

TE 2020

变比组别测试仪

Automatic Turns Ratio Tester

说 明 书

USER MANUAL

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一、衷心感谢您使用本公司的产品，您因此将获得本公司全面的技术支持和服务保障。

Firstly, we would like to express our heartfelt thanks for your choosing our product. You will receive overall technical support and service guarantee from our company.

二、本使用说明书适用于TE2020变比组别全自动测试仪。

Secondly, this manual book is designed for TE2020 Automatic Turns Ratio Tester.

三、当您在使用本产品前，请仔细阅读本使用说明书，并妥善保存以备查考。

Thirdly, before you use this product, please read this manual book carefully and keep it for reference.

四、请严格按说明书要求步骤操作，使用不当可能危及人身安全。

Fourthly, follow the steps strictly, any wrong operating can affect the personal safety.

五、在阅读本说明书或仪器使用过程中如有疑问，可向我公司咨询。

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Fifthly, if you have any question when you read this manual book or use the equipment, please feel free to contact us.

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1、1 用途 Application

TE2020变比组别全自动测试仪能全自动测量单相、三相变压器，电压互感器、分接变压器等设备的变比、极性、组别等参数，并能自动计算出变比误差，是变比电桥的升级换代产品。

TE2020 Automatic Turns Ratio Tester can full-automatically measure transformation ratio, polarity and group of the equipments such a one-phase or three-phase transformer, voltage transformer and tapping transformer, can automatically calculate transformation ratio error and is the upgrading and renewing product of the transformation ratio bridge.

1、2 性能特点 Function and Feature

1) 真正三相测试：单相电源输入，内部产生三相电源输出，测试结果具有更好的等效性，不会出现组别误判等现象。

1) True three-phase test: One-phase power input, the internal produces three-phase power output to make test results have better equivalence and will not produce wrong judgment.

2) 测量速度快

2) Quick measurement speed

3) 操作简单：无需选择接线方式，无需选择接线组别，测量Y/△、△/Y变压器无需外部短接，可根据选择的测试内容自动切换接线方式。

3) Easy operating: Needn't select connection mode and connection group. Need no external shorting during measurement of Y /△ and △/ Y transformer and automatically switch connection modes according to selected tested contents.

4) 分接测试：能快速测量在各分接开关位置的变比及变比误差，额定变比只需输入一次，不必反复输入就能计算出各分接位置的变比误差。

4) Tapping test: Quickly measure transformation ratio and transformation ratio error at each tapping position of the switch. The rated transformation ratio only need one input without repeating input and the transformation ratio error of can be each tapping can be calculated.

5) 保护功能完善：高压侧与低压侧测试接线反接能自动保护，并发出声光报警。

5) Perfect protection function: Inversion connection of the testing of high voltage side and low voltage side can automatically protect can give put audible and visual alarm.

1

概述 Overview

6) 现场检定：特别设计了软件修正功能，不需硬件调整就能实现精度修正，在各级电力试验研究部门均可现场检定。

6) On-Sidte calibrating: Specially design software correction function, realize accuracy correction without hardware adjustment and perform site calibrating in each level of electric power test and research organizations.

7) 抗振性好：军品接插件的使用增强了抗振性能。

7) Good anti-vibration performance: Military connector strengthens anti-vibration performance.

8) 携带方便：体积小，重量轻。

8) Easy carrying: Small volume and light weight.

1

概述 Overview

2、1 电源方面 Power supply

本仪器使用电源：交流 $220\text{V}\pm 10\%$ ，频率为 $50\text{Hz}\pm 1\text{Hz}$ 。

The instrument power supply: AC220V $\pm$ 10%, Frequency:50HZ $\pm$ 1HZ.

2、2 安全方面 Security

1) 为了仪器及操作人员的安全，仪器必须可靠接地。

1) The device must be well grounded to ensure safety for the operators.

2) 试验准备时最先接好地线，工作完毕时最后拆除接地线。

2) At time of preparing an experiment, it is better to connect the ground wire at the beginning firstly, which shall be removed at the end of the experiment finally.

3) 在通电情况下，任何人不得插拨任何接线。

3) When the power is on, nobody shall plug any wire.

4) 当在室外时，请勿将仪器长时间置于太阳下曝晒。

4) In case of operation outdoors, the device mustn't be exposed to the sun for a long time.

2、3 操作方面 Operation

1) 仪器面板与测试线的连接处应钮紧，不得有松动现象。

1) The connection between Instrument panel test line should be tight, without loosening.

2) 接线时，仪器面板上的四芯航插即高压侧接变压器的高压侧，三芯航插即低压侧接变压器的低压侧。

2) When wiring, The quad air plug on instrument panel is high voltage side, which connect to the transformer's high voltage side. Three-core air plug is low-voltage side, which connect to the transformer's low voltage side.

3) 保证被试品与外界完全断开。请注意高、低压侧不要接反。

3) To ensure that the object to be tested completely disconnected with the outside, please note that high and low pressure side not to take reverse.

4) 接线完毕后，应检查一遍，查看是否有接线错误。

测试过程中，如出现异常现象，应立即关闭电源，检查接线。

2

特别提示 Special Note

4)After wiring, check again to see if there are connection errors. During the test, such as abnormal phenomenon, immediately turn off the power, check wiring.

注：当仪器接线正确，测试结果误差很大时，可先检查仪器面板上高压侧三相保险管是否完好，其次可将仪器的高低压测试线短接，即A对a、B对b、C对c，（切记相间不能短接，否则会烧毁电源），然后开机进行三相测试，仪器如果正常则测试结果三相均为1。

Note:

When the instrument wiring is correct, the test results error is large, you can check on whether the three-phase fuse of high side on the instrument panel is intact, then the instrument can be shorted high-voltage test line, that is A on a, B of b, C for c, (You must remember different phase can not shorted, otherwise they will burn down the power), and then start the three-phase test, test results of three phases are all 1 if the instrument is normal.

1

概述 Overview

3、1 测量范围 Measurement range

变比：1~2200

Turns ratio: 1~2200

组别：0~11

Group: 0~11

3、2 测试准确度 Measurement Accuracy

仪器的测试准确度为： $\pm (0.2\% \times \text{读数} + 1\text{字})$

The Measurement accuracy of the instrument: $\pm (0.2\% \times \text{reading} + 1 \text{ digit})$

3、3 使用环境要求 Operation Environment requirement

环境温度：-10℃~40℃

Ambient temperature: -10℃~40℃

相对湿度： $\leq 80\%$

Relative humidity: $\leq 80\%$

3、4 使用电源 Power supply

电压：AC220V $\pm 10\%$

Voltage: AC220V $\pm 10\%$

频率：50HZ $\pm 1\text{HZ}$

Frequency: 50HZ $\pm 1\text{HZ}$

3、5 主机结构型式与尺寸 Host structure and size

型式：一体化便携式

Type: Integration portable type

外形尺寸：长350mm*宽280mm*高160mm

Boundary dimension: Length350mm*Width280mm*Height160mm

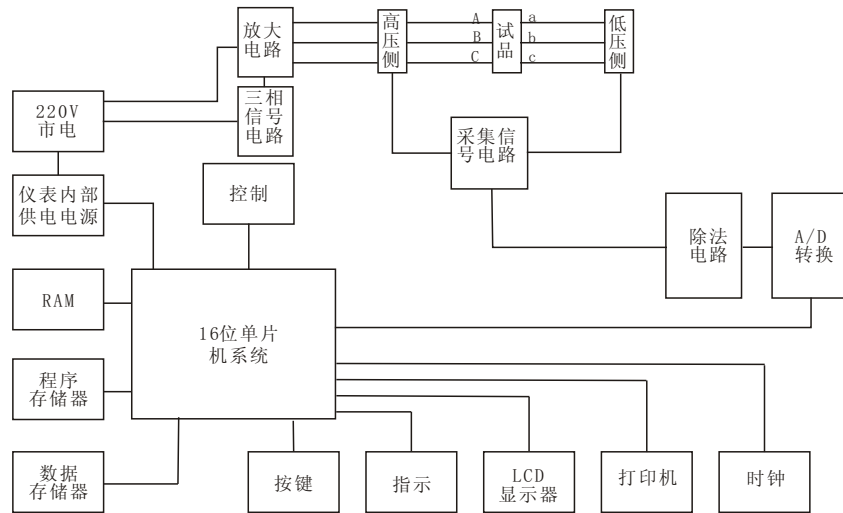
质量：4.5kg（不含附件）

Weight: 4.5kg (exclude accessories)

3

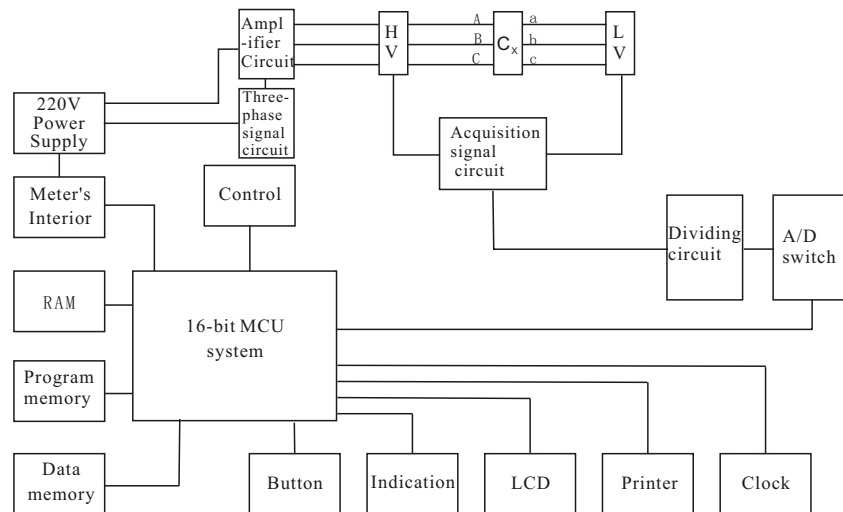
技术特征 Technical features

4、1原理框图

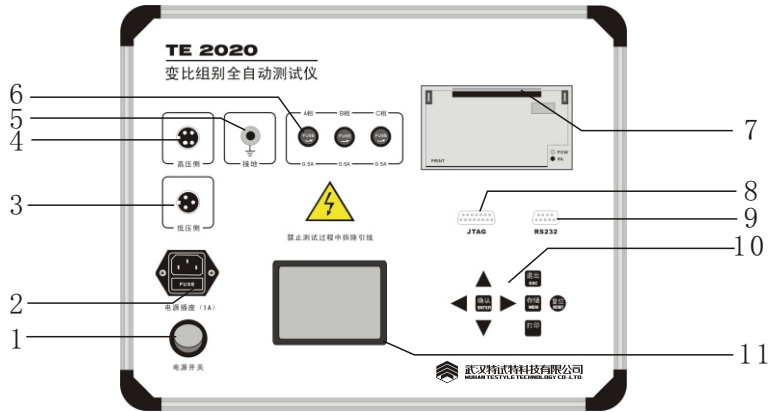


4

工作原理 Operating Principle



5、1 面板示意图 Panel Schematic diagram



高压侧: High-voltage side

低压测: Low-voltage side

接地: Earth

电源插座: Power socket

电源开关: Power switch

5、2 各部件说明 Illustration

1) 电源开关: 闭合该开关, 仪器处于通电状态。

1) Power switch: The switch is turned on to electrify the instrument.

2) 电源插座: 接220V市电, 该插座内含保险丝盒, 本仪器应安装3A保险管。

2) Power socket: Connecting to AC 220 V electric supply. This socket includes a fuse box in it and this instrument shall be provided 3 A fuse.

3) 低压侧端子: 三芯航插与三芯电缆航插线相接, 测量试品低压侧的三相电压。

3) Low voltage side terminals: Three-pin towing plug is connected to the three-pin towing cable, corresponding to three-phase voltage of low voltage side of the measured sample.

4) 高压侧端子: 四芯航插与四芯电缆航插线相接, 给被试品输入三相电源。

4) High voltage side terminals: Four-pin towing plug is connected to the Four-pin towing cable, corresponding to three-phase voltage of high voltage side of the tested sample.

5) 接地柱: 为保障操作者的安全及仪器正常工作, 使用前应将该接线端子可靠接地。

5) Grounding Post: In order to guarantee safety of the operators and the proper operating of the instrument, the terminals shall reliably be grounded.

5

面板布置

Panel Layout

6) 高压侧三相保险：当输出短路或接线错误时会熔断保险起到保护仪器的作用。

6) High voltage side three-phase fuse: When the output cable produces short circuit or connection mistake, fuse will play a role of protecting the instrument.

7) 打印机：前换纸型中文打印机，用于测试数据的打印。

7) Printer: Front changing-paper Chinese printer, which is convenient for recording the test data.

8) JTAG在线编程接口。

8) JTAG on-line programming interface .

9) Rs232电脑接口。

9) RS232 computer interface.

10) 触摸按键：详见5、3。

10) Touch keys: The details are shown in 5.3.

11) 液晶显示器：以中文方式显示菜单及测试结果。

11) LCD: Display menu and test results with the Chinese mode.

5

面板布置

Panel Layout

5、3 按键说明 Key-press illustration

▲ ▼ ◀ ▶ 光标的上下、左右移动键及数字的加减。

Up, down, left and right movement keys of cursor as.



确认选择内容。

well as plus and subtraction of numbers.



退出当前菜单。

Confirm the selected contents.



存储所测量的数据。

Store all test data.



打印出测量的数据。

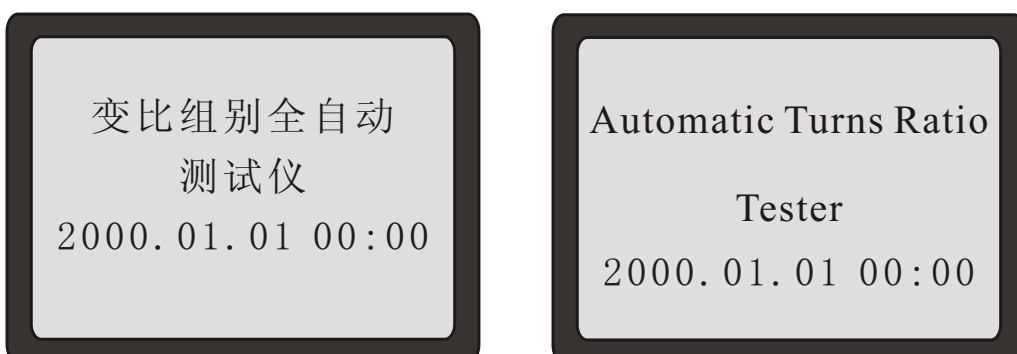
Print all test data.



复位到开机状态。

Reset to the starting condition.

6、1 开机页面 Starting page



1) 在此页面最下一行显示为系统当前的日期和时间，该日期和时间可被修改，具体操作详见6、8。

1) The bottom line in this page shows current date and time, which can be modified and the specific operating is shown in 6.8.

2) 按“确认”键进入主菜单。

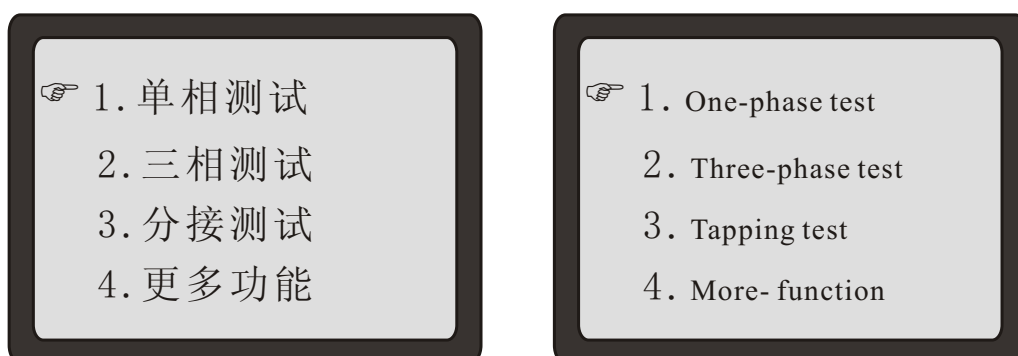
2) Press “ENTER” key to enter main menu.

6

页面说明

Page Instruction

6、2 主菜单



1) 按 ▲ ▼ 键，光标上下移动。

1) press ▲ ▼ Key Up and down movement of cursor

2) 选择“1、单相测试”，按“确认”键进入单相变压器测试，具体操作详见6、3。

2) Selection “1: One-phase test: Press “ENTER” key to enter one-phase transformer test, the specific operating is shown in 6.3.

3) 选择“2、三相测试”,按“确认”键进入三相变压器测试,具体操作详见6、4。

3) Selection “2: Three-phase test: Press “ENTER” key to enter Three-phase transformer test and the specific operating is shown in 6.4.

4) 选择“3、分接测试”,按“确认”键进入带分接开关测试,具体操作详见6、5。

4) Selection “3: Tapping test: Press “ENTER” key to enter test with tapping switch the specific operating is shown in 6.5.

5) 选择“4、更多功能”按“确认”键进入参数设置项,具体操作详见6、6。

5) Select “4: More- function: Press “ENTER” key to enter the parameter setting and the specific operating is shown in 6.6.

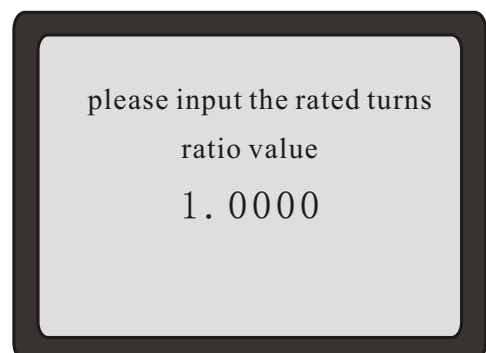
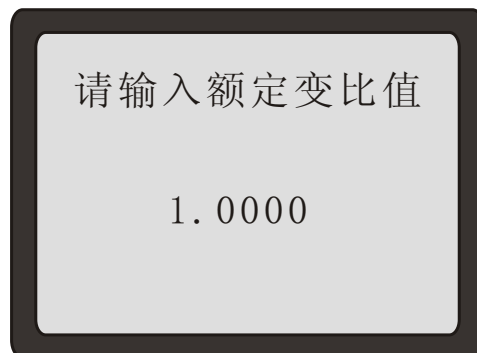
6、3 单相测试页

在主菜单中选择“1、单相测试”按“确认”键,液晶显示:

6

页面说明

Page Instruction



1) 按 ◀ ▶ 键,光标左右移动。

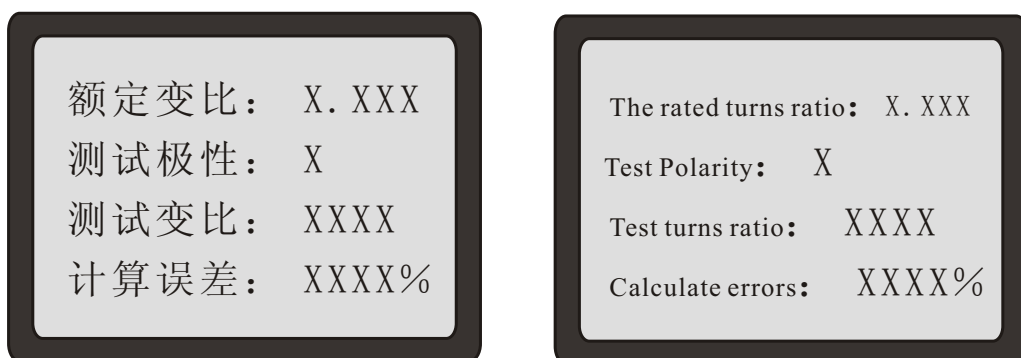
1) Press ◀ ▶ key to set Left and right movement of cursor.

2) 按 ▲ ▼ 键,设置额定变比值。

2) Press ▲ ▼ key to set the rated turns ratio value.

3) 按“确认”键,确认所设置数据并开始测量,几秒钟后显示测试结果,显示结果页。

3) Press “ENTER” key to confirm the set data and start test. Display the test results and the result page after several seconds.



1) 按“打印”键，打印当前测试数据。

1) Press PRINT key to print current test data.

2) 按“存储”键，将当前测试数据存储，详见6.7。

2) Press STORE key to store the current test data, shown in 6.7.

3) 按“复位”键，返回到开机页面。

3) Press RESET key to return to Switching-on Page.

4) 按“退出”键，返回到主菜单。

4) Press EXIT key to return to main menu.

说明：计算误差即为变比误差，变比误差是由下列公式计算得出：

$$\text{变比误差} = \frac{\text{测试变比} - \text{标准变比}}{\text{标准变比}} * 100\%$$

Note: Calculation error is the turns ratio error, which is calculated through the follow formula:

$$\text{turns ratio error} = (\text{Tested turns ratio} - \text{standard turns ratio}) / \text{standard turns ratio} * 100\%$$

6

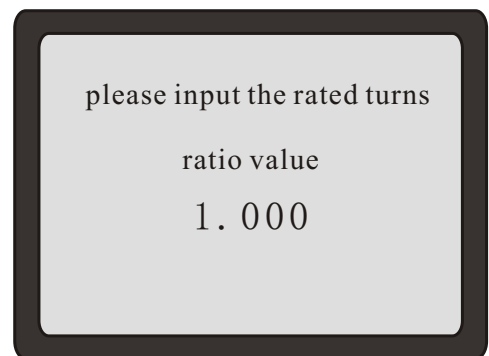
页面说明

Page Instruction

6、4 三相测试页 Three-phase Test Page

在主菜单中选择“2、三相测试”，按“确认”键，液晶显示：

Select “2. Three-phase Test” in the main menu, press “ENTER” key and LCD displays:



1) 设置额定变比，具体操作详见6、3。

1) Set the rated turns ratio and the specific operating is shown in 6.3.

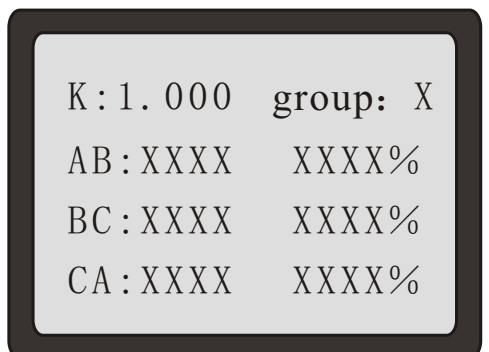
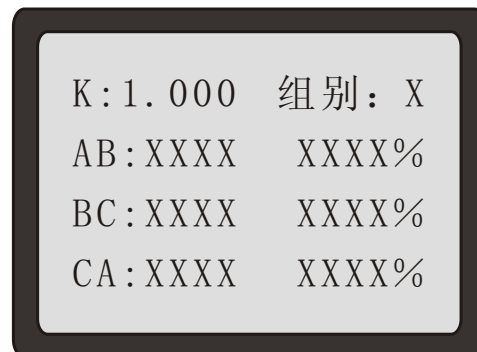
6

2) 按“确认”键确认所设置的数据并开始测试，几秒钟后显示测试结果。

2) Press “ENTER” key to confirm the set data and start test. Display test results after second.

页面说明

Page Instruction



1) 按“存储”键，将当前测试数据存储，详见6.7。

1) Press STORE key to store current test data and the specific operating is shown in 6.7.

2) 按“打印”键，将当前测试数据打印。

2) Press PRINT key to print current test data.

3) 按“确认”键，对所设置的变比数据重复测试。

3) Press “ENTER” key to perform repeating test of the set transformation ratio data.

4) 按“复位”键，返回到开机页面。

4) Press RESET key to return to the start page.

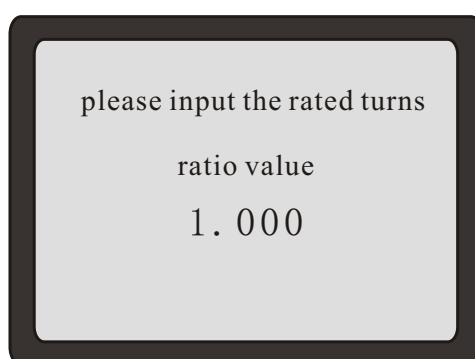
5) 按“退出”键，返回主菜单。

5) Press EXIT key to return to main menu.

6、5 带分接开关测试页 Test page with a tap switch

在主菜单中选择“3、分接测试”，按“确认”键，液晶显示：

Select “3. Tapping Test” in the main menu, press “ENTER” key and LCD displays:



6

页面说明

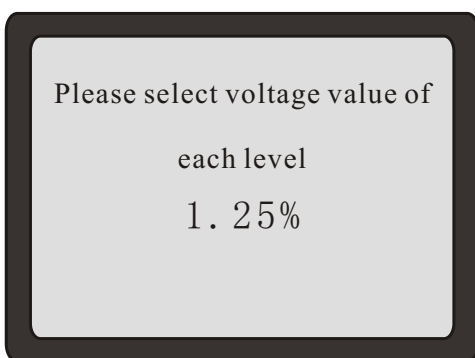
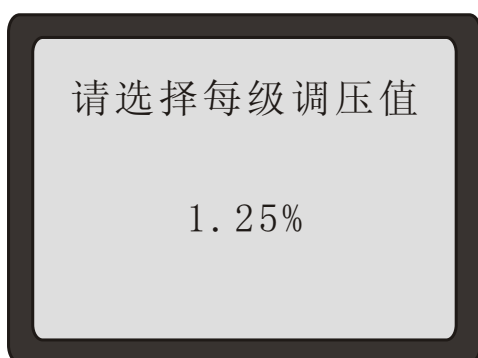
Page Instruction

1) 设置额定变比值，详见6、3。

1) Set the rated turns ratio and the specific operating is shown in 6.3.

2) 按“确认”键后，液晶显示：

2) Press “ENTER” key and LCD displays:



1) 按 ► 键，确定每级调压百分数，1.25%、1.5%、2.000%、2.500%、5.000%。

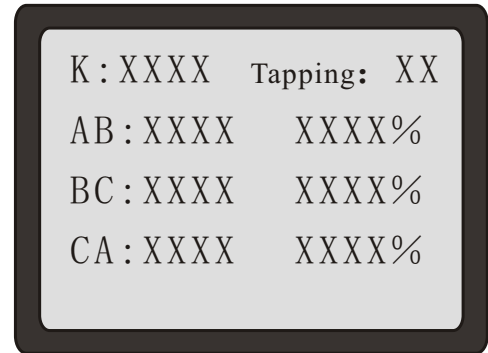
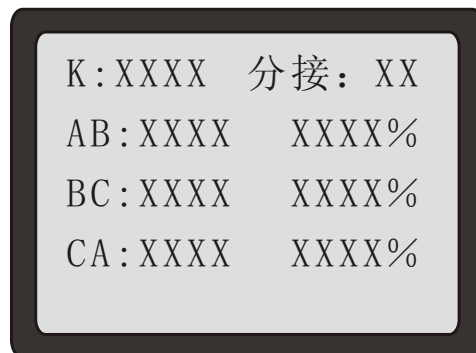
1) Press ► the key to confirm the percentage of each stage of voltage adjustment: 1.25%.1.5%.2.000%.2.500%.5.000 %.

2) 按 ◀ 键，可手动输入每级调压值，此时按“确认”键可对每级调压值进行设置。

2) Press ◀ the key to manually input each stage of voltage adjustment value. at then press “ENTER” key to set each stage of voltage adjustment value.

3) 选择或设置每级调压值，按“确认”键，液晶显示：

3) Select or set each stage of voltage adjustment value. Press “ENTER” key and LCD displays:



6

页面说明

Page Instruction

1) 按 ▲ ▼ 键，对K即额定变比值进行设置。

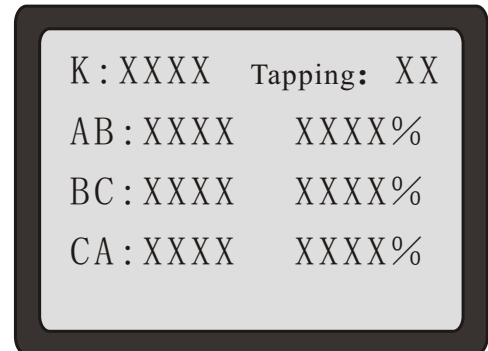
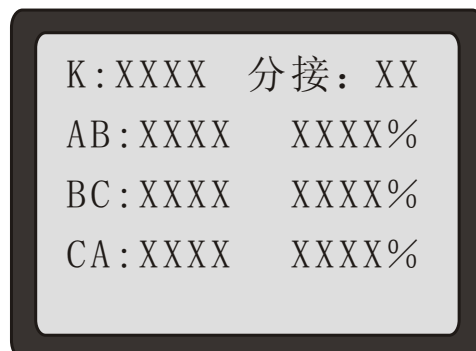
1) Press ▲ ▼ key, set K value i.e. The rated turns ratio value.

2) 按 ◀ ► 键，对分接位进行设置。

2) Press ◀ ► the key to set the tapping position.

3) 当以上数据设置完后，按“确认”键进行测试，几秒钟后显示测试结果。

3) After the above data is set, press “ENTER” key to perform test. Display the test data after seconds.



- 1) 按“存储”键，存储各分接测试数据。
- 1) Press STORE key to store each tapping test data.
- 2) 按“打印”键，打印出测试过的各分接位数据。
- 2) Press PRINT key to print data of the tested each tapping position.
- 3) 按“复位”键，返回到开机页面。
- 3) Press RESET key to return to the start Page.
- 4) 按“退出”键，返回到主菜单。
- 4) Press EXIT key to return to main menu.

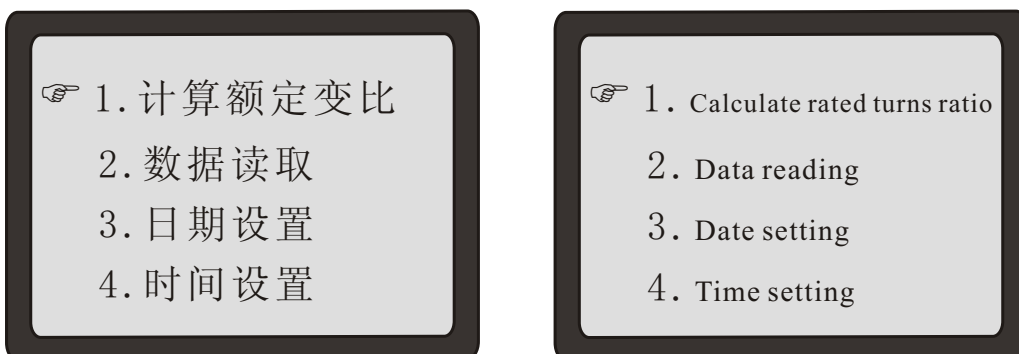
说明：在显示测试结果后，再次设置“K，分接”数据，按“确认”键，将对所设置的数据进行连续测试。

Note: After displaying the test results, re-set and tapping data. Press “ENTER” key to continuously test the set data.

6、6 更多功能页 More functions Page

在主菜单中选择“4、更多功能”按“确认”键后，液晶显示：

Select “4. More Functions” in the main menu, press ENTER key the LCD displays:



- 1) 按 ◀ ▶ 键，光标上下移动。
- 1) Press the key, cursor moves up and down.
- 2) 选择“1、计算额定变比”按“确认”键进入“计算额定变比”按“确认”键后液晶显示：
- 2) Select “1. Calculating Turns Ratio”, press “ENTER” key to enter “Calculating Turns Ratio ” and then press “ENTER” key.



1) 按 ◀ ▶ 键，光标左右移动。

1) Press ◀ ▶ the key, cursor move left and right.

2) 按 ▲ ▼ 键，设置数据。

2) Press ▲ ▼ key to set data.

3) 按“确认”键，液晶显示：

3) Press “ENTER” key and LCD displays:

6

页面说明

Page Instruction



1) 按 ◀ ▶ 键，光标左右移动。

1) Press ◀ ▶ the key, cursor move left and right.

2) 按 ▲ ▼ 键，设置数据。

2) Press ▲ ▼ key to set data.

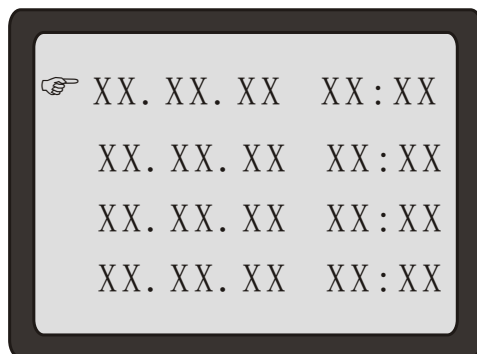
3) 按“确认”键后，自动记忆额定变比值并返回上一级菜单，在进行测试时变比值自动记录在额定变比页中。

3) Press “ENTER” key to automatically memorize the rated turns ratio and return to the last level of menu. During test, the turns ratio value is automatically recorded in the rated turns ratio page.

6、7 数据存储及读取页 Data storage and Reading Page

在测试数据显示页中，按“存储”键，液晶显示：

In the test data display page, press STORE key and LCD displays:



1) 按 ▲ ▼ 键，选择存储或读取的位置，可自动换页。

1) Press ▲ ▼ key to select the storing or reading position. The page can automatically be changed.

2) 按“确认”键，确认存储或读取的位置。并显示所存储或读取的数据。

2) Press “ENTER” key to select the storing or reading position and display the stored or the read data.

3) 按“打印”键打印数据。

3) Press PRINT key to print data.

4) 按“复位”键，返回到开机页面。

4) Press RESET key to return to the start page.

5) 按“退出”键，返回到上一级菜单。

5) Press EXIT key to return to the last level of menu.

6

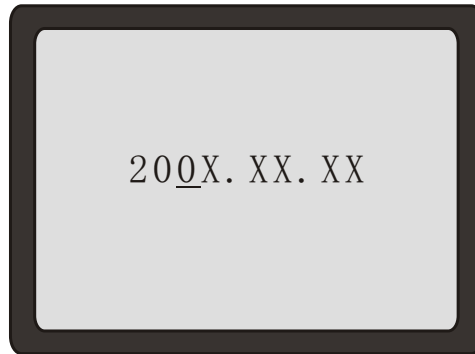
页面说明

Page Instruction

6、8 日期时间设置页 Date & Time setting page

在“更多功能”页面中，选择“3、日期设置”，按“确认”键，液晶显示：

In the More-function Page, select “3 date set” press “ENTER” key and LCD displays:



1) 按 ◀ ▶ 键，光标左右移动。

1) Press key, cursor moves right or left.

2) 按 ▲ ▼ 键，设置日期数据。

2) Press key, set date data.

3) 按“确认”键，确认所设置数据。

3) Press “ENTER” key, confirm the set data.

4) 按“退出”键，返回到上一级菜单。

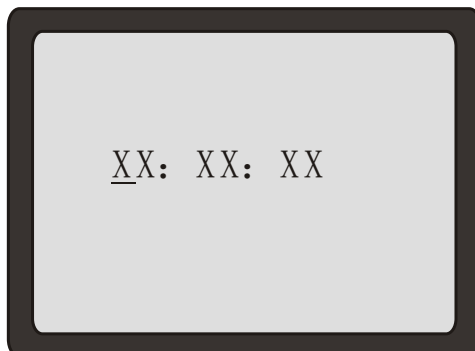
4) Press EXIT key, to return to the last level of menu.

5) 按“复位”键，返回到开机页面。

5) Press RESET key to return to Switching-on Page.

在“更多功能”页面中，选择“4、时间设置”，按“确认”键，液晶显示：

In the More functions Page, select “4 time set “press “CONFIRMING” key and LCD displays:



6 页面说明 Page Instruction

- 1) 按 ◀ ▶ 键，光标左右移动。
- 1) Press ◀ ▶ key, cursor moves right or left.
- 2) 按 ▼ ▲ 键，设置时间数据。
- 2) Press ▼ ▲ key, set time data.
- 3) 按“确认”键，确认所设置数据。
- 3) Press “ENTER” key, confirm the set data.
- 4) 按“退出”键，返回上一级菜单。
- 4) Press EXIT key, to return to the last level of menu.
- 5) 按“复位”键，返回开机页面。
- 5) Press RESET key to return to the start page.

6

页面说明

Page Instruction

7、1 如何设置日期和时间 How to set time and date

在主菜单页面，将光标停在“更多功能”位置，按“确认”键，将相应菜单项改为“日期设置”或“时间设置”，然后按“确认”键，即可更改系统日期或时间。具体操作方法详见6、8。

In the main menu page, put the cursor in the position of More functions Page, press ENTER key to DATE SET item or TIME SET item, then press ENTER key to change date or time. For details, see 6.8

7、2 如何存储数据 How to store data

测试一组数据后，仪器将自动显示测试结果，按“存储”键进行数据存储。具体操作方法详见6、7。

After test one group data, the test data show automatically, press STORE to store test data. For details, see 6.7

7、3 如何读取已存储的数据 How to read stored data

在主菜单页面，将光标停在“更多功能”位置，按“确认”键，将相应菜单项改为“数据读取”，即进入数据读取功能。具体操作方法详见6、7。

In the main menu page, put the cursor in the position of More functions Page, press ENTER key to “data reading” That access to the data read function. For details, see 6.7

7、4 如何打印测试数据 How to print test data

测试一组数据后，仪器将自动显示测试结果，按“打印”键即可打印测试数据。

After test one group data, the instrument will display the test data automatically. Press the PRINT button to print the test data.

仪器也可对以前测试并已存储的数据进行打印，具体操作方法详见6、7。

The instrument also can print the test data stored before, for details, see 6.7

7、5 如何更换打印纸 How to replace print paper

本仪器选用前换纸型打印机，不需拆机就可换纸，使用十分方便。

This instrument adopts the front changing-paper printer. Papers can be changed without disassembling the instrument. So its operation is quite easy.

7

基本操作

Basic Operation

(1) 打开打印机前盖板。

(1) Open the front cover of the printer.

(2) 用手捏紧打印机内的纸轴，将其取出。

(2) Hold the paper reel of the printer to take it out.

(3) 装上打印纸，重新将纸轴装在打印机上。

(3) Install the printing paper and replace the paper reel in the printer.

(4) 打开仪器电源，使打印机通电。

(4) Power on the instrument to electrify the printer.

(5) 按打印机上“S/L”键，使“POW”指示灯熄灭，此时机头开始走动。用手将纸送入机头入口处，这时纸便徐徐进入机头，直到从机头上露出。

(5) Press “S / L” key on the printer to make “P O W” indicator off. At then the printer head begins to move. Paper is sent into the inlet of the head with hands and then the paper will slowly enter the head until it expose from the printer head.

(6) 待纸走出一定长度后，再按一下“S/L”键，打印机停止工作。

(6) After the paper moves a certain length, re-press “S / L” key to make the printer stop operating.

(7) 盖上打印机前盖板。

(7) Replace the fore cover of the printer.

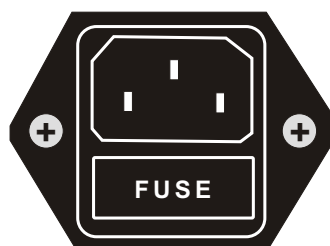
7

基本操作

Basic Operation

7、6 如何更换保险丝

在电源插座下方有一个保险丝盒，用平口起子将该保险丝盒往上拉即可更换保险丝。保险丝规格为3 A。



7.6How to displace the fuse

There is a fuse box under the power circuit. Draw the box upward with a flat screw driver and replace the fuse, which is specified in 3A.

8 测试 Test

8、1 接线准备 Test preparation

1) 将接地线一端夹在地网上，一端可靠地接于面板的接地端子上。注意：地网的接地点应具有良好的导电性，否则会影响测量的正确性。

1) One end of the grounding conductor is fastened to the grounding net and the other end is reliably connected to the grounding terminal of the panel. Note: The grounding point of the grounding net shall have good conduction; otherwise the correctness of measurement will be impacted.

2) 严格按接线图接线，并保证各接触点接触良好。

2) Connect the test cables strictly according to the Wiring diagram, and guarantee the good contact of the contact points.

3) 测试过程中，试品应与外界线路断开。

3) During test, the tested sample shall be disconnected from the external.

4) 插上电源插头。

4) Connect the power plug.

8、2 测试步骤 Test steps

1) 合上电源开关，仪器显示开机页面。

1) Turn on the power switch and the instrument display the start page.

2) 按“确认”键，进入主菜单。

2) Press “ENTER” key to enter Main Menu.

3) 根据情况选择“单相测试”、“三相测试”、“分接测试”。

3) Select “One-phase Test”, “Three-phase Test” or “Tapping Test” according to the conditions.

8、3 试验结束后现场清理 On-site cleanness after testing

1) 关掉电源开关，拔下电源线。

1) Turn off the power switch and pull out the power cable.

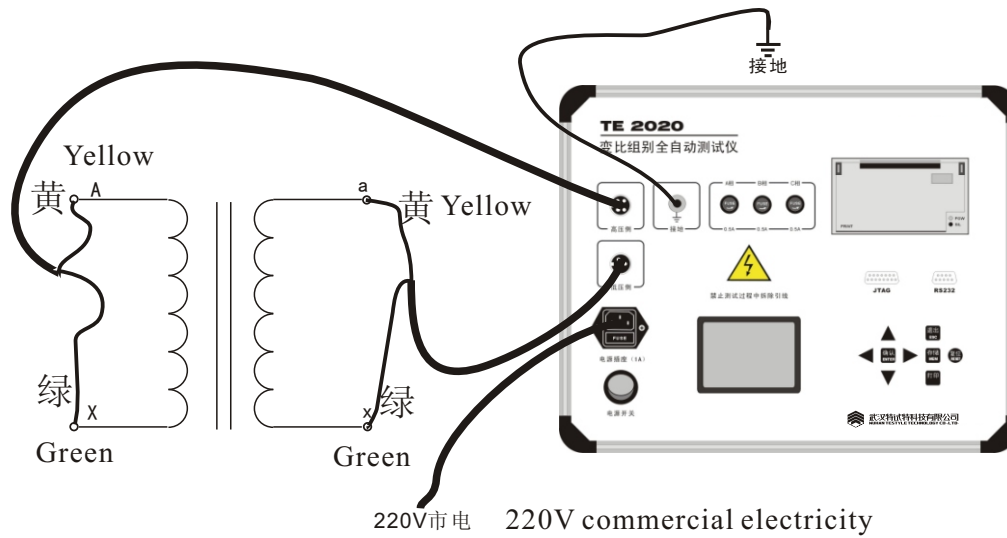
2) 将两组专用测试线拆除并收好，方便下次使用。

2) Remove two groups of special cables and properly store them to be convenient for future use.

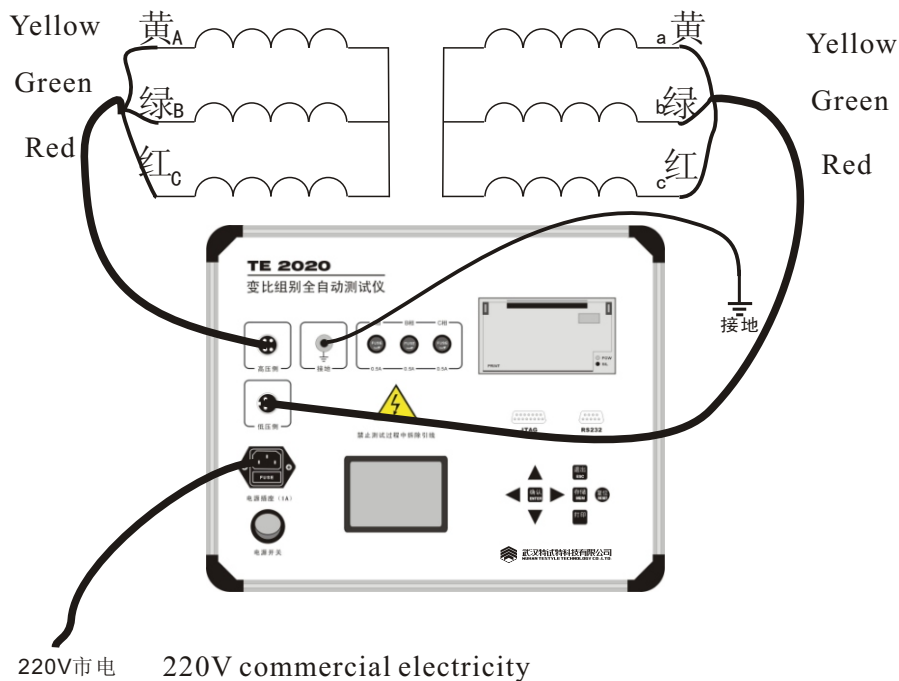
3) 拆除接地线，并整理好。

3) Remove grounding conductors and keep them well.

9、1 单相变压器 Single phase transformer



9、2 三相变压器及带分接开关测试 Three-phase Transformer and Test with Tapping Switch



9

接线图例

Connection graph

10.1 运输 Transportation

本产品运输时必须进行包装，包装箱可用纸箱或木箱，包装箱内应垫有泡沫防震层。包装好的产品，应能经公路、铁路、航空运输。运输过程中不得置于露天车箱。仓库应注意防雨、防尘、防机械损伤。

This product must be packaged for transportation, packing box can be carton or wooden case, the box should underlay shock-proof layer such as foam, etc. Well Packaged products should be able to transport by road, rail, and air. The products should not be placed in open trunk during transportation, and warehouse should keep away from rain, dust, mechanical damage.

10.2 储存 Storage

仪器平时不用时，应储存在环境温度 $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$ ，相对湿度不超过85%，通风，无腐蚀性气体的室内。存储时不应紧靠地面和墙壁。

Equipment should be stored indoors at ambient temperature $-20^{\circ}\text{C} \sim 60^{\circ}\text{C}$, relative humidity no more than 85%, ventilation, no corrosive gases. Equipments Should not be placed close to the ground and walls.

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运输与保养

Transportation & Maintenance

10.3 防潮 Damp Proof

在气候潮湿的地区或潮湿的季节，本仪器如长期不用，要求每月开机通电一次（约二小时），以使潮气散发，保护元器件。

In humid areas or damp season, if the equipment seldom use, it must be powered on once a month (about two hours), in order to disperse moisture, and protect electronic components.

10.4 防曝晒 Anti-exposure

仪器在室外使用时，尽可能避免或减少阳光对液晶显示屏的直接曝晒。

When the equipment used outdoors, please keep the equipment far away from sun, and avoid direct sun exposure on the LCD screen.

1 1 . 1	2 2 0 V电 源 线	一 根
	220V Power line	1 piece
1 1 . 2	专 用 测 试 线	一 组
	Special test line	one pieces
1 1 . 3	使 用 说 明 书	一 份
	User manual	1 piece
1 1 . 4	产 品 合 格 证	一 张
	Product certificate	1piece
1 1 . 5	产 品 出 厂 检 验 报 告	一 份
	Delivery inspection report	1piece
1 1 . 6	打 印 纸	一 卷
	Print paper	1 roll
1 1 . 7	保 险 丝 (3 A)	二 个
	Fuse	2 pieces
1 1 . 8	保 险 丝 (0 . 5 A)	六 个
	Fuse	6 pieces
1 1 . 9	双 色 接 地 线 (6 米)	一 根
	Double-color grounding line (6m)	1piece

11**随机附件**

Accessories

质量保证与售后服务

Quality Assurance and After-sales Service

(1) 本仪器严格按照国家标准和企业标准制造，每一台仪器都经过严格的出厂检验。

(1) The manufacturer of this equipment is in strict accordance with national standards and enterprise standards, the production procedures are strictly enforce the ISO9000 standards to ensure quality of the equipment.

(2) 本仪器享有24个月的保用期，在此期间由于制造上的原因而使质量低于特性要求的本公司将免费予以保修。

(2)The warranty of this instrument is 24 months, during this period, we will offer free repair if the technical fault cause by manufacturing.

(3) 本仪器实行三包。

(3) The instrument enjoys the warranty of repair and maintenance.

(4) 在仪器使用寿命内，本公司将长期提供仪器的维护、使用培训、软件升级、配件供应等相关服务。

(4) We will offer long-term of maintenance, software upgrades, and accessories supply service, etc. within the service life of equipment.

(5) 如果在使用中发现问题，请及时与本公司联系，我们将根据情况采取：上门维修指导，或送回或寄回公司维修，或先发备用机给用户使用，后再寄回修理。

(5)Any questions during using, please contact with us, and send the equipment back to our company for repairing.

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售后服务

After-sales service