

# STATIC EARTH LEAKAGE RELAY



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# Prok dv's®

An ISO 9001 : 2008 Company

STATIC EARTH LEAKAGE RELAY ( ELR ) WITH CORE BALANCE  
CURRENT TRANSFORMER(CBCT / ZCT)→ EL SERIES  
IEEE DEVICE CODE-64



## Features

- Consistent reliability with accuracy.
- Fixed or variable current sensitivity by Dip Switch selection
- LED's for visual indication of fault.
- High Barrier connector at rear for easy termination and safety standards.
- Tamper proof polycarbonate cover in the front.
- Test & Reset Facility for testing healthiness of the relay

## Applications

- Frame Leakage protection for L.T. Control Panels and switch boards.
- Earth Leakage protection for Feeders / Motors / Generators / Transformers / Mobile Operating Equipments.
- Protection for hazardous sensitive environments like Oil Refineries/ Cement Plant/Steel Plant /Chemical Platforms/Pulp industries and General Electrical Distribution.
- Protection for Mining & Control Engineering

## Specifications

Input auxiliary voltage	: 110V, 230V, 415V, 550V AC 50Hz 48V, 110V, & 220V VDC
Current Sensitivity range	: Variable: 30-300mA,50-2000mA, 300-3000mA 1-4 Amps, 1-8 Amps, 1-10 A, 4-12A. Fixed: 30mA, 100mA, 300mA, 500mA, also user specified ranges(sensitivity)

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#### Tripping time

Variable: 0.15 – 3 sec

Fixed: 100 millisecc, 500 millisecc , 1 sec & 3 sec

#### Core balance current transformer type:

Tape wound or Resin cast

CBCT / ZCT-Standard size I.D.

Circular: 40mm, 65mm, 100mm, 150mm, 200mm,  
250mm, 300mm

Rectangular: User specified

#### Relay contacts

: One pair of potential free NO & NC contacts or Two  
change over potential free NO & NC Contacts

#### Contact Rating

: 8 Amps/ 250V AC/ 8 Amps, 30 V DC

#### Mounting Type

: Flush / Din

#### Dimensions in mm

Flush : 96mm x 96mmx70mm

Panel Cutout size : 90x90+0.1 mm

Din: 75x95x75 mm (LxHxD) (fixing on 35mm din channel)

Note: 30-300 mA, 50-2000mA & 30-3000 mA, ELR is available upto 150 mm I.D. CBCT / ZCT only

## Introduction

Earth Leakage Current give rise to generation of heat and result in progressive failure of insulation, which leads to earth faults sparking flashovers, deterioration of earthing and finally results into catastrophic fires which destroys costly equipments, gadgets and precious lives. It is therefore essential to detect earth leakage current well before they cross the threshold limits and isolate the circuit in the event of leakages. Conventional over current and short circuit protection device are not designed detect earth leakage currents.

Prok dv's make Static Earth Leakage Relay (ELR) with Core Balance Current Transformer ( CBCT / ZCT) are used to detect the leakage current in an Electrical Power System. Static Earth Leakage Relay (ELR) Transmits a signal to activate the trip coil of the MCCB/ACB/OCB CONTACTOR in the event of Earth leakage, resulting in automatic isolation of the electrical power system. Static earth leakage relay (ELR) and core balance current transformer (CBCT / ZCT) have been widely used and accepted because these have field adaptability and are economic.

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Principle of Operation

Static Earth Leakage Relay(ELR) employs a Core Balance Current Transformer (CBCT / ZCT) to sense the leakage current. The CBCT / ZCT mounted externally and load current carrying cable is passed through the CBCT / ZCT. Ideally in a leakage free system the incoming and outgoing currents are equal and opposite in direction, which means that the vector sum of three phase currents is zero and can be expressed as:

$$\Rightarrow \Rightarrow \Rightarrow$$

$$I_r + I_y + I_b = 0 \text{ for 3 phase 3 wire system.}$$

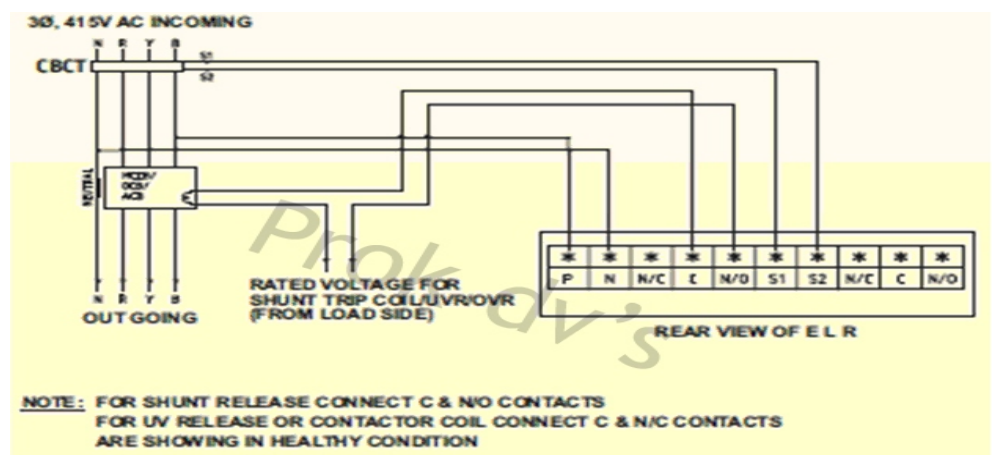
$$\Rightarrow \Rightarrow \Rightarrow$$

$$I_r + I_y + I_b + I_n = 0 \text{ for 3 phase, 4 wire system.}$$

For the above condition the CBCT / ZCT produces zero resultant magnetic flux keeping the system healthy.

In case of the Earth Leakage due to insulation failure of direct line to ground fault, the vector sum of currents is not zero and therefore generates resultant magnetic flux in the CBCT / ZCT, and signal is fed to the electronic circuit of Earth Leakage Relay (ELR). This signal is compared with internal reference determined by the selected position of the leakage current scale in the front facia of the relay. This energizes the output when the signal crosses the preset level. The potential free contacts of the relay is connected to the Shunt Trip/ No volt coil of the main trip device like MCCB/OCB/ACB/CONTACTOR etc., Under fault condition the output relay gets activated by cutting off or tripping against Earth Leakage /Faults. It is worthwhile to emphasize that the unequal/ unbalanced loading on the phases does not effect the vector sum and as such there is no difficulty in the use of Earth Leakage Relay (ELR) with Core Balance Current Transformer (CBCT / ZCT) on electrical distribution systems with unbalanced loading.

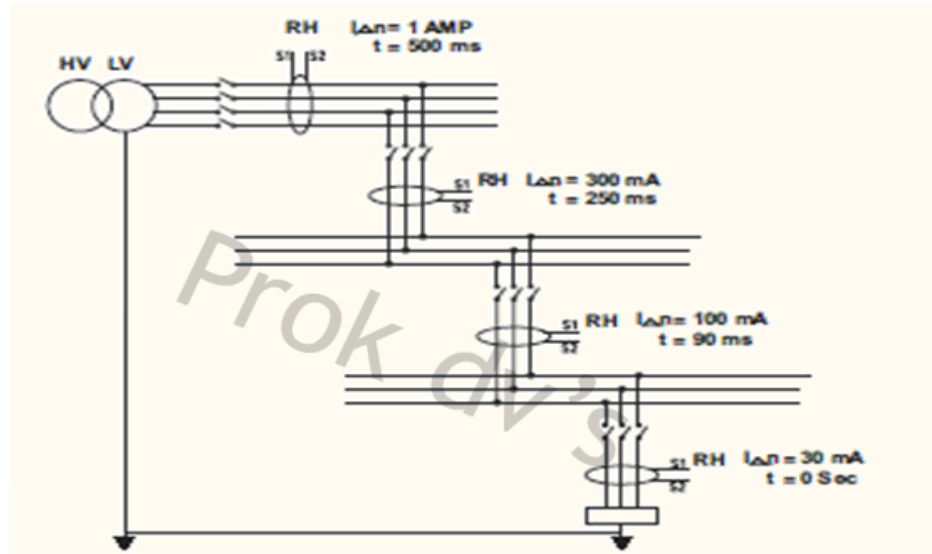
WIRING DIAGRAM FOR FLUSH MOUNTING  
 STATIC EARTH LEAKAGE RELAY (ELR) WITH CORE BALANCE CURRENT TRANSFORMER (CBCT / ZCT)



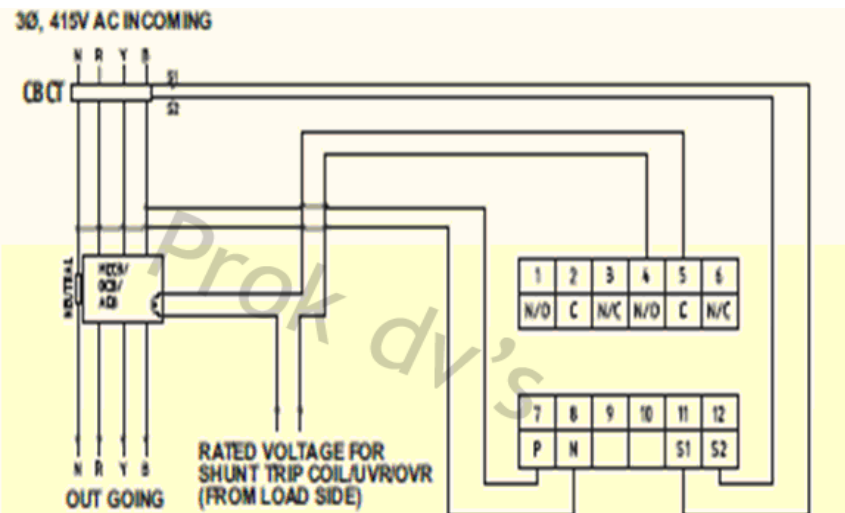
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STATIC EARTH LEAKAGE RELAY (ELR)  
 HIERARCHY-(Time & Current sensitivity)



WIRING DIAGRAM FOR DIN MOUNTING STATIC EARTH LEAKAGE RELAY (ELR) WITH CORE BALANCE CURRENT TRANSFORMER (CBCT / ZCT)

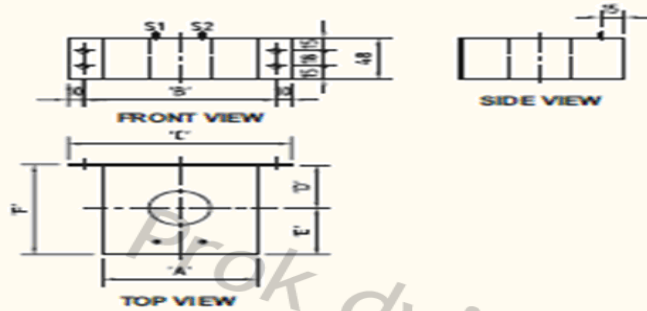


**NOTE:** FOR SHUNT RELEASE CONNECT C & N/O CONTACTS  
 FOR UV RELEASE OR CONTACTOR COIL CONNECT C & N/C CONTACTS  
 ARE SHOWING IN HEALTHY CONDITION

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RESIN CAST CORE BALANCE CURRENT TRANSFORMER (CBCT / ZCT) DIMENSIONS

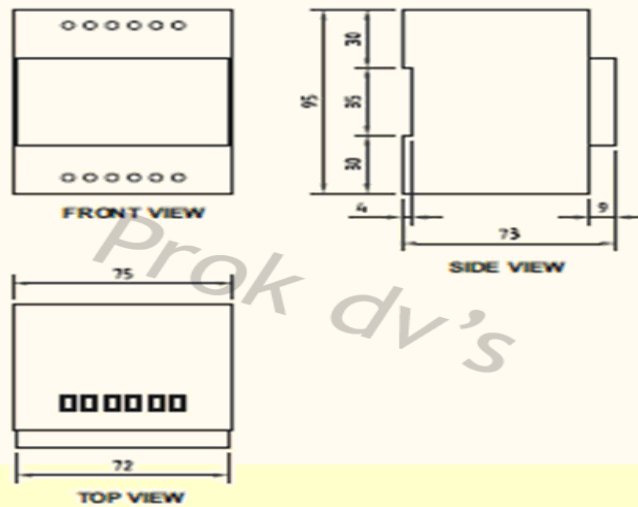


CBCT ID & DIMENSIONAL DETAILS:

CBCT ID $\phi$	A	B	C	D	E	F
40mm	100	125	145	50	55	106.5
65mm	125	150	170	62.5	67.5	131.5
100mm	160	185	205	80	85	166.5
150mm	210	235	255	105	110	216.5
200mm	260	285	305	130	135	266.5
250mm	310	335	355	155	165	321.5
300mm	360	385	405	180	185	366.5

NOTE: ALL DIMENSIONS ARE IN MM  
TOLERANCE:-  $\pm 0.1$ MM

MECHANICAL DIMENSION OF DIN MOUNTING STATIC EARTH LEAKAGE RELAY (ELR)



NOTE: ALL DIMENSIONS ARE IN MM  
TOLERANCE:-  $\pm 0.1$ MM

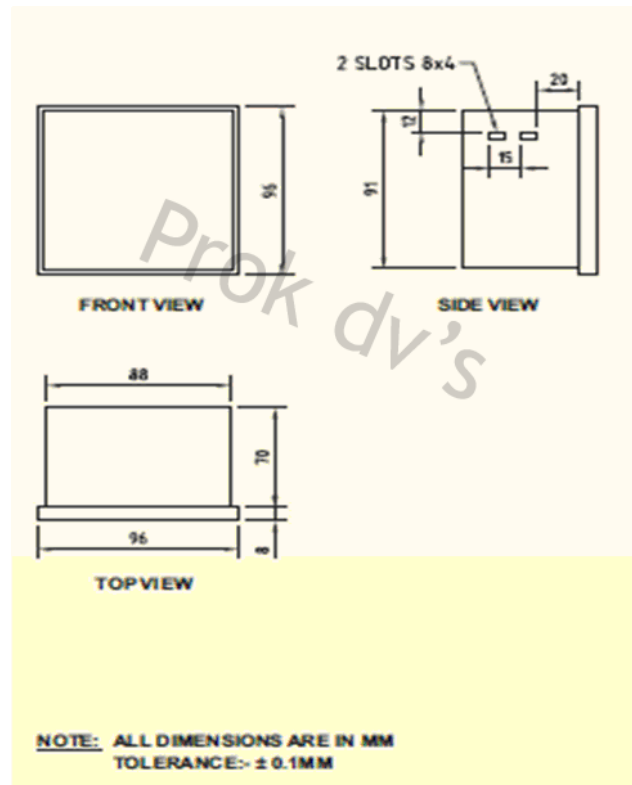
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MECHANICAL DIMENSION OF FLUSH MOUNTING  
STATIC EARTH LEAKAGE RELAY (ELR)

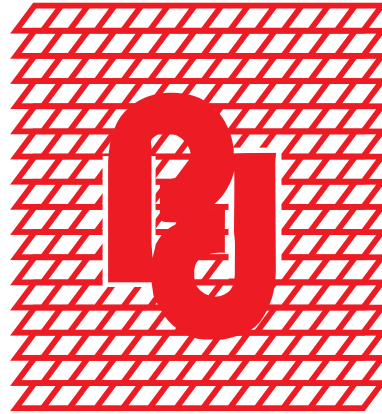


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