

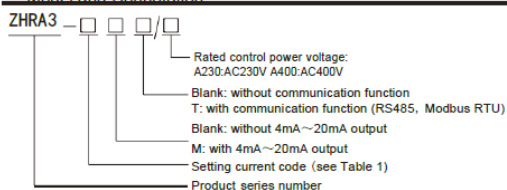
ZHRA3

Operating Instructions for ZHRA3 Series Motor Protector

Function Features

- High-performance, reliable micro controller resistant to interference.
- Split-type design.
- Many protective functions, such as over-loading, under loading, phase failure, locked-rotor, temperature, grounding and unbalance, etc.
- Protective parameters are set through the front panel.
- Over-load protection is of inverse-time limit characteristic with five releasing grades available.
- It has backlit LCD display. Information such as current and failure status. The measuring accuracy of current is 5%.
- RS485 communication interface is available and it supports Modbus protocol. Networking communication can be realized.
- It has one set of change-over contacts and one set of auxiliary normally open contacts. Star-delta and auto voltage reducing start can be realized.
- 4mA-20mA analog quantity output interface is available.

Model and Connotation



Setting current code	Rated working current
5	1A - 5A
10	2A - 10A
30	6A - 30A
50	10A - 50A
200	40A - 200A

Main Technical Parameters

Rated frequency	50Hz
Current measuring accuracy	5%
Rated working voltage	AC400V-AC690V
Number of poles	3P
Rated insulation voltage	AC690V
Protection degree of the case	IP20
Pollution level	3
Contact parameters	12 ¹ 1H 10A: 5A; AC-15A: Ue/Ie AC400V/0.95A AC240V/1.5A
Electrical service life	10 ⁵
Mechanical service life	10 ⁶
Height above sea level	2000m
Working environment temperature	-20°C~50°C
Allowable relative humidity	≤50rH
Storage temperature	-25 55, up to 70°C (Over24h)
Resetting method	Power-off resetting & push-button resetting
Power dissipation	1.5 VA
Capability of the connection terminals to connect the wires	2 - 5mm ² ± 0.5mm ²
Installation method	Panel & DIN rail installation

Panel Diagram

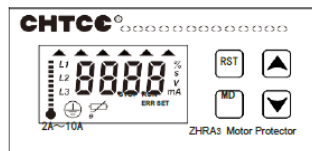
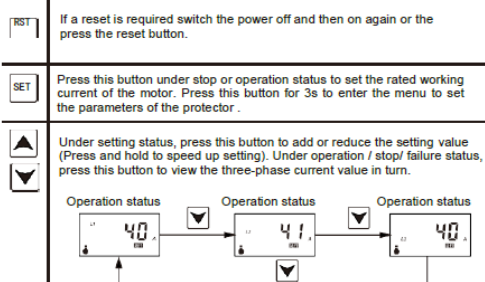
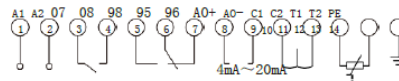


Illustration of the Buttons

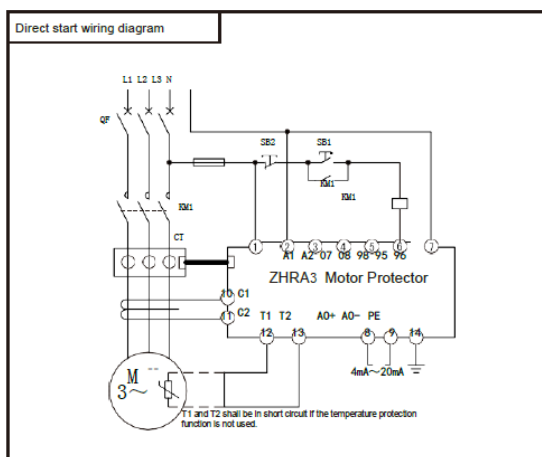


Connotation of the Connection Terminals



Note:
C1 and C2 connect to the ZCT. Keep them open if not used.
T1 and T2 connect to the thermistor built in the motor. Keep them shorted if not used.

Wiring Diagram



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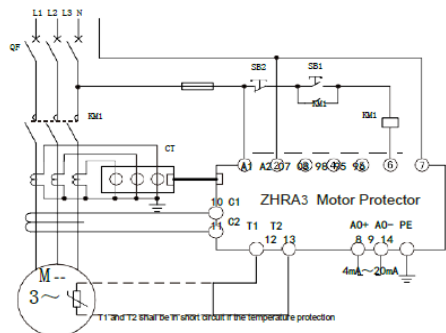
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Sales	010 202 3400
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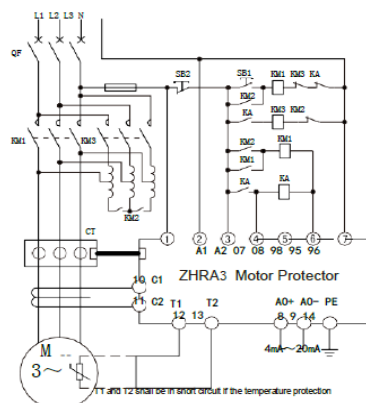
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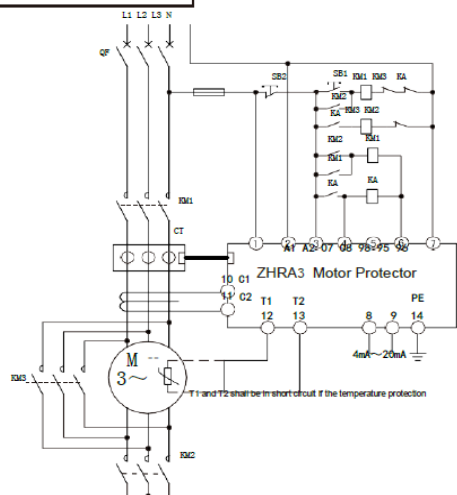
Secondary current start wiring diagram



Auto-induction voltage-reduced start wiring diagram



Star-delta start wiring diagram



Current Setting

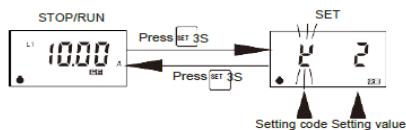
This product complies with GB14049.1 standard

The operation of current setting is shown below. When setting the current, the protector will quit the current setting status automatically if the buttons are not operated for over 60s. If the keyboard is locked, the current cannot be set.



Parameter Setting

Press the setting key for 3s to enter the parameter setting menu of the protector under stop or operation status, which is shown below



Under parameter setting status, short press the setting key to change the setting code. Press the up and down key to change the setting. Under setting status, long press the setting key for 3s to quit the setting status at any time. The setting parameters of the protector are shown in the table below.

Setting options	Setting code	Factory default	Setting value	Press the setting value to change
Tripping grade	2	2	1-2-3-4-5	
Start time	9	004	Setting range: 2s~120s	
Unbalanced current	P	40	Setting range: 20%~90%	
Ground-fault current	L	500	Setting range: 50mA~500mA	
Block running ratio	F	OFF	Setting range: closed or 1.2 times ~6.0 times. OFF means closed	
Blocking running action time	E	10	Setting range: 2s~30s. This option will not exist when the blocking running function is closed.	
Communication address	8	888	Setting range: 3~127	
Baud rate	b	96	96 9600bps 192J19200bps	
Auxiliary contact	E	OFF	Setting range: closed, or 1s~(start time-1)s, OFF means closed.	

Note:

- Under the setting status, the protector will quit the current setting status automatically if the keys are not operated over 60s.
- Under the setting status, all the protective functions of the protector are invalid. Therefore, it is suggested for the users to set the parameters of the motor under stop status and start the motor after the setting is completed.

Action Features

The action features of the protector of this series will be affected by ambient temperature. The action features include:

- Over-loading reverse limit protection: when the current is over 11 times the setting current, the protector will start over-loading reverse limit protection. The protector will simulate the heat accumulation of the motor and calculate the corresponding operation time according to the over-loading grade and the over-loading current. When the heat accumulation value is full, the protector will lock the contact to protect the motor. The over-loading current and the operation time are shown in Table 1 and Fig. 1 below.

Table 1: Over-loading limit features table (error: ±5%)

Fig1

Over-loading times trip time (s)	1.0	1.2	1.5	2	5	6	7.2	备注
Kr=1	63	40	22	3.6	2.5	1.8	5	
Kr=2	125	80	45	7.2	5	3.5	10A	
Kr=3	250	160	90	14	10	6.9	10	
Kr=4	500	320	180	29	20	14	20	
Kr=5	750	480	270	43	30	21	30	

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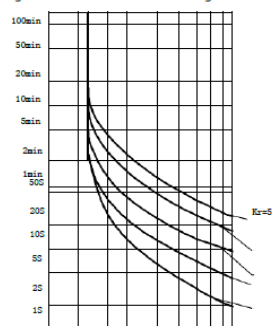
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Fig 1 Inverse time limit features diagram



Not influenced by the environment temperature

2. Locked-rotor protection feature: when the "block running" function is on and the over-loading current conforms to the following formula, the protector will take action after the preset time period.

$$I_{max} \cdot I_r \cdot \text{Action time of blocking running protection}$$

preset I_{max} : Maximum phase current value

I_r : Setting current value

3. Unbalanced current action feature: when the current value of three phases conforms to the following formula, the protector will take action. The action time is 3s.

$$\text{Unbalance rate of the three-phase current} = \frac{\max_{i=1}^3 |I_i - I_{avg}|}{I_{avg}} \leq 100\%$$

I_i : Effective current value of each phase

I_{avg} : Average current value of three-phase current

4. Phase failure action feature: when the current of any of the three-phase of main circuit is zero, the protector will take action. The action time is 3s.

5. Grounding protection action feature: the grounding failure protection of the protector is realized through the external zero sequence mutual inductor. When the zero sequence current = the grounding protection current value set, the protector will take action. The action time is 1s.

6. Temperature protection feature: the over-heating protection of the protector is realized through the PTC thermistor embedded in the motor. When the resistance value of the PTC thermistor = 3.6k Ω , the protector will take action. When the resistance value of the PTC thermistor is =650 Ω , the protector will be reset.

Other Instructions

1. Analogue 4-20mA output interface: 20mA corresponds to 2 x the setting current value of the protector. Example: when the setting current value is 15A, 20mA corresponds to a current value of 30A. 4mA corresponds to a current value of 0A. This is a 2 wire interface.

2. Check that the rated current of the motor is within the adjusting range of the protector before installation.

3. When the operational current is lower than 25% of the minimum setting current value, the protector will show "0A".

4. When the protector is ON (and the motor is not started), the protector is under stop status. The LCD will show "stop".

When the motor is started and the protector detects that the current of the major circuit is $\geq 25\%$, the protector is under start status. The LCD will show operation (Flashing). when the motor is operating normally the protector is under normal operation status and the LCD will show operation (No Flashing). If the motor fails, the LCD will indicate failure current and cause.

If the protector needs resetting, switch the power off and on again or press the reset button.



5. Communication function: the protector provides RS485 communication interface and supports Modbus protocol. If networking communication is needed, please contact us. We will provide you with detailed communication standards.

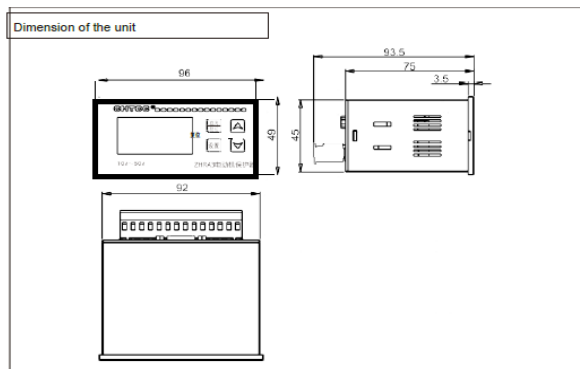
6. Please make temperature protection input terminal T1 and T2 shorted if not used.

7. Check the performance of the protector regularly. Carry out over-loading and phase failure tests.

8. The installation type is split type installation.

9. Use shielded twisted pair to connect the mutual inductor and the host. The connection cable (shielded twisted pair) between the host and the CT should be less than 5m. The factory standard configuration of the cable is 1m long. Please specify the length you need when placing an order.

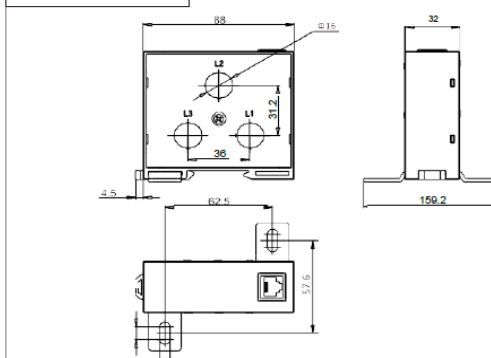
Diagram of Overall Dimensions



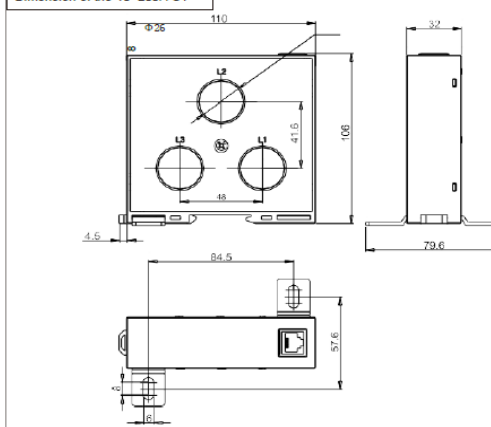
Panel Cut-Out size for the unit



Dimension of the 1-50A CT



Dimension of the 40-200A CT



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Packing List

Name	Quantity	Remarks
Host machine	1	
CT	1	
1m connecting cable	1	For connecting the unit and the CT
Installation module	2	For installing the unit
Installation plates	2	For installing the CT



Warning

1. This product should be installed, operated and maintained by qualified personnel.
2. User shall not dismantle or repair the UNIT without permission, we shall not assume any responsibility for the accident as a result thereof.
3. Please refer to the wiring diagram in Operation Instructions when installing arranging wires.
4. Never place power input line in the same conduit with other wires with heavy current. Please use shielded wire if necessary so as not to bring about interference that may influence the normal operation of relay.
5. Do not use this product in areas with dust, corrosive gases and with exposure to direct sunlight and rain.
6. Never use this product in medium with explosion hazard and with gases that may corrode metals and destroy the insulation, and do not use this product in a space with conductive dust.
7. Please store and use this product at rated supply voltage and stated temperature, height above sea level and humidity.
8. Failure to follow these instructions can result in death, serious injury, or equipment damage.
9. The warranty period of this product shall be 18 months under normal use.

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