User Manual of

Power Quality Instrument

Applicable Model:

SFERE820A





Notices for Use

Please read this manual carefully before using this device and be sure to observe the following notes while using it:

NOTE:

• This device must be operated and maintained by a professional who has read this manual.

• Before performing any internal or external operations on the device, disconnect all input signals and power supplies and make sure that the secondary terminals of the voltage transformer are not short-circuited and the secondary terminals of the current transformer are not open-circuited.

• Be sure to use an appropriate voltage measuring device to confirm that there is no voltage present in any of the device's components.

- The electric parameters supplied to the device must be within the rated range.
- Please do not touch the terminals of the device while it is working.
- To use the communication function of the device, please connect it to a secure communication network.

The following circumstances may result in the device being damaged or operating improperly:

- The operating environment is out of range.
- The voltage of the auxiliary power supply is out of range.
- The frequency of the power distribution system is out of range.
- The signal input exceeds the maximum rating.
- The polarity of the current or voltage input is incorrect.
- The connection is not as required.

Without our legal written consent, no contents of this manual may be duplicated or disseminated. We are not liable for any errors or omissions in this manual that result in or bring about negative outcomes. The contents of this manual are subject to change without further notice. If you require a copy of this manual, please contact our technical service department or scan the QR code on the device label.

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1. Introduction

1.1 Overview

SFERE820A is characterized by precise power parameter measurement, energy metering, and power quality monitoring capabilities, and meets IEC 61000-4-30 A for power quality. With a rich package of I/O modules for on-site equipment state monitoring and control, it can be easily integrated with various intelligent power monitoring systems and energy management systems to share a wealth of monitoring data and power quality data.

1.2 Model function

Functions		Sfere820A
Display Mode	TFT LCD (Color display)	5"
	Three-phase voltage (Va, Vb, Vc, Uab,Ubc, Uca)	•
	Three-phase current (Ia, Ib, Ic)	•
	Neutral current (In)	•
	Active power (P, Pa, Pb, Pc)	•
	Reactive power (Q, Qa, Qb, Qc)	•
Real-time	Apparent power (S, Sa, Sb, Sc)	•
Measurement	Power factor (Pf)	•
	Frequency (F)	•
	Demand	•
	Max/Min values	•
	Phase angle	•
	Bi-directional active energy	•
	Bi-directional reactive energy	•
Energy Metering	Four-quadrant reactive electric energy	•
	Apparent energy	•
	Bi-directional tariff energy	•

[Note 1]: "-" - not available, "● "- available, "○" - optional.

	Voltage deviation	•
	Frequency deviation	•
	Unbalance	•
	THD (Voltage, Current)	
	Harmonic content(2 nd -51 st)	•
	Inter-harmonic ratio	•
	Voltage flicker	•
Power Quality	Rapid voltage change	•
	Voltage swell	•
	Voltage dip	•
	Voltage interruption	•
	Crest factor	•
	k-factor of current	•
	Transient capture	80µs
	ITIC/SEMI F47 curve	•
	Voltage	•
	Current	•
	Active power	•
Alarms	Reactive power	•
	Apparent power	•
	Power factor	•
	Frequency	•
	SOE log	1,024 events
Data Records	PQ event log	1,024 events
	Waveform record	1,024 events

	Data freeze	•
	EN50160 report	60 events
	Data Memory	2GB
	Digital input	4
Input/Output	Relay output	4
Communication Modbus-RTU Through RS485 interface •		•
Time synchronization	IRIG-B	•
	Modbus- RTU	•
	FM2: 4 digital inputs	Ο
Ontional Modules	FM3: 2 relay outputs	Ο
optional modules	FM11: RS485 port, Modbus-RTU protocol	Ο
	FM24: Ethernet port, Modbus-TCP, Web- sever	0

2. Technical Specification

Accuracy		
Voltage (Va/Vb/Vc)	Class 0.1 (IEC 61557-12)	
Voltage (Uab/Ubc/Uca)	Class 0.1 (IEC 61557-12)	
Current (Ia/Ib/Ic)	Class 0.1 (IEC 61557-12)	
Current (In)	Class 0.1 (IEC 61557-12)	
Active Power (P/Pa/Pb/Pc)	Class 0.2 (IEC 61557-12)	
Reactive Power (Q/Qa/Qb/Qc)	Class 0.2 (IEC 61557-12)	
Apparent Power (S/Sa/Sb,Sc)	Class 0.2 (IEC 61557-12)	
Power Factor (PF/PFa/PFb/PFc)	Class 0.2 (IEC 61557-12)	
Frequency (F)	Class 0.1 (IEC 61557-12)	
Active Energy (EP+)	Class 0.2S (IEC 61557-12)	

Reactive Energy (EQ+)	Class 0.5S(IEC 61557-12)		
Power Quality Parameters	IEC 61000-4-30 Cl. A		
Environmental Characteristics			
Working Temperature	-25°C+70°C		
Storage Temperature	-25°C+70°C		
Relative Humidity	5%95%RH, without condensation		
Working Altitude	≤ 2000m (CAT III)		
Pollution Degree	2		
Mechanical Characteristics			
Dimension	144mm×144mm×80mm		
Protection Degree	Face frame: IP54; rear housing: IP20		
Safety Characteristics			
Measurement Category	300V (CAT III)		
Safety	IEC 61010-1, double insulation		
Auxiliary Power Supply			
Voltage	AC/DC 80V270V		
Frequency	50/60Hz ± 5Hz		
Power Consumption	≤ 10VA		
Voltage Measurement Input			
Rated Value	3×230/400 VAC		
Measurement Range	10 – 276VAC (L - N)		
שינמסעו כוווכוונ וגמווצכ	17 – 480VAC (L - L)		
Overload	Continuous: 1.2Vn; instantaneous: 2Vn/1min		
Frequency	45Hz65Hz		
Current Measurement Input			

Rated Value	3×/1A or/5A		
Minimum Operating value	10mA		
Overload	Continuous: 2In; instantaneous: 20In/0.5s		
Sampling time			
Number	256 samples/cycles at 50Hz/60Hz		
Data update rate	200ms		
Display update rate	1s		
Digital Input			
Number	4		
Туре	Dry contact, built-in DC 24V		
Relay Output			
Number	4		
Contact Capacity	AC 250V/5A or DC30V/5A		
Pulses of Electric Energy			
Number	1		
Туре	Photocoupler isolation		
Communication Port			
Number	1		
Port	RS485		
Baud rate	2.4kbps 115.2kbps		
Protocol	Modbus-RTU		
Real-time Clock			
Clock Drifting	≤ 0.5s/day		
Terminals			
Torque	0.5N·m		

Applicable Standards		
GB/T 39853/ IEC 62586	Power Quality Measurement in Power Supply System	
GB/T 18216.12/ IEC 61557-12	Power metering and monitoring devices (PMD)	
GB/T 17626.2/ IEC 61000-4-2	Immunity to electrostatic discharge, Level 4	
GB/T 17626.3/ IEC 61000-4-3	Immunity to radio-frequency field, Level 3	
GB/T 17626.4/ IEC 61000-4-4	Immunity to electrical fast transients/bursts, Level 4	
GB/T 17626.5/ IEC 61000-4-5	Surge Immunity, Level 4	
GB/T 17626.8/ IEC 61000-4-8	Immunity to power frequency magnetic fields, Level 4	
CE	Safety	
EN50160	Power quality report	

3. Installation

3.1 Dimensions



Figure 3.1.1 Sfere820A (Unit: mm)



FM2, FM3, FM11, FM24

Figure 3.1.2 Extension Module (Unit: mm)

3.2 Installation



Figure 3.2.1 Installation Diagram



Figure 3.2.2 Module installation Diagram

Note: FM24 module can only be installed in position (1) (see Figure 3.3.1.2) After the FM24 module is connected, no other modules can be installed in position (1).

3.3 Wirings

3.3.1 Typical Wiring Diagram



Figure 3.3.1.1 Typical wiring diagram



Figure 3.3.1.2 Back-end Diagram

3.3.2 Voltage/Current Input Connection



Figure 3.3.2.1 Voltage/Current Input Connection Diagram

3.3.3 Module Wiring



4. **Operation**

4.1 Panel



1 Display window

Content Prompt: The currently displayed content will be prompted in the center of each interface;

Page Number: Each interface has a unique number, which is displayed in the upper right corner of the interface;

Data Window: It displays various data contents;

2 Button

There are four prompt areas for button function icons at the bottom of each interface, indicating the present function of each physical button.

Users can set the device parameters with those buttons.

(3) Indicator led

Button functions

Icons	Description
	Increase the selected data bits.
	Move down the options/page down/change parameters.
	Move in a circular way to the left to change or display data.
	Move in a circular way to the right to change or display data.
	Return directly to the "Main Menu" page, return to the previous menu or discard
Back	modifications.
	Enter the selected option.
Enter	
	Confirm.
Confirm	
	Zoom in or out to display the image.
Zoom	
	Edit the options.
Edit	
	Turn to next page.
Turn	
	Invalidate the present button.

Modification methods for values:

Press " **T** " to move and modify the data bit, and then press " **T**" to cyclically increase the present data bit.

Entering and exiting of programming state:

Entering of programming state: On the main interface, press " and " , and " , to change the
selected item into "System Setup", and then press " Enter " to enter the interface of programming setup.
Generally, users can enter by selecting "User Setup". After entering the correct programming protection
password, they will enter the programming Setup and start setting parameters (the default programming
password is 0001, and users can modify it as necessary).

Exiting of programming state: When you have already returned to the first-tier menu of programming interface, Press the button " Back". Now, the device will prompt whether to save the modifications. Select "Yes" to save the modifications and return to the main menu, or select "No" to abandon saving the modifications and return to the main menu.

4.2 Display

4.2.1 Display Menu



Figure 4.2.1 Overview of Display Menu

4.2.2 Display Features

4.2.2.1 Real-time measurement

No.	Display	Description
1	Real-time overview 1.01 V1 219.022 V P1 1.092 kW V2 218.391 V P2 1.087 kW V3 218.594 V P3 1.093 kW U12 378.594 V PF1 1.000 U23 378.469 V PF2 1.000 U31 378.952 V PF2 1.000 U1 4.9888 A Q -0.003 kvar I2 4.9806 A S 3.273 kVA I3 5.0033 A F 49.998 Hz	Real-time measurement overview
2	Voltage 1.02 Max Min V1 219.022 V 219.142 000.000 V V2 218.391 V 220.042 V 000.000 V V3 218.594 V 220.741 V 000.000 V U12 378.594 V 379.154 V 000.000 V U23 378.469 V 380.147 V 000.000 V U31 378.952 V 379.986 V 000.000 V	Voltage Phase to neutral voltage V1=219.022V V2=218.391V V3=218.594V Phase to phase voltage U12=378.594V U23=378.469V U31=378.952V
3	Omega Current 1.03 I1 4.9987 A 5.0010 A 0.0000 A I2 5.0014 A 5.0014 A 0.0000 A I3 4.9997 A 5.0003 A 0.0000 A In 0.0001 A 0.0007 A 0.0000 A	Current I1=4.9987A I2=5.0014A I3=4.9997A Neutral current In=0.0001A
4	Omega Active power 1.04 P1 1.1002 kW P2 1.0997 kW P3 1.1003 kW P 3.3002 kW 3.3012 kW 0.0000 kW	Active power P1 =1.1002kW P2=1.0997kW P3=1.1003kW P= 3.3002kW

	Reactive power 1.05	Reactive power
5	Max Min Q1 -0.0002 kvar	Q1=-0.002kvar
	Q2 0.0000 kvar	Q2=0.000kvar
	Q3 -0.0002 kvar	Q3=-0.002kvar
	Q -0.0003 kvar 0.0003 kvar 0.0000 kvar	Q =-0.003kvar
6	Apparent power 1.06	Apparent power
_	Max Min	S1-1 1001JUA
	S1 1.1001 kVA	51=1.1001KVA
	52 1.1006 kVA	S2=1.1006kVA
	S3 1.1002 kVA	S3=1.1002kVA
	S 3.3008 KVA 3.3008 kVA 0.0000 kVA	S=3.3008kVA
	< > 5	
7	Power factor 1.07	Power factor
7	O Power factor 1.07 Max Min PF1 1.0000	Power factor PF1=1.000
7	Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000	Power factor PF1=1.000 PF2=1.000
7	Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000	Power factor PF1=1.000 PF2=1.000 PF3=1.000
7	Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 < >	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 PF 1.0000 Image: Comparison of the second se	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 PF 1.0000 Max Min	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency F=50.000Hz
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 PF 1.0000 Max Min	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency F=50.000Hz
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 PF 1.0000 Max Min Max Min F 50.000 Hz 50.000 Hz	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency F=50.000Hz
7	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 O Frequency Max Min F 50.000 Hz 50.000 Hz O Hz	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency F=50.000Hz
7 8	O Power factor 1.07 Max Min PF1 1.0000 PF2 1.0000 PF3 1.0000 PF 1.0000 O 1.0000 PF 1.0000 Max Min Max Min F 50.000 Hz 50.000 Hz 50.000	Power factor PF1=1.000 PF2=1.000 PF3=1.000 PF=1.000 Frequency F=50.000Hz

4.2.2.2 Energy metering

No.	Display	Description	
1	○ Energy overview 2.01 EP+ 0000000007.994 kWh EP- 000000000.965 kWh EQ+ 0000000001.671 kvarh EQ- 0000000005.210 kvarh ES 000000001.650 kvarh EQ1 000000001.650 kvarh EQ2 000000000.021 kvarh EQ3 000000000.000 kvarh EQ4 000000000.000 kvarh	Energy overview	
2	C L1 energy 2.02 EP+ 0000000002.672 kWh EP- 000000000.322 kWh EQ+ 0000000001.739 kvarh EQ- 000000001.739 kvarh C > > Fundamental energy 2.05 EP+ 000000000.949 kWh EQ+ 000000000.949 kWh EQ+ 000000000.949 kWh EQ+ 000000000.949 kWh EQ+ 000000000.000 kvarh EQ+ 000000000.000 kvarh EQ- 000000000.000 kvarh	L1 energy Import active energy EP+ = 2.672kWh Export active energy EP- = 0.322kWh Import reactive energy EP+ = 4.284kvarh Export reactive energy EP- = 1.814kvarh Fundamental energy Fundamental import active energy EP+ =7.964kWh Fundamental export active energy EP- = 0.949kWh Fundamental import reactive energy EQ+ = 1.651kvarh Fundamental export reactive energy	
4	O Tariff energy 2.06 Σ 0000000117.952 kWh T1 00000000117.952 kWh T2 000000000.000 kWh T3 000000000.000 kWh T4 000000000.000 kWh T5 000000000.000 kWh T6 000000000.000 kWh T7 00000000.000 kWh T8 000000000.000 kWh < > ⇒	EQ- = 0.000kvarh Tariff energy 8 tariffs energy	

4.2.2.3 Power quality Metering

No.	Display	Description	
1	O Power quality Harmonic Interharmonic Interharmonic Deviation Unbalance Flicker Flicker Waveform ITIC curve SEMI F47 curve EN50160 report ←	Power quality overview	
2	THD THD 3.1.01 THD_V1 001.270 % THD_V2 001.271 % THD_V3 001.269 % THD_I1 001.270 % THD_I2 001.271 % THD_I3 001.270 %	Total harmonic distortion (THD)	
3	O Harmonic content 3.1.02 HC_V1 001.271 V HC_V2 001.271 V HC_V3 001.270 V HC_I1 001.270 A HC_I2 001.272 A HC_I3 001.270 A	Harmonic content	
4	Image: Constraint of the state of the	Harmonic ratio	
5	Image: Constraint of the state of	Harmonic ratio	







ITIC/SEMI F47 Curves

The ITIC and SEMI F47 curves specify the ability of equipment to withstand power supply's voltage disturbances. Their significance lies in being the benchmarks for assessing the tolerance of power equipment

to voltage interference and voltage disturbances in power supply systems.

For the ITIC curve interface displayed by the device, the horizontal axis represents the duration of transient voltage event, and the vertical axis represents the voltage percentage (relative to nominal voltage). The upper curve represents the tolerance of equipment to voltage swells, and the lower curve represents the tolerance of equipment to voltage dips. The area between them represents the normal running range. As shown in the figure below, this interface shows the amplitude-duration distribution of a single transient event.



For the SEMI F47 curve interface displayed by the device, the horizontal axis represents the duration of transient voltage event, and the vertical axis represents the voltage percentage (relative to nominal voltage). The specification stipulates the tolerance time of equipment to voltage dips. The area above red solid line represents that the equipment must ensure normal continuous running under such interference. The equipment can run continuously for 0.02s at 0% of the nominal value, 0.2s at 50% of the nominal value, 0.5s at 70% of the nominal value, 1s at 80% of the nominal value, and 10s at 90% of the nominal value. As shown in the figure below, this interface shows the amplitude-duration distribution of a single transient event.

4.2.2.4 Demand

No.	Display	Description
1	Present period demand 4.01	Present period demand
	11 4.9877 A	I1=4.9877A
	12 4.9794 A 13 5.0022 A	I2=4.9794A
	P 3.271 kW Q -0.004 kvar	I3=5.0022A
	5 3.272 kVA	P=3.271kW
	$\langle \rangle $ 5	Q=-0.004kvar
		S=3.272kVA
2	Previous period demand 4.02	Previous period demand
	11 4.9877 A	I1=4.9877A
	13 5.0022 A	I2=4.9794A
	P 3.271 kW Q -0.004 kvar	I3=5.0022A
	s 3.272 kVA	P=3.271kW
	$\langle \rangle$ 5	Q=-0.004kvar
		S=3.272kVA
3	Forecast demand 4.03	Forecast demand
	11 4.9877 A	I1=4.9877A
	12 4.9794 A 13 4.9999 A	I2=4.9794A
	P 3.271 kW	13=4 99994
	Q -0.004 kvar S 3.272 kVA	D = 2.271 + M
		r - 3.27 IKW
	· · · · · · · · · · · · · · · · · · ·	Q=-0.004kvar
		S=3.272kVA
4		Max demand
	O Max Demand 4.04	I1=4.9895A
	11 4.9895 A	I2=4.9815A
	12 4.9815 A 13 5.0049 A	I3=5.0049A
	P 3.273 kW	P=3.273kW
	s 3.273 kVA	0=-0.024kvar
	< > 5	S=3 273kVA

4.2.2.5 Module

No.	Display	Description	
1	Image: Constraint of the second se	Local I/O	
2	✓ Module X1 5.02 FM2 (4DI) Ver.173A D11 Pluse count 0000000006 D12 Status monitor - D13 Status monitor - D14 Status monitor -	Expand module FM2	
3	O Module X2 5.03 FM11 (RS485) Ver.173A Address 002 Baud rate 57600 bps Data format N.8.1 Protocol Modbus-RTU	Expand module FM3	
4	 Module X3 FM3 (2D0) Ver.1101 D01 On >>- Off >>- →>-	Expand module FM11	

4.2.2.6 SOE logs

No.	Display	Description	
1	O Event log Dip event Swell event Interruption event RVC event Short-term flicker event Long-term flicker event SOE event Event counter	SOE logs overview	
1	Din quant	Din quant logo	
2	No. Start time Description 1/12 0001 2024-01-12 19:01:57 147 L3 voltage dip 0002 2024-01-12 19:01:57 147 L3 voltage dip 0003 2024-01-12 15:48:12 482 L2 voltage dip 0004 2024-01-12 12:23:28 163 L3 voltage dip 0005 2024-01-12 12:13:45 163 L1 voltage dip 0006 2024-01-12 06:25:46 233 L1 voltage dip 0007 2024-01-12 03:13:25 233 L3 voltage dip 0008 2024-01-12 03:13:25 233 L3 voltage dip	Dip event logs	
	O Dip event 6.1.01 No. Start time Description 1/12	Dip event logs	
	0001 2024-01-12 19:01:57 147 L3 voltage dip 0002 2024-01-12 15:48:12 482 L2 voltage dip 0002 2024-01-12 15:48:12 482 L2 voltage dip 0002 2024-01-12 15:48:12 482 L2 voltage dip		
	0003 2024-01-12 14:37:35 17.8 11 Voltage dip 0004 2024-01-12 12:23:28 163 L3 voltage dip 0005 2024-01-12 12:13:45 163 L1 voltage dip		
	0006 2024-01-12 06:25:46 233 L1 voltage dip 0007 2024-01-12 04:14:24 233 L2 voltage dip 0008 2024 01 12 02:12:25 223 L2 voltage dip		
3			
4	O Dip event 6.1.01 No. Start time Description 1/12 0001 2024 Event details tage dip 0002 2024 Type L3 voltage dip tage dip 0003 2024 Event details tage dip 0004 2024 End time 2024-01-12 03:13:25 233 tage dip 0005 2024 Min RMS for half-cycle 052:494 V tage dip 0005 2024 Utration 005:46.0 ms tage dip 0006 2024 Wave ITIC SEMI tage dip 0007 2024-01-12 04:14:24 235 L2 voltage dip tage dip 0008 2024-01-12 03:13:25 233 L3 voltage dip tage dip	Dip event logs	
	Swell event 6.2.01 No. Start time Description 1/15	Swell event logs	
5	0001 2024-01-12 23:14:22 345 L3 voltage swell 0002 2024-01-12 22:47:19 471 L2 voltage swell 0003 2024-01-12 18:57:50 148 L1 voltage swell 0004 2024-01-12 17:14:03 247 L3 voltage swell 0005 2024-01-12 17:14:03 247 L3 voltage swell 0006 2024-01-12 15:46:22 154 L1 voltage swell 0006 2024-01-12 09:01:54 221 L1 voltage swell 0007 2024-01-12 08:45:21 350 L2 voltage swell 0008 2024-01-12 07:21:21 576 L3 voltage swell		

6	Interruption event 6.3.01 No. Start time Description 1/1 0001 2024-01-12 20:48:34 148 L3 voltage interruption 0002 2024-01-12 16:17:07 355 L2 voltage interruption 0003 2024-01-12 11:01:32 255 L1 voltage interruption	Interruption event logs
7	O RVC event 6.4.01 No. Start time Description 1/1 0001 2024-01-22 04:52:51 061 L3 rapid voltage change 0002 2024-01-18 08:14:58 872 L2 rapid voltage change 0003 2024-01-12 03:11:51 454 L1 rapid voltage change	RVC event logs
8	Image: Short-term flicker event 6.5.01 No. Start time Description 1/1 0001 2024-03-5 02:24:22 481 Short-term flicker 0002 2024-01-14 00:29:21 534 Short-term flicker 0003 2024-01-12 11:01:32 255 Short-term flicker	Short term flick event logs
9	O Long-term flicker event 6.6.01 No. Start time Description 1/1 0001 2024-01-14 10:29:21 545 Long-term flicker	Long term flick event logs
10	SOE event 6.7.01 No. Start time Description 1/1 0001 2024-08-22 17:10:58 145 Power off 0002 2024-08-22 12:54:24 542 Power on 0003 2024-08-22 10:40:43 478 Power off 0004 2024-08-22 10:31:21 487 X2-DI2 off 0005 2024-08-22 08:25:54 245 X2-DI4 off	SOE logs

\bigcirc	Event counter	6.8.01	Event counter
No	. Event type	Number	
000	1 Dip event	0095	
000	2 Swell event	0125	
000	3 Interruption event	0003	
000	4 RVC event	0003	
000	5 Short-term flicker event	0003	
000	6 Long-term flicker event	0001	
000	7 SOE event	0005	
.1 🖵			

4.2.2.7 Help

No.	Display			Description
1	✓ H Measurement version Display version Power on time Load run time Current time	e1p 0000.240822 1000.240822 0000217976 0000049245 2024-09-01 15;	7.01	Help page

4.3 Setup

4.3.1 Setup Menu





Figure 4.3.1.1 Overview of Setup Menu

4.3.2 Basic Parameter Setup

Display	Menu1	Menu2
	Back Light	01 99min
		00 - always on
	Brightness	Level 1Level5
	Language	English
	Password	00009999
		Main menu
		Instant overview
		Voltage
		Current
		Active power
		Reactive power
		Apparent power
		Power factor frequency
		Energy overview
Basic parameter setup		L1/L2/L3 energy
BackLight 04 min Brightness Level 3 Language English		Fundamental energy
Password 0001 Default interface Main menu	Default interface	Tariff energy
Phase index 1.2.3 Phasor diagram direction Anti-clockwise		Present monthly energy
		THD
< > 2 4		Harmonic content
		Harmonic ratio
		Inter-harmonic content
		Inter-harmonic ratio
		Deviation
		Unbalance Phasor diagram
		Flicker
		Voltage Waveform
		Current Waveform
		Present Demand
		Last demand

		Predicted demand
		Max demand
		Max demand of present month
		Digital I/O
		Module X1X4
		About
	Phase index	a, b, c
	Phasor diagram direction	Clock wise/Anti-clock wise

4.3.3 Signal Input Setup

Display		Menu1	Menu2
		Wiring mode	3P3W/3P4W
Signal input setup		PT Primary	1999999V
Wiring mode3P4PT Primary000220	V 7	PT Secondary	1600V
PT Secondary 220 CT Primary 000005 A	/ A	CT Primary	1999999A
CT Secondary 5 A NCT Primary 000005 A	f f	CT Secondary	16A
NCT Secondary 5 A Frequency 50 Hz Power factor mode IEC-C		NCT Primary	1999999A
	-	NCT Secondary	16A
		Frequency	50Hz/60Hz
		Power factor mode	IEC-C/IEEE-C/IEC-P

4.3.4 Communication Setup

	Display	Menu1	Menu2
Comm	nunication setup	Slave Address	1247
Baud rate Data Format Protocol	57600bps N. 8. 1 Modbus-RTU	Baud rate	2400bps115200bps
		Data format	E81, 081, N81, N82
		Protocol	Modbus-RTU
< >	ب ب		

4.3.5 Digital Input Setup

	Display		Menu1	Menu2	
No. DI1 DI2 DI3 DI4	Digital input setup Mode status monitor status monitor status monitor status monitor	Debounce time 010 ms 010 ms 010 ms 010 ms	Mode	Status monitor/ Pulse counting	
			Debounce time	101000ms	

4.3.6 Relay Output Setup

Display	Menu1	Menu2
Image: Constraint of the sector of the se	Mode	Off/On/Alarm
> 5	Pulse width	0.1 999.9s

4.3.7 Power quality threshold setup

Display		Menu1	Menu2
🖉 < PQ threshold setup	>	Swell threshold	100180%
PQ event Swell threshold	110 %	Dip threshold	0100%
Dip threshold Interruption threshold RVC threshold	090 % 010 % 003 %	Interruption threshold	0100%
Swell hys Dip hys	002 % 002 %	RVC threshold	16%
Interruption hys RVC hys	002 % 002 %	Swell hysteresis	010%
< > 5	Ц	Dip hysteresis	010%
		Interruption hysteresis	010%
PQ threshold setup Mains signaling voltage	>	RVC hysteresis	03%
Frequency #1 Frequency #2 Frequency #3 Threshold	0050.00 Hz 0050.00 Hz 0050.00 Hz 005.0 %	Mains signaling voltage frequency	50.02575.0Hz
		Mains signaling voltage	0.31 00%
		threshold	
< > 5	Ц		

4.3.8 PQ event setup

Display	Menu1	Menu2	
PQ event setup	Swell	Enable/Disable	
Voltage dip 🥌 Voltage swell 🗢	Dip	Enable/Disable Enable/Disable	
Voltage interruption 🔷 🔍 Rapid voltage change 🔷	Interrupt		
Short-term flicker 🔷 🔍 Long-term flicker 🌼	RVC	Enable/Disable	
	Short term flick	Enable/Disable	
< >> 5 ↔	Long term flick	Enable/Disable	

4.3.9 Module setup



4.3.10 Reset setup

Display	Menu1	Menu2
	Reset energy values	Enable/ Disable
	Reset demand values	Enable/ Disable
Reset setup	Reset max/min values	Enable/ Disable
Reset max/min value Reset max/min value Clear PQ event Clear SOB Reset DI pluse counter Clear freeze data Clear EN50160 report Reset accumulation timer	Clear PQ event logs	Enable/ Disable
	Clear SOE logs	Enable/ Disable
	Reset DI pulse counter	Enable/ Disable
	Clear freeze data	Enable/ Disable
	Clear EN50160 report	Enable/ Disable
	Reset accumulation timer	Enable/Disable

4.3.11 Demand setup

Display		Menu1	Menu2
Demand setup		Mode	Sliding block/Fixed block
Mode Sliding Sliding time(t) 01 min Period factor(n) 15t		Sliding time	1min60 min
Max/min value interval History		Period factor	1t30 t
		Max/min interval	Historical /1/5/15/30/60/1440 min
< > 5	لــــ		

4.3.12 Time setup

	Display		Menu1	Menu2
System time Time zone Timing mode	Time setup 20 <mark>24</mark> -08-23 1	4: 10: 58 GMT-12:00	System time	Year/Month/day/hour/ minute/second
		moubus	Time zone	GMT-12:00GMT+13
			Timing mode	Modbus/IRIG-B/Web/NTP
<	> 5	L>		

4.3.13 EN50160 Setup

Display	Menu1	Menu2	Menu3
		Template	LV/MV/HV
⊘ < EN50160 setup > Basic setup	Basic update	Start week	MondaySunda y
TemplateLVStart weekSundayFrequency setupWide tol.100.00 % Narrow tol.099.50 %Pos. dev.104.00 % Pos. dev.101.00 %Neg. dev.094.00 % Neg. dev.099.00 %Flicker setupTolerance095.00 % LimitColorance095.00 % Limit001.00 %	Frequency setup	Wide/Narrow Tolerance Wide/Narrow positive deviation Wide/Narrow	0100% 0200% 0100%
		negative deviation	0.4000/
	Flick setup	Tolerance	0100%
		Limit	0100

5. Functions

5.1 Real-time measurements

The device can measure the full electric parameters of power grid.

Measurement		Phase	Total	max	Min	Average	Demand
	Phase voltage	•	_	•	•	•	
Voltage	Line voltage	•	_			•	_
	Fundamental voltage	•	—				
	Current	•	—	•	•	•	•
Current	Neutral current		•	•	•		
	Fundamental	•	_			_	_
	current						
	Active power	•	•	•	•	•	•
Power	Reactive power	•	•	•	•	•	•
	Apparent power	•	•	•	•	•	•
Power factor		•	•	•	•		
Frequency		_	•	•	•	_	_

5.2 Energy metering

The device can meter energies, which are specifically as follows:

- Bidirectional active energy/reactive energy
- Fundamental active energy/reactive energy
- Four-quadrant reactive energy
- Apparent energy
- Tariff energy

The energy values displayed by the device are all primary values, which are obtained by multiplying the secondary value by magnification ratios of voltage and current transformers. All electric energy values are based on secondary values. The minimum resolution for accumulation of secondary electric energy values is 1Wh or 1varh, and the minimum display resolution of electric energy values is 0.001kWh or 0.001kvarh.

The maximum energy that can be retained is 4,294,967,295Wh on the secondary side. The display range of electric energy is initially 99,999,999,999kWh (99.9 billion kWh). There will be no overflow during normal service life of the device. Users can manually reset and clear the electric energy data according to their own needs (user password is required).

The device provides 6 sets of daily tariffs that can be set, weekly tariffs or 12 time zone tariffs that are optional, and 90 variable holidays that can be set. When the switching time is reached or the year/month

registers of switching time are directly written with 0xFFFF, the present rate setting will be directly overwritten by backup rate setting, and the switching time register will be cleared (the device will always run under the present rate setting).

The following tariff energy will be recorded:

- Present total/T1/T2/T3/T4/T5/T6/T7/T8 energy
- Total/T1/T2/T3/T4/T5/T6/T7/T8 energy for this month
- Historical total/T1/T2/T3/T4/T5/T6/T7/T8 energy for past 1 month to past 12 months.

5.3 Demand

The device can provide present period demand, previous period demand, maximum demand, maximum demand of present month, maximum demand of previous month and maximum demand of past 2 months, and two calculation methods, i.e., sliding block and fixed block, and the relevant setup can be made through communication.

The device can measure basic demand values, including 6 fixed demand values (I1, I2, I3, P, Q,S) and 10 optional demand values (see communication manual).

The demand can be measured with 2 methods: sliding block and fixed block. The time parameter setup involved include t (sliding time, unit: minute) and T (sliding cycle/interval time, unit: minute).

Sliding block: Every t minutes, it calculates the average demand value in the most recent T minutes, makes judgments and records, and conducts automatic meter reading for the monthly demand.

Fixed block: Every T minutes, it calculates the average demand value in the most recent T minutes, makes judgments and records, and conducts automatic meter reading for the monthly demand.

5.3.1 Sliding Block Demand

The setup related to sliding calculation are as follows:

- ♦ Mode: Sliding Block.
- ♦ Sliding Time (t): "1" minute.
- ♦ Period Factor (n): Set to "15".

The calculation method is shown in Figure 5.2.1.1:

- Previous period Demand = $(dmd_{t1}+dmd_{t2}+...+dmd_{t14}+dmd_{t15})/15$
- Present period Demand = $(dmd_{t2}+ dmd_{t3}+ ... + dmd_{t15}+ dmd_{t16})/15$



n+1 = 16

Figure 5.2.1.1 Sliding Demand Calculation

5.3.2 Fixed Block Demand

The setup related to fixed block calculation are as follows:

\diamond	Mode: Fixed block.
\diamond	Sliding Time (t): "1" minute.
\diamond	Period Factor (n): "15".
The calcula	tion method is shown in Figure 5.2.2.1:
\triangleright	Previous period demand = $(dmd_{t1}+ dmd_{t2}+ + dmd_{t14}+ dmd_{t15})/15$

Present period demand = $(dmd_{t16}+ dmd_{t17}+ ... + dmd_{t29}+ dmd_{t30})/15$



Figure 5.2.2.1 Fixed Block Demand Calculation

5.4 Max/Min Values

The device provides two types of max/min values i.e., interval values or historical values. When the interval time is set to "0", it is the historical value; when it is not set to "0", it is the interval value. When the interval time is set to 15min and the current time is 12:20, the values displayed by the device is the values within 12:00-12:15.

The device provides basic max/min data, including 15 fixed max data,15 fixed min data and 34 programmed data.

5.5 Power Quality

5.5.1 Power Quality

The device can monitor and analyze the power quality of grid, including the following measurement parameters:

Voltage deviation, frequency deviation, harmonics, inter-harmonics, unbalance, flicker, swell, dip, interruption and voltage rapid change.

5.5.2 Fundamental Wave Analysis

The device can provide the following fundamental data:

- Split-phase fundamental phase/line voltage
- Split-phase fundamental current
- Split-phase/total fundamental active power
- Split-phase/total fundamental reactive power

- Split-phase/total fundamental apparent power
- Split-phase/total fundamental power factor

5.5.3 Crest Factor

The device calculates the crest factor by analyzing a complete voltage and current cycle to provide crest factors of three-phase voltage and current:

Crest factor = Peak value / r.m.s value

5.5.4 k-Factor

The device calculates the k-factor based on the calculated harmonic data of current to provide k-factor of three-phase current:

$$k = \frac{\sum_{h=2}^{h=h\max} I h^2 h^2}{I h^2}$$

In which, h refers to the harmonic order, I_h refers to the value of harmonic distortion for the hth current harmonic, and I_{th} refers to the value of total harmonic distortion. the device is capable of measuring 2^{nd} - 51^{st} harmonics. Therefore, h_{max} is equal to 51.

5.5.5 Voltage Deviation

Changes in the running mode of power supply and distribution system and slow variations in load will cause the voltage at various points of the system to change accordingly. The difference between voltage at each point and rated voltage is known as voltage deviation, which is usually expressed as a percentage. The calculation method is as follows:

$$\Delta U = \frac{U - U_N}{U_N} \times 100\%$$

In which

 ΔU is Voltage deviation

U is Real Voltage

UN is rated voltage.

5.5.6 Frequency Deviation

Frequency deviation refers to the difference between actual value and nominal value of system frequency under normal running conditions in the power system. The calculation method is as follows:

Frequency deviation = Actual frequency - Nominal frequency

5.5.7 Harmonic and Inter-harmonic

Harmonics: Perform Fourier series decomposition on the periodic alternating quantity to obtain components with frequencies that are integer multiples of the fundamental frequency higher than 1;

Inter-harmonics: Perform Fourier series decomposition on the periodic alternating quantity to obtain components with frequencies that are not equal to integer multiples of the fundamental frequency higher

than 1;

The device provides the following harmonic data:

- Split-phase 2nd ... 51st voltage/current harmonic ratio
- voltage/current THD
- voltage/current harmonics content
- Split-phase harmonic active power
- Split-phase harmonic reactive power
- Split-phase $2^{nd} \dots 51^{st}$ inter-harmonic ratio of voltage/current
- Voltage/current inter-harmonics content

5.5.8 Unbalance

For 3-phase 4-wire system, the device calculates voltage and current unbalance according to the calculated positive and negative sequence components of voltage and current; for 3-phase 4-wire system, the device calculates voltage and current unbalance according to the calculated maximum and average voltage and current values.

For 3-phase 4-wire System:

$$Unb2 = \frac{U2}{U1} \times 100$$
$$Unb0 = \frac{U0}{U1} \times 100$$
$$Inb2 = \frac{I2}{I1} \times 100$$
$$Inb0 = \frac{I0}{I1} \times 100$$

For 3-phase 3-wire System:

$$Unb = \frac{\max(U - Uavg)}{Uavg} \times 100$$
$$Inb = \frac{\max(I - Iavg)}{Iavg} \times 100$$

The device simultaneously provides the real and imaginary parts of fundamental wave of voltage and current.

5.5.9 Voltage Flicker

The human visual response to unstable illumination caused by voltage fluctuations (lamp flickering) is known as flicker. In other words, flicker reflects the impact of lamp flickering caused by voltage fluctuations on human visual perception.

The device provides short-term and long-term flicker values along with time stamps. Specifically, the short-term flicker update cycle is 10min, while the long-term flicker update cycle is 2h.



Figure 4.2.2.3.8.1 Waveform Screenshot of Voltage Flicker

5.5.10 Voltage Swell, dip and Interruption

Voltage Swell: Under power-frequency conditions, the root-mean-square value of voltage rises to 1.1-1.8 times of rated voltage.

Voltage dip: Under power-frequency conditions, the root-mean-square value of voltage drops to 0.1 0.9 times of rated voltage.

Voltage Interruption: Under power-frequency conditions, the root-mean-square value of voltage drops below 0.1 times of rated voltage for not more than 1min.

The device provides the following functions:

- Split-phase voltage swell, dip and interruption events
- Occurrence and end time, duration and extreme values during voltage swell, dip and interruption events
- Waveform recordings of voltage swell, dip and interruption events

The device provides the following relevant parameter Setup:

- Event enable setting
- Selection and setting of data sources for event
- Setup for event threshold, hysteresis and determination of occurrence duration



Figure 4.2.2.3.9.1 Waveform Screenshot of Voltage Swell



Figure 4.2.2.3.9.2 Waveform Screenshot of Voltage dip



Figure 4.2.2.3.9.3 Waveform Screenshot of Voltage Interruption

5.5.11 Rapid Voltage Change

Rapid voltage change refers to a rapid transition in the effective value of voltage between two stable voltage states, with the maximum change in effective voltage value not exceeding the threshold for voltage swell or dip. the device provides the following functions:

- Rapid change events of split-phase/total voltage
- Occurrence and end time, duration, \triangle **Umax** and \triangle **Uss** of rapid voltage change event
- Waveform recordings during a rapid voltage change event the device provides the following relevant parameter Setup:
- Event judgment enable setting
- Event judgment threshold and hysteresis setting

 \triangle Umax: It refers to the maximum absolute value of difference between the last Uavg before an RVC event starts and any Urms during the event. For a multiphase system, it refers to maximum value among \triangle Umax of all phases.

 \triangle Uss: It refers to the absolute value of difference between the last Uavg before an event starts and the first Uavg after the event ends. For a multiphase system, the maximum value among all phases is taken.

Uavg: It refers to the arithmetic mean of 100 consecutive Urms. Urms: It refers to the effective value of voltage half-wave.



Figure 4.2.5 Waveform Screenshot of Rapid Voltage Change

5.6 Alarm

The device can provide independent alarms with enable, limit, hysteresis, and delay time. When an alarm is triggered, the register value of the alarm state of the communication address table will be updated accordingly.

The alarm item includes voltage, current, power, THD etc. Triggering Conditions of Alarm:

1) The corresponding alarm is enabled.

2) The value is more than the threshold in case of upper limit alarms; the value is less than the threshold in case of lower limit alarms.

3) The duration exceeds the delay time Release Conditions of Alarm:

The value is less than the threshold - hysteresis in case of upper limit alarms; the value is more than the value of threshold + hysteresis in case of lower limit alarms.

Alarm item:

LN-Voltage	N-phase Current
------------	-----------------

LL-Voltage	Total Active Power
Current	Total Reactive Power
Total Apparent Power	1 st 50 th current inter-harmonic content
Total Power Factor	1 st 50 th voltage inter-harmonic content
Zero-sequence voltage unbalance	1 st 50 th current inter-harmonic content
Negative-sequence voltage unbalance	DI1 ON
Zero-sequence current unbalance	DI1 OFF
Negative-sequence current unbalance	DI2 ON
Fundamental Voltage	DI2 OFF
Fundamental Current	DI3 ON
Voltage Deviation	DI3 OFF
Frequency	DI4 ON
Frequency Deviation	DI4 OFF
THD-V	X1-DI1 ON
TOHD-V	X1-DI1 OFF
TEHD-V	X1-DI2 ON
THD-I	X1-DI2 OFF
TOHD-I	X1-DI3 ON
TEHD-I	X1-DI3 OFF
TIHD-V	X1-DI4 ON
TOIHD-V	X1-DI4 OFF
TEIHD-V	X2-DI1 ON
TIHD-I	X2-DI1 OFF

TOIHD-I	X2-DI2 ON
TEIHD-I	X2-DI2 OFF
HC_V	X2-DI3 ON
HC_I	X2-DI3 OFF
IHC_V	X2-DI4 ON
IHC_I	X2-DI4 OFF
Present demand-P	X3-DI1 ON
Present demand-Q	X3-DI1 OFF
Present demand-S	X3-DI2 ON
Present demand-PF	X3-DI2 OFF
Forecast demand-P	X3-DI3 ON
Forecast demand-Q	X3-DI3 OFF
Forecast demand-S	X3-DI4 ON
Forecast demand-PF	X3-DI4 OFF
Short-term flicker	X4-DI1 ON
Long-term flicker	X4-DI1 OFF
Rapid voltage change	X4-DI2 ON
2 nd 51 st voltage harmonic ratio	X4-DI2 OFF
2 nd 51 st current harmonic ratio	X4-DI3 ON
2 nd 51 st voltage harmonic content	X4-DI3 OFF
2 nd 51 st current harmonic content	X4-DI4 ON
1 st 50 th voltage inter-harmonic content	X4-DI4 OFF

5.7 Event Log

The device provides 1,024 data records for querying, where each record can be divided into two parts i.e., event + occurrence time. The event is divided into a high byte (event classification) and a low byte (specific event), as shown in the following table:

High byte	Event Classification	Low byte	Specific Events
0x00	No event	—	—
0x01	Power on/off event	0x00	Power off
		0x01	Power on
0x02	Over-limit start event	_	
0x03	Over-limit end event	_	see communication manual
		0x00	DI1 ON
		0x01	DI1 OFF
		0x02	DI2 ON
		0x03	DI2 OFF
		0x04	DI3 ON
		0x05	DI3 OFF
		0x06	DI4 ON
		0x07	DI4 OFF
		0x08	X1-DI1 ON
		0x09	X1-DI1 OFF
		0x0A	X1-DI2 ON
		0x0B	X1-DI2 OFF
0x04	DI event	0x0C	X1-DI3 ON
		0x0D	X1-DI3 OFF
		0x0E	X1-DI4 ON
		0x0F	X1-DI4 OFF
		0x10	X2-DI1 ON
		0x11	X2-DI1 OFF
		0x12	X2-DI2 ON
		0x13	X2-DI2 OFF
		0x14	X2-DI3 ON
		0x15	X2-DI3 OFF
		0x16	X2-DI4 ON
		0x17	X2-DI4 OFF
		0x18	X3-DI1 ON

	-		-
		0x19	X3-DI1 OFF
	0x1A	X3-DI2 ON	
		0x1B	X3-DI2 OFF
		0x1C	X3-DI3 ON
		0x1D	X3-DI3 OFF
		0x1E	X3-DI4 ON
		0x1F	X3-DI4 OFF
		0x20	X4-DI1 ON
		0x21	X4-DI1 OFF
		0x22	X4-DI2 ON
		0x23	X4-DI2 OFF
		0x24	X4-DI3 ON
		0x25	X4-DI3 OFF
	0x26	X4-DI4 ON	
		0x27	X4-DI4 OFF
		0x00	DO1 ON
		0x01	DO1 OFF
0x05	DO event	0x02	DO2 ON
		0x03	DO2 OFF
		0x04	DO3 ON
		0x05	DO3 OFF
		0x06	DO4 ON
		0x07	DO4 OFF
	0x08	X1- D01 ON	
	0x09	X1- D01 OFF	
	0x0A	X1- DO2 ON	
	0x0B	X1- D02 OFF	
		0x0C	X2- D01 ON
		0x0D	X2- D01 OFF
		0x0E	X2- D02 ON
		0x0F	X2- D02 OFF
		0x10	X3- D01 ON

		0x11	X3- D01 OFF
	0x12	X3- D02 ON	
		0x13	X3- D02 OFF
	0x14	X4- D01 ON	
	0x15	X4- D01 OFF	
	0x16	X4- DO2 ON	
	0x17	X4- D02 OFF	
0x06 Meter operation event		0x00	Setup change
		0x01	Reset energy values
		0x02	Reset demand values
		0x03	Reset max/min values
		0x05	Clear SOE logs
	0x07	Reset DI pulse counter	
	0x09	Reset running timer	
	-	0x0A	Clear PQ event
		0x0B	Clear EN50160 report
		0x0C	Clear freeze data
		0xFF	Clear all records

5.8 Data Freezing

The device can freeze data, including 5 fixed data (import active energy, export active energy, import reactive energy, export reactive energy and apparent energy) and 20 optional data. Freeze interval can select 1min,5min,15min,30min,60min or 1440min.

5.9 Address Mapping

The device has 60 registers that its address can be programmed.

For example, if the host computer wants to read "phase voltage-V1", "phase voltage-V2", "phase voltage-V3", and "average phase voltage" in one frame, you can set as follows:

- •Custom data setting 1/2 set to "0x0006"/ "0x0007" (address of phase voltage-V1)
- •Custom data setting 3/4 set to "0x0008"/ "0x0009" (address of phase voltage-V2)
- •Custom data setting 5/6 set to "0x000A"/ "0x000B" (address of phase voltage-V3)
- •Custom data setting 7/8 set to "0x0310"/ "0x0311" (Address of average phase voltage)

After the setting is completed, the host computer can read 8 addresses directly from the 0x1000 to complete a frame reading the above data.

5.10 Digital Input

The digital input module adopts the dry contact mode. Since it is equipped with an built-in power source, the device can be used to monitor the state of the circuit breaker, accumulate the pulses of energy without external power source.

5.11 Relay Output

Relay output can select three modes, including OFF mode, alarm mode and remote-control mode.

5.12 Expand Module

- FM2: 4 digital inputs
- FM3: 2 relay outputs
- FM11: RS485, Modbus-RTU
- FM24: Ethernet port, Modbus-TCP, Websever

The device supports expand module, including FM2, FM3, FM11 and FM24.

Revision History

Version Number	Content	Revision Date
V1.0A	EN Updated	May, 2024
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Elecnova

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JIANGSU SFERE ELECTRIC CO., LTD.

Add: No.1 Dongding Road, Jiangyin, Wuxi, Jiangsu, China.

Tel: +86-510-86199028

Email: info@sfere-elec.net

http://Sfere-elec.net