Huazheng®

HZ2421
Sweep Frequency Response Analyzer

Huazheng Electric Manufacturing (Baoding) Co., Ltd

Dear user:

Thank you for choosing Dear user:

Thank you for choosing HZ2421 Sweep Frequency Response Analyzer.

We hope that this instrument can make your work easier and more enjoyable, so that you can get the feeling of office automation in the test and analysis work.

Before using the instrument, please read this manual, and operate and maintain the instrument according to the manual to prolong its service life. "Just a light press, the test will be completed automatically" is the operating characteristics of this instrument.

If you are satisfied with this instrument, please tell your colleagues; if you are not satisfied with this instrument, please call (0312) 6775656 to tell you to serve you at all times-Baoding Huazheng Electric Manufacturing Co., Ltd., our company will definitely make you satisfied !

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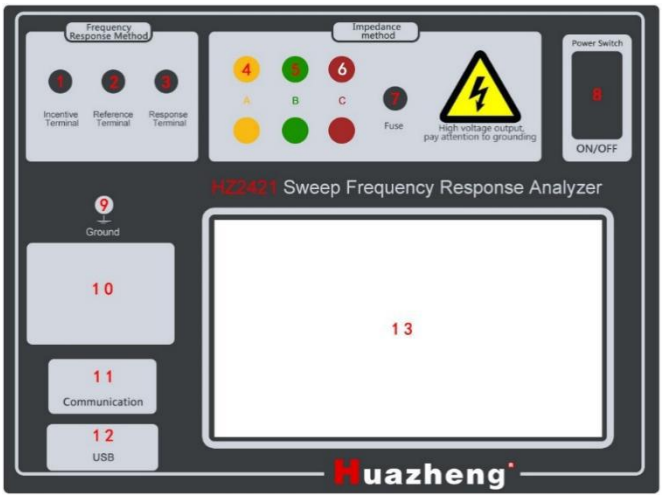

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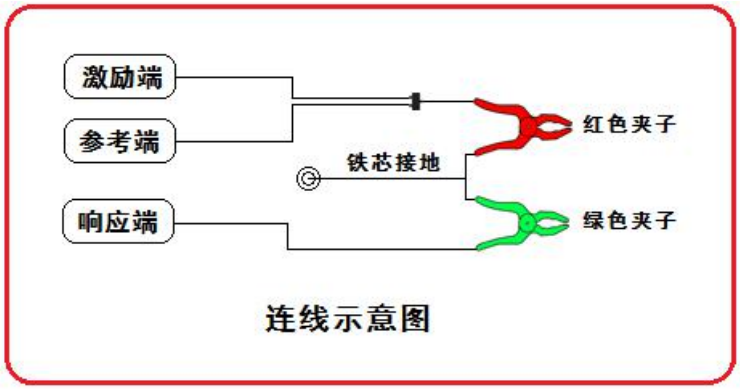


The tester of transformer winding deformation is composed of:

A. Main measurement unit (instrument)

B. Three pieces of parallel special measuring cable (in random order)

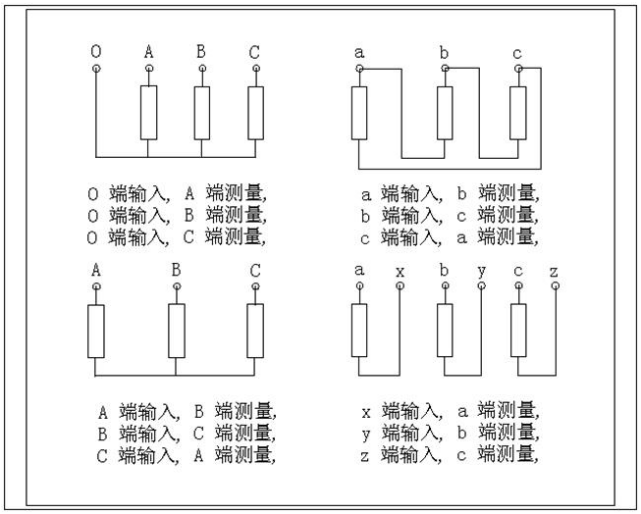
C. 1 pieces of two-to-one adaptor

D. One red and one green large clamp respectively for test

E. Grounding wire

After connection of test wire according to the figure above, use the red and green large clamps to connect the transformer winding according to the wiring method by referring to the figure below.

Common wiring method of transformer: Type Y, Type Yn, Type D (namely, Type △), split/single phase type.



Attention:

The case of product under test and shielding layer of testing cable must be reliably connected and grounded; large-scale transformer generally adopts the joint between the lead-out line of iron core grounding bushing and fuel tank as common grounding point; the transformer case point is grounded.

The red large clamp is connected to the input end and the green large clamp is connected to the measuring end.

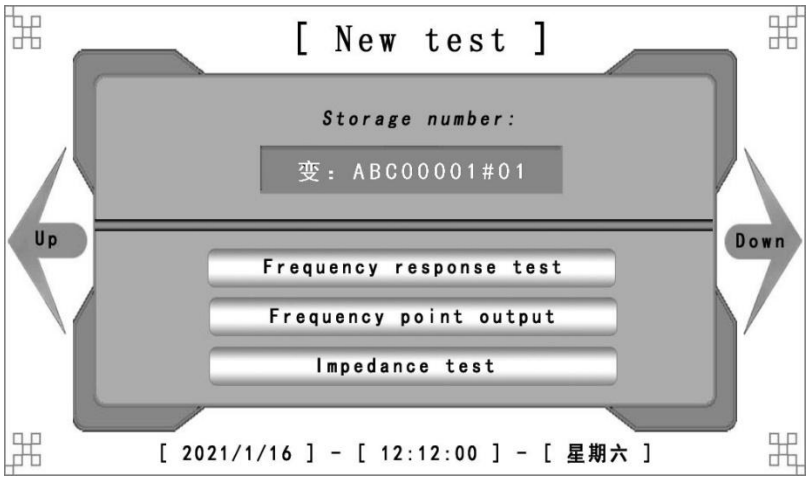
Chapter I Introduction of Interface

III.Initialization

Connect to AC 220V power supply and turn on the power switch on panel to start the initialization of instruction; the buzzer sounds twice after completion of initialization, wait 5 seconds or click anywhere on the screen to enter the main menu.

Click **[Page Up]** or **[Page Down]** after entering main interface to select the **menu page**.

2. New test



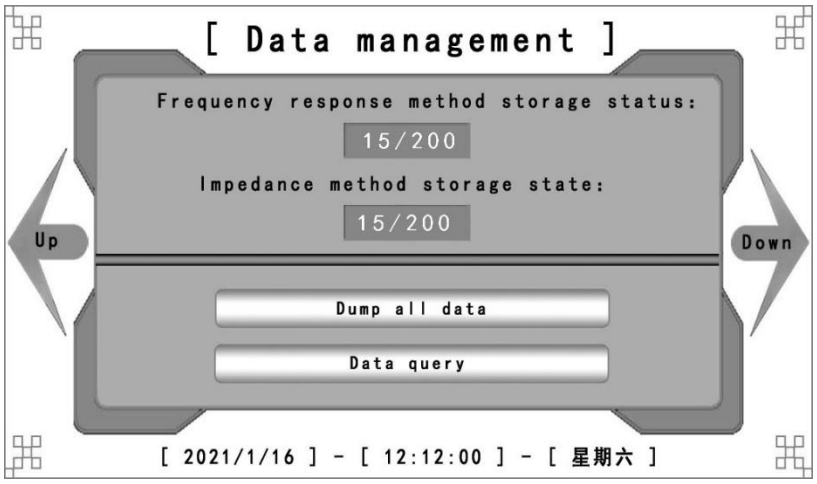
A. **Storage number.**: storage number. of current data, may input: Chinese + character + figure.

B. **Frequency response test:** click to set basic parameters of transformer and conduct the test with frequency-sweep method.

C. **Frequency point output**: used to detect or output a fixed frequency point.

D. **Impedance test**: click to set basic parameters of transformer and conduct short circuit impedance test.

3. Data management



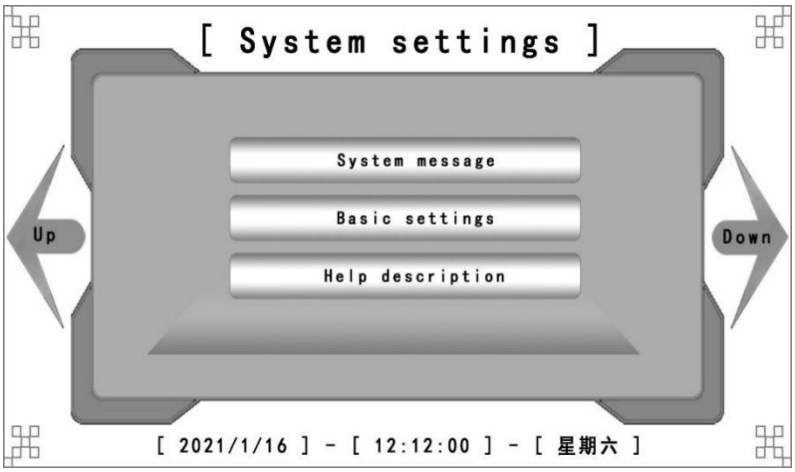
A. Storage status of frequency response method: indicate current storage status of frequency response method (used capacity/total capacity)

B. Storage status of impedance method: indicate current storage status of impedance method (used capacity/total capacity)

C. Transfer all data: transfer all data to USB disk.

D. Data query: screen, check, transfer or delete the saved data.

4. System setting



A. System information: display the version information and factory number of instrument.

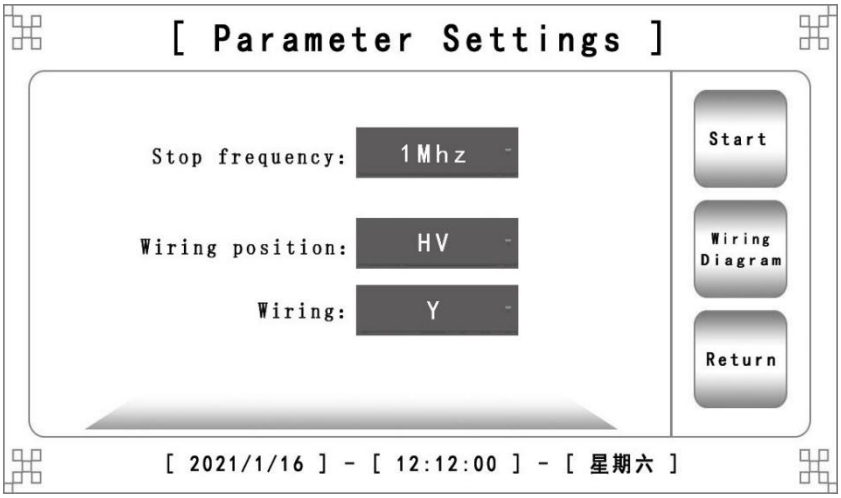
B. Basic setting: set date, time, brightness and clear the data.

C. Help information: reserved.

IV.New Test

1. New-frequency response method test

Input the storage number and click **[frequency response method test]** to pop up the interface as follows:



A. Parameter setting

- Stop frequency: the stop frequency of current test, the starting frequency is 1Khz.

Optional: 100Khz, 600Khz, 1Mhz, 2Mhz, 5Mhz, 10Mhz

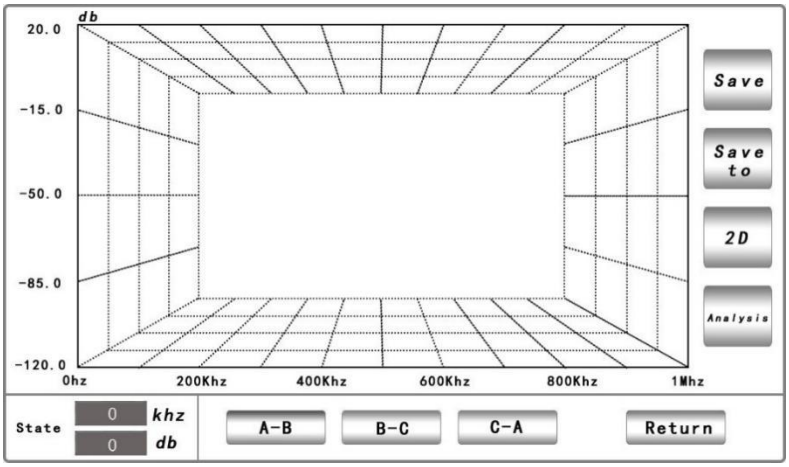
- Wiring position: the position of winding under test

Optional: high voltage side, intermediate voltage side, low voltage side

- Wiring method: the wiring method of winding at current position.

Optional: Type Y, Type Yn, inner △ type, outer △ type (split type)

Click [start test] to enter the test interface after completion of parameter setting, as shown below:



B. Test interface:

- **Status:** display current output frequency value and respond value (dB) during the test.

- **Phase button:** the three buttons below correspond to three windings of transformer. Select the winding to be tested according to the wiring position and click the phase button correspondingly to test the winding.

- **Saving**: save current data. “Saved” will be displayed above the butter after saving successfully.

- **Transfer**: transfer current data to USB disc.

- **2D**: switch to 2D display mode; may carry out 2D curve print.

- **Analysis**: may display or print the horizontal comparison of 3-phase windings.

- **Back to previous level:** mufti-function key.

In standby: back to previous menu.

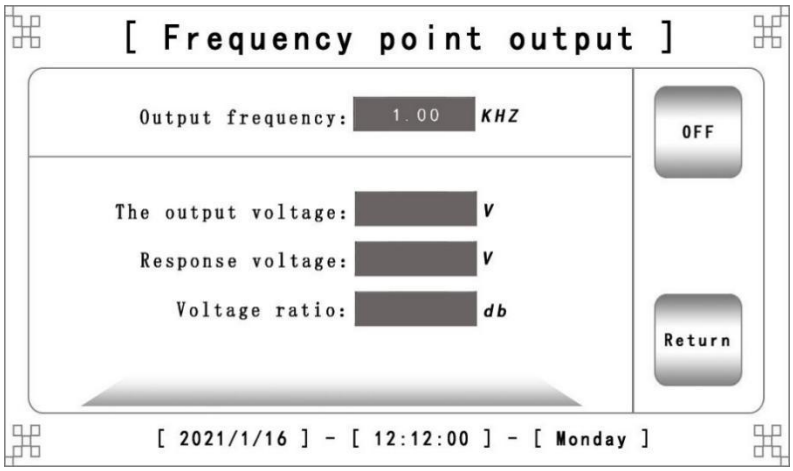
In test: stop test.

Note:

Each complete test of transformer must include the tests of phase A, B and C. If only one or two phases are tested, the instrument cannot provide completed analysis results.

2. Frequency point output

Click **[Frequency Point Output]** to pop up the interface below:



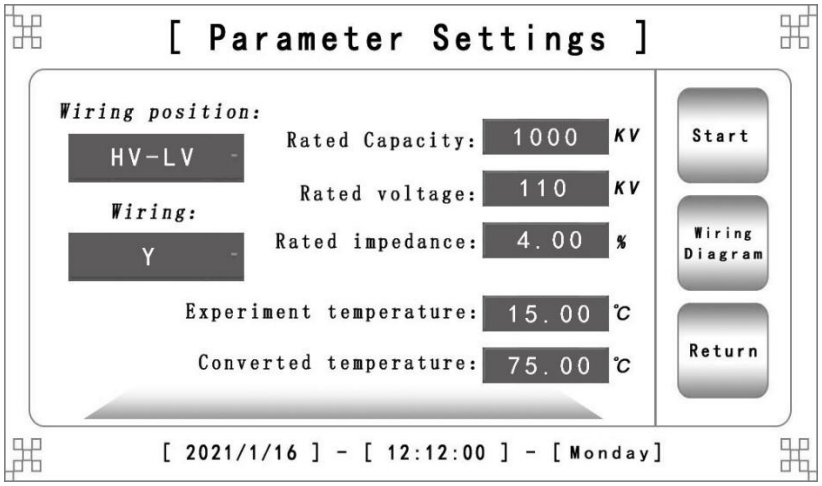
User may manually input any intended frequency, click **[Start Output]** button, the instrument will output the set frequency value and real-time display current testing value. Click [Stop Output] or [Return to Previous Level] to stop it.

Note:

This function can also be used to test the instrument: use coaxial line for test to short circuit the excitation end and reference end, or excitation end and response end, click [Start Output] to check that whether the corresponding position has voltage display.

3. New- impedance method test:

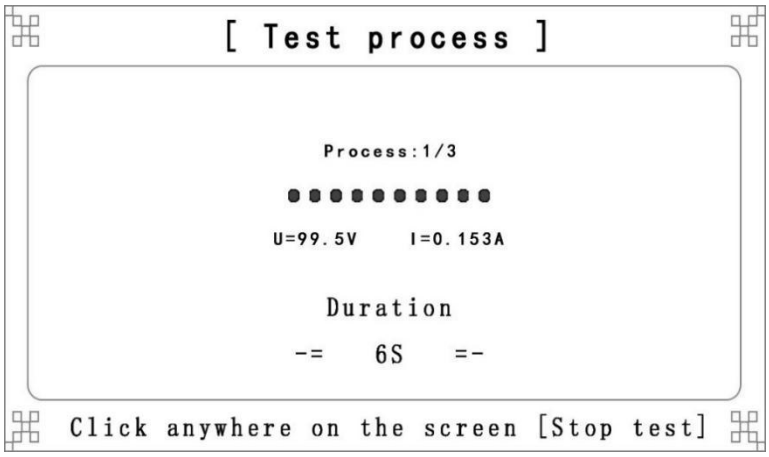
Input the storage number and click **[impedance method test]** to pop up the interface as follows:



A. Parameter setting:

- **Rated capacity**: input rated capacity of transformer under test.
- **Rated voltage**: input rated voltage (tested side) of transformer under test.
- **Rated impedance**: input rated short circuit impedance (nameplate rating) of transformer under test.
- **Wiring position:** optional: high to low, high to intermediate, intermediate to low.
- **Wiring method**: optional: Type Y, Type D (AZ-BX-CY), Type D (AY-BZ-CX), single phase
- **Test temperature**: input actual temperature of transformer.
- **Converted temperature:** input the converted temperature of transformer, which is 75°C generally.

Click **[Start Test]** to enter the test interface after completion of parameter setting, as shown in the figure below:



B. Test process:

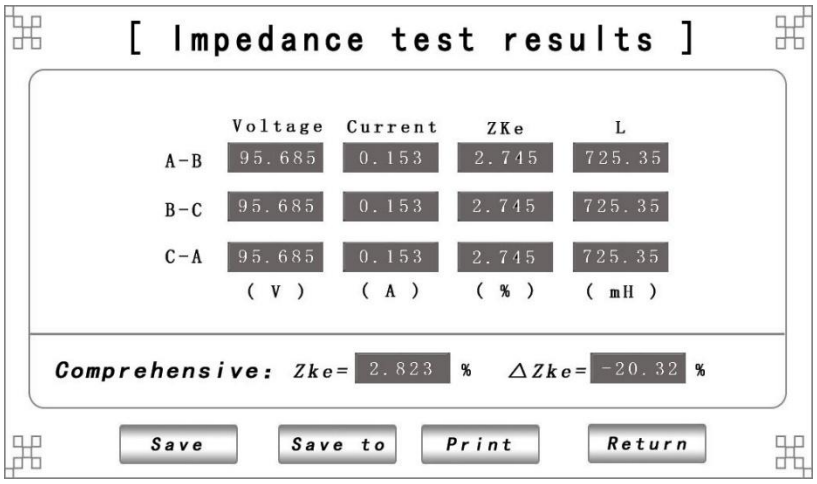
Test three phases of A, B and C in sequence, the number of process is 3. For single-phase transformer, the number of process is 1.

Note:

Click anywhere on the screen to stop the test if need be!

C. Test result:

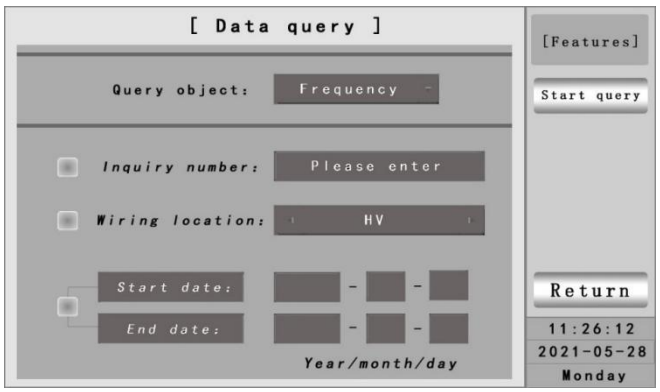
The interface of test result will pop up automatically after the completion of the process, as shown below.



- **Data saving:** save current data, click the left of button to display “Saved” after successful saving.
- **Transfer to USB disk**: transfer current data to USB disk.
- **Data printing**: print current result.
- **Back to home page:** back to main menu.

V.Data Query

Click **[Data Query]** to pop up the interface as follows:



1. Parameter setting:

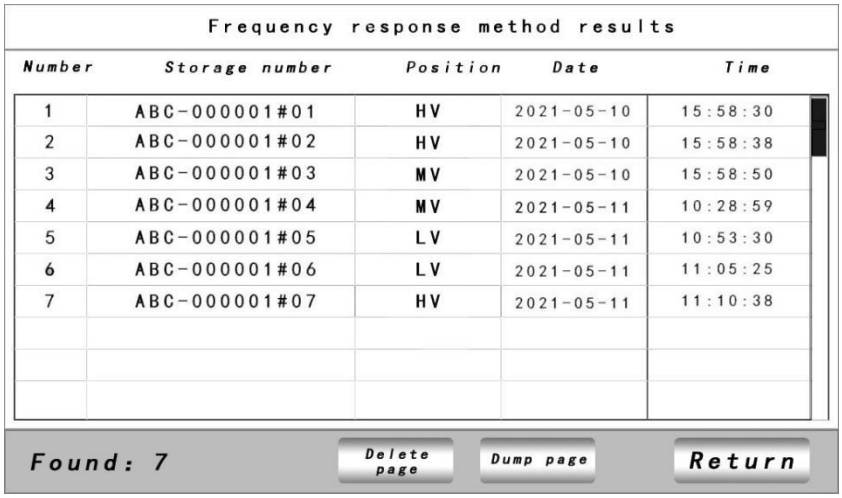
- **Query object**: select to query ***frequency response data*** or ***impedance data***.
- **Storage number**: input the data number for query.
- **Wiring position**: query the wiring position for query.
- **Date**: the startup and completion dates of data for query.

Notes:

Select the storage number, wiring position and date **firstly** for screening.

2. Query result

Click [Start Query] to get the result according to the set conditions, as shown in the figure below:



- **Page deletion**: delete all data queried.
- **Transfer page**: save all current queried data to USB disk.
- **Viewing data:** click the data for viewing.
- **Page up and down:** drag the slider at right side to page up and down.

Attention:

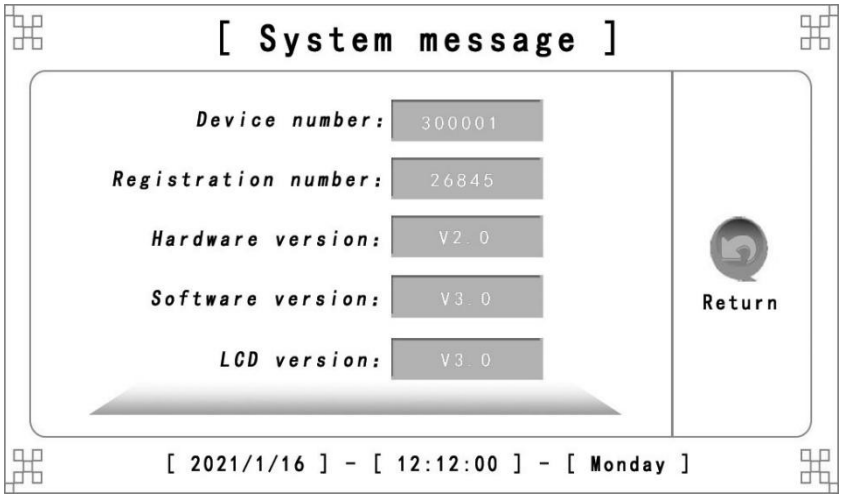
The deleted data cannot be recovered, please use this function carefully.

Sliders will be available only there are more than 10 groups of data!

VI. System Configuration

1. System information

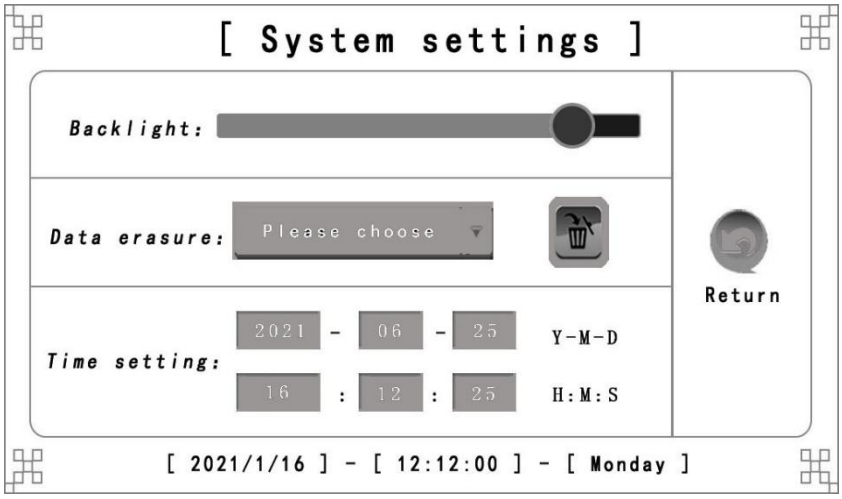
Click [System Information] to enter the interface as follows:



Current page provides some basic information of the equipment, in which the registration code is required for updating the system.

2. Parameter setting:

Click [System Information] to enter the interface as follows:



A. Backlight adjustment: adjust the brightness of current backlight.

B. **Data clearing:** clear the data of instrument.

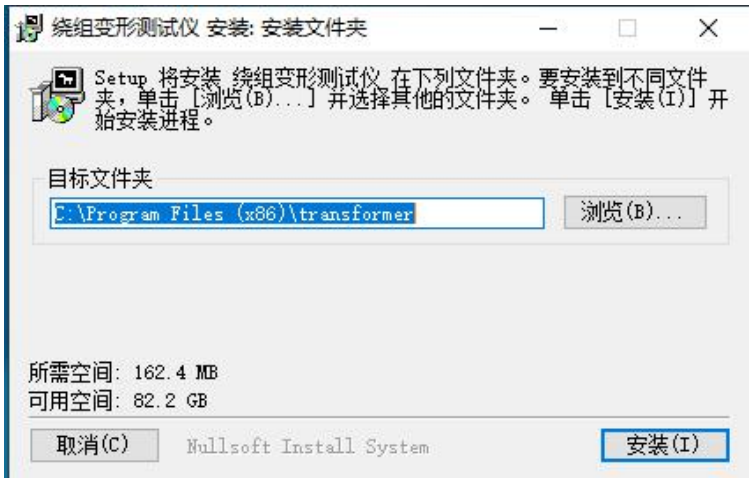
C. **Date and time setting:** click the textbox and use the keyboard provided by the system to input manually.

Note:*Cleared data cannot be recovered.*

VII.PC Software

1. Install client program

Open the USB disk and find the installation program: PC client of winding deformation tester (two-in-one) under the root directory: double click to open it and select “Yes” to run the program.



Select appropriated installation path and select “Install”, the installation will be finished after a while, and then select “Close” to complete the installation program.

The shortcut of client: winding deformation tester is available on the desktop. Double click to open.it.

2.Interface description:

Double click the icon on desktop to open the software interface, as shown in the figure below:

Since the software is opened at the first time without any data, there is a prompt to import data.

Function description:

- **Function switch:** click [Frequency Response Test] and [Impedance Test] at the top right corner to switch the function.
- **Function of importing data in USB disk**: select the [Import Data] at the top left corner.
- **On-Line test**: right click [Start On-line Test] below to start the test.
- **Administrator mode:** enable it to delete data.

Notes: the default password of administrator mode is 888888.

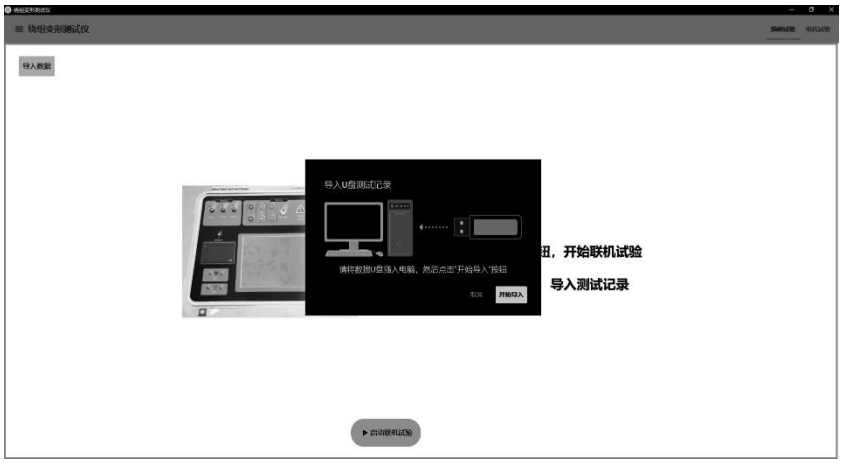
3.Data import

Click the [Import Data] at the top left corner to import historical data saved in USB disk to the database of client for convenient query, view, analysis and generating report at any time.

Details are as follows:

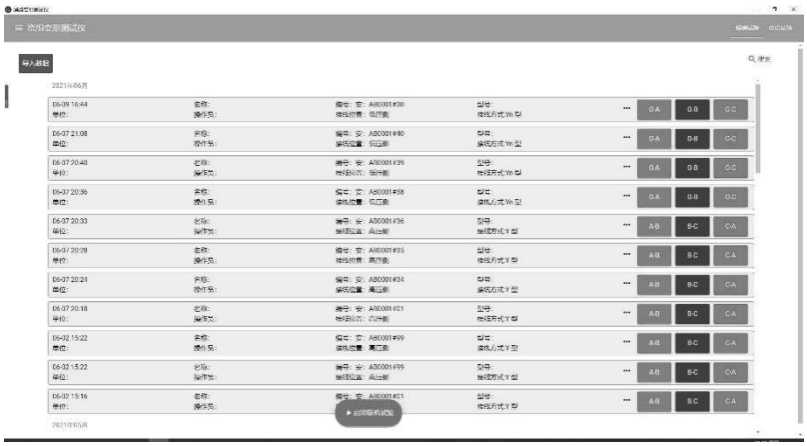
Insert the USB disk with transferred data into the USB port of PC and then click [Import Data] at the top left corner.

Select [Start Import] in the pop-up dialog box.



Wait for a while and the imported result will be available.

4.View of frequency response method data



Every test record displays the basic information for users to view. There are three color selection buttons including yellow, green and red at the right side of interface, which correspond to the data of 3-phase winding of transformer.

A. Change/Add basic information

Click ••• to pop up dialog box for change.

B. Search function

Click 搜索 “search” button at the right top corner for data screening.

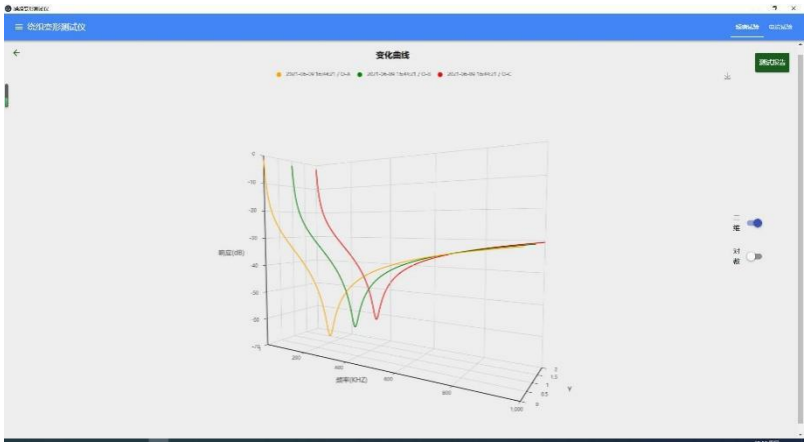
C. Generate curve and report:

Click the corresponding color button to check the test record of any winding; meanwhile, the selected content is displayed on the upper part of interface.

Note: even there is not upper limit on adding data, but don not exceed 15 groups as

far as possible.

Select “Comparison and Analysis” at the top right corner to check the test result.



D. 2D/3D graphics transformation:

Click 

switch at the right side for 2D or 3D graphics transformation.

E. Logarithmic curve

Click 

switch at the right side to open or close the display of logarithmic curve

F. Save curve as picture:

Click top-right button  to save current curve as picture format.

G. Local zoom in:

Click top-right  to zoom in local characters of curve.

Click top-right  to start the curve recovery.

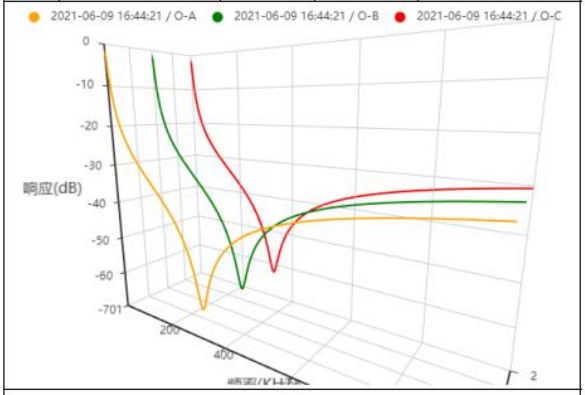
Note: this function can only zoom in 2D curve locally.

5.Generate report:

Click [Test Report] at the top right corner to generate test report.

变压器绕组变形测试报告

设备名称		设备编号	安：AB0001#30	
设备型号		施工单位		
序号	试验时间	接线位置	接线方式	试验相位
1	2021-06-09 16:44:21	低压侧	Yn 型	O-A
2	2021-06-09 16:44:21	低压侧	Yn 型	O-B
3	2021-06-09 16:44:21	低压侧	Yn 型	O-C

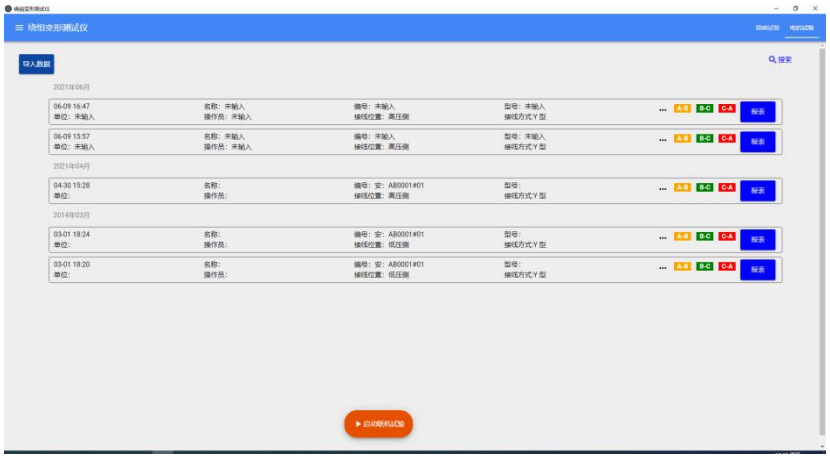


数据分析

对比序号	对比相位	低频段Rlf (1K-100K)	中频段Rmf (100K-600K)	高频段Rhf (600K-1000K)	分析结论
1 : 2	O-A vs O-B	6.3	5.7	6.3	一致性很好，正常绕组
1 : 3	O-A vs O-C	6.5	5.2	6.3	一致性很好，正常绕组
2 : 3	O-B vs O-C	7.0	5.7	6.4	一致性很好，正常绕组
分析依据	测试仪各项数据计算方法及分析结论均依据《DL/T 911-2016 电力变压器绕组变形的频率响应分析法》 数值范围如下： 严重变形—Rlf<0.6 明显变形—1.0>Rlf≥0.6或Rmf<0.6 轻度变形—2.0>Rlf≥1.0或0.6≤Rmf<1.0 正常绕组—Rlf≥2.0和Rmf≥1.0和Rhf≥0.6				
试验人员		报告日期	2021-06-24		

Click Save at the left side to save the report as .PDF format.

6.View of impedance method data



Every test record displays the basic information for users to view.

A. Change/add basic information

Click ••• to pop up dialog box for change.

B. Search function:

Click 搜索 button at the right top corner for data screening.

C. Generate report:

Click [Report] of data to generate test report.

变压器绕组变形测试报告

设备名称	未输入	设备编号	未输入	
设备型号	未输入	施工单位	未输入	
绕组类型	高---低	接线方式	Y 型	
接线位置	高压侧	额定功率	10 KVA	
额定电压	10 KV	额定阻抗	4 %	
试验温度	25 ℃	额定温度	75 ℃	
试验相位	测量电压	测量电流	短路阻抗Zke	漏电感Lk
A-B	91.5 V	0.136 A	3.724 %	743.0m H
B-C	92.3 V	0.138 A	3.714 %	723.0m H
C-A	92.6 V	0.138 A	3.702 %	738.6m H
综合	短路阻抗Zke	3.714 %	阻抗误差ΔZke	-7.161 %
试验人员	未输入	报告日期	2021-06-24	

Click Save at the left side to save the report as .PDF format.

VIII.PC Communication

1. Install USB drive program

Open the USB disk attached with the PC and then open the folder: stm32 virtual serial port drive.

There are 4 installation documents:

VCP_V1.5.0: drive version number.

W7_x64_64bits: 64-bit operating system for Win 7.

W7_x86_32bits: 32-bit operating system for Win 7.

W8_x64_64bits: 64-bit operating system for win8/10 and above.

W8_x86_32bits: 32-bit operating system for win8/10 and above.

Please pay attention to current operating system when installing drive program.

For example, please choose the installation document

VCP_V1.5.0_Setup_W8_x64_64bits for Win10_64 operating system which is widely used.

A. Double click and select “Yes” to run the program;

B. Select “Next” to continue to install;

C. Input User Name and Company Name and select “Next” to continue to install;

D. Select appropriated installation path or directly select “Next” to continue to install;

E. Select “Next Step” in another pop-up dialog box;

F. Select “Completion” after successful installation;

G. Back to original dialog box and select the second option: No, skip this step, which means ignore on-line update this time, and then select “Finish” to complete the installation.

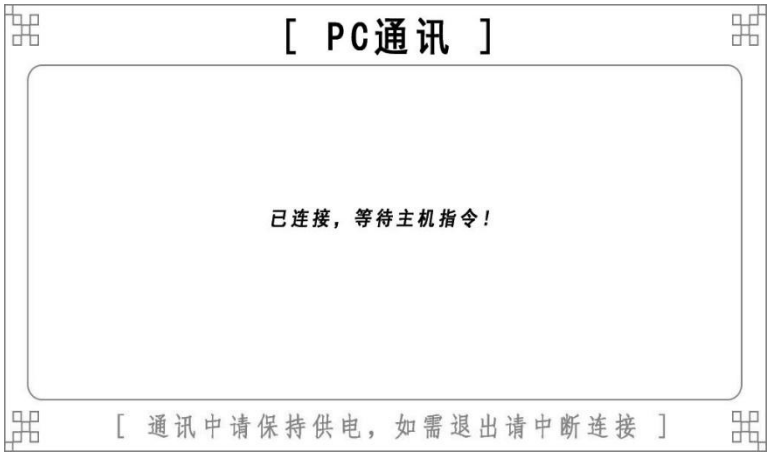
2.Online preparation

➢ Don’t operate after normal boot and entering main interface to ensure stay in main interface.

➢ Use USB communication cable to connect the equipment with any USB port in PC, then the equipment will display the communication interface PC.

➢ Use test cable to connect the transformer to the equipment. Please refer to the contents of wiring in the Instruction for wiring method.

The figure below is the communication interface of PC:



Please pull out and plug in the communication again if there is no such interface.

3.On-line frequency response method

Click the function icon “Start On-line Test” at the bottom of frequency response interface,

input or select necessary test information in the pop-up dialog box.

Click “OK” button to start on-line test.

Attention:

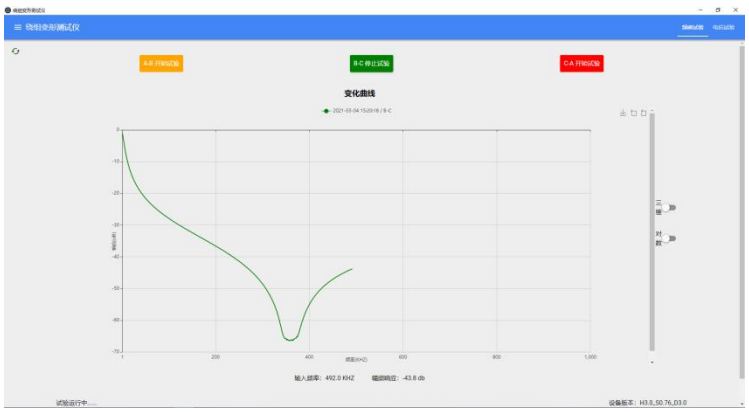
The equipment must display [PC Communication] interface before on-line test; check whether VCP Drive has been installed if not, and then re-check or pull out and plug in communication cable again until the equipment display [PC Communication] interface.

A. Test:

Users only need to operate 3 icons at the top, including:

Yellow icon-phase A, green icon-phase B, red icon-phase C.

Click the icon corresponding the phase which need to be tested. For example, click the green icon to on-line test Item B.

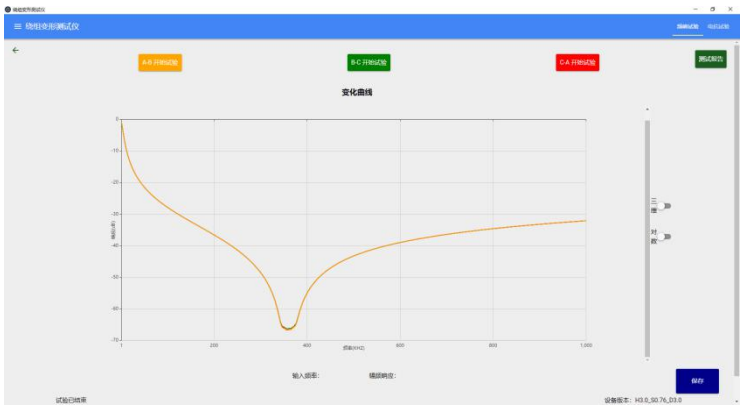


It should be noted that the text of green icon turns to “Stop Test”. If click the icon, the current test will stop, otherwise the test will be conducted until finish and stop automatically.

Similarly, Item A and Item C may be tested or certain phase may be tested repeatedly until the tests of all items are completed.

B. View/Save:

The data of three phases may be viewed after completion of test.



view 2D/3D curve and logarithmic curve.

Zoom in/out and display local 2D curve.

360° view 3D curve.

Generate test report, …

Please refer to Introduction of data view function for details.

Click bottom-right [Save] to save the data before escape.

4.On-line impedance method test

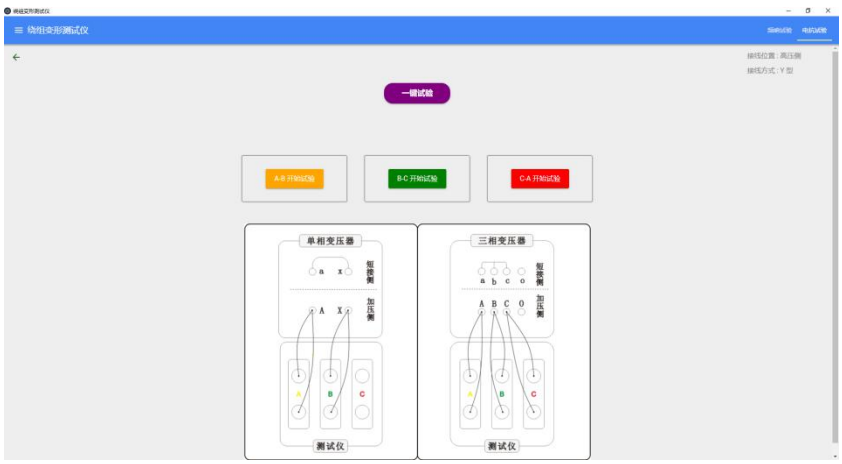
Click the function icon “Start On-line Test” at the bottom of impedance interface and input or select necessary test information in the pop-up dialog box.

Click “OK” button to start on-line test.

Notes:

The equipment must display [PC Communication] interface before on-line test; check whether VCP Drive has been installed if not, and then re-check or pull out and plug in communication cable again until the equipment display [PC Communication] interface.

A. Test:



➢ **One-key test**

Start “One-key Test” icon to enable automatic function and start one-key test of 3-phase winding; the result will be displayed automatically after all tests have completed.

➢ **Manual test:**

It is required to manually click 3-phase icon to conduct test of certain test in manual mode. Check the result manually after the 3-phase test.

B. Test result:

The results are shown in the figure below.

Click the icon “Test Report” at the top right corner to view the test report which is generated automatically.

Click the icon “Save” at the bottom right corner to save test data automatically and back to main interface.

Notes:

Please confirm whether the parameters are correct if the test result is abnormal.

Please check whether the fuse tube is blown if there is no voltage or current.

Please pull out and plug in communication cable and try again if there is no response in test.

IX. Packing List

No.	Item	Qty
1	Impedance test line	3
2	Power line	1
3	USB communication line	1
4	Red and green test clamp	Each 1
5	Ground lead	3
6	Coaxial line	3
7	Black Alligator Clip	4
8	U disk	1
9	Print paper	2
10	Fuse pipe(15A)	3