



## ELR-1D

### EARTH LEAKAGE RELAY IN A SINGLE DIN MODULE WITH SEPARATED CURRENT SENSOR

#### GENERALITY

The device type ELR-1D is an amperometric relay of maximum homopolar differential current to use to control the insulation towards earth of networks of Energy supplier, of electric machines, etc.

The device must be joined at a suitable toroidal current transformer of the CT line in the way to point out the earth leakage current of the system to control and to protect. The toroidal current transformer point out the vectorial sum of the current present on the active conductor of single phase line, three-phase with or without neutral (inside the toroidal current transformer will pass all phase conductor and if present the neutral, but none protection conductor must pass), in the way to point up the leakage current towards earth, depend of the insulation level line under control.

When the current read exceed the threshold value set the exchanging contact, available in output, will commute in the way to protect the line under control using opportune opening coils switch or contactor or to signal at distance the low insulation condition of the line or equipment under control.

#### INTRODUCTION

The ELR-1D has a case with reduced dimension (1 module of 17.5 mm) to mount on a DIN rail, in the way to use it in the application where the space available is limited.

A wide range of current and time of delay calibration, allows to use it in a lot of application, both like signalling of low insulation and like protection line according with the norms (EN 60947-2 attachment M), to realize adequate vertical and horizontal selectivity, etc.

The device has the following principal features: on input circuits of the measure circuit has opportune filters doing it exempt by external noises. The functioning is insured also with sinusoidal current and unidirectional button (type A according to norms IEC 755).

On the front it's possible to program the tripping current ( $30\text{mA} \div 30\text{ A}$ ), the tripping delay ( $0,02 \div 5\text{ sec.}$ ) using some micro-switches. The device has a normally open contact in output for tripping and manual reset functioning (reset button).

#### MODELS:

In basis of power supply there are 4 models:

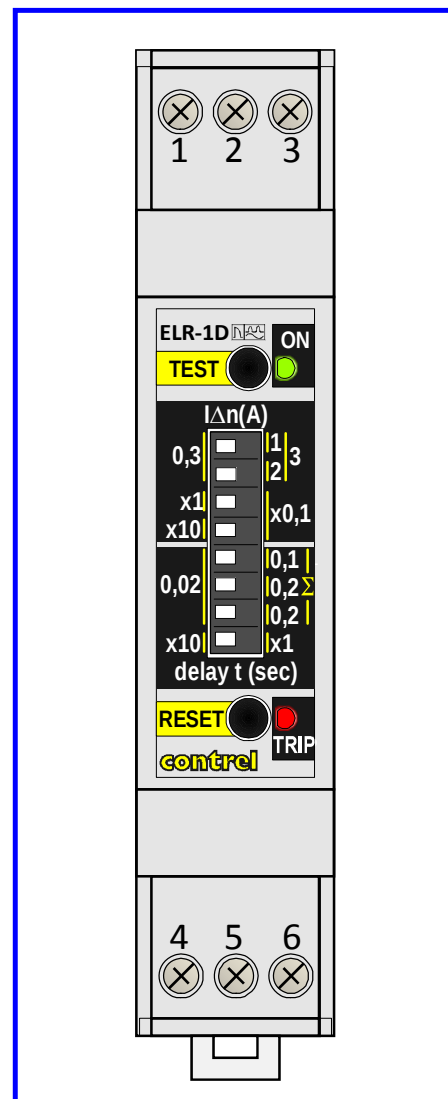
- ELR-1D-230: 220÷240Vac (standard)
- ELR-1D-110: 100÷130 Vac/dc (optional)
- ELR-1D-48: 48Vac/dc (optional)
- ELR-1D-24: 24Vac/dc (optional)

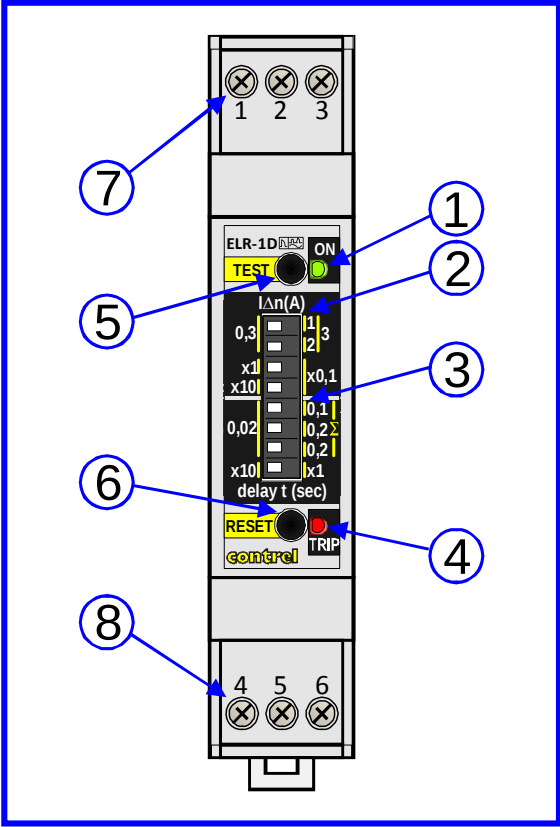
#### INSTALLATION

Only a qualified technician can do the installation. The instrument installation must be done in total absence of voltage. The instrument must be intact and it haven't damages caused of transport. The power supply must be compatible with the tool range.

The wire of connection between the relay and the toroidal current transformer must be twisted or shielded in presence of strong electromagnetic noises or considerable length. It's better to use a cable with a section of  $1\text{ mm}^2$  and a length lower than 30 meters. The toroidal current transformer must be connected at the terminals 1-2 (coil of measure).

To test the device it's possible to use the bottom of TEST that caused the intervention of relay after the delay set.





Legenda:

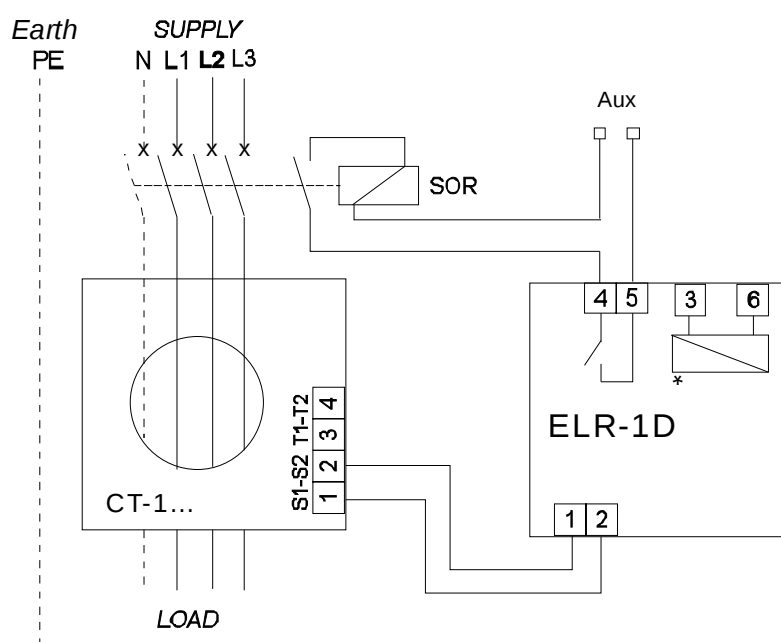
- 1. Green LED ON to signal that the device is powered on
- 2. Micro-switches to program the tripping current
- 3. Micro-switches to program the tripping delay

|        |       |       |
|--------|-------|-------|
|        |       |       |
| 0,03 A | 0,1 A | 0,2 A |
|        |       |       |
| 0,3 A  | 1 A   | 2 A   |
|        |       |       |
| 3 A    | 10 A  | 20 A  |
|        |       |       |
| 30 A   |       |       |

|         |        |        |
|---------|--------|--------|
|         |        |        |
| 0,02 s. | 0,1 s. | 0,2 s. |
|         |        |        |
| 0,3 s.  | 0,4 s. | 0,5 s. |
|         |        |        |
| 1 s.    | 2 s.   | 3 s.   |
|         |        |        |
| 4 s.    | 5 s.   |        |

- 4. Red LED (TRIP) to signal the device tripped
- 5. TEST button to verify the functioning device
- 6. RESET button for manual reset
- 7. Terminal board
- 8. Terminal board

## WIRING CONNECTION



Wiring diagram with switch with opening coil.

The output contact can be used to signal at distance the relay tripped.

\* power supply  $U_{aux}$

**ELR-1D-230**

- terminals 3 - 6 = 220÷240Vac

**ELR-1D-110**

- terminals 3 - 6 = 100÷130Vac/dc

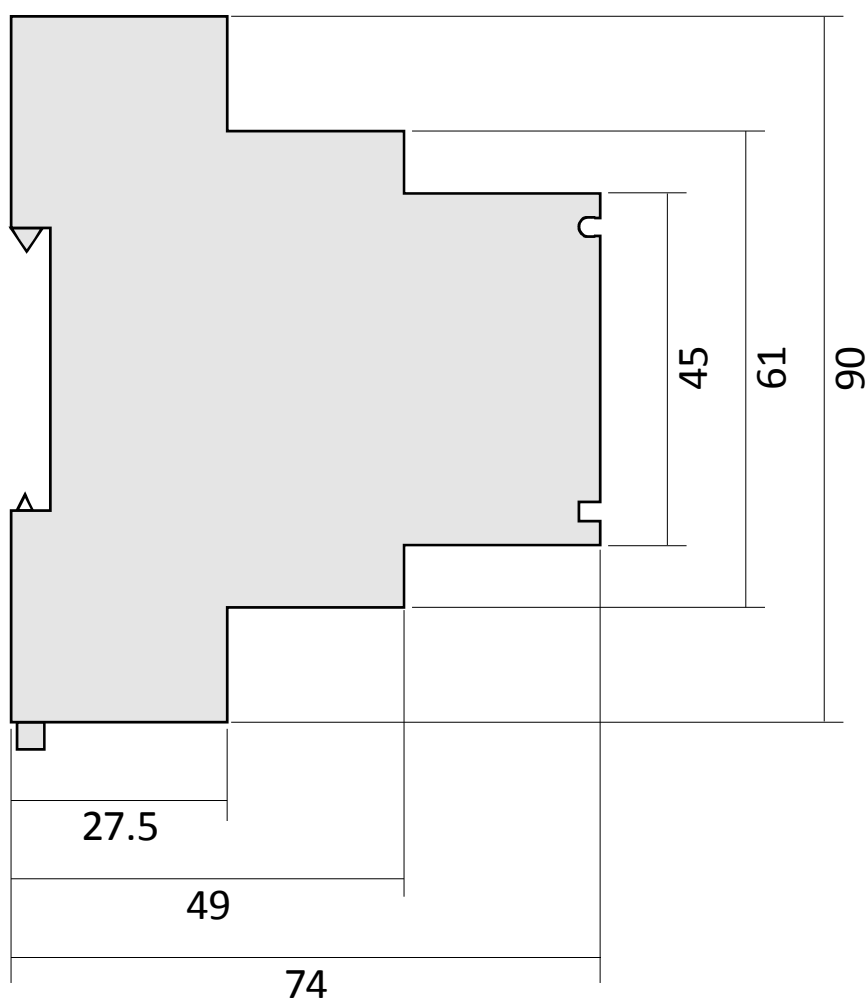
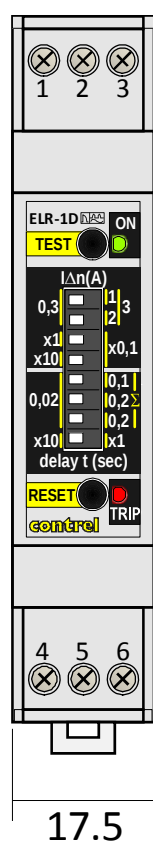
**ELR-1D-48**

- terminals 3 - 6 = 48Vac/dc

**ELR-1D-24**

- terminals 3 - 6 = 24Vac/dc

## DIMENSIONS



## FUNCTIONALITY

When the device is installed and correctly supplied, its green LED will be on. The eventual trip of relay (LED trip on) can depend by a presence of earth leakage current higher than the threshold set.

The manual reset can be performed pressing the RESET button on the front of the device. If it's impossible to do the reset after the tripping depends by a measured current, actually present, higher than the threshold.

## TECHNICAL FEATURES

|                                                  |                                                                                                                                                                                    |
|--------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Auxiliary power supply                           | <b>ELR-1D-230:</b> 220÷240V 50-60Hz ±15%<br><b>ELR-1D-110:</b> 100÷130V ac/dc 50-60Hz ±15%<br><b>ELR-1D-48:</b> 48V ac/dc 50-60Hz ±15%<br><b>ELR-1D-24:</b> 24V ac/dc 50-60Hz ±15% |
| Maximum consumption                              | 3 VA                                                                                                                                                                               |
| Tripping current adjustment range $I_{\Delta n}$ | 0,03 ÷ 30 A divided in 10 levels                                                                                                                                                   |
| Tripping time adjustment range t                 | 0,02 ÷ 5 sec. divided in 11 levels                                                                                                                                                 |
| Signalling                                       | led ON, led TRIP                                                                                                                                                                   |
| External toroidal current transformer            | CT-1... serie                                                                                                                                                                      |
| Output relay: voltage free contacts              | 1 contact NA 5 A 250V resistive load                                                                                                                                               |
| Programmable functions                           | tripping current threshold level, tripping delay level                                                                                                                             |
| Working temperature                              | -10 ÷ 60°C                                                                                                                                                                         |
| Storing temperature                              | -20 ÷ 70°C                                                                                                                                                                         |
| Relative humidity                                | ≤ 95 %                                                                                                                                                                             |
| Insulation test                                  | 3 kV 60 sec.                                                                                                                                                                       |
| Position of mounting                             | Indifferent                                                                                                                                                                        |
| Type of connection                               | Screw terminals, section wires max 2,5 mm <sup>2</sup>                                                                                                                             |
| Protection degree                                | IP 40 front with transparent cover - IP 20 enclosure                                                                                                                               |
| Mounting DIN 43700                               | Mounting on DIN bar 35mm, width single module by 17,5mm                                                                                                                            |
| Standards                                        | EN 60947-2:2007 M attachment - IEC 60755                                                                                                                                           |
| Electromagnetic compatibility                    | EN61000-4-2 / EN61000-4-3 / EN 61000-4-5 / EN 610004-4 / EN 61000-4.6                                                                                                              |

Contact the technical assistance or refer at specific document for application don't described in this manual.

### NOTE

At reason of the evolution of standards and products, the company reserves to modify in every time the features of the product described in this document, that it's necessary to verify preventively.

The liability of the producer for damage caused by defect of the product "can be reduced or deleted (...) when the damage is caused joint by a defect of product or for blame of the damaged or a person of which the damaged is responsible" (Article 8, 85/374/CEE).