1.Scope of Application

BAGB /BAFB Series Intelligent LV Shunt Capacitors (Hereinafter referred to as Intelligent Capacitor) are a new generation of intelligent integrated reactive power compensation equipment featuring reduced wire loss and improved power factor and power quality, suitable for automatic reactive power compensation of LV AC distribution systems of 0.4kV and below. The product changes the bulky and heavy structure mode of the traditional reactive power compensation device, and adopts new algorithm to optimize the switching capacitor according to the reactive power demand. The internal of Intelligent Capacitor contains two groups of Capacitors, which are input in turn to make the compensation more precise. The product has the advantages of small inrush current, compact size, low power consumption, simple wiring, modular structure, various capacity combinations, longer service life and high reliability, plus the communication function of host computer, which adapts to the higher requirements of modern smart grid for reactive power compensation.
Product executive standard: GB / T 15576

2.Model, Specification and Meaning

B A □ □ – □ (□ + □)

- Make up the simultaneous complementary capacity of the primary circuit and the secondary circuit, there is no such requirement in the phase-splitting compensation.
- Total capacity of Intelligent Capacitor (kvar)
- Rated voltage (V)
- Compensation modes: GB means three-phase simultaneous compensation, FB means phase-splitting compensation
- Auto control
- Series codeTotal capacity of Intelligent Capacitor (kvar)

Comparison Table for Product Selection of Intelligent Capacitor and Compensation Controller

Product Series	Model and Specification	Supporting Controller
BAGB	BAGB 450- □ (□ + □)	ZT-830GB
BAFB	BAFB 250- □	ZT-830GB

Note: BAGB Series Intelligent Capacitors with three-phase simultaneous compensation are usually selected. The phase-splitting compensation is considered when the three-phase current imbalance of the system is greater than 15%.

3.Normal Service Conditions

Working voltage	**AC, 380V ± 15% for simultaneous compensation, and 220V ± 15% for phase-splitting compensation**
	AC, 220V ± 15% for simultaneous compensation ; 60Hz, Special Order required
Working frequency	50Hz±5%
Grid harmonics	Total voltage harmonic distortion rate (THDU) shall not be greater than 5%.
Ambient temperature	-25℃ ~+50℃
Relative humidity	40℃ ≤50%, 20℃ ≤90%
Altitude	≤3000m
Installation spacing	≥50mm
Installation and transportation	The product is vertically fixed and mounted, and adopts inner foam box and outer carton box. The quantity per box is 3 Nos. Violent impact and heavy load must be avoided during transportation.
Environment conditions	No harmful gas and vapor, no conductive or explosive dust, no violent mechanical vibration.
Installation conditions	Under the conditions of meeting the safety precautions, the installation site shall be free of harmful gas and vapor, conductive or explosive dust and violent mechanical vibration.
Storage conditions	The inner box is sealed with adhesive tape and stored in a dry and ventilated room. The temperature for transportation and storage is in the range of -25℃ ~+55℃ , and is allowed to reach up to +70℃ in a short time.
Matters of attention during use	For iron and steel, metallurgical smelting, mining industry processing, battery manufacturing, automobile & ship manufacturing and other industries, the total harmonic distortion rate (THDU) of power grid is greater than 5%. BAGB Intelligent Capacitor must be cautiously used. Anti-harmonic filter Intelligent Capacitor or NXWAPF active power filter is preferably selected.

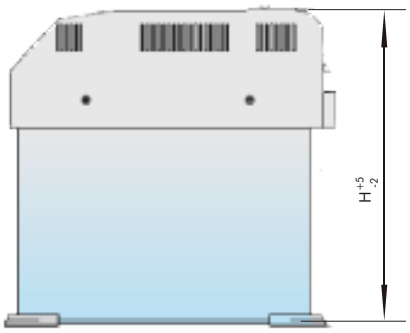
4. 1 Main Technical Parameters and Performance

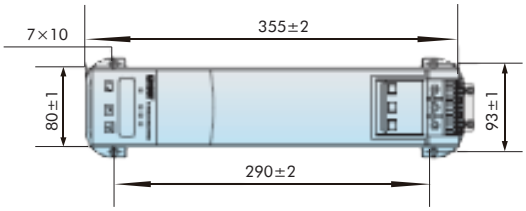
Item	Description on Functional Characteristics	Fault Code
Product composition	The product consists of intelligent measurement and control unit, zero-cross switching switch circuit, wire protection unit, network communication module and LV shunt Capacitor.	
Filling medium	Dry, polyurethane or high temperature microcrystalline wax	
Switching delay	The delay time interval between two groups of Capacitors is ≥ 10s.	
Control accuracy	100%	
Switching life	300,000 cycles or more	
Capacity decay rate	Capacity attenuation rate over operation time of Capacitor ≤ 2%/year.	
Small switching inrush current	Advanced zero-cross detection synchronous switching technology is adopted, of which inrush current multiple is less than 3.0IC to reduce impact on the power grid.	
Easy operation	As long as the external wiring is correct, the Unit will automatically connect to the network and assign addresses. After power on, it can run automatically without any setting by the user.	
Automatic networking	The operation of the Master will not be affected no matter whether the Slave is exited or connected. After the Slave is replaced, it will enter the compensation sequence online by the Master immediately and without any setting.	
Anti reactive power reverse transmission	Permanent fault trip protection device shall be adopted. Once the composite switch in the Intelligent Capacitor has any irreparable fault, it will trip automatically and exit the power grid to prevent reactive power reverse transmission to the power grid due to fault and ensure normal operation of reactive power compensation system.	
Under-voltage protection	The setting range of simultaneous compensation under-voltage is 280v ~ 360V, and the setting range of phase-splitting compensation under-voltage is 170V ~ 220V. When the setting value is exceeded, the input of Capacitor is blocked, and the Capacitor Bank that has been put into operation are automatically cut off quickly (5s) and level by level.	S-UL
Over-voltage protection	The setting range of simultaneous compensation over-voltage is 400V ~480V, and the set range of phase-splitting compensation over-voltage is 240V~280V. When the set value is exceeded, the input of Capacitor is blocked, and the Capacitor Bank that has been put into operation is automatically cut off quickly (5s) and level by level.	S-UH
Under current protection	When the secondary signal of current transformer is less than 100mA, the input of the Capacitor is blocked and the Capacitor Bank that has been put into operation is automatically cut off quickly (5s) and level by level.	S-IL
Over-temperature protection	The setting range of over temperature protection is 40℃ ~80℃ , and the factory presetting of 65℃ is adjustable. Give over-temperature alarm and lock the input of Capacitor.	S-TP
Discharge delay protection	After the Capacitor is cut off, the reconnection time is 3 min. During discharge, the green lights of C1 and C2 keep flashing.	
Analog switching function	Facilitate commissioning capacitance screen before leaving factory, and the Capacitor without the function in analog switching.	
anti-interference ability	The inlet wires for weak current and strong current are separated to prevent the interference of the primary line to the secondary signal line, thus greatly improving the anti-interference ability of the whole machine.	
Fault self- diagnosis	Monitor the operation status of internal synchronous switch, MCCB circuit breaker, Capacitor and other components of Intelligent Capacitor, give fault alarm and display fault code, which facilitates rapid fault location and timely processing.	
Capacitor body	Dry medium, built-in explosion-proof over-pressure protection device.	
Installation mode	Upright and vertical installation, the bottom fixed with screws.	

4.2 Main models, Specifications and Technical Parameters

Compensation Mode	Model and Specification	Capacity Configuration	Capacity (kvar)	Rated Voltage (V)	Height H (mm)
Three-phase simultaneous compensation	BAGB 450-10 (5+5)	5kvar+5kvar	10	450	230
	BAGB 450-10 (5+10)	5kvar+10kvar	15	450	230
	BAGB 450-20 (10+10)	10kvar+10kvar	20	450	230
	BAGB 450-30 (15+15)	15kvar+15kvar	30	450	300
	BAGB 450-30 (10+20)	10kvar+20kvar	30	450	300
	BAGB 450-40 (20+20)	20kvar+20kvar	40	450	300
	BAGB 450-50 (25+25)	25kvar+25kvar	50	450	330
	BAGB 450-60 (30+30)	30kvar+30kvar	60	450	360
Phase-splitting compensation	BAFB 250-5	5kvar Total capacity 5kvar	5	250	230
	BAFB 250-10	10kvar Total capacity 10kvar	10	250	300
	BAFB 250-15	15kvar Total capacity 15kvar	15	250	300
	BAFB 250-20	20kvar Total capacity 20kvar	20	250	330
	BAFB 250-25	25kvar Total capacity 25kvar	25	250	330

5. Main Characteristics, Overall Dimensions and Installation Dimension





7×10 long waist hole

Remarks: The installation dimension of product is 290mm × 93mm

6. Installation Procedure, Use Method and Product Wiring Diagram

Installation procedure: First clip the two plastic mounting pins of the Intelligent Capacitor into the bottom pin of the Capacitor, then install the Capacitor vertically on the fixed plate, fix with screws, then connect the primary and secondary wiring of the Intelligent Capacitor, and finally connect all the Intelligent Capacitors in series by using plug-in data cable, in which "IN" stands for input and "OUT" stands for output.

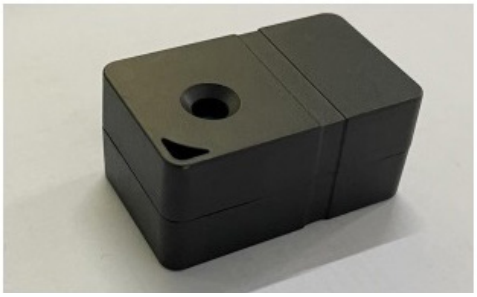
6.1 Description of Network Data Cable

The plug-in data cable (six core) configured by CHINT is used for networking products and secondary current signal acquisition.

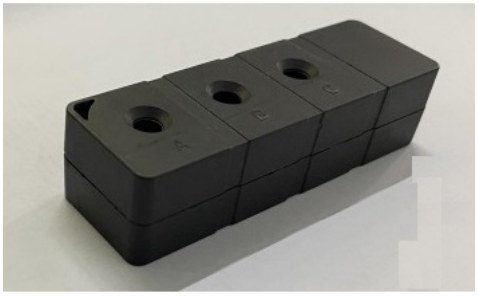
Serial No.	Type	Length	Purpose	Number of Accompanying Configuration
1	Type A	30cm	Used for connection between two adjacent products	Equipped along with product, one piece for each set
2	Type B	70cm	Used for connection between two adjacent layers of products	Equipped along with product, one piece for each box
3	Type C	150cm	Connection for secondary CT	Equipped along with product, one piece for each box
4	Type D	300cm	Connection for compensation Controller	One piece equipped for each Controller

6.2 Description of Secondary Current Transformer (Secondary CT)

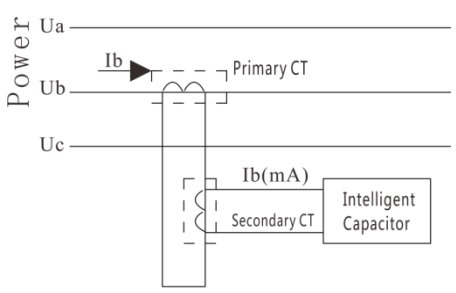
- In the Intelligent Capacitor automatic control system, the secondary current transformer is used for current sampling to convert the secondary current (0A ~ 5a) of primary current transformer in the inlet wiring cabinet into (0A ~ 5mA) current signal.
- Configuration mode: Only one secondary CT is required for one Capacitor Screen. A secondary CT3 is equipped for networking system with phase-splitting compensation;
- The fully simultaneous compensation networking system is equipped with a secondary CT1.
- When there is an external ZT-830GB Controller, the installation of secondary CT is unnecessary.



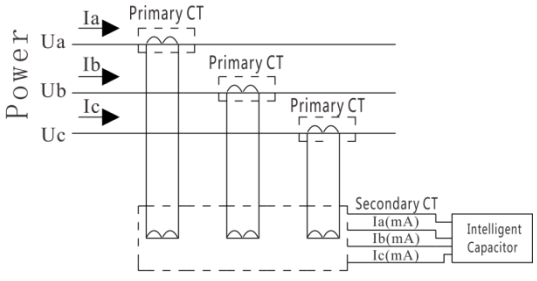
The appearance of BAGB-CT1 is shown in the figure below.



The appearance of BAFB-CT3 is shown in the figure below.



Total compensation CT1



Split Compensation CT3

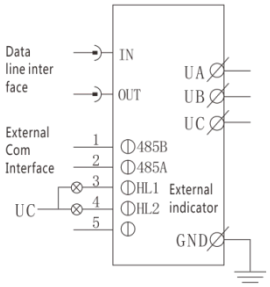
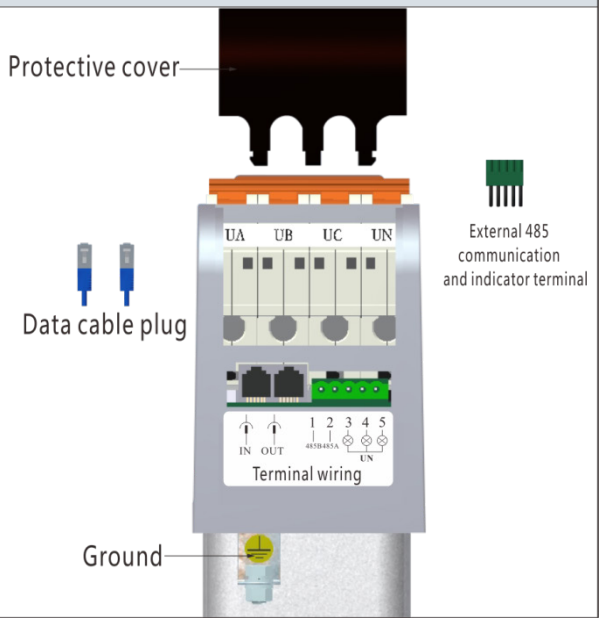
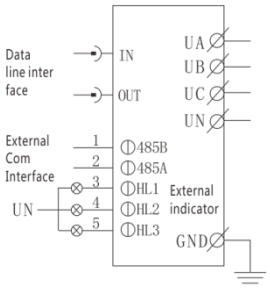
Note: The number of Intelligent Capacitors in each box is 3, and each box is equipped with a secondary CT.

6.3 Product Wiring Instructions

The wiring terminal of the product is divided into power terminal and measurement & control online terminal, which are placed at the rear of the product. The three-phase compensation power terminal is marked with "UA UB UC", and the phase-splitting compensation power terminal is marked with "UA UB UC UN". The measurement & control online terminal uses plug-in parts to facilitate on-site commissioning and replacement. The product is marked with "IN, OUT, 1, 2, 3, 4, 5" serial number, and full attention must be paid when wiring or replacement.

6.4 Electrical Wiring Requirements

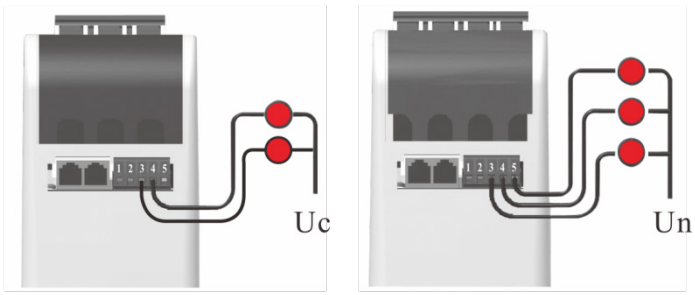
Product Terminal Wiring Diagram

Remunerate	Terminal diagram and meaning	product picture
Three-phase compensation		
Phase separation compensation		

6.4.1 The Power Cord is Made as Shown in the Figure: The screw must be tightened when connecting the power cord, and the power cord must be pulled hard to prove that it is very firm, otherwise it will cause excessive heating and damage the product.

6.4.2 When there is a Controller, the secondary wiring shall be connected with 485 port of the corresponding .Controller from the external 485 port of the first or last cabinet products.

6.4.3 When there is an external indicator light, the indicator light of the simultaneous compensation Capacitor is 380V. The indicator light of the phase-splitting compensation Capacitor is 220V. As shown in the figure below:

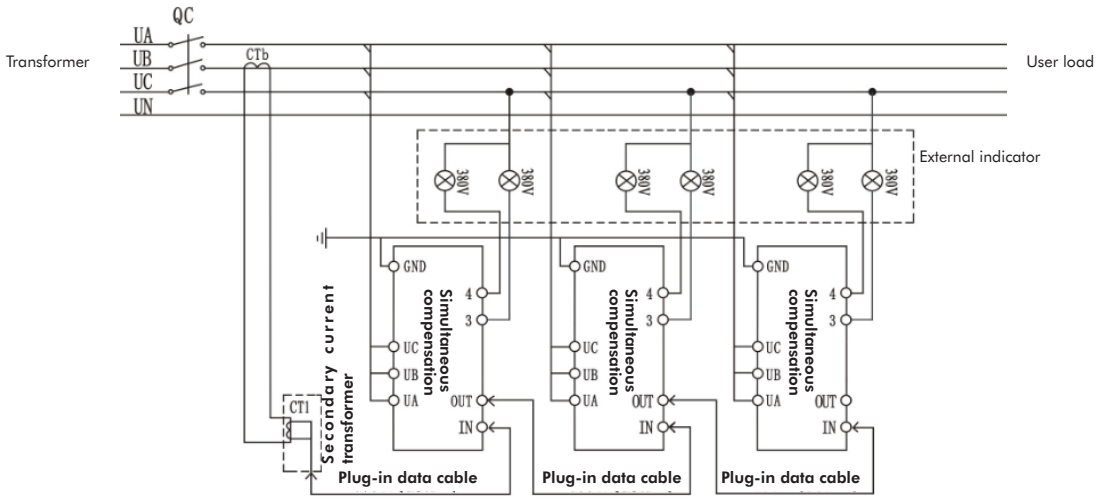


Co-compensation Split Compensation

6.4.4 When connecting to the straight-through secondary current transformer, the mark of the straight-through hole on the transformer must be paid attention to for the secondary sampling current of the incoming cabinet, the current phase sequence of A, B and C must be correctly corresponded. If only simultaneous compensation Capacitor is present, the secondary current transformer of CT1 model shall be selected, and the phase B of incoming cabinet shall be short circuited by secondary sampling current perforation. There is no direction requirement for current straight-through.

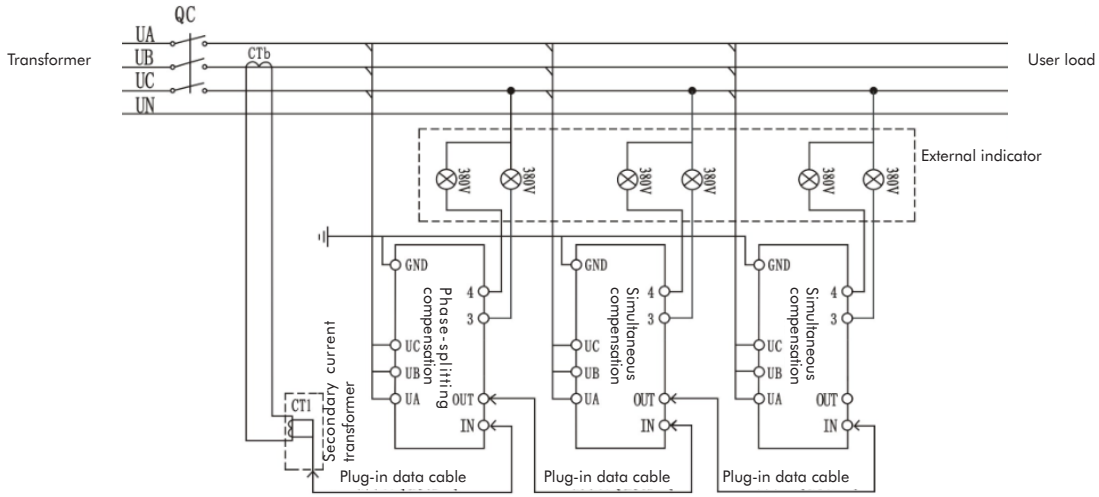
6.5 Product Wiring Diagram

6.5.1 Typical wiring diagram of full simultaneous compensation (Auto control mode, Master-Slave control, No Controller required)



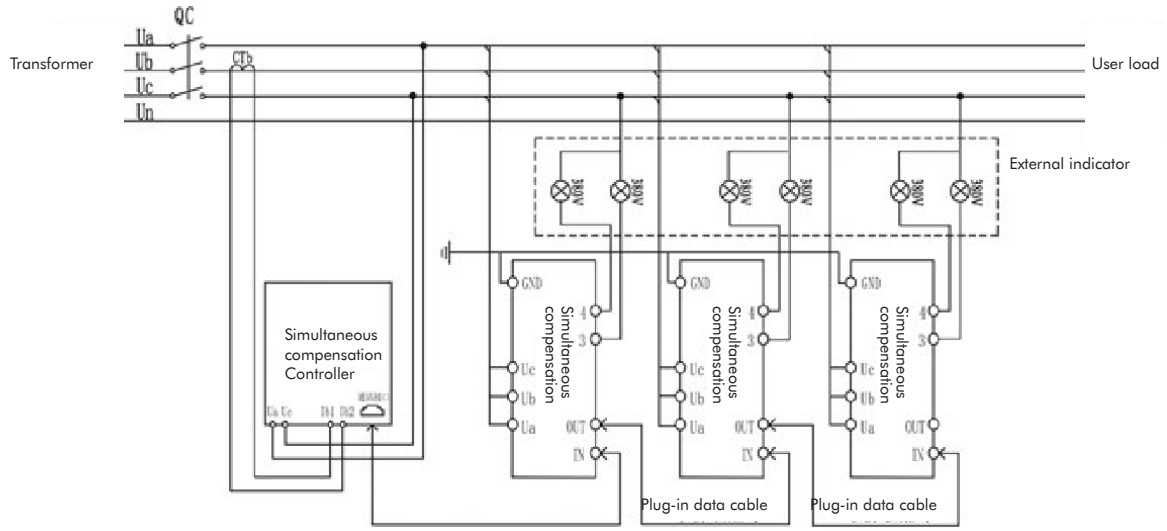
Note: The simultaneous compensation C1 for secondary current transformer must be equipped.

6.5.2 Typical wiring diagram of three-phase hybrid compensation (Auto control mode)

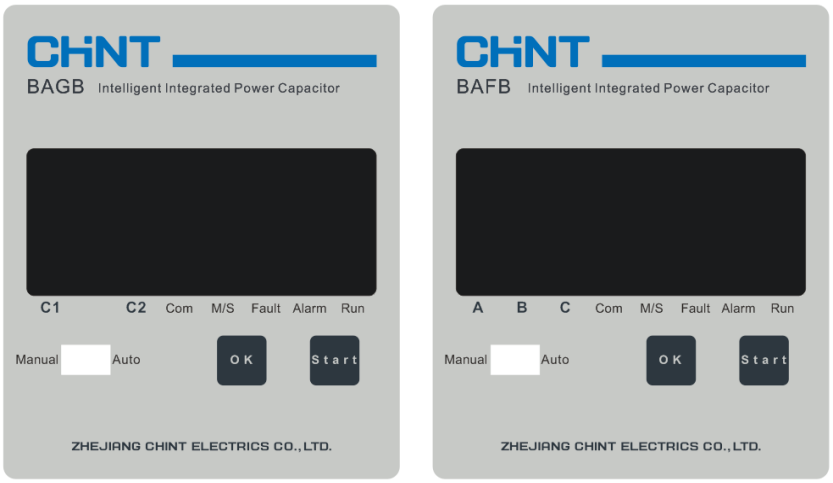


Note: The phase-splitting compensation (hybrid compensation) CT3 for secondary current transformer must be equipped.

6.5.3 Typical wiring diagram for simultaneous compensation of external Controller (Controlled mode, the external Controller ZT-830GB is required.)



7. Operation Interface



- LED digital tube display screen: Display the rotation display code and parameter value of each parameter
- Capacitance status indicator: When the green status indicator of "capacitance" is on, the Capacitor Bank is input, otherwise there is no input.
- Working status indicator: When the green status indicator of "working" is on, the Intelligent Capacitor enters the working state.
- Parameter out-of-range indicator: When the red "out-of-range" indicator is on, the measured parameter exceeds or is lower than the set value.
- Switch fault indicator: When the red indicator of "Fault" is on, indicating that there is a fault in the internal switch of the Intelligent Capacitor.
- Master/Slave status indicator: When the "Master-Slave" green indicator is on, the Intelligent Capacitor becomes the Master.
- Communication status indicator: When the "Communication" indicator flashes, indicating that the communication of this Intelligent Capacitor is normal, otherwise, it indicates that there is a communication problem.
- AUTO/MANUAL toggle switch: When the switch is in "AUTO" position, it indicates that the Intelligent
- Capacitor enters the automatic working state; and when the switch is in "MANUAL"position, it indicates that the Intelligent Capacitor enters the manual working state.

8. Product Commissioning and Application

8.1 Auto control mode adopts secondary CT current sampling, automatic networking and Master-Slave control.

When powered on for the first time, turn on the three-phase power supply of all Intelligent Capacitors, and the system will automatically select an Intelligent Capacitor as the Master (When there is the phase-splitting compensation, the phase-splitting compensation must be selected as the Master), without ID setting, and observe that its "Master / Slave" indicator light is on. If the Master fails during operation, the product will automatically exit the sequence, and the system will automatically select an Intelligent Capacitor from the remaining products as the Master.

8.2 Controlled mode, external ZT-830 Controller, Intelligent Capacitor operates according to the command of reactive power compensation Controller.

- First, set all the Intelligent Capacitors in "AUTO" state. When powered on for the first time, the ZT-830 Controller and the Intelligent Capacitor need automatic networking process for about 1min, and the communication light on the Controller and the Intelligent Capacitor flashes.

- Check that the number of green light groups of the status indicator lights on the Controller panel (Group C1 and C2 for simultaneous compensation, and group A, B and C for phase-splitting compensation) is the same as the number of Capacitors in the cabinet, indicating successful networking.

- After successful networking, manual switching or simulated switching test is carried out through ZT-830 reactive power compensation Controller, which can operate normally without parameter setting. Most Users select the controlled mode.

8.3 Effect Drawing of Complete Equipment of Intelligent Capacitor

9. Product Ordering Instructions

- When ordering, the User shall provide the product model and use requirements. If there are products beyond the use conditions and main technical parameters, the User can order upon negotiation;

- For example: Ordering BAGB 450-40 (20+20), 10 sets

- The example means ordering BAGB Series Intelligent Combined LV Shunt Capacitors with rated voltage of 450V, capacity of 20kvar for the first Capacitor Bank, capacity of 20kvar for the second Capacitor Bank, total rated capacity is 40kvar, and ordered quantity of 10 sets.