BRK Series User Manual

V3.0, 2026/10

BRK-2000 Series

IIoT MQTT Communication Server



Technical support: service@icpdas.com

Technical Editor: Jason Chen

Editor: Carol Hsu

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Revision History

This chapter provides information on historical changes to this Manual.
The following table shows the historical modifications.

Revision	Date	Description
V3.0	10/2026	3.0th Version: Function update: 1. Modify Micro SD contents
V2.1	03/2026	2.1th Version: Function update: 2. Edit the product description 3. Add time zone settings to the time settings 4. New Chapter 6: Data Visualization 5. New Chapter 7: Low-Code 6. New Chapter 8: Built-in Database
V2.0	02/2025	2.0th Version: Function update: 1. Add a function code field to the login page 2. Add time zone settings to the time settings 3. MQTT data to MySQL 4. MQTT data to SQL Server 5. MQTT data to MongoDB 6. Add Section 4.3.1 7. New Chapter 5: Report Generator
V1.0	03/2023	First Edition

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1. BRK Introduction

BRK-2841M Industrial-Grade Edge Computing Gateway: A High-Performance, Stable, and Zero-Loss Data platform.

1.1 Introduction

In the architecture of Smart Factories and the Industrial Internet of Things (IIoT), data continuity and system stability are the ultimate benchmarks of success. The **BRK-2841M** is a high-performance edge computing host specifically engineered for harsh industrial environments. By integrating robust communication protocols with intelligent automation mechanisms, it provides enterprises with the most reliable data hub solution**.**

- ### High-Performance Industrial-Grade Data Broker Service

  The BRK-2841M features a built-in industrial-grade MQTT Broker and Message Distribution Center, capable of stably handling high-volume data ingestion from numerous devices. Its core technical advantages include:

  ✧ **Full Protocol Compatibility:**
  Support for MQTT versions V.3.1, 3.1.1, and 5.0, ensuring seamless integration across multiple generations of devices.

  ✧ **Transmission Quality & Retention Mechanism:**
  Supports multi-level **QoS** (Quality of Service) and **Retain** mechanisms, guaranteeing precise delivery of critical data even in complex network environments.

  ✧ **Strict Cybersecurity Control:**
  Equipped with complete user authentication and communication encryption mechanisms, providing all-around security protection for industrial data transmission.

  ✧ **Real-time Status Monitoring:**
  Supports the **Last Will** feature, allowing the system to actively trigger alerts when a device unexpectedly disconnects, enhancing the immediacy of monitoring.

  ✧ **Flexible System Expansion:**
  Supports **Bridge** and **Cluster** technologies, enabling efficient data flow across servers and facilitating the easy construction of large-scale, cross-regional IoT networks.

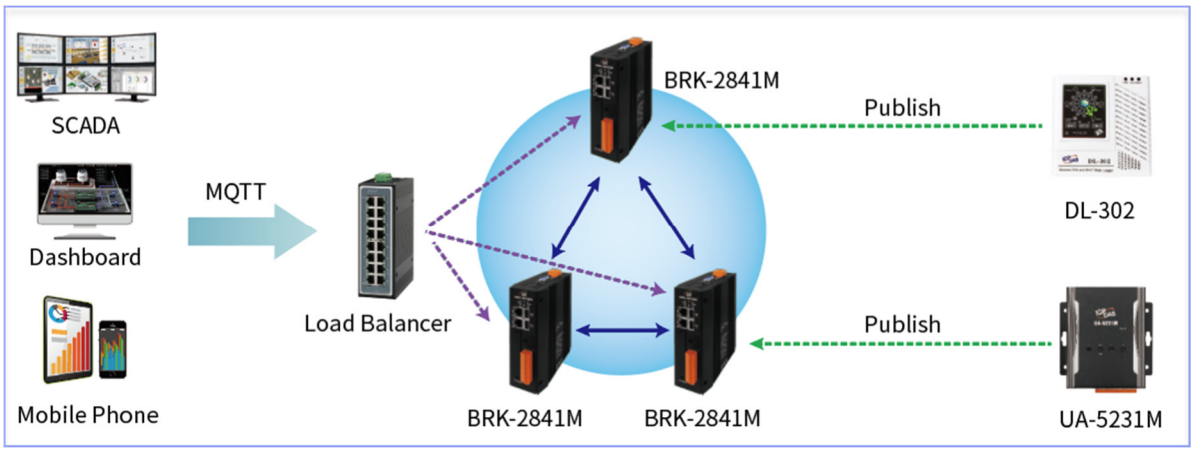


Figure 1-1 BRK-2841M Product Architecture

Automated Failover

To ensure "zero-disruption" service in production environments, the **BRK-2841M** features **High Availability (HA)** and automated failover capabilities. The system supports **Virtual IP (VIP)** configuration and real-time health monitoring. In the event of a primary host failure or network outage, the standby host automatically takes over all services within **10 seconds**. This seamless hot-standby mechanism minimizes downtime risks to the greatest extent possible.

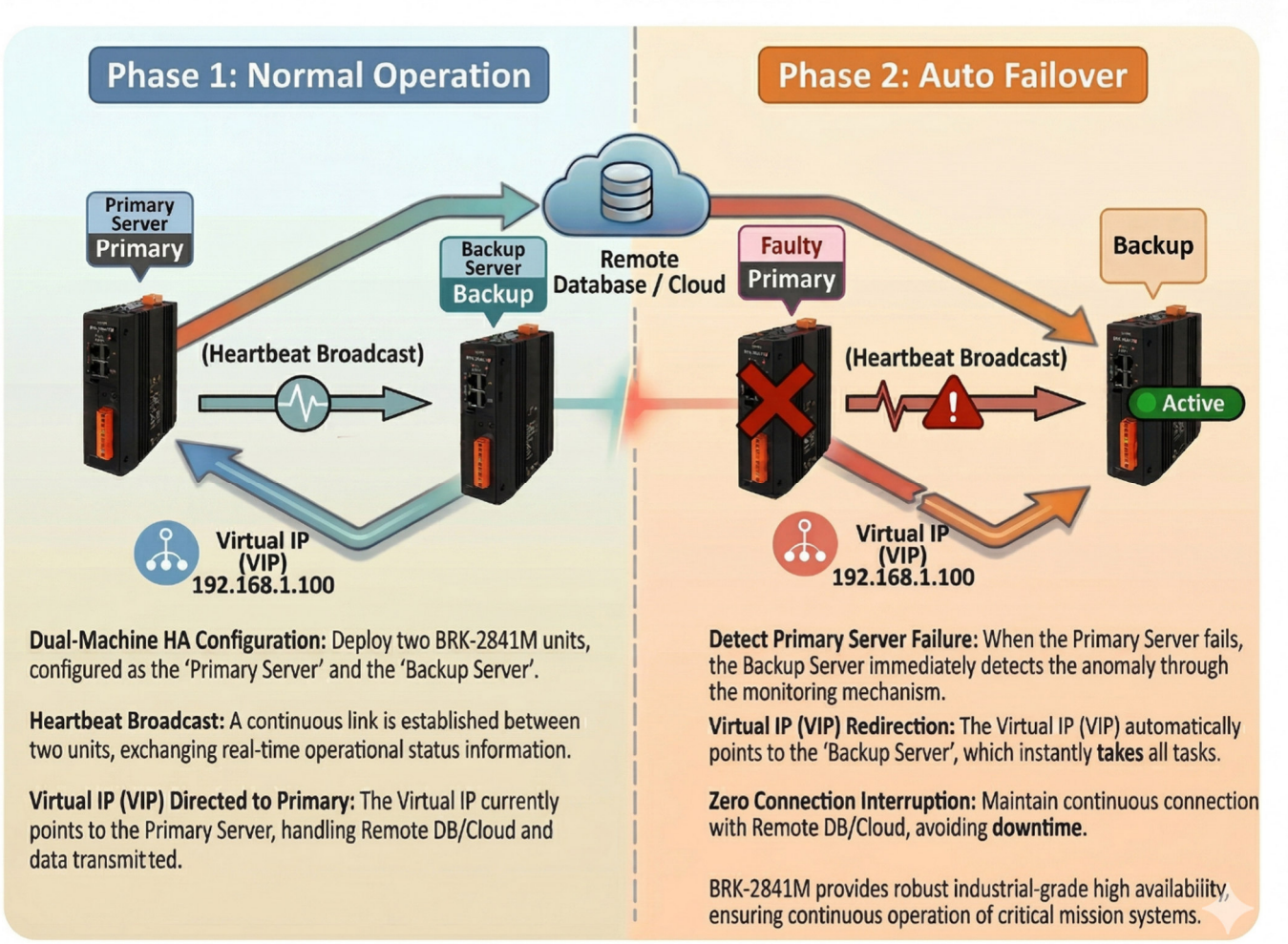


Figure 1-2 Automated Failover

- **Intuitive web-based remote management interface**

The product features a built-in Web UI management system, eliminating the need to install complex configuration software; users can quickly access and configure settings using a standard web browser. This lowers the barrier to on-site maintenance and reduces labor costs.

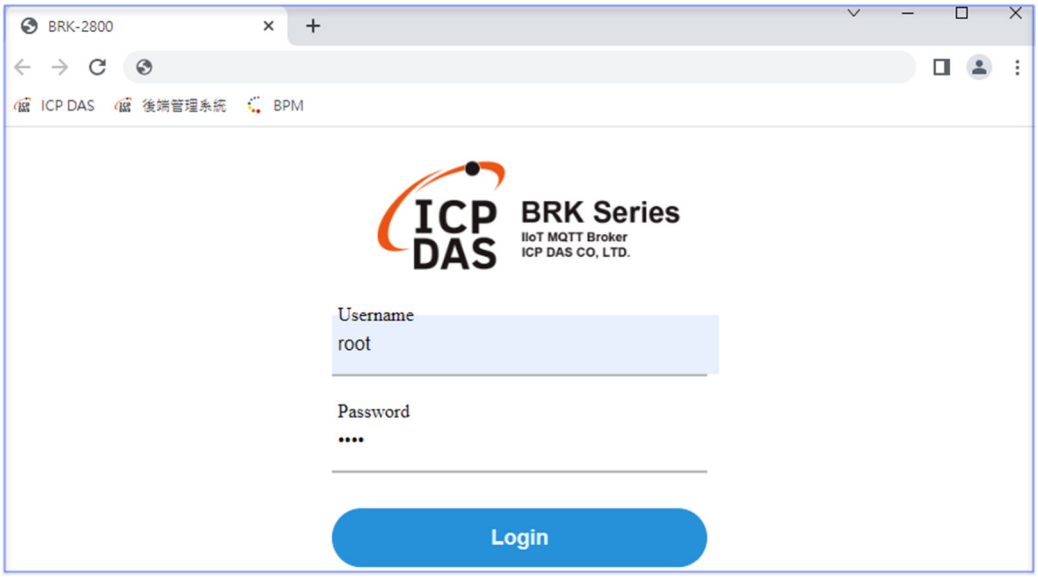


Figure 1-3 BRK-2841M Web Interface

- **Flexible Support for Diverse Database Integration**

With exceptional integration capabilities, the **BRK-2841M** supports direct MQTT data logging into mainstream databases like **MySQL, SQL Server, and MongoDB**. This feature effortlessly bridges the gap between **OT equipment and IT analytical platforms**, enabling real-time data aggregation and unlocking high-value industrial applications.

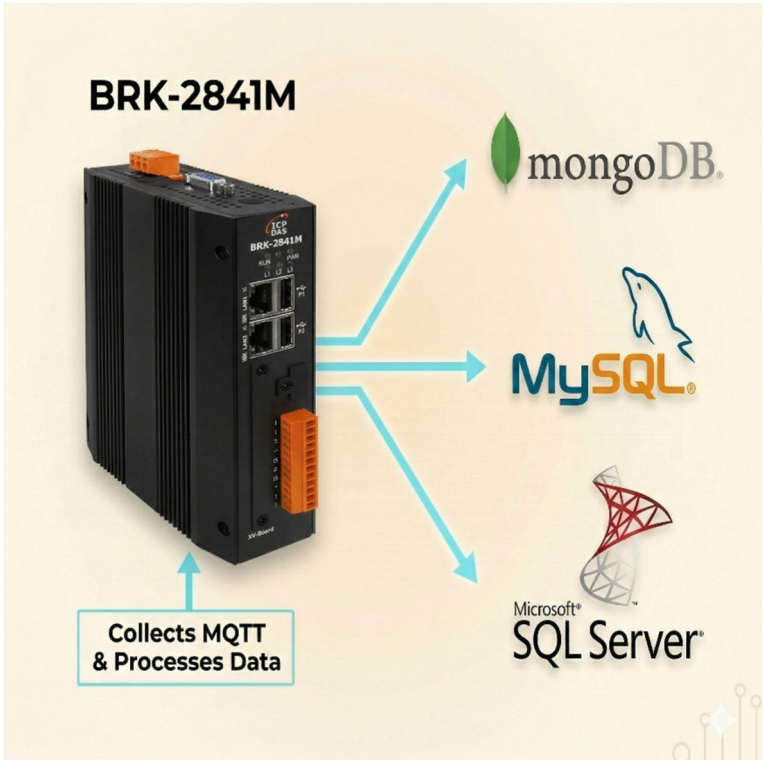


Figure 1-4 Database Writing Support

- **Comprehensive Data Retransmission: Local Storage & Auto-Backfill**

  To address intermittent network instability in industrial settings, the **BRK-2841M** features a robust data recovery mechanism. If the connection to the remote database is lost, the system automatically buffers data to the MicroSD card upon disconnection (MicroSD card sold separately). Once the connection is restored, the system sequentially **backfills** the cached data to the database, ensuring absolute data integrity and precise chronological records.

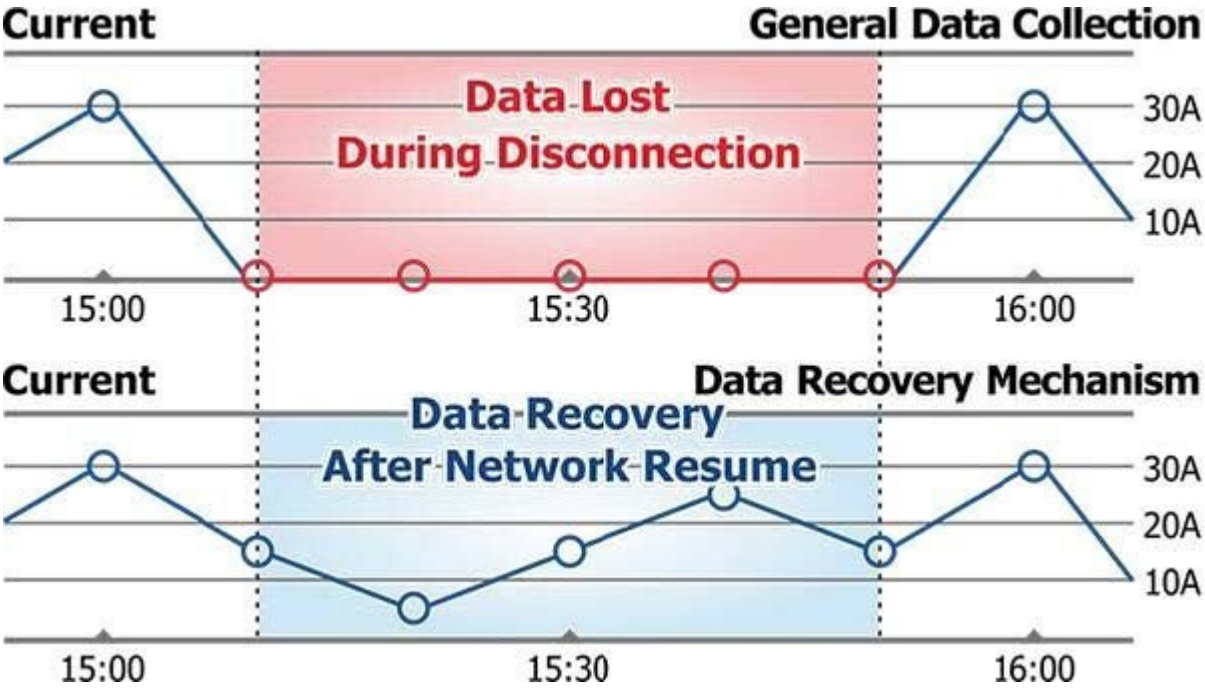


Figure 1-5 Data Recovery

1.2 Specifications

✧ Hardware Specifications

Model	BRK-2841M
Main Unit	
CPU	Quad-core ARM CPU, 1.6 GHz/Core
System Memory	DDR4 SDRAM 2 GB
Storage	eMMC 8 GB
Non-Volatile Memory	FRAM 64 KB, MRAM 128 KB
Ethernet	
Ports	RJ-45 x 2, 10/100/1000 Base-TX (Auto-negotiating, Auto MDI/MDI-X)
Power	
Input Range	+12～+48 VDC
Consumption	10 W
Environmental	

Operating Temperature	-25～+70° C
Storage Temperature	-40～+80° C
Humidity	10～90% RH,Non-condensing

Table 1-1 Hardware Specifications: BRK-2841M

✧ Software Specifications

Model		**BRK-2841M**
Function		
Built-in database	Support MongoDB	Data can be recorded directly into the built-in database, additional database setup is not required.
	Data Redundancy	Two or more BRK-2841Ms consist of a redundancy group in which all databases are synchronized to achieve data redundancy.
	Database Failover	BRK-2841Ms in the same redundancy group will monitor each other to see if they are functioning properly, and in case of failure, the rest of the devices will take over to ensure that the database recording is not interrupted.
	Writing Speed	20 times/second
Communication Redundancy Architecture – rapid setup	Redundancy System	Two or more BRK-2841M consist of a redundant group, all the devices in the group monitor each other, and when the host that mainly provides MQTT service fails, the redundant device will take over and continue to provide MQTT service to achieve Broker redundancy.
Information Security Protection – Multiple Mechanism	HTTPS	The built-in web server supports HTTPS to ensure secure communication between the server and the browser.
	Authority Management of Broker	Allow/prohibit connection requests to the Broker from specific IP addresses, Client IDs, or Broker users, and perform the first stage of filtering from the connection to improve the stability and security of the Broker.
	Management of Topic Publish/Subscribe	Allow/prohibit publish/subscribe to Topics, to normalize the publish/subscribe privileges of Topics by Clients who have passed the first stage of filtering, and to prevent important Topics from being modified with or read by others.
MQTT Broker – Bridge and Cluster	Max. Number of Clients	100000 connections
	Max. Number of Topics	100000 records
	Support MQTT Bridge	In Bridge mode, you can transfer data between multiple Brokers. • Transfer data to specific Brokers according to predefined rules. • Subscribe to specific Topics on the Bridge node and transfer or forward them to local or remote Brokers after receiving the data.
	Support MQTT Cluster	In Cluster Mode, two or more BRK-2841Ms work together to ensure the consistency and availability of MQTT services, which is very important for enterprises that cannot afford downtime.

Table 1-2 Software Specifications: BRK-2841M

1.3 Appearance

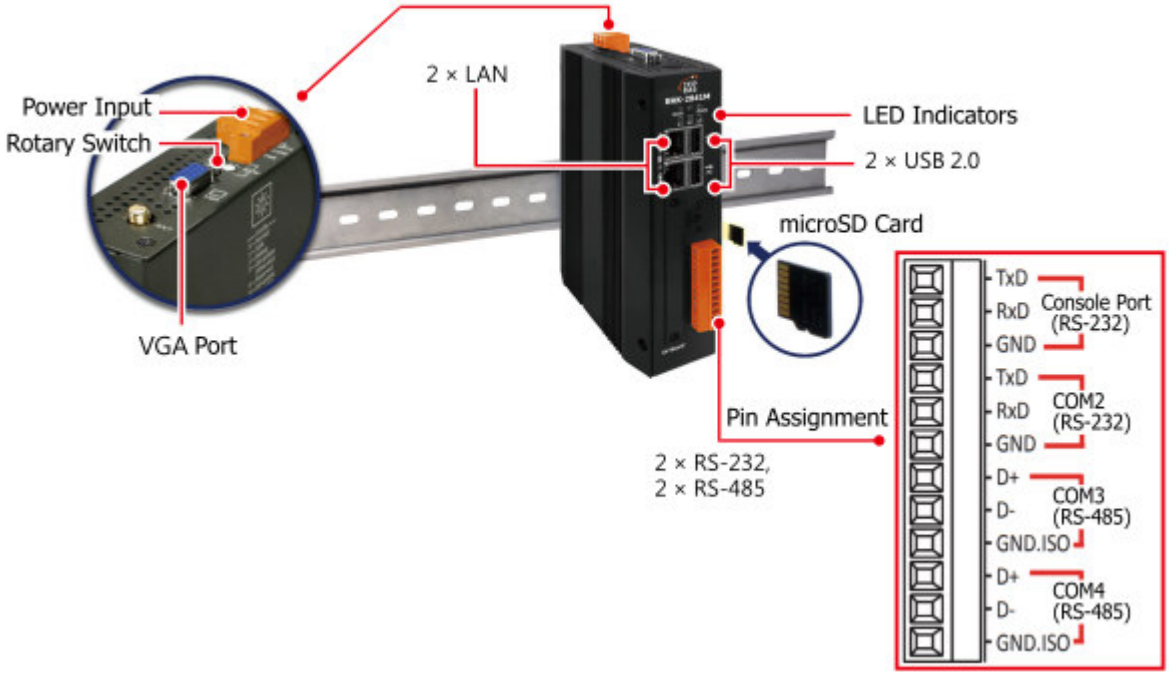


Figure 1-6 Appearance: BRK-2841M (1)

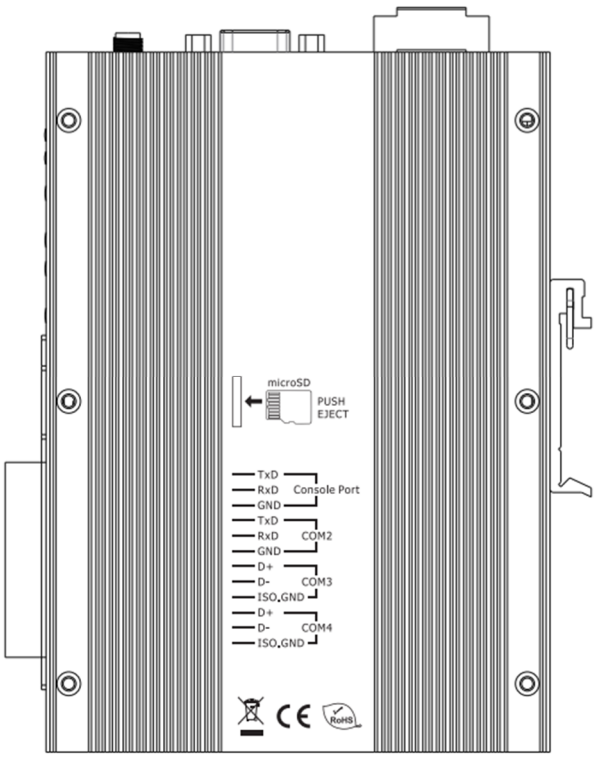


Figure 1-7 Appearance: BRK-2841M (2)

1.4 Dimensions

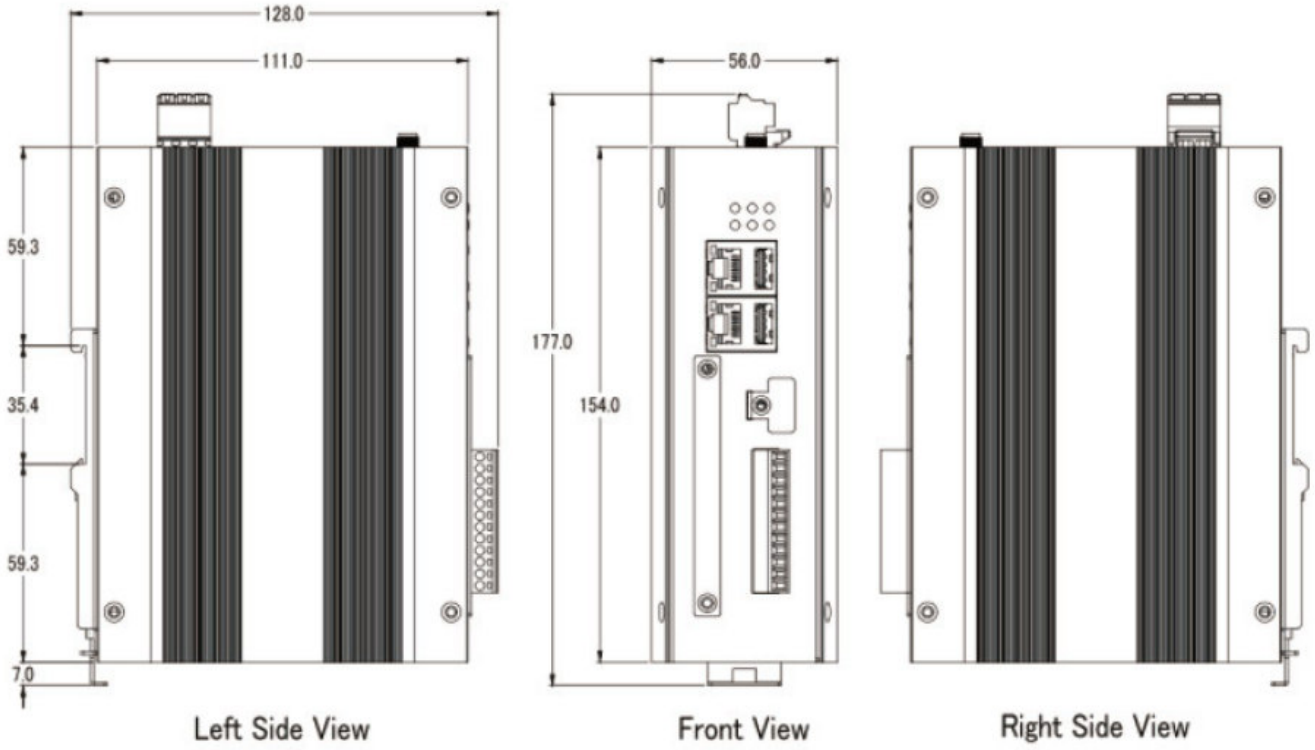


Figure 1-8 Dimensions: BRK-2841M

2. Quick Start: Hardware/Network Connection

This chapter describes the devices hardware connection, network connection and quick setting for the ECO Controller, and how to connect to the BRK controller web-based UI via a browser. Next chapter will set up web functions, and complete a demo project. (Please refer to Chapter 3).

2.1 Hardware Connection

This section describes the hardware wiring and connection for the BRK Series.

2.1.1 Preparations for Devices

In addition to the BRK controller (Ex: BRK-2841M) , please prepare the following:

1. **Computer: PC/NB** Connect to the local network and can set up the network
2. **Ethernet Hub or Switch**: e.g. NS-205
3. **Power Supply: +12 ~ +48**, e.g. MDR-60-24

2.1.2 Hardware Wiring

Use LAN2 of BRK-2800 to connect to the PC through a network hub/switch, or directly connect to the PC's network interface.

After power is connected, please [**wait for 1 minute**] for BRK boot procedure. When the "RUN" and "PWR" lights of the BRK start to flash green and red, it means the boot is completed, and the connection and setting can be performed.

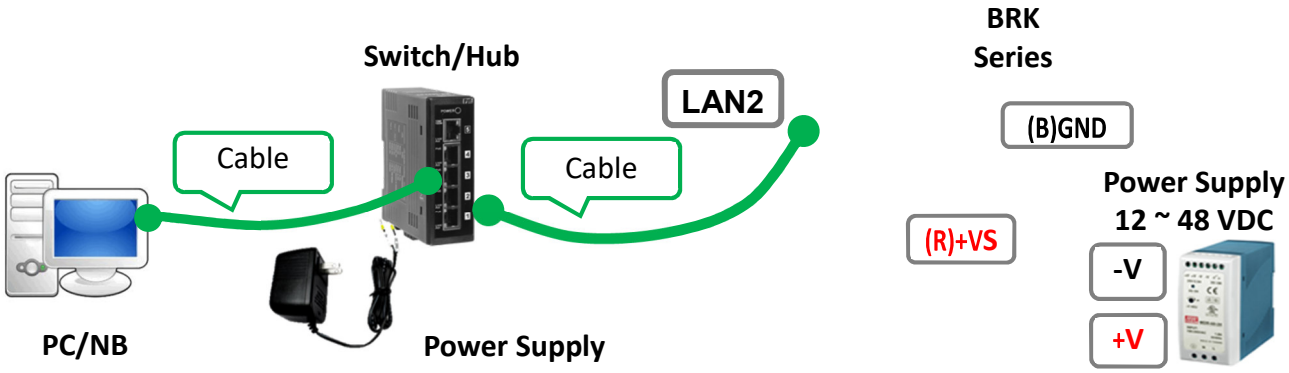


Figure 2-1 Hardware Wiring

2.2 Network Connection

There are three ways to log in to the **BRK Web UI** (User Interface) through BRK network connection. The following is a brief description, and then the steps are described in subsections:

- If the device has just arrived from the factory or is used for the first time (A), it is rBRKmmended to use the connection method in **Section 2.2.1** (same as the "Quick Start" included with the shipment).
- If the device has been set up to connect but does not know the IP (B), it is recommended to use the connection method in **Section 2.2.2** (use Utility to search for the devices).
- If the device has been set up and the connection IP (C) is known, you can directly enter the IP connection in the browser website to log in.

The methods to login the BRK Web UI:

A. Using Factory Default Setting:

This way is suitable for those who is setting a new BRK or the PC network IP is not in the same domain with BRK. This method changes the PC network IP to match the BRK factory default settings to connect and login the Web UI. (Refer to **Chapter 2.2.1**)

B. Using Software Utility:

Suitable for quick setting when multiple BRKs are connected in the same network but each IP

address is unknown. BRK products provide a free software utility to automatically search and connect to BRKs on the internet and can Log into BRK Web UI.(Refer to **Chapter 2.2.2)**

C. Using IP Address:

Suitable for the situation while BRK has a fixed IP and in the same domain network with the PC.
If the BRK has a fixed IP and in the same domain with the PC, users can directly enter the IP in the address bar of a web browser and log in to the Web UI of the BRK.

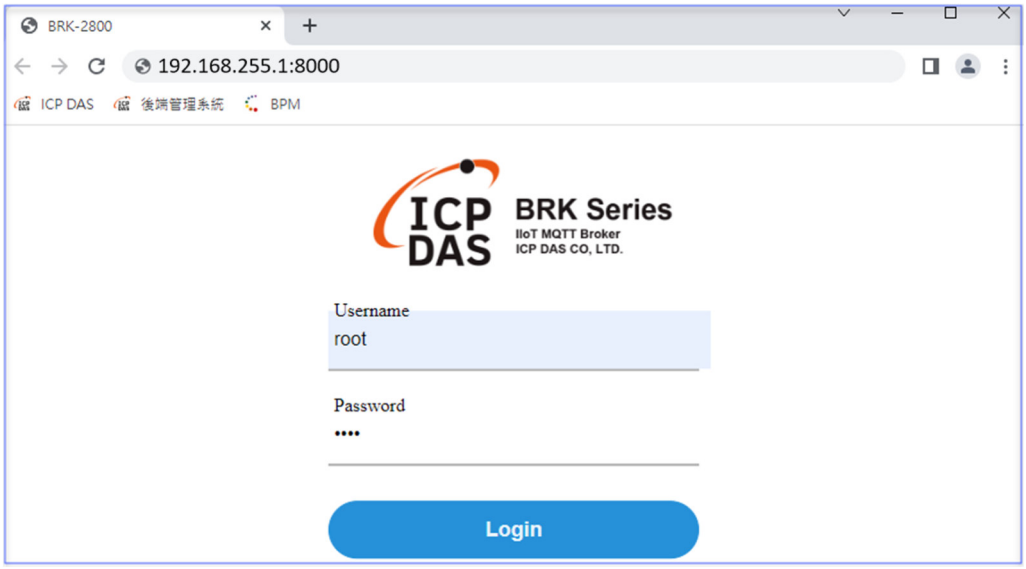


Figure 2-2 Using IP Address

2.2.1. Connection by Factory Default Settings (For New BRK)

The factory default settings of the BRK series are as the following table:

Factory Default Settings of BRK			
Network	**IP**	**192.168.255.1:8000**	Assign BRK-2800 a new IP setting according to your case.
	Netmask	**255.255.0.0**	
	Gateway	**192.168.1.1**	
Web UI Account	**Username**	**root**	**After the first login, change the default username/password to use other functions.**
	Password	**root**	

Table 2-1 Factory Default Settings of BRK

1. Change the **PC's IP** setting as follows. **(Write down the PC original network settings before modifying.)**

IP	**192.168.255.10:8000**
Subnet mask	**255.255.0.0**
Gateway address	**192.168.1.1**

Table 2-2 PC IP Setting

2. Make sure the PC and BRK is connecting through Ethernet. Then open a PC side browser (Ex: Chrome, IE…).

Type **http://192.168.255.1:8000** in the URL address. Use Web UI **default username / password** "**root**" / "**root**" to login the system.

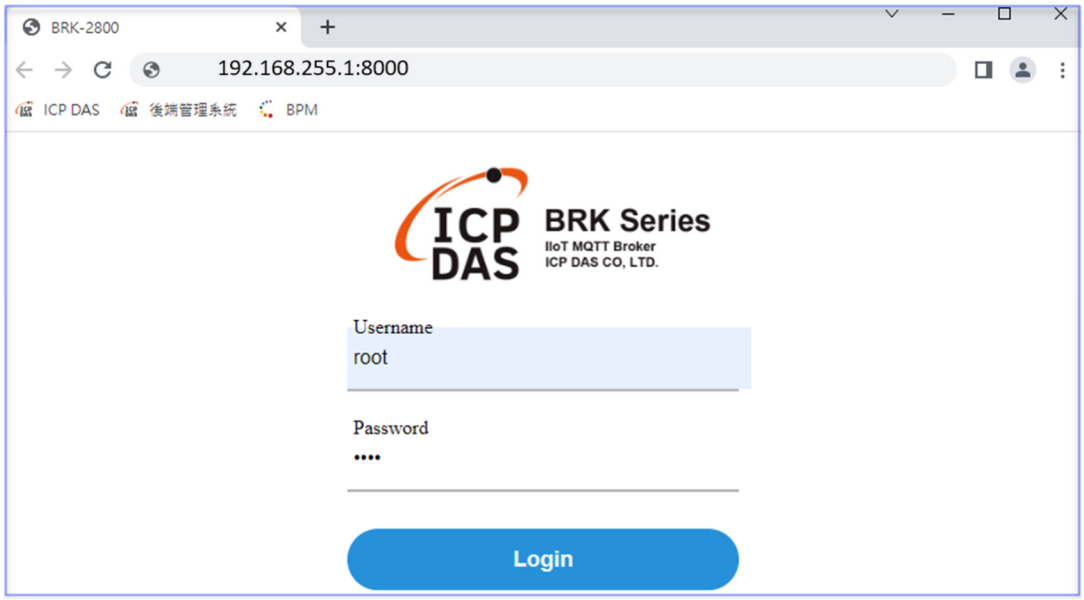


Figure 2-3 BRK default IP Login Web Page

3. Click【System Setting】➔【Account Setting】, change the Username/password first, or user cannot use any other function (New design for data security)

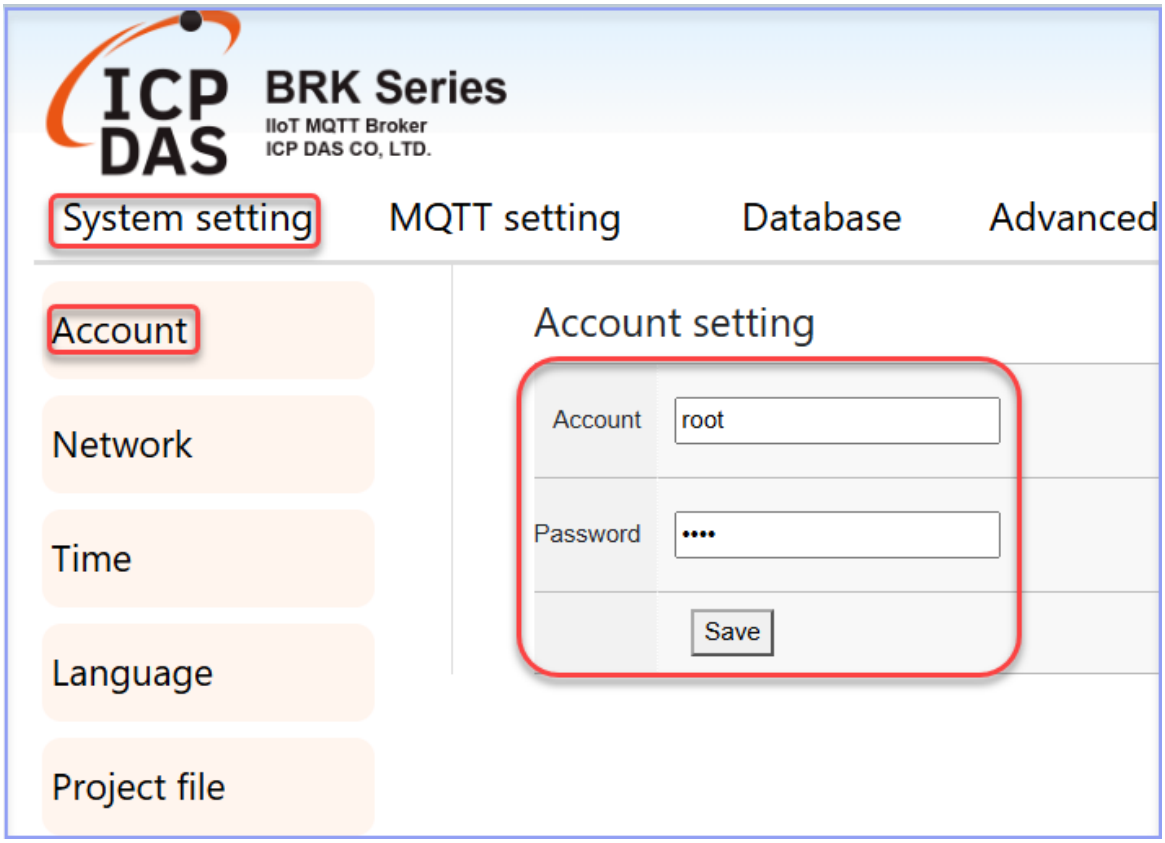


Figure 2-4 Account Setting Page

Password Setting rules:

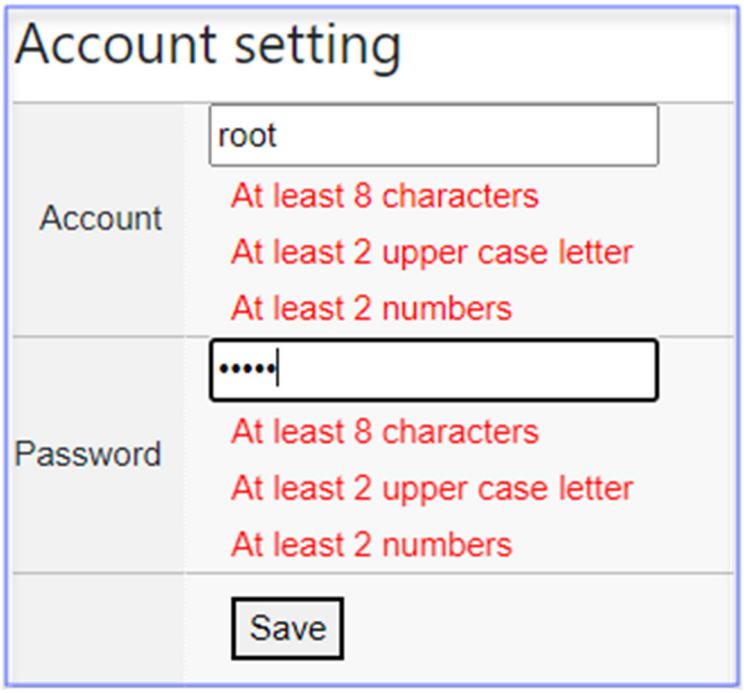


Figure 2-5 Password Setting Rules

4. Click【System Setting】➔【Network Setting】to change the IP setting by user network.

Note: While the network cable has been correctly connected to LAN1 and LAN2 will show up setting interface.

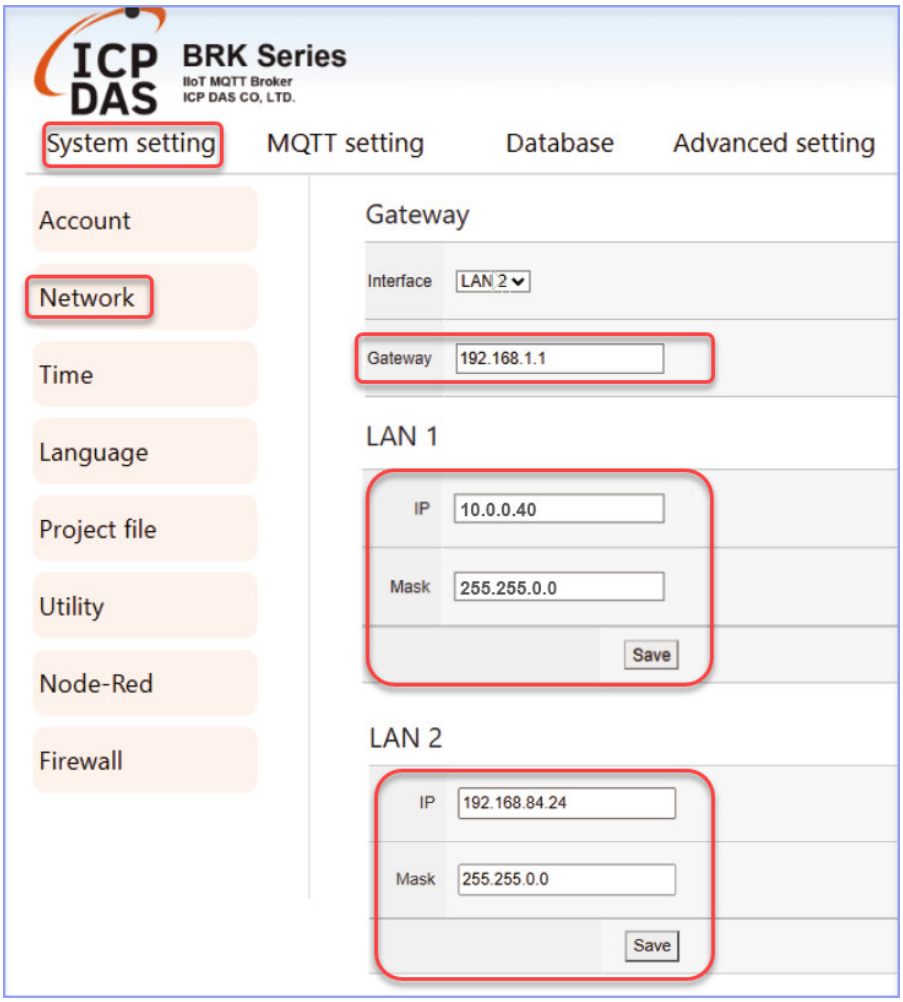


Figure 2-6 Network Setting Page

5. After saving successfully, enter the newly set IP address to log in to the BRK Web UI.

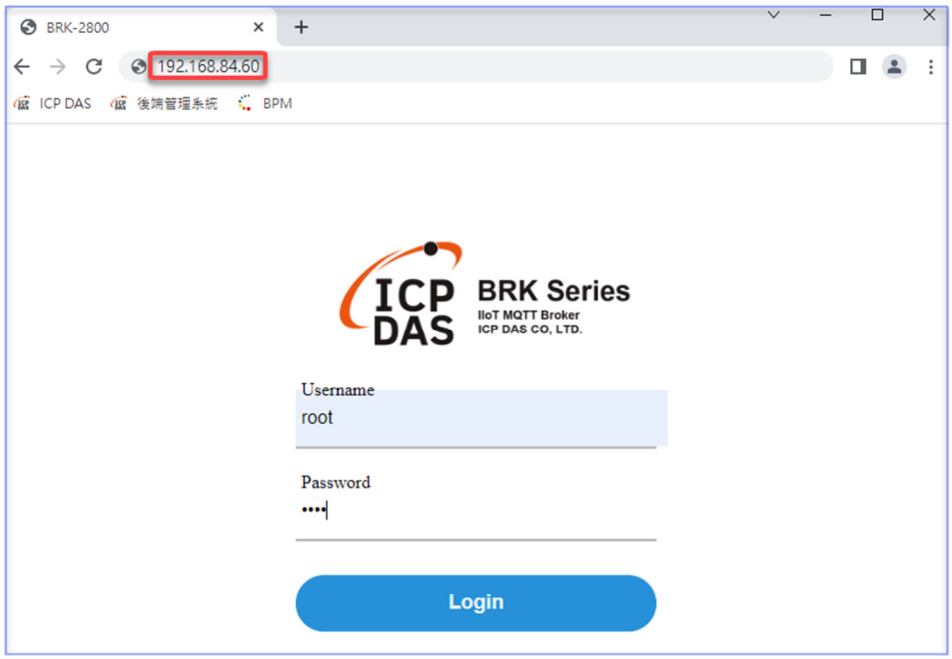


Figure 2-7 Enter a new IP address to log in to the Web UI.

2.2.2. Connection by Utility Searching

Setting new BRK or the new user please use the method in Chapter 2.2.1. (Method A)

If the BRK has a fixed IP and is in the same domain as the PC, users can directly enter the IP in the address bar of a web browser and log in to the Web UI of the BRK. (Method C)

This section introduces the 2nd method(B) where users use the BRK Utility to search the Network IP. This method is suitable for connecting multiple BRK series controllers to the Internet, but the IP addresses of BRK are unknown or need to modify the BRK quickly.

The Utility is a free tool software to quickly search each UA/BRK/UA_IO series in the network and connect to its Web UI for setting UA/BRK/UA_IO series products and projects.

In the PC, download and install the **Utility (EZ-UAQ Utility)** suitable for your PC, and then run it to connect the device. Please download the utility program from the website:
https://www.icpdas.com/en/download/show.php?num=8560&model=BRK-

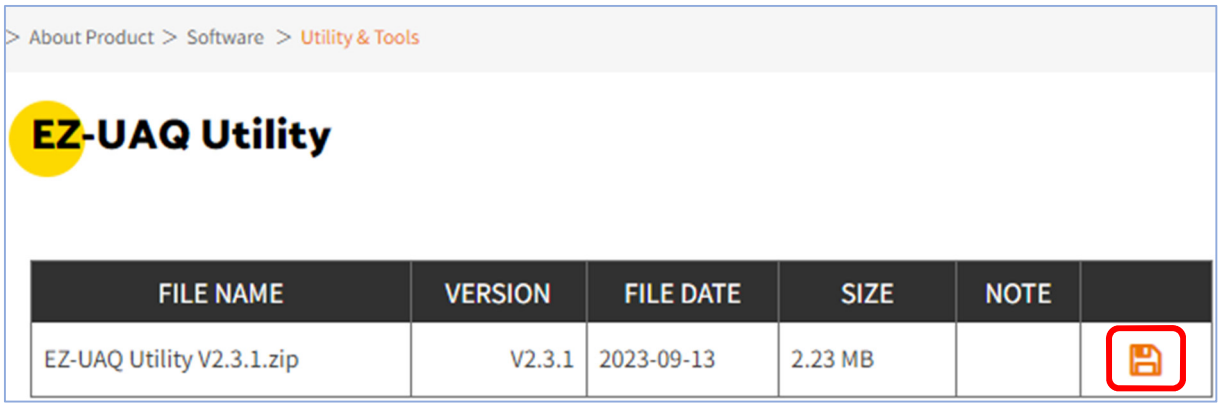


Figure 2-8 EZ-UAQ Utility Software Compression File

1. **Install and execute the Utility**
   Download and unzip the Utility, double-click the executable file (**EZ-UAQ Utility.msi**) to install and execute the Utility software.
   (If there is an old version of Utility on the PC, please uninstall it first.)

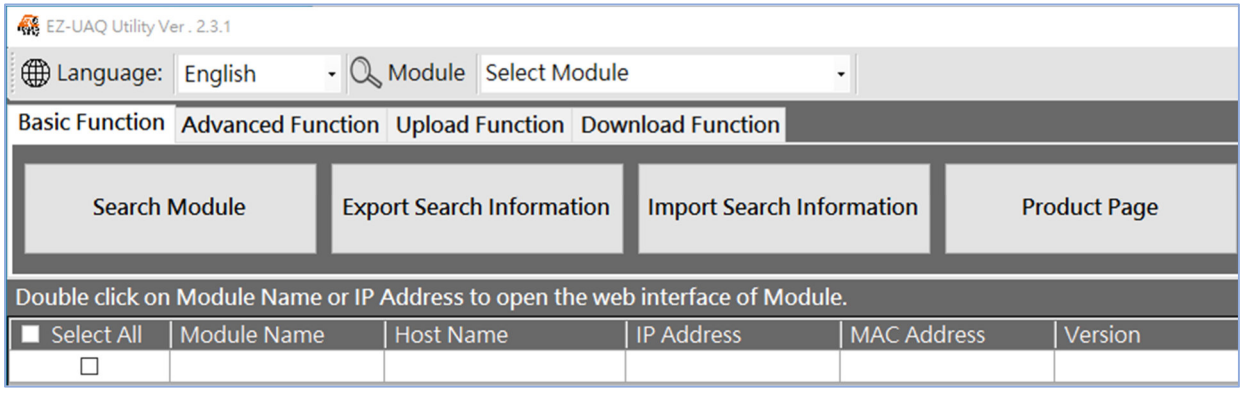


Figure 2-9 EZ-UAQ Utility Software (Basic Function Page)

2. Search the UA/BRK/UA-IO series modules

Click the "**Search Module**" button, the utility will search and list all UA/BRK/UA-IO modules in the network.

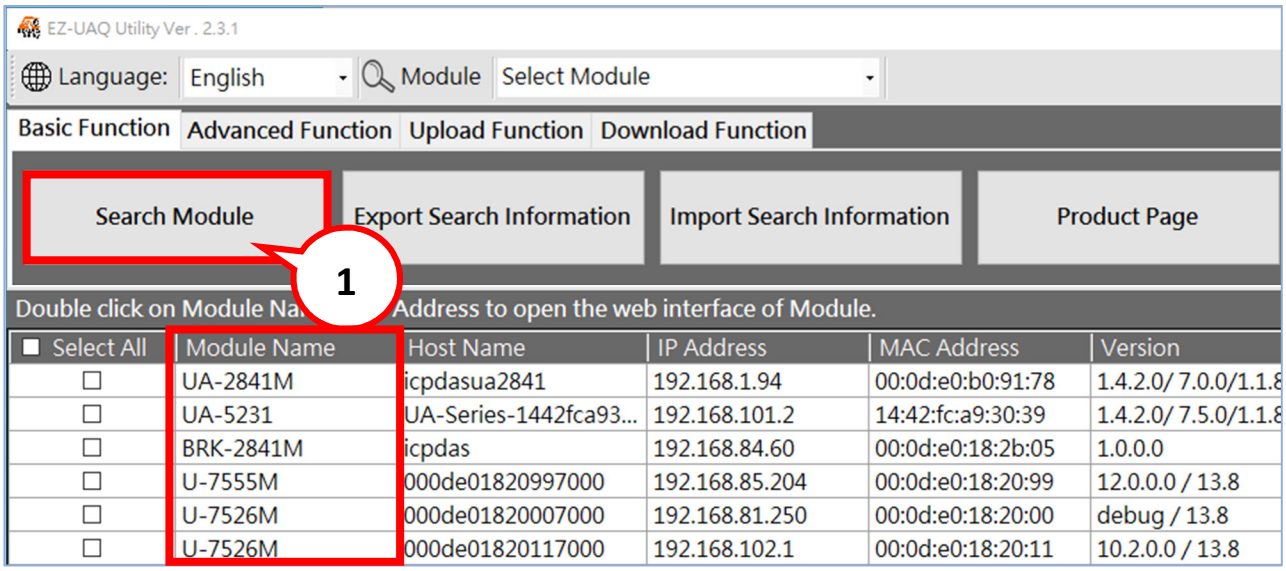


Figure 2-10 Search Module

3. Connect to the BRK Series

Double click the module list (from the Module Name to the IP address) you want to connect to, and it will directly link to the UA/BRK/UA-IO webpage via the default Web browser (Chrome, Edge, IE…).

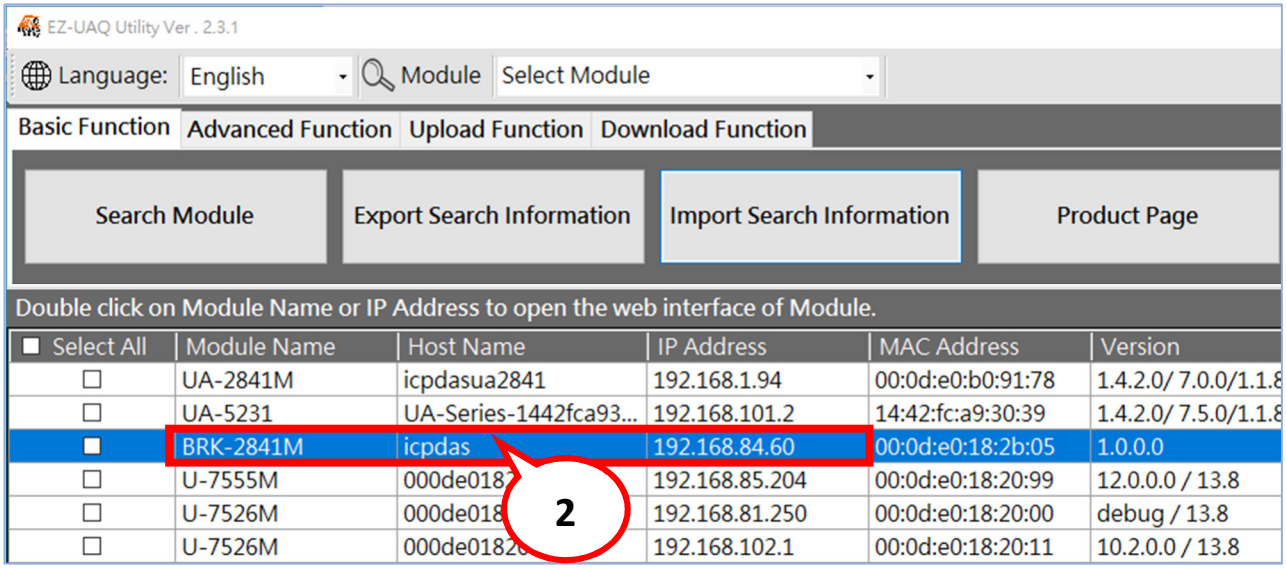


Figure 2-11 Connect to the BRK Series

4. Connection to the BRK Web UI

The default web browser will be run and direct go to the BRK login web site.
Please enter the username and password to login the BRK Web UI.
The default username: root.
The default password: root.
After login in, change the default Username/password first, or user cannot use any other function (New design for data security).

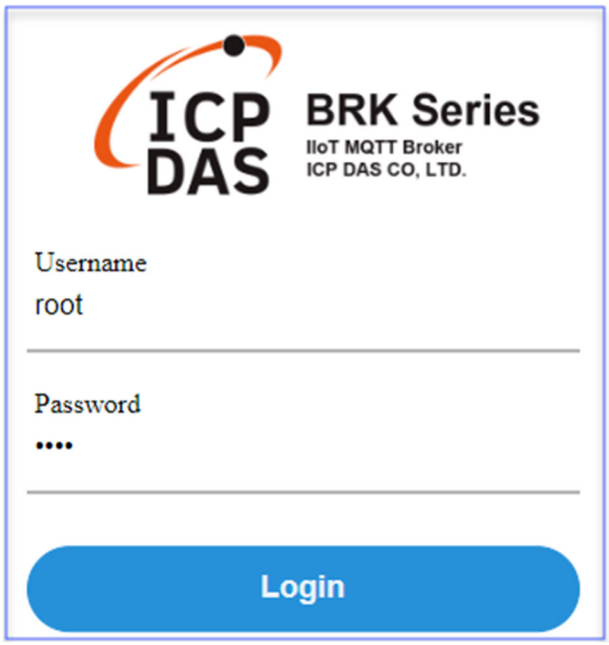


Figure 2-12 Connection to the BRK Web UI

5. Login the Web BRK of the BRK Series

When login into the web interface, the BRK default home page (the main configuration screen) will show as below, and will automatically read setting of that BRK to the webpage.

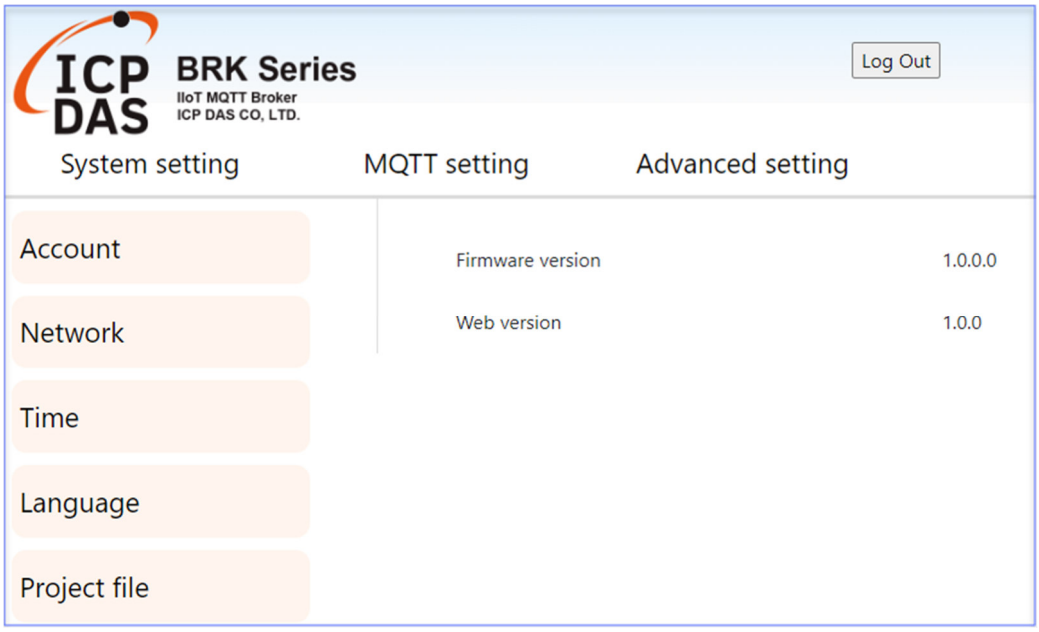


Figure 2-13 Login the Web BRK of the BRK Series

3. Main Function Settings

This chapter describes the main function and setting method of the BRK .

3.1 MQTT Introduction

MQTT (Message Queuing Telemetry Transport), developed by IBM and Arcom (now Eurotech) in 1999, enables lightweight, efficient real-time messaging in low-bandwidth or unstable networks like satellite communications.
Lightweight and concise: Low packet overhead, making it ideal for resource-constrained devices and low-bandwidth networks.
Real-time transmission: Adopts Pub/Sub mechanism with low latency and real-time communication capability.
QoS Levels: Supports three message transmission qualities (QoS 0, 1, and 2), and you can select the reliability level according to your needs.
Persistent Connections: Optionally keep messages in the Broker to ensure that you can still receive messages when the disconnected device is reconnected.

BRK-2800 is Sever of MQTT, can connect with large amount of modules with MQTT protocol: for example, the ICP DAS DL-300 series of data Logger sensors which can measure CO, CO2, Temperature, Humidity and Dew Point information. The communication mechanism that supports MQTT publishes the collected on-site environment parameters to the BRK-2800, and can simply monitor the on-site environment from a long distance by subscribing to the BRK-2800 using a mobile device or SCADA software that supports MQTT Client. The Ethernet I/O modules of the MQ-7200M series can automatically publish the collected digital I/O values to the BRK-2800 through MQTT. The MQTT Client only needs to subscribe and publish to the BRK-2800 to monitor or change remotely DO status of the Ethernet I/O modules.

MQTT Architecture of the BRK:

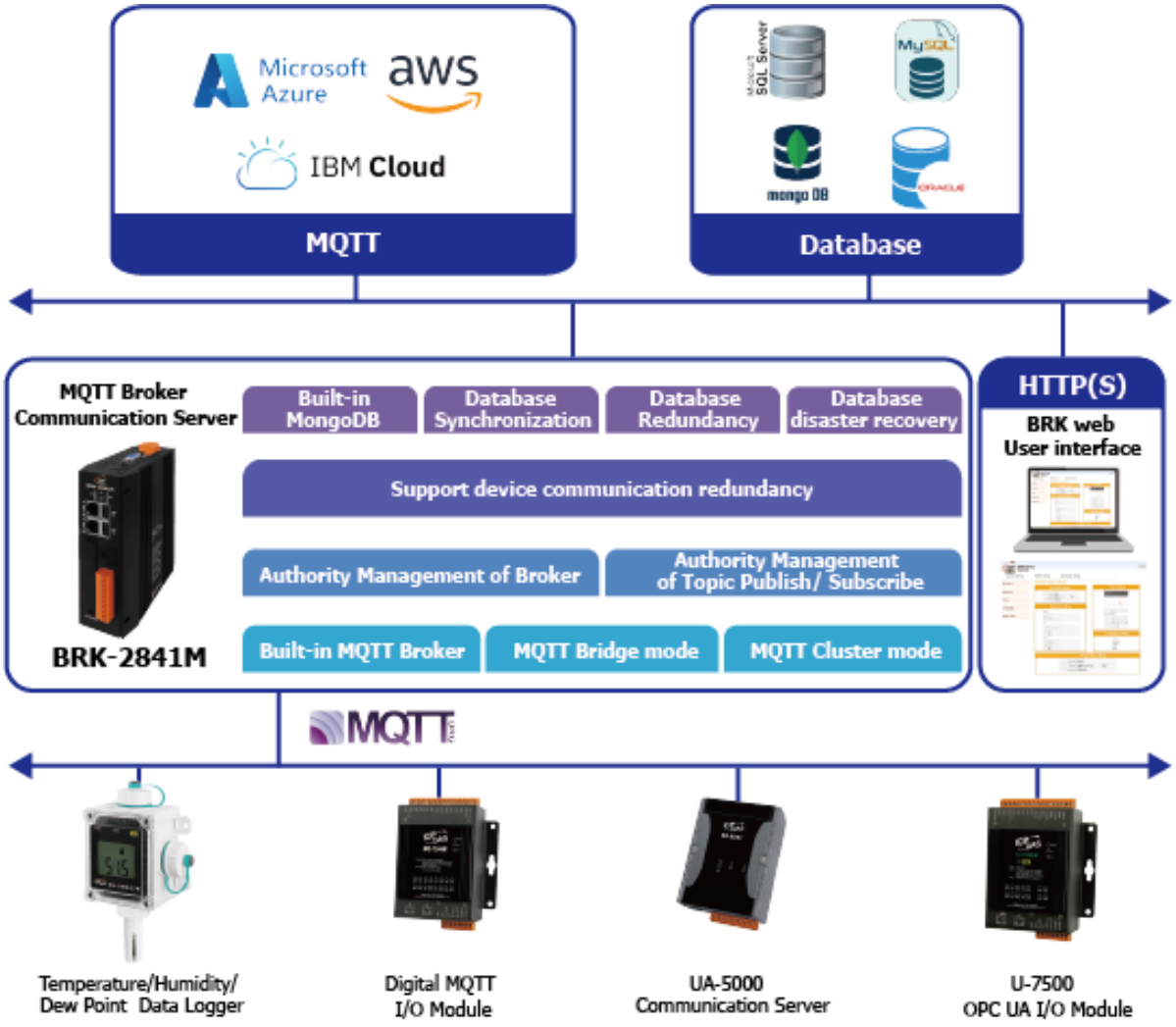


Figure 3-1 MQTT Architecture of the BRK

3.1.1 Forward the MQTT messages for BRK-2800

This chapter use the DL-302 (Client) as an example, to perform “Forward the MQTT message by BRK-2800 (Broker)”.

DL-302 need to set up the IP and Port of Broker Just communication, please refer to the DL-302 user manual **chapter 4.5 MQTT** (https://www.icpdas.com/web/product/download/iiot/sensor/dl-300/document/manual/DL-300_User_Manual_v1.2.0_en.pdf)

After setting is completed, DL-302 will automatic publish message for the BRK-2800; any MQTT Client device can subscribe to BRK-2800 to receive messages published by DL-302. Here we take the MQTT_fx_Client as an example: enter the IP address and Communication Port of BRK-2800, and connect to the BRK-2800 after the settings are correct.

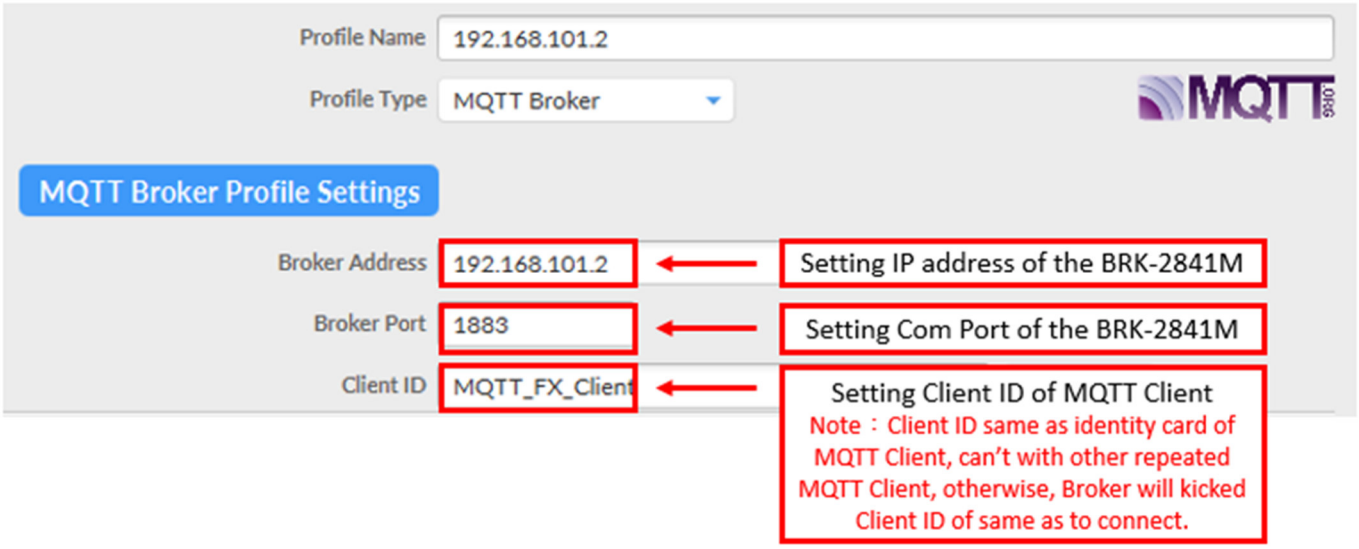


Figure 3-2 Forward the MQTT messages for BRK-2800 (1)

After successfully connect, now BRK-2800 can operate publish and subscribe.

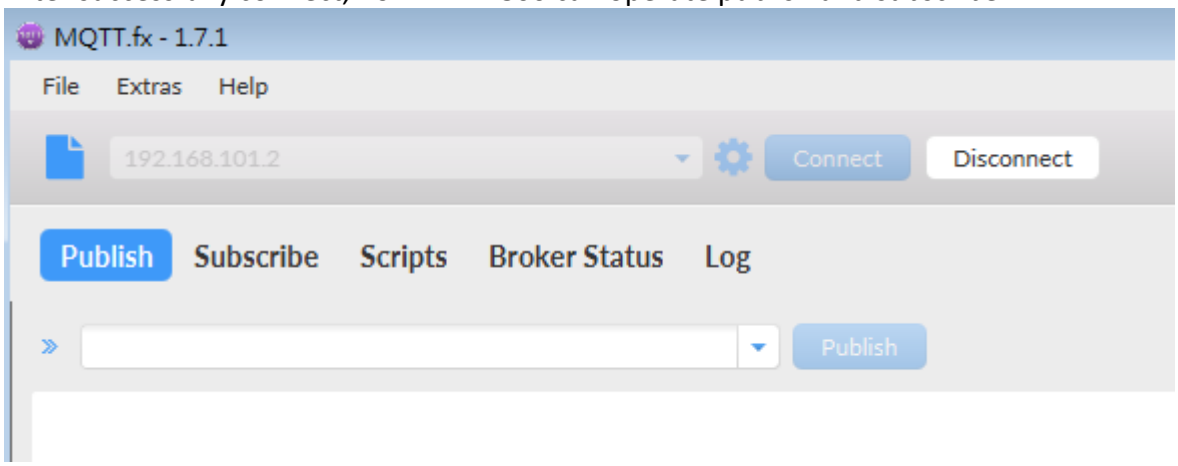


Figure 3-3 Forward the MQTT messages for BRK-2800 (2)

In order to make sure that the DL-302 has correctly published the environmental information to the BRK-2800, subscribe to the Wildcards character [#] of the topic to see the information published by the DL-302. Please refer to the following capture for the steps.

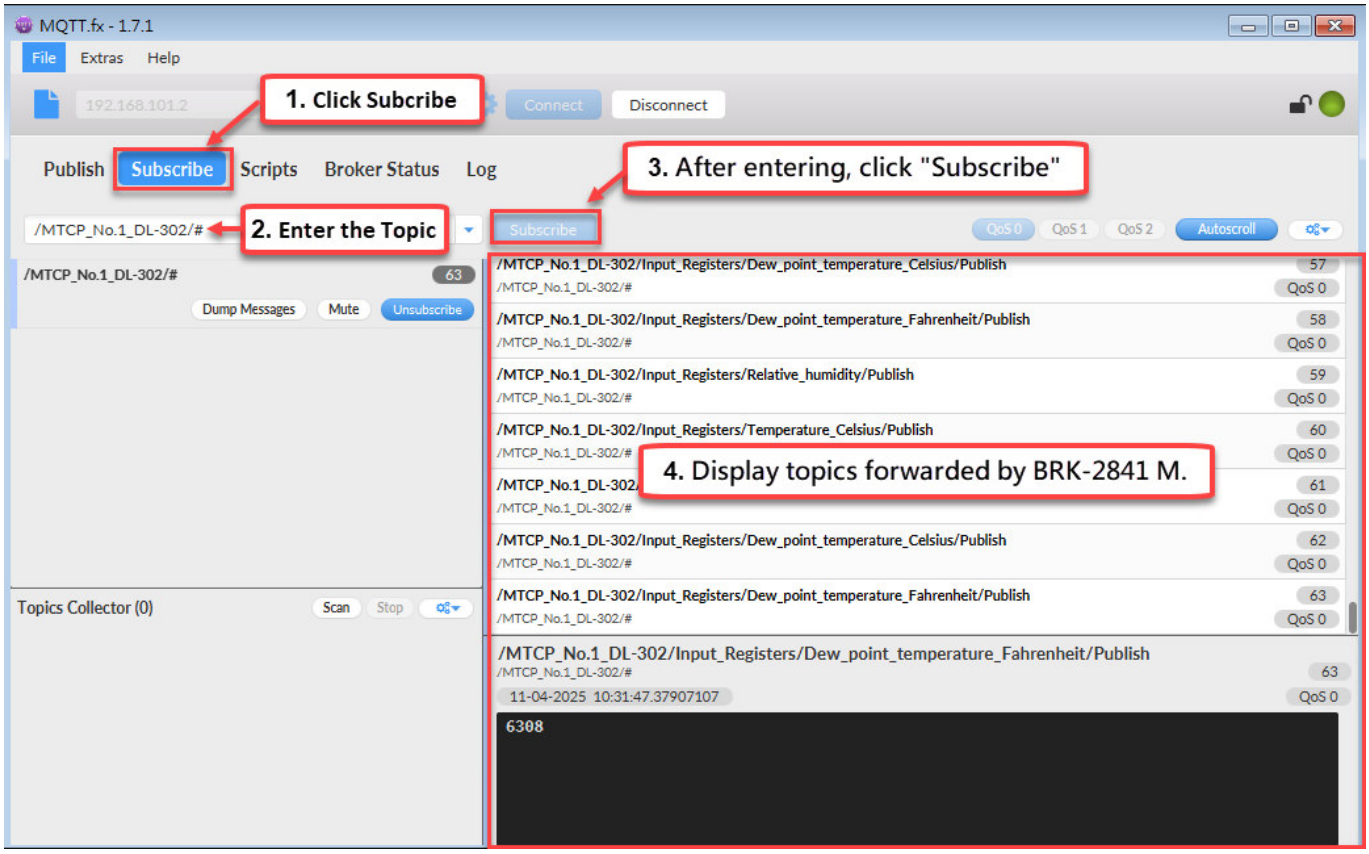


Figure 3-4 Forward the MQTT messages for BRK-2800 (3)

4. Main Menu: Parameter Descriptions

4.1 Main Menu - System Setting

System Setting is the first item of the Main Menu. This item is about the settings related to the hardware and operating system.

4.1.1 Account Setting

Function: Display and set up the login username and password of the BRK Web UI.

Menu Path:【System Setting】➔【Account Setting】

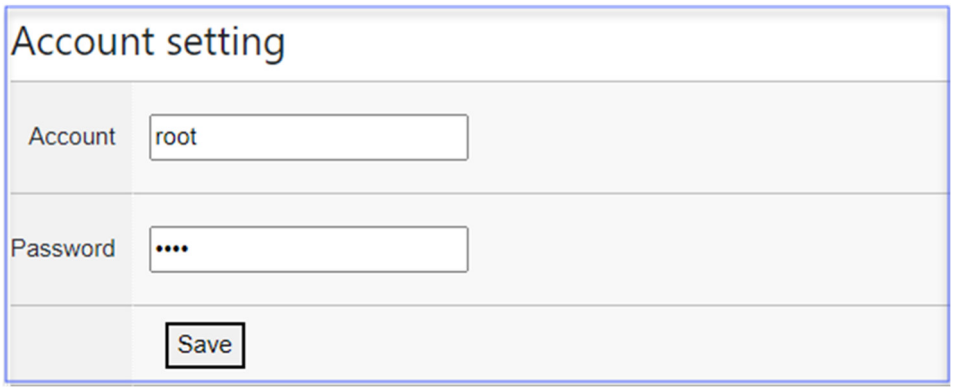


Figure 4-1 Account Setting Page

System Setting > Account Setting	
Account	The username for login the BRK Web UI. Factory default: root. Cannot be null. **After the first login with the factory default settings, change the default username/password first, or user may not be able to use any other function.** **Changing the account must meet the following conditions:** **1. At least 8 characters** **2. At least 2 upper case letter** **3. At least 2 numbers**
Password	The login password for the BRK Web UI. Factory default: root. Cannot be null. **After the first login with the factory default settings, change the default username/password first, or user may not be able to use any other function.** **Changing the password must meet the following conditions::** **1. At least 8 characters** **2. At least 2 upper case letter** **3. At least 2 numbers**
Save	Click to save the settings of this page.

Table 4-1 Descriptions: System Setting > Account Setting

4.1.2 Network Setting

Function: Display and set up the network settings of the BRK.

Menu Path：【System Setting】➔【Network Setting】

Note: While the network cable has been correctly connected to LAN1 and LAN2 will show up setting interface.

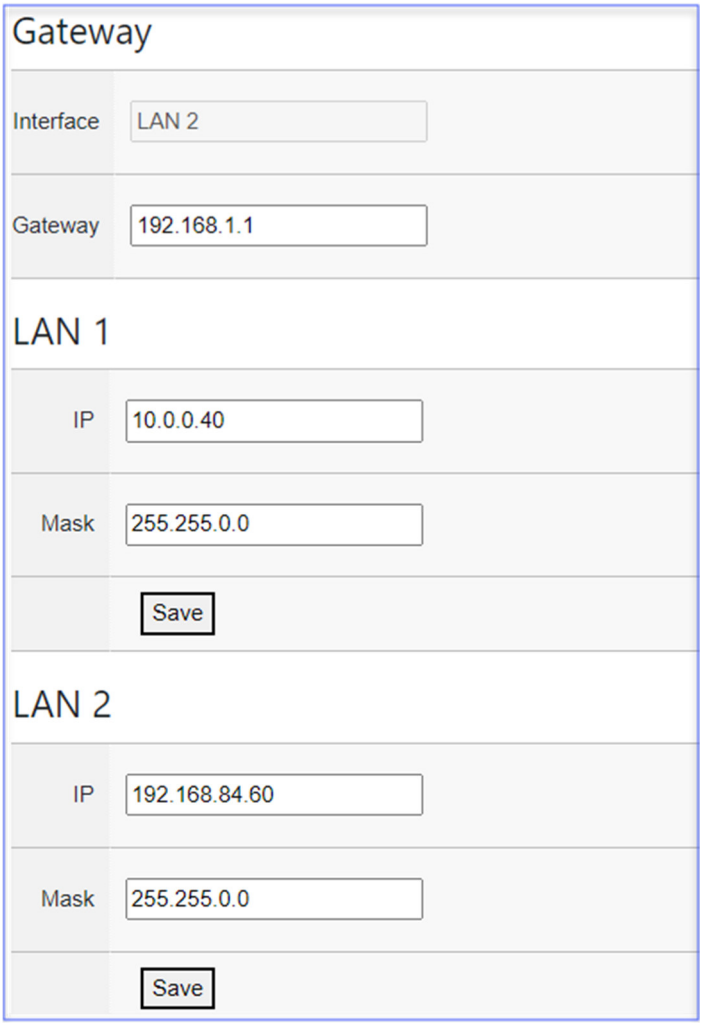


Figure 4-2 Network Setting Page

System Setting > Network Setting - Network Setting (LAN)	
IP	The LAN IP address of this BRK. Factory Default: 192.168.255.1:8000
Mask	The LAN mask address of this BRK. Factory Default: 255.255.0.0
Gateway	The LAN gateway address of this BRK. Factory default: 192.168.1.1
Save	Click to save the settings of LAN item.

Table 4-2 Descriptions: System Setting > Network Setting

4.1.3 Time Setting

Function: Display and set up the date and time of the BRK.
Menu Path:【System Setting】➔【Time Setting】

- **Display Date and Time**

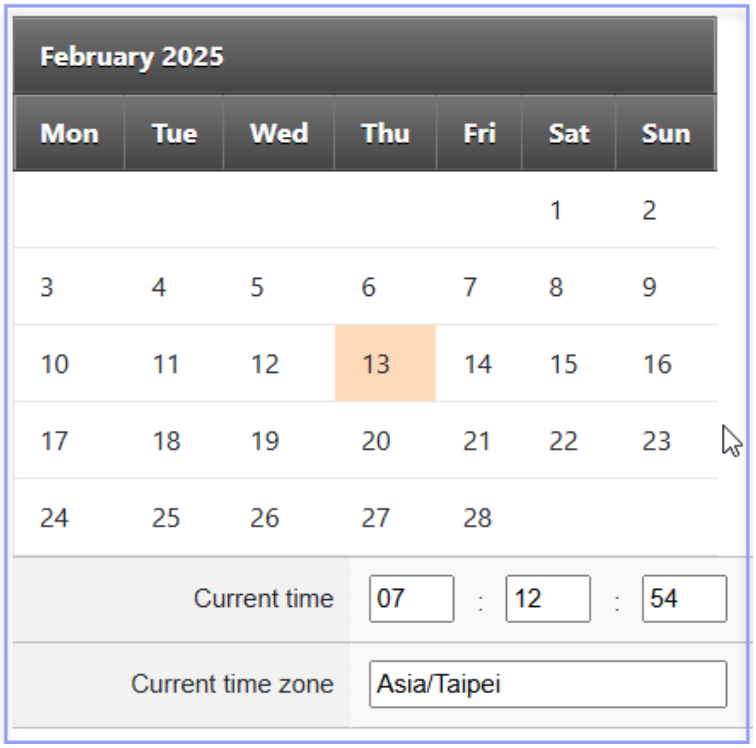


Figure 4-3 Time Setting Page

System Setting > Time Setting - Date and Time Display	
Date	Display the date of the BRK, including years, months and days.
Time	Display the current time of the BRK, including hours, minutes and seconds.
Current time zone	Display the current location of BRK, including continents and cities.

Table 4-3 Descriptions: System Setting > Time Setting > Date and Time Display

- **PC Time & Sync**



Figure 4-4 Set the date manually Page

System Setting > Time Setting - PC Time & Sync	
Date	Set the system date of the BRK by manually. Directly enter the year/month/day, and then click “Save”.
Time	Set the system time of the BRK manually. Directly enter the hour : minute second, and then click “Save”.
Time Zone	Set the time zone to match the actual country where the BRK-2841M system is installed.

Table 4-4 Descriptions: Time Setting > PC Time & Sync

- **Manual Time Adjustment**

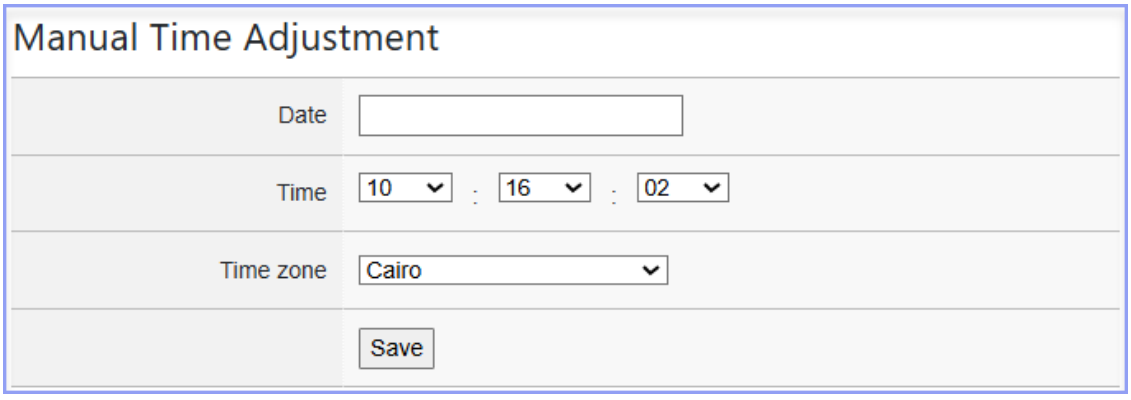


Figure 4-5 Manual Time Adjustment

System Setting > Time Setting - Set date and time Manually	
Date	Set the system date of the BRK by manually. Directly enter the year/month/day, and then click “Save”.
Time	Set the system time of the BRK manually. Directly enter the hour : minute second, and then click “Save”.
Time Duplication	Copy PC time: it can automatically detect the PC time of the BRK-2841M web page and write the date and time directly into the date and time fields, eliminating the need for manual input.

Time Zone	Set the time zone to match the actual country where the BRK-2841M system is installed.

Table 4-5 Descriptions: Time Setting > Set date and time Manually

- **NTP time calibration**

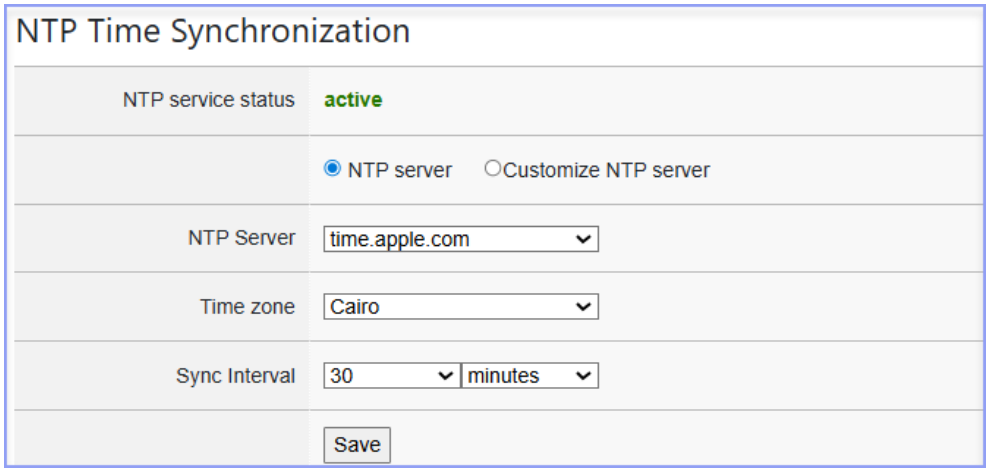


Figure 4-6 NTP time calibration Page

System Setting > Time Setting – NTP time calibration	
NTP service status	Displays whether the NTP service is active or not.
NTP server	Select the NTP server you want to use in the drop-down menu. If the drop-down menu does not have the NTP server you want, you can click Custom time server and manually enter the NTP server URL.
Time zone	Set the time zone to match the actual country where the BRK-2841M system is installed.
Sync Interval	Calibrate the time periodically against a time server to maintain clock accuracy.

Table 4-6 Descriptions: System Setting > Time Setting > NTP time calibration

Note: BRK-2841M will only apply one of the calibrations. If you select manual calibration first, it will automatically inactivate the NTP calibration service. After setting the NTP calibration, it will be based on the time of the selected NTP server.

4.1.4 Language Setting

Function： Change the ECO language settings.

Menu Path：【System Setting】➔【Language Setting】



Figure 4-7 Language Setting Page

System Setting > Language	
Language	Select to change the language.
Save	Click to save the settings of this page.

Table 4-7 Descriptions: System Setting > Language

4.1.5 Project File

Function: Provide back-up and restore setting for the ECO project.

Menu Path:【System Setting】➔【Project File】

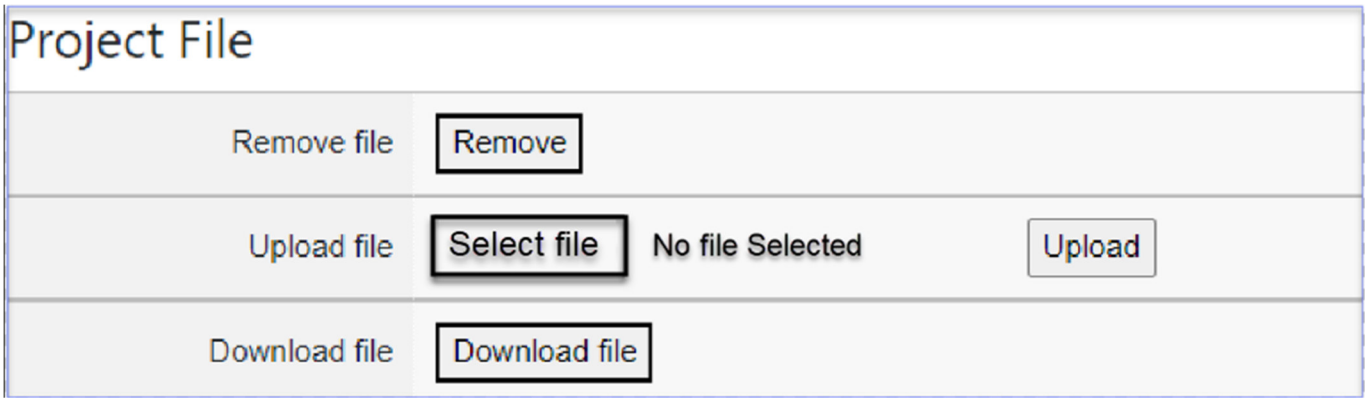


Figure 4-8 Project File Page

- Remove the project

Remove the current project and recover to factory setting.

- Upload the project

Upload the project file to the BRK. This function can quickly replace the previously backed up project file.

System Setting > Project File > Upload the project	
Select File	Select to restore the project file.
Upload	Upload project file.

Table 4-8 Descriptions: System Setting > Project File

- Download the project

Download the project file, to easily back up the project settings.

4.1.6 Utility

Function: The EZ-UAQ Utility allows site owners and network administrators to manage modules quickly.

Menu Path:【System Setting】➔【Utility】

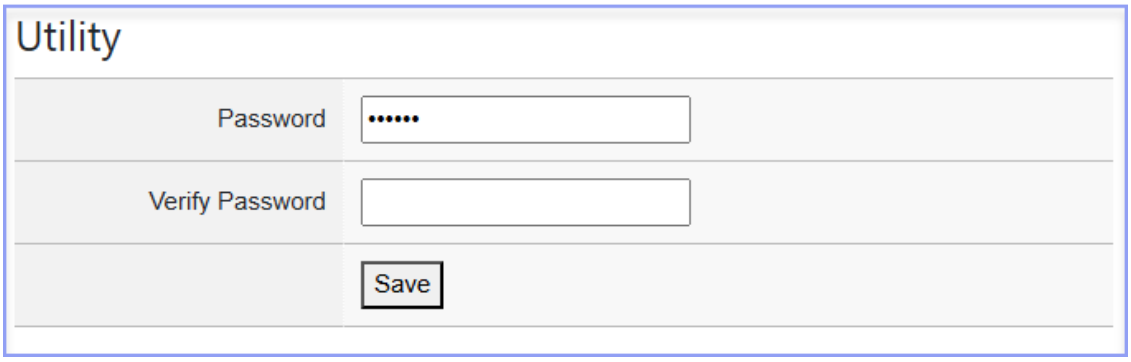
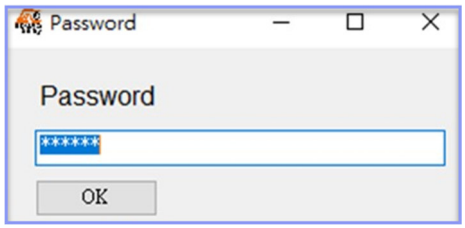
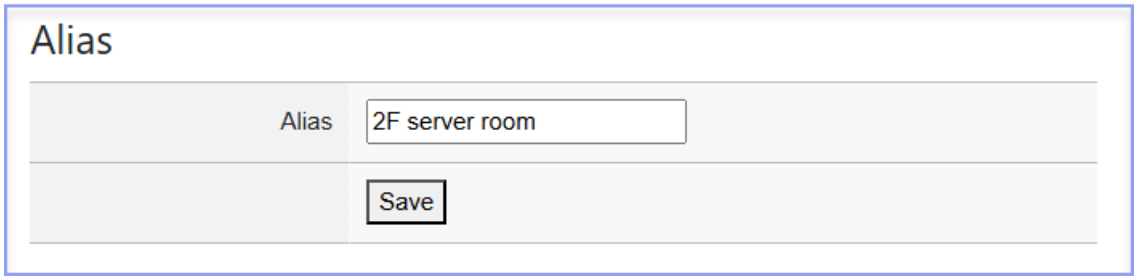
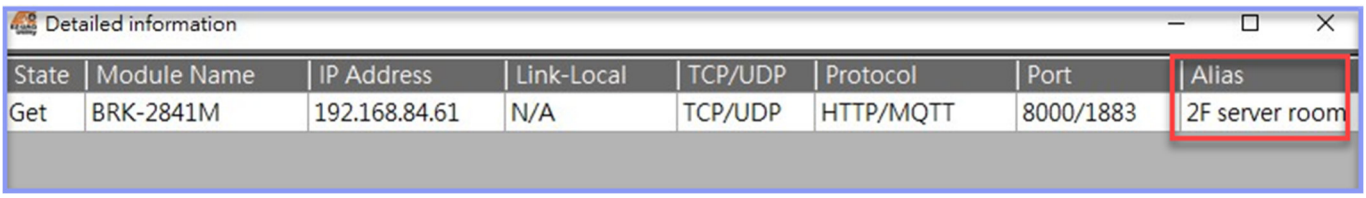


Figure 4-9 Utility Page







System Setting > Utility	
Password	Change EZ-UAQ Utility Password.
Verify Password	Re-enter the password you wish to change.
Alias	Set the name that BRK-2841M displays in the EZ-UAQ Utility scan list.

Table 4-9 Descriptions: System Setting > Utility

4.2 Main Menu – MQTT Setting

This main menu represents all information of MQTT Broker and provide related settings of MQTT services.

4.2.1 Local Broker Setting

Function: Provide built-in Broker setting of the BRK.

Menu Path:【MQTT Setting】➔【Local Broker Setting】

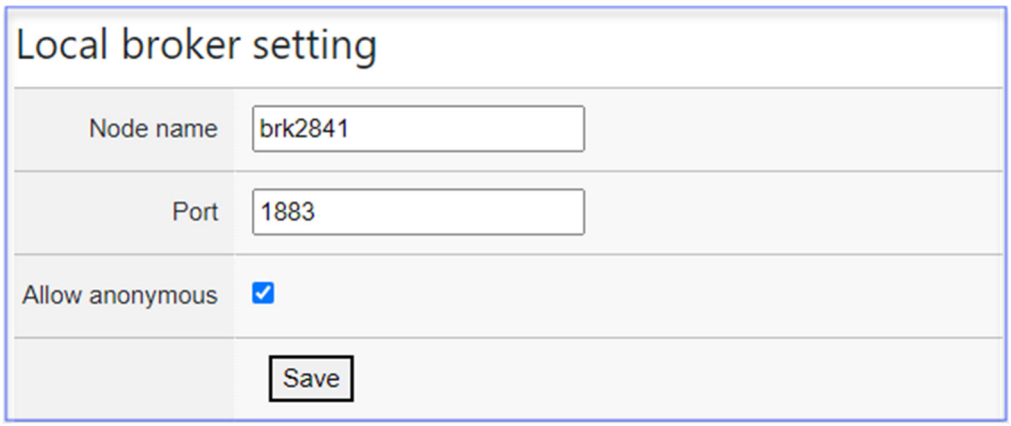


Figure 4-10 Local Broker Setting Page

MQTT Setting > Local broker Setting	
Node name	The broker's unique identifier is related to the following MQTT services. 1. Cluster Identification Nodes are the key to determining the identity of each node when BRK-2841M forms a cluster. Nodes are the key to determining the identity of each node when BRK-2841M forms a cluster. 2. Distributed Communications The node is the basis for communication between the BRK-2841M. For example, synchronizing subscription information and delivering messages between nodes. 3. Logs and monitoring identification Identify different node sources in the Log.
Port	COM Port of Broker, default: 1883.
Allow anonymous	1. Check the box: it can connect without a username and password. (Login anonymously) 2. Uncheck the box: the connection requires setting up the username and password. **(Please refer to 4.2.3 Broker Account Setting- Add Broker Account)**

Table 4-10 Descriptions: MQTT Setting > Local Broker Setting

4.2.2 MQTT Bridge Setting

Function: Provide MQTT Bridge setting.

Menu Path:【MQTT Setting】➔【MQTT Bridge Setting】

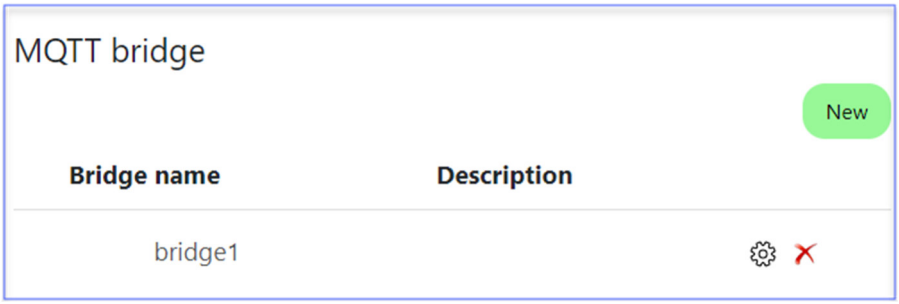


Figure 4-11 MQTT Bridge Setting Page (1)

MQTT Setting > MQTT bridge	
Bridge name	Name of connection of Local Broker bridge to remote Broker.
Description	The note of bridge name.
⚙	Edit setting of remote Broker bridge .
✕	Remove the remote Broker bridge.

Table 4-11 Descriptions: MQTT Setting > MQTT Bridge Setting (1)

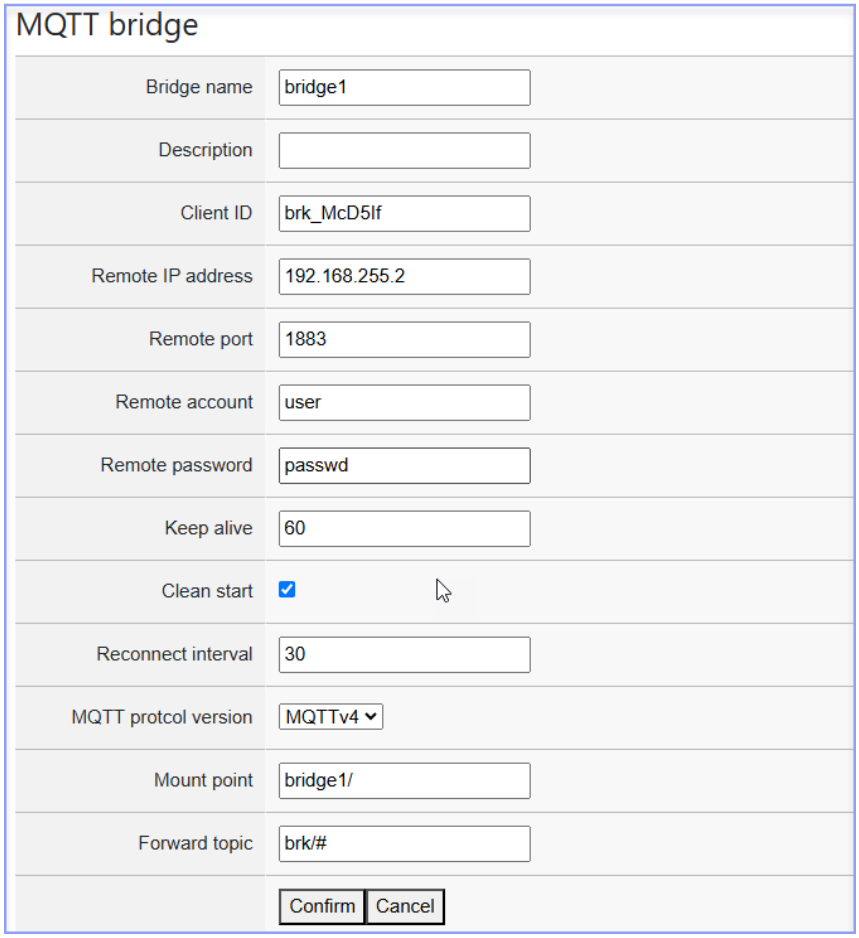


Figure 4-12 MQTT Bridge Setting Page (2)

MQTT Setting > MQTT bridge	
Bridge name	Name of connection of Local Broker bridge to remote Broker.
Description	The note of bridge name.
Client ID	Client connection to remote Broker ID.
Remote IP Address	The IP address of the remote Broker.
Remote Port	The COM port number of the remote MQTT Broker, default: 1883.
Remote account	Account of remote Broker. (This field can be null if remote Broker allow Anonymous login)
Remote password	Password of remote Broker. (This field can be null if remote Broker allow Anonymous login)
Keep Alive	Diagnosis whether local Broker and remote Broker interrupt. unit time: second.
Clean Start	Clean Cloud to Device(C2D) Message Some IoT platforms require to Clean it.
Reconnect interval	The interval for resetting the connection after the connection between the local broker and the remote broker is disconnected. (unit: second)
MQTT protocol version	Select the version of MQTT, offering MQTTv3, MQTTv4, and MQTTv5 options.
Mount Point	Prefix of the Topic.
Forward Topic	Forward the Topics

Table 4-12 Descriptions: MQTT Setting > MQTT Bridge Setting (2)

4.2.3 Users

Function：Allow specific user connect with Broker.

Menu Path：【MQTT Setting】➔【Users】

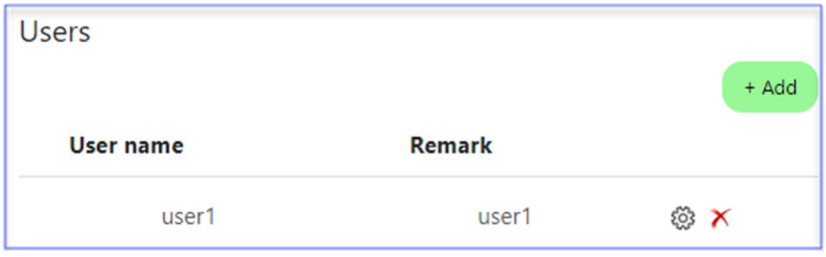


Figure 4-13 Users Setting Page (1)

MQTT Setting > Users	
User name	The local Broker account in use.
Remark	Remarks of the Account.
⚙	Edit password and remarks of the account.
✕	Remove the account from local Broker.

Table 4-13 Descriptions: MQTT Setting > Users

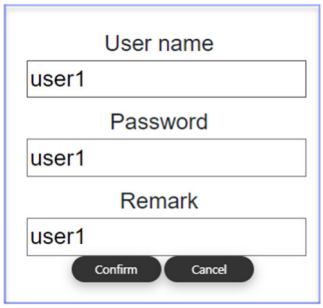


Figure 4-14 Users Setting Page (2)

MQTT Setting > Broker Account – Add User	
User name	Add account name for local Broker.
Password	Add password for local Broker.
Remark	Remarks of the Account.

Table 4-14 Descriptions: MQTT Setting > Broker Account > Add User

4.2.4 Rule Engine

Function： Manage read and write permissions of MQTT Topic.

Menu Path：【MQTT Setting】➔【Rule Engine】

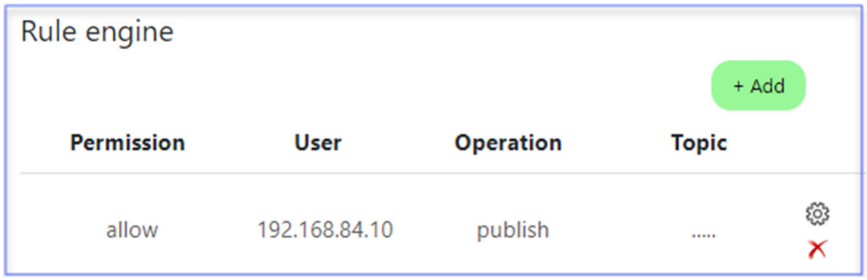


Figure 4-15 Rule Engine Page

MQTT Setting > Rule Management	
Permission	Permissions after enabling the rule. allow: allow deny: deny
User	The objects for which this rule takes effect can be selected from following three objects. User： Broker account can only display an account created by **4.2.3 Broker account.** Client ID： Client ID of MQTT session IP Address： IP Address
Operation	Set the MQTT operations allowed after the rule is enabled. There are three options below. publish： publish are limited to MQTT publish. subscribe： subscribe are limited to MQTT subscribe.

	publish/subscribe： Allows MQTT publish and subscribe.
Topic	MQTT Topic applied to this rule. **Note**： Topic string longer than 7 characters (including symbols) will be represented by “….”.

Table 4-15 Descriptions: MQTT Setting > Rule Management

4.2.5 MQTT Cluster Setting

What is an MQTT Cluster?

Think of the BRK-2841M as a “message hub” that forwards messages among numerous devices. When device numbers and messages increase, relying on a single hub may become too slow or even cause complete system failure if it malfunctions.
An MQTT Cluster transforms a “single hub” into “multiple hubs working together.”

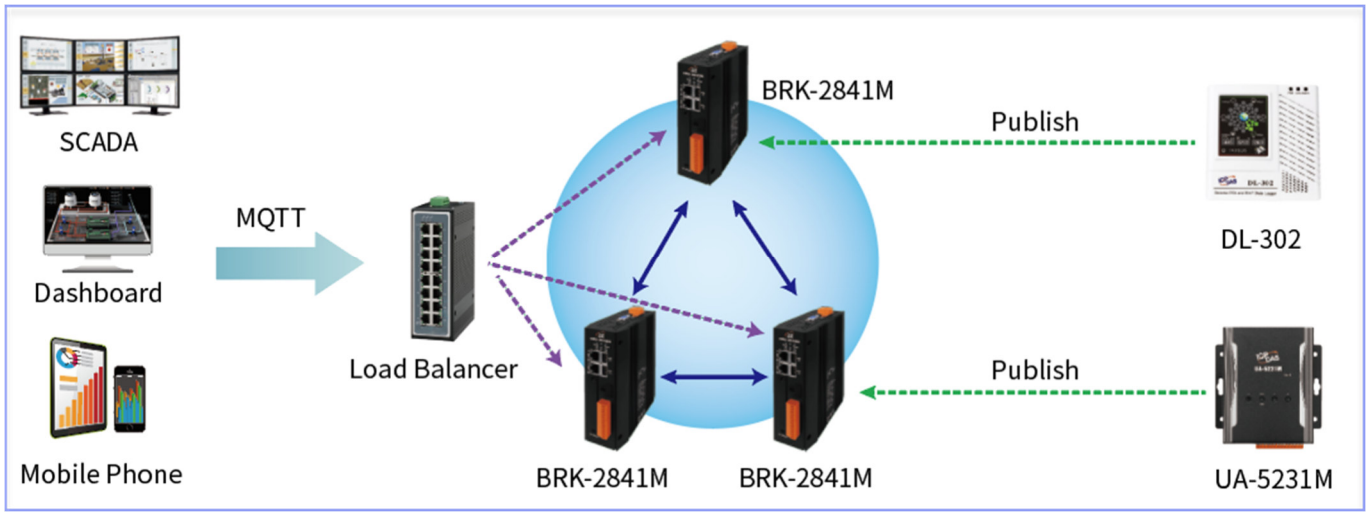


Figure 4-16 Cluster Architecture

Function： Provide MQTT Cluster setting.

Menu Path：【MQTT Setting】➔【MQTT Cluster】

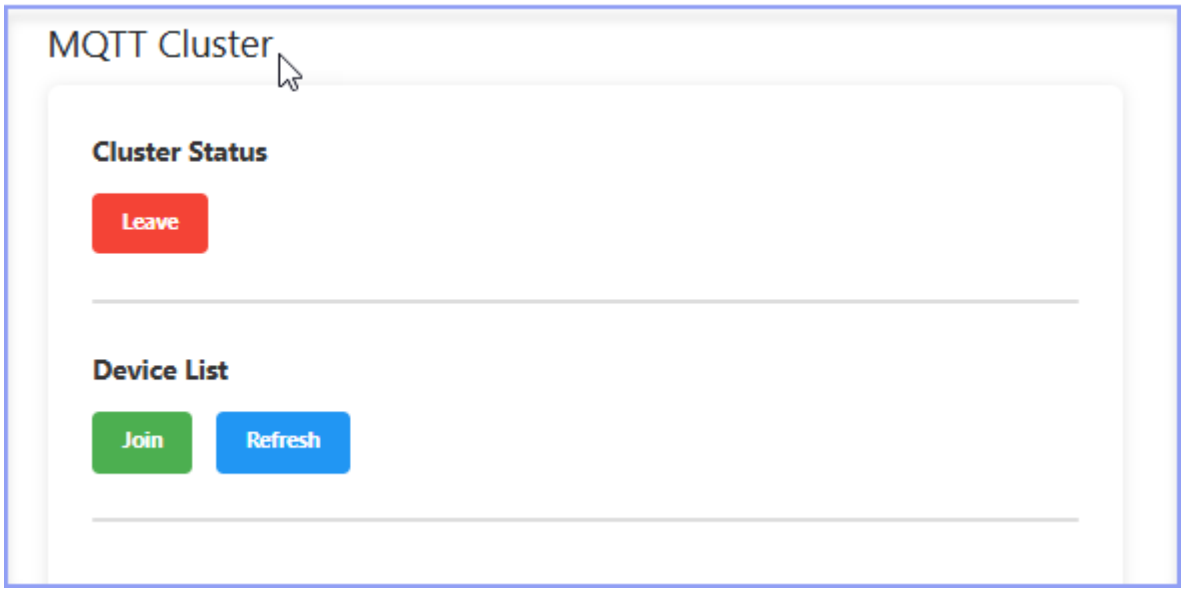


Figure 4-17 MQTT Cluster Setting

MQTT Setting > MQTT Cluster	
Leave	Remove the device from the MQTT cluster.
Join	Add the device to the MQTT cluster to share message forwarding.
Refresh	Search BRK-2841M in the same domain.

Table 4-16 MQTT Cluster Setting

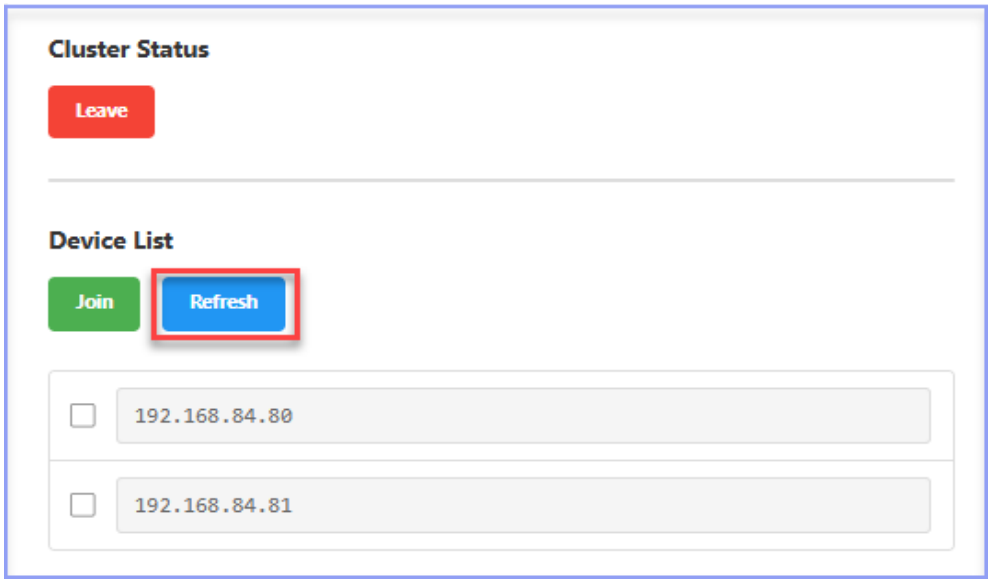


Figure 4-18 MQTT Cluster Setting-Refresh

MQTT Setting > MQTT Cluster > Search BRK-2841M	
Refresh	Search BRK-2841M in the same domain.

Table 4-17 MQTT Cluster Setting-Search BRK-2841M

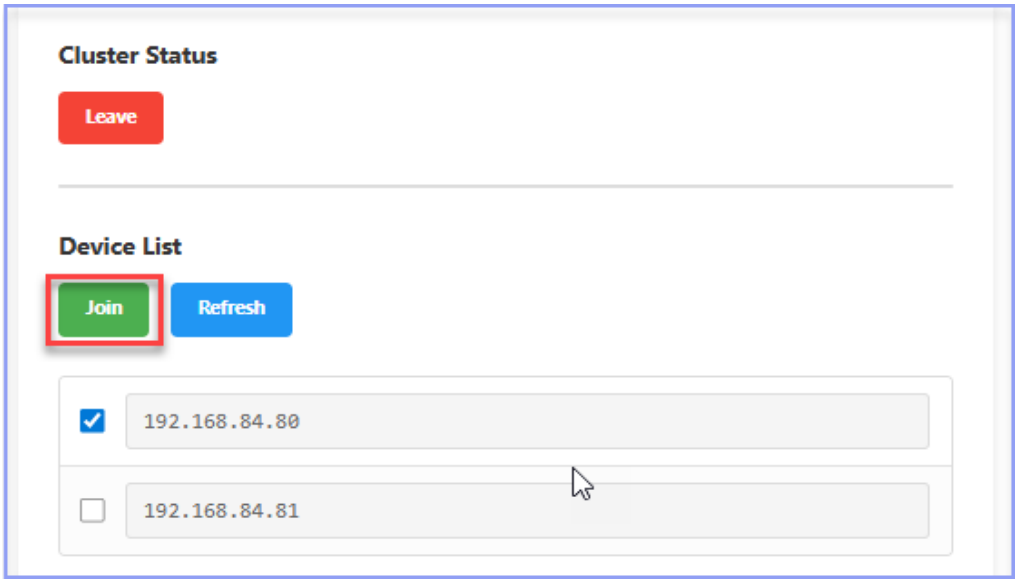


Figure 4-19 MQTT Cluster Setting-Join

MQTT Setting > MQTT Cluster> Add BRK-2841M to the MQTT cluster	
Join	Add the device to the MQTT cluster to share message forwarding.

Table 4-18 MQTT Cluster Setting-Add BRK-2841M to the MQTT cluster

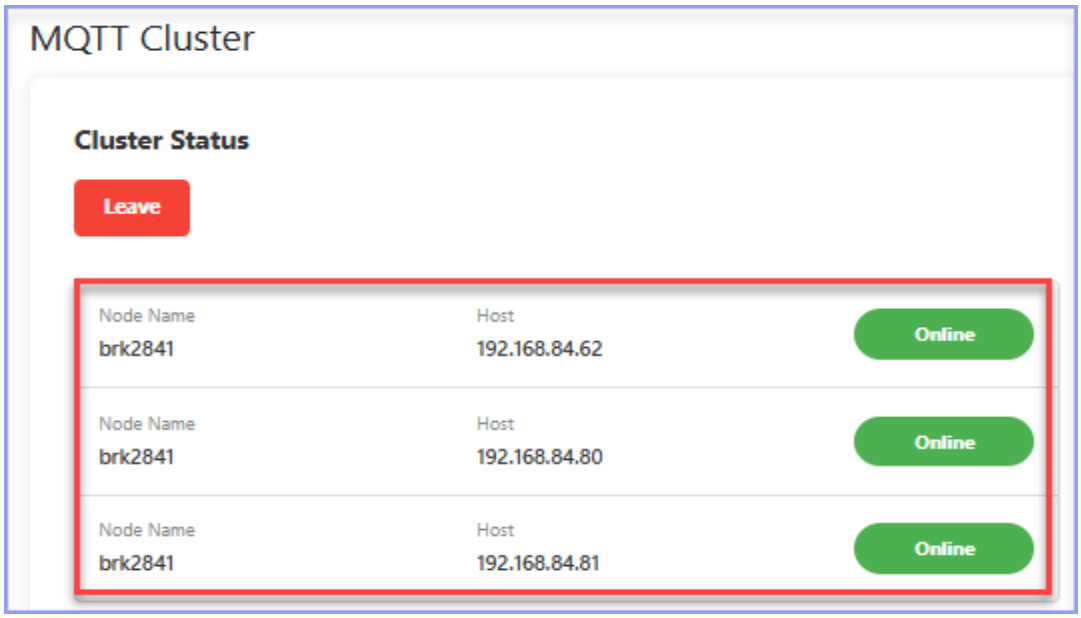


Figure 4-20 MQTT Cluster Setting-Device Status

MQTT Setting > MQTT Cluster> Display cluster device status.
Display the connection status of other BRK-2841M devices within the same cluster.

Table 4-19 MQTT Cluster Setting-Display cluster device status

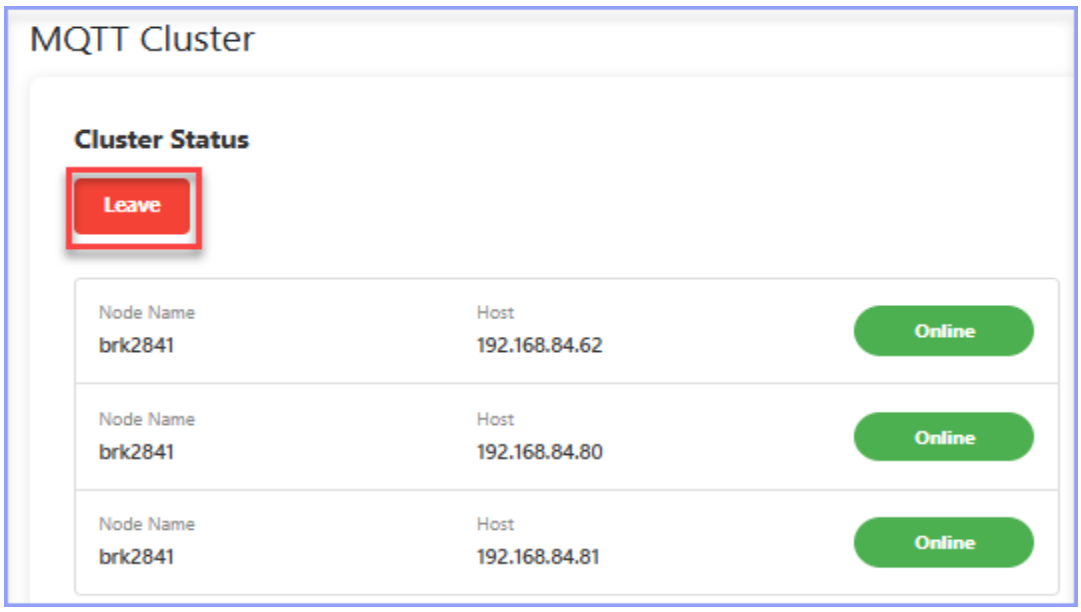


Figure 4-21 MQTT Cluster Setting-Leave

MQTT Setting > MQTT Cluster> Leave	
Leave	Remove the device from the MQTT cluster.

Table 4-20 MQTT Cluster Setting-Leave

4.3 Main Menu – Database

This main menu is a system for storing, managing and querying data.

4.3.1 MQTT data to MySQL

Function： Manage MySQL Connections.

Menu Path：【Database】➔【MySQL】

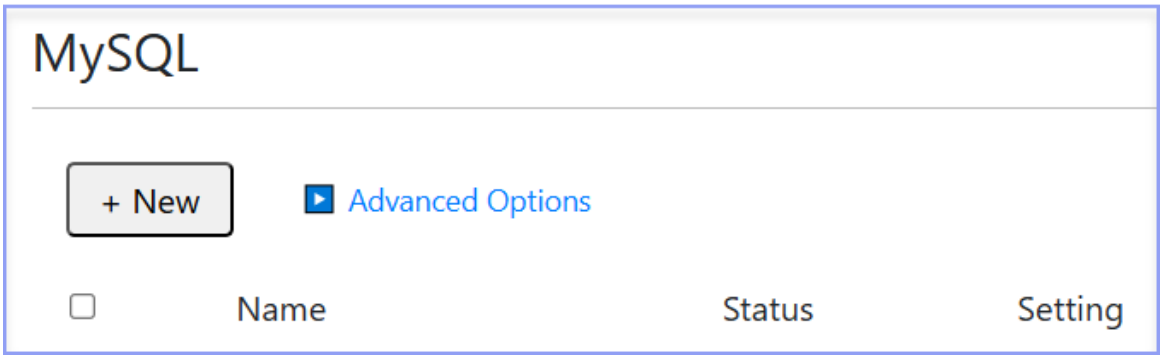


Figure 4-22 MySQL-New

Database > MySQL	
+ New	Click ‘New’ to add a new MySQL database connection.
Advanced Options	Click ‘Advanced Options to copy or delete the database.
Name	Set the MySQL name; if it is empty, the default name will be generated by BRK-2841M.
Status	Service enabled status.
Setting	MySQL Advanced Setting.

Table 4-21 Database > MySQL

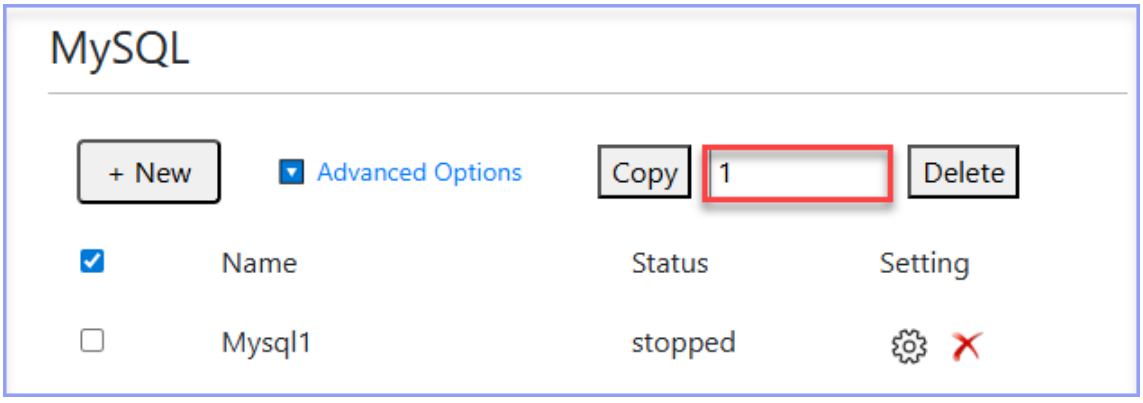


Figure 4-23 MySQL-Copy

Database > MySQL > Advanced OPtions	
Copy	Select the database to be copied. Note: Only one MySQL Setting can be copied.

Number of copies	Enter the numbers to be copied. Note: MySQL sets the maximum number of copies to 100. If the total number of copies exceeds 100, it will be reset to 1.
Delete	Select the database to be deleted.

Table 4-22 Database > Advanced OPtions

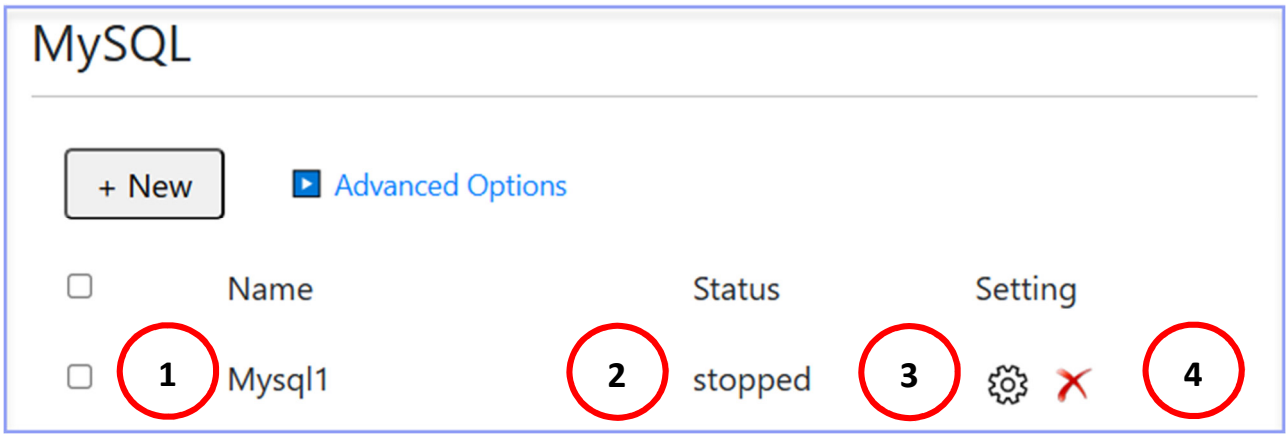


Figure 4-24 MySQL Setting

Database > MySQL	
Name	Name of MySQL.
Status	Service enabled status.
	MySQL Advanced Setting.
	Remove the connection.

Table 4-23 Database > MySQL

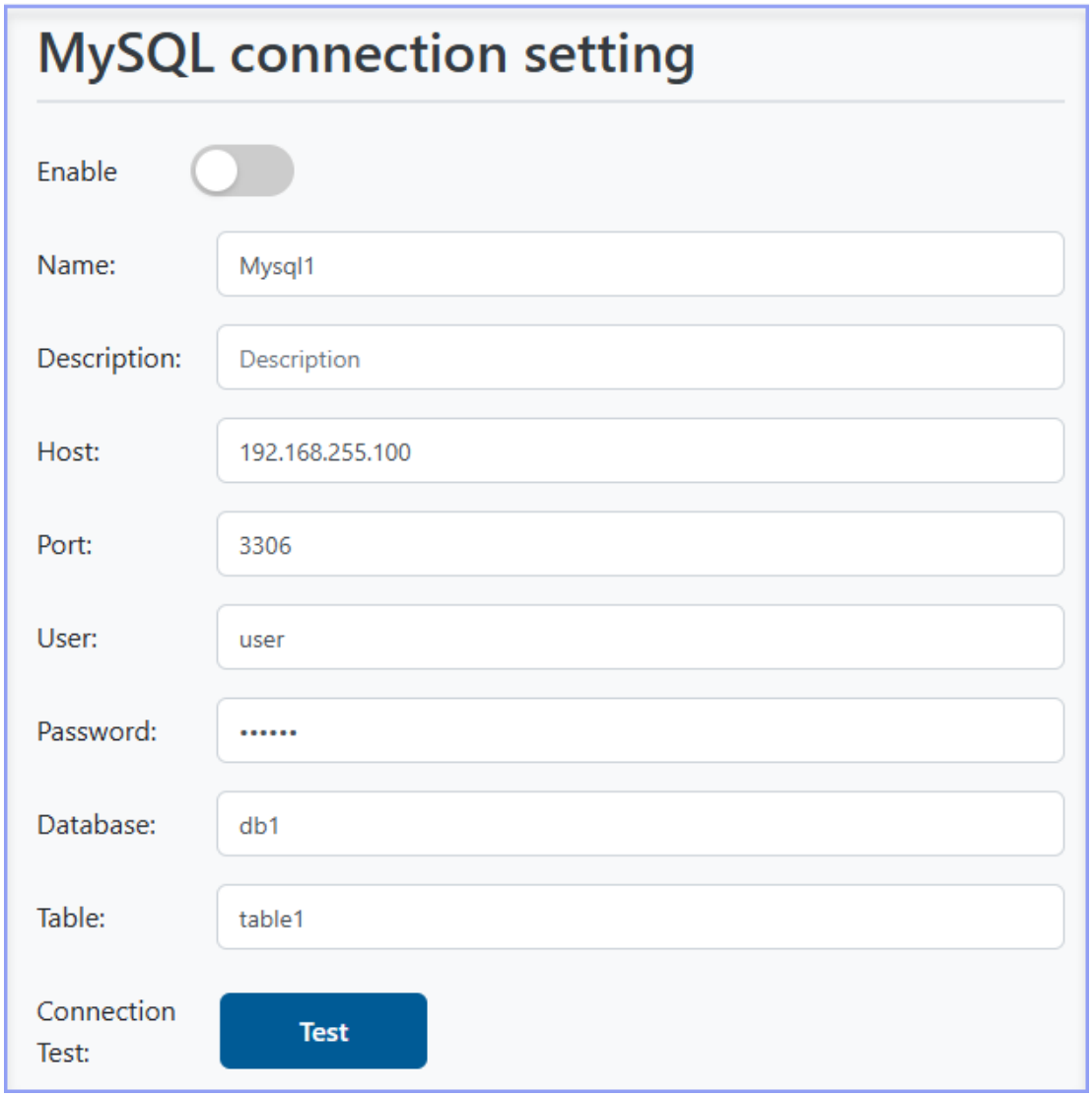


Figure 4-25 MySQL Advanced Setting

Database > MySQL > Advanced Setting	
Enable	Enable Database service, default is off.
Name	Name of MySQL.
Description	Field for User Comments (optional)
Host	IP address of the database server
Port	Database Server Port, default is 3306
User	Database connection account.
Password	Database password.
Database	The database you want to connect to.
Table	The table you want to write to.
Connection Test	Test whether the BRK-2841M connects to the database successfully. **Note: Displays "OK" or "Failed" on the right side. If "failed" appears, verify the Host, Port, User, and Password.**

Table 4-24 MySQL Advanced Setting

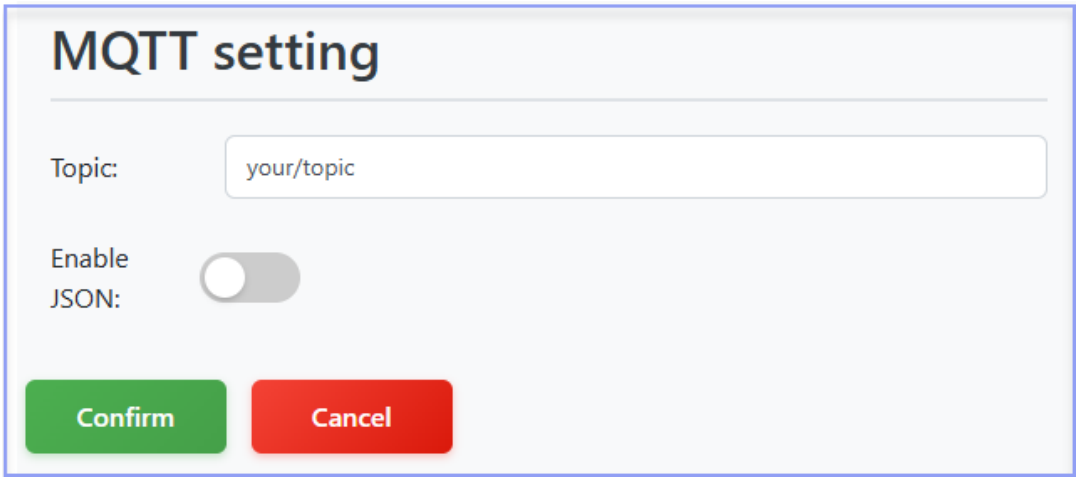


Figure 4-26 MQTT Setting (1)

Database > MySQL > MQTT Setting	
Topic	Set the MQTT topic to write into the database. Use "," to add topics to the same database.
Enable JSON	If this option is not enabled, the MQTT payload can only accept Plain Text / String. If your data type is JSON, make sure to enable this option.
Confirm	Store MQTT to MySQL Settings.
Cancel	Cancel Settings.

Table 4-25 Database > MySQL > MQTT Setting

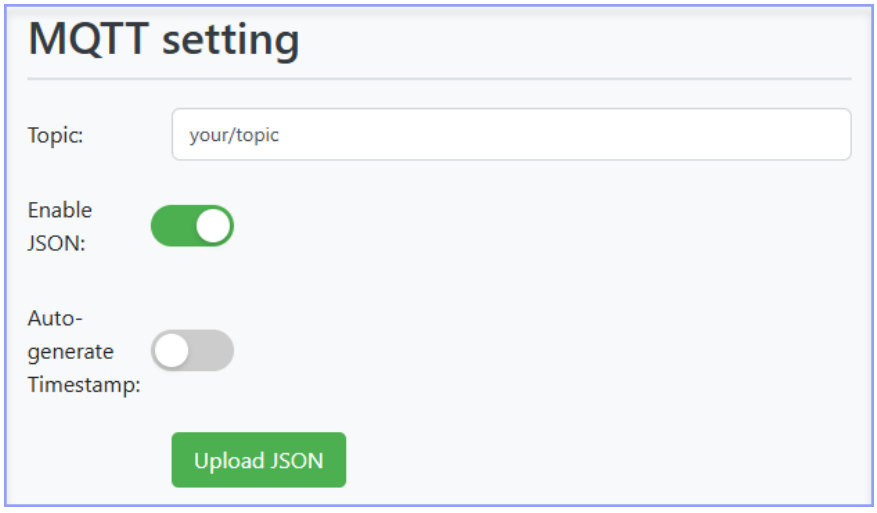
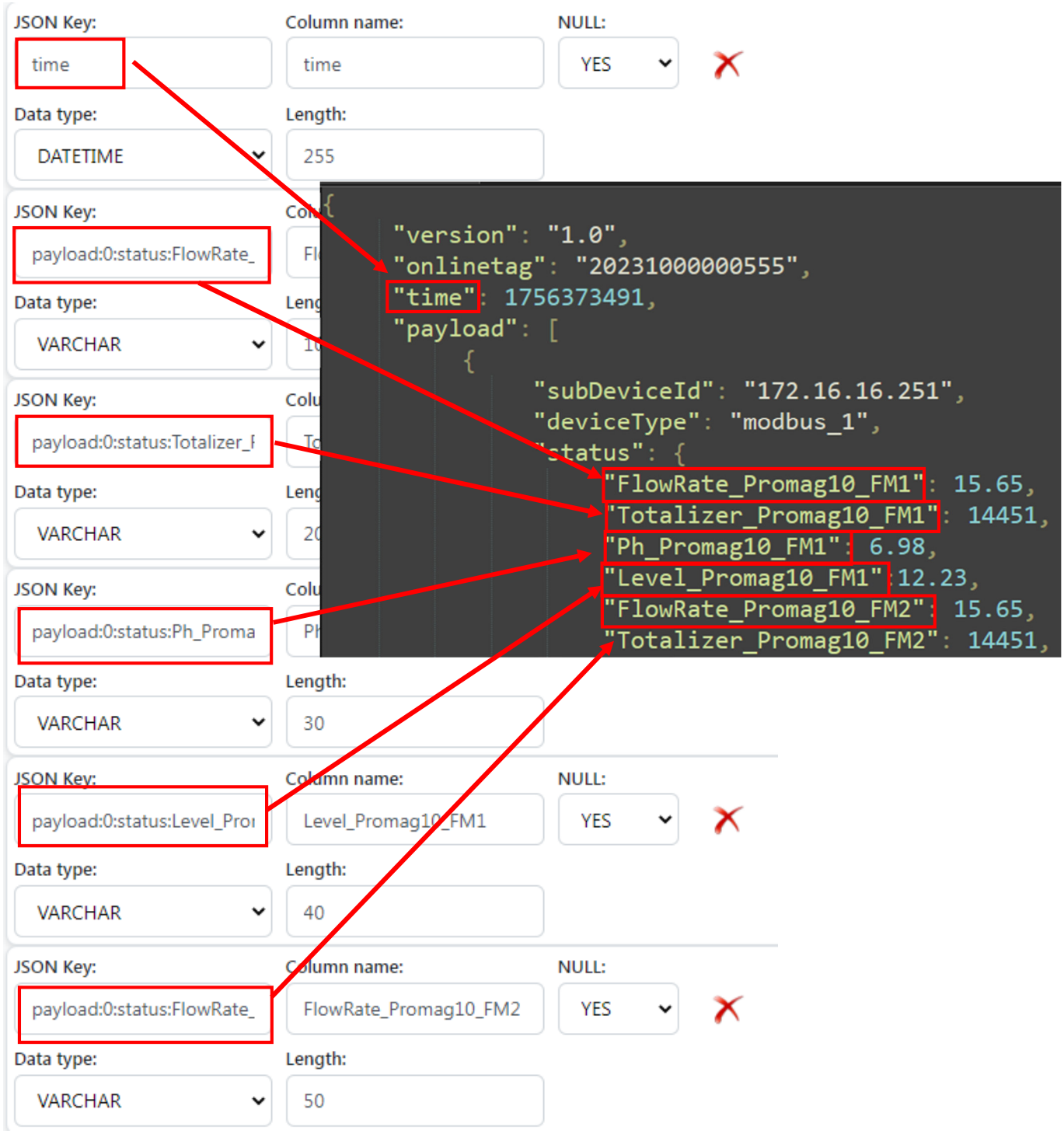


Figure 4-27 MQTT Setting (2)

Database > MySQL > MQTT Setting	
Topic	Set the MQTT topic to write into the database. Use "," to add topics to the same database.
Enable JSON	If this option is not enabled, the MQTT payload can only accept Plain Text / String. If your data type is JSON, make sure to enable this option.
Auto-generate Timestamp	The system will automatically add a timestamp to the message when it is enabled.
Upload JSON	Used to upload a custom JSON format.

Table 4-26 Database > MySQL > MQTT Setting

The mapping diagram of the JSON-parsed data to the original JSON file is shown below.

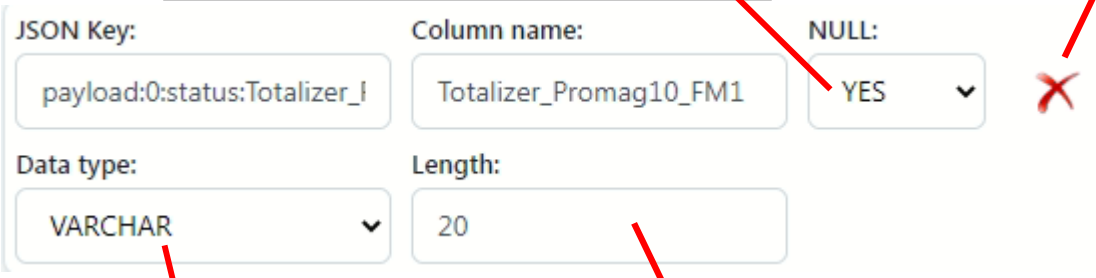


The mapping diagram of the JSON-parsed data to the MySQL columns is shown below.



Set whether the MySQL column allows "no data":
YES: Allows the field to be empty (NULL)
NO: Data is required

After JSON parsing, if the JSON key does not need to be stored in MySQL, click the delete icon to remove it.



Set the MySQL column type.
Available options include:
VARCHAR, INT, FLOAT, DOUBLE, TEXT, DATETIME, TIMESTAMP, TEXT, BOOL

Set the MySQL column length. Only the VARCHAR data type allows length setting; selecting other types will lock the length setting.

4.3.2 MQTT data to SQL Server

Function： Manage SQL Server Connections.

Menu Path：【Database】➔【SQL Server】

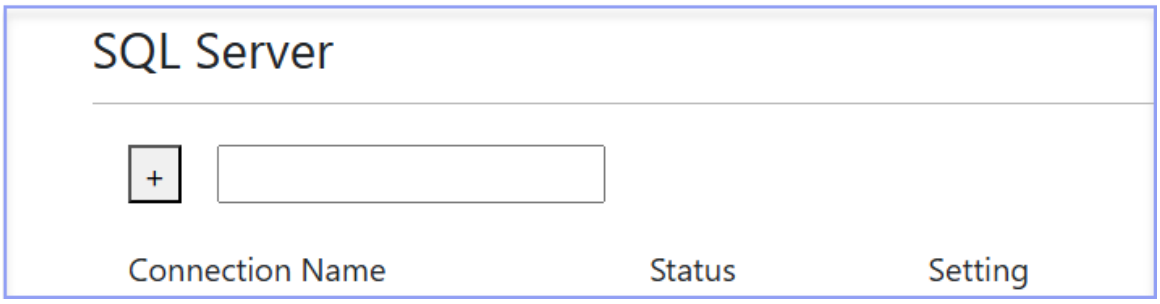


Figure 4-28 SQL Server Page (1)

Database > SQL Server	
Connection Name	Set the SQL Server connection name, if it is empty, the default name will be generated by BRK-2841M.
+	Click '+' to add a connection.

Table 4-27 Descriptions: Database > SQL Server (1)

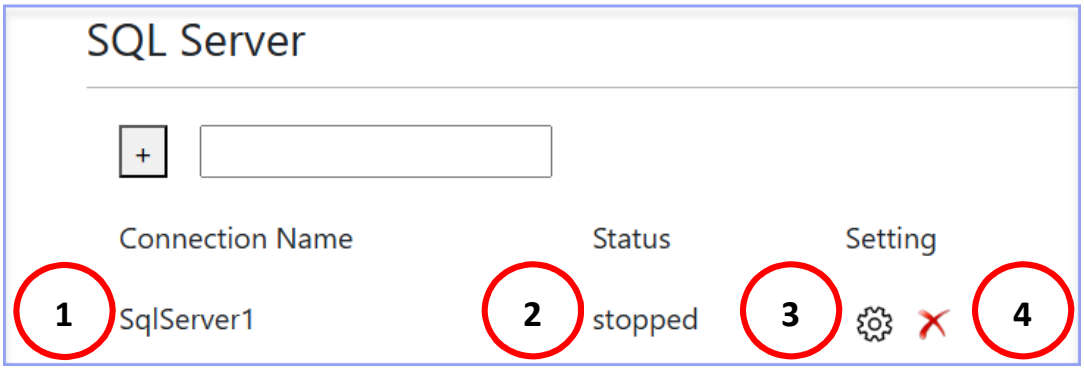


Figure 4-29 SQL Server Page (2)

Database > SQL Server	
Connection Name	Connection Name of SQL Server.
Status	Service enabled status.
⚙	SQL Server Advanced Setting.
✕	Remove the connection.

Table 4-28 Descriptions: Database > SQL Server (2)

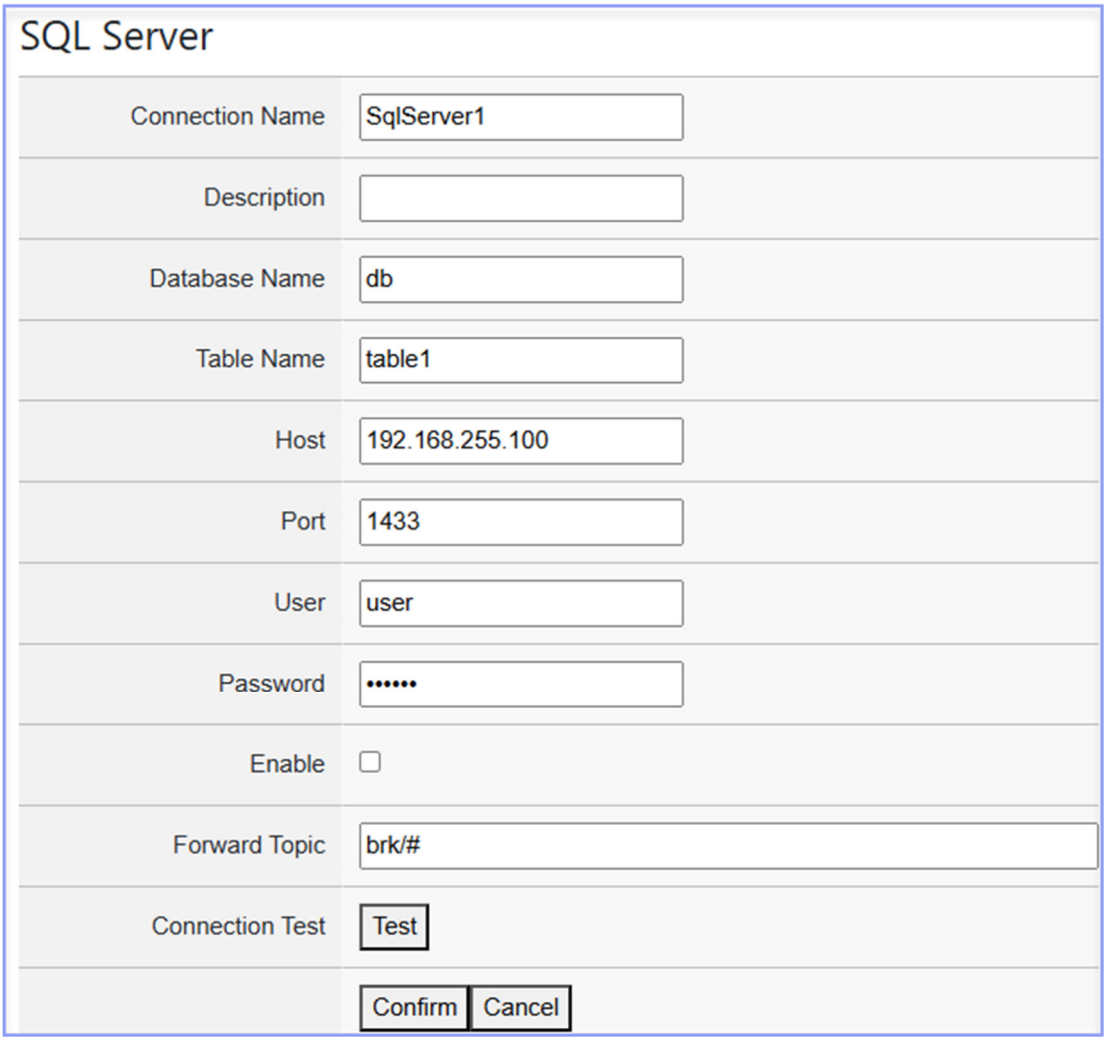


Figure 4-30 SQL Server Advanced Setting

Database > SQL Server > Advanced Setting	
Connection Name	Connection Name of SQL Server.
Description	Field for User Comments (optional)
Database Name	The database name you want to connect to.
Table Name	The table name you want to write to.
Host	IP address of the database server
Port	Database Server Port, default is 3306
User	Database connection account.
Password	Database password.
Enable	Enable Database service, default is off.
Forward Topic	Set the MQTT topic to write into the database. Use “,” to add topics to the same database.
Connection Test	Test whether the BRK-2841M connects to the database successfully. **Note: Displays “OK” or “Failed” on the right side. If “failed” appears, verify the Host, Port, User, and Password.**

Table 4-29 SQL Server Advanced Setting

4.3.3 MQTT data to MongoDB

Function： Manage MongoDB Connections.

Menu Path：【Database】➔【MongoDB】

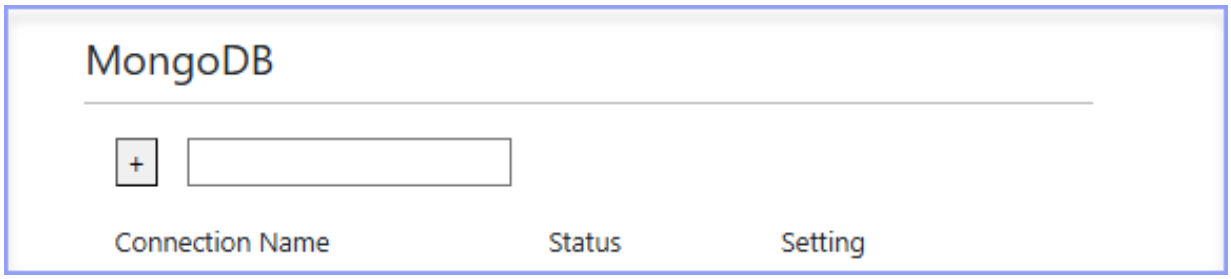


Figure 4-31 MongoDB Page (1)

Database > MongoDB	
Connection Name	Set the MongoDB connection name, if it is empty, the default name will be generated by BRK-2841M.
+	Click '+' to add a connection.

Table 4-30 Descriptions: Database > MongoDB (1)

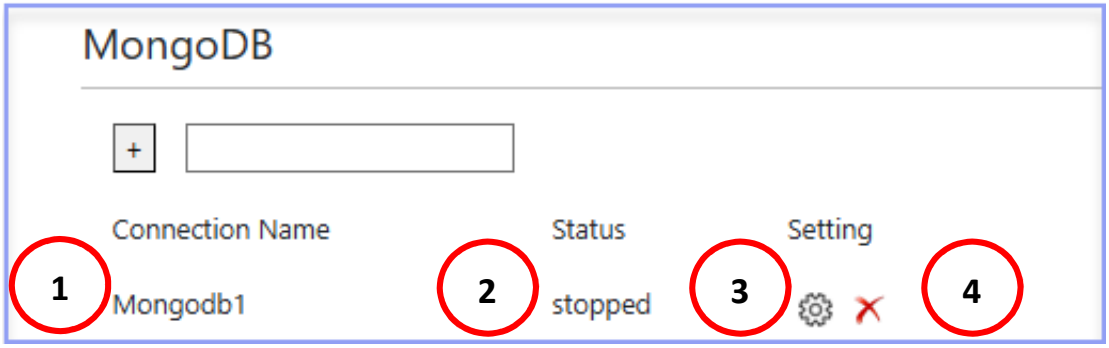


Figure 4-32 MongoDB Page (2)

Database > MongoDB	
Connection Name	Connection Name of MongoDB.
Status	Service enabled status.
⚙	MongoDB Advanced Setting.
✕	Remove the connection.

Table 4-31 Descriptions: Database > MongoDB (2)

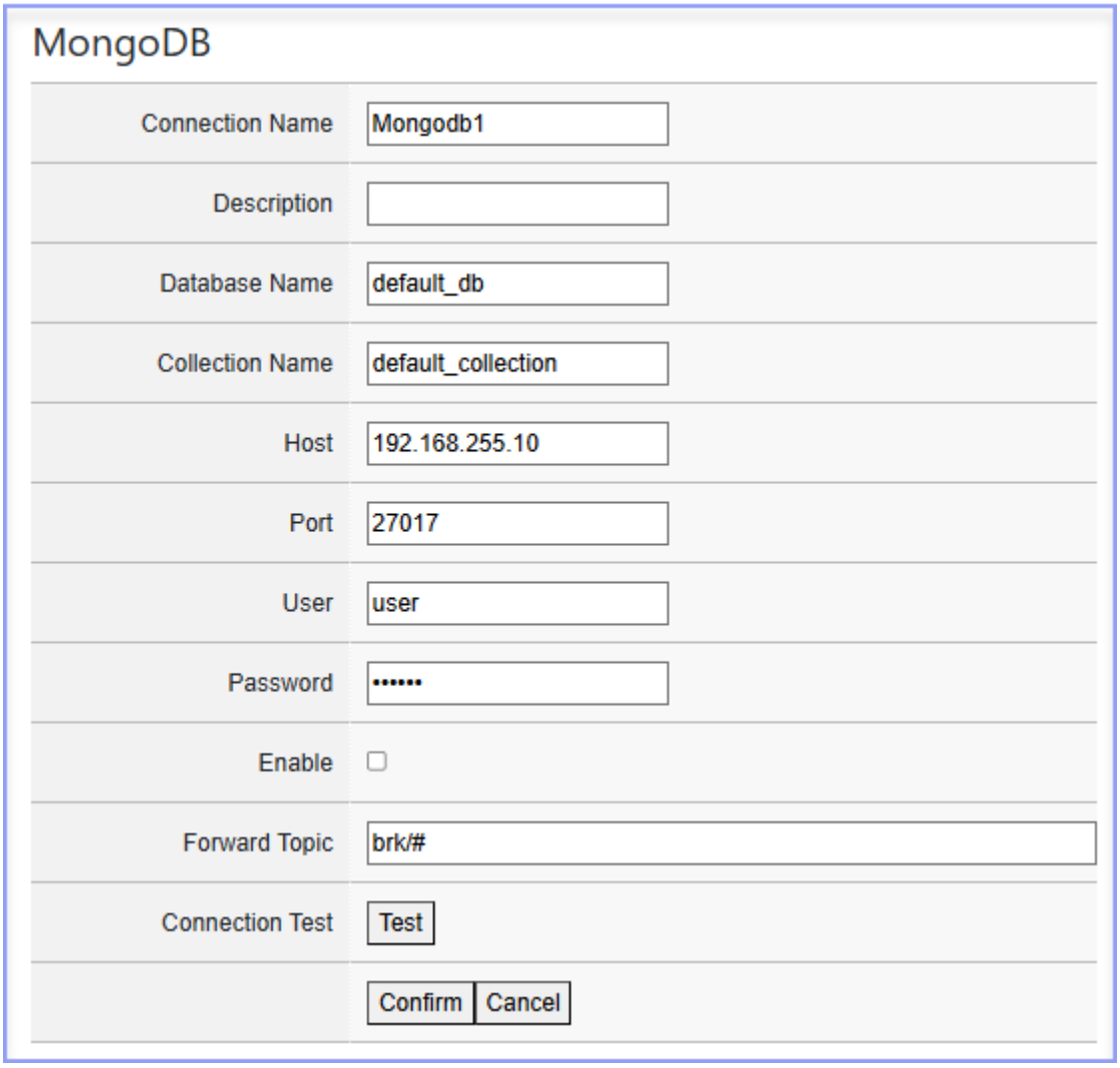


Figure 4-33 MongoDB Advanced Setting

Database > MongoDB > Advanced Setting	
Connection Name	Connection Name of MongoDB.
Description	Field for User Comments (optional)
Database Name	The database name you want to connect to.
Table Name	The table name you want to write to.
Host	IP address of the database server
Port	Database Server Port, default is 3306
User	Database connection account.
Password	Database password.
Enable	Enable Database service, default is off.
Forward Topic	Set the MQTT topic to write into the database. Use “,” to add topics to the same database.
Connection Test	Test whether the BRK-2841M connects to the database successfully. **Note: Displays “OK” or “Failed” on the right side. If “failed” appears, verify the Host, Port, User, and Password.**

Table 4-32 MongoDB Advanced Setting

4.4 Main Menu – Advanced Setting

This main menu is a collection of the advanced setting, such as the BRK device redundancy settings and more advanced functions will be developed in the succession.

4.4.1 Keep Alive Setting

Function： Set the BRK device redundancy function so that the system saves a data copy during operation. When the primary communication path fails, it automatically switches to the backup path to ensure uninterrupted connectivity.

Menu Path：【Advanced Setting】➔【Keep Alive Setting】

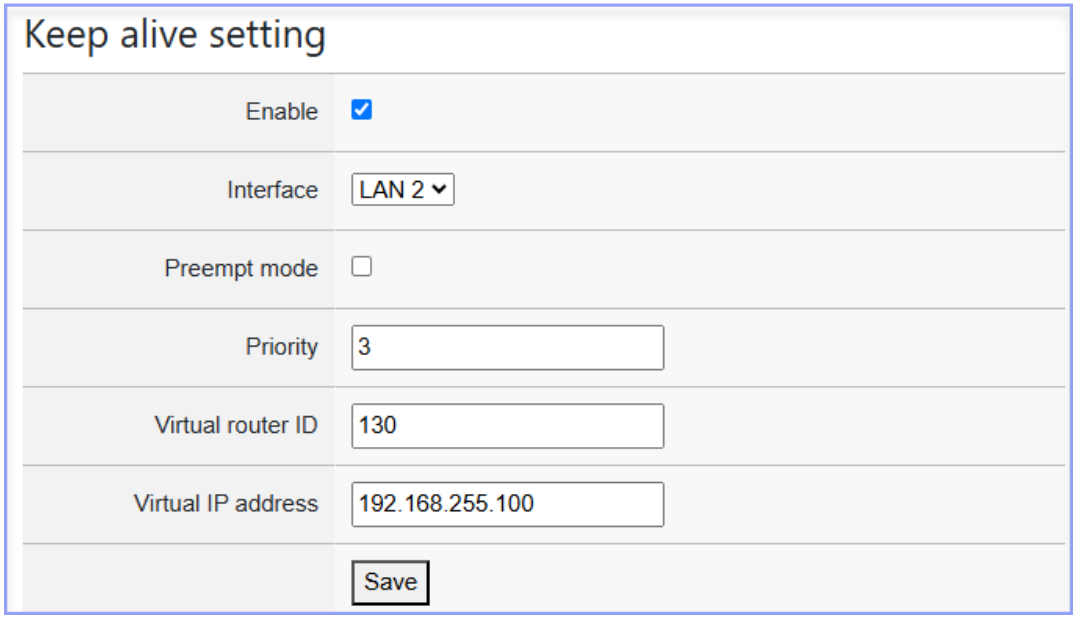


Figure 4-34 Keep Alive Setting Page

Advanced Setting > Keep alive Setting	
Enable	Decide whether to enable BRK redundancy service..
Interface	Network card interface for communication.
Preempt mode	When the primary device (Master) and backup device (Backup) are operating, if the primary device fails, the backup device will take over operation. If preempt mode is enabled, after recovery, the primary device will automatically “ preempt ” control and resume operation as the primary device.
Priority	Set the BRK redundancy service takeover order. The larger the number, the higher the takeover priority, and vice versa. **Note: Please set the range value within 0 to 255. If it exceeds 255, it will automatically switch to the default value.**
Virtual router ID	Set the ID numbers of the redundancy BRK devices in the same group. MUST be the same.
Virtual IP address	Set the IP Address of redundancy group. MUST be the same.

Table 4-33 Descriptions: Advanced Setting > Keep Alive Setting

5. Data Visualization

5.1 Introduction

The **BRK-2841M** features built-in Grafana for real-time data visualization, enabling rapid troubleshooting and historical trend analysis. This optimizes maintenance, prevents downtime, and comprehensively enhances overall operational efficiency.

5.2 Importing Dashboard Templates

The **BRK-2841M** provides multiple preset dashboard templates. By using the "Import" function, you can quickly create a dashboard with a basic layout without starting from scratch, significantly shortening setup time.

Prerequisites:

- Install EZ-UAQ Utility:
  https://www.icpdas.com/tw/download/index.php?nation=TW&kind1=&model=&kw=EZ-UAQ
- Download EZ-UAQ Utility Manual:
  https://www.icpdas.com/web/product/download/software/utility_driver/ez-uaq/document/manual/EZ-UAQ_Utility_user_manual_v3.1.3_en.pdf
- Download Dashboard Templates: (*** available soon**)

Operating Steps:

1. Open EZ-UAQ Utility.
2. Refer to the EZ-UAQ Utility manual section [5.2.3 Upload] -> [Update Project] to upload the pre-downloaded compressed file.

   * PS. This operation will delete the project currently running on the BRK-2841M. Please ensure the project has been backed up before proceeding.
3. After the upload is complete, open a web browser, enter the URL: (BRK-2841M-IP):3000, and enter your account and password to log in.

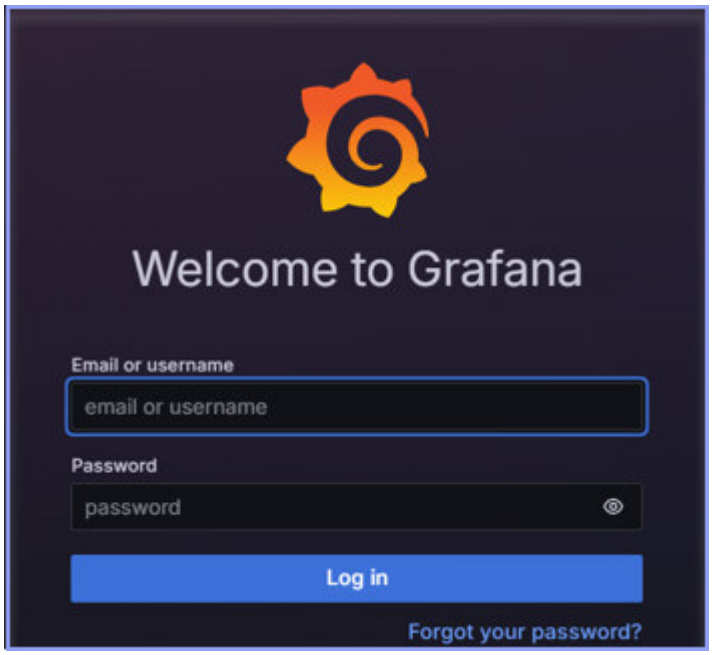


Figure 5-1 Grafana Login Page

4. After logging in, click on "Dashboards" in the upper left corner of the screen to view the dashboard templates.

5.3 Basic Integration of Grafana and MQTT

This section covers basic Grafana and MQTT integration, from configuring data sources and subscriptions to creating visual Panels. You'll learn data mapping and display settings to quickly build real-time monitoring dashboards.

Prerequisites:

Can connect to MQTT Broker (Mosquitto / EMQX / HiveMQ)

- Known Broker URL, Port, Credentials, and Topic.
- Recommended Topic message format is JSON (e.g., {"temp":26.4})

Operating Steps

1. Install the MQTT Data Source plugin (If already set up, you can skip directly to Step 5).

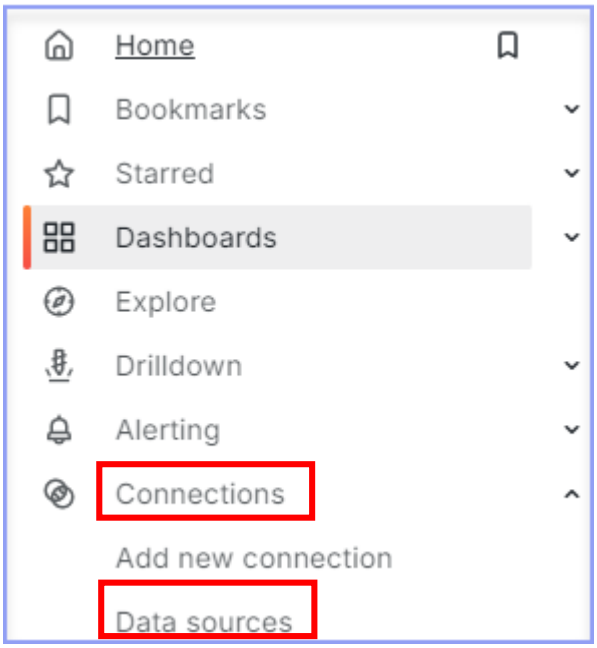


Figure 5-2 Dashboard Templates Page

2. Go to Connections -> Data sources -> Add data source, and add MQTT



Figure 5-3 Add MQTT Page (1)

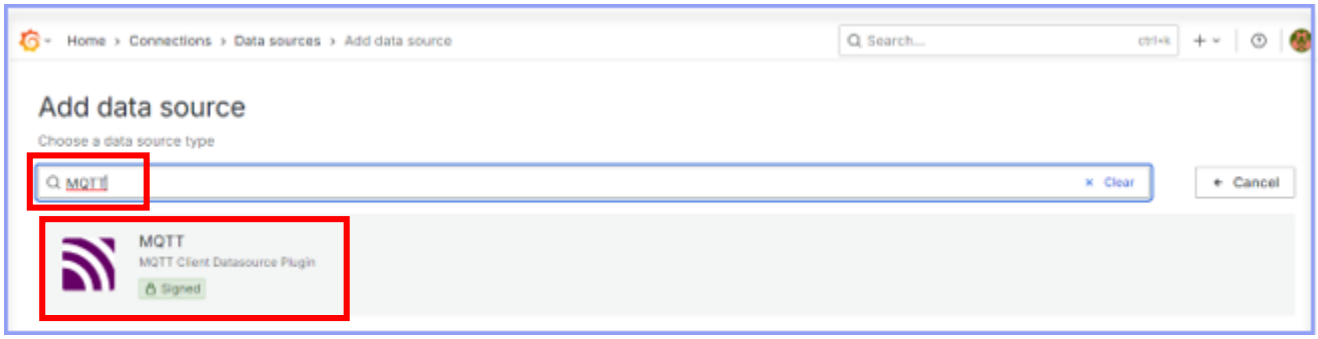


Figure 5-4 Add MQTT page (2)

3. Enter Broker URL, Client ID, credentials, and TLS (if needed)

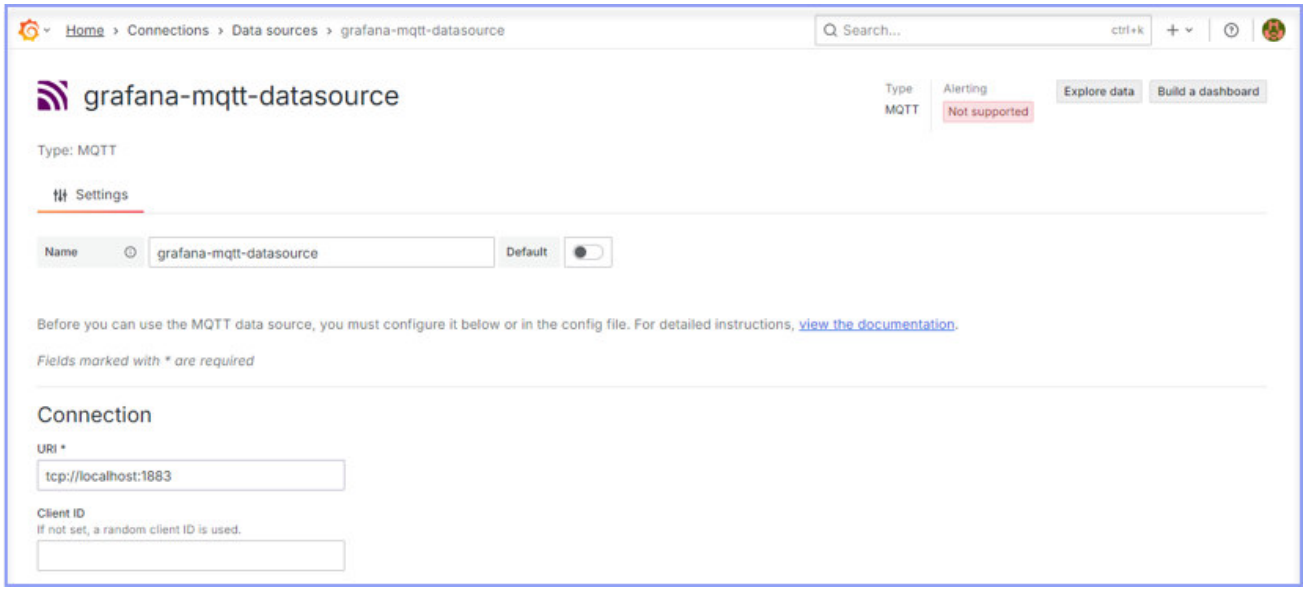


Figure 5-5 Enter Broker URL page

4. Click "Save & test" to confirm the connection is successful.

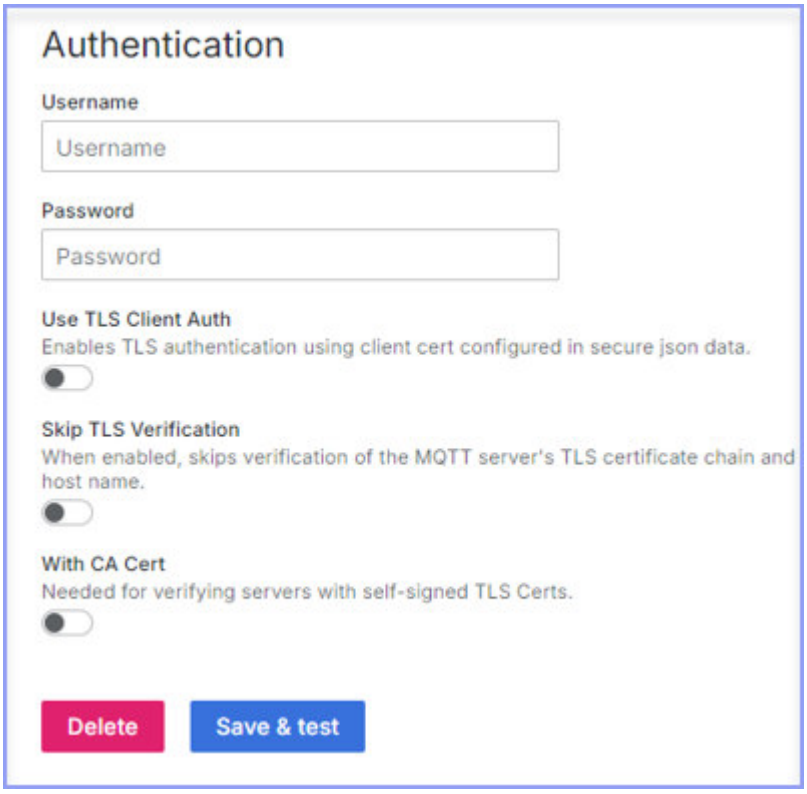


Figure 5- 6 Connection Success Confirmation Page

5. Create a new Dashboard → Add visualization → Select MQTT Data Source.

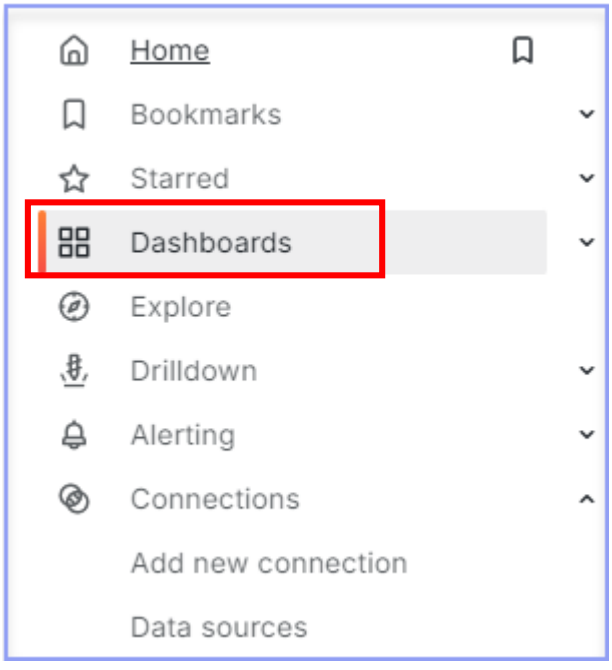


Figure 5-7 Create New Dashboard Page (1)

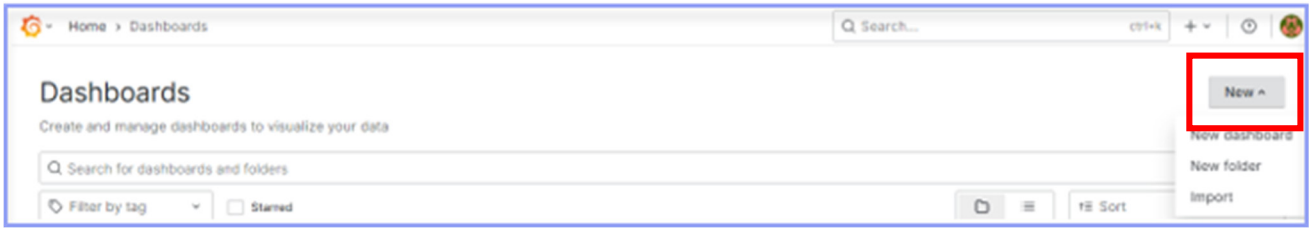


Figure 5-8 Create New Dashboard Page (2)

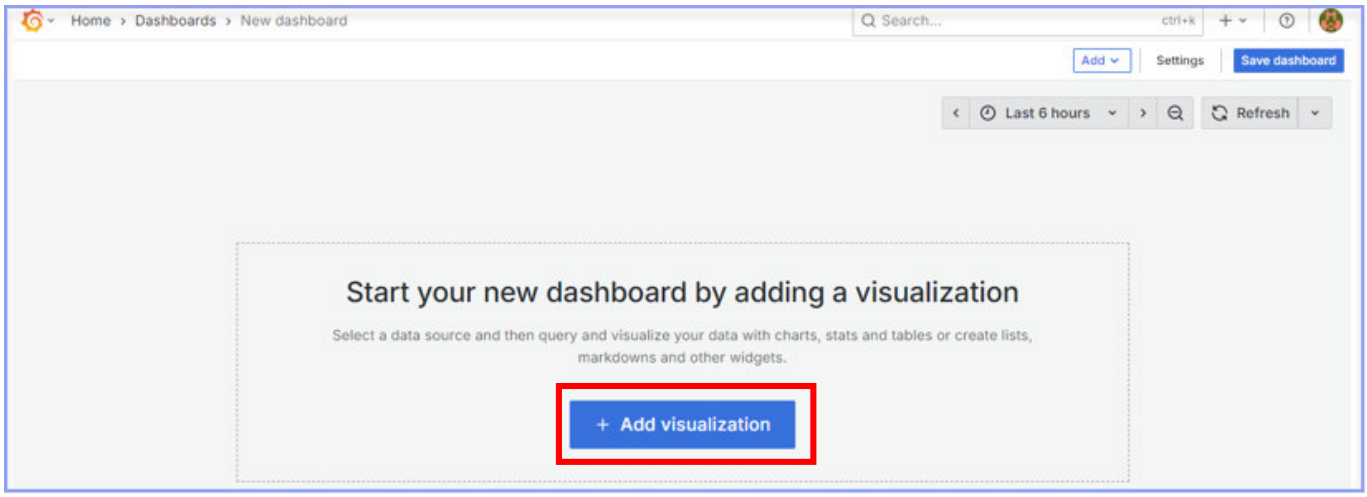


Figure 5-9 Create New Dashboard Page (3)

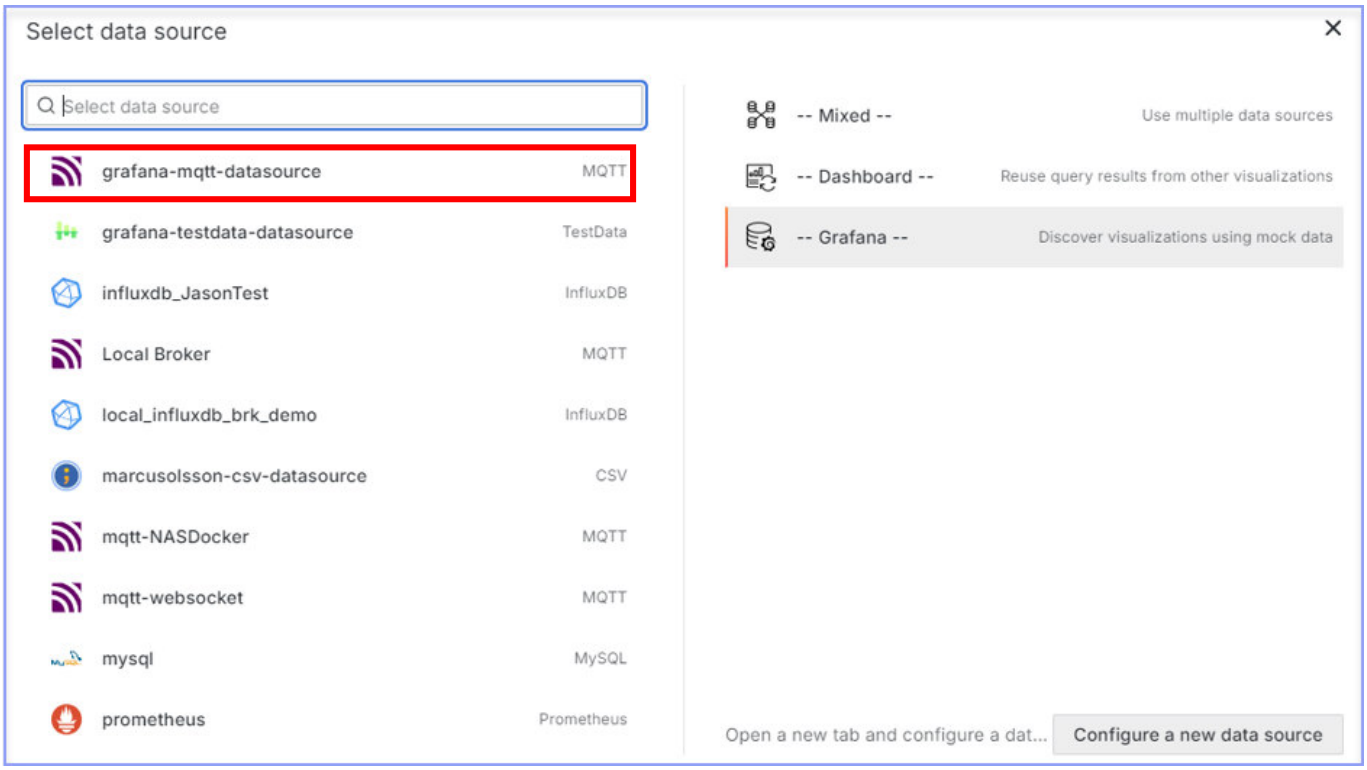


Figure 5-10 Create New Dashboard Page (4)

6. Query: Subscribe to a Topic (e.g., factory/line1/temp)

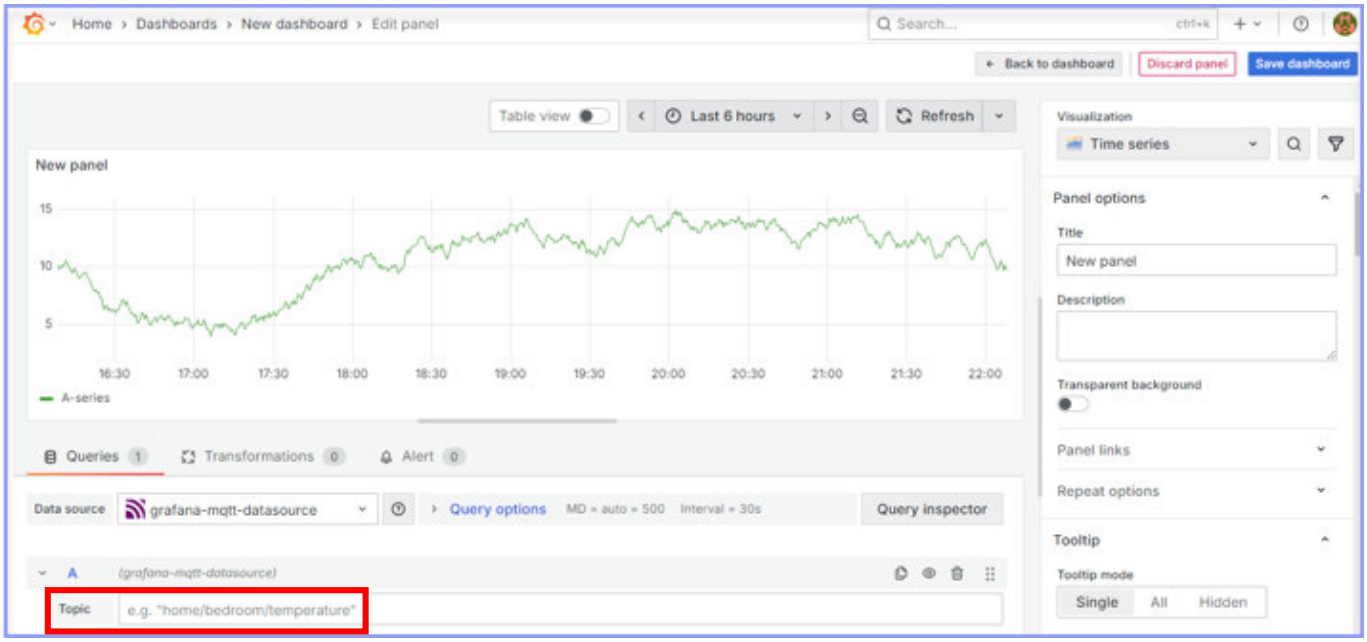


Figure 5-11 Create New Query: Subscribe to Topic Page

7. Set up Fields parsing (Extract values from specific JSON keys to display on the dashboard)

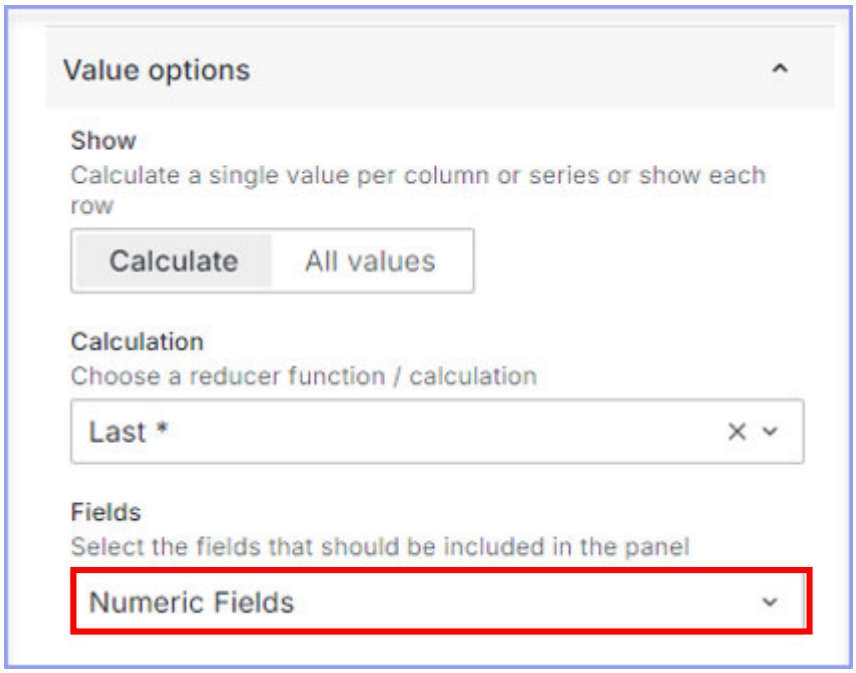


Figure 5-12 Column Configuration Page

8. Select **Stat** for Visualization, and select **Last** for Calculation.

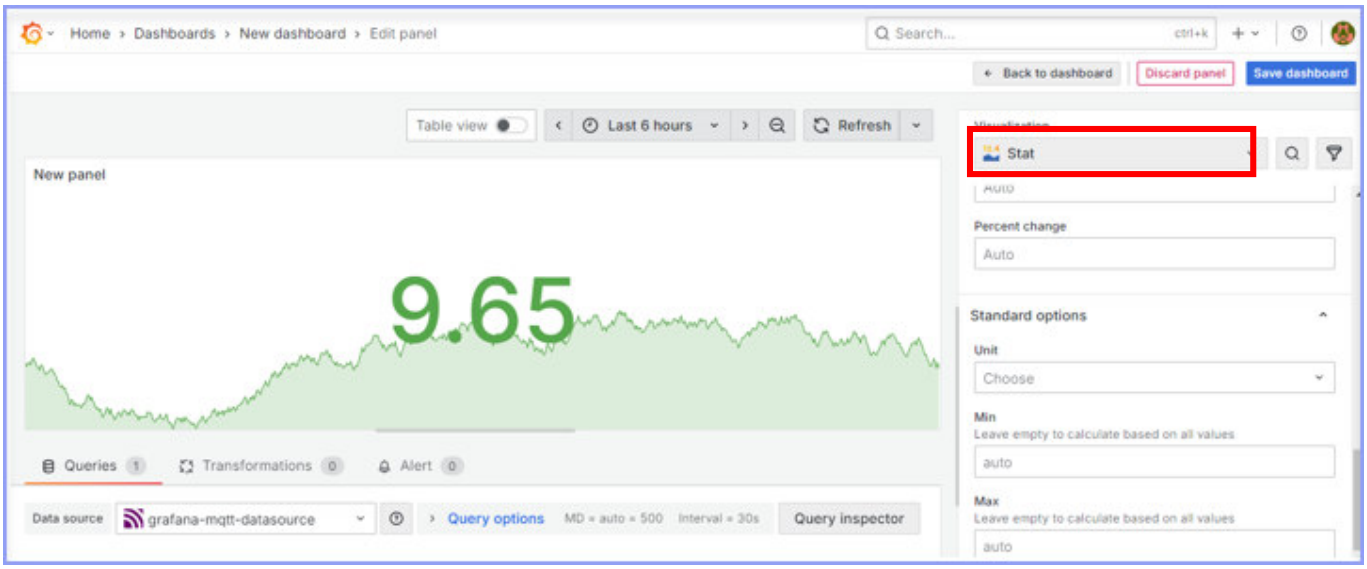


Figure 5-13 Visualization Page

9. Set the Unit (e.g., ℃) and Thresholds (Normal/Warning/Danger) (if needed).

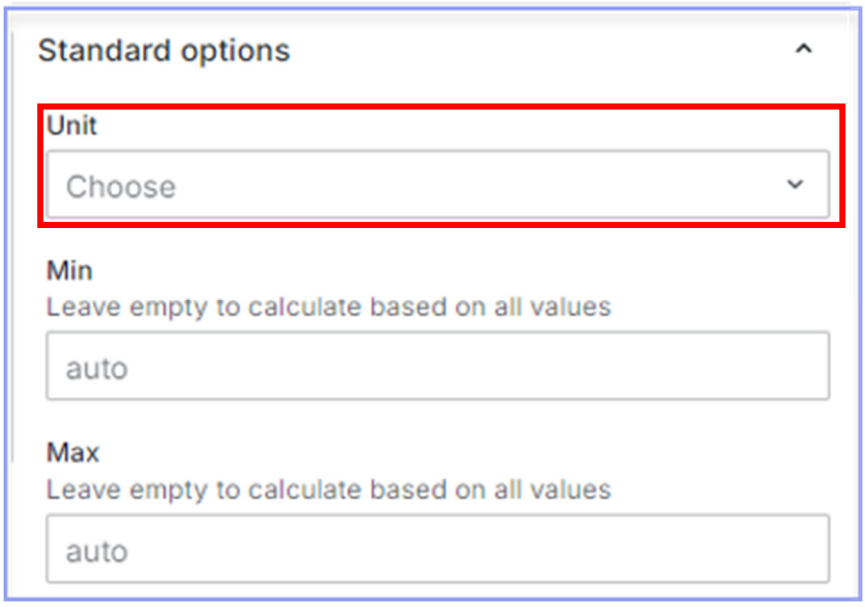


Figure 5-14 Unit Configuration Page

6. Low-code Features

6.1 Introduction

Node-RED simplifies development by using flow-based programming to turn complex logic into visual "Nodes." Users simply drag and connect these nodes to integrate hardware (e.g., Modbus) with cloud services and databases, streamlining the entire process.

6.2 How to Import and Fine-tune Default Flows

The following describes the steps to import a prepared Modbus-to-MQTT flow into the system:

Step 1: Import Flow

1. Enter the URL (BRK-2841M IP):1880 to open the Node-RED interface, then click the "Menu button (≡)" in the top right corner.
2. Select **Import**.

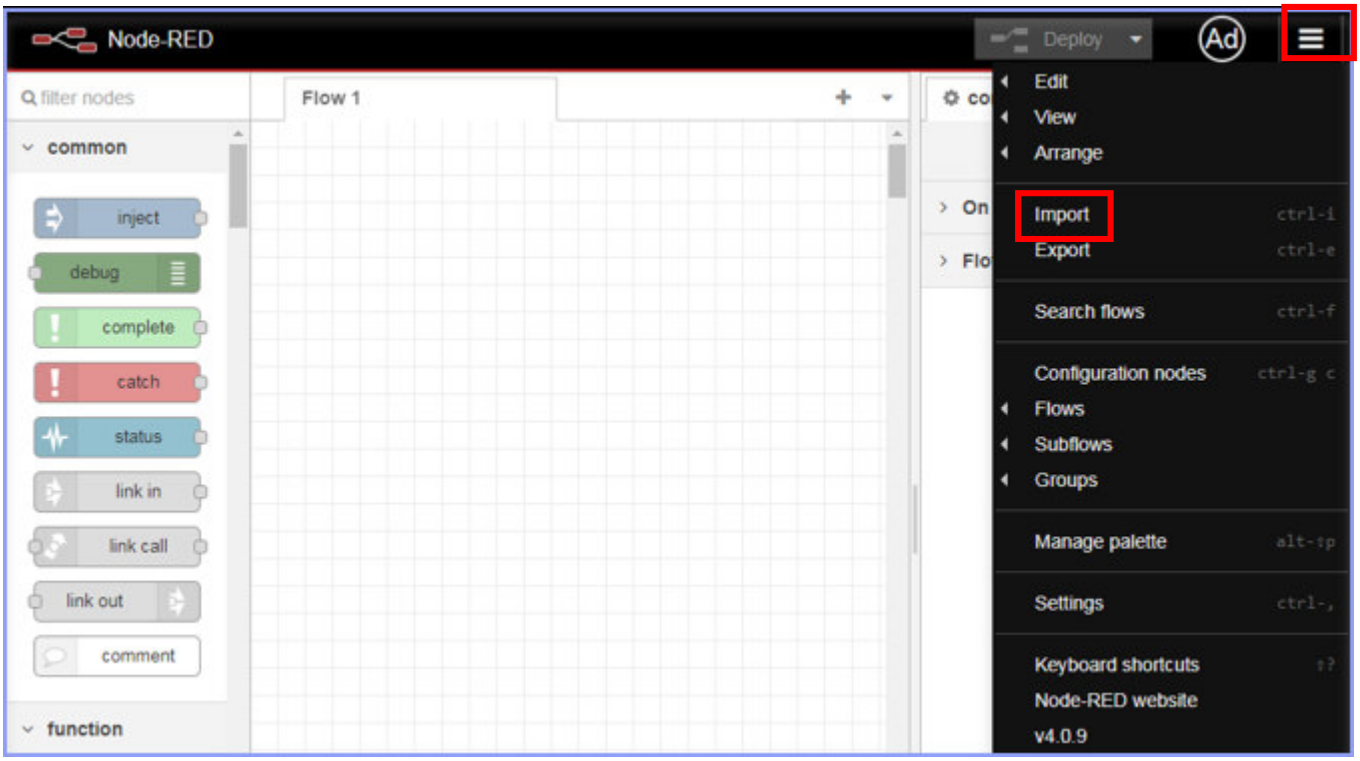


Figure 6-1 Low-code Import Page (1)

3. Paste the JSON code of the Flow into the text box, or drag and drop the JSON file directly.

4. Click Import, and the flow will appear on the workspace.

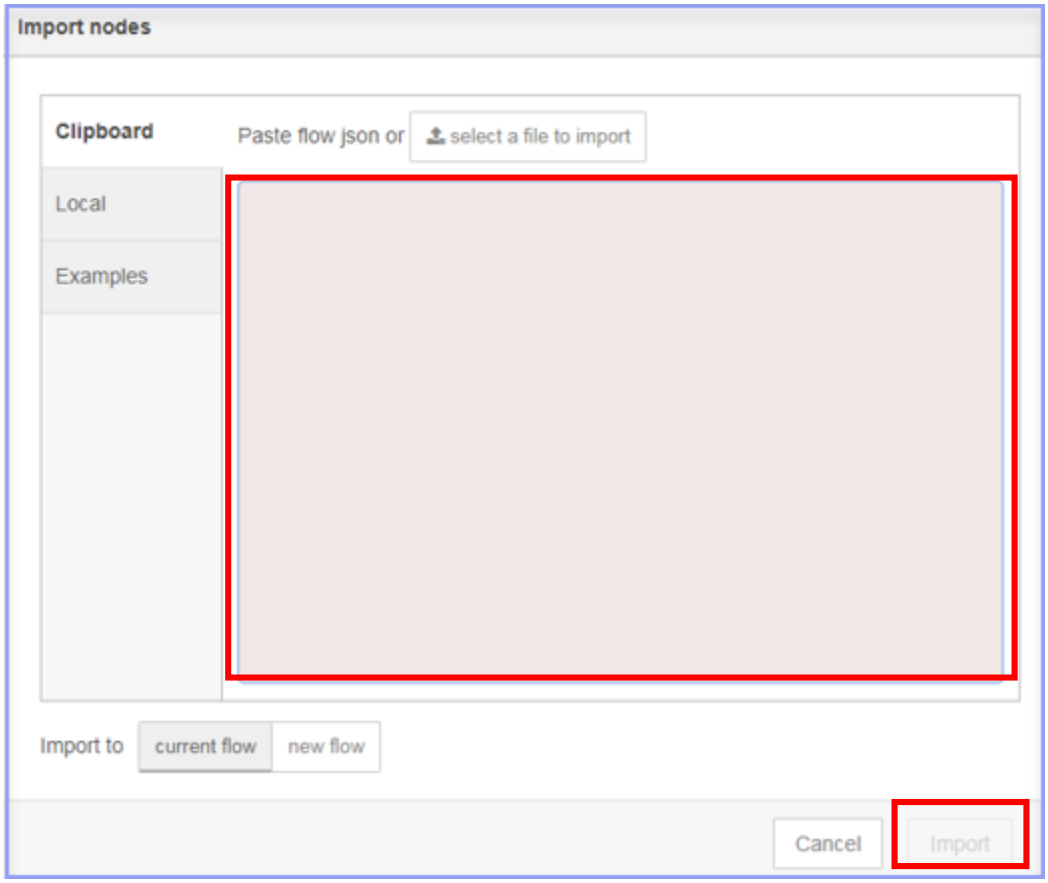


Figure 6-2 Import Page (2)

Step 2: Fine-tune the "Modbus Read" Node

1. Find the node named “Modbus Read” and double-click it to open the settings

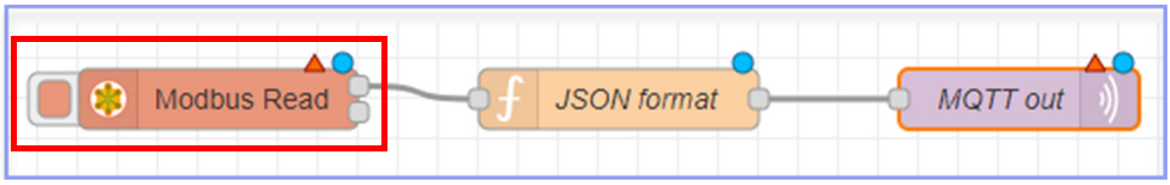


Figure 6-3 Fine-tune the Modbus Read Page

2. **Server Settings:** Click the + icon and verify that the IP Address points to your Modbus TCP device.

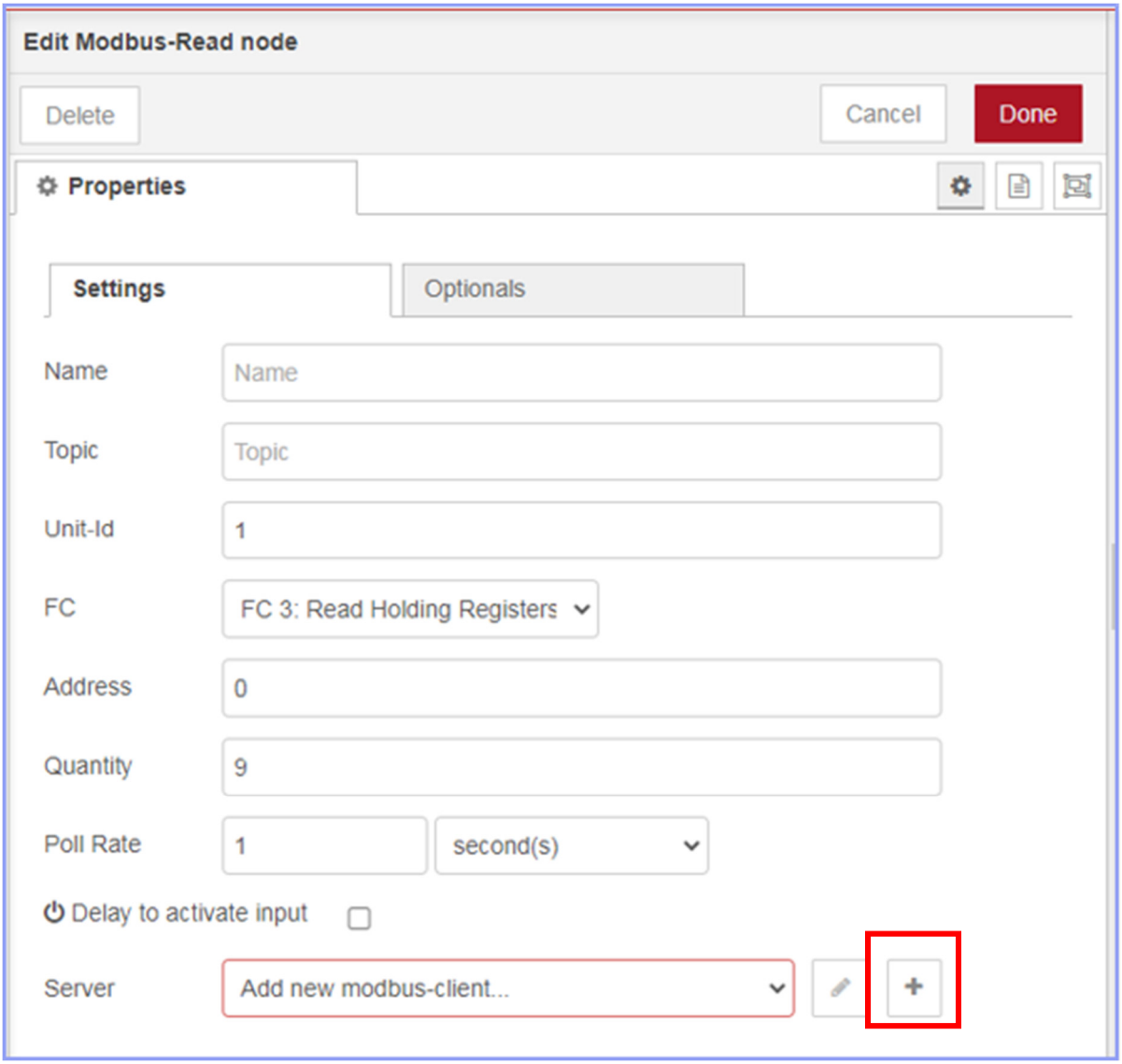


Figure 6-4 Server Settings (1)

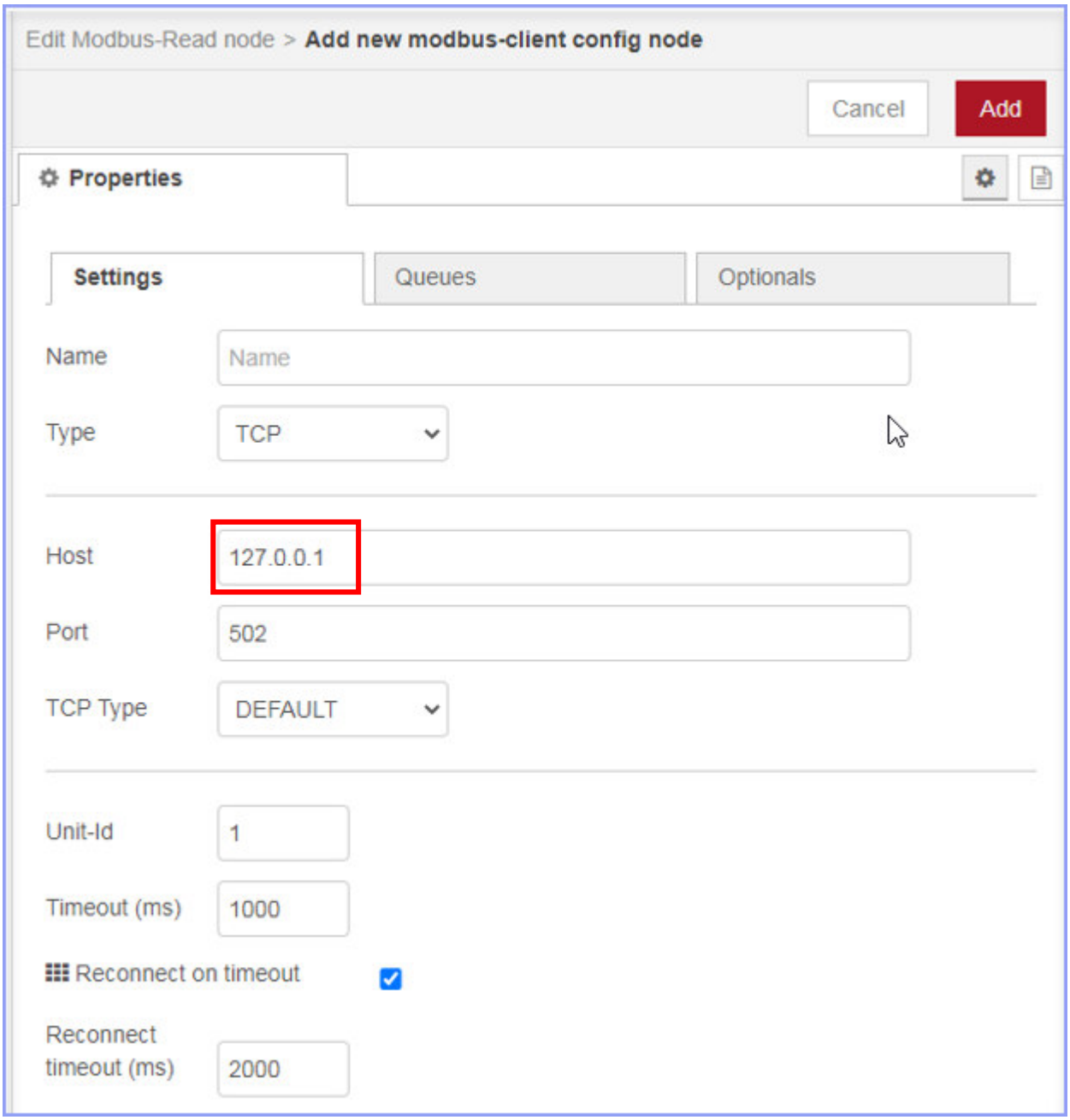


Figure 6-5 Server Settings (2)

3. **Read Range:** Confirm that Unit-ID is correct, and set Quantity to 10 (corresponding to addresses 0–9).

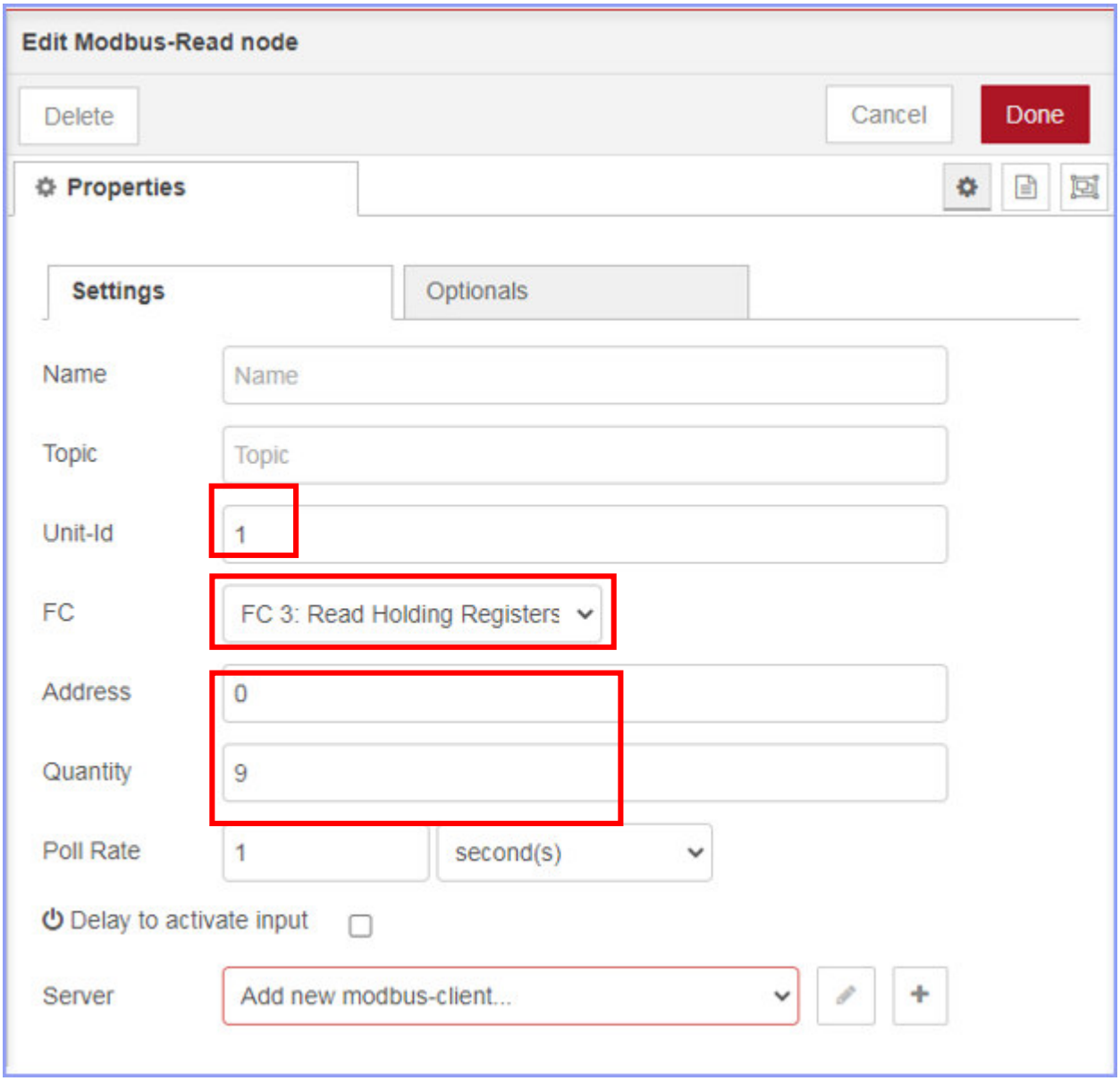


Figure 6-6 Read Range

4. Click **Done**.

Step 3: Fine-tune the "Modbus-Read" Node

1. Find the node named “Modbus Read” and double-click it to open the settings.

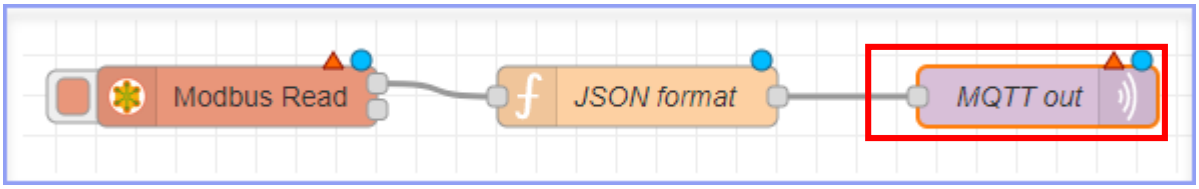


Figure 6-7 Fine-tune the Modbus-Read Node.

2. **Server Settings:** Confirm that the IP and Port of the MQTT Broker are correct.

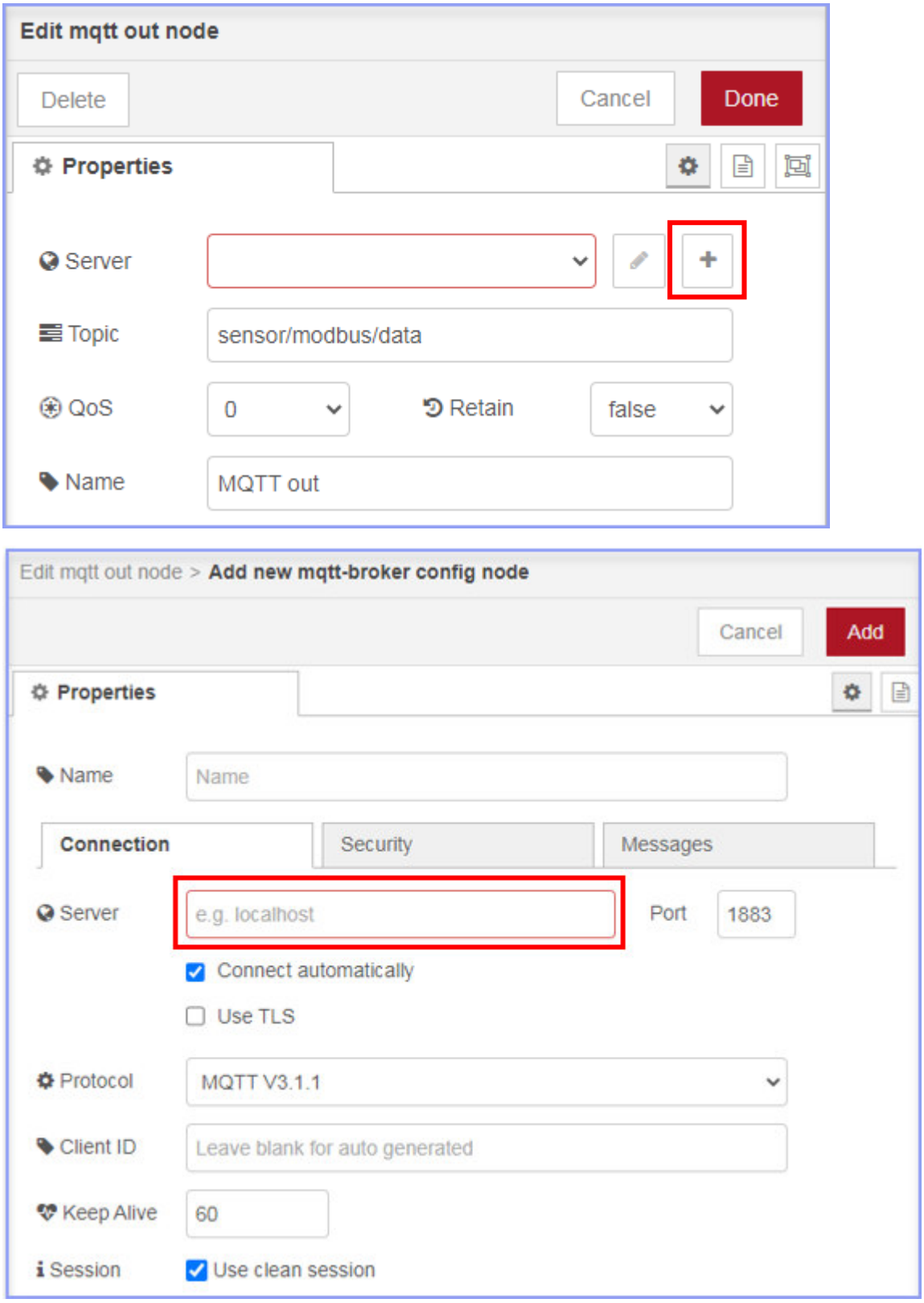


Figure 6-8 Verify MQTT Broker IP

3. **Topic Settings**: Enter your intended publishing destination in the Topic field (e.g., factory/sensor/data).

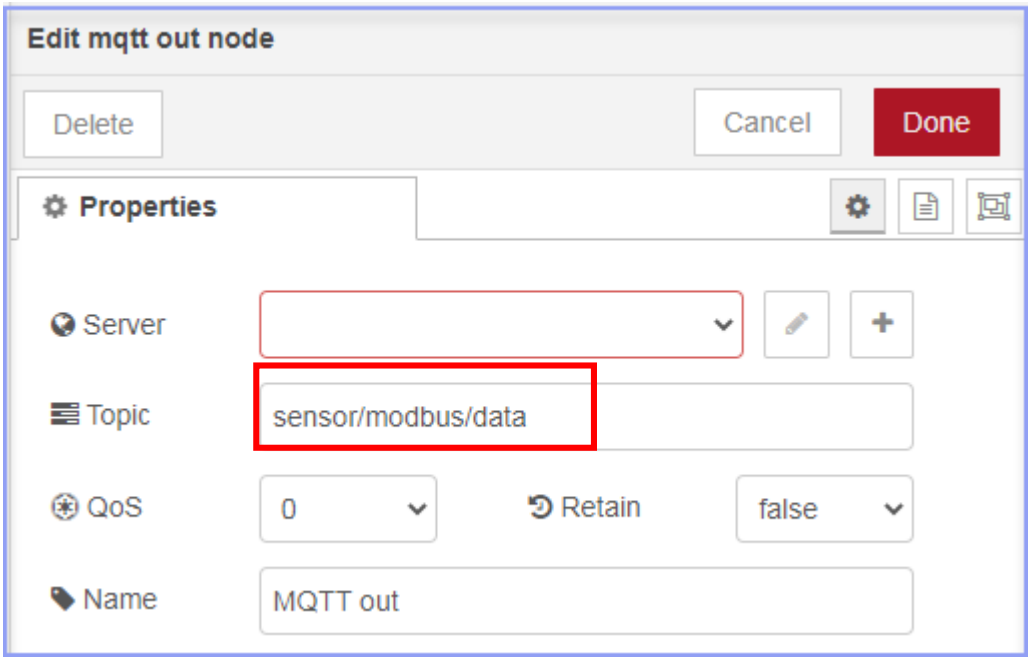


Figure 6-9 Enter the intended destination

4. Click **Done**

Step 4: Deployment

● Click the red Deploy button in the top right corner. When a green "connected" status appears below the node, it indicates that data reading and transmission have begun.

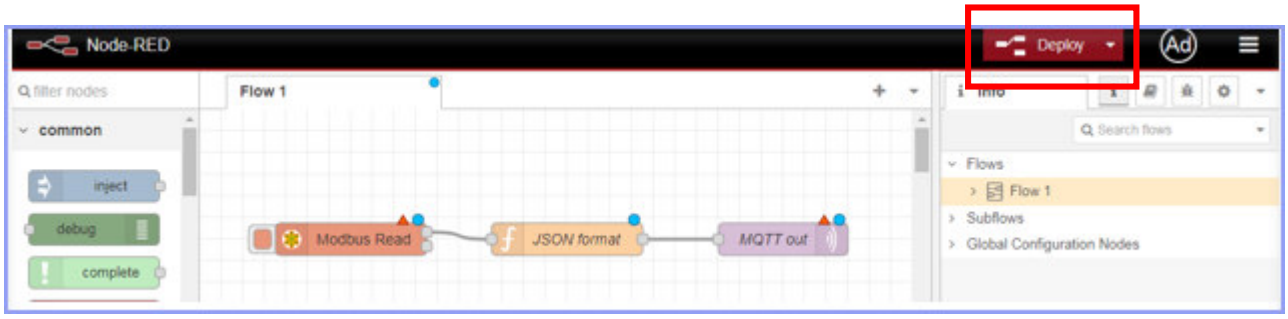


Figure 6-10 Deployment

7. Built-in Database

Note: To enable the built-in database services on the BRK-2841M, an additional adapter board and an SSD must be installed. Please contact ICP DAS sales for purchasing information.

7.1 Introduction

Deploying a database at the edge on the BRK-2841M goes beyond hardware performance; it establishes a highly autonomous, low-latency data hub for harsh production floors. The core advantages of this built-in database include:

1. Ultra-low Latency in Data Transmission

Industrial sensor data (pressure, vibration, current) is generated at millisecond speeds. A built-in database eliminates network latency by allowing immediate local reading and writing. This "local processing" ensures real-time monitoring, which is crucial for fault forecasting and process fine-tuning requiring sub-second responses.

2. Fault Tolerance and Data Integrity

Complex production networks often face disconnections. The built-in database enables the IPC to function as an independent "data island," logging key parameters even when offline. Resuming via breakpoint transmission upon reconnection prevents data loss and ensures continuous, compliant production records.

3. Localized Security and Privacy Protection

To protect proprietary processes, an embedded database keeps high-precision manufacturing data within a secure LAN. This physical isolation eliminates internet exposure, significantly reducing cybersecurity risks and the bandwidth costs of transmitting large raw datasets externally.

4. Integration Advantages with Visualization Tool "Grafana"

When the database and Grafana are built into the IPC simultaneously, it forms a powerful local monitoring station:

- Multi-source Data Integration: Grafana can simultaneously connect to different types of databases (such as MongoDB for processing logs and InfluxDB for processing waveforms), consolidating diverse data into a single screen.

- Real-time Dynamic Presentation: High-speed local storage allows Grafana to refresh dynamic trend lines instantly, enabling operators to intuitively monitor equipment trends.

- Local Alarm Triggering: When data exceeds a predefined threshold, Grafana can trigger local commands to issue alarms or switch Digital Output (DO) signals, achieving a complete closed-loop of "detection, storage, and alerting."

7.2 MongoDB

MongoDB is a document-based NoSQL database that is primarily responsible for handling device history and maintenance logs with varying formats in the IPC system.

1. Flexible Data Structure (Schema-less)
To handle diverse equipment data, MongoDB uses a flexible BSON format rather than a rigid schema. This enables adding sensors or adjusting fields without downtime for database redefinition, ensuring high deployment flexibility across various brands and models.

2. Efficient Aggregation Operations
With its built-in Aggregation Framework, MongoDB handles complex data statistics like shift output or anomaly filtering directly. By offloading these tasks from the IPC applications to the database, it significantly improves overall processing efficiency.

3. High Scalability

Although the IPC operates as a single machine, MongoDB supports Replica Set functionality. If expanded to a multi-IPC cluster in the future, data can automatically synchronize across nodes, providing excellent failover capability and data redundancy protection.

MongoDB Compass is the official cross-platform GUI tool that can connect to the MongoDB built into the BRK-2841M. After installation, enter (BRK-2841M-IP):27017 in the **Name** field to establish a connection.

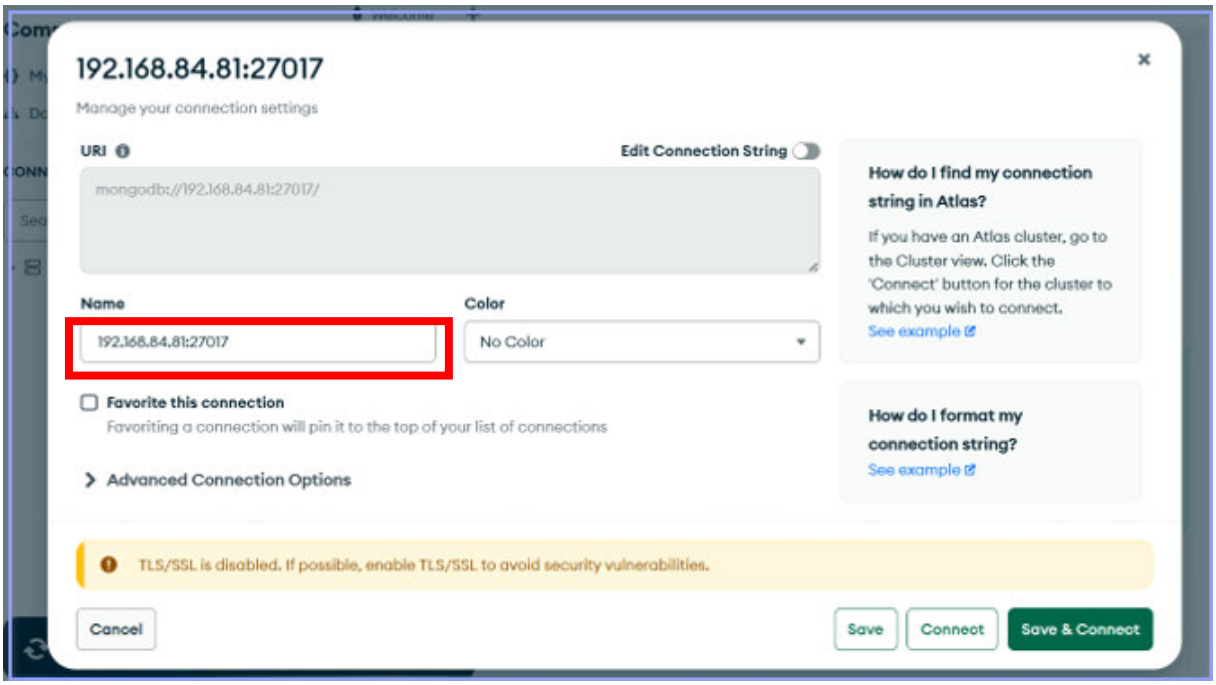


Figure 7-1 MongoDB Connection Settings

7.3 InfluxDB 2.x

InfluxDB is a database specifically designed for **Time-Series Data**. It is the premier choice for recording continuous sensor values (such as temperature and motor vibration) in industrial automation.

1. Exceptional Write Performance and Compression Ratio

Sensors can generate hundreds of data points per second, which can easily overwhelm traditional databases. InfluxDB 2.x utilizes the **TSM storage engine**, specifically optimized for high-frequency writes, and offers impressive data compression. This allows the space-limited IPC to store longer historical trends without rapidly depleting hard drive space.

2. Advanced Flux Query Language

Version 2.x fully adopts the **Flux** language, which provides both data querying and powerful analytical capabilities. Flux can perform windowed calculations (such as moving averages), cross-database operations, and even basic machine learning predictions at the moment of data retrieval. This ensures data is precisely processed before being displayed in **Grafana**.

3. Built-in Task Management and Lifecycle Policies

InfluxDB 2.x allows for automated data retention policies. For instance, you can configure the system to retain the original high-frequency data for the most recent 7 days, while automatically **downsampling** data older than 7 days into average values to maintain high system efficiency.

Entering the URL (BRK-2841M IP):8086 in a browser will display the InfluxDB 2.x Web UI.

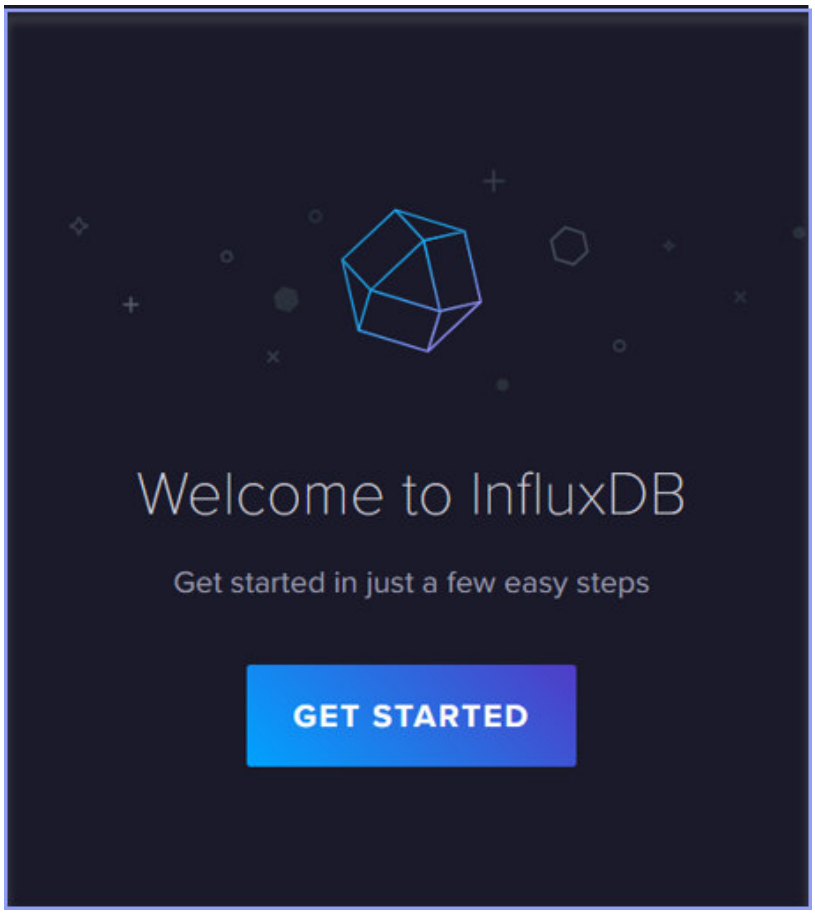


Figure 7-2 InfluxDB Web Interface

Upon first login, you will be required to set up a username, password, Organization, and Bucket.

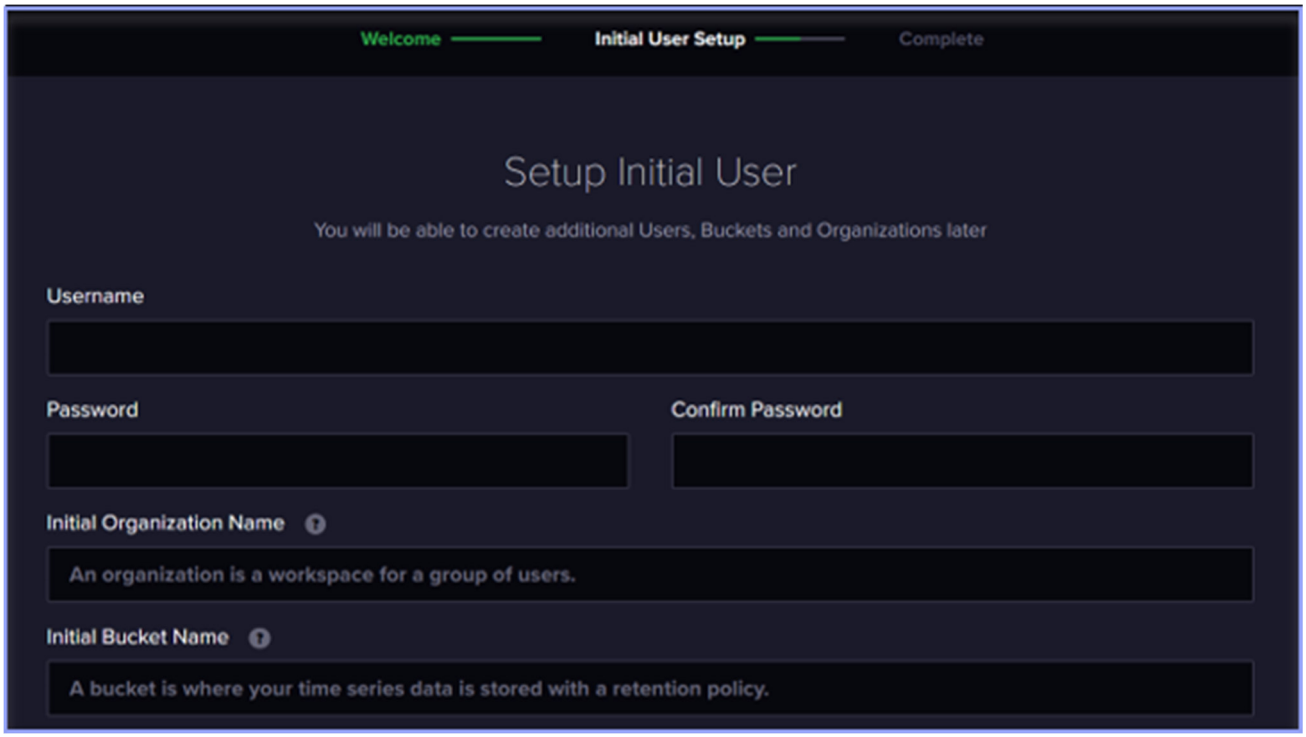


Figure 7- 3 Set up Username and Password

A token will be generated once setup is complete. Be sure to save it (e.g., in a text file); you will need this token for all InfluxDB 2.x read, write, and query operations.

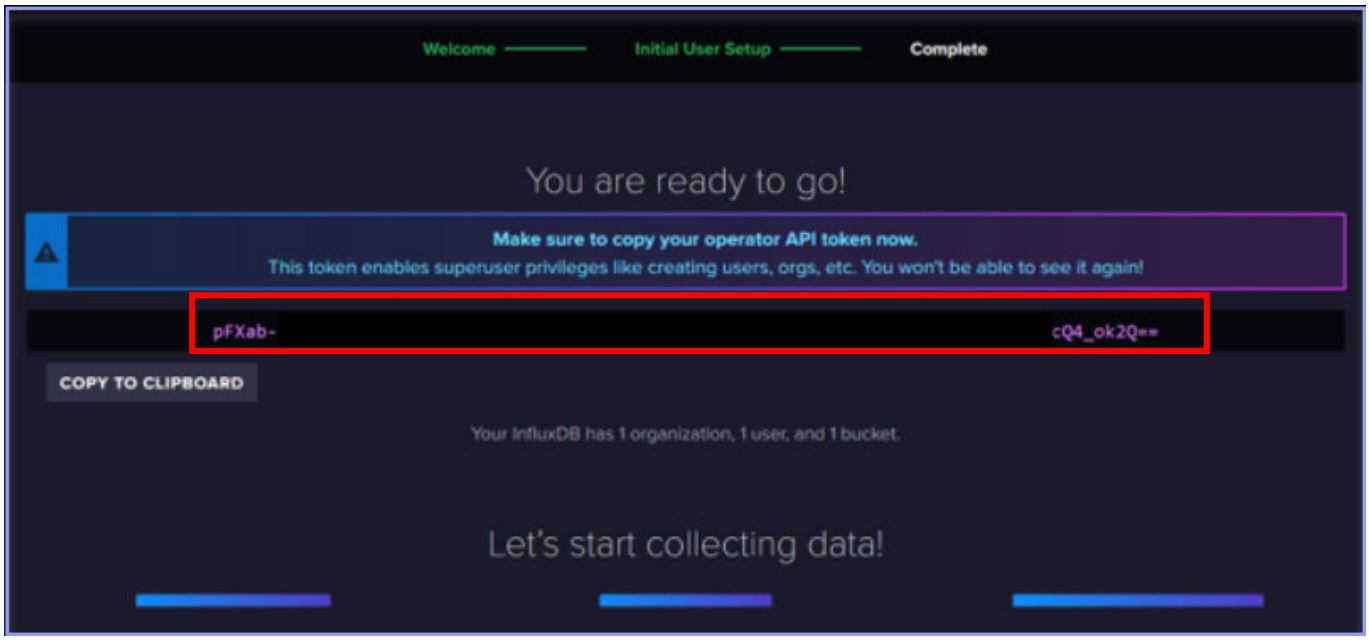


Figure 7-4 Generate a token