ICP DAS CO., LTD.

UA-5200 Series User Manual

IIoT Communication Server

Microsoft Azure Certified

Microsoft Azure Certified

UA-5231

UA-5231M

UA-5231M-3GWA
UA-5231M-4GE
UA-5231M-4GC

www.icpdas.com

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R&D Dept., ICP DAS CO., LTD.
Latest edited by: Eva Li; V4.3, 07/2018

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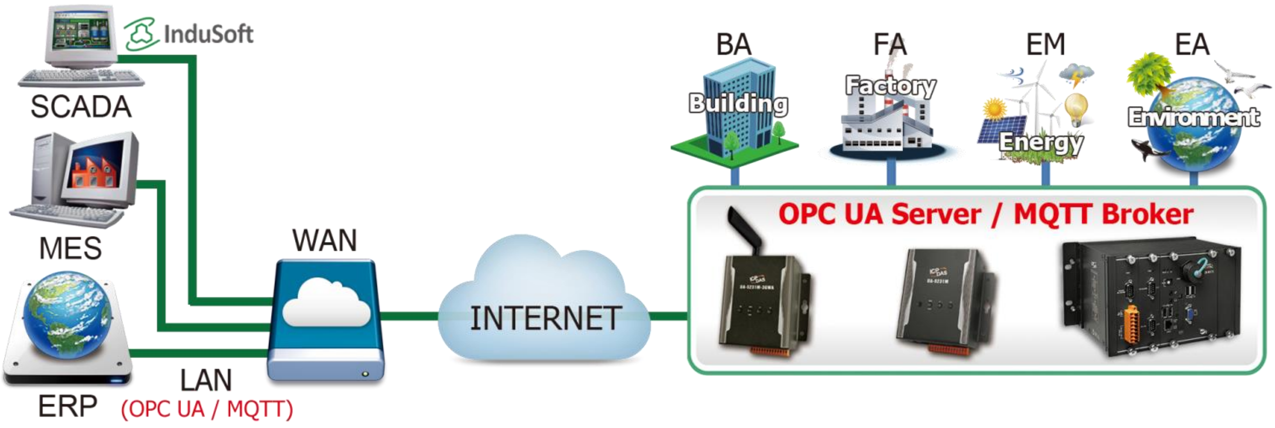
1. UA-5200 IIoT Communication Server

This chapter introduces the UA-5200 and its functions, software/hardware specifications...

1.1. Introduction

The **UA-5200** series is an IIoT communication server. It has built-in **OPC UA server**, **MQTT broker** and **client driver** to meet the need to connect to the MES, ERP, SCADA and cloud service. And with the Ethernet, RS-232, RS-485 interfaces and Modbus TCP/RTU/ASCII protocol, the UA-5200 series can access regular remote I/O modules or controllers that already widely used in the factory. With the UA-5200 series, it becomes very easy to make things used in the factory to connect to MES, ERP, SCADA and cloud.

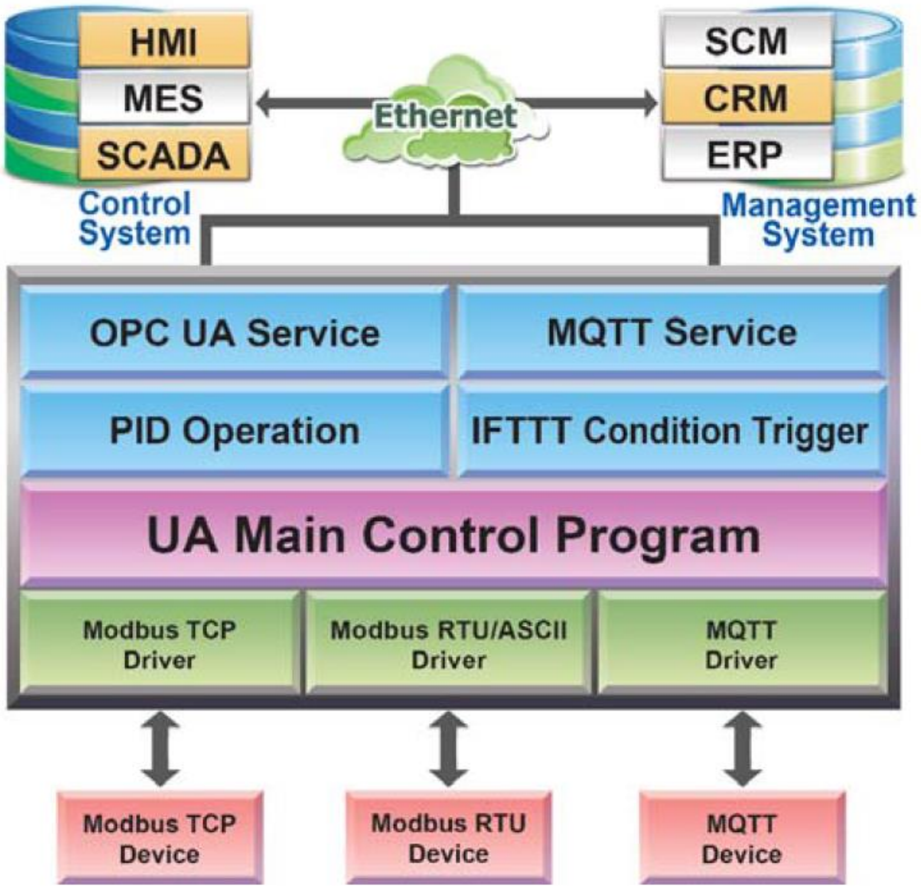


Applying the **OPC UA**, the UA-5200 can integrate the I/O products and the third-party devices, import their data to the back-end SCADA management system or the big-data analysis/decision system, to satisfy the reliability, interoperability and security needs of the Industrial 4.0 automation system. Using the **MQTT** active communications to bridge the Internet of Things (IoT) and transmit the statuses of various devices by the cloud-based interaction so that to meet the current trend of the IIoT and achieve the full smart automation system based on **Industry 4.0**.

1.2. Features

- OPC UA Server Service
- MQTT Client Service
- MQTT Broker Inside
- ARM CPU, 1.0 GHz
- 512 MB RAM and 512 MB Flash
- Linux kernel 3.2.14 OS
- Real-Time Capability
- 64-bit Hardware Serial Number for Software Protection
- Support Redundancy (OPC UA)
- Support PID Logic Control
- 10/100/1000 Mbit/s Ethernet Port
- 4 Serial Ports (RS-232/RS-485)
- Operating Temperature: -25 ~ +75°C

1.3. Functions



- **Built-in OPC UA Server Service**

  The built-in OPC UA Server Service is compliable with IEC 62541 Standard and provides functions of Redundancy, Transmission Security Encryption, Active Transmission, Error Detection, Communication Failure Recovery, etc. to connect SCADA or OPC UA Clients. Allowed up to 8000 OPC UA tags and up to 20 sessions for the OPC UA Client connection.

- **Built-in MQTT Broker Service**

  MQTT Broker inside and compliable with MQTT V.3.1.1 protocol. It provides functions of IoT Active M2M Transmission, QoS Quality Service, Retain Mechanism, Identity Verification, Encryption, Will, MQTT Client Drivers, etc. The Broker can connect up to 400 MQTT Clients.

Support IFTTT Logic Control and APP Message Notification

UA can combine the IFTTT cloud platform functions and send messages over 460 Web APPs (such as Line, Facebook, Twitter, etc.) when the special events occur. The device I/O change can be set to trigger the event of the IFTTT cloud service, and the IFTTT logic control (If This, Then That) will immediately let the pre-set Web Service (Such as LINE) send a message to one user or group to handle the event immediately.

Support IoT Cloud Platforms Connection

UA can actively connect to Amazon AWS, Microsoft Azure or other IoT platforms to send over the I/O data. The IoTstar Features:

- Based on Public Cloud: Microsoft Azure, IBM Bluemix, Amazon AWS
- Data Analysis and Report by Public Tools
- Remote Management and Maintenance
- Remote Monitoring and Control
- Cloud Big Data

Provide Step Box of Function Wizard for Easy Setup

The Web UI of UA provides a wizard-like Step Box in the Function Wizard area to guide user step by step to complete the project or function. It provides many items for setting the Communication Conversion, Azure Connecting, Function Configuration, PID Operation, Condition Trigger the APP Message Notification, and will be more. It will help users to set projects easily and quickly even for the new users.

Ethernet and Serial Communication Module Supporting

- In the Ethernet communication, the UA supports up to 100 Modbus TCP Slave module connections and up to 200 MQTT module connections.
- In the Serial communication, the UA provides three RS-232/RS-485 Serial ports, each of which can connect up to 32 Modbus RTU/ASCII Slave modules.
- Through the UA Web UI, the user can quickly set up the modules and display the module real-time statuses.

1.4. Specifications

Model	**UA-5231**	**UA-5231M**	**UA-5231M-3GWA**	**UA-5231M-4GE/4GC**
System Software				
OS	Linux Kernel 3.2.14			
Embedded Service	SFTP server, Web server, SSH			
CPU Module				
CPU	ARM CPU, 1.0 GHz			
DDR3 SDRAM	512 MB			
Flash	512 MB			
FRAM	64 KB			
Expansion Flash Memory	microSD socket with one 4 GB microSD card (support up to 32 GB microSDHC card)			
RTC (Real Time Clock)	Provide second, minute, hour, date, day of week, month, year			
64-bit Hardware Serial Number	Yes, for Software Copy Protection			
Dual Watchdog Timers	Yes			
LED Indicators	4 LEDs (Power, Running and 2 user defined LEDs)			
Rotary Switch	Yes (0 ~ 9)			
VGA & Communication Ports				
VGA	1 (Resolution: 640 × 480, 800 × 600, 1024 × 768, 1280 x 720)			
Ethernet	RJ-45 x 1; 10/100/1000 Based-TX (Auto-negotiating, Auto MDI/MDI-X, LED indicators)			
USB 2.0 (host)	1			
Console Port	RS-232 (RxD, TxD and GND); Non-isolated			
ttyO2	RS-485 (Data+, Data-); Non-isolated			
ttyO4	RS-232 (RxD, TxD and GND); Non-isolated			
ttyO5	RS-485 (Data+, Data-); 2500 VDC isolated			
Mechanical				
Dimensions (W x L x H)(mm)	91 x 132 x 52	117 x 126 x 58		
Installation	DIN-Rail Mounting			
Environmental				
Operating	-25 ~ +75°C			

Model	UA-5231	UA-5231M	UA-5231M-3GWA	UA-5231M-4GE/4GC
Temperature				
Storage Temperature	-40 ~ +80°C			
Ambient Relative Humidity	10 ~ 90% RH (non-condensing)			
Power				
Input Range	+12 ~ +48 VDC			
Consumption	4.8 W		6.5 W	
Wireless Communication **(Only For UA-5231M-3GWA / UA-5231M-4GE / UA-5231M-4GC)**				
GSM System	GSM: 850/900/1800/1900 MHz; GPRS class 12/10; GPRS station class B			
3G System	3GWA: WCDMA 850/900/1900/2100 MHz 4GE : WCDMA 850/900/2100 MHz 4GC : WCDMA 900/2100 MHz; TD-SCDMA 1900/2100 MHz; CDMA2000 (BC0) 800 MHz			
4G System	4GE : FDD LTE: B1/B3/B5/B7/B8/B20 MHz 4GC : FDD LTE: B1/B3/B8 MHz; TDD LTE: B38/B39/B40/B41 MHz			
Software Specifications: UA-5200Series				
OPC UA				
OPC UA Server	● OPC Unified Architecture: 1.02 ● Core Server Facet ● Data Access Server Facet ● Method Server Facet ● Client Redundancy Facet ● UA-TCP UA-SC UA Binary ● User Token User Name Password & X509 Certificate ● Security Policy ∘None ∘Basic128Rsa15 • Sign • Sign & Encrypt ∘Basic256 • Sign •Sign & Encrypt Recommend to keep the maximum number of sessions within 20 connections.			

Model	**UA-5231**	**UA-5231M**	**UA-5231M-3GWA**	**UA-5231M-4GE/4GC**
Modbus Master				
Modbus TCP	To read or control the devices that support standard Modbus TCP Slave protocol. Recommend to keep the maximum number of devices within 100 connections.			
Modbus RTU/ASCII	A max. of 3 ports: ttyO2, ttyO4, ttyO5 to connect other Modbus RTU Slave devices (e.g. M-7000). Recommend no more than 32 devices per port for better communication quality.			
MQTT				
MQTT Client	Connect the MQTT Broker to read/control the devices supporting the MQTT protocol.			
MQTT Service	Connect the MQTT Broker to externally read/control the devices supporting other protocols that linking with the UA-5200 series.			
MQTT Broker	Compliance with MQTT v3.1.1 protocol. Support MQTT message distribution management. Recommend to keep the connection number of Client within 400.			
Virtual Device				
PID Function	Combine the remote I/O devices for the PID logic control system.			

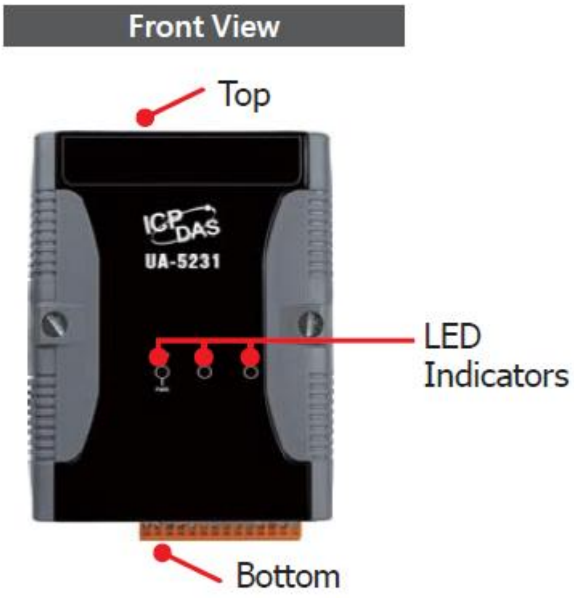
4GE/4GC Frequency Band Descriptions:

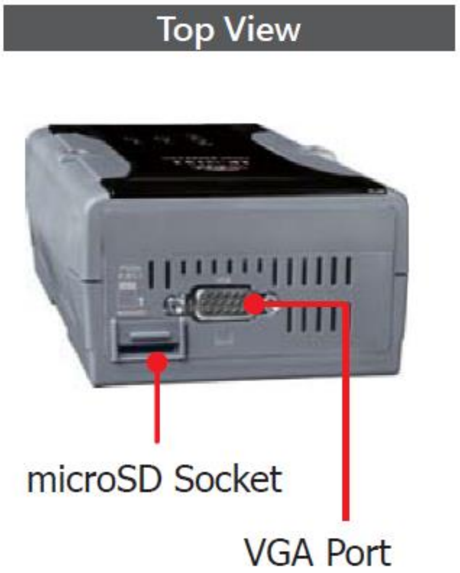
UA-5231M-4GE: Frequency Band for EMEA, Korea, Thailand, India and Taiwan

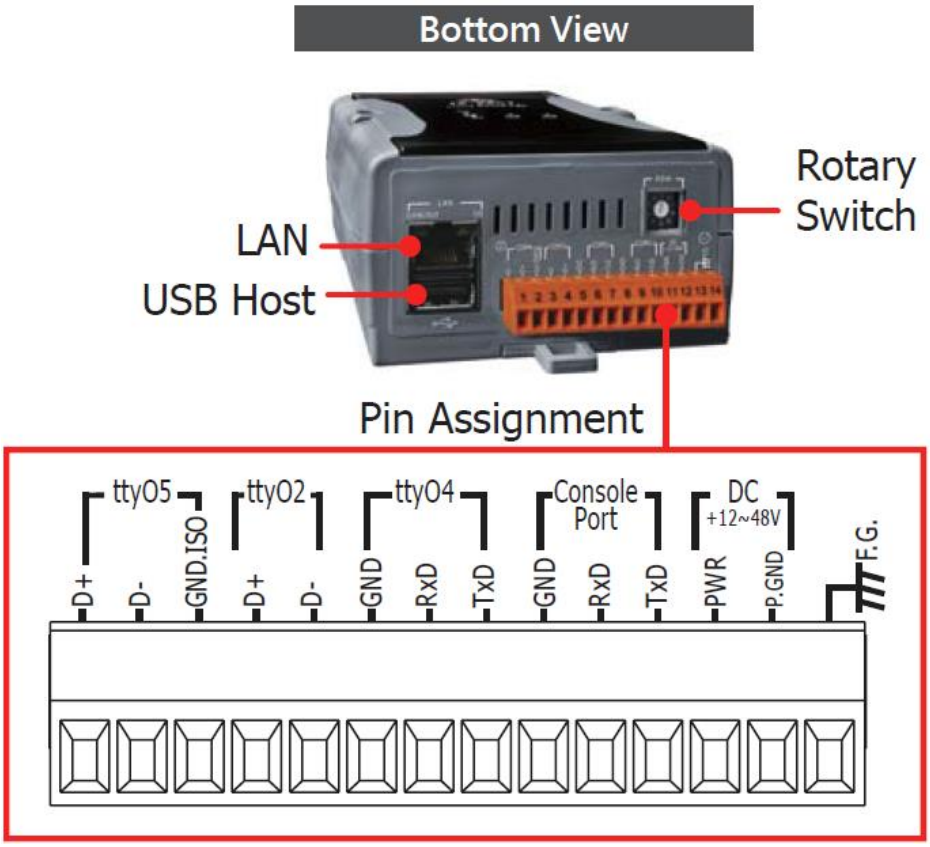
UA-5231M-4GC: Frequency Band for China

1.5. Appearance

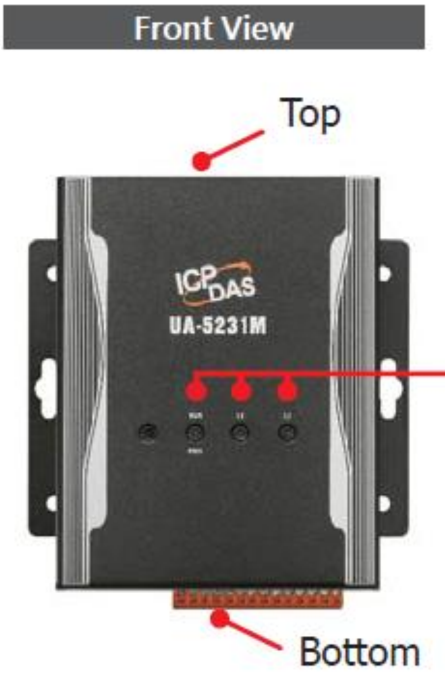
UA-5231

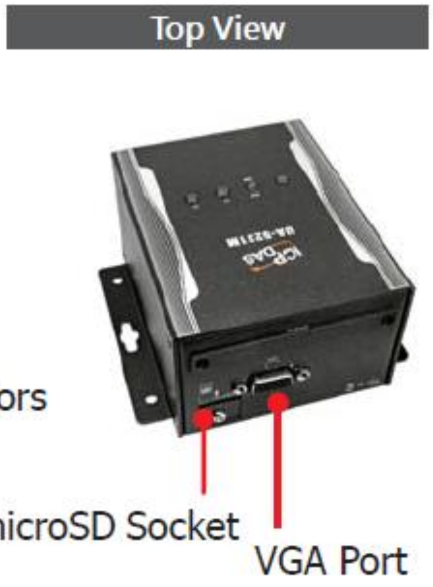


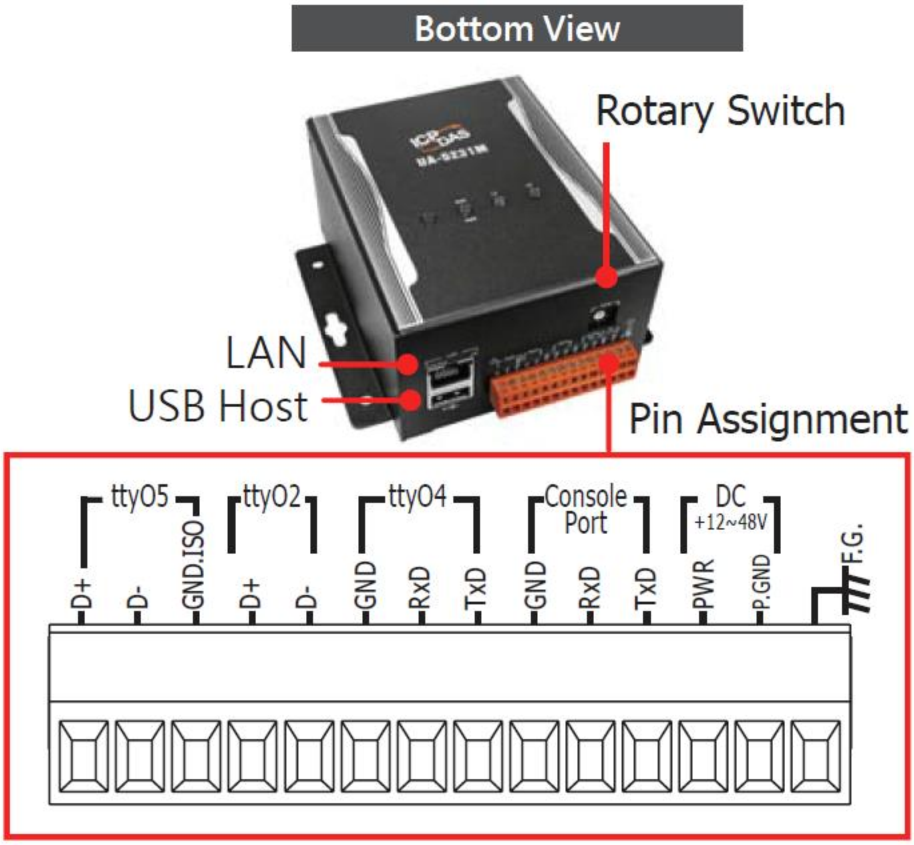




UA-5231M

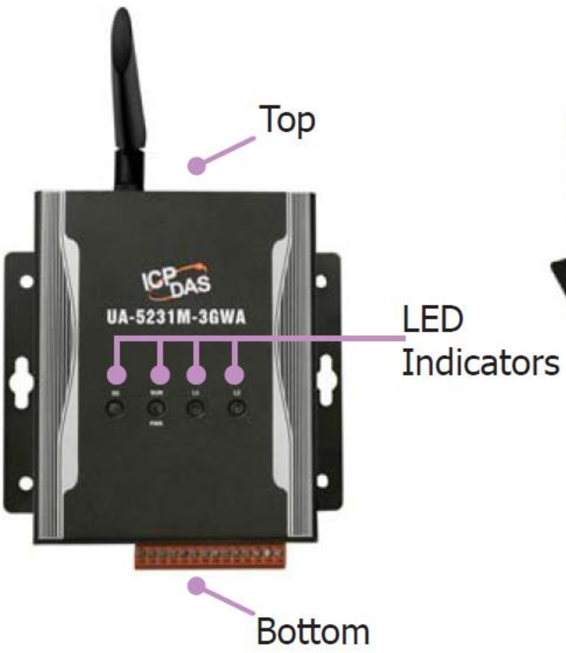

Front View
Top
ICP DAS
UA-5231M
LED Indicators
Bottom


Top View
microSD Socket
VGA Port

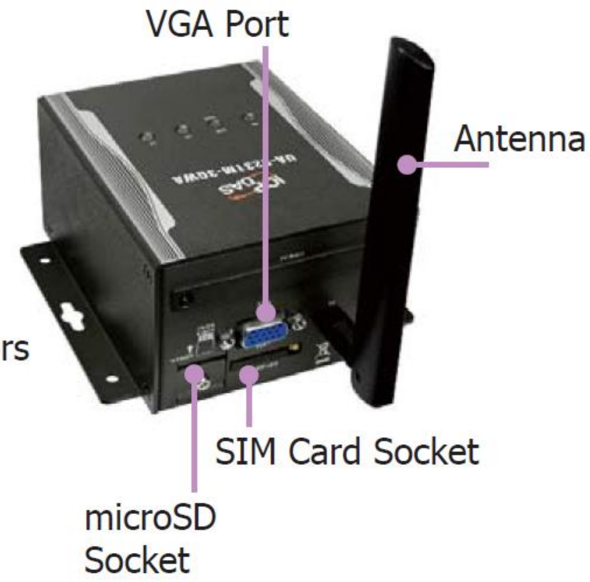

Bottom View
Rotary Switch
LAN
USB Host
Pin Assignment
ttyO5
ttyO2
ttyO4
Console Port
DC +12~48V
D+
D-
GND.ISO
D+
D-
GND
RxD
TxD
GND
RxD
TxD
PWR
P.GND
F.G.

UA-5231M-3GWA / 4GE / 4GC

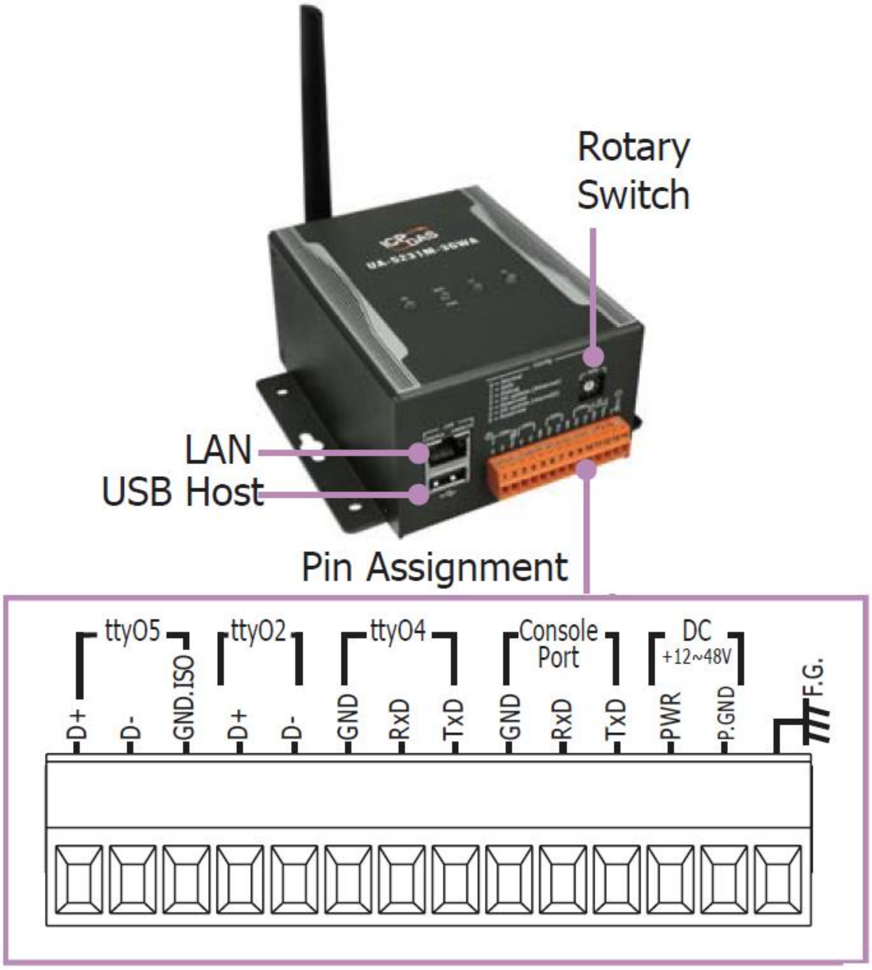
Front View



Top View



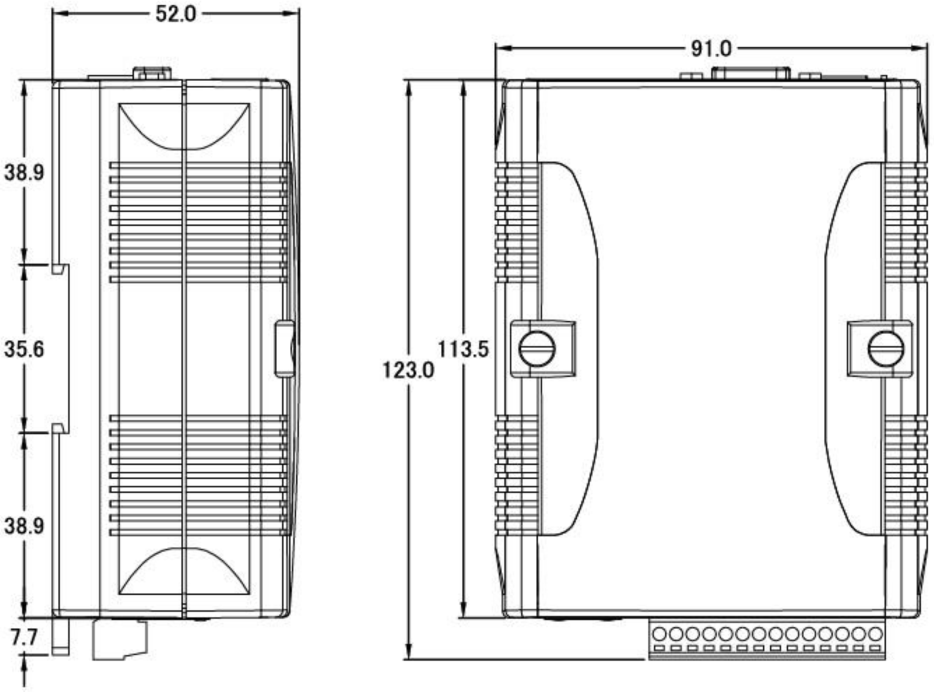
Bottom View



1.6. Dimensions

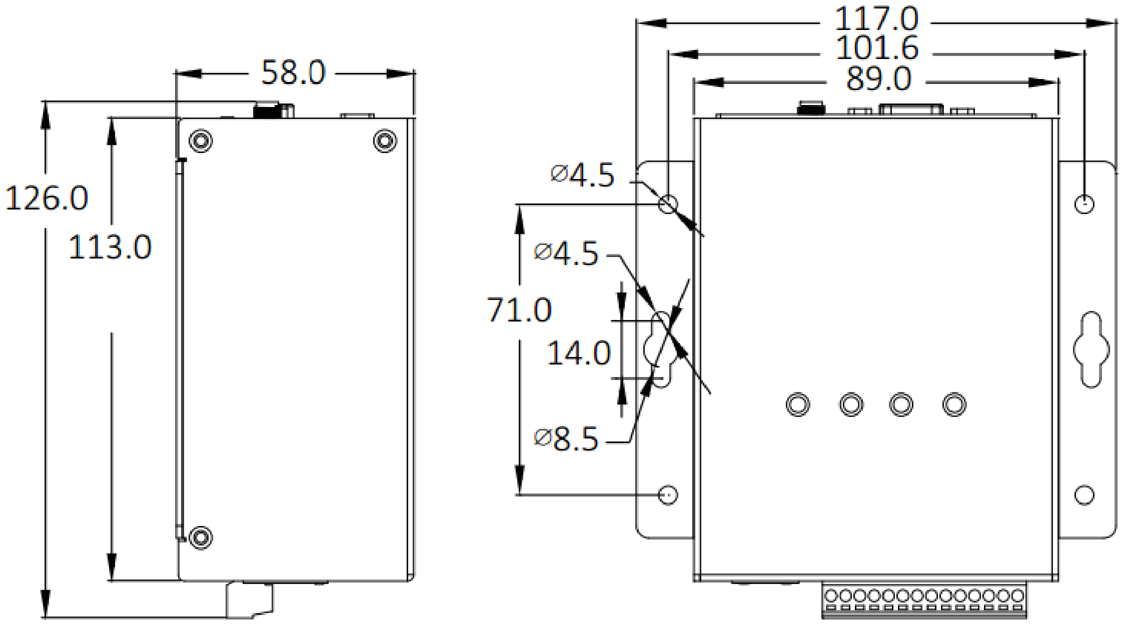
UA-5231

Unit: mm



UA-5231M / UA-5231M-3GWA / UA-5231M-4GE / UA-5231M-4GC

Unit: mm



2. Quick Start

This chapter describes the devices hardware connection, network connection and quick setting for the UA-5200 Controller, and how to connect to the UA controller web-based UI via a browser, set web functions step-by-step, and complete an example project.

2.1. Hardware Connection

This section describes the hardware wiring and connection for the UA-5200 Controller.

2.1.1. Preparations for Devices

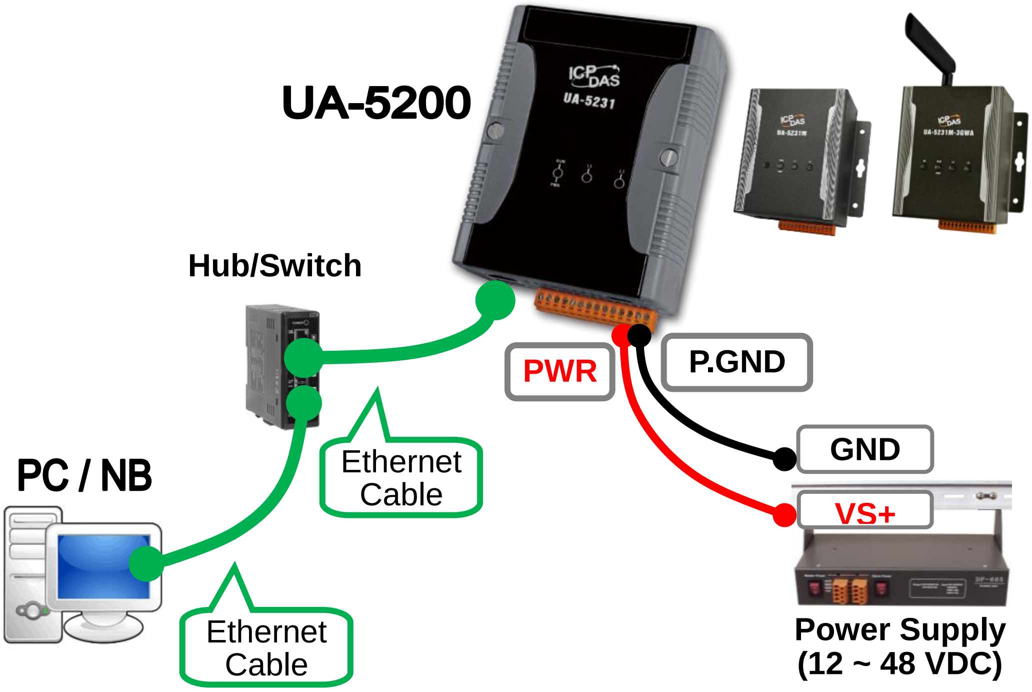
In addition to the UA-5200 series controllers (Ex: UA-5231), please prepare the following:

- Power Supply: +12 ~ +48 VDC (Ex: DP-665)
- 2. Ethernet Hub or Switch (Ex: NS-205)
- 3. PC/NB: Can connect to the network and set the network

2.1.2. Hardware Wiring

Connect the UA-5200 with the RJ-45 Ethernet port to an Ethernet hub/switch and PC. You can also link directly the UA-5200 to PC with an Ethernet cable.

After power is connected, please [wait 1 minute] for UA-5200 start-up procedure. When the "RUN/PWR" light starts flashing, it represents the boot is complete.



2.2. Network Connection

This section introduces how to connect to the UA-5200 Web User Interface (UA Web UI). The new user or setting the new UA controller is recommended to follow the method in the first session. (The same method as the "UA-5200 Quick Start" manual)

2.2.1. Connection by Factory Default Settings

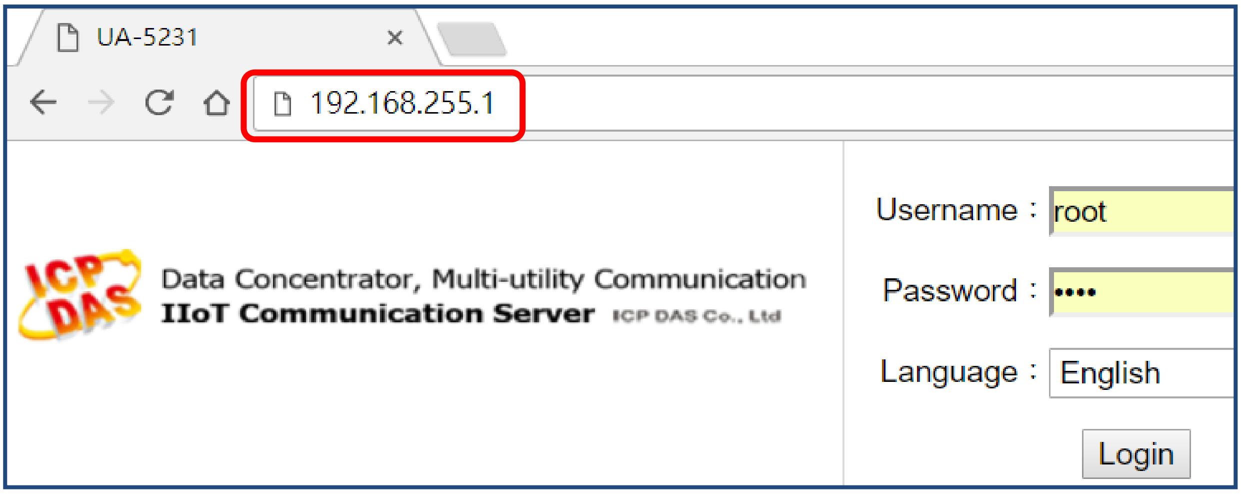
The factory default settings of the UA-5200 are as the following table:

Factory Default Settings of UA-5200			
Network	**IP**	**192.168.255.1**	Assign UA-5200 a new IP setting according to your case.
	Netmask	**255.255.0.0**	
	Gateway	**192.168.1.1**	
OS Account	**Username**	**root**	After login, change your password ASAP. (Refer User Manual)
	Password	**icpdas**	
Web UI Account	**Username**	**root**	
	Password	**root**	

1. Change the PC's IP setting as following. (Write down the PC original network settings before modify.)

IP	192.168.255.10
Subnet mask	255.255.0.0
Gateway address	192.168.1.1

2. Make sure the PC and UA-5200 is connecting through Ethernet. And then open a PC side browser (Ex: Chrome, IE…). Type **http://192.168.255.1** in the URL address. Use default Web UI username/password **root/root** to login the system.

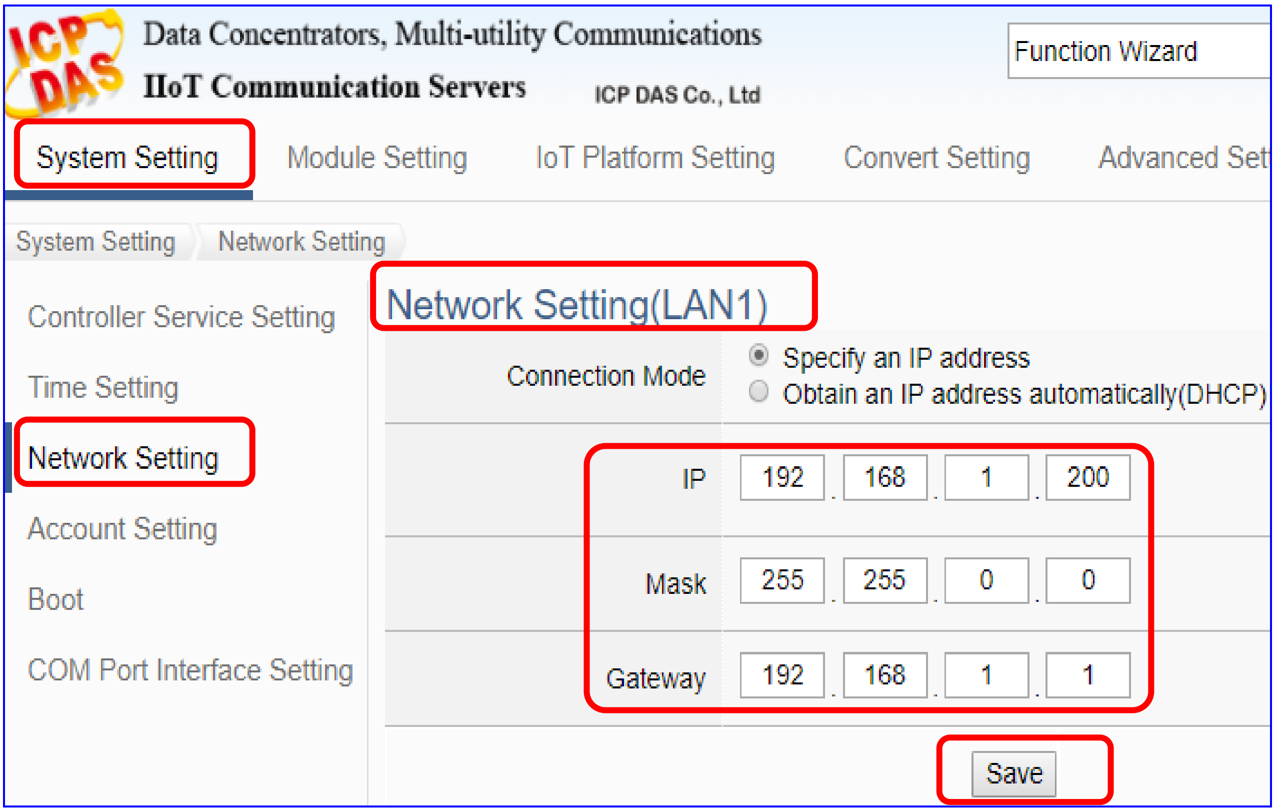

UA-5231
192.168.255.1
ICP DAS
Data Concentrator, Multi-utility Communication
IIoT Communication Server ICP DAS Co., Ltd
Login

Username : root

Password : ••••

Language : English

3. Click【System Setting】➔【Network Setting】➔【Network Setting(LAN1)】to change the IP setting by user network.



Network Setting(LAN1)

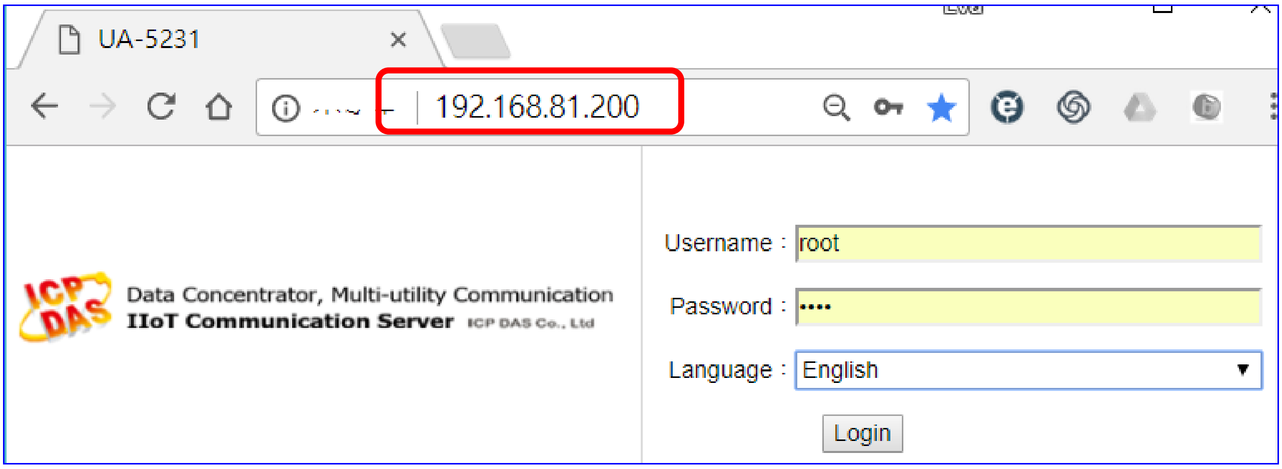
Connection Mode: ● Specify an IP address ○ Obtain an IP address automatically(DHCP)

IP: 192 . 168 . 1 . 200

Mask: 255 . 255 . 0 . 0

Gateway: 192 . 168 . 1 . 1

4. Save the IP setting, restore the PC original IP settings, and type the new IP in the browser as step-2 to login the Web UI of UA-5200. And then configure user’s UA project.


UA-5231
Data Concentrator, Multi-utility Communication
IIoT Communication Server ICP DAS Co., Ltd
Login

192.168.81.200

Username : root

Password : ••••

Language : English

2.2.2. Connection by Utility Searching

The method of using the UA-5200's factory default settings has described in the Section 2.2.1.

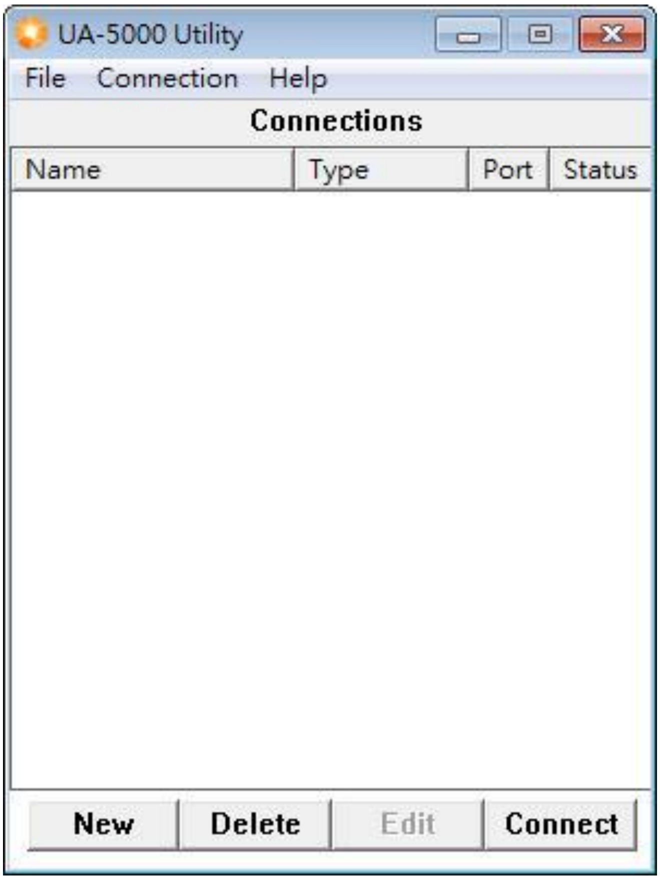
If the UA-5200 has a fixed IP and in the same domain as the PC, users can directly enter the IP in the address bar of a web browser and log in to the Web UI of the UA-5200.

In addition to the above 2 methods, users also can use the UA Utility to search Network. This method is suitable for connecting multiple UA series controllers to the Internet, but the IP addresses of UA-5200 are unknown or need to quickly modify the UA controller.

UA Utility is UA's free tool software to quickly search each UA-5200 controller on the network and connect to the UA-5200's Web UI for setting UA series controller and project.

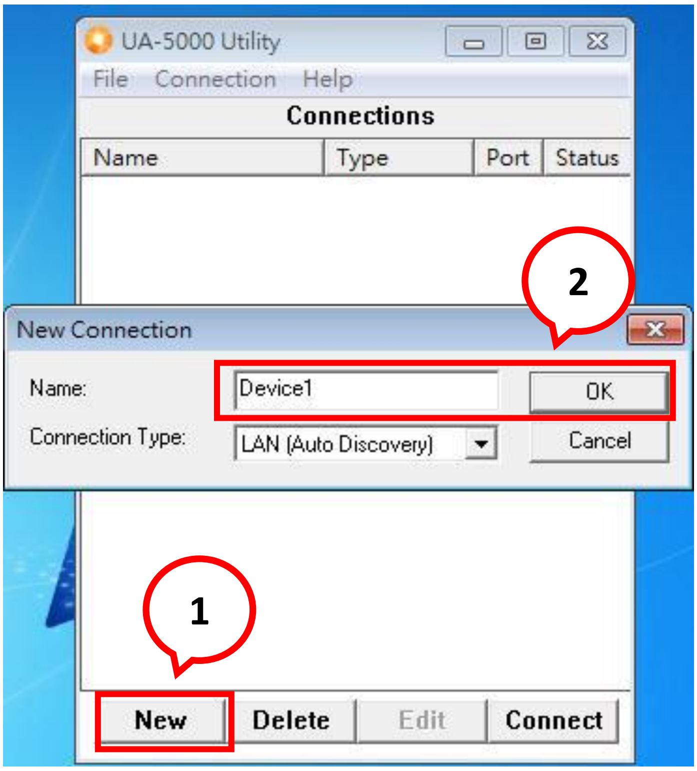
In the PC, install the **UA-5000 Utility** (named "**UA-5000utility.exe**") at the path of the companion CD (i.e., **CD:/UA-5000/Utility/**). Please copy this file to your PC, and then run it to connect the device. Or download the utility program from the website: **http://ftp.icpdas.com.tw/pub/cd/ua-5000/utility/**

1. **Install and execute the Utility**
   Run the UA-5000 Utility (file name: **UA-5000utility.exe**) to install the Utility program.



2. Create a new connection

Click “New” to add a connection item and give a name for it.

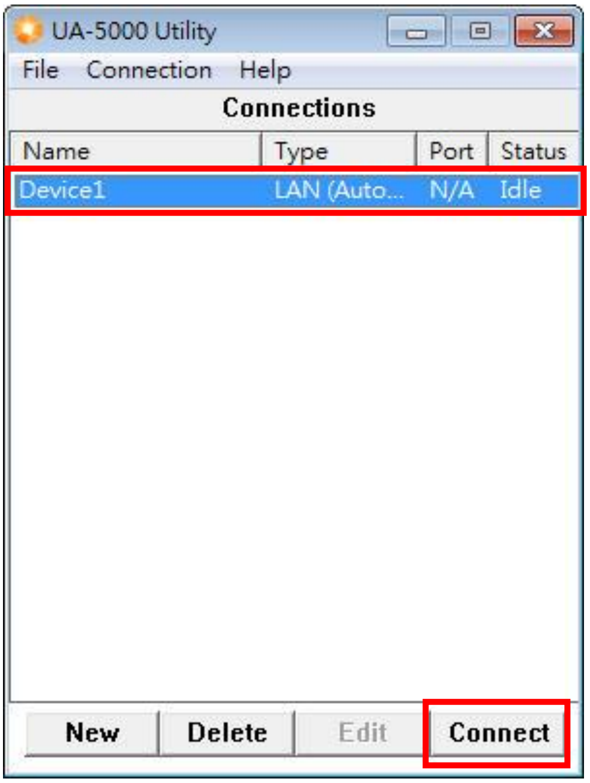


Name: Device1

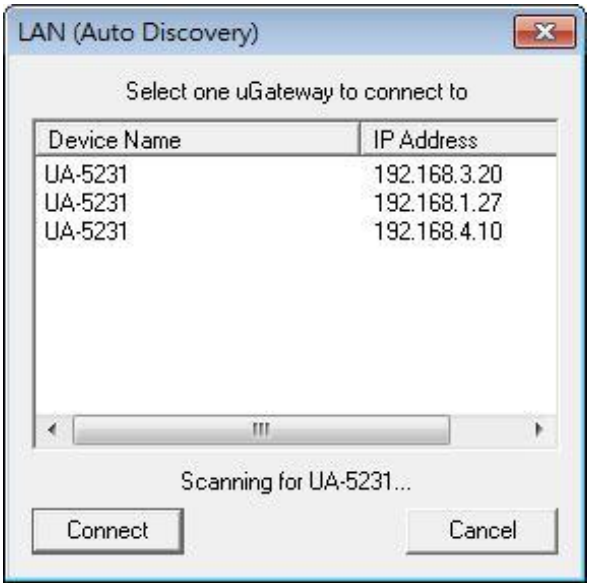
Connection Type: LAN (Auto Discovery)

3. Search the UA-5200 controller

Mouse double-click on the name you created (or single-click and then click the “Connect” button), this utility will scan and list all UA-5200 devices over the network.



Name	Type	Port	Status
Device1	LAN (Auto...	N/A	Idle



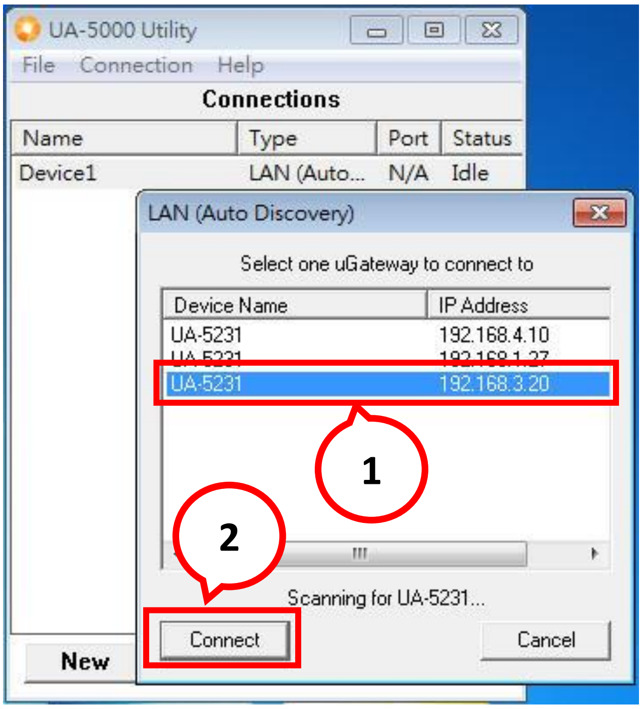
Select one uGateway to connect to

Device Name	IP Address
UA-5231	192.168.3.20
UA-5231	192.168.1.27
UA-5231	192.168.4.10

Scanning for UA-5231...

4. Connect to the UA-5200 controller

Click the device name you want to connect to, and then click the “Connect” button. It will connect to the UA-5200 webpage via the default Web browser (IE/Chrome…).



Connections

Name	Type	Port	Status
Device1	LAN (Auto...	N/A	Idle

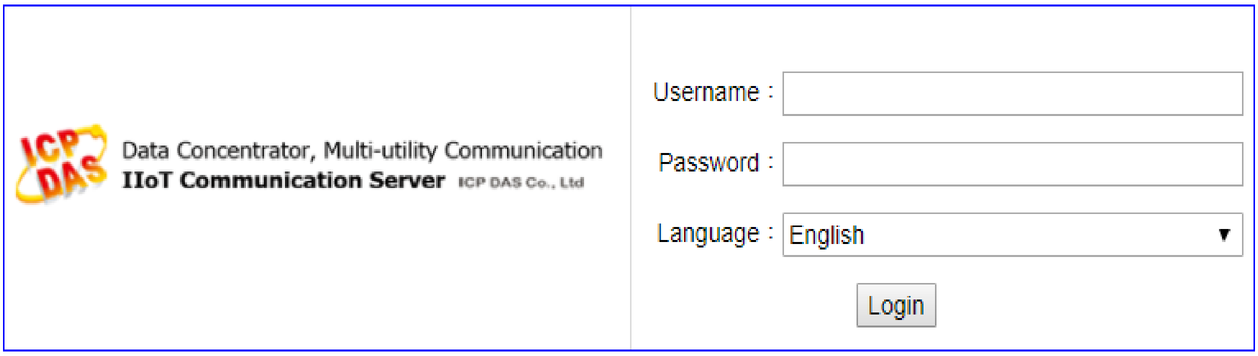
Select one uGateway to connect to

Device Name	IP Address
UA-5231	192.168.4.10
UA-5231	192.168.1.27
UA-5231	192.168.3.20

Scanning for UA-5231...

5. Connect to the UA-5200 controller

The default web browser will be run and direct go to the UA-5200 login web site. Please enter the username and password to login the UA series Web UI. The factory default user name: **root**. The factory default password: **root**.



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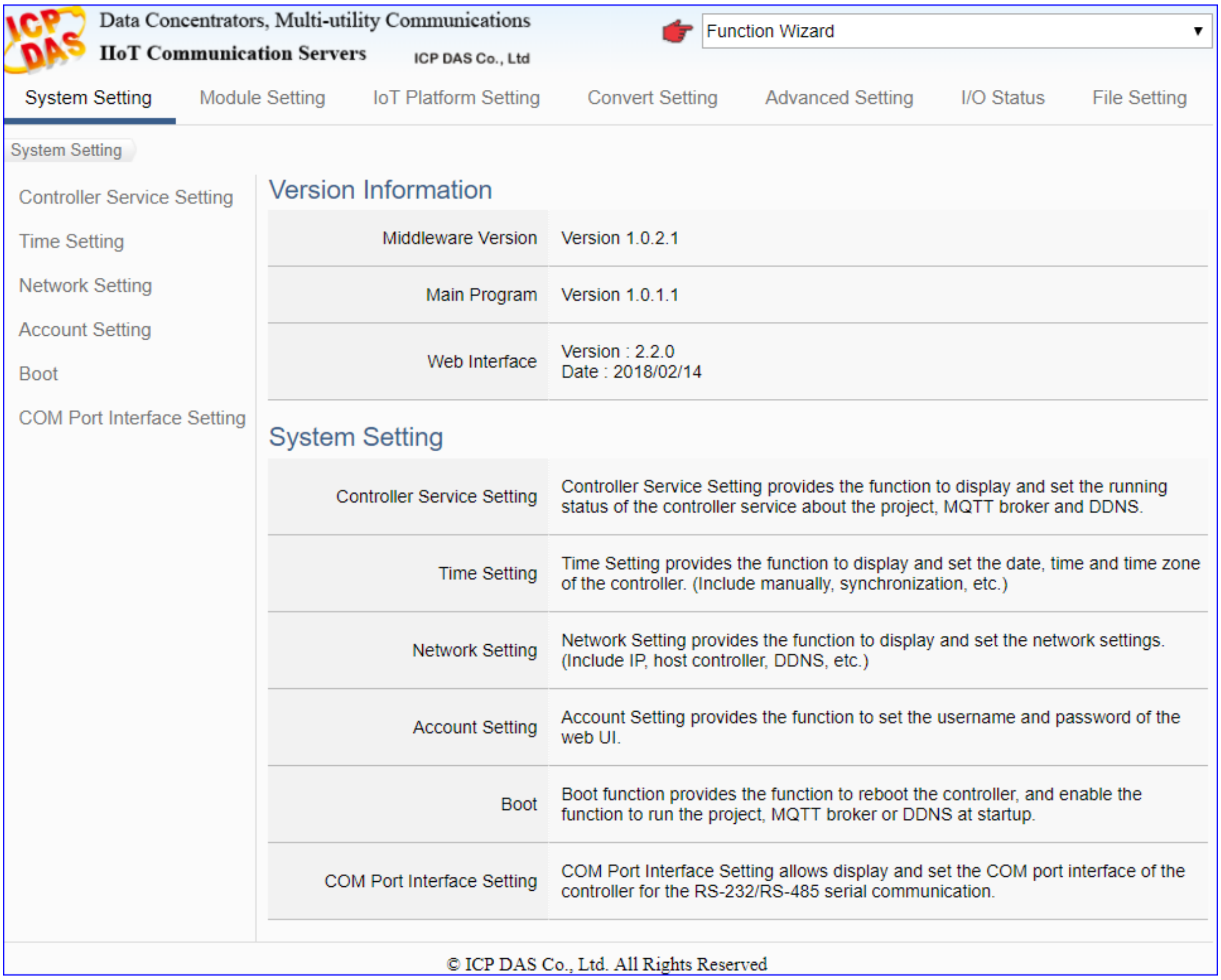
IIoT Communication Server ICP DAS Co., Ltd

Username :
Password :
Language : English

6. Login the Web UI of the UA-5200 controller

When login into the web interface, the UA-5200 default home page (the main configuration screen) will be displayed as below, and will automatically read setting of that UA-5200 to the webpage.



Version Information

Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 2.2.0 Date : 2018/02/14

System Setting

Controller Service Setting	Controller Service Setting provides the function to display and set the running status of the controller service about the project, MQTT broker and DDNS.
Time Setting	Time Setting provides the function to display and set the date, time and time zone of the controller. (Include manually, synchronization, etc.)
Network Setting	Network Setting provides the function to display and set the network settings. (Include IP, host controller, DDNS, etc.)
Account Setting	Account Setting provides the function to set the username and password of the web UI.
Boot	Boot function provides the function to reboot the controller, and enable the function to run the project, MQTT broker or DDNS at startup.
COM Port Interface Setting	COM Port Interface Setting allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

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2.3. Project Setting Example

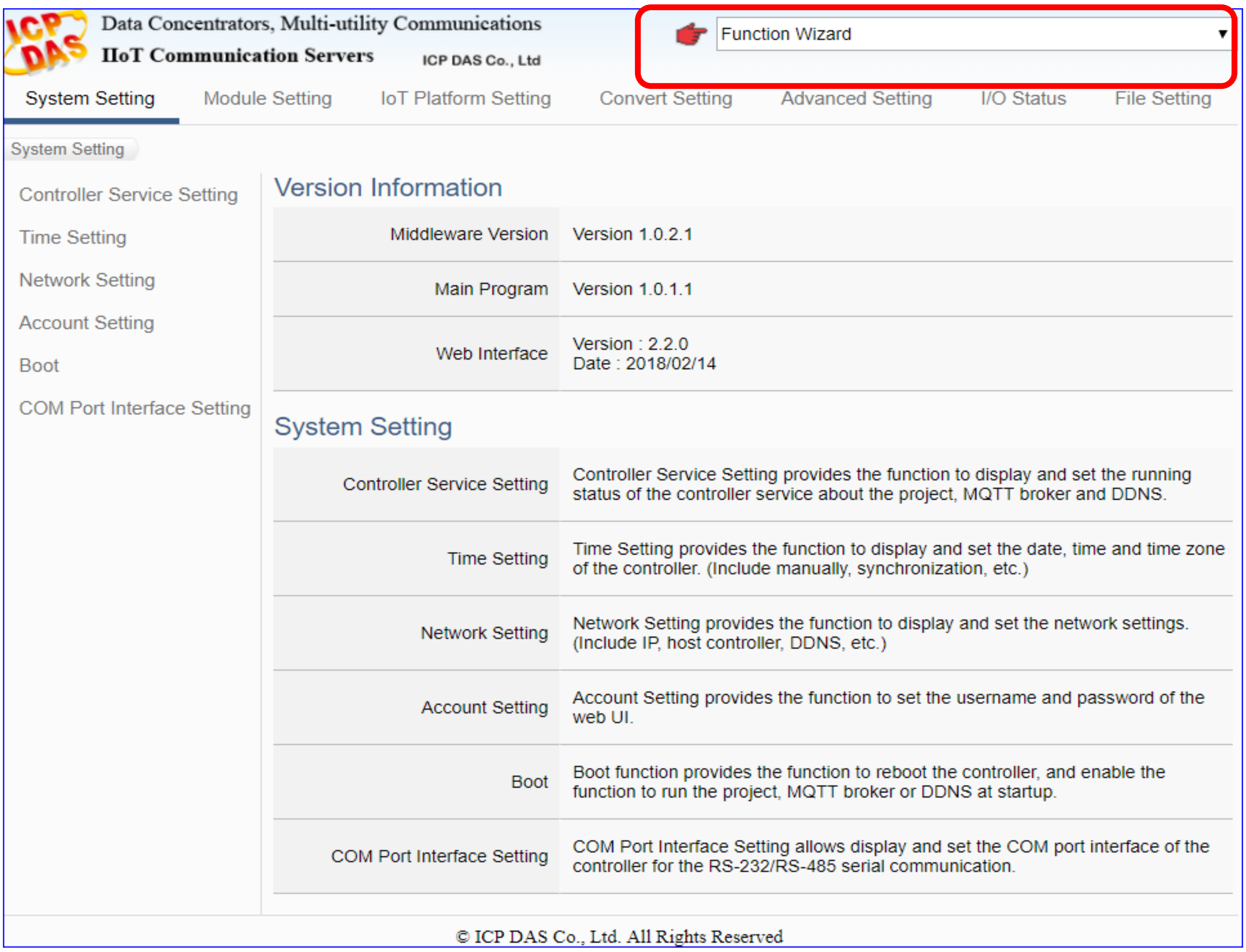
The screen view after login the UA-5200 Web UI (Web User Interface) is as the following picture. Then can start to setup the UA series controller.

If your UA-5200 controller has not connected to the Web UI, please refer to Section 2.1 Hardware Connection and Section 2.2 Network Connection.

This section will introduce a quick setup method to complete a simple project example to allow users to learn about the project setting flow and steps.

The quick setup method is to use the **[Function Wizard]** that at the up-right corner of the Web UI since Version V2.0.0. The Function Wizard provides several items for quick setting the projects or functions step by step like the Wizard guide. The users just follow the “step box” and then can complete the project quickly and well. For more detail information of the Function Wizard, please refer to Chapter 4.

The user can also select the main menu function of the Web UI to setup the project. The complete detail description of the menu functions, please see Chapter 5 ~ Chapter 11.



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IIoT Communication Servers
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Function Wizard

Version Information

Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 2.2.0 Date : 2018/02/14

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COM Port Interface Setting	COM Port Interface Setting allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

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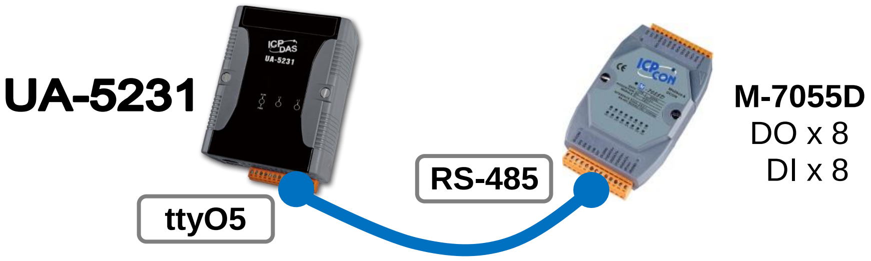
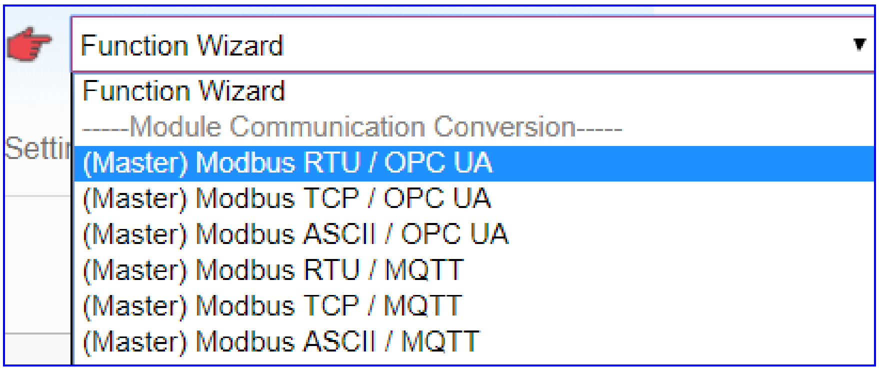
2.3.1. A Quick Setup Project Example

This example will setup a project for OPC UA and Modbus RTU (Master) communication protocol conversion using the Function Wizard. The devices include a UA-5231 controller and an M-7055D module that wired with RS-485 interface to read/write the Modbus RTU I/O data and need the convert setting. The connection is show as the picture below.

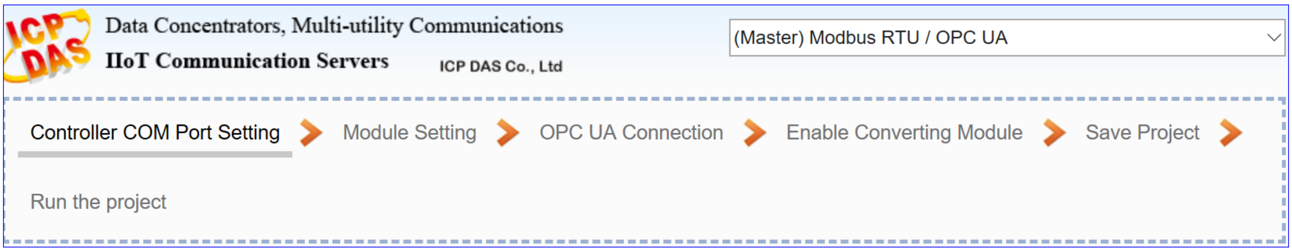


Note:【Function Wizard】at the up-right corner of the Web UI is a quick setup area. The hardware/network connection methods please see the Sec. 2.1 and Sec. 2.2.

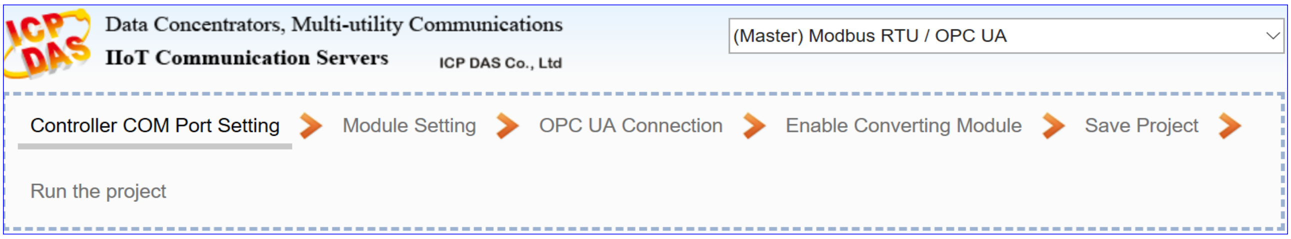
This sample uses the conversion function of the Function Wizard to convert the Modbus RTU / OPC UA, so first click the “**(Master) Modbus RTU / OPC UA”** item of the Function Wizard.


Function Wizard
Settir
Function Wizard
-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
(Master) Modbus RTU / MQTT
(Master) Modbus TCP / MQTT
(Master) Modbus ASCII / MQTT

The Web UI will enable a Wizard guide mode and show a “Step Box” (as below picture). The user just needs to follow the “Step Box” step by step and then can complete the project quickly and correctly.


Data Concentrators, Multi-utility Communications
IIoT Communication Servers
ICP DAS Co., Ltd
(Master) Modbus RTU / OPC UA
Controller COM Port Setting
Module Setting
OPC UA Connection
Enable Converting Module
Save Project
Run the project

After click the【**(Master) Modbus RTU / OPC UA**】, follow the "**Step Box**" to complete the 6 steps: (The step with a bold underline means it is the current step.)


Data Concentrators, Multi-utility Communications
IIoT Communication Servers
ICP DAS Co., Ltd
(Master) Modbus RTU / OPC UA
Controller COM Port Setting
Module Setting
OPC UA Connection
Enable Converting Module
Save Project
Run the project

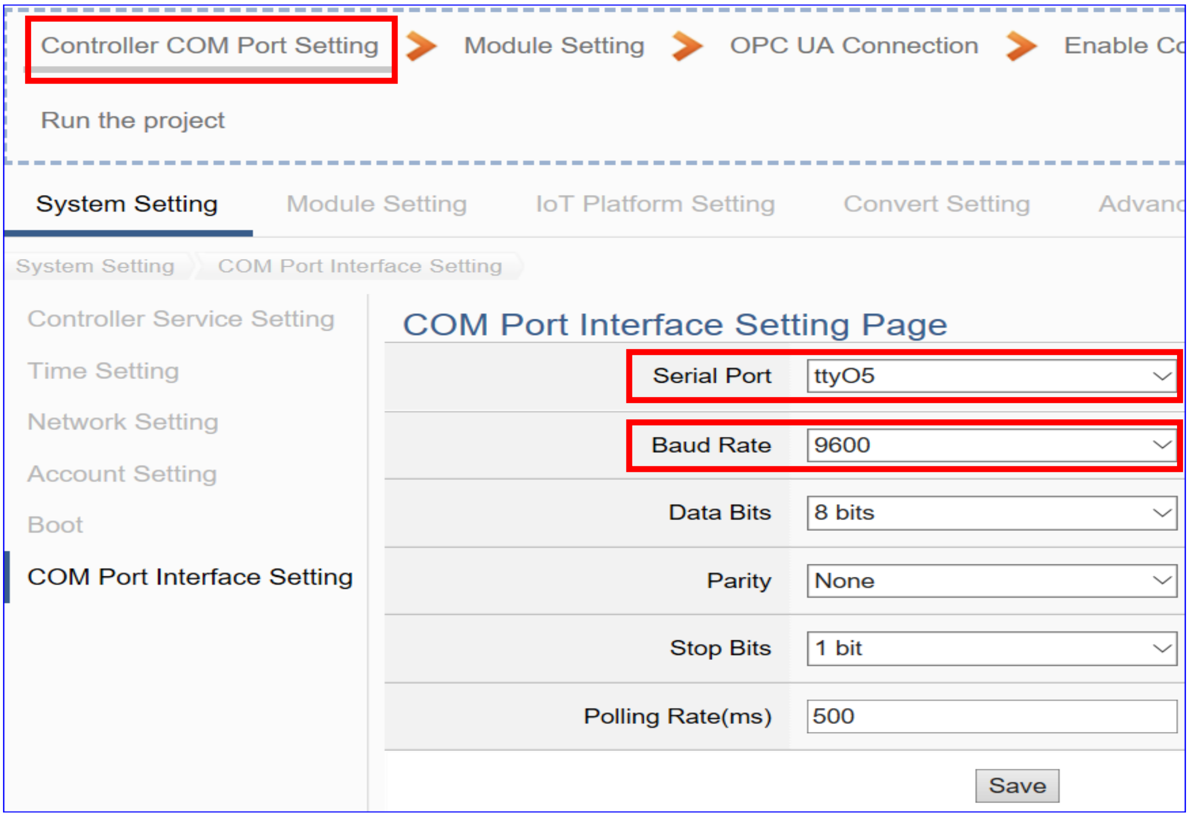
Step 1. Controller COM Port Setting

This step sets up the COM port of the UA series controller to connect with the module and the communication setting.

<This Example>

The UA-5231 uses the ttyO5 port to connect with the M-7055D, so set the **Serial Port: ttyO5**. The M-7055D module default setting is "9600, 8, N, 1", so set **Baud Rate: 9600**, **others need not to change**. After setting, click [Save] button to save the current settings. (The user also can save the whole project until the step 5 of "Save Project".)

Note: If user uses other port to link other module, or the module is not in the default state, please set this step according to your case. The M-7055D default state can be found in the Module CD or the Product Web Site .



COM Port Interface Setting Page

Serial Port	ttyO5
Baud Rate	9600
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Polling Rate(ms)	500

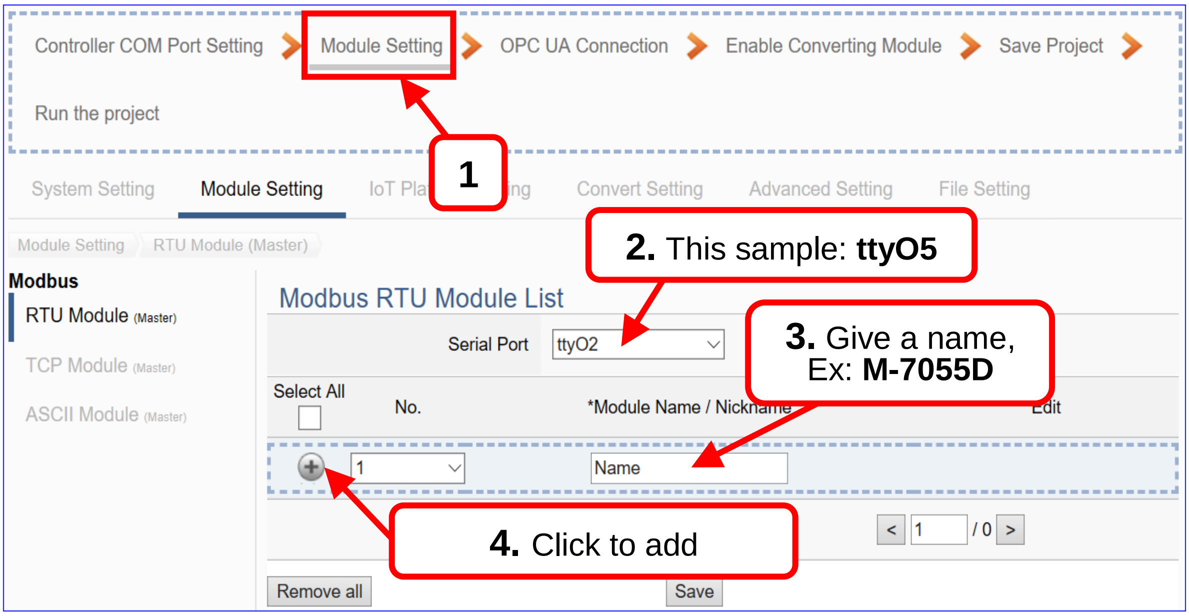
Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting]** of the UI setting.

This step is for setting the connected modules. The user can set each module a name (Default name: Name), click [⊕] button to create a new module, and click [Edit] button to configure the module content setting and Modbus mapping table.

<This Example>

First select the **Serial Port: ttyO5,** give the **Module Name: M-7055D**, and then click the button [⊕] to add a Module List.



Controller COM Port Setting > Module Setting > OPC UA Connection > Enable Converting Module > Save Project > Run the project

System Setting | Module Setting | IoT Platform Setting | Convert Setting | Advanced Setting | File Setting

Module Setting > RTU Module (Master)

Modbus
RTU Module (Master)
TCP Module (Master)
ASCII Module (Master)

Modbus RTU Module List

Serial Port: ttyO2

Select All □	No.	*Module Name / Nickname	Edit
⊕	1	Name	

< 1 / 0 >

Remove all | Save

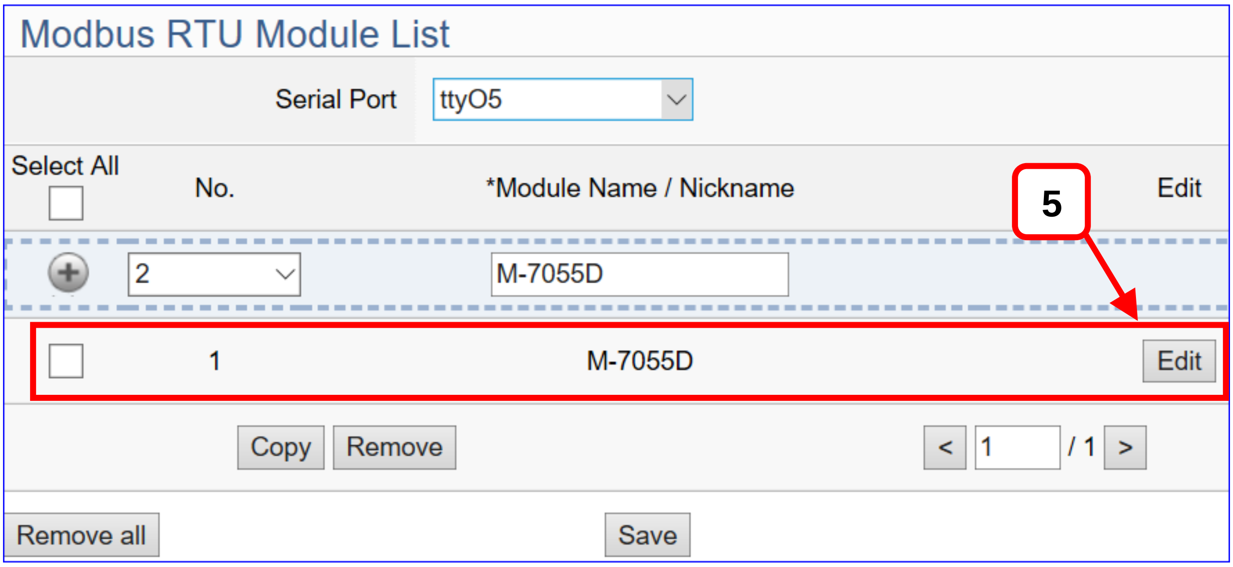
1

2. This sample: **ttyO5**

3. Give a name, Ex: **M-7055D**

4. Click to add

Add a module M-7055D as below, and then click [Edit] button to enter the “Module Content Setting” page.



Modbus RTU Module List

Serial Port: ttyO5

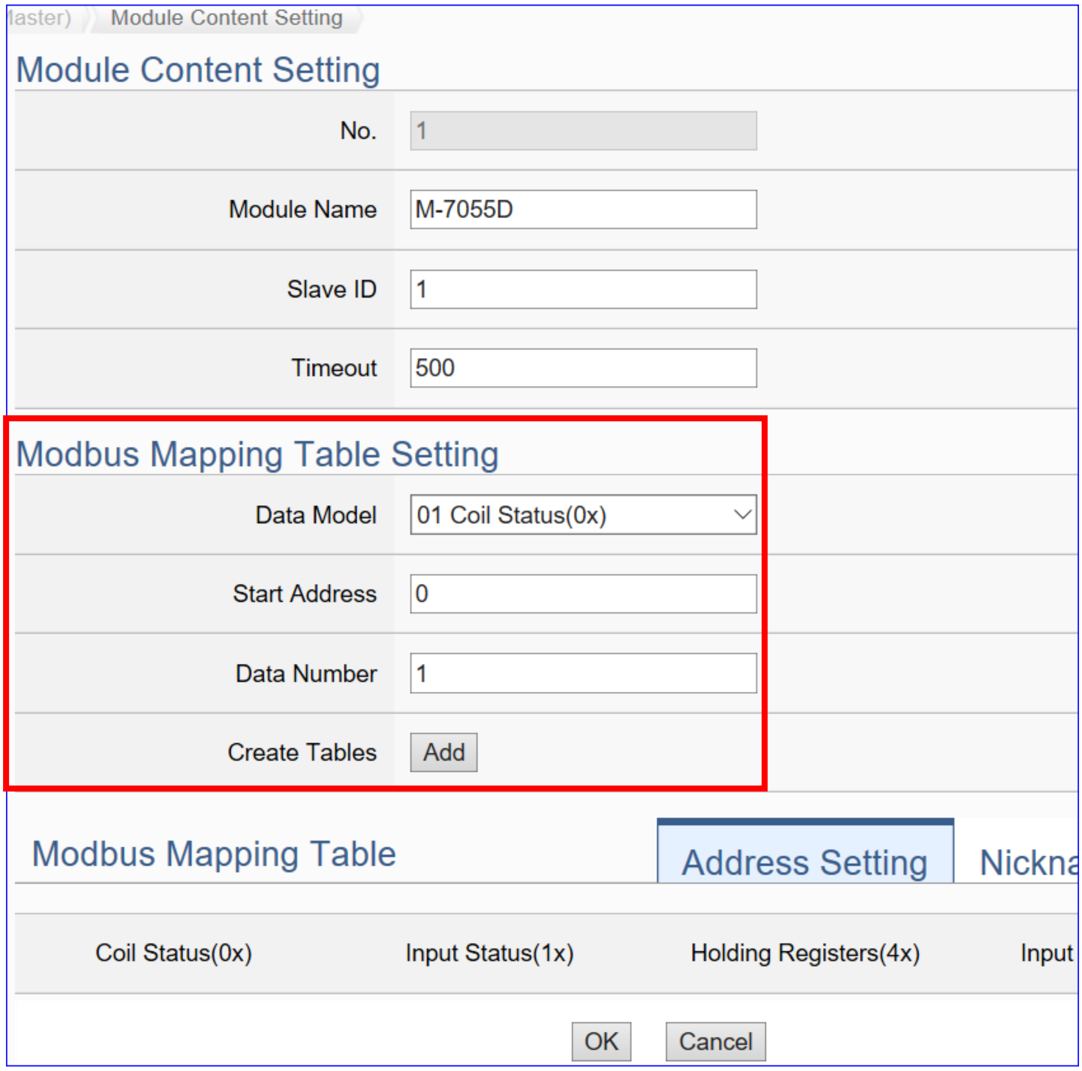
Select All □	No.	*Module Name / Nickname	Edit
⊕	2	M-7055D	
□	1	M-7055D	Edit

Copy | Remove | < 1 / 1 >

Remove all | Save

5

[**Module Content Setting**] page can set up the module and the Modbus address mapping table:



laster) Module Content Setting

Module Content Setting

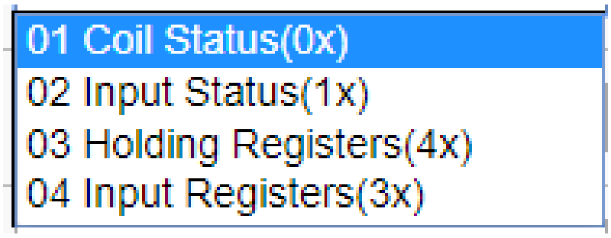
No.	1
Module Name	M-7055D
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x)
Start Address	0
Data Number	1
Create Tables	Add

Modbus Mapping Table

Please set up the addresses mapping with the module I/O channels in the [**Modbus Mapping Table Setting**]. The system provides 4 Modbus data models (as below) **"01" to "04"** for mapping to the **DO, DI, AO and AI** channels.

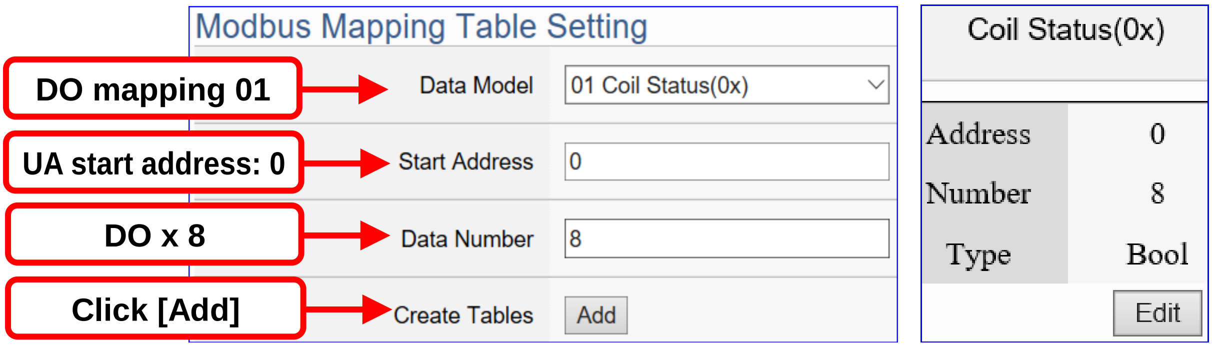


01 Coil Status(0x)
02 Input Status(1x)
03 Holding Registers(4x)
04 Input Registers(3x)

Please note that, the start address of UA series controller is start from address **"0"**. Although some modules are start from address 1, but here users must to set the start address from 1, and set enough Data number for mapping to the I/O channels of the linking module.

In this example, the M-7055D has DO and 8 DI channels, please create the table as following pictures of the [**Modbus Mapping Table Setting**]. After complete the setting, the DO and DI Modbus address settings will show in the [**Modbus Mapping Table**].

M-7055D **8 DO** setting and the [**Coil Status(0x)**] table after setting are as below:



Modbus Mapping Table Setting

DO mapping 01 → Data Model: 01 Coil Status(0x)

UA start address: 0 → Start Address: 0

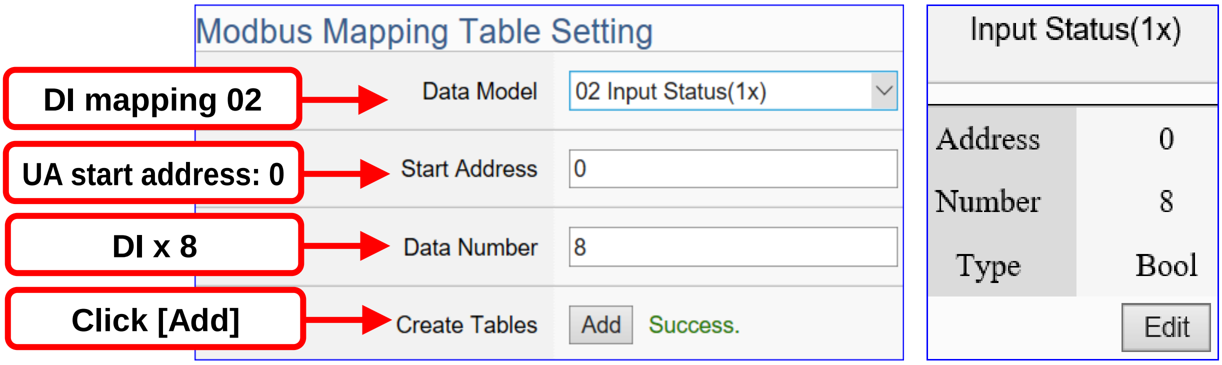
DO x 8 → Data Number: 8

Click [Add] → Create Tables: Add

Coil Status(0x)

Address	0
Number	8
Type	Bool

M-7055D **8 DI** setting and the [**Input Status(1x)**] table after setting are as below:



Modbus Mapping Table Setting

DI mapping 02 → Data Model: 02 Input Status(1x)

UA start address: 0 → Start Address: 0

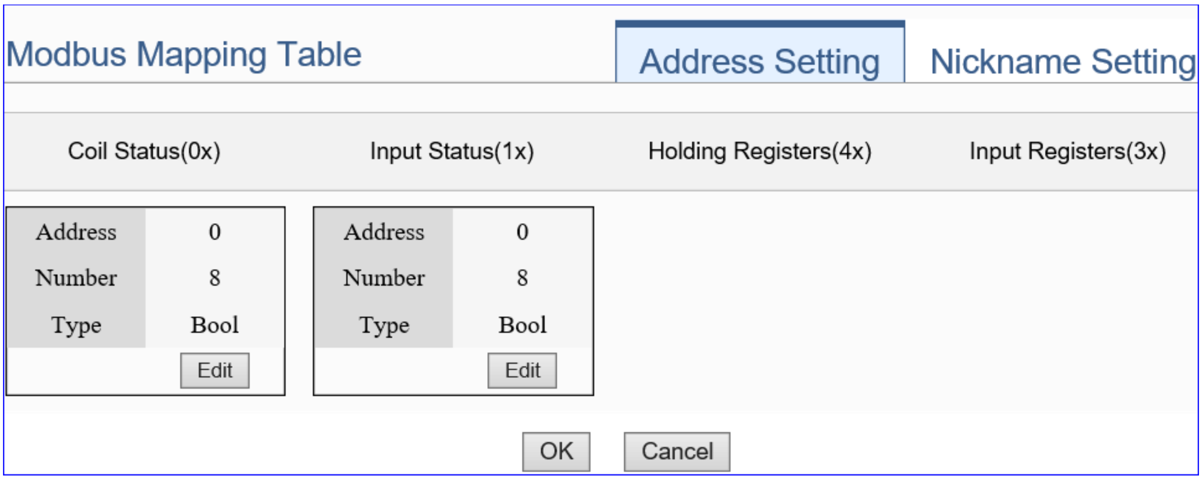
DI x 8 → Data Number: 8

Click [Add] → Create Tables: Add Success.

Input Status(1x)

Address	0
Number	8
Type	Bool

After setting, the Modbus Mapping table is showing as below. Click [OK] to save and exit.



Modbus Mapping Table

Coil Status(0x)	Input Status(1x)	Holding Registers(4x)	Input Registers(3x)
Address 0 Number 8 Type Bool	Address 0 Number 8 Type Bool		

For more setting item description, please refer to chapter 6. Module Setting.

Step 3. OPC UA Connection

Click the next step, and enter the **Step 3 [OPC UA Connection]** of the UI setting

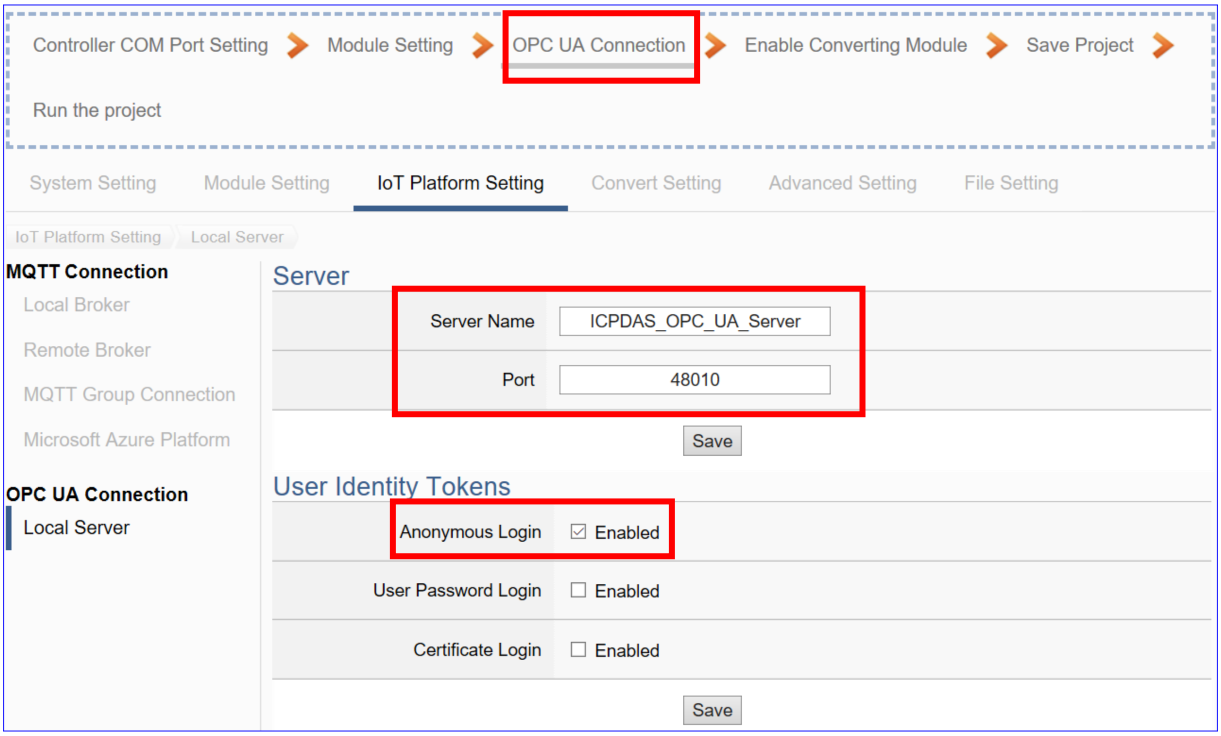
This step is for setting the IoT platform and the OPC UA connection, e.g. the server name, port, login identity information, etc.

We select the “Modbus RTU / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA Connection > Local Server**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.

<This Example>

The server name and port of [**OPC UA Connection**] will auto show up, user needs not to change in this example, but can change the port if needs.

The Anonymous Login default enables, you need not to change in this example. At last click [Save] button.



Server Name: ICPDAS_OPC_UA_Server

Port: 48010

Anonymous Login ☑ Enabled

User Password Login ☐ Enabled

Certificate Login ☐ Enabled

About other login methods will be found in the [OPC UA Connection] of the Chapter 7 IoT Platform Setting .

Step 4. Enable Converting Module

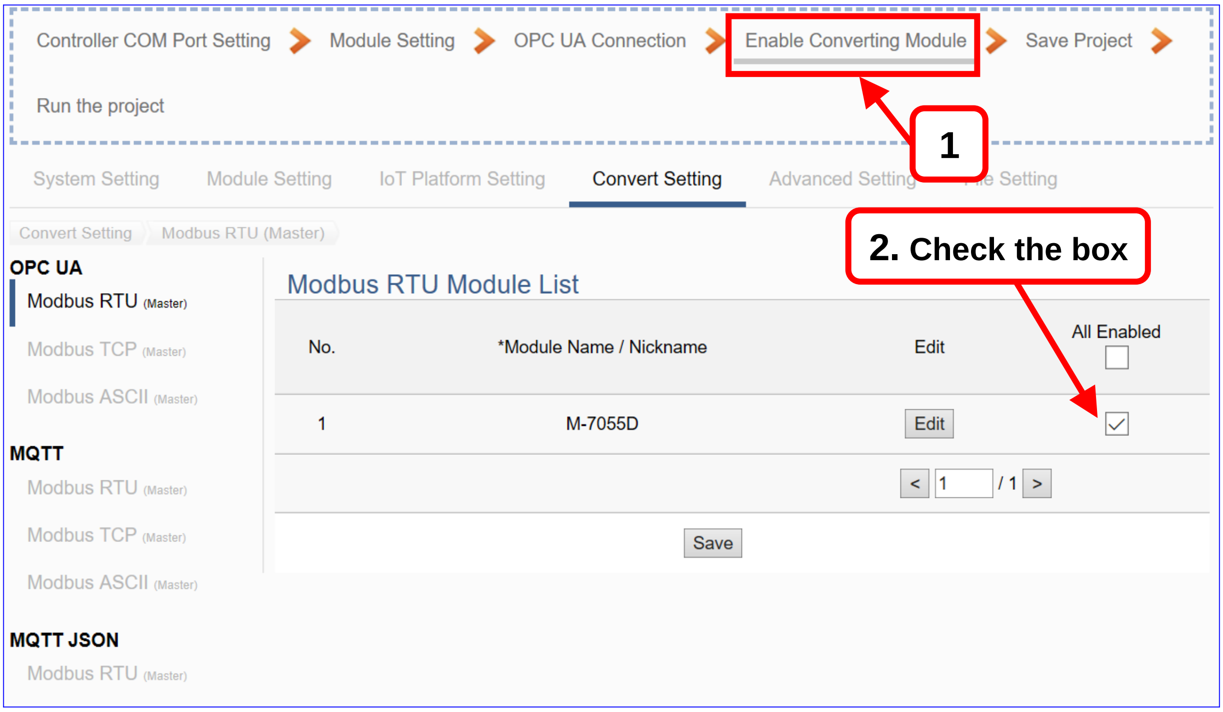
Click the next step, and enter the **Step 4 [Enable Converting Module]** UI setting

This step is for enabling the Modbus RTU / OPC UA conversion.

We select the “Modbus RTU / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA > Modbus RTU (Master)**] page of Conversion setting. The “Step Box” will prevent the user from selecting the wrong platform.

<This Example>
In this setting page, please check the enable box of the module **M-7055D** we set up in the previous steps. And click [Save] button.

The above action will enable all I/O channels of the M-7055D for communication conversion. If users need to enable some channels only, please click [Edit] to enable individual channels. (Refer to Chapter 8)



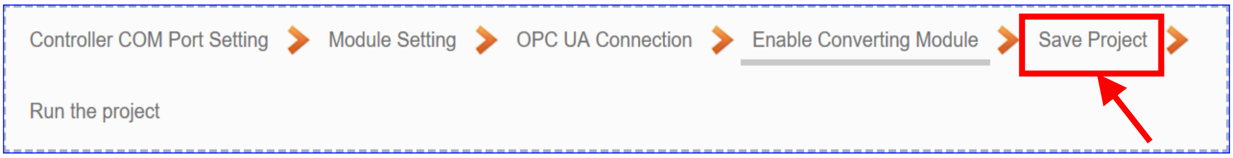
Modbus RTU Module List

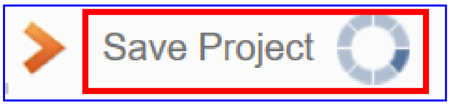
No.	*Module Name / Nickname	Edit	All Enabled □
1	M-7055D	Edit	☑

Step 5. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

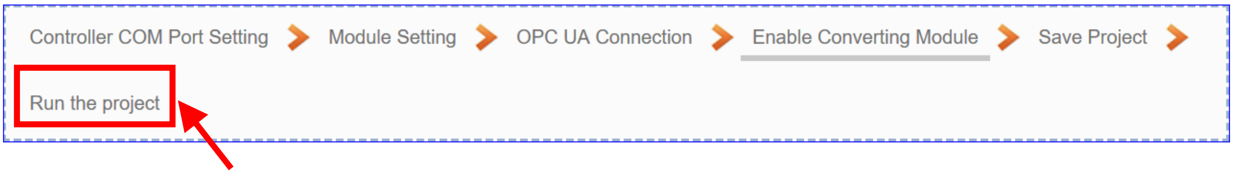
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



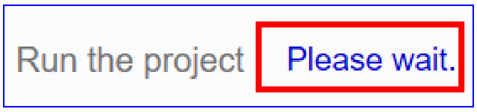


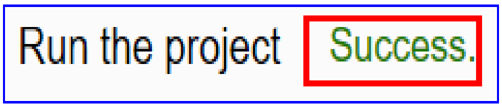
Step 6. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words “**Please wait**” (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words “**Please wait**” disappears, the new words “**Success**” appears (as below), that means the UA controller is running new project successfully.





And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

This example now completes the setting, uploading and running in the UA-5231 controller that connected with the M-7055D and can convert the OPC UA and Modbus RTU protocol communication.

For more and detail setting descriptions of the Web UI, please refer to the following chapters.

3. Web UI Login and Environment Overview

This chapter introduces the ways to login the UA Web User Interface (UI) and the environment of the Web UI of the UA series (IIoT Communication Server), including the version display, system information, function areas, etc. The detail information of the menus, functions, parameters, etc. will be introduced in the next chapters.

3.1. Login the UA Web UI

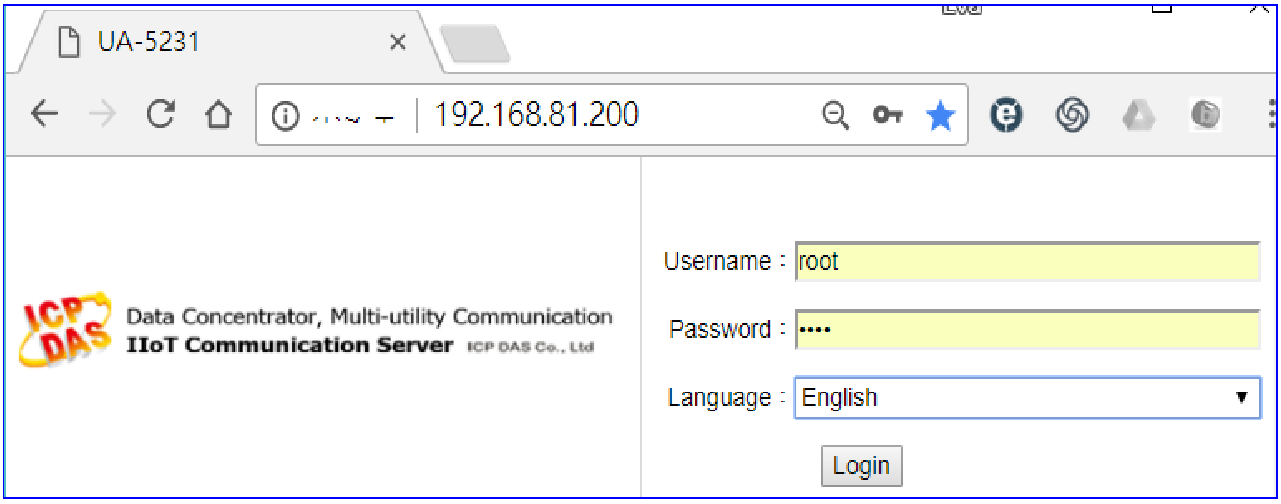
The methods to login the UA series Web UI:

A. Using Factory Default Setting: Suitable for the UA new user, setting the new UA controller, or the controller network IP is unknown. This method changes the PC network IP to be the same domain with the UA factory default network IP to login the Web UI. (Refer Section 2.2.1)

B. Using Software Utility: UA Series provides a free software utility for auto searching the UA controllers in the network and can quick jump to the login web page of the UA controller. It's very suitable for quick setting when many UA controllers in the network but the IP are unknown. (Refer Section 2.2.2)

C. Using IP Address: If the UA-5200 has a fixed IP and in the same domain as the PC, users can directly enter the IP in the address bar of a web browser and log in to the Web UI of the UA-5200. It's suitable for the users how familiar the series controllers.

The login web page for the Web UI of the UA series is as below. Enter the username and password can log in to set up the UA controller. (Default username/password: **root**/**root**)



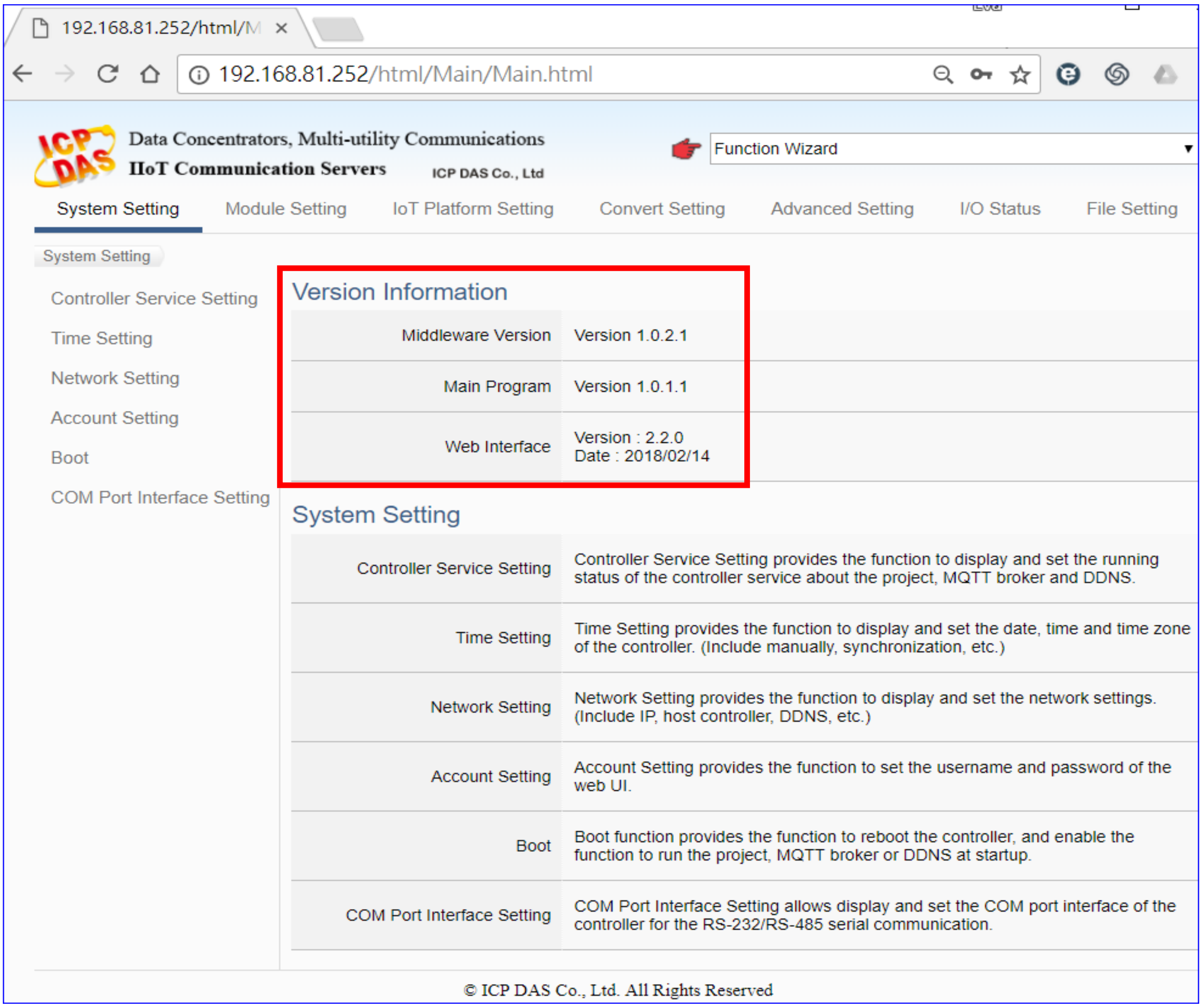
Username : root

Password : ••••

Language : English

UA-5231
192.168.81.200
Data Concentrator, Multi-utility Communication
IIoT Communication Server ICP DAS Co., Ltd
Login

After log in the Web UI, the version information is first displayed on the screen. It includes: the version of the install Middleware program, main program and Web Interface (and date). The following picture shows the screen view of the Web UI since Version 2.0.0.



Version Information

Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 2.2.0 Date : 2018/02/14

System Setting

Controller Service Setting	Controller Service Setting provides the function to display and set the running status of the controller service about the project, MQTT broker and DDNS.
Time Setting	Time Setting provides the function to display and set the date, time and time zone of the controller. (Include manually, synchronization, etc.)
Network Setting	Network Setting provides the function to display and set the network settings. (Include IP, host controller, DDNS, etc.)
Account Setting	Account Setting provides the function to set the username and password of the web UI.
Boot	Boot function provides the function to reboot the controller, and enable the function to run the project, MQTT broker or DDNS at startup.
COM Port Interface Setting	COM Port Interface Setting allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

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3.2. Web UI Environment Overview

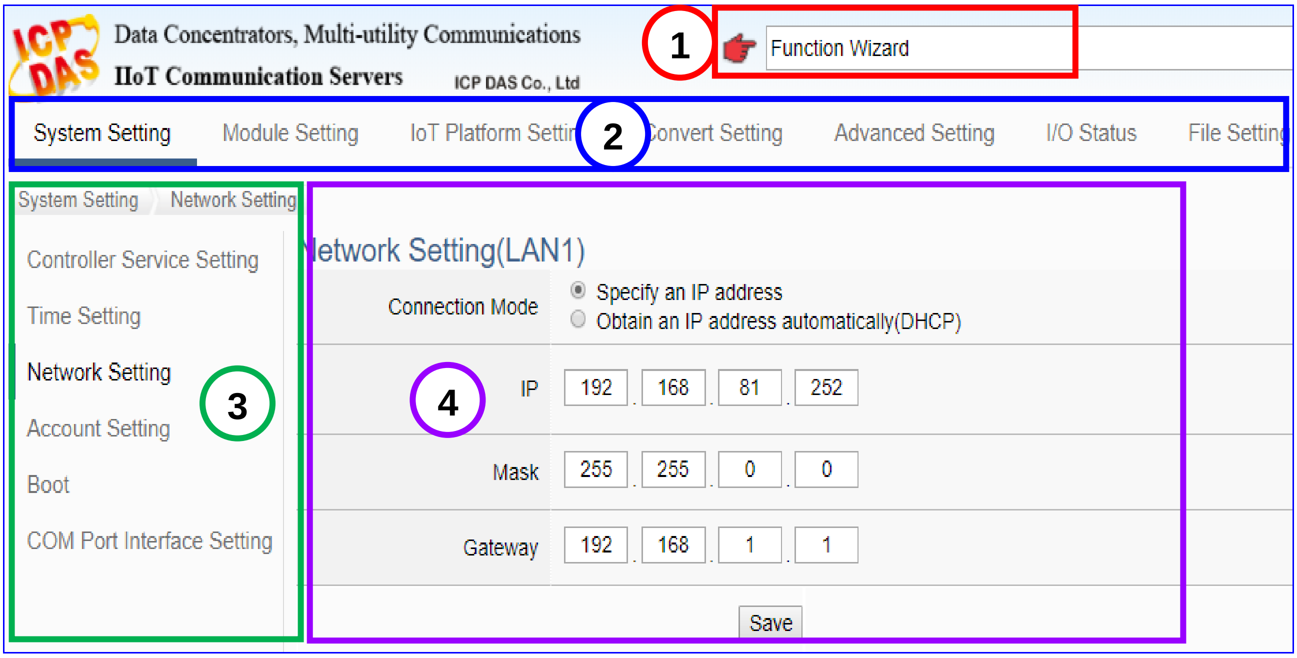
The function setting of the Web UI is including the following areas. The next seven chapters will introduce the settings of the functions and parameters. Here will overview these areas.

1. **Function Wizard**: A quick setup area for commonly used projects or functions suits the new users. The Web UI will enable a Wizard mode and show a "Step Box". The user just follows the "Step Box" step by step and then can complete the project quickly and rightly. (Refer Chapter 4)

2. **Main Menu Area**: The main menu contains all the setting functions that classified into six categories. Click the main menu item, the sub-menu will appear on the bottom left of the page, and the function descriptions will appear under the main menu area. (Refer from Chapter 5)

3. **Sub-Menu Area**: The sub-menu will display detailed functions under the selected main menu. The user could setup or review detailed function options in the setting area. (Refer from Chapter 5)

4. **Setting Area**: The setting area is for reviewing and setting the functions and parameters of UA series controller. The content of this area will be varied according to the selected main menu and sub-menu. (Refer Chapter 5)



Network Setting(LAN1)

Connection Mode
● Specify an IP address
○ Obtain an IP address automatically(DHCP)

IP 192 . 168 . 81 . 252

Mask 255 . 255 . 0 . 0

Gateway 192 . 168 . 1 . 1

3.3. Setting Procedures and Steps

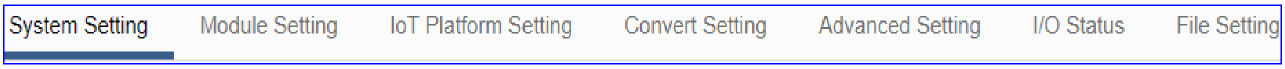
- **Procedures for Project/Function Setting:**

The function setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. The "Function Wizard" even provides the "Step Box" for new users to follow the steps and prevent from selecting the wrong function, e.g. the steps of the commonly used project about the Modbus communication and conversion with the OPC UA protocol are listed as follows:

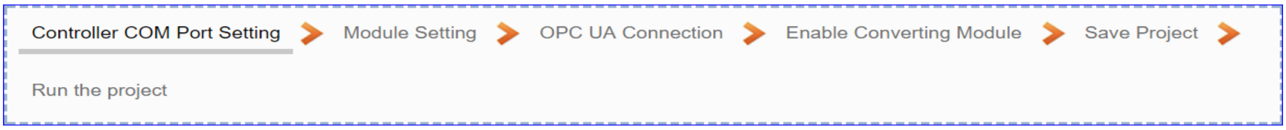
Function/Project Procedures:

Controller Setting > Module Setting > Connecting OPC UA (in IoT Platform) > Conversion > File Setting > Execution

Main Menu:



Step Box of the Function Wizard:



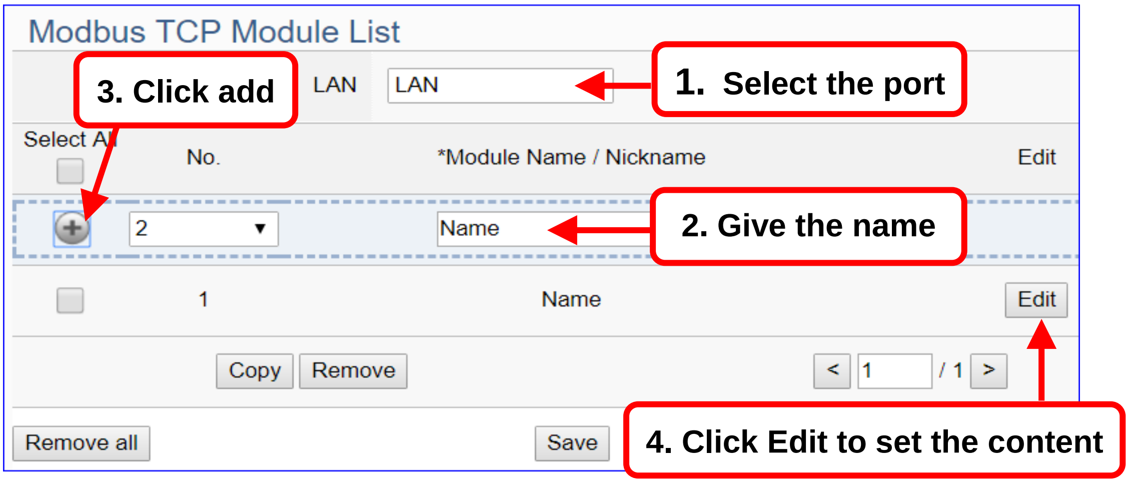
The chapter 2 provides an example for user to quickly know the setting procedure, and the chapter 4 provides various commonly used projects and functions for user to apply.

- **Steps for List Setting:**

About the List setting of module, connection…, they have the similar steps as below:

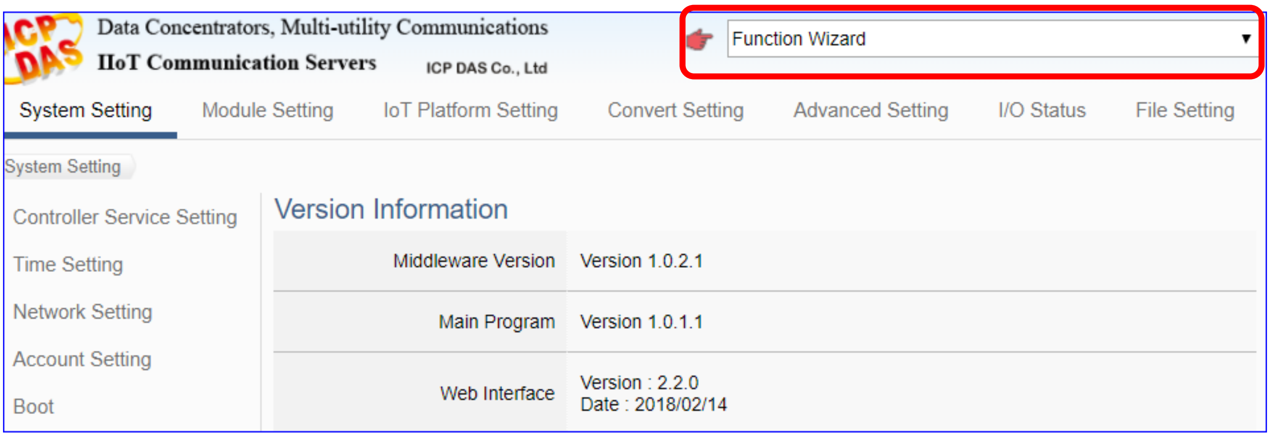
1. Select the port number, name… for the list (module, connect…)
2. Give a name or nickname, normally default name: Name
3. Click the button [⊕] to add a list of module, connect…
4. Click the button [Edit] to enter the Content Setting page
5. Set up the list content, and then click [Save] to back to the list page.

EX: Modbus TCP Module List:



4. Function Wizard

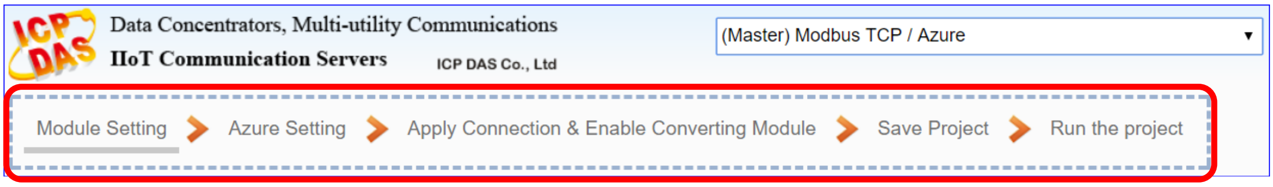
[Function Wizard] at the up-right corner of the Web UI since the version V2.0.0 provides a quick setting “Step Box” suitable for new users to set up the projects or functions.



Version Information

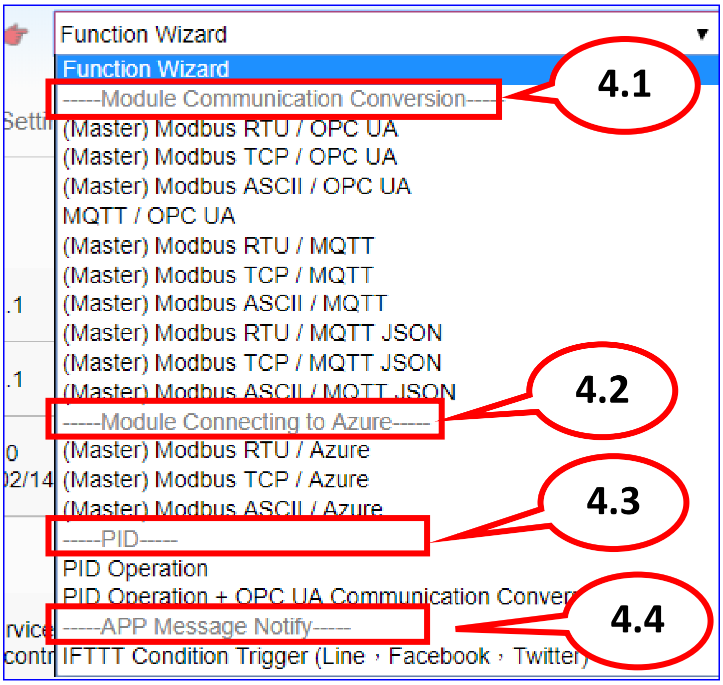
Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 2.2.0 Date : 2018/02/14

[Step Box] (As below picture) is a Wizard-like step guide. When the user selects a function item of the Function Wizard, the Web UI will enable a Wizard mode and show a “Step Box”. The user just needs to follow the “Step Box” step by step and then can complete the project or function quickly and rightly.


Data Concentrators, Multi-utility Communications
IIoT Communication Servers
ICP DAS Co., Ltd
(Master) Modbus TCP / Azure
Module Setting
Azure Setting
Apply Connection & Enable Converting Module
Save Project
Run the project

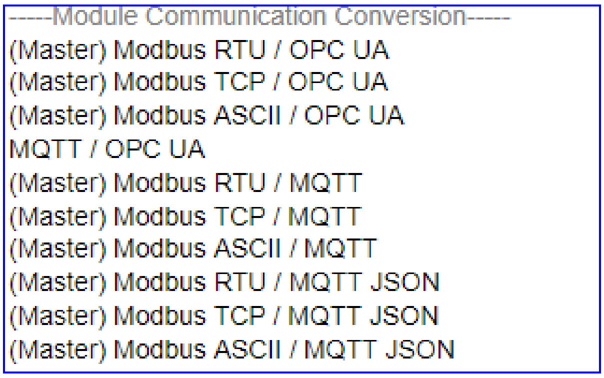
This chapter will focus on the steps and function settings. About the real module using, refer to Section 2.3.1 , there is a project using M-7055D and UA-5231, and converting Modbus RTU with OPC UA protocol. The user could see that chapter and this chapter to know more procedure concept and setting tips.

Function Wizard will develop more functions or projects, but now there are 16 items in 4 major categories, this chapter will introduce them in three sections.


Function Wizard
Function Wizard
-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
MQTT / OPC UA
(Master) Modbus RTU / MQTT
(Master) Modbus TCP / MQTT
(Master) Modbus ASCII / MQTT
(Master) Modbus RTU / MQTT JSON
(Master) Modbus TCP / MQTT JSON
(Master) Modbus ASCII / MQTT JSON
-----Module Connecting to Azure-----
(Master) Modbus RTU / Azure
(Master) Modbus TCP / Azure
(Master) Modbus ASCII / Azure
-----PID-----
PID Operation
PID Operation + OPC UA Communication Conver
-----APP Message Notify-----
IFTTT Condition Trigger (Line，Facebook，Twitter)
4.1
4.2
4.3
4.4

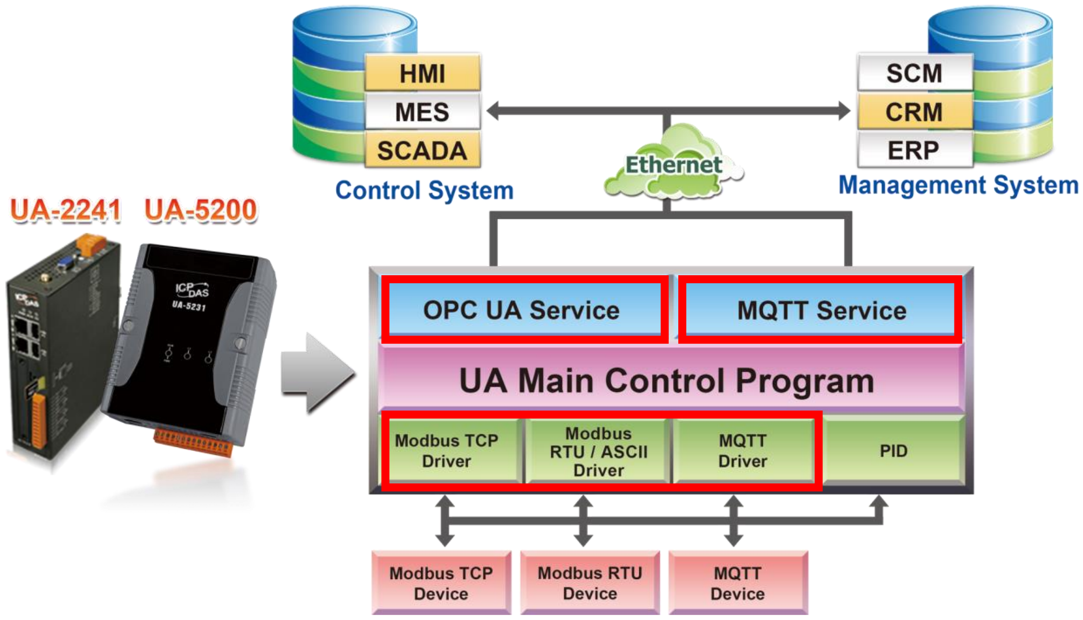
4.1. Module Communication Conversion

“Module Communication Conversion” of UA series, a very commonly used function, can effectively communicate the IoT devices or systems (e.g. cloud, database…) with I/O data of the module (e.g. Modbus module). This section will introduce the setting steps and the function parameters of the “Module Communication Conversion”. There are 9 items in this category that can be divided into 3 protocol types and introduced in 3 sub-sections: OPC UA, MQTT, MQTT JSON.



-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
MQTT / OPC UA
(Master) Modbus RTU / MQTT
(Master) Modbus TCP / MQTT
(Master) Modbus ASCII / MQTT
(Master) Modbus RTU / MQTT JSON
(Master) Modbus TCP / MQTT JSON
(Master) Modbus ASCII / MQTT JSON

Modbus / OPC UA Conversion	Using the OPC UA Service function to convert with Modbus RTU/TCP/ ASCII protocols. **(Section 4.1.1)**
MQTT / OPC UA Conversion	Using the OPC UA Service function to convert with MQTT protocols. **(Section 4.1.2)**
Modbus / MQTT Conversion	Using the MQTT Service function to convert with Modbus RTU/TCP/ ASCII protocols. **(Section 4.1.3)**
Modbus / MQTT JSON Conversion	Using the MQTT Service function in group of **JSON** format to convert with Modbus RTU/TCP/ ASCII protocols. **(Section 4.1.4)**

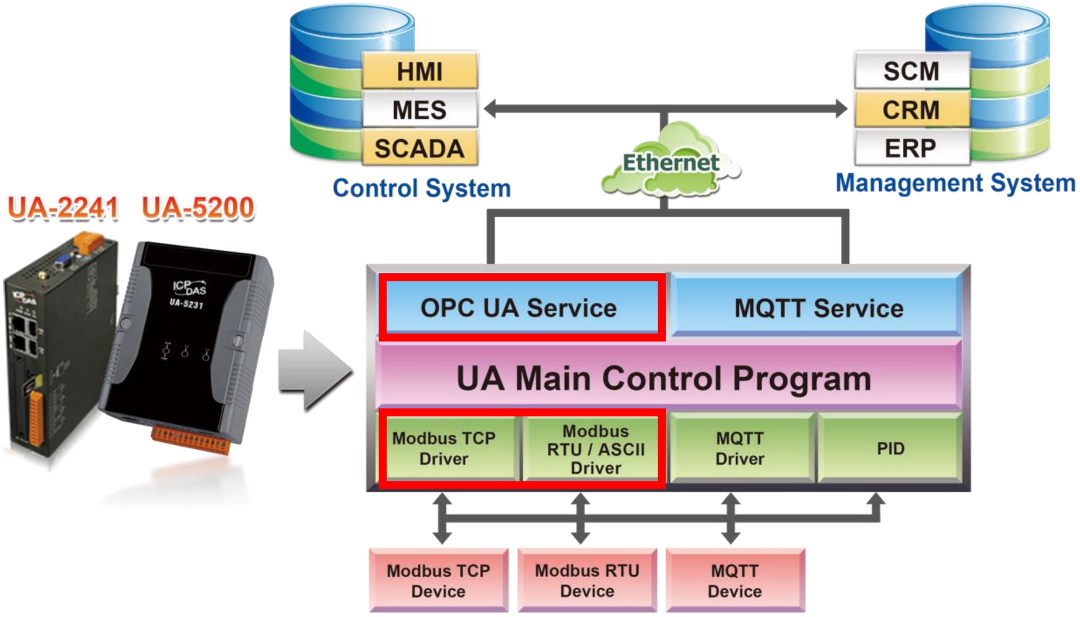


4.1.1. Modbus / OPC UA Conversion

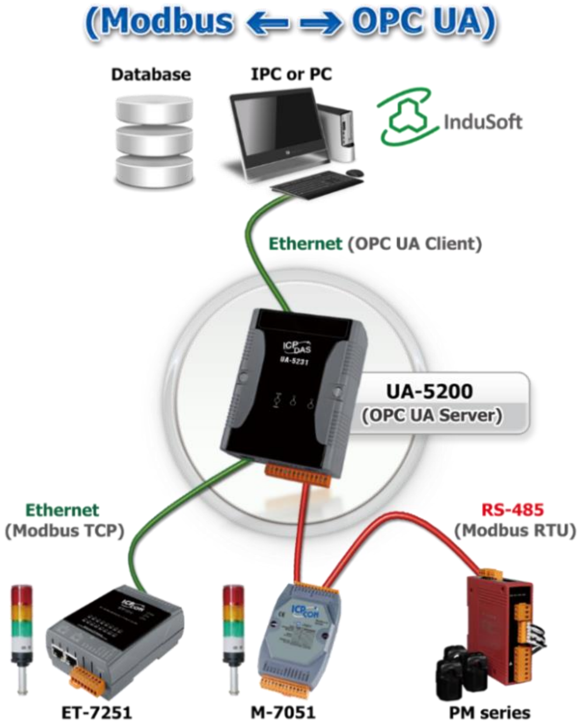
Modbus / OPC UA Conversion include the conversion of OPC UA and Modbus RTU / TCP / ASCII three protocols. With the OPC UA Service function, the OPC UA Server can read and write the Modbus RTU/TCP/ASCII devices that connected to the controller.

The settings of Modbus RTU/ASCII are the same. Here will introduce them together for a setting sample.

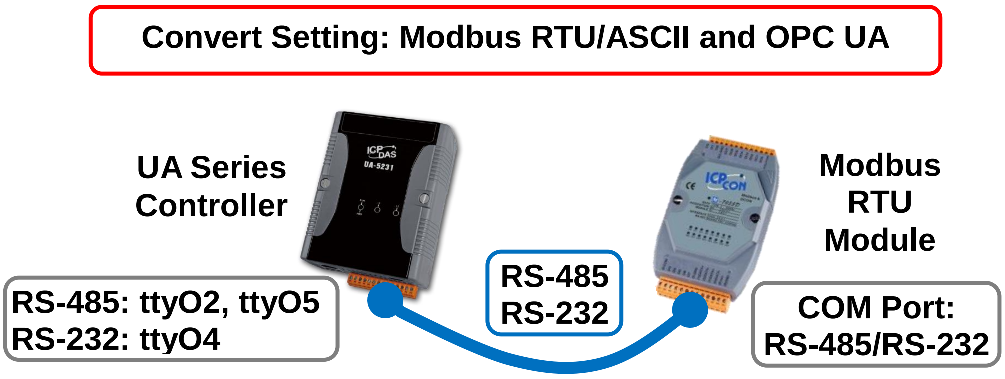
Modbus / OPC UA Function Diagram:



Application Solution:

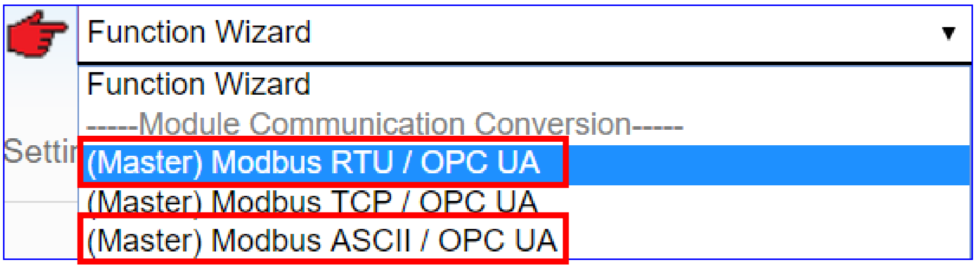


- **Convert Setting: Modbus RTU/ASCII and OPC UA**



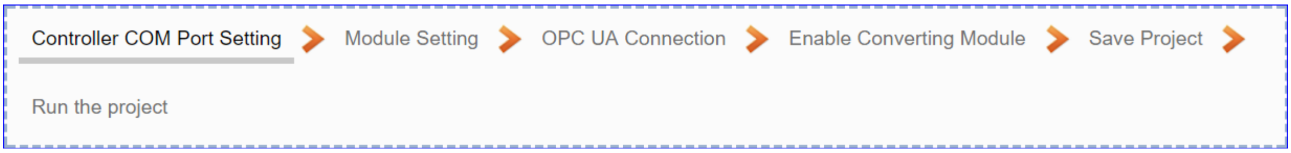
Note: The hardware/network connection methods please see the Chapter 2.

When UA series controller connects the Modbus RTU or ASCII module (via RS-485 / RS-232, as the picture) and read/write the Modbus I/O by OPC UA Server, user can choose the item [**Modbus RTU / OPC UA**] or [**Modbus ASCII / OPC UA**] of the "Module Communication Conversion" in the Function Wizard.


Function Wizard ▼
Function Wizard
-----Module Communication Conversion-----
Settir
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA

[Step Box]:

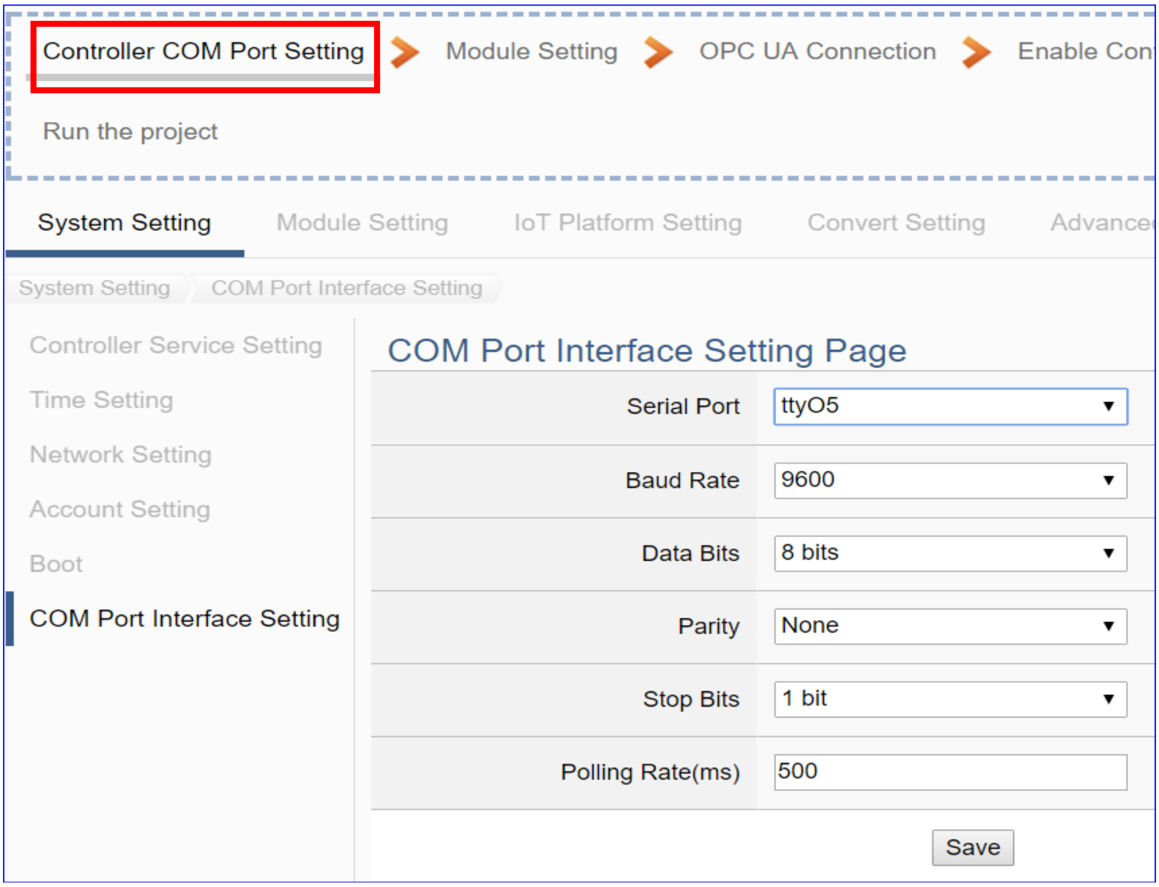
The Step Box of the [**Modbus RTU / OPC UA**] and [**Modbus ASCII / OPC UA**] has the same 6 steps, here will introduce them together. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project quickly and rightly.



Step 1. Controller COM Port Setting

This page allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

The user can find the default communication values of our I/O modules from the module CD, manual or I/O Module website.



COM Port Interface Setting Page

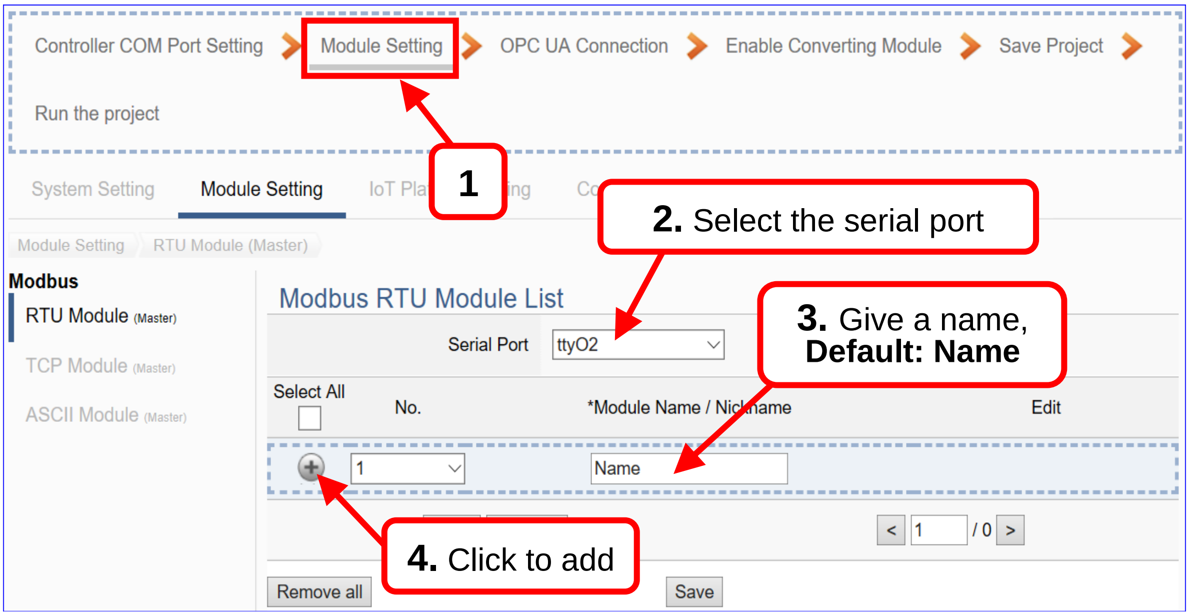
Serial Port: ttyO5
Baud Rate: 9600
Data Bits: 8 bits
Parity: None
Stop Bits: 1 bit
Polling Rate(ms): 500

COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click [Save] button could save the settings of this page.

Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting]** of the UI setting.

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

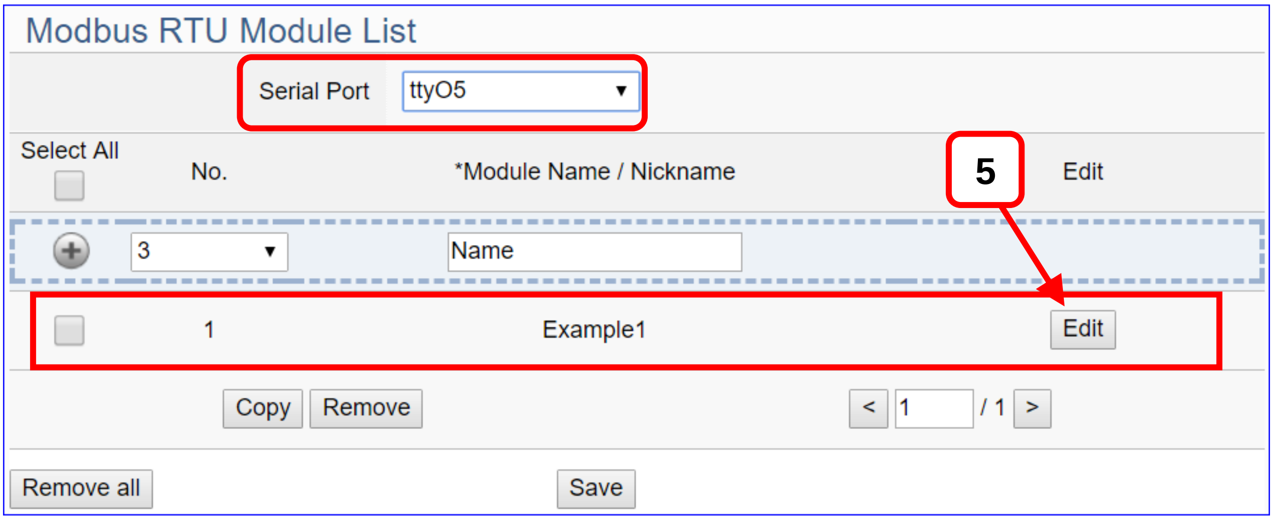


2. Select the serial port

3. Give a name, **Default: Name**

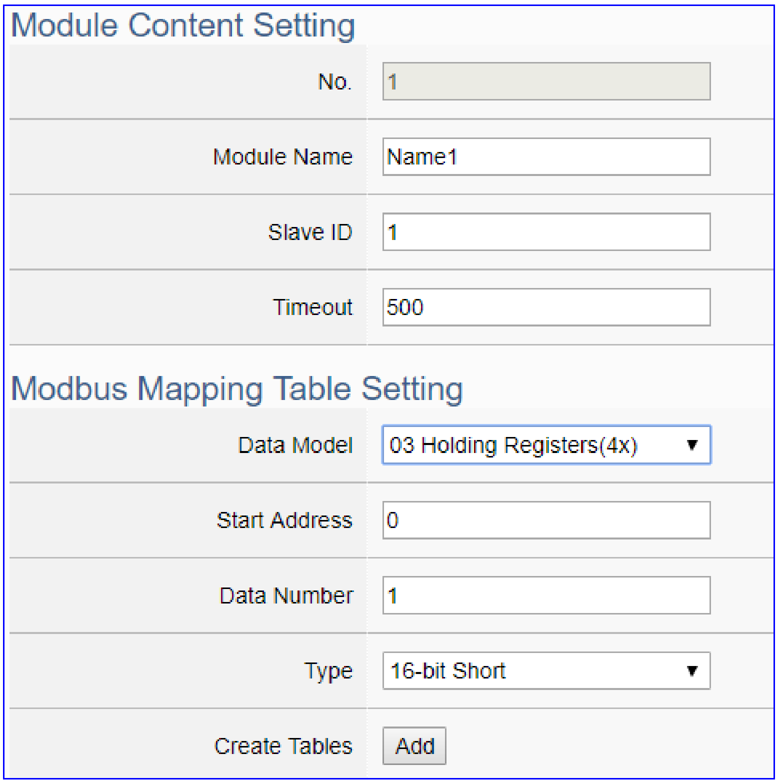
4. Click to add

Add a module (No.: 1, Name: Example1) as below, and then click [Edit] button to enter the “Module Content Setting” page.



If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

[**Module Content Setting**] page can set up the module and the Modbus address mapping table:

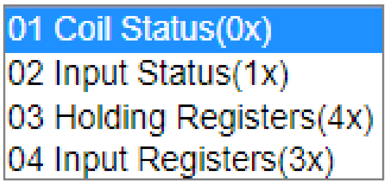


Module Content Setting

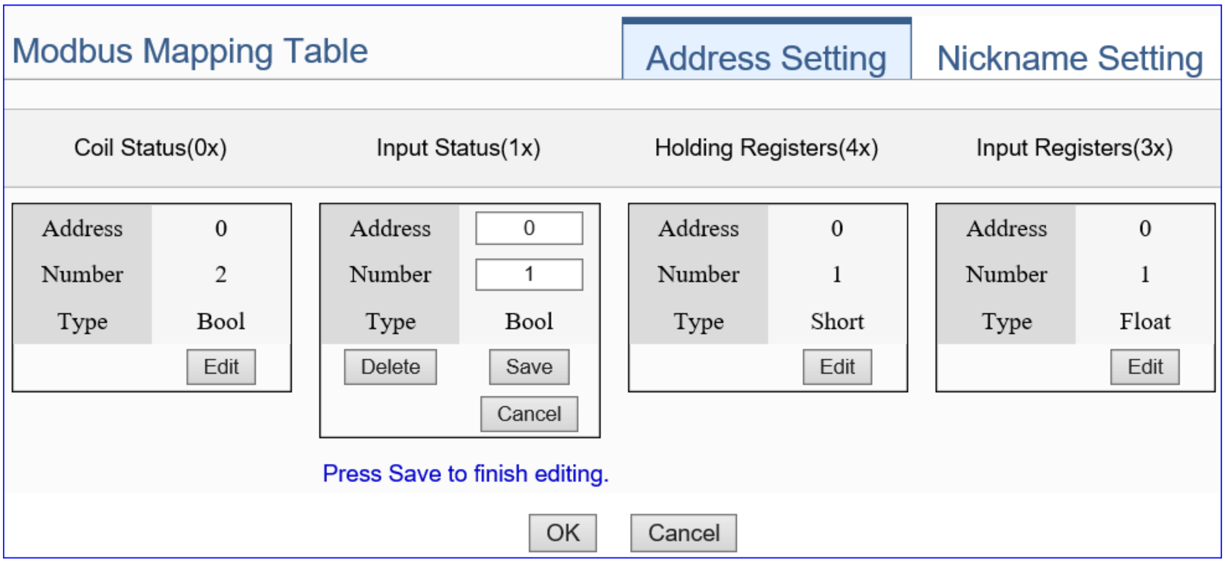
No.	1
Module Name	Name1
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	03 Holding Registers(4x) ▼
Start Address	0
Data Number	1
Type	16-bit Short ▼
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

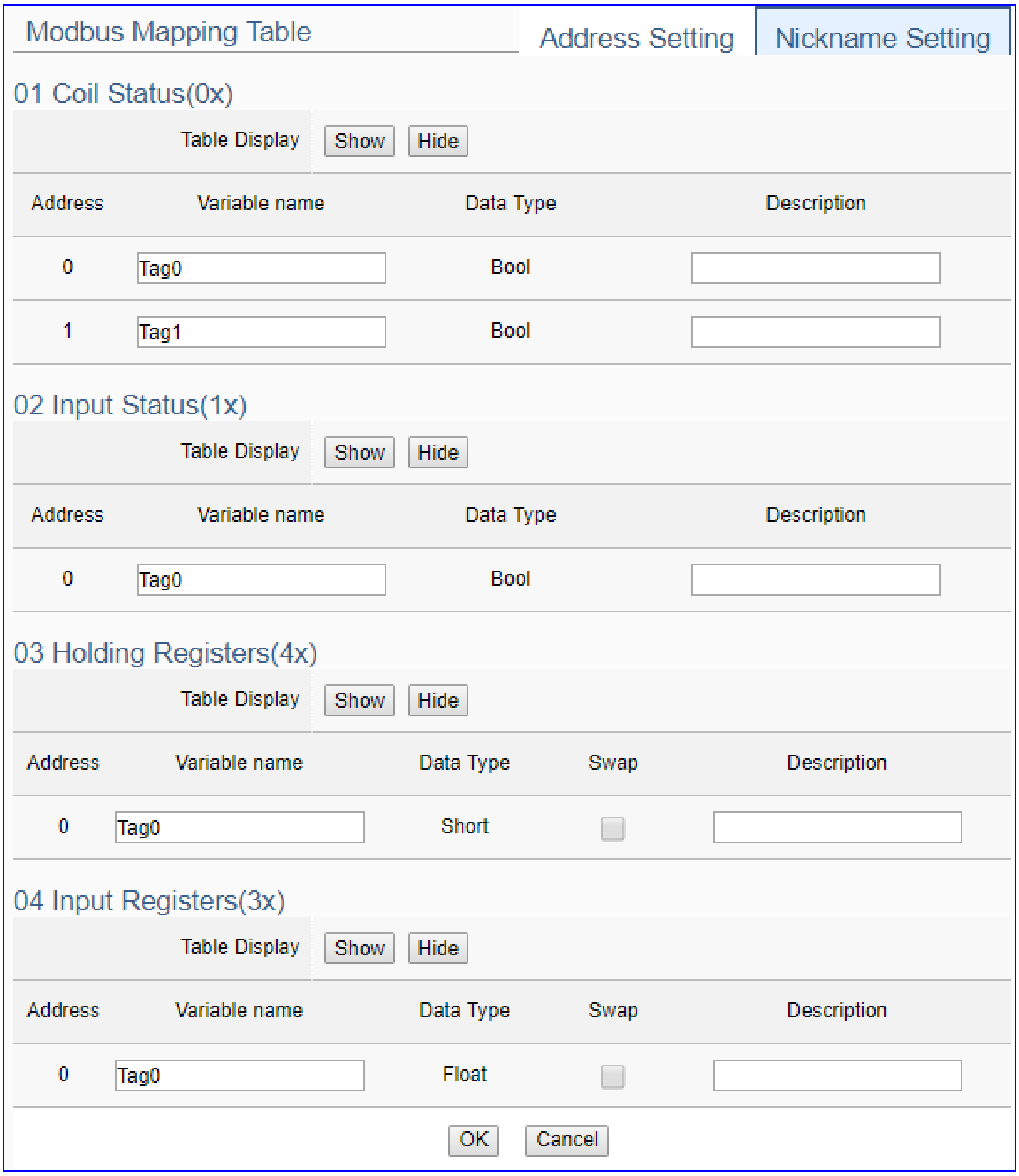


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



01 Coil Status(0x)

Table Display

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	☐	

04 Input Registers(3x)

Table Display

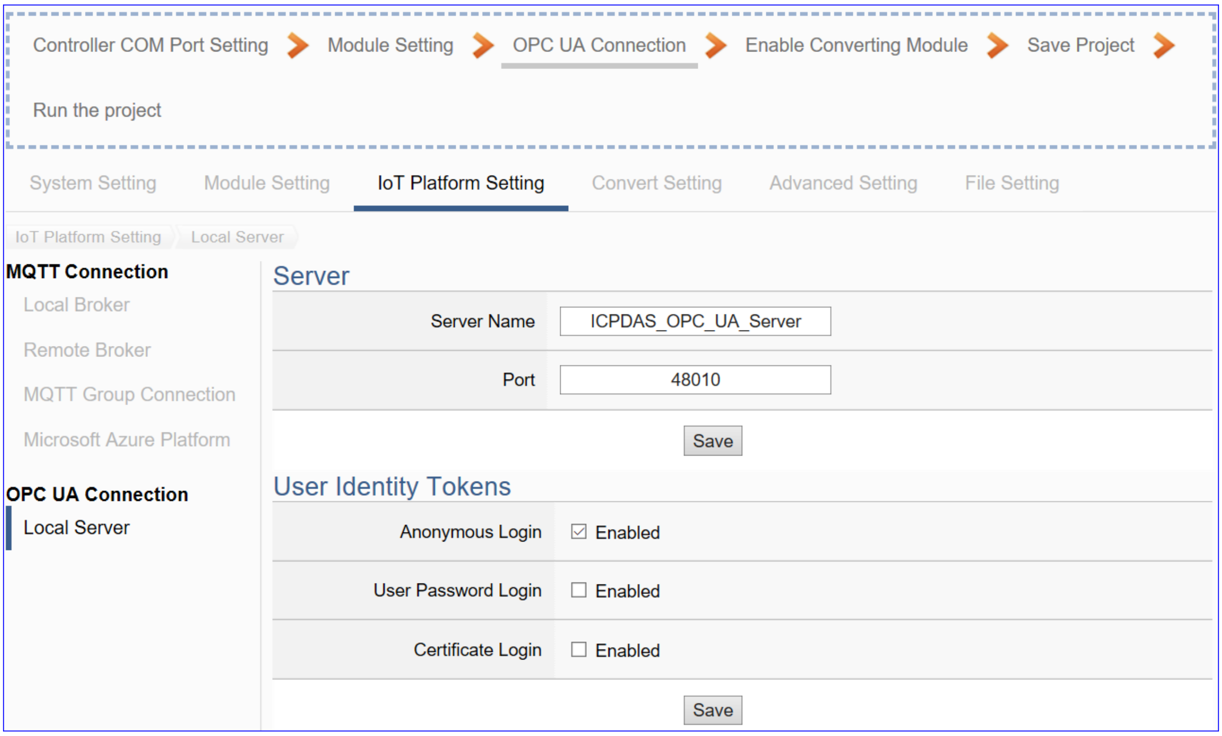
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	☐	

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 3. OPC UA Connection

Click the next step, and enter the **Step 3 [OPC UA Connection]** of the UI setting. This page is for setting the IoT platform and the OPC UA connection, e.g. the server name, port, login identity information, etc.

We select the “Modbus RTU / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA Connection > Local Server**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.



Server Name: ICPDAS_OPC_UA_Server

Port: 48010

Anonymous Login ☑ Enabled

User Password Login □ Enabled

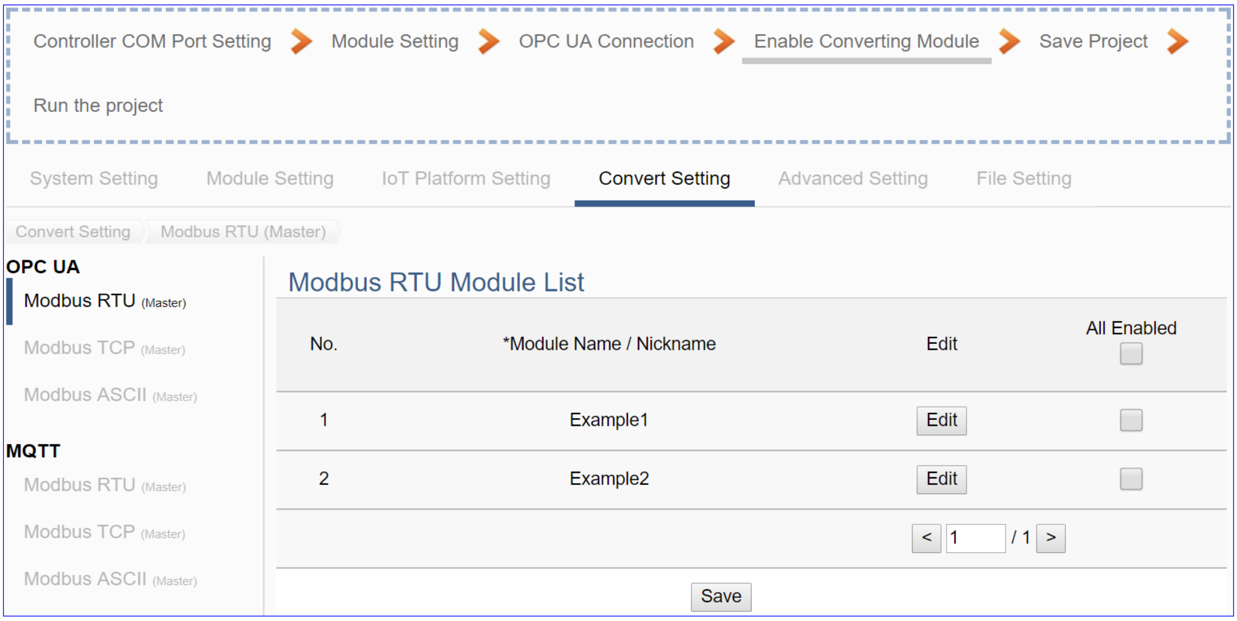
Certificate Login □ Enabled

OPC UA Connection > Local Server Setting –Server	
Server Name	Display the active OPC UA Server name. Not editable. System values: ICPDAS_OPC_UA_Server
Port	The communication port number of the OPC UA Server. System Default: 48010.
Save	Click to save the settings of this item.
OPC UA Connection > Local Server Setting –User Identity Tokens	
Anonymous Login	Check to enable the anonymous login of clients. Default: check.
User Password Login	Check to enable the user password login of clients. Default: uncheck.
Certificate Login	Check to enable the certificate login of clients. Default: uncheck.
Save	Click to save the settings of this item.

Step 4. Enable Converting Module

Click the next step, and enter the **Step 4 [Enable Converting Module]** UI setting This step is for enabling the Modbus RTU (or ASCII) / OPC UA conversion.

We select the “Modbus RTU (or ASCII) / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA > Modbus RTU/ASCII (Master)**] page of Conversion setting. The “Step Box” will prevent the user from selecting the wrong platform.



Modbus RTU Module List

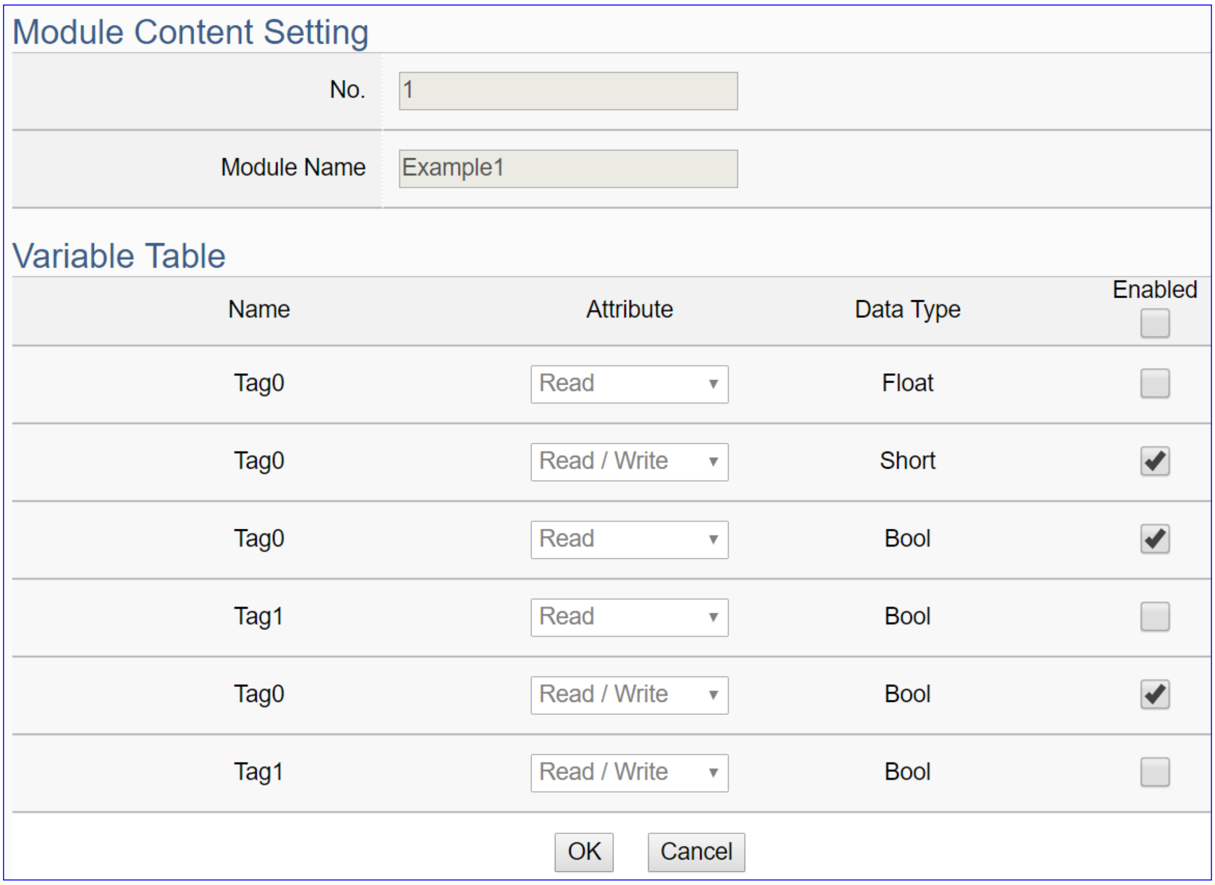
No.	*Module Name / Nickname	Edit	All Enabled □
1	Example1	Edit	□
2	Example2	Edit	□

< 1 / 1 >

Save

Convert Setting > OPC UA > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Variable Tale” setting. It is normal to set all channels as enabled, and the conversion will not affect the unconnected channels.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

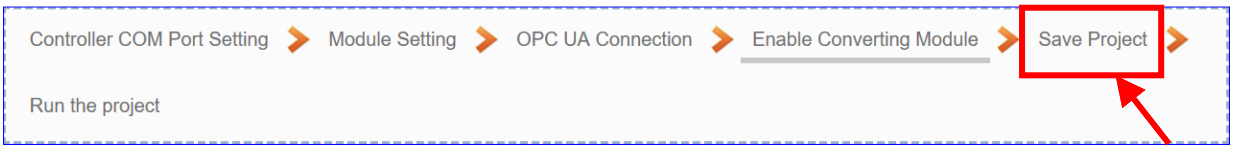
Name	Attribute	Data Type	Enabled □
Tag0	Read	Float	□
Tag0	Read / Write	Short	☑
Tag0	Read	Bool	☑
Tag1	Read	Bool	□
Tag0	Read / Write	Bool	☑
Tag1	Read / Write	Bool	□

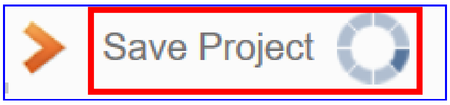
Convert Setting > OPC UA > Modbus RTU (Master) – Module Content	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > OPC UA > Modbus RTU (Master) – Variable Table	
Name	Display the variable name that set in the Modbus Address Mapping Table page (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

Step 5. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

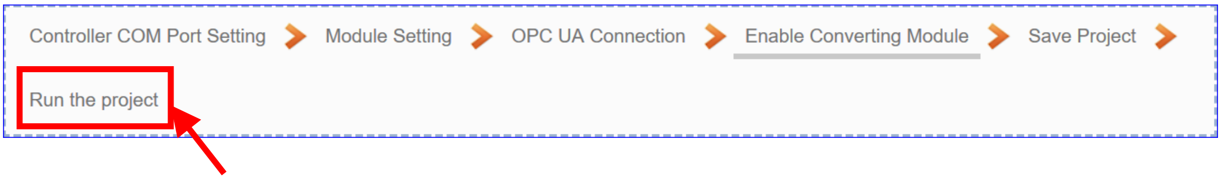
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



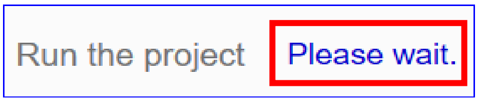


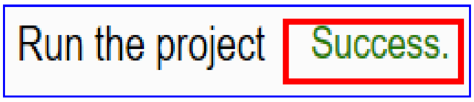
Step 6. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words "**Please wait**" (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words "**Please wait**" disappears, the new words "**Success**" appears (as below), that means the UA controller is running new project successfully.





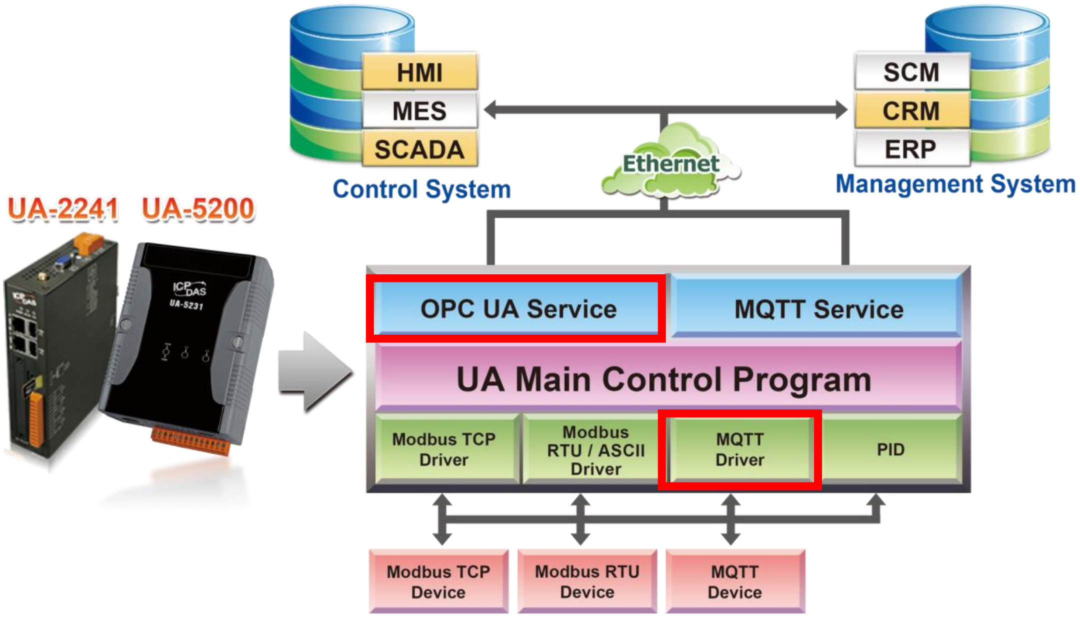
And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the conversion communication.

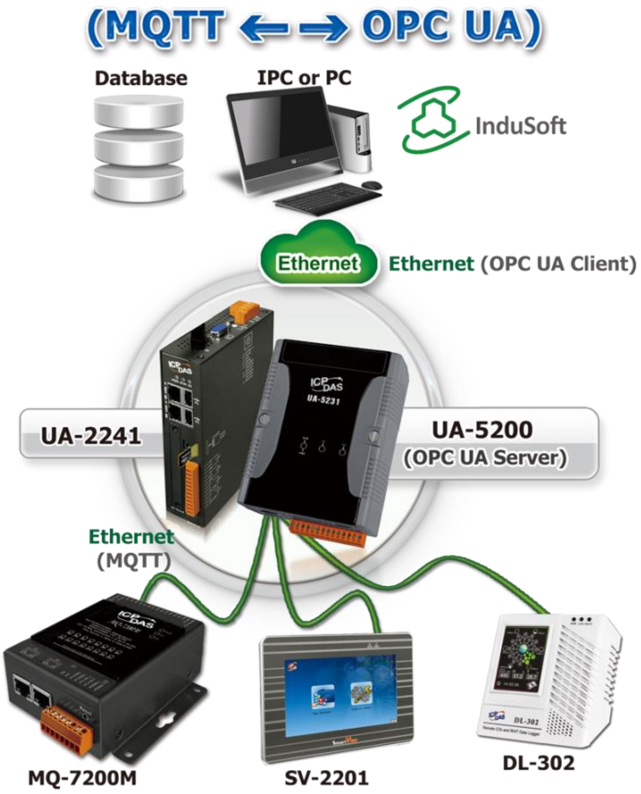
4.1.2. MQTT / OPC UA Conversion

MQTT / OPC UA Conversion include the conversion of OPC UA and MQTT protocols. With the **OPC UA Service** function, the OPC UA Server can read and write the MQTT device that connected to the controller.

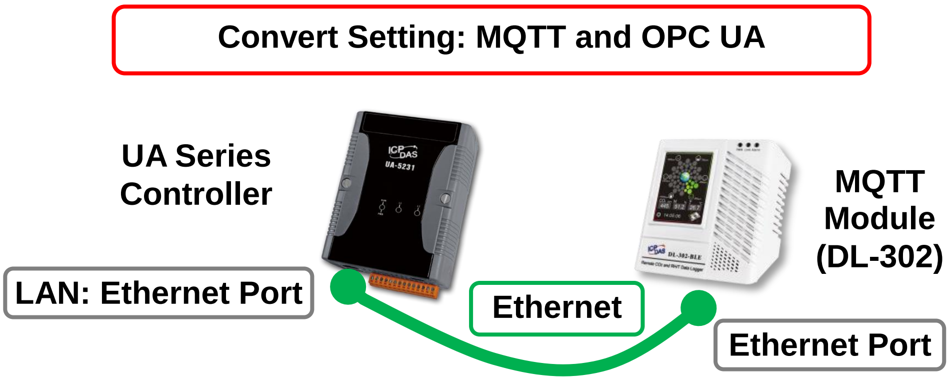
MQTT / OPC UA Function Diagram:



Application Solution:

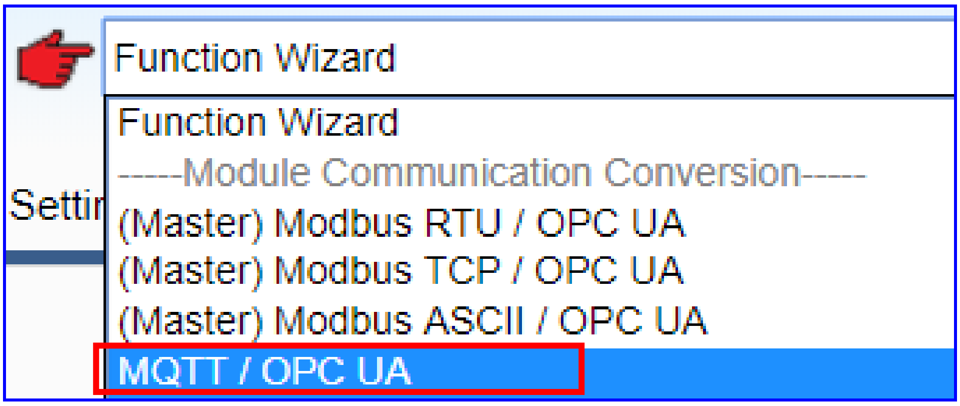


- **Convert Setting: MQTT and OPC UA**



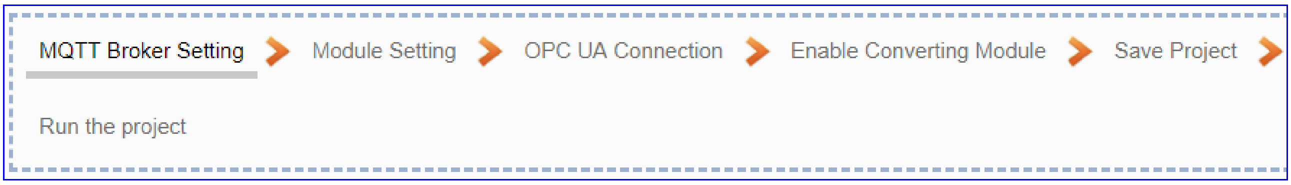
Note: The hardware/network connection methods please see the Chapter 2 .

When UA series controller connects the MQTT module (via Ethernet, as DL-302 in the picture) and through the OPC UA server to read/write the I/O data of the MQTT module, user can choose the item [**MQTT / OPC UA**] of the "Module Communication Conversion" in the Function Wizard.


Function Wizard
Settir
Function Wizard
-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
MQTT / OPC UA

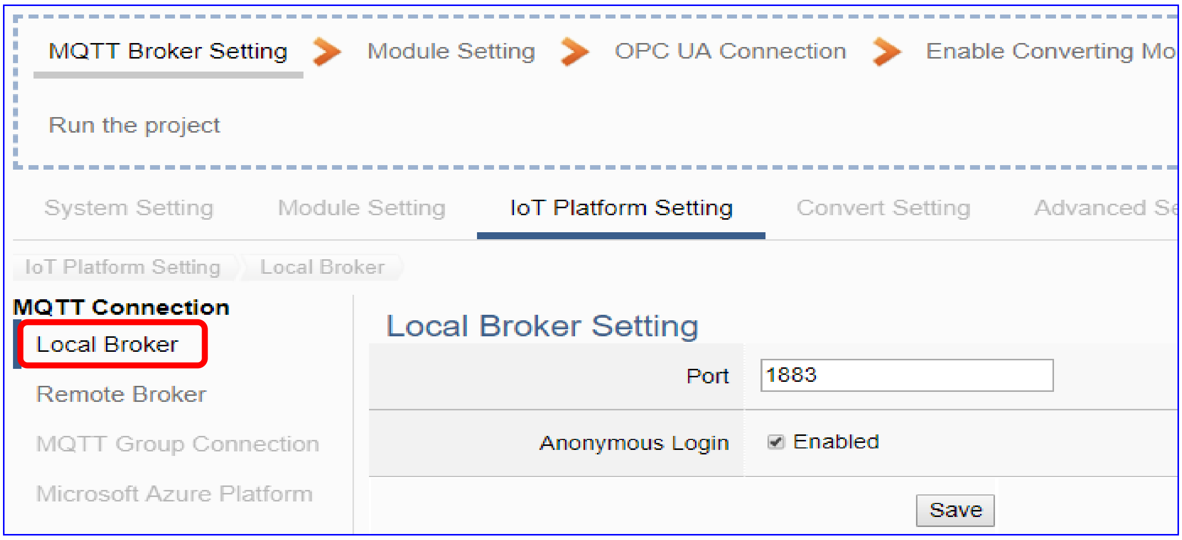
[Step Box]:

The Step Box of the [**MQTT / OPC UA**] has 6 steps as below. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project quickly and rightly.



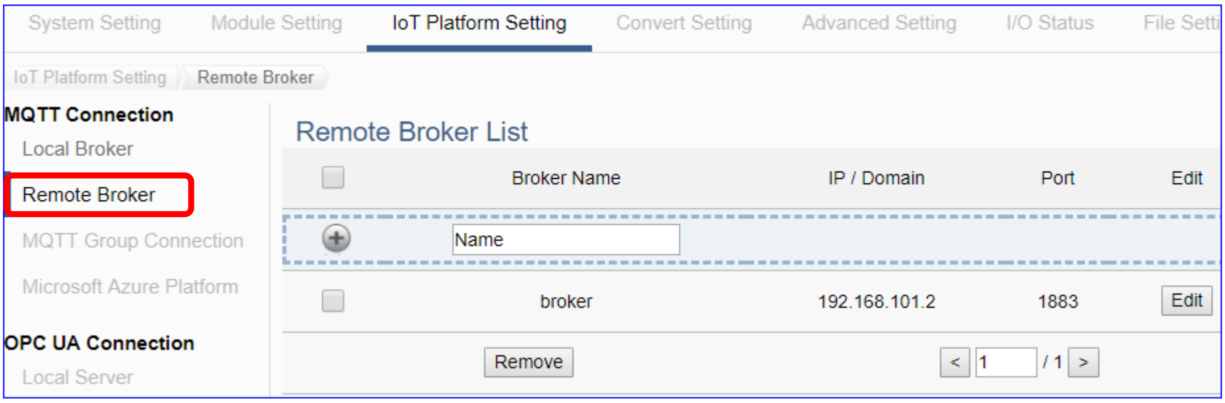
Step 1. MQTT Broker Setting

The **[MQTT Broker Setting]** is for setting the IoT platform and the MQTT Broker connection, e.g. the local or remote broker, port, login information, etc.
We select the “MQTT / OPC UA” conversion, so this step will auto enter the [**IoT Platform Setting > MQTT Connection > Local Broker**] page. The “Step Box” will prevent the user from selecting the wrong platform.
User can choose the **local or remote** broker for the MQTT connection.



Port: 1883
Anonymous Login: ☑ Enabled

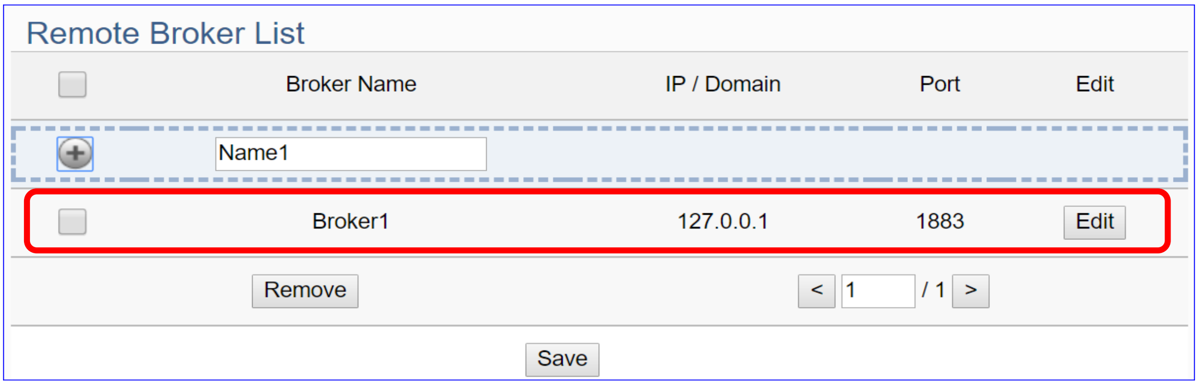
MQTT Connection > Local Broker Setting	
Port	The COM port of the Local MQTT Broker. System default: 1883
Anonymous Login	Check to allow anonymous login. Default: Check.
Save	Click to save the setting of this page.



□	Broker Name	IP / Domain	Port	Edit
⊕	Name			
□	broker	192.168.101.2	1883	Edit

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
⊕	Click to add a new remote Broker.
Save	Click to save the settings of this page.

After creating a new Remote Broker (as below) :



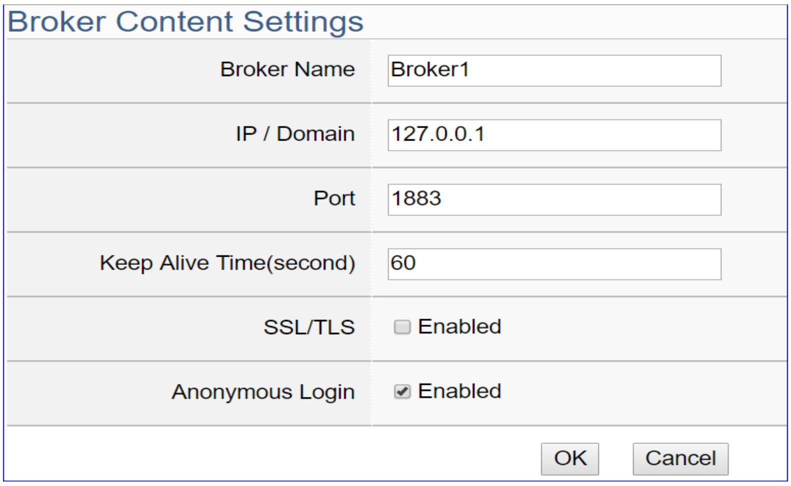
Remote Broker List

□	Broker Name	IP / Domain	Port	Edit
+	Name1			
□	Broker1	127.0.0.1	1883	Edit

Remove   < 1 / 1 >

Save

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Edit / Remove	Click [Edit] can set the Broker. Click the left box and [remove] can delete the Broker.
Save	Click to save the settings of this item.



Broker Content Settings

Broker Name	Broker1
IP / Domain	127.0.0.1
Port	1883
Keep Alive Time(second)	60
SSL/TLS	□ Enabled
Anonymous Login	☑ Enabled

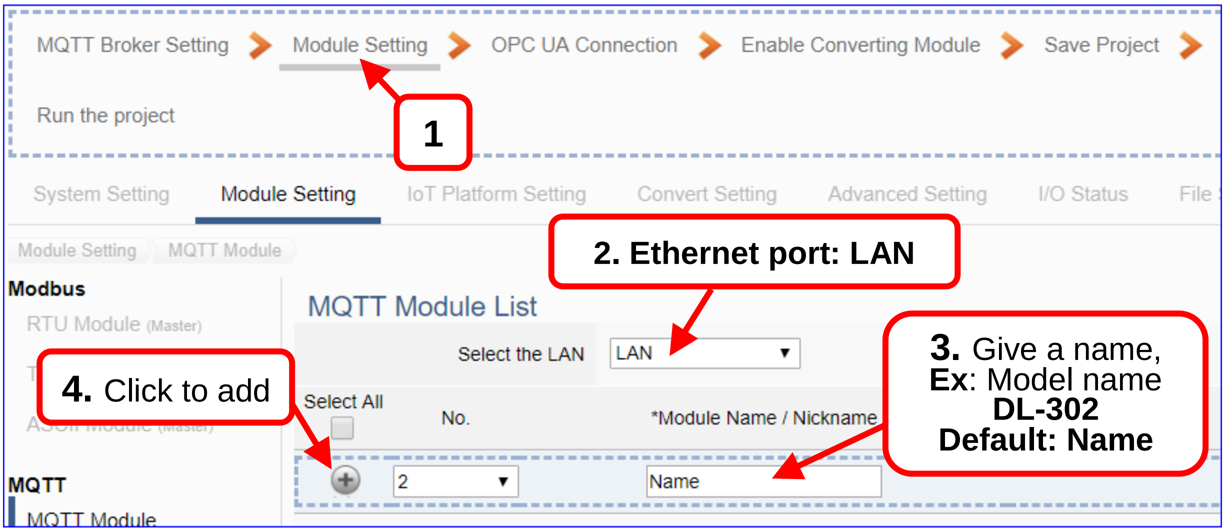
OK   Cancel

MQTT Connection > Remote Broker > Broker Content Settings	
Broker Name	The name of the remote MQTT Broker. (Editable)
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Keep Alive Time	The keep alive time. Default: 60 (second)
SSL/TLS	Check to enable the supporting of SSL/TLS security communication. Default: uncheck.
Anonymous Login	Check to allow anonymous login. Default: Check.
OK	Click to save the settings and exit.

Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting].** This page is for setting the communication values of the connected modules.

The Ethernet port is LAN for connecting with the TCP module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.



1

2. Ethernet port: LAN

3. Give a name,
Ex: Model name
DL-302
Default: Name

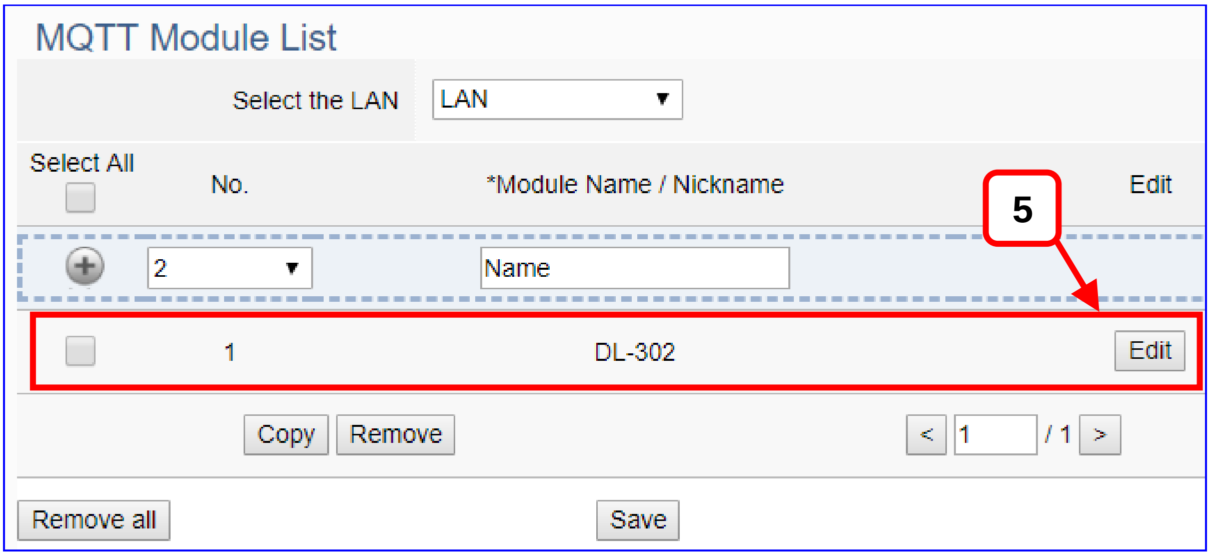
4. Click to add

MQTT Module List

Select the LAN: LAN ▼

Select All □	No.	*Module Name / Nickname
⊕	2 ▼	Name

Add a module (No.: 1, Name: DL-302) as below, and then click [Edit] button to enter the “Module Content Setting” page.



MQTT Module List

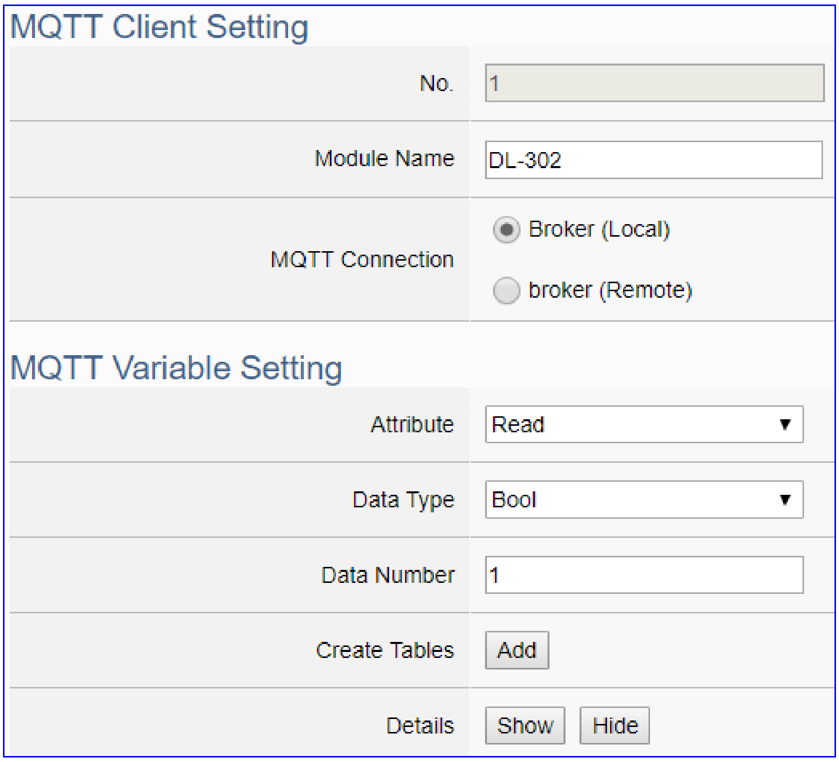
Select the LAN: LAN ▼

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	DL-302	Edit

If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

Click [Edit] can enter the [**MQTT Client Setting**] page to set up the MQTT Client and the MQTT Variable and the MQTT Variable table.

[**MQTT Client Setting**] page:



MQTT Client Setting

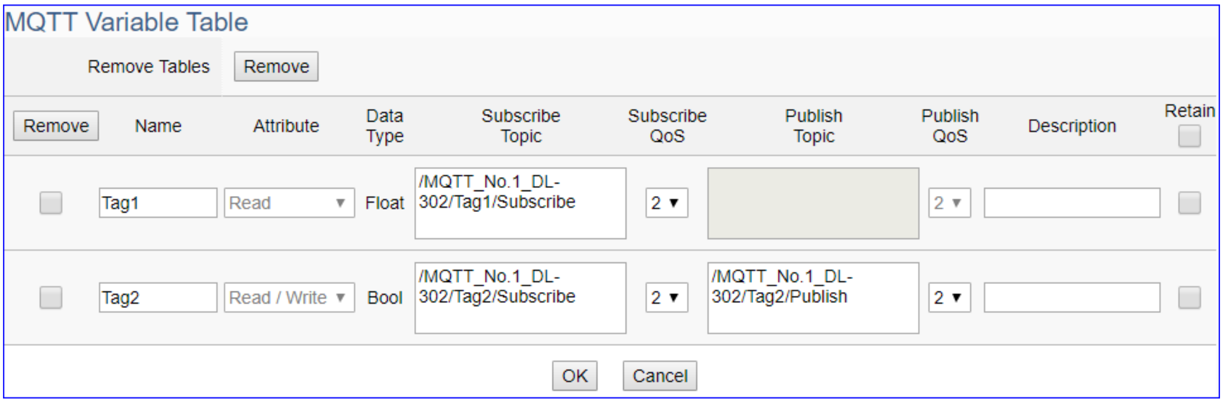
No.	1
Module Name	DL-302
MQTT Connection	● Broker (Local) ○ broker (Remote)

MQTT Variable Setting

Attribute	Read ▼
Data Type	Bool ▼
Data Number	1
Create Tables	Add
Details	Show Hide

MQTT Client Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
MQTT Connection	Check the Broker want to use Local Broker or Remote Broker.
MQTT Variable Setting	
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the MQTT variable. Include: Bool, Short, Unsigned Short, Long, Unsigned Long, Float, Double, String.
Data Number	The number for the I/O variables of the module. Default: 1.
Create Tables	Click [Add] button, it will add a variable list in the MQTT Variable Table.
Details Show / Hide	Click [Show] to display all fields, click [Hide] to hide some fields. The hide fields: Subscribe QoS, Publish QoS, Retain.

[**MQTT Variable Table**] :



MQTT Variable Table

Remove Tables [Remove]

Remove	Name	Attribute	Data Type	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Description	Retain □
□	Tag1	Read ▼	Float	/MQTT_No.1_DL-302/Tag1/Subscribe	2 ▼		2 ▼		□
□	Tag2	Read / Write ▼	Bool	/MQTT_No.1_DL-302/Tag2/Subscribe	2 ▼	/MQTT_No.1_DL-302/Tag2/Publish	2 ▼		□

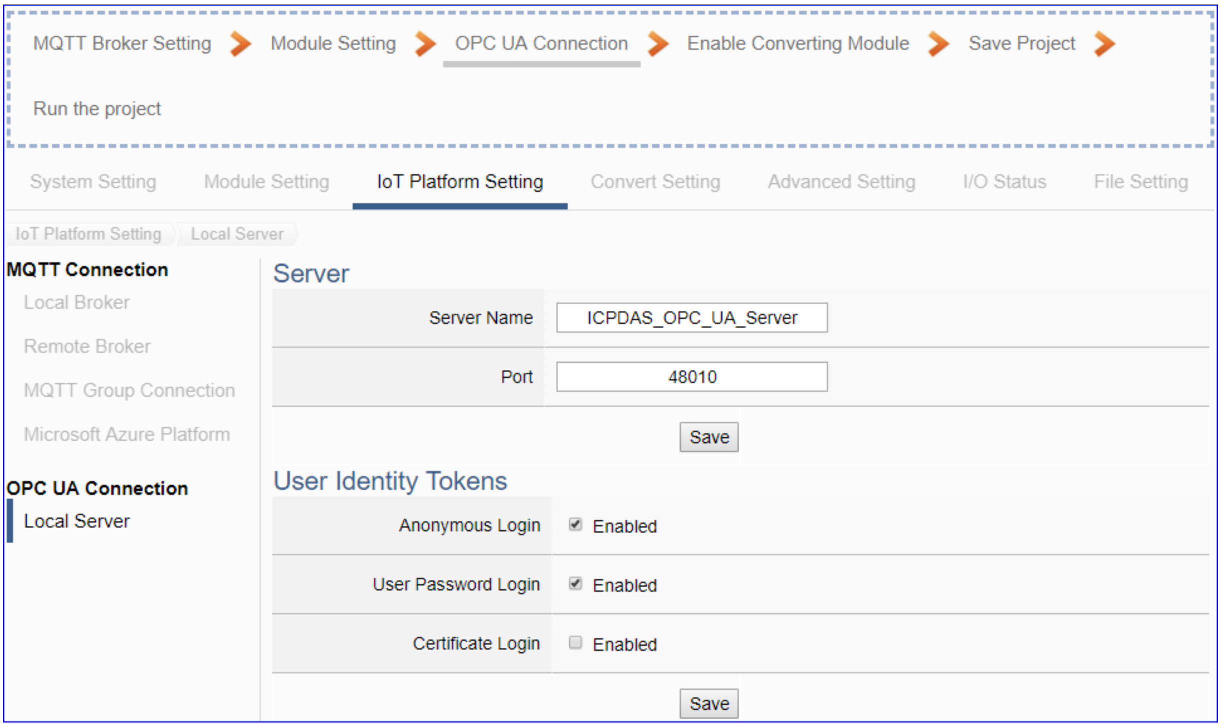
[OK] [Cancel]

MQTT Variable Table	
Details Show / Hide	Click [Show] to display all fields, click [Hide] to hide some fields. The hide fields: Subscribe QoS, Publish QoS and Retain.
Remove Table / Remove	Check the box in the left of the variable is to select that variable list, and click the “remove” on the box can delete that variable list. Click the “Remove” of the “Remove Table” will delete all lists.
Name	The name of the MQTT variable. Default: Tag#
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable. Include: Bool, Short, Unsigned Short, Long, Unsigned Long, Float, Double, String
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Description	For users set up the description for the variables.
Retain	Check [Retain] box of the top row can store the broker message for all variables in list. Check the box of each variable can store the broker message just that variable. Default: Uncheck.
OK / Cancer	Click [OK] to save and exit the page settings. Click [Cancer] to exit without saving.

Step 3. OPC UA Connection

Click the next step, and enter the **Step 3 [OPC UA Connection]** of the UI setting. This page is for setting the IoT platform and the OPC UA connection, e.g. the server name, port, login identity information, etc.

We select the “MQTT / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA Connection > Local Server**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.



Server

Server Name: ICPDAS_OPC_UA_Server

Port: 48010

Save

User Identity Tokens

Anonymous Login ☑ Enabled

User Password Login ☑ Enabled

Certificate Login □ Enabled

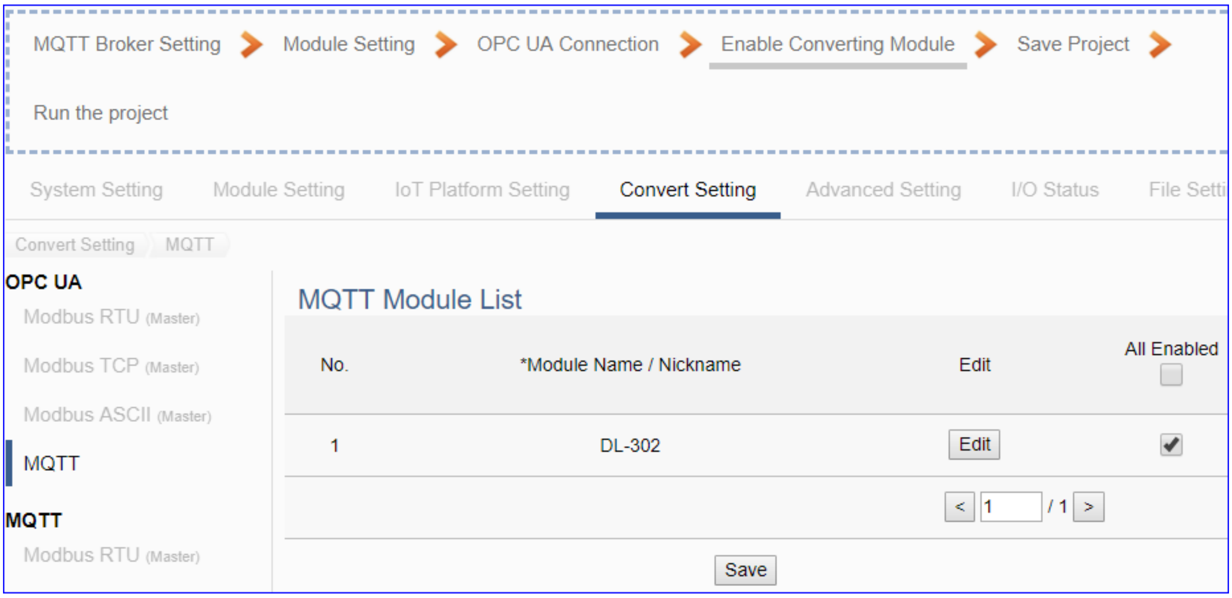
Save

OPC UA Connection > Local Server Setting –Server	
Server Name	Display the active OPC UA Server name. Not editable. System value: ICPDAS_OPC_UA_Server
Port	The communication port number of the OPC UA Server. System Default: 48010.
Save	Click to save the settings of this item.
OPC UA Connection > Local Server Setting –User Identity Tokens	
Anonymous Login	Check to enable the anonymous login of clients. Default: check.
User Password Login	Check to enable the user password login of clients. Default: uncheck.
Certificate Login	Check to enable the certificate login of clients. Default: uncheck.
Save	Click to save the settings of this item.

Step 4. Enable Converting Module

Click the next step, and enter the **Step 4 [Enable Converting Module]** UI setting This step is for enabling the MQTT / OPC UA conversion.

We select the "MQTT / OPC UA" conversion at the beginning, so this step will auto enter the [**OPC UA > MQTT**] page of Conversion setting. The "Step Box" will prevent the user from selecting the wrong platform.



MQTT Module List

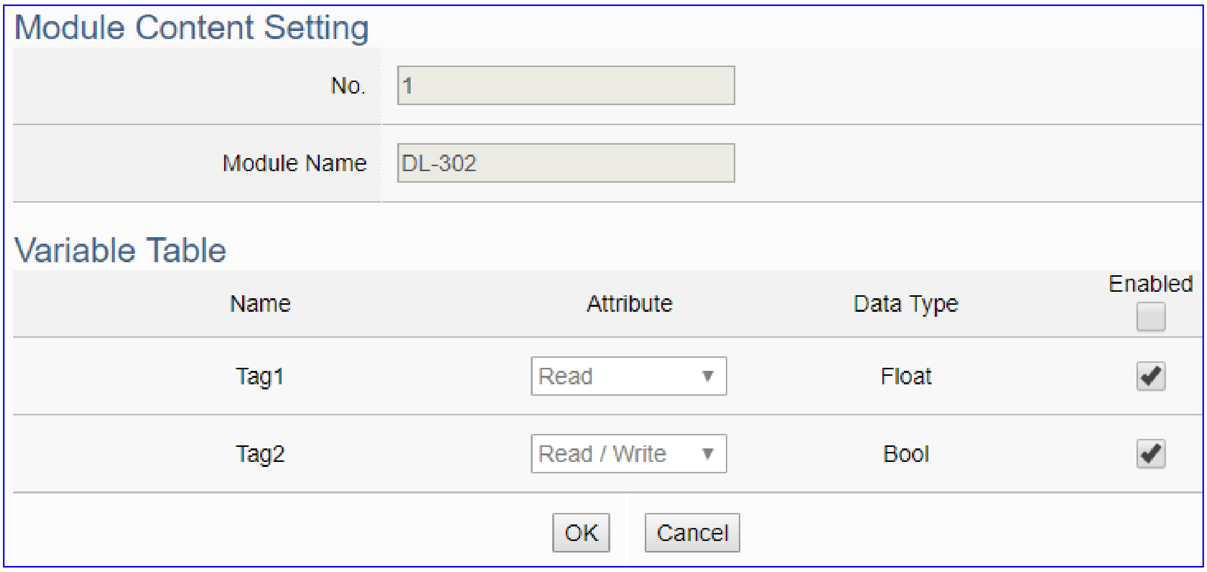
No.	*Module Name / Nickname	Edit	All Enabled ☐
1	DL-302	Edit	☑

< 1 / 1 >

Save

Convert Setting > OPC UA > MQTT - MQTT Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the "Variable Tale" setting. It is normal to set all channels as enabled, and the conversion will not affect the unconnected channels.
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:



Module Content Setting

No.	1
Module Name	DL-302

Variable Table

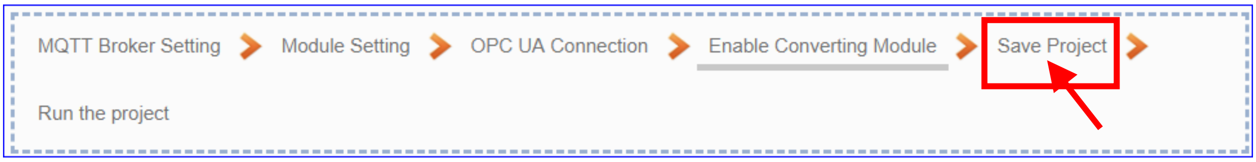
Name	Attribute	Data Type	Enabled □
Tag1	Read ▼	Float	☑
Tag2	Read / Write ▼	Bool	☑

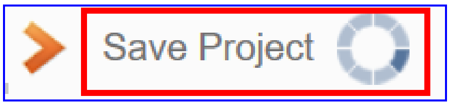
Convert Setting > OPC UA > MQTT – Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > OPC UA > MQTT – Variable Table	
Name	Display the variable name that set in the MQTT Module List (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus List. (Not editable) Include: Bool, Short, Float…
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK / Cancel	Click [OK] to save and exit the page settings. Click [Cancer] to exit without saving.

Step 5. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

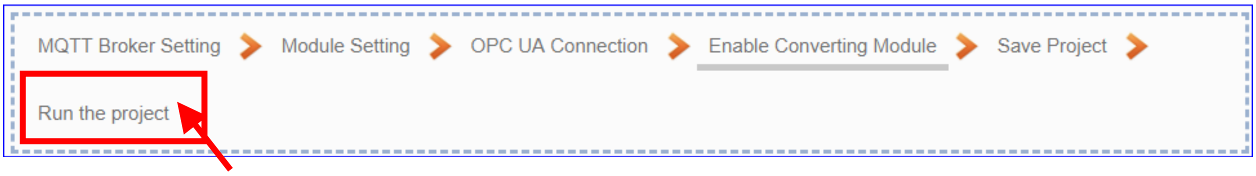
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



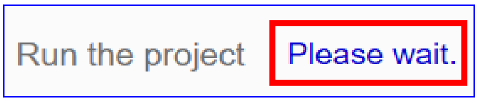


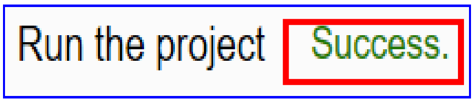
Step 6. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words "**Please wait**" (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words "**Please wait**" disappears, the new words "**Success**" appears (as below), that means the UA controller is running new project successfully.





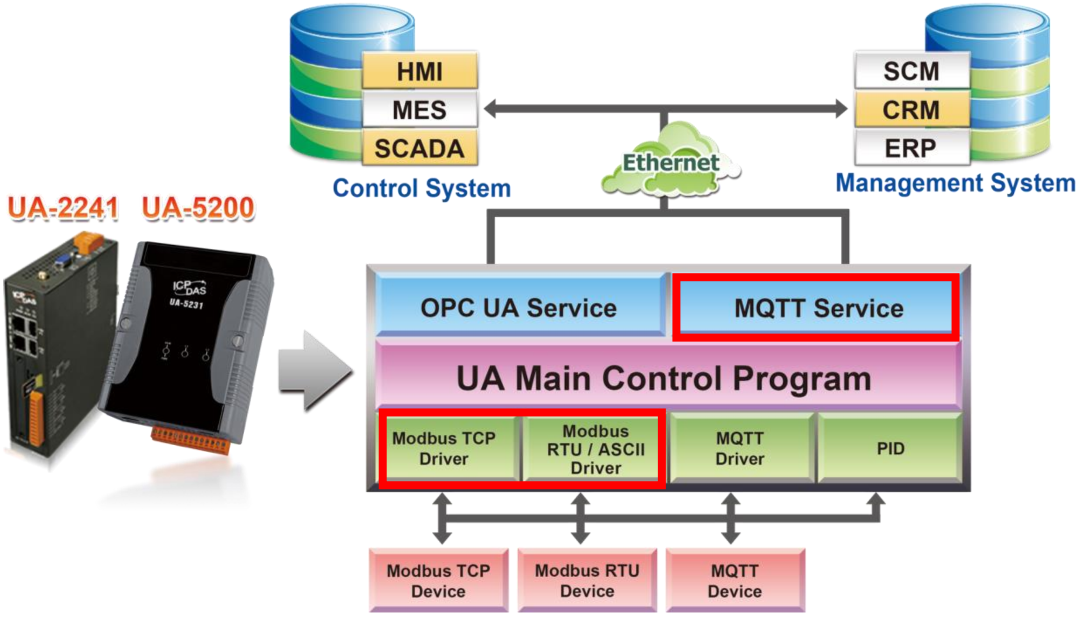
And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the conversion communication.

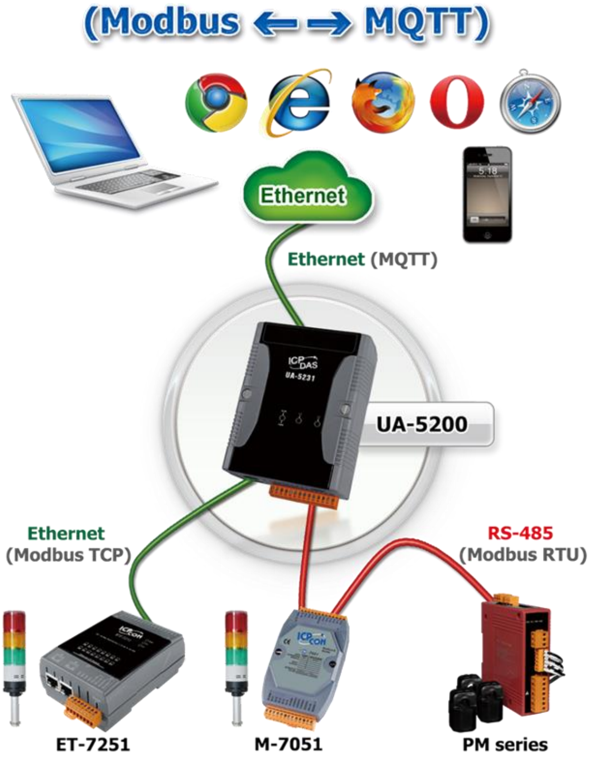
4.1.3. Modbus / MQTT Conversion

Modbus / MQTT Conversion include the conversion of MQTT and Modbus RTU / TCP / ASCII three protocols. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus device that connected to the controller.

Modbus / MQTT Function Diagram:

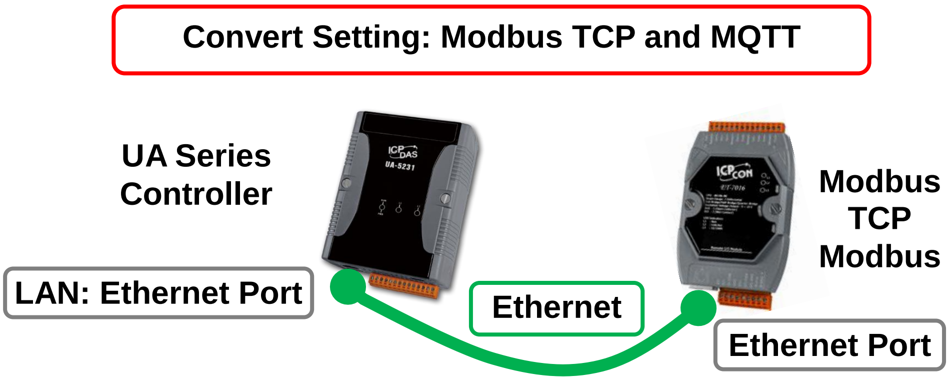


Application Solution:



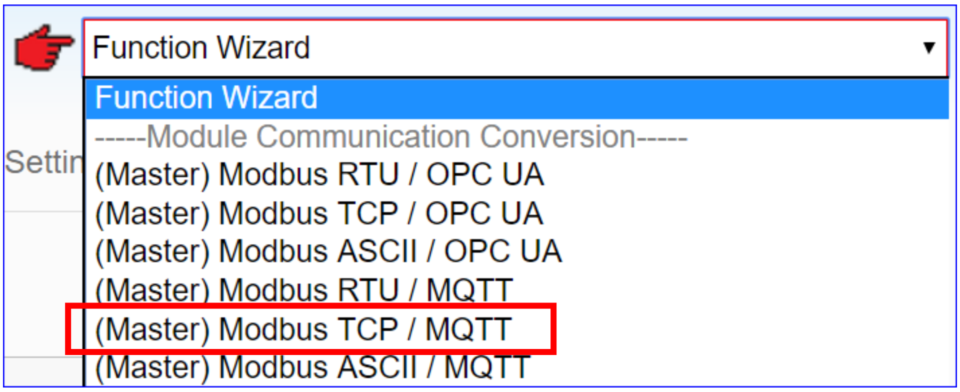
This section introduces the Modbus / MQTT conversion through the conversion of Modbus TCP and MQTT protocol.

- **Convert Setting: Modbus TCP and MQTT**



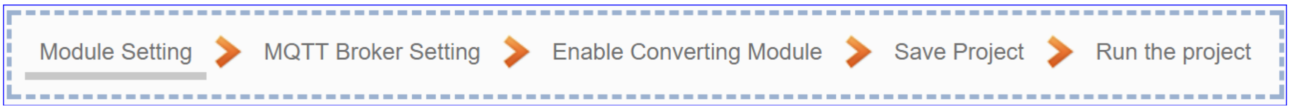
Note: The hardware/network connection methods please see the Chapter 2 .

When UA series controller connects the Modbus TCP (via Ethernet, as the picture) and read/write the Modbus I/O via MQTT Broker, user can choose the item [**Modbus TCP / MQTT**] of the "Module Communication Conversion" in the Function Wizard.


Function Wizard
Function Wizard
-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
(Master) Modbus RTU / MQTT
(Master) Modbus TCP / MQTT
(Master) Modbus ASCII / MQTT
Settin

[Step Box]:

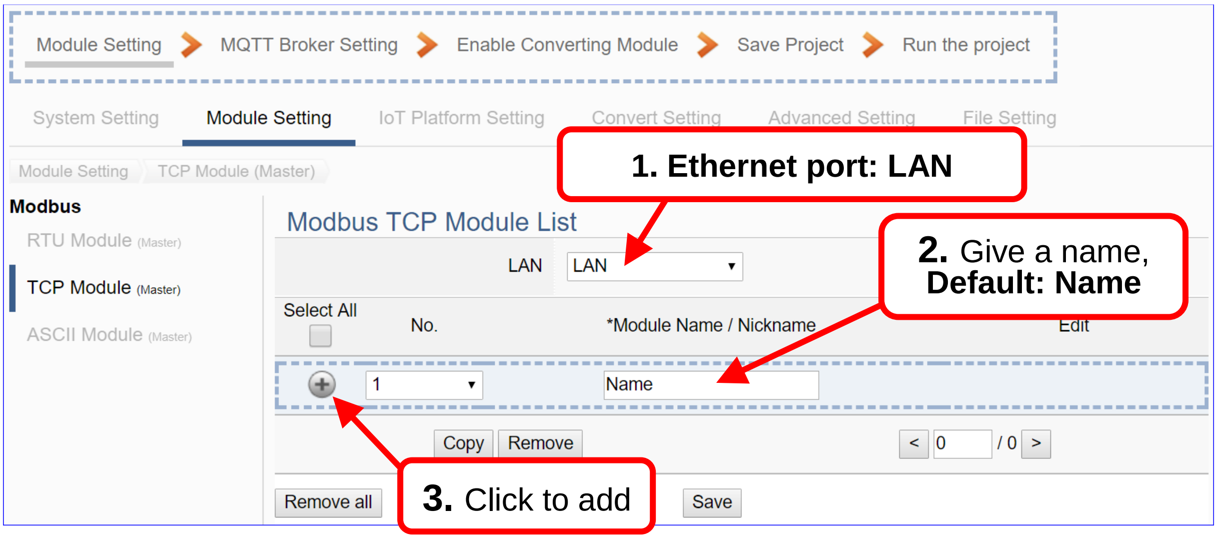
The Step Box of the [**Modbus TCP / MQTT**] has 5 steps as below. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project quickly and rightly.



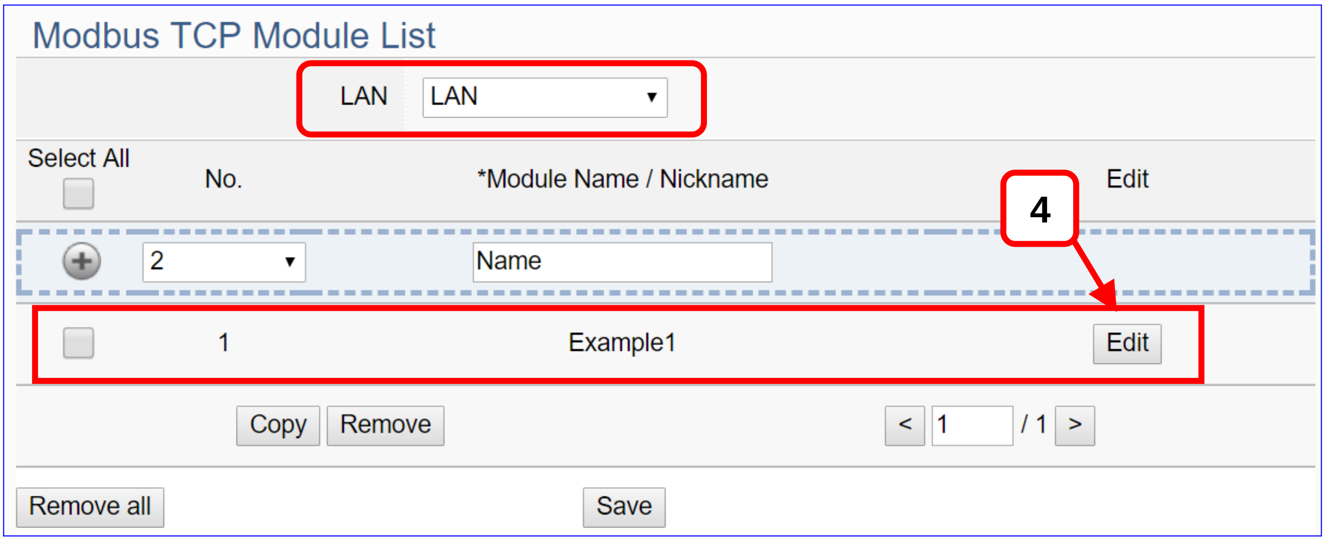
Step 7. Module Setting

This page is for setting the communication values of the connected modules.

The Ethernet port is LAN for connecting with the TCP module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

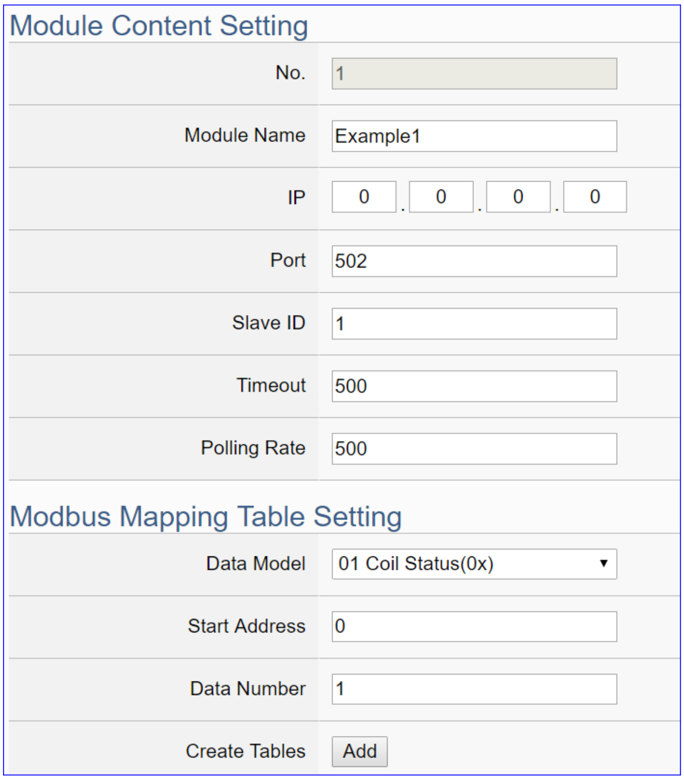


Add a module (No.: 1, Name: Example1) as below, and then click [Edit] button to enter the “Module Content Setting” page.



If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

Click [Edit] can enter the [**Module Content Setting**] page to set up the module and the Modbus address mapping table.

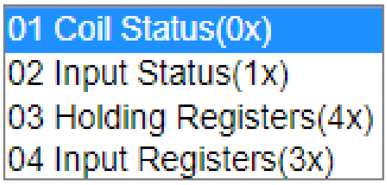


Module Content Setting

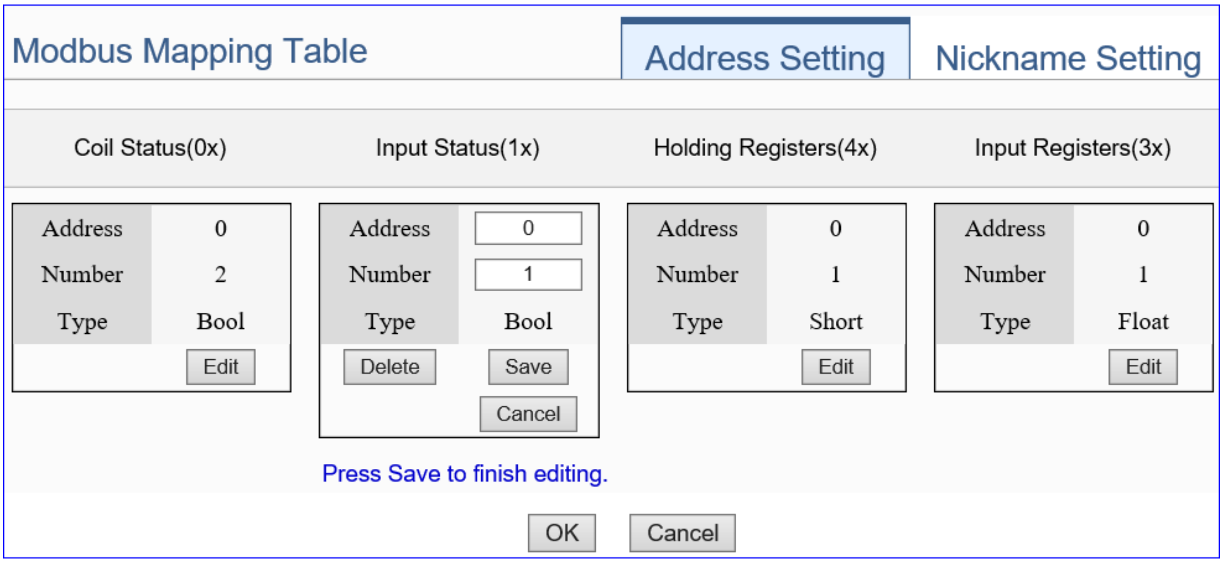
No.	1
Module Name	Example1
IP	0 . 0 . 0 . 0
Port	502
Slave ID	1
Timeout	500
Polling Rate	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▾
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
IP	The IP address of the connected module. Default: 0.0.0.0
Port	The port number for Modbus TCP. Default: 502
Slave ID	Set the Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Polling Rate	Set a time interval for the command. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

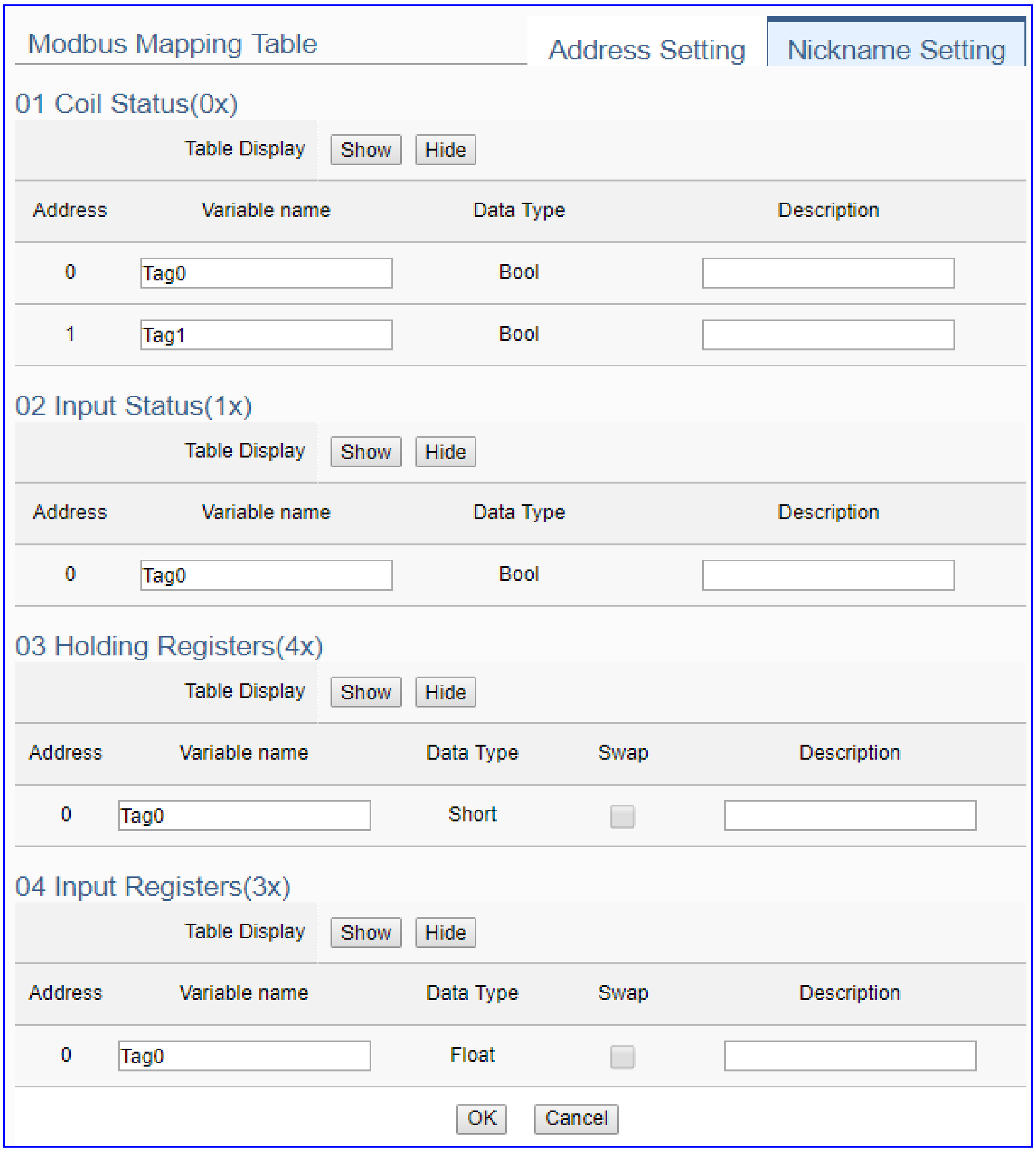


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



01 Coil Status(0x)

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

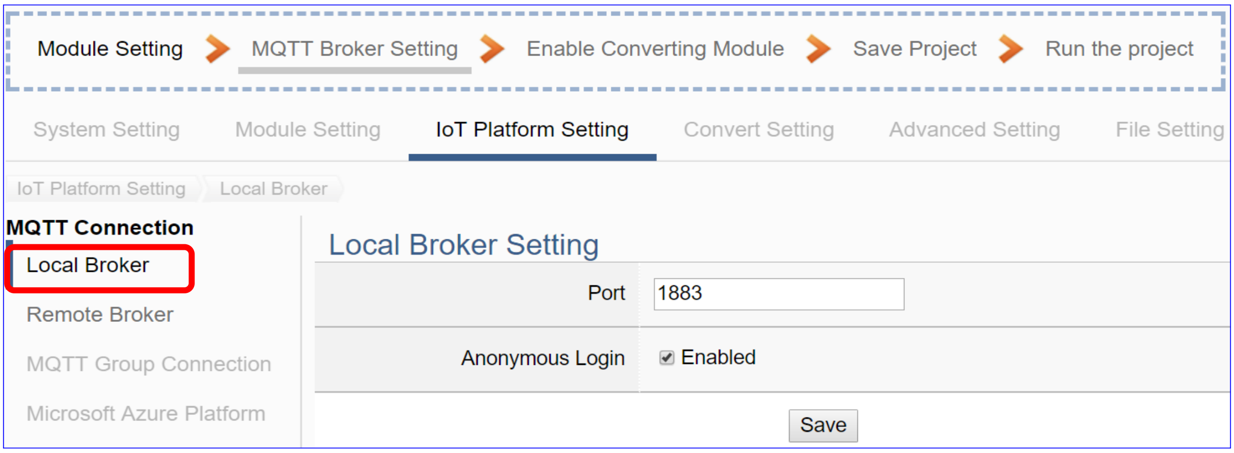
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 8. MQTT Broker Setting

Click the next step, and enter the **Step 2 [MQTT Broker Setting]** of the UI setting. This page is for setting the IoT platform and the MQTT Broker connection, e.g. the local or remote broker, port, login information, etc.

We select the “Modbus RTU / MQTT” conversion at the beginning, so this step will auto enter the [**MQTT Connection > Local Broker**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform. User can choose the local or remote broker for the MQTT connection.

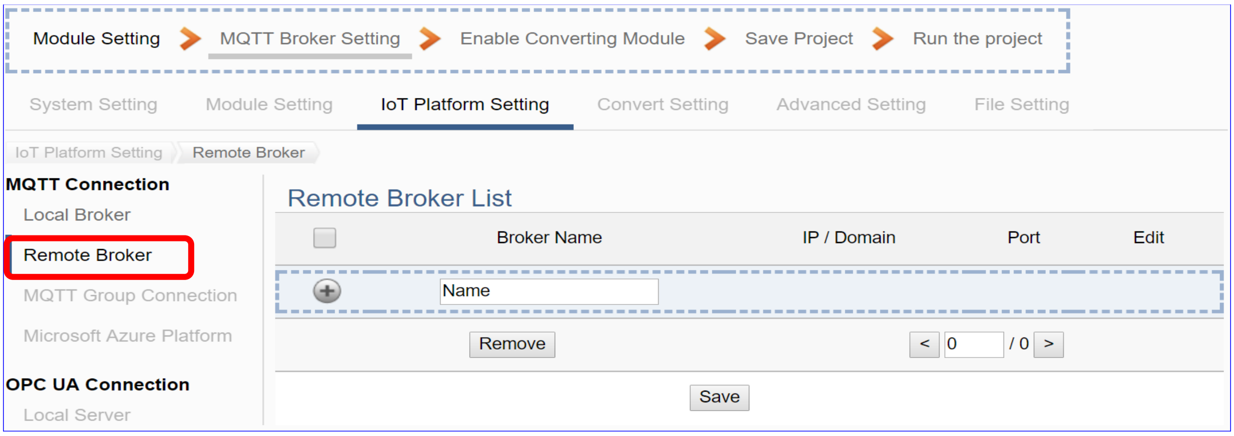


Local Broker Setting

Port: 1883

Anonymous Login: ☑ Enabled

MQTT Connection > Local Broker Setting	
Port	The COM port of the Local MQTT Broker. System default: 1883
Anonymous Login	Check to allow anonymous login. Default: Check.
Save	Click to save the setting of this page.

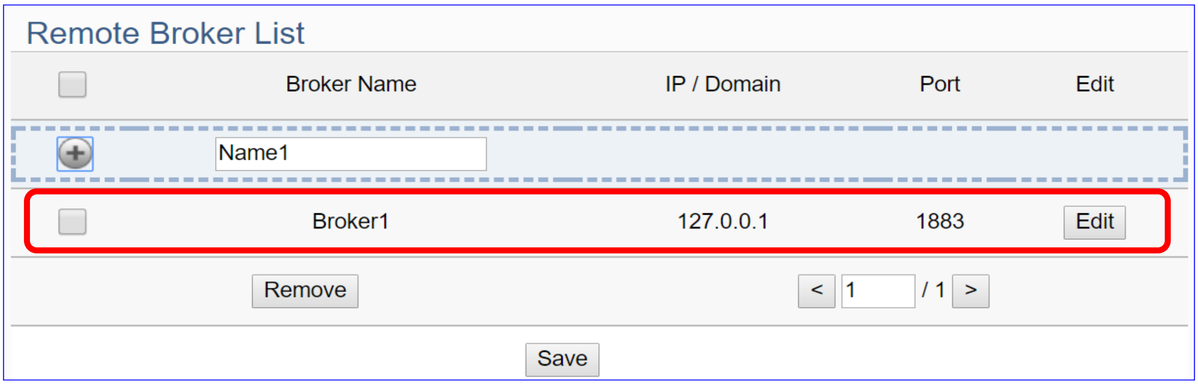


Remote Broker List

□	Broker Name	IP / Domain	Port	Edit
⊕	Name			

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
⊕	Click to add a new remote Broker.
Save	Click to save the settings of this page.

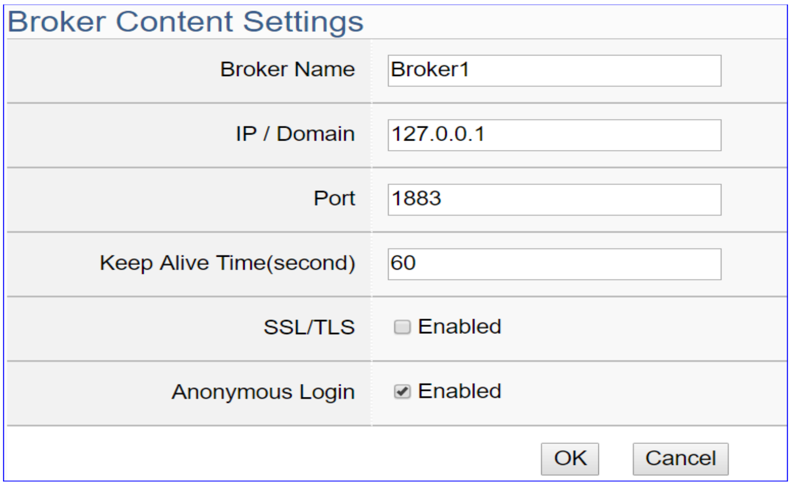
After creating a new Remote Broker (as below) :



Remote Broker List

	Broker Name	IP / Domain	Port	Edit
⊕	Name1			
□	Broker1	127.0.0.1	1883	Edit

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Edit / Remove	Click [Edit] can set the Broker. Click the left box and [remove] can delete the Broker.
Save	Click to save the settings of this item.



Broker Content Settings

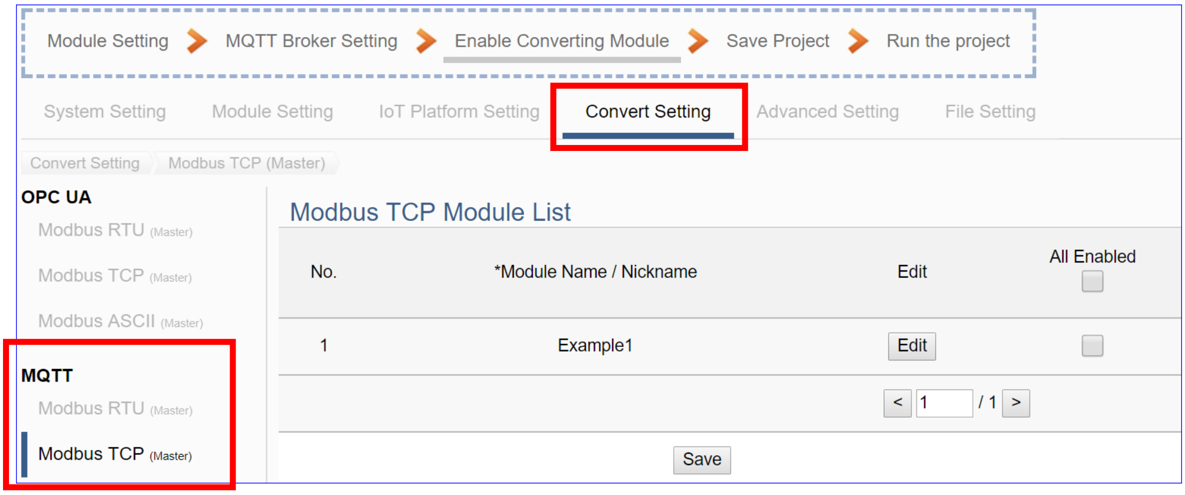
Broker Name	Broker1
IP / Domain	127.0.0.1
Port	1883
Keep Alive Time(second)	60
SSL/TLS	□ Enabled
Anonymous Login	☑ Enabled

MQTT Connection > Remote Broker > Broker Content Settings	
Broker Name	The name of the remote MQTT Broker. (Editable)
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Keep Alive Time	The keep alive time. Default: 60 (second)
SSL/TLS	Check to enable the supporting of SSL/TLS security communication. Default: uncheck.
Anonymous Login	Check to allow anonymous login. Default: Check.
OK	Click to save the settings and exit.

Step 9. Enable Converting Module

Click the next step, and enter the **Step 3 [Enable Converting Module]** UI setting This step is for enabling the module for the Modbus TCP / MQTT conversion.

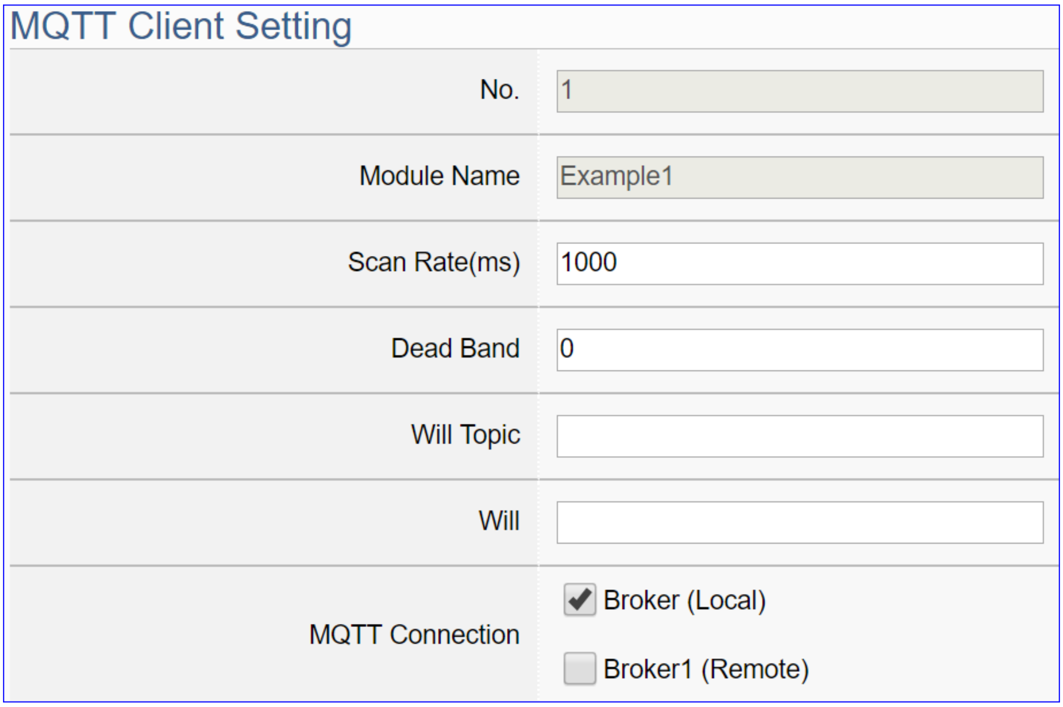
We select the “Modbus TCP / MQTT” conversion at the beginning, so this step will auto enter the [**MQTT > Modbus TCP (Master)**] page of Conversion setting. The “Step Box” will prevent the user from selecting the wrong platform.



No.	*Module Name / Nickname	Edit	All Enabled □
1	Example1	Edit	□

Convert Setting > MQTT > Modbus TCP (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	Click to enter the “MQTT Client Setting” page to set up the Topic, QoS, Publish, Subscribe …
< 1 /1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

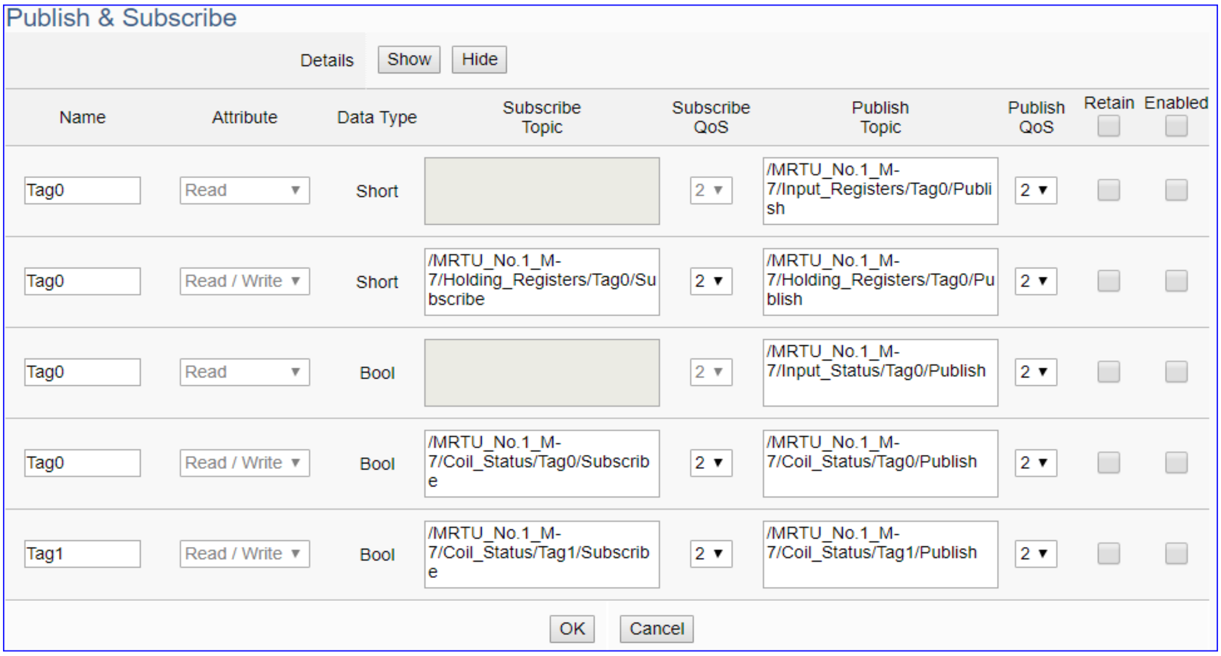
Click [Edit] button cauld enter the “MQTT Client Setting” page:



MQTT Client Setting

No.	1
Module Name	Example1
Scan Rate(ms)	1000
Dead Band	0
Will Topic	
Will	
MQTT Connection	☑ Broker (Local) ☐ Broker1 (Remote)

Convert Setting > MQTT > Modbus TCP (Master) – MQTT Client Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Scan Rate(ms)	Set an update frequency for the task data. Default: 1000 (Unit: ms)
Dead Bend	Give a dead bend value for updating a float signal. Default: 0
Will Topic	Enter the title of a disconnect notice. Default: Null.
Will	Enter a disconnect notice. Default: Null.
MQTT Connection	Check the Broker want to use Local Broker or Remote Broker.



Publish & Subscribe

Details [Show] [Hide]

Name	Attribute	Data Type	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Retain □	Enabled □
Tag0	Read ▼	Short		2 ▼	/MRTU_No.1_M-7/Input_Registers/Tag0/Publish	2 ▼	□	□
Tag0	Read / Write ▼	Short	/MRTU_No.1_M-7/Holding_Registers/Tag0/Subscribe	2 ▼	/MRTU_No.1_M-7/Holding_Registers/Tag0/Publish	2 ▼	□	□
Tag0	Read ▼	Bool		2 ▼	/MRTU_No.1_M-7/Input_Status/Tag0/Publish	2 ▼	□	□
Tag0	Read / Write ▼	Bool	/MRTU_No.1_M-7/Coil_Status/Tag0/Subscribe	2 ▼	/MRTU_No.1_M-7/Coil_Status/Tag0/Publish	2 ▼	□	□
Tag1	Read / Write ▼	Bool	/MRTU_No.1_M-7/Coil_Status/Tag1/Subscribe	2 ▼	/MRTU_No.1_M-7/Coil_Status/Tag1/Publish	2 ▼	□	□

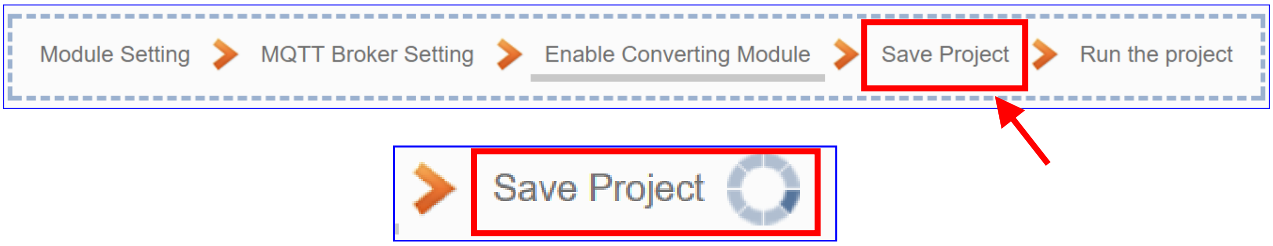
[OK] [Cancel]

Convert Setting > MQTT > Modbus TCP (Master) – Publish & Subscribe	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Name	The variable name of the mapping address. (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Retain	Check [Retain] box of the top row can store the broker message for all variables in list. Check the box of each variable can store the broker message just that variable. Default: Uncheck.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

Step 10. Save Project

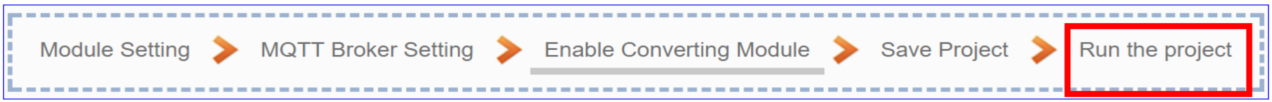
The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.

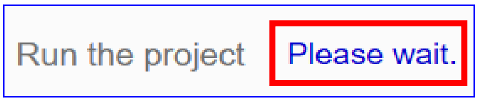


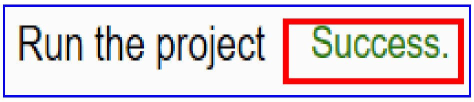
Step 11. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words “**Please wait**” (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words “**Please wait**” disappears, the new words “**Success**” appears (as below), that means the UA controller is running new project successfully.





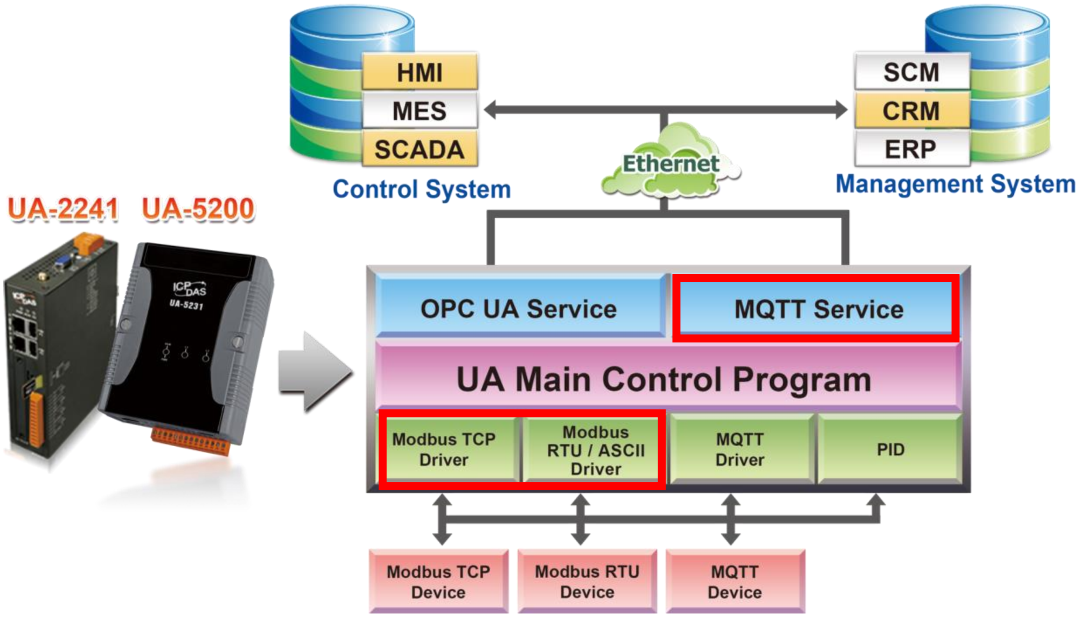
And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the conversion communication.

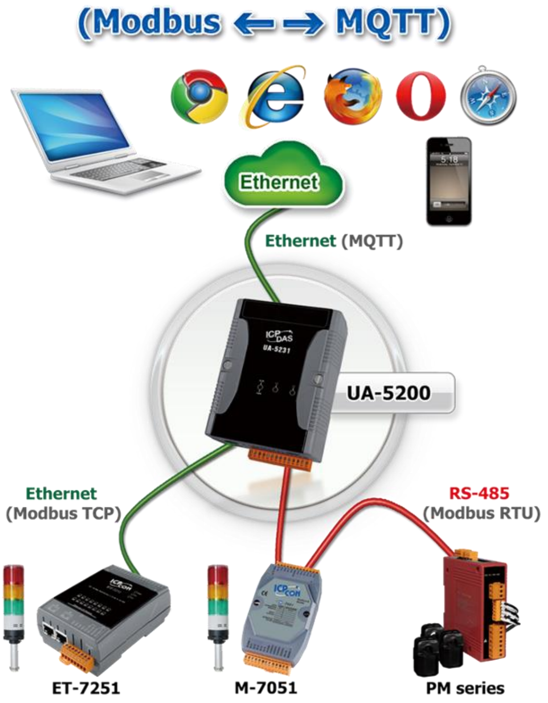
4.1.4. Modbus / MQTT JSON Conversion

Modbus / MQTT JSON Conversion include the conversion of MQTT and Modbus RTU / TCP / ASCII three protocols. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus RTU devices that connected to the controller.

Modbus / MQTT JSON Function Diagram:

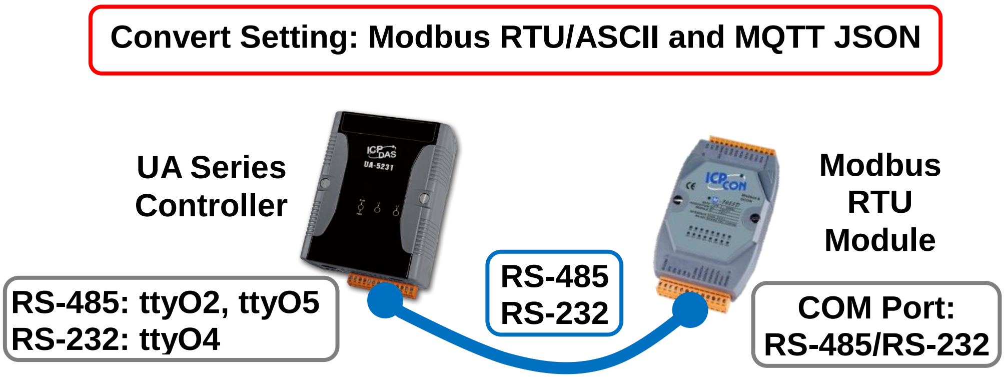


Application Solution:



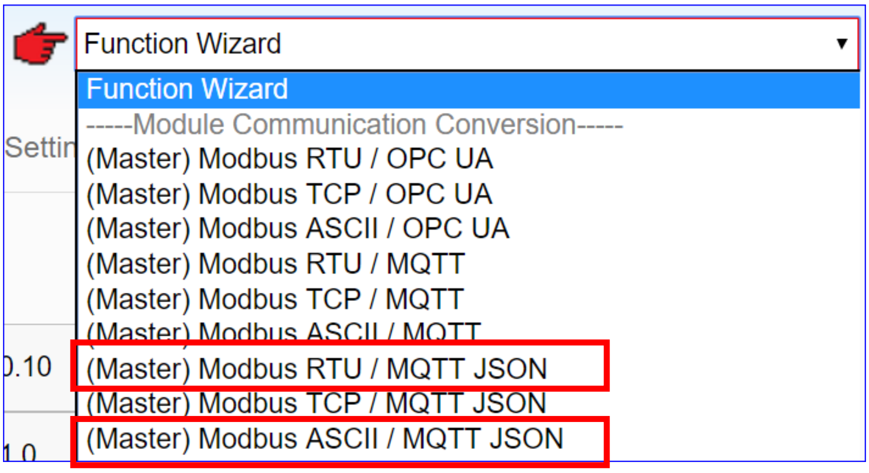
The settings of Modbus RTU/ASCII are the same. Here will introduce them together as a setting sample for Modbus / MQTT JSON conversion.

- **Modbus RTU / ASCII 與 MQTT JSON 轉換傳輸:**



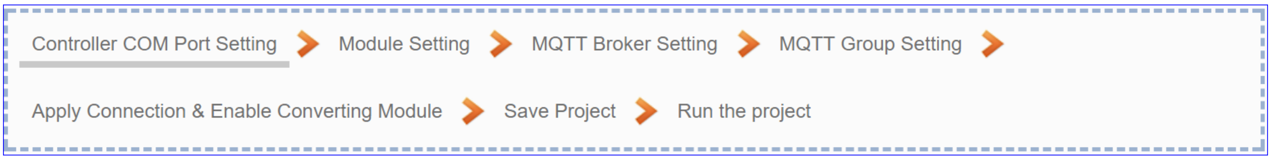
Note: The hardware/network connection methods please see the Chapter 2.

When UA series controller connects the Modbus RTU or ASCII module (via RS-485 / RS-232, as the picture) and read/write the Modbus I/O via MQTT Broker, user can choose the item [**Modbus RTU / MQTT JSON**] or [**Modbus ASCII / MQTT JSON**] of the "Module Communication Conversion" in the Function Wizard.


Function Wizard
Function Wizard
-----Module Communication Conversion-----
(Master) Modbus RTU / OPC UA
(Master) Modbus TCP / OPC UA
(Master) Modbus ASCII / OPC UA
(Master) Modbus RTU / MQTT
(Master) Modbus TCP / MQTT
(Master) Modbus ASCII / MQTT
(Master) Modbus RTU / MQTT JSON
(Master) Modbus TCP / MQTT JSON
(Master) Modbus ASCII / MQTT JSON

[Step Box]:

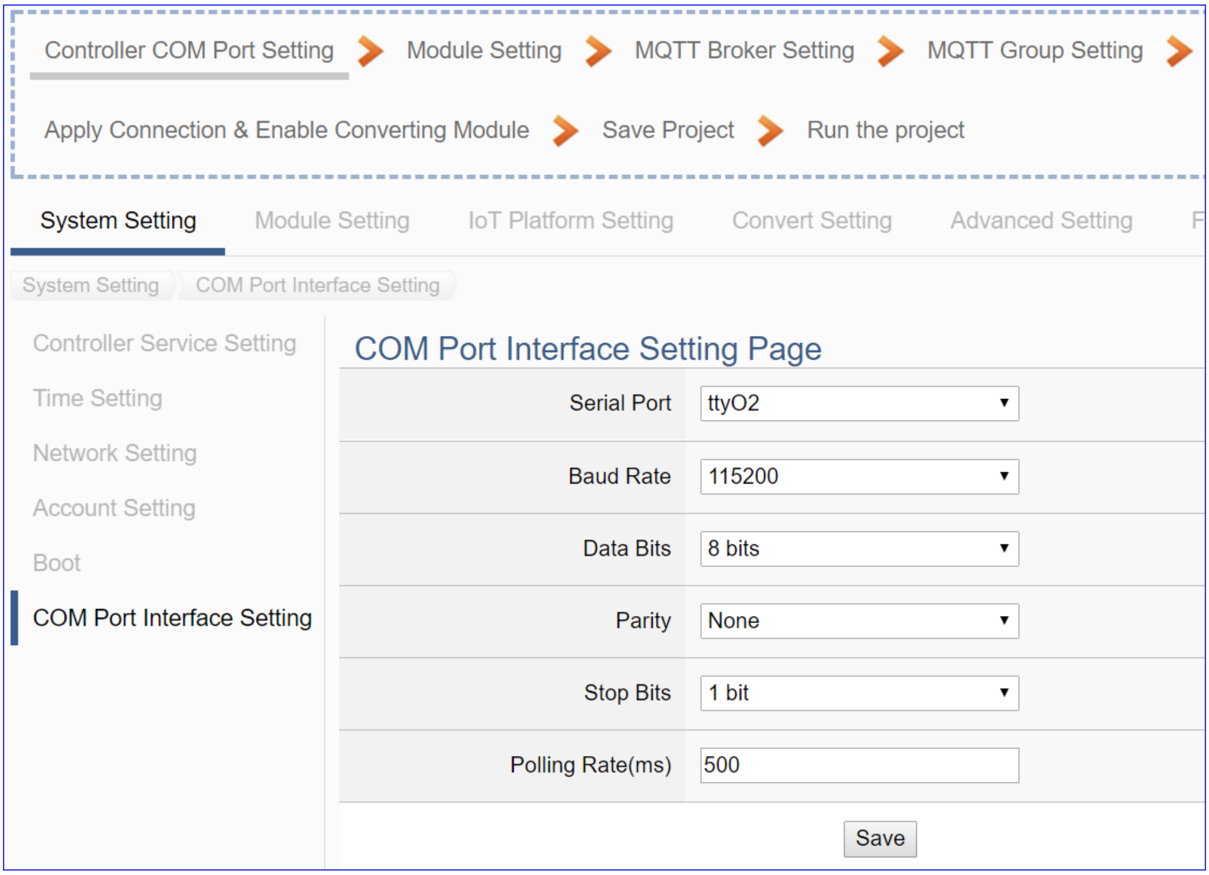
The Step Box of the [**Modbus RTU / MQTT JSON**] and [**Modbus ASCII / MQTT JSON**] has the same 7 steps, here will introduce them together. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project quickly and rightly.



Step 1. Controller COM Port Setting

This page allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

The user can find the default communication values of our I/O modules from the module CD, manual or I/O Module website.



COM Port Interface Setting Page

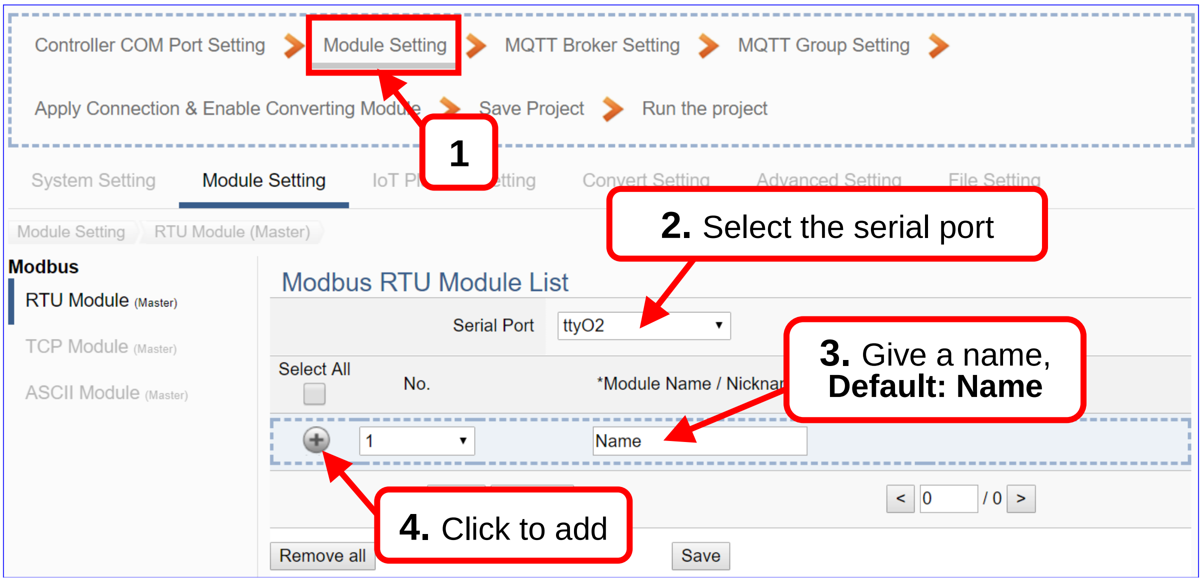
Serial Port	ttyO2
Baud Rate	115200
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Polling Rate(ms)	500

COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click [Save] button could save the settings of this page.

Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting]** of the UI setting.

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.



Serial Port: ttyO2

⊕ 1 ▾ Name

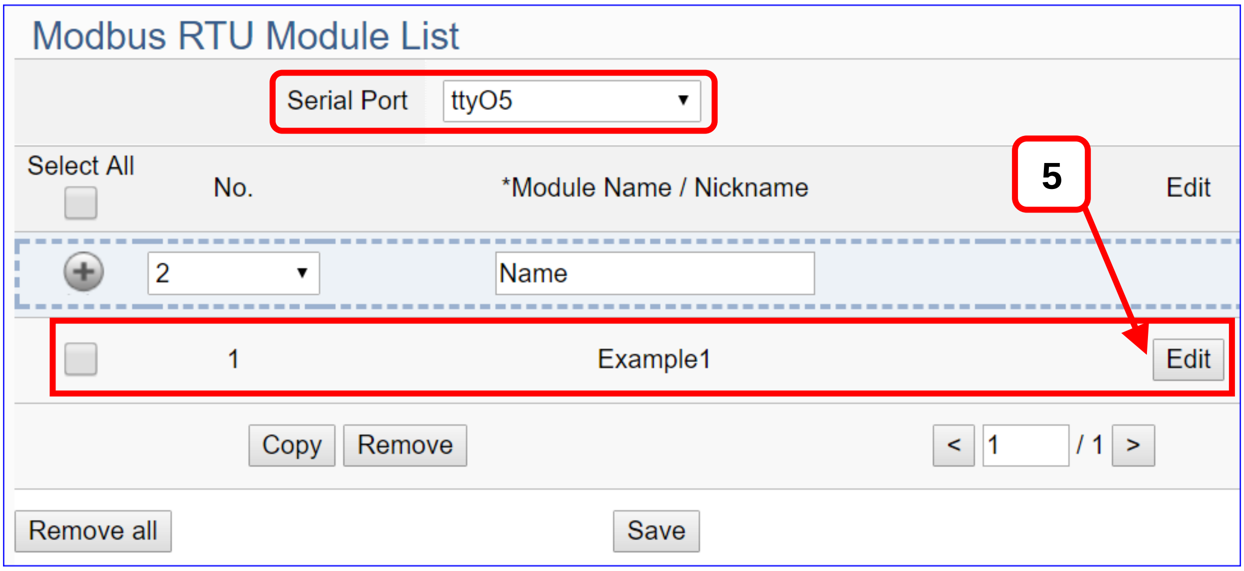
1

2. Select the serial port

3. Give a name, **Default: Name**

4. Click to add

Add a module (No.: 1, Name: Example1) as below, and then click [Edit] button to enter the “Module Content Setting” page.



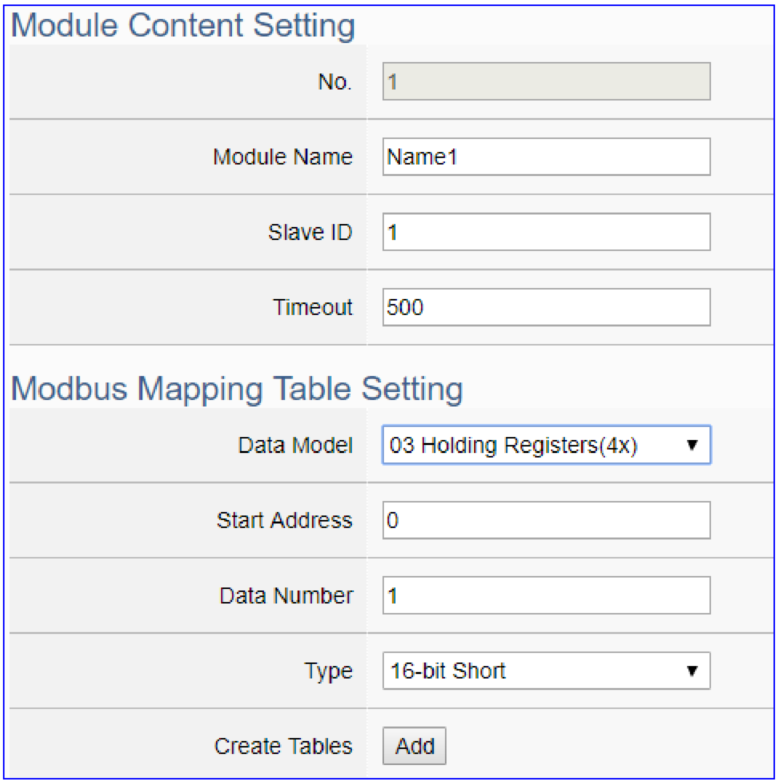
Serial Port: ttyO5

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▾	Name	
□	1	Example1	Edit

5

If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

[**Module Content Setting**] page can set up the module and the Modbus address mapping table:

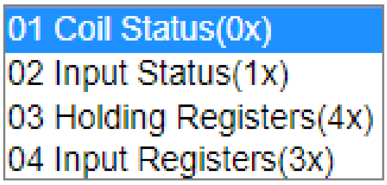


Module Content Setting

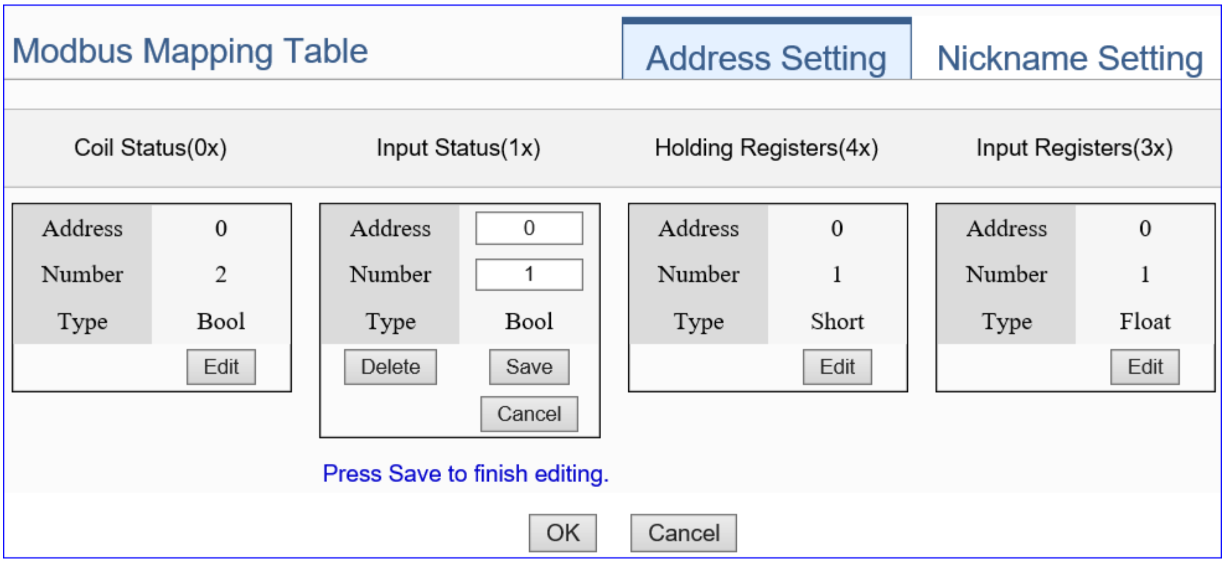
No.	1
Module Name	Name1
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	03 Holding Registers(4x) ▼
Start Address	0
Data Number	1
Type	16-bit Short ▼
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models “01” ~ “04” for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

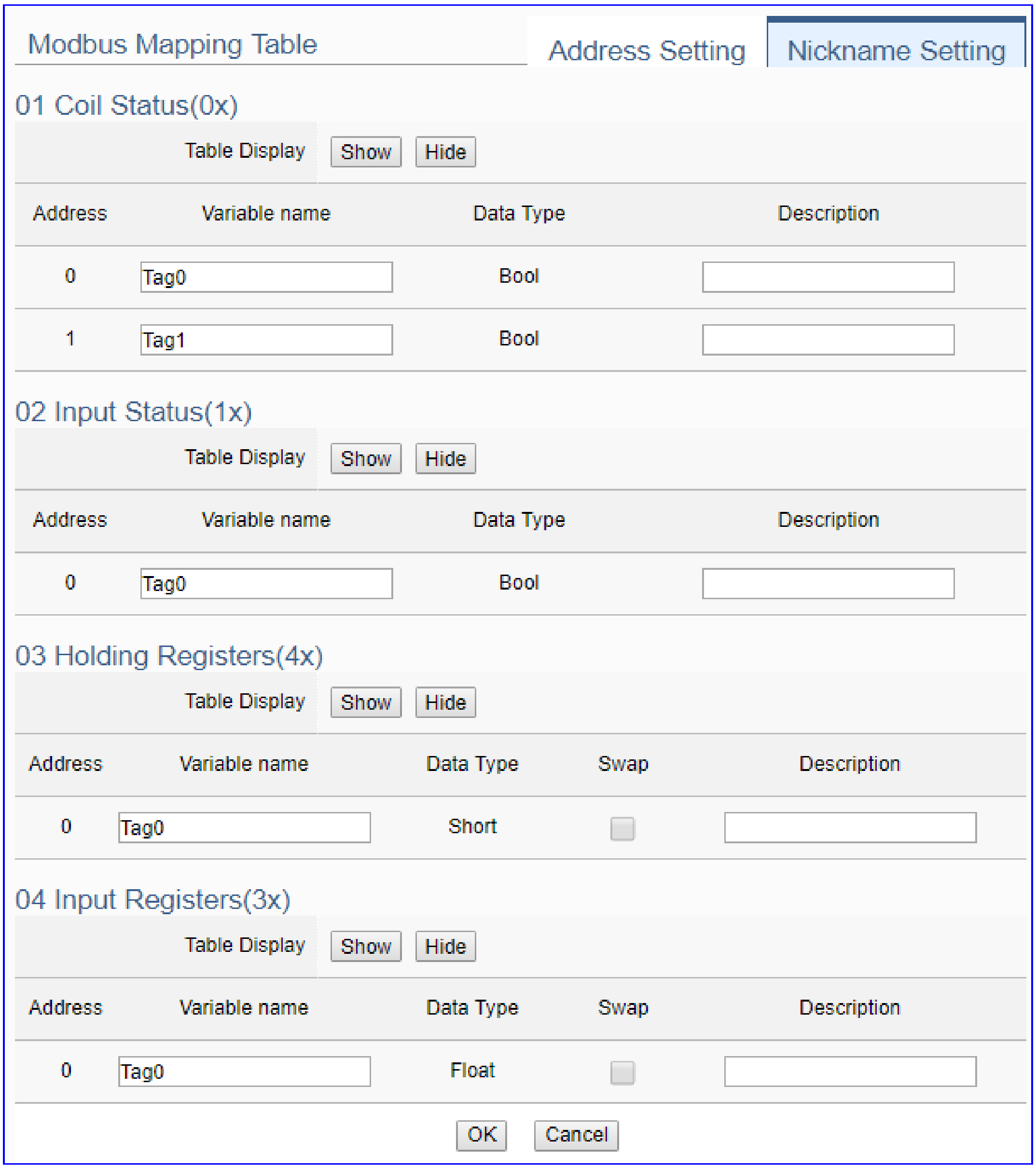


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	☐	

04 Input Registers(3x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	☐	

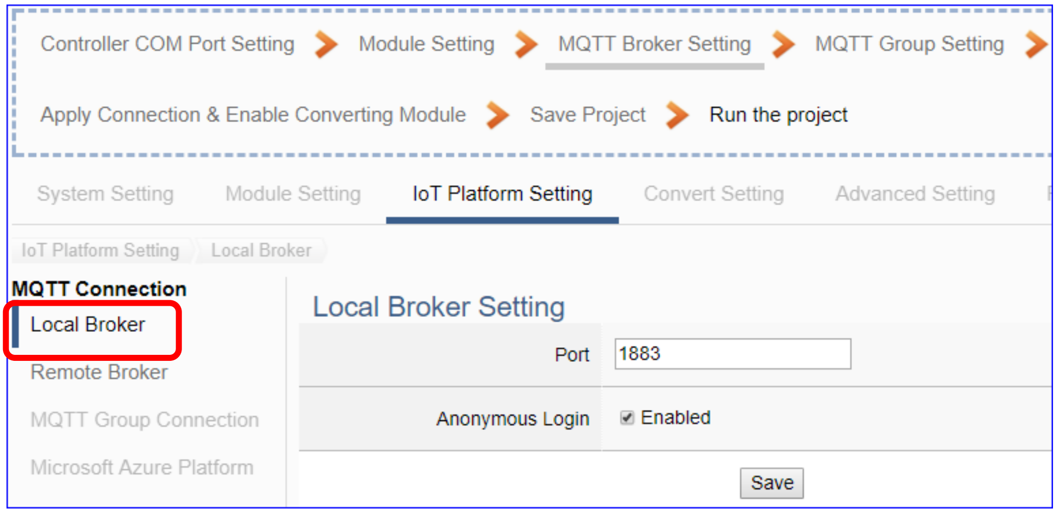
[OK] [Cancel]

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 3. MQTT Broker Setting

Click the next step, and enter the **Step 3 [MQTT Broker Setting]** of the UI setting. This page is for setting the IoT platform and the MQTT Broker connection, e.g. the local or remote broker, port, login information, etc.

We select the “Modbus RTU (or ASCII) / MQTT JSON” conversion at the beginning, so this step will auto enter the [**MQTT Connection > Local Broker**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform. User can choose the local or remote broker for the MQTT connection.

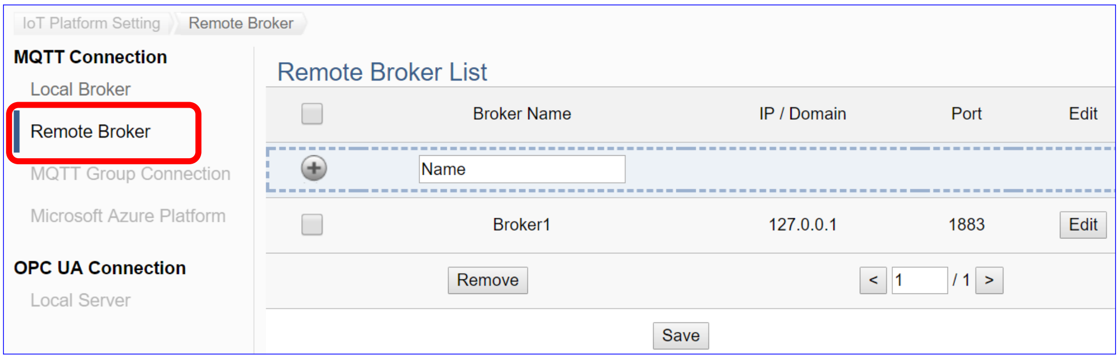


Local Broker Setting

Port: 1883

Anonymous Login: ☑ Enabled

MQTT Connection > Local Broker Setting	
Port	The COM port of the Local MQTT Broker. System default: 1883
Anonymous Login	Check to allow anonymous login. Default: Check.
Save	Click to save the setting of this page.



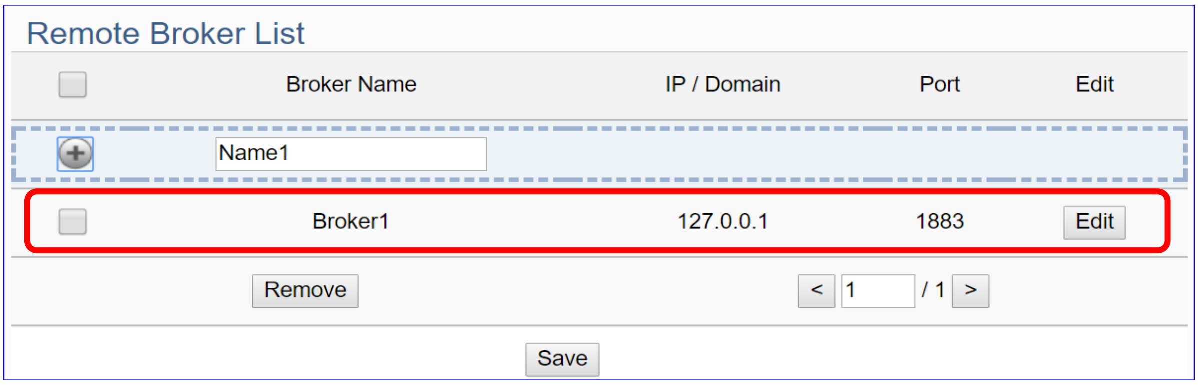
Remote Broker List

□	Broker Name	IP / Domain	Port	Edit
⊕	Name			
□	Broker1	127.0.0.1	1883	Edit

< 1 / 1 >

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
⊕	Click to add a new remote Broker.
Save	Click to save the settings of this page.

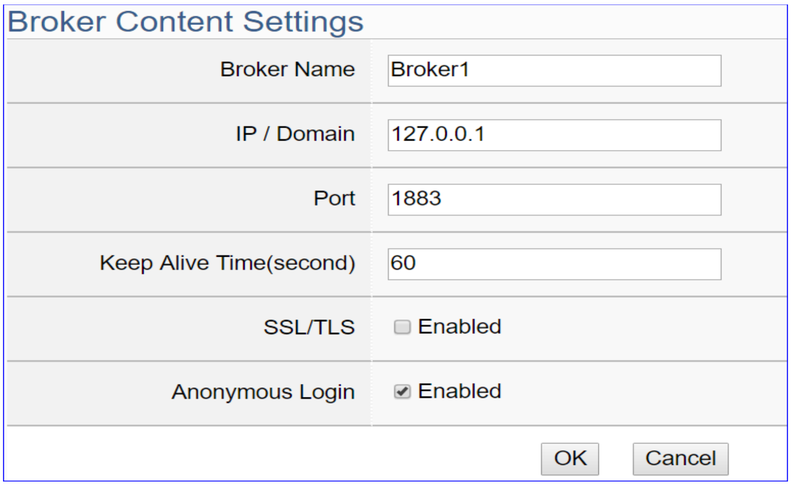
After creating a new Remote Broker (as below) :



Remote Broker List

□	Broker Name	IP / Domain	Port	Edit
⊕	Name1			
□	Broker1	127.0.0.1	1883	Edit

MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Edit / Remove	Click [Edit] can set the Broker. Click the left box and [remove] can delete the Broker.
Save	Click to save the settings of this item.



Broker Content Settings

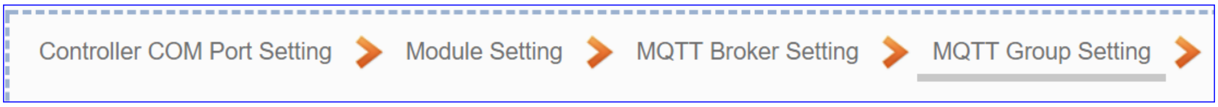
Broker Name	Broker1
IP / Domain	127.0.0.1
Port	1883
Keep Alive Time(second)	60
SSL/TLS	□ Enabled
Anonymous Login	☑ Enabled

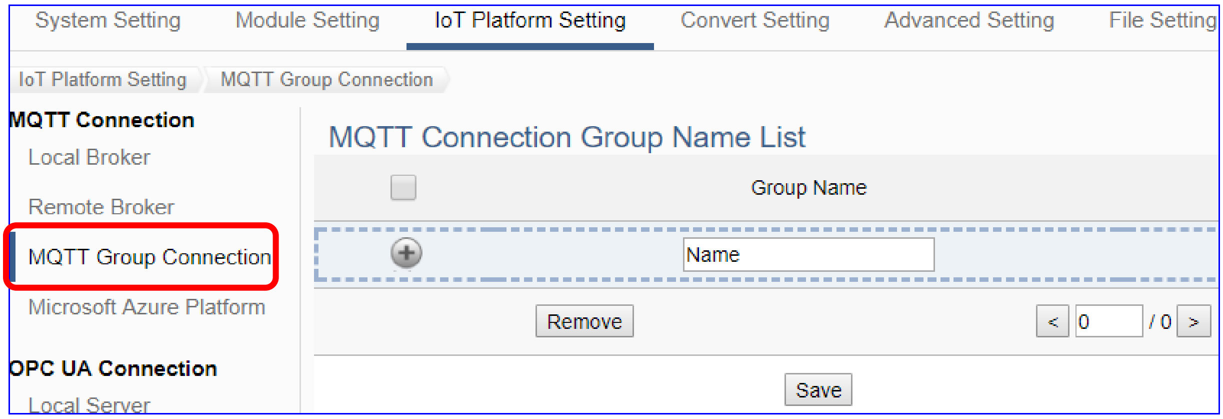
MQTT Connection > Remote Broker > Broker Content Settings	
Broker Name	The name of the remote MQTT Broker. (Editable)
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Keep Alive Time	The keep alive time. Default: 60 (second)
SSL/TLS	Check to enable the supporting of SSL/TLS security communication. Default: uncheck.
Anonymous Login	Check to allow anonymous login. Default: Check.
OK	Click to save the settings and exit.

Step 4. MQTT Group Setting

Click the next step, and enter the **Step 4 [MQTT Group Setting]** of the UI setting. This page is for setting the MQTT Group connection, Setting with the MQTT JSON function in the Convert Transmission, It can make the I/O module messages in groups and then mapping to the user-defined publish and subscribe topics.

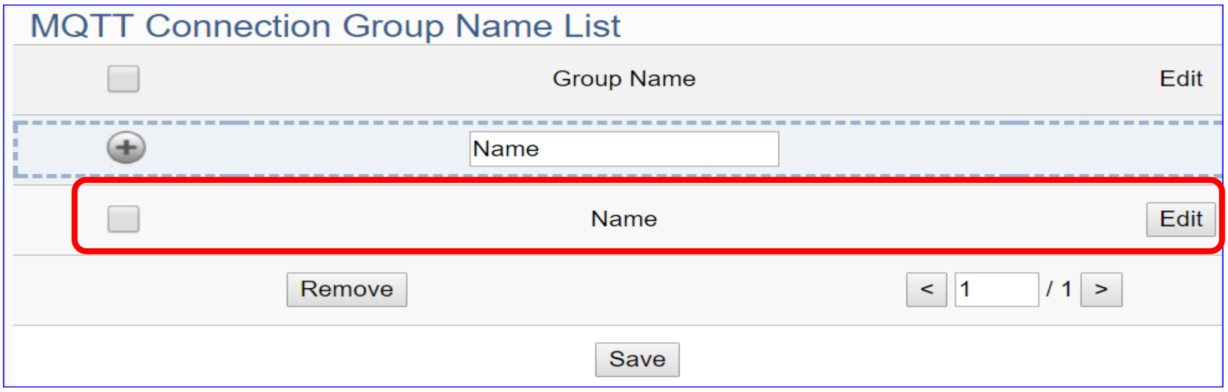
We select the “Modbus RTU (or ASCII) / MQTT JSON” conversion at the beginning, so this step will auto enter the [**MQTT Connection > MQTT Group Connection**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.





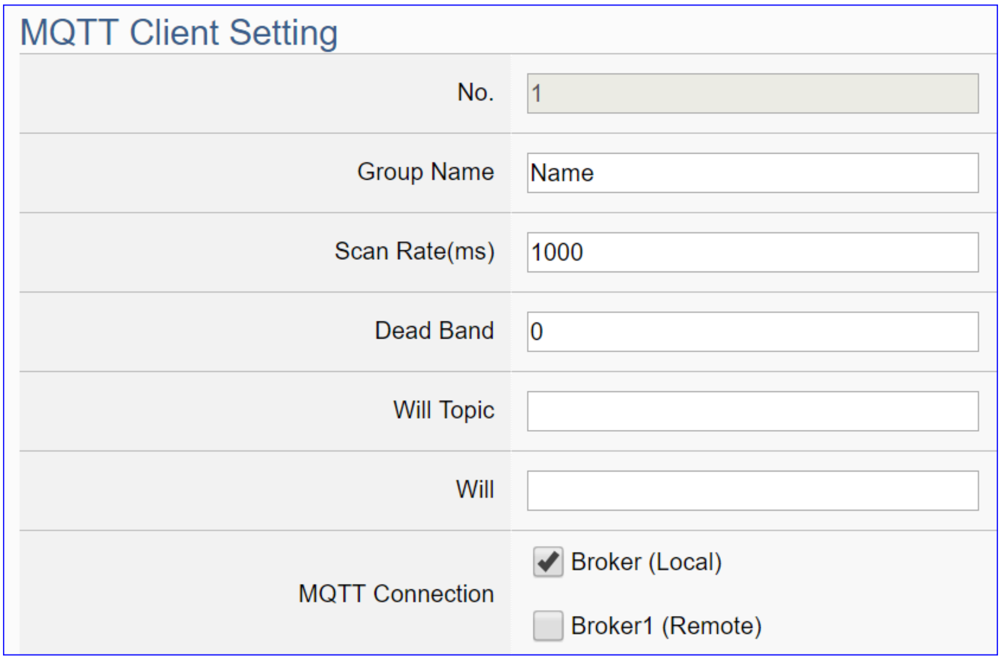
MQTT Connection > MQTT Group Connection > MQTT Connection Group Name List	
Group Name	MQTT group name, user can define, e.g. Group1. Default: Name.
⊕	Click to add a new MQTT Group.
< 1 / 1 >	The page number of the group list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the setting of this page.

After creating a new group (as below):


MQTT Connection Group Name List

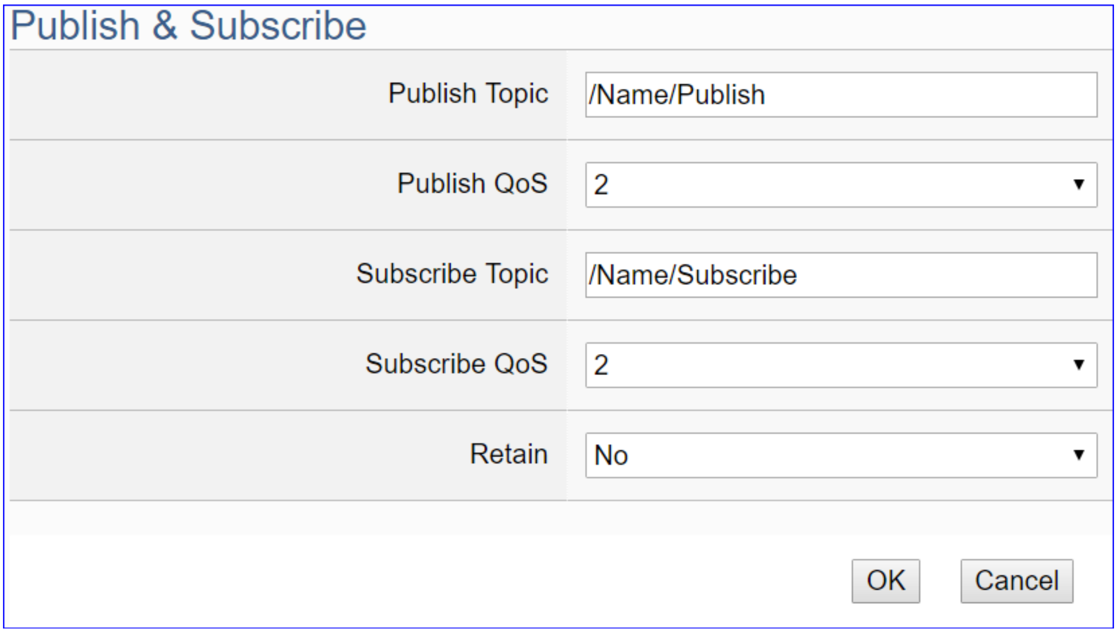
□	Group Name	Edit
⊕	Name	
□	Name	Edit

Click [Edit] botton to enter the [MQTT Client Setting] page:


MQTT Client Setting

No.	1
Group Name	Name
Scan Rate(ms)	1000
Dead Band	0
Will Topic	
Will	
MQTT Connection	☑ Broker (Local) □ Broker1 (Remote)

IoT Platform Setting > MQTT Group Connection > MQTT Client Setting	
No.	The group number in the MQTT Client list (Not editable here)
Group Name	Give a name, e.g. Group1. Default: Name.
Scan Rate(ms)	Set an update frequency for the data. Default: 1000 (Unit: ms)
Dead Bend	Give a dead bend value for updating a float signal. Default: 0
Will Topic	Enter the title of a disconnect notice. Default: Null.
Will	Enter a disconnect notice. Default: Null.
MQTT Connection	Check the Broker want to use Local Broker or Remote Broker.



Publish & Subscribe

Publish Topic: /Name/Publish

Publish QoS: 2

Subscribe Topic: /Name/Subscribe

Subscribe QoS: 2

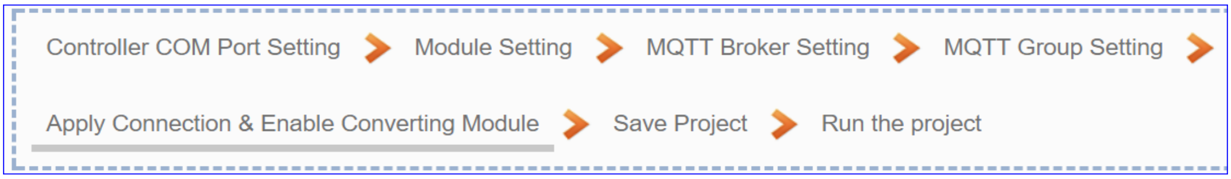
Retain: No

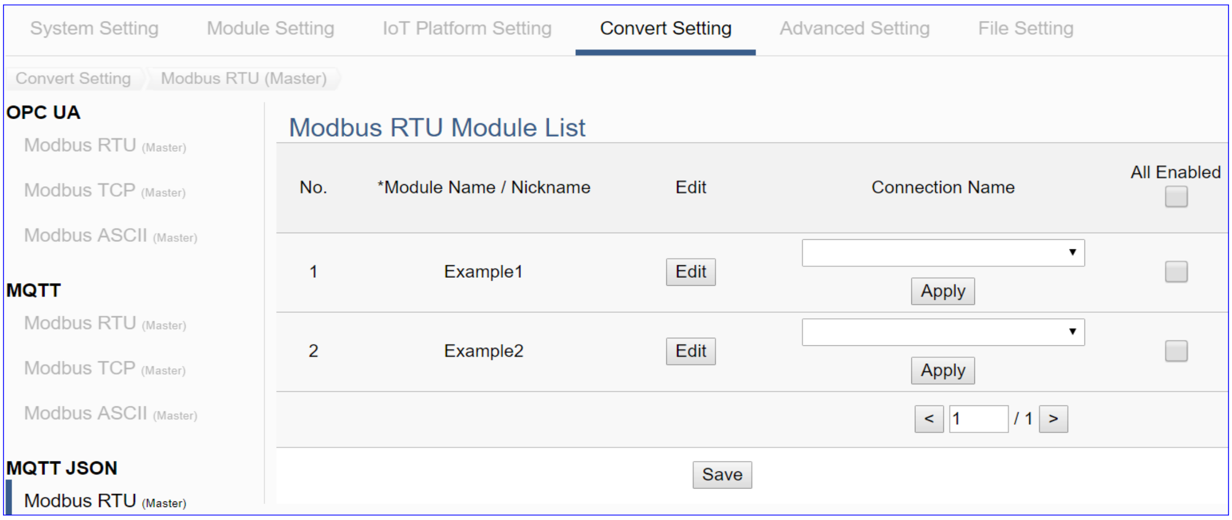
IoT Platform Setting > MQTT Group Connection > MQTT Client Setting – Publish & Subscribe	
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Retain	Whether to store a broker message. Default: No
OK	Click to save the settings and exit.

Step 5. Apply Connection & Enable Converting Module

Click the next step, and enter the **Step 5 [Apply Connection & Enable Converting Module]** UI setting. This page is for applying the connection and enabling the converting module.

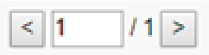
We select the “Modbus RTU (or ASCII) / MQTT JSON” conversion at the beginning, so this step will auto enter the [**Convert Setting > MQTT JSON - Modbus RTU (or ASCII) (Master)**] page of Convert setting. The “Step Box” will prevent the user from selecting the wrong platform.



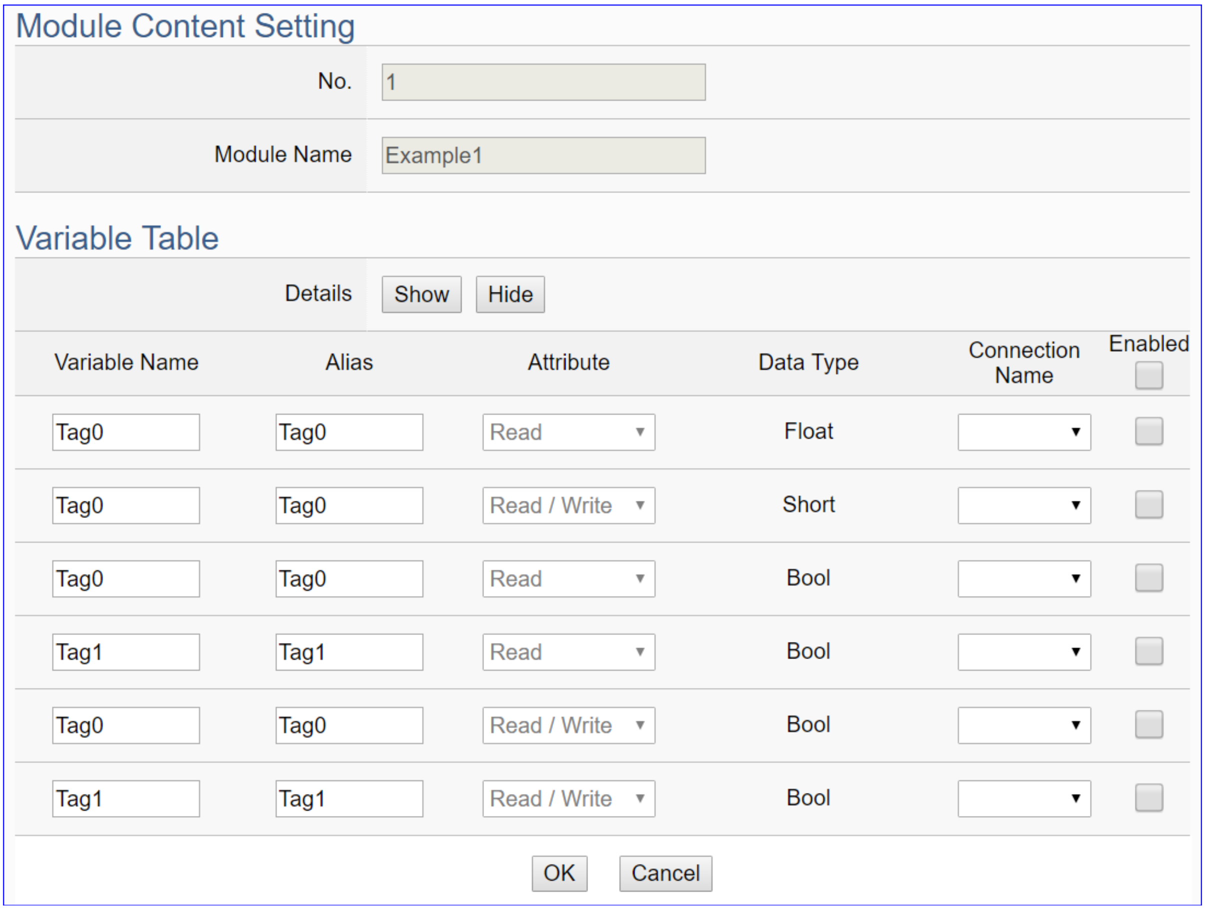


Modbus RTU Module List

No.	*Module Name / Nickname	Edit	Connection Name	All Enabled □
1	Example1	Edit	▾ Apply	□
2	Example2	Edit	▾ Apply	□
			< 1 / 1 >	

Convert Setting > MQTT JSON > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name	The module name set in the module list (Not editable here)
Connection Name	Select a group connection name, and then click [Apply].
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Variable Tale” setting.
	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Details [Show] [Hide]

Variable Name	Alias	Attribute	Data Type	Connection Name	Enabled □
Tag0	Tag0	Read	Float		□
Tag0	Tag0	Read / Write	Short		□
Tag0	Tag0	Read	Bool		□
Tag1	Tag1	Read	Bool		□
Tag0	Tag0	Read / Write	Bool		□
Tag1	Tag1	Read / Write	Bool		□

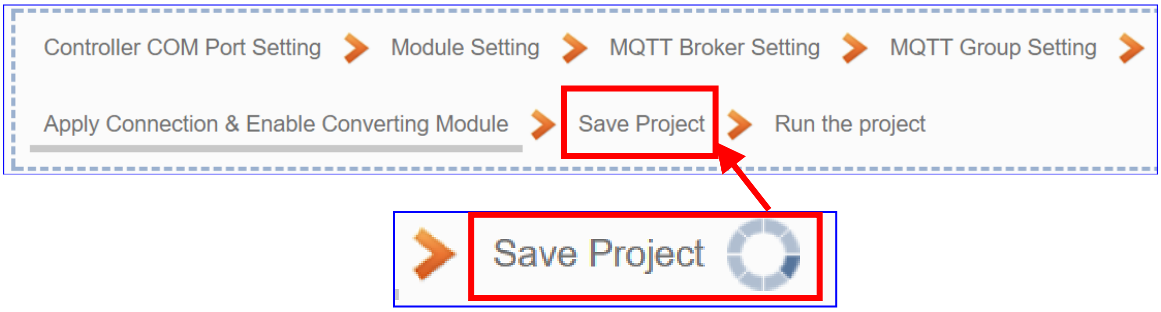
[OK] [Cancel]

Convert Setting > MQTT JSON > Modbus RTU (Master) – Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > MQTT JSON > Modbus RTU (Master) – Variable Table	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Variable Name	The variable name of the mapping address. (Not editable here)
Alias	The alias name for the variable. (Editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Connection Name	Select the group name that set in the group list page.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

Step 6. Save Project

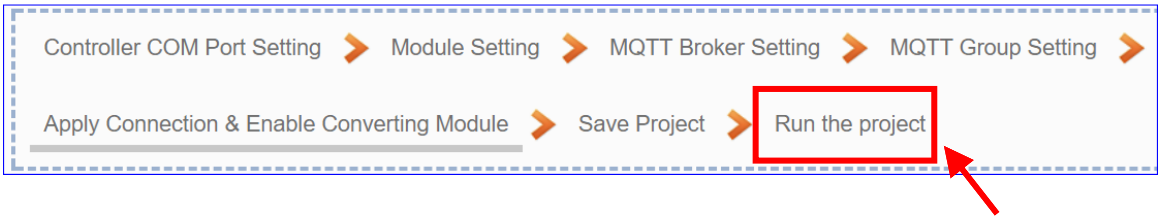
The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.

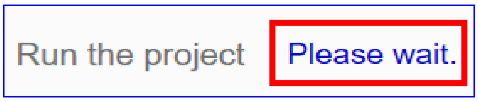


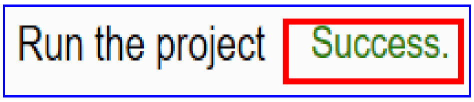
Step 7. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words “**Please wait**” (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words “**Please wait**” disappears, the new words “**Success**” appears (as below), that means the UA controller is running new project successfully.



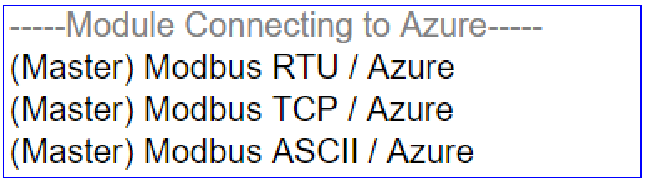


And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the conversion communication.

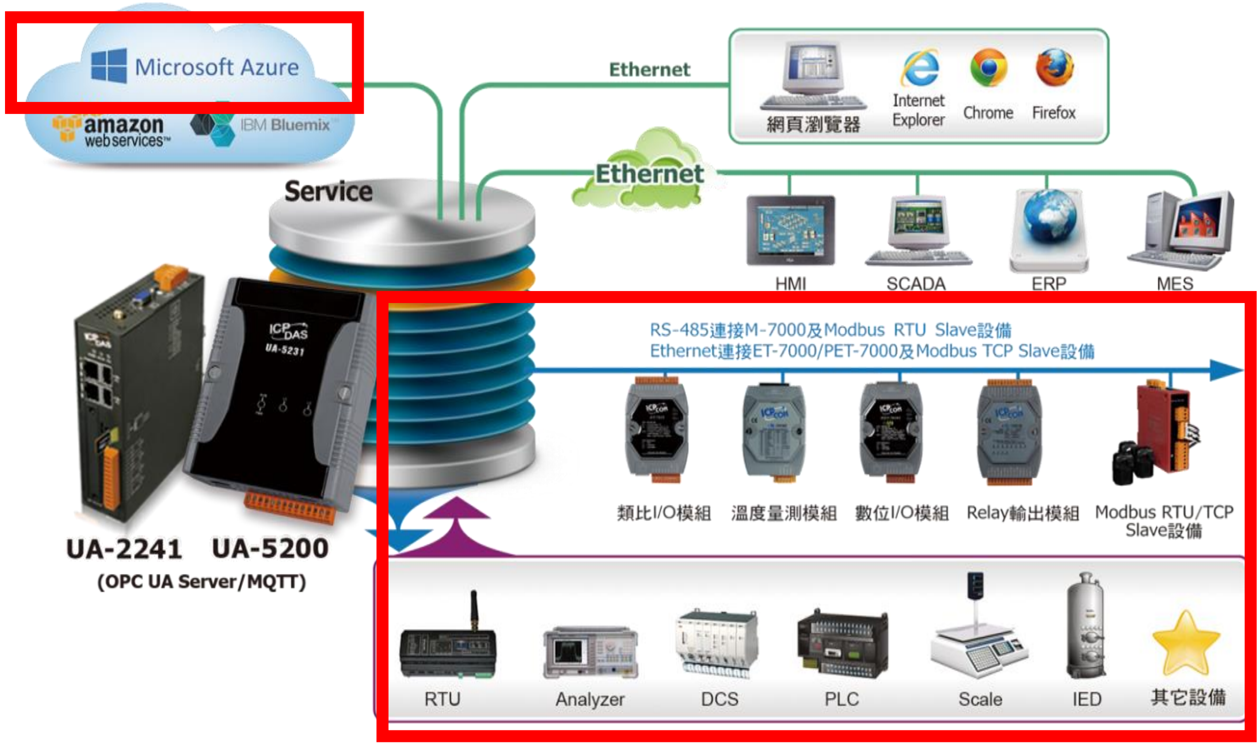
4.2. Module Connecting to Azure

"Module Connecting to Azure" is a common way to integrate IoT devices into the cloud. Many of the applications use MQTT connection to the cloud for the setting is fast and easy. The UA series also provides the MQTT function for module to connect to the Azure platform and allows users to publish messages to Microsoft Azure and receive messages from Microsoft Azure. This section will introduce the setting steps and the function parameters of the “Module Connecting to Azure”. There are 3 items in this category for 3 protocol types. Here will introduce the Modbus TCP / Azure for this category.



-----Module Connecting to Azure-----
(Master) Modbus RTU / Azure
(Master) Modbus TCP / Azure
(Master) Modbus ASCII / Azure

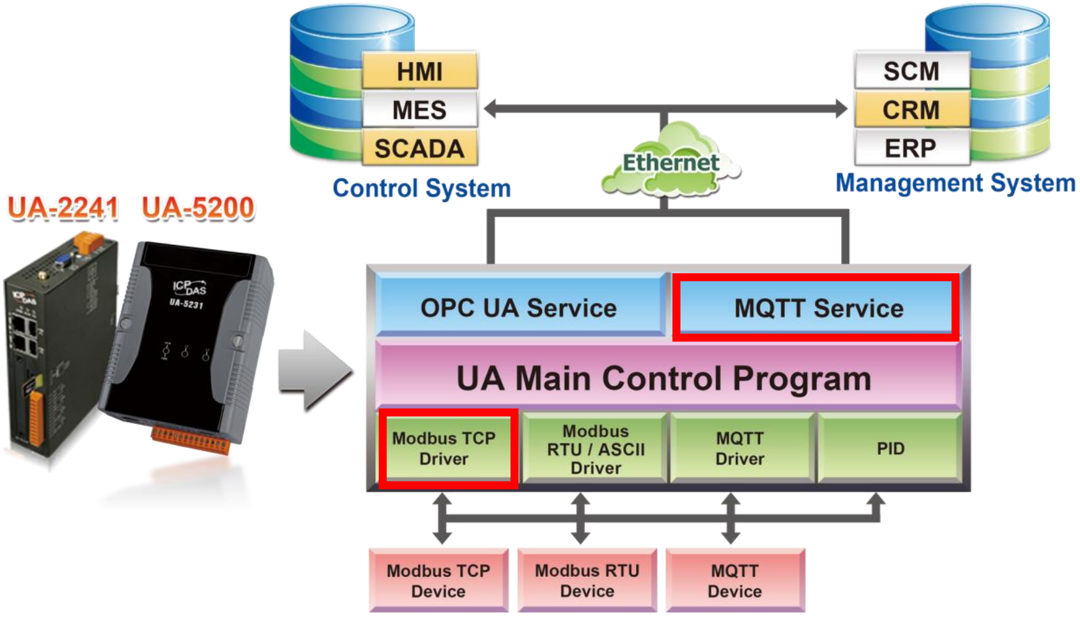
Modbus RTU / Azure	Allow the Modbus RTU connecting to the Microsoft Azure platform and can publish messages to Microsoft Azure and receive messages from Microsoft Azure.
Modbus TCP / Azure	Allow the Modbus RTU connecting to the Microsoft Azure platform and can publish messages to Microsoft Azure and receive messages from Microsoft Azure. **(Section 4.2.1)**
Modbus ASCII / Azure	Allow the Modbus RTU connecting to the Microsoft Azure platform and can publish messages to Microsoft Azure and receive messages from Microsoft Azure.



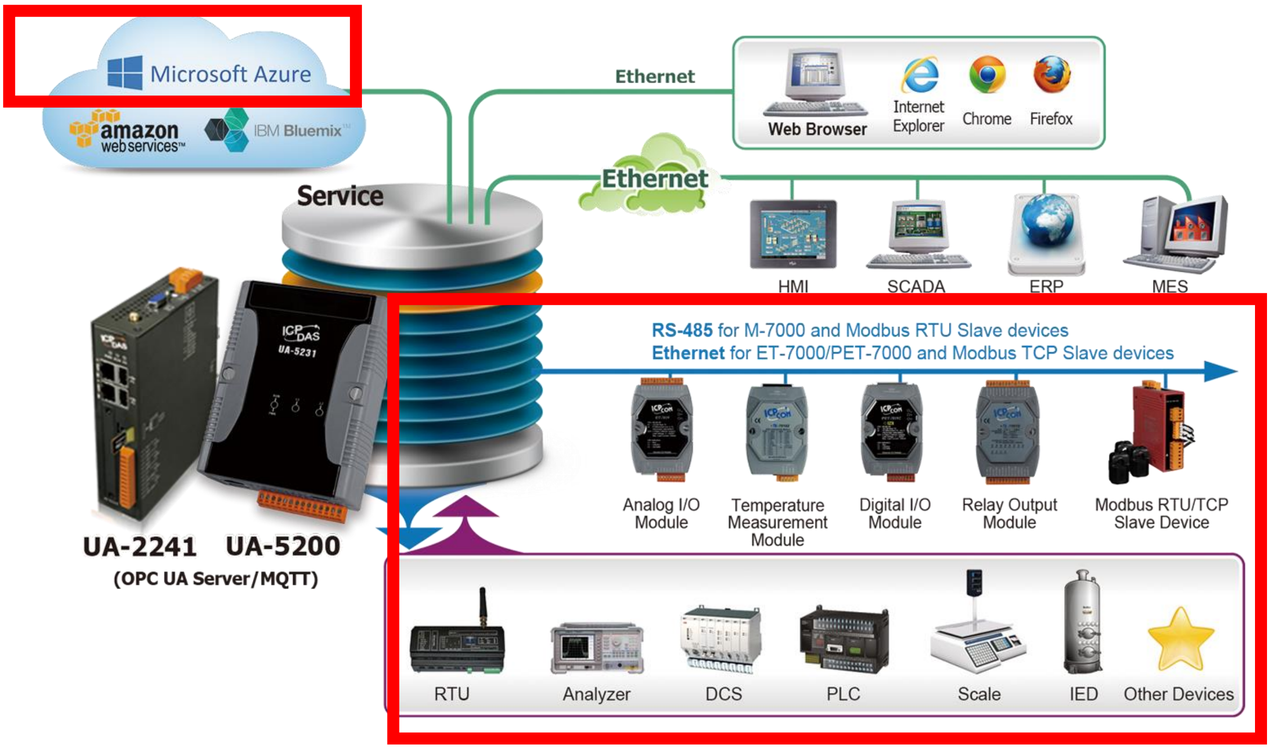
4.2.1. Modbus TCP / Azure Connecting

The UA series provides the MQTT function for module to connect to the Microsoft Azure platform and allows users to publish messages to Azure and receive messages from Azure. This section will introduce the setting steps and the function parameters. There are 3 items about Azure function in the “Function Wizard”. Here will introduce the Modbus TCP / Azure.

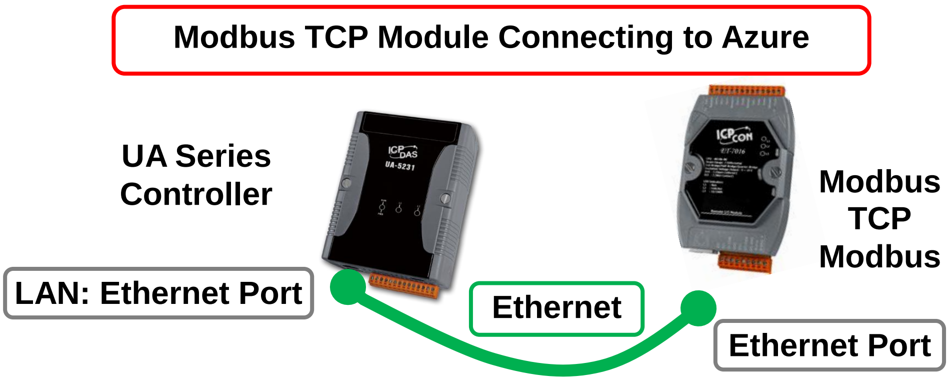
Function Diagram for Modbus TCP / Azure:



Application Solution:

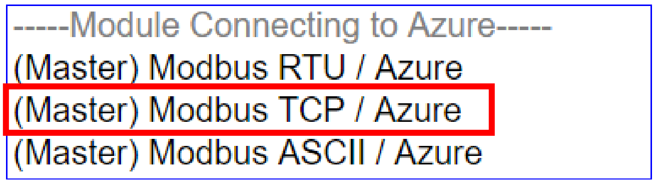


- **Modbus TCP Module Connecting to Azure**



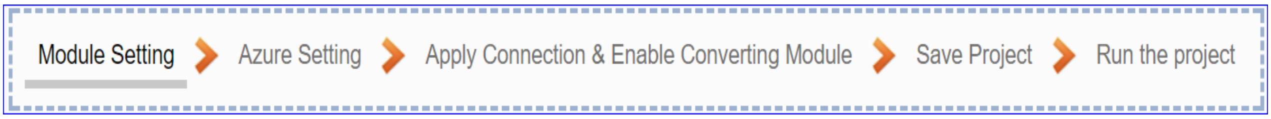
Note: The hardware/network connection methods please see the Chapter 2 .

When UA series controller connects the Modbus TCP (via Ethernet, as the picture), read/write the Modbus I/O via MQTT Broker and transfer the data to the Microsoft Azure platform, user can choose the item [**Modbus TCP / Azure**] of the "Module Connecting to Azure" in the Function Wizard.

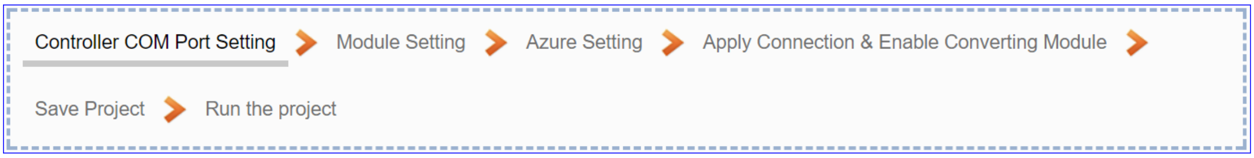

-----Module Connecting to Azure-----
(Master) Modbus RTU / Azure
(Master) Modbus TCP / Azure
(Master) Modbus ASCII / Azure

[Step Box]:

The Step Box of the [**Modbus TCP / Azure**] has 5 steps as below. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project quickly and rightly.



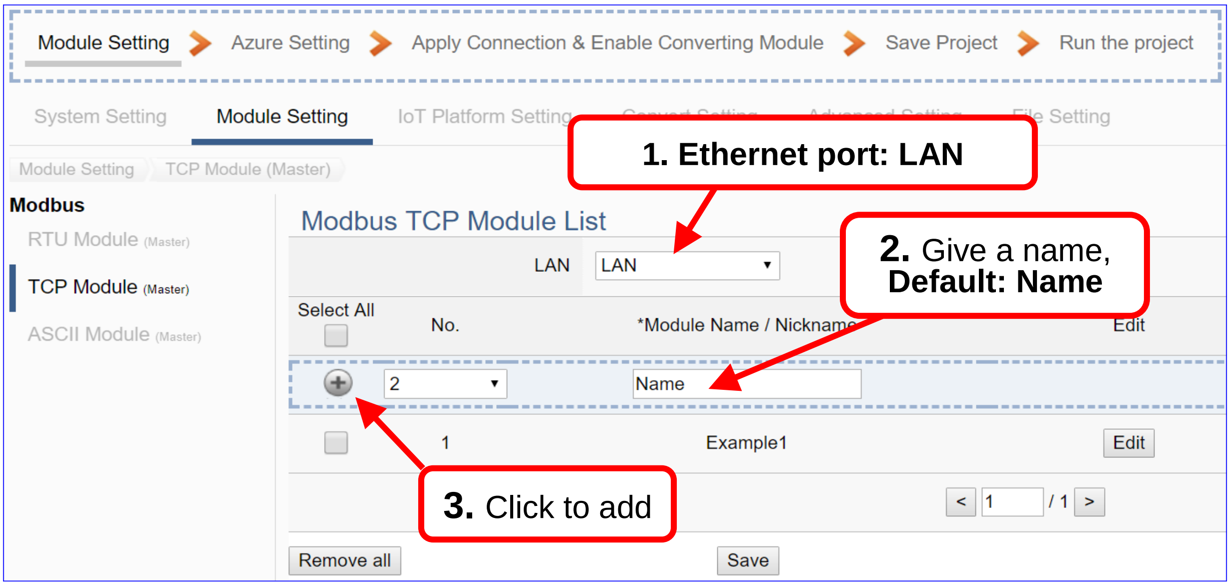
In addition, the Step Box of [Modbus RTU / Azure] or [Modbus ASCII / Azure] has 6 steps. The different step is "Controller COM Port Setting" that can refer to Section 4.1.1 or 4.1.3.


Controller COM Port Setting
Module Setting
Azure Setting
Apply Connection & Enable Converting Module
Save Project
Run the project

Step 1. Module Setting

This page is for setting the communication values of the connected modules.

The Ethernet port is LAN for connecting with the TCP module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.



Module Setting > Azure Setting > Apply Connection & Enable Converting Module > Save Project > Run the project

System Setting | Module Setting | IoT Platform Setting | Convert Setting | Advanced Setting | File Setting

Module Setting > TCP Module (Master)

Modbus
- RTU Module (Master)
- TCP Module (Master)
- ASCII Module (Master)

Modbus TCP Module List

LAN: LAN ▾

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▾	Name	
□	1	Example1	Edit

< 1 / 1 >

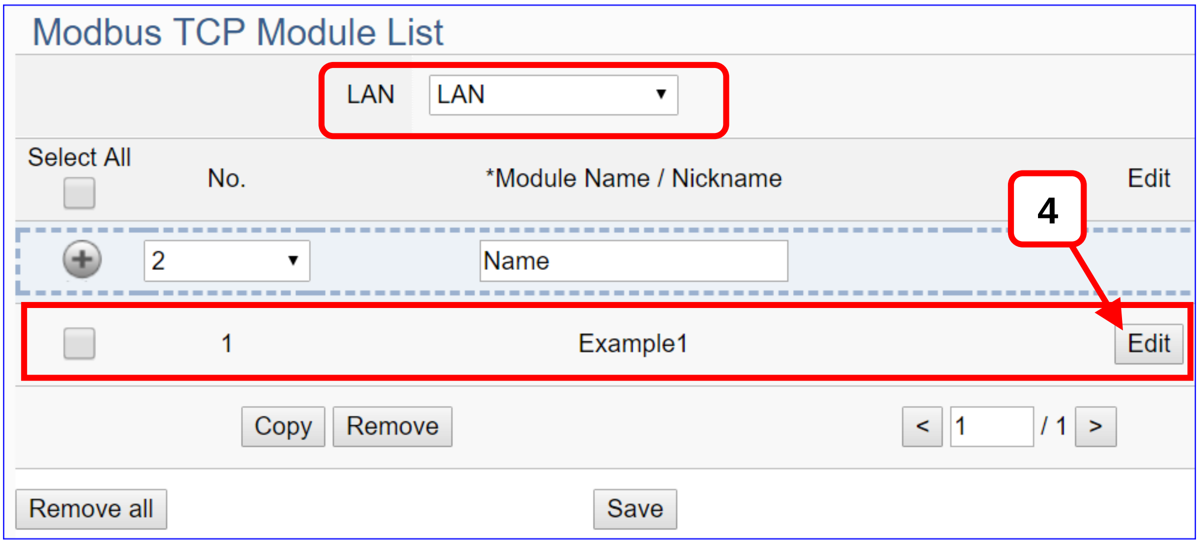
Remove all | Save

1. Ethernet port: LAN

2. Give a name, Default: Name

3. Click to add

Add a module (No.: 1, Name: Example1) as below, and then click [Edit] button to enter the “Module Content Setting” page.



Modbus TCP Module List

LAN: LAN ▾

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▾	Name	
□	1	Example1	Edit

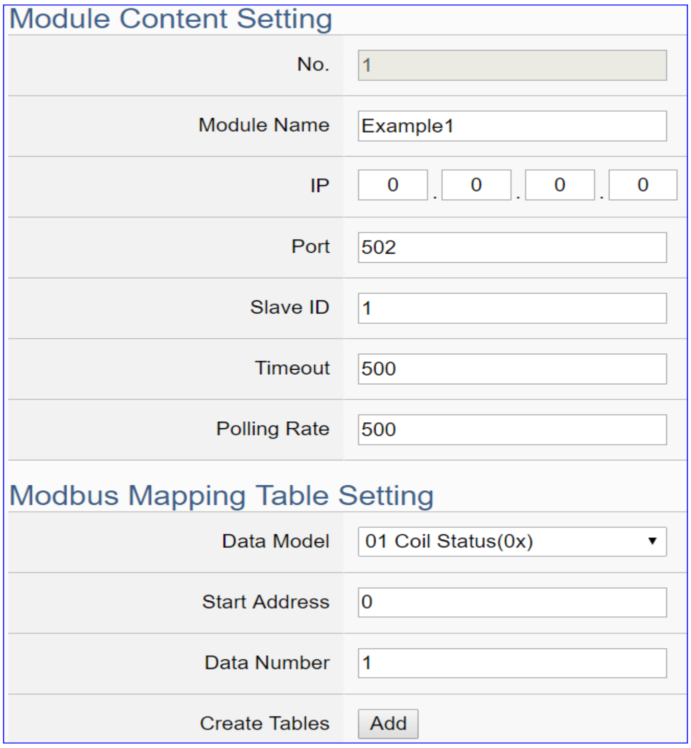
Copy | Remove   < 1 / 1 >

Remove all | Save

4

If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

Click [Edit] can enter the [**Module Content Setting**] page to set up the module and the Modbus address mapping table.

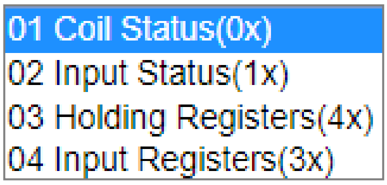


Module Content Setting

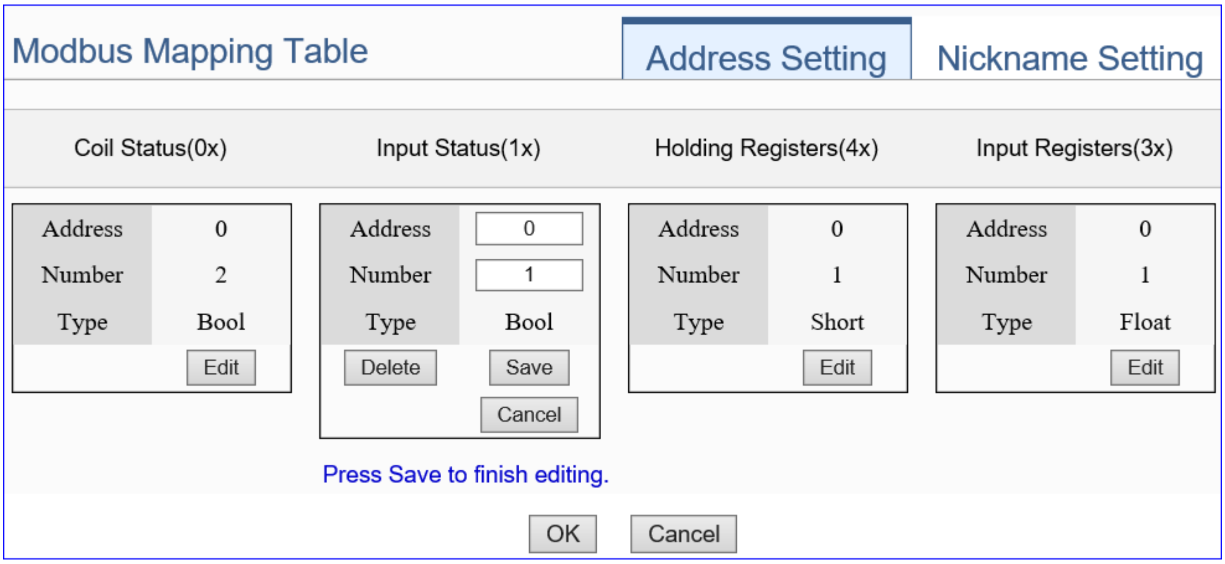
No.	1
Module Name	Example1
IP	0 . 0 . 0 . 0
Port	502
Slave ID	1
Timeout	500
Polling Rate	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▾
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
IP	The IP address of the connected module. Default: 0.0.0.0
Port	The port number for Modbus TCP. Default: 502
Slave ID	Set the Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Polling Rate	Set a time interval for the command. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models “01” ~ “04” for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

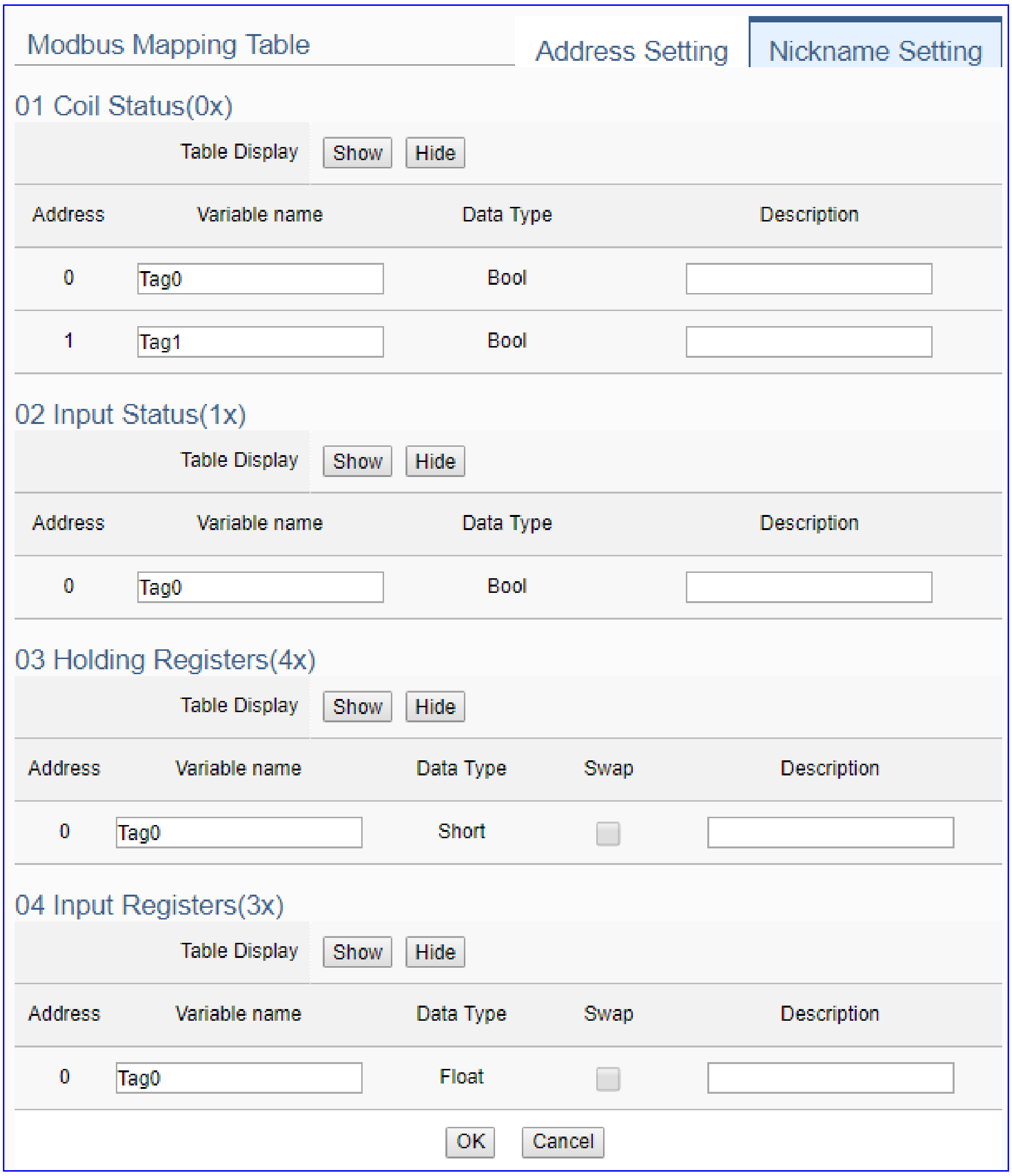


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table | Address Setting | Nickname Setting

01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

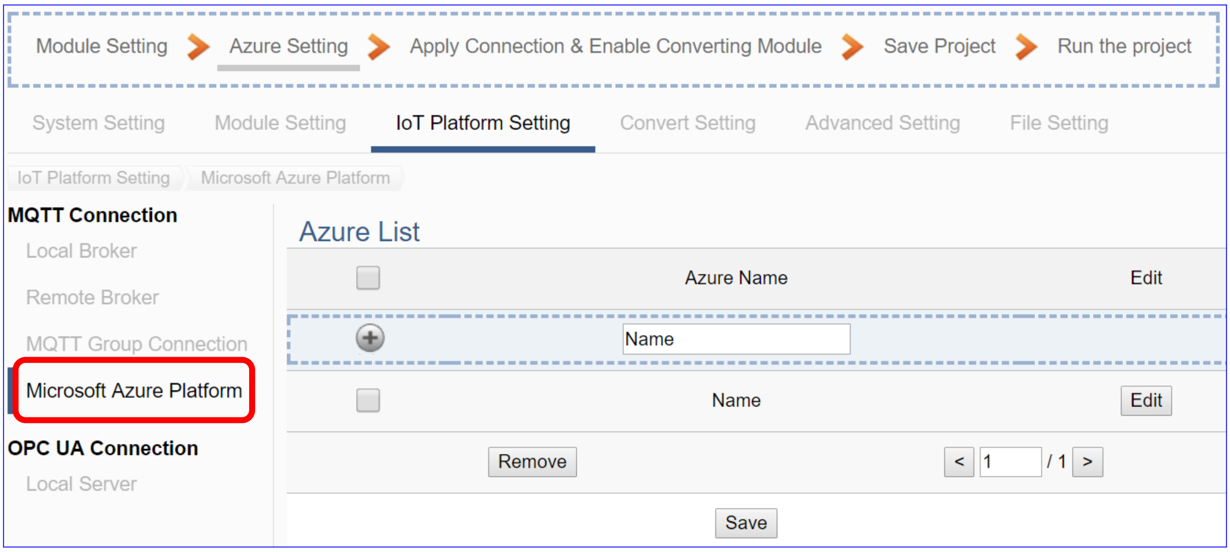
[OK] [Cancel]

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 2. Azure Setting

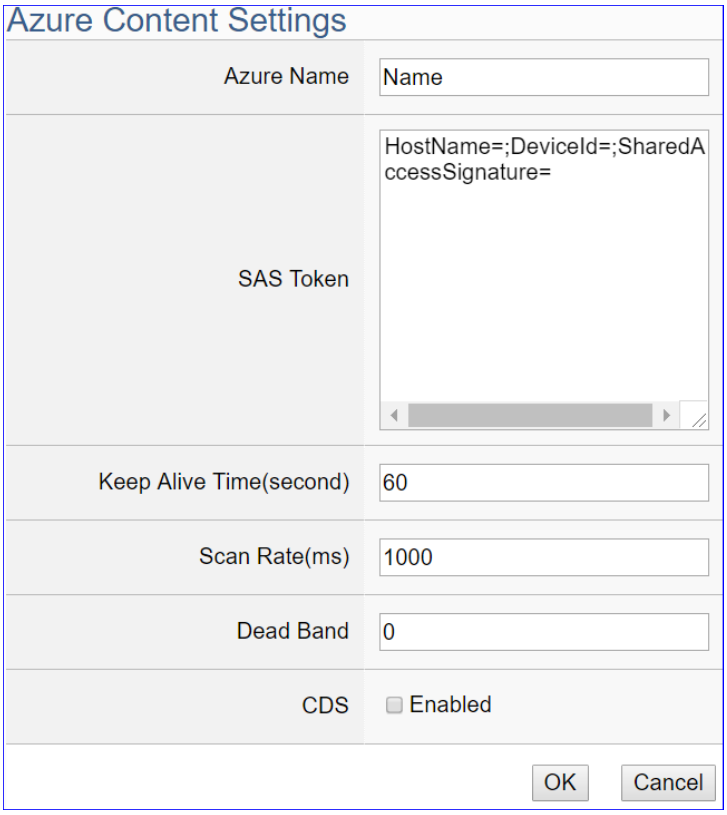
Click the next step, and enter the **Step 2 [Azure Setting]** of the UI setting.
This page is for setting the Microsoft Azure Platform related information of the MQTT Connection in the IoT platform, e.g. the name, SAS Token, etc.

We select the “Modbus TCP / Azure” connecting item at the beginning, so this step will auto enter the [**MQTT Connection > Microsoft Azure Platform**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.



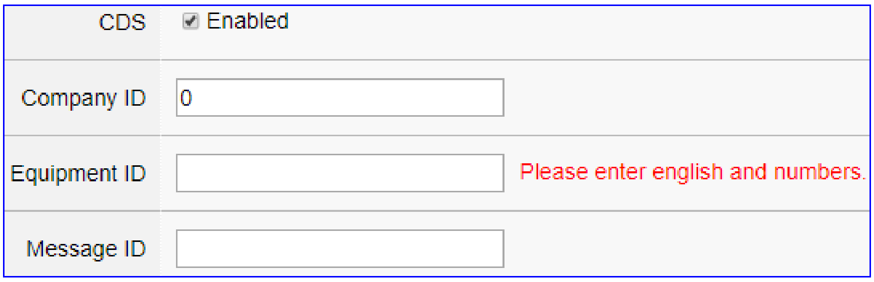
MQTT Connection > Microsoft Azure Platform > Azure List	
Azure Name	Azure name. User can define the name. Default: Name.
⊕	Click to add a new Azure list.
Edit / Remove	Click [Edit] can set the Azure list. Click the left box and [remove] can delete the Azure list.
< 1 / 1 >	The page number of the Azure list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “**Azure Content Settings**” page:



Azure Content Settings

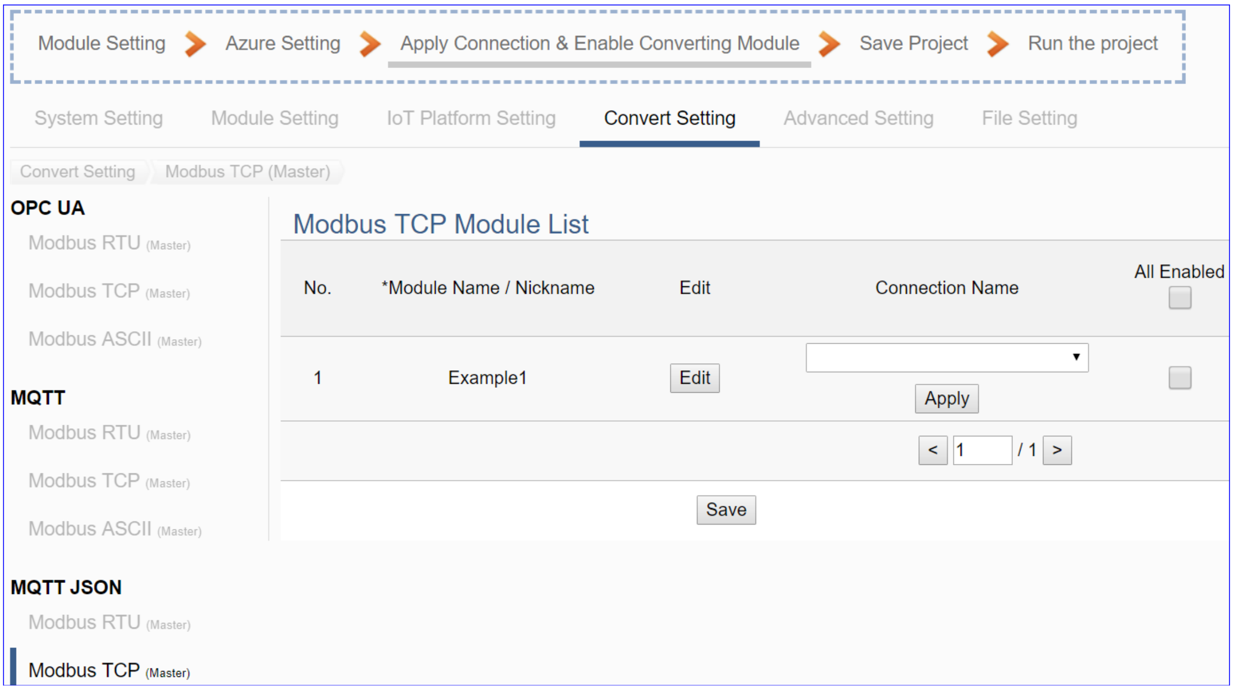
Azure Name	Name
SAS Token	HostName=;DeviceId=;SharedAccessSignature=
Keep Alive Time(second)	60
Scan Rate(ms)	1000
Dead Band	0
CDS	□ Enabled

MQTT Connection > Microsoft Azure Platform > Azure List > Azure Content Settings	
Azure Name	Azure name. User can define the name. Default: Name.
SAS Token	Input the SAS Token which you previously registered for the UA controller from Microsoft Azure. For the procedure to generate a SAS Token, please refer to the “Documentation > Azure IoT Hub > IoT Hub MQTT support” section on the Microsoft Azure Web Site for detailed information.
Keep Alive Time(second)	Set the time in second that pass away without communication between the UA controller and Microsoft Azure. Default: 60 second.
Scan Rate(ms)	Set an update frequency for the task data. Default: 1000 (Unit: ms)
Dead Band	Give a dead bend value for updating a float signal. Default: 0
CDS (Connected Device Studio)	If user wants to publish the messages compliant with the Microsoft CDS platform, user must check the "CDS” to Enabled and fill in the Company ID, Equipment ID and Message ID that applied from the Microsoft CDS platform.  CDS ☑ Enabled Company ID 0 Equipment ID Please enter english and numbers. Message ID
OK	Click to save and exit this page.

Step 3. Apply Connection & Enable Converting Module

Click the next step, and enter the **Step 3 [Apply Connection & Enable Converting Module]** UI setting. This page is for applying the connection and enabling the converting module.

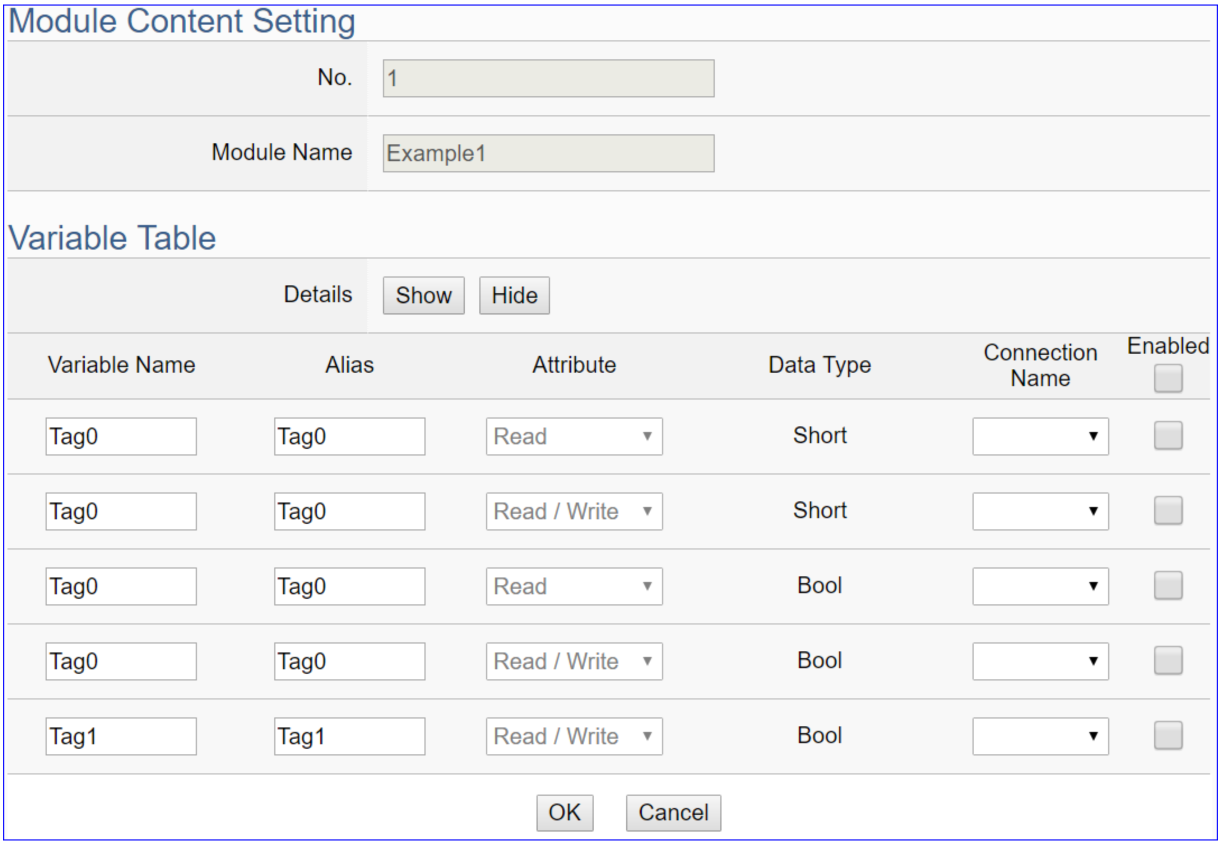
We select the “Modbus TCP / Azure” at the beginning, and UA system connecting to Azure through MQTT JSON group method, so this step will auto enter the [**Convert Setting > MQTT JSON - Modbus TCP (Master)**] page of Convert setting. The “Step Box” will prevent the user from selecting the wrong platform.



No.	*Module Name / Nickname	Edit	Connection Name	All Enabled □
1	Example1	Edit	Apply	□

Convert Setting > MQTT JSON > Modbus TCP (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Variable Tale” setting.
Connection Name	Select an Azure connection name, and then click [Apply].
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Details Show Hide

Variable Name	Alias	Attribute	Data Type	Connection Name	Enabled □
Tag0	Tag0	Read ▾	Short	▾	□
Tag0	Tag0	Read / Write ▾	Short	▾	□
Tag0	Tag0	Read ▾	Bool	▾	□
Tag0	Tag0	Read / Write ▾	Bool	▾	□
Tag1	Tag1	Read / Write ▾	Bool	▾	□

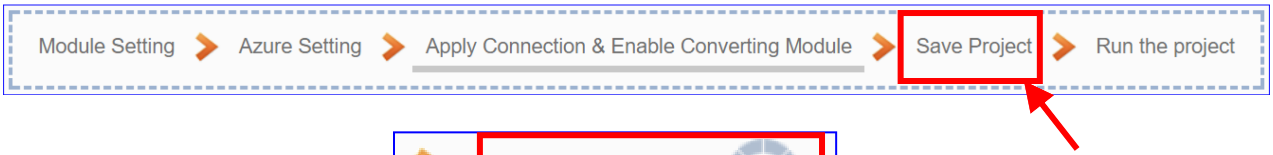
OK Cancel

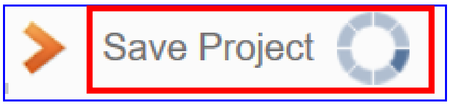
Convert Setting > MQTT JSON > Modbus TCP (Master) Module List –Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > MQTT JSON > Modbus TCP (Master) Module List – Variable Table	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Variable Name	The variable name of the mapping address. (Not editable here)
Alias	The alias name for the variable. (Editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Connection Name	Select the Azure connection name that set in the [Azure Setting] step.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

Step 4. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

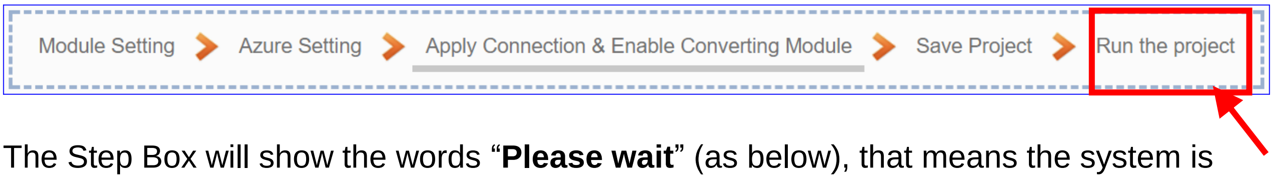
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



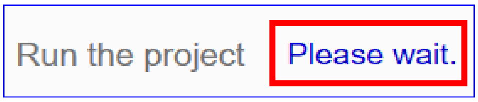


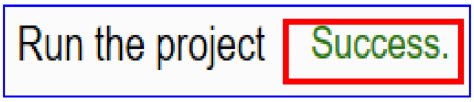
Step 5. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words “**Please wait**” (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words “**Please wait**” disappears, the new words “**Success**” appears (as below), that means the UA controller is running new project successfully.





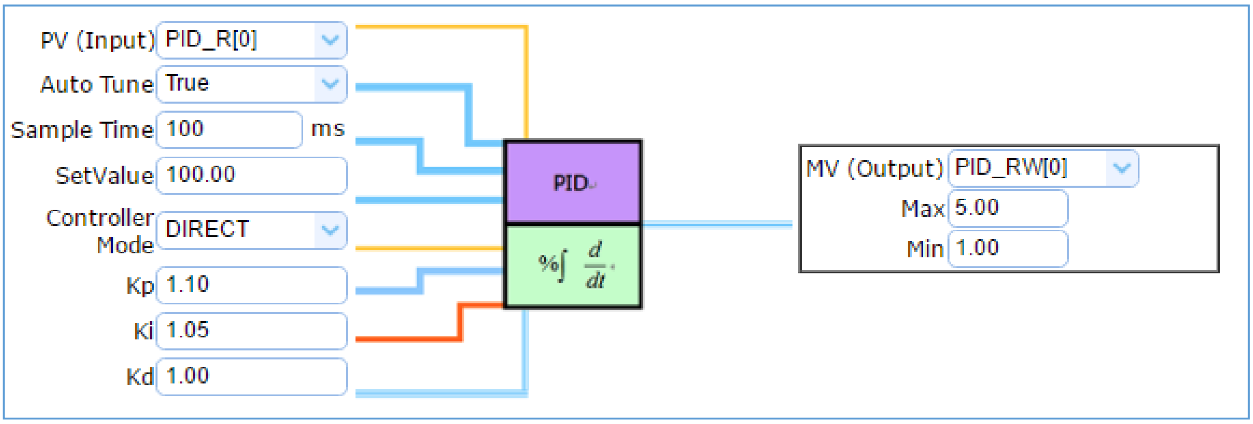
And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

The new project now completes the setting, uploading and running in the UA controller and can process the new function project.

4.3. PID

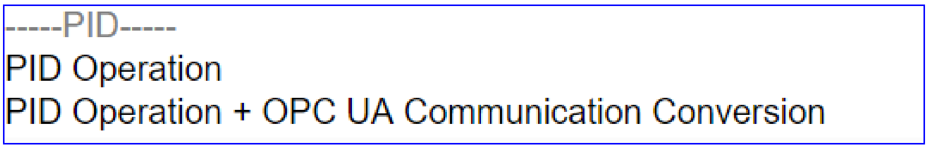
PID (Proportional-Integral-Derivative) control is the most widely used in industrial control systems. A regulator which is controlled in accordance with Proportional, Integral and Derivative is called PID control for short, also called PID regulator. When the user cannot fully grasp or measure parameters of the control system, the PID regulator is the best solution.

The PID controller is a common feedback loop component in industrial control applications. The controller compares the collected data with a reference value and then uses this difference to calculate a new input value whose purpose is to allow the system data to reach or remain at the reference value.

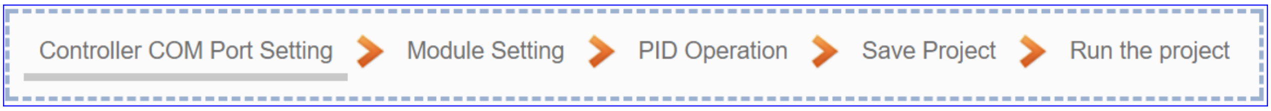


PV (Input) PID_R[0]
Auto Tune True
Sample Time 100 ms
SetValue 100.00
Controller Mode DIRECT
Kp 1.10
Ki 1.05
Kd 1.00
MV (Output) PID_RW[0]
Max 5.00
Min 1.00

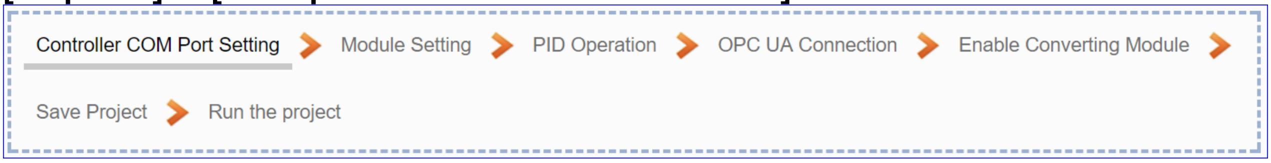
This section introduces the setting steps and the function parameters of the PID. There are 2 items about “PID” function in the “Function Wizard”. The 2nd item [PID Operation + OPC UA Communication Conversion] is combining the 1st item [PID Operation] and the Section 4.1.1 Modbus / OPC UA Conversion .


-----PID-----
PID Operation
PID Operation + OPC UA Communication Conversion

[Step Box] of [PID Operation] :


Controller COM Port Setting > Module Setting > PID Operation > Save Project > Run the project

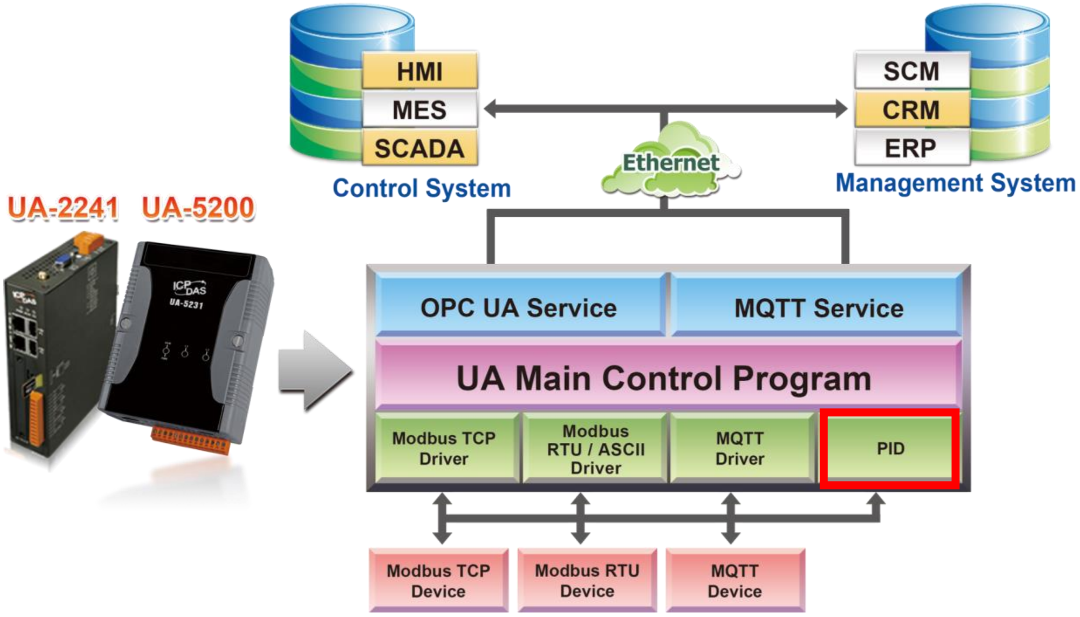
[Step Box] of [PID Operation + OPC UA Conversion] :


Controller COM Port Setting > Module Setting > PID Operation > OPC UA Connection > Enable Converting Module > Save Project > Run the project

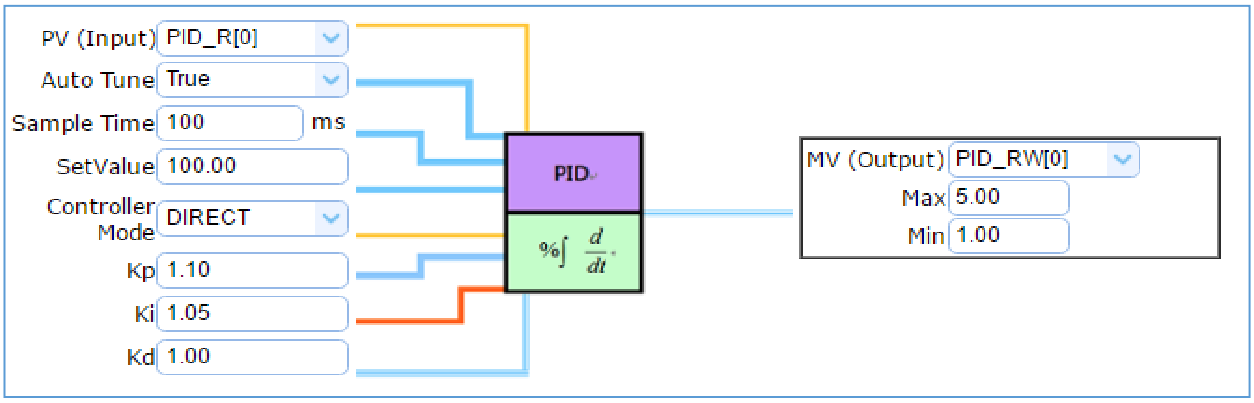
4.3.1. PID Operation

In the PID Operation function, UA controller collects the module's data to operate via the feedback loop component of PID control. The controller compares the collected data with a reference value and then uses this difference to calculate a new input value whose purpose is to allow the system data to reach or remain at the reference value. This section will introduce the setting steps and the function parameters of the [PID Operation].

Function Diagram for PID Operation:

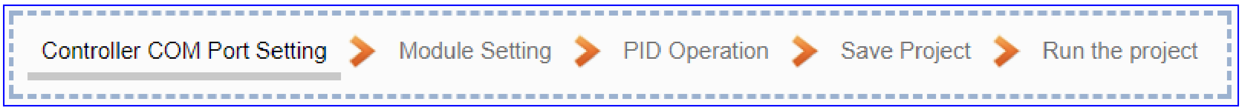


Application Solution Example:


PV (Input) PID_R[0]
Auto Tune True
Sample Time 100 ms
SetValue 100.00
Controller Mode DIRECT
Kp 1.10
Ki 1.05
Kd 1.00
MV (Output) PID_RW[0]
Max 5.00
Min 1.00

[Step Box]:

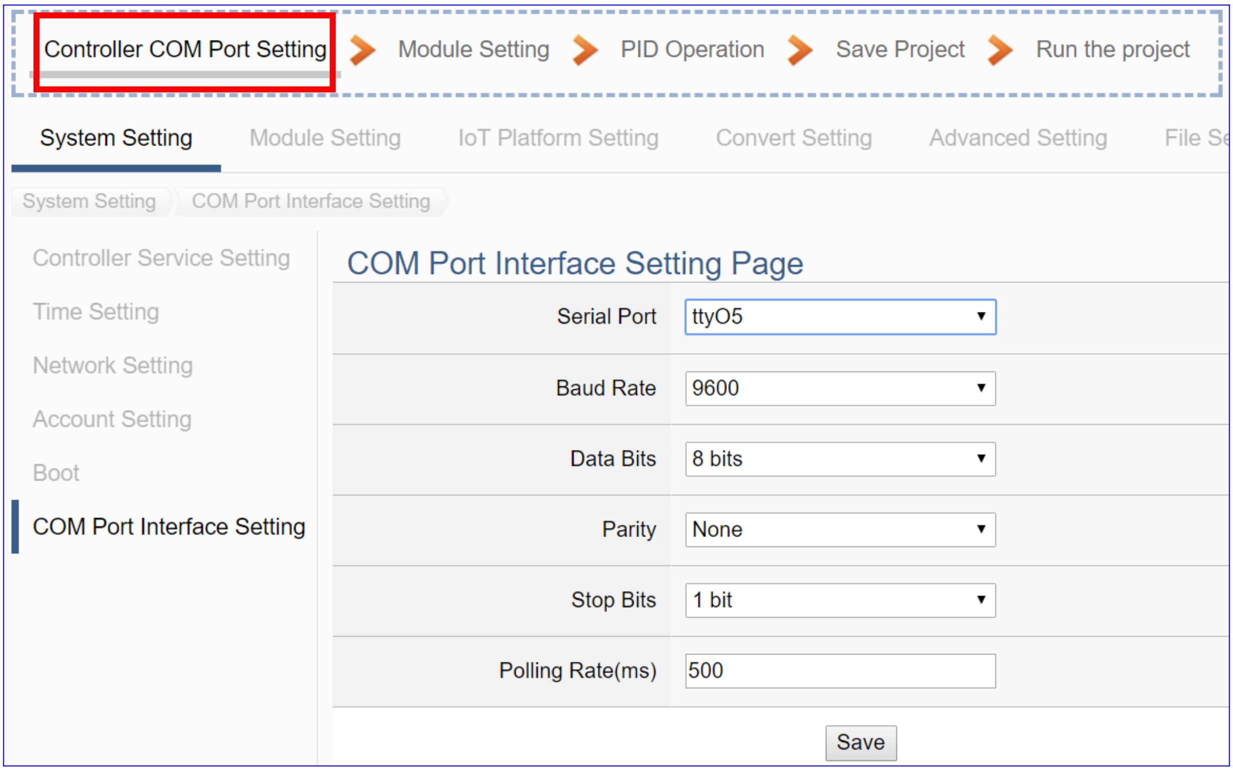
The Step Box of the [**PID Operation**] has 5 steps as below. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step by step and then can complete the project.



Step 1. Controller COM Port Setting

This page allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

The user can find the default communication values of our I/O modules from the module CD, manual or I/O Module website.



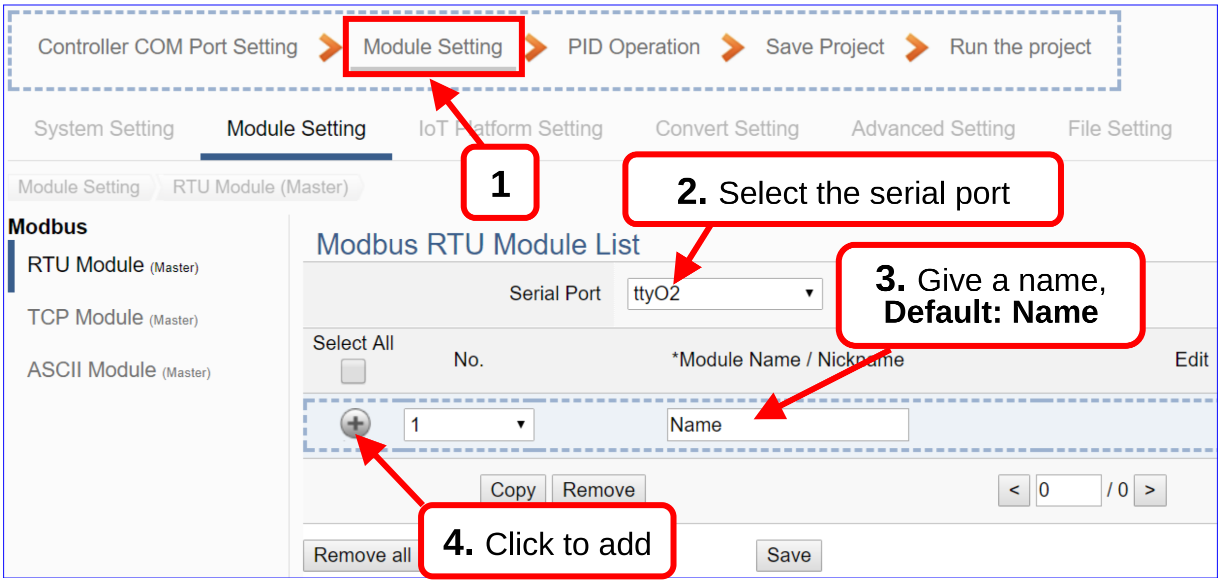
Serial Port: ttyO5
Baud Rate: 9600
Data Bits: 8 bits
Parity: None
Stop Bits: 1 bit
Polling Rate(ms): 500

COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click [Save] button could save the settings of this page.

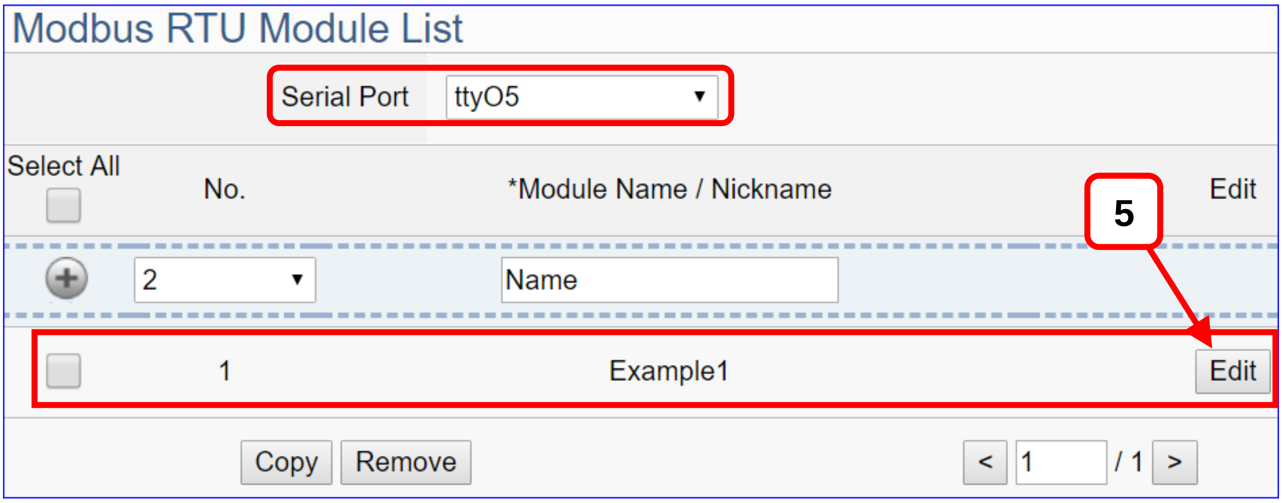
Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting]** of the UI setting.

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

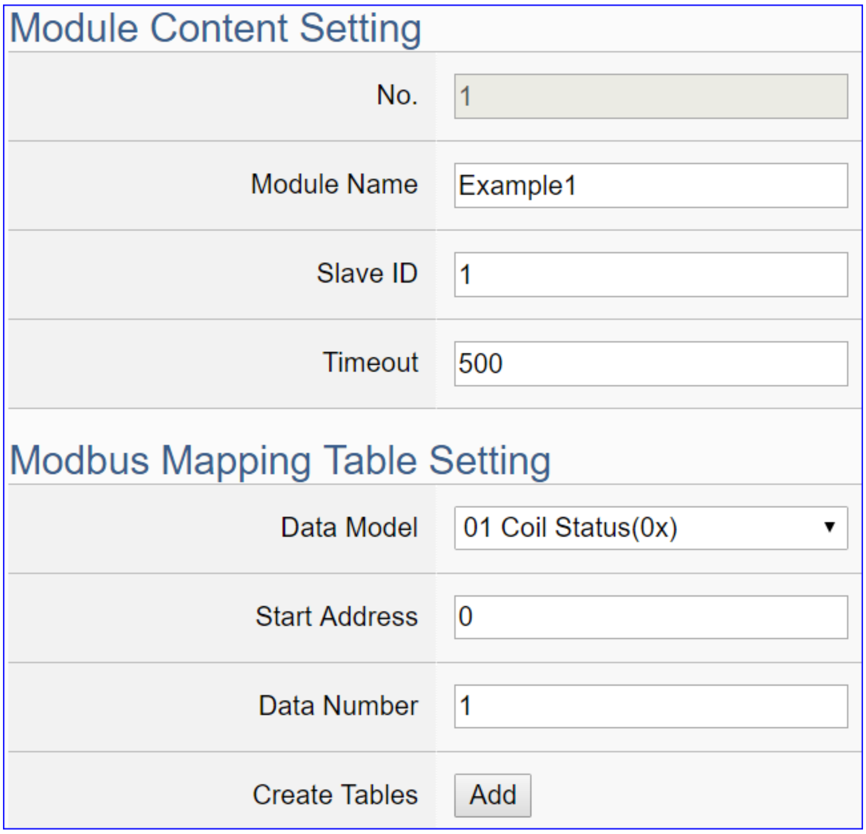


Add a module (No.: 1, Name: Example1) as below, and then click [Edit] button to enter the “Module Content Setting” page.



If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

[**Module Content Setting**] page can set up the module and the Modbus address mapping table:

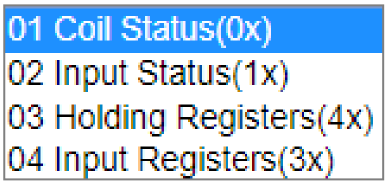


Module Content Setting

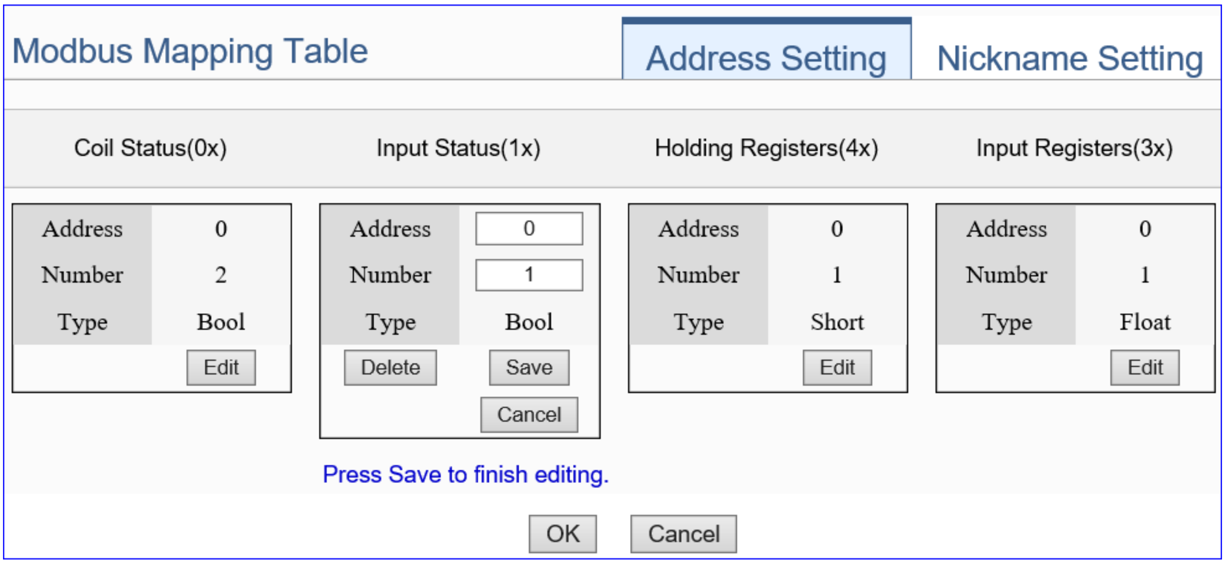
No.	1
Module Name	Example1
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▼
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

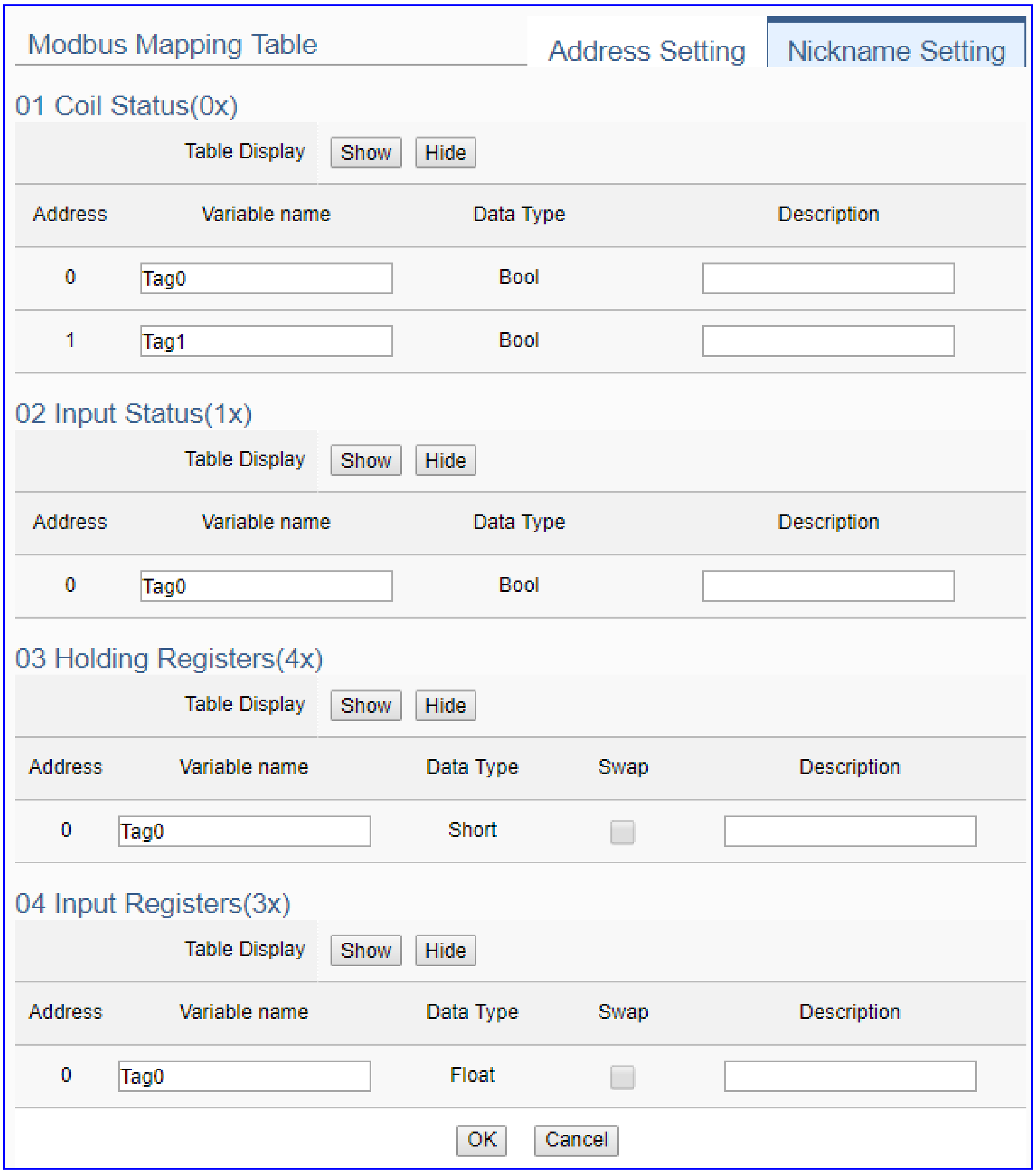
The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.



Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The "Address Setting" page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The "Nickname Setting" page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table

01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

Table Display [Show] [Hide]

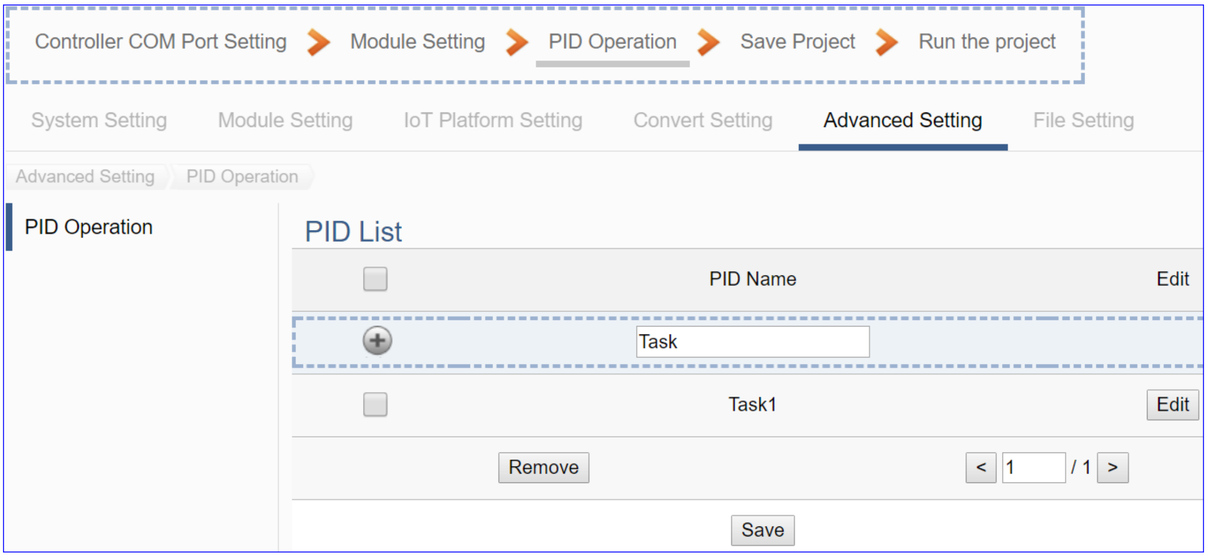
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 3. PID Operation

Click the next step, and enter the **Step 3 [PID Operation]** of the UI setting.
This page is for setting the Task and related parameters of the PID Operation, e.g. I/O module, I/O channels, variables, set point, control mode ….

We select the "**PID Operation**" at the beginning, so this step will auto enter the setting page [**Advanced Setting > PID Operation**]. The "Step Box" will prevent the user from selecting the wrong platform.

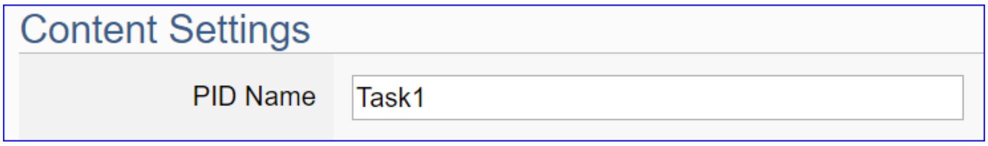


PID List

□	PID Name	Edit
⊕	Task	
□	Task1	Edit

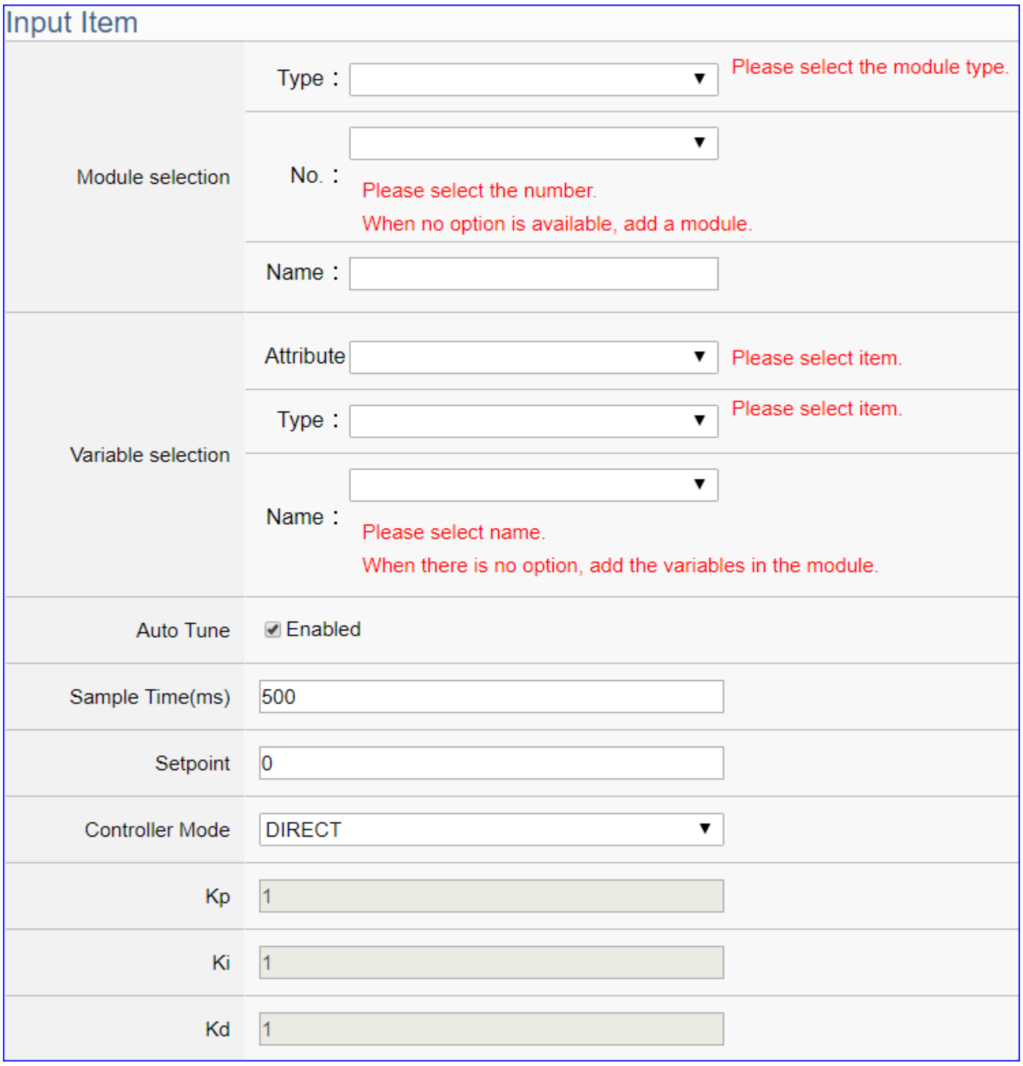
Advanced Setting > PID Operation > PID List	
PID Name	PID name, user can define, e.g. Task1. Default: Task.
⊕	Click to add a new PID Task.
Edit / Remove	Click [Edit] can set the PID content. Click the left box and [remove] can delete the PID list.
< 1 / 1 >	The page number of the PID list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the setting of this page.

Click [Edit] botton to enter the [Content Settings] page:


Content Settings

PID Name: Task1

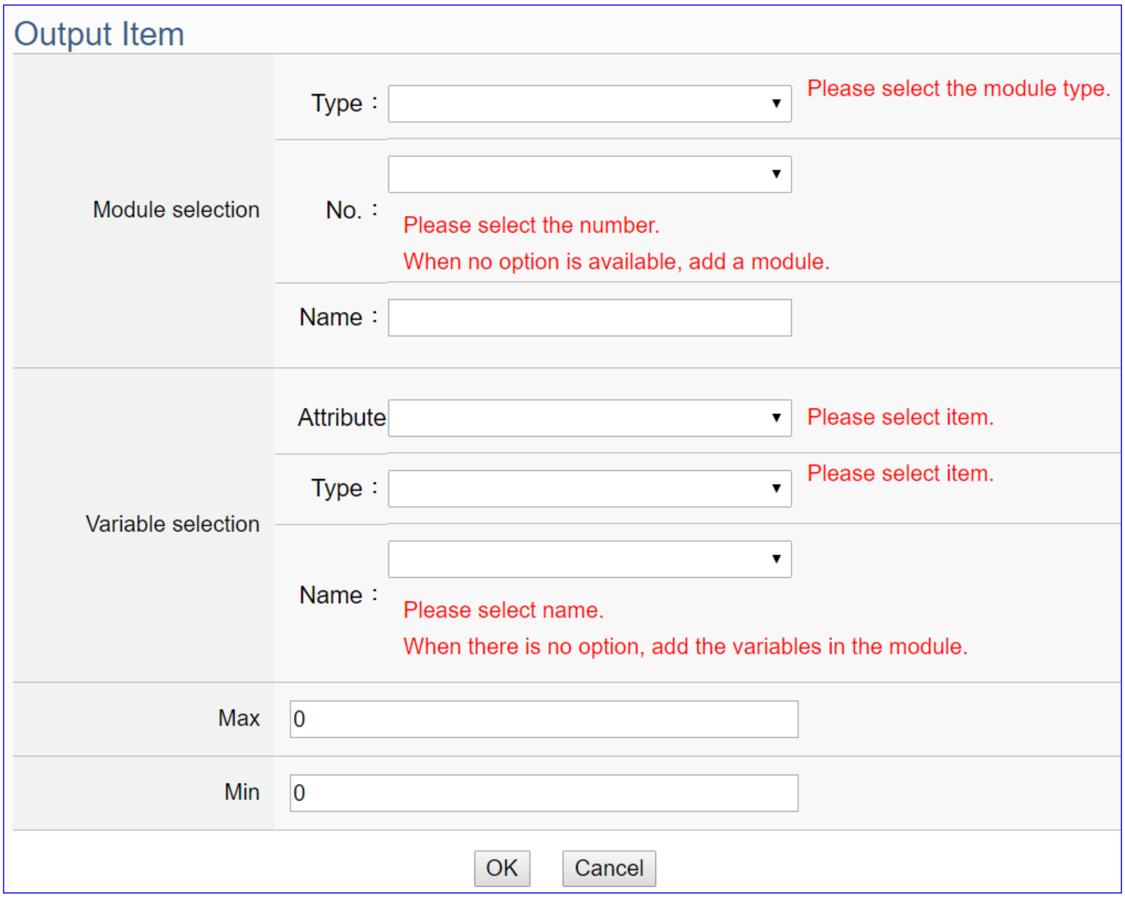
Advanced Setting > PID Operation > Content Settings	
PID Name	PID name, user can define, e.g. Task1. Default: Task.



Input Item

Module selection	Type：	Please select the module type.
	No.：	Please select the number. When no option is available, add a module.
	Name：	
Variable selection	Attribute	Please select item.
	Type：	Please select item.
	Name：	Please select name. When there is no option, add the variables in the module.
Auto Tune	☑ Enabled	
Sample Time(ms)	500	
Setpoint	0	
Controller Mode	DIRECT	
Kp	1	
Ki	1	
Kd	1	

Advanced Setting > PID Operation > Input Item	
Module selection	Choose a predefined module for input data of the PID. Select the type, number and name of the input module. If no option is available, add a new module.
Variable selection	Choose a predefined float variable as the input parameter for PID operation. Select the attribute, type and name of the float variable.
Auto Tune	Enable: Auto-tuning PID parameters for your system. Default: check. Un-Enable: Tuning PID parameters manually, e.g. Kp, Ki, Kd.
Sample Time (ms)	Set the sampling time. (Unit: ms) Default: 500 ms.
Setpoint	The target value for PID control. Default: 0.
Controller Mode	DIRECT: Set it as positive output value. Default: DIRECT. REVERSE: Set it as reverse output value.
Kp	Set the Proportional gain. Default: 1.
Ki	Set the Integral gain. Default: 1.
Kd	Set the Derivative gain. Default: 1.

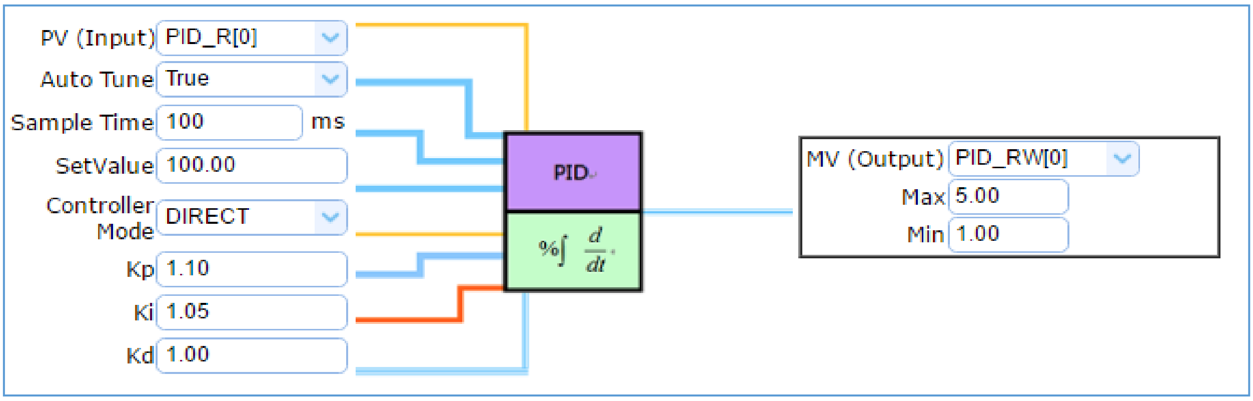


Output Item

Module selection	Type :	Please select the module type.
	No. :	Please select the number. When no option is available, add a module.
	Name :	
Variable selection	Attribute	Please select item.
	Type :	Please select item.
	Name :	Please select name. When there is no option, add the variables in the module.
Max	0	
Min	0	

Advanced Setting > PID Operation > Output Item	
Module selection	Choose a predefined module for output data of the PID. Select the type, number and name of the input module. If no option is available, add a new module.
Variable selection	Choose a predefined float variable as the output parameter for PID operation. Select the attribute, type and name of the float variable.
Max	Set the upper-limit value for the variable. Default: 0.
Min	Set the lower-limit value for the variable. Default: 0.
OK	Click to save the settings of the page and back to the PID list page.

Example:



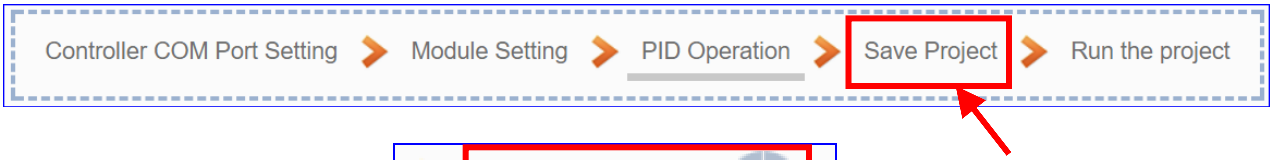
PV (Input) PID_R[0]
Auto Tune True
Sample Time 100 ms
SetValue 100.00
Controller Mode DIRECT
Kp 1.10
Ki 1.05
Kd 1.00

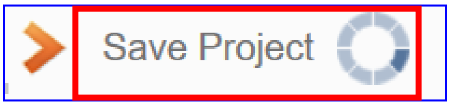
MV (Output) PID_RW[0]
Max 5.00
Min 1.00

Step 4. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

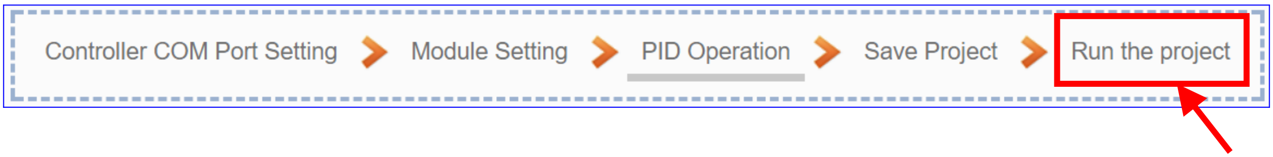
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



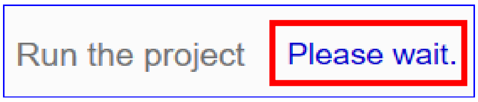


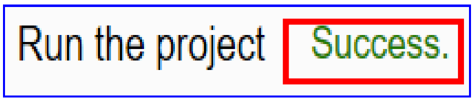
Step 5. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words "**Please wait**" (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words "**Please wait**" disappears, the new words "**Success**" appears (as below), that means the UA controller is running new project successfully.





And then the Step Box will disappear automatically now, and back to the first screen view of the Web UI.

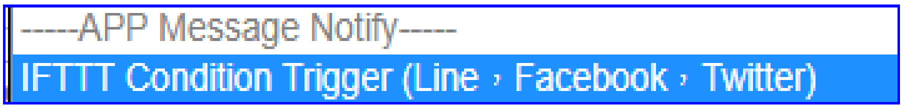
The new project now completes the setting, uploading and running in the UA controller and can process the new function project.

4.4. APP Message Notify

The "APP Message Notify" in the UA Function Wizard provides a condition trigger of IFTTT.

IFTTT (if this then that) is a cloud service platform that easy to get your apps and devices working together via creating chains of simple conditional statements (applets). An applet is triggered by changes that occur within other web services such as Line, Facebook, Twitter, Gmail, Instagram, etc. For example, “if” Facebook (Service A) has a new message, “then” send an email to Gmail (Service B). With the IFTTT cloud platform and UA functions, the users can send messages to IFTTT-related cloud services such as Line, Facebook, Twitter, etc. when the special events occur.

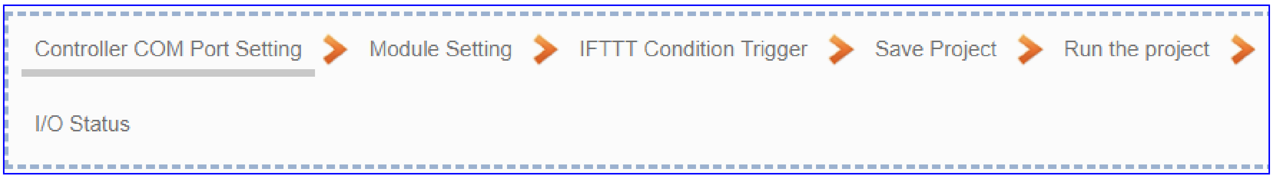
This section introduces the setting steps and the function parameters of the “APP Message Notify” and its item of “IFTTT Condition Trigger (Line, Face, Twitter)” function in the “Function Wizard” (Detail in Section 4.4.1).



-----APP Message Notify-----

IFTTT Condition Trigger (Line，Facebook，Twitter)

[Step Box] of [IFTTT Condition Trigger (Line, Facebook, Twitter)] :



Controller COM Port Setting › Module Setting › IFTTT Condition Trigger › Save Project › Run the project ›

I/O Status

4.4.1. IFTTT Condition Trigger (Line, Facebook, Twitter)

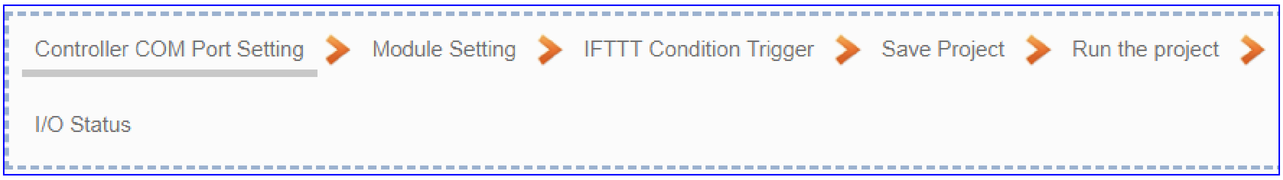
The “IFTTT Condition Trigger (Line, Facebook, Twitter)” combines the functions of the UA and IFTTT cloud platform. When the modules occur the special events that setting in the UA condition, it will trigger the IFTTT and send the message to the IFTTT-related cloud services (such as Line, Facebook, Twitter, etc.)

The settings for sending the message to the APP with the "IFTTT Condition Trigger (Line, Facebook, Twitter)" function includes two parts:

1. UA Web Interface Setting:
   In the UA Web HMI, set up the UA controller, modules, IFTTT trigger conditions, the condition variable table, and the IFTTT event connection.

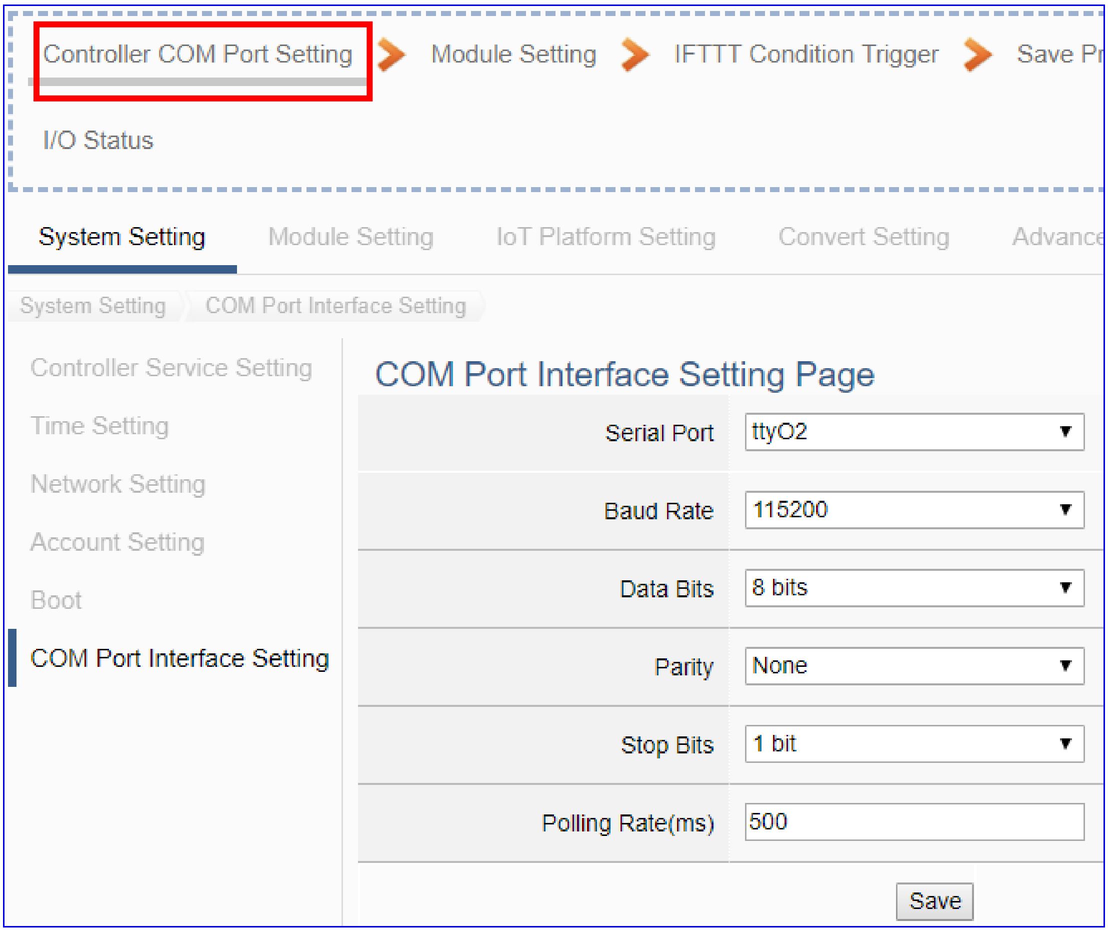
2. IFTTT Cloud Platform Setting:
   In the IFTTT website, set up the “**if**” side service and event (**this**: use **webhooks** for the UA), the “**then**” side service and action (**that**: user can select the service, such as the Line, Facebook, twitter, etc.). And then fill the “**Event Name**” and “**Key**” getting from the IFTTT website setting into the “**Content Setting**” of the UA We HMI. (Detail in the Appendix C.)

[Step Box]:
The Step Box of the [**IFTTT Condition Trigger (Line, Facebook, Twitter)**] has 6 steps as below. When enabling the Step Box, it auto enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the “Step Box” step by step and then can complete the project.



Step 1. Controller COM Port Setting

This page allows display and set the COM port interface of the controller for the serial communication. The user can find the default communication values of our I/O modules from the module CD, manual or I/O Module website.



COM Port Interface Setting Page

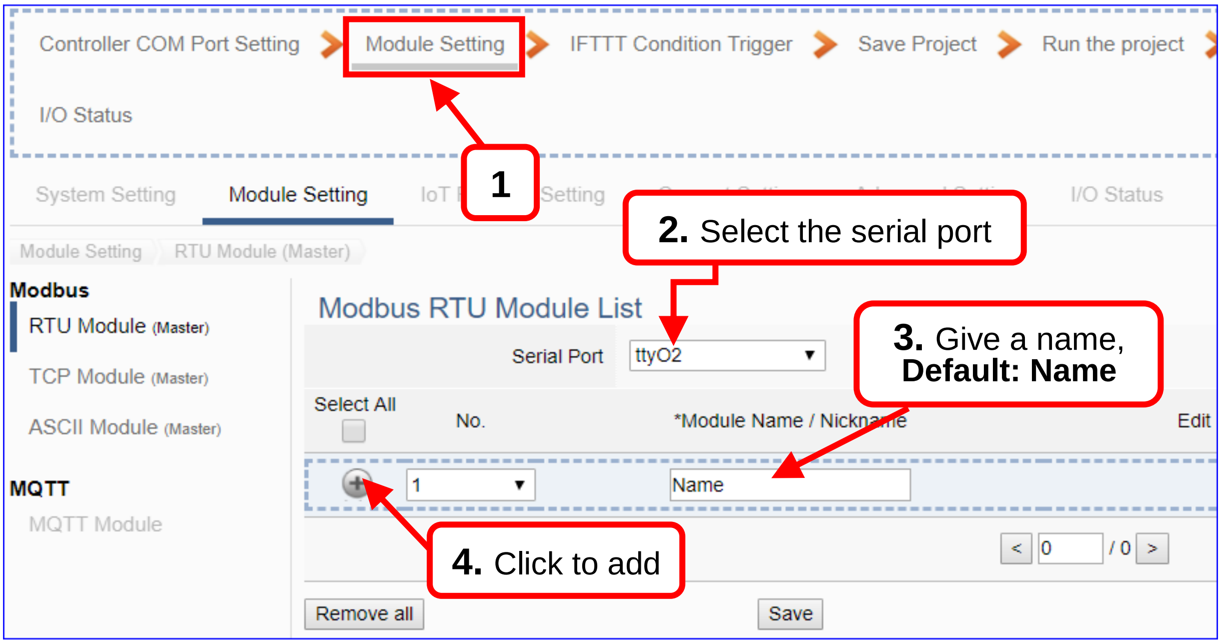
Serial Port	ttyO2
Baud Rate	115200
Data Bits	8 bits
Parity	None
Stop Bits	1 bit
Polling Rate(ms)	500

COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click [Save] button could save the settings of this page.

Step 2. Module Setting

Click the next step, and enter the **Step 2 [Module Setting]** of the UI setting.

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.



1

2. Select the serial port

3. Give a name, **Default: Name**

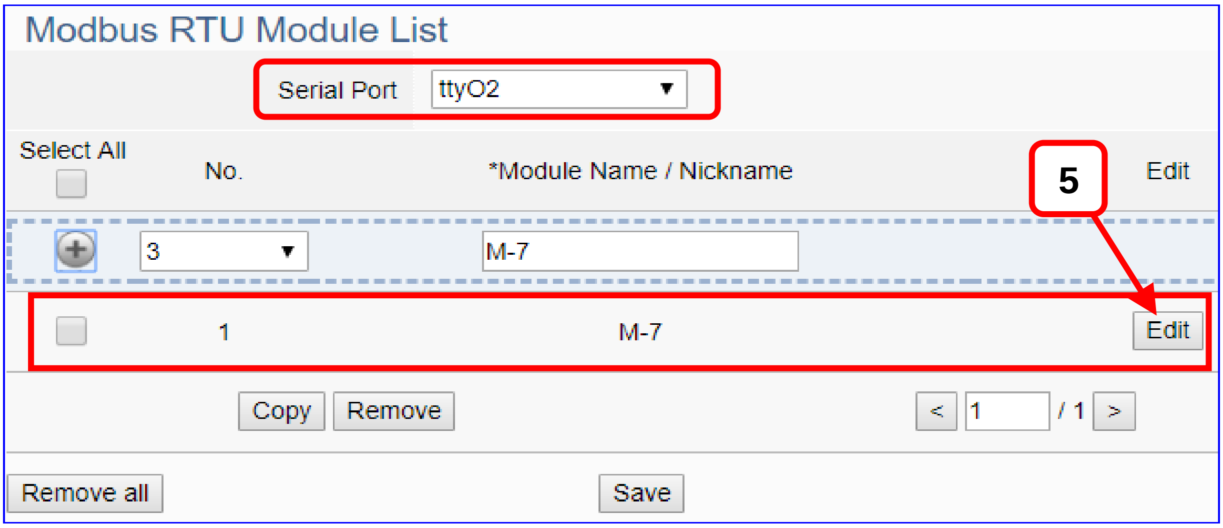
4. Click to add

Serial Port: ttyO2

No.: 1

*Module Name / Nickname: Name

Add a module (Ex: No.: 1, Name: M-7) as below, and then click [Edit] button to enter the “Module Content Setting” page.



5

Serial Port: ttyO2

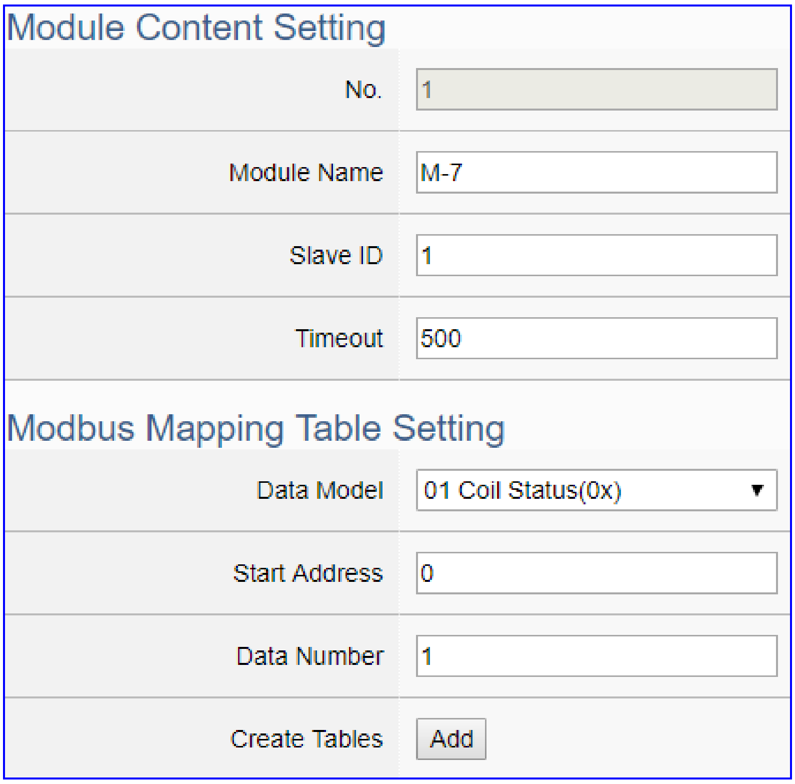
No.: 3

*Module Name / Nickname: M-7

No.	*Module Name / Nickname	Edit
1	M-7	Edit

If set up a wrong module, user can click the box in the left side of the module number and click the [Remove] button to delete the module.

[**Module Content Setting**] page can set up the module and the Modbus address mapping table:

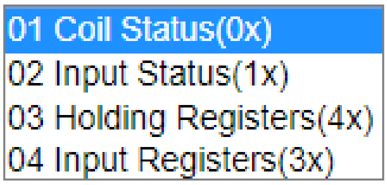


Module Content Setting

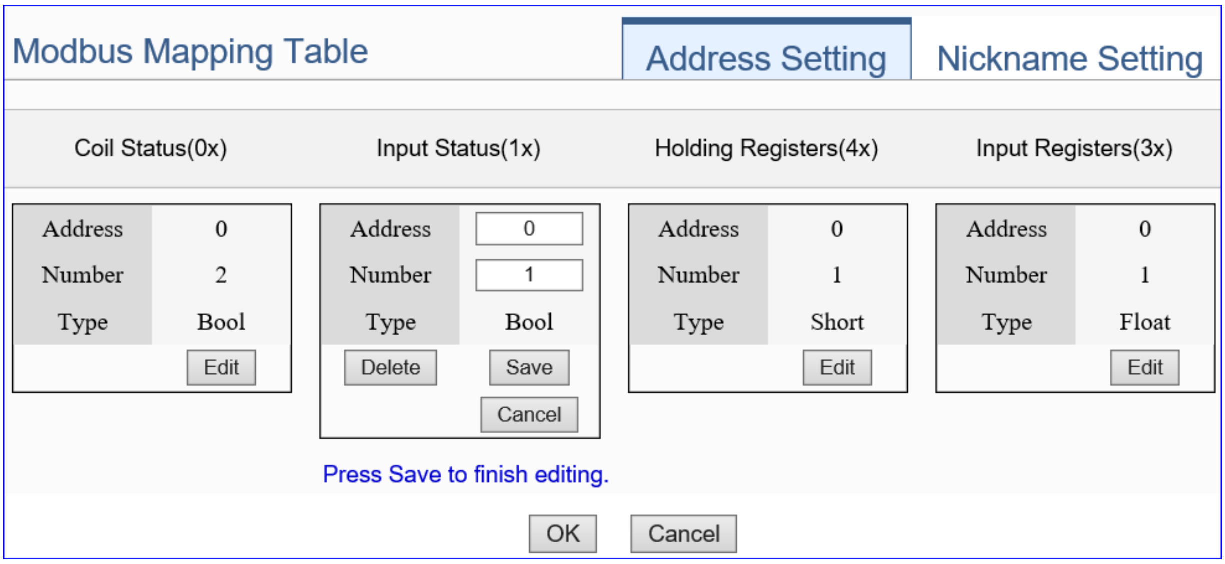
No.	1
Module Name	M-7
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x)
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

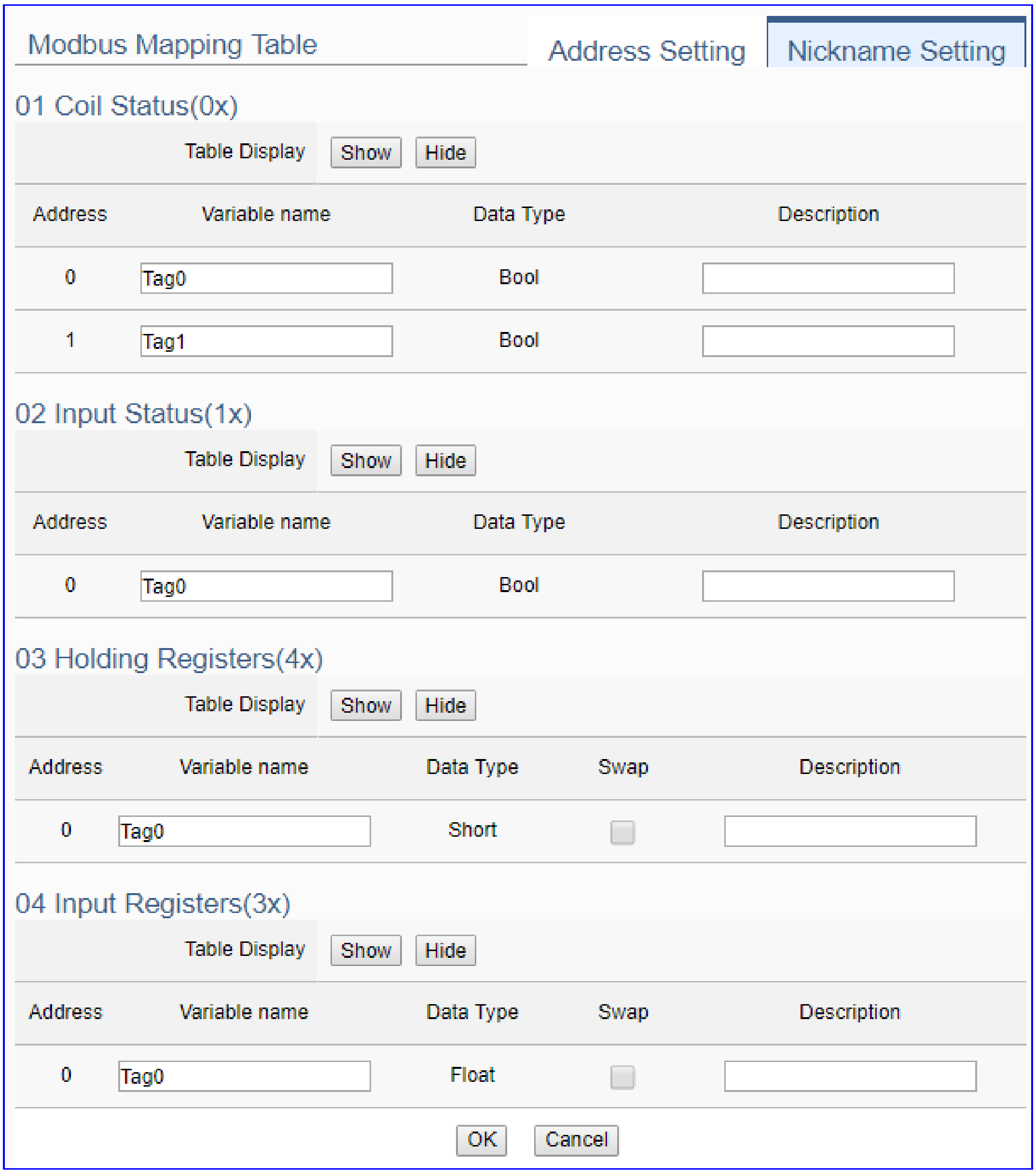


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The "Address Setting" page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The "Nickname Setting" page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table | Address Setting | Nickname Setting

01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

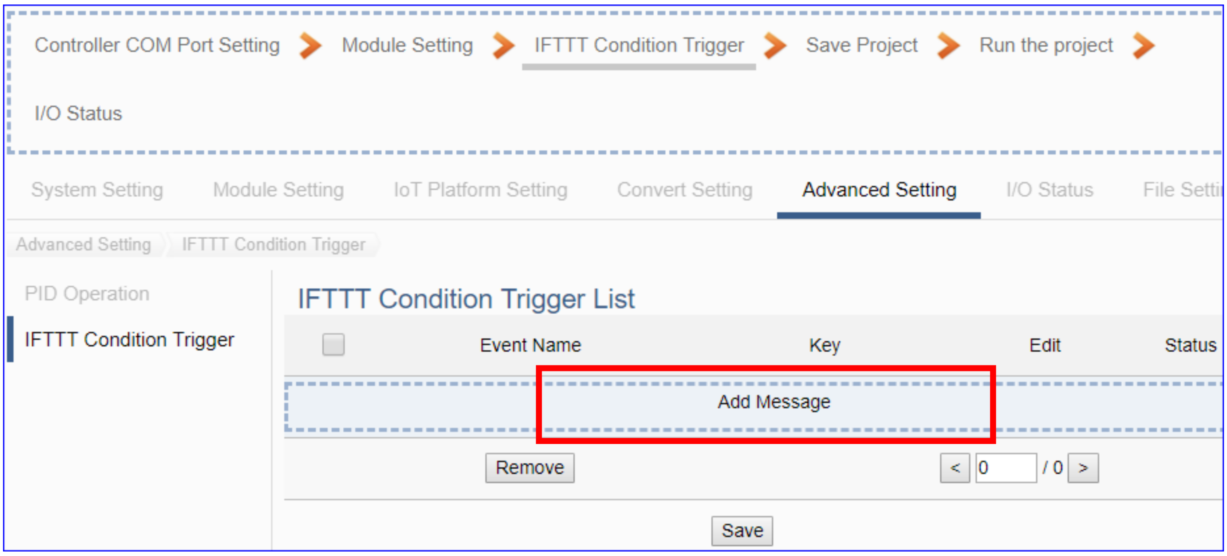
[OK] [Cancel]

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

Step 3. IFTTT Condition Trigger

Click the next step, and enter the **Step 3 [IFTTT Condition Trigger]**.
This page is for the APP message related setting, e.g. IFTTT event name, key, trigger condition, I/O variables ….

We select the “**IFTTT Condition Trigger (Line, Facebook, Twitter)**” at the beginning, so this step will auto enter the setting page [**Advanced Setting > IFTTT Condition Trigger**]. The “Step Box” will prevent the user from selecting the wrong platform.



Controller COM Port Setting > Module Setting > IFTTT Condition Trigger > Save Project > Run the project > I/O Status

System Setting | Module Setting | IoT Platform Setting | Convert Setting | Advanced Setting | I/O Status | File Setti

Advanced Setting > IFTTT Condition Trigger

PID Operation
IFTTT Condition Trigger

IFTTT Condition Trigger List

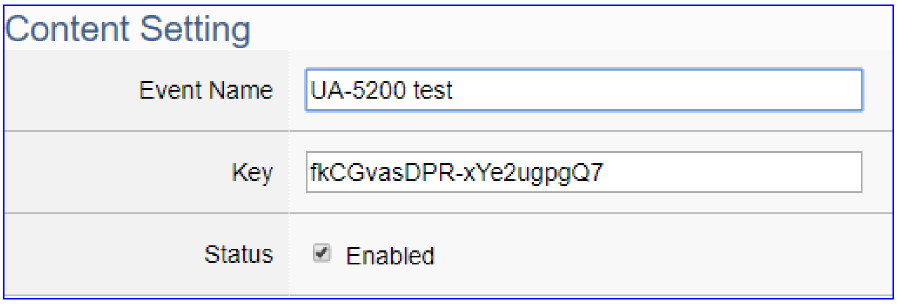
□	Event Name	Key	Edit	Status
	Add Message			

Remove   < 0 / 0 >

Save

Advanced Setting > IFTTT Condition Trigger > FTTT Condition Trigger List	
Add Message	Click to add a new IFTTT message. After setting, an IFTTT condition trigger list will show on the bottom, includes left box, event name, key and status.
□	Check the box in the left of the list is to select and to delete the list. Check the box on the top will select all lists.
Event Name	Display the “Event Name” setting in the IFTTT website. (Append. C)
Key	Display the “Key” getting from the IFTTT website. (Append. C)
Edit	Click [Edit] can set the IFTTT condition trigger content.
Status	Display the enable status of the IFTTT condition trigger list.
Remove	Click the left box and [remove] can delete the IFTTT list.
< 1 / 1 >	The page number of the IFTTT list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the setting of this page.

Click [Add Message] botton to enter the IFTTT [Content Settings] page:

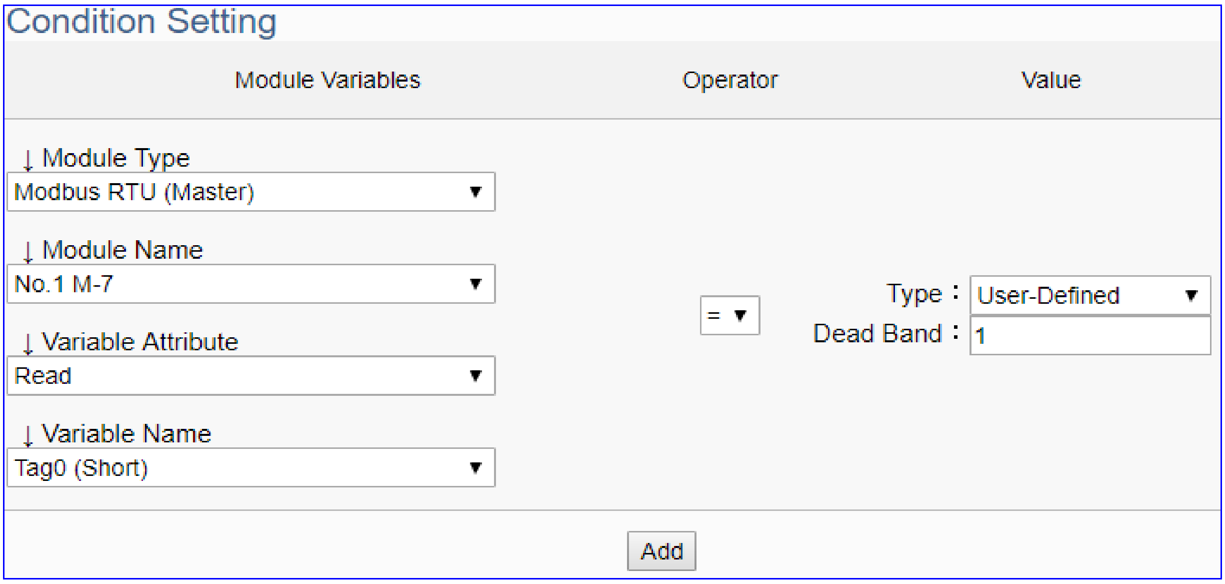


Content Setting

Event Name	UA-5200 test
Key	fkCGvasDPR-xYe2ugpgQ7
Status	☑ Enabled

Note: The “Event Name” and “Key” are set in the IFTTT website. If you are not familiar with IFTTT, please see the Appendix C for the setting introductions.

Advanced Setting > IFTTT Condition Trigger > Content Setting	
Event Name	Input the “Event Name” setting in the IFTTT website. (Append. C)
Key	Input the “Key” getting from the IFTTT website. (Append. C)
Status	Check to enable the IFTTT condition trigger event.



Condition Setting

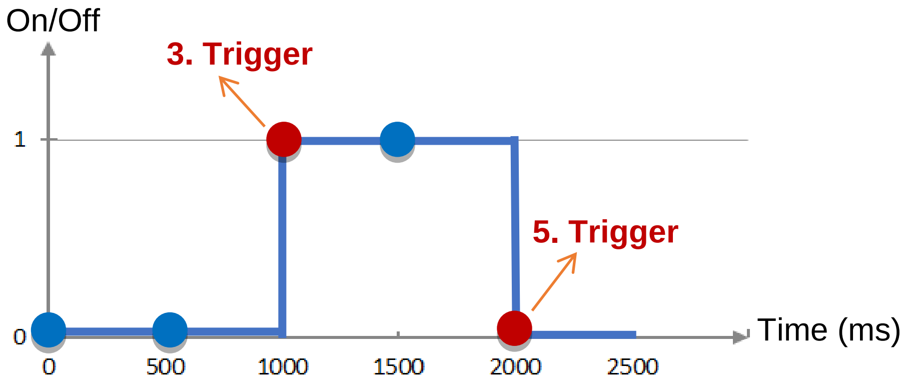
Module Variables	Operator	Value
↓ Module Type: Modbus RTU (Master) ↓ Module Name: No.1 M-7 ↓ Variable Attribute: Read ↓ Variable Name: Tag0 (Short)	=	Type：User-Defined Dead Band：1

Advanced Setting > IFTTT Condition Trigger > Condition Setting	
Module Variables	Select the module and variable for the condition trigger. Module Type: select the module type, Modbus RTU/TCP/ASCII… Module Name: select the module that set for condition trigger. Variable Attribute: select the variable attribute for condition trigger. Variable Name: select the variable name for condition trigger.
The following condition fields may different depending on the selected variable attribute. The condition trigger method will be descripted after this table.	
Operator	Select the operator for the trigger condition.
Value	Set up the value for the condition, include Type and Dead Band.
Status	Set up the status for the condition. Default: 0.
Add	Click to add a condition trigger list in the Condition Table..

Condition Trigger Descriptions:

The condition trigger method will different depending on the attribute of the selected variable and the trigger will be different. There are two operation styles: **DIO** and **AIO**.

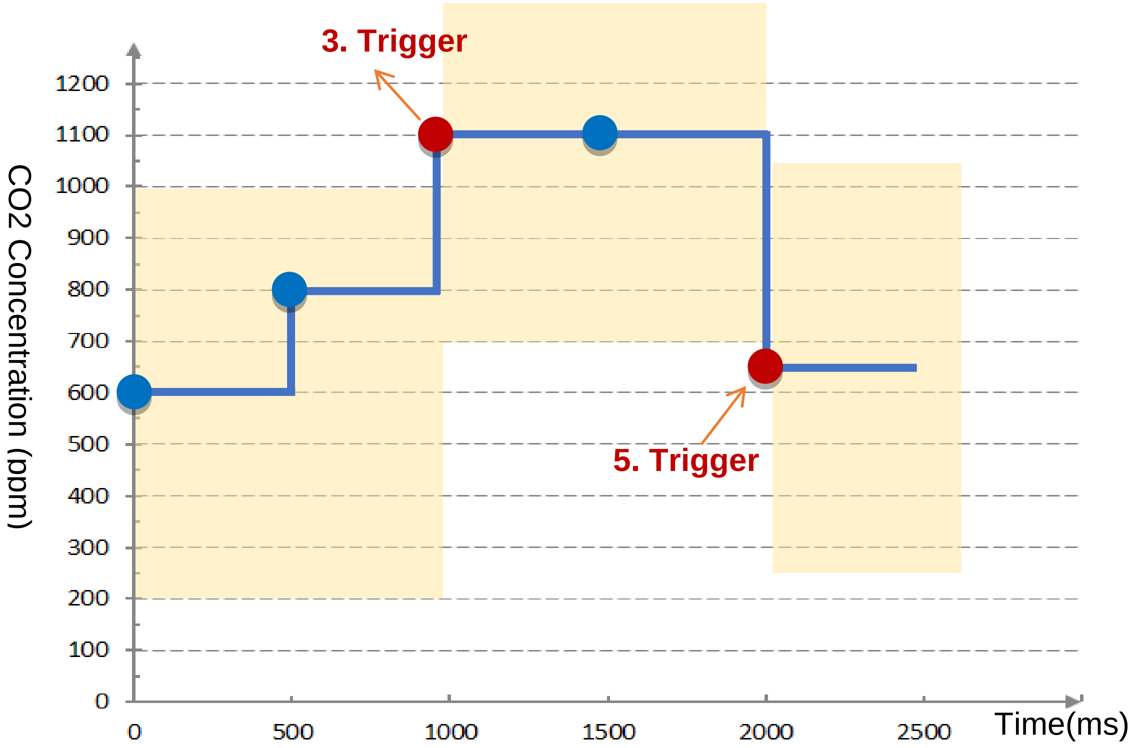
(A) If select **DIO variable**, then Condition is “Status Change”. When detecting the status is changed, it will trigger the event and send the assigned message. (Below is a switch detecting example.)



DIO Trigger: (Detect per 500 ms)

1. Detect initial switch status "Off" (status = 0)
2. Detect "Off" (status = 0, status no change), no trigger
3. Detect "On" (status = 1, status changed), **trigger** a message notification
4. Detect "On" (status = 1, status no change), no trigger
5. Detect "Off" (status = 0, status changed), **trigger** a message notification

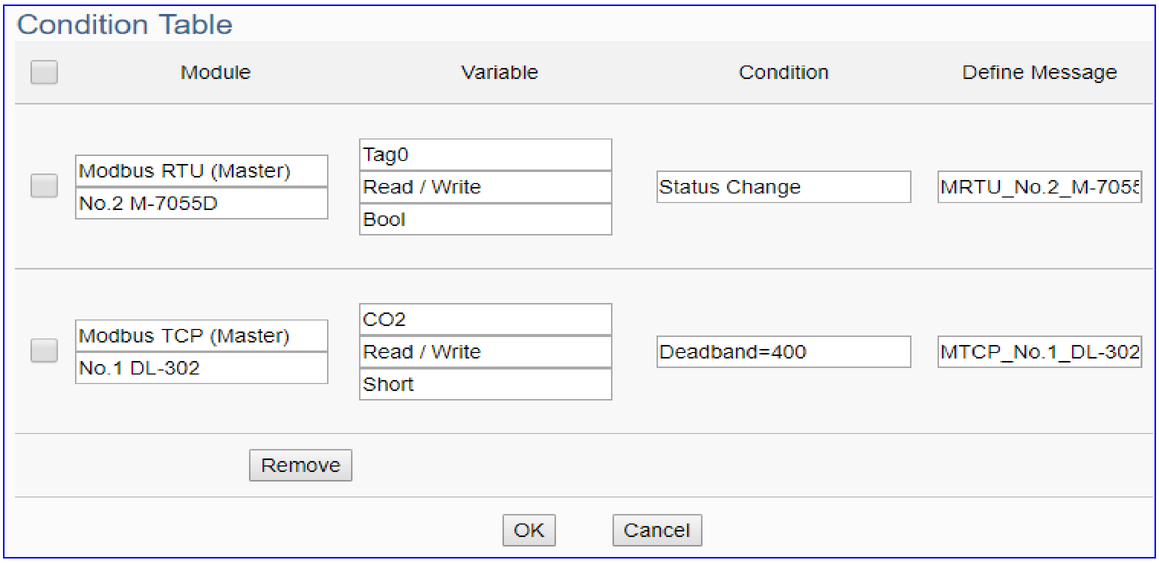
(B) If select **AIO variable**, then Condition is “Value” and can set the “Dead Band”. The condition will be triggered and send the message when the detected value exceeds the upper or lower Dead Band. (Below is a CO2 example. Detect per 500 ms)



AIO Trigger: (Detect per 500 ms. The yellow block means the Dead Band.)

1. Detect initial CO2 concentration 600 (ppm).
   Set Dead Band=400 (Initial Trigger Condition: **>=** 1000 **or <=** 200)
2. Detect CO2 concentration 800. It is in the range of Dead Band.
3. Detect CO2 concentration 1100. It exceeds the upper value (>= 1000) of Dead Band, so **trigger** a message for danger notification.
4. Detect CO2 concentration 1100. It is in the new range of Dead Band.
   Dead Band=400 (New Trigger Condition: **>=** 1500 **or <=** 700)
5. Detect CO2 concentration 650. It is below the lower value (<= 700) of Dead Band, so **trigger** a message for safety notification.

Please refer to the previous Condition Trigger Descriptions to set up your Condition. When complete, click the "Add" button. The setting will show in the Condition Table. Below Table is setting 2 conditions.

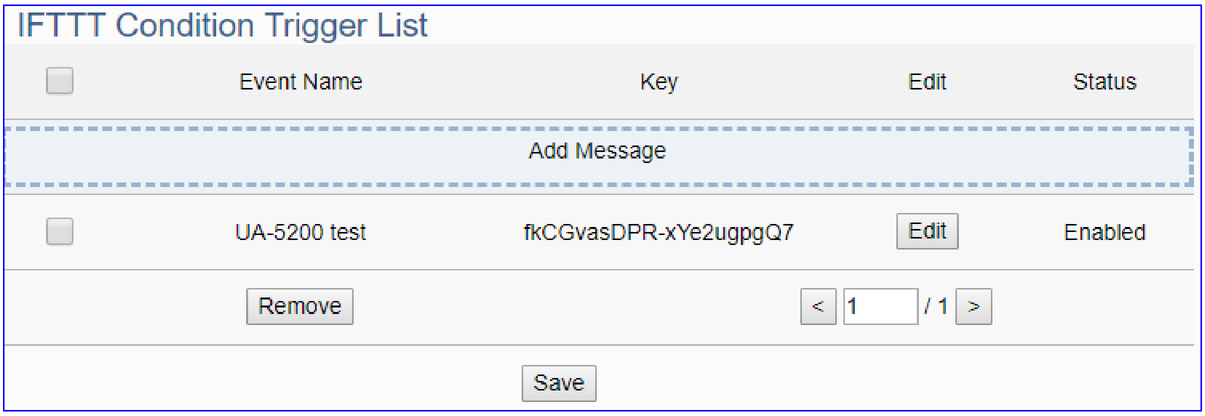


Condition Table

□	Module	Variable	Condition	Define Message
□	Modbus RTU (Master) No.2 M-7055D	Tag0 Read / Write Bool	Status Change	MRTU_No.2_M-7055
□	Modbus TCP (Master) No.1 DL-302	CO2 Read / Write Short	Deadband=400	MTCP_No.1_DL-302

Advanced Setting > IFTTT Condition Trigger > Condition Table	
Module	Display the module type and name of the condition. (Not editable here)
Variable	Display the variable attribute and name of the condition. (Not editable here)
Condition	Display the trigger condition. (Not editable here)
Define Message	Default Message: module code_variable code. The user can define own message in the format of English character, number, general symbol…
Remove	Click the left box and [remove] can delete the IFTTT list.
OK	Click to save this page settings and back to the module list page.
Cancel	Click to exit without saving and back to the module list page.

When back to the IFTTT Condition Trigger List, the condition trigger message will show as below picture. If need more trigger conditions, click the "Add Message" again to combine the IFTTT APP message sending and the UA system. At last, click the Save button.



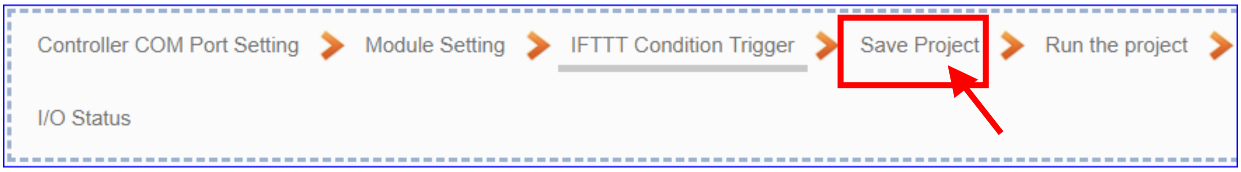
IFTTT Condition Trigger List

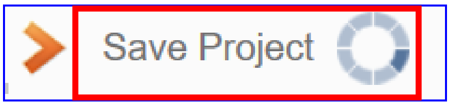
□	Event Name	Key	Edit	Status
	Add Message			
□	UA-5200 test	fkCGvasDPR-xYe2ugpgQ7	Edit	Enabled

Step 4. Save Project

The setting of this example is finished now, and then to save the whole project and run the project. So the last two steps will not show setting pages, but show some displays.

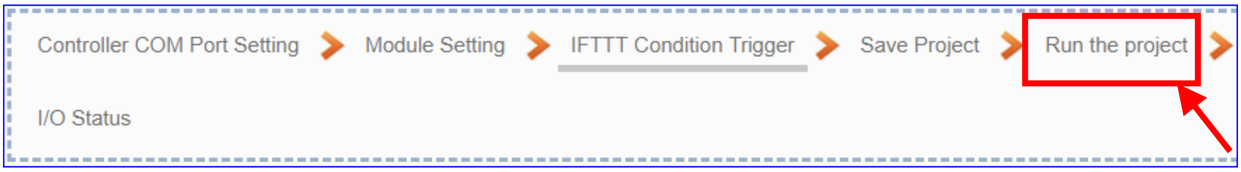
Click the next step **[Save Project],** the Step Box will show an animation as below picture, that means the project is saving. When the animation vanished, the project is saved completely.



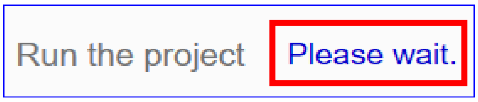


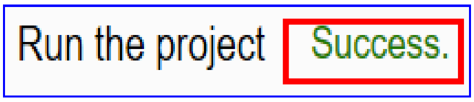
Step 5. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**.



The Step Box will show the words "**Please wait**" (as below), that means the system is deleting the old project in the UA controller, and will upload the new project into the UA series and run the new project. When the words "**Please wait**" disappears, the new words "**Success**" appears (as below), that means the UA controller is running new project successfully.

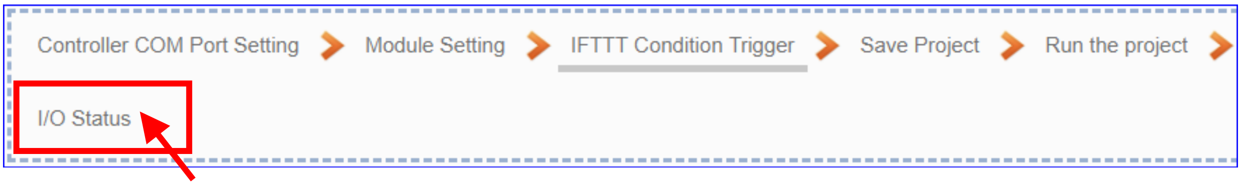




The new project now completes the setting, uploading and running in the UA controller and can process the new function project.

Step 6. I/O Status

The last step **[I/O Status]** can show the I/O real time status of the modules.

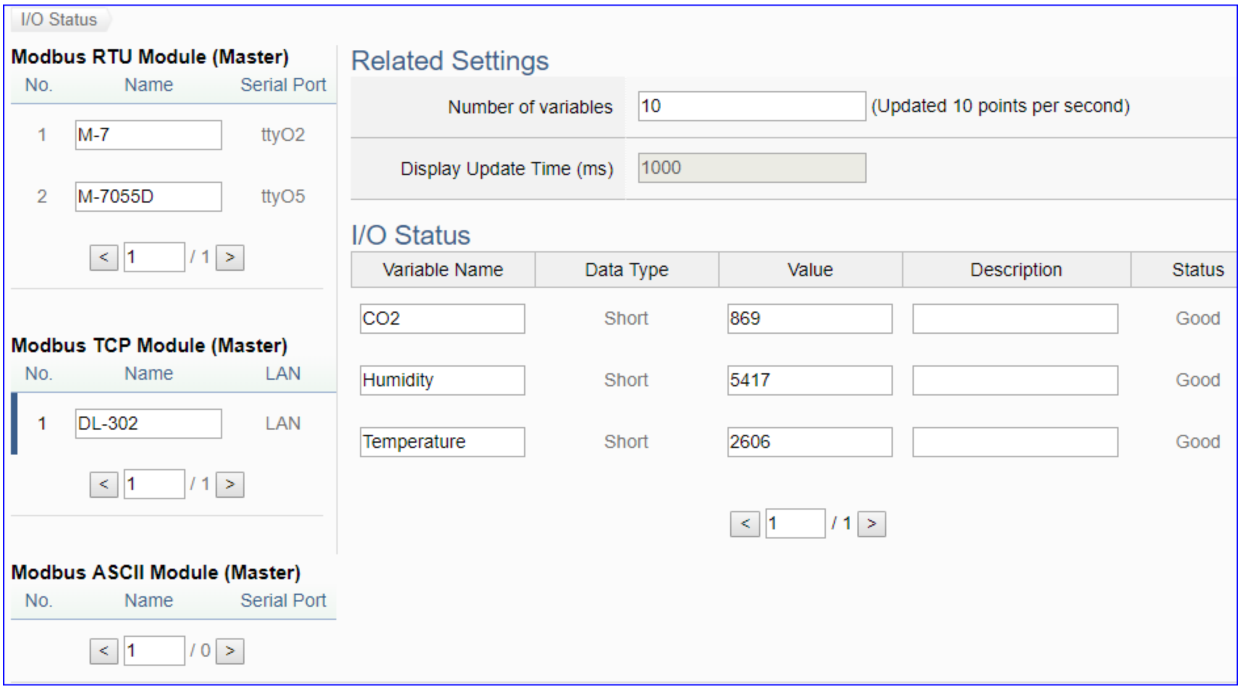


Controller COM Port Setting > Module Setting > IFTTT Condition Trigger > Save Project > Run the project >

I/O Status

When click the last step, the Step Box will disappear automatically now, and go to the I/O Status screen view.

Click the left module name, the right screen will show the module setting and the I/O real time status of the selected module.



I/O Status

Modbus RTU Module (Master)

No.	Name	Serial Port
1	M-7	ttyO2
2	M-7055D	ttyO5

< 1 / 1 >

Modbus TCP Module (Master)

No.	Name	LAN
1	DL-302	LAN

< 1 / 1 >

Modbus ASCII Module (Master)

No.	Name	Serial Port

< 1 / 0 >

Related Settings

Number of variables: 10 (Updated 10 points per second)

Display Update Time (ms): 1000

I/O Status

Variable Name	Data Type	Value	Description	Status
CO2	Short	869		Good
Humidity	Short	5417		Good
Temperature	Short	2606		Good

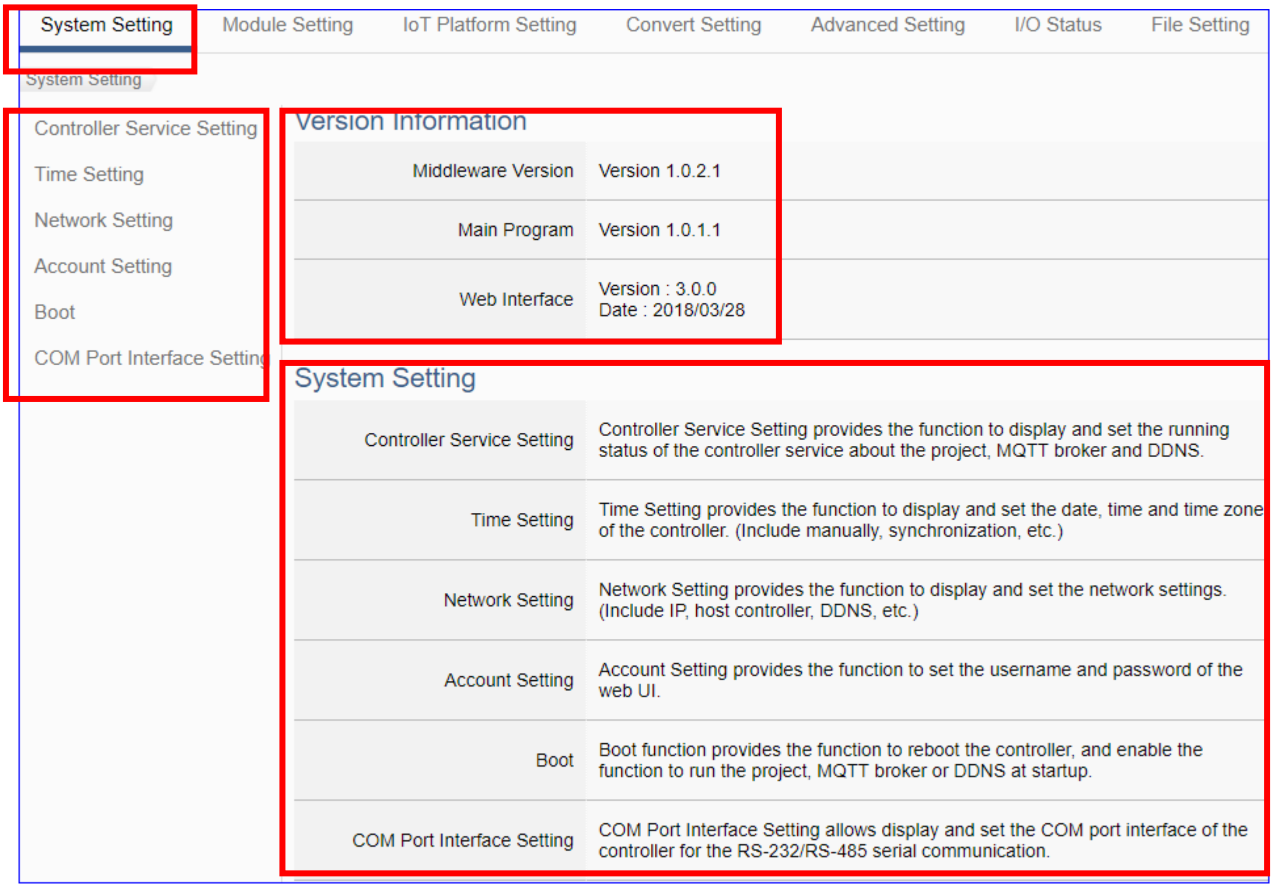
< 1 / 1 >

The project for APP message notifies via the IFTTT condition trigger (Lind, Facebook, Twitter) is now done.

5. System Setting

System Setting is the first item of the Main Menu and the first screen view when login the UA Web UI. The System Setting provides the functions for system management of the UA series controller and displays the version information of the system (Higher-left picture).

[System Setting] includes six sub-menu functions (Lower-left picture) and the function descriptions are listed on the page of the Main Menu, such as the controller service, time, network, account, boot and COM port interface settings. This chapter will introduce these function items and setting parameters.



Version Information

Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 3.0.0 Date : 2018/03/28

System Setting

Controller Service Setting	Controller Service Setting provides the function to display and set the running status of the controller service about the project, MQTT broker and DDNS.
Time Setting	Time Setting provides the function to display and set the date, time and time zone of the controller. (Include manually, synchronization, etc.)
Network Setting	Network Setting provides the function to display and set the network settings. (Include IP, host controller, DDNS, etc.)
Account Setting	Account Setting provides the function to set the username and password of the web UI.
Boot	Boot function provides the function to reboot the controller, and enable the function to run the project, MQTT broker or DDNS at startup.
COM Port Interface Setting	COM Port Interface Setting allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

The setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. User can find the procedure information in the following chapters.

3.3 Function Setting Procedure

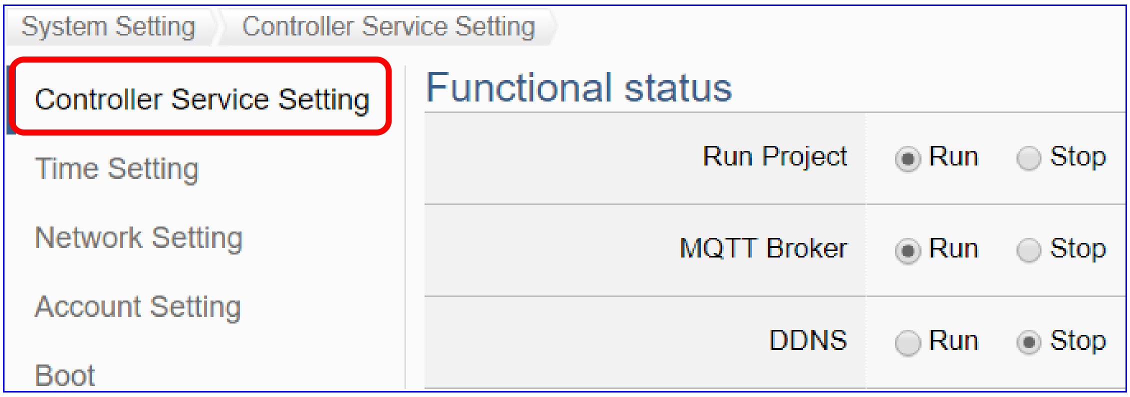
2. Quick Start

4. Function Wizard

About the Web UI login information and the UI environment, please refer to 3. Web UI Login and Enviroment Overview.

5.1. Controller Service Setting

Controller Service Setting provides the function to display and set the running status of the controller service about the project, MQTT Broker and DDNS.



Functional status

Run Project ● Run ○ Stop

MQTT Broker ● Run ○ Stop

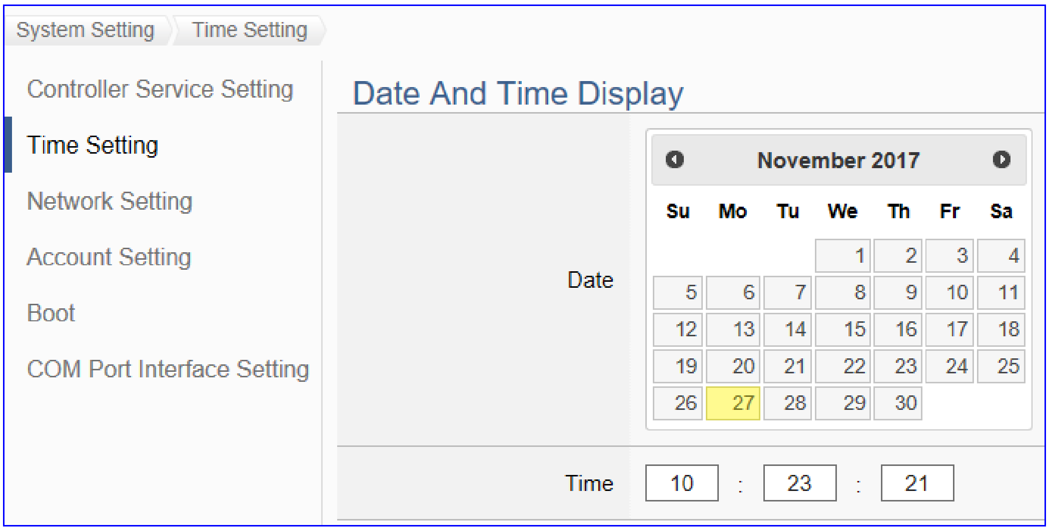
DDNS ○ Run ● Stop

System Setting > Controller Service Setting > Functional status	
Run Project	Display the current status of project running in the UA series controller and provide “Run” and “Stop” button to switch the status. Default: Run.
MQTT Broker	Display the current status of MQTT Broker of the UA series controller and provide “Run” and “Stop” button to switch the status. Default: Run.
DDNS	Display the current status of DDNS Client of the UA series controller and provide “Run” and “Stop” button to switch the status. Default: Stop.

5.2. Time Setting

Time Setting provides the function to display and set the date, time and time zone of the controller, including manually, synchronization, etc.

Time Setting provides 3 functions: Data and Time Display, NTP Time Synchronization Setting and Set the Time Manually.



System Setting > Time Setting

- Controller Service Setting
- Time Setting
- Network Setting
- Account Setting
- Boot
- COM Port Interface Setting

Date And Time Display

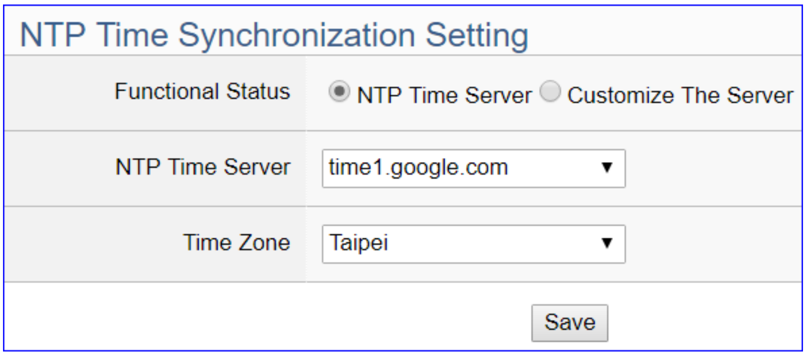
Date

November 2017

Su	Mo	Tu	We	Th	Fr	Sa
			1	2	3	4
5	6	7	8	9	10	11
12	13	14	15	16	17	18
19	20	21	22	23	24	25
26	27	28	29	30		

Time 10 : 23 : 21

System Setting > Time Setting > Date And Time Display	
Date	Display the date of the UA series controller. The yellow block means current day. User can switch to show the date in other month.
Time	Display the current time of the UA series controller, including hour, minute and second.



NTP Time Synchronization Setting

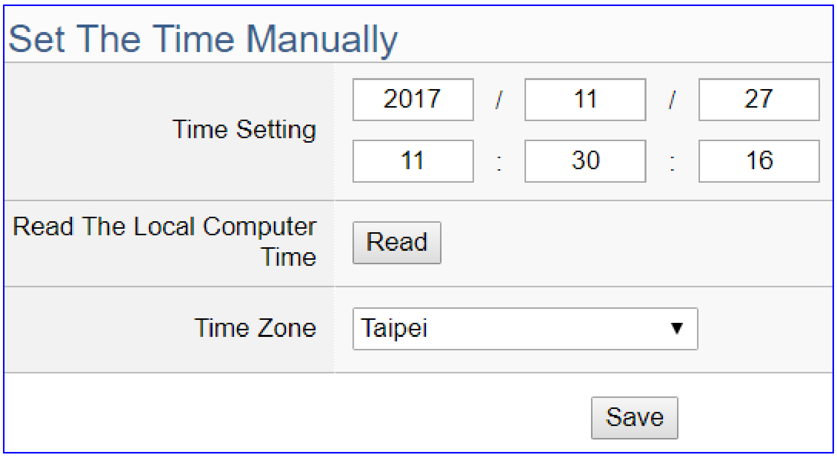
Functional Status ● NTP Time Server ○ Customize The Server

NTP Time Server: time1.google.com ▼

Time Zone: Taipei ▼

Save

System Setting > Time Setting > NTP Time Synchronization Setting	
Functional Status / NTP Time Server	Set up one NTP Time Server from the google (4), windows and nist (4) servers for synchronization. Click “Customize The Server” and enter the IP address or the domain name can set up user own time server.
Time Zone	Set up the time zone.
Save	Click to save the settings of this item.



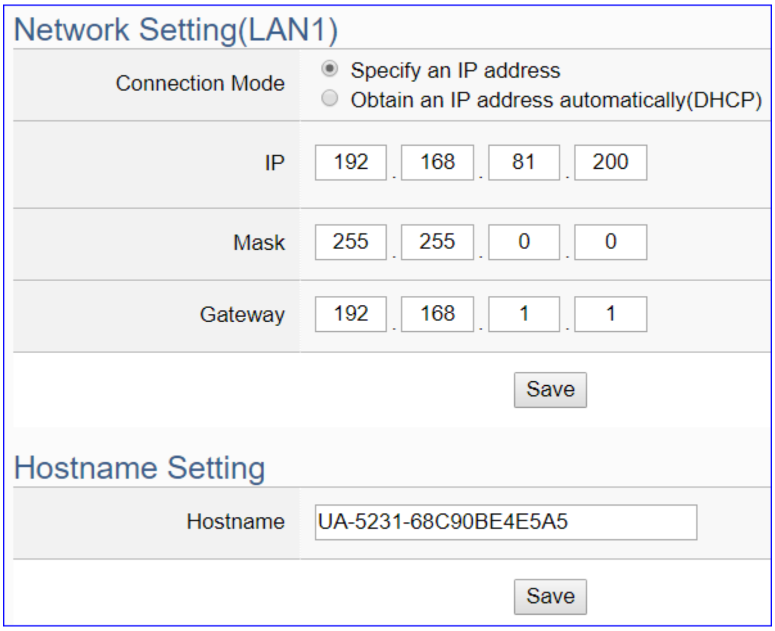
Set The Time Manually

Time Setting	2017 / 11 / 27 11 : 30 : 16
Read The Local Computer Time	Read
Time Zone	Taipei ▼

System Setting > **Time Setting** > **Set The Time Manually**	
Time Setting	Set the system time of the UA controller by manually. Directly enter the new year/month/date and hour:minute:second.
Read The Local Computer Time	Click [Read] can copy the current time of the using computer to the “Time Setting” of this item.
Time Zone	Set up the time zone.
Save	Click to save the settings of this item and update the data of “Time Setting” to the “Date And Time Display” on the top of this page.

5.3. Network Setting

Network Setting provides the function to display and set the network settings, including IP address, host controller, DDNS, etc.



Network Setting(LAN1)

Connection Mode: ● Specify an IP address ○ Obtain an IP address automatically(DHCP)

IP: 192 . 168 . 81 . 200

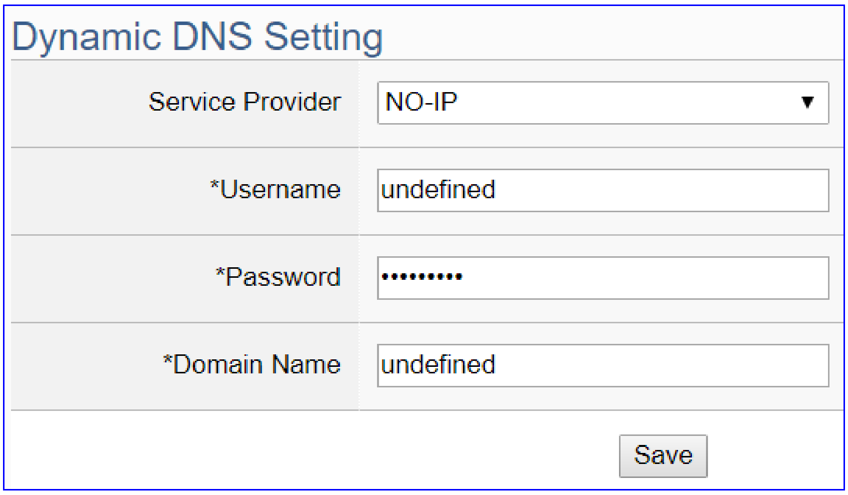
Mask: 255 . 255 . 0 . 0

Gateway: 192 . 168 . 1 . 1

Hostname Setting

Hostname: UA-5231-68C90BE4E5A5

System Setting > Network Setting > Network Setting (LAN1)	
Connection Mode	**Specify an IP address**: It's the fixed IP mode. Users input the values in the fields of IP, Mask and Gateway according to customer's network. Detail information for the factory default value of UA controller network refers to the Section 2.2.1. **Obtain an IP address automatically (DHCP)**: It's the Dynamic Host Configuration Protocol mode. The system assigns the IP, Mask and Gateway automatically.
IP	The IP address of this UA-5200. Factory Default: 192.168.255.1
Mask	The mask address of this UA-5200. Factory Default: 255.255.0.0
Gateway	The gateway address of this UA-5200. Factory Default: 192.168.1.1
Save	Click to save the settings of this item.
System Setting > Network Setting > Hostname Setting	
Hostname	The host name of this UA-5200. Default: system value. User can give a new name, but cannot be null.
Save	Click to save the settings of this item.

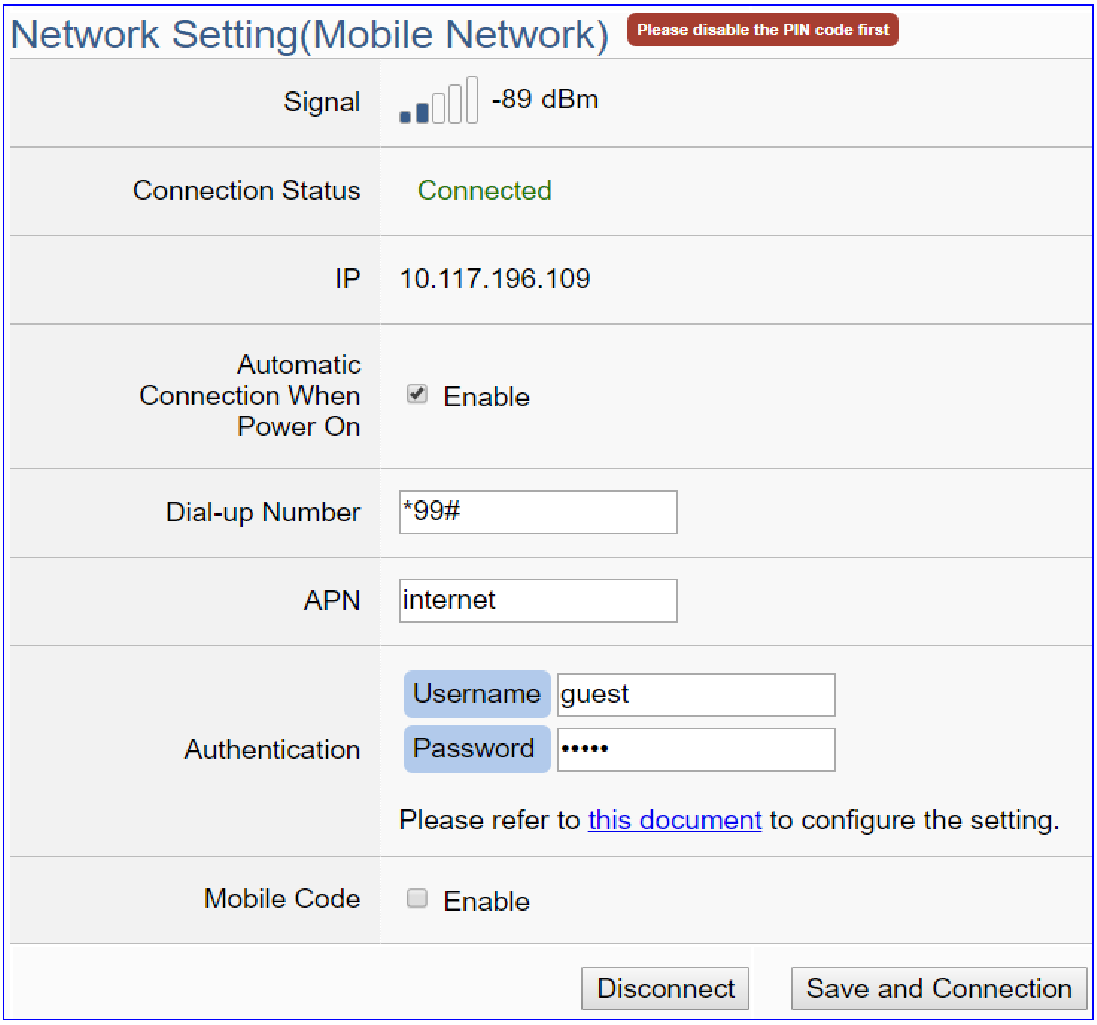


Dynamic DNS Setting

Service Provider	NO-IP ▼
*Username	undefined
*Password	•••••••••
*Domain Name	undefined

System Setting > Network Setting > Dynamic DNS Setting	
Service Provider	Select the company of the DDNS service. Default: NO-IP. Supports: NO-IP, ChangeIP.com, DynDNS, FreeDNS.
*Username	Set up the login user name. The star * means the field cannot be null. Default: undefined.
*Password	Set up the login password. The star * means the field cannot be null.
*Domain Name	Define the parked domain name of the DDNS. The star * means the field cannot be null. Default: undefined.
Save	Click to save the settings of this item.

* The star " * " means the field cannot be null.



Network Setting(Mobile Network)

Signal -89 dBm

Connection Status Connected

IP 10.117.196.109

Automatic Connection When Power On ☑ Enable

Dial-up Number *99#

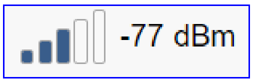
APN internet

Authentication Username guest Password •••••

Please refer to this document to configure the setting.

Mobile Code □ Enable

1. **This setting item only appears on the mobile model of UA controller.**
2. **In order to complete the connection to the Mobile Network, please disable the PIN code setting of the SIM card used in UA.**
3. **Insert the SIM card into the SIM card socket of UA, and then power on or restart the UA. When the 3G/4G signal turns green, the network connection is successful.**
4. **When the mobile network is enabled, the mobile network will serve as the main route to the external network.**

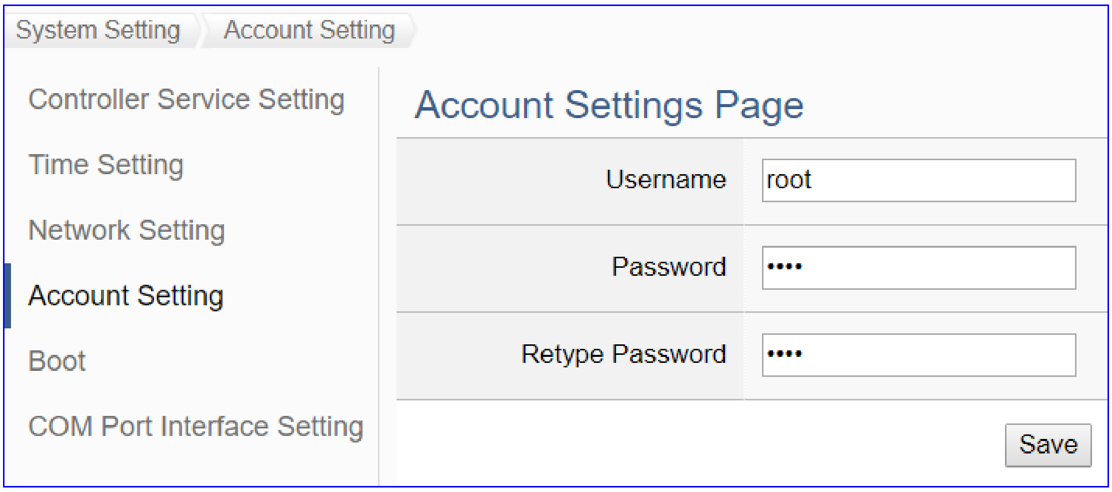
System Setting > Network Setting > Network Setting(Mobile Network)	
Signal	Display the strength level of the Mobile Network Signal. Signal strength range: (The strongest signal) -51 ~ -113 (No signal) 
Connection Status	Display the connection status: Connected or Disconnected.
IP	Display the IP address that UA occupies through Mobile Network.

System Setting > Network Setting > Network Setting(Mobile Network)	
Automatic Connection When Power On	If check the “Enable” box, it will enable the UA controller to complete the Mobile Network connection automatically when power on UA controller.
Dial-up Number	Default: *99#. User can change it by the proprietary number provided by the Telecommunication Service Company.
APN	Please refer to “this document” provided on the UA Web HMI page to configure the setting.
Authentication	Please refer to “this document” provided on the UA Web HMI page to configure the setting.
Mobile Code	It is an optional setting. It depends on the service the Telecommunication Service Company provides
Disconnect	Click button can disconnect the Mobile Network connection.
Save and Connection	Click button to save the setting and start to connect the Mobile Network.

5.4. Account Setting

Account Setting provides the function to set the login username and password of the UA-5200's web UI.

The factory default username and password of the UA Web UI: root / root. The detail information for the factory default network values of UA controller please refers to the Section 2.2.1.



Username: root

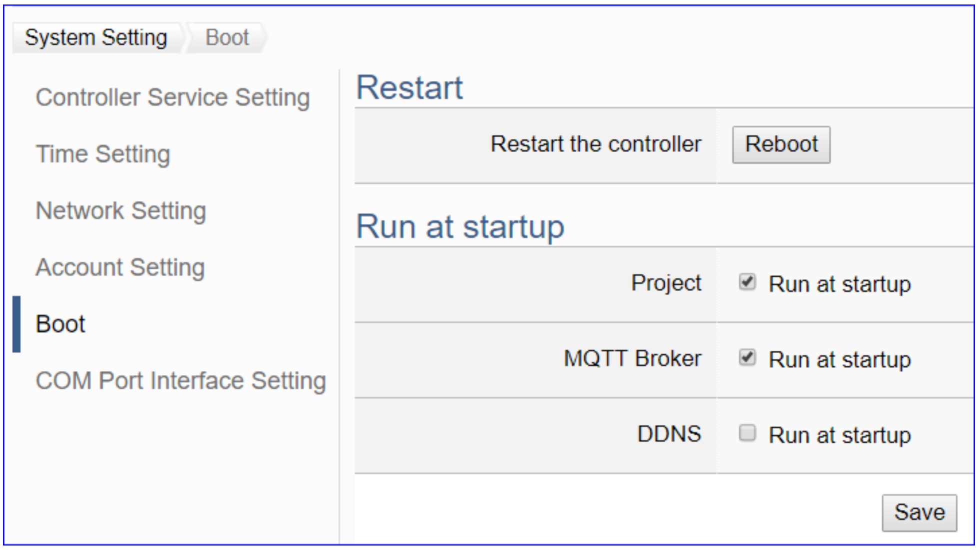
Password: ••••

Retype Password: ••••

System Setting > Account Setting > Account Settings Page	
Username	The login username for the UA-5200's Web UI. Factory default: root
Password	The login password for the UA-5200's Web UI. Factory default: root
Retype Password	Retype the password for the operation conform when setting the new account information.
Save	Click to save the settings of this page.

5.5. Boot

Boot function provides the function to reboot the UA series controller, and enable the function to run the project, MQTT broker or DDNS at startup.



Restart the controller

Project ☑ Run at startup

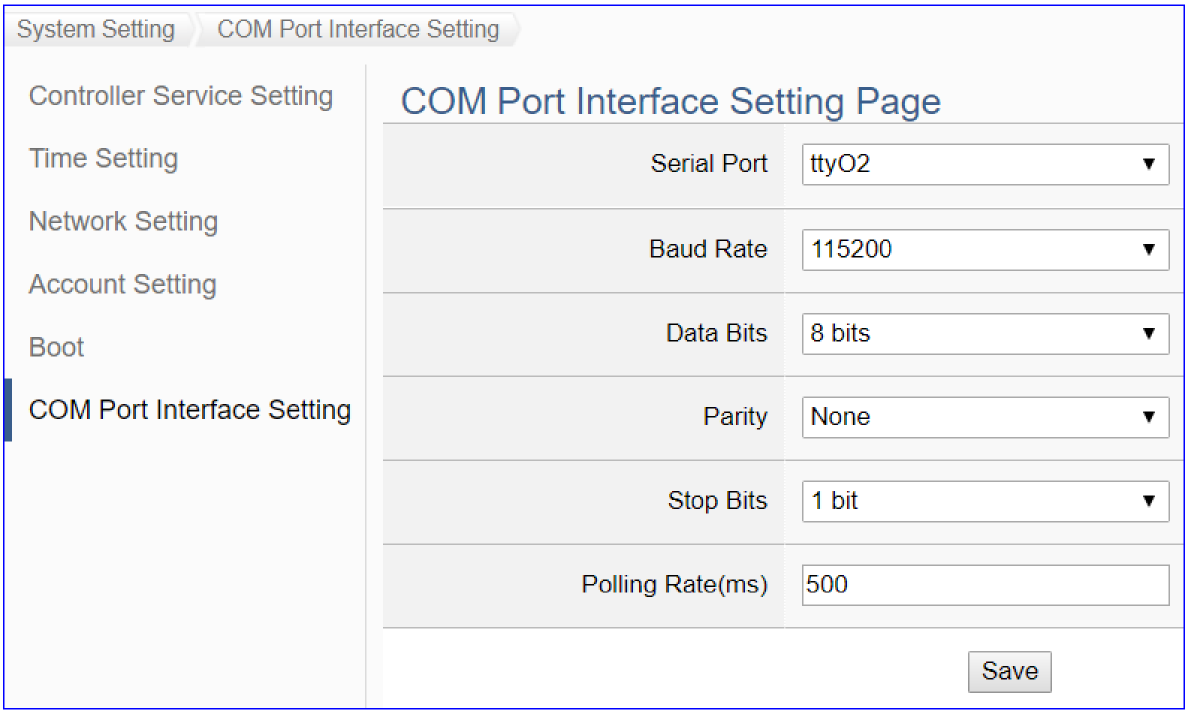
MQTT Broker ☑ Run at startup

DDNS □ Run at startup

System Setting > Boot > Restart	
Restart the controller	Click “Reboot” can restart the UA controller at once.
System Setting > Boot > Run at startup	
Project	Check the “Run at startup” box can set the project to run at the UA controller startup. Default: check.
MQTT Broker	Check the “Run at startup” box can set the MQTT Broker to run at the UA controller startup. Default: check.
DDNS	Check the “Run at startup” box can set the DDNS to run at the UA controller startup. Default: uncheck.
Save	Click to save the settings of this page.

5.6. COM Port Interface Setting

COM Port Interface Setting allows display and set the COM port interface of the UA series controller for the RS-232/RS-485 serial communication.


System Setting
COM Port Interface Setting
Controller Service Setting
Time Setting
Network Setting
Account Setting
Boot
COM Port Interface Setting
Save

COM Port Interface Setting Page

Serial Port: ttyO2

Baud Rate: 115200

Data Bits: 8 bits

Parity: None

Stop Bits: 1 bit

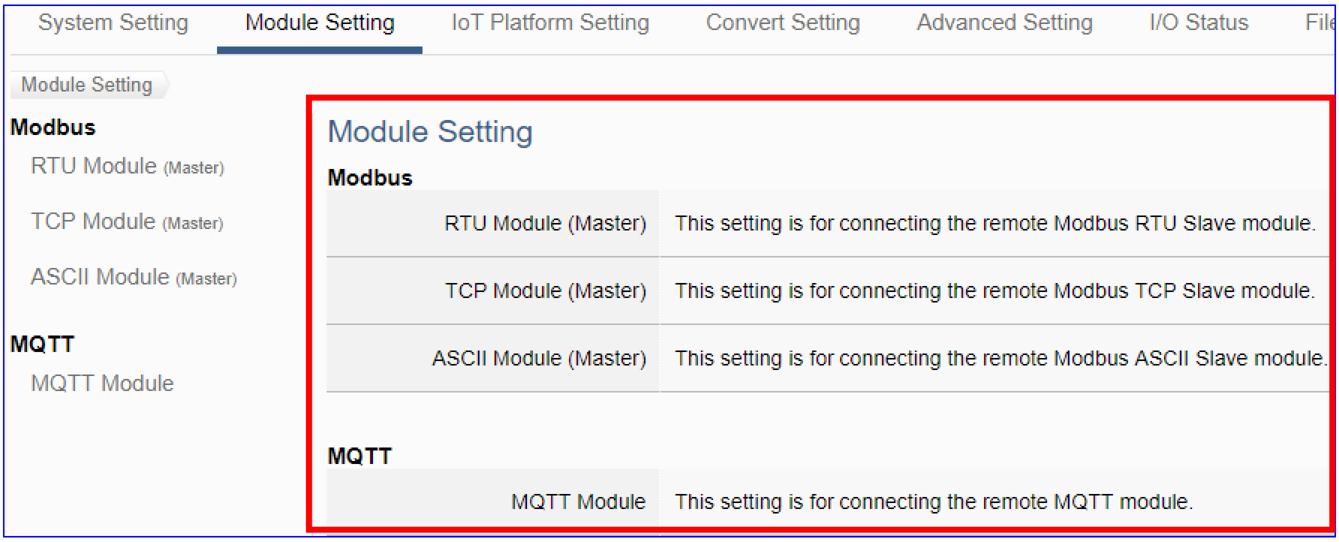
Polling Rate(ms): 500

System Setting > COM Port Interface Setting > COM Port Interface Setting Page	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485 ; ttyO4: RS-232 ; ttyO5: RS-485. Default: ttyO2.
Baud Rate	Choose a baud rate to communicate with the module: 1200, 2400, 4800, 9600, 19200, 38400, 57600 and 115200. The UA controller and the I/O module need have the same baud rate. Default: 115200.
Data Bits	The number of bits used to represent one byte of data: 7 bits or 8 bits. Default: 8 Bits.
Parity	Choose one way for the parity checking. Options: None, Even, and Odd. Default: None.
Stop Bits	Choose the number of stop bit: 1 bit or 2 bits. Default: 1.
Polling Rate(ms)	Set a time interval for the command. Default: 500 ms
Save	Click to save the settings of this page.

6. Module Setting

Module Setting is the second item of the Main Menu. The Module Setting provides the functions for UA series controller to connect the remote Modbus Slave module (including the Modbus RTU/TCP/ASCII module) and the remote MQTT module.

[Module Setting] includes three sub-menu functions (see the picture below) and the function descriptions are listed on the page of the Main Menu, such as the Modbus RTU Module (Master), TCP Module (Master), ASCII Module (Master) and MQTT Module. The Module Setting will support more modules in the future. This chapter will introduce the current function items and setting parameters.



Module Setting

Modbus

RTU Module (Master)	This setting is for connecting the remote Modbus RTU Slave module.
TCP Module (Master)	This setting is for connecting the remote Modbus TCP Slave module.
ASCII Module (Master)	This setting is for connecting the remote Modbus ASCII Slave module.

MQTT

MQTT Module	This setting is for connecting the remote MQTT module.

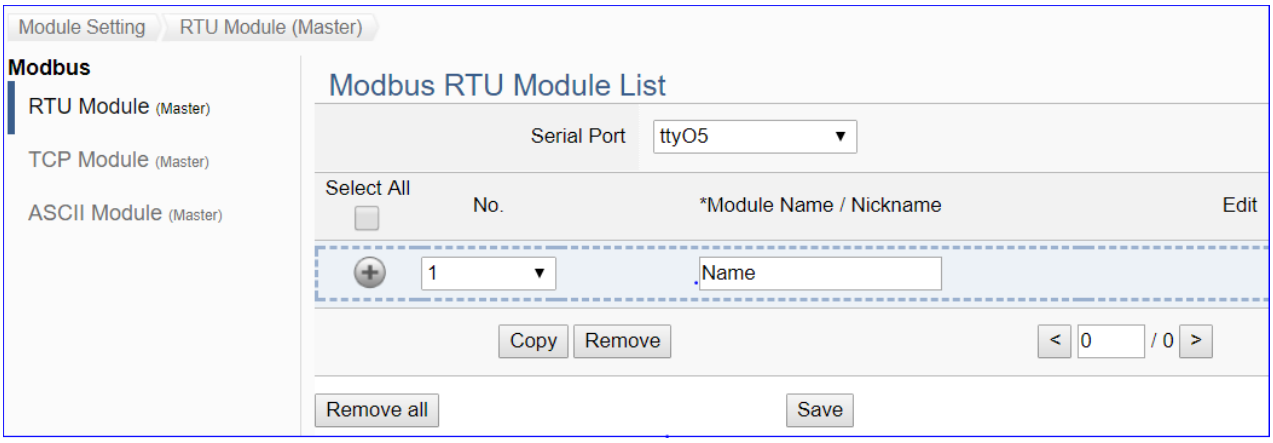
The setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. User can find the procedure information in the following chapters.

- 3.3 Function Setting Procedure
- 2. Quick Start
- 4. Function Wizard

About the Web UI login information and the UI environment, please refer to 3. Web UI Login and Enviroment Overview.

6.1. Modbus RTU (Master)

This setting is for UA Controller connecting the remote Modbus RTU Slave module.



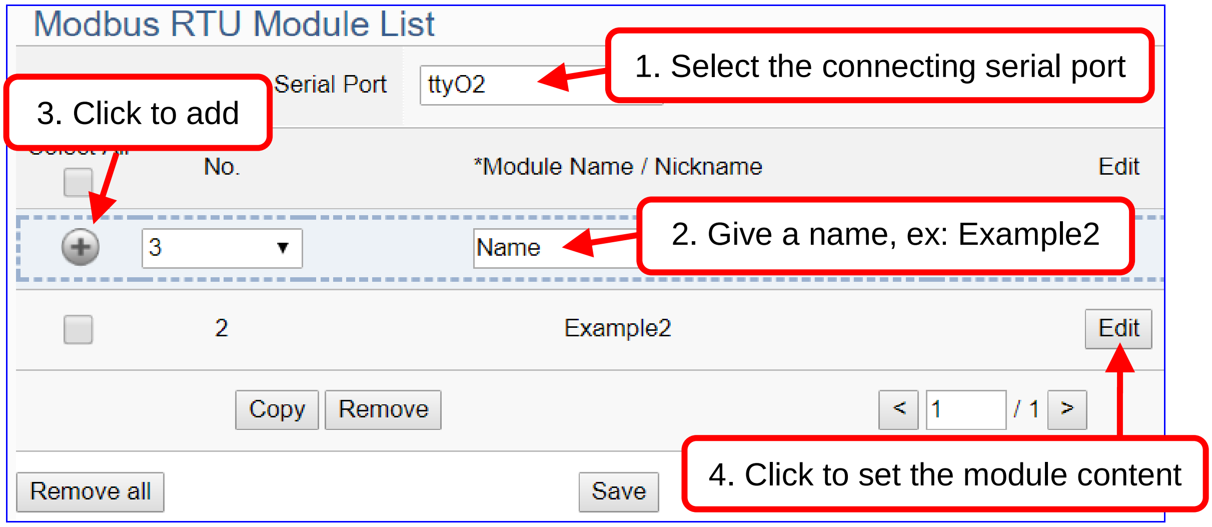
Serial Port: ttyO5

No.: 1 — Name

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

Setting Steps:

1. Select the module connecting Serial port
2. Give the module name or nickname, e.g. Example2. Default: Name
3. Click the button [⊕] to add a new module
4. Click the button [Edit] to enter the Module Content Setting page
5. Set up the Modbus Mapping Table for the UA controller and module I/O channels



Serial Port: ttyO2

No.: 3 — Name

2 — Example2 — Edit

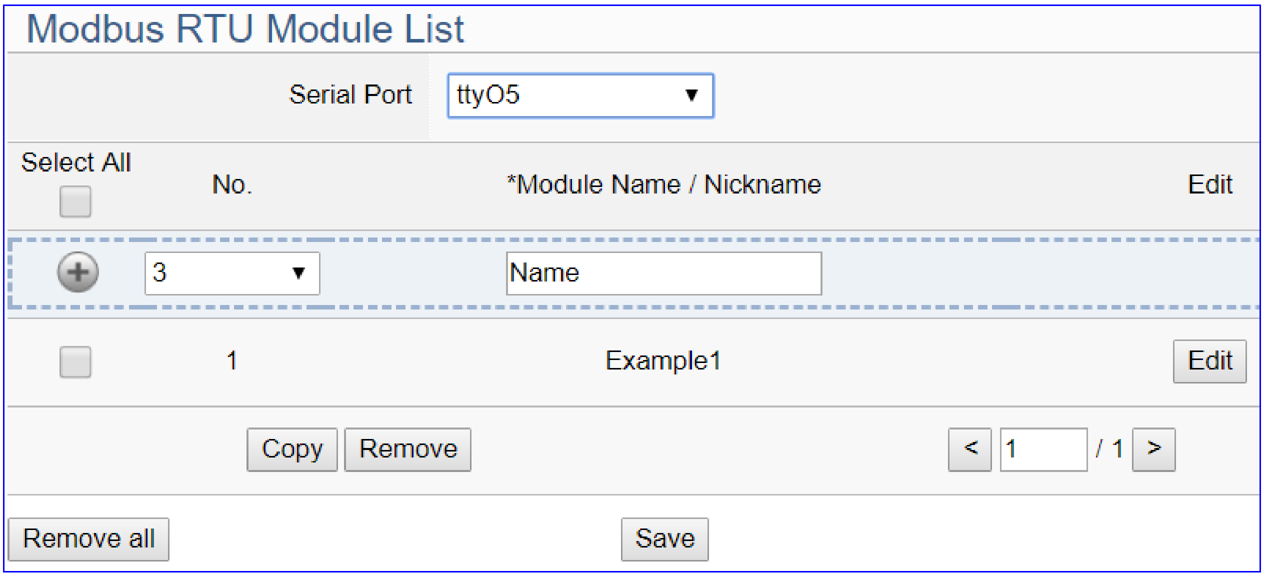
1. Select the connecting serial port

2. Give a name, ex: Example2

3. Click to add

4. Click to set the module content

The function items and setting parameters of the [Modbus RTU Module List]:



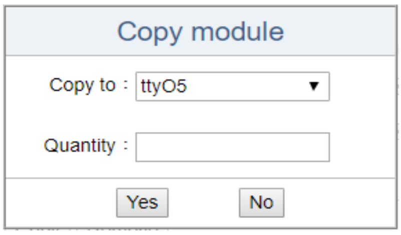
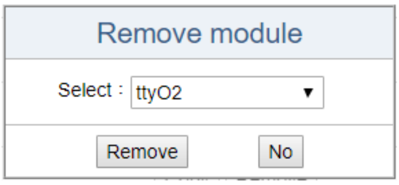
Modbus RTU Module List

Serial Port ttyO5 ▼

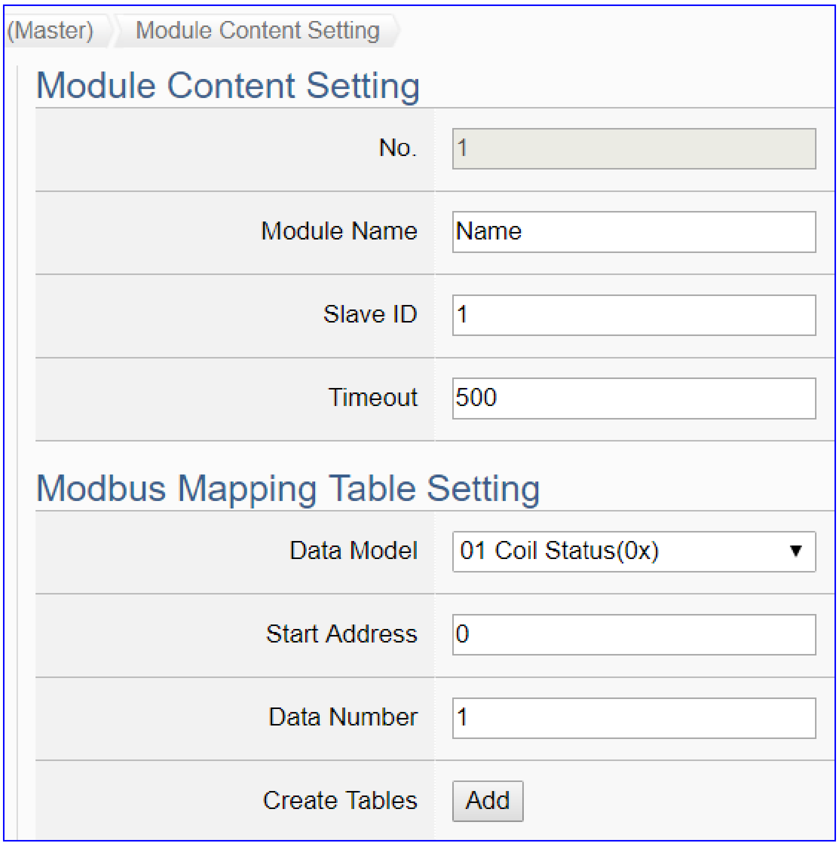
Select All □	No.	*Module Name / Nickname	Edit
⊕	3 ▼	Name	
□	1	Example1	Edit

Copy Remove < 1 / 1 >

Remove all Save

Module Setting > Modbus - RTU Module (Master) > Modbus RTU Module List	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485; ttyO4: RS-232; ttyO5: RS-485. Default: ttyO2.
⊕	Click to add a list of module.
□	Check the box in the left of the module is to select that module list, can delete or copy the module. Check the box "Select All" will select all modules in the list.
No.	The module number in the module list (System arrange, not editable)
*Module Name / Nickname	Module name or nick name. User can give a new name. (The star * means this field cannot be null.)
Edit	Click to set the module in the Module Content Setting page.
Copy	Select the module wants to copy by check the box and click [Copy] can copy module by assigning port and Number. Yes: copy the module and exit. No: exit without copy.  Copy module Copy to : ttyO5 ▼ Quantity : Yes No
Remove	Click to delete the checked module(s)
Remove all	Click to delete all modules linked with the selected port. Remove: delete the modules and exit. No: exit without delete module.  Remove module Select : ttyO2 ▼ Remove No
< 1 / 1 >	The page number / total pages of the module list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [Edit] button to enter the “Module Content Setting” page.



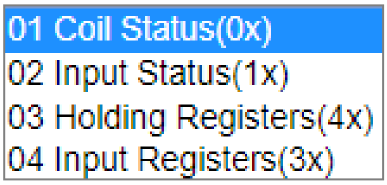
(Master) Module Content Setting

Module Content Setting

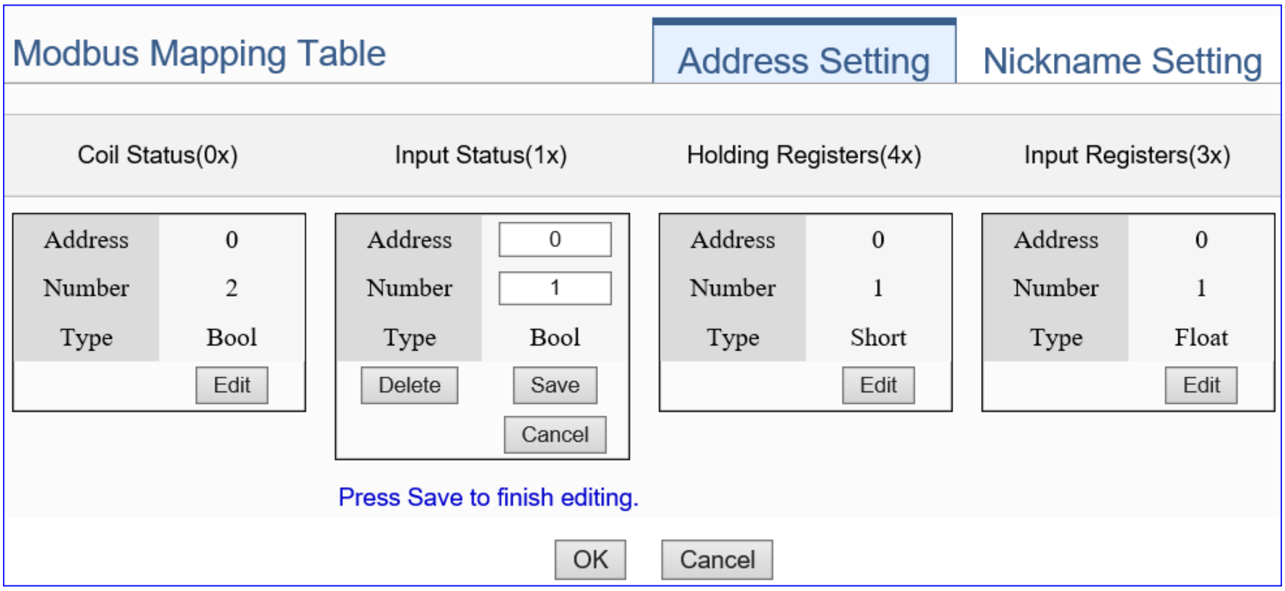
No.	1
Module Name	Name
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▼
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting		
No.	The module number in the module list (Not editable here)	
Module Name	Give a name, e.g. model number or name. Default: Name.	
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)	
Timeout	Set the timeout value for the module. Default: 500 ms	
Modbus Mapping Table Setting		
Data Model	System provides 4 Modbus data models “01” ~ “04” for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)	 01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.	
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.	
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.	
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.	

The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.

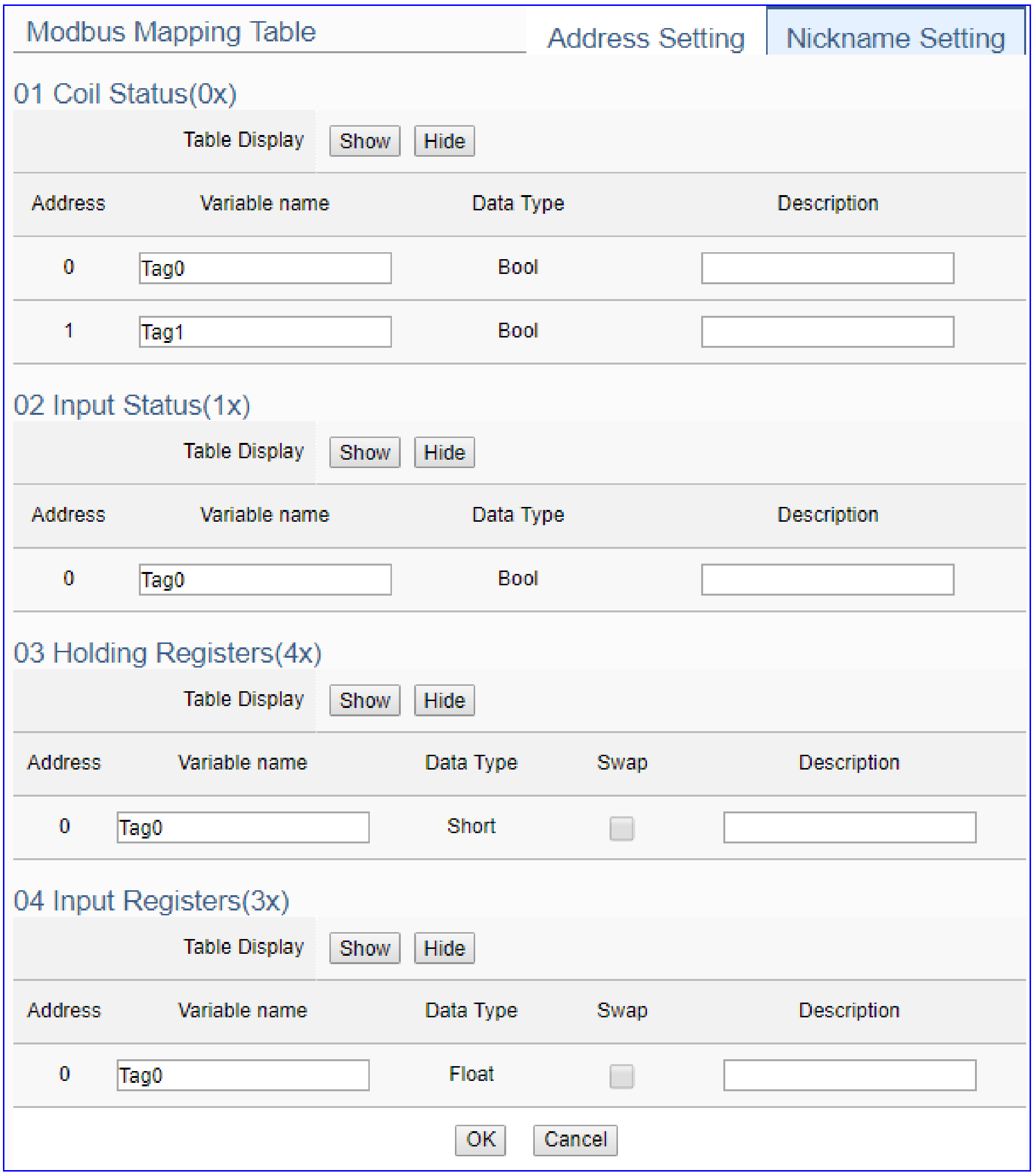


Modbus Mapping Table

Coil Status(0x)		Input Status(1x)		Holding Registers(4x)		Input Registers(3x)	
Address	0	Address	0	Address	0	Address	0
Number	2	Number	1	Number	1	Number	1
Type	Bool	Type	Bool	Type	Short	Type	Float
	Edit	Delete	Save		Edit		Edit
			Cancel				

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table | Address Setting | Nickname Setting

01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

Table Display [Show] [Hide]

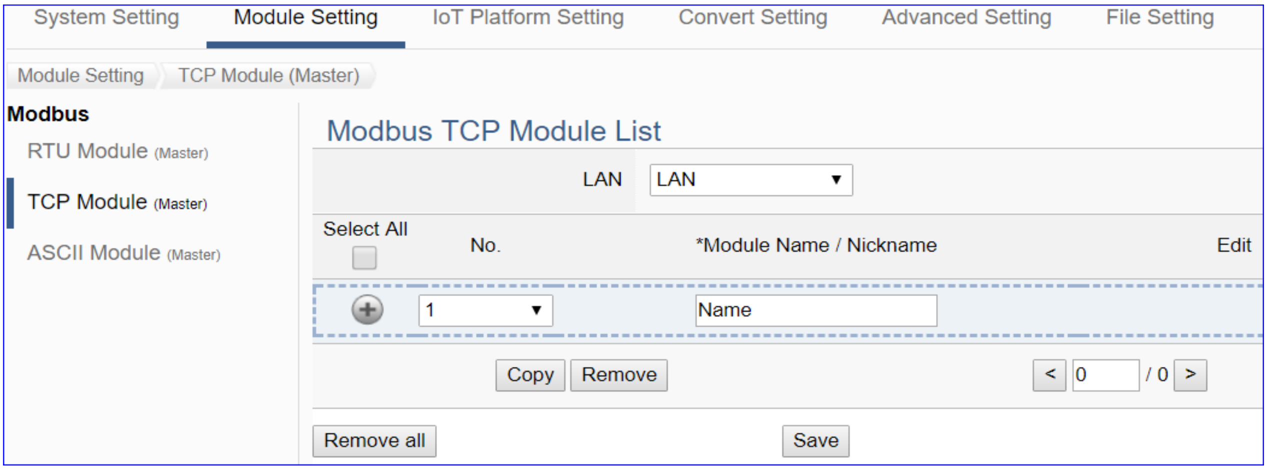
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

[OK] [Cancel]

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

6.2. Modbus TCP (Master)

This setting is for UA Controller connecting the remote Modbus TCP Slave module.



System Setting | Module Setting | IoT Platform Setting | Convert Setting | Advanced Setting | File Setting

Module Setting > TCP Module (Master)

Modbus
- RTU Module (Master)
- TCP Module (Master)
- ASCII Module (Master)

Modbus TCP Module List

LAN: LAN ▾

Select All □	No.	*Module Name / Nickname	Edit
⊕	1 ▾	Name	

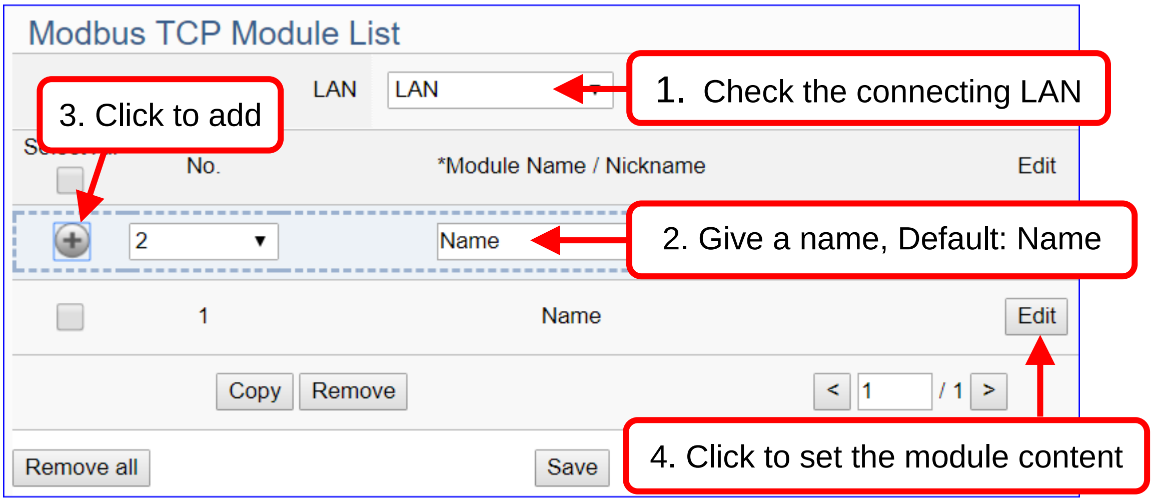
Copy | Remove | < 0 / 0 >

Remove all | Save

This page is for setting the communication values with the connected modules. First choose the Ethernet LAN port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

Setting Steps:

1. Select the module connecting Ethernet LAN port
2. Give the module name or nickname, e.g. Example2. Default: Name
3. Click the button [⊕] to add a new module
4. Click the button [Edit] to enter the Module Content Setting page
5. Set up the Modbus Mapping Table for the UA controller and module I/O channels



Modbus TCP Module List

LAN: LAN ▾

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▾	Name	
□	1	Name	Edit

Copy | Remove | < 1 / 1 >

Remove all | Save

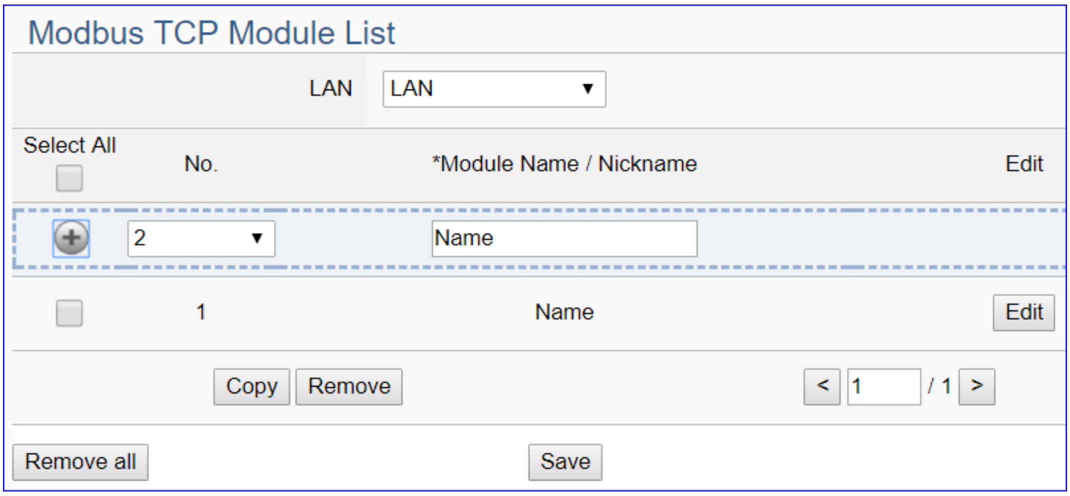
1. Check the connecting LAN

2. Give a name, Default: Name

3. Click to add

4. Click to set the module content

The function items and setting parameters of the [Modbus TCP Module List]:



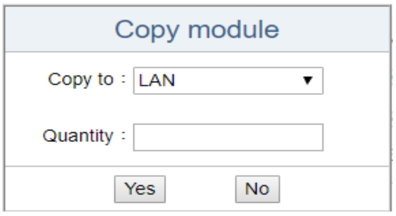
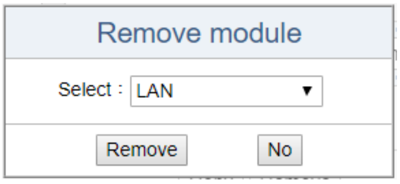
Modbus TCP Module List

LAN LAN ▼

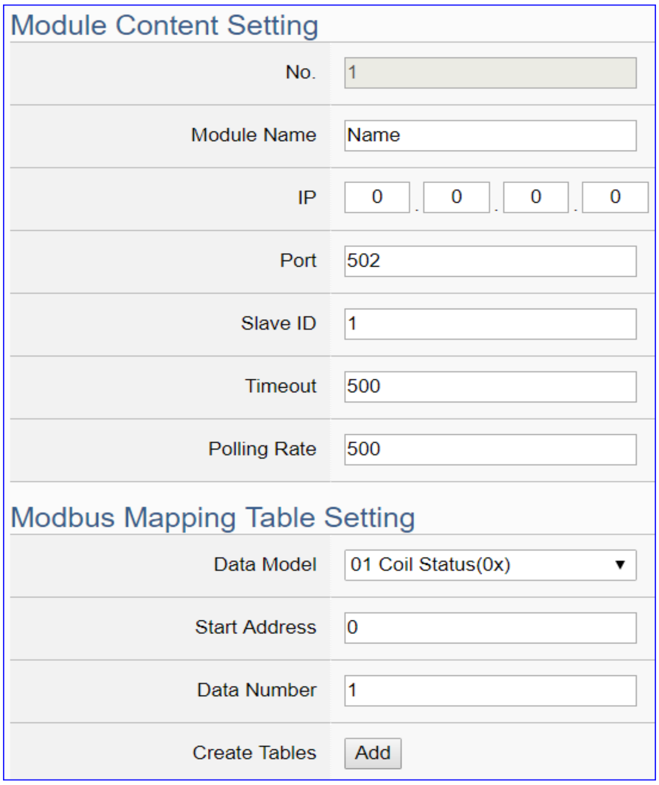
Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	Name	Edit

Copy Remove < 1 / 1 >

Remove all Save

Module Setting > Modbus - RTU Module (Master) > Modbus RTU Module List	
LAN	Choose the LAN port of UA controller that links with the TCP module. UA-52xx has one LAN port; the coming UA-2xxx has 2 LAN ports.
⊕	Click to add a list of module.
□	Check the box in the left of the module is to select that module list, can delete or copy the module. Check the box “Select All” will select all modules in the list.
No.	The module number in the module list (System arrange, not editable)
*Module Name / Nickname	Module name or nick name. User can give a new name. (The star * means this field cannot be null.)
Edit	Click to set the module in the Module Content Setting page.
Copy	Select the module wants to copy by check the box and click [Copy] can copy module by assigning port and quantity. Yes: copy the module and exit. No: exit without copy.  Copy module Copy to : LAN ▼ Quantity : Yes No
Remove	Click to delete the checked module(s)
Remove all	Click to delete all modules linked with the selected port. Remove: delete the modules and exit. No: exit without delete module.  Remove module Select : LAN ▼ Remove No
< 1 / 1 >	The page number / total pages of the module list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [Edit] can enter the [**Module Content Setting**] page to set up the module and the Modbus address mapping table.

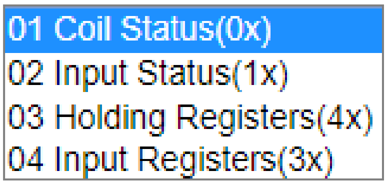


Module Content Setting

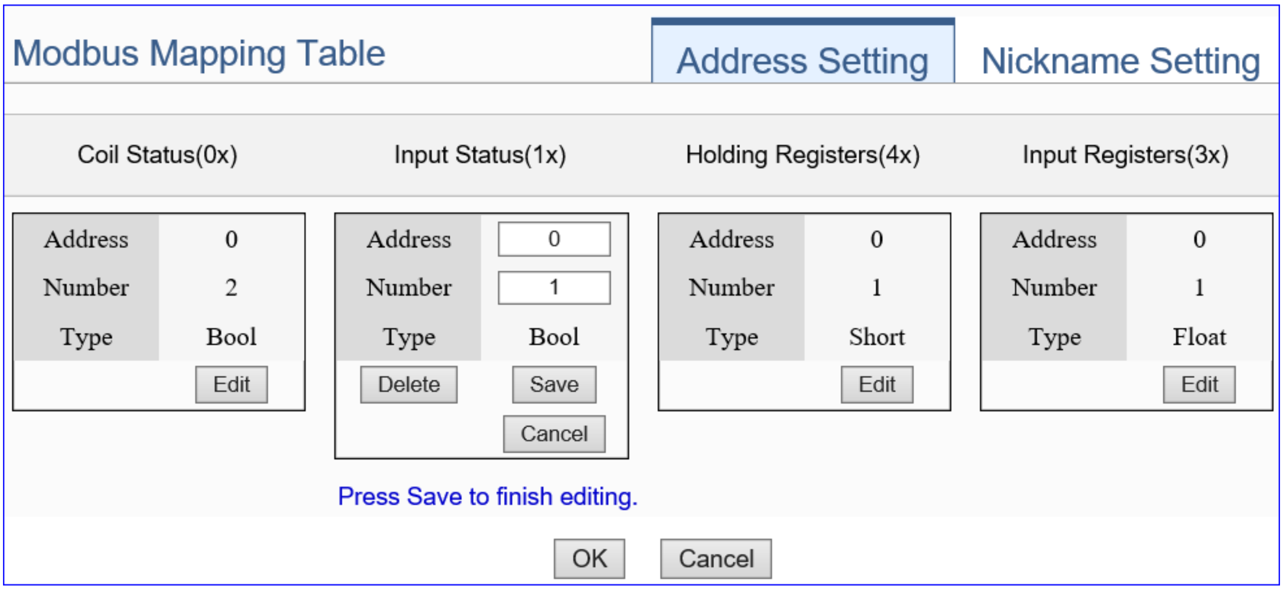
No.	1
Module Name	Name
IP	0 . 0 . 0 . 0
Port	502
Slave ID	1
Timeout	500
Polling Rate	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▼
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
IP	The IP address of the connected module. Default: 0.0.0.0
Port	The port number for Modbus TCP. Default: 502
Slave ID	Set the Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Polling Rate	Set a time interval for the command. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models "01" ~ "04" for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

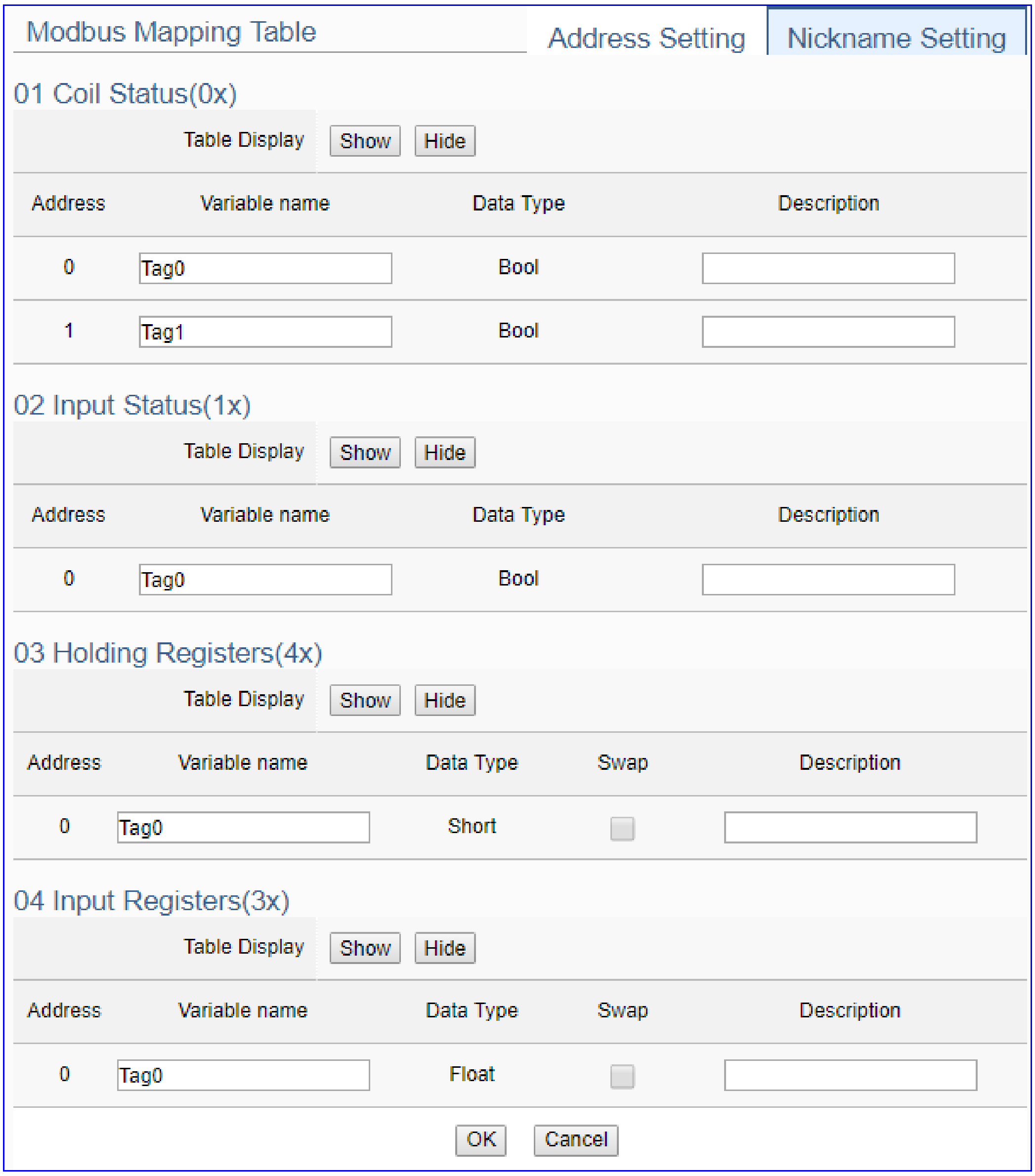
The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.



	Coil Status(0x)	Input Status(1x)	Holding Registers(4x)	Input Registers(3x)
Address	0	0	0	0
Number	2	1	1	1
Type	Bool	Bool	Short	Float

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The "Address Setting" page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The "Nickname Setting" page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table

Address Setting | Nickname Setting

01 Coil Status(0x)

Table Display Show Hide

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display Show Hide

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display Show Hide

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	☐	

04 Input Registers(3x)

Table Display Show Hide

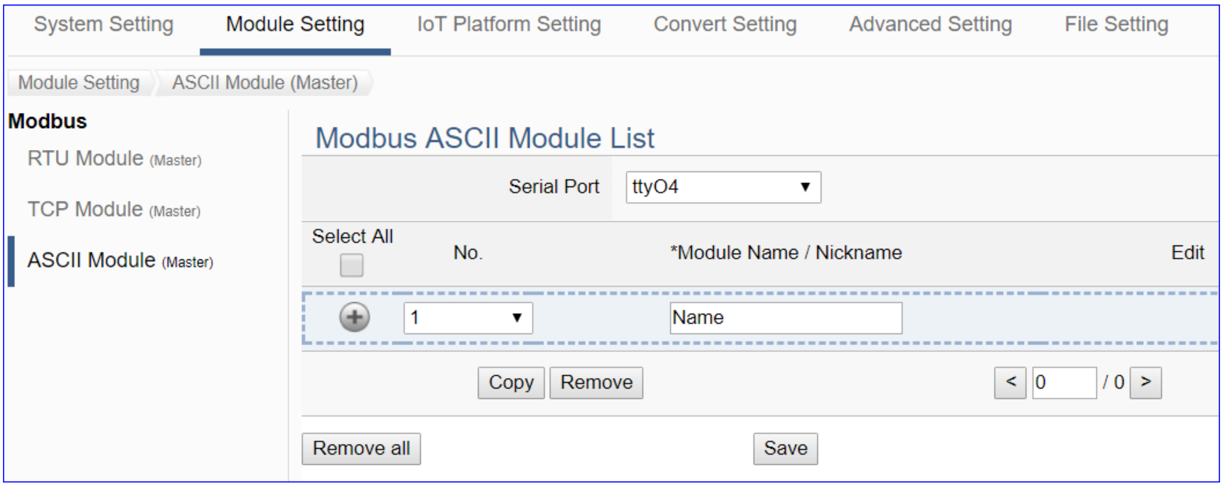
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	☐	

OK Cancel

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

6.3. Modbus ASCII (Master)

This setting is for UA Controller connecting the remote Modbus ASCII Slave module.



Modbus ASCII Module List

Serial Port: ttyO4

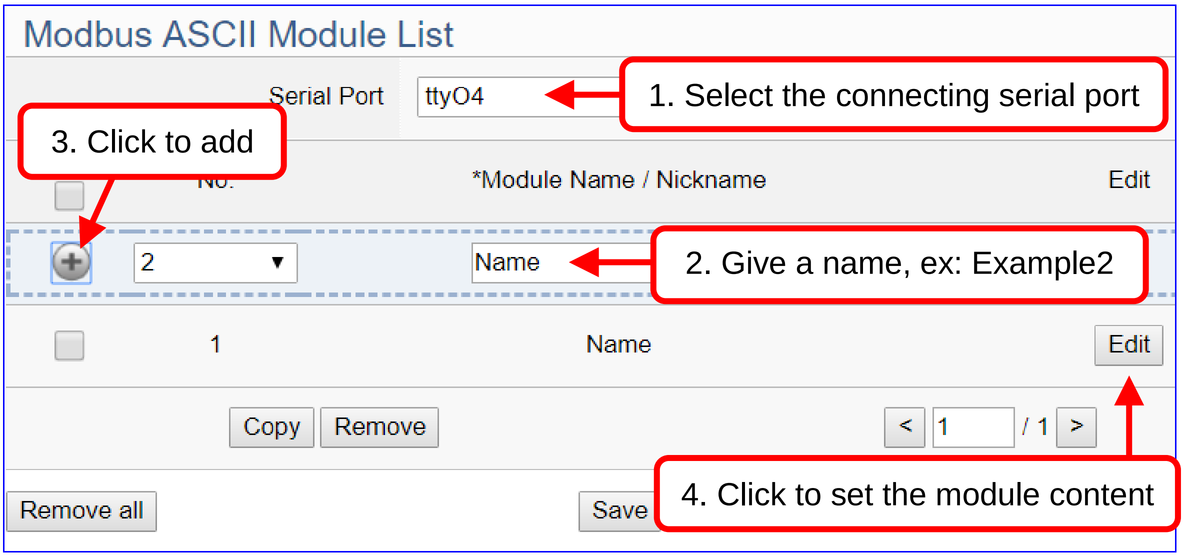
Select All □	No.	*Module Name / Nickname	Edit
⊕	1	Name	

< 0 / 0 >

This page is for setting the communication values with the connected modules. First choose the serial port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the Modbus mapping table.

Setting Steps:

1. Select the module connecting Serial port
2. Give the module name or nickname, e.g. Example2. Default: Name
3. Click the button [⊕] to add a new module
4. Click the button [Edit] to enter the Module Content Setting page
5. Set up the Modbus Mapping Table for the UA controller and module I/O channels



Modbus ASCII Module List

Serial Port: ttyO4

□	No.	*Module Name / Nickname	Edit
⊕	2	Name	
□	1	Name	Edit

< 1 / 1 >

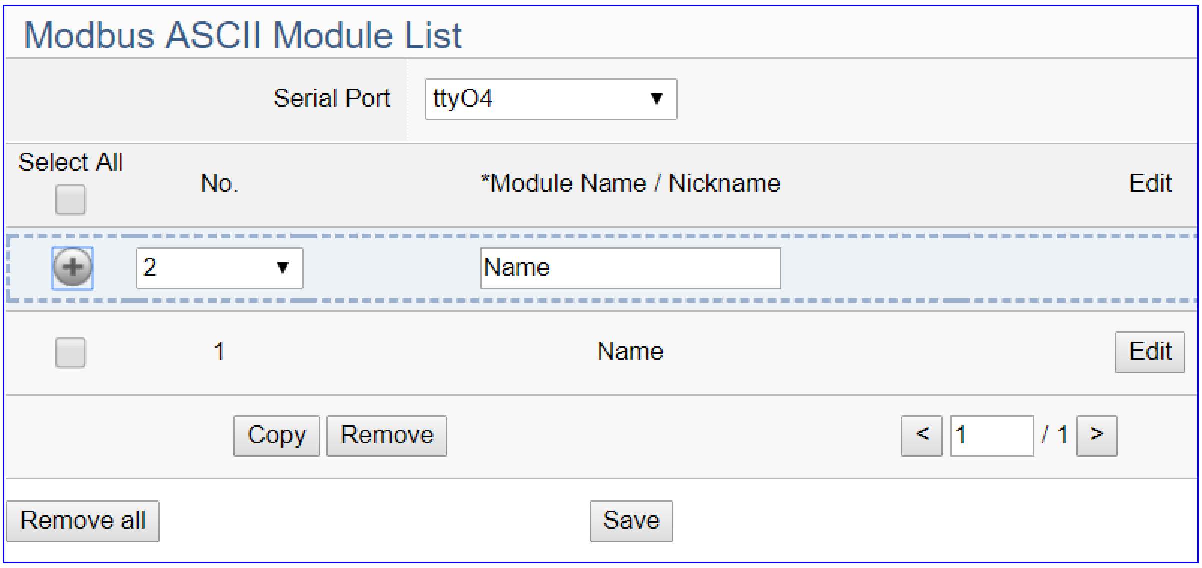
1. Select the connecting serial port

2. Give a name, ex: Example2

3. Click to add

4. Click to set the module content

The function items and setting parameters of the [Modbus ASCII Module List]:



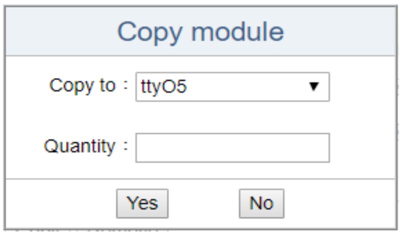
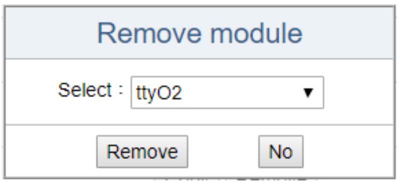
Modbus ASCII Module List

Serial Port: ttyO4 ▼

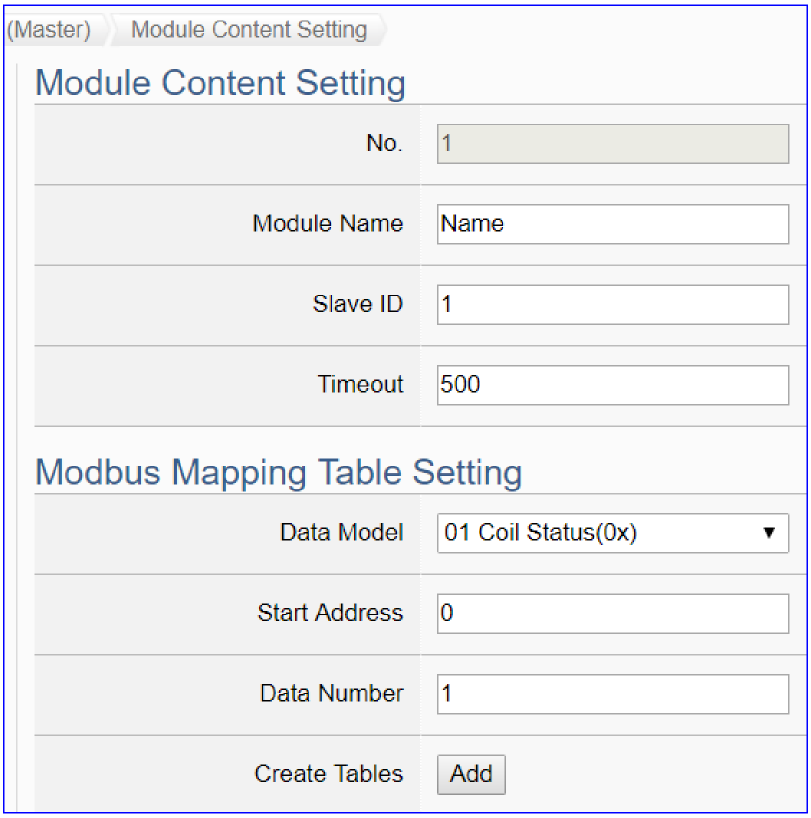
Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	Name	Edit

Copy | Remove | < 1 / 1 >

Remove all | Save

Module Setting > Modbus - ASCII Module (Master) > Modbus ASCII Module List	
Serial Port	Choose the serial port of UA controller that links with the I/O module. ttyO2: RS-485; ttyO4: RS-232; ttyO5: RS-485. Default: ttyO2.
⊕	Click to add a list of module.
□	Check the box in the left of the module is to select that module list, can delete or copy the module. Check the box “Select All” will select all modules in the list.
No.	The module number in the module list (System arrange, not editable)
*Module Name / Nickname	Module name or nick name. User can give a new name. (The star * means this field cannot be null.)
Edit	Click to set the module in the Module Content Setting page.
Copy	Select the module wants to copy by check the box and click [Copy] can copy module by assigning port and Quantity. Yes: copy the module and exit. No: exit without copy.  Copy module Copy to : ttyO5 ▼ Quantity : Yes No
Remove	Click to delete the checked module(s)
Remove all	Click to delete all modules linked with the selected port. Remove: delete the modules and exit. No: exit without delete module.  Remove module Select : ttyO2 ▼ Remove No
< 1 / 1 >	The page number / total pages of the module list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [Edit] button to enter the “Module Content Setting” page.



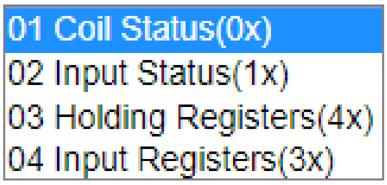
(Master) Module Content Setting

Module Content Setting

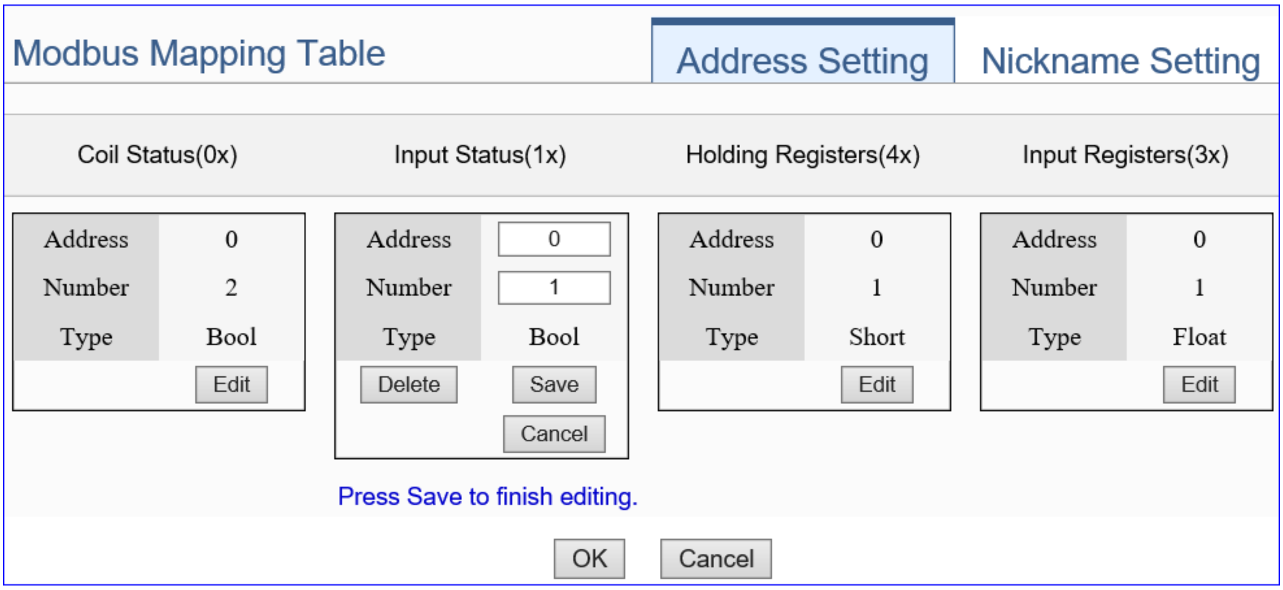
No.	1
Module Name	Name
Slave ID	1
Timeout	500

Modbus Mapping Table Setting

Data Model	01 Coil Status(0x) ▼
Start Address	0
Data Number	1
Create Tables	Add

Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Slave ID	Set the module Slave ID of the UA-5200. (Range: 1 ~ 247)
Timeout	Set the timeout value for the module. Default: 500 ms
Modbus Mapping Table Setting	
Data Model	System provides 4 Modbus data models “01” ~ “04” for mapping to address of DO, DI, AO and AI. (ex. 01: DO channels, 02: DI, 03: AO, 04: AI)  01 Coil Status(0x) 02 Input Status(1x) 03 Holding Registers(4x) 04 Input Registers(3x)
Start Address	The start address of the Modbus command. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to set follow the UA series to start from 0.
Data Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. Default: 1.
Type	This item only when the data model is 03 or 04. Choose the suitable data type: 16-bit Short, 16-bit Unsigned Short, 32-bit Long, 32-bit Unsigned Long, 32-bit Float, 64-bit Double.
Create Tables	Click [Add] button, it will add a table in the Modbus mapping table.

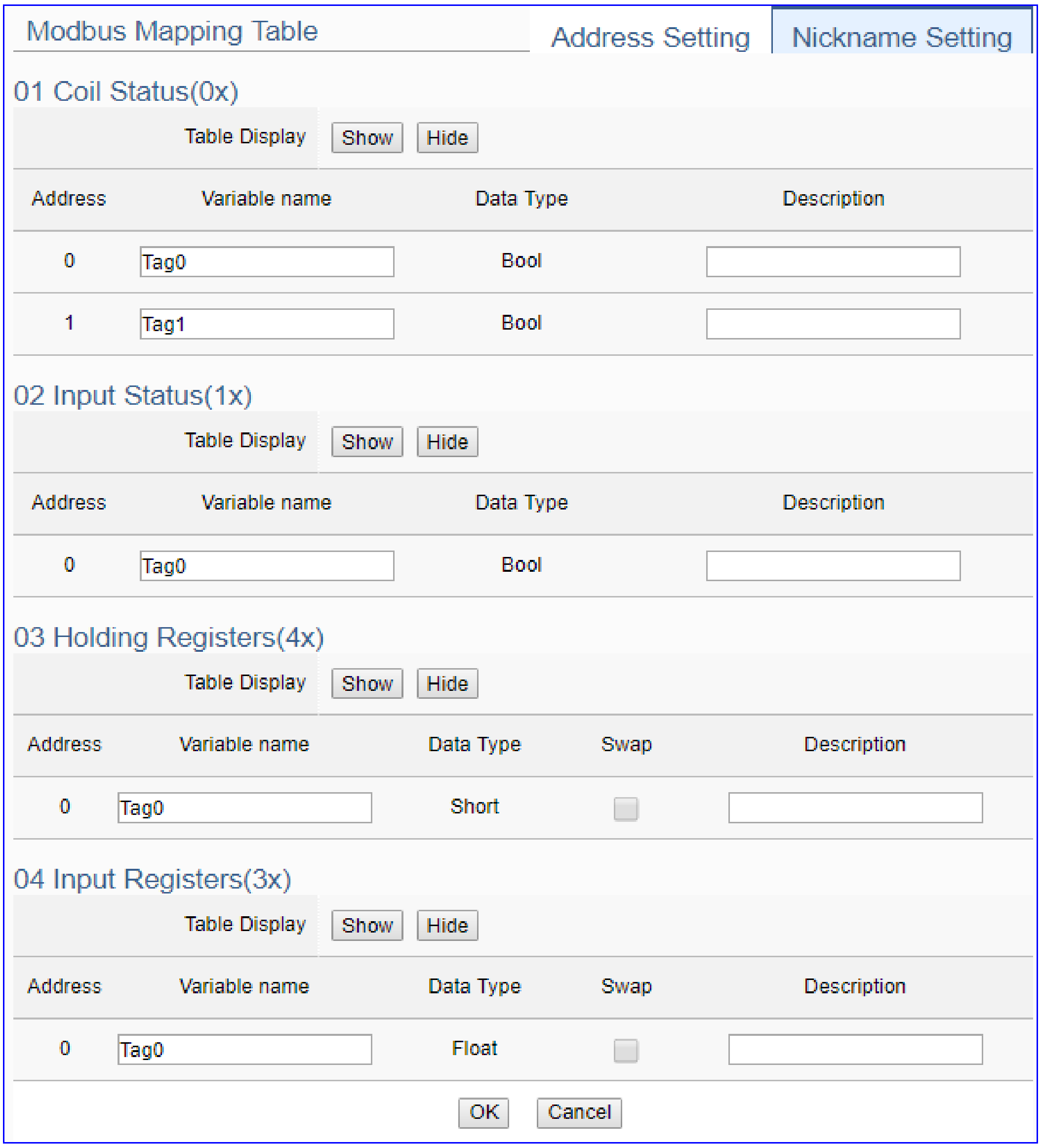
The finished Modbus Mapping Table as below is in order of DO, DI, AO and AI.



	Coil Status(0x)	Input Status(1x)	Holding Registers(4x)	Input Registers(3x)
Address	0	0	0	0
Number	2	1	1	1
Type	Bool	Bool	Short	Float
	Edit	Delete Save Cancel	Edit	Edit

Press Save to finish editing.

Modbus Mapping Table – Address Setting	
Address Setting	The “Address Setting” page of the Modbus Mapping Table
Nickname Setting	Click can switch to the The “Nickname Setting” page of the Modbus Mapping Table. (Next page)
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Address	The start address of the Modbus command. Default: 0. **Note:** the address of UA controller is start from 0, even if some modules are start from 1, here it needs to follow the UA series to start from 0.
Number	The number of the Modbus address. Need to give enough number for the DO, DI, AO, AI channels of the module. At least 1.
Type	DO/DI type: Bool (Boolean) AO/AI type: depend on setting of [Modbus Mapping Table Setting]
Edit	Click to change the address and Number.
Delete	Click to delete this address table.
Save	Click to save and exit this table editing.
Cancel	Click to exit without saving and back to the module list page.
OK	Click to save this page settings and back to the module list page.



Modbus Mapping Table | Address Setting | Nickname Setting

01 Coil Status(0x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	
1	Tag1	Bool	

02 Input Status(1x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Description
0	Tag0	Bool	

03 Holding Registers(4x)

Table Display [Show] [Hide]

Address	Variable name	Data Type	Swap	Description
0	Tag0	Short	□	

04 Input Registers(3x)

Table Display [Show] [Hide]

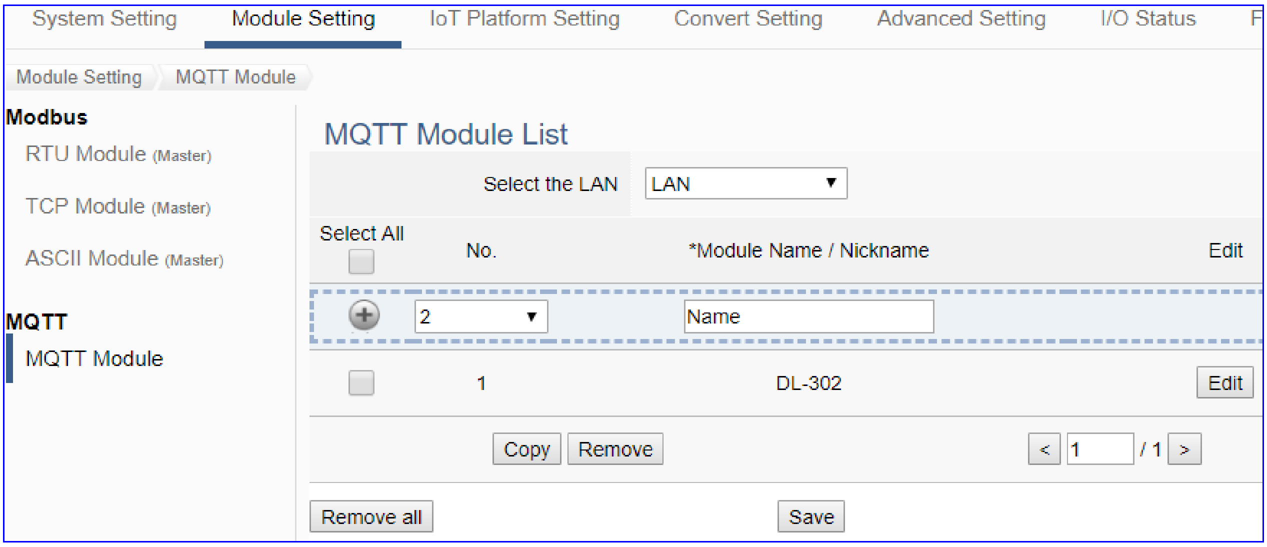
Address	Variable name	Data Type	Swap	Description
0	Tag0	Float	□	

[OK] [Cancel]

Modbus Mapping Table – Nickname Setting	
Modbus Mapping Table	Coil Status(0x): Mapping to DO Modbus address Input Status(1x): Mapping to DI Modbus address Holding Registers(4x): Mapping to AO Modbus address Input Registers(3x): Mapping to AI Modbus address
Table Display	Click [Show] to display all fields, click [Hide] to hide some fields.
Address	Modbus address. System auto arrange.
Variable name	The variable name of the mapping address. Default: Tag0 and auto arrange the number. User can define the name.
Data Type	Display data type of the variable. (Not editable)
Swap	Check to swap the byte order (Lo-Hi/Hi-Lo) for 4-byte or 8-byte.
Description	Write a note for this variable.
OK	Click to save this page settings and back to the module list page.

6.4. MQTT Module

This setting is for UA Controller connecting the remote MQTT module.



MQTT Module List

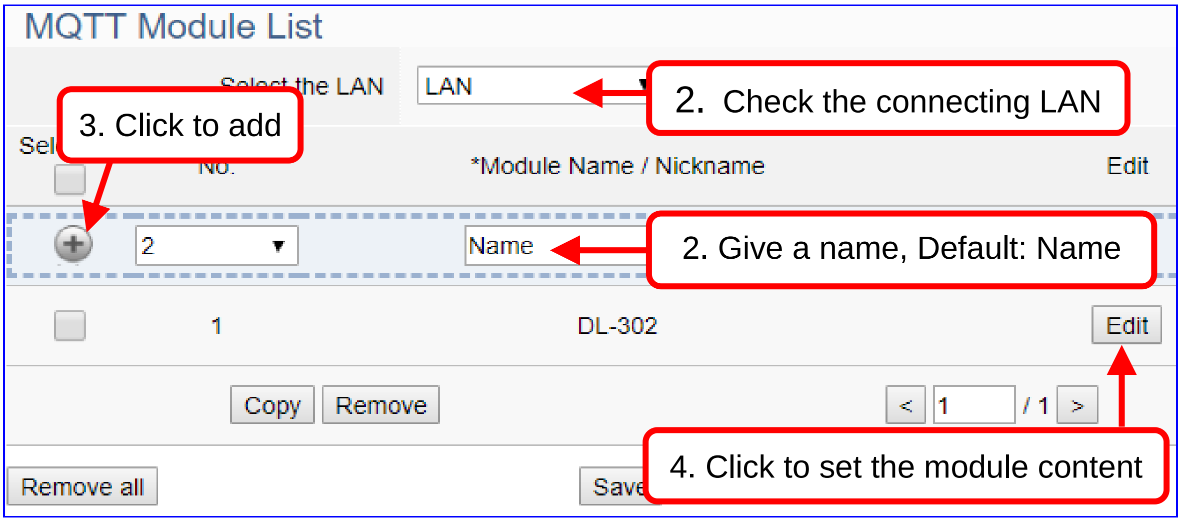
Select the LAN: LAN ▼

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	DL-302	Edit

This page is for setting the communication values with the connected modules. First choose the Ethernet LAN port that connected with the module, and each module can give a name (Default name: Name). Click [⊕] button could add a new module, and then click [Edit] button to configure the module content and the MQTT variable table.

Setting Steps:

1. Select the module connecting Ethernet LAN port
2. Give the module name or nickname, e.g. model name DL-302. Default: Name
3. Click the button [⊕] to add a new module
4. Click the button [Edit] to enter the Module Content Setting page
5. Set up the Modbus Mapping Table for the UA controller and module I/O channels



MQTT Module List

Select the LAN: LAN ▼

Sel □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	DL-302	Edit

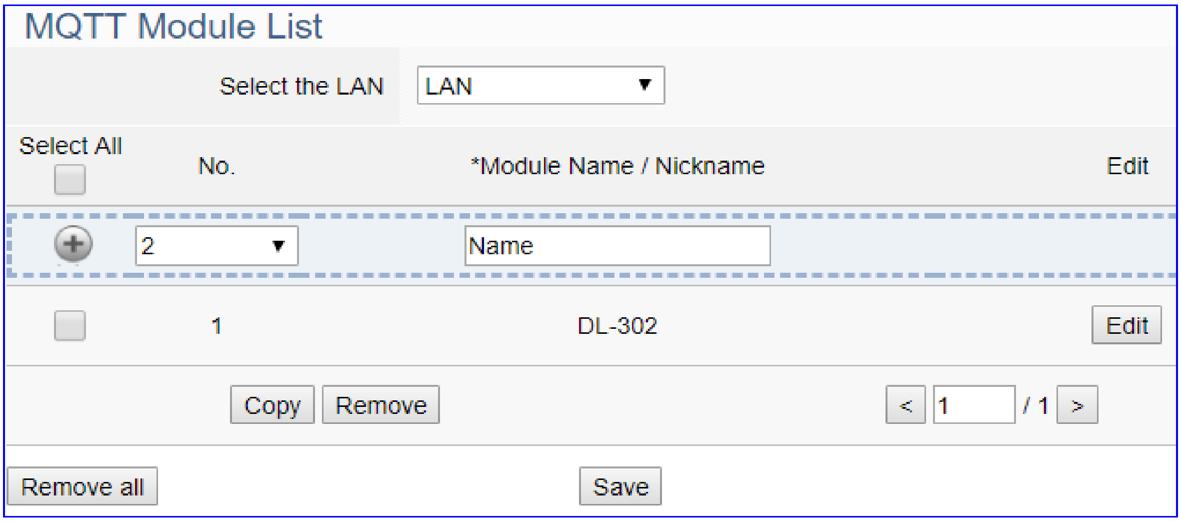
2. Check the connecting LAN

3. Click to add

2. Give a name, Default: Name

4. Click to set the module content

The function items and setting parameters of the [MQTT Module List]:



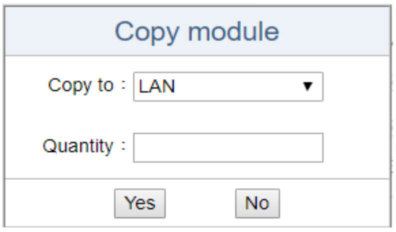
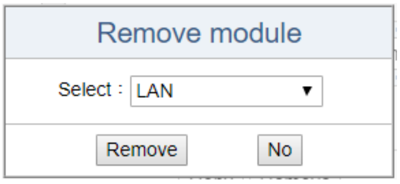
MQTT Module List

Select the LAN: LAN ▼

Select All □	No.	*Module Name / Nickname	Edit
⊕	2 ▼	Name	
□	1	DL-302	Edit

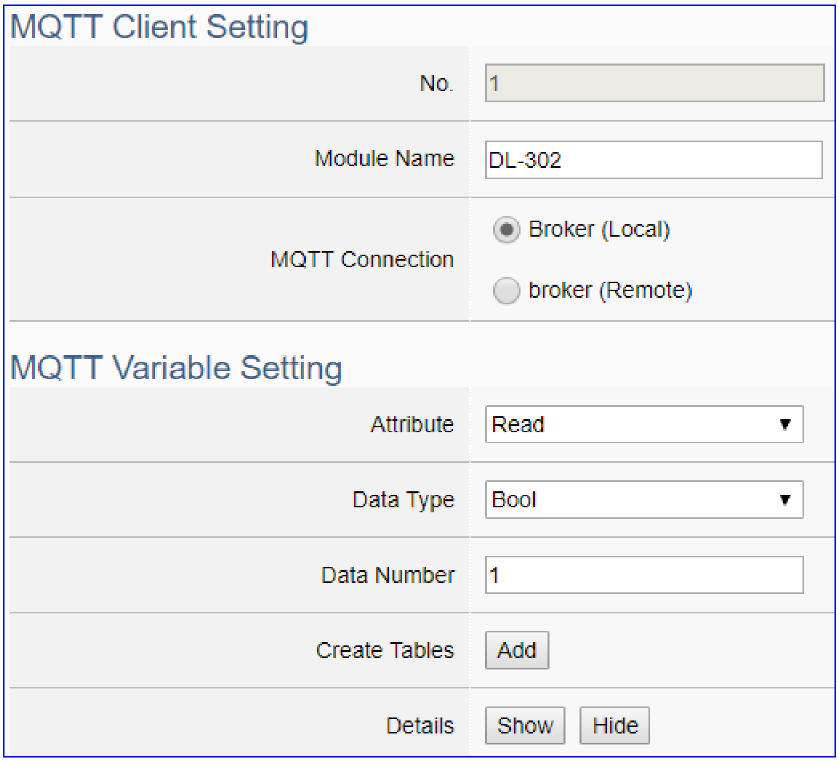
Copy | Remove   < 1 / 1 >

Remove all   Save

Module Setting > MQTT - MQTT Module > MQTT Module List	
LAN	Choose the LAN port of UA controller that links with the MQTT module.
⊕	Click to add a list of module.
□	Check the box in the left of the module is to select that module list, can delete or copy the module. Check the box “Select All” will select all modules in the list.
No.	The module number in the module list (System arrange, not editable)
*Module Name / Nickname	Module name or nick name. User can give a new name. (The star * means this field cannot be null.)
Edit	Click to set the module in the Module Content Setting page.
Copy	Select the module wants to copy by check the box and click [Copy] can copy module by assigning port and quantity. Yes: copy the module and exit. No: exit without copy.  Copy module Copy to : LAN ▼ Quantity : Yes No
Remove	Click to delete the checked module(s)
Remove all	Click to delete all modules linked with the selected port. Remove: delete the modules and exit. No: exit without delete module.  Remove module Select : LAN ▼ Remove No
< 1 / 1 >	The page number / total pages of the module list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [**Edit**] can enter the [**MQTT Client Setting**] page to set up the module and the variable table.

[**MQTT Client Setting**] page:



MQTT Client Setting

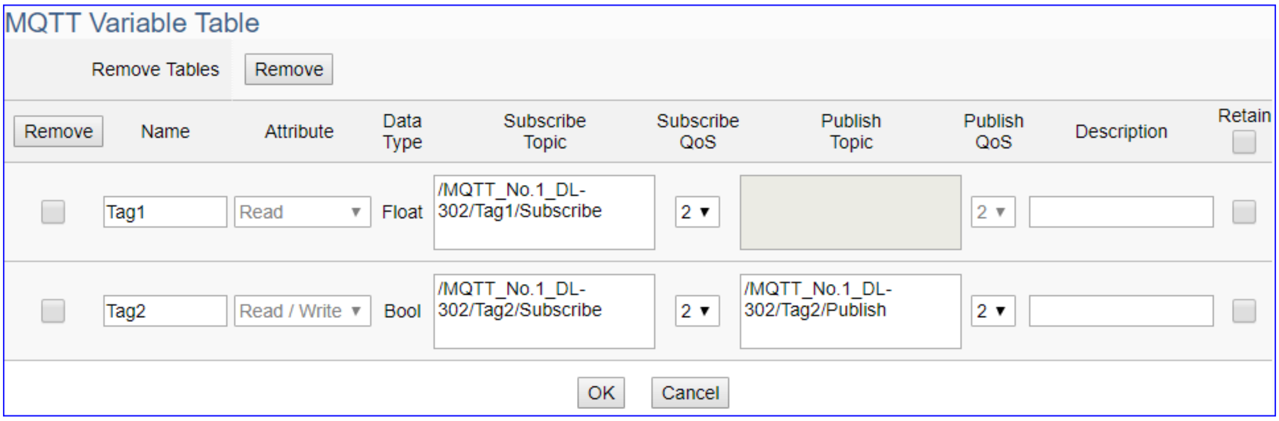
No.	1
Module Name	DL-302
MQTT Connection	● Broker (Local) ○ broker (Remote)

MQTT Variable Setting

Attribute	Read ▼
Data Type	Bool ▼
Data Number	1
Create Tables	Add
Details	Show Hide

MQTT Client Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
MQTT Connection	Check the Broker want to use Local Broker or Remote Broker.
MQTT Variable Setting	
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the MQTT variable. Include: Bool, Short, Unsigned Short, Long, Unsigned Long, Float, Double, String.
Data Number	The number for the I/O variables of the module. Default: 1.
Create Tables	Click [Add] button, it will add a variable list in the MQTT Variable Table.
Details Show / Hide	Click [Show] to display all fields, click [Hide] to hide some fields. The hide fields: Subscribe QoS, Publish QoS, Retain.

[**MQTT Variable Table**] :



MQTT Variable Table

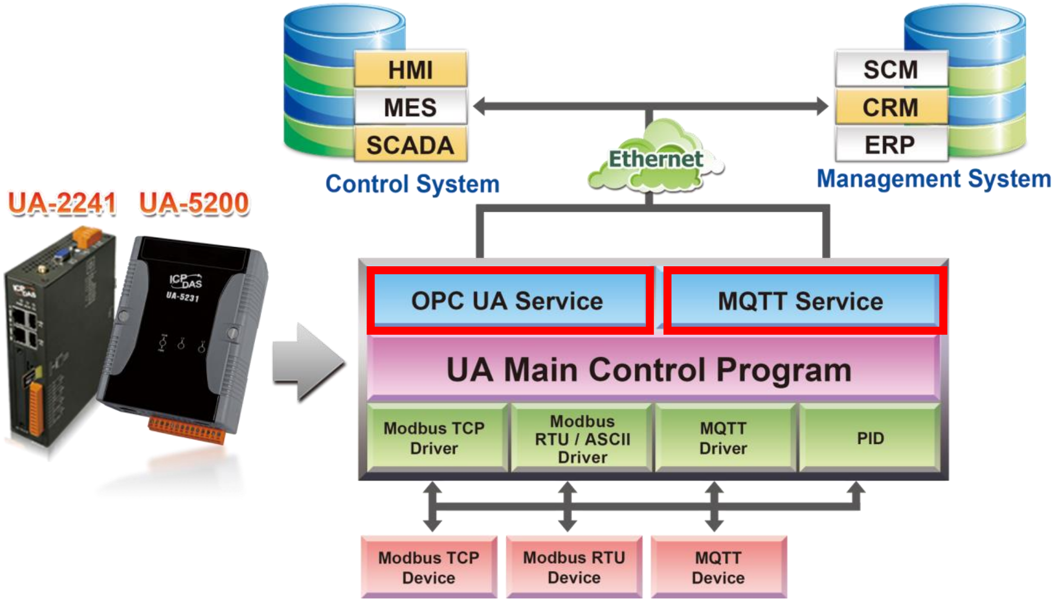
Remove Tables [Remove]

Remove	Name	Attribute	Data Type	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Description	Retain □
□	Tag1	Read ▼	Float	/MQTT_No.1_DL-302/Tag1/Subscribe	2 ▼		2 ▼		□
□	Tag2	Read / Write ▼	Bool	/MQTT_No.1_DL-302/Tag2/Subscribe	2 ▼	/MQTT_No.1_DL-302/Tag2/Publish	2 ▼		□

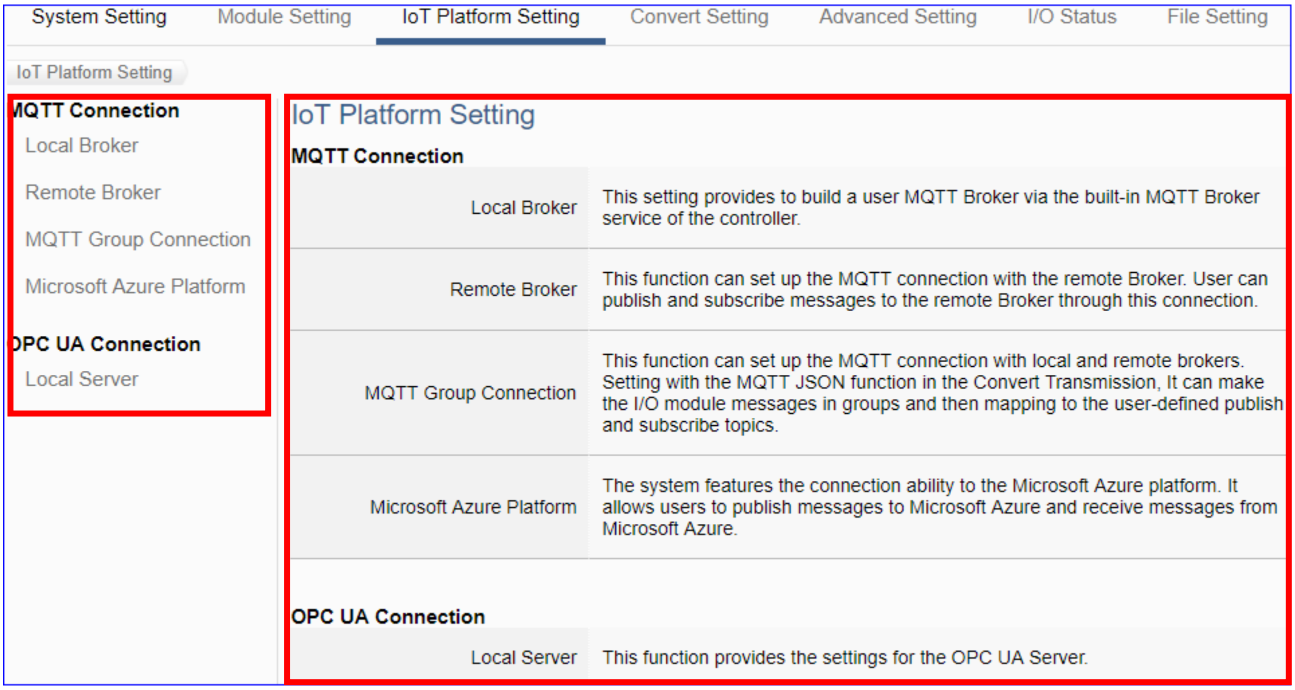
MQTT Variable Table	
Details Show / Hide	Click [Show] to display all fields, click [Hide] to hide some fields. The hide fields: Subscribe QoS, Publish QoS and Retain.
Remove Table / Remove	Check the box in the left of the variable is to select that variable list, and click the “remove” on the box can delete that variable list. Click the “Remove” of the “Remove Table” will delete all lists.
Name	The name of the MQTT variable. Default: Tag#
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable. Include: Bool, Short, Unsigned Short, Long, Unsigned Long, Float, Double, String
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Description	For users set up the description for the variables.
Retain	Check [Retain] box of the top row can store the broker message for all variables in list. Check the box of each variable can store the broker message just that variable. Default: Uncheck.
OK / Cancer	Click [OK] to save and exit the page settings. Click [Cancer] to exit without saving.

7. IoT Platform Setting

IoT Platform Setting is the third item of the Main Menu. It manages the interaction of the UA series connecting with the host computer in the Internet of Things. It provides OPC UA and MQTT protocols connection services via the Ethernet interface for data transmission.



[IoT Platform Setting] includes five sub-menu functions in MQTT and OPC UA two connections and the function descriptions are listed on the page of the Main Menu, such as the Local Broker, Remote Broker, MQTT Group Connection and Microsoft Azure Platform in the MQTT Connection category, and the Local Server in the OPC UA Connection category. This chapter will introduce these function items and setting parameters.



IoT Platform Setting

MQTT Connection

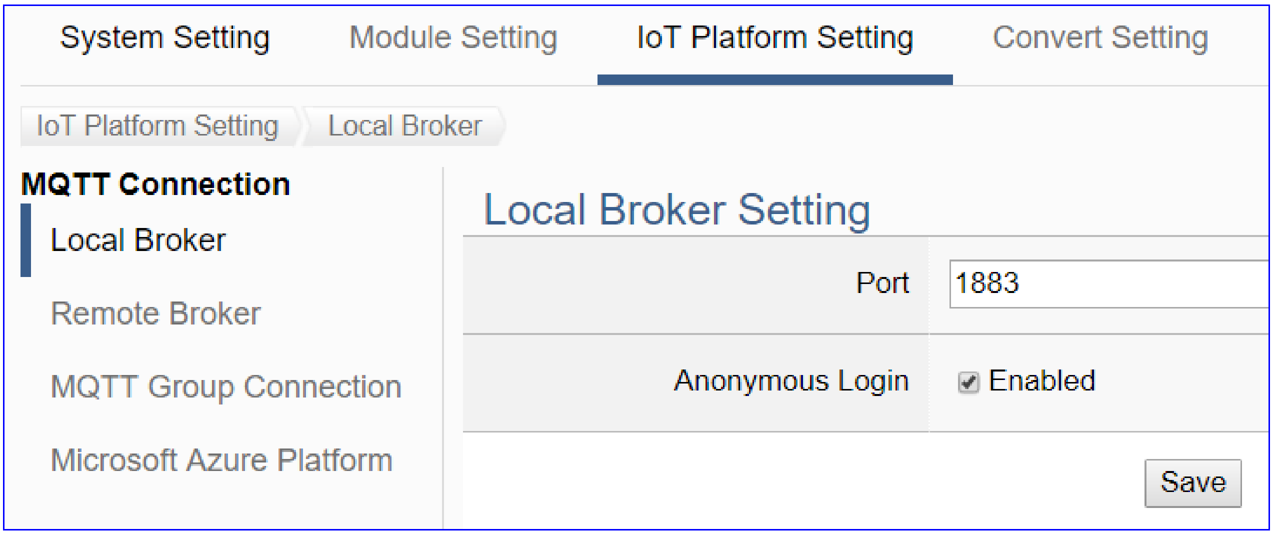
Local Broker	This setting provides to build a user MQTT Broker via the built-in MQTT Broker service of the controller.
Remote Broker	This function can set up the MQTT connection with the remote Broker. User can publish and subscribe messages to the remote Broker through this connection.
MQTT Group Connection	This function can set up the MQTT connection with local and remote brokers. Setting with the MQTT JSON function in the Convert Transmission, It can make the I/O module messages in groups and then mapping to the user-defined publish and subscribe topics.
Microsoft Azure Platform	The system features the connection ability to the Microsoft Azure platform. It allows users to publish messages to Microsoft Azure and receive messages from Microsoft Azure.

OPC UA Connection

Local Server	This function provides the settings for the OPC UA Server.

7.1. MQTT Local Broker

UA series controller built-in MQTT Broker that compliance with MQTT v3.1.1 protocol and supporting MQTT message distribution management. When using MQTT communication, there is no need to build a new Broker system.



Port 1883

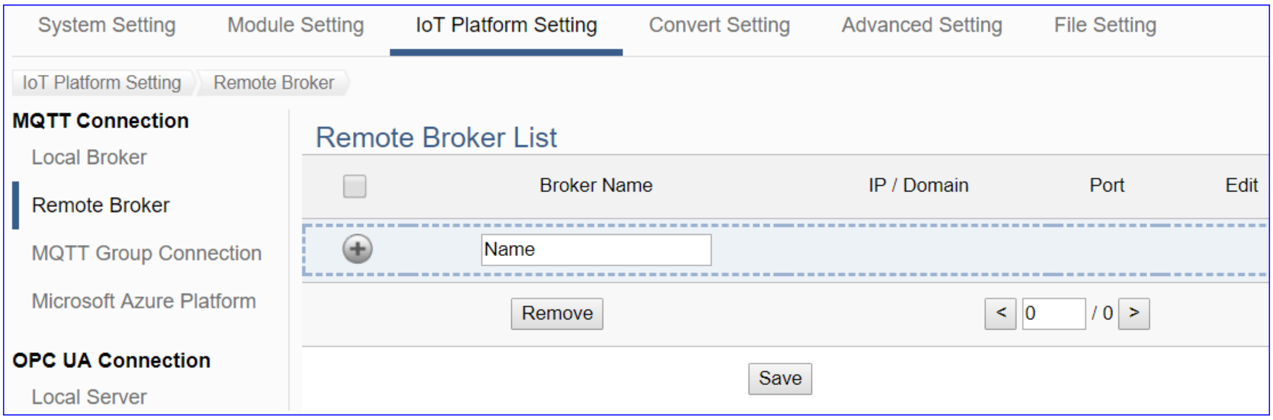
Anonymous Login ☑ Enabled

MQTT Connection > Local Broker Setting	
Port	MQTT Local Broker's COM port. System default: 1883
Anonymous Login	Check to allow anonymous login. Default: Check Enabled.
Save	Click to save the settings of this page.

7.2. MQTT Remote Broker

UA series controller built-in MQTT Broker(See Section 7.1), but when users want to use the external MQTT Broker, UA system also provides the settings to connect and publish/subscript messages with the MQTT Remote Broker.

This page can set up the MQTT connection with the remote Broker. User can publish and subscribe messages to the remote Broker through this connection.



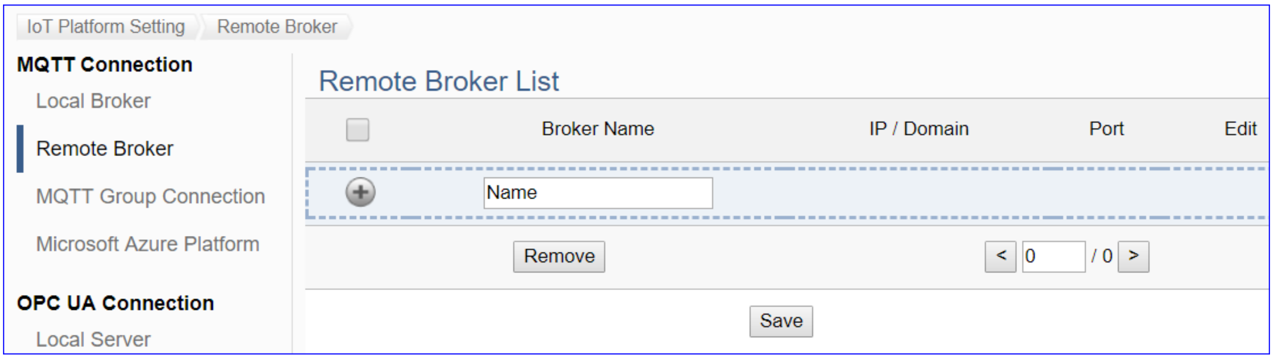
□	Broker Name	IP / Domain	Port	Edit
⊕	Name			

Setting Sequence for the MQTT Connection:

1. Add and set up a connection Broker name in the Remote Broker List.
2. Set up the contents of the Topic messages published/subscribed by other external MQTT devices for mapping to the Variables Table of the UA-5200 controller.
3. Convert the data contents of the MQTT device to communicate with other protocols.

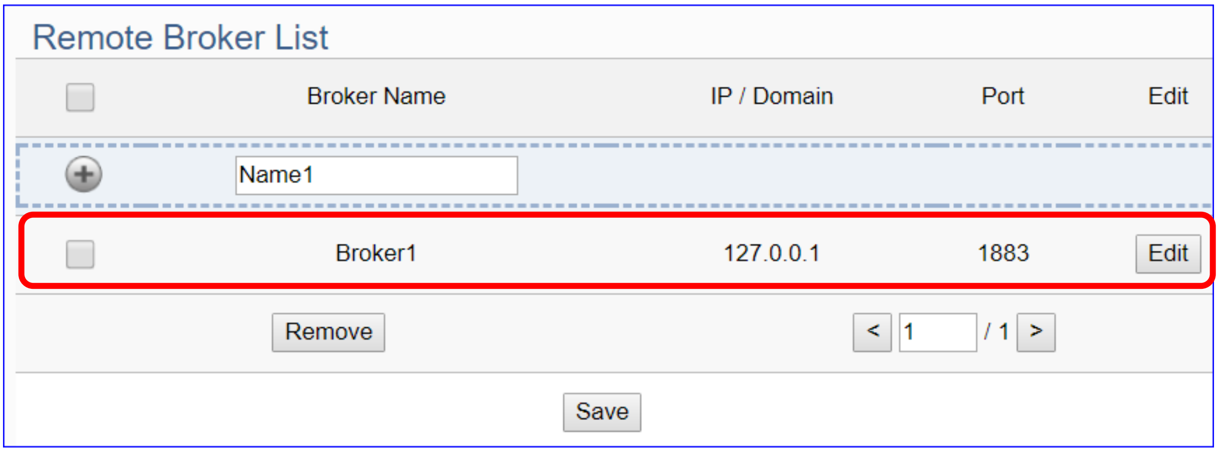
For the certificate about the communication security, please refer to Chapter 12.

This section will introduce the function items and setting parameters.



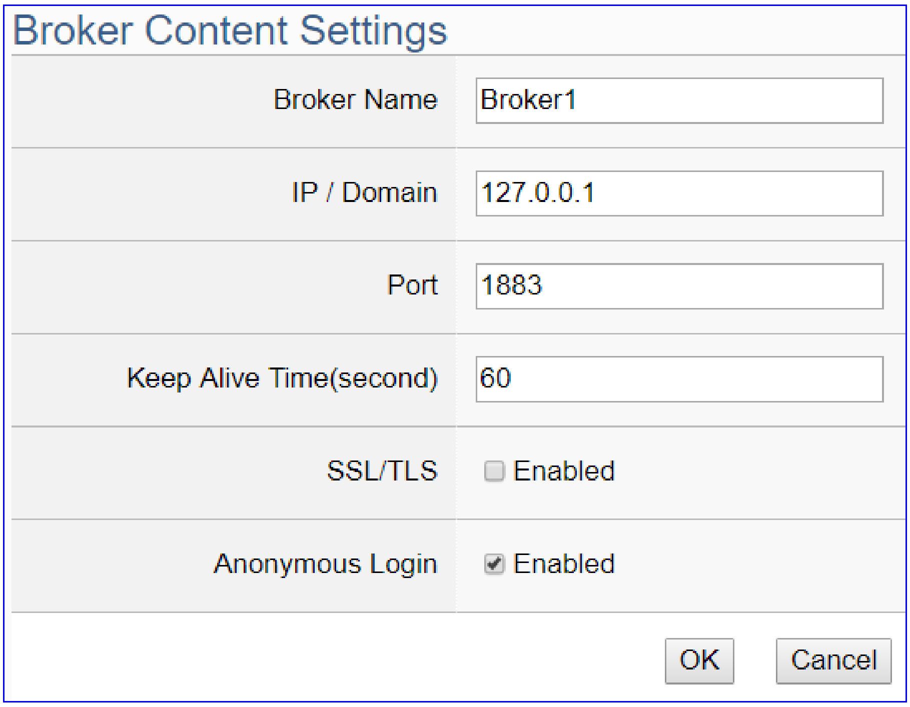
MQTT Connection > Remote Broker > Remote Broker List	
Broker Name	MQTT Remote Broker name. User can give a new name, e.g. Broker1. Default: Name.
⊕	Click to add a list of remote Broker.
Save	Click to save the settings of this page.

After adding a list of the Remote Broker:



MQTT Connection > Remote Broker > Remote Broker List	
Broker Name	The MQTT remote Broker name.
IP / Domain	The IP address or domain name of the remote Broker.
Port	The communication port of the remote Broker.
□	Check the box in the left of the Broker is to select that Broker, can delete or copy the Broker. Check the box on the top of the list will select all Brokers in the list.
Edit	Click to set up the remote Broker in the Broker Content Setting page.
Remove	Click to delete the checked Broker(s)
< 1 / 1 >	The page number / total pages of the Broker list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [Edit] to set up the group in the Broker Content Setting page.



Broker Content Settings

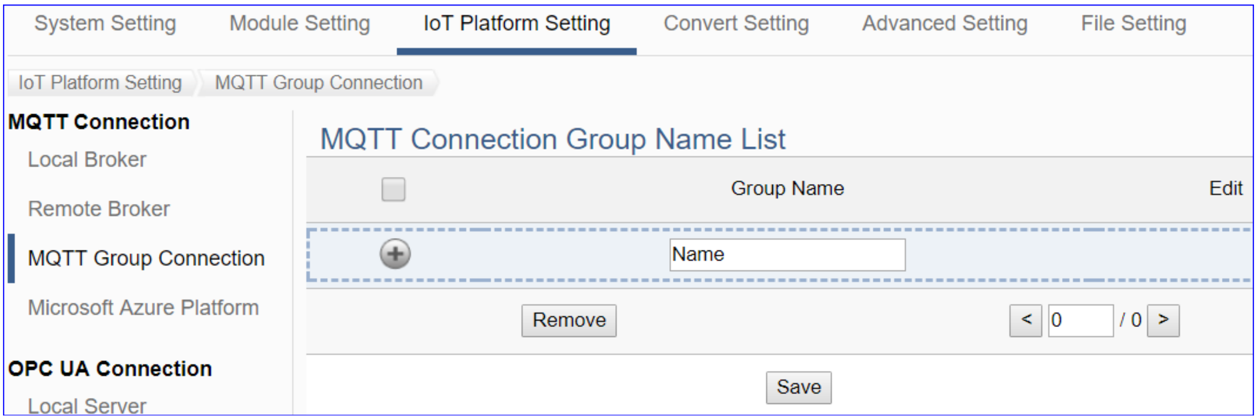
Broker Name	Broker1
IP / Domain	127.0.0.1
Port	1883
Keep Alive Time(second)	60
SSL/TLS	□ Enabled
Anonymous Login	☑ Enabled

MQTT Connection > Remote Broker List > Broker Content Settings	
Broker Name	The name of the remote MQTT Broker. User can define a new name.
IP / Domain	Set the IP address or domain name of the Remote MQTT Broker. Default: 127.0.0.1
Port	The remote Broker port. Default: 1883.
Keep Alive Time (second)	The Keep alive time. Default: 60 second.
SSL/TLS	Check to enable the supporting of SSL/TLS security communication. Default: Uncheck.
Anonymous Login	Check to allow anonymous login. Default: Check Enabled.
OK	Click to save the setting and exit this page. Click [Cancel] to exit this page without saving.

7.3. MQTT Group Connection

This function can set up the MQTT connection with local and remote brokers. Setting with the MQTT JSON function in the Convert Setting, It can make the I/O module messages in groups and then mapping to the user-defined publish and subscribe topics.

If the MQTT Group connection needs to use an external MQTT remote Broker, you need to set the remote Broker connection first and then set the connection group list. This page is for the setting of new, remove and set up the connection group list and their function parameters.

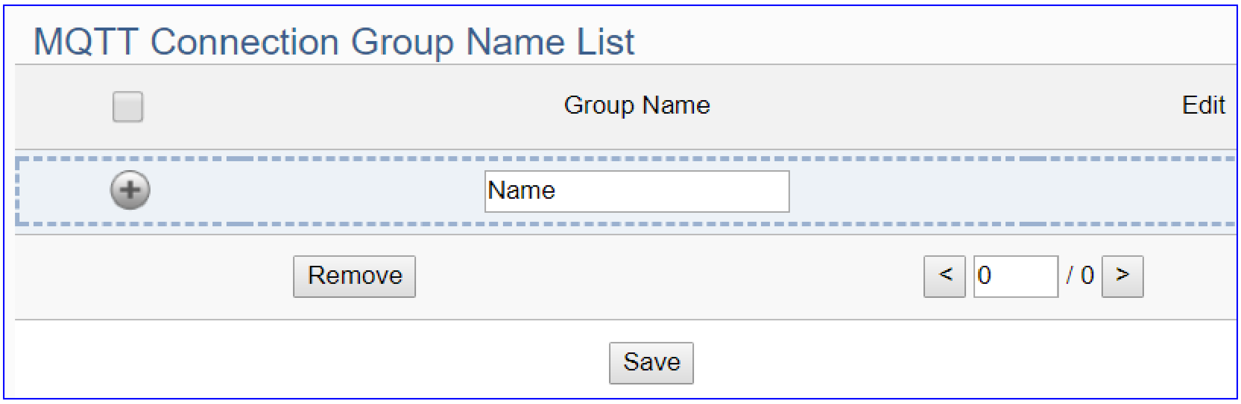


Setting Sequence for the MQTT Group Connection:

1. Set up a connection MQTT Broker of Local or Remote Broker.
2. Add and set up a MQTT connection group name in the List.
3. Set up the contents of the Topic messages published/subscribed by other external MQTT devices that supporting JSON format for mapping to the Variables Table of the UA-5200 controller.
4. Convert the data contents of the MQTT device into JSON format of groups to communicate with other protocols.

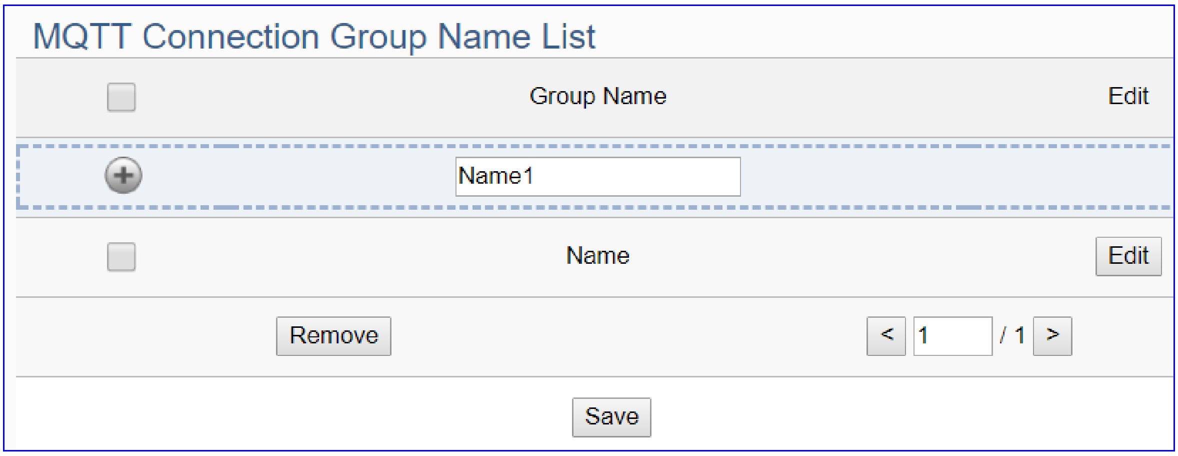
For the certificate about the communication security, please refer to Chapter 12.

This section will introduce the function items and setting parameters.



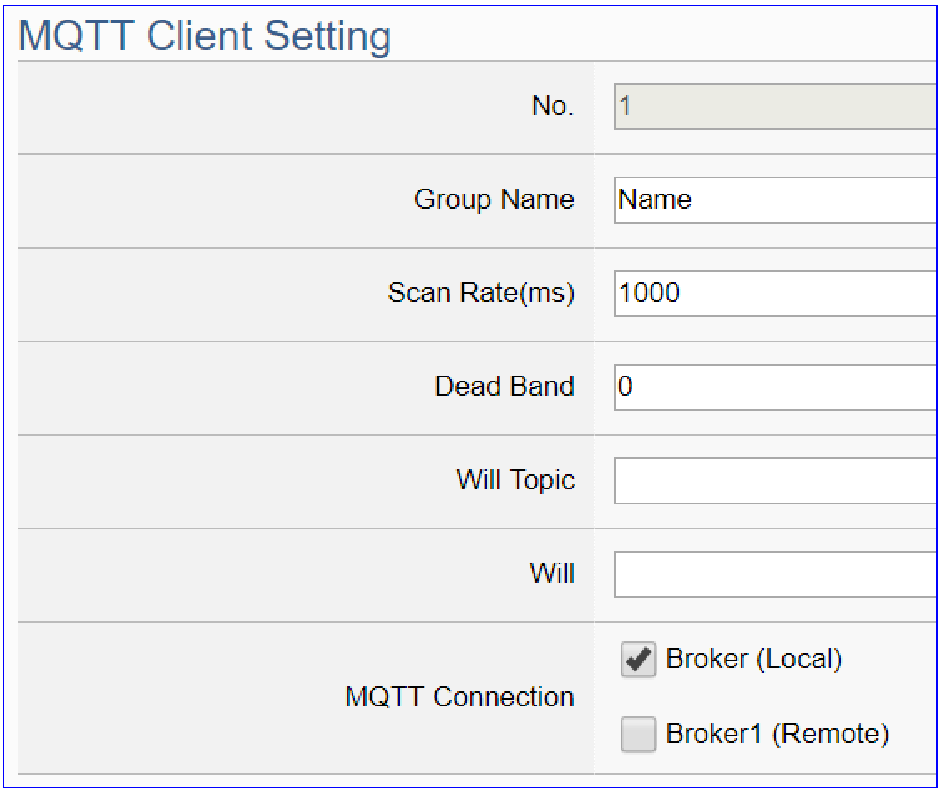
IoT Platform Setting > MQTT Connection > MQTT Connection Group Name List	
Group Name	MQTT connection group name. User can give a new name, e.g. Group1. Default: Name.
⊕	Click to add a list of MQTT connection group.
Save	Click to save the settings of this page.

After adding a list of the MQTT connection group:



IoT Platform Setting > MQTT Connection > MQTT Connection Group Name List	
Group Name	The MQTT connection group name.
□	Check the box in the left of the Group name is to select that group, can delete or copy the group. Check the box on the top of the list will select all groups in the list.
Edit	Click to set up the group in the MQTT Client Setting page.
Remove	Click to delete the checked group(s)
< 1 / 1 >	The page number / total pages of the group list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

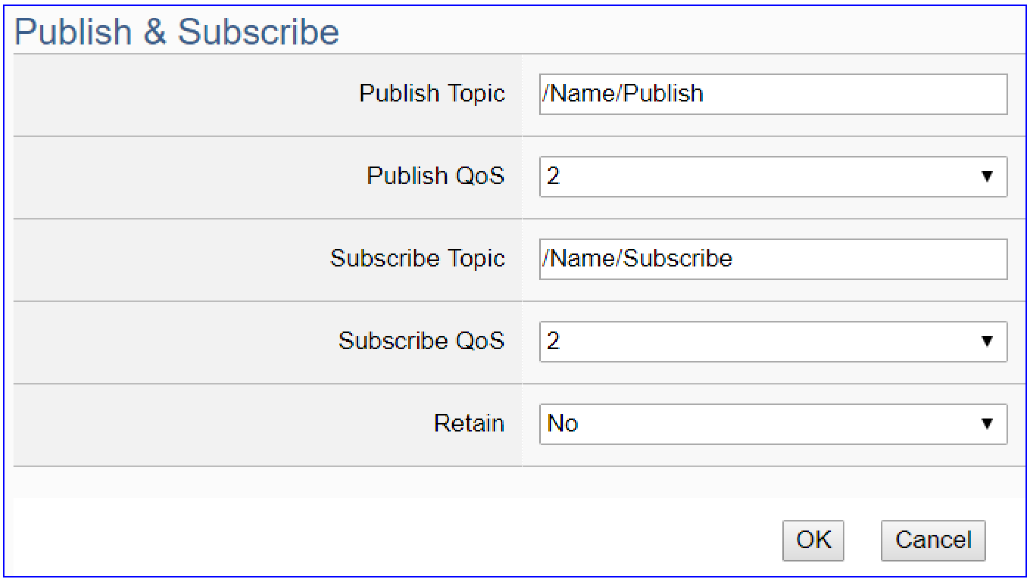
Click [Edit] to set up the group in the MQTT Client Setting page.



MQTT Client Setting

No.	1
Group Name	Name
Scan Rate(ms)	1000
Dead Band	0
Will Topic	
Will	
MQTT Connection	☑ Broker (Local) □ Broker1 (Remote)

IoT Platform Setting > MQTT Connection > MQTT Client Setting	
No.	The MQTT Client Number. (Un-editable)
Group Name	The name of the Group. User can define a new name.
Scan Rate(ms)	Set an update frequency for the data. Unit: ms. Default: 1000 ms.
Dead Band	Give a dead bend value for updating a float signal. Default: 0
Will Topic	The title of a disconnect notice. Default: Null.
Will	The disconnect notice. Default: Null.
MQTT Connection	Check the Broker for this MQTT connection, Local Broker or Remote Broker. Remote Broker option will appear only when set in advance.



Publish & Subscribe

Publish Topic: /Name/Publish

Publish QoS: 2 ▼

Subscribe Topic: /Name/Subscribe

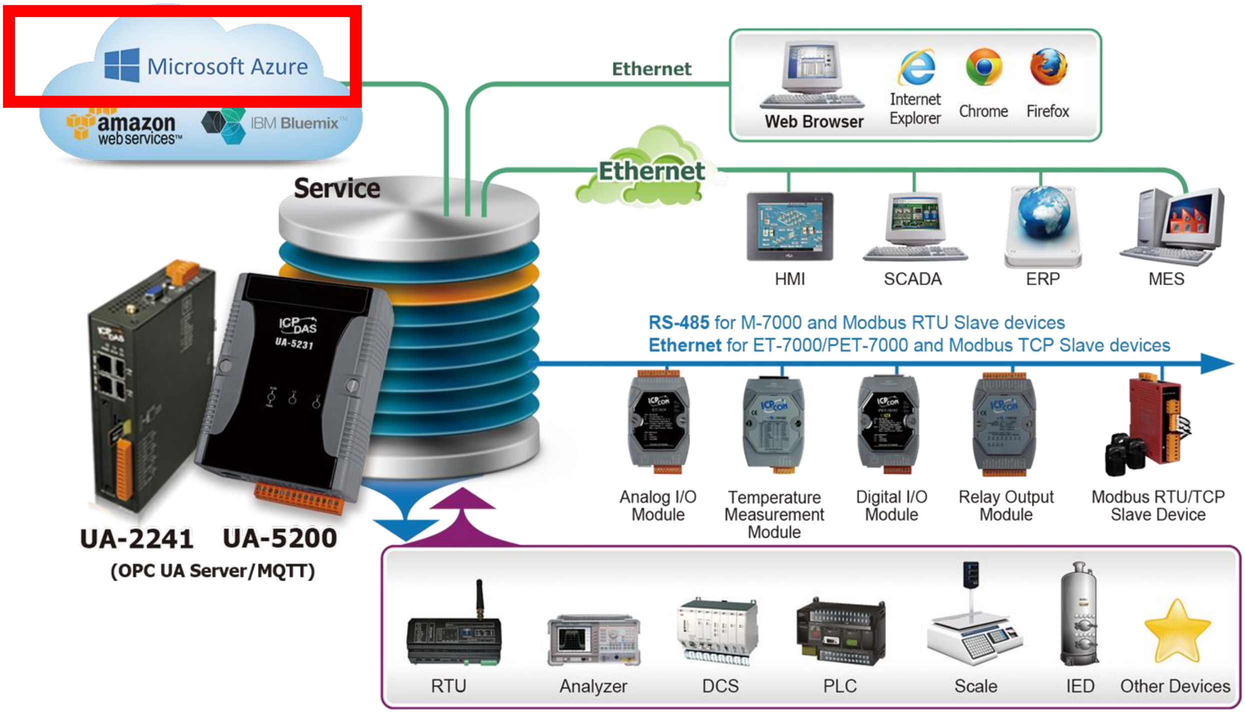
Subscribe QoS: 2 ▼

Retain: No ▼

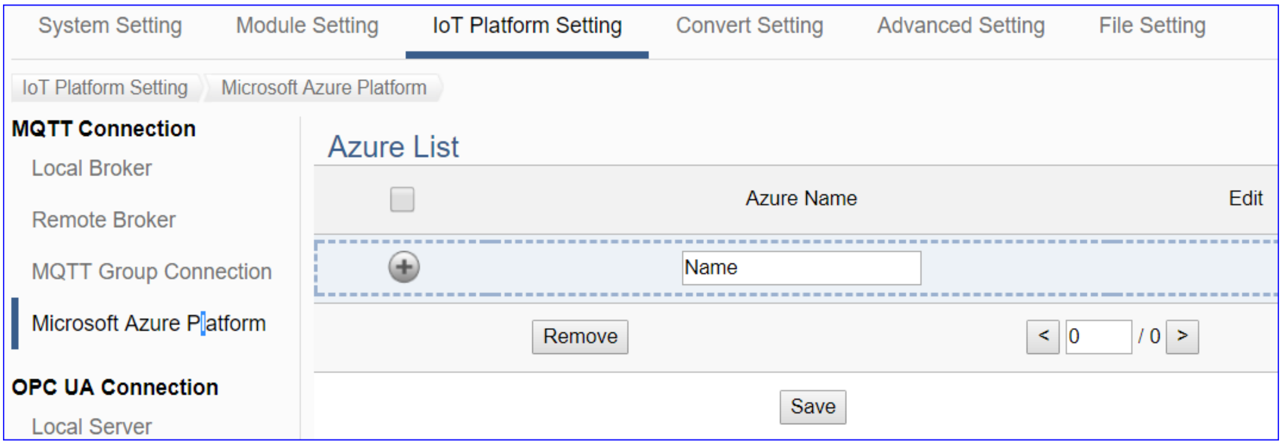
IoT Platform Setting > MQTT Connection > MQTT Client Setting – Publish & Subscribe	
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2. 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2. 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Retain	Whether the Broker to store the message. Default: No.
OK	Click to save the setting and exit this page. Click [Cancel] to exit this page without saving.

7.4. MQTT Connection - Microsoft Azure Platform

Microsoft Azure Platform is a common platform to integrate IoT devices into the cloud. Many of the applications use MQTT connection to the cloud for the setting is fast and easy. The UA series also provides the MQTT function for module to connect to the Azure platform and allows users to publish messages to Microsoft Azure and receive messages from Microsoft Azure.



This page will introduce the settings for UA series controller using MQTT service to connect to the Microsoft Azure Platform. It includes new, remove and set up the Azure list and the function parameters

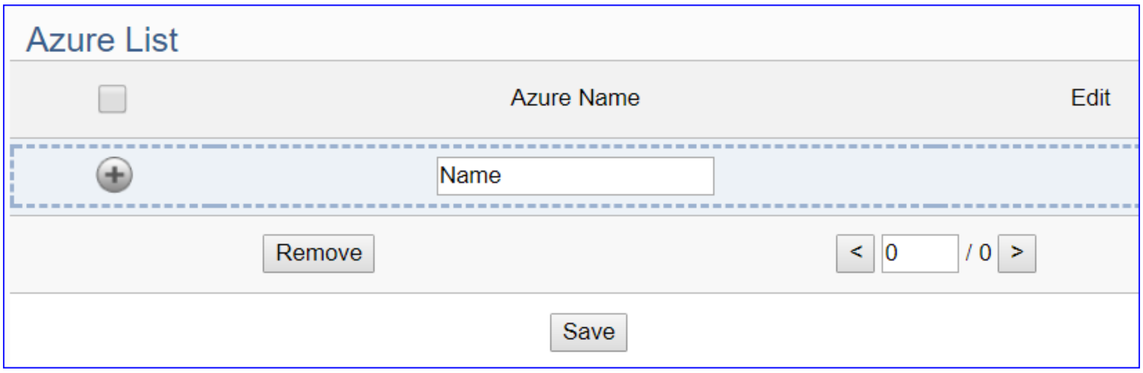


Azure List

□	Azure Name	Edit
⊕	Name	

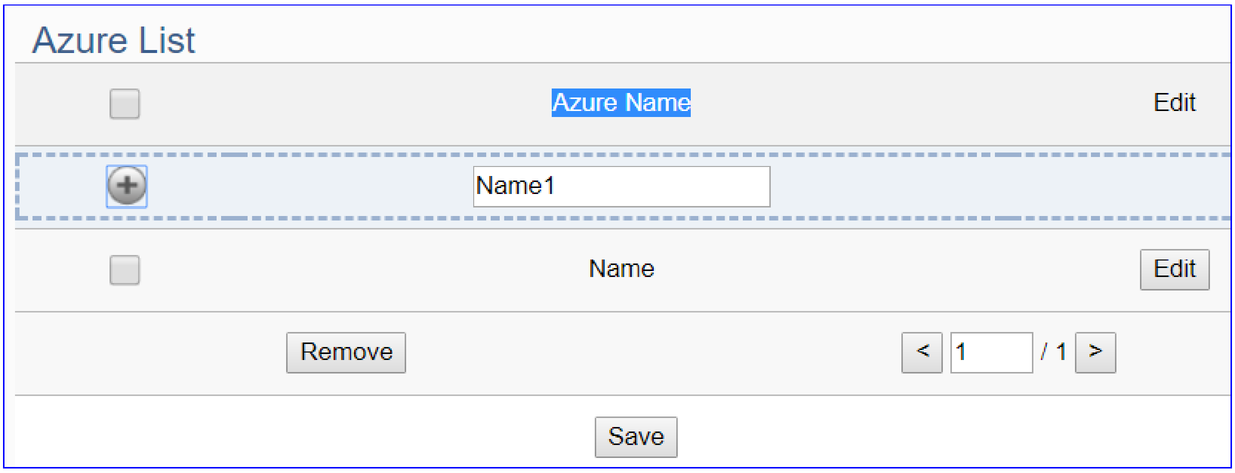
Remove   < 0 / 0 >

Save



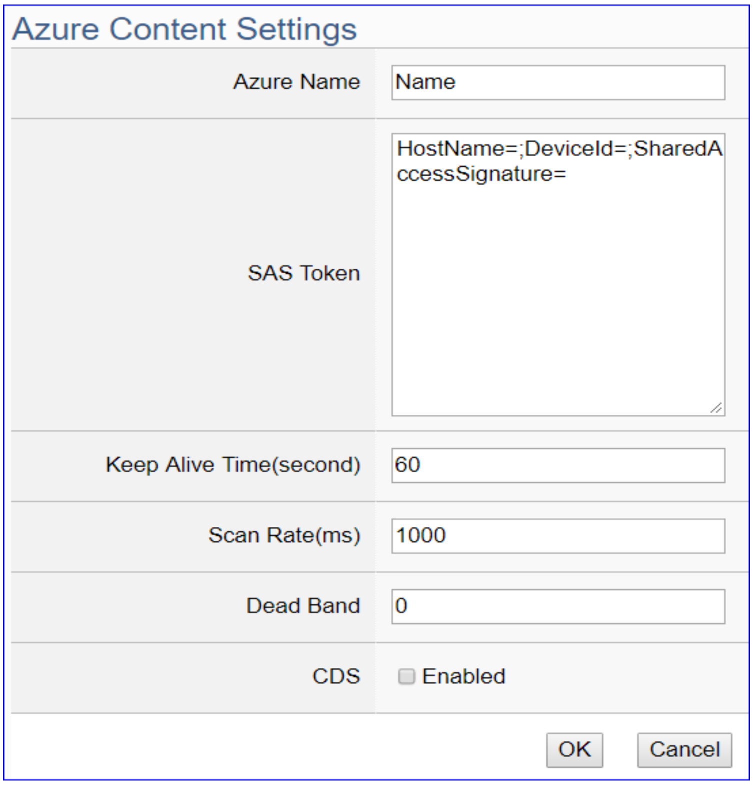
IoT Platform Setting > MQTT Connection > Microsoft Azure Platform > Azure List	
Azure Name	Azure name. User can give a new name1. Default: Name.
⊕	Click to add a list of Azure.

After adding a list of the Azure:



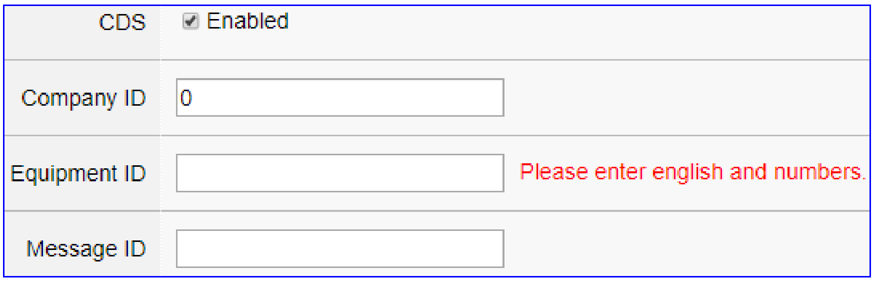
IoT Platform Setting > MQTT Connection > Microsoft Azure Platform > Azure List	
Azure Name	Azure name. User can define the name. Default: Name.
⊕	Click to add a new Azure list.
□	Check the box in the left of a Azure name is to select that Azure, can delete or copy the Azure. Check the box on the top of the list will select all Azures in the list.
Edit	Click to set up the Azure in the Azure Content Setting page.
Remove	Click to delete the checked Azure(s).
< 1 / 1 >	The page number / total pages of the Azure list. Click < or > to go to the previous or the next page.
Save	Click to save the settings of this page.

Click [Edit] to set up the Azure in the Azure Content Setting page.



Azure Content Settings

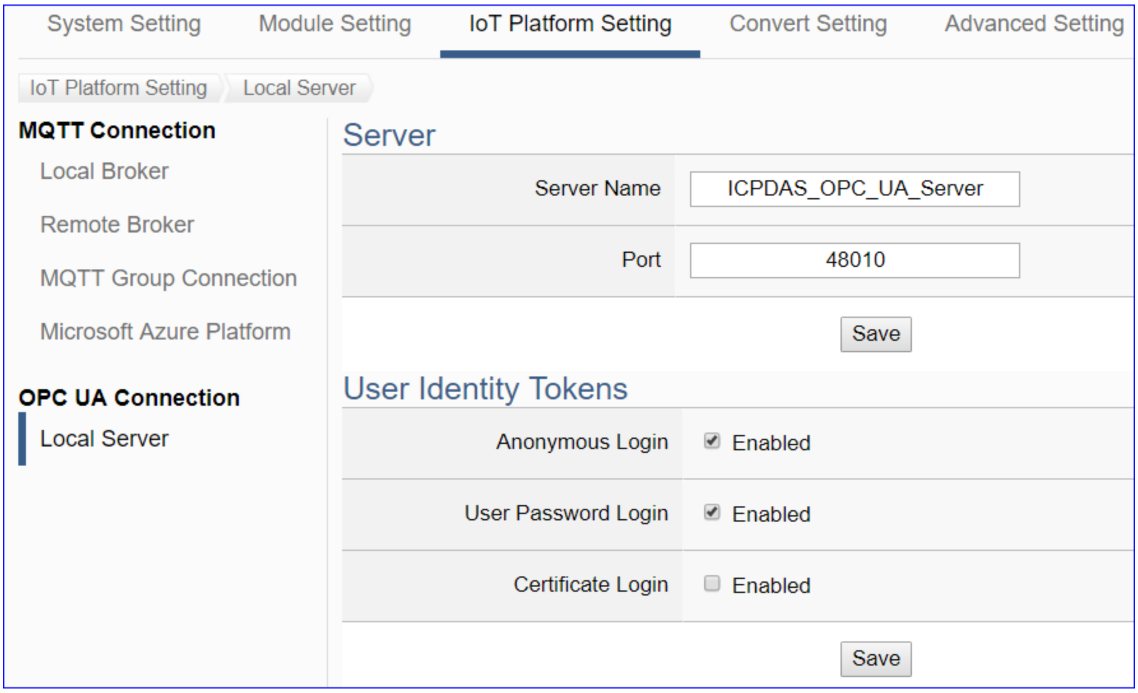
Azure Name	Name
SAS Token	HostName=;DeviceId=;SharedAccessSignature=
Keep Alive Time(second)	60
Scan Rate(ms)	1000
Dead Band	0
CDS	□ Enabled

IoT Platform Setting > MQTT Connection > Microsoft Azure Platform > Azure Content Settings	
Azure Name	Azure name. User can define the name. Default: Name.
SAS Token	Input the SAS Token which you previously registered for the UA controller from Microsoft Azure. For the procedure to generate a SAS Token, please refer to the “Documentation > Azure IoT Hub > IoT Hub MQTT support” section on the Microsoft Azure Web Site for detailed information.
Keep Alive Time(second)	Set the time in second that pass away without communication between the UA controller and Microsoft Azure. Default: 60 second.
Scan Rate(ms)	Set an update frequency for the task data. Default: 1000 (Unit: ms)
Dead Band	Give a dead bend value for updating a float signal. Default: 0
CDS (Connected Device Studio)	If user wants to publish the messages compliant with the Microsoft CDS platform, user must check the "CDS” and fill in the Company ID, Equipment ID and Message ID that applied from the Microsoft CDS platform. Default: Uncheck.  CDS: ☑ Enabled Company ID: 0 Equipment ID: Please enter english and numbers. Message ID:
OK	Click to save and exit this page.

7.5. OPC UA Connection - Local Server

UA series controller built-in OPC UA Server service can integrate the I/O products and the third-party devices, import their data to the back-end SCADA management system or the big-data analysis/decision system, to satisfy the reliability, interoperability and security needs of the Industrial 4.0 automation system.

This page provides the settings for the UA series built-in OPC UA Server.



Server Name: ICPDAS_OPC_UA_Server

Port: 48010

Anonymous Login: ☑ Enabled

User Password Login: ☑ Enabled

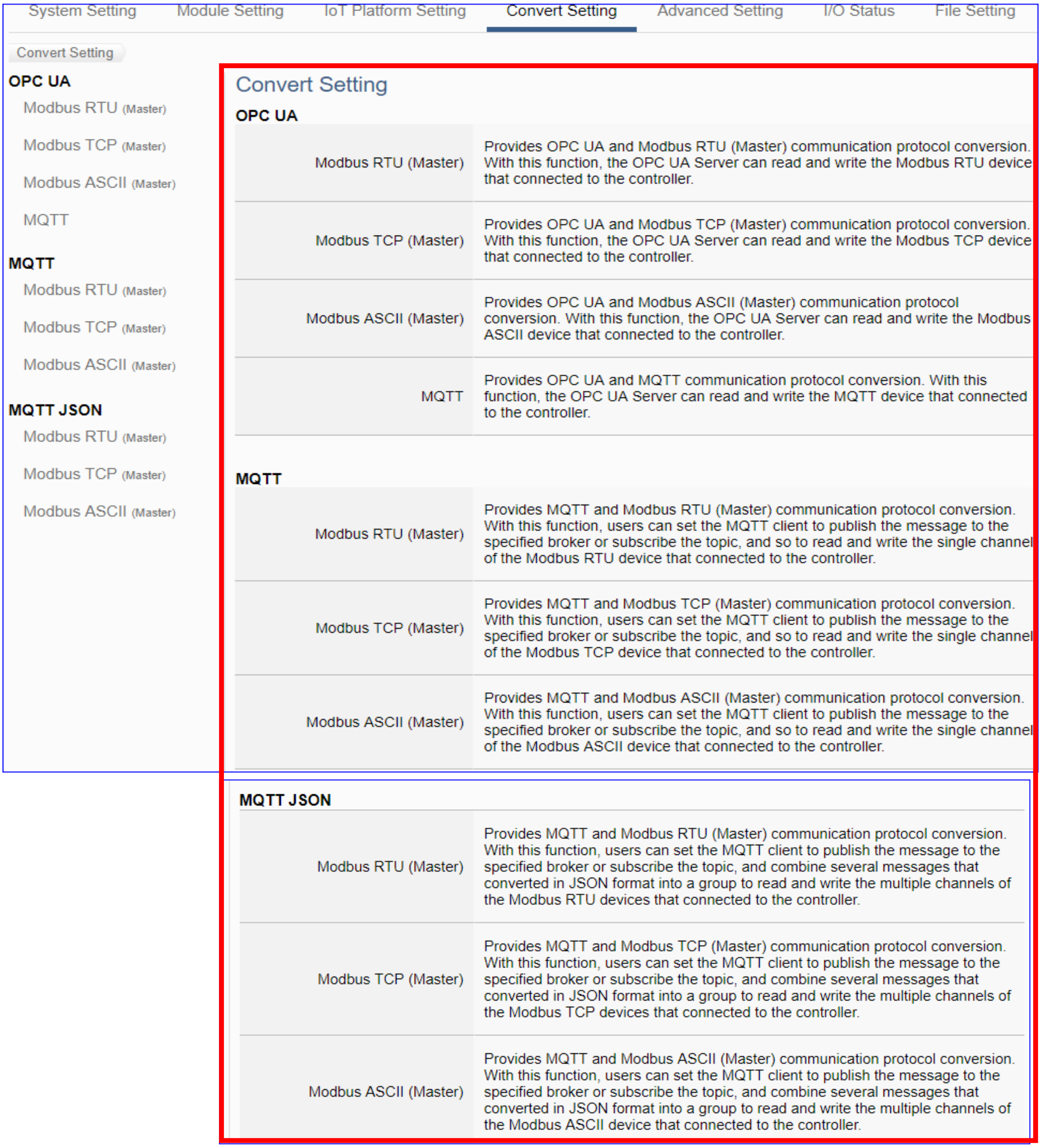
Certificate Login: □ Enabled

OPC UA Connection > Local Server – Server	
Server Name	Display the active OPC UA Server name. Not editable. System values: ICPDAS_OPC_UA_Server
Port	The communication port number of the OPC UA Server. System Default: 48010.
Save	Click to save the settings of this item.
OPC UA Connection > Local Server – User Identity Tokens	
Anonymous Login	Check to enable the anonymous login of clients. Default: check.
User Password Login	Check to enable the user password login of clients. Default: uncheck.
Certificate Login	Check to enable the certificate login of clients. Default: uncheck.
Save	Click to save the settings of this item.

8. Convert Setting

Convert Setting is the fourth item of the Main Menu for the communication conversion.

The Convert Setting has 9 sub-menu items in 3 protocol types including OPC UA, MQTT and MQTT JSON. And each protocol type has 3 convert settings items for conversion with the Modbus RTU/TCP/ASCII (Master) protocols and the function descriptions are listed on the page of the Main Menu. This chapter will introduce these function items and setting parameters.



Convert Setting

OPC UA

Modbus RTU (Master)	Provides OPC UA and Modbus RTU (Master) communication protocol conversion. With this function, the OPC UA Server can read and write the Modbus RTU device that connected to the controller.
Modbus TCP (Master)	Provides OPC UA and Modbus TCP (Master) communication protocol conversion. With this function, the OPC UA Server can read and write the Modbus TCP device that connected to the controller.
Modbus ASCII (Master)	Provides OPC UA and Modbus ASCII (Master) communication protocol conversion. With this function, the OPC UA Server can read and write the Modbus ASCII device that connected to the controller.
MQTT	Provides OPC UA and MQTT communication protocol conversion. With this function, the OPC UA Server can read and write the MQTT device that connected to the controller.

MQTT

Modbus RTU (Master)	Provides MQTT and Modbus RTU (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus RTU device that connected to the controller.
Modbus TCP (Master)	Provides MQTT and Modbus TCP (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus TCP device that connected to the controller.
Modbus ASCII (Master)	Provides MQTT and Modbus ASCII (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus ASCII device that connected to the controller.

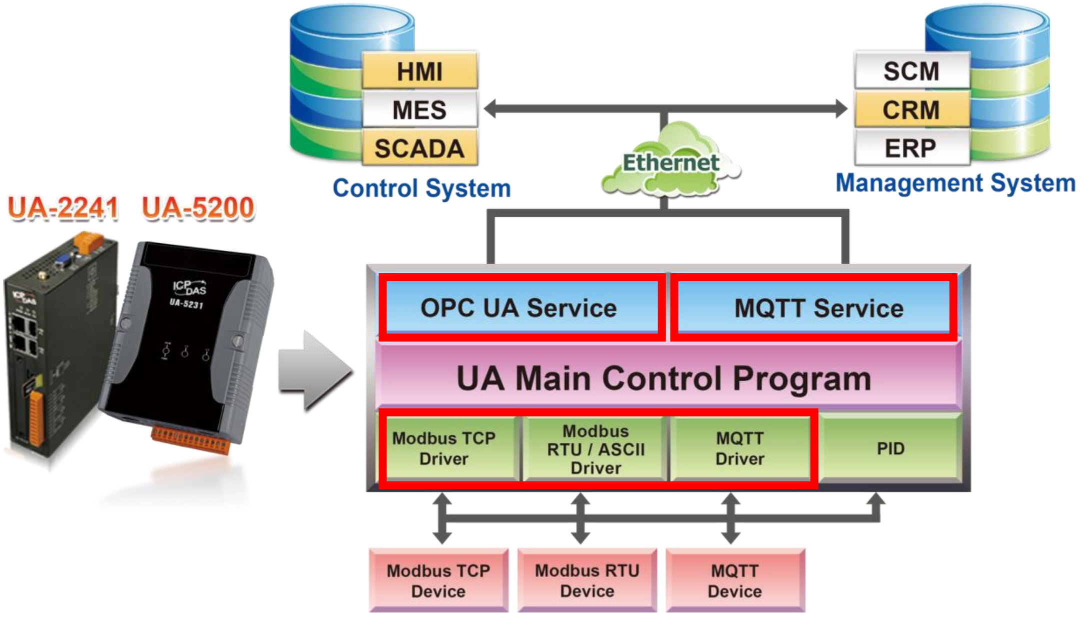
MQTT JSON

Modbus RTU (Master)	Provides MQTT and Modbus RTU (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus RTU devices that connected to the controller.
Modbus TCP (Master)	Provides MQTT and Modbus TCP (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus TCP devices that connected to the controller.
Modbus ASCII (Master)	Provides MQTT and Modbus ASCII (Master) communication protocol conversion. With this function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus ASCII device that connected to the controller.

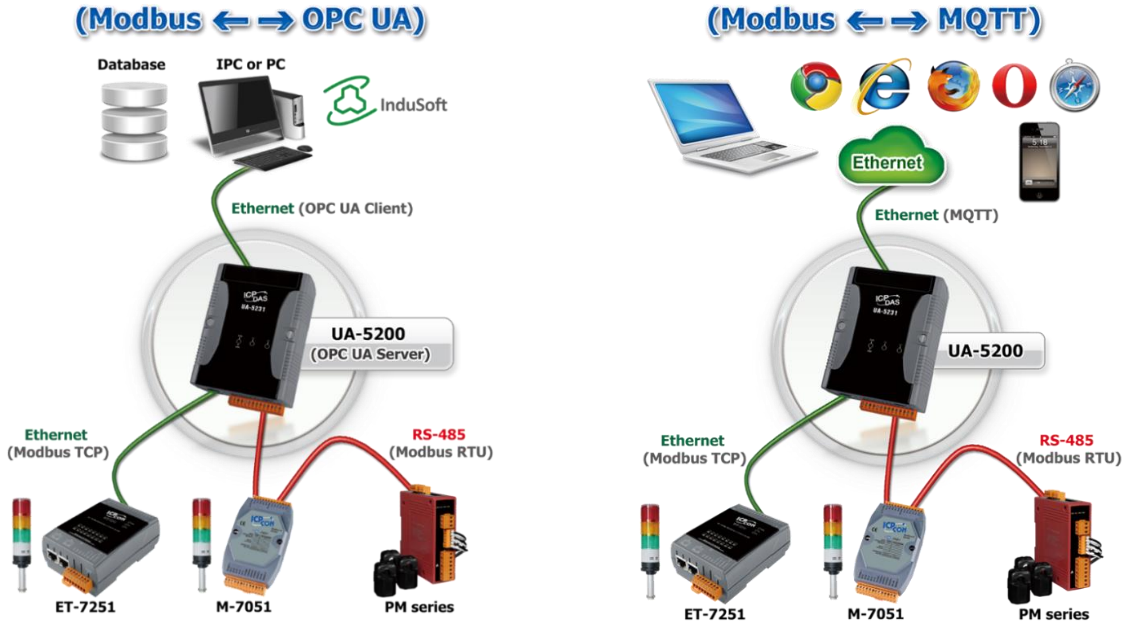
The settings of Modbus RTU/ASCII are the same. Here will introduce them together.

OPC UA	Use **OPC UA** Service to convert with **Modbus RTU/ASCII** protocol. **(8.1)** Use **OPC UA** Service to convert with **Modbus TCP** protocol. **(8.2)** Use **OPC UA** Service to convert with **MQTT** protocol. **(8.3)**
MQTT	Use **MQTT** Service to convert with **Modbus RTU/ASCII** protocol. **(8.4)** Use **MQTT** Service to convert with **Modbus TCP** protocol. **(8.5)**
MQTT JSON	Use **MQTT** Service in group of JSON format to convert with **Modbus RTU/ASCII** protocol. **(8.6)** Use **MQTT** Service in group of JSON format to convert with **Modbus TCP** protocol. **(8.7)**

UA Series Function Diagram:



Application Solution:

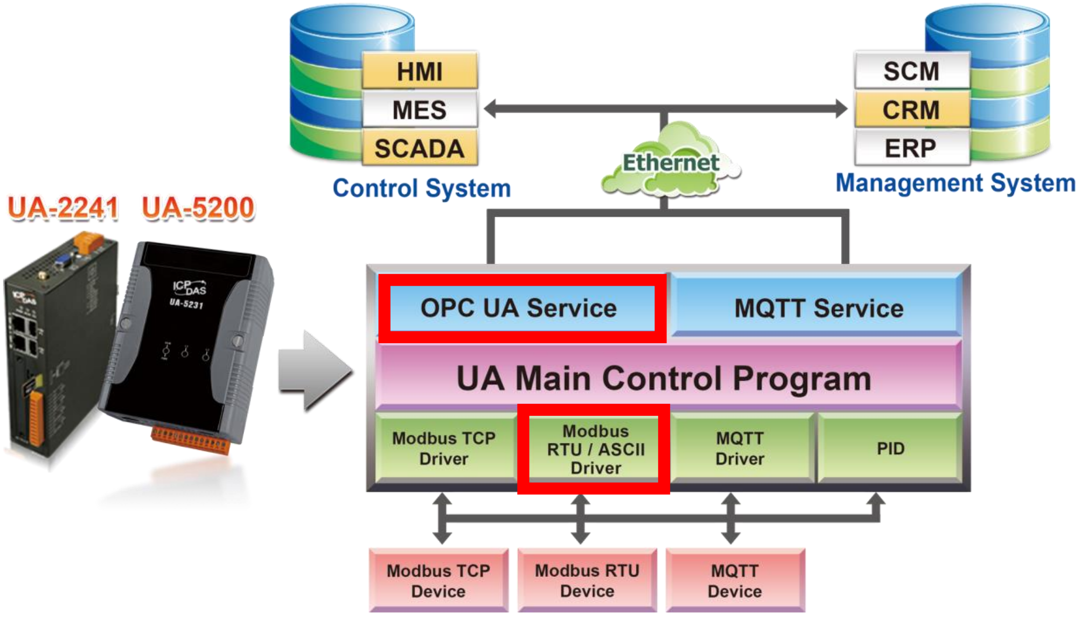


8.1. OPC UA and Modbus RTU/ASCII Conversion

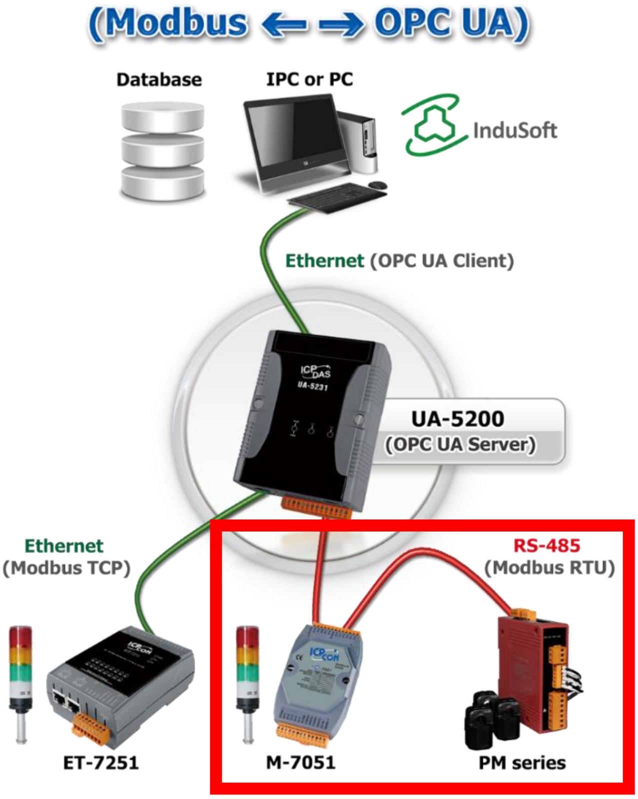
This page provides OPC UA and Modbus RTU/ASCII (Master) communication protocol conversion. With this function, the OPC UA Server can read and write the Modbus RTU / ASCII device that connected to the controller.

The settings of Modbus RTU/ASCII are the same. Here will introduce them together.

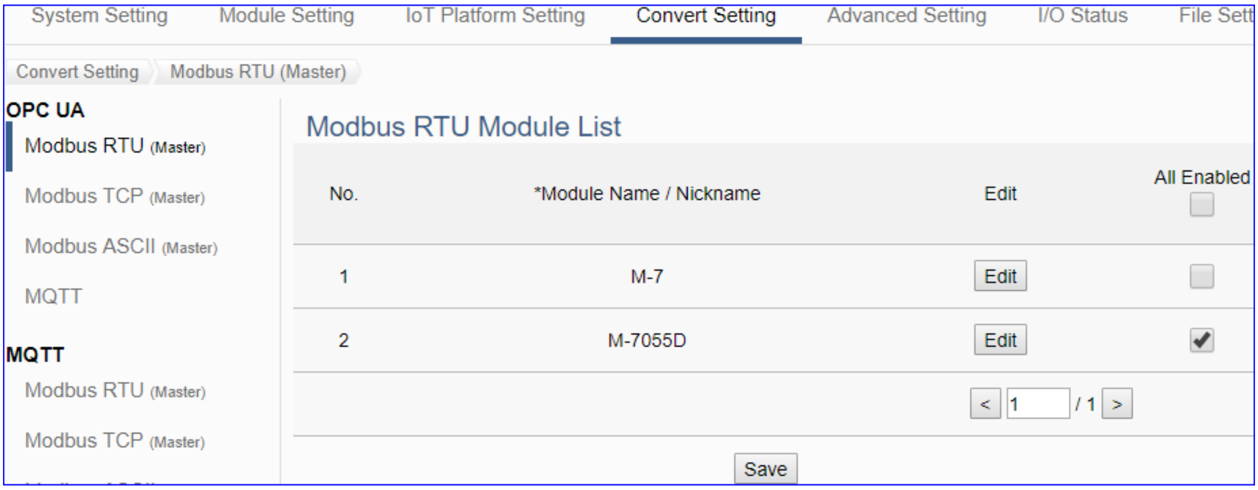
Function Diagram:



Application Solution:



When entering the menu [Convert Setting] and the sub-menu [OPC UA] > Modbus RTU (Master) or Modbus ASCII (Master), the Modbus RTU/ASCII modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)



Modbus RTU Module List

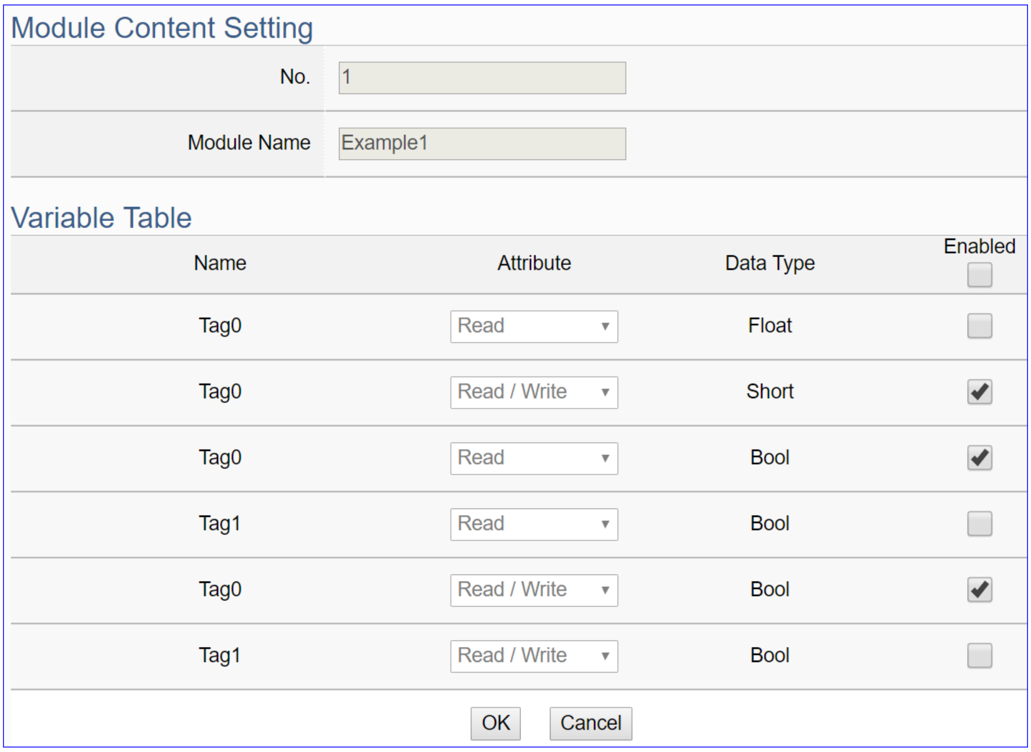
No.	*Module Name / Nickname	Edit	All Enabled □
1	M-7	Edit	□
2	M-7055D	Edit	☑
		< 1 / 1 >	

Save

Convert Setting > OPC UA > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Variable Tale” setting. It is normal to set all channels as enabled, and the conversion will not affect the unconnected channels.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:

The “Module Content Setting” page after clicking the [Edit] button:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Name	Attribute	Data Type	Enabled □
Tag0	Read ▾	Float	□
Tag0	Read / Write ▾	Short	☑
Tag0	Read ▾	Bool	☑
Tag1	Read ▾	Bool	□
Tag0	Read / Write ▾	Bool	☑
Tag1	Read / Write ▾	Bool	□

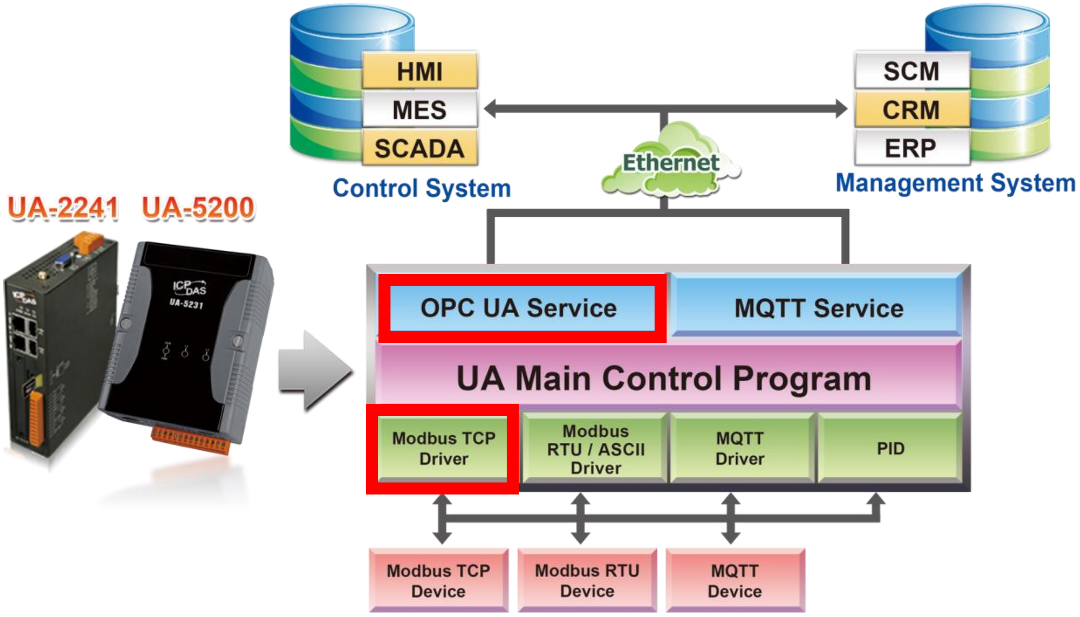
Convert Setting > OPC UA > Modbus RTU (Master) – Module Content	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > OPC UA > Modbus RTU (Master) – Variable Table	
Name	Display the variable name that set in the Modbus Address Mapping Table page (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

When complete the setting, click [OK] to save this page settings and back to the module list page. And remember to click [Save] to save the Convert Setting.

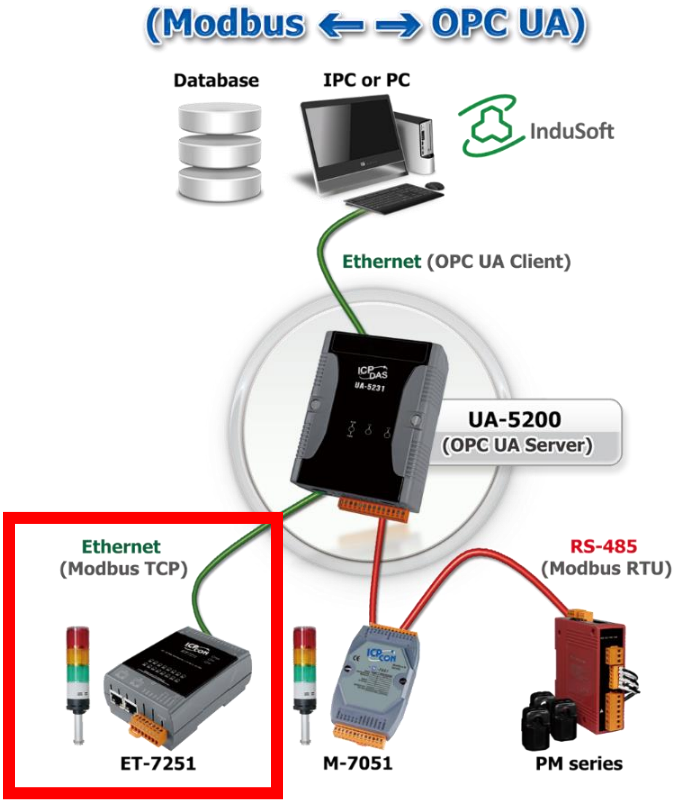
8.2. OPC UA and Modbus TCP Conversion

This page provides OPC UA and Modbus TCP (Master) communication protocol conversion. With this function, the OPC UA Server can read and write the Modbus TCP device that connected to the controller.

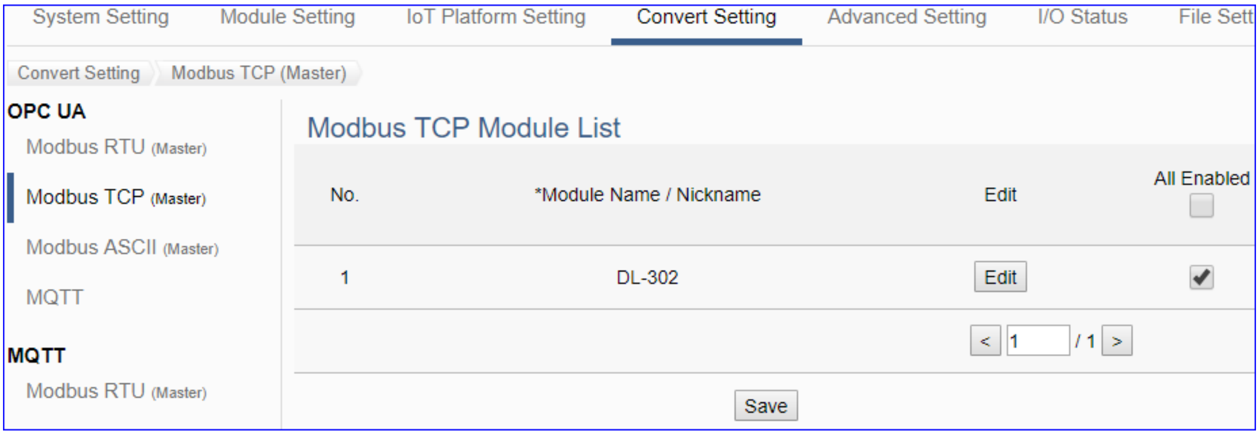
Function Diagram:



Application Solution:



When entering the menu [Convert Setting] and the sub-menu [OPC UA] > Modbus RTU (Master) or Modbus ASCII (Master), the Modbus RTU/ASCII modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)



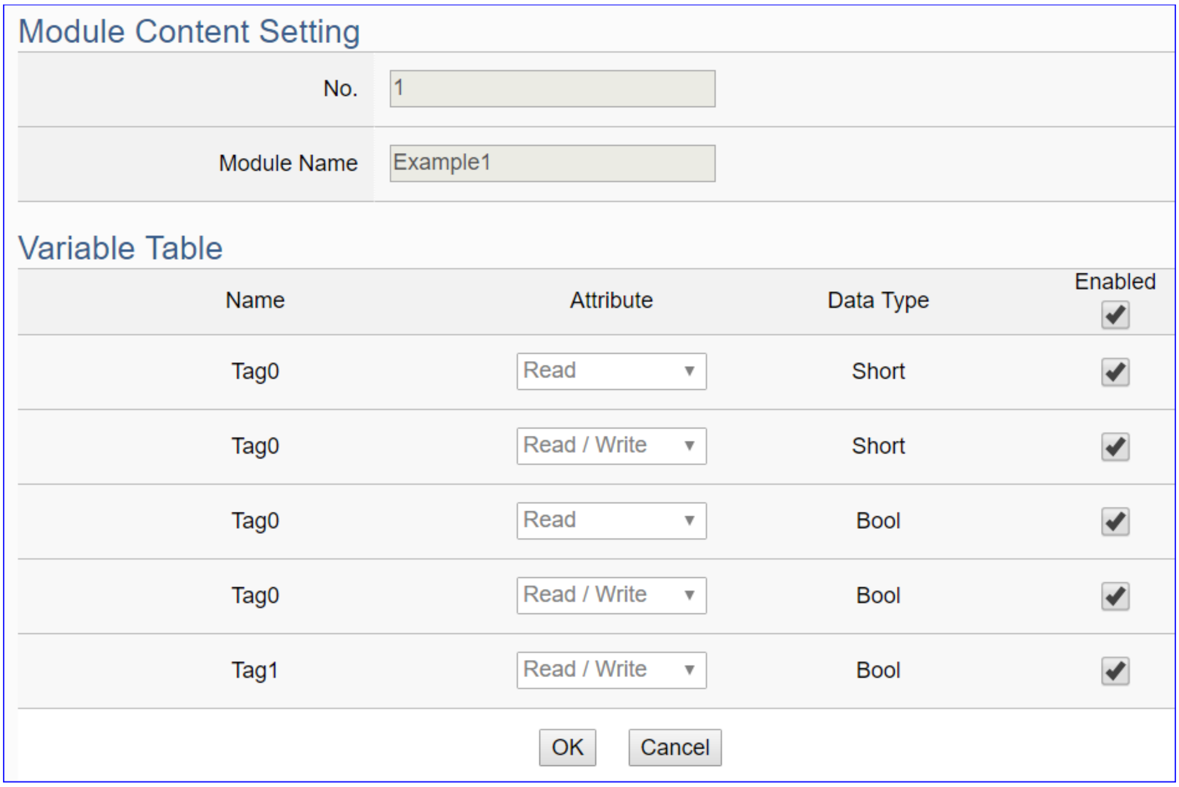
Modbus TCP Module List

No.	*Module Name / Nickname	Edit	All Enabled □
1	DL-302	Edit	☑

Convert Setting > MQTT > Modbus TCP (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	Click to enter the “MQTT Client Setting” page to set up the Topic, QoS, Publish, Subscribe …
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” page:

The “Module Content Setting” page after clicking the [Edit] button:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Name	Attribute	Data Type	Enabled ☑
Tag0	Read	Short	☑
Tag0	Read / Write	Short	☑
Tag0	Read	Bool	☑
Tag0	Read / Write	Bool	☑
Tag1	Read / Write	Bool	☑

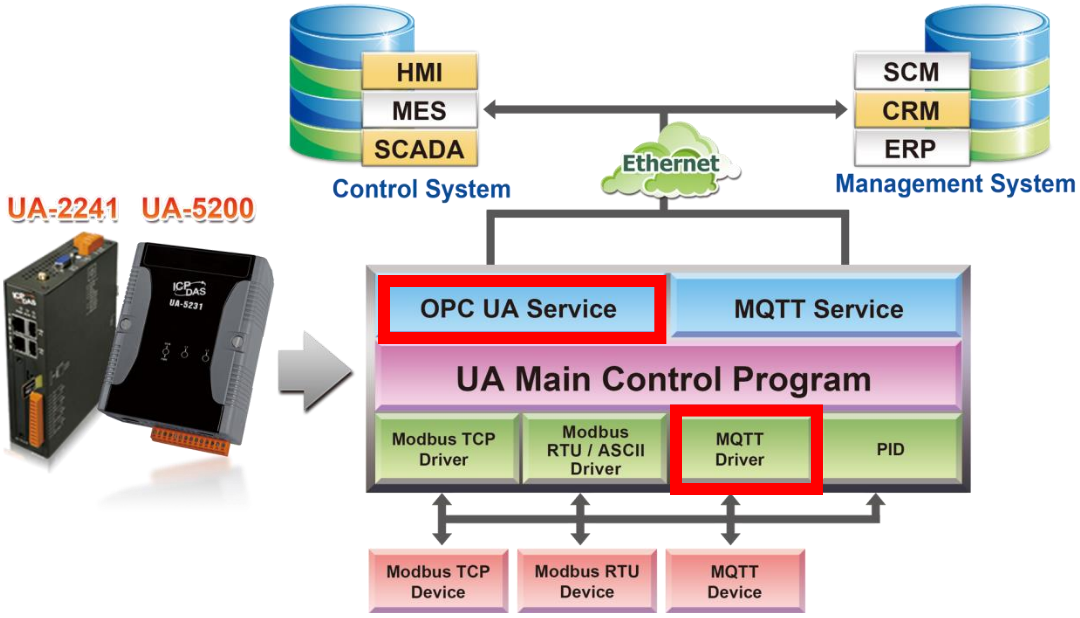
Convert Setting > OPC UA > Modbus TCP (Master) – Module Content	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > OPC UA > Modbus TCP (Master) – Variable Table	
Name	Display the variable name that set in the Modbus Address Mapping Table page (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

When complete the setting, click [OK] to save this page settings and back to the module list page. And remember to click [Save] to save the Convert Setting.

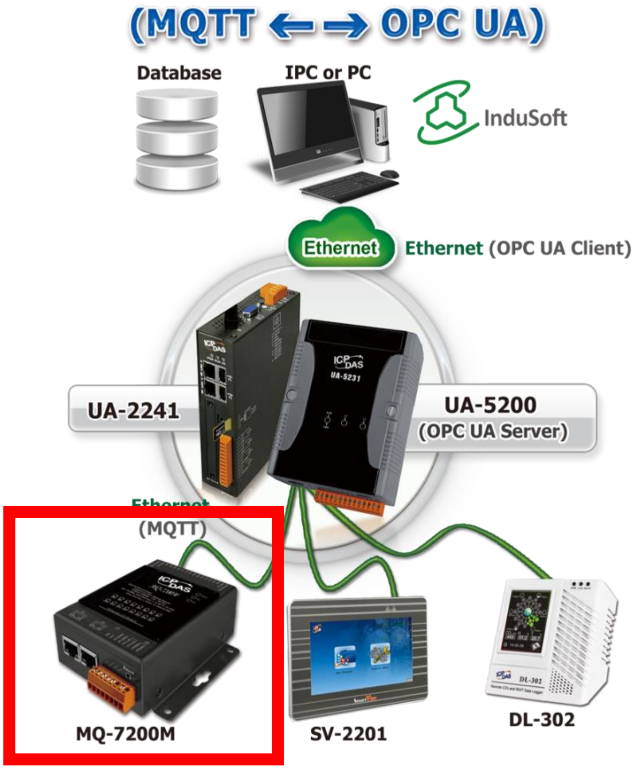
8.3. OPC UA and MQTT Conversion

This page provides OPC UA and MQTT communication protocol conversion. With this function, the OPC UA Server can read and write the MQTT device that connected to the controller.

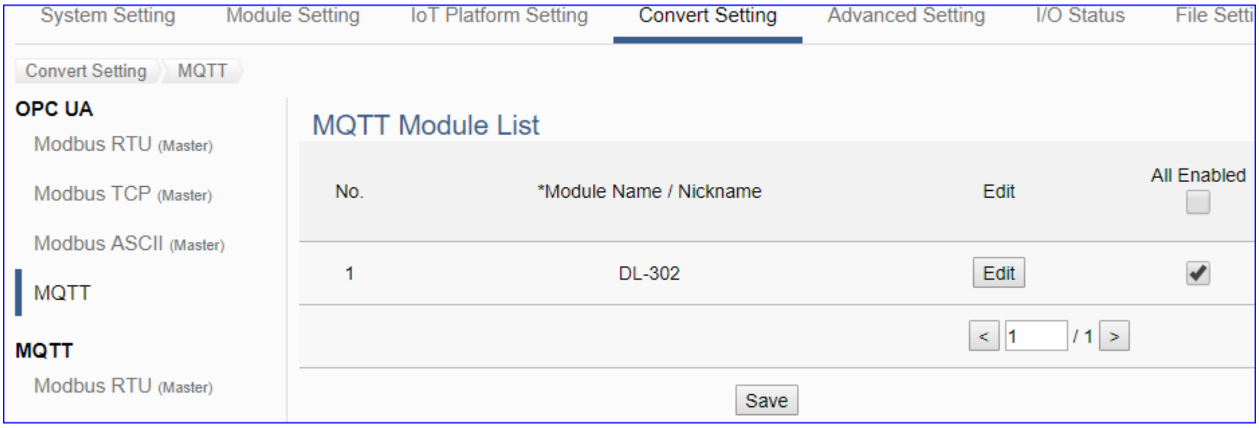
Function Diagram:



Application Solution:

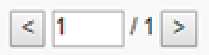


When entering the menu [Convert Setting] and the sub-menu [OPC UA] > MQTT, the MQTT modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)



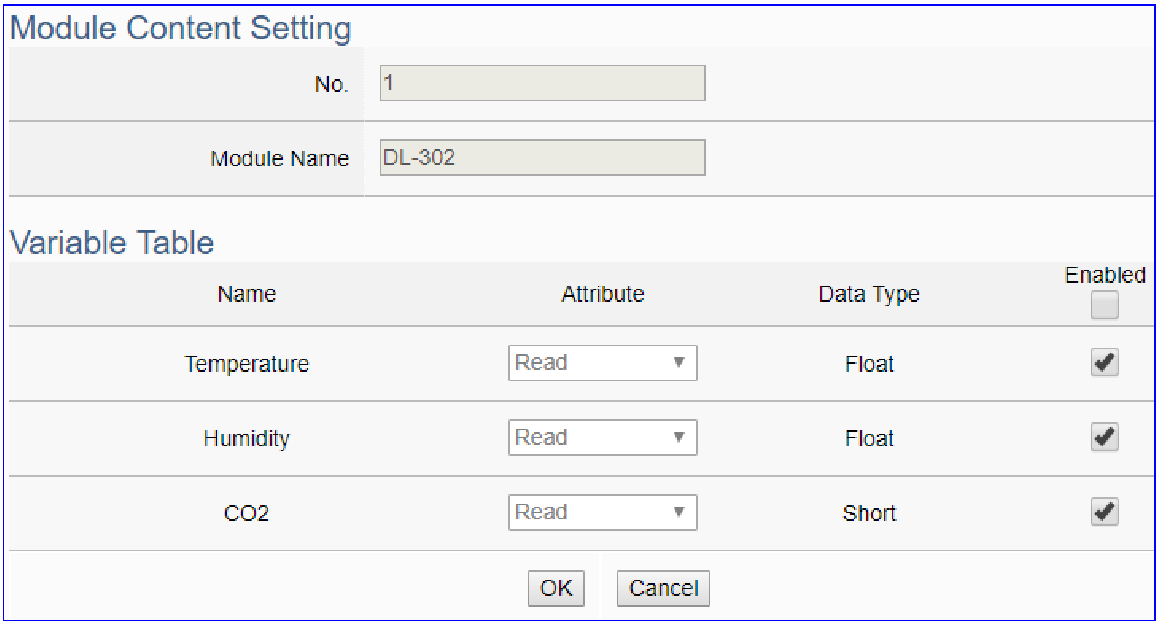
MQTT Module List

No.	*Module Name / Nickname	Edit	All Enabled □
1	DL-302	Edit	☑

Convert Setting > OPC UA > MQTT - MQTT Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	Click to enter the “MQTT Client Setting” page to set up the Topic, QoS, Publish, Subscribe …
 < 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [**Edit**] button cauld enter the “Module Content Setting” page:

[**Module Content Setting**] page:



Module Content Setting

No.	1
Module Name	DL-302

Variable Table

Name	Attribute	Data Type	Enabled □
Temperature	Read ▼	Float	☑
Humidity	Read ▼	Float	☑
CO2	Read ▼	Short	☑

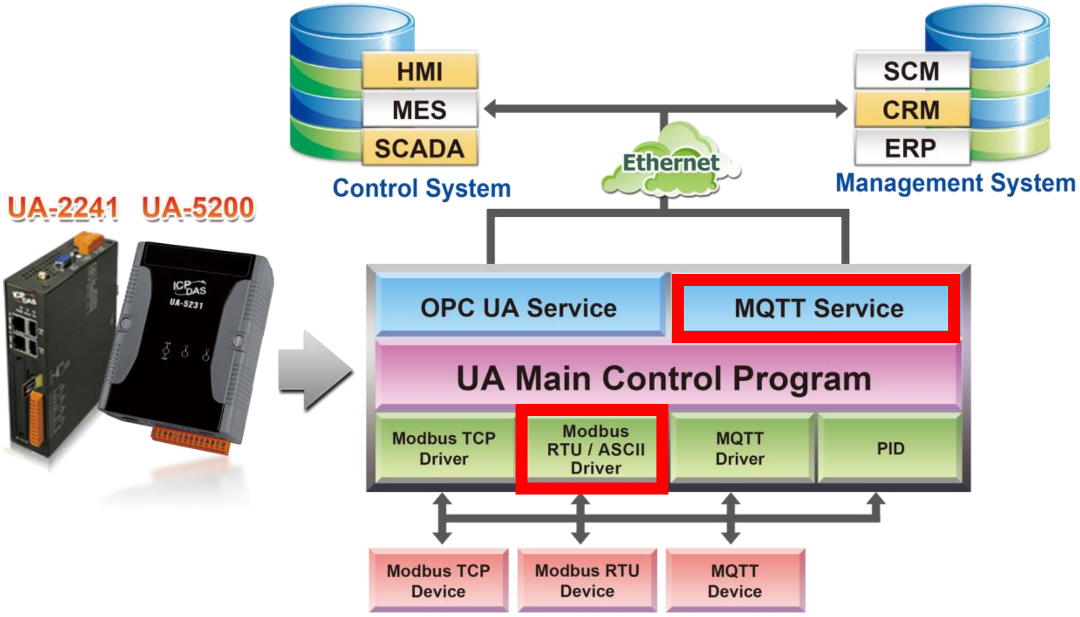
Convert Setting > OPC UA > MQTT - MQTT Module List > Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
Convert Setting > OPC UA > MQTT - MQTT Module List > Variable Table	
No.	The module name in the module list (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the MQTT variable. Include: Bool, Short, Unsigned Short, Long, Unsigned Long, Float, Double, String.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK / Cancer	Click [OK] to save and exit the page settings. Click [Cancer] to exit without saving.

8.4. MQTT and Modbus RTU/ASCII Conversion

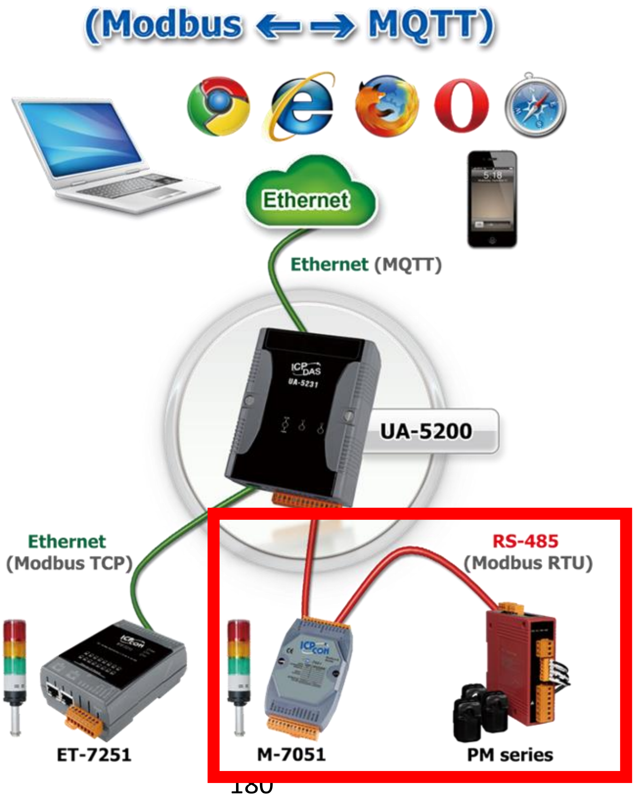
This page provides MQTT and Modbus RTU/ASCII (Master) communication protocol conversion. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus device that connected to the controller.

The settings of Modbus RTU/ASCII are the same. Here will introduce them together.
For the certificate about the communication security, please refer to Chapter 12.

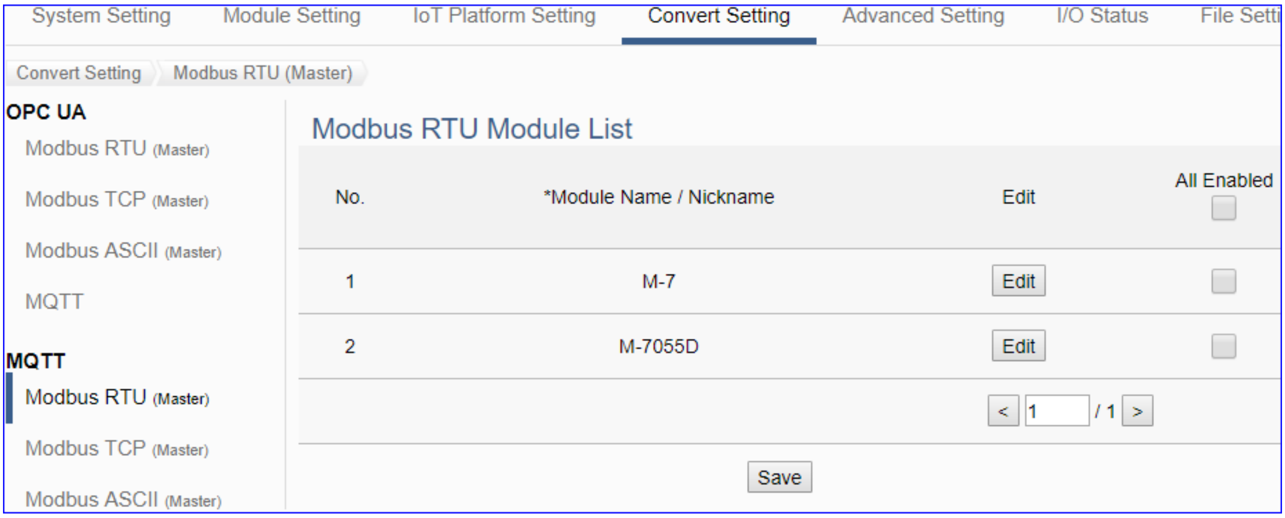
Function Diagram:



Application Solution:



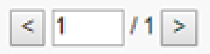
When entering the menu [Convert Setting] and the sub-menu [MQTT] > Modbus RTU (Master) or Modbus ASCII (Master), the Modbus RTU/ASCII modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)



Modbus RTU Module List

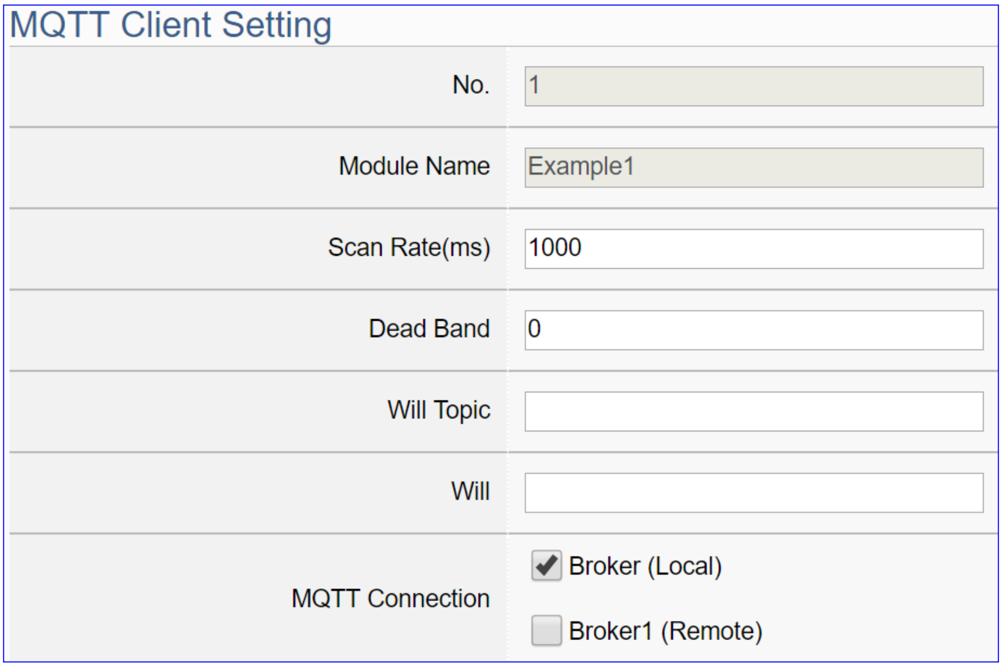
No.	*Module Name / Nickname	Edit	All Enabled ☐
1	M-7	Edit	☐
2	M-7055D	Edit	☐
		< 1 / 1 >	

Save

Convert Setting > MQTT > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	Click to enter the “MQTT Client Setting” page to set up the Topic, QoS, Publish, Subscribe …
 < 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [**Edit**] button cauld enter the “MQTT Client Setting” page.

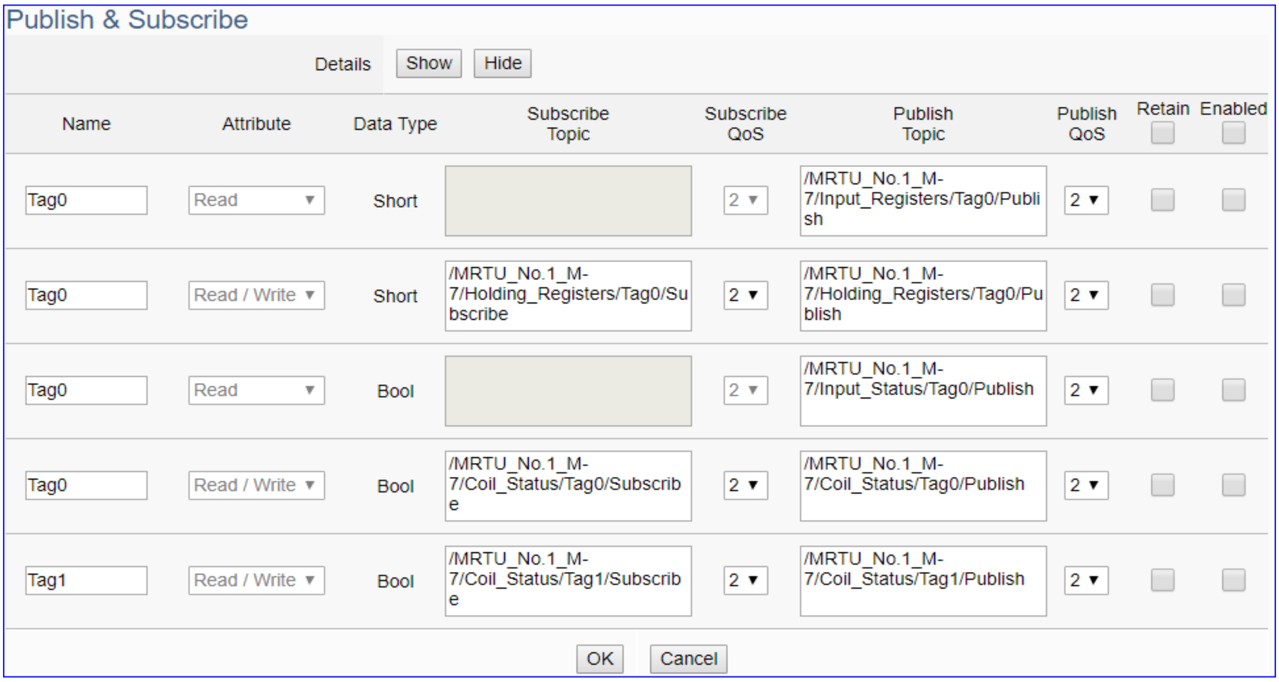
The “MQTT Client Setting” page after clicking the [Edit] button:



MQTT Client Setting

No.	1
Module Name	Example1
Scan Rate(ms)	1000
Dead Band	0
Will Topic	
Will	
MQTT Connection	☑ Broker (Local) ☐ Broker1 (Remote)

Convert Setting > MQTT > Modbus RTU (Master) – MQTT Client Setting	
No.	The module number in the module list (Un-editable)
Module Name	The module name set in the module list (Not editable here)
Scan Rate(ms)	Set an update frequency for the task data. Default: 1000 (Unit: ms)
Dead Bend	Give a dead bend value for updating a float signal. Default: 0
Will Topic	Enter the title of a disconnect notice. Default: Null.
Will	Enter a disconnect notice. Default: Null.
MQTT Connection	Check the Broker for this MQTT connection, Local Broker or Remote Broker. Remote Broker option will appear only when set in advance.



Publish & Subscribe

Details [Show] [Hide]

Name	Attribute	Data Type	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Retain □	Enabled □
Tag0	Read ▼	Short		2 ▼	/MRTU_No.1_M-7/Input_Registers/Tag0/Publish	2 ▼	□	□
Tag0	Read / Write ▼	Short	/MRTU_No.1_M-7/Holding_Registers/Tag0/Subscribe	2 ▼	/MRTU_No.1_M-7/Holding_Registers/Tag0/Publish	2 ▼	□	□
Tag0	Read ▼	Bool		2 ▼	/MRTU_No.1_M-7/Input_Status/Tag0/Publish	2 ▼	□	□
Tag0	Read / Write ▼	Bool	/MRTU_No.1_M-7/Coil_Status/Tag0/Subscribe	2 ▼	/MRTU_No.1_M-7/Coil_Status/Tag0/Publish	2 ▼	□	□
Tag1	Read / Write ▼	Bool	/MRTU_No.1_M-7/Coil_Status/Tag1/Subscribe	2 ▼	/MRTU_No.1_M-7/Coil_Status/Tag1/Publish	2 ▼	□	□

[OK] [Cancel]

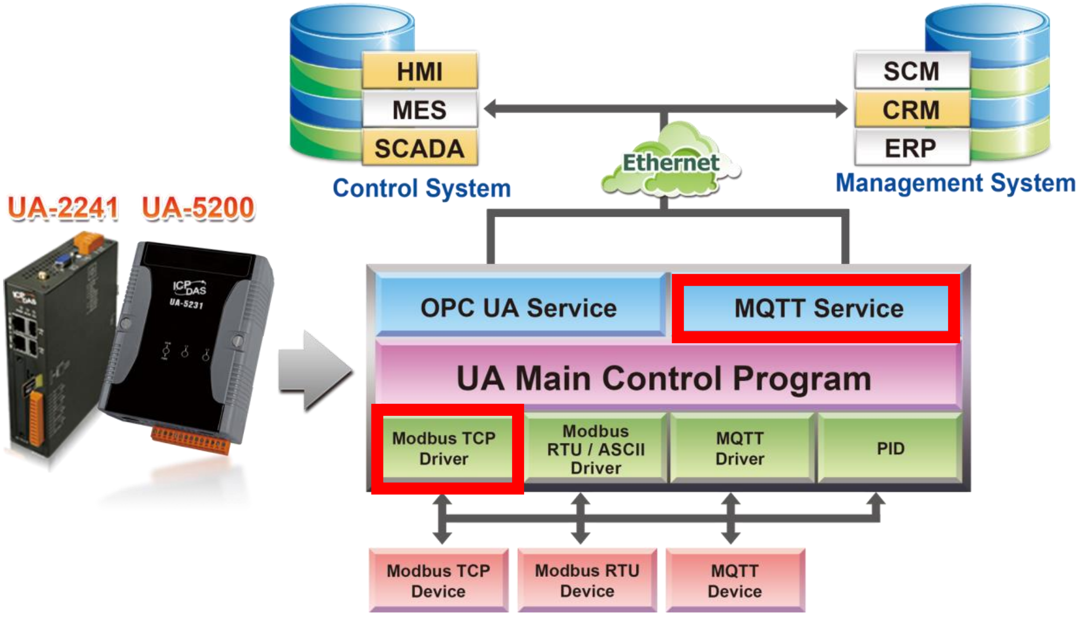
Convert Setting > MQTT > Modbus RTU (Master) – Publish & Subscribe	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Name	The variable name of the mapping address. (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Retain	Check [Retain] box of the top row can store the broker message for all variables in list. Check the box of each variable can store the broker message just that variable. Default: Uncheck.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

8.5. MQTT and Modbus TCP Conversion

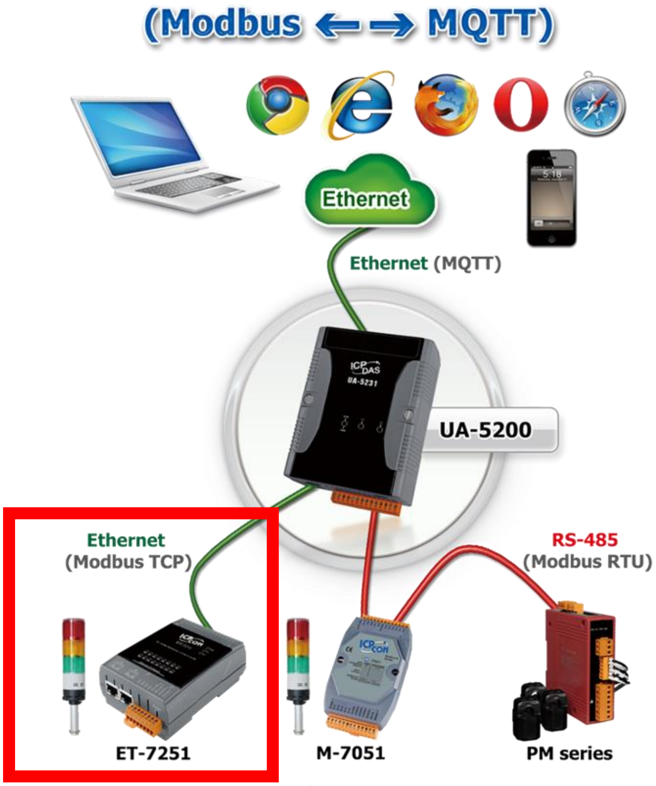
This page provides MQTT and Modbus TCP (Master) communication protocol conversion. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and so to read and write the single channel of the Modbus device that connected to the controller.

For the certificate about the communication security, please refer to Chapter 12.

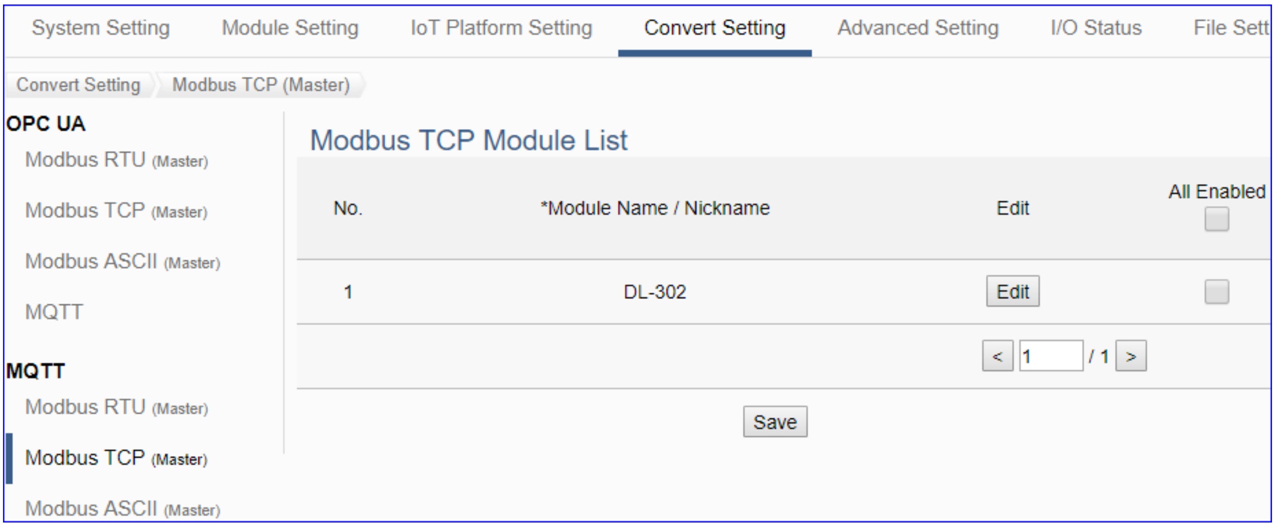
Function Diagram:



Application Solution:



When entering the menu [Convert Setting] and the sub-menu [MQTT] > Modbus TCP (Master), the Modbus TCP modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)



Modbus TCP Module List

No.	*Module Name / Nickname	Edit	All Enabled □
1	DL-302	Edit	□

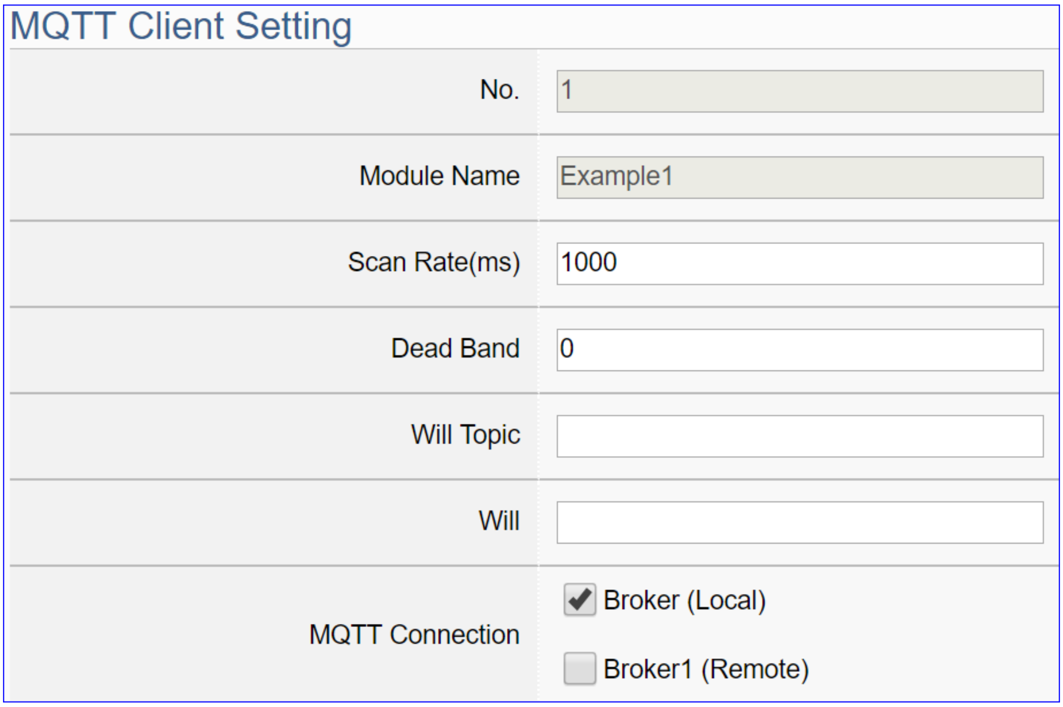
< 1 / 1 >

Save

Convert Setting > MQTT > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	Click to enter the “MQTT Client Setting” page to set up the Topic, QoS, Publish, Subscribe …
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [**Edit**] button cauld enter the “MQTT Client Setting” page.

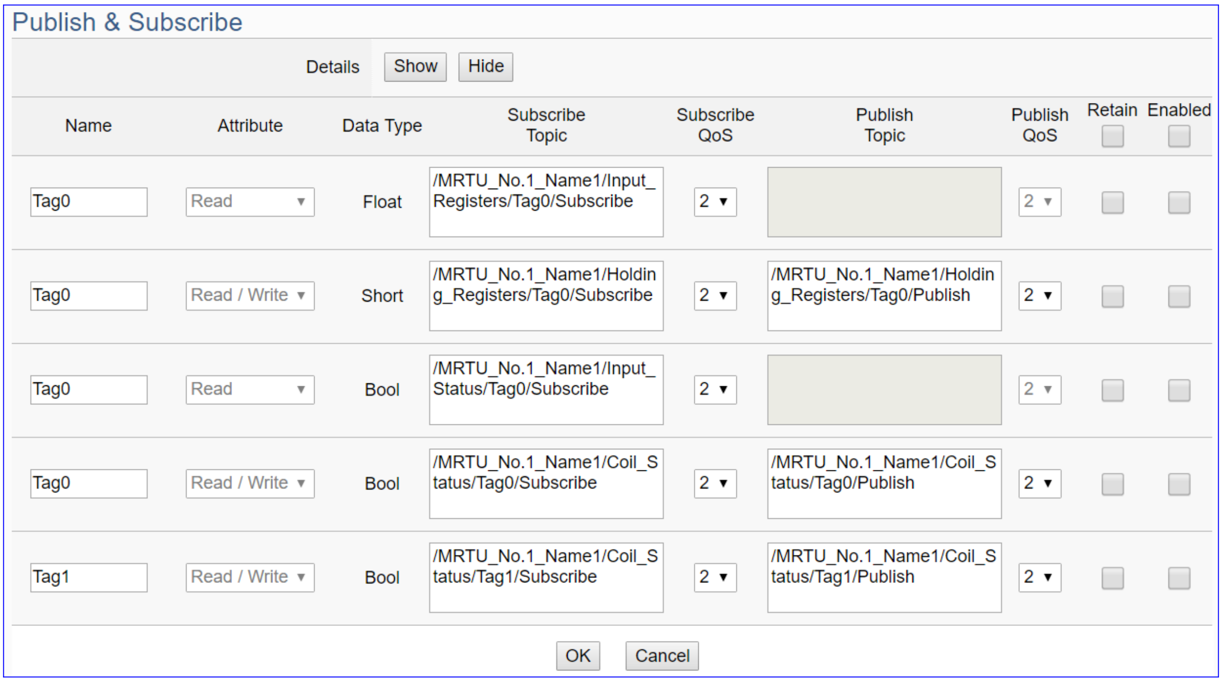
The “MQTT Client Setting” page after clicking the [Edit] button:



MQTT Client Setting

No.	1
Module Name	Example1
Scan Rate(ms)	1000
Dead Band	0
Will Topic	
Will	
MQTT Connection	☑ Broker (Local) □ Broker1 (Remote)

Convert Setting > MQTT > Modbus TCP (Master) – MQTT Client Setting	
No.	The module number in the module list (Un-editable)
Module Name	The module name set in the module list (Not editable here)
Scan Rate(ms)	Set an update frequency for the task data. Default: 1000 (Unit: ms)
Dead Bend	Give a dead bend value for updating a float signal. Default: 0
Will Topic	Enter the title of a disconnect notice. Default: Null.
Will	Enter a disconnect notice. Default: Null.
MQTT Connection	Check the Broker for this MQTT connection, Local Broker or Remote Broker. Remote Broker option will appear only when set in advance.



Publish & Subscribe

Details [Show] [Hide]

Name	Attribute	Data Type	Subscribe Topic	Subscribe QoS	Publish Topic	Publish QoS	Retain □	Enabled □
Tag0	Read	Float	/MRTU_No.1_Name1/Input_Registers/Tag0/Subscribe	2		2	□	□
Tag0	Read / Write	Short	/MRTU_No.1_Name1/Holding_Registers/Tag0/Subscribe	2	/MRTU_No.1_Name1/Holding_Registers/Tag0/Publish	2	□	□
Tag0	Read	Bool	/MRTU_No.1_Name1/Input_Status/Tag0/Subscribe	2		2	□	□
Tag0	Read / Write	Bool	/MRTU_No.1_Name1/Coil_Status/Tag0/Subscribe	2	/MRTU_No.1_Name1/Coil_Status/Tag0/Publish	2	□	□
Tag1	Read / Write	Bool	/MRTU_No.1_Name1/Coil_Status/Tag1/Subscribe	2	/MRTU_No.1_Name1/Coil_Status/Tag1/Publish	2	□	□

[OK] [Cancel]

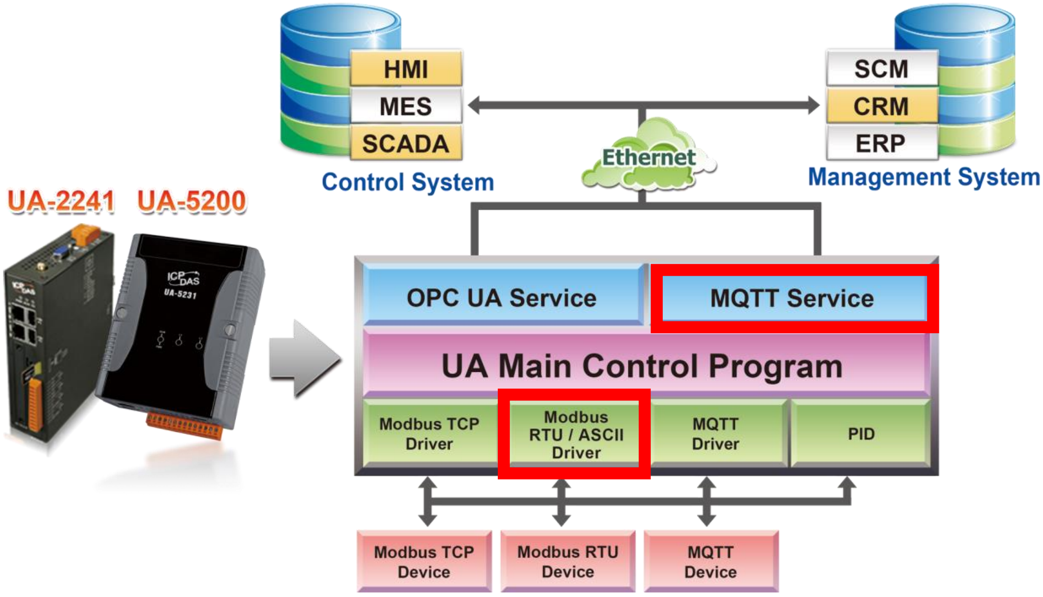
Convert Setting > MQTT > Modbus TCP (Master) – Publish & Subscribe	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Name	The variable name of the mapping address. (Not editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Subscribe Topic	The topic of receiving/subscribing data message.
Subscribe Qos	The subscribe Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Publish Topic	The topic of sending/publishing data message.
Publish Qos	The publish Qos (Quality of Service) levels. Default: 2 0: Delivering a message at most once. 1: Delivering a message at least once. 2: Delivering a message at exactly once.
Retain	Check [Retain] box of the top row can store the broker message for all variables in list. Check the box of each variable can store the broker message just that variable. Default: Uncheck.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

8.6. MQTT JSON and Modbus RTU/ASCII Conversion

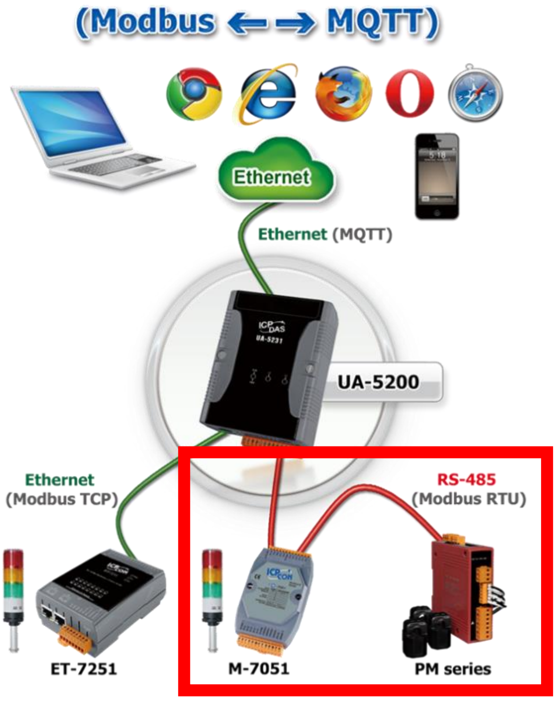
This page provides MQTT JSON and Modbus RTU/ASCII (Master) communication protocol conversion. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus RTU/ASCII devices that connected to the controller.

The settings of Modbus RTU/ASCII are the same. Here will introduce them together.
For the certificate about the communication security, please refer to Chapter 12.

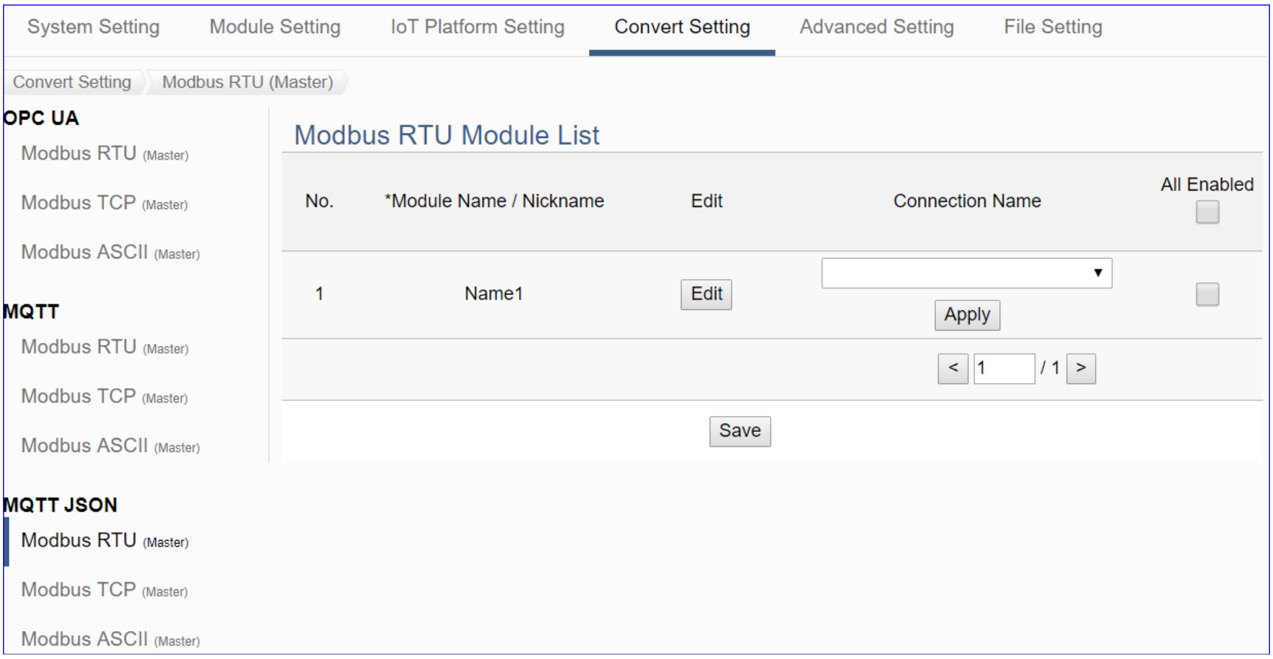
Function Diagram:



Application Solution:

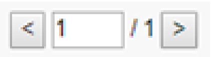


When entering the menu [Convert Setting] and the sub-menu [MQTT JSON] > Modbus RTU or Modbus ASCII (Master), the Modbus RTU/ASCII modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)

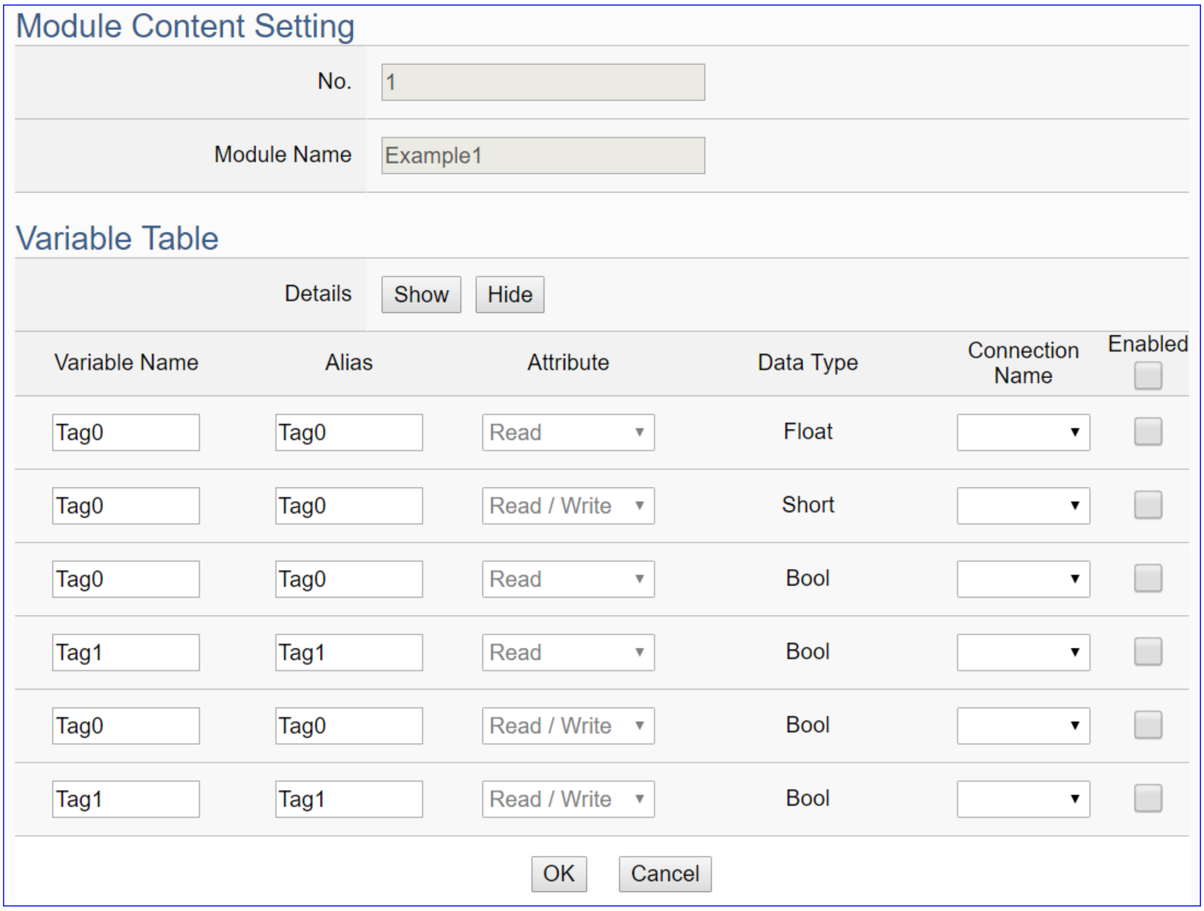


Modbus RTU Module List

No.	*Module Name / Nickname	Edit	Connection Name	All Enabled □
1	Name1	Edit	▾	□

Convert Setting > MQTT JSON > Modbus RTU (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
Connection Name	Select a group connection name, and then click [Apply].
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Module Content Setting” and “Variable Tale” page.
	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” and “Variable Tale” page:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Details [Show] [Hide]

Variable Name	Alias	Attribute	Data Type	Connection Name	Enabled ☐
Tag0	Tag0	Read	Float		☐
Tag0	Tag0	Read / Write	Short		☐
Tag0	Tag0	Read	Bool		☐
Tag1	Tag1	Read	Bool		☐
Tag0	Tag0	Read / Write	Bool		☐
Tag1	Tag1	Read / Write	Bool		☐

[OK] [Cancel]

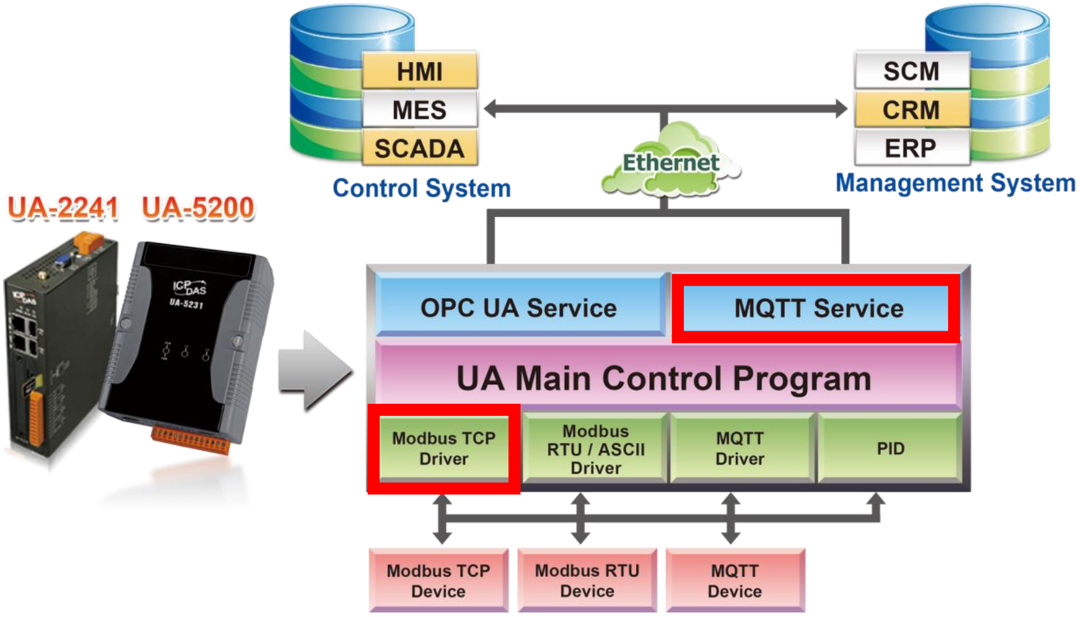
Convert Setting > MQTT JSON > Modbus RTU (Master) – Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > MQTT JSON > Modbus RTU (Master) – Variable Table	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Variable Name	The variable name of the mapping address. (Not editable here)
Alias	The alias name for the variable. (Editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Connection Name	Select the group name that set in the group list page.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

8.7. MQTT JSON and Modbus TCP Conversion

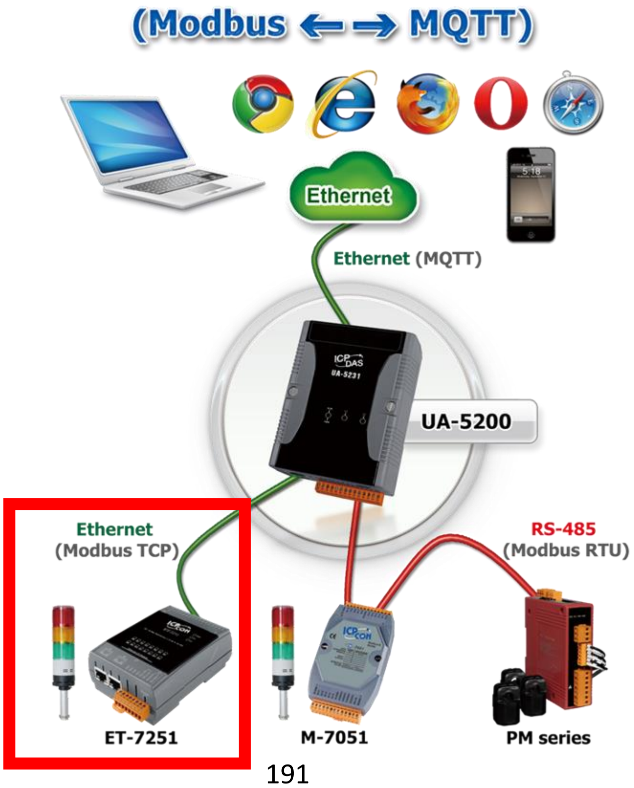
This page provides MQTT JSON and Modbus TCP (Master) communication protocol conversion. With the MQTT Service function, users can set the MQTT client to publish the message to the specified broker or subscribe the topic, and combine several messages that converted in JSON format into a group to read and write the multiple channels of the Modbus TCP devices that connected to the controller.

For the certificate about the communication security, please refer to Chapter 12.

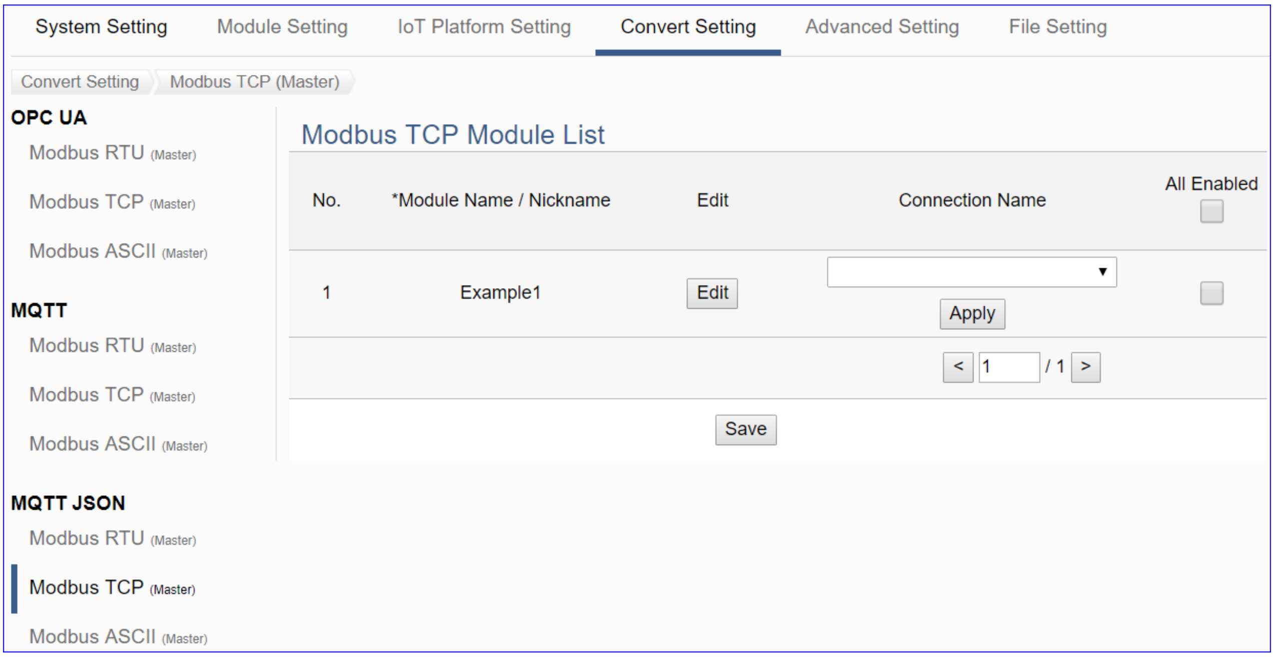
Function Diagram:



Application Solution:



When entering the menu [Convert Setting] and the sub-menu [MQTT JSON] > Modbus TCP (Master), the Modbus TCP modules preset in the [Module Setting] will show up in the Module List. (Refer to Chapter 6 for the Module Setting.)

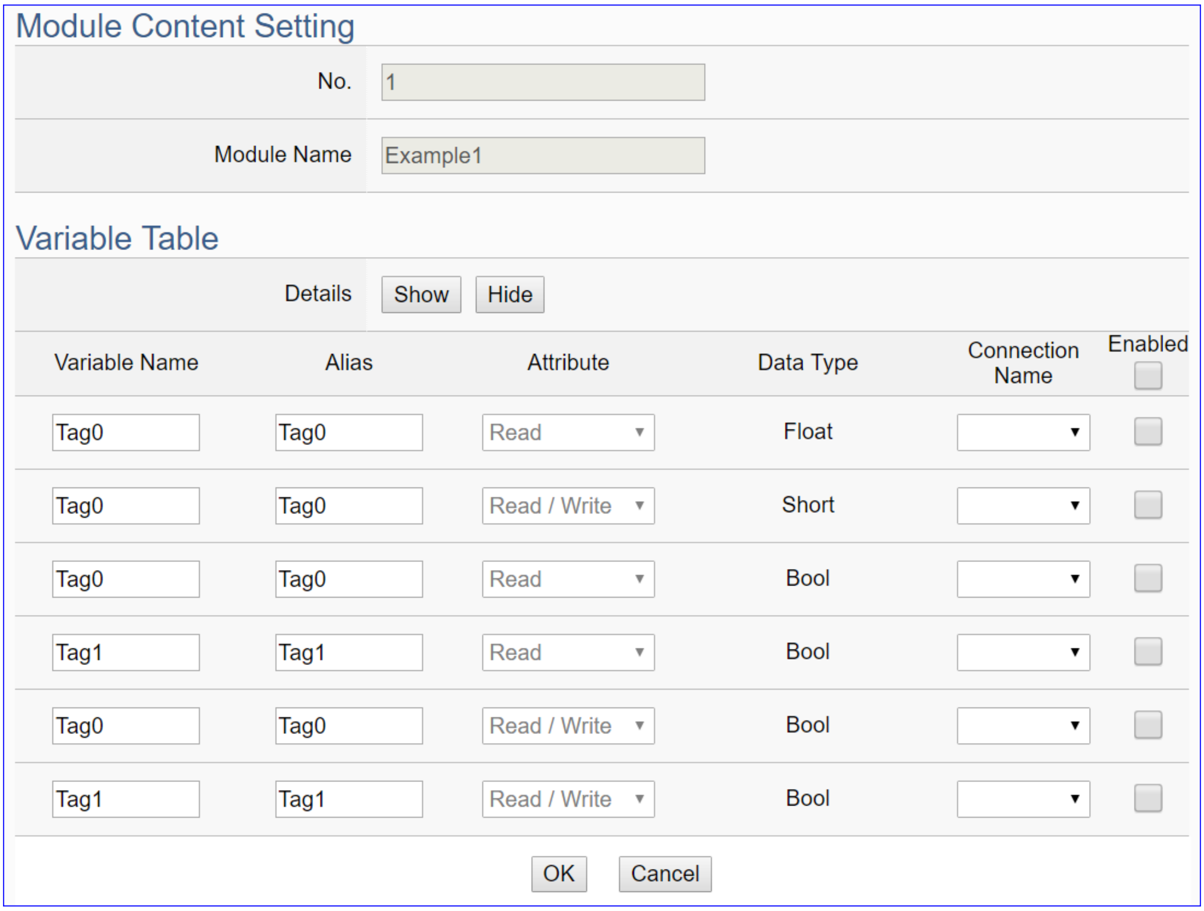


Modbus TCP Module List

No.	*Module Name / Nickname	Edit	Connection Name	All Enabled □
1	Example1	Edit	▾ Apply	□

Convert Setting > MQTT JSON > Modbus TCP (Master) Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
Connection Name	Select a group connection name, and then click [Apply].
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Module Content Setting” and “Variable Tale” page.
All Enabled	Check [All Enabled] box to enable all modules in list for conversion. Default: Uncheck. Check the box of each module can enable just that module for conversion.
< 1 / 1 >	The page number of the module list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the settings of this page.

Click [Edit] button cauld enter the “Module Content Setting” and “Variable Tale” page:



Module Content Setting

No.	1
Module Name	Example1

Variable Table

Details [Show] [Hide]

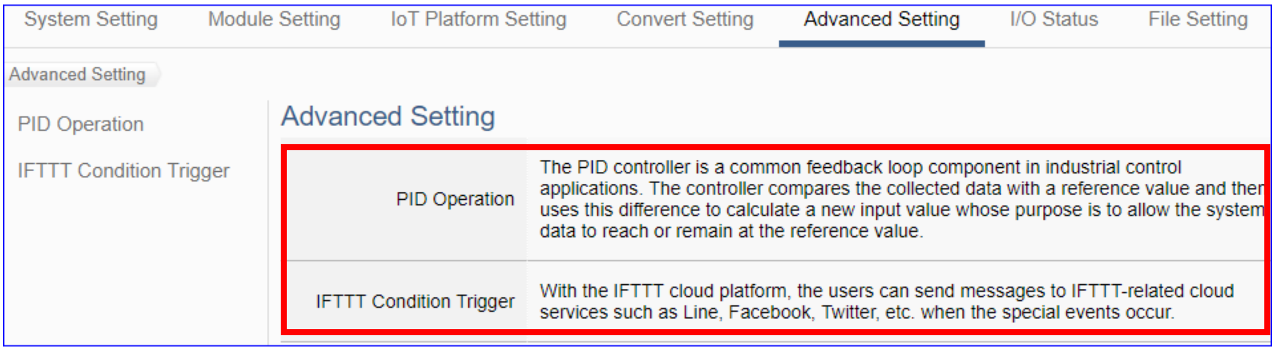
Variable Name	Alias	Attribute	Data Type	Connection Name	Enabled □
Tag0	Tag0	Read	Float		□
Tag0	Tag0	Read / Write	Short		□
Tag0	Tag0	Read	Bool		□
Tag1	Tag1	Read	Bool		□
Tag0	Tag0	Read / Write	Bool		□
Tag1	Tag1	Read / Write	Bool		□

Convert Setting > MQTT JSON > Modbus TCP (Master) – Module Content Setting	
No.	The module number in the module list (Not editable here)
Module Name	The module name set in the module list (Not editable here)
Convert Setting > MQTT JSON > Modbus TCP (Master) – Variable Table	
Details	Click [Show] to display all fields, click [Hide] to hide some fields.
Variable Name	The variable name of the mapping address. (Not editable here)
Alias	The alias name for the variable. (Editable here)
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
Data Type	Display data type of the variable that set in the Modbus Address Mapping Table page. (Not editable) Include: Bool, Short, Float…
Connection Name	Select the group name that set in the group list page.
Enabled	Check [Enabled] box of the top row can enable all variables in list. Check the box of each variable can enable just that variable for conversion. Default: Uncheck.
OK	Click to save this page settings and back to the module list page.

9. Advanced Setting

Advanced Setting is the fifth (5th) item of the Main Menu, mainly to provide advanced monitoring and control related settings.

Advanced Setting provides virtual device function or cloud service function. The description is listed on the page of the Main Menu. It will support more functions in the future.
There are 2 advanced setting functions now “PID Operation” and “IFTTT Condition Trigger”. This chapter will introduce the function items and setting parameters.



Advanced Setting

PID Operation	The PID controller is a common feedback loop component in industrial control applications. The controller compares the collected data with a reference value and then uses this difference to calculate a new input value whose purpose is to allow the system data to reach or remain at the reference value.
IFTTT Condition Trigger	With the IFTTT cloud platform, the users can send messages to IFTTT-related cloud services such as Line, Facebook, Twitter, etc. when the special events occur.

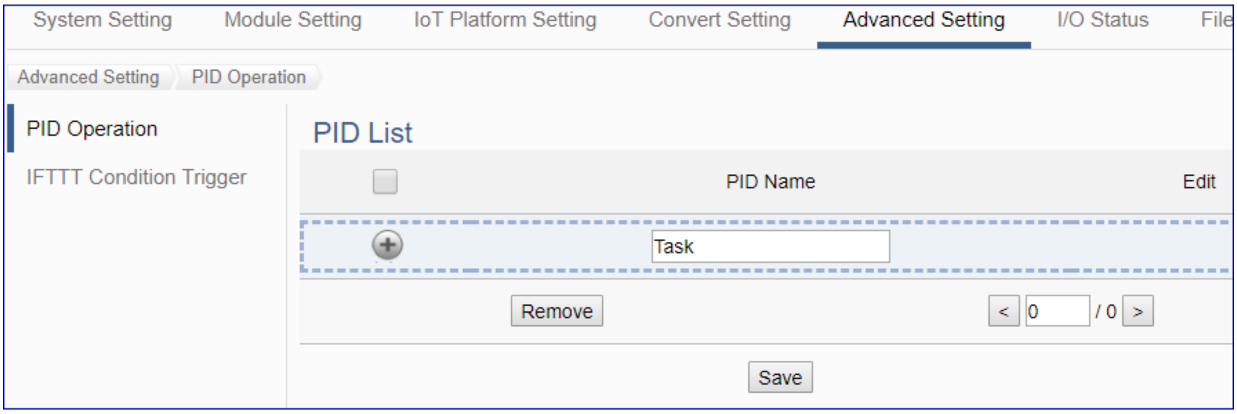
The setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. User can find the procedure information in the following chapters.

3.3 Function Setting Procedure
2. Quick Start
4. Function Wizard

About the Web UI login information and the UI environment, please refer to 3. Web UI Login and Enviroment Overview.

9.1. PID Operation

This page is about the virtual device function to allow users to simulate various devices with the real I/O by using the tuning function of PID operation.

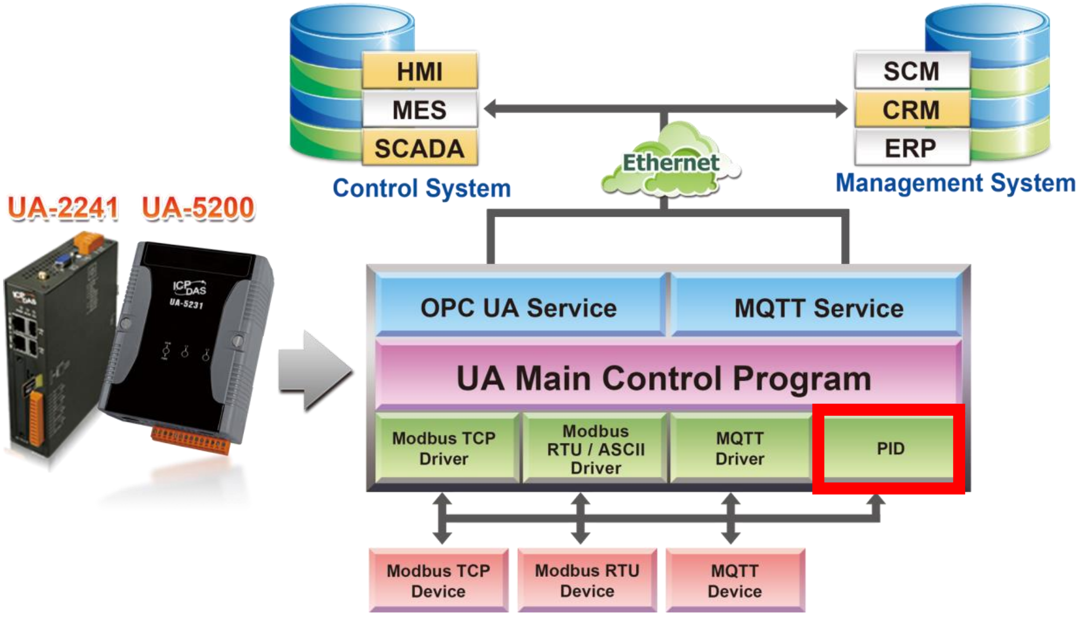


□	PID Name	Edit
⊕	Task	

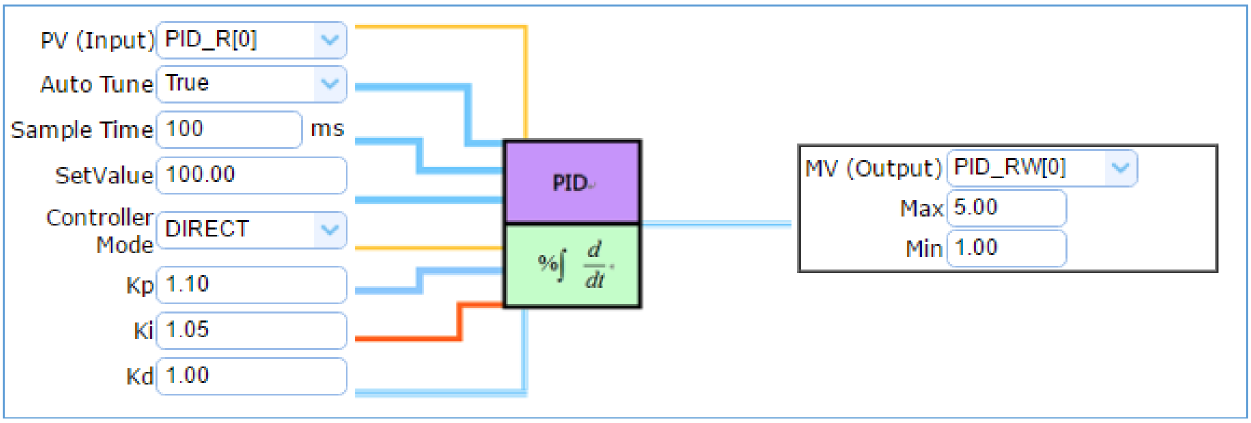
PID (Proportional-Integral-Derivative) control is the most widely used in industrial control systems. A regulator which is controlled in accordance with Proportional, Integral and Derivative is called PID control for short, also called PID regulator. When the user cannot fully grasp or measure parameters of the control system, the PID regulator is the best solution.

The PID controller is a common feedback loop component in industrial control applications. The controller compares the collected data with a reference value and then uses this difference to calculate a new input value whose purpose is to allow the system data to reach or remain at the reference value.

Function Diagram:



PID Operation Solution Example:

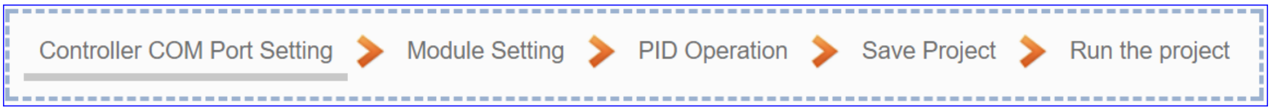


PV (Input) PID_R[0]
Auto Tune True
Sample Time 100 ms
SetValue 100.00
Controller Mode DIRECT
Kp 1.10
Ki 1.05
Kd 1.00
MV (Output) PID_RW[0]
Max 5.00
Min 1.00

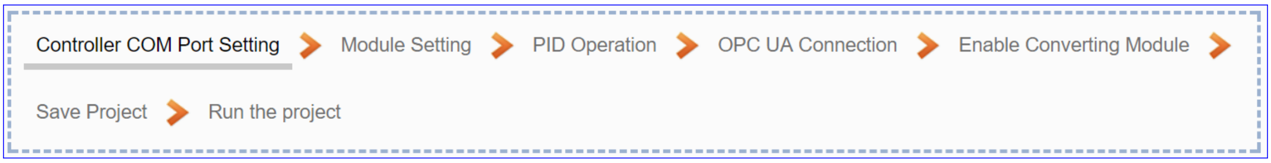
In the PID Operation function, UA controller collects the module’s data to operate via the feedback loop component of PID control. The controller compares the collected data with a reference value and then uses this difference to calculate a new input value whose purpose is to allow the system data to reach or remain at the reference value.

The setting steps of the PID Operation are as below. The descriptions for the steps setting please refer to Section 4.3 “PID” items in the Function Wizard.

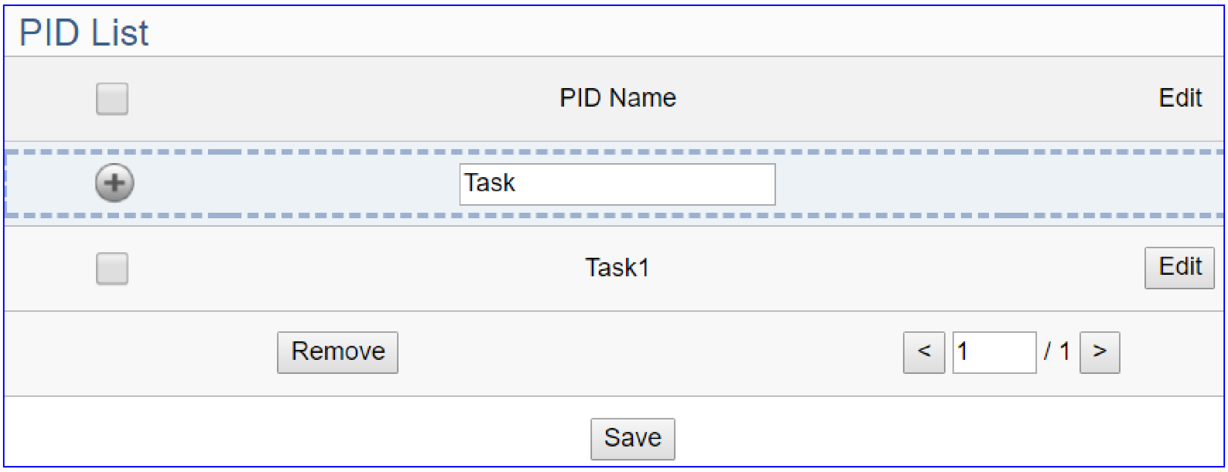
[Step Box] of [PID Operation] :



[Step Box] of [PID Operation + OPC UA Conversion] :



This section will introduce the function items and setting parameters of the PID Operation.

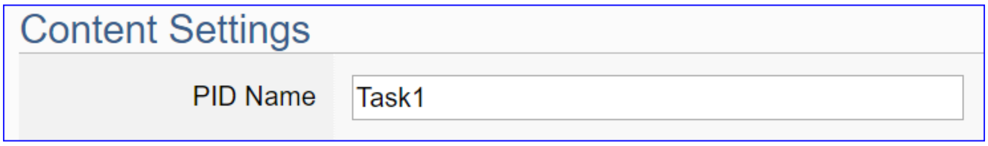


PID List

□	PID Name	Edit
⊕	Task	
□	Task1	Edit
Remove	< 1 / 1 >	
	Save	

Advanced Setting > PID Operation > PID List	
PID Name	PID name, user can define, e.g. Task1. Default: Task.
⊕	Click to add a new PID Task.
Edit / Remove	Click [Edit] can set the PID content. Click the left box and [remove] can delete the PID list.
< 1 / 1 >	The page number of the PID list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the setting of this page.

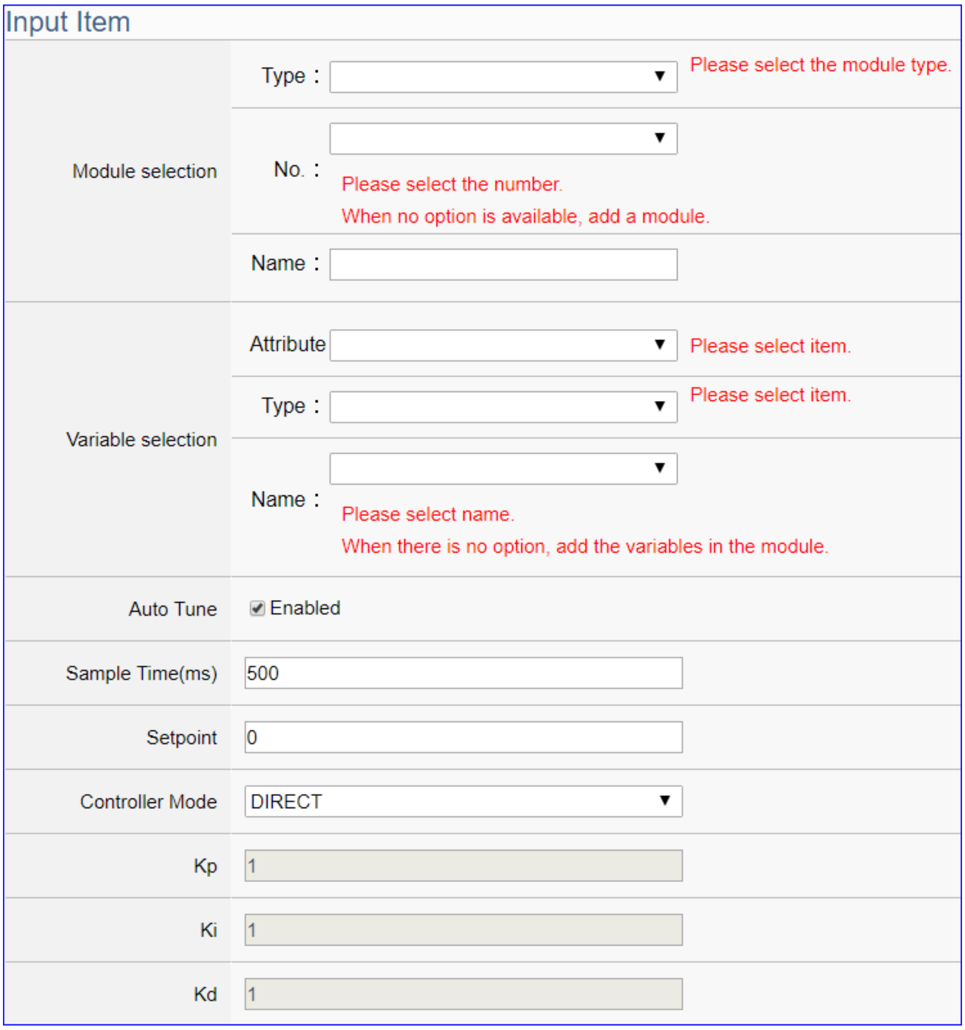
Click [Edit] botton to enter the [Content Settings] page:



Content Settings

PID Name: Task1

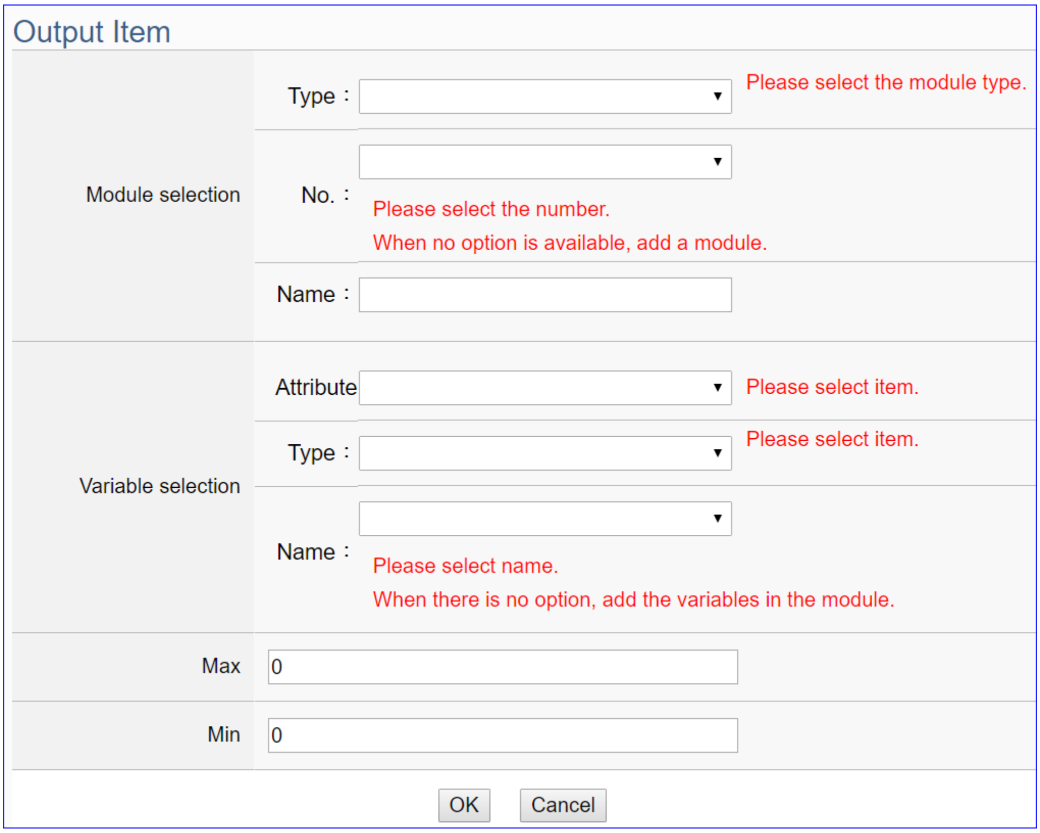
Advanced Setting > PID Operation > Content Settings	
PID Name	PID name, user can define, e.g. Task1. Default: Task.



Input Item

Module selection	Type：	▼	Please select the module type.
	No.：	▼ Please select the number. When no option is available, add a module.	
	Name：		
Variable selection	Attribute	▼	Please select item.
	Type：	▼	Please select item.
	Name：	▼ Please select name. When there is no option, add the variables in the module.	
Auto Tune	☑ Enabled		
Sample Time(ms)	500		
Setpoint	0		
Controller Mode	DIRECT ▼		
Kp	1		
Ki	1		
Kd	1		

Advanced Setting > PID Operation > Input Item	
Module selection	Choose a predefined module for input data of the PID. Select the type, number and name of the input module. If no option is available, add a new module.
Variable selection	Choose a predefined float variable as the input parameter for PID operation. Select the attribute, type and name of the float variable.
Auto Tune	Enable: Auto-tuning PID parameters for your system. Default: check. Un-Enable: Tuning PID parameters manually, e.g. Kp, Ki, Kd.
Sample Time (ms)	Set the sampling time. (Unit: ms) Default: 500 ms.
Setpoint	The target value for PID control. Default: 0.
Controller Mode	DIRECT: Set it as positive output value. Default: DIRECT. REVERSE: Set it as reverse output value.
Kp	Set the Proportional gain. Default: 1.
Ki	Set the Integral gain. Default: 1.
Kd	Set the Derivative gain. Default: 1.

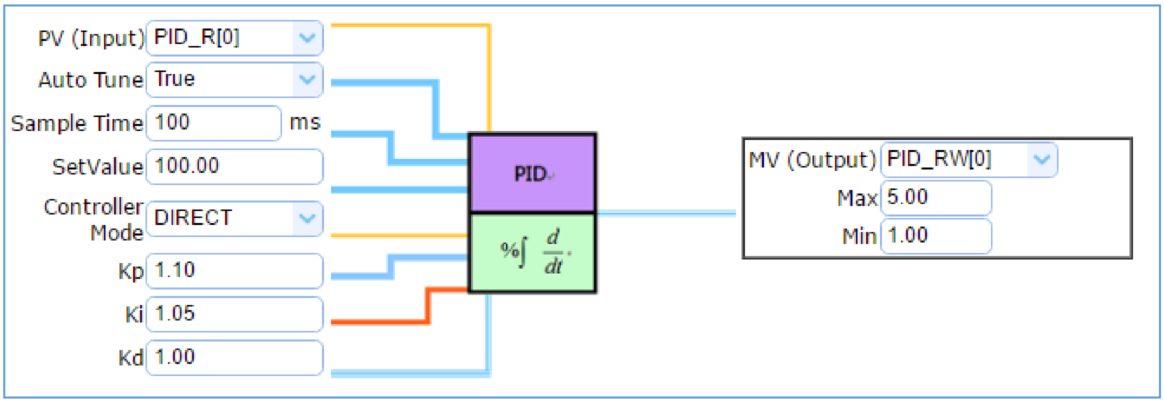


Output Item

Module selection	Type：	Please select the module type.
	No.：	Please select the number. When no option is available, add a module.
	Name：	
Variable selection	Attribute	Please select item.
	Type：	Please select item.
	Name：	Please select name. When there is no option, add the variables in the module.
Max	0	
Min	0	

Advanced Setting > PID Operation > Output Item	
Module selection	Choose a predefined module for output data of the PID. Select the type, number and name of the input module. If no option is available, add a new module.
Variable selection	Choose a predefined float variable as the output parameter for PID operation. Select the attribute, type and name of the float variable.
Max	Set the upper-limit value for the variable. Default: 0.
Min	Set the lower-limit value for the variable. Default: 0.
OK	Click to save the settings of the page and back to the PID list page.

PID Operation Solution Example:

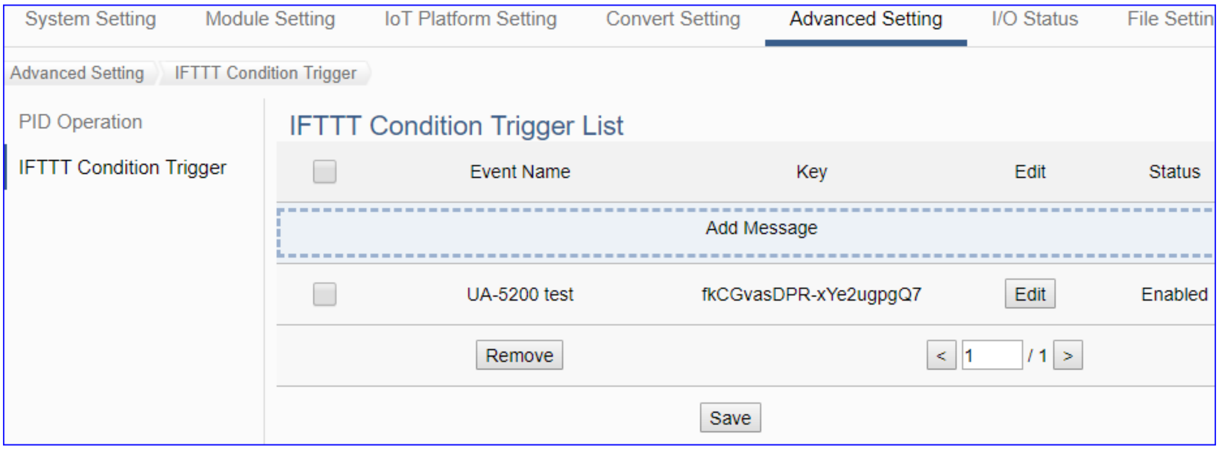


PV (Input) PID_R[0]
Auto Tune True
Sample Time 100 ms
SetValue 100.00
Controller Mode DIRECT
Kp 1.10
Ki 1.05
Kd 1.00

MV (Output) PID_RW[0]
Max 5.00
Min 1.00

9.2. IFTTT Condition Trigger

This page is about use the IFTTT cloud platform function. Combine with the IFTTT Condition Trigger function, when the special events occur, the users can send messages to IFTTT-related cloud services (such as Line, Facebook, Twitter, etc.).



IFTTT Condition Trigger List

□	Event Name	Key	Edit	Status
	Add Message			
□	UA-5200 test	fkCGvasDPR-xYe2ugpgQ7	Edit	Enabled

IFTTT (if this then that) is a cloud service platform that easy to get your apps and devices working together via creating chains of simple conditional statements (applets). An applet is triggered by changes that occur within other web services such as Line, Facebook, Twitter, Gmail, Instagram, etc. For example, “if” Facebook (Service A) has a new message, “then” send an email to Gmail (Service B).

UA using the IFTTT cloud platform functions, the users can send messages to cloud services such as Line, Facebook, Twitter, etc. when the special events occur.

Ex:

The settings for sending the message to the APP with the "IFTTT Condition Trigger (Line, Facebook, Twitter)" function includes two parts:

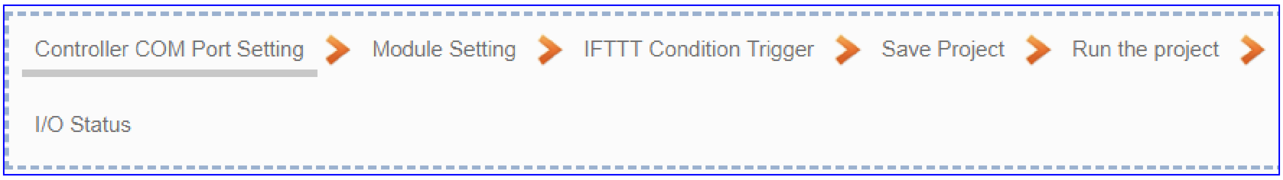
3. **UA Web Interface Setting:**
   In the UA Web HMI, set up the UA controller, modules, IFTTT trigger conditions, the condition variable table, and the IFTTT event connection.

4. **IFTTT Cloud Platform Setting:**
   In the IFTTT website, set up the “**if**” side service and event (**this**: use **webhooks** for the UA), the “**then**” side service and action (**that**: user can select the service, such as the Line, Facebook, twitter, etc.). And then fill the “**Event Name**” and “**Key**” getting from the IFTTT website setting into the “**Content Setting**” of the UA We HMI. (Detail in the Appendix C.)

This section introduces the setting part on the UA Web Interface, including the IFTTT trigger condition, variable table and the event message. About the setting on the IFTTT Cloud Platform, user can set up on the IFTTT website and get the “**Event Name**” and “**Key**” for the configuration here. If you are not familiar about the IFTTT, please refer to the Appendix C.

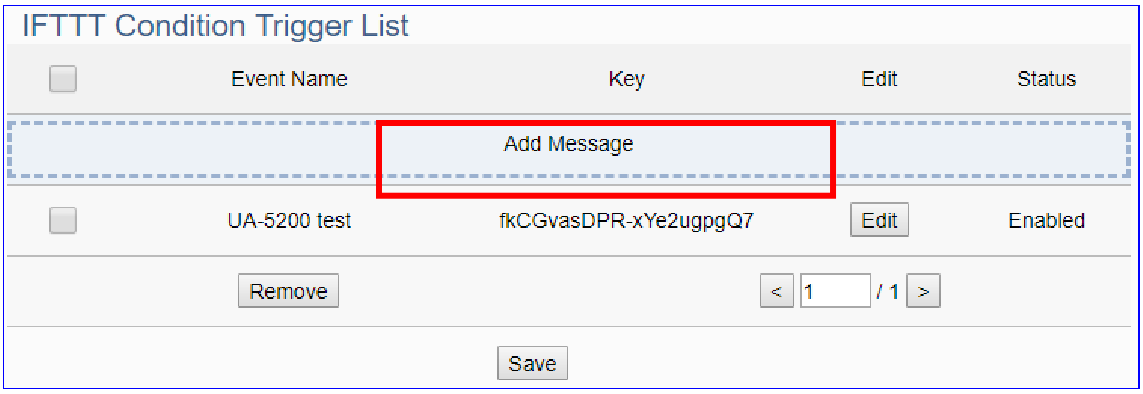
For the whole steps to send the message to an APP from setting the UA controller, module, I/O variables to the IFTTT Condition Trigger, the users can refer to the Section 4.4 and the step box below.

[Step Box : IFTTT Condition Trigger (Line, Facebook, Twitter)]:



Controller COM Port Setting > Module Setting > IFTTT Condition Trigger > Save Project > Run the project > I/O Status

This section will introduce the setting of the IFTTT condition trigger list, variable table and the event message.

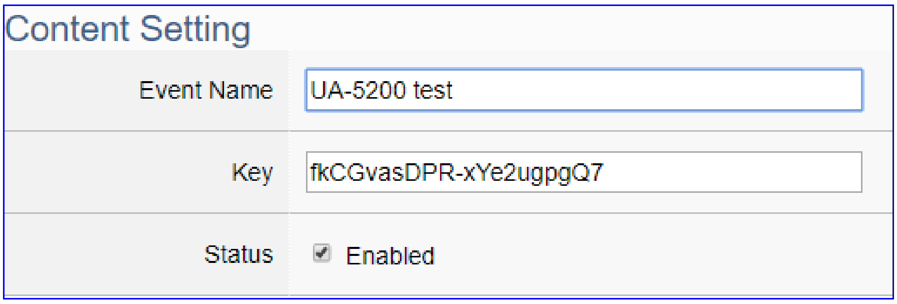


IFTTT Condition Trigger List

□	Event Name	Key	Edit	Status
		Add Message		
□	UA-5200 test	fkCGvasDPR-xYe2ugpgQ7	Edit	Enabled

Advanced Setting > IFTTT Condition Trigger > FTTT Condition Trigger List	
Add Message	Click to add a new IFTTT message. After setting, an IFTTT condition trigger list will show on the bottom, includes left box, event name, key and status.
□	Check the box in the left of the list is to select and to delete the list. Check the box on the top will select all lists.
Event Name	Display the "Event Name" setting in the IFTTT website. (Append. C)
Key	Display the "Key" getting from the IFTTT website. (Append. C)
Edit	Click [Edit] can set the IFTTT condition trigger content.
Status	Display the enable status of the IFTTT condition trigger list.
Remove	Click the left box and [remove] can delete the IFTTT list.
< 1 / 1 >	The page number of the IFTTT list: Current page / Total pages. Click < or > to go to the previous or next page.
Save	Click to save the setting of this page.

Click [**Add Message**] botton to enter the IFTTT [Content Settings] page:

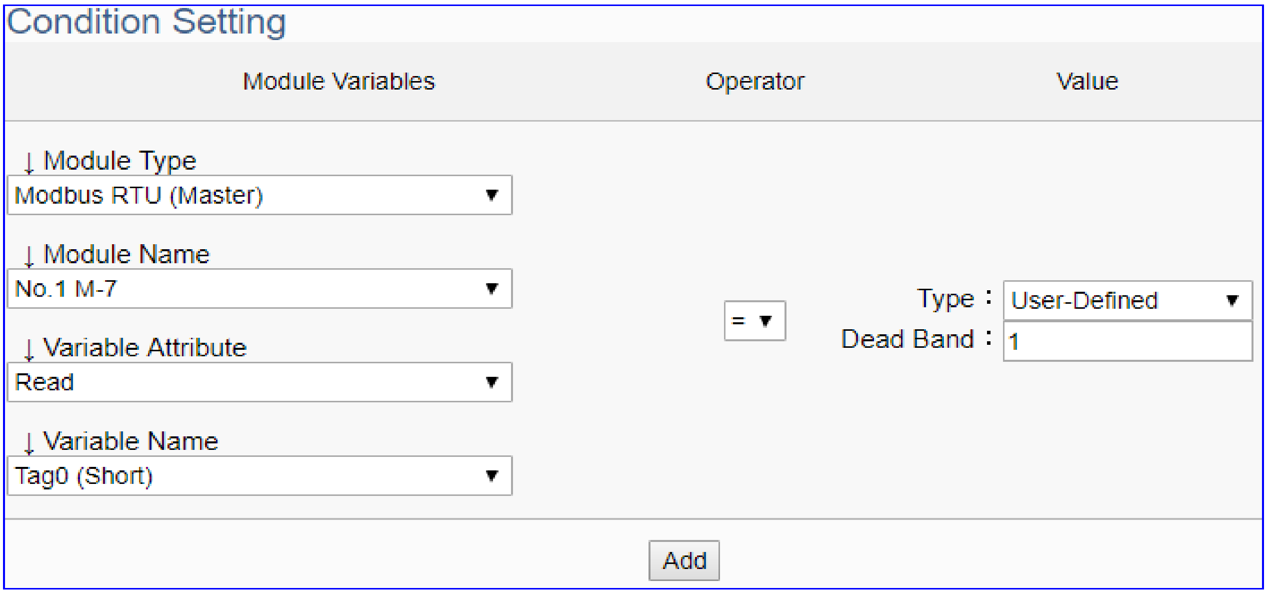


Content Setting

Event Name	UA-5200 test
Key	fkCGvasDPR-xYe2ugpgQ7
Status	☑ Enabled

Note: The "Event Name" and "Key" are set in the IFTTT website. If you are not familiar with IFTTT, please see the Appendix C for the setting introductions.

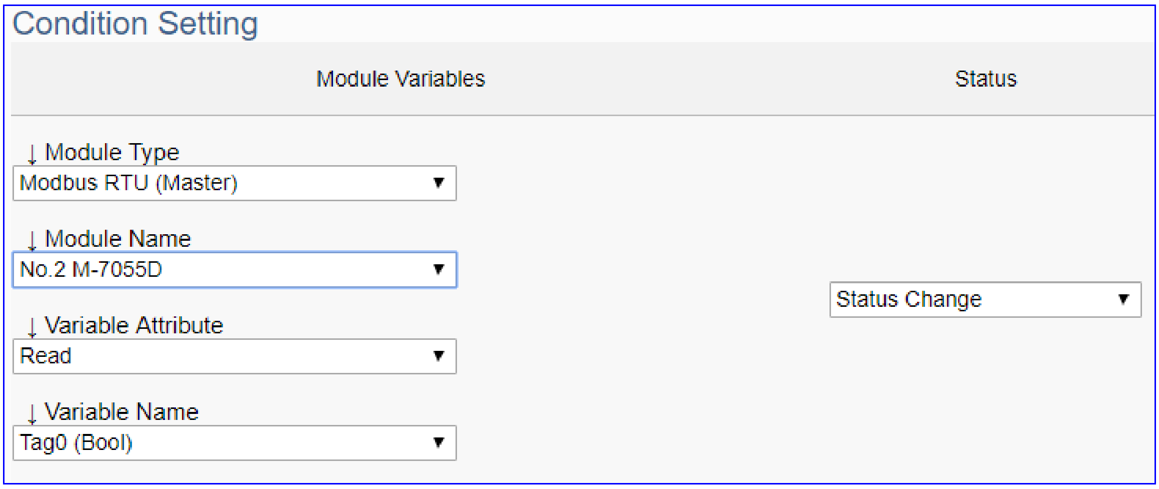
Advanced Setting > IFTTT Condition Trigger > Content Setting	
Event Name	Input the "Event Name" setting in the IFTTT website. (Append. C)
Key	Input the "Key" getting from the IFTTT website. (Append. C)
Status	Check to enable the IFTTT condition trigger event.



Condition Setting

Module Variables	Operator	Value
↓Module Type: Modbus RTU (Master) ↓Module Name: No.1 M-7 ↓Variable Attribute: Read ↓Variable Name: Tag0 (Short)	=	Type：User-Defined Dead Band：1

The condition setting field may different depending on the selected variable attribute.



Condition Setting

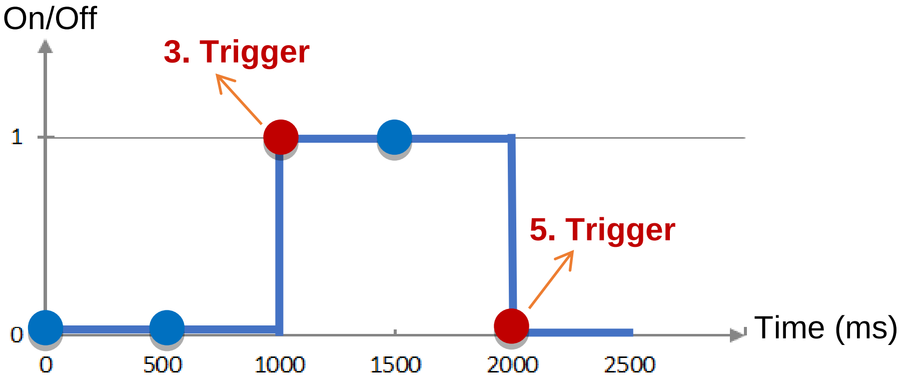
Module Variables	Status
↓Module Type: Modbus RTU (Master) ↓Module Name: No.2 M-7055D ↓Variable Attribute: Read ↓Variable Name: Tag0 (Bool)	Status Change

Advanced Setting > IFTTT Condition Trigger > Condition Setting	
Module Variables	Select the module and variable for the condition trigger. Module Type: select the module type, Modbus RTU/TCP/ASCII… Module Name: select the module that set for condition trigger. Variable Attribute: select the variable attribute for condition trigger. Variable Name: select the variable name for condition trigger.
The following condition fields may different depending on the selected variable attribute. The condition trigger method will be descripted after this table.	
Operator	Select the operator for the trigger condition.
Value	Set up the value for the condition, include Type and Dead Band.
Status	Set up the status for the condition. Default: 0.
Add	Click to add a condition trigger list in the Condition Table..

Condition Trigger Descriptions:

The condition trigger method will different depending on the attribute of the selected variable and the trigger will be different. There are two operation styles: **DIO** and **AIO**.

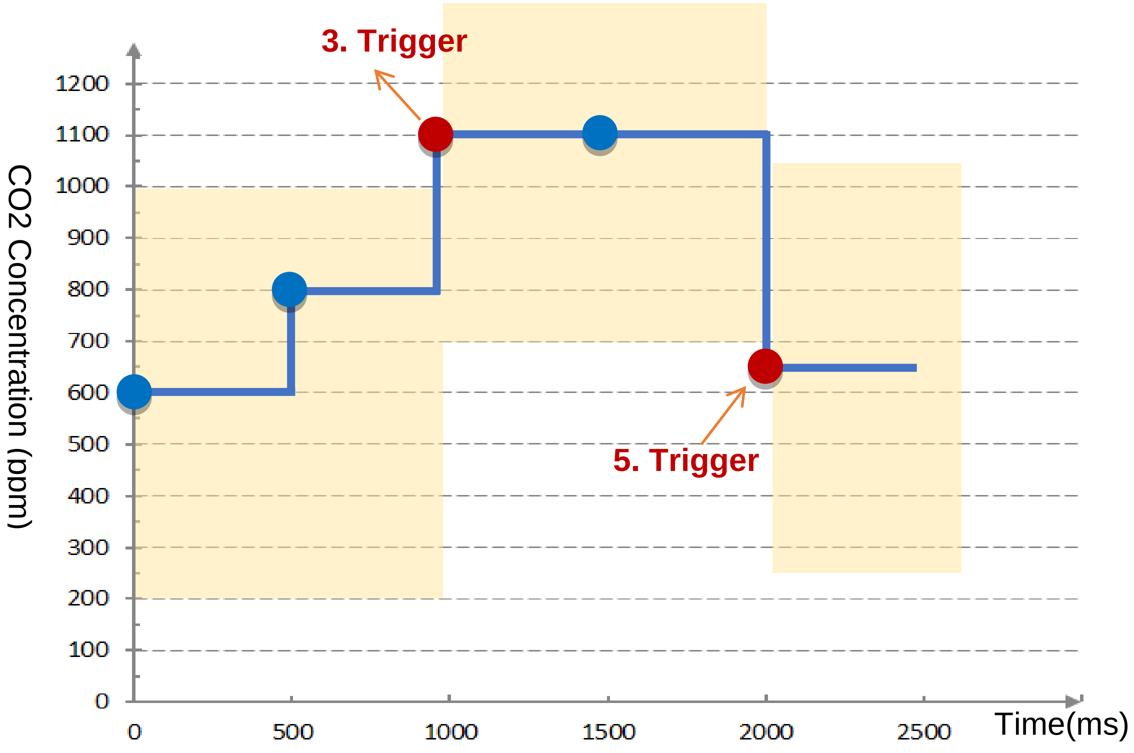
(A) If select **DIO variable**, then Condition is “Status Change”. When detecting the status is changed, it will trigger the event and send the assigned message. (Below is a switch detecting example.)



DIO Trigger: (Detect per 500 ms)

1. Detect initial switch status "Off" (status = 0)
2. Detect "Off" (status = 0, status no change), no trigger
3. Detect "On" (status = 1, status changed), trigger a message notification
4. Detect "On" (status = 1, status no change), no trigger
5. Detect "Off" (status = 0, status changed), trigger a message notification

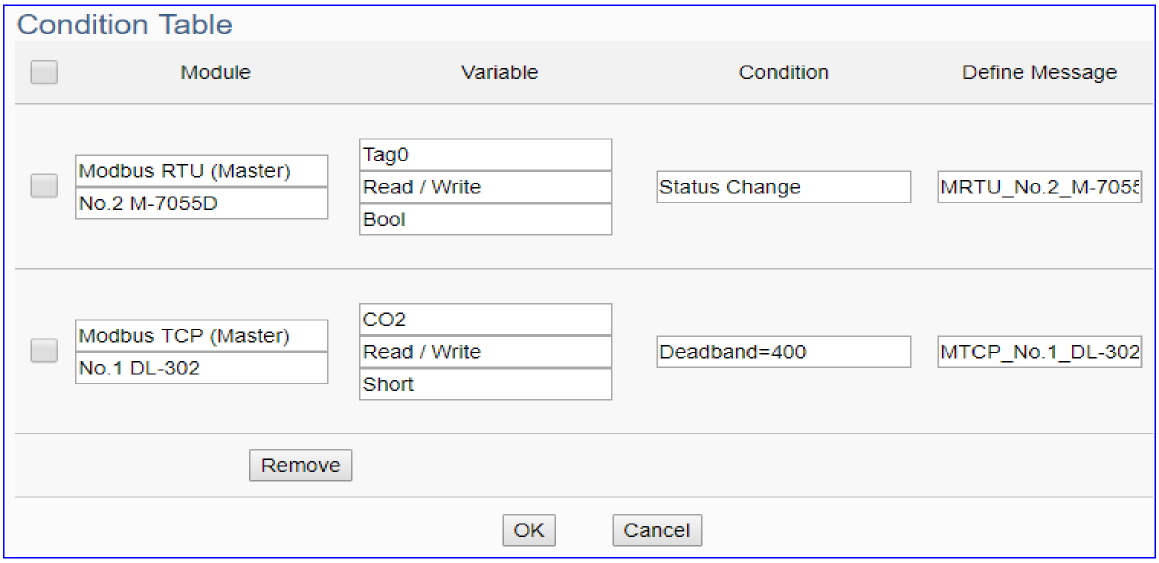
(B) If select **AIO variable**, then Condition is "Value" and can set the "Dead Band". The condition will be triggered and send the message when the detected value exceeds the upper or lower Dead Band. (Below is a CO2 example. Detect per 500 ms)



AIO Trigger: (Detect per 500 ms. The yellow block means the Dead Band.)

1. Detect initial CO2 concentration 600 (ppm).
   Set Dead Band=400 (Initial Trigger Condition: **>=** 1000 **or <=** 200)
2. Detect CO2 concentration 800. It is in the range of Dead Band.
3. Detect CO2 concentration 1100. It exceeds the upper value (>= 1000) of Dead Band, so trigger a message for danger notification.
4. Detect CO2 concentration 1100. It is in the new range of Dead Band.
   Dead Band=400 (New Trigger Condition: **>=** 1500 **or <=** 700)
5. Detect CO2 concentration 650. It is below the lower value (<= 700) of Dead Band, so trigger a message for safety notification.

Please refer to the previous Condition Trigger Descriptions to set up your Condition. When complete, click the "Add" button. The setting will show in the Condition Table. Below Table is setting 2 conditions.

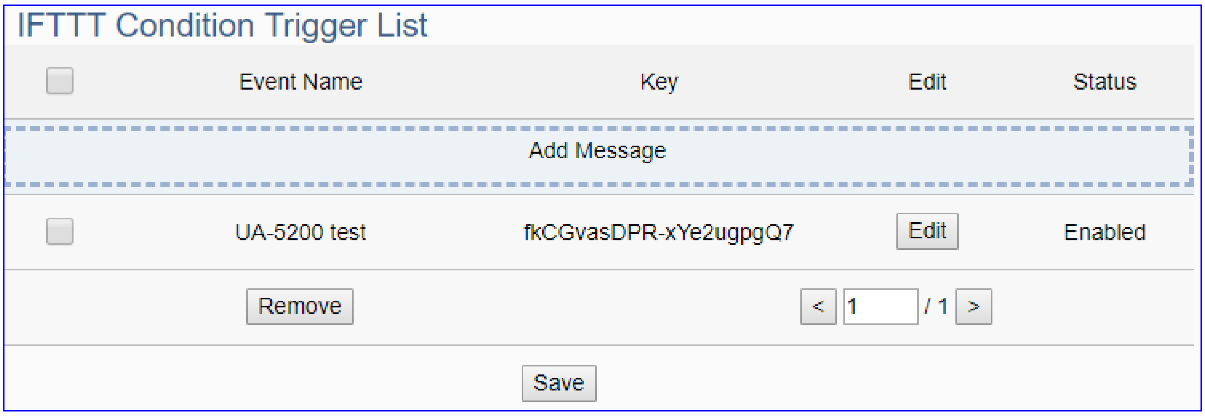


Condition Table

□	Module	Variable	Condition	Define Message
□	Modbus RTU (Master) No.2 M-7055D	Tag0 Read / Write Bool	Status Change	MRTU_No.2_M-7055
□	Modbus TCP (Master) No.1 DL-302	CO2 Read / Write Short	Deadband=400	MTCP_No.1_DL-302

Advanced Setting > IFTTT Condition Trigger > Condition Table	
Module	Display the module type and name of the condition. (Not editable here)
Variable	Display the variable attribute and name of the condition. (Not editable here)
Condition	Display the trigger condition. (Not editable here)
Define Message	Default Message: module code_variable code. The user can define own message in the format of English character, number, general symbol…
Remove	Click the left box and [remove] can delete the IFTTT list.
OK	Click to save this page settings and back to the module list page.
Cancel	Click to exit without saving and back to the module list page.

When back to the IFTTT Condition Trigger List, the condition trigger message will show as below picture. If need more trigger conditions, click the "Add Message" again to combine the IFTTT APP message sending and the UA system. At last, click the Save button.



IFTTT Condition Trigger List

□	Event Name	Key	Edit	Status
□	UA-5200 test	fkCGvasDPR-xYe2ugpgQ7	Edit	Enabled

10. I/O Status

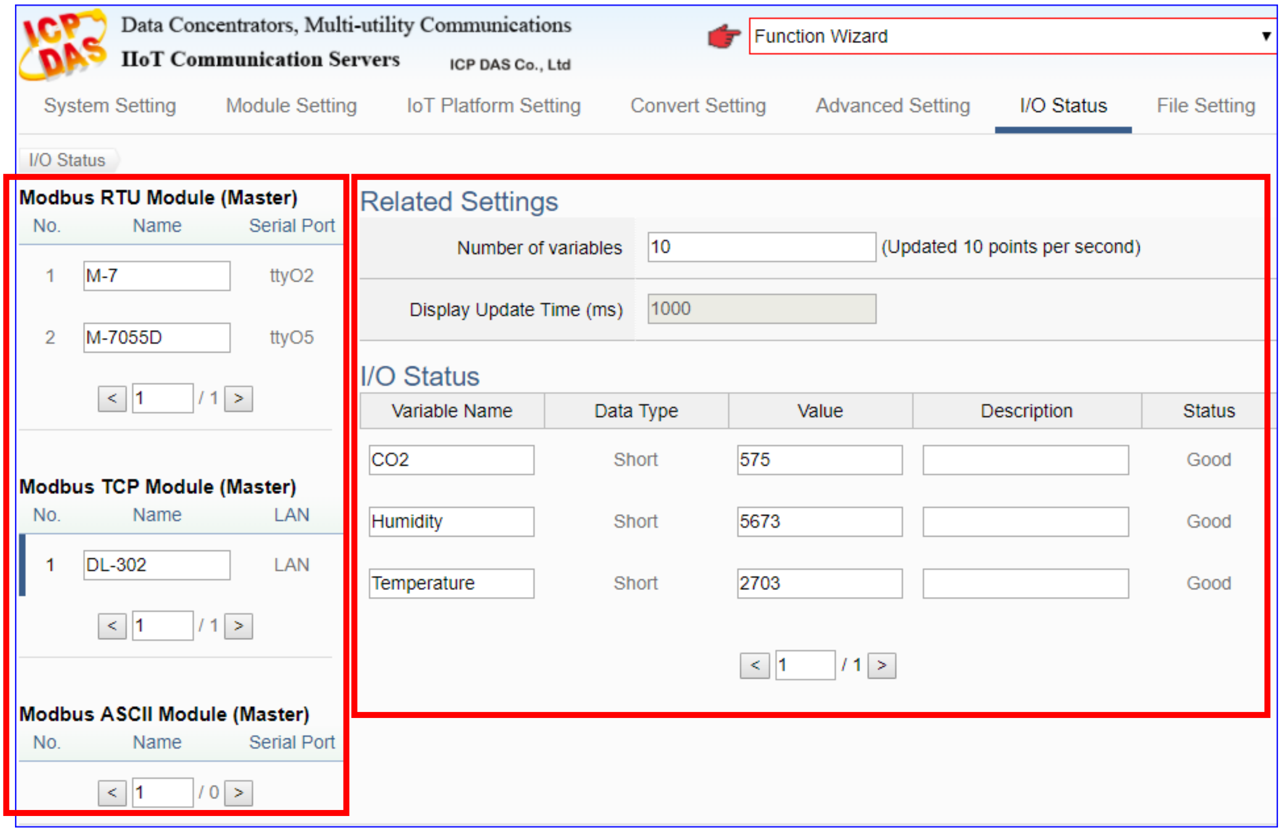
I/O Status is the 6th item of the Main Menu, mainly to display the retime I/O status of all the modules.

I/O Status page offers an easy way to view monitoring page that allows you to view important controller information in real time. The I/O Status page includes the following information.

i. System default I/O Status page: It displays the all I/O channel information based on the sorting of all I/O Modules.

ii. Related settings and the user-defined I/O Status page: It displays the I/O channel status based on the user-defined arrangement.

The user can click the module name on the left page, the right will show all the real time I/O status of the selected module.



Modbus RTU Module (Master)

No.	Name	Serial Port
1	M-7	ttyO2
2	M-7055D	ttyO5

< 1 / 1 >

Modbus TCP Module (Master)

No.	Name	LAN
1	DL-302	LAN

< 1 / 1 >

Modbus ASCII Module (Master)

No.	Name	Serial Port

< 1 / 0 >

Related Settings

Number of variables: 10 (Updated 10 points per second)

Display Update Time (ms): 1000

I/O Status

Variable Name	Data Type	Value	Description	Status
CO2	Short	575		Good
Humidity	Short	5673		Good
Temperature	Short	2703		Good

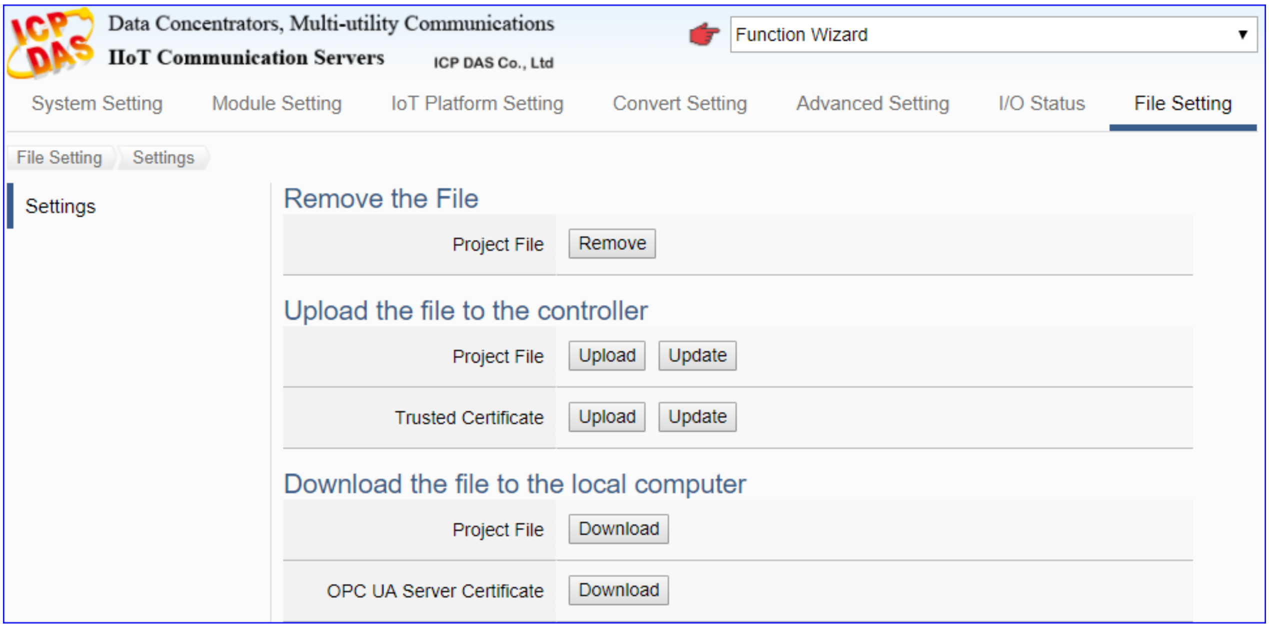
< 1 / 1 >

The setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. User can find the procedure information in the following chapters.

11. File Setting

File Setting is the last (7th) item of the Main Menu, mainly to provide the settings about the files, such as remove, update, upload and download the files of the project and certificate.

File Setting provides one sub-menu function "Settings" and has 3 setting items. This chapter will introduce the function items and setting parameters.



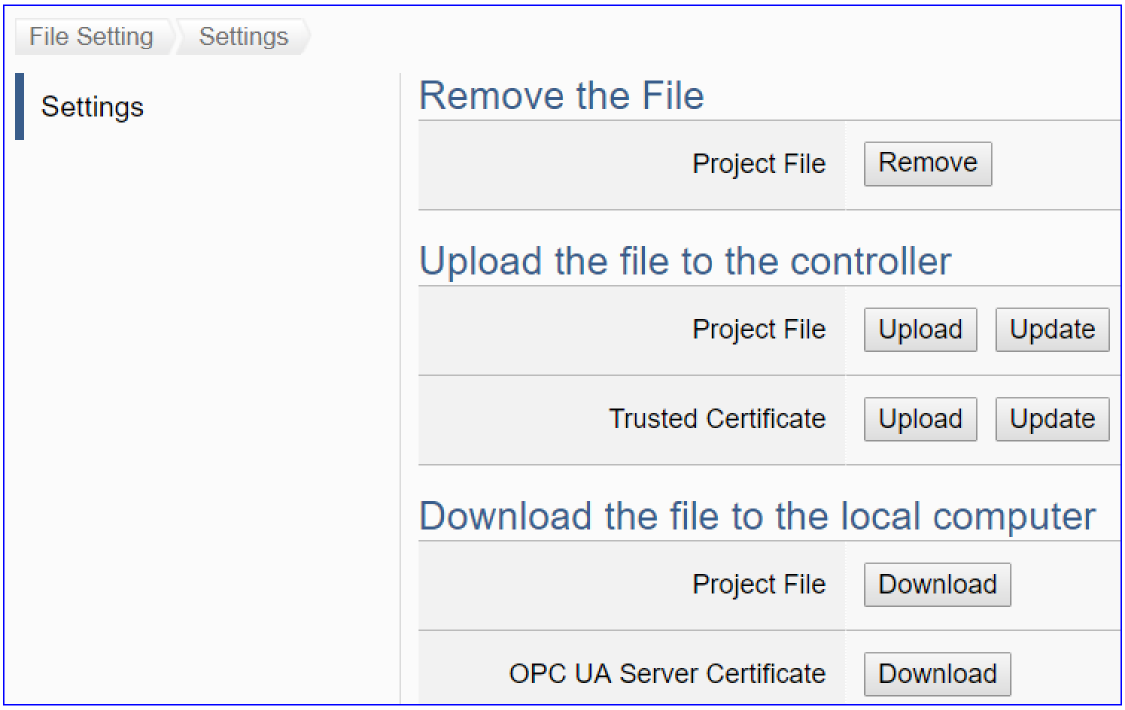
The setting procedure for the UA series controllers is to set up from the left to the right of the main menu functions. User can find the procedure information in the following chapters.

3.3 Function Setting Procedure
2. Quick Start
4. Function Wizard

About the Web UI login information and the UI environment, please refer to 3. Web UI Login and Enviroment Overview.

11.1. Settings

This page provides 3 setting items: Remove the file, Upload the file to the controller, and Download the file to the local computer.



File Setting > Settings > Remove the File	
Project File	Click [Remove] to delete all project settings current in the UA series controller.
File Setting > Settings > Upload the file to the controller	
Project File	**Upload**: Upload the project with all Web UI settings to the UA series controller. (Extension name of the project file: “.tar”) **Update**: Update and run the project file that uploaded into the controller.
Trusted Certificate	**Upload**: Upload the Trusted Certificate file to the UA series controller. **Update**: Update and run the Trusted Certificate file that uploaded into the controller.
File Setting > Settings > Download the file to the local computer	
Project File	**Download**: Download the project with all Web UI settings to the current computer. (Extension name of the project file: “.tar”)
OPC UA Server Certificate	**Download**: Download the OPC UA Server Certificate file to the current using computer.

12. Factory Setting Recovering and Middleware Updating

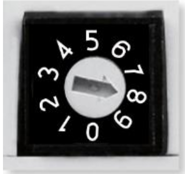
This chapter will introduce the settings by hardware Rotary Switch, including "Factory Setting Recovering" and "Middleware Updating" that supported since Version 1.0.0.3.

12.1. Recovering to Factory Setting (Rotary Switch: 8)

Turn the Rotary Switch of UA-5200 series to "8" can recover to the factory setting. Before that, first to connect the UA controller via a network cable to a PC or a Switch.

The steps:

1. After network connection, power off the UA-5200 hardware, and turn the Rotary Switch to "8".



2. Reboot the UA-5200 and wait a long buzzer sound that means of doing the recovering.

3. Wait about 3 minutes until **2** long buzzer sounds, and then turn the Rotary Switch to "**0**". **Note**: If the buzzer makes **4** short beeps, it means the network is not connected properly. Please check the network cable again.

4. Reboot the UA-5200 again, and the system will recover to the factory settings.

Factory Default Settings of UA-5200			
Network	**IP**	**192.168.255.1**	Assign UA-5200 a new IP setting according to your case.
	Netmask	**255.255.0.0**	
	Gateway	**192.168.1.1**	
OS Account	**Username**	**root**	After login, change your password ASAP. (Refer to Section 5.4)
	Password	**icpdas**	
Web UI Account	**Username**	**root**	
	Password	**root**	

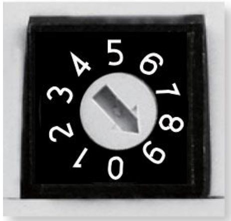
12.2. Updating Middleware via USB (Rotary Switch: 9)

Turn the Rotary Switch of UA-5200 series to “9” can update the Middleware version via USB.

Note: After the system version is updated, only the last network environment settings (IP, Netmask and Gateway) of the UA series controller will be retained and the rest will be factory recovered.

The steps:

1. Power off the UA-5200 hardware, and turn the Rotary Switch to “9”.



2. Download the Middleware package file of the UA-5200 hardware corresponding model. The download website: http.icpdas.com.tw/pub/cd/UA-5000/middleware

3. Save the Middleware package file into an empty FAT32 format USB drive and put to the UA-5200 USB port.

4. Reboot the UA-5200 and wait a long buzzer sound that means of doing the version updating.

5. Wait about five minutes until **two** long buzzer sounds, and then turn the Rotary Switch to “0”.
   Note:
   * If the buzzer makes 2 short beeps, it means the USB is not connected properly. Please check and connect the USB again.

6. Reboot the UA-5200 again, and the system will update to the version of the package file.

Note:

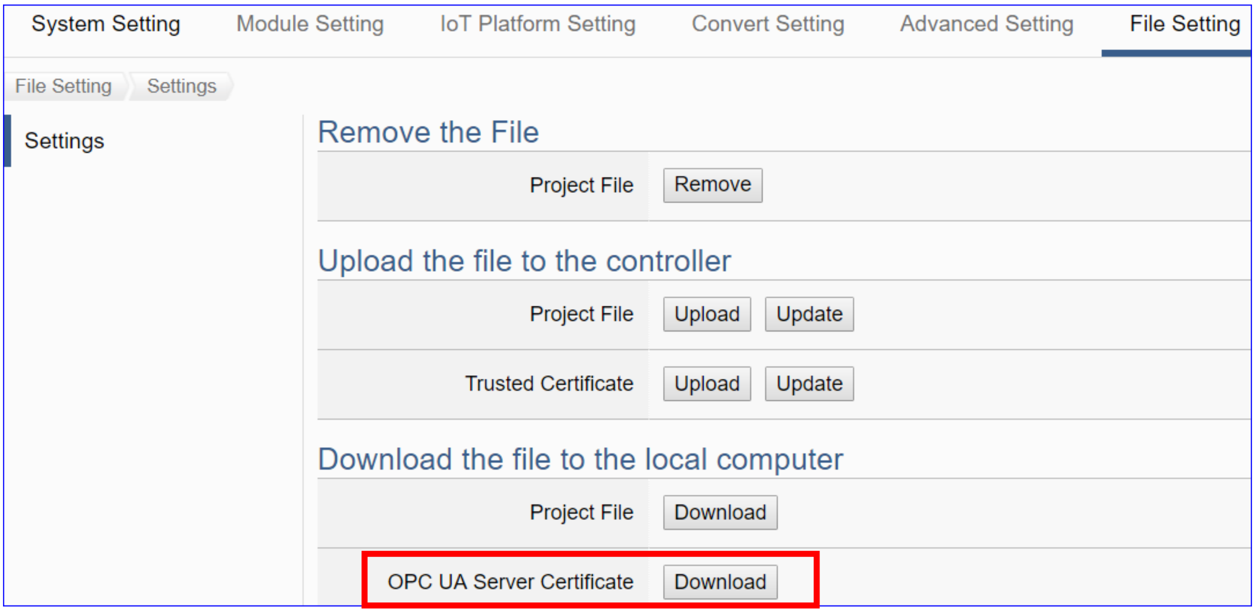
If the updating Middleware via USB still fails, please refer to Appendix D for using the MicroSD card to manually update the Middleware version.

13. Security Certificate: Download/Upload/Update

This chapter introduces the security certificate for the UA series controller, and the process to download, upload or update the certificate.

The communication security of the UA series controller, in addition to providing username / password protection mechanism, the SSL/TLS (Secure Socket Layer / Transport Layer Security Transport Layer Security) secure communication mechanism, and also provides the OPC UA trust certificate to protect data transmission security. The OPC UA is secure by default, encryption enabled, and uses advanced certificate handling which includes authentication, authorization, confidentiality and Integrity.

13.1. Download the Certificate of UA Controller

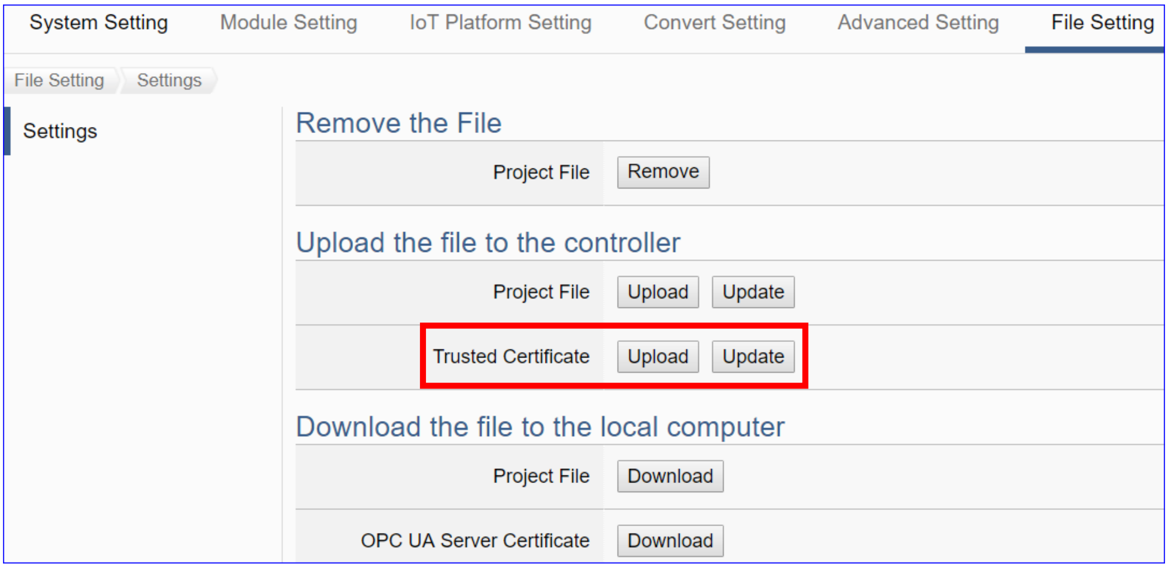


1. Click the main menu [File Setting > Settings > Download the file to the local computer – OPC UA Server Certificate] and then click on the button [Download].

2. Save the OPC UA Server certificate file to your designated folder. The downloaded certificate file (*.tar) of the UA series controller looks similar to the figure below.

13.2. Upload/Update the Certificate to UA Controller

The user can store trusted certificates of the OPC UA client or the MQTT Broker from other device into the UA series controller project for setting up security communications.



1. Get the trusted certificates from OPC UA Client or MQTT Client and save in the PC.

2. Click the main menu [File Setting > Settings > Upload the file to the controller – Trusted Certificate] and click on the button [Upload]. Then select the certificate designated folder to open the file. The certificate will be uploaded to the UA controller.

3. Click the button [Update], then UA system can exchange the certificate authentication.

Notes for OPC UA Client Certificate:

- The supported name is “***.der”**. The sub-file name must be “**.der**”, while the file name can follow the user need.
- The supported code format is “**DER**”.

Notes for MQTT Client Certificate:

- The supported name is “**ca.crt”**. The file name must be “**ca**”, and the sub-file name must be “**.crt**”.
- The supported code format is “**PEM**”.

Appendix A. MQTT JSON Format of the UA Series

MQTT JSON Example & Format Descriptions:

```
{
   "Variable" : [ {
      "Name" : "Bool_R[0]",
      "Attribute" : "R",
      "Datatype" : "Bool",
      "Value" : 0,
      "Quality" : "Uncertain"
   }, {
      "Name" : "Short_R[0]",
      "Attribute" : "R",
      "Datatype" : "Int16",
      "Value" : 0,
      "Quality" : "Uncertain"
   }, {
      "Name" : "Short_R[1]",
      "Attribute" : "R",
      "Datatype" : "Int16",
      "Value" : 0,
      "Quality" : "Uncertain"
   }, {
      "Name" : "Short_R[2]",
      "Attribute" : "R",
      "Datatype" : "Int16",
      "Value" : 0,
      "Quality" : "Uncertain"
   }, {
      "Name" : "Short_RW[2]",
      "Attribute" : "RW",
      "Datatype" : "Int16",
      "Value" : 0,
      "Quality" : "Uncertain"
   } ]
}
```

Name	Descriptions
Variable	The array name of JSON. Its structure includes several member data as below.
Name	The member name of the array element
Attribute	The member attribute of the array element: “R” : can read “W” : can write ”RW” : can read and write
Datatype	The member’s data type of the array element: "Bool" "Int8" "UInt8" "UInt16" "Int16" "UInt32" "Int32" "UInt64" "Int64" "Float" "Double" "String"
Value	The member’s current value of the array element
Quality	The member’s current status of the array element: "Uncertain" "Good" "Bad"

Appendix B. Technical Reference Websites

- **OPC UA**

https://opcfoundation.org/

- **MQTT**

http://mqtt.org/

- **Modbus**

http://modbus.org/

Appendix C. IFTTT Website Setting

UA Function combines the IFTTT cloud platform. When the special events occur, it will trigger the IFTTT and send the message to the IFTTT-related cloud services (such as Line, Facebook, Twitter, etc.)

Applet Maker

if this then that

Ex:

The settings for sending the message to the APP with the "IFTTT Condition Trigger (Line, Facebook, Twitter)" function includes two parts:

1. **UA Web Interface Setting: (Refer to Section 9.2 Advanced Setting > IFTTT …)**
   In the UA Web HMI, set up the UA controller, modules, IFTTT trigger conditions, the condition variable table, and the IFTTT event connection.

2. **IFTTT Cloud Platform Setting: (Introduced in this Appendix C)**
   In the IFTTT website, set up the “**if**” side service and event (**this**: use **webhooks** for the UA), the “**then**” side service and action (**that**: user can select the service, such as the Line, Facebook, twitter, etc.). And then fill the “**Event Name**” and “**Key**” getting from the IFTTT website setting into the “**Content Setting**” of the UA We HMI.

if
then
that

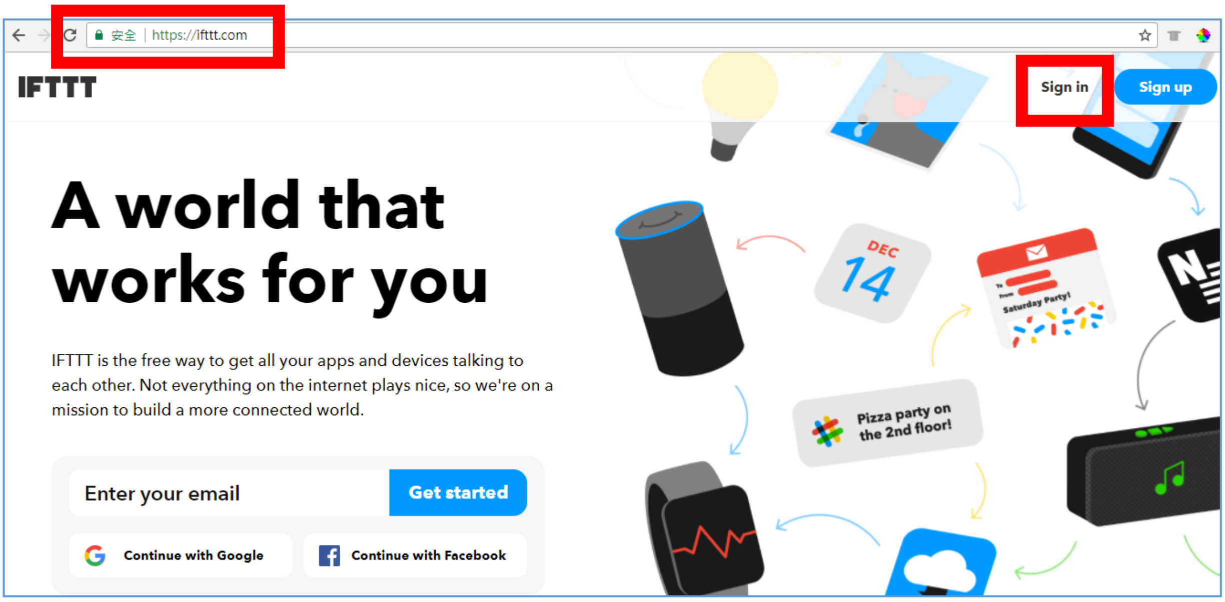
This Appendix C introduces the IFTTT website setting for the second part. After complete the setting, the user will set up an “**Event Name**” and get a “**Key**”, please input them to the IFTTT Condition Trigger setting page in the UA Web HMI setting.

This IFTTT setting example will **send a message to the APP Line service**. IFTTT provides hundreds of Web or APP services (Ex: Line, Facebook, Twitter, Gmail...). The setting is in a similar way. Users can follow the steps below for **Line** to set up own APP.

● IFTTT Website Setting Steps

1. Login in IFTTT website

Sign in IFTTT: https://ifttt.com/. If you never use the IFTTT, sign up a member.

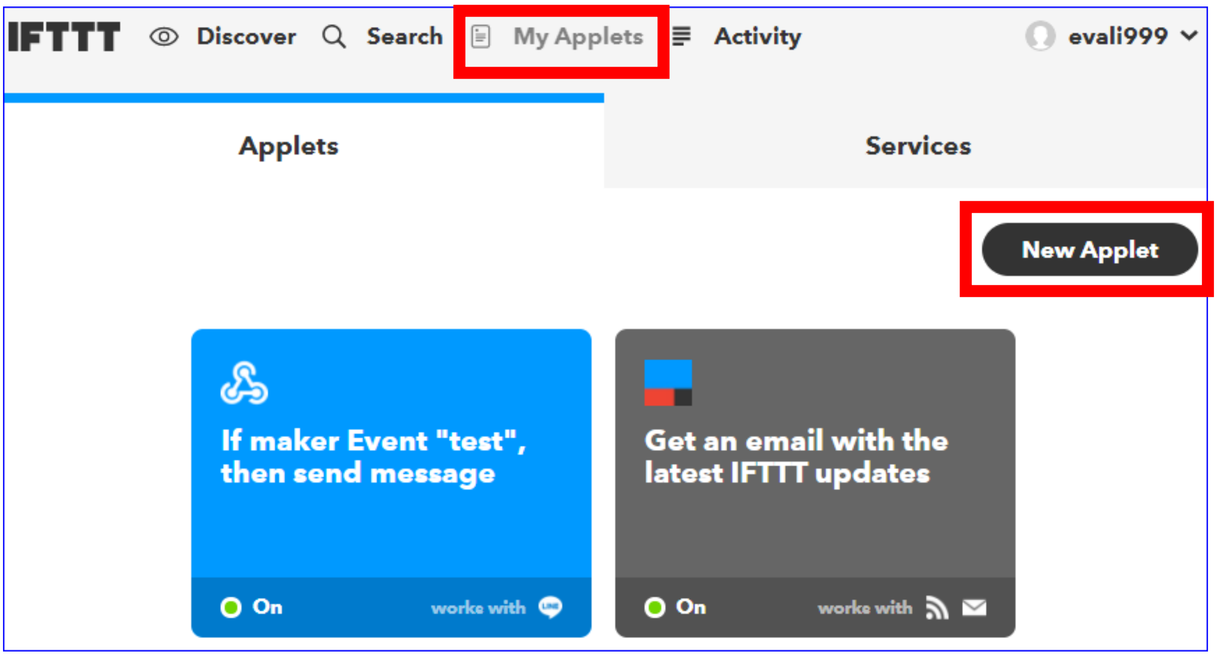


A world that works for you

IFTTT is the free way to get all your apps and devices talking to each other. Not everything on the internet plays nice, so we're on a mission to build a more connected world.

2. New an Applet

Click the “May Applets” > “New Applet”.

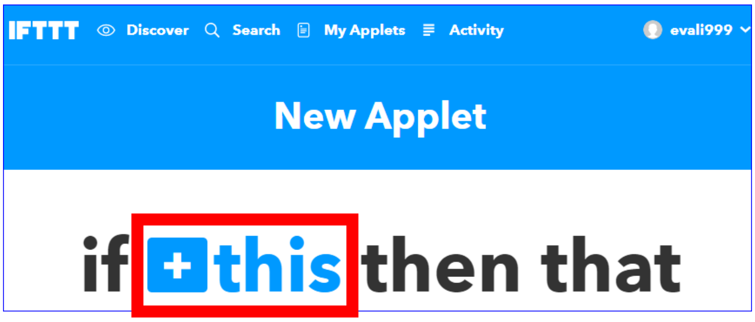


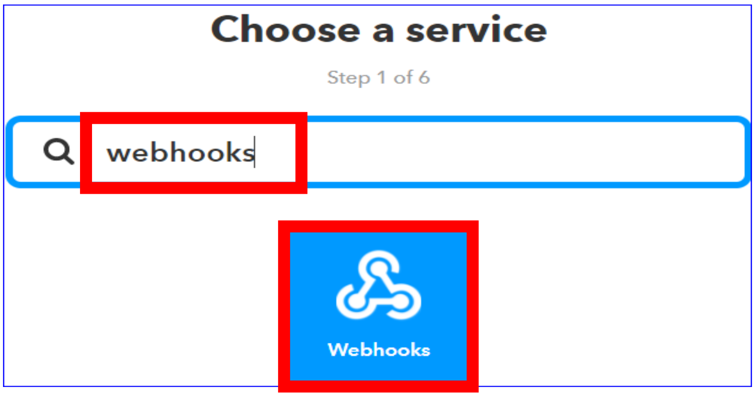
If maker Event "test", then send message

Get an email with the latest IFTTT updates

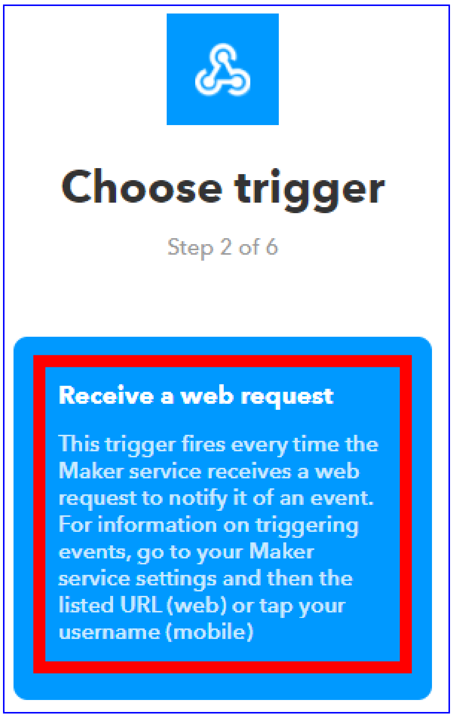
3. Set up this

Click the button "+this", and then search and choose the service "**webhooks**".

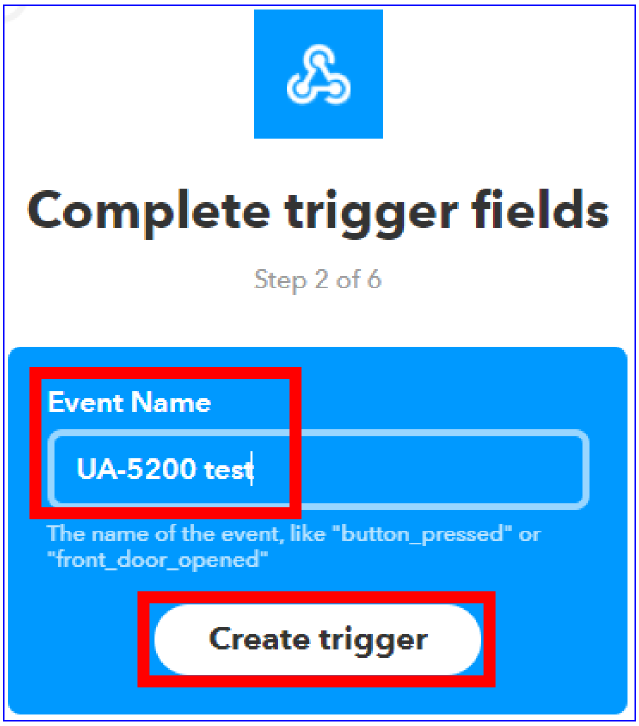




Choose the trigger of "Receive a web request", and then enter the **"Event Name"** you want, for example **"UA-5200 test"**. The user can define a new name and copy into the **"Event Name"** setting field in the **UA Web HMI [Advanced Setting > IFTTT Condition Trigger > Add Message > Content Setting] (See Section 9.2).** At last, click the "Create trigger" to complete the setting of "**this**".



This trigger fires every time the Maker service receives a web request to notify it of an event. For information on triggering events, go to your Maker service settings and then the listed URL (web) or tap your username (mobile)



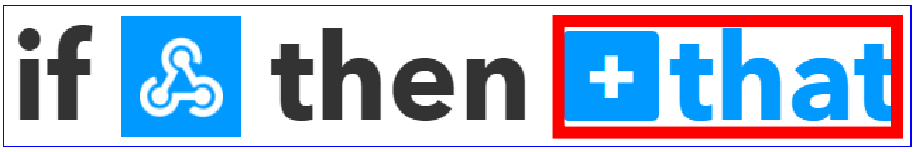
Event Name: UA-5200 test

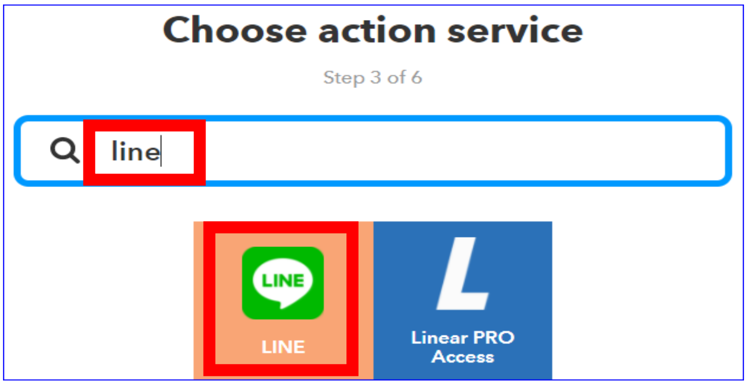
The name of the event, like "button_pressed" or "front_door_opened"

4. **Set up that**

The “+this” setting is completed (as the picture below).

Now click the button “+that”, and then search and choose the service for the action. In this example, we search and choose the service “**LINE**”.

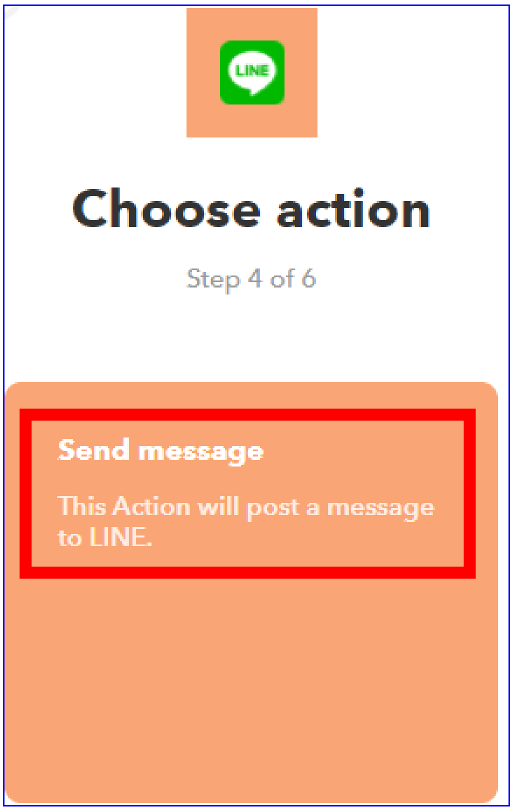



Choose action service

Step 3 of 6

line

Choose the action “Send message” to send message to the service “LINE”.



Choose action

Step 4 of 6

Send message

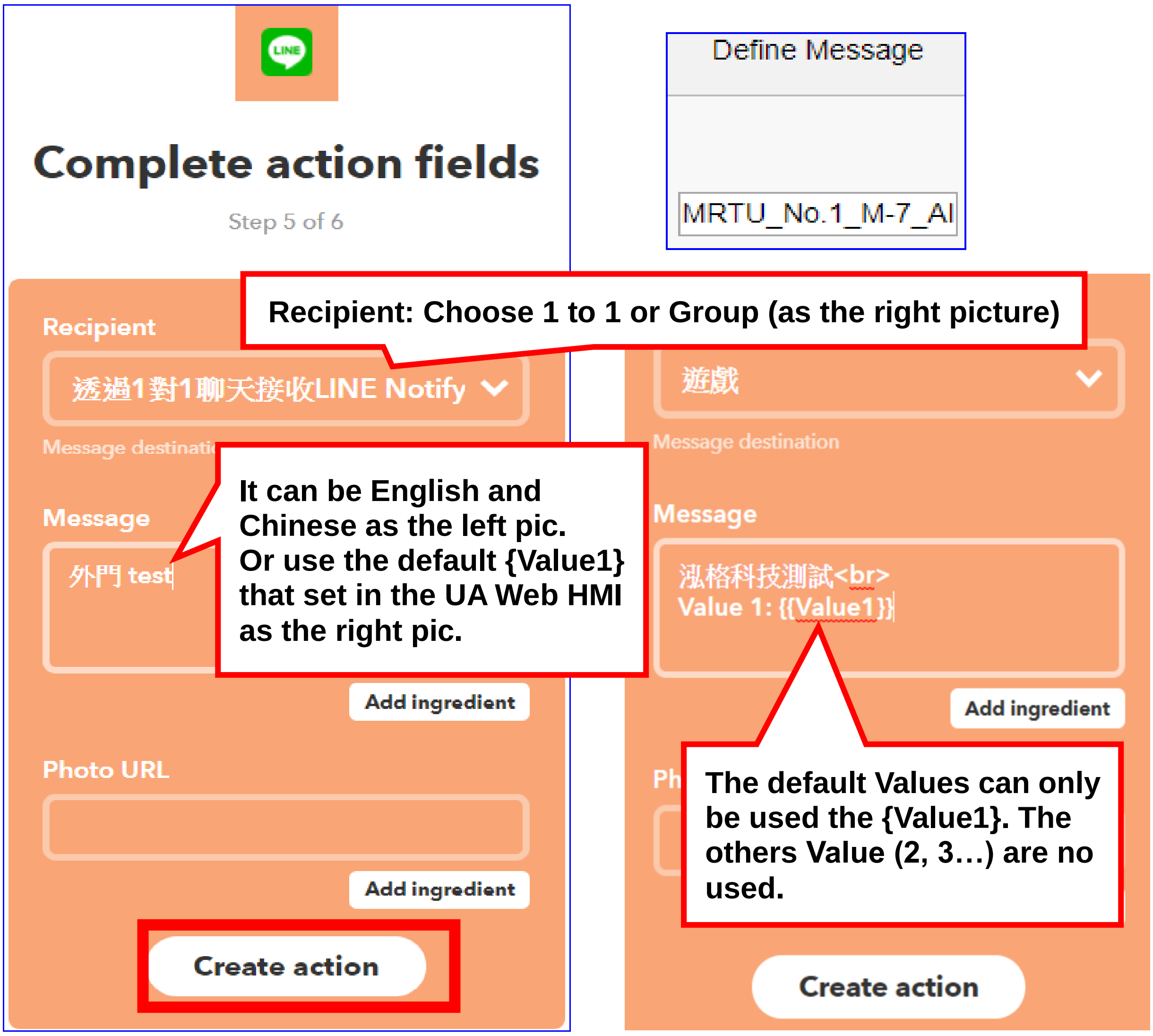
This Action will post a message to LINE.

Step Descriptions:

“**Recipient**”: Choose a name in the field to receive the LINE Notify message. It can be a LINE user or LINE group (It will auto show the names and groups of the connecting LINE account. If choose a LINE group, all the members in the LINE group will receive the message.)

“**Message**”: Set up the message content. It can be English or Chinese, Ex: “外門 test”.

The user also can use the default value “Value1: {{Value1}}”, it will send the message content that setting in the “Define Message” field of the UA Web HMI [IFTTT Condition Trigger > Condition Table]. (The message will list the module name code plus the I/O variable code as the picture below. Refer Section 9.2). The user can choose one depending on your need.



Complete action fields

Step 5 of 6

Recipient: 透過1對1聊天接收LINE Notify

Message: 外門 test

Define Message: MRTU_No.1_M-7_AI

Recipient: 遊戲

Message: 泓格科技測試
Value 1: {{Value1}}

Recipient: Choose 1 to 1 or Group (as the right picture)

It can be English and Chinese as the left pic. Or use the default {Value1} that set in the UA Web HMI as the right pic.

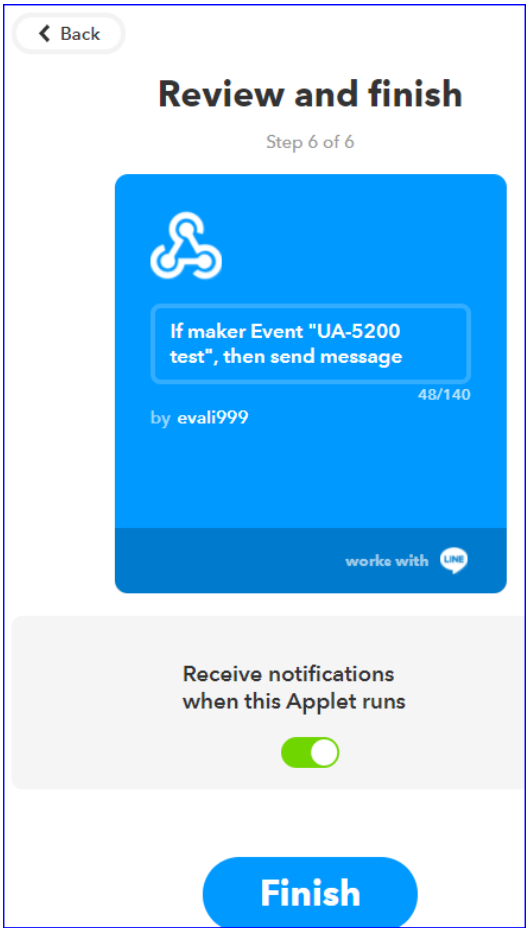
The default Values can only be used the {Value1}. The others Value (2, 3…) are no used.

5. Finish IFTTT Setting

When complete the Applet setting, the picture is like the left picture. You can click “Back” button to review and change the setting.

Click “Finish” button when all set. The “Applet” will show in the “My Applets”, and link the “Webhooks” and “LINE”, and has a UA-5200 test” event to send a message.

Next, we will introduce how to get the “Key” and test the event message.



Review and finish

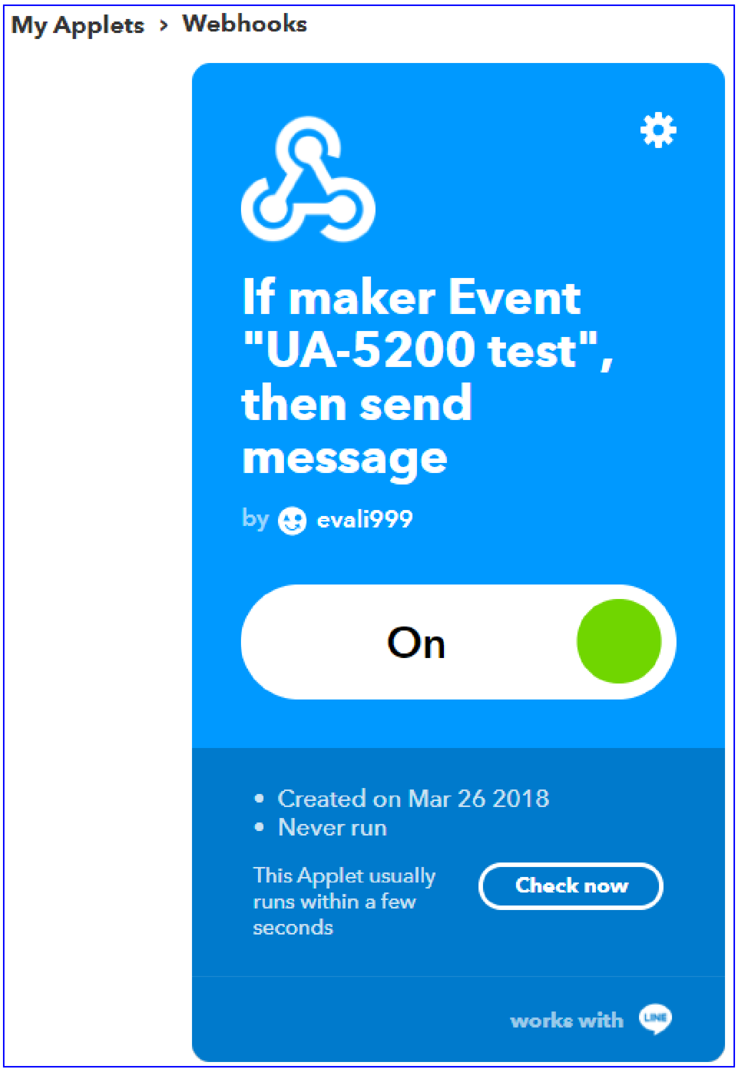
Step 6 of 6

If maker Event "UA-5200 test", then send message

48/140

by evali999

Receive notifications when this Applet runs



If maker Event "UA-5200 test", then send message

by evali999

- Created on Mar 26 2018
- Never run

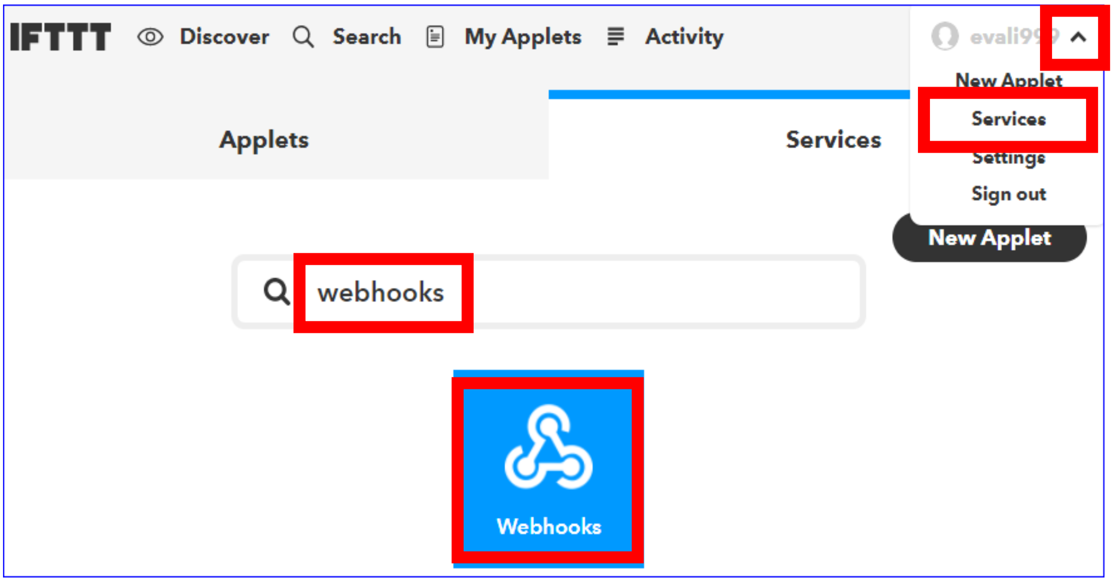
This Applet usually runs within a few seconds

- **Test IFTTT Event**

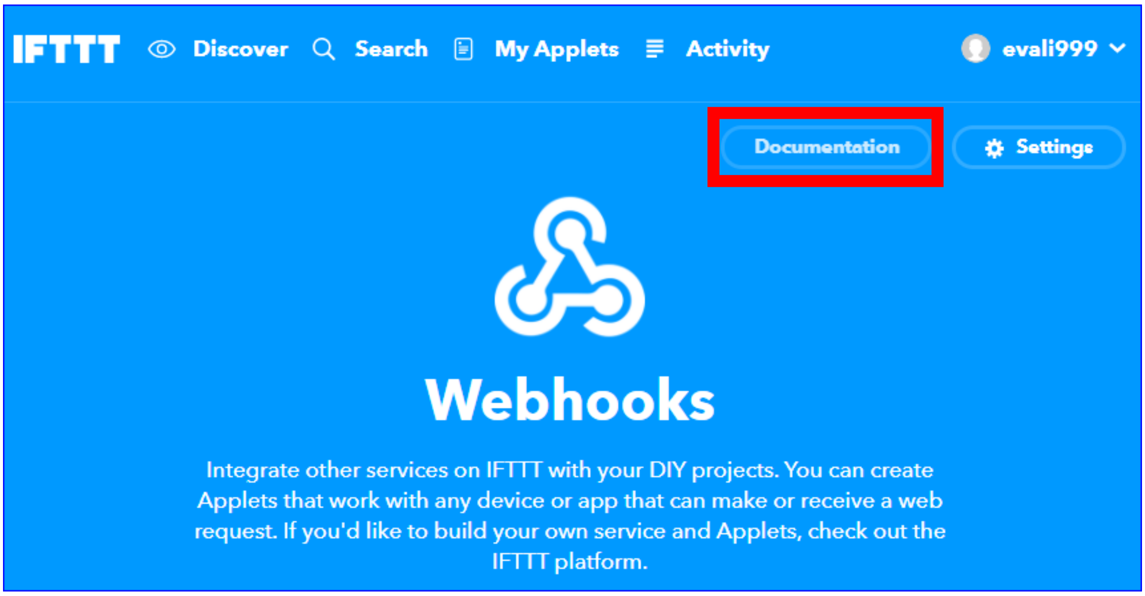
The IFTTT Website setting is set up in the previous steps. Now we will check the event "Key" and test the message sending.

1. Go to "Webhooks" service

Click the account function menu of "Services" on the up-right corner. Search and choose the Services "Webhooks".



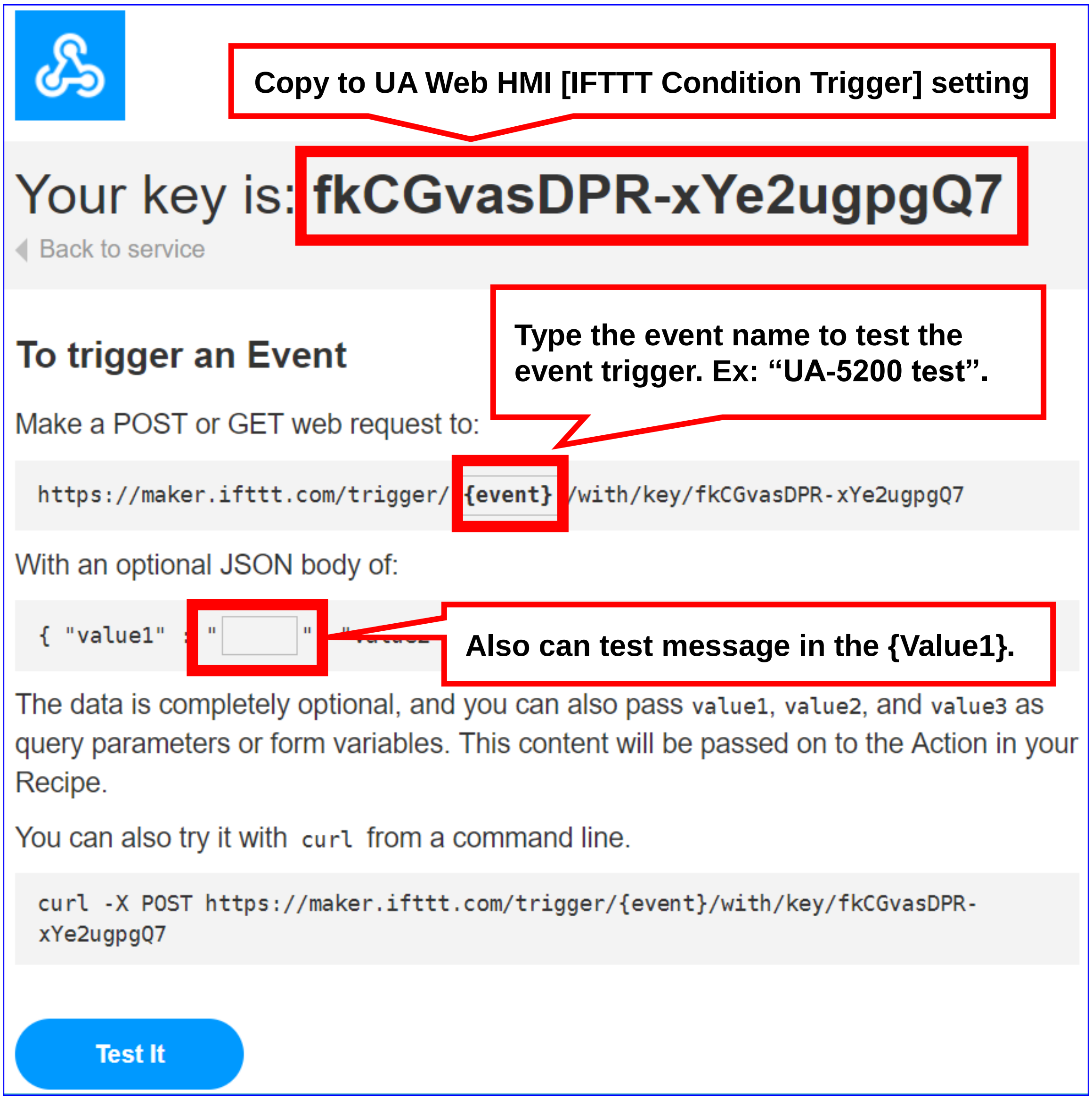
Click "Documentation" can switch to the test web page.



Integrate other services on IFTTT with your DIY projects. You can create Applets that work with any device or app that can make or receive a web request. If you'd like to build your own service and Applets, check out the IFTTT platform.

2. The Key and the Event Message

On the test web page, please copy the “Key” into the setting field “Key” in the **UA Web HMI [Advanced Setting > IFTTT Condition Trigger > Add Message > Content Setting] (See Section 9.2).**



Copy to UA Web HMI [IFTTT Condition Trigger] setting

Your key is: fkCGvasDPR-xYe2ugpgQ7

Back to service

Type the event name to test the event trigger. Ex: “UA-5200 test”.

To trigger an Event

Make a POST or GET web request to:

```
https://maker.ifttt.com/trigger/{event}/with/key/fkCGvasDPR-xYe2ugpgQ7
```

With an optional JSON body of:

```
{ "value1" : "" "
```

Also can test message in the {Value1}.

The data is completely optional, and you can also pass `value1`, `value2`, and `value3` as query parameters or form variables. This content will be passed on to the Action in your Recipe.

You can also try it with `curl` from a command line.

```
curl -X POST https://maker.ifttt.com/trigger/{event}/with/key/fkCGvasDPR-
xYe2ugpgQ7
```

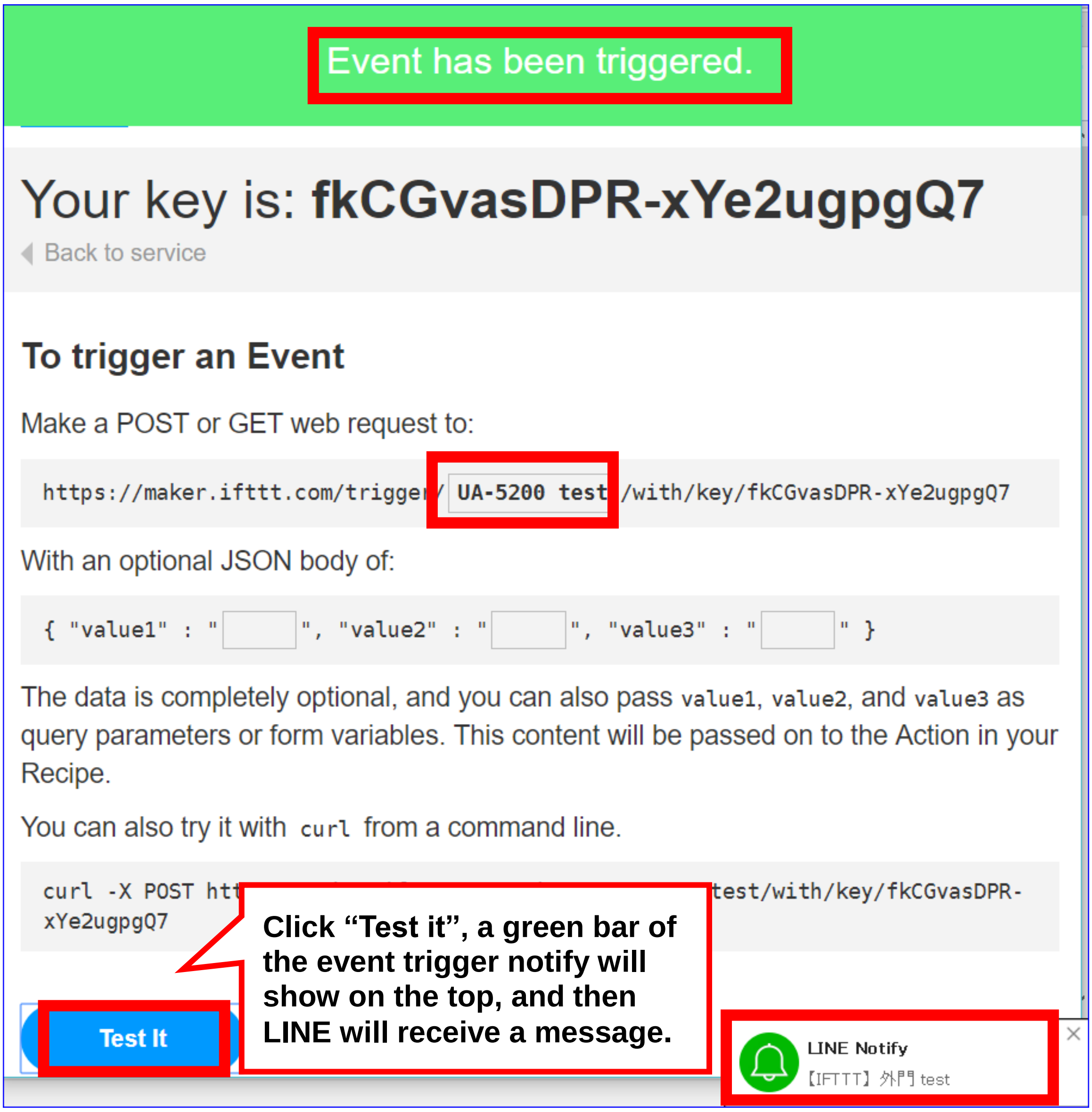
3. Test the Event

After giving the event information (This example: “UA-5200 test”), click the “Test it” on the bottom to test the message sending (This example: LINE).

The result and descriptions:

After click the “Test it” button, the green trigger bar shows on the top.

And then, the LINE receives a message “[IFTTT] 外門 test” (This notify is received on the PC version LINE. See the bottom right corner.) It means the IFTTT website setting is successful. The mobile phone is also received the LINE APP message. (See the next page)



Event has been triggered.

Your key is: **fkCGvasDPR-xYe2ugpgQ7**

Back to service

To trigger an Event

Make a POST or GET web request to:

```
https://maker.ifttt.com/trigger/ UA-5200 test /with/key/fkCGvasDPR-xYe2ugpgQ7
```

With an optional JSON body of:

```
{ "value1" : "     ", "value2" : "     ", "value3" : "     " }
```

The data is completely optional, and you can also pass `value1`, `value2`, and `value3` as query parameters or form variables. This content will be passed on to the Action in your Recipe.

You can also try it with `curl` from a command line.

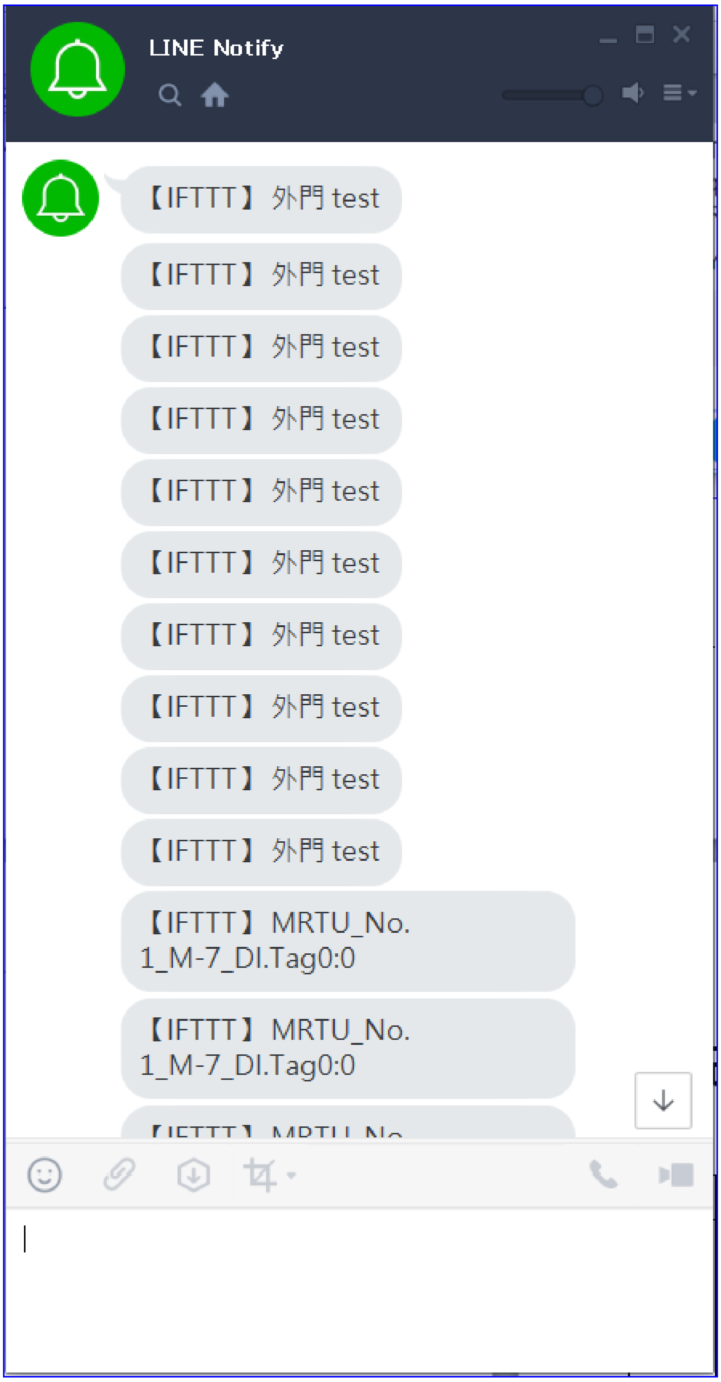
```
curl -X POST htt                              test/with/key/fkCGvasDPR-
xYe2ugpgQ7
```

Click “Test it”, a green bar of the event trigger notify will show on the top, and then LINE will receive a message.

LINE Notify

【IFTTT】外門 test

The LINE APP messages received on the mobile phone:



【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】外門 test

【IFTTT】MRTU_No.1_M-7_DI.Tag0:0

【IFTTT】MRTU_No.1_M-7_DI.Tag0:0

【IFTTT】MRTU_No

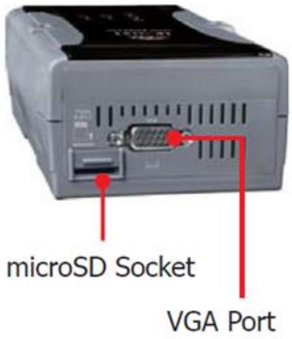
Appendix D. Updating Middleware via MicroSD Card Manually

If the updating Middleware (UA version file) via USB still fails, please refer to the following steps for using the microSD card to manually update the Middleware version.

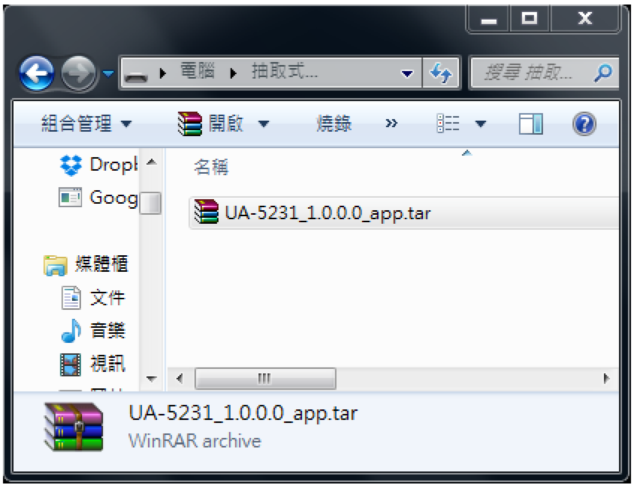
- **Preparations:**
  - ✓ PC * 1
  - ✓ SSH / Telnet Software, Ex: PuTTY
  - ✓ UA Series * 1, Ex: UA-5231 (Must wire with a networked device, ex: PC or Switch)
  - ✓ MicroSD Card Reader * 1
  - ✓ CA-0910 Cable * 1 (In the shopping box of the UA Series)
  - ✓ Power Supply * 1 (10 ~ 30 VDC)

- **The Steps to Update Middleware via MicroSD Card :**

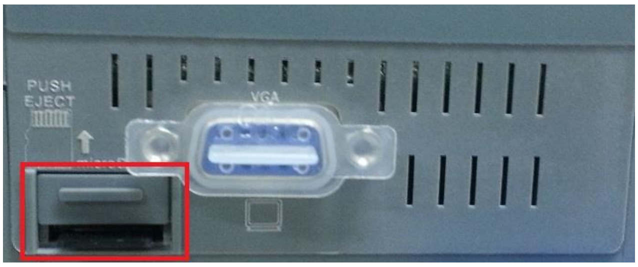
1. Take the microSD card from the socket of the UA-5200, and connect the card with PC via the card reader.



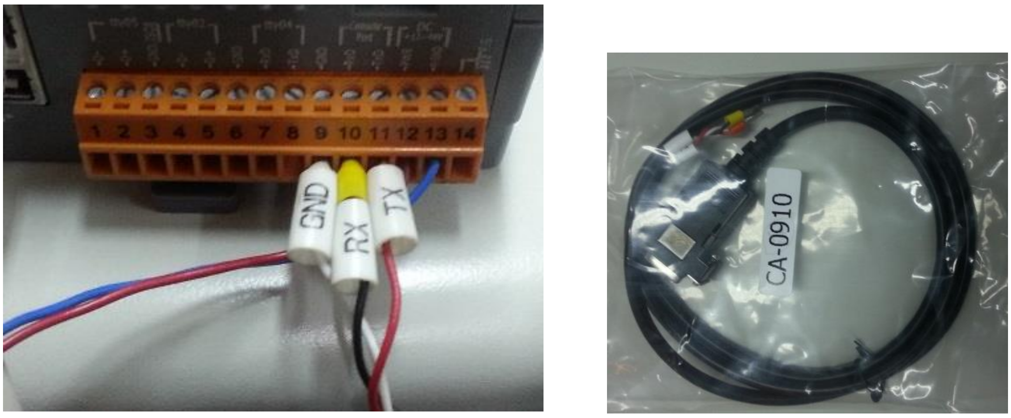
2. Download the middleware file and save to the microSD card. (Save one middleware file only)
Download from: http://ftp.icpdas.com/pub/cd/ua-5000/middleware/ UA-5231_x.x.x.x_app.tar
NOTE: save the file directly into the card, DO NOT decompress the file.



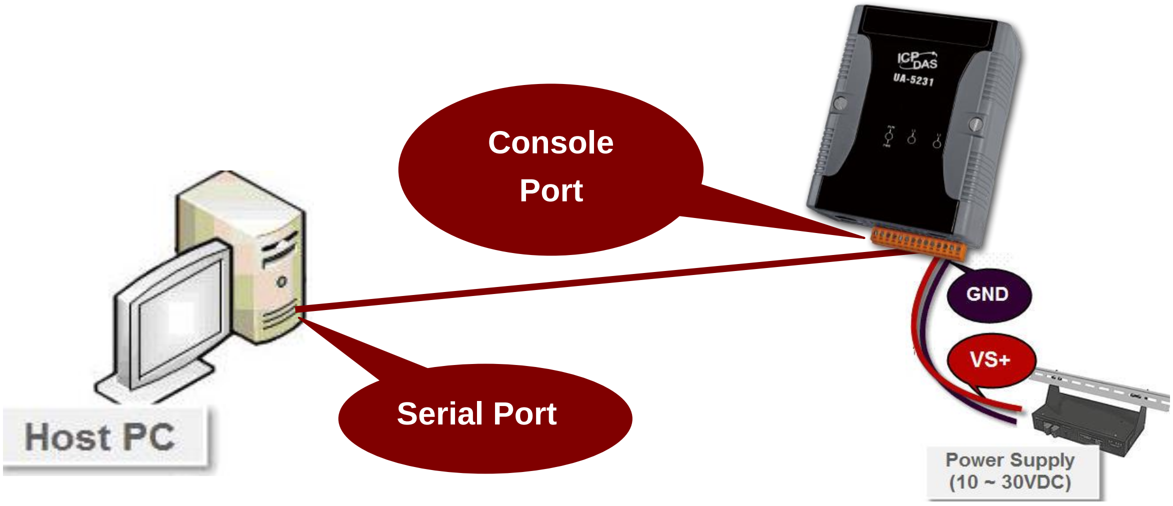
3. Insert the microSD card into the UA-5200 again.



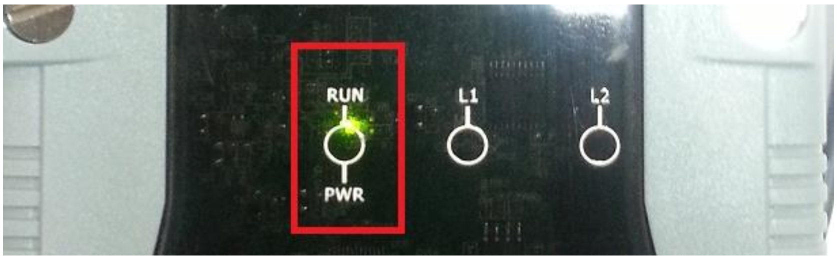
4. Wire the female head of CA-0910 cable to the network PC, and the other head to the “Console Port” of UA.



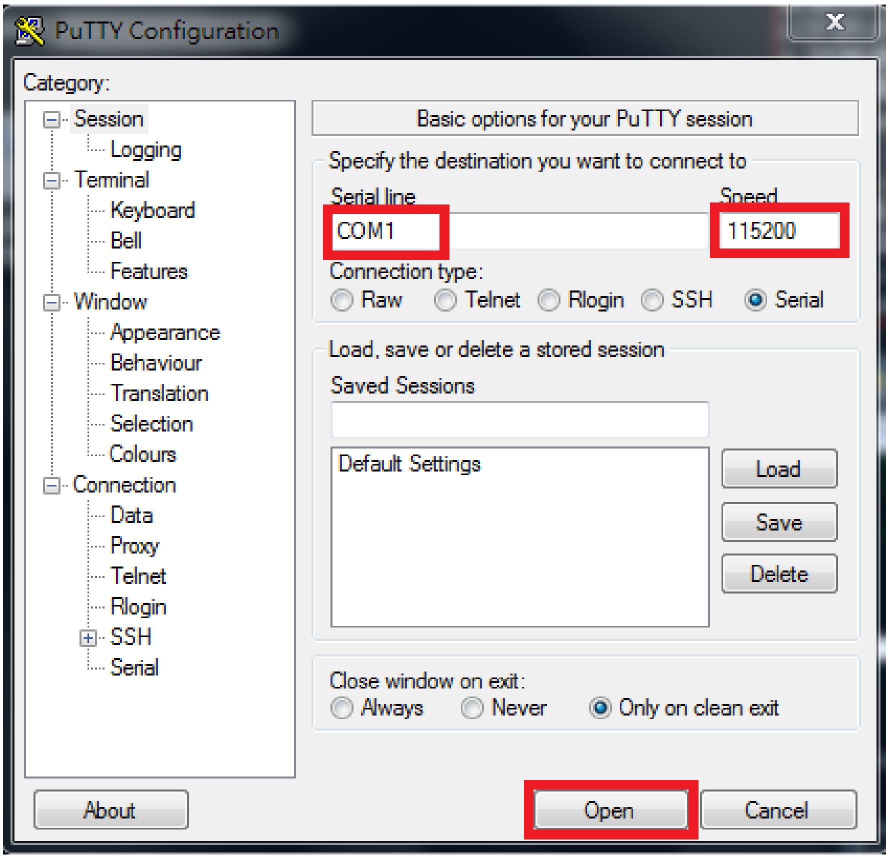
(Wire CA-0910 cable to the Console port of UA)



5. And then, turn on the power of the UA-5200. When the light is left with ONE LED, the boot is completed.

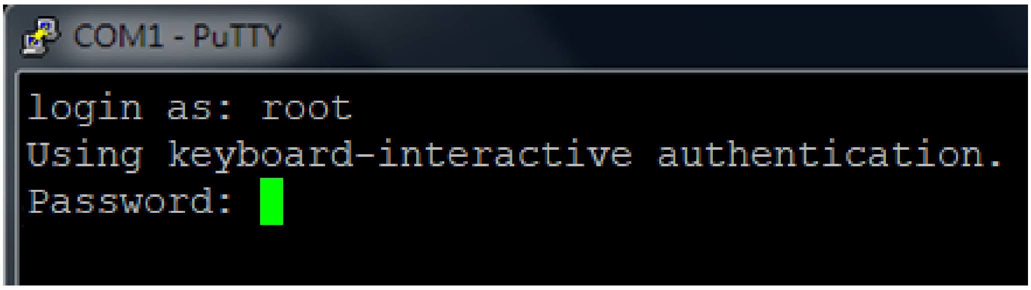


6. Use an SSH/Telnet software, e.g. PuTTY, to connect to UA-5200 via the Serial connection. Input your Serial line (default: COM1) and Speed (115200 for UA). And then click “Open” button.



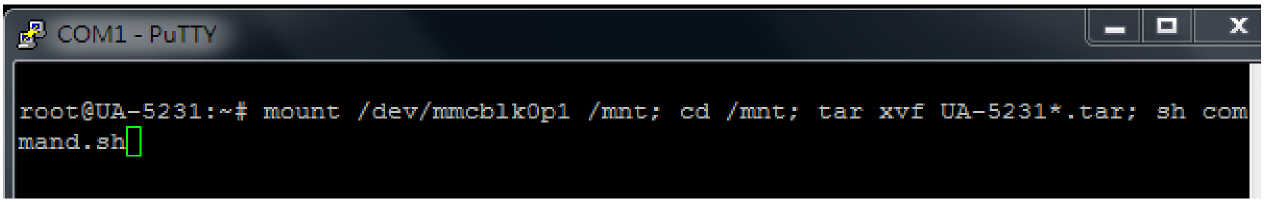
Specify the destination you want to connect to
Serial line: COM1
Speed: 115200
Connection type: ○ Raw ○ Telnet ○ Rlogin ○ SSH ● Serial
Close window on exit: ○ Always ○ Never ● Only on clean exit

7. After the login message, enter the default **username** (**root**) and **password** (**icpdas**).



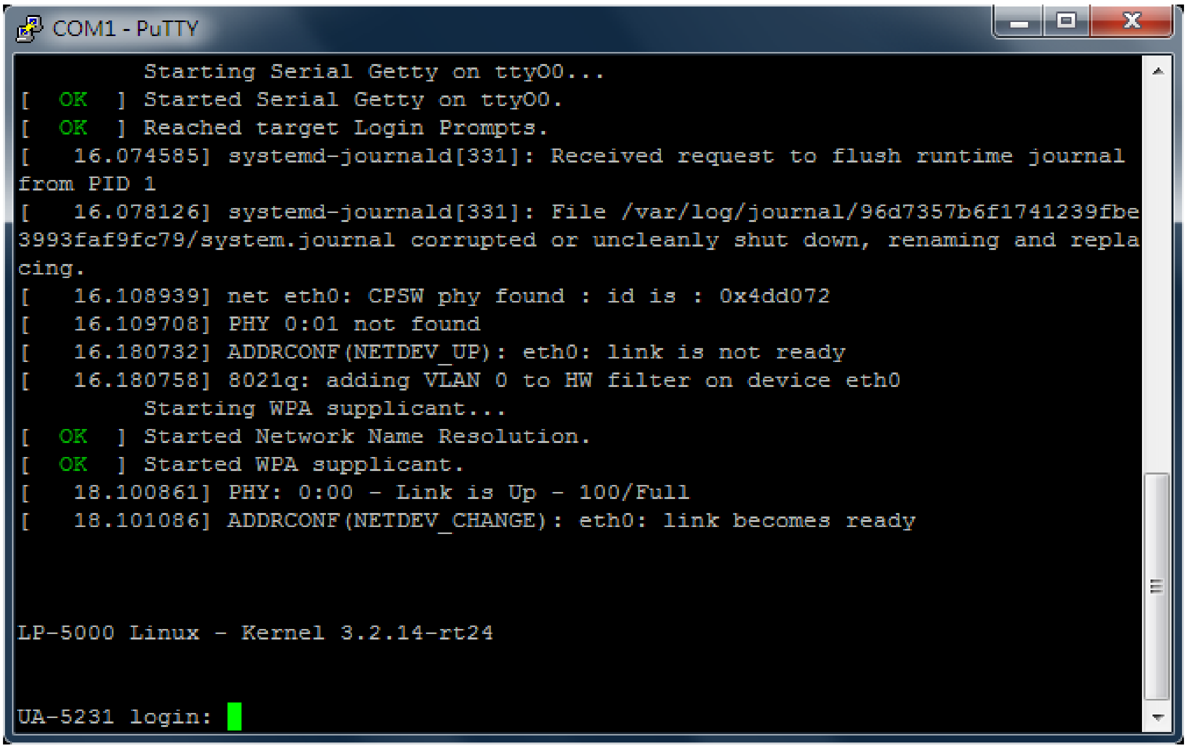
```
login as: root
Using keyboard-interactive authentication.
Password:
```

8. Configure the UA environment:
Cony the following red strings “mount /dev/mmcblk0p1 /mnt; cd /mnt; tar xvf UA-5231*.tar; sh command.sh” to the PuTTY screen and press the Enter key.



```
root@UA-5231:~# mount /dev/mmcblk0p1 /mnt; cd /mnt; tar xvf UA-5231*.tar; sh com
mand.sh
```

9. Please wait a while for the UA controller configuration until the login screen appears again.



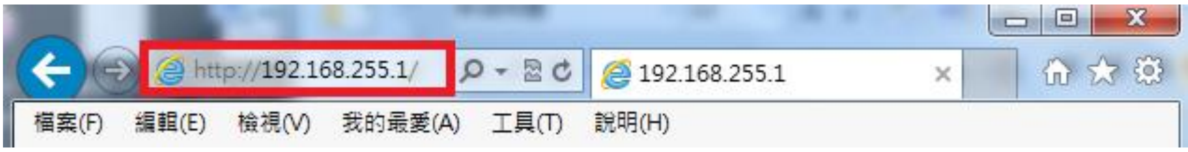
```
         Starting Serial Getty on ttyO0...
[  OK  ] Started Serial Getty on ttyO0.
[  OK  ] Reached target Login Prompts.
[   16.074585] systemd-journald[331]: Received request to flush runtime journal
from PID 1
[   16.078126] systemd-journald[331]: File /var/log/journal/96d7357b6f1741239fbe
3993faf9fc79/system.journal corrupted or uncleanly shut down, renaming and repla
cing.
[   16.108939] net eth0: CPSW phy found : id is : 0x4dd072
[   16.109708] PHY 0:01 not found
[   16.180732] ADDRCONF(NETDEV_UP): eth0: link is not ready
[   16.180758] 8021q: adding VLAN 0 to HW filter on device eth0
         Starting WPA supplicant...
[  OK  ] Started Network Name Resolution.
[  OK  ] Started WPA supplicant.
[   18.100861] PHY: 0:00 - Link is Up - 100/Full
[   18.101086] ADDRCONF(NETDEV_CHANGE): eth0: link becomes ready



LP-5000 Linux - Kernel 3.2.14-rt24


UA-5231 login:
```

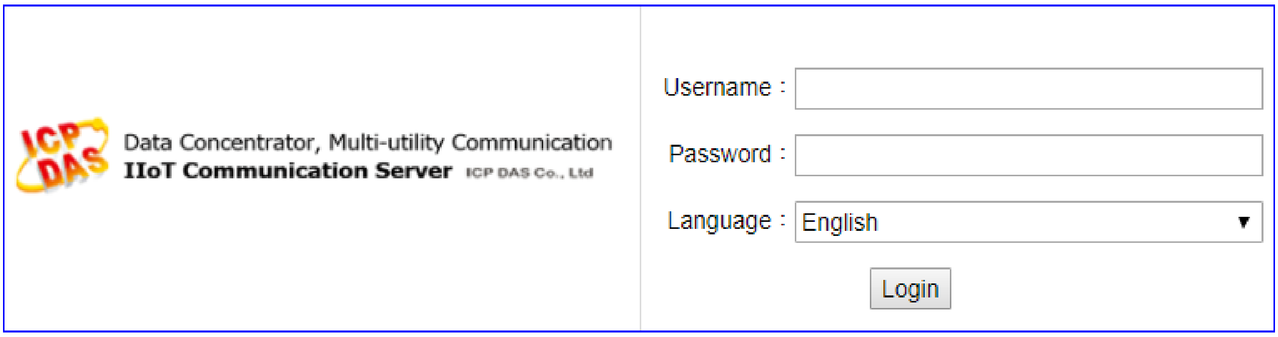
10. Open a web browser on the PC (ex: Google Chrome, IE...) and enter "**192.168.255.1**" in the address bar.



11. The web browser will run and go to the UA login web site as below. Please enter the default username/password and click the “Login” button.

Default Username: root

Default Password: root

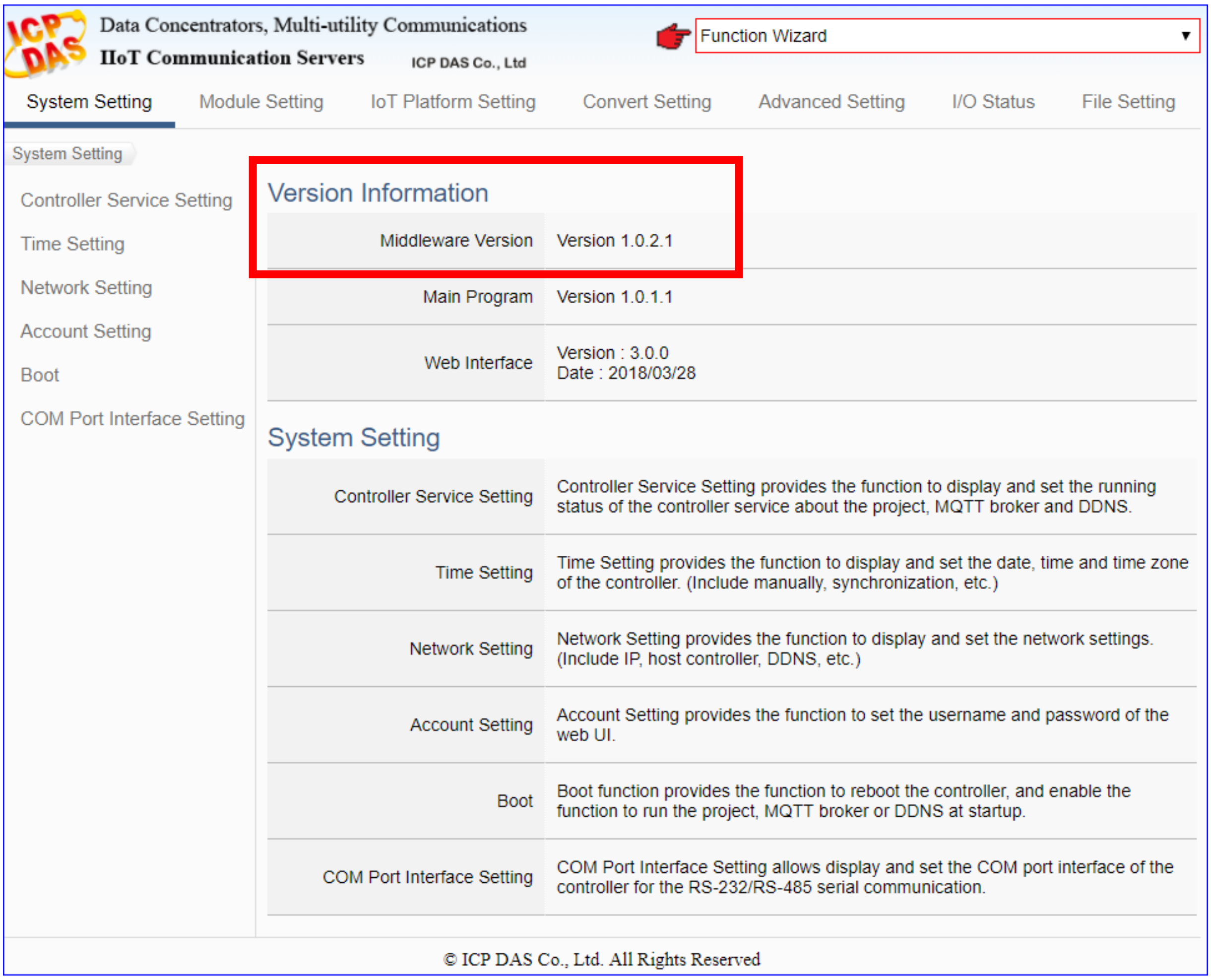

ICP DAS
Data Concentrator, Multi-utility Communication
IIoT Communication Server ICP DAS Co., Ltd
Login

Username :

Password :

Language : English ▼

12. When login to the web interface, the UA-5200 home page will be displayed as below. If the Middleware Version number is the same as your download version, the updating is successful.



Version Information

Middleware Version	Version 1.0.2.1
Main Program	Version 1.0.1.1
Web Interface	Version : 3.0.0 Date : 2018/03/28

System Setting

Controller Service Setting	Controller Service Setting provides the function to display and set the running status of the controller service about the project, MQTT broker and DDNS.
Time Setting	Time Setting provides the function to display and set the date, time and time zone of the controller. (Include manually, synchronization, etc.)
Network Setting	Network Setting provides the function to display and set the network settings. (Include IP, host controller, DDNS, etc.)
Account Setting	Account Setting provides the function to set the username and password of the web UI.
Boot	Boot function provides the function to reboot the controller, and enable the function to run the project, MQTT broker or DDNS at startup.
COM Port Interface Setting	COM Port Interface Setting allows display and set the COM port interface of the controller for the RS-232/RS-485 serial communication.

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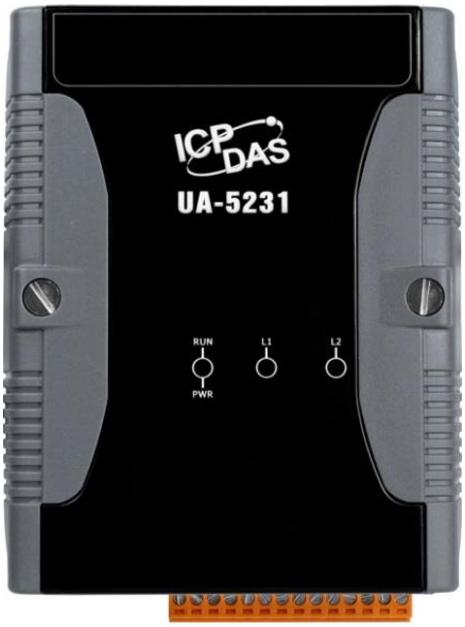
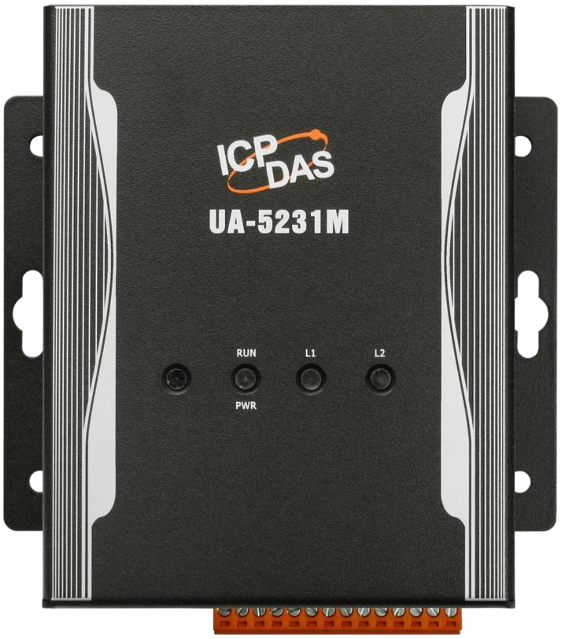
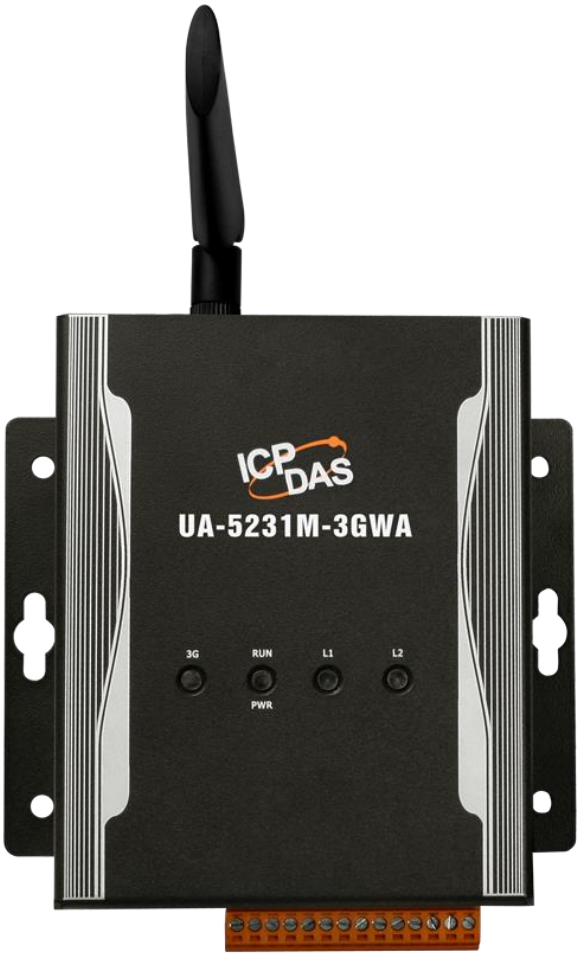
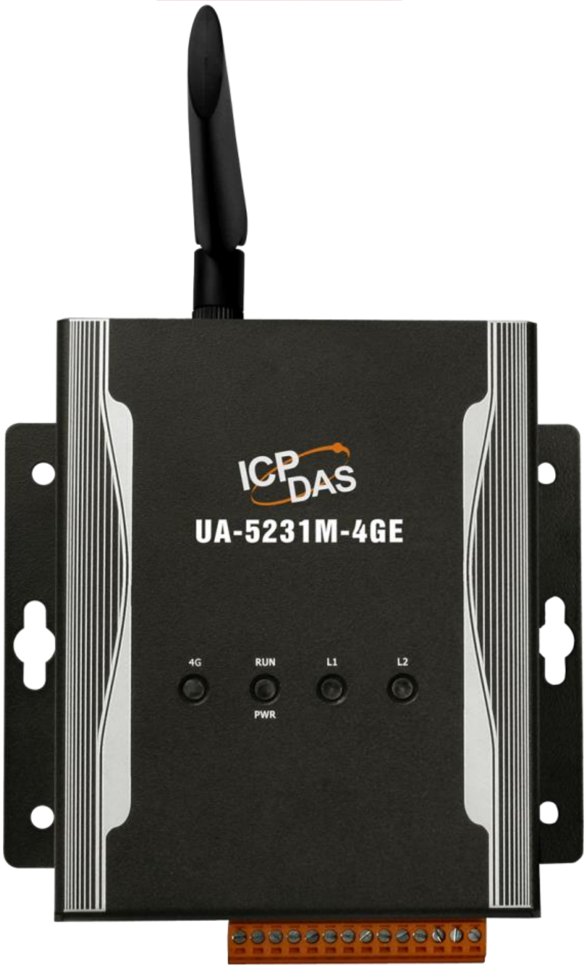
Appendix E. UA Series LED Indicators

LED indicators of UA Series provide a very convenient way of status indications for faster, easier diagnostics.









LED	LED Status	Module Status
PWR (Green)	ON	The module is powered on.
RUN (Red)	Blinking Red (one flash per second)	The module is functioning normally. PS: When UA is powered on, please wait about one minute to complete the start-up procedure, until the "RUN" led starts flashing.
3G (Green)	ON	The modem is functioning normally, and SIM card inside.
	OFF	The modem is not functioning, or no SIM card inside.
4G (Green)	ON and one flash per 2 seconds	The modem is functioning normally, and SIM card inside.
	OFF and one flash per 2 seconds	The modem is not functioning, or no SIM card inside.
	Flashing	Data Transferring.
L1 / L2	OFF	Function reserved

Postscript: Document Version List

Version	Description
V4.3	Date: 2018/07 1. Add 4G new products: UA-5231M-4GE / UA-5231M-4GC (CH1, CH5) 2. Modify introduction, features, function diagram and function features (CH1) 3. Update specifications, appearance and dimensions (CH1) 4. Add LED Indicators descriptions for UA Series (Appendix E.) 5. Update Document Version List (Postscript)
V4.2	Date: 2018/04 6. Add new 3G function: UA-5231M-3GWA (CH1~3) 7. Add new function in the Function Wizard: (CH4) a. Module Communication Conversion: Add MQTT / OPC UA b. Add ”APP Message Notify” new type, and add new function “IFTTT Condition Trigger (Line, Facebook, Twitter)” 8. Add new function: System Setting > Network Setting > Mobile Network (3G) (CH5) 9. Add new function: Module Setting > MQTT Module (CH6) 10. Add new function: Convert Setting > OPC UA > MQTT (CH8) 11. Add new function: Advanced Setting > IFTTT Condition Trigger (CH9) 12. Add new function menu: I/O Status (CH10) 13. Modify: Recovering to Factory Setting (Rotary Switch: 8) (CH12) 14. Add IFTTT Website Setting (Appendix C) 15. Add Updating Middleware via MicroSD Card Manually (CH12.2 & Appendix D) 16. Add: Postscript: Document Version List