Dear Client,

Thank you for choosing our UHV-408 Circuit Breaker Analyzer. Please read this manual carefully before your initial use, and this manual will help you use our equipment skillfully.

There may be a little bit differences between the equipment you got for our trial to improve and perfect our products. You can find the changes in the appendix. Sorry for all the inconvenience caused to you. You can contact us if you have any doubts of our tester.

Voltage of terminals side may be Hazardous that would cause Electrical Discharge when you attach and detach test side. Be careful for risk of electric shock and personal injury.

◆ SERIOUS WARRANTY

All products of our company carry a three-month limited warranty from the date of shipment. If any such product proves defective during this warranty period we will provide a replacement in exchange for the defective product without charge. In one year (including one year) the product will be maintained and repaired for free if it proves to be defective. Beyond one year, lifetime maintenance and repair with charge is available.

◆ SAFETY REQUIREMENTS

Please read the following safety precautions to avoid personal injury and to prevent this product or any other attached products being damaged. In order to avoid possible danger, this product can only be used within the scope of the provision.

Only qualified technician can carry out maintenance or repair work.

—To avoid fire hazard or personal injury

Use Proper Power Cord. Use only the product-specific power cord and the power cord must be in line with the specifications of the product.

Connect and Disconnect Correctly. When the testing wire is connected to the charged terminal, do not connect or disconnect to test wire at will.

Ground the Product. In addition to this product being grounded through the grounding conductor of the power cord, the grounding

column of the product shell must also be grounded. To avoid electric shock, the grounding conductor must be connected to earth ground. Before making connections to the input or output terminals of the product, please do check that the product is properly grounded.

Pay Attention to the Ratings of All Terminals. In order to prevent the fire hazard or electric shock, please be care of all ratings of this product and labels. Before connecting this product, please read the product manual to acquire information about the ratings in further detail.

Do Not Operate Without Covers. Do not operate this product with covers or panels removed.

Use Proper Fuse. Use only the fuse type and rating specified for this product.

Avoid Touching Bare Wire and Conductor. When the product is charged, do not touch the bare connection point and parts.

Do Not Operate With Suspected Failures. If you suspect there is damage to this product, have it inspected by qualified service personnel.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmosphere.

Keep the Surface of the Product Clean and Dry.

—Security Terms

Warning: Warning statements identify conditions or practices that could result in injury or loss of life.

Caution: Caution statements identify conditions or practices that could result in damage to this product or other property.

Contents

Notices in using instruments

1. Ensure wiring well before using instrument firstly, in order to confirm user & instrument' s security.

2. Before using the instrument, please check whether the power supply is AC 220V, otherwise the instrument will be damaged.

3. Keep attention to safety on working instrument with internal DC220 V outlet.

4. Scrutinize the control wiring and strictly prohibit short out to avoid damaging the internal DC power or control contact, which is under circumstance of using the divide-shut brake of internal DC power control switch.

5. Confirm each part of fracture lines connecting well for fear that switch vibration influences test data.

6. Prohibit to open enclosure randomly while there has 220V voltage inside.

I.Outline:

with the development of society, the electricity security is required to be more by people, HVCB burdens the dual-control and protection in electric system, whose performance relates to the operation of electric system . mechanic parameter is one of indispensable parameter in analyzing the performance of breaker. The comprehensive characteristic tester of high-voltage switch , namely, the mechanic characteristic tester, is according to the latest version of < high-voltage AC circuit breaker> GB1984-2003 as design model, referring to the third part of PRC's power industry standards <Genera technical specifications for high voltage test equipment>, and designing based on DL/T846.3-2004, which inspect various grades of voltages in high-voltage circuit breaker's mechanic dynamic characteristic parameters about oil lack, oil excess, vacuum and sulfur hexafluoride, to provide convenience to many kinds of breakers.

II. Instrument characteristics:

(1) Suitable for domestic and foreign production of SF6 switch, GIS combination electrical appliances, vacuum switch, oil switch, vacuum contactor, special circuit breaker (train circuit breaker). At the same time, 12 metal contact fractures, 6 main fractures and 6 auxiliary fractures can be measured. The circuit breaker is operated once, and the data and waveform such as time, bounce number and time, speed, coil current and coil resistance are obtained. With energy storage, automatic and manual low jump test, circuit breaker life test and(lock power supply and dry contact control optional) and other functions. Equipped with high speed thermal printer, convenient to print test data on site.

(2) 7 inch color screen, operating under the sun is clearly visible. Menu operation, quick test interface, one-key operation, support Chinese and English input. The 12-channel fracture status is displayed in Chinese. The time, stroke, speed and waveform are displayed on the same screen. Analyze the average velocity of the specified segment and mark it on the stroke curve for easy viewing.

(3) machine integrated operation power supply, no site secondary power, easy to use. Can provide DC20 ~ 270V adjustable power supply, current 20A. Short circuit protection function. In case of short circuit, 1ms will stop the voltage and current output and emit a beep to prompt the

operator to check the circuit. Unique double circuit power supply design, such as closing or breaking control circuit in one damage, with the other can also be tested.

(4) equipped with linear sensor, 360 degrees without dead Angle rotation sensor, with special fixed multifunctional joint, installation is very convenient, simple. The length of the 30-1000mm linear sensor can be set arbitrarily. It only needs to be equipped with the sensor, and the instrument does not need to be returned to the factory to change the program.

(5) the host can store 100 groups of test data, real-time clock in the machine, easy to archive.

(6) Equipped with U disk interface and R232 interface, data saved to U disk, uploaded to the computer for analysis, saving, printing, R232 interface can be connected to the computer online operation (optional function).

(7) The internal anti-interference circuit can be used reliably in 500KV substation.

III. Main technic parameters:

1. Time measurement:

12 natural switching (closing) time

The opening (closing) phase is not at the same time

The difference between different periods of switching (closing)

Closing (opening) Bouncing time (number of bounces)

Internal trigger test range: 1ms ~ 10000ms, resolution: 0.01ms,

External trigger test range: 1ms ~ 10000ms,

Resolution within 999ms: 0.01ms,1000-9999ms: 0.1ms, and over 10000ms: 1ms.

Accuracy within 200ms: 0.05%± 0.1ms

2. velocity measurement : instant separating (instant closing) velocity

Appointed time slot(stroke segment or angle segment) average velocity

3. velocity measurement range: 0.1mm sensor 0.01～20.00m/s，

345°angle sensor 1 cycle/ 0.01°

4. Travel measurement: Travel of moving contact (travel)

Contact stroke (open distance)

Over travel

Overshoot or rebound stroke

5. Measuring range: linear sensor: 50mm, measuring range: 0-50mm, resolution :0.1mm.

Optional 100-1000mm linear sensor of any length.

Encoder: 345° Rotate sensor, measurement

range: 0-1000mm, resolution :0.1°.

6. Current resistance range: the maximum current 20 A, resolution: 0.01 A, 1000 Ω resistance, resolution: 0.01 Ω.

7. Instrument power supply: AC 220V ± 10%; 50 hz plus or minus 10%

8. Dc power output: continuously adjustable DC20 ~ 270V, DC220V≤20A (short time), Power: 4400W.

9. External trigger voltage: AC/DC10-300V, current ≤120A

10. disconnecting switch measurement range

(1) Voltage output: DC20～270V(adjustable)

(2) Current output time: 0.01~10 s (settable)

(3) Fracture signal maximum acquisition time: 10s

(4) Measurable fracture closing, separation time, three-phase a synchronism , bounce time and frequency .

11. mainframe volume : 360×260×170mm

12. operating environment: -20℃~+50℃

13. relative humidity: ≤90%

IV. term definition:

(1) Three-phase synchronism: refers to the maximum & minimum differentials of on-off three-phase separation (closing) switch.

(2) Same phase asynchronies : refers to 6 fractures or more switches, the time difference of separating (closing) brake to same phase fracture

(3) Bounce time: refers to the accumulative time values, which is the interval from first contacting to completely contacting, of all contacts while in progress of closing, separating (bounce) brake when switch's moving & static contacts .

(4) Opening time: refers to the interval from separating brake dropping out with electrification to

every polar arc contact separating, where the breaker is in closed position.

(5) Closing time: refers to the interval from closing circuit with electrification to every polar arc contact touching, where the breaker is in open position.

(6) Reclosing time: in the cyclic process of reclosing, it's the interval from opening to each polar contacts closing together.

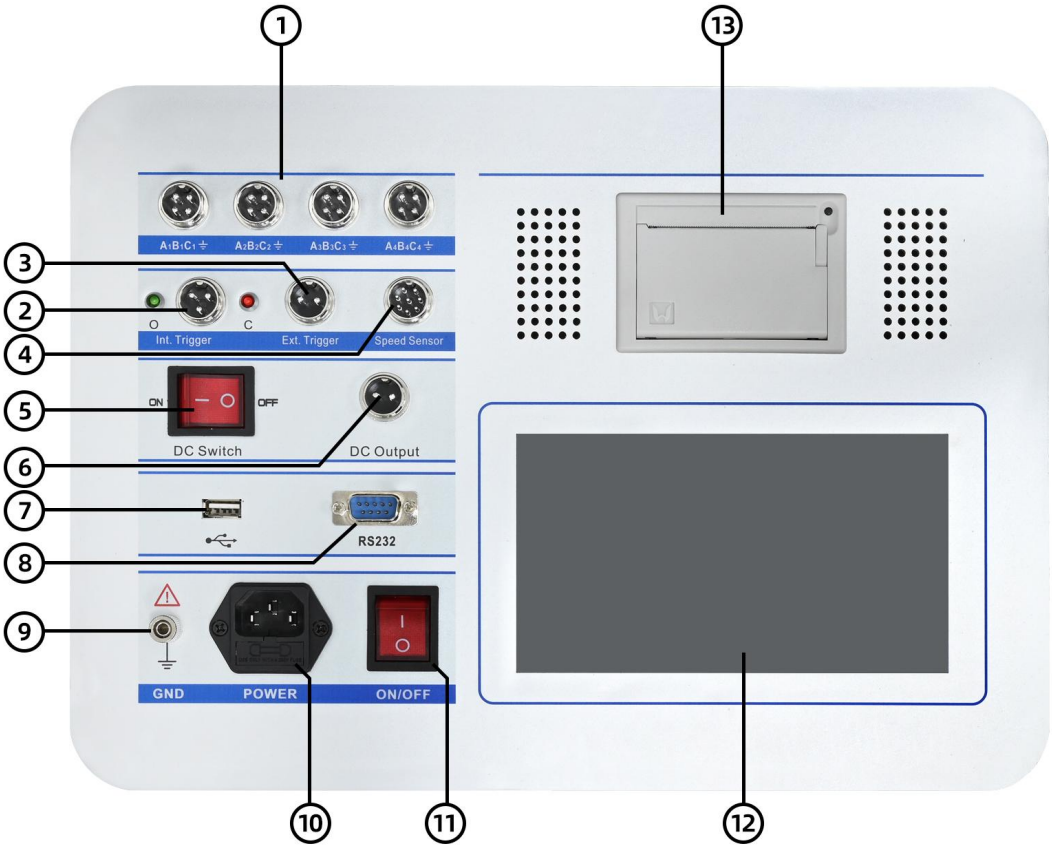
(7) Instant separating (closing) velocity: refers to within some appointed time of opening/ closing moving contact and static contact, or average velocity of a certain appointed stroke. Take 10ms for instance, to separating brake ,it's average velocity to separate brake within 10ms after separating. To closing brake, it's average velocity to close brake within 10ms before closing.

(8) Opening range: refers to the stroke of switch from divided state to instant touch of moving contact with static contact.

(9) The maximum velocity of opening (closing)switch: refers to the maximum instantaneous speed of opening (closing) switch, generally speaking, this value shall appear in this stroke or point, which is analyzed from velocity and stroke curve, while switch just opening or closing.

(10) Average velocity of opening (closing): refers to the ratio of stroke to time , where the switch moving contact exists in whole action.

V. instrument panel introduction :



(Note: the panel color in the figure is for reference only)

1. A1B1C1 / A2B2C2 / A3B3C3 / A4B4C4 fracture measurements
2. Int. Trigger
3. Ext. Trigger
4. Speed Sensor
5. DC Switch
6. DC Output
7. Usb interface
8. R232 upload interface
9. Instrument grounding
10. AC/DC220V power input
11. Power switch

12. 7 "color screen

13. The printer

(1) Metal contact testing port: can measure tome of 12 circuits ordinary breakers' closing, separating brake, bounce, synchronism, same phase, etc.

(2) Internal trigger: refers to the operation in separating and closing with the output of DC30~265V adjustable power supply of instrument, which defaults as DC220V.

(3) External trigger: refers to the operation in on-off action with on-site power supply (both AC and DC), while the DC power supply is in non-operative station inside of instrument.

(4)Motor: motor energy storage interface, dc20-270V adjustable DC power supply, the default is DC220V. First, set the duration of energy storage voltage output before operation. The duration of energy storage can be set for 5-20 seconds, and the default is 8 seconds.

(5) Ground pole :confirm the ground wires connecting well before beginning the tests.

(6) Velocity sensor port: the ports of connecting liner sensor with rotation sensor and universal sensor.

(7) Printer: print the measure data on site.

(8) LED screen : parameter design, measure, data display.

VI. fracture wire, closing/ opening brake control, sensor mounting methods:

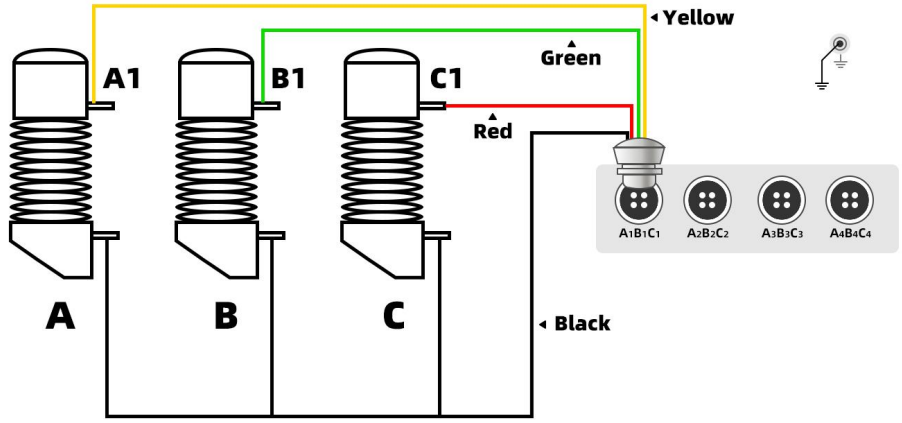
6.1 fracture wiring methods:

This instrument has two fracture testing input ports, each facture with 4 wires, which are A1(yellow), B1(green) and C1(red) these three connect with three-phase moving contact port, GND(black), static contact(three-phase short circuit), could test and sample 6 fracture breakers (switch) in total.

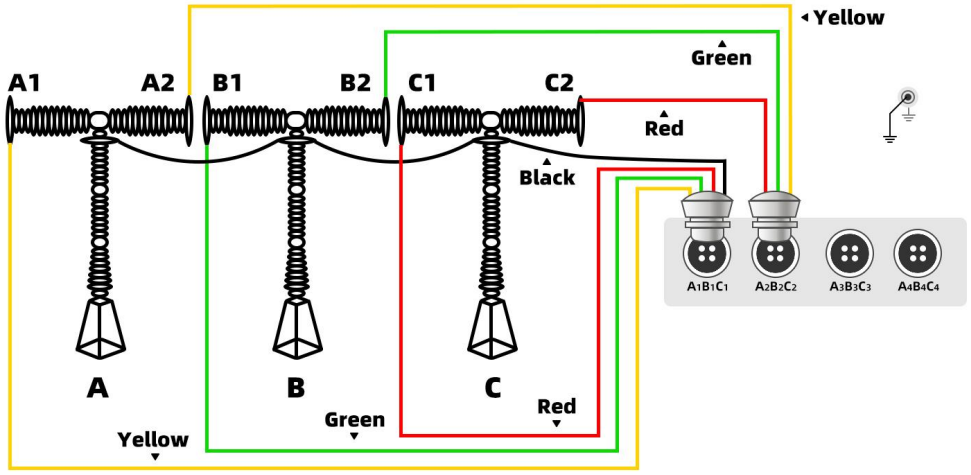
The pictures below are exemplified as breakers' connection of 3 fractures and 6 fractures. Use these fracture testing input interfaces, and their connections are : A1 and A2 connect the yellow fracture input line, B1 and B2 connect with green fracture input line, C1 and C2 connect with red fracture input line. For three-phase 3 breakers, which only use the former fracture testing signal input port, A1 is the main

fracture in it. (notation: 3 fracture, 6 facture breakers have one public GND).

Fracture connection diagram (three fractures)



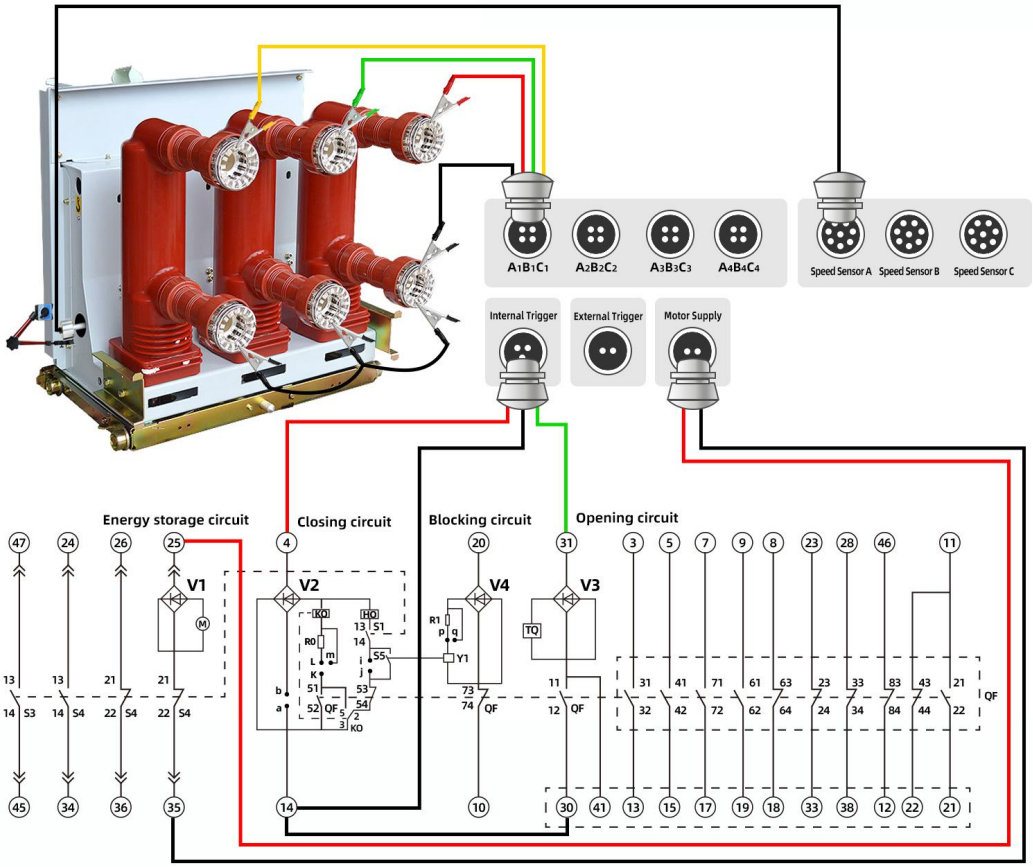
Fracture connection diagram (six fractures)



6.2 wiring methods for internal trigger separating/ closing brake control

In on-site test, if select interior power supply of instrument, three control wires of closing brake control wire(red), separating brake control wire(green), public wire(black), connect with “internal trigger” ports (aviation plug) of instrument panel. When instrument inputs separation+, close+, negative+, usually connect with contacts of pilot switch(effectively protect coil and instrument).

Auction: sever the included operational power (cut-off brake or pull up fuses) of high-voltage switch gear, that avoids conflicts between two powers to damage instrument.



6.3 external wiring (used in AC switch or permanent magnetic switch)

Use an external power supply for closing or opening test, the instrument only collects voltage and current signals, the steps are as follows:

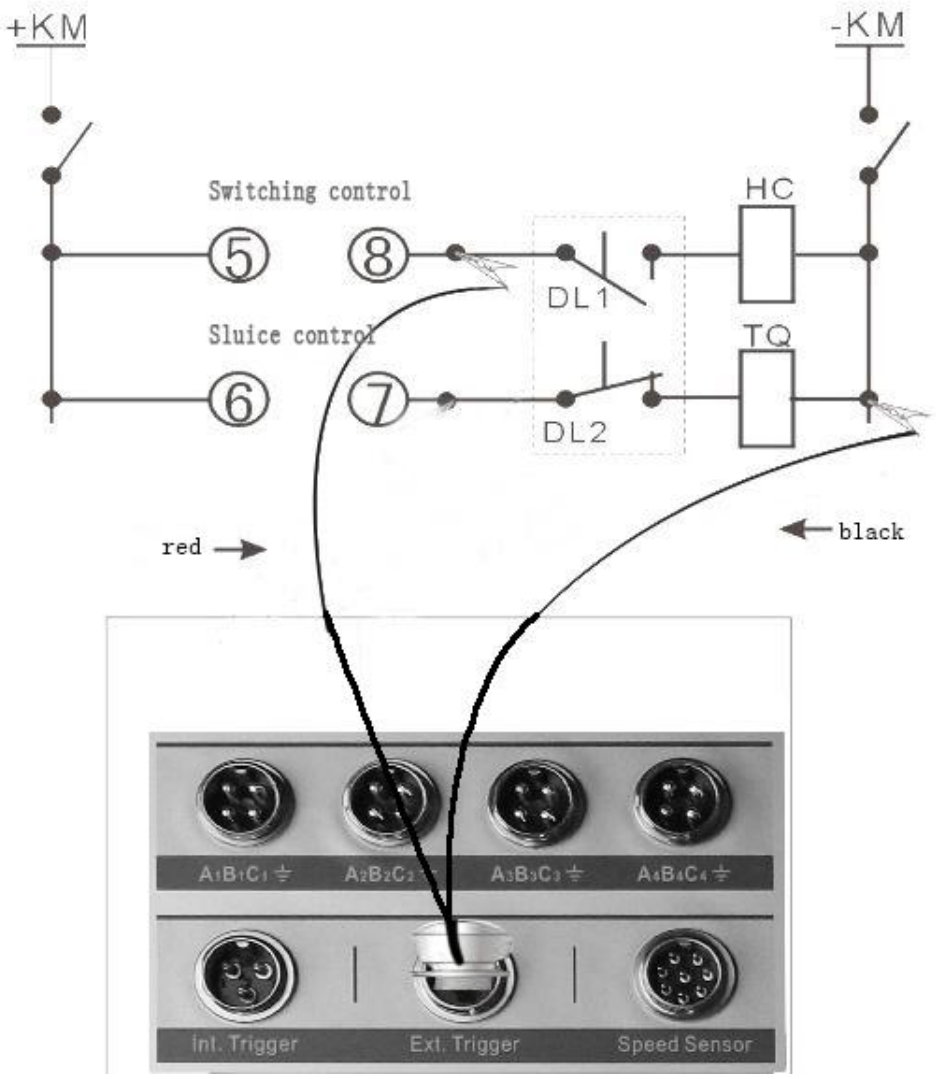
⑴. First connect the control line to the "external trigger" port on the instrument panel

⑵. Set the parameters of the instrument, set the trigger mode to external trigger, set the acquisition time to about 5 seconds, the set acquisition time is the length of waiting for the signal, and the data will not be collected if the time is exceeded.

⑶. Use an external trigger wire (same as the energy storage wire) to connect the two ends of the brake or opening coil (the control loop point can also be connected).

⑷. Select closing or opening test in the characteristic test menu, and then start the external voltage, and the instrument can collect the closing and opening data.

⑸ Before wiring, users should carefully analyze the wiring according to the wiring diagrams of various high-voltage switch control panels.



6.4 manual trigger needn't wiring control

Extend the signal acquisition time by 5 seconds in the parameter setting menu, and then quickly manually open or close the switch to acquire the signal. This action must be completed within 5 seconds. If it exceeds, no data will be displayed. The test data is mainly for reference The bounce time, the number of bounces, the synchronization, the speed, the closing time and the closing time are the evaluation values.

6.5 installation methods of velocity sensor

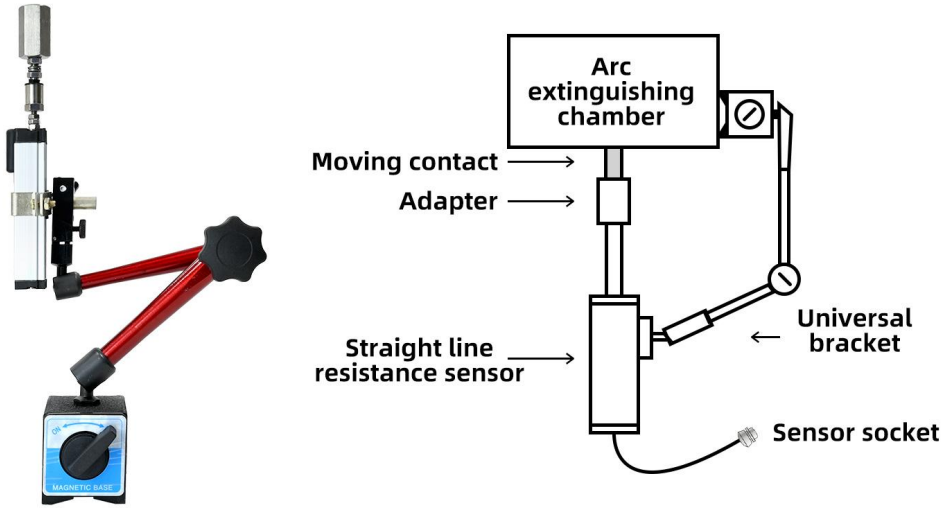
When testing the switching speed, the sensor is installed on the moving contact or the arm of the high-voltage switch, and the corresponding sensor installation is selected according to the motion mechanism of the circuit breaker.

50mm liner sensor(vacuum switch class)

The linear pull rod of the sensor is attached to the vertical conductive rod (moving contact) of the

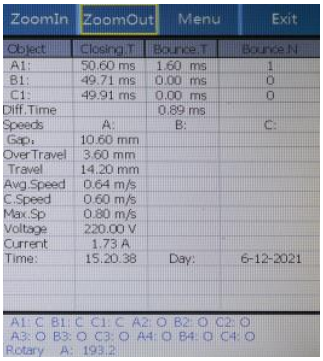
switch with a magnet, and the sensor is fixed with a universal bracket and installed in the open state. When installing, the electronic ruler must be perpendicular to the moving contact. First, pull out a buffer length of about 15mm to ensure that the sensor does not damage the sensor by switching up and down during closing and opening. This type of installation method is mainly a vacuum switch with exposed moving contacts such as ZN28 switch or ZN63 (VSI) without a chassis.

Installation diagram of straight line sensor

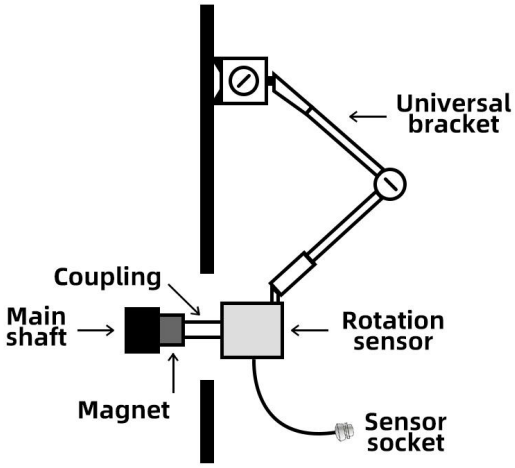


Rotating sensor mounting mode：

The effective stroke of the rotating sensor is 3450, the tail of the sensor pointer points to the red area, or the sensor status can be seen in the status bar of the instrument test interface, as shown in the figure below, try to keep the sensor reading between 160 and 200.

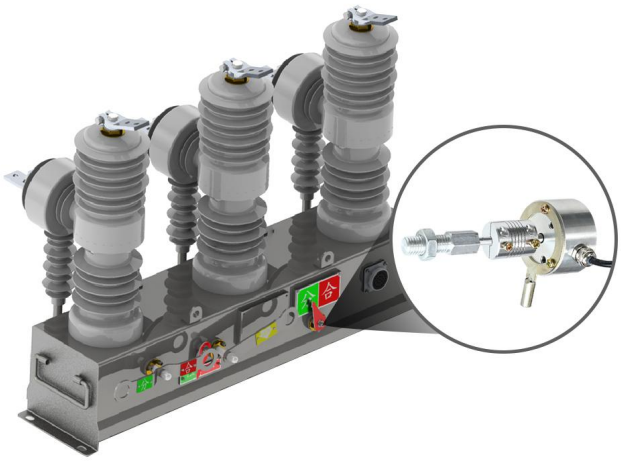


For example, sealed VS1 and VD4 switches are installed on the arms (spindles) on both sides of the switch. Remove the white sealing covers on both sides. You can see the plum blossom-shaped spindle. The magnet is attracted to the center of the spindle. Keep it horizontal during installation. The universal bracket is fixed.

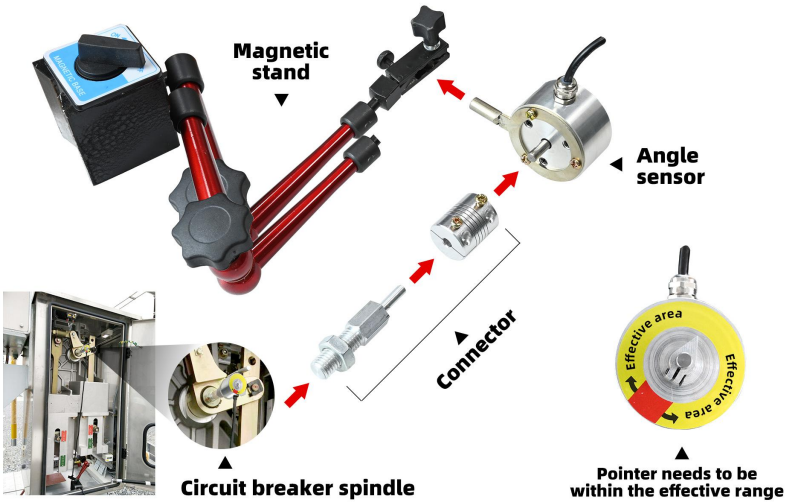


Outdoor SF6 circuit breakers whose speed is below 3.5m/S can be attracted to the main shaft with a magnet. If the speed exceeds this speed, it must be installed on the main shaft with a hard connection.

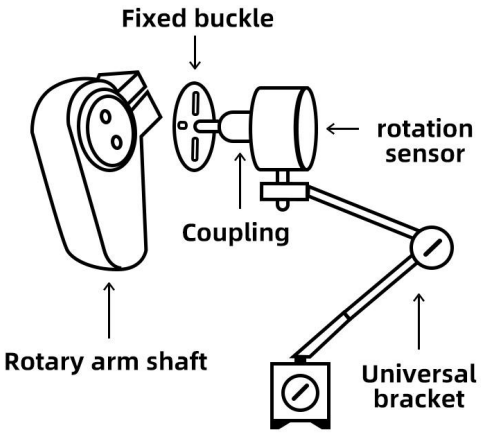
If you can't find the arm, install it at the split finger pin, first remove the split finger pin, and then screw on the sensor connector.



Installation diagram of outdoor vacuum switch and sulfur hexafluoride:



The arm of the SF6 circuit breaker has an angular displacement sensor connection port. Fix the U-shaped port in the screw hole correspondingly, and then fix the sensor with a universal joint. As shown below:



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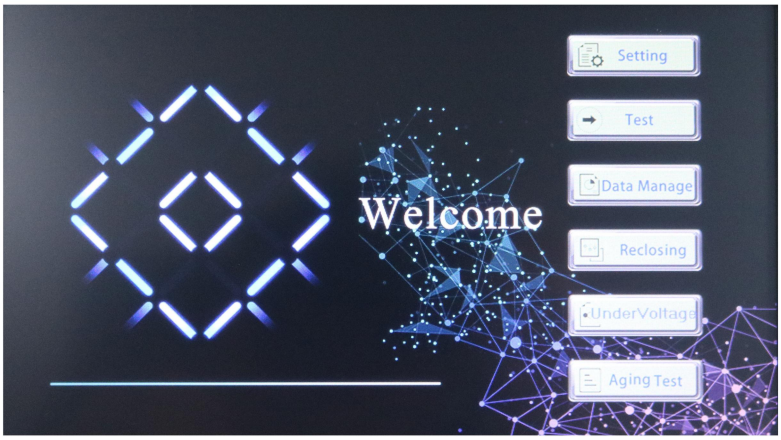
VII. menu instruction:

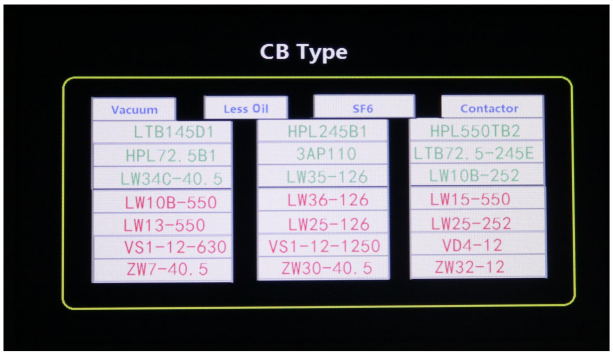
After starting up, enter the main interface of the instrument operation, and there are three menus: parameter setting, test and file management, as shown in the figure below:



A. File menu: Click parameter setting, as shown in the figure below:

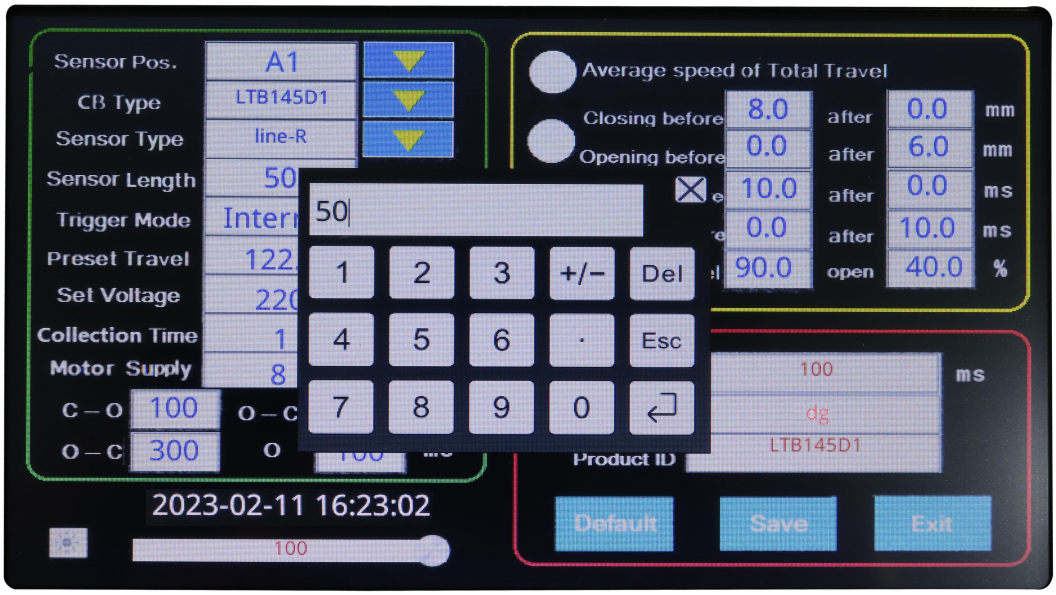
(1) sensor location: The default location of the sensor is A1 fracture, according to the actual situation of the sensor installation to set, such as accident speed travel, do not need to set.

(2) switch type: switch type vacuum, less oil, sulfur hexafluoride, contactor (train circuit breaker), according to the choice, such as only do time test do not do speed test, do not choose the type of switch can be, as shown in the figure below:



(3) Sensor type: Sensor type has linear, encoder (rotation sensor) as shown in the figure below:

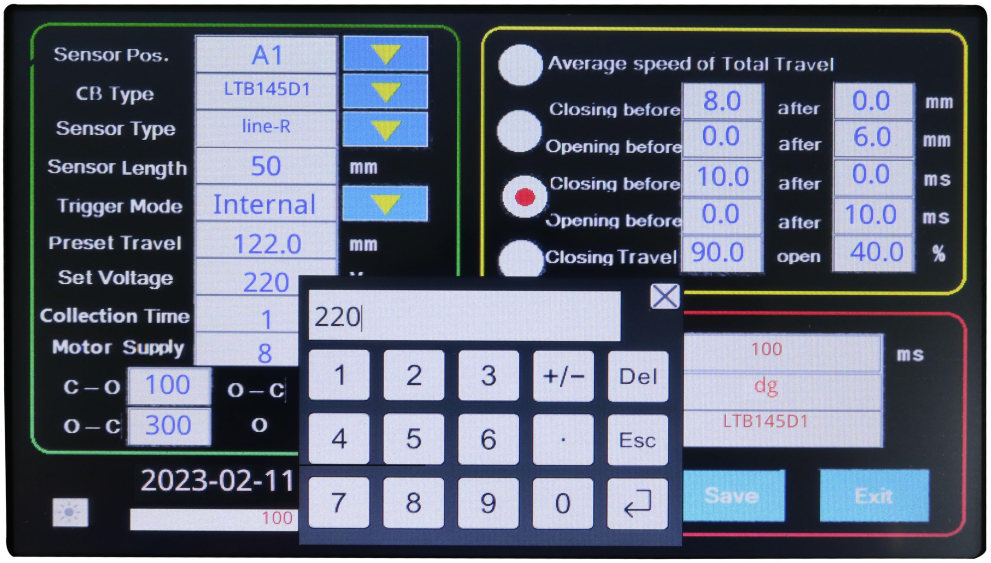
(4) sensor length: if the length of the linear sensor is 50mm, in addition, set 50, if it is 300 of the linear sensor will be set 300. According to the length of the sensor used for setting, the instrument adaptive calculation. Click the number, the keyboard pops up, Enter the correct number, and press Enter to confirm, as shown in the figure below:



(5) trigger mode: trigger mode has inside trigger, outside trigger, from trigger (also known as manual trigger) three ways.

(6)Preset schedule: set the total stroke, the open distance plus over data.

(7) Voltage setting: the coil voltage of different circuit breakers is different. The voltage of DC20-270V can be set. If the setting voltage is too low, please refer to the following figure：



(8)Acquisition time: under normal circumstances, the acquisition time as long as 1 second can be, time can be set 1-10 seconds.

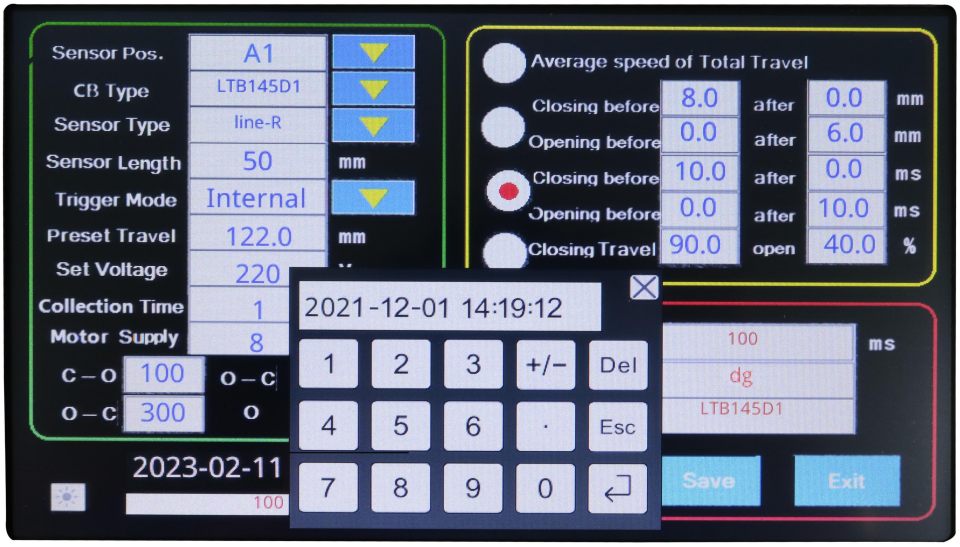
(9) energy storage time: The general circuit breaker energy storage time is about 8 seconds, duration can be set to 5-20s.

(10) Split time: do split time (golden short time) test, generally set to be greater than the closing time of 15ms.

(11)Split and join time: do split and join time (no current time) test, generally set at about 280ms.

(12) Dividing and dividing time: do dividing and dividing time test. Dividing and dividing time set 280ms, and dividing time is greater than closing time about 15ms.

(13) Time setting: Click the current year, month and day for about three seconds, do not let go, the following graphics appear can be released, directly input the current year, month, day, hour, minute and second, press ENTER to confirm, as shown in the figure below.

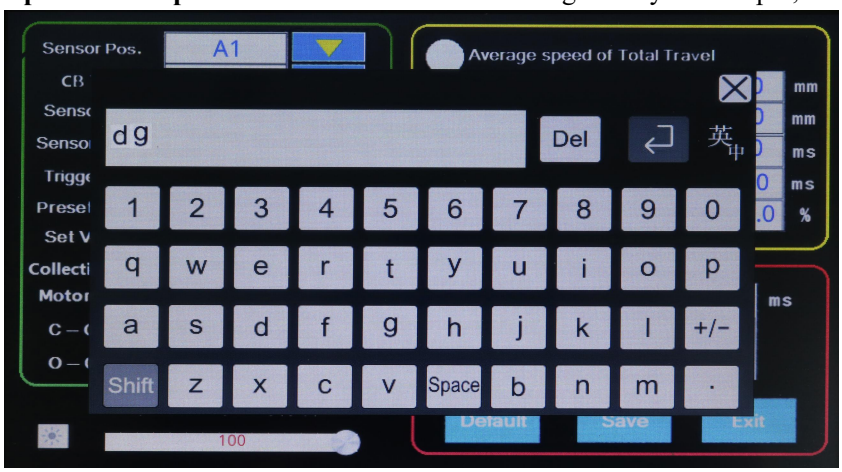


(14) Brightness: Drag the progress bar to set the backlight brightness.

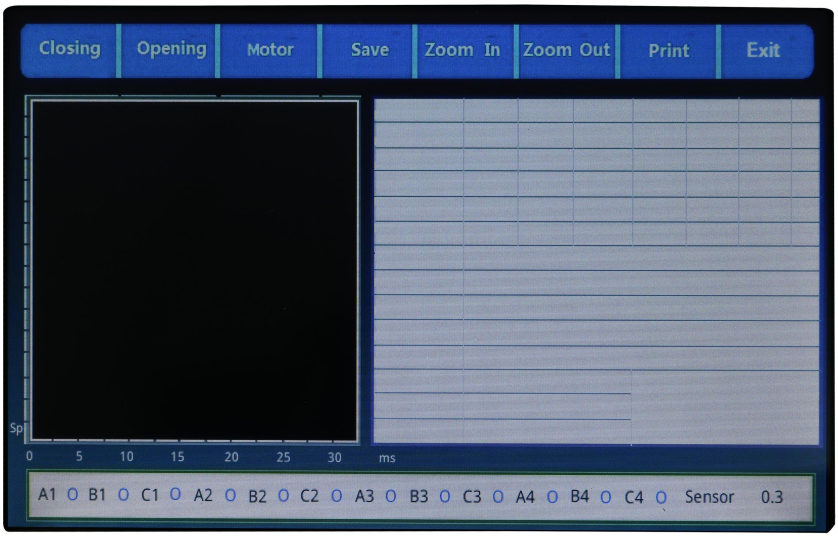
(15) There are four definitions: the average speed of the head office trip, mm after the head office trip, ms after the head office trip, and the percentage of the crutch. Set according to different requirements of circuit breakers. There are also 21 built-in speed definitions of circuit breakers for quick selection. After selecting the speed parameters in the switch type, there is no need to set the speed parameters.

(16) Trigger time: refers to the time of power output, which is normally 100ms, and the duration can be set from 50 to 10000ms. Please do not set too long, improper operation will cause damage to the instrument and circuit breaker coil.

(17) Operator and product number: Chinese and English keyboard input, as shown below:



B.Click the test menu, as shown below:

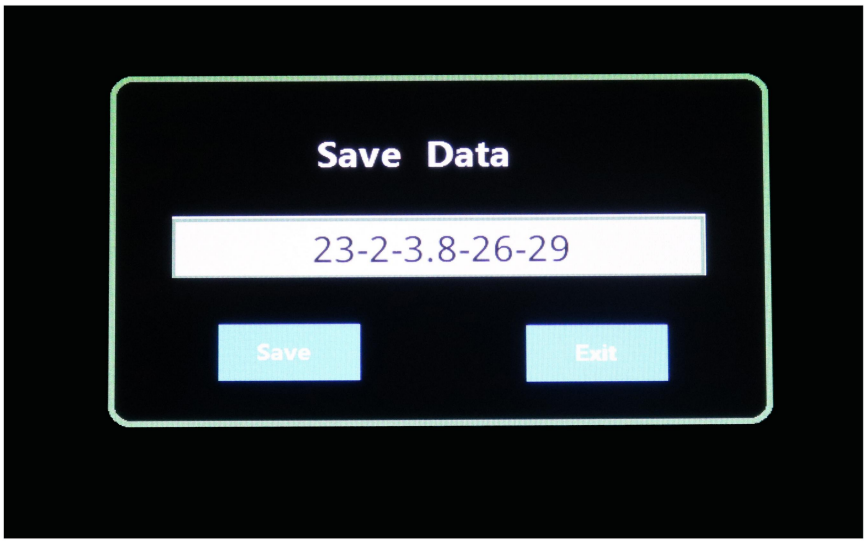


(1) **Closing test:** click this menu, closing voltage output, measuring closing time, bounce time and times, three-phase different period, speed and other parameters are displayed on the same screen, as shown below:

(2) **Opening test:** click this menu, opening voltage output, measuring opening time, three-phase different period, speed and other parameters.

(3) **Energy storage:** Click this menu, energy storage voltage output, motor rotation for energy storage.

(4) Save: Click the menu as shown below, click Save, then exit as shown below:

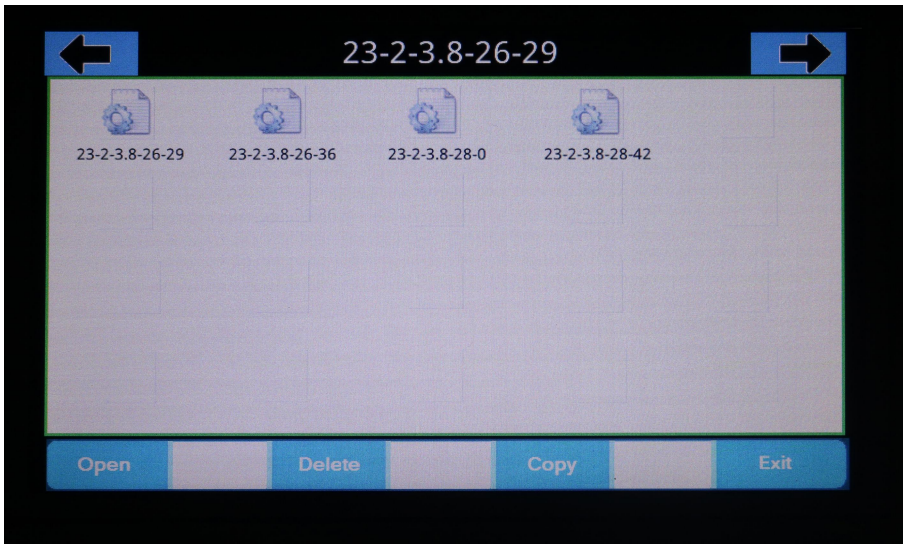


(5) Zoom in and zoom out: Click this menu to zoom in and out the test waveform for analysis.

(6) Print: Click this menu to print the test data.

(7) Exit: Click this menu to return to the home page

C. Data Management Menu: Click this menu to enter data management and query, as shown below:



(1) Select the data to be opened first, and then click the Open menu.

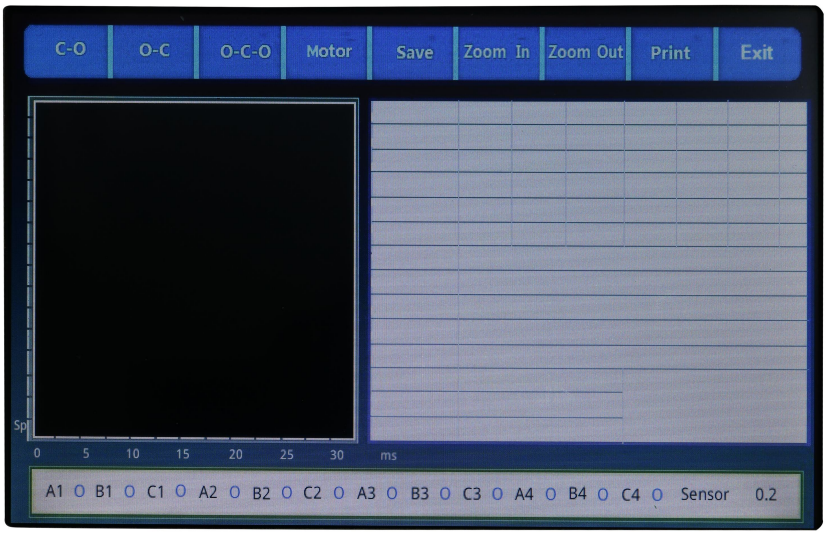
(2)  This key is the page turning key.

(3) If you want to delete a group of data, select it first, and then click the delete menu.

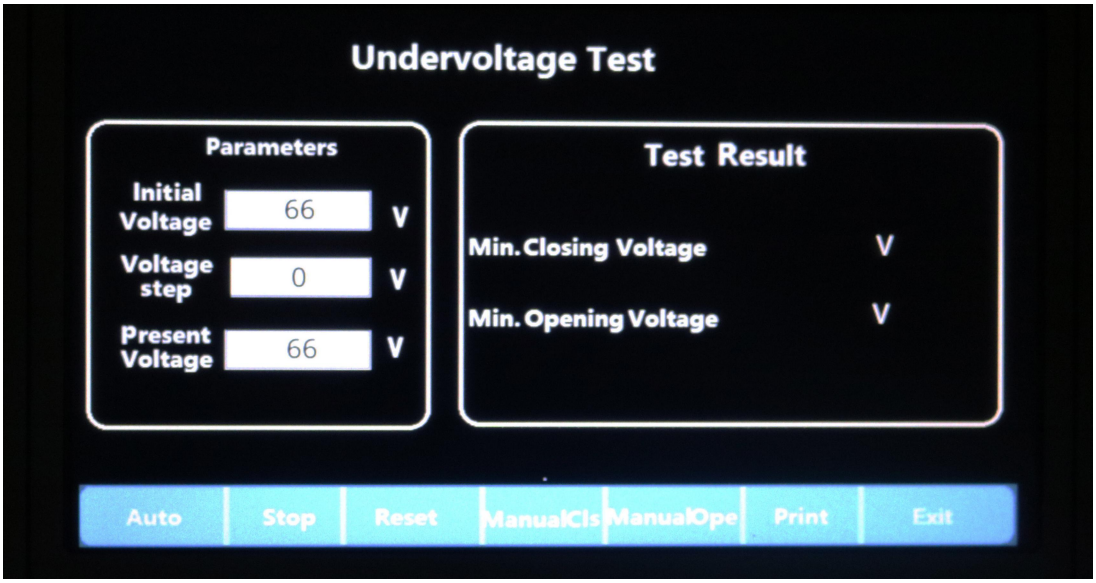
(4) Copy the menu. Insert the USB flash drive first, and then click the menu to copy the data to the USB flash drive.

(5) Exit the menu, exit the current page, and return to the main interface.

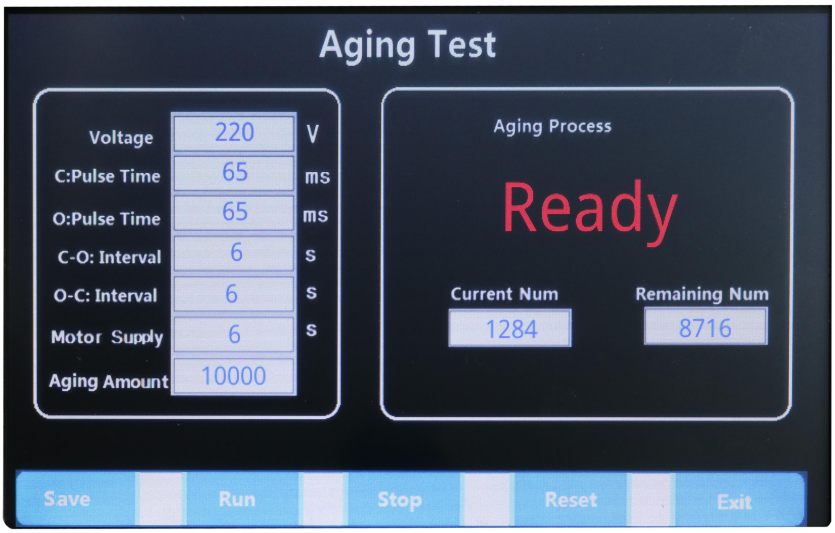
D. Reclosing menu: Click this menu to conduct the test of separation, separation and separation. Before the test, the correct parameters must be set before the test can be carried out, as shown below:



E. Low jump test: this menu has two functions of automatic low jump and manual low jump. To select automatic low jump, the test can only be carried out after connecting the fracture line and identifying the fracture state. Manual closing and manual dividing, do not need to connect the fracture line, directly to the coil voltage. Both the initial voltage and the cumulative voltage can be set, as shown in the figure below:



F. Aging test: this menu is used for circuit breaker life test. For special functions, it can only be used for hundreds of aging tests in normal configuration. The diagram below:



VIII. Common technical problems and solutions on the test site:

A . The switch does not operate when the control closing and opening operation is carried out by on-site instruments

1. Incorrect connection of field closing and opening control.

How to deal with it: find the control wiring diagram of the field control cabinet, ask professionals, find the closing and closing coil and switch auxiliary contacts respectively, refer to the control wiring diagram in this manual, and rewire.

2. If the coil load on site is too large or the control circuit is short circuited, the instrument cannot be normally driven, and the power supply emits an overload buzzer.Alarm, power will be restored automatically after four sound.

① For the permanent magnet switch or less oil circuit breaker, due to the switch closing coil requirements of the drive.The flow is large (up to 100A or a few hundred amps) and the maximum load capacity of the instrument operating power is 20A. Cause excessive load, meter.The device cannot be driven normally. At this time, please use the external trigger mode, connect the closing control line to the closing coil, and connect the opening control line.Collect the switching voltage signal (trigger time) on the switching coil, either DC or AC.

②Check the control loop to ensure the loop is unblocked.

3. Check whether there is DC output of the energy storage, opening and closing of the instrument

① Check the DC voltage of energy storage: Please set the multimeter at the dc 1000V gear to control the energy storage.The red and black wires are connected to the red and black wires of the

multimeter respectively. Test on the energy storage interface, the time is extended to 3 seconds, and the voltage is output according to the energy storage test. If there is no voltage output, please return the power supply fault to the factory for repair.

②dc switching power supply check: the instrument is in a state of break-brake check to not answer the fracture test line is brake state, testing interface will also show "points" word, if A1 fracture or other fracture show is "us", said the fracture failure, please switch to the A2 fracture, redo closing test, check for the power output. To do this test, the acquisition time and trigger time should be extended by more than 2 seconds before the multimeter can detect the voltage.

③Switch-on DC voltage check: check the instrument when it is in the state of closing, clamp the yellow line and the black line of the fracture line together, and then connect the control line to the internal trigger. Other steps are the same as the switch-on voltage check.

④The above three methods have no voltage output, please return the instrument to the factory for inspection and maintenance. Please do not turn on the instrument by yourself. There is a danger of high voltage output inside.

⑤ Countermeasures: If there is no DC output and you are in a hurry to do the test, please use external contact for measurement and return to the factory for maintenance after completion.

3. The switch mechanism has protection latches (such as Siemens and ABB switches).

Methods of handling:①Use the internal power supply provided by the instrument to operate the switch closing and opening test, the lock must be removed, please ask the field technicians or switch manufacturer staff according to the field control cabinet control wiring diagram, help to remove the lock.

② Use the on-site operating power supply and test in the way of "external trigger".

B. When the instrument performs single closing and single subdivision tests, the switch is activated, showing no indication of fracture action

The fracture line is not connected well. The treatment method is as follows:

①When doing indoor 10KV switch, yellow (A), green (B) and red (C) are connected with contact, and static contact is connected with black line after short connection.

② Do outdoor switch, yellow (A), green (B), red (C) connected to the upper end, black wire grounding (substation outdoor switch other end has been grounded).

③ There is a problem with the switch control circuit, because it is separated immediately after closing, please check the switch circuit to do the experiment.

C. A printer can move paper but cannot print text or graphics

1、The printing paper is installed upside down

What to do: Reinstall thermosensitive printing paper properly.

2、The heating head of the thermal printer is broken

Treatment: back to the factory to repair the heating head of the thermal printer.

D. No speed data is shown when the instrument is tested for speed

1、 There is an error in the selection of the sensor (for example, the linear sensor is installed and the rotation sensor is selected). Please reload the sensor

New Settings.

2、The sensor is installed in the wrong position. For example, the rotation sensor can only collect signals through the rotation of the spindle

There is no data to be displayed in the place of linear displacement or other places that do not move.

3、 If the sensor options and installation position are correct and the speed is not displayed yet, the sensor is damaged, please return to the factory for repair.

E. When the instrument is grounded on site, why should the ground wire be connected first and then the fracture wire?

Because in the field test, due to the high voltage switch (especially above 220Kv) fracture between the ground often have a high induction Voltage, at this time the voltage value is large, less energy, but enough to threaten the safety of the instrument itself. Inside the instrument, fracture The signal input terminal has an indirect discharge circuit to the ground. Therefore, the ground wire is connected first, and the discharge circuit is connected first. At this time, the connection is broken.In the case of port signal line, even if the fault induces a very high voltage, it can be discharged to the earth through the discharge circuit, thus ensuring the instrument.The fracture channel of the device is safe.

F. how to determine instrument port is normal?

The instrument has 12 fracture, each phase fracture can be used independently.

① When the test line is not connected, the test interface will also display the word "split". If something is brokeng.If the word "match" appears in one phase, it means there is a fault in this fracture. At this time, it is necessary to switch to another fracture for testing.

② Connect the fracture test line, and shorten the yellow, green, red and black (common) of the fracture line. The fracture state is divided by the word ".Change to "he", which means normal.

IX. Daily maintenance

1. this instrument is one precise and valuable. Prevent it from falling and hit when use. Operate under shady field possibly to avoid the LED screen long exposing in outside.

2. store in a place when it is not in use, where keeps in -10~40。C , relative humidity less than 80%, ventilation, no corrosive air. In humid seasons, electrify it around 30 minutes once per month when it is long-term unused.