SDM630-EV V2

DIN Rail Smart Meter for Single and Three Phase EV Systems

USER MANUAL

2025 V1.2

Statements

Eastron reserves the right to amend the product specifications in this manual without prior notice. Before placing an order, please contact our company or local agent to get the latest specifications.

CONTENT

Version History

Version	Date	Changes
1.0	2022-10-27	Initial issue
1.1	2025-01-02	Update the company logo
1.2	2025-09-17	New template

Risk Information

Information for Your Own Safety

This manual does not contain all of the safety measures operating the equipment (module, device) for different conditions and requirements. However, it does contain information which you must know for your own safety and to avoid damages. These information are highlighted by a warning triangle indicating the degree of potential danger.

Warning

This means that failure to observe the instruction can result in death, serious injury or considerable material damage.

Caution

This means hazard of electric shock and failure to take the necessary safety precautions will result in death, serious injury or considerable material damage.

Qualified personnel

Operation of the equipment (module, device) described in this manual may only be performed by qualified personnel. Qualified personnel in this manual means person who are authorized to commission, start up, ground and label devices, systems and circuits according to safety and Regulatory standards.

Proper handling

The prerequisites for perfect, reliable operation of the product are proper transport, proper storage, installation and proper operation and maintenance. When operating electrical equipment, parts of this equipment automatically carry dangerous voltages. Improper handling can therefore result in serious injuries or material damage.

- ✧ Use only insulating tools.
- ✧ Do not connect while circuit is live (hot).
- ✧ Place the meter only in dry surroundings.
- ✧ Do not mount the meter in an explosive area or expose the meter to dust, mildew and insects.
- ✧ Make sure the wires are suitable for the maximum current of this meter.
- ✧ Make sure the AC wires are connected correctly before activating the current/voltage to the meter.
- ✧ Do not touch the meter connecting clamps directly with metal, blank wire and your bare hands as you may get electrical shock.
- ✧ Make sure the protection cover is placed after installation.
- ✧ Installation, maintenance and reparation should only be done by qualified personnel.
- ✧ Never break the seals and open the front cover as this might influence the function of the meter, and will cause no warranty.
- ✧ Do not drop, or allow strong physical impact on the meter as the high precisely components inside may be damaged.
- ✧ Designed to be mounted inside of switchboards or cabinet on DIN rail.

- ✧ This device must have a suitable sized Circuit Breaker feeding the Multi Function Energy Meter so it does not exceed the maximum rated current.
- ✧ The supply wiring of this device shall be suitable sized cable to match the installed circuit breaker.
- ✧ A Disconnection Device (Circuit Breaker) should be installed close to the Multi Function Energy Meter.
- ✧ The Disconnection Device shall be marked as the Disconnection Device for the Multi Function Energy Meter.

Disclaimer

We have checked the contents of this publication and every effort has been made to ensure that the descriptions are as accurate as possible.

However, deviations from the description cannot be completely ruled out, so that no liability can be accepted for any errors contained in the information given. The data in this manual is checked regularly and the necessary corrections are included in subsequent editions. We are grateful for any improvements that you suggest.

Chapter 1. Introduction

1.1 Product Introduction

The meter SDM630-EV V2 is a three phases energy meter designed by EASTRON for E-Car Charger billing purpose. The meter adopts special encryption method for the safety of data transmission: One-way encryption is achieved through ECC (Ellipse Curve Ctyptography).

The SDM630-EV V2 measures and displays the characteristics of single phase two wires (1p2w), three phase three wires (3p3w,) and three phase four wires(3p4w) supplies, including voltage, frequency, current, power, active and reactive energy, imported or exported. Energy is measured in terms of kWh, kVArh.
The meter SDM630-EV supports max. 100A direct connection, saves the cost and avoid the trouble to connect external CTs, giving the unit a cost-effective and easy operation. Built-in interfaces provide 2 channels RS485 Modbus RTU outputs. Configuration is password protected.

1.2 Product Characteristics

- Bi-directional measurement IMP & EXP
- ECC encryption
- LED pulse output
- 2 channels of RS485 Modbus RTU
- Din rail mounting 35mm
- 100A direct connection
- Multi-parameters measurement
- Better than Class 0.5 / C accuracy
- LCD with white backlit, adjustable backlit time

Measurements:

- Phase voltage: V1, V2, V3
- Line voltage: V1-2, V2-3, V3-1
- Current: I1, I2, I3, IN
- Active power: P1, P2, P3, P_total (total active power)
- Reactive power: Q1, Q2, Q3, Q_total (total reactive power)
- Apparent power: S1, S2, S3, S_Total (total apparent power)
- Frequency: Hz
- Power factor: PF
- Active energy: Ep_imp (import active energy), Ep_exp (export active energy), Ep_total (total active energy)
- Reactive energy: Eq_imp (import reactive energy), Eq_exp (export reactive energy), Eq_total (total reactive energy)

Setup:

- RS485 Modbus RTU
- Backlit time
- Supply system 1p2w, 3p3w,3p4w
- Password modification

Chapter 2. Technical Parameters

2.1 Technical Parameters

Voltage AC (Un)	3*230/400V AC
Voltage Range	100 - 277V AC (L-N)
Voltage Between Phase	100 to 480V AC (L-L)
Current Input	0.3-10(100)A
Starting Current (Ist)	0.04A
Transition Current (Itr)	1A
Over Current Withstand	30Imax for 0.01S
Frequency Rating Value	50/60Hz
AC Voltage Withstand	4KV/1min
Impulse Voltage Withstand	6kV – 1.2/50μS waveform
Voltage Circuit Power Consumption	≤ 2W/10VA
Current Circuit Power Consumption	≤0.05VA
Display	LCD with white backlit
Max. reading	999999.99 kWh/kVArh

2.2 Mechanical Characteristics

Weight	≈314g
IP Degree of Protection (IEC 60529)	IP51 Front Display IP20 Whole Meter
Dimensions (DxHxW)	100*72*66mm
Mounting	DIN Rail 35mm
Material of Meter Case	Self-extinguishing UL 94 V-0
Mechanical Environment	M1

2.3 Performance Criteria

Operation humidity	≤90% Non-condensing
Storage humidity	≤95% Non-condensing
Operating temperature	-40℃~+70℃
Storage temperature	-40℃~+80℃
Pollution Degree	II
Altitude	≤2000m
Vibration	10Hz to 50Hz, IEC 60068-2-6

2.4 Electromagnetic Compatibility

Electrostatic Discharge	IEC 61000-4-2
Immunity to Radiated Fields	IEC 61000-4-3
Immunity to Fast Transients	IEC 61000-4-4
Immunity to Impulse Waves	IEC 61000-4-5
Conducted Immunity	IEC 61000-4-6
Immunity to Magnetic Fields	IEC 61000-4-8
Immunity to Voltage Dips	IEC 61000-4-11
Radiated Emissions	IEC 62052-11
Conducted Emissions	IEC 62052-11

2.5 Safety

Over-voltage Category	CAT III
Installation Category	CAT III
Insulating Encased Meter of Protective Class	II

2.6 Accuracy

Parameters	Accuracy	Resolution
Voltage	±0.5%	0.1V
Current	±0.5%	0.01A
Frequency	±0.2%	0.01Hz
Power Factor	±0.01	0.001
Active Power	±1%	0.01kW
Reactive Power	±1%	0.01kVAr
Apparent Power	±1%	0.01kVA
Active Energy	Class 0.5 IEC62053-21 Class C EN50470-3:2022	0.001kWh
Reactive Energy	Class 2 IEC 62053-23	0.001kVArh

2.7 Communication

RS485 Modbus RTU

The 1st Modbus Output (configurable):

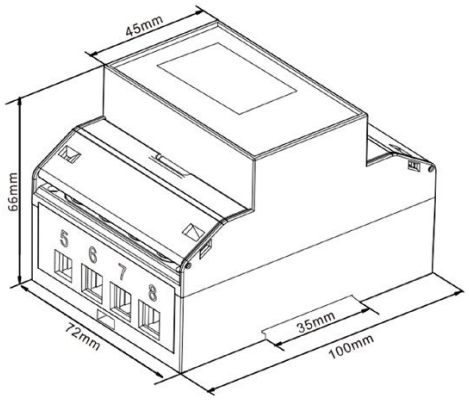
For Modbus RTU, the following RS485 communication parameters can be configured Via the Set-up menu:

Bus Type	RS485
Communication Protocol	Modbus RTU
Baud Rate	2400/4800/9600(default)/19200/38400bps
Address Range	001 to 247
Bus Load	64 PCS
Communication Distance	1000m
Parity Bit	none(default)/ odd / even
Stop Bit	1 or 2
Data Bits	8

The 2nd Modbus Output (non-configurable):

Bus Type	RS485
Communication Protocol	Modbus RTU
Baud Rate	9600
Address Range	001 to 247
Bus Load	64 PCS
Communication Distance	1000m
Parity Bit	none
Stop Bit	1
Data Bits	8

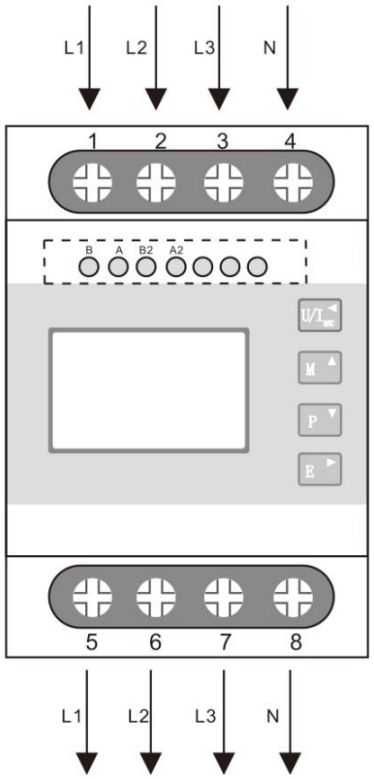
2.8 Dimensions



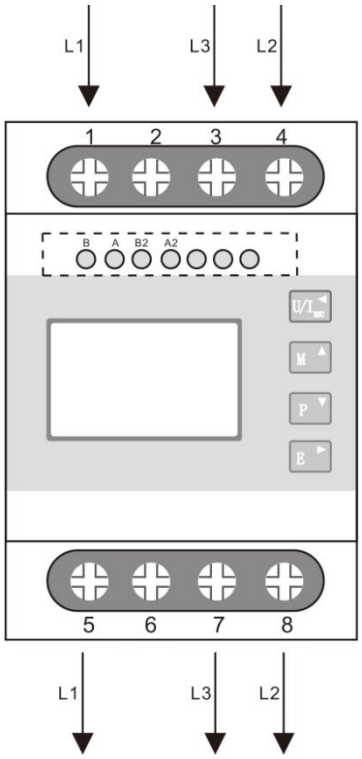
Height: 100 mm
Width: 72mm
Depth: 66mm

2.9 Wiring Diagram

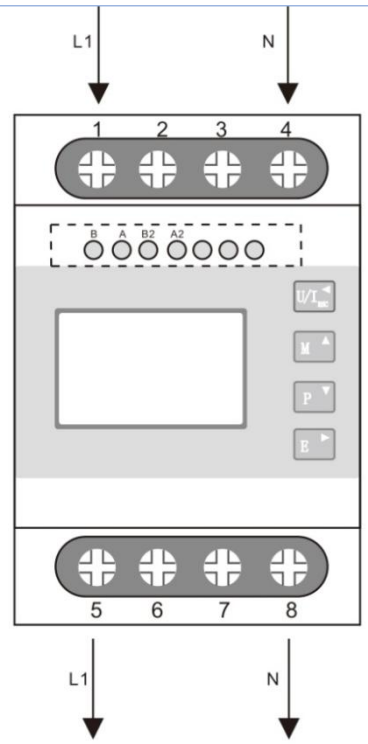
Current and Voltage Inputs



3P4W



3P3W

	
1P2W	

Current Direction Configuration: The current direction can be reversed by writing to the 'Current Direction' register via the RS485 communication interface.

Wiring Guide

Terminal ①~⑧	Measurement Connection	Screw Connection
	Strip Length	12-13mm
	Screw	M5
	Rigid/Supple	4-25mm² (11~4AWG)
	Tightening Torque	3.5Nm
	Model	PH2
Terminal (B、A、B2、A2)	Measurement Connection	Screw Connection
	Strip Length	6-7mm
	Rigid/Supple	0.5-1.5mm² (26 ~ 14AWG)
	Tightening Torque	0.4Nm
	Model	PH0

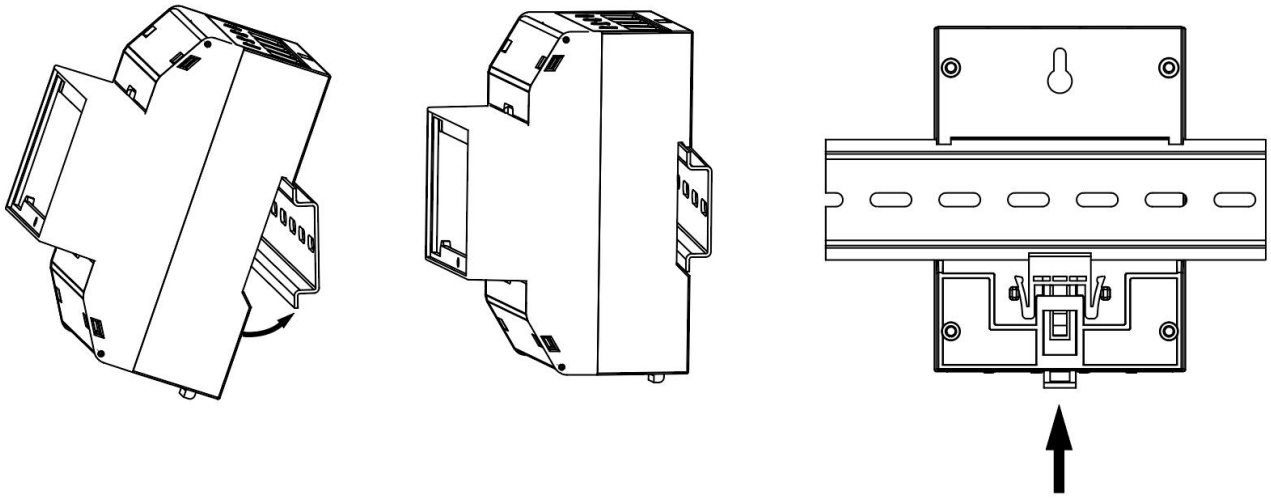
Installation

Step 1: Select a 35mm-wide DIN rail, Pull down the back-end clip on the meter to unlock the mounting mechanism.

Step 2: Align Upper Slot with DIN Rail. Position the upper slot of the meter's DIN rail groove onto the DIN rail, ensuring full contact (see Figure 1).

Step 3: Following the direction indicated in Figure 1, engage the lower slot of the DIN rail groove onto the DIN rail until audibly seated (see Figure 2).

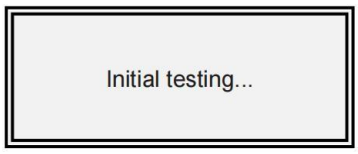
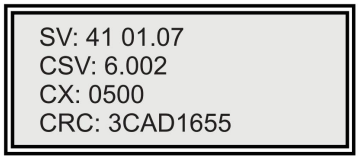
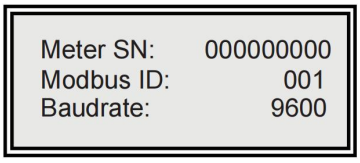
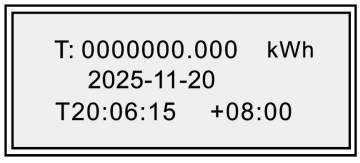
Step 4: Push up the back-end clip to lock the meter firmly onto the DIN rail (see Figure 3).



① ② ③

Chapter 3. Operation

3.1 Installation Display

	The interface performs initial testing.
	The second screen indicates: software version; software number; CRC number.
	Meter serial number; Modbus ID; Baud rate info are provided.
	The public key will be displayed on the fourth screen.
	After a short delay, the screen will display active energy measurements, date, time, time zone.

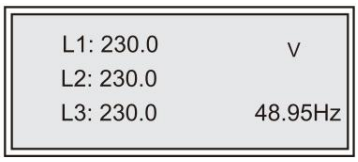
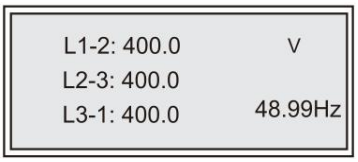
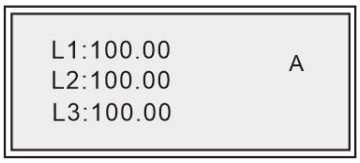
3.2 Button Functions

Button	Short click		Long press (3s)	
	Display mode	Setup mode	Display mode	Setup mode
	V1 V2 V3 V1-2 V2-3 V3-1 I1 I2 I3 IN	Return to previous menu		
	PF PF1 PF2 PF3	Previous page or increase value		
	P-t Q-t S-t P1 P2 P3 Q1 Q2 Q3 S1 S2 S3	Next page or decrease value	public key	
	Active E-t, time Id Active E-t, Imp active E, Exp active E Reactive E-t, Imp reactive E, Exp reactive E	Move to right side	Enter Setup mode	Confirm setting

3.3 Measurements

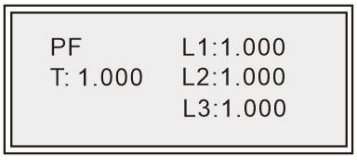
3.3.1 Voltage and current

Each successive pressing of the U/I button selects a new range:

	Phase to neutral voltages(3p4w); Frequency.
	Phase to phase voltages(3p3w); Frequency.
	Current on each phase.
	Neutral current.

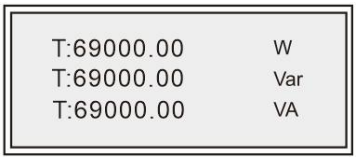
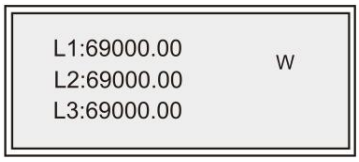
3.3.2 Power factor

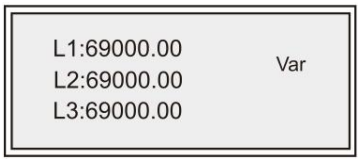
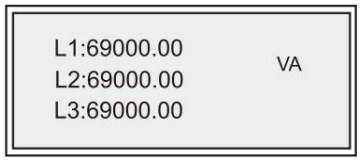
Each successive pressing of the M button selects a new range:

	Power factor.

3.3.3 Power

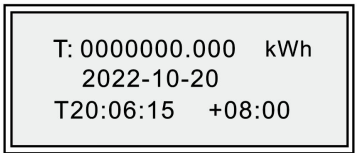
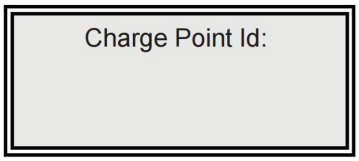
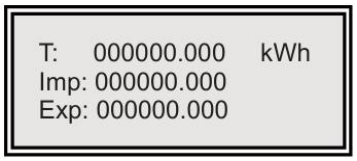
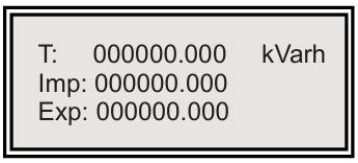
Each successive pressing of the P button select a new range:

	Total kW, kVArh, kVA.
	Instantaneous active power in W.

	Instantaneous reactive power in Var.
	Instantaneous volt-amps in VA.

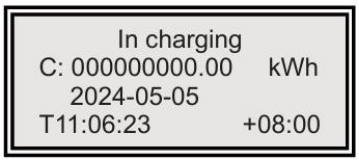
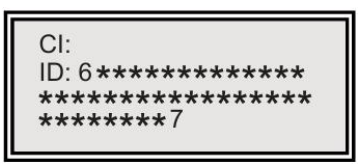
3.3.4 Energy

Each successive pressing of the  button shows following measurements:

	Total kWh and time will be showed when no charging.
	Charging point id will be showed.
	Total active kWh; Imported active kWh; Exported active kWh.
	Total reactive kVarh; Imported reactive kVarh; Exported reactive kVarh.

When in charging, the display will change(as follows):

Each successive pressing of the  button selects a new range:

	Total kWh and time will be showed when charging. (The total power display will automatically deduct the lost energy)
	Charge-point-identification id will be displayed and it is hidden.

3.4 Setup Mode

To enter set-up mode, pressing the E button for 3 seconds, until the password screen appears.

Setting up is password-protected so you must enter the correct password (default '1000') before processing. If an incorrect password is entered, the display will show: Error!

To exit setting-up mode, press U/I ESC repeatedly until the measurement screen is restored.
Some menu items, such as password and CT, require a four-digit number entry while others, such as supply system, require selection from a number of menu options.

3.4.1 Menu Option Selection

1.Use the M and P buttons to scroll through the different options of the set up menu.

2.Long press E to confirm your selection.

3.If an item flashes, then it can be adjusted by the M and P buttons.

4.Having selected an option from the current layer, long press E to confirm your selection.

5.Having completed a parameter setting, press U/I ESC to return to a higher menu level.

You will be able to use the M and P buttons for further menu selection.

6.On completion of all setting-up, press U/I ESC repeatedly until the measurement screen is restored.

3.4.2 Number Entry Procedure

When setting up the unit, some screens require the entering of a number. In particular,
on entry to the setting up section, a password must be entered. Digits are set individually, from left to right.

The procedure is as follows：

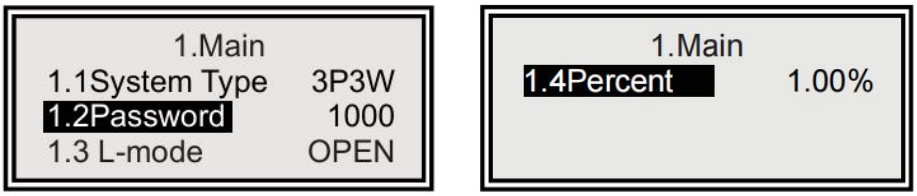
1.The current digit to be set flashes and is set using the M and P buttons.

2.Short press E to confirm the digit setting and remove to the next.

3.After setting the last digit, long press E to confirm the setting.

4.Press U/I ESC to return to a higher menu level.

3.4.3 Main Setting



1.1	System type	From the set-up menu, use the M and P to select the system option. The screen will show the currently selected system type. Press E for 3 seconds to select and confirm the selected system. Options: 1P2W, 3P3W, 3P4W
1.2	Password	From the set-up menu, use the M and P to change password.
1.3	L-mode	From the set-up menu, use the M and P to select cable loss option. Option: Open, Close. Default: Close
1.4	Percent	When the cable loss mode is open, use the M and P to set the percent of the cable loss. Range: 0.01 to 9.99%
Press U/I ESC to exit the number setting routine and return to the Set-up menu.		

3.4.4 Communication Setting

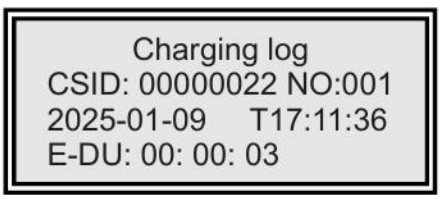
2.1	Addr	From the set-up menu, use the M and P to set the address. The screen will show the currently selected address. Hold E for 3 seconds to set and confirm the new address. Options: 001~247
2.2	Baud	From the set-up menu, use the M and P to change baud rate. Options: 2400, 4800, 9600, 19200, 38400

		Default: 9600
2.3	Parity	From the set-up menu, use the M and P to change parity option. Options: NONE, EVEN, ODD. Default: NONE.
2.4	Stop	From the set-up menu, use the M and P to change stop option. Options: 1, 2. Default: 1. Note: , the stop bit can be changed to 2 when the parity is NONE.
Press U/I ESC to exit the number setting routine and return to the Set-up menu.		

3.4.5 Time Setting

3.1	TIME ZONE	From the set-up menu, use M and P buttons to select the ZONE. Option: -12 to +12
3.2	Backlight	From the set-up menu, use M and P buttons to select the Backlight. Options: on, 10, 30, 60, 120, off. Default: 60 min.
Use M and P buttons to select the time interval. Press E to confirm the set-up. Press U/I ESC to exit the number setting routine and return to the Set-up menu. SET will be removed.		

3.4.6 Charging Log



4	Charging	From the Set-up menu, use the  and  to check the Record data. Max: latest 99 records.
Use  and  buttons to select the time interval.		

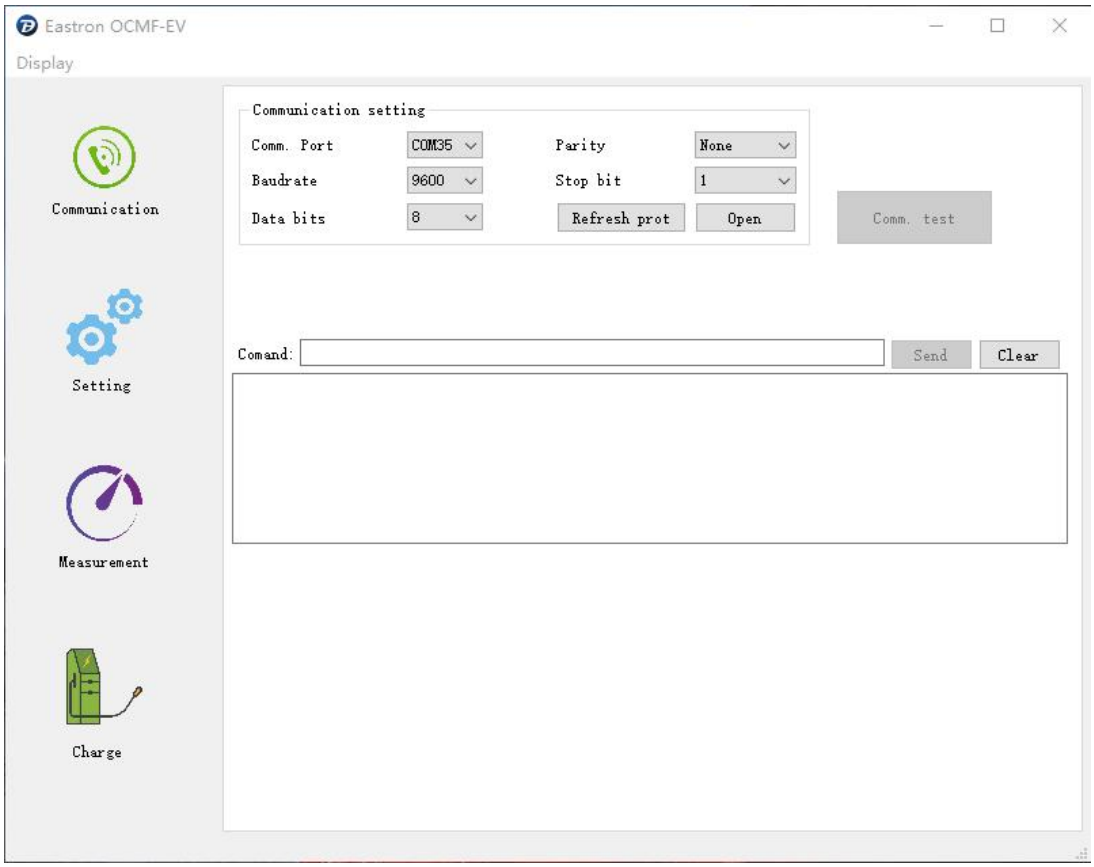
Chapter 4. OCMF-EV software

4.1 Introduction

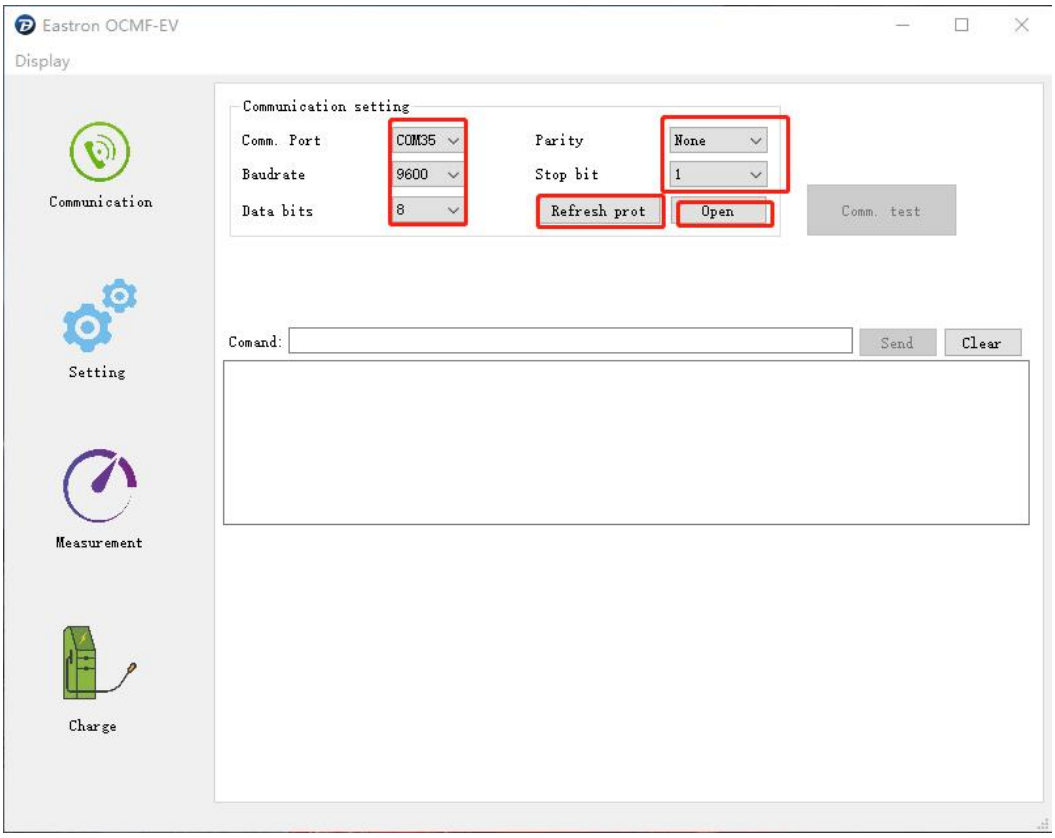
Eastron OCMF-EV can communicate with the electricity meter SDM630-EV through the converter USB to RS485. It can simulate the charging pile to set the parameters of the electricity meter and read the multi parameters of the meter , and charge control. It also supports the signatures of the OCMF data.

4.2 Connection

Step 1: Before setting the communication parameters, please connect the meter SDM630-EV with the computer via a converter USB to RS485.
Step 2: Open the OCMF-EV software, as shown in the figure below:

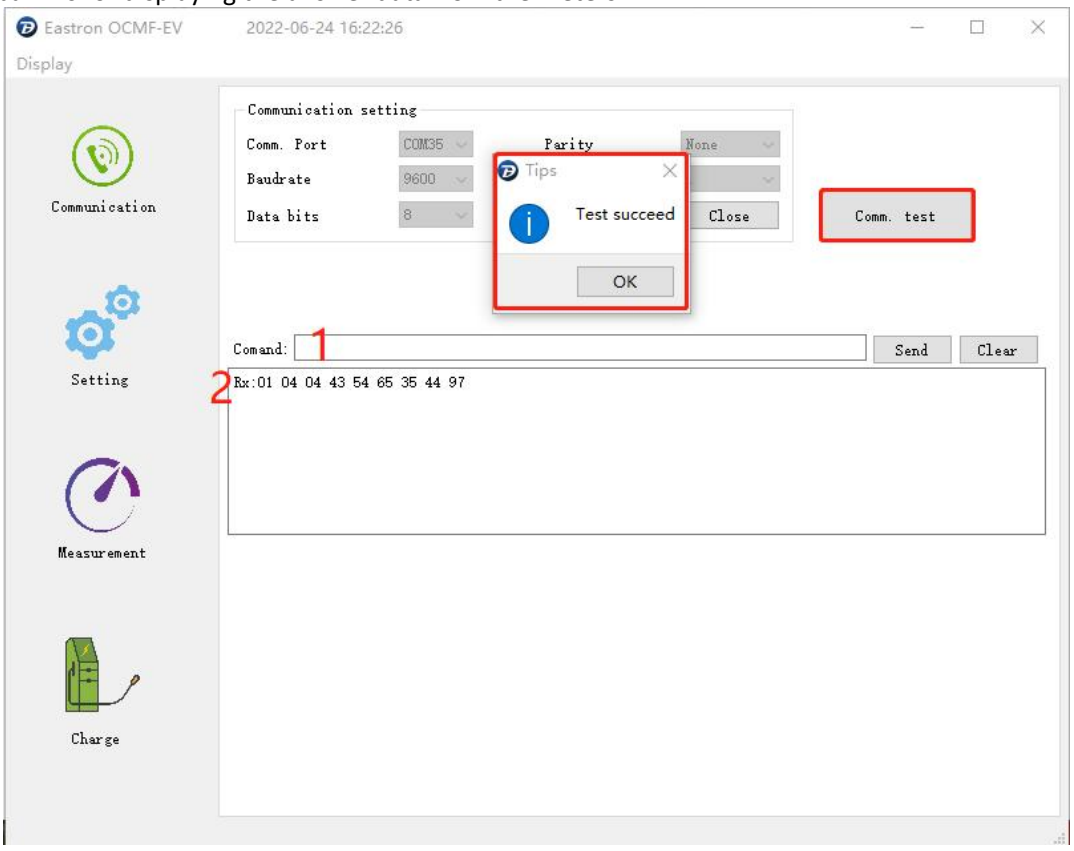


Step 3: Open the relevant terminal of the USB and set the correct parameters of the communication. The default of the meter SDM630-EV:
Baud rate: 9600
Parity: None
Stop: 1
If the OCMF-EV software cannot display the port of Com.of USB, please click “ Refreshport”.



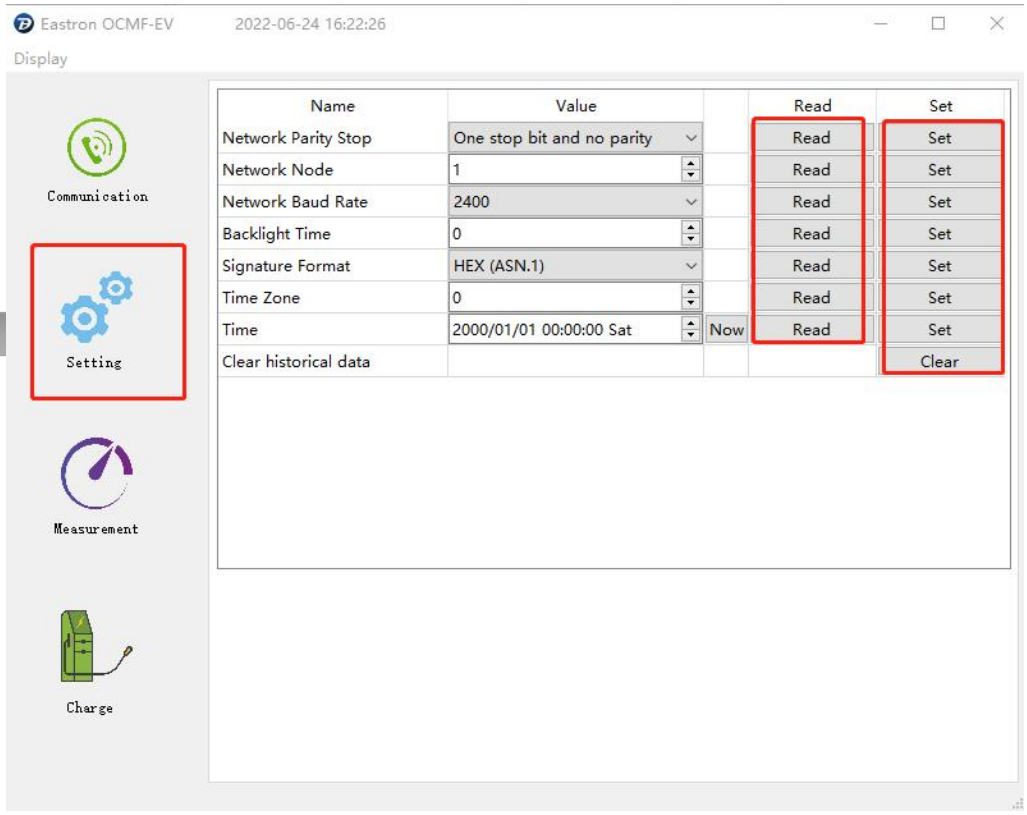
Step 4: After opening the Comm port, please click “Comm. Test” to test the communication. If the testing is OK, you will see a pop up window to show “Test succeed” .

Window bar 1 is for sending some command if you need. And the software will automatically create CRC. Window bar 2 is for displaying the answer data from the meters.

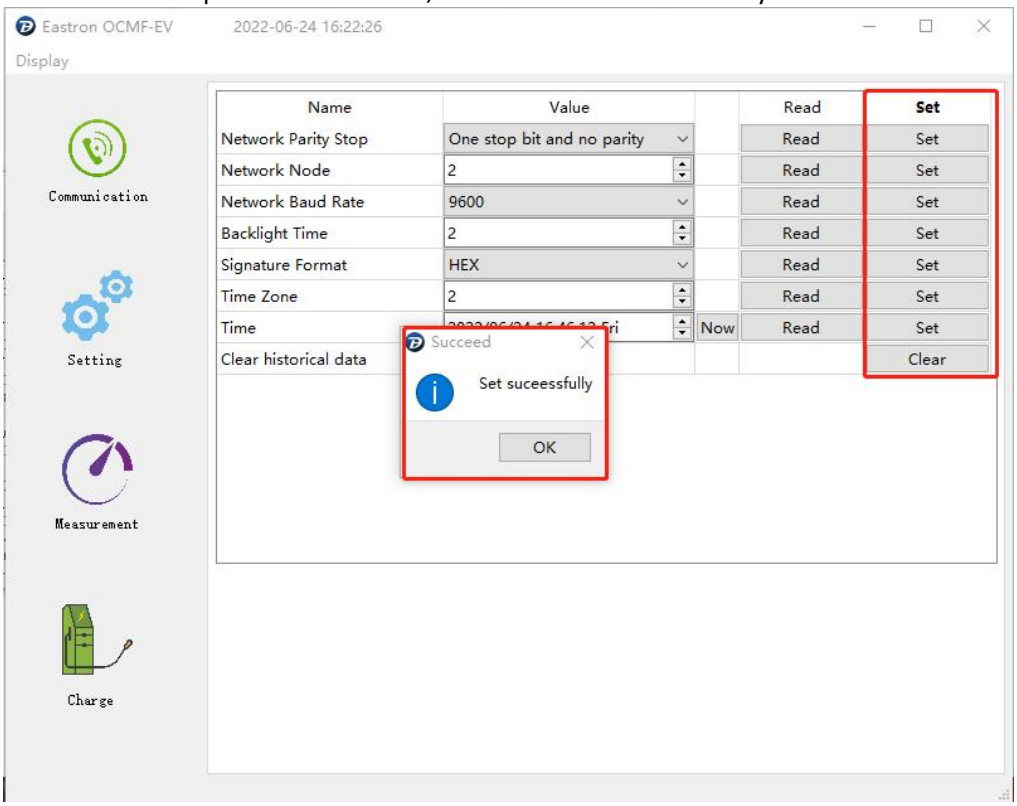


4.3 How to use the software

Step 1: Click “ Setting “ to set the parameters and click “ read ” to read the data from the energy meter SDM630-EV.



Step 2: Click “ Set “ to set the parameters. If done, it will show “ Set successfully ”

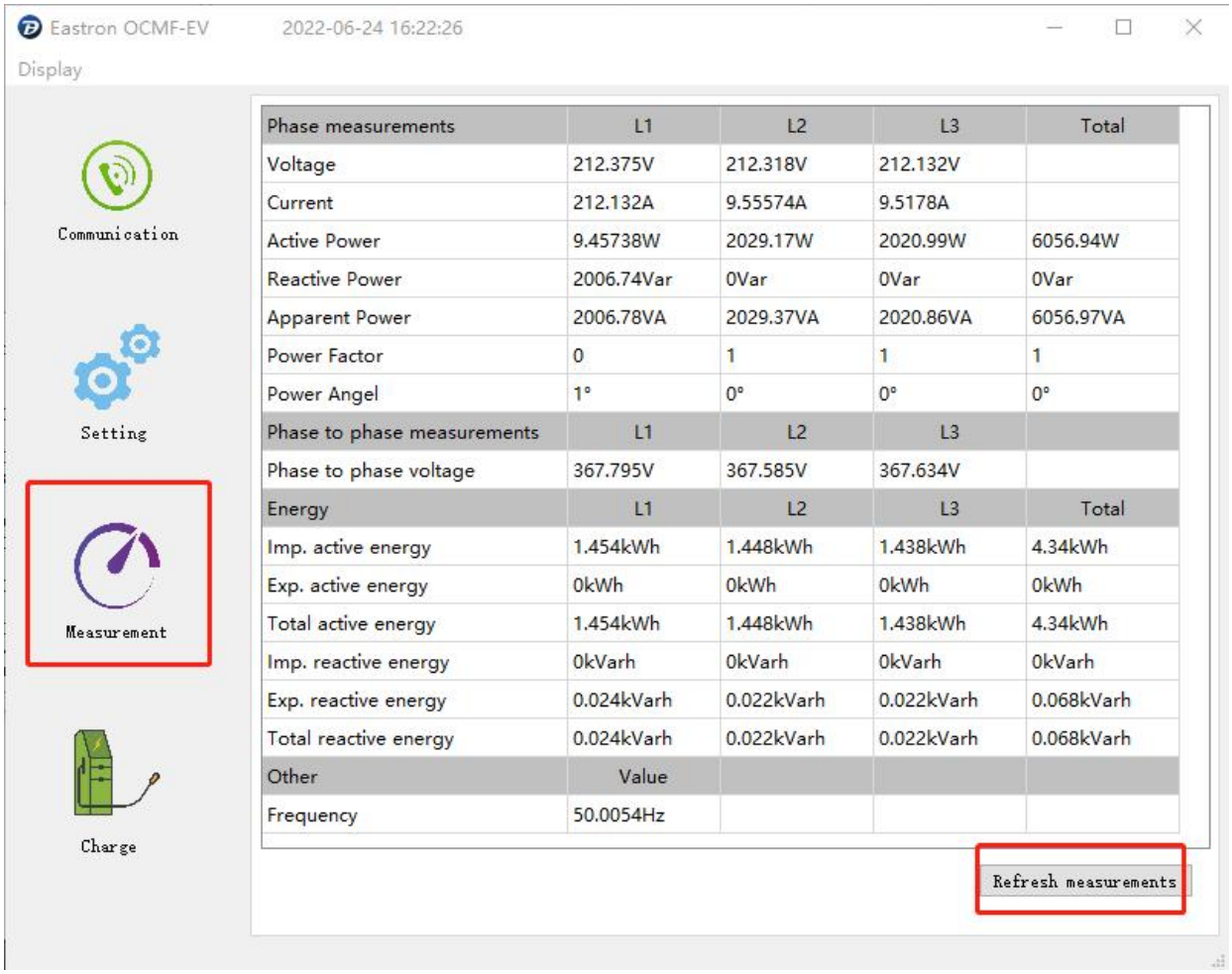


Note:

-> Measurement

Some common parameters can be read via the Measurement part in the software as shown in the figure below.

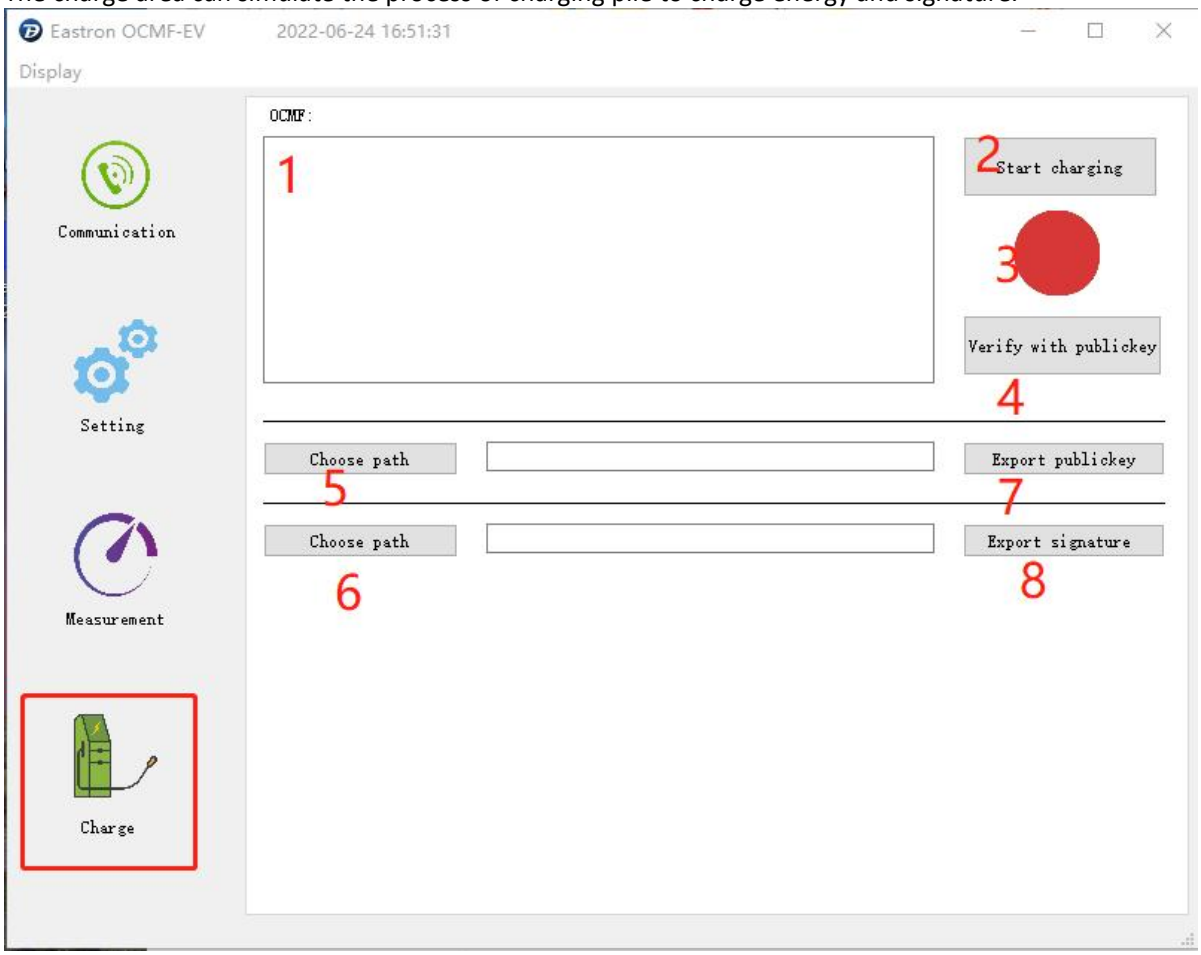
Click “ Measurement ” to enter the measurement window, then click “ Refresh measurements to get updated data.



Phase measurements	L1	L2	L3	Total
Voltage	212.375V	212.318V	212.132V	
Current	212.132A	9.55574A	9.5178A	
Active Power	9.45738W	2029.17W	2020.99W	6056.94W
Reactive Power	2006.74Var	0Var	0Var	0Var
Apparent Power	2006.78VA	2029.37VA	2020.86VA	6056.97VA
Power Factor	0	1	1	1
Power Angel	1°	0°	0°	0°
Phase to phase measurements	L1	L2	L3	
Phase to phase voltage	367.795V	367.585V	367.634V	
Energy	L1	L2	L3	Total
Imp. active energy	1.454kWh	1.448kWh	1.438kWh	4.34kWh
Exp. active energy	0kWh	0kWh	0kWh	0kWh
Total active energy	1.454kWh	1.448kWh	1.438kWh	4.34kWh
Imp. reactive energy	0kVarh	0kVarh	0kVarh	0kVarh
Exp. reactive energy	0.024kVarh	0.022kVarh	0.022kVarh	0.068kVarh
Total reactive energy	0.024kVarh	0.022kVarh	0.022kVarh	0.068kVarh
Other	Value			
Frequency	50.0054Hz			

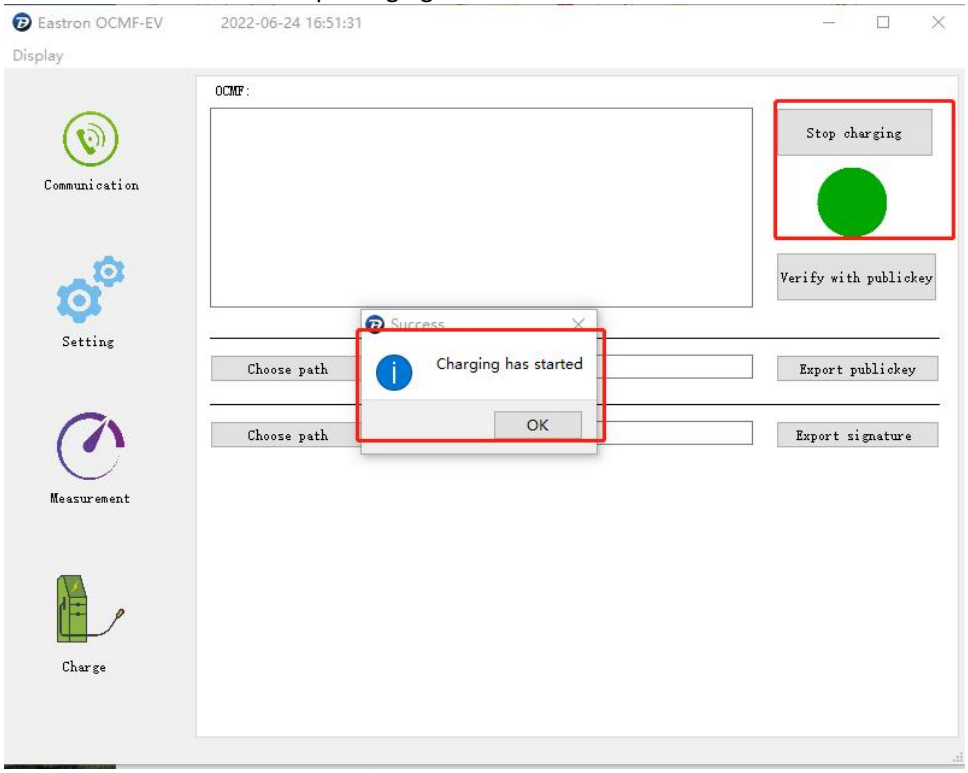
-> Charging :

The charge area can simulate the process of charging pile to charge energy and signature.

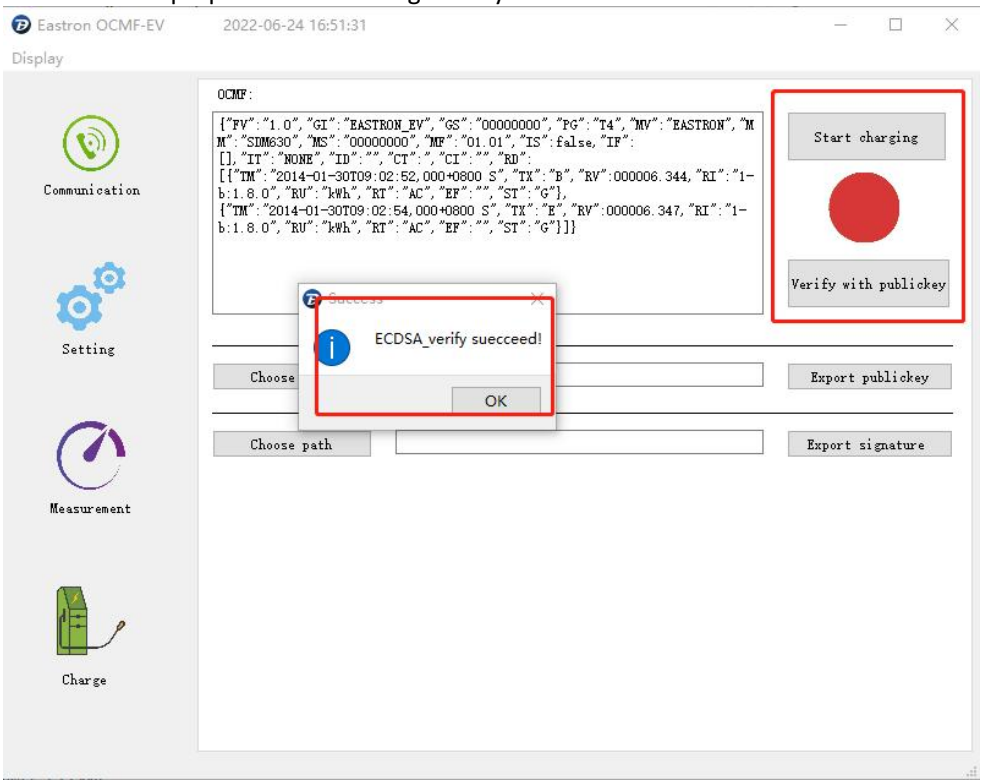


① Indicate receiving the OCMF data.
② Starting / Ending Charging button.
③ Charging light: red is for ending charging and green means it is under charging.
④ Use Public Key to sign.
⑤ Select the address of the output of Public Key file.
⑥ Select the address of the output of Signing file.
⑦ Click to output the Public Key file.
⑧ Click to output the Signing file.

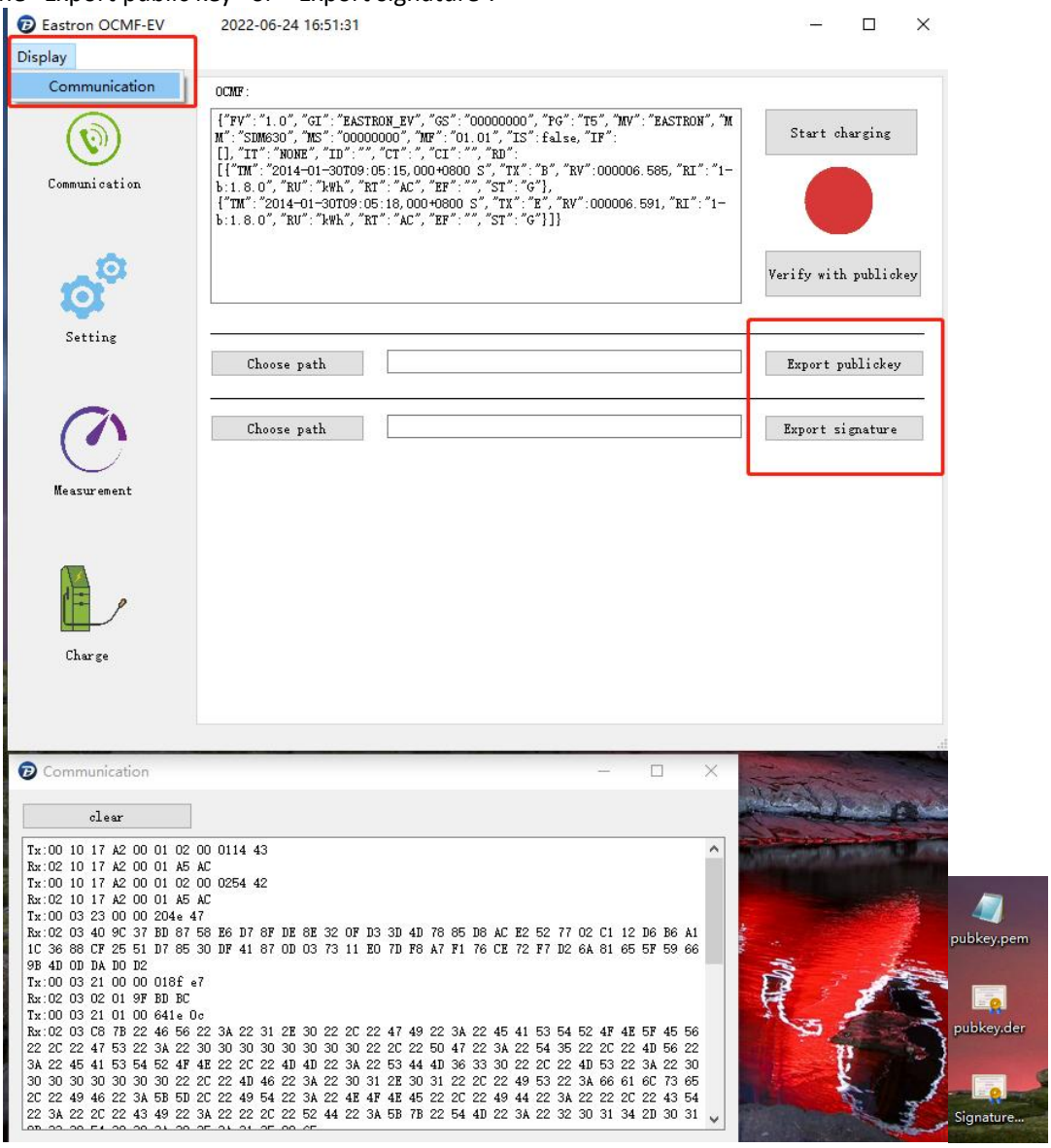
Step 3: Click " Start charging", you will see a pop-up window "Charging has started" as following.
And the button will switch to " Stop charging"



Step 4: Click " Stop charging " to end the charging, then click "Verify with Public Key" to check the date of Signing, and then you will see the Pop-up window showing "Verify successed".



Step 5: Click “Communication” to open the Comm to monitor the data. The relevant data can be exported via clicking the “Export public key” or “ Export signature”.



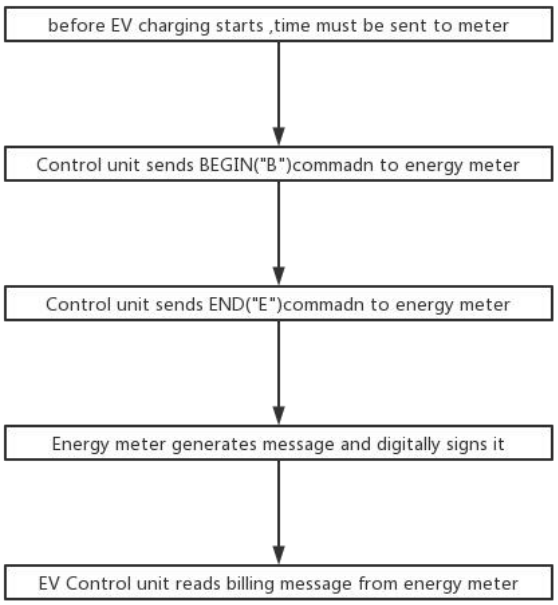
Chapter 5. Digital Signature

5.1 Introduction

The energy meter SDM630-EV supports the digital signature of energy information, which can ensure the integrity of the data received by the terminal. All of the digital signatures are completed by special encryption chips, which can better ensure the security of data. The meter supports ECDSA FIPS186-3 elliptic curve digital signature. It can communicate with the EV charger control unit through RS485.

5.2 Process of Signature

EV charger control unit is responsible to send start and stop command to energy meter. Energy meter measures consumed energy during charging. When charging is finished, EV control unit provides data packet (customer info, time, etc.) to energy meter via MODBUS communication. Energy meter adds measured energy and generates final billing message with digital signature. EV charger control unit then reads complete billing information with measured energy consumption and digital signature.



EV charger control unit must use following procedure to measure charging consumption and sign Data packet:

1. Set time, time zone, signature format
2. Send Begin command
3.Enter data packet size
4. Send intermediate reading commands (optional)
5. Send End command (triggers signing process)
6. Check signature status register until signature is ready
7. Read Output message length
8. Read Output message
9. Read signature length
10. Read signature
11. Read public key

5.3 The generation and reading of the public key

5.3.1 Generation of private/public key

This is one-time procedure made at production of energy meter. Generation of key pair is HW based with dedicated crypto chip. Private key is stored internally within the crypto chip and there is no way of reading it.

5.3.2 Generation of private/public key

Public key is available to end user for verification of digital signature. Therefore, public key is readable through MODBUS communication.
Public key is stored in 64 bytes raw format at MODBUS address 48961.
For **Transparenz Software** check, public key header should be prepended:
3059301306072A8648CE3D020106082A8648CE3D03010703420004
For checking with ECDSA, public key header is: 04.

5.4 Json data format

Format is compliant with OCMF v1.0.
Energy meter requires following fields in data packet:

```
OCMF|{
"FV":"1.0",
"GI":"",
"GS":"",
"PG":"",
"MV":"",
"MM":"",
"MS":"",
"MF":"",
"IS":true,
"IF":[],
"IT":"NONE",
"ID":",
"CT":"",
"CI":"",
"RD":[
{
"TM":"2019-11-11T13:22:28,000+0000 S",
"TX":"B",
"RV":123457.529,
"RI":"1-b:1.8.0",
"RU":"kWh",
"RT":"AC",
"EF":"",
"ST":"G"
},
{
"TM":"2019-11-11T13:24:12,000+0000 S",
"TX":"E",
"RV":123457.529,
"RI":"1-b:1.8.0",
"RU":"kWh",
"RT":"AC",
"EF":"",
"ST":"G"}
]
} |
{
"SD":string,
```

}

key	type	describe
FV	String	Format-Version: = "1.0"
GI	String	Gateway identification= "EASTRON EV".
GS	String	serial number (string of 8 char)
PG	String	Pagination of the entire dataset = string of "T<value>" with value increased for each read of transaction
MV	String	Meter-Vendor = "EASTRON"
MM	String	Instrument identification= “SDM630”
MS	String	serial number (string of 8 char)
MF	String	Meter-Firmware: "01.01"
IS	Boolean	Identification status: General status for user assignment: true: Users successfully assigned, false: Users not associated.
IF	Array of String	Identification flags for RFID, OCPP, ISO15118 and PLMN protocol
IT	String	Identification-Type: "string"
ID	String	Identification-Data: "string"
TT	String	Tariff Text
CT	String	Charge-Point-Identification-Type
Cable name	String	Cable name
CI	String	Charge-Point-Identification
CF	String	Charge controller firmware
TM	String	Time
TX	String	Transaction
RV	Number	Reading Value
RI	String	1-b:1.8.0 .Purchase of electrical energy (active energy) from the power grid (of the charging point operator) to the customer.
RU	String	Reading Unit
RT	String	Reading Current Type
EF	String	"" No error "E" Error in the energy register "t" Error in the time status "Et" Error in the energy registers and the time status
ST	String	Status

CONTACT US

If you have any question, please feel free to contact our sales team.

Eastron Electronic Co., Ltd.
No. 52, Dongjin Road, Nanhu, Jiaxing, Zhejiang, China
Tel: +86-573-83698881 Fax: +86-573-83698883
Email: sales@eastrongroup.com
www.eastrongroup.com