KASHEF 002

Operation Manual

EECC Fault Indicator
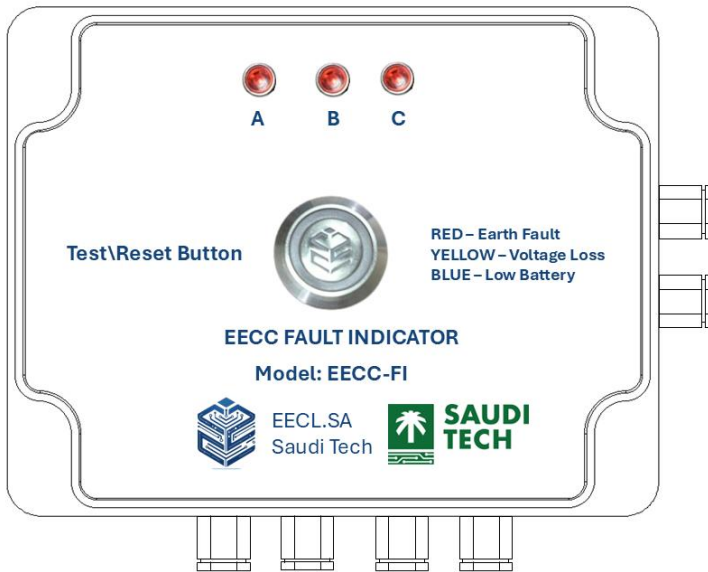
Model: EECC-FI

| Version	Date	Formulation / Revision	Make	Verify
V1.0	2024.10.24	First Published	Fatema	Saleem

Contents

Part 1: General Description

EECC-FI, is a Smart Fault Indicator developed by EECC, widely used in various ring main unit (RMU) equipment for underground power cables. Underground fault indicator devices are essential tools used in electrical power systems to detect and locate earth faults (ground faults) and short circuit faults in underground cables. These devices help in maintaining the reliability and safety of the electrical distribution network by quickly identifying fault locations, thereby reducing downtime, and facilitating faster repair times.

EECC-FI technology uses electromagnetic induction signal processed using an intelligent MCU. It is equipped with AC power loss indication, battery low power alarm indication; low-power design, high-capacity lithium battery power supply, external structure designed with external bracket for easier mounting.

Device Outlook:
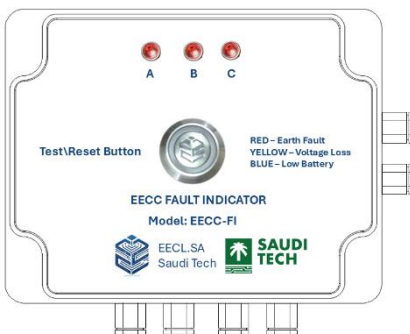
Front Side View
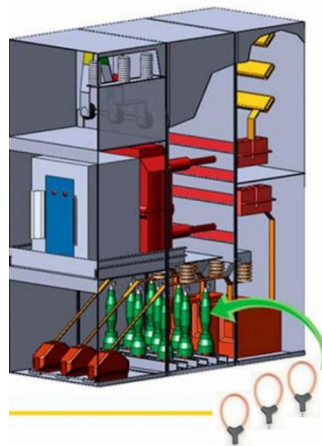
Current Sensors

Part 2: Technical Description

1. Functional Characteristics

- ❖ Intelligent indication of ground faults through the corresponding RED colored LED on the display unit to indicate the fault.

- ❖ AC power loss detection and indication with a YELLOW colored LED.

- ❖ Low battery indication with a Blue colored LED.

- ❖ Display unit designed with button for convenient reset or testing.

- ❖ The pulse width time of fault current can be configured to prevent incorrect fault indication caused by surge current.

- ❖ WIFI Web Server configuration interface provide simple & easy parameters configuration.

- ❖ Earth fault & Short-Circuit alarm trigger current, settable as desired from the Web Server interface.

- ❖ Battery can be replaced conveniently without soldering or tool.

- ❖ Zero-Sequence & Phases current measurement.

2. Functional Description

Earth Fault Alarm Indication: When an earth fault current is detected, where the zero-sequence current is higher than equal to or equal to the tripping current threshold, the display unit will indicate the event using Earth Fault LED blinking.

Short Circuit Fault Alarm Indication: When a short circuit fault current is detected, the display unit will indicate the event using the corresponding Phase RED LED blinking.

Power Loss Alarm Indication: When the AC supply is lost, the Fault Indicator activates a YELLOW colored blinking LED to indicate the Power Loss Alarm.

Low battery Alarm Indication: When the battery voltage is low, while the AC supply is available, the Fault Indicator activates a BLUE colored blinking LED to indicate the Low Battery Alarm.

Test Mode: If no fault is active, press the "Test/Reset" button and hold for at least 2 seconds, to check the LED indicators, and relay output.

Reset Mode: If any fault is active, press the " Test/Reset " button and hold for at least 2 seconds, to clear the active faults and release the flip the relay pins.

Phases Current Measurements: Phases Current Measurements reported through MODBUS RTU protocol using RS485 port.

3. Technical Specifications

Parameters	Specifications
Types of recorded Faults	- Earth Faults. - Double & triple phase short-circuit.
Earth Fault Detection Range	10 ~ 2000 A
Short Circuit Detection Range	200 ~ 2000 A
Current Measurement Range	1 ~ 6000 A
Current Measurement Accuracy	Calibrated: +/- 0.5% Uncalibrated: +/- 5%
Voltage Ratings	0.11-70 kV
Visual indication	– High Intensity LED
Main Power supply	– 100~270 VAC. – 9~14VDC (Power Supply / 16W Solar Panel).
Power Consumption	– 3mA@12V
Battery Type	– 2 PCS 3.7V 3000mAh 18650 Size
Indication Backup Supply	- > 900 hours of Indication

Resetting the fault indication	– Remotely From SCADA – Timer Reset. (Configurable time). – Automatic Voltage Restoration Reset. – Automatic Transient Reset (can be switched off). – Manual Test/Reset Button.
Trigger control	– Visual. – Relay output
Connection	RS-485 MODBUS RTU
Earth Fault Response Time	60 - 300 ms
Installation Location	At the side of switchgear, Ring Main Unit (RMU), and Substation (Distribution Transformer)
Sensors Type	– Rogowski coil 85mV/kA 50Hz.
Temperature range	Standard from –40 °C ~ +85 °C
Device protection degrees	IP 65 by GOST14254-2015 (IEC 60529:2013)

Part 3: Communication Description

3.1 Access point Activation:

- **WIFI Access Point Activation**: The system uses a magnet to turn the WIFI access point for 5 minutes, conserving energy during storage and delivery.

3.2 Communication Standards:

- **WIFI**: Operates on **2.4Ghz** frequency for wireless Parameters Configuration.
- **Protocol**: Uses **MODBUS RTU**, where the indicator serves as the **Slave** and the SCADA system as the **Master**.

3.3 MODBUS RTU Parameters:

Parameter	Specification
Connection	RS-485
Slave ID	Default 1 (Configurable)
Baud Rate	9600BPS
Parity	No parity
Data Bits	8
Stop Bit	1

3.4 MODBUS RTU SIGNALS LIST.

Function Code: Holding Resister (0x03)	
Index	Define
0	**TEST/RESET**
1	**Voltage Status**
2	**Battery Status**
3	**Phase A Current**
4	**Phase B Current**
5	**Phase C Current**
6	**Zero Sequence Current**
7	**Earth Fault Status**
8	**Phase A Short Circuit Status**
9	**Phase B Short Circuit Status**
10	**Phase C Short Circuit Status**
11	**Phase A Trip Current**
12	**Phase B Trip Current**
13	**Phase C Trip Current**
14	**Zero Sequence Trip Current**

4. Terminal Connection.
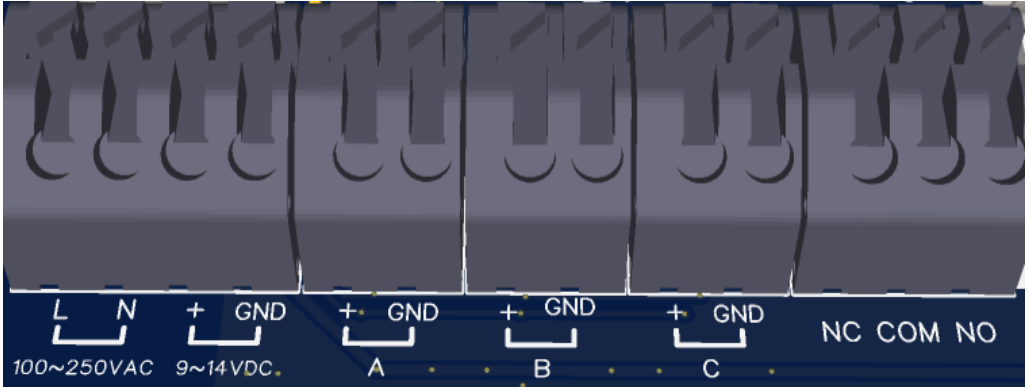
- ❖ **100~250VAC:**   AC Power Supply.
- ❖ **9~14VDC:**   DC Power Supply or 5W Solar Panel.
- ❖ **A:**   Phase A Current Sensor (Black is GND).
- ❖ **B:**   Phase B Current Sensor (Black is GND).
- ❖ **C:**   Phase C Current Sensor (Black is GND).
- ❖ **NC-COM:**   Normally Open Relay.
- ❖ **NC-COM:**   Normally Closed Relay.
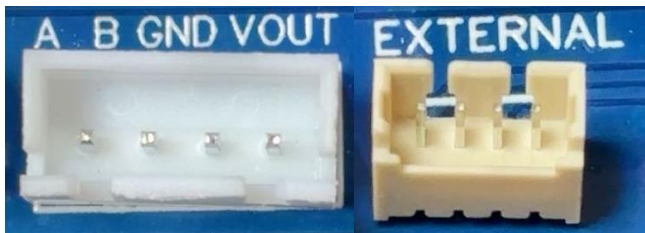
- ❖ **A-B:**   RS485 Connection Wires.
- ❖ **GND-**VOUT: 5~8.4VDC AUX Power Supply for External Modules.
- ❖ **EXTERNAL:**   AUX Terminal for External Fault Indication & Test/Reset.

5. Parameters Configuration Interface

The web server can be accessed after connecting to EECC-FI WIFI, the Access Point is activated by passing a magnet on the top of the device, AP remains active for 5 minutes and automatically shut down.

Parameter	Default
SSID	EECC-FI
Password	12345678
WEB Server IP	192.168.4.1

EECC Fault Indicator

Phase RMS Currents

Phase 1 RMS Current: 7.68 A

Phase 2 RMS Current: 11.36 A

Phase 3 RMS Current: 1.45 A

Zero Sequence Current: 11.38 A

Battery Voltage: 7.60 A

Configuration Interface

Slave ID:

1

Earth Fault Threshold (A):

50

Earth Fault Delay (ms):

0

Short Circuit Threshold (A):

60

Short Circuit Delay (ms):

0

Reset Timer (Minute):

30

Transient Reset: ☑
Voltage LED Enable: ☑

Update

Note: Threshold Current and Delay must be selected correctly to prevent false alarms due to an inrush current when circuit breakers are closed.

6. Working characteristics

EECC-EFI can sense Earth Fault in power lines by monitoring the waveform of zero sequence current simultaneously resulting real time detection when the earth fault current exceeds the settable accepted tripping current.
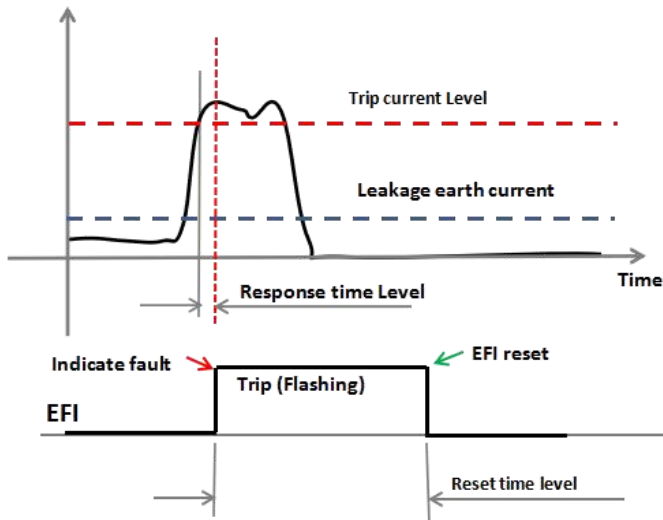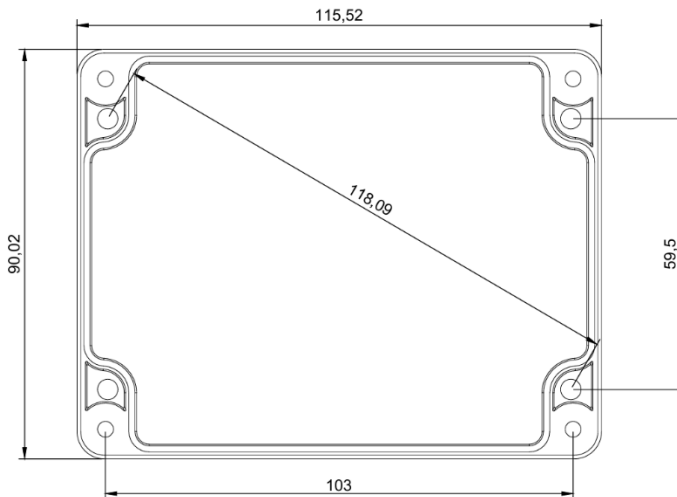
Part 3: Dimensions & Installation

1. Dimensions:

- Display Unit

Name	Overall dimensions, mm		
	Length	Width	Depth
Fault Indicator	115	90	55

- Rogowski CT

Name	Overall Dimensions
	Diameter, mm
A	80
B	80
C	80

2. System Wirring Diagram:

Test\Reset Button

RED – Earth Fault
YELLOW – Voltage Loss
BLUE – Low Battery
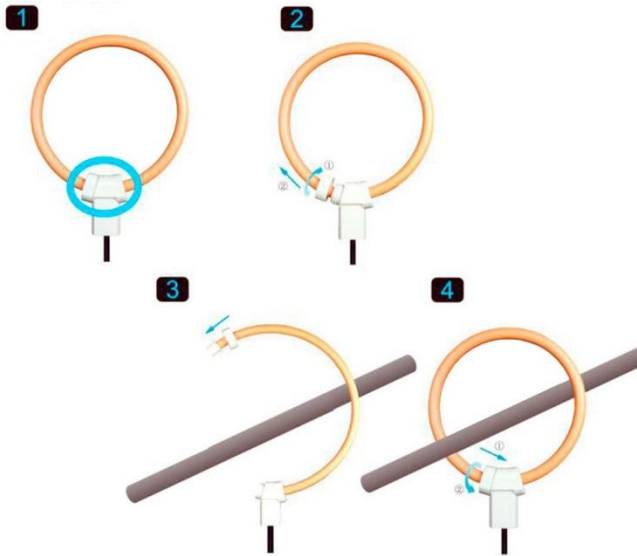
EECC FAULT INDICATOR

Model: EECC-FI

EECL.SA
Saudi Tech

SAUDI
TECH

A
B
C
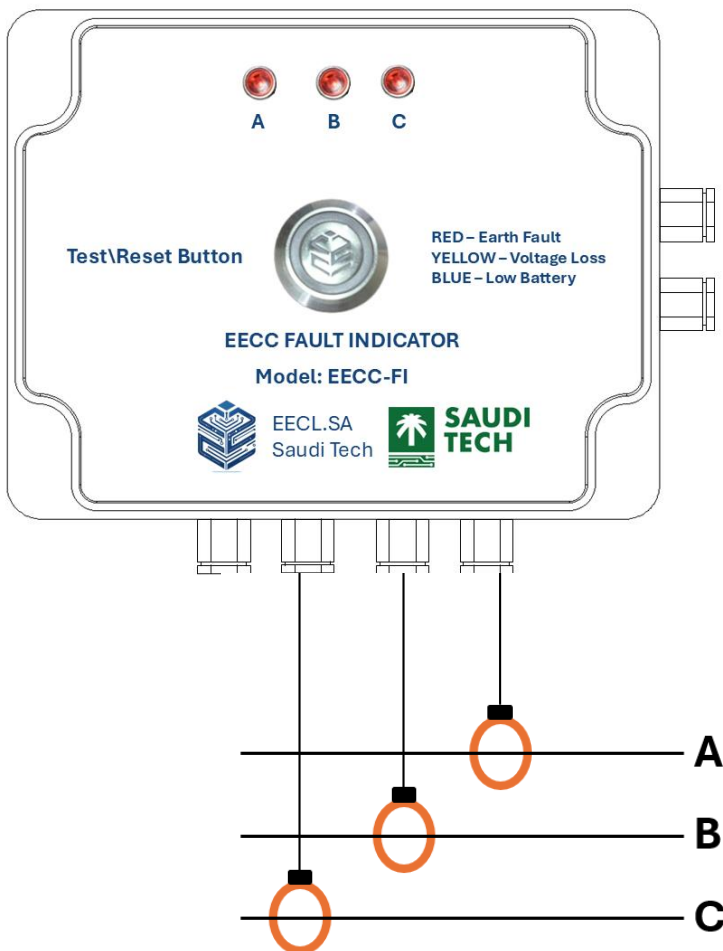
3. Earth Fault Sensor (CT) Installation:

- The current sensor needs to be mounted around the power cable conductors and tightened with the tie belt.

Current Sensor Installation Steps.
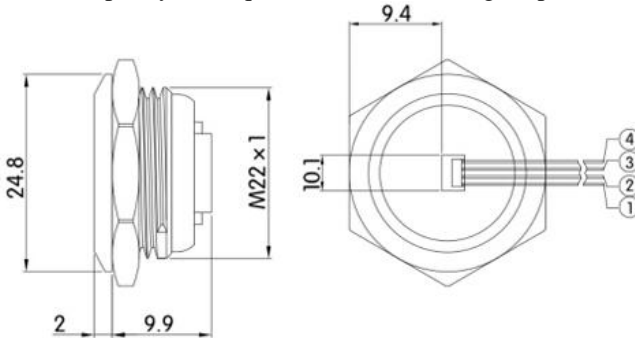
Part 4: Order Information

1. Package List

Standard Package Includes,

Fault Indicator	1Pcs
Current Sensor	3Pcs
Battery	2Pcs
Installation Kit (**INFX-KIT**).	1Pcs
Datasheet	1Pcs

2. Optional Accessories

- EECC-EX-BLED Auxiliary External Indicator + Test/Reset Button.
  (Please Specify the required Lead Cable Length upon order placement).

3. Order Placement Tips

For orders, additional information or technical support, reach us on email,

info@eecl.sa