# PS-BB103 Transformer Turns Ratio Tester

**User Manual** 

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#### 1 General

During the processing of the semi-finished products and the finished products in transformer production, the newly installation transformer before using, and according to IEC and national standard, the turns ratio or voltage ratio should be tested in the circle rate. Can check the correctness of the transformer turn ratio, tap-changer condition, whether short circuit between turs and whether the transformer can parallel run. Traditional bridge method is complicated, and can't read the data directly, and you have to make conversion, the testing results are data of one phase. Turns ratio tester of PS-BB101 type overcomes the shortcomings of traditional bridge method. The monitor adopts big screen with lattice liquid crystal, which has the function of indicating by menu, operating easily and directly. It finishes test of three-phase voltage ratio or turns ratio once, fast testing and high precision

#### 2. Functions Features:

(1).Instrument internal adopt precision three-phase inverter measurement power supply instead of the single-phase mains supply as measuring voltage, which eliminate the harmonic effect of the main voltage , more accuracy. If the working power supply is generator and its without any effect.

(2).using three-phase output voltage, improve the test speed, can measure the angle between the phases, automatically identify the transformer wiring group 0-11.

(3).Suitable for various of transformers, with the function of testing the Z type transformer rectifier transformer grounding transformer, electric furnace transformer, phase-shifting transformer, balanced transformer,Scott transformer,Inverse Scott transformer.

(4).Using precision three-phase inverter power supply, has the high and low voltage reverse connect protection and transformer inter-turns short circuit protection, tap-changer protection and output short circuit protection functions, increase the stability of instrument.

(5).After inputting the rated parameters, can automatic measure transformer turns ratio, error and tap-changer points, especially for asymmetric tap-changer points, also can accurately test the position of the transformer tap-changer, can measure up to 99 points of tap-changer



(6).With 65K True Color Module LCD display, each operation step with English prompt, and the operation can be completed just by prompt and no need of manual.

(7).With Micro-printer ,USB and RS232 interface.

(8)With sealed water-proof and shock-proof sturdy hand-case, be suitable for field testing.

(9).Android mobile phones can pay attention to WeChat public number downloading and installing special software, connect the whole process control instrument through Bluetooth, and store the test data in a fixed format on the mobile phone, so as to facilitate data inquiry at any time.

#### 3. Technical data

1)Range: 0.9~10000

2)Accuracy: ±0.1%+2wrods (0.9~500)

±0.2%+2words (501-2000)

±0.5%+2words (2001-10000)

- 3) Resolution: Minimum is 0.0001
- 4) Output voltage: According to load to adjust automatically.

5)Working power supply: AC220V±10% 50±1Hz

6)Applied temperature: -10℃~40℃

7)Contrary humidity: ≤85%, no dew.

8)Size: TTR Tester: 360\*290\*170(mm) Wire box: 360\*290\*170(mm)

9)Weigth:Tester 5.9Kg wire box: 5.65Kg





# 4. Panel instruction

**1. Display**: 7 inch True Color matrix LCD, digital adjust the backlight, display the operation menu and the test results.

**2.High voltage terminals:** Connect instrument terminals: The yellow, green,red and black terminals with the corresponding A, B, C ,0 three phase of the tested transformer high-voltage side

**3.Low voltage terminals:** Connect instrument terminal: The yellow, green, red and black with the corresponding a, b, c ,0 three phase of the tested transformer **4.AC 220V**:Power supply input.

5.: Ground rod protection

6.RS232: Communication interface.

7.USB:USB Flash disk

8.Printer: Print the testing results.

### **5.Operating Instruction**



# (1)Menu display as the Fig1

Fig1

The functions can be selected after the instrument turns on, as the Fig 2. It included "Three-phase test" "Single-phase test", "Z type transformer"



"Scott transformer" "Data quiry" "Setting".

(2) Three-phase test



Fig 2

 Click "Three-phase test" to enter test, the user can type a specail value firstly. The standard value can be modified by button on the right. The way of Single-phase test ,Z type transformer test, Scott transformer test are same as Three-phase test.

Ratio Test Phase Ratio Error Angle Start 0.000° A 25.000 0.000% Save 25.000 B 0.000% 0.000° 0.000° C 25.000 0.000% Print Current variable ratic: 25.000 Tap Value: 0. 00% Connection: YN/yn-0 Tap Position: 3 Back

Test result as below Fig3



2. Click"Back" to home after finish the test, Click "Test" to test again, Click "Save" to save the data on U disk and machine. Click "Print" to print the test result.

| Connection   Test Mode   Test Style   Information     YN/yn-0   Three-phase group   Next     A 相   25.000   0.000%   0.000°     B 相   25.000   0.000%   0.000°     C 相   25.000   0.000%   0.000°     C 相   25.000   0.000%   0.000°     Current variable ratio   Tap Value   Tap Position  | High Voltage Low Voltage Voltage<br>10.00kV 0.400kV |        |    | ge Regulation Ratio R.<br>0. 500% |  | d Tap Test Time<br>3 2019-1- | Last  |  |
|---|---|--------|----|-----------------------------------|--|------------------------------|-------|--|
| Phase   Ratio   Error   Angle   Next     A 相   25.000   0.000%   0.000°   Save     B 相   25.000   0.000%   0.000°   Save     C 相   25.000   0.000%   0.000°   Print     Current variable ratio   Tap Value   Tap Position   Print   | <u>YN/yn=0</u> Three-phase group                    |        |    |                                   |  |                              | Next  |  |
| Image: A minipage of the second structure Image: Constructure < | Phase<br>A 相  | Ratio  |    | Error                             |  | Angle                        | INCAL |  |
| C 相 25.000 0.000% 0.000°<br>Current variable ratio Tap Value Tap Position Rook  | B 相   | 25.000 |    | 0.000%                            |  | 0.000°                       | Save  |  |
| Current variable ratio Tap Value Tap Position   | C 相   | 25.000 |    | 0.000%                            |  | 0.000°                       | Print |  |
| DE DOD D DOW D Back   | Current variable ratio                              |        | Ta | ap Value                          |  | p Position                   |       |  |
| 25.000 0.00% 3  | 25.000  |        | C  | 0.00%                             |  | 3                            | Back  |  |

3. Click "Data quiry" to quiry the test data as the below Fig 4

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Fig 4
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"Previous" "Next" to view and print the historical data

"Transferring" save the data to U disk.

"Print" printing the test result.

4. "Setting" as the Fig 5: Factory setting is pre-setting, the user needs to input the passwords, don't needs to modify.





# 6. Connection

(1) Y-d-11,Voltage combination 110±8×1.25%/10.5transformer,Connecting as Fig 6.





(3) Single transformer ,voltage combination  $525/\sqrt{3}\pm4\times2.50\%/20$ ,connecting

as Fig7





# 3. Z type transformer wire connection: as Fig 8 below:



4. Scott Transformer test



# 5.Inverse Scott transformer test





#### 7. Notice

(1)For the multiple tap points transformer, equal tapping level, tapping type, Input the rated high and low voltage is in order to make the test results can automatically calculate the error value, and the position of tap-changer, once the nominal data input, when testing each tap point it will be automatically calculated error values and the No of tap points (i.e., tapping points No ), don't need change data any more

(2) Equal taping level, also called tapping distance, voltage combination 110±8×1.25%/10.0 e transformer, 1.25% is equal tapping level

(3) Tap types, voltage combination  $110\pm8\times1.25\%/10.0$  transformer, equal level is for 8 + 1 or 9,input rated tap position is ok, and also for rated tap position is not in the middle point of the transformer, the tapping position testing also will not appear mistake.

(4) Turns ratio, add three-phase power to get the voltage ratio of relations of HV and LV, turns ratio is the ratio of high voltage and low voltage windings ,for the star connection HV transformer (whether or not with a neutral point), For the low voltage delta connection transformer, the variable ratio is  $\sqrt{3}$  times of the turns ratio. For low voltage star connection transformer (whether or not with a neutral point), for the delta connection HV transformer, turns ratio is  $\sqrt{3}$  times of the variable ratio.

(5) For the transformer with neutral point, such as YN - d - 11, according to YN - d - 11 and Y- d - 11 testing ,the results have a deviation, theoretical analysis according to the Y - d - 11 is better.

(6) On-load tap-changer 19 level transformer, if the 9, 10 and 11 tapping are the same values, input tap types should input 9.

(7) Tap-changer in low voltage side transformer, the displaying tap position and the actual tap position is inversion.



(8) The Low voltage LV transformer, when the input voltage value bits is not enough, it may enlarge the high voltage and low voltage by 10 or 100times.then input it.

(9) When testing single-phase transformer test, only choose single at the testing option.

## 8.Common problems and inspection methods

When the test is not normal, you can use the following methods for self-test. The wiring is as shown below:



After connecting the line, select Y-y-0 or D-d-0, then press the enter key to start the measurement. The measured value is 1.0000. The above display indicates that the instrument is normal, otherwise there is a problem with the instrument.

If there is no short wire, you can short the high-voltage side yellow, green, red and black wiring clamps of the test line to the low-voltage side yellow, green, red and black wiring clamps. (When short-connected, pay attention to the position of the pliers lead, wired One end must be reliably connected together).

#### 9. Store condition and after sale service

Instruments should be kept indoor ,the environment temperature is 0  $^\circ {\rm C}$   $\sim$ 



 $40^{\circ}$ C,relative humidity $30\% \sim 80\%$ ,and the air without corrosion of harmful substances.

#### After sale service:

- 1) We offer one years free components maintain if quality problem.
- 2) We offer life-long basic components cost maintain. Customer need to cover the delivery cost.
- 3) We offer life-long technology support through email, or remote online.
- 4) Please reserve this certificate carefully for warranty. Please delivery it together with the device.

\*Free maintain won't be given under the following circumstance:

Without certificate

- 5) Breakdown caused by the manipulation that hasn't follow the requests of the Manual
- 6) The damage caused by the dismantle movement of a non-our-company authorized maintainer
- 7) The damage caused by customer inappropriate preservation, maintain, or the usage.
- 8) The breakdown and the damage caused by the Force majeure.