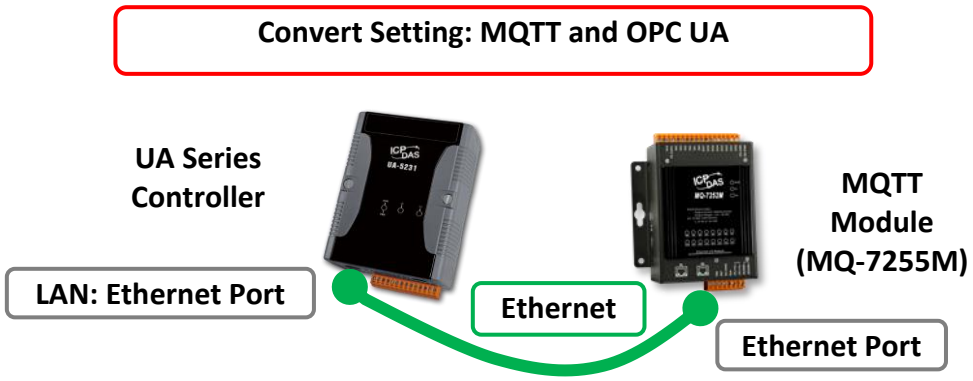
FAQ-CNV-02: UA Web UI Function Wizard – Module Communication Conversion - How to Convert MQTT / OPC UA ? (Use MQ-7255M)

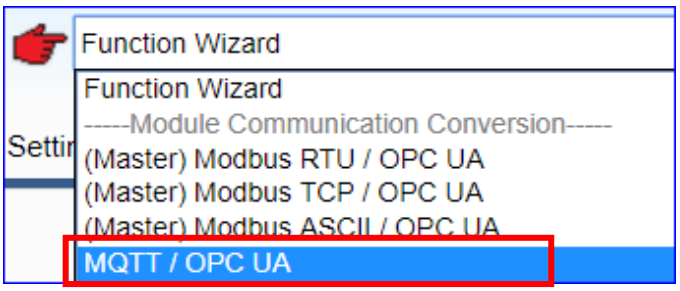
MQTT / OPC UA Conversion include the conversion of OPC UA and MQTT protocols. With the **OPC UA Service** function, the OPC UA Server can read and write the **MQTT** device that connected to the controller.

● Convert Setting: MQTT and OPC UA

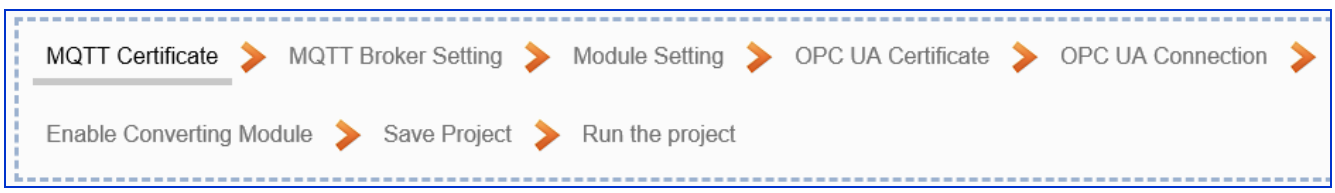


Note: The hardware/network connection methods please see the UA manual Chapter 2.

When UA series controller connects the MQTT module (via Ethernet, as MQ-7255M 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.

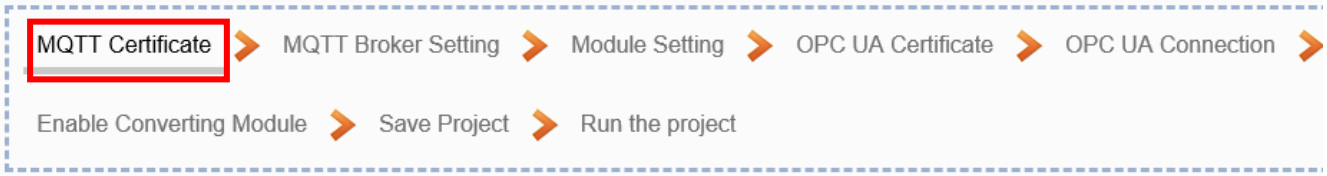


[Step Box]:
The Step Box of the [**MQTT / OPC UA**] has the steps as below. When enabling the Step Box, it auto-enters the first step setting page (The step with a bold underline means it is the current step.). The user just needs to follow the "Step Box" step-by-step and then can complete the project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

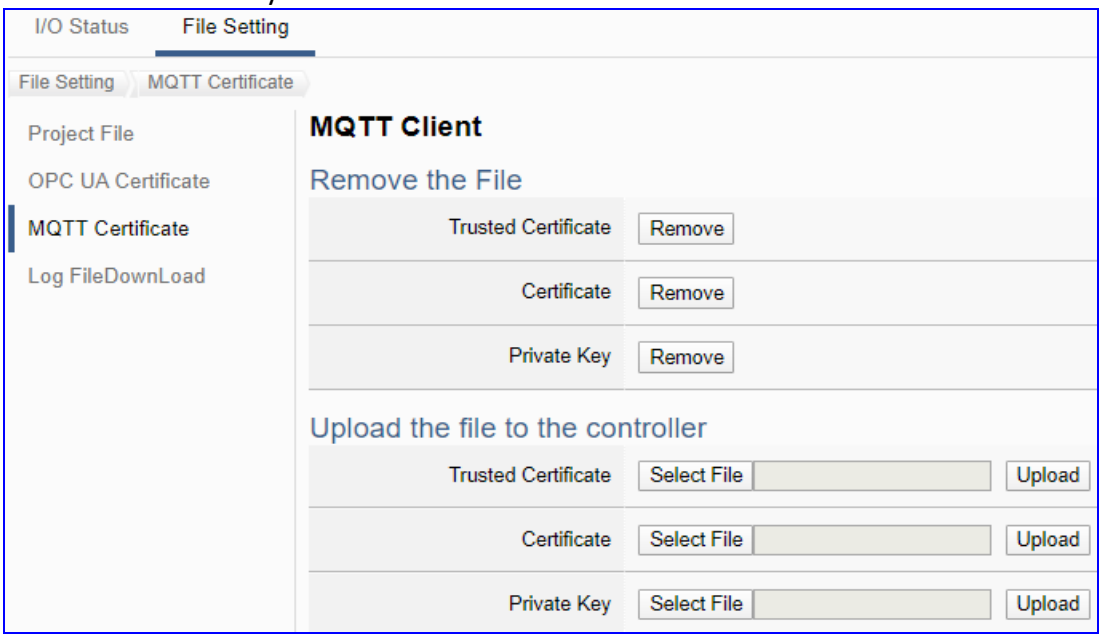


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Step 1. MQTT Certificate



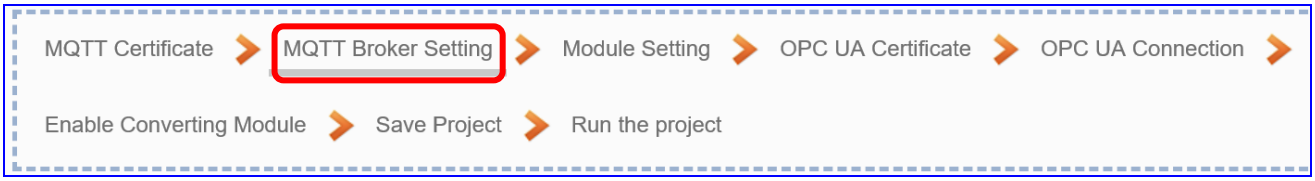
The **[MQTT Certificate]** is for setting up security communications to upload the **MQTT Trusted Certificate, Certificate and Private Key**. The users upload the file to the UA controller according to the type of obtained certificate. If you want to perform **Broker authentication**, you need to upload the **Trusted Certificate**. If you want to perform the **Broker/Client two-way authentication**, you need to upload the **Credential and Private Key additionally**. The user can skip this step if the user project does not use certificate transmission security.



File Setting > MQTT Certificate > Upload the file to the controller	
Trusted Certificate	**Select File**: select the MQTT Trusted Certificate file of the device. **Upload**: upload the MQTT Trusted Certificate file to the UA controller. • File format must be **PEM**. Extension name must be "**pem / cer / crt**". • If select a wrong file, the system will show an error message. 
Certificate	**Select File**: select the MQTT Certificate file of the device. **Upload**: upload the MQTT Certificate file to the UA controller. • File format must be **PEM**. Extension name must be "**pem / cer / crt**". • If select a wrong file, the system will show an error message.
Private Key	**Select File**: select the MQTT Private Key of the device. **Upload**: upload the MQTT Private Key file to the UA controller. • File format must be **PEM**. Extension name must be "**.key**". • If select a wrong file, the system will show an error message.

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Step 2. MQTT Broker Setting

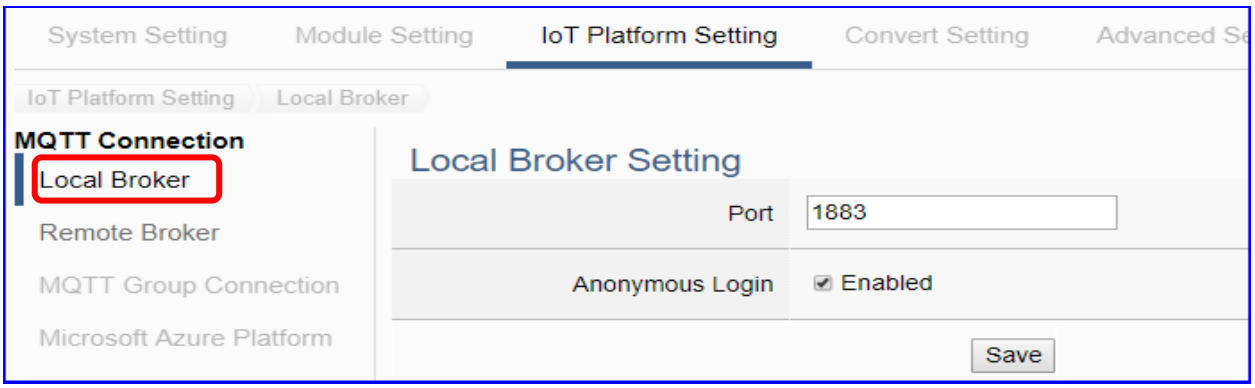


The **[MQTT Broker Setting]** is for setting the IoT platform and the MQTT Broker connection, e.g. the local or remote broker, port, login information, etc.

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.

The example uses local Broker.

Local Broker

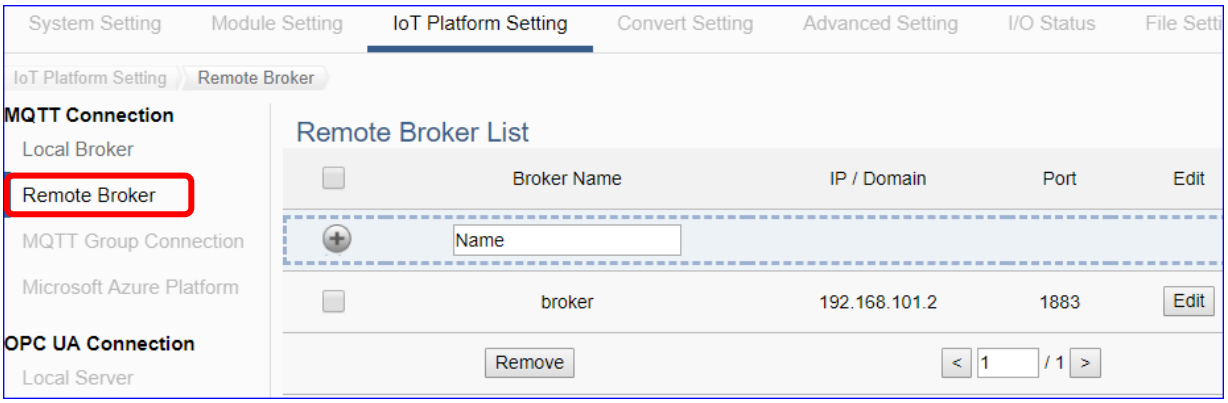


MQTT Connection > Local Broker Setting	
Port	The COM port of the Local MQTT Broker. System default: 1883
Anonymous Login	Check to allow anonymous login. Default: Check.
Save	Click to save the setting of this page.

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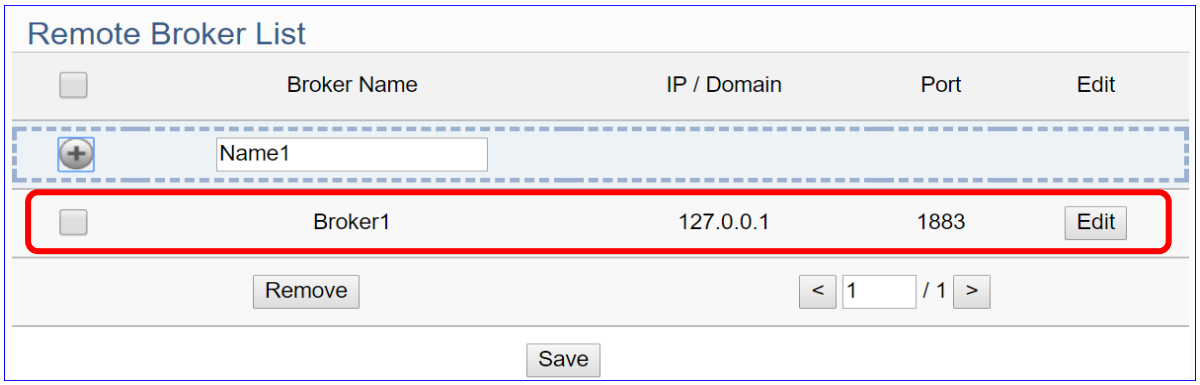
If users apply a remote Broker, the screen will as follow.

Remote Broker:



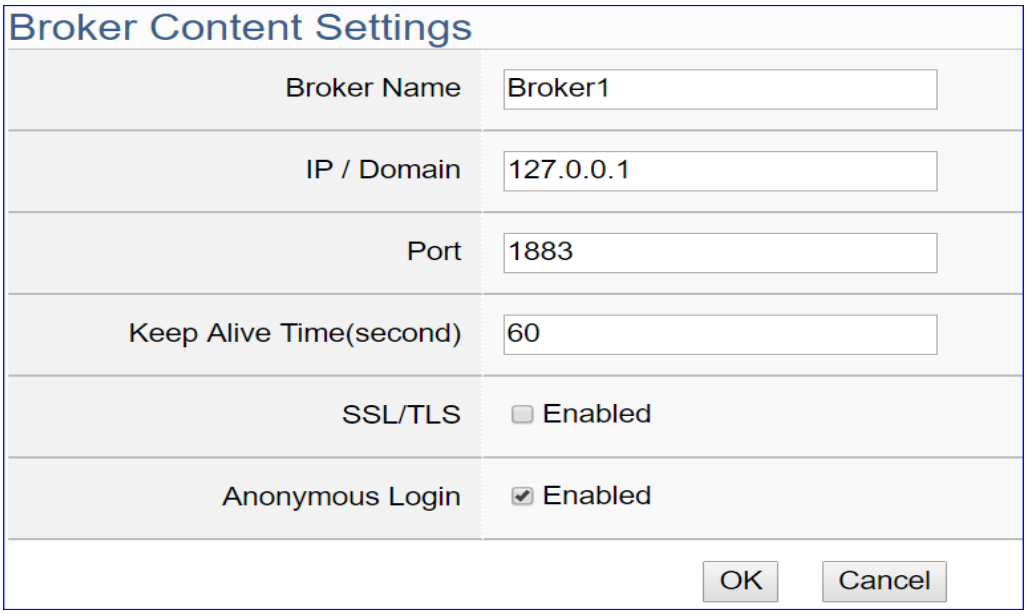
MQTT Connection > Remote Broker List	
Broker Name	The name of the remote MQTT Broker. User can define the name, e.g. Broker1. Default: Name.
	Click to add a new remote Broker.
Save	Click to save the settings of this page.

After creating a new Remote Broker (as below):



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.

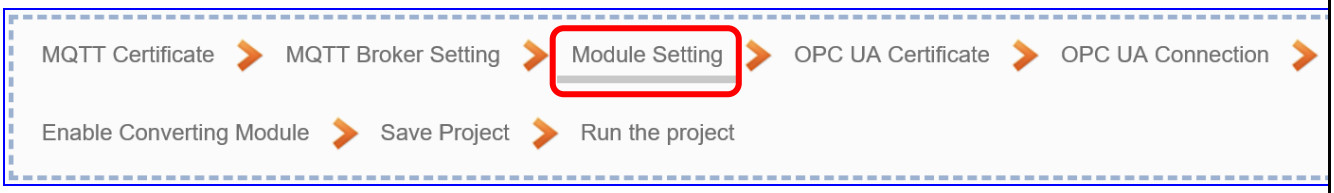
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MQTT Connection > Remote Broker > Broker Content Settings	
Broker Name	The name of the remote MQTT Broker. (Editable)
IP / Domain	The IP address of the remote Broker. Default: 127.0.0.1
Port	The COM port of the remote Broker. Default: 1883
Keep Alive 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.

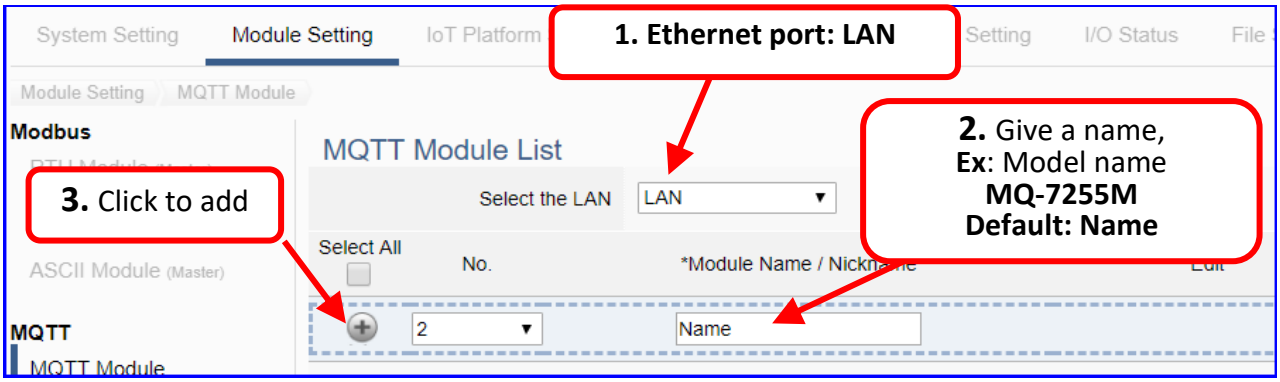
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Step 3. Module Setting

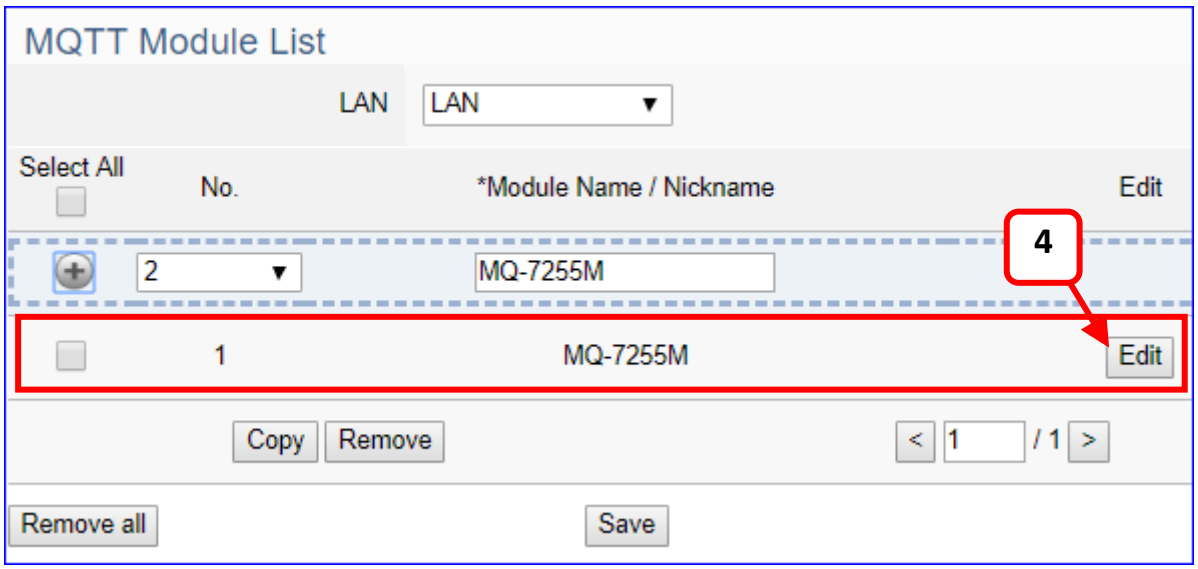


Click the next step, and enter the **Step 3 [Module Setting].** This page is for setting the communication values of the connected modules.

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.



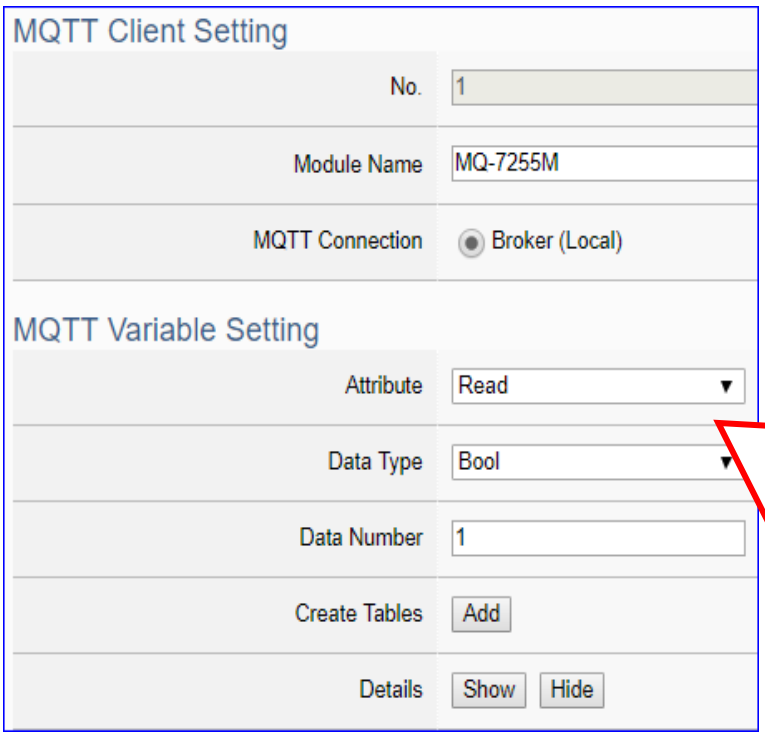
Add a module (No.: 1, Name: MQ-7255M) as below, and then click [Edit] button to enter the "Module Content Setting" page.



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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.

[**MQTT Client Setting**] page:



> MQTT Variable Setting:
Select attribute, data type and number of the module I/O, and click "Add".

Ex: MQ-7255M, 8xDI, 8xDO
[DI] Attribute: Read, Type: Bool, Number: 8, click "Add"
[DO] Attribute: Read/Write, Type: Bool, Number: 8, click "Add"
User can check the I/O data of module via user manual to set up the variable table.

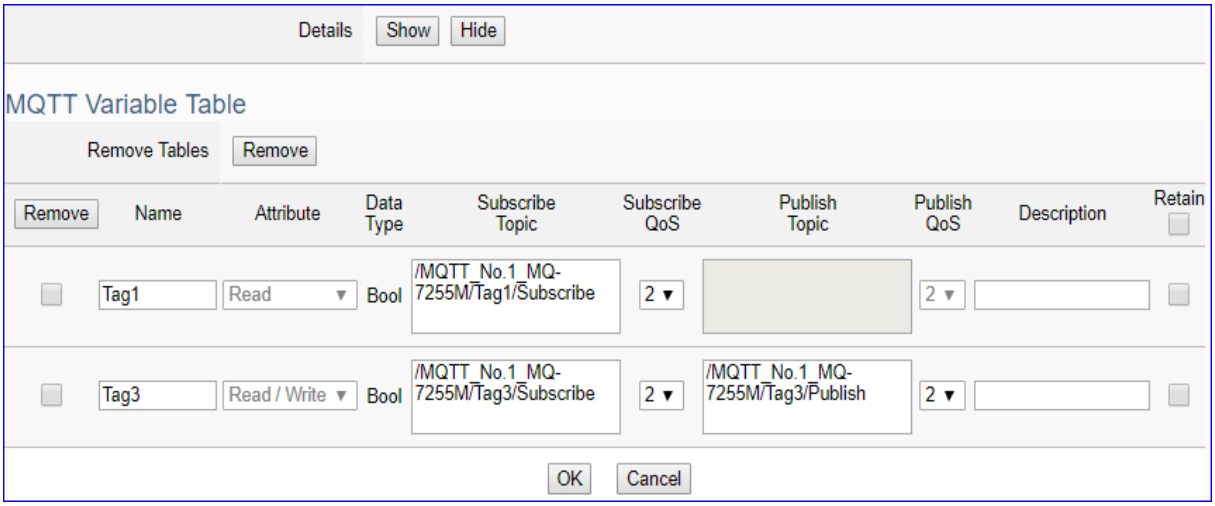
MQTT Client Setting	
No.	The module number in the module list (Not editable here)
Module Name	Give a name, e.g. model number or name. Default: Name.
MQTT Connection	The used Broker: Local Broker.
MQTT Variable Setting	
Attribute	Display data attribute of the variable. (Not editable) Include: Read, Read/Write…
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.

Please create the variable table in the page. Select "Attribute", "Data Type" and "Data Number", and click "Add" button to create a variable table.

Note: The different "Attribute" variables need to create separately.

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[**MQTT Variable Table**] :



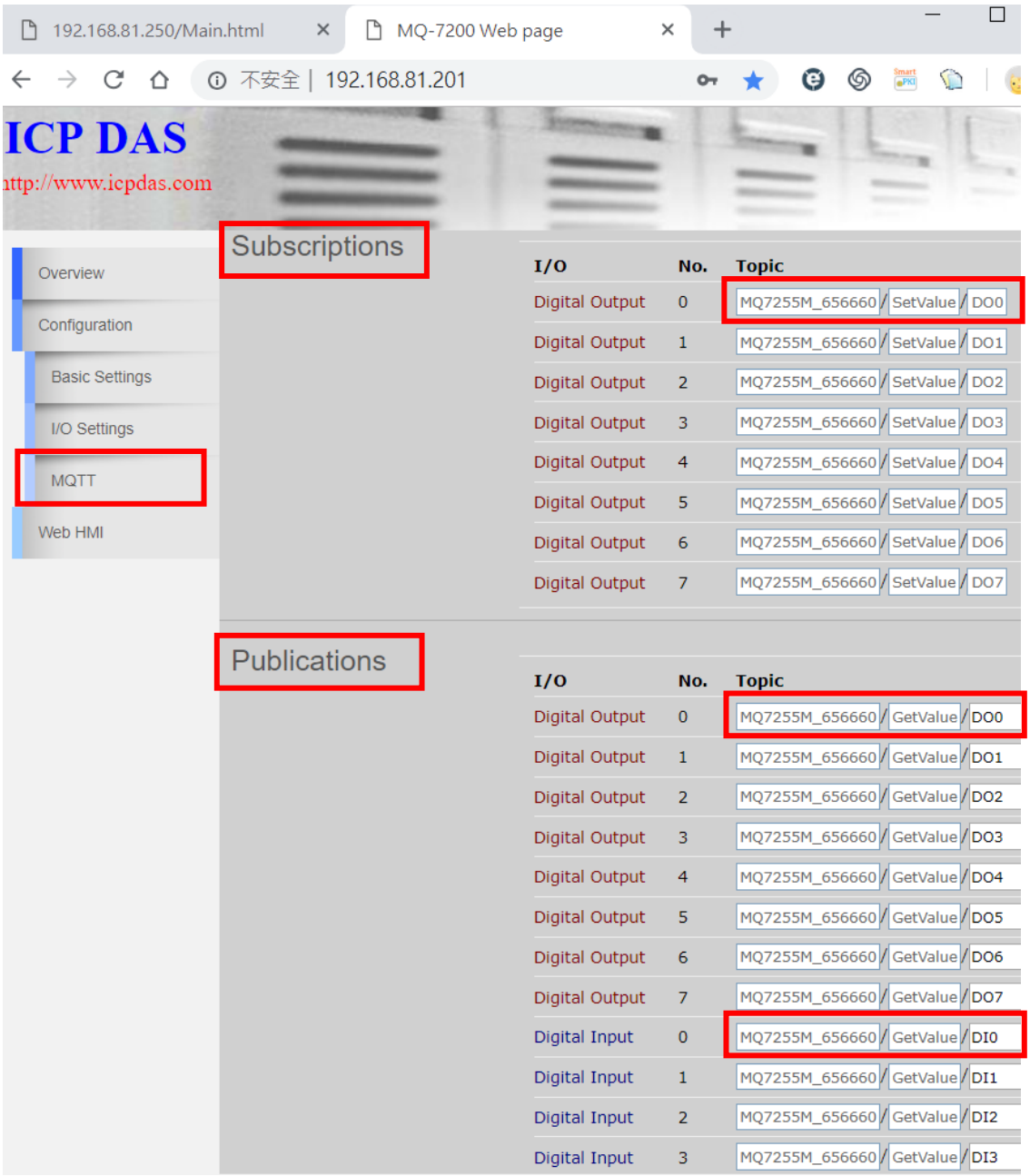
MQTT Variable Table	
Details Show / Hide	Click [Show] to display all fields, click [Hide] to hide some fields. The hide fields: Subscribe QoS, Publish QoS and Retain.
Remove Table / Remove	Check the box in the left of the variable is to select that variable list, and click the “remove” on the box can 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. It can copy the Publish Topic of linked module, e.g. MQ-7255M in this example.
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. It can copy the Subscribe Topic of linked module, e.g. MQ-7255M in this example.
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.

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The Subscribe / Publish Topic items must fill the related Topics of the connected MQTT module, e.g. UA connects with MQ-7255M in this case.

User can find the Topics from the MQTT setting of MQ-7200 Web page, and copy them to the UA setting:

Copy the Subscriptions I/O Topic of MQ-7200 to the I/O Publish Topic of UA, and copy the Publications I/O Topic of MQ-7200 to the I/O Subscribe Topic of UA.



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Step 4. OPC UA Certificate



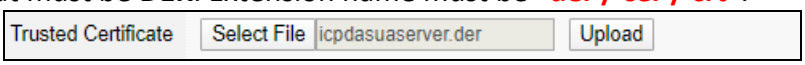
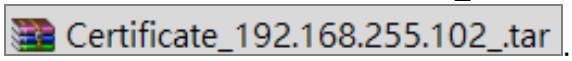
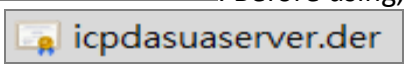
Click the next step, and enter the **Step 4 [OPC UA Certificate]** of the UI setting.
This step is about setting the OPC UA Certificate for the security and encryption, e.g. upload, download, delete certificate. **If the user's project does not need to use the secure encryption connection, please skip this step and click the next step directly.**

In the [**OPC UA Certificate**] step, users can add mutual credentials on both side's devices to strengthen security encryption.

① First, obtain the **OPC UA Client** trust certificate file of the device from the connected party, save it to the PC. In this step, select this file and upload it to the UA controller. (If there was an old certificate file in UA, remove it first.)

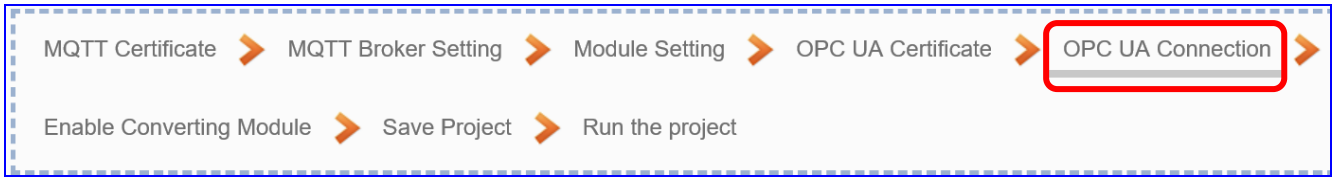
② The device of the other side needs the UA certificate also. In this step, download the **OPC UA Server** certificate file (**Certicate_IPAddress_.tar**) to the other party, so that they can decompress the file (**icpdasuaserver.der**) and upload to their device.



File Setting > OPC UA Certificate > Upload the file to the controller	
Trusted Certificate	**Select File**: select the OPC UA Trusted Certificate file in PC. **Upload**: upload the Trusted Certificate file to the UA controller. • File format must be **DER**. Extension name must be "**der / cer / crt**".  • If select a wrong file, the system will show an error message.
File Setting > OPC UA Certificate > Download the file from controller	
OPC UA Server Certificate	**Download**: Download the OPC UA Server Certificate file to the PC. • File format: **DER**. File name: **Certicate_IP-address_.tar** e.g. . Before using, decompress to **icpdasuaserver.der**, as below. 

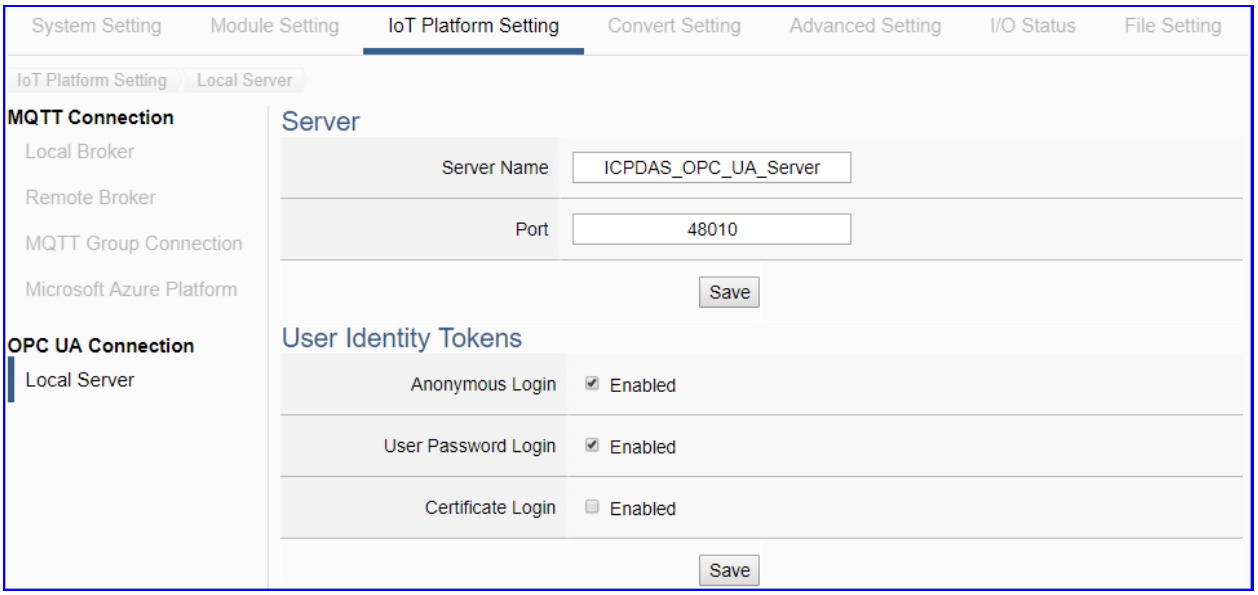
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Step 5. OPC UA Connection



Click the next step, and enter the **Step 5 [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.

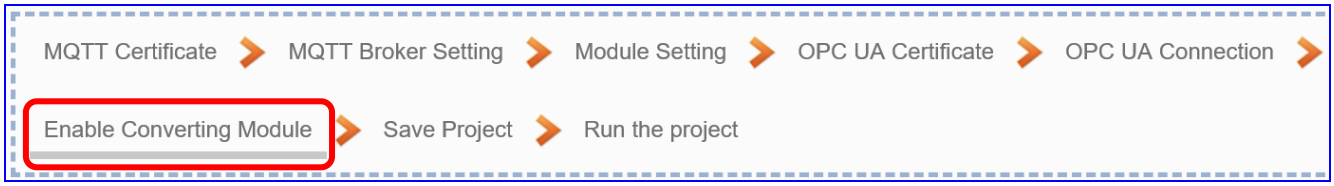
We select the “MQTT / OPC UA” conversion at the beginning, so this step will auto enter the [**OPC UA Connection > Local Server**] page of IoT Platform Setting. The “Step Box” will prevent the user from selecting the wrong platform.



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.

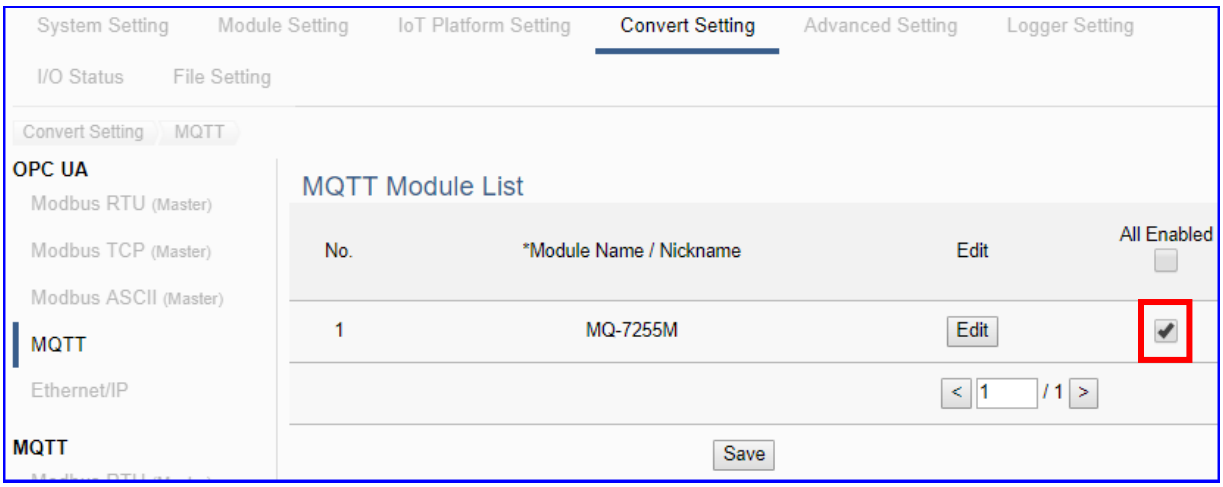
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Step 6. Enable Converting Module



Click the next step, and enter the **Step 6 [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.

This step: Please check the box of the module to enable the converting.

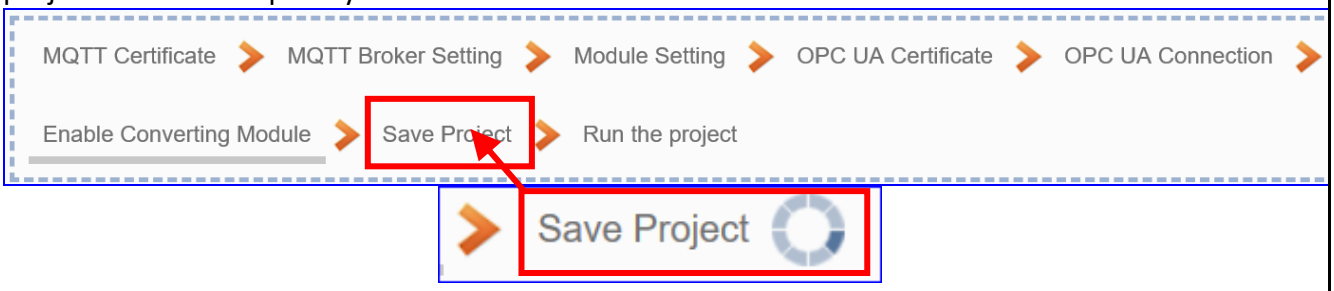


Convert Setting > OPC UA > MQTT - MQTT Module List	
No.	The module number in the module list (Not editable here)
*Module Name / Nickname	The module name set in the module list (Not editable here)
Edit	If user wants to enable some I/O channels for conversion, click [Edit] of that module to enter the “Variable 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.

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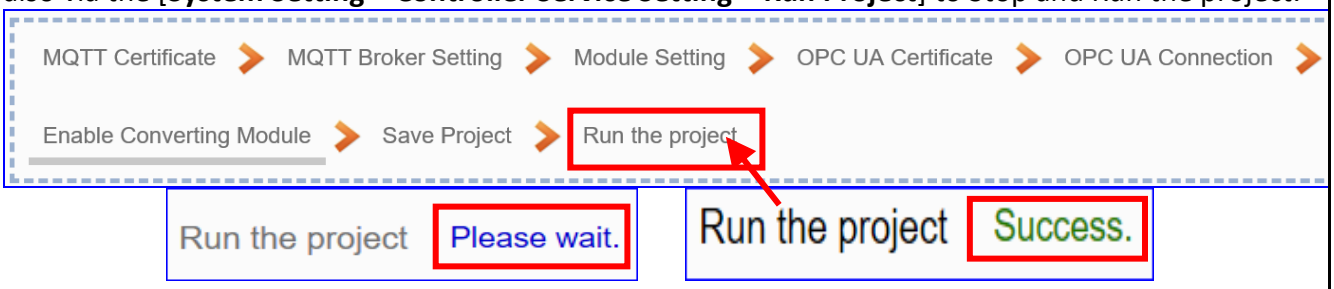
Step 7. Save Project

The setting of this example is finished now. 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.



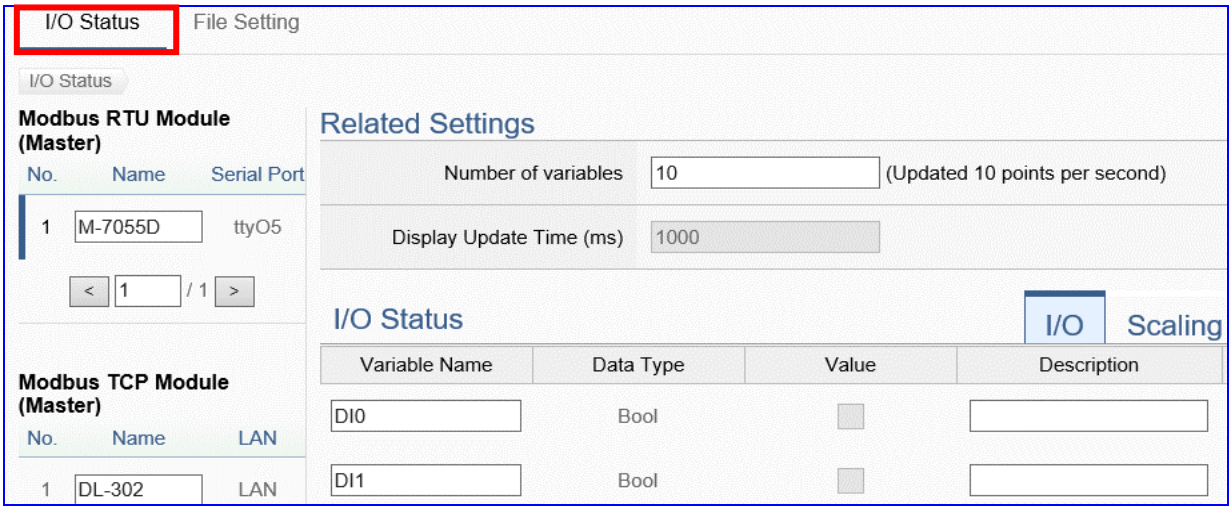
Step 8. Run the Project

The project, after saving, needs to be executed. Click the next step **[Run the Project]**. This step can also via the [**System Setting** > **Controller Service Setting** > **Run Project**] to Stop and Run the project.



When the words "**Please wait**" disappears, the new words "**Success**" appears, that means the UA controller is running new project successfully. 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. Users can see the I/O status from the menu [**I/O Status**]. For more about the Web UI settings, please refer to UA Manual CH4 and CH5.



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