

SCOPE

CFL PL4+ Cable Fault Prelocator



Identify cable faults quickly and
precisely with CFL PL Series

The Product

Cable Fault Prelocator

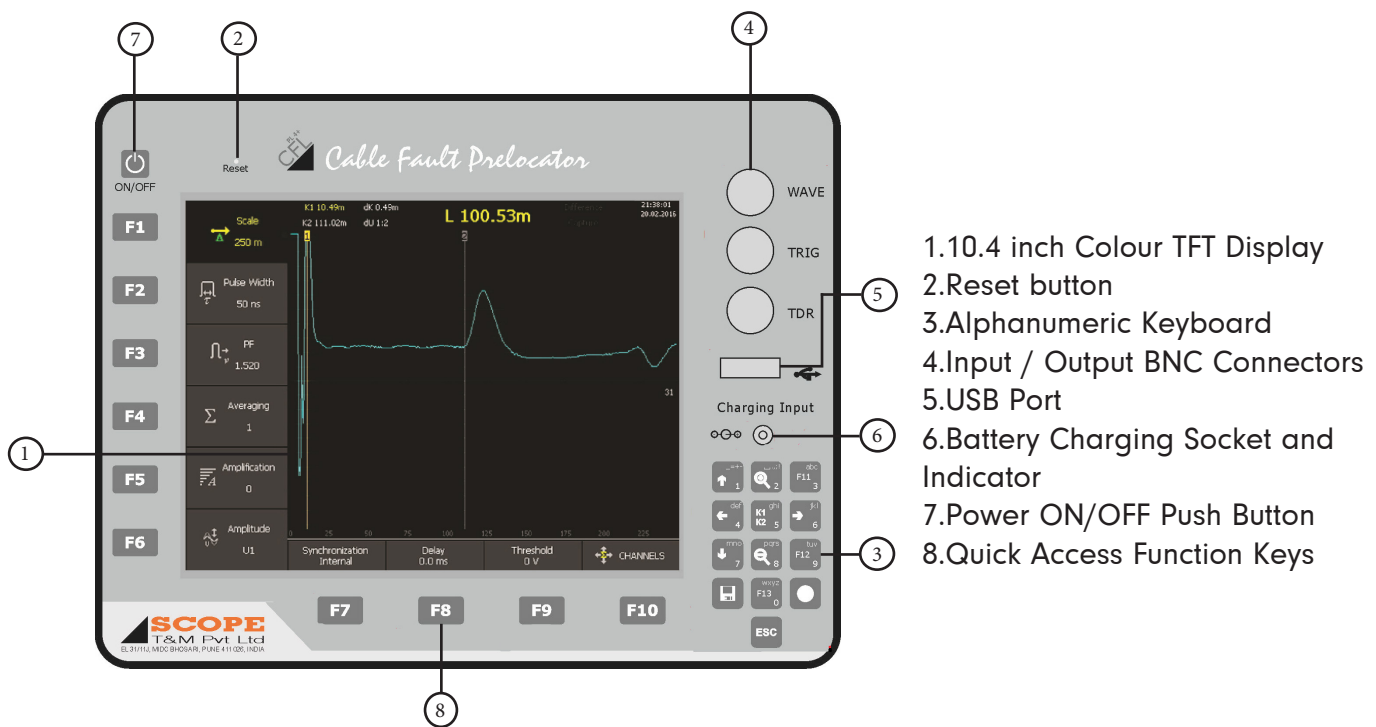
Underground cable faults cannot be avoided due to many factors such as ageing, moisture ingress, road widening, infrastructure improvement, digging carried out for repairs of other underground utilities etc.

These faults generally take long time to detect and hence long time to repair the damaged cables and restore the power supply. Long outages cause heavy production loss to industries, revenue loss to power distribution companies and inconvenience to consumers. This calls for quick fault location and restoration of power supply in minimum possible time.

An ordinary fault locating kit comprising of Surge Generator and Pinpointing set can take long time to locate fault point. SCOPE offers Prelocator instruments that can give the fault distance to help the operator for reaching the spot quickly and pinpointing the fault in a short time.

The new generation CFL PL4+ Cable Fault Prelocator from SCOPE is the ultimate solution for locating underground cable faults in minimum time. It uses advanced technology for fault distance measurement which helps even an unskilled operator to locate the fault accurately.

CFL PL4+ portable Prelocator is used for identification of fault types in underground cables and the distance of fault. These products are designed to find out various types faults in the cable such as Open Circuit, Short Circuit, Splice in Cable, High Resistance, Moisture Ingress, etc. Various modes of operation combined with advanced features offers user the most effective solution for the job.



1. 10.4 inch Colour TFT Display
2. Reset button
3. Alphanumeric Keyboard
4. Input / Output BNC Connectors
5. USB Port
6. Battery Charging Socket and Indicator
7. Power ON/OFF Push Button
8. Quick Access Function Keys

Application Area

- Underground Power Cables
- Signaling and Control Cables
- Communication / Telecom Cables
- Overhead Cable Lines
- IT / Computer Network Cables
- Television Cables

Measurement Modes

Low Voltage Pulse-echo / Time Domain Reflectometer (TDR)

Time Domain Reflectometer (TDR) works on the same basic principle as radar. In this mode of operation, the Prelocator sends a low voltage, high frequency wave / pulse periodically into the cable under test. If the cable has constant impedance and is properly terminated, all of the sent energy will be equally dissipated across the cable. If there is any fault or, abnormality in the cable (like joint etc.) there will be a change of impedance at that point. As a result of the same, a part or all of the pulse energy is reflected back to the sending end of the instrument. Based on the velocity of propagation and the time difference between instant of transmitting the pulse and receiving back the reflected pulse, the distance to fault point from the sending end gets calculated.

TDR method is useful for identifying Open Circuit Faults, Short Circuit Faults, Low Resistance Faults, Cable Joints and Ingress of Moisture. TDR mode can also be used to measure the length of a healthy cable and determination of VoP for a known length of healthy cable.

Secondary Impulse / Arc Reflection / Multiple Impulse Method (SIM/ARC/MIM)

Localization of the cable faults with a high fault resistance is usually difficult using low-voltage TDR method. To localize these types of faults, the Prelocator need to be used in conjunction with the CFL SG Series High Voltage Surge Generator (Thumper) and ARC / SIM filter. The essence of the Arc Reflection Method is that with the help of CFL SG Series High Voltage Surge Generator, a short-time electric arc is created in the place of cable damage and this arc time gets prolonged by the use of ARC / SIM filter. Synchronously with the arc, the Prelocator performs the measurement. Thus, we can transform the high resistance fault into a low resistance fault or short circuit fault and the fault location can be identified easily with the simultaneous application of TDR by Prelocator. However, to achieve this, the Prelocator need to be coupled properly with the Surge generator and ARC / SIM filter in ARC / SIM mode. Multiple signatures of Arc Reflection Method (ARC) or, Secondary Impulse Method (SIM) are taken in quick succession and they are compared together to identify the fault location most clearly. This is known as Multiple Impulse Method (MIM).

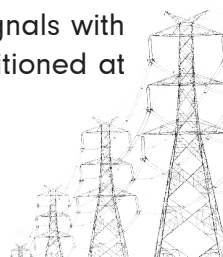
Impulse Current Method (ICM/ICE)

In case of high resistance or flashing faults, the SIM/ARC/MIM method may not be able to give the result due to corroded cable sheath or damping of returned TDR signals. Hence, we use current transient method for Prelocation of fault. This is commonly known as Impulse Current Method (ICM or, ICE) and preferred for longer cables. In ICM / ICE mode, the Prelocator need to be used in conjunction with the CFL SG Series High Voltage Surge Generator (Thumper). The Prelocator and surge generator gets coupled to each other with the help of a current coupler. During momentarily breakdown or flash-over at the fault, current transients are generated and oscillates back to the source end, sensed through the current coupler and displayed on Prelocator for further analysis of fault distance.

Voltage Decay Mode

When the Surge Generator cannot breakdown at the fault point, then a DC High voltage is applied gradually in the test cable, until the high resistance fault breaks down. During this, the cable stores the energy in the form of capacitance. At breakdown, the cable capacitance gets discharged through the fault and generates a voltage pulse that travels back to the test set where it gets reflected back to the fault point. When the same pulse reaches back the fault point, its polarity gets reversed and it again travels back to the test set. This process continues till the cable completely gets discharged.

In the Voltage Decay Mode, the Prelocator does not send any pulse into the cable but, operates in passive mode, just like an oscilloscope and captures the back and forth voltage transient signals with the help of a Voltage Decay Coupler. To determine the location of the fault, cursors are positioned at consecutive peaks of the trace to get the fault distance.



Features

- Compact, Lightweight and Rugged
- User friendly operation
- Wide measurement range up to 256km
- Highest measurement accuracy up to 0.025%
- High speed sampling of 800MHz
- Multiple waveform comparison with Subtraction mode to show waveform differences
- Zoom function for detailed analysis of the waveform
- Asynchronous interference & noise suppression
- Adjustable Gain and Balance
- Inbuilt Cable Library for easy setup and testing
- Inbuilt memory to store 300 waveforms with USB connectivity
- High resolution 10.4" colour TFT display
- "Screenshot" function with image saving in JPG
- Mains as well as Inbuilt Rechargeable Battery operated
- Housed in IP67 class molded case

Specification

Parameters	CFL PL4+			
Modes of Operation	<ul style="list-style-type: none"> • TDR : Time Domain Reflectometry / Low Voltage Pulse-echo • SIM / MIM / ARC : Secondary Impulse / Arc Reflection/ Multiple Impulse • ICM / ICE : Impulse Current • Voltage Decay 			
Sampling Rate	800MHz			
Measurement Range	Up to 256km			
Measurement Accuracy	0.025% to 0.2%			
Resolution	0.01m			
Pulse Amplitude (OCV)	18V and 86V selectable			
Pulse Width	10nS to 100µS			
Output Impedance	25Ω to 600Ω (Default 75Ω)			
Velocity of Propagation (VoP) / Propagation Factor (PF) Settings	Parameter	VoP %	PF	V/2
	From	33.3%	3.000	50m/µS
	To	99.9%	1.000	150m/µS
	Step	0.1%	0.001	0.1m/µS
Memory	300 Waveforms			
Connectivity	USB, Direct Download to Pen drive			
Cable Library	>100 Settings			
Display	10.4" Colour TFT			
Battery	Rechargeable Lithium Ion, Suitable for 6 hour operation			
Charger Input Supply	90V to 264V AC, 47 to 63 Hz, Single Phase			
Environmental	-10°C to +50°C, up to 95% RH (Non-Condensing)			
Dimension	339mm x 295mm x 152mm			
Weight	3.7kg			

Standard Accessories

TDR Cable, 2m Long	1 No.
Trigger Cable, 2m Long	2 No.
Current Coupler	1 No.
Mains Input / Battery Charger Cable	1 No.
Operation Manual	1 No.
Soft Carrying Bag for Main Instrument and other accessories	1 No.
Factory Test and Calibration Report	1 No.

Optional Accessories

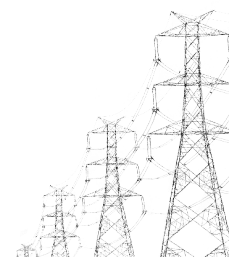
- Voltage Decay Coupler
- TDR Test Cable 5m / 10m / 20m / 25m / 35m / 50m Long
- Other length of TDR Test Cable are also available on request
- Long Cable can be supplied with Cable Drum
- Pen Drive

Ordering Code

Example: CFL PL4+

N	F	F	F	F	N	F	N	T	R	I	N
CFL PL4+	F	F	F	F		F					

N	None										None	N
C	Voltage Decay Coupler										Customised	Z
P	Pen Drive										Indian Plug	I
B	Both										Universal Plug	U
F	Reserved										Industrial Plug	V
F	Reserved											
F	Reserved									230V ± 15%, 50/60Hz AC Input	R	
F	Reserved									110V ± 15%, 50/60Hz AC Input	Q	
N	None										5m Test Lead Set	T
Z	Customised										10m Test Lead Set	S
F	Reserved										25m Test Lead Set	E
N	None										35m Test Lead Set	D
1	Manual Cable Drum										50m Test Lead Set	G
2	Motorised Cable Drum										Customised Test Lead Set	Z



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Distribution, Industry ...

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always!



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