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HHD1F Motor Protector

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

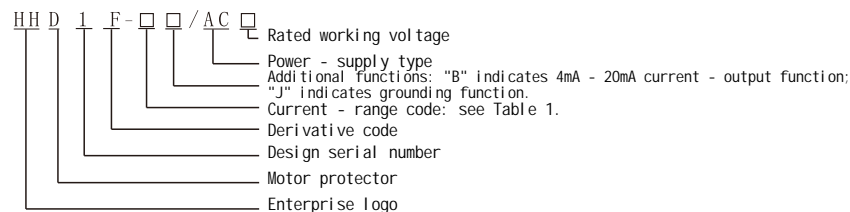
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I. Overview

HHD1F motor protector (hereinafter referred to as the protector) is applicable to the power - supply circuit with AC 50Hz, rated working voltage AC380V and below, and forms a motor control circuit with switching apparatus such as AC contactor. When the main circuit of the motor has abnormal working conditions like phase - failure, three - phase imbalance, overload, locked - rotor, etc., it promptly disconnects the contacts of the switching apparatus, interrupts the three - phase power supply of the motor, and protects the motor quickly and reliably.

The protector can directly set the motor protection current according to the rated current value marked on the motor nameplate, featuring accuracy, intuitiveness, and convenience. It adopts starting - avoidance technology, separating the starting - avoidance time from the overload time, and the overload action has good inverse time - limit characteristics. The protector uses fault - current self - locking technology. After fault protection, it displays the current value at the time of the fault, facilitating users to understand the cause and troubleshoot. The protector complies with the requirements of GB/T 14048.4 standard.

. Model and Its Meaning



. Normal Working Conditions and Installation Conditions

- Altitude: not exceeding 2000m.
- Ambient air temperature is - 5 to + 40 , and the average value within 24h does not exceed + 35 .
- Atmospheric conditions: when the maximum temperature is + 40 , the relative air humidity does not exceed 50%. At lower temperatures, higher relative humidity is allowed. For example, at + 20 , the air humidity can reach 90%. Special measures should be taken for occasional condensation due to temperature changes.
- The inclination of the installation surface to the vertical surface is not greater than $\pm 5^\circ$.
- Pollution grade: 3.
- In a place without significant shaking, impact, and vibration.
- Shell protection grade: IP40.
- Trip level: 10A class.

. Main Technical Parameters

- Main circuit: Rated insulation voltage U_i : AC400V, rated frequency 50Hz. Rated impulse withstand voltage U_{imp} 4kV.
- Auxiliary circuit: Rated insulation voltage U_i : AC400V, rated frequency 50Hz. Usage category AC - 15, U_e/I_e : AC380V/3A, AC220V/3A. Rated restricted short - circuit current matching SCPD model: NT00 5A.

Table 1 Main Technical Parameters

Model Specification	HHD1F-A	HHD1F-B	HHD1F-C
Setting Current Range Ie	0.5A~6.5A	1A~100A	20A~300A
Working Voltage US	AC220V 50Hz, AC380V 50Hz available for selection when ordering		
Fixed Delay	≤2s±20%		
Starting Avoidance Time	During the starting avoidance 5s±20%, it protects against phase - failure, locked - rotor, three - phase current imbalance, under - load, and grounding functions.		
Phase - failure Action Time	6s±20% (when any one - phase current in the three - phase power supply is zero), indicator light stays on.		
Three - Phase Current Imbalance Protection	6s±20% (when the current difference between any one phase and other phases reaches the set value), indicator light blinks.		
Overload Action Time	See Table 2		
Locked - Rotor Action Time	6s±20% (when the working current reaches 6.5 times the setting current and above)		
Under - Load Action Time	When the operating current < the set under - load percentage, it acts after the set delay time, indicator light blinks.		
Grounding Action Time	When the grounding current set value, action time 0.2s, indicator light stays on.		
Grounding Action Value Code	See Table 3		
Reset Method	Panel button reset, power - off reset, and automatic reset		
Contact Capacity	3A AC380V (resistive)		
Installation Method	Panel - mounted and 35mm din - rail compatible	Panel - mounted	
Fault Inquiry	Can query the last fault		

Table 2 Overload Action Time

Overload Inverse Time - Limit Action Code	Action Time								
	1.05 times	1.2 times	1.5 times	2 times	3 times	4 times	5 times	6 times	7.2 times
0*	Setting Value								
1	≤75s	≤32s	≤16s	≤8s	≤6s	≤5s	≤3s	≤3s	
2	≤180s	≤80s	≤38s	≤19s	≤12s	≤8s	≤5s	≤4s	
3 (10A)	≤350s	≤150s	≤80s	≤40s	≤22s	≤13s	≤8s	2s < Tp ≤ 10s	
4	≤500s	≤240s	≤120s	≤60s	≤33s	≤18s	≤12s	≤11s	
5	≤700s	≤300s	≤160s	≤80s	≤44s	≤24s	≤15s	≤13s	
6	≤850s	≤390s	≤200s	≤100s	≤55s	≤30s	≤18s	≤16s	
7	≤1000s	≤470s	≤240s	≤120s	≤70s	≤36s	≤21s	≤19s	
8	≤1200s	≤550s	≤280s	≤140s	≤80s	≤42s	≤24s	≤22s	
9	≤1400s	≤620s	≤310s	≤155s	≤90s	≤48s	≤27s	≤25s	

* a represents definite time - limit, operating current > 1.05 times the setting current.

Table 3 Grounding Action Value Code

Setting Value Serial Number	1	2	3	4	5	6	7	8	9
Grounding Current Value (mA)	30	50	100	150	200	250	300	350	400

Operation Method

(1) Description of Operation Button Functions

1. Reset Button: Press the "Reset" button in the setting state to return to the previous layer or exit the setting state; press this button to reset the protector after the protection action.

2. Test Button: Press this button in the setting state as the shift key, whose function is for the preset character position (the position blinks). Press this button in the standby state, the overload light and locked - rotor light turn on, and the digital tube displays 10 times the setting current value.

3. Data Button: Press this button once in the setting state, and the blinking bit increments by 1.

4. Setting Button: Press this button in the standby state to enter the parameter - setting interface or confirm the completion of the parameter setting and enter the next layer.

(2) Protection Parameter Setting

In the standby state (displaying "5FOP"), press the "Setting" button, and cyclically display "1.5Er", "2.BUG", "3.5UP" through the "Data" button.

1. 5Er ⇒ Press the "Setting" button to enter the setting - function menu, then press the "Test" button in sequence to select cursor shift, press the "Data" button for data modification. After a certain parameter is set, press the "Setting" button again to enter the next - item setting state (see Table 4 for specific settings) until the end. After all parameters are set, press the "Reset" button to return to the upper - level menu, exit the setting state, press the "Reset" button once more to exit the menu, displaying "5FOP".

2. BUG ⇒ Press the "Setting" button to query the last historical fault and clear all historical faults (see Table 5 for details). If "Error" is displayed and the corresponding fault name lights up while showing the fault value; if "NULL" is displayed, it indicates no fault; if

"CLR" is displayed and press the "Setting" button, then eliminate all historical faults.

3. 5Er ⇒ Press the "Setting" button to enter the function enable setting (see Table 6 for details).

Table 4 5Er Function Menu Setting (Enter by Pressing the "Setting" Button)

Operation Sequence	Display Content	Code Definition	Setting Range	
First press the setting button	F001	Current transformer change coefficient value	Setting range 1 - 200 (only valid for - A, invalid for other specifications)	1
Second press the setting button	R160	Rated current value	Setting should be within the protection value specification range	
Third press the setting button	t050	Starting avoidance time	Setting range 1.0 - 99.9s	5.0s
Fourth press the setting button	5--1	Overload inverse time - limit protection action code	Setting range 0 - 9	1
Fifth press the setting button	c002	Definite time - limit action time	Setting range 0.2 - 99.9s	0.2s
Sixth press the setting button	-40	Three - phase current imbalance percentage value	Setting range 10 - 89%	40%
Seventh press the setting button	d-6.5	Locked - rotor multiple	Setting range 3.0 - 6.5	6.5Ie
Eighth press the setting button	E-30	Under - load current percentage value	Setting range 20 - 89%	30%
Ninth press the setting button	r100	Under - load current protection time	Setting range 1.0 - 99.9s	10s
Tenth press the setting button	L--1	Grounding current value code	Setting range 1 - 9	1
Eleventh press the setting button	k--0	Reset mode	0 manual, 1 automatic	0
Twelfth press the setting button	LO50	Automatic reset time	Setting range 1.0 - 99.9s	5.0s

Note: When setting "F001" for the first time, when the rated current is greater than 6.5A, an external current transformer is required. Modify when needing to display primary current; set to "1" when displaying secondary current.

Table 5 2BUG Fault Inquiry (Enter by Pressing the "Setting" Button)

Operation Method	Display Content	Code Definition
Press the setting button	nULL	No fault
	Err 1	There is a fault (press the setting button to display fault information)
	cLr	Fault clearing

Table 6 3SUP Function Enable Setting (Enter by Pressing the "Setting" Button)

Operation Sequence	Display Content	Code Definition	Default Value
First press the setting button	P000	Need to enter the password to enter (the password is: 001)	
		Display "P-Err", this code indicates: wrong password input	
Second press the setting button	0--1	Relay output status (0 represents no - pull - in when energized, 1 represents pull - in when energized)	1
Third press the setting button	--1	Three - phase imbalance function (0 represents turning off this function, 1 represents turning on this function)	1
Fourth press the setting button	d--1	Locked - rotor function (0 represents turning off this function, 1 represents turning on this function)	1
Fifth press the setting button	E--1	Under - load function (0 represents turning off this function, 1 represents turning on this function)	0

(3) Fault indication:

When the protector detects a motor fault, the corresponding fault action light turns on, and after the action, the digital tube displays the corresponding motor fault value.

VI. Current output formula (4mA - 20mA)

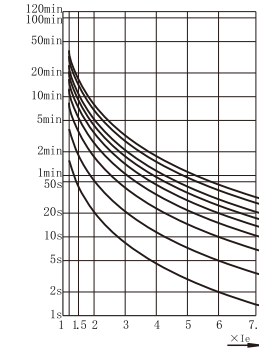
$$I_o = \frac{I_{max}}{I_r} \times 16 + 4$$

I_o : is the 4mA - 20mA output current

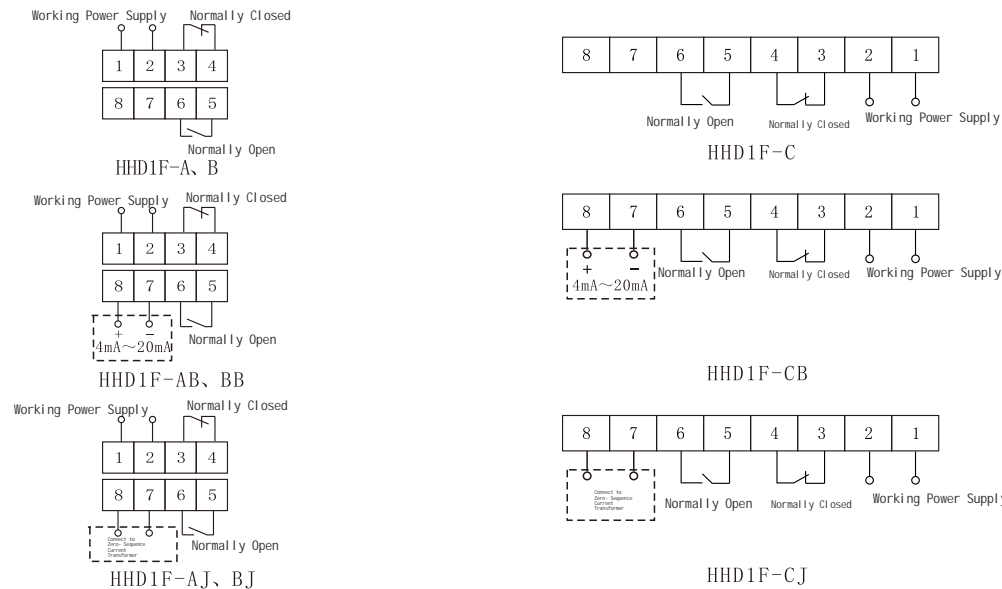
I_{max} : is the three - phase maximum operating current

I_r : is the setting current

VII. Inverse time - limit characteristic diagram of overload protection



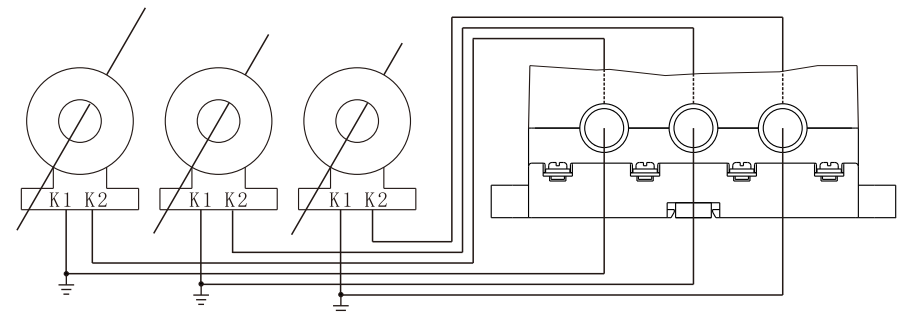
VIII. Wiring Diagram



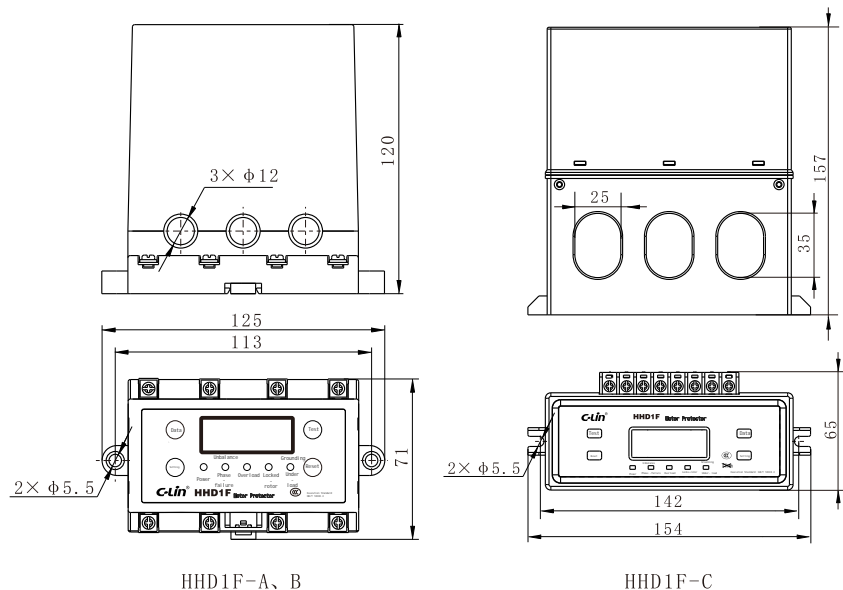
Note: The parts within the dashed box are optional function terminals, choose one of the two optional functions.

IX. Transformer Wiring Method

The wiring method of the transformation - ratio transformer is shown in the following diagram: it is only applicable to HHD1F - A, and other specifications are not applicable.



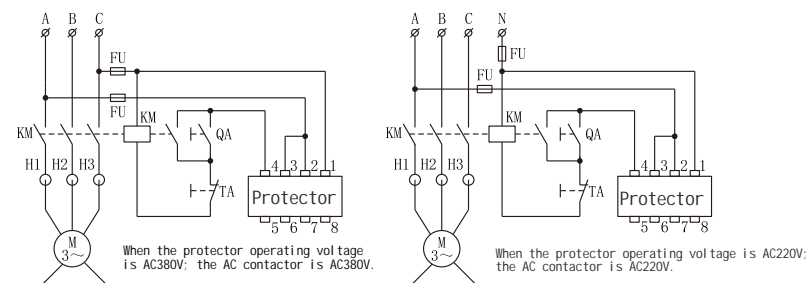
X. Overall and Installation Dimensions (mm)



HDD1F-A, B

HDD1F-C

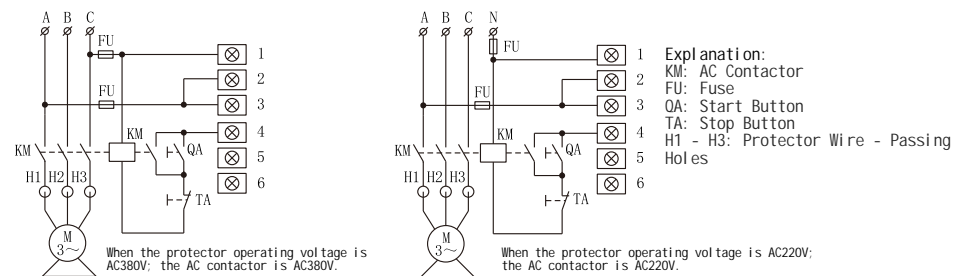
XI. Application Circuit Examples



When the protector operating voltage is AC380V; the AC contactor is AC380V.

When the protector operating voltage is AC220V; the AC contactor is AC220V.

HDD1F-A, B



When the protector operating voltage is AC380V; the AC contactor is AC380V.

When the protector operating voltage is AC220V; the AC contactor is AC220V.

HDD1F-C

Explanation:
 KM: AC Contactor
 FU: Fuse
 QA: Start Button
 TA: Stop Button
 H1 - H3: Protector Wire - Passing Holes

XII. Instructions for Use

1. Installation and Adjustment:

- Refer to the application circuit example to correctly connect the protector to the control circuit (it is advisable to fix the protector below the AC contactor, and the three - phase current wires pass through the three wire - passing holes of the protector in the same direction respectively).
- Power - on test: Connect the power supply, and the power (red) indicator light turns on. Press the test button, the overload indicator (red light), locked - rotor indicator (red light), and the digital tube displays 10 times the setting current value. At the same time, the internal relay of the protector acts for protection. Press the reset button, the internal relay of the protector resets, and the overload indicator (red light), locked - rotor indicator (red light) go out, which means the protector functions normally.
- Refer to the rated current value marked on the motor nameplate, and directly set the setting current value according to the motor load rate.
- Start the motor, the power indicator light turns on, the overload indicator light turns on, other indicator lights do not turn on, and the current display is the starting current of the motor. After the start - up is completed and the motor enters normal operation, the overload indicator light goes out, the current display is the operating current of the motor, and the entire adjustment process is completed

2. Precautions:

- Relay output contacts of the protector: For example, HDD1F - A by default: before power - on and after protection execution, terminals 1 and 2 are normally open, and terminals 3 and 4 are normally closed; at the moment of power - on and during normal operation, terminals 1 and 2 are normally closed, and terminals 3 and 4 are normally open. If the "0 - 1" (relay output status) in the "Function Enable Setting" menu is modified to "0 - 0", the output contact status is changed to: before power - on, during operation and standby, terminals 1 and 2 are normally open, and terminals 3 and 4 are normally closed; after the fault protection is executed, terminals 1 and 2 are normally closed, and terminals 3 and 4 are normally open.

- When the motor shuts down normally for 1 minute, the digital tube turns off the display. When the motor is restarted or any button is pressed, it restores the current display, featuring energy - saving and power - saving functions; when the motor shuts down due to a fault, the protector displays the fault current data, and the display will not turn off automatically.
- After the protector performs a protection action, the load can be restarted only after the cause is identified, to prevent damage to the motor.
- When the items in "Function Enable Setting" of Table 6 are modified, the user should keep corresponding records. For example, the "relay output status" enable item is directly related to the secondary wiring problem. If the product is returned to the factory for maintenance or other situations, the product setting list may be disrupted.
- The rated current of the motor must be within the setting range of the protector; otherwise, the motor will not be effectively protected.

XIII. Ordering Information

When selecting a protector, the model specification, power supply voltage, and quantity should be specified.

Example 1: HDD1F - B, AC220V, 10 units, indicating a protector with a current specification of 1A - 100A and a power supply of AC220V.

Example 2: HDD1F - CB, AC380V, 10 units, indicating a protector with a current specification of 20A - 300A, power supply of AC380V, and with 4mA - 20mA function.

Example 3: HDD1F - CJ, AC380V, 10 units, indicating a protector with a current specification of 20A - 300A, power supply of AC380V, and with grounding function.