Anti harmonic intelligent capacitor

抗谐波智能电容器

用户使用手册

User Manual

CHNJN® 锦能电力

Drive power smart energy saving

Content

1 Product introduce

JNX □/□□□-□□-□

- Reactance rete%(7、14)
- Reactor capacity (Kvar)
- Rated voltage v (280,480,525)
- Compensation type:3 phase/ single phase
- Corporate logo

Note:

Products with a 7% reactor rate are mainly used in occasions with high 5th and above harmonic content;

Products with a 14% reactor rate are mainly used in occasions with high 3rd and above harmonic content

2 Pre-Installation Work

2.1 Removing the Outer Packaging

Open the packaging of the intelligent capacitor and check whether the capacitor is damaged during transportation. Also, verify that all accessories shown in the diagram below are complete. If the capacitor is damaged during transportation or accessories are missing, please contact our company or the distributor immediately.

2.2 Appearance of the Anti-Harmonic Intelligent Capacitor

Attachment

Wireharness

CT(no controller)

indicator

3.Installation

3.1Instruction of network cable length and usage

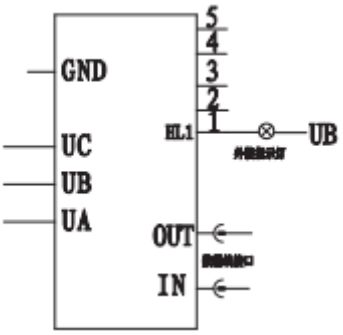
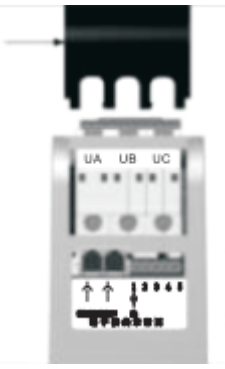
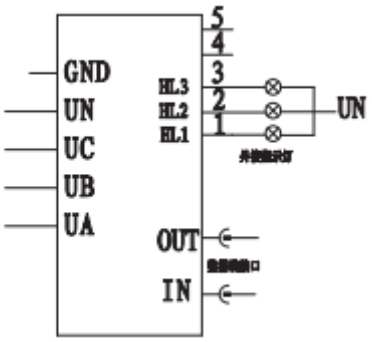
No	Product	Spe	Usage	remark
1	Network cable 8-core	0.3m	Used for connecting capacitors installed on the same layer	Each capacitor 1 piece
		0.7m	Used for connecting capacitors installed on the up and down layer	Up to demand
		1.5m	For the self-control state of the capacitor, the secondary current transformer is connected to the capacitor.	1 piece for each CT
		3m	Used for connecting between capacitor and controller	1 piece for each controller

2	Secondary CT	JN-CTI	Current sampling without a controller, used for full common compensation (auto compensation)	Controller-less, one for every 12 units
		JN-CT3	Current sampling without a controller, used for mixed common/split-phase auto compensation.	Controller-less, one for every 12 units

3.2. Model of current signal adapter

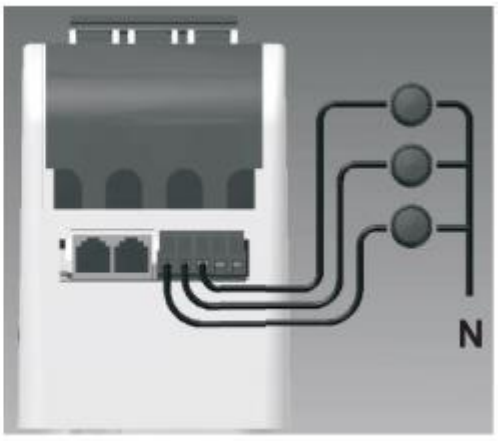
Model	Compensation mode	remark
JN-CT1	Common compensation	For applications equipped with intelligent capacitor controllers, this accessory is not required.
JN-CT3	hybrid (common + split-phase) auto compensation	

3.3. Instruction of connector terminal

Compensation type	diagram	Pic
Common compensation		
Split-phase compensation		

Connect in accordance with the UA/UB/UC phase sequence.

3.4Connection Instructions for Trip/Close Indicator Lights



Note: During the product's usage, the HL1/HL2/HL3 terminals in the split type shall not be short-circuited.

3.5. Product installation dimension

3.6. Product Specifications (7% Reactance Rate)

Chart1 Common compensation dimension									
Model	Capacity	Voltage	Reactance rate	Type of compensation	dimension			Instalation size	
					LengthA(mm)	WidthB(mm)	H(mm)	LengthC(mm)	WidithD(mm)
JNXS-10/480-7%	10	480	7%	common	420	175	375	350	155
JNXS-15/480-7%	15	480	7%	common	420	175	375	350	155
JNXS-20/480-7%	20	480	7%	common	420	175	375	350	155
JNXS-25/480-7%	25	480	7%	common	420	175	425	350	155
JNXS-30/480-7%	30	480	7%	common	420	175	425	350	155
JNXS-35/480-7%	35	480	7%	common	420	175	475	350	155
JNXS-40/480-7%	40	480	7%	common	420	175	475	350	155
JNXS-50/480-7%	50	480	7%	common	450	175	475	350	155

Chart2 Split compensation dimension									
Model	Capacity	Voltage	Reactance rate	Type of compensation	dimension			Instalation size	
					LengthA(mm)	widthB(mm)	H(mm)	LengthC(mm)	widithD(mm)
JNXF-10/280-7%	10	280	7%	Split-phase	420	175	375	350	155
JNXF-15/280-7%	15	280	7%	Split-phase	420	175	375	350	155
JNXF-20/280-7%	20	280	7%	Split-phase	420	175	375	350	155

JNXF-25/280-7%	25	280	7%	Split-phase	420	175	425	350	155
JNXF-30/280-7%	30	280	7%	Split-phase	420	175	425	350	155

3.6. Product Specifications (14% Reactance Rate)

Chart1 Common compensation dimension									
Model	Capacity	Voltage	Reactance rate	Type of compensation	Dimension			Instalation size	
					LengthA(mm)	widthB(mm)	H(mm)	LengthC(mm)	widithD(mm)
JNXS-5/525-14%	5	525	14%	common	420	175	375	350	155
JNXS-10/525-14%	10	525	14%	common	420	175	375	350	155
JNXS-15/525-14%	15	525	14%	common	420	175	375	350	155
JNXS-20/525-14%	20	525	14%	common	420	175	425	350	155
JNXS-25/525-14%	25	525	14%	common	420	175	475	350	155
JNXS-30/525-14%	30	525	14%	common	420	175	475	350	155
JNXS-40/525-14%	40	525	14%	common	420	175	475	350	155
JNXS-50/525-14%	50	525	14%	common	475	190	475	350	170

Chart2 Split compensation dimension									
Model	Capacity	Voltage	Reactance rate	Type of compensation	Dimension			Instalation size	
					LengthA(mm)	widthB(mm)	H(mm)	LengthC(mm)	widithD(mm)
JNXF-5/300-14%	5	300	14%	Split-phase	420	175	375	350	155
JNXF-10/300-14%	10	300	14%	Split-phase	420	175	375	350	155
JNXF-15/300-14%	15	300	14%	Split-phase	420	175	375	350	155
JNXF-20/300-14%	20	300	14%	Split-phase	420	175	425	350	155
JNXF-25/300-14%	25	300	14%	Split-phase	420	175	475	350	155
JNXF-30/300-14%	30	300	14%	Split-phase	420	175	475	350	155

4. Product Installation Illustration

4.1 Examples of connection methods

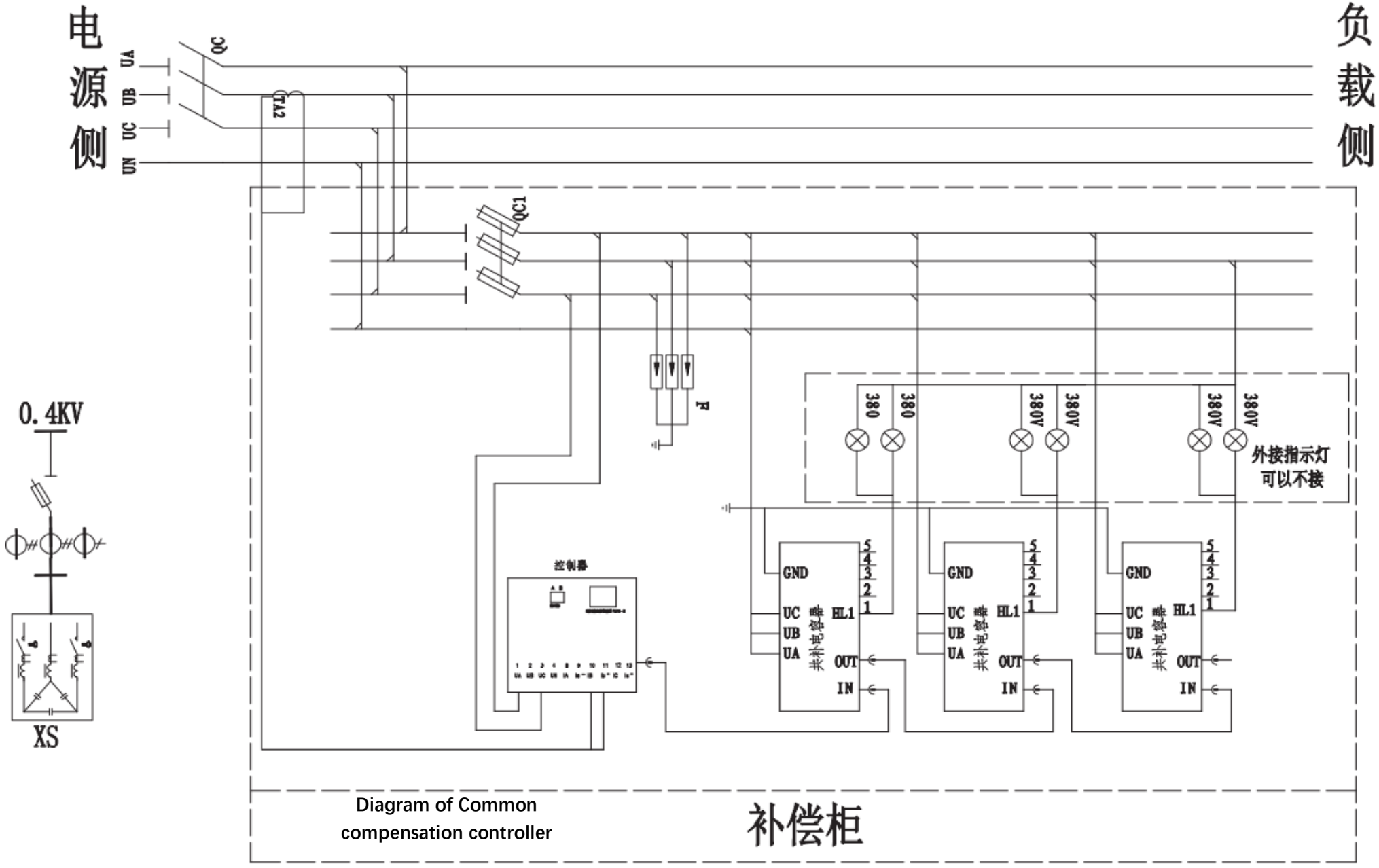


Diagram of Common compensation controller

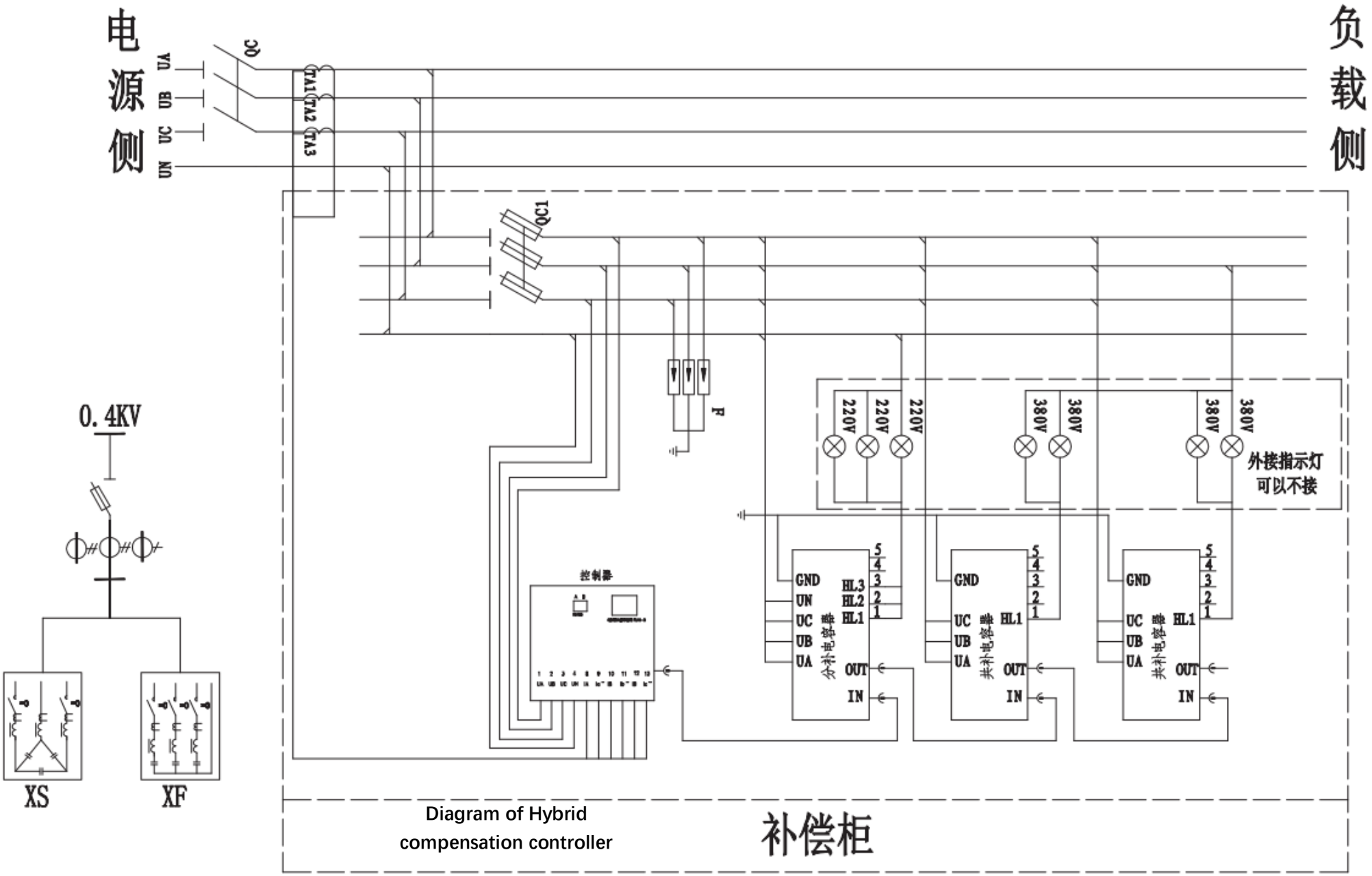
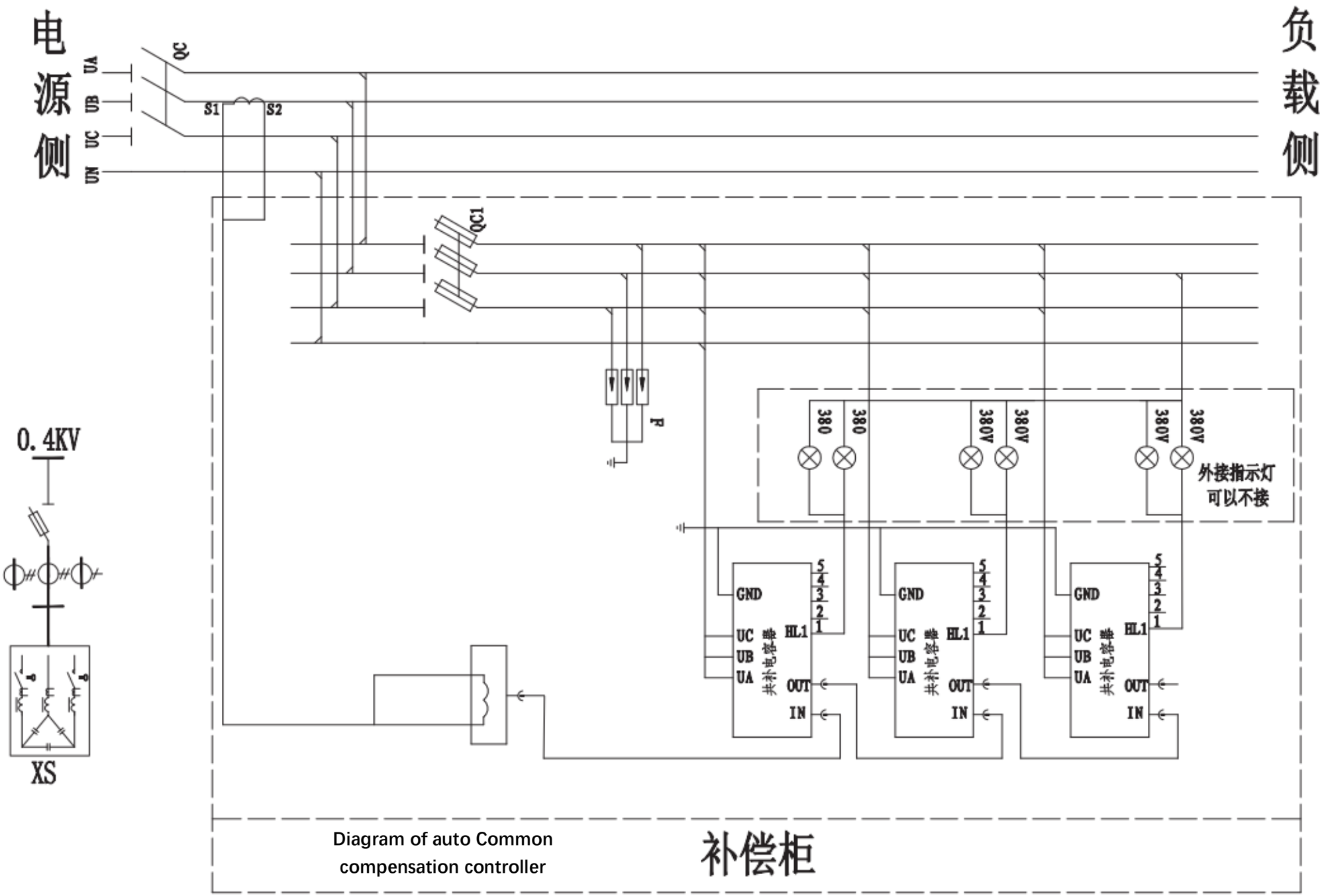


Diagram of Hybrid compensation controller


电源侧
负载侧
UA
UB
UC
UN
QC
S1
S2
QC1
F
0.4KV
XS
380
380V
外接指示灯
可以不接
GND
UC
UB
UA
共补电容器
HL1
OUT
IN
1
2
3
4
5
Diagram of auto Common compensation controller
补偿柜

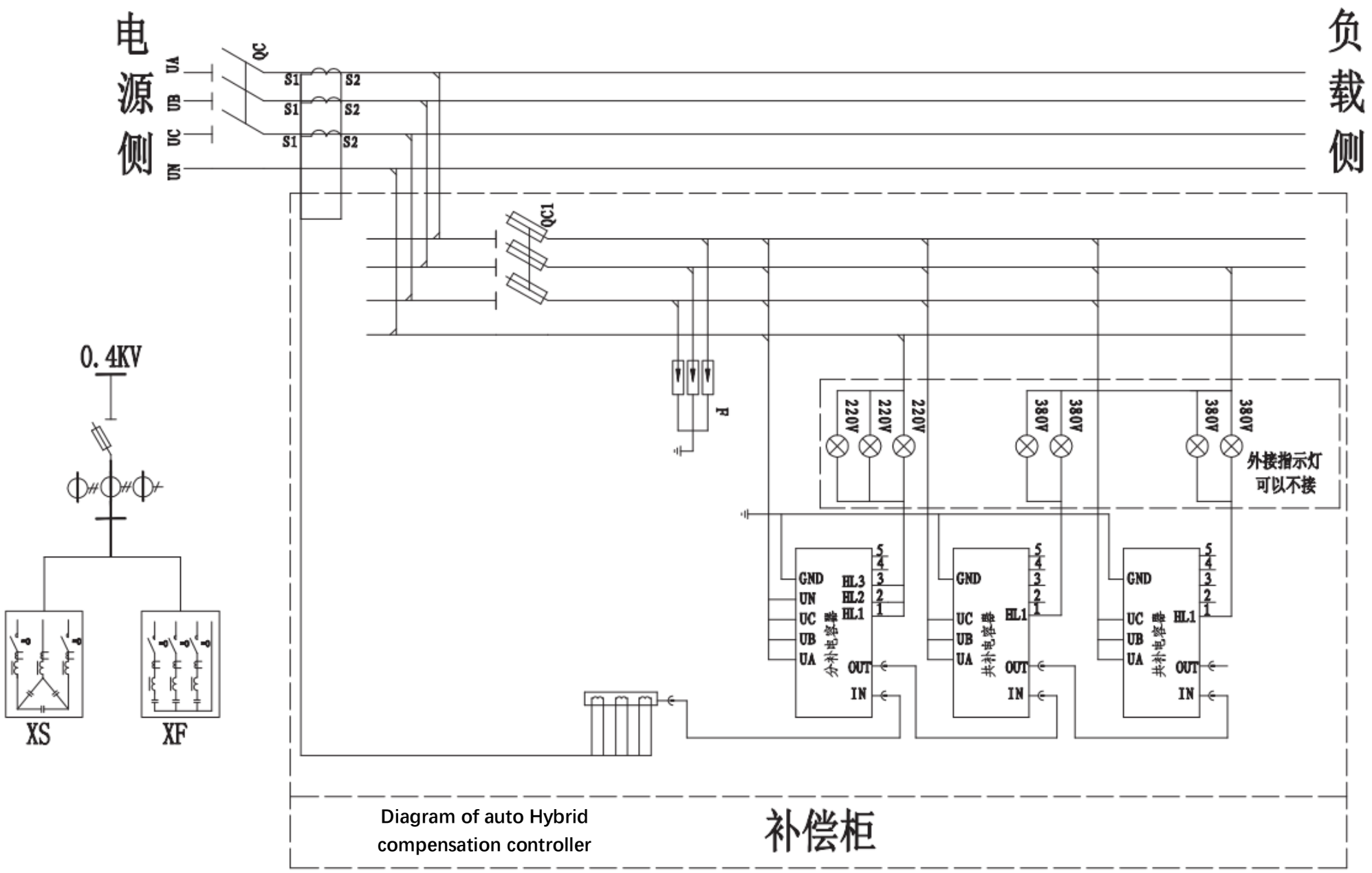
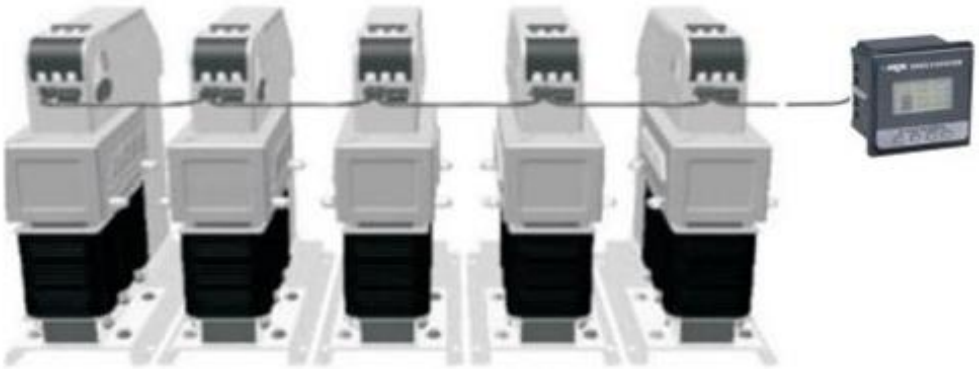


Diagram of auto Hybrid compensation controller

4.2 Cabinet Style



5 Product Overview

The intelligent capacitor is an integrated reactive power compensation device applied in the 0.4KV power grid. It consists of a CPU measurement and control module, a capacitor switching composite switch, a capacitor protection module, a series reactor, and a low-voltage self-healing power capacitor, forming an independent and complete intelligent compensation unit. The low-voltage reactive power compensation system composed of intelligent capacitors has the characteristics of flexible compensation methods (combined compensation and split compensation can be combined arbitrarily), convenient installation and maintenance, strong protection function, small device volume, good compensation effect, low power consumption, and high reliability, meeting the user's requirements for reactive power compensation, and truly meeting the actual needs of improving power factor, improving power quality, and saving energy and reducing losses.

It realizes the perfect combination of measurement and control technology and synchronous switching. It has no controllable silicon, high withstand voltage between contacts, synchronous switching, automatic tracking and calibration of closing phase, and the switch can achieve millions of switching times with a long service life. Compared with the existing similar intelligent capacitors, it has many advantages such as high reliability, low failure rate, and long service life.

The product has complete measurement and protection functions, and is equipped with protection functions such as internal temperature of the capacitor, phase loss, overvoltage, and undervoltage.

The product can be used in modular form with multiple units, and different capacities can be flexibly matched.

When multiple units are used, an automatic host is generated, and the rest are slave units. If a certain slave unit exits, it will not affect the operation of other machines. The degree of intelligence is relatively high.

6 Product Performance

6.1 Compliance with Technical Standards:

GB/T 15576-2008 Low-Voltage Reactive Power Compensation Devices

6.2 Application Environmental Conditions:

Ambient Temperature: -25°C to +55°C

Ambient Humidity: ≤90% at 20°C, ≤50% at 40°C

Altitude: ≤2000m

6.3 Electrical Safety:

Main Circuit Insulation Strength: 2500V Test Voltage (1 minute)

Protective Circuit Continuity: All grounding components are securely connected to grounding screws.

Safety Protection: The device's casing, potentially live metal parts, and grounded metal parts are securely connected to grounding screws.

Protection Level: IP20

6.4 Power Supply Conditions:

Rated Voltage: Common Compensation AC450V ±20%, Split Compensation AC250V ±20%

Operating Frequency: 50Hz Power Consumption: ≤3VA

6.5 Measurement Errors:

Voltage/Current: ≤0.5% Reactive Power: ≤±2%

Power Factor: ±0.01 Temperature Measurement: ±1°C

7 Display Panel and Key Operations

7.1 Panel Composition and Key Descriptions

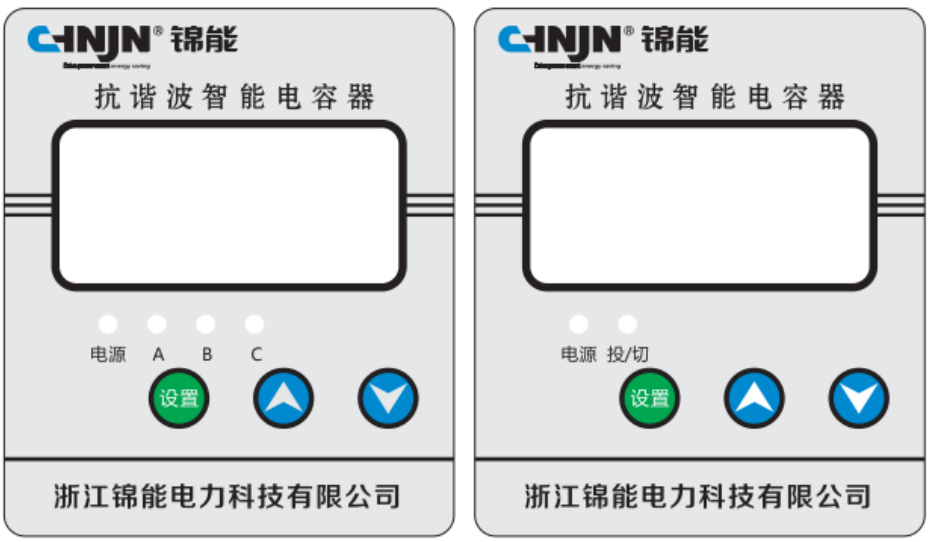
The display panel mainly consists of: LCD screen, capacitor status indicator lights, "▲" key, "▼" key, and "Set" key. Their functions are as shown in the table below.

Button	Auto-run menu	Manual-run menu	Parameter pre-set menu
设置 /Setting	Click - Select Power Parameter Display Item Option	Press to switch from manual to auto run menu	Long press to exit parameter, preset program. Press to select parameter items
▲	/	Cycle to switch capacitors on	Increment parameter
▼	/	Cycle to switch capacitors off	Decrement parameter
设置 /Setting + ▲	Enter parameter setting menu	/	/
设置 /Setting + ▼	Enter manual run menu	/	/
设置 /Setting + ▲ + ▼	Enter manual mode run menu	/	Long press for 2 seconds to display auto/manual status

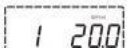
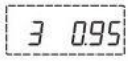
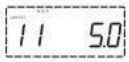
Note: In the control parameter preset interface and the fine-tuning power parameter interface, if no key is pressed for 30 seconds, the capacitor will abandon the current operation and return to the auto-run interface.

2. LED Display Meanings

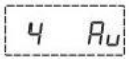
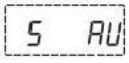
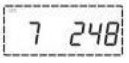
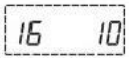
LED	LED on	LED off	remark
Power	Normal power-on	Abnormal power-off	
A	Split-phase A on	Split-phase C off	
B	Split-phase B on	Split-phase B off	
C	Split-phase C on	Split-phase C off	
On/Off	Common compensation on	Common compensation off	



8.Parameter setting instruction (Anti-Harmonic Common Compensation)

Parameter no	Single-loop anti-harmonic compensation display interface	Parameter	Default value	Range	Remarks
1		Capacitance of circuit 1 (kvar)	20.0	1.0-40.0	
2		Capacitance of circuit 1 (kvar)	0	1.0-40.0	
3		Power factor Setting	Lagging0.95	Lagging0.9-Leading0.9	
4		Switching Delay(s)	30	1-180	
5		Main CT Ratio	100	Au-10-1000	Au enables auto CT ratio①
6		Network Address	AU	0-1-32-AU	0 Master 1-32;Slave AU(auto-assigned)②
7		Overtemperature protection(℃)	65	OFF-40-80	OFF disables temperature protection③
8		Over voltage level 1(V)	429	420-440	Blocking voltage④
9		Over voltage level 2 (V)	450	440-480	Overvoltage to force disconnection⑤
10		Under voltage(V)	320	320-340	Voltage threshold to force disconnection⑥
11		Over voltage THD(%)	5.0	OFF-2.0-10.0	OFF disables THD protection ⑦
12		Undercurrent(mA)	OFF	OFF-80-500	OFF disables undercurrent protection
13		Protection delay(s)	2	1-20	
14		Disconnection power factor	1.00	Lagging0.92-Leading 0.88	
15		Capacitor rated voltage(V)	480	400-600	
16		Reactance rate(%)	7.0	0.0-18.0	

8.Control parameter list:(Anti-harmonic split-phase)

Parameter no	Display interface	Paratmeter	Default value	Range	Remarks
1		3phase capacitance(kvar)	20.0	1.0~40.0	
2		Power factor Setting	0.95	Lagging0.9 ~ Leading0.9	
3		Switching Delay (秒)	30	1-180	
4		Main CT Ratio	100	Au-10-1000	Au auto-detection for CT ratio①
5		Network Address	AU	0-1-32-AU	0 Master 1-32;Slave AU(auto-assigned)②
6		Overtemperature protection(℃)	65	OFF-40-80	OFF disables temperature protection ③
7		Overvoltage level1(V)	248	243-254	Blocking voltage④
8		Overvoltage level2(V)	260	254-276	Overvoltage to force disconnection⑤
9		undervoltage(V)	185	185-196	Voltage threshold to force disconnection⑥
10		Over voltage THD (%)	5.0	OFF-2.0-10.0	OFF disables THD protection⑦
11		undercurrent(mA)	OFF	OFF-80-500	OFF disables undercurrent protection
12		Capacitor discharge time(s)	2	2-180	
13		Voltage balance threshold(%)	OFF	OFF-10-40	OFF disables balance protection
14		Disconnection power factor	1.00	Lagging0.92-Leading0.88	
15		Capacitor rated voltage(V)	280	220-346	
16		Reactor rate(%)	7.0	00-20.0	

① The smart capacitor automatically detects the CT ratio after networking. For example, a 500/5 CT has a ratio of 100.

② Networking modes: 0-32 are fixed address modes (1-32 for subordinate addresses); Au is auto-address mode.

③ Action hysteresis: 5°C.

④ Prohibits capacitor turn-on above this threshold.

⑤ Cuts off capacitors above this threshold.

⑥ Cuts off capacitors below this threshold.

⑦ Action hysteresis: 2%. OFF disables overvoltage distortion protection.

Note: When the compensation system is successfully networked or the host control parameters are changed, the host will overwrite its own control parameters to all subordinates. If the host abnormally exits, the new host will operate

under the user-preset parameters after re-networking.
Note 1: Capacitor attribute parameters will not be overwritten (capacitor capacity, rated voltage, series reactor rate).

Note 2: When the host is a split-phase smart capacitor controller or split-phase smart capacitor, the common compensation parameters (overvoltage, undervoltage thresholds) are multiplied by 1.732 before overwriting.

Control Parameter List (Anti-Harmonic Split Compensation)

Network display:

Display	Instruction	Display	Instruction
	CD—2.0 means software version 2.0		CD — 2.0 means software version 2.0

Note: Electric Parameter will shows immediately after networking implement.

Parameter shows host common compensation

Display	Instruction	Display	Instruction
	AC Phase Voltage (V) Powe factor		Current THD%
	Secondary Current (A) of Sampling CT Reactive power(kvar)		Capacitor temperature
	Voltage THD%		Connected Slave Units

Electric Parameter shows-slave common compensation

Display	Instruction	Display	Instruction
	Slave address		Voltage THD%
	AC Phase Voltage (V)		Capacitor temperature

Electric Parameter shows-host split compensation

Display	Instruction	Display	Instruction
	A Phase Voltage (V) A Phase Powe factor		A phase voltage THD%
	B Phase Voltage (V) B Phase Powe facto		B phase voltage THD%

	C Phase Voltage (V) C Phase Powe facto		C phase voltage THD%
	secondary current A of sampling CT A phase reactive power(kvar)		A phase current THD%
	secondary current B of sampling CT B phase reactive power(kvar)		B phase current THD%
	secondary current C of sampling CT C phase reactive power(kvar)		C phase current THD%
	Capacitor temperature		Connected Slave Units

Electric Parameter shows-host split compensation

Display	Instruction	Display	Instruction
	Slave address		B phase voltage THD%
	A phase/B phase voltage		C phase voltage THD%
	C phase voltage		Capacitor temperature
	A phase voltage THD%		

9 Networking Rules

1. After the networking is completed, the main machine is generated in the order of intelligent capacitor controller, sub-supplementary intelligent capacitor, and common-supplementary intelligent capacitor.
2. In the same compensation system, one main machine and several sub-machines constitute a group. The maximum number of machines does not exceed 32.
3. Each time the machine is powered on or the capacitor attribute parameters are modified, the automatic networking process will be initiated. The entire process lasts approximately 18 seconds. The number of machines has little impact on the networking process time.
4. In the same network, it is not allowed for automatic addresses and set address modes to coexist. Otherwise, there

will be networking abnormalities.

5. In the automatic address mode, after each networking is completed, the address codes assigned to each intelligent capacitor will be different. This may cause the pairing relationship with the switching indicator lights of the capacitor cabinet body to change, but it will not affect the normal operation of the entire compensation system. If the user cannot accept this fact, the pairing relationship can be fixed by manually setting the address codes.

The rule for address setting is that the main machine is always set to 0; the addresses of the sub-machines are 1-32. The address codes of the sub-machines must be set starting from 1, and the common-supplementary intelligent capacitor is set first and then the sub-supplementary intelligent capacitor. The authority of the main machine must follow the following priority order: 1. Intelligent capacitor controller; 2. Sub-supplementary intelligent capacitor; 3. Common-supplementary intelligent capacitor. For example, in a system where both sub-supplementary intelligent capacitors and common-supplementary intelligent capacitors exist, the common-supplementary intelligent capacitor cannot be set as the main machine.

6. If the main machine fails and cannot assume the responsibility of the main machine, it will automatically disconnect from the network. Before the fault is restored, it will not participate in the re-networking process. The remaining intelligent capacitors will re-network and operate after a delay of approximately 30 seconds.

Comparison of advantages and disadvantages of automatic address and set address

Advantages	Disadvantages
1.No need to set address 2.No need to know address setting rules 3.Automatic exit and re-networking if the main unit fails 4.No parameter setup required when replacing capacitor	The pairing between indicator lights and capacitor numbering changes after each networking
Fixed pairing between indicator LEDS and capacitor numbering	Users must mater all controller parameter setting.A main unit failure will halt the entire compensation system

Default cover Enable Settings for split compensation Intelligent Capacitors

Parameter no	Parameter name	Host enable	Slave enable	remarks
0	First Capacitor Bank Capacity			
1	Secondary Capacitor Bank Capacity			
2	Switching Threshold			
3	Switching delay			
4	CT ratio			
5	Network address	O①		When the host is type A
6	Overtemperature Threshold			
7	Common Compensation Overvoltage Level 1			
8	Common Compensation Overvoltage Level 2			
9	Common Compensation undervoltage			
10	Split Compensation Overvoltage Level 1			
11	Split Compensation Overvoltage Level 1			
12	Split Compensation Undervoltage			

13	Voltage Harmonic Threshold			
14	Protection delay			
15	Total Cabinet Undercurrent Threshold			
16	Capacitor Discharge Delay			
17	Voltage Unbalance Threshold			
18	Cut-off Threshold			

Default cover Enable Settings for Common Compensation Intelligent Capacitor Parameters

Parameter no	Parameter name	Host enable	Slave enable	remarks
0	First Capacitor Bank Capacity			
1	Secondary Capacitor Bank Capacity			
2	Switching Threshold			
3	Switching delay			
4	CT ratio			
5	Network address	O①		When the host is type A
6	Overtemperature Threshold			
7	Common Compensation Overvoltage Level 1			
8	Common Compensation Overvoltage Level 2			Threshold parameters from intelligent capacitors to controllers or split compensation capacitors are multiplied by 0.732 before override.
9	Common Compensation undervoltage			
10	Split Compensation Overvoltage Level 1			
11	Split Compensation Overvoltage Level 1			
12	Split Compensation Undervoltage			
13	Voltage Harmonic Threshold			
14	Protection delay			
15	Total Cabinet Undercurrent Threshold			
16	Capacitor Discharge Delay			
17	Voltage Unbalance Threshold			
18	Cut-off Threshold			

①: When the host device is in auto-addressing mode

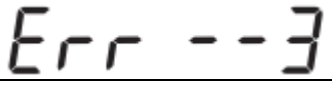
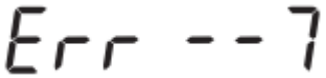
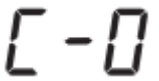
After networking is completed or the controller is modified, the host will broadcast a message to set all slave devices to auto-addressing mode. If the user needs to switch the addressing mode to auto-addressing mode, they only need to modify the host device to complete the configuration.

Note:

Host Enable means that when the intelligent capacitor is in host mode, it will override the specified parameters on all slave devices.

Slave Enable means that when the intelligent capacitor is in slave mode, the corresponding parameters can be overridden by the host.

Remind information

Display Code	Meaning
	Relay Sticking Fault 2-path Common Compensation：EEE-A1,EEE-C1;EEE-A2,EEE-C2 1-path Split Compensation：EEEE-A;EEEE-b;EEEE-C 2-path Split Compensation：EEE-A1;EEEE-b1;EEEE-C1 EEE-A2;EEE-b2;EEE-C2 1-path Common + 1-path Split Compensation：EEE-A1,EEE-C1,EEEE-A;EEEE-b;EEEE-C
	Auto-recoverable Switching Oscillation Fault： 1. Caused by Overvoltage Distortion Rate； 2. Caused by Overcurrent Distortion Rate； 3. Caused by Overvoltage； 4. Caused by Undercurrent； 5. Caused by Overcompensation；
	Networking Fault (Address Mode Conflict or Duplicate Address)
	Network Packet Transmission Failure (Hardware Fault)
	Preset Parameter Timeout Error
	Discarded Modified Parameters During Preset
	Communication Error with Synchronization Switch
	Synchronization Switch Fault (Check via Intelligent Capacitor Controller for Details)
	Failed to Connect to Existing Slave Unit
	Saved Modified Parameters
	Total Current < 80mA (Sensitivity Threshold)
Overvoltage	Voltage Signal Exceeds Overvoltage Threshold
Undervoltage	Voltage Signal Below Undervoltage Threshold
Distortion	Voltage/Current Signal Distortion Exceeds Threshold
Overtemperature	Intelligent Capacitor Overheating
Undercurrent	Secondary Current of Main Cabinet Below Threshold
Phase	Current-Voltage Phase Difference in Quadrant 2/3 (Auto-Corrected)

10. After-Sales Service

Thank you for purchasing our products, giving us the opportunity to provide you with high-quality service. To ensure your satisfaction, please carefully read this manual after purchase.

1. Warranty Period

The product is covered by a one-year warranty starting from the date of shipment. If any quality issues arise within this period—provided that the user complies with the manual's instructions and the cover has not been opened—our company will provide free repairs. After one year, lifetime maintenance is offered.

If there is a contractual agreement, the terms of the contract shall take precedence over this clause.