CATALOG

CABLE FAULT LOCATOR

www.cabletestingmachines.com

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TO THE USERS:

Welcome to use the cable fault locator (high anti-interference type). This product is a precision instrument, please don't disassemble it privately to avoid affecting the warranty service. During the test, please do not connect the tester directly to the live cables. In order to avoid strong electricity entering and burning the meter. Keep in mind please! If there are any confusion for operating the tester, please contact the technical support staff in time. Our company will continue to improve this tester, and individual parts of the instrument provided may be different from the description in this manual, without prior notice.

THE STANDARD CONFIGURATION:

1. Cable fault locator……1set
2. Signal generator……1set
3. Test Earphone……1pc
4. Power charger……2pcs
5. Path probe……1pc
6. Leakage probe……1pc
7. Length test line……1pc
8. High Anti-interference cable fault locator user manual
9. (Signal generator connection line...Common to length test)
10. Grounding solder……1pc
11. Instrument bag……2pcs
12. Instruction manual……1pc
13. Certificate and warranty card……1set

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- General Introduction
- Technical parameters
- Working principle
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- Leakage fault test
- Path direction test
- High Anti-interference cable fault locator user manual
- Embedding depth test
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- Simple fault judgment

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GENERAL INTRODUCTION

This tester is mainly used to locate the disconnection, short circuit, earth leakage fault of high and low voltage buried power cables within 10KV level (insulation resistance to ground is less than 0.5 mega ohm), and to detect the depth and path direction of buried cables. It is suitable for street lamp cable maintenance, farm land irrigated ground cable fault investigation and repair, residential property and landscaping belt buried armored irons heat power cable, field power cable, highway, factory and mining enterprises, iron tower communication base station direct-buried power supply cable fault investigation and other industries. Three-channel design,

1. Length test: It can directly test the length of the cable disconnection and short-circuit fault distance in the power-off state.
2. Anti-interference channel: adopts high-performance filter anti-power frequency interference circuit, and cooperates with the signal generator to locate directly in the power-off state The location of the buried cable's leakage current to the ground, and the measurement of the direction and depth of the buried cable path.
3. Full-band channel: Use the probe to test the location of the minor leakage fault of the directly buried low-voltage cable to the ground under the power-on state. It is a powerful tool to shorten troubleshooting time, improve work efficiency, and reduce the labor intensity of line maintenance personnel.

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TECHNICAL PARAMETER

- Comprehensive tester distance and length test:
- Test range: 8000 meters (can customize)
- Test blind zone: 0 meters
- Test resolution: 0.5 meters minimum
- Pulse width: 96ns-10μs automatic adjustment
- Test method: automatic test, manual analysis, two me thodsare available Leakage and path positioning of integrated tester: Leakage fault: Leakage insulation resistance range0—0.5MΩ
- Test error: no more than 1 meter
- Cable depth: no less than 3 meters
- Detection range: 8000 meters
- Path accuracy: no more than 0.2 meters
- Signal generator (true color display): Signal output: 1KHZ adjustable Multi meter function: AC and DC voltage:
- Insulation resistance: Cable loop lock resistance:
- Host volume: 220*160*90 (W*D*H, mm)
- Weight : 2 Kgs approx

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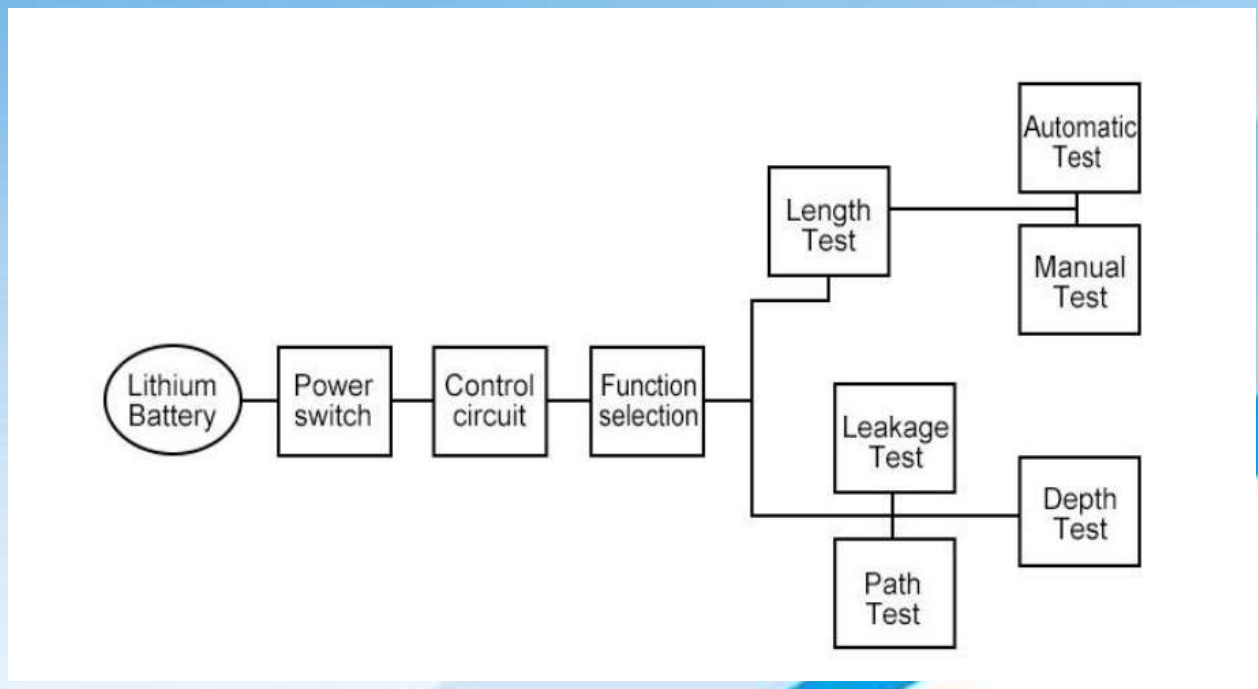
WORKING PRINCIPLE

The working principle diagram of the instrument is as follows:



This instrument uses advanced integrated circuit technology, cutting-edge calculation methods, simple circuit structure, high reliability, and low misjudgment rate.

Features

1) The delicate screen of the 480*800 large screen true color mobile phone can be clearly distinguished in the sun.
2) With its own data interface, supports remote upgrade.
3) 3) Adopting ARM CPU and FPGA technology can quickly and accurately determine the fault waveform

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4) Waveform comparison function, especially suitable fortesting and positioning of low back-end voltage failure caused by oxidation at a certain point of the line.

5) The simple corresponding function keys are easy to learn and operate.

6) High-energy lithium battery, the working time canreach6-8hours.

7) The signal generator comes with a multimeter function to facilitate testing of voltage resistance and insulation. Panel description The instrument is a vertical structure, which is convenient for operation and observation. The panel integrates all the control, operation and display information

PANEL DESCRIPTION

The instrument is a vertical structure, which is convenient for operation and observation. The panel integrates all the control, operation and display information.

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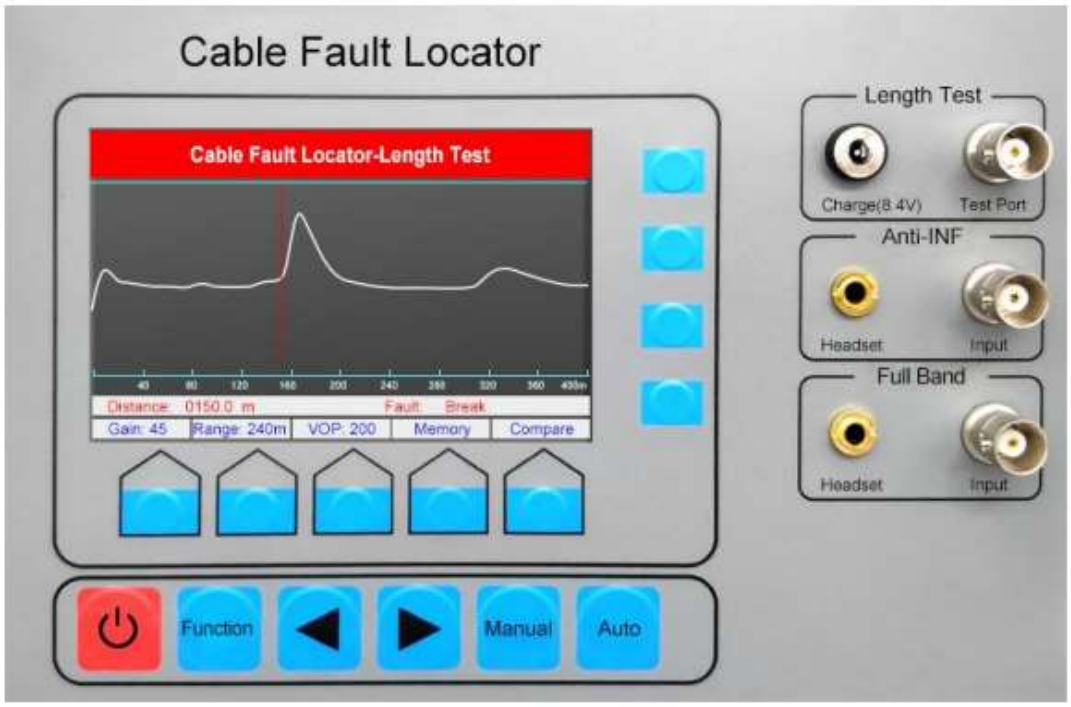

Cable fault locator panel

① Switch key: the power switch key of the instrument (long press to turn on, short press to turn off)

②Function key: switch length test, signal receiving interface.

③◄ and ►: add and subtract parameter values, move the cursor.

④Manual key: manually analyze the wave form during the length test.

⑤Automatic key: automatic intelligent test without manual parameter setting.

⑥Test port: connect the black and red clip length test Cable Charging port: power charger socket.

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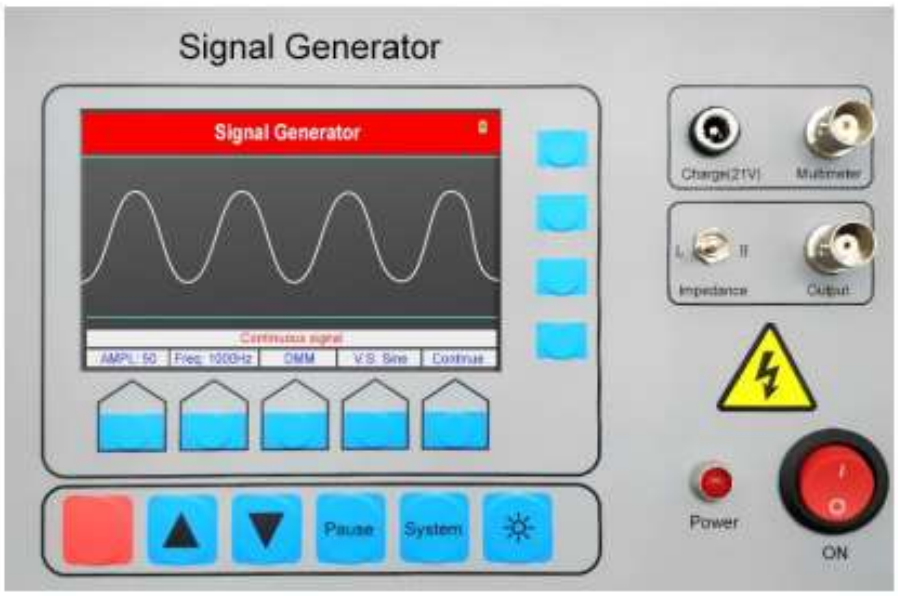
⑧Headphone: headphone jack.

⑨Anti-interference channel: cooperate with signal generator for path and leakage fault location test.

⑩Full-band channel: used to test for minor earth leakage faults

⑪ No word key: Corresponding to the function of the corresponding position on the display screen.

Note: Do not connect the length test line when the cable is live, so as not to burn the tester!



Signal generate panel

⑫Switch key: the power switch of the instrument (long press to turn ON, short press to turn OFF)

⑬◄ and ►: add and subtract parameter values, adjust signal

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⑭Pause key: signal transmission and stop

⑮System key: can view information such as version number.

⑯ Energy-saving key: turn off the screen brightness to save power to the greatest extent

⑰ Output port: connection line interface.

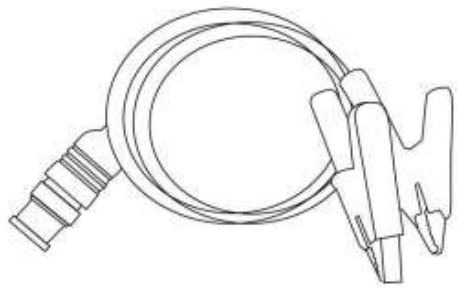
⑱Charging port: charger socket

⑲Multimeter: used to test the voltage, resistance, insulation and other parameters of the circuit

⑳No word key: Corresponding to the function of the corresponding position on the display screen.

Note: Do not connect the signal output line when the line is live, so as not to burn the machine!

Main accessories



Test connection line: connect to the test port of the tester, two clamps respectively clamp a line to be tested, regardless of positive or negative. In the length test state, the disconnection and short-circuit length test is carried out.

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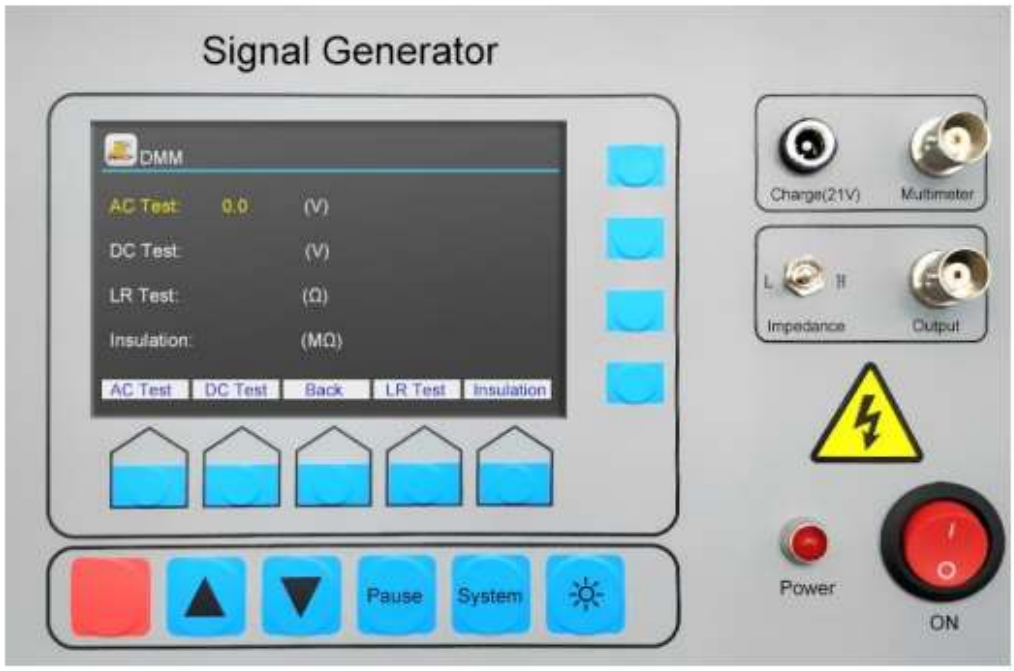
Path test probe

Leakage test probe

Fault type screening



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Before detection, it is necessary to know the nature of the fault line. Connect the cable to the multimeter port of the signal generator, press the corresponding multimeter button on the screen to determine the fault type and the fault line by measuring the insulation resistance and other indicators. Cable faults types can be simply divided into the following:

● Disconnection: One or more core of the cable are break, and there is no power at the back end (phase loss). Use the length test method to quickly test the length of the broken wire.

● Short circuit: also called mixed line, it means that the phase line and the phase line are fully connected between the phase line and the armor. The resistance value of the multimeter is very small. Use the length test method to quickly test the length of the short circuit.

● Leakage: The leakage detection method of this tester can be used to locate the fault point if the relative armor leakage and the relative ground leakage insulation resistance of the cable are within 0.5M. If the operator know the line direction and fault conditions, will help to quickly find the fault point. When a cable fails, comprehensive consideration should be given to the time of the failure, the scope of the failure, the environment where the cable is located, the location of the joint and the manhole, the impact of weather and possible problems, etc. This make sit easy to find the point of failure quickly

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CABLE FAULT TEST METHOD

1. Disconnection and short-circuit fault length test.

(1) Automatic test length for disconnection and short circuit fault

Test in the power-off state: first untie the test head of the faulty cable to be tested and hang it in the air, clamp any one of the red clips and black clips of the test line on the disconnection fault line, and the other clip clamps the other line in the same cable, regardless of positive and negative, directly press the "Auto" key of the tester. The type of fault and the distance in meters are displayed at the bottom of the screen. When testing the aluminum wire, press the automatic test and the mixed line appears to be 0 meters. Press the button corresponding to the small secondary pulse icon in the lower right corner of the screen in the nearest range covering the total length of the line.

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(2). Manual length test for disconnection and short circuit fault.

When the line condition is complicated and the automatic test fails to find the correct fault point, manual testing is required. First untie the test head of the faulty cable and hang it in the air, clamp the red clip or the black clip on the fault cable, and the other clip clamps the other line in the same cable. Press the "Range“ key and the "◄►" key to gradually change from small to large, until the full length of the cable can be seen. Press the "Gain" key and the "◄►" key to adjust the gain size(the wave form should be as large as possible but not to exceed the screen), press the "Manual" key, press once to test once, and the "◄►" key will move the cursor to the left of fault wave form, then can check the displayed test value. If it is not easy to confirm the fault waveform, can test the faulty wire pair first, press the "memory" button to memorize the current test waveform; then do not change any parameters. Replace the test clip with a good pair of wires in the same cable, press "Manual" key; then press the "Compare" key again, the two wave forms will be displayed at the same time. The place where there is obvious difference between the two wave forms is the location of the fault point. The "◄►" key will move the cursor to the bifurcation point to display the fault point distances. Then combine the detected line path to find the fault location.

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3. SEVERE LINE OXIDATION CAUSES LOW BACK-END VOLTAGE FAULT TEST

The waveform comparison function is especially suitable for testing and locating the back-end voltage fault caused by oxidation at a certain point of the line. First untie the test head of the faulty cable and hang it in the air, clamp the red clip or black clip on the fault line, and the other clip clamps the other line in the same cable. Select the test range: press the "range“ key and the "◄►" key to gradually change from small to big, until the full length of the cable can be seen. If the amplitude of the reflected pulse is too big or too small, press the "Gain" key and the "◄►" key to adjust the gain as big as possible, press the "Manual" key and the "Memory" key to memorize the current test waveform; Then do not change any parameter, replace the test clip with a set of good wire pairs, and press the "Manual“ button; then press the "Compare" button, the two waveforms will be displayed at the same time, and the place where the two wave forms have obvious differences is the point of failure. The"◄►" key moves the cursor to the position of the bifurcation point, that is the fault location distance. Then combine the detected line path to find the fault location.

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4.The cable to the ground and armored iron sheet leakage fault test

1. Serious leakage (insulation resistance is within 0.5 megabytes) test method

First, find the most serious ground leakage fault cable through multimeter in the signal generator.

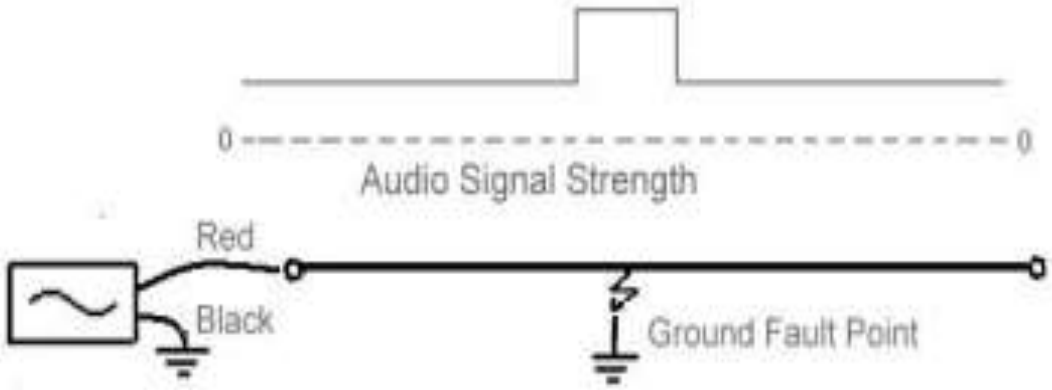

Figure 2-1 Cable relative to the ground fault (leakage to the ground)

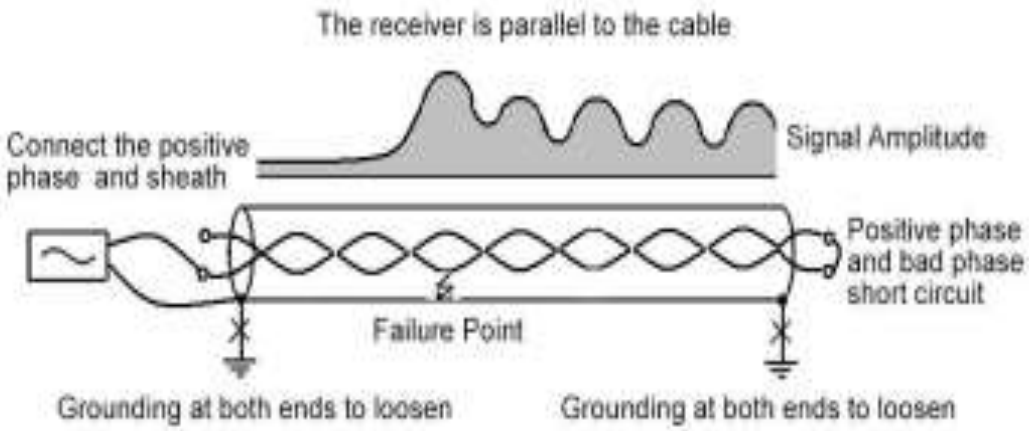

Figure 2-2 Leakage of cable to armored iron sheet

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As shown in Figures 2-1 and 2-2, untie both ends grounding of the neutral wire and ground wire of the low-voltage cable and test in the power-off state: Connect the probe to the anti-interference channel, the earphone corresponds, and pressing "Function" key to enter the signal receiving interface can display the signal changes synchronously. The signal generator output is wired as shown in Figure 2-1 when the earth leakage fault occurs, and the signal generator output is connected as shown in Figure 2-2 when the armor leakage fault occurs. Use the probe (the two rods are separatedby0.5-1meters) from the proximal end of the signal generator todetectthe ground closely, and gradually move the detectiontothefarend. The location with the strongest signal is the groundfault point. Use the probe to detect from the near end of theannunciator close to the ground, and gradually movetothefarend for detection. The signal before the fault point islarge, andthe signal attenuates significantly after the fault point. Thesignal change position is the fault point. The probeissuitablefor the detection of leakage faults of cables buriedunder concrete and wires in home walls. When using anti-interferencechannels, the signal generator must select 512Hz sinewavehigh anti-interference signal to cooperate with detection.

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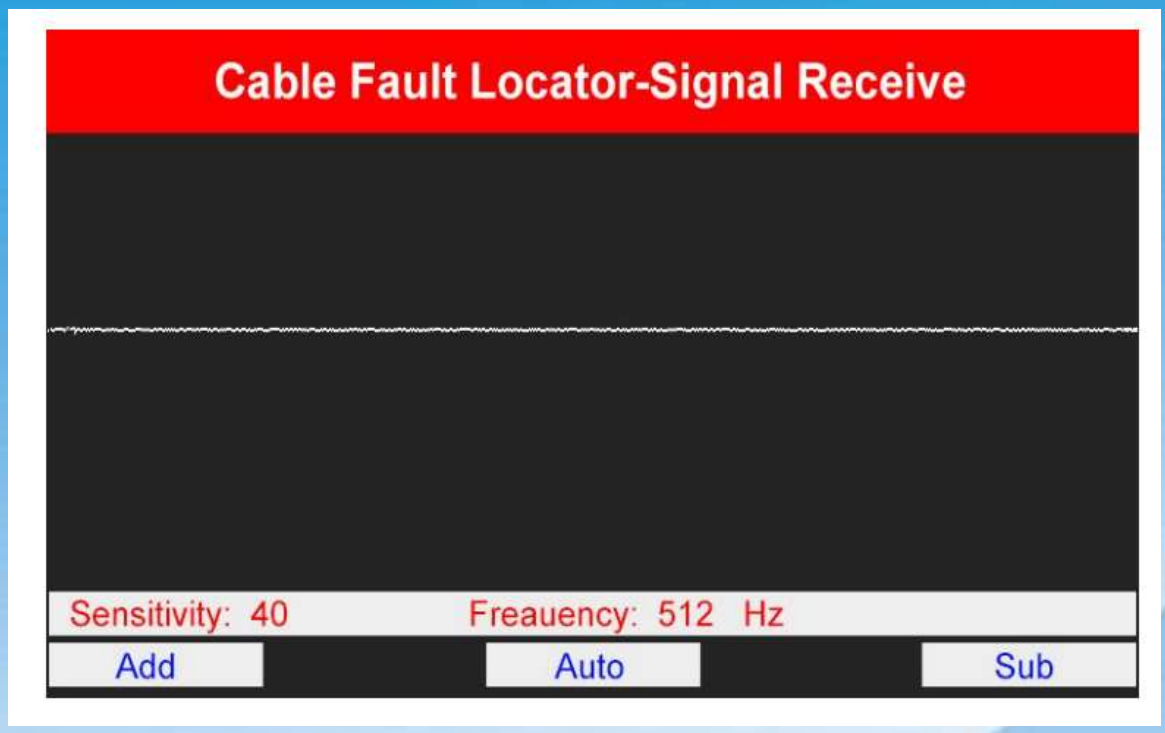

When detecting with the probe, should turn down the earphone volume, better the earphone has just heard a clear signal. If the volume is too high, the range of the dumb spot will be widened and the identification is not obvious enough. The probe point of maximum signal is the fault point, and the point where the signal changes from big to small when the probe is the fault point.

Note: It is very important to choose the location of the signal generator for the characteristics of one main line and multiple branch lines of rural power. In order to expand the effective detection range, select the playback point and search in sections. For example, there are three cables A, B, and C, and when detecting B, the sound should be sent from end B to end A. If the sound is sent on end A, the signal current will be shunted by the A and C cables (as shown in the figure below). And so on. or disassemble the connector at point A to determine which branch cable is faulty, and then test the cable in the corresponding direction. Be sure to remove the cables from the power distribution box before testing.

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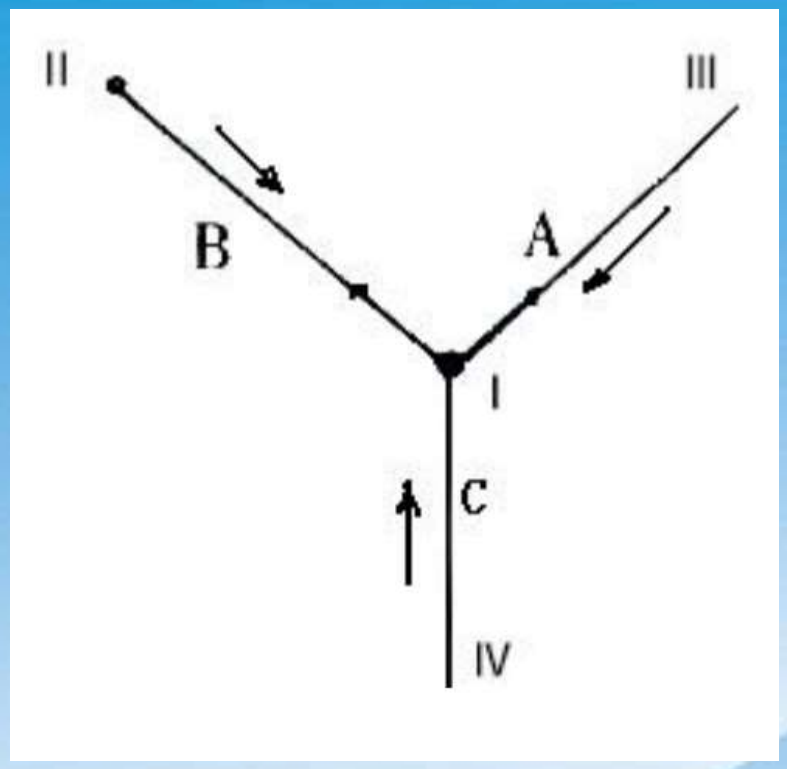

2. TEST METHOD FOR LOW-VOLTAGE CABLE TO GROUND LEAKAGE UNDER THE POWER-ON STATE OF THE CABLE

First before detecting, it is necessary to find out the natureof the leakage fault cable. If it is only insulation damage that leaks to the earth, the cable is not short-circuited, not broken and not trip, and the line can be conventionally transmitted; If the cableis short-circuited and leakage or the line to line simulation is normal, some cables is broken and leakage, all lines (three-wire or four-wire) of this road can be connected in parallel and single-phase power is sent to the cable. Just carry the cable fault locator, connect the two probes to the full-band channel earphones, and press the "function" button to enter the signal receiving interface. The receiving circuit starts to work. Touch the two probes for few times, meanwhile, the ear phones with rattle should be heard inside, and the machine is normal. Take a probe rod in one hand and follow the direction of the buried wire for ground penetration detection.

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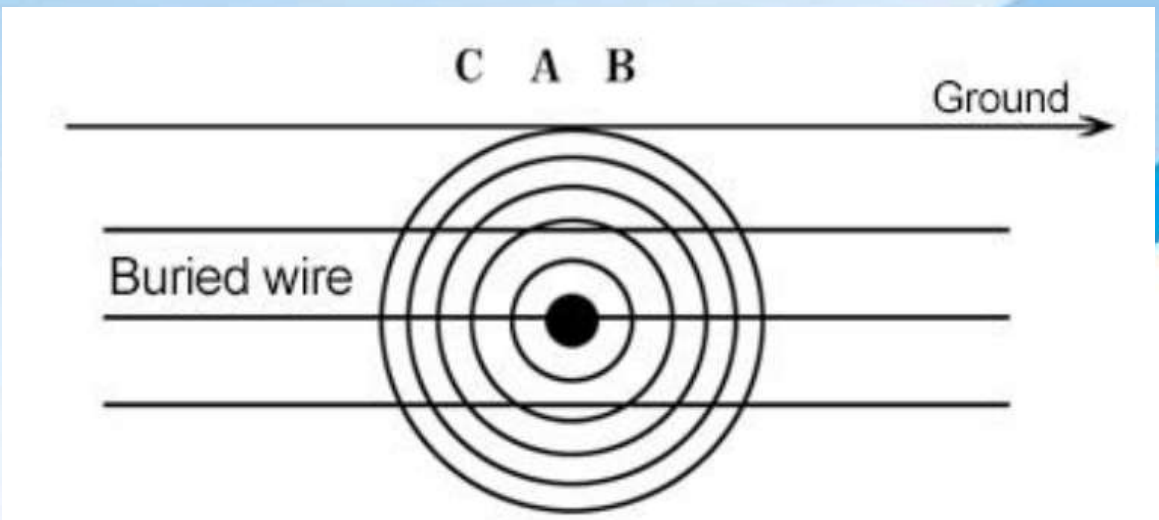
Detect from one end to the other end above the buried cable, and walk slowly forward. If the cable with good insulation to the ground, the earphone is basically silent. When the fault point (C) is approaching, the banging sound gradually increases from small to big. At the fault point (A), the sound is the loudest, when it crosses the fault point to (B), the sound changes from loud to silent, and then can return to the place where the sound is loudest (A), this point is the leakage fault location.



In order to improve the accuracy, when detecting the fault location, the detection rod should be as far as possible to reduce the area of the grounding point.

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5. (1) DETECTION OF BURIED CABLE PATH DIRECTION (UNCHARGED CABLE)

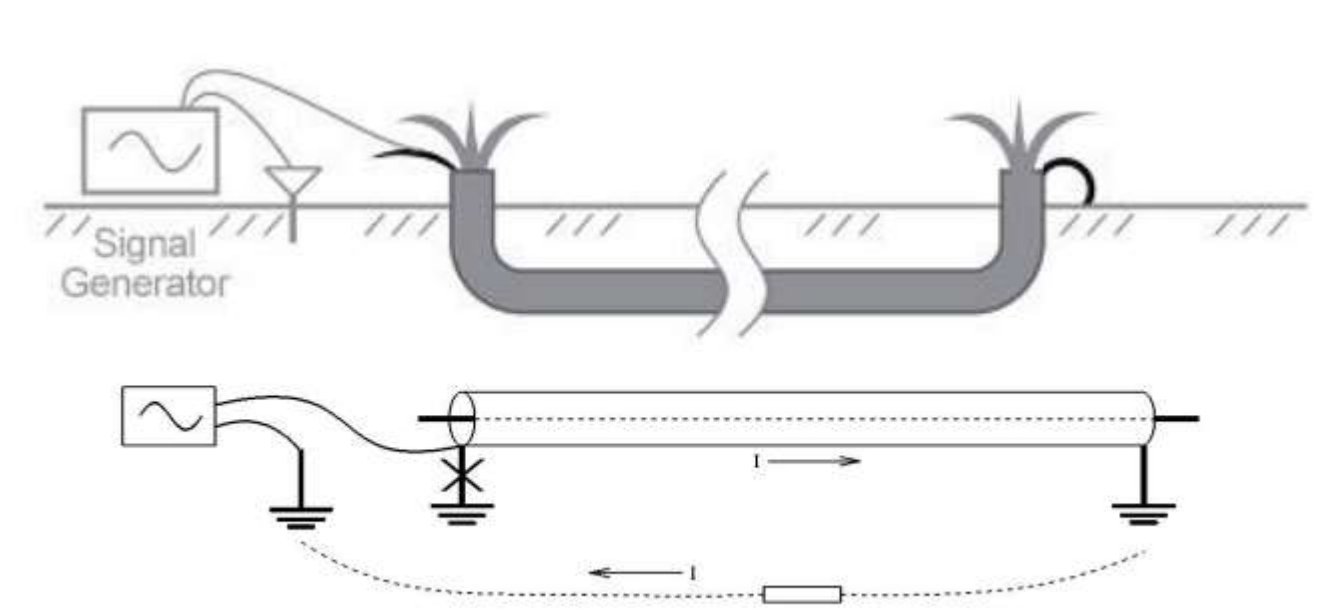

Figure 5-1-2 Sheath-ground connection method

As shown in the figure, untie the ground wire of the armored sheath at the proximal end of the cable, and also untie the grounding of the neutral wire and ground wire of the low-voltage cable. Keep the cable sheath at the opposite end grounded. The red alligator clip of the generator is clamped on the outer armor, and the black alligator clip is clamped on the grounding brazing drilled into the ground (no grounding net is allowed),and the phase wire of the cable remains suspended. There is no shielding in this connection, so the signal generated on the ground is the strongest, and the signal characteristics are relatively clear. For the signal blocking caused by the discontinuity of the outer armor, the remedy: the red clip clamps the outer armor and a good core wire together

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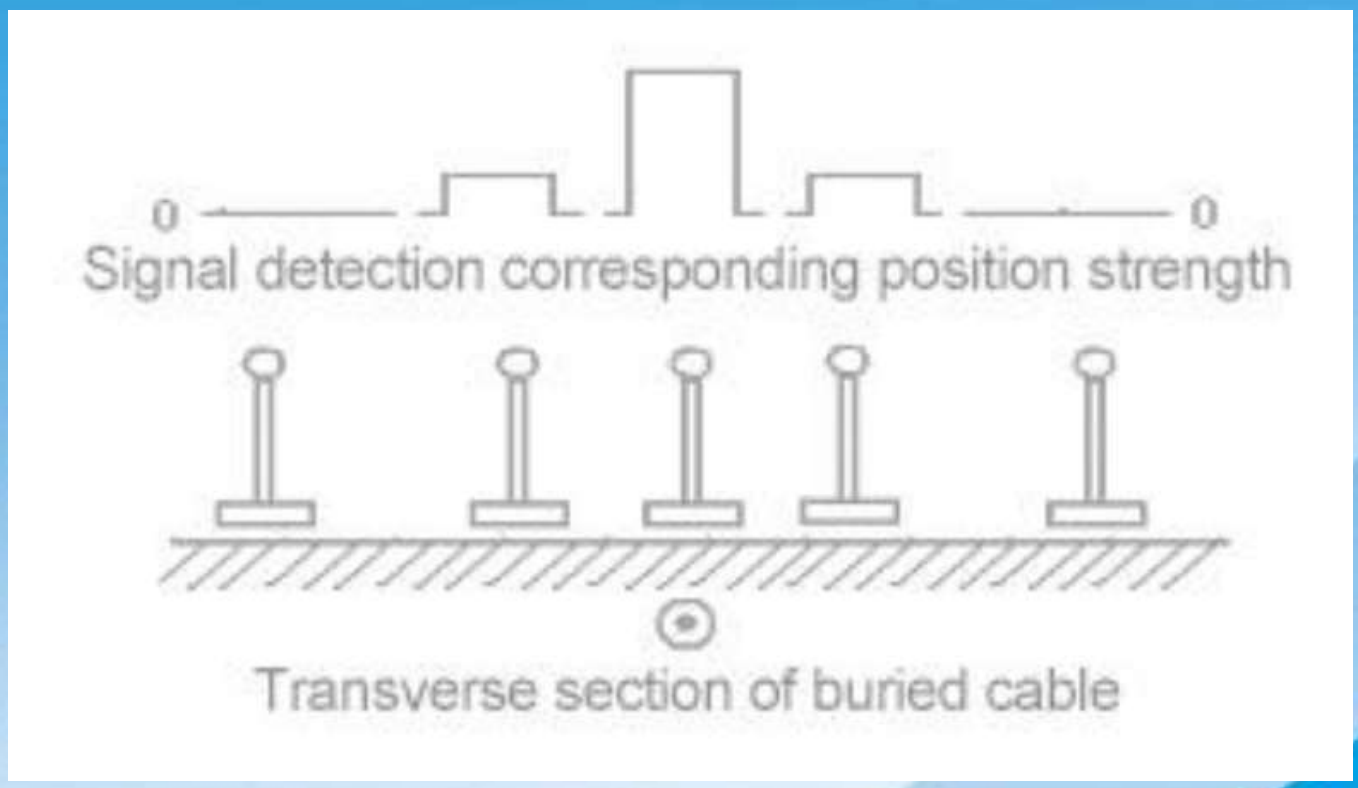

Connect the probe to the earphone of the anti-interference channel and press the "function" key to enter the signal receiving interface to display the signal change synchronously. As shown in the figure above, when the probe and therefore in a T shape, the position where the sound is loud is the position oft the cable; when the probe and the rod are 0 degrees perpendicular to the ground, there is no signal directly above the cable, and the signal on both sides of the cable direction is strong; the sensitivity is adjusted during testing. The two methods are used in combination to achieve an ideal test effect when finding the route of the l ine.

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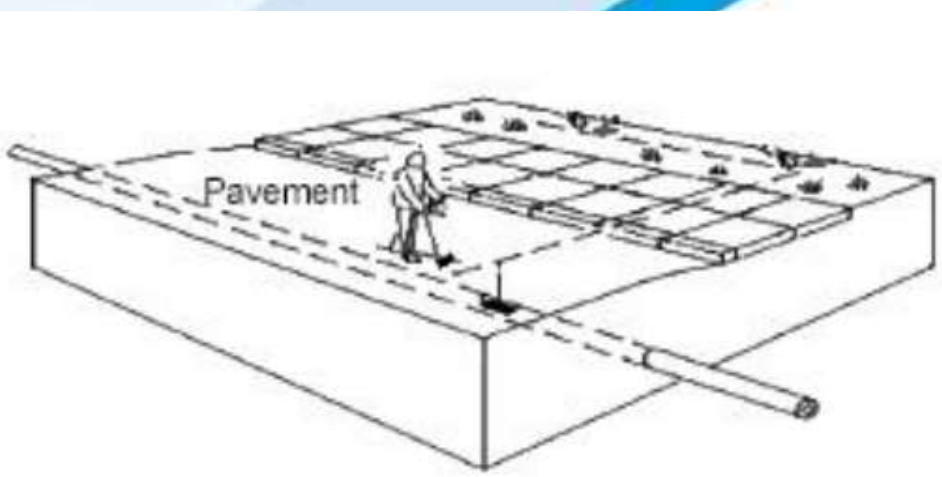
(2). Detection of buried cable path (live line)

(3) Only need to use the tester, connect the probe to the full frequency channel, the earphone corresponds, press the "function" button to enter the signal receiving inter face and the receiving circuit starts to work. With the black round head in your hand, the probe is close to the ground and sweeps across the ground, similar to mine detection. When there is a live cable under ground, there will be a strong power frequency hum in the earphone, and the corresponding signal will be weaken edif it deviates from the cable. In order to determine whether there are live cables and the location of live cables underground.



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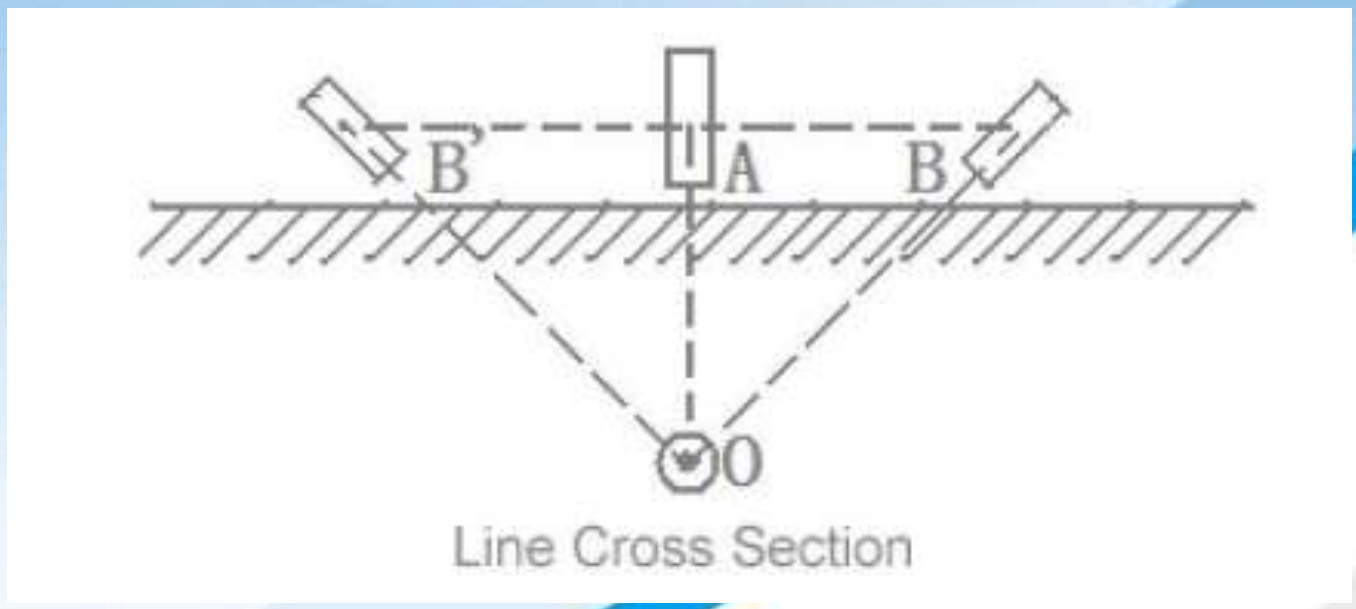
6. TEST METHOD OF THE BURIED CABLE DEPTH

Connect the red clip of the signal generator to the grounding solder of the black clip of the test cable, and the opposite end of the cable to be tested is grounded. (The connection method of path detection)



Line Cross Section

Connect the probe to the anti-interference channel, the earphone corresponds, and press the "function" key to enter the signal receiving interface to display the signal change synchronously. The probe and the rod are perpendicular to the ground at 0 degrees and move slowly and laterally directly above the cable under test to find the ground position A of the sensing probe when the sound is the smallest; then place the sensing probe at a 45 degree angle to the ground (vertical to the direction of the cable) . Move left or right along the cable to find the point B or B' on the ground when the noise is the smallest, and measure the length of AB or AB'. AB or AB' is equal to the buried depth AO of the cable.

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Cable wave speed reference value

Type of insulator	(speed m/us）
High molecular polymer	168－186
Filled polyethylene	192
Polyethylene	201
PTFE	213
Pulp（0.13uF/Km）	216
Foamed polyethylene	246
Paper（0.117uF/Km）	264
9.5mm Coaxial（w）	286
9.5mm Coaxial（s）	295
Copper core power cable	172
Aluminum core power cable	204

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Modify the VOP

Take certain length of cable that should know the actual length(the same as the cable to be tested, about 50-100 meters in length), press the automatic key, the tester will display a broken wire length, then press the corresponding key of the wave speed, and use the ◄ and ► keys to adjust the VOP. When the speed makes the displayed length equal to the actual length, the wave speed at this time is the VOP of the test cable.

Charging instructions

1. The instrument displays the current battery capacity on the screen top right corner. When the battery voltage is low, please use the supplied special charger to charge the instrument.
2. When charging, the indicator light on the charger is red. When the indicator light changes from red to green, it means charging is complete.
3. The charging time is about 4-5 hours.

Notes

1. Avoid direct sunlight to the instrument panel, because when the liquid crystal is higher than 60°C, the contrast will become poor and even unusable; when the temperature is lower than60°C, it will naturally recover.
2. Before the test, better to measure the voltage between the cables to be tested to avoid measurement errors or burnout the meter.
3. Be careful not to directly hit the LCD panel with hard objects to avoid damage .

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SIMPLE FAULT JUDGMENT

If the following situations happened, users can make simple judgments.

1. **When proceed the length test, the broken wire length is always displayed as 0 meters.**

Reasons:

① The tested cable is not connected properly.

②The test cable is broken.

③The tester is problem. Judgment method: Be sure that the test cable is in good condition, test the two clips without connecting to the cable and shows breaking at 0 meters. If the two clamps of the test line are short-circuited and the test shows that the mixed line is 0 meters, it means that the tester is working well, otherwise contact the factory for after-sale service.

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1. The instrument could not be turned ON

Reasons:

① The battery has run down.

②Instrument problem.

③ Battery over current protection Judgment method: when the charger is not plugged into the meter, the light is green. When charging, it is red, indicating that it is charging normally. If it turns green for a short time, it means that the battery is broken (except new instrument); If the instrument could not be turned on after full charging, usually caused by the short-circuited over current protection When plugging and unplugging. In this case, plug the charger again and it will be normal; otherwise, contact the factory for after-sales service. This instrument is a precision instrument. When had fault, the user shall not disassemble and repair it without authorization to avoid further damage to the instrument. Please contact us as soon as possible.

TEST EXPERIENCE

1. The length test error of the aluminum wire disconnection and short circuit fault:

The problem with the length error is the VOP value not correct.

(1), VOP calibration: take the same material as the test cable and the length of the cable is within 50-100 meters. If the measured cable length is different from the actual length, select "VOP" and "◄►" key to adjust the VOP speed until the displayed value is equal to the actual length of the cable, and the VOP value at this time is the actual VOP of the cable. Reference: Copper wire—172; Aluminum wire—204. (Better to calibrate actually)

(2). If don't want to calibrate the VOP but still need a exact distance, enter the following formula through the test values at both ends of the cable: the actual total length of the cable is L meters; the test result of the A end is m1 meters; the test result of the B end is m2 meters; the accuracy from the A end Distance={m1/(m1+m2)}*L.

Then find the fault location according to the detected line direction. This method has been verified in practice.

(3). Whether the tested disconnection and short-circuit wave form is correct or not: the fault wave form is the largest among all the wave forms on the screen.

2. Attention in length test, path test, and leakage test.

(1). The length test can only be used for measuring the two cables, or one cable and one armor cable; It cannot be tested on the earth. The length test can only measure the distance at the point where the cable is disconnected or mixed (short-circuit), and cannot measure the length at the leakage point. Remember! ! ! (2). Path test: Mainly test the path of the cable(that is, the direction of the cable under the ground). Connect the red clip of the signal generator to a good wire (if there is an armor, the core wire armor is connected in parallel and then one is connected to the red clip) and the black clip is clipped to the ground and brazed to the ground. The part connected by the red clip at the other end of the line must be grounded, which just forms a loop; Note that the original grounding wire of the cable must be disconnected. The probe is similar to mine detection, there is a signal above the cable, and there is no signal when it deviates.(3). Leakage test: Mainly test the leakage of the core wire to the ground and the leakage of the core wire to the armor.

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Anti-interference channel: When detecting with a probe, the volume should be turned on as low as possible, so that the earphone can get a clear signal. If the volume is too large, the range of the dumb point will be widened and the discrimination is not obvious. The maximum signal is the fault location; When the signal is probed, the point where the signal changes from big to small is the point of fault. The detection effects of the two accessories are exactly opposite, so pay attention to distinguish them.

(4). When using the anti-interference channel, the signal generator must select 512Hz sine wave high anti-interference signal to along with detection

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