Kingrun Instrument Co.,Ltd.

JYT-A

Automatic Three-Phase Transformer Turn Ratio Tester

Kingrun Transformer Instrument Co., Ltd
2024

Kingrun Instrument Co.,Ltd.

The JYT-A is a fully automatic three-phase testing device designed specifically for the turn ratio of power, distribution, and instrument transformers. The JYT-A accurately measures the voltage on the no-load transformer windings by applying voltage to the high-voltage winding and then determines the transformer turn ratio by displaying the ratio of these voltages.

The JYT-A is based on the most advanced technology available today. This testing device can be used for testing single-phase and three-phase transformers, CT, PT, CVT, Z-type connections, and transformers with neutral points, including those with and without taps, meeting the requirements of the IEC 60076-1 standard.

For three-phase measurements, the testing device connects to all three phases of the transformer to be tested. If measuring different types of transformers (such as single-phase, delta to star, star to delta, delta to delta, star to star, delta to zigzag, etc.), there is no need to switch the test connection cables; the test can be performed directly.
The JYT-A can automatically compare the test results with the nameplate voltage of the transformer input by the user, calculate the turn ratio deviation, and print out the error percentage for each test. Even if the user does not input any data, the JYT-A can still accurately measure the transformation ratio.

The JYT-A features high and low voltage reverse connection protection, transformer short circuit, inter-turn short circuit protection, and a very high ability to eliminate electrostatic and electromagnetic interference in high-voltage electric fields, effectively ensuring the accuracy of the test results.

Three- Phase Turn Ratio Tester JYT-A :

- **A** — Automatically adjust output voltage10V/ 160V, automatic testing of voltage, turn ratio and current
- **B** — Test ratio range 0.9 ~ 10000, cover all type of power transformers, PT's and CT's
- **C** — Accuracy can reach to ± 0.1%
- **D** — Test Transformer with neutral point (Non- converted)
- **E** — Color LCD touch screen
- **F** — 2 Years warranty time

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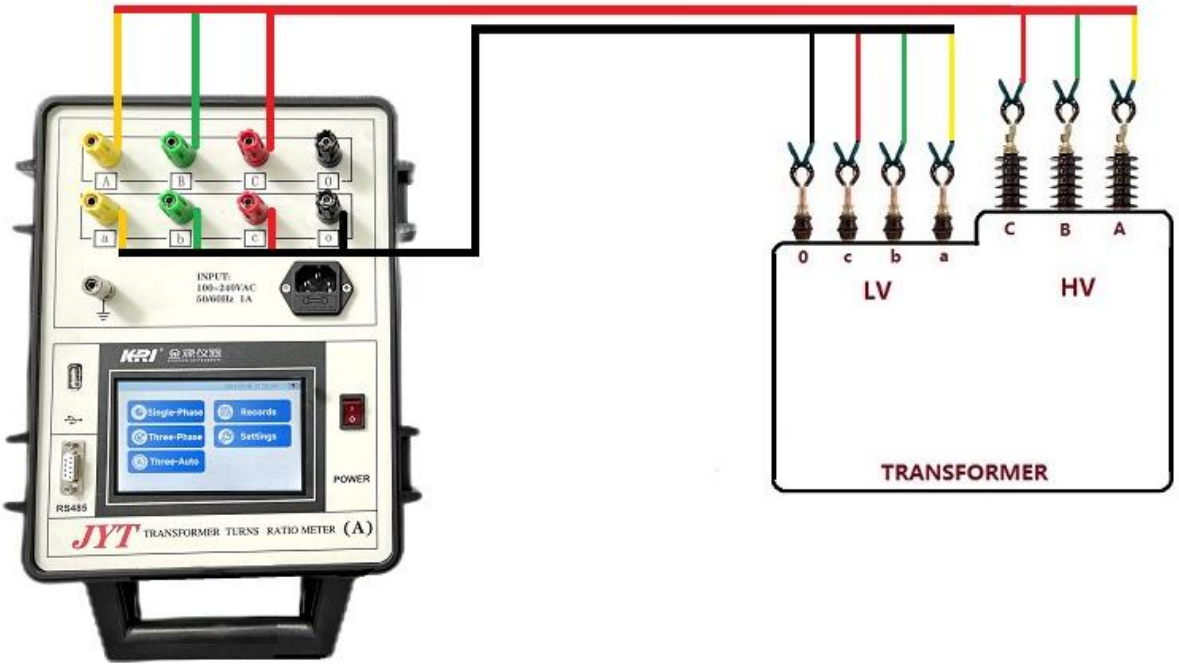
JYT-A Technical Specification:

Digits displayed	Five digits	
Output line Voltage	≤160V	
Range	0.9-10000	
Accuracy	<2000	±0.1%
	2000-10000	±0.3%
Min. Resolution	0.0001	
Operation Power	AC100-240V,50/60Hz, or lithium battery (Option)	
Operation Temperature	-20℃～40℃	
Relative Humidity	≤80%RH, no dew	
Volume	L285mmxW218mmxH158mm	
Net Weight	5kg	
Data Stored	200sets	

JYT-A Connection way with transformer:



The colored leads are marked to indicate to which transformer terminal they must be connected for correct operation.

Voltage ratio and nameplate ratio:

For single-phase as well as standard 3-phase Yy and Dd transformers, turn ratio/voltage ratio is the same as nameplate ratio. However, for Yd, Dy, some zig-zags and configurations without accessible neutral, voltage ratio is different from nameplate ratio. For recalculation of nameplate ratio to voltage ratio.

Transformer configurations/vector groups	TVR recalculation factor, TVR=k*TNR
Dd	1
Dy	√3
Dyn	√3
Dz	1.5
Dzn	1.5
Yd	√3/2
YNd	1/√3
Yy	1
YNy	1
Yyn	1
YNyn	1
Yz	√3/2
YNz	√3/2
Yzn	√3
YNzn	√3
Zd	1
ZNd	2/3
Zy	√3/2
ZNy	1/√3
Zyn	1
ZNyn	1

TNR: Ratio between the specific labeled (line-to-line) voltage of a higher voltage winding to a specific labeled (line-to-line) voltage of a lower voltage of the transformer

TVR:Ratio between a specific terminal voltage of a higher voltage winding to a specific terminal voltage of a lower voltage winding of the transformer

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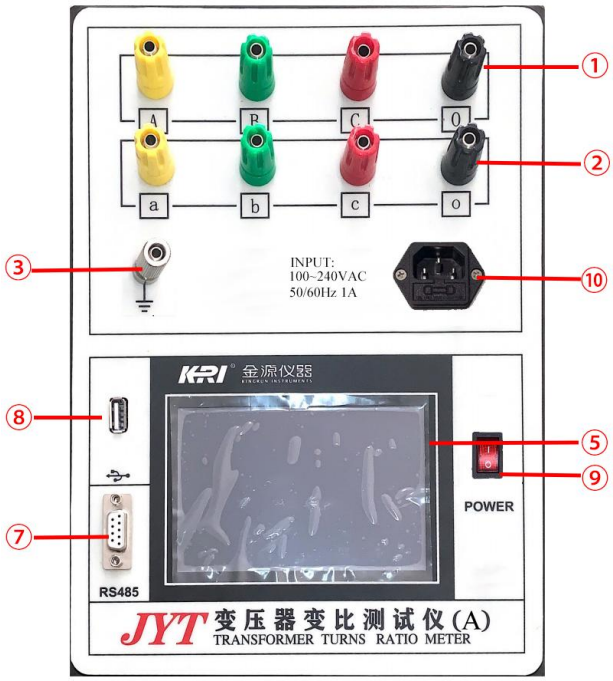
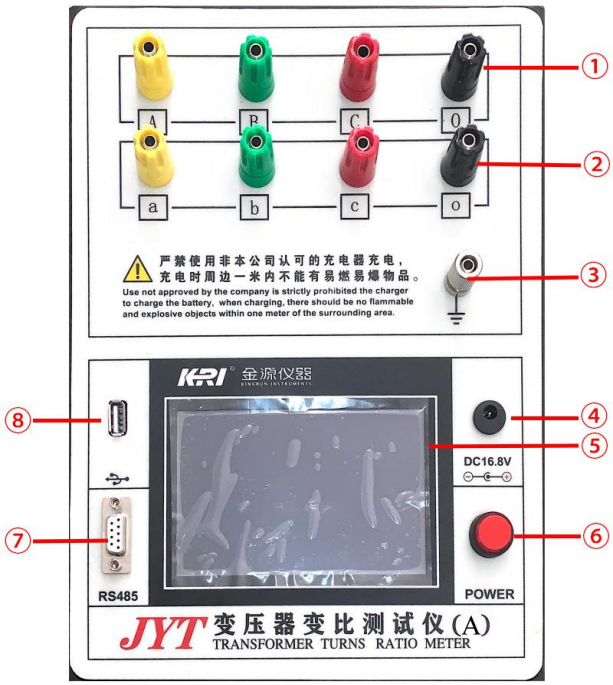
JYT-A Operation Panel Instruction:



AC-powered instrument panel



Battery-powered instrument panel

1) High-voltage output: yellow, green, red, black binding posts, respectively A, B, C, O three phases, connected to the corresponding color cable, the other end of the cable has yellow, green, red, black clamps, corresponding to the high voltage side of the transformer under test A, B, C, O three phases.

2) Low-voltage input terminal: yellow, green, red, black binding posts, respectively a, b, c, o three phases, connect the corresponding color cable, the other end of the cable has yellow, green, red, black clamps, corresponding to the low voltage side of the transformer under test a, b, c, o three phases.

3) Protect the grounding post, in order to ensure the safety of the operator and the normal operation of the instrument, the terminal of the terminal should be reliably grounded before use.

4) Battery charger interface: used to charge the battery inside the tester.

5) LCD touch LCD display: used to operate the menu and display the test results.

6) Battery instrument switch.

7) RS485 communication interface: used to connect to PC, convenient for remote control through PC.

8) USB interface: used to export test records to USB devices.

9) AC instrument power switch.

10) Power socket: AC power input port, connected to 100-240V, 50/60Hz AC power supply, the socket contains a fuse, this instrument should be installed with a 1A fuse.

6. Operation Instructions

6.1 Instrument boot interface

After turning on the power of the instrument, the 2-second boot screen is displayed, and the instrument is being initialized accordingly, as shown in Figure 1.

fig 1

6.2 Instrument self-test:

After the instrument-related initialization is complete, an internal self-test is performed, as shown in Figure 2.

fig 2

6.3 Main menu

After the instrument self-test is completed, it will automatically enter the main menu, as shown in Figure 3.

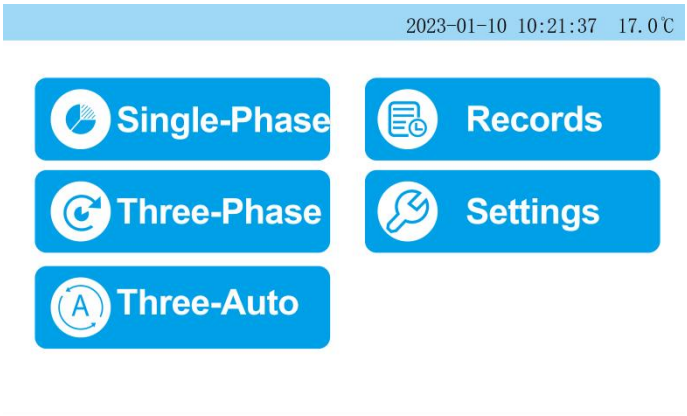


fig 3

The main menu is mainly divided into **test operation buttons, time display area, system setting buttons, and access history buttons**.

A）**Test operation buttons：**

< Single-phase > : Single-phase transformation ratio test.

< Three-Auto > : The instrument automatically performs three-phase testing without entering parameters.

< three-phase >: with neutral point test method, it can test transformer turn ratio. The specific test methods are shown in Appendix I.

B）**Time display area：**

Displays the current perpetual calendar information in the format of: 2015-01-20 10:20:48 .

C）**Settings button：**

Instrument system settings menu.

D）**Records button:**

Click the record button to enter the record interface, which is convenient to view the relevant test records.

6.4 Single-phase testing

Click the <Single-Phase test > button on the main menu panel, and the instrument will enter the < parameter setting > menu to set the relevant parameters, as shown in Figure 4.

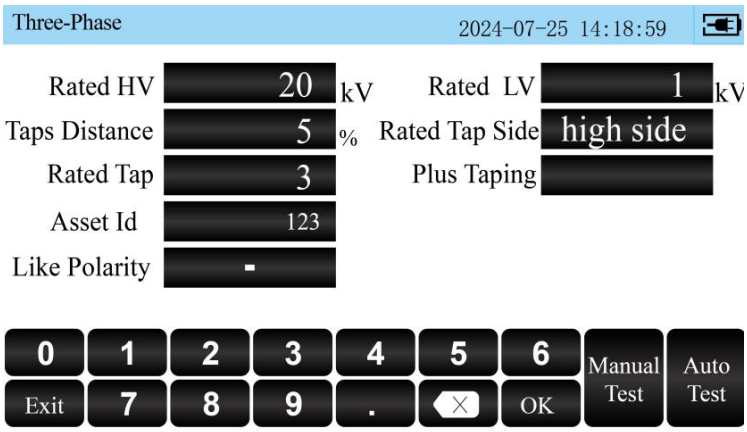


fig 4

Including：

Rated HV: The rated voltage on the high voltage side of the transformer.

Rated LV: The rated voltage on the low voltage side of the transformer.

Taps distance: transformer equal tap distance.

Rated Tap Side: Determines whether the tap changer position is on the high voltage or low voltage side of the tap.

Rated tap: Fill in the rated tap position of the transformer.

Plus taping: fill in the number of positive taps of the transformer (optional)

Asset ID: The number of the device under test.

Like Polarity: Select the copolarity display "-" or "+".

Note: After correctly entering the transformer's rated HV, rated LV, rated tap, and tap-distance, the test result will automatically display the number of positions and the error value of this tap.

After the parameter setting is completed, click the test button in the lower right corner to start the test, and the test result is shown in Figure 5.

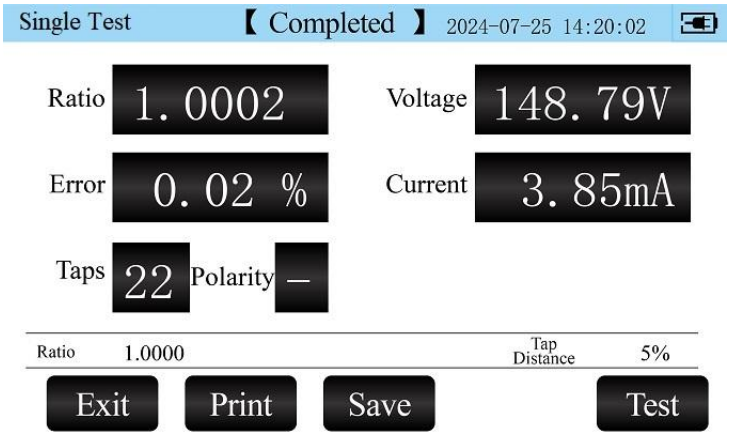
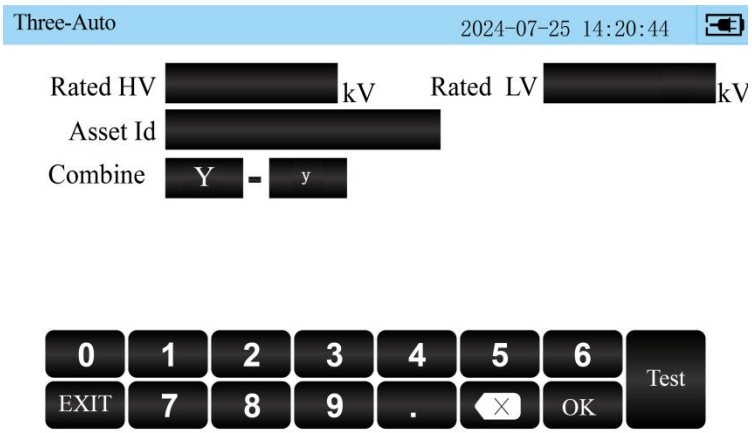


Fig 5

6.5 Auto test:



The instrument performs three-phase automatic testing, and the ratio test can be completed without entering parameters. The three-phase automatic test interface is shown in Figure 6.

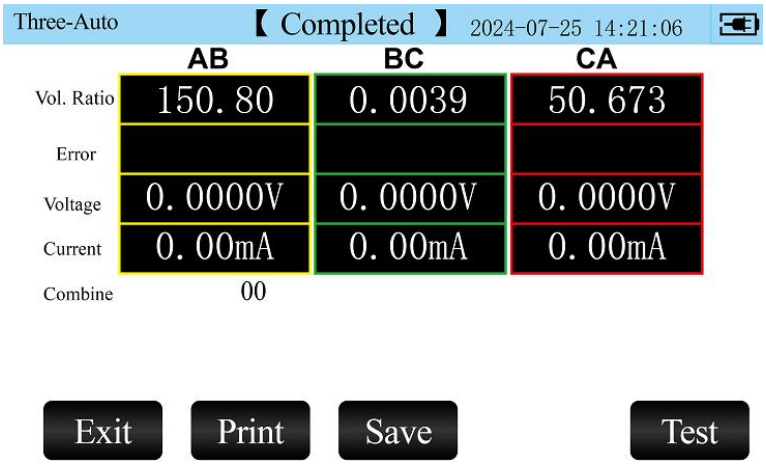


figure 6

6.6 Three phase test:

Click the <Three-phase Test> button on the main menu panel, and the instrument will enter the relevant parameter settings > <Three-phase Parameter Setting, as shown in Figure 7.

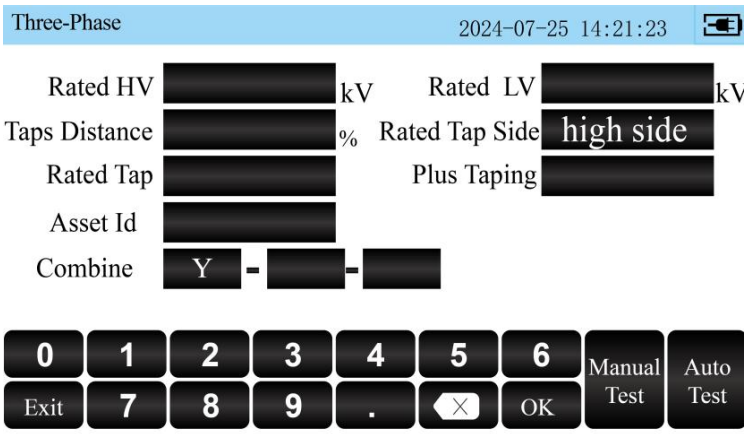


Figure 7

Including：

Rated HV: The rated voltage on the high voltage side of the transformer.

Rated LV: The rated voltage on the low voltage side of the transformer.

Taps distance: transformer equal tap distance.

Rated Tap Side: Determines whether the tap changer position is on the high voltage or low voltage side of the tap.

Rated tap: Fill in the rated tap position of the transformer.

Plus taping: fill in the number of positive taps of the transformer (optional)

Asset ID: The number of the device under test.

Combine: Select the connection mode of the transformer under test. When the input connection mode is inconsistent with the tested connection mode, the instrument will be alerted in red.

Note: After correctly entering the four data of the transformer's high voltage, low voltage, rated tap, and tap distance, the test result will automatically display the number of tap positions and the error value of this tap.

After the parameter setting is completed, click the Auto test button in the lower right corner to start the test, as shown in Figure 8.

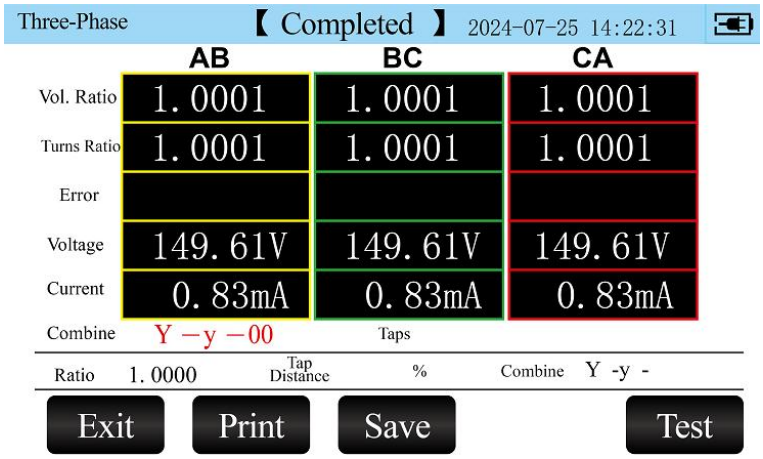


Figure 8

6.7 Records interface:

Select the <Records> key in the main menu to enter the record interface, as shown in Figure 9:

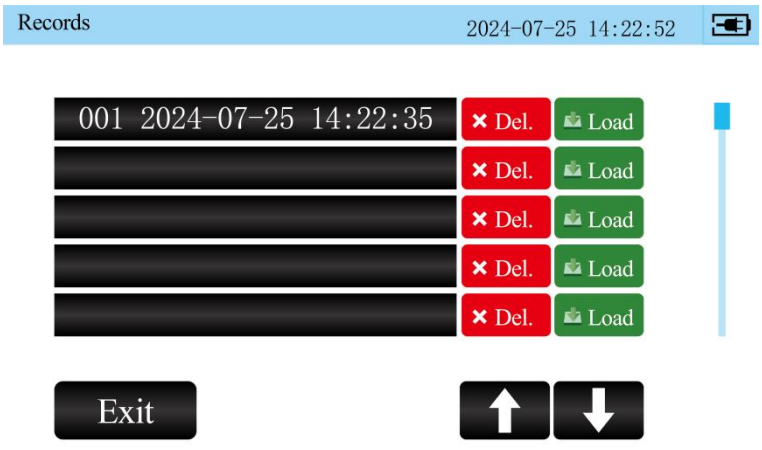


Figure 9

A total of 200 sets of data can be stored on the instrument. Users can flip the screen by "↑" and "↓", and the blue progress bar on the right indicates the current scrolling position. When 200 data sets are stored, the latest data overwrites the oldest data. Each set of data can be deleted and exported to a USB device separately.

The directory consists of the data type and the data test time, for example: S 2015-01-20 10:20:38, where S indicates that this set of test data is single-phase test data, if the test data is three-phase test data, it is T. The following time indicates the time when the data was tested. Click on the data in the directory to go to the specific data display page.

6.8 System Settings Interface

From the main menu, press < Settings> key. The instrument enters the instrument setting menu, as shown in Figure 10

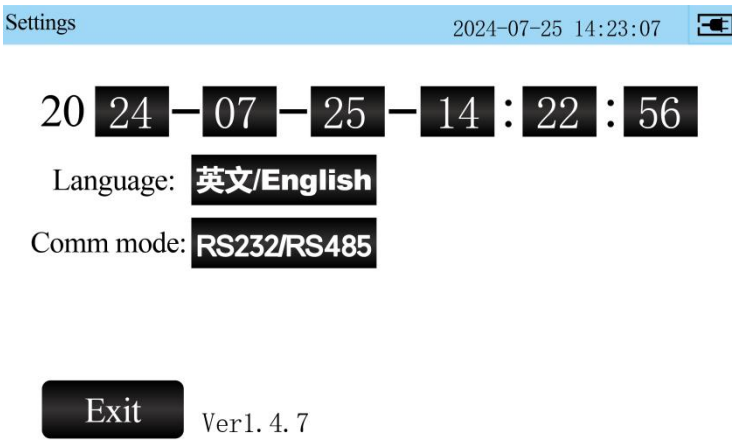


Figure 10

<Test Mode>: This option generally defaults to Auto mode, and when the transformer has a small amount o f leftover magnetic which affect test result, try using the “Manual” mode to test, where the tester manually c ontrols the test time and click the "Next" button to perform the next phase data test when the first phase of t he data stabilizes. If accurate data is still not available, degaussing needed before performing the ratio test.

< Language >: Used to switch between Chinese and English in the instrument menu.

< Comm mode>: wireless communication (Bluetooth/WIFI) or wired (RS232/485) communication options.Time setting: You can set the date and time by pressing the up and down keys of the time display location.

6.9 Store datas：

After testing, the instrument will automatically display the test results, press the "Save" key to store the data, and after completion, the upper right corner of the instrument will prompt [Save Completed].

6.10 Review datas：

The "Records" button on the main menu allows you to review the test records. For details, see 6.7 record page.

6.11 Delete datas：

Enter the records interface through the "Record" key of the main menu, at this time the stored record

directory is displayed, each record corresponds to a "Del" key, the user can delete the data through the "Del" key on the right, delete a group of data needs to click the "Del" key twice, the first time you click the "Del" key, the corresponding data directory will become red, and when you click the "Del" button again, the data will be deleted.

6.12 Download datas to USB flash：

The user can export the record data saved to a USB flash drive, and when the interface is in record interface, insert the USB flash drive, and the USB flash drive connection logo will be displayed in the upper right corner of the screen. After the USB flash drive is unplugged, the USB flash drive connection symbol disappears automatically. After the USB flash drive is successfully connected, click the "Load" button corresponding to the data to be exported, and the data will be imported to the USB flash drive. When the data export is completed, the screen prompts [Export Completed], as shown in Figure 11.

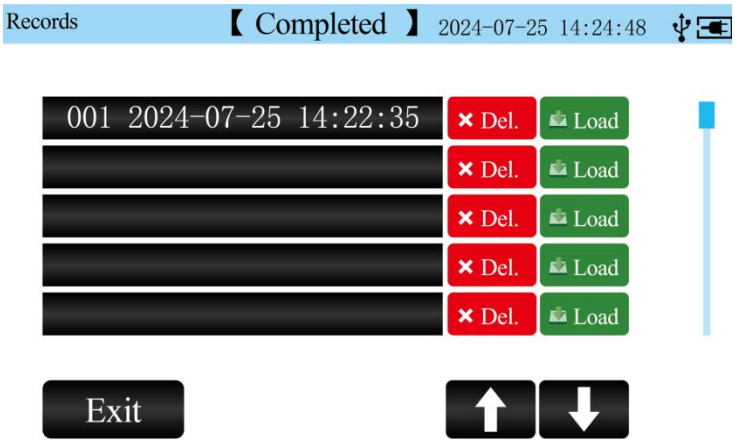


Figure 11

At this time, the instrument will automatically create a folder named "JT ******" in the root directory of the USB flash drive (the last six digits are the year, month and day of the data storage) and create a file named "JT ******.TXT" (the last six digits are the hours, minutes, and seconds of the data storage).

6.13 Printing datas: The instrument can choose a Bluetooth printer for test data printing.

After testing, the instrument will prompt [Test Completed]. At this time.

(Note: During the test, the printing and storage operations are invalid, and the instrument will not execute the corresponding commands.)

7.Test：

7.1 Wiring preparation

1） Clamp one end of the grounding wire to the ground grid, and one end is reliably attached to the grounding terminal of the panel. Note: The grounding point of the ground grid should have good electrical conductivity, otherwise the accuracy of the measurement will be affected.

2） Wiring in strict accordance with the wiring diagram, and ensure that the contact points are in good contact.

3）During the test, the test object should be disconnected from the external line.

7.2 Test Steps:

1）Turn on the power switch and wait for the instrument to enter the main menu.

2）Select "Auto Test", "Single-phase Test", "Three-Phase Test" according to the situation.

7.3 Clean up the site after the test.

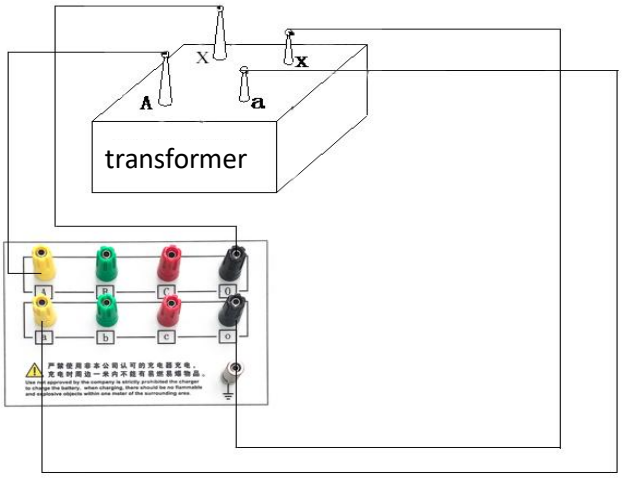
1) Turn off the power switch.

2) Dismantle and put away the two sets of dedicated test wires for easy use next time.

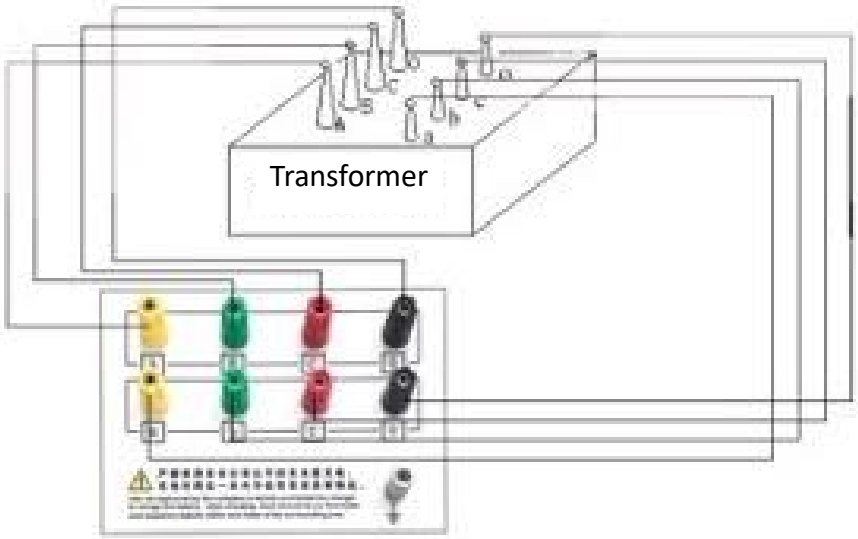
3) Remove the grounding wire and tidy it up.

8.Wiring diagram：

8.1 Single-phase transformers：



8.2 Three-phase transformers：



9.Transportation & Maintenance

9.1 Transportation

This product must be packed during transportation, and the packing box can be a carton or wooden box, and the packaging box should be padded with a foam shockproof layer. The packaged products should be able to be transported by road, rail and air. It shall not be placed in an open car during transportation. The warehouse should pay attention to rain, dust, and mechanical damage.

9.2 Storage

When the instrument is not in use, it should be stored in an indoor room with ambient temperature of -20°C~60°C, relative humidity not exceeding 85%, ventilation and no corrosive gas. It should not be stored against walls and floors.

9.3 Protection from Moisture

In humid areas or humid seasons, if this instrument is not used for a long time, it is required to turn on the power once a month (about two hours) to dissipate moisture and protect components.

9.4 Protection from the sun

When the instrument is used outdoors, avoid or reduce direct exposure to sunlight on the LCD screen as much as possible.

9.5 Maintenance

When the instrument is not used for a long time, the battery should be regularly maintained (at least once every 90 days for a full charge). In order to avoid battery failure affecting the use of the instrument.

10.Precautions:

10.1.The output voltage of the instrument is 160V, and safety should be paid attention to to prevent electric shock.

10.2.When testing a transformer with an on-load tap-changer in neutral, the correct number of positive tap-changers is entered to display the correct tap number.

11. Accessories:

Name	Quantity	Remarks
JYT A host	1	
Test cable	1 set	It is 13 meters long, with yellow, green, red and black color each two pieces
Three-core power cord	1	250V/10A（For AC model）
Grounding wire	1	2 meters
Operator's manual	1	
Certificate of Conformity/Warranty Card	1	
Fuse	2	2A
Bluetooth printers	1	optional
Packing list	1	
Power adapter	1	16825 (battery model)

12.After-sales service

The instrument is granted with free repair and replacement for problems arising from product quality within two years from the date of purchase, and lifetime warranty and technical services. For any abnormality or fault of the instrument, please contact us in time for the most convenient solution.

Special Tips

2.1 Power supply aspects:

This instrument provides two power supply modes, AC model uses AC100~240V 50/60HZ, DC model has built-in lithium battery.

2.2 Security aspects

1) Be sure to read this manual carefully before using this instrument.

2)The operator of the instrument should have common sense of the use of electrical equipment or instruments.

3) For the safety of the instrument and the operator, the instrument should be reliably grounded when used. When testing equipment, the ground wire is connected first, and the grounding wire is removed at the end of the work.

4) The output voltage of the instrument is high, and safety should be paid attention to to prevent electric shock.

5) This instrument can be used both indoors and outdoors, but it should be avoided in harsh environments such as rain and corrosive gas.

6) The maintenance, care and adjustment of the instrument should be carried out by professionals.

7) The instrument should avoid violent vibration.

2.3 Operational aspects

1) The connection between the instrument panel and the test line should be tightened and there should be no loosening.

2) When wiring, the yellow, green, red and black of the test wire clamp correspond to the A, B, C, O of the transformer respectively, and the high and low voltage cables should not be reversed.

3) When measuring in single phase, use yellow and black wire clamps, don't use the wrong ones, and the unused test clips should be suspended.

4) After the wiring is completed, it should be checked again to see if there is any wiring error. During the test, if there is any abnormal phenomenon, the power should be turned off immediately and the wiring should be checked.

(Appendix 1) JYT A Turns Ratio Tester Winding Short Circuit and Measurement Method

Group	HV side UH	LV side UL	Turns ratio K
D－d－0 D－d－6	A－B	a—b	K=UH/UL
	B－C	b—c	
	C－A	c--a	
D－d－2 D－d－8	A－B	b—c	K=UH/UL
	B－C	c—a	
	C－A	a—b	
D－d－4 D－d－10	A－B	c—a	K=UH/UL
	B－C	a—b	
	C－A	b--c	
Y－y－0 Y－y－6	A-(B-C)	a-(b-c)	K=UH/UL
	B-(C-A)	b-(c-a)	
	C-(A-B)	c-(a-b)	
Y－y－2 Y－y－8	A-(B-C)	b-(c-a)	K=UH/UL
	B-(C-A)	c-(a-b)	
	C-(A-B)	a-(b-c)	
Y－y－4 Y－y－10	A-(B-C)	c-(a-b)	K=UH/UL
	B-(C-A)	a-(b-c)	
	C-(A-B)	b-(c-a)	
YN－yn－0 YN－yn－6	A－O	a—o	K=UH/UL
	B－O	b—o	
	C－O	c—o	
YN－yn－2 YN－yn－8	A－O	b—o	K=UH/UL
	B－O	c—o	
	C－O	a—o	
YN－yn－4 YN－yn－10	A－O	c—o	K=UH/UL
	B－O	a—o	

	C—O	b—o	
YN—y—0 YN—y—6	A—O	a-(b-c)	K=(UH/UL)×1.5
	B—O	b-(c-a)	
	C—O	c-(a-b)	
YN—y—2 YN—y—8	A—O	b-(c-a)	K=(UH/UL)×1.5
	B—O	c-(a-b)	
	C—O	a-(b-c)	
YN—y—4 YN—y—10	A—O	c-(a-b)	K=(UH/UL)×1.5
	B—O	a-(b-c)	
	C—O	b-(c-a)	
Y—yn—0 Y—yn—6	A-(B-C)	a—o	K=(UH/UL)/1.5
	B-(C-A)	b—o	
	C-(A-B)	c—o	
Y—yn—2 Y—yn—8	A-(B-C)	b—o	K=(UH/UL)/1.5
	B-(C-A)	c—o	
	C-(A-B)	a—o	
Y—yn—4 Y—yn—10	A-(B-C)	c—o	K=(UH/UL)/1.5
	B-(C-A)	a—o	
	C-(A-B)	b—o	
YN—d—1 YN—d—7	A—O	a—b	K=(UH/UL)×√3
	B—O	b—c	
	C—O	c--a	
YN—d—3 YN—d—9	A—O	b—c	K=(UH/UL)×√3
	B—O	c—a	
	C—O	a—b	
YN—d—5 YN—d—11	A—O	c—a	K=(UH/UL)×√3
	B—O	a—b	
	C—O	b--c	
Y—d—1	A-(B-C)	a—b	

Y—d—7	B-(C-A)	b—c	K=(UH/UL)×(2/√3)
	C-(A-B)	c--a	
Y—d—3	A-(B-C)	b—c	
Y—d—9	B-(C-A)	c—a	K=(UH/UL)×(2/√3)
	C-(A-B)	a—b	
Y—d—5	A-(B-C)	c—a	
Y—d—11	B-(C-A)	a—b	K=(UH/UL)×(2/√3)
	C-(A-B)	b--c	
D—yn—1	A—B	b—o	
D—yn—7	B—C	c—o	K=(UH/UL)/√3
	C—A	a—o	
D—yn—3	A—B	c—o	
D—yn—9	B—C	a—o	K=(UH/UL)/√3
	C—A	b—o	
D—yn—5	A—B	a—o	
D—yn—11	B—C	b—o	K=(UH/UL)/√3
	C—A	c—o	
D—y—1	A—B	b-(c-a)	
D—y—7	B—C	c-(a-b)	K=(UH/UL)/(2/√3)
	C—A	a-(b-c)	
D—y—3	A—B	c-(a-b)	
D—y—9	B—C	a-(b-c)	K=(UH/UL)/(2/√3)
	C—A	b-(c-a)	
D—y—5	A—B	a-(b-c)	
D—y—11	B—C	b-(c-a)	K=(UH/UL)/(2/√3)
	C—A	c-(a-b)	

(Appendix 2) Prompt Information and Handling

Prompt Message	Meaning	Required Actions
	The instrument is powered by the battery 100% battery capacity left.	
	The instrument is powered by the battery 75% battery capacity left.	
	The instrument is powered by the battery 50% battery capacity left.	
	The instrument is powered by the battery 20% battery capacity left.	Charge as soon as possible to not affect using..
	The instrument is powered by the battery Battery is out of power.	Charge as soon as possible to not affect using..
Under testing	The instrument is testing, please wait.	
Test completed.	The instrument finishes testing and is able to print and save data.	
Under printing.	The instrument is printing, please wait	
Print completed.	The instrument finishes printing	

Under saving	The instrument is saving test data to memory, please wait	
Save completed.	The instrument finishes saving of test data	
	USB has been correctly inserted into the instrument and data can be exported.	
Under exporting.	The data saved in the instrument is being imported into the USB flash drive, please wait	
Export completed.	The operation of exporting the recorded data has been completed. The USB flash drive can be pulled out or the next set of data can be exported after 2 seconds.	
Export falied.	An error occurred in the process of data exporting, and the export of records failed.	Export data again. If the export fails again, please replace the USB flash drive, restart the instrument and export again. In case of repeated export failures, please contact the manufacturer's technician for handling.

USB module error	The internal module of the instrument fails.	Please contact the manufacturer’s technician for handling
Input error	The input parameters have an error	Please check the input parameters to see if they meet the specifications.
Internal Error	Instrument internal error	Please restart the instrument and try again. If the fault is not eliminated, please contact the manufacturer's technician for handling.
Test error	An error occurred during the testing of the instrument	Please check if the test leads are correctly connected. If the fault is not eliminated, please contact the manufacturer's technician for handling.
! Current Protection	Overcurrent	Check if there's short circuits in the wiring and tested product.
! Voltage Protection	Overvoltage	Please check if high and low voltage test leads are reversed in connection
! Battery Protection	The part of inverter power source fails	Please restart the instrument and try again. If the fault is not eliminated, please contact the manufacturer's technician for handling.

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