Know your transformers more accurately.

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JYR-20S

Transformer DC Winding Resistance Tester

A **10 Output Current Settings (Max.20A)**

B **Test range 0 ~ 20kΩ, cover all type of transformers, switch contacts, PT's and CT's**

C **Automatically calculate 5" 15" 30" resistance deviation percentage**

D **Automatic temperature conversion (20℃/75℃/120℃) & Demagnetization function**

E **It can simultaneously test the three-phase resistance of windings with Yn, Y, and D connection types, automatically switch phases, and calculate the three-phase unbalance rate.**

JYR20S Technical Specification:

Tester type	JYR-20S							
Scope of application	20A	3A	1A	300mA	100mA	30mA	10mA	Auto
Test range	Single Phase: 0~20KΩ / Three Phase Simultaneously: 0~360Ω							
Accuracy	0.2%±0.2μΩ							
Minimum resolution	0.1μΩ							
Standard conversion temperature	20℃/75℃/120℃							
Output Voltage	DC24V							
Volume	Length 420mm Width 320mm Height 200mm							
Net weight	13.8KGS							

I. Overview

The DC resistance of the transformer is a mandatory test item for the semi-finished products, finished product factory tests, installation, handover tests and preventive tests of the power sector in the manufacture of transformers, which can effectively find manufacturing defects such as material selection, welding, loose connection parts, lack of shares, broken wires and hidden dangers after operation of the transformer coil. In order to meet the needs of rapid measurement of dc resistance of transformers, **Kingrun Company** has developed a new generation of **JYR** series DC winding resistance testers by using its own technical advantages. The instrument adopts a new power supply technology, which is characterized by small size, light weight and large output current. It is a test instrument optimized for measuring the DC resistance of three-phase windings of large-capacity transformers. The three-phase winding DC resistance of the transformer can be tested simultaneously. For on-load voltage regulating transformers, there is no need to discharge, directly adjust the tap, the measurement time is one-third of the traditional single-phase measurement, which can greatly shorten the working time. The whole machine is controlled by a single-chip microcomputer, which automatically completes the functions of self-test, data processing, display, etc., and also has functions such as automatic discharge and discharge sound alarm indication. This instrument test data is stable, high precision, fast speed, good repeatability, is the best choice for on-site measurement of transformer DC resistance.

II. Security measures

1. Be sure to read this manual carefully before using this instrument.
2. The operator of the instrument should have common knowledge of the use of general electrical equipment or instruments.
3. This instrument can be used indoors and outdoors, but it should be avoided in places such as rain, corrosive gases, excessive dust, high temperature, and direct sunlight.
4. This instrument is a high-precision instrument, should avoid severe vibration, transportation should take certain shock absorption measures.
5. Repair, maintenance and commissioning of this instrument shall be carried out by professionals.
6. In order to ensure personal safety, a reliable ground wire should be connected before the power supply is turned on, and the removal of the ground wire should be carried out after the power supply is removed.
7. During the test, it is forbidden to disassemble and move the test clip and power supply line. After the test is completed, it is necessary to wait for the discharge alarm sound to end before the test line can be removed.

8. For unloaded voltage regulated windings, it is not allowed to switch the loadless tap-changer during the test or when the power is not discharged.
9. During the test, the power supply is suddenly cut off, the instrument will begin to discharge automatically, at this time it is not allowed to immediately dismantle the test line, and the test line can be dismantled after the discharge alarm sound is over.

III., performance characteristics

1. Fixed current output (10mA-20A total 8 gears), automatic current output (0.03-20A automatically set the optimal current according to the resistance value of the sample).
2. With a wide measuring range (0Ω-20K Ω), it can measure inductive DC resistance such as transformers and transformers.
3. It has the functions of single-channel measurement, YN three-phase simultaneous measurement, YN three-phase compensation simultaneous measurement (including O-phase resistance), YND11 transformer automatic magnetization, YN three-phase phase selective measurement, D/Y three-phase phase selective measurement, and automatically calculates the three-phase resistance balance rate.
4. Assist in judging data stabilization function. Automatically calculates the percentage of resistance deviation of 5", 15" or 30" to accurately determine the readability of data and prevent misreading of data.
5. According to the temperature conversion function of the test material (copper, aluminum), it is convenient to compare with historical data.
6. It has the function of transformer demagnetization, which can effectively reduce the residual magnetism of the transformer.
7. With perpetual calendar, 100 sets of data storage, Chinese and English interface selection and other functions, shutdown does not lose data. There is also a micro printer, "USB stick" interface.
8. The monitor adopts a 6-inch color touch LCD screen.
9. Dual RS485 communication interface, convenient cascading between devices. With the host computer control software, to achieve long-distance control measurements, but also optionally installed built-in Bluetooth module, to achieve Bluetooth wireless communication.

10. With acoustic discharge alarm, the discharge indication is clear, reducing misoperation.
11. With input misconnected AC380V power supply protection function, protect the rear audio alarm to reduce the damage to the instrument by misoperation, the instrument also has a perfect anti-potential protection function, strong anti-arc resistance.
12. It has the characteristics of dustproof, shockproof, moisture-proof, high measurement accuracy, good stability and repeatability, and easy to carry.

IV. Specifications

1. **Output current:Auto**、20A、10A、3A、1A、300m A、100mA 、30mA、10mA、10mA
2. **Test Range:**

Auto (30mA -20A)	0Ω - 600Ω	(3 phase measurement 0.001 Ω - 360Ω).
20A	0Ω – 1.0Ω	(3 phase measurement 0.001 Ω–0.6 Ω).
10A	0.001 Ω – 2.0Ω	(3 phase measurement 0.002 Ω–1.2Ω).
3A	0.003Ω – 6.0Ω	(3 phase measurement 0.006Ω–3.6Ω).
1A	0.01Ω – 20Ω	(3 phase measurement 0.02Ω – 12Ω).
300m A	0.03Ω – 60Ω	(3 phase measurement 0.06Ω - 36Ω).
100m A	0.1Ω – 200Ω	(3 phase measurement 0.2Ω - 120Ω).
30m A	0.5Ω – 600Ω	(3 phase measurement 1.0Ω - 360Ω).
10m A	20Ω – 20kΩ	(single phase test only).

3. **Accuracy:** 0.2% ±0. 2μΩ
4. **Minimum resolution:** 0.1 μΩ
5. **Working temperature:** -20~ 40 °C
6. **Ambient humidity:** ≤ 80%RH, no condensation
7. **Power supply:** AC: AC220V±10%, 50Hz±1Hz
8. **Volume:** Length 420mm× width 320mm× height 200mm
9. **Net weight:** 13.8kg

V. System Introduction

See Figure 1 for the instrument panel.

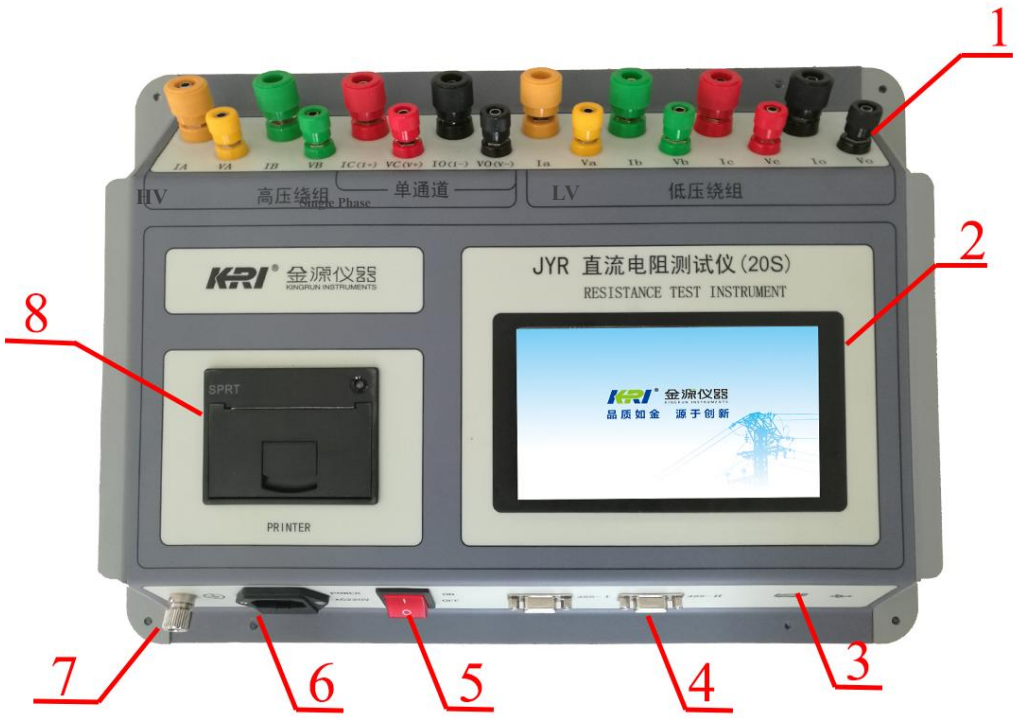

figure 1

1. Terminal area **of** the terminal **post**

IA, IB, IC, IO terminals: Current output terminals for high-voltage winding measurement.

VA, VB, VC, VO terminals: Voltage input terminals for high-voltage winding measurements.

Ia, Ib, Ic, Io terminals: Current output terminals for low-voltage winding measurements.

Va, Vb, Vc, Vo terminals: Voltage input terminals for low-voltage winding measurements.

I+, I-terminal: Current output terminal for single-channel measurements.

V+, V-terminals: Voltage input terminals for single-channel measurements.

2. Display: large screen true color touch LCD monitor.

3. USB stick interface: Connect a USB stick to export memory data.

4. 485-I/485-II: Two 485 communication interfaces.

5. Power switch: Control the power supply of the whole machine on and off.

6. Power input port: the whole machine AC power input port, input rated voltage AC220V frequency 50Hz(can be customized according to application area), with fuse warehouse with fuses inside.

7. Grounding column: for the whole machine shell grounding.

8. Printer: Prints the current, resistance value, and ancillary information results.

VI. Test and Operation Method

1. **Measurement wiring:** the tested product through the special test cable and the test post of the machine connected, test the large tab of the test cable is connected to the current end, and the small tab is connected to the voltage end. The connection is secure and prevents loosening. At the same time, connect the ground wire well. The wire clamp ends are clamped at the ends of the coil resistance of the test specimen at each end of the lead-out end. For the specific wiring method, please refer to the connection diagram below to take the YND11 transformer a an example. The following example wiring is the least measured wiring, and the lead-out column that does not test the winding needs to be independently suspended. Three-channel measurement wiring: (**three phase measurements of the YN winding)** wiring is shown in Figure 2

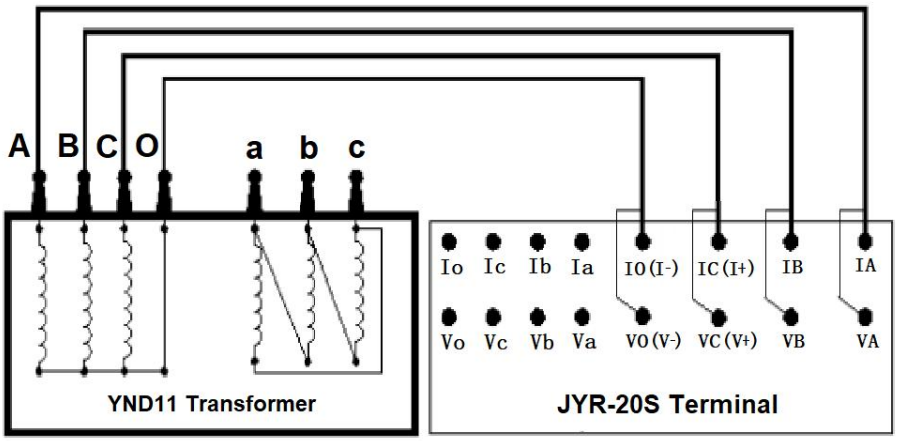

Figure 2

Phase to phase measurement of the YN winding: (The YN winding phases are measured separately) The wiring is shown in Figure 2

D/Y winding phase to phase measurement: (D/Y winding of each phase of the measurement) D winding wiring is shown in Figure 3

Y winding wiring is equivalent.

Instrument high voltage winding terminal supports **three phase** measurement **of YN windings, YN/D/Y winding phase selection measurement, YN/D/ Y windings phase by phase measurement.**

The instrument low-voltage winding terminal supports **YN/D/Y winding phase selection measurement and YN/D/Y winding phase-by-phase measurement.**

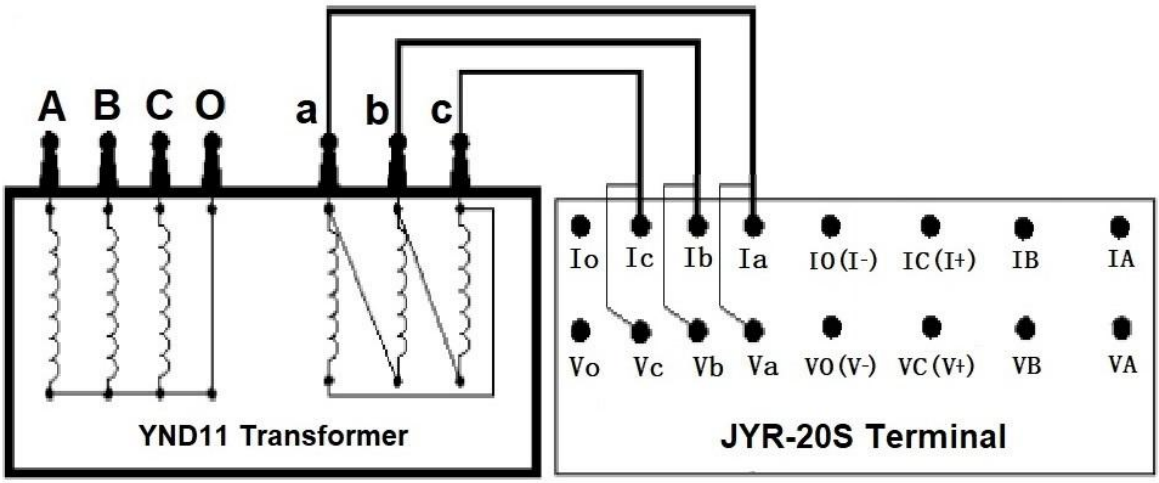

Figure 3

Single-channel direct measurement wiring: (YND11 transformer CO phase measurement) see Figure 4.

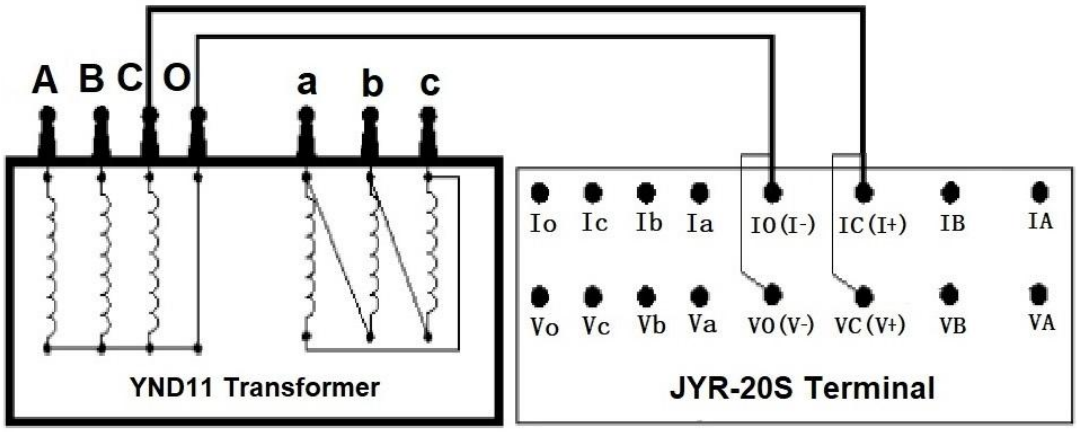

Figure 4

Yn winding phase by phase measurement: (Yn winding each phase measurement) Yn winding wiring is shown in Figure 5 as below:

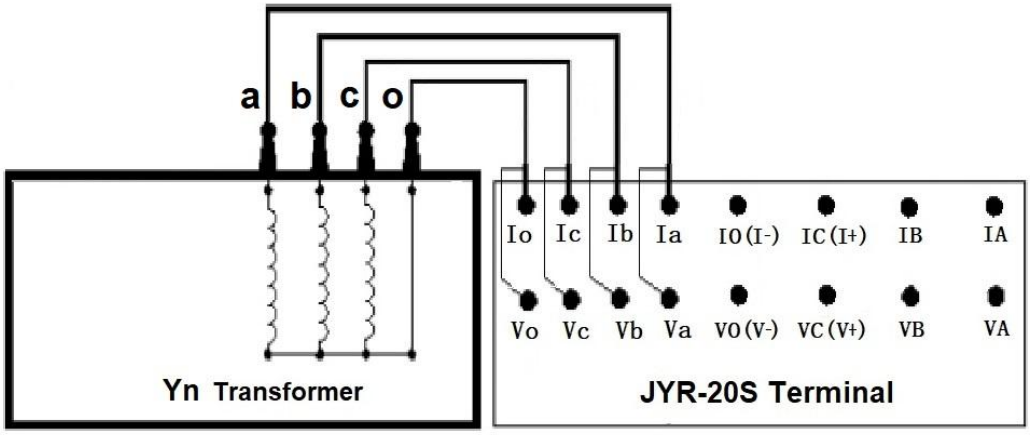

figure 5

Iron Core five-post YND11 transformer magnetic measurement wiring: (optional or phase by phase magnetic measuring low-voltage windings).

See Figure 6(I)

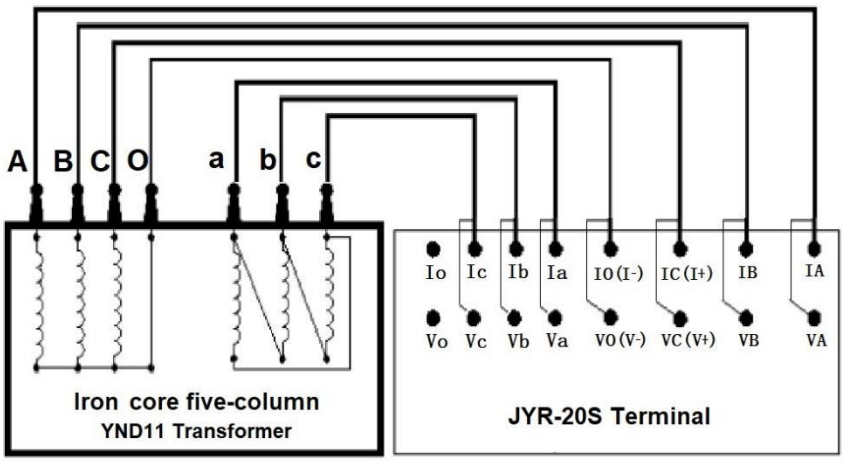

Figure 6 (I)

Manual wiring for magnetic assist measurement of Iron core five-column YND11 transformer: The wiring can be measured using the single-channel method according to the external wiring method in Figure 6(II).

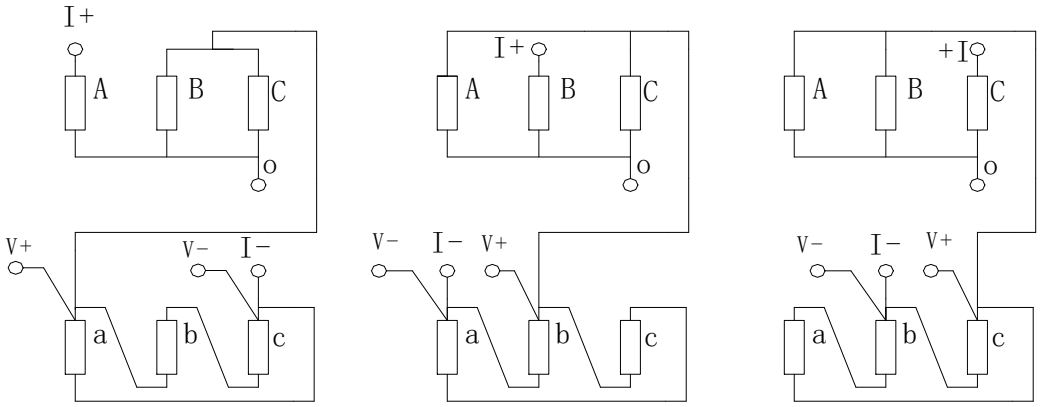

Figure 6（II）

2. **Power on:** Connect the power cord that came with this unit to the AC power input. Turn on the power switch LCD will be lit. **(If the input power supply AC220V** is mistakenly **connected to AC380V, then the internal protection of the instrument works, the internal power supply is cut off, and the buzzer will always alarm).**

   The company LOGO interface will be displayed on the display, which will be automatically skipped for about 3 seconds, and the main interface for entering the selection setting is shown in Figure 7:

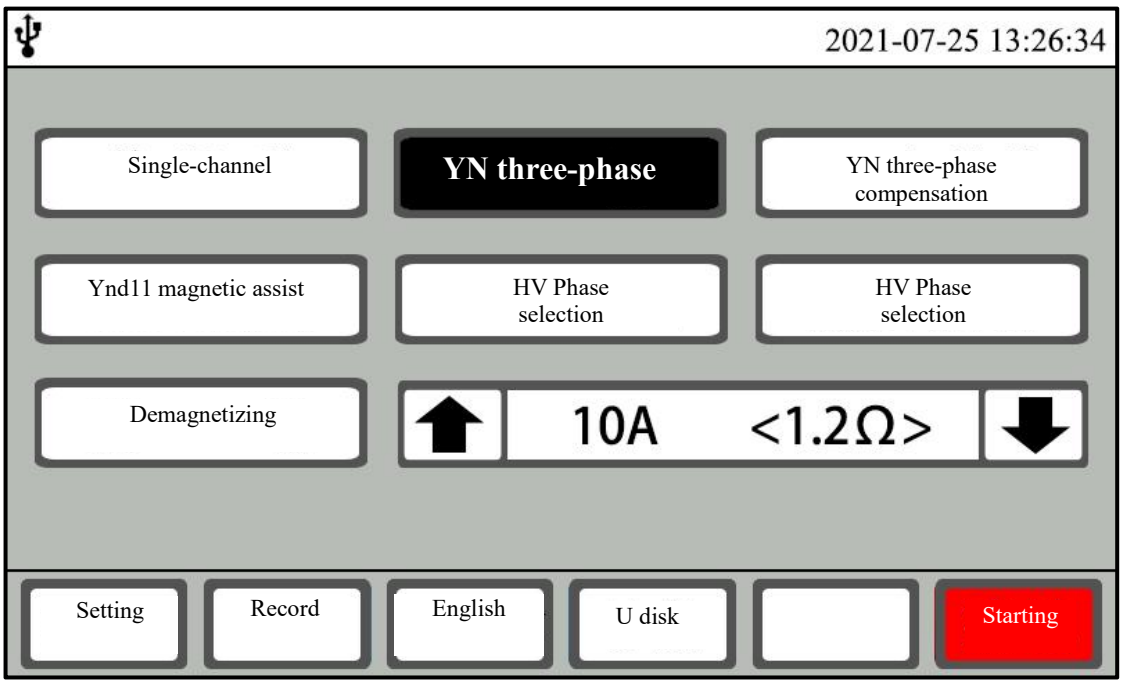

figure 7

2. **Measurement method selection:** The display screen shows the interface of Figure 7, at which time the **desired measurement method** can be **selected** by tapping the test mode option**.**

"Single channel" mode: Conventional single-phase winding four-terminal test method.

"YN three-phase" method: high-voltage YN winding three-phase three-channel test method (excluding O-phase resistance).

"YN three-phase compensation" method: YN winding three-phase three-channel test method (including O-phase resistance through compensation).

"YNd11 magnetic assit" method: The large three-core, five-column YNd11 connection method shortens the stability time of low voltage test by high voltage to low voltage magnetic assist.

"High voltage phase selection" method: high voltage winding **YN/D/Y** three phase phase selection test method.

"Low voltage phase selection" method: Low voltage winding **YN/D/Y** three phase phase selection test method.

"Demagnetization" method: Used to eliminate transformer residual magnetism.

Carefully check whether the connection test cable is consistent with the selection method and check that it is correct before the test can be carried out. **Otherwise, incorrect measurements will be made, affecting the accuracy of test results.**

4. Test current selection: The display screen shows the interface of Figure 7, at this time, the required measurement current can be selected by tapping the **current selection up and down arrow** keys, and each time it is touched, the display screen will be displayed in a loop The corresponding test current and the maximum resistance of the test at the corresponding current. (In the case of meeting the resistance test range, a larger current should be used as much as possible but the rated power of the specimen should also be considered, and the test exceeding the rated power of the specimen can cause damage to the specimen.) The fever of the test product also has a certain impact on the test data and should be considered comprehensively).)

5. Parameter settings: The display screen shows the interface of Figure 7, at this time, you can enter the parameter setting interface as shown in Figure 8 by tapping the **"Settings"** button. In this interface, you can set the temperature of the test product, the conversion temperature of the test product, the time interval of data

stabilization, the sample material, the communication baud rate, the sample number, the perpetual calendar time and other functions.

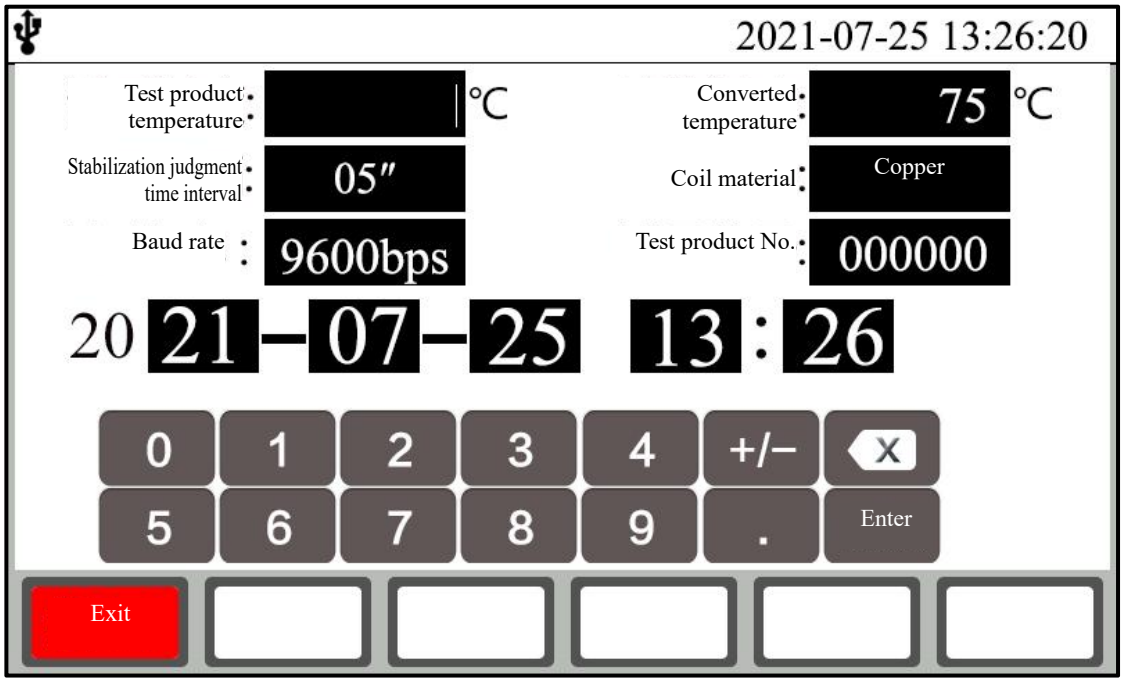

figure 8

Tap the desired settings display area and the input soft keyboard will automatically pop up, enter the appropriate information and change the corresponding settings as prompted. After the setting is completed, tapping the "Back" key will return to the main interface of selecting settings.

6. **Test: After selecting the** main interface of settings, selecting the corresponding measurement method and the corresponding test current, tap **the "Enter"** button. You will enter the test waiting interface for the corresponding measurement method, tap the "**Test**" button to start the test.

6.1 "Single Channel" Test

After starting the test, the display indicates the test charge current value and prompts "Charging ..." The system clock starts timing to show when the test starts from charging. When the test current reaches the preset current and is stable, it prompts "Testing", then displays the test resistance value (RX), observes that the test current value and resistance value are stable, and the instrument is continuously tested (see Figure 9). 。 The instrument starts from the display of resistance data to reach the stabilization interval, which will prompt the percentage of the error of the current resistance data and the resistance data before the stabilization interval to determine the stability of

the channel measurement resistance data. This interval setting can be converted between 5", 15", and 30" by touching the interval selector key. It can be set according to the test experience of the sample history, and the setting of the stabilization interval can also be modified in the setting menu. Tap the Print key to generate a test report on the printout. Tapping the "Save" key will save the current test data report to instrument memory. Instrument testing generally uses "fast" measurement mode, when the test resistance value fluctuates greatly, you can try to switch to "slow" mode. At this point, just tap the speed selection key to convert between "fast" and "slow". Tapping the Tap -" or "Tap +" keys activates the input of tap information, tapping again changes the tap bit value, or if the tap value is empty, the tap input function is turned off. Tapping the "Convert" key will convert the temperature according to the set sample temperature, conversion temperature and material, display the conversion resistance value and the corresponding sample temperature and conversion temperature, and tap the "Conversion" key again to cancel the conversion mode to return to the data state of no conversion resistance. Sample temperature, conversion temperature and material selection can be set by selecting the main interface of settings to enter the setting menu.

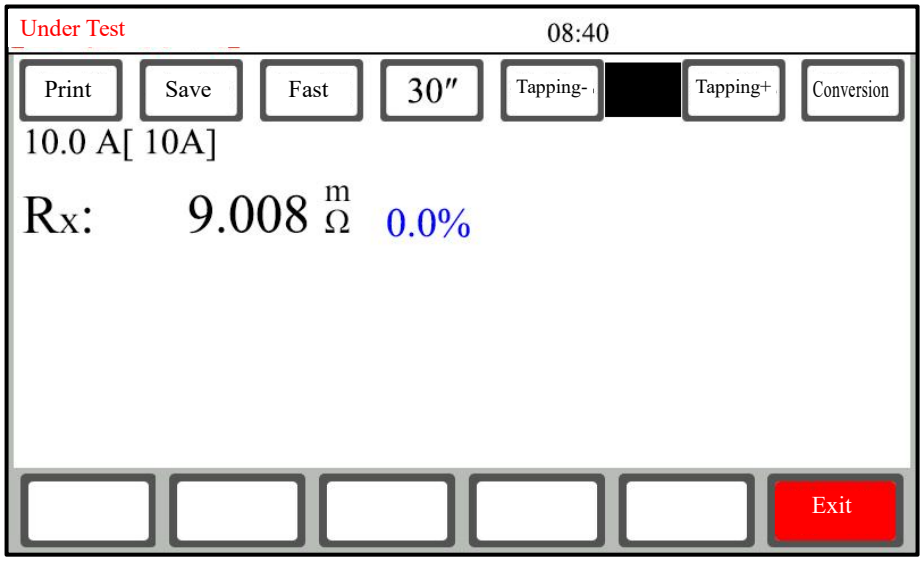

figure 9

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

6.2 "YN three-phase" test

After starting the test, the display indicates the test charge current value and prompts "Charging ..." The system clock starts timing to show when the test starts from charging. When the test current reaches the preset current and is stable, it prompts "Testing", and then displays the AO, BO, CO three-phase resistance value and three-phase balance rate of the test at the same time δ, observe that the test current value and resistance value are stable, and the instrument is continuously tested (See Figure 10). **The "YN three-phase" test** is generally stable and faster in the BO phase, the AO phase and the CO phase are slower, and the stabilization time is relatively long, which is a normal phenomenon. Adjusting the on-load tap-changer allows the tap-changer to be switched directly without stopping the test. **For tap-changers without load regulation, the test must be stopped and the tap-changer can be reversed after the discharge is complete.** The remaining accessibility operations are equivalent to the single-channel test, as detailed in **the 6.1 "Single Channel" test**.

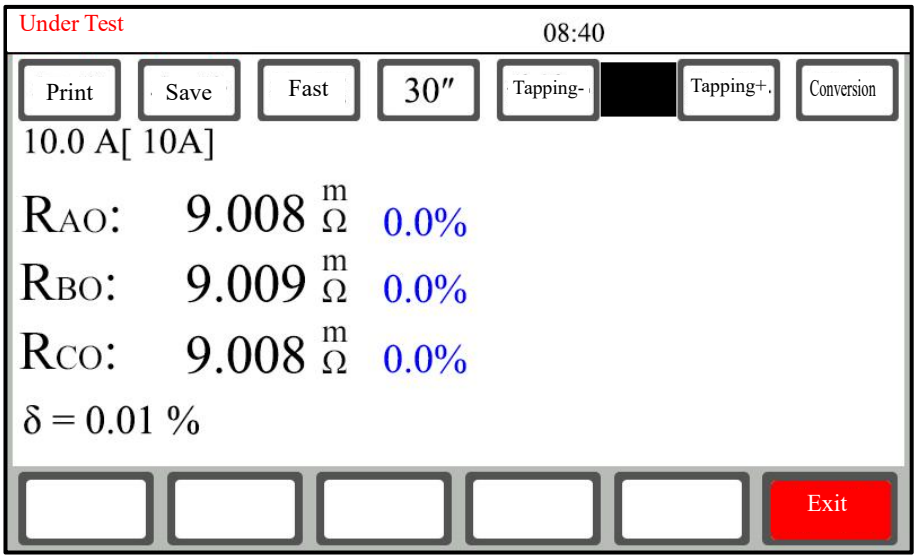

figure 10

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

6.3 "YN three-phase compensation" test (applicable to YN three-phase winding multi-tap transformer resistance measurement).

Step 1: Measure the phase-selective resistance of AO, BO, and CO.

After starting the test, the display switches to the **YN three-phase** option test interface (Figure 11).

AO phase test method: Tap the "AO Phase" key to select, then tap the "Test" key

The display indicates the test charge current value and prompts "Charging ...." ", the system clock start timer shows the time from charging to start testing. When the test

current reaches the preset current and stabilizes, it prompts "Testing", then displays the AO phase resistance value .When The current and resistance values are stable and the instrument will test continuously. After the resistance data is stable and readable, tap the "Exit" key, the instrument automatically discharges, ends the AO phase resistance test, and the system automatically records the AO phase resistance test results.

BO phase and CO phase selection test method: Tap the corresponding "BO phase" and "CO phase" keys to select.Then tap the "Test" button, which is equivalent to the AO phase test method. After the resistance data is stable and readable, touch the "Exit" key, the instrument automatically discharges, and the system automatically records the corresponding phase-selective resistance test results.

Step 2: Perform simultaneous measurements of A, B, and C.

Complete the measurement of the AO, BO, and CO phase-selective resistances performed in the first step (Figure 12).

Tap the "ABC" key to select, then tap the "Test" key to enter A, B, C three simultaneous measurements. The measurement results of the first step AO, BO, and CO phase-selective resistors are recorded on the right side of the screen.

Indicates the test charge current value and prompts "Charging ..." The system clock starts timing to show when the test starts from charging. When the test current reaches the preset current and is stable, it prompts "Testing", and then displays the AO, BO, and CO phase resistance values of the test at the same time to observe that the test current value and the resistance value are stable, and the instrument is continuously tested (Figure 13). After the three-phase resistance data are stable and readable, touch the "Compensation" key, the instrument automatically compensates the YN three identical measurement resistors according to the AO, BO, and CO phase-selective resistors in the first step (compensates for the O-column resistance value), and the system records the compensation amount of each phase O-pillar on the right side of the screen (Figure 14). The instrument is tested continuously. Note: The data should be kept in the same tap position during the first and second steps of testing, otherwise the compensation value will be affected and the data will be inaccurate.

Step 3: Make simultaneous measurements of the next tap of three phases.

Adjust the on-load tap-changer to the corresponding tap position, observe the stability of the data, and read the data.

Reverse to next tap, observe the data stabilization, read the data. Until all taps are tested.

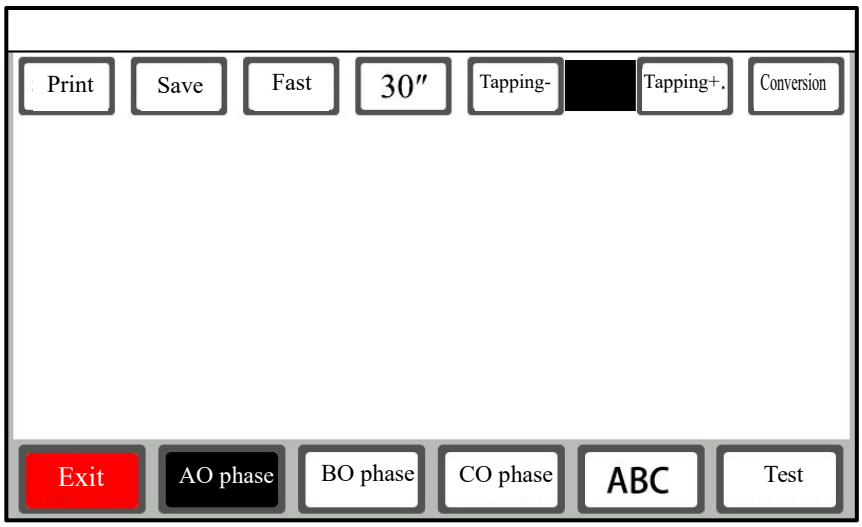

figure 11

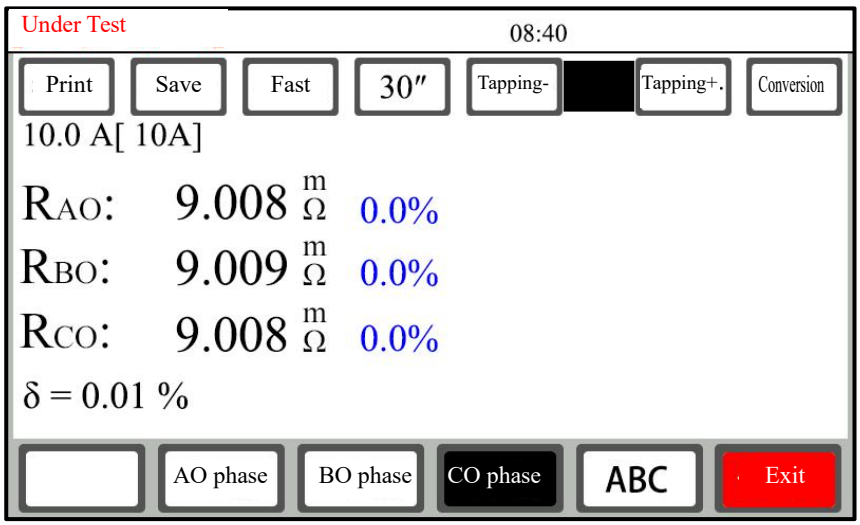

figure 12

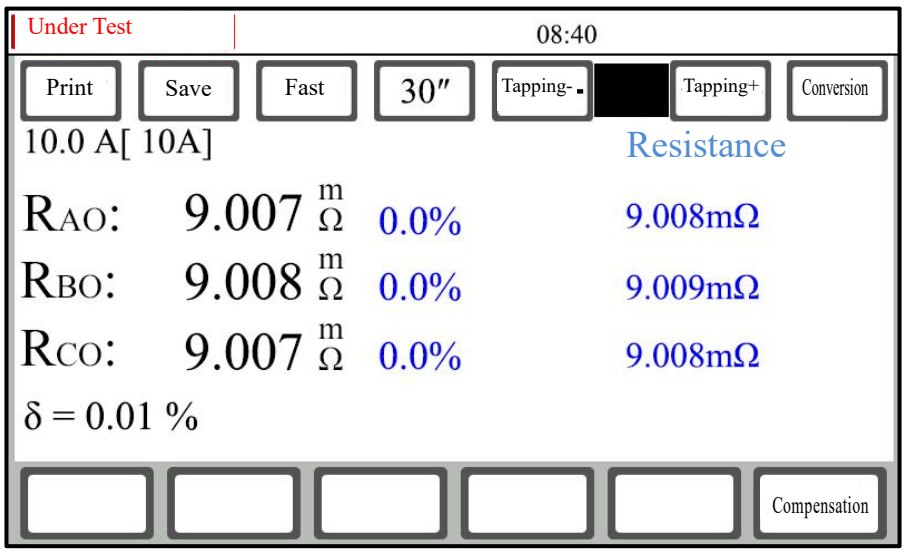

figure 13

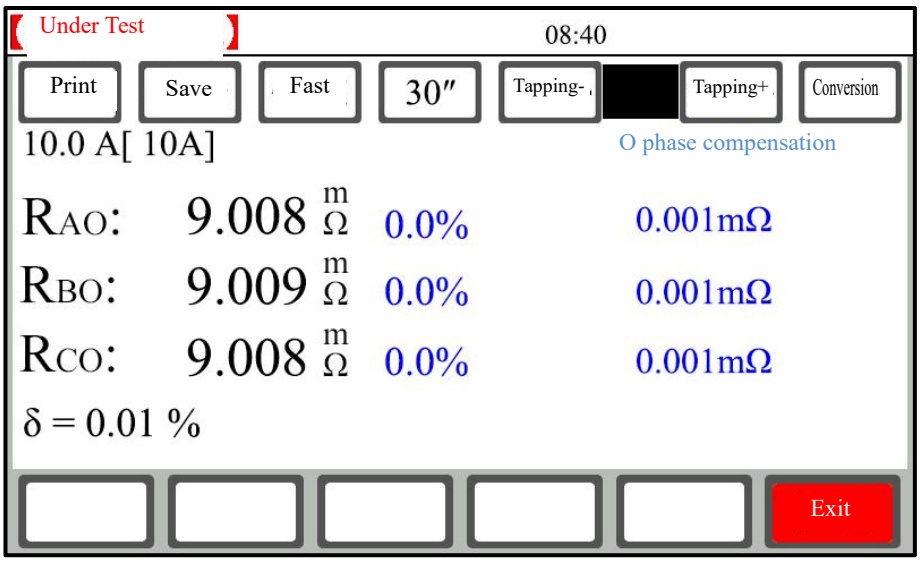

figure 14

The remaining accessibility features are equivalent to single-channel testing in "single-channel" testing.

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

6.4 "YNd11 Magnetic Assit" test

After starting the test, the display switches to the **YNd11 magnetic assit** option test interface (Figure 15).

Test method: "AO-ca", "BO-ab", "CO-bc" three option keys, tap any one of the selected (system default "AO-ca") to "AO-ca" phase as an example, and then tap the "Test" key,

the display indicates the test charging current number value at the same time prompts "Charging ...." , The system clock start timing shows the time from charging to start testing. When the test current reaches the preset current and stabilizes, it prompts "Testing", and then displays the high voltage AO phase resistance value and the low voltage ca Phase resistance value, when the test current value and resistance value are stable, the instrument continue to test. when the resistance data is Stable and readable, touch the "Exit" key, the instrument automatically discharges, ends the "AO-ca" phase resistance test, and the system automatically records the "AO-ca" phase resistance test results. Test the resistance values of the remaining options using the method above. When the three-phase test is completed, the system automatically calculates the balance rate of the high-voltage three phases and low-voltage three phases, respectively.

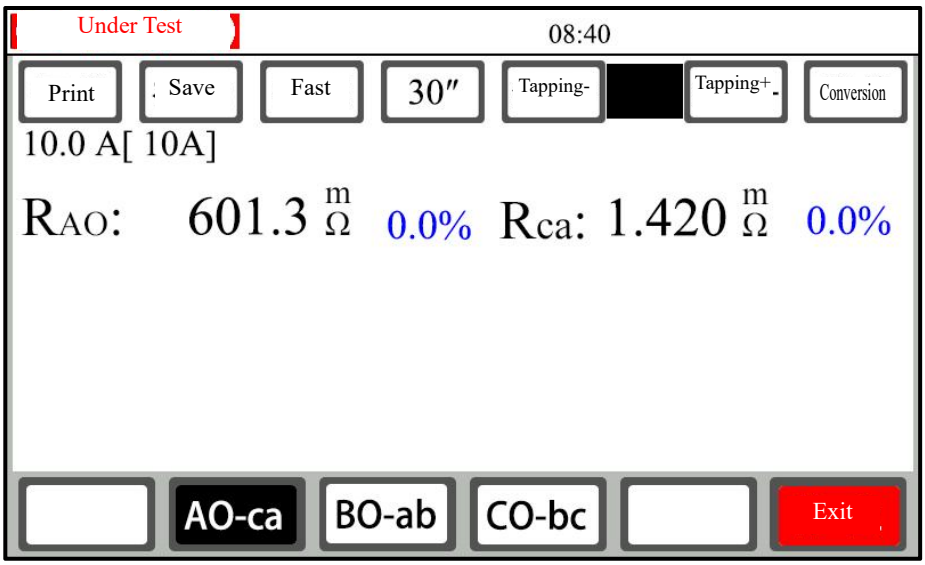

figure 15

The remaining accessibility features are equivalent to single-channel testing in "single-channel" testing.

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

6.5 "High Voltage Phase Selection" Test

After starting the test, the display switches to the "**High Voltage Phase Selection**" test interface (Figure 16).

Test method: First select the test mode YN mode or D/Y mode, which is tested

according to the selected mode output current and corresponding channel. Take the YN method as an example, "AO phase", "BO phase", "CO phase" three option keys, tap any one of the selected (system default "AO phase") to "AO phase" as an example, and then tap the "Test" key, the display indicates the test charging current number value at the same time prompt "Charging **...**). The system clock starts timing to show the time from charging to start testing. When the test current reaches the preset current and after stabilization, it prompts "Testing", and then displays the high voltage AO phase resistance value.Observe test current value and resistance value are stable, and the instrument continue testing. After the resistance data is stable and readable, tap the "Exit" key, the instrument automatically discharges, ends the "AO phase" resistance test, and the system automatically records the "AO phase" resistance test results. Test the resistance values of the remaining options using the method above. When the three-phase test is completed, the system automatically calculates the balance rate of the high-voltage three-phase respectively.

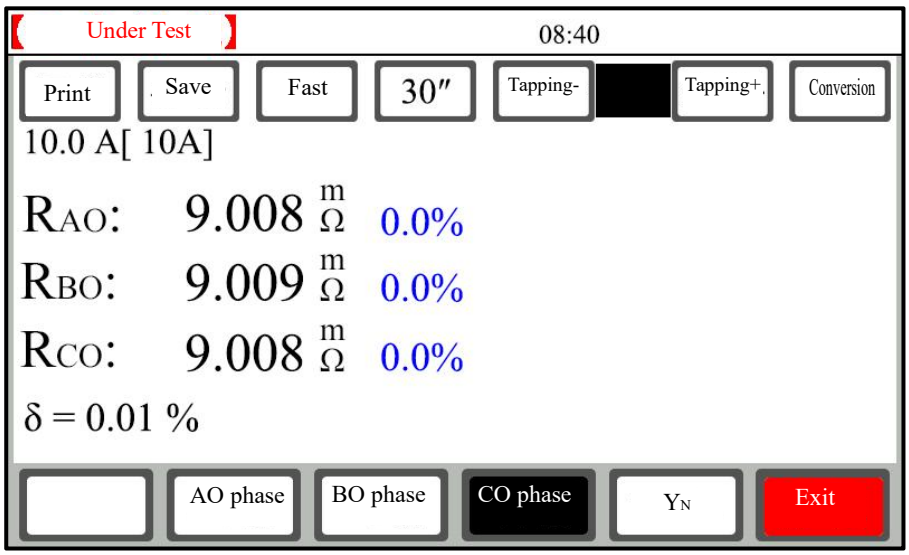

Figure 16

The remaining accessibility features are equivalent to single-channel testing in "single-channel" testing.

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

6.6 "Low Voltage Phase Selection" Test

After starting the test, the display switches to the "**low-voltage phase selection**" test interface (Figure 17).

Test method: First select the test mode YN mode or D/Y mode, which is tested according to the selected mode output current and corresponding channel. Take the D/Y mode as an example, "ca phase", "ab phase", "bc phase" three option keys, tap any of them selected (the system default "ca phase") to "ca phase" as an example, and then tap the "test" key, the display indicates the test charging current number value at the same time prompt "Charging **...**" ", the system clock starts timing to show the test time from charging to start testing. When the test current reaches the preset current and stabilizes, it prompts "Testing", and then displays "CA phase" resistance value.Observe the test current value and resistance value is stable, the instrument continue testing.. When the resistance data is Stable and readable, tap the "Exit" button, the instrument automatically discharges, ending the "ca phase" Resistance test.The system automatically records the "ca phase" resistance test results. Select the remaining items again.The resistance values of the remaining options are tested with reference to the above method. Wait until the three-phase test is complete.The balance rate of the D/Y three phases is automatically calculated separately.

The remaining accessibility features are equivalent to single-channel testing in "single-channel" testing.

When the test is completed, just touch the "Exit" button, and the instrument automatically discharges to end the test, retaining the final test results. Tap the "Exit" key to return to the main interface for selecting settings.

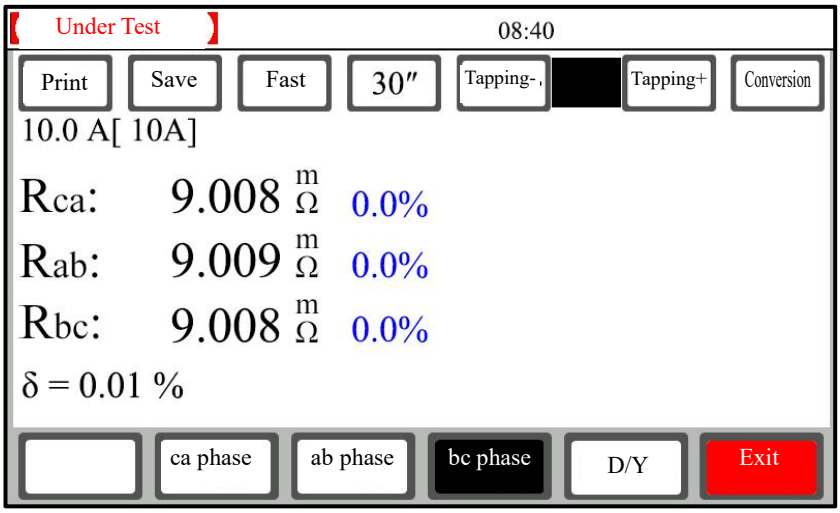

figure 17

6.7 "Demagnetizing" test

Demagnetizing method: The demagnetizing wiring adopts the transformer high-side degaussing wiring method. Ab phase degaussing, BC phase degaussing, ABC phase demagnetization can be selected. AB phase degaussing needs to connect the corresponding test lines to the transformer A and B phases and the instrument high voltage windings IA and IB, select the AB phase and then touch the "Test" key to start the AB phase demagnetization interface (Figure 18).

BC phase degaussing needs to connect the corresponding test line to the transformer B, C phase and instrument high voltage windings IB and IC, select the BC phase and then touch the "Test" key to start BC phase degaussing.

ABC phase degaussing is performed first by AB phase demagnetization, followed by automatic BC phase demagnetization. Single-phase transformers can be degaussed with either AB phase degaussing or BC phase demagnetization.

The three-phase transformer needs to degauss both the AB phase and the BC phase to complete the overall degaussing of the transformer.

Note: There will be repeated charging and discharging processes during the demagnetization process, and it is normal for the buzzer to repeatedly alarm this. The end of the degaussing test during the degaussing process is completed by simply touching the "Exit" button, and the instrument automatically discharges to end the test. Tap the "Exit" key to return to the main interface for selecting settings.

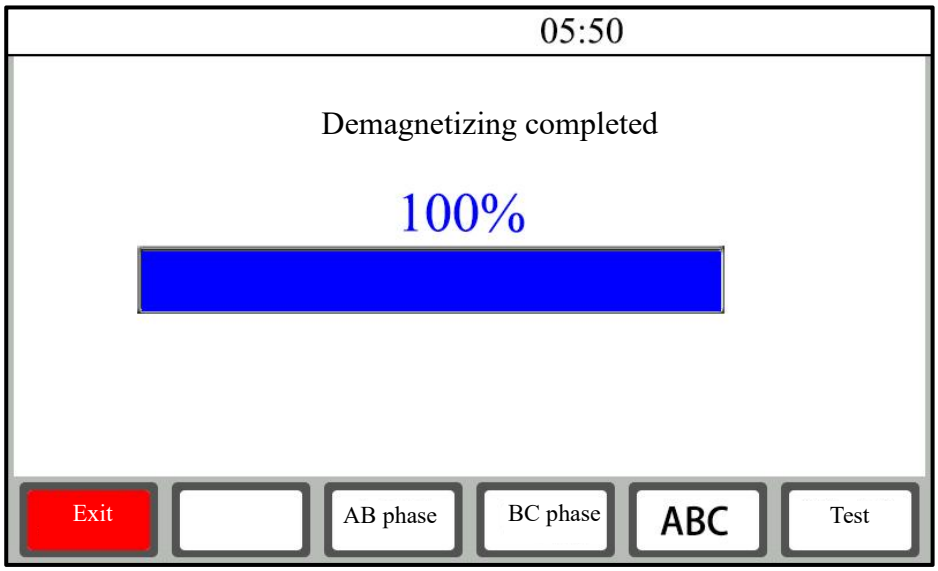

figure 18

7. **View memory record data**: On the boot interface, tap the "Record" key to enter the view record interface, you can cycle through, you can store and view up to 100 groups of data, tap" Exit the "Key" to return to the main interface of the selection settings, and tap the "Print" key to print the record data. If there is no data for viewing, "No records" will be displayed.

8. **Export USB stick**: In the main interface of selecting settings, press the "U disk" function key to import the instrument memory data into the "U disk", if there is no data for export, it will display "No record". Before that, please insert the USB stick first, when inserting the USB stick, the upper right corner of the instrument will prompt the . When the USB stick is pulled out, the disappears. During the data export process, you are prompted "Exporting". After the data export is complete, you will be prompted to "Export Complete", and you can unplug the USB drive after the export is complete.

Do not unplug the USB stick while "exporting"!

The file name for importing a USB drive is defined as follows:

First, create a folder in days such as DT170408

Where "DT" is the fixed format at the beginning of the file; "17" is the second two digits after 2017; "04" is April; **and "08" is the number 8.** Then create a file in hours, minutes and seconds, such as SJ092458

where "SJ" is the fixed format at the beginning of the file; "09" is 9:00 a.m.; "24" is 24 points;

"58" is 58 seconds.

The file is created at the time of the establishment at the export time. (System Default)

9. Language switching: The instrument adopts a one-click switch between Chinese and English interfaces, and can switch between Chinese and English interfaces.

10. **"Communication" function,** the instrument adopts the standard RS485 interface (optional wireless Bluetooth mode), the instrument RS485 interface and the computer USB interface through the UT850 converter connection, with the host computer operation software can complete the communication control of the instrument and the editing and printing of test data and other functions.

VII. Precautions

1. Before measuring the reverse tap of the loadless voltage regulating transformer, the test must be stopped first, and after the discharge is over, the alarm sound stops before the tap point can be switched.
2. It is strictly forbidden to disassemble the test cable during the measurement process. Be sure to stop the test and wait for the discharge alarm to end, and then remove the cable to prevent injury to people and equipment.
3. When measuring the resistance on the high side of the transformer with on-load voltage regulation, the test current should be selected by tap-tap with the largest resistance value, the measurement should be started, or the automatic current file test should be selected.
4. When choosing a measurement method, refer to the range in the technical indicator column, do not use the range beyond the range.
5. For the measurement of low-voltage side windings of **large-capacity iron core five-column YND11** transformers, it is best to use high-voltage magnetism methods to save measurement time.
6. For the YN type high, medium and low voltage star windings, three identical measurement methods are used, and in order to eliminate the influence of O-column resistance on the data, it is recommended to use the "YN three-phase compensation" method for three identical measurements.

VIII. Common problems and solutions

1, **can not turn on the buzzer has been chirping**

In this case, first check whether the power supply is plugged in AC380V or the input supply voltage is too low.

2, **the boot LCD screen can not be lit, the instrument fan does not work**

In this case, first check whether the input AC220V power supply is normal, and then check whether the insurance has been fused, such as fuse and replace.

3. **The LCD screen is lit but the display is not normal or cannot be displayed**

In this case, the system is first shut down and restarted once.

4. **The test data is unstable or the error is large**

In this case, first check the test line, whether there is a virtual connection, loose. If it cannot be solved, check whether the sample is rusty.

5, **the test process has been displayed "charging** ... . . . **”**

If the current has not changed for a long time and has been near the zero current, you should check whether the line is broken, and if there is a current that cannot be charged, you need to check whether it is out of the measurement range.

*** The above problems cannot be solved, please contact us** in time

VIII. Instrument Completeness

Principal Unit of DC Resistance Test Instrument	1 uit
Test Line	1 set
Three-core power line	1 piece
Fuse 5A	2 pieces
Certificate of approval/ warranty card	1 piece
Packing list	1 piece
Operation manual	1 copy

IX. After-sales Service

Product shall be repaired and replaced free of charge in case of product quality problem in 24 months from purchase date, guarantee and technical service are provided for whole service life of the product.In case any abnormal condition or fault is found in the instrument, please contact the company in time so that we can organize most convenient treatment plan for you.