

Terminal Protection to IP20



Dims: to DIN
43880
W. 44mm

- ❑ "Type B" operating characteristics measuring smooth DC, pulsed DC and AC fault currents
- ❑ Used in conjunction with separate current measuring toroid
- ❑ Programmable user settings/adjustments
- ❑ Built-in NFC (Near Field Communication) allows user to access and change settings via compatible Smartphone/Device with installed app as well as retrieve historical data
- ❑ Option to select tripping method (latch, auto-reset or auto-reclosure modes), Output relay logic (pre-alarm, energise or de-energise on trip) and filter cut-off points
- ❑ Connection facility for remote "Test/Reset" push button or N.O. contact
- ❑ Toroid open and short-circuit detection
- ❑ 2 Relay outputs – Relay 1 (SPDT) and Relay 2 (SPNO) - User configurable
- ❑ Wide auxiliary operating supply voltage - 24 – 230V AC/DC
- ❑ Compliant with IEC 60947-2 / Annex M



ISO 9001:2015
Cert. No. 14125771

OVERVIEW

The ELRB-03N is a fully featured, "Type B" Earth Leakage Relay which is suitable for applications such as Photovoltaic, EV (DC) Charging, UPS and Variable Speed Drives where smooth DC fault currents may occur.

Adjustments of the trip level and time delay are accessed via the front selector switches. LED's provide clear indication of the unit status and any actual measured fault current that may be present in the system. 2 programmable relay outputs are provided allowing for independent control/switching of external devices (i.e., contactors, shunt trips or undervoltage releases).

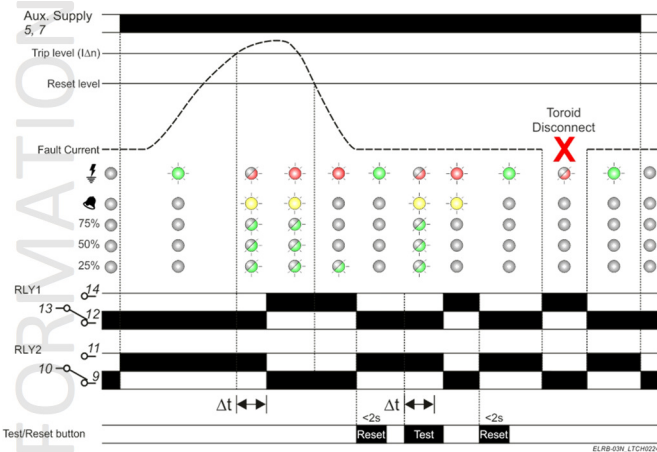
NFC allows further adjustment and setting of additional features provided. Utilising the app, allows the user to define how the unit should operate (see Function diagrams below) as well as configure and set parameters such as the relay logic (i.e., energise or de-energise on trip). It is also possible to define how the Auto-Reclosure mode should operate and set a filter cut-off point therefore allowing the unit to ignore signals above a certain frequency.

NFC technology allows the unit to be used in a "Passive" mode whereby settings can be made in the app and written to the unit without the need for the unit to be powered. This feature is useful where a panel needs to be shut down and power removed (for safety reasons) before any work or alterations need to be made. The user can read back the configuration using the app to establish/check the settings. Additionally, it is possible to measure (and display) the actual leakage current present in the system. The option to recall previous tripping information (accessed via the Logs option in the app) provides the user with historical data allowing the user to establish a pattern in the tripping occurrence's and hence make any necessary adjustments.

FUNCTION DIAGRAMS

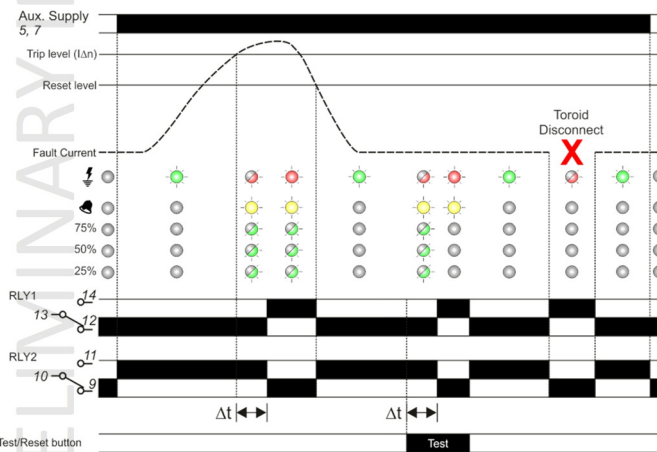
The following operational modes are selected using the app

Latching mode (factory default)



ELRB-03N_LTC0224

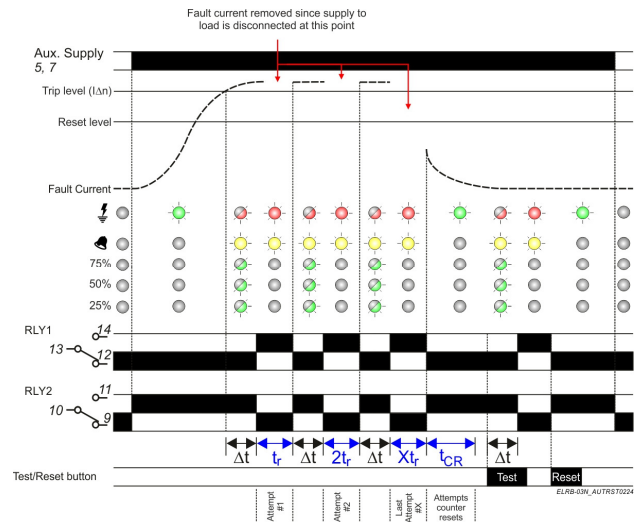
Auto-reset mode (enabled via app)



ELRB-03N_AUTR0224

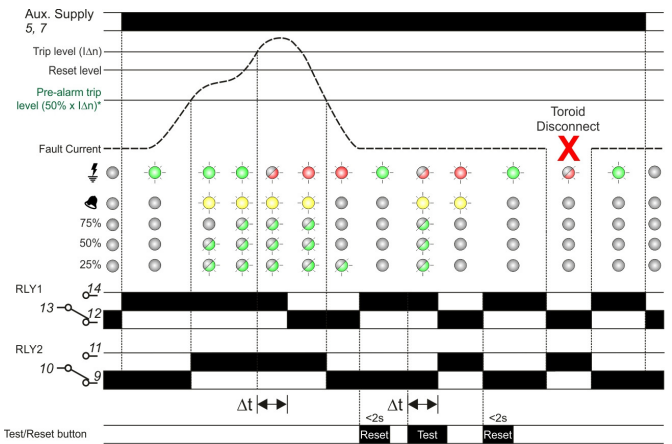
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Auto-reclosure mode (enabled via app)



ELRB-03N_AUTR0224

Pre-Alarm mode (enabled via app)



ELRB-03N_PRA0224

Note: relays are shown operating in their factory default states i.e. RLY1 = Standard Output and RLY2 = Positive Safety Output (Pre-Alarm default states are RLY1 and RLY2 = Standard Output)

INSTALLATION



Installation work must be carried out by qualified personnel.

- BEFORE INSTALLATION, ISOLATE THE SUPPLY.
- Connect the unit as shown in the diagram below on the next page (N.B. certain features may not be required and therefore do not need to be connected).
- Ensure the Auxiliary supply voltage to be connected to terminals 5 and 7 matches the rating of the product.
- A suitably rated fuse should be installed in series with connection to terminal 5 (A1) in order to protect the unit. See Technical specification for further information.
- Refer to separate data sheet for installation advice regarding the externally connected toroid.

APP

To utilise the full features, the app must be downloaded and installed on to the device that will be used to communicate with the unit.

This app will be made available Q2 2024.

SETTING

- The unit should be set according to the requirements of the application and the features required.

Applying Power.

- Apply power and the LED ③ will illuminate in green.
- Assuming the relays are in their factory default state will operate as follows: The “positive safety output” (RLY2) relay will energise.
- The positive safety output relay will de-energise if:
 - the fault current level exceeds the set trip level ($I_{\Delta n}$) **
 - there is a failure of the connection between the relay and the toroid ** (Note LED ③ will flash red during this condition)
 - the supply to the unit is removed

** causes the “standard output” relay (RLY1) to energise in response to the fault condition.

- Prior to the unit tripping, the LED bargraph ⑤ will indicate the % of $I_{\Delta n}$ being detected (the display is scaled between 25, 50, and 75% of the actual trip level). After all 3 LED's have illuminated plus alarm LED ④ and the unit trips due to an excessive fault current, LED ③ will illuminate in red.
- After the fault has cleared, the unit will then continue to operate as follows depending on how initially setup:
 - remain in the latched state
 - automatically reset (if enabled)
 - carry out the auto-reclosing function (if enabled)

Fault simulation (Test mode).

- The unit can be placed into a fault condition by pressing the “Test/Reset” button ⑥ on the front of the unit (or by pressing the remote button - if fitted). The output relays operate accordingly. *Note, if the time delay (Δt) is set, the button must be held for this duration before tripping occurs.*
- Press the same “Test/Reset” button on the front of the unit (or remote button - if fitted) to reset the unit. The output relays revert back to their “non-tripped” state.
- The unit can also be reset by interrupting the power supply.
- To satisfy regulations, it is recommended that the device be tested periodically to ensure correct operation.

Troubleshooting.

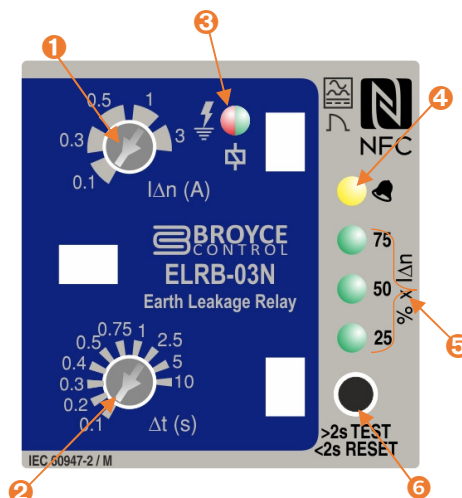
- If the unit fails to operate correctly check that all wiring and connections are good. Also check that the externally connected toroid meets the requirements of the product.

Note:

The operating function of this unit is classed as a **Type B** for which tripping is ensured for residual direct currents, sinusoidal alternating currents and residual pulsating direct currents, whether applied suddenly or slowly rising. Additionally, this unit is protected against nuisance tripping . This unit will also satisfy the requirements for **Type A and AC** devices which only need to detect residual alternating currents.

DESCRIPTION

- $I_{\Delta n}$ Trip level selector
- Δt Time delay selector
- “Power on/Tripped” bi-colour LED indication (Red/Green)
- “Alarm” LED indication (Yellow)
- Bargraph LED indication (Green)
- Combined “Test/Reset” button



TECHNICAL SPECIFICATION

Auxiliary Power Supply (5, 7)

Voltage range (Us):	24 – 230V AC/DC
<i>1.25A (T) rated fuse should be installed in line with terminal 5 (A1)</i>	
Frequency range (AC supply):	50/60Hz
Supply variation:	85 – 115% of Us
<i>Auxiliary supply is galvanically isolated from the Toroid and Remote Test/Reset connections</i>	
Overtoltage category:	III (IEC 60664)
Rated impulse withstand voltage:	4kV (1.2/50µs) IEC 60664
Power consumption (max.):	AC: 6VA, DC: 5W

Monitored input (via external Toroid connected to terminals 3, 4)

Unit classification:	Type B
Measurement principle:	True R.M.S.
Frequency range:	DC – 2000Hz
Monitored leakage current range:	1.5mA – 1A
External Toroid connection:	2-core cable (max. cable length 10m)

User adjustments

Trip level settings (IΔn) ¹ :	0.1A, 0.3A, 0.5A, 1A, 3A
Actual trip level:	85% of IΔn (+/- 5%)
Rated residual non-operating current (IΔno):	<80% of IΔn
Reset level:	≈ 85% tripped level
Time delay (Non-operate) settings (Δt) ² :	0.1s, 0.2s, 0.3s, 0.4s, 0.5s, 0.8s, 1s, 2.5s, 5s, 10s

¹ Adjustment of these settings can be made to suit the requirements of the installation. To prevent tampering of the settings, the clear window can be secured in place using a 2mm or 2.5mm wide cable tie (not supplied).

Reset time: <1s (from supply interruption)

LED indication

Power Supply	Bi-colour Green/Red x1	Dual functioning LED used to indicate Aux. power supply present and tripped status
Tripped		
Alarm	Yellow x 1	
Bargraph (25, 50, 75%)	Green x 3	

Test and Reset

	Front push button	Remote N.O. push button
"Test" method (assuming unit is in the non-tripped state)	Press and hold for >2s to trip the unit	Press button to trip the unit (connected to terminals 1 and 2)
"Reset" method (assuming unit is in the tripped state and fault current cleared)	Press <2s to reset the unit	Press same above button to reset the unit
Minimum trigger time:	>Δt	>80ms + Δt setting (only applicable to remote "Test")

Auto-reset

To enable: Via app

Relay operational modes

To change modes:	Via app only	
	RLY1	RLY2
Key (assuming non-tripped state):	S.O. (factory default)	P.S.O. (factory default)
S.O. = Standard Output (relay normally de-energised)	S.O.	Pre-alarm*
P.S.O. = Positive Safety Output (relay normally energised)	P.S.O.	P.S.O.
	S.O.	S.O.
	* Relay energises when Pre-alarm threshold exceeded (factory default = 50% of IΔn). Threshold can be changed via app	

TECHNICAL SPECIFICATION (continued)

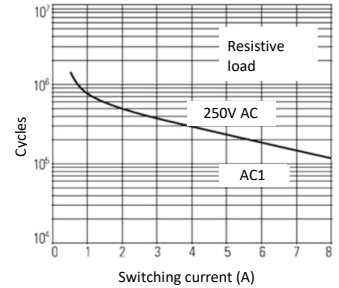
Temperature rating

Operating:	-20 to +60°C
Storage:	-30 to +70°C
Relative humidity:	+95% max.

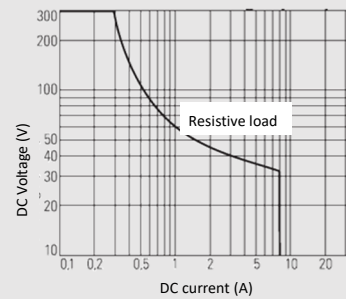
Output

	RLY1	RLY2
Terminals:	12, 13, 14	9, 10, 11
Contact arrangement:	1 x SPDT	1 x SPDT
AC1 (250V)	5A (1250VA)	5A (1250VA)
AC15 (250V)	2.5A	2.5A
DC1 (25V)	5A (200W)	5A (200W)

Electrical life:



DC load capacity:



Dielectric voltage:	2kV AC (rms) IEC 60947-1
Rated impulse withstand voltage:	4kV (1.2/50µs) IEC 60664

Housing

Material:	Grey flame retardant Lexan UL94 V0
Weight:	120g
Mounting option:	On to 35mm symmetric DIN rail to BS EN 60715

Terminal conductor size

Cable type:			
Nominal cross section:	0.2 – 4mm ²	0.2 – 2.5mm ²	0.2 – 2.5mm ²
	30 – 12AWG	30 – 12AWG	30 – 12AWG
Stripping length:	6mm		

Standards

Product:	IEC 60947-2 / Annex M, IEC 60755, IEC 62020
EMC:	IEC 61543, IEC 61000-4 Series, CISPR 22

CE and RoHS Compliant. C-tick

Toroid options

Part number:	Aperture	Internal diameter/size:	IΔn (min.) A
SEN-070	○	70mm Ø	0.1
SEN-120	○	120mm Ø	0.1

CONNECTION DIAGRAM

