

Modbus TCP / BACnet IP / MQTT Gateway GT200-MQ-BMT

User Manual

V 1.3

Rev A



SST Automation

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Important Information

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The product has many applications. The users must make sure that all operations and results are in accordance with the safety of relevant fields, and the safety includes laws, rules, codes and standards.

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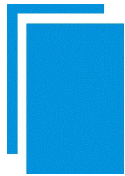


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1 Product Overview

1.1 Product Function

The GT200-MQ-BMT is a gateway that enables data exchange among Modbus TCP client/servers, a single BACnet IP client, and MQTT network. It can connect a wide range of PLCs (e.g., Siemens, Schneider, etc.), Modbus fieldbus instruments, and BACnet IP controllers to the cloud servers (e.g., Microsoft Azure, Amazon AWS, and custom servers) over a wired Ethernet connection (WAN) using the MQTT protocol.

1.2 Product Features

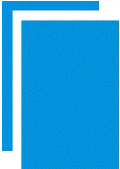
- Easy to Use: Users can refer to the product manual to quickly configure a data connection that meets their needs.
- Wide Applications: Any device with a Modbus TCP interface or BACnet IP client can be connected to a MQTT network through the GT200-MQ-BMT gateway.
- 2 Ethernet ports, Ethernet 10/100M (auto-negotiating), with separate network cards.
- Supports DHCP and static configuration.
- Easy-to-use configuration software SST-BMQ-CFG.

1.3 Technical Specifications

[1] Data communication among BACnet IP, Modbus TCP and MQTT.

[2] BACnet IP features:

- Supports one BACnet IP client connection.
- Supports up to 500 BACnet BIs, 300 BOs, 300 BVs, 500 AIs, 300AOs, 300 AVs, 500 MSIs, 100MSOs and 100 MSVs.
- Supported BACnet IP services: Who Is, I Am, Who Has, I Have, Read Property, Write Property, Read Property Multiple.



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[3] Modbus TCP features:

- Supports Modbus TCP client and server.
- Supports up to 36 Modbus TCP connections.
- Supports up to 128 Modbus commands.
- Supports function code: 01, 02, 03, 04, 05, 06, 15, 16.
- Modbus TCP client supports maximum 2048 input/output bytes.
- Modbus TCP client supports 3 types of output command modes: Change of Value, Cycle and Forbidden.

[4] MQTT features:

- Supports MQTT V3.1.1.
- Supports up to 3000 data point tags.
- Supports MQTT connections through a wired WAN network.
- TLS V1.2. Supports custom Client ID.
- QoS 0 and 1 supported.
- Supports at most 25 topic numbers.
- Supports Timestamp and Time Zone settings.

[5] Data mapping:

- Supports byte swap.
- Supports data scaling.
- Supports mapping mode selection.
- Supports data hold or clear during network failure.
- Supports priority selection for scaling and byte swap.

[6] Power supply: 24VDC (9V ~ 30V), 90mA (24VDC).

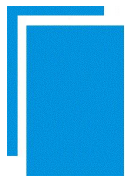
[7] Operating temperature: -40°F to 158°F (-40°C to 85 °C), relative humidity: 5% ~ 95% (non-condensing).

[8] External dimension (W*H*D): 0.9 in*3.9 in*4.5 in (22.5mm*99mm*114.5mm).

[9] Installation: 1.4in (35mm) DIN rail.

[10] Protection class: IP20.

[11] Test standard: EMC test standards.

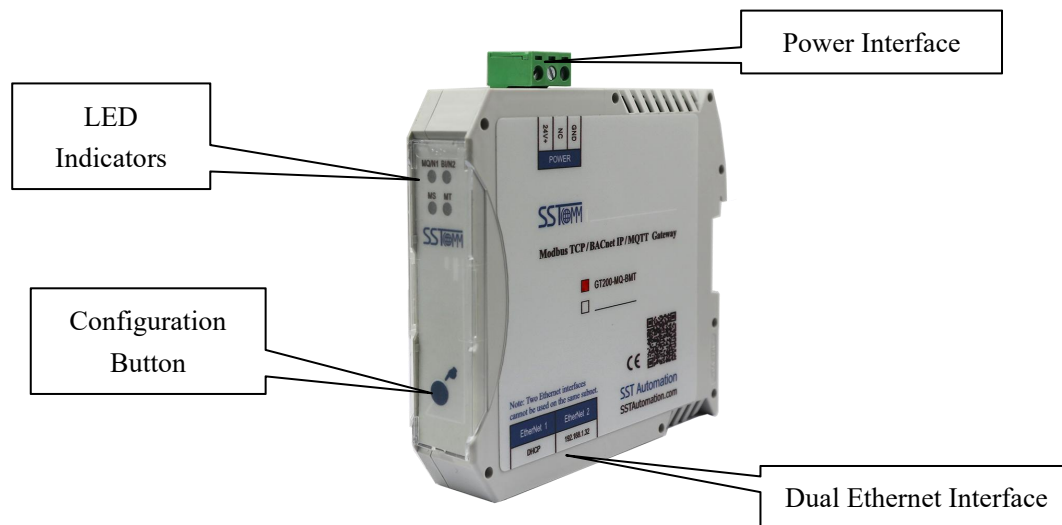


1.4 Revision History

Revision	Date	Chapter	Description
V1.3 Rev A	6/8/2023	MQTT Chapters 5.4.4 and 5.4.5.	Added details on how to configure Microsoft Azure and Amazon AWS.
V1.3	5/9/2023	All	New release

2 Hardware Description

2.1 Product Appearance



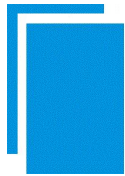
Note: This picture is for reference only. The product appearance is subject to the actual product.



2.2 LED Indicators

Indicators	Function
MQ/N1 (Top Left)	Network status of MQTT and EtherNet 1
BI/N2 (Top Right)	Network status of BACnet IP and EtherNet 2
MS (Bottom Left)	Module Status
MT (Bottom Right)	Network status of Modbus TCP

Indicators	State	Description
MQ/N1 (Network Status Indicator of MQTT and EtherNet 1)	Solid Green	MQTT connection established
	Blinking Green	Attempting to establish MQTT connection or connection disconnected
	Blinking Red	DHCP (EtherNet 1)
	Solid Red	The IP address of EtherNet 1 is in the same subnet as EtherNet 2
BI/N2 (Network Status Indicator of BACnet IP and EtherNet 2)	Solid Green	BACnet IP connection established
	Blinking Green	Attempting to establish BACnet IP connection or connection disconnected
	Blinking Red	DHCP (EtherNet 2)
	Solid Red	The IP address of EtherNet 2 is in the same subnet as EtherNet 1
MS (Module Network Status Indicator)	Solid Green	Startup
	Flashes Green Two times, then Off	Restore factory settings through the button
	Solid Red for 500ms	Configuration is locked
	Solid Red for 300ms, Off for 400ms, Solid Red for 300ms	Configuration is unlocked
	Solid Red	Gateway Failure
	Solid Orange	Initialization
MT (Modbus TCP Network Status Indicator)	Solid Green	Modbus TCP connection established
	Blinking Green	Attempting to establish Modbus TCP connection or connection disconnected
	Blinking Red	Reserved
N1 Orange and N2 Orange (Orange: Red/Green is on simultaneously)	All On	Startup Status
	Alternate Blinking for 3s	Locating the gateway



2.3 Configuration Button

The configuration button is located on the front of the gateway. There are two functions below.

1. Restore Factory Settings

Within 10 seconds of completing the device's power-on startup (i.e., when the MS green light is constantly on), press and hold the button for 5 seconds, the MS green light will blink (2Hz). Within 5 seconds, click the button once to turn off the MS indicator light, and the device will restore its factory settings and automatically restart. After restoring the factory settings, the IP address will change to the default value DHCP (EtherNet 1) and 192.168.1.32 (EtherNet 2). If the button is not clicked within 5 seconds, the MS green light will return to being constantly on, and the device will resume normal operation.

2. Configuration Lock

While the device is running, double-click the button. The MS red light will turn on for 500ms and then turn off, indicating that the configuration function is locked. Double-click the button again, and the MS red light will turn on for 300ms, then turn off for 400ms, and then turn on for another 300ms before turning off again, indicating that the configuration function is unlocked. (When the MS red light is on, the MS green light will turn off. When the MS red light turns off, the MS green light will turn back on.)

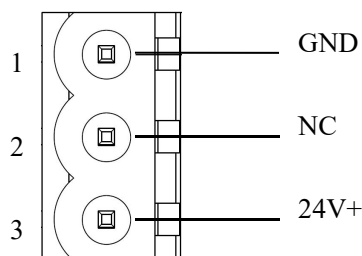
Lock: After the configuration function is locked, the configuration software cannot upload or download gateway configurations after detecting the device.

Unlock: After the configuration function is unlocked, the configuration software can upload and download gateway configurations normally after detecting the device.

2.4 Interfaces

2.4.1 Power Interface

The GT200-BM-MT gateway uses a 24V DC power supply.

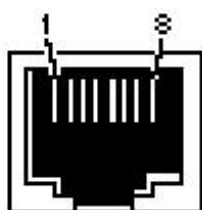


Pin	Description
1	GND
2	NC (Not Connected)
3	24V+, DC

2.4.2 Ethernet Interface

The two Ethernet interface uses an RJ-45 connector and follows the IEEE802.3u 100BASE-T standard. Its pin (standard Ethernet signal) is defined as below.

The EtherNet 1 adopts DHCP and EtherNet 2 uses a fixed IP 192.168.1.32.



RJ-45 port

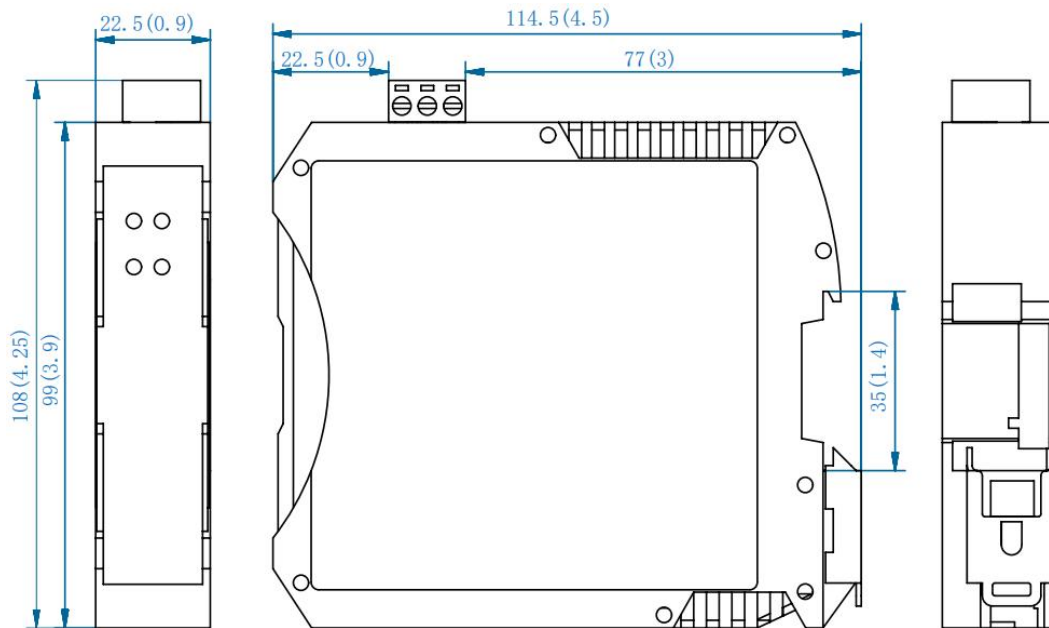
Pin	Description
S1	TXD+, Tranceive Data+, Output
S2	TXD-, Tranceive Data-, Output
S3	RXD+, Receive Data+, Input
S4	Bi-Directional Data+
S5	Bi-Directional Data-
S6	RXD-, Receive Data-, Input
S7	Bi-Directional Data+
S8	Bi-Directional Data-

3 Hardware Installation

3.1 Mechanical Dimensions

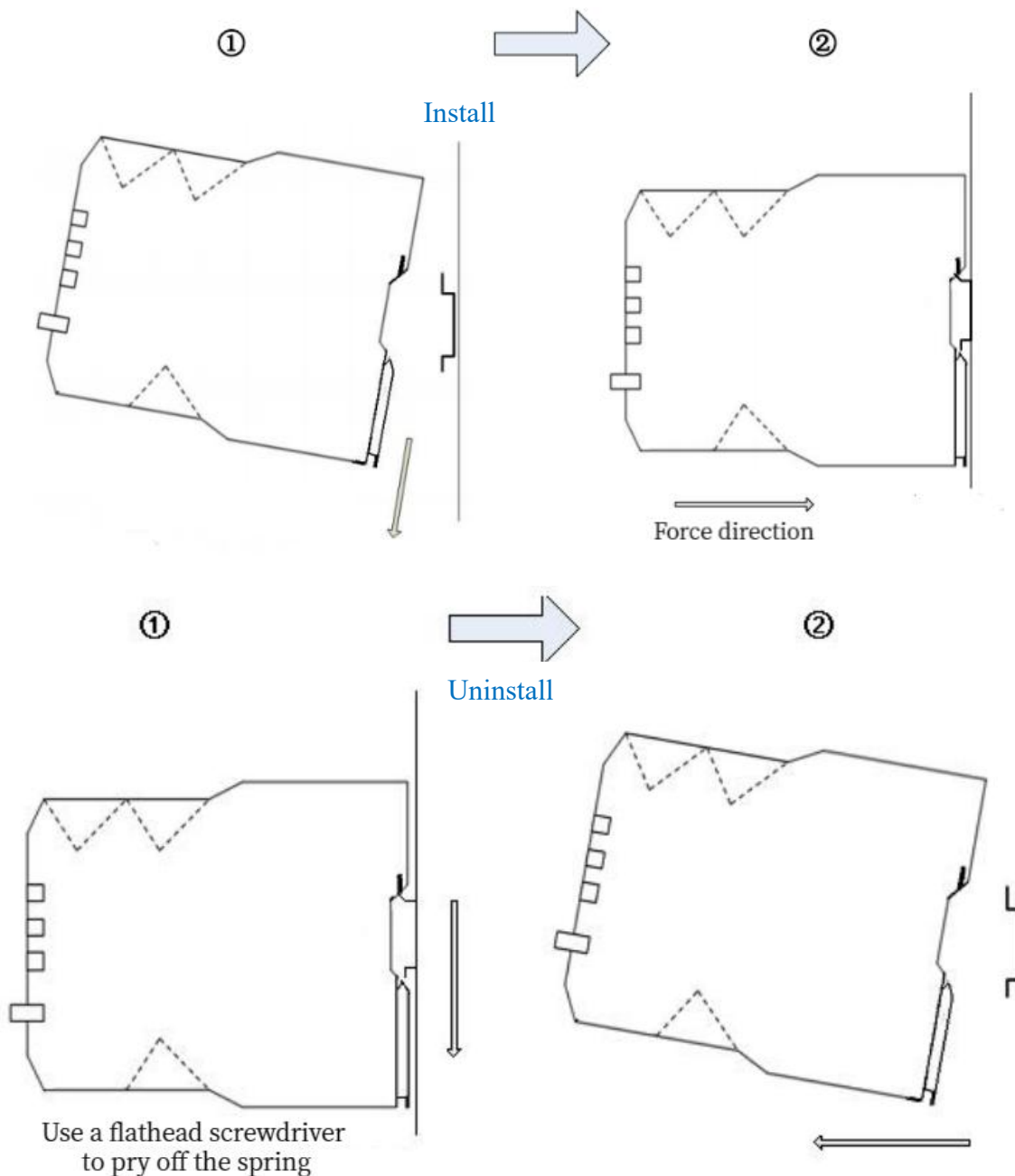
Size (width * height * depth):

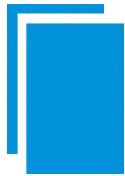
0.9 in * 3.9 in * 4.5 in (22.5 mm * 108 mm * 114.5 mm)



3.2 Installation Method

Using 1.4 in (35 mm) DIN RAIL.



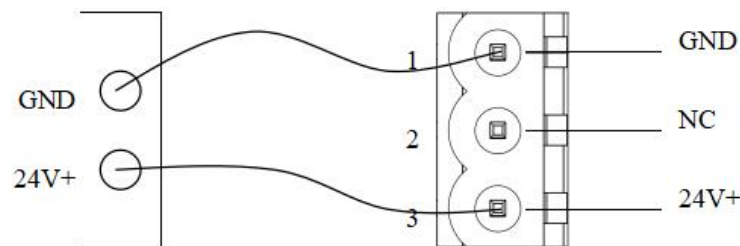


4 Quick Start Guide

4.1 Hardware Connection

1. Connect the power to the power supply.

Please do not power on the devices before finishing and confirming all the connections.



2. Connect the GT200-MQ-BMT gateway with your computer via Ethernet cable.
3. Power on the GT200-MQ-BMT.

4.2 Software Configuration

Download the configuration software SST-BMQ-CFG from www.sstautomation.com and install it.

1. Click "Upload" on the toolbar to upload the configuration from the gateway. Find the GT200-MQ-BMT Gateway in the list, click it and then click "Upload" on the left.

Note: If you cannot find the GT200-MQ-BMT gateway, check your Hardware configuration or your network configuration. Refer to the note [How to Use the Ping Command](#).

This is a default configuration created by SST Automation. If you would like to create a configuration from the beginning simply click "New".

2. Double click "BACnet IP " under the Management and configure the settings to your needs in the pop-up window.
3. Double click the "Modbus TCP" under the Management and configure the settings to your needs in the pop-up window.
4. To add a node, right click the Modbus TCP you wish to add the node to and proceed to click the "Add Node"

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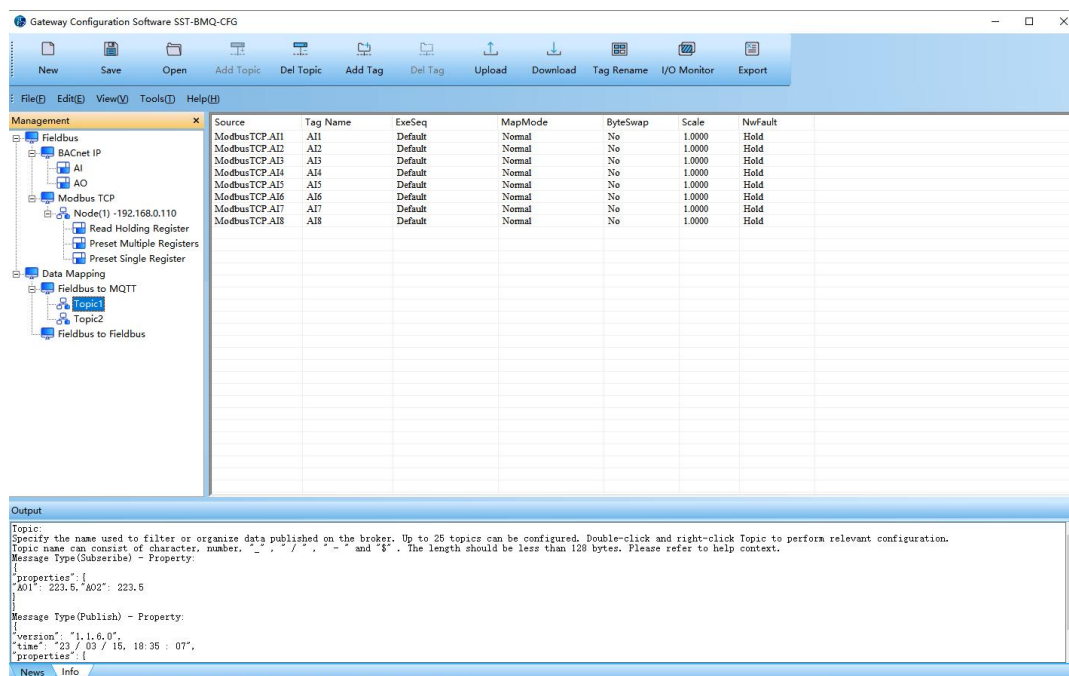
operation.

Double-click the added node to configure it.

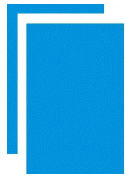
5. To add a command, right click the node you wish to add the command to and proceed to click the "Add Command" operation. Double click on the commands you wish to add to the Node.

Double-click the added command to configure it.

6. Double click the "Fieldbus to MQTT" under the Management and configure the settings to your needs in the pop-up window.
7. Add or edit MQTT Topic.



8. Click the "Fieldbus to Fieldbus" under the Management and configure the settings to your needs under the Configuration Window.
9. Once configuration is complete, click "Download" to download your configuration into GT200-MQ-BMT gateway.
10. Test the communication.



5 Software Instructions

5.1 Software Interface Description

SST-BMQ-CFG is the configuration software that is used to configure the GT200-MQ-BMT. The software runs on Windows and supports the following operating systems: Win7, Win10, Win11 and other Windows Server systems.

To get started with using the SST-BMQ-CFG configuration software, download the installation package from SST Automation's website at www.SSTAutomation.com/Download1/ which is available free of charge. Double click the installation package to install the configuration software SST-BMQ-CFG. Follow the prompts to complete the installation, then open the installed configuration software and begin configuring the GT200-BM-MT gateway.

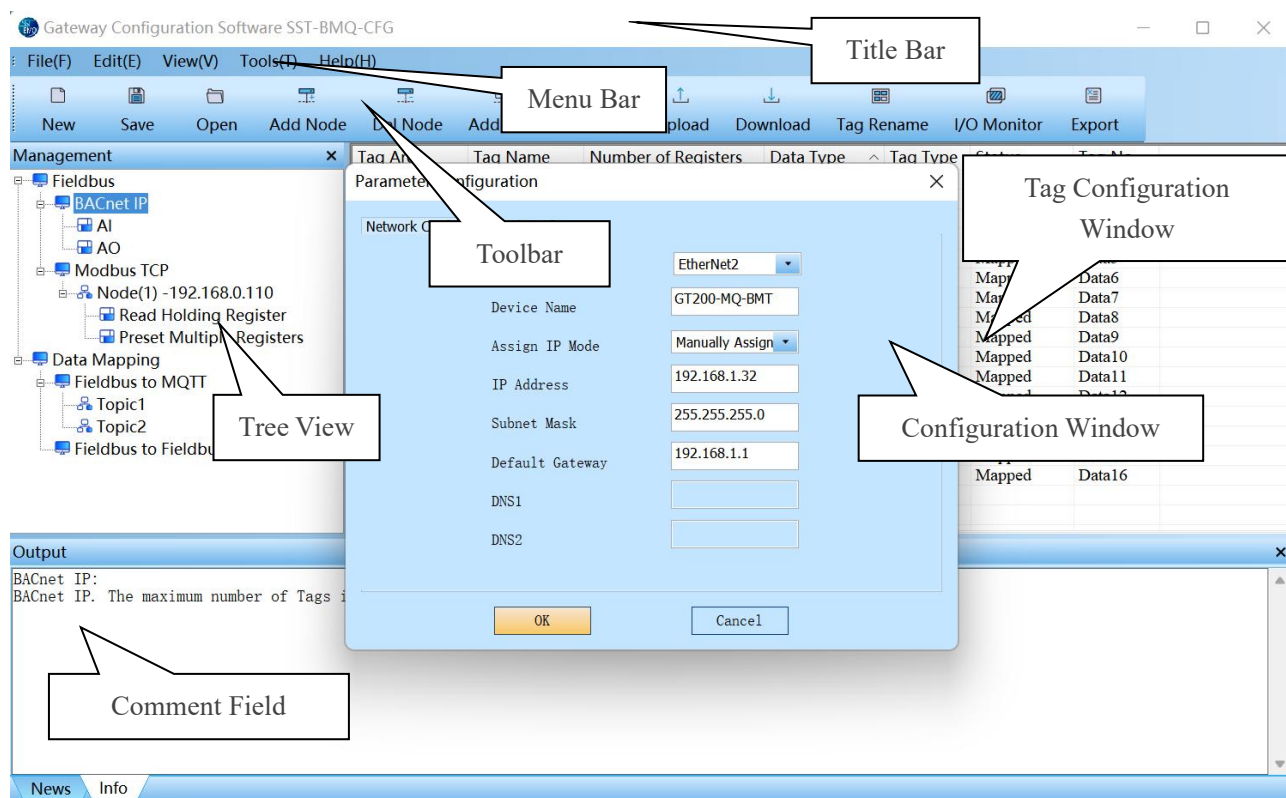
The following introduction is aimed at helping you get quickly started at using the gateway. For more detailed instructions on using the software, please refer to software documentation located in "Help -> Content" in the SST-BMQ-CFG software.

Note: The factory default network settings for EtherNet 1 and EtherNet 2 of GT200-MQ-BMT gateway is DHCP and 192.168.1.32 respectively.

5.1.1 Software Main Interface

The software interface includes: Title bar, Menu bar, Toolbar, Configuration Window and Tree View.

Note: The grayed out parameters cannot be changed.





5.1.2 Toolbar

1. When selecting the “Modbus TCP” option in the Tree View, the Toolbar interface has the following functions as shown in the figure below:



The functions from left to right are: New, Save, Open, Add Node, Delete Node, Add Command, Delete Command, Upload, Download, Tag Rename, I/O Monitor, and Export.

 New	New: Create a new configuration project.
 Save	Save: Save the current configuration.
 Open	Open: Open a configuration project.
 Add Node	Add Node: Add a Modbus TCP node.
 Del Node	Delete Node: Delete a Modbus TCP node.
 Add Cmd	Add Command: Add a Modbus TCP command.
 Del Cmd	Delete Command: Delete a Modbus TCP command.
 Upload	Upload: Upload the configuration from the gateway.
 Download	Download: Download the configuration to the gateway.
 Tag Rename	Tag Rename: Automatically changed and rearranged the object name.
 I/O Monitor	I/O Monitor: Monitor the gateway for the input and output data of each protocol.
 Export	Export Excel: Export current configuration as a table and save it as *.xls file.

GT200-MQ-BMT

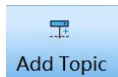
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2. When selecting the "Fieldbus to MQTT" option in the Tree View, the Toolbar interface has the following functions as shown in the figure below:



The functions from left to right are: Add Topic, Delete Topic, Add Tag, and Delete Tag. The other options have the same functionality as when selecting "Modbus TCP".



Add Topic: Add a Topic.



Delete Topic: Delete a Topic.



Add Tag: Add the MQTT side properties and add the mapping relationship



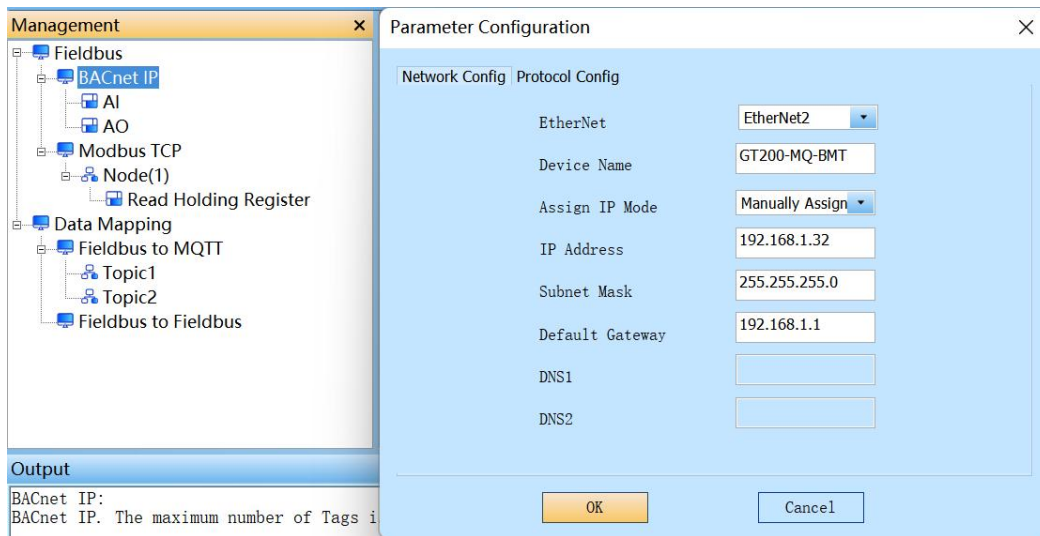
Delete Tag: Delete the attributes of the MQTT side and delete the corresponding mapping relationship.

5.2 BACnet IP Configuration

Double click "BACnet IP" in the left tree view to open the BACnet IP configuration window.

5.2.1 BACnet IP Network Configuration Interface

The BACnet IP Network configuration interface is shown below:



EtherNet: The network port to be used for BACnet IP. The default is 'EtherNet2'. The available options are 'EtherNet1' and 'EtherNet2'. 'EtherNet1' corresponds to network port 1, and 'EtherNet2' corresponds to network port 2.

Device Name: The name used to identify the GT200-MQ-BMT in order to distinguish it from other devices.

Note: The name cannot have spaces and can have a maximum length of 16 characters.

Assign IP Mode: The GT200-MQ-BMT's IP address configuration mode. The available options are 'Manually Assign' (Static Configuration) and DHCP. In DHCP mode, the GT200-MQ-BMT will need to connect to a DHCP server or switch to get a valid IP address.

IP Address: The GT200-MQ-BMT's IP address.

Subnet Mask: The GT200-MQ-BMT's subnet mask.

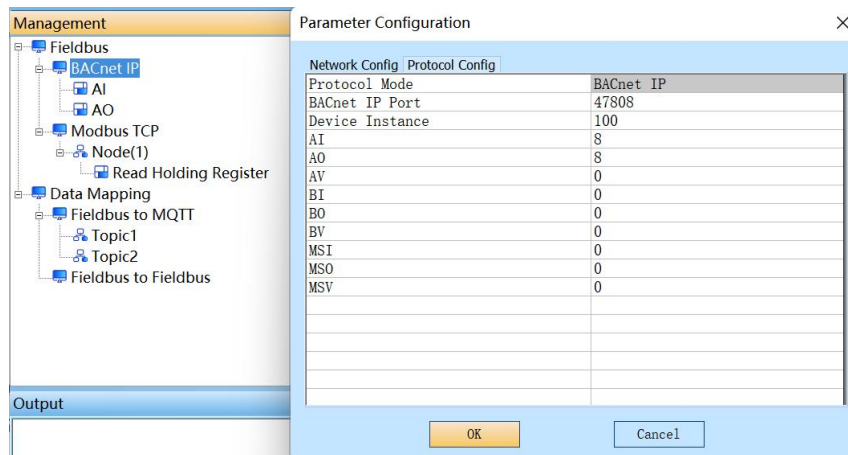
Default Gateway: The network gateway IP address.

DNS 1: Reserved.

DNS 2: Reserved.

5.2.2 BACnet IP Protocol Configuration Interface

The BACnet IP Protocol configuration interface is shown below:



BACnet IP Port: The GT200-MQ-BMT's BACnet IP port number. Range: 1-65535. Default value is 47808.

Device Instance: The GT200-MQ-BMT's device instance number. Range: 0-4194303. Default value is 100.

AI: Analog Input Object Type. The data type supports FLOAT and FLOATV, with up to 500 AI available.

AO: Analog Output Object Type. The data type supports FLOAT and FLOATV, with up to 500 AO available.

AV: Analog Value Object Type. The data type supports FLOAT and FLOATV, with up to 500 AV available.

BI: Binary Input Object Type. The data type supports BOOL, with a maximum of 500 BI.

BO: Binary Output Object Type. The data type supports BOOL, with a maximum of 500 BO.

BV: Binary Value Object Type. The data type supports BOOL, with a maximum of 500 BV.

MSI: Multi-state Input Object Type. The data type supports INT 32, UINT32, INT32V, UINT32V and a maximum of 500 MSI.

MSO: Multi-state Output Object Type. The data type supports INT 32, UINT32, INT32V, UINT32V and a maximum of 500 MSO.

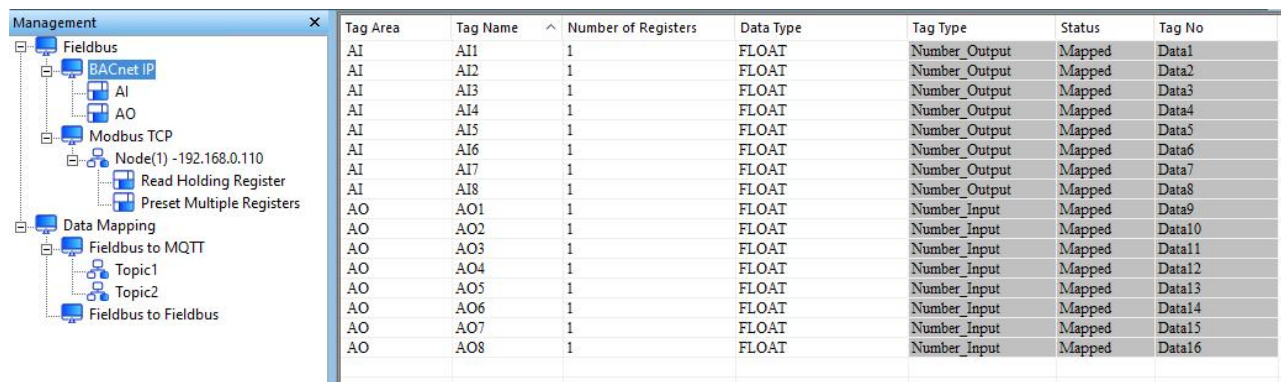
MSV: Multi-state Value Object Type. The data type supports INT 32, UINT32, INT32V, UINT32V and a maximum of 500 MSV.



5.2.3 Tag Configuration

Select "BACnet IP" in the left tree view to enter the BACnet IP tag configuration window.

The BACnet IP tag configuration window is shown below:



Tag Area	Tag Name	Number of Registers	Data Type	Tag Type	Status	Tag No
AI	AI1	1	FLOAT	Number_Output	Mapped	Data1
AI	AI2	1	FLOAT	Number_Output	Mapped	Data2
AI	AI3	1	FLOAT	Number_Output	Mapped	Data3
AI	AI4	1	FLOAT	Number_Output	Mapped	Data4
AI	AI5	1	FLOAT	Number_Output	Mapped	Data5
AI	AI6	1	FLOAT	Number_Output	Mapped	Data6
AI	AI7	1	FLOAT	Number_Output	Mapped	Data7
AI	AI8	1	FLOAT	Number_Output	Mapped	Data8
AO	AO1	1	FLOAT	Number_Input	Mapped	Data9
AO	AO2	1	FLOAT	Number_Input	Mapped	Data10
AO	AO3	1	FLOAT	Number_Input	Mapped	Data11
AO	AO4	1	FLOAT	Number_Input	Mapped	Data12
AO	AO5	1	FLOAT	Number_Input	Mapped	Data13
AO	AO6	1	FLOAT	Number_Input	Mapped	Data14
AO	AO7	1	FLOAT	Number_Input	Mapped	Data15
AO	AO8	1	FLOAT	Number_Input	Mapped	Data16

Tag Area: Displays the tag object type. The available object types are AI, AO,AV, BI, BO, BV, MSI, MSO, and MSV.

Tag Name: Displays the tag name. The tag name can be modified. It can contain 1 to 32 characters, including uppercase and lowercase English characters and digits.

Number of Registers: The default is 1 and is not modifiable.

Data Type:

When the "Tag Area" is AI, AO, and AV, the default data type is FLOAT, and the data types FLOAT, FLOATV are supported.

When the "Tag Area" is BI, BO, and BV, the data type BOOL is supported.

When the "Tag Area" is MSI, MSO, and MSV, the default data type is UINT32, and the data types INT 32, UINT32, INT32V, and UINT32V are supported.

Tag Type: Displays the tag value type and direction. The available options are "Number_Input", "Number_Output", "Boolean_Input", and "Boolean_Output".

Number_Input: Input of numeric data type.

Number_Output: Output of numeric data type.

Boolean_Input: Input of Boolean data type.

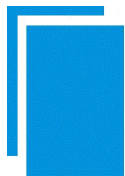
Boolean_Output: Output of Boolean data type.

Status: Displays whether the tag is mapped to a corresponding MQTT or Modbus TCP Input/Output.

Unmapped: Data mapping is not complete.

Mapped: Data mapping is complete.

Tag No: Displays the tag's sequence number. Each tag has a unique number.

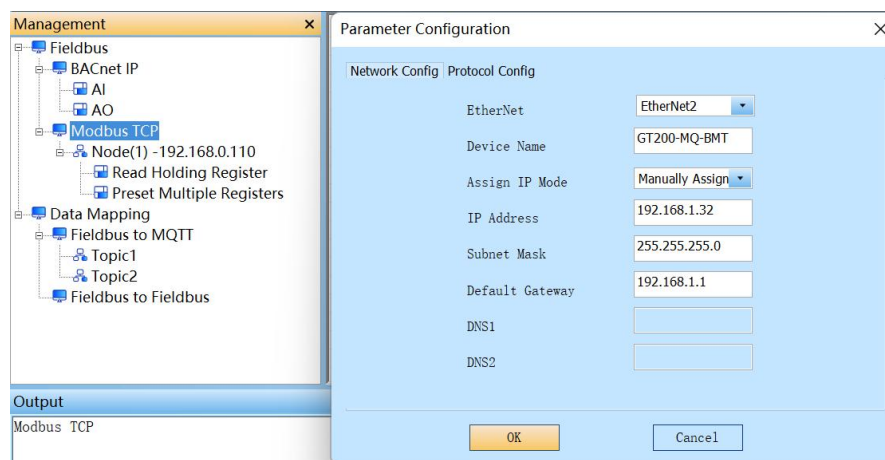


5.3 Modbus TCP Configuration

Double click "Modbus TCP" in the left tree view to open the Modbus TCP configuration window.

5.3.1 Modbus TCP Network Configuration Interface

The Modbus TCP Network configuration interface is shown below:



The parameters have the same definitions as with the "BACnet IP Network Configuration Interface". Please refer to [Chapter 5.2.1](#).

The GT200-MQ-BMT supports Modbus TCP connections and can function as either a Client or a Server. The Modbus TCP mode for the device has can be set by changing the "Protocol Mode" in the Protocol Configuration Interface.

The Modbus TCP Client mode protocol configuration interface is shown below:

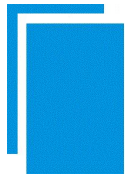
Protocol Mode: Modbus TCP Client station. As the Modbus TCP Client device, the gateway establishes communication with Modbus TCP server devices.

Delay between Polls (ms): The amount of time to delay between receiving a response and sending the next request. Range: 0-2500ms. Default value is 0ms.

Change of Value: When the output data changes, the write command will be sent.

Cycle: Send the write command periodically.

Forbidden: The gateway will not send any write commands.



5.3.2.2 Modbus TCP Server Mode

The Modbus TCP Server mode protocol configuration interface is shown below:

Parameter Configuration	
Network Config Protocol Config	
Protocol Mode	Modbus TCP Server
Coil Status Starting Address	0
Coil Status Block Size	0
Input Status Starting Address	0
Input Status Block Size	0
Holding Register Starting Address	0
Holding Register Block Size	0
Input Register Starting Address	0
Input Register Block Size	0
Function Code 01/02 Exchange	Disabled
Function Code 03/04 Exchange	Disabled

OK Cancel

Protocol Mode: Modbus TCP Client station. As the Modbus TCP Client device, the gateway establishes communication with Modbus TCP server devices.

Coil Status Starting Address: The starting address of the 0XXXX area. Range: 0-65535. The default is 0.

Coil Status Block Size: The block size of the 0XXXX area. Range: 0-512. The default to 0.

Input Status Starting Address: The starting address of the 1XXXX area. Range: 0-65535. The default is 0.

Input Status Block Size: The block size of the 1XXXX area. Range: 0-512. The default to 0.

Holding Register Starting Address: The starting address of the 4XXXX area. Range (register): 0-65535. The default is 0.

Holding Register Block Size: The block size of the 4XXXX area. Range (register): 0-1024. The default is 0.

Input Register Starting Address: The starting address of the 3XXX area. Range (register): 0-65535. The default is 0.

Input Register Block Size: The block size of the 3XXX area. Range (register): 0-1024. The default is 0.

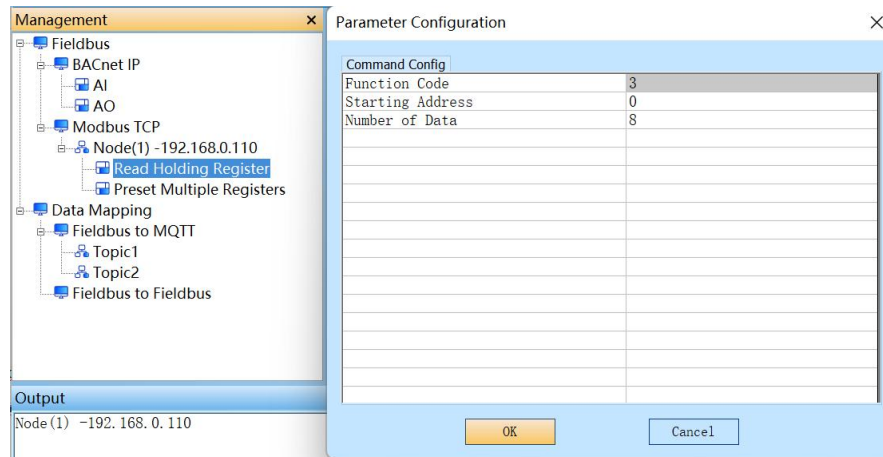
Function Code 01/02 Exchange:

Disable: Function code 01 corresponds to the coil status data in area 0XXXX, and function code 02 corresponds to the input status data in area 1XXXX.

Enable: Function code 01 corresponds to the input state data in area 1XXXX, and function code 02 corresponds to the coil status data in area 0XXXX.

Right click "Node(X)" in the left tree view to add Modbus Commands. Double click a command in the left tree view to enter the command configuration window.

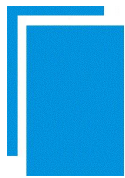
The Modbus command configuration window is shown below:



Function Code: Modbus Function Code.

Starting Address: The starting address of register or switching value or loop and so on in Modbus TCP slave and the range is 0-65535.

Number of Data: Number of register/switching value/coil in the Modbus TCP Server.

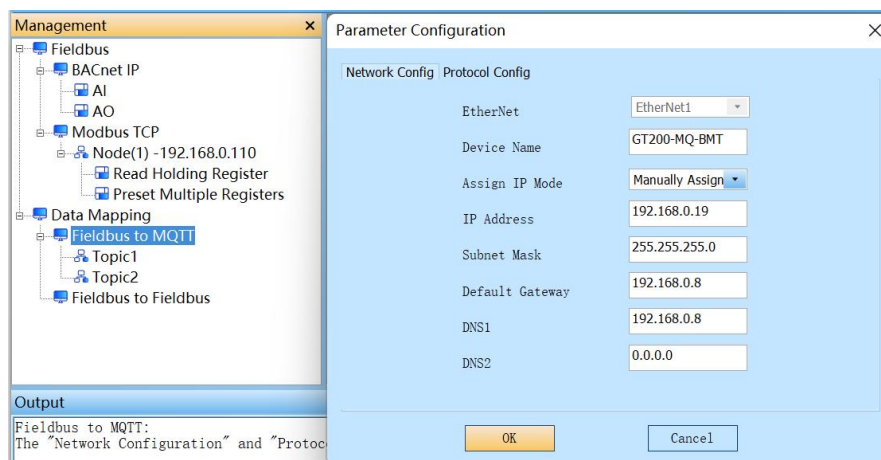


5.4 MQTT Configuration

Double click "Fieldbus to MQTT" in the left tree view to open the MQTT configuration window.

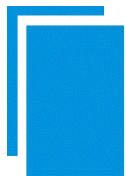
5.4.1 MQTT Network Configuration Interface

The MQTT Network configuration interface is shown below:



The parameters have the same definitions as with the "BACnet IP Network Configuration Interface". Please refer to [Chapter 5.2.1](#).

Note: MQTT can only be used on network port 1 (EtherNet1).



5.4.2 MQTT Protocol Configuration Interface

The MQTT Protocol configuration interface is shown below:

Network Config Protocol Config	
Protocol Mode	MQTT Client
User Name	MqttTest
Password	123456
Timestamp	Disabled
Time Zone	
Publish Mode	Cyclic
Sending Cycle (Seconds)	60
MQTT Broker Address	mqtt.sstautomation.com
MQTT Broker Port	1883
SSL/TLS	Disabled
Client ID	Default
Object Model Communication	Disabled
Custom Message Format	Disabled
Edit Message Format	{ "timestamp": TIMESTAMP , "
CA File	
Client Certificate File	
Client Key File	

Protocol Mode: Support MQTT Client. Cannot be modified.

User Name: This information is the user name that the user has created and is valid in the corresponding cloud platform, and should be configured consistent with the name set by the platform. Can support letters, numbers, symbols, 0 to 90 characters.

Password: The password for the user binding in the cloud platform. Can support letters, numbers, symbols, 0 to 90 characters.

Timestamp: Default is closed, support to close and open. The time when the data is uploaded to the cloud platform together with the data when opened.

Publish Mode: Trigger condition selection for sending data to remote server, supporting "New Data Push Mechanism" and "Period Send Mechanism" two options:

Change of Value: Data is sent to the remote server only when the data changes.

Cyclic: Sends data on a specified period, regardless of whether the data has changed.

Sending Cycle (Seconds): The cycle time of periodic data transmission is 60s by default, ranging from 5 to 10000 s. This is valid when "Publish Mode" is "Cyclic".

MQTT Broker Address: The default address is mqtt.sstautomation.com.

MQTT Broker Port: The default value is 1883. The value ranges from 1 to 65535.

SSL/TLS: This parameter is disabled by default and supports enabled, disabled and Bidirectional authentication. If you want to connect GT200-MQ-BMT to AWS, Azure IoT or other Cloud provider using certificate, please select Bidirectional.

Client ID: Configure the client ID to connect to the MQTT broker, By default, the device serial number is used. When connecting to MQTT broker, the Client ID of each client must be unique, so it is recommended to configure

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this option as the default when there is no special requirement. You can enter characters of English, numbers and special symbols, and the length is less than 90 characters.

Object Model Communication: This parameter is disabled by default and supports disabled and enabled.

Custom Message Format: This parameter is disabled by default and supports disabled and enabled.

Edit Message Format: User-defined editing data format.

CA File: The CA File is provided by AWS or other Cloud provider. Please refer to Developer Guide. When SSL/TLS is Bidirectional, it is valid. If it is not filled in, it means that the default CA file of the current gateway is used directly.

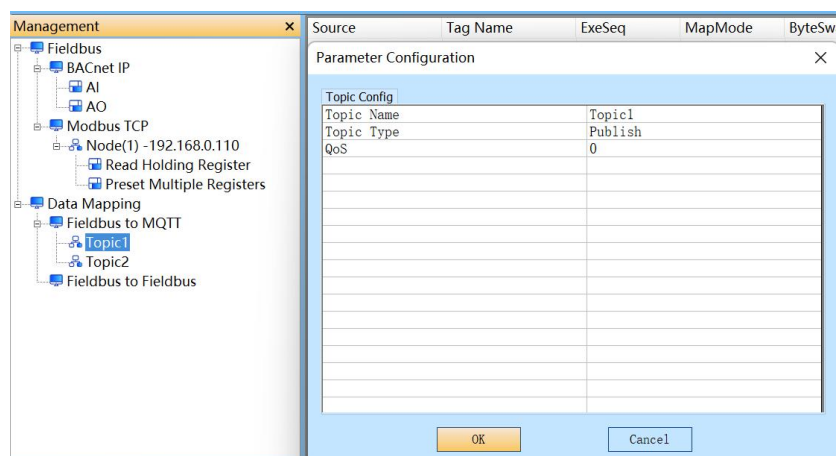
Client Certificate File: The Client Certificate File is provided by AWS, Azure IoT and other Cloud provider.

Client Key File: The Client Key File is provided by AWS, Azure IoT and other Cloud provider. When SSL/TLS is Bidirectional, it is valid. If it is not filled in, it means that the default client key file of the current gateway is used directly.

5.4.3 MQTT Topic Configuration

Right click "Fieldbus to MQTT" in the left tree view to add MQTT Topics. Double click "Topic X" in the left tree view to open the Topic configuration window.

The Topic configuration window is shown below:



Topic Name: It can be composed of characters, numbers, "_", "\", "#", "-", and "\$". The length must be less than 128 characters.

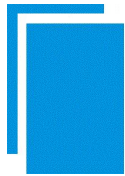
Topic Type: Three options are supported: publish, subscribe, publish and subscribe.

Publish: The data is published to the MOTT broker.

Subscribe: The gateway subscribes the data from MQTT broker.

QoS: Supports QoS 0 and 1.

QoS 0: The gateway will send the data package only once, whether it is received or not. It applies to the less



important data.

QoS 1: There will be an ACK to ensure that the Client or Server receives the data. The data will be sent all the time until it is successfully received.

5.4.4 Connecting to Microsoft Azure

The GT100-MQ-RS supports the following device authentication methods to connect to Azure IoT:

1. Symmetric Key / Shared Access Signature (SAS) Token:

Simply configure the correct username and password, and enable TLS. A certificate file does not need to be imported. The following fields in the SST-MQT-CFG configuration software will need to match the following format to connect to Azure:

Property	Format
Client ID	<deviceID>
MQTT Broker Username	<IoT Hub Name>/<deviceID>/?api-version=2018-06-30
MQTT Broker Password	<SAS Token>
MQTT Broker Address	<IoT Hub Name>.azure-devices.net
MQTT Broker Port	8883
Publish Topic	devices/<deviceID>/messages/events/
Subscription Topic	devices/<deviceID>/messages/devicebound/#

2. Self-Signed X.509 Certificate:

When creating a device in Azure IoT, it is necessary to fill in the fingerprint information of the certificate along with the Device ID. In the SST-MQT-CFG configuration software, configure the correct username, enable TLS, and import the Client Certificate and Client Key. The following fields in the SST-MQT-CFG configuration software will need to match the following format to connect to Azure:

Property	Format
Client ID	<deviceID>
MQTT Broker Username	<IoT Hub Name>/<deviceID>/?api-version=2018-06-30
MQTT Broker Password	No password is required
MQTT Broker Address	<IoT Hub Name>.azure-devices.net
MQTT Broker Port	8883
CA File	No CA file is required
Client Certificate File*	<Device Certificate.pem>

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Client Key File*	<Private Key.pem.key>
Publish Topic	devices/<deviceId>/messages/events/
Subscription Topic	devices/<deviceId>/messages/devicebound/#

*Note: Certificates and keys must be in PEM format.

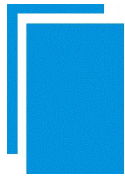
3. Signed X.509CA Certificate:

When creating a device in Azure IoT, it is necessary to register the X.509 CA certificate to your IoT Hub. Detailed instructions can be found on [Microsoft's website](#).

In the SST-MQT-CFG configuration software, configure the correct username, enable TLS, and import the correct certificates (CA Certificate, Client Certificate, and Client Key). The following fields in the SST-MQT-CFG configuration software will need to match the following format to connect to Azure:

Property	Format
Client ID	<deviceId>
MQTT Broker Username	<IoT Hub Name>/<deviceId>/?api-version=2018-06-30
MQTT Broker Password	No password is required
MQTT Broker Address	<IoT Hub Name>.azure-devices.net
MQTT Broker Port	8883
CA File*	<X.509 CA.pem>
Client Certificate File*	<Device Certificate.pem> Note: The certificate subject Common Name (CN) must match the <deviceId>.
Client Key File*	<Private Key.pem.key>
Publish Topic	devices/<deviceId>/messages/events/
Subscription Topic	devices/<deviceId>/messages/devicebound/#

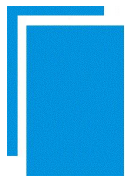
*Note: Certificates and keys must be in PEM format.



5.4.5 Connecting to Amazon AWS

To connect the GT100-MQ-RS to AWS IoT, configure the MQTT broker address and port, enable TLS and import the correct certificates (CA Certificate, Client Certificate, and Client Key). The following fields in the SST-MQT-CFG configuration software will need to match the following format to connect to AWS:

Property	Format
MQTT Broker Username	No username is required
MQTT Broker Password	No password is required
MQTT Broker Address	<AWS Endpoint URL String>.amazonaws.com
MQTT Broker Port	8883
CA File	<Amazon Root CA.pem>
Client Certificate File	<Device Certificate.pem.crt>
Client Key File	<Private Key.pem.key>



5.4.6 MQTT Tag Configuration

Select a Topic in the left tree view to view the Tag Configuration window.

The MQTT Tag configuration window is shown below:

Source	Tag Name	ExeSeq	MapMode	ByteSwap	Scale	NwFault
ModbusTCP.AI1	AI1	Default	Normal	No	1.0000	Hold
ModbusTCP.AI2	AI2	Default	Normal	No	1.0000	Hold
ModbusTCP.AI3	AI3	Default	Normal	No	1.0000	Hold
ModbusTCP.AI4	AI4	Default	Normal	No	1.0000	Hold
ModbusTCP.AI5	AI5	Default	Normal	No	1.0000	Hold
ModbusTCP.AI6	AI6	Default	Normal	No	1.0000	Hold
ModbusTCP.AI7	AI7	Default	Normal	No	1.0000	Hold
ModbusTCP.AI8	AI8	Default	Normal	No	1.0000	Hold

Source: Data tag mapped to the other end.

Tag Name: Can be modified, support case and case English characters, numbers, can input 1~32 characters.

ExeSeq: The default is Default, and there are Default and Scale before Byte Swap options.

Default: Execute in sequence.

Scale before Byte Swap: The scaling is performed before the byte swap.

MapMode: The default is Normal, and there are Normal, InputForced and OutputForced options.

Normal: Normal mapping.

InputForced: Force the mapping according to the data type of the input end.

OutputForced: Force the mapping according to the data type of the output end.

ByteSwap: The default is No, including No, 2 Bytes, 4 Bytes, 2 Words, 8 Bytes, 4 Words and 2 Dwords.

No: Data is transmitted normally.

2 Bytes: Two bytes in the same register are exchanged. For example: 12 34 the result of exchange is 34 12.

4 Bytes: Four bytes in the two registers are exchanged. For example: 12 34 56 78 the result of the exchange is 78 56 34 12

2 Words: Two words are exchanged. For example: 12 34 56 78 the result of exchange is 56 78 12 34.

8 Bytes: Eight bytes are exchanged. For example: 12 34 56 78 90 12 34 56 the result after exchange is 56 34 12 90 78 56 34 12.

4 Words: Four words are exchanged. For example: 12 34 56 78 90 12 34 56 the result after exchange is 34 56 90 12 56 78 12 34.

2 Dwords: Two double words are exchanged. For example: 12 34 56 78 90 12 34 56 the result of exchange is 90 12 34 56 12 34 56 78

Scale: The default is 1.0000, and the scaling range is 0.0001-1000. For example: If the scaling ratio is set to 0.0001, a data input of 1230000 will have an output of $1230000 \times 0.0001 = 123$.

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NwFault: The default is Hold, and there are Hold and Clear options.

Hold: When input end network timed out, the output end keeps the last correct data received.

Clear: When input end network timed out, the output data will be cleared.

Note: Modbus TCP client mode supports Hold/Clear after network timeout, while Modbus TCP server and BACnet IP only support Hold.

5.4.7 Fieldbus to Fieldbus Configuration

Select "Fieldbus to Fieldbus" in the left tree view to configure tags to BACnet IP and Modbus TCP.

Input Tag	Output Tag	ExeSeq	MapMode	ByteSwap	Scale	NwFault	
ModbusTCP.AI1	BACnetIP.AI1	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI2	BACnetIP.AI2	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI3	BACnetIP.AI3	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI4	BACnetIP.AI4	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI5	BACnetIP.AI5	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI6	BACnetIP.AI6	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI7	BACnetIP.AI7	Default	Normal	No	1.0000	Hold	
ModbusTCP.AI8	BACnetIP.AI8	Default	Normal	No	1.0000	Hold	
BACnetIP.AO1	ModbusTCP.AO1	Default	Normal	No	1.0000	Hold	
BACnetIP.AO2	ModbusTCP.AO2	Default	Normal	No	1.0000	Hold	
BACnetIP.AO3	ModbusTCP.AO3	Default	Normal	No	1.0000	Hold	
BACnetIP.AO4	ModbusTCP.AO4	Default	Normal	No	1.0000	Hold	
BACnetIP.AO5	ModbusTCP.AO5	Default	Normal	No	1.0000	Hold	
BACnetIP.AO6	ModbusTCP.AO6	Default	Normal	No	1.0000	Hold	
BACnetIP.AO7	ModbusTCP.AO7	Default	Normal	No	1.0000	Hold	
BACnetIP.AO8	ModbusTCP.AO8	Default	Normal	No	1.0000	Hold	

Input Tag: Input data tag:

Output Tag: Output data tag.

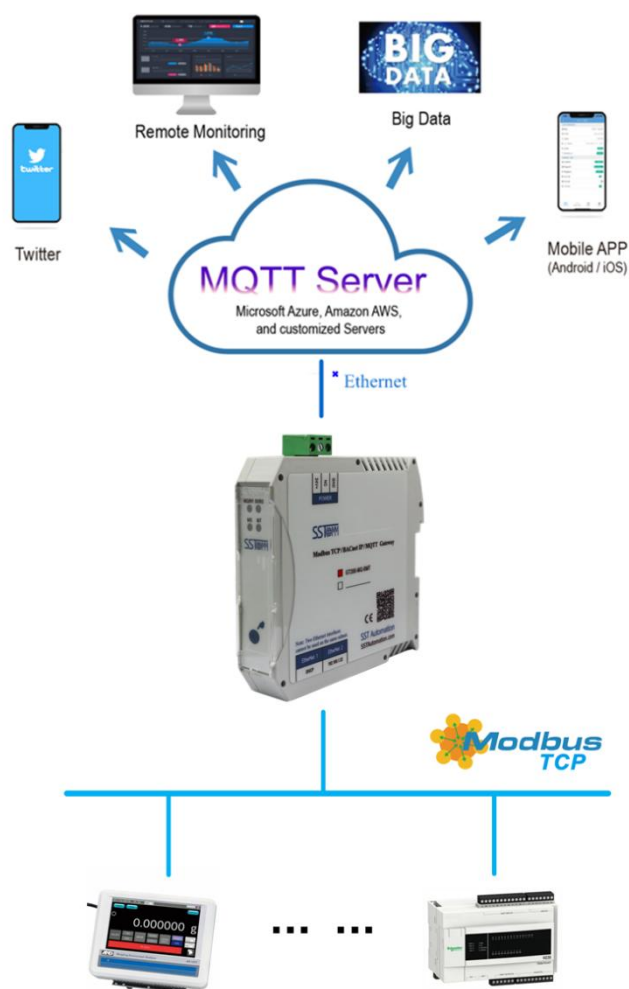
Other parameters are consistent with the "Tag Source"

6 Typical Application

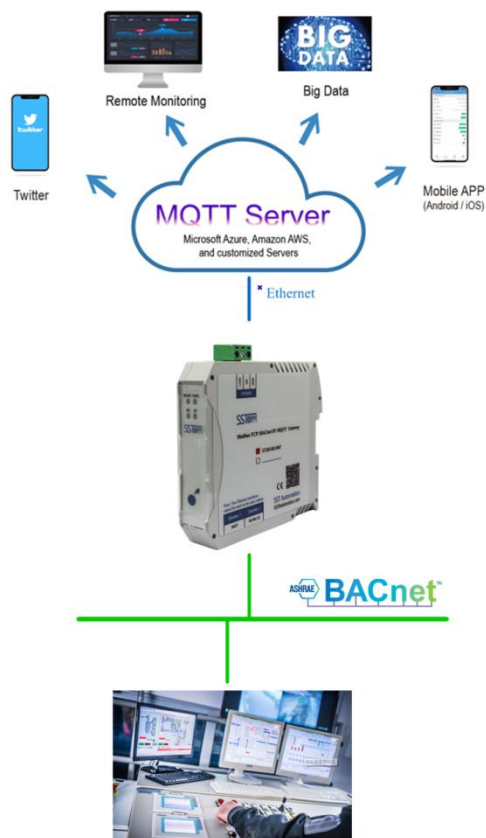
GT200-MQ-BMT gateway can realize the data exchange among Modbus TCP client/server devices, BACnet IP client, and MQTT.

The following is three typical application.

6.1 Use Case 1: Modbus TCP Client/Servers to MQTT



6.2 Use Case 2: BACnet IP Client to MQTT



6.3 Use Case 3: Modbus TCP Client/Servers and BACnet IP Client to MQTT

