

## I. Purpose

The HHD10 series phase - failure and phase - sequence protection relays (hereinafter referred to as protection relays) are suitable for forming a motor control circuit with switching appliances such as AC contactors in a power supply circuit of AC 50Hz and voltage 380V. When the main circuit of the motor has abnormal states such as phase - error, phase - failure, and voltage imbalance, the contacts of the switching appliance are timely disconnected to cut off the three - phase power supply of the motor, quickly and reliably protecting the motor.

The protection relay adopts a voltage - sampling method, which is independent of the motor's power size, and no setting or adjustment of any current level is required. The whole machine has advantages such as a wide application range, simple and convenient operation, and stable and reliable performance.

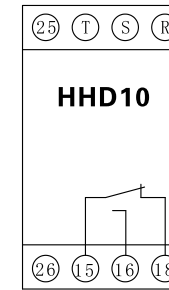
This series of protection relays complies with the relevant requirements of GB/T 14048.5.

## II. Model Specifications

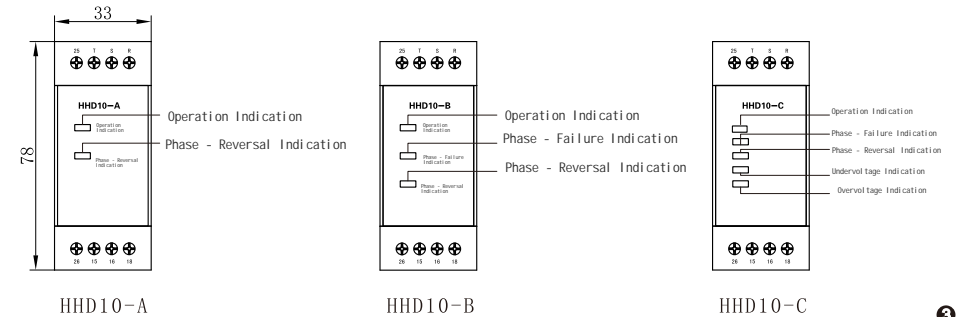
Model	Protection Function	Indicator Function	Contact Form
HHD10-A	Phase - sequence protection	Operation indication, phase - sequence protection indication	One set of normally open and normally closed contacts
HHD10-B	Phase - failure protection, three - phase voltage - imbalance protection, phase - sequence protection	Operation indication, phase - failure protection indication, phase - sequence protection indication	
HHD10-C	Overvoltage protection, undervoltage protection, phase - failure protection, three - phase voltage - imbalance protection, phase - sequence protection	Operation indication, phase - failure protection indication, phase - sequence protection indication, undervoltage protection indication, overvoltage protection indication	
HHD10-D	Overvoltage protection (adjustable), undervoltage protection (adjustable), phase - failure protection, three - phase voltage - imbalance protection, phase - sequence protection	Operation indication, phase - failure and reversal protection indication, over - and under - voltage protection indication	

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## IV. Wiring Diagram



## V. Outline and Cutout Dimensions Diagram (mm)



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## III. Main Technical Data

- Working power supply (control power supply voltage): three - phase 380V 50Hz, allowable fluctuation range is (85% - 110%) U<sub>e</sub>.
- Phase - failure protection: at the front - end of the voltage - sampling signals R, S, T of the product, if any phase in the three - phase power supply is phase - failed, the protection relay can operate reliably, playing the role of phase - failure protection.
- Phase - sequence protection: after the phase - sequence of the protection relay is identified, if any one phase - wire is swapped, the motor will fail to start, and the protection relay plays the role of phase - sequence protection.
- Voltage - imbalance protection: when the voltage imbalance between any two phases in the three - phase power supply reaches 50V - 75V, the protection relay can operate reliably, playing the protective role.
- HHD10 - C overvoltage protection: 445V - 465V (non - adjustable), delay 3s - 5s (non - adjustable); HHD10 - D overvoltage protection: 400V - 460V (adjustable on the panel), delay 0.5s - 5s (adjustable on the panel).
- HHD10 - C undervoltage protection: 290V - 310V (non - adjustable), delay 3s - 5s (non - adjustable); HHD10 - D undervoltage protection: 300V - 360V (adjustable on the panel), delay 1s - 10s (adjustable on the panel).
- Phase - failure protection action time: 3s - 5s.
- Phase - sequence protection action time: 0.2s.
- Contact capacity: 3A AC250V (resistive).
- Ambient temperature: - 5 - 40 .
- Altitude: 2000m.
- Humidity: when the maximum temperature at the installation site is 40 , the relative humidity of the air 50%; at lower temperatures, a higher relative humidity is permissible, such as 90% at 20 . Special measures should be taken for occasional condensation due to temperature changes.
- Pollution degree: grade 3.
- Installation methods: panel - mounted, rail - mounted.
- Conventional heating current I<sub>th</sub>: 5A.
- Rated insulation voltage U<sub>i</sub>: 400V.
- Rated impulse withstand voltage U<sub>imp</sub>: 4KV.
- Each rated operating voltage U<sub>e</sub> / rated operating current I<sub>e</sub> under the usage category: AC - 15 Ue : AC250V, AC380V, I<sub>e</sub>: 3A.

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## VI. Instructions for Use

### 1. Wiring and Precautions

Refer to the circuit example in Article 8. Connecting the protection relay into the power - supply control circuit can provide protection. Phase - failure at the front - end of the three - phase (A, B, C) voltage sampling of the protection relay from the three - phase power grid is protected, while phase - failure at the rear - end is not.

### 2. Phase - sequence and Phase - failure Protection

If the motor fails to start, swap any two phases of the three - phase power supply (A, B, C) input to the protection relay, then press the start button again. If the motor starts normally, the phase - sequence of the protection relay is identified. If the phase - sequence changes hereafter, the protection relay will function to protect. If the motor still does not start, check the three - phase circuit for phase - failure.

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### 3. Overvoltage and Undervoltage Value Setting (for HHD10 - D only)

The voltage scale value on the protector panel is an indicative scale. If the user wants to set it accurately, please adjust the potentiometer knob before formal use, subject to the actual measurement value. The "overvoltage value" setting knob is set slightly lower than the maximum upper limit of the allowable operating voltage of the protected equipment, and the "undervoltage value" setting knob can be set slightly higher than the minimum lower limit of the allowable operating voltage of the protected equipment.

### 4. Over - and Under - voltage Delay Value Setting (for HHD10 - D only)

"Overvoltage delay" is the time from when the working voltage exceeds the set voltage value to the protective action of the protection relay, and "undervoltage delay" is the time from when the working voltage is lower than the set undervoltage value to the protective action of the protection relay.

### 5. Contact and Indicator Light Status

When the protection relay is de - energized, its contacts 15 and 18 are closed, and 15 and 16 are open; in normal operation, its contacts 15 and 18 are open, 15 and 16 are closed, and the operation indicator light is on; in protection state, its contacts 15 and 18 are closed, 15 and 16 are open, the operation indicator light is off, and other indicator lights indicate the fault category.

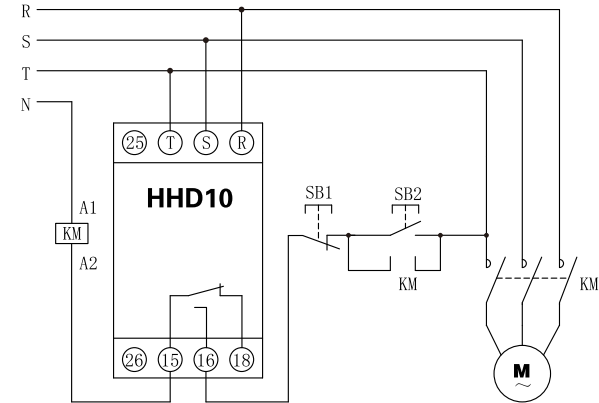
## VII. Installation and Dismantling Methods

1. Rail - mounted installation sequence: (1) (2) (3) (4)
2. Rail - mounted dismantling sequence: (5) (6)
3. Panel - mounted installation sequence: (1) (7) (8)
4. Panel - mounted dismantling sequence: (9) (10)

Note: The main circuit power supply must be cut off before installation or dismantling.

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## VIII. Application Circuit Example



Note 1: KM is an AC 220V contactor, (A1, A2) are its coil terminals.

Note 2: M is an AC motor.

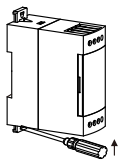
Note 3: SB1 and SB2 are stop and start buttons.

## IX. Ordering Instructions

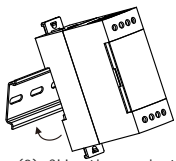
Please specify the product model, voltage class, quantity, and any special requirements should be noted separately.

For example: HHD10 - A AC380V, 100 pieces.

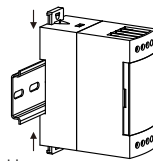
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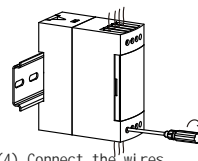
(1) Prise open the rail clamp.



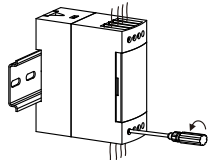
(2) Clip the product onto the rail.



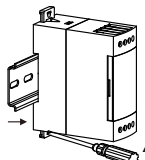
(3) Close the rail clamp.



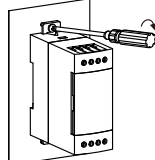
(4) Connect the wires according to the product terminal markings and tighten the terminal screws.



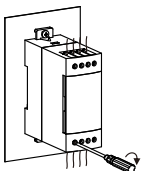
(5) Loosen the terminal screws and remove the wires.



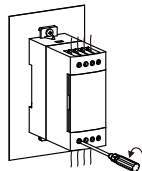
(6) Prise open the rail clamp and remove the product.



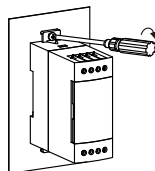
(7) Tighten the mounting screws.



(8) Connect the wires according to the product terminal markings and tighten the terminal screws.



(9) Loosen the terminal screws and remove the wires.



(10) Loosen the mounting screws and remove the product.

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**C-Lin** 欣灵

使用说明书  
Products Instructions

**HHD10 series**

Over - Undervoltage, Phase - Failure, Three - Phase Imbalance and Phase - Sequence Protector

Thank you very much for using C-Lin brand protector. Please read the instruction manual before using the product!

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