



**EEM-LoRa System
Instruction
Version 2018.1**

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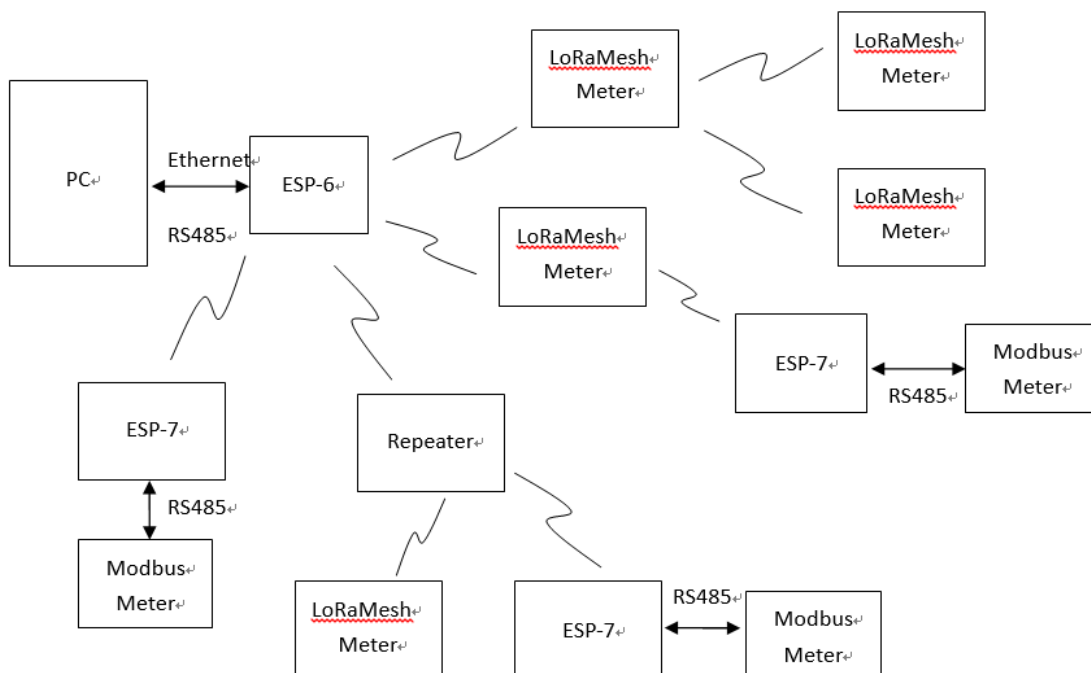
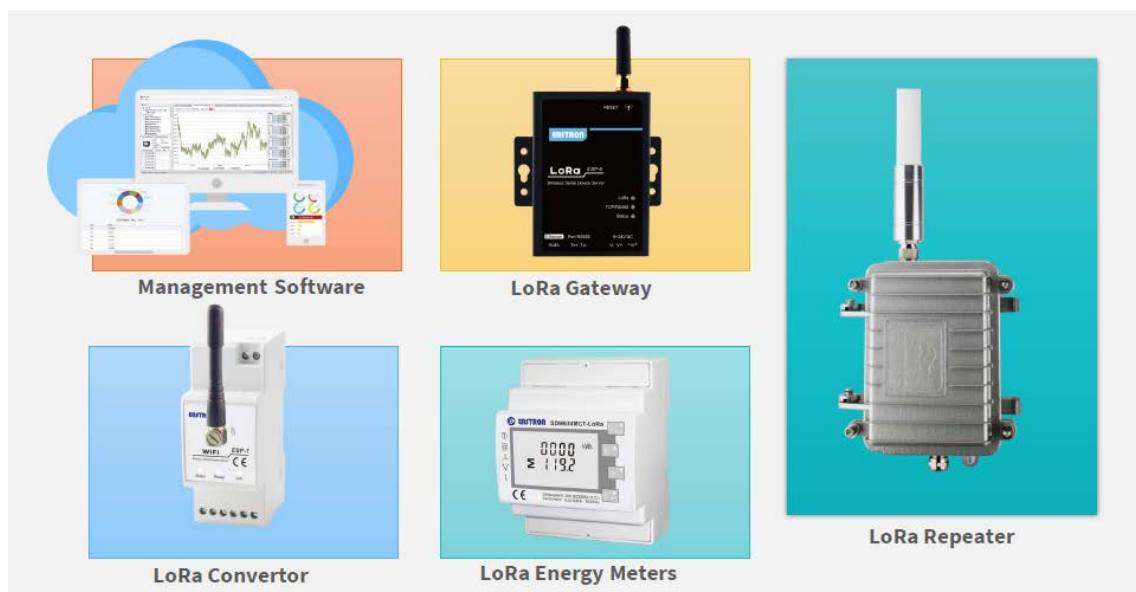
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1. EEM-LoRa System Instruction

The EEM-LoRa System, is consisted of gateway (ESP-6), converter (ESP-7), LoRaMesh meter (SDM630MCT-LoRa, SDM230-LoRa) and repeater under the LoRaMesh communication with self-defined protocol. The wireless meter reading solution will be built on using with the meter reading software (EEM-LoRa).

The LoRaMesh communication supports Mesh transmission, and supports the jump-transmission maximum up to 4 grades. The terminal devices (LoRaMesh meter or ESP-7) also support the jump-transmission. The system works with self-organizing network mode, and the new device will join the network automatically when power-on. If the communication distance is too long, the repeater can be added to help enhance the single.

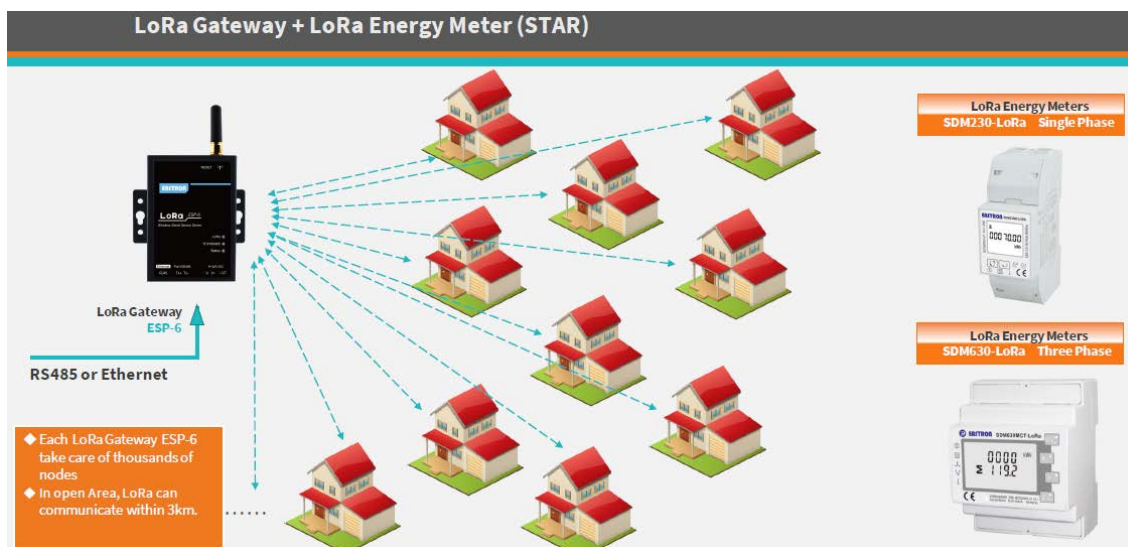


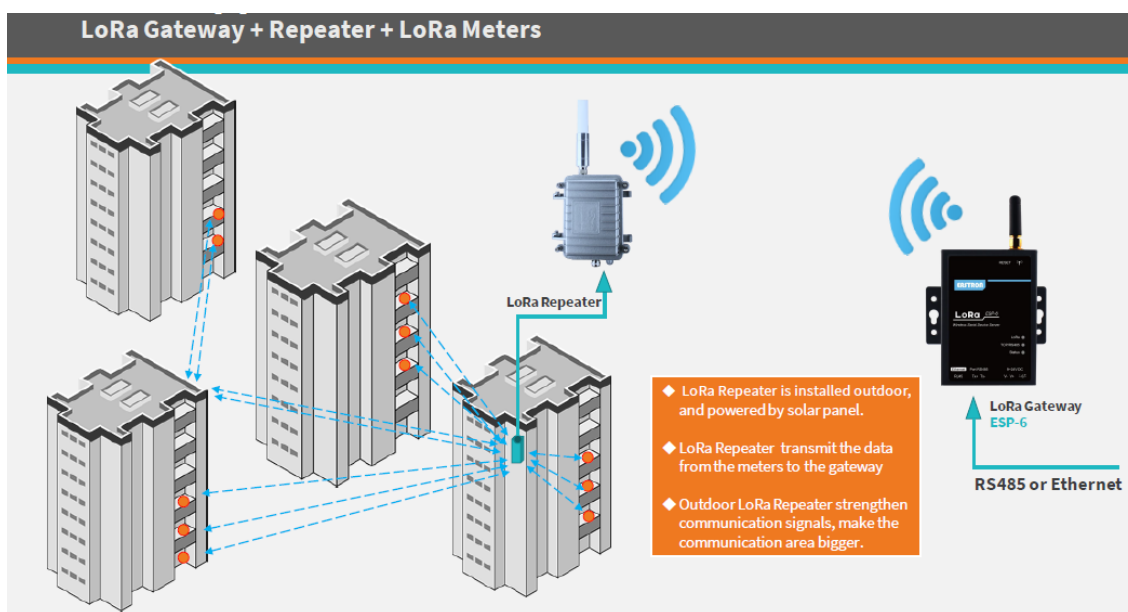
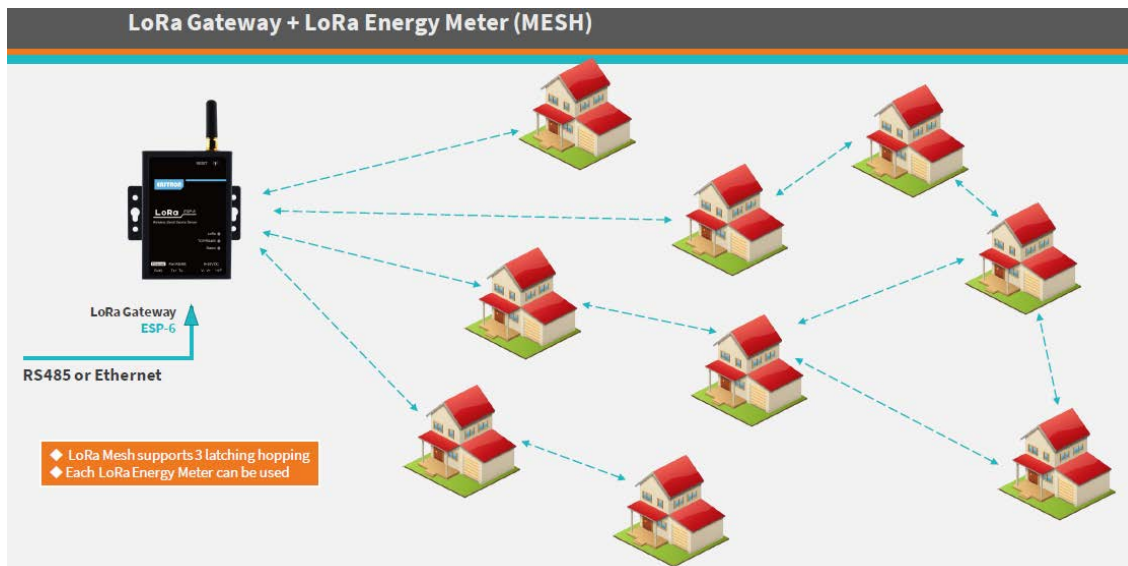
The complete reading process: the wireless meter reading software (EEM-LoRa) connected to the ESP-6 via Ethernet or RS485, and the reading data commands to be delivered to the ESP-6, after the ESP-6 received the commands, the command will be converted into the LoRa signal and sent to the terminal device (LoRaMesh meter or ESP-7), and then waits for the response of the terminal device. If a command response from the terminal device is received, the command is transmitted to the software. During the LoRaMesh communication process, the system identify all the devices via the unique LoRa ID number.

Notice: The meter reading software can also be developed by the customer according to the communication protocol provided by EASTRON.

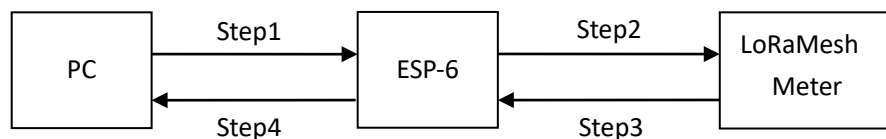
2. Application

2.1 ESP-6+ LoRaMesh Meter





You can build a meter reading system by LoRaMesh meter and ESP-6, please refer to the sketch map as below:

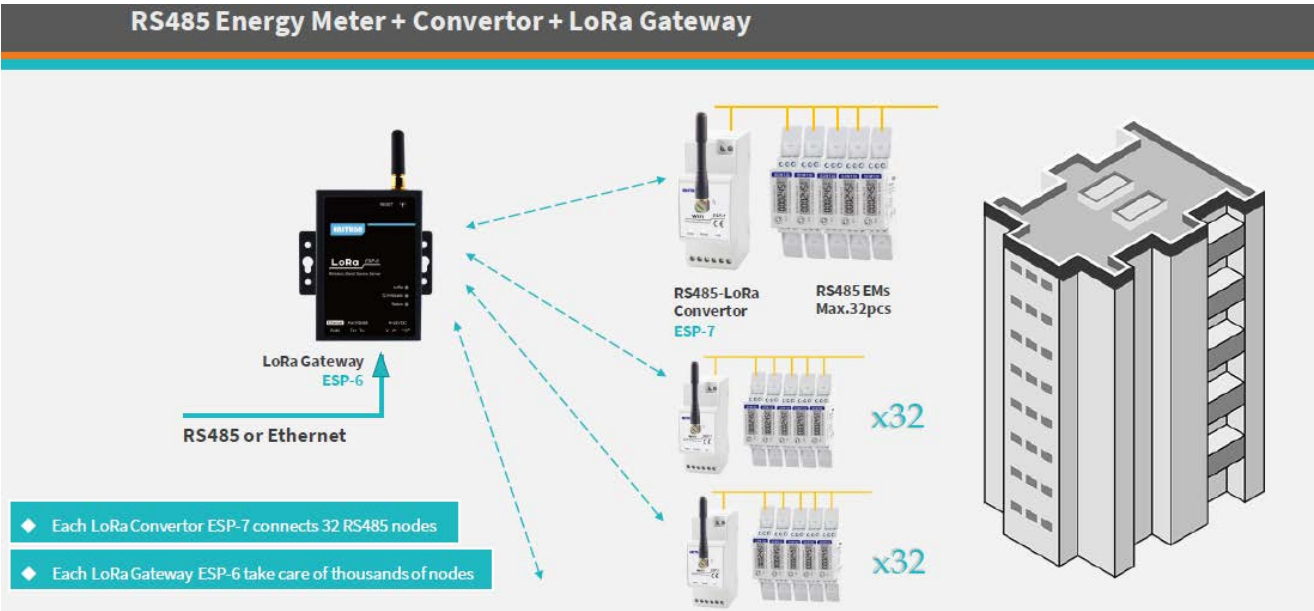


During the communication process, for ESP-6, Step2 is the downlink operation and Step4 is the uplink operation. For the LoRaMesh meter, there is only the Step3 uplink operation and no downlink operation. Both Step2 and Step3 are the communication process of LoRaMesh.

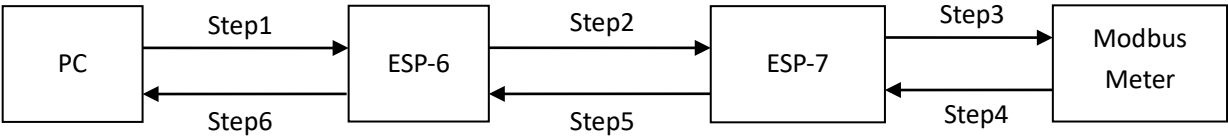
In this application, the meter reading command is sent to the ESP-6 by the software, then the ESP-6 converts the command into the LoRa signal and sends it to the LoRaMesh meter. When the LoRaMesh meter receives the command and analysis it, the reading data will be sent to the ESP-6 via LoRa signal. After received the returned

command, the ESP-6 transmit the reading data to the software through Ethernet or RS485. So far, a completed meter reading process is completed.

2.2 ESP-6+ ESP-7+Modbus Meter



You can build a meter reading system by ESP-7&ESP-6 with traditional Modbus meter, please refer to the sketch map as below:



In this process, for ESP-6, Step2 is the downlink operation and Step6 is the uplink operation. For ESP-7, Step3 is the downlink operation and Step5 is the uplink operation. For Modbus meters, only Step4 uplink operation, no downlink operation. Both Step2 and Step5 are the communication via LoRaMesh.

The reading command sent from the software to ESP-6, then the ESP-6 converts the command into LoRa signal and sends it to ESP-7; after received the reading command, ESP-7 transmit it to the Modbus meters via RS485. After the command received by the Modbus meter, the reading data will be sent to the ESP-7 after analysis, and then the reading data be sent to the ESP-6 through the LoRa signal. After receiving the response command, the ESP-6 send the data to software via Ethernet or RS485. So far, a completed meter reading process is completed.

3. Device user manual

3.1 Gateway ESP-6



3.1.1 Instruction

The ESP-6 is powered by DC and has two communication ports: Ethernet and RS485, user can connect the ESP-6 with PC via one of the two ports. During the using, it is necessary to ensure that the LoRaMesh communication parameters of the ESP-6 are consistent with that of the terminal device (LoRaMesh meter or ESP-7), so that LoRaMesh communication can be realized.

3.1.2 Specifications

- Supply voltage: 9 ~ 24VDC, the maximum input voltage: 28VDC, maximum consumption: <2.5W
- Communication frequency: 470MHz/433MHz; there is 8 communication channels under every frequency band, user can choose which in need.
- Spreading Factor (SF) : 7 ~12(settable), factory default SF=9;
- The maximum transmit power 100mW, low receiver sensitivity -112dBm / 9.6kbps;
- Communication distance: open area, communication distance up to 2.5km; urban area, communication distance up to 1.5km;
- Penetration: can penetrate 4 layers (reinforced concrete floor);

- RS485 communication parameters can be set: baud rate: 2400 ~ 38400 bps can be set; parity bit: None / Odd / Even; stop bit: 1/2 bit; data bit: 8 bit; factory default: 9600 bps, None, 8 data bit, 1 stop bit;
- TCP/IP communication port: RJ45,10/100Mbps ;
- Operating temperature range: -25 to 55 ° C
- Storage temperature range: -40 to 70 ° C
- Humidity Range: <95% RH at 50° C (non-condensing).

3.1.3 Setting Parameters

Type	Parameters	Parameter setting instruction	Example
LoRaMesh Communication	Spreading Factor (SF)	Setting Range: 7~12 Data Type: Hex Data Length: 2 byte Factory Default: 9 Remark: After the parameter is set, user need to restart the device to take effect.	FF FF FF FF 00 10 FD 04 03 06 44 48 44 5A 00 09 64 82 00 09 is the SF which need be set =9 64 82 is the CRC check code, low byte first
	Frequency	Find the setting parameters in datasheet 1 Data Type: Hex Data Length: 2 byte 470MHz frequency band default: 470.8MHz 433MHz frequency band default: 433.8MHz Remark: After the parameter is set, user need to restart the device to take effect.	FF FF FF FF 00 10 FD 07 03 06 44 48 44 5A 00 01 71 B4 00 01 is the Hex of the frequency which need be set 71 B4 is the CRC check code, low byte first
RS485 Communication	Baud Rate	Setting Range: 2400~38400 bps。 0 : 2400 bps; 1 : 4800 bps; 2 : 9600 bps; 3 : 19200 bps; 4 : 38400bps;	FF FF FF FF 00 10 00 1C 00 02 04 40 00 00 00 E6 C5 40 00 00 00 is the baud rate to be set =9600 bps E6 C5 is the CRC check code, low byte first.

		Data Type: Folat Data Length: 4 byte Factory Default: 9600bps	
	parity bit& stop bit	Setting Range: 0: None, 1 stop bit 1: Even, 1 stop bit 2: Odd, 1 stop bit 3: None, 2 stop bit Data Type: Float Data Length: 4 byte Factory Default: None, 1 stop bit	FF FF FF FF 00 10 00 12 00 02 04 3F 80 00 00 7F 75 3F 80 00 00 is the parity bit& stop bit to be set = Even, 1 stop bit 7F 75 is the CRC check code, low byte first.
Ethernet Communication	IP address、subnet mask、default gateway、IP port number, etc.	The IP address occupies 4 bytes, the subnet mask occupies 4 bytes, the default gateway occupies 4 bytes, and the IP port number occupies 2 bytes. Data Format: IP address - subnet mask - default gateway - IP port number Data Type: Hex Data Length: 14 byte Factory Default: IP address 192.168.1.200 subnet mask: 255.255.255.0 default gateway: 192.168.1.1 IP port number: 502	FF FF FF FF 00 10 F0 06 00 07 0E C0 A8 00 C8 FF FF FF 00 C0 A8 00 01 01 F6 C1 45 C0 A8 00 C8 is the IP address =192.168.0.200 FF FF FF 00 is the subnet mask = 255.255.255.0 C0 A8 00 01 is the default gateway = 192.168.0.1 01 F6 is the IP port number = 502 C1 45 is the CRC check code, low byte first.

3.1.4 Datasheet 1: Frequency List

470MHz	
Reference Number (Hex)	Frequency
00 00	470.8 MHz
00 01	471.1 MHz

00 02	471.4 MHz
00 03	471.7 MHz
00 04	472.0 MHz
00 05	474.1 MHz
00 06	475.0 MHz
00 07	475.3 MHz
00 08	475.6 MHz
00 09	487.0 MHz
433MHz	
Reference Number (Hex)	Frequency
00 10	433.8 MHz
00 11	434.1 MHz
00 12	434.4 MHz
00 13	434.7 MHz
00 14	435.0 MHz
00 15	437.1 MHz
00 16	438.0 MHz
00 17	438.3 MHz
00 18	438.6 MHz
00 19	450.0 MHz

The LoRa ID of ESP-6 will be posted on the product shell at the time of shipment. That number is the LoRa ID. In addition, the LoRa ID of the ESP-6 can be obtained by reading the communication. The operation method as follows:

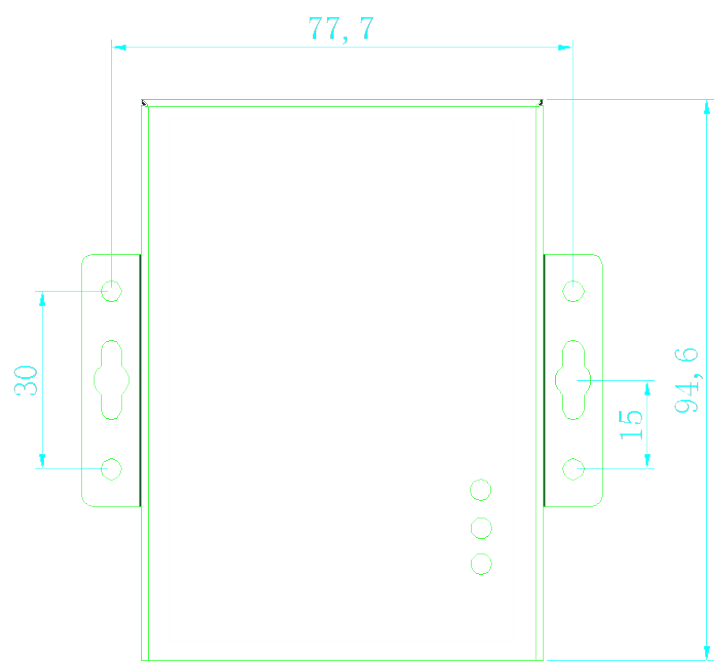
A. Send command: FF FF FF FF 00 03 FD 00 00 04 34 64

B. Received the returned command from ESP-6, resolve the LoRa ID.

For example: if the LoRa ID of ESP-6= 00000048, the received command from ESP-6 should be

FF FF FF FF 00 03 08 00 00 00 00 00 00 00 30 94 30, 00 00 00 30 is the LoRa ID, converting the Hex code to decimal data is 00000048; 94 30 is the CRC check code, low byte first.

3.1.5 Dimensions



3.2 Convertor ESP-7

3.2.1 Instruction

The ESP-7 is powered by DC or AC (optional), connected the Modbus meter via the RS485 port. Up to 32 Modbus meters can be mounted on one ESP-7. During the using, it is necessary to ensure that the LoRaMesh communication parameters of the ESP-7 are consistent with that of the ESP-6, so that LoRaMesh communication can be realized.



3.2.2 Specifications

- Supply voltage: 9 ~ 24VDC, the maximum input voltage 28VDC, the maximum consumption: <2.5W;
- Supply voltage: 85~295 VAC, the maximum consumption: <15VA;
- Communication frequency: 470MHz/433MHz; there is 8 communication channels under every frequency band for choose.
- Spreading Factor (SF) : 7~12(settable), factory default SF=9;
- The maximum transmit power 100mW, low receiver sensitivity -112dBm / 9.6kbps
- Communication distance: open area, communication distance up to 2.5km; urban area, communication distance up to 1.5km;
- Penetration: can penetrate 4 layers (reinforced concrete floor)
- RS485 communication parameters can be set: baud rate: 2400 ~ 38400 bps can be set; parity bit: None / Odd / Even; stop bit: 1/2 bit; data bit: 8 bit. The factory default parameter: 9600 bps, None, 8 data bit, 1 stop bit.

- Operating temperature range: -25 to 55 ° C
- Storage temperature range: -40 to 70 ° C
- Humidity Range: <95% RH at 50° C (non-condensing).

3.2.3 Setting Parameters

Type	Parameters	Parameter setting instruction	Example
LoRaMesh Communication	Spreading Factor (SF)	Setting Range: 7~12 Data Type: Hex Data Length: 2 byte Factory Default: 9 Remark: After the parameter is set, user need to restart the device to take effect.	FF 10 FD 04 03 06 44 48 44 5A 00 09 FC 94 00 09 is the SF=9 FC 94 is the CRC check code, low byte first.
	Frequency	Find the setting parameters in datasheet 1 Data Type: Hex Data Length: 2 byte 470MHz frequency band default: 470.8MHz 433MHz frequency band default: 433.8MHz Remark: After the parameter is set, user need to restart the device to take effect.	FF 10 FD 07 03 06 44 48 44 5A 00 01 E9 A2 00 01 is the reference number of frequency which need to be set=00 01 E9 A2 is the CRC check code, low byte first.
RS485 Communication	Baud rate	Setting Range: 2400~38400 bps。 0 : 2400 bps; 1 : 4800 bps; 2 : 9600 bps; 3 : 19200 bps; 4 : 38400bps; Data Type: Folat Data Length: 4 byte Factory Default: 9600bps	FF 10 00 1C 00 02 04 40 00 00 00 D0 DD 40 00 00 00 is the baud rate which need to be set=9600 bps D0 DD is the CRC check code, low byte first.

	Parity bit& Stop bit	Setting Range: 0: None, 1 stop bit 1: Even, 1 stop bit 2: Odd, 1 stop bit 3: None, 2 stop bit Data Type: Float Data Length: 4 byte Factory Default: None, 1 stop bit	FF 10 00 12 00 02 04 3F 80 00 00 49 6D 3F 80 00 00 is the Parity bit& Stop bit which need to be set= Even, 1 stop bit 49 6D is the CRC check code, low byte first.
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3.2.4 Datasheet 1: Frequency List

470MHz	
Reference Number (Hex)	Frequency
00 00	470.8 MHz
00 01	471.1 MHz
00 02	471.4 MHz
00 03	471.7 MHz
00 04	472.0 MHz
00 05	474.1 MHz
00 06	475.0 MHz
00 07	475.3 MHz
00 08	475.6 MHz
00 09	487.0 MHz
433MHz	
Reference Number (Hex)	Frequency
00 10	433.8 MHz
00 11	434.1 MHz
00 12	434.4 MHz
00 13	434.7 MHz
00 14	435.0 MHz
00 15	437.1 MHz
00 16	438.0 MHz
00 17	438.3 MHz
00 18	438.6 MHz
00 19	450.0 MHz

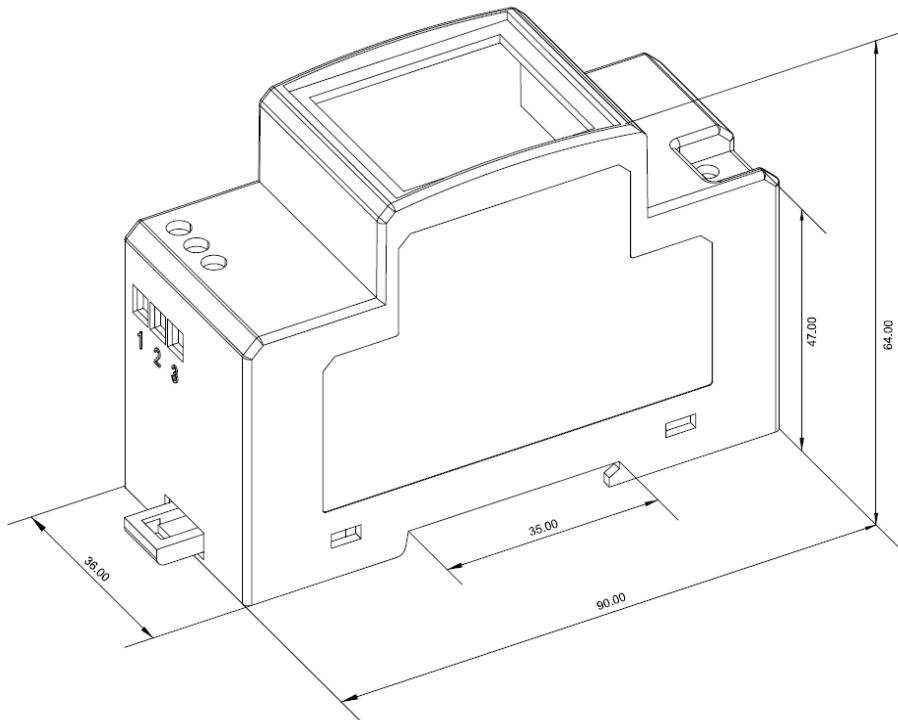
The LoRa ID of ESP-7 will be posted on the product shell when ship out. That number is the LoRa ID. In addition, the LoRa ID of the ESP-7 can be obtained by reading the communication. The operation method as follows:

- A. Send command: FF 03 FD 00 00 04 60 7B
- B. Received the returned command from ESP-7, resolve the LoRa ID.

For example: if the LoRa ID of ESP-7= 88000008, the received command from ESP-7 should be FF 03 08 00

00 00 00 05 3E C6 08 91 5A, 05 3E C6 08 is the LoRa ID, converted from the Hex code to decimal data is 88000008; 91 5A is the CRC check code, low byte first.

3.3.5 Dimension



3.3 Repeater

3.3.1 Instruction

The repeater is a device used to enlarge the signal coverage and thus extend the communication distance. The working mode of the repeater is to re-send the received legitimate LoRaMesh communication data, thereby realizing the signal hopping and achieving the purpose of extending the communication distance.

The repeater powered by the built-in lithium battery, and also allow the solar panel charging, which does not require an external power supply, and is convenient for installation and use. The battery can work for 1 week in rainy conditions when fully charged. During using, it is necessary to make sure the LoRaMesh parameters of repeater are consistent with that of the ESP-6&ESP-7.

3.3.2 Specifications

- Lithium battery parameters: 3.7V, 8000mAh;
- Solar Panel Parameters: Pm (Peak power): 5W; Vm (Peak Voltage): 5.7V; Im (Peak Current): 0.88A;
Voc (Open-circuit Voltage): 7.0V; Isc (Short-circuit Current): 0.96A
- Frequency Band: 470/433MHz; There is 8 communication channels under every frequency band for choose.
- Spreading Factor (SF) : 7~12 (settable) , factory default SF=9;
- The maximum transmit power 100mW, low receiver sensitivity -112dBm / 9.6kbps
- Communication distance: open area, communication distance up to 3.5km; urban area, communication distance up to 2km;
- Penetration: can penetrate 6 layers (reinforced concrete floor)
- RS485 communication parameters is fixed: 9600bps, None, 8 Data bit, 1 Stop bit.
- Operating temperature range: -25 to 55 °C
- Storage temperature range: -40 to 70 °C
- Humidity Range: <95% RH at 50° C (non-condensing).
- Protection Class: IP55.

3.3.3 Setting Parameters

Type	Parameters	Parameter setting instruction	Example
LoRaMesh Communication	Spreading Factor (SF)	Setting Range: 7~12 Data Type: Hex Data Length: 2 byte Factory Default: 9 Remark: After the parameter is set, user need to restart the device to take effect.	FF 10 FD 04 03 06 44 48 44 5A 00 09 FC 94 00 09 is the SF=9 FC 94 is CRC check code, low byte first.
	Frequency	Find the setting parameters in datasheet 1 Data Type: Hex Data Length: 2 byte 470MHz Frequency Band Default: 470.8MHz 433MHz Frequency	FF 10 FD 07 03 06 44 48 44 5A 00 01 E9 A2 00 01 is the reference number of frequency= 00 01 E9 A2 is the CRC check code, low byte first

		Band Default: 433.8MHz Remark: After the parameter is set, user need to restart the device to take effect.	
Re-start the software	Command for restart the software	After the parameter is set, the software restart function is triggered to enable the parameter.	FF 10 FD 1C 00 04 08 44 48 44 5A 52 45 53 54 EC 85

3.3.4 Datasheet 1: Frequency List

470MHz	
Reference Number (Hex)	Frequency
00 00	470.8 MHz
00 01	471.1 MHz
00 02	471.4 MHz
00 03	471.7 MHz
00 04	472.0 MHz
00 05	474.1 MHz
00 06	475.0 MHz
00 07	475.3 MHz
00 08	475.6 MHz
00 09	487.0 MHz
433MHz	
Reference Number (Hex)	Frequency
00 10	433.8 MHz
00 11	434.1 MHz
00 12	434.4 MHz
00 13	434.7 MHz
00 14	435.0 MHz
00 15	437.1 MHz
00 16	438.0 MHz
00 17	438.3 MHz
00 18	438.6 MHz
00 19	450.0 MHz

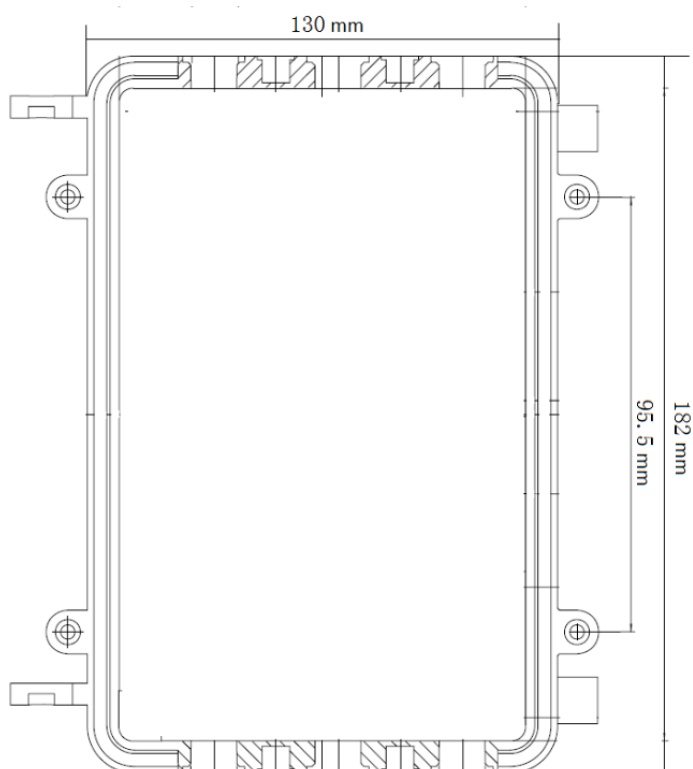
The LoRa ID information of the repeater will be posted on the product shell before shipped out. In addition, the LoRa ID information of the repeater can be obtained by communication:

A, Send command: FF 03 FD 00 00 04 60 7B

B, Received the returned command from repeater, resolve the LoRa ID.

C, For example: if the LoRa ID of Repeater = 96000001, the received command from Repeater should be FF 03 08 00 00 00 00 05 B8 D8 01 B9 15, 05 B8 D8 01 is the LoRa ID, converted from the Hex code to decimal data is 96000001; B9 15 is the CRC check code, low byte first.

3.3.5 Dimension



3.4 LoRaMesh Meter

3.4.1 Notice

During the using, it is necessary to ensure that the LoRaMesh communication parameters of the LoRaMesh meter are consistent with that of the ESP-6, so that LoRaMesh communication can be realized.

3.4.2 Protocol format

3.4.2.1 The protocol format between ESP-6 & LoRaMesh meter.

Slave ID [Ⓜ] (Hi) [Ⓜ]	Slave ID [Ⓜ] Ⓜ	Slave ID [Ⓜ] Ⓜ	Slave ID [Ⓜ] (Lo) [Ⓜ]	Reserved [Ⓜ]	Function Code [Ⓜ]	Start Address [Ⓜ] (Hi) [Ⓜ]	Start Address [Ⓜ] (Lo) [Ⓜ]	Number of Points [Ⓜ] (Hi) [Ⓜ]	Number of Points [Ⓜ] (Lo) [Ⓜ]	CRC [Ⓜ] (Lo) [Ⓜ]	CRC [Ⓜ] (Hi) [Ⓜ]
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Slave ID is the LoRa ID of LoRaMesh meter

Reserved = 01

3.4.2.2 The protocol format between ESP-6&ESP-7.

Slave ID is the LoRa ID of ESP-7, 4 byte;

Slave Meter Modbus Address is the communication address of Modbus meter which connect with ESP-7.

4. EEM-LoRa Software

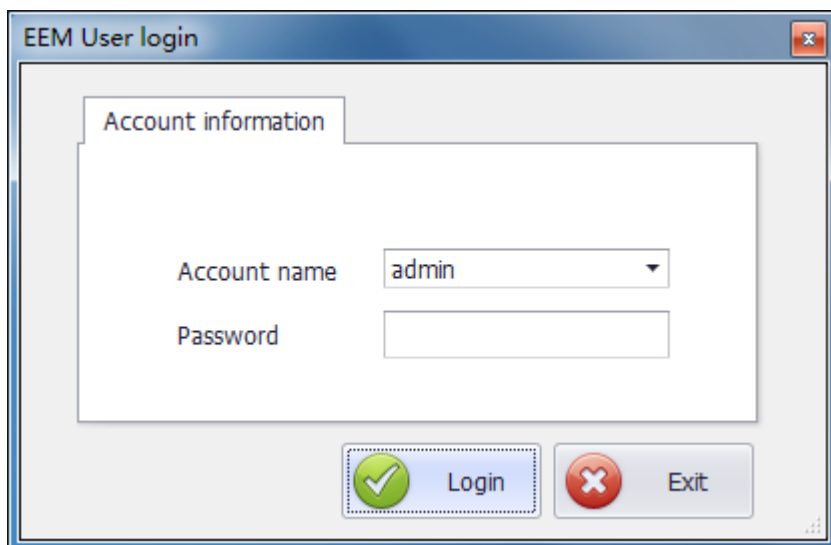
4.1 Software log-in

This part shows to how log-in the software.



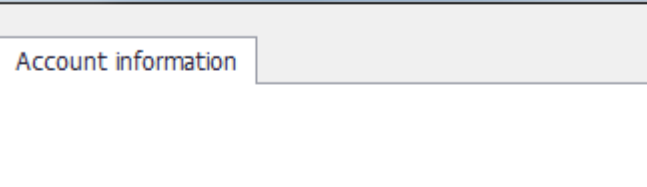
Below is the icon of the software generated after installation:

Double click the icon to run the software, the log-in page will pop up.

A screenshot of the 'EEM User login' window. The window has a title bar with the text 'EEM User login' and a close button. Inside the window, there is a tab labeled 'Account information'. Below the tab, there are two input fields: 'Account name' with a dropdown menu showing 'admin', and 'Password' with an empty text box. At the bottom of the window, there are two buttons: a green 'Login' button with a checkmark icon and a red 'Exit' button with an 'X' icon.

Fill up the account name and password, the default value of them are:

Password: 999



EEM User login

Account information

Account name admin

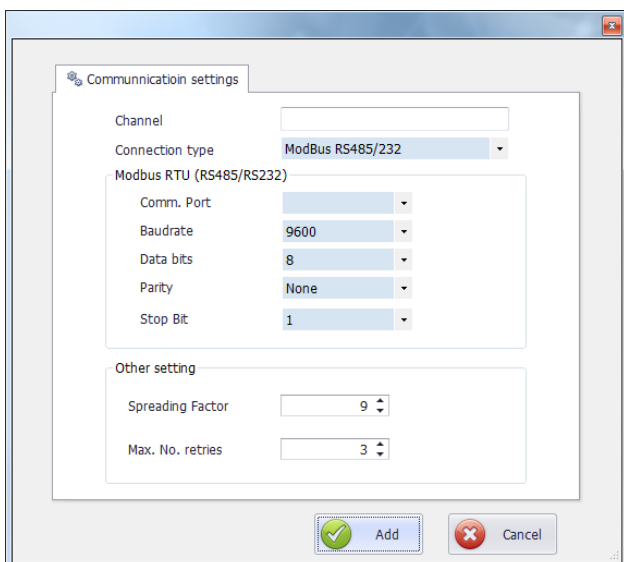
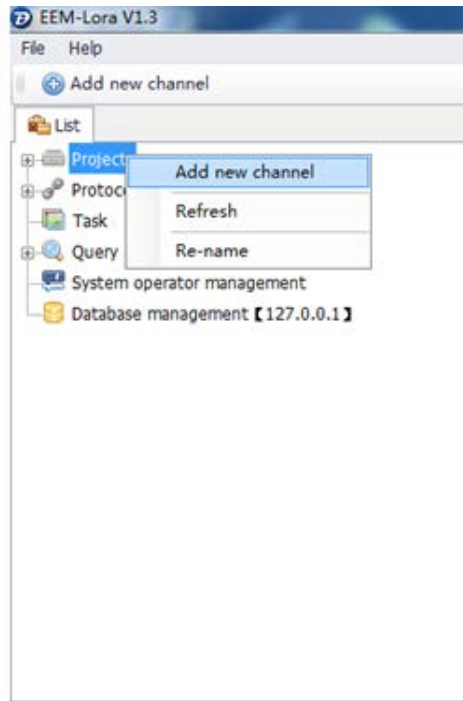
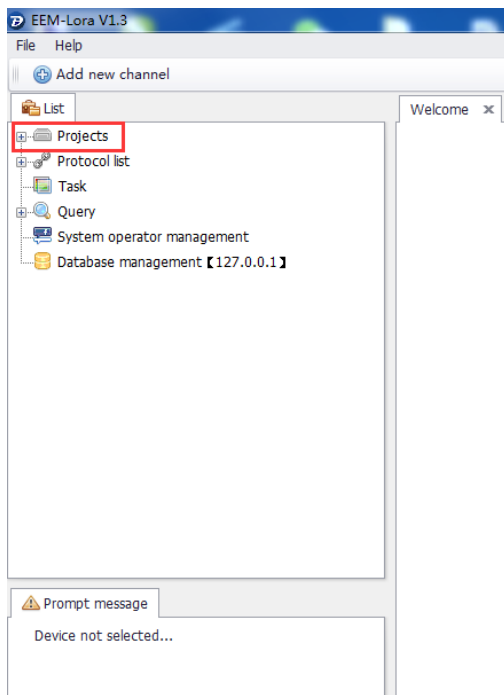
Password ***

Login Exit

The screenshot shows the EASTRON software interface. The left sidebar contains a menu with the following items: "Add new channel", "Add", "Monitor (N)", "Test", "Query", "System operator management", and "Database management (107.6.0.1)". The main window features the EASTRON logo at the top, followed by a globe graphic with a network overlay. Below the globe, there is a block of text in Chinese characters.

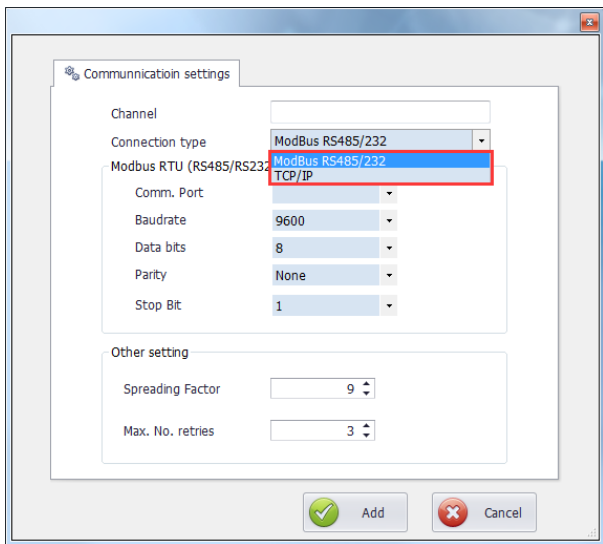
In order to build a LoRa network, the first step is generate a project.

Click “Add a new Channel”, here below window will popup



There are two options on the connection type:

1. Modbus RS485/232
2. TCP/IP



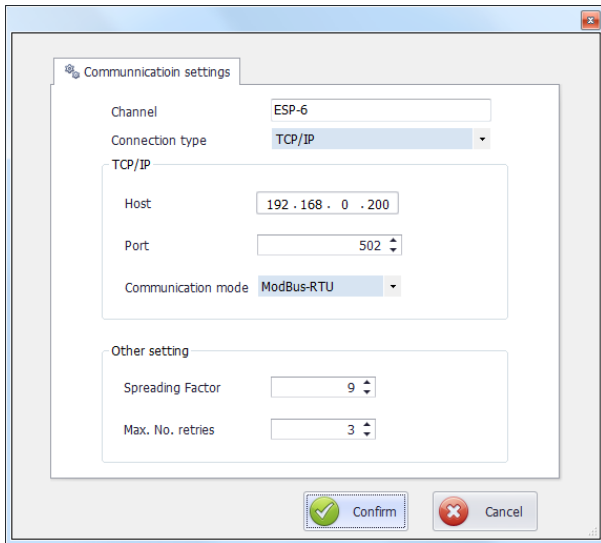
Please check the connection on the ESP-6, if use Ethernet port, please choose TCP/IP



If use Port RS485, please choose Modbus RS485/232



If use TCP/IP



Channel name: you add enter a name for the channel.

Connection Type: TCP/IP

TCP/IP Host^①: the information is on the Gateway, please check and enter. The default value is: 192.168.1.200.

Port^①: the information is on the gateway, the default value is 502.

Communication mode: please choose Modbus-RTU.

Spreading Factor (SF): range from 7~12. Default value is 9.

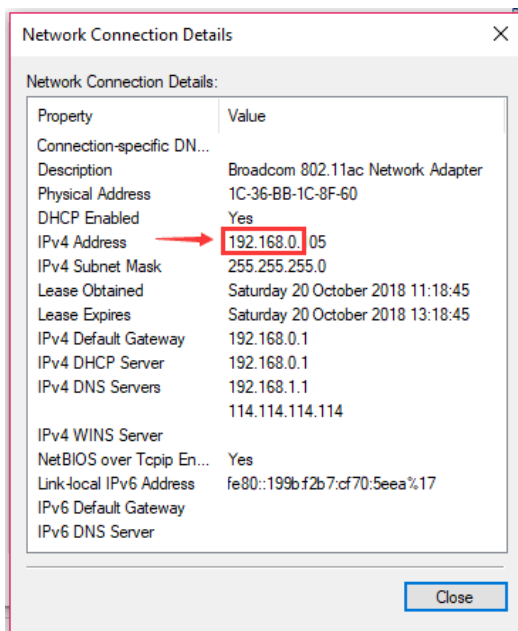
The value setting must be same to that on the meter. Otherwise communication failure might happens.

Max. No. retries:

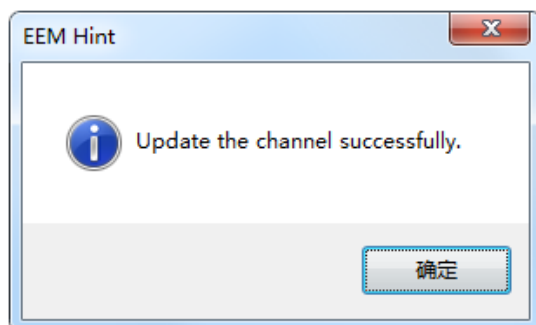
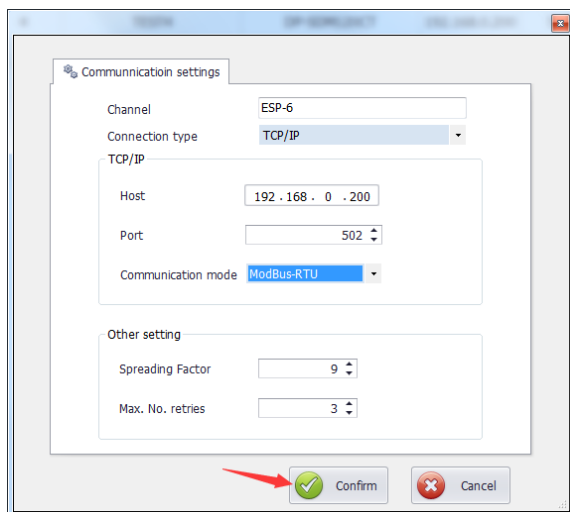
P.S:

① : TCP/IP host and Port can be programmed via a setting tool:  EEM_LoraSet

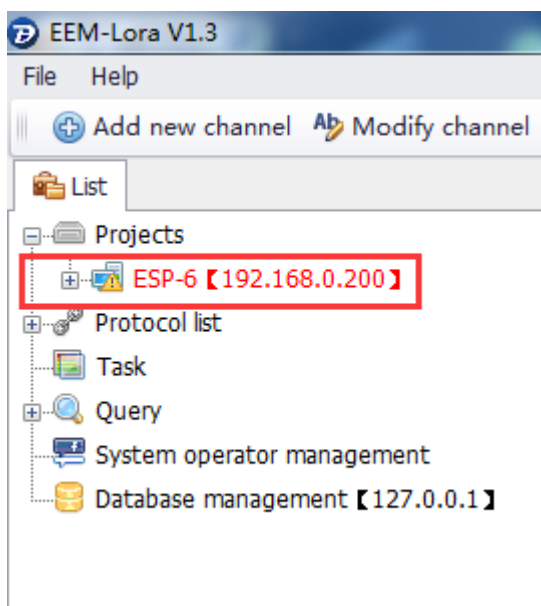
EEM-LoRa Set can be downloaded from www.eastrongroup.com/download



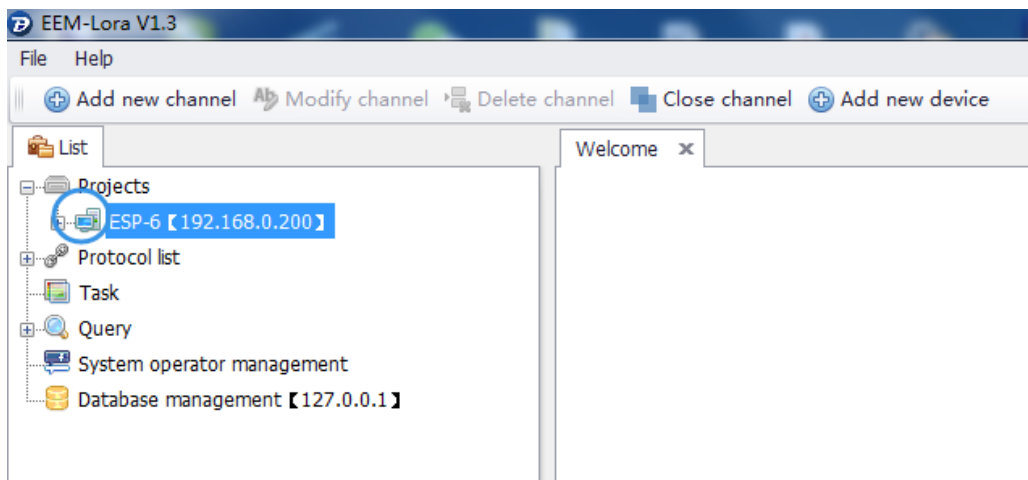
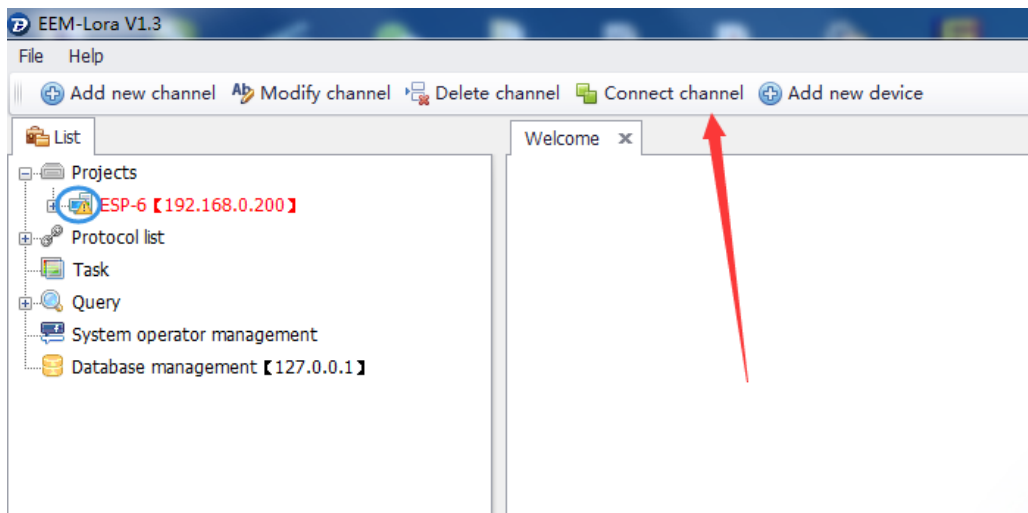
Click "Confirm", the channel is generated successfully.



The new channel is shown on the left list.



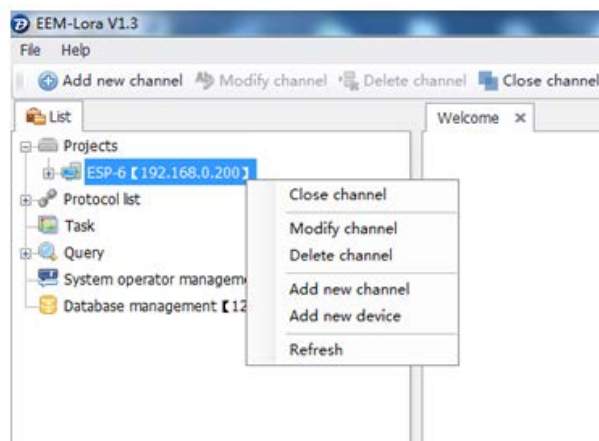
The Channel is still not connected, the user need click “Connect channel”.



4.2.2 Add new device

4.2.2.1 Add sub-channel + Modbus Energy meter

After the channel is generated, the user needs to add new sub-channels or new devices.



Add new Channel: this is to add sub-channel. If the solution is ESP-6 + ESP-7(convertor) + Modbus Energy Meter, you need to add new channel.

Subchannel dialog box with the following fields:

- Channel: ESP-6 [192.168.0.200]
- Model: ESP-7
- Subchannel: (empty text box)
- Lora ID: 1

Buttons: Add (green checkmark), Cancel (red X).

Subchannel: the name of the subchannel can be filled.

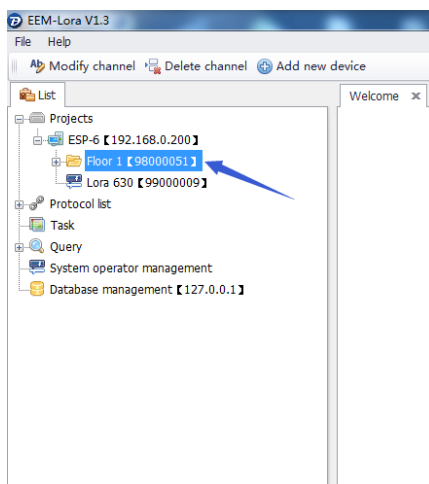
LoRa ID: the Lora ID of ESP-7, which is lasered on the case of ESP-7.

Subchannel dialog box with the following fields:

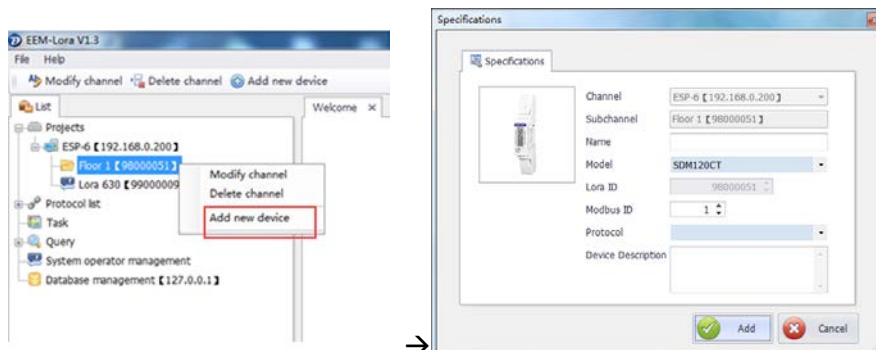
- Channel: ESP-6 [192.168.0.200]
- Model: ESP-7
- Subchannel: Floor 1
- Lora ID: 98000051

Buttons: Add (green checkmark), Cancel (red X).

Click Add, a new sub-channel is added successfully:



Right click the sub-channel, the user can add new device



For example if now the ESP-7 wired with SDM120CTM:



Fill up the information accordingly

Name: a unique name can be given in order to be easily distinguished. It will shows on the devices list.

Model: the model of the meter connect to ESP-7

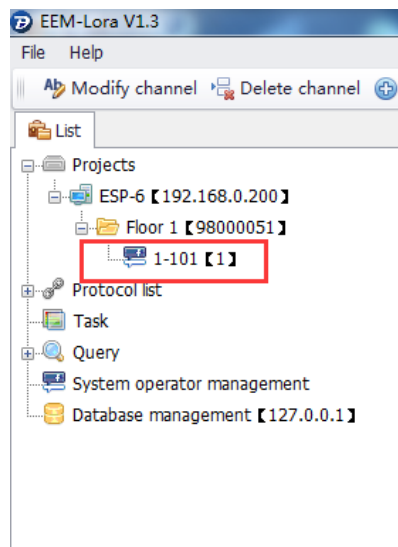
Modbus ID: the Modbus address of the Modbus Energy Meter.

Protocol: the communication protocol of the energy meter connect to the ESP-7.

Device description: any extra information necessary.

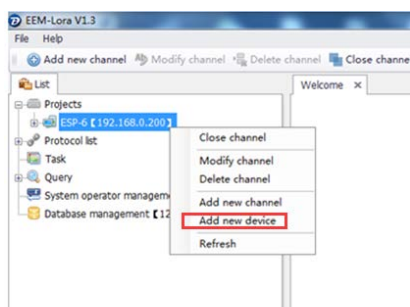
After fill up, Click "Add", the device is added successfully.

The meter shows in the device list.

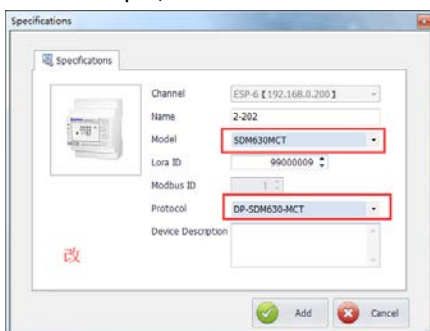


4.2.2.2 Add LoRa Energy Meter

In case the user choose solution: ESP-6 + Lora Energy Meter, the new device can be added directly under main Channel.



For example, a SDM630MCT-Lora is installed and going to communicate with ESP-6:



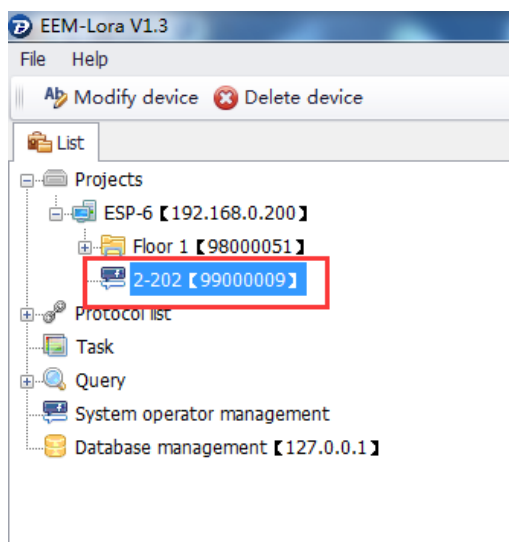
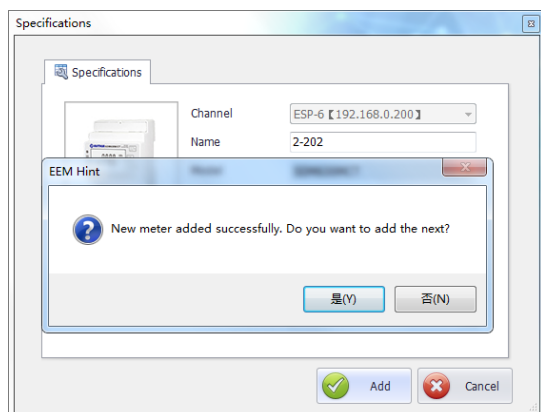
Name: a unique name can be given in order to be easily distinguished. It will shows on the devices list.

Model: the model name of the meter.

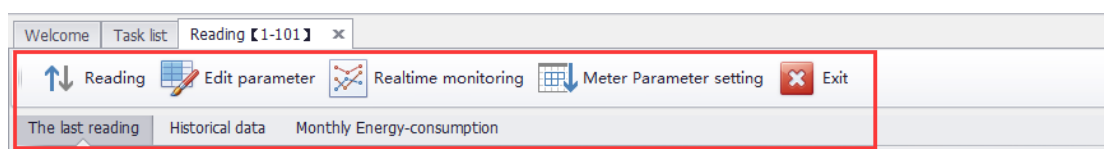
Protocol: the communication protocol of the energy meter.

Device description: any extra information necessary.

After fill up the information, and click "Add"

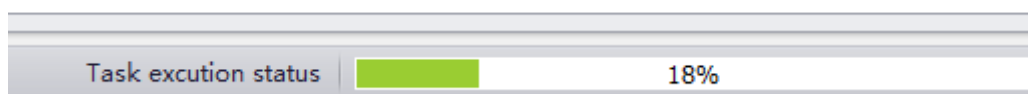
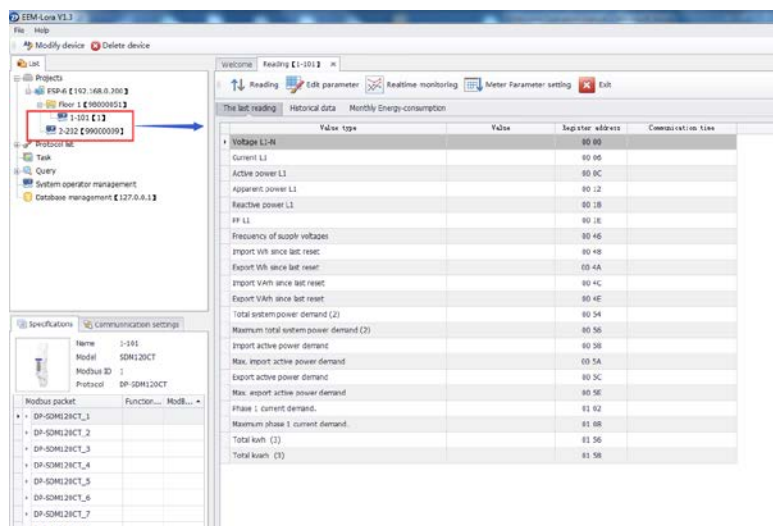


4.3 Meter Reading



4.3.1 Reading

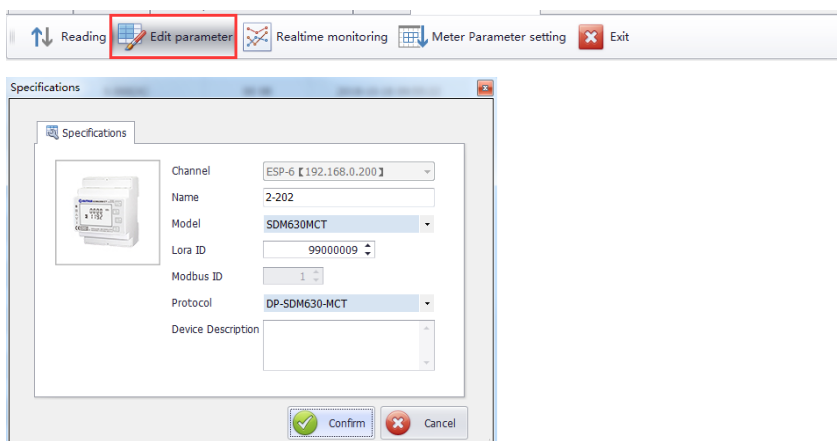
After devices are added in the system, the user can read and monitor the data from those devices. Double click the device in the left side column, the right side shows the capturable data.



The last reading			
Value type	Value	Register address	Communication time
Voltage L1-N	224.800(V)	00 00	2018-10-18 09:47:05
Current L1	0.000(A)	00 06	2018-10-18 09:47:07
Active power L1	0.000(W)	00 0C	2018-10-18 09:47:09
Apparent power L1	0.000(VA)	00 12	2018-10-18 09:47:11
Reactive power L1	0.000(VAr)	00 18	2018-10-18 09:47:12
PF L1	1.000	00 1E	2018-10-18 09:47:14
Frequency of supply voltages	50.040(Hz)	00 46	2018-10-18 09:47:16
Import VWh since last reset	36.251(kVWh)	00 48	2018-10-18 09:47:16
Export VWh since last reset	0.030(kVWh)	00 4A	2018-10-18 09:47:16
Import VAh since last reset	5.125(kVArh)	00 4C	2018-10-18 09:47:16
Export VAh since last reset	2.828(kVArh)	00 4E	2018-10-18 09:47:16
Total system power demand (2)	0.000(W)	00 54	2018-10-18 09:47:18
Maximum total system power demand (2)	11440.450(W)	00 56	2018-10-18 09:47:18
Import active power demand	0.000(W)	00 58	2018-10-18 09:47:18
Max. import active power demand	11440.450(W)	00 5A	2018-10-18 09:47:18
Export active power demand	0.000(W)	00 5C	2018-10-18 09:47:18
Max. export active power demand	7.468(W)	00 5E	2018-10-18 09:47:18
Phase 1 current demand.	0.000(A)	01 02	2018-10-18 09:47:21
Maximum phase 1 current demand.	49.886(A)	01 08	2018-10-18 09:47:23
Total kwh (3)	36.281(kwh)	01 56	2018-10-18 09:47:24
Total kwhh (3)	7.953(kwhh)	01 58	2018-10-18 09:47:24

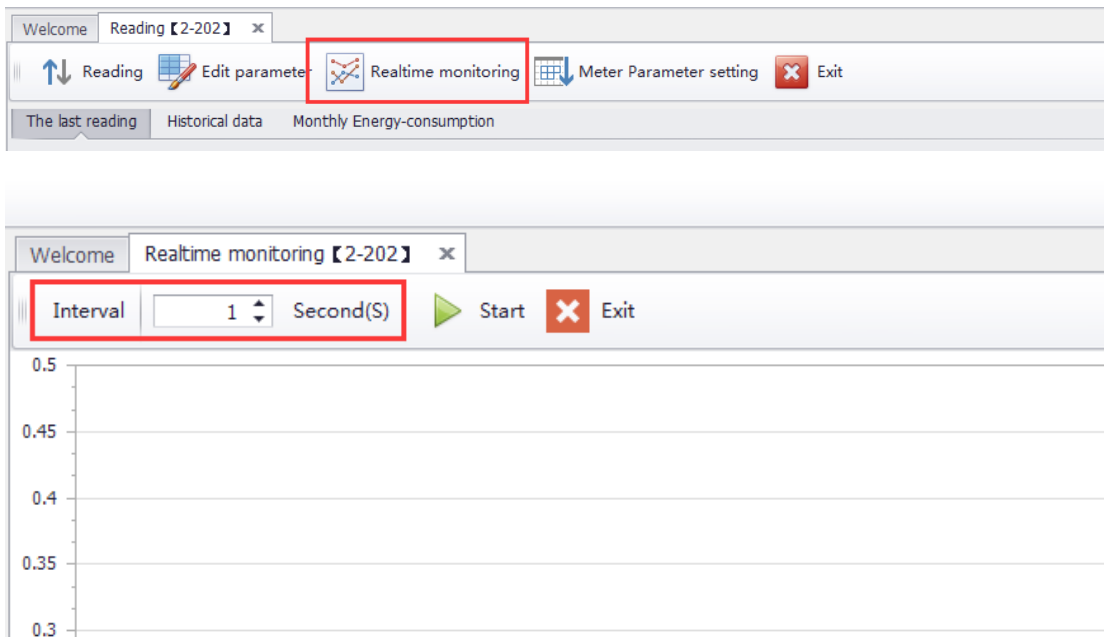
4.3.2 Edit parameter

Click "Edit parameter", there will be a pop-up window, the user can edit the information of device.

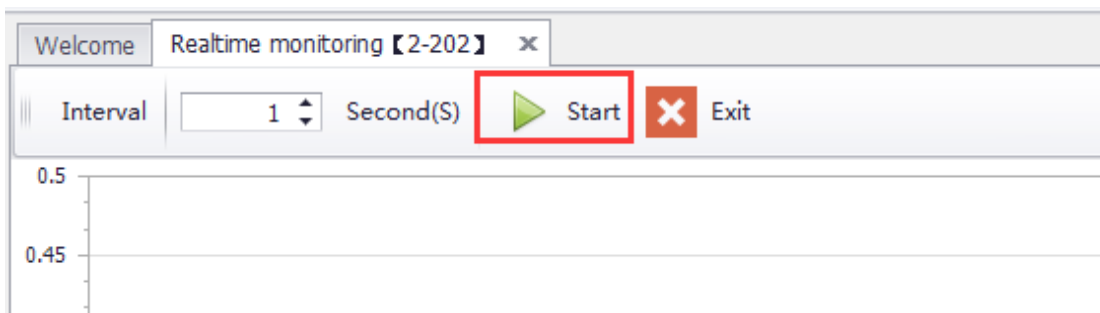


4.3.3 Real time monitoring

Click “Real time monitoring”, user can set the monitoring interval.



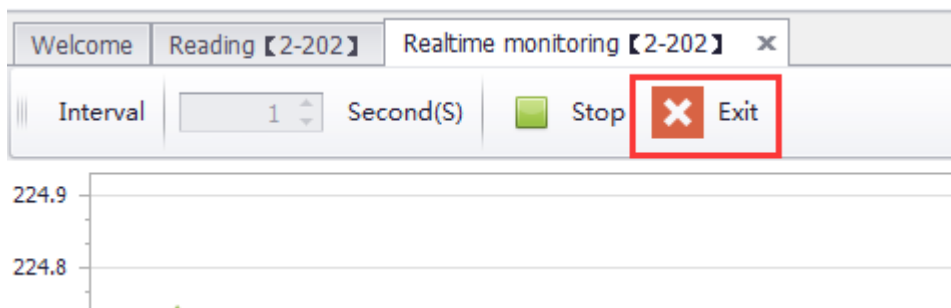
Click “Start”, the monitoring start to work:



Click the button “Curves”, the corresponding parameter will be showed on the screen.



Click the button “Exit”, the real time monitoring will stop and exit.



4.3.4 Meter Parameter Setting

Click “Meter Parameter setting”, the user can set the parameter of connected devices.

ID	Descriptions	Register ...	Value	Notes	Read only	Write only	Password pro...	Modify	HexValue
2	Demand interval	00 02	60min		✓	✓		Modify Ab	42 70 00 00
4007	System Volts	00 06	220V		✓			Modify Ab	43 5C 00 00
5	System Current	00 08	5A		✓			Modify Ab	40 A0 00 00
6	System type	00 0A	3P4W		✓	✓	✓	Modify Ab	40 40 00 00
7	Pulse duration of S0-1	00 0C	200ms		✓	✓		Modify Ab	43 48 00 00
8	Authorization	00 0E	Unauthorized		✓	✓	✓	Modify Ab	00 00 00 00
10	Parity and Stop bit	00 12	EVEN,1		✓	✓		Modify Ab	3F 80 00 00
11	Modbus ID	00 14	1		✓	✓		Modify Ab	3F 80 00 00

4.3.5 Historical data

Pls refer to part 6.

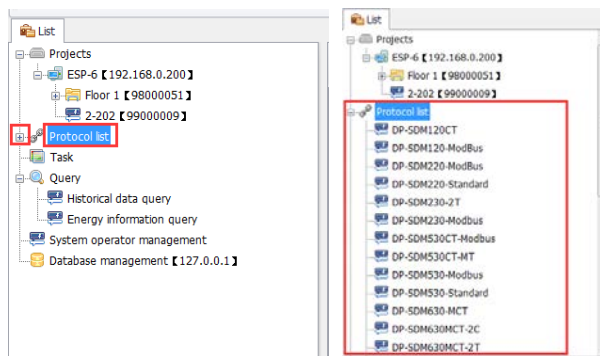
4.3.6 Monthly Energy-Consumption

Pls refer to part 6.

4.4 Protocol List

All Eastron energy modules protocol in Protocol list. The Protocol can be added, deleted, modified, imported and exported.

Double click “Protocol list” or click “+”, the protocol list will be opened.



4.4.1 Protocol list

Add protocol Delete protocol Edit protocol Protocol details Export Import			
Protocol name	Modbus packets no.	Protocol description	
DP-SDM120CT	11		
DP-SDM120-ModBus	11		
DP-SDM220-ModBus	9		
DP-SDM220-Standard	2		
DP-SDM230-2T	23		

4.4.1.1 Add protocol: Add a new protocol in the list.

Protocol name

Protocol name

Protocol description

Add
 Cancel

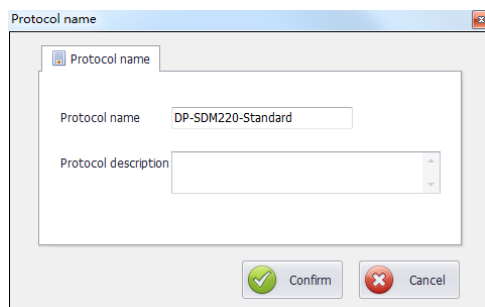
4.4.1.2 Delete protocol: Delete a protocol from the list.

Welcome Protocol list Add protocol Delete protocol Edit protocol Protocol details Export			
Protocol name	Modbus packets no.	Protocol description	
DP-SDM120CT	11		
DP-SDM120-ModBus	11		
DP-SDM220-ModBus	9		
DP-SDM220-Standard	2		
DP-SDM230-2T	23		
DP-SDM230-Modbus	13		
DP-SDM530CT-Modbus	13		
DP-SDM530CT-MT	96		

PS: If one or more than one device connects with the protocol, the protocol can't be deleted; if no device connects with

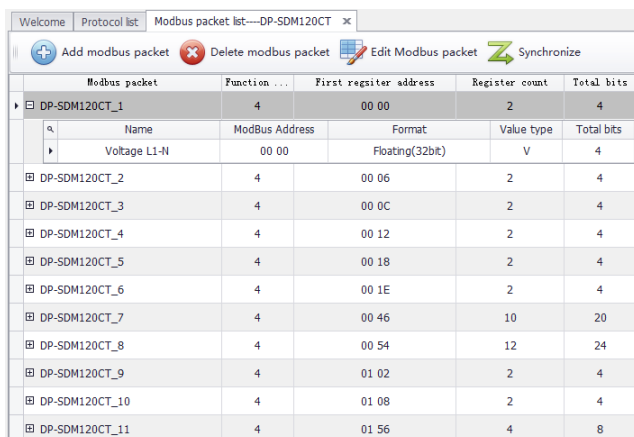
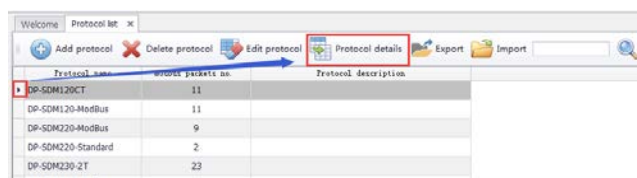
the protocol, the protocol can be deleted.

4.4.1.3 Edit protocol: Edit the existing protocol



A dialog box titled "Protocol name" with a tab labeled "Protocol name". It contains two input fields: "Protocol name" with the text "DP-SDM220-Standard" and "Protocol description" which is empty. At the bottom are "Confirm" and "Cancel" buttons.

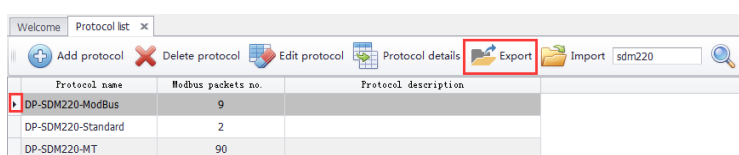
4.4.1.4 Protocol details: Click “Protocol details”, the user can check the protocol details of selected protocol.



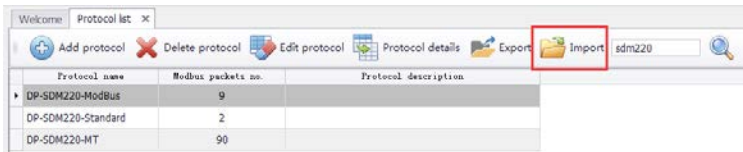
The "Modbus packet list" window for "DP-SDM120CT" shows a table of Modbus packets. The "DP-SDM120CT_1" packet is expanded, showing its details.

Modbus packet	Function	First register address	Register count	Total bits
DP-SDM120CT_1	4	00 00	2	4
Name: Voltage L1-N, Modbus Address: 00 00, Format: Floating(32bit), Value type: V, Total bits: 4				
DP-SDM120CT_2	4	00 06	2	4
DP-SDM120CT_3	4	00 0C	2	4
DP-SDM120CT_4	4	00 12	2	4
DP-SDM120CT_5	4	00 18	2	4
DP-SDM120CT_6	4	00 1E	2	4
DP-SDM120CT_7	4	00 46	10	20
DP-SDM120CT_8	4	00 54	12	24
DP-SDM120CT_9	4	01 02	2	4
DP-SDM120CT_10	4	01 08	2	4
DP-SDM120CT_11	4	01 56	4	8

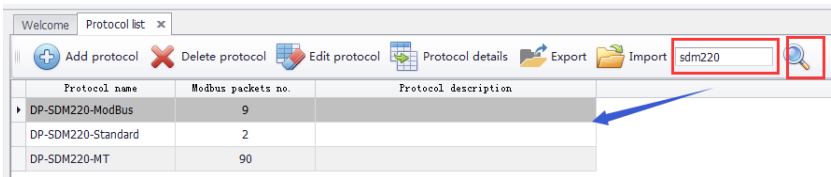
4.4.1.5 Export: Click “Export”, the user can export the protocol information of the selected protocol.



4.4.1.6 Import: Click “Import”, the user can import the protocol from local PC.

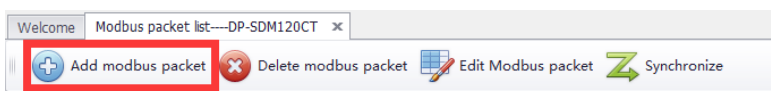


4.4.1.7 Search: Enter the protocol name and click button , the related protocol will be shown on the screen.



4.4.2 Modbus packet

4.4.2.1 Add Modbus packet



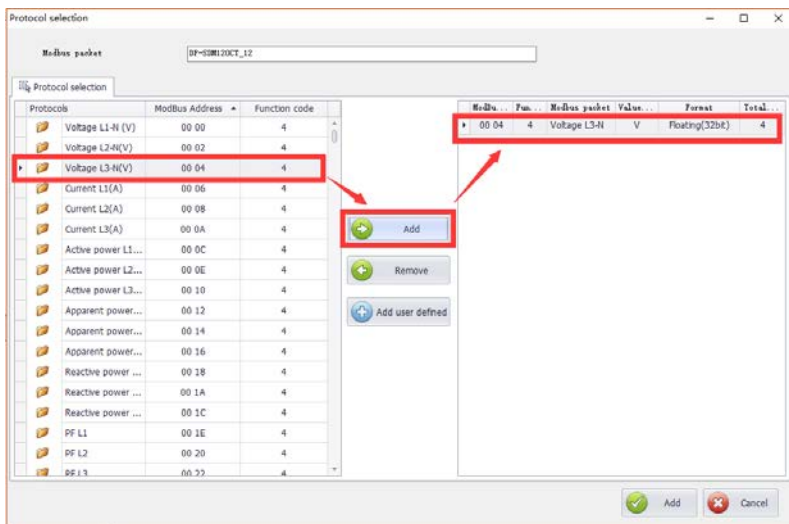
Modbus packet: the name of the group of protocol packet, the system will have a name automatically. The user can define it by himself. Normally we will use the name which system give us as default.

In the left list, there is our protocol library. User can choose the protocol which he need.

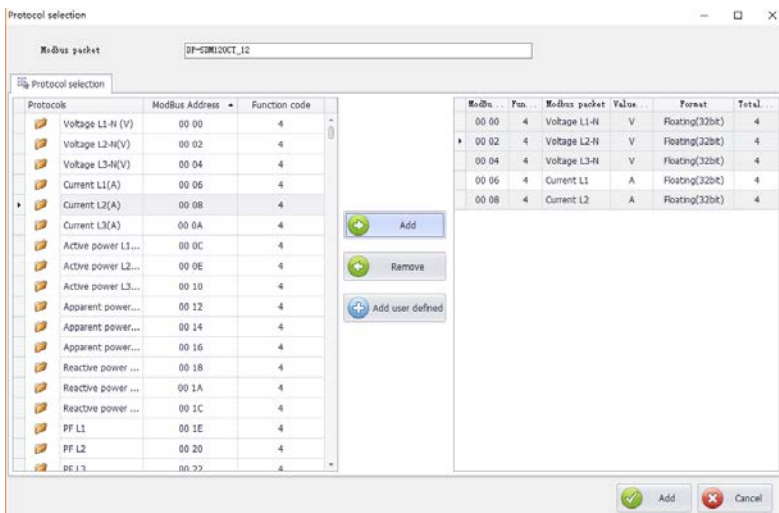
In the right is the chosen protocol.

Choosing the protocol, you need in the protocol library.

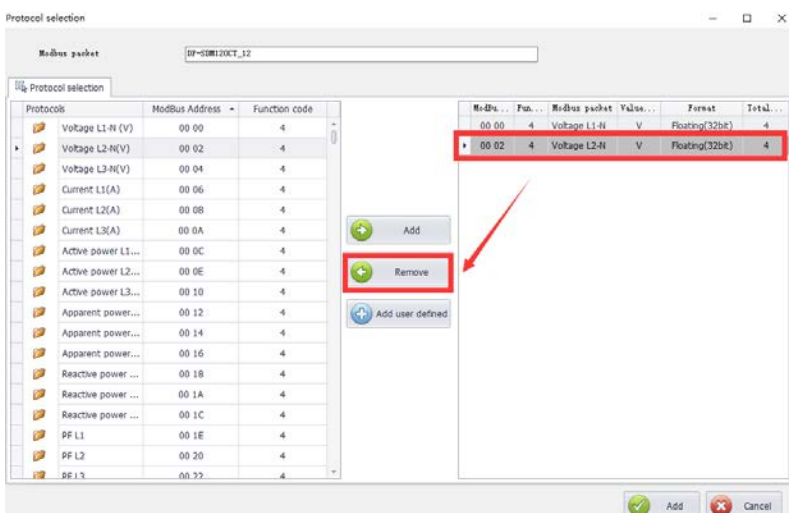
In the left, choosing the protocol to double click them or press “Add” button, then in the right window will add the protocol you just choose.



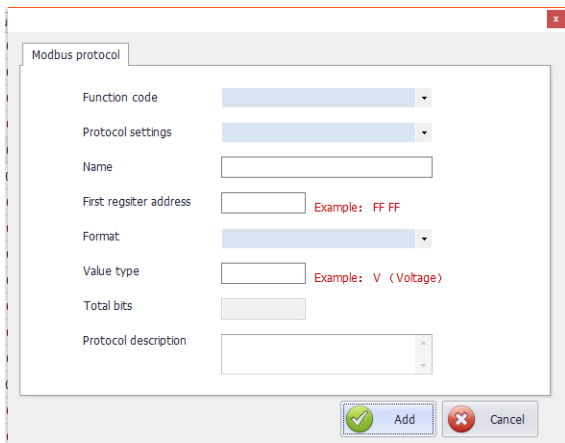
Many continuous protocols can be adding. Discontinuous protocols can't be added.



Click the button "Remove", the user can remove the parameter in the modbus packet on right side.



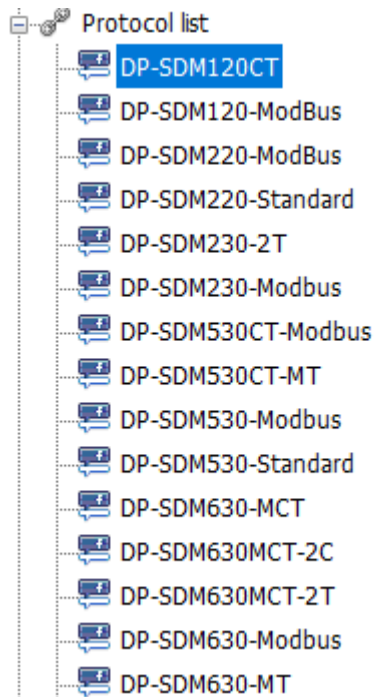
The user-defined protocol also can be added, click "Add user defined" to open a small popup window. Enter parameters, click "Add", the register address also should be continuous.



Modbus protocol configuration dialog box. Fields include: Function code (dropdown), Protocol settings (dropdown), Name (text box), First register address (text box with example FF FF), Format (dropdown), Value type (text box with example V (Voltage)), Total bits (text box), and Protocol description (text box). Buttons: Add (green checkmark), Cancel (red X).

4.4.2.2 Delete modbus packet

Choosing the protocol in the left protocol tree,



Double click to enter the window of the group of protocol packet.

Welcome

Modbus packet list—DP-SDM120CT

x

+

Add modbus packet

✖

Delete modbus packet

✎

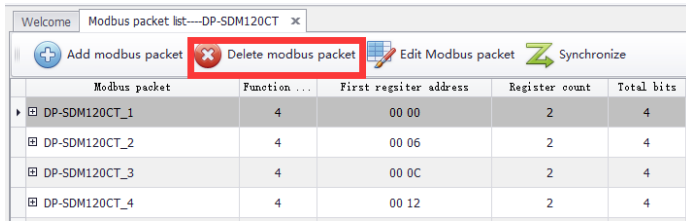
Edit Modbus packet

↻

Synchronize

Modbus packet	Function ...	First register address	Register count	Total bits
DP-SDM120CT_1	4	00 00	2	4
🔍 Name ModBus Address Format Value type Total bits Voltage L1-N 00 00 Floating(32bit) V 4				
DP-SDM120CT_2	4	00 06	2	4
DP-SDM120CT_3	4	00 0C	2	4
DP-SDM120CT_4	4	00 12	2	4
DP-SDM120CT_5	4	00 18	2	4
DP-SDM120CT_6	4	00 1E	2	4
DP-SDM120CT_7	4	00 46	10	20
DP-SDM120CT_8	4	00 54	12	24
DP-SDM120CT_9	4	01 02	2	4
DP-SDM120CT_10	4	01 08	2	4
DP-SDM120CT_11	4	01 56	4	8

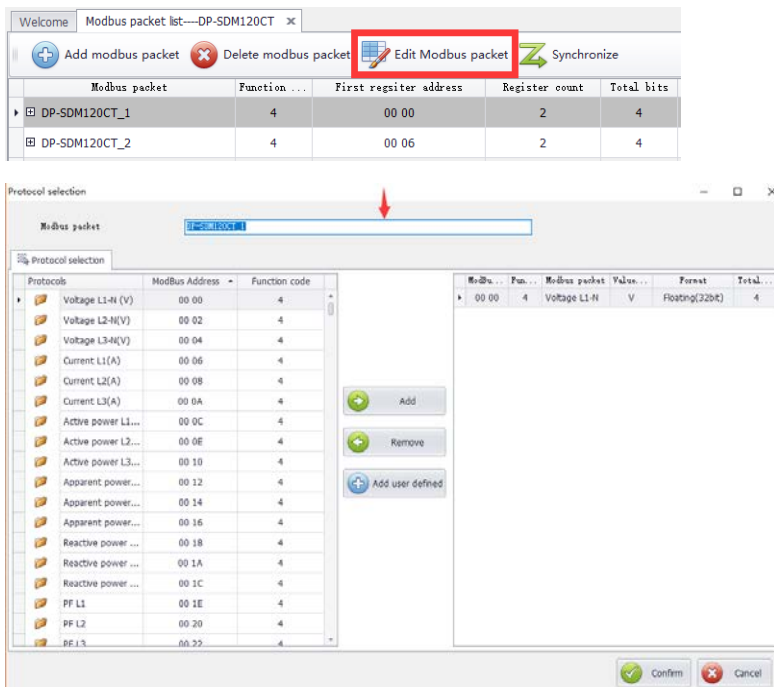
Choosing the group of protocol packet which want to be deleted, click button “Delete Modbus packet”



PS: After delete the protocol packet, the device take effect after synchronize to the device list which include this protocol.

4.4.2.3 Edit Modbus packet

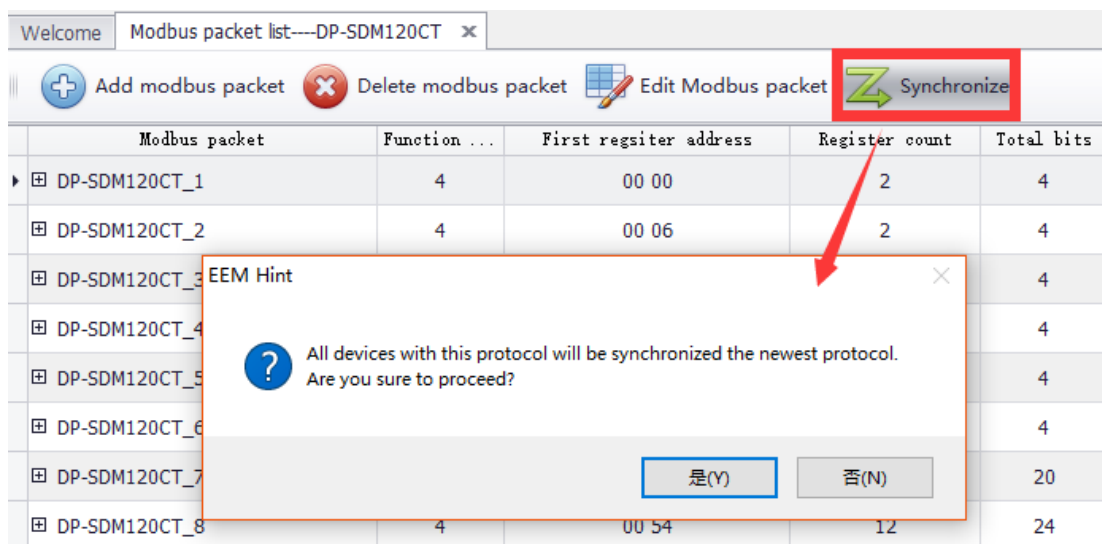
Click “Edit Modbus packet”, the specifications operation as same as that of “Add modbus packet”.



PS: If the protocol changed, all the device which connect with this protocol, need to click “Synchronize” to ensure consistency of protocol.

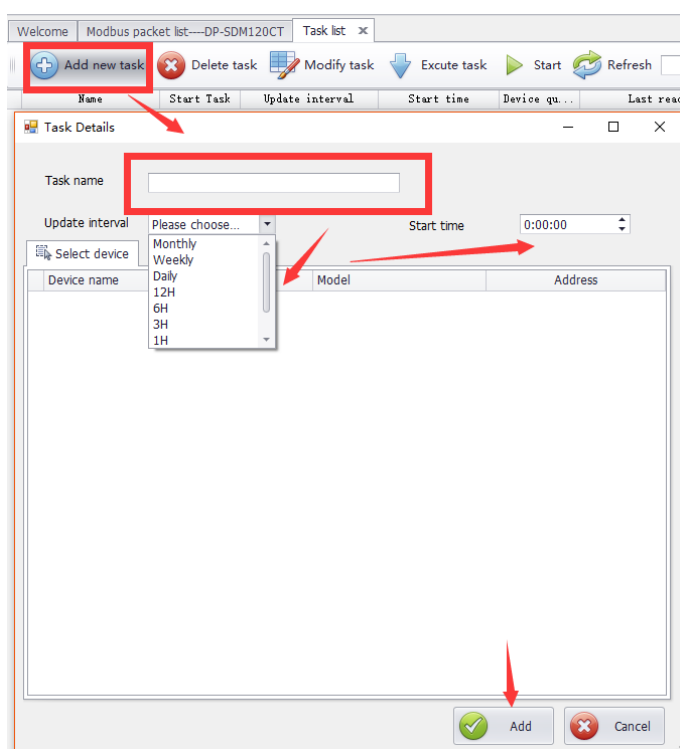
4.4.2.4 Synchronize

Click “Synchronize”, all devices with this protocol will be synchronized the newest protocol.



4.5 Task

4.5.1 Add new task



Task name: the name of the task;

Update interval: the frequency of the meter reading (every month, every week, every day, every 12 hours, every 6 hours, every three hours, every hour, every 30 minutes, every 15 minutes) ;

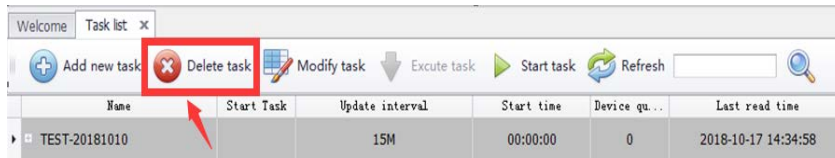
Start time: meter reading start time;

Select device: User can select the device which be read. All the devices under one channel can be chosen, or user can choose several channels at same time.

Click “Add” to finish the meter reading task adding.

4.5.2 Delete task

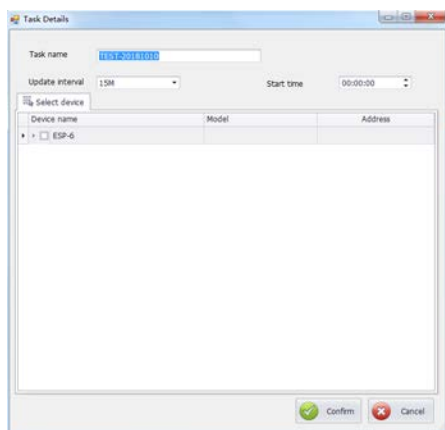
In the list of meter reading plan, select the reading task which need to be deleted, click “Delete task” to delete the task.



PS: The task which already started can't be deleted.

4.5.3 Modify task

Choosing the task which need to be modified from the task list, click “Modify task” to open a small popup window. Modifying operation is the same as adding task operation, please refer to the operation “Adding task”.



PS: The task already started can't be modified.

4.5.4 Start/ Stop task

When a meter reading task is created, the default status is not started.

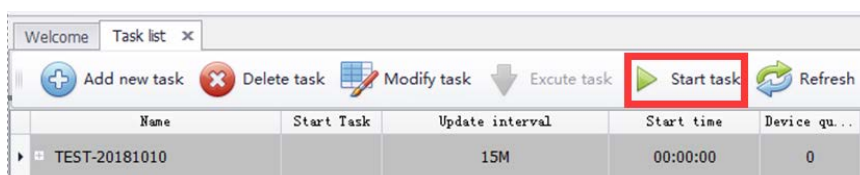
Under the column “Start Task”,

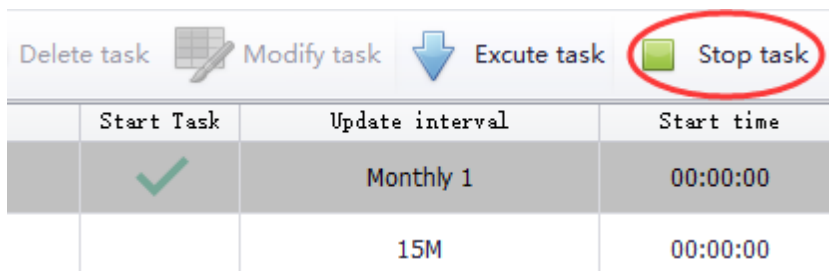
“Blank” means task is not started;



“ ” means the task started.

Click the button “Start”/ “Stop” to start or stop the task.



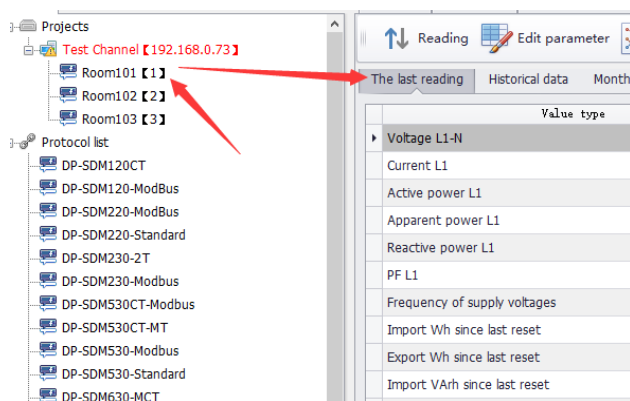


4.6 Query

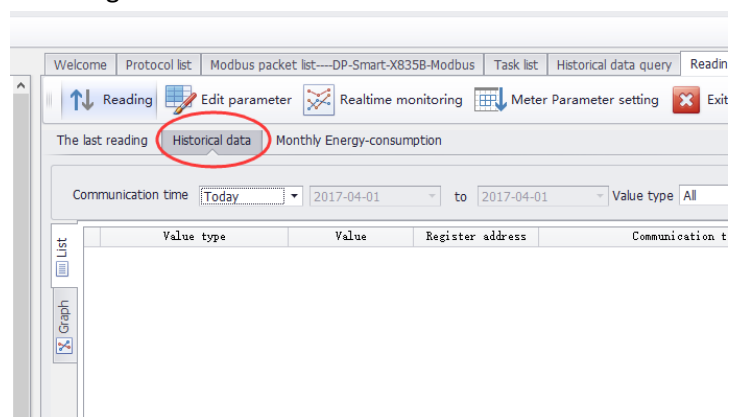
4.6.1 Historical meter reading data

4.6.1.1 Check each meter's reading data.

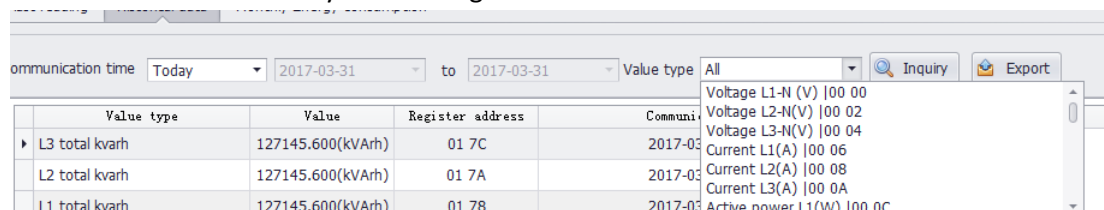
The user can select the device in the left list to check the historical data:



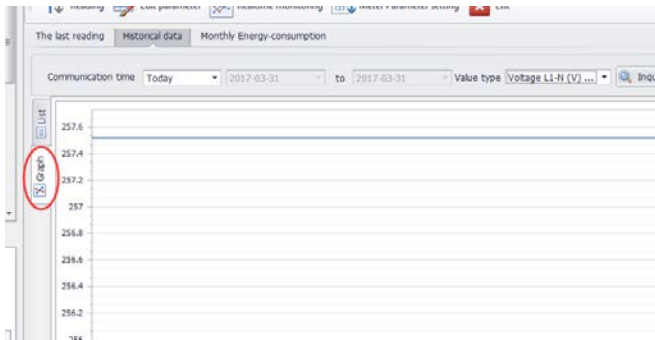
Choosing "Historical data" to check the historical meter reading data.



The data can be checked by the filtering data.

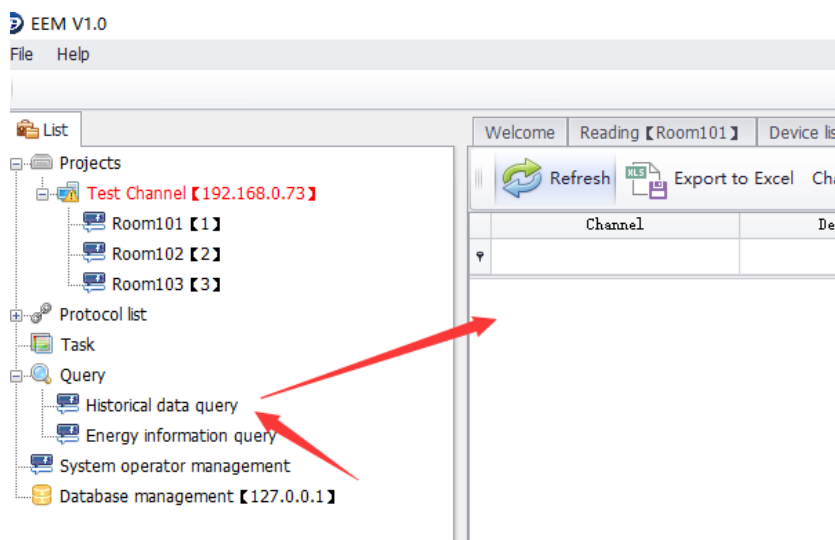


Click “Graph”, the data can be shown by curves.



4.6.1.2 Check many meters reading data

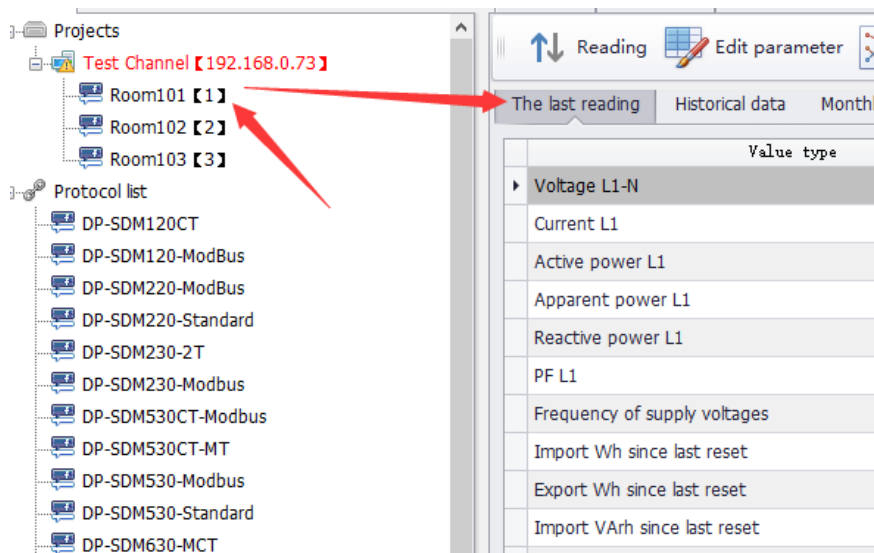
Click” Historical data query” in the left device list, open the historical meter reading window. After enter the screening condition, the data which want to be checked will be shown. The data can be exported to Excel documents.



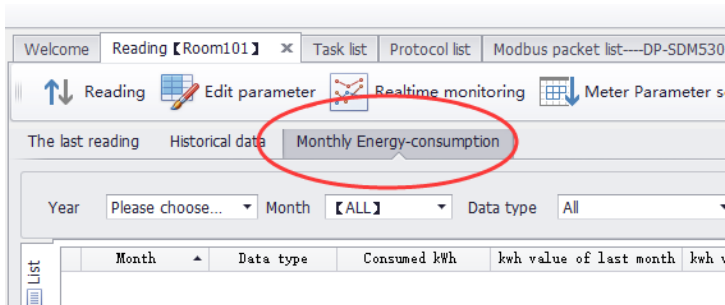
4.6.2 Historical energy consumption check

4.6.2.1 Check each meter’s historical energy consumption

The user can select the device in the left list to check the historical energy consumption:

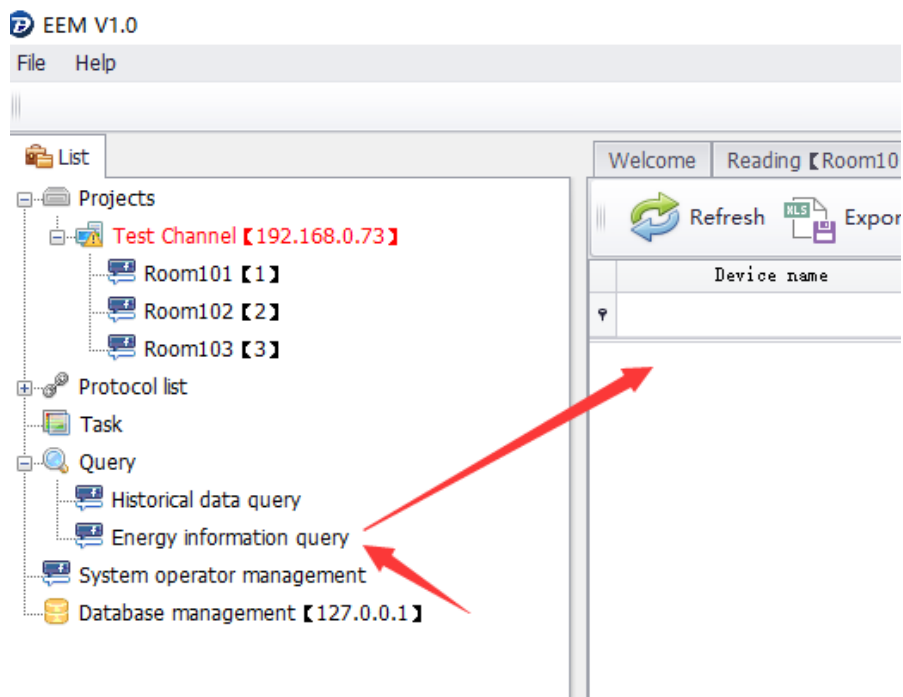


Choosing “Monthly Energy-consumption”, the result can be checked through filter criteria.



4.6.2.2 Check many meters' historical energy consumption

Click “Energy information query” in left function tree to open a window to check the historical energy consumption. After enter the screening condition, the data which need to be checked will be shown. The data can be exported to Excel documents.



4.7 System operator management

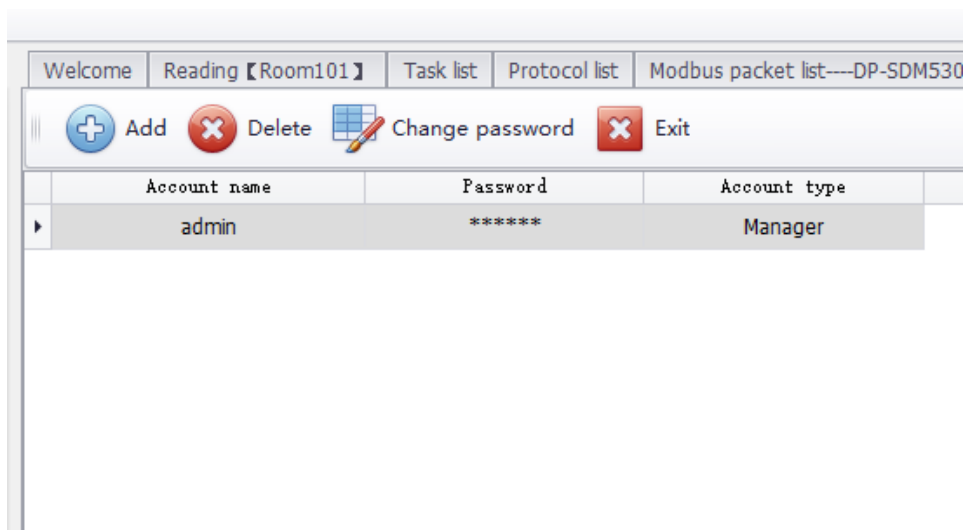
There are two kinds of operators: “Super operator” and “normal operator”

“Super operator”: The unique one in the system, can add, modify normal operators, can operate all the function of the software.

“Normal operator”: user can't create operator account, can't operate database backup, restore, can't modify energy meters' function and so on.

4.7.1 Check operators

Click “System operator management” to open system account window. See below picture:



4.7.2 Add operators

Click “Add”, there will be the account information.

User can only add normal operators, enter account and password, press “Add” to finish adding.

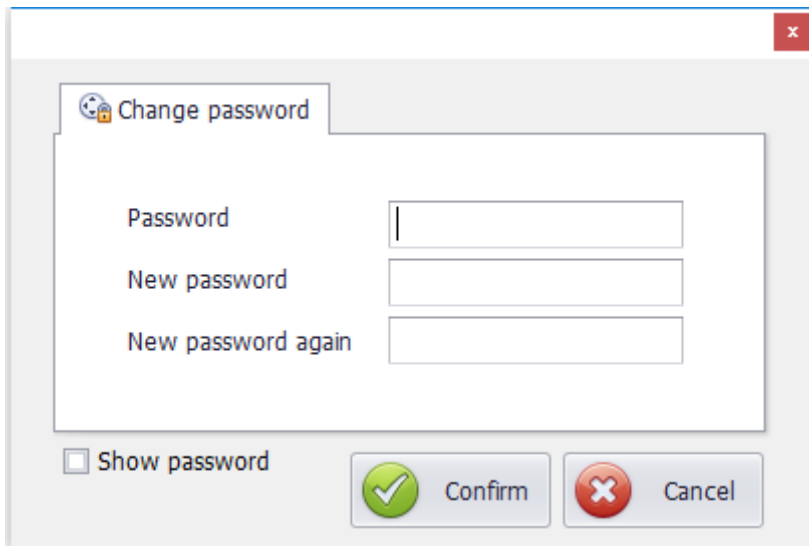
4.7.3 Delete operators

Choosing the operators which want to be deleted from the list, click the “Delete” on the toolbar to finish account delete.

PS: Super operator can’t be deleted.

4.7.4 Modify operator’s password

Choosing the operator which need to change the password. Click “Change password”, enter the old password and new password, and click “Confirm” to finish modifying.

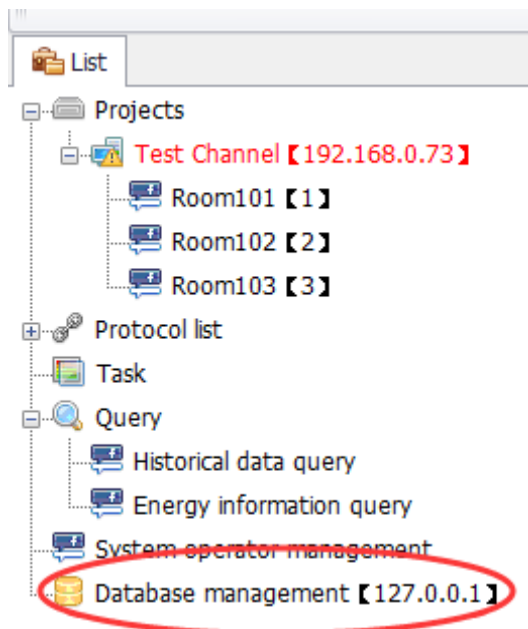


4.8 Database management

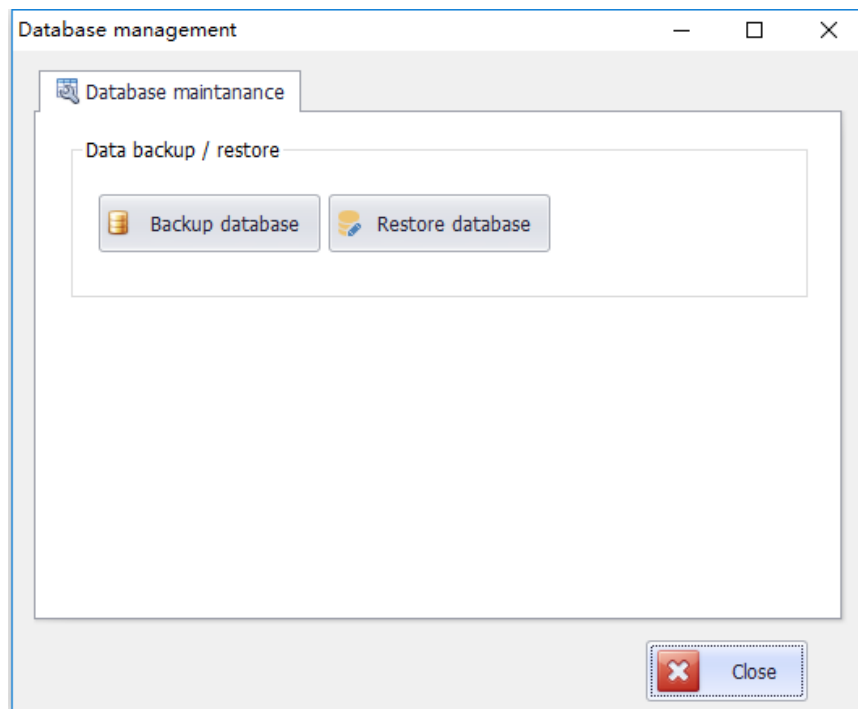
The database is MySQL5.5. Please backup database regularly to avoid the data losing.

4.8.1 Backup database

Click "Database management" as show in below picture



Open the window of backup database

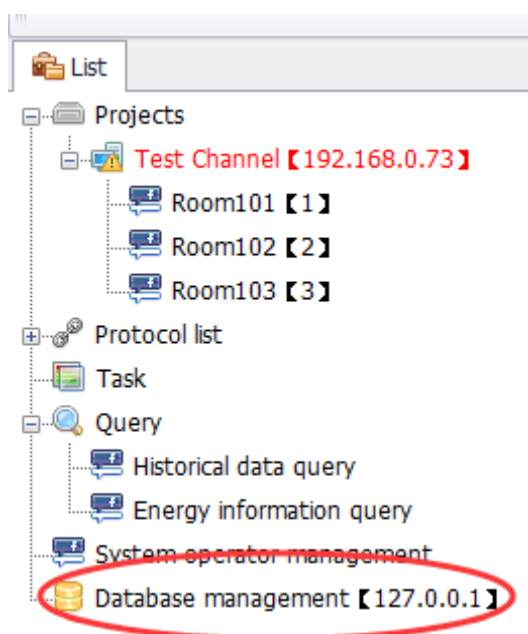


Click "Backup database", choosing the backup database to save.

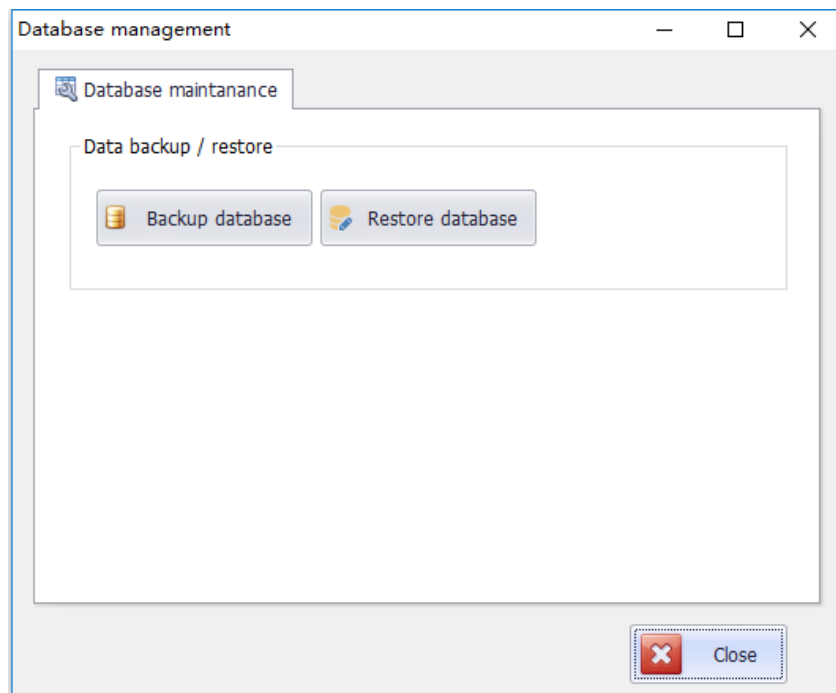
4.9 Restore database

Restore database need to operate carefully. When restored database, the origin data will lose.

Click "Database management" as shown in below picture



Open the window of database management



Click "Restore database", choosing the restore document to finish the database restore.