METRIX 1.0 **Automated Van System for underground cable fault location**

General

- Indian manufacturer with 20 years of experience in CTV backed by strong sales and service network in India with service centres in all major metros.
- Trained technical personnel with 20 + years of experience
- Automated Van System for underground cable fault location in India with integrated Prelocator, HV Surge Tester, DC Hi-pot, Arc Reflection, Sheath Fault Location modules.
- The system modularity ensures that even in case of malfunction of any one unit, cable fault location can still be carried out.

Application

Metrix 1.0 is an Automated Van System for underground cable fault location and testing for LV, MV, HV & EHV power cables. The key parameters are flexible to satisfy customer's specific requirements.

Description

Telemetrics make Automated Van System for underground cable fault location is a basic requirement of any power distribution network company.
It is a very powerful tool to localize the underground cable fault of any nature in short time. The system is a mobile laboratory having all types of required equipment available to the operator at a site. The Automatic Cable Test Van System is a total solution for fault location in any type of power cables.

In van system operator safety is a highest priority. Generally the van is divided in two sections, operator section and high voltage section. HV section is equipped with a proper safe guard such as door interlocks, earth monitoring system, auto discharge, and emergency off controls are provided on operating control panel. These safety controls are very important in any emergency to avoid any major accident.

The control unit menu driven based and responsible for all control operation of various functions such as Mode selection, Surge Test, Burn and Arc reflection, Range selection, Voltage and current limit adjustment, surge sequence selection, auto discharge, earth monitoring from a blue tooth mouse and touchscreen display and no access to the high voltage side shall be available to the operator as well as operator guidance with on-screen help texts.

Pre-location

After identifying the type of fault, pre-location of fault done determined using the latest pre-location methods such as TDR, ICM, SIM/MIM & Decay that are provided in the system.

TDR / ECHO Method

A narrow electromagnetic pulse with a fast rise time is sent in the cable that reflects back from the fault point /far end where the impedance is changed. The VOP for each cable depends on the cable dielectric material is set. The distance to the fault is then computed automatically and displayed on pre-locator.

SIM/MIM Method

The Time Domain Reflectometer using a high speed transient recorder to record no. of measurements showing the fault position during only 1 high voltage impulse.

ICM Method

It is a current transient analysis method of pre-location of fault. During a breakdown or flash over at the fault, transient's waves are generated that oscillate back to the source end which is utilized through a linear current coupler and store and displayed on pre-locator.

Decay Method

It is a voltage transient analysis method of pre-location of fault. Using DC voltage, at a fault point voltage transients are generated that oscillate back to the source end which is utilized through a voltage divider coupler and store and displayed on pre-locator.

DC Test

Used to check the dielectric strength of insulation in the cable and prove the integrity to identify and confirm fault conditions with a test voltage up to 40 kV and a current of 500 mA. The over-current trip is provided for protection to the system under test in the event of the cable under test breaking down.

Pin-point

Accurate pin-pointing of cable fault is carried out using surge wave tester with the help of surge wave receiver in acoustic method. The maximum output voltage of 32 kV in three selectable 4,8,16,32 kV @ 2500 joules.

Proof/Burn Test

Using the available DC high voltage of 40 kV with Imax 200 mA outputs, the maximum current is applied for stabilizing the unstable cable faults for short period. This allows easier and quick pre-location and pinpointing of the unstable faults.

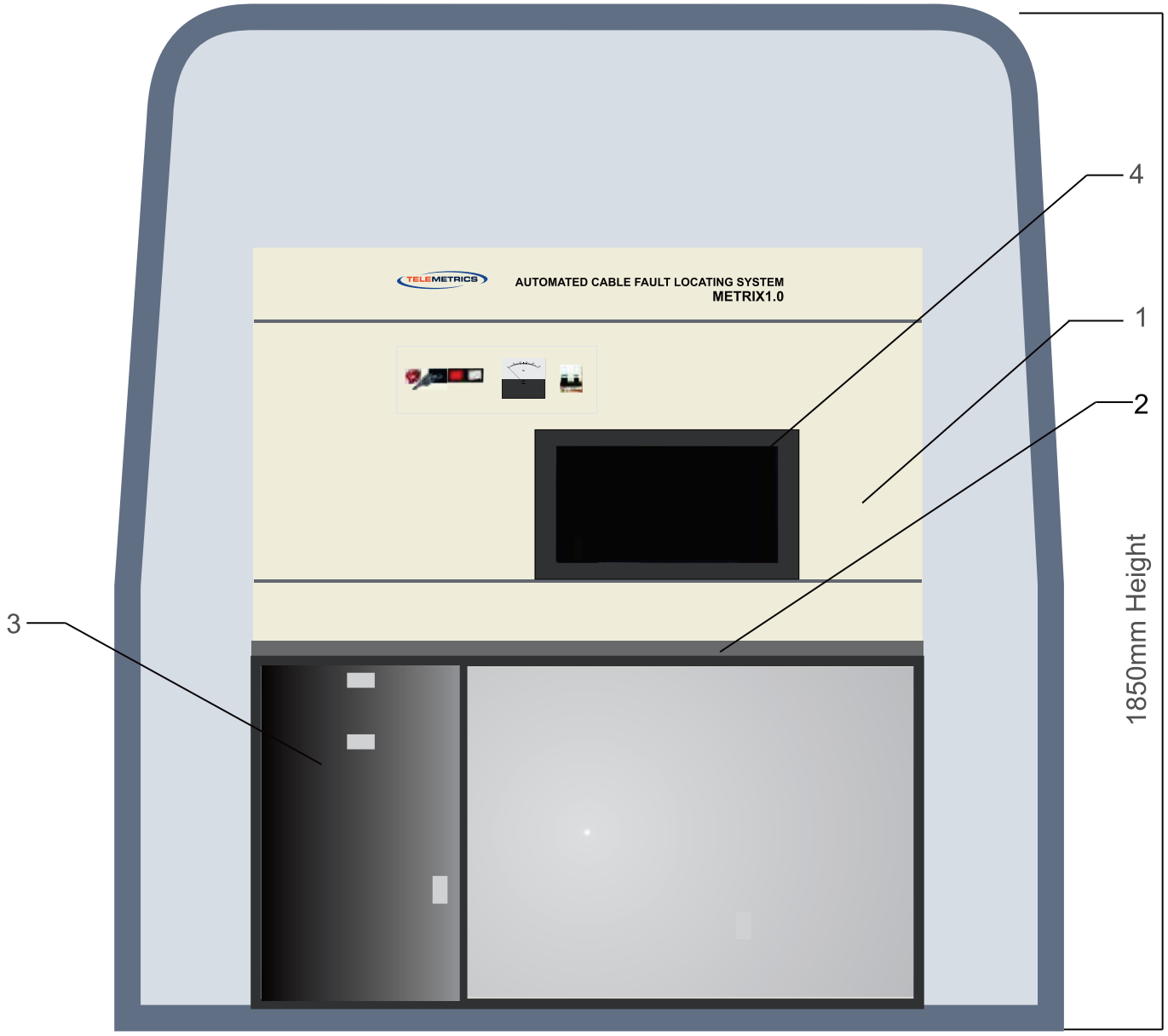
Functions

The manual operating control unit is an integrated central operator inter-face for all operational modes and provides the monitoring of the system and the integrated safety facilities. It enables an easy and quick operation of the system, prevents operational errors and reduces the fault location time considerably. All necessary selection of equipment, switching and operations such as pre-locations, high voltage test, and pin-pointing is carried out on control panel.

Safety

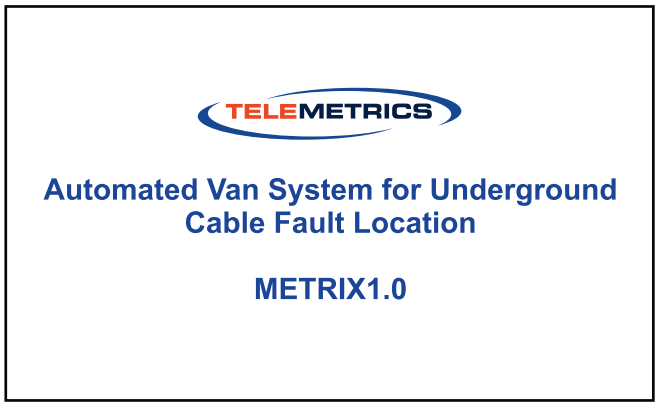
Telemetrics gives highest priority to safety of operating personnel. The van system is divided in two sections, operator section and HV section. HV section is equipped with proper safe guards such as door interlocks, earth monitoring system, auto discharge. Emergency off control is provided on control panel. External emergency off switch is provided to switch off in case of any emergency. Earth monitoring system is provided which trips the entire system in case of any dangerous high voltages (more than 40kV DC) accumulated on van chassis during high voltage testing. Copper shielding is provided for good and proper earth in high voltage section.

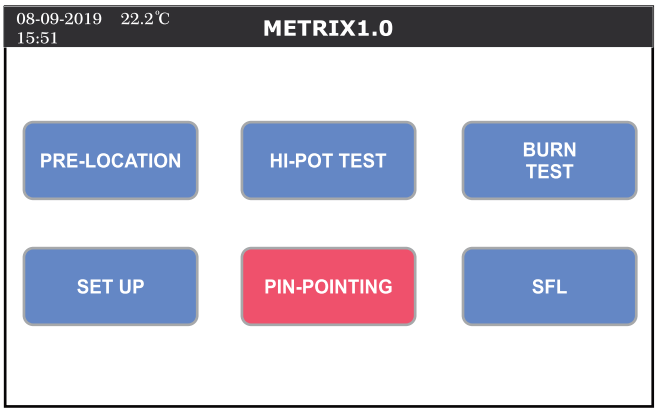
Operating Panel

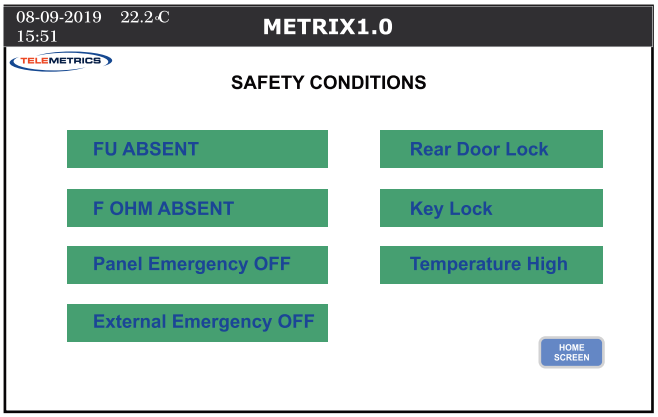


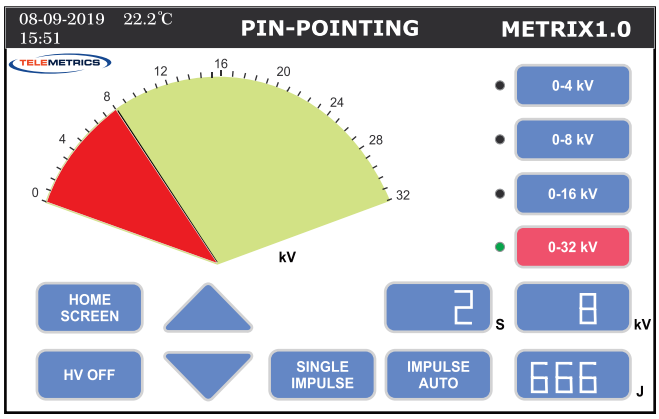
1. Microprocessor Unit
2. Writing Desk
3. Cupborad with Drawers
4. Color Control Display

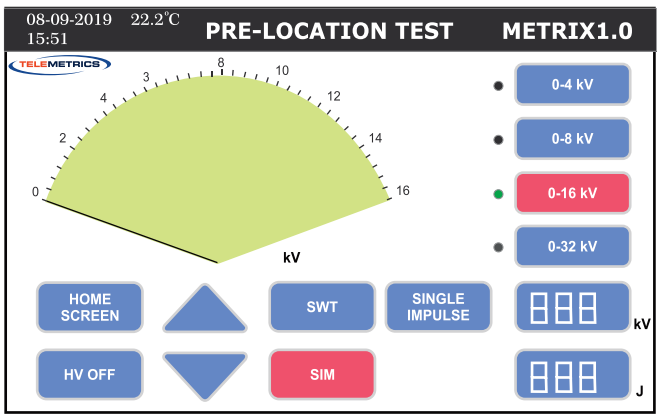
Display Screens

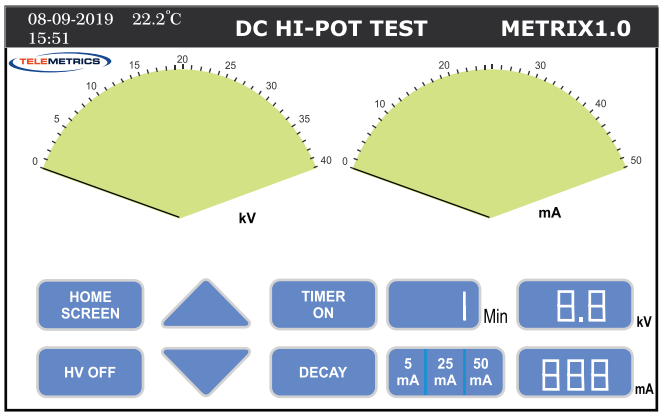


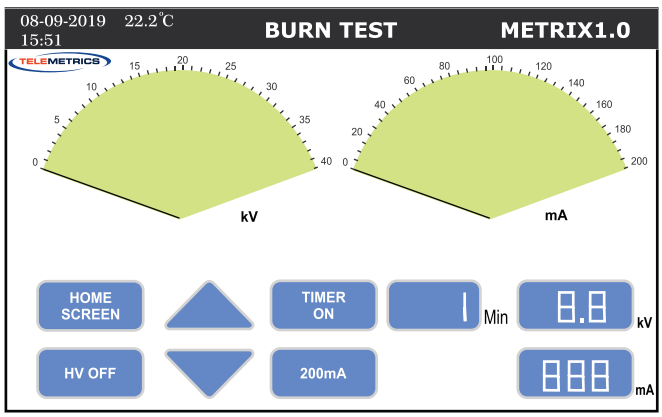


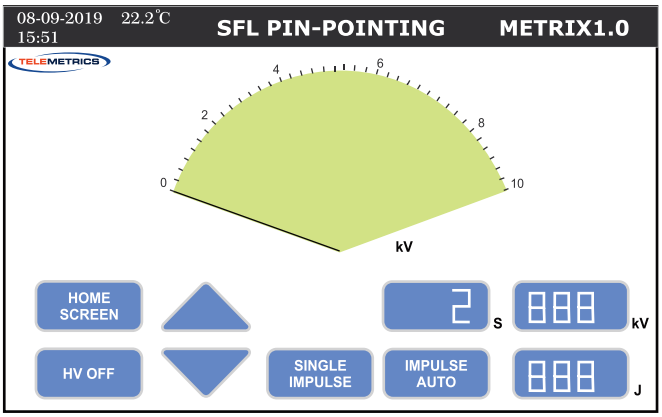












UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

Features

- DC cable testing up to 40 kV
- Burning Vmax - 40kV, | 200mA
- Surge energy up to 3000J
- Surge Voltage 4, 8, 16, 32 kV selectable
- User friendly interface
- High safety level interlocks
- Auto discharge
- High Temperature Auto OFF
- Operation through Blue tooth Mouse / Touchscreen
- GPS mapping (Optional)
- Integrated insulation testing facility up to 5kV
- Surge ranges / Impulse time / Hipot voltage setting / Burn voltage setting controlled through Blue tooth Mouse/ touchscreen
- System error shall be displayed in a display along with its error code.
- Safety Interlocks indication
- Output Energy and Output Voltage & Output Current displayed on screen during operation.
- Precise fault pre-locating using Time-Domain Reflectometer
  TDR Mode,
  Arc-Reflection Mode (SIM/MIM),
  Impulse Current Mode (ICM/ICE),
  Voltage coupling Mode (DECAY)
  Automatic cursor setting in TDR mode

Specification

Input voltage	230V AC ± 10%, 50Hz
Power consumption	2.5 kVA Max
DC Test Mode	
Output voltage	0–40kV DC variable
Output Current	0-5mA, 25mA 50mA DC
Burn Mode	
Output voltage	40 kV
Burn Current	200mA DC
Pin-Pointing Mode	
DC voltage	4 / 8 / 16 / 32kV ranges
Output energy	2500 Joules @ 4/16/32 kV 1100 Joules @ 4kV
Timer set	1 to 99 seconds (automatic surge mode)

Manual single surge

Flexible voltage change during automatic operation

Pinpointing with an acoustic receiver

System operation and parameter programming through Blue tooth Mouse/Touch screen with display

Measuring Range	160 Km
O/P Imp	8 - 2000 ohm
Pulse width	20ns - 30us
Pulse Voltage	10 - 200
Velocity of propogation (V/2)	10 - 150 m/us
Sampling Rate	400MHz
Time domain accuracy	±0.1 % of FS
Propagation velocity (V/2) resolution	0.1 m/us
Operation modes	TDR, ARC/SIM, ICE/ICM, DECAY
Automatic distance measuring	Yes
Internal data storage	8 Gb (not less than 1000 reflectograms with data)

Sheath Fault (Optional) - Pin-point of cable sheath fault
0 - 10 kV / 100 mA

Display size - 15", 19" & 21.5 inch color LCD Touch screen Display as per the customer requirement

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THE MOTWANE MANUFACTURING CO. PVT. LTD.

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Works : Unit No. 07 & 08, Electronic Sadan No. 2, MIDC, Bhosari, Pune - 411 026
Tel. : 091-20-27122936, 27123176

SLE 200-Z **Surge Wave Receiver**

Description

Surge Wave Receiver SLE200-Z is a highly sensitive equipment to exactly locate the fault point in a short time. It can be used on low, medium and high voltage power networks effectively.
The success of locating exact fault point on the underground cable depends on the search carried out on the lay of the cable. This calls for an indication to guide the operator to walk precisely on the cable route.

Application

The SLE 200-Z Surge Wave Receiver is an easy operation device used to pinpoint the fault point. It integrated the function of acoustic magnetic synchronization method, the step voltage method, the magnetic field strength method to make the pinpointing accuracy.

Features

- Perfect functions, suitable for pin-pointing all kinds of cable faults and detect cable path.
- High accuracy
- Synchronous sensing of acoustic and magnetic signals of the fault with high ability to anti-interference.
- Waveforms displayed on large LCD
- With the assistance of the earphone, direct and easy to identify the fault.
- High Acoustic & Magnetic field sensitivity
- High Performance electronic suppression of external noise and interference
- Automatic contactless turn off of the Headset, as the hand approaches the handle
- Indication of the direction to the fault -. Compass
- Comparison of last and the new measurement
- Low batt indication.
- Graphical indication of the magnetic field
- Indication of the acoustic signal detection
- Indication of all adjustments and settings
- Fault distances measurement
- Measure of magnetic field and sound coincidence with acoustic selection and calibration of the measuring range.
- Indication of cable position in respect to the sensor.
- Cursor to identify the time of delay between the acoustic signal and the magnetic signal, thus to confirm the fault range
- Automatic switch between different work modes
- Automatic gain adjustment
- Indication of cable position in respect to the sensor
- With back light, automatic power-off and overcharge protection functions. Easy to operate

SLE 200-Z **Surge Wave Receiver**

TELEMETRICS

UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

Working Principle

Acoustic magnetic synchronous pinpointing method is a accuracy and based on traditional audio magnetic pin-pointing method but with improvement.
Traditional method use the high voltage generator to impact the fault cable by DC high voltage to make the fault point breakdown and discharge. The mechanical vibration from this delivered to the earth and be collected by the sensor, which is synchronous with the special sound.

The traditional method only use the earphone to monitor and use the meter pointer to help to distinguish the discharging sound. Because this discharging sound is fleeting and difficult o distinguish from the environment noise, it common requires rich experience user.

To modify the traditional method, we now use acoustic magnetic synchronous pinpointing method.

Because the magnetic transmission velocity is much quicker than the acoustic transmission velocity, It's definitive sample to find the faulty point by testing the time difference between magnetic signal and audio signal. Keep moving the sensor to find the point with min. time difference, and this will be the fault point.

Please also notice, because there's no exact data for the acoustic velocity in the cable and have no exact data of the cable depth, it is difficult to calculate the distance between the sensor and the faulty point.

Standard Accessories

- Ground Sensor
- Headphones
- Carrying Stick - Connect to Sensor
- Connecting Cables
- Carrying Case
- Instruction Manual

Specifications

Acoustic magnetic synchronous pin-pointing

Acoustic channel Bandwidth	All -pass 80Hz~1500Hz Low-pass 80Hz~400Hz High-pass 200Hz~1500Hz Band-pass 150Hz~600Hz
Signal gain	≥100 dB
Accuracy	0.1m
Step voltage function (optional)	Magnification times ≥100 dB
Gain Adjustment	Manual

Indication of the direction to the fault

Indication of Acoustic signal detection

Power Supply Battery	Built-in Li-ion battery 7.4V- 3400mAH
Working time	9 hours approx
Charger	Input AC220V±10%,50Hz, Output 8.4V,DC 1A
Quick charging	< 4 hours
Display method	320 x 240 dot LCD Screen
IP Protection	Sensor - IP 65 Receiver - IP 54
Dimensions	210mm × 95mm × 115mm
Weight	0.6kg

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CRT 50D Cable Route Tracer

Description

Cable Route Tracer CRT50D is an essential item in the kit for fault location of underground power and telecom cable network.

It is a powerful audio frequency system that can be effectively used for various unique functions such as route tracing of any metallic cable, depth measurement, live loaded cable tracing and ground survey of underground utilities.

The system is capable to trace route of underground cable maximum 15km, and find out the depth up to 5 meter, This method is found to give more accurate results in presence of other metallic utilities in close proximity.

The system can be used to trace route of loaded live cable with the help of receiver unit and search coil in passive mode.

It is also use to carry out ground survey and metallic pipe route tracing in inductive mode effectively.

Application

It is used for route tracing of any underground metallic cable in power transmission, distribution and signal cable networks or cable fault location service provider.

Features

- Route tracing of buried underground any metallic cables up to 15 km max length.
- Depth measurement of buried cables up to 5m.
- Portable and light weight, easy to use, powered by rechargeable battery, one person can operate, tests can be completed at once.
- Digital design, software control, stable and reliable performance
- With back light function, adapt to night operation.
- Large-screen LCD interface, easy to understand at a glance, easy to learn and understand.
- The measured information is provided to the operator in three ways: digital size, grating length, and voice priority, making the test process easy and free.
- The transmitter has constant power output and automatic matching to ensure that the machine is working in the best condition. The built-in ohmmeter function can automatically measure the loop impedance of the cable to the ground and between phases, which can assist in judging the nature of the fault.

UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

Working Principle

The Audio Frequency Generator injects an Audio frequency signal into the cable which generates an electromagnetic field around it.

This field is concentric to the cable & is present over the entire length. The presence of this field is detected by a highly selective and sensitive receiver with a search coil.

Function

The audio frequency signal is passing through the cable conductor an electromagnetic field of sending frequency is developed around on the conductor. When the search coil axis is passing in the developed field, it will sense the field and given to the receiver unit.

The receiver amplifies that signal and indicates in terms of maximum signal strength and sound in buzzer on the cable. When the search coil is going away from the field the signal indication and sound will reduce.

Specifications

Audio Frequency Generator AFG 50

Output Power : 5, 10, 25 and 50 Watts selectable

Output Frequency : 480Hz, 1450Hz & 9820Hz selectable

Impedance Matching : From 0.5 to 1000 Ohms selectable

Indication : Analog meter indication to indicate of transmitted power and charge condition of internal battery ON & Battery Charging Indication

Power Supply : 230VAC ±10%, 50Hz Single phase, or external 12 Volt DC or Internal rechargeable accumulator

Operating Time : Internal accumulator 1.5Hrs on 10 Watts Mains and Ext DC power supply no time limit

Storage Temp. : -5 Deg C ~ 60 Deg C

Working Temp. : 0 Deg C ~ 50 Deg C

Dimensions : 270 (L) x 248 (W) x 175 (H) mm

Weight : 5.45 kg Approx

Standard Warranty : One Year

Standard Accessories : Transmitter Tongs CTS120
Transmitter Coil TC 8
Connecting Cords
Operating Manual

Audio Frequency Receiver AFR 4

Receiving frequency : Receiving three kinds of sinusoidal AC signals of different frequencies, namely low frequency, intermediate frequency, high frequency, 50HZ/60Hz.

Receiving mode : Crest method (horizontal coil), trough method (vertical coil), external device method (A-frame,couplingclamp).

Signal interface : Three interfaces of digital size, grating length, and voice prompt simultaneously indicate the strength of the signal

Display interface : Large-screen,graphic display,with backlight

Gain control : Manual adjustment, dynamic range 000-100db.

Detection length : When directly connected to the cable, the maximum lengthis 15KM.
When coupling cables, one coupling can measure 3Km,and multiple couplings are infinite. When the cable is inducted, it can measure 300m in one induction and infinitely in many times.

Depth measurement : Direct reading detection depth, range 000-250cm.80% method for measuring depth, range 000-250cm (induction)\ 500cm (direct connection)

Current measurement : Direct reading current

Detection accuracy : 5% of buried depth

GPS Feature : Optional

Power source : Standard No.5 1.2V rechargeable battery 6, charge and discharge 500times.

Stand by time : More than 12hours, power prompt.

Over heating and over current : automatic protection.

Working temperature : -0°C ~ 50°C.

Volume : 690 × 110 × 230mm

Weight : 1.8 Kg Approx.

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Required Cable for Testing to be supplied from Client Side

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Cable Identification System CI 60S-D

Application

Digital Cable Identification System can be effectively used to identify any power cable low, medium, high or extra high voltage single or multi core cable of any grade, size and insulation in any power distribution networks companies.

Features

- Non destructive, simple, and easy system to used and understand the operation.
- Identification of wanted cable from the bunch of cables in power network.
- Suitable for single and multi core armored or unarmored power cables.
- Modulation control for better result.
- Cyclical pulse repetition for precise cable identification.
- High Impulse current to offer reliable good result of identification.
- Operation on mains / internal battery supply.
- Manual selectable sensitivity control receiver from minimum to maximum.
- Hand held, small, flexible receiver with Digital display 128x64
- High pulse DC current up to100Amp.

Specifications

Cable Identification Transmitter PG 60S

Power Supply	230V AC ± 10%, 50 Hz, Single phase or from built in-Accumulator with internal charging supply
Impulse Voltage	300 V
Impulse Current	180 Amp
Impulse Sequence	I : 2.5s II : 2.5 and 1 s alternating
Indication	Analog moving coil meter for output current Charging Indication Power on indication Low battery Indication
Operating Time	6 Hrs. Continuous
Working Temp.	0 Deg C ~ 55 Deg C
Storage Temp.	-5 Deg C ~ 60 Deg C
Dimensions	242(L) x 134(W) x 245(D) mm
Weight	5.3 kg Approx.

Digital Cable Identification Receiver PR-6D

Sensitivity	6 stages manually selectable from minimum to maximum.
Display	Digital graphical display 128x64 with back-lit sensing
Indication	Digital Arrow with Right & Wrong indication
Power supply	9V battery (recommended Duracell)
Working Temp.	0 Deg C ~ 55 Deg C
Storage Temp.	-5 Deg C ~ 60 Deg C
Dimensions	235(L) x 130(W) x 50(D) mm
Weight	0.5 kg Approx.

Cable Identification Tongs CT 150

Internal Dia	120 mm
Dimensions	268(L) x 160(W) x 35(D) mm
Weight	1.08 kg

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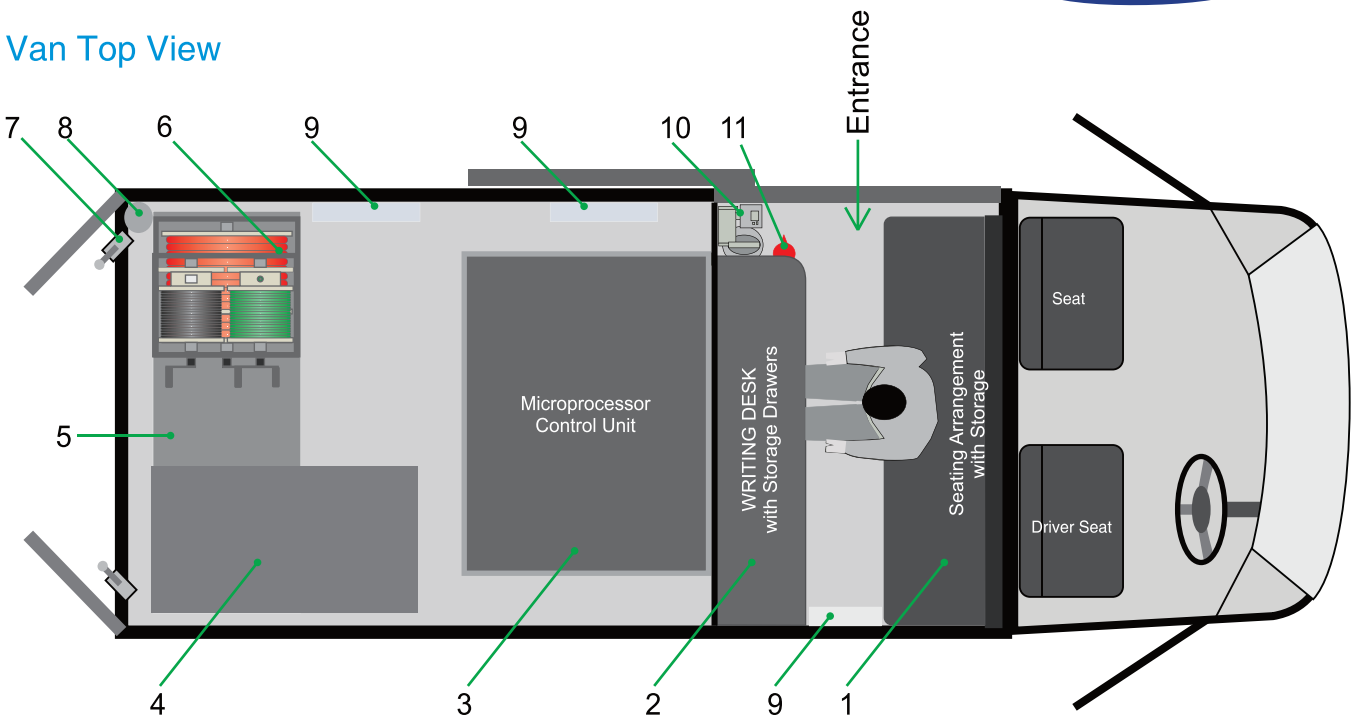
UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

Van Top View



1. Seating Arrangement
   for operator + 2 persons with Storage arrangement
   Multimeter,
   Cable Route Tracer CRT 50
   Cable Identificatiion System CI60S-D (optional)
2. Writing Desk with storage Drawers
   (Files, Tools & Tackles)
3. Microprocessor Control Unit
4. Generator 3.0 kVA Honda Petrol (Optional)
5. Storage arrangement for
   Discharge rod, Measuring wheel,
   Earth Spikes,
6. Cable drums
   HV - cable 50kV - 50mtr.
   Mains Cable - 50mtr.
   Earthing Cable - 50mtr.
   Aux Earth - 50 mtr
   RF Cable - 50 mtr.
7. Door Microswitch
8. Safety earth
9. Tube llghts - 3Nos
10. Storage Arrangement
    for SLE
11. Fire Extinguisher - 1No

Van

- Airconditioned Tempo Traveller WB 3350 / Tata 407 / equivalent
- Seating arrangement for operator + another 2 person
- Writing desk for operator
- Three sections in the van - Driver section, Operating section & HV section
- Partition for Operating & HV section
- Cable Outlet on rear door
- External Emergency OFF

Cable Drums

- HV Cable 50kV - 50 mtr.
- Mains Cable - 50 mtr.
- Earthing Cable - 50 mtr.
- Aux. Earth Cable - 50mtr.
- RF Cable - 50mtr.

(other cable length as per customer requirement)

Standard Accessories

- Discharge Rod
- Multimeter
- Gloves/Shoes/Helmet
- Rodometer
- Fire Extinghisher
- Earth Spike
- Cooling Fan
- Tools Set
- Instruction / Operating Manual
- Van Flooring - Copper Sheet, Rubber Sheet & Carpet

Standard Warranty : 12 month from the date of installation

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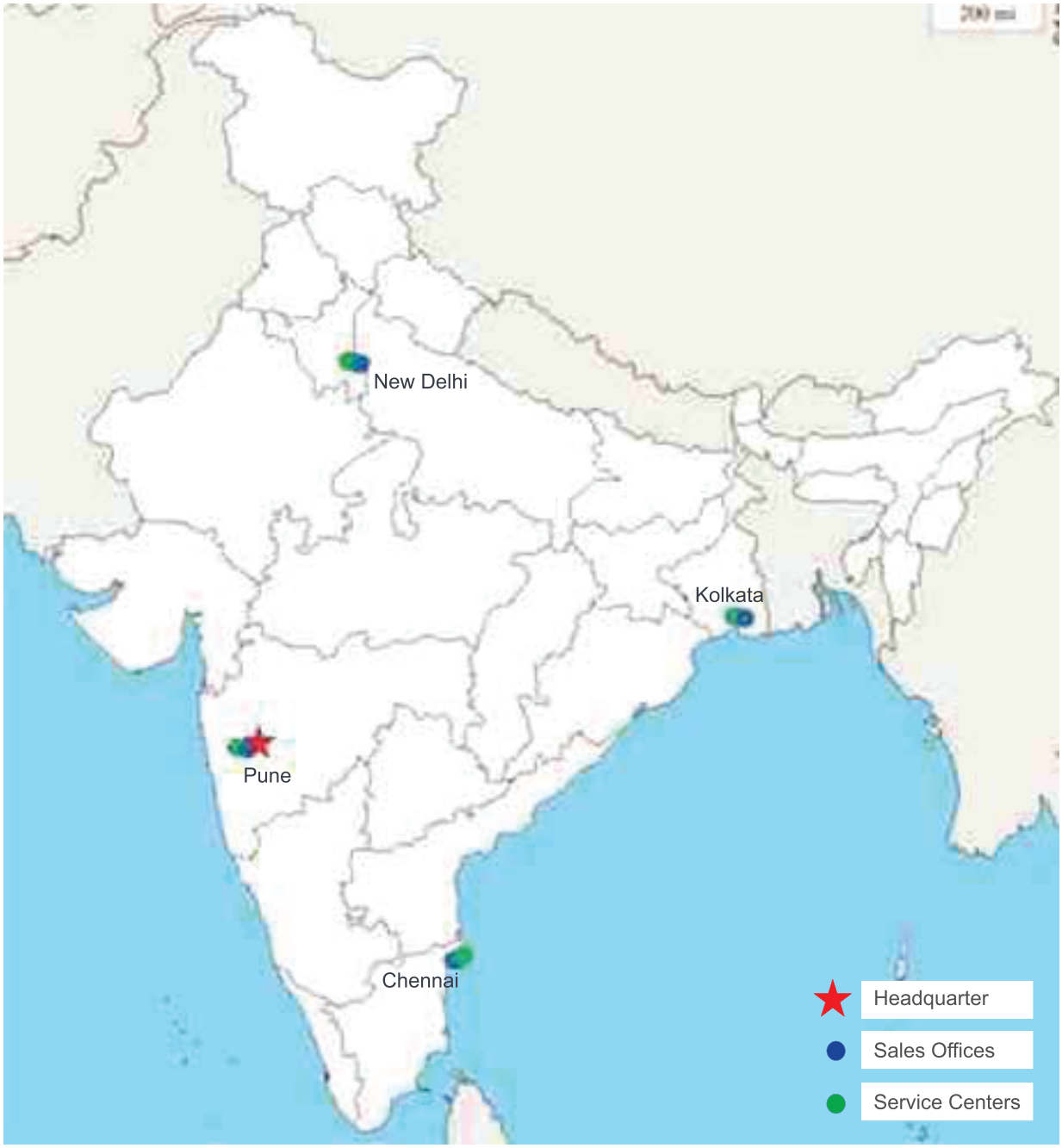

Key Customers

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