ANKLAM®
安 克 拉 姆 电 气

AN-RVT/KSeries reactive power compensation controller

Instruction Book

WUXI ANKLAM ELECTRIC CO., LTD

First, Safety tips

1. The installation, wiring and commissioning of the product shall be carried out in accordance with the methods and steps specified in this manual, and pay attention to the wiring diagram and terminal diagram label of the controller.

2, when the controller shell has obvious damage or display function failure, shall not continue to install and use, please contact the product supplier.

3, the installation of the controller must comply with all relevant safety operating procedures, must be through the correct wiring and wire size to ensure the safety of operation, reliability and measurement accuracy.

4, the power input, CT secondary side, will produce a high voltage harmful to personal safety, should be careful in the operation, strictly abide by the safety operation procedures.

5. Only professionals can put the equipment into use according to the instructions and safety specifications.

Second ,Application range and characteristics

1、AN-RVT/K series reactive power compensation controller is widely used in reactive power compensation control system, mainly composed of power module, data acquisition, man-machine interface, reactive power compensation control and GPRS data module five parts, GPRS network communication technology is mature, wide coverage, It is an important direction of power system modernization to realize data collection and monitoring of distribution network by using wireless network provided by mobile operators.

2, the controller can display real-time data, historical cosφ curve, harmonic data, capacitor status information and rod diagram, statistical data and other information. The parameters can be manually set and the capacitor switching can be manually controlled.

3, the controller output can be expanded. The machine has 12 outputs, which can be connected to 6 network intelligent modules through

RJ45 communication standard connectors. Each expansion module has 16 outputs, and a total of 108 outputs can be controlled.

4, the controller has a special design in terms of power anti-interference and heat dissipation, making the equipment more suitable for harsh working environment.

5, the controller is suitable for hybrid compensation.

Third,Specification

1. Environmental conditions

Altitude: ≤2500m

Operating temperature: -20℃ ~ +60℃

Storage temperature: -25℃ ~ +70℃

There is no corrosive gas, no conductive dust, no flammable and explosive media in the surrounding environment, no violent vibration, no rain and snow erosion at the installation site.

2. Measurement data

Measuring voltage: 59V ~ 265V

Measuring current: 0 ~ 6000A

Sensitivity: 50mA (secondary)

Measurement power factor: lag 0.2 ~ lead 0.2

Working power supply: 220V±20%

Measurement frequency: 50 ~ 60Hz

Display active power: 0 ~ 6553Kw

Display reactive power: 0 ~ 6553 Kvar

Display voltage total harmonic distortion rate: 0.0 ~ 100.0%

Display current total harmonic distortion rate: 0.0 ~ 100.0%

3. Display performance

LCD data refresh period ≤1s.

4. Communication interface data

COM1 RJ45 communication port: Connects to the network intelligent module

5, measurement accuracy

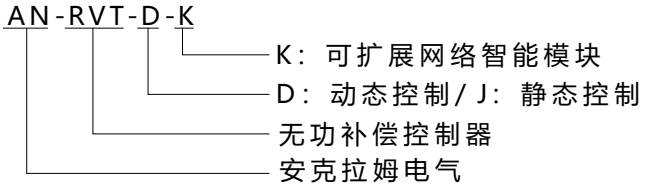
Voltage: ± 0.5% Active power: ± 1.0%

Current: ± 0.5% Reactive power: ± 1.0%
Frequency: ± 0.1 Hz Power factor: ± 1.0%
The above data is based on controller warm-up after 10 minutes and calibration within 1 year.

6. Reliability:

Mean time to failure (MTBF) : > 25,000 hours

Fourth,demonstration of the type



Fifth、operating instructions

5.1 Panel Functions

1, parameter display LCD screer

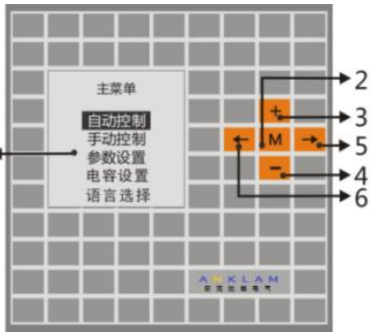
2、M Menu key, confirm key

3、+ Menu key, confirm key

4、− Down key, decrement

5、→ Case keydownarrow

6、← Left key shift

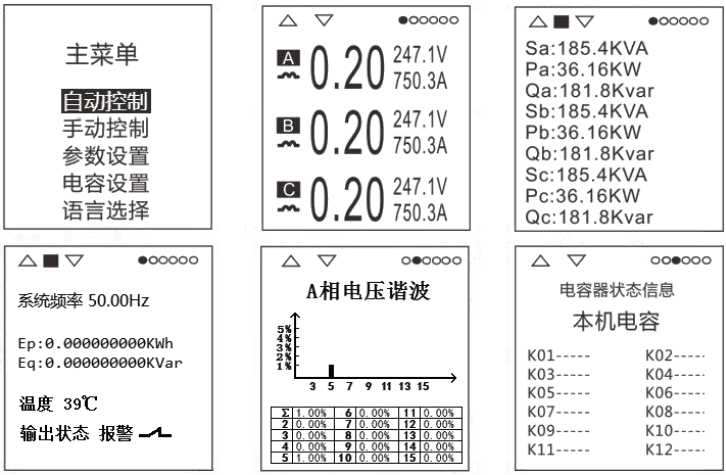


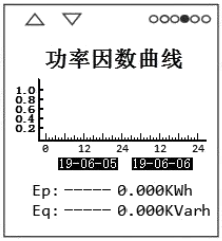
5.2 Display of automatic control parameters

After the power is powered on, the display automatically enters the "Automatic Control" display interface. Or on any screen, hold down M to go to the Main Menu screen, press + and - to move the reverse color cursor up or down, select the Auto control menu item, and press M to go to the Auto Control screen.

5.2.1 5.2.1 Power Parameters Display Description

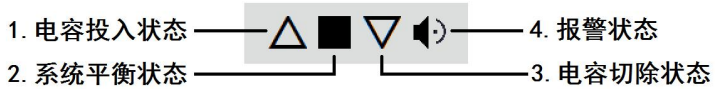
A total of six different types of parameters are displayed, corresponding to the six circle symbols in the top left corner of the display. Each parameter interface has several display pages. To view real-time data quickly, press +, -, ←, and →. Real-time electrical parameter data (U, I, cosφ, Sa, Pa, Qa, Sb, Pb, Qb, Sc, Pc, Qc, Ep, Eq, frequency, etc.), harmonic data, capacitor operating status, cosφ historical curve information bar graph, statistical data and so on.





5.2.2 Supercapacitor Switching Status Description

In the automatic control display state, the upper left corner of the display screen has the capacitor switching state display.



1. Capacitor input state: △ indicates no input state. The "▲" flashing indicates that the capacitor is waiting for input. If the actual value is insufficient to set the target power factor and input threshold, "▲" will continue to flash.

2. System balance: □ indicates that the system is unbalanced. The system performs capacitor switching. ■ Blinking indicates the system balance.

3. Capacitor excision state: "▽" indicates no excision state. The "▼" blinking indicates that the capacitor is waiting to be removed. If the actual value exceeds the set target power factor and excision threshold, "▼" will continue to flash.

4. Alarm state: When the controller has an alarm state, the controller will carry out the corresponding locking action, and will display the alarm symbol and continue to blink. If the alarm state can be lifted automatically, the alarm symbol will disappear at the same time.

5. On the third parameter page of the "Automatic control" display interface, you can view the operation of the "local capacitor". Press the + and - keys to turn the page and display the running status of the Expansion Module

Capacitor. If a single loop is shown in black, it means that the loop capacitor has been put into operation.

5.35.3 Manual Switching Operation Description

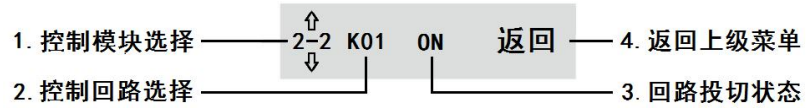
5.3.1 操作说明

On the Main Menu screen, press + and - to select the manual control menu item, and press M to enter the Manual Control screen. Press +, -, ←, and → To move the cursor, you can select and switch capacitors on the local device or expansion module. Move the cursor to the right and press M to return to the main menu.

Note: When the static controller is manually operated, the reinput time of the capacitor should be greater than the discharge time of the capacitor (3 minutes according to the national standard). Otherwise, repeated switching of the capacitor in a short period of time may cause the capacitor to burst.

5.3.2 Manual Control

Manual control of switching capacitors is carried out in the figure below. Press ← and → function keys to move the cursor to select each module and each circuit. Press "+" and "-" function keys to manually switch the capacitor.



1, control module selection: the total number of the machine (1) + expansion module (6) ≤7 groups. The first digit indicates the total

number of modules, and the last digit indicates the serial number of modules.

2, control loop selection: the local output loop ≤12, single expansion module output loop ≤16.

3. Loop switching state: there are two states of "ON" (input) and "OFF" (excision).

4. Return to the upper-level menu: Return to the upper-level menu.

5.4 Parameter Settings

On the Main Menu screen, press + and - to select a parameter setting menu item, and press M to enter the Enter Password screen. Enter the password or press M to confirm the password to enter the Set Parameter screen on the secondary menu. Press + and - to select a parameter item, and press M to enter the parameter setting screen. After the Settings are complete, press M to save the Settings or return to the upper-level menu.

1, the target power factor: the user wants the system to reach the normal power factor value. The default value is 0.95.

2. Bus CT: is the ratio value of the current transformer ratio on the bus side, such as 500/5 set to 100, 100/1 set to 100.

3, Advanced Settings: three level sub-menu, select and enter to set the advanced parameters.

4. System clock: Adjust to the current Beijing time.

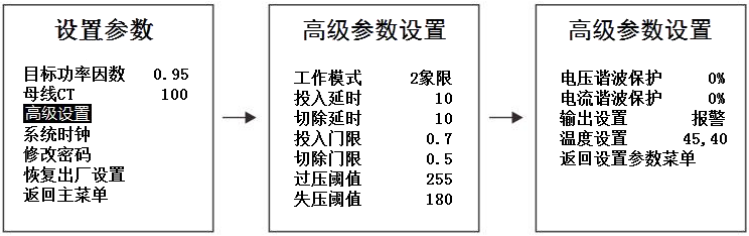
5, Change the password: the password set range is 0000 ~ 9999, the factory default value is 0000.

6, restore factory Settings: restore to the original factory state.

7, Return to the main menu: You can return to the upper level "main menu" interface.

5.4.1 Advanced Parameter Settings

On the Set Parameters menu page, select Advanced Settings to go to the Advanced Parameter Settings page.



1. Working mode: working quadrant setting. Power generation system compensation option 4, other compensation option 2. The default value is 2.

2. Input delay: delay input time is set when the capacitor is input. The default is 10.

3, cutting delay: capacitor cutting delay cutting time set. The default is 10.

4, input threshold: the ratio of the target power factor when the capacitor is input. The default value is 0.7.

5, cutting threshold: the ratio of the target power factor when the capacitor is cut. The default value is 0.5.

6, overvoltage threshold: overvoltage protection upper limit. Remove capacitor immediately after overvoltage. Default value 255.

7, voltage loss threshold: under voltage protection lower limit. Remove capacitor immediately after overvoltage. The default value is 180.

8, voltage harmonic protection: system harmonic voltage protection upper limit. The default value is 0, which disables protection Settings.

9, current harmonic protection: system harmonic current protection upper limit. The default value is 0, which disables protection Settings.

10, output setting: the machine normally open dry contact output. Set to "Alarm" or "Temperature" status output. Can only choose one or the other. Default value "Alarm" output. The dry contact closes when

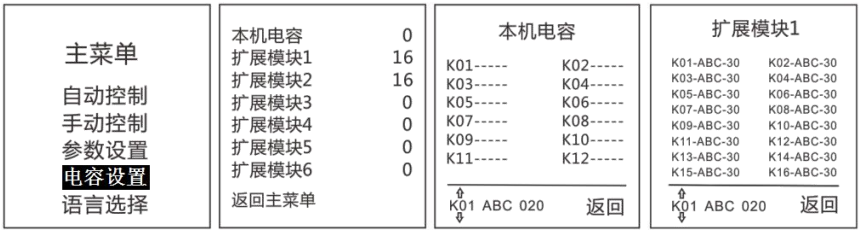
the system has an alarm.
11. Temperature setting: action limit of protection temperature and recovery temperature. Usually used in external cooling equipment. The temperature displayed on the screen is the value measured by the temperature sensor in the controller. The dry contact can be driven by temperature protection only when Output Setting is set to Temperature. The dry contact closes when the protection temperature exceeds the threshold. The dry contact is disconnected only when the temperature is lower than the recovery temperature.
12, Return to the setting parameter menu: you can return to the upper-level "Parameter Settings" menu interface.

5.4.2 Parameter Settings Summary

Set content	scope	default	step size	explain
power factor	-0.5 ~ 0.5	0.95	0.01	
Bus barCT	0 ~ 99999	100	1	
work pattern	2/4quadrant	2		
Input delay s S	0.1 ~ 100	10	0.1	dynamic parameter
Input delay s S	0.1 ~ 100	10	0.1	dynamic parameter
Input delay s S	5 ~ 100	10	5	Static type
Input delay s S	5 ~ 100	10	5	Static type
on and off limit	0 ~ 2.0	0.7	0.1	Input threshold + excision threshold should be ≥1.2. Small sum value is easy to produce switching oscillation
on and off limit	0 ~ 2.0	0.5	0.1	
Overpressure threshold V	220 ~ 265	255	1	
Pressure loss threshold V	175 ~ 220	180	1	
voltage harmonic	3% ~ 20%	0	1	0: disables the protection function

current harmonics	5%～50%	0	1	0: disables the protection function
Output setting	Alarm/Temperature	Alarm		
Protection temperature ℃	30～99	45	1	Output Setting The dry contact output is available only when the temperature is selected
recovery temperature	0～40	25	1	

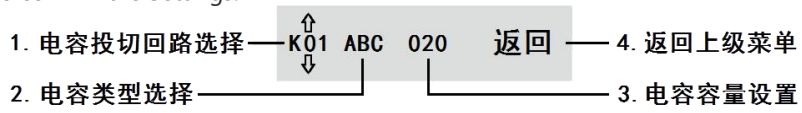
5.5 Capacitor setting operation description



On the main menu screen, press + and - to select a capacitor configuration menu item, and press M to go to the Module Selection screen. Press the + and - keys to select the local capacitor menu item, and press the M key to enter the Local Capacitor screen to set capacitor parameters. Move the cursor to the Back menu item and press M to return to the Module Selection screen of the upper-level menu. Repeat the preceding steps to go to the expansion module screen for configuration.

5.5.1 Setting Capacitor Parameters

Capacitor parameters are set in the following figure. Press ← or → to move the cursor to select a parameter. Press the + and - function keys to set the parameter status or range of each loop. After the Settings are complete, press M to confirm the Settings.



1, capacitor switching circuit selection: the number of circuit of the machine ≤12 groups, the number of expansion module circuit ≤16 groups.

2, capacitor type selection: There are 5 options for capacitor type selection. "A", "B" and "C" are single-phase dispensing capacitors; "ABC" is a three-phase cocomplement capacitor; -- Sets a vacancy for the local loop.

3. Capacitive capacity setting: total capacity of single loop. Range 0-999.

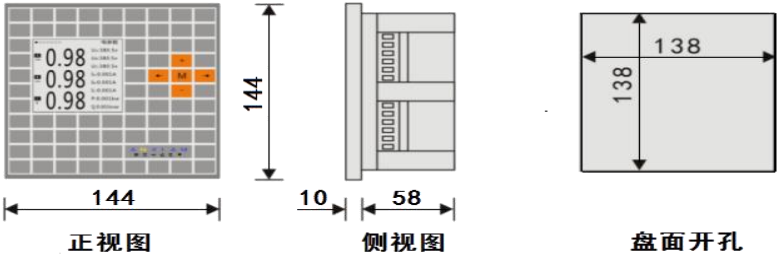
4. Return to the upper-level menu: Return to the upper-level menu.

5.6 GPRS5.6 GPRS Output

This machine is equipped with optional accessories GPRS module. The module is applied to wireless network communication connection. Please contact the supplier if you need to order.

Sixth,Outline and mounting dimensions drawing

The equipment is embedded installation, the upper and lower sides of each side has a tooth type fixing card accessories, quick and convenient installation.

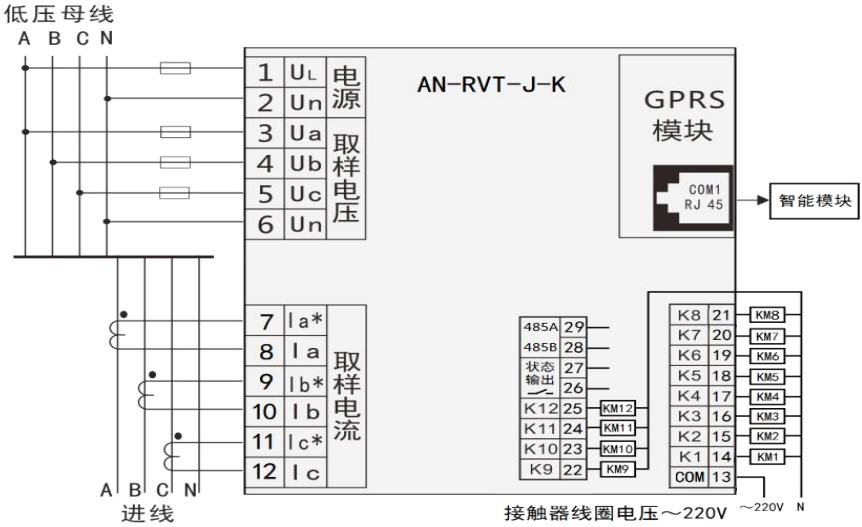


Seventh ，Refer to the wiring diagram

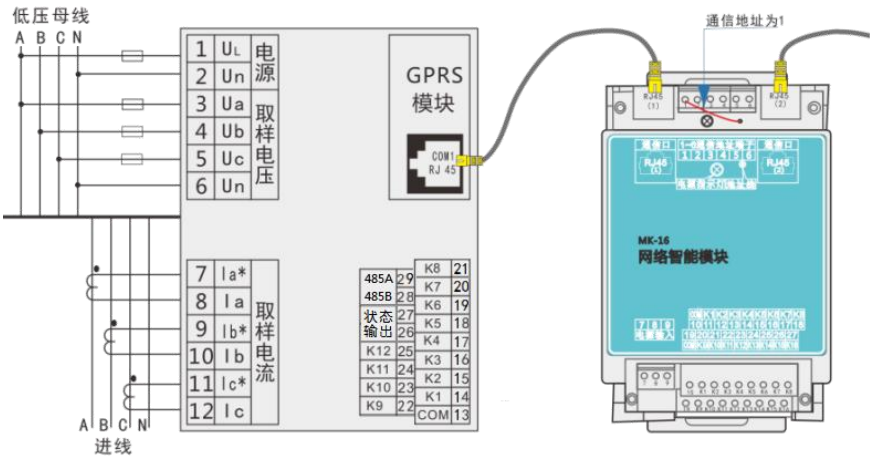
If the capacitor switching loop is less than or equal to 12 channels, the output loop unit of the machine can be used. You can also connect the intelligent expansion module through a network cable and use the output loop unit on the module.

7.1 AN-RVT-D-K Dynamic Connection reference diagram

7.2 AN-RVT-J-K Static type connection reference diagram



7.3 Diagram of Connecting a Controller Network Cable to an Intelligent Expansion Module



7.4 Terminal Description

al terminal instructions	Make clear	Reserve note
1、2	Woek power	AC 220V、50Hz
3～6	sampling voltage	0.4kV，three-phase four-wire system
7～12	Current Sense	Take the automatic incoming cabinet transformer
13	power bus	Phase junction line Connected to thyristor switch +12V control terminal (dynamic)
14～25	Loop 1 to 12 output	Connect AC contactor coil terminal (static)

		-12V control terminal with thyristor switch (dynamic)
26、27	Passive dry contact switch output	Alarm output or temperature output
28、29	485 Communication port	29A, 28B
RJ45	RJ45 connector	Connects to the intelligent expansion module
GPRS	GPRS module is a non-standard component	**mating**

Eighth,container loading list

numerical order	name	quantity	remark
1	**specification**	1Set	
2	**controller**	1Set	
3	**clip**	1Pcs	
4	**reticle**	1Pcs	Dispense as needed