POLARIS®
普莱瑞思®仪器

# SD2000 Cable faults test instrument
# SD2000 智能型电缆故障测试仪



## Operation manual
# 操作手册

Shanghai SHUJIA electric CO.,LTD
上海舒佳电气有限公司

一、概述：

为迎接电力工业时代的到来，本公司在产品开发研制中不断追求完美、努力创新。电缆故障预定位测试主机是公司的又一杰作，技术达到国际先进水平，打破了国外公司在此领域的垄断，电缆故障预定位测试主机采用了国际最高水平的时域反射法（TDR）技术，判断故障距离轻松愉快。

电缆故障预定位测试主机用于检测各种动力电缆的高阻泄漏故障、闪络性故障、低阻接地和断路故障。

## Part Ⅰ Overview:

To welcome the arrival of the era of power industry, the company in product development, the pursuit of perfection, strive to innovation. Cable fault location test is host is another masterpiece, the company's technology has reached the international advanced level, and break the monopoly of the foreign companies in this field, cable fault location test is host adopted international highest level of time-domain reflect meter (TDR) technology, judge fault distance relaxed and happy.

Host cable fault location test is used to test various kinds of power cable of high resistance leakage failure, flashover failure, low resistance grounding and open circuit fault.



二、仪器功能与特点：

1. 可测 35KV 以下等级所有电缆的高、低阻故障，适应面广。
2. 采用国际最先进的“TDR”测试技术。具有击高压闪络法和低压脉冲法。
3. 具有方便用户的软件和中文菜单。按键定义简单明了。测量方法简单快速。
4. 检测故障成功率、测试精度及测试方便程度优于国内任何一种检测设备。
5. 超大触摸液晶屏作为显示终端，仪器具有强大的数据处理能力和友好的显示界面。
6. 具有极安全的采样高压保护措施。测试仪器在冲击高压环境中不会死机和损坏。

7. 内置电源，可在无电源环境测试电缆的开路及低阻短路故障。

## PartⅡ Functions and features:

1. All measurable below 35 kv level high and low resistance fault of cable, adaptation of wide.

2. Adopt the international most advanced "TDR" testing technology. A high voltage flashover method and low voltage pulse method.

3. Has a user-friendly software and Chinese menu. The key to define simple and clear. The measuring method is simple and rapid.

4. Test failure rate, the test precision and how easy it is to test is better than that of any kind of testing equipment in China.

5. Large touch LCD screen as the display terminal, the instrument has powerful data processing ability and friendly display interface.

6. Has the extremely safe sampling high voltage protection. Impact test equipment in high pressure environment will not crash and damage.

7. The built-in power supply, can be in the absence of power supply environment test cable open circuit and low resistance fault.

三、主要性能指标：

1. 测试方法：低压脉冲、高压闪络、速度测量。
2. 冲击高压：低于 35KV 电力电缆。
3. 数据采样速率：80MHz、40 MHz、20MHz、10 MHz。
4. 测试距离：＞30Km。
5. 读数分辨率：1m。
6. 系统测试精度：小于 50cm。
7. 测试电缆脉宽设有："0.05"、"0.1"、"0.2"、"0.5"、"1"、"2"、"8" 微

秒。

8．具有测试波形储存功能：能将现场测试到的波形按规定顺序方便地储存于仪器内，供随时调用观察。可以储存大量的现场测试波形。

8．可自动判断故障距离。

10．内置电源：充满电后仪器可连续工作 3 小时以上，亦可外接交流电源工作。

11．工作条件：温度-10℃～+45℃，相对湿度 90%。

## PartⅢ Main technical criteria

1. Test method: low voltage pulse, high voltage flashover, velocity measurement.

2. The impact of high pressure: below 35 kv power cables.

3. The data sampling rate: 80 MHz, 40 MHz, 20 MHz, 10 MHz.

4. Test distance: > 30 km.

5. The readout resolution: 1 m.

6. System test precision: less than 50 cm.

7. Test cable pulse-width has: "0.05", "0.1", "0.2", "0.5", "1", "2", "8" microseconds.

8. Test waveform storage function: can to field test of waveform sequence easily stored in the instrument by the regulation, to call at any time to observe. Can store large amounts of field test waveform.

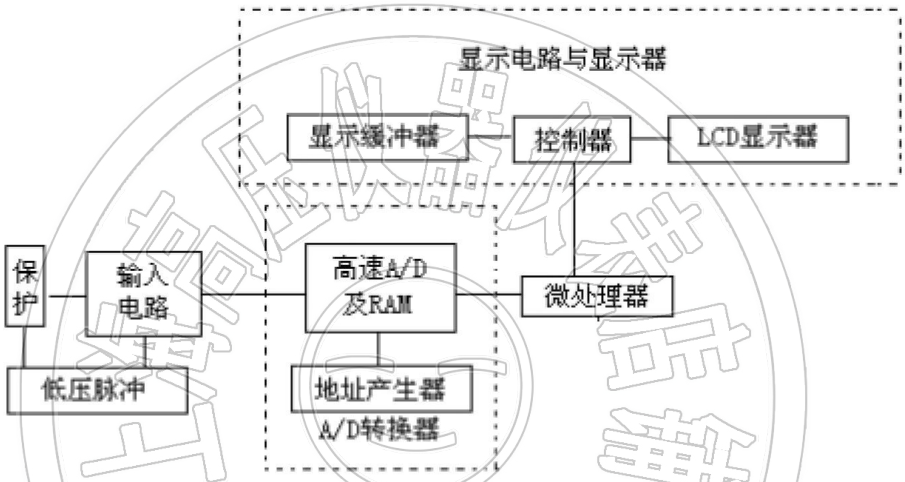
8. Can automatically judge fault distance.

10. The built-in power supply: full of electricity, the instrument can work continuously for more than three hours after work can be an external ac power.

11. The working conditions: temperature - 10 ℃ ~ + 45 ℃, relative humidity 90%.

四、仪器的系统组成详细介绍：

电缆故障测试仪系统的组成方框图如图一所示：




图（1） 电缆故障测试仪组成框图

电缆故障测试仪由测试主机、路径信号产生器、路径信号接收器和定位仪几部分组成。

故障测试主机包括低压脉冲产生和数据处理，用于测试故障的距离，也可用来测量电缆的长度和电波在电缆中的传播速度。

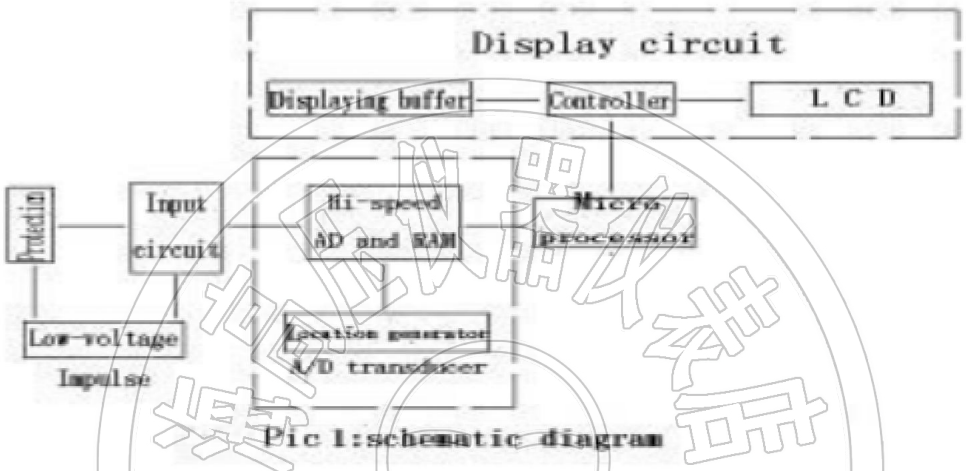
路径信号产生器产生频率 15KHz、最大幅度 30V 的断续正弦波信号，用于寻测查找电缆的路径。

路径信号接收器用来接收路径信号，用于查找电缆走向和估测电缆埋设的深度。

定位仪用于故障点的精确定位。

## PartⅣ System in detail:

Cable fault tester system composition block diagram is shown in figure 1:




Pic 1:schematic diagram

Cable fault tester by path of test host, signal generator, signal receiver and locator.

Fault test host including low voltage pulse generation and data processing, is used to test the fault distance, also can be used to measure the length of the cable and the propagation speed of waves on the cable.

Path signal generator to generate frequency 15 KHZ, the biggest 30 v intermittent sine wave signal, is used to find cable path.

Path to the receiver to receive path signal, to find the cable to the embedded depth and estimate the cable.

Device used for precise positioning point of failure.

五、仪器的配套性：

| | |
|---|---|
| 1. 电缆故障预定位测试主机（测距主机） | 一台 |
| 2. 路径仪 | 一台 |
| 3. 定点仪 | 一台 |
| 4. 信号采样线 | 一根 |
| 5. 220V 电源线 | 一根 |
| 8. 球间隙 | 一个 |
| 9. 电流取样盒 | 一个 |
| 10. 探头（音频振动传感器） | 一个 |
| 11. 8.4V 充电器 | 一个 |
| 12. 耳机 | 一个 |
| 13. 仪器使用说明书 | 一本 |

## Part V Form a complete set of equipment

1. The cable fault location test is the host (host range)

2. The path to the instrument

3. The fixed point meter

4. A sampling line

5.220 V power line one

8. A ball clearance

9. Current sampling a box

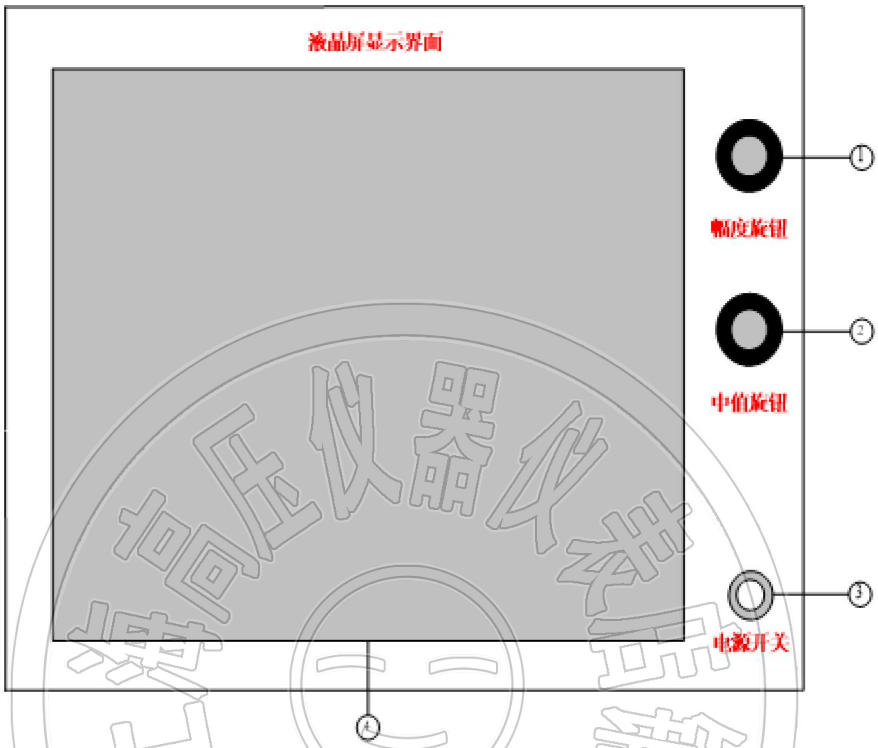
10. Audio vibration sensor

11.8.4 V battery charger

12. The instrument instruction manual one

六、仪器面板说明：

1．仪器面板结构示意图如下图所示：




图二 仪器面板结构示意图



2．面板结构和功能键说明

本仪器主机面板设有三个功能键：一个调节幅度旋扭①、一个垂直位移旋扭②、一个电源开关③。④是液晶屏显示界面，如图二所示。下面逐一说明它们的功能和使用方法。

✧ 幅度旋钮①：

采样时调节此旋钮，可以改变测试波形在屏幕上的幅度（此项功能只对重新采样后的波形起作用）。

✧ 中值旋钮②：

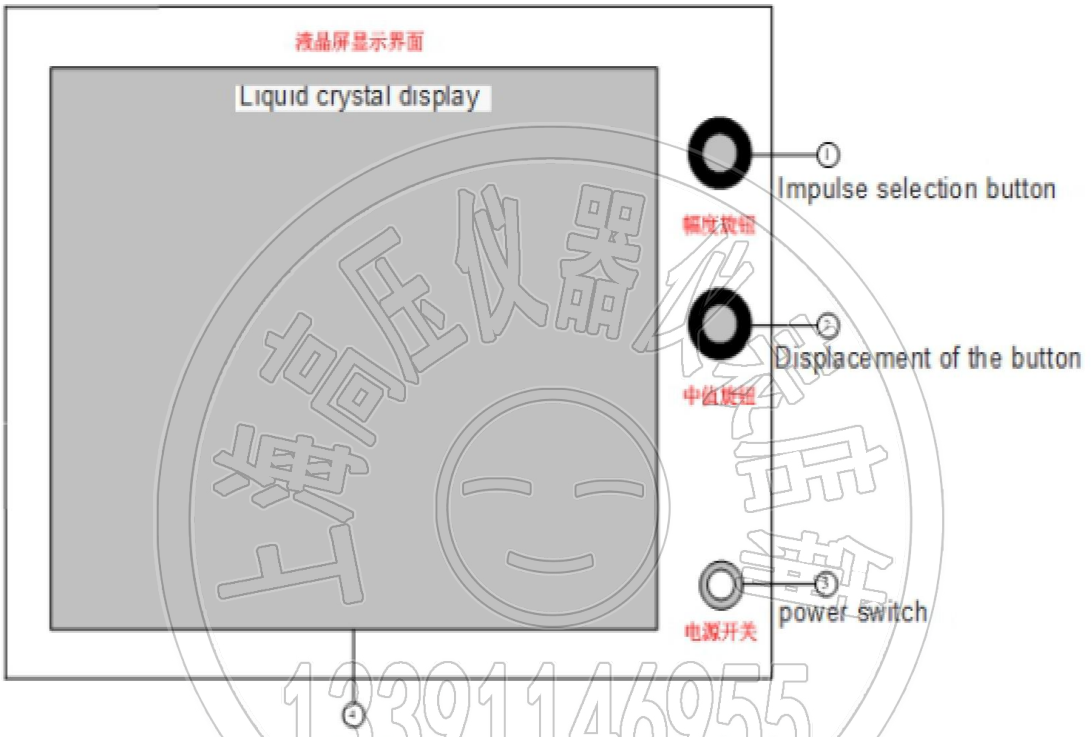
采样时调节此旋钮，可以改变测试波形在屏幕上的垂直位置（此项功能只对重新采样后的波形起作用）。

✧ 开关键③：

按键为电源开关键。仪器 10 分钟无按键操作将自动关机。

## PartⅥ Introduction for Panel and functional key

1. The instrument panel structure diagram as shown in the figure below






2. The panel structure and function keys

Host the instrument panel is equipped with three function keys: a regulating knobs (1), a vertical displacement amplitude knob and (2), a power supply switch (3). (4) is a LCD display interface, as shown in figure. The following one by one to explain their function and use method.

Amplitude knob (1) :

Sampling to adjust the knob, you can change the range of the test waveform in the screen (this function only work on the waveform after resampling).

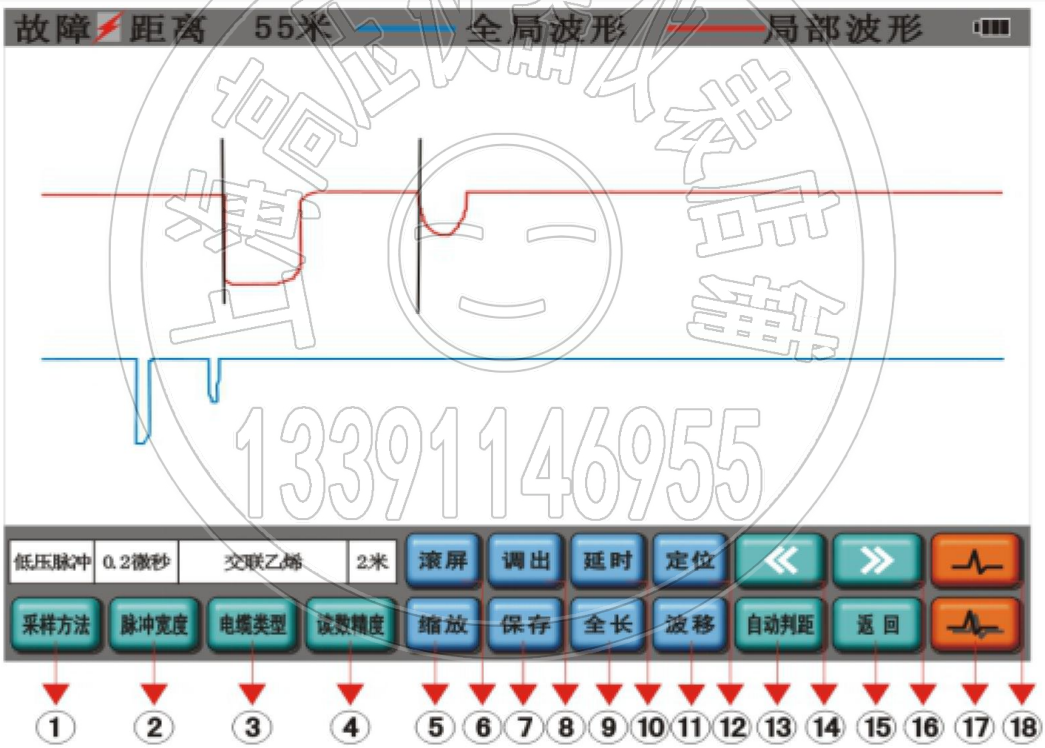
Median knob (2) :

Sampling to adjust the knob, you can change the test waveform in the vertical position on the screen (this function only work on the waveform after resampling).

Open key (3) :

Button to power on the key. Instrument for 10 minutes without keystrokes will automatically be turned off.

3.液晶屏幕菜单说明




液晶屏菜单显示示意图

✧ 采样方法 1

按采样方法键，弹出子菜单。子菜单中包括 5 个选项为低压脉冲/闪络方法/速度测量，仪器默认选中低压脉冲，根据测量需要，可选择相应的采样方法。再按“采样方法键”退出此项功能。

✧ 脉冲宽度 2

此菜单在高压闪络测试法中无效。按脉冲宽度键，弹出脉冲宽度选择子菜单。可根据测试距离选择合适的脉冲宽度按对应的子菜单键，可以对脉冲宽度进行选择。脉冲宽度大小为 50 纳秒、100 纳秒、200 纳秒、1 微秒、2 微秒、5 微妙、8 微秒共 7 个档位。当选中 50 纳秒脉宽时，电脑自动锁定读数精度为 1 米；当选中 8 微秒时，电脑自动锁定读数精度为 8 米；选择其他脉宽时，可以按读数精度键任意调节，仪器初始值为 200 纳秒。再按“脉冲宽度键”退出此项功能。

✧ 电缆类型 3

不同介质的电缆中电波传播速度不同，因此在测试故障之前必须选定介质类型，以确定电波传播速度。按电缆类型键，屏幕出现电缆类型选择对话筐，有油浸纸型、不滴油型、交联乙烯、聚氯乙烯和未知类型 5 个选项，仪器初始值为油浸纸型，可根据需要按对应的电缆类型键。若被测电缆不属于四种已知类型，则应按“未知类型键”，弹出对话框，调整波速数值，达到选定值后按“OK”键。再按“电缆类型键”退出此项功能。波形速度最大 300m/us

✧ 读数精度 4

根据测量需要选取合适的档位。共分为 8 米/4 米/2 米/1 米的测量精度，仪器初始值为 2 米。再按“读数精度”退出此项功能。

✧ 波形缩放 5

由于波形数据量很大，每次采样后屏幕上显示的是局部的波形。为了观察波形细节，必须将波形缩放。按“波形缩放键”进入缩放功能，仪器提供 3 种压缩比例，分别为 1、1/2、1/3，通过“左键《 或 右键 》”可对波形进行 3 种比例的循环压缩。通过屏幕右下角可以观察到压缩比例。再按“波形缩放键”，退出此功能。

✧ 滚屏显示 6

波形扩展后需要分成多段显示，仪器自动显示第一段。若需要观测后续各段波形，应执行“滚屏”功能。按“滚屏显示键”，通过“左键《 或 右键 》”可对波形进行左右移动。再按“滚屏显示键”，退出此功能。

✧ 保存波形 7

将屏幕上的显示内容存储于仪器中，可以存储 20 幅波形。

✧ 调出波形 8

在屏幕上重现存储的波形。

✧ 电缆全长 9

在“采样方法”子菜单中若执行“速度测量”，则菜单中的电缆类型变为电缆全长。按“全长键”，屏幕上弹出“电缆长度”输入对话筐，初始值为“0”米。输入电缆长度值后，按“OK 键”。

✧ 延时 10

设置触发时间，此功能一般不用。

✧ 波移 11

按“波行移位键”后进入波形移动操作，可以用“左键《 或 右键 》” 移动当前的波形，再按“波形移位键”则退出波移操作。

✧ 定位 12

用于确定测量的起点。执行“定位”键后，游标当前所处的位置即被确定为测试起点。通过 “左键《 或 右键 》”可对游标进行左右移动。

✧ 自动判距 13

按“自动判距键”，游标进行自动定位，显示屏左上方自动显示故障距离。

✧ 左键/右键(加/减) 1416

移动游标定位用时，每按“左键《 或 右键 》”一次，定位游标尺左/右移一个单位点（像素）；当连续按游标左/右键时，游标移动的速度加快，一次移动八个单位点。

波形缩放、滚屏显示、波形移位进行选择时，按左键《 或 右键 》(加/减)。

✧ 返回 15 系统用不到暂不介绍。

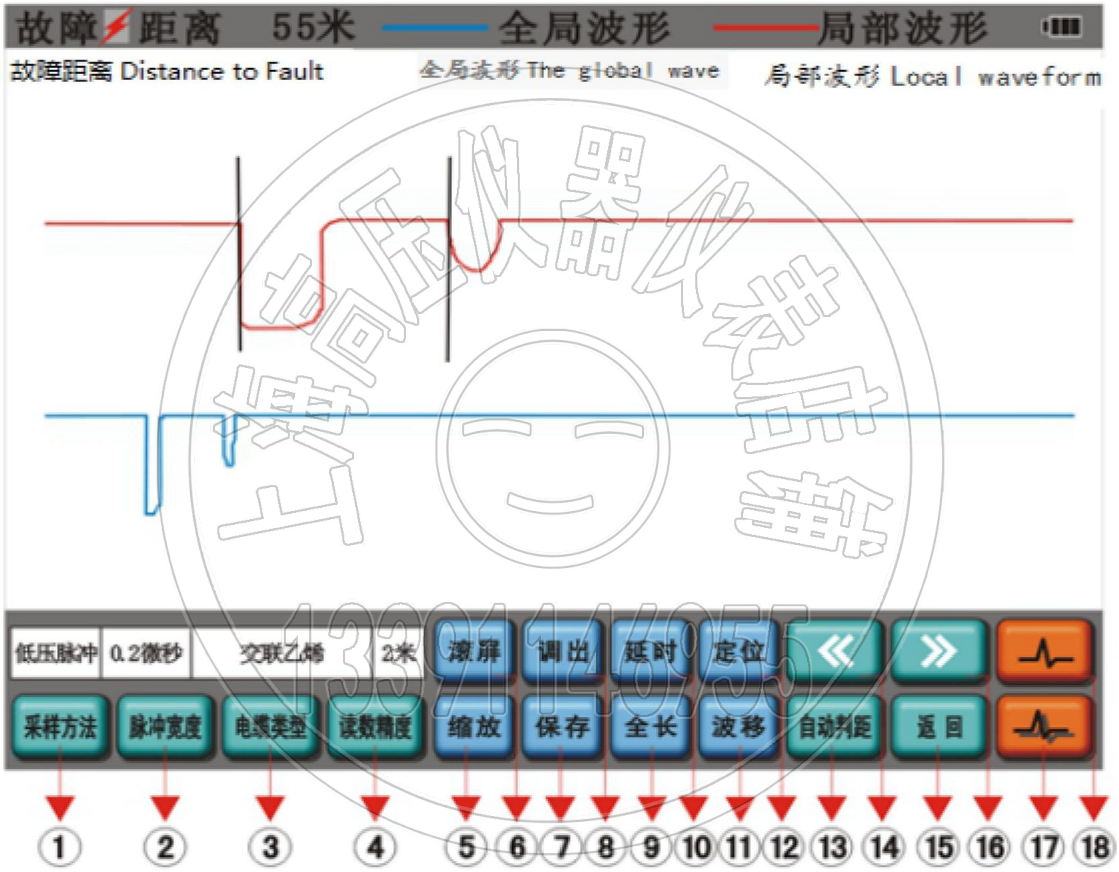
✧ 二次采样键 17 系统用不到暂不介绍。

✧ 采样键 18

当仪器处于低压脉冲法测量时，按下采样键后，屏幕的波形显示区能马上显示出发射脉冲和回波脉冲。红色波形为局部波形，蓝色波形为全局波形。

当仪器处于高压闪络法测量时，按下采样键后，当有外部触发后，屏幕将显示高压闪络波，红色波形为局部波形，蓝色波形为全局波形。

3. LCD screen menu




1, The sampling method

Press sampling method, the pop-up menu. Sub menu includes five options for low voltage pulse/flashover method/speed measurement, low pressure pulse instrument is selected by default, according to the requirements of the measurement, can choose the corresponding sampling method. Then press "sampling method" out of the feature.

2, Pulse width

This menu is invalid in the high voltage flashover test method. Press pulse width, the pop-up pulse width choose submenu. Can choose the appropriate pulse width according to the test distance by the corresponding menu, the pulse width can be choose. Pulse width size of 50 nanoseconds, 100 nanoseconds, 200 nanoseconds, 1 millisecond, 2 microseconds, 5, 8 microseconds delicate, a total of seven gear. 50 nanoseconds pulse width was elected, the computer automatically lock reading accuracy of 1 m; Elected in 8 microseconds, the computer automatically lock reading accuracy is 8 meters; Choose other pulse width, can adjust arbitrarily according to the accuracy of reading key, instruments and the initial value of 200 nanoseconds. Then press the "pulse width button" out of the feature.

3, Cable type

Speed of radio waves propagation in different medium of cable is different, so before test failures must be selected medium type, to determine the wave propagation speed. By cable type key, the screen appears cable type selection dialog basket, oil-immersed paper pattern, don't drop oil type, crosslinked ethylene, polyvinyl chloride (PVC) and unknown type 5 options, instruments and the initial value for oil-immersed paper, can press the corresponding cable type according to need. If the cable under test does not belong to the four known types, should press button "" unknown type, the pop-up dialog, adjust the wave velocity value, after reaching the selected value in accordance with the" OK "button. Then press "cable type" out of the feature. Wave velocity maximum 300 m/us .

4,Reading accuracy

According to the need to select the appropriate gear measurement. Will be divided into 8 m / 4 m / 2 m / 1 meter accuracy of measurement, instruments and the initial value is 2 meters. According to "reading accuracy" exit the feature again.

5, Waveform zoom

After each time, because of the large amount of waveform data sampling is local waveform is displayed on the screen. In order to observe the waveform details, must be waveform zoom. Press "waveform zoom button" into the zoom function, instrument provides three kinds of compression ratio, 1, 1/2, 1/3, respectively, through the "left" or right click "" to three kinds of waveform cycle of compression ratio. Through the screen can be observed at the lower compression ratio. Press "waveform zoom button again," out of this feature.

6, Scrolling display

Waveform expanded need is divided into many segments, according to instrument shows the first paragraph. If need to subsequent paragraphs waveform, and shall implement the "volume" function. Press "scrolling display", through the "left" or right click "" the waves can move around. Then press "scrolling display button," out of this feature.

7,Save the waveform

Will display on the screen content stored in the instrument, can store 20 waveform.

8, Bring up the waveform

On the screen is stored waveform again.

9,Cable length

If performed in the "sampling method" sub menu "velocity measurement, the menu of cable type into cable length. Press "2", pop-up "cable length" enter dialogue on the screen basket, the initial value to "0". Input cable length value, press "OK".

10, time delay,

Sets the trigger time, generally don't have this function.

11, Shift of the waveform

Enter the waveform after press "wave line shift" mobile operation, can use the "left" or right click "move the current waveform, then retreat to wave the waveform shift key is moving operation.

12, Positioning

Used to determine the starting point of the measurement. The current execution "localization" button, the cursor position is identified as the test start. By "left" or right click "" to move the cursor around.

13, Automatic judgment

Ress "automatically", cursor for automatic positioning, automatic display the upper left shows fault distance.

14, 16 left/right (plus/minus)

Move the cursor positioning, each according to the "left" or right click "" at a time, positioning vernier left/right to move a unit point (pixel); When continuous press the cursor left/right cursor move faster, 8 units moving point at a time.

Waveform zoom, scrolling display, waveform shift make a selection, according to the left or right (plus/minus).

15 、Return

System in less than no introduction.

17, secondary sampling keys

System in less than no introduction.

18, sample button

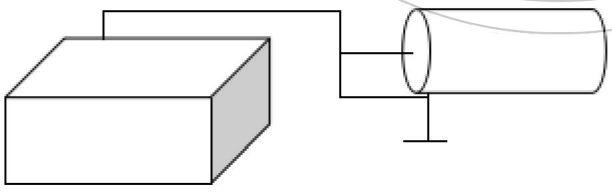
When the instruments are in a low pressure pulse measurement, press the sample button, waveform display area of the screen can display the transmitted pulse and the echo pulse immediately. Red waveform for local waveform, blue waveform as global waveform.

When the instruments are in a high voltage flashover method measurement, press the sample button, when there are external trigger, the screen will show the high voltage flashover wave, red waveform for local waveform, the blue wave as global waveform.

七、仪器的操作使用步骤：

由于本仪器主要在高压环境中工作，在现场使用此仪器检测电缆故障前，应详细阅读本使用说明书中的有关仪器测试原理、接线方式和使用注意事项。以免发生人身事故和损坏仪器设备。

**1.** 用低压脉冲法测试电缆的低阻接地、短路、断路故障



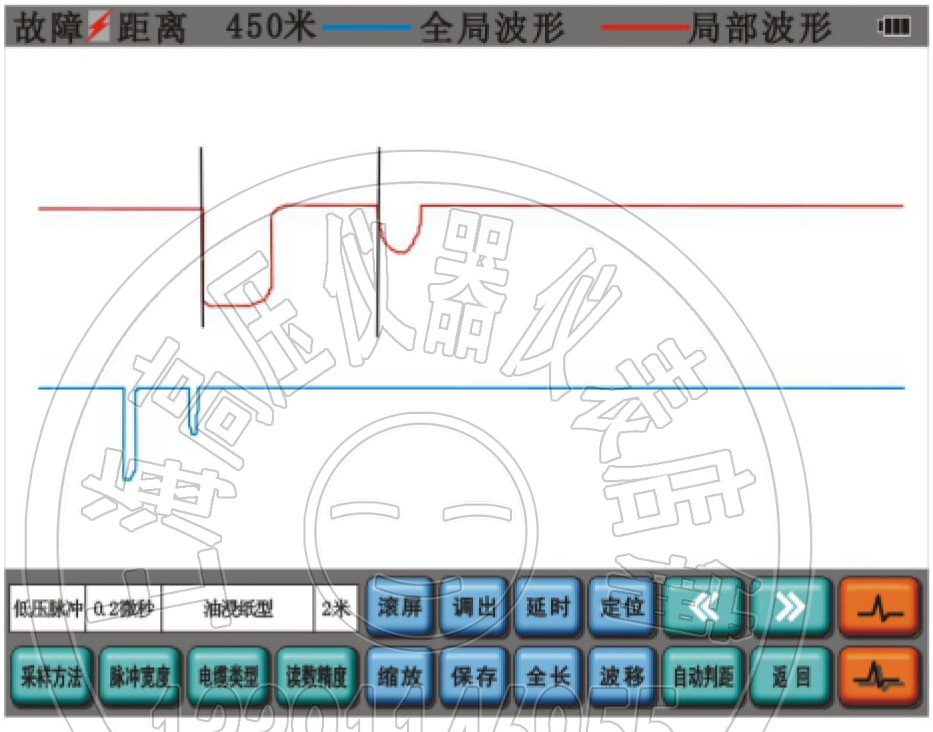
图五 低压脉冲连线图

A. 此时不用多次脉冲控制器。直接在电缆故障测试仪的输入输出接口接出一根夹子线。将夹子线的红夹子夹在故障电缆故障相芯线上，黑夹子夹在电缆的外皮地线上。

B. 启动仪器电源开关，屏幕工作以后，触摸屏幕任意地方进入设置界面。此时仪器默认的状态是“低压脉冲法”。应根据现场被测电缆种类、长度和初步判断的故障性质选择使用方法。设置在“低压脉冲法”时，在此界面还可以进行波速测量和打开历史文件查阅以前的测试结果。

C. 完成设备参数设置后，点击“采样”键，仪器自动发出测试脉冲。此界面将显示电缆的开路（全长）波形或低阻接地（短路）故障波形。若波形不好操作者应调节“中值”和“幅度”，并观察采到的回波，直到操作者认为回波的幅度和位置适合分析定位为止。

D. 波形定位读距离。低压脉冲判距比较容易，只要将游标分别定位到发射波及反射波的起点即可。




低压脉冲法测试的开路全长波形界面

E.“保存”

很多时候，需要将测试结果保留或留作对比用，就要利用仪器中的“保存”功能，将此次测得的波形保存在仪器的数据库中。

如果测试人员认为有必要保存此次测试结果，可点击“保存”键，根据子菜单提示操作即可。

## PartⅦ Instrument operation steps:

Because this instrument is mainly working in a high pressure environment, before using this instrument detection cable fault at the scene, should be carefully read this instruction manual of the instrument testing

principle, connection mode and use the matters needing attention. To avoid personal accident and damage equipment.

1、With low voltage pulse method to test the low resistance of the cable grounding, short circuit, open circuit fault

A. No multiple pulse controller at this time. Directly in the cable fault tester input/output interface to pick out a line clip. Will the red clip ,clip wire on the fault cable fault phase conductor, black clip skins on the ground of the cable.

B. Start the instrument power switch, after work, the screen touch screen any place Settings into the interface. The instrument to the default state is "low voltage pulse method". Should be based on field measured cable type, length, and the preliminary judgment fault nature chose to use method. Set in the "low voltage pulse method", in the interface can also wave velocity measurement and open the history file refer to the previous test results.

C. After completing equipment parameter Settings, click on the "sampling" key, the instrument testing pulse. This interface will display the open (2) the shape of the cable or low resistance grounding fault waveform (short circuit). If the waveform is bad the operator should adjust the "value" and "margin", and observe to echo, until the operator think echo amplitude and position is suitable for analysis of positioning.

D. Waveform positioning reading distance. Low pressure pulse sentence from easy, as long as the cursor position respectively to launch affected the starting point of reflection wave.

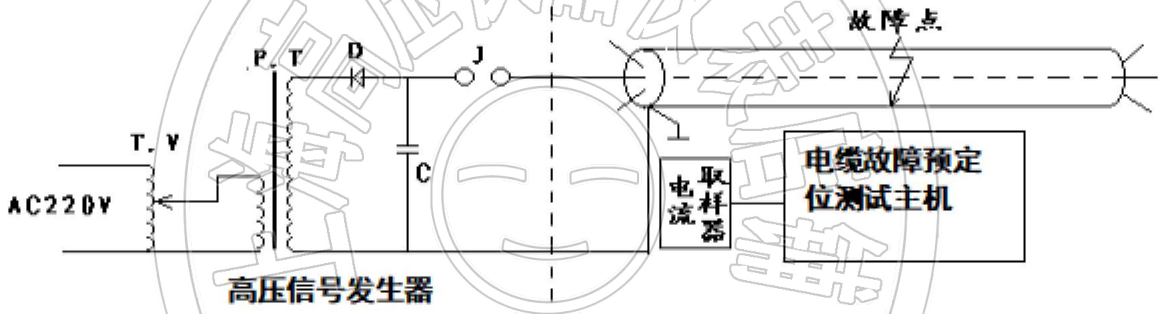
E. "Save"

A lot of times, it is necessary to keep the test results or left as compared with that will be using the "save" function in the instrument, described the measured waveform is saved in the database of the instrument.

If the tester think it necessary to save the test results, can click the "save" button, according to the sub menu prompt operation.

2．用冲击高压闪络法测试电缆的高阻泄漏故障（包括高阻闪络性故障）

本仪器可用冲击高压闪络法测试电缆的高阻泄漏故障。冲击高压闪络法测试电缆的高阻泄漏故障是目前在国内流行的传统检测方法。很多用户都习惯使用此方法。外接线路较为简单，但是波形分析的难度较大，只有在大量测试的基础上，有一定经验后才能熟练掌握，是一种行之有效的测试方法。



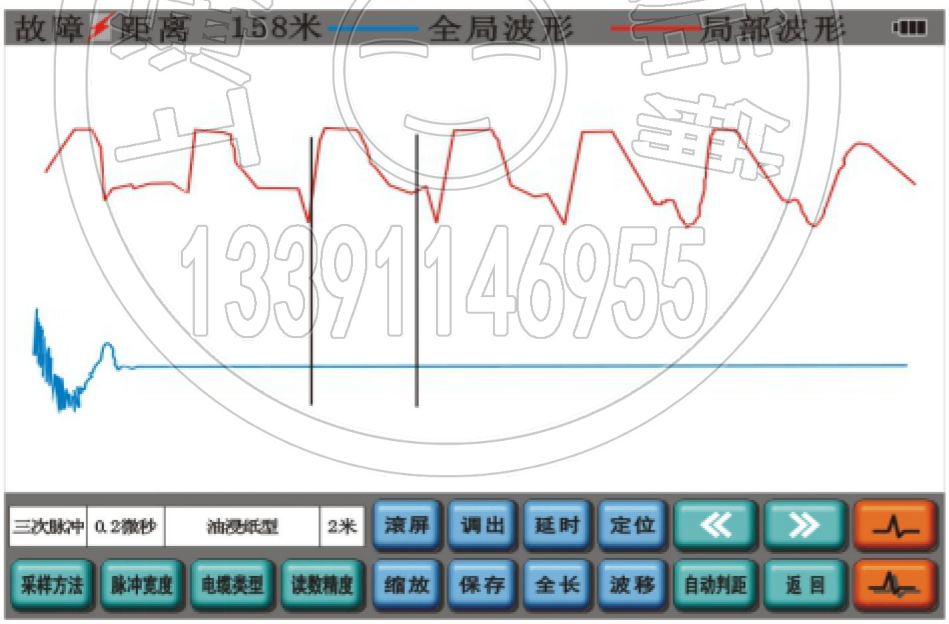

将仪器附带的电流取样器用信号线与主机连接后放在电缆与高压设备间的接地线旁即可。只要冲击高压发生器输出的电压足够高，故障点在此冲击高压的冲击下击穿，电缆中就会产生电波反射。电流取样器将地线上的电流信号通过磁耦合取得的感应反射电波传电缆故障预定位测试主机，经过 A/D 采样和数据处理，并将采得的波形显示在屏幕上进行故障距离分析。

2. Use shock high voltage flashover method to test the high resistance of the cable leakage fault (including high resistance flashover failure)

The instrument is available shock high voltage flashover method testing the high resistance of the cable leakage fault. Shock high voltage flashover method to test the high resistance of the cable leakage fault is currently in the domestic popularity of traditional detection methods. Many users are accustomed to using this method. An external circuit is

relatively simple, but the difficult of waveform analysis, only on the basis of a large number of tests, have certain experience to master, is a kind of effective testing methods.

The instrument with current sampling is used after the signal lines connected to the host in between the cable and high voltage equipment by the ground wire. As long as the impact of high voltage generator output voltage is high enough, the point of failure under the impact of high pressure impact breakdown, will produce reflection waves in the cable. Current sampler will be on the ground current signal by magnetic coupling induction of reflection waves spread cable fault location test is host, through A/D sampling and data processing, and will be picked the fault distance analysis waveform displayed on the screen.




高压闪络法测试波形

仪器的预置方法将采样方法改成高压闪络法即可。

Instrument of preset change sampling method to high voltage flashover method.

电缆类型和采样频率确定以后就可以点击“采样”键 ，进行采样

等待。一旦高压发生器进行冲击高压闪络，仪器就自动进行数据采集和波形显示。

屏幕上方红色波形是经过局部放大后的波形，下方蓝色波形为测试波形全貌。

当采集到较为理想的波形后，便可操作“波形缩放”和位移、移动游标来标定故障距离。操作方法与低压脉冲法一致。

 Cable type and sampling frequency to determine can click on the "sampling", after sampling to wait. Once the high voltage generator for high voltage flashover, automatic data acquisition and waveform display instrument.

Red waveform on the top of the screen after partial enlargement of waveform, below blue waveform for test waveform.

After the acquisition to the ideal waveform, can operate waveform zoom and displacement, move the cursor to calibrate the fault distance. Operation method and the method of low pressure pulse.

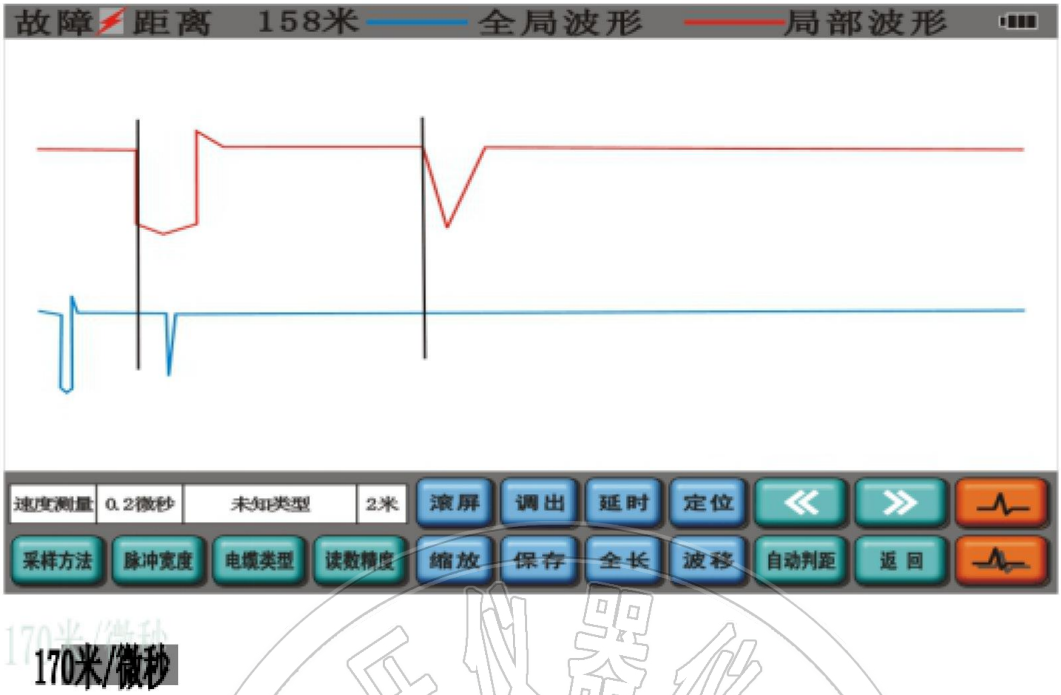
3. 波速测量

不同厂家生产的电缆，尽管型号相同，因为工艺和介质配方的差异，会导致电波传播速度的差异。如果直接使用仪器给出的平均电波传播速度，会造成一定的测试误差。为了更加精确地测试故障距离，往往需要重新核对（测试）该电缆的电波传播速度。

电波测速的方法如下：

A. 首先选一段已知长度被测电缆。如果此次被测电缆的长度为已知，也可以用此电缆进行测速。

 B. 仪器进入设置界面后，按“采样方法”后选择“速度测量键”。 选取适当的采样频率和脉冲宽度。仪器的测量夹子线接在被测电缆的芯线和外皮上。按“电缆长度”键，弹出对话框，填写电缆长度值，按“OK”键。点击“采样”键 ，仪器屏幕将显示低压脉冲开路测试波形，通过游标定位仪器将自动显示所选的电缆的测试速度。




测速时的画面图

3. The wave velocity measurement

Different manufacturer production of cable, although the same type, because the process and the difference of medium formula, can lead to the difference between wave propagation speed. If direct use of the instrument shows the average wave propagation speed, can cause a certain test error. In order to more precisely test the fault distance, often need to check (test) wave propagation velocity of the cable.

Wave velocity method is as follows:

A. first, choose A known length of cable to be tested. If the length of the cable under test are known, you can also use this cable for speed.

B. the instrument enter the setting interface, press the "sampling method" after select "speed measuring key". Select the appropriate sampling frequency and pulse width. The clamp of the instrument is plugged in the conductor of the cable under test and skin. Press "cable length" button,

the pop-up dialog box, fill out the cable length value, press "OK". Click on the "sample" button, open circuit test instrument screen will show the low voltage pulse waveform, through the cursor positioning instrument will automatically display the selected cable test speed.

八．仪器使用注意事项：

1．在进行故障测试前应仔细阅读仪器使用说明书，掌握好操作步骤和仪器的安全接线。

2．本电缆故障预定位测试主机的主要特点之一是无外接电源，设备全部由机内内置电池提供。这给仪器的使用带来很大的方便，提高了安全因素。机内电源电池的状态由荧屏右上方电池电量显示百分比。不足时(大约 10%时)会有声音提示。在每次到现场测试电缆故障时，必须将测距主机的电池电压充足。电池电压充足以后可以保证正常工作 2 小时以上。仪器在使用时可接交流电源进行浮充使用。但是在进行高压闪络测试时，必须与外部交流市电完全断开。

3．仪器属高度精密的电子设备。非专业人员千万不要轻率拆卸。仪器有问题，请及时与经销商或本公司联系。如因人为因素造成仪器损坏，将使你失去仪器保修的权利。

4.使用人员应具备高压设备操作常识，并接受本仪器使用培训。使用中应注意高压防护措施，定期对设备和高压部件检测维护。



## PartⅧ Instrument use notice:

1. Before the fault test instrument instruction manual carefully, grasp the operation steps of the instrument and secure connection.

2. The cable fault location test is one of the main characteristics of host is no external power supply, all equipment provided by the built-in battery inside machine. It brings to the instrument using a lot of convenience, improve the safety factor. Built-in power battery state by the screen top battery percentage. Low (about 10%) will have the voice

prompt. At every time of on-site test cable fault, battery voltage range of the host must be sufficient. The battery voltage is enough after can guarantee the normal work more than 2 hours. Instrument when use can be floating use connect ac power. But when the high voltage flashover test, must communicate with external mains completely disconnect.

3. The instrument is a highly sophisticated electronic equipment. Amateurs don't reckless disassembly. Instrument has a problem, please contact with dealers or the company in a timely manner. Such as equipment damage caused by man-made factors, will make you lose instrument warranty rights.

4. Use the personnel should possess high voltage equipment operation, common sense and accept the instrument used for training. Should be paid attention to in using high pressure protection measures, for detecting equipment and high pressure parts maintenance on a regular basis.

## 电缆仪装箱单 Instrument packing list



| Name and type | Unit | Quantity | Remark |
|---|---|---|---|
| Cable faults test device 电缆测试主机 | Pcs | 1 | |
| 声磁 synchro-location device 定点仪 | Pcs | 1 | |
| Path to the instrument 路径仪 | Pcs | 1 | |
| Current sampler 电流取样器 | Pcs | 1 | |

| | | | |
|---|---|---|---|
| H.V discharge sphere partsH。V 放电球部分 | Pcs | 1 | |
| Audio vibration senso 探头 r | Pcs | 1 | |
| Synchro-receive antenna 天线 | Pcs | 1 | |
| earphone 耳机 | Pair | 1 | |
| Testing wire 测试线 | Pcs | 1 | |
| Connection wire 连接线 | Set | 1 | |
| Discharge bar 放电棒 | Pcs | 1 | |
| Power cord 电源线 | Pcs | 1 | |



全套设备装箱单 A full set of equipment

| Code | Name | Type | Quan. | Unit |
|---|---|---|---|---|
| 1 | Cable faults test device 测试设备 | | 1 | Set |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| | | | | |
|---|---|---|---|---|
| 2 | H.V test maneuvering box 操作箱 | 3KVA/50KV | 1 | Pcs |
| 3 | Alternating current-direct current H.V transformer<br>变压器 | 3KVA/50KV | 1 | Pcs |
| 4 | Impulse capacitor 脉冲电容器 | 2μs /35kv | 1 | Pcs |

（END）