

Power quality monitoring unit

User Manual

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Special statement

Personal Safety

1. If stored or left unused for a long time, this product must be placed in a dry, clean and specified temperature range.
2. This product should be used in an appropriate working environment.

It is forbidden to use this product in the following working environments:

1. High temperature, low temperature or humid places that exceed the technical specifications of this product
2. Places where there is vibration and are susceptible to collision
3. Close to heat sources or places with strong electromagnetic field interference
4. Places with corrosive gases and dusts

Statement of Responsibility

We are not responsible for defects or malfunctions caused by:

- Exceed the scope of use and working environment specified in the product
- Unauthorized modification or maintenance, wrong installation, improper operation
- Encountering force majeure
- Other matters that violate the provisions of this product manual

This manual refers to the following products

Product range	Product name	Model
Power quality monitoring unit	MMS7.0G00-SVG 7 inch LCD display unit	MMS7.0G00
Power quality monitoring unit	MMS7.0F00-APF 7 inch LCD display unit	MMS7.0F00
Power quality monitoring unit	MMS7.0A00-ASVG 7 inch LCD display unit	MMS7.0A00
Power quality monitoring unit	MMS7.0FG00-APF+SVG 7 inch LCD display unit	MMS7.0FG00
Power quality monitoring unit	MMS7.000-APF/SVG/ASVG Triad 7 inch LCD display unit	MMS7.000
Power quality monitoring unit	MMS7.0C32F00-APF Control 32 channels of common capacitive contactor controllers (7-inch screen)	MMS7.0C32F00
Power quality monitoring unit	MMS7.0T32F00-APF Control 32 channels of common capacitor thyristor/composite switch controller (7-inch screen)	MMS7.0T32F00
Power quality monitoring unit	MMS7.0C32A00-ASVG Control 32 channels of common capacitive contactor controllers (7-inch screen)	MMS7.0C32A00
Power quality monitoring unit	MMS7.0T32A00-ASVG Control 32 channels of common capacitor thyristor/composite switch controller (7-inch screen)	MMS7.0T32A00
Power quality monitoring unit	MMS7.0C32FG00-APF+SVG Control 32 channels of common capacitive contactor controllers (7-inch screen)	MMS7.0C32FG00
Power quality monitoring unit	MMS7.0T32FG00-APF+SVG Control 32 channels of common capacitor thyristor/composite switch controller (7-inch screen)	MMS7.0T32FG00
Power quality monitoring unit	MMS7.0C32G00-SVG Control 32 channels of common capacitive contactor controllers (7-inch screen)	MMS7.0C32G00
Power quality monitoring unit	MMS7.0T32G00-SVG Control 32 channels of common capacitor thyristor/composite switch controller (7-inch screen)	MMS7.0T32G00

Table of Contents

Model one	7/10 inch screen power quality monitoring unit	1
1.	Installation dimensions	1
1.1	7-inch screen	1
1.2	10-inch screen	2
2.	Screen-related communication wiring	2
2.1	7-inch screen and module communication wiring diagram	2
2.2	Circuit diagram of the module controlling the smart capacitor	4
2.3	module controls the wiring diagram of the smart capacitor device	5
3.	Power on Operation Instructions	5
3.1	Boot main screen	5
3.2	Parameter settings	6
3.3	Capacitance Information (Smart Capacitors)	8
Model two	7-inch screen + 32-way contactor/thyristor switch	10
1.	Installation dimensions	10
1.1	7-inch screen + 32-way contactor monitoring unit installation size	10
1.2	7-inch screen + 32-channel thyristor switch monitoring unit installation size	10
2.	Wiring instructions	11
2.1	Contactor type	11
2.1.1	monitoring unit dry node wiring	11
2.1.2	module control capacitor circuit wiring diagram	12
2.2	Type of composite/thyristor switch	12
2.2.1	monitoring unit dry node wiring	13
2.2.2	Module control capacitor circuit wiring diagram	13
3.	Power on Operation Instructions	14
3.1	Boot main screen	14
3.2	Parameter settings	14
3.3	Common capacitance information	17

Model one 7/10 inch screen power quality monitoring unit

1. Installation dimensions

Note: The following dimensions are in millimeters

1.1 7-inch screen

The monitoring unit is installed on the cabinet, and its dimensions are as follows:

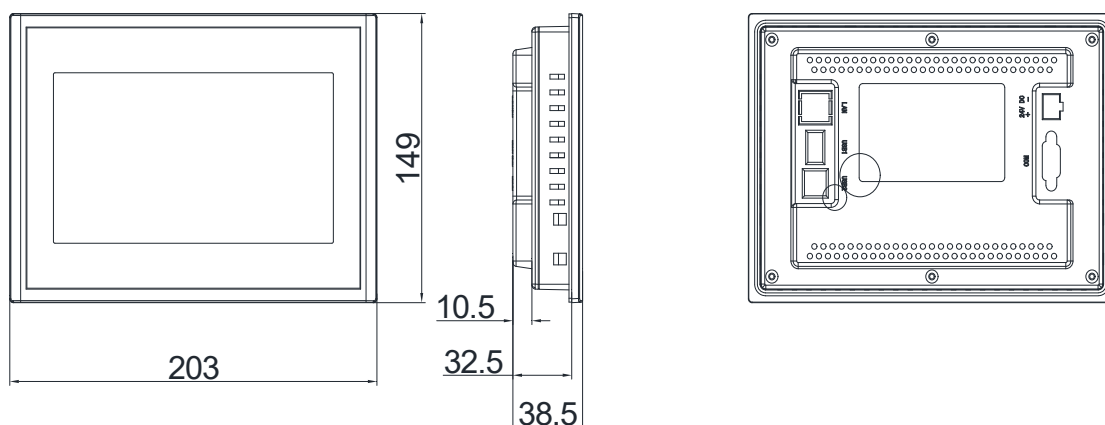


Figure 1-1 installation size of the 7-inch screen

The size of the opening is shown in the figure below:

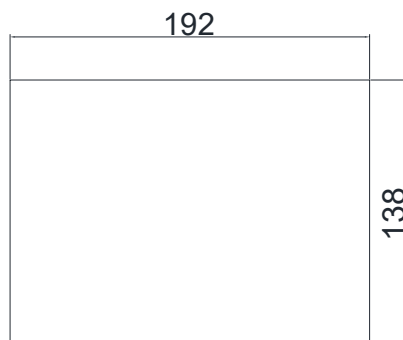


Figure 1-2 7-inch screen size

1.2 10-inch screen

The monitoring unit is installed on the cabinet, and its dimensions are as follows:

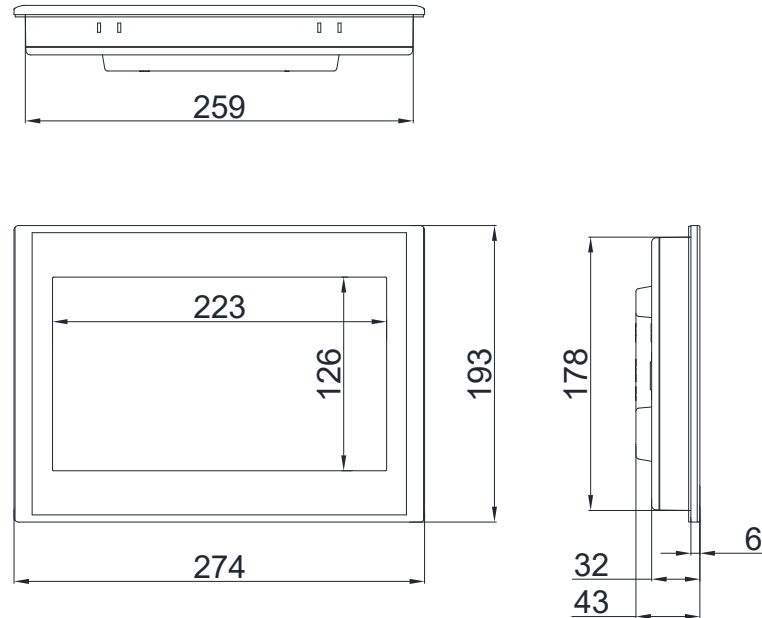


Figure 1-3 Installation size of 10-inch screen

The size of the opening is shown in the figure below:

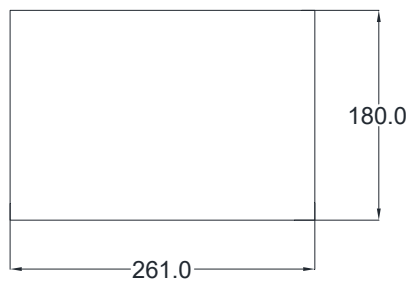


Figure 1-4 7-inch screen size

2. Screen-related communication wiring

2.1 7-inch screen and module communication wiring diagram

The touch screen 24V DC is connected to the module terminal 24V and GND to supply power to the touch screen, and the COM terminal is connected to the module terminal 485+_2 and 485-_2 for communication.

When multiple modules are paralleled, only the $\pm 24V$ port of one of the modules can be used to supply power to the large monitoring screen.

2.2 Circuit diagram of the module controlling the smart capacitor

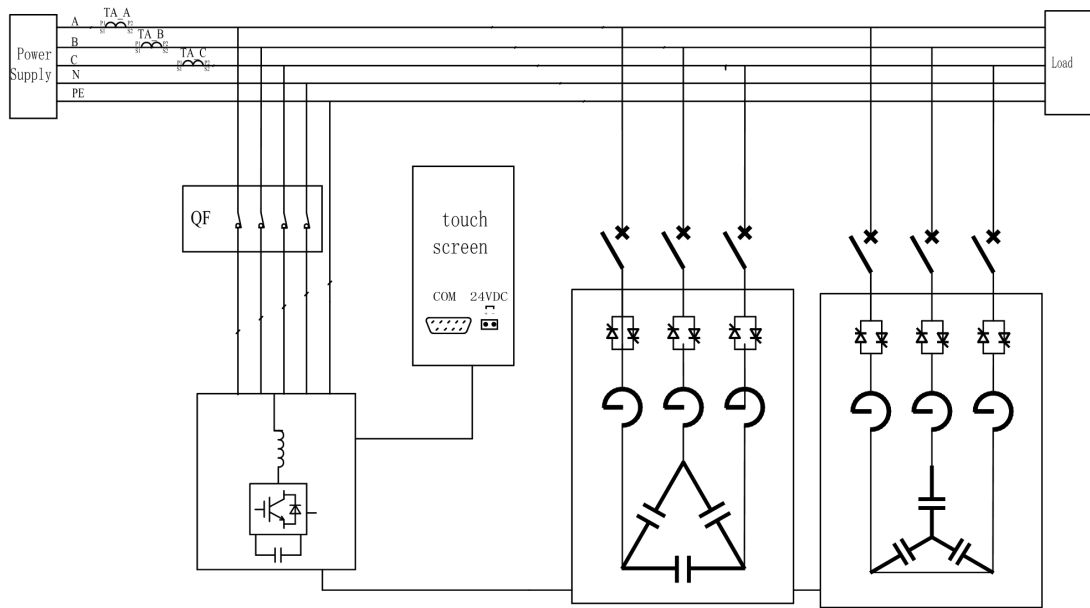


Figure 2-2 CT is located on the grid side

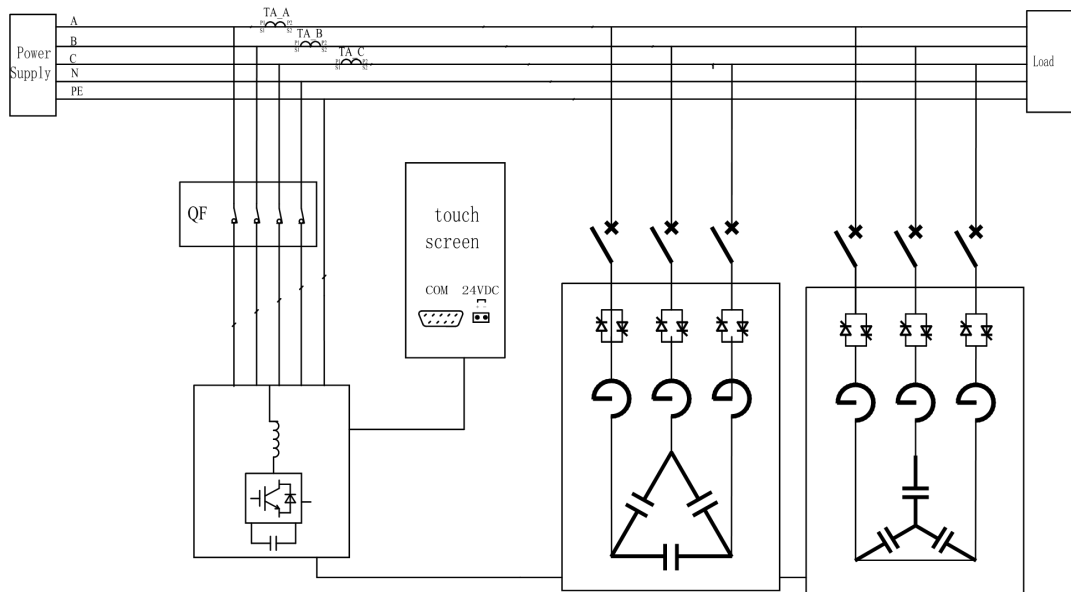


Figure 2-3 CT is on the load side

Since it is not easy to wire the CT in the two cabinets where the actual field module and capacitor are placed separately, the CT is generally placed on the grid side.

2.3 module controls the wiring diagram of the smart capacitor device

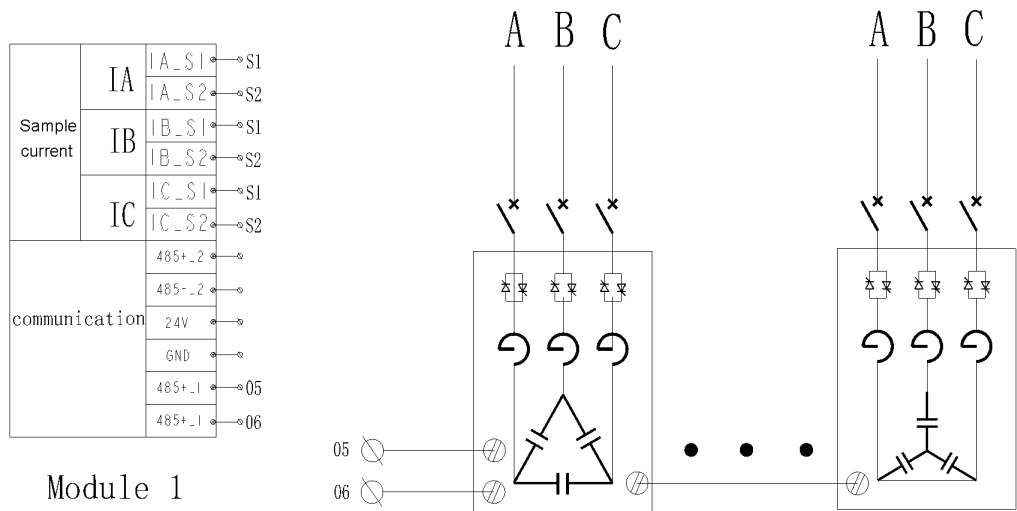


Figure 2-4 Module 1 controls the wiring diagram of the smart capacitor device

3.Power on Operation Instructions

3.1 Boot main screen

After the LCD screen is powered on, it enters the boot interface, as shown in Figure 3-1. The interface displays key power quality information such as voltage, current, harmonic distortion, and power factor.

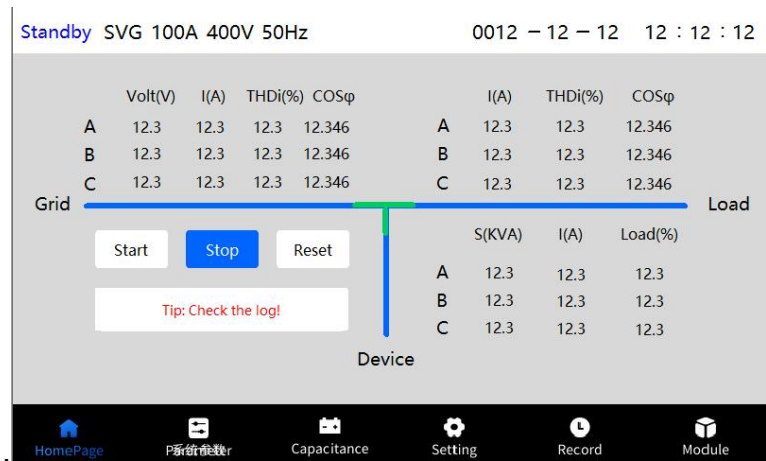


Figure 3-1 the main interface of booting

3.2 Parameter settings

Click "Parameter Settings" to enter the password "123456", and click "Confirm" to enter the parameter setting interface, as shown in Figure 3-2 to Figure3-4.

Standby SVG 100A 400V 50Hz 2024 - 05 - 08 09 : 31 : 01

Enter Password 123456

Confirm

Tip: Please click the white box above, and then enter the six-digit password in the pop-up keyboard, and then click OK.

HomePage Parameter Capacitance Setting Record Module

Figure 3-2 Parameter Setting Input Password

Standby SVG 100A 400V 50Hz 2024 - 05 - 08 09 : 34 : 02

Starting mode: ☐ Manual ☒ Automatic

Target COSφ: 0.000 (Input: -0.999-0.999)

CT Location: ☐ Grid ☒ Load

CT Ratio: 0 :5 (Input:50-10000)

CT Polarity Adaptation: ☐ Enable ☒ Disable

Phase sequence adaptive: ☐ Enable ☒ Disable

PV Mode: ☐ Enable ☒ Disenable

Wire system selection: ☐ 3P3W ☒ 3P4W

Set

HomePage Parameter Capacitance Setting Record Module

Figure 3-3 First page of parameter setting interface

Standby SVG 100A 400V 50Hz 2024 - 05 - 08 13 : 45 : 25

Function: Reactive

Current Loop Coefficient: 0

Reactive Set: 0.00%

Set

HomePage Parameter Capacitance Setting Record Module

Figure 3-4 Parameter Setting Interface Page 2

This screen displays the settings of "Start Mode", "Target COS Value", "CT Position", "CT Conversion Ratio", "CT Polarity Adaptation", "Phase

Sequence Adaptation", "PV Mode (PV Mode)", "Line System Selection", "Function Selection", "Current Loop Proportional Factor" and "Reactive Power Setpoint".

(1) Start mode

Manual start: In this mode, the device cannot be powered on automatically, but can be powered on or off by the LCD screen.

Auto-start: In this mode, if the device is powered on before power-off, after the device is powered on again, if there is no fault, the device will start automatically.

(2) The target COS value is generally set to 0.95 or more.

(3) CT position:

Load side: The external CT is mounted on the right side of the module's busbar access point, close to the load

Power side: The external CT is mounted on the left side of the module's busbar access point, near the transformer

(4) CT ratio:

According to the actual ratio of the installed current transformer.

(5) CT polarity adaptation:

For example, after S1 and S2 of phase A CT are reversed, there will be a fault alarm "CT reversed", select "Enable" CT polarity adaptation, click Confirm Settings, and automatically adjust the CT polarity.

(6) Phase order adaptation:

When the primary power line of the SVG is reversed from phase A and phase C, there will be a message in the "Record" that "Grid Phase Sequence Abnormal". At this time, click "Enable" in "Phase Sequence Adaptation" and click Confirm to automatically adjust the phase sequence.

(7) After the "PV mode" is integrated into the power grid, the current reversal may be detected, so this function needs to be enabled. (CT polarity adaptive failure in PV mode)

(8) "Wire system selection" according to the site environment, choose to use three-phase three-wire system or three-phase four-wire system.

(9) "Function selection", the reactive power compensation needs to be selected, and the capacitor can work.

(10) "Current Ring Ratio Coefficient", the larger the value, the better the compensation effect, but the lower the stability of the system. Generally 1500.

(11) "Reactive power setting value" refers to the amount of additional reactive power emitted by the device.

3.3 Capacitance Information (Smart Capacitors)

The Capacitance Information screen displays information such as capacitor type, capacitance, and switching status. This is shown in Figure 3-5 and Figure3-8.

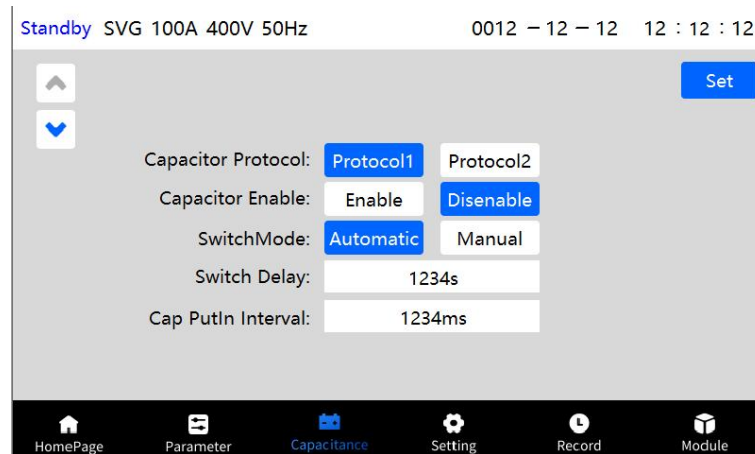


Figure 3-5 Capacitor interface 1

Capacitor switching delay: The time interval between each capacitor switching action is generally 25S.

Capacitor switching time interval: When multiple capacitors are switched at the same time, the switching time interval of different capacitors is generally 600ms.

Smart capacitor type: Automatically identifies the capacity of the co-compensating or sub-compensating capacitor after the smart capacitor is connected.

On this interface, you can see the type, capacitance, and switching status of the capacitor.

There is a switching protection time when the capacitor is put in and cut out to prevent damage to the capacitor.

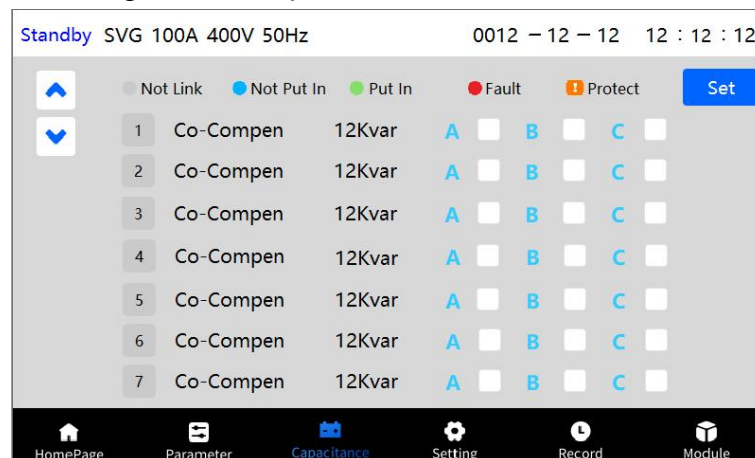


Figure3-6 Capacitor interface 2

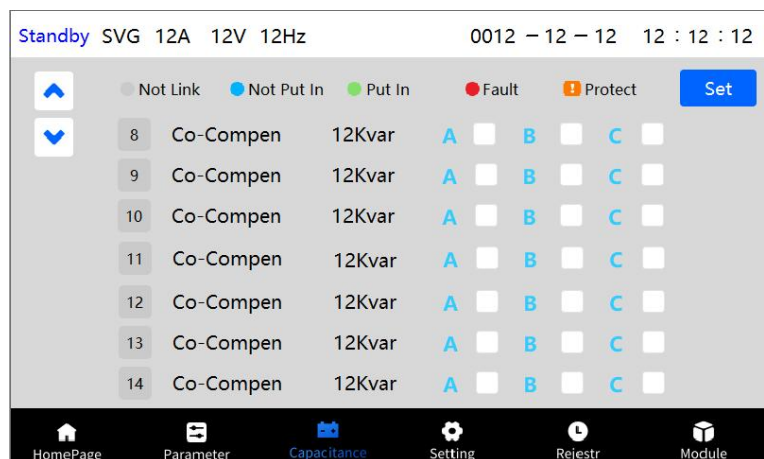


Figure3-7 Capacitor interface 3

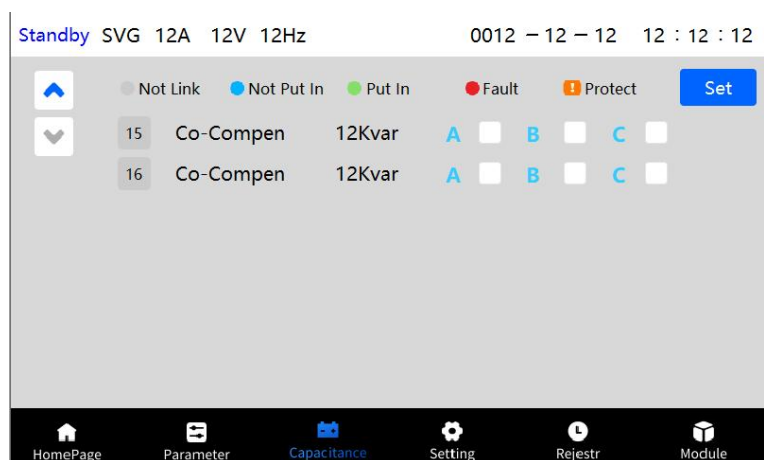


Figure3-8 Capacitor interface 4

Model two 7-inch screen + 32-way contactor/thyristor switch

1. Installation dimensions

Note: The following dimensions are in millimeters.

1.1 7-inch screen + 32-way contactor monitoring unit installation size

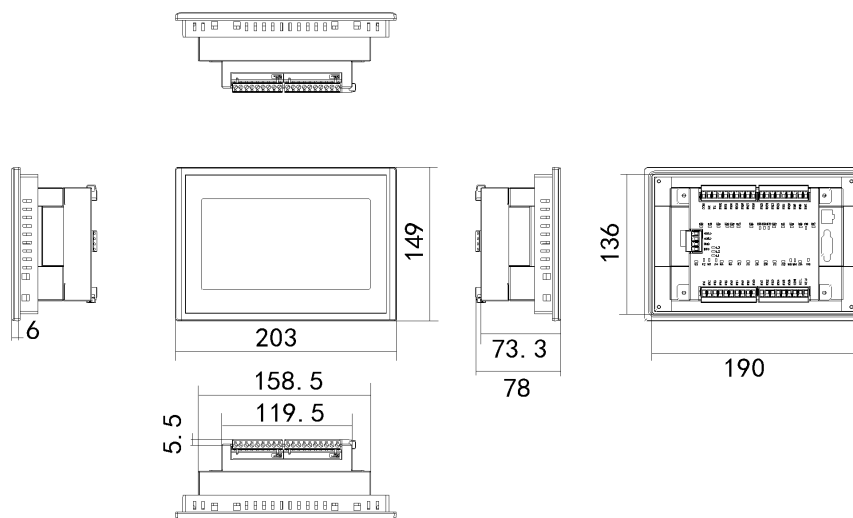


Figure 1-1 7-inch screen + 32-way contactor monitoring unit installation size

1.2 7-inch screen + 32-channel thyristor switch monitoring unit installation size

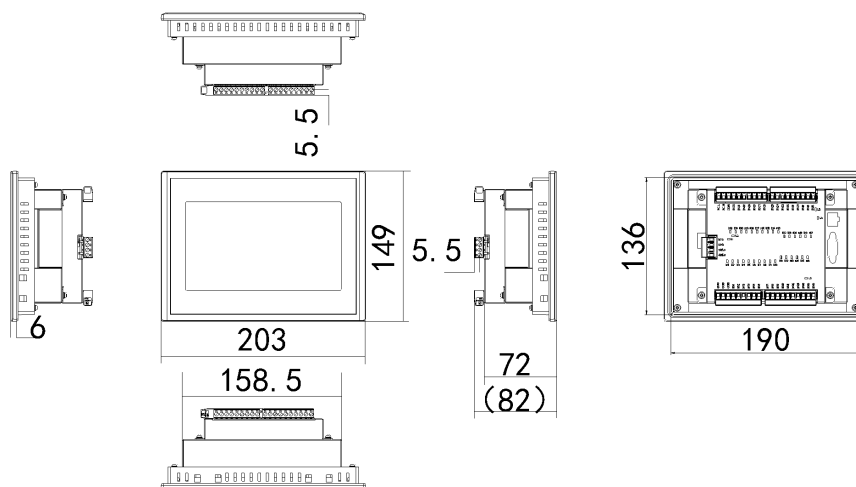


Figure 1-2 7-inch screen + 32-channel thyristor switch monitoring unit installation size

The size of the opening is shown in the figure:

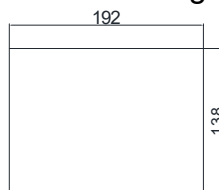


Figure 1-3 7-inch screen cut-out size

2. Wiring instructions

The module controls the common capacitors, which are divided into two schemes: the parallel control of ordinary capacitors of the same type module (APF/SVG/ASVG) and the parallel control of ordinary capacitors of different types of modules (APF+SVG). Here are a few things to keep in mind:

1. Only the ordinary capacitor can be controlled by module 1, that is, the module DIP ID connected with the monitoring unit through the 485_1 terminal must be 1.

2. When the APF+SVG module controls the ordinary capacitor in parallel, the SVG module can only control the ordinary capacitor, that is, the module connected with the monitoring unit through the 485_1 terminal can only be SVG.

2.1 Contactor type

2.1.1 monitoring unit dry node wiring

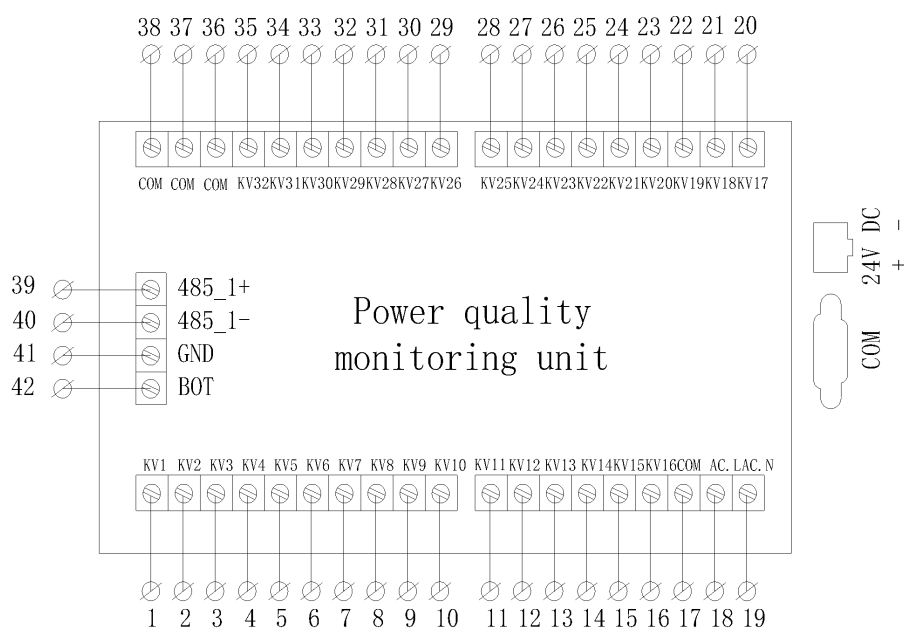


Figure 2-1 Description of the dry node of the power quality monitoring unit

(1-16, 20-35): Connect 1-32 control signals
 (17, 36-38):32-way contactor common end
 (18, 19): Connect AC220V power supply
 (39, 40):Connect to the 485+_1, 485-_ 1 ports of the module 1 terminal,
 Module 1 communicates with the capacitor
 (41, 42): The port is not connected during burning, and it is short-circuited
 after the burning is completed

As shown in Figure 2-1, the 24V DC (+ -) connection module on the right is connected to the 24V GND port to supply power to the large screen, and the COM terminal is connected to the 485+_2 and 485-_2 ports of the module to communicate with the large screen.

2.1.2 module control capacitor circuit wiring diagram

The wiring diagram of the module control (contactor switch) capacitor circuit is shown in Figure 2-2.

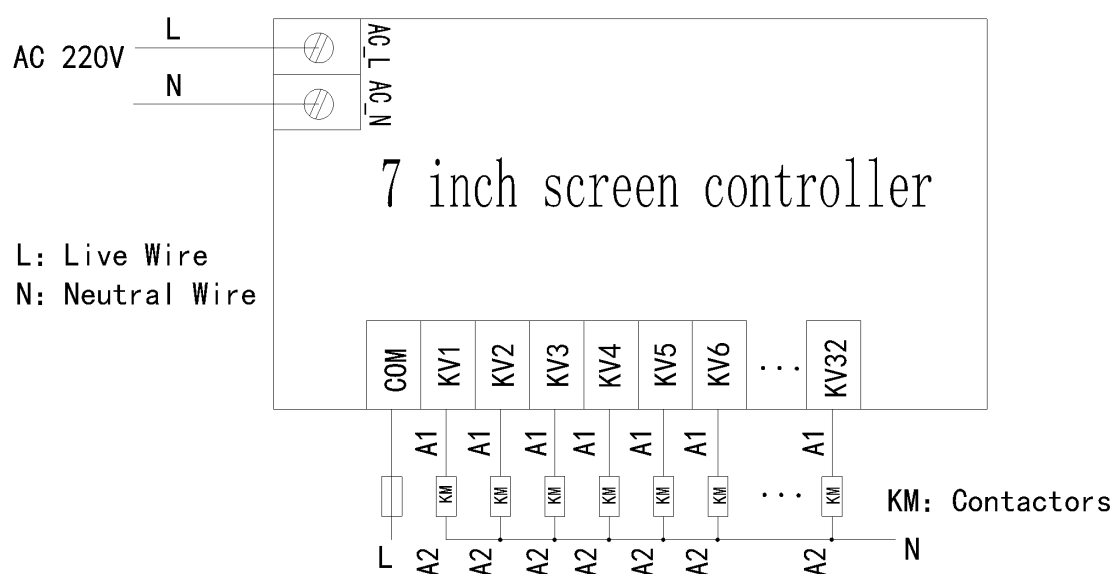


Figure 2-2 Control capacitor circuit wiring diagram

Wiring instructions: The contactor needs to be connected to the external voltage, according to the contactor model standard for the external voltage reference, and the COM port on the dry node of the controller can be connected to either one.

2.2 Type of composite/thyristor switch

2.2.1 monitoring unit dry node wiring

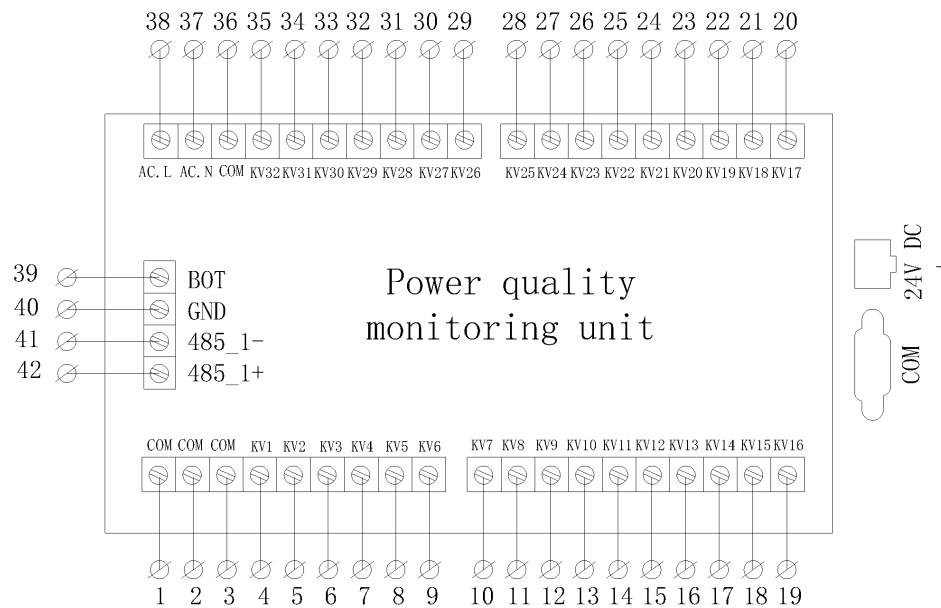


Figure 2-3 Description of the dry node of the thyristor switching control unit

(1-3, 36): 32-way compound switch common terminal

(4-19, 20-35): Connect 1-32 control signals

(37,38): Connect to AC220V power supply

(39, 40): The port is not connected during burning, and it is short-circuited after the burning is completed

(41, 42): Connect to the 485-_1, 485+_1 ports of the module 1 terminal, Module 1 communicates with the capacitor

As shown in Figure 2-3, the 24V DC (+ -) connection module on the right is connected to the 24V GND port to supply power to the large screen, and the COM terminal is connected to the 485+_2 and 485-_2 ports of the module to communicate with the large screen.

2.2.2 Module control capacitor circuit wiring diagram

The wiring diagram of the module control (composite/thyristor switch) capacitor circuit is shown in Figure 2-4.

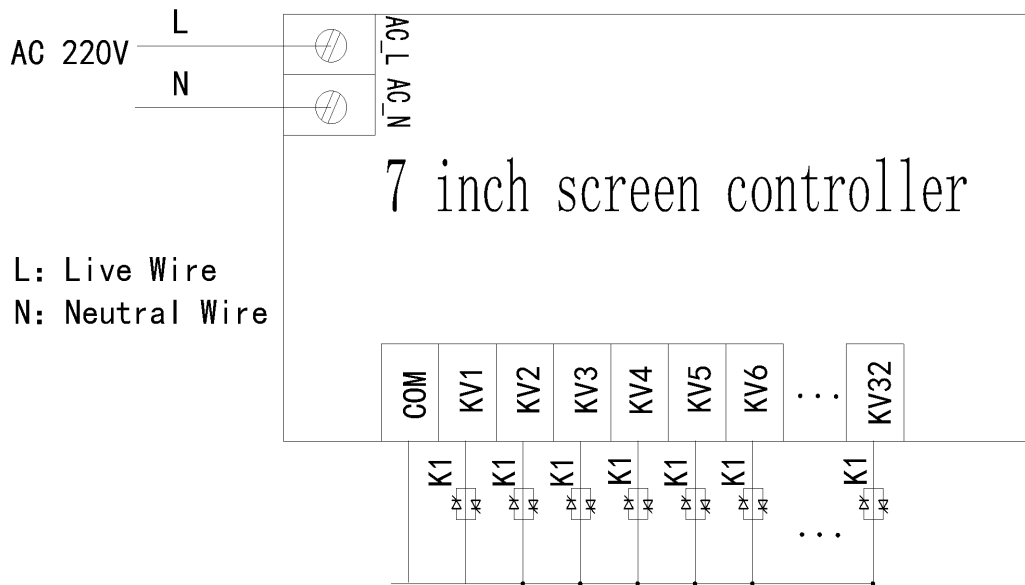


Figure 2-4 Control capacitor circuit wiring diagram

Wiring instructions: The composite/thyristor switch does not need to be connected to an external voltage, and the COM port on the dry node of the controller can be connected to any one.

3. Power on Operation Instructions

3.1 Boot main screen

After the LCD screen is powered on, it enters the boot interface, as shown in Figure 3-1. The interface displays key power quality information such as voltage, current, harmonic distortion, and power factor.

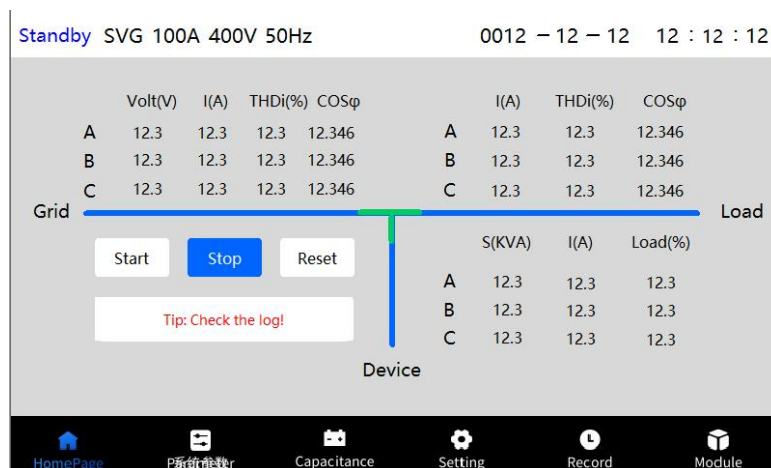


Figure 3-1 the main interface of booting

2.2 Parameter settings

Click "Parameter Settings" to enter the password "123456", and click "Confirm" to enter the parameter setting interface, as shown in Figure 3-2 to

Figure 3-4.

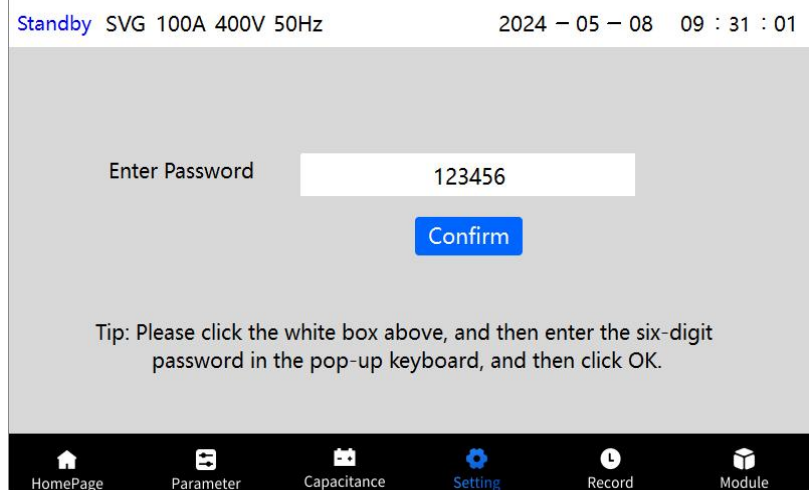


Figure 3-2 Parameter Setting Input Password

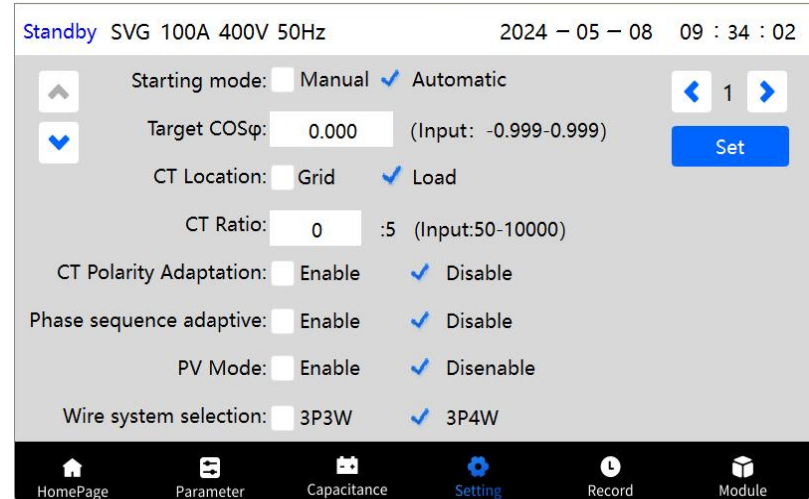


Figure 3-3 First page of parameter setting interface

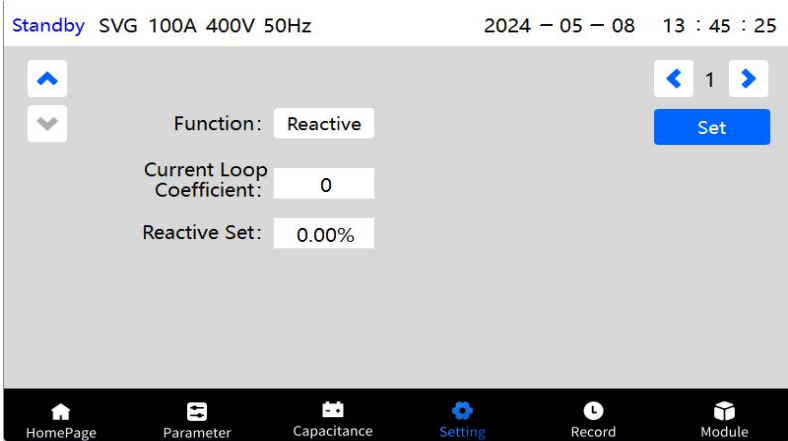


Figure 3-4 Parameter Setting Interface Page 2

This screen displays the settings of "Start Mode", "Target Cos Value", "CT Position", "CT Conversion Ratio", "CT Polarity Adaptation", "Phase Sequence Adaptation", "PV Mode (PV Mode)", "Line System Selection", "Function Selection", "Current Loop Proportional Factor" and "Reactive Power Setpoint".

(1) Start mode

Manual start: In this mode, the device cannot be powered on automatically, but can be powered on or off by the LCD screen.

Auto-start: In this mode, if the device is powered on before power-off, after the device is powered on again, if there is no fault, the device will start automatically.

(2) The target COS value is generally set to 0.95 or more.

(3) CT position: the CT location is generally placed on the grid side.

Load side: The external CT is mounted on the right side of the module's busbar access point, close to the load

Power side: The external CT is mounted on the left side of the module's busbar access point, near the transformer

(4) CT ratio:

According to the actual ratio of the installed current transformer.

(5) CT polarity adaptation:

For example, after S1 and S2 of phase A CT are reversed, there will be a fault alarm "CT reversed", select "Enable" CT polarity adaptation, click Confirm Settings, and automatically adjust the CT polarity.

(6) Phase order adaptation:

When the primary power line of the SVG is reversed from phase A and phase C, there will be a message in the "Record" that "Grid Phase Sequence Abnormal". At this time, click "Enable" in "Phase Sequence Adaptation" and click Confirm to automatically adjust the phase sequence.

(7) After the "PV mode" is integrated into the power grid, the current reversal may be detected, so this function needs to be enabled. (CT polarity adaptive failure in PV mode)

(8) "Wire system selection" according to the site environment, choose to use three-phase three-wire system or three-phase four-wire system.

(9) "Function selection", the reactive power compensation needs to be selected, and the capacitor can work.

(10) "Current Ring Ratio Coefficient", the larger the value, the better the compensation effect, but the lower the stability of the system. Generally 1500.

(11) "Reactive power setting value" refers to the amount of additional reactive power emitted by the device.

3.3 Common capacitance information

In "Capacitance Information", you can set the type and capacity of the capacitor and read the switching status information of the capacitor. This is shown in Figure 3-5 to Figure 3-9.

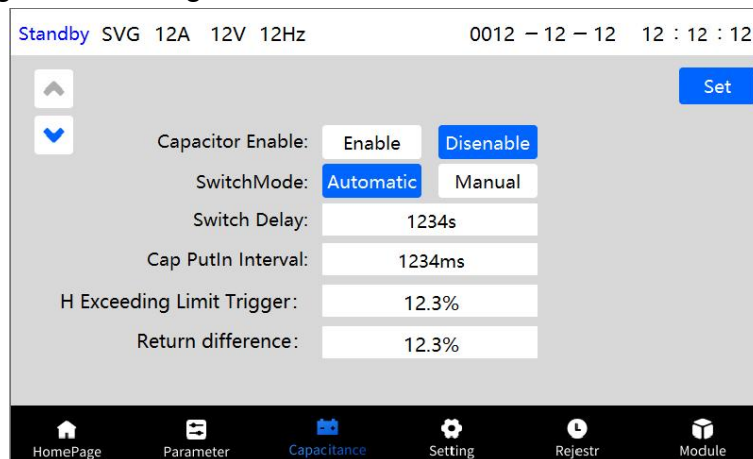


Figure 3-5 Capacitor interface

Capacitor switching delay: The time interval between each capacitor switching action is generally 25S.

Capacitor switching time interval: When multiple capacitors are switched at the same time, the switching time interval of different capacitors is generally 600ms.

Capacitance harmonic out-of-limit trigger value: When the power grid THDu exceeds this value, the alarm: harmonic out-of-limit.

Capacitance harmonic out-of-limit return difference: When the power grid THDu is reduced to (capacitance harmonic out-of-limit trigger value - capacitance harmonic out-of-limit back-difference value), the harmonic out-of-limit alarm disappears.



Figure 3-6 Capacitor information interface 1

Standby SVG 12A 12V 12Hz 0012 - 12 - 12 12 : 12 : 12

☐ Not Link
 ☐ Not Put In
 ☐ Put In
 ☐ Fault
 ☐ Protect
 Set

IO 9	Combo Box	1234Kvar	Put In	Cut Out
IO 10	Combo Box	1234Kvar	Put In	Cut Out
IO 11	Combo Box	1234Kvar	Put In	Cut Out
IO 12	Combo Box	1234Kvar	Put In	Cut Out
IO 13	Combo Box	1234Kvar	Put In	Cut Out
IO 14	Combo Box	1234Kvar	Put In	Cut Out
IO 15	Combo Box	1234Kvar	Put In	Cut Out
IO 16	Combo Box	1234Kvar	Put In	Cut Out

HomePage
Parameter
Capacitance
Setting
Rejestr
Module

Figure 3-7 Capacitor information interface 2

Standby SVG 12A 12V 12Hz 0012 - 12 - 12 12 : 12 : 12

☐ Not Link
 ☐ Not Put In
 ☐ Put In
 ☐ Fault
 ☐ Protect
 Set

IO 17	Combo Box	1234Kvar	Put In	Cut Out
IO 18	Combo Box	1234Kvar	Put In	Cut Out
IO 19	Combo Box	1234Kvar	Put In	Cut Out
IO 20	Combo Box	1234Kvar	Put In	Cut Out
IO 21	Combo Box	1234Kvar	Put In	Cut Out
IO 22	Combo Box	1234Kvar	Put In	Cut Out
IO 23	Combo Box	1234Kvar	Put In	Cut Out
IO 24	Combo Box	1234Kvar	Put In	Cut Out

HomePage
Parameter
Capacitance
Setting
Rejestr
Module

Figure 3-8 Capacitor information interface 3

Standby SVG 12A 12V 12Hz 0012 - 12 - 12 12 : 12 : 12

☐ Not Link
 ☐ Not Put In
 ☐ Put In
 ☐ Fault
 ☐ Protect
 Set

IO 25	Combo Box	1234Kvar	Put In	Cut Out
IO 26	Combo Box	1234Kvar	Put In	Cut Out
IO 27	Combo Box	1234Kvar	Put In	Cut Out
IO 28	Combo Box	1234Kvar	Put In	Cut Out
IO 29	Combo Box	1234Kvar	Put In	Cut Out
IO 30	Combo Box	1234Kvar	Put In	Cut Out
IO 31	Combo Box	1234Kvar	Put In	Cut Out
IO 32	Combo Box	1234Kvar	Put In	Cut Out

HomePage
Parameter
Capacitance
Setting
Rejestr
Module

Figure 3-9 Capacitor information interface 4