

ZW32-RC-15/24/38KV

OPERATION MANUAL

OF

AUTOMATIC CIRCUIT RECLOSER

Strong Power Electric Co.,Ltd.

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12.2 Inside inspection:if you suspect damaged or loose of mechanism ,please open the box to check the mechanism and electric connection parts ,if some part is damaged ,replace it ,if loose,tight it46

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1.Application:

This manual is only applicable for the installation, operation and maintenance of ZW32-RC automatic circuit recloser including of controller.

1.1 NOTE:

Please read and understand carefully the operation manual's all the contents .

The operational manual is not possible to include all the detail of the automatic circuit recloser of ZW32-RC-15KV/24KV/38KV .if you need more detailed info,please contact us freely by Email: info@zgzbdc.com or Mobile /WhatsApp:+8613653737638,Tel/Fax:+86-03735068807.

1.2 Warning:

It is necessary to train operator to understand the operational manual before operator installment ,operation and maintenance of the automatic circuit recloser.

1.2.1Personnel ability

The buyer have the duty to confirm the capability of operator who can install,operate and maintain to the ZW32-RC-15KV/24KV/38KV automatic circuit recloser including of:

Understanding of the all the content of the manual.

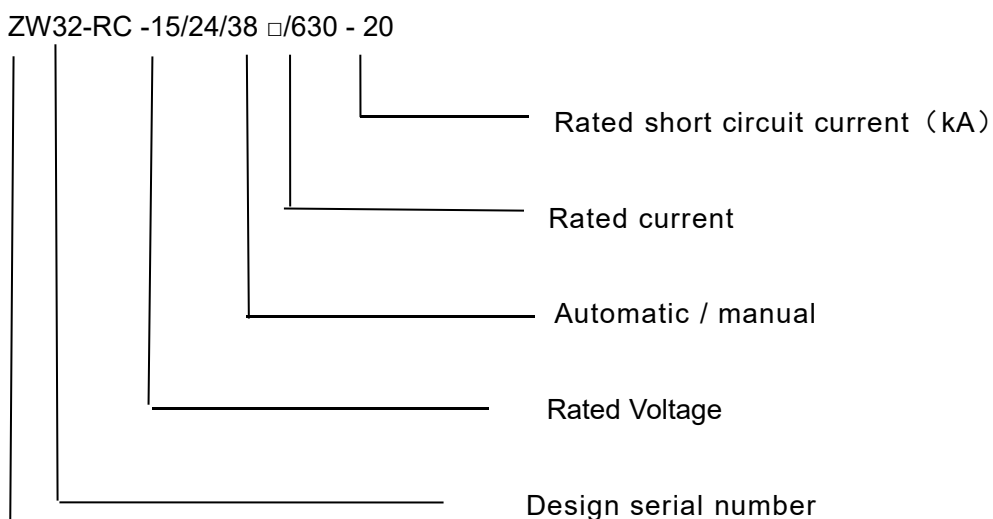
Trained of safety operation programs and technology of mid voltage equipment.

Trained of operation programs of on-off electricity and authorized by General Manager.

2. PRODUCT NAME

ZW32-RC-15KV/24KV/38KV HV.AC outdoor automatic circuit recloser is combined of ZW32-RC-15KV/24KV/38KV vacuum circuit recloser and controller.

2.1 Product Model



automatic circuit recloser

2.2 Standard

IEC56-427 HV.AC circuit recloser

IEEEc37.60,IEC62271-111 High-voltage switch-gear and control gear — Part 111: : Automatic circuit reclosers and fault interrupters for alternating current systems up to 38 kV》

GB1984-2003 HV.AC circuit recloser

GB/T11022-1999

Common technology of HV.AC controller and equipment

DL/T403-2000

HV.AC ordered technology conditions of circuit recloser

Q/TG35-JT

ZW32-RC-15KV/24KV/38KV HV-AC technology conditions of outdoor vacuum circuit recloser

2.3 Environment conditions

The altitude is not more than 3000m

The environments air temperature is -45℃-65℃, the day's temperature difference is 25℃

Wind speed is not more than 35m/s

Earthquake strength is not more than 8 degree

Contamination class:4 class

The installation site is with out firing without exploding and without corroding.

3. ZW32-RC Technology Parameter of Vacuum circuit recloser

3.1 Main technology parameter see table 1.

Table 1

SN	Item	UNIT	Value		
			15kV	27KV	38KV
1	Rated voltage	kV	15	24	38
2	Rated Frequency	Hz	50/60	50/60	50/60
3	Rated current	A	630	630	630
4	Rated short circuit current	kA	20	20	20
5	Rated peak with stand current	kA	50	50	50
6	Duration of rated short circuit	kA/S	20/4	20/4	20/4

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	current					
7	Rated short circuit making current (peak)		kA	50	50	50
8	Rated operation sequence		times	0-0.2s-C0-2s-CO-2s-CO-30s		
9	Mechanical life		times	10000		
10	Breaking times at rated short circuit current		times	50		
11	1min Power frequency withstand voltage	Phase to earth/phase to phase	kV	50/60	50/60	70/80
12	Lightning impulse withstand voltage (peak) phase to phase,ground/fracture bil		kV	110/125	125/145	170/185
13	1min secondary withstand voltage		V	2000		

3.2 Permanent magnet operating mechanism characteristics see talbe 2

Description	Value	Note
Model	CB	
Input voltage	AC 220	
UPS backup power	DC24	
Type	Single capacity coils and single stability	DC220/110V/24
Capacitor voltage	DC75~DC300	Optional
Max coils current	80A~150A	
Max holding power	5000N	
Max travel	30mm	
Maximum setting width of closing/opening coil current pulse	80ms	Adjustable
Environment temperature	-25~~70℃	Standard
	-40~~80℃	Special
Fault counter	1~3 times	
Operation counter	0~9999	

3.3 Main technical parameters of spring operating mechanism see table 3

NO	Item	Rated voltage (V)	Rated current (A)	Normal working range
		DC24	11.5	Opening coil: Reliable tripping under
		DC48	6	

ZW32-RC Automatic Recloser Manual

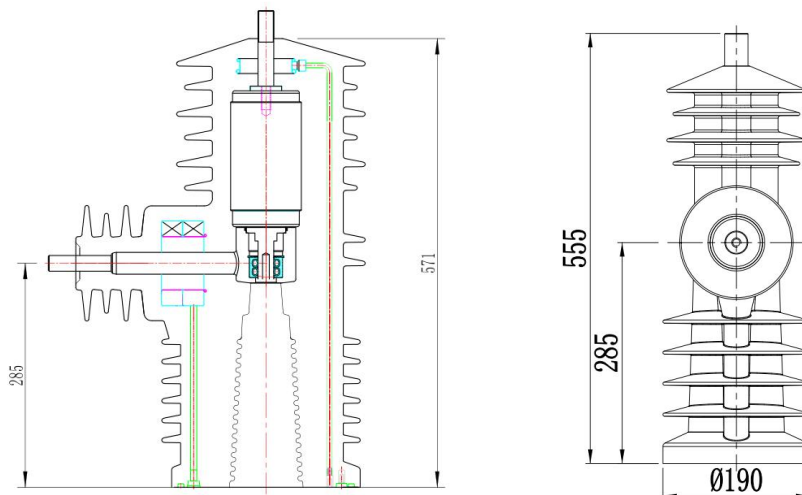
1	Opening and closing coil	DC110	3.4	65%-120% rated voltage, no opening under 30% rated voltage Closing coil: 85%-110% (DC), 80%-110% Reliable under rated voltage (AC) Close
		DC220	1.69	
		AC110	4.4	
		AC220	3.4	
2	Over-current trip coil		5	> 90%-110% reliable trip
3	Energy storage motor	Rated voltage: DC24 —220V Rated power: 40W (24kV:70W)		85%-110% rated voltage
4	Energy storage time			≤8s

4. ZW32-RC vacuum circuit structure

4.1 General

ZW32-RC type adopts the most advanced solid insulation technology in the world, and deeply integrates the voltage sensor, current sensor, zero sequence current sensor, vacuum interrupter, etc. with the main circuit inside the insulation pole, which is a fusion of integrated solid insulation vacuum circuit recloser. ZW32-RC type can be used with intelligent terminals to meet the requirements of reclosers, automatic sectioning devices, contact switches and user boundary switches on distribution network lines. At the same time, it can also be connected to the central master station through GPRS, optical fiber, Ethernet and other communication methods to form a distribution network feeder automation. Deeply integrated intelligent pole-mounted circuit recloser includes two driving modes: the spring operation mechanism type and the permanent magnet mechanism type. The bounce-operated circuit recloser adopts a miniaturized, maintenance-free bounce-operated mechanism, which requires small energy when opening and closing the switch, long life, high reliability, and mechanical life up to 10,000 times.

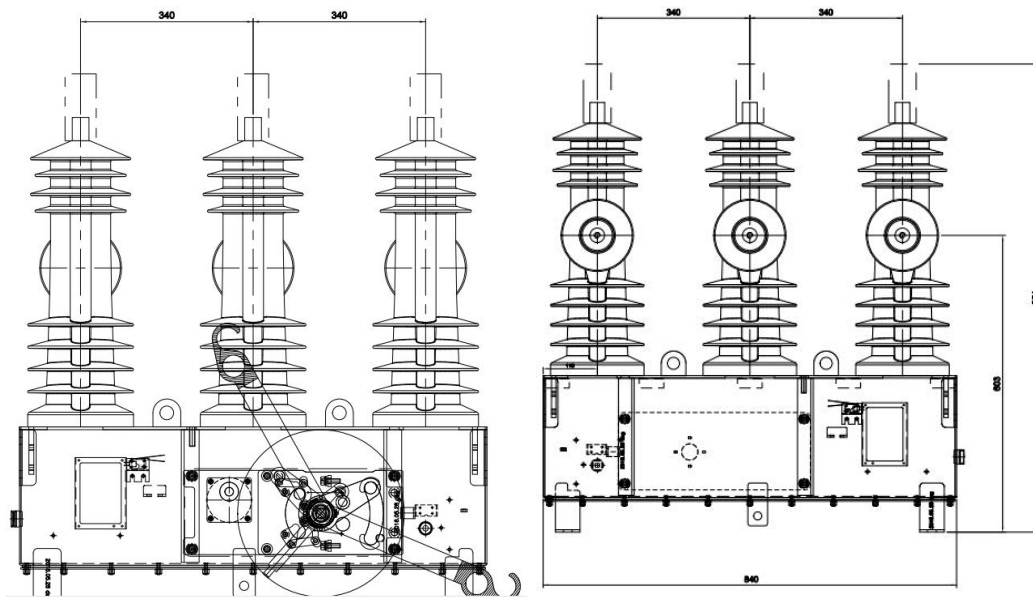
4.2 Cross drawing



Pic 1: ZW32-RC section view

4.3 Outside size

ZW32-RC outside size: as below



Pic 2: ZW32-RC outside size

Voltage level	Dimensions (mm)				Installation size (m m)	
	A	B	C	E	D(lengt h)	F(width)
12kV	340	720	980	700	920	160
15kV	340	720	980	700	920	160
24KV	380	830	1060	700	1000	160
27KV	380	830	1060	700	1000	160
38kV	380	830	1060	700	1000	160

4.4 Main insulated bushing



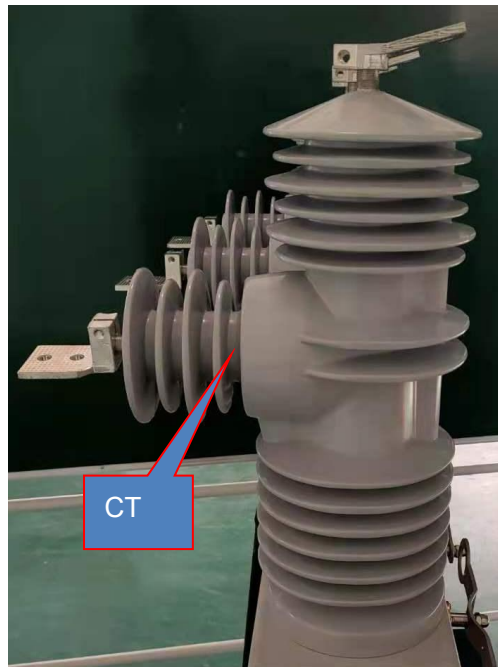
Pic 3: ZW32-RC MAIN INSULATED BUSHING

Main insulated bushing is poly insulated pole with anti ultraviolet rays,the silicon rubber tube is with creep distance 600mm,the diameter is 235mm.it is suitable for working environment where is very heavy pollution.

The terminals kits on the upper pole is with size 70mmx40mmx8mm t2y tinned copper terminal kits
The power side terminal kits is marked A,B,C ,for it is operated by lv mechanism, both side can be power side.

4.5 Current transformer

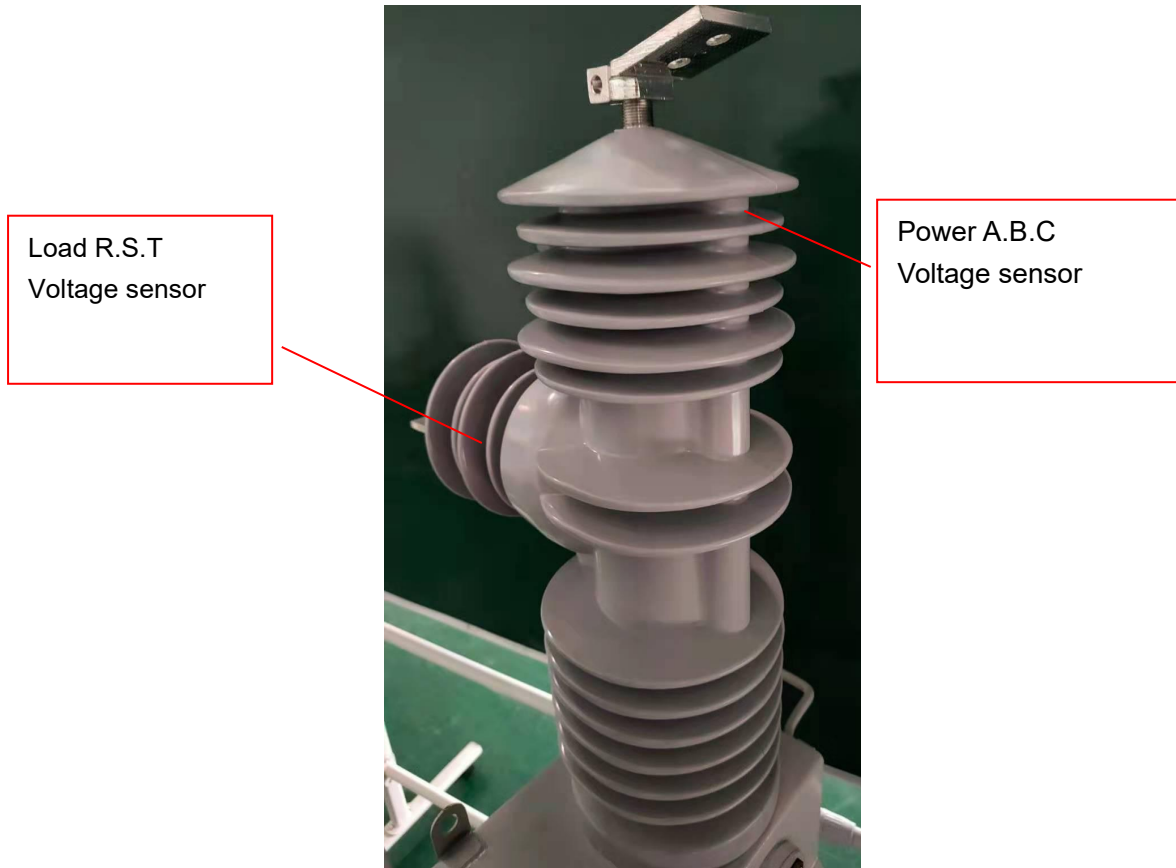
The current metering is achieved by 3 pcs current transformer which rate is 600:1/1000: 1A at side of insulated bushing side.the secondary current outlet is connected the protect module of current transformer at terminal part of the mechanism shell and connect to the controller by control cable .



Pic 4: ZW32-RC current transformer

4.6 Voltage sensor

The voltage metering is achieved by 6pcs voltage sensors which rate is Phase voltage /0.4-7v at the side of insulated bushing. The secondary voltage sensor terminal is connected to the protect module of voltage at the terminal part of the mechanism part and connect to the controller by a control cable .



Pic 5: ZW32-RC voltage sensor

4.7 Manual handle for ON/OFF

The manual handle is made of stainless with barking finish ,the color is green ,the power is 20kg to draw down the handle to open the recloser.



Pic 6: manual handle for ON/OFF

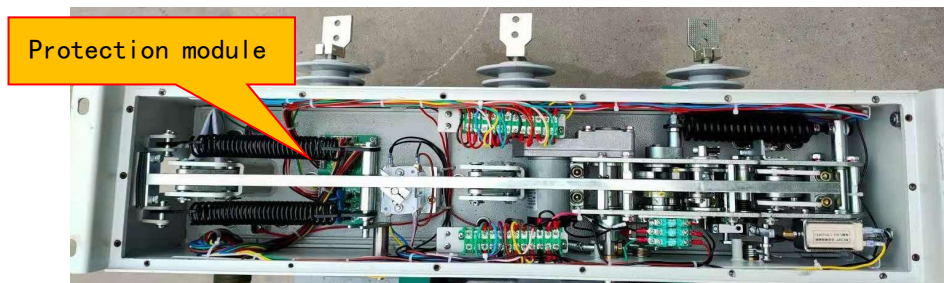
4.8 indication of position ON/OFF



The yellow arrow to "ON" indicate "OPEN", the yellow arrow to "OFF" indicate "CLOSE"

4.9 Configure of protect modules of current transformer and voltage sensor

The recloser is configured with protect modules to avoid of short circuit and over current and over voltage .



Pic 8: the protect module of ct current transformer and voltage sensor

4.10 integration socket with control cable

ZW32-RCZW32-RC recloser's controls cable connect controller and vacuum circuit recloser by the integration socket which is included of CT signal, voltage sensor signal and all the signals of coils and auxiliary switch signal, the cable length is 8m.



Pic 9: integration socket

5. ZW32-RC recloser controller

5.1 General

The control module and driving module of cycle operation of recloser is installed in the controller box which is made of stainless steel, it is used for operation of recloser.

5.2 Parameter

5.2.1 Basic parameter

Operate cycle: drive module

O-0.2S-CO-2S-CO-5S-CO-30S

Frequency operation times per hours: 100 times

The max working temperature: +55°C

The min working temperature: 40°C

The max humidity 98% without condense

Max sea level 3000m

Protect class IP40

Mechanical vibrate anti capacity: 4M4

Withstand capacity at limited temperature according to IEC600-2

96Hours: +55°C/-40°C

5.2.2 Electrical strength

1min power frequent withstand voltage according to IEC60255-5 2KV

Impulse voltage according to IEC60255-5 @ 1.2μs/50μs/0.5j: 5KV

The insulated resistor at 1000VDC : ≥5MΩ

5.2.3 Electromagnetic compatibility

Voltage Short time breaking and changeable is according to IEC6100-4-11

Voltage changeable 15%, time 2-3s, interval 5-10s

The electrical speedy momentary impulse interfere is according to IEC6100-4-4

Vibration wave Interfere is according to IEC61000-4-12

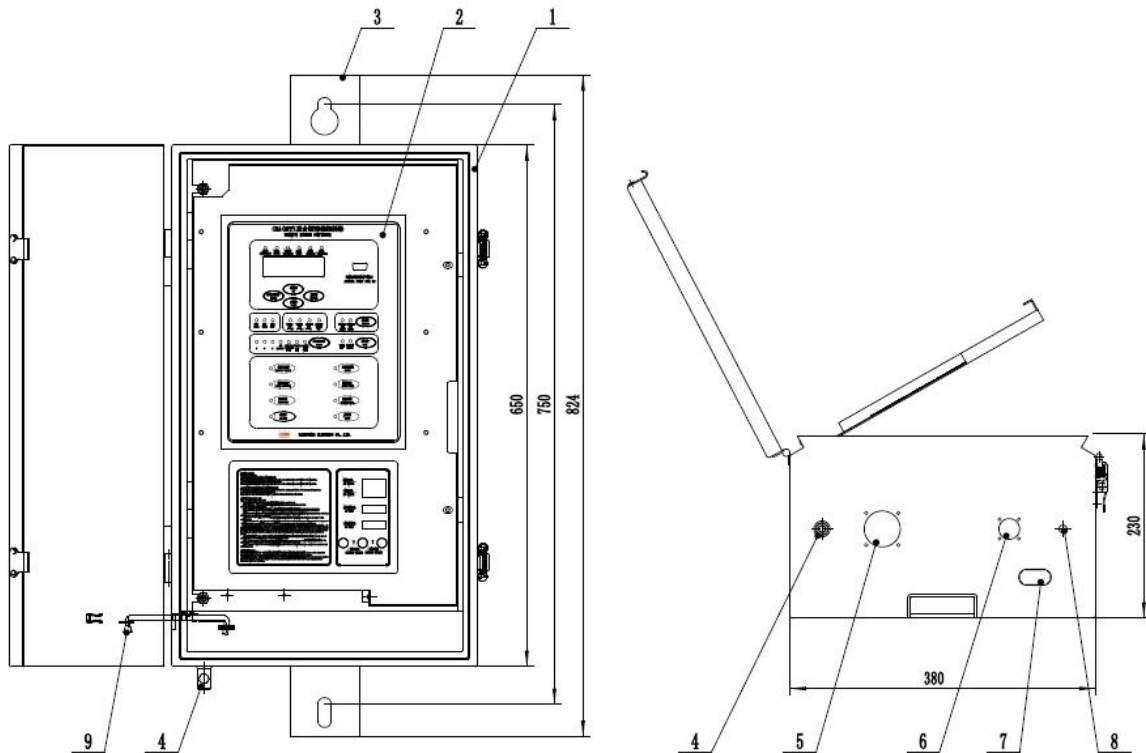
The inrush current interfere is according to IEC61000-4-5

The power frequency magnetic interfere is according to IEC61000-4-8

The impulse magnetic field interfere is according to IEC61000-4-9

Damping oscillating magnetic field immunity is according to IEC61000-4-10

5.3 Outside size



Pic 10: ZW32-RC controller's outside size

① (Control Cabinet) :

The control cabinet is made of anti-corrosion stainless with excellent insulating and anti-heating and be well ventilated and water proofing.

② (Operating Panel) :

The operating panel is for operate the switch to change or set or confirm the set data by LCD display.

③ Install structure : it is suitable for different type pole or pad-substation

④ Ground terminal: it is connected to control cabinet to earth

⑤ The integration plug (for controller) is connected to vacuum circuit recloser

⑥The integration plug (for power) is connected to outside power AC 125V.

⑦ Ventilate window is for adjustable temperature.

⑧ communication port:

The communication port of RS232,RS485,RJ45 is for remote ACADA ,If need wireless ,it should

be antenna wire or blue teeth or Wifi

5.4 Rated parameter

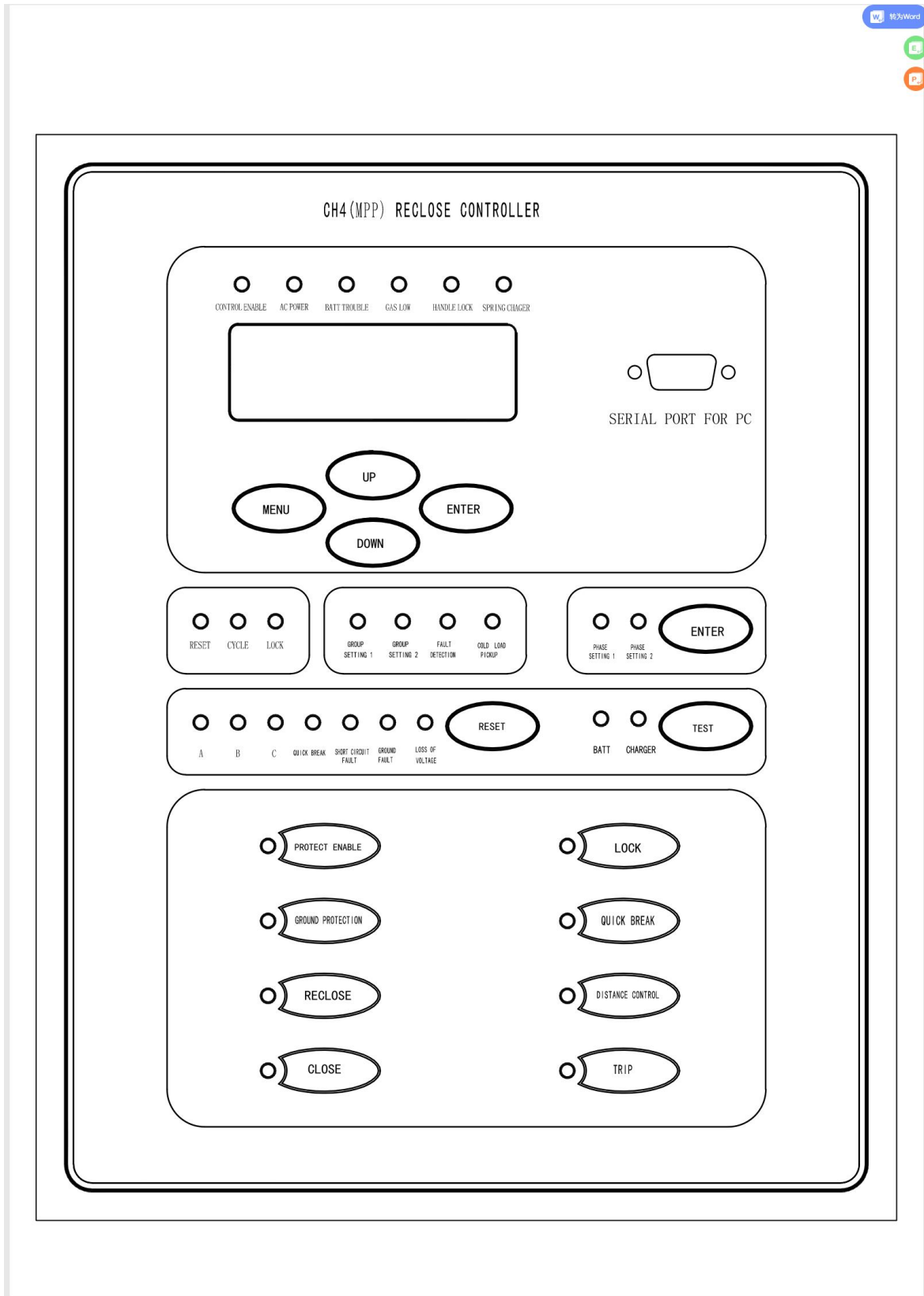
Table 3

Items			Unit	Data
Model			ZW32-RC	
rated voltage			DC V	24
			AC V	125
Rated frequency			Hz	50/60
Set data	Over-current projection	Phase current set range	A	OFF, 20 ~ 1260
		Movement delay	s	0.0 ~ 60.0
	Single earthing protect	Zero current set range	A	OFF, 0.1 ~ 20.0
		Zero voltage set range	%	OFF, 5 ~ 100
		Movement delay	s	1 ~ 7200
		Standard phase position	°C	0 ~ 359
		Phase position range	°C	10 ~ 170

Set data	Movement times		Time	1~ 4
	Reclosing time	1 st	s	0.2~ 180
		2 nd	s	1~ 180
		3 rd	s	1 ~ 180
	Restoration time	Lock restoration time	s	1 ~ 600
		Cycle restoration time	s	1 ~ 600
	Short circuit speedy protect	Movement current	A	OFF, 630 ~ 20000
		Movement delay	s	0.0 ~ 10.0
		Lock time	Time	1 ~ 4
	Cooling load movement prohibit	Movement current times	Time	OFF, 1 ~ 10
		Inhibition time	s	0.1~ 60.0
		Recovery time	s	0.1~ 60.0
	less voltage protect			-

Set	Load invade movement prohibit	Allow/prohibit	–	allow /prohibit
		Movement current	A	20 ~ 1260
		Load phase position(direction)	°C	90 ~ (-)90
		Load phase position (opposite direction)	°C	90 ~(-)90
	Weight		Kg	25

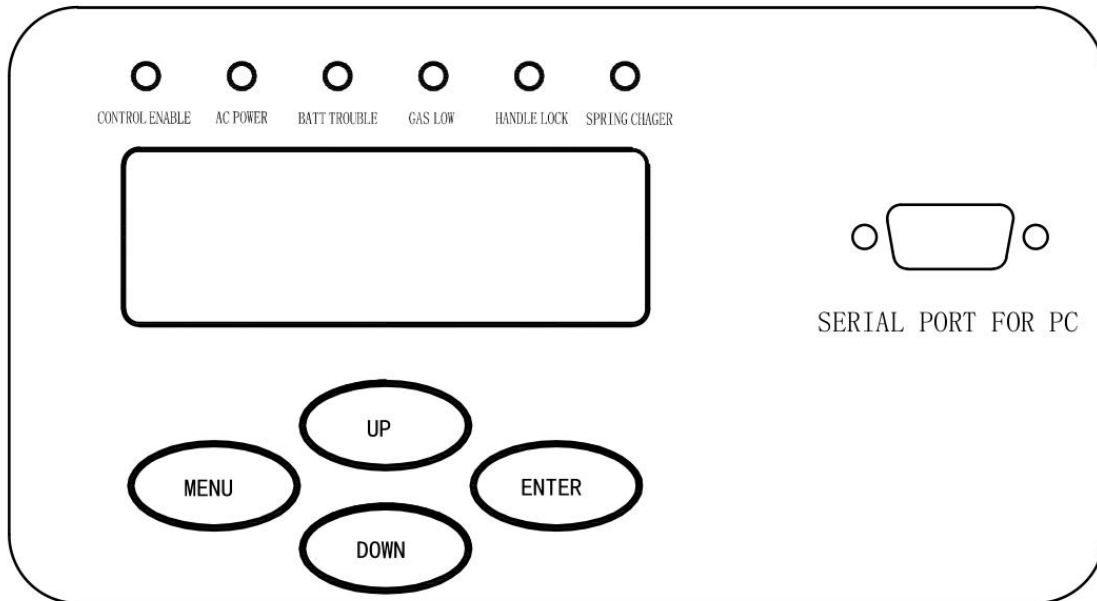
5.5 The operation panel of control panel



Pic 11: Controller operation panel

5.5.1 The operation panel structure is as below:

CH4 (MPP) RECLOSE CONTROLLER



① Controller operation panel

20 characters × 4 lines LCD, display various status and measurement value of ZW32-RC, display confirmation or change setting value;

② LCD operation button operation push switch LCD operation operation: increase UP, decrease DOWN, MANUAL, menu/abandon button MENU, selection button ENTER 4 keys.

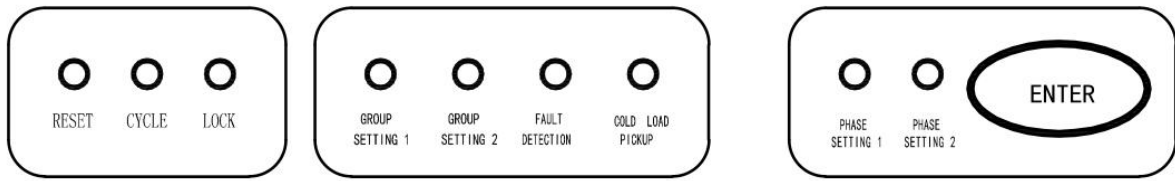
③ LED indication lamp of Power Monitoring.

- Control working okay:
if ZW32-RC recloser control function is okay ,the LED lamp is brighting .
- AC Power: if AC Power is working okay ,The LED lamp is brighting .
- Battery is not okay: the LED indication Lamp will confirm the battery and charger is in good condition and bad condition ,if any conditions meet follows:
 - The battery load voltage is below 22V. At this condition ,the LED will be brighting until recovery the battery voltage to 23kv above and secondly testing .
 - The AC power is okay ,but the charger loop is not okay.
 - The charger loop is okay ,but the AC Power is not okay.

④ Swish state

- Vacuum circuit recloser lock:
When the vacuum circuit recloser is in lock,the LED lamp will be bright.this time the movement of C/O is prohibited.
- Spring save energy : ZW32-RC
When the vacuum circuit recloser is in saving energy,the LED Lamp is bright

⑤ Control movements state:



- reset : ZW32-RC

ZW32-RC Recloser control function was reset ,the LED lamp bright to show the the condition is on ready.

- cycle:

Showing the recloser controller functions is in active.

- lock: ZW32-RC;

When the relouser controller function is finished ,the lock lamp will be brighted .

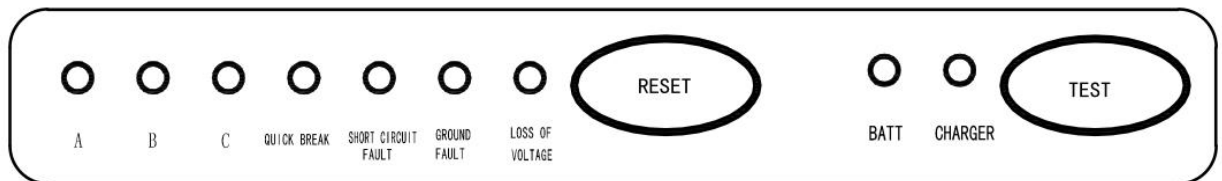
⑥ Control movement state

- Setting group 1, setting group 2: indicates the current setting group. The setting group light is on.
- Fault detector: when the control make the inspection of fault ,the lamp is bright.
- Cold load pickup:when the cold load pickup is in working ,the led lamp is brighting
- Phase setting 1 ,phase setting 2: which seeting 1/2 is working ,which led lamp is brighting .
- Enter :enter to choose phase setting 1/2

⑦ Fault indication

These indication lamps are for indicate the fault of phase sequence and protect type.when the phase is in fault ,the led lamp is brighting ,when the break is finished ,the led lamp is brighting .led lamp will be bright for the fault happened to over current ,grounding and seedy break.after closing or remove the fault ,the led lamp will be off or you can off the led lamp by reset push switch .

- A:Bright for A phase faults
- B: Bright for B phase faults
- C: Bright for C phase faults.



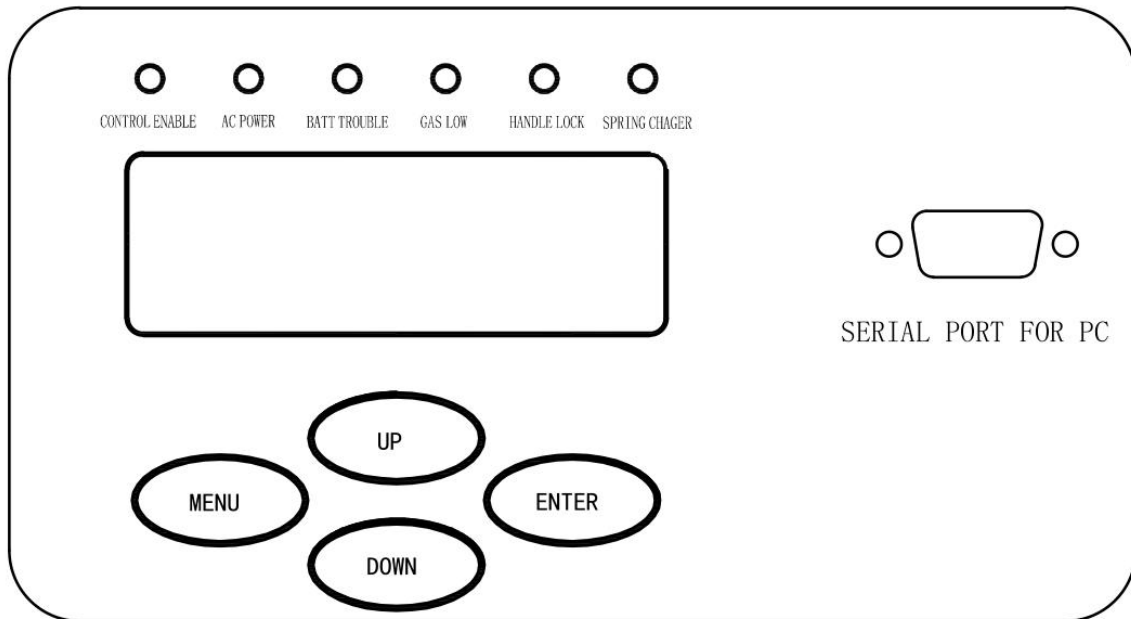
- Quick break:bright for short circuit break faults
- Short circuit fault: bright for over current break
- Grounding fault :bright for zero sequence faults
- Reset: recovery the starting condition
-for recovery the all the faults lamps

-for knowing if all the led lamp is in good conditions

⑧ Battery monitoring

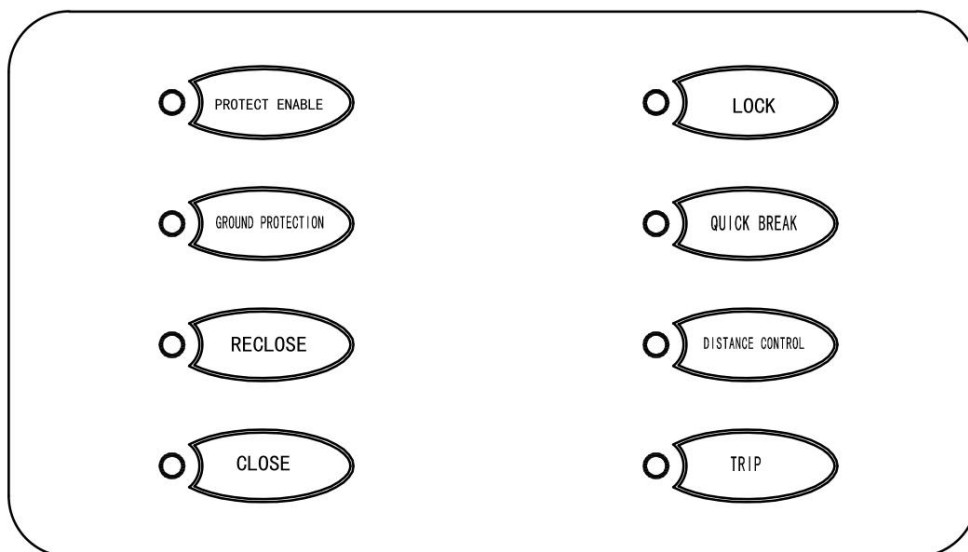
- Battery: bright 5 seconds for battery voltage is OK
- Charger: Bright 5 seconds for the charger look is okay
- Test: push test switch to start test the load of battery.

⑨ Serial port for PC



The serial port RS323 is back up port ,it is connected to PC RS232 port by a 5m RS232 cable or by 6m RS232-USB cable to PC USB port. By PC ,you can confirm all the condition or download the data to change the setting data in control.please note that:when you use the PC Serial port RS323/USD ,please close the communication RJ45 and RS485.

⑩ Function module key and LED lamp



- Protect enable ,the protect enable key is for switch of all the protect functions.when the key is locked ,the led lamp is off ,when the protection is in working ,Led lamp will be on.you just push key to change the led lamp ON/OFF.
- Lock:the lock key is for protect mistaken operation and mistaken setting .if you push the lock key above 3s ,it will lock or unlock the function.
- Grounding protect :allowed.prohibited for grounding protection function
- Quick break: he key for allowed/prohibited for quick break function.
- Recloser: active key of recloser function ,it is only allowed by LCD display operation programs or PC operation programs ,when the reclosing function is in working ,the LED lamp is on.
- Distance control : allowed /prohibited for FTU distance control

⑪ Close/open button and LED indicator

- Closing : checking the trip led lamp is bright ,and then operation the closing ,then the trip led is off ,closing led lamp is on ,closing operation only to following conditions:
 - spring energy storage:LED indication Lamp is on
 - vacuum circuit recloser lock: LED indication Lamp is off
 - key lock: LED indication Lamp is off.
- Tripping:only closing led lamp is on ,you can push tripping key.only following condition you can push tripping key:
 - vacuum lock: LED lamp is off
 - push key is lock: the LED lamp is off .

5.6 Description of control cable and ZW32-RC Control input and output terminals

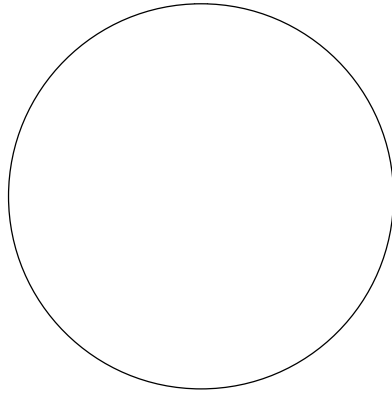
ZW32-RC The cable connecting the recloser and the controller is composed of the following figure.

Item	specification
length	8 ± 0.1 m
Cable spec	0.75 mm ² X 37C,
Receptacle	MS 28-21

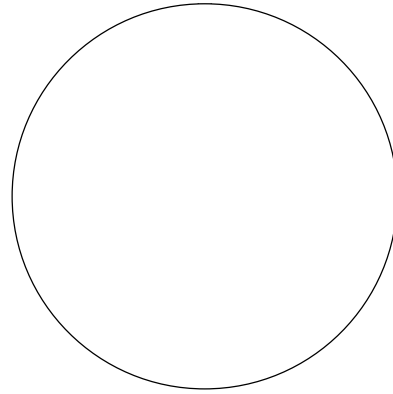
[spec of control cable]

PIN S.N	Signals	DISCRIPTIONS
A	A Phase current	signal of A phase current
B	B phase current	Signal of B phase current
C	C phase current	Signal of C phase current
D	Common current	Signal of common current
F	A phase voltage	Signal of A phase voltage
M	B phase voltage	Signal of B phase voltage
S	C phase voltage	Signal of C phase voltage
G	Switch Housing common grounding	Signal of common voltage
X	Contact of tripping condition	Signal of tripping conditions
Z	Contact of closing condition	Signal of closing condition
h	common terminal of remote signal	Signal of remote measure of common terminals
K,L	Positive of magnetic mechanism coils	Connect to positive of closing coil
g,h	Negative of magnetic mechanism coils	Connect to negative of closing coil

[Signal composition of control cable]



[socket MS28-21P (Male)]



[plug MS28-21S (Female)]

5.7 Battery bank and charger

① battery

ZW32-RC Battery bank is combined of 2x12v(17ah) free maintenance sealed lead acid battery

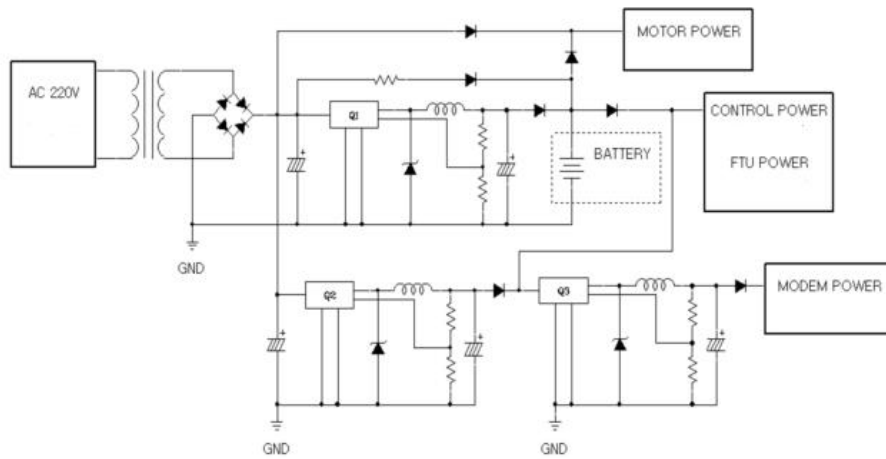
In series for 100times operations within 48hours

Battery bank parameter:

- voltage: $24V = 12V \times 2 \uparrow$
- capacity: 17Ah

② charger

The charger schematic diagram as below :



[Charger and power schematic]

5.7.1 Function of battery protect

Power down function,when the battery discharge without input power ,in order to protect the over discharge ,it should separate the battery bank and charger to protect the battery bank.when power down voltage near to DC23V,it will be into protect battery modules,all the power function will be invalid at this condition,please switch the power

switch to be off and then on ,the power function will be valid for 1 minus ,after 1 minus ,it will be in protect modules and power switch will be off automatic.

5.7.2 Battery replace

Battery (-) terminal is connected to another battery (+) terminal in serials.battery bank (+/-) terminals is connected to load (+-)/charger(+/-) terminal.

6. Movement function

ZW32-RC automatic circuit recloser is used for outlet line of substation or branch point line to protect line and remove the moment fault and permanent fault as bellowing:

6.1 Protect function of over current

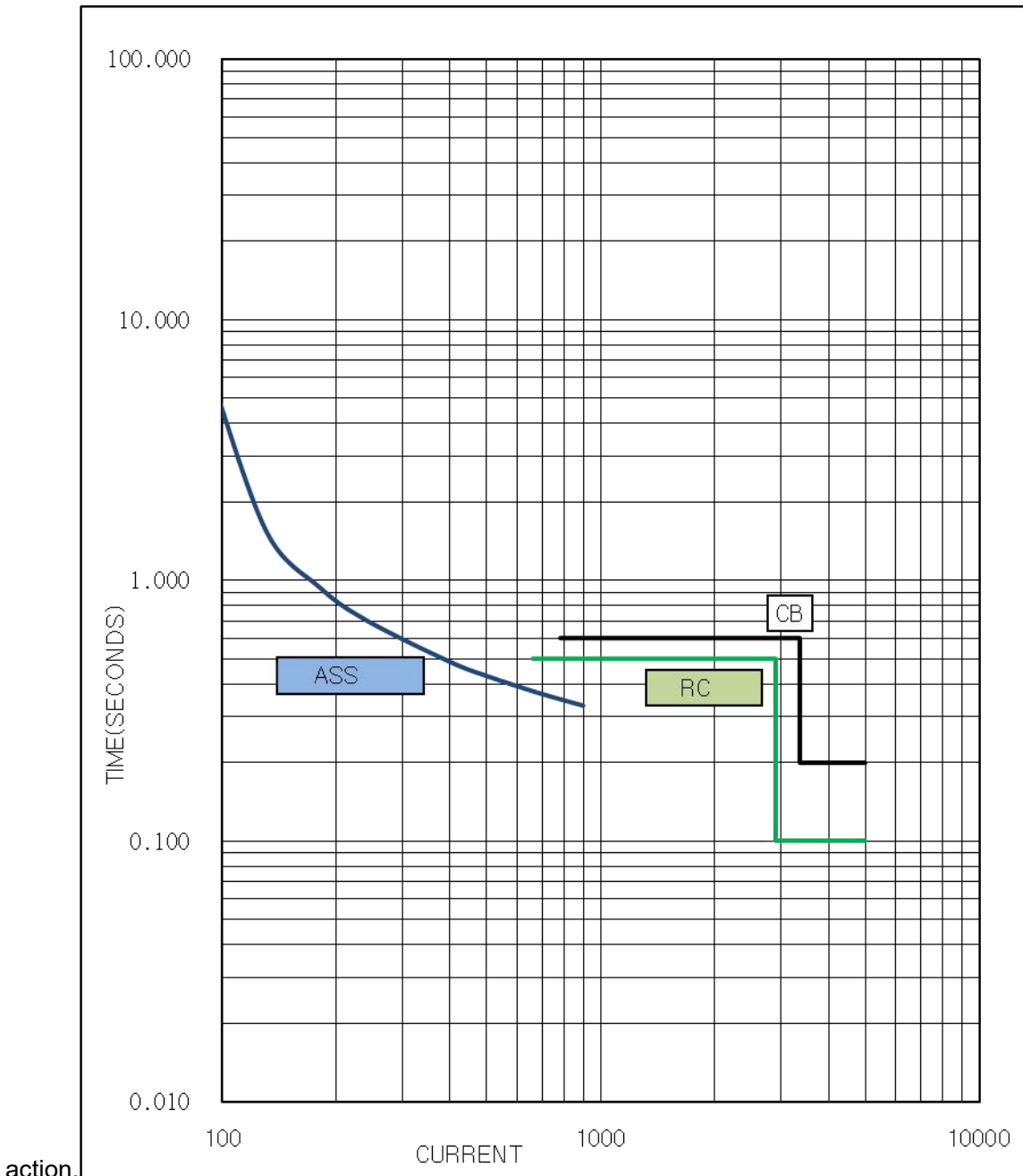
If the line real pass current is over the set over current data ,ZW32-RC will start to remove the fault current .the active current may set within 20a-1260a,if active current is set in OFF ,over current protect is not working.also it can be set the delay time of active within 0-60s,if you set the active delay times is 0 which is limited time ,this will make the mistaken active for moment over current.so it is very necessary to set some delay time.

The annex 1 is data set table

6.2 Quick break function

The quick-break action current and the over-current action current can be set independently, and the setting range can be changed within the range of 630 ~ 20000A. When setting, it is set to be faster than the over-current delay time, the delay time can be set from 0 to 10 seconds, and the number of actions can also be set independently. If the quick-break action current is set to OFF

(closed), the quick-break function will not start, but it will not affect the over-current protection.



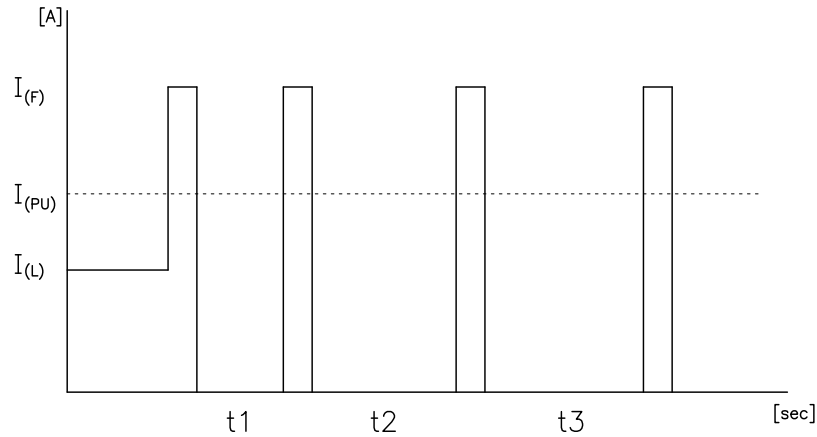
action.

See appendix 1 for details: Setting table

6.3 Reclosing function

In order to judge the fault is transient fault or permanence fault,ZW32-RCZW32-RC Recloser is with recloser function.It will remove the transient fault automatically after one time power off and reclosing to power on.and if the recloser is matched with sectional load break switch or sectional circuit recloser to be the automatic feed line ,it need to be setted 3 times reclosing.The first time is for removing the transient fault ,the second is for disconnect the area where is with faults ,the third times is for recovery the power on .

By the manual of LCD Display can change the set movement times which can be set as 1 to 3 times.but for the limited of mechanical characteristic ,the second reclosing time and third reclosing time should be set more than time of saving energy (about 2s to 6s)



$I(L)$: normal load current $t1$: 1st reclosing time
 $I(PU)$: min movement current $t2$: 2nd reclosing time
 $I(F)$: fault current $t3$:3nd reclosing time

See the annex 1: set data table

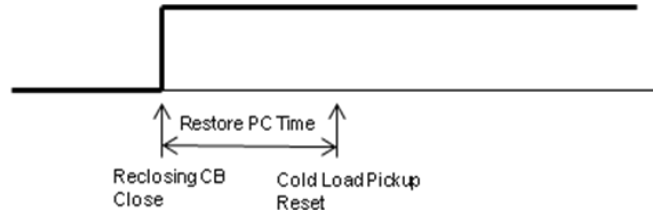
6.4 Cold load movement prohibit function

On the power side ,when other line remove the fault and power on again ,the power voltage will rise higher ,the motor load restarting current will be higher, load momentary current will be 3-4 times of normal current and the same conditions is existed as in reclosing moment.and after then the current will be reduce to normal current ,this is called cold load.it will cause mistaken movement of protect .in order to prevent the mistaken movements of protect ,ZW32-RCZW32-RC Recloser is with cold load prohibit function.the same for moment current which is 3-4times than normal current .

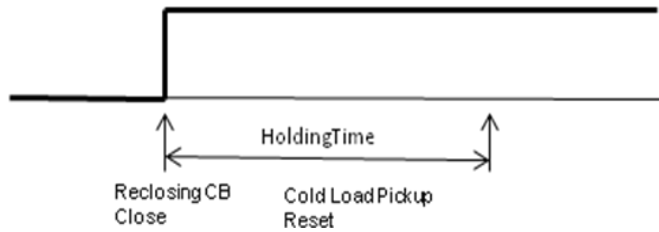
The moment times is set 1-10times ,if the times is lower than the times of overcurrent protect ,the cold load prohibit function is off .such as ,if the phase current is 100A ,the movement times is 4times ,then when the current is below than $100 \times 4 = 400a$,The clod load prohibit function is off .

The schematic diagram as below:

Cold Load Pickup Current
 Min. Pickup Phase × Multiple
 Min. Pickup Phase



Cold Load Pickup Current
 Min. Pickup Phase × Multiple
 Min. Pickup Phase



see the data set table 1 in annex 1

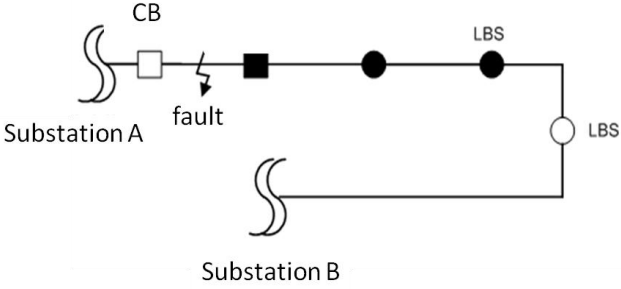
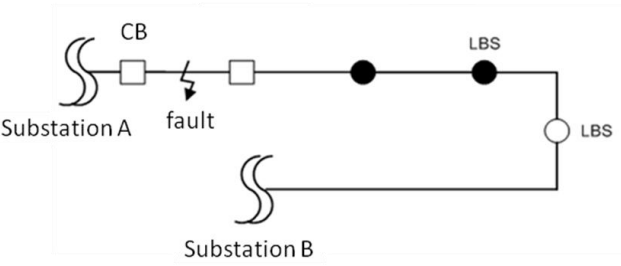
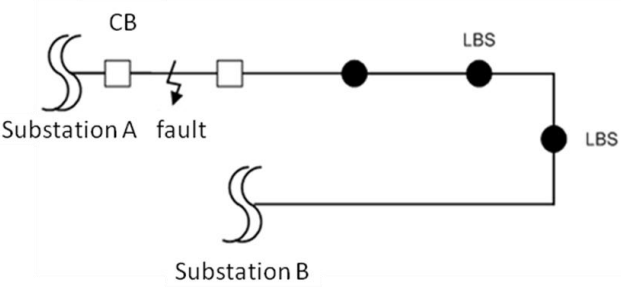
6.5 Loss of pressure lockout function

This function can be used when ZW32-RC recloser cooperates with line section load switch or line section circuit recloser to form feeder automation. This function can also be allowed or prohibited according to the installation position and line structure of the ZW32-RC recloser. If you need to set this function, it is best to install the equipment on the load side of the reverse feed after the tie switch is automatically closed.

It is necessary to set the delay of opening and blocking after experiencing the loss of voltage. The delay time is usually $0.5s \sim 1s$ of the automatic closing time of the tie switch.

The operation description is as follows.

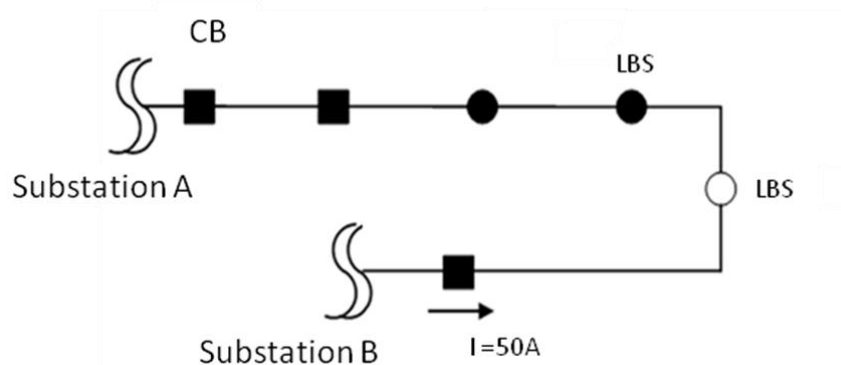
	Feeder line structure
--	-----------------------

	<p>When a fault occurs between the substation and the recloser, the circuit recloser in the substation will operate</p>
	<p>After the recloser starts the loss-of-voltage lockout function, it opens and locks to eliminate the fault area</p>
	<p>The tie switch is closed and the power supply is restored normally</p>

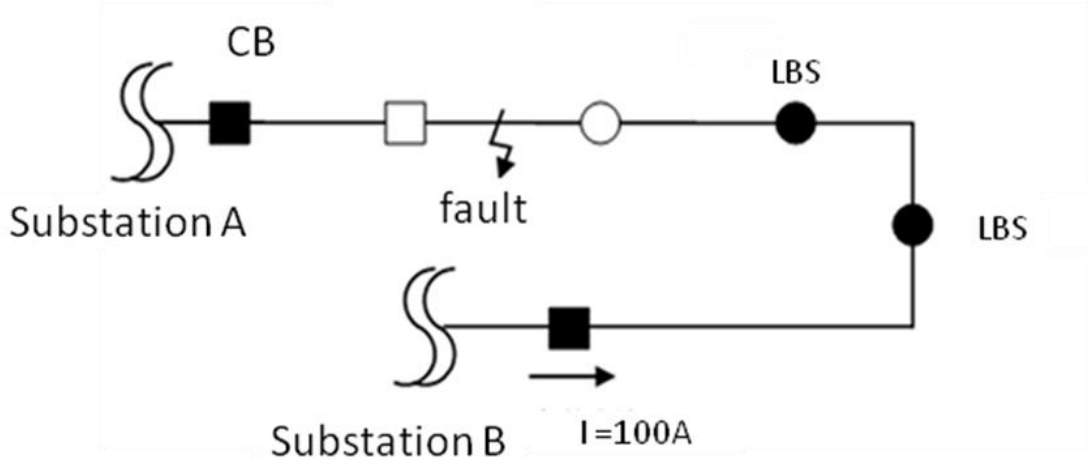
For setting details, please refer to Appendix 1: Setting Table

6.6 load invade movement prohibition function

This function is required for the recloser on the side where there is no fault on the ring network. The action procedure is as follows:

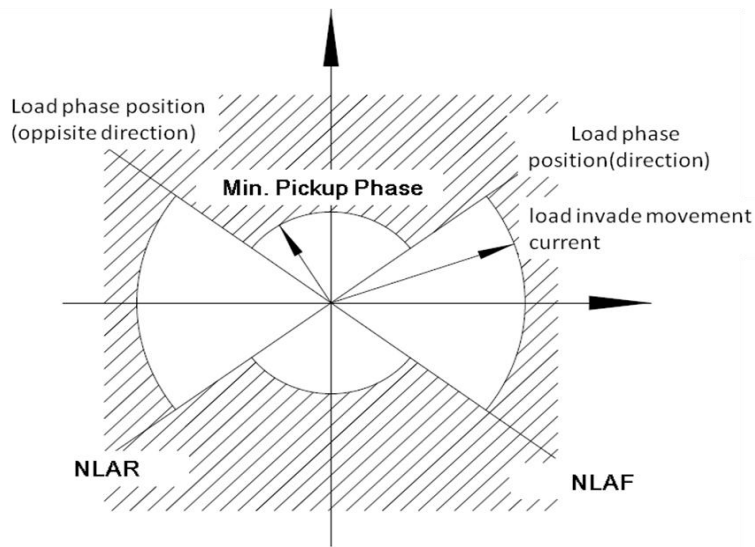


[Load current during normal operation]



[Overload current during reverse operation]

At the moment after reclosing relative switch ,the working recloser’s load current will be higher then normal current to cause overcurrent break.so the normal phase angle current will be set higher than phase movement current reduce the possible of over load breaking .the normal phase angle is set as four phase angles with 0.7-0.9.phase angle of the inverse rate (46 ~ 26°).



For setting details, please refer to Appendix 1: Setting Table

6.7 inrush current prohibition protect

it is fixed in recloser without setting

In the event of a power failure, when the backup protection device is switched off and then re-closed, the inrush current suppression function is automatically activated to prevent malfunction caused by the transformer excitation surge current.

This function judge the inrush current by compare secondary harmonic wave components within components of standard wave frequency.

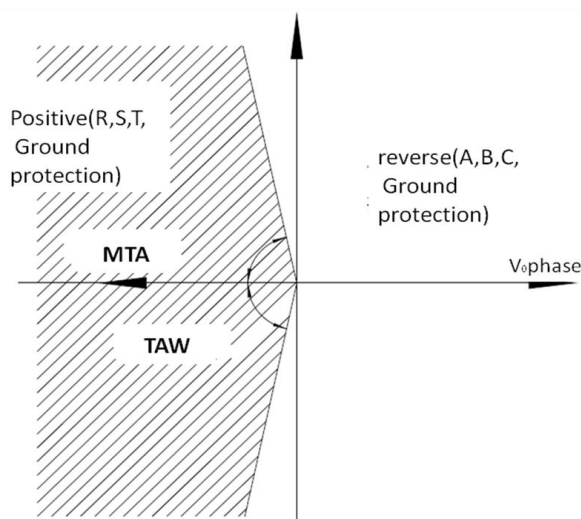
6.8 Single grounding protect phase (applied for no earthing/resistor earthing /harmonic coil earthing)

ZW32-RC the recloser adopts the zero-sequence voltage and zero-sequence current through the high-precision 3-phase voltage sensor and zero-sequence current transformer installed in the body. Based on the amplitude of the zero sequence voltage V_0 and the zero sequence current I_0 , the phase angle between the zero sequence current I_0 and the zero sequence voltage V_0 , the ground fault is comprehensively judged.

ZW32-RC Set the program as following:

- Allowed/prohibited=set as allowed :allowed protect function of grounding.
- Tripping=set as allowed :inspection the grounding fault ,and warning of grounding fault but switch is no tripping (the fault lamp is on)
- Zero sequence current =set as off :no grounding protect function
- Zero sequence voltage=set as off :judge the grounding fault only by zero sequence current (when the location site is near the load terminal ,the load side grounding capacity is more less than power side grounding capacity)

Grounding fault can be set delay within 1-7200s(2 hours).the standard phase angle and range is set only after setting the zero sequence voltage and current and when locating site is in the middle of line , it must be set to judge the load side grounding fault and power side grounding fault.



The set data is phase angle of zero sequence

current when the zero sequence voltage phase angle is 0 for different grounding system ,the data

is set as following:

- The neutral is without grounding /by resistor grounding ,set data is $270^\circ \pm 85^\circ$.However, the range can be adjusted according to the operating environment and conditions of the line.

In system of natural is without grounding or resistor grounding .if the load side is with grounding fault ,the zero current phase angle is located near 270° basing on zero sequence voltage phase angle.if the power side is with fault ,the zero sequence phase angle is near 90° .so it is easy to judge the direction of grounding fault .so by above description,in system of no neutral grounding or resistor grounding ,the best phase angle range is $270 \pm 85^\circ$.of course it can be adjusted by different line environment and conditions



- The extinction coils grounding system,data is set as $180^\circ \pm 85^\circ$



In the extinction coils grounding system ,no matter with in outlet terminal of substation or middle line or line terminal,when the load side is with grounding fault ,the phase angle is located within $> 90^\circ \sim < 180^\circ$ if over compensate and is located within $> 180^\circ \sim < 270^\circ$ if no enough compensate.when power side is with grounding faults the phase angle is with in $> 0^\circ \sim < 90^\circ$.the best phase angle is within $180^\circ \pm 85^\circ$,but you can adjust it by line environment and conditions.

Set data is see annex-1

7. LCD menu composition and usage

LCD operation keys are included of 4 basic keys: Manual ,enter ,up and down.the main function of every key is as following:

key	Description
	The current/voltage display mode is converted to the menu selection mode, and the service menu used in each menu returns to the previous menu function. Press the function key on the main menu to switch to display current/voltage mode. In the state of setting value change, press this key to return all the changed values to the original setting value.
MANUL	
	It is used for menu selection or changing the setting value. The menu selection screen functions as a menu selection function. Switch to the corresponding value change mode when the set value is changed. When the setting value is changed, press this key to switch the setting value change mode to the menu conversion mode. (Menu selection/Toggle action when setting value is changed) ※ When setting value is changed, select the setting of the corresponding setting change menu Save the menu, save to complete the change of the set value.
ENTER	

 UP	It is used when the menu is moved up or the set value is increased. All menus have a cycle selection function. The uppermost menu position is moved to the lowermost menu loop. When the setting value is changed, the setting value is changed in a circular manner. After the uppermost setting, press this key to select the lowermost setting value.
 DOWN	It is used to move down the menu or decrease the setting value. This key is the same as the increase key, which is adapted to the cyclic menu change/setting value change.

7.1 Initial picture

ZW32-RC Controller will show following picture with it is power on:

The current of each phase is displayed on the status screen IA, IB, IC, Zero sequence current

$3I_0$), Line voltage $V_{AB}, V_{BC}, V_{CA}, V_{RS}, V_{ST}, V_{TR}$, Zero sequence voltage $3V_0$

IA : 0 0 0 0 0 A 0 0 . 0 / 0 0 . 0
IB : 0 0 0 0 0 A 0 0 . 0 / 0 0 . 0
IC : 0 0 0 0 0 A 0 0 . 0 / 0 0 . 0
IN : 0 0 0 0 0 A 0 0 . 0 kV

[LCD picture] state picture

※ Display unit Current: 1A, voltage 1 kV .

※ LCD menu process, please refer to "Appendix 2: Menu Directory Structure".

State picture will show different phase current :IA,IB,IC ,zero sequence phase current I_0 ,line

voltage : $V_{AB}, V_{BC}, V_{CA}, V_{RS}, V_{ST}, V_{TR}$ and zero sequence line voltage V

7.2 Main Menu

In initial state,push MANUL key,showing items as following:

<p>[CONTROL MENU] > 1. CONFIG 2. MEASUREMENT 3. STATUS 4. EVENT</p>
--

[LCD picture] ZW32-RC CONTROL MENU picture

Use the <Increase>/<Decrease> keys to select each menu, and press the <Increase key at the top position to select the circular menu selection to the bottom menu. The menu selection position is the menu on the left side of the LCD screen (>) is displayed.

7.2.1 Control Setup Menu

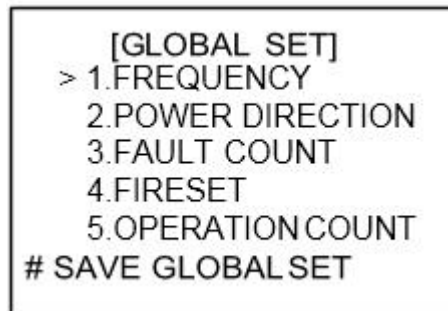


[LCD picture] CONTROL SETUP MENU picture

Use the <Increase>/<Decrease> keys to select each menu, and press the <Increase> key at the top position to select the circular menu selection to the bottom menu. The selection position of the menu is the menu on the left side of the LCD screen Key (>) is displayed.

- Global Set

Global set is as following picture



[LCD picture] Global Set Menu picture

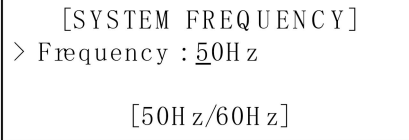
If choose FRECUENCY menu as following:

[LCD picture] set frequency picture

SYSTEM FREQUENCY is set by ENTER key to start set as following :

The functions of each key during system frequency setting are as follows.

- <Menu/Discard MANUL> key: back to previous manual items
- <Select ENTER> key: Change to set data changeable conditions (the set cursor(_)will flash)
- <Increase UP> key: to choose (50Hz/60Hz)。
- <Decrease DOWN> Key: to choose (50Hz/60Hz)。



[SYSTEM FREQUENCY]
> Frequency : 50Hz

[50Hz/60Hz]

[LCD picture] FREQUENCY SYSTEM SETTED PICTURE

After set,push MANUAL key to show previous picture

※ There are a SAVE GLOBAL SET item to save the set data at the bottom of the GLOBAL SET MENU bottom items



[GLOBAL SET]
4. FI RESET
5. OPERATION COUNT
> # SAVE GLOBAL SET

[LCD picture] Global Set Save set data picture

The SAVE GLOBAL SET item picture is as following:



GLOBAL Setting
SAVE Success!!!

[LCD picture] confirming picture of save set data

If you enter the SAVE GLOBE SET items and want to save the set data but real do not do the save ,it will be back to the previous picture ,it will ask you to confirm to save the set data again as following :



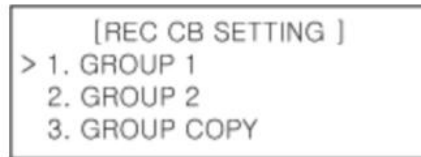
[SETTING DATA SAVE]
Press Enter Save
Press Menu Cancel

[LCD picture] Confirming data save picture

※ In additional,other items (POWER DIRECTION, FAULT COUNT, FI RESET, OPERATION COUNT)is to be set as above ways.

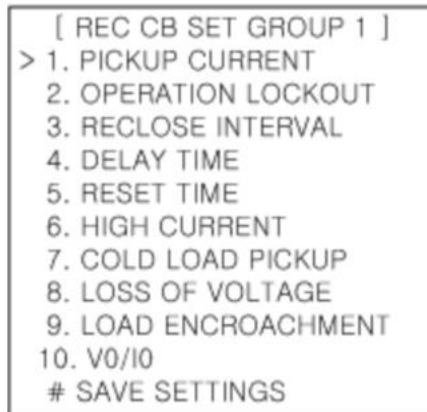
- REC CB SET

Recloser controller have 2 setting ,SETTEING 1 AND SETTING 2 are the same manual items chosen automatically applied for line direction.



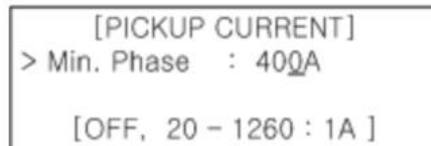
[LCD picture] REC CB SET picture

REC CB SET Menu items is as bellowing picture



[LCD picture] REC CB SET GROUP1 picture

PICKUP CURRENT menu item is shown as following picture:



[LCD picture] PICKUP CURRENT set picture

Push ENTER to set min phase current

At this moment ,all keys is with following functions

- <MENU/〉 key : Back up to previous menu
- <ENTER〉 key: TO SET CHANGEABLE DATA
- <UP〉 key: Add the data
- <DOWN〉 key : Reduce the data

※ When the Min. Phase menu is selected, the setting range of the corresponding menu at the bottom of the screen is displayed. Example; [OFF, 20-1260 / 1A] is displayed at the bottom. The displayed value means that it can be adjusted within the range of 20 to 1260, and it is set to 0A when the unit is changed in 1A or the minimum operating phase current is set to 20A or less. Explain the meaning of bypass. After the setting value is changed, press the <Menu/Cancel> button in the menu selection state to display the previous menu screen.

※ The setting value saving method is to select the "#SAVE GLOBAL SET" item at the bottom of the reclosing circuit recloser setting menu (REC CB SET MENU).



[LCD picture] REC CB SET picture



[LCD picture] confirming picture of saved data

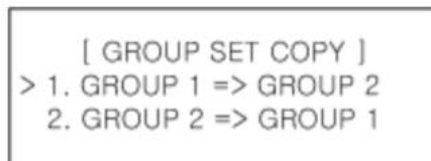
If, after the setting value of reclosing breaker setting (REC CB SET) is changed, select the lowest "#SAVE GLOBAL SET" item and the changed value is not saved. When returning to the previous menu, the following screen will be displayed, confirm whether to save the set value.



[LCD picture] Setting save confirmation picture

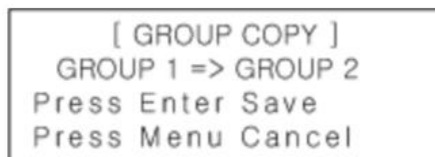
※ Another such as OPERATION LOCKOUT, RECLOSE INTERVAL, DELAY TIME, RESET TIME , HIGH CURRENT , COLD LOAD PICKUP , LOSS OF VOLTAGE , LOAD ENCROACHMENT, V0/I0) is set update data as above listed programs.

- Group Copy
Group Copy is as follow picture:



[LCD picture] Group Copy picture

ENTER to follow picture >



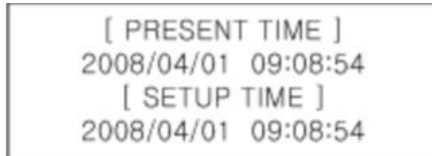
[LCD picture] Group Copy picture

※ When selecting the 『 Group 1 => Group 2 (Group1=>Group2) 』 menu on the Group Copy menu, it is necessary to set the value of the menu group 2 (Group2 Set) and the set value of the group 1 (Group1.) Selected when the menu value is the same setting.

After the setting value is changed, press the <Menu/Cancel> button in the menu selection state to display the previous menu screen.

- TIME SET

Enter (TIME SET) to showing following picture:



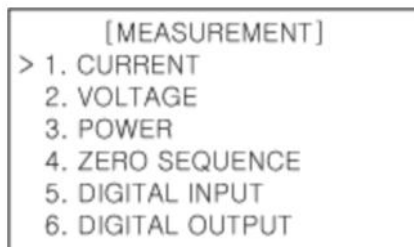
[LCD picture] TIME SET picture

To set a new time, use the <Increase> <Decrease> <Select> keys to set the year/month/day hour: minute: second (the time is displayed in 24 hours).



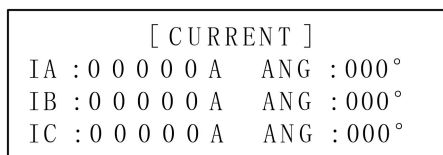
[LCD picture] Time Setting value saved successfully picture

- MEASUREMENT



[LCD picture] MEASUREMENT picture

By UP/DOWN to choose menu items to show MEASUREMENT items as below picture



[LCD picture] Current picture

```

[VOLTAGE ]
VA : 0 . 0 0 kV   VR : 0 . 0 0 kV
VB : 0 . 0 0 kV   VS : 0 . 0 0 kV
VC : 0 . 0 0 kV   VT : 0 . 0 0 kV
    
```

[LCD picture] Voltage picture

```

[ POWER ]
3PkW   : 0 0 0 . 0 kW
3PkVAR : 0 0 0 . 0 kVAR
3PF    : + 0 0 0 %
    
```

[LCD picture] Power picture

```

[ ZERO SEQUENCE ]
3V0 : 0 0 . 0 kV
3I0 : 0 0 0 0 0 A
I0/V0 Angle : 0 0 0 °
    
```

[LCD picture] Zero Sequence picture

```

[ DIGITAL INPUT ]
0 1 2 3 4 5 6 7 8 9 A B C D E F
X 0 X X 0 X X X 0 X X 0 X X X X
    
```

[LCD picture] Digital Input picture

```

[ DIGITAL OUTPUT ]
0 1 2 3 4 5 6 7 8
X X X X X X 0 X X
    
```

[LCD picture] Digital Output picture

- Status

STATE menu items as following picture:

```

[STATUS]
> OPEN/CLOSE      : CLOSE
OP. COUNT        : 0000
HANDLE LOCK      : UNLOCK
GAS PRESSURE     : NORMAL
AC POWER         : ON
BATTERY          : GOOD
CONTROL DOOR    : OPEN
    
```

[LCD picture] Status picture

- Fault Event

Choose{ Fault Event},the items as bellowing list ,and to show the fault event by UP/DOWN

1 0 0 1 3 1 1 2 : 5 8 : 2 0 0 0 1
IA : 0 0 0 5 0 A 3I0 : 00.40A
IB : 0 0 0 4 8 A 3V0 : 02.6kV
IC : 0 0 0 5 2 A ANG : 108°

[LCD picture] Fault Event picture

Fault Event IS shown as following :

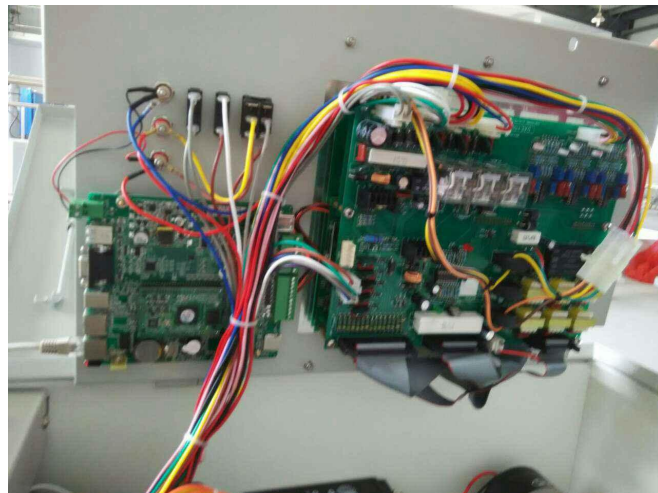
③	1 0 0 1 3 1 1 2 : 5 8 : 2 0 0 0 1	①
	IA : 0 0 0 5 0 A 3I0 : 00.40A	
	IB : 0 0 0 4 8 A 3V0 : 02.6kV	
	IC : 0 0 0 5 2 A ANG : 108°	②

- ① Fault No : show Fault Events from 001-200
- ② Showing the fault current ,zero sequence current and zero sequence voltage
- ③ Resume occurrence time:year/month/day, hour/minute/second

8.Protocol conversion modules

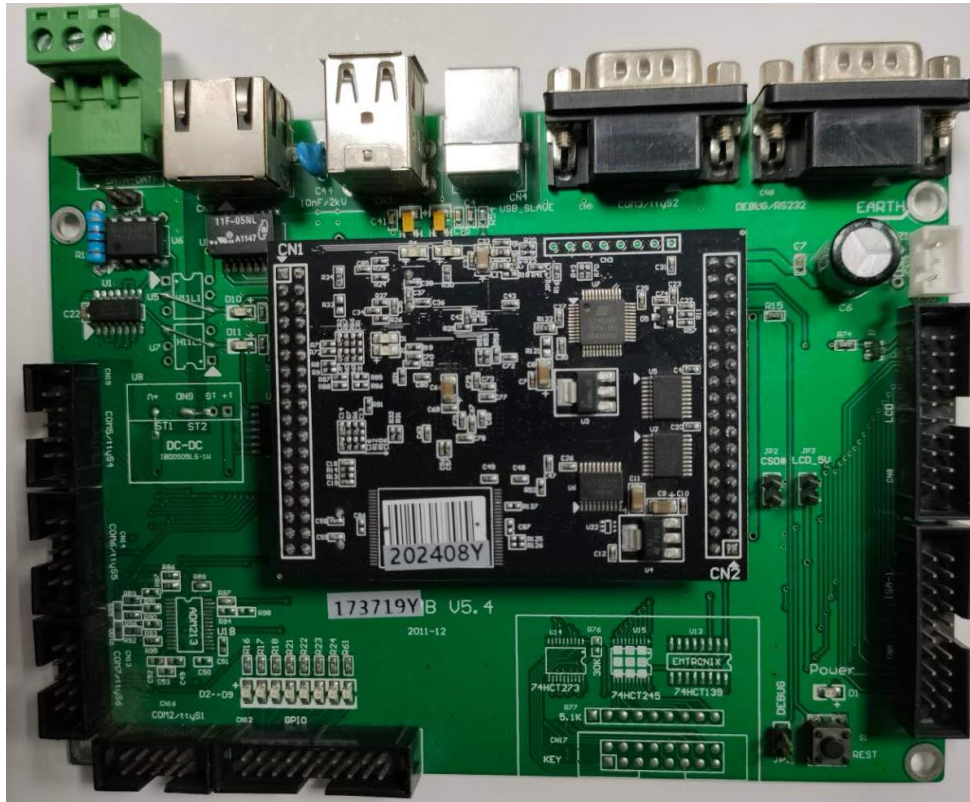
ZW32-RC The local protocol of the recloser controller is Modbus, and the protocol conversion module converts the Modbus protocol to IEC61850, DNP3.0, Modbus and other three communication protocols to meet the requirements of different master station communication protocols.

The protocol conversion modules is fixed the back side of controller panel



Pic 12

8.1 Serial port



Pic 13

8.1.1 PWR power port

GND: grounding

PWR: DC24V power port DC24V

8.1.2 USB port

Can be connected to USB keyboard, mouse, U disk and other devices.

8.1.3 VGA port

GA display.

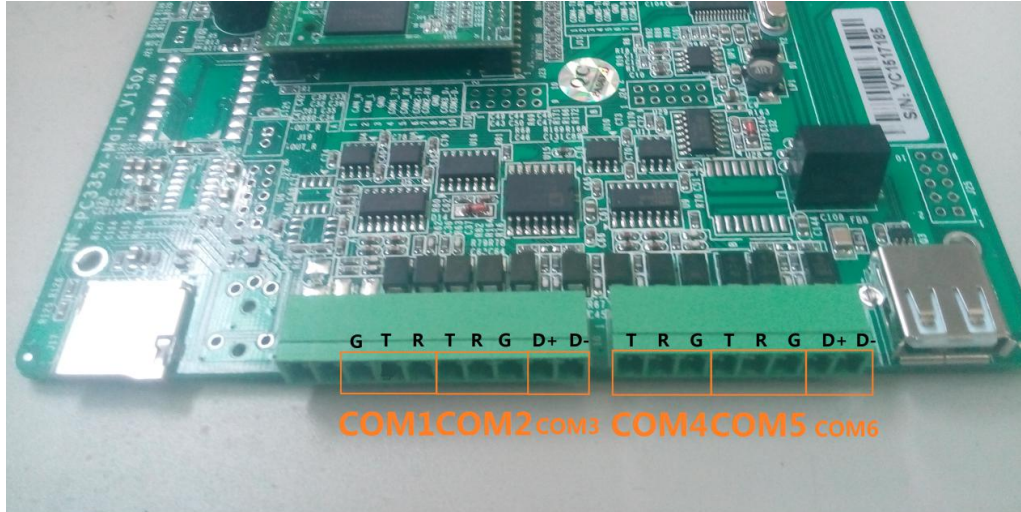
8.1.4 RJ45 Internet

for 100M Internet IEC61850

8.1.5 TF PORT

For TF card

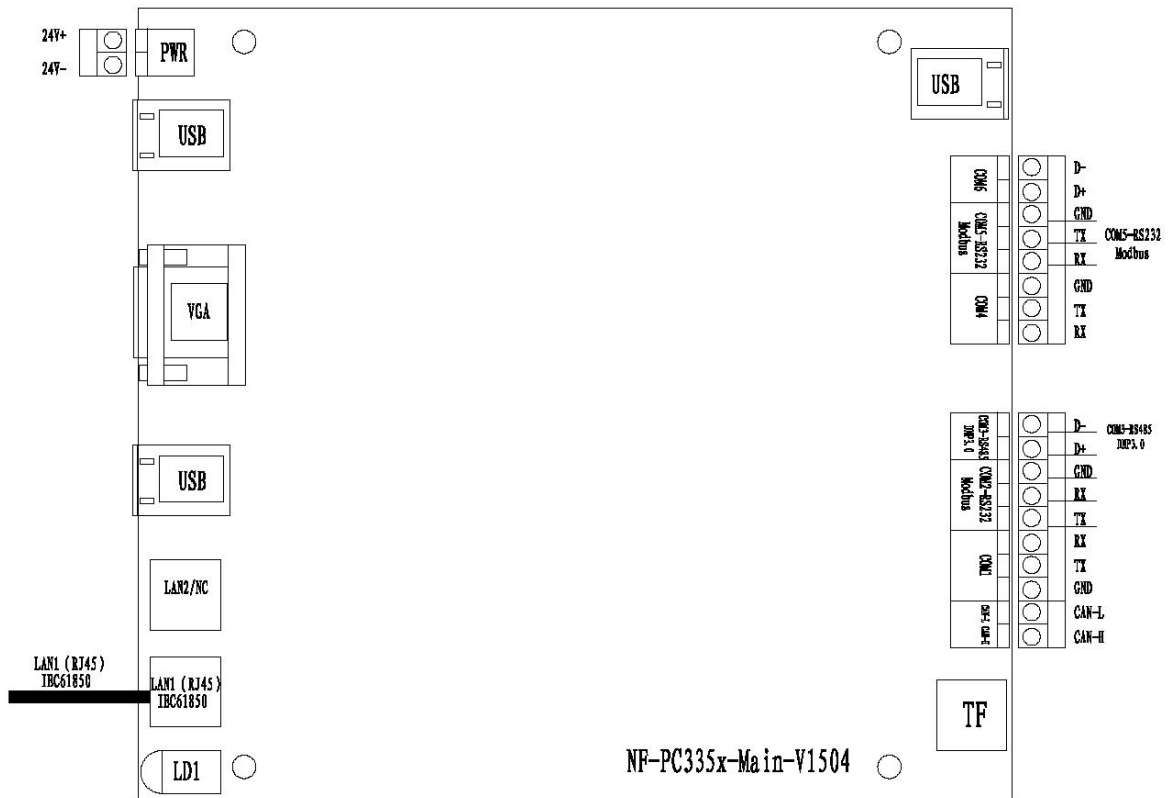
8.1.6 RS232/RS485 serial port



Pic 14 RS232/RS485serial port

Serial port match protocol

serial port	Name	type	function
COM1	ttySAC0	RS232	for local testing
COM2	ttySAC1	RS232	ZW32-RC Controller and conversion module communication interface
COM3	ttySAC2	RS485	DNP3.0 protocol Output Interface
COM4	ttySAC3	RS232	Reserve
COM5	ttySAC4	RS232	Modbus protocol Output Interface
COM6	ttySAC5	RS485	Reserve



8.2 ZW32-RC measuring data points

ZW32-RC measuring data points			
1.measuring points		2.signal points	
id	item	id	item
YC01	Ia	YX00	MSa(Close)
YC02	Ib	YX01	MSB(Open)
YC03	Ic	YX02	GasLow
YC04	In(3I0)	YX03	Handle Lock
YC05	Ia Angle	YX04	Spring Charger
YC06	Ib Angle	YX05	Door Open
YC07	Ic Angle	YX06	Charger Good
YC08	In Angle	YX07	Battery Good
YC09	Vab	YX08	Tricle Charge
YC10	Vbc	YX09	Bulk Charge
YC11	Vca	YX10	Over Charge
YC12	Vrs	YX11	Floating Charge
YC13	Vst	YX12	Reserved
YC14	Vtr	YX13	Reserved
YC15	Va	YX14	Reserved
YC16	Vb	YX15	Reserved
YC17	Vc	YX16	Close
YC18	Vr	YX17	Trip
YC19	Vs	YX18	Battery Test
YC20	Vt	YX19	Power Seal
YC21	Va Angle	YX20	Reserved
YC22	Vb Angle	YX21	Reserved
YC23	Vc Angle	YX22	Reserved
YC24	Vr Angle	YX23	Reserved
YC25	Vs Angle	YX24	Reserved
YC26	Vt Angle	YX25	Reserved
YC27	kWa	YX26	Reserved
YC28	kWb	YX27	Reserved
YC29	kWc	YX28	Reserved
YC30	kW3p	YX29	Reserved
YC31	kVARa	YX30	Reserved
YC32	kVARb	YX31	Reserved
YC33	kVARc	YX32	Protection Enable
YC34	kVAR3p	YX33	V0/I0 Enable
YC35	PFA	YX34	Remote Enable
YC36	PFB	YX35	High Current Enable

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YC37	PFC	YX36	Reclose Enable
YC38	PF3p	YX37	Battery Test
YC39	kVAa	YX38	Battery Charge
YC40	kVAb	YX39	Button Lock
YC41	kVAc	YX40	A Phase Fault
YC42	kVA3p	YX41	B Phase Fault
YC43	3I0	YX42	C Phase Fault
YC44	I1	YX43	OCR
YC45	3I2	YX44	High Current
YC46	3I0 Angle	YX45	VOIO
YC47	I1 Angle	YX46	LOV
YC48	3I2 Angle	YX47	CPU Run
YC49	3V0	YX48	AC Power
YC50	V1	YX49	Battery Trouble
YC51	3V2	YX50	Handle Lock
YC52	3V0 Angle	YX51	Gas Low
YC53	V1 Angle	YX52	Spring Charger
YC54	3V2 Angle	YX53	Close
YC55	V0/I0 Angle	YX54	Trip
YC56	IA Event	YX55	Reset
YC57	IB Event	YX56	Cycle
YC58	IC Event	YX57	Lockout
YC59	3I0 Event	YX58	Setting Group1
YC60	3V0 Event	YX59	Setting Group2
YC61	3I0/3V0 Angle Event	YX60	Pickup
		YX61	Coldload Pickup
		YX62	Angle1
		YX63	Angle2

3.control points

id	item
YK01	Trip
YK02	Close
YK03	FI Reset
YK04	Battery Test
YK05	Protection Enable
YK06	Protection Disable
YK07	V0/I0 Enable
YK08	V0/I0 Disable
YK09	REC Enable
YK10	REC Disable
YK11	High Current Enable

YK12	High Current Disable
YK13	V0/I0 Angle Configuration 1
YK14	V0/I0 Angle Configuration 2

9. Check for acceptance

Every ZW32-RCZW32-RC is checked and severe tested before ex-workshop.

9.1 Checking

After The user got the product,the user should make a inspection at products' outside including of surface ,sealed poles ,bolts ,accessories .

9.2 Storage

IF it is necessary to store ZW32-RCZW32-RC recloser for a long time ,please keep it in dry and clean environment ,and during storage, protective measures should be taken to reduce possible mechanical damage, especially do not tilt, place upside down, and do not stack debris on the circuit recloser to protect the silicone rubber/epoxy resin casing. It is strictly forbidden to soak the circuit recloser and intelligent controller in water.

9.3 Installation

When lifting and installing the equipment, please follow the local recommended safe operations. Please use the lifting ring on the circuit recloser. Please lift the equipment steadily to ensure that the center of gravity of the circuit recloser does not deviate, and the circuit recloser is not allowed to swing sharply. Incorrect lifting may cause damage to the equipment.

9.4 Hoisting

ZW32-RC recloser should be in closing location.It is not allowed to turn down the recloser, lifting must be by listing hoop on the VCB and keep the level line in hoisting, it is prohibited to lift by sealed poles or current transformer.

9.5 Fixing

ZW32-RCZW32-RC is suitable for pole mounted or structure mounted in substation.

- A. When arrival in site ,first to make a vertical install trial;
- B. If it is pole mounted ,the pole should be strong to support the circuit recloser;
- C. The mounting bracket of the recloser is firmly installed on the pole or floor mounting bracket;
- D. Lift the recloser to a suitable position and fix it on the mounting bracket;
- E. Connect to high voltage line ,the input and output line of recloser should be in curve to prevent over strength;
- F. Fixed the controller on the poles or structure in substation;
- G. Connection vacuum circuit recloser and controller by integration cable;
- H. Switch on the power supply of the controller. If a DC power supply is used, ensure the correct wiring of the positive and negative poles of the power supply;
- I. Now start to test by following steps:

10. Installation site testing

Before putting the recloser into operation, it is necessary to make some site inspection.

WARNING :

- ✧ HIGH VOLTAGE DANGEROUS: it is possible to cause death or harm body if you are not carefully. it is necessary to follow the local safety programs;
- ✧ If the device is not equipped with obvious visible fracture. Please follow local safety regulations. In high-voltage operation, failure to follow correct safety operations may result in death or serious personal injury;
- ✧ it is necessary to keep the AC POWER is 125VAC
- ✧ It is necessary to keep the VCB and controller to be safety grounding.

10.1 Insulating withstand voltage testing

When testing, both VCB and controller must be safety to ground.

The vacuum circuit recloser testing should be tested at 75% value of rated power frequency withstand voltage, 15kv, 60hz, 50kv to ground and break.

A.) Testing 1 operation programs to earth :

- closing the vacuum circuit break
- make the VCB and controller is with safety grounding
- Connect 3 phase's terminals of power side to be together.
- exert the testing voltage at terminals of power side
- the VCB should be able to withstand testing voltage for 60s

B.) Testing 2 operation programs to phases :

- closing the vacuum circuit break
- make the VCB and controller is with safety grounding
- make the A phase and C phase of load side is with safety grounding
- exert testing voltage at B phase terminal of power side
- the VCB should be able to withstand testing voltage for 60s

C.) testing 3, operation program to break

- closing the vacuum circuit recloser
- make the VCB and controller is with safety grounding
- connect 3 phase terminals of load side to be together and to be with good safety grounding
- connect 3 phase terminal of power side together and to be with safety grounding.
- exert the testing at terminals of power side
- the VCB should be able to withstand testing voltage for 60s

Change the connection type, now connect 3 phases terminals of power side together and is with safety grounding.

Connect 3 phase terminals of load side together and exert the testing voltage at terminal of load side, the VCB should be able to withstand testing voltage for 60s

10.2 Resistor testing of circuit loop

The resistor of circuit loop of recloser should be not bigger than $70\mu\Omega$ for every phase

11. Put into operation

- ✧ Operator should follow the local safety operation programs to prevent dead or harmed for peoples
- ✧ High voltage is dangerous
- ✧ There are obvious break gaps of recloser for operation inspection, please keep your safety.

12. Product maintenance

ZW32-RCZW32-RC recloser is with silicon rubber and epoxy resin sealed poles without oil and without pollution. It is necessary to maintain and inspect at recloser to make sure safety working of recloser. Maintenance and inspection should be on condition of electricity off, no working and high busbar grounding, recloser shell is grounding. and then do as following:

12.1 Outside inspection: Inspection if the silicon rubber /epoxy resin sealed pole, current transformer is with damaged, if damaged, replace it immediately, if box shell is with damaged, if yes, repair it, if paint or protection layer is damaged, repair it.

12.2 Inside inspection: if you suspect damaged or loose of mechanism, please open the box to check the mechanism and electric connection parts, if some part is damaged, replace it, if loose, tight it.

When you inspection or storage the recloser, please keep the recloser away from tools, another materials and components

13. FILES WITH PRODUCT

- PRODUCT CERTIFICATES :1 COPY
- ROUTINE TESTING REPORT:1COPY
- PRODUCT INSTALLATION DRAWING :1SET
- SECONDARY CONNECTING DRAWING:1 SET

ANNEX 1

ZW32-RC Controller Primary Set Data Sheet

Controller serial number: RC20141005(001-029)

Date: Sep.1, 2021

GLOBAL SET

	Global Set Menu	Setting Item	Range	Default	Setting Value	Step
1	FREQUENCY	Frequency	50 Hz/60 Hz	60 Hz		1 Hz
	Input right system frequency,if it is mistaken ,the measuring will be non-stability and ZW32-RC controller will work in unusual					
2	POWER DIRECTION	Direction	ABC -> RST, RST -> ABC	ABC->RS T		
	A,B,C is power side ,R,S,T is load side ,if the location is opposite with line direction ,the RST should be ABC ,otherwise ,the direction components will make unexpected operations					
3	FAULT COUNT	F.I. Count	1 ~ 4 time	1 time		1 time
	FAULT COINT for F.I.Count is only for "PROTECTION = DISABLE" conditions					
4	FI RESET	Reset on Closed	Yes / No	Yes		
	FI SET is set yes ,ZW32-RC will reset on closed ,if set no ,will keep until to indicator light reset					
5	OPERATION COUNT	OP Count	0 ~ 9999time	0 time		1 time
	Switch operation number is set as 0					

Reclosing CB Setting

	Setting Menu	Setting Item	Range	Default	Setting Value	Step
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1	PICKUP CURRENT	Min. Pickup Phase	OFF, 20 ~ 1260A	600A		1A	
	Set min value for testing fault current						
2	OPERATION LOCKOUT	Operation	1 ~ 4time	4time		1time	
	Set breaking times for Vacuum circuit recloser						
3	RECLOSE INTERVAL	1 time	0.3 ~ 180 S	0.2 S		0.1 S	
		2 time	1 ~ 180 S	2 S		1 S	
		3 time	1 ~ 180 S	5 S		1 S	
		Set reclose interval for 1 st , 2 nd , 3 rd . reclose interval is time from sensing fault to break and reclosing; Warning !! Note: The 2nd and 3rd reclosing time is set to be longer than the time required for the body to store energy (about 5-6 seconds), and the 1 reclosing time can be set arbitrarily.					
4	DELAY TIME Delay Time	Delay Time	0.0 ~ 60.0 S	0.5 S		0.1S	
		Set delay time for short circuit and over current					
5	RESET TIME	From Lockout	1 ~ 600 S	30 S		1S	
		Set reset time from lockout					
		From Cycle	1 ~ 600 S	30 S		1S	
		Set rest time from cycle					
6	HIGH CURRENT	Pickup	OFF, 630 ~ 20000	2000 A		1A	
		Set high current for pickup current					
		Delay Time	0.0 ~ 10.0 S	0.1 S		0.01 S	
		Set delay time for high current					
		Lockout	1 ~ 4 Time	2 Time		1 Time	
		Set the number of actions for the quick-break action. The number of actions for item 2 will operate separately					
7	COLD LOAD PICKUP	Multiple	OFF, 1 ~ 10	4 Time		1Time	
		In cold load pickup prohibit function ,it is times of phase current to judge the short circuit fault .					
		Holding time	0.1 ~ 60.0 S	3.0 S		0.1 S	
		Set holding time for cold load pick					
	Restore PC Time	0.1 ~ 60.0 S	0.3 S		0.1 S		
Set restore PC time for cold load pickup							

8	LOSS OF VOLTAGE	Enable / Disable	Enable /Disable	Disable			
		Enable /disable for loss of voltage protect					
9	LOAD ENCROACHMENT	Enable / Disable	Enable/ Disable	Disable			
		Allow the use of load intrusion suppression function or prohibit the use					
		Load pickup	20~ 1260A	600A			1A
		Set load pickup current for load encroachment					
		PLAF Positive direction	0 ~ 90 °	30°			1°
		NLAF negative direction	0 ~ -90 °	-36 °			1°
		PLAR PLA reverse	0 ~ 90 °	44 °			1°
		NLAR NLA reverse	0 ~ -90 °	-31 °			1°
		Set normal load phase angle range for load encroachment					
		10	V ₀ ,I ₀ Protection	Enable / Disable	Enable / Disable	Disable	
Enable /disable for V ₀ . I ₀ protection							
Trip	Enable / Disable			Enable			
Enable /disable for zero sequence protect trip function							
Trip Delay	1 ~ 7200s			10s			1s
Delay setting of zero sequence protection trip function							
I ₀ ZERO CURRENT	OFF, 0.1 ~ 20.0 A			1 A			0,1A
SET DATA FOR STARTING DATA OF I ₀							
V ₀ Zero sequence voltage	OFF, 5 ~ 100 %			25 %			1%
Set data for starting data for V ₀							
MTA1 1 STANDARD PHASES ANGLE 1	0° ~ 359 °			180°			1°
TAW1 STANDARD PHASES ANGLE RANGE 1	10° ~ 170°			85°			1°
Set phase shift angle condition between zero sequence current and zero sequence voltage (arc suppression coil grounding system).							
MTA2 STANDARD PHASE ANGLE 2	0 ~ 359 °			270°			1°
TAW2	10 ~ 170 °			85°			1°

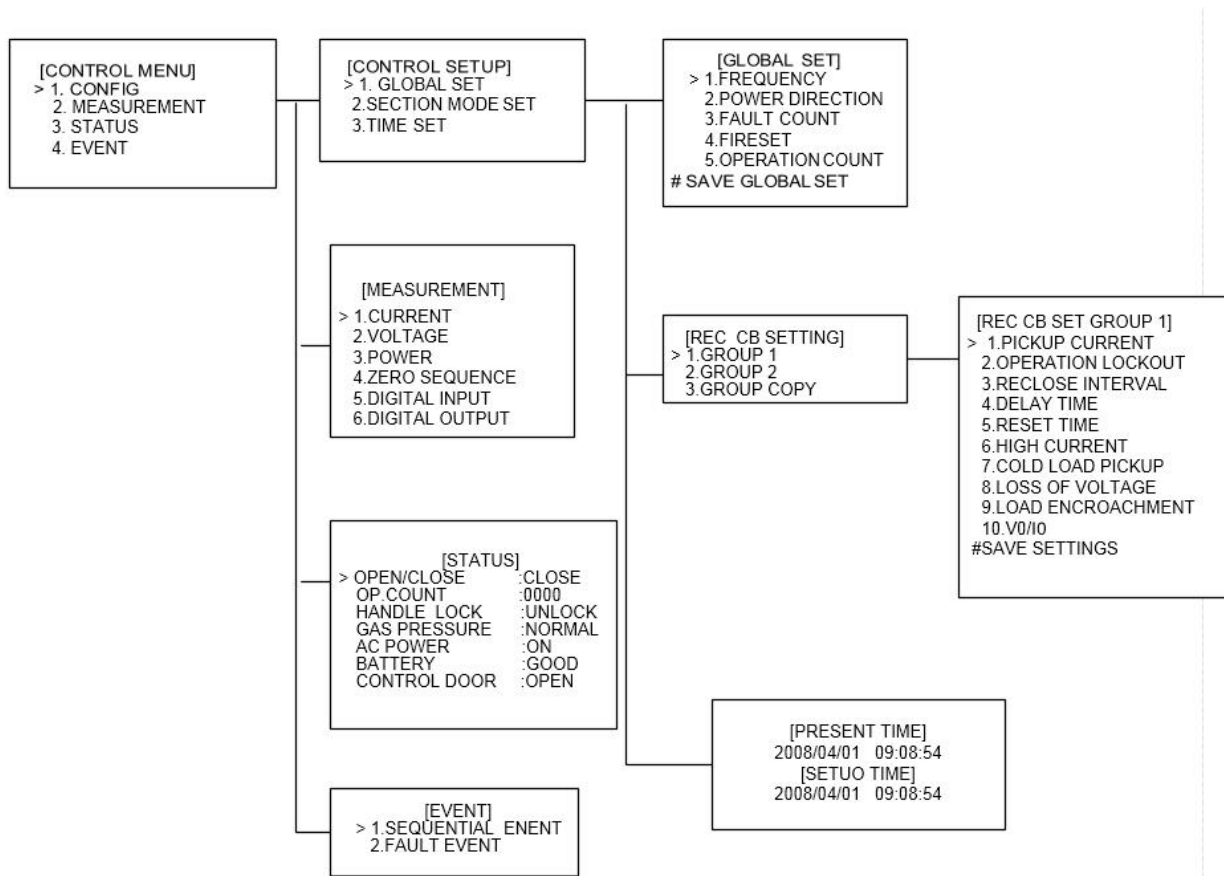
ZW32-RC Automatic Recloser Manual

		STANDARD PHASE ANGLE 2				
		For natural no grounding system and resistor grounding system ,set move phase angle condition				

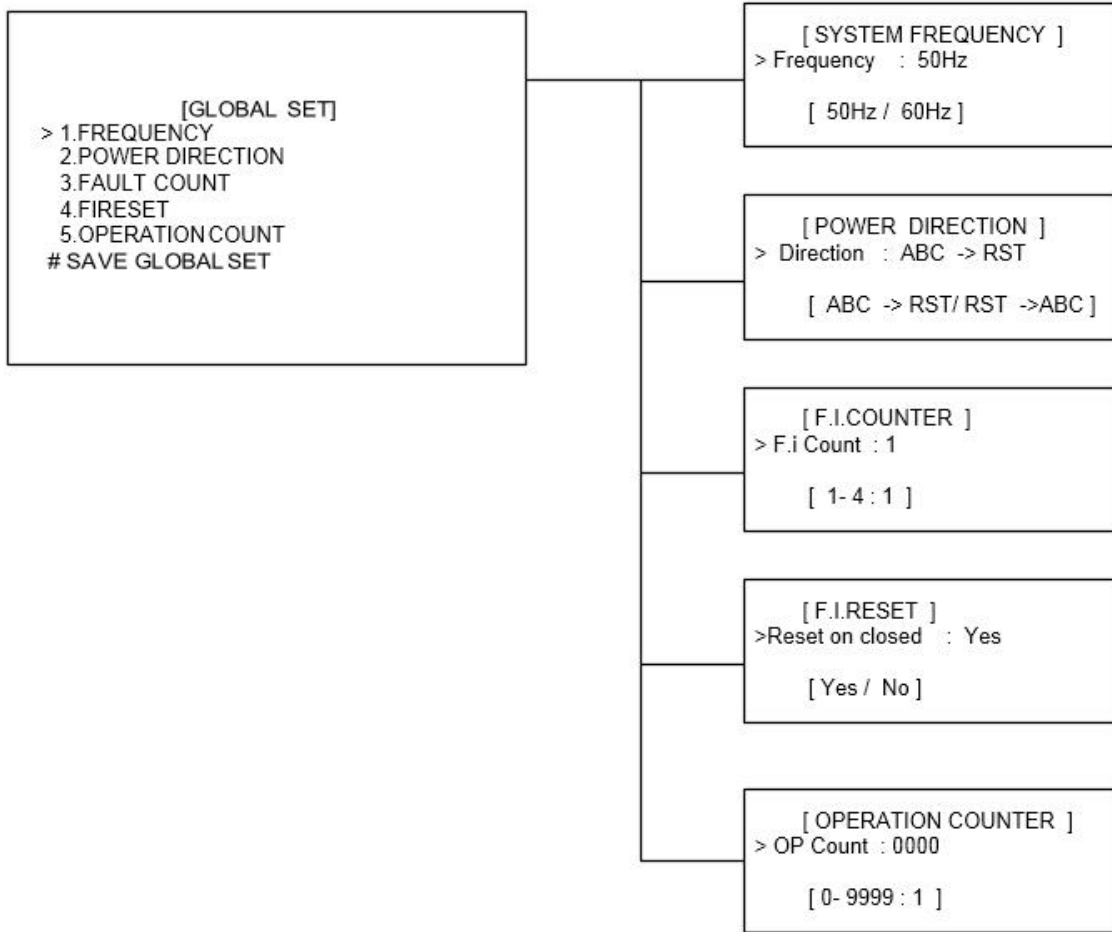
ANNEXT 2

ZW32-RC CONTROLLER MENU TREE

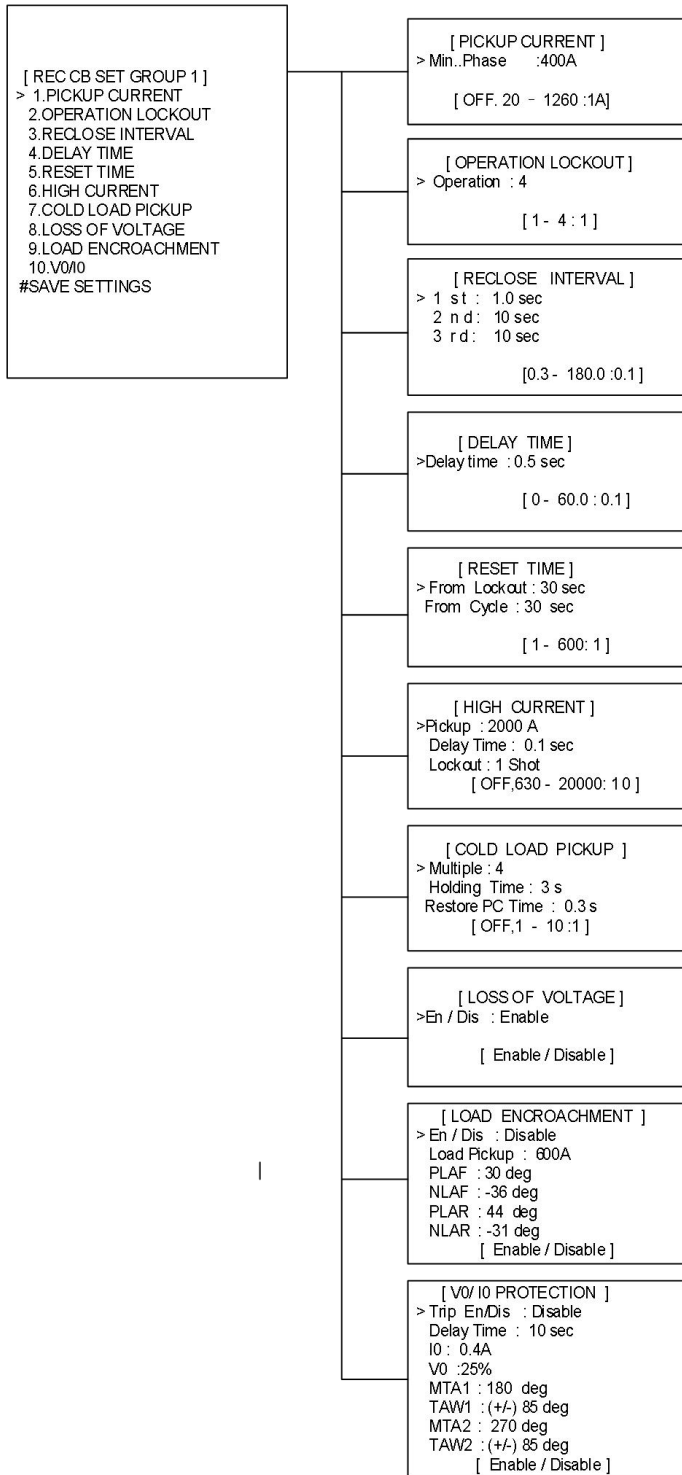
Main Menu



Global Set Menu



Setting Menu



Recloser photos:







Control photos:

