

# POWER FACTOR CONTROLLER

## Uppf(Fractional compensation)

功率因数控制器 分补（四代）

操作手册

**Operation manual**



**Lafaelt**  
莱提电气

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## 请在安装、接线、操作、保养或检查本设备前仔细阅读本手册。

Please read this manual carefully before installing, wiring, operating, maintaining or inspecting the equipment. Please place this manual where it is readily available for quick reference

### 安全操作警告/Safety Operation Warning

1. 本机上电之前应仔细检查装置是否可靠接地；
2. 只有熟悉该机操作手册的专业技术人员才允许安装、运行或检修本机；
3. 本机的安装必须遵照所有有关的安全操作规程，必须通过正确的接线和电线尺寸来保证操作的安全性和运行的可靠性以及测量的准确性。
4. 电源输入、CT 二次侧，均会产生危害人身安全的高电压，在操作时应小心，严格遵守用电安全操作规程。
5. 在检修、安装和调换本机时，必须确保断开电源和短接 CT 二次侧回路；
6. 在带电采集、设置数据时，无论何种情况下都不得接触带电部分。

1. Before the machine power should be carefully checked whether the device is reliably grounded;
2. Only professional and technical personnel who are familiar with the operation manual of the machine are allowed to install, run or repair the machine;
3. The installation of the machine must comply with all relevant safety operating procedures, and must ensure the safety of operation and reliability of operation and measurement accuracy through the correct wiring and wire size.
4. Both the power input and the secondary side of CT will produce high

voltages that harm personal safety, so be careful when operating and strictly follow the safety operation procedures of power consumption.

5. During the maintenance, installation and replacement of the machine, the power supply must be disconnected and the CT secondary circuit must be short-circuited.

6. Do not touch live parts under any circumstances when collecting and setting data on line.

## 基本安装/Basic installation

在安装本自动功率因数调整器时，请务必遵守标准作业规范和安全准则。

安装：

1. 确认量测与控制电压、供电频率和电流转换比是否与控制器技术资料吻合。
2. 配电盘上开孔尺寸是 138\*138mm.，利用两个固定夹将此调整器安装至配电盘上，其嵌入的深度是 60mm。
3. 根据配线图进行接线。
4. 请移除 CT 短接片。

When installing this automatic power factor regulator, be sure to follow standard operating practices and safety guidelines.

Installation:

1. Confirm whether the measured and controlled voltage, power supply frequency and current conversion ratio are consistent with the controller technical data.
2. The opening size of the switchboard is 138\*138mm. The regulator is installed on the switchboard using two fixed clips, and the depth of its embedding is 60mm.
3. Connect cables according to the wiring diagram.

4. Remove the CT short graft.

## 1 产品概述/Product overview

智能无功补偿控制器是集数据采集、无功补偿、电网参数分析等功能于一体的新型配电测控设备，适用于交流 0.4KV、50Hz 低压配电系统的监测及无功补偿控制。

智能无功补偿控制器以高速数字信号处理器为核心，采用交流取样，人机界面为 128X64 点阵大屏幕液晶显示器，其具有配电监测、无功补偿、谐波分析，自适应频率算法，输入信号在 45Hz-55Hz 之间变化。

The intelligent reactive power compensation controller is a new type of power distribution measurement and control equipment that integrates data acquisition, reactive power compensation, and network parameter analysis. It is suitable for the monitoring and reactive power compensation control of AC 0.4KV and 50Hz low-voltage power distribution systems.

The intelligent reactive power compensation controller takes high-speed digital signal processor as the core, adopts AC sampling, human-machine interface is 128X64 lattice large-screen LCD display, which has power distribution monitoring, reactive power compensation, harmonic analysis, adaptive frequency algorithm, and input signal changes between 45Hz and 55Hz.

## 2 使用条件/Conditions of use

空气温度：空气温度不高于+65℃，不低于-25℃。

大气条件：空气湿度在 20℃时不超过 90%，在温度较低时，允许有较高的相对湿度。

海拔高度：不超过 2500 米。

环境条件：周围介质无燃爆危险，无腐蚀性气体，无导电尘埃及雨雪侵蚀，安装地点不

能剧烈振动。

Air temperature: The air temperature is not higher than +65℃, not lower than -25℃.

Atmospheric conditions: The humidity of the air does not exceed 90% at 20 ° C, and high relative humidity is allowed at low temperatures.

Altitude: No more than 2500 meters.

Environmental conditions: The surrounding medium has no danger of explosion, corrosive gas, conductive dust, rain and snow erosion, and the installation location is not

It vibrates violently.

### 3 终端功能/Terminal function

#### 3.1 实时数据监测

电压、电流、功率因数

所配电容器组投切状态

有功功率、无功功率、系统频率

电压总谐波畸变率、电流总谐波畸变率，环境温度（选配）

3、5、7、9、11、13、15、17、19、21、23、25、27、29、31 次电压谐波含有率

3、5、7、9、11、13、15、17、19、21、23、25、27、29、31 次电流谐波含有率

#### 3.1 Real-time data monitoring

Voltage, current, power factor

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Switching status of the distribution container group

Active power, reactive power, system frequency

Total harmonic distortion of voltage, total harmonic distortion of current, ambient temperature (optional)

3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 voltage harmonic content rate

3, 5, 7, 9, 11, 13, 15, 17, 19, 21, 23, 25, 27, 29, 31 harmonic current content rate

3.2 无功补偿

取样物理量为无功功率，无投切振荡。

Δ型补偿方式

3.2 Reactive power compensation

The sampling physical quantity is reactive power without switching oscillation.

Delta type compensation mode

4 技术数据/Technical data

4.1 基本参数

|                                  |                                                                     |
|----------------------------------|---------------------------------------------------------------------|
| 电源电压/Supply voltage              | AC 220V ± 20%                                                       |
| 取样电压/Sampling voltage            | AC 220V ± 20%                                                       |
| 电源频率/Power frequency             | 50Hz ± 5%                                                           |
| 取样电流/Sampling current            | 0~5A/0~1A                                                           |
| 整机最大功耗/Maximum power consumption | 12W（视所控制的投切开关功率而定）<br>(Depending on controlled switching power)     |
| 控制输出接点/Control output contact    | 18 路 每路 DC12V × 40mA 或 220V /5A<br>24 channels each DC12V x 40mA or |

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220V /5A

### 4.2 测量精度

|                       |              |
|-----------------------|--------------|
| 电压/voltage            | $\pm 0.5\%$  |
| 电 流 /Electric current | $\pm 0.5\%$  |
| 有 功 功 率 /Active power | $\pm 1.0 \%$ |
| 无功功率//Reactive power  | $\pm 1.0 \%$ |
| 频率/Frequency rate     | $\pm 0.5\%$  |
| 功 率 因 数 /Power factor | $\pm 1.0 \%$ |

### 4.3 控制参数/Control parameter

|                                          |                                   |
|------------------------------------------|-----------------------------------|
| 控 制 灵 敏 度 /Control sensitivity           | 30mA                              |
| 目标 $\cos \varphi$ /Target $\cos \varphi$ | 0.85—1.00<br>步长/Step size 0.01    |
| 门 限 系 数 /Threshold coefficient           | 0.6—1.2<br>步长/Step size 0.1       |
| 投切延时 (1) /Switching delay (1)            | 0.02s—600s<br>步长/Step size 1/0.02 |
| 投切延时 (2) /Switching delay (2)            | 00s—300s<br>步长/Step size 1        |
| 过 压 保 护 /Overvoltage protection          | 235V—280V<br>步长/Step size 1V      |
| 欠 压 保 护 /Undervoltage protection         | 175V—210V<br>步长/Step size 1V      |
| 过 电 流 保 护 /Overcurrent protection        | 0—9999A<br>步长/Step size 1A        |
| 小 电 流 保 护 /Low current protection        | 0—990A<br>步长/Step size 1A         |
| 谐波电压超限/The harmonic                      | 00.0%—100%<br>步长/Step             |

|                           |            |         |
|---------------------------|------------|---------|
| voltage exceeds the limit | size 0.5%  |         |
| 谐波电流超限 /Harmonic          | 00.0%—100% | 步长/Step |
| current exceeds the limit | size 0.5%  |         |

## 5 显示及操作

### 5.1 自动控制/Automatic control

系统上电后，30 秒钟后自动进入主菜单(分中英文两种显示方式，如下图)，延时约 180 秒后进入自动运行状态。液晶背光 180 秒自动关闭，按任意键激活背光。

After the system is powered on, it will automatically enter the main menu 30 seconds later (in both English and Chinese, as shown in the following figure), and enter the automatic running state after a delay of about 180 seconds. The LCD backlight will turn off automatically for 180 seconds. Press any key to activate the backlight.

|      |       |
|------|-------|
| 自动控制 | AUTO  |
| 参数设置 | SETUP |
| 手动控制 | HAND  |
| 版本信息 | VER   |

自动运行状态共有 7 屏，操作上行或下行键可循环显示各项电网运行数据(显示根据控制输出路数不同而不同)。

The automatic operation state has 7 screens, and the operation uplink or downlink keys can display the power grid operation data (the display varies according to the number of control output routes).

第一屏 显示实时电压、电流、电网频率、电容器投切状态。

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The first screen displays real-time voltage, current, power factor, capacitor switching status (in English and Chinese).

|    | U (V)                      | I (A)  | F (Hz) |
|----|----------------------------|--------|--------|
| A  | 0223.4                     | 0501.6 | 50.1   |
| B  | 0222.0                     | 0502.0 |        |
| C  | 0222.2                     | 0501.0 |        |
| ▲▼ | 1 2 3 4 5 6 7 8 9 10 11 12 |        |        |

“▲▼”为投切指示，当要投入或切除某路电容器时▲或▼闪烁，表示将要执行的动作。

1—24 为输出状态，若某路号反显，表示该路已被投入。否则表示未被投入。

第二屏 显示有功功率、无功功率、功率因数，电容器投切状态。

“▲▼” is the switching indication. ▲ or ▼ flashes when a capacitor is to be put in or removed, indicating the action to be performed.

1 to 24 indicates the output state. If a route number is displayed backward, it indicates that the route is invested. Otherwise, it is not invested.

The second screen shows active power, reactive power, frequency, capacitor switching state.

|    | P (KW)                  | Q (Kvar) | COS $\phi$ |
|----|-------------------------|----------|------------|
| A  | 0111.9                  | -002.9   | 1.000      |
| B  | 0111.4                  | -0001.3  | 1.000      |
| C  | 0111.3                  | -000.0   | 1.000      |
| ▲▼ | 13 14 15 16 17 18 19 20 |          |            |

第三屏 显示各相电压、电流谐波总畸变率，环境温度，电容器投切状态。

The third screen displays each phase voltage, current harmonic total distortion rate, ambient temperature, capacitor switching state.

|    | THDu(%) | THDi(%) | T(℃)  |
|----|---------|---------|-------|
| A  | 0000.3  | 0000.4  | 22    |
| B  | 0000.3  | 0000.4  |       |
| C  | 0000.3  | 0000.4  |       |
| ▲▼ | 21      | 22      | 23 24 |

第四屏 显示 3、5、7、9、11、13 次电压谐波畸变率。

The fourth screen displays the voltage harmonic distortion rate of 3, 5, 7, 9, 11 and 13 times.

| HRUn(%) | A    | B    | C    |
|---------|------|------|------|
| 3       | 00.3 | 00.2 | 00.2 |
| 5       | 00.1 | 00.1 | 00.1 |
| 7       | 00.2 | 00.1 | 00.1 |
| 9       | 00.0 | 00.1 | 00.0 |
| 11      | 00.1 | 00.0 | 00.1 |
| 13      | 00.0 | 00.0 | 00.0 |

第五屏 显示 15、17、19、21 次电压谐波畸变率。

The fifth screen shows the voltage harmonic distortion rate of 15, 17, 19 and 21.

| HRUn(%) | A    | B    | C    |
|---------|------|------|------|
| 15      | 00.0 | 00.1 | 00.0 |
| 17      | 00.0 | 00.0 | 00.0 |
| 19      | 00.0 | 00.0 | 00.0 |
| 21      | 00.0 | 00.0 | 00.0 |

第六屏 显示 3、5、7、9、11、13 次电流谐波畸变率。

The sixth screen displays the current harmonic distortion rate of 3, 5, 7, 9, 11, and 13 times.

| HRIn(%) | A    | B    | C    |
|---------|------|------|------|
| 3       | 00.3 | 00.3 | 00.3 |
| 5       | 00.1 | 00.1 | 00.1 |
| 7       | 00.2 | 00.2 | 00.2 |
| 9       | 00.0 | 00.1 | 00.0 |
| 11      | 00.1 | 00.1 | 00.1 |
| 13      | 00.0 | 00.0 | 00.0 |

第七屏 显示 13、15、17、19、21 次电流谐波畸变率。

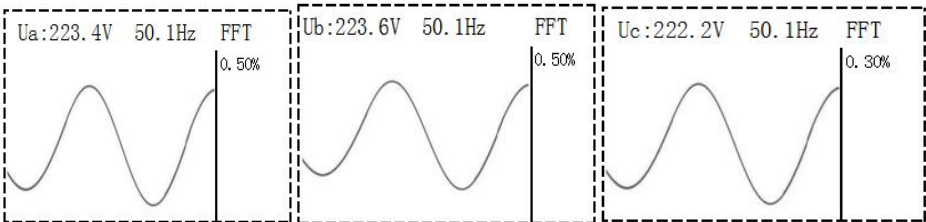
The seventh screen shows the current harmonic distortion rate of 13,

15, 17, 19 and 21 times.

| HRIn(%) | A    | B    | C    |
|---------|------|------|------|
| 15      | 00.0 | 00.1 | 00.1 |
| 17      | 00.0 | 00.0 | 00.0 |
| 19      | 00.0 | 00.0 | 00.0 |
| 21      | 00.0 | 00.0 | 00.0 |

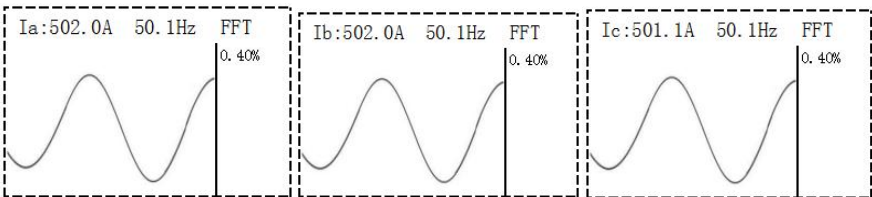
再次按向下键, 进入 实时波形, 按 ENT 键进入, 图例为电压谐波波形, 左侧区域为波形, 右侧柱状 图为谐波分量, 最多可显示 31 次谐波 (如下图)

Press the down button again to enter the real-time waveform, press ENT key to enter, the legend is the voltage harmonic waveform, the left area is the waveform, the right bar chart is the harmonic component, up to 31 harmonics can be displayed (as shown below).



再次按向下键, 进入 实时波形, 按 ENT 键进入, 电流谐波波形, 左侧区域为波形,

Press down again to enter the real-time waveform. Press ENT to enter the current harmonic waveform. The left area is the waveform.



该屏显示 A、B、C 三相的功率因数，电压，电流，以及 1-24 路所有电容器的投切状态

The screen displays the power factor, voltage, current of the three phases A, B and C, as well as the switching status of all capacitors of 1-24 channels

|             |        |        |
|-------------|--------|--------|
|             |        | 223.4V |
| A           | 1.000C | 501.6A |
|             |        | 222.0v |
| B           | 1.000C | 0502.0 |
|             |        | 222.3V |
| C           | 1.000C | 501.1A |
| <div></div> |        |        |

显示 A 相、B 相、C 相 视在功率

Displays phase A, phase B, and phase C at each other's power

|     |            |
|-----|------------|
| Sa: | 113.206KVA |
| Sb: | 113.506KVA |
| Sc: | 113.404KVA |

5.2 手动控制/Manual control

手动功能只作用于补偿电容器的强制投切。

按 Esc 键进入主菜单, 操作 ▲ ▼键选择 “手动控制”, 操作 “Ent” 键, 进入手动状态。

The manual function only applies to the forced switching of the compensating capacitor.

Press Esc key to enter the main menu, operation ▲ ▼ key select "manual control", operation "Ent" key, enter the manual state.

|      |       |
|------|-------|
| 自动控制 | AUTO  |
| 参数设置 | SETUP |
| 手动控制 | HAND  |
| 版本信息 | VER   |

如某路电容值反显时，表示已被投入，否则表示未投

If the value of a capacitor is reflected, it indicates that it has been invested; otherwise, it indicates that it has not been invested

|    |       |      |     |       |      |     |       |      |
|----|-------|------|-----|-------|------|-----|-------|------|
| C1 | 030.0 | Kvar | C9  | 030.0 | Kvar | C17 | 030.0 | Kvar |
| C2 | 030.0 | Kvar | C10 | 030.0 | Kvar | C18 | 030.0 | Kvar |
| C3 | 030.0 | Kvar | C11 | 030.0 | Kvar | C19 | 030.0 | Kvar |
| C4 | 030.0 | Kvar | C12 | 030.0 | Kvar | C20 | 030.0 | Kvar |
| C5 | 030.0 | Kvar | C13 | 030.0 | Kvar | C21 | 030.0 | Kvar |
| C6 | 030.0 | Kvar | C14 | 030.0 | Kvar | C22 | 030.0 | Kvar |
| C7 | 030.0 | Kvar | C15 | 030.0 | Kvar | C23 | 030.0 | Kvar |
| C8 | 030.0 | Kvar | C16 | 030.0 | Kvar | C24 | 030.0 | Kvar |

如某路容量被设置为“00”时则该路不能投入。操作 ▲ ▼键选择要投入的路号，操作“Ent”键则该路电容器执行投入或切除动作。

For example, if the capacity of a road is set to 00, the road cannot be invested. Operation ▲ ▼ key Select the road number to be put in, operation "Ent" key, the capacitor to perform input or cut action.

5.3 参数设置

产品有关参数，出厂已经预置，用户可根据现场需要进行修改。

所有设置参数自动记忆，掉电不丢失。

如某项参数反显时，若需修改，可直接操作▲ ▼键修改参数。

如某项参数反显时，若不需修改，可直接操作 “Ent” 键选择其它项参数。

注意：如首次使用，必须按实际现场需要对变比、电容等参数重新设定。

按 Esc 键进入主菜单, 操作 ▲ ▼键选择“参数配置”, 操作“Ent”键, 进入设置状态。

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Product parameters have been preset before delivery, and users can modify them according to site needs.

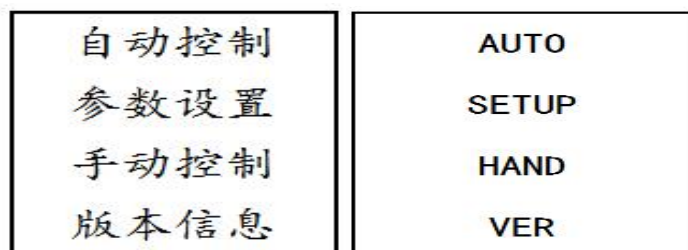
All setting parameters are automatically remembered and not lost after power failure.

If a parameter is reflected, if you need to modify it, you can directly operate the ▲ ▼ key to modify the parameter.

If a parameter is displayed backwards, you can directly press the Ent key to select another parameter if you do not need to modify it.

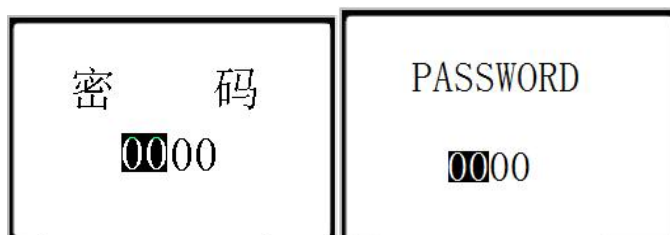
Note: If it is used for the first time, the ratio, capacitance and other parameters must be reset according to the actual field needs.

Press Esc key to enter the main menu, operation ▲ ▼ key select "Parameter configuration", operation "Ent" key, enter the setting state.



### 5.3.1 密码确认 (出厂预置 0000)/Password confirmation (factory preset0000)

按 “Ent” 键进入, 输入密码/Press Ent to enter and enter your password.



5.3.2 参数项选择/Parameter item selection

按 “Ent” 键进入，选择要设定的参数项，比如 “运行参数”。

Press the “Ent” key to enter and select the parameter item to be set, such as “running parameter”.



5.3.3 设置运行参数/Set running parameters

按 “Ent” 键进入，选择要设定的参数项。

Press the “Ent” key to enter and select the parameter to be set

|      |   |           |    |
|------|---|-----------|----|
| LCD  | : | CN        |    |
| PW   | : | 0000      |    |
| ID   | : | 001       |    |
| PT   | : | 00400/400 |    |
| CT   | : | 01000     |    |
| U1   | : | 00260     | V  |
| U2   | : | 00190     | V  |
| I1   | : | 0000.000  | A  |
| I2   | : | 005       | A  |
| D1   | : | 005.0     | S  |
| D2   | : | 005       |    |
| TK   | : | 0.00      |    |
| TQ   | : | <<<       |    |
| COS  | : | 0.95L     |    |
| THDu | : | 030.0%    |    |
| THDi | : | 050.0%    |    |
| TEMP | : | 050       | °C |
| C-H  | : | 01        | H  |
| A-H  | : | A         |    |

5.3.3.1 显示设置

标识：LCD

出厂预置：CN

用途：中英文显示切换

范围：CN:中文， EN: 英文

#### 5.3.3.1 Display Settings

Logo: LCD

Factory preset: CN

Usage: Chinese and English display switch

Scope: CN: Chinese, EN: English

#### 5.3.3.2 密码设置

标识: PW

出厂预置: 0000

用途: 确定参数修改权限

范围: 0000-9999

#### 5.3.3.2 Password Settings

Identification: PW

Factory preset: 0000

Purpose: Determine the permission to modify parameters

Range: 0000-9999

#### 5.3.3.3 通讯地址

标识: ID

出厂预置: 001

用途: 通讯设备地址

范围: 1-255

#### 5.3.3.3 Communication Address

Identification: ID

Factory preset: 001

Purpose: Address of communication equipment

Range: 1 to 255

#### 5.3.3.4 电压变比设置

标识: PT

出厂预置: 00400/400

用途: 电压互感器比值设置

#### 5.3.3.4 电压变比设置

标识: PT

出厂预置: 00400/400

用途: 电压互感器比值设置

#### 5.3.3.4 Voltage Ratio Settings

Identification: PT

Factory preset: 00400/400

Purpose: voltage transformer ratio setting

#### 5.3.3.5 电流互感器变比设置

标识: CT

出厂预置: 0100(500/5)或(100/1)

用途: 进线柜电流互感器变比, 提供测量与控制参数

#### 5.3.3.5 Current Transformer Ratio Setting

Identification: CT

Factory preset: 0100(500/5) or (100/1)

Application: Current transformer ratio of incoming cabinet, providing measurement and control parameters

#### 5.3.3.6 过压保护设置

标识: U1

出厂预置: 260 V

范围: 235V-280V

用途: 过压时切除电容

#### 5.3.3.6 Setting Overvoltage Protection

Identification: U1

Factory preset: 260 V

Range: 235V to 280V

Purpose: excise capacitor when overvoltage

#### 5.3.3.7 欠压保护设置

标识: U2

出厂预置: 190V

范围: 175V-210V

步长: 1V

用途: 电网欠压时切除电容器

#### 5.3.3.7 Setting Undervoltage Protection

Logo: U2

Factory preset: 190V

Range: 175V to 210V

Step length: 1V

Use: Cut the capacitor when the power grid is under voltage

#### 5.3.3.8 过流保护、及回差设置

标识: I1

出厂预置: 0500 010

用途：电网过流时切除电容器

特殊说明：0500 是过流值，010 回差值

#### 5.3.3.8 Setting Overcurrent Protection and Return error

Id: I1

Factory preset: 0500 010

Usage: Cutting capacitor when power grid overcurrent

Special note: 0500 is the overcurrent value, 010 back difference value

#### 5.3.3.9 小电流保护设置

标识：I2

出厂预置：005

用途：电网失流时切除电容

范围：0 - 990

#### 5.3.3.9 Setting Small Current Protection

Id: I2

Factory preset: 005

Usage: Cutting capacitor when the power grid is out of current

Range: 0 to 990

#### 5.3.3.10 投切延时(1)设置

标识：D1

出厂预置：030.0S

范围：000 - 600 S

用途：设置电容投切延时时间

#### 5.3.3.10 Switching Delay (1) Setting

Id: D1

Factory preset: 030.0S

Range: 000-600 S

Purpose: Set capacitor switching delay time

### 5.3.3.11 切投保护延时(2)设置

标识: D2

出厂预置: 180S

范围: 00 - 300S

用途: 电容放电时间

### 5.3.3.11 Switch Protection Delay (2) Setting

Id: D2

Factory preset: 180S

Range: 00-300s

Purpose: capacitor discharge time

### 5.3.3.12 门限系数设置.

标识: TK 参数 (按照 JB/T9663-2013 新标准, TK 该参数未启用)

出厂预置: 1.0

### 5.3.3.12 Threshold Coefficient Setting.

Identification: TK parameter (According to the new JB/T9663-2013 standard, TK parameter is not enabled)

Factory preset: 1.0

### 5.3.3.13 电流方向

标识: TQ

出厂预置: <<<

范围: <<<: 改变电流互感极性

<<<: 现场可通过改此参数调整极性，不需要调整互感器二次线。

#### 5.3.3.13 Current Direction

Identifier: TQ

Factory preset: <<<

Range: <<< : Changes the polarity of current mutual inductance

<<< : The polarity can be adjusted by changing this parameter on site, and the secondary transformer line does not need to be adjusted.

#### 5.3.3.14 功率因数下限设置

标识: COS

出厂预置: 1.00

范围: 0.85-1.00

步长: 0.01

用途: 功率因数下限，低于此功率因数会投入电容器。

#### 5.3.3.14 Power Factor Lower Limit Settings

Logo: COS

Factory preset: 1.00

Range: 0.85-1.00

Step size: 0.01

Usage: Lower limit of power factor, lower than this power factor will be put into the capacitor.

#### 5.3.3.15 电压总谐波畸变率超限设置

标识: THDu

出厂预置: 00.0%

范围: 00.0%-100.0%

步长：0.5%

用途：电压总谐波畸变率超限保护

5.3.3.15 The voltage Total harmonic Distortion Rate Exceeds the Limit

Identification: THDu

Factory preset: 00.0%

Range: 00.0%–100.0%

Step size: 0.5%

Application: Voltage total harmonic distortion rate overlimit protection

#### 5.3.3.16 电流总谐波畸变率超限设置

标识：THDi

出厂预置：00.0%

范围：00.0%–100.0%

步长：0.5%

用途：电流总谐波畸变率超限保护

5.3.3.16 The Total current Harmonic Distortion Rate Exceeds the Limit

Id: THDi

Factory preset: 00.0%

Range: 00.0%–100.0%

Step size: 0.5%

Usage: Current total harmonic distortion rate overlimit protection

#### 5.3.3.17 温度保护设置（选配）

标识：TEMP

出厂预置: 000℃

范围: 0-100℃

用途: 温度超限时切除电容

#### 5.3.3.17 Temperature Protection Settings (Optional)

Identifier: TEMP

Factory preset: 000℃

Range: 0-100℃

Usage: Cutting capacitor when temperature exceeds limit

#### 5.3.3.18 电容器投切时间设置

标识: C-H

出厂预置: 3 h

范围: 0-24

用途: 强制轮换投切时间设置

#### 5.3.3.18 Capacitor Switching Time Setting

Identification: C-H

Factory preset: 3 h

Value range: 0 to 24

Usage: Force rotation switching time setting

#### 5.3.3.19 电容器投入方式

标识: A-H

出厂预置: A

范围: A, H

用途: 自动, 手动

#### 5.3.3.19 Capacitor input mode

Id: A-H

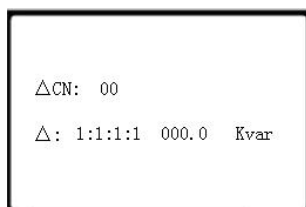
Factory preset: A

Range: A, H

Use: automatic, manual

#### 5.3.4 设置电容参数/Set capacitance parameters

选择“电容参数”,按“Enter”键进入/ Select Capacitance Parameter and press Enter.



第一屏

(如果电容设置有规律照此设置方便简单, 编码方式。此屏设置的参数不保存, 设置参数准确与否请参考下一屏。如果没有规律可循, 请手动设置第二屏的参数。)

First screen

(If capacitors are set regularly follow this setting for easy, simple encoding. The parameters set on this screen are not saved. For details, see the next screen. If there is no rule to follow, manually set the parameters for the second screen.

##### 5.3.4.1 △型路数

标识: △CN

出厂预置: 00

范围 0-16

用途：设置共补电容路数

5.3.4.1  $\triangle$  Number of modes

Logo:  $\triangle$ CN

Factory preset: 00

It ranges from 0 to 16

Purpose: Set the number of co-complement capacitor channels

#### 5.3.4.2 $\triangle$ 型电容编码及容量

标识:  $\triangle$

出厂预置: 1: 1: 1: 1 000.0

说明: 第 1 路电容值=容量\*第一个编码

第 2 路电容值=容量\*第二个编码

第 3 路电容值=容量\*第三个编码

第 4-24 路电容值=容量\*第四个编码

举例:  $\triangle$ 型路数为 6, 编码为 1: 2: 3: 4 容量为 10.0

第 1 路电容容量为 10, 第 2 路为 20, 第 3 路为 30, 第 4 路为 40, 第 5 路为 40, 第 6 路为 40

#### 5.3.4.2 Delta Capacitance coding and capacity

Logo:  $\triangle$

Factory preset: 1:1:1:000.0

Note: The first capacitance value = capacity \* the first code

Second capacitance = capacity \* second code

Third capacitance = Capacity \* third code

Capacitance value 4-24 = Capacity \* Fourth code

For example,  $\triangle$  The number of modes is 6, the code is 1:2:3:4, and the

capacity is 10.0

The capacity of the first road is 10, the second road is 20, the third road is 30, the fourth road is 40, the fifth road is 40, and the sixth road is 40

|    |       |      |     |       |      |     |       |      |
|----|-------|------|-----|-------|------|-----|-------|------|
| C1 | 030.0 | Kvar | C9  | 030.0 | Kvar | C17 | 030.0 | Kvar |
| C2 | 030.0 | Kvar | C10 | 030.0 | Kvar | C18 | 030.0 | Kvar |
| C3 | 030.0 | Kvar | C11 | 030.0 | Kvar | C19 | 030.0 | Kvar |
| C4 | 030.0 | Kvar | C12 | 030.0 | Kvar | C20 | 030.0 | Kvar |
| C5 | 030.0 | Kvar | C13 | 030.0 | Kvar | C21 | 030.0 | Kvar |
| C6 | 030.0 | Kvar | C14 | 030.0 | Kvar | C22 | 030.0 | Kvar |
| C7 | 030.0 | Kvar | C15 | 030.0 | Kvar | C23 | 030.0 | Kvar |
| C8 | 030.0 | Kvar | C16 | 030.0 | Kvar | C24 | 030.0 | Kvar |

(如果电容设置没有规律照此设置，可任意设置)

C1-C24: 24 路电容（根据输出路数显示相应的电容参数）；

每路补偿方式和容量均可根据需要任意设置。

030.0：电容容值设置，若设为 00.0 则该路电容不能进行投切；

(If the capacitor setting is not regularly set according to this setting, you can set it arbitrarily)

C1-C24:24 capacitors (the corresponding capacitance parameters are displayed according to the number of output channels);

Each compensation mode and capacity can be arbitrarily set as required.

030.0: Capacitance value setting. If it is set to 00.0, the capacitor cannot be switched.

## 5.4 超限及故障警示/Out-of-limit and fault warning

当电网出现故障或某项参数超限时，对应参数反显提示某项值的状态过压、欠

压、缺相以及某个参数超限。

When a power grid fault occurs or a parameter exceeds the limit, the corresponding parameter displays the status of a value: overvoltage, undervoltage, phase deficiency, and a parameter exceeds the limit.

### 5.4.1 缺相/Phase loss

|                                                                                   | U (V)  | I (A)  | F (Hz)                 |
|-----------------------------------------------------------------------------------|--------|--------|------------------------|
| A                                                                                 | 0223.4 | 0501.6 | 50.1                   |
| B                                                                                 | 0222.0 | 0502.0 |                        |
| C                                                                                 | 0222.2 | 0501.0 |                        |
|  |        |        |                        |
|                                                                                   | 1      | 2      | 3 4 5 6 7 8 9 10 11 12 |

## 6 安装与测试/Installation and testing

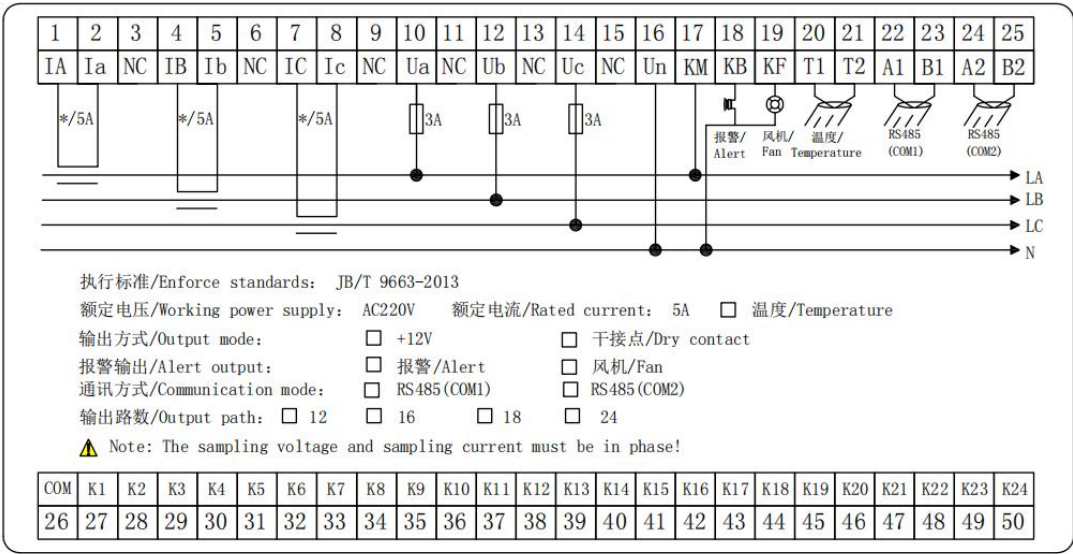
### 6.1 安装前的检查与接线图/Check and wiring diagram before installation

在打开本机的包装准备安装前，应仔细检查是否有损坏迹象，检查附件和说明书是否齐全，如发现问题，请及时与我司联系。

接入电源，通电检测操作功能和显示是否正常。

Before unpacking the machine for installation, carefully check whether there are signs of damage, check whether the accessories and instructions are complete. If you find any problems, please contact us in time.

Connect to the power supply and check whether the operation function and display are normal.



6.2 安装尺寸/Mounting dimension

外形尺寸/Overall dimension: 148\*148\*78mm

开口尺寸/Opening size: 138\*138mm

嵌入深度/Embedding depth: 60mm

6.3 接线须知/Wiring instructions

在考虑安装方案时，应遵循易于安装，观察采集方便，有利于信号、电源及接地的走线原则。

When considering the installation scheme, it should follow the principle of easy installation, convenient observation and collection, and conducive to signal, power and grounding.

6.3.1 工作电源

本机工作电源为 L、N, 需要单独 AC220V ± 20% 的电源

The working power supply of the machine is L and N, and a separate AC220V ± 20% power supply is required

### 6.3.2 电压信号线/Voltage signal line

电压信号线兼作本机电源输入, 应选用  $1.5\text{mm}^2$  单股铜导线, 并尽量远离高压电, 大电流载体, 以减少电磁影响。

The voltage signal line doubles as the power input of the machine, and should choose  $1.5\text{mm}^2$  single strand copper wire, and try to stay away from high voltage and high current carrier to reduce electromagnetic influence.

### 6.3.3 电流信号线/Current signal line

为了不影响测量精度, 电流信号线应选用  $2.5\text{mm}^2$  单股铜导线, 并应让导线尽可能短。

In order not to affect the measurement accuracy, the current signal line should use  $2.5\text{mm}^2$  single-strand copper wire, and the wire should be as short as possible.

### 6.3.4 接点/开关量输出/Contact/switch output

接点输出容量是  $5\text{A}/\text{AC}220\text{V}$ , 电平输出容量是  $\text{DC}12\text{V}/40\text{mA}$ , 连线时应尽量远离输入回路、高电压、大电流载体。

The contact output capacity is  $5\text{A}/\text{AC}220\text{V}$ , the level output capacity is  $\text{DC}12\text{V}/40\text{mA}$ , and the connection should be as far away from the input loop, high voltage and high current carrier as possible.

## 7 开箱检查/Unpacking inspection

打开外包装, 检查控制器外观是否完好, 附件和说明书是否齐全。

如发现控制器外壳有损坏, 或附件和说明书不齐全时, 请及时与供应商联系。

Open the outer package and check whether the appearance of the controller

is intact and whether the accessories and instructions are complete. If the controller enclosure is damaged, or the accessories and instructions are not complete, please contact the supplier in time.

## 8 安全操作警告/Safe operation warning

- 1、本机上电之前应仔细检查装置是否可靠接地；
- 2、只有熟悉该机操作手册的专业技术人员才允许安装、运行或检修本机；
- 3、本机的安装必须遵照所有有关的安全操作规程，必须通过正确的接线和电线尺寸来保证操作的安全性和运行的可靠性以及测量的准确性。
- 4、电源输入、CT 二次侧，均会产生危害人身安全的高电压，在操作时应小心，严格遵守用电安全操作规程。

- 5、在检修、安装和调换本机时，必须确保断开电源和短接 CT 二次侧回路；
- 6、在带电采集、设置数据时，无论何种情况下都不得接触带电部分。

1, the machine should carefully check whether the device is reliably grounded before electricity;

2, only professional and technical personnel familiar with the operation manual of the machine are allowed to install, run or repair the machine;

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

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

5, in the maintenance, installation and replacement of the machine,

must be sure to disconnect the power supply and short CT secondary circuit;

6. When collecting and setting data on the line, do not touch the live part under any circumstances.

## 9 简单故障排除/9 Simple troubleshooting

### 1、不显示

请检查电源线是否接好；

### 2、某相无数据

请检查该相接线是否牢靠；

### 3、 $\cos\phi$ 值的随着电容器投切而该项无变化

请检查取样电流互感器位置是否正确（取样电流=负载电流+电容电流）。

### 4、 $\cos\phi$ 值的错误

请检查取样电压信号与取样电流信号是否为对应的相，两者不能为同相。

### 5、电流显示为“0.0A”

请检查电流互感器与控制器电流信号端子线路是否开路或是没有负载。

### 6、电流显示错误

请检查参数设置项中的“CT 变比”中配置的值是否与取样电流互感器的比值一致。

## 7、强制切除电容器

请核对电网某项指标是否超出设定的保护范围，此时控制器会有相应报警指示。

## 8、补偿效果欠佳（ $\cos\phi$ 值小）

第一，可通过重新配置参数设置项中的几项来实现，提高“目标  $\cos\phi$ ”的值，或是

减小“投切门限”的值，我们推荐值分别是 1.00 和 1.0，每组电容值设定与实际的物理值相同。

第二，要根据现场情况合理配置电容器的容量。如果是分级补偿，应尽量减小各级电容的容量差。

9、若以上检查无法排除故障，请更换一台控制器再作判断，或直接与经销商联系获取帮助。

### 1. No display

Please check whether the power cable is properly connected.

### 2. A phase has no data

Please check whether the phase connection is secure;

3, the COS  $\phi$  value does not change with the capacitor switching

Check whether the sampling current transformer is located correctly

(sampling current = load current + capacitance current).

4, COS  $\phi$  value error

Please check whether the sampled voltage signal and the sampled current signal are in the corresponding phase, and the two cannot be in the same phase.

5, the current is displayed as "0.0A"

Check whether the current signal terminals of the current transformer and controller are open or not loaded.

6. Current display error

Check whether the value set in CT Ratio is consistent with the ratio of the sampled current transformer.

7. Force capacitor removal

Please check whether a certain indicator of the power grid exceeds the set protection range, and the controller will give corresponding alarm instructions.

8. Poor compensation effect (small COS $\phi$  value)

First, this can be achieved by reconfiguring several of the parameter Settings to increase the value of the "target COSØ", or Reduce the value of the "switching threshold", our recommended values are 1.00 and 1.0 respectively, and the capacitance value of each group is set with the actual thing

The reason is the same.

Second, the capacity of the capacitor should be reasonably configured according to the field situation. If it is graded compensation, the capacity difference of each level of capacitance should be minimized.

9, if the above check can not eliminate the fault, please replace a controller to make a judgment, or directly contact the dealer to obtain

Help.



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Service Hotline: 400-882-1973

Address: No. 1, Xinyan Road, Xinwu District, Wuxi City, Jiangsu  
Province

Website: [www.lafaelt.cn](http://www.lafaelt.cn)

Version number: V3.1 2408

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