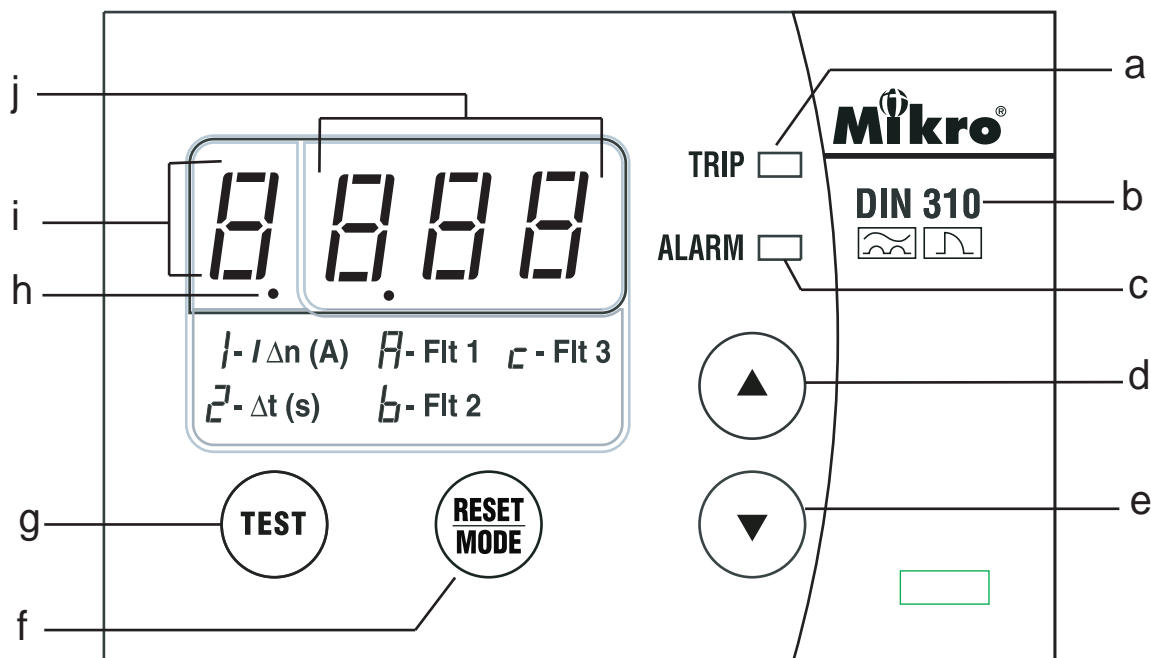


# DIN310 & DIN310E Earth Leakage Relay User's Guide

## A BRIEF OVERVIEW



- a - Trip status indicator
- b - Model
- c - Alarm status indicator
- d - Up button
- e - Down button
- f - Reset/mode button
- g - Integral test button
- h - DP indicator
- i - FUNCTION indicator
- j - DATA indicator

### Symbols

- $I_{\Delta n}$  - Sensitivity setting
- $\Delta t$  - Time delay setting
- Flt 1 - Fault record 1 (Newest)
- Flt 2 - Fault record 2
- Flt 3 - Fault record 3 (Oldest)

## 1. DESCRIPTION

The DIN310 and DIN310E are microprocessors based earth leakage relays designed for measure the low-level leakage or unbalanced currents due to insulation loss in conductors or equipment to be protected. A zero phase current transformer is used to sense the leakage current. All conductors of the circuit to be protected shall go through the ZCT.

For better fault preventive control of the system or equipment, DIN310E comes with a pre-fault alarm contact and a positive safety contact. The pre-fault alarm contact is energized whenever the leakage current exceed 50% of the sensitivity setting,  $I_{\Delta n}$ . The positive safety contact is energized if the relay is power up and function correctly.

## 2. LIGHT INDICATORS

The indicators display the status of the system as follow:

Indicator					Status
Trip	Alarm	FUNC	DP	DATA	
0	0	0	0	0	No auxiliary supply
0	0	0	0	1	Normal condition, no tripping
0	B	X	X	X	Leakage current exceeded 50% of the sensitivity setting, $I_{\Delta n}$ .
0	FB	X	X	X	Leakage current exceeded 85% of the sensitivity setting, $I_{\Delta n}$ . Time delay countdown started
1	1	0	0	B	Delay time lapsed and relay tripped
0	X	1	0	1	Scroll through setting
0	X	1	1	1	Scroll through records
0	X	B	0	1	Programming mode

Table 1: System status

1 = ON  
 0 = OFF  
 X = Don't care  
 B = Normal blinking  
 FB = Fast blinking  
 FUNC = FUNCTION

FUNC	DP	DATA
off	off	Real time leakage current
1	off	Sensitivity setting
2	off	Delay time setting
A	on	Fault record 1 (Newest)
b	on	Fault record 2
c	on	Fault record 3 (Oldest)

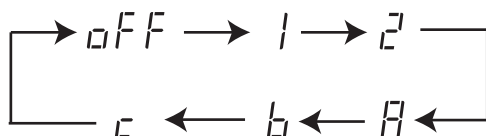
Table 2: Function codes

Message	Description
'Ct'	Error in ZCT connection
'tSt'	Relay tripped under test mode

Table 3: Display messages

## 3. PUSH BUTTON OPERATIONS

- a. Integral Trip Test:  
Press the "TEST" button to perform an integral test on the relay ranging from analog sensing circuitry to output contact(s) of the relay as well as the relay indicators and display.
- b. Trip Reset:  
Press the "RESET" button to reset the relay when tripped
- c. CT Fault:  
Press the "RESET" button to reset the relay after fixing the ZCT connection error. No reset function is carry out if the fault is not cleared.
- d. View Setting:  
When the relay is not under tripped condition or ZCT fault condition pressing the "RESET" button will scroll through the various functions.



- e. Program Setting:
  - Step 1: Press “RESET” button until the function digit shows the required function.
  - Step 2: Press the “UP” and “DOWN” button simultaneously and hold for 1 sec to enter programming mode. The function digit will blink to indicate the relay is in programming mode.
  - Step 3: Use the “UP” or “DOWN” button to select the desired value.
  - Step 4: To save the selected value, press the “UP” and “DOWN” button simultaneously and hold for 1 sec again. It will exit the programming mode with data digits displaying new setting.

To exit programming mode without saving the selected setting, press the “RESET” button once.

## 4. REMOTE INPUT \*

The DIN310E built in one remote reset input. This digital input is to remotely reset the relay when tripped or after fixing the ZCT connection error. To reset the relay, make a connection between terminals 4 and 5 of the relay.

## 5. OUTPUT CONTACT

- a. Trip Contact  
This is the latching type contact. It is energized either relay tripped due to leakage fault or broken connection between the relay and the ZCT.
- b. Positive Safety Contact \*  
Contact energized when the relay is power up and function correctly with no tripping.
- c. Pre -Fault Contact \*  
Contact energized when the leakage current exceeded 50% of the sensitivity setting and de-energized when the leakage current drop below 45% of the sensitivity setting.  
Contact is energized and latched if the relay is either tripped due to leakage fault or broken connection between the relay and the ZCT.

## 6. RECORD

The DIN310 / DIN310E incorporates a fault record function. It records the 3 latest tripped faults current and stored in non-volatile memory. No data is recorded if the tripping is triggered by integral test button.

## 7. TECHNICAL DATA

### AUXILIARY SUPPLY

DIN310-230(6).....	184 ~ 276 VAC
DIN310E-230(6).....	184 ~ 276 VAC
Rated frequency.....	50Hz or 60 Hz
VA rating.....	3 VA typical

### SETTING RANGES

Sensitivity adjustment.....	30mA, 50mA, 0.10A – 1.00A (Step = 50mA), 1.00A – 10.0A (Step = 1.00A)
Delay time adjustment.....	Instantaneous, 0.1s – 3.0s (Step = 0.10s)

### RECORD

Fault record.....	3 latest tripped fault currents
Storage.....	Non-volatile memory

### INPUT

Remote reset.....	N.O. dry contact
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### OUTPUTS

Trip contact.....	5A / 250V AC1
Positive safety contact *.....	5A / 250V AC1
Pre-fault alarm contact *.....	5A / 250V AC1

\*Applicable to DIN310E series only

**CONTACT SPECIFICATION**

Contact arrangement:.....Change-over  
 Contact material:.....Silver alloy  
 Expected electrical life:.....100,000 at rated current  
 Expected mechanical life:.....5x10<sup>6</sup> operations

**INDICATORS**

Pre-fault alarm:.....Red indicator  
 Time delay:.....Red indicator  
 Leakage trip:.....7-segment display & red indicator  
 ZCT fault:.....7-segment display & red indicator  
 Real-time leakage current:.....7-segment display

**ZERO-PHASE CURRENT TRANSFORMER**

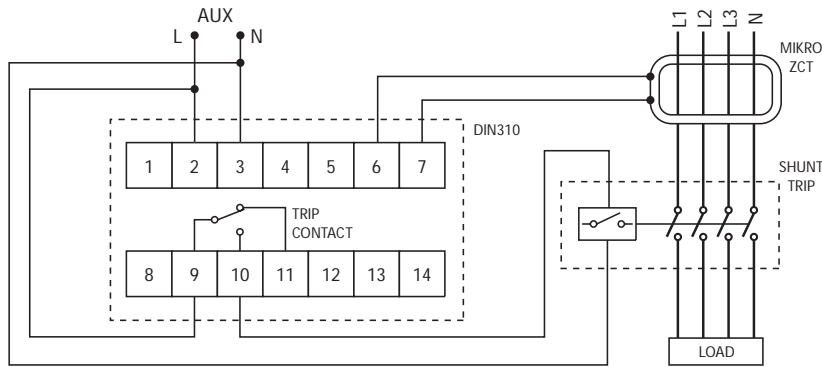
To operate with Mikro's ZCT series of current transformer

**MECHANICAL**

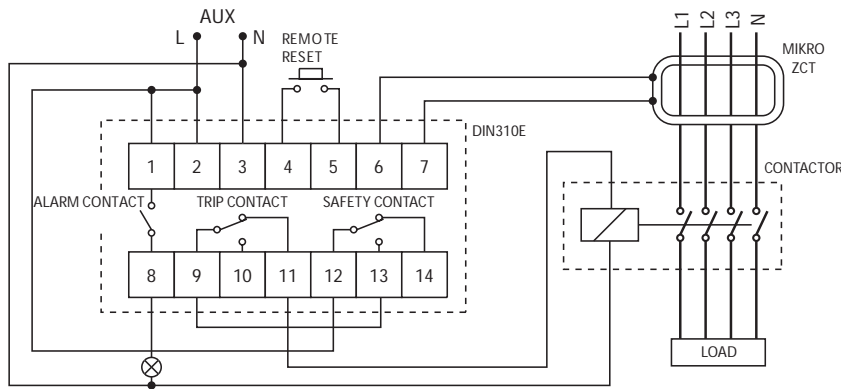
Mounting method:.....Standard 35mm DIN rail mounting  
 Approximate weight:..... 0.38kg (excluding ZCT)

**8. CONNECTION DIAGRAMS**

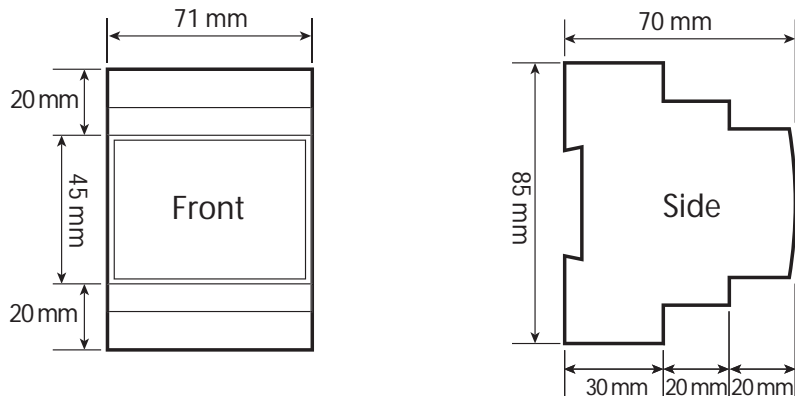
Typical application diagram for DIN310



Typical application diagram for DIN310E



**9. CASE DIMENSION**



\*Applicable to DIN310E series only