



HI-POT TESTER

7630 7605

1.3

User Manual

02st Apr 2019

Table of Contents

1.	Precautions before use	4
1.1	Electrification and Electric Shock.....	4
1.2	Ground	4
1.3	Power	4
1.4	Connect the testing cable to the high voltage output terminal.....	4
1.5	Warm up.....	4
1.6	External control host.....	4
1.7	Machine malfunction	4
1.8	Test End.....	4
1.9	Placement and Storage	4
1.10	Emergency Measures	4
2.	General description	5
2.1	Package and Accessories.....	5
2.2	Front Panel	6
2.3	Rear Panel	8
3.	Basic Operations	10
3.1	Function Block Diagram.....	10
3.2	Standby Screen.....	11
3.3	System Settings (SYSTEM).....	12
3.4	Function Setting (FUNC).....	13
3.5	Specification Settings Description 1 (SETUP).....	14
3.6	Specific Setting Description 2 (SETUP).....	15
3.7	File Management (FILE)	17
4.	Start test.....	20
4.1	Before testing	20
4.2	Testing	21
4.3	End Test.....	22
4.4	Releasing Determined Result.....	23
5.	Remote Control I/O Description (REMOTE).....	24
6.	RS-232/USB DEVICE Instructions	26
6.1	RS-232 interface specifications	26
6.2	Command Format	26
6.3	Connectors	26
6.4	Cables and Connecting Methods.....	27
6.5	USB DEVICE Interface Specifications	27

7.	Remote Interface Instructions	28
7.1	Instruction Summary	28
7.2	Instruction Description.....	30

1. Precautions before use

This tester outputs voltage as high as 5kVac/6kVdc for external testing; accidents will happen if this tester is used incorrectly or improperly. Therefore, in consideration of your own safety, please read the precautions described in this chapter carefully and memorize them in order to prevent accidents from occurring.

1.1 Electrification and Electric Shock

In order to prevent electric shocks, the wearing of insulating plastic gloves is recommended before using this tester to perform testing related tasks.

1.2 Ground

This is a safety ground terminal on the rear panel case of this tester. Please ground this terminal properly in order to prevent electric shock accidents from occurring when touching the case.

1.3 Power

Power that can be used with this machine is AC 100Vac~240Vac with a frequency range from 47Hz~63Hz; please confirm whether the input power voltage and frequency are within range before inserting the power.

1.4 Connect the testing cable to the high voltage output terminal

While the tester is powered off, insert the high voltage testing cables to the high voltage output terminals on the tester respectively, and confirm that the exteriors of the testing cables are not ruptured or shed.

1.5 Warm up

The tester can operate normally once the power is turned on; however, in order to achieve the accuracy within specification, please turn on the machine in advance and let it warm up for 15 minutes or more before use.

1.6 External control host

This tester can perform external control; make sure the operator is not touching the high voltage output terminal and DUT when performing such controls in order to avoid causing danger.

1.7 Machine malfunction

If it is discovered that this tester has malfunctioned, for example: the voltage displayed on the voltmeter differs greatly from the voltage set, or there is no high voltage output but the high voltage output warning indicator remains on etc., cease usage immediately and contact our company or your dealer to perform repairs.

1.8 Test End

Turn off the power switch when the tester is not being used.

1.9 Placement and Storage

The normal temperature and humidity range of this machine is 5°C –40°C, 80% RH; the actions might be abnormal if exceeding this range. The storage temperature and humidity range of this machine is -20°C–70°C, 80% RH. In order to achieve accurate testing and for safety considerations, do not place this machine in environments with direct sunlight exposure, high temperature, high humidity, frequent vibrations or excessive dust.

1.10 Emergency Measures

When there is an electric shock or if the DUT or machine catches on fire, please switch off the power and unplug the power cable.

2. General description

2.1 Package and Accessories

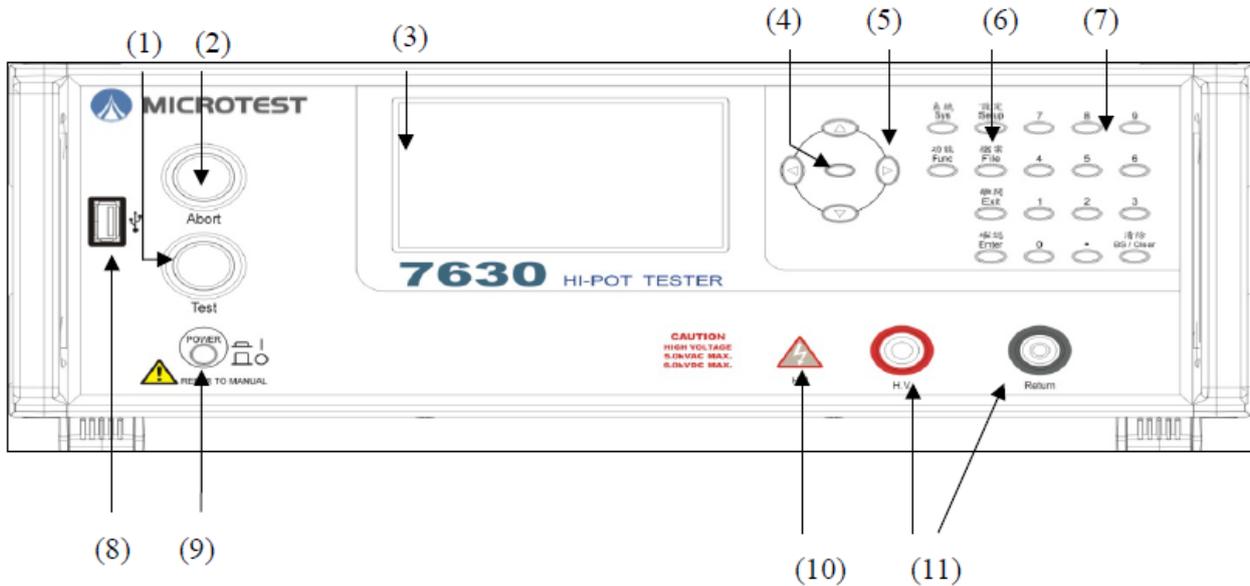
Standard accessories included with the HT-7630 high voltage tester package should include the following items:

1. HT-7630 high voltage tester *1
2. High voltage testing cable (red) *1
3. Low voltage terminal testing cable (black)*1
4. Power cable *1
5. User Manual Disc *1
6. Inter Lock short-circuit cable *1

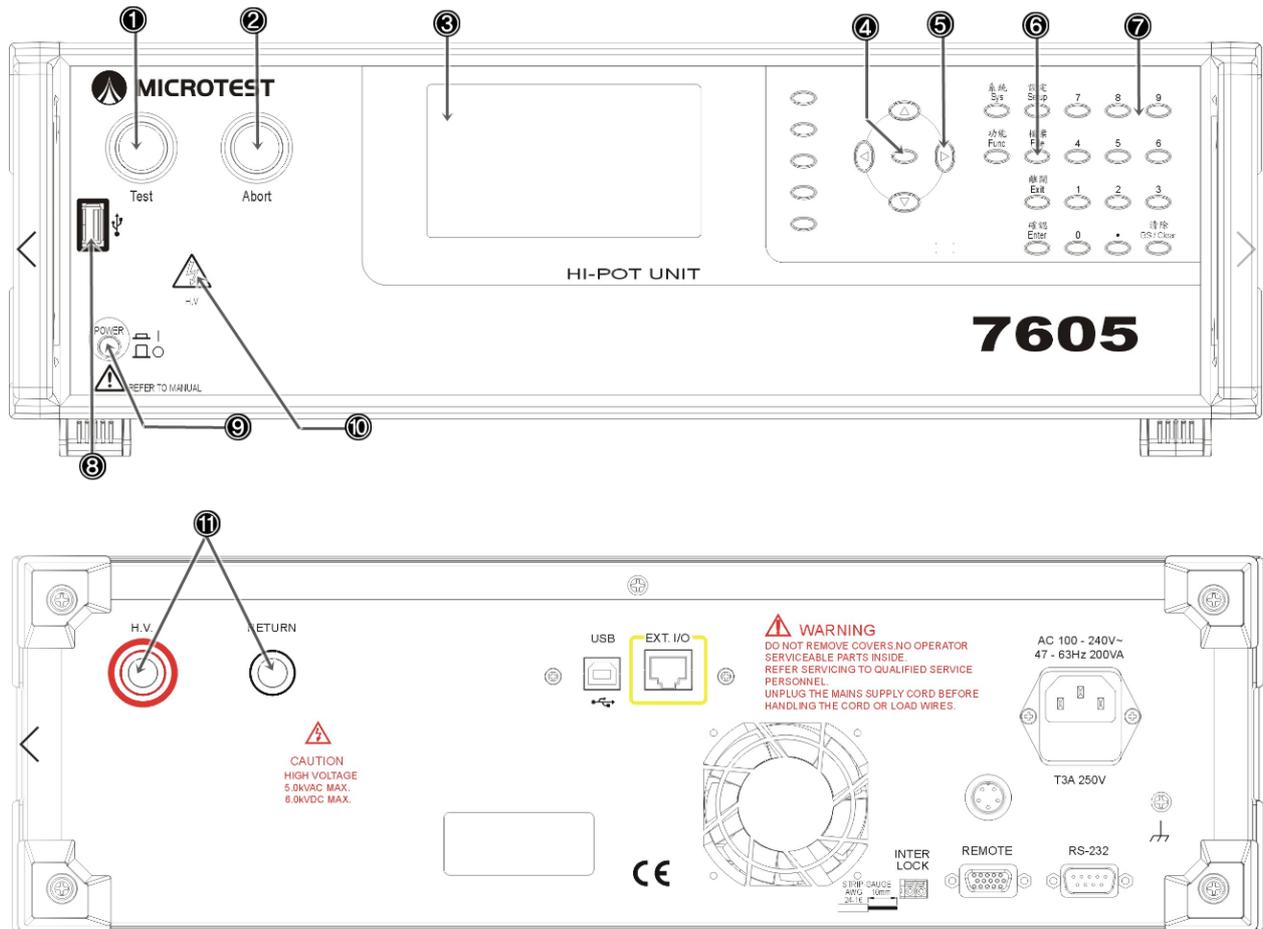
Standard accessories included with the HT-7605 high voltage tester package should include the following items:

1. HT-7605 high voltage tester *1
2. High voltage testing cable (red) *1
3. Low voltage terminal testing cable (black)*1
4. Power cable *1
5. User Manual Disc *1
6. Inter Lock short-circuit cable *1

2.2 Front Panel

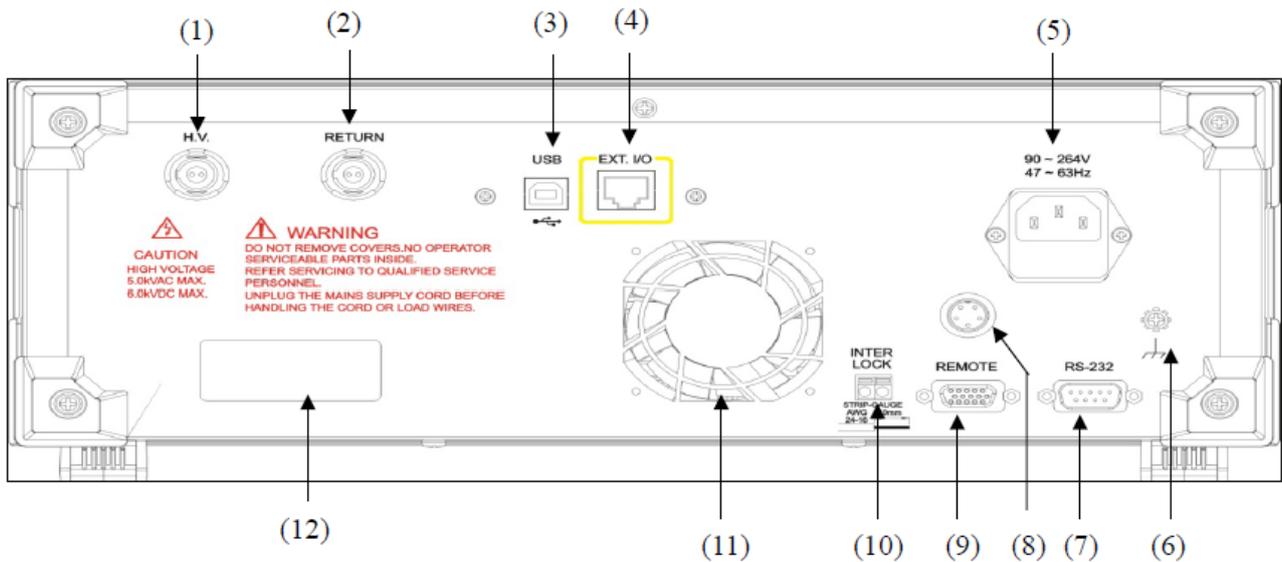


- (1) **Test button (includes PASS indicator):** Pressing this button while the machine is in READY status will start performing testing; if the test result passed, this indicator will light up.
- (2) **Abort button (includes FAIL indicator):** Pressing this button while the machine is in testing status will stop the test and switch off the high voltage output; if the test result failed, this indicator will light up and the alarm will sound. At this time, this button also needs to be pressed to turn off the alarm.
- (3) **Color LCD display:** Displays the various settings and testing results.
- (4) **Software buttons:** This software button does not have any fixed function; the screen will prompt its current function. For example: Copy or Delete etc. If there is no prompt on the screen, it means that this button currently has no effect.
- (5) **Direction buttons:** These can move the cursor to perform editing. If this field includes selectable items, the left and right buttons can also be pressed to switch the options.
- (6) **Function buttons:** Press the corresponding button to enter that function and perform settings; they will be explained in the function settings chapter.
- (7) **Number buttons:** Performs number editing.
- (8) **USB port:** Insert portable storage devices to access settings files and perform firmware updates. **Note: Only supports FAT format**
- (9) **Power switch:** Switches the power of the host On or Off
- (10) **High voltage output warning indicator:** When there is voltage output at the high voltage output terminal, this warning indicator will light up. Do not touch the high voltage output terminal when the high voltage warning indicator is on in order to avoid the danger of electric shocks.
- (11) **High and low voltage output ports:** Ports used to output test voltages.

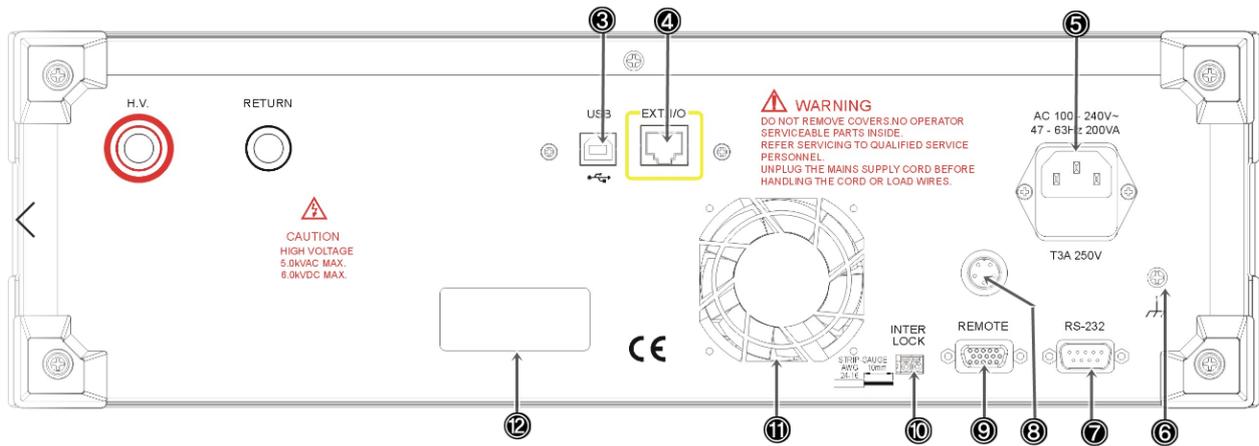


- (1) Test button (includes PASS indicator): Pressing this button while the machine is in READY status will start performing testing; if the test result passed, this indicator will light up.
- (2) Abort button (includes FAIL indicator): Pressing this button while the machine is in testing status will stop the test and switch off the high voltage output; if the test result failed, this indicator will light up and the alarm will sound. At this time, this button also needs to be pressed to turn off the alarm.
- (3) Color LCD display: Displays the various settings and testing results.
- (4) Software buttons: This software button does not have any fixed function; the screen will prompt its current function. For example: Copy or Delete etc. If there is no prompt on the screen, it means that this button currently has no effect.
- (5) Direction buttons: These can move the cursor to perform editing. If this field includes selectable items, the left and right buttons can also be pressed to switch the options.
- (6) Function buttons: Press the corresponding button to enter that function and perform settings; they will be explained in the function settings chapter.
- (7) Number buttons: Performs number editing.
- (8) USB port: Insert portable storage devices to access settings files and perform firmware updates.
Note: Only supports FAT format
- (9) Power switch: Switches the power of the host On or Off
- (10) High voltage output warning indicator: When there is voltage output at the high voltage output terminal, this warning indicator will light up. Do not touch the high voltage output terminal when the high voltage warning indicator is on in order to avoid the danger of electric shocks.
- (11) High and low voltage output ports: Ports used to output test voltages

2.3 Rear Panel



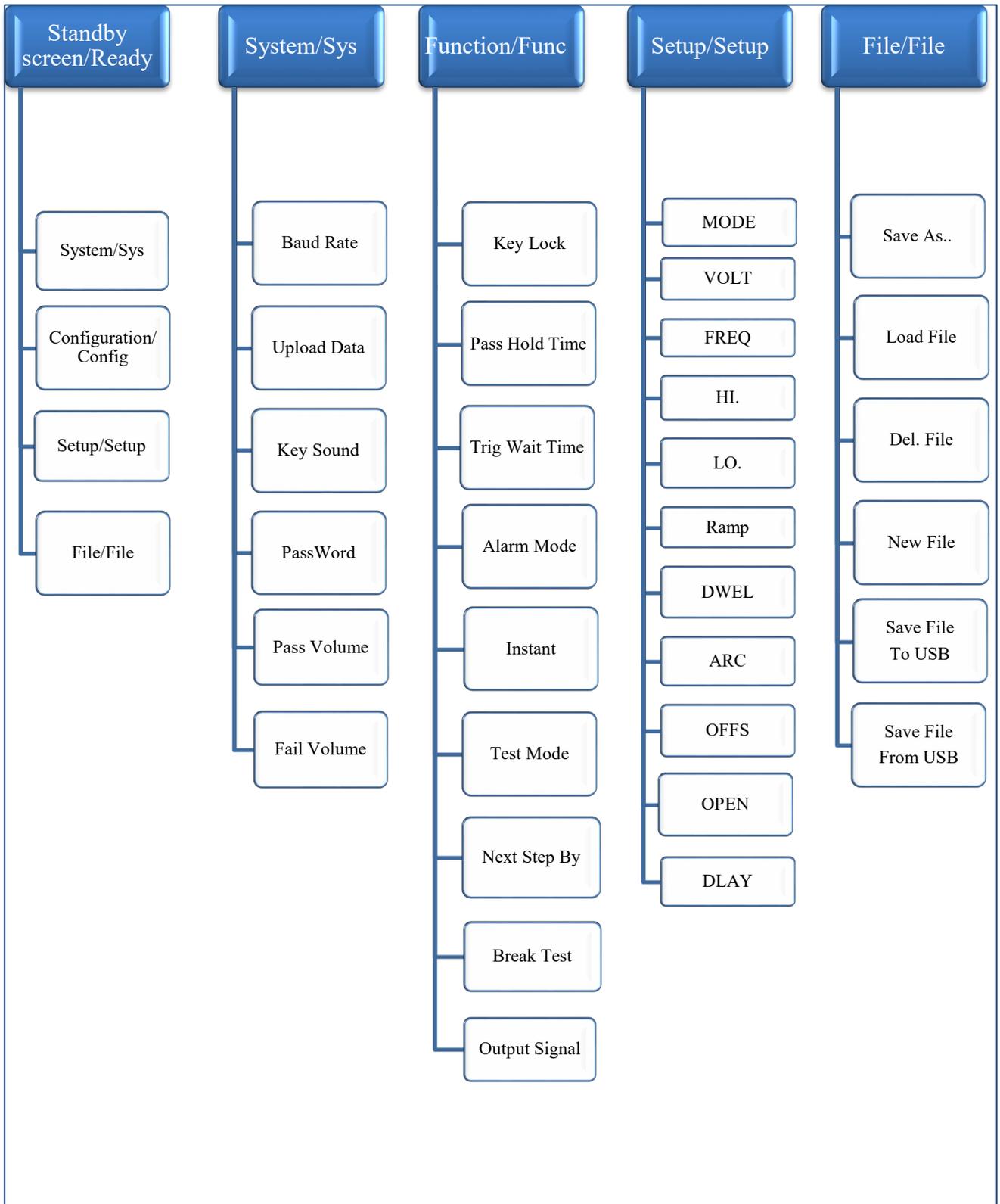
- (1) **High voltage output terminal:** Used to connect to expansion box.
- (2) **Low voltage output terminal:** Used to connect to expansion box.
- (3) **USB device port:** Used to connect to computer; instructions can be used to control the machine from the computer terminal.
- (4) **Expansion box port:** This terminal needs to be connected to the expansion box with a cable when connecting an expansion box.
- (5) **AC power socket:** AC power input terminal; it includes a 250V/3.15A fuse inside.
- (6) **Shell terminal:** Used to connect the ground terminal; in order to allow the machine to operate more stably, please connect this terminal to ground.
- (7) **RS-232 port:** Used to connect to computer; instructions can be used to control the machine from the computer terminal.
- (8) **High voltage testing rod port:** Used to connect the high voltage testing rod.
- (9) **Remote control port:** External control signal; it can output the determined results and the signals during testing. External signals can also be input to control the machine functions of starting or stopping tests.
- (10) **Inter Lock port:** High voltage output safety switch; short-circuit the two points of this port when performing tests in order to output test voltage. If this port is an open circuit during testing, the machine will stop testing immediately and display the message INTER LOCK on the screen.
- (11) **Exhaust vent:** Exhaust vent used for cooling.
- (12) **Serial number sticker:** Records the production serial number of the machine.



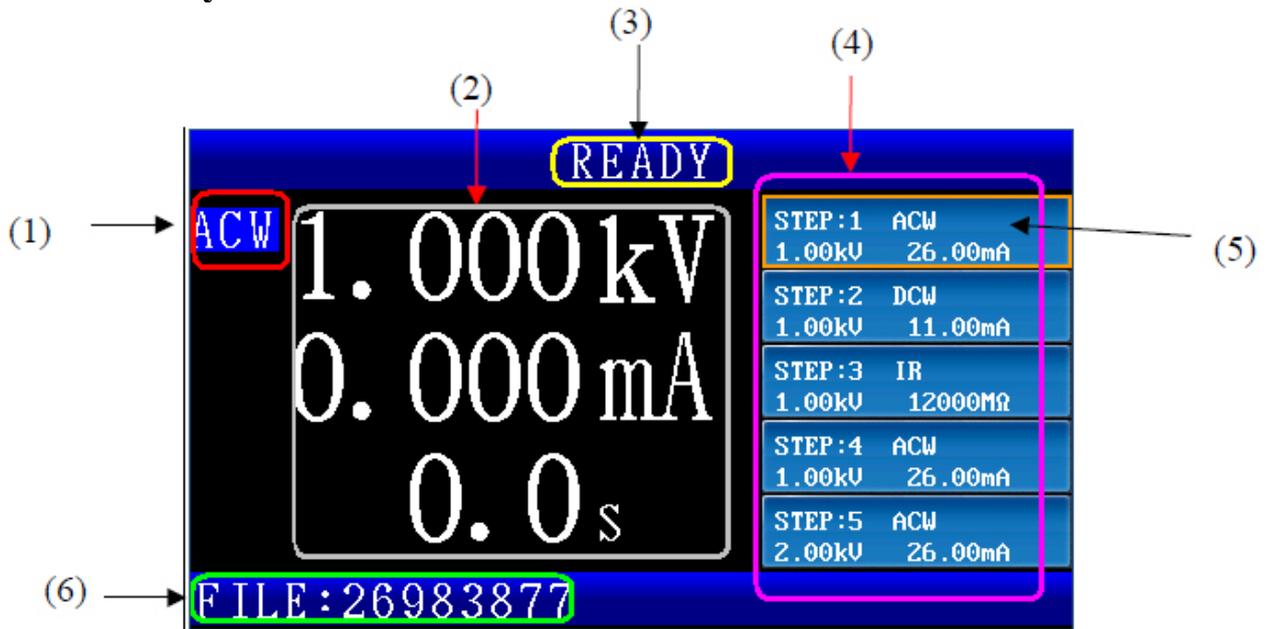
- (3) USB device port: Used to connect to computer; instructions can be used to control the machine from the computer terminal.
- (4) Expansion box port: This terminal needs to be connected to the expansion box with a cable when connecting an expansion box.
- (5) AC power socket: AC power input terminal; it includes a 250V/3.15A fuse inside.
- (6) Shell terminal: Used to connect the ground terminal; in order to allow the machine to operate more stably, please connect this terminal to ground.
- (7) RS-232 port: Used to connect to computer; instructions can be used to control the machine from the computer terminal.
- (8) High voltage testing rod port: Used to connect the high voltage testing rod.
- (9) Remote control port: External control signal; it can output the determined results and the signals during testing. External signals can also be input to control the machine functions of starting or stopping tests.
- (10) Inter Lock port: High voltage output safety switch; short-circuit the two points of this port when performing tests in order to output test voltage. If this port is an open circuit during testing, the machine will stop testing immediately and display the message INTER LOCK on the screen.
- (11) Exhaust vent: Exhaust vent used for cooling.
- (12) Serial number sticker: Records the production serial number of the machine.

3. Basic Operations

3.1 Function Block Diagram



3.2 Standby Screen



- (1) Displays the current test mode; the text ACW is displayed when testing AC withstand voltage, the text DCW is displayed when testing DC withstand voltage and the text IR is displayed when testing insulation resistance.
- (2) Displays the voltage value and current value (the resistance value will be displayed when the measuring mode is IR) of the output terminal, as well as test time for the current measurement; if the test has not yet been performed, it will display the current voltage value set and the test time.
- (3) Displays the current status of the machine; the table below shows detailed descriptions of the various statuses displayed.

Status display	Description
READY	The machine is in ready status; press the TEST button to start testing immediately
TEST	Testing
WAIT	Wait time; the Trig Wait Time can be set in CONFIG
WAIT KEY	Trigger signal to wait for the next step of the test
PASS	Determined result as PASS
Break Down	Leakage current exceeded the maximum measurement value
Arcing	Arc exceeded maximum limit
Lo-Limit	Measurement value lower than minimum limit
Hi-limit	Measurement value higher than maximum limit
FAIL	During multi-step tests, one or more of the steps were determined as failed
INTER-LOCK	High voltage safety lock activation
VOLT-ERROR	High voltage output error
OPEN	Test cable detached error

- (4) Displays the first five test steps of the current file.
- (5) The orange frame is the steps and test specifications of the current test; the down button of the directional buttons can be used to move the cursor to the step you want to test. If the ENTER button is pressed, it will enter the settings item for that step.
- (6) Displays the current file name; if there is an asterisk at the end of a file name, it means that the file has been edited but has not yet been saved; files that have not yet been saved cannot copy the data currently set into mobile storage devices.

3.3 System Settings (SYSTEM)

SYSTEM MENU		OPT
(1)	Baud Rate	115200
(2)	Upload Data	OFF
(3)	Key Sound	OFF
(4)	Password	Change
(5)	Pass Volume	3
(6)	Fail Volume	3

- (1) Baud Rate: Sets the transmission speed of RS-232; there are five speeds available for selection: 9600, 19200, 38400, 57600 and 115200. The speed selection must match the speed of the control terminal.
- (2) Upload Data: Automatically uploads the test result; options include OFF, RS-232, FLASH and BOTH. When the function is set as RS-232, the machine will automatically reply the current status. Its statuses include: When the machine is booting up, it will return the string POWER ON and START; when the test ends, the machine will return the current test step and result. For example: 01,ACW,1.001e+03,7.169e-06,PASS, in which the data includes a total of five fields which are separated using a comma. The first field represents the number of the test step. The second field represents the test mode, which includes seven types: ACW, DCW, IR, CONTACT, ACW-P, DCW-P and IR-P. The third field represents the output voltage during the test, and is indicated by a scientific notation. The fourth field represents the current value during the test, and is indicated by a scientific notation (if the test item is IR, this field will return the resistance value). The fifth field represents the determined result, which includes PASS (passed), Hi-Limit (exceeded maximum limit of the setting value), Lo-Limit (lower than the minimum limit of the setting value), INTER-LOCK (high voltage safety lock activated), ABORT (test stopped), BREAKDOWN (crash point detected), ARCING (discharge detected), VOLT ERR (voltage output error) and OPEN (DUT connection error) etc. If multi-step test was performed, the final determined result will be added when the test ends. When the function is set as FLASH, after the machine finishes testing, it will automatically write the test result onto the mobile storage device; its format will be the same as the content of RS-232. The data storage path is \7630\STAT\current test file name.csv. When the function is set as BOTH, the two actions above will be performed simultaneously. When the function is set as OFF, this function will be disabled.
Note: When the RS-232 and FLASH functions are enabled, since the data transmission requires some time (the time varies according to the transmission speed set and the mobile access device), it will cause some time delays to continuous or multi-step tests.
- (3) Key Sound: Button sound switch; when enabled, there will be sounds when buttons are pressed.
- (4) Pass Word: Changes the password of the keyboard lock. When the keyboard lock is enabled, the correct password must be entered in order to release the keyboard lock function. This function allows changing of the password. The default factory password of this machine is 7630.
- (5) Pass Volume: The volume for tests that have passed; 1-5 stages of volumes can be set where 1 is the lowest volume and 5 is the loudest volume. To turn off the volume, set it in Func.
- (6) Fail Volume: The volume for tests that have failed; 1-5 stages of volumes can be set where 1 is the lowest volume and 5 is the loudest volume. To turn off the volume, set it in Func.
- (7) OPT: When this symbol appears on the screen, press the software button to adjust the options.

3.4 Function Setting (FUNC)

FUNCTION MENU		OPT
Key Lock	OFF	
Pass Hold Time	Infinity	
Trig Wait Time	0.0s	
Alarm Mode	ALL	
Instant	OFF	
Test Mode	ALL	
Next Step By	AUTO	
Break Test	1 FAIL	
Output Signal	TOTAL	

- (1) **Key Lock:** The key lock is the function used to prevent people from changing test conditions due to misuse; when the function is enabled, users can only start and stop tests, but cannot change settings data. When this function is enabled, to release the key lock function, the password originally set must be entered in order to release it. To change the password, please refer to the descriptions in system settings.
- (2) **Pass Hold Time:** Holding time to determine as PASS. After the test has ended, if the result was determined to have passed, the machine will display the text PASS and output signal from the remote control port. This function can set the length of time for the display and output signal; settings values include seven options: 50mS, 100mS, 500mS, 1S, 2S, 5S and Infinity (always On). If set as Infinity, the test result will always be displayed until the ABORT (stop button) switch is pressed.
- (3) **Trig Wait Time:** Test wait time; after pressing the Test button, the machine will enter the test screen (the status field will display the text WAIT) and then wait for the amount of time set, and then output the high voltage to perform testing. This is generally used to trigger the test fixture and then waits until the fixture reaches the proper position before performing the test.
- (4) **Alarm Mode:** Alarm mode can be set to all alarm (ALL), pass alarm (PASS), fail alarm (FAIL) or OFF etc.
- (5) **Instant:** Instant test mode; only when the TEST button is pressed and held down will the test be performed. If the TEST button was released during testing, the machine will stop testing immediately.
- (6) **Test Mode:** Allows selecting a single step test mode and multi-step test mode. After setting as single step mode, the up and down directional buttons can be pressed at the REAY screen to move the cursor to the step to test to perform testing; when the test is complete, the result will be determined immediately. If set as multi-step mode, the machine will perform the test according to the order from the first step all the way down to the final set in SETUP, and use the follow-up settings items to determine when the result will be determined.
- (7) **Next Step By:** When performing multi-step test, after the first step test has ended, it will move to the next step test according to the trigger source set. When set as AUTO, it will automatically move to the next step and perform the test; if set as Trig, the TEST button must be held down in order to move to the next step to perform the test. **This item requires setting Test Mode as ALL in order for it to appear.**
- (8) **Break Test:** When performing multi-step test, if the result was determined to be a FAIL, the machine will either stop testing or continue testing based on the settings of this field. When set as 1 FAIL, the machine will stop testing immediately when determined to FAIL. If set as OFF, all the steps will be tested for it to end. **This item requires setting Test Mode as ALL in order for it to appear.**
- (9) **Output Signal:** When performing multi-step test, if this item is set to EACH, then each step will have a result determined output signal; if set to TOTAL, the test has to end before there will be a PASS or FAIL signal output.

3.5 Specification Settings Description 1 (SETUP)

STEP	1	2	3	
MODE	ACW	ACW	ACW	COPY
VOLT	1.00kV	1.00kV	1.00kV	DEL
FREQ	50Hz	50Hz	50Hz	
HI.	26.00mA	26.00mA	26.00mA	
LO.	0.00mA	0.00mA	0.00mA	
RAMP	0.1s	0.1s	0.1s	
DWEL	300s	1.0s	1.0s	
ARC	0	0	0	
OFFS	0.000mA	0.000mA	0.000mA	

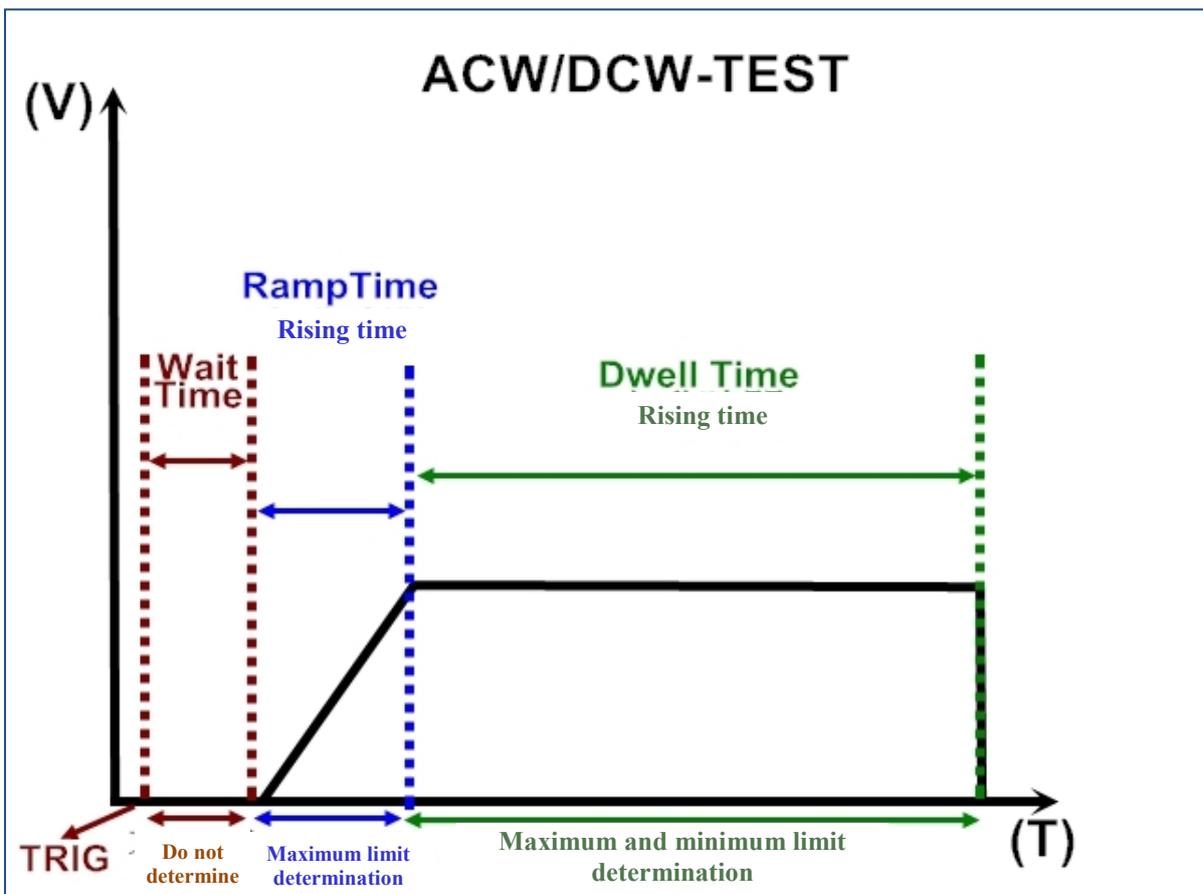
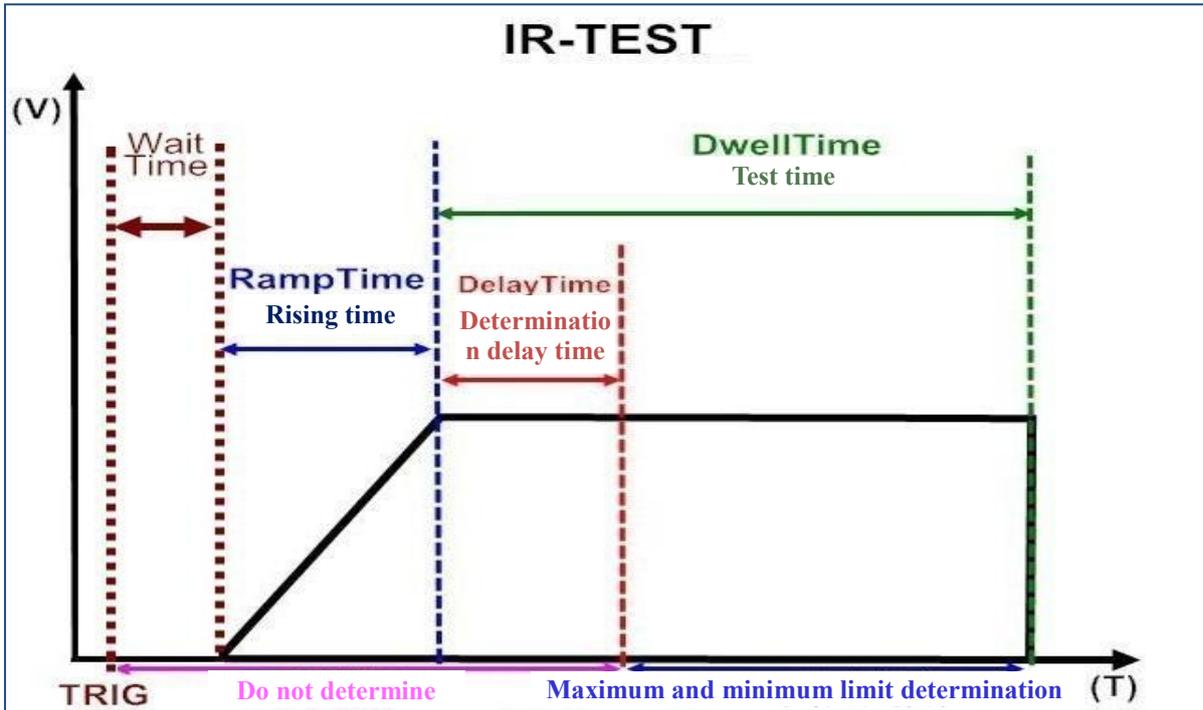
- (1) **STEP:** Step number; each file supports a maximum of only 16 steps. To add a second step, the COPY software button needs to be pressed. Steps are also deleted by pressing the DEL software button; it deletes the step the cursor is currently on. Each file must have at least 1 step. The cursor must move to this field before the step can be copied or deleted.
- (2) **MODE:** Test mode setting includes three modes: ACW, DCW and IR. The software buttons can be used to select the mode.
- (3) **VOLT:** Sets the size of the test voltage; the number buttons can be used to enter directly. The maximum value of the voltage varies according to the test mode; ACW: 5.0kV, DCW: 6kV, IR: 1kV, their minimum values are all 0.1kV.
- (4) **FREQ:** Test frequency; there are two types: 50Hz and 60Hz. The software buttons can be used to select the mode.
- (5) **HI.:** Maximum reference value; if the measured value is greater than this settings value, it will be determined as a FAIL and the test will stop immediately. The maximum value of this item varies according to the test mode; ACW: 26mA, DCW: 11mA, IR: 1200MΩ. If IR is set to 1200M, determining the maximum value will not be performed.
- (6) **Lo.:** Minimum reference value; if the measured value is less than this settings value, it will be determined as a FAIL and the test will stop immediately. If set to 0, determining the minimum value will not be performed.
- (7) **Ramp:** The time needed for the voltage to increase from 0 voltage to the voltage set. The maximum value is 10S and the minimum value is 0.1S.
- (8) **DWEL:** Continuation time refers to the time to continue testing after the voltage has increased to the voltage set. If the time is set to 0, it will test continually until the ABORT button is pressed or determined as a FAIL for it to stop.
- (9) **ARC:** Sensitivity setting for detecting arcs; the greater the value set, the lower the sensitivity is. If it is set to 0, if an arc occurs during testing, the tester will ignore it and not make any determinations.
- (10) **OFFS:** Offset value for the test terminal; in order to prevent the accuracy of the machine from being affected due to connecting external fixtures, this field can deduct the leakage current caused by the fixture first and display the actual leakage current on the DUT. The formula is “measured value displayed = actual measured value - offset value”. There are two settings methods; one is manual setting and the other is automatic setting. The manual setting method can be completed by entering numbers directly. Automatic setting method: First wait until the DUT detaches, then move the cursor to the OFFS field and press the AUTO software button. The machine will perform testing according to the voltage value set and display the measured value on the screen. When the test ends, the string SAVE=ENTER will appear on the screen; pressing the ENTER button at this time will save the test value. If you do not want to save, press the EXIT button to cancel saving. Once it is saved, the offset value will be deducted automatically for every test, allowing the test value to be more accurate.

3.6 Specific Setting Description 2 (SETUP)

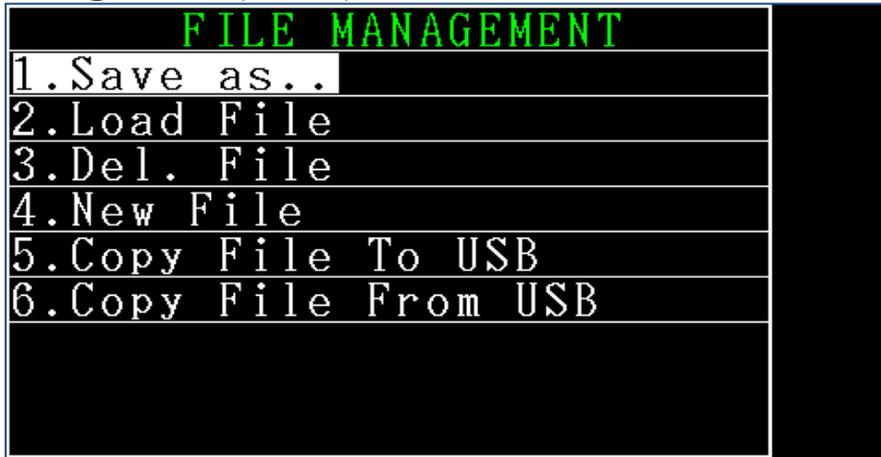
STEP	4	5	6	AUTO
OPEN	0	0	0	
DLAY	--- S	--- S	--- S	

- (1) **OPEN:** Open circuit detection sensitivity. When performing withstand voltage test, if the high voltage test cables were not connected to the DUT correctly, the measurement current will become lower and causing the result to be determined as a PASS. When this function is enabled (settings value not 0), the machine will first use low voltage to measure the capacitance on the DUT when performing high voltage tests (measuring time approximately 200ms); if the capacitance is lower than the settings value, it is possible that the test cables were not connected to the DUT correctly. At this time, the machine will display OPEN and stop testing. There are two settings methods; one is manual setting and the other is automatic setting. The manual setting method can be completed by entering numbers directly. Automatic setting method: First connect the DUT properly, then move the cursor to the OPEN field and press the AUTO software button. The machine will perform testing according to the output channel set. When the test ends, the string SAVE=ENTER will appear on the screen; pressing the ENTER button at this time will save the test value. If you do not want to save, press the EXIT button to cancel saving.
- Note: If the value with DUT connected and the value without DUT connected are very close (less than 20), it means that the capacitance of the DUT is very small, and this method is not suitable to use to determine open circuits.**
- (2) **DLAY: Mode must be set as IR for this item in order for it to be edited.** Determination delay time; if the DUT includes capacitance characteristics when testing IR, it must wait until the capacitor is fully charged before performing determinations. The delay time starts counting after the voltage reaches the value set; during this time, only the measured value will be displayed, but maximum and minimum limits will not be determined. It will wait until the delay time ends and then enter determining mode immediately. **The determination delay time is included in the testing time, so when setting the delay time, it cannot be set to greater than or equal to the testing time.**

- (3) **High voltage output time and result determination timing:** The two figures below mainly explain that when the user presses the TEST button, the timing to determine the result, especially during the delay time and rising time of IR, and the determining of maximum and minimum limits are not performed, and only the maximum limit is determined during the rising time of ACW and DCW mode.



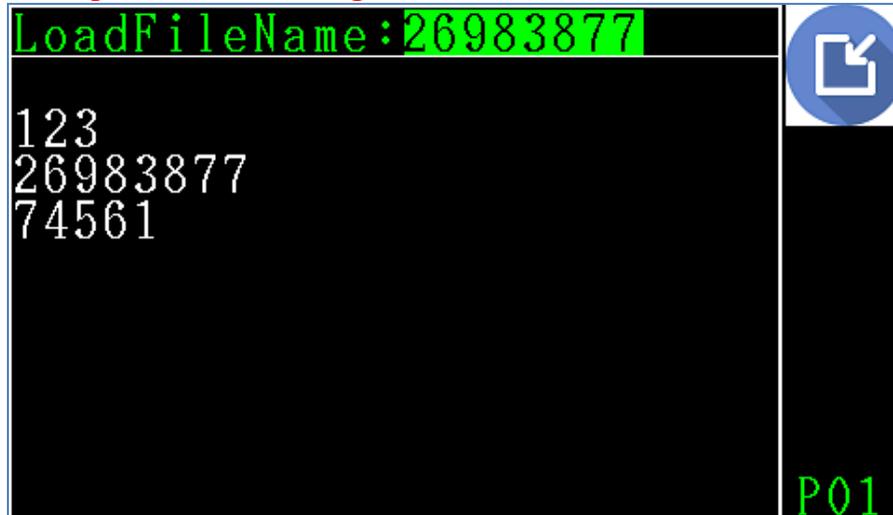
3.7 File Management (FILE)



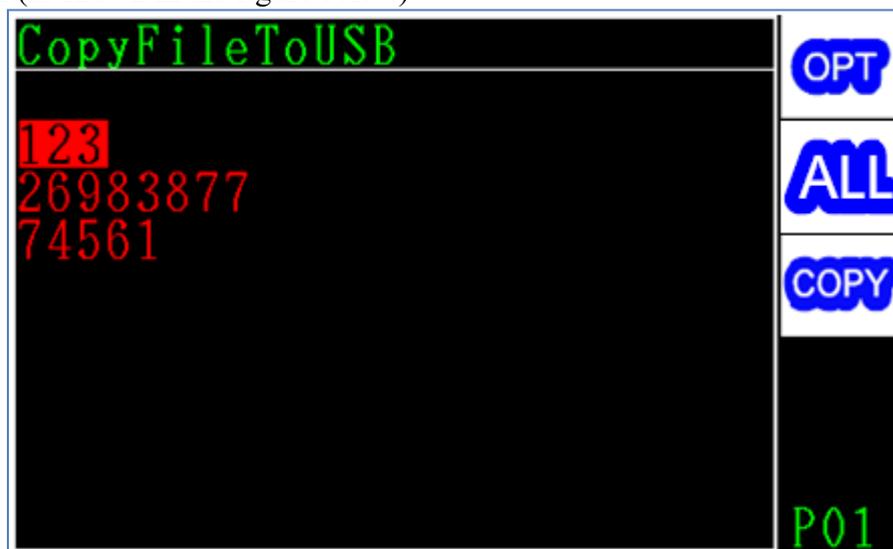
- (1) **Save As..:** Save as new file; saves the file set using a new file name (**a maximum of 30 sets can be saved inside this machine**). After entering the save screen, the screen will display all files already saved inside; if a portable access device is inserted in the USB slot, the USB icon will appear at the top-right corner of the screen. At this time, the software buttons can be pressed to choose whether to save the file on the USB memory or internal memory. The new file name can be entered directly or use the directional buttons to select an existing file. (As shown in the figure below).



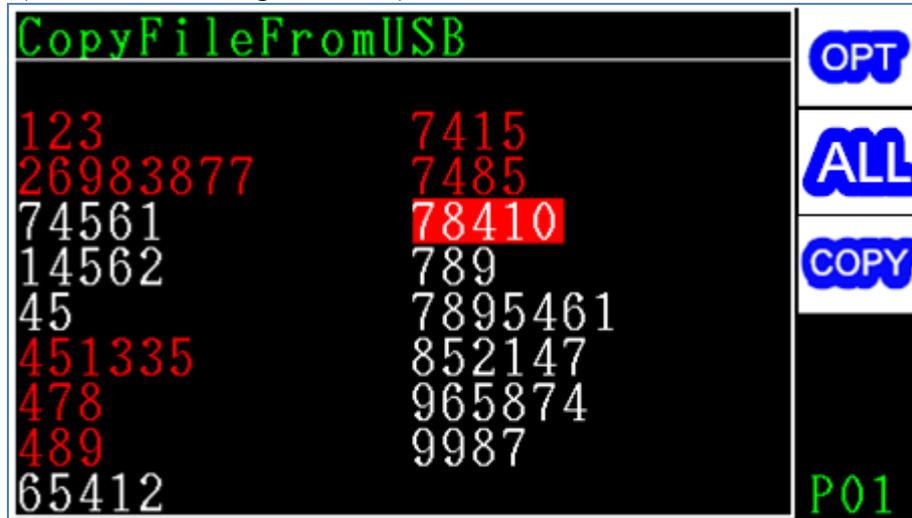
- (2) **Load File:** Read file; reads the file that was saved. After entering the read file screen, the screen will display all files saved inside; if a portable access device is inserted in the USB slot, the USB icon will appear at the top-right corner of the screen. At this time, the software buttons can be pressed to choose whether to read the file on the USB memory or internal memory. The file name can be entered directly or use the directional buttons to select an existing file. (As shown in the figure below). **Note: All settings files must be generated inside the machine; do not modify the data in order to prevent data damage or machine malfunctions.**



- (3) **Del File:** Delete file; deletes existing files. Its operations are the same as saving and loading files.
- (4) **New File:** Create new file; initializes all settings files and creates a new file name.
- (5) **Copy File To USB:** Copies the settings file saved on this machine to USB; if the file names are the same, it will be overwritten directly. After entering the menu, the screen will display the file names currently saved on this machine. Press the software buttons to select the three functions OPT, ALL or COPY; OPT is to select the file to copy, multiple files can be selected. ALL is to select all files and COPY will perform the copy action immediately. ALL is limited to only selecting all files on the current page; if there is a next page, the steps above must be repeated and executed again (as shown in the figure below).



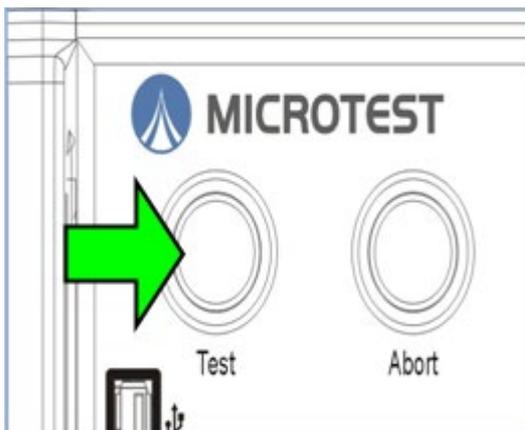
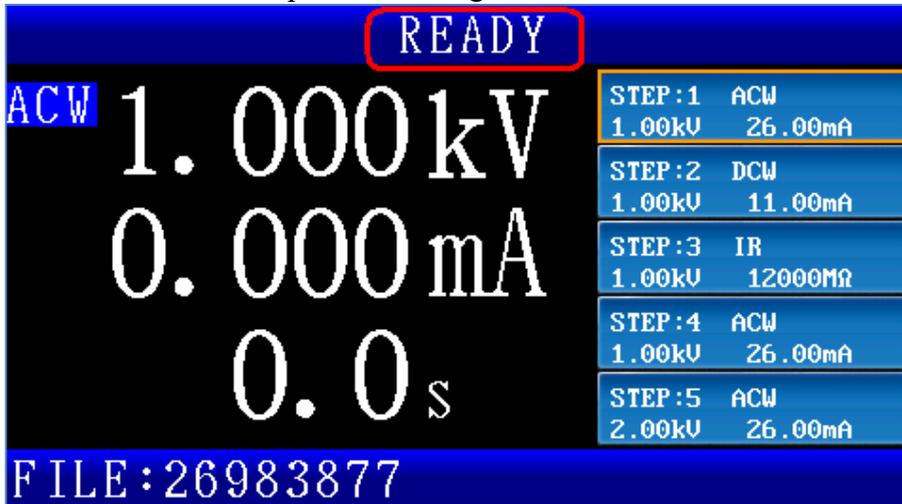
(6) Copy File From USB: Copies the settings file on the USB drive to inside the machine; if the file names are the same, it will be overwritten directly. After entering the menu, the screen will display the file names currently saved on the USB drive. Press the software buttons to select the three functions OPT, ALL or COPY; OPT is to select the file to copy, multiple files can be selected. ALL is to select all files and COPY will perform the copy action immediately. ALL is limited to only selecting all files on the current page; if there is a next page, the steps above must be repeated and executed again (as shown in the figure below).



4. Start test

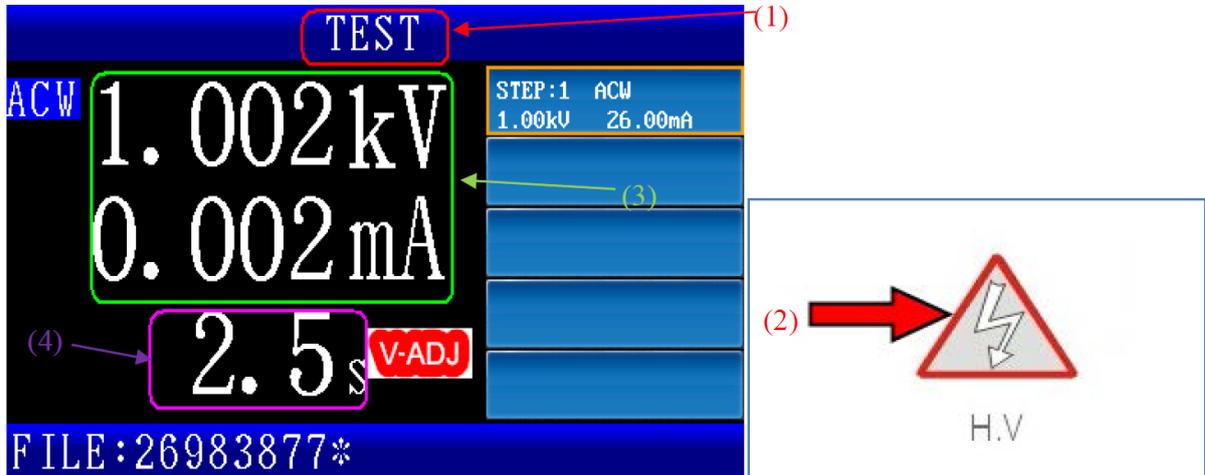
4.1 Before testing

- (1) Confirm whether the specification settings are correct.
- (2) Confirm whether the machine and DUT is connected properly.
- (3) Check whether the text READY is displayed on the message field.
- (4) Press the TEST button to perform testing



4.2 Testing

- (1) The message field displays the text TEST.
- (2) The high voltage output indicator on the front panel lights up.
- (3) Output voltage measurement and leakage current measurement.
- (4) Test time count; if the test time exceeds 100 seconds, only the whole number part will be displayed. The decimal numbers will not be displayed. If the time exceeds 999 seconds, the seconds will no longer be counted. The displayed number of seconds will also stop at 999 seconds and it will flash continuously.



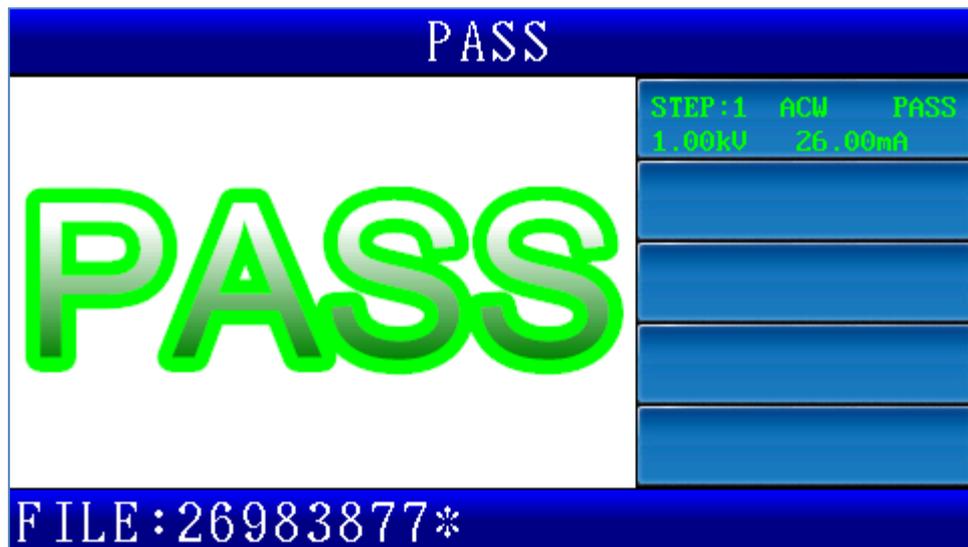
4.3 End Test

(1) Interrupt testing by pressing the ABORT button



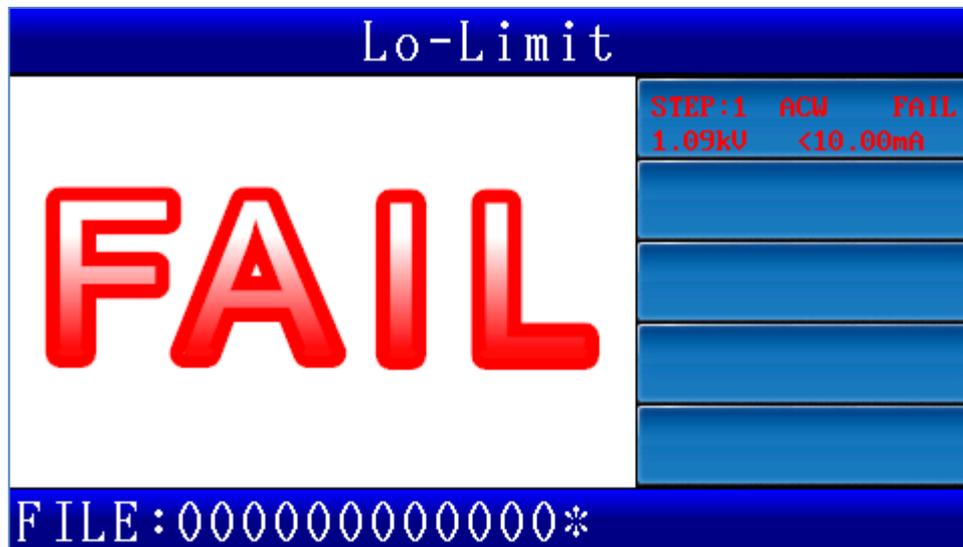
- (2) Measured current/resistance exceeded the maximum value set (HI-LIMIT)
- (3) Measured current/resistance is less than the minimum value set (LO-LIMIT)
- (4) Leakage current exceeded the maximum measurement value (Break Down)
- (5) Arc exceeded the setting value (Arcing)
- (6) Output safety switch enabled (Inter Lock)
- (7) DUT terminal open circuit (OPEN)
- (8) Reached test time

The test will end when any one of the conditions above occurs. When the test ends, the high voltage output indicator will go off and the high voltage output will go off. When the test ended due to conditions 2 to 8 above, the determined result will appear on the screen.



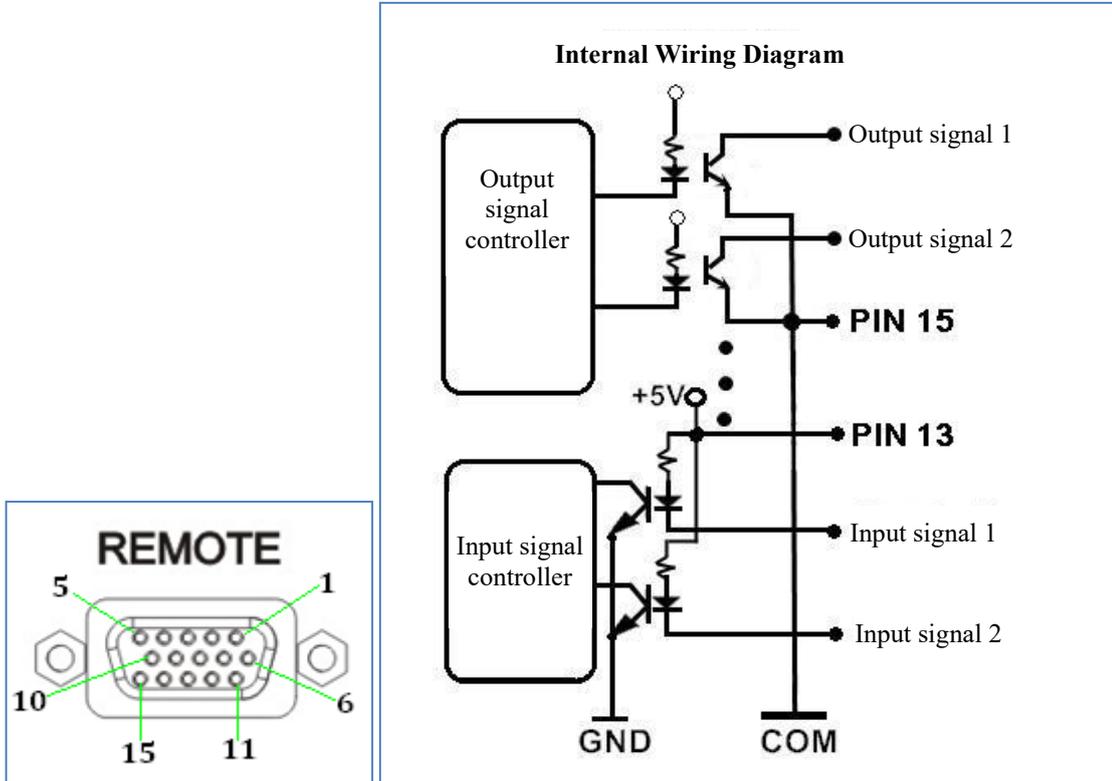
4.4 Releasing Determined Result

- (1) After the testing time has passed, the PASS (green) indicator will light up and the text PASS will appear on the screen. When the PASS HOLD time is reached, the screen will return to the READY status and the PASS indicator will go off. If the PASS HOLD time was set to Infinity, the ABORT button needs to be pressed to release the determined result.
- (2) When the determined result is FAIL, the FAIL (red) indicator will light up and the text FAIL will appear on the screen. At this time, the ABORT button needs to be pressed in order to release the determined result.



5. Remote Control I/O Description (REMOTE)

On the rear panel of the tester there is a socket for remote control (REMOTE); insert the control cable into this slot when you want to use external signal to control the output of this machine. Since it is controlled by external signals, prevent testing personnel from touching the high voltage output terminal and causing danger.



Pin number	Name	I/O	Function
1	CTL1	O	Reserved function
2	CTL2	O	Reserved function
3	CTL3	O	Reserved function
4	CTL4	O	Reserved function
5	TESTING	O	Testing
6	PASS	O	Result determined as PASS
7	FAIL	O	Result determined as FAIL
8	HV-ON	O	High voltage outputting
9	GND	---	GND pin of this machine
10	TRIG	I	Test trigger
11	ABORT	I	Stop test
12	RESET	I	Reset this machine
13	+5V	---	DC +5V output
14	+12V	---	DC +12V output
15	COM	---	Shared ground point; this is the voltage ground point of pin 13 and 14. It is different from the GND of this machine system.

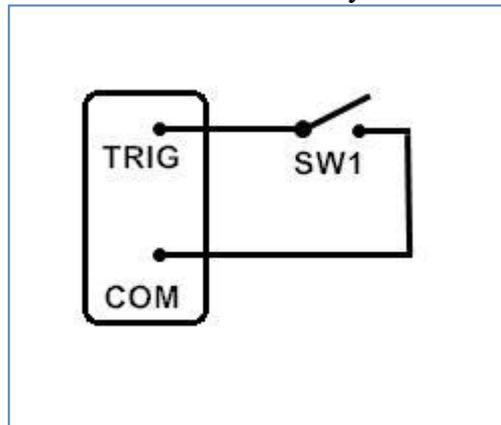
Instructions:

PIN1-PIN8 are open collector outputs and they do not output of any voltages or signals; the current that flows through the contacts must not exceed 50mA

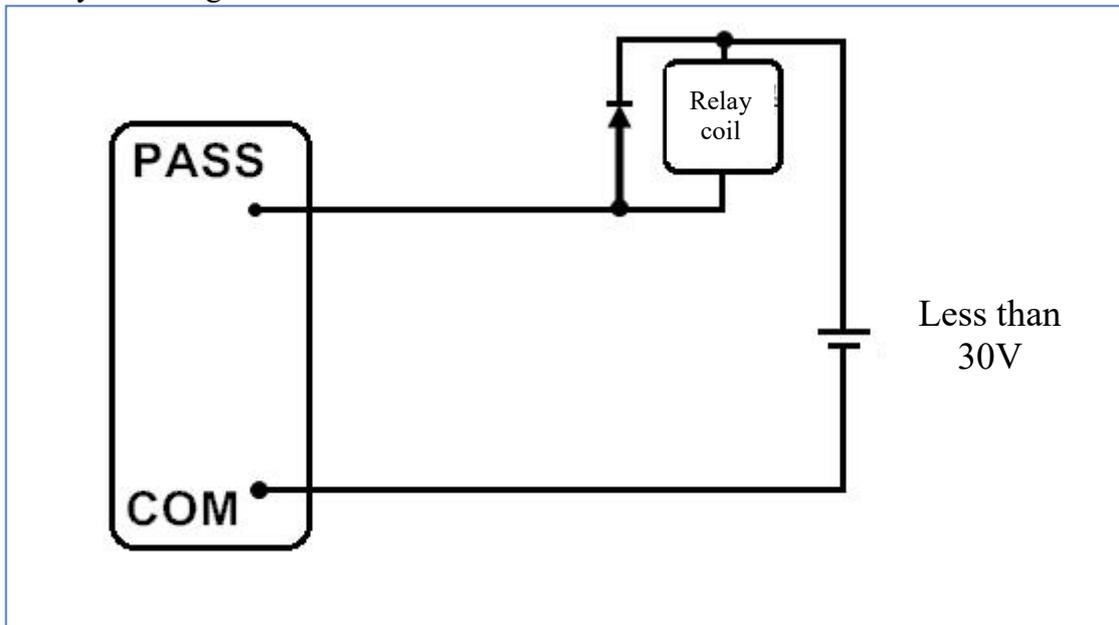
- (1) TRIG (Pin10): When short-circuited with Pin15 (COM), it functions the same as the function of the TEST button on the front panel.
- (2) ABORT (Pin11): When short-circuited with Pin15 (COM), it functions the same as the function of the ABORT button on the front panel.
- (3) PASS (Pin6): When the tester determines the DUT as PASS, it conducts with Pin15 (COM).
- (4) FAIL (Pin7): When the tester determines the DUT as FAIL, it conducts with Pin15 (COM).
- (5) TESTING (Pin5): While the tester is testing, it conducts with Pin15 (COM).
- (6) H.V. ON: When the tester is outputting high voltage, it conducts with Pin15 (COM).

Common usages:

1. (Input signal) Uses the normal-on switch of the relay to control the machine to perform tests.



2. (Output signal) Uses output signal to control the relay. For safer use, please connect the coil part of the relay to the regulator diode



6. RS-232/USB DEVICE Instructions

6.1 RS-232 interface specifications

Baud Rate: 9600/19200/38400/57600/115200; can be set in System mode

Transmission bit: 1 start bit, 8 data bits and 1 end bit.

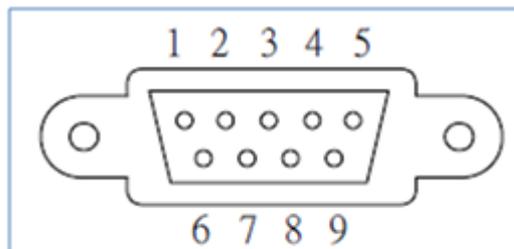
6.2 Command Format

The function of this machine's RS-232 interface is to input instruction strings composed of ASCII codes to achieve remote control and settings functions. The instruction string is composed of [instruction + parameter]; any two instructions are connected with semicolon [;] and finally the end code is added. There are two types of end codes; one is LF (0x0a) and the other is CR (0x0d) + LF (0x0a).

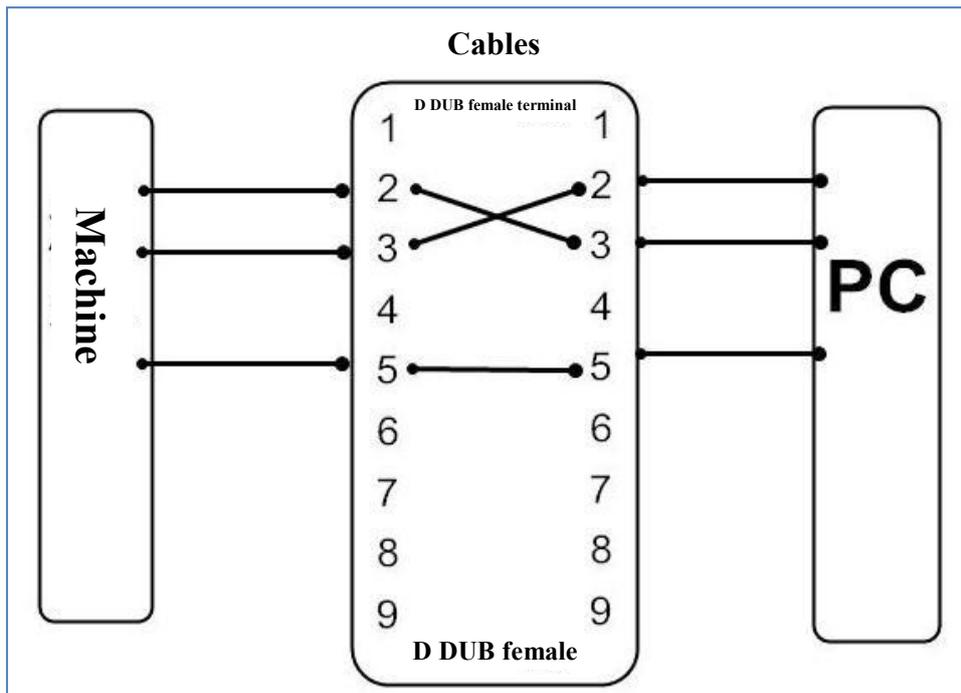
6.3 Connectors

The connectors of this machine are 9Pin male connectors

Pin	Name	Description
1	CD	Unused
2	RxD	Transmit data
3	TxD	Receive data
4	DTR	Unused
5	GND	Signal GND pin
6	DSR	Unused
7	RTD	Unused
8	CTS	Unused
9	RI	Unused



6.4 Cables and Connecting Methods



6.5 USB DEVICE Interface Specifications

Interface I/O	USB Specification 2.0 Self-powered Transfer rate: MAX 12Mbps (Full Speed)
Instruction string end code	LF or EOM while receiving LF + EOM while transmitting
Vendor ID	0x1FC9
Product ID	0x811D

7. Remote Interface Instructions

7.1 Instruction Summary

Shared Instructions

- *CLS
- *IDN?
- *OPC
- *OPC?
- *OPT?
- *RCL
- *SAV

SCPI instructions

:CONFigure	:KLOCK	<ON , OFF, 1, 0>		
	:ALARm	<ALL,PASS, FAIL,OFF>		
	:PHOLd	<50ms,100ms,500ms,1s,2s,5s,INFinity>		
	:TGWAit	<NRf>		
	:TMODe	<SINGLE,MULTI>		
	:TMODe	:MULTi	:TSOUrce	<AUTO,TRIG>
	:TMODe	:MULTi	:BREAk	<FAIL,OFF>
	:TMODe	:MULTi	:SIGNal	<EACH,TOTAL>
:EDIT	:STEP	<numeric>		
	:FUNCTion	<ACW,DCW,IR>		
	:VOLTage	<NRf>		
	:FREQuency	<NRf>		
	:HILImit	<NRf>		
	:LOLImit	<NRf>		
	:RAMP	<NRf>		
	:DWELl	<NRf>		
	:CHANnel	:POSItive	<numeric>	
	:CHANnel	:NEGAtive	<numeric>	
	:CHANnel	:CLOSe	<numeric>	
	:ARC	<numeric>		
	:OFFSet	<NRf>		
	:OPEN	<NRf>		
	:IR	:DELAy	<NRf>	
	:STEP	:COUNt?		
	:STEP	:DELete	<numeric>	
	:STEP	:ADD	<numeric>	
:STEP	:CONDition	<numeric>		
:MEASure	:VOLTage?			
	:CURREnt?			
	:RESistance?			
	:TIME?			
:OPERation	:STEP	<numeric>		

	:FILE?			
:RESU?				
:STAR				
:STOP				
:SYSTEM	:AUREply	<ON , OFF, 1, 0>		
	:KYSOund	<ON , OFF, 1, 0>		
	:ALARm	[:VOLUme]	:PASS	<numeric>
	:ALARm	[:VOLUme]	:FAIL	<numeric>
	:ERROR?			
:TEST	:ABORT			
	:EXECute			

7.2 Instruction Description

Shared Instructions

Instruction	Function
*CLS	Clears the values of all registers.
*IDN?	Reads the basic information of the device; the output format is separated by commas, which are: manufacturer, machine model number, machine serial number and firmware version, respectively.
*OPC	Operation completed command.
*OPC?	Queries operation completed command. Returns 1 when operation is completed; otherwise returns 0
*OPT?	Queries whether it is an optional accessory of the device.
*RCL	Read file commands from inside the machine. Please enter ASCII file names for parameters. For example: *RCL 26983877 will read the file named "26983877"
*SAV	The command to save current settings data as a new file. Please enter ASCII file names for parameters. For example: *SAV 26984089 will save the current settings data into a new file named "26984089"

SCPI instructions

<p>:CONFigure:KLOCK <ON , OFF, 1, 0> This command enables or releases the key lock function. Example: CONF:KLOC ON Example description: Enables the key lock function Example: CONF:KLOC? Return data: 1 <enabling></p>
<p>:CONFigure:ALARm <ALL,PASS, FAIL,OFF> This command is used to set alarm mode. Example: CONF:ALAR FAIL Example description: Send alarm when the determined result is FAIL Example: CONF:ALARm ? Return data: FAIL <alarm when FAIL></p>
<p>:CONFigure: PHOLD <50ms,100ms,500ms,1s,2s,5s,INFINITY> This command is used to set the hold time to display PASS. Example: CONF:PHOL 100ms Example description: Set the time to display PASS to 100mS Example: CONF:PHOLD? Return data: +1.00000E-01 <100ms></p>
<p>:CONFigure:TGWAit <NRF> This command is used to set the time to wait to start the test after triggering. Example: CONF:TGWA 500mS Example description: Set the time to wait to start the test after triggering as 500mS Example: CONF:TGWA? Return data: +5.00000E-01 <500ms></p>
<p>:CONFigure:TMODE <SINGLE,MULTI> This command is used to set the test mode. Example: CONF:TMOD MULTI Example description: Sets the test mode as multi-step test mode Example: CONF:TMOD? Return data: MULTI <multi-step mode></p>
<p>:CONFigure:TMODE:MULTi:TSOURce <AUTO,TRIG> This command is used to set the trigger source between each step in multi-step tests. Example: CONF:TMOD:MULT:TSOU AUTO Example description: Sets to automatically move to the next step and perform test in multi-step test mode. Example: CONF:TMOD:MULT:TSOU? Return data: AUTO <automatically move to the</p>

next step and test>
<p>:CONFigure:TMODe:MULTi:BR EAk <FAIL,OFF> This command sets the interrupt test source during multi-step test. Example: CONF:TMOD:MULT:BR EA FAIL Example description: Set that if one of the steps was determined as FAIL during multi-step test mode, stop the test immediately. Example: CONF:TMOD:MULT:BR EA? Return data: FAIL <stop test when determined as FAIL></p>
<p>:CONFigure:TMODe:MULTi:SIGNal <EACH,TOTAL> This command sets the signal output method during multi-step test. Example: CONF:TMOD:MULT:SIGN TOTAL Example description: Set to wait until all tests have completed and then output the total determination signal for multi-step test mode. Example: CONF:TMOD:MULT:SIGN? Return data: TOTAL <output the total determination signal></p>
<p>:EDIT:STEP <numeric> This command is used to set the step to edit. The following instruction that begins with EDIT, its settings content will be set according to the steps set by the instruction. For example, currently the edit step is set as the voltage or current after number 1 will all modify the contents of step number 1 directly. To modify step number 2, it must first be switched to step number 2 (:EDIT:STEP 2) and then perform setting. Example: EDIT:STEP 1 Example description: Set to edit the data of step 1. Example: EDIT:STEP? Return data: 1 <step 1></p>
<p>:EDIT: :FUNCTion <ACW,DCW,IR > This command is used to set the test item. Example: EDIT: FUNC ACW Example description: Set the test item as ACW. Example: EDIT: FUNC? Return data: ACW</p>
<p>:EDIT: VOLTage <NRf > This command is used to set the test voltage. Example: EDIT:VOLT 1kV Example description: Set the test voltage to 1kV. Example: EDIT:VOLT? Return data: +1.00000E+02 <1kV></p>
<p>:EDIT:FREQuency <NRf > This command is used to set the frequency of the test AC voltage. Example: EDIT:FREQ 50HZ Example description: Sets the frequency of the test AC voltage to 50Hz. Example: EDIT:ACW:FREQ? Return data: +5.00000E+01 <50Hz></p>
<p>:EDIT: HILimit <NRf > This command is used to set the maximum limit determination value. Example: EDIT:HILI 1mA Example description: Sets the maximum limit determination value to 1mA. Example: EDIT: HILI? Return data: +1.00000E-03 <1mA></p>
<p>:EDIT: LOLimit <NRf > This command is used to set the minimum limit determination value. Example: EDIT:LOLI 0.5mA Example description: Sets the minimum limit determination value to 0.5mA. Example: EDIT: LOLI? Return data: +5.00000E-04 <0.5mA></p>
<p>:EDIT: RAMP <NRf > This command sets the voltage rise time. Example: EDIT:RAMP 0.5s</p>

Example: EDIT:STEP:ADD 2 Example description: Add the test step STEP2.																		
:EDIT: STEP:CONDition? < numeric > This command queries the test step conditions. Example: EDIT:STEP: COND? 2 Example description: Queries the test conditions of step 2. Return data: ACW,1.00kV,50HZ,26.00mA, 0.00mA, 0.1s, 1.0s,0, 0.00mA,OFF. Order of the contents: Test item, voltage, frequency, maximum limit, minimum limit, rise time, test time, arc sensitivity, offset deduction value and determination delay time.																		
:MEASure: VOLTage? This command queries the voltage value for the current measurement. Example: MEAS:VOLT? Return data: +1.00000E+02 <1kV>																		
:MEASure: CURREnt? This command queries the currently measured current value. Example: MEAS:CURR? Return data: +2.00000E-06 <0.002mA>																		
:MEASure: RESistance? This command queries the currently measured resistance value. Example: MEAS:RES? Return data: +1.20000E+10 <12G>																		
:MEASure:TIME? This command queries the current test time passed. Example: MEAS: TIME? Return data: +1.0000E+0 <1S>																		
: OPERation: STEP <numeric> This command selects the test step. The step tested when performing single mode and during multi-step test all begin testing from step one. Example: OPER:STEP 2 Example description: Selects the step STEP2. : OPERation: STEP? Return data: 2 <the second STEP>																		
: OPERation:FILE? This command queries the current file name Example: OPER:FILE? Return data: 26983877 <the file name is 26983877>																		
: RESUlt? This command queries the test result. Example: RESU? Return data: 01,+9.01235E+00,+7.52562E-07,+1.19756E+07,2. The order of the content is: Test step number, measured voltage value, measured current value, measured resistance value and the determined result. In the determined result is a code; the code correspondence table is as follows:																		
<table border="1"> <thead> <tr> <th>Code</th> <th>Description</th> </tr> </thead> <tbody> <tr> <td>1</td> <td>Test stopped</td> </tr> <tr> <td>2</td> <td>Determined as PASS</td> </tr> <tr> <td>3</td> <td>Measured result exceeded maximum limit value (determined as FAIL)</td> </tr> <tr> <td>4</td> <td>Measured result lower than minimum value (determined as FAIL)</td> </tr> <tr> <td>5</td> <td>Arc detected (determined as FAIL)</td> </tr> <tr> <td>6</td> <td>Reached crash voltage (determined as FAIL)</td> </tr> <tr> <td>7</td> <td>Voltage error (measured voltage and the voltage set differs too much)</td> </tr> <tr> <td>8</td> <td>Open circuit FAILED</td> </tr> </tbody> </table>	Code	Description	1	Test stopped	2	Determined as PASS	3	Measured result exceeded maximum limit value (determined as FAIL)	4	Measured result lower than minimum value (determined as FAIL)	5	Arc detected (determined as FAIL)	6	Reached crash voltage (determined as FAIL)	7	Voltage error (measured voltage and the voltage set differs too much)	8	Open circuit FAILED
Code	Description																	
1	Test stopped																	
2	Determined as PASS																	
3	Measured result exceeded maximum limit value (determined as FAIL)																	
4	Measured result lower than minimum value (determined as FAIL)																	
5	Arc detected (determined as FAIL)																	
6	Reached crash voltage (determined as FAIL)																	
7	Voltage error (measured voltage and the voltage set differs too much)																	
8	Open circuit FAILED																	
:START																		

Appendix 1 Error message

-100	Command error	Instruction error
-102	Syntax error	Syntax error
-103	Invalid separator	Invalid separation character discovered in the instruction string
-108	Parameter not allowed	Received parameters that are not allowed
-109	Missing parameter	Parameter missing
-112	Program mnemonic too long	Simple program header exceeded 12 characters
-113	Undefined header(query a command only command or query command missing ?	Received undefined header
-141	Invalid character data	Received illegal character data
-211	Trigger ignored	No acceptable trigger status
-221	Settings conflict	Command conflicts with the device status; cannot execute
-222	Data out of range	Parameter value exceeded allowable range
-223	Too much data	Instruction exceeded 64 characters
-292	Reference name dose not exist	Specified name does not exist
-410	Query interrupted	Query interrupted; when a query instruction was received but data was not yet returned, another query instruction was received
-420	Query unterminate	When there is no data in the output queue, but an output queue data instruction was received