

ELR Earth Leakage Protector Relay ELRP/S-12/24, ELRP/S-24/240 DIN-rail mounted

Introduction

These units monitor earth leakage current and compares it with the user selectable trip level (I_{max} A), should this level be exceeded, the relay will trip with a response time of less than 40ms, the supply can be disconnected before serious damage can occur. This unit works in conjunction with the Crompton core balanced current transformer CBT. The leakage current is determine by passing the phase conducted (and neutral) if present through a core balanced current transformer CBT. The current transformer sums the current flowing into and back from the load. Ideally, the load will have no leakage current, so current flow through the CT with be completely cancelled out.

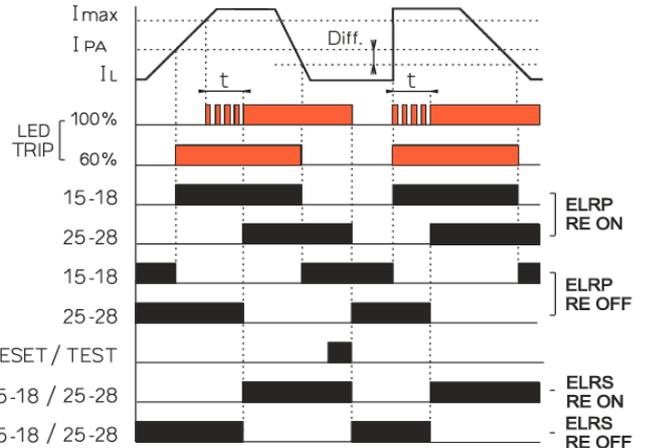
Front panel controls allow selection of:

- Selectable trip levels I_{max} , 30mA to 10 Amps
- RESET & TEST button for the return to the initial state or device test
- time delay before a trip triggers a relay response.
- **ELRP** = with 60% Pre-alarm
RE ON = energise on Trip, **RE OFF** = de-energise on trip
- **ELRS** = without Pre-alarm
RE ON = energise on Trip, **RE OFF** = de-energise on trip

LEDs indicate power on and trip status. Two changeover, volt-free relays are fitted. Two types are available - a 12/24 unit powered from 12-24V D.C and a 24/240 unit powered from 24V-240V A.C or D.C. These instructions contain important safety information. Please read them thoroughly before commissioning, operating or maintenance of the unit.

Specification

Parameter	12/24	24/240
Supply voltage	12-24V DC	24V/240V AC/DC
Burden on supply	1W	3VA/0.9W
A.C. Supply frequency	45-65 Hz	
Supply voltage tolerance	±10%	
Adjustable current levels (I_{max})	0.03A, 0.1A, 0.2A, 0.3A, 0.5A, 1A, 2A, 3A, 5A, 10A	
Overload capacity	20x set value (I_{max}) 1s max	
Pre-Alarm (I_{pa}) Current level	60% (I_{max})	
Pre-Alarm difference	10% (I_{max})	
Adjustable delay t(s)	0s, 0.1s, 0.2s, 0.4s, 0.6s, 0.8s, 1s, 2s, 5s, 10s*	
Analogue Output	0-1mA = 100% set Value (I_{max})	
Response time	< 40ms	
Relay contacts: for general switching operations	2 x changeover, volt-free	
Load capacity - a.c.	250V @ 8A, 2 kVA	
Load capacity - d.c.	30V 8A	
Insulation	4 kV/1 min	
Mechanical endurance	30x10 ⁶ operations	
Other Data:		
Dimensions	90 x 52 x 64 mm	
Weight	135g approx.	
Maximum conductor size	2 x 1.5 mm ² or 1 x 2.5 mm ²	
Operating temperature	-20 to +55 °C	
Storage temperature	-30 to +70 °C	
Over-voltage category	III	
Pollution degree	2	
Environmental protection	IP40 for front panel IP20 for terminals.	
Standards	EN 60255-6, EN 60255-27, EN 61000-6-2, EN 61000-6-4	
	Insulation Class: Ensure any external circuits connected to the relay are provided with double or reinforced insulation.	



The time delay and differential trip levels help to prevent relay chatter as the monitored voltage level varies.

As the relays have changeover contacts, the relay outputs can be inverted by wiring to the alternative terminals 15-16 or 25-26.

* Note In the case of a current range 0.03A or if the set current value is exceeded 5 times the time delay is ignored.

Operation

The green  LED lights to show when the supply is present (A1-A2) connections. Under normal conditions, with the monitored (I_{max}) current level below thresholds, both red LEDs will be off. With supply voltage off, both relays will be de-energised.

ELRS function (no pre-alarm)

- Position 1 (RE ON - energise on trip)

Both relays operate simultaneously (energise) at 100% of the trip set point. The relay operation is adjustable from 0 to 10 seconds delay. The red trip LED flashes during the delay period.

- Position 2 (RE OFF - de-energise on trip)

Both relays operate simultaneously (de-energise) at 100% of the trip set point. The relay operation is adjustable from 0 to 10 seconds delay. The red trip LED flashes during the delay period.

ELRP function (pre-alarm)

- Position 3 (RE ON - energise on trip)

If the fault current exceeds 60% of the trip set point, relay 1 (15-18) energises and the red pre-alarm LED will be on. If the current increases to 100% of the trip point, then relay 2 (25-28) energises and the red trip led will light. The operation of relay 2 can be delayed from 0-10 seconds after the 100% set point is reached, and the trip LED flashes during the delay period. Relay 1 is not affected by the time delay setting.

- Position 4 (RE OFF - de-energise on trip)

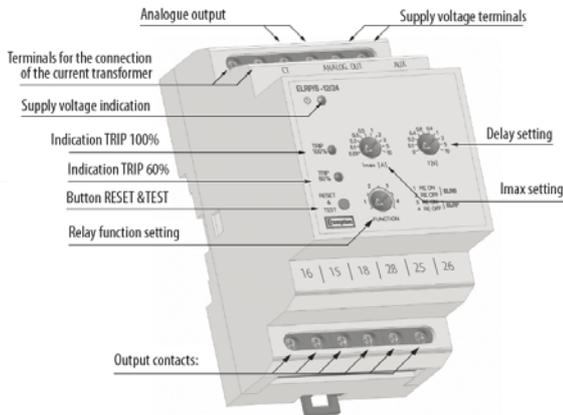
If the fault current exceeds 60% of the trip set point, relay 1 (15-18) de-energises and the red pre-alarm LED will be on. If the current increases to 100% of the trip point, then relay 2 (25-28) de-energises and the red trip led will light. The operation of relay 2 can be delayed from 0-10 seconds after the 100% set point is reached, and the trip LED flashes during the delay period. Relay 1 is not affected by the time delay setting.

Note: Red LED indicates fault condition, not relay status.

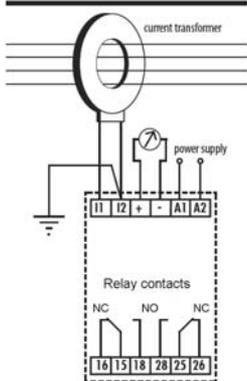
Installation

The unit is intended for mounting on a standard DIN rail. Hook the unit onto the top of the rail and press the bottom of the unit until it locks in place. To remove the unit from the rail, lever down the black tab at the bottom of the unit to release it from the rail.

The unit is intended for use in a reasonably stable ambient temperature within the range -20 to +55°C. Do not mount the unit where there is excessive vibration or in excessive direct sunlight.



The grounding device must lead outside the current transformer.



NC = Normally closed. Contact closed when relay de-energised.

NO = Normally open. Contact open when relay de-energised.

Warnings:



Caution: Risk of Electric Shock

- During normal operation, voltages hazardous to life may be present at some of the terminals of this unit. Installation and servicing should be performed only by qualified, properly trained personnel abiding by local regulations. Ensure all supplies are de-energised before attempting connection or other procedures.
- It is recommended adjustments be made with the supplies de-energised, but if this is not possible, then extreme caution should be exercised.
- Terminals should not be user accessible after installation and external installation provisions must be sufficient to prevent hazards under fault conditions.
- This unit is not intended to function as part of a system providing the sole means of fault protection - good engineering practice dictates that any critical function be protected by at least two independent and diverse means.
- The unit does not have internal fuses therefore external fuses must be used for protection and safety under fault conditions.
- If this equipment is used in a manner not specified by the manufacturer, protection provided by the equipment may be impaired.

Safety

The unit was designed in accordance with BS EN 600255-6 and -27 – Permanently connected use, Normal condition. Insulation category III, pollution degree 2, basic insulation for rated voltage. Measurement Category III.

All of the above information, including drawings, illustrations and graphic designs, reflects our present understanding and is to the best of our knowledge and belief correct and reliable. Users, however, should independently evaluate the suitability of each product for the desired application. Under no circumstances does this constitute an assurance of any particular quality or performance. Such an assurance is only provided in the context of our product specifications or explicit contractual arrangements. Our liability for these products is set forth in our standard terms and conditions of sale.

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EMC Installation Requirements

This unit has been designed to provide protection against EM (electromagnetic) interference in line, in accordance with BS EN 61000-6-2 and -6-4. Precautions necessary to provide proper operation of this and adjacent equipment will be installation dependent and so the following can only be general guidance:

- Avoid routing wiring to this unit alongside cables and products that are, or could be, a source of interference.
- To protect the product against incorrect operation or permanent damage, surge transients must be controlled. It is good EMC practice to suppress differential surges to 2kV or less at the source. The unit has been designed to automatically recover from typical transients, however in extreme circumstances it may be necessary to temporarily disconnect the auxiliary supply for a period of greater than 5 seconds to restore correct operation.
- Screened communication leads are recommended and may be required. These and other connecting leads may require the fitting of RF suppression components, such as ferrite absorbers, line filters etc., if RF fields cause problems.
- It is good practice to install sensitive electronic instruments that are performing critical functions in EMC enclosures that protect against electrical interference causing a disturbance in function.

Wiring

All connections are made to screw clamp terminals. Terminals are suitable for copper wires only and will accept one stranded 0.05 - 2.5mm² (30 - 12 AWG) stranded or solid core cables. Terminal screws should be tightened to 0.5 Nm. Choice of cable should meet local regulations.

Instrument transformers used for connection to the meter must be of approved type, compliant with ANSI/IEEE C57.13 / IEC 60044-1 to provide isolation from measuring inputs.

For UL approved installation, use National Electrical Code (NEC) Class 1 wiring, rated at 300V / 60°C min rating.

Fusing

A suitable switch or circuit breaker conforming to the relevant parts of IEC 60947-1 and IEC 60947-3 should be included in the building installation. It should be positioned so as to be easy to operate, in close proximity to the equipment, and clearly identified as the disconnecting device.

This unit must be fitted with an external fuse in voltage supply line. Line must be fused with a quick blow fuse 1A maximum. Choose fuse of a type and with a breaking capacity appropriate to the supply and in accordance with local regulations.

For UL approved installations:

UL listed branch circuit fuses, suitable for the installation voltage, shall be provided and installed in accordance with national installation code – 1A fast acting AC rated at the input.

Auxiliary Supply

There are two auxiliary supply options available. The unit should ideally be powered from a dedicated supply. However it may be powered from the signal source, providing the source will always be within tolerance for the auxiliary supply (24 to 240V AC or DC ±10% 0.9W 3VA. 45-65 Hz for AC). For 12-24V DC 1W, polarity reversal will not cause damage but the instrument will not function.

Maintenance

In normal use, little or no maintenance is needed. Where used, ensure any CT secondary circuits are short circuited prior to carrying out installation or maintenance of the unit. As appropriate for service conditions, isolate electrical power, inspect the unit and remove any dust or other foreign material present. Periodically check all connections for freedom from corrosion and screw tightness, particularly if vibration is present.

