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# User MANUAL

## Transformer Turns Ratio Tester

ATO-TTR5001



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## 1 Product overview

In process production of the power transformer's semi-finished products and finished products, before the newly installed transformer put into operation, according to the preventive test code of the state power department, it is required to run regular transformer turns ration or voltage ratio test.

## 2 Function Characteristics

- Test wide range, the highest ratio can be measured up to 10000.
- The built-in three-phase digital power supply, to improve the stability of the test.
- Small volume, light weight, fast test speed,10 seconds to complete the test phase.
- Z shaped linking transformer testing
- have blind test ratio, group test function.
- The display of clock and date on not power down, the function of data storage(can select to save data to the U disk)
- the function of high and low voltage reverser polarity protection, short circuit protection.
- the function of thermal printer output, fast speed, low noise.
- Full penetration type large-screen LCD, can clearly show in the sun.

## 3 Technical Parameters

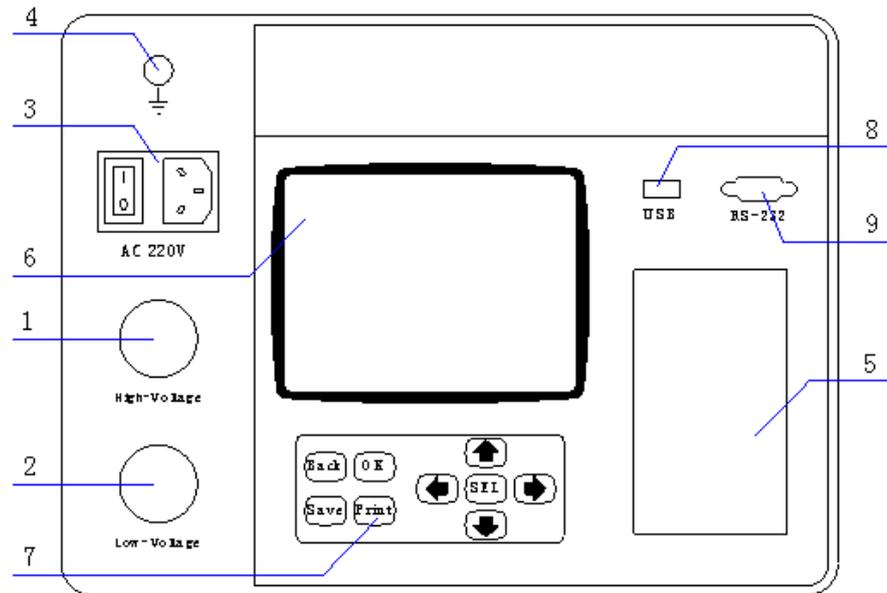
- range of measurement 0.9~10000
- resolution minimum 0.0001
- Accuracy 0.2level
- Output Voltage 160 V
- Dimension 345mm×295mm×175mm
- Instrument weight 5Kg

## 4 Service Condition

- Environment temperature -10°C~50°C

- Environment humidity  $\leq 85\%RH$
- Working power AC220V  $\pm 10\%$
- Supply frequency 60Hz  $\pm 1Hz$

## 5 Panel Instruction



**1. High-Voltage** Corresponding to the high voltage side of the A ,B ,C three-phase of the measured transformer

**2. Low-Voltage** Corresponding to the low voltage side of the A,B,C three-phase of the measured transformer

**3. Switch** To turn on or turn off the power supply test device

**4. Earthing rod** Before any testing please contact the earthing rod to the ground ,so as to avoid electric shock hazard.

**5. Printer** print the test data.

**6. LCD panel** Display, Black character on white background, can be clearly display in the sun.

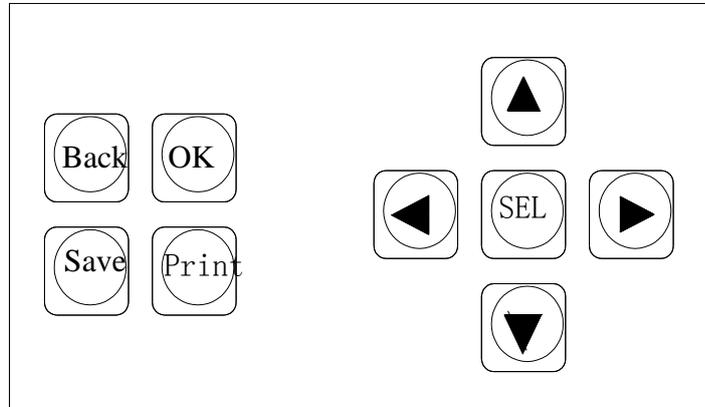
**7.Key disk** Used for operating equipment

**8.U S B** Connect USB flash disk, save data

**9.RS232** Used for upgrade programs

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## 6 Key Introductions

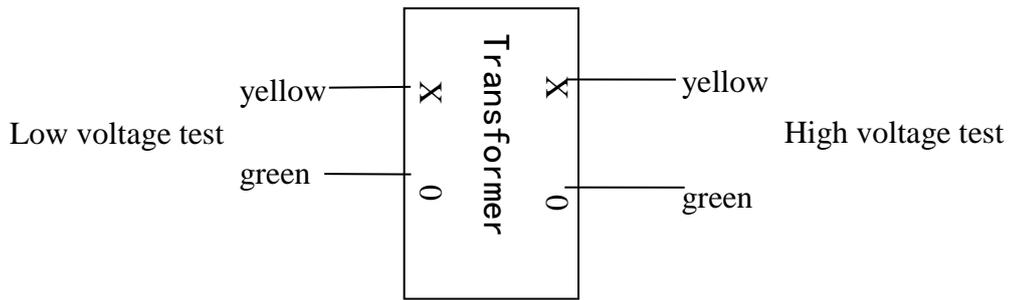


- **OK** Confirmation of the selected project.
- **Back** return the last layer on the menu
- **Save** save data, the test data is stored to the apparatus main memory or the external U disk
- **Print** print the test result data
- **↑ ↓** select to move up or down, and the data to edit add or sub 1
- **← →** select to move left or right ,and the data bits to edit move left or right
- **SEL** different panel have different function

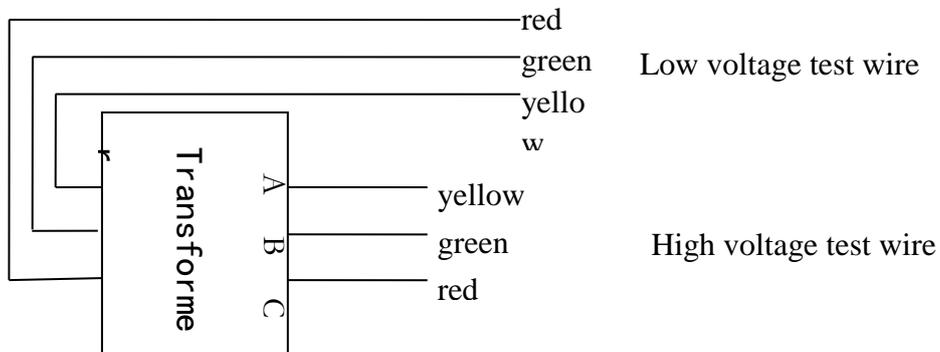
## 7 Operating instructions

### 7.1 Instrument wiring

- Single-phase ratio wiring (the unused test line hung up is ok) , as shown in the figure.

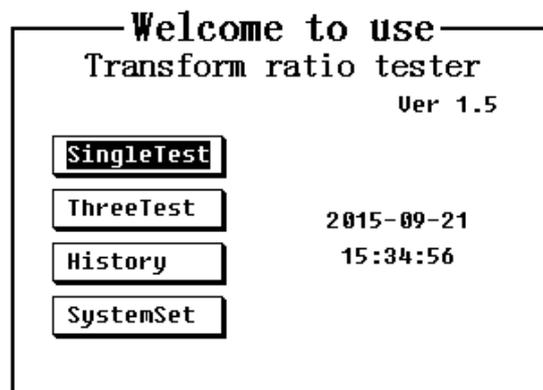


➤ Three-phase ratio connection as shown:



## 7.2 Starting Interface

After as required to connect the test line, open the power switch of the panel, the starting interface will display as shown.



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On this interface, press the key ↑ ↓ , select the various function of the instrument, each function instructions as follow,

- SingleTest the ratio of single-phase transformer and voltage transformer
- ThreeTest test the ratio of Three –phase (include Z shape) transformer
- History view the stored historical data
- SystemSet setup the system parameters such as setup time

### 7.3 Parameter setting interface

Parameter setting interface is used to set transformer parameters of using in ratio test, and test the sequence number of sample.

The two pictures of parameters setting interface as shown, First one shown interface is transformer connection mode and group number set, It is appear only in three-phase measurement, single-phase measurement do not need to setup. Second picture shown interface is the related parameters setting of transformer rated ratio and tapping switch .

After you press “save” key, the setting up parameters can be saved to the instrument internal flash memory, as the default parameter values for each boot.

If system setting interface have selected “Automatic Identifying” , it will automatic identify the group number only the group number setup as "XX".

The screenshot shows a screen titled "Parameter Set". It contains two columns of radio button options. The left column is labeled "HV\_Conne" and has options: Unknow, YN (selected), Y, D, and Z. The right column is labeled "LV\_Conne" and has options: Unknow, yn (selected), y, and d. Below these columns is a field labeled "ConNum:" with a display showing "11 XX 00 01 02". At the bottom of the screen are three buttons: "Next", "Save", and "Back".

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### Parameter Set

Rated_HV:	10.0000KV
Rated_LV:	0.4000KV
TapNumbe:	17
Prin-Tap:	09
Tap_Inte:	5.00%
SerialNum:	666666

Start
Save
Back

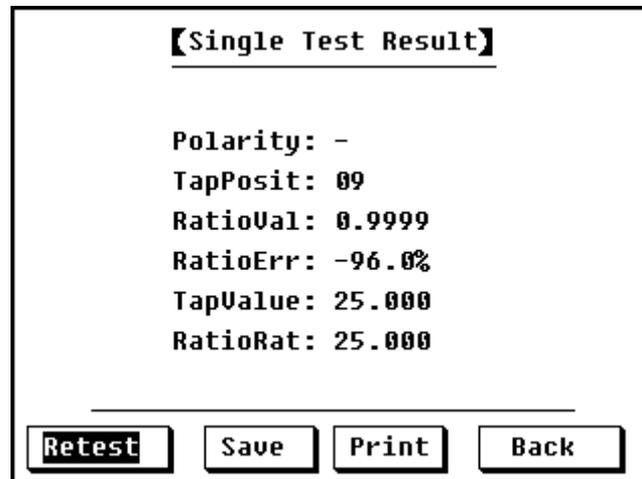
Parameter instruction

- Rated\_HV: setting the rated high voltage of the measured transformer (setting as the transformer nameplate )
- Rated\_LV : setting the rated low voltage of the measured transformer(setting as the transformer nameplate )
- TapNumbe: setting the total number tapping of the measured transformer(setting as the transformer nameplate) if setup as 0, the instrument will not judge the location of tapping
- Prin-Tap: setting the tapping location of the measured transformer's rated tapping. When setting the total number of tapping, it will default to change to intermediate tapping, if rated tapping is not intermediate tap, it can be changed manual.
- Tap\_Inte: setting the tapping space of the measured transformer(setting as the transformer nameplate )
- SerialNum: Users can set the test number used for record each test random.

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## 7.4 Single-phase ratio test results interface

After the single-phase test, the interface turn into single-phase test result interface as follow shown:



the picture shown the all test result in the interface, the setting parameters not shown in the interface but it is included in the printer result. If select "Retest", it will test use the new setting parameters.

If you press "select" the interface turns into "parameter setting", it is different from starting into "parameters setting" interface, this parameters setting will directly re-calculation "ratioVal", "TapPosition", "TapValue" "RatioErr" and other parameters on the measured data. After test, if find ratio error or tapping position is wrong, press "select" turn into "parameter setting" interface review and correction the parameters .

Press the "Back" key can quickly return to the previous screen, press the "Save" key can quickly save the results to the fuselage memory or U disk, press the "Prin" key you can quickly print results.

## 7.5 Three-phase ratio test results interface

After the completion of the three-phase test, it turn into the three-phase test results interface as shown, the same with single-phase test results displayed on this screen, it only displays all test results without displaying parameter settings, the results printed out will include parameter settings, press "Retest", it

will re-measure with the setup parameter.

The same with the single-phase test results interface, in this interface press "SEL" button can also turn into the "parameter setting" interface, but the group number only work in next measurement , it can not play a role for the measured data.

Press the "Back" key can quickly return to the previous screen, press the "Save" key can quickly save the results to the fuselage memory or U disk, press the "Print" button you can quickly print results.

Three-phase testing process is to add the angle of the three-phase power measurements to calculate the group number, then according group number conduct the measurement variable ratio. But it will directly conduct ratio test if choose stand-by power, group numbers should be input in strict accordance with the transformer nameplate.

**【Three Test Result】**

Connecti:  TapPosit:   
RatioRat:  TapValue:

Phase	Result	Error
AB/ab	0.9999	-96.0%
BC/bc	0.9999	-96.0%
AC/ac	0.9999	-96.0%

Three-phase ratio test results interface

**【Three Test Result】**

Please Select...

Storage Medium:

- U-Disk
- ◆ Local

press "save" key popup storage medium selection interface

## 7.6 History record interface

History record interface is used to manage data stored in the body memory.

As it is shown below, users can find the experimental record by the test number and the recording time.

In the following interface, Press the key "Save" to store the data into U disk and press the key "SEL" to delete the test records.

Index	SerialNum	TestTime
0001	666666	2015/08/13 08:49

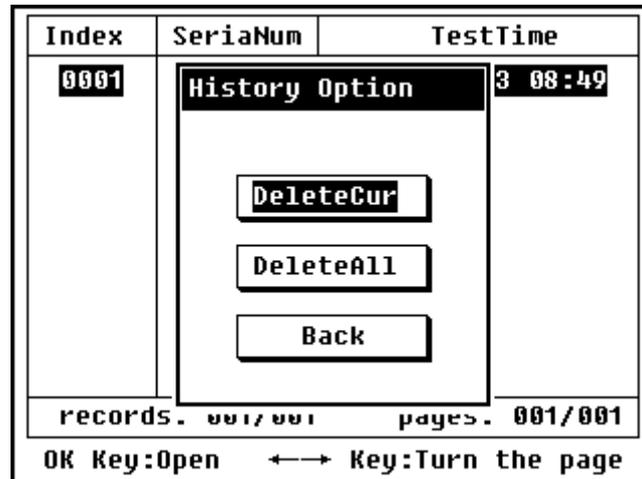
records: 001/001      pages: 001/001  
OK Key:Open   ←→ Key:Turn the page

The following figure shows the test record that displays the details of history.

Connecti: 00	TapNumbe: 17												
Rated_HV: 10.00	Tap_Inte: 5.00%												
Rated_LV: 0.400	TapPosit: 09												
RatioRat: 25.00	TapValue: 25.00												
<table border="1"><thead><tr><th>Phase</th><th>Result</th><th>Error</th></tr></thead><tbody><tr><td>AB/ab</td><td>25.008</td><td>0.03%</td></tr><tr><td>BC/bc</td><td>25.009</td><td>0.03%</td></tr><tr><td>AC/ac</td><td>25.011</td><td>0.04%</td></tr></tbody></table>		Phase	Result	Error	AB/ab	25.008	0.03%	BC/bc	25.009	0.03%	AC/ac	25.011	0.04%
Phase	Result	Error											
AB/ab	25.008	0.03%											
BC/bc	25.009	0.03%											
AC/ac	25.011	0.04%											
SerialNum: 666666	Prin-Tap: 09												
2015-08-13 08:49:47													

In the interface, press the key "Save" to store the data into U disk and press the key "print" to print the test records. Print the key ←→ to change the displayed records. Print the key "Back" to go back to the previous interface.

Press the key "SEL" in the history records interface to turn into the data management interface as follows. Select "DeleteCur" and then press the key "OK" to delete the currently selected records. Select "DeleteAll" and the key "OK" to delete all the history records. Select "Back" and then the key "OK" to return the history record interface without any processing.



## 7.7 System setting interface

In the main menu, select "SystemSet" to open the system setting interface as shown.

In the following picture, "Calibrat" and "OtherSet" are used by the manufacturer for the testing of the instrument. Users need not use password protection. "TimeSet" can open the time setting interface and users can set the time.

If you select "Use 10V Power" option, you will test by a power of 10V. If the current is too large and you are sure it is not caused by a short-circuit, this option should be selected to test.

If the "Automatically Identifying " option is selected, the group number set by users will not work and the tester will automatically identifying the group number for each measurement.

If the "Emergency power" option is selected, the standby power inside the instrument is used to test. This option is available only when the main power fails to work and the standby power can not recognize the group number.

If there are changes to the parameters when they are returned, the parameters are

automatically saved.

**System Set**

Use 100 Power  
 Auto Identification  
 Emergency Power

Use standby power test.

**TimeSet**      **OtherSet**  
**Calibrat**      **Back**

If the "Time Setting" option is selected, the time setting interface is shown as follows. Press the key "OK" to make the system time change as you set, and the tester will go back to the starting interface. Press the key "Back" to abandon modifying time and return to the initial interface directly.

**Time Set**

20 15 - 09 - 21  
/ 15 : 38 : 11

**Confirm**      **Back**

## 8 Note items

1. Do not put the tester on an unstable platform or desk to prevent it from drop impact.
2. The power used by AC 220V, and the tester cannot be connected to a power which is AC 220V.
3. Don't let any foreign bodies fall into the chassis to avoid a short circuit.
4. Connect the ground rod on the device panel to the earth reliably before

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testing to avoid occurrence of danger.

## 9 Fault analysis

In the process of using the device, if there are some abnormal situations, please follow these steps below:

1. If the measured data are wrong, please check whether the circuit is right.
2. If there is no response when you turn the tester on and the LCD is not bright, please check whether the power fuse hidden in the panel is open.
3. If it is an internal fault, please contact our company quickly and we will solve it for you as soon as possible.

## 10 After-sale service

This meter is provided with free repairing and replacement in case of quality issues within one year since the date of purchase. It is rendered with life-long maintenance and technical service. If abnormal condition or malfunction is found, please contact us timely so that we can provide you the most convenient solution.