

DSP-822 变压器保护测控装置

Transformer Protection Measurement and Control Device

使

用

说

明

书

Operation Instructions



苏州苏继电气有限公司

Suzhou suji Electric Co.,Ltd.

V1.00

重 要 提 示

Important Note

感谢您使用本公司的产品。为了安全、高效地使用本装置，请您务必注意以下重要提示：

Thank you for using our company's products. For safe and efficient use of this device, please pay attention to the following important tips:

1) 本说明书仅适用于 DSP-822 变压器保护测控装置。

1) This manual is only applicable to the DSP-822 Transformer protection measurement and control device.

2) 请仔细阅读本说明书，并按照说明书的规定调整、测试和操作。

如有随机资料，请以随机资料为准。

2) Please read this manual carefully and adjust, test, and operate according to the instructions in the manual. If there is any random data, please refer to the random data for accuracy.

3) 为防止装置损坏，严禁带电插拔装置各插件、触摸印制电路板上的芯片和器件。

3) To prevent device damage, it is strictly prohibited to plug and unplug various plugins of the device, touch chips and devices on the printed circuit board with electricity.

4) 请使用合格的测试仪器和设备对装置进行试验和检测。

4) Please use qualified testing instruments and equipment to test and

inspect the device.

5) 装置如出现异常或需维修，请及时与本公司联系。

5) If there are any abnormalities or maintenance needs in the device, please contact our company's service hotline in a timely manner.

6) 本说明书和产品可能会修改，请注意最新版本资料。保护信息点表另有相关文件说明。

6) This manual and product may be modified, please pay attention to the latest version information. The table of protected information points is accompanied by relevant documentation.

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第一章 概述

Chapter One Overview

1.1 适用范围 Scope of Application

DSP-822 适用于 35kV 及以下电压等级的不接地系统、电阻接地系统及直接接地系统的变压器保护及测控装置，可组屏安装，也可在开关柜就地安装。

DSP-822 is suitable for transformer protection and measurement devices in ungrounded systems, resistance grounded systems, and directly grounded systems with voltage levels of 35kV and below. It can be installed as a panel or on-site in switchgear.

1.2 产品特点 Product Features

- 人性化设计界面：大屏幕液晶显示屏，实时显示电流、电压、功率、频率等电气量，汉化操作菜单简单易用，清晰显示保护动作全过程。
- Humanized design interface: Large screen LCD display screen, real-time display of electrical quantities such as current, voltage, power, frequency, etc. Chinese operation menu is simple and easy to use, clearly displaying the entire process of protection action.
- 出口独立：所有出口继电器都单独使用一个通道，遥控分合、保护跳闸、事故信号、告警信号及其他特殊信号出口均可单独配置。
- Independent export: All export relays use a separate channel, and can be configured separately for remote control opening and closing, protection tripping, accident signals, alarm signals, and other special signal exports.
- 高集成度：装置集成操作回路，紧急时可直接对开关进行操作。
- High integration: The device integrates an operating circuit and can directly operate the switch in case of emergency.
- 设计灵活：根据现场情况，可设计成集中组屏式，也可分散安装于开关柜。
- Flexible design: Depending on the on-site situation, it can be designed as a centralized group screen or installed separately in the switchgear.
- 运行可靠：具有完善的自检体系及操作记录。

- Reliable operation: With a comprehensive self inspection system and operation records.

1.3 功能配置 Functional Configuration

1.3.1. 保护配置 Protection Configuration

- 过流 I、II、III 段 (跳闸, 经复压闭锁)
- The Over-current Protection With Three Stages (Trip, Compound voltage blocking)
- 过流反时限 (跳闸, 一般/非常/极端可选, 经复压闭锁)
- The Inverse-time Over-current Protection (Trip, General/Very/Extreme options, Compound voltage blocking)
- 过负荷 (告警/跳闸可选)
- Overload Protection (Alarm/Trip optional)
- 零序过流 I 段 (跳闸)
- Neutral Over-current stage I (Trip)
- 零序过流 II 段 (告警/跳闸可选)
- Neutral Over-current stage II (Alarm/Trip optional)
- 零序过流反时限 (跳闸, 一般/非常/极端可选)
- Inverse Time neutral Over-current Protection (Trip, General/Very/Extreme options)
- 低侧零序过流 (告警/跳闸可选)
- Neutral Over-current of Low Side (Alarm/Trip optional)
- 过电压 (跳闸)
- Over-voltage Protection (Trip)
- 低电压 (告警/跳闸可选)
- Low-voltage Protection (Alarm/Trip optional)
- 零序过电压 (告警/跳闸可选)
- Neutral Over-voltage Protection (Alarm/Trip optional)
- 低频减载 (跳闸)
- Low-frequency Protection (Trip)
- PT 断线 (告警, 发生断线时, 闭锁低电压)
- PT Break (Alarm, PT Break occurs, Lock Low-voltage Protection)
- 控制回路断线 (告警)
- Control Circuit Break (Alarm)
- 系统失电 (告警/跳闸可选)
- Loss System Power (Alarm/Trip optional)

- 非电量保护
- Non-electricity Protection

1.3.2. 测控功能 Measurement and Control Function

- 电压 Voltages: U_a 、 U_b 、 U_c 、 U_{ab} 、 U_{bc} 、 U_{ca} 、 $3U_0$;
- 电流 Currents: I_a 、 I_b 、 I_c 、 i_a 、 i_b 、 i_c 、 $3i_0$ 、 $3i_{0L}$;
- 功率参数 Power Parameters: P 、 Q 、 $\cos \phi$;
- 频率 Frequency: f ;
- 电度 Electric energy: $EP+$ 、 $EP-$ 、 $EQ+$ 、 $EQ-$;
- 具有 14 路遥信开入采集;
- 14 remote signal input acquisition;
- 8 路继电器出口;
- 8 relay outlets;
- 事件 SOE 记录;
- Event SOE records;

1.3.3. 通信功能 Communication Function

- 通讯接口: 2 路以太网接口 (支持以太网 103 规约, 可选配);
1 路 RS485 通讯端口 (支持 Modbus-RTU 规约);
- Communication interface: 2-way Ethernet interface (supporting Ethernet 103 protocol, Optional);
1 RS485 communication port (supports Modbus RTU protocol);

1.3.4. 对时功能 Timing Function

- 支持通信报文对时、SNTP 对时和 IRIG-B 对时。
- Support communication message synchronization, SNTP synchronization, and IRIG-B synchronization.

1.3.5. 记录功能 Recording Function

- 保护事件: 记录保护动作事件的时间、动作值、保护名称, 可记录 128 条。
- Protection events: Record the time, action value, and protection name of the protection action event, with a maximum of 128 records.
- 告警事件: 记录告警事件的动作时间、动作值、保护名称, 可记录 128 条。
- Alarm events: Record the action time, action value, and protection name of the alarm event,

and can record 128 events.

- 遥信事件：记录遥信的变位信息，可记录 128 条。
- Remote communication events: Record the displacement information of remote communication, with a capacity of 128 records.
- 操作记录：记录保护装置的操作步骤，包含定值修改、保护投退等，可记录 128 条。
- Operation record: Record the operation steps of the protection device, including constant value modification, protection on/off, etc., with a record of 128 entries.
- 自检事件：记录装置自检产生的事件，可记录 16 条。
- Self inspection events: Record 16 events generated by the device's self inspection.
- 录波事件：记录保护动作事件对应的波形，可记录 32 条。
- Recording events: Record the waveform corresponding to the protection action event, with a capacity of 32 records.

1.4 订货须知 Ordering Notice

- 产品型号、名称、订货数量；
- Product model, name, and order quantity;
- 电流互感器额定交流电流：1A，5A；
- Rated AC current of current transformer: 1A, 5A;
- 控制回路电源电压等级：AC/DC220V，DC110V，DC48V（可定制）；
- Control circuit power supply voltage level: AC/DC220V, DC110V, DC48V (customizable);
- 开入插件电压等级：AC/DC220V，DC110V，无源；
- Input plug-in voltage level: AC/DC220V, DC110V, passive;

第二章 技术参数

Chapter Two Technical Parameters

2.1 环境参数 Environmental Parameters

- 工作温度 Operation temperature: $-40 \sim 70\text{ }^{\circ}\text{C}$
- 贮存及运输 Storage and transportation: $-40 \sim 80\text{ }^{\circ}\text{C}$
- 相对湿度 Relative humidity: $5\% \sim 90\%$ (内部无凝露 No condensation inside)

2.2 额定电气参数 Rated Electrical Parameters

- 额定交流电流: 5A 或 1A (订货时说明)
- Rated AC current: 5A or 1A (specify when ordering)
- 交流电压 AC Voltage: 100V
- 频率测量范围 Frequency measurement range: $35 \sim 65\text{Hz}$
- 工作电源: 交流: AC100V~264V; $50\text{Hz} \pm 0.5\text{Hz}$; 谐波畸变率不大于 15%
直流: DC100V~264V, 纹波系数不大于 5%
- Working power supply: AC: AC100V~264V; $50\text{Hz} \pm 0.5\text{Hz}$; Harmonic distortion rate not exceeding 15%
DC: DC100V~264V, ripple coefficient not exceeding 5%
- 功耗:
 - 交流电压回路: 每相不大于 0.5VA
 - 交流电流回路: 每相不大于 0.5VA
 - 直流电源回路: 正常工作时, 不大于 5W
保护动作时, 不大于 10W
- Power consumption:
 - AC voltage circuit: not more than 0.5VA per phase
 - AC current circuit: not more than 0.5VA per phase
 - DC power supply circuit: Under normal operation, not more than 5W
During protection action, not exceeding 10W
- 保护回路过载能力:
 - 交流电压回路: 1.4 倍额定电压, 连续工作
 - 交流电流回路: 2 倍额定电流, 连续工作
10 倍额定电流, 允许 10s

20 倍额定电流, 允许 1s

- Overload capacity of protection circuit:

AC voltage circuit: 1.4 times rated voltage, continuous operation

AC current circuit: 2 times rated current, continuous operation

10 times the rated current, allowing for 10 seconds

20 times rated current, allowed for 1 second

装置经受上述的过载电流/电压后, 绝缘性能不下降。

After experiencing the above overload current/voltage, the insulation performance of the device does not decrease.

2.3 主要技术指标 Main Technical Indicators

- 定值精度

电流定值误差: $\leq \pm 2.5\%$

频率定值误差: $\leq \pm 0.02\text{Hz}$

激励量 ≥ 1.2 倍定值时, 瞬时动作段动作时间: $\leq 35\text{ms}$

延时动作段动作时间离散误差: 不大于 $\pm 5\%$ 或 $\pm 35\text{ms}$

遥信量分辨率: $\leq 1\text{ms}$

- Fixed value accuracy

Current setting error: $\leq \pm 2.5\%$

Frequency setting error: $\leq \pm 0.02\text{Hz}$

When the excitation amount is ≥ 1.2 times the fixed value, the instantaneous action period action time: $\leq 35\text{ms}$

Discretization error of action time in delayed action segment: not more than $\pm 5\%$ or $\pm 35\text{ms}$

Remote signal resolution: $\leq 1\text{ms}$

- 遥测量计量等级

电流、电压: 0.5 级

频率: $\pm 0.01\text{Hz}$

其他: 1.0 级

- Remote measurement and measurement level

Current and voltage: 0.5 level

Frequency: $\pm 0.01\text{Hz}$

Other: Level 1.0

- 继电器输出

输出形式: 无源接点

触点容量: 8A@250V (AC); 8A@30V (DC)

动作时间: $\leq 8\text{ms}$

返回时间: $\leq 5\text{ms}$

- Relay output

Output form: Passive contact
Contact capacity: 8a@250v (AC); 8a@30v (DC)
Action time: $\leq 8\text{ms}$
Return time: $\leq 5\text{ms}$

2.4 电磁兼容性能 Electromagnetic Compatibility Performance

- 静电放电

装置能承受 GB/T 14598.26-2015 规定的接触放电 $\pm 8\text{kV}$ 、空气放电 $\pm 15\text{kV}$ 静电放电干扰试验，达性能准则 A；

- Electrostatic discharge

The device can withstand the static discharge interference test of contact discharge $\pm 8\text{kV}$ and air discharge $\pm 15\text{kV}$ specified in GB/T 14598.26-2015, and meet performance criterion A;

- 快速瞬变

装置能承受 GB/T 14598.26-2015 规定的 A 类（电压： $\pm 4\text{kV}$ ，干扰信号重复频率： 5kHz ，干扰信号持续时间：正负极性各持续 60s ）快速瞬变干扰试验；

- Fast transient

The device can withstand Class A fast transient interference test specified in GB/T 14598.26-2015 (voltage: $\pm 4\text{kV}$, interference signal repetition frequency: 5kHz , interference signal duration: positive and negative polarity for 60 seconds each);

- 辐射射频电磁场

装置能承受 GB/T 14598.26-2015 规定的 10V/m 辐射射频电磁场干扰试验，满足验收准则 A 要求；

- Radiated RF electromagnetic field

The device can withstand the 10V/m radiated radio frequency electromagnetic field interference test specified in GB/T 14598.26-2015, and meets the requirements of acceptance criterion A;

- 浪涌

装置能承受 GB/T 14598.26-2015 规定的 A 类（线-地 4kV ，线-线 2kV ）浪涌干扰试验；

- Surge

The device can withstand the Class A (line to ground 4kV , line to line 2kV) surge interference test specified in GB/T 14598.26-2015;

- 工频磁场

装置能承受 GB/T 14598.26-2015 规定 A 类工频磁场抗扰度试验；

- Power frequency magnetic field

The device can withstand the Class A power frequency magnetic field immunity test specified in GB/T 14598.26-2015;

- 阻尼振荡磁场

装置能承受 GB/T 17626. 10-2017 规定的严酷等级为 5 级（100A/m）的阻尼振荡磁场抗扰度试验，达到性能准则 A；

- Damping oscillation magnetic field

The device can withstand the damping oscillation magnetic field immunity test with a severity level of 5 (100A/m) specified in GB/T 17626.10-2017, and meet performance criterion A;

- 脉冲磁场

装置能承受 GB/T 17626. 9-2011 规定的严酷等级为 5 级（1000A/m）的脉冲磁场抗扰度抗扰度试验，达到性能准则 A；

- Pulse magnetic field

The device can withstand the pulse magnetic field immunity test with a severity level of 5 (1000A/m) specified in GB/T 17626.9-2011, and meet performance criterion A;

- 射频场感应的传导骚扰

装置能承受 GB/T 14598. 26-2015 规定的射频场感应的传导骚扰抗扰度试验，满足验收准则 A 要求；

- Conducted disturbances induced by radio frequency fields

The device can withstand the conducted disturbance immunity test induced by radio frequency fields as specified in GB/T 14598.26-2015, and meets the requirements of acceptance criterion A;

- 传导发射

装置发出的干扰信号符合 GB/T 14598. 26-2015 规定的传导发射限值要求

- Conducted emission

The interference signal emitted by the device complies with the conducted emission limit requirements specified in GB/T 14598.26-2015

- 辐射发射

装置发出的干扰信号符合 GB/T 14598. 26-2015 规定的辐射发射限值要求

- Radiation emission

The interference signal emitted by the device complies with the radiation emission limit requirements specified in GB/T 14598.26-2015

2.5 绝缘性能 Insulation Performance

- 绝缘电阻

各导电回路对地、无电气联系的回路之间的绝缘电阻不低于 100M Ω

- Insulation resistance

The insulation resistance between conductive circuits to ground and circuits without electrical connection shall not be less than 100M Ω

- 介质强度

各导电回路对地、无电气联系的回路之间，对于额定绝缘电压 63V~250V 的回路能承受工频 2.0kV 的耐压试验，对于额定绝缘电压 $\leq$ 63V 的回路能承受工频 500V 的耐压试验，历时 1min，装置无击穿、闪络及元件损坏现象。

- Medium strength

Between conductive circuits and circuits without electrical connection, circuits with a rated insulation voltage of 63V~250V can withstand a withstand voltage test of 2.0kV at power frequency. For circuits with a rated insulation voltage of $\leq$ 63V, they can withstand a withstand voltage test of 500V at power frequency for 1 minute without any breakdown, flashover, or component damage.

- 冲击电压

各导电回路对地、无电气联系的回路之间，对于额定绝缘电压 63V~250V 的回路能承受 1.2/50 μ s、开路电压为 5kV 的标准雷电波的短时冲击电压试验；对于额定绝缘电压 $\leq$ 63V 的回路能承受 1.2/50 μ s、开路实验电压为 1kV 的标准雷电波的短时冲击电压试验；装置无绝缘击穿或损坏现象。

- Impulse voltage

Each conductive circuit can withstand 1.2/50 for circuits with a rated insulation voltage of 63V to 250V between ground and circuits without electrical connection μ s. Short time impulse voltage test for standard lightning waves with an open circuit voltage of 5kV; For circuits with rated insulation voltage $\leq$ 63V, they can withstand 1.2/50 μ s. Short time impulse voltage test of standard lightning wave with an open circuit test voltage of 1kV; The device has no insulation breakdown or damage.

第三章 保护原理

Chapter Three Principles of Protection

3.1 三段式定时限过流保护(The Over-current Protection With Three Stages)

1. 过流 I 段—“投” (0: 退, 1: 投);
2. 保护电流 i_a 、 i_b 、 i_c 中任意一相 $\geq$ 过流 I 段定值;
3. 满足以上条件的持续时间 $\geq$ 过流 I 段延时;

满足以上条件, 保护装置立即出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。逻辑框图如 3-1 所示:

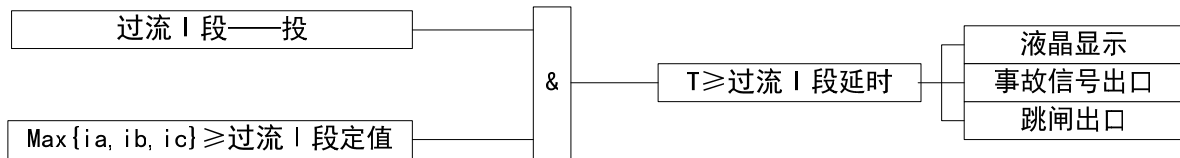


图 3-1: 过流 I 段保护动作逻辑图

过流 II 段、III 段逻辑同过流 I 段

1. Over-current stage I control setting: OC-I —“ON” (0: “OFF”, 1: “ON”);
2. Protection current i_a , i_b , i_c , any one of the phases $\geq$ “OC-I Value”;
3. The duration that meets the above conditions is $\geq$ “OC-I Time”;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset). The logical block diagram is shown in Figure 3-1:

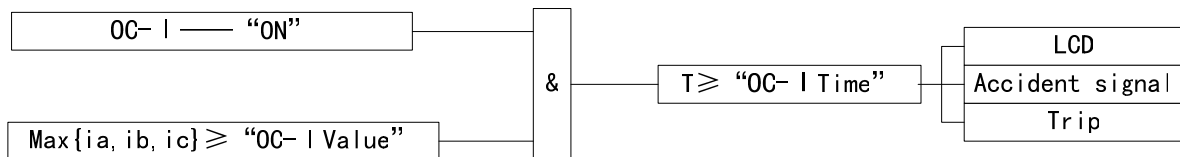


Figure 3-1: Logic diagram of overcurrent section I protection action

OC-II/OC-III is the same as OC-I

3.2 过流反时限(The Inverse-time Over-current Protection)

装置提供三种反时限特性（依据 IEC225-4 标准）：

1) 一般反时限：

$$t = \frac{0.14}{(I/I_p)^{0.02} - 1} T_p$$

2) 非常反时限：

$$t = \frac{13.5}{(I/I_p) - 1} T_p$$

3) 极端反时限：

$$t = \frac{80}{(I/I_p)^2 - 1} T_p$$

上式中， I_p 为过流 III 段定值， t_p 为过流 III 段延时。

注：过流反时限保护使用过流 III 段定值和过流 III 段延时，过流反时限保护和过流 III 段同时投入时，过流反时限保护无效。动作逻辑框图如图 3-2 所示：

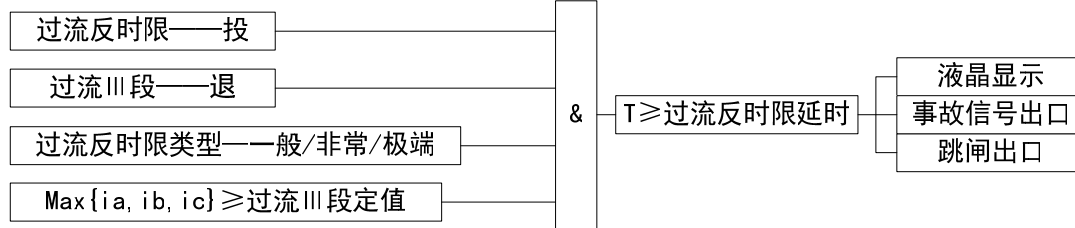


图 3-2：过流反时限动作逻辑图

The device provides three type inverse time characteristics (according to IEC225-4 standard):

1) General inverse time limit:

$$t = \frac{0.14}{(I/I_p)^{0.02} - 1} T_p$$

2) Very inverse time limit:

$$t = \frac{13.5}{(I/I_p) - 1} T_p$$

3) Extreme inverse time limit:

$$t = \frac{80}{(I/I_p)^2 - 1} T_p$$

In the above equation, I_p is “OC-III Value”, t_p is “OC-III Time”.

Note: the OC Inverse-Time uses the “OC-III Value” and “OC-III Time”. When both OC Inverse-Time and OC-III are activated simultaneously, the OC Inverse-Time is invalid. The action logic diagram is shown in Figure 3-2:

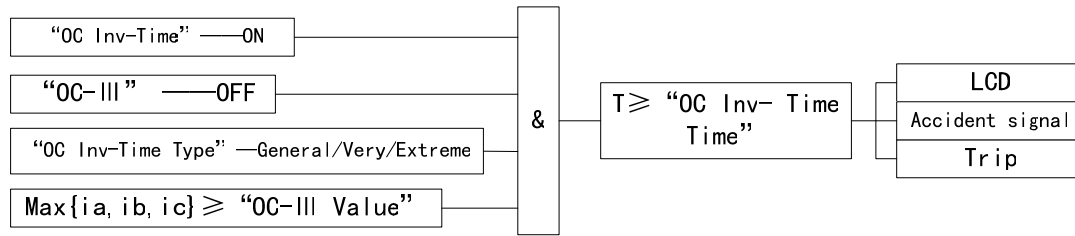


Figure 3-2: Logic diagram of overcurrent inverse time limit action

3.3 电流闭锁元件(Current blocking element)

● 复压元件 Complex voltage element

复压闭锁包含低电压闭锁、负序电压闭锁。过流 N 段、过流反时限复压闭锁可独立投退，定值共用一套。整定原则：低电压闭锁定值一般整定为 0.6~0.7 倍额定线电压，负序电压一般取 4%~8%的额定电压。

当“PT 断线退电流保护”为“退”时，PT 断线动作后，过流 N 段、过流反时限变为纯过流保护；当“PT 断线退电流保护”为“投”时，PT 断线条件满足后，闭锁过流 N 段、过流反时限、后加速；

低电压闭锁按相取下表中的电压作为判据，两个线电压中只要有一个低于定值时就开放电流（过流 N 段、过流反时限、后加速）保护；低电压元件电压与电流的对应关系如表 1 所示：

表 1 低压闭锁电压与电流的对应关系

电流相别	电压
A 相	UAB、UCA
B 相	UBC、UAB
C 相	UCA、UBC

以 A 相为例，低压闭锁和负压闭锁同时投入时，逻辑图如 3-3 所示：

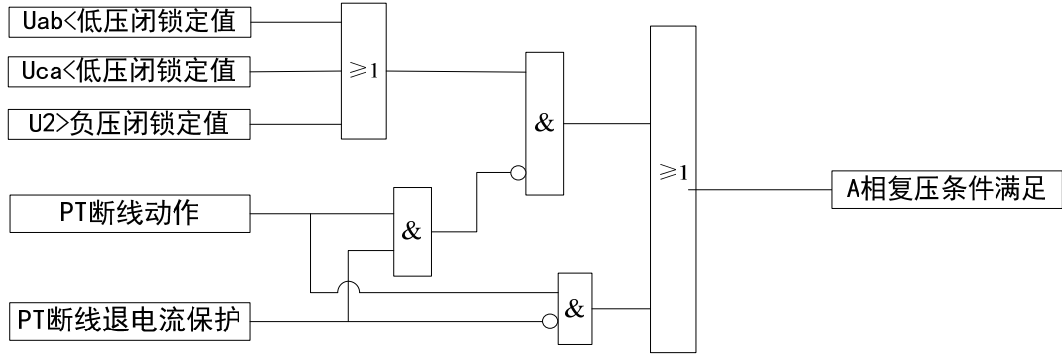


图 3-3：复压闭锁逻辑图

Complex voltage blocking includes low voltage blocking and negative sequence voltage blocking. The overcurrent N-segment, overcurrent inverse time limit, and post acceleration complex voltage locking can be independently switched on and off, with a shared set of fixed values. Setting principle: The low voltage lockout value is generally set to 0.6~0.7 times the rated line voltage, and the negative sequence voltage is generally set to 4%~8% of the rated voltage.

When the "PT disconnection and current withdrawal protection" is set to "withdrawal", after the PT disconnection action, the complex voltage element meets the requirements, and the overcurrent N-segment, overcurrent inverse time limit, and rear acceleration become pure overcurrent protection;

When the "PT disconnection and current withdrawal protection" is set to "on", after the PT disconnection action, the overcurrent N-segment, overcurrent inverse time limit, and rear acceleration will be locked;

Low voltage blocking is based on the voltage listed in the table as a criterion. When one of the two line voltages is lower than the set value, current protection (overcurrent N-segment, overcurrent inverse time limit, and post acceleration) will be activated; The corresponding relationship between voltage and current of low-voltage components is shown in Table 1:

Table 1 Correspondence between Low Voltage Lockout Voltage and Current

Current phase difference	Voltage
A phase	UAB、UCA
B phase	UBC、UAB
C phase	UCA、UBC

Taking phase A as an example, the logic diagram is shown in Figure 3-3:

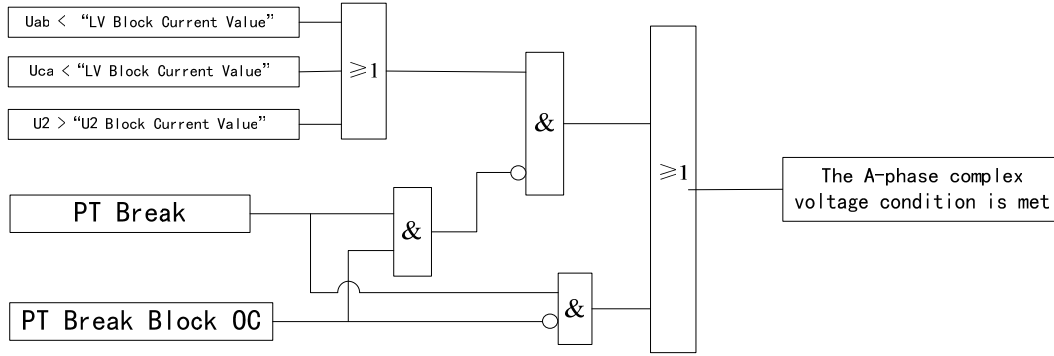


Figure 3-3: Logic diagram of complex voltage blocking

3.3.1 含闭锁元件三段式定时限过流保护

Three stage timed overcurrent protection with locking element

三段式定时限过流保护可选择经复压，其动作输出同 3-1，以过流 I 段 A 相为例，逻辑框图如 3-4 所示。

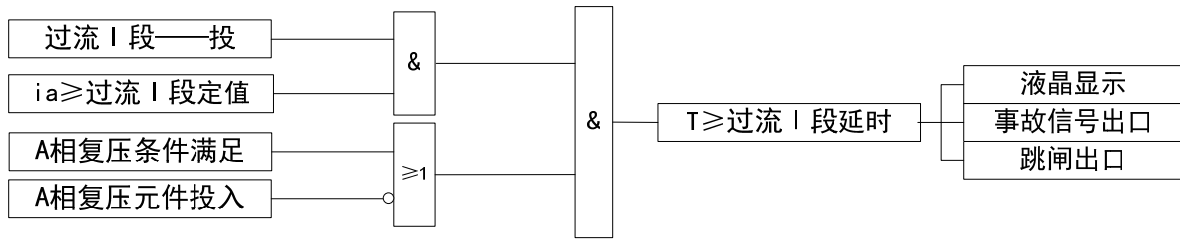


图 3-4：A 相过流 I 段保护动作逻辑图

B 相、C 相逻辑图同上图 A 相
过流 II 段、III 段逻辑同过流 I 段

The three-stage timed overcurrent protection can be selected through complex voltage and directional blocking, and its action output is the same as 3-1. Taking overcurrent section I phase A as an example, the logic diagram is shown in 3-4.

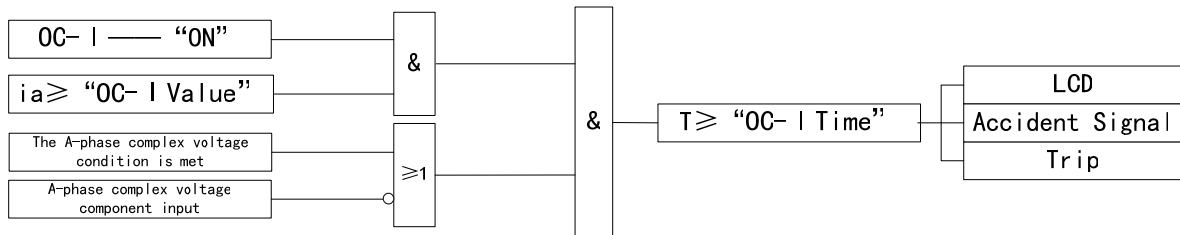


Figure 3-4: Logic diagram of protection action for phase A overcurrent section I

The logic diagram of phase B and phase C is the same as that of phase A in the diagram above
OC-II、OC-III is the same as OC-I.

3.3.2 含闭锁元件过流反时限

Overcurrent inverse time limit with locking element

过流反时限保护可选择经复压，其动作输出同 3-2，逻辑框图如 3-5 所示。

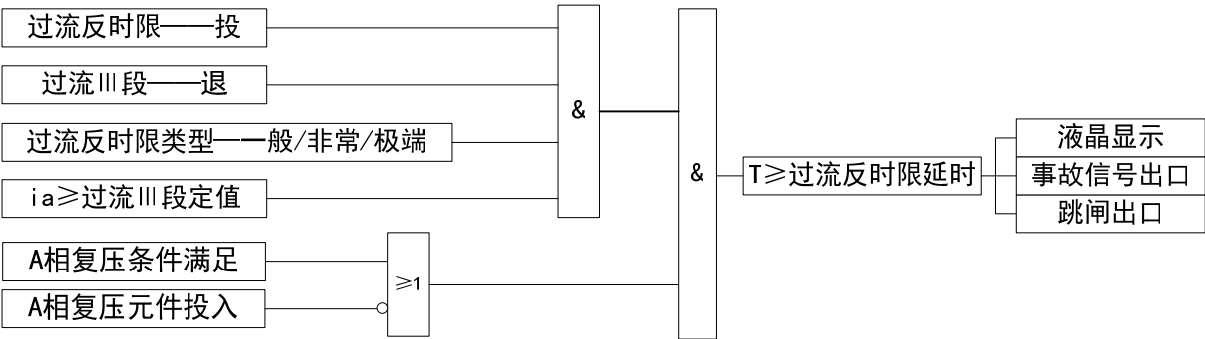


图 3-5：A 相过流反时限动作逻辑图

B 相、C 相逻辑图同上图 A 相

The overcurrent inverse time limit protection can be selected through complex voltage and directional blocking, and its action output is the same as 3-2 The logic diagram is shown in 3-5.

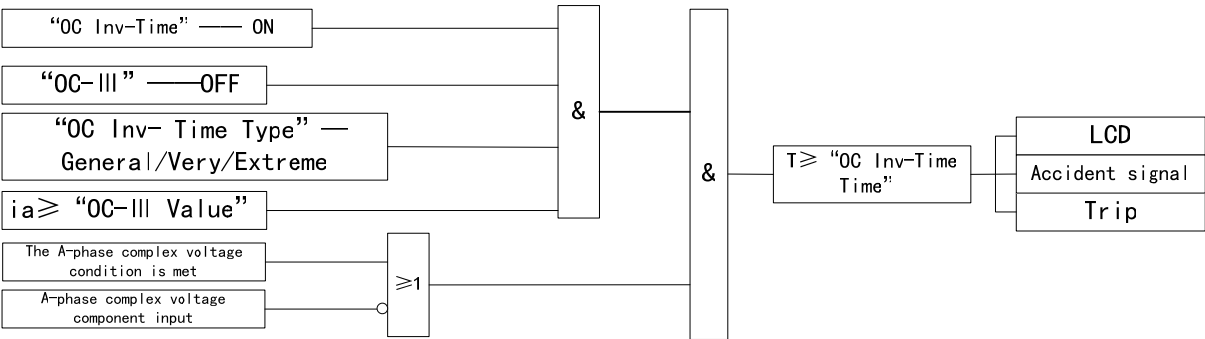


Figure 3-5: Logic diagram of A-phase overcurrent inverse time limit action

The logic diagram of phase B and phase C is the same as that of phase A in the diagram above

3.4 过负荷(Overload Protection)

1. 过负荷—“投”（0：退，1：投）；
2. 过负荷类型—“告警/跳闸”（0：跳闸，1：告警）；
3. 保护电流 i_a 、 i_b 、 i_c 最大相 $\geq$ 过负荷定值；
4. 满足以上条件的持续时间 $\geq$ 过负荷延时；

满足以上条件，若投“跳闸”，保护装置立即驱动出口 4J(307/308)，同时驱动事故信号继电器 7J(313/314)，液晶显示保护动作信息，面板事故灯亮（信号继电器、液晶事故信息提示和事故指示灯须手动复归）；

若投“告警”，保护装置即驱动告警信号继电器 8J(315/316)，液晶显示告警信息，面板告警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。动作的逻辑框图如 3-6 所示：

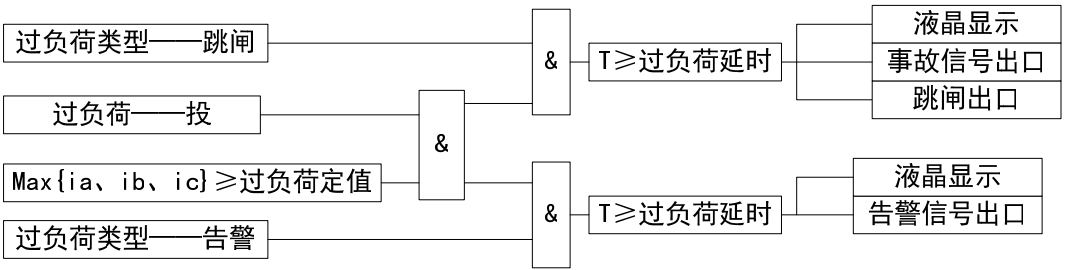


图 3-6：过负荷保护动作逻辑图

1. Overload control setting: Overload - "ON" (0: OFF, 1: ON);
 2. Overload Type - "Alarm/Trip" (0: Trip , 1: Alarm);
 3. The maximum phase in the protection currents i_a , i_b , and i_c is $\geq$ Overload Value;
 4. The duration of meeting the above conditions is $\geq$ Overload Time;
- If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);
- If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset). The logical block diagram of the action is shown in Figure 3-6:

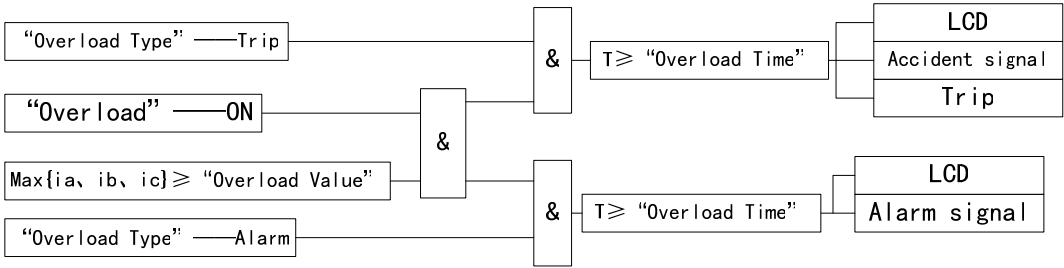


Figure 3-6: Logic diagram of overload protection action

3.5 零序过流 I 段 (Neutral Over-current stage I)

1. 零序过流 I 段 — “投” (0: 退, 1: 投);
2. 零序电流 $3i_0 \geq$ 零序过流 I 段定值;
3. 满足以上条件的持续时间 $\geq$ 零序过流 I 段延时;

满足以上条件，保护装置立即出口 4J (307/308)，同时驱动事故信号继电器 7J (313/314)，液晶显示保护动作信息，面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。动作的逻辑框图如 3-7 所示：

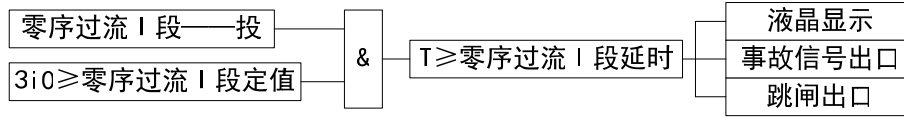


图 3-7：零序过流 I 段保护动作逻辑图

1. Neutral Over-current stage I control setting: Neu-OC-I - "ON" (0: OFF 1: ON);
2. Zero sequence current $3i_0 \geq \text{Neu-OC-I Value}$;
3. The duration that meets the above conditions is $\geq \text{Neu-OC-I Time}$;

If the above conditions are met, the protection device immediately drives the outlet 4J (307/308), and at the same time drives the accident signal relay 7J (313/314). The LCD displays the protection action information, and the panel accident light is on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

The logical block diagram of the action is shown in Figures 3-7:

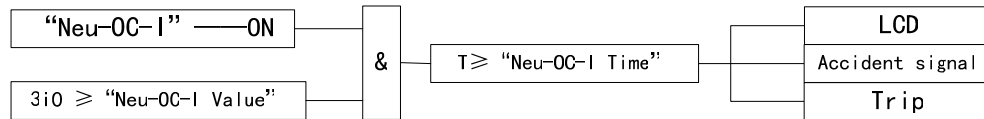


Figure 3-7: Logic diagram of zero sequence overcurrent section I protection action

3.6 零序过流 II 段 (Neutral Over-current stage II)

1. 零序过流 II 段—“投” (0: 退, 1: 投);
2. 零序过流 II 段类型—“告警/跳闸” (0: 跳闸, 1: 告警);
3. 零序电流 $3i_0 \geq \text{零序过流 II 段定值}$;
4. 满足以上条件的持续时间 $\geq \text{零序过流 II 段延时}$;

满足以上条件，若投“跳闸”，保护装置立即驱动出口 4J (307/308)，同时驱动事故信号继电器 7J (313/314)，液晶显示保护动作信息，面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)；

若投“告警”，保护装置即驱动告警信号继电器 8J (315/316)，液晶显示告警信息，面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

动作的逻辑框图如 3-8 示：

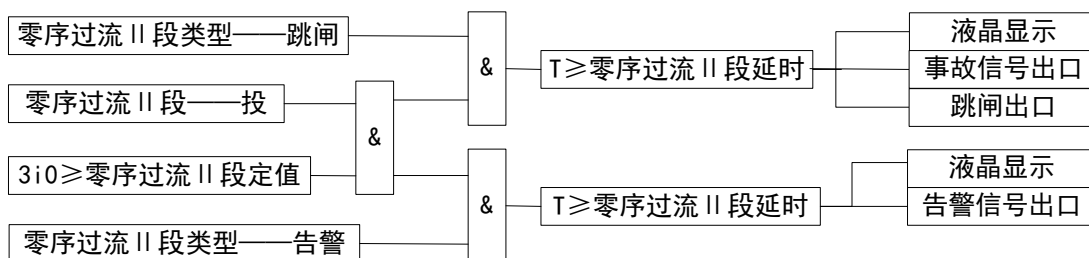


图 3-8：零序过流 II 段保护动作逻辑图

1. Neutral Over-current stage II control setting: Neu-OC-II — "ON" (0: OFF, 1: ON);
2. Neu-OC-II Type — "Alarm/Trip" (0: Trip, 1: Alarm);
3. Zero sequence current $3i_0 \geq \text{Neu-OC-II Value}$;
4. The duration that meets the above conditions is $\geq \text{Neu-OC-II Time}$;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

The logical block diagram of the action is shown in Figure 3-8:

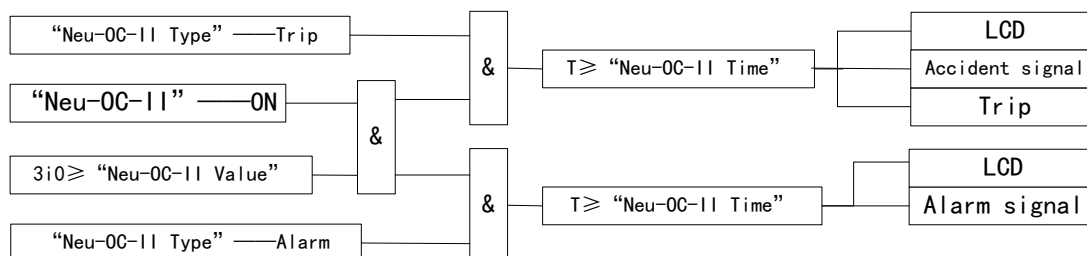


Figure 3-8: Logic diagram of zero sequence overcurrent section II protection action

3.7 零序过流反时限(Inverse Time neutral Over-current Protection)

装置提供三种反时限特性（依据 IEC225-4 标准）：

- 1) 一般反时限：

$$t = \frac{0.14}{(I/I_p)^{0.02} - 1} T_p$$

2) 非常反时限:

$$t = \frac{13.5}{(I/I_p)^{-1}} T_p$$

3) 极端反时限:

$$t = \frac{80}{(I/I_p)^2 - 1} T_p$$

上式中, I_p 为零序过流 II 段定值, T_p 为零序过流 II 段延时。动作的逻辑框图如 3-9 所示:

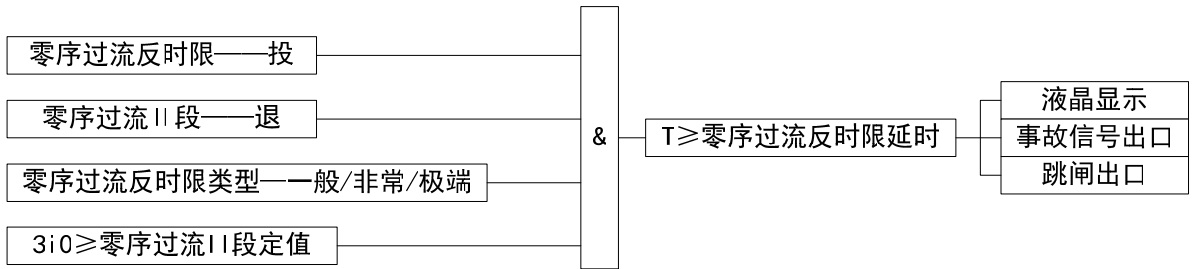


图 3-9: 零序过流反时限保护动作逻辑图

The device provides three inverse time characteristics (according to IEC225-4 standard):

1) General inverse time limit:

$$t = \frac{0.14}{(I/I_p)^{0.02} - 1} T_p$$

2) Very inverse time limit:

$$t = \frac{13.5}{(I/I_p)^{-1}} T_p$$

3) Extreme inverse time limit:

$$t = \frac{80}{(I/I_p)^2 - 1} T_p$$

In the above equation, I_p is the Neu-OC-II Value, and t_p is the Neu-OC-II Time. The logical block diagram of the action is shown in Figure 3-9:

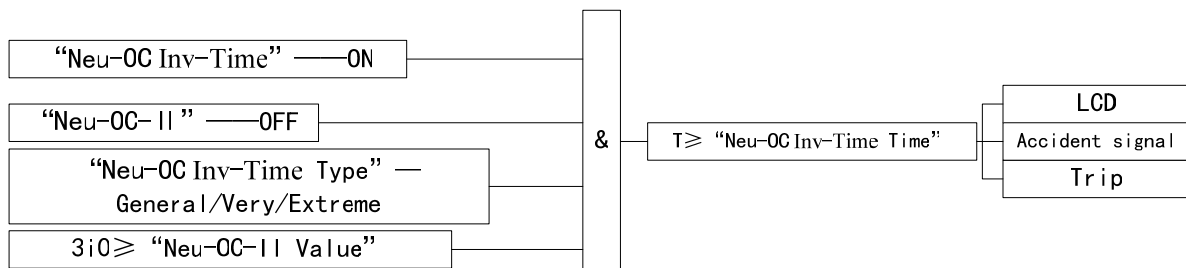


Figure 3-9: Logic diagram of zero sequence overcurrent inverse time limit protection action

3.8 低侧零序过流 (Neutral Over-current of Low Side)

1. 低侧零序过流—投 (0: 退, 1: 投);
2. 低侧零序过流类型—“告警/跳闸” (0: 跳闸, 1: 告警);
3. 低侧零序电流 $3i_{0L} \geq$ 低侧零序过流定值;
4. 满足以上条件的持续时间 $\geq$ 低侧零序过流延时;

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。动作的逻辑框图如 3-10 所示:

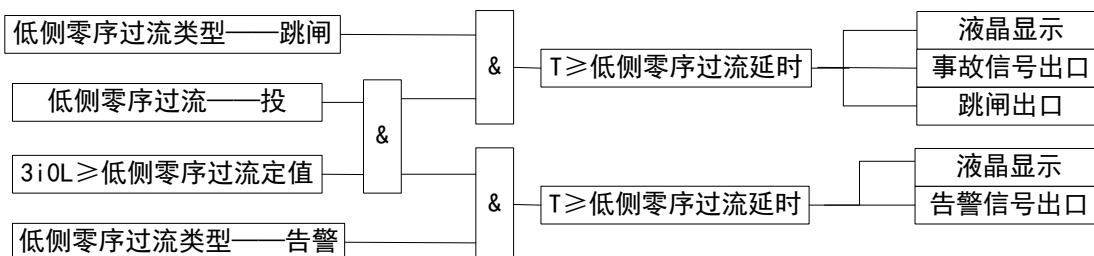


图 3-10: 低侧零序过流保护动作逻辑图

1. Neutral Over-current of Low Side control setting: Neu-OC-L - "ON" (0: OFF, 1: ON);
2. Neu-OC-L Type - "Alarm/Trip" (0: Trip, 1: Alarm);
3. Zero sequence current of Low Side $3i_{0L} \geq$ Neu-OC-L Value;
4. The duration that meets the above conditions is $\geq$ Neu-OC-L Time;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316),

display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

The logical block diagram of the action is shown in Figure 3-10:

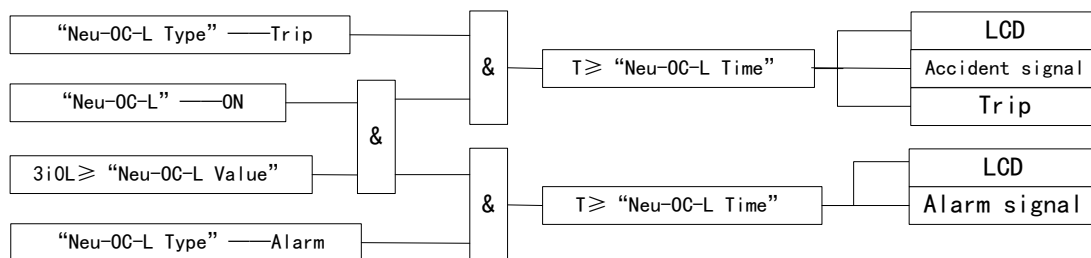


Figure 3-10: Logic diagram of low side zero sequence overcurrent protection action

3.9 低频减载 (Low-frequency Protection)

1. 低频减载—“投”(0:退, 1:投);
2. 合位信号为 1 (401=1, 402=0);;
3. 保护装置频率 f 采样值 < 低频减载定值;
4. 满足以上条件的持续时间 $\geq$ 低频减载延时;

满足以上条件, 保护装置立即出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。动作逻辑框图如 3-11 所示:

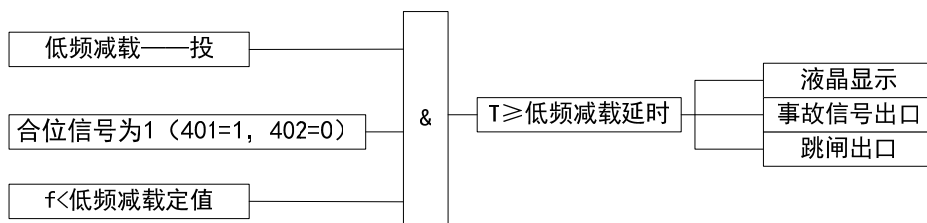


图 3-11: 低频减载保护逻辑框图

1. Low-frequency Protection control setting: LF——“ON”(0:OFF,1:ON);
2. The Closing Signal is 1 (401=1, 402=0);
3. Frequency $f < \text{“LF Value”}$;
4. The duration of meeting the above conditions $\geq \text{“LF Time”}$;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset). The action logic diagram is shown in Figure 3-11:

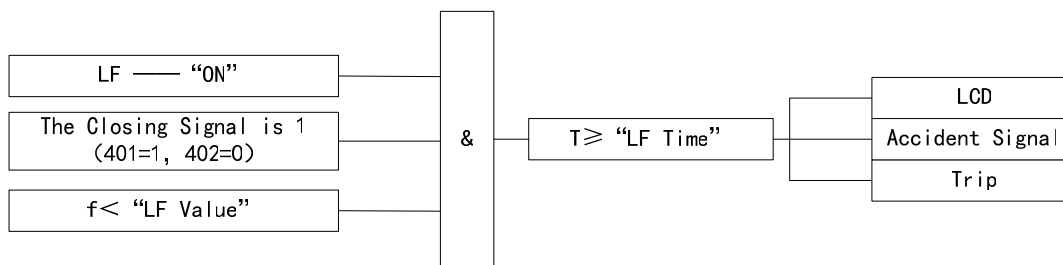


Figure 3-11: Logic Block Diagram of Low Frequency Load Shed Protection

3.10 过电压 (Over-voltage Protection)

1. 过电压—“投” (0: 退, 1: 投);
2. 线电压 U_{ab} 、 U_{bc} 、 U_{ca} 中的最大值 $\geq$ 过电压定值;
3. 满足以上条件的持续时间 $\geq$ 过电压延时;

满足以上条件, 保护装置立即出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。动作的逻辑框图如 3-12 所示:

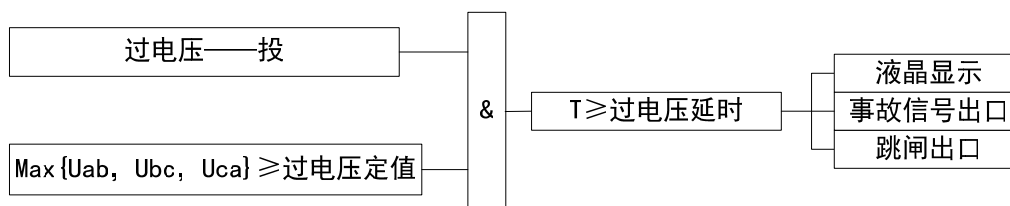


图 3-12: 过电压保护动作逻辑图

1. Over-voltage Protection control setting: OV ——“ON” (0:OFF,1:ON);
2. The maximum value of line voltage U_{ab} , U_{bc} , and $U_{ca} \geq$ “OV Value”;
3. The duration of meeting the above conditions $\geq$ “OV Time”;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset). The logical block diagram of the action is shown in 3-12:

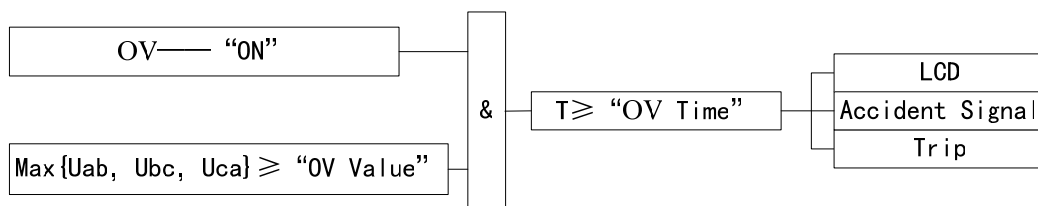


Figure 3-12: Logic diagram of overvoltage protection action

3.11 低电压 (Low-voltage Protection)

1. 低电压—“投” (0: 退, 1: 投);
 2. 低电压类型—“告警/跳闸” (0: 跳闸, 1: 告警);
 3. 若低电压相别选择 “0” (三相): (U_n 为 PT 二次额定电压值)
 0. $3U_n \leq$ 线电压 U_{ab}, U_{bc}, U_{ca} 均 $<$ 低电压定值; (U_n 为二次额定电压值)
 若低电压相别选择 “1” (单相):
 0. $3U_n \leq$ 线电压 U_{ab}, U_{bc}, U_{ca} 中任意一项 $<$ 低电压定值; (U_n 为二次额定电压值)
 4. 满足以上条件的持续时间 $\geq$ 低电压延时;
- 满足以上条件, 若投 “跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);
- 若投 “告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

动作逻辑框图如 3-13 所示:

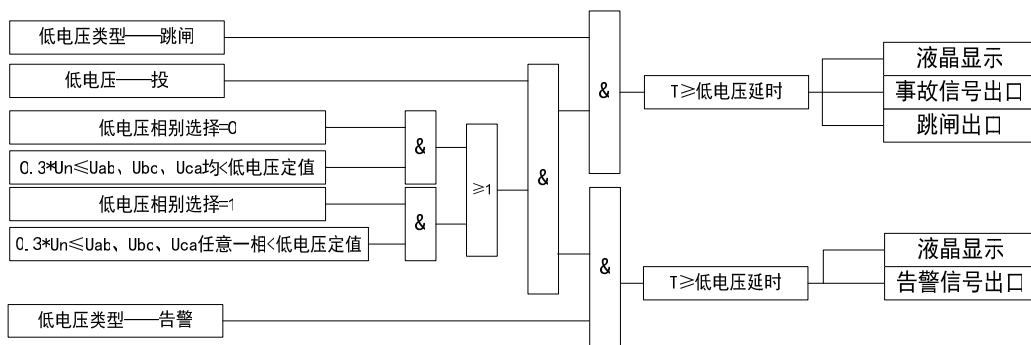


图 3-13: 低电压保护逻辑框图

说明: PT 断线投入时, 若 PT 断线动作, 闭锁低电压。

1. Low-voltage Protection control setting: LV——“ON” (0:OFF,1:ON);
2. “LV Type”——“Alarm/Trip” (0:Trip, 1: Alarm);
3. If “LV Phase Select” is 0 (Three-Ph): (U_n is the secondary rated voltage of PT.)
 0. $3U_n \leq$ Line voltage U_{ab}, U_{bc}, U_{ca} all $<$ “LV Value”;

If “LV Phase Select” is 1 (Single-Ph):

$0.3U_n \leq \text{Any of the line voltages } U_{ab}, U_{bc}, \text{ or } U_{ca} < \text{“LV Value”};$

4. The duration of meeting the above conditions $\geq$ “LV Time”;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

The action logic diagram is shown in Figure 3-13:

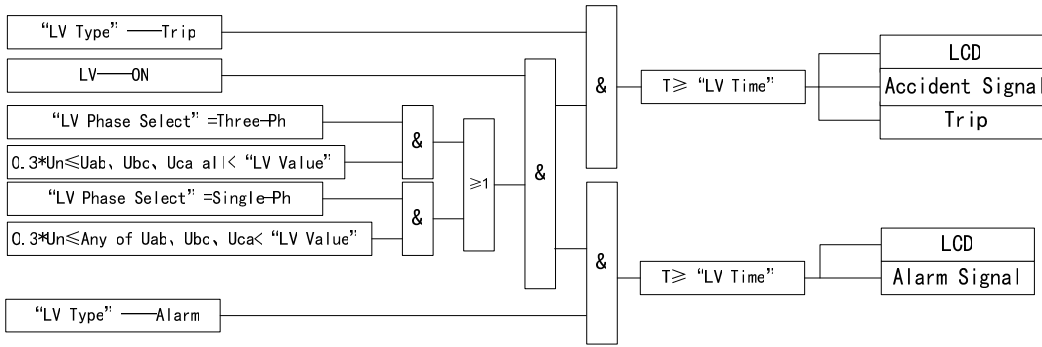


Figure 3-13: Low voltage protection logic block diagram

Explanation: When the PT is disconnected and put into operation, if the PT is disconnected, the low voltage will be locked.

3.12 零序过电压 (Neutral Over-voltage Protection)

1. 零序过电压-“投” (0: 退, 1: 投);
2. 零序过电压类型—“告警/跳闸” (0: 跳闸, 1: 告警);
3. 零序过电压 $3U_0 \geq$ 零序过电压定值;
4. 满足以上条件的持续时间 $\geq$ 零序过电压延时;

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

动作的逻辑框图如 3-14 所示:

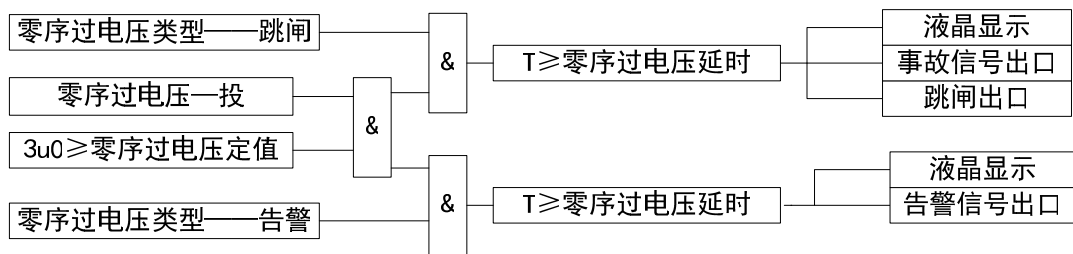


图 3-14：零序过电压保护动作逻辑图

1. Neutral Over-voltage Protection control setting: Neu-OV ——“ON”(0:OFF,1:ON);
2. “Neu-OV Type” ——“Alarm/Trip”(0:Trip , 1: Alarm);
3. $3U_0 \geq \text{“Neu-OV Value”}$;
4. The duration of meeting the above conditions $\geq \text{“Neu-OV Time”}$;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

The logical block diagram of the action is shown in Figure 3-14:

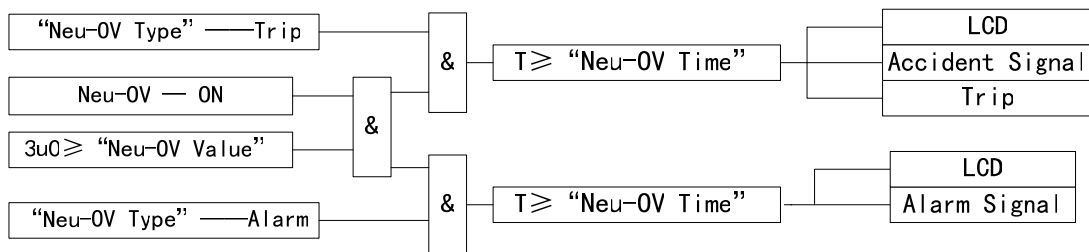


Figure 3-14: Logic diagram of zero sequence overvoltage protection action

3.13 PT 断线 (PT Break)

1. PT 断线——“投” (0: 退, 1: 投);
2. 正序电压 $U_1 < 0.3U_n$ 且电流 i_a 、 i_b 、 i_c 中最大电流 $\geq 0.04I_n$;
或者负序电压 $U_2 \geq 0.08U_n$;
3. 满足以上条件的持续时间 $\geq$ PT 断线延时;

注： U_n 为 PT 二次额定值； I_n 为保护 CT 二次额定值。（设备参数中设定值）

满足以上条件，保护装置即驱动告警信号继电器 8J (315/316)，液晶显示告警信息，面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。动作的逻辑框图如 3-15 所示：

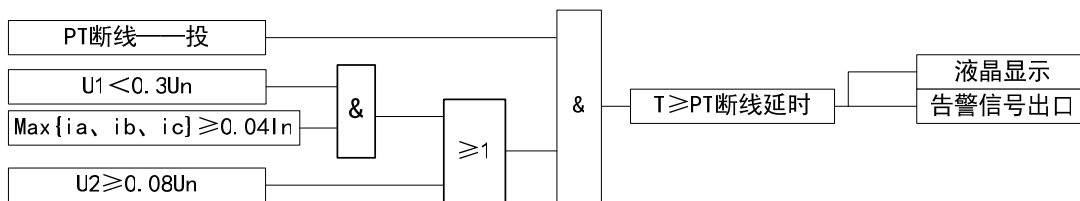


图 3-15：PT 断线保护动作逻辑图

1. PT Break Protection control setting: PT Break —— “ON” (0: OFF, 1: ON) ;
2. Positive sequence voltage $U1 < 0.3U_n$ and maximum current in currents i_a, i_b , and $i_c \geq 0.04I_n$;
Or negative sequence voltage $U2 \geq 0.08U_n$;
3. The duration of meeting the above conditions $\geq$ “PT Break Time”;

Note: U_n is the secondary rated value of PT; I_n is to protect the secondary rated value of CT. (Set value in Device-Parameters)

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset). The logical block diagram of the action is shown in 3-15:

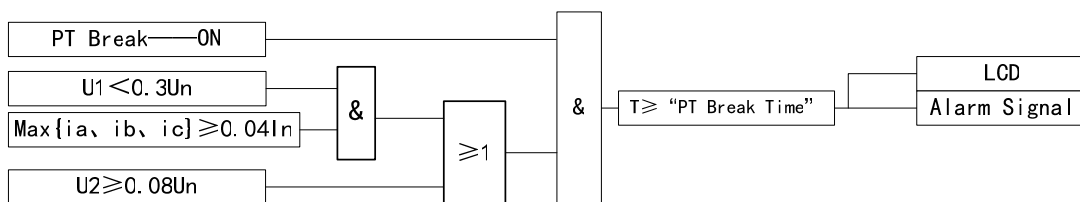


Figure 3-15: Logic diagram of PT disconnection protection action

3. 14 控制回路断线 (Control Circuit Break)

1. 控制回路断线—“投” ((0: 退, 1: 投);
2. 分位、合位信号同时为 1 (401=1, 402=1), 或分位、合位信号同时为 0 (401=0, 402=0);
3. 满足以上条件的持续时间 $\geq$ 控制回路断线延时;

满足以上条件, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。动作的逻辑框图如 3-16 所示:

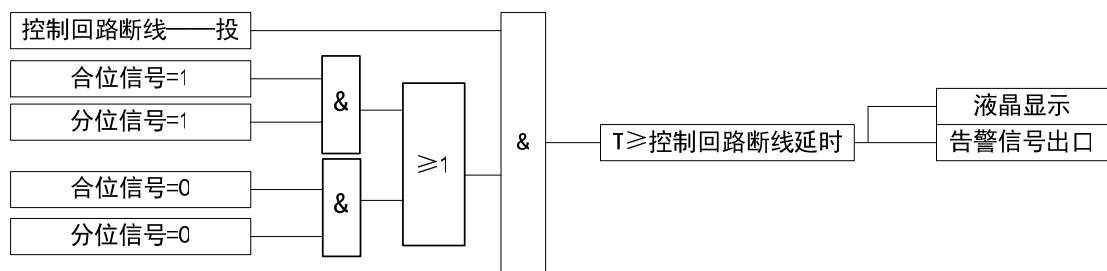


图 3-16：控制回路断线保护动作逻辑图

1. Control Circuit Break control setting: CCB —— “ON” (0: OFF, 1: ON) ;
2. The quantile and combined signals are both 1 (401=1, 402=1), or the quantile and combined signals are both 0 (401=0, 402=0);
3. The duration of meeting the above conditions $\geq$ “CCB Time”;

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset). The logical block diagram of the action is shown in 3-16:

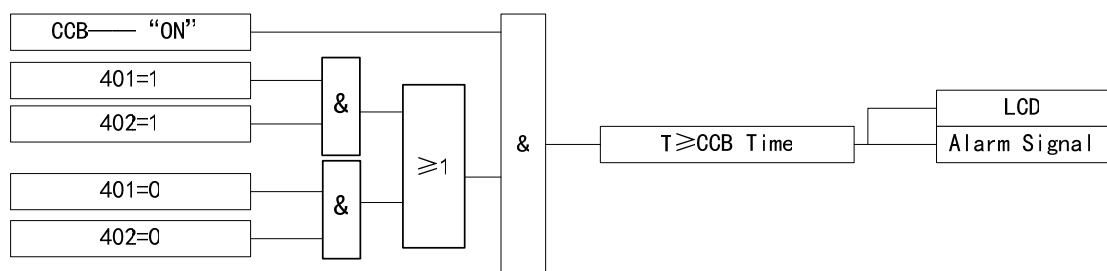


Figure 3-16: Logic diagram of control circuit disconnection protection action

3.15 系统失电 (Loss System Power)

1. 系统失电 — “投” (0: 退, 1: 投);
 2. 系统失电类型 — “告警/跳闸” (0: 跳闸, 1: 告警);
 3. 线电压 U_{ab} , U_{bc} , U_{ca} 都 $< 0.3U_n$;
 4. 电流 i_a , i_b , i_c 中最大值 $< 0.04I_n$;
 5. 合位信号为 1 (401=1, 402=0);
 6. 系统有压标志 =1 (系统所有线电压 $\geq 0.7U_n$, 有压标志置 1, 检测到分位信号后清除该标志);
- 注: U_n 为 PT 二次额定值, I_n 为保护 CT 二次额定值; (设备参数中设定值)

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告

警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。动作的逻辑框图如 3-17 所示:

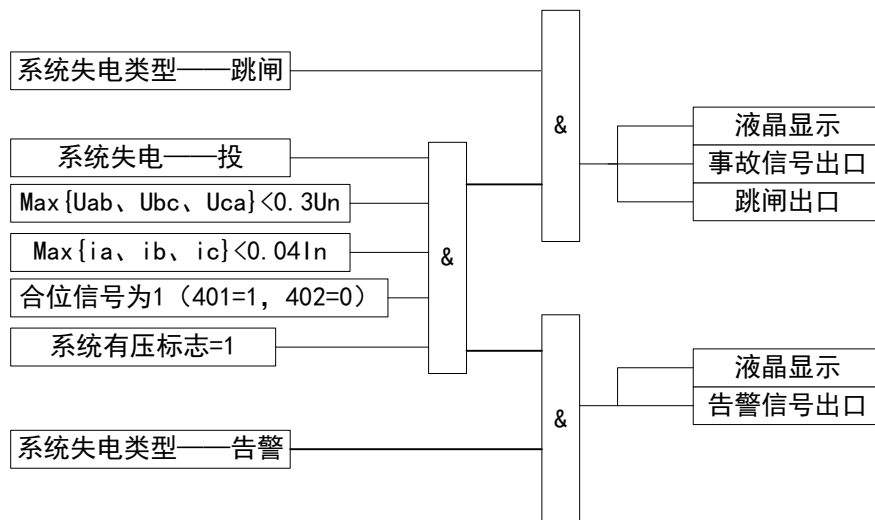


图 3-17: 系统失电保护动作逻辑图

1. Loss System Power control setting :Loss S-Power —— “ON” (0: OFF,1:ON) ;
2. “Loss S-Power Type”—— “Alarm/Trip” (0:Trip , 1: Alarm);
3. Line voltage U_{ab}, U_{bc}, U_{ca} all $< 0.3U_n$;
4. The maximum value of current i_a, i_b , and $i_c < 0.04I_n$;
5. The closing signal is 1 (401=1, 402=0);
6. System voltage flag=1 (if the voltage of all lines in the system is $\geq 0.7U_n$, set the voltage flag to 1 and clear it after the system loses power);

Note: U_n is the secondary rated value of PT; I_n is to protect the secondary rated value of CT. (Set value in Device-Parameters)

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

The logical block diagram of the action is shown in Figure 3-17:

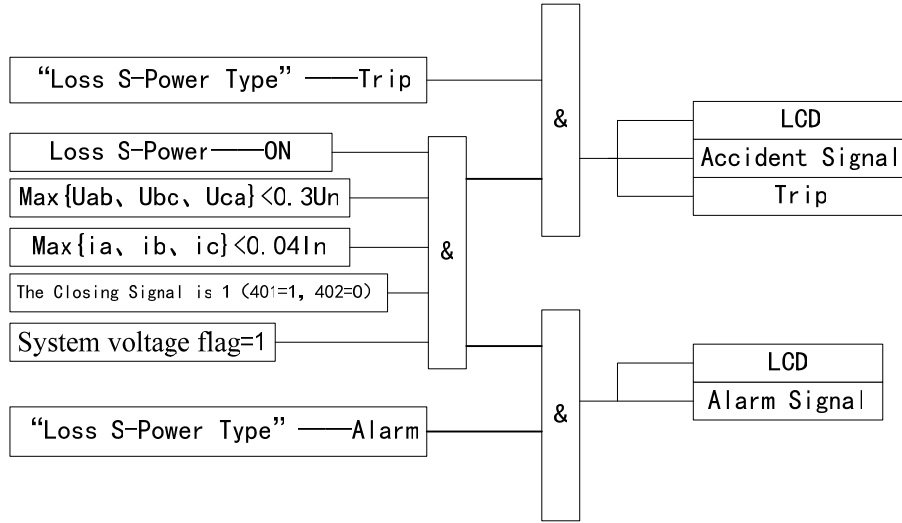


Figure 3-17: Logic diagram of system power-off protection action

3.16 主变开门 (Open Door)

1. 主变开门—投 (0: 退, 1: 投);
2. 主变开门类型—“告警/跳闸” (0: 跳闸, 1: 告警);
3. 主变开门开入量为 1;

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Open Door control setting : Open-Door —— “ON” (0: OFF, 1: ON) ;
2. “Open-Door Type” —— “Alarm/Trip” (0: Trip, 1: Alarm);
3. Input of Open-Door is 1;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.17 负控跳闸 (Load Control)

1. 负控跳闸—“投” (0: 退, 1: 投);

2. 负控跳闸开入量为 1;

满足以上条件, 保护装置立即出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。

1. Load Control control setting : Load-Control —— “ON” (0: OFF,1:ON) ;

2. Input of Load-Control is 1;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset).

3.18 重瓦斯 (Heavy Gas)

1. 重瓦斯—“投”(0: 退, 1: 投);

2. 重瓦斯开入量为 1;

满足以上条件, 保护装置立即出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归)。

1. Heavy Gas control setting : Heavy-Gas —— “ON” (0: OFF,1:ON) ;

2. Input of Heavy-Gas is 1;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset).

3.19 轻瓦斯 (Light Gas)

1. 轻瓦斯—“投”(0: 退, 1: 投);

2. 轻瓦斯开入量为 1;

满足以上条件, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Light Gas control setting : Light-Gas —— “ON” (0: OFF,1:ON) ;

2. Input of Light-Gas is 1;

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.20 温度升高 (Temperature Rise)

1. 温度升高—“投”(0: 退, 1: 投);
2. 温度升高开入量为 1;

满足以上条件, 保护装置即驱动告警信号继电器 8J(315/316), 液晶显示告警信息, 面板告警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Temperature Rise control setting : Temp-Rise —— “ON” (0: OFF,1:ON) ;
2. Input of Temp-Rise is 1;

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.21 油位高 (High oil level)

1. 油位高—“投”(0: 退, 1: 投);
2. 油位高开入量为 1;

满足以上条件, 保护装置即驱动告警信号继电器 8J(315/316), 液晶显示告警信息, 面板告警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. High oil level control setting : Oil-High —— “ON” (0: OFF,1:ON) ;
2. Input of Oil-High is 1;

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.22 温度过高 (High Temperature)

1. 温度过高—“投”(0: 退, 1: 投);
2. 温度过高开入量为 1;

满足以上条件, 保护装置立即出口 4J(307/308), 同时驱动事故信号继电器 7J(313/314), 液晶显示保护动作信息, 面板事故灯亮(信号继电器、液晶事故信息提示和事故指示灯须手动复归)。

1. High Temperature control setting : Temp-High —— “ON” (0: OFF,1:ON) ;
2. Input of Temp-High is 1;

If the above conditions are met, the protection device will immediately exit 4J (307/308) and drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and

accident indicator light must be manually reset).

3.23 油位低 (Low oil level)

1. 油位低—“投”(0: 退, 1: 投);
2. 油位低开入量为 1;

满足以上条件, 保护装置即驱动告警信号继电器 8J(315/316), 液晶显示告警信息, 面板告警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Low oil level control setting : Oil-Low —— “ON” (0: OFF,1:ON) ;
2. Input of Oil-Low is 1;

If the above conditions are met, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will be on (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.24 压力释放 (Pressure Release)

1. 压力释放—投 (0: 退, 1: 投);
2. 压力释放类型—“告警/跳闸”(0: 跳闸, 1: 告警);
3. 压力释放开入量为 1;

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J(307/308), 同时驱动事故信号继电器 7J(313/314), 液晶显示保护动作信息, 面板事故灯亮(信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J(315/316), 液晶显示告警信息, 面板告警灯亮(信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Pressure Release control setting : Press-Release —— “ON” (0: OFF,1:ON) ;
2. “Press-Release Type” —— “Alarm/Trip”(0:Trip , 1: Alarm);
3. Input of Pressure Release is 1;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

3.25 备用非电量 1/2 (Backup Non-Ele1/2)

1. 备用非电量 1/2—投 (0: 退, 1: 投);
2. 备用非电量 1/2 类型—“告警/跳闸” (0: 跳闸, 1: 告警);
3. 备用非电量 1/2 开入量为 1;

满足以上条件, 若投“跳闸”, 保护装置立即驱动出口 4J (307/308), 同时驱动事故信号继电器 7J (313/314), 液晶显示保护动作信息, 面板事故灯亮 (信号继电器、液晶事故信息提示和事故指示灯须手动复归);

若投“告警”, 保护装置即驱动告警信号继电器 8J (315/316), 液晶显示告警信息, 面板告警灯亮 (信号继电器、液晶告警信息提示和告警指示灯须手动复归)。

1. Backup Non-Electricity1/2 control setting : Backup Non-Ele1/2 ——“ON” (0: OFF, 1: ON) ;
2. “Backup Non-Ele1/2 Type” ——“Alarm/Trip”(0: Trip , 1: Alarm);
3. Input of Backup Non-Ele1/2 is 1;

If the above conditions are met, if the "trip" is activated, the protection device will immediately drive the outlet 4J (307/308), and at the same time drive the accident signal relay 7J (313/314). The LCD will display the protection action information, and the panel accident light will be on (the signal relay, LCD accident information prompt, and accident indicator light must be manually reset);

If an alarm is triggered, the protection device will drive the alarm signal relay 8J (315/316), display the alarm information on the LCD, and the panel alarm light will light up (the signal relay, LCD alarm information prompt, and alarm indicator light must be manually reset).

注意: 以上保护功能出口、开入量描述均为默认配置。

Attention: The above description of protection function exits and input quantities is the default configuration.

第四章 硬件配置

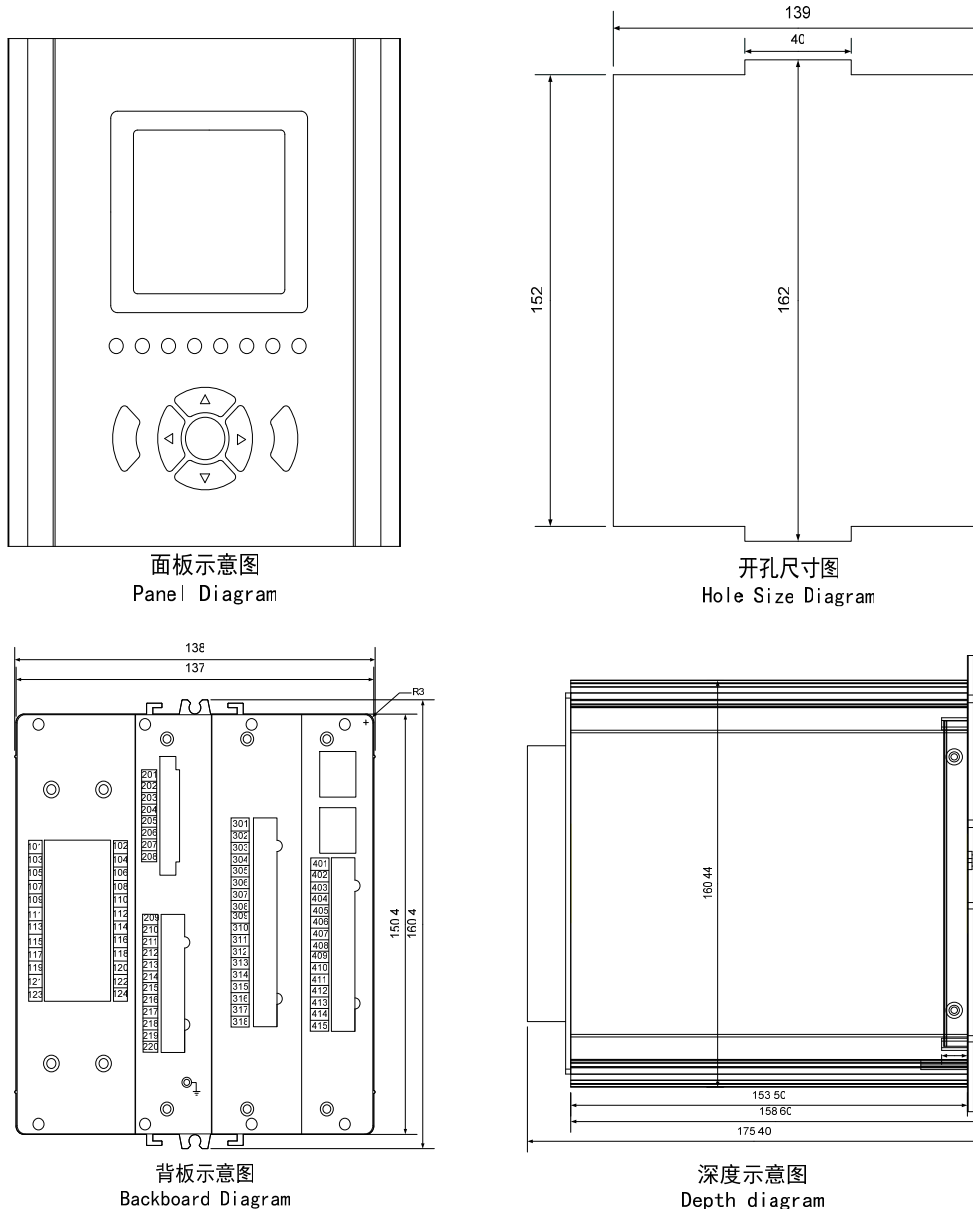
Chapter Four Hardware Configuration

4.1 装置结构与尺寸 Device structure and dimensions

机箱采用嵌入式安装方式。可以组屏安装，也可就地安装到开关柜，机箱结构和屏面开孔尺寸如下图所示。

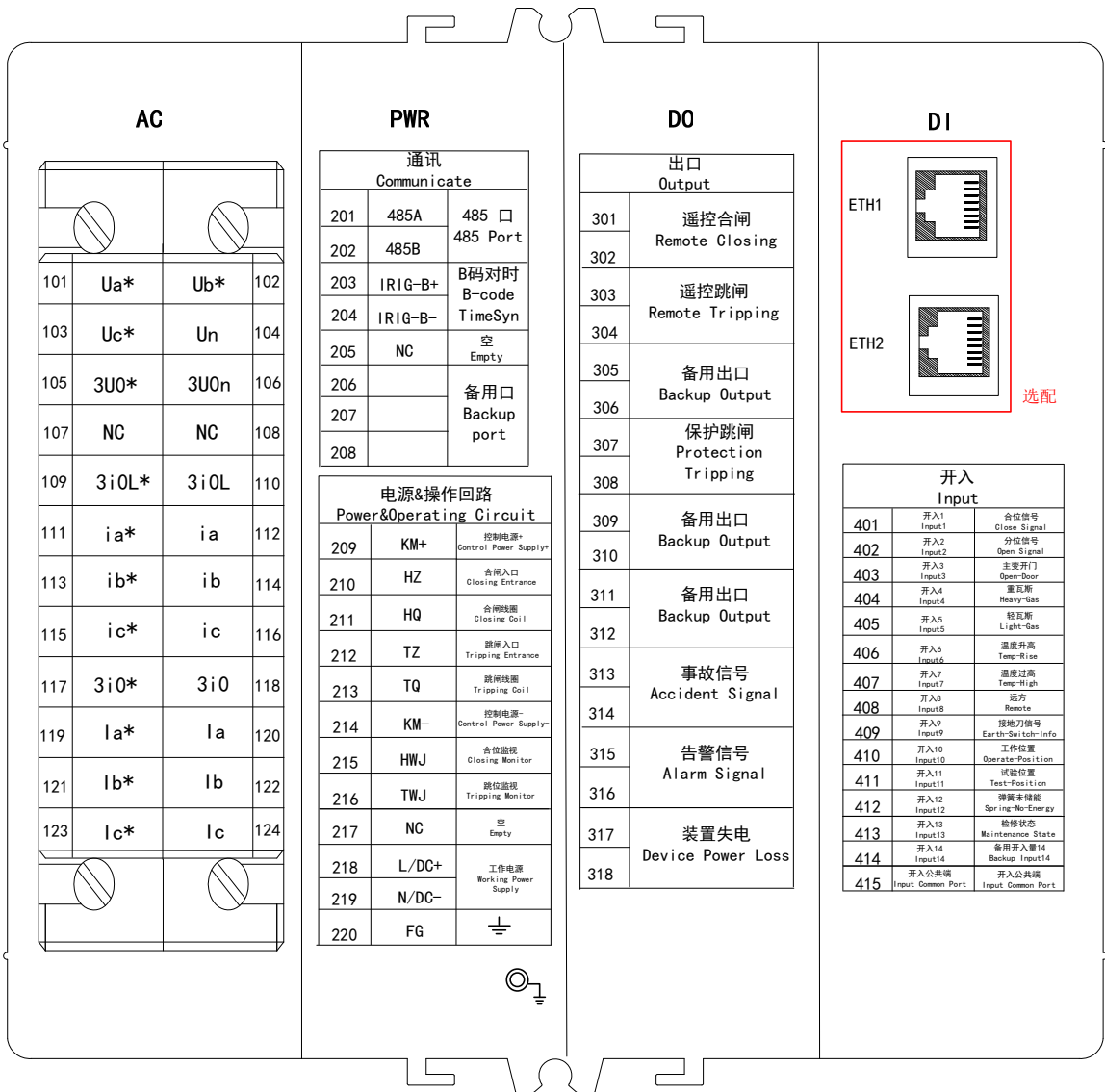
The chassis adopts embedded installation method. It can be installed as a group screen or on-site in a switchgear, with the chassis structure and screen opening size

As shown in the following figure.



4.2 装置硬件配置 Device hardware configuration

4.2.1 背板端子图 Backboard terminal diagram



4.2.2 AC 板 AC board

该插板包括:

The plug-in board includes:

- 模拟量输入端口: 支持 4 路电压输入 (三相电压, 零序电压), 8 路电流输入 (3 路保护电流, 两路零序电流, 3 路测量电流)
- Analog input port: supports 4 voltage inputs (three-phase voltage, zero sequence voltage), 8

current inputs (3 protection currents, 2 zero sequence currents, and 3 measurement currents)

注：若 PT 个数为 2（即 VV 接法），将 Ub 接到 Un 的位置即可

Note: If the number of PTs is 2 (i.e. VV connection method), simply connect Ub to the position of Un

4.2.3 PWR 板 PWR board

该插板包括：

The plug-in board includes:

- 通讯端口 201-208：1 路 RS485 通讯端口，1 路 B 码对时端口（第二路可切换为 RS485 通讯）。
- Communication port 201-208: 1 RS485 communication port and 1 B-code timing port (the second channel can be switched to RS485 communication).
- 控制回路端口 209-216：209、214 分别为控制电源+、控制电源-。
- Control circuit ports 209-216: 209 and 214 respectively represent control power supply+ and control power supply -.
- 装置电源端口 218-219
- Device power ports 218-219

PWR		
端子 terminal	说明 Description	
201	485A	485 口 485 Port
202	485B	
203	IRIG-B+	B 码对时 B-code TimeSyn
204	IRIG-B-	
205	NC	空 Empty
206		备用口 Backup Port
207		
208		
电源&操作回路 Power&Operating Circuit		
209	KM+	控制电源+ Control Power Supply+
210	HZ	合闸入口

		Closing Entrance
211	HQ	合闸线圈 Closing Coil
212	TZ	跳闸入口 Tripping Entrance
213	TQ	跳闸线圈 Tripping Coil
214	KM-	控制电源- Control Power Supply-
215	HWJ	合位监视 Closing Monitor
216	TWJ	跳位监视 Tripping Monitor
217	NC	空 Empty
218	L/DC+	工作电源 Working Power Supply
219	L/DC-	
220	FG	接地 Ground

4.2.4 DO 板 DO board

- 9 路继电器出口 301-316: 8 路常规出口 (可在【参数设置】→【出口配置】中设置出口定义), 1 路装置失电常闭出口。
- 9-way relay outlet 301-316: 8-way conventional outlet (outlet definition can be set in 【 Set-Parameter 】 → 【 Output-Config 】), 1-way device power loss normally closed outlet.

4.2.5 DI 板 DI board

- 2 路以太网接口: ETH1、ETH2(可选配)
- Two Ethernet interfaces: ETH1 and ETH2 (Optional)
- 14 路开入量输入 401-415: 开入 1 (401) 为合位信号, 开入 2 (402) 为分位信号
- 14 input inputs 401-415: Input 1 (401) is the closing signal, and input 2 (402) is the opening signal



第五章 装置使用说明

Chapter Five Instructions for Device Use

保护由交流采样插板、电源及操作回路插板、继电器插板、开入量插板及 CPU 板等组成。采用集成 DSP 及浮点运算的高速 32 位微控制器芯片,完成保护逻辑及运算等功能。液晶显示屏、按键、运行指示灯、断路器位置指示灯、电源指示灯均集成于面板上便于操作和观察。

The protection consists of an AC sampling board, a power and operation circuit board, a relay board, an input quantity board, and a CPU board. Using a high-speed 32-bit microcontroller chip that integrates DSP and floating-point operations, it completes functions such as protection logic and computation. The LCD display screen, buttons, operation indicator lights, circuit breaker position indicator lights, and power indicator lights are all integrated on the panel for easy operation and observation.

5.1 面板指示灯说明 Description of panel indicator lights

面板指示灯共有八个,从左到右排列顺序依次如下:

There are a total of eight panel indicator lights, arranged in the following order from left to right:

- 电源: 绿色, 正常运行时常亮。
- Power: Green, always on during normal operation.
- 运行: 绿色, 正常运行时闪烁。
- Run: Green, flashing during normal operation.
- 通讯: 绿色, 串口正常通讯时闪烁。
- Comm: Green, flashing when the serial port is communicating normally.
- 事故: 红色, 装置发生跳闸事件时点亮, 复归后熄灭。
- Accident: Red, lights up when the device trips and goes out after resetting.
- 告警: 红色, 装置发生告警事件时点亮, 复归后熄灭。
- Alarm: Red, lights up when an alarm event occurs in the device, and goes off after resetting.
- 故障: 红色, 装置自检异常时点亮。
- Fault: Red, lights up when the device self checks abnormally.
- 分位: 绿色, 断路器分位时点亮。
- Open: Green, illuminated when the circuit breaker is open.
- 合位: 红色, 断路器合位时点亮。
- Close: Red, illuminated when the circuit breaker is closed.

5.2 按键使用说明 Key usage instructions

- ↑ (+): 是液晶上光标的向上移动键，按此键光标将从下往上移动，同时，此按键也作为整定数字的增加键，按一次，数字加 1。
- ↑ (+): It is the upward movement key of the cursor on the LCD. Pressing this key will move the cursor from bottom to top. At the same time, this button also serves as an increase key for setting numbers. Pressing it once will increase the number by 1.
- ↓ (-): 是液晶上光标的向下移动键，按此键光标将从上往下移动；同时，此按键也作为整定数字的减少键，按一次，数字减 1。
- ↓ (-): It is the downward movement key of the cursor on the LCD, pressing this key will move the cursor from top to bottom; At the same time, this button also serves as a decrease key for setting numbers. Pressing it once will result in a decrease of 1 from the number.
- ← : 是液晶上光标的向左移动键，按此键光标将从右往左移动。
- ← : It is the left movement key of the cursor on the LCD. Pressing this key will move the cursor from right to left.
- : 是液晶上光标的向右移动键，按此键光标将从左往右移动。
- : It is the right movement key of the cursor on the LCD. Pressing this key will move the cursor from left to right.
- OK : 执行命令后，按此键，则进行下一步操作。
- OK : After executing the command, press this key to proceed to the next step.
- ↵ : 按此键，则返回到上一级菜单。
- ↵ : Press this key to return to the previous menu level.
- ↻ : 信号复归，复归保持信号。
- ↻ : Signal reset, reset to maintain signal.

5.3 装置菜单功能说明 Device Menu Function Description

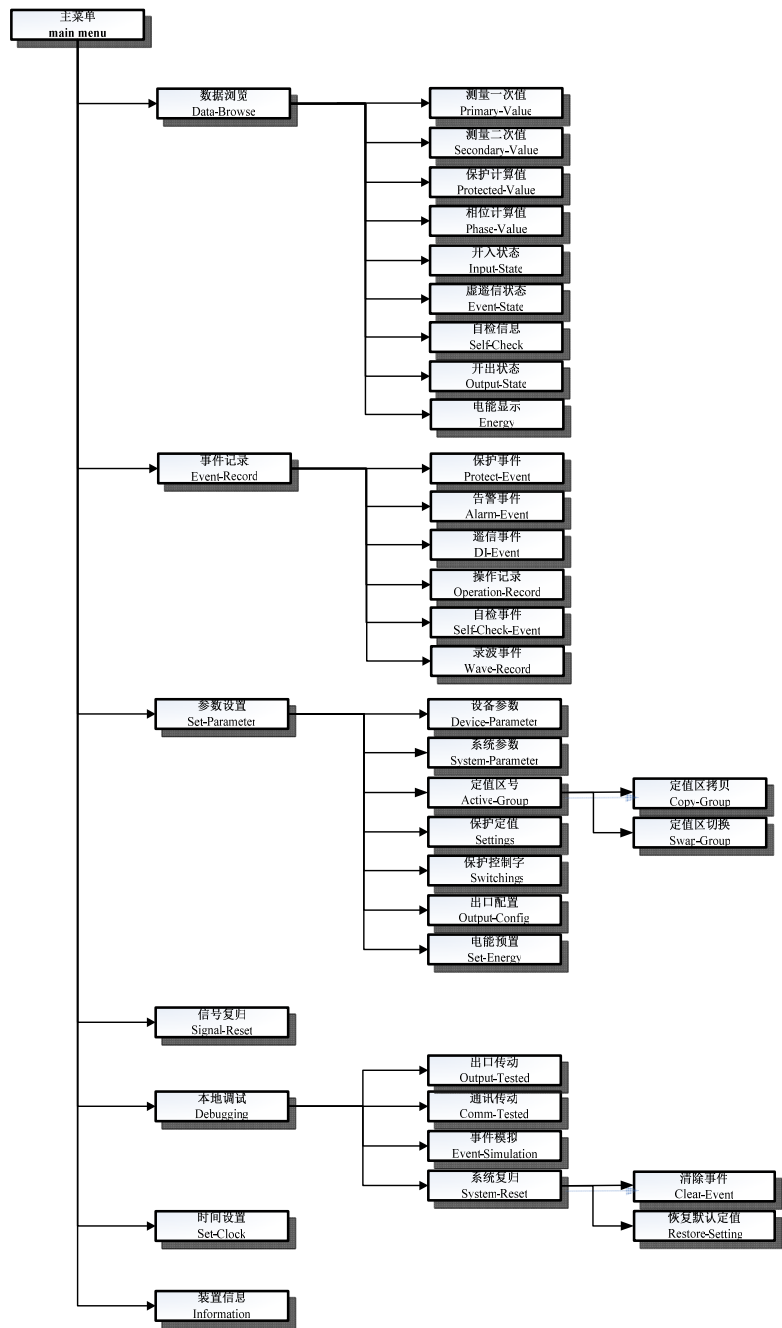
在主画面状态下，按“OK”键可进入主菜单，通过“↑”、“↓”、“OK”和“↵”键选择子菜单。当有多级分组子菜单时，按“OK”键逐级进入下一级子菜单，按“↵”键返回上一级子菜单。

In the main screen state, press the "OK" key to enter the main menu, and use the "↑", "↓", "OK", and "↵" keys to select submenus. When there are multi-level grouping sub menus, press the "OK"

key to enter the next level sub menu step by step, and press the "↩" key to return to the previous level sub menu.

命令菜单采用如下的树形目录结构：

The command menu adopts the following tree directory structure:



注：菜单目录以实物为准。

Note: The menu directory is subject to the actual item.

第六章 定值及整定说明

Chapter Six Setting and Setting Instructions

6.1 设备参数 Device-Parameter

本菜单主要用来设置或查看电压互感器（电流互感器）的参数、零序电压（零序电流）的选取方式的选择以及电流极性的选择。

This menu is mainly used to set or view the parameters of voltage transformers (current transformers), the selection method of zero sequence voltage (zero sequence current), and the selection of current polarity.

序号 No.	参数名称 Parameter Name	定值范围 Setting Range	默认值 Default Value	备注 Notes
1	PT 一次额定值 PT PRI Value	0.1~110.00kV	10kV	
2	PT 二次额定值 PT SEC Value	100~999V	100V	
3	测量 CT 一次额定值 MCT PRI Value	1~6000A	600A	
4	测量 CT 二次额定值 MCT SEC Value	1A, 5A	5A	
5	保护 CT 一次额定值 PCT PRI Value	1~6000A	600A	
6	保护 CT 二次额定值 PCT SEC Value	1A, 5A	5A	
7	保留 Reserve			
8	低侧零序 CT 二次额定值 L-NeuCT SEC Value	1A, 5A	5A	
9	PT 个数 PT Num	2, 3	3	
10	测量 CT 个数 MEA CT Num	2, 3	3	
11	零序电压自产 Calculate 3U0	0, 1	0	0: 外接 1: 自产 0: External 1: Self produced
12	零序电流自产 Calculate 3I0	0, 1	0	0: 外接 1: 自产 0: External 1: Self produced

13	保护 A 相极性 ia polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
14	保护 B 相极性 ib polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
15	保护 C 相极性 ic polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
16	保留 Reserve			
17	测量 A 相极性 la polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
18	测量 B 相极性 lb polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
19	测量 C 相极性 lc polarity	0, 1	0	0: 正 1: 负 0: Positive 1: Negative
20~ 24	保留 Reserve			

注:

- a. PT 一次额定值、PT 二次额定值、测量 CT 一次额定值、测量 CT 二次额定值的设置正确与否将会影响装置界面有功功率与无功功率的显示。

Note:

- a. The correct setting of PT primary rating, PT secondary rating, measuring CT primary rating, and measuring CT secondary rating will affect the display of active and reactive power on the device interface.

6.2 系统参数 System-Parameter

本菜单主要用来通讯参数、液晶显示以及出口继电器相关参数进行设置。

This menu is mainly used to set communication parameters, LCD display, and export relay related parameters.

序号 No.	参数名称 Parameter Name	定值范围 Setting Range	默认值 Default Value	定值说明 Setting Description
1	装置通信地址 Device Address	1~251	1	
2	串口 1 波特率 Uart1 Baud Rate	1, 2, 3, 4, 5, 6, 7	3	1: 2400bps, 2: 4800bps, 3: 9600bps, 4: 19200bps, 5: 38400bps, 6: 57600bps, 7: 115200bps
3	串口 1 校验位 Uart1 CRC	0, 1, 2	0	0: 无校验, 1: 奇校验, 2: 偶校验 0: NO Check, 1: Odd Check, 2:Even Check
4	串口 2 波特率 Uart2 Baud Rate	1, 2, 3, 4, 5, 6, 7	3	1: 2400bps, 2: 4800bps, 3: 9600bps, 4: 19200bps, 5: 38400bps, 6: 57600bps, 7: 115200bps
5	串口 2 校验位 Uart2 CRC	0, 1, 2	0	0: 无校验, 1: 奇校验, 2: 偶校验 0: NO Check, 1: Odd Check, 2:Even Check
6	串口 3 波特率 Uart3 Baud Rate	1, 2, 3, 4, 5, 6, 7	3	1: 2400bps, 2: 4800bps, 3: 9600bps, 4: 19200bps, 5: 38400bps, 6: 57600bps, 7: 115200bps
7	串口 3 校验位 Uart3 CRC	0, 1, 2	0	0: 无校验, 1: 奇校验, 2: 偶校验 0: NO Check, 1: Odd Check, 2:Even Check
8	对时方式 TimeSyn Type	0, 1, 2, 3, 4	1	0: 关闭对时, 1: B 码对时, 2: Modbus 对时, 3: 以太网 103 对时, 4: SNTP 对时 0: Close TimeSyn, 1: Code B, 2: Modbus TimeSyn, 3: IEC103 TimeSyn, 4: SNTP

				TimeSyn
9	网口 1 IP 地址 Net1 IP Address	0. 0. 0. 0～ 255. 255. 255. 255	192. 168. 0 . 66	
10	网口 1 本机 UDP 端口号 Net1 UDP Port	0～65535	1032	
11	网口 1 目标 TCP 端口号 Net1 TCP Port	0～65535	1048	
12	网口 2 IP 地址 Net2 IP Address	0. 0. 0. 0～ 255. 255. 255. 255	192. 168. 1 . 66	
13	网口 2 本机 UDP 端口号 Net2 UDP Port	0～65535	1032	
14	网口 2 目标 TCP 端口 Net2 TCP Port	0～65535	1048	
15	SNTP 服务器地址 SNTP Server Address	0. 0. 0. 0～ 255. 255. 255. 255	192. 168. 0 . 243	
16	SNTP 时区 SNTP Time Zone	0～24	8	
17	语言选择 Language	0, 1	0	0: 中文 1: 英文 0: Chinese 1: English
18	显示对比度 UI Contrast	50～100	75	
19	显示温补系数 UI Temp.Comp	0, 1, 2	1	
20	开入类型 Input Type	0, 1	0	0: 直流, 1: 交流 0: DC, 1: AC
21	遥信去抖延时 Signal Deboubling Delay	10～500ms	40ms	
22	遥信展宽延时 Signal Width	10～500ms	40ms	
23	继电器出口展宽 延时 Output Width	0. 2～30. 0s	3s	
24	遥控返校延时 Remote Reverse	0～50000ms	3000ms	

	CRC Delay			
25	保留 Reserve	0	0	

注：

a. 修改参数后退出系统参数设置修改界面时输入密码后，进行参数保存。

b. 继电器出口展宽：延长继电器动作保持时长

Note:

a. After modifying the parameters, when exiting the system parameter setting interface, enter the password "1000" to save the parameters

b. Relay outlet widening: extending the duration of relay operation and holding

6.3 定值区号 Active Group

菜单 Menu	说明 Explain
定值区拷贝 Copy Group	拷贝保护定值、保护控制字 Copy Settings、Switching
定值区切换 Swap Group	切换当前运行的定值组 Swap Current Group

6.4 保护定值 Settings

定值序号 No.	定值名称 Setting Name	整定范围 Setting Range	备注 Notes
1	过流低电压定值 LV Block Current Value	1~400V	Locked Over-current protection voltage setting
2	过流负序电压定值 U2 Block Current Value	0.1~400V	Locked Over-current protection negative sequence voltage setting
3	过流Ⅰ段定值 OC-Ⅰ Value	0.1~100A	Over-current protection stage I setting
4	过流Ⅰ段延时 OC-Ⅰ Time	0~100s	Over-current protection stage I time
5	过流Ⅱ段定值 OC-Ⅱ Value	0.1~100A	Over-current protection stage II setting
6	过流Ⅱ段延时 OC-Ⅱ Time	0~100s	Over-current protection stage II time
7	过流Ⅲ段定值 OC-Ⅲ Value	0.1~100A	Over-current protection stage III setting

8	过流Ⅲ段延时 OC-Ⅲ Time	0~100s	Over-current protection stage Ⅲ time
9	过流反时限类型 OC Inv-Time Type	0, 1, 2	The Type of Over-current Inverse-Time protection 0: 一般 1: 非常 2: 极端 0: General 1: Very 2: Extreme
10	过负荷定值 Overload Value	0.1~100A	
11	过负荷延时 Overload Time	0~100s	
12	过负荷类型 Overload Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
13	零序过流Ⅰ段定值 Neu-OC-Ⅰ Value	0.1~100A	Neutral Over-current protection stage I setting
14	零序过流Ⅰ段延时 Neu-OC-Ⅰ Time	0~100s	Neutral Over-current protection stage I time
15	零序过流Ⅱ段定值 Neu-OC-Ⅱ Value	0.1~100A	Neutral Over-current protection stage II setting
16	零序过流Ⅱ段延时 Neu-OC-Ⅱ Time	0~100s	Neutral Over-current protection stage II time
17	零序过流Ⅱ段类型 Neu-OC-Ⅱ Type	0, 1	The Type of Neutral Over-current protection stage II 0: 跳闸 1: 告警 0: Trip 1: Alarm
18	零序过流反时限类型 Neu-OC Inv-Time Type	0, 1, 2	The Type of Neutral Over-current Inverse-Time protection 0: 一般 1: 非常 2: 极端 0: General 1: Very 2: Extreme
19	低侧零序过流定值 Neu-OC-L Value	0.5~100A	Low Side Neutral Over-current protection setting
20	低侧零序过流延时 Neu-OC-L Time	0~100s	Low Side Neutral Over-current protection time
21	低侧零序过流类型 Neu-OC-L Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
22	过电压定值 OV Value	50~600V	Over-voltage protection setting

23	过电压延时 OV Time	0.01~100s	Over-voltage protection time
24	低电压定值 LV Value	30~400V	Low-voltage protection setting
25	低电压相别选择 LV Phase Select	0, 1	0: 三相 1: 单相 0: Three-ph 1: Single-ph
26	低电压延时 LV Time	0.01~100s	Low-voltage protection time
27	低电压类型 LV Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
28	零序过电压定值 Neu-OV Value	0.1~600V	Neutral Over-voltage setting
29	零序过电压延时 Neu-OV Time	0.01~100s	Neutral Over-voltage time
30	零序过电压类型 Neu-OV Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
31	低频减载定值 LF Value	35~60.00HZ	Low-frequency Protection setting
32	低频减载延时 LF Time	0.01~100s	Low-frequency Protection setting time
33	PT 断线延时 PT Break Time	0.1~100s	
34	控制回路断线延时 CCB Time	0.1~100s	Control Circuit Break time
35	系统失电类型 Loss S-Power Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
36	主变开门类型 Open-Door Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
37	压力释放类型 Press-Release Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
38	备用非电量 1 类型 Backup Non-Ele1 Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm
39	备用非电量 2 类型 Backup Non-Ele2 Type	0, 1	0: 跳闸 1: 告警 0: Trip 1: Alarm

注：修改参数后，退出参数设置修改界面时，输入密码‘1000’进行参数保存

Note: After modifying the parameters, when exiting the parameter setting modification interface, enter the password ‘1000’ to save the parameters

6.5 保护控制字 Switchings

保护序号 Protect No.	保护名称 Protect Name	整定范围 Setting Range	备注 Notes
01	过流Ⅰ段 OC-I	0: 退出 1: 投入 0: OFF 1: ON	
02	低压闭锁过流Ⅰ段 LV Block OC-I	0: 退出 1: 投入 0: OFF 1: ON	
03	负序闭锁过流Ⅰ段 U2 Block OC-I	0: 退出 1: 投入 0: OFF 1: ON	
04	过流Ⅱ段 OC-II	0: 退出 1: 投入 0: OFF 1: ON	
05	低压闭锁过流Ⅱ段 LV Block OC-II	0: 退出 1: 投入 0: OFF 1: ON	
06	负序闭锁过流Ⅱ段 U2 Block OC-II	0: 退出 1: 投入 0: OFF 1: ON	
07	过流Ⅲ段 OC-III	0: 退出 1: 投入 0: OFF 1: ON	
08	低压闭锁过流Ⅲ段 LV Block OC-III	0: 退出 1: 投入 0: OFF 1: ON	
09	负序闭锁过流Ⅲ段 U2 Block OC-III	0: 退出 1: 投入 0: OFF 1: ON	
10	过流反时限 OC Inv-Time	0: 退出 1: 投入 0: OFF 1: ON	
11	低压闭锁过流反时限 LV Block OC Inv-Time	0: 退出 1: 投入 0: OFF 1: ON	
12	负序闭锁过流反时限 U2 Block OC Inv-Time	0: 退出 1: 投入 0: OFF 1: ON	
13	过负荷 Overload	0: 退出 1: 投入 0: OFF 1: ON	
14	零序过流Ⅰ段 Neu-OC-I	0: 退出 1: 投入 0: OFF 1: ON	
15	零序过流Ⅱ段 Neu-OC-II	0: 退出 1: 投入 0: OFF 1: ON	
16	零序过流反时限 Neu-OC Inv-Time	0: 退出 1: 投入 0: OFF 1: ON	
17	低侧零序过流 Neu-OC-L	0: 退出 1: 投入 0: OFF 1: ON	

18	过电压 OV	0: 退出 1: 投入 0: OFF 1: ON	
19	低电压 LV	0: 退出 1: 投入 0: OFF 1: ON	
20	零序过电压 Neu-OV	0: 退出 1: 投入 0: OFF 1: ON	
21	低频减载 LF	0: 退出 1: 投入 0: OFF 1: ON	
22	PT 断线 PT Break	0: 退出 1: 投入 0: OFF 1: ON	
23	PT 断线退电流保护 PT Break Block OC	0: 退出 1: 投入 0: OFF 1: ON	
24	控制回路断线 CCB	0: 退出 1: 投入 0: OFF 1: ON	
25	系统失电 Loss S-Power	0: 退出 1: 投入 0: OFF 1: ON	
26	主变开门 Open-Door	0: 退出 1: 投入 0: OFF 1: ON	
27	负控跳闸 Load-Control	0: 退出 1: 投入 0: OFF 1: ON	
28	重瓦斯 Heavy-Gas	0: 退出 1: 投入 0: OFF 1: ON	
29	轻瓦斯 Light-Gas	0: 退出 1: 投入 0: OFF 1: ON	
30	温度过高 Temp-High	0: 退出 1: 投入 0: OFF 1: ON	
31	温度升高 Temp-Rise	0: 退出 1: 投入 0: OFF 1: ON	
32	油位低 Oil-Low	0: 退出 1: 投入 0: OFF 1: ON	
33	油位高 Oil-High	0: 退出 1: 投入 0: OFF 1: ON	
34	压力释放 Press-Release	0: 退出 1: 投入 0: OFF 1: ON	
35	备用非电量 1 Backup Non-Ele1	0: 退出 1: 投入 0: OFF 1: ON	
36	备用非电量 2 Backup Non-Ele2	0: 退出 1: 投入 0: OFF 1: ON	

注：

1) 修改参数后，退出参数设置修改界面时，输入密码 ‘1000’ 进行参数保存

2) 若[PT 个数]设置为 2, “零序过电压”保护功能无效

Note:

1) After modifying the parameters, when exiting the parameter setting modification interface, enter the password ‘1000’ to save the parameters

2) If [PT number] is set to 2, the "Neutral Over-voltage" protection function is invalid

6.6 出口配置 Output-Config

序号 No.	出口名称 Output Name	定值范围 Setting Range	默认值 Default Value
1	过流Ⅰ段出口 OC-I	b00000000~b11111111	00001000
2	过流Ⅱ段出口 OC-II	b00000000~b11111111	00001000
3	过流Ⅲ段出口 OC-III	b00000000~b11111111	00001000
4	过流反时限出口 OC Inv-Time	b00000000~b11111111	00001000
5	过负荷出口 Overload	b00000000~b11111111	00001000
6	零序过流Ⅰ段出口 Neu-OC-I	b00000000~b11111111	00001000
7	零序过流Ⅱ段出口 Neu-OC-II	b00000000~b11111111	00001000
8	零序过流反时限出口 Neu-OC Inv-Time	b00000000~b11111111	00001000
9	低侧零序过流出口 Neu-OC-L	b00000000~b11111111	00001000
10	过电压出口 OV	b00000000~b11111111	00001000
11	低电压出口 LV	b00000000~b11111111	00001000
12	零序过电压出口 Neu-OV	b00000000~b11111111	00001000
13	低频减载出口 LF	b00000000~b11111111	00001000
14	系统失电出口 Loss S-Power	b00000000~b11111111	00001000

15	主变开门出口 Open-Door	b00000000~b11111111	00001000
16	负控跳闸出口 Load-Control	b00000000~b11111111	00001000
17	重瓦斯出口 Heavy-Gas	b00000000~b11111111	00001000
18	温度过高出口 Temp-High	b00000000~b11111111	00001000
19	压力释放出口 Pressure-Release	b00000000~b11111111	00001000
20	备用非电量 1 出口 Backup Non-Ele1	b00000000~b11111111	00001000
21	备用非电量 2 出口 Backup Non-Ele2	b00000000~b11111111	00001000
22	保留 Reserve	b00000000~b11111111	00000000
23	保留 Reserve	b00000000~b11111111	00000000
24	保留 Reserve	b00000000~b11111111	00000000
25	保留 Reserve	b00000000~b11111111	00000000
26	保留 Reserve	b00000000~b11111111	00000000
27	保留 Reserve	b00000000~b11111111	00000000
28	保留 Reserve	b00000000~b11111111	00000000
29	保留 Reserve	b00000000~b11111111	00000000
30	保留 Reserve	b00000000~b11111111	00000000
31	事故信号出口 Accident Signal	b00000000~b11111111	01000000
32	告警信号出口 Alarm Signal	b00000000~b11111111	10000000

注：出口配置定值从右往左按位依次对应出口 1~出口 8

Note: The fixed value of the outlet configuration corresponds to outlet 1 to outlet 8 in sequence from right to left

6.7 电能预置 Set-Energy

电能名称 Energy Name	定值范围 Setting Range
正向有功电能 EP+	0.00~99999999.99
反向有功电能 EP-	0.00~99999999.99
正向无功电能 EQ+	0.00~99999999.99
反向无功电能 EQ-	0.00~99999999.99

注：修改参数后退出参数设置修改界面时输入密码后，进行参数保存

Note: After modifying the parameters, when exiting the parameter setting modification interface, enter the password to save the parameters

6.8 本地调试 Debugging

菜单 Menu	备注 Notes
出口传动 Output-Tested	对 8 个出口进行测试。 8 Output Tested
通讯传动 Comm-Tested	用于测试测量值、保护值以及虚遥信的通讯上传功能 Communication upload function for testing measurement values, protection values, and virtual remote signals
事件模拟 Event-Simulation	用于模拟生成各类事件，测试通信 SOE 报文。 Used to simulate the generation of various events and test communication SOE messages.
系统复归 System-Reset	包括清除事件、恢复默认定值。 This includes clearing events and restoring default settings.

注：

a) 恢复默认定值：将所有定值组的保护定值、保护投退恢复为默认定值。

b) 进入本地调试界面需要先输入装置密码。

Note:

1) Restore default fixed values: Restore the protection fixed values and protection on/off of all fixed value groups to their default fixed values.

2) To enter the local debugging interface, you need to enter the device password first.

6.9 时间设置 Set-Clock

该界面进行装置时间的设置

This interface is used to set the device time

6.10 装置信息 Information

该界面显示“装置名称”、“软件日期”、“软件版本”、“校验码”、“BOOT 版本”信息

This interface displays information such as "device name", "software date", "software version", "verification code", and "BOOT version"

6.11 录波事件 Wave-Record

录波显示中“NO:”表示当前记录序号，“Num:”表示录波记录总数，如需查看其它记录，按“确定”键，此时光标落在当前记录序号上，可通过“↑”“↓”按键选择录波事件。

再次按确定键，光标消失，此时通过“↑”“↓”按键可以查看不同通道的故障波形：UA、UB、UC、U0、ia、ib、ic、3i0；其中 ia、ib、ic 为三相保护电流。

界面上“1/10”表示一共有 10 个周波，此界面显示 A 相保护电流前四个周波的波形。可通过“←”“→”键查看其它周波的波形，10 个周波中前 4 个波形是故障前波形，后 6 个波形是故障后波形，最大可存储 32 条波形。

In the waveform recording display, "NO:" represents the current record number, "Num:" represents the total number of waveform recording records. If you need to view other records, press the "OK" key, and the cursor will fall on the current record number. You can use the "↑" and "↓" buttons to select the waveform recording event.

Press the OK button again, and the cursor will disappear. At this time, the "↑" and "↓" buttons can be used to view the fault waveforms of different channels: UA, UB, UC, U0, ia, ib, ic, 3i0; Among them, ia, ib, and ic are three-phase protection currents.

On the interface, "1/10" indicates a total of 10 cycles, and this interface displays the waveforms of the first four cycles of the A-phase protection current. You can use the "←" and "→" keys to view the waveforms of other cycles. Among the 10 cycles, the first 4 waveforms are the pre fault waveforms, and the last 6 waveforms are the post fault waveforms. It can store up to 32 events.

附：说明书版本历史 Attachment: Version history of the instruction manual

说明书版本以及修改历史记录

Manual version and modification history

说明书版本 Ver		日期 Date	修改说明 information
源版本 Pre	新版本 Now		
	V1. 00	2024. 03. 15	基础版说明书 (Base Version)