

# SEW832 MQTT Gateway

## User's Manual



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## 1. Introduction

This SEW832 Ethernet+WiFi MQTT Gateway provides the ways of connecting Modbus Serial and TCP devices to MQTT Broker via Ethernet and Wireless LAN (Wi-Fi 802.11 b/g/n ). It is designed to operate serial ports through Ethernet (10/100Mbps) and wireless (Wi-Fi 802.11 b/g/n) in Modbus TCP and RTU/ASCII networks. As the data is transmitted via Modbus protocol, therefore data acquisition and controlling is available to go through Intranet and Internet.

The wireless supports 802.11 b/g/n in AP/Station mode with WEP/WPA/WPA2 encryption for data transmission security. Ethernet support 10/100 Mbps auto-detecting communication speeds.

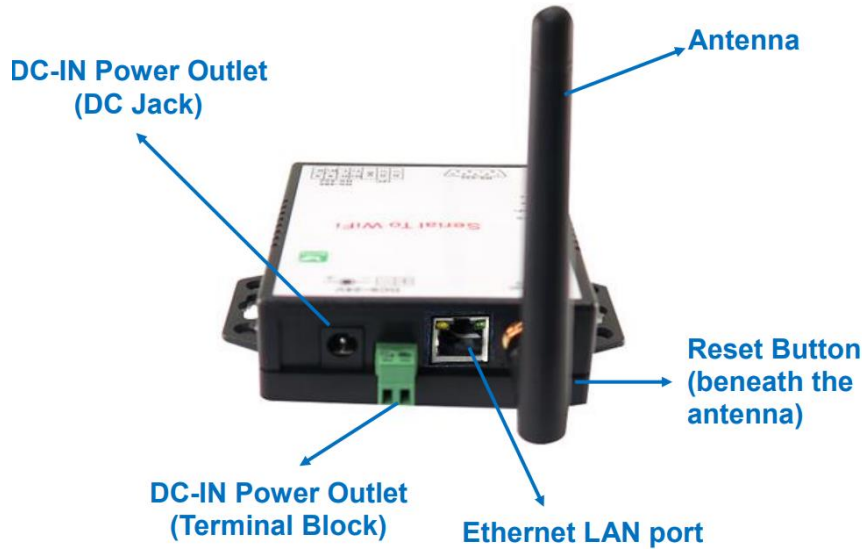
There are two serial ports as one is a RS-232 and other one is RS-422/485. Configuration is easy to operate via web page setup.

This Gateway is designed to operate 2 Serial ports (RS-232 and RS-422/485) over wireless and Ethernet network. This device is a high performance design composed with carefully selecting qualified components from reliable and certified sources. This operation manual will guide you to configure functions step by step.

This MQTT Gateway Support for MQTT protocol provides a perfect solution to make your industrial Sensor devices connect to Industrial Internet of Things (IIoT) system instantly via Wireless and/or Ethernet LAN. To run with MQTT client tools on the PC/NB or mobile devices, users can simply and effectively control/monitor remote sensors. It becomes the ideal device for transmitting the data from your RS-232 or RS-422/485 Serial interface devices or remote TCP making it possible for your software to access data or control the I/O via MQTT Broker.

## 1.1 Product Views

### Antenna Side

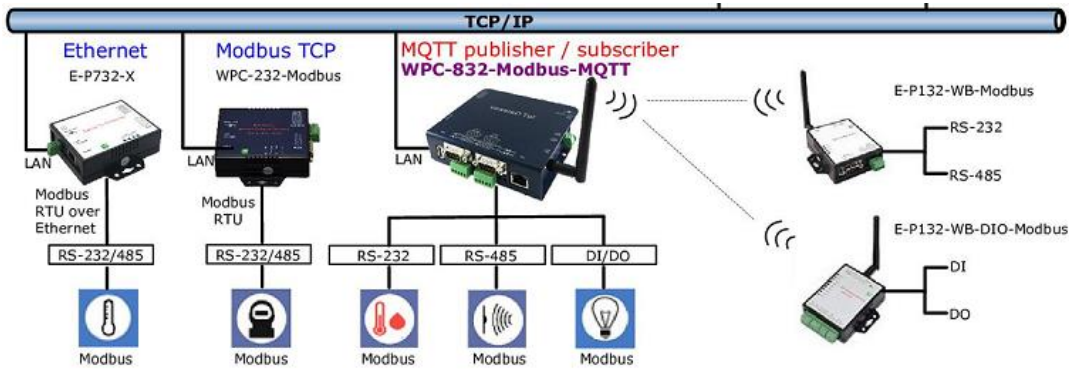


### Serial Interface Side



Figure 1 Product Views

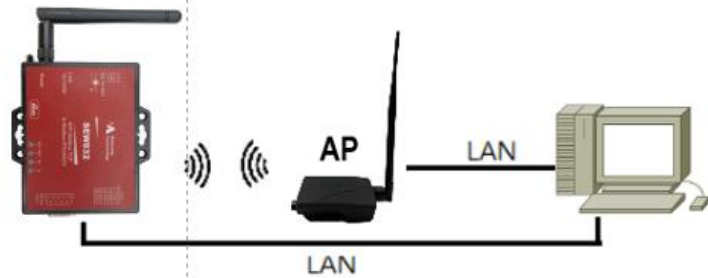
## 1.2 Wiring Architecture



### 1. RS-232

RS-232 Wiring  
Serial Device

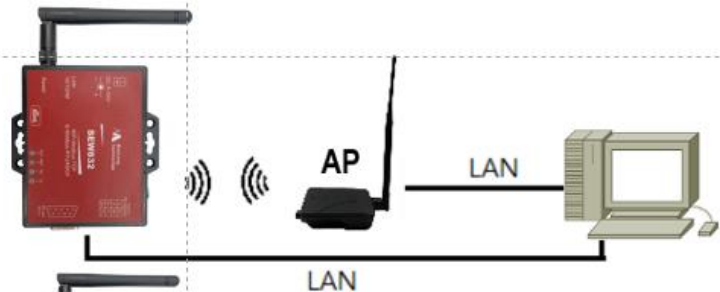
DB 9 ————— DB 9



### 2. RS-422/RS-485

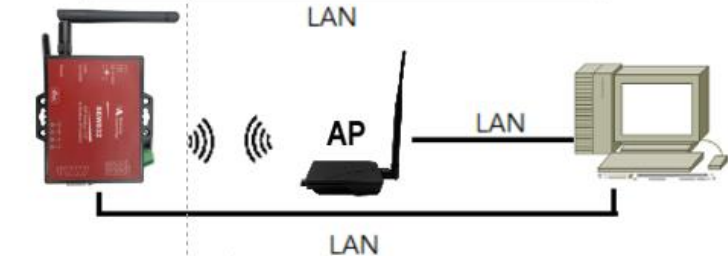
RS-422 Wiring  
Serial Device

T- ————— R-  
T+ ————— R+  
R- ————— T-  
R+ ————— T+



RS-485 Wiring  
Serial Device

D+ ————— D+  
D- ————— D-



## 2. 2.Configuration

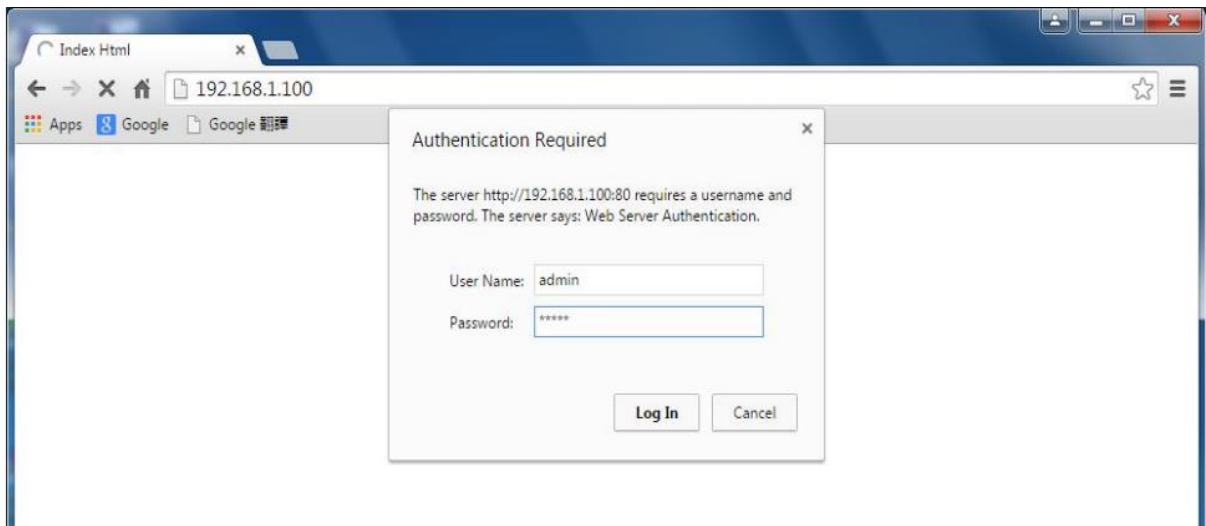
### 2.1 Configuration Via Web

Step1 → The first thing is to configure the Host PC's IP address

IP :192.168.1.xx

Step2 → Open a web page of configuration <http://192.168.1.100>

Step3 → Default *User name: "admin" and Password: "admin"*



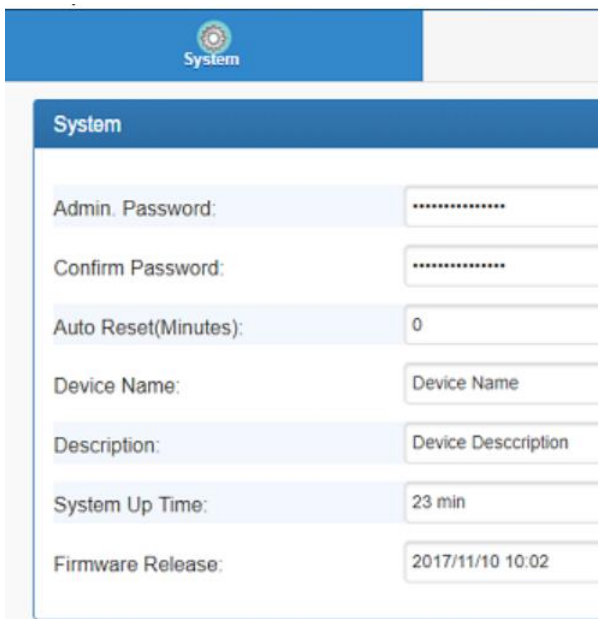
Step4 → And now you have successfully connected to this MQTT Gateway

**There are 6 setup pages as "System", "Network", "Serial", "MQTT", "Topic", "Logger".**

## 2.2 Configuration Sections

### 2.2.1 System Setup

1. System: Where one can change Password, set up Auto Reset time and modify Device Name, Description of device etc.



The screenshot shows a web-based configuration interface for the 'System' section. The page has a blue header with the 'System' logo. Below the header, there is a 'System' title bar. The main content area contains several configuration fields:

Admin. Password:	*****
Confirm Password:	*****
Auto Reset(Minutes):	0
Device Name:	Device Name
Description:	Device Description
System Up Time:	23 min
Firmware Release:	2017/11/10 10:02



2. Appearance of Wireless and Ethernet setup:

Wireless	
IP Address:	10.0.0.1
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1
MAC Address:	9c:65:f9:24:55:56

Ethernet	
IP Address:	192.168.1.199
Subnet Mask:	255.255.255.0
Gateway:	192.168.1.1
MAC Address:	9c:65:f9:24:2a:36

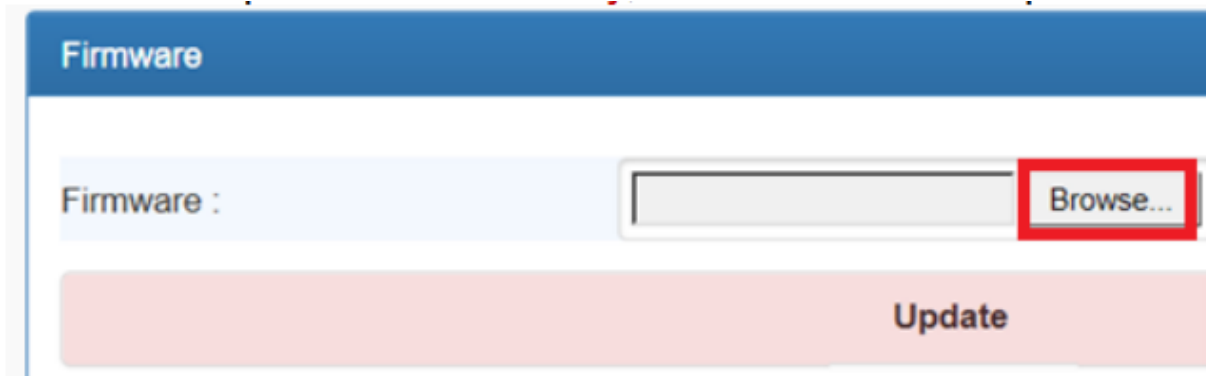
3. NTP: Enable / Disable NTP function; Set up NTP server and Time Zone.

SERVICES	
HTTP Port	80
NTP Enabled:	Enabled 
NTP Server :	openwrt.pool.ntp.org
NTP Offset :	UTC 

4. Firmware update:

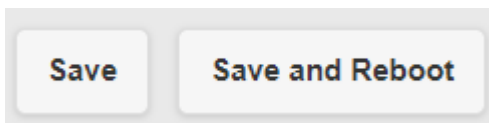
(1) If necessary, click “Browse” to open file manager



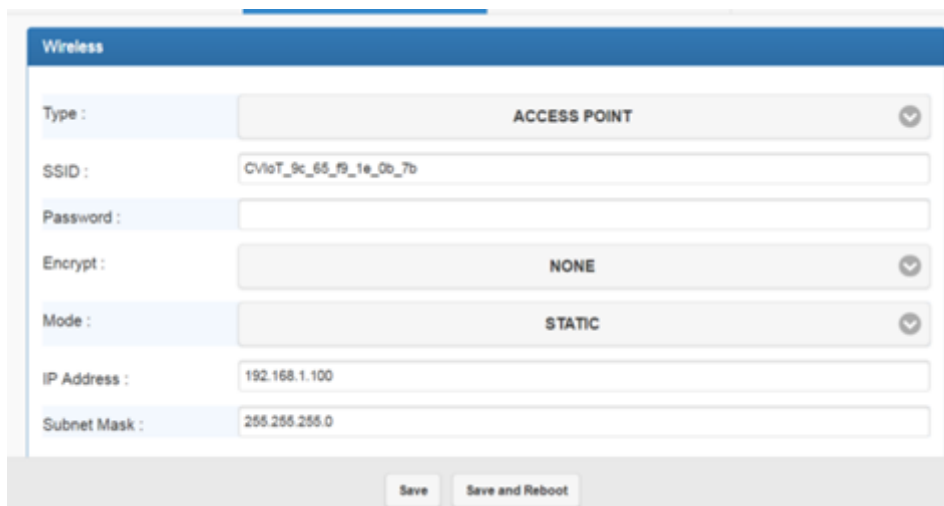


- (2) Select the file with specified version and click “Confirm” button.
- (3) When the selected file name appears on the input column, click “Update” button.

5. Up to now, Setup is successfully configured. Please click “Save” this page before “Save and Reboot” for permanent web pages.



## 2.2.2 Network Setup



1. Wireless section:

(1) Type: to select “INFRASTRUCTURE” or “ACCESS POINT”

The screenshot shows the 'Wireless' configuration page. The 'Type' dropdown menu is open, showing 'ACCESS POINT' as the current selection and 'INFRASTRUCTURE' as the selected option. Other fields include SSID (ACCESS POINT), Password (DISABLED), Encrypt (WPA2), Mode (STATIC), IP Address (192.168.1), and Subnet Mask (255.255.255.0).

(2) When selected “INFRASTRUCTURE”, go to SSID, click “Scan” will get list of available SSID, select one to link.

The screenshot shows the SSID selection dialog box. The 'Scan' button has been clicked, resulting in a list of available SSIDs. The 'edimax\_2.4G' SSID is highlighted with a red box. The list includes SSID, MAC, and Strength columns.

SSID	MAC	Strength
NAS-AP	74:DA:38:33:EA:EE	100%
edimax_2.4G	74:DA:38:14:A2:D0	73%
nhrm	B8:55:10:C8:AC:72	7%
Burn_in_test_1	00:02:70:65:99:A4	96%
Fortune	5C:F4:AB:5F:J*44	10%
CHT Wi-Fi Auto	1C:AF:F7:35:36:96	7%
CHT Wi-Fi(HiNet)	1E:AF:F7:35:36:96	57%

(3) Input password for the AP and assign STATIC IP address

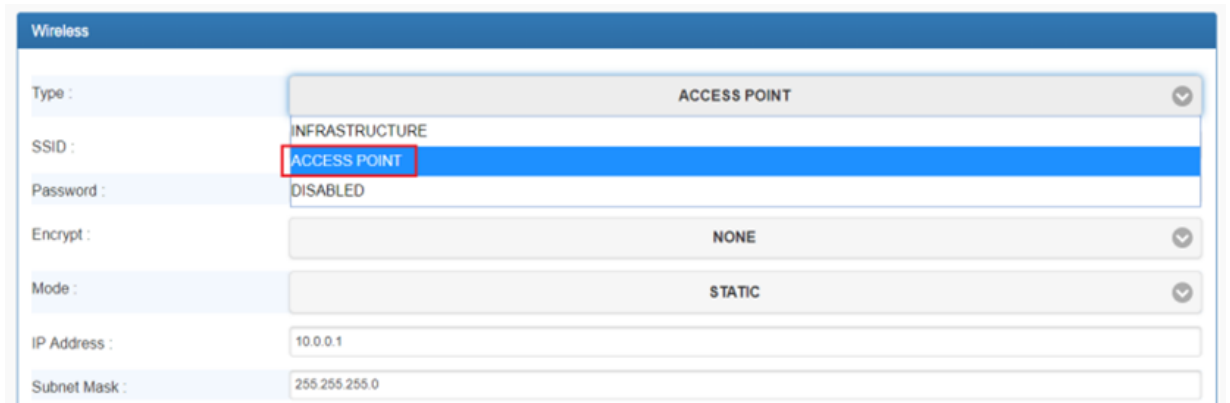
The screenshot shows the 'Wireless' configuration page with the 'Type' dropdown set to 'INFRASTRUCTURE'. The 'SSID' field is 'edimax\_2.4G\_ksh', the 'Password' field is 'arp78945612', and the 'Mode' dropdown is set to 'STATIC'. The 'IP Address' field is '192.168.1.100' and the 'Subnet Mask' field is '255.255.255.0'. The 'Save' and 'Save and Reboot' buttons are visible at the bottom.

(4) In NB/PC, choose same SSID to link. NB/PC must close Ethernet in

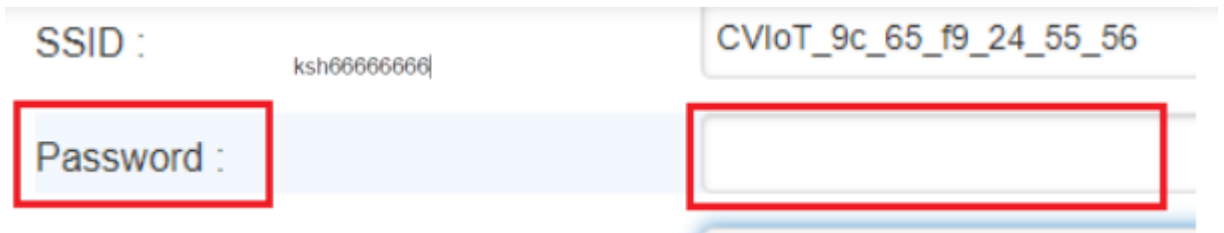
advance



2. When selected “ACCESS POINT”, Converter acts as an Access Point which is allowed to be connected by PC /NB /Smart Phone/ PAD. It supports DHCP server function. Soft AP broadcasts its SSID “CVIoT\_XX\_XX\_XX\_XX\_XX\_XX”. PC /NB /Smart Phone/PAD should connect to this SSID and then open web browser with default IP for Converter setup.

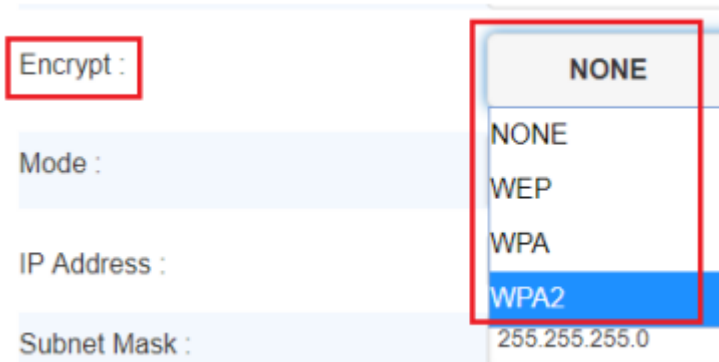


3. Password: Key in selected AP log in password



SSID : ksh66666666 CVIoT\_9c\_65\_f9\_24\_55\_56  
Password : [Redacted]

4. Encrypt

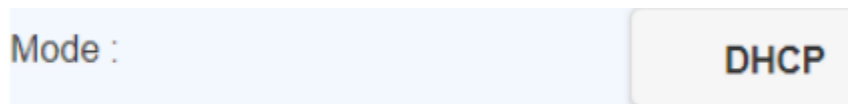


Encrypt : [Redacted]  
Mode : [Redacted]  
IP Address : [Redacted]  
Subnet Mask : 255.255.255.0

- NONE
- NONE
- WEP
- WPA
- WPA2

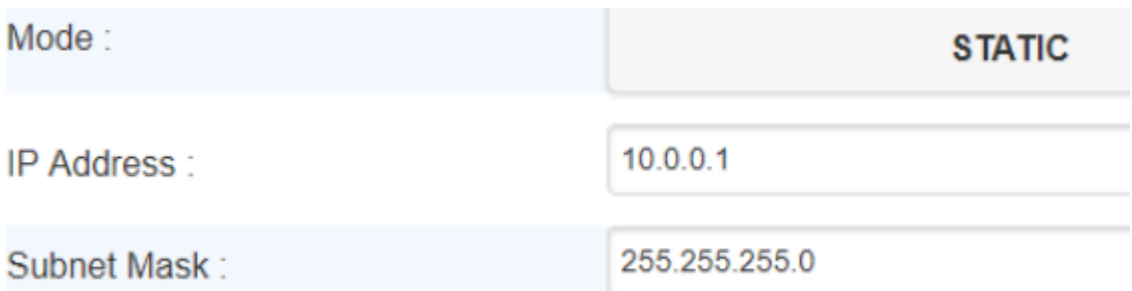
5. Mode: IP Address

(1) "DHCP": Let AP to assign IP address to itself



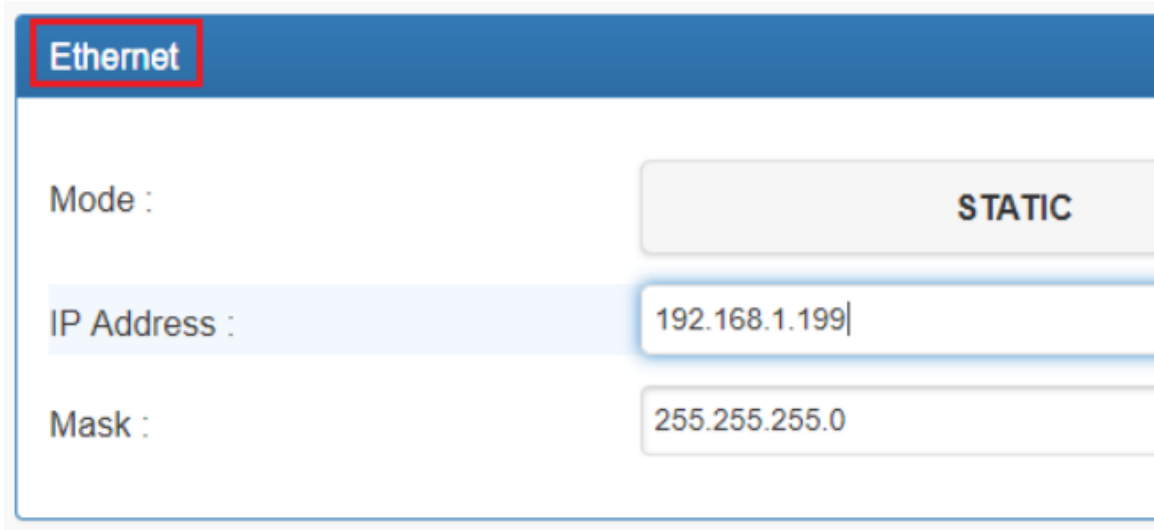
Mode : DHCP

(2) "STATIC": To input assigned IP address, Subnet Mask.



Mode : STATIC  
IP Address : 10.0.0.1  
Subnet Mask : 255.255.255.0

6. Ethernet: select STATIC or DHCP to assign IP address.



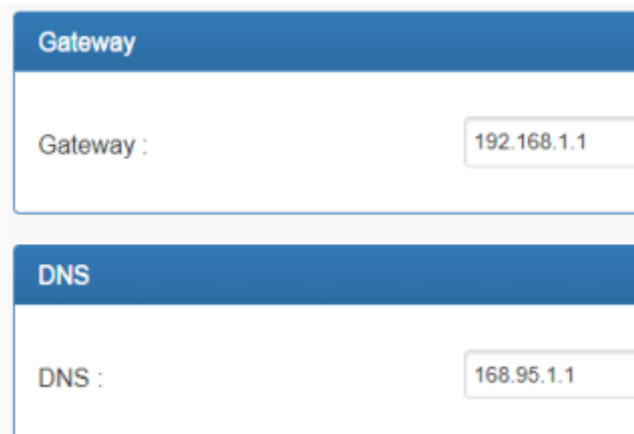
**Ethernet**

Mode : **STATIC**

IP Address : 192.168.1.199

Mask : 255.255.255.0

7. Gateway and DNS: To check with MIS for right IP address.



**Gateway**

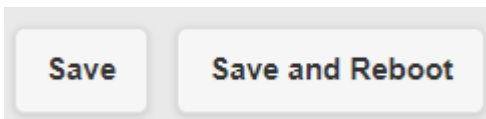
Gateway : 192.168.1.1

**DNS**

DNS : 168.95.1.1

※The Gateway must be set with correct IP enable to connect with Internet.

8. Up to now, Setup is successfully configured. Please click “Save” this page before permanent change of configuration.

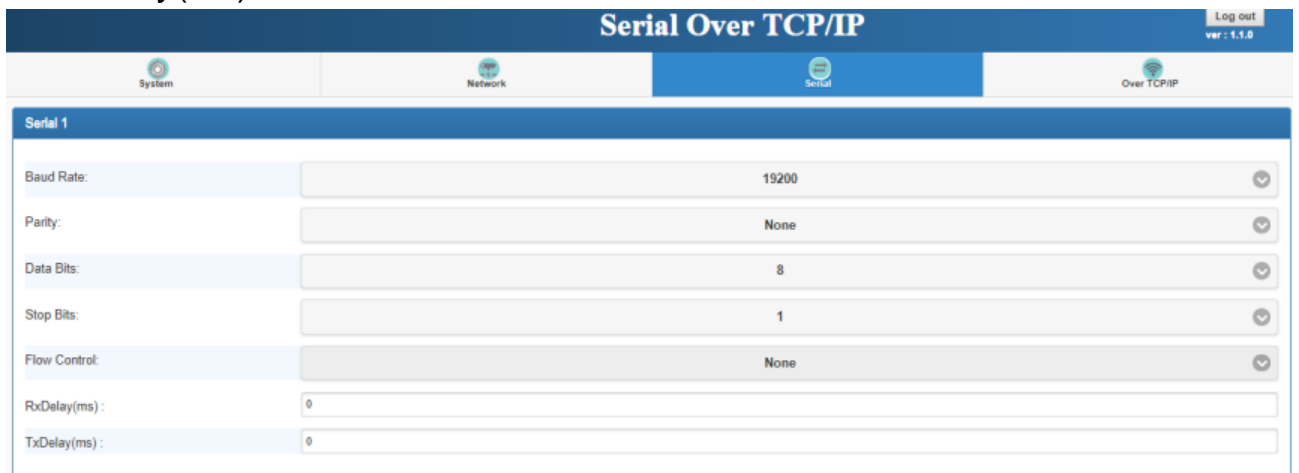


**Save** **Save and Reboot**

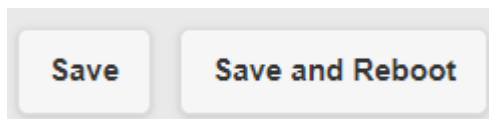
## 2.2.3 Serial Port Setup

Input each parameters to match with the remote terminal units.

1. Baud Rate
2. Parity
3. Data Bits
4. Stop Bits
5. Flow Control
6. RxDelay(ms)
7. TxDelay(ms)



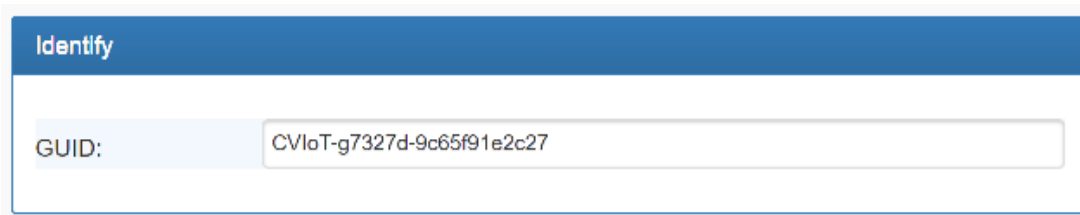
9. Click “Save” this page before permanent pages



## 2.2.4 MQTT Setup

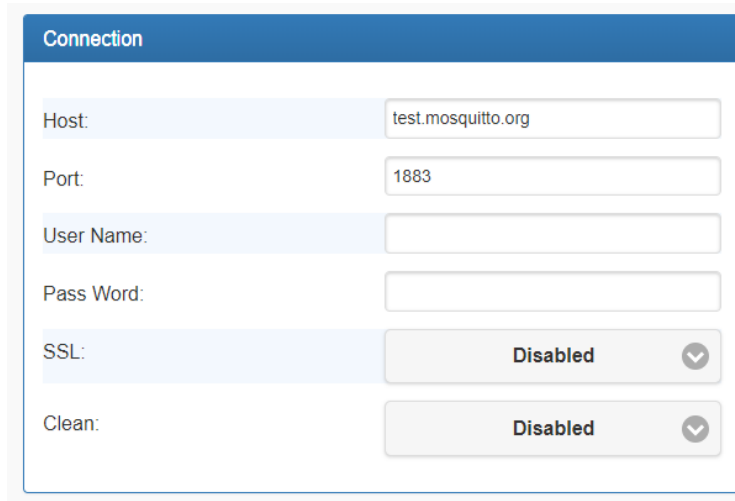


1. Client GUID: it must be the only one in all client side. This value is a default and not to be modified.



The 'Identify' form has a blue header with the title 'Identify'. Below the header is a single input field labeled 'GUID:' containing the text 'CVIoT-g7327d-9c65f91e2c27'.

## 2. Configuration of connection with MQTT Broker.

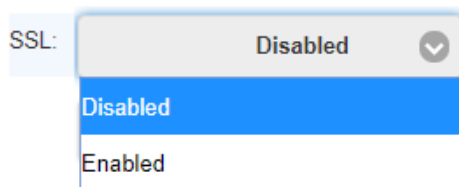


The 'Connection' form has a blue header with the title 'Connection'. It contains several fields: 'Host:' with 'test.mosquitto.org', 'Port:' with '1883', 'User Name:', 'Pass Word:', 'SSL:' with a dropdown menu set to 'Disabled', and 'Clean:' with a dropdown menu set to 'Disabled'.

1.1 Input Host IP and Socket Port number. Example: test.mosquitto.org is a free Broker for testing purpose only

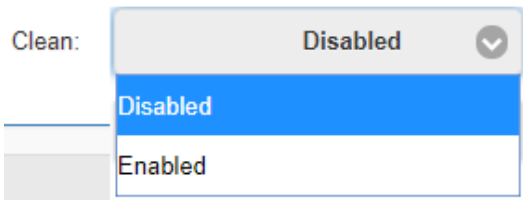
2.2 If needed, may input User Name and Password.

### 3. SSL: Enabled or Disabled.



A dropdown menu for the 'SSL:' field. The current selection is 'Disabled'. The menu is open, showing 'Disabled' (highlighted in blue) and 'Enabled' as options.

### 4 Clean session: Enabled or Disabled.



A dropdown menu for the 'Clean:' field. The current selection is 'Disabled'. The menu is open, showing 'Disabled' (highlighted in blue) and 'Enabled' as options.

4.1 When "Clean session" set "Disabled", it will build a permanent dialog with MQTT Broker. The dialog will keep working and save off-line message until the dialog to be cancelled due to overtime.

4.2 When “Clean Session” set “Enabled” , it will build a temporary dialog with MQTT Broker. The dialog will be terminated when client break the connection with MQTT Broker.

## 2.2.5.TOPIC Setup

Topics : (The PAYLOAD format is in JSON format.)  
PUBLISH "cviot-48c4-9e65-f905-a657/Register/<RegName>"  
SUBSCRIBE "cviot-48c4-9e65-f905-a657/Register/set\_<RegName>" (If SUB. is checked.)

No.	RegName	Media	Slave	R.Start	Endial	Format	Count	INT.S	QoS	Retain	SUB.
1	T1	Serial 1	1	40001	Little	INT16	1	10	0	<input checked="" type="checkbox"/>	<input type="checkbox"/>
2	T2	Socket 1	1	1	Little	UINT16	1	30	0	<input type="checkbox"/>	<input checked="" type="checkbox"/>
3		Socket 1	0	0	Little	UINT16	1	1	0	<input type="checkbox"/>	<input type="checkbox"/>

Topics : (The PAYLOAD format is in JSON format.)  
PUBLISH "cviot-48c4-9e65-f905-a657/Register/<RegName>"  
SUBSCRIBE "cviot-48c4-9e65-f905-a657/Register/set\_<RegName>" (If SUB. is checked.)

- PUBLISH a topic as per RegName to MQTT Broker: on the contrary, to subscribe this topic must input with whole line of “cviot-48c4-9e65-f905-a657/Register/<RegName>”
- SUBSCRIBE a topic as per RegName from MQTT Broker: On the contrary, there should be a topic as per “cviot-48c4-9e65-f905-a657/Register/set\_<RegName>” was published to MQTT Broker.

5.1 Section “Medias” for MQTT Client to get data from Serial Port and TCP Remote devices.

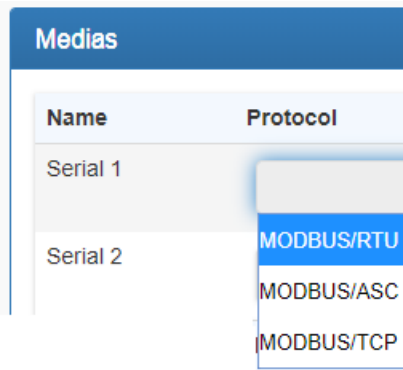
**Medias**

Name	Protocol
Serial 1	MODBUS/RTU
Serial 2	MODBUS/RTU

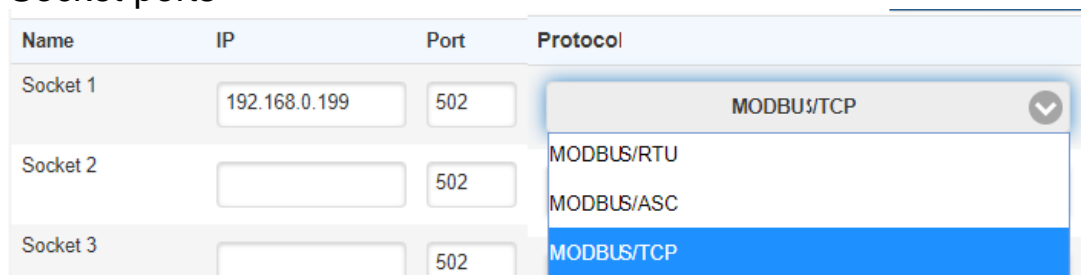
Name	IP	Port	Protocol
Socket 1	192.168.0.199	502	MODBUS/TCP
Socket 2		502	MODBUS/TCP
Socket 3		502	MODBUS/TCP
Socket 4		502	MODBUS/TCP

### 5.1.1 Serial ports





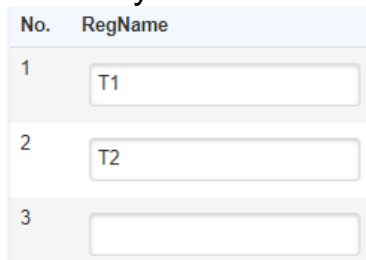
### 5.1.2 Socket ports



## 5.2 TOPIC settings

### 5.2.1 No.1 ~ 16:

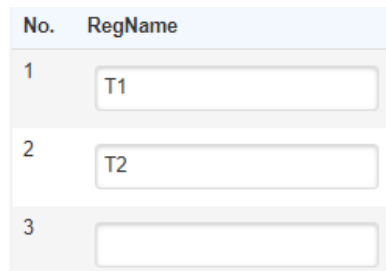
Gateway can set 16 topics publish to MQTT Broker.



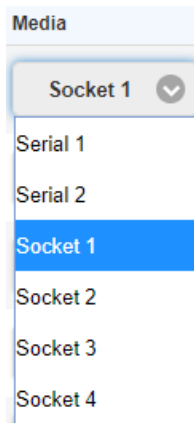
### 5.2.2 RegName:

5.2.3 Input name of a topic. It composes with GUID as a completed topic string.

For example: 『 CVIoT-g7327d-9c65f91e2c27/Register/T1 』 ,  
“Register” is default and similar as a folder.



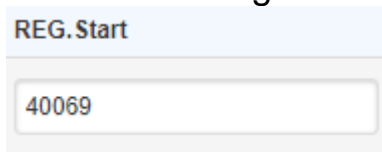
### 5.2.4 Media:



5.2.5 Slave: Input ID of Modbus Slave. Different Modbus Devices on the same “Media” must not repeat ID.



5.2.6 R.Start: Register Start address.



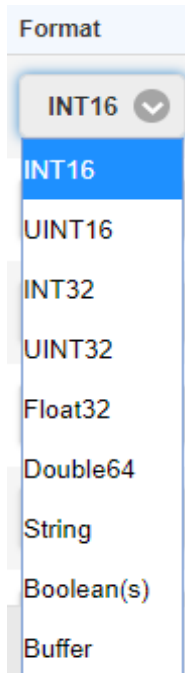
- 1 – 9999 : Read/Writeable Coils (modbus function code 0x01)
- 10001-19999: Read only Coils (modbus function code 0x02)
- 30001-39999: Read only Registers (modbus function code 0x04)
- 40001-49999: Read/Writeable Registers (modbus function code 0x03)

\* Please check Modbus device whether register start from 0 or 1.

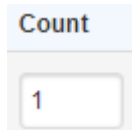
### 5.2.7 Endial: Endianness



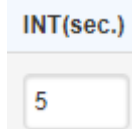
### 5.2.8 Format: Numeric format selections



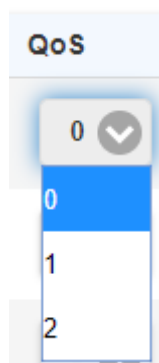
5.2.9 Count: Length of register to read out in JSON format.



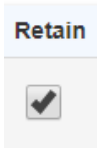
5.2.10 INT.S: Interval time (seconds) for data subscribing and publishing.



5.2.11 QoS: MQTT quality of service.



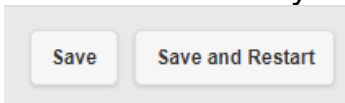
5.2.12 retain: For "Publish" purpose, retain last value in MQTT Broker until next publish.



5.2.13 SUB.: Subscribe data from MQTT Broker.



5.2.14 Click “Save” before change page or click “Save and Restart” to reboot Gateway.



## 2.2.6. Logger page

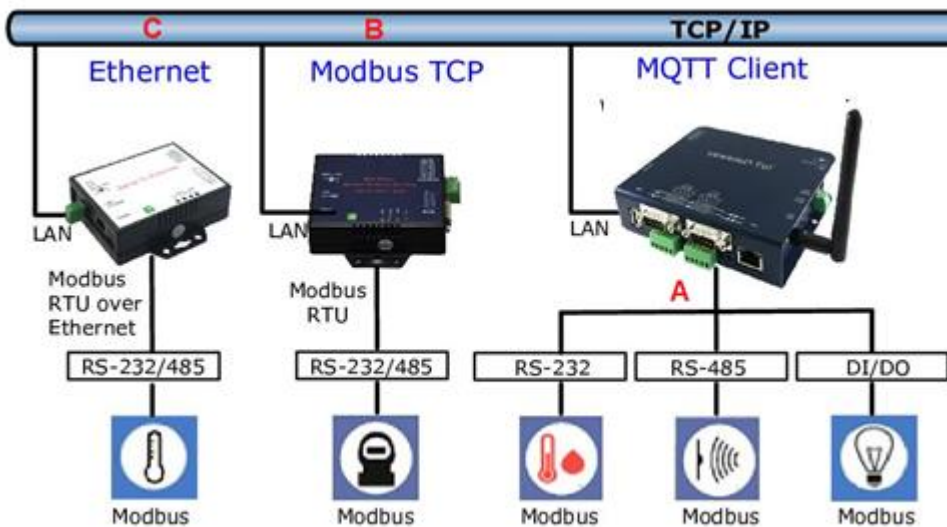
1. Status: to update connection status and values of subscription or publishing.

Status	
Name	Value
cviot-48c4-9e65-f905-a657/Connection/Serial1	"connected"
cviot-48c4-9e65-f905-a657/Connection/Socket1	"connected"
services.MqttGateway	"connected"
cviot-48c4-9e65-f905-a657/Register/P01	""
cviot-48c4-9e65-f905-a657/Register/P02	0
cviot-48c4-9e65-f905-a657/Exception/P02	""

2. Logger: to update status of payload upon subscription or publishing.

Logger		
Time	Scope	Message
2019-04-22 15:31:25	MQTT	publish>{"Topic":"cviot-48c4-9e65-f905-a657/Register/P02","Payload":"0","QoS":0,"Retain":false}
2019-04-22 15:31:25	Gateway	Fetch P02 register is 0
2019-04-22 15:31:25	MQTT	publish>{"Topic":"cviot-48c4-9e65-f905-a657/Exception/P01","QoS":0,"Retain":true}
2019-04-22 15:31:25	Gateway	Fetch/Preset P01 register have exception undefined
2019-04-22 15:31:10	MQTT	publish>{"Topic":"cviot-48c4-9e65-f905-a657/Exception/P01","QoS":0,"Retain":true}
2019-04-22 15:31:10	Gateway	Fetch/Preset P01 register have exception undefined

### 2.2.7.Data acquisition device style settings:



A style:

Protocol: select "RTU"

Media: Serial 1 or Serial 2

B style:

Protocol: select "TCP"

Media: Socket 1 ~ 4

C style:

Protocol: select "RTU"

Media: Socket 1 ~ 4

## 2.2.8. MQTT Topic List

Topics	Payload Format	Note
<GUID>/Register/<RegName>	JSON	Format of RegName existing value
<GUID>/Connection/<Media>	STRING	Media connection status as follows: 『 "disconnected" 』 『 "connecting" 』 『 "connected" 』
<GUID>/Exception/<RegName>	STRING	Exception happened upon reading RegName. STRING states the exception.

## 2.2.9 Reset Button

If any chance you forgot the login password or have incorrect settings making this Device inoperable, upon the power is on and the “SYS” LED light on, use a point tip to press this button and hold it for more than 20 seconds the release the point tip. The Device will reboot and all the parameters will be reset to the factory default.