

BRK Series User Manual V2.0, 2025/04

BRK-2800 Series IIoT MQTT Communication Server



Technical support: service@icpdas.com Technical Editor: Jason Chen Editor: Sandy Lin Last Editor: Carol Hsu

Warranty

All products manufactured by ICP DAS are under warranty regarding defective materials for a period of one year, beginning from the date of delivery to the original purchaser.

Warning

ICP DAS assumes no liability for any damage resulting from the use of this product. ICP DAS reserves the right to change this manual at any time without notice. The information furnished by ICP DAS is believed to be accurate and reliable. However, no responsibility is assumed by ICP DAS for its use, not for any infringements of patents or other rights of third parties resulting from its use.

Copyright

Copyright @ 2023 by ICP DAS Co., Ltd. All rights are reserved.

Trademark

The names used for identification only may be registered trademarks of their respective companies.

License

The user can use, modify and backup this software on a single machine. The user may not reproduce, transfer or distribute this software, or any copy, in whole or in part.

Contact US

If you have any problem, please feel free to contact us.

You can count on us for quick response.

Email: service@icpdas.com

For more product information please refer to website: https://www.icpdas.com

Revision History

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

Revision	Date	te Description	
V2.0	03/2025	 2.0th Version: Function update: Add function code field to the login page Add the Time Zone setting function to the Time Setting New Function: MQTT data to MySQL MQTT data to SQL Server MQTT data to MongoDB 	

Content of Table

REVISION HISTORY	3
CONTENT OF TABLE	4
LIST OF FIGURES	6
LIST OF TABLES	8
1. BRK INTRODUCTION	9
1.1 INTRODUCTION	9
1.2 Features	9
1.3 Specifications	12
1.4 Appearance	13
1.5 DIMENSIONS	14
2. QUICK START: HARDWARE/NETWORK CONNECTION	15
2.1 HARDWARE CONNECTION	15
2.1.1 Preparations for Devices	15
2.1.2 Hardware Wiring	15
2.2 Network Connection	
2.2.1. Connection by Factory Default Settings (For New BRK)	
2.2.2. Connection by Utility Searching	
	20
2.2.2. Connection by Utility Searching	20 23
2.2.2. Connection by Utility Searching	20 23 23
 2.2.2. Connection by Utility Searching 3. MAIN FUNCTION SETTINGS 3.1 MQTT INTRODUCTION 	20 23 23 23 24
 2.2.2. Connection by Utility Searching 3. MAIN FUNCTION SETTINGS	20 23 23 24 24
 2.2.2. Connection by Utility Searching	20 23 23 24 27 27
 2.2.2. Connection by Utility Searching	20 23 23 24 27 27 27
 2.2.2. Connection by Utility Searching	
 2.2.2. Connection by Utility Searching. 3. MAIN FUNCTION SETTINGS 3.1 MQTT INTRODUCTION 3.1.1 Forward the MQTT messages for BRK-2800 4. MAIN MENU: PARAMETER DESCRIPTIONS 4.1 MAIN MENU - SYSTEM SETTING 4.1.1 Account Setting 4.1.2 Network Setting 	
 2.2.2. Connection by Utility Searching	
 2.2.2. Connection by Utility Searching. 3. MAIN FUNCTION SETTINGS 3.1 MQTT INTRODUCTION 3.1.1 Forward the MQTT messages for BRK-2800. 4. MAIN MENU: PARAMETER DESCRIPTIONS 4.1 MAIN MENU - SYSTEM SETTING 4.1.1 Account Setting. 4.1.2 Network Setting 4.1.3 Time Setting 4.1.4 Language Setting. 	
 2.2.2. Connection by Utility Searching	
 2.2.2. Connection by Utility Searching	
 2.2.2. Connection by Utility Searching	

	4.2.4 Rule Engine	38
4.	3 Main Menu – Database	39
	4.3.1 MQTT data to MySQL	39
	4.3.2 MQTT data to SQL Server	41
	4.3.3 MQTT data to MongoDB	43
	4 Main Menu – Advanced Setting	
	4.4.1 Keep Alive Setting	.45

List of Figures

Figure 1-1 Appearance: BRK-2841M (1)	13
Figure 1-2 Appearance: BRK-2841M (2)	14
Figure 1-3 Dimensions: BRK-2841M	14

Figure 2-1 Hardware Wiring	15
Figure 2-2 Using IP Address	16
Figure 2-3 BRK default IP Login Web Page	17
Figure 2-4 Account Setting Page	
Figure 2-5 Password Setting Rules	
Figure 2-6 Network Setting Page	19
Figure 2-7 Restore the PC original IP settings	19
Figure 2-8 EZ-UAQ Utility Software Compression File	20
Figure 2-9 EZ-UAQ Utility Software (Basic Function Page)	20
Figure 2-10 Search Module	21
Figure 2-11 Connect to the BRK Series	21
Figure 2-12 Connection to the BRK Web UI	22
Figure 2-13 Login the Web BRK of the BRK Series	22

Figure 3-1 MQTT Architecture of the BRK	24
Figure 3-2 Forward the MQTT messages for BRK-2800 (1)	25
Figure 3-3 Forward the MQTT messages for BRK-2800 (2)	25
Figure 3-4 Forward the MQTT messages for BRK-2800 (3)	26

Figure 4-1 Account Setting Page	27
Figure 4-2 Network Setting Page	28
Figure 4-3 Time Setting Page	29
Figure 4-4 Set the date manually Page	30
Figure 4-5 NTP time calibration Page	31
Figure 4-6 Language Setting Page	31
Figure 4-7 Project File Page	32
Figure 4-8 Utility Page	33

Figure 4-9 Local Broker Setting Page	34
Figure 4-10 MQTT Bridge Setting Page (1)	
Figure 4-11 MQTT Bridge Setting Page (2)	36
Figure 4-12 Users Setting Page (1)	37
Figure 4-13 Users Setting Page (2)	37
Figure 4-14 Rule Engine Page	38
Figure 4-15 MySQL Page	39
Figure 4-16 SQL Server Page	41
Figure 4-17 MongoDB Page	43
Figure 4-18 Keep Alive Setting Page	45

List of Tables

Table 1-1 Hardware Specifications: BRK-2841M	12
Table 1-2 Software Specifications: BRK-2841M	13

Table 2-1 Factory Default Settings of BRK	17
Table 2-2 PC IP Setting	17

Table 4-1 Descriptions: System Setting > Account Setting	27
Table 4-2 Descriptions: System Setting > Network Setting	.28
Table 4-3 Descriptions: System Setting > Time Setting > Date and Time Display	.29
Table 4-4 Descriptions: System Setting > Time Setting > Set date and time Manually	.30
Table 4-5 Descriptions: System Setting > Time Setting > NTP time calibration	31
Table 4-6 Descriptions: System Setting > Language	31
Table 4-7 Descriptions: System Setting > Project File	.32
Table 4-8 Descriptions: System Setting > Utility	.33
Table 4-9 Descriptions: MQTT Setting > Local Broker Setting	.34
Table 4-10 Descriptions: MQTT Setting > MQTT Bridge Setting (1)	.35
Table 4-11 Descriptions: MQTT Setting > MQTT Bridge Setting (2)	.37
Table 4-12 Descriptions: MQTT Setting > Users	.37
Table 4-13 Descriptions: MQTT Setting > Broker Account > Add User	.38
Table 4-14 Descriptions: MQTT Setting > Rule Management	.38
Table 4-15 Descriptions: Database > MySQL	.39
Table 4-16 Descriptions: Database > SQL Server	.41
Table 4-17 Descriptions: Database > MongoDB	.43
Table 4-18 Descriptions: Advanced Setting > Keep Alive Setting	.45

1. BRK Introduction

1.1 Introduction

BRK Series is a Communication Server that specially provides Broker function of MQTT protocol for MQTT message distribution and concentrator in M2M and Industrial Internet of Things environments. The BRK Series is compatible with the MQTT version V.3.1, V.3.1.1 and V.5.0 protocol. It supports many functions such as QoS message quality mechanism, retains mechanism, identity authentication, communication encryption, last message (Last Will), and bridge. The method of Web UI settings can quickly set up BRK functions. This reduce the burden of setting up the broker by user oneself and the maintenance cost. Besides, BRK Series provides Bridge, Cluster, Load Balancer, and High Availability functions. By forming multiple BRK Series a group to a better Redundancy system can prevent field systems from stopping services due to hardware or network failures.

1.2 Features

• Built-in database (Available Soon)

♦ Support MongoDB

BRK 2841M can record the collected data in the built-in MongoDB without adding an extra database.

♦ Data Redundancy

Two or more BRK-2841Ms consist of a redundancy group in which all databases are synchronized to achieve data redundancy.

♦ Database Failover

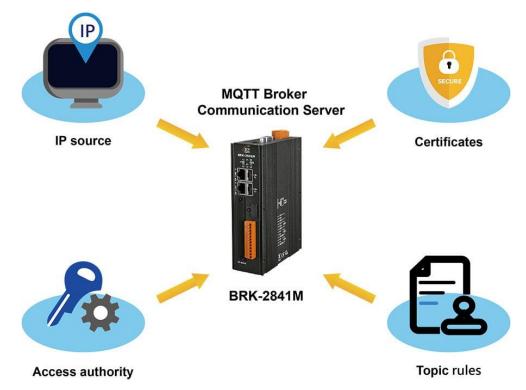
BRK-2841Ms in the same redundancy group will monitor each other to see if they are functioning properly, and in case of failure, the rest of the devices will take over to ensure that the database recording is not interrupted.



Communication Redundancy Architecture – rapid setup

∻ **Redundancy System** B AVEVA Edge SCADA Redundancy: Ethernet Switch NSM-208G . If the Main Broker fails, the Backup Broker will take over the service automatically. . If the Main Broker goes online again, the Backup Broker will return the service. Backup Broker Main Broker Monitor Each Other **BRK-2841M BRK-2841M** W. (b) 2 10 MQ-7000 UA I/O DL-302 PMC-523X **PIR-230** tSL-P4R1

Information Security Protection – Multiple Mechanism



♦ HTTPS (Available Soon)

The built-in web server support HTTPS protocol which is authentication of accessed website to protects against man-in-the-middle attacks and ensure the privacy and integrity of exchanged

BRK Series **Communication Server**

MQTT Broker

data while it is in transit.

♦ **Management of Broker permissions**

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

Support MQTT Bridge ∻

downtime.

Under Bridge Mode allows multiple Brokers to communicate and transfer data. Following introduce the features of Bridge Mode:

■ 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 (Available Soon)

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

1.3 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~+75°C	
Storage Temperature	-40 ~ +80 °C	
Humidity	$10 \sim$ 90% RH,Non-condensing	

Table 1-1 Hardware Specifications: BRK-2841M

♦ Software Specifications

Model		BRK-2841M		
Function				
	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.		
Built-in database	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		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.		
	HTTPS	The built-in web server supports HTTPS to ensure secure communication between the server and the browser.		

Authority	Allow/prohibit connection requests to the Broker from specific IP		
Management of	addresses, Client IDs, or Broker users, and perform the first stage		
-	of filtering from the connection to improve the stability and		
Broker	security of the Broker.		
Management of	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		
Publish/Subscribe	being modified with or read by others.		
Max. Number of	100000 connections		
Clients			
Max. Number of	100000 records		
Topics			
	In Bridge mode, you can transfer data between multiple Brokers.		
Support MQTT	 Transfer data to specific Brokers according to predefined rules. 		
Bridge	• Subscribe to specific Topics on the Bridge node and transfer or		
	forward them to local or remote Brokers after receiving the data.		
Course and MOTT	In Cluster Mode, two or more BRK-2841Ms work together to		
	ensure the consistency and availability of MQTT services, which is		
Cluster	very important for enterprises that cannot afford downtime.		
	Management of Broker Management of Topic Publish/Subscribe Max. Number of Clients Max. Number of Topics Support MQTT		

Table 1-2 Software Specifications: BRK-2841M

1.4 Appearance

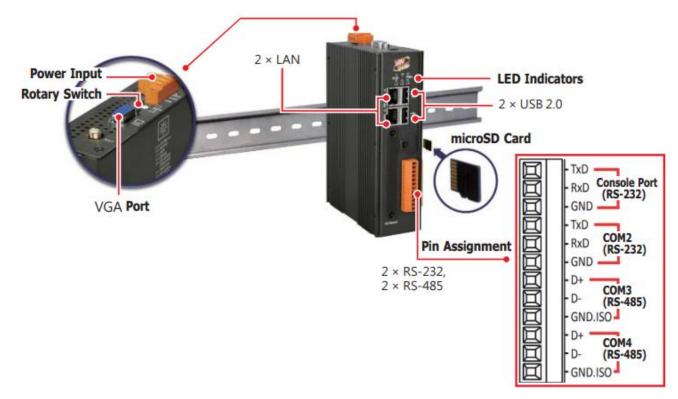


Figure 1-1 Appearance: BRK-2841M (1)

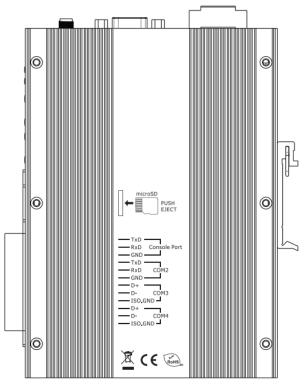


Figure 1-2 Appearance: BRK-2841M (2)



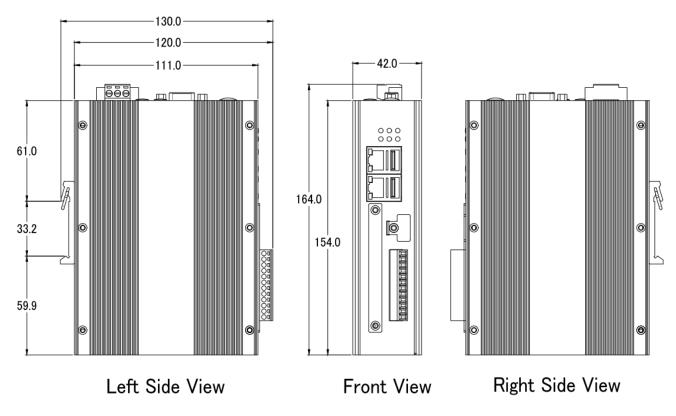


Figure 1-3 Dimensions: BRK-2841M

2. Quick Start: Hardware/Network Connection

This chapter describes the devices hardware connection, network connection and quick setting for the BRK 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

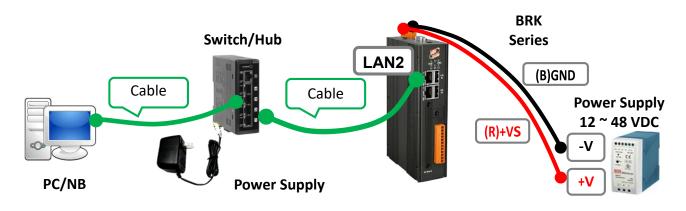
In addition to the BRK controller (Ex: BRK-2841M), please prepare the following:

- 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.





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 recommended 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.

S BRK-2800	× +	~ – 🗆 X
← → C ③ 192.168	3.255.1:8000	I 🔺 :
G ICP DAS G 後端管理系統	BPM	
	BRK Series Lot Matt Broker ICP DAS CO, LTD. Username	
	root	
	Password	
	••••	
	Login	

Figure 2-2 Using IP Address

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

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

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

 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.

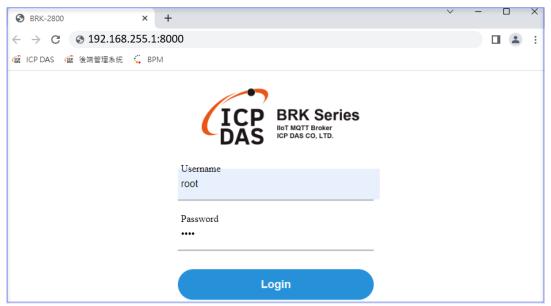


Figure 2-3 BRK default IP Login Web Page

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

BRK Series INT MQTT Broker ICP DAS CO, LTD.	
System setting	MQTT setting Advanced setting
Account	Account setting
Network	Account root
Time	Password
Language	Save
Project file	

Figure 2-4 Account Setting Page

Password Setting rules:

Account setting				
	root			
Account	At least 8 characters			
	At least 2 upper case letter			
	At least 2 numbers			
	•••••			
Password	At least 8 characters			
Password	At least 8 characters At least 2 upper case letter			
Password				

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.

ICP BRK Series	Log Out
System setting	MQTT setting Advanced setting
Account	Gateway
Network	Interface LAN 2
Time	Gateway 192.168.1.1
Language	LAN 1
Project file	IP 10.0.0.40
	Mask 255.255.0.0
	Save
	LAN 2
	IP 192.168.84.60
	Mask 255.255.0.0
	Save

Figure 2-6 Network Setting Page

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

SBRK-2800 × +		× -	· 🗆	Х
← → C ③ 192.168.84.60				:
🧟 ICP DAS 🔞 後端管理系統 🏅 BPM				
	DAS BRK Series			
	DAS ICP DAS CO, LTD.			
Userr	ame			
root				
Passy	and			
	Login			

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.)

🥵 EZ-UAQ Utility V	er . 2.3.1						
) Language:	English	- 🔍 Module Se	elect Module		•		
Basic Function	Advanced Fun	ction Upload Fu	nction Down	load Function			
Search Module Export Search Information Import Search Information Product Page							
Double click on Module Name or IP Address to open the web interface of Module.							
Select All Module Name Host Name IP Address MAC Address Version							/ersion

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.

n EZ-UAQ Utility Ver . 2.3.1							
Language: English • 🔍 Module Select Module •							
Basic Function	Basic Function Advanced Function Upload Function Download Function						
	Search Module Export Search Information Import Search Information Product Page						
Double click on	n Module Na	Address to open the we	b interface of Module	.			
Select All	Module Name	Host Name	IP Address	MAC Address	Version		
	UA-2841M	icpdasua2841	192.168.1.94	00:0d:e0:b0:91:78	3 1.4.2.0/ 7.0.0/1.1.8		
	UA-5231	UA-Series-1442fca93	192.168.101.2	14:42:fc:a9:30:39	1.4.2.0/ 7.5.0/1.1.8		
	BRK-2841M	icpdas	192.168.84.60	00:0d:e0:18:2b:05	5 1.0.0.0		
	U-7555M	000de01820997000	192.168.85.204	00:0d:e0:18:20:99 12.0.0.0 / 13.			
	U-7526M	000de01820007000	192.168.81.250	00:0d:e0:18:20:00) debug / 13.8		
	U-7526M	000de01820117000	192.168.102.1	00:0d:e0:18:20:11	10.2.0.0 / 13.8		

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...).

🥵 EZ-UAQ Utility V	🙀 EZ-UAQ Utility Ver . 2.3.1						
Language: English • 🔍 Module Select Module •							
Basic Function	Basic Function Advanced Function Upload Function Download Function						
Search Module Export Search Information Import Search Information Product Page							
Double click on	Module Name or IP	Address to open the we	b interface of Module	<u>)</u> .			
Select All	Module Name	Host Name	IP Address	MAC Addres	ss	Version	
	UA-2841M	icpdasua2841	192.168.1.94	00:0d:e0:b0:9	91:78	1.4.2.0/ 7.0.0/1.1.8	
	UA-5231	UA-Series-1442fca93	192.168.101.2	14:42:fc:a9:3	0:39	1.4.2.0/ 7.5.0/1.1.8	
	DDV 2041NA	icpdas	1021699460	00:0d:e0:18:2	2b:05	1.0.0.0	
	LI 7555M	000do018 2027000	102 168 85 204	00:0d:e0:18:2	20:99	12.0.0.0 / 13.8	
	U-7526M	000de018	192.168.81.250	00:0d:e0:18:2	20:00	debug / 13.8	
	U-7526M	000de018 2	192.168.102.1	00:0d:e0:18:2	20:11	10.2.0.0 / 13.8	

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.

BRK Ser IOT MQTT Broker ICP DAS CO, LTD.	ies	Log Out
System setting	MQTT setting	Advanced setting
Account	Firmware version	1.0.0.0
Network	Web version	1.0.0
Time		
Language		
Project file		

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 lowbandwidth 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:

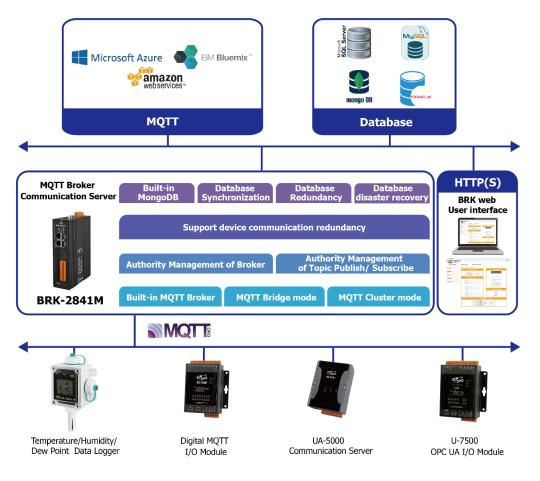


Figure 3-1 MQTT Architecture of the BRK

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.

Profile Name	192.168.101.2			
Profile Type	MQTT Broker	•	MQT	.0R6
MQTT Broker Profile Settings				
Broker Address	192.168.101.2		Setting IP address of the BRK-2841M	
Broker Port	1883		Setting Com Port of the BRK-2841M	
Client ID	MQTT_FX_Client		Setting Client ID of MQTT Client Note : Client ID same as identity card of MQTT Client, can't with other repeated MQTT Client, otherwise, Broker will kicked Client ID of same as to connect.	

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

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

🍘 MQTT.fx - 1.7.1	
File Extras Help	
192.168.101.2	Connect Disconnect
Publish Subscribe Scripts I	Broker Status Log
»	Publish

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.

👹 MQTT.fx - 1.7.1		
File Extras Help		
192.168.101.2 1. Click Subcrik	Connect Disconnect	-
Publish Subscribe Scripts Broker Status	Log 3. After entering, click "Subscribe"	
/MTCP_No.1_DL-302/#	Subscribe QoS0 QoS1 QoS2 Aut	oscroll OST
/MTCP_No.1_DL-302/#	63 /MTCP_No.1_DL-302/Input_Registers/Dew_point_temperature_Celsius/Publish	57
Dump Messages Mute Unsubsc	/MTCP_No.1_DL-302/#	QoS 0
	/MTCP_No.1_DL-302/Input_Registers/Dew_point_temperature_Fahrenheit/Publish /MTCP_No.1_DL-302/#	58 QoS 0
	/MTCP_No.1_DL-302/Input_Registers/Relative_humidity/Publish	59
	/MTCP_No.1_DL-302/#	QoS 0
	/MTCP_No.1_DL-302/Input_Registers/Temperature_Celsius/Publish	60
	4. Display topics forwarded by BRK-2841 M.	QoS 0
	/MTCP_No.1_DL-302/#	61 OoS 0
	/MTCP_No.1_DL-302/Input_Registers/Dew_point_temperature_Celsius/Publish	62
	/MTCP_No.1_DL-302/#	QoS 0
	/MTCP_No.1_DL-302/Input_Registers/Dew_point_temperature_Fahrenheit/Publish	63
Topics Collector (0) Scan Stop	/MTCP_No.1_DL-302/#	QoS 0
	/MTCP_No.1_DL-302/Input_Registers/Dew_point_temperature_Fahrenheit/Publish	
	/MTCP_No.1_DL-302/# 11-04-2025 10:31:47.37907107	63 QoS 0
	6308	4.000

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】

Accour	Account setting	
Account	root	
Password	••••	
	Save	

Figure 4-1 Account Setting Page

System Settin	ng > 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.

Gatew	Gateway	
Interface	LAN 2	
Gateway	192.168.1.1	
LAN 1		
IP	10.0.40	
Mask	255.255.0.0	
	Save	
LAN 2		
IP	192.168.84.60	
Mask	255.255.0.0	
	Save	

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

Febru	ary 2025						
Mon	Tue	Wed	Thu	Fri	Sat	Sun	
					1	2	
3	4	5	6	7	8	9	
10	11	12	13	14	15	16	
17	18	19	20	21	22	23	6
24	25	26	27	28			
	Cu	irrent time	07	: 1	12	54	
	Current	time zone	Asia/	Taipei			

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

• Set the date manually

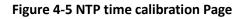
Manual time calibration		
Date		
Time		
Time Duplication	Load (Load current time of this computer.)	
Time zone	Cairo	
	Save	

Figure 4-4 Set the date manually Page

System Setting > Tin	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	Click to save the settings of this item and update the data of "Time Setting" to the "Date And Time Display" on the top of this page.	

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

NTP time calibration	on
NTP service status	inactive
	NTP server O Custom time server
NTP Server	time.apple.com
	Save



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.

Table 4-5 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 BRK language settings.

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

Language	
English	
○ 简体中文	
○繁體中文	
Save	

Figure 4-6 Language Setting Page

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

Table 4-6 Descriptions: System Setting > Language

4.1.5 Project File

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

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

Project File	
Remove file	Remove
Upload file	Select file No file Selected Upload
Download file	Download file

Figure 4-7 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 4-7 Descriptions: System Setting > Project File

Download the project

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

4.1.6 Utility

Menu Path: 【System Setting】 → 【Utility】

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

Utility	
Password	•••••
Verify Password	
	Save
	Figure 4-8 Utility Page
	Password – 🗆 X Password
Alias	
Alias	2F server room
	Save

A 400 100						12211	-
State	Module Name	IP Address	Link-Local	TCP/UDP	Protocol	Port	Alias
Get	BRK-2841M	192.168.84.61	N/A	TCP/UDP	HTTP/MQTT	8000/1883	2F server room

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 4-8 Descriptions: System Setting > Utility		

Table 4-8 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]	
------------	------------------	---	------------------------	--

Local broke	r setting
Node name	brk2841
Port	1883
Allow anonymous	
	Save

Figure 4-9 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	 Check the box: it can connect without a username and password. (Log anonymously) 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 4-9 Descriptions: MQTT Setting > Local Broker Setting

4.2.2 MQTT Bridge Setting

Function: Provide MQTT Bridge setting.

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

MQTT bridge		New
Bridge name	Description	
bridge1		ې بې

Figure 4-10 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.	
ŝ	Edit setting of remote Broker bridge .	
×	Remove the remote Broker bridge.	

Table 4-10 Descriptions: MQTT Setting > MQTT Bridge Setting (1)

MQTT bridge			
Bridge name	bridge1		
Description			
Client ID	brk_McD5lf		
Remote IP address	192.168.255.2		
Remote port	1883		
Remote account	user		
Remote password	passwd		
Keep alive	60		
Clean start			
Reconnect interval	30		
MQTT protcol version	MQTTv4 V		
Mount point	bridge1/		
Forward topic	brk/#		
	Confirm Cancel		

Figure 4-11 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.

Forward Topic	Forward the Topics
Mount Point	Prefix of the Topic.
MQTT protocol version	Select the version of MQTT, offering MQTTv3, MQTTv4, and MQTTv5 options.
Reconnect interval	The interval for resetting the connection after the connection between the local broker and the remote broker is disconnected. (unit: second)
Clean Start	Clean Cloud to Device(C2D) Message Some IoT platforms require to Clean it.

Table 4-11 Descriptions: MQTT Setting > MQTT Bridge Setting (2)

4.2.3 Users

Function : Allow specific user connect with Broker.

Menu Path : 【MQTT Setting】 → 【Users】

Users		+ Add
User name	Remark	
user1	user1	*

Figure 4-12 Users Setting Page (1)

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

Table 4-12 Descriptions: MQTT Setting > Users

User name
user1
Password
user1
Remark
user1
Confirm Cancel

Figure 4-13 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.

4.2.4 Rule Engine

Function : Manage read and write permissions of MQTT Topic.

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

Rule engine			+ A	dd
Permission	User	Operation	Торіс	
allow	192.168.84.10	publish		© ×

Figure 4-14 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.
Торіс	MQTT Topic applied to this rule.
	Note : Topic string longer than 7 characters (including symbols) will be represented by "".

Table 4-14 Descriptions: MQTT Setting > Rule Management

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】

MySQL			
+			
Connection Name	Status	Setting	

Figure 4-15 MySQL Page (1)

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

Table 4-15 Descriptions: Database > MySQL (1)

MySQL		
+		
Connection Name	Status	Setting
1 Mysql1	2 stopped	3 ⊗ × 4

Figure 4-16 MySQL Page (2)

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

Table 4-16 Descriptions: Database > MySQL (2)

MySQL	
Connection Name	Mysql1
Description	
Database Name	db
Table Name	table1
Host	192.168.255.100
Port	3306
User	user
Password	
Enable	
Forward Topic	brk/#
Connection Test	Test
	Confirm Cancel

Figure 4-17 MySQ	L Advanced Setting
------------------	--------------------

Database > MySQL > Advanced Setting		
Connection Name	Connection Name of MySQL.	
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 4-17 MySQL Advanced Setting

4.3.2 MQTT data to SQL Server

Function : Manage SQL Server Connections.

Menu Path : 【 Database 】 → 【 SQL Server 】

SQL Server		
+		
Connection Name	Status	Setting

Figure 4-18 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 4-18 Descriptions: Database > SQL Server (1)



Figure 4-19 SQL Server Page (2)

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

Table 4-19 Descriptions: Database > SQL Server (2)

SQL Server			
Connection Name	SqlServer1		
Description			
Database Name	db		
Table Name	table1		
Host	192.168.255.100		
Port	1433		
User	user		
Password	•••••		
Enable			
Forward Topic	brk/#		
Connection Test	Test		
	Confirm Cancel		

Figure 4-20 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 4-20 SQL Server Advanced Setting

4.3.3 MQTT data to MongoDB

Function : Manage MongoDB Connections.

Menu Path : 【Database】 → 【MongoDB】

MongoDB			
+			
Connection Name	Status	Setting	

Figure 4-21 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 4-21 Descriptions: Database > MongoDB (1)

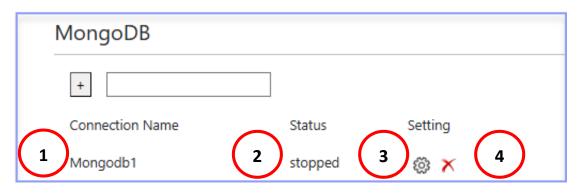


Figure 4-22 MongoDB Page (2)

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

Table 4-22 Descriptions: Database > MongoDB (2)

MongoDB	
Connection Name	Mongodb1
Description	
Database Name	default_db
Collection Name	default_collection
Host	192.168.255.10
Port	27017
User	user
Password	
Enable	
Forward Topic	brk/#
Connection Test	Test
	Confirm Cancel

Figure 4-23 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 4-23 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 up the redundancy function of the BRK device.

Menu Path 🗄	【 Advanced Setting 】	→	Keep Alive Setting	
-------------	----------------------	---	--------------------	--

Keep alive setting		
Enable		
Interface	LAN 2 ~	
Preempt mode		
Priority	3	
Virtual router ID	130	
Virtual IP address	192.168.255.100	
	Save	

Figure 4-24 Keep Alive Setting Page

Advanced Setting > Keep alive Setting	
Enable	Decide whether to enable BRK redundancy service
Interface	Network card interface for communication.
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 4-24 Descriptions: Advanced Setting > Keep Alive Setting