

HZHD-523

Cable Sheath Fault Pinpoint Locator

USER MANUAL

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I. Product overview

With the city network development, many power supply bureau, construction, and even the design institute are first met 110kV XLPE cable, due to time and lack of experience, resulting in many cable outer sheath can't passed withstand voltage test (10kV/1min). At present, the external protective layer mostly uses HDPE sheath material, passed the DC 25kV/5min withstand voltage test before out of factory, the leakage current is less than dozens of μA . Therefore, after the laying of defects mostly by laying, including external damage during filling and covering process. The defects include termite bites; ground box with water; deterioration of the original defects; grounding wire or part moisture penetration insulation resistance decreased and other reasons, sometimes because the cable buried too deep, or the complexity of the situation around buried cable, so that the positioning is very difficult, some defects can't be solved after many years, with the hidden danger to run.

The output voltage of high voltage cable sheath fault detector is 10KV and below, fully meet the sheath voltage test China provisions of the national standard GB50150-2006, including suitable cross interconnected system of cable sheath and preventive test and acceptance test of cable sheath fault location. Fast and accurate detect 10kv-500kv single core and three cores HV and UHV cable sheath grounding fault and leakage current too large and other hazards, At same time, used for DC voltage withstand testing of the 5kv-10kv HDPE and PVC sheath for 1 minutes, it is the necessary equipment using for maintenance of 10kv-500kv single core and three core HV and UHV cables.

II. Feature

Voltage adjustable.

Frequency adjustable.

Over current protection.

Pin-pointing and withstand testing switched by one button ,non blind area. the receiver sensitivity can be adjust.



Signal frequency adjustable, and zero protection.

The test range without blind area

The receiver sensitivity is adjustable

Signal frequency is adjustable

III. Technical data

- a) Power: 220V ($1 \pm 10\%$), 50Hz ($1 \pm 5\%$)
- b) Output voltage: 0~10kV (Square wave)
- c) output current: 200mA
- d) Output capacity: 2kVA
- e) Frequency adjust:Min:0.4Hz,Max:1Hz(range adjustable)

IV. Working principle

1. positioning function

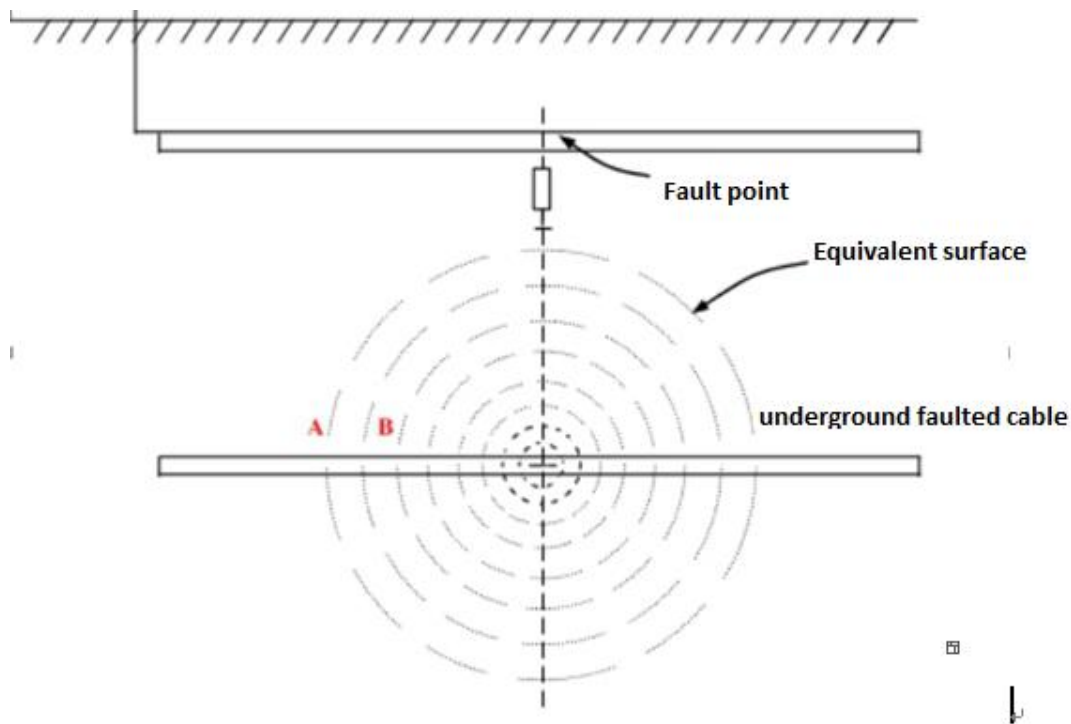
The 220VAC through a full wave rectifier to achieve excellent high-power conversion transform to the required identification special signal, the signal through the connecting line applied on the cable to be located, accurately find out the cable faults by "step voltage method" or "current" measuring method.

1.1. Step voltage method

If the ground fault occurs in a buried cable, we can use the potential difference method to find out the fault point. The method is applied the test voltage between the test point of the fault cable and the ground, and a distributed electric field with a place of entrance is formed around the entrance site of the cable. There is no potential difference at electric field with the same radius at any point, but potential different between two arbitrary points with different radius (A, B points), and when the distance of two points is fixed, the potential difference is more stronger when the two points near to the center.



Using this feature, we can move A, B two points gradually approaching the center point. When the fault point is located exactly between A and B, the potential difference becomes zero. If you continue to move over the fault point, the polarity of the potential difference will be reversed, so moving back and forth can accurately determine the grounding point.



1.2. Current method

When one of tunnel cable get grounding fault, we detect the fault make use of different direction of current before and after faulted point. which method is that boost high voltage signal of impulse to faulted cable , make the fault point discharge, and then it will coming into being opposite polarity current before and after fault point, but the fault point current is minimum.

We can use receiving clamp to detect the fault point according to above principle. Clip the receiving clamp to cable, then receiving box will indicate a direction. When continue to over the fault point, then will get opposite polarity current, such as move



back and forth to accurately judge the grounding point.

2. Withstand voltage function

Switching the function key to withstand voltage function, to get 0-10kV of voltage, and then make withstand voltage to cable.

V. Panel and structure is introduced



The whole picture



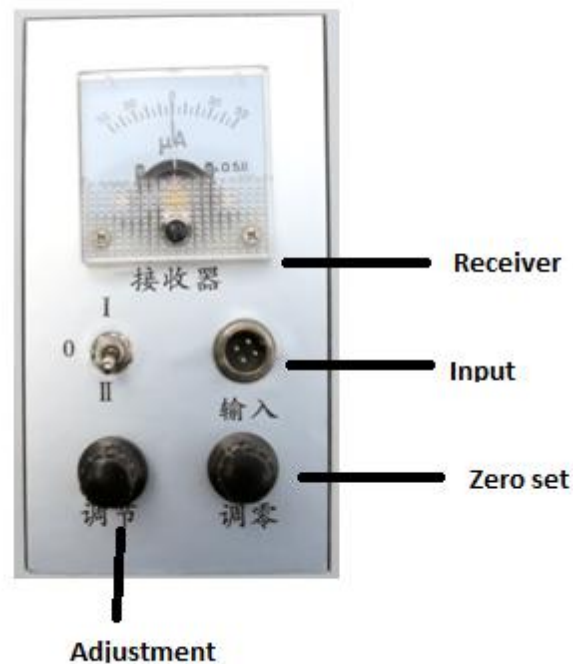
1. Mainframe



- ① HV output terminal
- ② Start light (green)
- ③ Start knob
- ④ Positioning /withstand voltage light(yellow)
- ⑤ Positioning/withstand voltage switchover knob
- ⑥ Voltage output stop knob
- ⑦ Frequency adjustment of positioning mode
- ⑧ Analog voltage meter 10kV
- ⑨ Analog current meter 200mA
- ⑩ Switch AC220V input
- Ⓜ Grounding rod
- Ⓜ Voltage adjustment

2. Receiver

2.1 Panel drawing



2.2 Description

A) Microammeter: the size and direction of index signal

B) Gear switch: “0” means shutdown state

“ I ” be used for test mode of both step voltage and receiving clamp. It’ s suitable for of weak signal testing condition (there is amplifying circuit inside). “ II ” only suitable for step voltage test mode.

It’ s suitable for the strong signal test condition.

C) Input: Signal input terminal

D) Adjustment: adjust rang of input signal.

E) Zero set: adjust signal basis reference under “ I ” mode; No effect under “ II ” mode

3. A frame



4. Current receiving clamp



VI. Instrument operation

1. Mainframe introduction

1.1. Insert read high voltage wire to ① HV output terminal, grounding shall be reliable.



Don' t start up on process of wiring.

1.2. After finishing of wiring, connect switch⑪ to AC220V power supply. Start “⑥ the red light;

1.3. After confirming the correct wiring, checking “voltage adjustment” before start, anticlockwise rotate to confirm zero. Note: No start under no zero.

1.4.Press “③” , then “②” green light, press “⑤” positioning/withstand voltage knob to select working mode. Position mode: “④ yellow ” no light. Withstand voltage mode: “④” yellow light.

Positioning mode is adjustable “⑧ frequency adjustment” knob, adjust voltage output frequency.

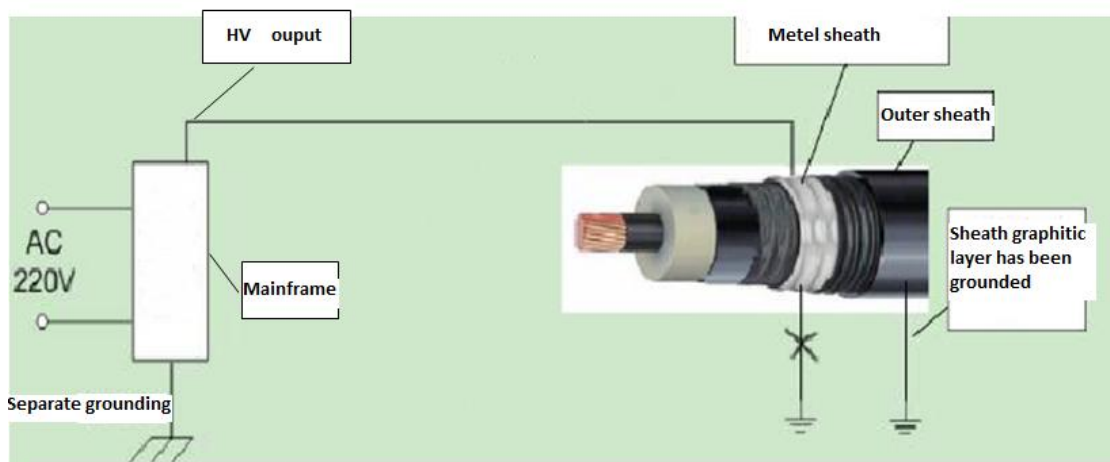
1.5. Clockwise rotate “voltage adjustment” to watch voltage meter and current meter. Note: select correct voltage output.

1.6. After finishing test, anticlockwise rotate “voltage adjustment” to zero, press “⑦ stop” knob, the instrument stop working, then shut down switch.

1.7.Remove test wire only after discharging the high voltage of faulted cable.

Description of cable fault point positioning

Mainframe wiring description as below:



2.1.1 Install A frame, and then connect A frame to receiver by A frame line.

2.1.2 Turn receiver’ s gear switch to “ I ” when weak signal, turn receiver’ s gear switch to “ II ” when strong signal.



Adjust to “zero set” knob under be on “ I ” , to make microammeter pointer to zero. When be on “ II ” , “zero” knob without effect.

2.1.3 Along with cable route, upper pre-location cable, insert A frame probe t underground, watching current size and direction of receiver. Rotate “adjustment” to right place, to make pointer keep proper swing. In case of oversize swing, please rotate “adjustment” knob to reduce swing, oppositely, in case of too small swing, please rotate “adjustment” knob to increase swing.

2.1.4 Keep “adjustment” knob to right place, keep the ordinal position of A frame probe, above the cable route, make away A frame. Watching receiver’ s microammeter pointer, and find out location of polarity change (pointer direction), and then find out this point that pulse signal is “0” , that is fault point.

2.1.5 After finishing test, turn receiver’ s gear switch to “0” , and turn off high voltage pulse signal, discharging cable and capacitor.

Attentions:

- ★ No change ordinal position of A frame in process of moving.
- ★ Considering drop water to A frame in case of too dry ground or cement floor.
- ★ Please detect fault point one by one when more faults.
- ★ In process of test, it’ s not necessarily to pre-locating in case of a short cable distance, it can be pinpointed directly.

2.2. Current method

It suitable for cable sheath fault by equipped tunnel

2.2.1 Connect current receiving clamp and receiver.

2.2.2 Turn receiver’ s gear switch to “ I ” (can be on “ II ” in case of strong current), rotate “adjustment” knob, make microammeter pointer to zero.



2.2.3 Clip current receiving clamp to cable, watching current size and direction of receiver. Rotate “adjustment” to right place, to make pointer keep proper swing. In case of oversize swing, please rotate “adjustment” knob to reduce swing, oppositely, in case of too small swing, please rotate “adjustment” knob to increase swing.

2.2.4 Keep “adjustment” knob to right place, keep direction of current receiving clamp, make away current receiving clamp. In this process, watching receiver’ s microammeter pointer, and find out location of polarity change (pointer direction), and then find out this point that pulse signal is “0” , that is fault point.

2.2.5 After finishing test, turn receiver’ s gear switch to “0” , and turn off high voltage pulse signal, discharging cable and capacitor.

Attentions:

- ★No change primary current direction of A frame in process of moving.
- ★Please detect fault point one by one when more faults
- ★ In process of test, it’ s not necessarily to pre-locating in case of a short cable distance, it can be pinpointed directly.

VII. Attentions

1. Forbidden to touch high voltage connection line and tested cable to avoid hurt people.
2. Don’ t starting up when connect cable, shut down power supply when finishing test.
3. Instrument will stop protecting in case of more than 200mA current
4. Instrument cannot starting when voltage adjustment is not on zero.
5. Please separate rear cover to check 9V battery when receiver are not able adjust to zero.



VIII. Packing list

1. Cable sheath locator mainframe 1 Unit
2. HV output line (black 50kV*5m) 1pcs
3. Power line 1pcs
4. Ground line 1pcs
5. Fuse $\Phi 5 \times 20$ 8A 2pcs
6. User manuals 1pcs
7. A frame & probe 1 pcs
8. A frame connection line 1pcs
9. Current receiving clamp 1pcs
10. Receiver 1pcs