Dear Client,

Thank you for purchasing our UHV-725 Automatic Capacitance Inductance Tester. Please read the manual in detail prior to first use, which will help you use the equipment skillfully.

Our aim is to improve and perfect the company's products continually, so there may be slight differences between your purchase equipment and its instruction manual. You can find the changes in the appendix. Sorry for the inconvenience. If you have further questions, welcome to contact with our service department.

The input/output terminals and the test column may bring voltage, when you plug/draw the test wire or power outlet, they will cause electric spark. PLEASE CAUTION RISK OF ELECTRICAL SHOCK!

Company Address:

- **T4， No. 1, High-tech 2 Road，East Lake High-tech Development Zone，Wuhan**
- Sales Hotline: 86-27- 87492243
- After Service Hotline**:** 86-27- 87459656
- Fax: 86-27- 87803129
- E-mail:qiao@hvtest.cc
- Website: www.cnuhv.com

◆ SERIOUS COMMITMENT

All products of our company carry one year limited warranty from the date of shipment. If any such product proves defective during this warranty period we will maintain it for free. Meanwhile we implement lifetime service. Except otherwise agreed by contract.

SAFETY REQUIREMENTS

Please read the following safety precautions carefully to avoid body injury and prevent the product or other relevant subassembly to damage. In order to avoid possible danger, this product can only be used within the prescribed scope.

Only qualified technician can carry out maintenance or repair work.

--To avoid fire and personal injury:

Use Proper Power Cord

Only use the power wire supplied by the product or meet the specification of this produce.

Connect and Disconnect Correctly

When the test wire is connected to the live terminal, please do not connect or disconnect the test wire.

Grounding

The product is grounded through the power wire; besides, the

ground pole of the shell must be grounded. To prevent electric shock, the grounding conductor must be connected to the ground.

Make sure the product has been grounded correctly before connecting with the input/output port.

Pay Attention to the Ratings of All Terminals

To prevent the fire hazard or electric shock, please be care of all ratings and labels/marks of this product. Before connecting, please read the instruction manual to acquire information about the ratings.

Do Not Operate without Covers

Do not operate this product when covers or panels removed.

Use Proper Fuse

Only use the fuse with type and rating specified for the product.

Avoid Touching Bare Circuit and Charged Metal.

Do not touch the bare connection points and parts of energized equipment.

Do Not Operate with Suspicious Failures

If you encounter operating failure, do not continue. Please contact with our maintenance staff.

Do Not Operate in Wet/Damp Conditions.

Do Not Operate in Explosive Atmospheres.

Ensure Product Surfaces Clean and Dry

—Security Terms

Warning: indicates that death or severe personal injury may result if proper precautions are not taken

Caution: indicates that property damage may result if proper precautions are not taken.

Contents

Safety precautions before the test

1. No live measurement.

2. Clamps supporting the use of instruments, please replace the accessory box after each use to avoid damage.

3. Instrument test leads, clips and clamp jaws should be kept clean to ensure good contact test.

4. The power cord should be matched the instrument electrical outlets.

5. Since the LCD is affected by temperature, resulting in the screen brightness changes, such as the writing is not clear in the System Settings screen to adjust backlight settings.

6. The instrument should work in the technical parameters specified environment, especially the instrument connecting test leads should be away from strong electromagnetic fields, so as not to interfere with the measurement.

7. After unpacking the instrument, check the instrument according to the packing list before the instrument operation, first read this manual, or the people familiar with the guidance of the operation, in order to avoid misuse.

I. Product instruction

1.1 Overview

UHV-725 adopts a new generation of high-speed mixing microprocessors, highly integrated, simultaneous collect the tested objects' voltage signals and current signals, automatically calculate the capacitance value, the inductance value and reactive power value. Field measurement capacitor without removing the connecting wire, simplifying the testing process, improve efficiency and avoid damage to electrical equipment. After finished the test, automatically calculate each phase capacitance value and other parameters, can easily distinguish the capacitor quality and connecting conductors faults among components. At the same time, the instrument with data storage and USB communication functions, can ensure the measuring data integrity.

1.2 Instrument function

The main function of the instrument is measuring compensation capacitor capacitance value of each phase and total capacitance, inductance value, the resistive component of the test sample, dielectric loss angle, loss factor, reactive power and active power.

1.3 Products features

1. No wire disconnect test: instrument equipped with high-current high-precision current clamp, field measurement capacitor without removing the cable, simplifying the testing process, improve efficiency and avoid damage to electrical equipment.

2. Highly intelligent: after the three-phase test is completed , automatically calculate the capacitance value of each phase and the total capacitance value , reactive power and other parameters, simple and intuitive , reducing the burden on the tester.

3. Four-terminal measurement: The four-terminal measurement techniques, measurement accuracy, repeatability good

4. Automatic Compensation: current automatic segmentation compensation, current full scale linearly, improve measurement precision

5. Storage features: Max Storage 400 instrument data, historical data query capabilities.

6. USB communication: USB communication functions with the PC.

7. Large Touch Screen: 7-inch color touch -screen LCD display, intuitive interface, easy to operate.

8. Temperature monitoring: monitor ambient temperature, easy to record values of capacitors at different temperatures.

1.4 Technique parameters

1) Capacitance measurement range and accuracy

Capacitance measurement range：0.1uF～3300uF

Accuracy：±（reading ×1%+0.005uF）

Resolution：0.001uF

2) Inductance measurement range and accuracy

Inductance measurement range：100μH～50H

Accuracy：±reading×2%

3) Power supply and Test Power

Power supply：AC 220V±10%，50Hz

Output voltage (open circuit)：AC 23V±10%, 50Hz (capacitance);

AC 3V±20%，50Hz (inductance)

Maximum output current：20A

Output short circuit protection: Automatic

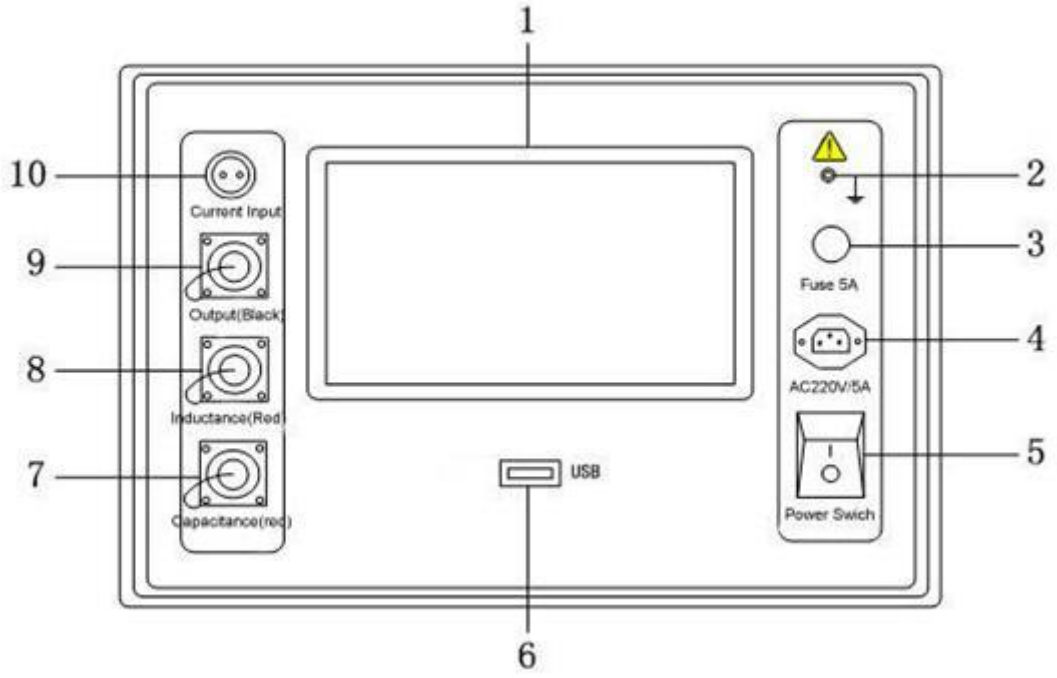
4) Working conditions, dimension and weight

Temperature：-10℃～+40℃ ；relative humidity：≤90%;

Dimension (host)：400×290×175mm；weight：9.5kg;

Out case dimension：340×260×135mm　weight：3.6kg;

1.5 Instrument panel



Picture 1.1 panel layout

1.touch screen 2.ground terminal 3.2A fuse

4.power outlet 5.power switch 6.USB interface

7.capacitance measurement output port connection

8.inductance measurement output port connection

9.public output interface

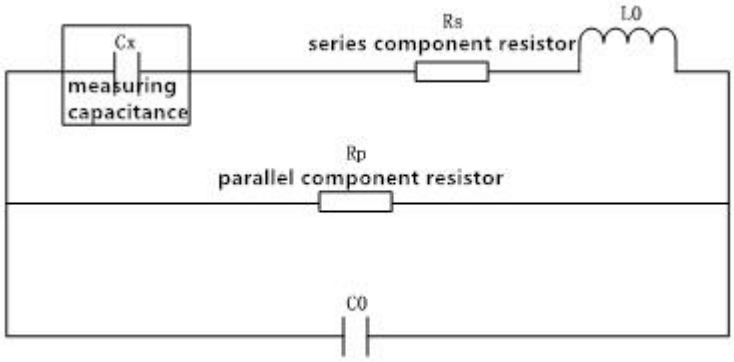
10. clamp current sensor

Note: electrical outlet containing a fuse holder, containing 5A fuse 2 pcs.

1.6 Work principle

The instrument uses a new generation of high-speed mixing microprocessors, highly integrated, dual-chip high-speed 16-bit AD converter, synchronous acquisition the test voltage and current signals, automatic identify range, programmable gain amplifier, amplification capability 1000 times, use precision resistors, temperature coefficient is small, the data will be converted after the microprocessor operation to obtain test results, LCD display all measurement parameters, the entire measurement automatically. RC inner serial, parallel equivalent circuit diagram shown in Figure 1.2, Cx is actual

capacity, Rs is lead resistance, Lo is the lead inductance, Rp is the insulation resistance between poles, Co is distributed capacitance between electrodes. Actual inductance, capacitance, resistance or reactance are not an ideal resistive element, but in series or parallel impedance presented in the form of a complex element, the instrument according to parallel and series equivalent circuit to calculate the desired values, the equivalent circuit will be different the result, which depends on various different elements. Generally for low impedance component (essentially high capacitance and low inductance) in series equivalent circuit. Conversely, the high value impedance element (basically low capacitance and high inductance) using the parallel equivalent circuit.



Picture 1.2 RC inner serial, parallel equivalent circuit diagram

II. Instrument wiring

Power capacitors inte connection generally use star connection (Y) or delta-connected (△). Actual operating experience has shown that the delta connection capacitor bank failure rate is much higher than star connected, currently the majority of high-voltage parallel capacitor banks use star connection. The instrument with connection methods: three-phase Y-shaped, three-phase △ shape, three-phase Yn-shape, three-phase Ⅲ shape.

Before power capacitor or reactor test, first the red cable clamp connect

with red wire, black clamp with black wire, the subsequent connection of two parts: the instrument panel wiring and measurements wiring, instrument panel wiring means connecting the test leads to the instrument panel, the measurement wiring means connection between test line and test article.

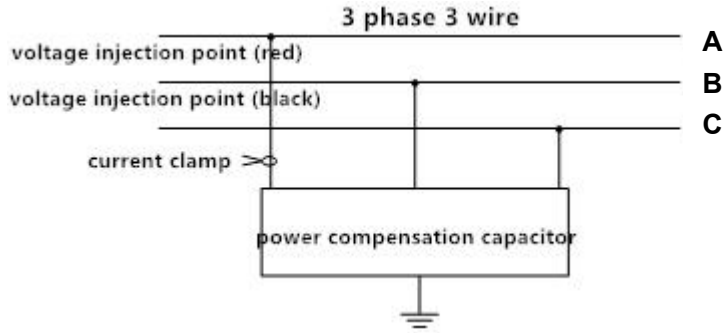
2.1 Three-phase Y-connected capacitor measurement

Three phase Y- connected, instrument panel A, B, C three-phase wiring the same, as described below:

1. Black wire connect “output (black)”
2. Red wire connect “capacitor (red)”
3. Clamp current sensor connect “current input”

Y-connected tested capacitor A phase measuring wiring is shown in Figure 2.1, the following specific wiring:

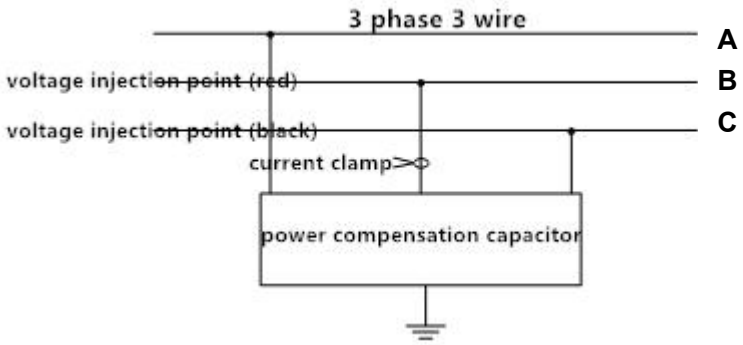
1. Red clip: phase A busbar
2. Black clip: phase B busbar
3. Clamp Current Sensor set in the high-voltage capacitor bank A phase lead.



Picture 2.1 Y-connected tested capacitor A phase measuring wiring

Y-connected tested capacitor B phase measuring wiring is shown in Figure 2.2, the following specific wiring:

1. Red clip: phase B busbar
2. Black clip: phase C busbar
3. Clamp Current Sensor set in the high-voltage capacitor bank B phase lead.



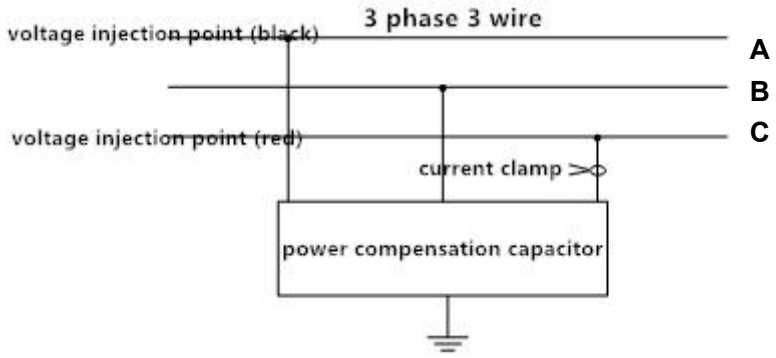
Picture 2.2 Y-connected tested capacitor C phase measuring wiring

Y-connected tested capacitor C phase measuring wiring is shown in Figure 2.3, the following specific wiring:

1. Red clip: phase C busbar

2. Black clip: phase A busbar

3. Clamp Current Sensor set in the high-voltage capacitor bank C phase lead.



Picture 2.3 Y-connected tested capacitor C phase measuring wiring

2.2 Three phase △-connected capacitor measurement

Three phase △- connected, instrument panel A, B, C three-phase wiring the same, as described below:

1. Black wire connect “output (black)”

2. Red wire connect “capacitor (red)”

3. Clamp current sensor connect “current input”

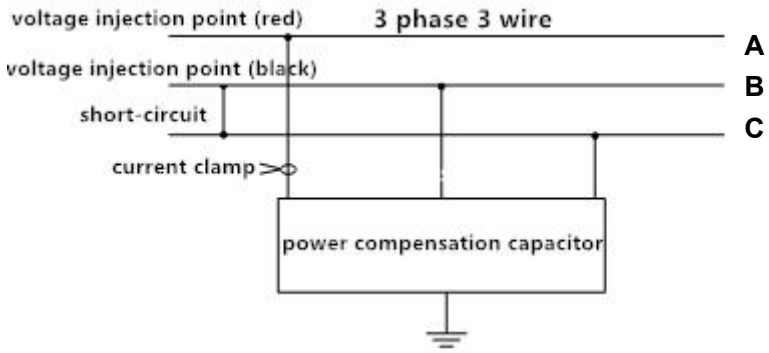
△-connected tested capacitor A phase measuring wiring is shown in Figure 2.4, the following specific wiring:

1. Red clip: phase A busbar

2. Black clip: phase B busbar

3. Short circuit phase B and C

4. Clamp Current Sensor set in the high-voltage capacitor bank A phase lead.



Picture 2.4 △-connected tested capacitor A phase measuring wiring

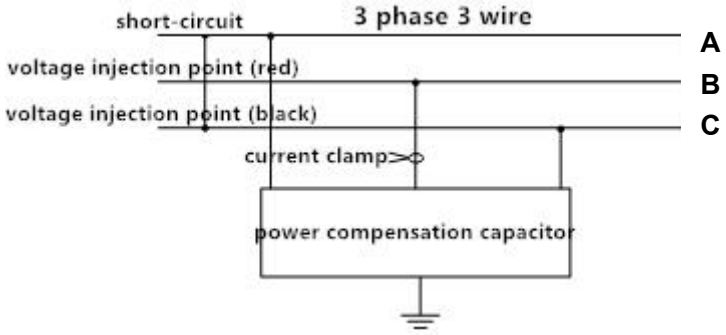
△-connected tested capacitor B phase measuring wiring is shown in Figure 2.5, the following specific wiring:

1. Red clip: phase B busbar

2. Black clip: phase C busbar

3. Short circuit phase A and C

4. Clamp Current Sensor set in the high-voltage capacitor bank B phase lead.



Picture 2.5 △-connected tested capacitor B phase measuring wiring

△-connected tested capacitor C phase measuring wiring is shown in Figure 2.6, the following specific wiring:

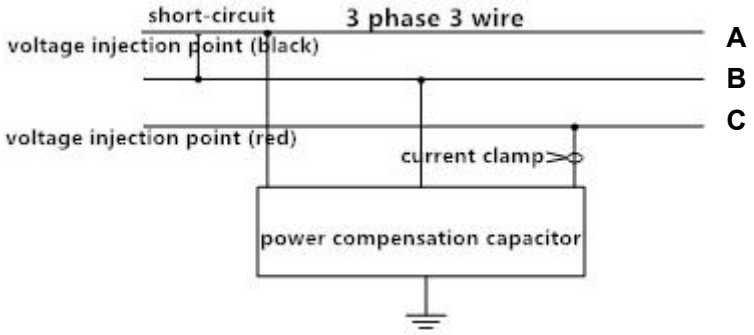
1. Red clip: phase C busbar

2. Black clip: phase A busbar

3. Short circuit phase A andB

4. Clamp Current Sensor set in the high-voltage capacitor bank C phase

lead.



Picture 2.6 △-connected tested capacitor C phase measuring wiring

2.3 Three-phase Yn-connected capacitor measurement

Three phase Yn- connected, instrument panel A, B, C three-phase wiring the same, as described below:

1. Black wire connect “output (black)”

2. Red wire connect “capacitor (red)”

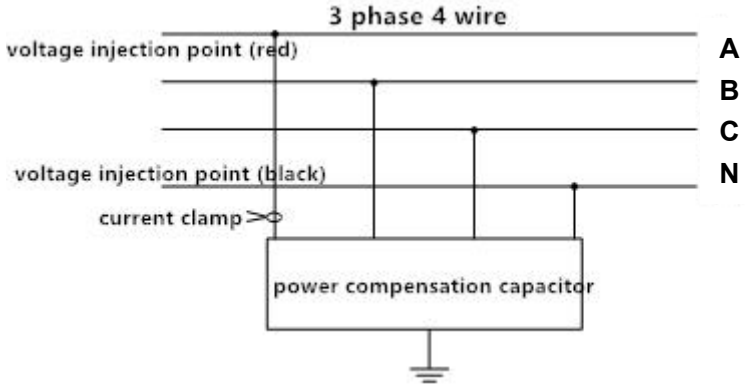
3. Clamp current sensor connect “current input”

Yn-connected tested capacitor A phase measuring wiring is shown in Figure 2.7, the following specific wiring:

1. Red clip: phase A busbar

2. Black clip: phase N

3. Clamp Current Sensor set in the high-voltage capacitor bank A phase lead.



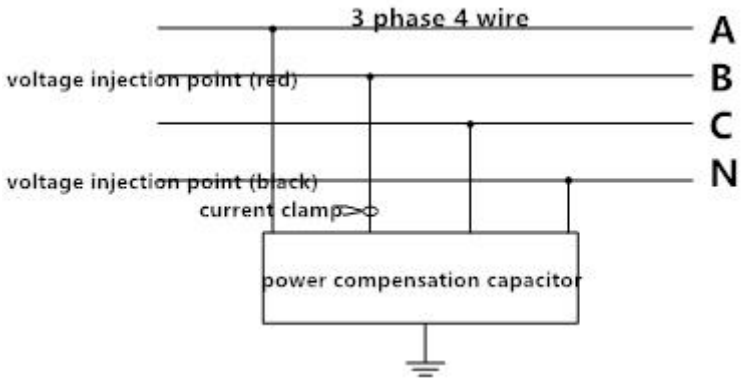
Picture 2.7 Yn-connected tested capacitor A phase measuring wiring

Yn-connected tested capacitor B phase measuring wiring is shown in Figure 2.8, the following specific wiring:

1. Red clip: phase B busbar

2. Black clip: phase N

3. Clamp Current Sensor set in the high-voltage capacitor bank B phase lead.



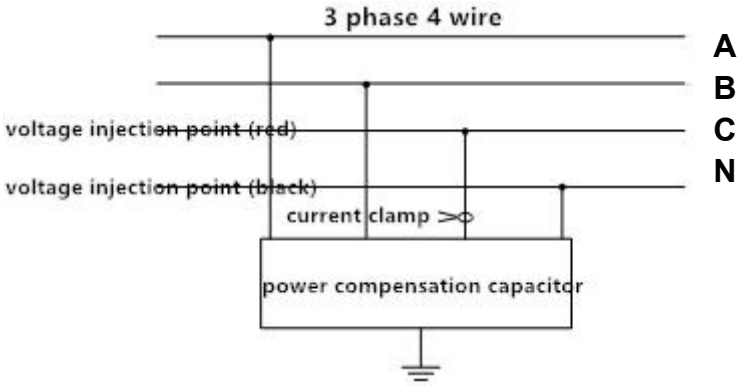
Picture 2.8 Yn-connected tested capacitor B phase measuring wiring

Yn-connected tested capacitor C phase measuring wiring is shown in Figure 2.9, the following specific wiring:

1. Red clip: phase C busbar

2. Black clip: phase N

3. Clamp Current Sensor set in the high-voltage capacitor bank C phase lead.



Picture 2.9 Yn-connected tested capacitor C phase measuring wiring

2.4 Three-phase III-connected capacitor measurement

Three phase III- connected, instrument panel A, B, C three-phase wiring the same, as described below:

1. Black wire connect “output (black)”

2. Red wire connect “capacitor (red)”

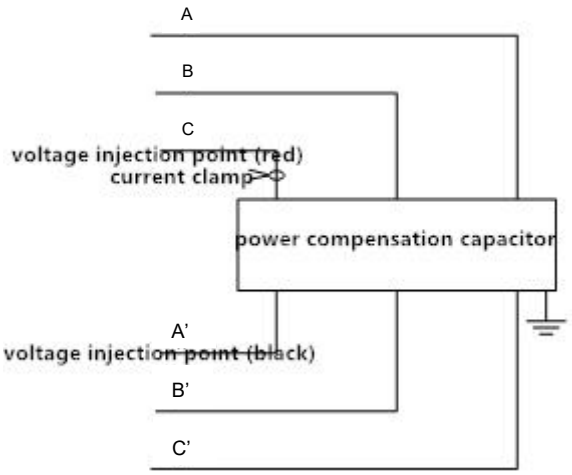
3. Clamp current sensor connect “current input”

III-connected tested capacitor R phase measuring wiring is shown in Figure 2.10, the following specific wiring:

1. Red clip: phase A busbar

2. Black clip: phase A’

3. Clamp Current Sensor set in the high-voltage capacitor bank A phase lead.



Picture 2.10 III-connected tested capacitor A phase measuring wiring

After A phase measurement completion transfer to the next phase wire, the same as B, C phase sequentially move wiring.

2.5 Inductance measurement

Inductance measurement instrument panel wiring as follows:

1. Black wire connect “output (black)”

2. Red wire connect “inductance (red)”

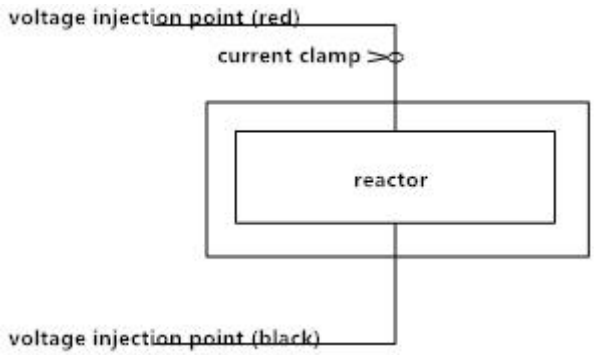
3. Clamp current sensor connect “current input”

Wiring as shown in picture 2.11, the following specific wiring:

1. Red clip: one end of busbar

2. Black clip: another end of busbar

3. Clamp Current Sensor set in the inductor lead.



Picture 2.11 Inductance measurement wiring

III. Instrument operation

3.1. Interface introduction

First connect AC230V power cable to the power outlet, turn on the power switch on the front panel, the instrument into the welcome interface, after system initialization is completed, the instrument into the main interface, as shown in Figure 3.1. The interface has six options, click on the icon to enter the corresponding sub-interface.

3.2. System setting

Click on "System Setting" icon on the screen to enter the system setting interface (Figure 3.2). In this interface, set the time and backlight settings.

Time setting: first click on "time setting", then click on "+" or "-" on the right, after the time modification is completed, click "Setting" icon, the time setting is completed.

Backlight setting: Click on "+" or "-" on the right, to complete the backlight setting, the screen synchronously displays modified backlight brightness.

Click "back" button to return to the main interface.

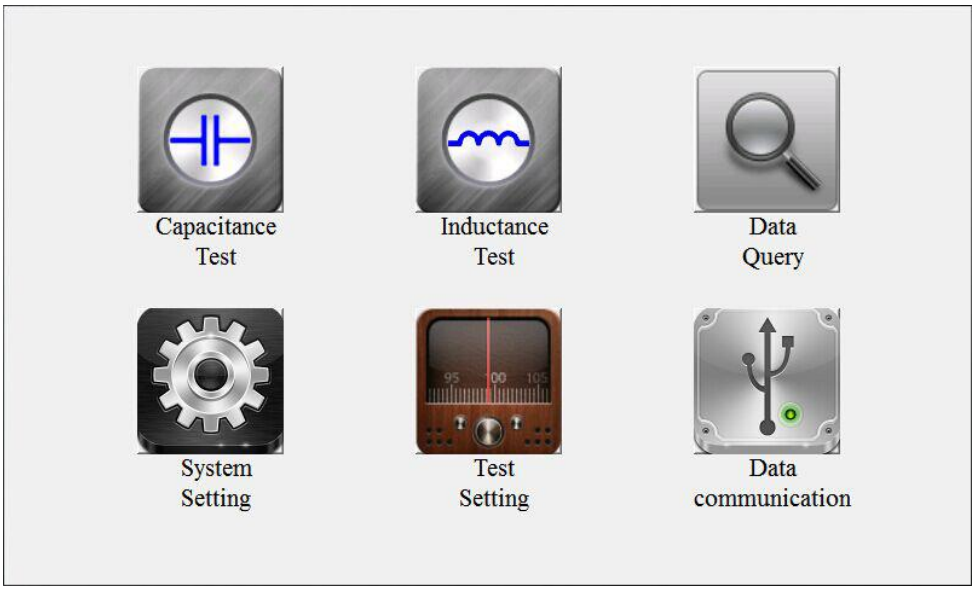


Figure 3.1 main interface

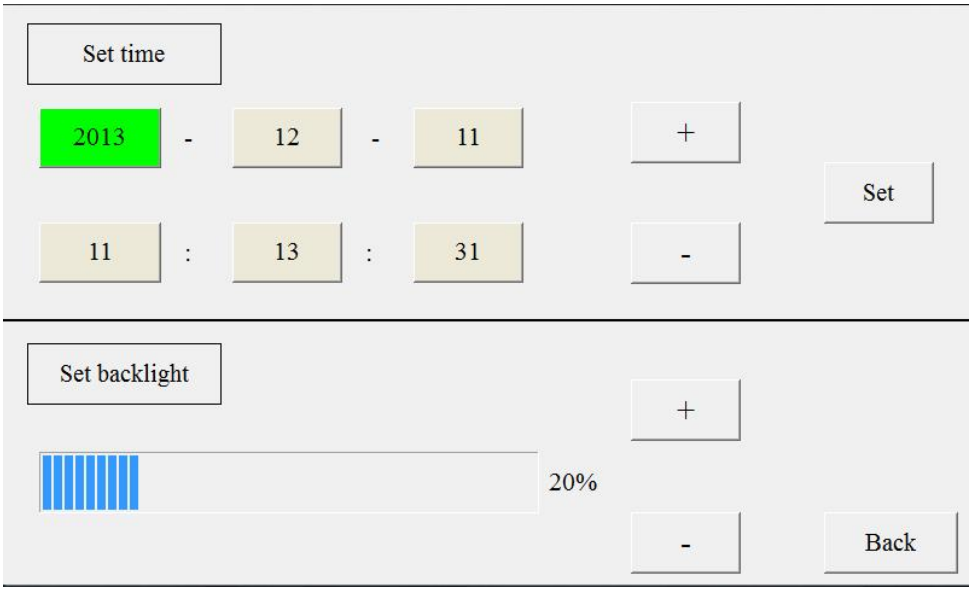


Figure 3.2 system setting interface

3.3. Measurement setting

Before doing capacitance or inductance test, need to set the corresponding measuring parameters according to tested product parameters, click on "Measurement Setting" icon in the main interface to enter measurement setting interface (Figure 3.3). In this interface, there is "Set voltage level," "Add voltage level", "Set equivalent mode" and "System Information" four settings.

Set voltage level: Click on "《 "or " 》 " button to select the required voltage level, while the "System Information" column will be prompted

"switching voltage level is completed". Click on "Setting" button to complete the setting, while the "System Information" column will be prompted "setting the voltage level is successful". "Current / Total" displays the currently selected voltage level sequence number in the total voltage level numbers. Click on "Delete" that deletes the currently selected voltage level, while the "System Information" column will be prompted "delete is successful". If there is no required voltage level value, the user can add the required voltage level value in the "add voltage level" bar, in the "please enter" option box to enter the required voltage level value, click "Add" button to complete, at the same time. "System information "column will be prompted "Adding user-defined voltage level is successful"

Set equivalent mode: the default equivalent mode is "series mode." If the currently displayed equivalent mode is "series mode", click on the system automatically switches to "Parallel mode"; if the currently displayed equivalent mode is" parallel mode", click on the system automatically switches to "series mode", while "System information" column displays the currently selected equivalent mode. Click "setting "button to complete the setting, while the "system information "column will be prompted "setting equivalent mode is successful".

Click "back" button to return to the main interface.

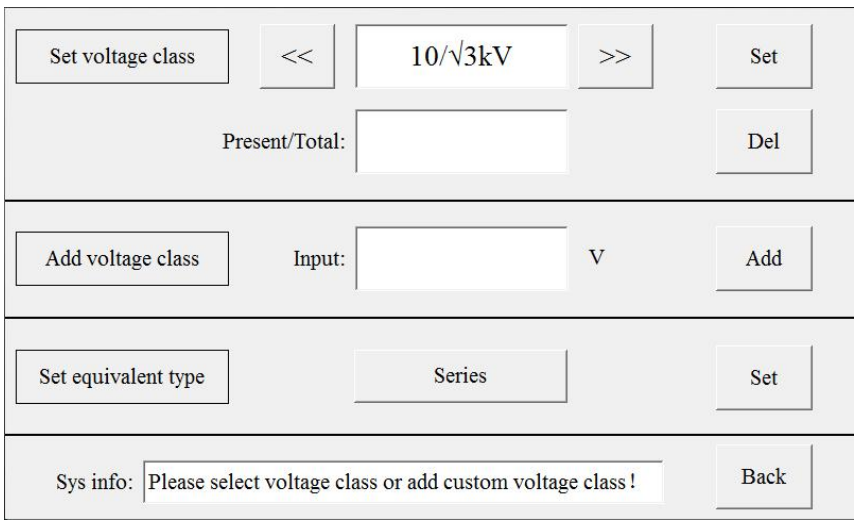


Figure 3.3 measurement setting interface

3.4. Capacitance test

In the main interface, click on "capacitance test" icon to enter the capacitance test interface, can select Y type, Yn type, △ type, and Ⅲ type, the following take Yn type capacitor as example.

First click on "Yn type" option, the interface will automatically switch to Yn type capacitance test interface, as shown in Figure 3.4.

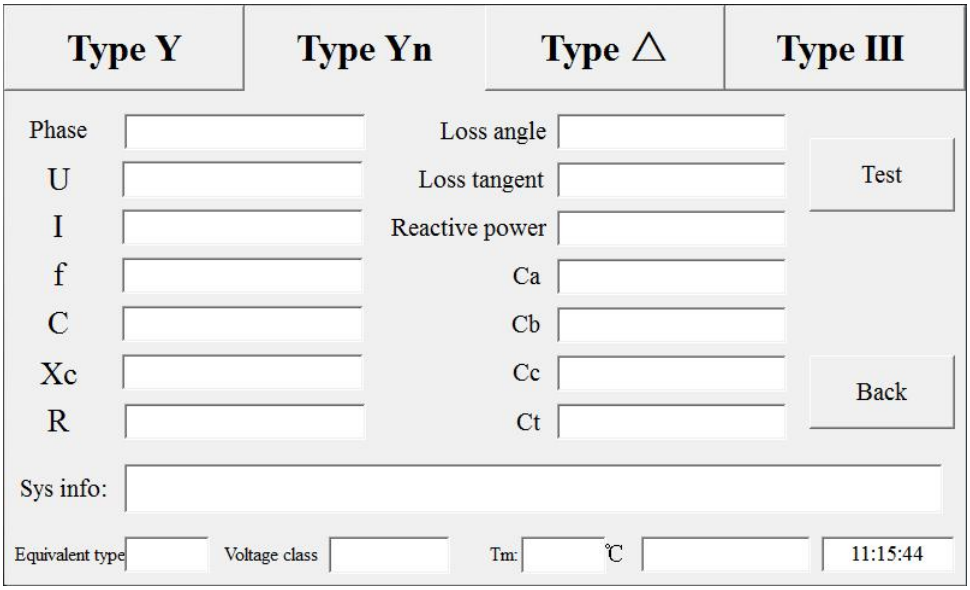


Figure 3.4 capacitance test interface

After checking the wiring is correct, click on "Measure" button, the instrument will automatically complete R-phase measurement (Figure 3.5).

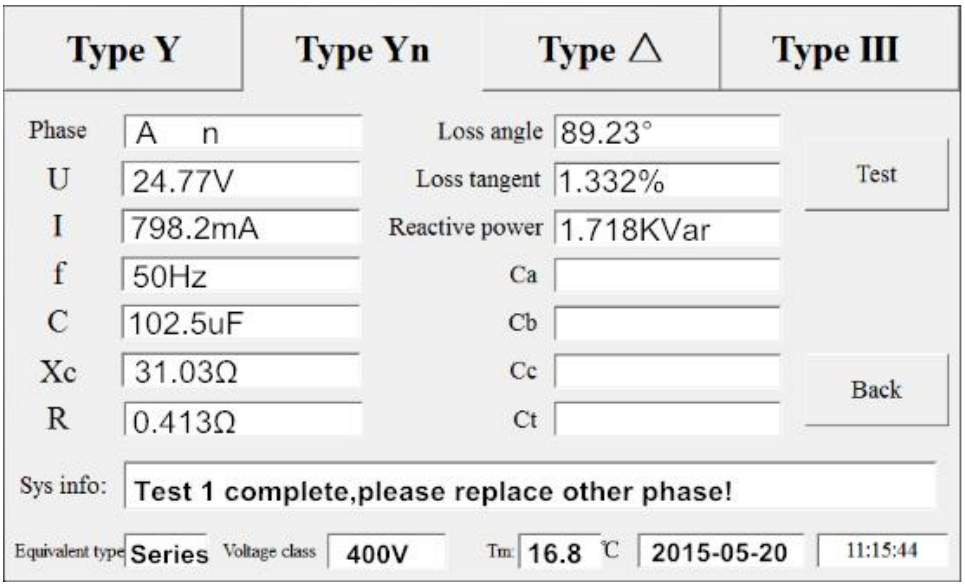


Figure 3.5 A-phase measured data

After manually replace B-phase, click on "measure" button, the instrument

automatically complete B-phase measurement (Figure 3.6), and then manually replace C-phase, click on "measure" button, the instrument automatically complete C-phase measurement, as shown in Figure 3.7, the "system information" column will prompt "three kinds of phases capacitance test is completed, continues to test or replaces the network to test", then the interface appears "save" button, Yn type capacitor test is completed, click " save "button to save the measured data for later queries. After the test is completed, click on "measure" will begin next group of tests, click on "back" button to return to the main interface.

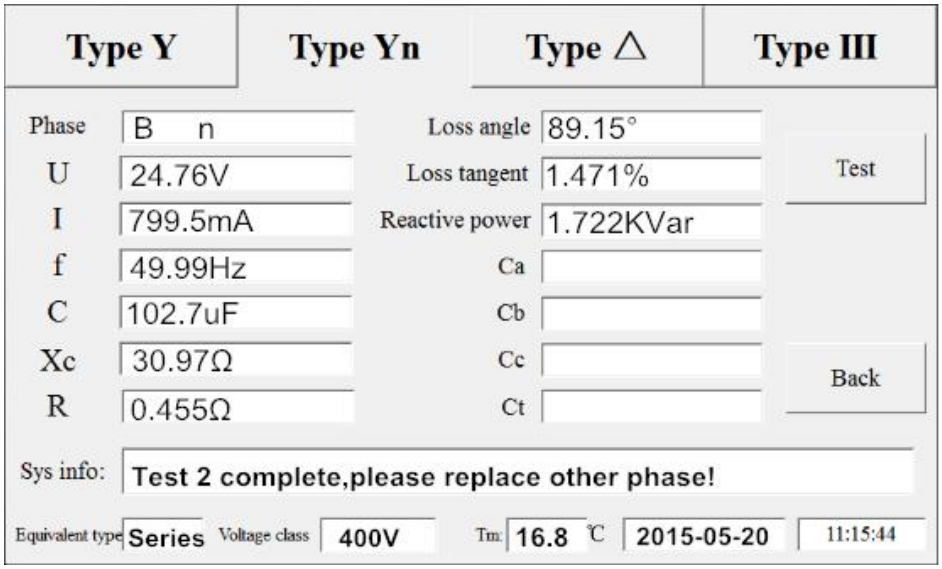


Figure 3.6 B-phase measured data

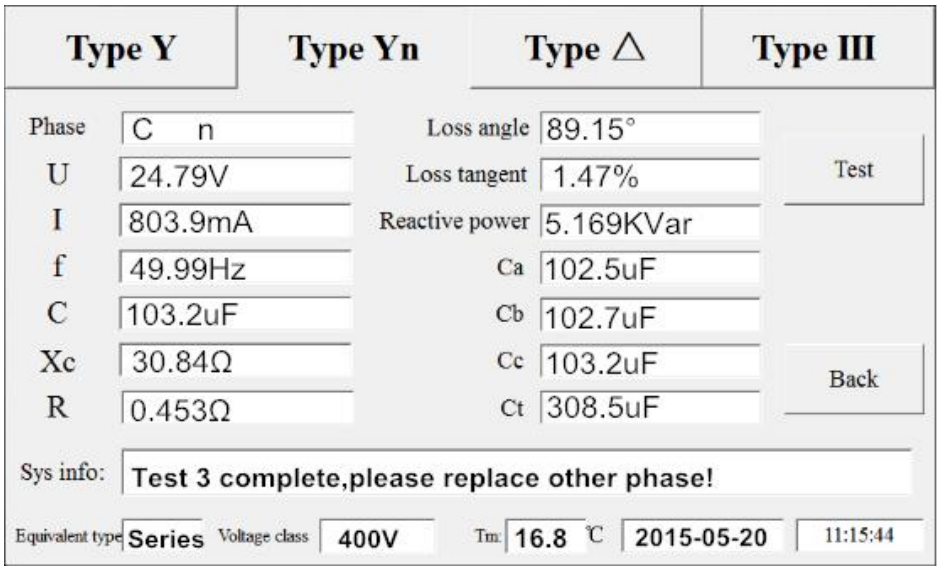


Figure 3.7 C-phase measured data

Note: 1. after completed each phase measurement, need to manually replace the wiring.

2. During each measurement, forbid to returning to "Measurement Setting" interface, change the measuring setting parameters, otherwise it will not save this set of measured data

3.5. Inductance test

In the main interface, click on "inductance test" icon to enter inductance test interface (Figure 3.8), confirm the wiring is correct, click on "Measure" button to start the test, after the test is completed, click "Save" to save measured data (Figure 3.9).

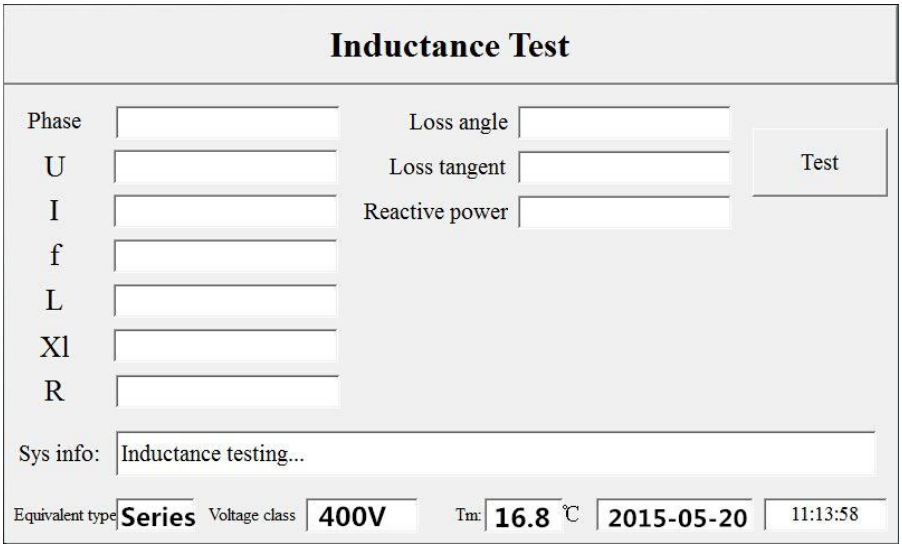


Figure 3.8 inductance test interface

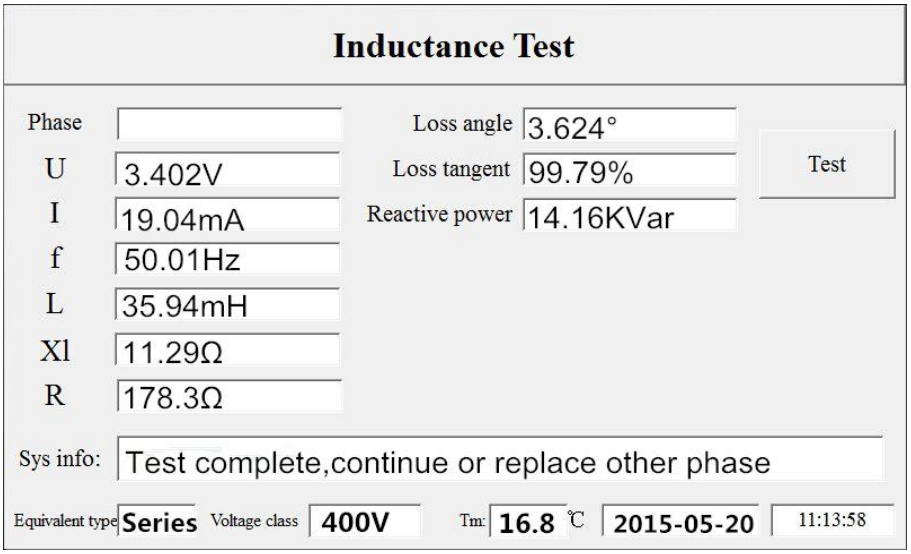


Figure 3.9 inductance measured data

3.6 Data query

Instrument maximum save 200 groups of test data, in the main interface, click on "Data Query" to enter data query interface to view saved history data (Figure 3.10).

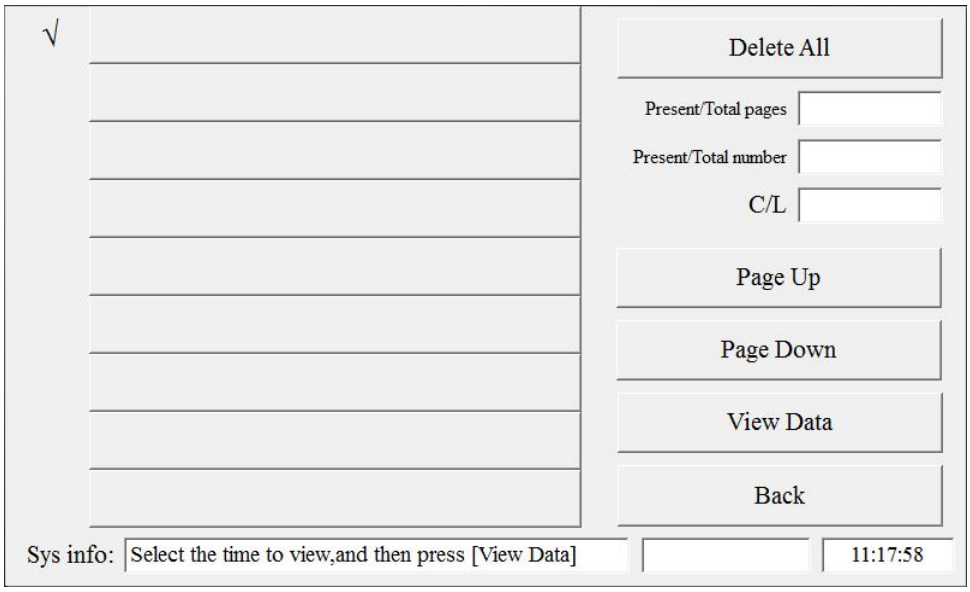


Figure 3.10 data query

Click date data on the screen to select the data you want to view, prior to the date " √ " indicates which data is selected, click on "Query Data" to query the selected historical data, query data interface is the same with capacitance and inductance measurement data interface.

Click the Back button to return to the main interface.

Explain the right of information bar of Figure 3.10

1. Data query interface capacitance and inductance data together, saved according time.

2. "Current page / Total page": "current page" refers to the number of information page for data query on the left shows in the total pages; "total page" refers to the total number of pages.

3. "Current Number / Total": "Current number" means the currently selected capacitive or inductive data in the total number of data sorting number; "Total" refers to the total capacitive or inductive data.

4. "Capacitance / inductance": "capacitance" refers to the total number of

capacitive data; "inductance" refers to the total number of data inductance.

5. "Delete All": click "Delete All" will delete all the saved data.

3.7 Data communication

After the communication cable connected, power on the instrument, until the instrument into the main interface shown in Figure 3.1, click the "data communication" entering the communication interface (Figure 3.11). Through the PC queries saved history data or the data for further analysis, the specific operation see "IV software."

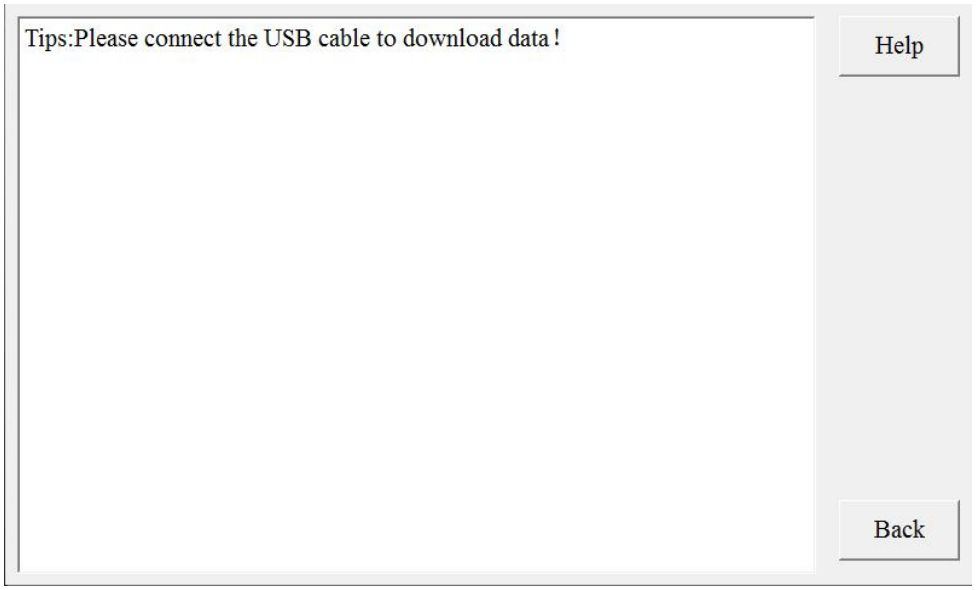


Figure 3.11 data communication interface

IV. Software

4.1. Software brief introduction

This matching software is used to upload data from the instrument to the PC, for test personnel to do further analysis and data processing.

4.2. Software Features

The software is green software, no installation can be used

Supports Windows series of operating systems, running speed, easy to use

4.3. Operating environment

Hardware requirements: recommended Celeron 533 or above CPU, 512 MB or more memory, 1 GB or more available hard-disk space.

Support software: Windows98, Windows2000, Windows XP, Windows2003, Vista, Windows7 and Windows series of operating systems; Microsoft Office 2000 and above version (must include Excel).

4.4. U-disk File

Open configuration U-disk, copy the file to the local computer folder, and open the file directory as shown in Figure 4.1.

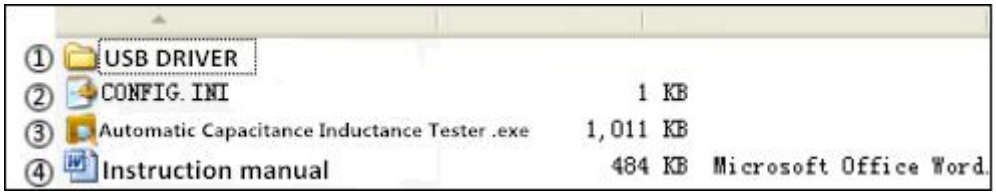


Figure 4.1 U-disk directory

Icon ①: USB Driver

Icon ②: CONFIG.INI configuration file

Icon ③: " Automatic Capacitance Inductance Tester .exe", double-click the file to run the program

Icon ④: Instruction manual

4.5. PC Communication cable usage

First connect to the PC need to install USB driver, after connecting the USB cable, turn on the instrument, the computer will be prompted to find new hardware, at the same time pop-up prompts to install the driver software, choose " from list or specific location to install", as shown in Figure 4.2.

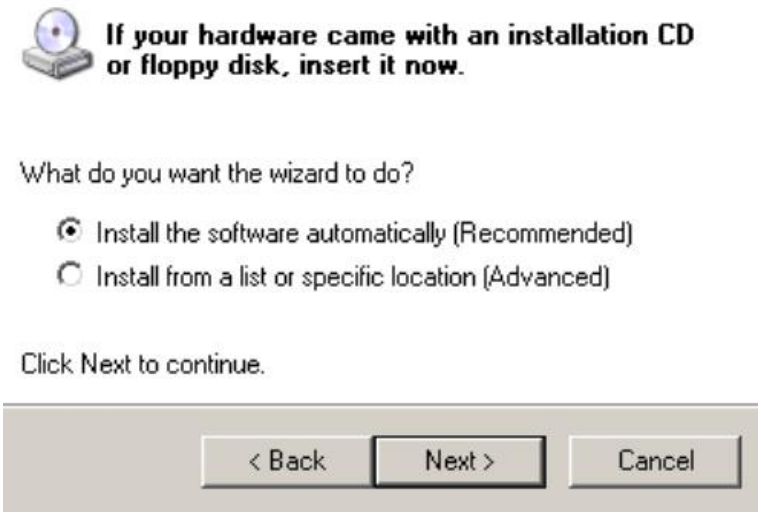


Figure 4.2 USB driver installation (advanced)

Click "Next" in the dialog box, tick "Include this location in the search", click "Browse" and select the drive letter of the U-disk, click on "Next" to automatically install the USB driver, as shown in Figure 4.3.

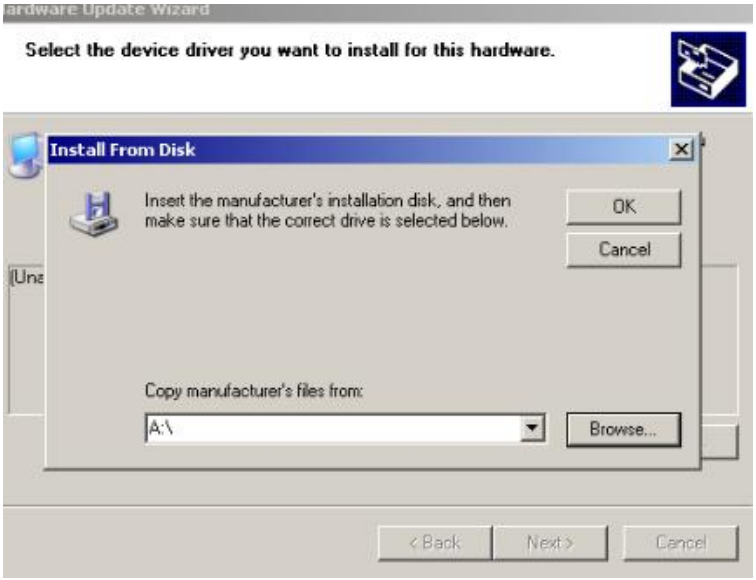


Figure 4.3 USB driver installations (Browse)

4.6. Software operating instructions

After connecting the communication cable, turn on the instrument, until the instrument into the main interface, click on "data communication", and then run "Automatic Capacitance Inductance Tester .exe", as shown in Figure 4.4.

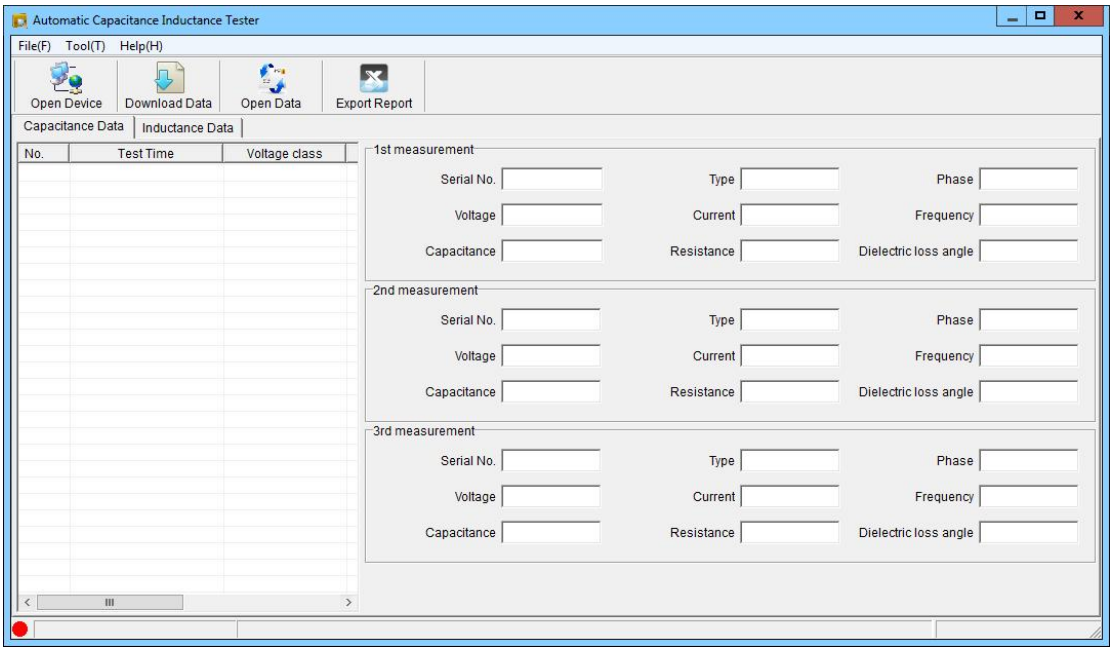


Figure 4.4 software interface

Click on "Open Device", automatic on-line, bottom left screen display "Connected", as shown in Figure 4.5.

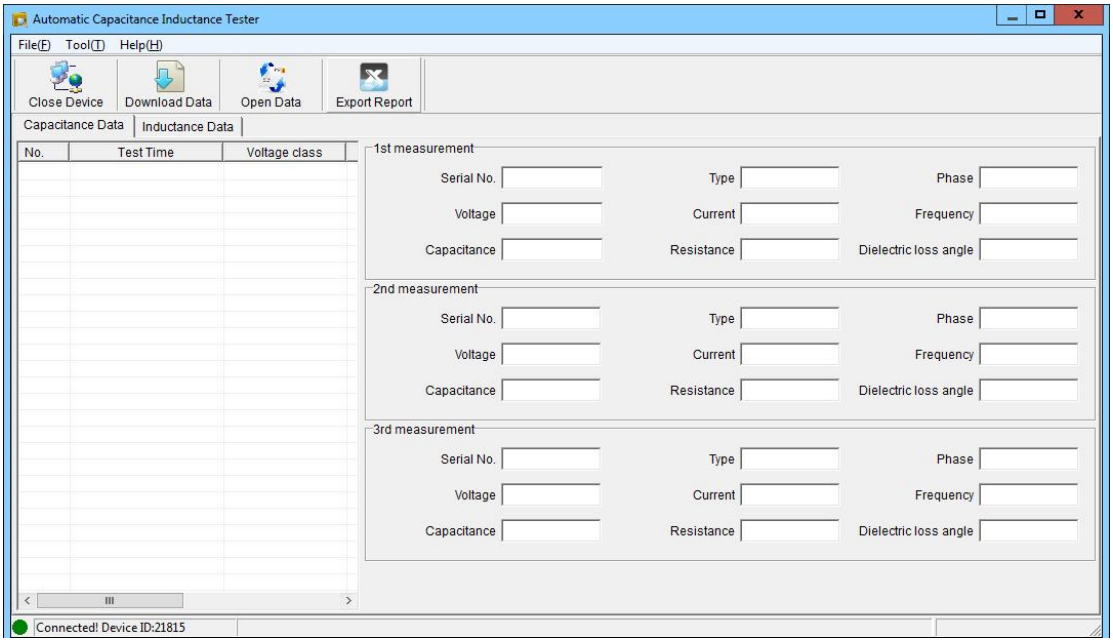


Figure 4.5 the device is connected

Click on "Download Data" pop-up dialog box to save the file, as shown in Figure 4.6.

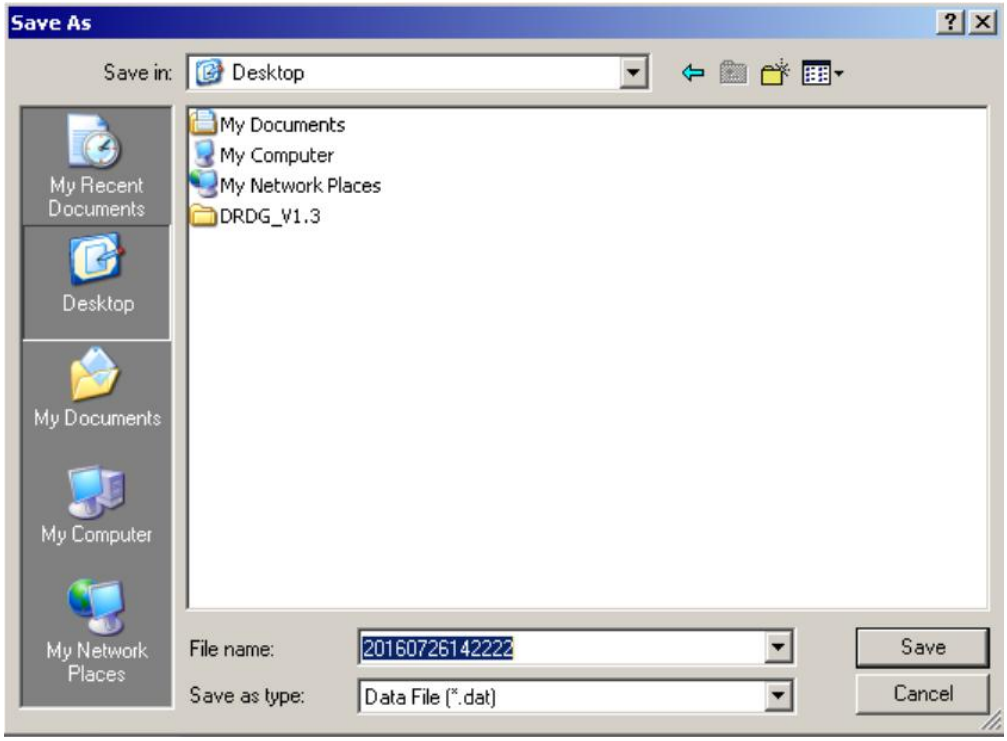


Figure 4.6 data save dialog box

After set the save path, click on "Save" button, the data is automatically uploaded from the instrument to the PC, the download is finished, prompts "download success", as shown in Figure 4.7.

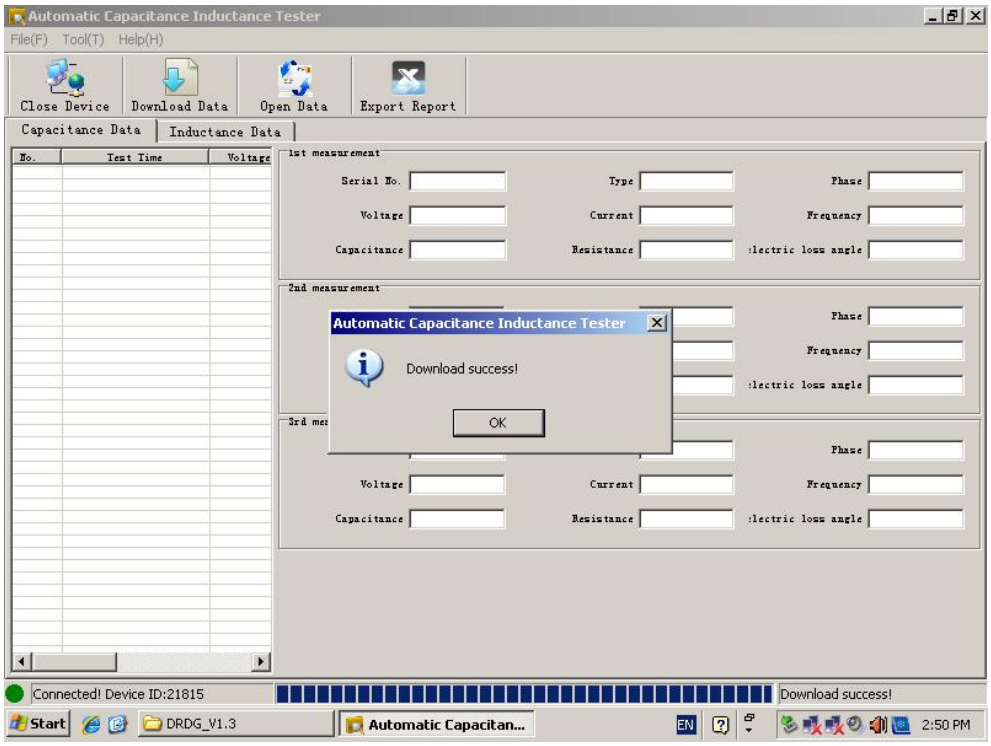


Figure 4.7 download success

Click on "Confirm" button, the list displays the downloaded capacitance

and inductance data, as shown in Figure 4.8.

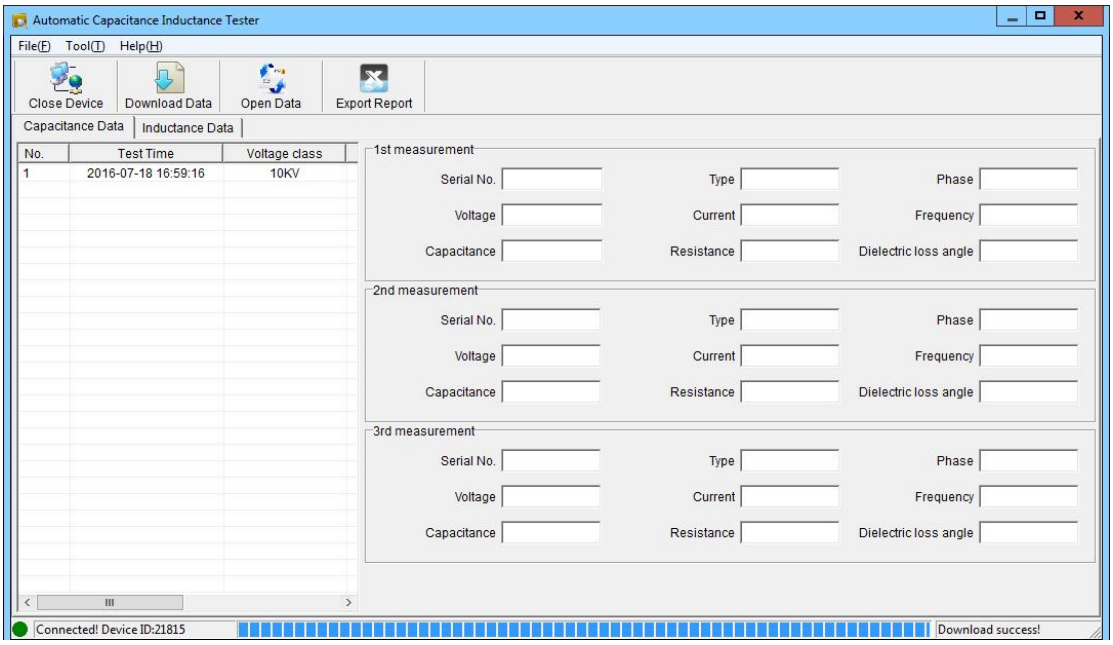


Figure 4.8 download data

Capacitance data: click capacitance data list to view the detailed results, as shown in Figure 4.9.

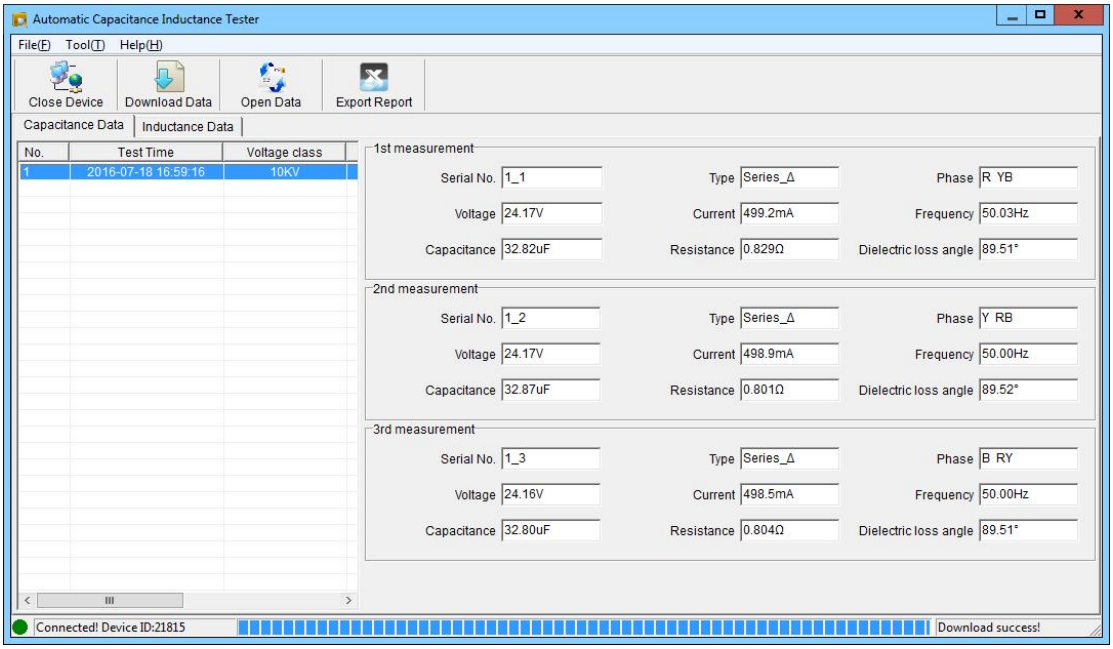


Figure 4.9 capacitance measured data

Inductance data as shown in Figure 4.10

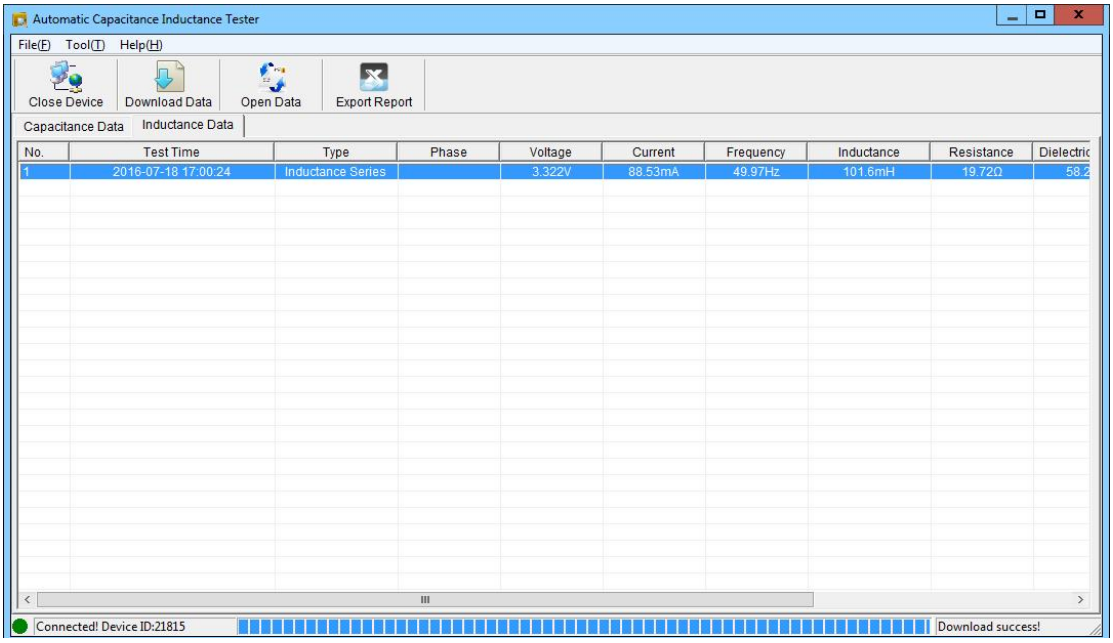


Figure 4.10 inductance measured data

Open the data: in Figure 4.4, can also click on "Open Data" button to view history data saved in the PC, as shown in Figure 4.11.

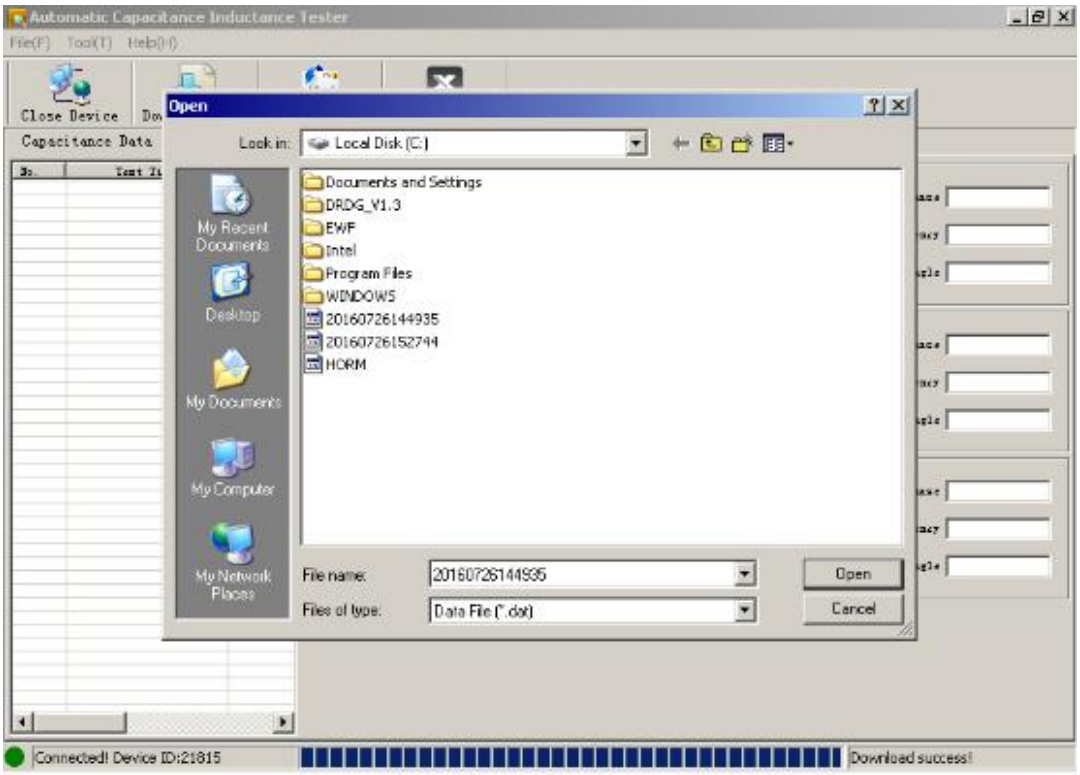


Figure 4.11 open data

Export Report: In Figure 4.8, select capacitance data or inductance data, click on "Export Report" to generate test report document. Capacitance data

file names begin with CDATA, as shown in Figure 4.12.

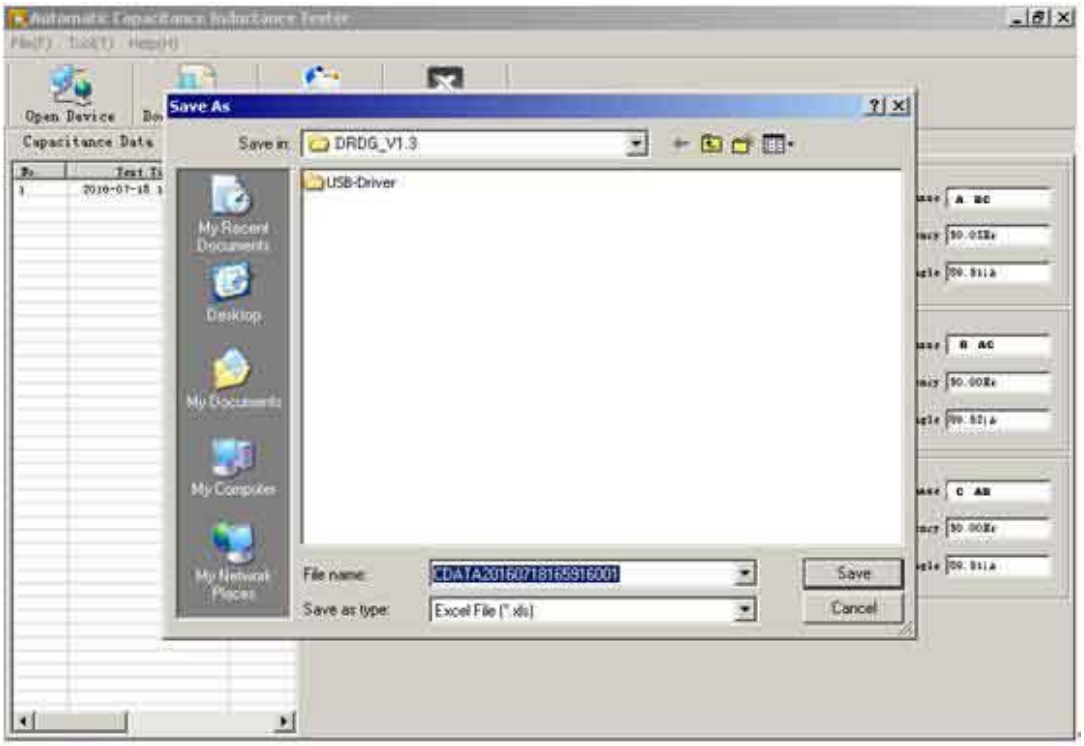


Figure 4.12 capacitance export report

Inductance data file names begin with IDATA, as shown in Figure 4.13.

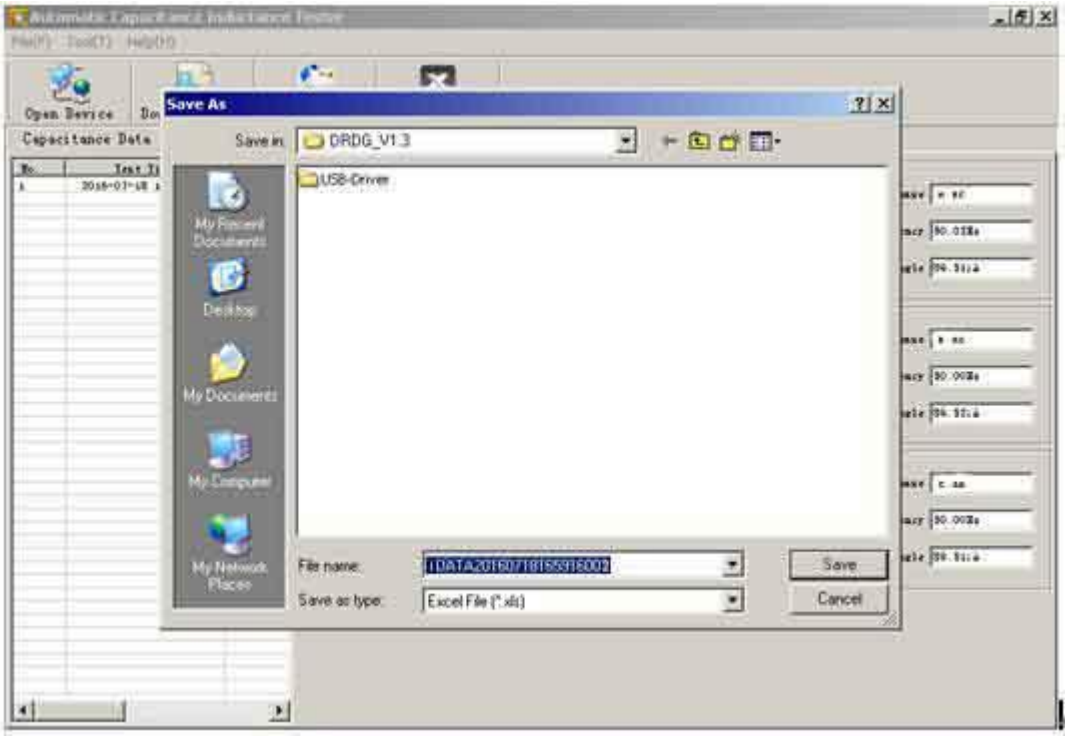


Figure 4.13 inductance export report

The filename format is CDATA / XDATA and XXXX (year) XX (month) XX (day) XX (hour) XX (minute) XX (second) XXX (group number) EXCEL files.

Export report is finished, open the exported report, view and edit complete test reports, capacitance test report as shown in Figure 4.14, inductance test report as shown in Figure 4.15

Capacitance Test Report

Test time:2016-07-18 16:59:16

	1st measurement	2nd measurement	3rd measurement
Serial No.	1_1	1_2	1_3
Type	Series_△	Series_△	Series_△
Phase	A BC	B AC	C AB
Voltage	24.17V	24.17V	24.16V
Current	499.2mA	498.9mA	498.5mA
Frequency	50.03Hz	50.00Hz	50.00Hz
Capacitance	32.82uF	32.87uF	32.80uF
Resistance	0.829Ω	0.801Ω	0.804Ω
Dielectric loss angle	89.51°	89.52°	89.51°
Reactive power	3.095MVar		
Total capacitance	98.51uF		
Temperature	25.81℃		
Voltage class	10KV		
Remark			

Testers:

Print personnel:

Print time: 2016-07-26 15:21

Figure 4.14 capacitance test report

Inductance Test Report

Test time:2016-07-18 17:00:24

Serial No.	1
Type	Inductance Series
Phase	
Voltage	3.322V
Current	88.53mA
Frequency	49.97Hz
Inductance	101.6mH
Resistance	19.72Ω
Dielectric loss angle	58.29°
Reactive power	0Var
Temperature	26.06℃
Voltage class	10KV
Remark	

Testers:

Print personnel:

Print time: 2016-07-26 15:21

Figure 4.15 inductance test report

V. Fault phenomenon and troubleshooting

Fault phenomenon	Troubleshooting
No response after boot, no LCD display	Check whether there is AC power supply or not
	Check the power cord
	Check whether 5A fuse in the power socket is burn out or not
USB communication error	Check whether the device enters the computer communication interface or not after turned on
	Check the USB cable connection is stable or not
	Check whether the USB driver is installed or reinstalled or not
	Check whether re-plug the USB cable or not after installed the USB driver
Boot normally, the touch screen no response	Turn off the power supply, reboot
Boot normally, the measured value without reading	Check 5A fuse on the panel is burn out or not
	Check the wiring is correct or not
	Check each test line interior is disconnected or not

VI. Packing list

No.	Name	QTY
1	Host	1
2	Test leads(red/black with clip, 5M）	1
3	220V AC power cord	1
4	Clamp Current Sensor	1
5	USB communication wire	1
6	Short circuit wire（with clip, 2m）	1
7	Ground wire	1
8	5A fuse	6
9	U-disk	1
10	Instruction manual	1
11	Test report	1
12	Certificate	1