UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

COMPAC 32D **Cable Fault Locating System**

Description

Cable Fault Locating System COMPAC 32D is prime system to provide quick, effective, accurate and safe fault location. Specifically designed for service, industrial and power utility companies. It is a multi functional system in a trolley mounting design. The HV surge tester, DC High voltage test set, Arc reflection and Burn / Proof test is given for cable fault location of short circuit, open circuit, high resistance, and intermittent and sheath faults.

Pre-location
After identifying the type of fault, pre-location of fault can be determined using the latest pre-location methods such TDR, ICE/ICM, ARC/SIM, is provided in this system.

TDR Mode
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 was change. The VOP for each cable depending on the cable dielectric material is set. The distance to the fault is then computed automatically and displayed on pre-locator.

ICE/ICM Mode
It is a current transient analysis method of pre-location of fault. During a breakdown or flashover 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.

ARC/SIM Mode
It is a arc stabilizing mode, faults are stabilized by creating a temporary arc at the fault point through an arc reflection filter and reduce the resistance value of fault as short circuit, and displayed on pre-locator with reference graph.

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DC Test
Used to check the di-electric strength of insulation in the cable and prove the integrity to identify and confirm fault conditions with a test voltage up to 32kV and current of 24 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 8, 16 and 32 kV ranges with 2000 Joules of energy.

Proof / Burn Test
Using the available DC high voltage of 32 kV outputs, the maximum current is applied for stabilizing the unstable cable faults. This allows easier and quick pre-location and pin-pointing of the unstable faults.

Application

The Cable Fault Locating System COMPAC 32D is used to perform DC high pot test, Pre-location of fault distance with the help of pre-locator unit and Pin-point underground cable fault in acoustic method with the help of suitable Surge wave receiver and Pin-point sheath faults in power transmission and distribution networks or service provider companies.

Features

- Optimized surge energy for switchable capacitors values for each range.
- Pin-point location of cable faults in Low, Medium and High voltage cables by acoustic method.
- Perform DC / Proof test up to 32 kV
- Burn test up to 32 kV
- Surge voltage selectable in ranges 8, 16 and 32 kV.
- Full energy delivering capacity at each select range.
- High energy of 2000 Joules
- Adjustable output voltage from 0 to 100 % of selected range.
- Single manual Impulse for pre-location of cable faults.
- Cyclical pulse repetition for precise pin-pointing of cable faults in acoustic Method.
- Fully protected operation with three safety interlocks.
- In-built current coupler for pre-location of cable faults distance on ICM/ICE mode.
- Emergency OFF facility
- Pre-location of cable faults distance with TDR, ICM/ICE, SIM/ARC mode.
- Menu driven operation.
- Interactive menu - guidance
- Color LCD display
- Maximum measuring range up to 64km
- Automatic discharging facility of cable under test, in case of power failure or after switching off.
- Continues operation for extended period in case of pin-point difficult cable faults.
- Rugged construction and easy to carry on site.

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

Specifications

Operating Mode Surge, SIM, DC / Proof Test, Burning Pre-location, Sheath Fault

Surge Mode

Output Ranges	0 - 8, 16, 32 kV selectable & continuously variable
Output Energy	2000 Joules full energy at each range
Impulse Mode	Single and Auto
Auto Impulse Sequence	1.5, 3 and 6 seconds intervals or as per customer request
Indication	ON / OFF lamp indication Respective mode select lamp indication Analog moving coil meter for output voltage (kV) Indication Over Heat indication

ARC / SIM Mode

Application	Pre-location of high resistance intermittent faults
Working Voltage	35 kV max
Surge Carrying capacity	2000 Joules Max
Indication	Visual lamp indication of ARC/SIM
ARC Stabilization Time	20 ms approx

HV DC Test Mode

Output Voltage	32 kV continuously variable
Output / Proof Test Current	6, 12, 18, 24mA

Burn Mode

Burn Voltage	32kV
Burn Current	60mA for short period
Indication	Analog moving coil meter for output voltage (kV) Indication Analog moving coil meter for output leakage current (mA) Indication Leakage current trip lamp indication
Protection	Over current tripping

Sheath Fault Mode

Sheath Fault	0-8kV current up to 220mA

Pre-location

Operating Mode	TDR, ARC/SIM, ICE/ICM
Distance measu-rement ranges,	120 km,
Sampling rate	500MHz
Gain	-33 – 104dB
Output impedance (10 Ohm steps)	10 – 500 Ohm
Propagation velocity (v/2)	50.0 – 150.0m/µs
Pulse amplitude	45V
Pulse width	10ns – 100 000ns
Propagation velocity (V/2) resolution	0.1 m/us
Connectivity	RS-485, USB
Internal data storage	4 Gb (not less than 1000 reflectograms with data)
Display	Color LCD display
Internal battery	12 V (8 hours of operating when fully charged)
External power adaptor	Input 230V 50 Hz Output 24 V DC
Power consumption	36 W max

General Specification

Power Supply	230V AC ± 10%, 50/60Hz Single phase
Over Load Protection	Input current Limiter switch Fast blow fuse in mains and controlled supply
Earth Discharge	Soft automatic discharge through in-built solenoid
Operating Temp.	0 Deg C ~ 55 Deg C
Storage Temp.	- 5 Deg C ~ 60 Deg C
Safety Protection	Variac Zero inter-lock Output cable plugs inter-lock HV Switch inter-lock Mode Switch inter-lock Over Heat protection Emergency OFF switching
Dimensions	670 (L) x 700 (W) x 1000 (H) mm with Rubber wheels
Weight	215 Kg Approx.

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Working Principle

The HV surge tester SWT ignites an arc or spark at the fault. This results in a transient, i.e. a spreading and repeatedly reflected travailing wave between the fault and the surge wave generator. Inductive couplers record this transient wave with the help of a pre-locator unit and convert in to fault distance.

Surges of high energy are applied to the fault at the set voltage and time interval for pin-pointing the exact spot on the cable length.

These surges create noise and vibrations at the fault site. The intensity of the noise and vibrations get attenuated during their travel to the ground surface. A ground microphone and a sensitive surge wave receiver SLE90 carried on the route of the cable on the pre-located area pin-point the exact spot of the fault in minimum time.

The high voltage DC test up to 32 kV is carried out to check the dielectric strength or insulation of cable on DC test mode. The respective voltage and leakage current is indicated on the meters.

Function

The COMPAC 32D is a variable DC high voltage power supply, connected to a high voltage capacitor bank. The value of capacitance is usually selectable by parallel, series parallel and series combination.

This combination being linked with suitable voltage taping to give the constant energy output on low voltage / high capacitance or high voltage / low capacitance in surge mode.

In DC test mode the internal capacitor is isolated through a mode selection switch. This high voltage output is applied to the cable under test through a spark discharge device.

The cable fault pre-locator is a microprocessor based equipment and can be used to pre-locate fault distance with different mode.

Standard Accessories

- HV Output Cable 10 sq mm single core screen cable 25 meter length with heavy duty clamp wound on cable drum
- Mains supply 1.5 sq. mm 3 core cable 25 meter length wound on cable drum
- Yellow / Green 10 sq mm earthing cable 25 meter length with heavy duty clamp wound on cable drum
- For Aux earth cable 25 meter length wound on cable drum
- Soft discharge rod 35kV
- Instruction / Operating Manual
- Printer Software CD for Pre-locator
- Rexin Cover

Standard Warranty	**One Year**
Associated receiver use to pin-point cable faults	**Surge wave receiver SLE 200Z**
Associated receiver use to pin-point sheath faults	**Earth Fault Locator EFL 1**

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

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

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

SLE 200-Z **Surge Wave Receiver**

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	≥ 80dB
Accuracy	0.1m
Step voltage function (optional)	Magnification times>80db
Gain Adjustment	Manual

Indication of the direction to the fault - Compass - Yes

Indication of Acoustic signal detection - Yes

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 below 4 hours

Display method	320 x 240 dot LCD Screen
IP Protection	Sensor - IP 54, Receiver - IP 65
Dimensions	210mm × 95mm × 115mm
Weight	0.6kg

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

CRT 8 **Cable Route Tracer**

Description

Cable Route Tracer CRT8 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 10km, and find out the depth up to 5 meter, by triangulation method. This method is found to give more accurate results in presence of other metallic utilities in close proximity.

The system is accurately identifying the wanted cable from the bunch of cables in communication network.

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 communication, power transmission, distribution and signal cable networks or cable fault location service provider.
It is also use to identification of wanted cable from bunch of cables in communication network.

Features

- Route tracing of buried underground any metallic cables up to 10 km max length.
- LCD Bar-graph on Audio frequency receiver unit for precise indication of cable route tracing.
- Route tracing of underground loaded live cables with passive frequency and inductive coupling.
- Peak and null reception methods for route tracing of cables.
- Depth measurement of buried cables up to 5m with triangulation method.
- Ground survey of underground metallic utilities.
- Pin-Pointing of contact nature faults.
- Possibility of injecting the signal in 220-240V live cables through separation filter (Optional)
- Inductive coupling in a particular cable using transmitter tong (Optional)
- Identification of cable from bunch of cables in communication cable network.
- Rugged construction and easy to carry on site.

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

CRT 8 **Cable Route Tracer**

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 bar-graph and sound in headphone on the cable. When the search coil is going away from the field the signal indication and sound will reduce.

Standard Accessories

- Transmitter Coil TC 8
- Cable Identification Probe CIP 3
- Headphone
- Earth Spikes
- Output connecting cables
- 5 pin connecting cable
- Mains cord
- Ext. DC supplies cord

Optional Accessories

- Transmitter Tongs CTS 120
- Separation Filter SF 8

Standard Warranty	**One Year**

Specifications

Audio Frequency Generator AFG 8

Output Power	1, 2, 4 and 8 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	230V AC ±10 %, 50 Hz Single phase, or external 12 Volt DC or Internal rechargeable accumulator
Operating Time	Internal accumulator 1.5Hrs on 8Watts Mains and Ext DC power supply no time limit
Storage Temp.	-5 Deg C ~ 60 Deg C
Working Temp.	0 Deg C ~ 55 Deg C
Dimensions	250 (L) x 120 (H) x 255 (D) mm
Weight	5.12 kg Approx

Audio Frequency Receiver AFR 4

Receiving Frequency	Passive - 50 Hz Active 480Hz, 1450Hz, 9820Hz selectable
Gain	More than 90 db
Indication	LCD Bar-graph display with scale illumination for signal strength & Battery status indication
Power Supply	8 x 1.5 V AA size alkaline batteries
Operating Time	8 to 10 hrs without scale illumination
Storage Temp.	- 5 deg C ~ 60 deg C
Working Temp.	0 deg C ~ 55 deg C
Dimensions	240 (L) x 110 (H) x 155 (D) mm
Weight	1.35 kg Approx

Universal Search Coil SC 4

Receiving Freq.	50 / 480 Hz, 1450 Hz, 9820 Hz selectable
Axis of Coil	Can be swivelled 45 / 90 Deg
Extension of Coil	Telescope and Adjustable
Dimensions	470 (H) x 80 (W) x 207 (D) mm
Weight	0.85 kg Approx

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UNDERGROUND CABLE FAULT LOCATING EQUIPMENTS & SYSTEMS

CI 60S **Cable Identification System**

Description

Cable Identification System is an essential item in the kit for fault location of underground power cable network.

It consists of Identification Transmitter, Identification Receiver and Identification Tongs. The system is use for identification of wanted cable from the bunch of cables in power cable network.

The precise identification of a particular cable from a bunch is a common problem faced by technicians and cable jointers in every day practice.

The wrong identification of a power cable can result in catastrophic or fatal results if the cable is cut. This requires the most reliable system having no chance for wrong identification. Cable identification system incorporates all the safety features and gives 100% safe full identification of the wanted cable, and leaving no chance for an accident.

Application

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.
- High Impulse current to offer reliable good result of identification.
- Cyclical pulse repetition for precise cable identification.
- Modulation control for better result..
- Operation on mains / internal battery supply.
- Manual selectable sensitivity control receiver from minimum to maximum.
- Rugged construction and easy to carry on site.
- Hand held, small, flexible receiver with center zero galvanometer.
- High pulse DC current up to 60 Amp.
- Availability of special tongs as per customer's requirement.
- Complete system is offered in a robust molded carrying case.

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CI 60S **Cable Identification System**

Working Principle

The saw toothed impulses sent on the wanted cable to the far end are given return path to the sending end through the sheaths armors of all the cables. Current flow direction is monitored on all the cables.

Direction of current flow in the wanted cable is in one direction whereas it is indifferent in all other cables. Thus the direction of the current flow identifies the wanted cable.

Function

The Cable Identification System consists of Cable identification transmitter, Cable identification receiver and Cable identification Directional Tongs. The saw toothed impulses from the transmitter are fed into the cable which is to be identified. Identification directional Tongs applied on the cable receive them as DC impulse and are feed to the identification receiver unit. Direction of current of these impulses identifies the wanted cable, on wanted cable the center zero meter deflect on positive direction and on other unwanted cable its deflect on negative direction.

Standard Accessories

- Mains supply cord
- Output connecting cables
- Earthing cable

Standard Warranty	**One Year**
Other models available	**Cable Identification System CI 60 (Mains Operated)**

Note: Special Tongs CT 150 available on request

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	36 V
Impulse Current	60 Amp
Impulse Sequence I	2.5s
Impulse Sequence 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.

Cable Identification Receiver PR 6

Sensitivity	6 stages manually selectable from minimum to maximum.
Indication	Analog moving coil center zero Meter.
Working Temp.	0 Deg C ~ 55 Deg C
Storage Temp.	-5 Deg C ~ 60 Deg C
Dimensions	197(L) x 108(W) x 68(D) mm
Weight	0.4 kg Approx.

Cable Identification Tongs CT120 (Optional CT150)

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

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