ZX-BRY02 Transformer Winding deformation Tester

WARNING!

To avoid personal injury and equipment damages, read the "Safety Tips" and "Warning" and "Caution" and other relevant information before using the tester.

Safety Tips

Follow the instructions in this manual while using the tester, or otherwise the protection provided by the tester may be damaged.

In this manual, the Warning refers to the situations or operations which pose dangers to the user.

Caution refers to the situations or operations which cause damage to the tester or the transformer tested.

Note refers to the situations or operations which bring about error to the test result.

Safety Guidelines

Read the safety instructions and follow the safety guidelines described below. Warnings, cautions and notes!

To avoid personal injury as well as damages to the tester or tested transformer, follow these guidelines in operation: Before use, check the appearance of the tester, if the power switch is on the "off" position, and respective terminals are normal.

Measuring grounding transformer is not connected properly before, please do not start winding deformation tests.

Before the test, fully discharge the transformer terminals before test.

Winding deformation test shall be done under the premise that all the transformer leads are disconnected (including overhead lines, enclosed bus bars and cables), and that these leads are kept far away from the transformer bushing (grounding conductors and metal suspensions more than 20cm away from the transformer bushing), especially for the transformer connected to enclosed bus bar.

Tap-changer's position must be properly recorded during testing. Put the transformer tap-changer at the first tap, especially for the on-load voltage regulating transformers to obtain more comprehensive information of winding. For no-load voltage regulating transformers, ensure to place the tap-changer at the same position during each measurement for easy comparison.

Transformer core and the casing must be grounded.

Ensure that the connecting clamp for measurement is in close contact with the bushing wire clamp. If there is a conductive paste or rust on the bushing clamp, use gauze or dry cotton cloth to wipe it clean.

Proper use of measuring line: make the line straight without curl when uncoiling it; wind the line up smoothly when coiling it; after measuring ends, detach the clamp from the line to avoid the it catching onto the transformer and damaging measuring line.

Contents

Ⅰ、product description

The instrument based can make accurate diagnosis on the transformer internal fault based on the measurement of the characteristic parameters of transformer windings inside, using the frequency response analysis (FRA) method developed and improved by the developed countries.

After the completion of design and manufacture of transformers, the coils and internal structure are finalized, so for the coil of a multi-winding transformer, if the voltage level and winding method are the same, the corresponding parameters (Ci, Li) of each coil shall be determined. Therefore, the frequency characteristics response of each coil also will be determined, so the frequency spectrums of the corresponding coils of three phases are comparable.

During the test of transformer, in case of inter-turn, inter-phase short circuit, or relative coil displacement caused by collisions during transport, as well as coil deformation resulted from electromagnetic tension during operation under short circuit and fault conditions, the distribution parameters of transformer windings will change, which thereby in turn affects and changes the transformers' original frequency domain characteristics, namely the frequency response change in magnitude and the resonant frequency points shift. The transformer winding tester developed according to the response analysis method is the novel NDT equipment for detecting transformer internal fault. It applies to the detection of internal structure fault in 63kV-500kV power transformers.

The instrument is to determine the degree of changes in internal windings of the transformer based on the quantity of change, magnitude and region affecting change and tendency of frequency response change which are quantized from the response changes in different frequency domains of transformer's internal winding parameters, and then it can help you determine whether the transformer has been severely damaged, or need a major overhaul in accordance with the measurement results.

For the transformer in operation, no matter whether the frequency domain characteristic drawing is saved, by comparing the differences between the inter-coil characteristic spectra of faulted transformer, it can determine the extent of the failure as well. Of course, if you have saved the original transformer windings feature drawings, it will be simpler to provide a precise basis for operating conditions, post-fault analysis and maintenance overhaul of the transformer.

The instrument is constituted by a laptop computer and Microcontroller forming a precision measurement system with the compact structure, easy operation, and a more complete test analysis

function, which can be operated referring to the instruction manual or through short-term training.

Ⅱ、Performance characteristics

1. Acquisition and control using high-speed, highly integrated microprocessor.
2. Communication USB interface used between a laptop and instrument.
3. Wireless WIFI interface (optional) used between the laptop computer and instrument.
4. Hardware adopts dedicated DDS digital high-speed scanning technology (USA), which can accurately diagnose the faults like winding distorted, bulged, shift, tilt, inter-turn short-circuit deformation and inter-phase contact short-circuit.
5. High-speed dual-channel 16-bit A/D sampling (in field test, move tap changer, and the wave curve shows obvious change) .
6. Signal output amplitude is adjusted by software, and the peak value of amplitude is ± 10V.
7. The computer will automatically analyze the test results and generate electronic documents (Word)
8. The instrument has dual measurement features: linear frequency scanning measurement and segment frequency scanning measurement, compatible with measurement mode of two technical groups in China
9. The amplitude-frequency characteristics are in line with the national technical specifications on amplitude-frequency characteristics tester. X-coordinate (frequency) has linear indexing and logarithmic indexing, so you can print out the curve with linear indexing and logarithmic indexing. The user can choose either according to actual needs.
10. Automatic test data analysis system,

1) Compare between A, B, C -phases in winding similarity comparison, and the analysis results are:
   ① excellent consistency
   ② good consistency
   ③ poor consistency
   ④ rather poor consistency
2) Compare winding deformation by calling the original data and comparing it with the current data of the same phase, namely A-A, B-B, C-C, and the analysis results are:

① normal winding

② mild deformation

③ moderate deformation

④ severely deformation

11. Word electronic document can be automatically generated for saving and printing.

12. The instrument can fully meet the technical requirements of electricity standard DL/T911-2004 "Transformer winding deformation frequency response analysis".

Ⅲ、Technical Parameters

1. Linear scanning distribution

1) Scanning measurement range: (10Hz) - (10MHz) 40000 scanning point, resolution 0.25kHz, 0.5kHz and 1kHz

2. Segment frequency scanning measurement distribution

2) Frequency scanning measurement range: (0.5kHz) - (1MHz), 2000 scanning points ;

(0.5kHz) - (10kHz)

(10kHz) - (100kHz)

(100kHz) - (500kHz)

(500kHz) - (1000kHz)

2. Other technical parameters:

1) Amplitude measurement range: (-120dB) to (+20dB)

2) Amplitude measurement accuracy: 0.1dB

3) Scanning frequency accuracy: 0.01%

4) Signal input impedance: 1MΩ

5) Signal output impedance: 50Ω

6) Signal output amplitude: ± 20V

7) Test repetition percent: 99.9%

8) Measuring instruments dimensions (LxWxH) 300X340X120 (mm)

9) Instrument's aluminum box size (LxWxH) 310X400X330 (mm)

10) Overall weight: 10Kg

Ⅳ、Use characteristics

1. Transformer winding deformation tester consists of the measurement part and analysis software. The measurement part is controlled by high-speed microcontroller, composed of signal generation and signal measurement components. The measurement part is connected by a wireless Bluetooth interface to the tablet computers, requiring no wiring, easy to use, or by a USB interface to the tablet PCs or laptops.
2. In the test, only the connection bus bar of transformer needs to be removed, but the transformer cover needs not to be lifted and the transformer needs not to be dismantled.
3. The instrument has a linear frequency scanning measurement function for a variety of frequency, with the scanning frequencies up to 10MHz, at a scanning interval of 0.25kHz, 0.5kHz and 1kHz, to the provide more analysis about the deformation of the transformer.
4. The instrument is highly smart, easy to use, with automatic range adjustment, automatic sampling frequency adjustment and other functions.
5. The software runs on the Windows platform, compatible with windows98/2000/winXP/Windows7/8/10 system, which provides the user with a more convenient and easy to use display interface.
6. It provides a comparative analysis of the historical curve, which can be loaded with multiple history curves for observation, among which you can select any specific curve for analysis. It is equipped with expert analysis and intelligent diagnostic system that can automatically diagnose the state of the transformer windings. It can automatically calculate parameters of each of the six curves simultaneously loaded to diagnose the winding deformation and give the diagnostic conclusions for reference.
7. The software has a power management function, and fully considers the needs of field use, saves environmental conditions parameters automatically so as to provide the basis for diagnosing transformer winding deformation. The measured data is automatically saved, with color printing capabilities to facilitate the user to print test report.
8. The software is obviously user-friendly, with most of its measurement conditions being optional, and transformers detailed parameters stored for diagnostic reference, and requiring no entry in the field. Information can be later added or modified, which is more convenient to use.
9. The software has a high degree of intelligence. After the input, the output signal is connected and the conditions parameters are set, you can do all the measurements, and can open at any time the historical waveform curve in the measurements to compare, observe and stop the measurement.
10. The time required for measuring each phase is less than 60 seconds. For a power transformer with

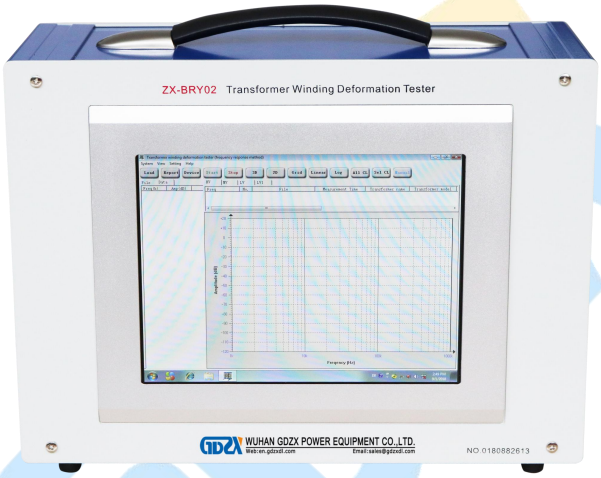
high, medium and low windings (capacity, voltage levels are not limited), the winding deformation measurement only needs a total time not exceeding 10 minutes.

11. When measuring transformers, workers can lay the signal input and output leads freely, which has no influence on the measurement results. The workers can stay on the oil tank of the transformer, without getting down to reduce labor intensity.

Ⅴ、Usage method

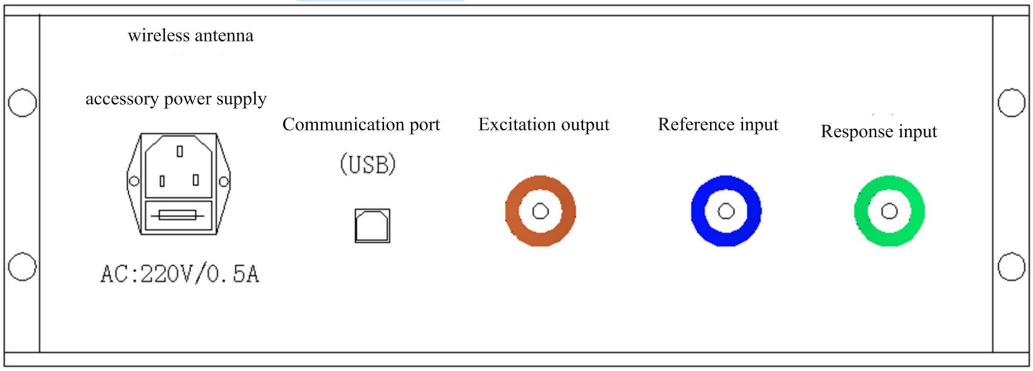
1. Instrument Panel

1) It is equipped with self-locking power switch. When press, the power is turned on, and indicator lights; when press release, the light goes out.

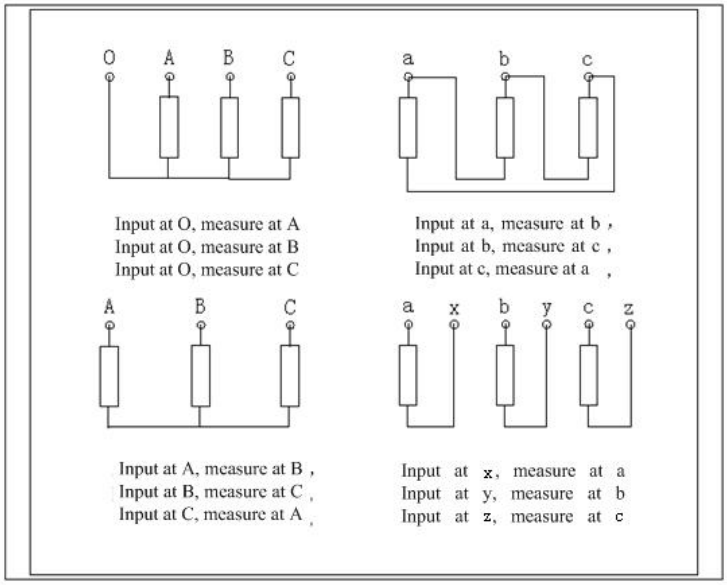


2) The instrument backboard is equipped with a power socket and hidden fuse.

3) Measurement signal port: K9 socket having consistent color with standard measurement cable, connect the color before connection;



2. Several commonly used wiring methods to transformer

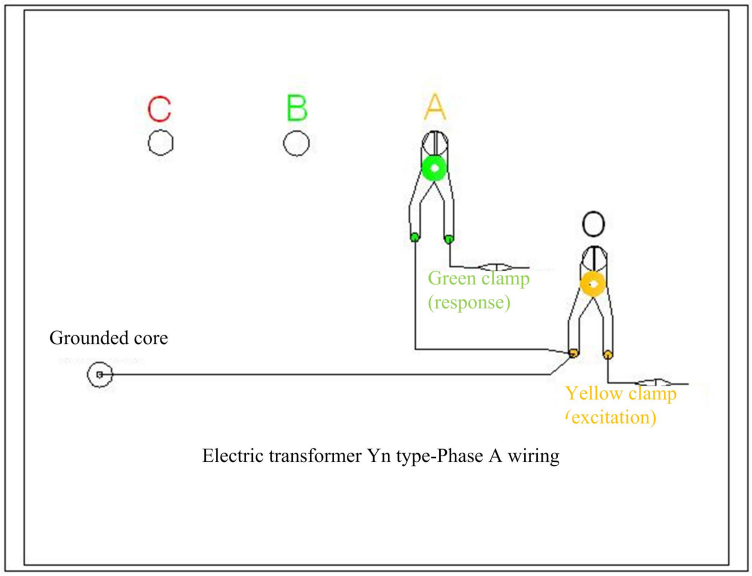


Transformer winding deformation tester is mainly composed of a main measuring unit and a laptop, three parallel special measuring cables and measuring clamps and grounding lines.

The main measurement unit is connected to the sample transformer with high frequency coaxial cable, and the scanning signal transmits via the output port (excitation output) to the transformer tested by connecting the signal cable clamp (yellow); collect the signal with the signal measurement clamp (green) to get the signal from the transformer tested via cable (in response to input); get the synchronization reference signal from the signal measurements via cable to the input (reference input). The casing of transformer tested and cable shield must be reliably connected and grounded. For a large transformer, lead of cores ground sleeve and tank serves as the connection point as a shared grounding point, so as to have transformer enclosure grounded.

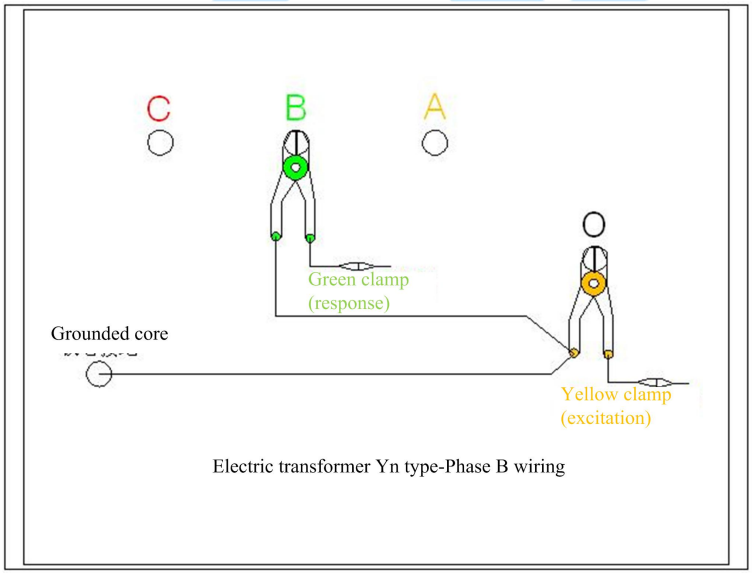
Ⅵ、Three-phase Yn-type measurement wiring

1. The measurement system shares one grounding point at the transformer core.
2. The yellow clamp is defined as inputs, fixed at ‘O' point of Yn; the green clamp is defined as the measurement, fixed at phase A.
3. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
4. The above wiring form the three-phase Yn-type phase A measurement wiring.



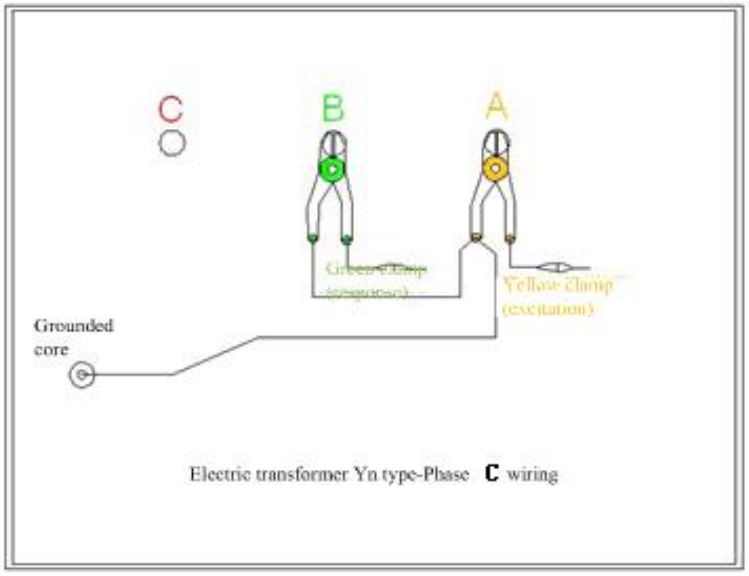
Electric transformer Yn type-Phase A wiring

5. The measurement system shares one grounding point at the transformer core.
6. The yellow clamp is defined as inputs, fixed at ‘O' point of Yn; the green clamp is defined as the measurement, fixed at phase B.
7. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
8. The above wiring form the three-phase Yn-type phase B measurement wiring



Electric transformer Yn type-Phase B wiring

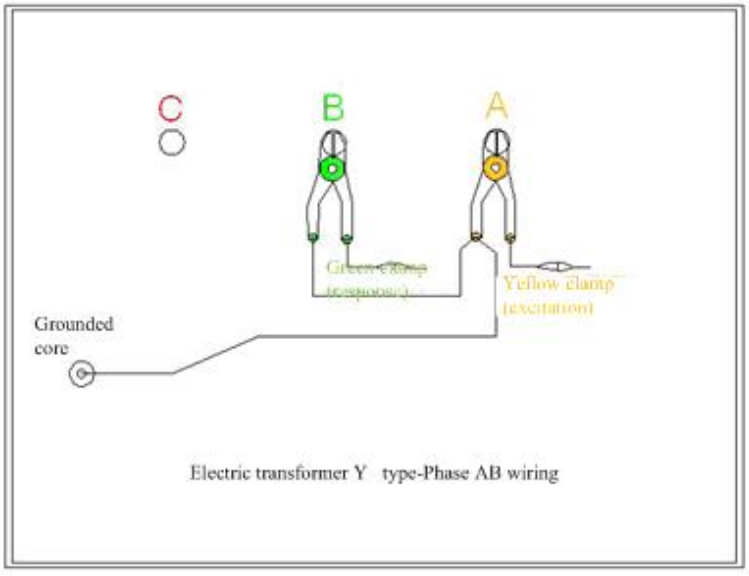
9. The measurement system shares one grounding point at the transformer core.
10. The yellow clamp is defined as inputs, fixed at ‘O' point of Yn; the green clamp is defined as the measurement, fixed at phase C.
11. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
12. The above wiring form the three-phase Yn-type phase C measurement wiring.



Electric transformer Yn type-Phase **C** wiring

Ⅶ、Three-phase Y-ype measurement wiring

1. The measurement system shares one grounding point at the transformer core.
2. The yellow clamp is defined as inputs, fixed at Phase A of Y; the green clamp is defined as the measurement, fixed at phase B.
3. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
4. The above wiring form the three-phase Y-type phase A,B measurement wiring.

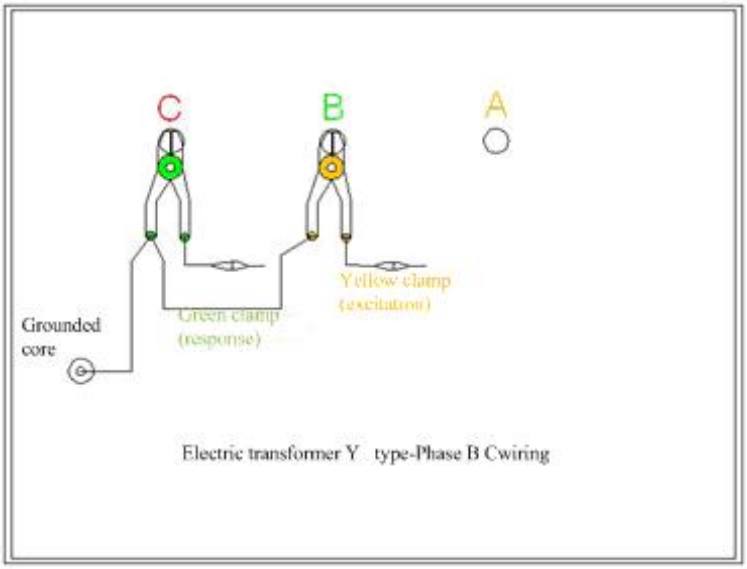


Electric transformer Y type-Phase AB wiring

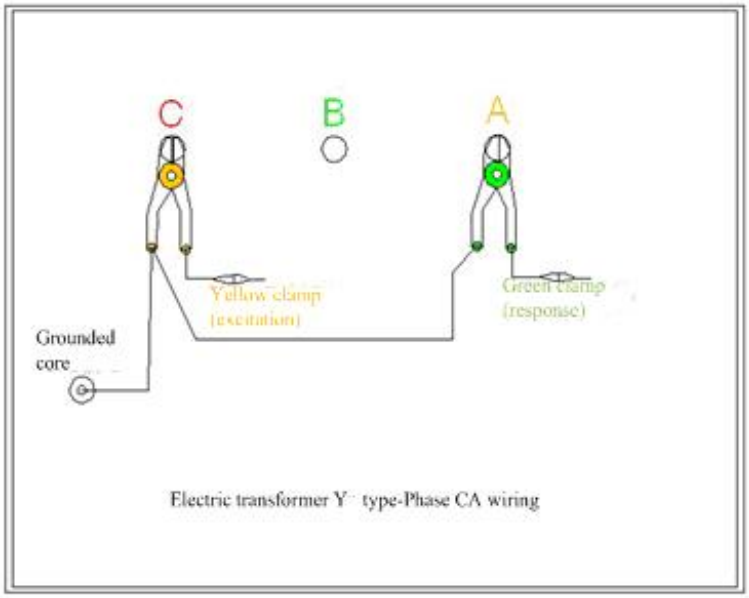
5. The measurement system shares one grounding point at the transformer core.
6. The yellow clamp is defined as inputs, fixed at Phase B of Y; the green clamp is defined as the measurement, fixed at phase C.
7. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of

yellow clamp, and then connects to a ground wire, connected to the core grounding.

8. The above wiring form the three-phase Y-type phase B, C measurement wiring.



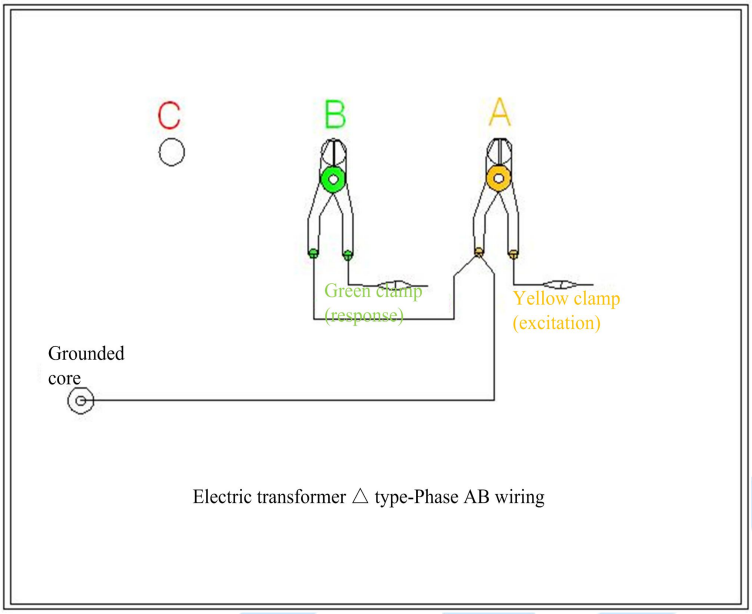
9. The measurement system shares one grounding point at the transformer core.
10. The yellow clamp is defined as inputs, fixed at Phase C of Y; the green clamp is defined as the measurement, fixed at phase A.
11. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
12. The above wiring form the three-phase Y-type phase C, A measurement wiring.



Ⅷ、Three-phase △-type measurement wiring

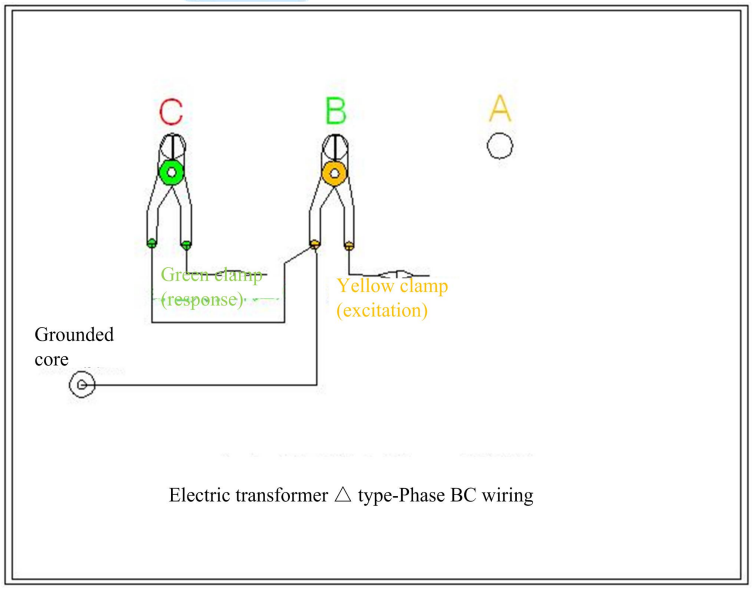
1. The measurement system shares one grounding point at the transformer core.

2. The yellow clamp is defined as inputs, fixed at Phase A of △; the green clamp is defined as the measurement, fixed at phase B.
3. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
4. The above wiring form the three-phase △-type phase A, B measurement wiring.



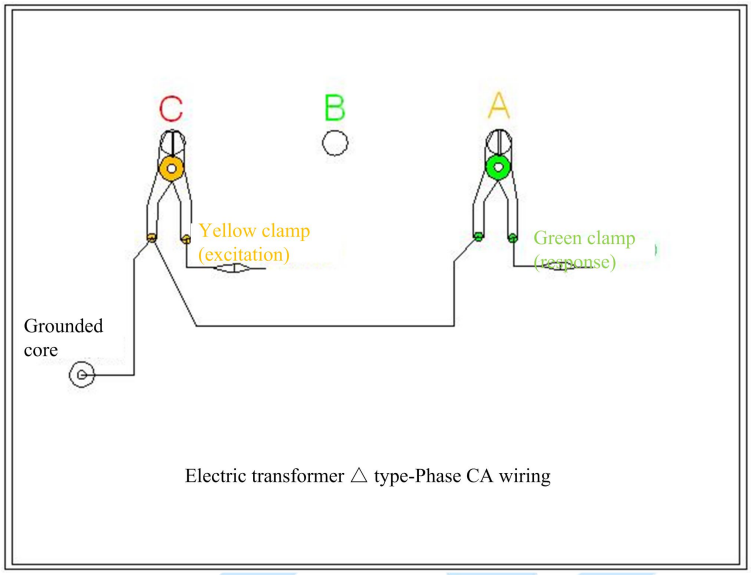
Electric transformer △ type-Phase AB wiring

5. The measurement system shares one grounding point at the transformer core.
6. The yellow clamp is defined as inputs, fixed at Phase B of △; the green clamp is defined as the measurement, fixed at phase C.
7. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
8. The above wiring form the three-phase △-type phase A, B measurement wiring.



Electric transformer △ type-Phase BC wiring

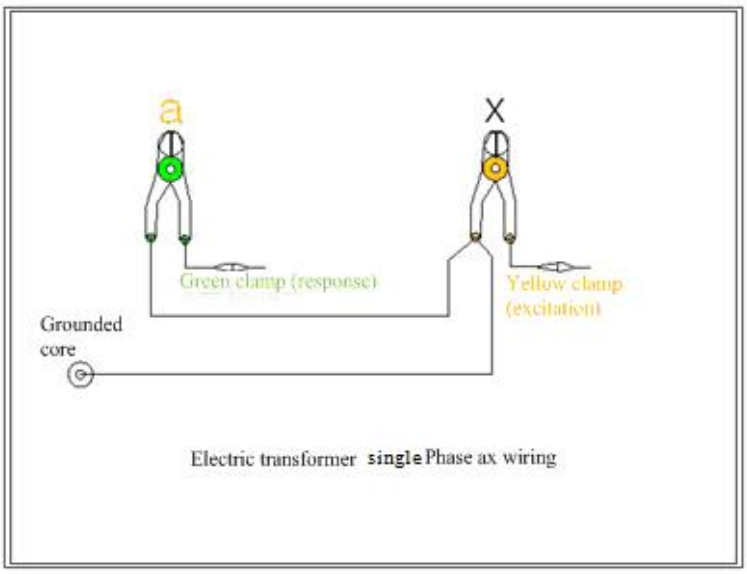
9. The measurement system shares one grounding point at the transformer core.
10. The yellow clamp is defined as inputs, fixed at Phase A of △; the green clamp is defined as the measurement, fixed at phase B.
11. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
12. The above wiring form the three-phase △-type phase A, B measurement wiring.



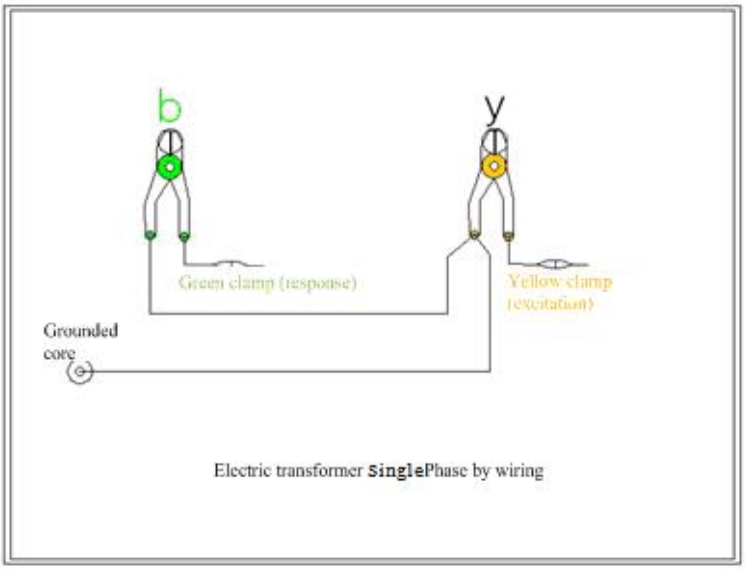
Electric transformer △ type-Phase CA wiring

Ⅸ、Single Phase X, Y, Z measuring wiring

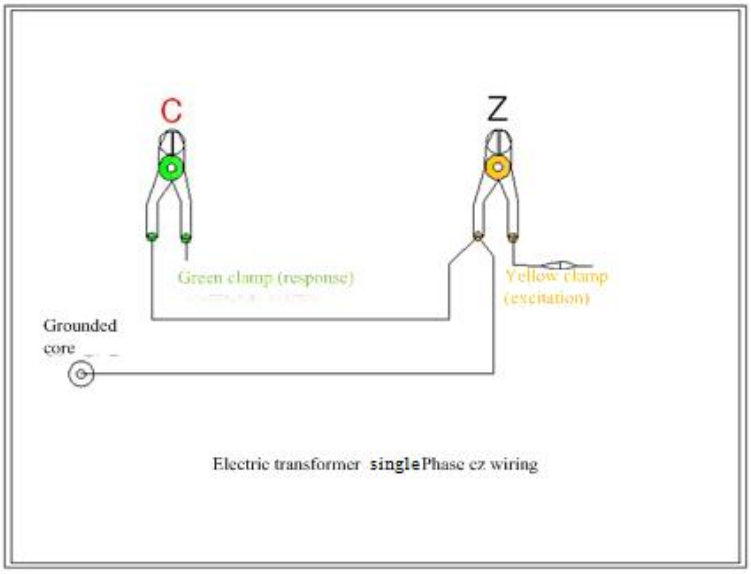
1. The measurement system shares one grounding point at the transformer core.
2. The yellow clamp is defined as inputs, fixed at y point of a single phase; the green clamp is defined as the measurement, fixed at point b.
3. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
4. The above wiring forms the phase X measurement wiring.



5. The measurement system shares one grounding point at the transformer core.
6. The yellow clamp is defined as inputs, fixed at y point of a single phase; the green clamp is defined as the measurement, fixed at point b.
7. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
8. The above wiring forms the phase Y measurement wiring.



9. The measurement system shares one grounding point at the transformer core.
10. The yellow clamp is defined as inputs, fixed at y point of a single phase; the green clamp is defined as the measurement, fixed at point b.
11. The grounding grid is connected from the ground wire hole of green clamp to the ground wire hole of yellow clamp, and then connects to a ground wire, connected to the core grounding.
12. The above wiring forms the phase Z measurement wiring.



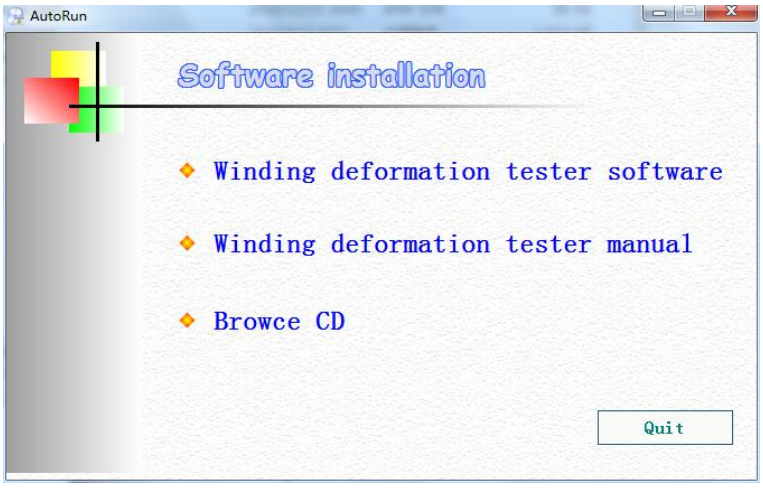
Note:

The instrument shall be preheated 15 minutes before measuring; if in the case of low temperatures in winter, preheating time should be appropriately extended to ensure the normal measuring of instruments.

Strictly connect the grounding wire as required in figure; specially, the response signal grounding clamp shall be first connected to the grounding clamp of excitation signal through a cable; and then grounded by the grounding cable excitation signal and the core to ensure the proper flow direction of signal current.

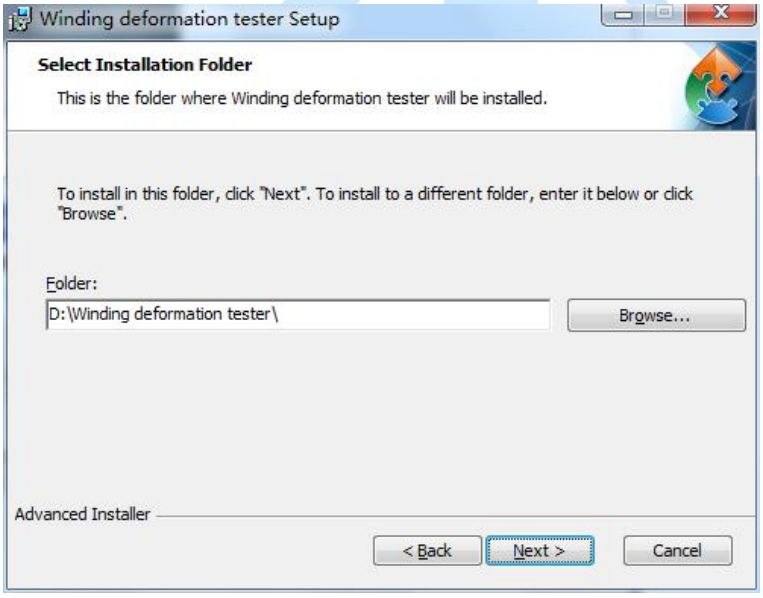
Ⅹ、Installation of PC test software

1. Place the software CD into the drive; if it can run automatically, it will go directly to the installation interface of the software, or otherwise click on the drive in "My Computer" to run "autorun.exe" in CD; enter the installation interface of the software.

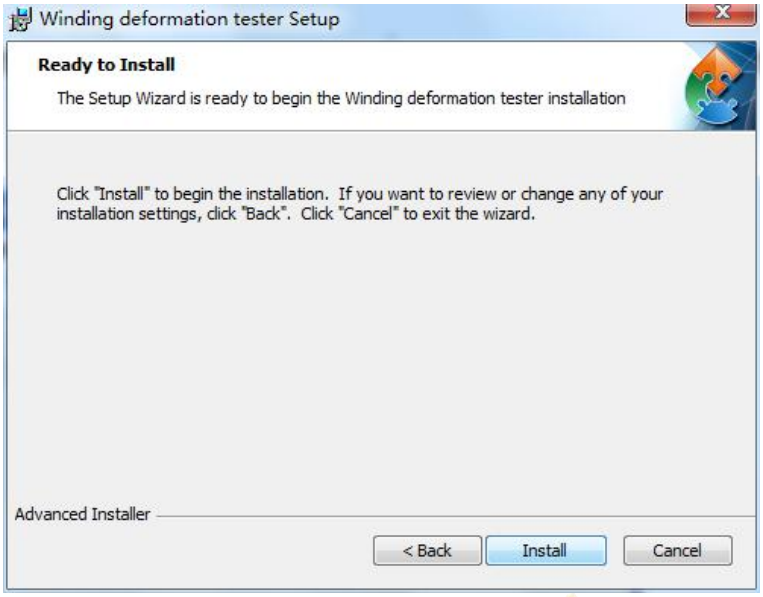


2. Choose the winding deformation tester software installation; it will enter installation wizard of winding deformation tester software. Directly select "Next."

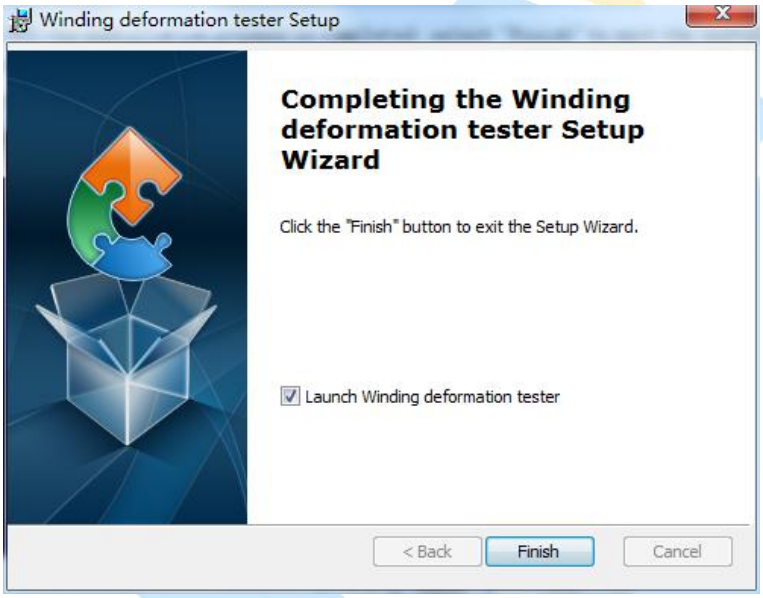
3. At this point, set the installation path of the software; if you do not change the default installation path, directly select "Next."



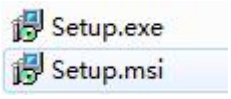
4. Have completed all of the setup process; choose "Install" to start the software installation.



5. All the installation process is completed; select "Finish" to exit the installation wizard.



6. To install winding deformation tester software, you can also directly enter the "Winding deformation tester" directory in the CD-ROM; run the following two programs to start the software installation wizard.



7. After the installation is completed; two software icons will show on the Desktop; the installation directory of the "Transformer winding deformation tester" will show in Start menu with two software icons.

8. Uninstall the software; select installation directory of "transformer winding deformation tester" in the Start Menu; Select the "Uninstall", and the following dialog box will appear; confirm and the software will be uninstalled.

XI、User interface of PC test software

All operations except for the wiring of the instrument can be done on the computer. After checking that the test connection is correct, turn on the computer power switch. After the computer runs normally, then start the power supply of the main measuring unit, whose indicator should display properly. If only analyze the measured data, do not connect and start the main measuring unit, and only start the computer; after the computer starts, double-click the execution icon of the instrument, start the work program.

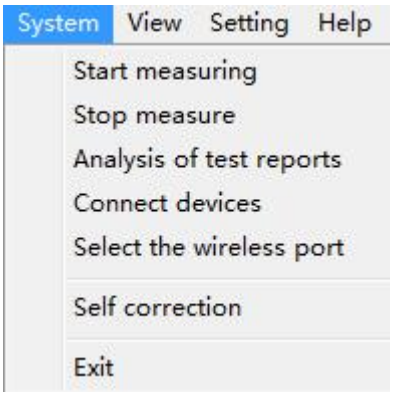
The following describes the functions of the software interface in each region.

Note: Enter the system or re-install the system at the first time; the system will automatically perform parameter initialization, keep the power on for all devices; USB is correctly connected; this process may take several minutes, please be patient. After the initialization is completed, the process will not occur in future use.

1. Menu Bar

Enter the software; on the top left is the menu bar, respectively including the four pull-down menu "System", "View", "Settings" and "Help". Specific functions of each pull-down menu are introduced below.

1) System



① Start measuring; before beginning testing transformers, some parameters need to be set; it is generally recommended to start the course of the test in the measurement region (see below for more details).

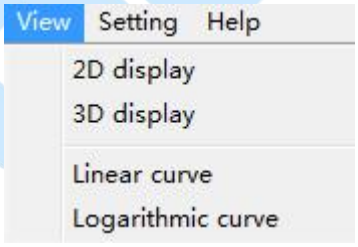
② Analysis of test reports; according to the current test curve, which shows the detailed test report, but before conducting analysis, select the parameters like curve to be analyzed and displayed, so it is recommended to display analysis process in the area of the curve analysis (see below for details).

③ Connect devices; when running this software, if the USB cable is not connected, re-connect after the USB cable and test instrument has been powered by re-selecting the item. Run the software after confirming the USB cable is connected and the test instrument is powered on.

④ Select the wireless port, which is the connection using a handheld machine.

⑤ Exit the system; select this item to exit after completion.

2) View



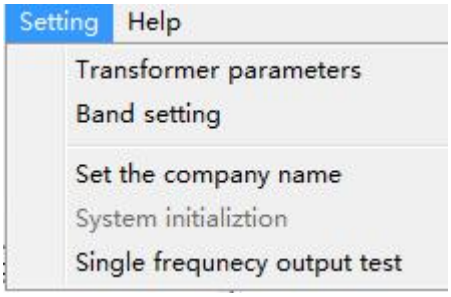
① 2-dimensional display; the coordinates for the current test curve and the historical curve are two-dimensional. Then you can observe if the multiple curves are the same.

② Three-dimensional display; the coordinates for the current test curve and the historical curve are three-dimensional. Then you can observe many details of each curve.

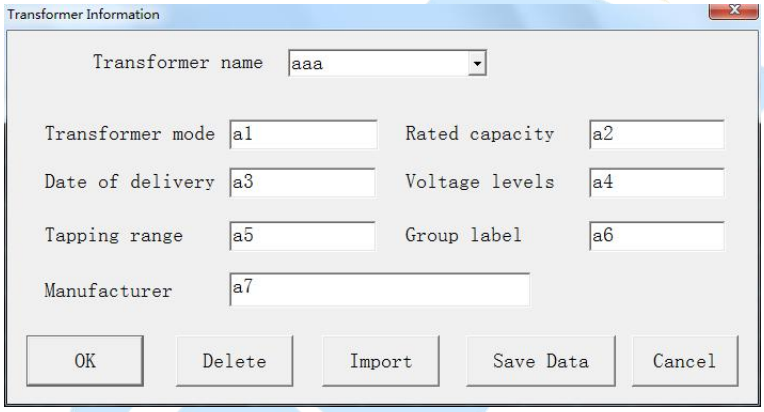
③ Linear curve; the coordinate X frequency of the current test curve and the historical curve increases linearly. Then you can observe the details of the different frequency segments of curves.

④ Logarithmic curve; the coordinate X frequency of the current test curve and the historical curve increases logarithmic ally. Then you can observe the details of the low frequency segments of curves.

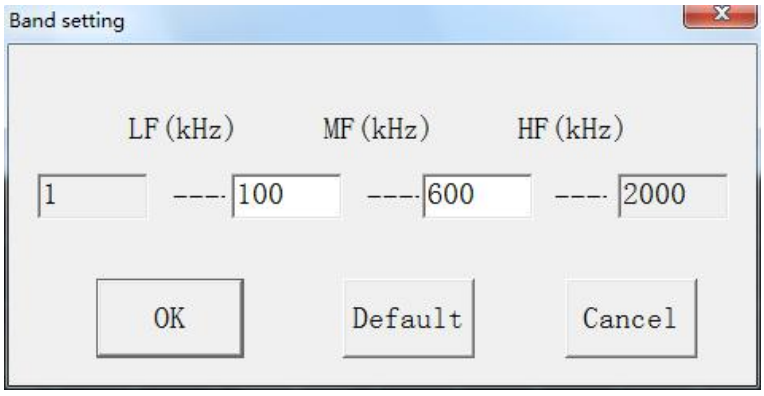
3) Setting



① Transformer parameters; select the item to open a transformer parameters dialog box; set the parameters, and press the "OK" button to save the input data. Press the "Cancel" button to abandon the input data. Press the "Write Data File" button to enter the parameter of this transformer into the historical curve, overwriting the previous transformer parameters. (This feature is for when the transformers on-site testing is performed, simply set up temporary transformer parameters, and then want to change transformer parameters saved again after the completion of the test.)

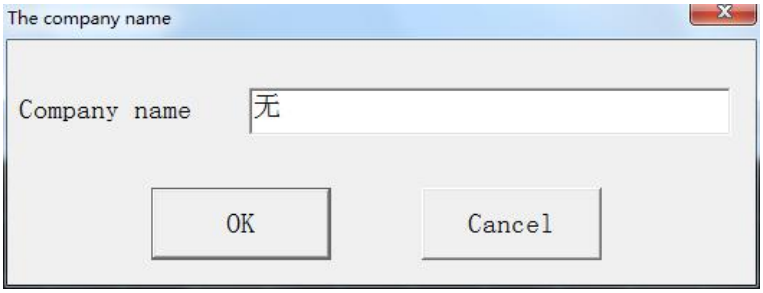


② Band setting; select the item to open a dialog box for scanning frequency of low, medium and high frequency bands; after setting the range of each band, press the "OK" button to save the input data; press the "Cancel" button to abandon input data; press the "Restore" button to revert to the default frequency setting. The setting parameters of this item are only shown in the printed report.



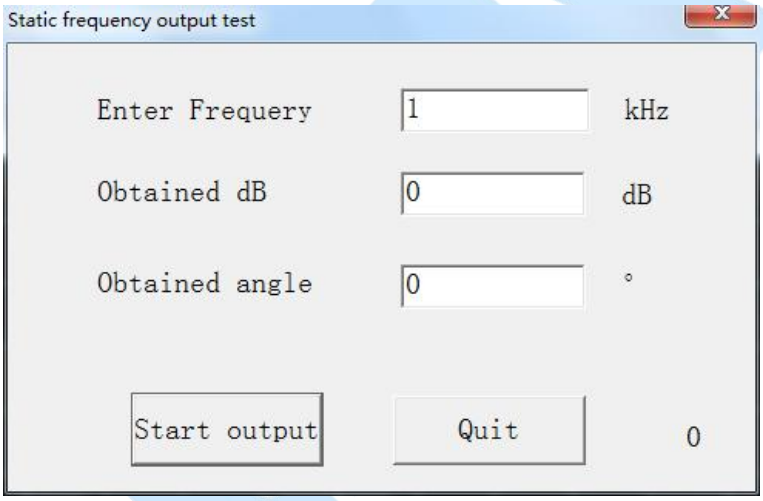
③ Set the company name; after selecting the item, it will open a dialog box that asks for the name of the company; press the "OK" button to save the entry; press the "Cancel" button to abandon input.

The company name set in this item can be shown only in printed reports.

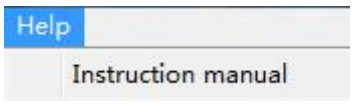


④ System initialization; when the system is first installed or used after installation; in operation, the option will be automatically activated to start the initialization process of measured parameters for the system. Generally, users do not need to manually use the item.

⑤ Fixed frequency output test; selecting this item to open a dialog box that requires input and output frequencies; select "Start Output" to show the DB values obtained after output. This feature is mainly used to provide to external instrument for detecting the precision of frequency and amplitude of this instrument.



4) Help



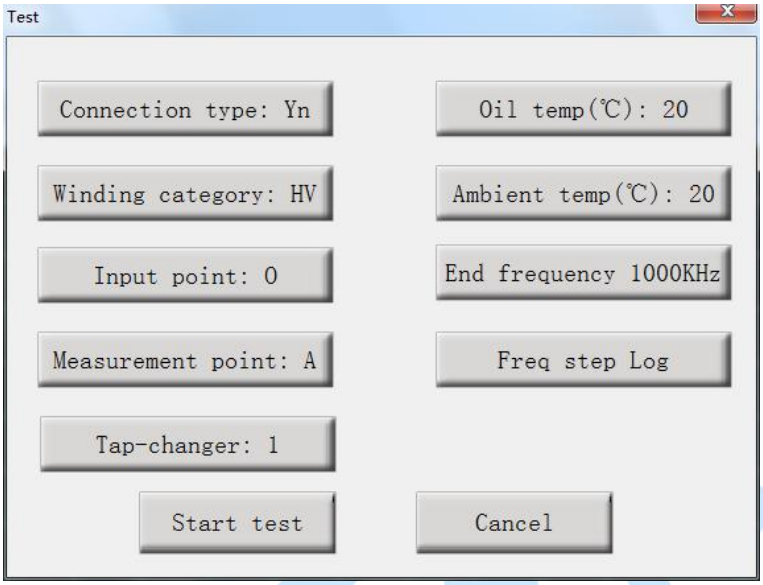
you can browse the manual of winding deformation tester on the computer.

2. View

Below the menu bar, it is the view and measurement region; select different items, and the content below will also change. When viewing and analyzing curve data file after the test is completed, select "View". At this point, the file system tree is shown below; select the saved curve data file, please refer to the software testing process for the specific operation.

3. Measuring

When preparing for transformer testing, select "Measure". When measuring transformers below, fill in some parameters to the "Transformer parameters" key with the menu transformer parameters (Note: If the measurement is stopped during test, the measurement will not be able to continue, and the data can not be saved.)

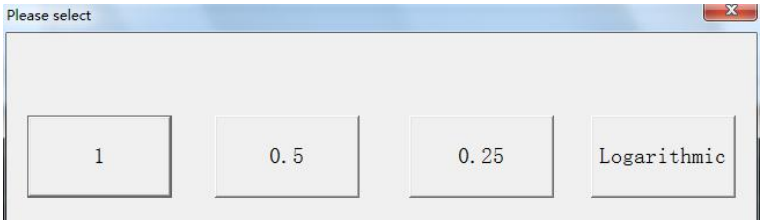


4. Curvilinear coordinates

The centered coordinate system is curvilinear coordinates, where the X-axis is frequency, Y-axis is decibels; the historical curve and measurement curves are displayed in this coordinate system, and the specific operational function description can be seen in the software testing process.

5. Setting

Before beginning the measurement, set the end frequency and frequency step size of the measurement; when the end frequency range is 600k-2000k Hz, the frequency step can be 1kHz, 0.5kHz and 0.25kHz; when selecting 0.25kHz and 0.5kHz step size, the end frequency can not be greater than 1000k Hz. You can also choose a logarithmic distribution, but the end frequency can only be 1000k Hz.



6. Curve data analysis management window

The windows described above are the curve data analysis management window, and the specific

operating functions description can be seen in the software testing process.

7. Toolbar

Most of these functions can be selected directly on the toolbar, which is easier to use.

Ⅻ、Process of PC test software

1. USB driver installation

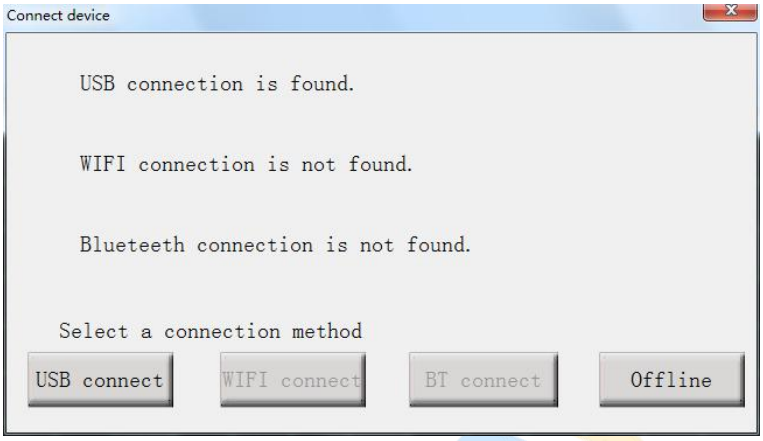
1) When the power supply of tester is turned on, and the USB wiring is correct, the computer will display the that new hardware is found by wizard. If it displays "USB CH372/CH375", select "Install from a list or specific location (Advanced)", then click "Next."

2) Then select "Search for the best driver in these locations", check "Include this location in the search", and enter into the following address of drive letter of the software CD. Select "Next" when finished.

3) If the path of discs is correct, the system will automatically install the USB driver program. Wait for a minute, and the system completes the installation of the USB driver program, and you can use the test software.

2. Select function

After running the software, the function selection will appear. When the device is powered on, the USB connection is connected and the USB driver is installed, USB connection will appear, or otherwise only offline application can be selected.



3. Measuring

After entering the software, click on the "Measure", and the registration window for transformer under test shows; click the "Transformer parameters", select or fill in the parameters of the new transformers tested as prompted on the screen; after confirmation, enter into the computer the type of transformer windings, connection type, signal input side, signal measurement side, high and low voltage tap-changers, oil temperature and ambient temperature. (The system will automatically select the correct signal input end, signal measuring end) after input is completed, press the "Start Measurement" to measure. Because the file name and saved is related to the input information, so please fill in the relevant information. In case of failure to select the transformer parameters, the system refuses to start the measurement.

Note: The contents of all transformer parameters can not contain spaces or special characters.

After the measurement is completed, the system will automatically select the next phase. You can press the "Start measurement" to proceed to the next phase measurements after correct wiring is complete. If in manual modification of the measurement parameters, the phase tested occurs, the system will automatically alert to prevent the incomplete measurement process because of the omission of measurements. During the measurement, you can select the historical data curve in the data analysis management window, so you can compared the horizontal or vertical curves in the test in order to detect wiring errors if any, and timely stop measuring and correct. In the measurement, data display window will track and display related data and measurement can be interrupted at any time. After the measurement,

the data saved window will appear, and data analysis curve will appear in the data file management window. Then the next measurement can be started.

4. Call data files

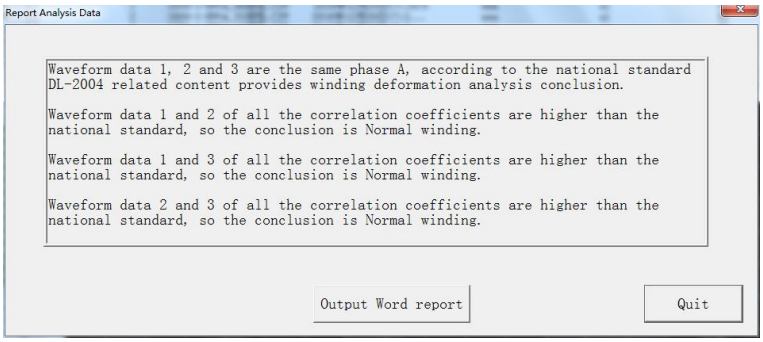
Select "Browse", there will be a data file system of tree structure. You can double-click the file name or click the file in front of the selection box, the required data file hook and add to the file enumeration window, (above the software interface). When the window file is selected, the data contained in the curve will be displayed in the curve coordinate system, the curve data analysis results will be displayed in the data analysis list. (below the software interface). Double click the file name or click the file in front of the selection box, you can cancel the data file is displayed. Select "Analysis test report", test report of top three curves in the data files selected to display will show and can be printed.

Note: The different maximum test frequencies or frequency step size data files can not be called and analyzed together.

Frequency range	R12	R13	R23	R45	R46	R56
LF	7.288	5.203	5.254			
MF	7.173	7.200	7.441			
HF	7.074	4.588	4.589			
AF	7.739	5.737	5.770			
Conclusion	Excellent consistency	Excellent consistency	Excellent consistency			

5. Report Analysis Data

Select "Analysis Test Report", and there will be a data file report. At top is the file name and the measurement time of the curve added; at the middle is the correlation coefficient of the curve, divided into low frequency, medium frequency, high frequency and overall conclusions. If the logarithmic coordinates are chosen, all the correlation coefficients are for reference, ranging between 0 and 10, the higher numbers indicating the better similarity. If you select an average coordinate system, the correlation coefficients for each band are reference numbers ranging between 0 and 10, the higher numbers indicating the better similarity. The overall conclusion will show different results depending on the phase relationship between the curves selected. For the two curves of different phases, according to the magnitude of the correlation coefficient, the results like "Excellent consistency", "Good consistency", "Poor consistency", "Rather poor consistency" will show. If two curves of the same phase are selected, depending on the magnitude of the correlation coefficient, the results like "Normal winding", "Slight deformation", "Significant deformation", "Serious distortion" will show. Select "Print Test Report", print directly test curve reports generated, and select the "Output Word Report", a test report in Word document can be viewed and printed.



6. Analysis of data curves

After calling the data files, apply the linear or logarithmic coordinates to display waveform, you can use a two-dimensional or three-dimensional mode to view a variety of curves; select "Data" on toolbar, you can open the folder where the file data are saved, which is user-friendly for direct viewing data files or Word analysis report.

7. Other operations

Select "Settings" in the "Band Settings", you can set the ranges of low, medium and high frequency, which will affect the correlation coefficient and standard deviation in the report to be displayed.

XIII、Wireless driver installation (Tablet PC Accessories)

1. laptop or PDA and wireless WIFI module operation process, using Windows own wireless network manager and wireless WIFI server link. Before proceeding, please note that the computer's wireless network card has been opened (if it is an external wireless network card, please insert the computer, if the built-in wireless network card, please confirm that the function has been opened) and the steps are as follows:
2. make sure to open the instrument power, and then open the wireless network manager to find the WIFI server named USR-C215.

3. choose to connect to this server, password is “12345678”, after the success of the connection can be normal use of this instrument.

XIV、Test procedure and cautions

1. First check if the transformer is properly grounded, and the casing leads are all disconnected.
2. Record if the nameplate data and original conditions of the tested transformer are normal, and the position of tap-changers under the current test conditions and carefully enter it into the registration window.
3. Create the a subdirectory for test data file of the transformer tested; after the test, copy the measurement data to the directory, and sort the data well.
4. Data saving format: file is saved in ASCII format, and the user can read and modify it with a variety of text -editing software to.
5. Test the transformer that just stops running. Before the measurement, allow it to cool down the heat; but in the entire measurement process, stop cooling to maintain the temperature, so as to prevent temperature changes in the measuring process affecting the consistency of measurement results.

XV、Random attachmen

NO.	name	Quantity	Remarks
1	Host		Latest DDS scanning technology (U.S.)
2	Test Cable	2	High-frequency co-axial cable 50Ω/(15m)
3	Test clamp	2	yellow, green(200A)
4	Ground wire	4	5m
5	Grounding clip	2	black
6	USB communication cable	1	
7	CD	1	VCD format
8	U disk	1	8G
9	fuse	3	2A
10	Power cable	1	

11	mouse	1	
12	mouse pad	1	
13	manual	1	
14	Test Report	1	
15	Certificate / Warranty Card	1	
16	Aluminum alloy box	1	