



# SELMOUNT POWER SYSTEMS PVT. LTD

(AN ISO 9001-2015 COMPANY)

SELMOUNT ARCADE No. 254/1-6, 3rd Phase,  
Peenya Indl. Area, Bengaluru- 560 058.

(Formerly known as SAHYADRI ELECTRICALS PVT. LTD.)



**DATA CAPTURE**

**DATA ANALYTICS**

**PREVENTIVE ACTION**

EARLY WARNING RADAR FOR ALL YOUR EARTH LEAKAGE PROBLEMS !

## ONLINE DC EARTH LEAKAGE DETECTOR

MULTIPLE PHYSICAL NODES & SUB NODES

# ELD-30120

[www.selmount.in](http://www.selmount.in)

## What is DC leakage/ DC ground fault ?

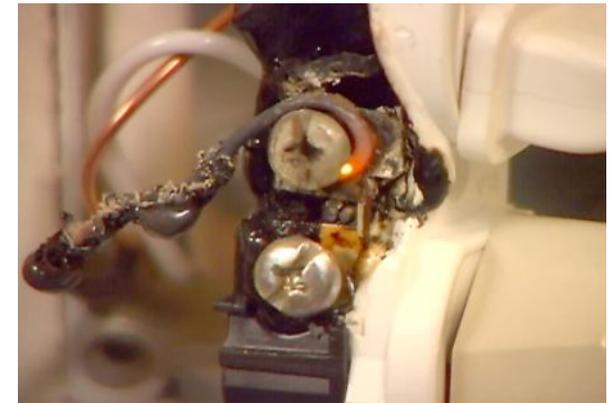
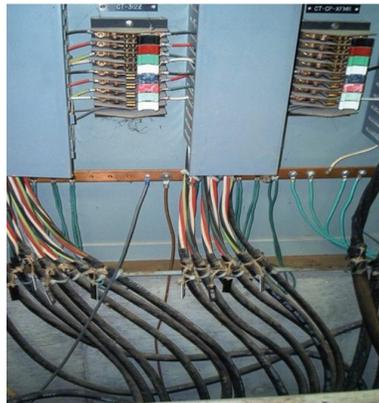
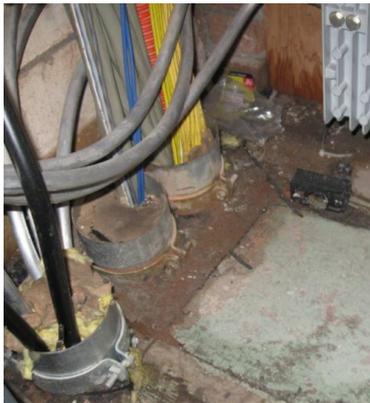
DC power systems and stationary battery in switchgear and control applications are typically designed and operated as ungrounded systems which means that there is no intentional low resistance or solid connection to ground from either the positive polarity or negative polarity of the dc system.

Ground faults happen when a current-carrying conductor makes unwanted contact with an equipment grounding conductor, or any piece of metal that is grounded. Leakages can result in potentially dangerous situations.



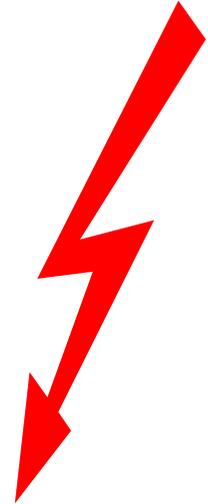
## Common factors for DC leakages:

- > Moisture in conduit and environmental conditions
- > Junction boxes or switch/sensor improper terminations
- > Wire splices soaking in water
- > Degraded cable or wire insulation caused by aging
- > Wild habitat and constant abrasion from vibration
- > Sharp objects piercing cable and wire insulation



## Consequences of DC ground fault:

- > Mal functioning of switch gears
- > Failure of battery & chargers
- > Over-heatings, Blown fuses, fire hazards
- > Equipments failure/damage



## Our solution:

“Selmount” offers online DC earth leakage locators for fast and effective measurement of leakages in any dc circuits. The ELD-30120 system consist of a centralized unit DELM-30 with 7 inch touch panel display. DELM-30 collects the data wirelessly from nodes DELN-4 and gives an alarm above the set value. As shown in the *fig-1*, it is possible to locate the source of leakage current using ultra low current measurement clamp DCT-100 & take methodical measurement without the need of disconnection of the circuit.

Large number of measuring nodes help in this aspect by finding the nearest source of leakages. This method will eliminate time consuming troubleshooting methods & helps to increase the stability of your electrical equipments.

This device is widely used in different dc systems including power utilities, locomotive, telecom etc.

Since the data collection is via a secured licence free wireless communication band, it will make the installation, retrofit and maintenance very easy to our customers.



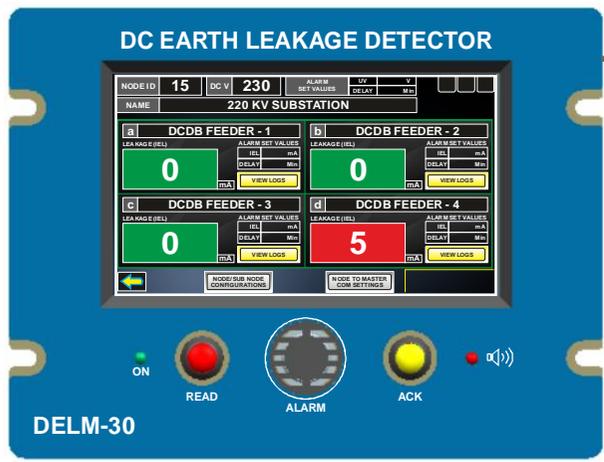
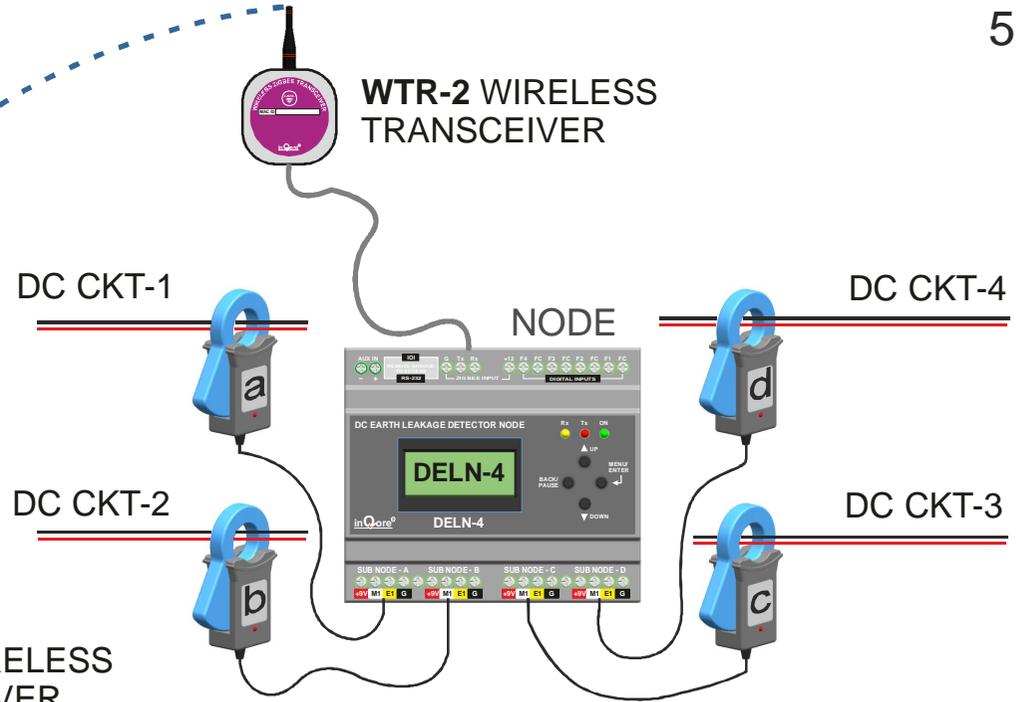
DELN-4 is the core module for data collection from 4 DCT-100 sub nodes. The raw data from the CT is signal conditioned & digitalized. This unit also has a dc voltage measurement function. The information is then transmitted to the data collection unit DELM-30 via a secured wireless communication interface. This module also has a character LCD for local interface. This unit is small in size with easy mounting options & can easily retrofitted in any existing dc circuits quickly. An optional IP-65 enclosure can be supplied for outdoor use.



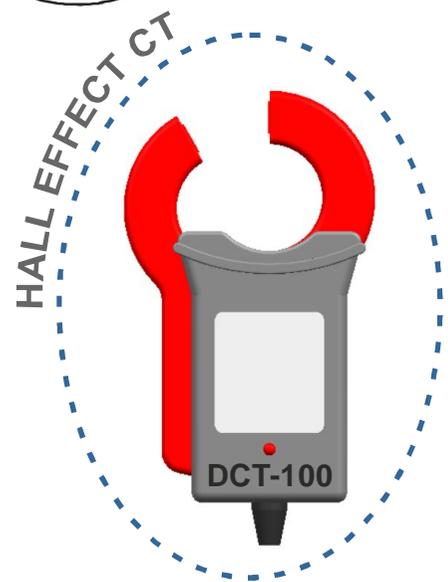
DELM-30 serves as the centralized information presentation module for all the sensor nodes. The data from all available DELN-4 modules is polled at specific intervals and presented in a graphical and user friendly 7" touch panel display. The display also provides the user with convenient programming facility for alarm and events. This unit can be easily flush mounted in a control room with a panel.

# Advantages:

- > Continuous monitoring (up to 120 points)
- > Non-intrusive measurement
- > Preventive maintenance
- > Centralized DATA presentation
- > Large DATA collection nodes
- > Secured wireless communication channel
- > Can be used as an audit tool
- > Easy installation, retrofits and low maintenance



USER CAN PROGRAM NAMES OF INDIVIDUAL NODE AND SUB NODE/CIRCUIT FOR FAST & EASY LOCATION OF THE FAULTY CIRCUIT



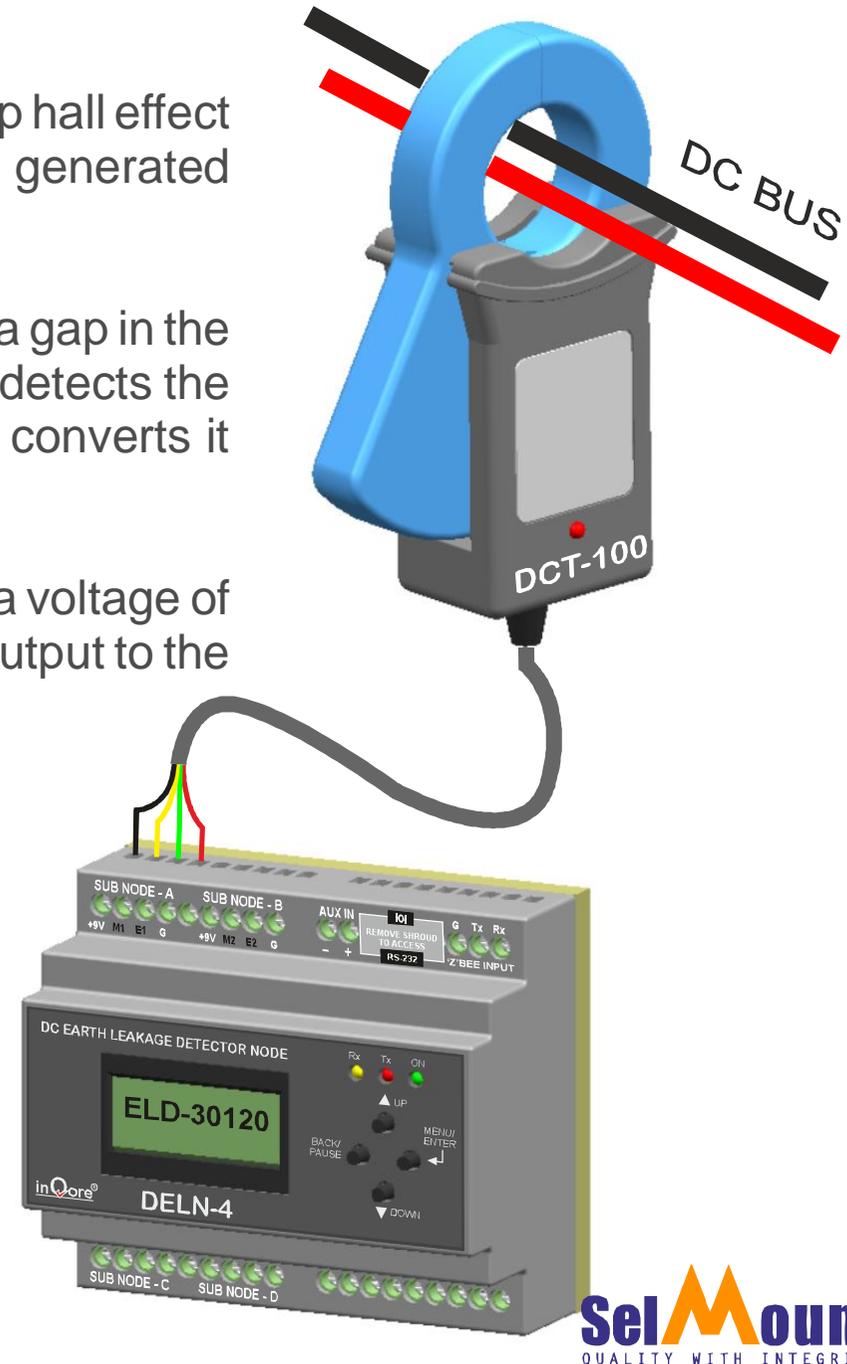
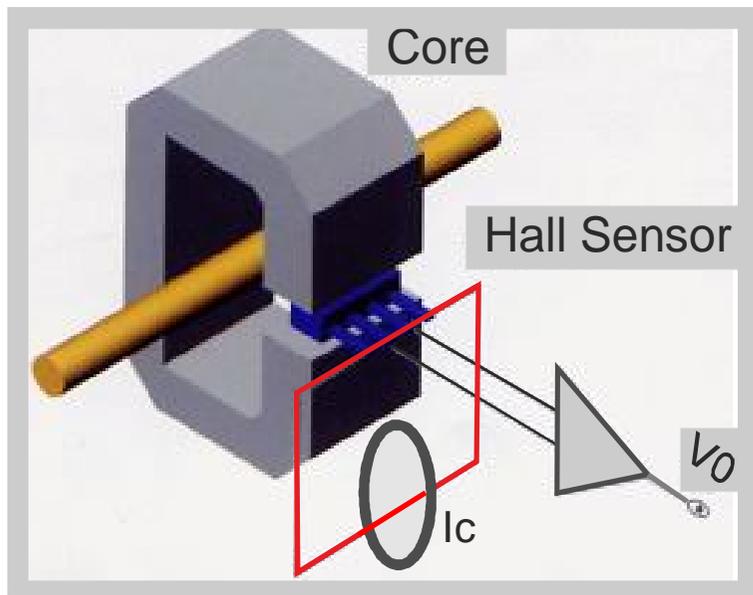
Each node has 4 separate leakage measurement sub units. A maximum of 30 nodes can be added in a network with a single common DATA presentation module. Hence a total of 120 points can be monitored online in a network.

## What is hall effect CT?

The **DCT-100** Series CT is embedded with an open-loop hall effect current sensor that directly detect the magnetic fields generated due to flow of leakage current by the target DC circuit.

This type of sensor have a hall element that is fit inside a gap in the core that surrounds the current bus. This hall element detects the magnetic field generated by the target current ( $I$ ) and converts it into a voltage.

Since the Hall element's output is low, it is amplified to a voltage of several volts by a downstream amplifier before being output to the control unit..





## How does DMN-S4R (switchable resistor) unit works ?

Consider multiple feeder arrangement with one incomer.

- 1) Resistor R1 & R2 (bank1) is selected for inducing 10mA (or least current) as reference current through earth.
- 2) If  $I_{eL} = F5 I_{eL}$ , then leakage is present in feeder-5 (F5) only.
- 3) If  $I_{eL} = F5 I_{eL} + F6 I_{eL}$ , then leakage is present in F5 & F6 only.
- 4) If  $I_{eL} = F5 I_{eL} + F6 I_{eL} + F7 I_{eL}$ , then leakage is present in F5 , F6 and F7.
- 5) Now as the number of leakages increases, the current will split between the various feeders & subsequently the earth leakage current in the individual feeder decreases. The leakage current (in case of huge number of multiple leakages) may reduce to such an extent that, it might be less than the measuring range of the feeder transducer.

**Inference:** If  $I_{eL}$  is measured (summation leakage current), but none of the feeders are showing any leakage current, we can infer that there are multiple leakages in the feeders or that the transducer is not connected to the feeder which has leakage in it.

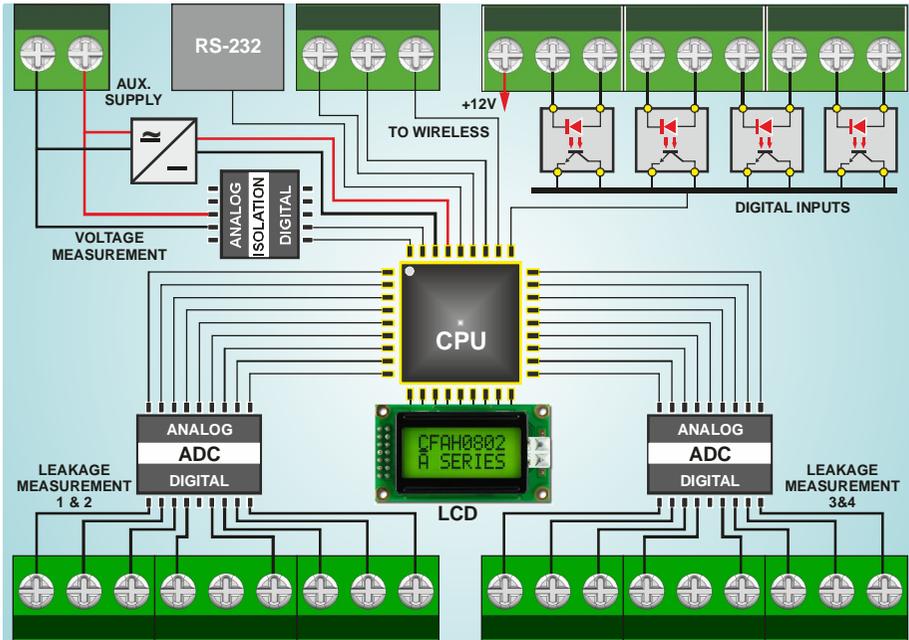
**Solution:** The solution to this issue is a switchable resistor bank which can increase the reference current for a short duration of time. Increasing the reference current will help to bring back the transducers into the measuring range. With this new method, multiple earth leakages can be easily measured.

The automatic resistor bank switching is done in a stepped manner (from higher resistance to lower resistance) & the switching time duration is restricted to < 500mSeconds. This method allows for better current control & provides adequate measurement window for the transducer.

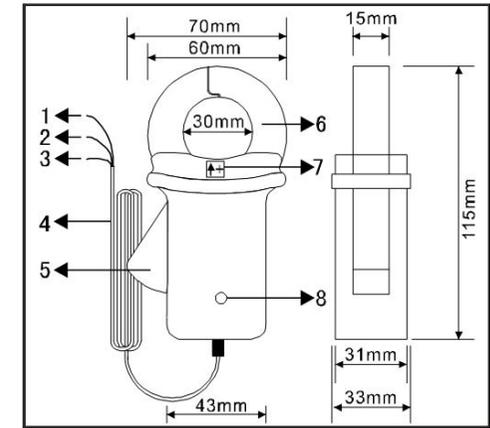
The resistance is introduced only during the measurement cycle (scheduled or on-demand) so that un-necessary leakages are not introduced in the system.

# Additional details

## Internal block diagram of deln-4 module



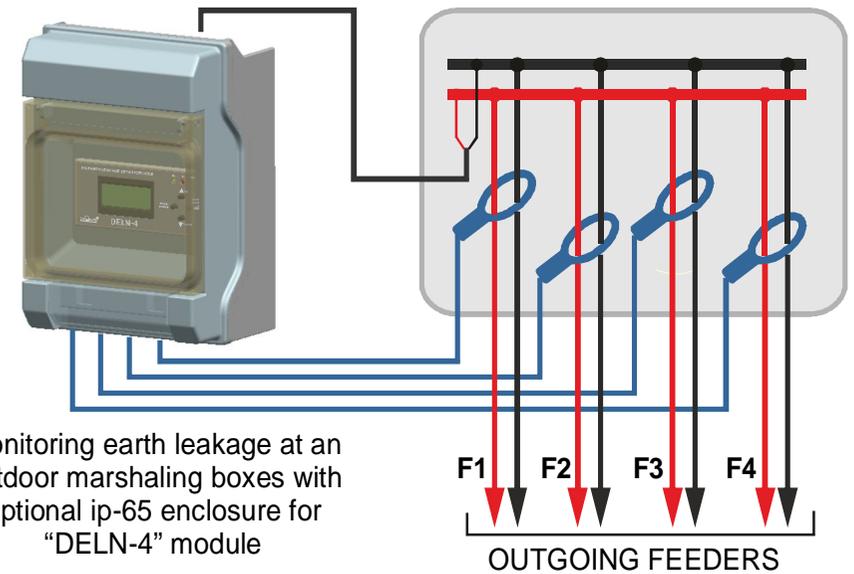
## DCT-100 CT Dimensional details



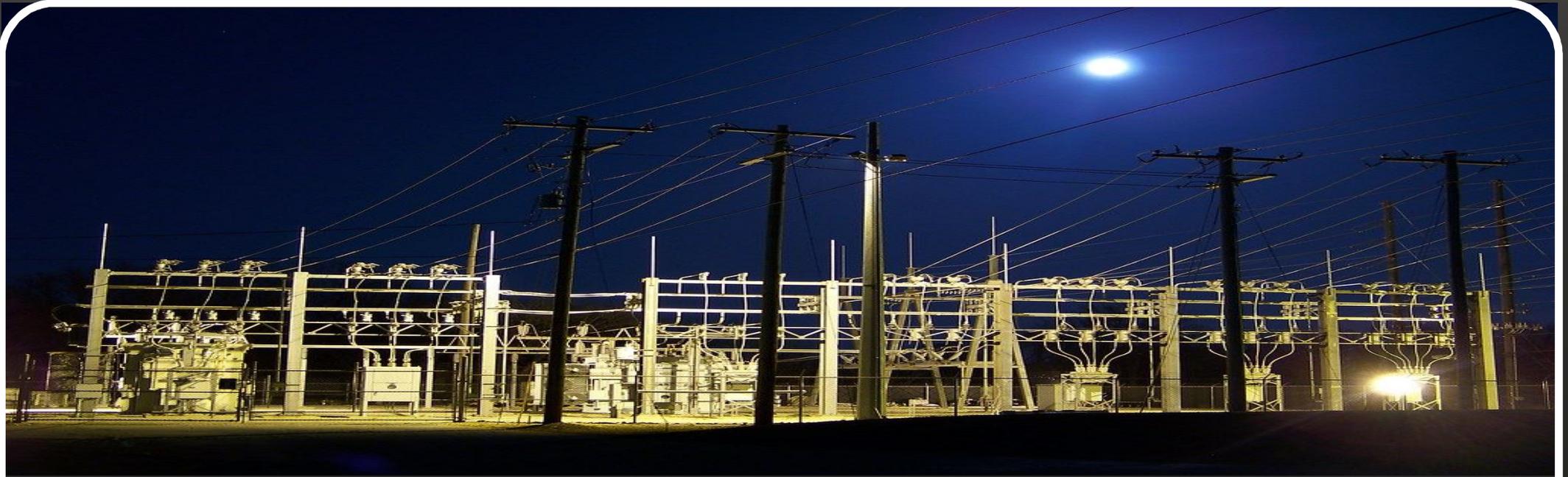
All dimensions are in mm

Optional ip-65 enclosure for outdoor use

4 feeder out door dc marshaling box



Monitoring earth leakage at an outdoor marshaling boxes with optional ip-65 enclosure for "DELN-4" module



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