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Cable Fault Location and State Detection Specialist

Power Cable Fault Location & Cable State Detection

Hangzhou Bete Equipment Manufacture Co., Ltd.
Professional technology makes the cable fault location much easier. Cable fault location process is generally divided into five steps:

1. **Check the type of fault:** Before locating the fault, the type of fault should be checked with a mega meter and a multimeter. Measure respectively the insulation resistance of each cable phase core to the earth and phase-to-phase, and do the conductor connectivity test.

2. **Fault pre-location (also called rough test):** Because no matter what method used, the measured value represents only the cable (fault) length under the earth. Due to the reserved length under the earth cannot be accurately estimated, this length cannot represent the distance on the ground. Therefore, cable fault test cannot complete in one step, only to test out the approximate range of the fault point.

3. **Cable path location (if need):** For old cables for many years or cables with incomplete information of cable path, T2000 intelligent cable locator is applied to trace the path of related cable, which is helpful to pin-point the cable fault.

4. **Pinpoint:** It is a critical step for cable locating, which helps to reduce excavation range and labor intensity and get precious time for repair. Locate the cable fault on the basis of complete certainty of cable path (direction). By applying shock high voltage to cable (or HV impulse), discharging acoustic wave from fault point, magnetic and acoustic synchronization method or step voltage method is applied to accurately locate the fault within the range of fault distance in the rough test.

5. **Cable identification (if need):** If the cable fault is found, but it cannot identify which one is the fault one from the surface after digging out, don’t cut the cable hastily. Only cut after identifying the fault cable with cable identifier.
About us

Tanbos concentrate on the cable fault location and condition monitoring, and strive for being the testing expert of underground pipeline network. With advanced technology, easy operation, intelligence and durability, Tanbos popularize rapidly in different areas, electric grid, railway, metro, power generation, nuclear power, wind power, airport, and gain praises from our users. It provides professional technical solutions for power cable running, testing, construction and installation and experiment.

1. Cable Fault Location
   Power Cable Main Insulation Fault Location
   T32 Intelligent Cable Fault Location System ................................................................. 01
   T20 Cable Fault Location System .................................................................................... 03
   T8 Low Voltage Cable Fault Location System ................................................................. 05
   LB4/60 Intelligent Digital Cable Fault Location Bridge ..................................................... 07
   LB15 Cable Fault Location Bridge .................................................................................. 09
   BS60/500 DC Withstand Voltage and Constant Current Burnt Through Power ................ 10

   High Voltage Single-core Cable Outer Sheath Fault Location
   TM10 Cable Outer Sheath Fault Location System ............................................................ 11

   Overhead Line Fault Location
   XHKJ-1000 Overhead Line Fault Location System ......................................................... 12

   Railway Signal Cable Fault Location
   ST-10 Railway Signal Cable Fault Tester ........................................................................ 13

2. Underground Cable and Cable Location
   T3000 Cable and Pipe Locator ......................................................................................... 14

3. Cable Identification
   HCI Cable Identifier ......................................................................................................... 15
   ECI Low Voltage Cable Identifier .................................................................................. 16
   AI-100 Intelligent Transformer and Phase Identifier ...................................................... 17

4. Cable State Detection and Diagnosis
   TV10 DAC Situation Detection Location System ............................................................ 18
   Online Distributing Network Fault Location System ...................................................... 19
   VLF-40kV 0.1Hz Cable AC Withstand Voltage Test System ............................................ 20

5. Cable Fault Test Van .................................................................................................... 21

6. Tanbos Cable Fault Location Training Center ............................................................. 22

7. Technical Date ............................................................................................................. 25
T32 Intelligent Cable Fault Location System

Introduction

The most international advanced tech—stable arc reflection method, and set HV impulse, DC withstand test, burn through in one, mainly used in 380V-500kV cable’s major insulation fault shooting. Powerful current will burn through the fault in a short time, making knotty high-resistance fault location easier. New intelligent digital HV voltage drop technology and intelligent voltage bridge technology, easy to locate stable and water-in knotty high resistance fault, etc. New generation intelligent time-different technology and cable path bearing tech make pre-location and pinpoint faster, more accurate and effective.

Features

- Design: portable trolley, built-in system from Germany, suitable for wild application
- Functions: withstand voltage test, HV impulse, burning
- Strong output: 0~32kV/1800J/1000mA
- Sampling frequency: 200MHz
- High accuracy: 0.4m

Strong power to burn through

- Output voltage up to 60kV
- Output current up to 600mA
- Quickly change knotty high resistance fault into low resistance

Pre-location technology

- Intelligent digital bridge location technology: one button operation, no need to check the waveform or calculate, show the fault distance in number directly.
- Intelligent voltage drop method: avoiding to be interfered by induced voltage of single-core cable, and it’s more effective to single-core cable’s sheath fault location.
- Intelligent digital bridge method: very effective to water-in intermediate joints, damping knotty stable high resistance fault.
- Sectional area method: input the cable’s sectional area, can also show the distance of fault quickly and effectively.
- Stable arc reflection technology: automatically recognize fault point, ends of cable and show the distance of fault.

Pinpoint technology

- Intelligent time-different technology: show the time difference between fault and test place in number, faster and more accuracy.
- Cable path tour gauging technology: show the cable’s position visually, ensure the instrument always right above.

T32 on-site application

- Wiring for Single Phase Grounding Fault
- Intermittent time-different: the smaller number, the closer to the fault
- Left/right arrow: show cable’s position visually

Show the fault point’s distance directly
Stable arc reflection method: automatic point the fault
T20 Cable Fault Location System

Introduction
The first product puts creative remote positioning system in cable’s location in the world, which mainly used 0~30kV cable major insulation fault shooting. Under the monitor 24 hours working and special technology, making fault location faster, safer, more convenient and effective.

Features

Appearance: elegant, lightness, potable, integration
- Elegant: trolley case from US PALICAN.
- Lightness: not over 25kg.
- Potable: trolley case, integrated design.
- Integration: set capacitance, controller, voltage booster, rectification and recharge equipment in one.

Safety
- HV output line with special insulation, withstand voltage up to 60kV.
- With “emergency” button, further improved the safety of operation.
- Multi-safety protection, HV starts from 0, automatic release the capacitance after power off.

Pre-location test method
- LV impulse method: applicable to locate low resistance fault, open circuit fault, total length and intermediate joint.
- Impulse current method: current coupler gathers signal from ground line, applicable to locate high resistance and flashover fault.
- Second-impulse method: high precision, simple waveform, easy analysis, applicable to locate high resistance and flashover fault.

Intelligent time—different location technology
- High accuracy: free from traditional sounding method--- only by listening the sound has big errors and interference, T20 combines with digital time-difference technology.
- Easy analysis: overcome the difficulty that user must be very experienced with waveform.
- Intuitively: show the time difference between fault and test place in number, easy to judge, which makes pinpointing faster and more accuracy.

With the time-difference smaller, the handler is closer to the real fault place.

Locate the intermediate joint distance: 394.4m

Classic impulse current method: flashover distance: 646m

Second-impulse method: high resistance distance: 97.8m

Locate the intermediate joint distance: 394.4m
T8 Low Voltage Cable Fault Location System

Introduction
Although low voltage cable and distribution cable have relatively low voltage, the fault's location is more difficult than HV cable because of the larger quantity lines and bad environment. Because of common HV surge generator's high output is over the max withstand voltage of LV cable, which is very easy to cause new faults. T8 overcomes this problem effectively. The max output is 15kV, but max impulse energy up to 500J, which can protect the LV cable and make the recharge sound loud enough.

Features
Appearance: elegant, lightness, portable
- Elegant: trolley case imported from US PALICAN.
- Lightness: not over 25kg.
- Portable: trolley case, integrated design.

Humanized design
- Big capacity: 10μF super big capacitance, recharge energy up to 500J.
- Multifunction: DC withstand voltage test, once impulse, period impulse.
- High safety: HV starts from 0, “emergency” button.

Pre-location test method
- LV impulse method: applicable to locate low resistance fault, open circuit fault, total length and intermediate joint.
- Impulse current method: current coupler gathers signal from ground line, safe and reliable; applicable to locate high resistance and flashover fault.
- Second-impulse method: high accuracy, simple waveform, easy analysis, applicable to locate high resistance and flashover fault.

Locate the intermediate joint distance: 394.4m
Classic impulse current method: flashover distance: 646m
Second-Impulse method: high resistance distance: 97.8m

Accuracy pinpoint technology
- Intelligent time-different technology: show the time difference between fault and test place in number, faster and more accurate.
- Step voltage location technology: auxiliary to locate metal dead grounding fault and sheath-broken fault.

Wiring diagram for fault between cable phases

Intelligent time-different: the smaller number, the closer to the fault
Step voltage method: auxiliary to pinpoint the fault
**LB4/60 Intelligent Digital Cable Fault Location Bridge**

**Introduction**

In the cable fault test, there are always faults like intermediate joint damp of insulation, water-in cable, the fault cannot be burn through by flashover. These faults generally 1~2MΩ, some even tens MΩ or hundreds MΩ, called super-high resistance fault. When these fault occur, the methods based on impulse reflection principle cannot locate the fault effectively. LB4/60, uses new digital location model, and combines with Wheatstone Bridge tech and constant current burn through technology, the output voltage up to 60 kV, location current 600 mA, having solved these super-high resistance faults effectively. It's the necessary instrument of cable maintenance department.

**Features**

**Appearance: elegant, portable, integration**

- Elegant: trolley case from US PALICAN.
- Portable: trolley case integrated design.
- Integration: set intelligent bridge and constant current burn through in one.

**Strong power to burn through**

- Output voltage up to 60 kV.
- Output current up to 600 mA.
- Quickly burn through super high resistance fault.

**New digital location mode**

- Showing the fault distance by number.
- Solving problems with waveform difficult to analysis.
- Easy to locate cable’s intermediate joint fault.
- One button operation makes things easier.

**Intelligent location: compared with traditional impulse–reflect method**

- High accuracy: intelligent bridge method no dead zone.
- Easy analysis: no need to see the waveform, showing the fault distance by number.
- Wide range: very applicable to locate big section and long distance fault.
- Diversification: intelligent HV bridge method, voltage drop method, sectional area method.
- Specificity: very effective to water-in and stable high resistance fault.

**High Technology, Major Breakthrough**

- Traditional wave-reflect location: arc reflection method
- New digital location mode show fault distance directly

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**Locating cable’s intermediate joint fault**

- High resistance fault in cable’s intermediate joint being burn through

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**Traditional wave-reflect location: impulse current method**

- Traditional wave-reflect location: arc reflection method
Introduction

On the cable fault test, there are always faults like intermediate joint damp of insulation, water-in cable, the fault cannot be burn through by flashover. These faults generally with 1~2MΩ, some even 10s MΩ or 100s MΩ, and called super-high resistance fault. When these faults occur, conventional methods like impulse method, second impulse method or arc reflection method, cannot locate the fault effectively because of the waveform cannot be sampled. LB15 is designed on the basis of Murray Bridge, to solve these super-high resistance faults effectively. It’s the necessary instrument of cable maintenance department.

Features

- Wide range: applicable to 380V~35kV cable’s pre-location.
- Easy to locate bad wave property cable’s fault like PVC cable or no copper shield cable.
- Effective to locate intermediate joint damp of insulation, water-in cable stable high resistance fault.
- Output: voltage, 5kV and 15kV; current 30mA.

Principle of bridge location

In figure L1/L2=R1/(R1+R2), fault distance L1=2L*r1/(r1+r2). r1/(r1+r2) is got from the dial scale after the balance of the bridge.

LB15 on-site application

BS60/500 DC Withstand Voltage and Constant Current Burnt Through Power

Introduction

Applicable to DC withstand voltage test for HV electrical equipment, especially in burn through for power cable high resistance fault point to reduce the resistance of fault point, also using in withstand voltage test of cable, capacitor, dynamo, chinaware.

DC withstand test: 0~60kV DC voltage, constant and adjustable, using in DC withstand test of HV cable and HV electrical equipment.

High resistance fault burn through: burn through voltage up to 60kV, burn through current up to 600mA, will burn through the fault in a short time.

Features

- Output voltage up to 60kV.
- Output current up to 600mA, with 1000W.
- Quickly change knotty high resistance fault into low resistance.

Function

- Appearance design: trolley case with integrated design imported from US, small, light and convenient.
- Using switching power technology: PWM pulse width modulation, super audio full-bridge inverter, double voltage resolution, no noise.
- High safety: max voltage, current and power with strong shock resistance.
- Screen: double digital LCD screen, current and voltage output are visual.

BS60/500 on-site application
The health status of outer sheath is directly related to the safe running of single-core high voltage cable, and intact sheath is the prerequisite to avoid water seepage and failures. If the high voltage cable sheath is damaged, multi-point grounding of the metal sheath and loss of circulation will happen, and the normal safe running of the cable is affected. Thus, it is necessary to take timely treatment for the cable sheath fault. TM10 sheath fault location system can accurately locate cable sheath fault after cable installation, which is the ideal equipment to solve sheath fault.

### TM10 Cable outer sheath fault location system

**Features**
- Three work modes: outer sheath DC withstand voltage test, pin-point signal for generator step voltage method, pre-locate signal generator for resistance (voltage) comparison method.
- 2 KV impulse voltage output and big current (200-1000 mA), strong anti-interference capability.
- Imported trolley case, easy to carry, strong and durable.
- High sensitive amplifier and galvanometer as balance instructor, constituting a balanced bridge with proportional potentiometer bridge.
- Bridge using four-terminal resistance test method avoids errors introduced by lead resistance, high precision.
- High integration, simple wiring and operation, convenient and easy to find fault location. Users can be skilled after simple training.

**TM10 on-site application**

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### XHKJ-1000 Overhead Line Fault Location System

**Introduction**

XHKJ-1000 is a portable device, which can apply to overhead line small current grounding power system. It is use to pinpoint the earth fault when line break down when single phase grounding fault happen. The kit includes transmitter, sensor and receiver and the accessories.

After the overhead line stop running, the transmitter will inject ultralow frequency HV signal to the line to reappear the fault. Detect along with the line by the sensor and it will transmit data to the receiver by wireless mode. The receiver will collect and display this detect result.

**Features**
- Principle: ultralow frequency signal transmission technology.
- Wide range: up to 30 km.
- Anti-interference: ultralow frequency signal to avoid capacitor influence.
- Apply to small current neutral grounding distribution power system.
- Safe transmitter by black and short-circuit function.
- Light and easy to carry.
- Large LCD display interface.
The railway signal cable fault tester is high-tech product, which uses modern micro-electronic technology with pulse reflection method and intelligent bridge method for pinpointing railway signal cable, local cable, plastic cable, users wire breakage, mixed lines, short circuit, high or low resistance grounding fault with poor insulation and poor contact. It is effective tool to reduce troubleshooting time and labor intensity to improve efficiency.

### ST-10 Railway Signal Cable Fault Tester

#### Introduction
The railway signal cable fault tester is high-tech product, which uses modern micro-electronic technology with pulse reflection method and intelligent bridge method for pinpointing railway signal cable, local cable, plastic cable, users wire breakage, mixed lines, short circuit, high or low resistance grounding fault with poor insulation and poor contact. It is effective tool to reduce troubleshooting time and labor intensity to improve efficiency.

#### Features
- Light and portable: 2kg, with a small single shoulder bag.
- Integrated: set impulse reflection and intelligent bridge in one.
- Intelligent: automatic test, intelligently judge the fault type.
- Power: build-in Li battery, working time up to 6 hours.

#### Multiple locating modes
- Impulse reflection: locating low resistance fault, open circuit, intermediate joint and total length.
- Intelligent bridge: showing the fault distance automatically, achieving high resistance and mixed lines fault.

### ST-10 on-site application

#### Impulse reflection method:
- High resistance fault location 381m
- Low resistance fault location 397m

### T3000 Cable and Pipe Locator

#### Introduction
T3000 is a high performance underground metallic pipe locating system. It consists a transmitter and a receiver, can be used to do route tracing, pipe exploration and depth measurement of the underground cables and metallic pipes. It can also be used to identify target cable from a bunch of cables, locate the pipe insulation damage and part type cable fault.

#### Features
- Compass display: to display pipe position directly.
- Left/right arrow indication: use the left/right arrow to indicate the pipe position when route tracing.
- Right/wrong indication: real-time test the pipe current direction to indicate tracing result and avoid the nearby lines interference.
- Real-time depth measure and current measure.
- Digitalization high accuracy sampling and processing, narrow receiving passband to rise the anti-interference capability and suppress power interference and harmonic interference from nearby running cable and pipe.

#### Interface introduction

- **Direct connection mark**
- **Pipe voltage testing mark**
- **Pipe voltage measurement interface**
- **Direct connection output interface**
- **Clamp coupling output interface**
- **Receiver interface**
**HCI Cable Identifier**

**Introduction**
Identifying a certain cable correctly from a bunch of cables is a common tech question for power cable engineers and cable workers. Cable identifying will avoid severe damage resulting from sawing wrong cable. Cable identifying usually need professional person proceed from 2 ends of cable, and make sure the two numbers are correct. But, human memory is not as reliable as professional device at any time in any circumstance. HCI is suitable for identifying the target cable with power cut off.

In premise that clamp arrow pointing to the far end of target cable, when HCI receiver indicator light is green, the cable is your target cable. In premise that clamp arrow pointing to the far end of target cable, the rest cables are shown in red light or light is not on.

**Features**
- Easy operation and safe, result is intuitive, no need any experience.
- 100% correct result under correct method.
- Fully meet the 2005 edition of “Electric Safe Work Regulation”.
- Light weight, less than 2kg of the whole set.

**On-site test wiring**

**HCI on-site application**

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**ECI Low Voltage Cable Identifier**

**Introduction**
Identifying a certain cable correctly from a bunch of cables is a common tech question. Cable identifying will avoid severe damage resulting from sawing wrong cable. Cable identifying usually need professional person proceed from 2 ends of cable, and make sure the two serious numbers are correct. But, human memory is not as reliable as professional device at any time in any circumstance. ECI is applicable for identifying low voltage live cable 220V/380V, and the identification of low voltage section.

It can identify the target cable and low-volt section without power off. 100% correct result under correct method.

In premise that clamp arrow pointing to the far end of target cable, when HCI receiver indicator light is green, the cable is your target cable. In premise that clamp arrow pointing to the far end of target cable, the rest cables are shown in red light or light is not on.

**Features**
- Small size, high stability, easy operation and safe, result is intuitive, no need any experience.
- 100% correct result under correct method.
- Meet the “Electricity Safety Regulations” of 2005 version.
- Light weight, less than 1.6kg of the whole set.

**On-site test wiring**

**ECI on-site application**
**AI-100 Intelligent Transformer and Phase Identifier**

**Introduction**
AI-100 is to meet standardization management requirement, under the live power, to ensure the user is powered by which transformer and which phase. It’s wildly applied to: LV transformer records checking, collecting system debugging, management of line loss, load control, quality test for electric network, strong antijamming capability. At the same time, having overcome the perplexity that traditional two-way identifier mainframe needs to connect current, AI-100 connects between power line, and under the correct operation, and the result will be 100% correct.

**AI-100 Benefits**
- Accurately check SG186 system transformer area lines’ affiliation, be convenient to adjust electrical load and ensure safety.
- Lower the line loss to meet the national standard.
- Making sure records in conformity with actual transformer area, improving success rate of carrier wave meter reading, making it no big fluctuation in long terms.
- Clarify transformer area lines’ ownership relation, phase relation, convenient to adjust carrier wave routing node, and solve the difficulty of carrier wave meter reading.

**Features**
- Power frequency distortion technology: test result would not be interfered by common null line common ground, HV coupling crosstalk, etc.
- Super-long identification length: having achieved signal complete coverage in the area, the farthest up to 5 km.
- High accuracy: ensuring the ownership, phase relation effectively, with 100% correct.
- High efficiency: testing 8 areas at the same time, 100% ensure the ownership.
- Appearance design: LCD color screen, hand-held, small, light and convenient.
- Branches identification: identifying electricity meter controlled by branches switch, to achieve fine management.

**Schematic Diagram**

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**TV10 DAC Situation Detection Location System**

**Introduction**
DAC is new technology in cable situation checking, and is closely focused by all over the world recent years. The essence of DAC is to use DAC voltage to replace power frequency AC withstand voltage test, on the basis to meet IEC60270 standard. DAC situation detection location system TV10, combines DAC withstand voltage test and partial discharge, to do non-destructive test and provide effective way to find the potential faults. With partial discharge measurement location function, it can locate the fault successfully. It’s ideal equipment of operating maintenance department and test department.

**Features**
- Damping oscillatory wave release process is based on RLC principle, and the tested cable with HV inductance form a LC circuit.
- Constant current linear boost method storages energy to the tested cable, automatic boost to the preset voltage, on the process without statistic DC electric field in cable insulation.
- Finished boost, HV switch will close LC circuit at 1 μs, producing 20~300 Hz oscillating AC voltage.
- Under the stimulation of oscillation voltage, cable’s inner fault will cause partial discharge. Mainframe collects oscillatory wave and partial discharge signal by partial discharge pressure/coupling unit, then analysis.

**System Principle**
- During the test, there is no statistic current, and no wastage to the crosslinked cable.

**TV10 on-site application**
**Online Distributing Network Fault Location System**

**Introduction**

Distribution network is relatively complicated with multiple branches. Once faults occurred, generally, we need to make the line power off, no matter good or bad. Line selection is not very reliable, and tour gauging cost many material and financial resources. Even so, faults cannot be found sometimes. In such situations, we do the R&D of online distributing line fault location system, which uses 24 hours of real-time monitoring. When faults occurs, it can indicate the fault place or show it in map in time. With this system, we can farewell to tour gauging, short the time of fault finding, lower workers’ labour intensity, improve work efficiency and the lines’ reliability.

**Technical Innovation**

- Travelling wave fault location principle applies to distributing line.
- Ranging algorithm is to complex and multiple branches network, including algorithm for rejecting false faults.
- Hybrid power line’s (combines overhead line and underground cable) ranging algorithm.
- New anti-interference method and strategy.
- Ungrounded system’s power frequency and voltage travelling wave sensor.

**System Framework**

As shown in figure, a distributing line has many branches, and all head ends and tail ends need to install terminals, terminal and master station telecommunicate by internet, formed online distributing line fault location system.

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**VLF-40kV 0.1Hz Cable AC Withstand Voltage Test System**

**Introduction**

Ultra-low frequency insulation withstand voltage test is actually an alternative method of power frequency withstand voltage test. As we know, when power frequency withstand voltage test to large generators and cable, it needs to test transformer or resonant transformers with large capacity because their insulation layer are with big capacitance. Such huge equipment, not only weight heavy, high cost and application is also inconvenient. In order to solve this problem, Power Sections adopt reducing the test frequency, thus reducing the capacity of the test power supply.

0.1 Hz AC withstand voltage test alternative power frequency withstand voltage test, not only can have the same equivalence, but also have much less volume of equipment and greatly reduce the weight.

**Features**

**Appearance**

- Light: 25kg.
- Screen: big LCD screen.
- Safety: over-voltage and over-current protect, no more than 20ms.

**Test range**

- Function: withstand voltage test of 10kV and below cable.
- Output voltage: max 40kV, effective voltage 28kV.
- Big capacity: test fast, test length up to 5km.

**VLF-40kV on-site application**

As shown in figure, a distributing line has many branches, and all head ends and tail ends need to install terminals, terminal and master station telecommunicate by internet, formed online distributing line fault location system.
Cable Fault Test Van

Introduction

According user-defined design to meet test need on the scene, our company has designed this cable test van. Put all kinds of test instruments, equipment, accessories and auxiliary tools in station wagon after refitting, which will set cable test, cable fault diagnose, cable fault pre-location, cable locator, fault pin-pointer and cable identifier in one, to give customer complete cable fault solution plan. The efficiency and standard of cable fault detection are improved effectively.

Function

- Pre-location and pin-point.
- Accuracy searching for cable path.
- Cable identifier for live and dead cable.
- 0.1Hz cable AC withstand voltage test.
- High resistance fault burn through.
- Cable DC withstand voltage test.
- Auxiliary tools for routine work.

Application

Hangzhou China Tanbos Power Cable Experience and Training Center

To:  

Brief Introduction:

With the rapid development of China’s urbanization, more and more power cables are applied, but the accompanying cable faults happen more often. Most power cables bury underground with complex and changing environment, coupled with front-line staff operation of the instrument experience is not enough, as well as complex and diverse scene makes fault waveform difficult to identify because they are lack of experience and other issues, which causes when the events of failure happen, it is difficult to quickly find the point of failure in the first time, resulting in a lot of manpower, material waste, having brought immeasurable economic losses to the community. In order to improve the technical level of cable fault locating staff and make them master cable condition-based maintenance technology, familiar fast positioning methods and experience of complex cable system failure, the International Emergency Industry Alliance cooperates with Xianheng International (Hangzhou) Cable Training Centre to hold “Power Cable Fault Location and Condition Based Maintenance Technology Special Training Courses”.

Training Affairs as Follows:

2. Domestic and international cable fault locator technology principles, methods, experience introduction
3. Technical explanation about 10kV-220kV cable's comprehensive assessment of the status and maintenance
4. Explain power cable's the daily operation, maintenance, service experience skills
5. Explain cable joints manufacturing techniques
6. Classic cases on the scene sharing and discussion
7. The practical operation of real cable faults
8. Assessment: Theory + Practice Exam + Team competition

Training Staff:

Power System or Railways System enterprises about electric power, technicians or managers in charge of power cable operation, intermediate joints making or cable testing.

Hangzhou China Tanbos Power Cable Experience and Training Center
Hangzhou China Tanbos Power Cable Experience and Training Center

Tanbos power cable training center, as part of the International emergency Equipment Center, is a versatile and experiential technical exchange and training platform, with fully functional teaching base and impeccable training system.

**Brief Introduction**

**Main Training Terms:**
- Precise and comprehensive management technology of underground pipe network
- Cable fault location and comprehensive assessment of cable status
- Cable intermediate joint manufacturing technique

**Main Aims:**
- To improve the technical level of cable fault locating staff
- To ensure the safe operation of power, and effectively improve the reliability of power supply
- To be China's outstanding, professional technical exchanges and training platform

**Cable Laying Ways**
- Overhead Lines Laying
- Cable Trench Laying
- Direct Burial Laying
- Cable Laying in Pipe
- Concrete Pavement Laying
- Cable Well Laying

**Seven Training Area**

- Exhibition Area
- Cable Status Assessment
- Cable Fault Location
- Overhead Line Faults Location
- Cable Path Location
- Cable Identification
- Training Room (150 people)

Tanbos Power Cable Training Center is strictly according to international standards to lay 9 cables, with 12 kinds of faults: single phase grounding fault, single phase low resistance grounding fault, dead grounding fault, flashover high resistance fault, open circuit fault, interphase high resistance fault, interphase short circuit fault, high voltage single-core cable outer sheath fault, fault in the pipe, intermediate joint fault. Different difficulties can meet different needs from different levels’ people.

Training Center also hires experts to teach professional knowledge regularly, or technical seminars, by combining theory and practice. Staffs in electric power industry can exchange theoretical knowledge, also get true experience of cable fault location, which has really improved the capacity of them, and ensured the work safe, fast and effective to enhance the social and economic benefits.

**Technical Communication**

- Training Course Group Photo
- Outdoor Training
- Technical Communication
Technical Date

T32 Intelligent Cable Fault Location System

Fault location power LP30/4

- Output voltage: 0-32kV continuously adjustable
- Momentary burn through current: 1000mA
- Capacitance: 4µF
- Single discharge energy: 1800J
- Weight: 60kg
- Volume: 380x380x790(mm)

Impulse reflector/Cable fault pre-locator (TDR) WL50

- Low voltage impulse: 65V
- Impulse width: 40ns-10µs
- Sampling frequency: 200MHz
- Error: 0.4m
- Test range: 50km
- Work mode: Low voltage impulse, Impulse current, Stable Arc Reflection Method
- Weight: 6kg
- Volume: 355x269x155(mm)

Cable fault pin-pointer PP10

- Precision of sound & magnetic synchronization method: 0.1m
- Precision of path location precision: 10% of laying depth
- Precision of step voltage method: 0.1m
- Work mode: Sound & magnetic synchronization, step voltage, electromagnetic, path trace.
- Display mode: Color LCD
- Power: Li-battery, 12h standby

T20 Cable Fault Location System

Fault location power LP30/2

- DC Output: 0-35kV continuously adjustable
- Max charging current: 30mA
- Max discharge energy: 1200J
- Polarity of output voltage: Negative polarity
- Power supply: 220V±10%
- Capacity: 1kVA
- Volume: 500x305x457(mm)
- Net weight: 30 kg

Cable fault pre-locator (TDR) WL20

- Low voltage impulse launching voltage: 30V
- Sampling frequency: 200MHz
- Max ranging scope: 100km
- Dead zone: 2m
- Max resolution: 0.4m
- Power: Polymer Li-ion battery pack, for Min 5 hours continuous usage.
- Size: 274x218x81(mm)
- Weight: 3.5kg

Cable fault pin-pointer PP10

- Precision of sound & magnetic synchronization method: 0.1m
- Precision of path location precision: 10% of laying depth
- Precision of step voltage method: 0.1m
- Work mode: Sound & magnetic synchronization, step voltage, electromagnetic, path trace.
- Display mode: Color LCD
- Power: Li-battery, 12h standby
## T8 Low Voltage Cable Fault Location System

**Fault location power LP8/10**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pulse and DC output voltage</td>
<td>0-15kV continuously adjustable</td>
</tr>
<tr>
<td>Max burning through power</td>
<td>300W</td>
</tr>
<tr>
<td>Discharge capacitance</td>
<td>10 μf</td>
</tr>
<tr>
<td>Single discharge energy</td>
<td>500J</td>
</tr>
<tr>
<td>Max. resolution</td>
<td>0.4m</td>
</tr>
<tr>
<td>Power supply</td>
<td>220V mains supply or equipped with portable power</td>
</tr>
<tr>
<td>Size</td>
<td>420×420×80(mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>25kg</td>
</tr>
</tbody>
</table>

**Cable fault pre-locator (TDR) WL20**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low voltage impulse launching voltage</td>
<td>30V</td>
</tr>
<tr>
<td>Sampling frequency</td>
<td>200MHz</td>
</tr>
<tr>
<td>Max ranging scope</td>
<td>100km</td>
</tr>
<tr>
<td>Dead zone</td>
<td>2m</td>
</tr>
<tr>
<td>Max resolution</td>
<td>0.4m</td>
</tr>
<tr>
<td>Power</td>
<td>Polymer Li-ion battery pack, for Min 5 hours continuous usage.</td>
</tr>
<tr>
<td>Size</td>
<td>274×218×81(mm)</td>
</tr>
<tr>
<td>Weight</td>
<td>3.5kg</td>
</tr>
</tbody>
</table>

**Cable fault pin-pointer PP10**

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Precision of sound &amp; magnetic synchronization method</td>
<td>0.1m</td>
</tr>
<tr>
<td>Precision of path location precision</td>
<td>10% of laying depth</td>
</tr>
<tr>
<td>Precision of step voltage method</td>
<td>0.1m</td>
</tr>
<tr>
<td>Work mode</td>
<td>Sound &amp; magnetic synchronization, step voltage, electromagnetic, path trace.</td>
</tr>
<tr>
<td>Display mode</td>
<td>Color LCD</td>
</tr>
<tr>
<td>Power</td>
<td>Li-battery, 12h standby</td>
</tr>
</tbody>
</table>

## LB4/60 Intelligent Digital Cable Fault Location Bridge

### Burn through function

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>0-60kV continuously adjustable 600mA</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>600mA</td>
</tr>
</tbody>
</table>

### Bridge function

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output voltage</td>
<td>0-4kV continuously adjustable</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>600mA</td>
</tr>
<tr>
<td>LCD screen</td>
<td>192mm×64mm</td>
</tr>
<tr>
<td>Location precision</td>
<td>±(0.2%×L+1)m</td>
</tr>
<tr>
<td>Testing range</td>
<td>1~60000m</td>
</tr>
<tr>
<td>Operating keyboard</td>
<td>One key operation</td>
</tr>
<tr>
<td>Power supply</td>
<td>220V AC±10%, 50Hz</td>
</tr>
<tr>
<td>Power</td>
<td>2kVA, generator as power supply (&gt;2kW)</td>
</tr>
<tr>
<td>Weight</td>
<td>29kg</td>
</tr>
<tr>
<td>Dimension</td>
<td>30×46×50(cm)</td>
</tr>
<tr>
<td>Working temperature</td>
<td>-10℃~+55℃</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20℃~+70℃</td>
</tr>
</tbody>
</table>

## LB15 Cable Fault Location Bridge

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test voltage</td>
<td>5kV</td>
</tr>
<tr>
<td>Short circuit current</td>
<td>30mA</td>
</tr>
<tr>
<td>Burn through power</td>
<td>250W</td>
</tr>
<tr>
<td>Location ratio precision</td>
<td>±(0.2%×L+1)m</td>
</tr>
<tr>
<td>Weight</td>
<td>10kg</td>
</tr>
<tr>
<td>Size</td>
<td>38×36×27(cm)</td>
</tr>
<tr>
<td>Working power supply</td>
<td>Power frequency 220V±15%</td>
</tr>
</tbody>
</table>

## BS60/500 DC Withstand Voltage and Constant Current Burnt Through Power

<table>
<thead>
<tr>
<th>Feature</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Work mode</td>
<td>Allowed continuous work</td>
</tr>
<tr>
<td>Burn through power</td>
<td>1000W</td>
</tr>
<tr>
<td>Output voltage</td>
<td>60kV adjustable</td>
</tr>
<tr>
<td>Max current</td>
<td>500mA</td>
</tr>
<tr>
<td>Test accuracy of voltage and current</td>
<td>1.5%</td>
</tr>
<tr>
<td>Power supply voltage</td>
<td>Power frequency 220V±15%</td>
</tr>
<tr>
<td>Environment temperature</td>
<td>-15℃~+45℃</td>
</tr>
<tr>
<td>Size</td>
<td>30cm×46cm×50cm</td>
</tr>
<tr>
<td>Weight</td>
<td>17kg</td>
</tr>
</tbody>
</table>
## Technical Data

### TM10 Cable Outer Sheath Fault Location System

**Cable sheath fault location power SLP15**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Output mode</td>
<td>DC, withstand voltage, impulse</td>
</tr>
<tr>
<td>DC voltage output</td>
<td>0-15kV continuous adjust</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>20mA-100mA adjustable</td>
</tr>
<tr>
<td>Impulse current output</td>
<td>Max. voltage 2kV, current 200-1000mA adjustable</td>
</tr>
<tr>
<td>Weight</td>
<td>15kg</td>
</tr>
<tr>
<td>Volume</td>
<td>310×300×330(mm)</td>
</tr>
</tbody>
</table>

### Cable fault location bridge LB15

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Testing voltage</td>
<td>5kV, 15kV alternative</td>
</tr>
<tr>
<td>Short-circuit current</td>
<td>30mA</td>
</tr>
<tr>
<td>Burn through power</td>
<td>450W</td>
</tr>
<tr>
<td>Location accuracy</td>
<td>±(0.2%×L+1)m</td>
</tr>
<tr>
<td>Weight</td>
<td>10kg</td>
</tr>
<tr>
<td>Volume</td>
<td>380×360×270(mm)</td>
</tr>
<tr>
<td>Power supply</td>
<td>Lithium battery, 3h continuous</td>
</tr>
</tbody>
</table>

### Step voltage indicator SVI-1

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test sensitivity</td>
<td>0.10V(not amplified); 0.30mV(amplified)</td>
</tr>
<tr>
<td>Sensitivity adjust</td>
<td>Not amplified: 6 gears; amplified: 6 gears</td>
</tr>
<tr>
<td>Zero adjust</td>
<td>± full scale</td>
</tr>
<tr>
<td>Volume</td>
<td>212×96×100mm</td>
</tr>
<tr>
<td>Weight</td>
<td>1kg</td>
</tr>
</tbody>
</table>

### XHKJ-1000 Overhead Line Fault Location System

**Transmitter:**

- Open circuit voltage: 8 kV
- Short circuit current: 100 mA
- Output frequency: 1 Hz
- Power: AC 220V, or generator, car inverter Max. power 900W
- Size: 350×210×300mm
- Weight: 12 kg

**Receiver:**

- Accuracy: 0.2m
- Distance from the transmitter: Below 30 m
- Power: 5*AA dry battery
- Size: 205×100×35mm
- Weight: 0.45 kg

### ST-10 Railway Signal Cable Fault Tester

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Impulse reflection test method</td>
<td></td>
</tr>
<tr>
<td>Max range</td>
<td>8 km</td>
</tr>
<tr>
<td>Dead zone</td>
<td>0</td>
</tr>
<tr>
<td>Resolution ratio</td>
<td>Max. range is 1 m; Min. range is 6 m.</td>
</tr>
<tr>
<td>Pulse width</td>
<td>80ns-10μs</td>
</tr>
<tr>
<td>Gain control</td>
<td>Auto and Manual</td>
</tr>
<tr>
<td>Max resistance</td>
<td>100 MΩ</td>
</tr>
<tr>
<td>Max length</td>
<td>9999 m *3</td>
</tr>
<tr>
<td>Intelligent bridge test method</td>
<td></td>
</tr>
<tr>
<td>Precision</td>
<td>±1% cable total length</td>
</tr>
<tr>
<td>Input 3 times</td>
<td>Input wire diameter 0.3mm-0.99mm</td>
</tr>
<tr>
<td>Changing time</td>
<td>4 hours</td>
</tr>
<tr>
<td>Continuously work time</td>
<td>8 hours</td>
</tr>
<tr>
<td>Size</td>
<td>230×150×160 mm</td>
</tr>
<tr>
<td>Weight</td>
<td>2 kg</td>
</tr>
</tbody>
</table>
### T3000 Cable and Pipe Locator

#### Transmitter:
- **Output**: Direct Connection output, Clamp Coupling Output (optional), Radiation output
- **Output Frequency**: 640Hz (complex frequency), 1280Hz (complex frequency), 10kHz, 33kHz, 83kHz
- **Output power**: Max. 10W, 10 levels adjustable, auto impedance matching
- **Direct connection voltage**: Max. 150Vpp
- **HMI**: 128X64 LCD
- **Power supply**: 4*built-in 18650 Li-on batteries, standard 7.4V, 6.8Ah

#### Receiver:
- **Input**: Internal receiving loop, Clamp (optional), sensor (optional), fault locating A Frame (optional)
- **Receiving frequency**: Active frequency: 640Hz, 1280Hz, 10kHz, 33kHz, 83kHz
  - Power frequency: 50Hz/60Hz, 250Hz/300Hz
  - Radiation frequency passive frequency: center frequency 10kHz, 33kHz, 83kHz
- **Pipe detection mode**: Wide peak method, narrow peak method, valley method
- **Cable identification mode**: Receiving Clamp (optional) intelligent identification and sensor (optional) identification
- **HMI**: 320X240 LCD
- **Built-in battery**: 2*18650 Li-on batteries, standard 7.4V, 3.4Ah

#### Others:
- **Volume**: Transmitter 270x220x85mm, Receiver 700x270x125mm
- **Weight**: Transmitter 2.2kg, Receiver 2.2kg
- **Charger**: Input AC 100~240V, 50/60Hz, output DC8.4V/2A
- **Working environment**: Temperature: -10~40℃, humidity: 5~90%, elevation: <4500m

### HCI Cable Identifier

#### Transmitter:
- **Indicator display**: LED signal strength indicator (red/yellow/green)
  - LED battery status indicator (red/yellow/green)
- **One-button operation**: ON/OFF
- **Pulse Voltage**: 55V, DC
- **Pulse current**: 0-100A
- **Pulse frequency**: 30 times/min
- **Pulse width**: 72ms
- **Power supply**: AC 100-240V, 50Hz or built-in 12V battery
- **On-site use time**: Over 6 hours, continuous use
- **Charge time**: 6 hours
- **Weight**: 800g (no battery); 1.6kg (with battery)
- **Size**: 201x120x80(mm)

#### Receiver:
- **Indicator display**: LED status indicator (green)
  - LED signal strength indicator (red/green)
- **Operation method**: Touch keys
- **Clamp**: Flexible clamp
- **Gain**: 10 gears (-3dB to +24dB)
- **Power supply**: 2pcs of 1.5V AA battery
- **On-site use time**: >50hours
- **Weight**: 400g (with clamp and battery)
- **Size**: 150x65x35(mm)

### ECI Low Voltage Cable Identifier

#### Transmitter (ECI-10T):
- **Working voltage**: AC220V 50Hz
- **Periodic impulse current**: 100mA±10A
- **Power**: ≤6W
- **Impulse frequency**: 40 times/min, 40HZ
- **Power supply**: Lithium battery
- **Display mode**: Red, green LED
- **Weight**: 500g
- **Size**: 158x90x60(mm)

#### Receiver (ECI-10R):
- **Volume**: Transmitter 270x220x85mm, Receiver 700x270x125mm
- **Weight**: Transmitter 2.2kg
- **Charger**: Input AC 100~240V, 50/60Hz, output DC8.4V/2A
- **Working environment**: Temperature: -10~40℃, humidity: 5~90%, elevation: <4500m

#### Others:
- **Keys press mode**: Touch button
- **Test distance**: >5km
- **Power dissipation**: ≤2W
- **Power supply**: 2 PCS 1.5V AA battery
- **Accuracy**: 100%
- **Clamp**: Flexible clamp
- **Display mode**: Red, green LED
- **Weight**: 400g
- **Size**: 118x78x24(mm)
### Technical Data

#### AI-100 Intelligent Transformer and Phase Identifier

<table>
<thead>
<tr>
<th>Normal Voltage</th>
<th>Tree-phase four-wire</th>
</tr>
</thead>
<tbody>
<tr>
<td>Periodic pulse current</td>
<td>100A</td>
</tr>
<tr>
<td>Frequency</td>
<td>50 times/minute</td>
</tr>
<tr>
<td>Normal voltage range</td>
<td>0.8~1.2Un</td>
</tr>
<tr>
<td>Power</td>
<td>2W</td>
</tr>
<tr>
<td>Temperature</td>
<td>-30~+70°C</td>
</tr>
<tr>
<td>Period</td>
<td>5 s</td>
</tr>
<tr>
<td>Accuracy</td>
<td>100%</td>
</tr>
<tr>
<td>Precision</td>
<td>0.1%</td>
</tr>
<tr>
<td>Weight</td>
<td>600g</td>
</tr>
<tr>
<td>Size</td>
<td>50<em>110</em>230mm</td>
</tr>
</tbody>
</table>

#### TV10 DAC situation detection location system

| Power | 220VAC ±10%, 50Hz |
| Oscillating wave output maximum voltage | 30kV |
| Oscillation frequency range | 20Hz ~ 300Hz |
| Cable length (can test) | 200m ~ 20km |
| High voltage charging current | 5 mA |
| High-voltage switch trigger mode | Laser trigger high-voltage switch |
| High voltage switch control | On-time: 1µs |
| Switch on-resistance: less than 1Ω |
| Optical Fiber Communication |
| PD measurement range | 1pC ~ 100nC |
| PD level detection and bandwidth | International Electro technical Commission IEC60270 standard |
| Partial positioning bandwidth | 150kHz ~ 45MHz automatic adjustment |
| PD locating accuracy | Cable length 1% (minimum resolution 2m) |
| Dielectric loss measurement range | 0.1% to 10% |
| Real-time sampling rate | 100MHz |
| PD sampling storage depth | 32MB (recordable 300ms data length) |
| Control mode | Wireless control |
| PD calibration mode | Auto / Manual |
| In the calibration mode, the time-domain pulse reflection positioning function | Automatically locks the connector position |

#### VLF-40kV 0.1Hz Cable AC Withstand Voltage Test System

<table>
<thead>
<tr>
<th>Model</th>
<th>Rated voltage</th>
<th>Load capacity</th>
<th>Power fuse</th>
<th>Weight</th>
<th>Application</th>
</tr>
</thead>
<tbody>
<tr>
<td>VLF-40</td>
<td>40kV (peak value)</td>
<td>0.1Hz, ±1.1µF</td>
<td>0.05Hz, ±2.2µF</td>
<td>0.02Hz, ±5.5µF</td>
<td>10A Controller: 4kg Step-up: 25kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1Hz, ±1.1µF</td>
<td>0.05Hz, ±2.2µF</td>
<td>0.02Hz, ±5.5µF</td>
<td>=10kV cable</td>
</tr>
<tr>
<td>VLF-90</td>
<td>90kV (peak value)</td>
<td>0.1Hz, ±1.1µF</td>
<td>0.05Hz, ±2.2µF</td>
<td>0.02Hz, ±5.5µF</td>
<td>35A Controller: 5kg Step-up: 50kg</td>
</tr>
<tr>
<td></td>
<td></td>
<td>0.1Hz, ±1.1µF</td>
<td>0.05Hz, ±2.2µF</td>
<td>0.02Hz, ±5.5µF</td>
<td>=35kV cable</td>
</tr>
</tbody>
</table>

- **Output frequency**: 0.1 Hz, 0.05Hz, 0.02Hz
- **Load capacity**: 0.1 Hz Max 1.1µF, 0.05 Hz Max 2.2µF, 0.02 Hz Max 5.5µF
- **Accuracy**: 3%
- **Error of peak positive and negative voltage**: ≤3%
- **Voltage waveform distortion**: ≤5%
- **Use condition**: indoor and outdoor; Temperature: -10°C ~ +40°C; humidity: ≤85%RH
- **Power supply**: AC 220V±5%; 50 Hz