

YCM8YV series


Electronic Liquid Crystal Molded
Case Circuit Breaker

OPERATION INSTRUCTION

Standard: IEC60947-2

CNC

Deliver
Power For Better Life

 Before installing and using this product,
please read this manual carefully and
pay more attention to safety.

YCM8YV series

Electronic Liquid Crystal Molded Case Circuit Breaker

1 Purpose

The rated insulation voltage of YCM8YV series electronic liquid crystal molded case circuit breaker is 1000V. It is suitable for the distribution network with AC 50Hz, rated voltage of 400V and below and rated current up to 800A. Under normal circumstances, the circuit breaker can be used for infrequent switching of circuits and infrequent starting of motors. It can protect the circuits from overload and short circuit, as well as over-voltage, under-voltage and phase loss.

standards: IEC60947-2

2 Working Environment

(1) The ambient temperature is $-5^{\circ}\text{C} \sim +40^{\circ}\text{C}$, and the altitude is no more than 2,000m.

(2) Atmospheric conditions: the max. temperature is 40°C , and the relative humidity of air is not more than 50%; higher relative humidity can be allowed at lower temperature like 90% at 20°C . Special measures shall be taken for occasional

condensation due to temperature change.

(3) The external magnetic field of the installation site shall not exceed 5 times of the geomagnetic field in any direction, avoid large electromagnetic interference (such as high-power motor or frequency converter) near the product, explosive and corrosive gas, as well as invasion by rain and snow, and keep the place dry and ventilated.

(4) Class of pollution: Class 3; installation category: III.

3 Symbol Description

I _{mn}	Controller frame current	I _n	Rated current of controller
I _R	Setting current of overload long time delay tripping	T _R	Setting time of overload long time delay
I _{sd}	Setting current of short-circuit short time delay tripping	T _{sd}	Setting time of short-circuit short time delay
I _i	Setting current of short-circuit instantaneous tripping	U _{vo}	Over-voltage protection action value
T _{vo}	Over-voltage protection action delay value	U _{vor}	Return value of over-voltage protection action failure
U _{vu}	Under-voltage protection action value	T _{vu}	Under-voltage protection action delay value
U _{vur}	Return value of under-voltage protection action failure	I	Main circuit current

4 Product Function Description

Table of characteristics & functions of intelligent protection controller:

Table 1: Characteristics & Functions of Product

Spec. & Functions			
Classification	Description	●	
Display Mode	LCD+LED indicator light	●	
Interface operation	Key	●	
Protective functions	Current protection	Overload long time delay protection	●
		Short-circuit short time delay protection	●
		Short-circuit instantaneous protection	●
		Overload pre-alarm function	-
	Voltage protection	Under-voltage and over-voltage protection functions	-
		Phase loss protection function	●
		Protection function of fault neutral line at power supply side	○
		Protection function of voltage loss and trip at power supply side	●
	Communication function	DL/T 645-2007 Multi-functional meter communication protocol	○
		Modbus-RTU communication protocol	○
		Communication hardware 1-channel RS-485	-
	Function of external DI/O port	Auxiliary communication power input	●
		1-channel DI/O programmable control input	●
		1-channel passive contact output	-
	Fault record	Storage of 10 times of trip faults (the upper computer needs to read the feedback information uploaded each time for query of more records.)	●
		Record of max./min. voltage and current in 30 days	●
		Record of 10 self-check events of protector	-
Record of 80 protection function enable/disable events		●	
Record of 10 gate position change events		●	
Record of 10 alarm events		●	
	Record of 10 times of high voltage power loss and recovery	●	
Time function	With the function of real-time clock which consists of YY, MM, DD, hh, mm and ss.	●	

Notes: symbol "●" indicates that this function is available; symbol "○" indicates that this function can be selected; and symbol "-" indicates that this function is not available.

4.1 Voltage protection function

4.1.1 Over-voltage protection function +-

Over-voltage protection is a protection function designed for circuit over-voltage. The protection mode of the controller may be trip or data alarm. See Table 2 for the setting range, setting value, action characteristics and error range of protection characteristics.

Table 2 Over-voltage Protection Characteristics

Description of parameter settings	Setting range	Setting step size	Action characteristics
Over-voltage threshold U_{vo}	253V~286V	1V	$\geq 1.0U_{vo}$, delayed action
Delayed action	1~10s	1s	Definite time-lag
Return threshold U_{vor}	$U_{vor} = U_{vo} - 10V$	—	$\leq 1.0U_{vor}$, return
Delayed return	1s	—	Definite time-lag
Operating mode	Trip without alarm + Alarm without trip + No trip or alarm		
Protection error	$\pm 2\%$ (voltage)		

4.1.2 Under-voltage protection function

Under-voltage protection is a protection function designed for circuit under-voltage. The protection mode of the controller may be trip or data alarm. See Table 3 for the setting range, setting value, action characteristics and error range of protection characteristics.

Table 3 Under-voltage Protection Characteristics

Description of parameter settings	Setting range	Setting step size	Action characteristics
Under-voltage threshold U_{vu}	154V~187V	1V	$\leq 1.0U_{vu}$, delayed action
Delayed action	1 ~ 10s	1s	Definite time-lag
Return threshold U_{vur}	$U_{vur} = U_{vu} + 10V$	—	$\geq 1.0U_{vur}$, return
Delayed return	1s	—	Definite time-lag
Operating mode	Trip without alarm + Alarm without trip + No trip or alarm		
Protection error	$\pm 2\%$ (voltage)		

4.1.3 Phase loss protection function

The phase loss protection function indicates that when any phase of Phases A, B and C is lost at the switching power supply side, there will be a switch protection trip and the action time is less than or equal to 1s.

4.2. Current protection function

4.2.1 Overload long time delay protection function

The overload long time delay adopts inverse time-lag protection mode, and its current-time characteristic curve is as follows:

$t = k \cdot TR$ (t: actual action time of inverse time-lag protection)

Setting range of overload long time delay protection current setting value $I_R = (0.4 \sim 1.0) \times I_n$; step size 1A.

Setting range of overload long time delay protection action time $T_R = 3\sim 18s$; step size 1s.

See Table 4 for overload long time delay protection characteristics.

Table 4 Overload Long Time Delay Protection Characteristics

Setting range								Action time
Current I		Action time t						(1)
$\times IR$	1.05IR	T_R	$I \leq 1.05IR$, no action within 2h					$\pm 10\%$
(1)	1.30IR	(1)	$I \geq 1.3IR$, action within 1h					(1)
(1)	2.0IR	(1)	27s	45s	90s	108s	162s	(1)
(1)	6.0IR	(1)	3s	5s	10	12s	18s	(1)

4.2.2 Short-circuit short time delay protection function

Definite time-lag protection characteristic is adopted for short-circuit short time delay protection by default.

Definite time-lag protection characteristic: $t = T_{sd}$
($T_{sd} = 0.1\sim 1.0s$)

Setting value of short time delay current: $I_{sd} = (2\sim 10) * IR$; adjust step size 1.0IR.

Short time delay protection characteristic: $I < 0.9I_{sd}$, no action; $I \geq 1.1I_{sd}$, action

Time accuracy of short time delay protection: $\pm 10\%$

4.2.3 Short-circuit instantaneous protection function

Instantaneous protection refers to the tripping

protection without any time delay except for the inherent execution time of the controller when the instantaneous short-circuit current is generated.

Setting value of instantaneous protection: $I_i = (2 \sim 12) * I_R$; adjust step size $1.0I_R$.

The user can select $\times I_R$ or $\times I_n$ for instantaneous protection as needed, and the product default is $\times I_R$.

Instantaneous protection characteristic: $I < 0.85I_{sd}$, no action; $I \geq 1.15I_{sd}$, action

Inherent action time of instantaneous protection controller: $< 200\text{ms}$.

4.2.4 Overload pre-alarm function

The default overload pre-alarm is $1.0I_R$. The alarm forms include LED indicator light alarm, display interface indication alarm and upper computer communication data alarm.

Overload pre-alarm characteristic: $I \geq 1.13I_R$ alarm start; $I < 1.05I_R$ alarm disabled.

4.3 Communication function

4.3.1 Communication mode

In the communication network, the controller is a data terminal device that can receive information from and exchange information with the master station. All the data and alarm modes of the controller must be obtained by querying from the master station, and the function of data upload to

the master station is not supported, unless otherwise specially customized by the user. The physical layer interface of the controller is RS-485 serial electrical interface by default, which supports half-duplex communication mode. Communication rate setting range: 600bps, 1200 bps, 2400bps, 4800bps, 9600bps, 19200bps; and the effective communication transmission distance is less than or equal to 1,200m.

4.3.2 Communication protocol

Communication protocol supporting:

DL/T 645 low voltage molded case circuit breaker communication protocol (Jiangsu version - without current leakage protection);

Modbus-RTU communication protocol (user customized)

4.4 External interface function

4.4.1 Interface description

This controller has 7-channel external interface input and output functions by default, including:

1-channel N-phase power supply wiring

1-channel communication auxiliary power input (DC12V\AC24V), used for the communication

function of the controller to support the work of the controller in case of a power failure of the main circuit

1-channel programmable DI/O input function, the input mode is passive node input: when the node of

one channel is connected, the switch is closed; when the other is connected, the switch is opened; the two nodes cannot be connected at the same time
1-channel grounded input, with auxiliary power supply and DI/O input.

3-channel RS-485 communication input interface, including R_A+, R_B- and R_GND.

Refer to the corresponding specific product interface identification for specific interface and wiring method.

4.5. Fault and alarm function

4.5.1. Fault recording function

See Table 1 Characteristics & Functions of Product for specific record type.

4.5.2 Alarm function

The controller supports various fault alarm indication and data recording functions with delay protection function. Data alarm function can be "Enabled" or "Disabled" through "Data Alarm" setting item in "Function Settings" menu. (In the communication protocol, control word 1: Bit6=0 all disabled, Bit6=1 all enabled)

4.6 Real-time clock function

4.6.1 Clock function

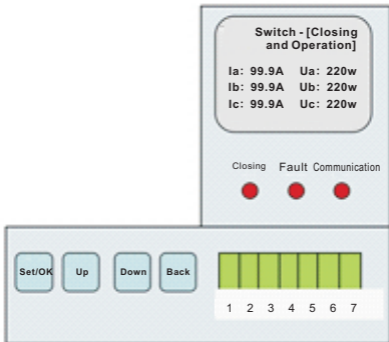
Real-time clock consists of YY, MM, DD, hh, mm and ss. For the controller with clock function, the user can modify the time and date through "Time Settings", and it also supports the clock setting through communication broadcasting timing.

5. Setting and Use of Product Functions

5.1.1 Operation interface

The operation interface of the controller is shown in Fig. 1. The interface consists of a LCD window, 3 LED function indicator lights and 4 function keys.

Fig. 1: Controller Operation Interface



1-RS485-A, 2-RS485-B, 3-GND, 4-DIO-Opening, 5-DC12V, 6-Null, 7-N-phase input (required for Class 3)

5.1.2. Function definition of LED indicator lights

Closing light: when the switch is in the closing state, the indicator light is always on, and when it is in the opening state, the indicator light is off.

Fault light: in case of a fault alarm of switch, the indicator light will flicker, and it will always be on when the switch is locked.

Communication light: in case of data exchange between the switch and upper computer communication, the indicator light will flicker.

5.1.3. Definition of key functions

Up key: when the switch is in the setting state, scroll up on the menu or increase data. In normal operation state, press and hold this key for 4-5s to enter the remote communication address setting state.

Down key: when the switch is in the setting state, scroll down on the menu or decrease data. In normal operation state, press and hold this key for 4-5s to enter the interface of current, voltage and automatic correction (this function is only for automatic calibration coefficient during production and debugging of the product!).

Set/OK key: in any state of the switch, press this key to enter the main menu interface of the controller. When the switch is in the setting state, press this key to enter the menu selected or set the data storage operation.

Return key: when the switch is in the setting state,

press this key to exit from the setting menu operation; to unlock and return to normal operation state when the switch is in the locking state; to abandon the storage operation when in data setting state; to return to the previous menu from a sub-menu.

5.1.4. Definition of key operation

Press: press and hold a key for a short time (less than 1s) and then release it;

Long press: press a key and hold it for 3s-5s and then release it;

Continuous pressing: press a key continuously at an interval of less than 1s.

5.1.5 Interface display state

The display state of the controller is divided as normal operation state, alarm state, fault locking state and man-machine operation state.

5.1.5.1 Normal operation state

The normal operation state refers to the state content of LCD and indicator light when the switch is closed without controller fault or alarm. Under normal operation condition, LCD is divided into 3 screens (2 screens without company LOOG) to display the real-time current, voltage, residual current and other information of the current main circuit in turns. Fig. 2-a, Fig. b and Fig. c are LCD screens for normal operation.

Fig. 2 Normal Operation Interface

Switch - [Opening locking]
Ia = 250A Ua = 220V
Ib = 250A Ub = 220V
Ic = 250A Uc = 220V

Fig. 2-a

Rated current - 250A
I _r :250A Tr: 3s
I _{sd} : 8I _r I _i :10I _r
19/01/18-13:30:35

Fig. 2-b

Corresponding company
LOOG
XXXXXXXXXXXX

Fig. 2-c

Under the normal operation interface, the "Closing" indicator light is always on, and the "Operation" indicator light flickers (if any).

Display description of normal operation interface:

Fig. 2-a: when the switch is in opening state:

Switch - [Opening and Locking]; when the switch is

in closing state: Switch - [Closing and Operation]

Fig. 2-b Display of current three section protection setting value and real-time clock display

5.1.5.2 Alarm state interface

The alarm state interface refers to the alarm information interface displayed by the controller in case of a fault trip delay and fault alarm without trip, such as several alarm interfaces shown in Fig. 3. Meanwhile, the "Fault" indicator light flickers for alarm.

Fig. 3 Alarm State Interface

19-01-07 Overload trip 10:03:15
Ia:300A Ib:200A
Ic:200A
Threshold Setting: 250A

19-01-07 Over-voltage trip 10:03:15
Ua:220V Ub:280V
Uc:220V
Threshold Setting: 275V

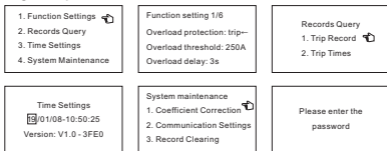
19-01-07 Under-voltage trip 10:03:15
Ua:220V Ub:220V
Uc:155V
Threshold Setting: 160V

The anti-black display in the fault interlocking interface indicates the fault phase.

5.1.5.4 Man-machine operation interface

The man-machine operation interface refers to the interface information displayed in partial setting query states, such as several operation indication state interfaces shown in Fig. 5.

Fig. 5 Operation Indication Interface



The above operation instructions only list partial interfaces. Please operate according to different interfaces.

"↔" indicates that there is sub-menu data, and "←" or "box" indicates the currently settable data options.

5.2 LCD operation

5.2.1. Main menu operation

In any state of the switch, the user can press the "Set" key to set parameters or query information. Special tips: in the switch locking state, the cause of switch trip shall be determined first, and then the "Set" key can be pressed to enter the setting menu after removal of fault.

Operation method: press the "Set" key, and the controller will enter the main menu of settings, as shown in Fig. 6. Then, click "▲+" and "▼-" to browse the menu information up or down. Browse to the current menu, and click "OK" to enter the sub-menu corresponding to this item.

The main menu consists of 4 function menus as follows: 1. Function Settings; 2. Record Query; 3. Time Settings; and 4. System Maintenance.



Fig. 6

5.2.2 Function setting options

In the function "Setting Menu 1/6", 1 represents the contents displayed on the first screen at present, and 6 indicates that there are 6 screens in the menu.

Click "Up" or "Down" key under "Function Settings" menu to browse parameter setting options. Click "OK" at the parameter setting item pointed to by "←", and this parameter can be used for setting of partial the anti-black display. At this time, the user can set the parameter or function through "Up" or "Down" key, and store it by pressing "OK" or "Back" key to abandon this setting. Operate by the steps shown in Fig. 7.

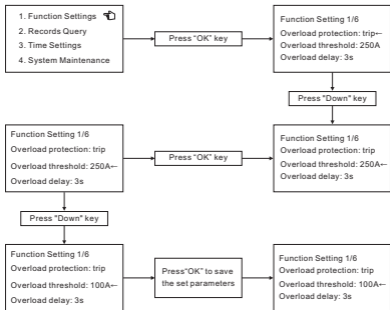


Fig.7

All parameter setting items and setting ranges of function setting menus are shown in the Table below:

Set Parameter Menu	Set Item	Parameter Setting Range	Factory Defaults
Function setting 1/6	Overload protection function	Closing, alarm, trip	Trip
	Overload current threshold	$IR = (0.4 \sim 1.0) \times I_n$, 6-time inverse time-lag curve	$1.0I_n$
	Overload action delay	3~18s	3s

Function setting 2/6	Short-circuit short time delay protection	Closing, alarm, trip	Trip
	Short-circuit short time delay threshold	$I_{sd} = (2 \sim 10) \times I_R$	$8I_R$
	Short-circuit short time delay time	0.1~1.0s	0.3s
Function setting 3/6	Short-circuit instantaneous protection	Closing, alarm, trip	Trip
	Short-circuit instantaneous threshold	$I_i = (2 \sim 12) \times I_R$	$10I_R$
	Data alarm function	Enabled/Disabled (total control bit of data alarm)	Enabled
Function setting 4/6	Over-voltage protection function	Closing, alarm, trip	Trip
	Over-voltage protection threshold	253V~286V, stepping 1V continuously adjustable	275v
	Over-voltage protection delay	1~10s, stepping 1s continuously adjustable	3s
Function setting 5/6	Under-voltage protection function	Closing, alarm, trip	Disabled
	Under-voltage protection threshold	154v~187v, stepping 1V continuously adjustable	160v
	Under-voltage protection delay	1~10s, stepping 1s continuously adjustable	2s
Function setting 6/6	Phase loss protection function	Closing, alarm, trip	Turn off
	Phase loss protection threshold	50v~200v, stepping 1V continuously adjustable	140v
	Protection function of fault neutral line	Closing, alarm, trip	Trip

Note: the factory defaults can be customized as needed by the user.

5.2.3. Record query options

The record query options include two sub-menus as follows: 1. Trip record; and 2.

Trip times, as shown in Fig. 8.



Fig. 8

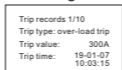


Fig. 9

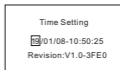


Fig. 10

5.2.4. Trip record query, as shown in Fig. 9.

There are 10 record items in total for inquiry, and 1 in 1/10 represents the nearly one trip record among the current 10 record items.

5.2.5 Clock setting options

Clock setting is used for manual timing of product clock (YY, MM, DD, hh, mm and ss), as well as query of the software version number and software upgrade address code of the product, as shown in Fig. 10.

5.2.6. Query of trip times

The query of trip times covers the following 9 trip times, as shown in Fig. 11 below.



5.2.7 System maintenance options

The system maintenance options are used to set the important parameters of the controller, including three sub-menus, i.e., coefficient correction, communication settings and record clearing.

5.2.7.1. Communication setting menu

Communication setting menu consists of two options: communication rate and communication address.

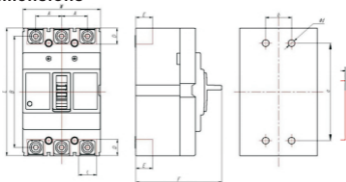
Communication rate setting range: 0.6, 1.2, 2.4, 4, 8, 9.6 and 19.2Kbps, default: 9.6 Kbps

The communication address A5-A0 is a 6-bit double-byte parameter (corresponding to the address field in DL/T 645 protocol), which is set as 12-bit data, and the setting range of each bit is 0-9. The specific correspondence is set from left to right in the sequence as follows: A5 A4 A3 A2 A1 A0 = 00 00 00 00 00 01.

5.2.7.2 Record clearing menu

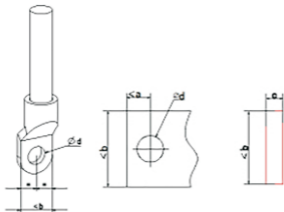
The record clearing menu is used for clearing of all records, such as faults, alarms and events, as well as the trip times before delivery of the product passing the test.

6. Boundary dimensions and installation dimensions



Model Size(mm)	YCM8YV-250		YCM8YV-400		YCM8YV-630		YCM8YV-800	
	3P	4P	3P	4P	3P	4P	3P	4P
L	165		257		275.5		275.5	
W	105	140	140	184	140	184	210	280
A	35		43.5		43.5		70	
B	144		230		230		243.5	
C	24		31		31		45	
D	21		29		29		30	
E	22.5		31.5		31.5		26	
F	116		155		155		155	
a	126		194		194		243	
b	35		44		44		70	
Φd	4 $\times\Phi 4.5$		4 $\times\Phi 7$		4 $\times\Phi 7$		4 $\times\Phi 8$	

7. Wiring bar spec.



S/N	Product Model	Terminal Width (mm)	Terminal Diameter d (mm)	Terminal Edge Distance (mm)	Thickness c (mm)
1	YCM8YV-250	20	φ 9	-	5.0
2	YCM8YV-400	28	φ 11	-	6.0
3	YCM8YV-630	40	φ 13	12	8.0
4	YCM8YV-800	40	φ 13	12	10.0

8. Specification Table of Mounting Wiring Screws

Name & Spec. Model	12Copper bar wiring screws	Mounting screws	Remarks
YCM8YV-250	M8*20	M4*80	
YCM8YV-400	M10*30	M6*65	
YCM8YV-630	M12*30	M6*40	
YCM8YV-800	M12*30	M6*40	

9. The reduced capacity required due to heating when the ambient temperature of the circuit breaker exceeds +40°C

Ambient temperature Model	+40°C	+45°C	+50°C	+55°C	+60°C
YCM8YV-250	1In	1In	0.96In	0.88In	0.78In
YCM8YV-400	1In	1In	0.95In	0.88In	0.78In
YCM8YV-630	1In	0.98In	0.95In	0.82In	0.75In
YCM8YV-800	1In	0.97In	0.92In	0.80In	0.72In

10. Capacity reduction at high altitude

If the altitude exceeds the applicable working environment of 2,000m, the electrical performance of circuit breaker can be corrected according to the Table below.

Altitude (m)	2000	2500	3000	4000	4500	5000
Power frequency withstand voltage (V)	2500	2500	2250	1950	1775	1625
Insulation withstand voltage (V)	1000	1000	900	780	710	650
Max. working voltage (V)	400	400	350	312	284	260
Working current correction factor	1	1	0.98	0.95	0.92	0.90

11. Precautions

To ensure your safety and the safety of electrical equipment, before the circuit breaker is put into operation, the user must obey the following rules:

- (1) Read this manual carefully before installation and use.
- (2) Use it under normal working conditions.
- (3) Before installation, confirm whether the specification and model meet the requirements.
- (4) During wiring of the communication interface, pay attention to the matching of the plug and the cable entry and ensure the directions are consistent. Do not connect it in the opposite direction.
- (5) After all wires are connected, turn on the power switch after checking.
- (6) Install the circuit breaker correctly without abnormal mechanical stress.

(7) Do not press the key too hard.

12. Warranty

(1) Warranty period: 36 months from the date of delivery.

(2) Within the warranty period: in case of any production quality problems, our company is responsible for replacement or repair; in case of any product damage caused by improper operation, use beyond the specification, falling, damage during installation, weather and natural disasters, our company is responsible for paid repair or replacement.

(3) Beyond the warranty period: in the situation that the function can be maintained after repair, paid repair shall be carried out, or paid replacement may be carried out.

(4) Please contact the After-sales Service Department of our company in case of any fault.



CERTIFICATE

Product Model: YCM8YV series

Standard: IEC60947-2

Inspector : **CNC001**

Production date: Printed on the product
or package.

This product is qualified according
to the delivery inspection

CNC ELECTRIC

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CNC

YCM8YV series