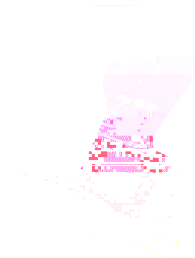
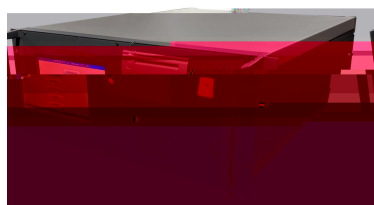
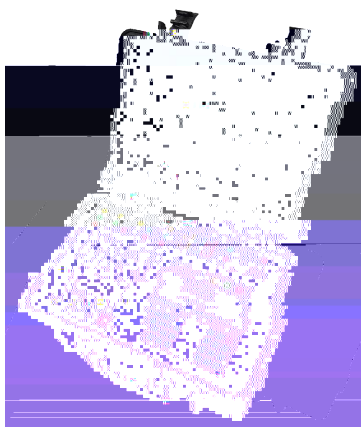


CT8009 Series Circuit Breaker Analyzer



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1. Characteristics

- ∅ the instrument can test the vacuum circuit breaker, sf6, oil circuit breaker, GIS and etc.
- ∅ there are discharge circuit on every main contact channel, so the instrument can be used in the 550kV environment.
- ∅ the instrument can test up to 12 main contacts. 6 aux contacts, 6 PIR contacts, 3 or 6 graphite contacts, 3 or 6 BSG are selectable.
- ∅ With one analog motion transducers and one digital transducers test interface. Three analog and digital transducers are selectable.
- ∅ Just one test, the user can get the close(open) , C-O, O-C and O-C-O's time , motion and speed results table and graph.
- ∅ Up to 50 different circuit breaker types are supported.
- ∅ With the built-in large power and isolation digital dc power, the MTC,MLC , charge motor and charge motor test are easily supported.
- ∅ With archive management, the pc software is available, the **envelope curves function is available.**
- ∅ With a 7 inch TFT LCD panel, keypad, a friendly HMI interface is supported.
- ∅ The **change** between the simple Chinese and English language is supported.

Type Test ability	AD	A	B	C	D	E	F	G	H
Normal contact	12	12	12	12	12	12	12	12	12
PIR	Select		6	6	6	6	6	6	6
BSG	Select					3	6	3	6
Graphite	Select			3	6			3	6
Auxiliary	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)	(6)

2. Technical Specification

2.1. Timing Part

(1) Main Contact, Aux Contact :

Recording length : 1ms~ 20s

Time resolution : 0. 1ms~ 20ms(Depend on recording time length)

Time accuracy : $\pm 0.1\% \text{reading} \pm 1\text{Lsb}$

(2) PIR Contact :

PIR resistance range : $50\Omega \sim 5000\Omega$

PIR resistance resolution: 1 Ω

PIR resistance accuracy: $\pm 1\% \text{reading} \pm 2\Omega$

(3) Graphite Contact :

Recording length : 1ms~ 2s

Time resolution : 0. 1ms

Time accuracy : $\pm 0.2\% \text{reading} \pm 1\text{Lsb}$

(4) BSG test method :

Recording length : 1ms~ 2s

Time resolution : 0. 1ms

Time accuracy : $\pm 0.2\% \text{reading} \pm 1\text{Lsb}$

2.2. Stroke Part

Stroke range : 0~ 1000mm

Stroke resolution : 0.1mm

Stroke accuracy : $\pm 0.5\% \text{reading} \pm 1\text{Lsb}$

2.3. Velocity Part

Velocity range : 0~ 20.0m/s

Velocity resolution : 0.01m/s

2.4. Coil Current Part

Current range : 0~ 20A

Current resolution : 0.001A

2.5. Voltage Source Part

Voltage range : 15~ 255V

Max power : 5kW

2.6. Power Supply Part

Main unit supply : 220V±10% AC, 50Hz±10%

2.7.Environment Part

Operating temperature : -10 ℃ ~ 55 ℃

Storage temperature : -30 ℃ ~ 70 ℃

Relative humidity : 5~95%, non-condensing

Altitude : less than 2000m

2.8.Main unit Dimensions

Type A/B ABS : 456(W)*372(D)*185(H)mm

Type C to H ABS : 472(W)*365(D)*210(H)mm

Type AD(4U aluminum) : 483(W)*450(D)*178(H)mm

2.9.Weight

Type A/B ABS :

Type C to H ABS : 11.5 kg

Type AD(4U aluminum) :

3. Basic concepts

3.1. time

Closing time : interval of time between energizing the closing circuit, the circuit-breaker being in the open position, and the instant when the contacts touch in all poles.

Opening time: the interval of time between the instant of energizing the opening release, the circuit-breaker being in the closed position, and the instant when the arcing contacts have separated in all poles.

Bounce time: The time gap between the two contacts touch(separate)the first time and the two contacts touch(separate) stable.

Bounce cycles: The cycles in the progress of the time gap between the two contacts touch(separate) the first time and the two contacts touch(separate) stable.

close-open time: interval of time between the instant when the contacts touch in the first pole during a closing operation and the instant when the arcing contacts have separated in all poles during the subsequent opening operation.

3.2' Motion/Travel

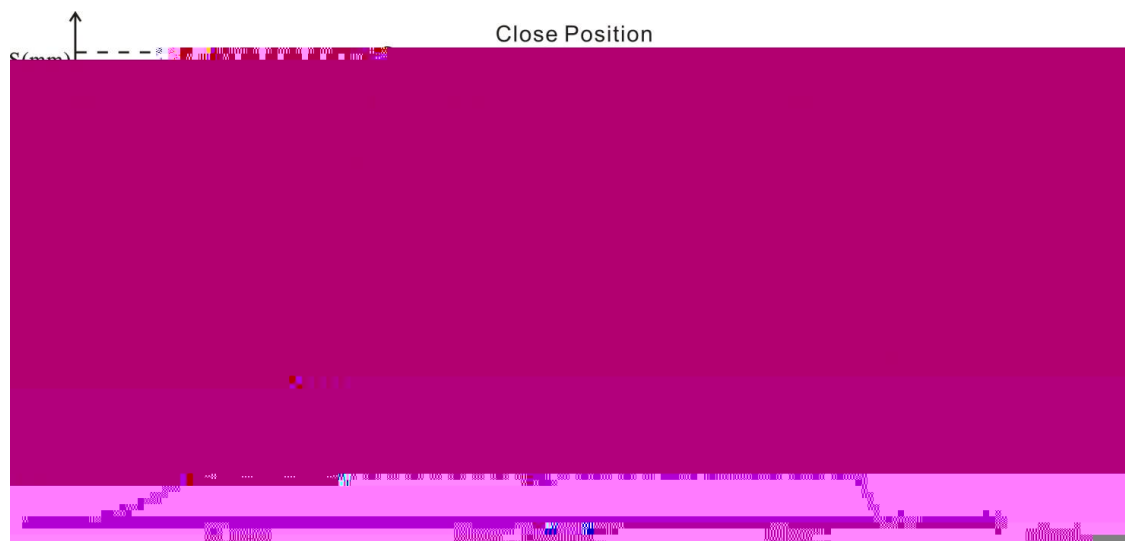
Stroke : stroke is the distance from the stable initial close(open) state to the stable final close(open) state.

3.3' Speed

Speed : the close or open speed is defined by the circuit breaker producer. It is also called just open/close speed, or average speed.

Max Speed: it means the maximum average speed based on the 10ms gap.

Speed definition: from the circuit breaker producer's speed definition or the country's standards, the average speed can be calculated from the S-t graph. $V = H \cdot S / H \cdot t = H \cdot L / H \cdot t$ HL is the distance gap $\tilde{H} \cdot t$ is the time gap.



Instrument Panel

- ' six main contacts interface.
- ' six main contacts, combined with pir test function.
- ' the

5.1 Create a circuit breaker model

1st - Edit and store the circuit breaker model makes the test easier, once the model is created(with test set parameters), select one model and test immediately .

2nd - the instrument can store up to 50 circuit breaker types

3rd - Power up the tester ,the screen is as following.



4th - select the Time velocity Test , and press key Enter ,the screen is as following.

SN	Model List
001	IFT-252
002	MET-3
003	IFT-252
004	3AT
005	3AO

5th - Press key **í** to select the Add button ,then press key **Enter** .the screen is

when the stroke type is Measure type ,the circuit breaker's stroke calculation
use the se

1. The test is elevated by definition to

2. The test is elevated by definition to

3. The test is elevated by definition to

4. The test is elevated by definition to

5. The test is elevated by definition to

6. The test is elevated by definition to

7. The test is elevated by definition to

8. The test is elevated by definition to

9. The test is elevated by definition to

10. The test is elevated by definition to

13th - The close pulse and open pulse width set.

1 pulse ____ (ms) set the close operation's power width.

2 pulse ____ (ms) set the open operation's power width.

14th - open and close record time set.

2 pulse ____ (ms) set the open operation's power width.

Open pulse width



(Digital Transducer Test page)

16cht- Contact selection¹. The contact varies from A1B1C1 to A4B4C4. The selected contact's close time and open time will be used to calculate the stroke parameters and velocity parameters .

5.2 Time Velocity Test

One → Connect the test lines and install the transducer.

Two → Create one circuit breaker model according to title 5.1 .

Three → Select the circuit breaker model under test, press enter to load the very

Principle

key is to set the gain value of the high sampling circuit, the gain changes

between 1 and 100, the principal is set the gain value is to get a bigger gap between the close and open loop .

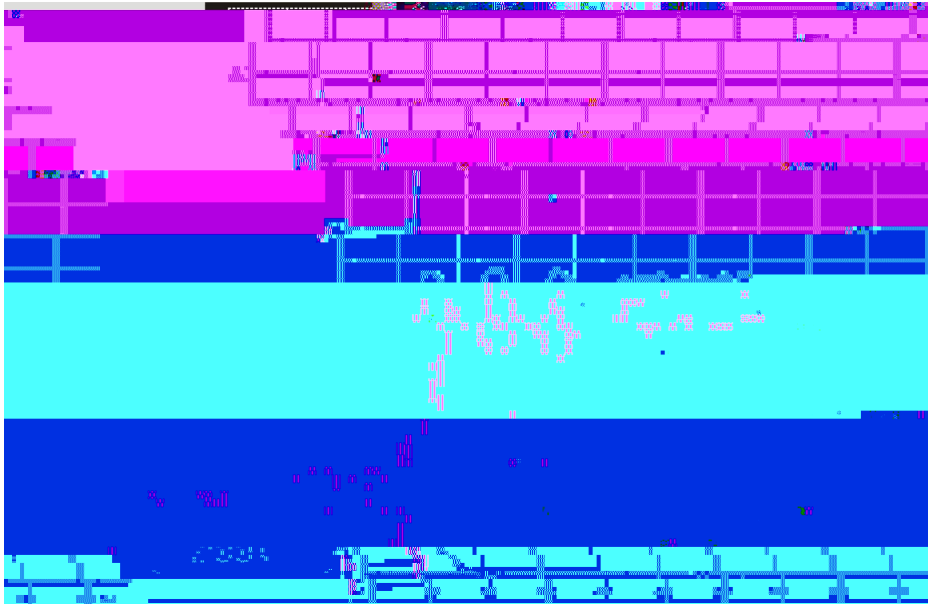
Seventh→The operation sequences include: Open , Close, O-C, C-O ,O-C-O ,O_Ext_Trigger, C_Ext_Trigger, O_Handle ,

On the tabula, use the $\uparrow$ or $\downarrow$ direction key to move the focus .If the contacts are not displayed totally ,as A2 ,A3 and A4 ,Use key $\rightarrow$ or $\leftarrow$ to view the others.

Press enter during the Save button is focused ,the test results will store to the flash .The archive data can be loaded or exported to the USB flash disk for further analyze.

Press enter during the Print button is focused, the thermal printer will printout the tabula and graph.

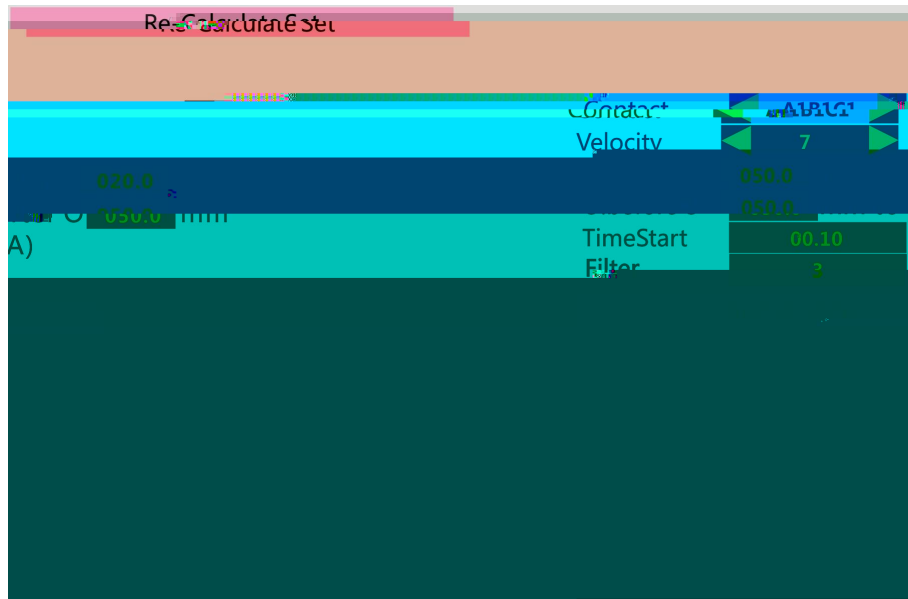
Press enter during the Graph button is focused, the screen will display the graph.



On the graph, there are contacts curve, stroke curve,close coil current or open coil current displayed simultaneous.

Press key Return to return to the previous page.

Tenth→On the tabula, Press button ReCalc. to jump to the recalculate set screen.



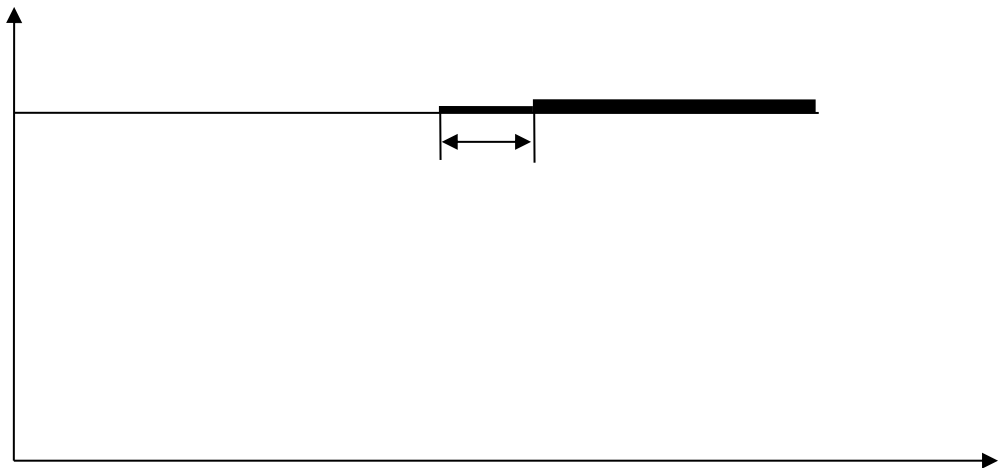
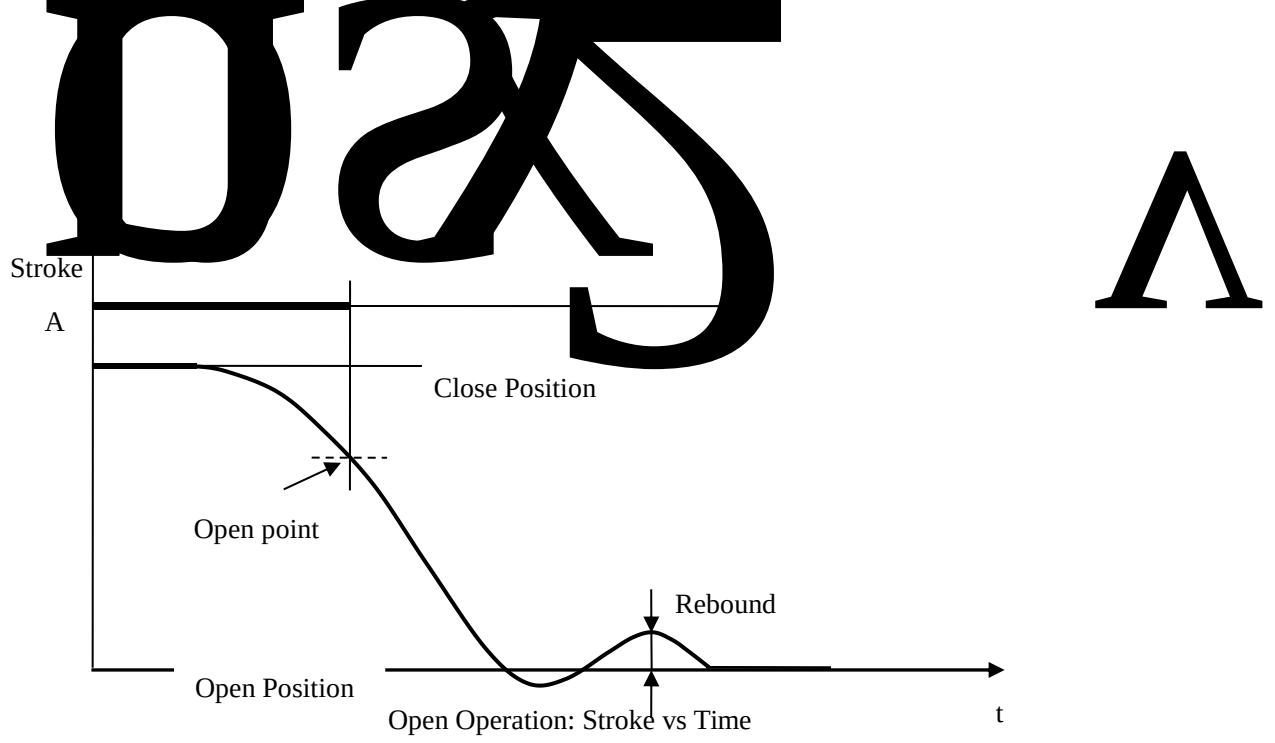
If the test set parameters are not suitable, modify the test parameters, especially the velocity definition. After set, then press the ReCalculate button. the screen will display the tabula. It is helpful during modify some test set parameters, for the reason there is no need to modify the test set parameters and test again.

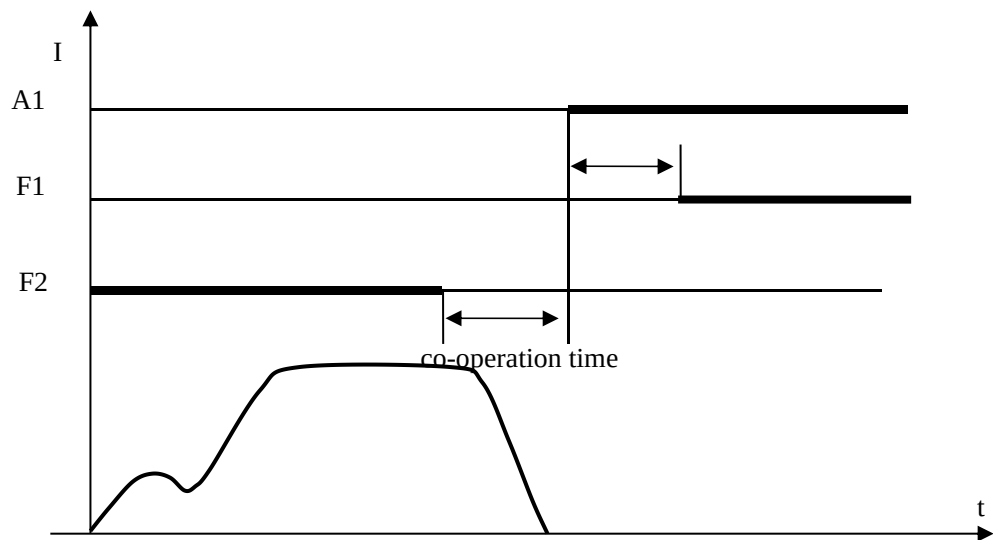
Circuit breaker's graph analyze

Stroke

Close Position







main contact vs auxiliary contact

5.3 Operate Test

This module is for the circuit breaker's operate test.



Mod

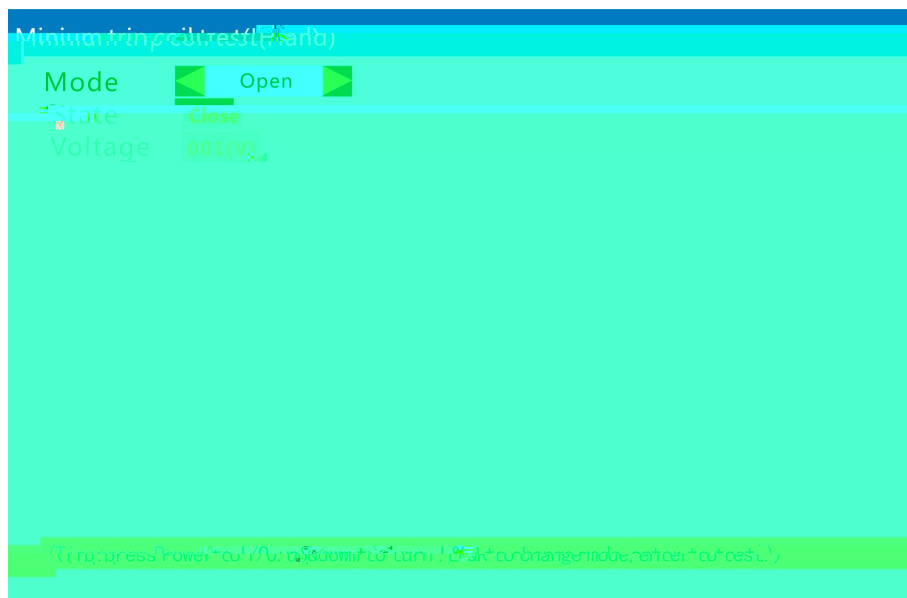
button will change to start again.

Save' When it needs to halt in the operation, and go with the current executed cycles next time .press the save button before leaving the page.

Clear' When it needs to clear the executed cycles, Press the clear button. Once the Clear button has been pressed, the executed cycles will return to zero.

Quit' Press this button to return to the analyzer's main page.

5.4 Minimum trip coil test(Hand)



Operation steps '

1 à Connect the analyzer's close or open output to the D.U.T.'s close coil or open coil (it is better to connect the coils via the auxiliary contact).

2 à Connect the analyzer's power out to the DUT's motor charge input.

3 → press key Power to turn on the internal power , the state will change from Close to Open ,the voltage starts from 30V .When the power is on state, press key Power again, the power will be shut down, the state will change from Open to Close.

4 → Turn ↑ → ↓ to turn the voltage to the target value.

5 → Press ← → to change the test sequence between close and open.

6 → Press enter to send the voltage pulse from the close or open output.

5.5 Minimum trip coil test(Auto)

This test mode is used to test the minimum trip voltage of the coils automatically .

Rated Voltage is the operating mechanism's rated voltage.

Vstart is the start voltage of the test.

Vend is the max voltage of the test.

Pulsewide is the voltage pulse's time length.

Vstep is the voltage gap between the two voltage pulses.

Tstep is the time gap between the two voltage pulses.

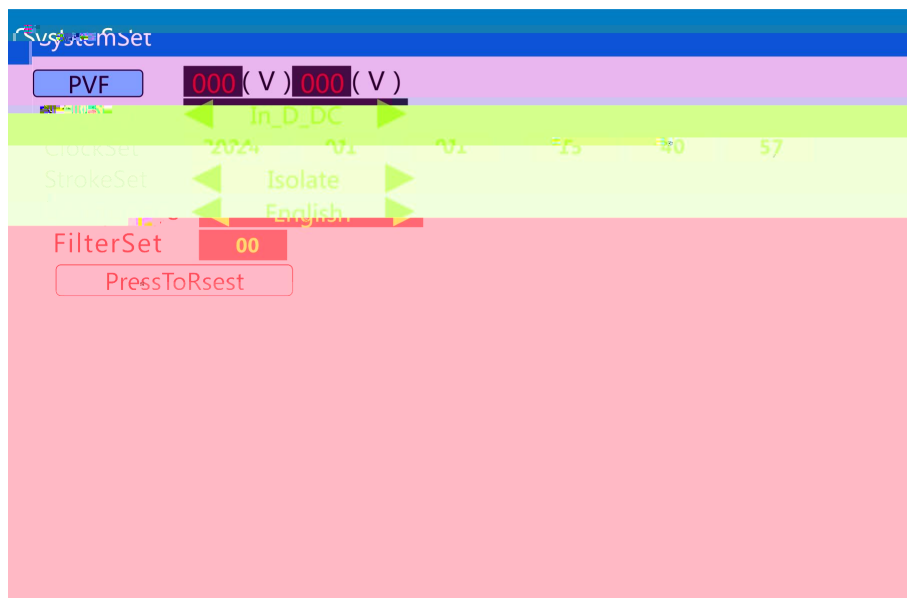
Mode is to set the operation sequence, there are two modes to select, open or close.



Operation steps '

- 1 → Connect the analyzer's close or open output to the D.U.T.'s close coil or open coil (it is better to connect the coils via the auxiliary contact). Connect the circuit breaker's contacts to the analyzer's normal contacts, this analyzer supports three contacts .
- 2 → Connect the analyzer's power out to the DUT's motor charge input.
- 3 → Set the test parameters based on the necessary .
- 4 → Press button Start when the button has focus .

5.6 System Set



PVF' Press the button PVF to verify the internal Digital Control DC power.

PowerSet' press key ← → to change the power mode ,include the internal digital controlled DC power(In_D_DC for short) and the external DC power(Ex_DC for short).

ClockSet' Set the analyzer system's internal RTC.

StrokeSet' Set the stroke curves as combined together or isolated.

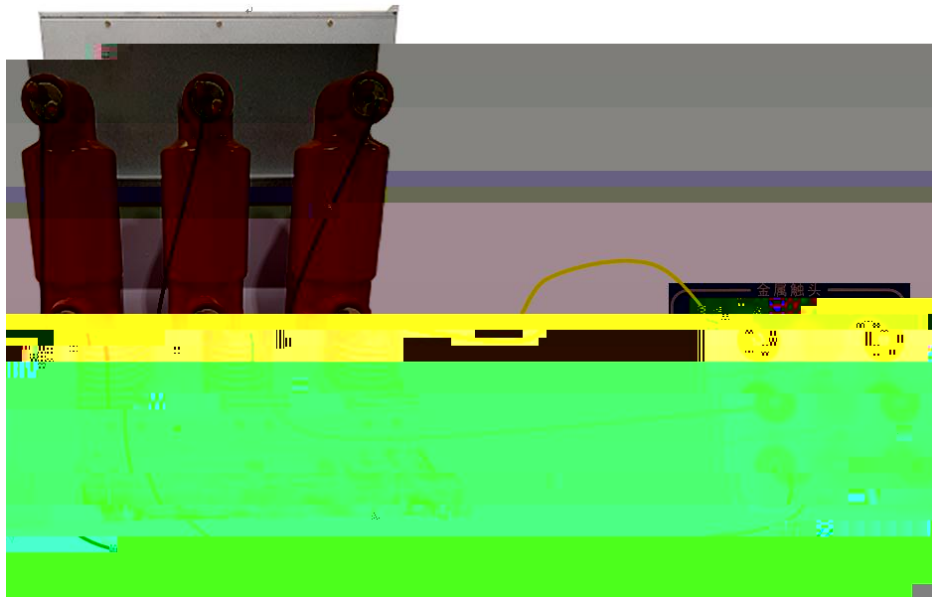
Language: set the analyzer's language between English and Chinese. Once the language has changed, the system will restart automatically to load the new characters.

FilterSet' This filter set the optical encoder's filter depth, it ranges from 0 to 15 .The filter is deeper when the value is bigger. The demo value is zero, means that there is no

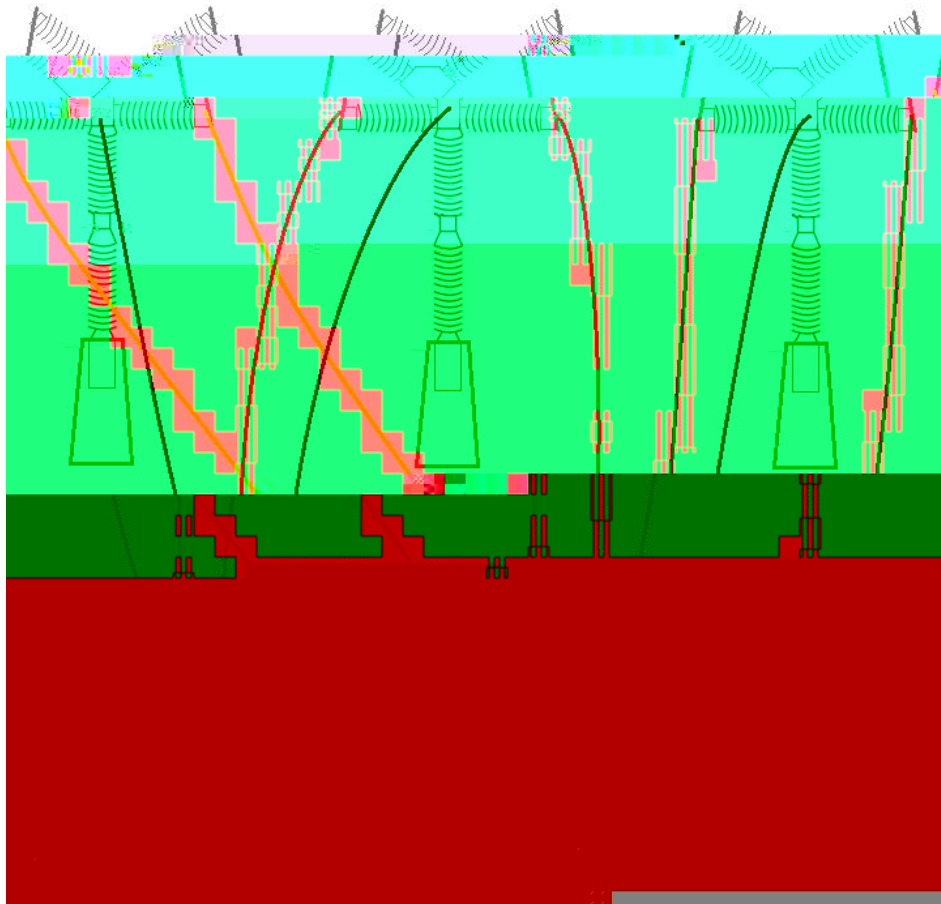
filter .

PressToReset Press the $\uparrow \rightarrow \downarrow$ direction keys to move the focus of the widgets. When the button has the focus(the background color changes to light blue) ,press key Enter to reset the analyzer to the factory set state.

6. Test lines connection



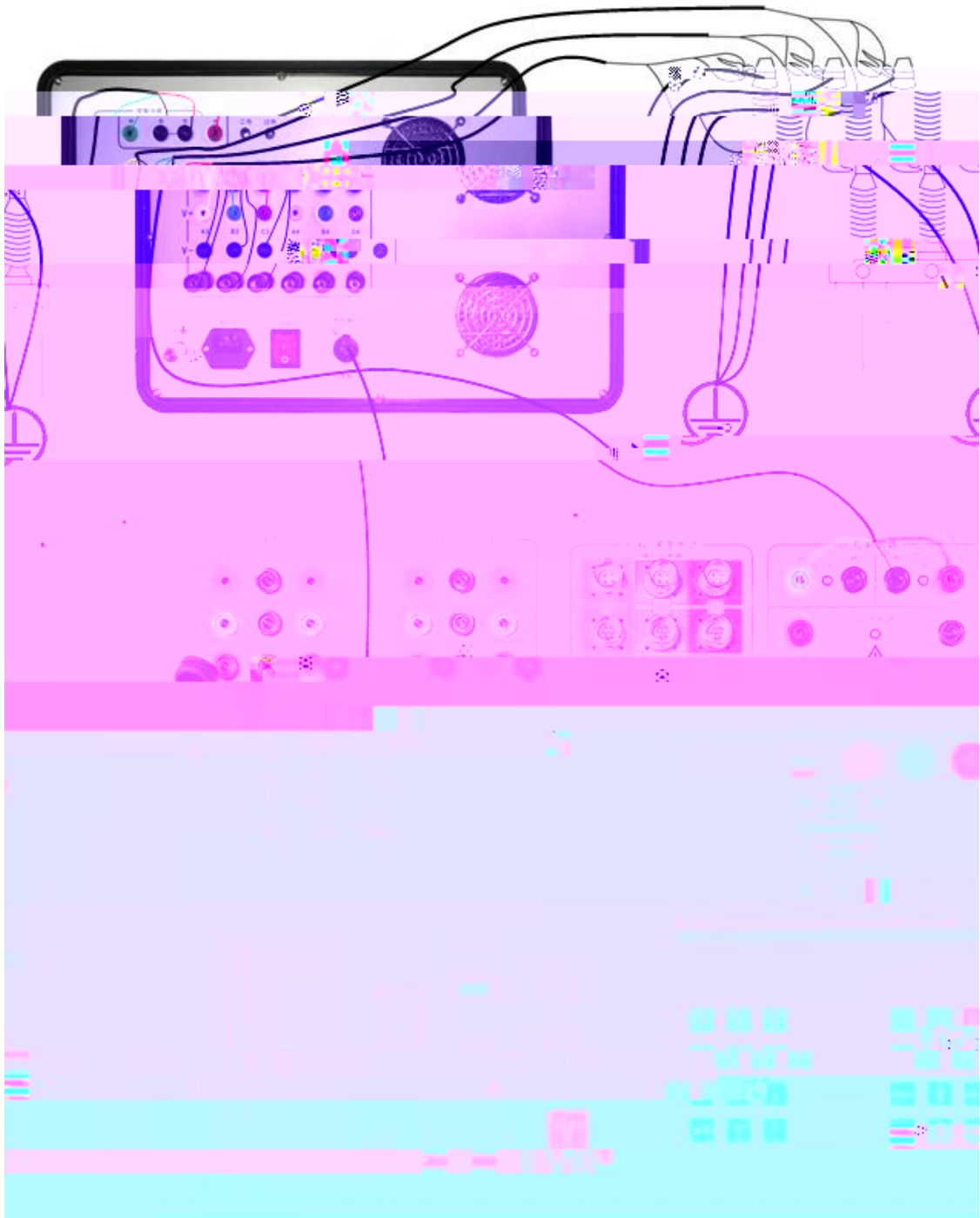
Normal contact connection^ 3 contacts for example~



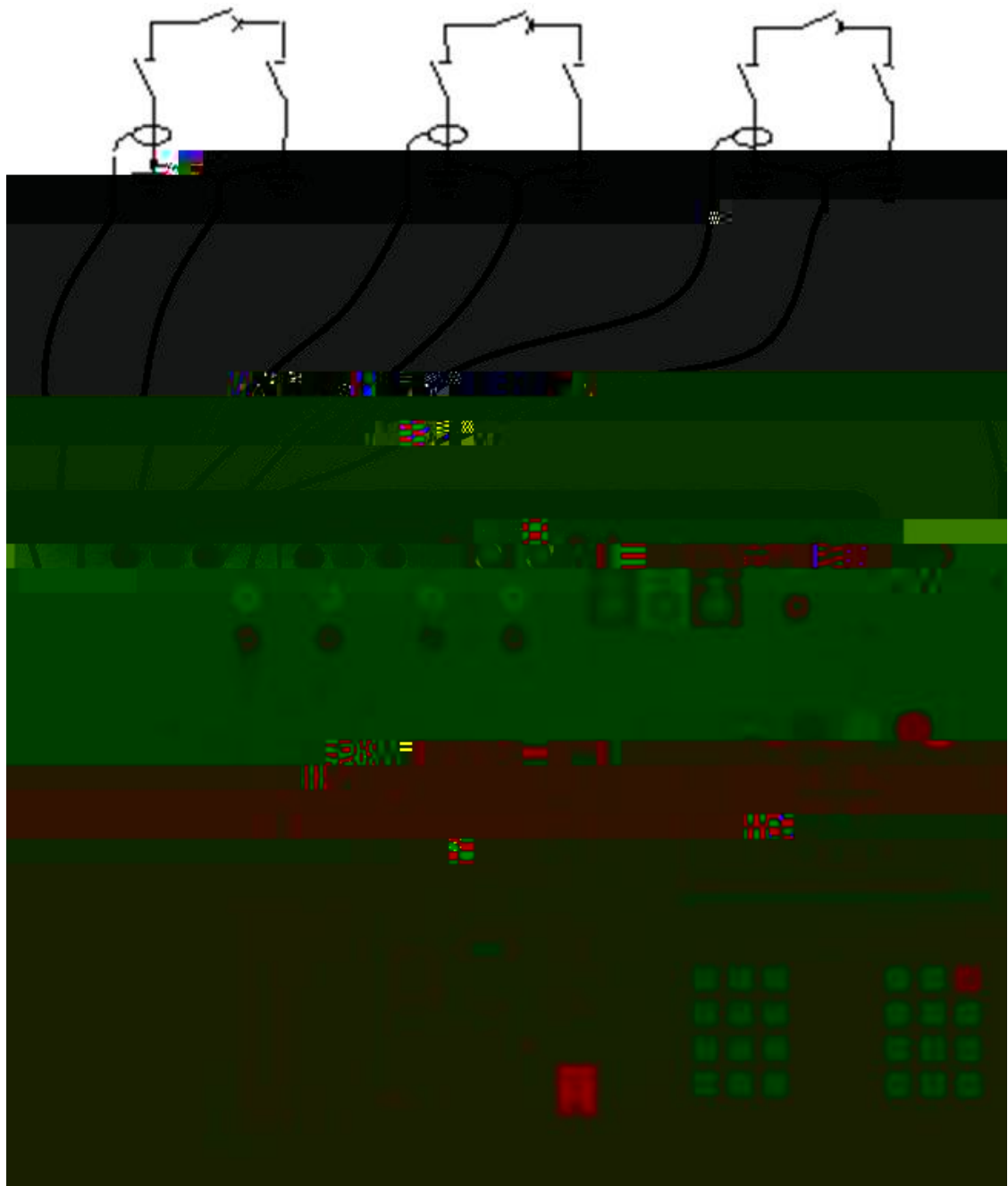
PIR contacts` 6 contacts for example~



Graphite contactsˆ 3 contacts for exampleˆ



BSG(DC)(3 contacts for example)



BSG(AC)(3 contacts for example)

7. After-sales service

Our company will supply a quality guarantee of three years of the product.