
OPERATION MANUAL

U9036 Motor Stator Tester



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Chapter 1 Overview

Thank you for using our products. Before using, please verify that you have received all the items listed in the last chapter and any optional accessories you may have ordered. If anyone is missing, please contact us without delay.

For your proper use of U9036, please read this manual carefully.

Warning!

1) Operation

Do not put heavy objects on the tester.

There is a cooling fan on the rear panel of this instrument, so any block of the air inlet is prohibited.

2) Rigid power input

The stability of high voltage depends on stable power input. Make sure to provide rated AC power or corrected power.

3) Grounding

For the safety of personnel and instrument, ensure the grounding terminal, designed in power cord, be grounded correctly.

4) Test cable

When testing, the cable and test samples connected will carry a high voltage. To avoid electrical shock hazard, do not touch test terminals and test samples.

5) DO NOT open the case unauthorized

To avoid the injury to personnel and damage to the instrument, do not open the case unauthorized due to the existence of high voltage in instrument.

6) Carry or move

Before moving the instrument, unplug the AC power sockets and remove high voltage test line or external control line.

7) Maintenance

When not used, the instrument should be covered with a plastic or cloth cover. Do not use the following chemicals to clean the instrument: diluent, benzene or organic solvent with similar chemical property with above materials. To clean the tester, wipe the dirty parts with a soft cloth soaked with neutral detergent.

8) Location

Do not locate the instrument in the environment of high temperature, direct sunlight or poor ventilation. In addition, the instrument will generate high voltage, so it must be used at room temperature and in the absence of much dust.

1.1 Introduction

U9036 is specially designed for motor stators to test the DC resistance, Inductance, Insulation resistance, inter-IW(Surge) circuit and AC/DC withstanding. U9036 is equipped with 12 independent test channels and 1 high voltage return terminal.

Adopting advanced IW(Surge) test technology, U9036 compares standard waveform stored in the non-volatile memory with the current tested waveform and provides the comparison result according to AREA SIZE, DIFFERENTIAL AREA, CORONA DISCHARGE or DIFFERENTIAL PHASE.

With its strong functions, accurate test, flexible operation method and multiple interfaces, U9036 can provide a test solution for most motor stator products.

1.2 Principles of IW(Surge)

The IW(Surge) test can test the electrical characteristics of coil winding without damaging the DUT. The prerequisite condition is to judge the quality of coil winding in transient moment. The detection is carried out when the same electric impulse, as used in the standard coil and here discharged by a capacitor, is applied to the DUT. The voltage attenuation wave is generated in response to the impulse, related to the Q-factor and inductance of the coil. In this sense, the tester can detect turn and IW(Surge), the differences in the number of turns and the material of the core. If high impulse voltage is applied, the poor insulation will appear as a corona or layer discharge.

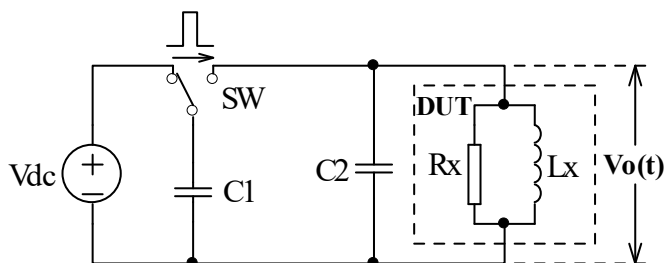


Figure 1-1 Simplified diagram for principles of winding IW(Surge)

In figure 1-2, the self-oscillation attenuation wave has a close relation with the inductance L and quality factor Q , while L and Q depend on the number of turn, manufacture technology, properties of iron core material and whether it has air-coils. What's more, the applied voltage is a high impulse voltage, thus, it is easy to observe the short circuit, partial short turns and lays or turns discharge phenomenon caused by insulation damage.

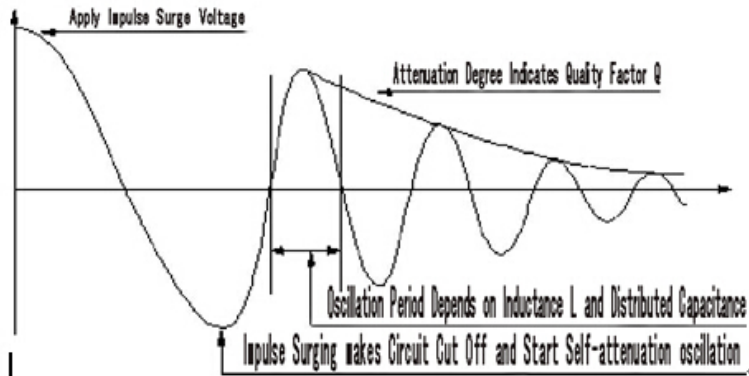


Figure 1-2 Typical self-attenuation oscillation wave

1.3 Operation environment

1.3.1 Power supply

Voltage: 198V-242V AC or 99V - 121V

Power frequency: 47.5Hz-52.5Hz

Consumption: $\leq 200\text{VA}$

1.3.2 Environment temperature and humidity

Normal working temperature: $0^{\circ}\text{C}\sim 40^{\circ}\text{C}$, Humidity: $\leq 90\%\text{RH}$

Referential working temperature: $20^{\circ}\text{C}\pm 8^{\circ}\text{C}$, Humidity: $\leq 80\%\text{RH}$

Transferring environment temperature: $0^{\circ}\text{C}\sim 50^{\circ}\text{C}$, Humidity: $\leq 93\%\text{RH}$

1.3.3 Warm-up

The warm-up time should not be less than 15 minutes.

1.4 Dimensions and weight

Dimensions (W*H*D): 430mm×175mm×440mm

Weight: Approx. 26.0kg

Chapter 2 General specifications

2.1 Specifications

DC Resistance	
Measurement range	0.1mΩ~20kΩ (4-wire measurement accuracy)
Measurement accuracy	0.1mΩ~200mΩ ±(0.1% ± 0.5mΩ) 200mΩ~20kΩ ±0.1%
Inductance	
Measurement Parameters	Ls,Lp,Q
Test frequency	50Hz,60Hz,100Hz,120Hz,1kHz,10kHz,20kHz,40kHz,50kHz,100kHz
Test Levels	0.1V,0.3V,1.0V
Output Impedance	100Ω
Basic Accuracy	0.1%
Measurement Ranges	L 0.001uH ~ 9.9999kH
	Q 0.0001-999.99
Insulation Resistance	
Output Voltage Range	100V ~ 1.000kV ±(1.5% of reading + 5 counts),Resolution: 2V
Resistance Measurement Range	1MΩ ~ 10GΩ
Test Time	0.3S ~ 999.9S
Accuracy	<500V 1 MΩ ~ 1GΩ: ± (10% of reading + 5 counts) >=500V 1 MΩ ~ 1GΩ: ± (5% of reading + 5 counts) 1GΩ ~ 10 GΩ: ± (10% of reading + 5 counts)
AC/DC Withstanding	
Output Voltage Range	AC: 0.050kV~5.000kV(±2% of reading+5 digits) DC: 0.050kV~6.000kV(±2% of reading+5 digits)
Current Measurement Range	AC: 0~30mA DC: 0~10mA
ARC Detect	AC: 1mA ~ 15mA DC: 1mA ~ 10mA
Test Time	0.3s~999.9s
Accuracy	±2%

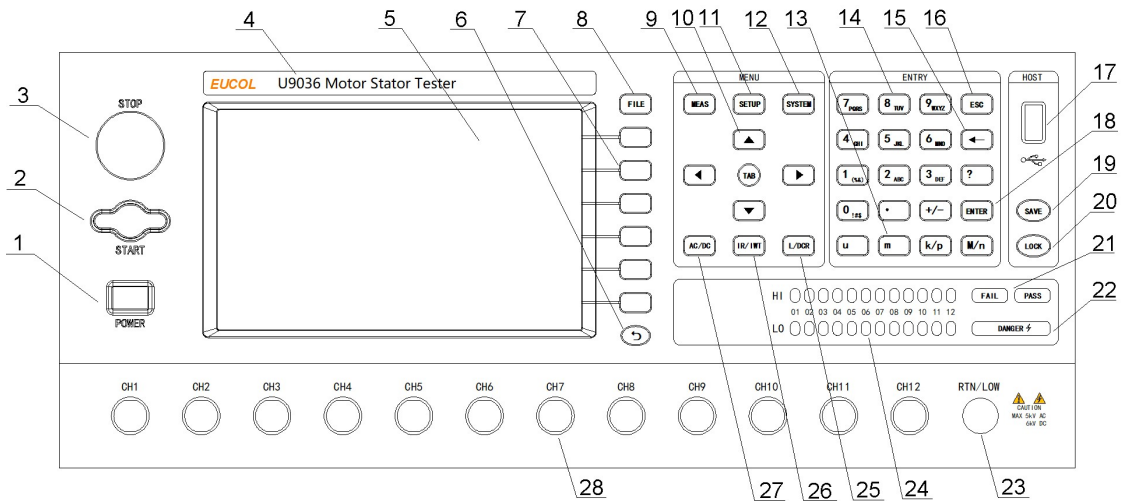
	Impulse Winding Test(Surge test)
Measurement voltage	100V~5000V, 10Vsteps, $\pm 5\% \pm 10V$
Measurement item	AreaSize Comparison, DiffZone Comparison, Corona Comparison, PhaseDiff Comparison, Waveform Comparison
Measurement repeatability accuracy	1%
Waveform sampling	Sampling rate: 100MSa/s~100kSa/s, 10 bins Resolution ratio: 8bits Sampling point: 6500bytes
Input impedance	10M Ω

2.2 Other specifications

Test Channels	4 ~ 12(Customization)	
Judgment output	PASS/FAIL display, LED display, beeper alarm	
Beep mode	High long, low long, single-short, double-short, OFF	
Data recording	1000 groups of test data	
Memory	Internal	180 groups(standard waveform data and test setup parameters)
	U-disk	600 groups(standard waveform data and test setup parameters)
Interface	HANDLER (START,STOP,PASS,FAIL,EOM) USB Slave, RS232C USB Host (storage of BMP, GIF, PNG and CSV files, support firmware upgrade)	

Chapter 3 Panels and display

3.1 Front panel

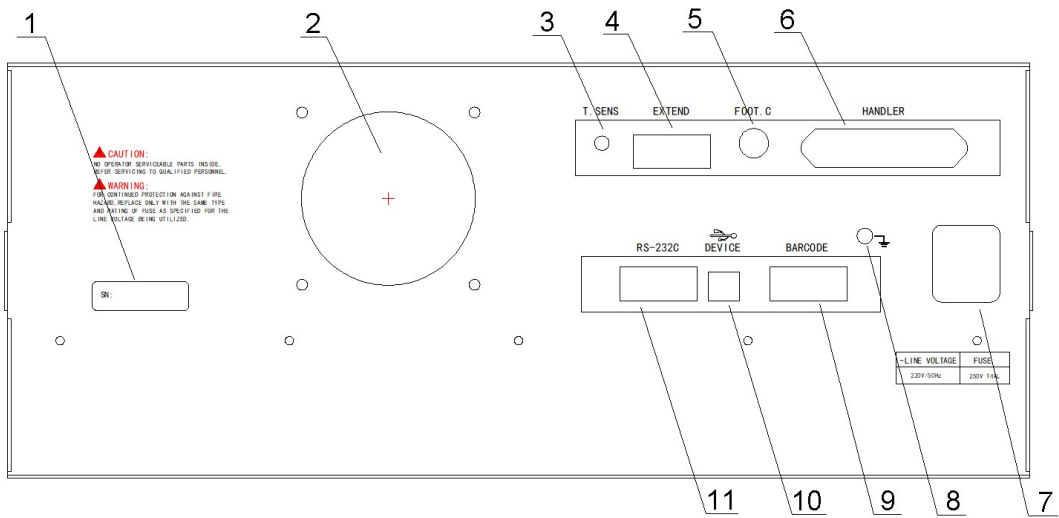


No.	Name	Description
1	POWER	Switch on or off the main power.
2	START key	Press the key to start a measurement.
3	STOP key	In the process of test, pressing the key to terminate the measurement.
4	Brand and model	Brand and model.
5	LCD screen	7.0-inch 800×480 dot-matrix TFT LCD displays measurement waveform, set parameters, system configurations, etc.
6	Return key	Currently used for searching file in <File List> page
7	SOFTKEY	The functions of the six soft keys are not fixed and have different functions in different menus. The corresponding function of each soft key is displayed along its right side.
8	[FILE] key	Press FILE menu key to enter the <File List> page.
9	[MEAS] key	Press MEAS menu key to enter the <Test Disp> page.

10	CURSOR	Control the movement of highlight bar in LCD parameter area. The selected parameter region will be highlighted.
11	[SETUP] key	Press SETUP menu key to enter the <Test Setup> page.
12	[SYSTEM] key	Press SYSTEM menu key to enter the <SYSTEM> page.
13	Unit key	Input the unit of data
14	Numeric key	Input numbers or characters.
15	BACKSPACE key	Delete numbers or characters wrongly entered.
16	ESC key	ESC key is used to cancel inputting.
17	USB interface	Be used for connecting the U-disk.
18	ENTER key	Confirm the numbers or characters entered.
19	SAVE key	Press SAVE key to save the image files (BMP, GIF and PNG) or wave files (CSV) to U-disk.
20	LOCK/LOCAL key	Press LOCK key, the key will be lightened and the panel keys are locked; press LOCK again, the key will not be lightened and the panel keys are unlocked. In remote control, press this key to unlock the remote control state and return to key operation.
21	PASS/FAIL indicator	Output the judgment results after one measurement.
22	High Voltage indicator(DANGER)	The indicator will be lightened when high voltage is output on the test terminals.
23	Output low terminal of withstand voltage & insulation test (RT/LOW)	Connect the DUT.
24	Channel indicator	Indicates the current test channel.
25	[L/DCR] key	Press this key to enter <L Setup> or <DCR Setup> page
26	[IR/IWT] key	Press this key to enter <IR Setup> or <IW(Surge) Setup> page
27	[AC/DC] key	Press this key to enter <Hipot Setup> page
28	Measurement signal output terminal (CH1~CH12)	Connect the DUT.

Table 3-1 Front panel instruction

3.2 Rear panel



No.	Name	Description
1	Name plate	Record the information of manufacture date, model, batch number, etc.
2	Fan window	Thermal discharge.
3	Temperature Sensor socket	Connect the temperature sensor to test the environment temperature.
4	Extension interface	Reserved interface
5	FOOT CONTROL	In MAN mode, the foot switch can be used to start a measurement.
6	HANDLER interface	Comparison results are output via the handler interface. The instrument can get START or STOP signal through the interface.
7	3-wire power socket	Connect the AC power.
8	Ground terminal	Safety ground terminal. Connect the other terminal to ground for the safety of operator.
9	Barcode interface	Connect the barcode scan gun to input bar code and other information.
10	USB communication interface	Support USB TMC and USD CDC, the function is the same as 6.
11	RS232C serial interface	The serial communication interface can be connected to an external device for remote control without panel operation.

Table 3-2 Rear Panel Instruction

Chapter 4 Instruction for Use

This chapter introduces the operation of different keys and rotary knob, including the measurement display page, measurement setup page, system setup page and file manage page.

4.1 Test setup

Press SETUP menu key to enter into the test setup interface (as shown in figure 4-1-1).

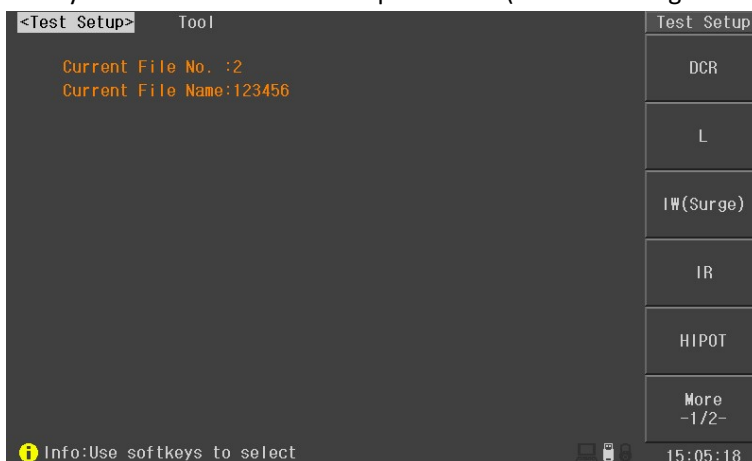


Figure 4-1-1 Test setup page

4.1.1 DCR Setup

Press DCR key in Test Setup interface to enter into the DCR setup interface (as shown in figure 4-1-1-1).

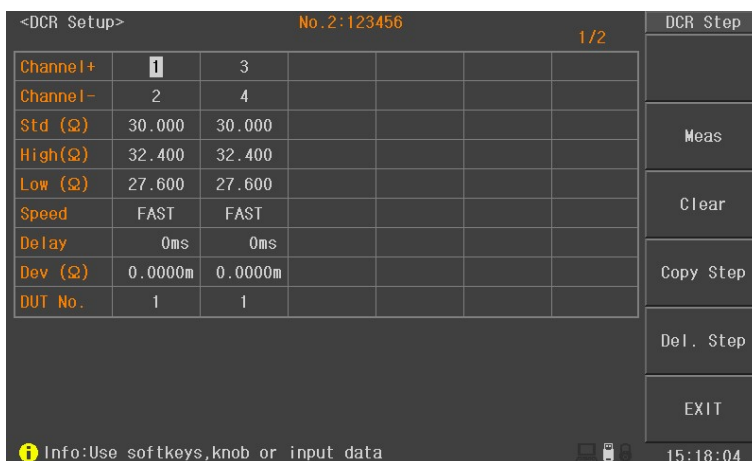


Figure 4-1-1-1 DCR setup interface

Channel+/channel-: Move the cursor to this zone and input the channel through the numeric key. When inputting the channel+, the instrument will automatically set the next channel in channel-. Channel+ means the high voltage positive terminal, while channel- means the high voltage negative terminal. Channel+ and channel- can not be set at the same channel.

Clear: in order to acquire more accurate test results, clearing operation must be done after setting the channel. Before clearing, please short the test clips of selected channel correctly according to figure 4-1-1-2.

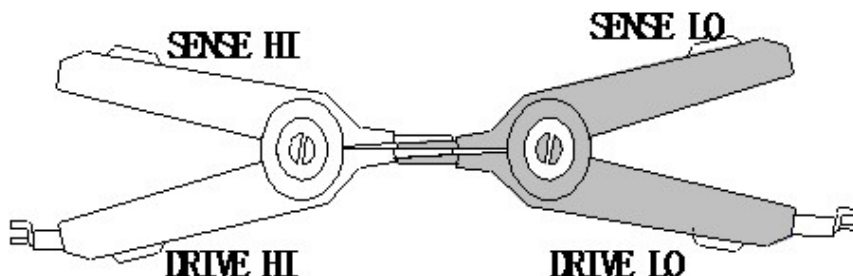


Figure 4-1-1-2 correct short the clips

Std(Ω): set the standard resistance of DUT. Move the cursor to this zone, use numeric key to input the value or press “Meas” soft key to input it automatically. When using automatic input function, please press “Meas” soft key after connecting the standard sample with the set channel. The measured value will be displayed in the current page (figure 4-1-1-3). At this moment, press Enter Std soft key to finish inputting the standard value. In measurement result display window, correctly short the clips refer to figure 4-1-1-2 and then press Clear soft key to finish clearing operation.

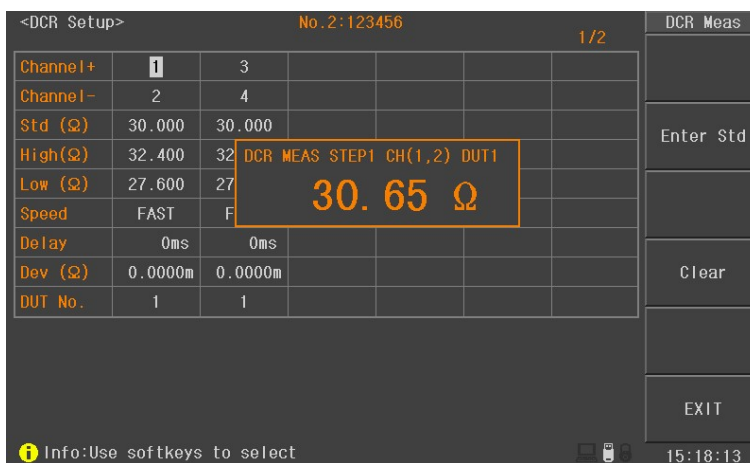


Figure 4-1-1-3 DCR test

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use numeric key to input the value or press “% Calc” soft key to input the percentage. When pressing “% Calc” soft key, calculation window will be displayed (figure 4-1-1-4). Use numeric key to input the limit and press “OK” soft key, the instrument will automatically calculated the high and low value.

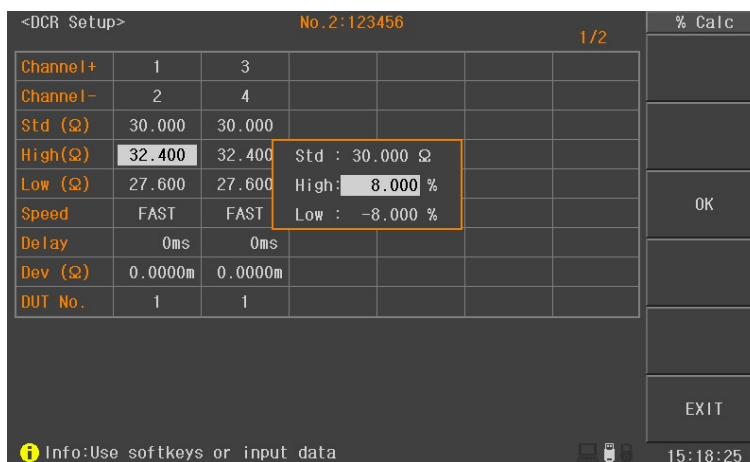


Figure 4-1-1-4 % Calc of High/Low

Speed: set the test speed of DCR. When in SLOW, the test speed is the slowest but with the best stability. When in FAST, the test speed is the fastest but with the bad stability. Move the cursor to this zone, use soft key to select the test speed: FAST, MEDIUM, SLOW.

Delay: set the delay time before DCR test. When testing coils with large inductance, it is better to set the delay time for stable measurement signal. Move the cursor to this zone, use numeric key to input the delay time. The range of delay time is :0s~60.000s.

Dev: deviation is used for correcting the test results. Each test result will be added the deviation. Move the cursor to this zone, use numeric key to input the deviation value. Also, the deviation value can be set to 0 by using soft key “Set to 0”.

DUT No.: For ease of identification, the DUT No. is displayed in the front of the test item when in comprehensive test. Move the cursor to this zone, use numeric key to input the number. It can be set as 1~6.

4.1.2 L(Inductance) Setup

Press L key in Test Setup interface to enter into the L(inductance) setup interface (as shown in figure 4-1-2-1).

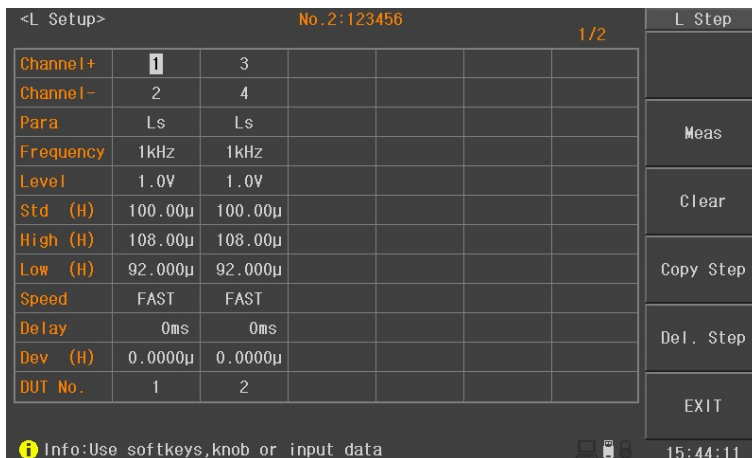


Figure 4-1-2-1 L(inductance) setup interface

Channel+/channel-: Move the cursor to this zone and input the channel through the numeric key. When inputting the channel+, the instrument will automatically set the next channel in channel-. Channel+ means the high voltage positive terminal, while channel- means the high voltage negative terminal. Channel+ and channel- can not be set at the same channel.

Clear: in order to acquire more accurate test results, clearing operation must be done after setting the channel. Before clearing, please short the test clips of selected channel correctly according to figure 4-1-2-2.

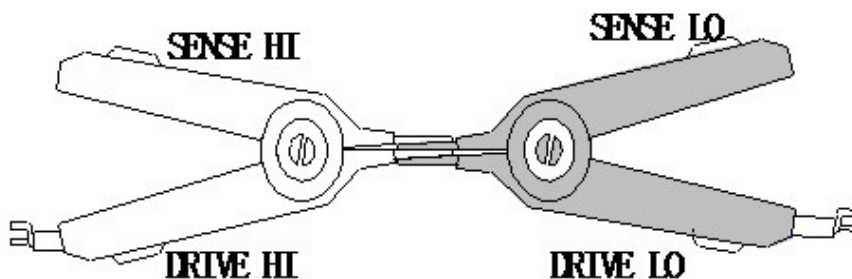


Figure 4-1-2-2 correct short the clips

Para: set the test parameter of inductance. Move the cursor to this zone, use soft key to select the test parameter: Ls-Q and Lp-Q.

Frequency: set the test frequency of inductance. Move the cursor to this zone, use soft key to select the test frequency: 50Hz,60Hz,100Hz,120Hz,1kHz,10kHz,20kHz,40kHz,50kHz and 100kHz.

Level: set the test level of inductance. Move the cursor to this zone, use soft key to select the test level: 0.1V,0.3V and 1.0V.

Std(H): set the standard inductance of DUT. Move the cursor to this zone, use numeric key to input the value or press “Meas” soft key to input it automatically. When using automatic input function, please press “Meas” soft key after connecting the standard sample with the set channel. The measured value will be displayed in the current page (figure 4-1-2-3). At this moment, press Enter Std soft key to finish inputting the standard value. In measurement result display window, correctly short the clips refer to figure 4-1-2-2 and then press Clear soft key to finish clearing operation.

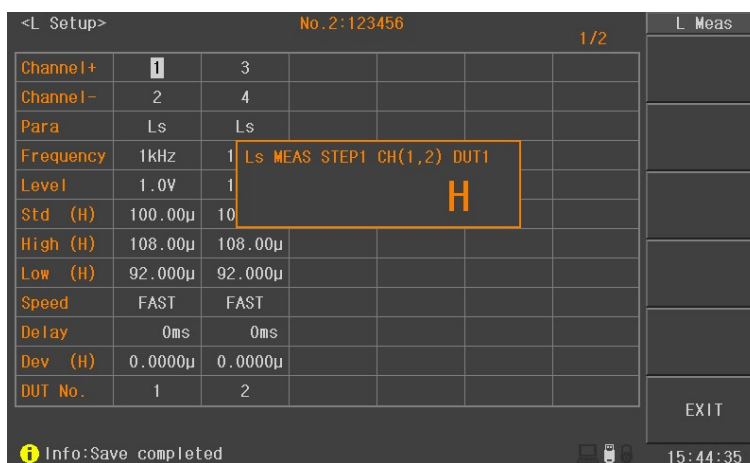


Figure 4-1-2-3 L(Inductance) test

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use numeric key to input the value or press “% Calc” soft key to input the percentage. When pressing “% Calc” soft key, calculation window will be displayed (figure 4-1-2-4). Use numeric key to input the limit and press “OK” soft key, the instrument will automatically calculated the high and low value.

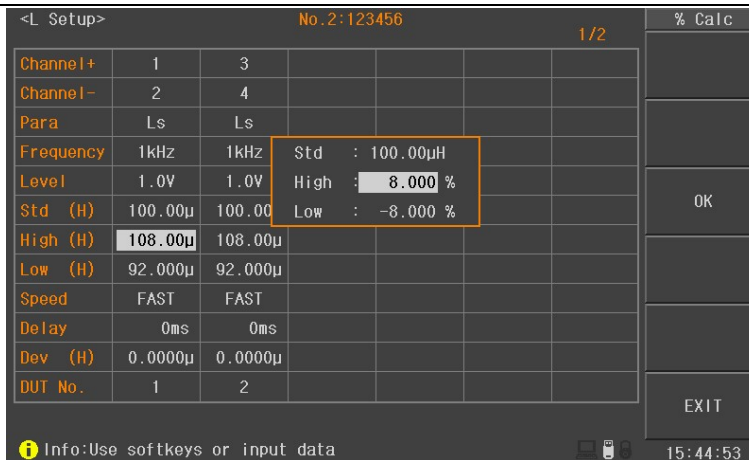


Figure 4-1-2-4 % Calc of High/Low

Speed: set the test speed of inductance. When in SLOW, the test speed is the slowest but with the best stability. When in FAST, the test speed is the fastest but with the bad stability. Move the cursor to this zone, use soft key to select the test speed: FAST, MEDIUM, SLOW.

Delay: set the delay time before inductance test. When testing coils with large inductance, it is better to set the delay time for stable measurement signal. Move the cursor to this zone, use numeric key to input the delay time. The range of delay time is :0s~60.000s.

Dev(H): deviation is used for correcting the test results. Each test result will be added the deviation. Move the cursor to this zone, use numeric key to input the deviation value. Also, the deviation value can be set to 0 by using soft key "Set to 0".

DUT No.: For ease of identification, the DUT No. is displayed in the front of the test item when in comprehensive test. Move the cursor to this zone, use numeric key to input the number. It can be set as 1~6.

4.1.3 IW (Surge) setup

Press IW(Surge) in Test Setup interface to enter into the IW(Surge) setup interface (as shown in figure 4-1-3-1).

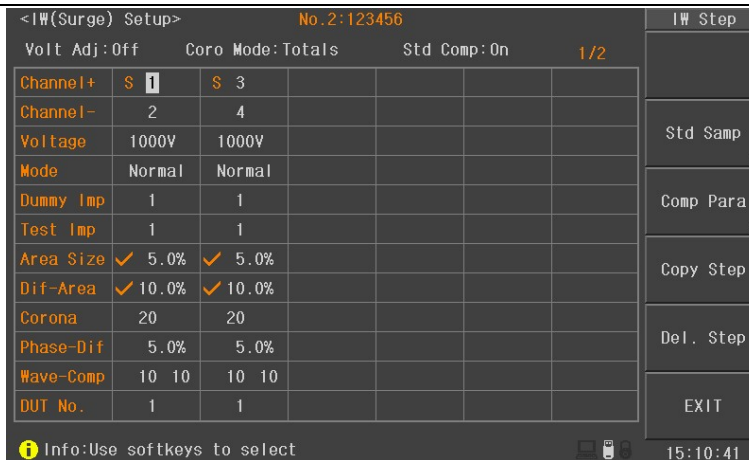


Figure 4-1-3-1 IW(Surge) setup page

Volt Adj: For a given impulse voltage, when the DUT is different, the actual voltage applied on each DUT may also be different. Therefore, the voltage adjust function can automatically change the output voltage and make all voltages applied across all DUT identical. **Voltage adjustment is particularly suitable for small inductance coil.** Move the cursor to this zone, using soft keys to turn ON/OFF the voltage adjust function.

Coro Mode: Move the cursor to this zone and use the soft key to select the corona mode. The corona mode includes the following: peak, totals and jitter. Peak mode makes comparison by using the calculated maximum corona results; sum mode makes comparison by using the calculated accumulated corona results; jitter mode makes comparison by using the accumulated corona results of some interval.

Std Comp: Move the cursor to this zone and turn ON/OFF the standard comparison function by using the soft keys. When setting the comparison function as ON, comparison test of test waveform and standard waveform will be made; When setting the comparison function as OFF, comparison test of test waveform and standard waveform will not be made (there is no need to make comparison between the corona and the standard waveform, so it is in normal test). In this case, the inter layer balance function can be used to judge the consistency between the motor winding. Please see details in section 4.1.2 IW BAL Setup.

Channel+/channel-: Set the channel through the numeric key. When inputting the channel+, the instrument will automatically set the next channel in channel-. Channel+ means the high voltage positive terminal, while channel- means the high voltage negative terminal. Channel+ and channel- can not be set at the same channel.

Voltage: After setting the channel, move the cursor to test voltage and set the test voltage

through the numeric key. The test voltage range is from 100V to 5000V.

BDV test: BDV test is a test method used for judgment of limit withstand voltage of DUT. Starting from Start Volt and ending at End Volt by a resolution of Step Volt, the test is finally done by corona comparison. Move the cursor to Voltage zone and press BDV test soft key to enter into the BDV test page (figure 4-1-3-2).

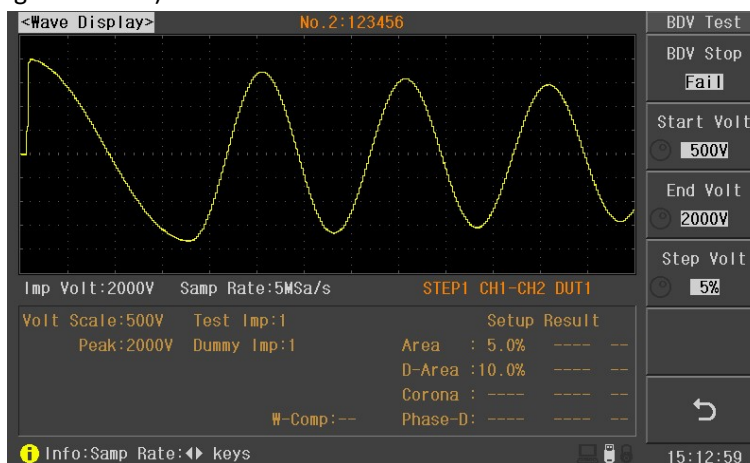


Figure 4-1-3-2 BDV test page

BDV Stop: set the BDV test to stop when the test fails or end when reaches the End Voltage.

Start Volt& End Volt: set the start voltage and end voltage of BDV test.

Step Volt: set the step of BDV test, ranging from 1%~50%.

NOTE: please set the Corona test function as ON before BDV test.

NOTE: the current voltage will be recorded when the BDV test encounter failure. The recommended test voltage will be given after testing and it can be used as the test voltage by user.

Man Std: IW(Surge) test uses waveform compare to test, so to be compared with the test waveform of DUT, standard waveform must be sampled before testing. After setting Channel+, channel-, test voltage, test mode, dummy impulse and test impulse, press Man Std soft key to enter into the Man Std interface (figure 4-1-3-3). After entering into the Man Std interface, connecting the standard component with the high voltage output terminal and press START key to sample. The waveform will be displayed in the screen after sampling. If the displayed waveform is too wide or too narrow, use left and right key to adjust the sampling rate until the suitable waveform is displayed. The test voltage (use rotary knob or numeric key or up and down key) and test mode (use Mode key) can be modified in standard sampling page. **Press return key to go back to the IW(Surge) setup page after sampling. At this time, "S" symbol is displayed in the left side of channel+ of the standard waveform, meaning the standard waveform of this channel has been sampled.**

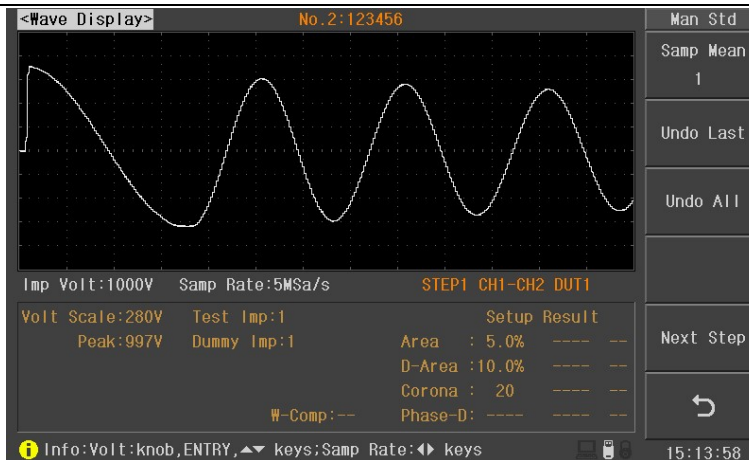


Figure 4-1-3-3 Man Std page

Mode: IW(Surge) uses waveform compare method to test. If the inductance value of the measured object is too small, the oscillating waveform is not obvious. Making comparison test of this waveform will result in great error with only a slight gap between the measured waveform and standard waveform. Therefore, the instrument can be selected as the low inductance mode (option) according to the characteristics of the DUT and then the oscillation waveform will be enlarged and comparison test will be made. Move the cursor to the test mode, then use the "Select" soft key to select Normal or low inductance test mode. Note that in low inductance mode, you can set the maximum test voltage to 2000V.

Dummy Imp: Dummy impulse is number of times of high voltage applied to the DUT. The magnet of motors and other coils still remain residual magnetic field after cutting the power. When pulse testing is conducted in this case, there are significant differences in the first test waveform and the second and subsequent test waveforms. Adding the dummy impulse can avoid this situation and so as to determine the good product and bad product. The machine does not make judgment of good product and bad product when in dummy impulse. The waveform compare test will only be made by applying a pulse to the measured object and waiting for the actual test. Move the cursor to the dummy impulse position and then input it using the numeric keys to change the times of dummy impulse. The range can be set from 0 to 8.

Test Imp: Test impulse is the impulse times applied to the DUT when testing. The average calculation of several test waveform can improve the stability and reliability of the measurement results. Move the cursor to this zone and then input it using the numeric keys to change the times of test impulse. The range can be set from 1 to 32.

Area Size: area size is the synthesis of all areas covered between the waveform and central line, aiming at testing the energy loss in the winding. When a sample winding has a short circuit

between layers, the short circuit area is reflected as an increase of energy loss. Move the cursor to Area Size zone, using the numeric key to input the error. Or press Comparator key to enter into the comparator setup interface (figure 4-1-3-4, standard sampling must be made) and then press Area Size to enter into the Area Size setup menu (figure 4-1-3-5), set the start point, end point and limit through soft key 2-4. After setting, start a test to observe whether the test results of area size is within the limit.

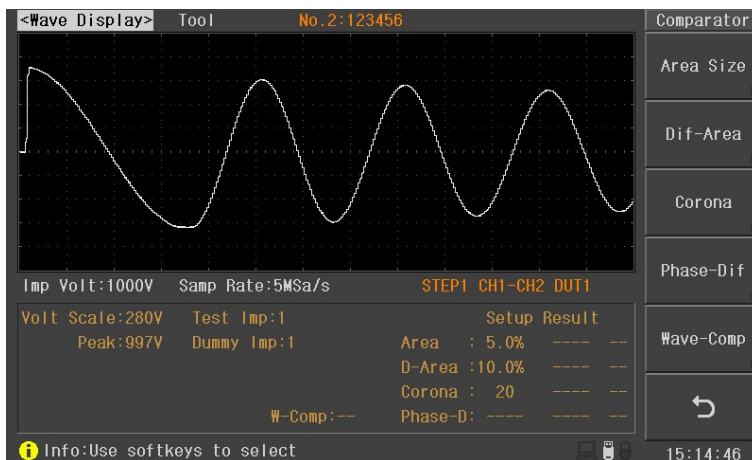


Figure 4-1-3-4 Comparator setup interface

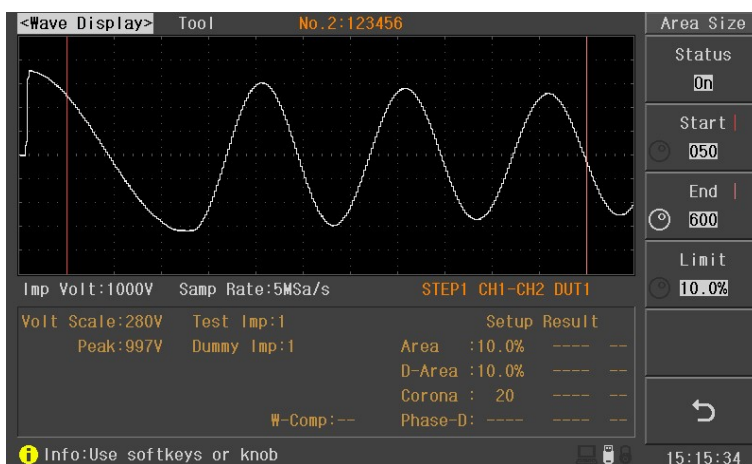


Figure 4-1-3-5 Area Size setup interface

Dif-Area: The differential area is the different area between the tested waveform and standard waveform, which is especially effective to detect the differences of inductance L between the standard winding and the tested winding. Move the cursor to Dif-Area zone and use Status key to set the dif-area test to ON or OFF. When setting it as ON, the check symbol will be displayed in the

left side of Limit. Use the numeric key to input the Limit. Or press Comparator key to enter into the comparator setup interface (figure 4-1-3-4, standard sampling must be made) and then press Dif-Area to enter into the Dif-area setup menu (figure 4-1-3-6), set the start point, end point and limit through soft key 1-4. After setting, start a test to observe whether the test results of dif-area is within the limit.

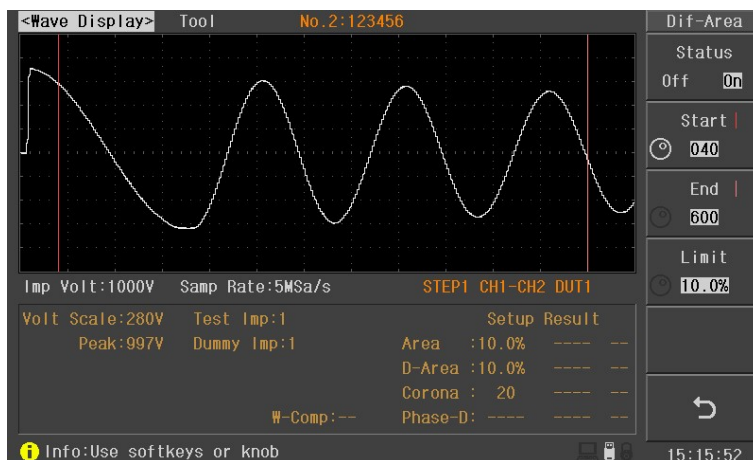


Figure 4-1-3-6 Dif-Area setup interface

Corona: corona is the value under high frequency oscillation of coils. If high frequency oscillation is occurred when coils discharge in testing, its corona will be increased. In this way, the instrument can judge whether there is discharge between coils. Move the cursor to Corona, using Status key to set corona to ON or OFF. When the corona is set as ON, the check symbol will be displayed in the left side of Limit. Use the numeric key to input the limit. Or press Comparator key to enter into the comparator setup interface (figure 4-1-3-4, standard sampling must be made) and then press Corona to enter into the corona setup menu (figure 4-1-3-7), set the start point, end point and limit through soft key 1-4. After setting, start a test to observe whether the test results of corona is within the limit. Select suitable corona mode (see more detail in corona mode) before corona setup.

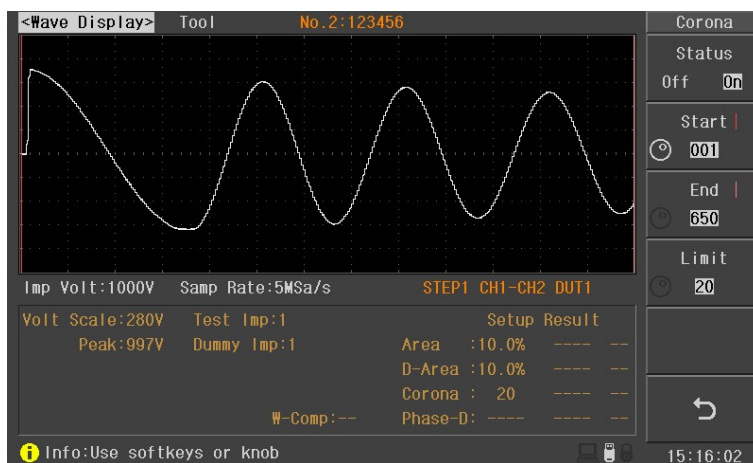


Figure 4-1-3-7 Corona setup interface

Phase-Dif: phase-dif directly reflect the inductance difference of coils, mainly used for the judgment of inductance difference. User can specify a zero-crossing point to compare. The instrument will judge the zero-crossing offset between the tested waveform and standard waveform and then compare the oscillation period between the two waveforms. The percentage of the two values will be taken as the judging criterion and the reference is set by percentage. Move the cursor to Phase-dif zone and use Status to set the phase-dif to ON or OFF. When the phase-dif is set as ON, the check symbol will be displayed in the left side of Limit. Use the numeric key to input the Limit. Or press Comparator key to enter into the comparator setup interface (figure 4-1-3-4, standard sampling must be made) and then press Phase-dif to enter into the Phase-dif setup menu (figure 4-1-3-8), set the phase-dif ON/OFF, position and limit through soft key 1-4. After setting, start a test to observe whether the test results of phase-dif is within the limit.

NOTE: The tester can only set zero-crossing points from 2 to 20. The first zero-crossing point cannot reflect the actual performance of coils, so it is not necessary to set the first point. The third zero-crossing point must be present in the waveform so as to ensure the normal operation of phase differential comparison.

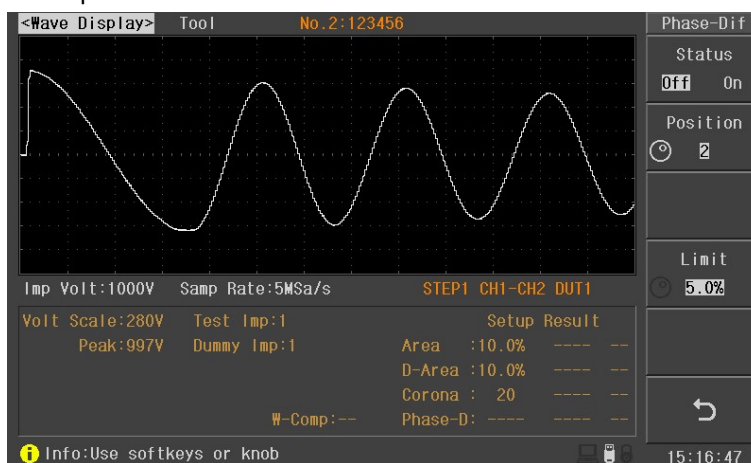


Figure 4-1-3-8 Phase-Dif setup interface

Wave-Comp: this test item can detect whether there is difference between the test waveform and standard waveform in order to strengthen the detection ability of IW (Surge). Move the cursor to Wave-Comp zone and use Status to set the Wave-Comp to ON or OFF. When the Wave-Comp is set as ON, the check symbol will be displayed in the left side of T dif and V dif. Use the numeric key to input the difference. Or press Comparator key to enter into the comparator setup interface (figure 4-1-3-4, standard sampling must be made) and then press Wave-Comp to enter into the Wave-Comp setup menu (figure 4-1-3-9), set the Wave-Comp ON/OFF, start point, end point and T dif and V dif through soft key 1-4. After setting, start a test to observe whether the waveform

compare test result is good.

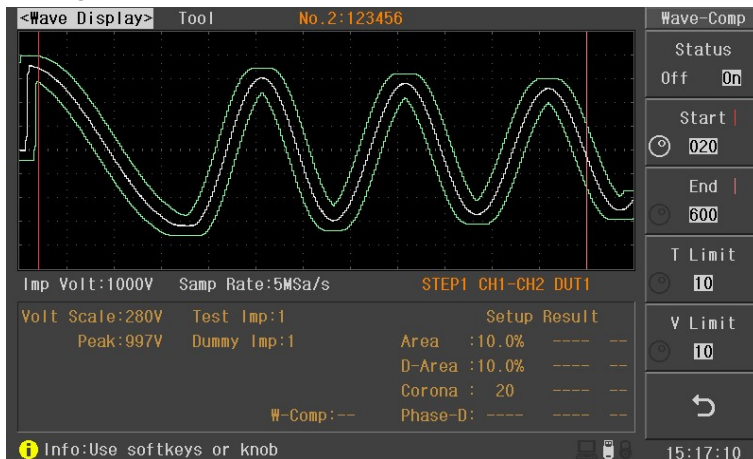


Figure 4-1-3-9 Wave-Comp setup interface

DUT No.: For ease of identification, the DUT No. is displayed in the front of the test item when in comprehensive test. Move the cursor to this zone, use numeric key to input the number. It can be set as 1~6.

4.1.4 Insulation Resistance (IR) setup

Press IR in Test Setup interface to enter into the IR setup interface (as shown in figure 4-1-4-1).

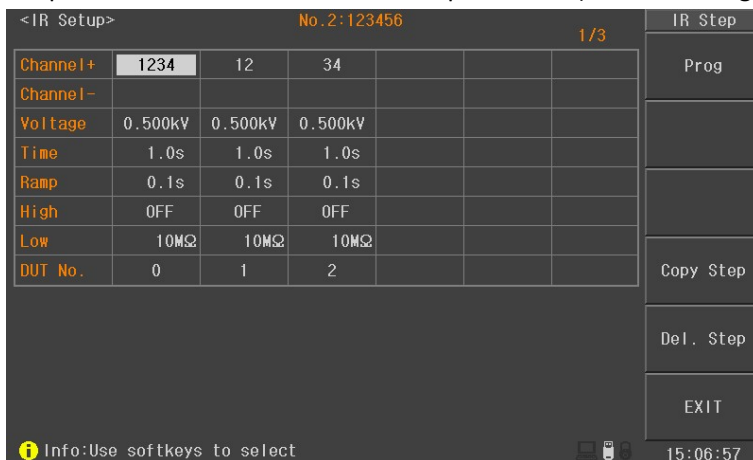


Figure 4-1-4-1 IR setup page

Channel+/channel-: Move the cursor to this zone and press the “Prog” soft key to display the <high voltage output channel selection window>(as show in figure 4-1-4-2). In this window, you can move the cursor to each channel and press the “ON/OFF” soft key to set the output of this channel. Channel “+” indicates positive side of high voltage output, channel “-” indicates negative side of high voltage output. “+” and “-” can’t be set at the same channel. Press the “OK” soft key to save the settings. RTN/LOW terminal is always used as the negative side of high voltage output.



Figure 4-1-4-2

Voltage: After setting the channel, move the cursor to Test voltage and set the test voltage through the soft key or numeric key. The test voltage range is from 100V to 1000V.

Time : Move the cursor to this zone and set the test time through the soft key or numeric key. The test time range is from 0.1s to 999.9s.

Ramp : Move the cursor to this zone and set the ramp time through the soft key or numeric key. The test time range is from 0.1s to 999.9s.

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use the soft key or numeric key to input the value. The range is from 1M to 50G. "0" indicates shut off the high or low limit.

DUT No.: For ease of identification, the DUT No. is displayed in the front of the test item when in comprehensive test. Move the cursor to this zone, use numeric key to input the number. It can be set as 1~6.

4.1.5 HIPOT setup

Press HIPOT in Test Setup interface to enter into the Hipot setup interface (as shown in figure 4-1-5-1).

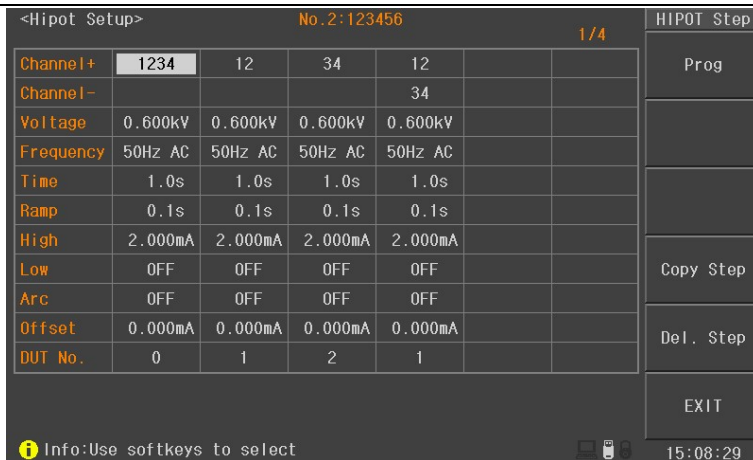


Figure 4-1-5-1 Hipot setup page

Channel+/channel-: Move the cursor to this zone and press the “Prog” soft key to display the <high voltage output channel selection window>(as show in figure 4-1-5-2). In this window, you can move the cursor to each channel and press the “ON/OFF” soft key to set the output of this channel. Channel “+” indicates positive side of high voltage output, channel “-” indicates negative side of high voltage output. “+” and “-” can’t be set at the same channel. Press the “OK” soft key to save the settings. RTN/LOW terminal is always used as the negative side of high voltage output.

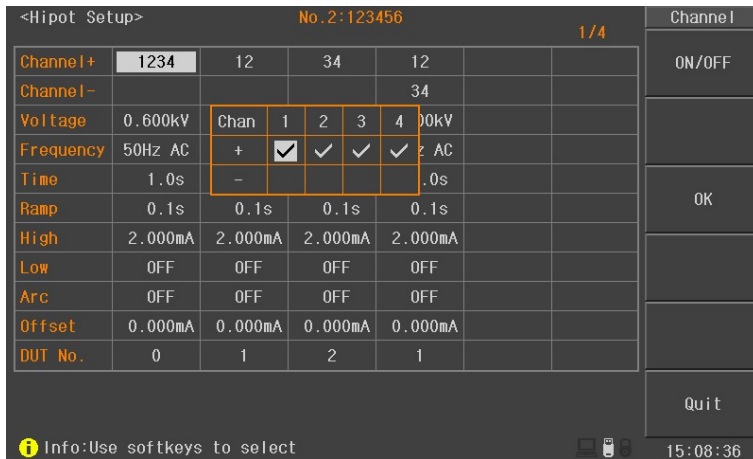


Figure 4-1-5-2

Voltage: After setting the channel, move the cursor to Test voltage and set the test voltage through the soft key or numeric key. The test voltage range is from 100V to 5000V for AC and from 100V to 6000V for DC.

Frequency : Move the cursor to this zone and use the “Prog” soft key to select frequency of high voltage. It can be selected as “50Hz AC”, “60Hz DC” and “DC”.

Time : Move the cursor to this zone and set the test time through the soft key or numeric key. The test time ranges from 0.1s~999.9s.

Ramp : Move the cursor to this zone and set the ramp time through the soft key or numeric key. The test time ranges from 0.1s~999.9s.

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use the soft key or numeric key to input the value. The ranges is from 0.001mA to 30.000mA for AC and from 0.001mA to 10.000mA for DC. "0" indicates shut off the high or low limit.

Arc : Set the sensitivity of arc detection. The lower value indicates the higher sensitivity. Move the cursor to this zone and set the Arc through the soft key or numeric key. The ARC range is from 0.1mA to 15.0mA for AC and from 0.1mA to 10.0mA for DC. "0" indicates turn off the ARC detection function.

Offset : This function is used to deduct the leakage current generated by the test fixtures. The offset value will be automatically deducted in each test. Move the cursor to this zone and set the offset value through the "offset" soft key or numeric key. The offset value range is from 0.1mA to 15.0mA for AC and from 0.1mA to 10.0mA for DC. "0" indicates turn off the offset function.

DUT No.: For ease of identification, the DUT No. is displayed in the front of the test item when in comprehensive test. Move the cursor to this zone, use numeric key to input the number. It can be set as 1~6.

4.1.6 DCR BAL Setup

The purpose of the testing DCR balance is to test the resistance difference between the two winding coils. To use this function, you need to set at least two DCR test steps. The resistance value to be compared in balance test is the measurement value of the DCR. The judgment is made by subtracting the two DCR values and selecting the absolute value. Press DCR BAL soft key in Test Setup interface to enter into the R BAL interface (figure 4-1-6-1).

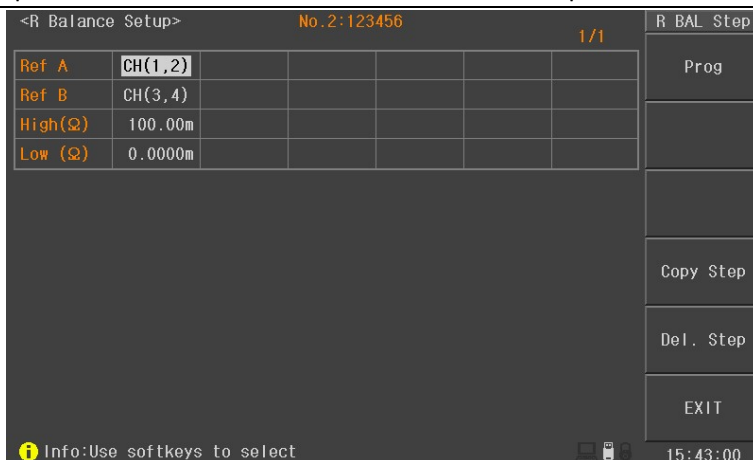


Figure 4-1-6-1 DCR BAL Setup interface

Ref A/Ref B: Ref A/Ref B are used for setting two sets of coils needed to compare. The two sets of coils should be set in DCR. Move the cursor to this zone and use soft key to select the coils needed to compare.

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use numeric key to input the high and low value.

4.1.7 L BAL Setup

The purpose of the testing inductance balance is to test the resistance difference between the two winding coils. To use this function, you need to set at least two inductance test steps. The inductance value to be compared in balance test is the measurement value of the L. The judgment is made by subtracting the two L values and selecting the absolute value. Press L BAL soft key in Test Setup interface to enter into the L BAL interface (figure 4-1-7-1).

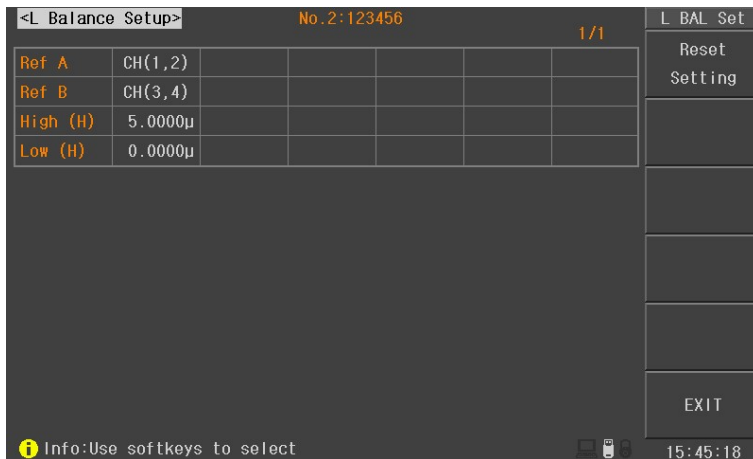


Figure 4-1-7-1 L BAL Setup interface

Ref A/Ref B: Ref A/Ref B are used for setting two sets of coils needed to compare. The two sets of coils should be set in L. Move the cursor to this zone and use soft key to select the coils needed to compare.

High/Low: set the high and low value. If the test result is out of the range, it will be judged as FAIL. Move the cursor to this zone, use numeric key to input the high and low value.

4.1.8 IW Balance Setup

Press IW BAL in Test Setup interface to enter into the IW BAL setup interface (as shown in figure 4-1-8-1).

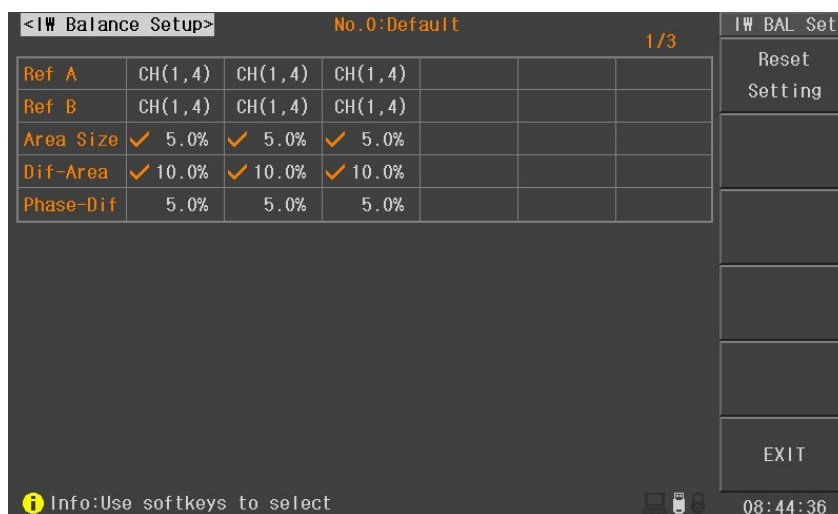


Figure 4-1-8-1 IW BAL setup interface

Ref A/Ref B: Ref A/Ref B are used for setting two sets of coils needed to compare. The two sets of coils should be set in IW (Surge). Move the cursor to this zone and use soft key to select the coils needed to compare.

Area Size, Dif-Area, Phase-Dif: set the compare items and judgment range of the two sets of coils. The specific setup, please refer to IW(Surge) setup.

4.1.9 Open/Short(O/S) setup

Press O/S in Test Setup interface to enter into the O/S setup interface (as shown in figure 4-1-9-1).

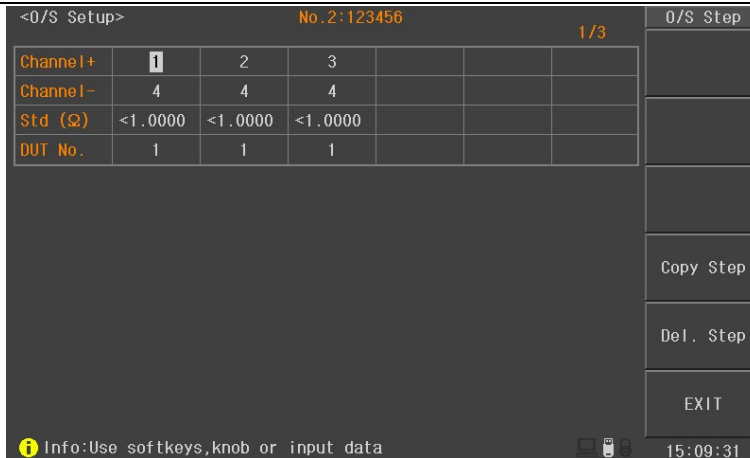


Figure 4-1-9-1 O/S setup page

Channel+/channel-: Move the cursor to this zone and input the channel through the numeric key. When inputting the channel+, the instrument will automatically set the next channel in channel-. Channel+ means the high voltage positive terminal, while channel- means the high voltage negative terminal. Channel+ and channel- can not be set at the same channel.

Std(Ω): Set the standard resistance as the judgement of Open/short function. Move the cursor to this zone, use numeric key to input the value. When the measured value is less than the setting value, the test terminals can be considered as short. Otherwise, the test terminals are considered as open.

4.1.10 Seq Setup

In Seq Setup interface, you can turn on/off the Function or adjust the test sequence of the function. In Test setup interface, press Seq Setup soft key to enter into the Seq Setup interface (figure4-1-10-1).

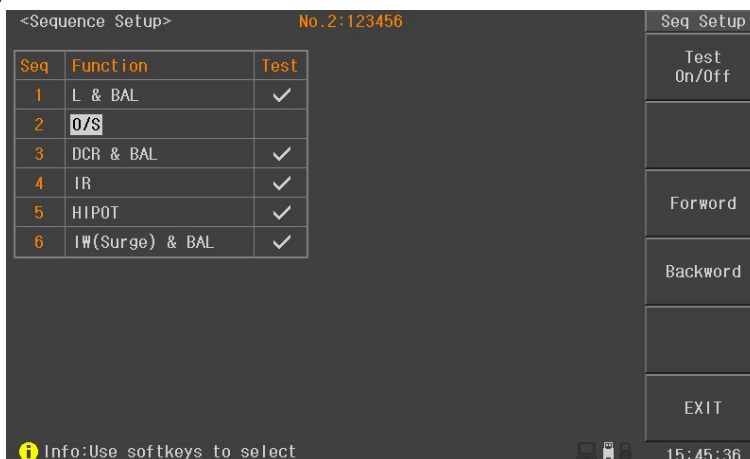


Figure 4-1-10-1 Seq Setup interface

Function: this function is used for selecting the test item. Move the cursor to the Function needed to be set and use Test soft key to turn on or off the function. When set the Function as ON, the check symbol will be displayed in Test block, or it will not be displayed.

Forward/Backward: this function is used for adjusting the test sequence. Move the cursor to the Function needed to be set, and then use “Forward” soft key to move the test item upward, “Backward” soft key to move the test item backward.

Note: it is suggested to move the DCR test upward and IW(Surge) test backward.

4.2 System Setup

Press **SYSTEM** to enter **System**. System configuration, test configuration, system information, system test and IW (Surge) output voltage test as well as firmware upgrade can be set in this interface.

4.2.1 System Config

Press **SYSTEM** to enter into the system configuration interface (figure4-2-1-1).

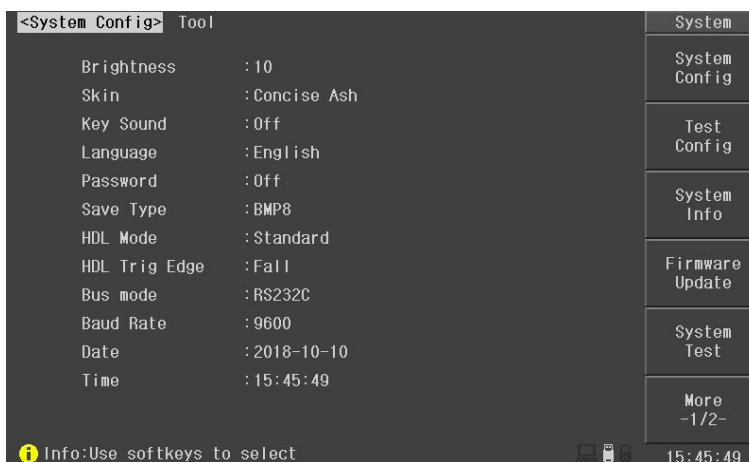


Figure 4-2-1-1 System Config interface

Brightness: this option is used to set the backlight brightness of the LCD screen for different natural environment brightness. Move the cursor to this zone, use soft key to adjust the brightness ranging from 1-20.

Skin: the instrument provides several skins. Move the cursor to this zone and use the soft key to select.

Key Sound: Move the cursor to this zone and use the soft key to select it as ON/OFF.

Language: the instrument provides two kinds of language. Move the cursor to this zone and use the soft key to select Chinese or English.

Password: the instrument provides several kinds of password methods. Set it as Off, there is no need to input the password when testing; in key lock mode, it is need to input the password when unlock the key; in system mode, it is need to input the password when turn on the instrument; in file mode, it is need to input the password when entering into the file page. Move the cursor to this zone, use soft key to select the password mode: OFF, keylock, system and file; press “modify” soft key to change the new password. The factory initial password is 123456.

Save Type: this option is used to set the file type to be saved to the U-disk when pressing the SAVE soft key in the panel. DATA format is used to start or stop saving the test results. The test result will be saved to the U-disk (in CSV format) after each measurement; DATA+WAVE format will save the standard waveform and test waveform of the test results and IW(Surge) test int to U-disk (in CSV format, the waveform data is saved following the DATA); GIF, BMP, BMP24 and PNG format will save the displayed content in the screen to the U-disk according to the picture format. Move the cursor to this zone and use the soft key to select the Save Type.

HDL Mode: this option is used for setting the signal mode of external sorting interface (handler). Off or Standard mode can be set. Also, optional expansion mode with more comprehensive interface signal can be selected. See details in Chapter 6 “Handle interface”.

HDL Trig Edge: this option is used for setting the handler interface to use Rise or Down edge of start signal to trigger the measurement.

Bus Mode: the instrument provides several bus mode to achieve remote control and measurement of the instrument in PC. There are three bus modes: RS232C, USB CDC and USB TMC. See details in Chapter 5 “Remote control”.

Baud Rate: this option is used for setting the communication rate (it can also be used in USB CDC). The baud rates can be set: 4800, 9600, 19200, 38400, 57600 and 115200.

Date/Time: there is built-in real-time clock in the instrument and it is used for setting the accurate date and time. The time option can be set as ON/OFF. When setting it as OFF, the time will not be displayed in the right corner of the screen.

4.2.2 Test Config

Press **SYSTEM** to enter into the test configuration interface (figure4-2-2-1).

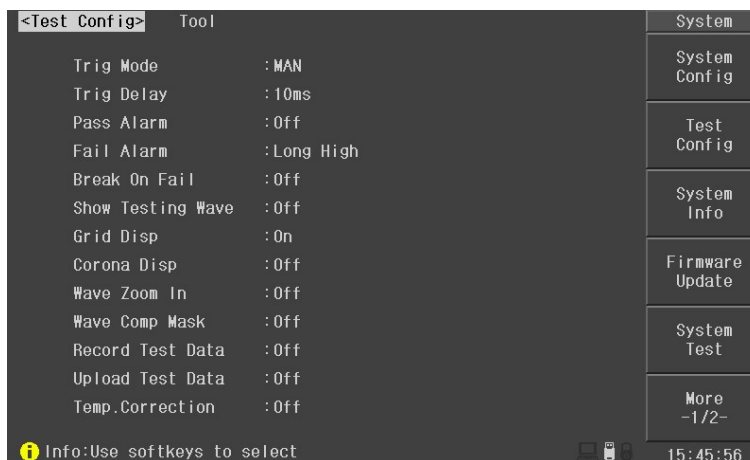


Figure 4-2-2-1 Test Config interface

Trig Mode: this option is used to select the trigger mode of one measurement, including MAN, EXT and BUS. MAN: the default trigger mode, press the START key in the panel or foot switch to start a test; EXT: input a TTL negative pulse with width larger than $1\mu\text{s}$ in external handler interface and start a test in its rise edge or down edge; BUS: send trigger commands to start a test through RS232C, USB CDC or USB TMC interface.

Trig Delay: this option is used for setting the delay time from triggering a test to real testing, usually used for the synchronization between external handler and mechanical operation. In general, the delay time is set to 0 in MAN mode. The range of the delay time can be set from 0s to 60s.

Pass Alarm/Fail Alarm: this option can set the alarm of judgment. Move the cursor to this zone and use soft key to select the alarm: Long High, Long Low, One Short, Two Short or OFF.

Break on Fail: this option can select to stop testing or continue testing when on Fail test result. Move the cursor to this zone and use the soft key to select ON/OFF.

Show Testing Wave: this option can select whether to display the test waveform of IW(Surge) in the screen when in comprehensive testing. Move the cursor to this zone and use the soft key to select ON/OFF. After the comprehensive testing is finished, use Wave soft key to view the test waveform of IW(Surge).

Grid Disp: this option can select whether to turn on the grid display of waveform display area on IW(Surge) waveform display page. Move the cursor to this zone and use the soft key to select ON/OFF.

Corona Disp: this option can select whether to turn on the corona function on IW(Surge) waveform display page. Move the cursor to this zone and use the soft key to select ON/OFF. **Not only set the Corona Disp as ON, but also set the corresponding corona compare as ON. When the corona value is out of the limit of corona, it will be displayed in red, otherwise, in green.**

Wave Zoom In: this option can select whether to zoom in the waveform on IW(Surge) waveform display page. Move the cursor to this zone and use the soft key to select ON/OFF.

Wave Comp Mask: this option can select whether to display the waveform compare mask. Move the cursor to this zone and use the soft key to select ON/OFF.

Record Test Data: the instrument can record the test results (not including the test waveform of IW(surge)) of comprehensive testing. It can record 1500 pieces of data, which can be browsed in "History data" page or saved to U-disk for statistics and analysis. The mode of recording test data can be set as: OFF, PASS, FAIL and ALL. OFF: not record any test data; PASS: record the test data result in PASS only; FAIL: record the test data result in FAIL only; ALL: record all the test data.

Upload Test Data: after the end of comprehensive testing, the instrument can upload the test data to PC through interface (only support RS232C and USB CDC). The mode of uploading test data can be set as: OFF, PASS, FAIL and ALL. OFF: not upload any test data; PASS: upload the test data result in PASS only; FAIL: upload the test data result in FAIL only; ALL: upload all the test data.

Temp.correction (TC): By this function, the resistance tested under the current environment temperature will be converted to a resistance value under the user-set environment temperature. For instance, a resistor is tested as 100Ω under 20°C. If user sets the temperature as 10°C, after correction, the value will be displayed as 96.22Ω. This is realized by formulary conversion.

Formula: $R_t = R_{t0} * \{1 + \alpha t_0 * (t - t_0)\}$

R_t Resistance measured under the current environment temperature

R_{t0} Resistance after correction

t₀ Preset temperature

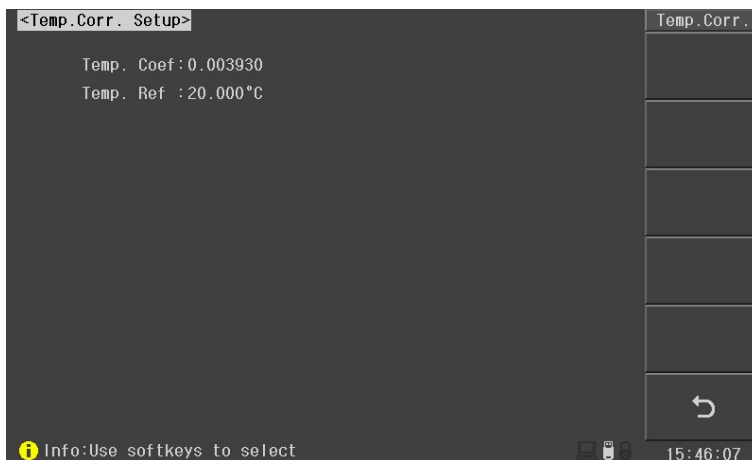
t Current environment temperature

αt₀ Temperature coefficient of the material

For example: A resistor is measured as 100Ω under 20°C (Suppose the temperature coefficient as 3930ppm), the resistance under 10°C will be 96.22Ω.

$$R_{t0} = \frac{R_t}{1 + \alpha_{t0} \cdot (t - t_0)} = \frac{100}{1 + (3930 \times 10^{-6}) \times (20 - 10)} = 96.22 \Omega$$

NOTE: Before measurement, it is necessary to warm up the instrument and the probe for about half an hour. The temperature sensor should be placed to the DUT as close as possible but cannot contact it. After the displayed result comes to be stable, you can read or record the result.



4.2.3 Firmware Upgrade

Press **SYSTEM** to enter into the system configuration interface and press Firmware Upgrade soft key to enter into the firmware upgrade interface (the U-disk with upload file must be inserted before upgrading).

When using U-disk to upgrade, please make sure the upgrade file has been copied in the root directory. After entering into the firmware upgrade interface, select the upgrade file and press upgrade to start upgrading. The instrument will automatically reboot after upgrading. Do not disconnect the power in the process of upgrading, or the system firmware will be damaged and the instrument can not work normally.

4.2.4 HV Test

Press **SYSTEM** to enter into the system configuration interface. Press “More” to switch the menu to page two and press “HV Test” to enter into the HV Test (figure 4-2-4-1). The HV test detect whether the output high voltage signal of IW(Surge) is good or not. Press Begin Test to start one self-check of HV output. When the cursor is in HV Test, the instrument will test all the voltage in the form; when the cursor is in the voltage in the form, the instrument will test the current voltage only.



Figure 4-2-4-1 HV Test interface

Power on self test: this option can set the instrument to operate power-on self test or not. Move the cursor to this zone and select ON/OFF through the soft key.

4.3 File List

Press File menu to enter into the File List interface (figure 4-3-1). The set parameter and sampled standard waveform data can be saved to the non-volatile memory or external U-disk in file format. There is no need to reset these parameters when using the same setup. To load the corresponding file can restore the set parameter and standard waveform data, thus greatly save the time of resetting the parameter.



Figure 4-3-1 File List interface

Load: load a file saved in the non-volatile memory or external U-disk .

Build: build a new test file in designated position, the setup of function is empty.

Save: save the current setup of function to designated position.

Delete: delete the selected file.

Copy: copy the file. There are three steps: input the number of original file, input the number of aim file and input the number needed to copy. This number is used to copy several files according to the sequence of file number.

Rules of name inputting: when pressing some numeric key, if the corresponding number (or special character) has been displayed in the soft key area, input the figure; otherwise, switch the soft key function, not input the figure; when pressing the soft key, input the corresponding figure or specific character.

☞ **Note: if the file name already exists, the new file will cover the old one.**

☞ **Note: press ENTER key to switch between the internal file and U-disk file.**

☞ **Note: press right and left keys to flip operation.**

☞ **Note: when the U-disk insert the instrument for the first time, the instrument will build a U9036 file in the U-disk root directory and then SETUP, IMAGE and DATA files will be built in this folder, respectively store the setup, image and data.**

Instruction: the current file number and name will be displayed in measurement and setup page after loading the file. When using the internal file (No.1~300), the modified test function parameter will be written into the file and there is no need to save it again. No.0 is the internal specific file of the instrument. When not using the file listed in the file list, the instrument will use No.0 file and it will not save the modified test function parameter. **The test function parameter loaded from the PC use No.0 file.**

4.4 How to test

Confirm that there is no voltage output and the HV indicator is not lightened, connect the DUT with the test line and make sure the test line is correctly connected with the instrument.

4.4.1 Start testing

1. Press MEAS menu key to enter into the test Disp interface (figure 4-4-1-1) and press START key to begin a comprehensive test.

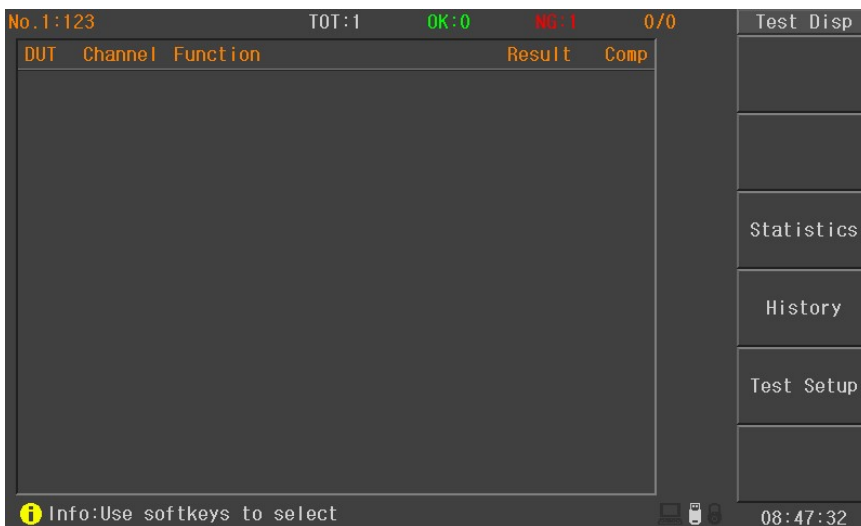


Figure 4-4-1-1 Test Disp interface

2. After pressing START key, if the current test step is IW(Surge), the HV indicator will be lightened. The measurement result and judgment result will be displayed in display page after one test step. After the whole test is finished, the PASS and FAIL judgment result in big character will be displayed in the right of test result list (figure 4-4-1-2).

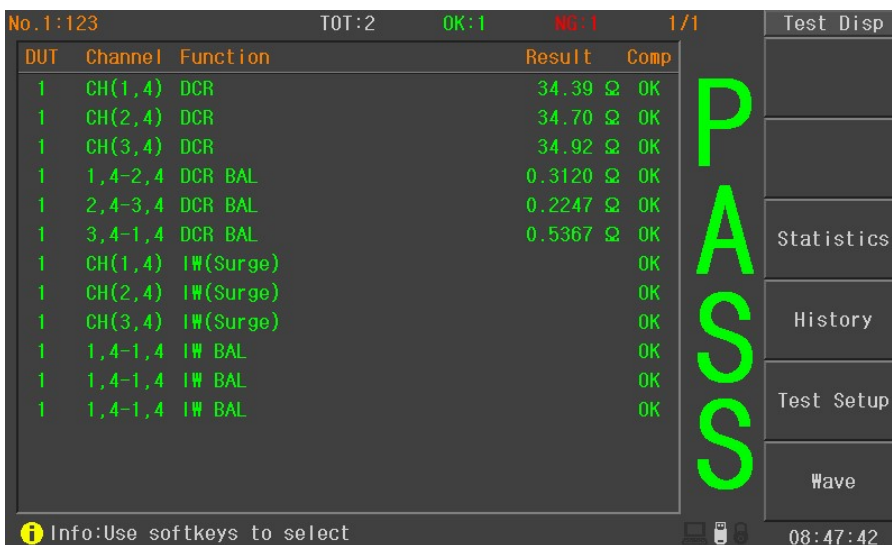


Figure 4-4-1-2 Test result display

3. If there is IW(surge) in the test function, press Wave Disp soft key to view the test waveform of IW(surge) (figure 4-4-1-3) and relevant test data after testing. Press Next soft key to view the test waveform and data of next channel.

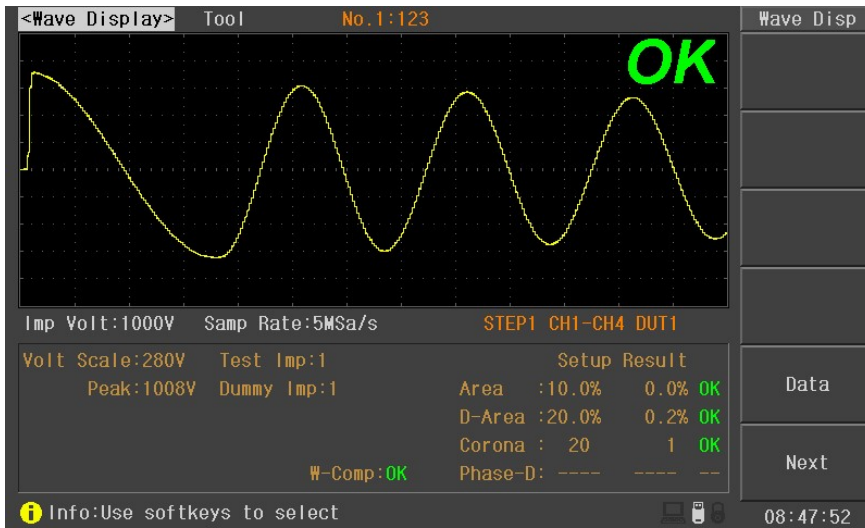


Figure 4-4-1-3 Waveform Display page

4. If the test result is FAIL, the FAIL information will be displayed after testing. The failed test function will be displayed in red (PASS in green) and the upper and lower limit of this failed function will be displayed for easy recognition (figure 4-4-1-4).

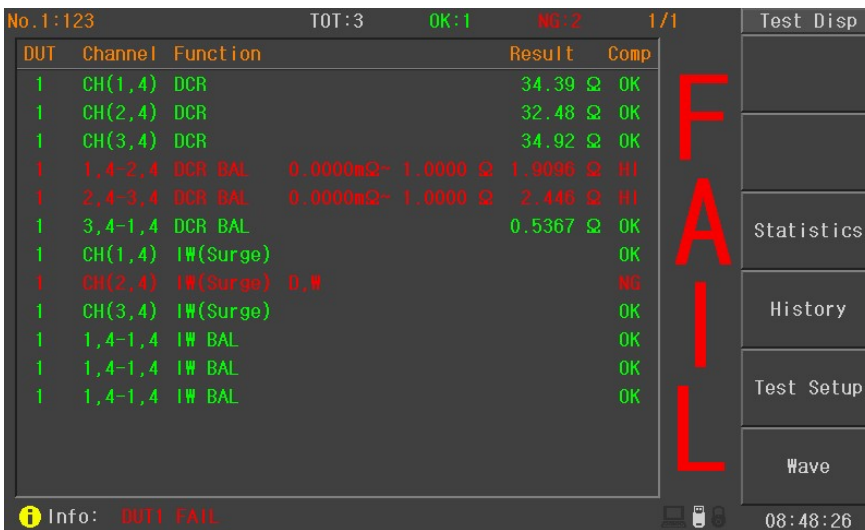


Figure 4-4-1-4 Test result display

4.4.2 Judgment result analysis

Hipot

Judgment result display	Instruction
HI	Leakage current value exceeds the set high limit.
LO	Leakage current value exceeds the set low limit.
Break Down	Poor withstanding voltage of the DUT
Arcing	The ARC current exceeds the upper limit
Rng Fail	The current exceeds the range of the meter
ADV Over	Voltage reading exceeds the hardware available digits
ADI Over	Current reading exceeds the hardware available digits
Volt Low	The output voltage is too low

Insulation Resistance

Judgment result display	Instruction
HI	Leakage current value exceeds the set high limit.
LO	Leakage current value exceeds the set low limit.
Rng Fail	The resistance exceeds the range of the meter
ADV Over	Voltage reading exceeds the hardware available digits
ADI Over	Current reading exceeds the hardware available digits
Volt Low	The output voltage is too low

DCR/L(inductance)

Judgment result display	Instruction
HI	DCR value exceeds the set high limit.
LO	DCR value exceeds the set low limit.
Link Error	Poor connection of internal control link line.
No End	Hardware problems of DCR/L test unit.

L/DCR Balance

Judgment result display	Instruction
HI	Resistance difference exceeds the high limit.
LO	Resistance difference exceeds the low limit.

IW (Surge)&Balance

Judgment result display	Instruction
A	Area exceeds the limit.
D	Area difference exceeds the limit.
C	Corona exceeds the limit.
P	Phase difference exceeds the limit.
W	Waveform Comparison exceeds the limit.

4.4.3 View history data

The instrument can store 1500 pieces of test data for viewing and statistics; when the storage number exceeds 1500, the instrument will cover the history from 1. For details of the saved data mode, please refer to “record the test data” in 4.2.2 Test Cofig section.

Press History Data soft key to enter into the history data display interface (figure 4-4-3-1).

<History Data>		G: 1/5	123	P: 1/1	History
DUT	Channel	Function	Result	Comp	
1	CH(1,4)	DCR	34.39 Ω	OK	PASS Save Previous Group Next Group ↻
1	CH(2,4)	DCR	34.72 Ω	OK	
1	CH(3,4)	DCR	34.91 Ω	OK	
1	1,4-2,4	DCR BAL	0.3370 Ω	OK	
1	2,4-3,4	DCR BAL	187.22mΩ	OK	
1	3,4-1,4	DCR BAL	0.5242 Ω	OK	
1	CH(1,4)	IW(Surge)		OK	
1	CH(2,4)	IW(Surge)		OK	
1	CH(3,4)	IW(Surge)		OK	
1	1,4-1,4	IW BAL		OK	
1	1,4-1,4	IW BAL		OK	
1	1,4-1,4	IW BAL		OK	

Info: Use softkeys to select 08:51:01

Figure 4-4-3-1 History data display interface

The test group information is displayed in the right of **History Data**, G:1/4 indicates the test group information, 1 indicates the current test group and 4 indicates the total test groups; the file ID information of the current group is displayed in the right of the group information (namely, the file name used during testing); P:1/2 means the test result page information of the current group, 1 means page 1 and 2 means the total pages of test results.

Press **Next Page** and **Previous Page** to switch the multiple test result pages; press **Next Group** and **Previous Group** to switch other test results.

Press **Save** soft key to save the history test data into U-disk in CSV format for statistics and analysis.

Chapter 5 Remote control

The instrument is provided with RS232 serial interface, USB interface to achieve data communication and remote control of the instrument without panel; they have the same program-controlled command, but use different hardware configuration and communication protocol.

5.1 Instruction of RS232C interface

RS-232 standard, also called as asynchronous serial communication standard, has already been widely used for data communication between computers, computer and external equipment. RS is the English abbreviation of Recommended Standard; 232, the standard number. This standard is issued by IEA in 1969, which rules to send one bit in a data line every time.

As most serial interfaces, the serial interface of the instrument is also not strictly based on RS-232 standard but only uses the smallest subset of this standard. The signals are listed in the following table.

Signal	Code	Connector pin number
Transmitted data	TXD	2
Received data	RXD	3
Signal ground common	GND	5

The reason is that the use of three lines is much more inexpensive and much simpler than that of five lines or six lines, which is the biggest advantage of using serial interface for communication.

NOTE: to avoid electric shock, please turn off the power before plugging and unplugging the connectors;

NOTE: in order to avoid damage to the device, please do not arbitrarily short output terminals, or with the casing.

5.1.1 The connection of the instrument with PC

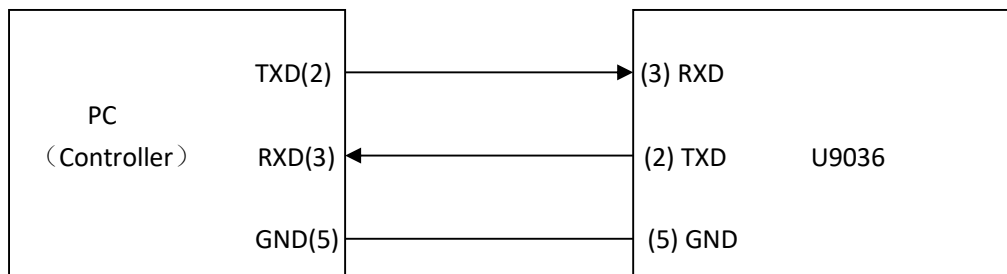


Figure 5-1-1 Connection of the instrument with PC

Figure 5-1-1 shows that the serial interface pin definition of this instrument is different from that of 9 pin connector used in IMB AT compatible computer. User can use double core shielded wire to make the three-line of connecting line (the length should be less than 1.5m) according to the picture or purchase the serial interface cable from our company.

When using serial port to connect the PC and the instrument, please set the bus mode firstly. The operation sequence is as follows:

Press SYSTEM menu key → move the highlight bar to BUS mode → RS232C soft key

5.1.2 Main parameters for serial port

Transmission mode	Full-duplex asynchronous communication, including start bit and stop bit
Baud Rate	4800、9600、19200、38400、57600、115200
Data bit	8 BIT
Stop bit	1 BIT
Verification	No
End mark	NL(line break, ASCII code 10)
Contact manner	Software
Connector	DB9-core

5.2 Instruction of USB CDC interface (virtual serial port)

USB CDC (virtual serial port) acts as a serial port. After installing the driver, it can work as a port to operate the instrument. Install the driver according to the following steps:

A. After inserting the USB cable for the first time, there will be a tip in the right corner “Found New Hardware” and then there will be a pop up dialog of installing the driver, as shown in figure 5-2-1.

B. Click “Next” and select “install from the list or designated position”, as shown in figure 5-2-2.

C. Click “NEXT” again and select the right route of driver file (the right position of provided Euco1-VCOM.inf), as shown in figure 5-2-3. Click “NEXT” to finish installing the USB CDC driver.

D. After installing the driver, USB CDC device can be seen in the Device Manager of the computer, as shown in figure 5-2-4.



Figure 5-2-1 Found New Hardware



Figure 5-2-2 Install from the list or designated position

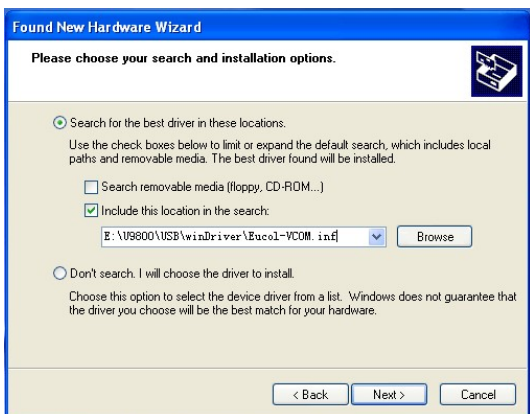


Figure 5-2-3 Designated driver file

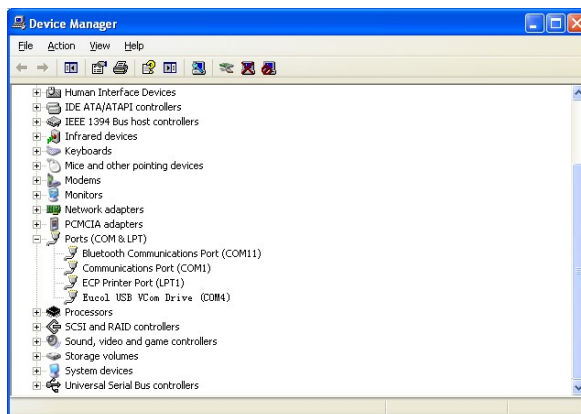


Figure 5-2-4 USB CDC Device

5.3 Instruction of USB TMC interface

When using USB TMC interface, please download NI-VISA from the internet of NI (<http://www.ni.com/china>). The software includes USB TMC driver.

After inserting the USB cable, there will be a pop up dialog box of installing the driver and install the “USB Test and Measurement Device” driver according to the suggestion, as shown in figure 5-3-1.



Figure 5-3-1 Install the USB TMC driver

E. After installing the driver, “USB Test and Measurement Device” can be seen in the in the Device Manager of the computer, as shown in figure 5-3-2.

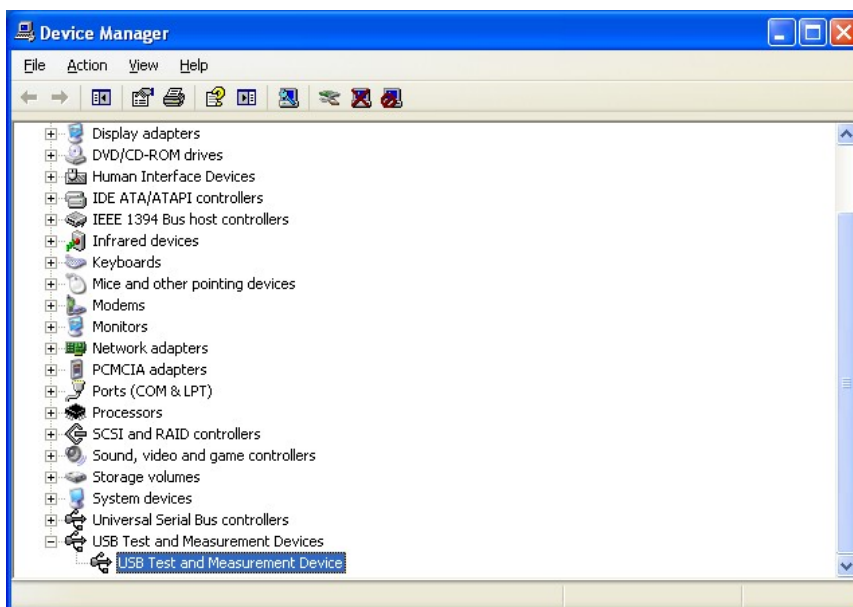
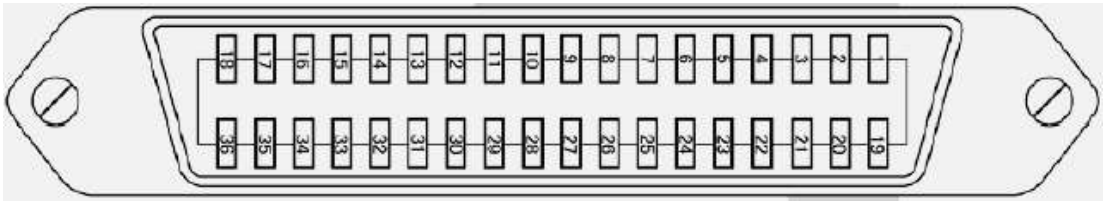


Figure 5-3-2 USB TMC device

Chapter 6 Handler interface

6.1 Basic information

The handler interface employs a 36pin connector. Pin sequence is as follow.

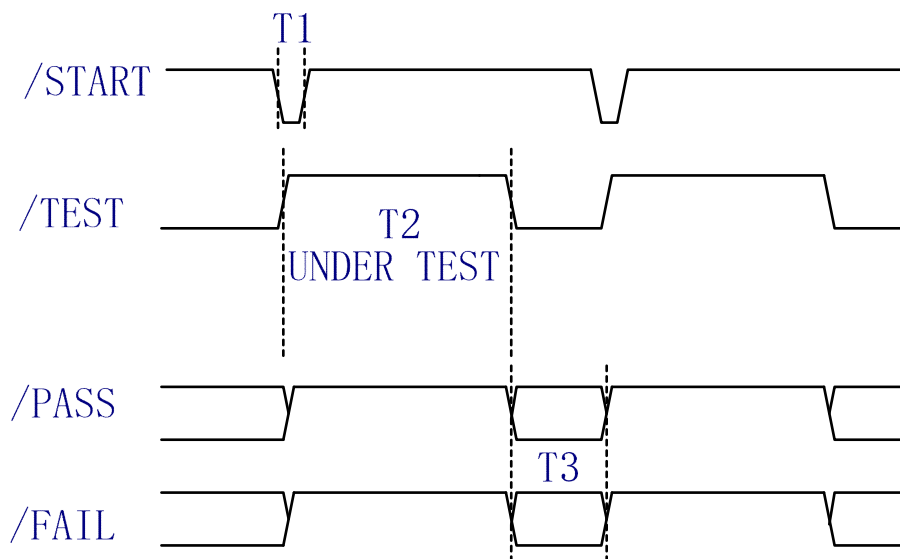


The signal definitions for each pin are described as follows:

Note: The / (back slash) in the signal name means that the signal is asserted when in low level.

Pin No.	Pin name	Remark
1	/PASS	All the DUTs test pass, output 0, otherwise, output 1.
2	/TEST	measurement signal. When in testing, /TEST signal is 0; after testing, /TEST signal is 1. This signal is used to inform the next DUT to be connected to the system.
3~8	/L_FAIL_DUT1~/L_FAIL_DUT6	When L test fails, output 0, otherwise, output 1.
9-14	/DCR_FAIL_DUT1 ~ /DCR_FAIL_DUT6	When DCR test fails, output 0, otherwise, output 1.
15-20	/IW_FAIL_DUT1~/IW_FAIL_DUT6	When IW test fails, output 0, otherwise, output 1.
21-26	/HI_FAIL_DUT1~/HI_FAIL_DUT6	When HIPOT test fails, output 0, otherwise, output 1.
27-32	/IR_FAIL_DUT1~ /IR_FAIL_DUT6	When IR test fails, output 0, otherwise, output 1.
33	/START	External trigger signal input. When the trigger mode is EXT, test can be triggered on the rising edge or falling edge(determined by the trigger edge of the

		Handler) of the signal.
34	/STOP	External Stop signal input.
35	EXGND	External power ground. When using the internal voltage, it is connected to internal power ground.
36	EXV	External power supply output.



As shown in above figure of the timing diagram for handler interface, T1 is the trigger pulse width and the minimum pulse width is 1 us. T3 is the delay time, after the foregoing measurement completed to the next trigger signal; its minimum pulse width is 0 us. START can trigger the signal on the rising edge or falling edge, the above picture indicates the trigger in rising edge. /PASS and /FAIL signals are effective after BUSY signal turns low.

6.2 Electrical characteristics

6.2.1 DC isolated output

Each DC output is the collector output of the built-in pull-up resistor and isolated by an opto-coupler. The output voltage of each line is set by a pull-up resistor on the handler interface board. The pull-up resistors can be connected to the internally supplied voltage (+5V), or to an externally applied voltage (EXV: +5V to +24V) by setting jumpers. Table 1 shows the electrical characteristics of the DC isolated outputs.

Output signal	Voltage output rating		Maximum current	Circuit common
	Low	High		
/TEST PASS FAIL	≤0.5V	+5V~ +24V	60mA	Internal pull-up voltage: GND External voltage (EXV): EXGND

Table 1 DC isolated output electrical characteristics

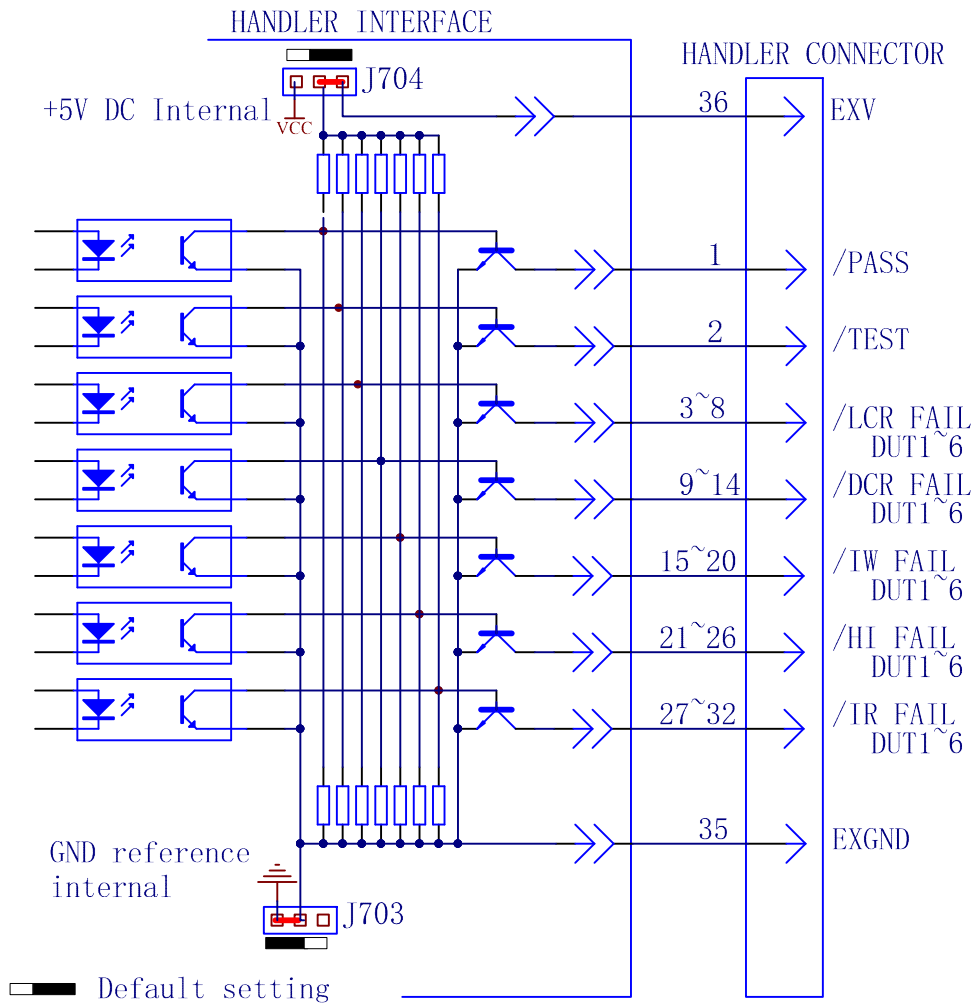


Figure 1 Simplified diagram of the output signals

Figure 1 shows a simplified diagram of the output signals. The default jumper setting is to use external voltage source. Refer to the next section Jumper Setup on Handler interface board.

6.2.2 Isolated input

The /START signal (pin 7) is connected to the cathode of the LED in an opto-coupler. The instrument is triggered on the rising edge or falling edge of the /START pulse. The anode of the LED can be driven by the internal +5V DC voltage, or an external DC voltage EXV (the same external voltage source used for output signal).

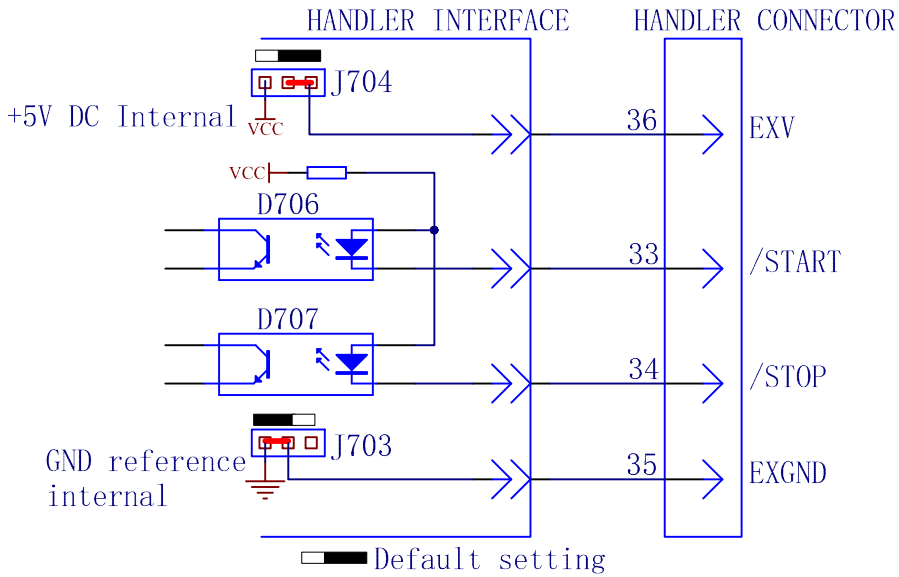


Figure2 Simplified diagram of the input signal

6.3 Jumper setup on HANDLER interface

The jumpers on the handler interface boards are used to select the internal voltage source or external voltage source for the output signal and input signal. There are two jumpers on the Handler interface board. Their locations are shown in figure 3.

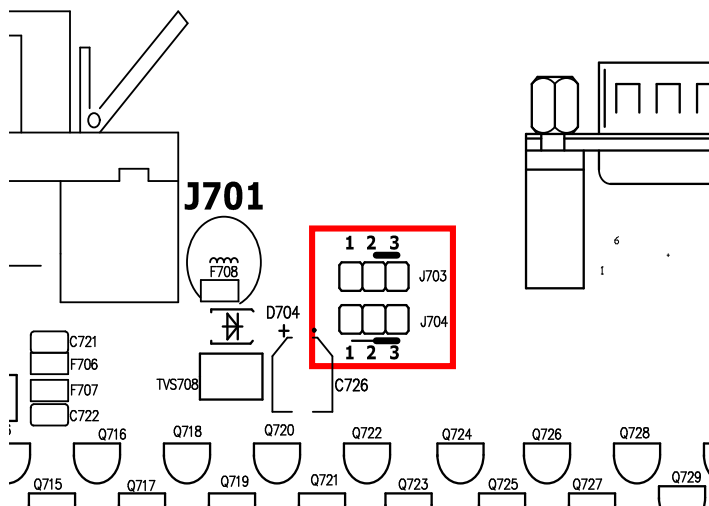


Figure 3 Jumper position on the Handler interface board

As above figure shown, when shipped from the factory, both jumpers are set at the upper position. If you want to use the internal power supply, you must set both jumpers at the lower position. Likewise, when using external power supply to substitute the internal power supply, the two jumpers should be set at the same time.

ⓘ Warning: Make sure the instrument has been powered off and the plug has been removed before opening the case to alter jumper setting.

Chapter 7 Package contents and warranty

7.1 Package contents

Following items should be contained in the package.

Serial number	Name	Quantity
1	U9036 Impulse winding/DCR Tester	1
2	U26022 High-voltage Test cable	1
3	U26023 Foot Switch	1
4	Three-wire power line	1
5	Operational Manual	1
6	Warranty Card	1
7	Test Report	1
8		

Verify that you have received all above items and any optional accessories you may have ordered. If any one is missing, please contact us without delay.

7.2 Warranty

warranty period: The product is warranted against defects in material and workmanship for a period of two years from the date of shipment. You should supply us with the warranty card before you enjoy the free maintenance service. This warranty does not apply in the event of misuse or abuse of the product or as a result of unauthorized alterations or repairs. We are responsible for lifelong maintenance of the instrument.

The maintenance for this instrument should be performed by professional maintenance personnel. Do not substitute the internal components unauthorized when maintaining. In order to ensure the measurement accuracy, the instrument must be measured and corrected after maintenance. You should bear the maintenance expense for damages caused by unauthorized repairing or substituting components.

The instrument should not be placed in the environment present direct sunlight and moisture. Place the instrument in the original package box if you do not use it for a long time.