NOVAKON

HMI – Your Intelligent IIoT Gateway Solutions

iM-Connect®

Protocol Conversion Software User Guide

Version Novakon_2.2.24.00

1306.0032

Directory

1. Log in to the Web

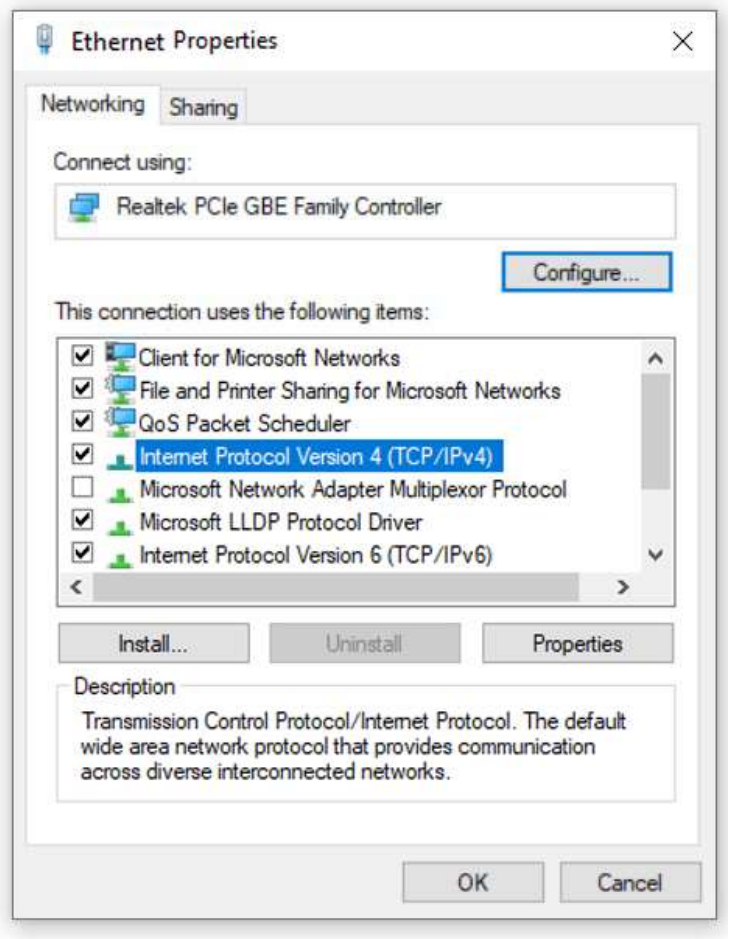
When you use GATEWAY for the first time, the default network port can be used to enter the web page for editing. The default interface is[LINK1].

The IP address is set as[http://192.168.0.80]or [http://im-connect.local]. Please do not change this IP address if not necessary.

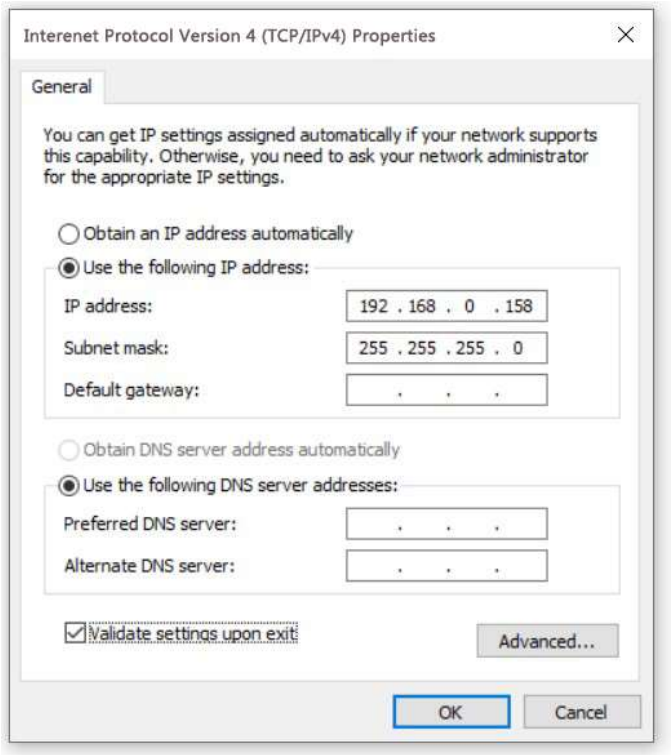
A new IP address of [LINK2] can be set after entering the webpage if needed.

When you enter the web page for the first time, the home page of the company profile (About) is shown. With the change of the operation screen, the page that a user leaves at last time would be shown in the next visit.

The first step is to set the computer's IP to match the same network segment as GATEWAY. Then, in Internet settings, click on Ethernet Properties,[Internet Protocol Version 4 (TCP/IPv4)], and[Properties].



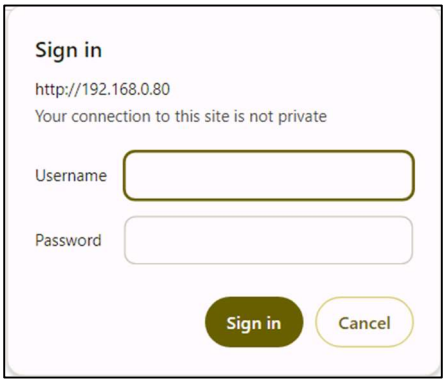
Next is to assign an IP address to the computer, which must be in the same network segment as GATEWAY. For example, the IP of GATEWAY is 192.168.0.80, and the computer can be set to 192.168.0.XXX as well. Both IPs have the same network segment but with different URLs.



Open the browser and enter the default URL :[http: //192.168.0.80] to enter the login page.

User name:[admin]

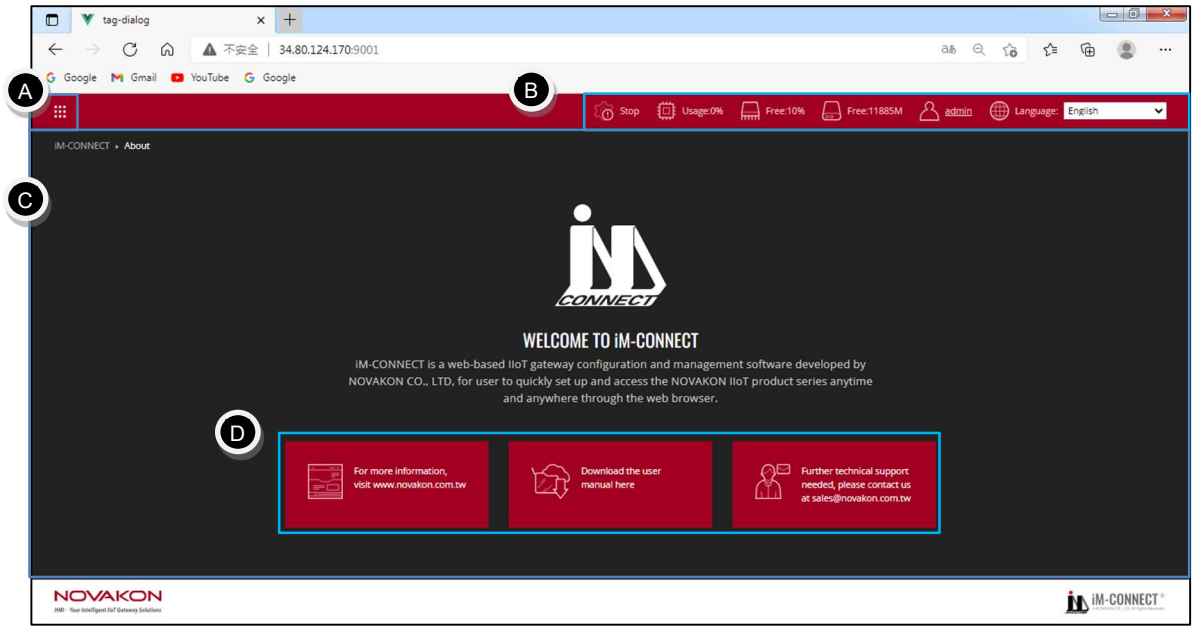
Default password :[1234]



[Note]: When restarting the Gateway, one must wait at least 50 seconds before restarting the web page.

2. Interface Description

After entering the URL and logging in, the following webpage is displayed.



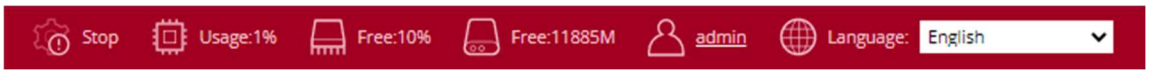
Ⓐ IM-CONNECT Menu	Ⓑ System Status Bar
Ⓒ Operation Setting Area	Ⓓ External Links

Ⓐ Click the button  to open the[IM-CONNECT]Menu. Then, choose the action to be performed:

[IM-CONNECT]website options:

IM-CONNECT Menu
1.ABOUT
2.PLC SETTING
3.TAG SETTING
4.DATA LOGGER
5.ALARM
6.MQTT
7.MACRO EDITOR
8.OPCUA
9.REST API
10.ONLINE MONTOR
11.PROJECT SETTING
12.SYSTEM SETTING
12.1 System Information
12.2 Network Setup
12.3 Date and Time
12.4 Security Setting
12.5 Service Status
12.6 Open License

Ⓑ System Status Bar:



	Display whether the RT is running or stopped.
	Display the percentage of current CPU usage.
	Display the remaining capacity of SDRAM.
	Display the remaining capacity of Flash.
	Press to log out current user.
	The language to be displayed in the interface and on the webpage. 2 options are available at this moment, including [English], [Traditional Chinese], [Simplified Chinese] and [Japanese].

Ⓒ Operation Setting Area:The selected function can be set up and performed in this area.

Ⓓ External Links:By clicking the buttons, you can access to Novakon official website for product introduction, document download or contact us for technical support.

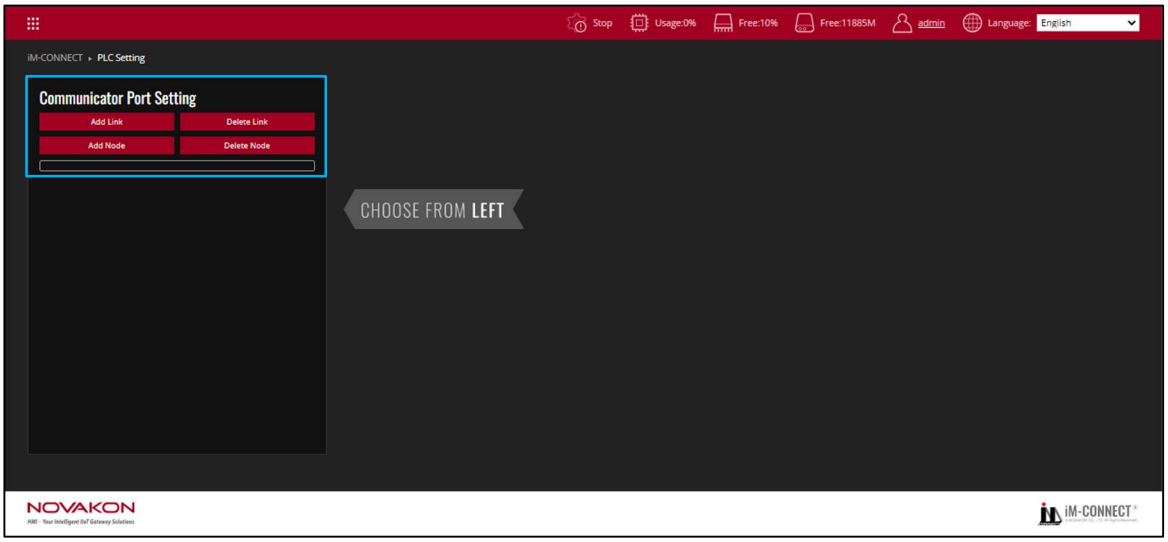
The related settings and operations of each function are introduced in the following chapters.

3. PLC Setting

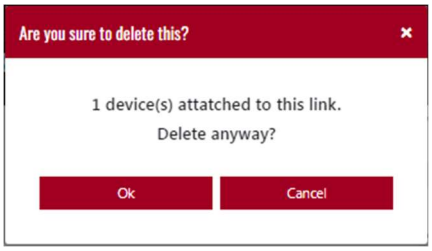
In the industrial automation applications, control and monitoring through the connection with PLC (Programmable Logic Controller) or controllers is very common. NOVAKON provides PLC Drivers that support various industrial communication protocols and PLC models widely used in the markets.

3.1 Communication Port Setting

First, set the communication port and related parameter to be used.

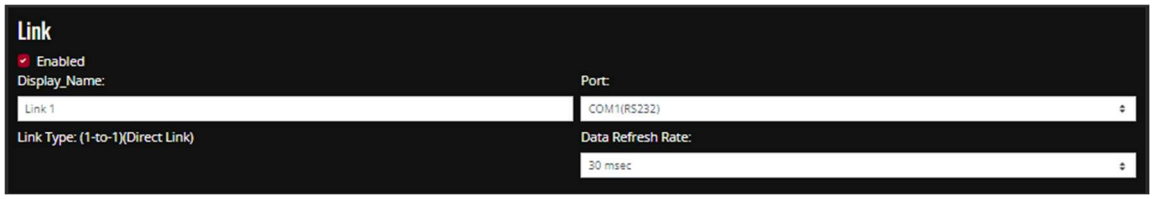


Add Link	Add a new link to be connected.
Delete Link	Check the box of the link desired to be deleted. After pressing[Delete Link], a dialog box would pop up for the user to confirm to delete a LINK. Press [Yes] to delete the selected link. Press [No] to cancel this action.

	
Add Node	Add a node to the selected Link.
Delete Node	Delete the selected node directly in the Link.

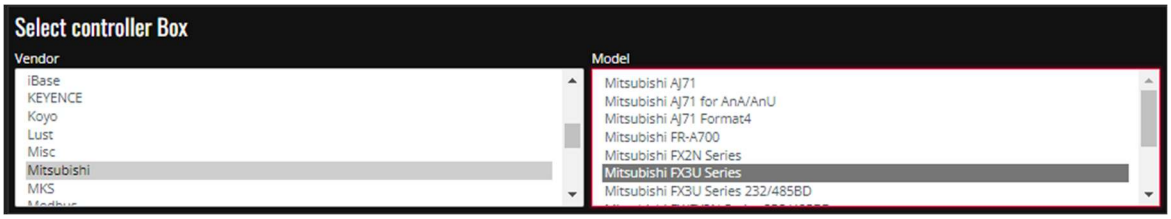
After adding a new link, the related details of the Link can be set up, such as the communication port to be used, PLC model (Protocol type), communication parameters, etc.

3.2 Link Setting



Enable	Check this box to activate the connection. The [Enable] is checked by default after the connection is established.
Display_Name	The name of the connection to be displayed. The default name is Link1.
Port	Select the communication port to be used. Based on different scenarios, one can select the corresponding communication ports, including[COM1(RS232)]、[COM1(RS422/RS485]、[Ethernet].

Link Type	Indicating the current connection type of the control is 1 to 1 direct connection (1-to-1).
Data Refresh Rate	To set the speed and frequency of receiving data from the controller.

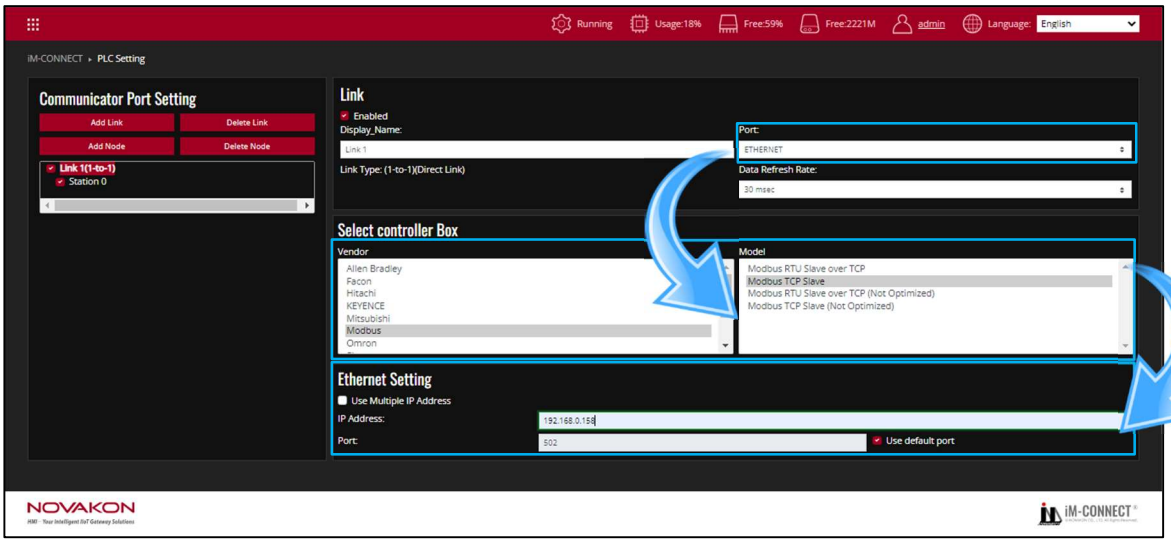


Select controller Box	Currently supported controller vendor and model. Please choose the vendor and then choose the model. For example, when COM is selected, only PLC models that support COM Port would be displayed. Likewise, when Ethernet is selected, only PLC models that support Ethernet are displayed.

Communication Format	Set the communication format.
Interface	Select RS232, RS422, or RS485.
Baud rate	Select 4800, 9600, 19200, 38400, 57600, 115200, or 187500.
Parity	Select Even, None, or Odd.
Data Bits	Select 7 Bit or 8 Bit.

Stop Bits	Select 1 Bit or 2 Bit.

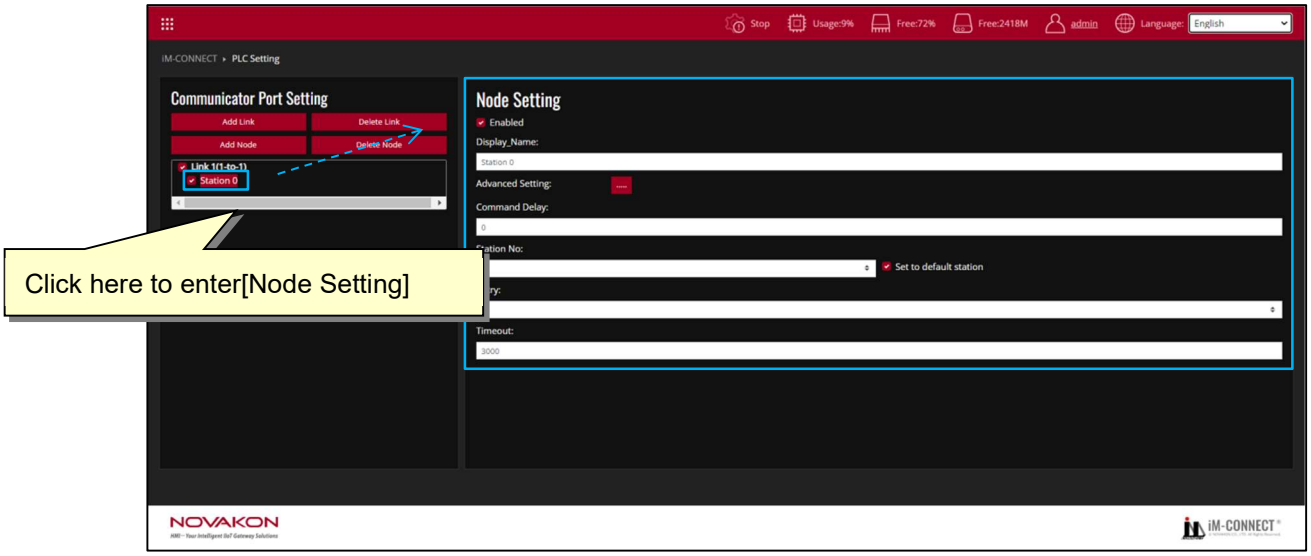
When the port is selected as Ethernet, only drivers that support Ethernet would be displayed, and the interface would be changed to the settings for Ethernet accordingly.



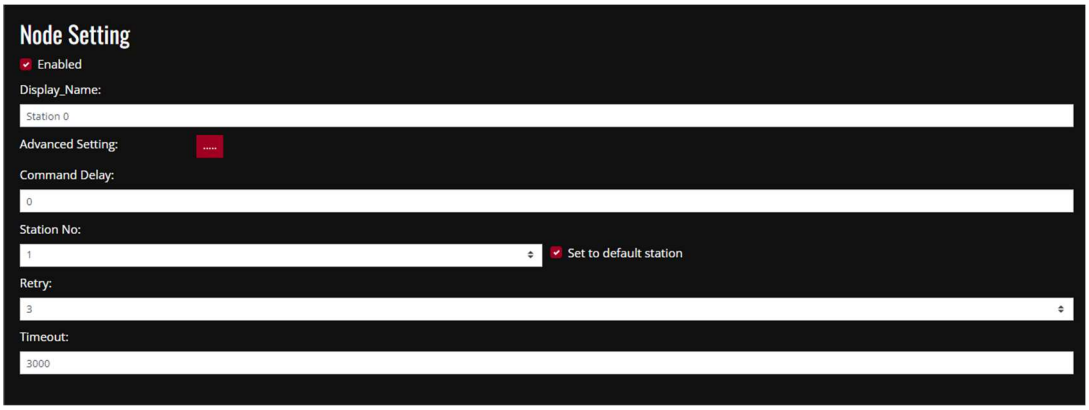
Ethernet Setting	Set Ethernet related parameters
IP Address	Set the IP address of the controller to be connected.
Port	Set the port number of the controller to be connected.
Use default port	Check to use the default port number; if you want to enter the port number yourself, uncheck it and enter it directly.

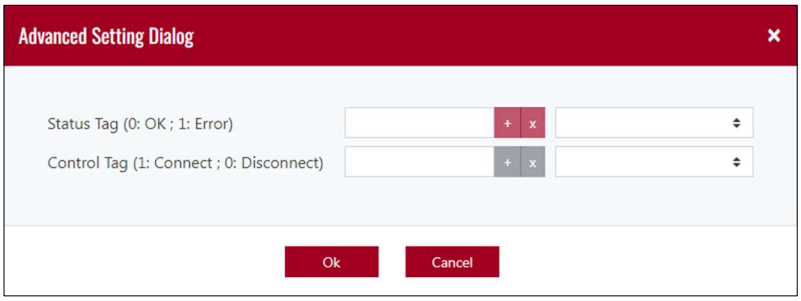
3.3 **Node Setting**

Node Setting is mainly used as auxiliary settings for connections, including information such as [Command Delay], [Station No], [Retry] and [Timeout].



Double Click[Link1]to display[Station 0]. Click[Station 0]to enter Node Setting page.



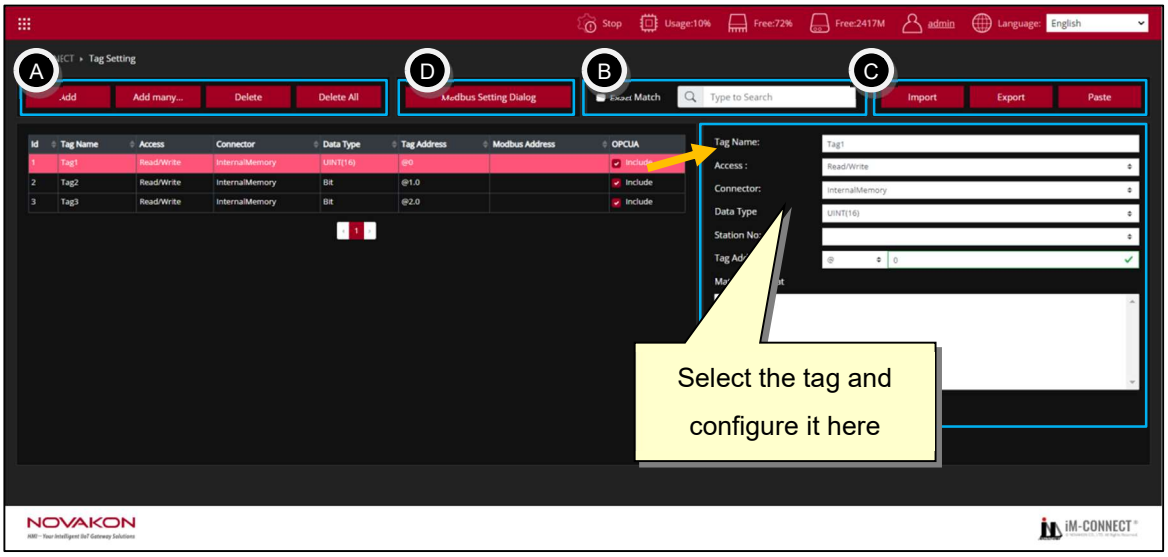
Enable	Check this box to activate the node. This [Enable] box is checked by default when a node is created.
Display_Name	Set the name of selected node. Default name is Station 0.
Advanced Setting	Set the system to show connection status when there's error. 

	[Status Tag]:Status of connection (0 means connected; 1 means disconnected) . [Control Tag]:The status of whether the connection is controlled. Tag value of 0 indicates disconnection, while 1 indicates connection.
Command Delay	The delay time for sending and receiving of commands to the controller. The unit is milliseconds.
Station No	Link to the controller corresponding to each node. You can set this station number as the default station number to facilitate linking with tags. If the PLC station number changes, the corresponding node station number must also change accordingly. If "Set as Default Station Number" is checked, the station number of this node will automatically correspond to the default value, so there is no need to specify the station number separately in the address of the tag settings. However, if other nodes are set in the project, the station number of each individual tag used must be specified one by one.
Retry	The number of times the confirmation signal would be automatically resent when the communication is abnormal.
Timeout	The waiting time before the connection is terminated and an error occurs when the communication is abnormal. The unit is milliseconds.

4. Tag Setting

Tag is closely related to each service, and almost all functions need well-defined tags. The way of using a tag is different for each function; however, setting a tag is quite similar. There are many benefits of using tags. One of them is to allow users to effectively summarize and organize the registers used by the controller.

Each ID represents a tag, which can correspond to the register address of a PLC or controller. If the registration number is not set, an error message would appear when entering the registered address and compiling.



A. Tag operation:

Add

One tag can be added at a time. After pressing the [Add] button, the complete content of the tag can be created in sequence.

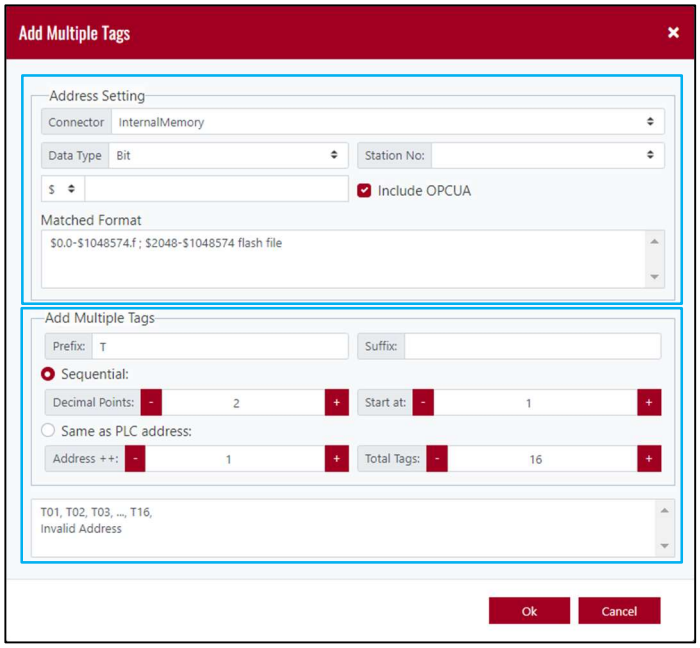
Tag_Name	Each tag can be assigned a tag name. The name supports multi-language input, and the name in English is case-sensitive (for example, Apple and apple represent two different tag names). The

	tag name must not be duplicated.
Access	Set the tag to be[Read/Write]or[Write Only].
Connector	Select the controller or the InternalMemory of Gateway to be used.
Data Type	Select the data type, including[Bit],[INT(8)],[UINT(8)], [INT(16)],[UINT(16)],[INT(32)], [UINT(32)],[FLOAT],[Ascii], [DOUBLE],[Ascii],[INT(64)],[UINT(64)]
Station No	The station number of the controller to be used. Some controllers have different station numbers, such as thermostats that use the Modbus protocol.
Modbus Address	The value of this address can be copied to the specified Modbus address.
Tag Address	The address of the register. If the format or range of the register is unknown, please refer to the prompt in the [Matched Format] window below, which display such information for the input of [Tag Address]. The figure below shows that a green frame would appear if the entered address meets the format.  The figure below shows that a red frame would appear if the entered address does not meet the format.  If the selected connection is [InternalMemory], it means that no external controller is connected, and only the internal register provided by GATEWAY is used. There are currently two register codes that can be used:

	[$]:This code represents the memory retaining with power off. When GATEWAY is restarted, the original data is still saved. The range is from $0 to $1048574, of which $2048 to $1048574 are stored in Flash. [@]:This code represents the memory not retaining with power off. When GATEWAY is restarted, the original data is not saved. The range is from @0～@65535. The above-mentioned two register codes can be used without actual connection to external controller as long as the setting conforms to the data type format. For example, when @0 (16-bit) is presented as a bit type, the expression is @0.0～@0.f. It can be understood that it is a squad of the troop. The left side of the decimal (integer place) means the number of squads, and the right side of the decimal (decimal place) is the squad number in the squad.

Add many…

Multiple consecutive tags can be added at one time.



Address Setting

Selection of Connector, Data type, Station No, and address.

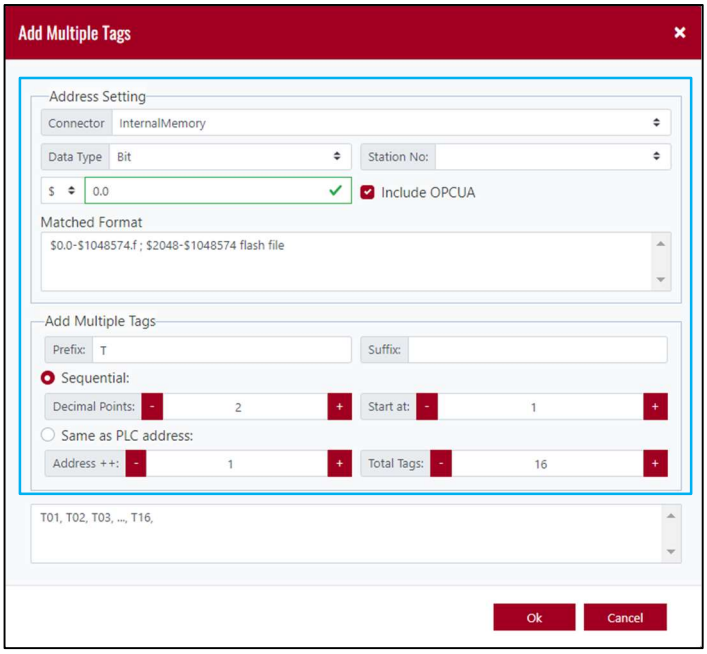
Connector	Selection of the controller to be used when adding new addresses.
Data Type	Selection of the type of data to be used when adding new addresses.
Station No	Selection of the station number of the controller to be used when adding new addresses.
Address	Enter the starting register address of the new tag.
Matched Format	This displays the format of the register address that the user can reference.

Add Multiple Tags

Set the format of add multiple tags.

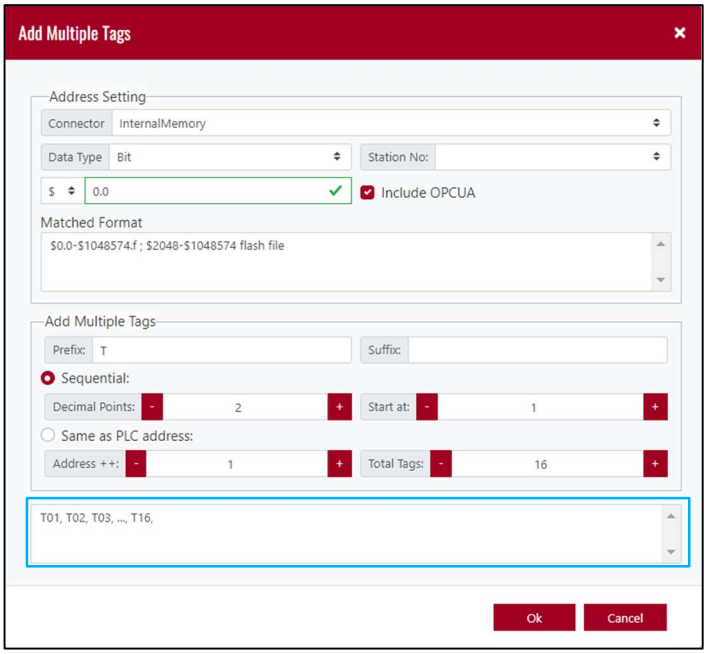
Prefix	Set the prefix of tag name.
Suffix	Set the suffix of tag name.

Sequential	The setting of custom prefixes and suffixes for the names of consecutively added multiple tags...
Decimal Points	The setting of the number of digits in the middle of the prefix and suffix.
Start at	The starting number of [Decimal Points].
Address ++	The number of increments of the register number in each step.
Total Tags	The total number of tags to be added.
Same as PLC address	Check this box, and the new tag name would be the same as the address of the PLC register.



For example, in the figure shown above, the controller is set a [InternalMemory](internal memory), and the data type is [Bit], the address is [$0.0]. The prefix is set to [T], the suffix is not set, the number of digits is [2], and the initial value is [1], the address increment is [1], and the number of tags is [16].

When [Continuous] is selected, the tag name is set in the sequence of T01, T02, T03,..., T16, and the corresponding address is $0.0,$0.1,$0.2,...,$0.f.

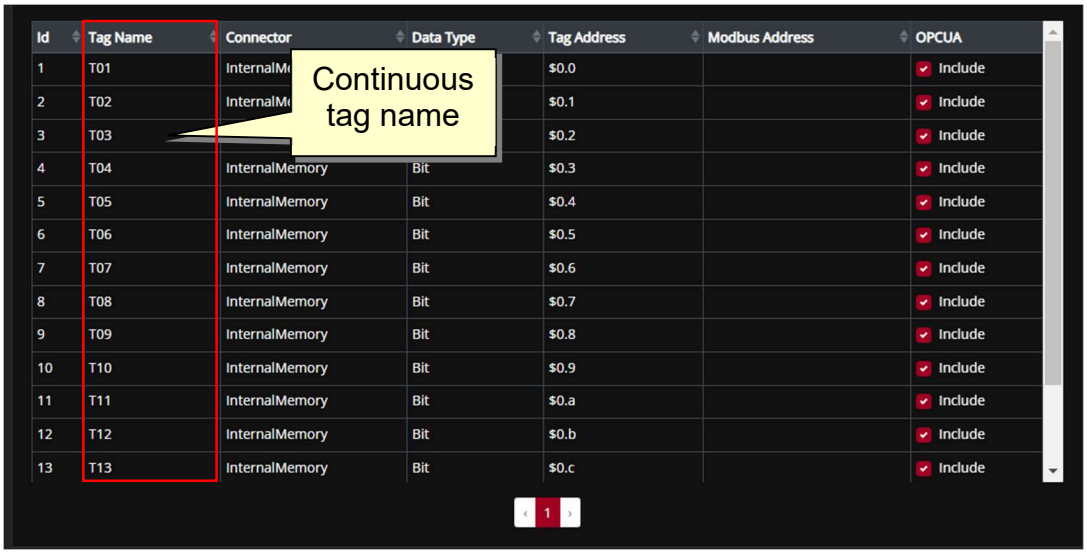


According to the new tag content set, the added tag name would be generated immediately to provide a preview at the bottom of the dialog box. If the setting is wrong, the preview window prompts the message of [Invalid Address].

Click [OK] after completion, and GATEWAY would automatically add consecutive tags.

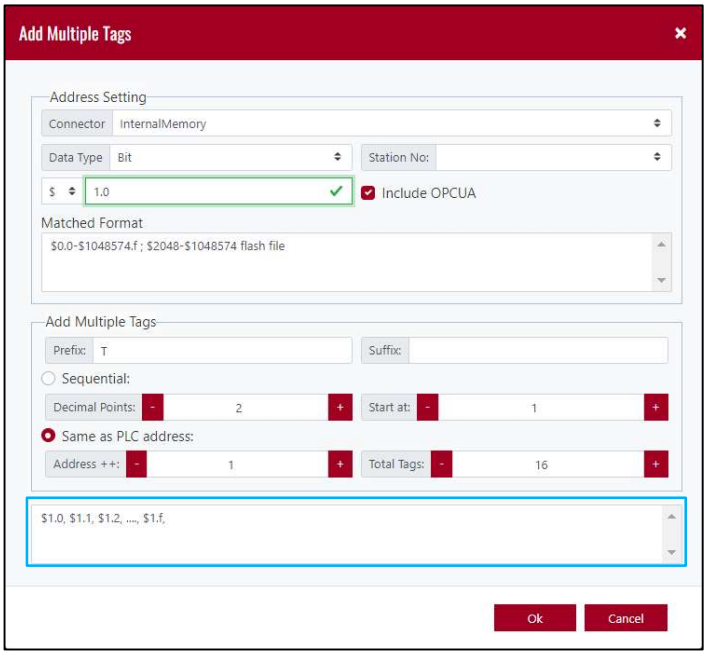
Note: All objects in the edit correspond to the tag name, not the address of the controller.

The following figure shows the content of the tag created when [Continuous] is selected.

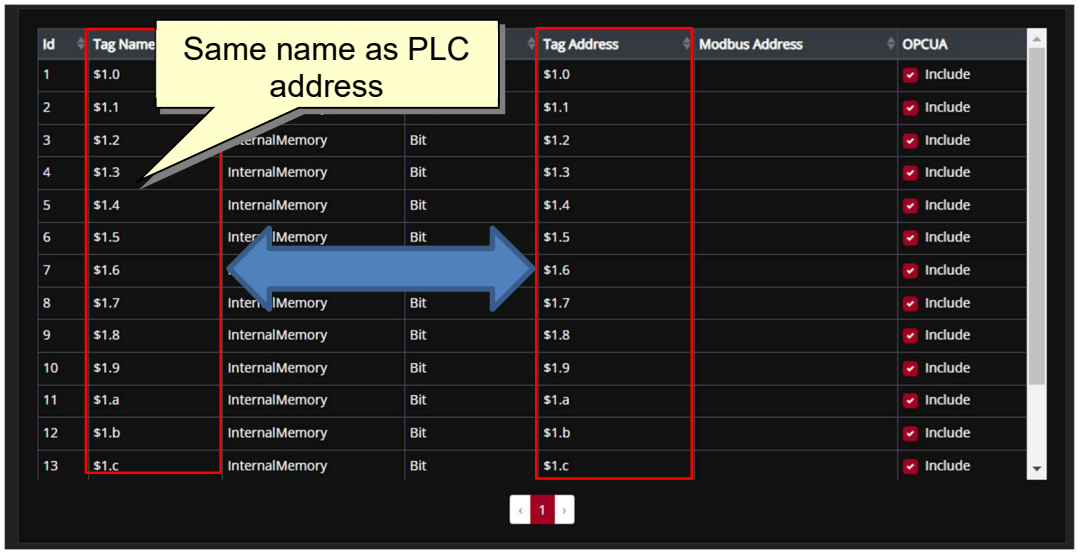


Id	Tag Name	Connector	Data Type	Tag Address	Modbus Address	OPCUA
1	T01	InternalM		$0.0		Include
2	T02	InternalM		$0.1		Include
3	T03			$0.2		Include
4	T04	InternalMemory	Bit	$0.3		Include
5	T05	InternalMemory	Bit	$0.4		Include
6	T06	InternalMemory	Bit	$0.5		Include
7	T07	InternalMemory	Bit	$0.6		Include
8	T08	InternalMemory	Bit	$0.7		Include
9	T09	InternalMemory	Bit	$0.8		Include
10	T10	InternalMemory	Bit	$0.9		Include
11	T11	InternalMemory	Bit	$0.a		Include
12	T12	InternalMemory	Bit	$0.b		Include
13	T13	InternalMemory	Bit	$0.c		Include

If [Same as PLC address] is selected, the tag name would be the same as the PLC address, as shown in the figure below.



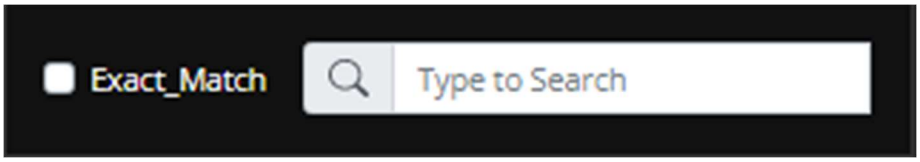
The following figure shows the created tag.



Delete	Click this button to delete a tag(s). Move the cursor to the leftmost serial number column, press, hold and drag the mouse's left button to select multiple tags, and click [Delete] to delete multiple tags simultaneously.
Delete All	Click this button to delete all the tags.

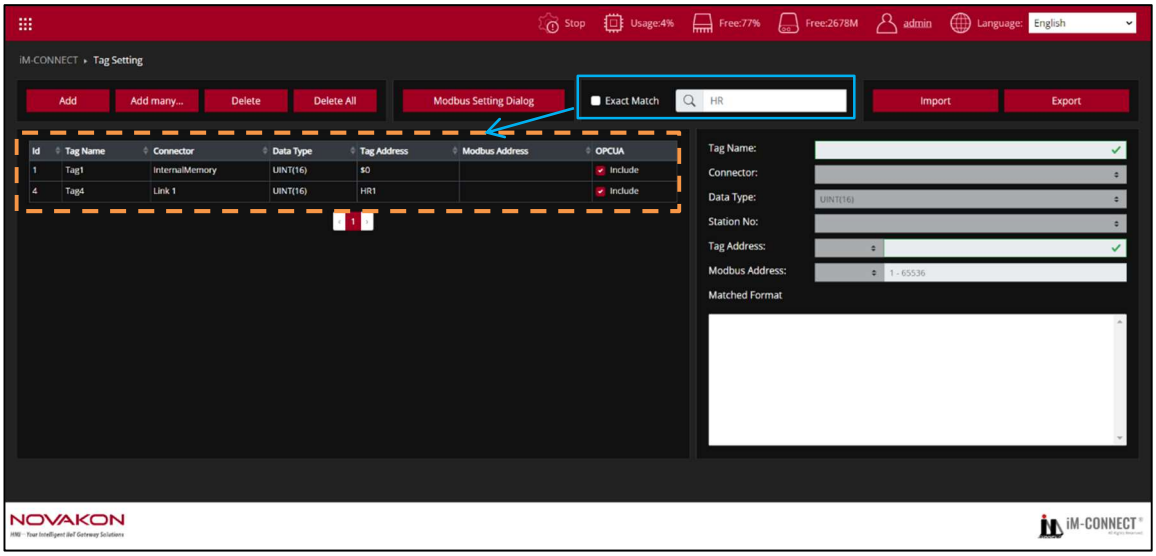
B. Search

This is used for searching for tags that are the same as the keywords according to the input content, including tag name, type, address, etc.

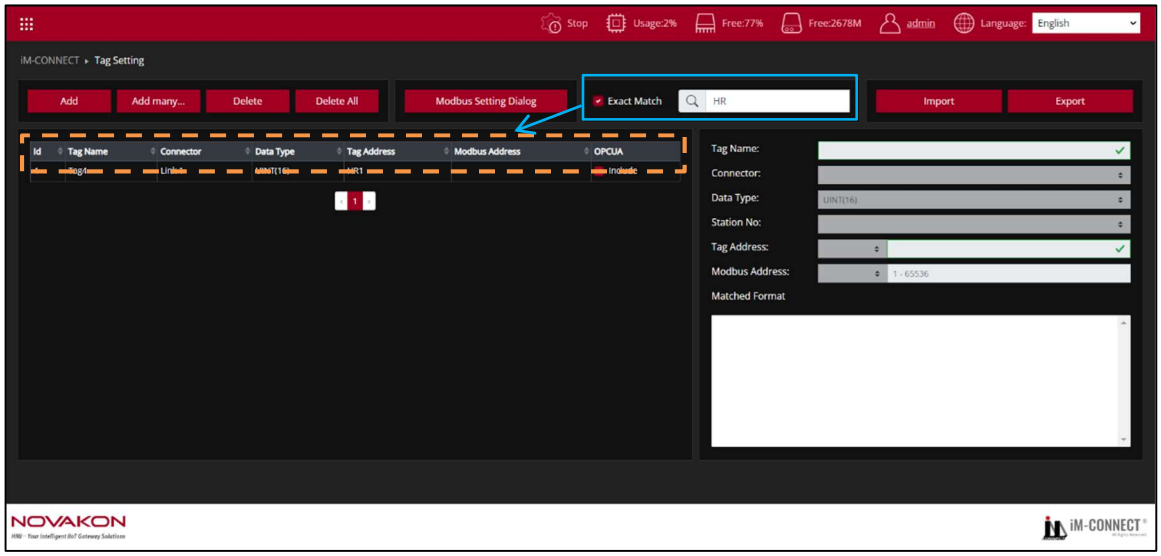


GATEWAY would automatically help us search for all matching tag content when we enter the text to be searched.

For example, after entering the search [HR] in the figure below, all tags containing [H] or [R] would be displayed, regardless of the order in which they are arranged.



But when [Exact_Match]is checked, GATEWAY would automatically list all the tag names that meet the [HR] conditions, and the arrangement position must be correct.

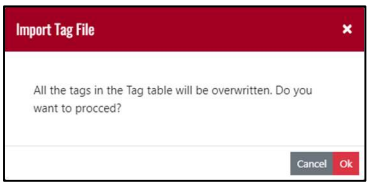


C. Import/Export

Export is to output the data content of the tag into a text file (default as fileName.TXT).

Import is to read the text file (*xml, *njnx, *.TXT) back into the tag content.

Click the [Import] button, and a confirmation window as shown in the figure below would pop up.



Click [YES] to confirm to execute the action of importing tags, select the file you want to import, and then press [Open].

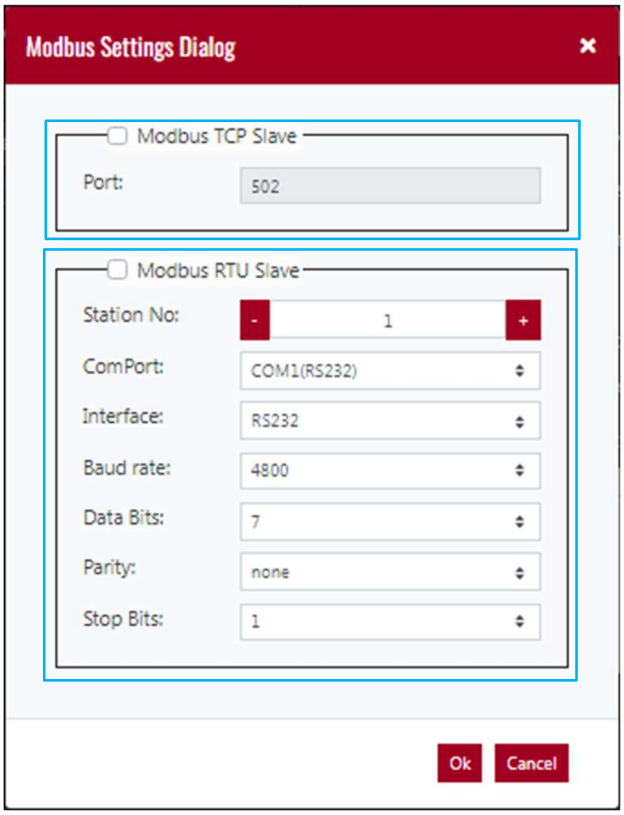
Click [NO] to exit from executing the action of importing tag.

Click the [Output] button, the system will output the data content of the tags into a text file (*.TXT) as backup or for user to edit then import later.

D. Modbus Setting Dialog

Set GATEWAY as Modbus slave.

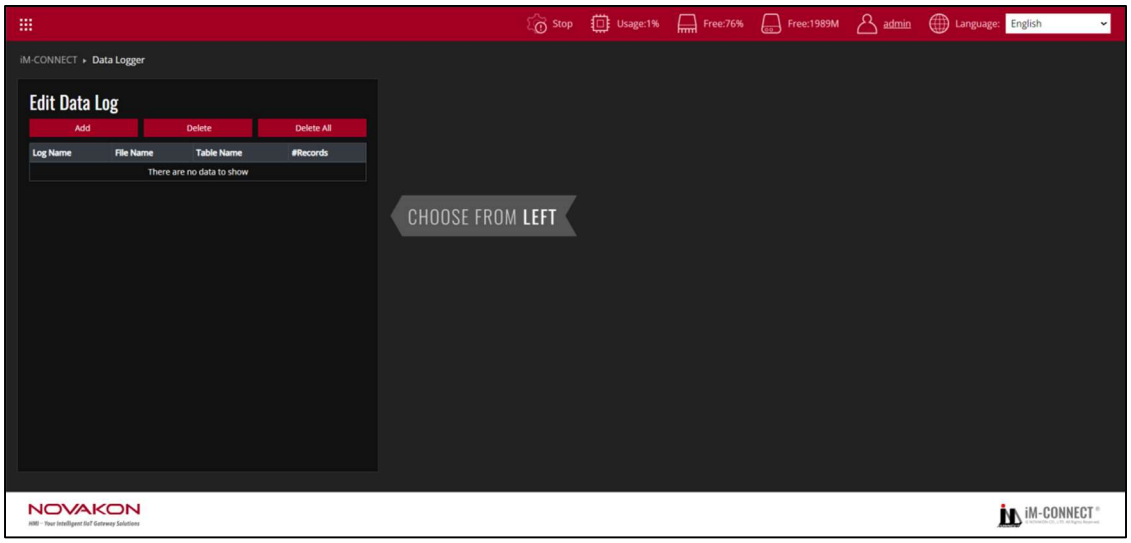
Note:When setting the Modbus slave controller in [PLC Setting], it means GATEWAY itself is Modbus Master, and the controller is Modbus slave.



Modbus TCP Slave	Check the box to activate GATEWAY as[Modbus TCP Slave].
Modbus RTU Slave	Check the box to activate GATEWAY as[Modbus RTU Slave].

5. Data Logger

[Data Log]:Store the historical data in flash memory and move to database at the defined timing.



Edit data log

Set the basic parameters of the data record. A buffer is created for each data record, and historical data can be stored in the buffer.

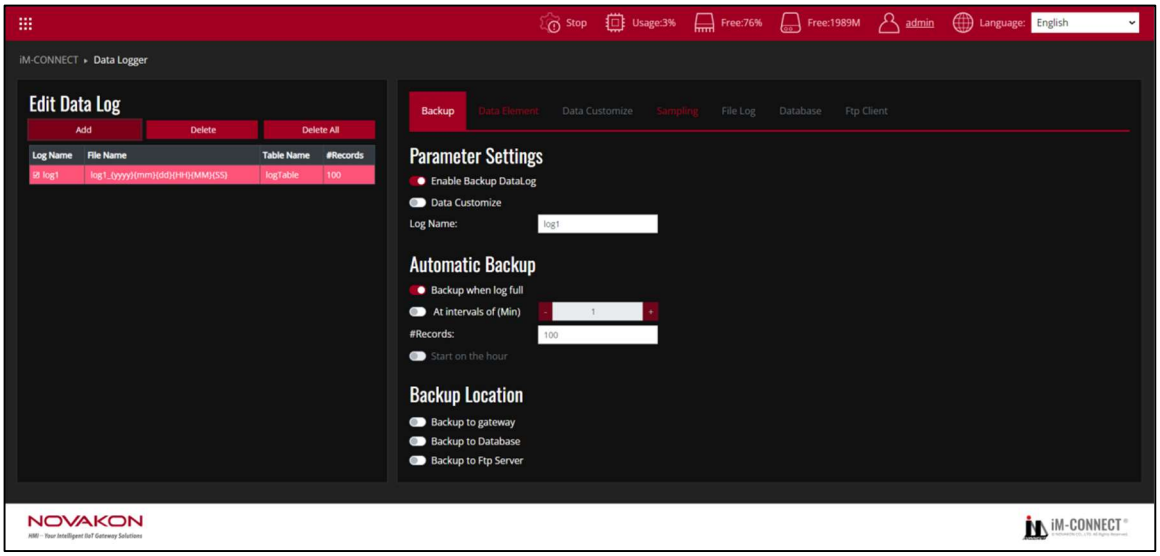
Add	Add a set of record. The records can be added up to 100 sets in maximum.
Delete	Delete the selected record name.
Delete All	Delete all the records at once.
Log Name	Display the log name. You can set the name in "Backup" -> "Parameter Settings", defaulting to "log1".
File Name	Display the name of the saved file. You can set it in "File Name", defaulting to "log1_{yyyy}{mm} {dd}{HH}{MM}{SS}" (file name_yearmonthdayhourminutesecond).

Table Name	Display the name of the database table. You can set it in "Database", defaulting to "logTable".
#Records	Display the number of backup entries. You can set it in "Backup" -> "Automatic Backup".

[File (table) name][#record] is located in the same location as the above-edited data record content.

When using a database, [log name] is the table name of the database.

When the file does not exist in the MSSQL, MYSQL, or FTP path, it will be automatically added and then created based on the name.

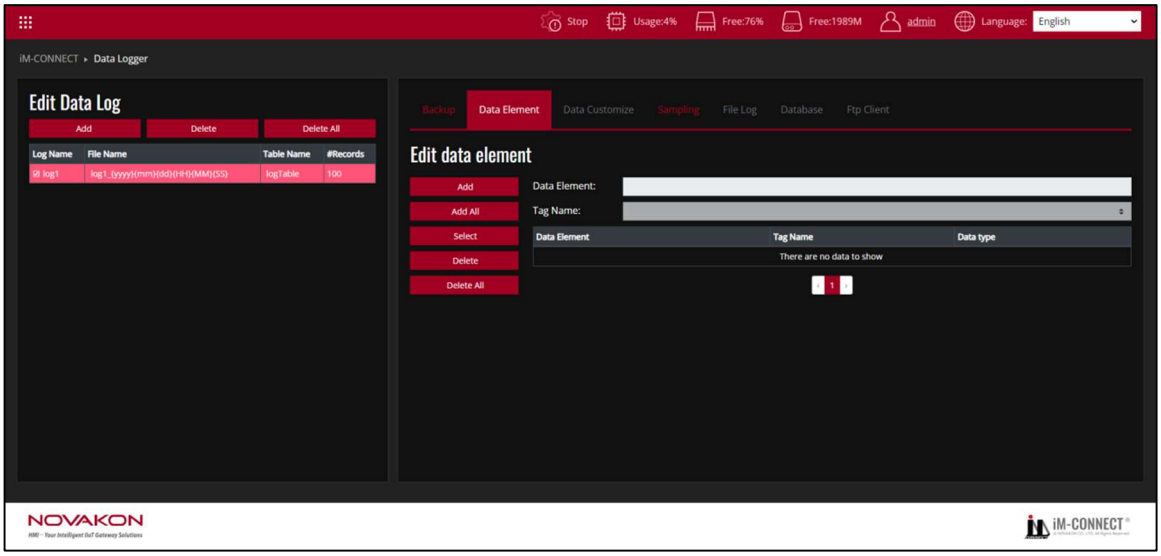


Backup

Set the backup time and device.

Parameter Settings	Set whether to enable backup logging, Data Customize, and Log Name.
Enable Backup DataLog	Activate the data logging backup function. Once activated, you can edit the items of the data records in the[Data Element]section.
Data	Activate the custom data logging backup function. Once activated,

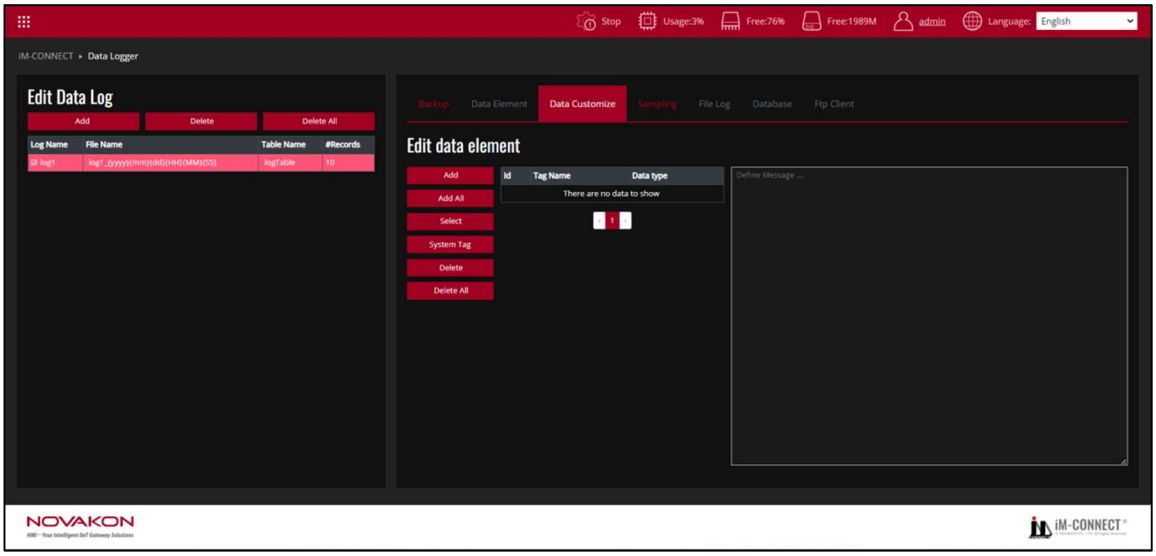
Customize	you can edit the items of the data records in the [Data Customize]section. If [Backup to Database] is activated in the[Backup Location], then [Data Customize] cannot be activated, and vice versa.
Log Name	Set the name of the data logging file. This name will be displayed in the [LogName] section of [Edit Data Log].
Automatic Backup	Set the condition to trigger automatic backup.
Backup when log full	When this option is activated, the data record is backed up when it is full. And [At intervals of (Min)]and[Start on the hour]are mutually exclusive.
At intervals of(Min)	Set to backup records at fixed minute intervals. The default is every 1 minute.
#Rccords	Set the number of data backups.The maximum number is 65535. If combined with [Data Customize]to create a table, it represents the number of times the data record is repeated in the data log.
Start on the hour	When this option is activated, the backup time will be set to the top of the hour (i.e., at 0 minutes), and the time will follow the [At intervals of (Min)] setting mentioned above. However, at this time, [At intervals of (Min)] can only be set to values that are divisible by 60.
Backup Location	Set the location to store data logs. Options include "Backup to gateway," "Backup to Database," and "Backup to FTP Server."



Data Element

Set the constituent items of the data record, including project uyname, tag, data format.

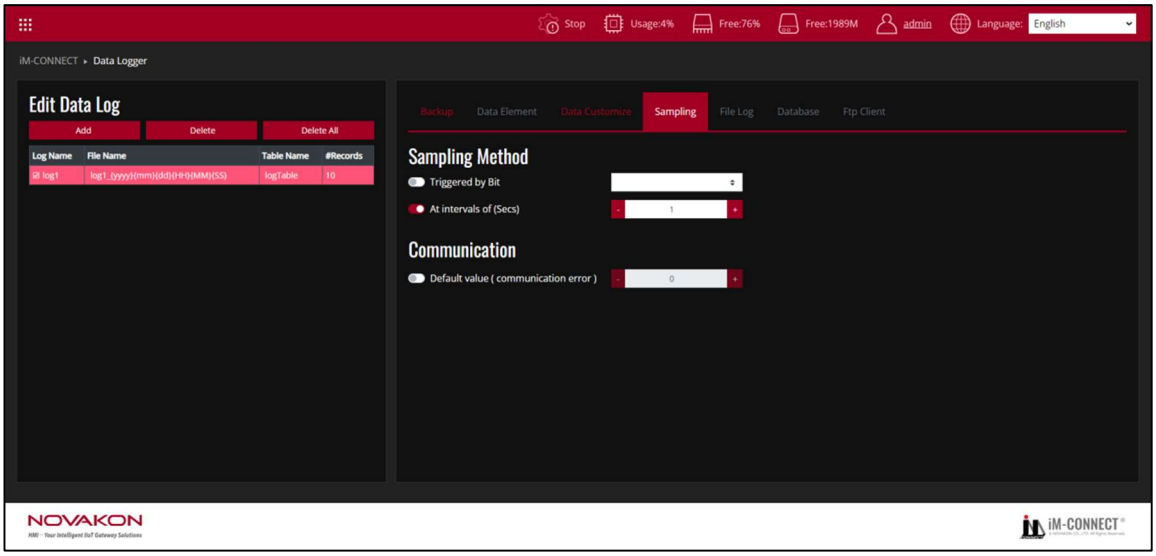
Edit data element	Set the items and conditions of data records.
Add	Add a data element. The added items can contain 32 items in maximum.
Add All	Add all tags to the data record items.
Select	Select the existing tags as the item contents.
Delete	Delete the selected item.
Delete All	Delete all item at once.
Data Element	Set the item name. The name would be displayed in the database, and it supports multiple languages editing. Nevertheless, using English for naming is suggested.
Tag Name	Set the designated tag for each item. The tag type supports all formats.
Data type	Display the data type of each tags.



Data Customize

Customers can define the content of data record items themselves.

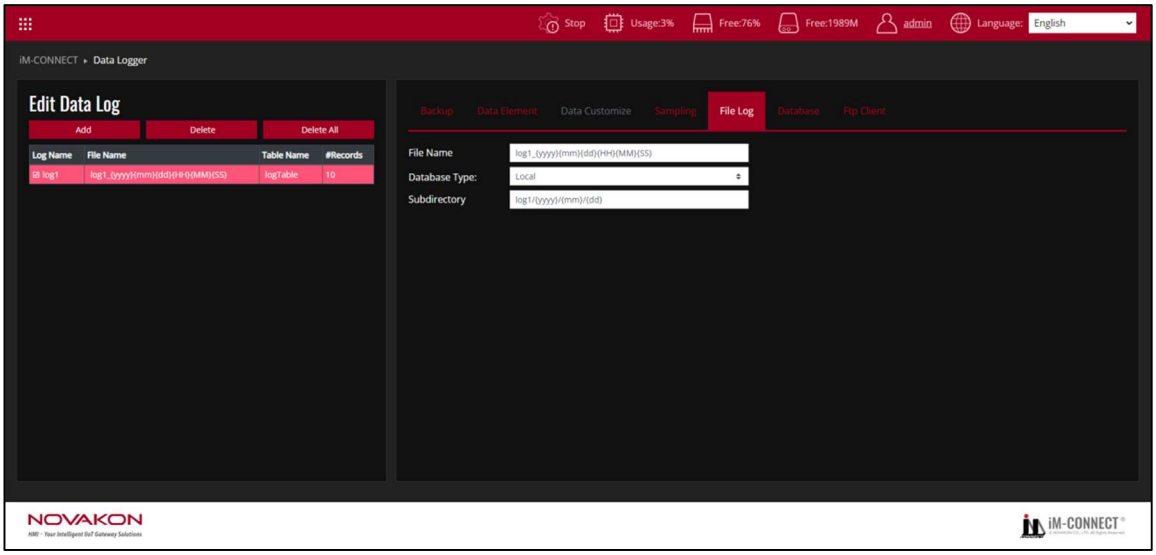
Edit data element	Configure the components of the data record, including item name, tags, and data format.
Add	Add a tag.
Add All	Add all tags to the data record items , excluding system tags.
Select	Select the existing tags as the item contents.
System Tag	Select system tags to be used as the content of data record items.
Delete	Delete the selected item.
Delete All	Delete all item at once.
Define Message…	You can enter the defined message text here. Use the tag from GW01 with the format #{ID}.



Sampling

Set the sampling conditions and the corresponding action.

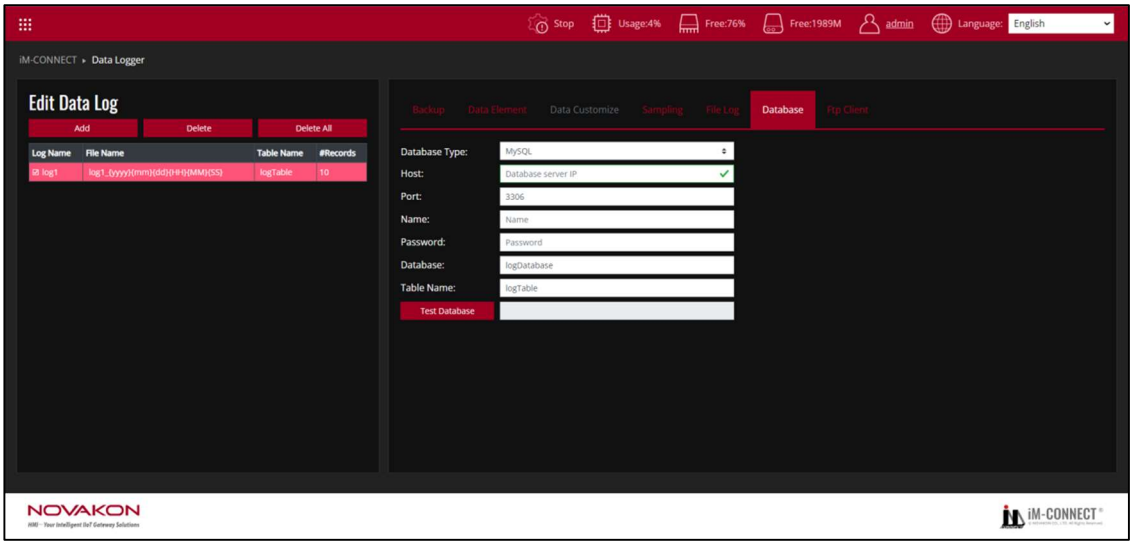
Triggered by Bit	Trigger the sampling based on Bit ON or Bit OFF.
At intervals of	Set the fixed time interval of seconds for sampling records. The default value is 1.0 seconds.
Default value (communication error)	Set the value to indicate communication error.



File Log

Configure the information for saving files.

File Name	Set the name of the data log file for saving. This name will be displayed in[Edit Data Log]under[File Name] ◦ The default is[log1_{yyyy}{mm}{dd}{HH}{MM}{SS}]
Database Type	Select the device type for accessing the database. Options include[Local]or[USB].
Subdirectory	Set the subdirectory for storage. The default is [log1/{yyyy}/{mm}/{dd}].

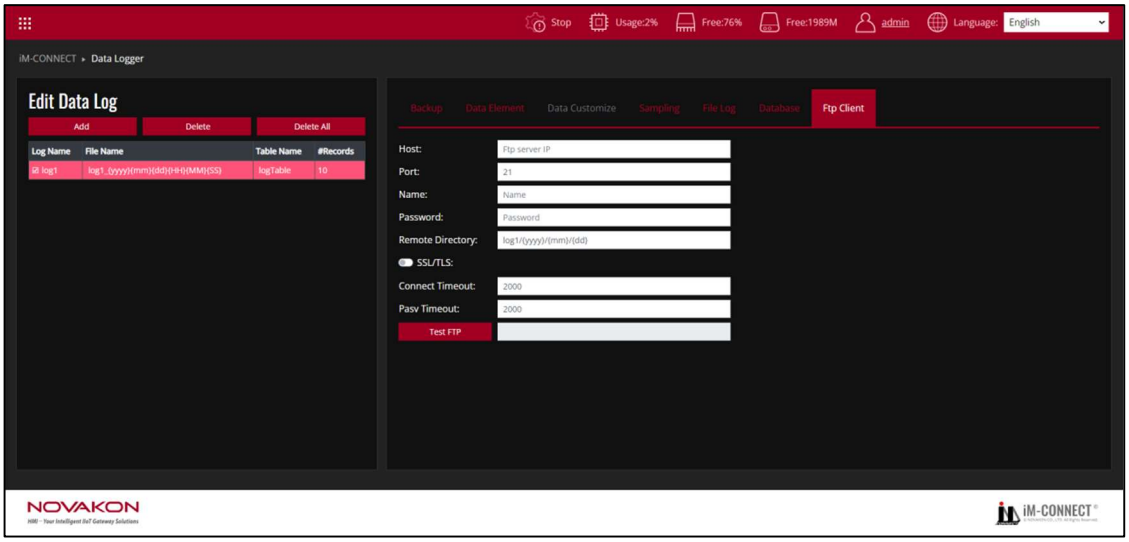


Database

Set the uploaded database information.

Database Type	Set the database type. [MySQL]and[MS SQL]are currently available in the latest version.
Host	Set the name or IP of the server for the uploaded database.
Port	Set the Port number of the uploaded database.
Database	Set the name of the uploaded database.
Name	Enter the database username.
Password	Enter the database user password.
Database	Enter the name of the database. The default is[logDatabase]. If the database has not been created, it will be automatically created during the first data transmission.
Table Name	Enter the name of the database table. The default is[logTable]. If the database has not been created, it will be automatically created during the first data transmission.
Test Database	Test the settings of the database. You can test the connection with database here as long as the boxes of[Enable Backup Datalog]and

	[Enable Database Backup]are checked.



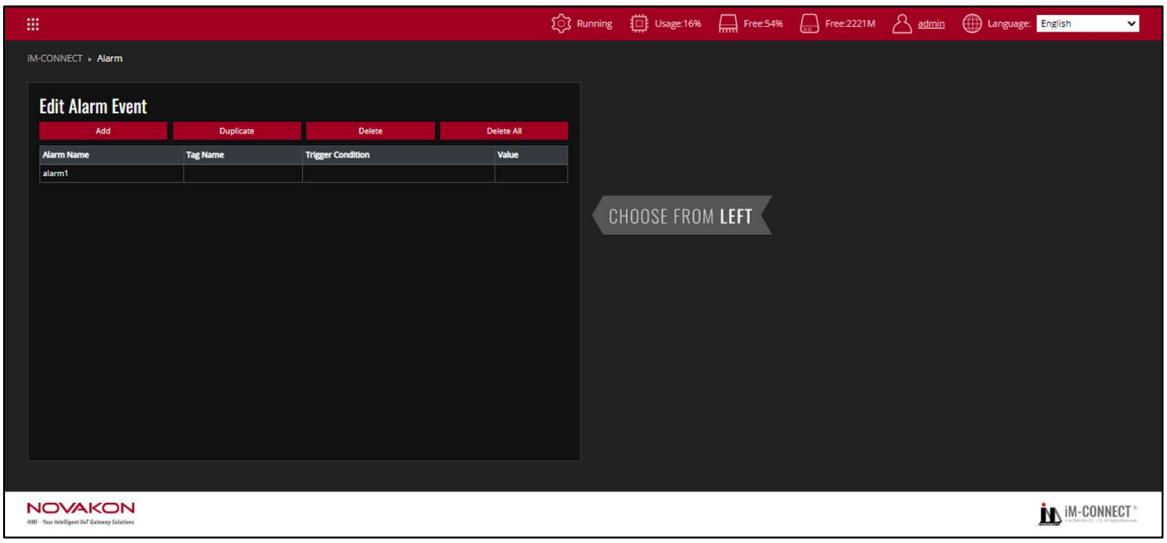
FTP Client

Set gateway as FTP Client with the condition and related information of FTP Server, to which gateway send data through Internet.

Host	Input the server's name for connection.
Port	Input the port number of the server to connect.
Name	Input the FTP client username.
Password	Input the FTP client password.
Remote Directory	Input the remote directory of FTP server for upload.
SSL/TLS	Check to enable connection encryption.
Connect Timeout	You can set the connection timeout period. The default is 2000 milliseconds.
Pasv Timeout	You can set the passive timeout period. The default is 2000 milliseconds.
Test FTP	Click to test the connection to FTP server.

6. Alarm

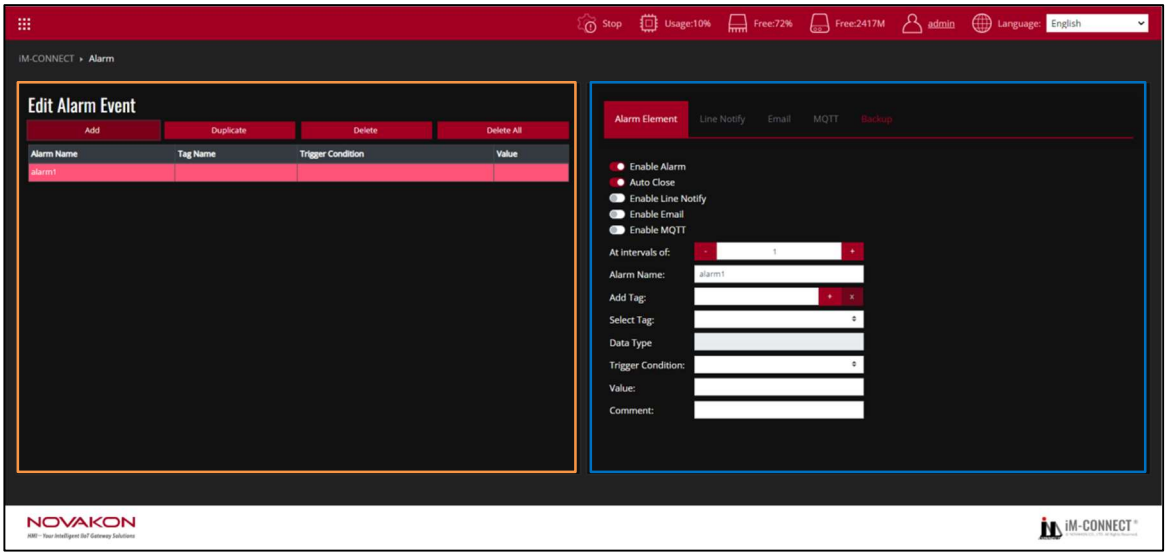
Alarm enables the set tag to send alarm messages through Line Notify, Email, or MQTT when the defined condition is met. (e.g. value falls in the predefined range, or bit turns on, etc.).



Edit Alarm Event

Edit Alarm Event can be used to edit the content of the alarm data, including [Add], [Duplicate],[Delete], and [Delete All].

Add	Add an alarm. One alarm content can be added at a time.
Delete	Delete an alarm. Move the mouse cursor to an alarm and press [Delete] to delete the selected alarm.
Duplicate	Copy an alert. After moving the mouse cursor to an alarm, press [Duplicate] to duplicate the same alarm. The name of the duplicated alarm would be incremented by the default name (alarm). The rest of the content is the same.
Delete All	Delete all alarms at once.



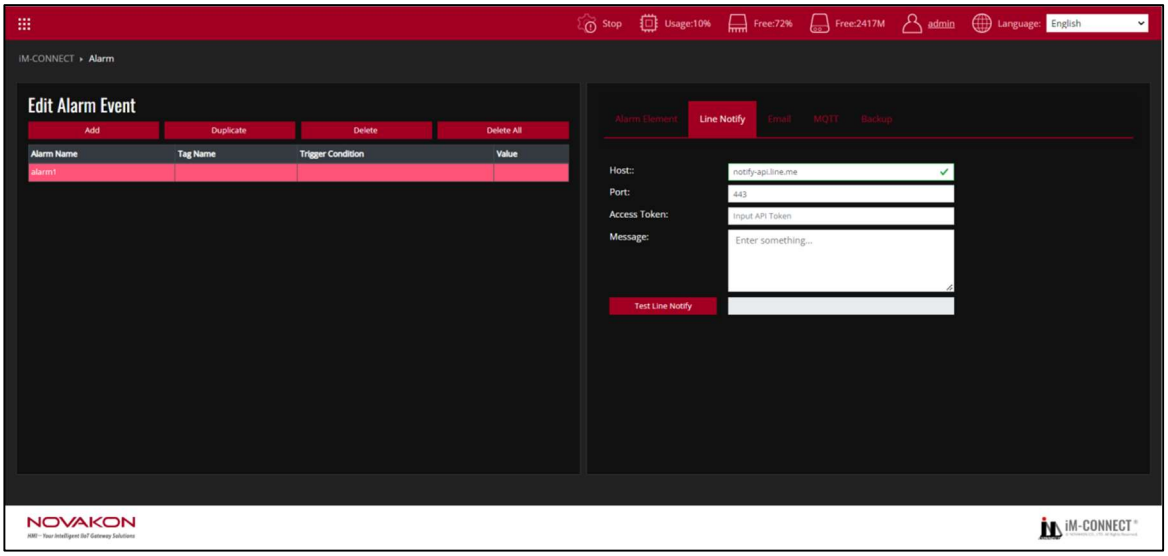
In the above figure, the orange frame on the left shows all the alarms that have been set.

Alarm Name	Set the name of the alarm, which can be used to describe the content of the alarm.
Tag Name	Set the connected tag to determine whether an alarm occurs.
Trigger Condition	Display the trigger conditions.
Value	Display the condition value of the alarm.

The blue frame on the right side of the figure above is the dialog box for the alarm setting.

Enable Alarm	Activate the alarm. If this option is not activated, the alarm content would not be displayed regardless of whether the conditions are met.
Auto Close	When the alarm is cleared (the trigger condition is not met), the alarm is automatically closed. If this option is not activated, the alarm continues to be triggered even if the alarm condition has been

	removed.
Enable Line Notify	Set the Line Notify Messenger APP function when the alarm is triggered.
Enable Email	Set the function of sending email to a specified mailbox when the alarm is triggered.
Enable MQTT	Set the function of publishing message to the designated MQTT Broker when the alarm is triggered.
At intervals of	The interval between alarm sampling. The unit is seconds.
Alarm Name	Set the name of the alarm, which can be used to describe the content of the alarm.
Add Tag	Set the tag to determine whether an alarm has occurred. If the tag has not been created, press [+] on the right to add a tag.
Select Tag	The set tag can be selected as the one to judge the alarm. In the same alarm, [Add Tag] and [Select Tag] would have the same selected tag.
Data Type	Display the specified tag type.
Trigger Condition	Display the trigger conditions. When the trigger tag type is [Bit], [Set] or [Clear] can be selected to trigger an alarm. The various types of judgment mechanisms, including [=], [!=] (not equal to), [>], [>=], [<] and [<=] are available for selection.
Value	The value of the condition that the alarm is established. When the content of the [tag] meets the [value] of the [Trigger Condition], the alarm would be triggered. If the source type is [Bit], this field does not need to be set.
Comment	Set the description of the alarm.



Line Notify

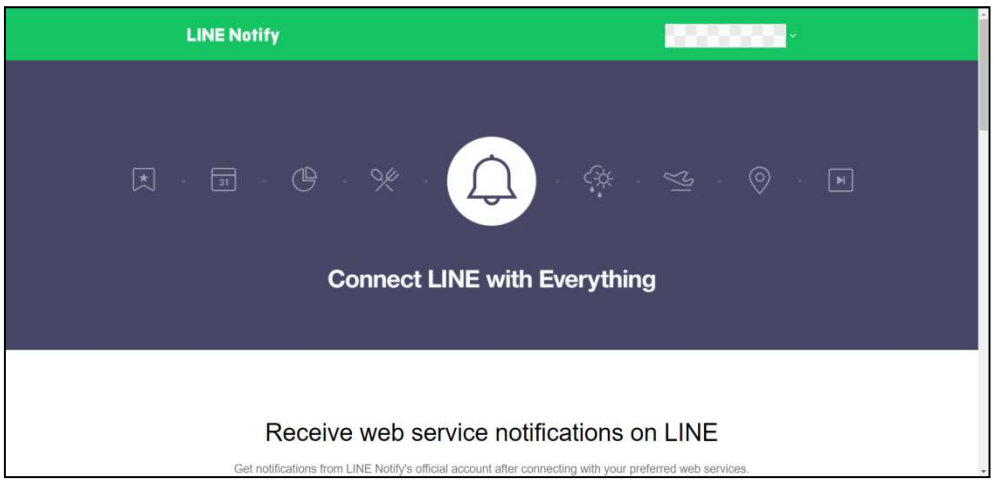
Set the line group and message to be sent when the alarm is triggered.

Host	Display the default server address of Line Messenger App.
Port	Displays the default Port of Line Messenger App.
Access Token	Enter the access token for Line. For the line access token setting method, please refer to [Appendix:LINE Push Broadcast Setting].
Message	Enter the content of the message to be pushed. Input[#{tag name}]in the Message Body if the message should contain Tag content.
Test Line Notify	Show the content of the response message after the push.

For example:

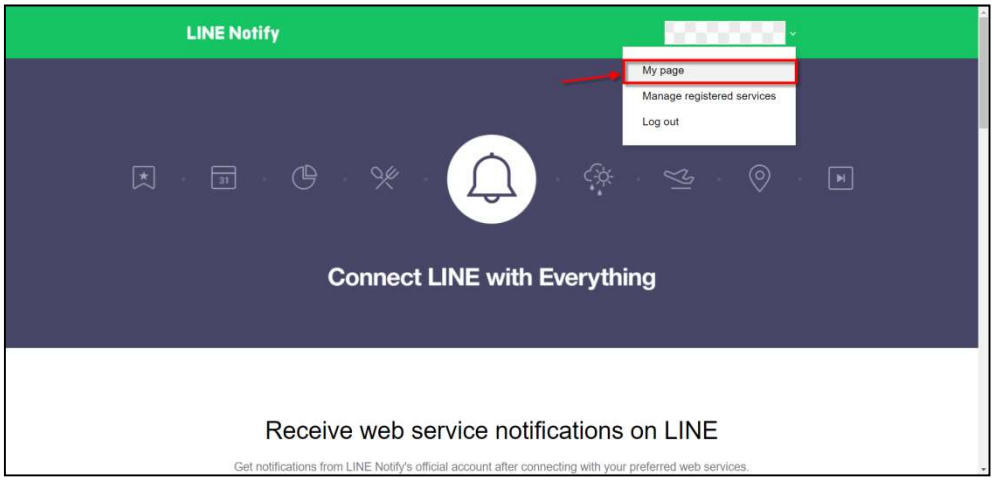
STEP1.

Connect to the Line Notify website and click on "Log in with Line account".



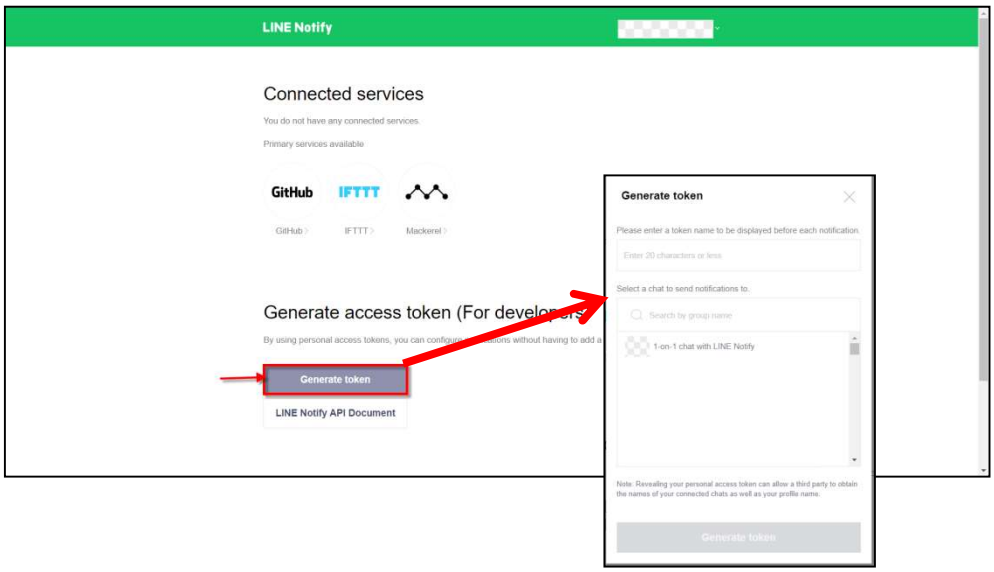
STEP2.

Click on "My page" to enter.



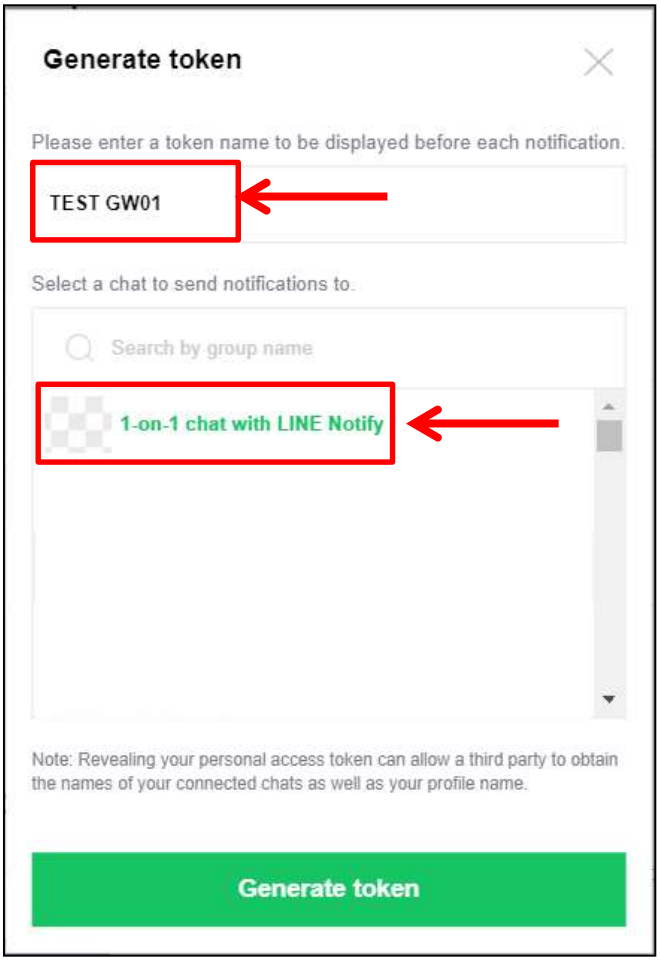
STEP3.

Click on "Generate token" to open the settings window.



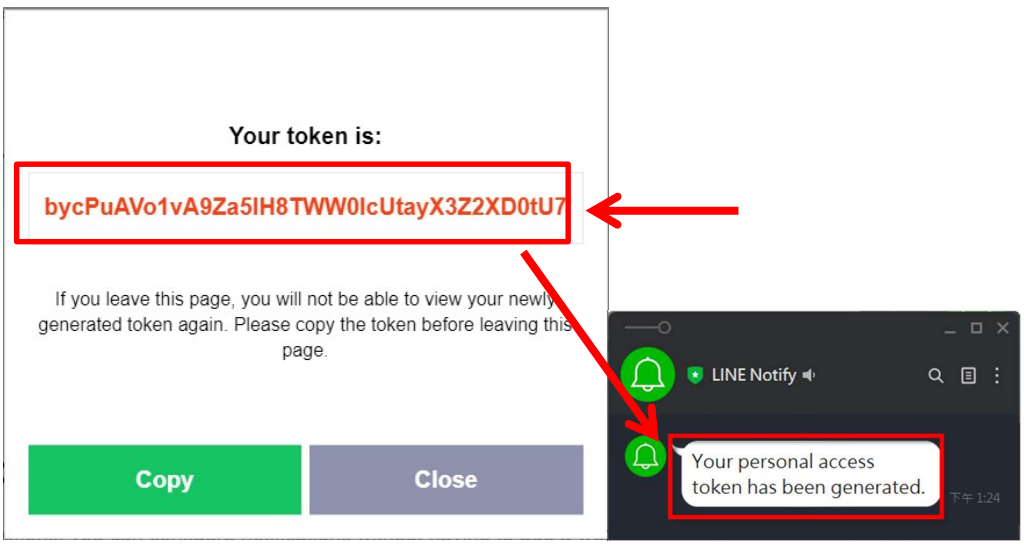
STEP4.

Enter a name and select the Line group to receive messages.



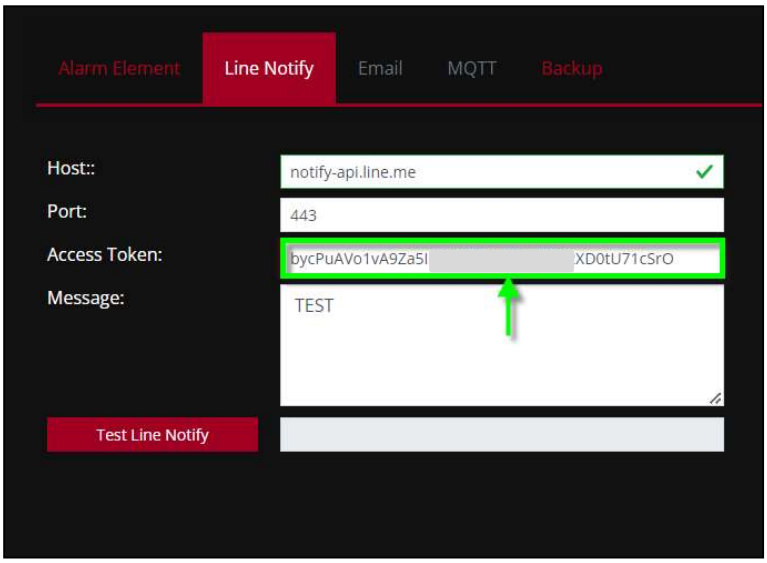
STEP5.

Obtain the token and copy it.



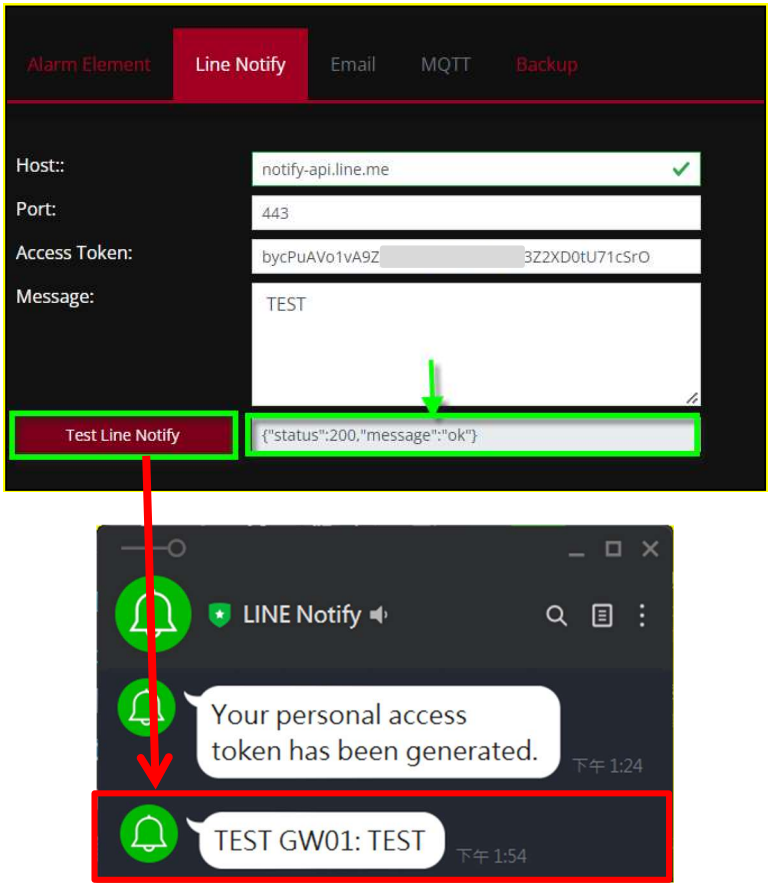
STEP6.

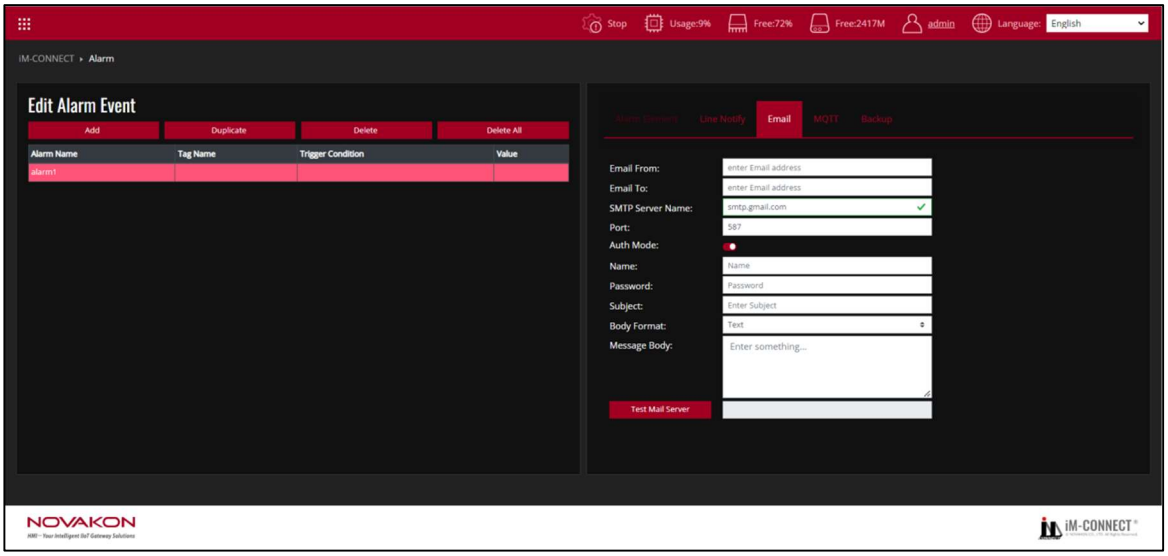
Paste the copied token into "Access Token" and enter the message you want to send in "Message".



STEP7.

Click on "Test", and you will be able to see the message sent on Line Notify.





Email

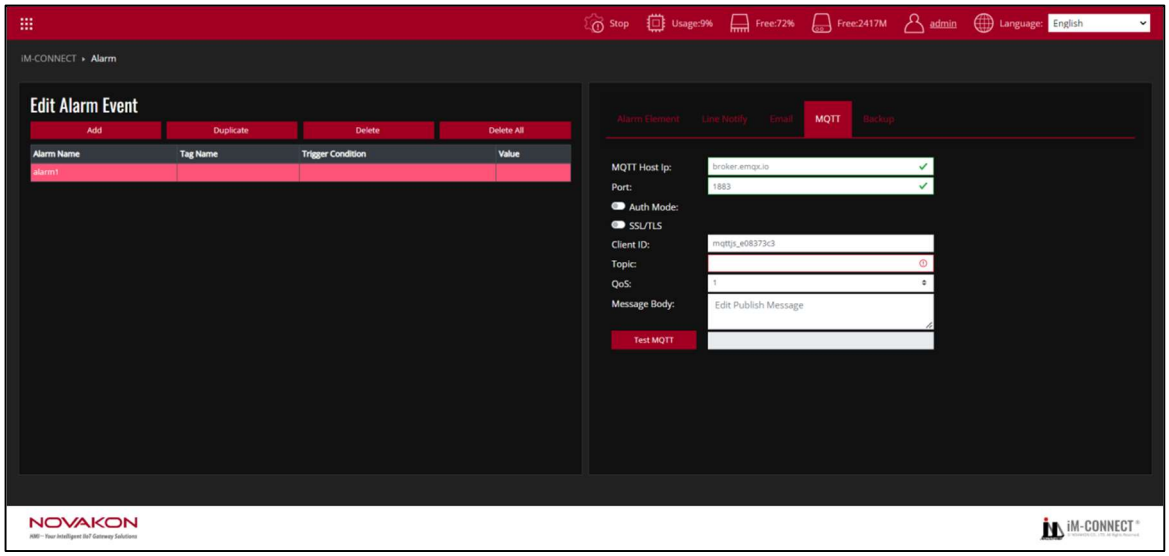
Set the email message to be sent when the alarm is triggered.

Email From	Enter the email address of the sender.
Email To	Enter the email address of the recipient. If multiple groups of emails need to be set up, please separate each group of emails with a comma.
SMTP Server Name	Enter the name of the SMTP server to be used.
Port	Display the port number to be used.
Auth Mode	Confirm whether to log in for verification.
Name	Enter the email address of the sender.
Password	Enter the sender's email password.
Subject	Enter the subject of the message.
Body Format	Enter the content body in [Text] or [Html] format of the email to be sent.
Message Body	The content of the response message to be shown after the email is sent. Input[#{tag name}]in the Message Body if the message should

	contain Tag content.
Test Mail Server	Displays the content of the response message after the email is sent.

Note:

Please set up the above settings in accordance with the specifications of each email server. For example of Gmail, please set the [Allow Low-Security Applications] of the Google account to be [Enabled].

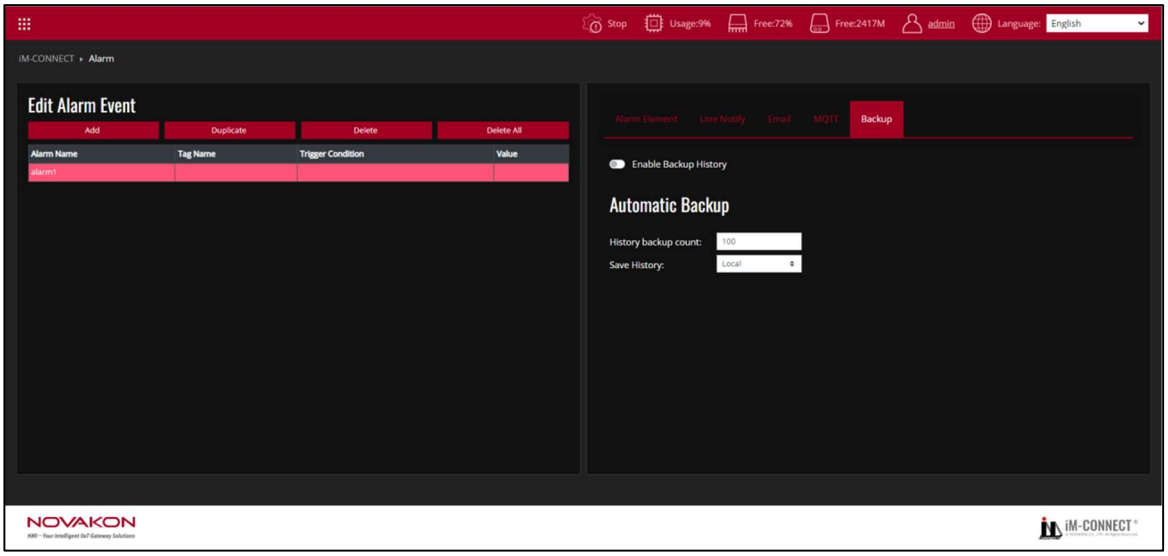


MQTT

Set the designated MQTT client that receives the alarm message when the alarm is triggered.

MQTT Host IP	Set the MQTT Broker IP that receives the messages.
Auth Mode	Confirm whether authentication is required. If it is selected, the account name and password must be input.
SSL/TLS/Port	Set SSL/TLS port number.
Require	Confirm whether the certificate file is required or not.

Certificate	
Upload Cert File	Import the certificate provided by the Server.
Upload Key File	Import the key provided by the Server.
SSL Secure	After selecting it, the validity of the certificate file provided by the Server will be verified.
Client ID	Set the user's ID. Every MQTT user needs a unique ID. MQTT Broker identifies the users through the Client IDs, and records the status of the users individually, such as subscription topics and communication quality setting.
Topic	Set the topic name. The name must comply with MQTT naming principles.
QoS	The quality of service is divided into three levels: 0, 1 and 2. The greater the number, the better the quality. 0:Sent once at most (in charge of sending messages only, suitable for less critical situations). 1:Sent once successfully at least (the data is correctly sent but message repetition may occur). 2:Sent once properly (rigorous delivery with the feedback of "message delivered").
Message body	Input the message to be sent. If a tag is needed in the message, add [#{tag name}] in the message body.
Test MQTT	The response message sent after MQTT is published.



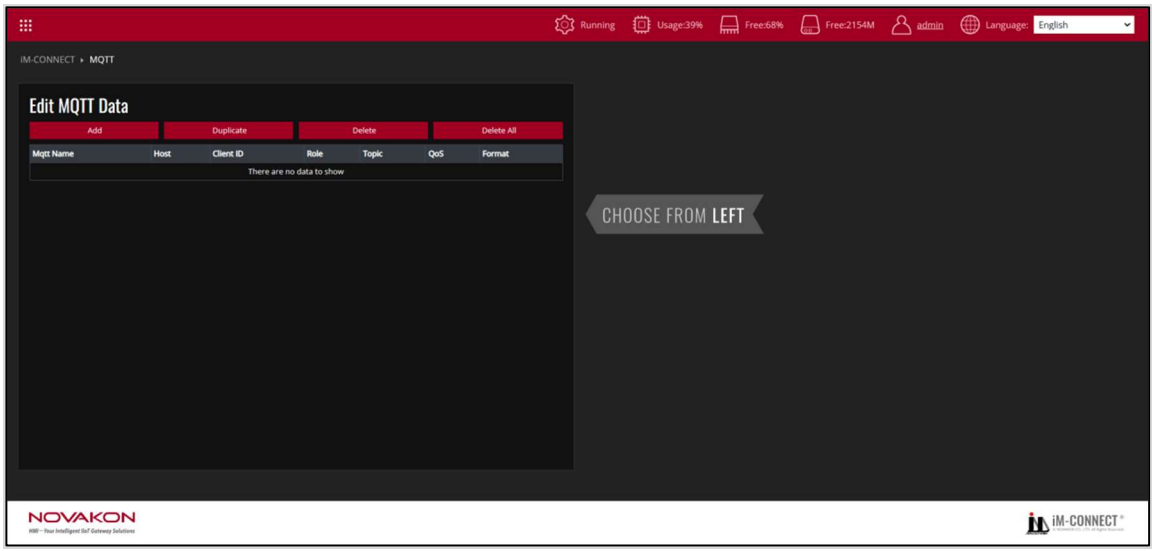
Backup

Set the number of alarm history to be backup and the destination where the log to be saved. When [Enable Backup History] is on, the condition of Automatic Backup can be set.

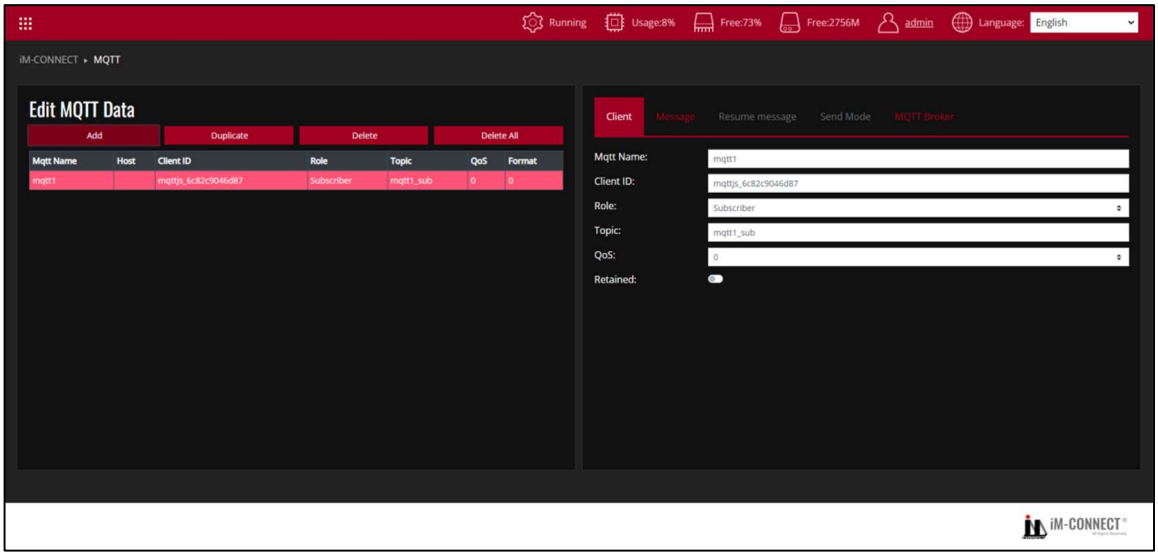
History backup count	Set how many alarm history to be automatically backup to the appointed storage.
Save History	Set where to backup the history. [Local] for Gateway local storage or [USB] for external USB disk.

7. MQTT

MQTT is generally used as a messaging protocol in IoT (Internet of Things), with the main features of lightweight, openness, and easiness. When the program capacity is limited or the network bandwidth is limited, such advantages become more explicit. It is suitable to be used on the continuous monitoring of the data such as temperature, humidity, pressures, electricity, water level, and others.



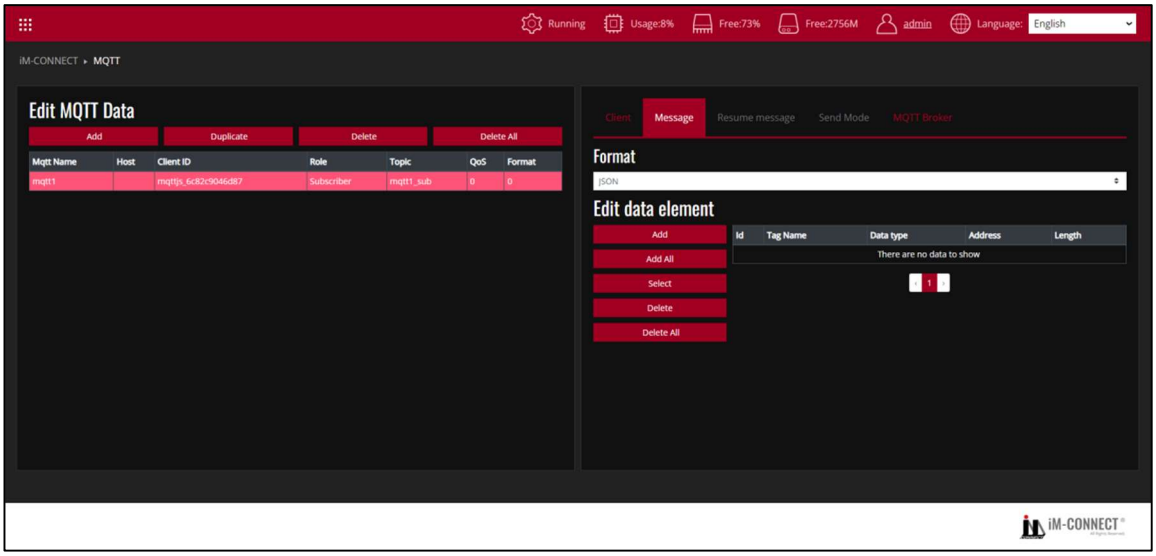
Add	Add a set of MQTT items.
Delete	Delete the selected MQTT item.
Duplicate	Duplicate the selected set of MQTT items.
Delete All	Delete all the MQTT items.



Client

MQTT name	Assign a MQTT name.
Client ID	Set the User's ID. Every MQTT user needs a unique ID. MQTT Broker identifies the users through the Client IDs, and records the status of the users individually, such as subscription topics and communication quality setting.
Role	Set the role in MQTT. There two major roles in the MQTT protocol: Publisher and Subscriber. The Subscriber must subscribe the topics that it needs. Then, when the Publisher publishes messages to the topic, the broker sends such messages to Subscribers who subscribed to the same topic. Publisher:To set as a Publisher. The tag body will be published to the designated broker. Subscriber:To set as a Subscriber. Subscribe the designated broker and set a value to the tag when receiving the data. When the Role is set as the Publisher, the tag to be sent must be set up; otherwise, no tag will be sent as default.

Topic	Topic name to be used.
QoS	The quality of service is divided into three levels: 0, 1 and 2. The greater the number, the better the quality. 0:Sent once at most (in charge of sending messages only, suitable for less critical situations). 1:Sent once successfully at least (the data is correctly sent but message repetition may occur). 2:Sent once properly (rigorous delivery with the feedback of “message delivered”).
Retained	Retain the last message successfully sent.



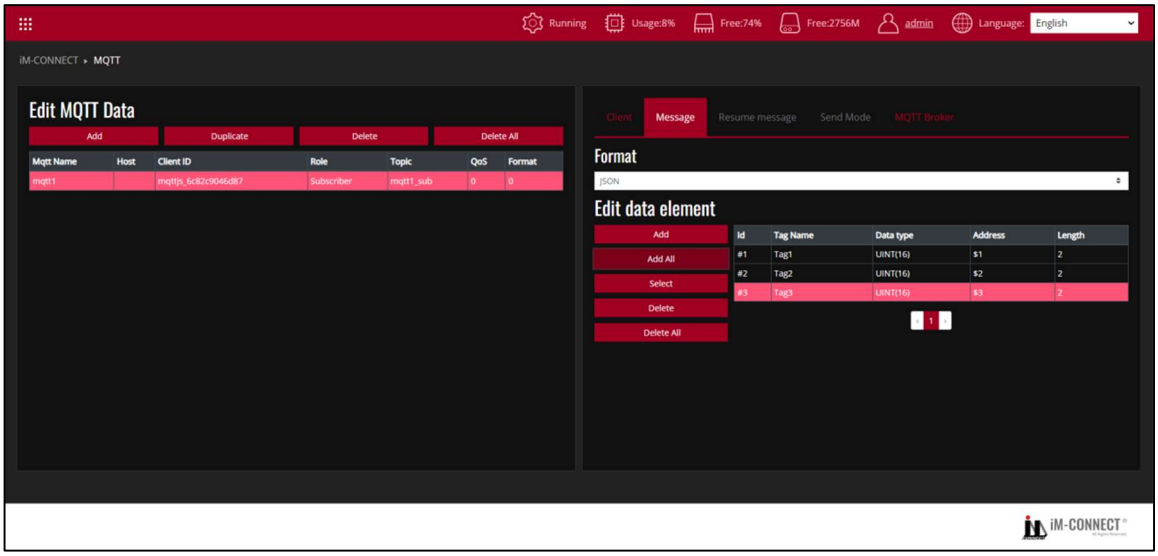
Message

Format	Designate the MQTT format. Select [JSON](default), [Binary]or[Customize].
JSON	Through the JSON standard format, the tag content set according to the Publisher is output.

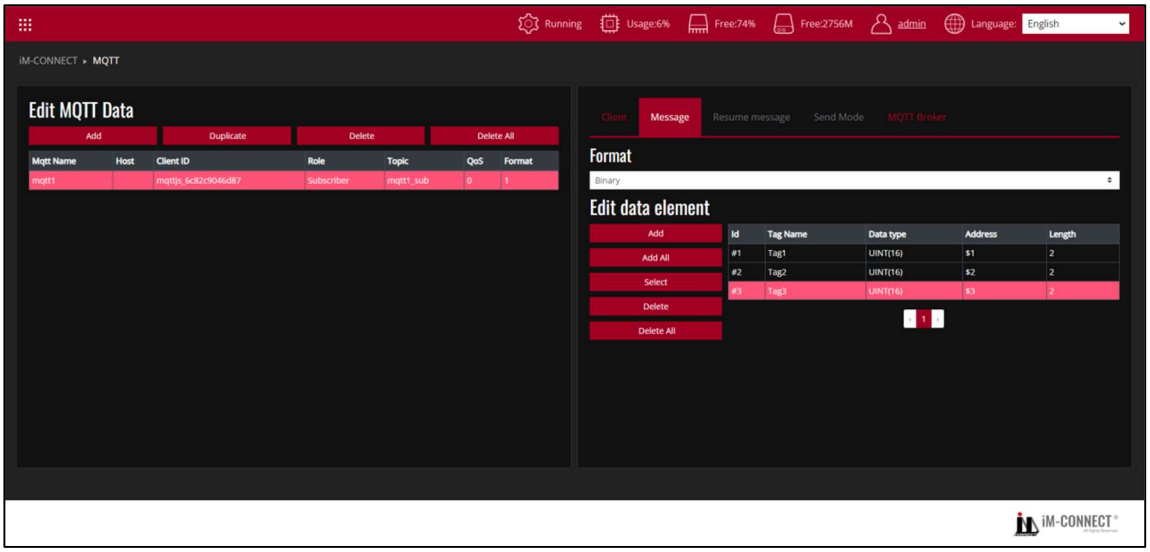
As shown in the following diagram, when the sending condition is established, the Publisher sends the content to the Subscriber(s) according to the content values of the set tags T01, T02, and T03.

The format consists of: {“Publisher_Tag name1”: Send value1,“Publisher_Tag name2”: Send value 2,” Publisher_Tag name3”: Send value 3 , and so on.}

Thus, the input format shall be: {“T01”:value,“T02”: value,”T03”: value }



Binary	The tag content set according to the Publisher will be reorganized into binary format and output.

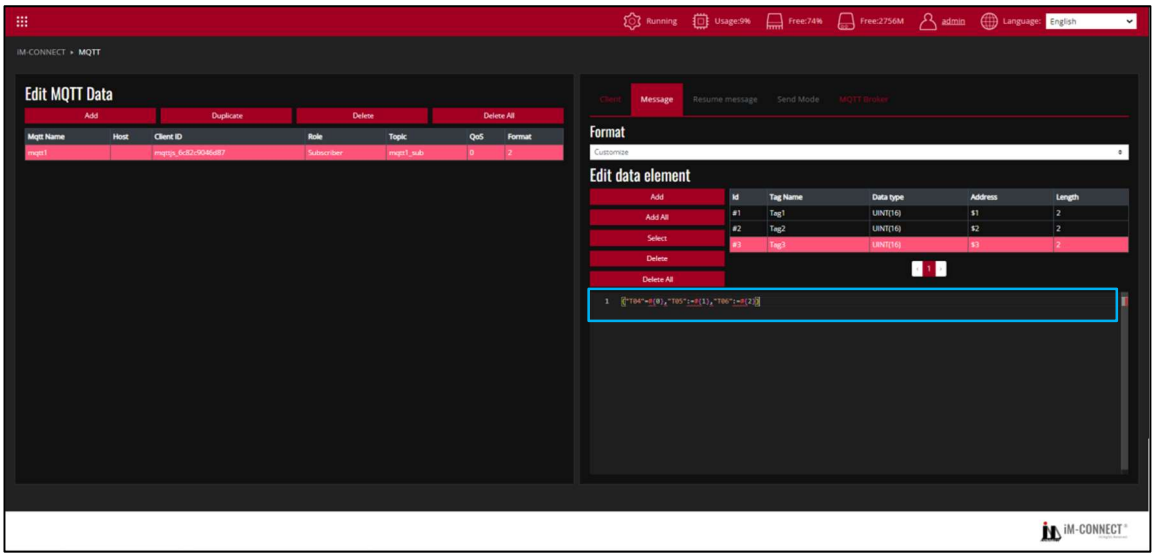


Customize	The tag content is output based on the user's customized format.

As shown in the following diagram, when the sending condition is established, the Publisher sends the content of tags T04, T05, and T06 to the Subscriber(s) according to the content values of the set tags T01, T02, and T03.

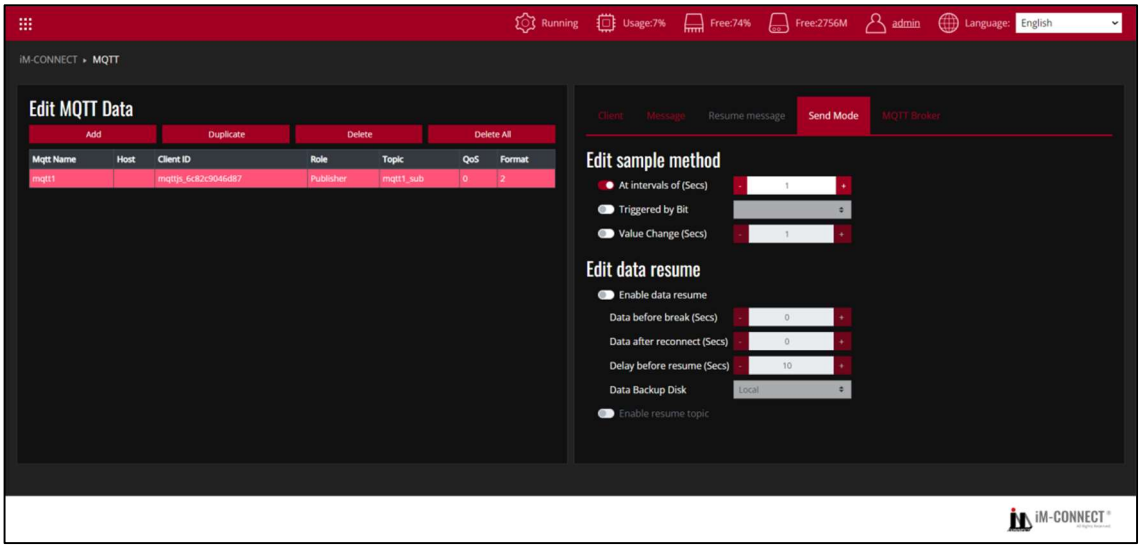
The format consists of: {“Subscriber_Tag name1”: Publisher_ID1,“Subscriber_Tag name2”: Publisher_ID2,” Subscriber_Tag name3”: Publisher_ID3 , and so on.}

Thus, the input format in this case shall be: {“T04”:=#{0},“T05”:=#{1},”T06”:=#{2}}.



Edit data element

Add	Add a MQTT item.
Add All	Add all tags to MQTT items.
Select	Select a MQTT item.
System tag	Use the system tag to obtain Gateway system time and other information.
Delete	Delete the selected MQTT item.
Delete all	Delete all the MQTT items.



Send Mode

Set the method or condition for sending MQTT message.

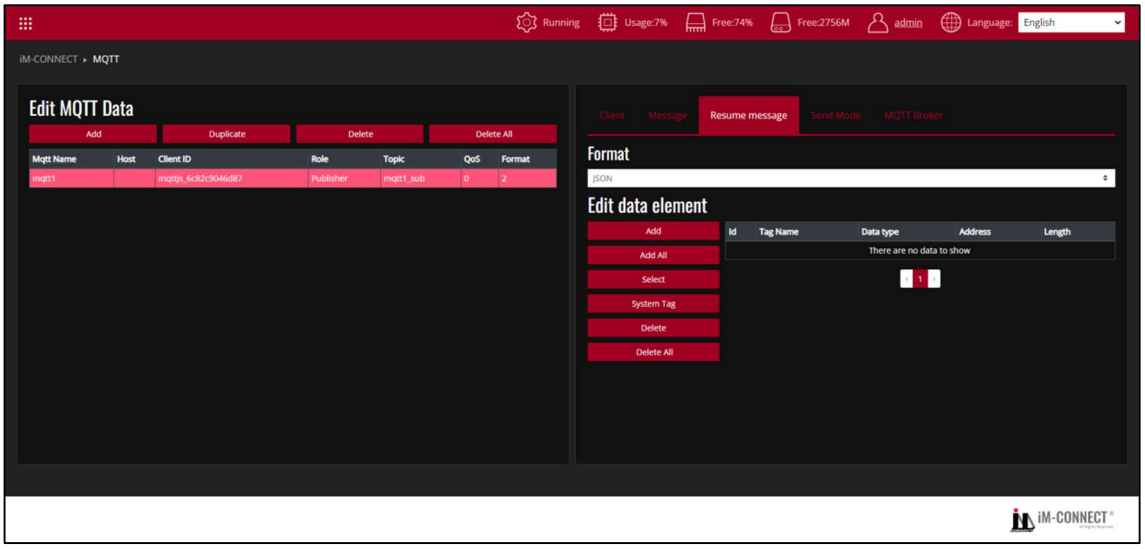
Edit sample method

At Intervals of(Secs)	Set to send MQTT message in a fixed interval in seconds. The default is 1 second.
Triggered by Bit	Set to send MQTT message when the status is triggered by bit, from OFF to ON.
Value Change(Secs)	Set to send MQTT message when the designated tag status is changed.

Edit data resume

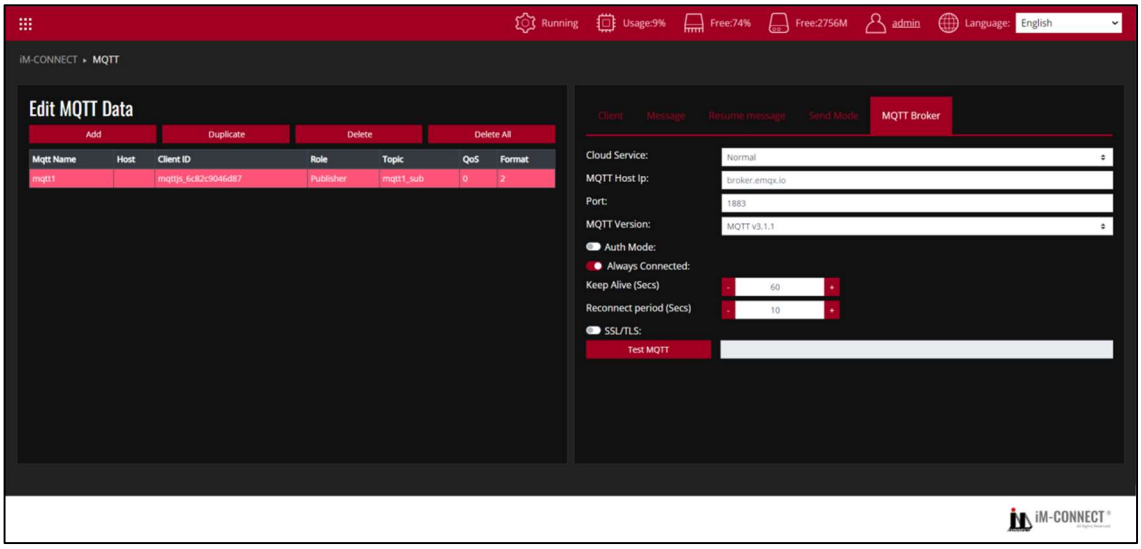
Enable data resume	Check this option to activate MQTT data resuming functionality.
Data before break(Secs)	Set the time period before the break for data to be transmitted upon reconnection, in seconds.
Data after break(Secs)	Set the time period after the break for data transmission upon reconnection, in seconds.

Data before resume(Secs)	Set the delay time for transmitting data after a break and before reconnecting, default is 10 seconds.
Data Backup Disk	Set the location for backing up data for resuming from breakpoints, selectable options are [Local] or [USB].
Enable resume topic	Check this option to activate designated resume topic content. This feature separates data during disconnection and connection periods, facilitating user differentiation.



Resume message

This allows configuring the content of the resume message for resuming from breakpoints, utilizing the same method as described in[Message]above. This enables differentiation between data during connection and disconnection times.



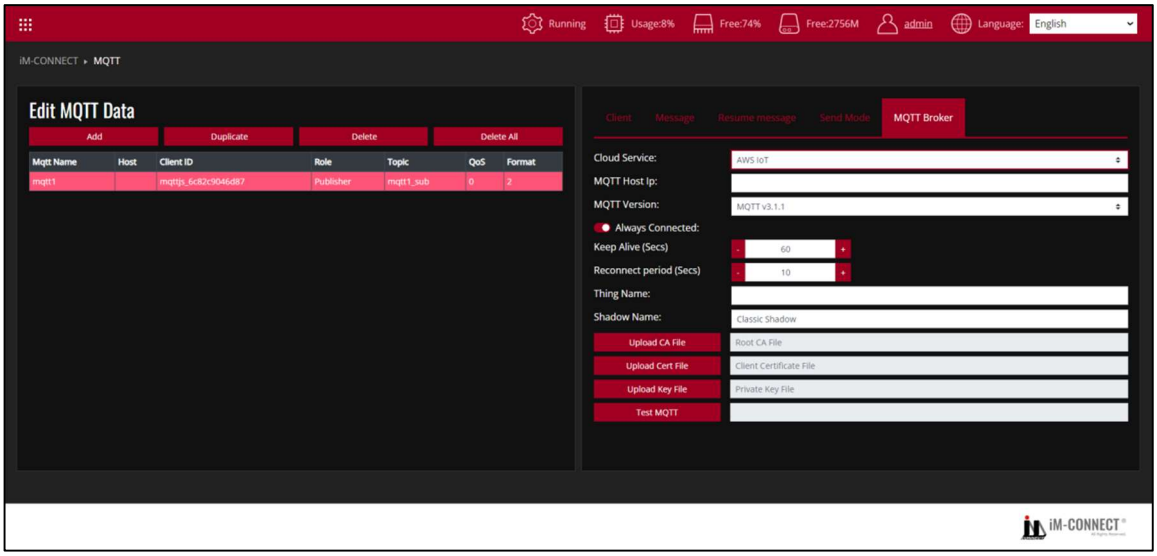
MQTT Broker

Cloud Service	Select[Normal],[AWS IoT],[Azure IoT Hub],[Google Cloud IoT] according to the requirement.

Normal

MQTT Host IP	Set the MQTT broker's IP, to receive the messages.
Port	Set the port number that allows the connection with an external device.
MQTT Version	Set the version of MQTT.
Auth Mode	Confirm whether authentication is required. If it is selected, the account name and password must be input.
SSL/TLS	Enable SSL/TLS encryption mechanism.
Require Certificate	Confirm whether the certificate file needs to be verified. Note:Enable either[SSL/TLS]or[Require Certificate]at one time according to actual use case requirement.
Upload Cert File	Import the certificate file provided by the Server.

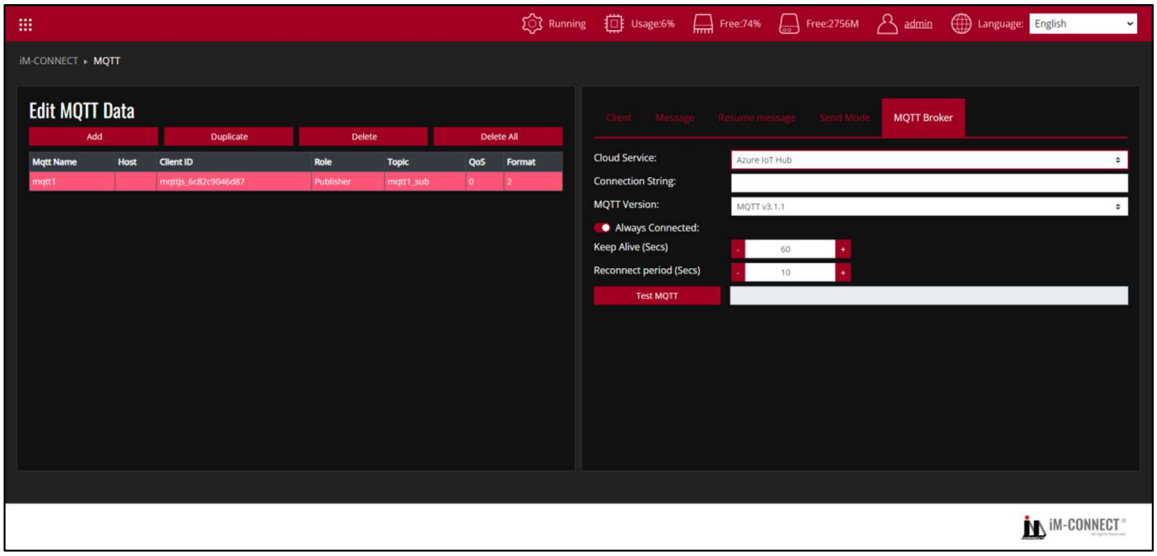
Upload Key File	Import the key file provided by the Server.
SSL Secure	After selecting it, the validity of the certificate provided by the Server is verified.
Test MQTT	It shows the response message sent by MQTT.



AWS IoT

Choose AWS IoT as Broker by using Thing to send message with Shadow support.

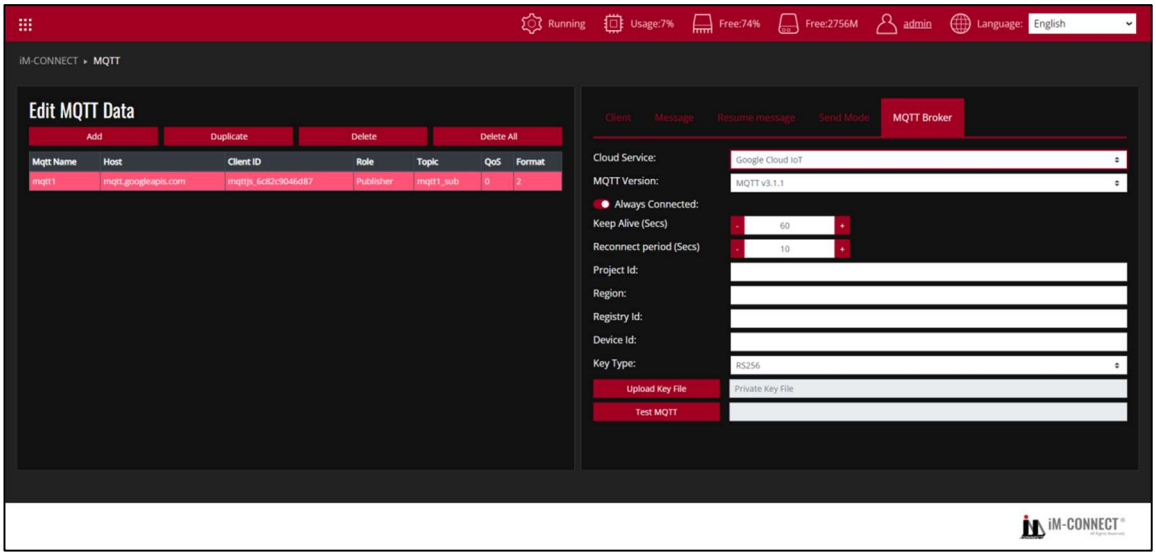
MQTT Host IP	Set the IP address of MQTT Broker in use.
MQTT Version	Set the version of MQTT Broker in use.
Always Connected	Set the MQTT to be always connected.
Thing Name	Set the name of AWS IoT Thing.
Shadow Name	Set the Shadow name that AWS IoT Thing corresponds to. Shadows can make a device's state available to apps and other services whether the device is connected to AWS IoT or not.
Upload CA File	Upload the client certificate signed by Certificate Authorities (CA) verified by Amazon.
Upload Cert File	Upload the certificate file.
Upload Key File	Upload the key file.
Test MQTT	Show the message received after MQTT publish.



Azure IoT Hub

Set Microsoft Azure IoT Hub as Broker, input the correct connection string.

Connection String	Input the [Connection String] acquired from Microsoft Azure IoT Hub.
MQTT Version	Set the corresponding MQTT version.
Always Connected	Set the MQTT to be always connected.
Test MQTT	Show the messaged received after MQTT publish.



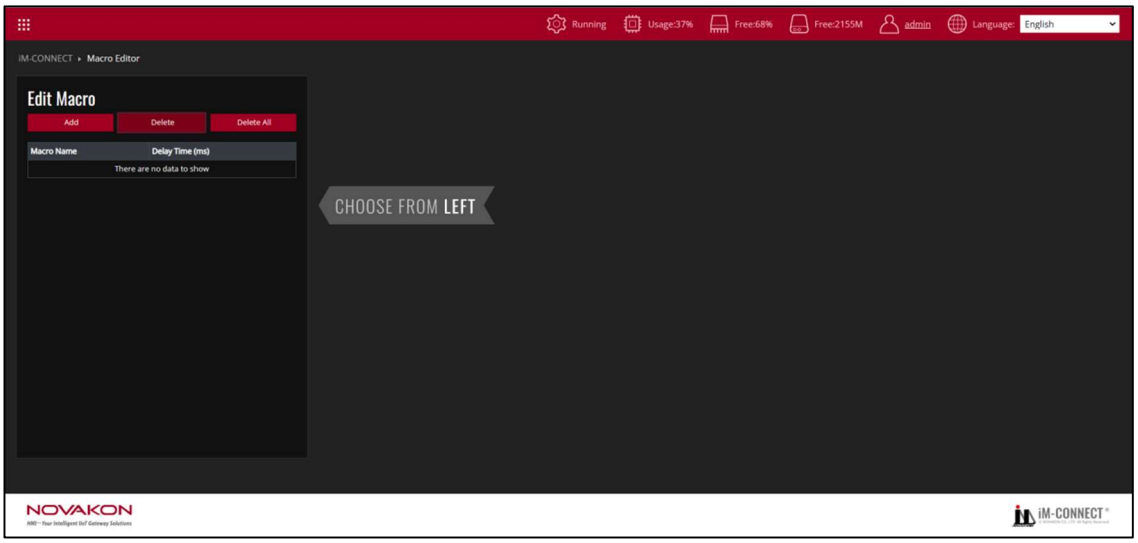
Google Cloud IoT

Set Google Cloud IoT Core as Broker, input the required parameters and certificate for connection.

MQTT Version	Set the corresponding MQTT version.
Always Connected	Set the MQTT to be always connected.
Project ID	Input the Project ID to be used.
Region	Select the region of cloud service. Now only [us-central1],[europe-west1]and[asia-east1]are available.
Registry ID	Input the registry ID created in Google Cloud.
Device ID	Input the device ID.
Key Type	Select the key type between [RS256] and [ES256].
Upload Key File	Upload the assigned key file.
Type MQTT	Show the message received after MQTT publish.

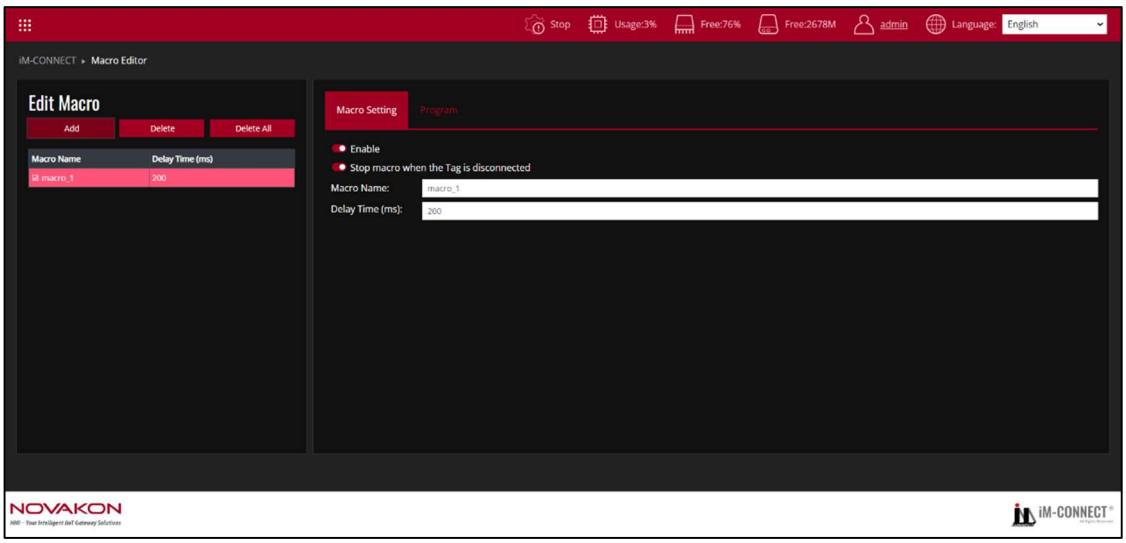
8. Edit Macro

Edit Marco can perform arithmetic operation, data transfer , and other actions for the Gateway’s tag.



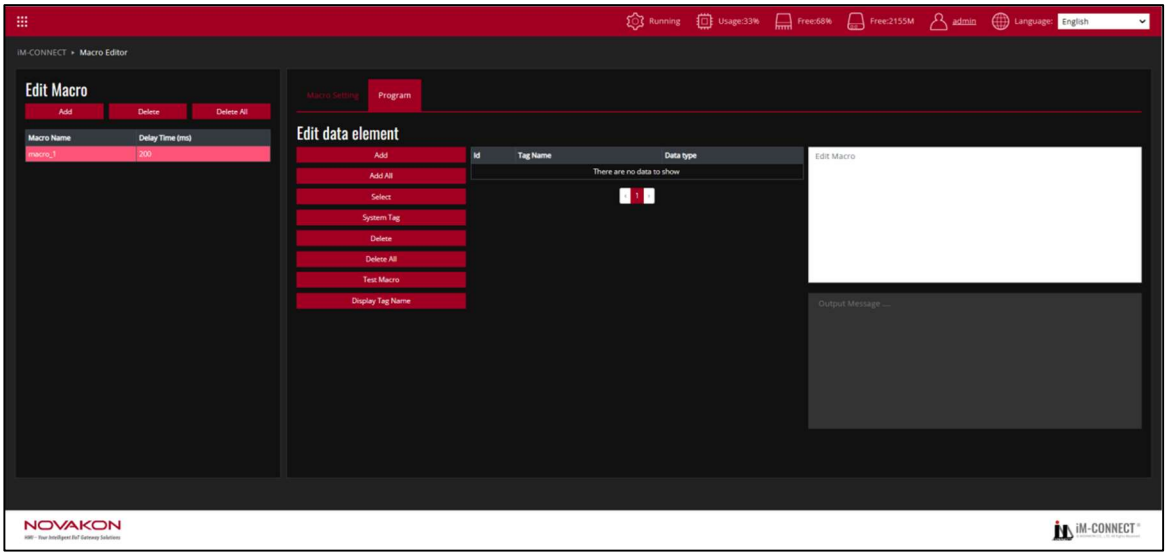
Add	Add a set of macro programming.
Delete	Delete the selected macro programming.
Delete All	Delete all the macros.

Start writing a set of macro programming after selecting[Add].

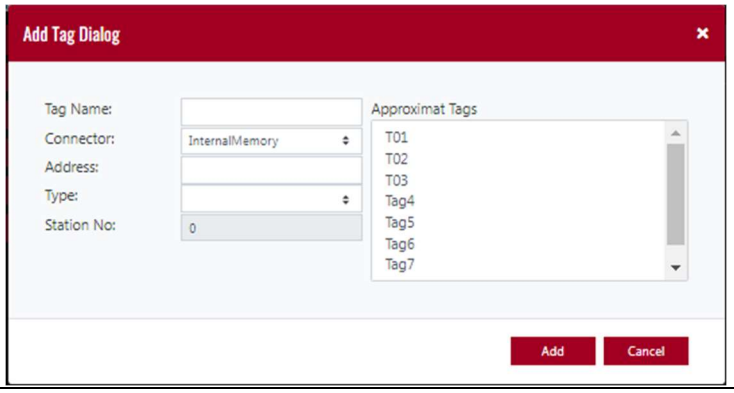


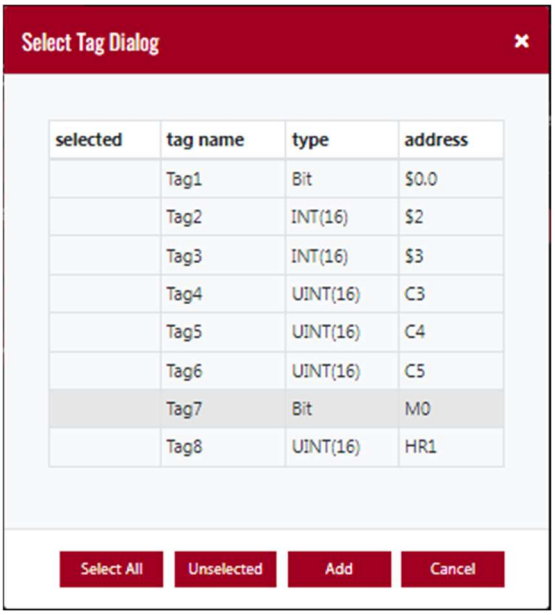
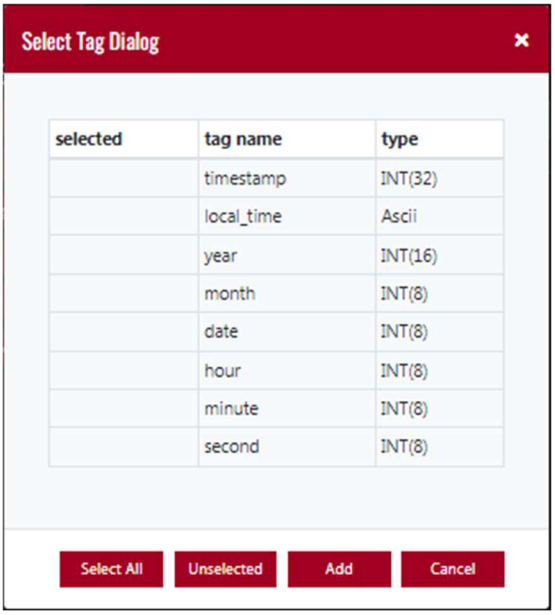
Macro Setting

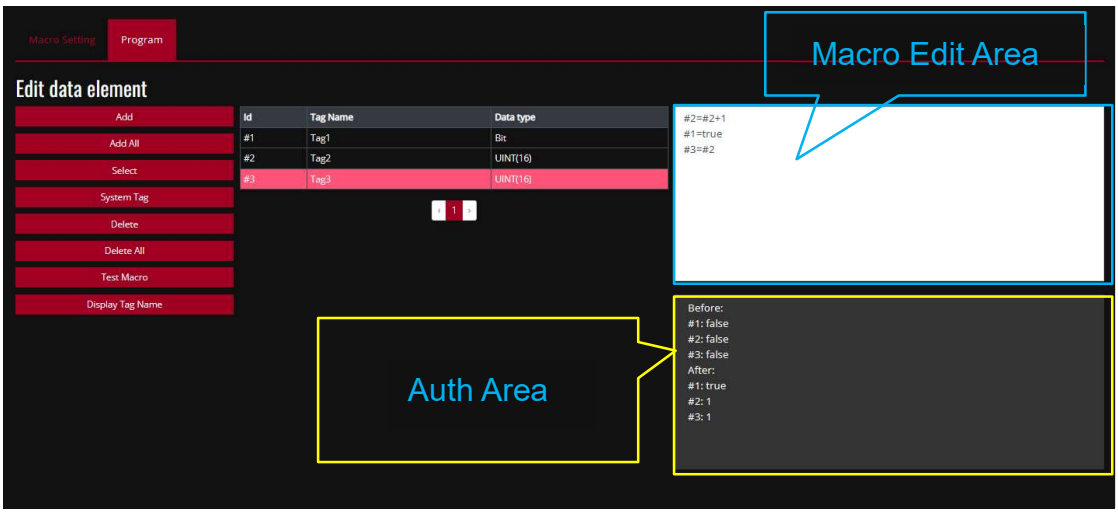
Enable	Checking this box enables the execution of the macro program.
Stop macro when the Tag is disconnected	Checking this box causes the entire macro to stop running if the tag disconnects during its execution; otherwise, the macro will continue to execute.
Macro Name	Set the name of the set of macro programming.
Time (Secs)	Set how long it delays after a regular loop of macro programming complete before starting the next loop.



Edit data element

Add	Add the tag(s) needed in the macro programming. The newly added tag(s) will also be set in the Tag Setting page. 
Add All	Add all the tags existing in the project.
Select	Select the tag(s) needed in the Macro Programming from the list of tags.

	
System Tag	Select the system tag(s) required in the macro programming from the list of tags. 
Delete	Delete the selected set of macro programming.
Delete all	Delete all the macro programming.
Test Macro	Verify the results of the macro programming performance test.
Display Tag Name	Change the display from ID number to Tag Name in Macro Edit Area. (Marco Edit Area becomes read only when it is changed to display Tag Name)



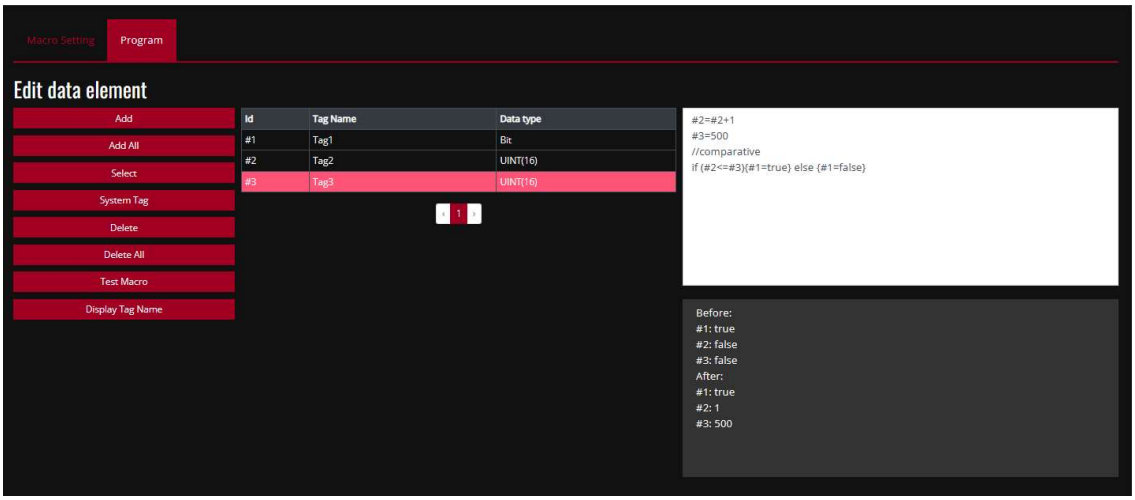
Macro Edit Area	The user can write the macro programming here.
Auth Area	The results from the macro programming performance can be learned in the Auth Area after the[Test Macro]is selected.

For example:As shown in the diagram above, it can edit simple expressions. For the variables (tags), the corresponding ID must be input. At the same time, if the data type is Bit (Boolean), the condition must be expressed in [true](lower case) or[false](lower case).

To add Notes, express it with [//].

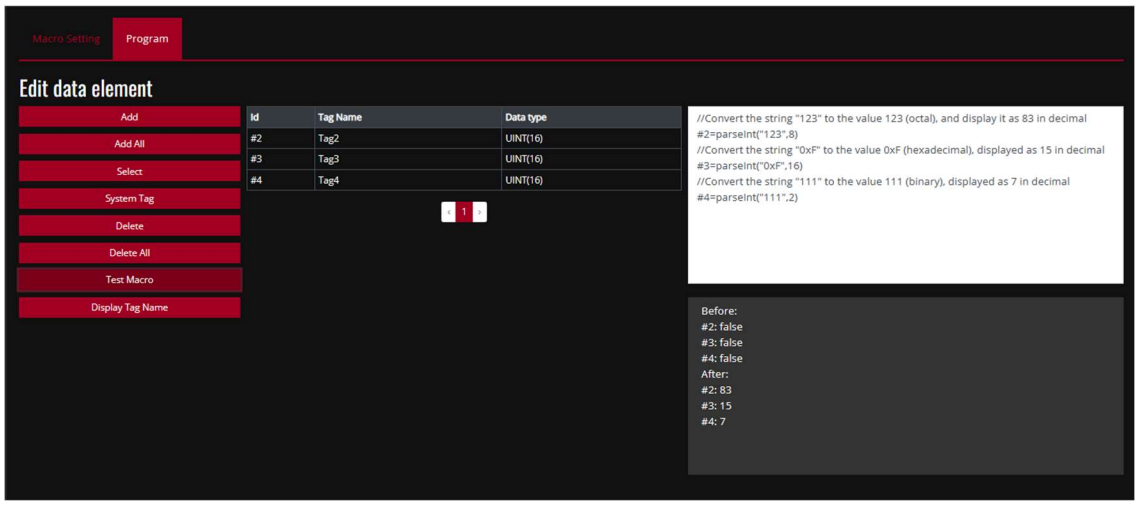
To add conditional execution, express it with [if (conditional execution body){Results executed after the conditional execution statement is set up } else {Results executed after the conditional execution statement is not set up }]

For example:



iM-connect can support elements of JavaScript, such as Number, Date, Math, etc.

The following is an example of base conversion by using JavaScript function [parseInt]:



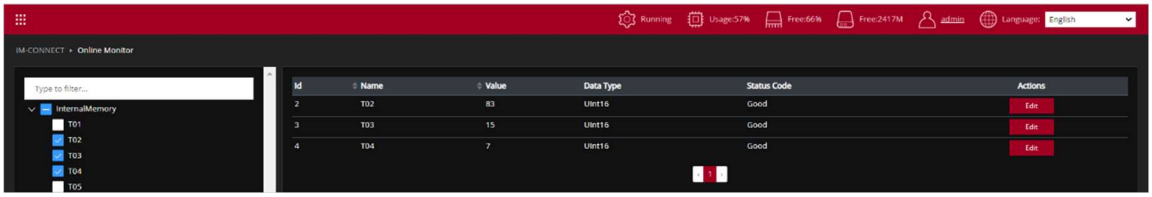
① [Add] or [Select] the needed tag.

② Write the program.

③ Go to[Project Setting]to execute[Save & Compile] and [Enable Service].

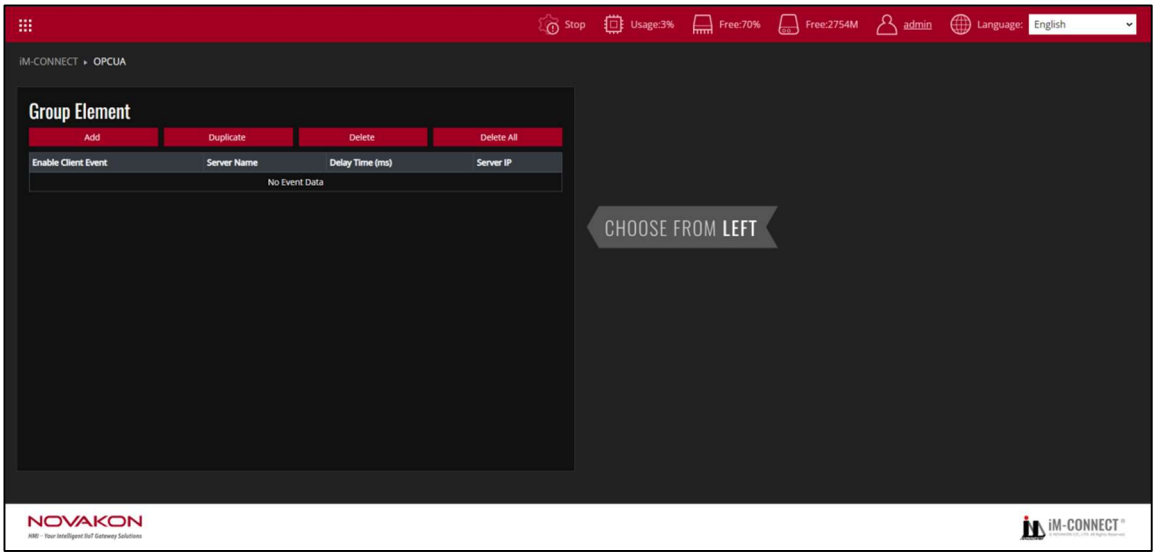
④ After selecting [Test Macro], you get the correct result.

⑤ Enter [Online Monitor] to monitor the actual tag values. The results must be consistent with the results of Test Macro.



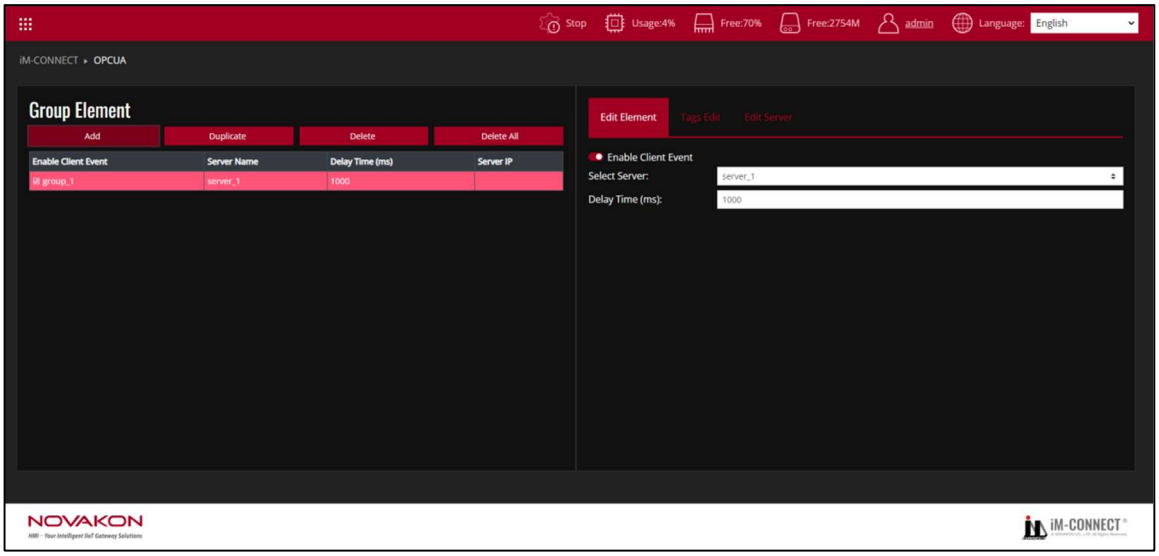
9. OPCUA

OPC was primarily developed to address the compatibility issues arising from manufacturers' proprietary software designs, which made monitoring difficult due to lack of compatibility. It established communication protocol standards. OPC UA, on the other hand, removes the limitations of OPC DA tied to Windows COM/DCOM technology and instead adopts a new protocol based on HTTP for further development.



Add	Add a set of OPCUA Client.
Duplicate	Duplicate the selected setting of the set of OPCUA Client.
Delete	Delete the selected setting of the set of OPCUA Client.
Delete All	Delete all the events of OPCUA Client.

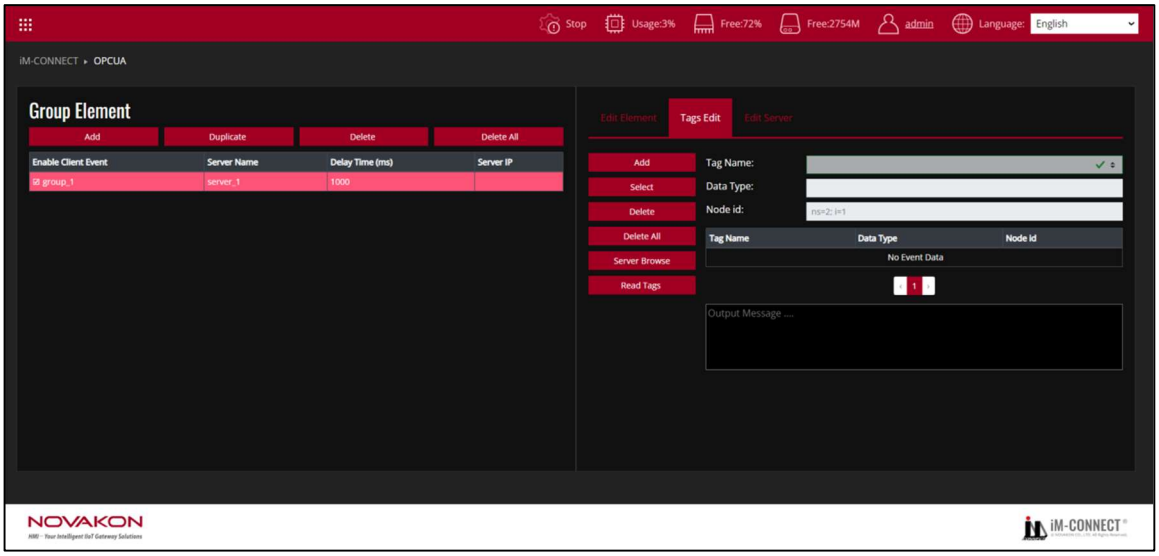
Start the OPCUA Client setting after selecting [Add].



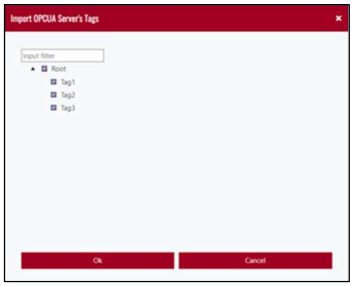
Edit Element

Definite a OPCUA event.

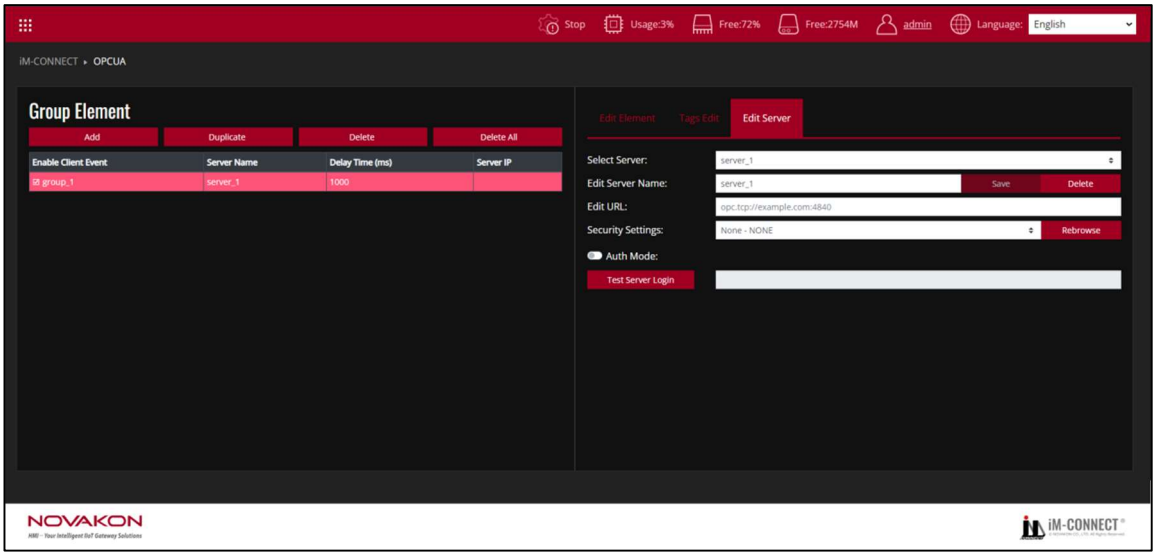
Enable Client Event	Enable a OPCUA Client item.
Select Server	Select the name of the OPCUA Server to be connected with.
Delay Time	Set OPCUA delay time.



Tags Edit

Add	Add a tag as the monitor of OPCUA Client.
Select	Select an already established tag as the OPCUA Client.
Delete	Delete the selected tag(s).
Delete All	Delete all the tag(s) of this event.
Server Browse	Import the selected tags from OPCUA server. 
Tag name	It shows the tag name of the OPCUA Client.
Data Type	It shows the tag type of the OPCUA Client.
Node ID	Input the Node ID of the element address on the OPCUA Client. The names defined by each equipment may differ, so it shall be input based on each of the definitions.

The established Tag Name, Data Type, Node ID, Output Message, and other data are listed in sequence below.



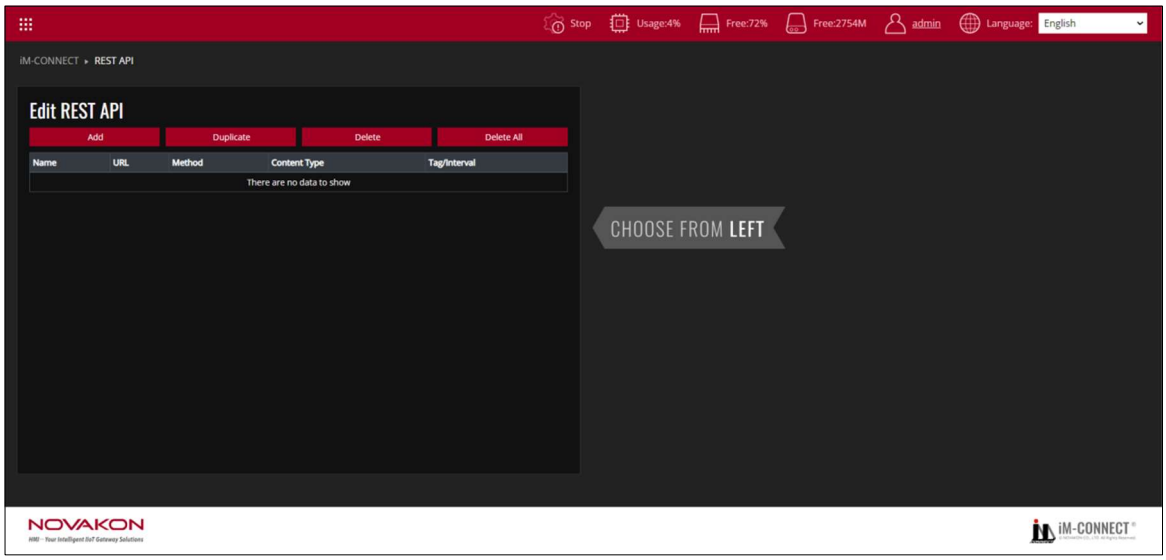
Edit Server

Define the relevant data of the OPCUA Server.

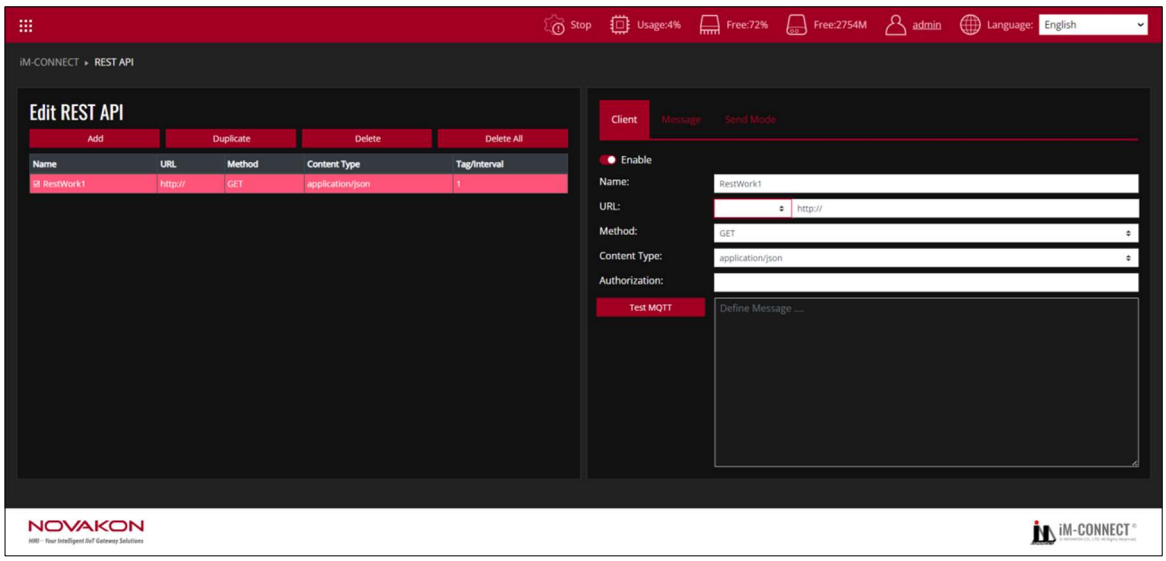
Select Server	Select the name of the OPCUA Server to be connected with.
Edit Server Name	Edit the name of the OPCUA Server.
Server IP	Input the IP of the OPCUA Server to be connected with.
Port	Set the port number of the OPCUA Server.
Security Settings	Set the security mode for communication according to the connected Server.
Auth Mode	Select whether the to-be-logged-in OPCUA Server needs an authentication. If it needs authentication, input the account name and password to be logged in.
Test OPC UA Server	Test connection status after selecting it.

10. REST API

Rest API refers to the state transfer of information in a certain format (usually JSON format) on the network. The human-machine sends requests in JSON format through the Rest API and receives responses from the cloud to meet the needs of IoT applications.



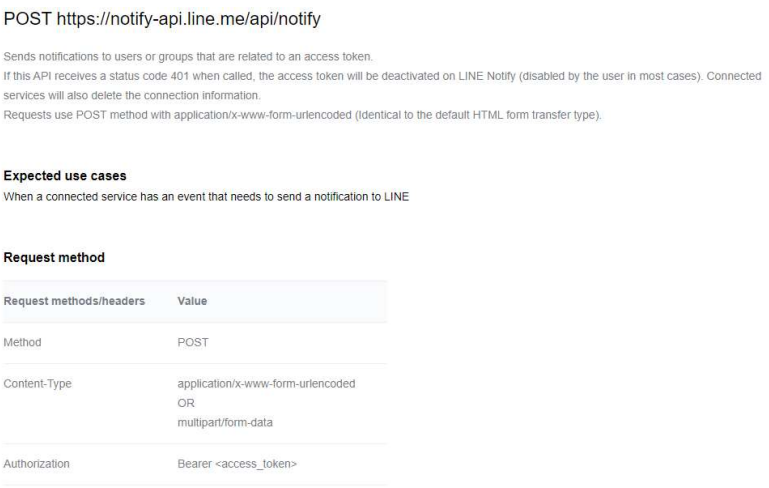
Add	Add a new set of Rest API.
Duplicate	Copy the Rest API settings of the selected group.
Delete	Delete the selected Rest API settings.
Delete All	Delete all Rest API events.

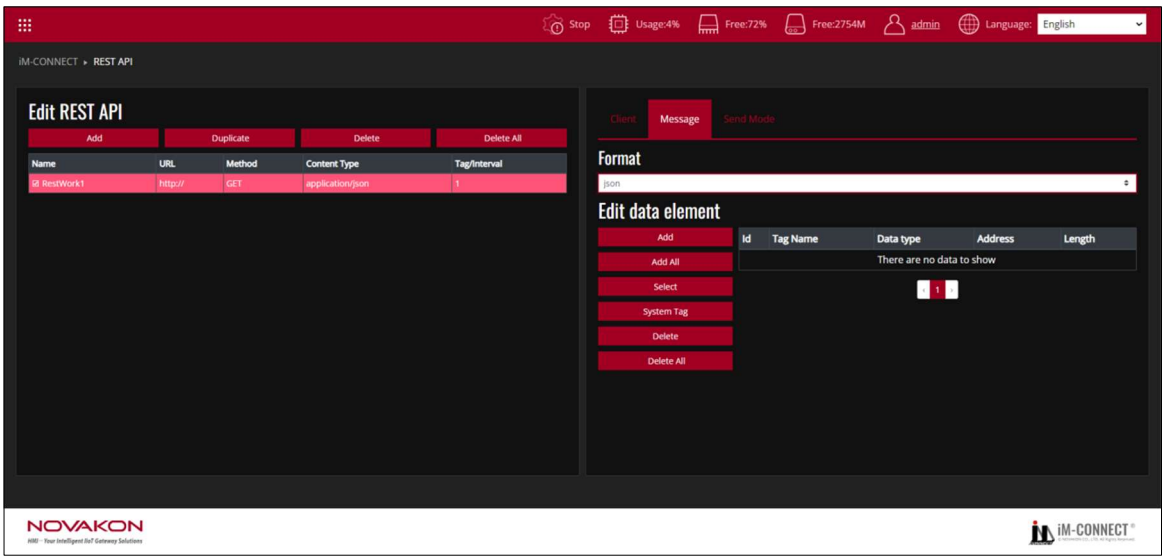


Client

Define a Rest API event.

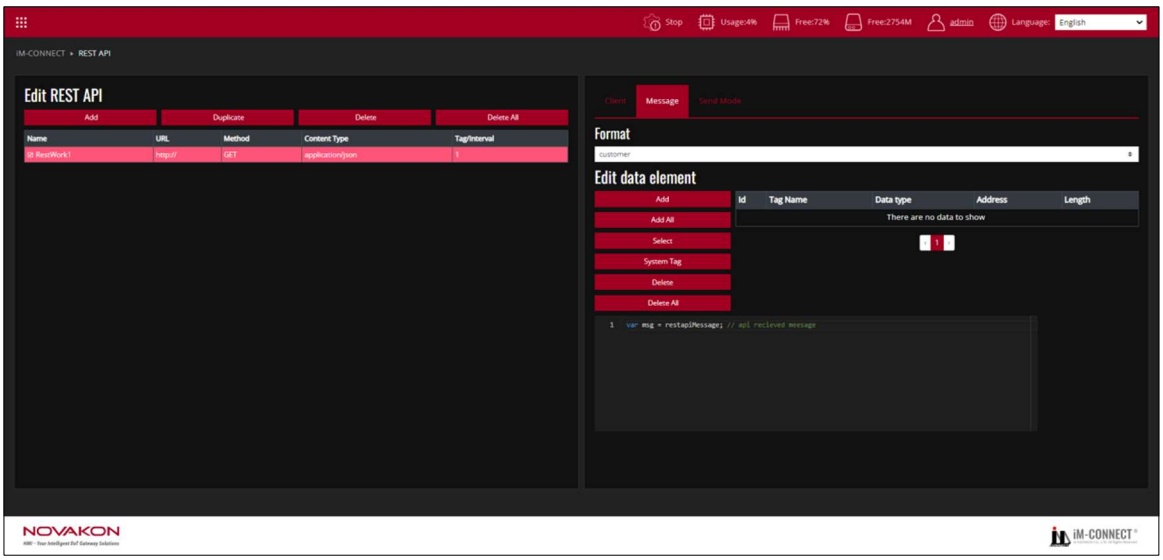
Enable	Check to start this Rest API project.
Name	Set the name of Rest API.
URL	Set the URL of Rest API.
Method	Set the GET/POST/PUT/DELETE commands of Rest API.
GET	The client uses the GET method to access resources at the specified URL on the server. They can quickly make GET requests and pass parameters in RESTful API requests to instruct the server to filter data before sending it.
POST	The client uses POST to send data to the server. It contains a representation of the data in the request. A common result of sending the same POST request multiple times is to create the same resource multiple times.
PUT	The client uses PUT to update existing resources on the server. Unlike POST, transmitting the same PUT request multiple times in a RESTful web service will produce the same result.

DELETE	The client uses DELETE to request deletion of the resource. DELETE requests a change to the server state. However, if the user does not have proper authentication, the request will fail.
Content Type	Set the type of Rest API. Can be divided into [text/plain], [application/json], [application/x-www-form-urlencoded].
text/plain	Used to indicate that the body of the request or response is plain text data.
application/json	Used to indicate that the body of the request or response is data in JSON format.
application/x-www-form-urlencoded	Usually used for HTML form submission default Content-Type, encoding form data into key-value pairs.
Authorization	Set the authorization of Rest API. Ensure that only authenticated and authorized consumers can access resources using the REST API. When using Line's REST api function, you need to add [Bearer] before authorization.  POST https://notify-api.line.me/api/notify Sends notifications to users or groups that are related to an access token. If this API receives a status code 401 when called, the access token will be deactivated on LINE Notify (disabled by the user in most cases). Connected services will also delete the connection information. Requests use POST method with application/x-www-form-urlencoded (Identical to the default HTML form transfer type). **Expected use cases** When a connected service has an event that needs to send a notification to LINE **Request method** Request methods/headers / Value: Method: POST; Content-Type: application/x-www-form-urlencoded OR multipart/form-data; Authorization: Bearer <access_token>
Test API	Displays the content of the response message after the Rest API is sent.

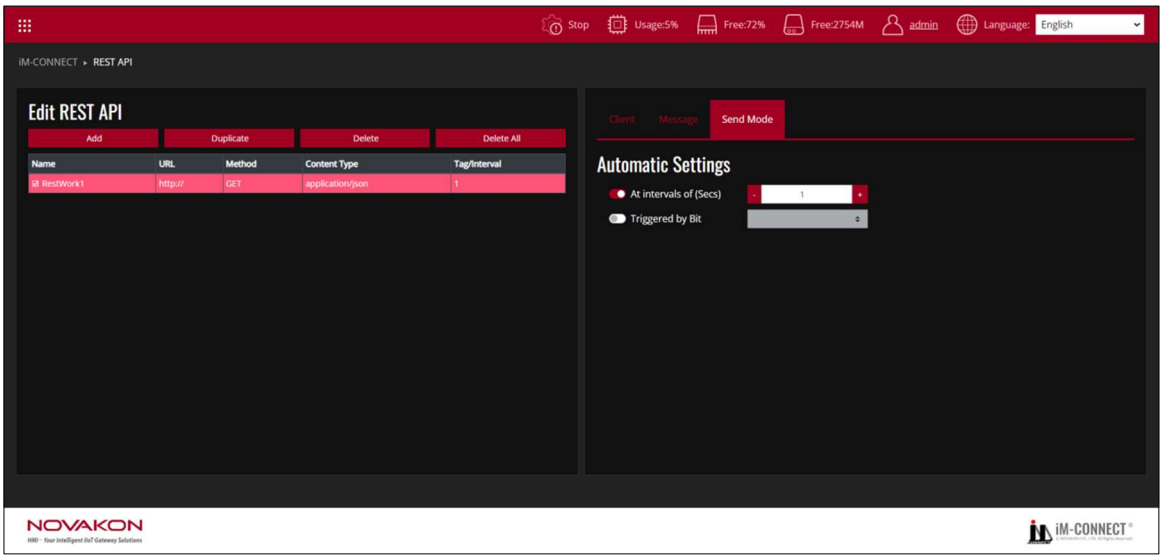


Message

Format	You can set the [JSON]/[Customer] format. The default is [JSON].
JSON	JSON is a lightweight data exchange format that is easy for humans to read and write, and easy for machines to parse and generate. In REST APIs, JSON is the most common data format used to represent request and response bodies.
Add	Add tags used by Rest API.
Add All	Add all tags to Rest API.
Select	Select the tag used by Rest API.
System Tag	Obtain the system time and other information of the gateway through the system label.
Delete	Delete the selected tag.
Delete All	Delete all tags.



If the data format is selected as [Customer] format, the user must write the specified data into the specified tag in accordance with the RESTAPI Server definition.

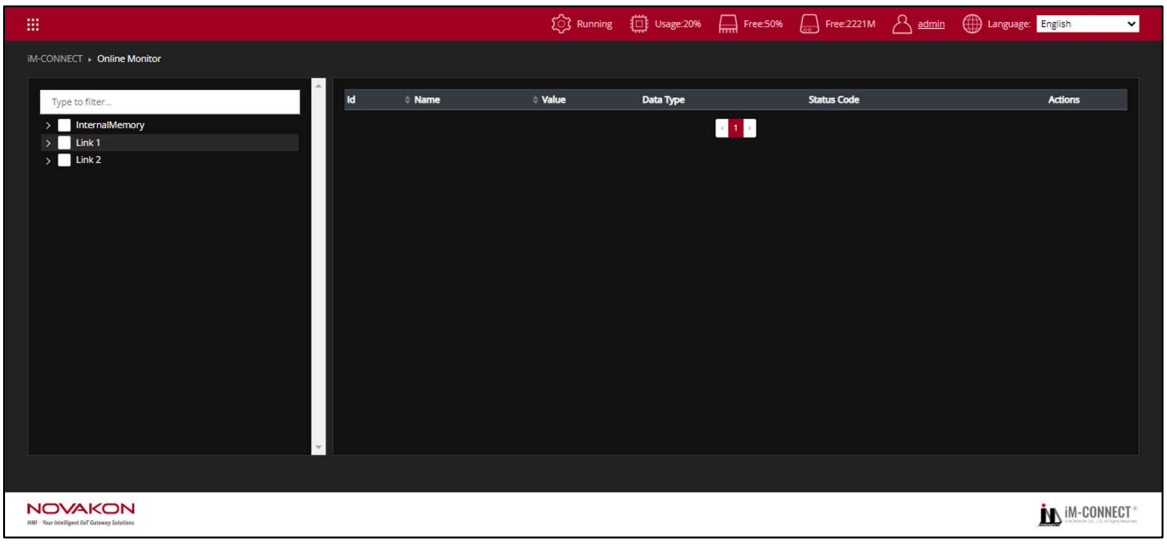


Send Mode

At intervals of (Secs)	Set to send Rest API messages at fixed intervals of seconds. The default is 1 second.
Triggered by Bit	Set to send a Rest API message when the status of the trigger bit changes from OFF to ON.

11. Online Monitor

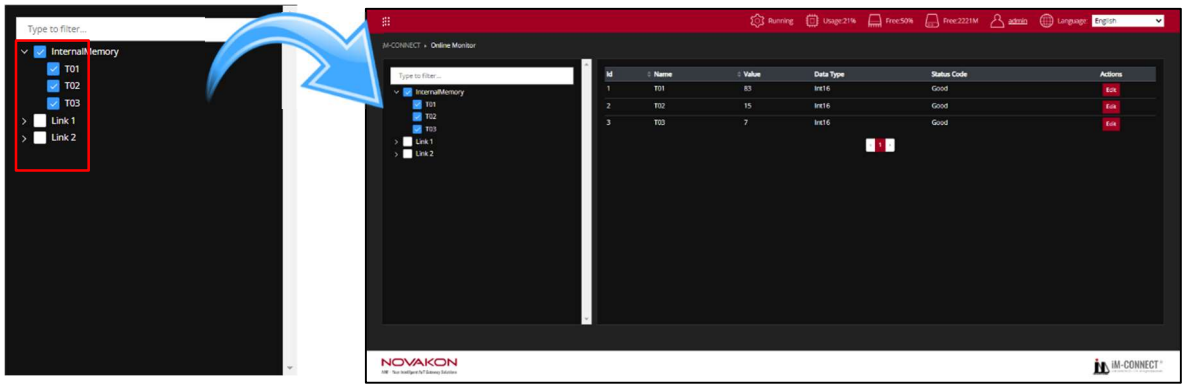
The main function of [Online Monitor] is to monitor the current tag values from the controller that connected to GATEWAY.



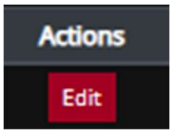
First, enter [OPCUA] from the [iM-CONNECT Menu].

The left window displays a list of all tags of the current project.

Click [>] to expand or collapse the list. Next, click the box [ ] next to the tag to monitor the tag's current value in the right window.

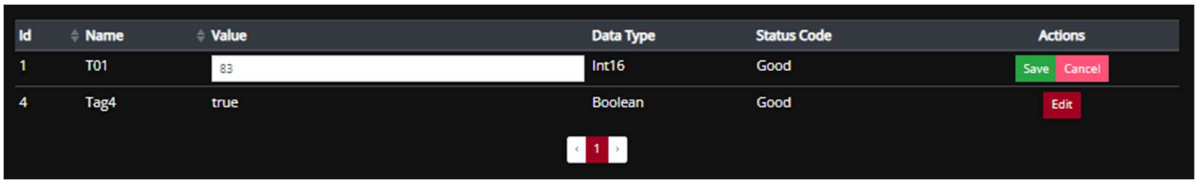


The current tag value can be monitored in the right window. To update the GATEWAY data during the monitoring process, click [Edit] at [Actions] to modify the tag status value.

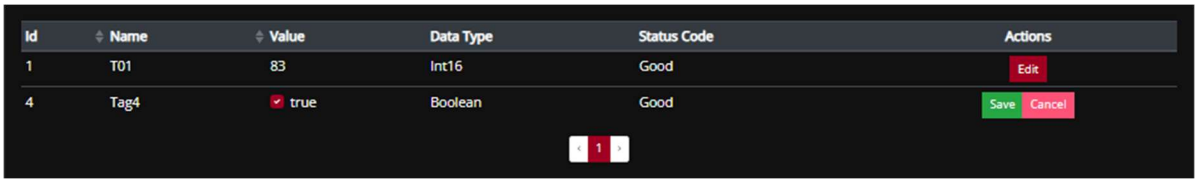


If the modified tag is [int16], after clicking [Edit] at [Actions], set the value to be modified in the box [Value]. After finishing, click [Save] to write the value to GATEWAY. To cancel writing the value to GATEWAY, click [Cancel].

After modifying the status or value of the tag, click the blank space next to it to complete the modification setting.

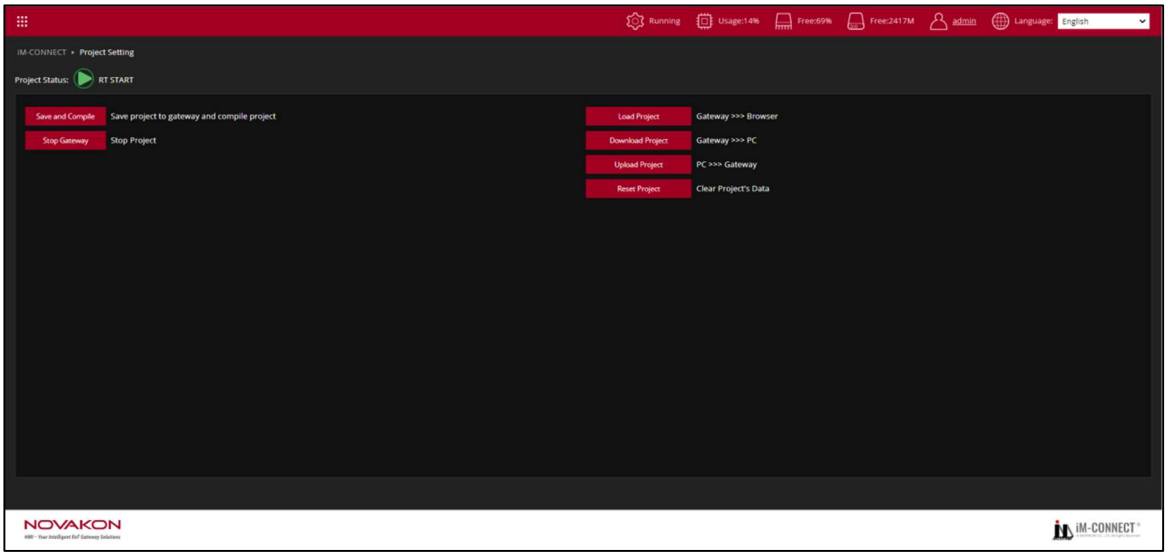


If the modified tag is [Bit], after clicking [Edit] at [Actions], the [Value] can be checked as [true] (1, ON) or unchecked as [false] (that is, Is 0, OFF). After finishing, click [Save] to write the value to GATEWAY. To cancel writing the value to GATEWAY, click [Cancel].



12. Project Setting

The project setting is mainly used to perform related actions such as [Save and Compile],[Run & Stop], [Load Project] , and[Download/Upload]of the project.



Project Status	Display the current status of GATEWAY (RT) operation.
Save and Compile	Save the edited tag data to GATEWAY for verification.
Run/Stop Gateway	Run or stop the GATEWAY (RT) operation.
Load Project	Load the GATEWAY data into the web page for later tag edit, modification or add action.
Download Project	Load all current data back to the computer.
Upload Project	Return all current data to GATEWAY.
Reset Project	Clear all the settings and parameters of the project (Username, password, and IP address will not be affected).

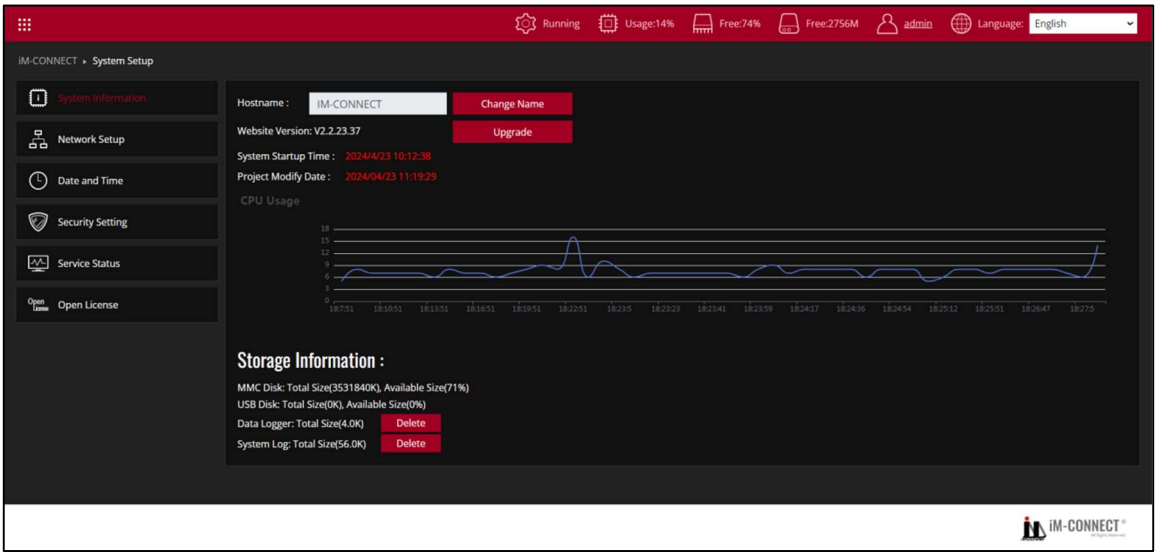
Note: **Please remember to press [Load Project] to load the returned data to the Web page** after downloading the previous data to the computer with [Download] or after updating the originally set IP. Otherwise, the content seen on the web page would not be updated synchronously.

13. System Setting

This is where to view current GATEWAY-related information and settings, including network settings, date & time settings, security settings, etc.

13.1 System Information

Click on each page to view information about the currently connected GATEWAY.

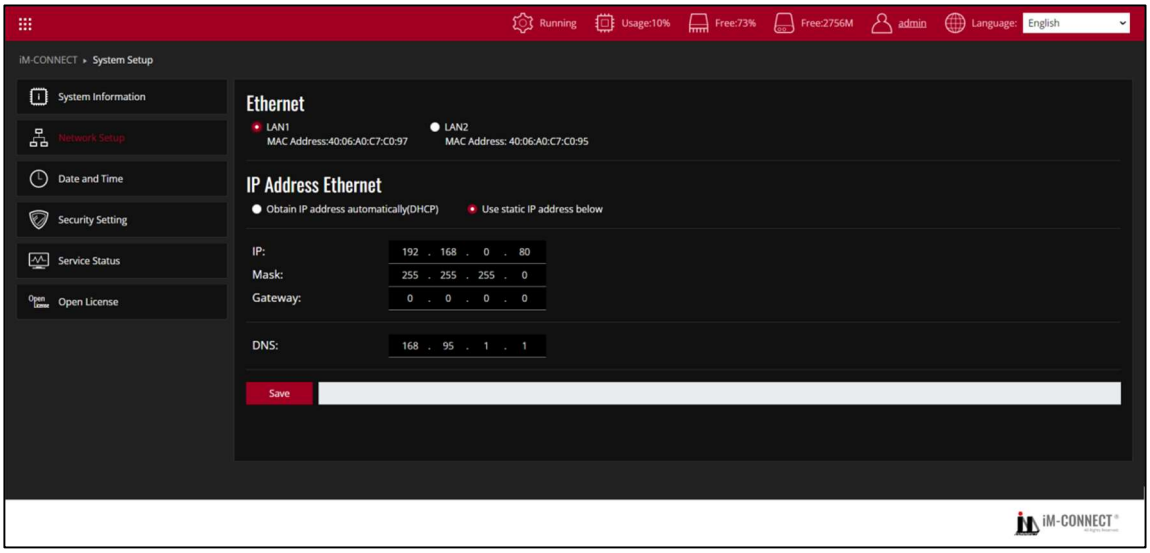


Hostname	Click the button of[Change Name]to modify the host name. After modification, click [Submit]to complete. This host name can be used for log in IP address for the web browser. For instance, if the host name is set as [demo], enter[http://demo.local]on the browser to access the webpage.
Website Version	Display the current website version. By clicking the button of [Upgrade], you can upgrade the system to the latest version.
System	The last startup time of this system.

Startup Time	
RT Modify Date	The time when RT is last modified.
Project Modify Date	The time when project is last modified. If this time is consistent with RT Modify Date, it means the project content on the server and your webpage are aligned. If this time is different from RT Modify Date, it means you have modified the project content during the RT operation, you need to compile and save and compile and re-start the project.
CPU Usage	Display the CPU usage with trend chart.
Storage Information	Display total and remaining capacity of eMMC (Embedded MMC) and USB Disk.
Data Logger	Displays the current total storage capacity of recorded data, in KB. Pressing [Delete] clears the capacity.
System Log	Displays the total capacity of the current system logs, in KB. Pressing [Delete]clears its capacity.

13.2 Network Setup

Press [Network Setup] to set the network parameters of GATEWAY.



A. Ethernet

Set the IP Address, Mask, Gateway, DNS for[LAN1]and[LAN2]respectively.

After finishing the setting, press [Save] to save the contents of the current setting.

B. IP Address Ethernet

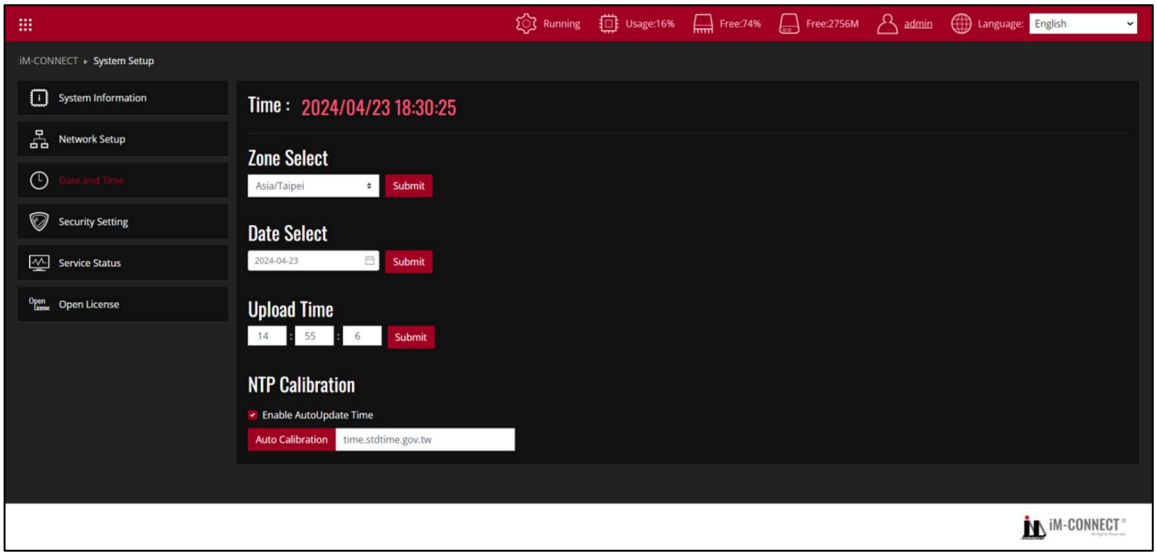
Obtain IP address automatically (DHCP)	IP address assigned by system.
Use static IP address below	IP address defined by user.

Checking[Obtain DNS server address automatically]allows the system to automatically obtain the DNS server address. Conversely, if unchecked, the user must manually input the DNS server address.

C. After the IP setting of each group is completed, press [Save] to save the setting value to GATEWAY.

13.3 Date and Time

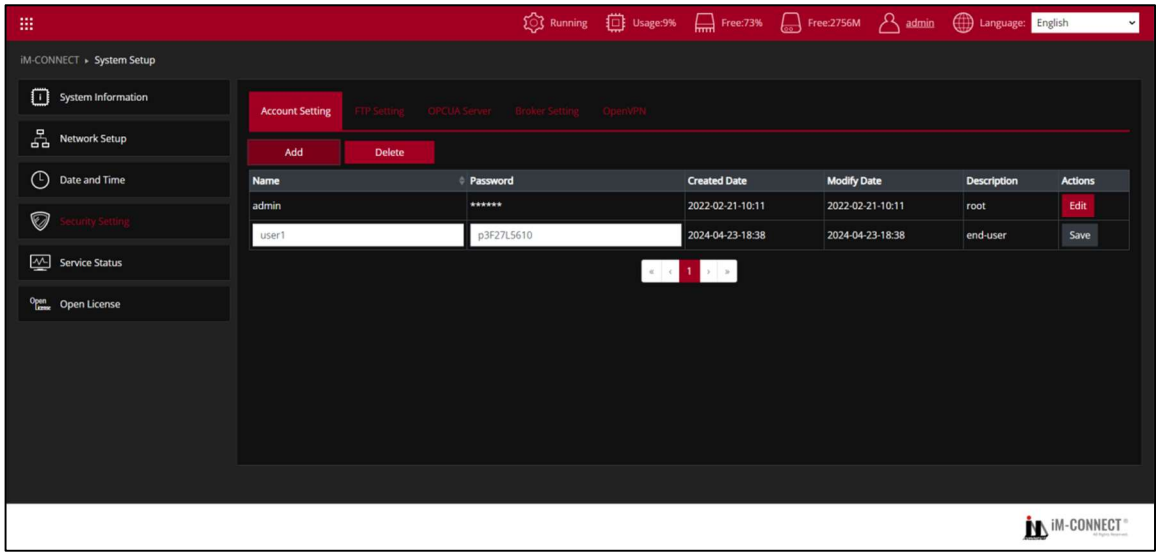
Set the date and time of the GATEWAY.



TIME	Displays current time and date of the system.
Zone Select	Choose the current location and country. After setting, press [Submit] to save the current setting.
Date Select	Set the current system date of GATEWAY. After finishing the setting, press [Submit] to save the current setting.
Time Select	Set the current system time of GATEWAY. After finishing the setting, press [Submit] to save the current setting.
NTP Calibration	Check the box to synchronize with network time. If there are variations in the customer's local area network, they can manually input the NTP server. Press [Auto Calibration]to synchronize the date and time of the GATEWAY system with the network time.

13.4 Security Setting

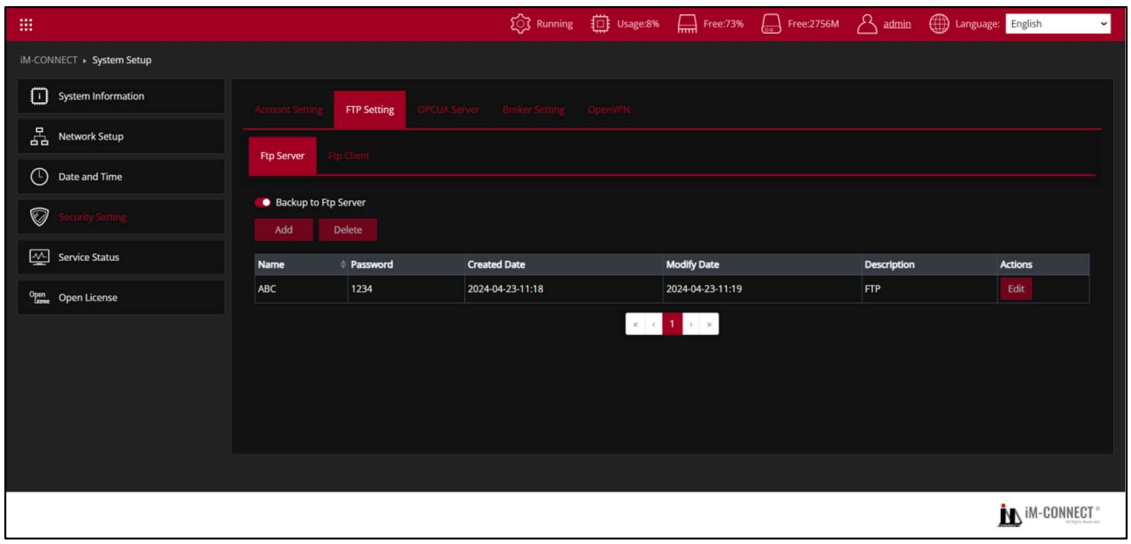
Set the login GATEWAY username and password of the account and [FTP], relevant settings of MQTT [Broker] and OpenVPN.



Account Setting

Add or Delete usernames and passwords. Username can be set as [root] or [end-user]. Log in as [root] can access all the functions；as [end-user] only display basic functions.

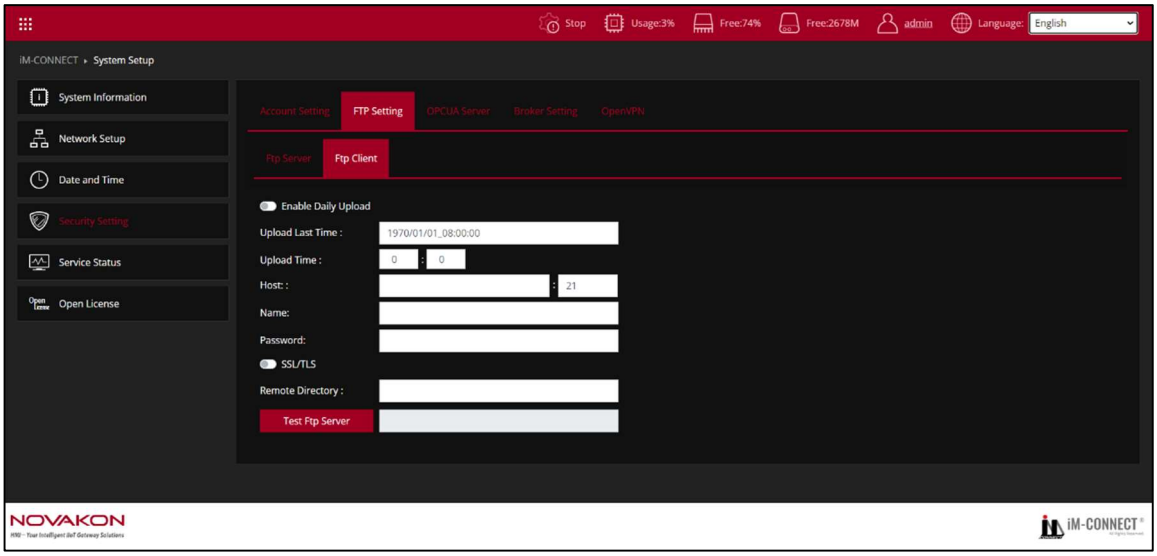
Add	Add a new set of username and password with[end-user]access.
Delete	Delete a set of username and password.
Edit	Modify username and password. Press[Save]when editing is completed. System will automatically log out for user to log in with modified username and password.



FTP Setting

Add or Delete FTP username and password.

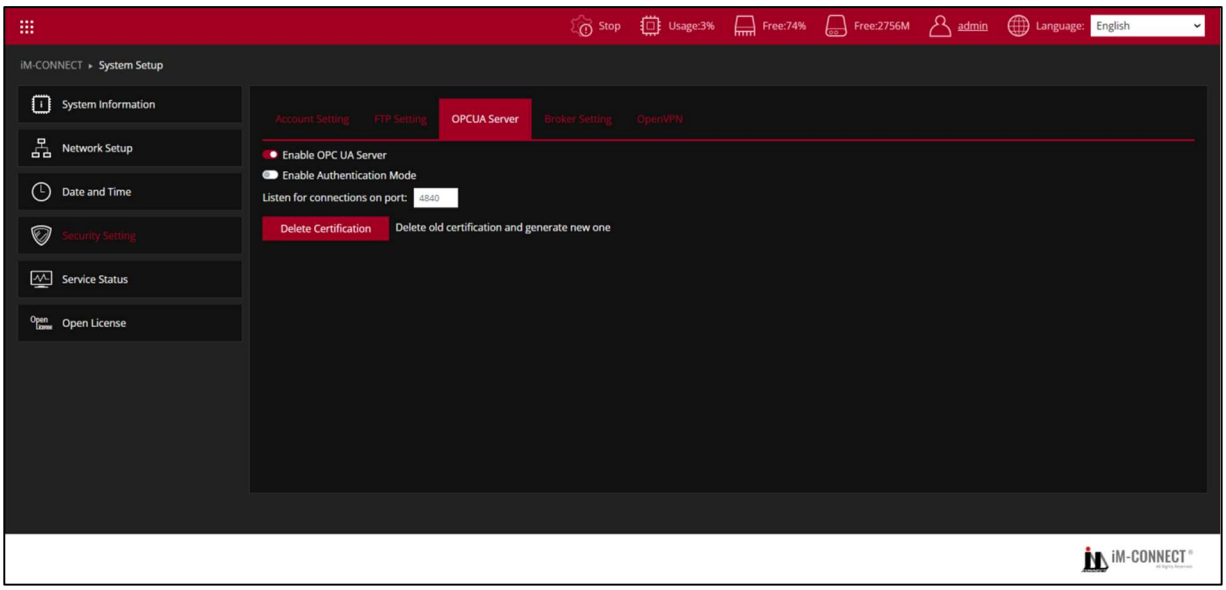
FTP Server	Set the gateway as FTP Server with related information.
Enable Server at project Startup	Check the box to enable FTP, in which data log file can be accessed.
Add	Add a new set of FTP username and password.
Delete	Delete a set of FTP username and password.
Edit	Modify FTP username and password. Press[Save]to complete the modification.



FTP Client

Set gateway as FTP Client with the condition and related information of FTP Server, to which gateway send data through Internet.

Enable Daily Upload	Set the time that gateway uploads data (Datalog/Alarm History) to FTP server everyday.
Upload Last Time	Displays the time when the file was last uploaded.
Upload Time	You can set the time to upload files every day.
Host	Input the server's name for connection.
Name	Input the FTP client username.
Password	Input the FTP client password.
SSL/TLS	Check to enable connection encryption.
Remote Directory	Input the remote directory of FTP server for upload.
Test Ftp Server	Click to test the connection to FTP server.



OPCUA Server

Set GW-01 as a OPCUA Server.

Enable OPC UA Server	Enable the OPCUA Server.
Enable Authentication Mode	Input the username and passcode when it is enabled.
Listen for connections on port	Set the port on which the OPC UA Server is listening for connection requests of OPC UA Clients. The default port is[4840].
Delete Certification	Delete old certification and generate new one.

Example

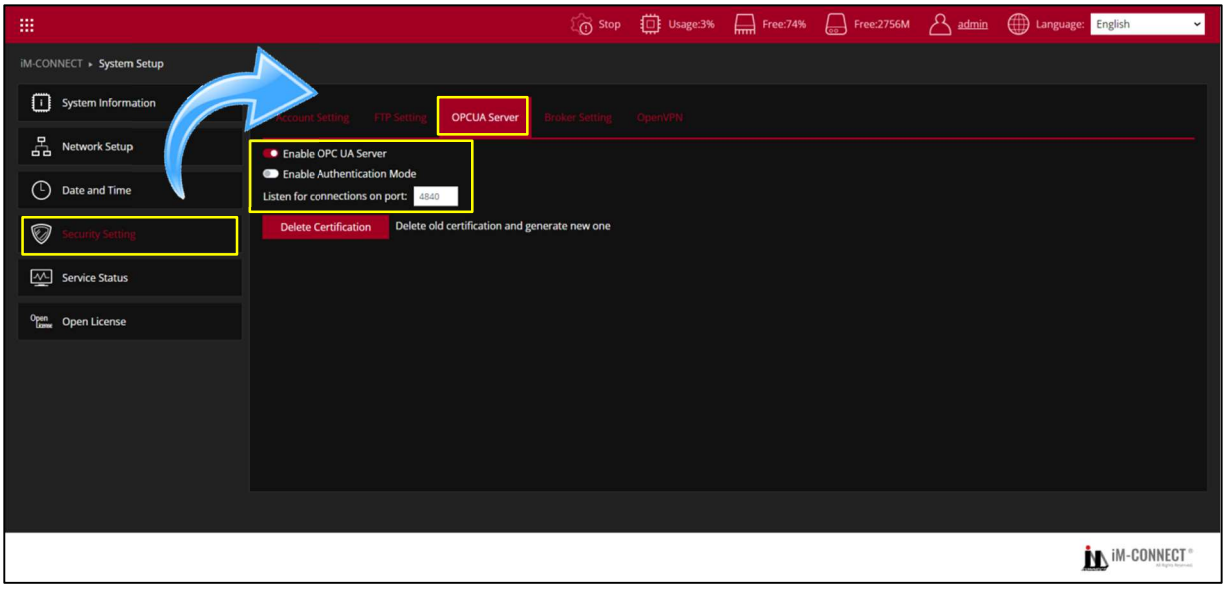
Take two GW-01, one as OPCUA Server, another one as OPCUA Client to test the connection.

A. OPCUA Server Settings (IP address 192.168.90.94)

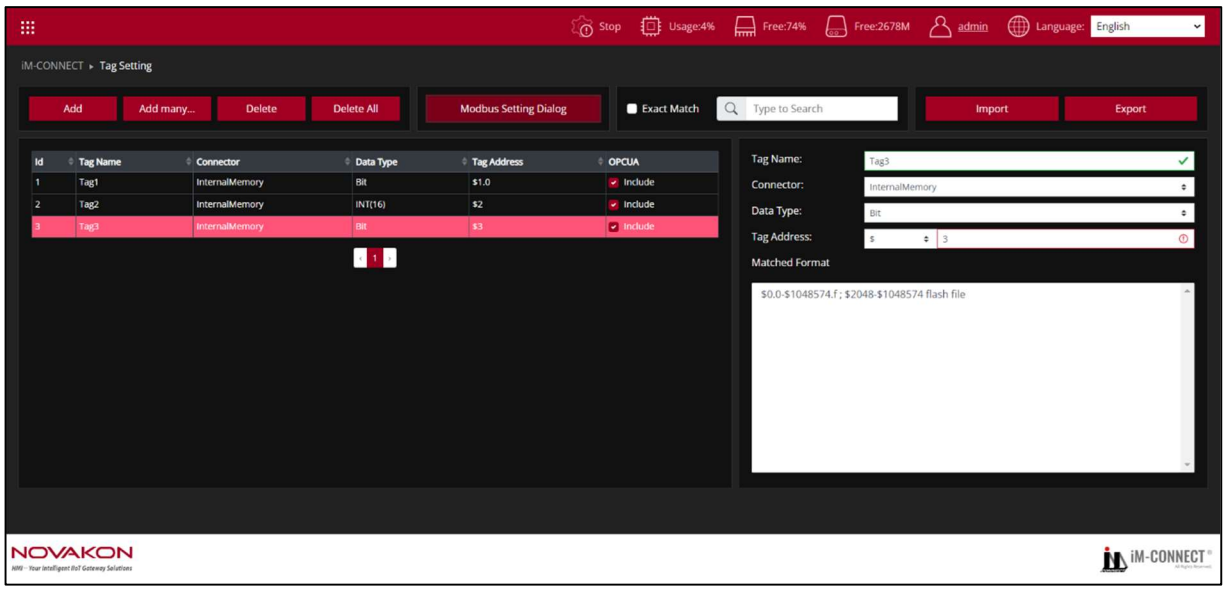
(1) Click upper left corner to open the menu. Click[System Setup].

(2) Click[Security Setting]→[OPCUA Server], Click [Enable OPC UA Server], Listen for connections on port to default[4840].

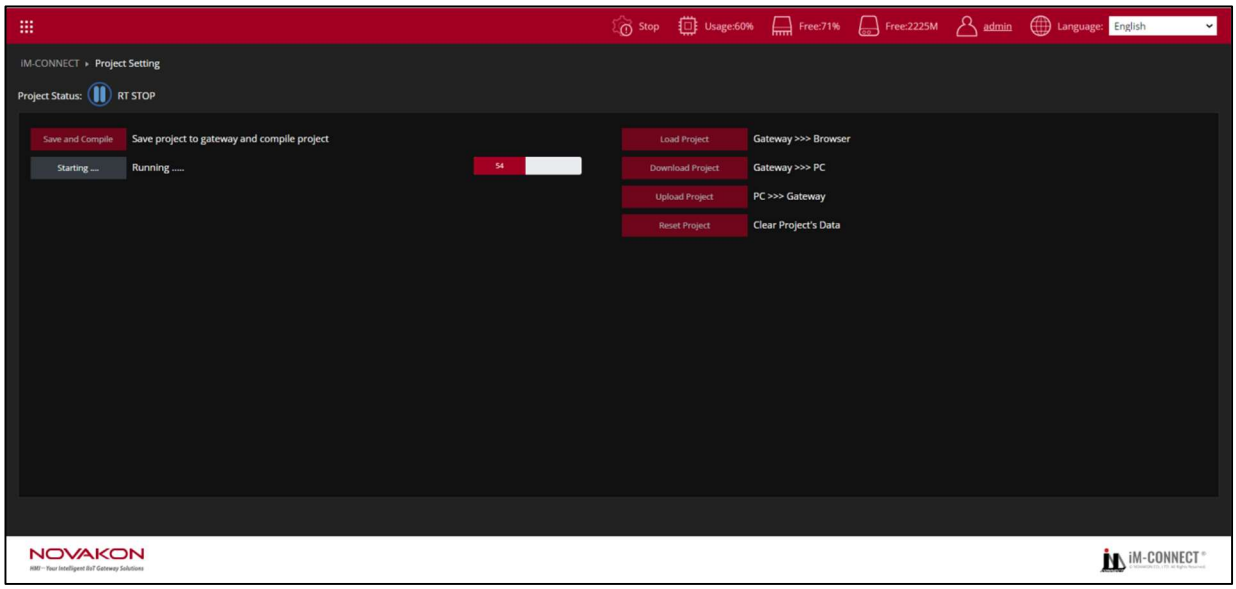
(Before changing the state of [Enable OPC UA Server], make sure the Project is stopped first.)



(3) Click upper left corner to open the menu. Click[Tag Setting]. Add three new tags with datatypes of Bit/INT(16)/UINT(32). For the details of Tag setting, please refer to Chapter 4[Tag Setting].



(4) After setting, go to[Project Setting], click[Save and Compile]to GW-01 and[Start Project].

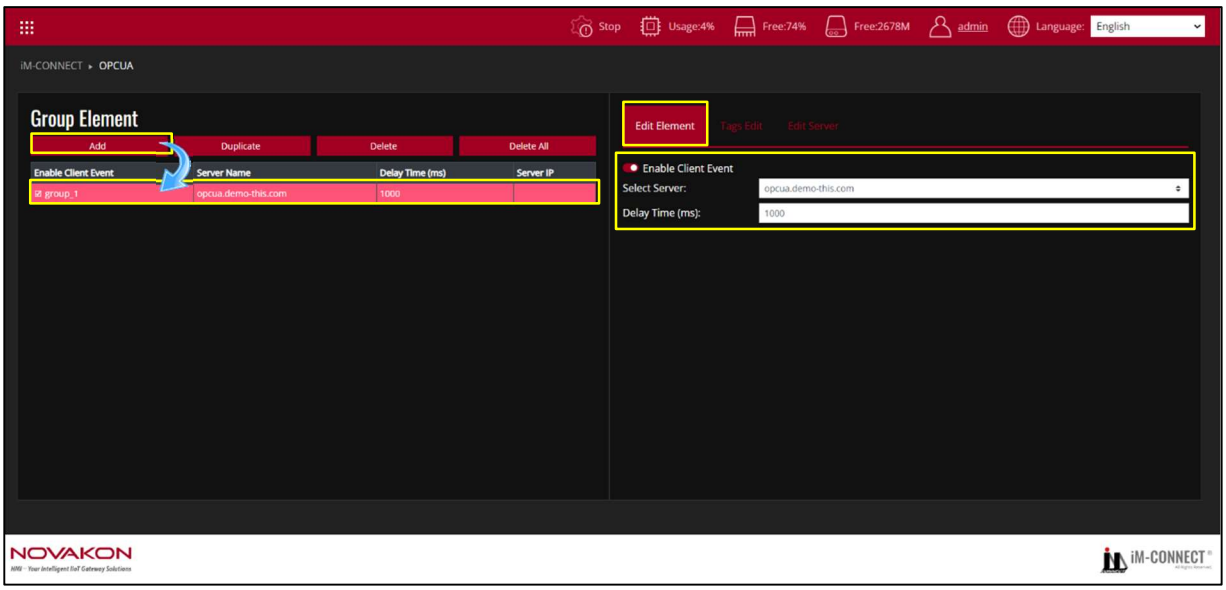


B. OPCUA CLIENT Settings (IP address 192.168.90.118)

(1) Click upper left corner to open the menu, Click[OPCUA].

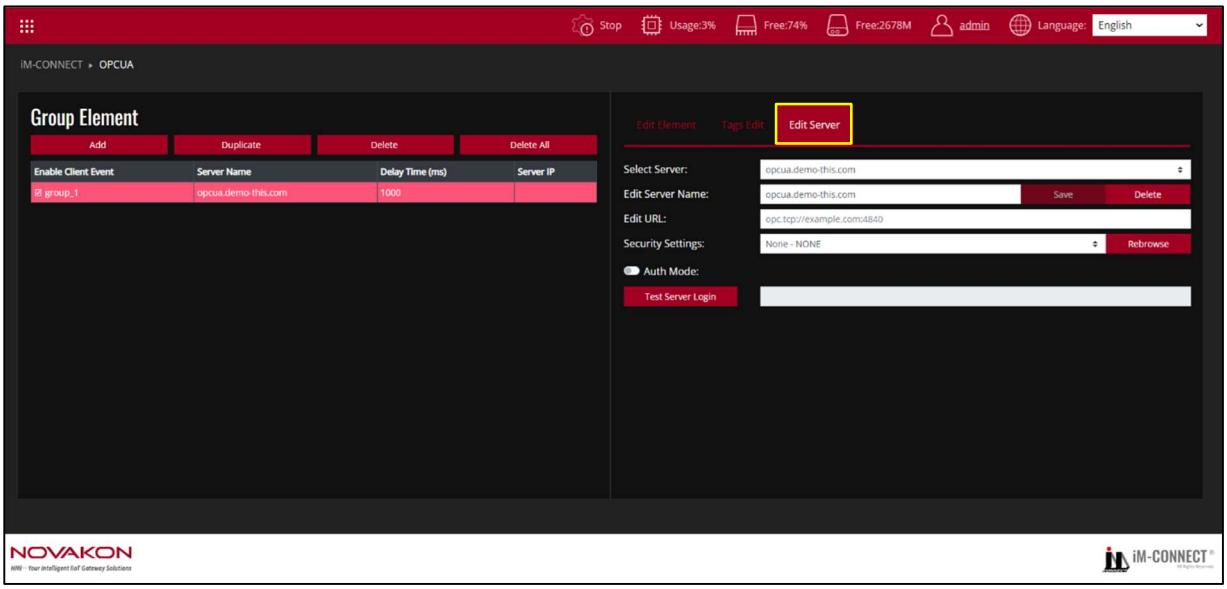
(2) Click[Add]to add an OPCUA item.

(3) Go to the right column [Edit Element], click[Enable Client Event].



(4) Click [Edit Server], set the connection to OPCUA SERVER.

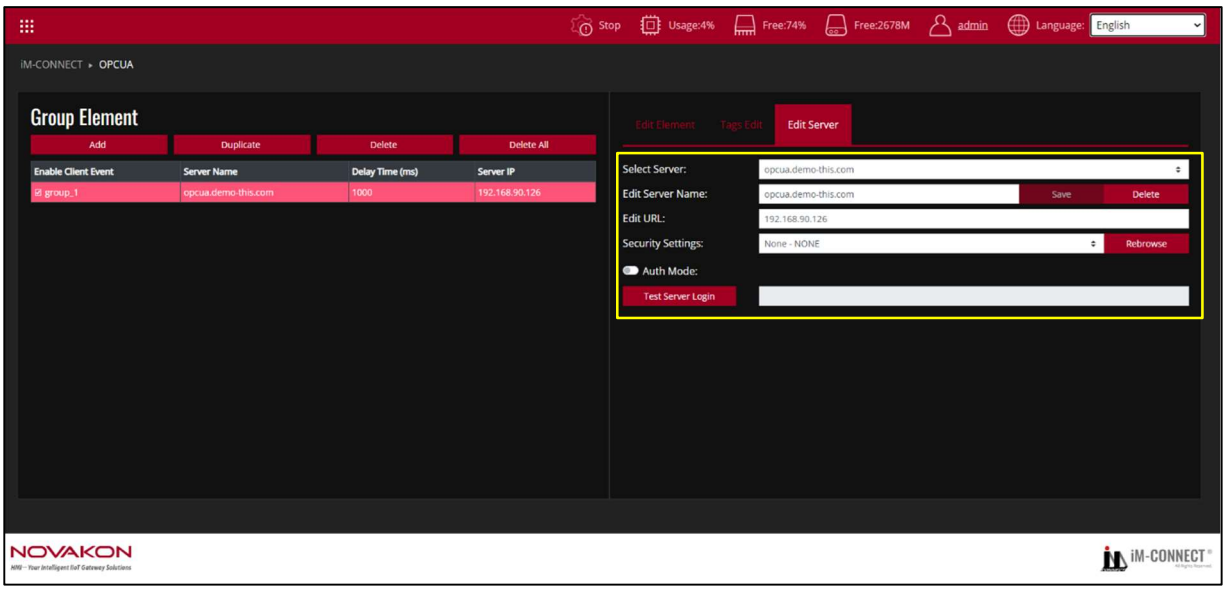
For the details of OPCUA CLIENT settings, please refer to Chapter [9.OPCUA].



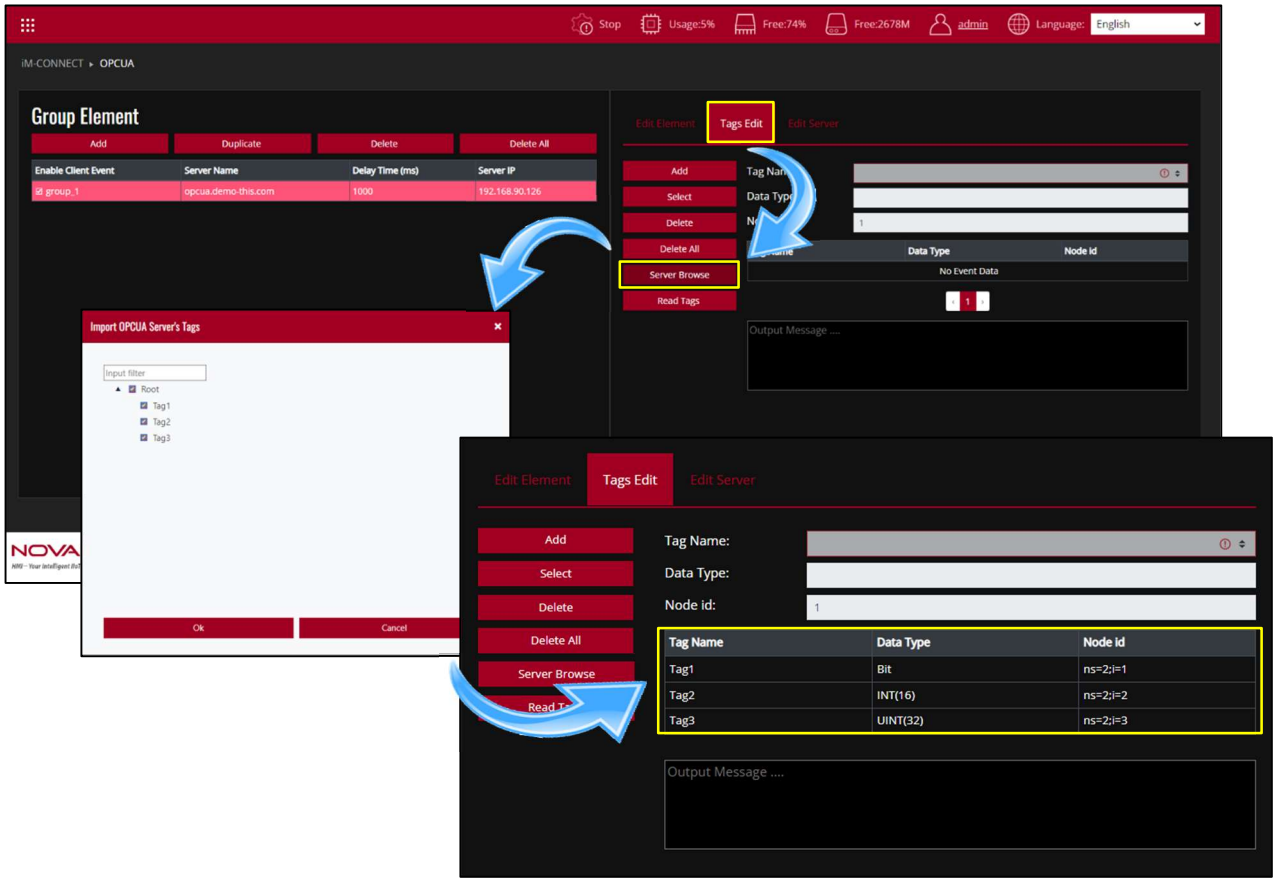
(5) Click [Edit Server], set the connection to OPCUA SERVER.

For the details of OPCUA CLIENT settings, please refer to Chapter [9.OPCUA].

After the setting is completed, press [Test Server Login]. If the test is correct, [Server connect successfully] will be displayed.

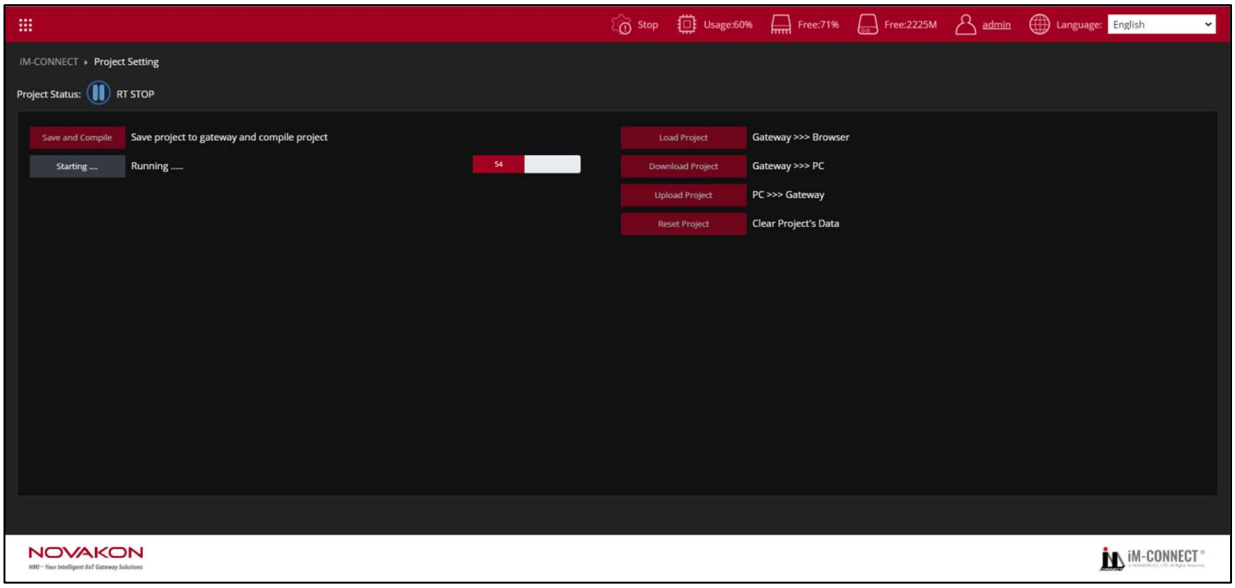


(6) Switch to [Tags Edit]. After clicking [Server Browse], you can see the tags created in OPCUA SERVER. Check the required tags and press [OK] to automatically add the tags of OPCUA SERVER to the OPCUA CLIENT device.



(7) After the setting is completed, you can go to[Project Setting] to execute [Save

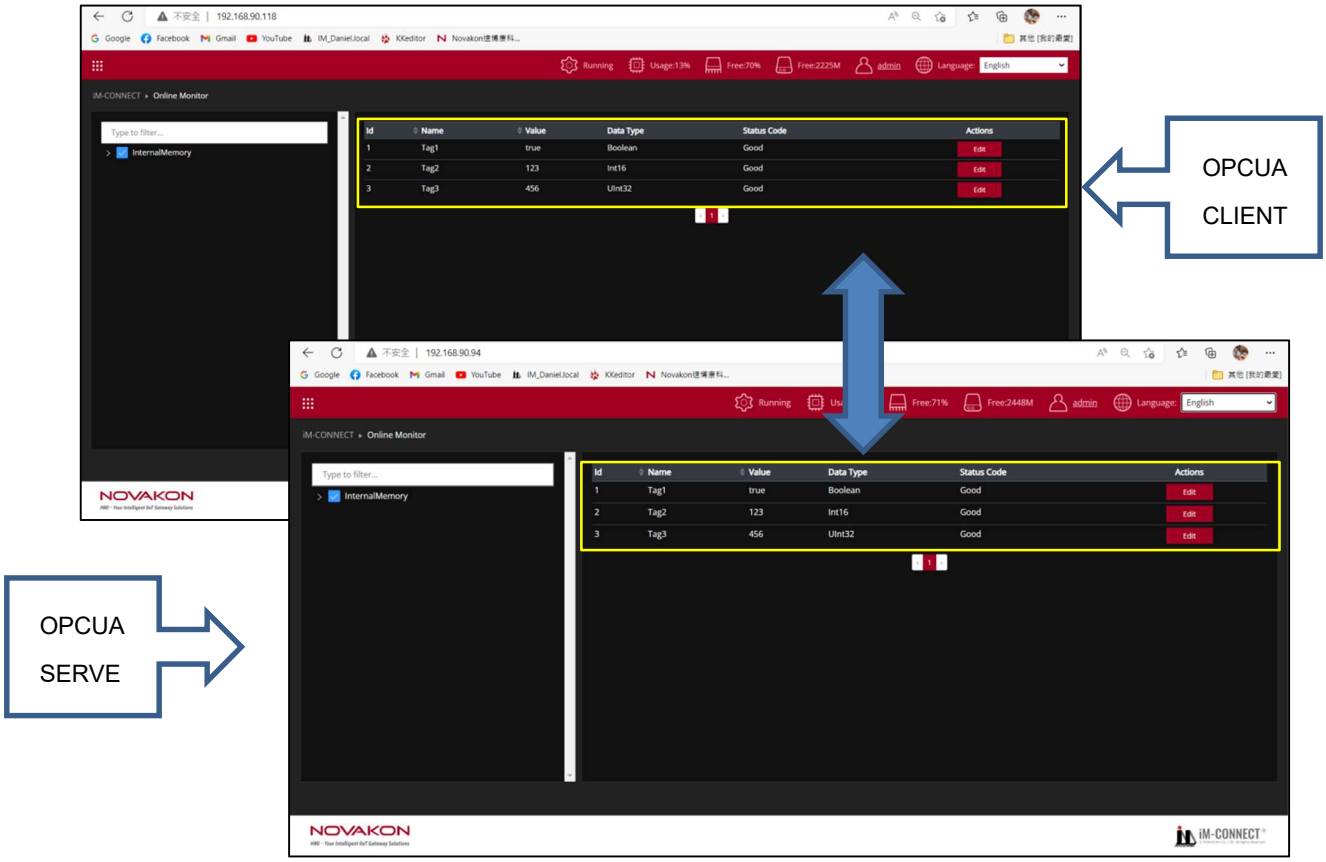
and Compile] to GW01 and [Start Project].

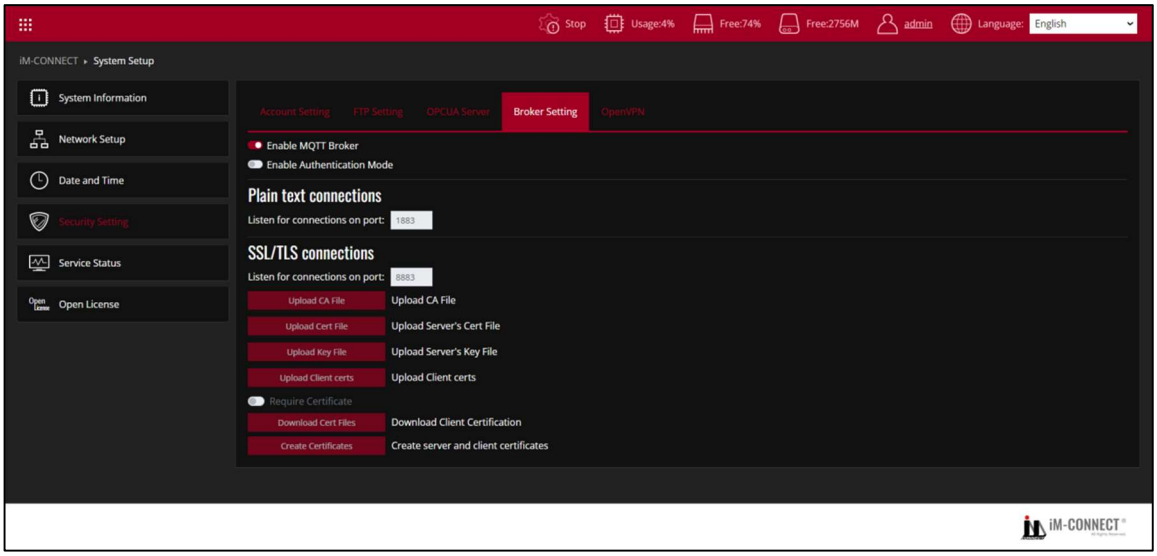


C. Connection Test

(1) Connect two GW01 separately, click on the upper left to open the menu, and click [Online Monitor] to enter the monitoring screen.

(2) It can be seen from the [Online Monitor] that the two devices can monitor the tag value synchronously, which means that the connection through OPCUA has been successful.





Broker Setting

When using the MQTT protocol for data transmission, GW01 can be set as a Broker (must be set as the Publisher).

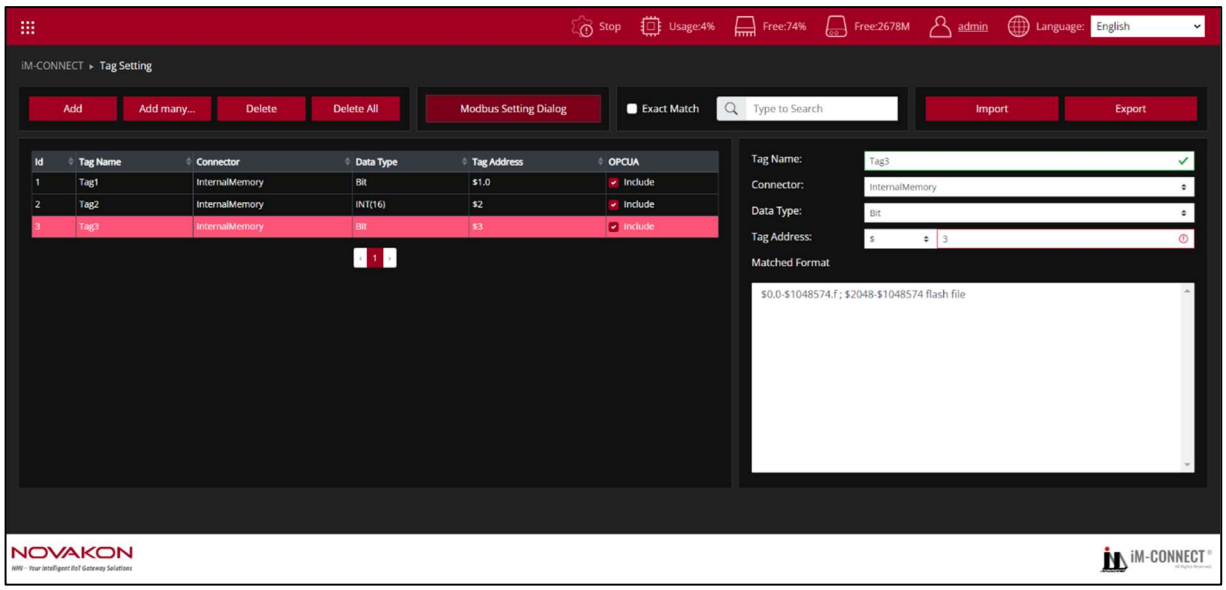
Enable MQTT Broker at RT Startup	Enable MQTT Broker after clicking on it.
Enable Authentication Mode	To enable the MQTT Log In Verification Mechanism, click on it and enter the account name and password for authentication.
Plain text connections	Designate the listening port with unencrypted connection. The default is[1883].
SSL/TLS connections	Designate the listening port with SSL encrypted connection. The default is[8883].
Upload CA File	Import the certificate file provided by the server.
Upload Cert File	Import the verification certificate provided by the Server.
Upload Key	Import the key provided by the Server.

File	
Upload Client certs	Import client certificates.
Require Certificate	Download the certificate required for the log in. Checking[Require Certificate]enables the download of client login certificates.
Download Cert Files	Download Client Certification.
Create Certificates	Create server and client certificates.

Example

Take two GW-01 as an example, one is MQTT Subscriber and the other is MQTT Publisher.

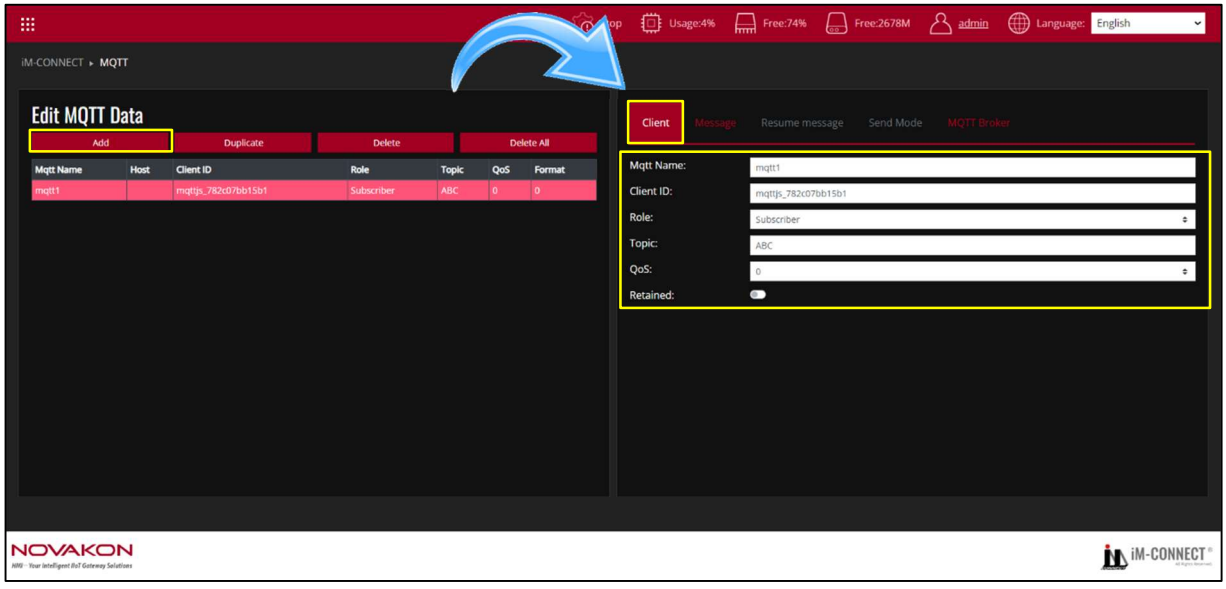
A. Click on the upper left  to open the menu, click [Tag Setting] to enter the setting.
   Add three new tags with the data types of Bit/INT(16)/UINT(32).
   Both GW-01 must create these tags separately.
   For instructions on tag setting, please refer to [4. Tag Setting] in this manual.



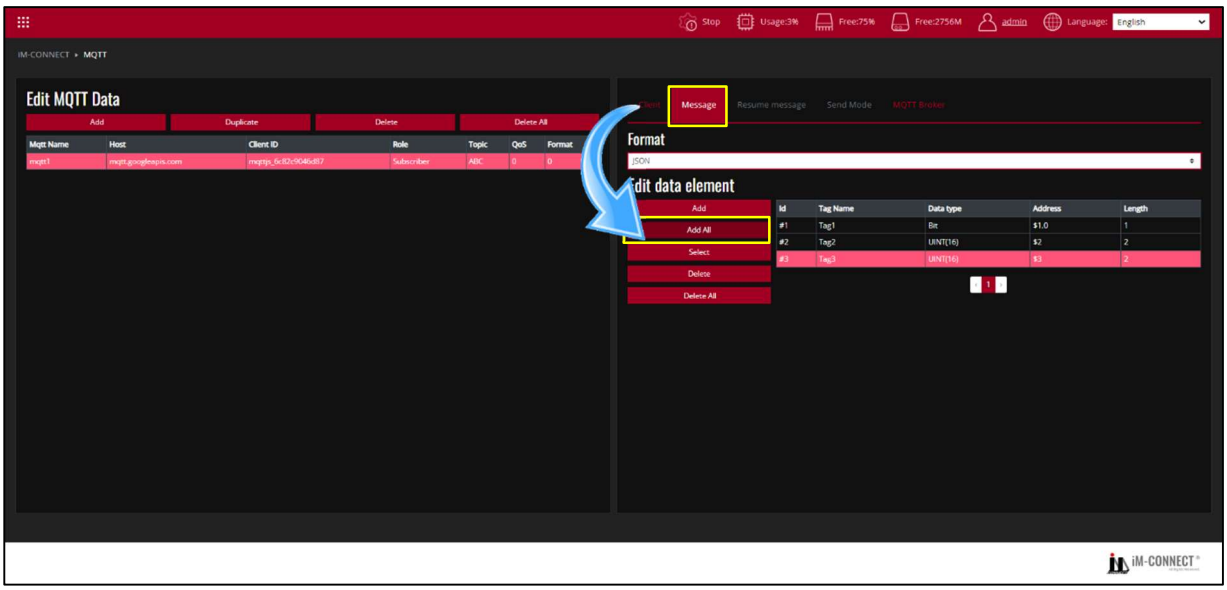
B. MQTT Subscriber setting (the IP of GW01 is 192.168.90.129)

(1) Click on the upper left  to open the menu and click [MQTT] to enter the settings.

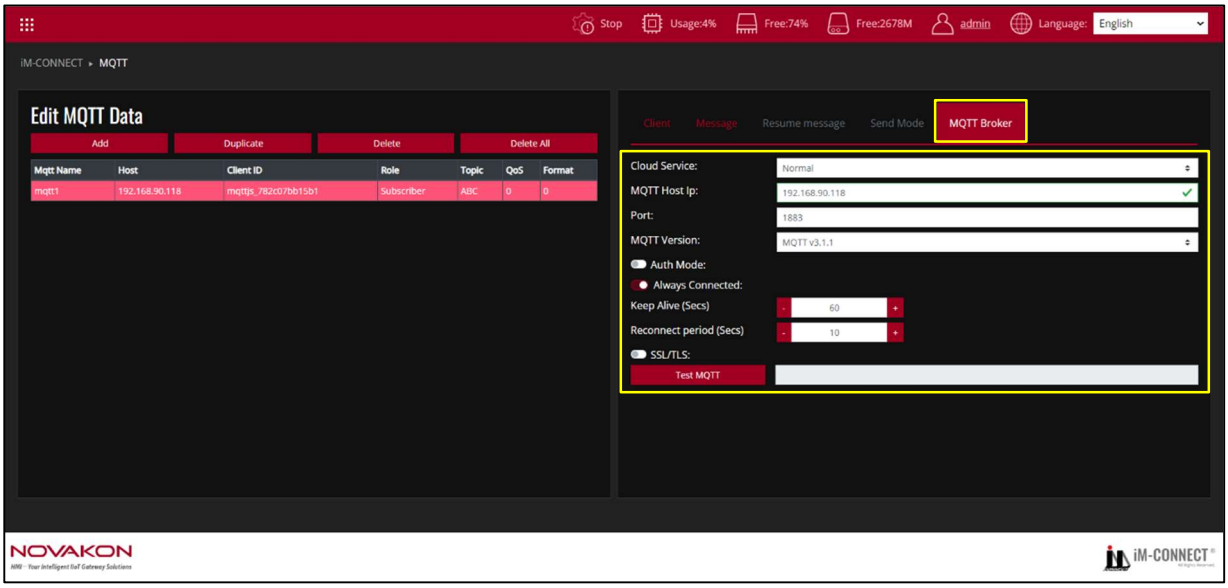
(2) Click [Add] and go to [Client] to set the role to [Subscriber], and the topic must be consistent with the Publisher setting. In this example, set it to [ABC].



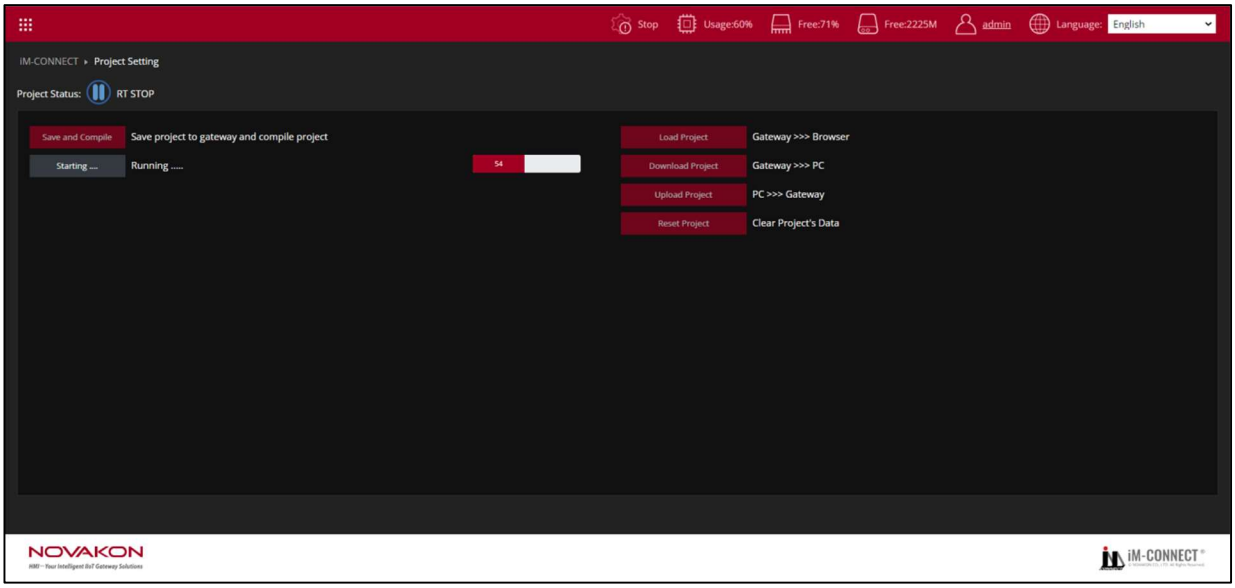
(3) Click [Message] and press [Add All] to add all the three tags created.



(4) Click [MQTT Broker] and set [Cloud Service] (this example is set to [Normal]) / [MQTT Host ip] (in this example the command is sent by the Publisher, so Host ip must be set to the IP address of the Publisher [192.168.90.118]) /[Port](in this example, the default is [1883]).



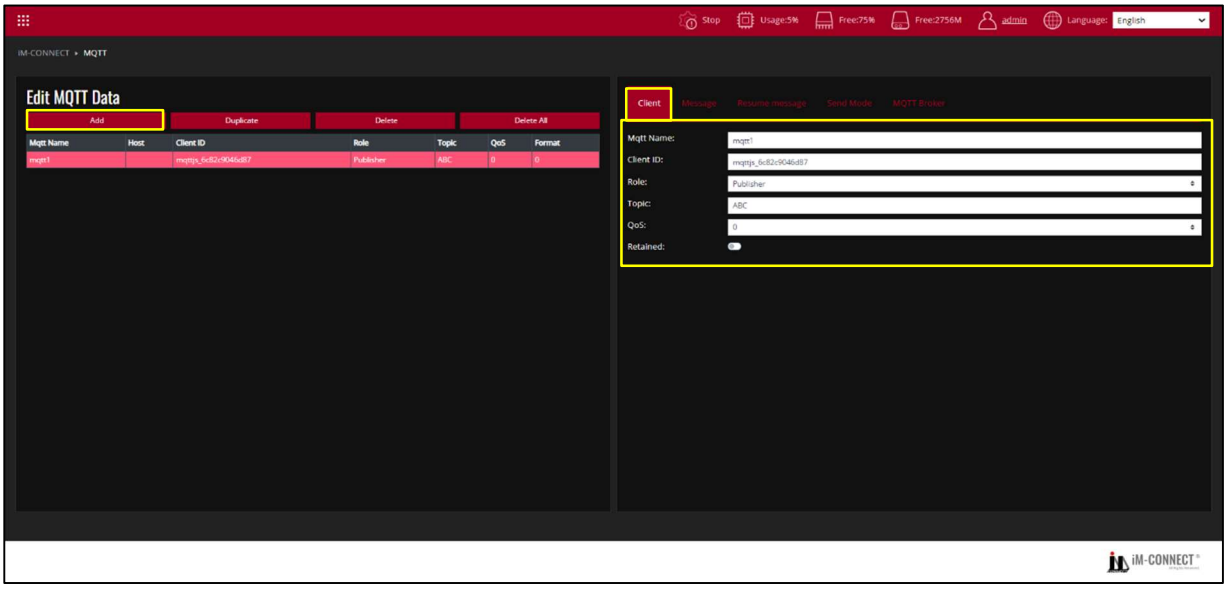
(5) After the setting is completed, you can go to [Project Setting] to execute [Save and Compile] to GW01 and then [Start Project].



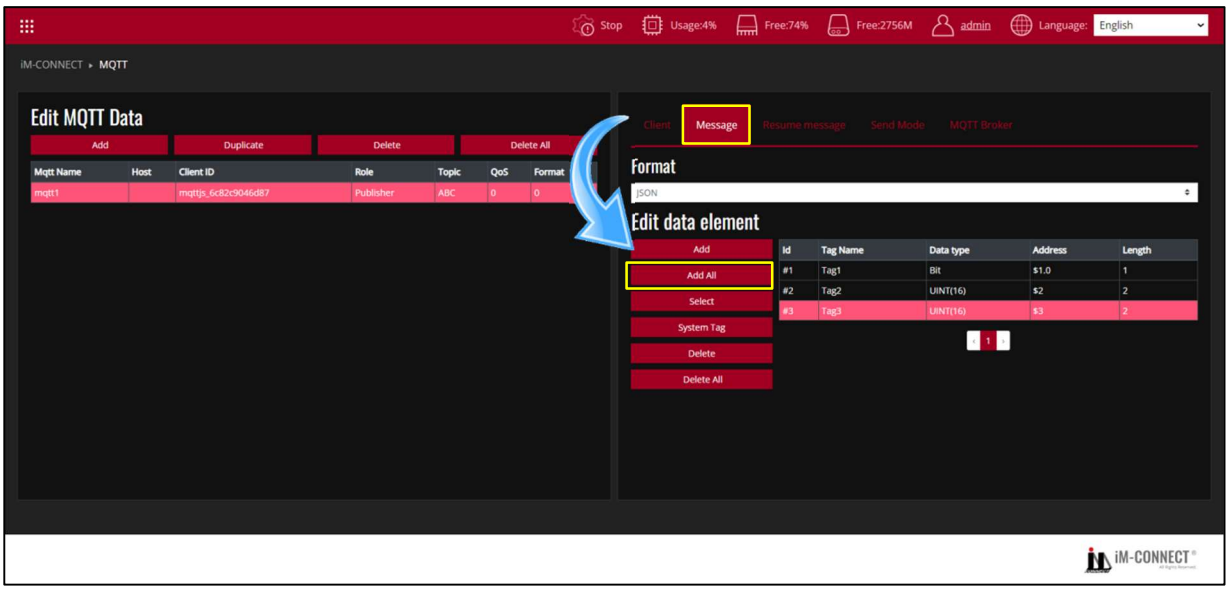
C. MQTT Publisher settings (the ip of GW01 is 192.168.90.118)

(1) Click on the upper left to open the menu, and click [MQTT] to enter the settings.

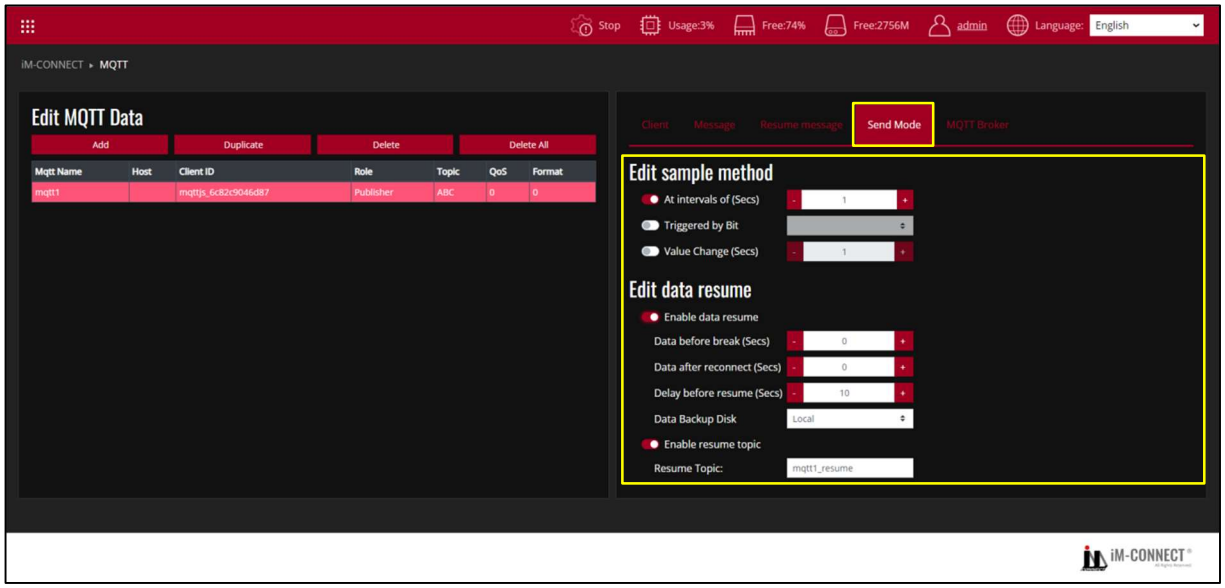
(2) [Client] set the role to [Publisher], and the topic should be consistent with the Subscriber setting. In this example, it is set to [ABC]



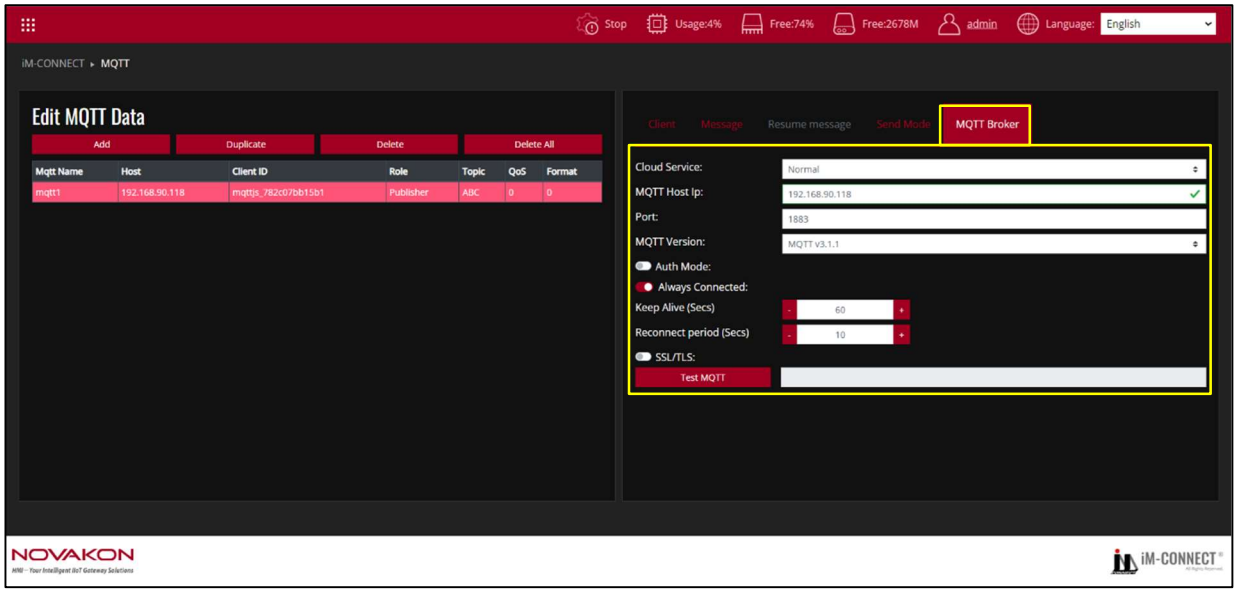
(3) Click [Message] and press [Add All] to add all the three tags created.



(4) Click [Send Mode], and set the conditions for transmitting data according to actual needs (in this example, set [At intervals of (Secs)] to transmit once per second).

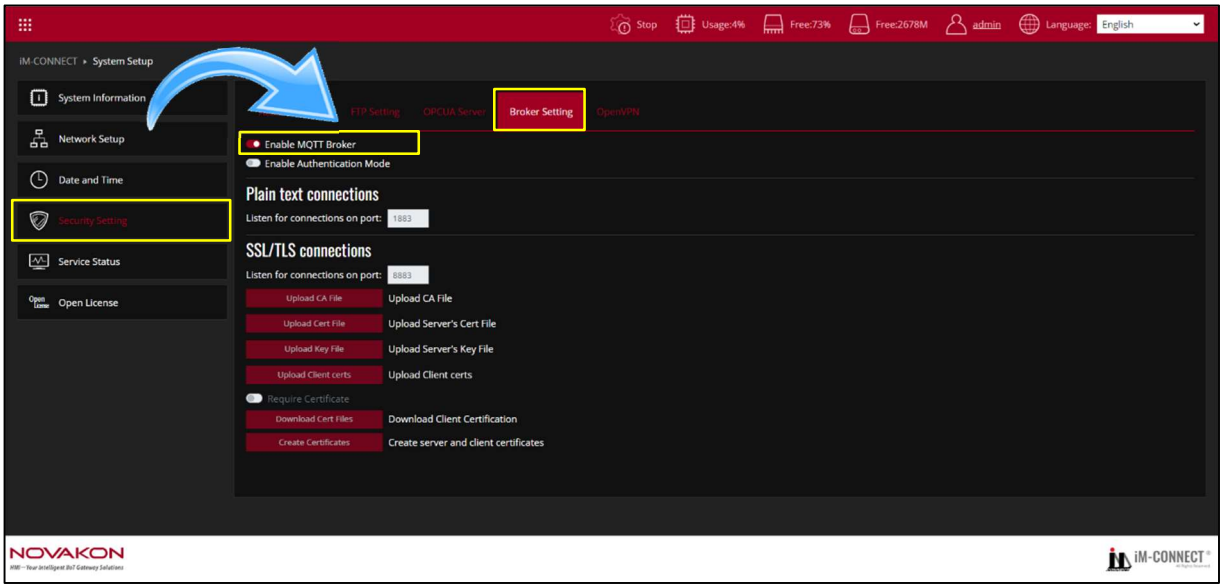


(5) Click [MQTT Broker] and set [Cloud Service] (this example is set to [Normal]) / [MQTT Host Ip] (because this gateway is the Publisher, so enter the IP of this gateway [192.168.90.118] here) /[Port](in this example, the default is [1883]).

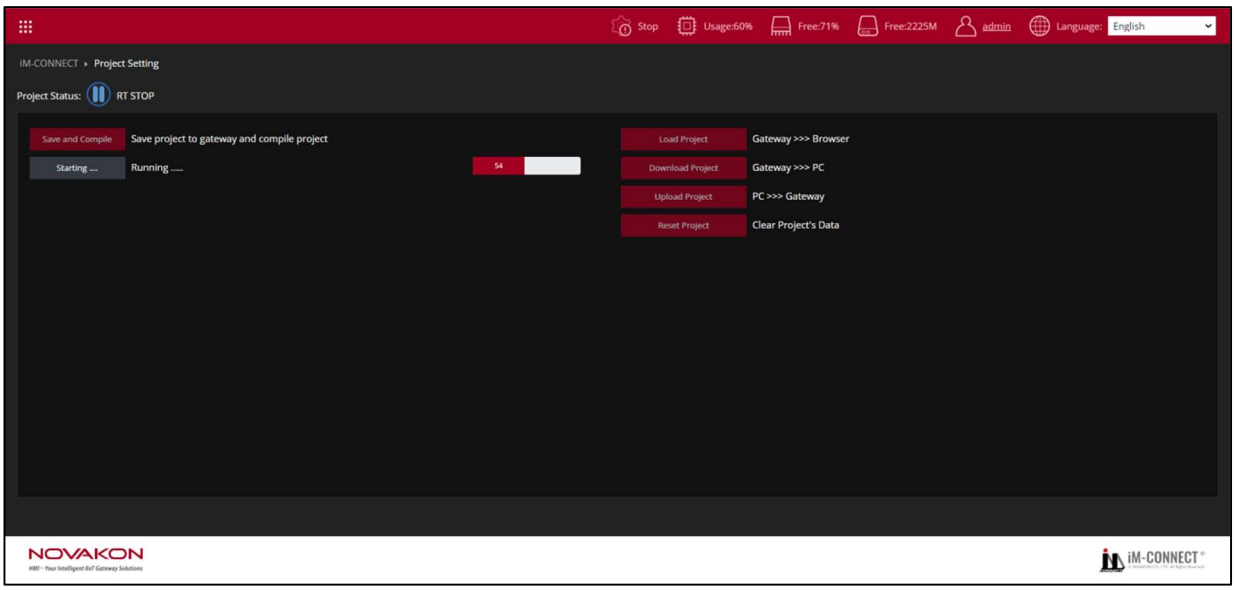


(6) Click on the upper left to open the menu, and click [System Setup] to enter the settings.

(7) Click [Security Setting] → [Broker Setting]. Press [Enable MQTT Broker] and specify it as MQTT Broker.



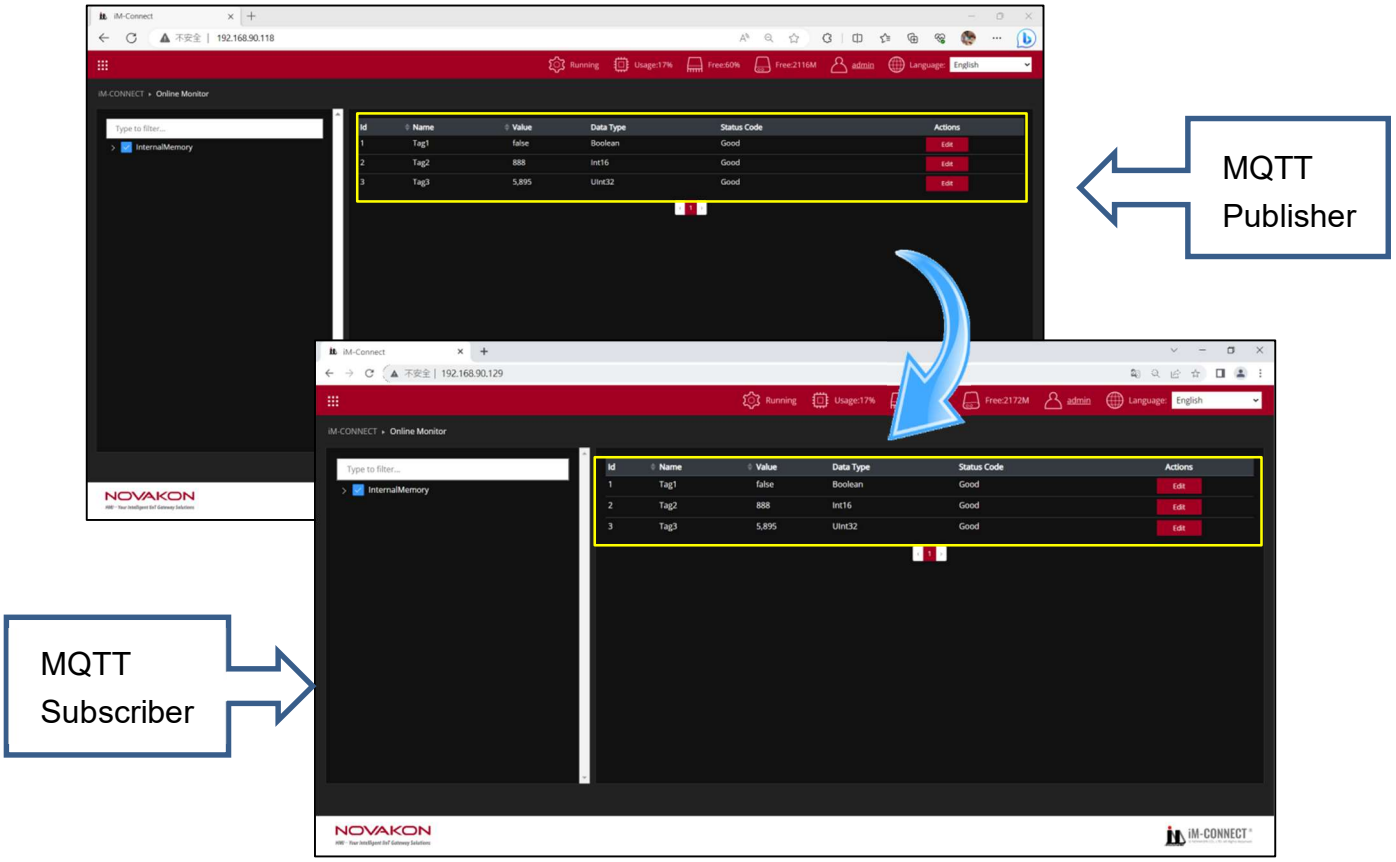
(8) After the setting is completed, you can go to [Project Setting] to execute [Save and Compile] to GW01 and [Start Project]



D. Connection Test

(1) Connect two GW01 respectively, click on the upper left  to open the menu, and click [Online Monitor] to enter the monitoring screen.

(2) It can be seen from the webpage that when the Publisher modifies the tag value, it will be sent to the Subscriber after one second, which means that the connection through MQTT has been successful.



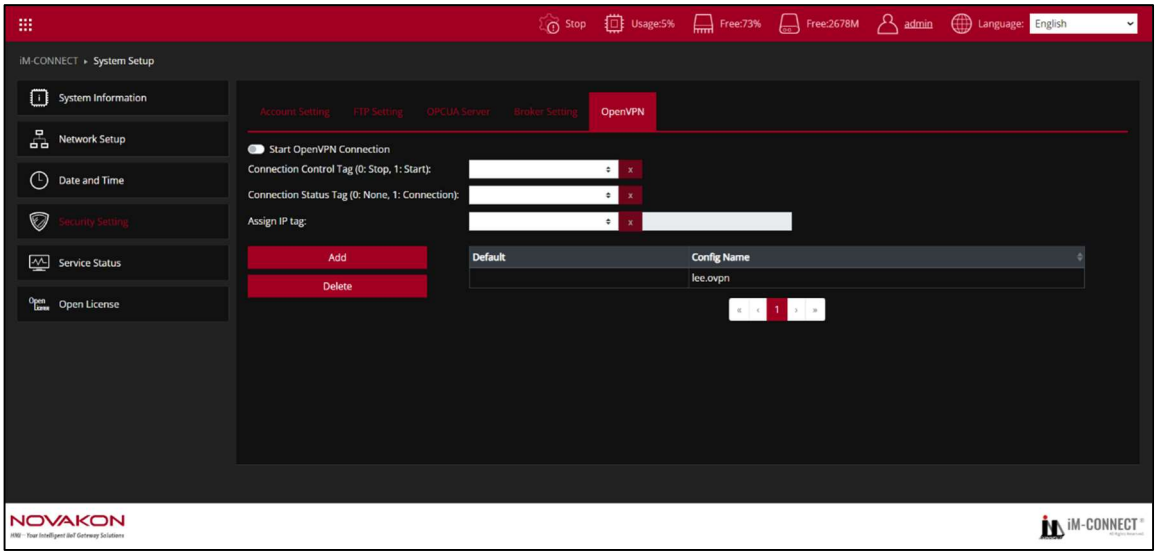
Remark:

(1) The MQTT server host URL of [Subscriber] should be consistent with [Publisher], so that the data can be sent from [Publisher]to [Subscriber] smoothly.

(2) The MQTT Broker used in this example is built inside the same GW01 as the [Publisher], so you should go to [System Setup] → [Security Setting] → [Broker Setting], and press [Enable MQTT Broker], to specify it as an MQTT Broker.

(3) After the setting is complete, you can enter the [MQTT Broker] tab and press [Test MQTT] to check whether it is correct.

(4) MQTT is a one-way data transmission method, that is, [Publisher] sends data to [Subscriber].



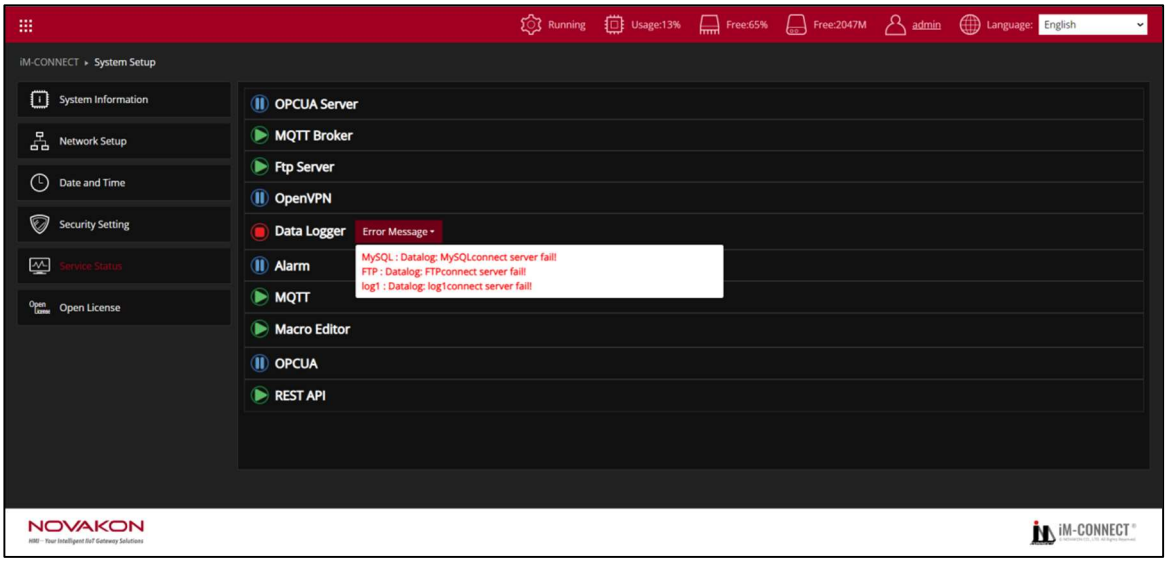
OpenVPN

Set OpenVPN for remote control and monitoring

Start OpenVPN Connection	Enable to start OpenVPN connection.
Connection Control Tag	Assign a bit tag to trigger the OpenVPN connection. (e.g. false:disconnect；true:connect)
Connection Status Tag	Assign a bit tag to show the OpenVPN connection status. (false:disconnected；true:connected)
Assign IP tag	Assign a string tag to show the assigned IP address of the OpenVPN Client.
Add	Add a (*.ovpn) file. Click [Add]to open the dialogue to select the (*.ovpn) file.
Delete	Delete the (*.ovpn) file is not needed.

13.5 Service Status

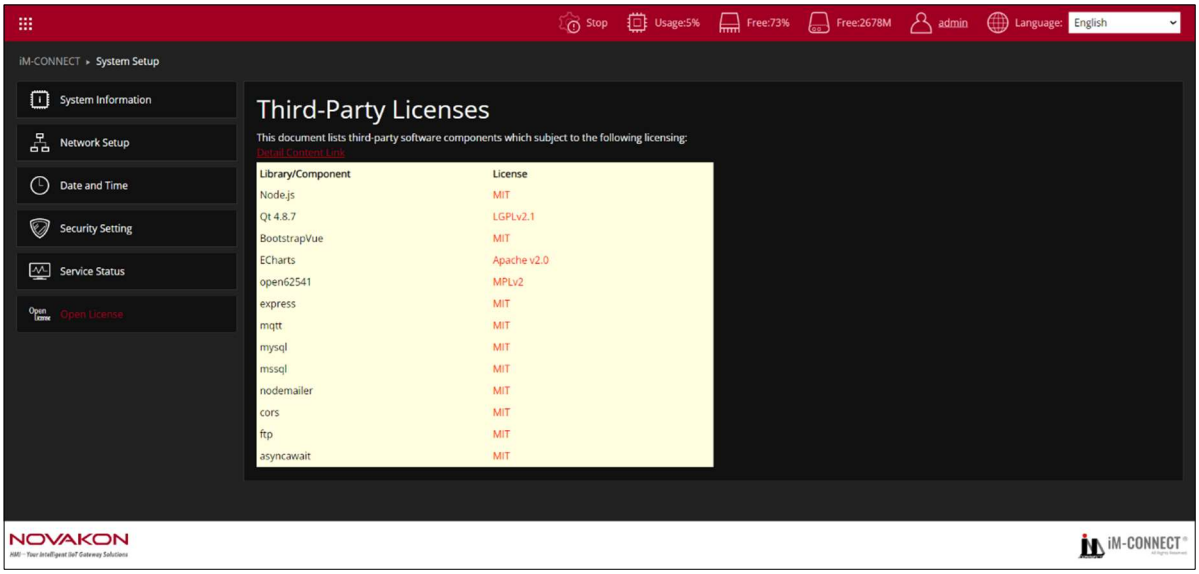
Display current status of each services in the project.



indicates the service is started; shows the service is stopped.

When there is an error in the service, will be displayed, and when the red [Error Message] button is pressed, a drop-down window will be displayed to show error-related messages.

13.6 **Open Licenses**

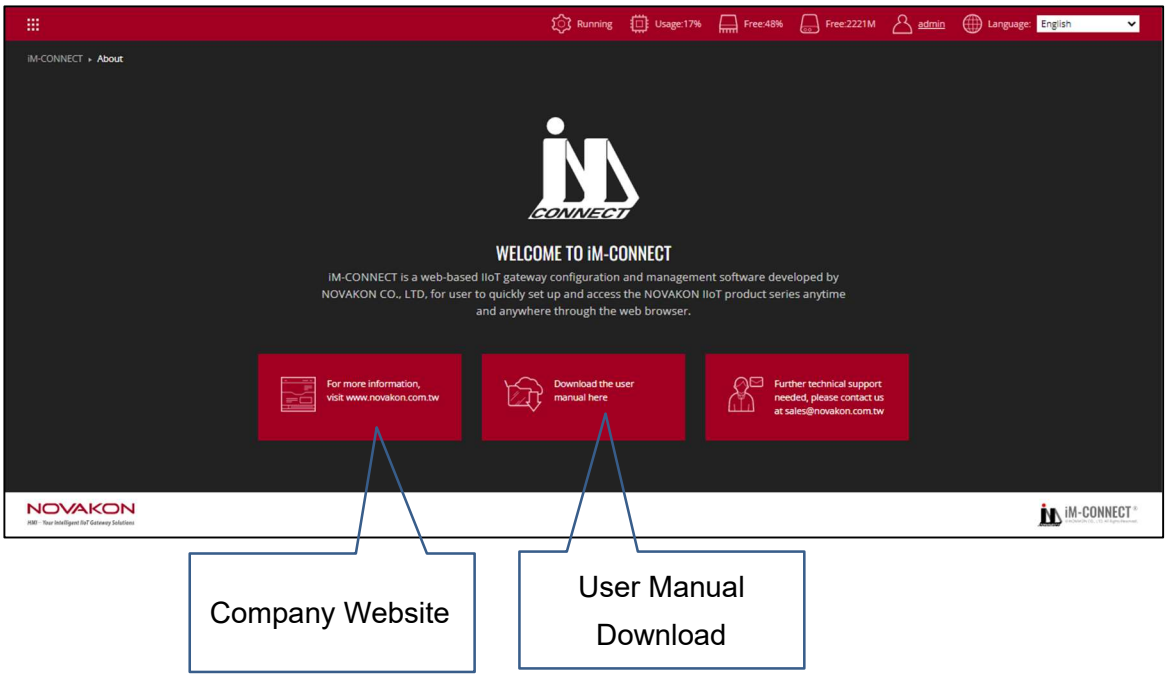


This document lists third-party software components which subject to the following licensing:

You can click on the link to view detailed content.

14. About

[About]displays company and product related information. Users can access to NOVAKON official website for resources, including download the user manual.



15. Connection Setup Example

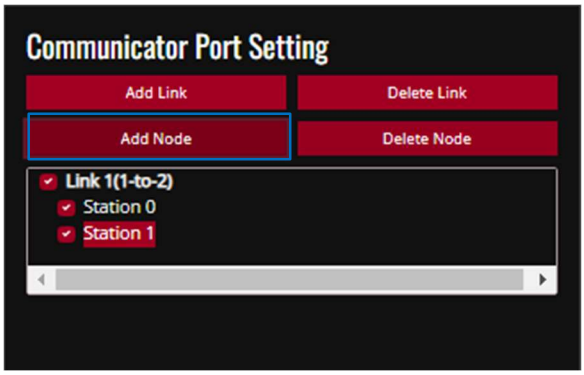
15.1 Add Station and Link

15.1.1 Add Station

If same devices are using the same IP, press [Add Note] to add a Station; otherwise, press [Delete Note] to delete a Station.

Each Station can be assigned a different [Station No], which means it is already connected to other devices. Likewise, each tag can be assigned to a specified Station No.

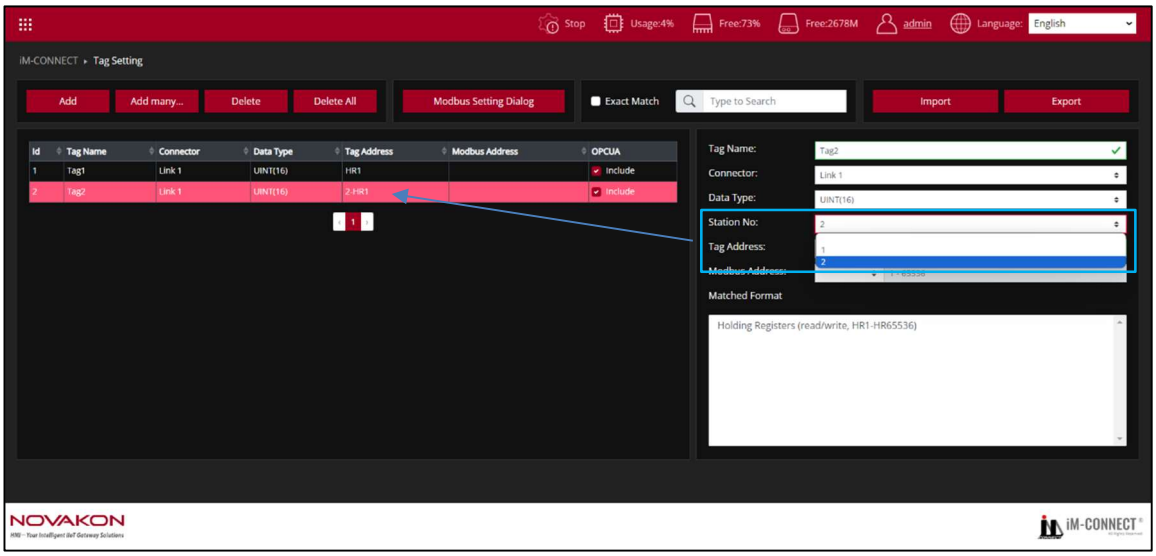
A. Click Link 1 (1-to-1) and add [Station 1] by clicking [Add Node].



B. Edit the content of [Station 1], set [Station No] to 2, meaning pairing to Device Id: 2. Repeat the same steps to increase the number of [Station No].

C. Edit the tag, open [Tag Setting], and press [Add] to add a new Tag. Add tags in sequence by following the same procedure shown above.

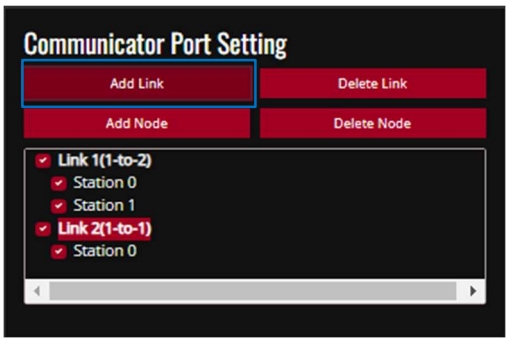
D. Specify the paring Device Id by selecting the corresponding [Station No] with the same number.



15.1.2 **Add LINK**

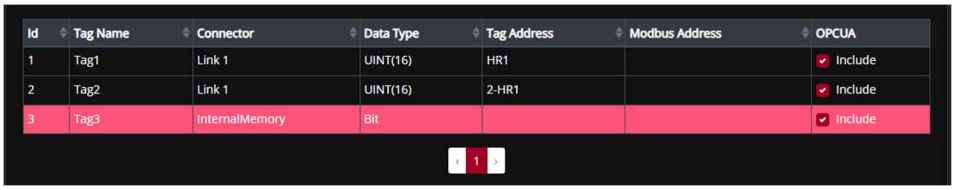
If a different IP (including the Port number) or COM Port is used, a LINK must be added to establish a different connection. The process is shown as follows:

A. Go back to [IM-CONNECT Menu] and enter the [PLC Setting] page → click [Add Link] to add a new set of connections.

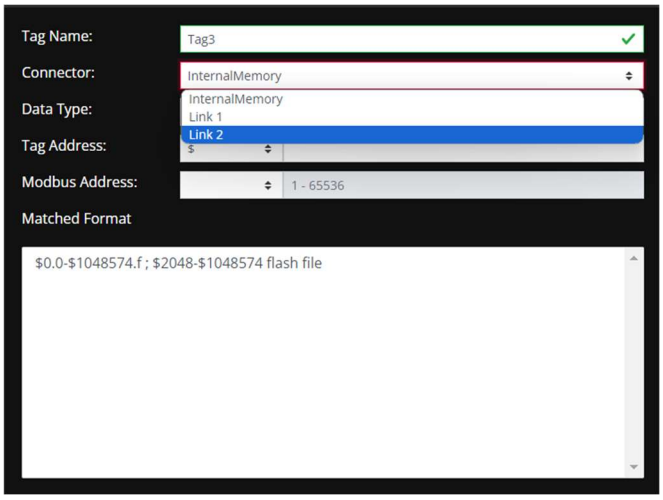


B. Please refer to the above section [8.1] for the method of choosing a PLC Driver.

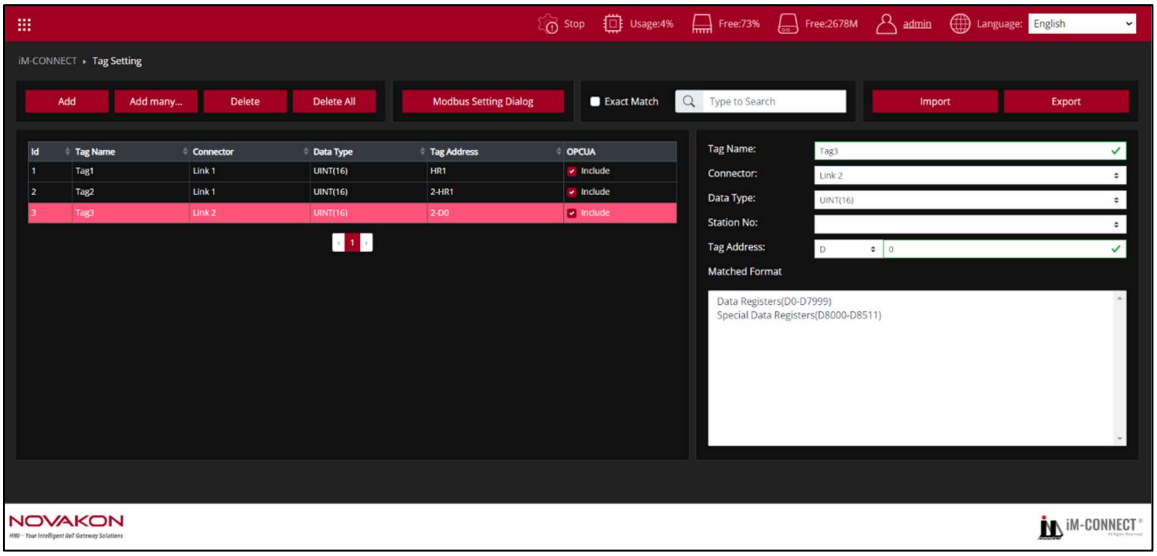
Follow the aforementioned process to add tags to be used in sequence.



C. Select Link2 in the drop-down list of [Connector].



D. The setting is complete. Tag3 is now changed as Link2.

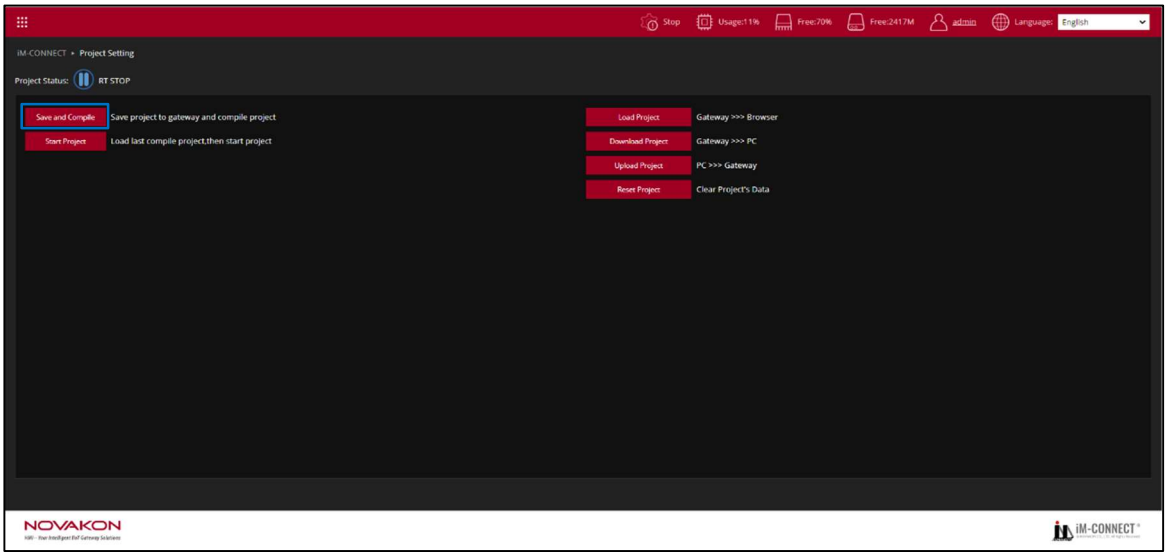

Stop
Usage:4%
Free:73%
Free:2678M
admin
Language:
English
iM-CONNECT ▸ Tag Setting
Add
Add many...
Delete
Delete All
Modbus Setting Dialog
Exact Match
Type to Search
Import
Export
Id
Tag Name
Connector
Data Type
Tag Address
OPCUA
1
Tag1
Link 1
UINT(16)
HR1
Include
2
Tag2
Link 1
UINT(16)
2-HR1
Include
3
Tag3
Link 2
UINT(16)
2-D0
Include
1
Tag Name:
Tag3
Connector:
Link 2
Data Type:
UINT(16)
Station No:
Tag Address:
D
0
Matched Format
Data Registers(D0-D7999)
Special Data Registers(D8000-D8511)
NOVAKON
iM-CONNECT

15.2 Compile PLC and Tag data, load and start service

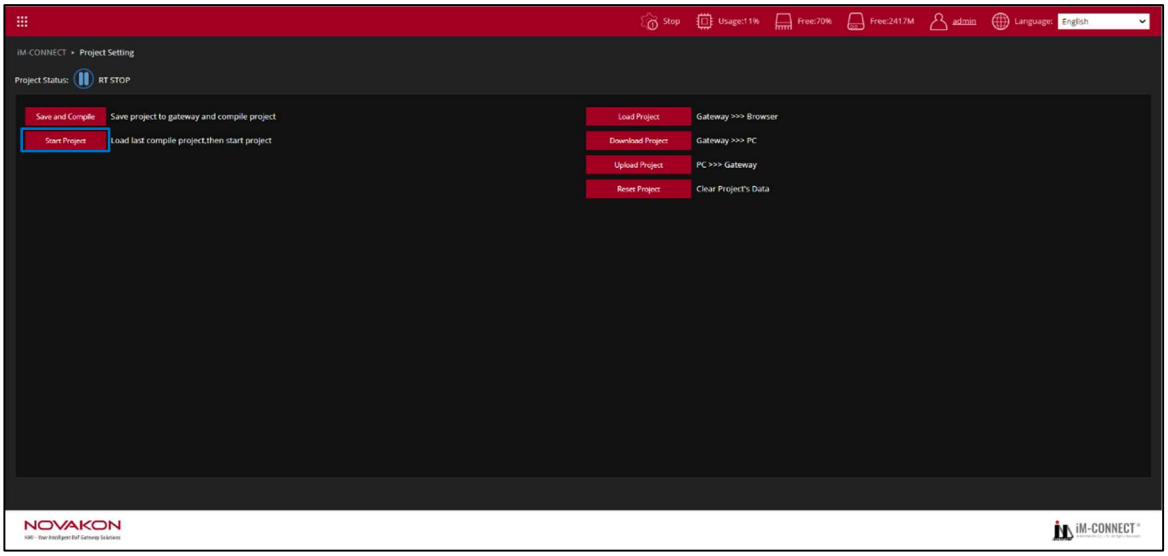
After the tag is set, the project is ready to be uploaded to GATEWAY.

A. Go back to [IM-CONNECT Menu] and click [Project Setting].

B. Enter [Save and Compile]to save the previously set content to GATEWAY for compilation.

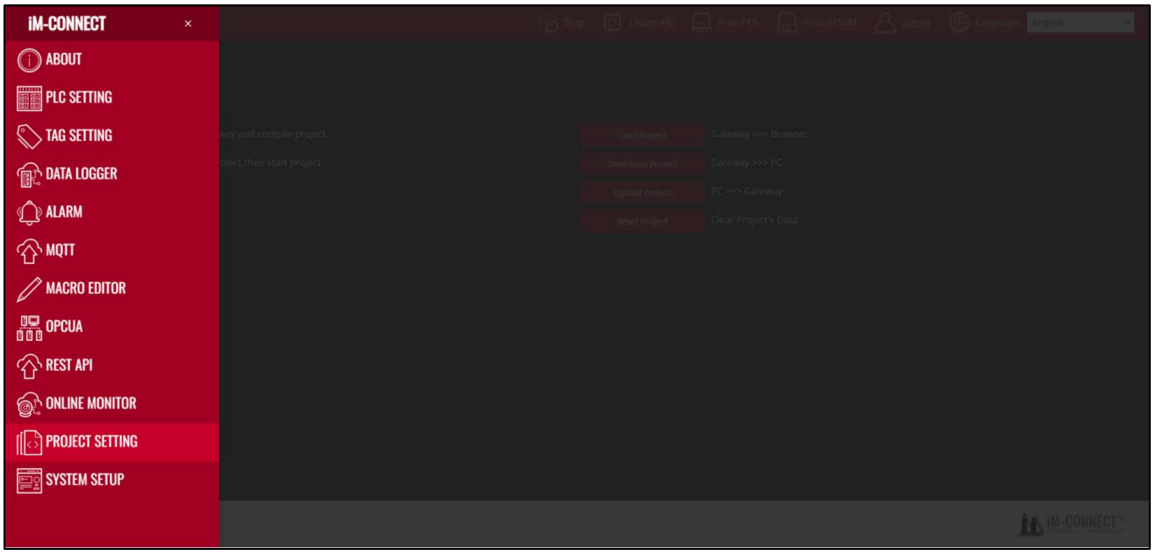


C. Click [Start Project] button to stop the current service, load the new successfully compiled data, and restart the Gateway.

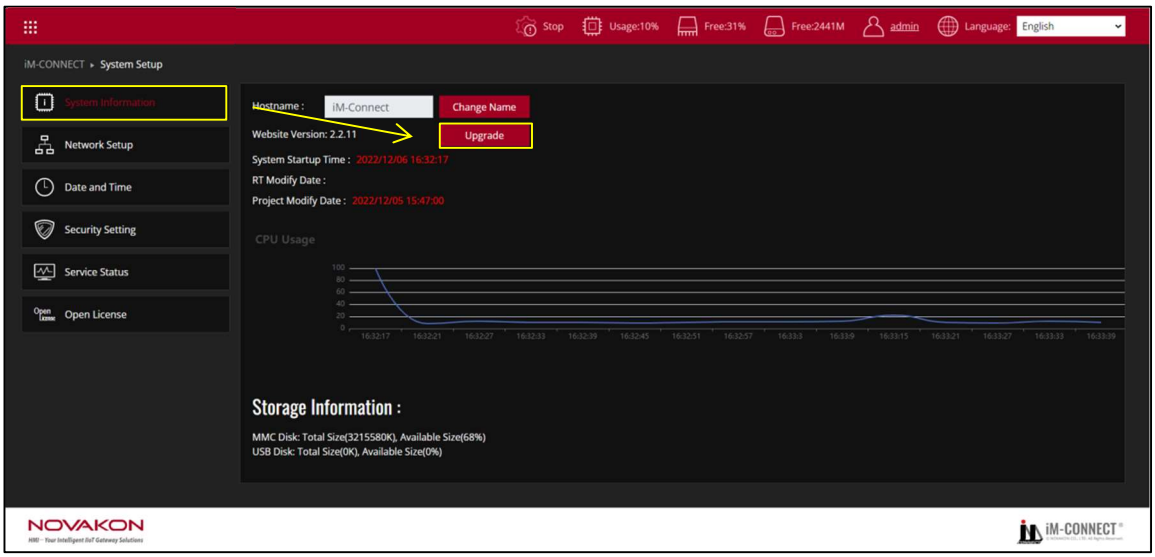

Stop
Usage:11%
Free:70%
Free:2417M
admin
Language:
English
iM-CONNECT ▸ Project Setting
Project Status:
RT STOP
Save and Compile
Save project to gateway and compile project
Start Project
Load last compile project,then start project
Load Project
Gateway >>> Browser
Download Project
Gateway >>> PC
Upload Project
PC >>> Gateway
Reset Project
Clear Project's Data
NOVAKON
iM-CONNECT

16. Software Upgrade Guide

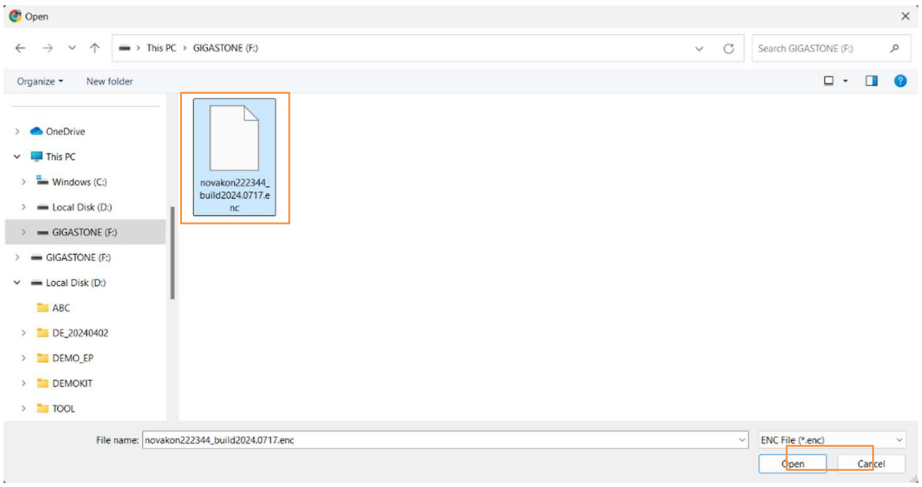
A. On iM-Connect webpage, click  to open system menu, click on “SYSTEM SETUP”.



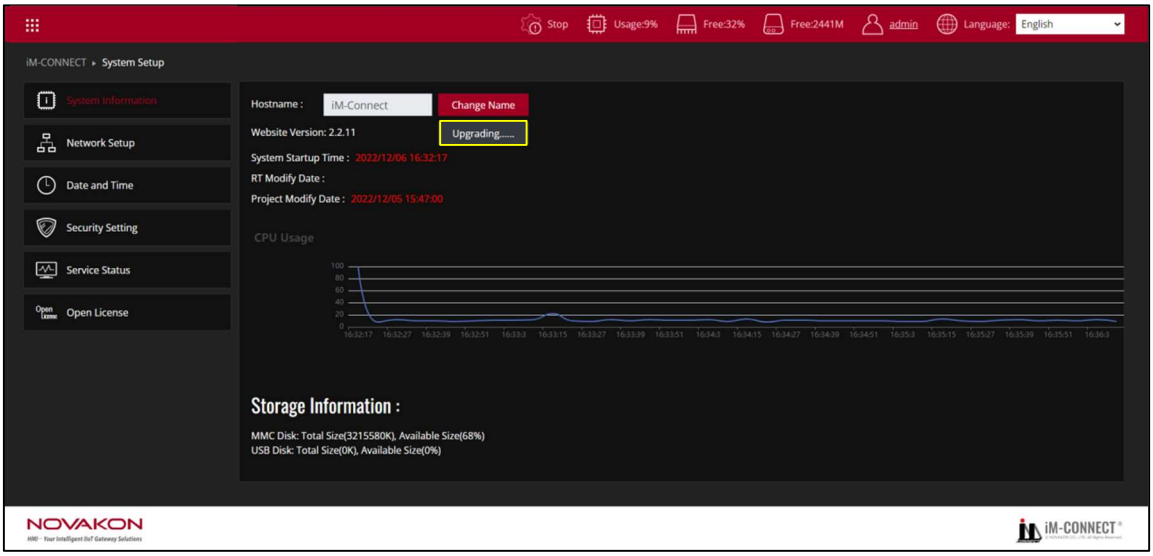
B. Click “System Information” (In this example, website version is 2.2.11), and click “Upgrade”



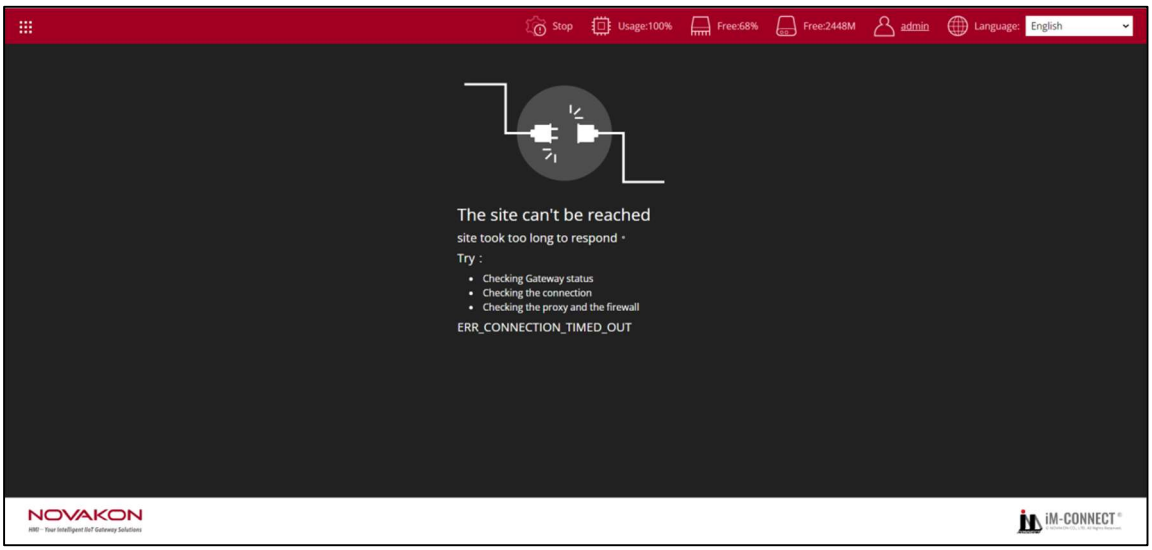
C. Locate the folder where the upgrade firmware(*.enc) was saved and click “Open”.



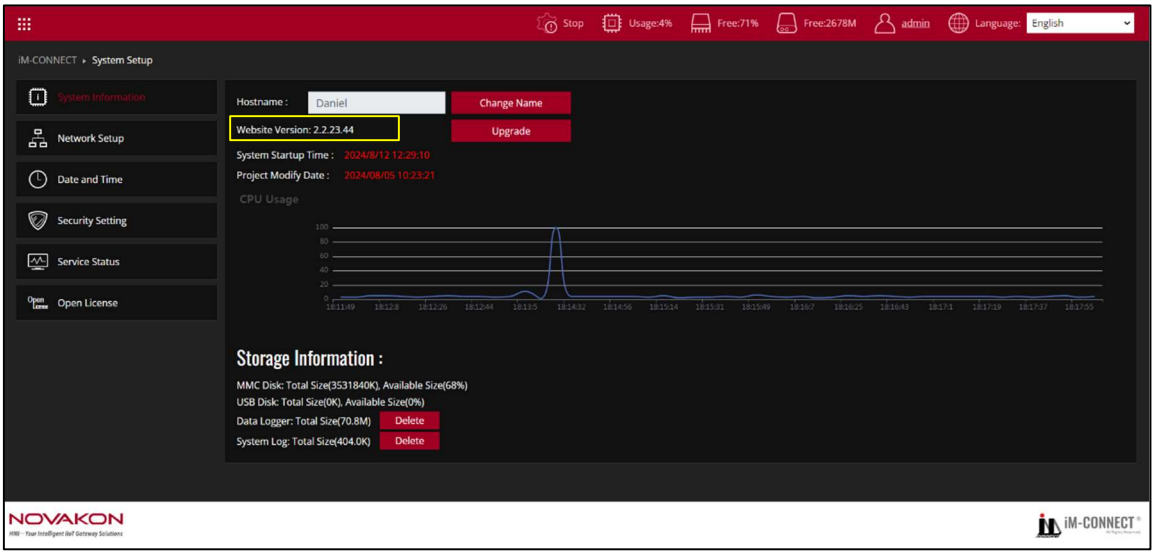
D. You will see “Upgrading……”during the process



E. When the upgrade is complete, system will reboot, during which the webpage will show “The site can’t be reached”.



F. Wait until the webpage is reconnected. Now the system has been upgraded but still shows previous website version.



G. If there is no update, please press Refres[ ] to display the updated version.