Quality is the lifeblood of industrial products; every screw is the object we concerned.

TE3036 High Voltage Circuit Breaker Characteristics Tester

Brief Introduction:

The Circuit breaker analyzer system is widely used to test live tank oil, bulk-oil, vacuum, SF6 and other models, with different voltage level of high voltage circuit breaker, can also be used for opening and closing & contemporaneous performance of the low-voltage electrical appliances such as contactors and relays.

Appearance and configuration:

Main features:

- No need to choose sensors, a universal sensor can meet all models of circuit breaker mechanical properties testing.
- The unique universal bracket with new fixture make it more convenient to acquire the speed signal, there are various models of circuit breakers special bracket, make the measurements more accurate.
- Only one kind of connection with different testing methods, simple to use.
- Powerful printing can print time data, the time fracture surface curve, time - speed curve, time - stroke curve and stroke - speed curve to facilitate the definition of the speed characteristics of circuit breakers at any time or any stroke.

Technical Parameters:

- Power Supply: Voltage：AC220V±10% Frequency：50Hz±1Hz
- Service condition:Ambient temperature：-10℃~-40℃
- Security: Insulation Resistance： >2MΩ

  Leakage Current： <1.000mA

  Dielectric Strength：Power connection line on the chassis can withstand 1500V (50Hz RMS) 1 minute.

- Measurement Accuracy : Time: ±(1%×reading +0.2ms)
  Speed: ±(1%×reading+0.5m/s)
  Stroke:±(1%×reading+0.2mm)
- Built-in operation power supply: DC30～250V Adjustable, instantaneous 20A
- Dimensions: Length330mm*Width260mm*Height200mm
- Weight:5kg(Exclude accessories)

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TE 3036

高压开关特性综合测试仪

High Voltage Circuit Breaker Characteristics 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TE3036高压开关特性综合测试仪。

Secondly, this manual book is designed for TE3036 High Voltage Circuit Breaker Characteristics 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、在阅读本说明书或仪器使用过程中如有疑惑，可向我公司咨询。

咨询电话：+86-800-8800780, +86-27-67845315

Fourthly, 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

高压断路器是电力系统中重要的控制设备。电网中高压断路器的运行数量最多，运行条件和技术要求比较复杂，其运行可靠性不仅关系到高压断路器本身，而且影响到其他设备乃至整个电网。因此，对高压断路器的特性进行测试是一项很重要的工作，但采用传统的方法对高压断路器进行特性测试时存在操作复杂、测试精度低等缺点，为了解决这些问题，我们开发了TE3036高压开关特性综合测试仪。

High-voltage circuit breaker is important control equipment in power system. The most widely used equipment in grid system is high-voltage circuit breakers, and its operating conditions and technical requirements are more complex, at the same time. Its reliability is not only related to the performance of high voltage circuit breaker itself, but also affects other equipment and the whole grid system. Therefore, the test to the characteristics of high voltage circuit breaker is very important. However, the traditional method for testing characteristic of high-voltage circuit breakers is complicated and has low precision. In order to solve these problems, we developed TE3036 High Voltage Circuit Breaker Characteristics Tester.

1.2 性能特点 Function and Feature

（1）**万能传感器：**将直线传感器和角度传感器组装到一起，能够实现各种电压等级及不同型号开关的动作特性的测量。

(1) Universal Sensor: Combine the line sensor and angle sensor together can measure the operating characteristics of a variety of voltage levels and different types of switch.

（2）**智能化程度高：**采用中文菜单操作，测量数据显示结果直观，内置的前换纸热敏打印机能以中文模式打印数据、断口波形、时间-行程、时间-速度、速度-行程曲线，打印速度快、换纸更加方便。

(2) High intelligence: The Chinese menu operation interface, data of the measured result displayed intuitive, built-in thermal printer can output result, include data, fracture wave, time stroke, time - speed, speed - stroke curve, print quickly, replacing paper more convenient.

（3）**测量准确：**全数字化处理，内建精密数学模型，具有较高的测量精度，测试结果重复性好。

(3) Accurate measurement: all-digital processing, built-in sophisticated mathematical models with high accuracy, repeatable test results.

（4）**携带方便：**便携式高度，体积、重量只有同类产品的30%~70%，携带十分方便。

(4) Easy to carry: a portable height, volume, weight， only 30% to 70% of similar products, and very convenient to carry.

（5）**联机接口：**ＴＥＢＵＳ接口和ＵＳＢ接口，方便我公司进行在线软硬件升级服务以及与计算机进行联机操作。

（5）Online Interface: TEBUS interface and USB interface to facilitate our online hardware and software upgrades services and computer on-line operation.

（6）**操作电源：**仪器自带ＤＣ３０～２５０Ｖ电源，可提供开关操作电源及储能电源，方便现场使用。

（6）Operation power: built-in DC30 ~ 250V power, providing switching power supply and energy storage power, convenient for field use.

（7）**使用方便：**内置百种不同开关型号及速度定义类型，让烦琐的测试变得更加简单。

（7）Easy to use: the built-in hundreds of different switch models and speed defined type make the complex test easier.

2.1 电源方面 Power

（1） 电源电压：AC220V ±10%。

(1) Power voltage: AC220V ± 10%.

（2） 电源频率：50Hz±1Hz。

(2) Power frequency: 50Hz ± 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) For the safety of the equipment and personnel, the instrument must be well grounded.

（2） 试验准备时最先接好地线，工作完毕最后拆除接地线。

(2) Keep in mind: connect the ground line first, and remove the ground line last in the test.

（3） 在测试前请手动开关合、分闸按钮，确保开关动作正常。

(3) Manually switched on-off the circuit breaker before the test to ensure its function is normal.

（4） 电源输出线应保证不能短路，以免因短路造成设备内部电源损坏。

(4) Power output lines should be guaranteed not short circuit, so as to avoid damage of the power supply inside the device.

（5）在安装传感器时注意保护传感器，不要因摔、碰对传感器的测试精度带来影响。

(5) When installing the sensor, pay attention to protect the sensor, keep off from broke and collision to make sure the test accuracy of the sensor.

（6） 在开关动作时，不要去调整传感器以及其他的危险的开关部件，以免出现人身安全问题。

(6) In the switching action, not to adjust the sensor and other dangerous parts of the switch to avoid safety issues.

2.3 操作方面 Operation

（1）各端口连接线应连接紧固，以免因开关动作振动影响测试结果。

(1)The port cable should be connected fastening, so as to avoid switching vibration affects test results.

（2）速度传感器的安装应保持直线传感器与动作运动部件在一个平面且应平行状态。

(2) In the installation of speed sensors, you should keep the linear sensor and moving parts be in a plane surface and keep in parallel state.

（3）端口线、速度传感器信号线及电源输出线与仪器连接应紧连接，避免因连接线接触不好造成不正确的测试结果。

(3) Port lines, the speed sensor signal wire and power supply output line should be tightly connected to the instrument, avoid poor line connection caused the incorrect test results.

2

特别提示

Special Note

（4）仪器内电源和断路器的操作电源不能同时使用，即两个电压源不能并联使用。在使用高压断路器自身操作电源时请不要将设备内电源+与仪器面板KM+短接。

(4) The power of the instrument and power supply of the circuit breaker can not be used at the same time, that is, two voltage sources can not be parallel. When use the power supply of the high-voltage circuit breakers, do not connect the positive pole of the equipment power to the positive pole of KM on the instrument panel.

3.1 名称和分类 Name and Classification

（1） 名称：TE3036高压开关综合特性测试仪。

(1) Name: TE3036 High Voltage Circuit Breaker Characteristics Tester.

（2） 环境组别： 属GB6587.1-86《电子测量仪器环境试验总纲》中的III组仪器（即可在室外环境使用）。

(2) Environmental group: can be used in the outdoor environment.

3.2 主机结构型式与尺寸 Structure and Dimension of Body Part

（1） 型式： 一体化便携式

(1) Type: Integrated Portable

（2） 外形尺寸： 长330mm*宽260mm*高200mm

(2) Dimensions: Length 330mm * Width 260mm * height200mm

（3） 质量：5kg（不含附件）

(3) Quality: 5kg (exclude accessories)

3.3 使用电源 Power Supply

（1） 电压：AC220V±10%

(1) Voltage: AC220V ± 10%

（2） 频率：50Hz±1Hz

(2) Frequency: 50Hz ± 1Hz

3.4 使用环境要求 Environmental requirements

（1）环境温度：-10℃～40℃

(1) Ambient temperature: -10 ℃ ~ 40 ℃

（2） 相对湿度： ≤80%

(2) Relative humidity: ≤ 80%

3.5 安全性能　Safety performance

（1） 绝缘电阻： ＞2MΩ

(1) Insulation resistance :> 2MΩ

（2） 泄漏电流： ＜1.000mA

(2) Leakage current: <1.000mA

（3） 介电强度： 电源连线对机壳能承受1500V（50Hz有效值）1分钟耐压。

(3) Dielectric strength: The chassis can withstand 1500V (50Hz effective value) for 1 minute.

3.6 参数　Parameters

（1） 时间测量分辨率: 0.1ms

(1) Time measurement resolution: 0.1ms

（2） 速度测量分辨率: 0.01m/s

(2) Speed measurement resolution: 0.01m / s

（3） 行程测量分辨率: 0.1mm

(3) Stroke measurement resolution: 0.1mm

（4） 最大测量速度: 20m/s

(4) Maximum measurement speed: 20m / s

（5） 最小动作同期差：0.1ms

(5) Minimum simultaneous time difference: 0.1ms

（6） 测试通道：12路断口时间，1路速度

(6) Test channel: 12 Road fracture time, a road speed

（7） 直线传感器测量范围：225mm

(7) Linear sensor measuring range: 225mm

（8） 旋转传感器角度范围: 360°

(8) Rotation sensor angle range: 360 °

（9） 内置操作电源：DC30～250V可调， 瞬时20A

(9) Built-in operating power supply: DC30 ~ 250V adjustable, instantaneous 20A

（10） 测量精度： 时间： ±(1%× 读数+0.2ms)
速度： ±(1%× 读数+0.5m/s)
行程： ±(1%× 读数+0.2mm)

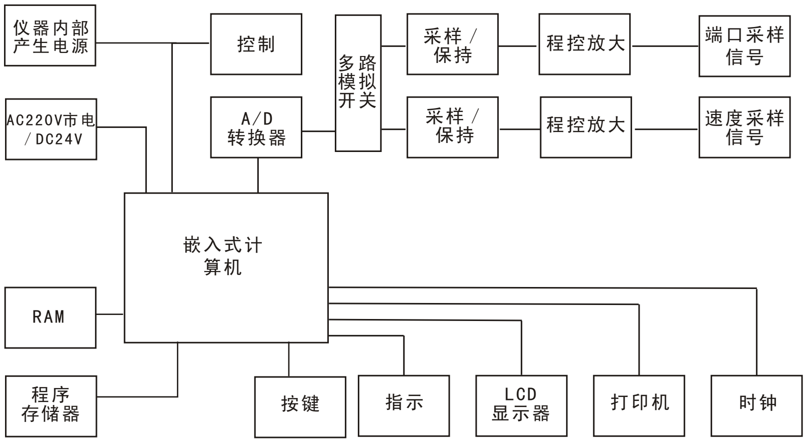
(10) Accuracy: Time: ± (1% of reading +0.2 ms)

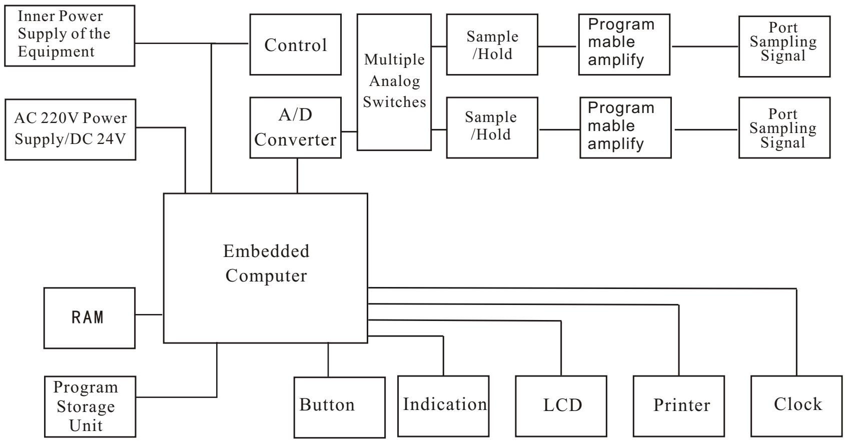
Speed: ± (1% of reading +0.5m/s)

Stroke: ±(1% of reading+0.2mm)

3
技术特征
Technical features

4.1 原理框图　Operational Principle





4.2 工作原理 Working Principal

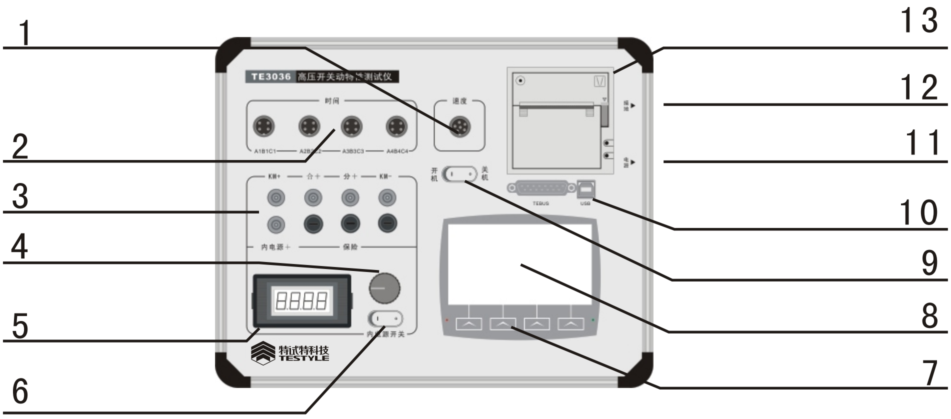
仪器测量线路包括12路端口采集开关动作启动到接触的时间信号，1路传感器采集速度行程信号，通过时间信号和速度行程信号分析出开关动作的分（合）闸时间，通过时间差来计算分（合）闸同期性，通过上述信号来分析开关运行的开距、接触行程（超程）、刚分（刚合）速度、最大速度及平均速度。

The measuring circuit of the equipment includes 12-ports gather time signals of the switch open-close operation (or “off to on”), 1 channel sensor acquisition speed-motion signal. By using the time signal and speed-motion signal analyses time of open-close operation. Calculate the open-close simultaneous by time difference, through the analysis of the signal to calculate the length of break, contact over travel, instantaneous speed of separating(contacting), maximum speed and average speed.

仪器内部可输出DC30V～250V直流电源，用来开关动作电源，还可以用作开关的储能电源。

The internal instrument output DC30V ~ 250V power supply used as the operation power supply, as well as the energy-storage power supply of the switch.

5.1 面板示意图



5.2 各部件说明 Function Illustration

（1） **速度传感器接口：** 用于采集速度行程信号。

（1）Speed sensor interface: used to collect speed-motion signal.

（2） **断路器端口接口：** 用于采集断路器1 2路端口时间信号。

(2)Circuit breakers port interface: collect time signals for 12-port of circuit breaker.

（3） **控制回路接线端子：** 连接开关控制回路的接线端子、内部直流电源输出端子及控制回路保险。

(3) Control circuit connect terminals: Connecting terminal which is used to connect with the control circuit of the circuit breaker, output terminal for the internal DC power supply and control circuit fuse.

（4） **直流电源调节：** 用于控制仪器内部直流电源的输出调节。

(4)DC power supply regulation: it is used for DC power supply output regulation of the internal equipment.

（5） **直流电源显示：** 显示直流电源的伏值，可用于断路器分（合）闸操作电源及储能电源。

(5) DC power supply display: Display the voltage value of the DC power supply, it can be used for open-close operation and energy-storage power supply for circuit breaker.

（6） **直流电源开关：** 用于开断仪器内部直流电源的输出。

（6）DC power supply circuit breaker: it is used to switch on/off the DC power supply of internal equipment.

（7） **触摸按键：** 详见5.3

（7）Touched key-press: See details in picture 5.3

5
面板布置
Panel Layout

（8） **液晶显示器：** 以中文方式显示菜单及测试结果。

(8) LCD display: displays the menu and the test results in Chinese.

（9） **电源开关：** 闭合该开关，仪器电源接通。

(9) Power switch: Close the breaker to switch on the power of the instrument.

（10） **联机接口：** 本仪器有一个TEBUS接口和一个USB接口，方便进行硬件升级服务和与计算机进行联机操作。

(10) On-line interface: The instrument has a TEBUS interface and a USB interface, easy for hardware upgrade service and on-line operation with the computer.

（11） **电源插座：** 接220V市电，该插座内含保险丝盒，本仪器应安装10A保险丝。

(11)Power outlet: connect 220V power supply; the outlet contains fuse box, the equipment should be installed 10A fuse.

（12） **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。

(13) Earth terminal: To protect the safety of operators and normal operation of equipment, and keep the earth terminal well grounded before use.

（13） **打印机：** 前换纸型中文打印机，用于测试数据及波形的记录。

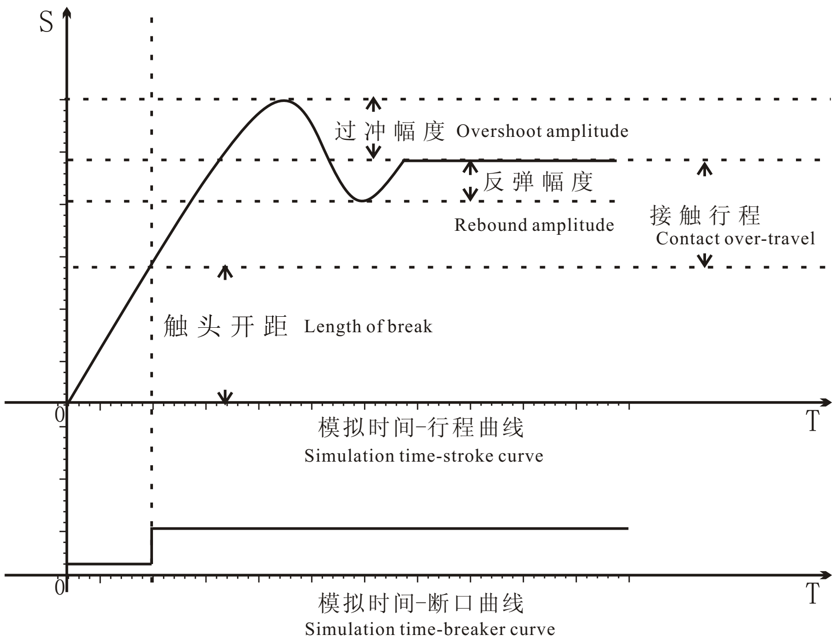
(13)Printer: the front-type paper replaced printer for recording test data and waveform.

5.3 按键说明 key-press illustration

仪器有四个按键，每个按键对应正上方屏幕显示的相应功能菜单，按下后，该功能生效。

The equipment has four key-presses. Each key-press has its corresponding functions displayed on the screen. Press them to control it.

术语定义： Definition of Terms



触头开距：分闸时，动静触头刚分点到分闸静止状态的行程。合闸时，动触头从分闸位置到刚合位置之间的距离。

Length of break: when doing the opening test, it is the distance from the static and dynamic contactor's separating points to the static place. When doing the closing test, it is the distance from the dynamic contactor's opening place to the contacting points.

接触行程：分闸时，指运动开始前的静止位置到动静触头刚分点的位移。合闸时，指动静触头刚合点到合闸静止位置的位移。

Contact over-travel: When doing the opening test, it means the displacement from the static place to the separating point. When doing the Closing test, it means the displacement from the contacting point of the static and dynamic contactor in the opening test to its static place.

过冲幅度：分闸时，动触头分闸静止位置到最大过冲位置的位移。合闸时，指动静触头从合闸静止位置到最大过冲位置的位移。

Overshoot amplitude: When doing the opening test, it means the displacement from the static place of the dynamic contactor in the opening test to the maximum overshoot place. When doing the Closing test, it means the displacement from the static place of the static and dynamic contactor in the closing test to the maximum overshoot place.

反弹幅度：分闸时，指动触头分闸静止位置到最大反弹位置的位移。合闸时，指动静触头合闸静止位置到最大反弹位置

6 术语定义 Definition of Terms

的位移。

Rebound amplitude: When doing the opening test, it means the displacement from the static place of the dynamic contactor in the opening test to the maximum rebound place. When doing the closing test, it means the displacement from the static place of the static and dynamic contactor in the closing test to the maximum rebound place.

弹跳次数： 开关动触头与静触头在分（合）闸操作中，分开（合上）的次数。

Bounce times: when doing the opening (closing) test, the open (close) number of times of the static and dynamic contactor.

最大速度： 分(合)闸过程中，动触头开始运动后，取动触头运动每10ms为一个计速单元，直至动触头运动停止，得到若干个速度单元值，其中最大的单元速度值即为分(合)闸最大速度。

Maximum speed: After the dynamic contactor begins to move in the opening (closing) test, take every 10ms as a speed count unit until the dynamic contactor stops moving, and get several speed units, among which, the maximum unit speed value is the maximum speed of the opening (closing) test.

平均速度： 分(合)闸过程中，动触头总行程的前、后各去掉10%，取中间80%，动触头运动的行程与时间之比。

Average speed: remove the first 10% and last 10% of the total stroke of the dynamic contactor, and take the 80% in the middle, the stroke and time ratio of the dynamic contactor in the movement.

刚(分)合速度： 根据被测开关的制造厂不同，开关型号不同，各制造厂定义了不同的刚分，刚合速度，本测试仪将各种不同的定义部分列入其中，供用户自已选择。

Instantaneous speed of separating (contacting): because the circuit breaker has different manufacturers and types, they are defined in different Instantaneous speed of separating (contacting). This test equipment provides a variety of definitions for users' choice.

合(分)闸同期： 同一次测试中，断口分(合)闸里时间最大与最小之差。

Open-close simultaneous: in one test, the difference value of the maximum and minimum time in the opening (closing) test.

7.1 主菜单　Main menu

仪器开机几秒钟后，仪器显示主菜单：

After the equipment turning on for a few seconds, the equipment displays the main menu:

主菜单：Main menu　　版权所有：Copyright reserved

TE3036 高压开关特性综合测试仪

TE3036 High Voltage Circuit Breaker Characteristics Tester

测试:Test　数据：Data　　设置：Setting　帮助：Help

按下功能菜单正下方的按键，该功能生效，进入该功能页面。

Press the key below the function menu, then this function come into effect, and enter the function page.

7.2 测试菜单　Test menu

在主菜单页面下，按下“测试”功能按键进入测试菜单页面：

Under the main menu page, press the "test" function key to access the test menu page:

测试参数设置：Test parameters setting

刚分（合）速度定义：

Instantaneous speed of separating (contacting) definition

分后（合前）：After opening (before closing)

直线传感：Linear sensor　　测试：Test　　选择：Option

修改：Modify　　返回：Return

在此页面下,光标首先会在“**刚分(合)速度定义**”上面,测试前先要对开关的速度定义和传感器类型这两个测试参数进行选择。按“**选择**”按键，光标将在这两项参数设置上循环，然后按“**修改**”按键分别对其进行设置。

On this page, the cursor will first stay on “Instantaneous speed of separating (contacting)”, choose the speed definition and sensor types before test. Click "Option" key, the cursor will flash on these two parameters, and then click "Modify" key to set them separately.

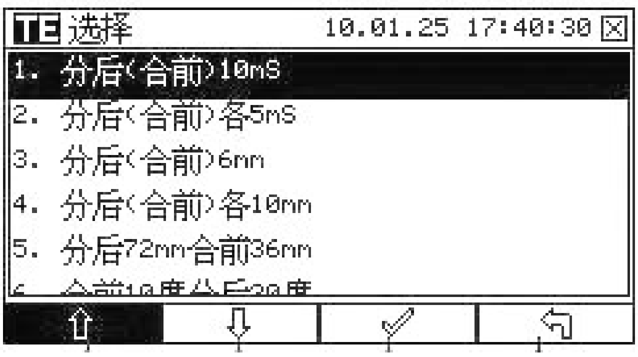
7.2.1 速度定义设置 Speed definition setting

光标在“**刚分(合)速度定义**”上面时,按下菜单中“**修改**”按键将进入到速度定义设置页面。

When the Cursor on the “Instantaneous speed of separating (contacting) definition”, press the "Modify" key on the menu will enter into the speed definition setting page.

不同开关厂家对开关刚分(合)速度定义不同，用户根据不同型号开关的进行设置。

Different circuit breaker manufacturers have different definitions on the Instantaneous speed of separating (contacting), the user need to set it by different types of circuit breaker.

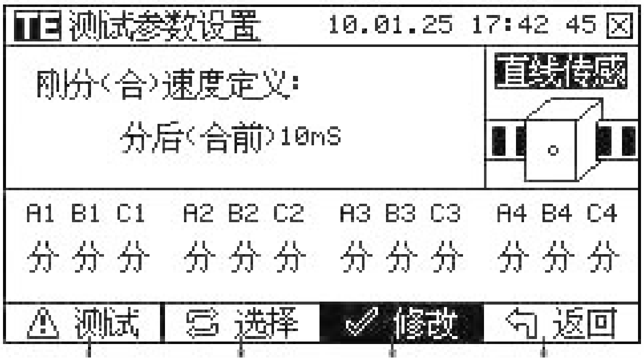


选择：Option　　分后（合前）after opening(before closing)

7. 2. 2传感器设置　Sensor setting

光标在“传感器”上面时,按下菜单中“修改”按键将会对传感器的类型进行选择。

When the cursor on the "sensor", press "Modify" key on the menu will select the types of sensor.



测试参数设置：Test parameters setting

刚分（合）速度定义：

Instantaneous speed of separating (contacting) definition

分后（合前）：After opening (before closing)

直线传感：Linear sensor　　测试：Test　　选择：

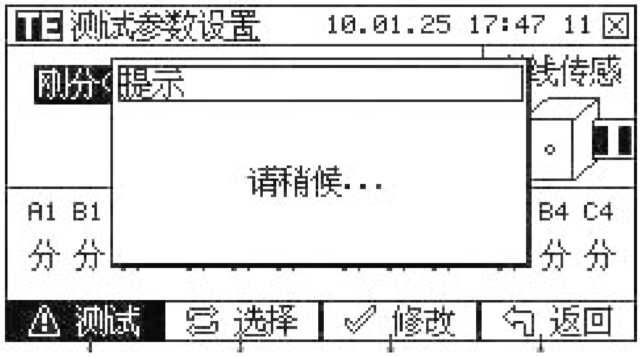
可选择直线传感器、旋转传感器、无传感器，该三种传感器类型可循环更改。

These three types of sensor are optional: linear sensors, rotation sensors, no sensors.

7. 3 开始测试页面　Start testing page

测试参数设置完成后，按“测试”功能按键开始测试，仪器根据开关的分合闸状态，自动选择合闸或分闸测试。

After setting the test parameters, press the "test" function key to start the test, the equipment automatically selects closing or opening test mode according to the open and close state of the circuit breaker.



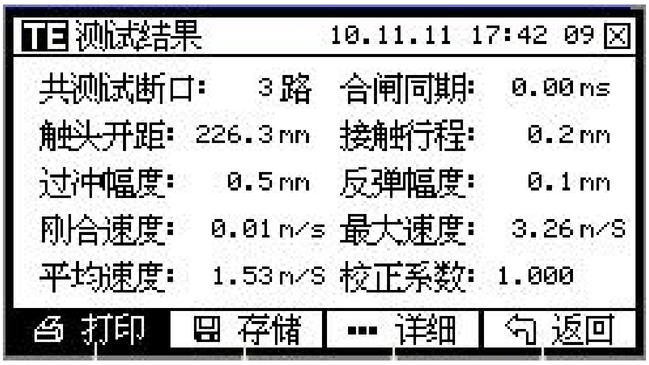
测试参数设置：Test parameters setting

提示：请稍候　Prompt: Please wait

直线传感：Linear sensor　测试：Test　选择：Option

修改：Modify　返回：Return

7.3.1 测试数据页面　Test data page



测试结果：Test result　共测试断口：Shared test fracture

触头开距：Length of break　接触行程：Contact over-travel

过冲幅度：Overshoot amplitude　反弹幅度：Rebound amplitude

刚合速度：Instantaneous speed of contacting

最大速度：Maximum speed　平均速度：Average speed

校正系数：Correction coefficient

在此页面可查看断口、合(分)闸同期数据及速度特性数据。

On this page, you can view the fracture, Open-close simultaneous data and speed characteristic data.

按“存储”或“打印”功能按键可存储或打印数据。（建议全部查看完所有数据后，再确定是否保存或打印数据）

Press "Save" or "Print" function keys can store or print data. (Recommended after seeing all the data, and then determine whether to save or print data)

按“返回”键，返回至测试参数设置页面。

Press the "Return" key to return to the test parameter setting page.

按“详细”键，可查看更多测试数据及关系曲线。

Click "Details" key, you can see more test data and relation curve.

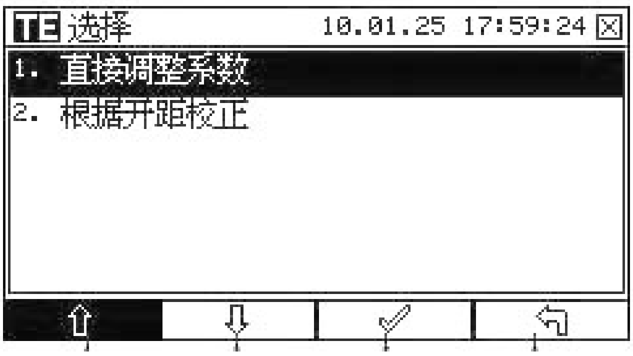
校正系数：Correction coefficient 断口数据：Fracture data

时间-波形断口：Time-fracture wave 时间-行程波形: Time-stroke wave

时间-速度波形：Time-speed wave

进入此页面,光标首先默认会停在“断口数据”上，按“⇧⇩”键，可移动光标，选择要查看的项,然后按“✔”确认。返回上一页面按“↰”。

Access this page, the cursor will first stay on "fracture data" by default, press "⇧⇩" key, you can move the cursor, select the item you want to view, then press "✔" to confirm. If you want to back to the previous page, press "↰".



直接调整系数：Adjust the coefficient directly

根据开距校正：Calibrate by length of break

选择校正系数一般只有旋转传感器的时候采用,有直接调整系数校正和根据开距校正两种方式,根据开距校正需输入开关的实际开距， 然后通过开距换算出开关的旋转系数。

Generally, only when you use the rotation sensors, you need to select correction coefficient. There are two ways of correction: one is to adjust coefficient directly, the other is calibrate according to the length of break. Calibrate based on the length of break need to input actual length of break, and then use the length of break to calculate the rotation factor of the circuit breaker.

校正系数后,按“↰”返回到测试结果页面， 检查系数是否已更改,再按“↰”又回到测试页面,选择测试,即可测出开关的真实特性参数。

After calibrating the coefficient, press " ↰ “ to return to the test results page, check whether the coefficient has been changed, press " ↰“ returne to the test page, select test to detect the true features parameters of the circuit breaker.

7 页面说明

Page Instruction

TE 查看数据 10.01.25 18:03 29

断口	合闸时间	弹跳次数	弹跳时间
A1	568.1ms	2次	639.4ms
B1	568.1ms	2次	639.4ms
C1	568.1ms	2次	639.4ms
A2	568.1ms	2次	639.4ms
B2	568.1ms	2次	639.4ms
C2	568.1ms	2次	639.4ms

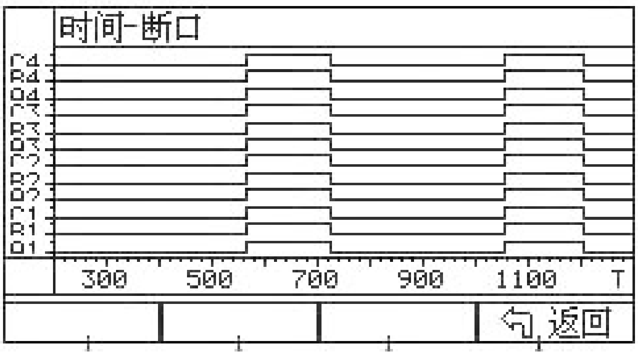
⇧ ⇩ ↰ 返回

查看数据：View data 断口：Fracture 合闸时间：Closing time

弹跳次数：Rebounce number of times 弹跳时间：Rebounce time

在“详细”选择页面，选择“断口数据”，可查看被测试每一个断口的合闸时间、弹跳次数、弹跳时间，如上图。

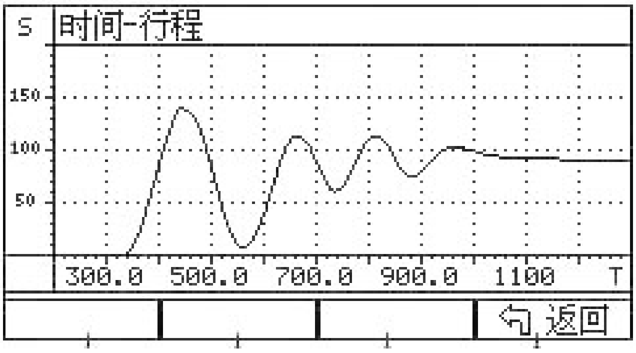
In the "Details" selection page, choose the "fracture data", you can view the closing time, number of bounces and bounce time of every fracture been tested. As shown above.



时间-断口: Time-fracture 返回：Return

选择“时间-断口波形”，可观察出每一路断口合、分闸的时间关系曲线，其中时间的单位为ms。

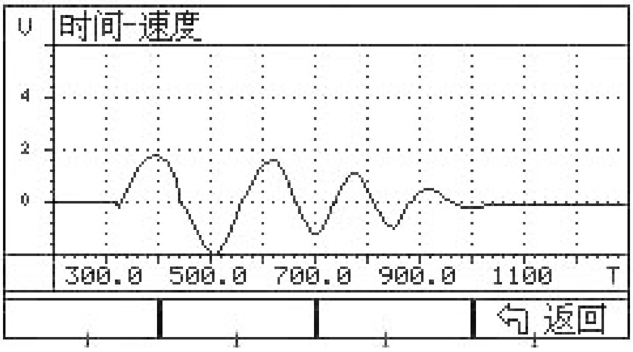
Select "Time-fracture wave"，you can observed the relation curve of every fracture in the opening and closing test, and the time unit is ms.



时 间-行 程: Time-strokewaveform　　返 回：Return

选 择 “ 时 间-行 程 波 形 ” ， 可 观 察 时 间 与 行 程 的 关 系 曲 线， 其 中X轴 为 时 间， 单 位 为m s； Y轴 为 行 程， 单 位 为m m。

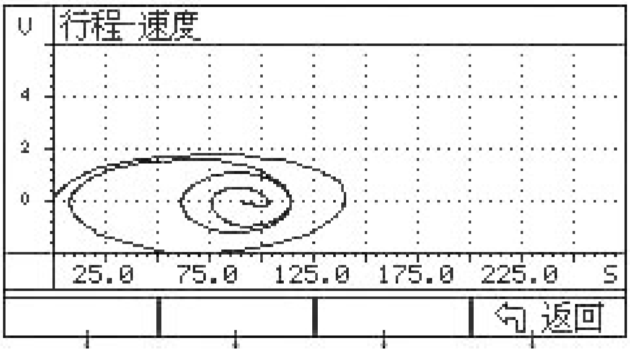
Select "Time - stroke waveform", you can observe time-stroke relation curve, where X axis represents time, the unit is ms; Y-axis represents stroke, and the unit is mm.



时 间-速 度: Time-speed　　返 回：Return

选 择 “ 时 间-速 度 波 形 ” ， 可 观 察 时 间 与 速 度 的 关 系 曲 线， 其 中X轴 为 时 间， 单 位 为m s； Y轴 为 速 度， 单 位 为m / s。

Select "time-speed waveform"，you can observe time-speed relation curve, where X axis represents time, the unit is ms; Y-axis represents speed, and the unit is m/s.



时 间-速 度: stroke-speed　　返 回 : Return

选择行程-速度波形，可观察行程与速度的关系曲线，其中X轴为行程，单位为mm；Y轴为速度，单位为m/s。

Select "stroke-speed waveform", you can observe stroke-speed relation curve, where X axis represents stroke, the unit is mm; Y-axis represents speed, and the unit is m/s.

7
页面说明
Page Instruction

7.3.2 数据存储页面　Data storage page

在测试数据页面下按“存储”功能按键可存储数据。

Press "store" function key can store data under the test data page.

数据存储: data storage　测试时间: test time　设备编号: Equipment No.
测试人员: Test staff　存储记录: Storage record

存储数据前，可为该数据设置设备编号及测试人员，方便日后查看及对照。

Before the data storage, you can set the equipment NO. and test staff for the data for future reference.

按“编号”键，进入输入法页面，此页面下用户可对测试开关进行编号。

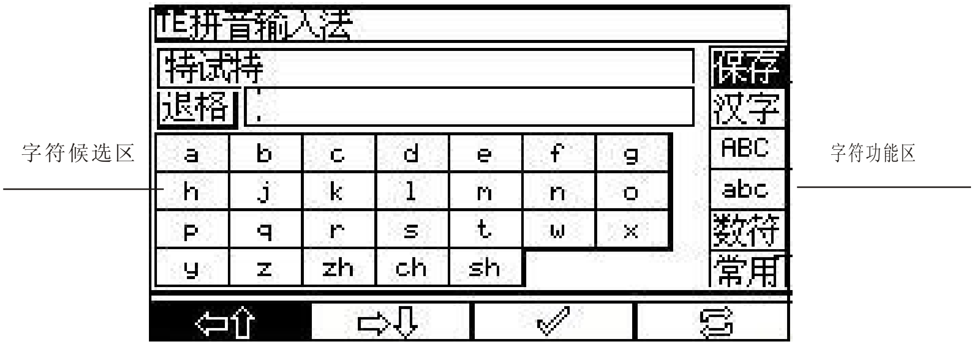
Click "No." key to enter the input page, and the user can set the No. for the test circuit breaker in this page.

按“人员”键，进入输入法页面，此页面下用户可对测试人员进行输入。

Press "staff" key to enter the input page, and the user can enter the name of the test staff in this page.

在“数据存储”页面，按“编号”或“人员”功能按键后，进入“输入法”页面：

In the "data storage" page, press "No." or "staff" key to enter the "Input Method" page:



拼音输入法：Pinyin Input method　　保存：Save

汉字：Chinese character　　数符：Numerical symbols

常用：Common phrases　　退格：Backspace

在输入法页面可以输入汉字、大小写字母、数符、及常用词组。此处以输入汉字“特”为例讲解输入法页面：

按“⇆”键光标移动到“退格”功能，退格功能可以对字符候选区的字符进行删除；再按“⇆”键，光标移动到保存，按“⇨⇩”键选择“汉字”功能，此时按“⇆”键界面切换至汉字功能页面（进入输入法页面时，系统默认为汉字功能页面，当需要输入其它字符时，可用此方法进行功能切换），按“⇦⇧”及“⇨⇩”键选择“t”，然后按“✓”键，进入声母“t”拼音界面，按“⇦⇧”及“⇨⇩”键选择“t e”拼音，然后按“✓”键，进入拼音“t e”的汉字列表，按“⇦⇧”及“⇨⇩”键选择“特”字，按“✓”键，汉字“特”便在字符候选区，如输入错误，可按“⇆”键切换至“退格”功能，按“✓”键进行删除；如输入正确，按

“⇆”键切换至“保存”功能，按“✓”键保存并返回数据存储页面。

按“确定”功能按键，数据开始存储。

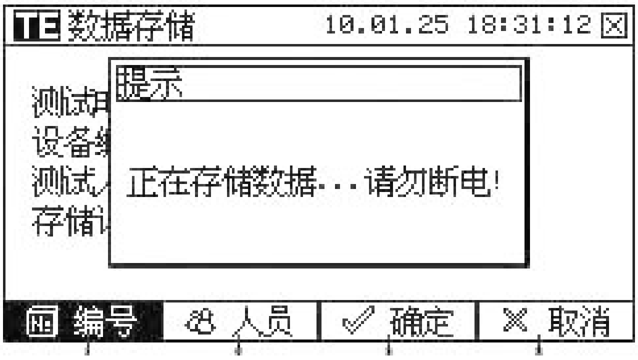
In the input page, you can input Chinese characters, Uppercase and lowercase letters, Numerical symbols, and common phrases. Here we set the Chinese characters "特" as an example to explain input page:

When you press "⇄" key, the cursor moves to "backspace" function, the backspace function can delete characters in the waiting region; then, click "⇄" key, the cursor moves to save, press "⇨⇩" key to choose "Chinese character" function, at this time, press " ⇄ " key to switch to the Chinese character function page (When enter into the input method page, the system default page is Chinese character interface, when you need to input other characters, this method can be used for functional switching). Press "⇦⇧" and the " ⇨⇩ " button to select "t", then press "✓" key to enter the consonant "t" pinyin interface, press "⇦⇧" and the " ⇨⇩ " key to select the "te" pinyin, and then press "✓" key to enter the Pinyin "te" Chinese characters list, press "⇦⇧" and "⇨⇩" to select "特" characters, press "✓" key， the characters "特" will be in the waiting areas, if input error occurs, press " ⇄ " key to switch to the "backspace" function, press "✓ " key to delete; If input correctly, press "⇄" key to switch to "Save" function, press the " ✓ " key to save and return to data storage page. Click "OK" function key to start data storage.

7

页面说明

Page Instruction



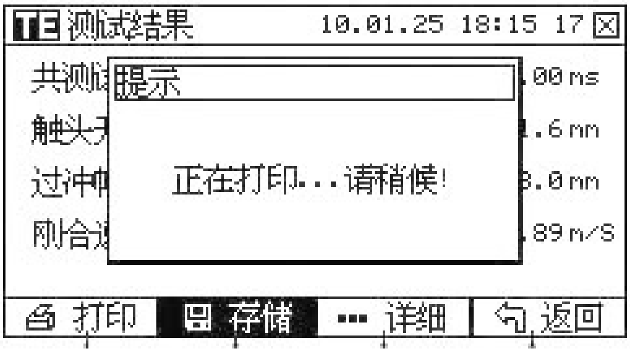
数据存储：Data storage

正在存储数据, 请勿断电：Saving the data now, please do not cut off the power

7.3.3 数据打印页面　Data printed page

在测试数据页面下按“打印”功能按键可打印数据。

In the test data page, press "Print" function key to print data.



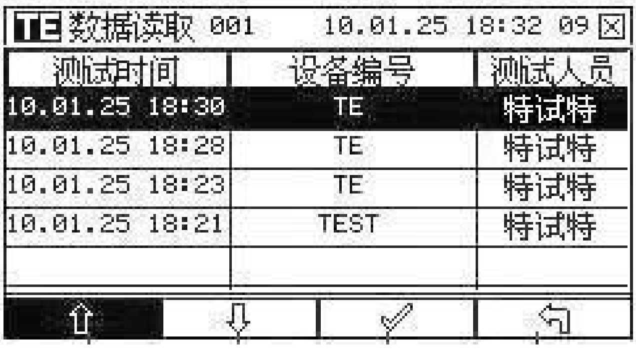
测试结果：Test result　　提示：Promote

正在打印，请稍后：Printing now, please wait

7.4 数据读取菜单　Data read the menu

在主菜单页面下，按下“数据”功能按键，仪器进入数据读取页面：

Data read the menu in the main menu page, press the "Data" function button, the instrument into the data page reads:



测试时间：Test time　设备编号：Equipment No　测试人员：Test staff:

此页面用户可根据测试时间、设备编号、测试人员等信息选择正确的历史测试数据，按“✓”键进入数据查看页面：

The user can select the correct historical test data according to test time, Equipment No., test staff and other information in this page. Press " " key to enter the data review page:

测试结果：Test result　　共测试断口：Shared test fracture

合闸同期：Simultaneous time difference of contacting

触头开距：Length of break　　接触行程：Contact over-travel

过冲幅度：Overshoot amplitude　反弹幅度：Rebound amplitude

刚合速度：Instantaneous speed of contacting　最大速度：Maximum speed

7
页面说明
Page Instruction

此页面显示为上次保存的测试结果，有四个功能按键可以选择。

This page shows test results saved last time, there are four function keys for choose.

按“翻页”键可查看其它测试数据，但没有波形及特性曲线显示。

Click "next page" key to view other test data, but no wave and the characteristic curve display.

按“打印”键可将存储的数据全部打印出来。

Press "Print" key can print all the data stored.

按“删除”键则可将历史纪录删除。

Press "delete" key to delete the history records.

按“↰”键则可返回上一页面。

Press "↰ “ key can return to the previous page.

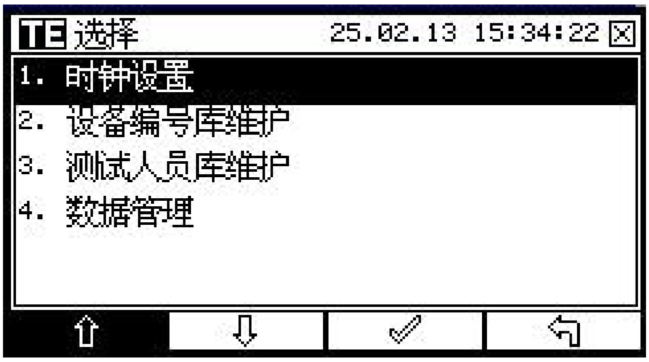
7.5 设置菜单　Setting menu

在6.2主菜单中，按“设置”功能按键，仪器显示设置菜单页面：

In the main menu 6.2, press "SET" function keys, the instrument display settings menu page:

选 择 “ 设 备 编 号 库 维 护 ” 与 “ 测 试 人 员 入 库 维 护 ” 可 以 录 入 一 些 经 常 用 到 的 试 品 编 号 与 被 试 人 员 姓 名 ， 方 便 测 试 完 成 后 进 行 数 据 管 理 。

Select "Device ID database maintenance" and "test staff storage maintenance" can input a number of common used test product No. and name of the test staff, and it is convenient for the data management after test.



选择：Option　　时钟设置：Clock setting　　数据管理：Data managemen

设备编号库维护：Device ID database maintenance

测试人员库维护： Test staff storage maintenance　t

在6．5菜 单 中 ， 选 择 “ 时 钟 设 置 ” 将 进 入 时 钟 设 置 页 面 。
In the menu 6.5, select "Clock Settings" to enter the clock settings page.

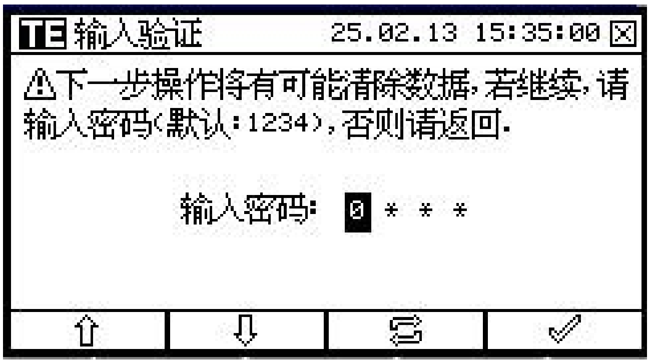
时钟设置：Clock setting　　时、分、秒：hour, minute, second

按 “ ” 键 选 择 ， 按 “ ⇧ ” “ ⇩ ” 键 可 以 对 时 间 进 行 修 改 ， 按 “ ✓ ” 键 确 认 返 回 。

Press " " key to select, press "⇧ " "⇩ " key to modify the time, press "✓" key to confirm return.

在6．5菜 单 中 ， 选 择 “ 数 据 管 理 ” 将 进 入 数 据 管 理 页 面 。

In menu 6.5, select "Data Management" will enter the data management page.



输入验证：Input verify

下一步操作将有可能清除数据，若继续，请输入密码：（默认：1234），否则请返回。

The next operation might delete data, if continue, please input the password (default: 1234), otherwise, please return.

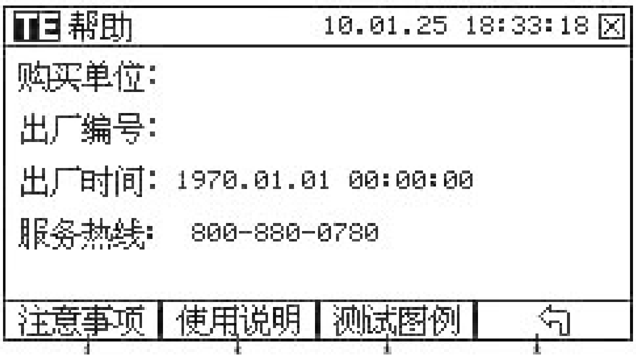
首先要输入密码，出厂时默认为“1234”，按“ ”键选择，按“ ”“ ”键可以对时间进行修改，按“ ”键确认进入。

First to input password, factory default is "1234", press " " key to select, press the " " " " key to modify the time; Press " " key to confirm entry.

7.6 帮助菜单 Help menu

在主菜单页面下，按“帮助”功能按键，仪器显示帮助页面：

In the main menu page, press "Help" function key, the instrument displays the help page:



帮助：Help 购买单位：Purchasing company

出厂编号：Product No. 出厂时间：Date of manufacture

服务热线：Service hotline 注意事项：Notes

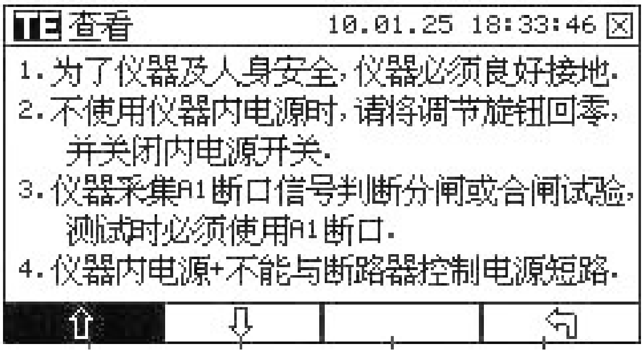
使用说明：Usage instruction 测试图例：Test graph

帮助页面主要显示购买单位、出厂编号、出厂时间以及服务热线等信息；标题栏系统时间（如上图）。

The help page mainly displays purchasing company, Product No., manufacture date and service hotline and other information; title bar display system time (see pictured above).

（1）按“注意事项”功能按键，仪器进入注意事项页面；此页面主要显示仪器在安全操作方面的相关注意事项。用户在使用仪器前，请先阅读此页面内容，并请严格按要求操作。使用“⇩”、“⇧”功能按键翻阅内容，使用“ ”功能按键返回帮助页面。如下图:

Press "Note" function key, the instrument enter into the note pages. This page mainly shows the notes in the aspects of the safe operation. Before using the equipment, the users should read the contents of this page, and operate in strict accordance with the request. Use "⇩", "⇧" function keys to read the contents, use " " function key to return to the help page. See picture below:



查看：view

1、为了仪器及人身安全，仪器必须良好接地；

1.For the safety of the equipment and human, the equipment must be well grounded.

2、不使用仪器内电源时，请将调节旋钮回零，并关闭内电源开关。

2.If you do not use the inner power supply, please set the knob back to zero position, and switch off the inner power supply.

3、仪器采集A1断口信号判断分闸或合闸试验，测试时必须使用A1断口；

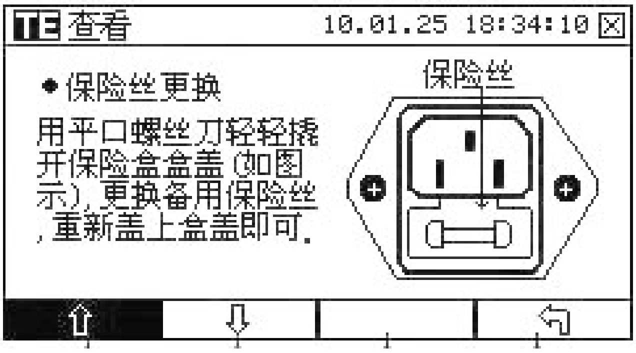
3.The equipment gathers the fracture signal of A1 and analyzes if it is opening or closing test. A1 fracture must be used in the test.

4、仪器内电源+不能与断路器控制电源短路

4.The positive pole of the inner power supply of the equipment can not be short-circuited with the control power supply.

(2)按“使用说明”功能按键，仪器进入使用说明页面；

(2) Click "Usage instruction" function key, the instrument enter into the instruction page;



查看：View　保险丝更换：Fuse replacement　保险丝：Fuse

用平口螺丝刀轻轻撬开保险盒盒盖（如图示），更换备用保险丝，重新盖上盒盖即可：

Use the flat screwdriver to open the cover of the fuse box gently (see the picture), replace the fuse with the reserve one, and then close the cover.

7 页面说明

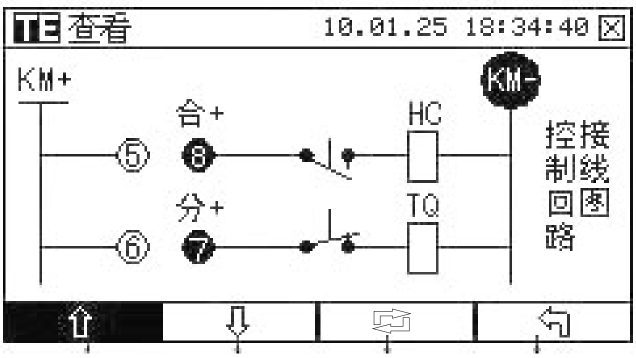
Page Instruction

此页面主要显示仪器正常使用时的一些操作说明。用户在使用仪器过程中，对照使用说明进行操作。按“⇧”、“⇩”功能按键翻阅内容，使用“ ”功能按键返回帮助页面。

This page mainly shows some normal use operating instructions of the equipment. The user operates the equipment according to the instruction. Press "⇧" "⇩" function keys to read the contents, use " “ function key to return to the help page.

(3)按“测试图例”功能按键，仪器进入测试图例页面；

(3) Click "Test graph" function key to enter into the test graph page;



查看: View　合：Close　分：Open

控制回路接线图：Control circuit connection picture

此页面主要显示仪器使用时的一部份接线图。用户在使用仪器时，可参考测试图例进行接线。使用“⇧”、“⇩”功能按键翻阅内容，使用“ ”菜单返回帮助页面。

This page mainly shows a part of connection picture in the operation process of the equipment. When using the device, the user can refer to the test graph to connect the wire. Use "⇧", "⇩" function keys to read the contents, use" " menu to return to the help page.

7

页面说明

Page Instruction

7.1如何更换打印纸　How to replace the printing 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。

Paper can be changed without dismantling the machine due to front paper-change printer adopted by this instrument, which is very convenient.

（1）打开打印机前盖板。

(1) Open the front cover board of the printer.

（2）用手捏紧打印机内的纸轴，将其取出。

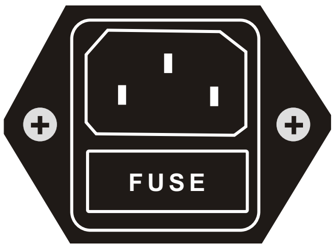
(2) Pinch the shaft and take out it.

（3）装上打印纸，请将打印纸的光面朝上,并用打印机光感头压住打印纸,盖上打印机前盖板即可。

(3) Input paper. Keep the shiny side up. Let the light perception head suppresses the printing paper, and close the printer front cover.

7.2 如何更换保险丝

How to replace the fuse



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5 A。

There is a power outlet in the bottom of the fuse box, you can pull up the fuse box by a flat screwdriver and replace it. Fuse is 5A.

9.1 接线准备 Connect ready

（1）将接地线一端夹在地网上，一端可靠接的接于面板的接地端子上。

(1)Connect one end of the ground wire to the ground line, one end connected to the ground terminal on the panel reliably.

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，甚至危及人身安全。

Note: access to network sites should have good conductivity; otherwise it will affect the measurement accuracy, and even endanger their personal safety.

（2）将端口测试线与仪器时间端口连接，航插应锁紧以保证接触良好。

(2)Connect the port test line with equipment time port, and the plug should be locked tightly in order to ensure good contact.

（3）速度传感器安装完成后，将速度传感器的连接线与仪器连接并锁紧航插。

(3)When the speed sensor installation is complete, connect the speed sensor connecting line with the equipment and lock the plug tightly.

（4）**在使用仪器内电源时**，将专用测试线与仪器的KM一、合＋、分＋连接，连接好后接到断路器控制回路中的KM－、合+、分+，用一根短测试线将仪器面板KM+与内电源+短接。

(4)When you use the inner power supply of the equipment, connect the special test lines with the KM-, close+, open+ of the equipment. After you connect them well, connect these special test lines to the KM-, close+, open+ in the control circuit of the circuit breaker, and shorted connect the KM+ of the instrument panel with the positive pole of the inner power supply.

（5）**在使用高压断路器自身电源的时候**，用专用测试线将仪器与断路器的KM＋、KM一、合＋、分＋连接，**注意请不要将内电源和断路器控制电源短路,否则可能损坏仪器。**

(5)When you use the inner power supply of the high-voltage circuit breaker, connect the KM+, KM-, joint+, sub+ of the circuit breaker with the equipment by a short test line, please note that do not short connect the inner power supply with the control power of the circuit breaker. Otherwise, the equipment may be damaged.

（6）插上电源插头。

(6)Plug the power.

9.2 测试步骤 Test procedure

（1）打开仪器电源开关，几秒钟后，仪器进入主菜单，**使用仪器内电源时**，需合上仪器内部直流电源开关，并调到断路器动作额定电压（DC220V）。

(1) Switch on the power of the instrument, after a few seconds, the instrument displays the main menu. When use the inner power supply of the equipment, you need to turn on the internal DC power supply, and adjust it to the working rated voltage the circuit breakers (DC220V).

（2）按下“测试”功能按键，进入测试页面，设置好“速度定义”类型及传感器类型后，按“测试”功能按键，仪器开始测试，数秒后显示测试结果。

(2) Press the "Test" function key to enter into the test page, and set "Speed defines" type and sensor type, then press the "Test" function key to start the testing, finally, the test results will be displayed after a few seconds.

（3）如测试采用旋转传感器，则需要根据实际情况输入开关的旋转系数。

(3) If using a rotating sensor, you need to input the rotation factor of the switch according to the actual situation.

（4）在数据菜单页面中可以打印或存储所有数据及曲线。

(4)All the data and curves can be printed or stored in the data menu page.

8.3 试验结束后现场清理 Clear Up Test-site After Test

（1）关闭内电源开关后再关闭仪器电源开关，拔下电源线。

(1)Turn off the inner power supply, and then switch off the power supply of the equipment, unplug the power cord at last.

（2）将所有测试线拆下并整理好,为下一次试验做准备。

(2)Remove all the test line and sort them out to make preparation for the next test.

（3）拆除接地线，并整理好。

(3) Remove the ground line, and sort them out.

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℃～60℃，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℃ ~ 60℃, relative humidity no more than 85%, ventilation, no corrosive gases. Equipments Should not be placed close to the ground and walls.

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.

11.1　220V电源线　power cord　一根　one piece

11.2　专用测试线　Special Test Line　一套　one set

11.3　专用万向夹具　Special universal clamp　一套　one set

11.4　万能传感器　Universal Sensor　一套 one set

11.5　使用说明书　Manual Book　一份　one copy

11.6　产品合格证　Product certification　一份　one copy

11.7　出厂质检报告　manufacturer inspection report

一份　one copy

11.8　打印纸　Print Paper　一卷　one roll

11.9　保险丝（10A）Fuse　二个 two pieces

11.10　保险丝（15A）Fuse　六个　six pieces

11.11　双色接地线　Ground color　一根　one piece

11.12　测试夹子　Test clip　一包 one bag

11.13　配件箱　Accessory Box　一个 one box

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12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 12 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.