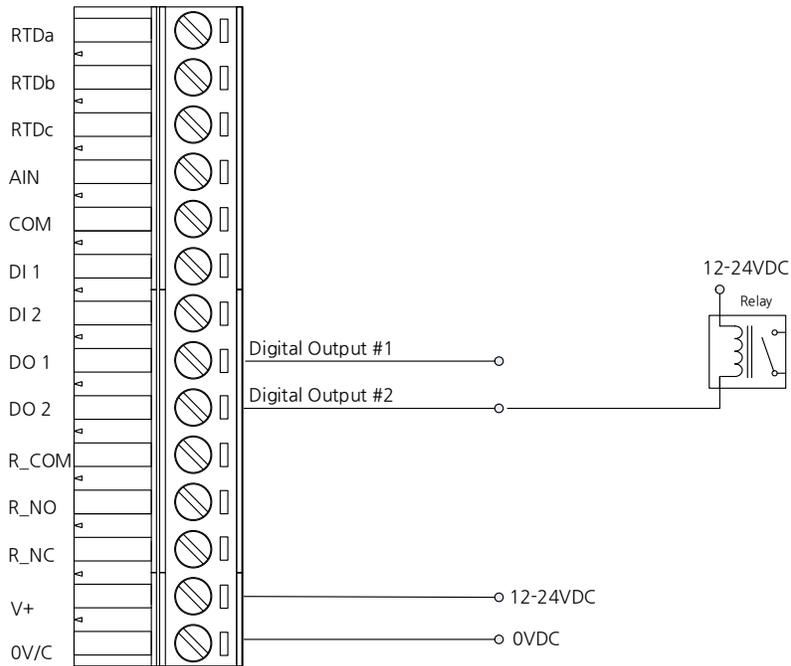
### I/O Port Pin Specification



Pin	Description
0V/C	Ground Terminal (Field Ground)
+V	12~24VDC voltage + Terminal (12-24VDC)
R_NC	Initial status of Relay (Relay Normally Closed)
R_NO	Operate when status of Relay is changed (Relay Normally Open)
R_COM	Relay Ground Terminal (Relay Common)
DO#1	DO Port1 (Digital Output #1)
DO#2	DO Port2 (Digital Output #2)
DI#1	DI Port1 (Digital Input #1)
DI#2	DI Port2 (Digital Input #2)
A_COM	Analog Ground Terminal (Analog Common)
AIN	Analog Input Terminal (Analog Input)
RTDc	RTD Lo
RTDb	RTD Lo
RTDa	RTD Hi

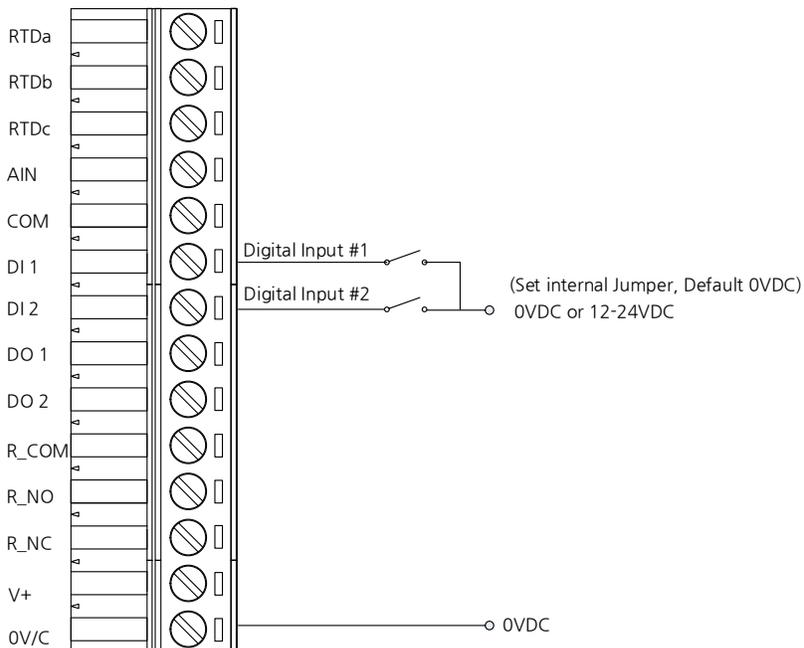
## 4. Wiring

### DO Wiring



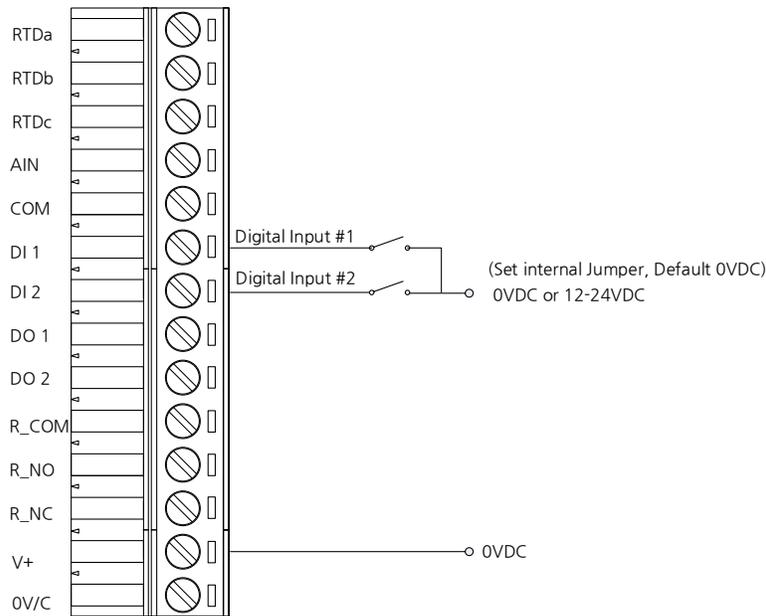
When 12~24 VDC is applied to V+ and the ground is connected to 0 V/C, DO1 and DO2 operate normally.

### DI Wiring



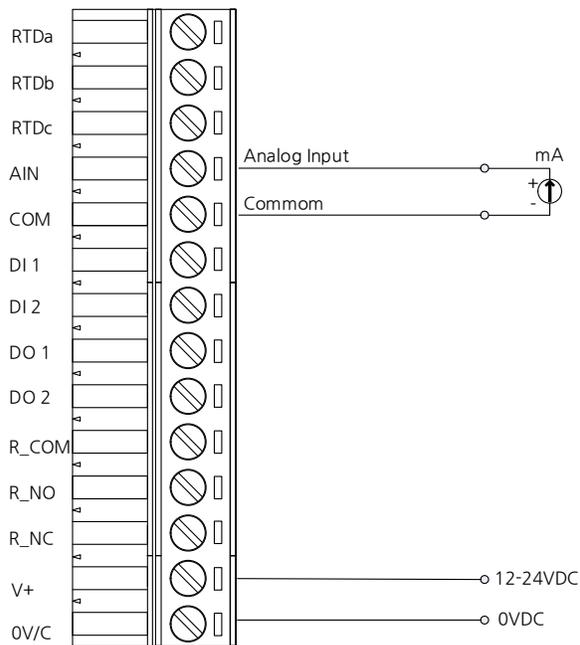
The above is a PNP-type wiring. Jumper must be connected to the PNP in the "Jumper Settings" below.

When 12~24 VDC is applied to DI1 or DI2, and the ground is connected to 0 V/C, the DI operates normally.

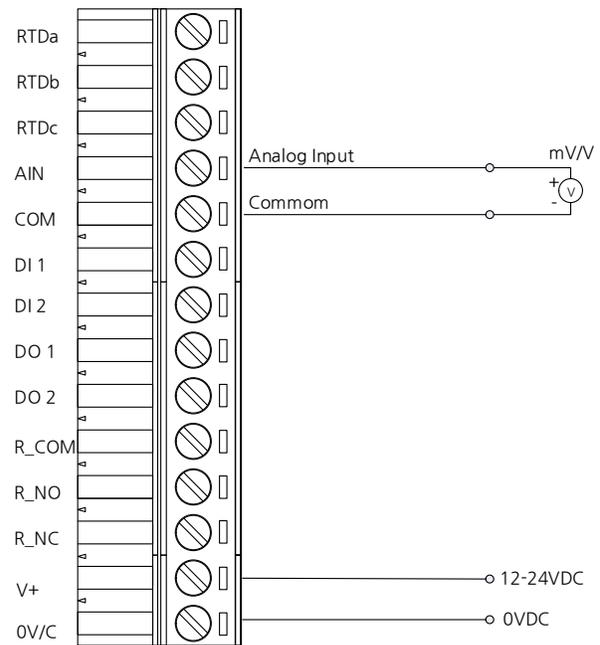


The above is an NPN-type wiring. Jumper must be connected to the NPN within the "Jumper Settings" below.  
 The DI operates normally when 12~24 VDC is applied to DI1 or DI2 and power is connected to V+.

### AI Wiring



<AI Ampere Mode>

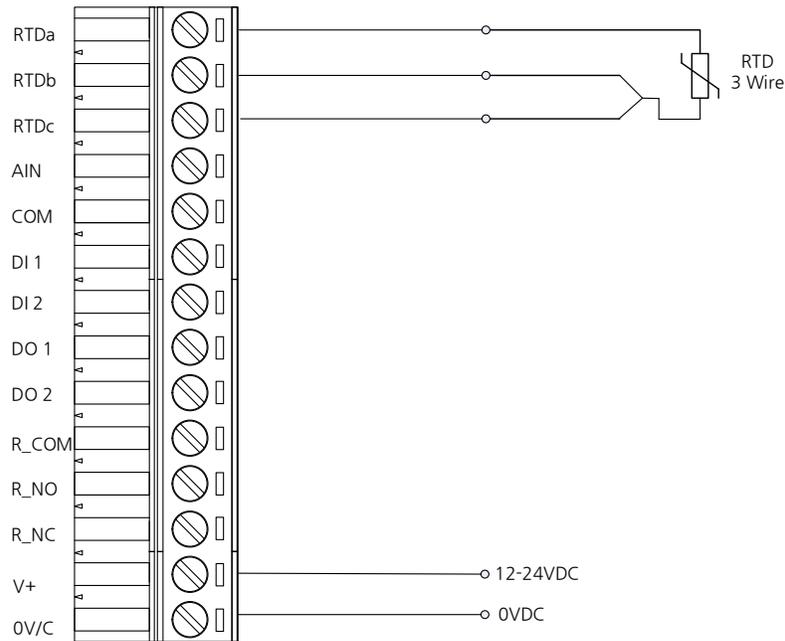


<AI Voltage Mode>

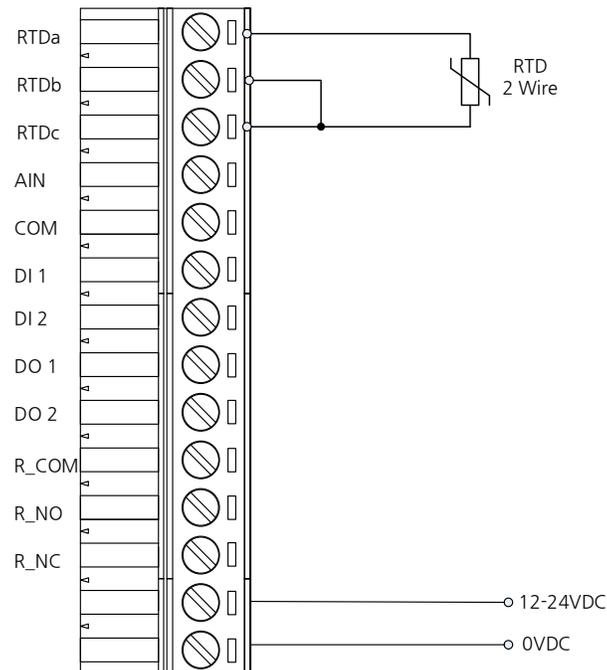
When 12~24 VDC is applied to the V+ and the ground is connected to COM or 0 V/C, the AIN operates normally.  
 Depending on the AI Ampere/Voltage Mode, the J8 PIN must be repositioned(Please refer to Chapter4. How to Use → AI(Analog In) port). Please refer to APPENDIX 5. Calibration for the voltage/current bit value of AI.

## RTD Wiring

3 lines



2 lines



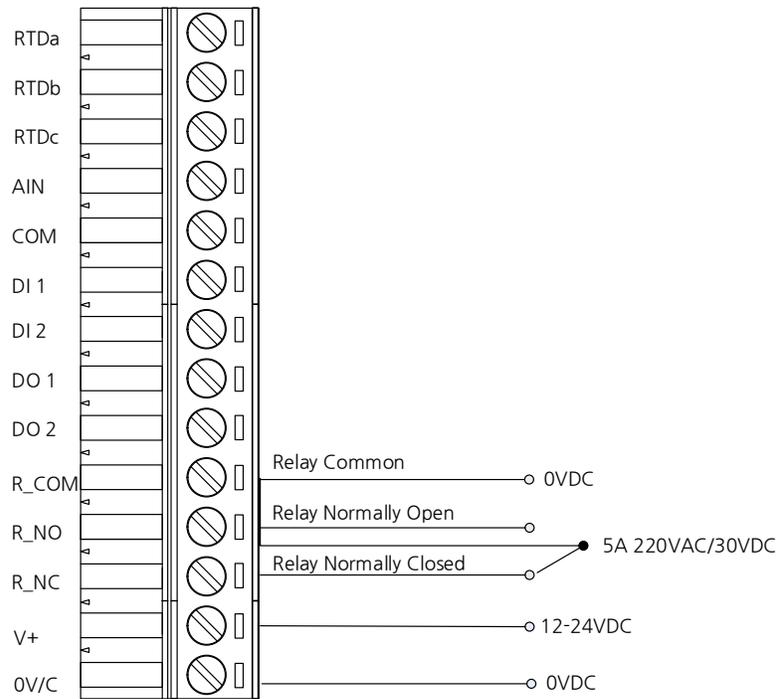
When 12~24 VDC is applied to V+ and the ground is connected to 0 V/C, the RTD sensor value can be read normally.

\* 3 lines: Connect all 3 lines,

2 lines: Short RTDb and RTDc lines

\* Please refer to APPENDIX 5. Calibration for the bit value of RTD temperature value.

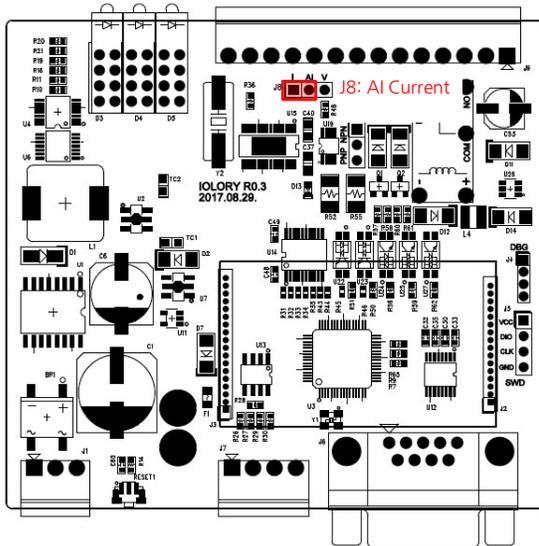
## RO Wiring



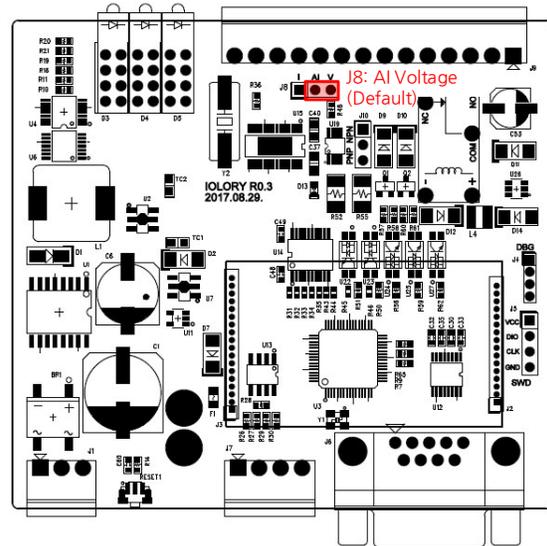
When 12~24 VDC is applied to V+ and the ground is connected to 0/C and R\_COM, R\_NO, R\_NC operates normally.

## Jumper Setting

For AI ports, select current or voltage with a J8 jumper inside the product.



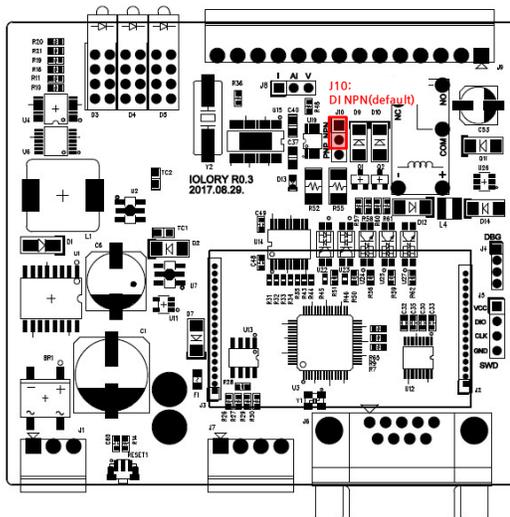
<AI Ampere(Default)>



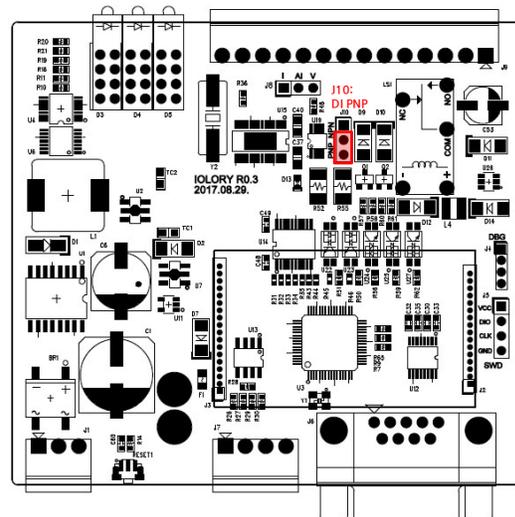
<AT Voltage>

Menu	Measurement Method
AI - I	Current
AI - V	Voltage (Default)

For DI ports, select the NPN or PNP input method with the J10 jumper.



<NPN (Default)>



<PNP Voltage>

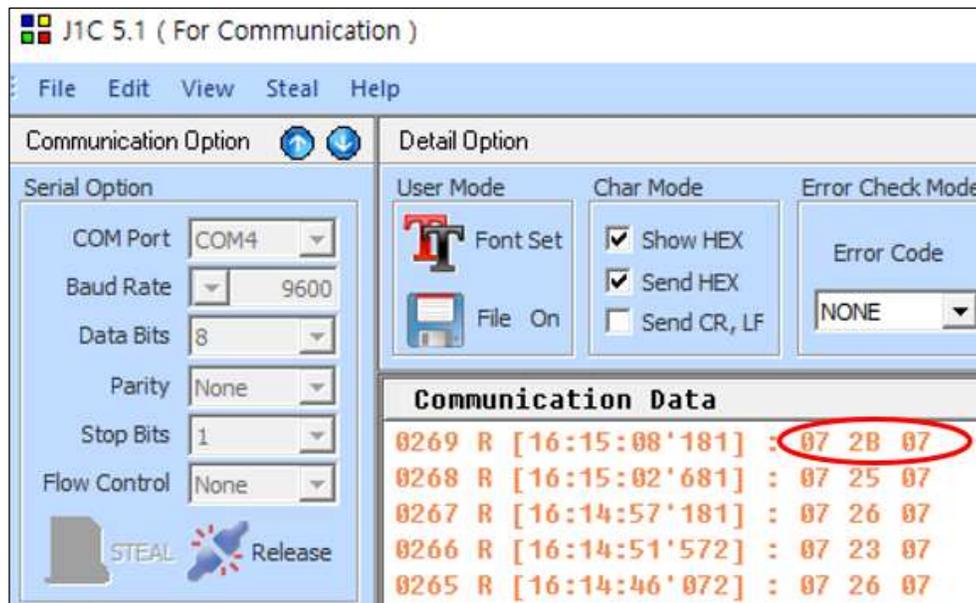
Menu	Input Voltage
NPN	Set - (Default)

## 5. Calibration

Calibration is a table of the voltage, current and the temperature values of RTD according to the Bit values of AI and RTD of the ioWiFi.

The error range of Bit values by device is approximately  $\pm 10$  to 30 and may be larger depending on the surrounding environment.

Example of use)



If RTD received value is 0x072B07,

07: Port Table Number of RTD

2B07: Process Little Endian with 072B Hex value → Convert to DEC value: 1835 → Compare table Bit value

1835 → Means Approx. 30°C

For AI values, check the voltage/current values by comparing with table as same.

AI				RTD	
Voltage(V)	Bit Value	Current(mA)	Bit Value	Temperature(C°)	Bit Value
0.0	5	0.0	5	200	2930
0.4	1297	0.4	323	190	2878
0.8	2589	0.8	642	180	2800
1.2	3881	1.2	959	170	2721
1.6	5173	1.6	1276	160	2698
2.0	6464	2.0	1595	150	2619
2.4	7756	2.4	1912	140	2560
2.8	9042	2.8	2230	130	2467
3.2	10340	3.2	2548	120	2421
3.6	11632	3.6	2866	110	2363
4.0	12924	4.0	3183	100	2290
4.4	14216	4.4	3502	95	2271
4.8	15508	4.8	3820	90	2231
5.2	16801	5.2	4137	85	2199
5.6	18092	5.6	4455	80	2154
6.0	19384	6.0	4772	75	2139
6.4	20676	6.4	5091	70	2112
6.8	22000	6.8	5408	65	2078
7.2	23260	7.2	5726	60	2044
7.6	24554	7.6	6045	55	2007
8.0	25843	8.0	6362	50	1974
8.4	27135	8.4	6680	45	1934
8.8	28426	8.8	6998	40	1881
9.2	29718	9.2	7315	35	1859
9.6	31010	9.6	7634	30	1835
10.0	32302	10.0	7952	25	1813
		10.4	8270	20	1774
		10.8	8587	15	1753
		11.2	8906	10	1717

		11.6	9223	5	1682
		12.0	9540	0	1635
		12.4	9859	-5	1608
		12.8	10176	-10	1587
		13.2	10495	-15	1557
		13.6	10813	-20	1514
		14.0	11131	-25	1477
		14.4	11450	-30	1445
		14.8	11768	-35	1418
		15.2	12086	-40	1387
		15.6	12404	-45	1329
		16.0	12722	-50	1311
		16.4	13040	-60	1247
		16.8	13359	-70	1161
		17.2	13677	-80	1105
		17.6	13995	-90	1060
		18.0	14314	-100	991
		18.4	14633	-110	905
		18.8	14951	-120	848
		19.2	15269	-130	790
		19.6	15588	-140	741
		20.0	15906	-150	633
				-160	568
				-170	492
				-180	436
				-190	372
				-200	295

## 6. Setting Utility Menu

The main menus of Network Setup are as follows:

Menu	Default	Description
IP Type choice	Static IP	Select the IP type to set for the device. Static IP is a fixed IP, and DHCP is an automatic IP mode which is assigned by the AP.
Device Name	BASSO-IOWiFi	Set the name of the device.
Device IP Address	192.168.0.223	Sets the Static IP address of the equipment. (If Connection Type is Static IP, enter the IP address directly. If it is DHCP, it is unchangeable and you can verify the IP address once assigned by the AP)
Subnet mask	255.255.255.0	Sets the subnet mask address of the equipment. (If the Connection Type is Static IP, enter the subnet mask directly. If it is DHCP, it is not able to change it)
Gateway	192.168.0.254	Set the gateway address of the equipment. (If the Connection Type is Static IP, enter the gateway address directly. If it is DHCP, it is not able to change it)
DNS	168.126.63.1	Set the IP address of the server that provides the Domain Name Service(DNS).
Security	open	Set the encryption mode. <b>open</b> Disable encryption. <b>WEP</b> An encryption method using RC4 algorithm which uses 40bit(5Byte) and 104bit(13Byte) keys. <b>WPA-PSK</b> It uses TKIP algorithm by default, but CCMP algorithm is also available. A key longer than 8Byte is required. <b>WPA2-PSK</b> It uses AES algorithm and a key longer than 8Byte is required. <b>WPA-Enterprise</b> An encryption mode that blocks access from unauthorized devices and allows only authorized devices to access the network. It uses EAP(Extensible Authentication Protocol). <b>WPA2-Enterprise</b> WPA-Enterprise basically supports CCMP instead of TKIP. In Infrastructure mode, it is displayed as shaded because it connects with the information of the AP to connect to.

		In Soft-AP mode, open, WPA-PSK, and WPA2-PSK encryption modes are selectable.
Security Key	-	Enter the password for the AP to connect to.
Connection Type	Infrastructure	<p>Set up the connection method of ioWiFi.</p> <p><b>Infrastructure</b> The mode in which an intermediate AP performs the connection between ioWiFi and data is sent/received. The AP Scan button menu appears when you select this type.</p> <p><b>Soft AP</b> The mode in which ioWiFi performs AP functions. Computer or other ioWiFi is connected to the ioWiFi operating in Soft-AP mode and perform communication without AP. At this time, please select Static IP for the IP setting of the ioWiFi that you want to connect to and use it as a fixed IP in the same band. When using Soft-AP, we recommend you to change the Device Name so that you can easily find the default Device Name “ioWiFi” with the AP.</p>
Target AP Name(SSID)	-	<p>Specify the destination AP name to connect to.</p> <p>The AP name is automatically displayed when the AP is selected with the [AP Scan] button.</p>
Target AP MAC Address	-	<p>Specify the destination AP MAC address to connect to.</p> <p>The AP name is automatically displayed when the AP is selected with the [AP Scan] button.</p>
Country	KR	<p>Indicate the country code of the ioWiFi.</p> <p>Channel values may vary by country.</p>
Mode	802.11 a/b/g/n	<p>Set the 802.11 protocol(a/b/g/n).</p> <p><b>802.11 a</b> 5GHz band It uses OFDM technology and supports transmission speed up to 54Mbps. Due to the characteristic of signal, it is easily affected by the surrounding environment such as obstacles or city buildings.</p> <p><b>802.11 b</b> 2.4GHz band The maximum transmission speed is 11Mbps, but in practice 6-7Mbps during implementation of CSMA/CA technology.</p> <p><b>802.11 g</b> 2.4GHz band The transmission speed is the same as the 802.11 a, but it uses 2.4GHz band frequency. It is now widely used because it is easily</p>

		<p>compatible with the popular 802.11 b.</p> <p><b>802.11 n</b> 2.4GHz band It uses 2.4 GHz band and supports speeds up to 600Mbps.</p>
Channel	Auto(2.4G)	<p>Set up a channel of ioWiFi.</p> <p>In Korea, the 2.4GHz band can set channels from 1 to 13CH(2.412~2.472GHz), and 5GHZ band from 36 to 165CH(5.180~5.720GHz).</p> <p>Among these channels, from 52 to 144(5.250~5.720GHz) channels are designated as DFS(Dynamic Frequency Selection) channels under Korean Radio Wave Act and are not supported in the Soft AP mode of this product.</p>
Roaming	0	<p>Enables/disables the automatic Roaming feature.</p> <p>If 0, it is disabled.</p> <p>If you assign an RSSI value between -100 and -1dbm, automatic Roaming is performed if sensitivity is lower than that RSSI.</p>
Algorithm	TKIP	<p>Encryption algorithm</p> <p><b>TKIP(Temporal key Integrity Protocol)</b> The default encryption algorithm used in WPA.</p> <p><b>CCMP(AES) (Counter Cipher Mode with block chaining message authentication code Protocol)</b> Advanced AES(Advanced Encryption Standard) based encryption algorithm with enhanced security.</p>
EAP type	-	<p><b>TLS</b> TLS is the IETF public standard defined in RFC5216. It is considered as the safest of the EAP standards and is commonly used. Certificates are required for both Server and Client sides.</p> <p><b>TTLS</b> TTLS secures TLS, to perform mutual authentication of the Client and the network over encrypted channels on the Server. TTLS only requires certificate from the Server side.</p> <p><b>PEAP</b> Use tunneling between the authentication Server and the PEAP Client to transfer authentication data. Only server-side certificate is required as same as TTLS. <b>This setting is displayed when Security is Enterprise.</b></p>
EAP ID	-	<p>EADP Authentication ID</p> <p><b>This setting is displayed when Security is Enterprise.</b></p>
EAP PW	-	<p>EADP Authentication Password</p> <p><b>This setting is displayed when Security is Enterprise.</b></p>

EAP Anonymous ID	-	EAP Anonymous ID <b>This setting is displayed when Security is Enterprise.</b>
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The main menus of Communication Setup are as follows:

Menu	Default	Description
Modbus Slave ID	1	Set the Modbus Slave ID.
RS485 BaudRate	9600	Set the communication speed of the RS485 serial port. ("300", "600", "1200", "2400", "4800", "9600", "14400", "19200", "28800", "38400", "57600", "115200", "230400", "460800", "921600")
RS485 Parity	None	Sets the RS485 parity checking method(None, Odd, Even).
Operation Mode	COM Redirect	<p>Set the operation protocol.</p> <p><b>COM Redirect</b> Enables a PC in a Windows environment to use communication over Ethernet through a virtual COM Port(VCP).</p> <p><b>TCP Server</b> ioWiFi acts as a TCP Server and waits for connection from Clients on the network. The socket number waiting for a connection is set at [Local Port] and data can be sent and received when the socket connection is complete.</p> <p><b>TCP Client</b> When a particular server on the network waits for a connection, ioWiFi acts as a client of socket and attempts to connect with the IP address and socket number of the Server which is set. Data can be sent and received when the socket connection is complete. The IP and port number of the Server to request access to are set at [Target IP/Target Port].</p> <p><b>UDP</b> ioWiFi communicates with UDP. The socket number to open is set at [Local Port]. The IP address and port number of the destination are set at [Target IP/Target Port].</p> <p><b>Modbus TCP</b> ioWiFi acts as a Modbus TCP Server(Modbus Slave) and waits for connection from the Client(Modbus Master) on the network. The socket number waiting for a connection is set at [Local Port] and data can be sent and received when the socket connection is complete.</p> <p>We recommend using Static IP rather than DHCP for COM Redirector, TCP Server, UDP and Modbus TCP.</p>

Protocol	Raw Data	Set the protocol to be used by COM Redirector.
Local Port	4001	Specify the number assigned to the port. Use this port to wait for network connection in TCP Server and UDP mode.
Target IP Address	0.0.0.0	Specify the IP address of the destination to connect to in TCP Client mode.
Target Port	4001	Specify the port of the destination to connect to in TCP Client mode.
KeepAlive	60	After TCP socket connection is complete, it checks the network status at the set number of seconds to terminate or reset the socket connection if a network abnormality is determined. This feature is not used when set to 0. Keep Alive is applied when used as TCP Server, Client.

The main menus of IO Setup are as follows:

Menu	Default	Description
DI Mode	IO	You can change the type of each IO port by channel. <b>IO</b> Run the channel in IO mode. For DI ports, it operates in Input mode. <b>Counter</b> Fun the channel in Counter mode.
DI Sync Interval	0	Set how often the current status value of the DI port is Sync-reported. You can set it from 1 to 255 second/minute/hour/day, and if set to 0, it will be disabled(will not be Sync-reported).
DI Sync Trans Condition	NoUSE	Set the transmission condition according to the status change of the DI port. NoUSE: Disabled USE: Sync-report when status changes
DI Value	0	If each channel is DI Counter, you can check the Counter value of the port or reset it to zero.
DO Mode	IO	You can change the type of each IO port by channel. <b>IO</b> Run the channel in IO mode. For DO ports, it operates in Output mode. <b>PWM</b> Run the channel in PWM mode.
DO Init Status	OFF	Set the initial state of the DO port at the time of system start. ON: Initialize to OFF when system starts

		OFF: Initialize to ON when system starts
DO Sync Interval	0	Set how often the current status value of the DO port is Sync-reported. You can set it from 1 to 255 second/minute/hour/day, and if set to 0, it will be disabled(will not be Sync-reported).
DO Sync Trans Condition	NoUSE	Set the transmission condition according to the status change of the DO port. NoUSE: Disabled USE: Sync-report when status changes
DO PWM HIGH Time	0	If each channel is DO PWM, you can set the HIGH Time.
DO PWM LOW Time	0	If each channel is DO PWM, you can set the LOW Time.
AI Sampling Count	3	Set the number of AI sampling. You can set the value from 1 to 10.
AI Filtering Min	0	Set the AI noise filtering sub-value. Values below the set value are ignored.
AI Filtering Max	65535	Set the AI noise filtering parent value. Any value above the set value is ignored.
AI Sync Interval	0	Set how often the current status value of the AI port is Sync-reported. You can set it from 1 to 255 second/minute/hour/day, and if set to 0, it will be disabled(will not be Sync-reported).
AI Sync Trans Condition	NoUSE	Set the transmission condition according to the status change of the AI port. NoUSE: Disabled USE: Sync-report when status changes
RTD Sampling Count	3	Set the number of RTD sampling. You can set the value from 1 to 10.
RTD Filtering Min	0	Set the RTD noise filtering sub-value. Values below the set value are ignored.
RTD Filtering Max	65535	Set the RTD noise filtering parent value. Any value above the set value is ignored.
RTD Sync Interval	0	Set how often the current status value of the RTD port is Sync-reported. You can set it from 1 to 255 second/minute/hour/day, and if set to 0, it will be disabled(will not be Sync-reported).
RTD Sync Trans Condition	NoUSE	Set the transmission condition according to the status change of the RTD port. NoUSE: Disabled USE: Sync-report when status changes

RO Init Status	OFF	Set the initial state of the RO port at the time of system start. ON: Initialize to OFF when system starts OFF: Initialize to ON when system starts
RO Sync Interval	0	Set how often the current status value of the RO port is Sync-reported. You can set it from 1 to 255 second/minute/hour/day, and if set to 0, it will be disabled(will not be Sync-reported).
RO Sync Trans Condition	NoUSE	Set the transmission condition according to the status change of the RO port. NoUSE: Disabled USE: Sync-report when status changes

## 7. Certification

- KC

Number: R-R-STB-BASSO1070TW

## 8. Certification

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