

# Type: ELRV-30

## True RMS Earth Leakage Relay (Variable) - Type A

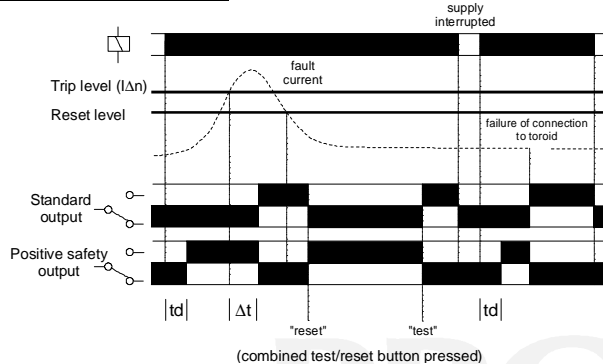
- 70mm DIN rail housing
- Designed to monitor and detect true RMS, earth fault currents (up to 30A) in conjunction with a separate toroid
- Fast response time of <25ms<sup>1</sup> to fault currents that are 5 x greater than the set trip current
- Digital LED Display shows measured leakage current, various user settings and diagnostics
- Microprocessor controlled with internal monitoring (self-checking)
- Sensitivity (I<sub>Δn</sub>) and time delay (Δt) adjustable using simple 2-button operation
- "Display" push button allows user to view settings without needing to open the tamperproof cover. The "last recorded" peak trip current can also be recalled using the same push button
- Single button operation for "Test / Reset" and connection facility for remote "Test" and "Reset" push buttons
- Connection for remote lamp facility warning user prior to a trip condition (level adjustable by user)
- Toroid open and short circuit detection (unit forced to trip during open circuit condition)
- 2 x SPDT relay output 8A. LED indication of user settings / fault condition after unit has tripped

Dims:  
to DIN 43880  
W. 70mm

Terminal Protection to IP20



### FUNCTION DIAGRAM



### INSTALLATION

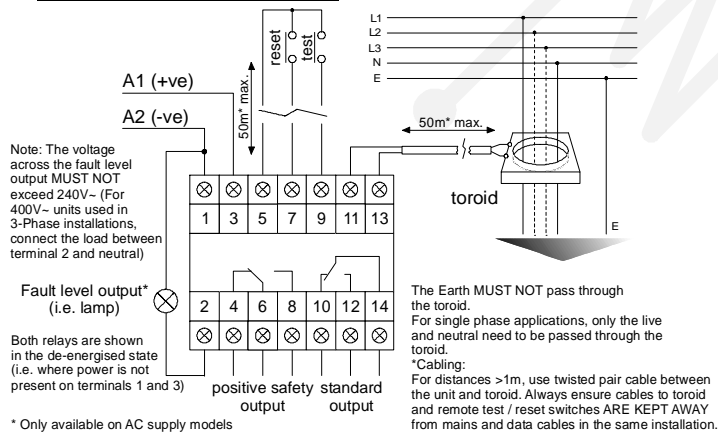
- BEFORE INSTALLATION, ISOLATE THE SUPPLY.
- Connect the unit as shown in the diagram below (N.B. certain features may not be required and therefore do not need to be connected).
- Operational and setting information can be found on the reverse of this data sheet.



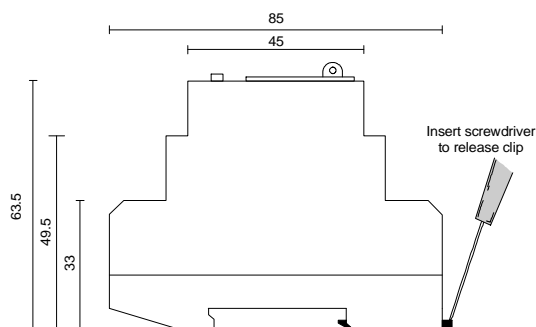
Installation work must be carried out by qualified personnel.

This unit should be installed in conjunction with the latest wiring regulations and practices (IEE, etc)

### CONNECTION DIAGRAM



### MOUNTING DETAILS



### TECHNICAL SPECIFICATION

|                                       |   |
|---------------------------------------|---|
| Supply voltage U <sub>n</sub> (1, 3): | 12 – 60V DC (85 – 115% of U)<br>24, 115, 230, 400V AC (85 – 115% of U <sub>n</sub> )<br>Galvanic isolation between the supply and the toroid and remote test / reset connections on AC supply versions. |
| Supply frequency:                     | 50/60/400Hz (AC supplies)   |
| Isolation:                            | Over voltage cat. III   |
| Rated impulse withstand voltage:      | 800V (24V AC supply)<br>2.5kV (115V AC supply)<br>4kV (230V, 400V AC supplies)  |
| Power consumption (max.):             | 6VA (AC supplies), 5W (DC supply)   |
| Monitored leakage current:            | 2mA to 30A (50/60/400Hz) (through external toroid with 1000:1 ratio and connected to terminals 11 and 13)   |
| Sensitivity I <sub>Δn</sub> :         | 6, 10, 30, 50, 75, 100, 300, 500, 750mA<br>1, 3, 5, 7.5, 10, 15, 20, 25, 30A (user selectable)  |
| Trip level:                           | 75% of I <sub>Δn</sub> (nominal)  |
| Hysteresis:                           | 8% of I <sub>Δn</sub> or 2mA, whichever greater   |
| Accuracy:                             | ±15% (valid range 10 ... 110% of I <sub>Δn</sub> or 2mA, whichever greater)   |
| Time delay Δt:                        | inst., 50, 250, 500ms, 1, 2.5, 5, 10 sec. (user selectable)   |

Please state Supply voltage when ordering.

Note: For I<sub>Δn</sub> settings of 30mA or less, the time delay is fixed to inst. (instantaneous, <25ms) and is not adjustable.

|                                   |   |
|-----------------------------------|---|
| Measured current:                 | Displayed on auto ranging 2 digit 7-segment red LED display   |
| Display Resolution:               | 100uA min.  |
| Reset time:                       | <200ms (from supply interruption)   |
| Power on delays:                  | Self test duration: <5 secs.<br>Delay before P.S.O. relay energises "td": 600ms (Note: relay will energise during self test period assuming no fault present) |
| Memory:                           | storage of the leakage fault and reset with "test / reset" button   |
| Ambient temp:                     | -5 to +60°C   |
| Relative humidity:                | -5 to +40°C (in accordance with IEC 755)<br>+95%  |
| Output :                          | 2 x SPDT relay (4, 6, 8 / 10, 12, 14)   |
| Output rating:                    | AC1 250V 8A (2000VA)<br>AC15 250V 2.5A<br>DC1 25V 8A (200W)   |
| Electrical life:                  | ≥ 150,000 ops at rated load   |
| Dielectric voltage:               | 2kV AC (rms) IEC 60947-1  |
| Rated impulse withstand voltage:  | 4kV (1.2 / 50μs) IEC 60664  |
| Remote "test" / "reset" (5, 7, 9) | Requires two N.O. contacts. (i.e. push buttons)   |
| Contact closure time:             | > 100ms   |
| Fault level output (1, 2):        | 50% of I <sub>Δn</sub> (factory set)<br>User adjustable from 10 - 65% in 5% increments  |
| Hysteresis:                       | 8% of I <sub>Δn</sub> or 2mA, whichever greater   |
| Load (resistive):                 | 40mA max. @ 240V<br>Note: A remote lamp can only be connected when terminals 1 and 3 are being supplied with an AC supply                                     |
| Housing:                          | Grey flame retardant Lexan UL94 VO  |
| Weight:                           | ≈ 250g (AC supplies), ≈ 170g (DC supply)  |
| Mounting option:                  | On to 35mm symmetric DIN rail to BS5584:1978 (EN50 002, DIN 46277-3)  |
| Terminal conductor size:          | ≤ 2.5mm <sup>2</sup> stranded, ≤ 4mm <sup>2</sup> solid   |
| Approvals:                        | Conforms to: IEC 755, IEC 61543 (EMC)<br>Radiated Immunity: IEC 61000-4-3: 1.89GHz @ 30V/m  |

and CE and Compliant.

- Options
- For other supply voltages, alternative trip levels or time delays, please consult the sales office.
- Accessories – Toroids

| Toroid Type: | Internal diameter: | I <sub>Δn</sub> (min.) A |
|--------------|--------------------|--------------------------|
| BZCT035      | 35mm Ø             | 0.03                     |
| BZCT070      | 70mm Ø             | 0.03                     |
| BZCT120      | 120mm Ø            | 0.1                      |
| BZCT210      | 210mm Ø            | 0.3                      |

Note:  
( ) Numbers in brackets shown above refer to terminal numbers on the relay housing.



Broyce Control Ltd., Pool Street, Wolverhampton, West Midlands WV2 4HN. England

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Telephone: +44 (0) 1902 773746 Facsimile: +44 (0) 1902 420639 Email: sales@broycecontrol.com Web: <http://www.broycecontrol.com>  
The information provided in this literature is believed to be accurate (subject to change without prior notice); however, use of such information shall be entirely at the user's own risk.

## • OPERATING INSTRUCTIONS AND SETTINGS

### Description

- The operating function of this unit is classed as a Type A  for which tripping is ensured for residual true RMS sinusoidal alternating currents and residual pulsating direct currents, whether applied suddenly or slowly rising. Additionally, this unit is protected against nuisance tripping. 

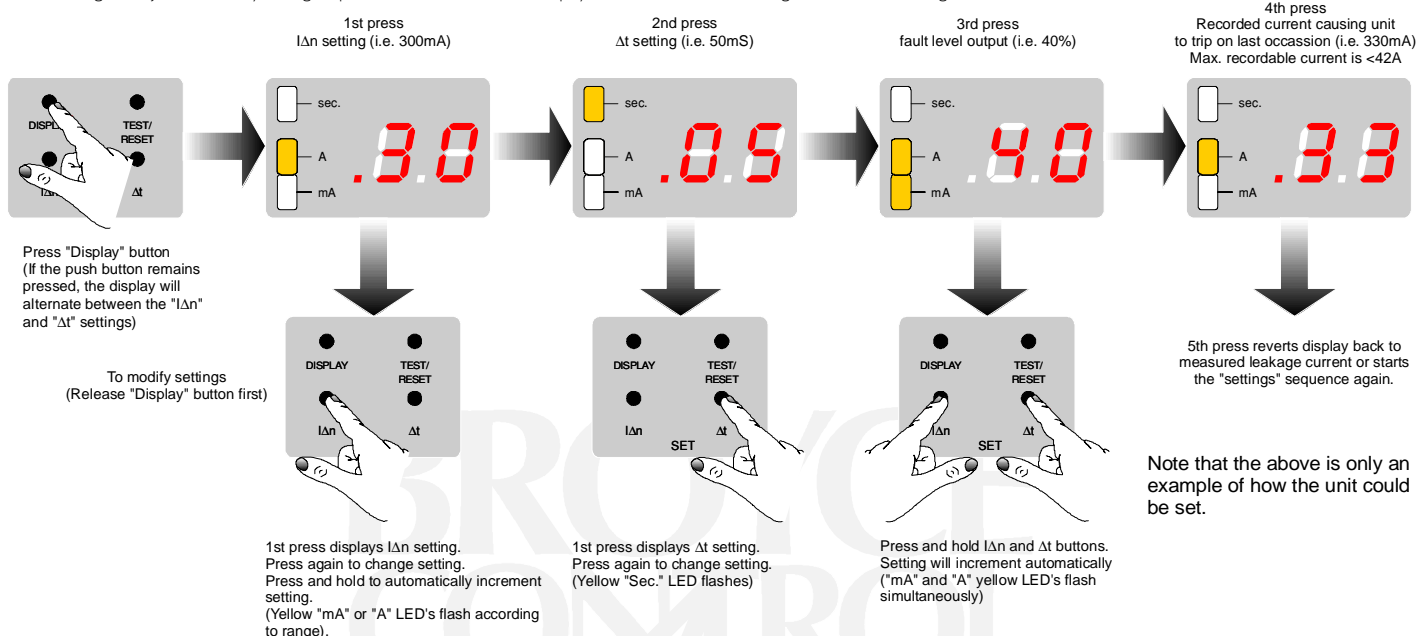
### Applying power (assuming no leakage current present)

- Apply power, the "positive safety output" relay will energise and contacts **6** and **8** will close after delay "td". The "standard output" relay will remain de-energised (contacts **12** and **14** open).
- After carrying out a self test (all segments illuminate on the LED display for a short period), then indicate the I<sub>Δn</sub> setting, followed by the measured "leakage current" that may be present in the installation. The yellow LED's to the left of the display show whether the current is "mA" or "A".

### Viewing and changing the user settings.

**Note:** The unit is factory set to 30mA trip and instantaneous delay. The remote fault level output is set to 50%. Adjustment of these settings can be made if required to suit the requirements of the installation. A seal is supplied with the unit allowing the user to secure the clear window and hence prevent any unnecessary adjustment of the settings.

- The settings can be viewed and checked by pressing the "Display" push button as shown. Carrying out adjustments to these settings requires the tamperproof cover to be lifted in order to gain access to the two push buttons underneath.
- If during the adjustment of any settings, a push button is released, the display will revert back to indicating the measured "leakage current" after a short duration.



**Note:** After a change to a setting has been made, the new setting will only be stored once the yellow LED has stopped flashing.

Fig. 1

### Fault simulation (Test mode)

- The unit can be placed into a fault condition by pressing the "Test/Reset" button on the front of the unit (or by pressing the remote "Test" button - if fitted). If the unit is already in a "no fault" condition, i.e., not tripped, the first press will trip the unit. The output relays operate accordingly. The display shows the characters as in Fig.2
- Press the same button again to reset the unit. The display reverts back to any measured leakage current that may be present.
- The unit can also be reset using the external "Reset" button (if fitted) or by interrupting the power supply.
- To satisfy regulations, it is recommended the device is tested periodically to ensure correct operation.

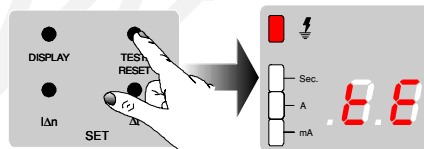



Fig. 2

### Fault conditions

#### Leakage currents

- If during normal service, the leakage current increases above the setting for the fault level output, the remote lamp will illuminate (if fitted) and the display will flash to give the user early warning of a possible fault condition. If the fault persists and the level of leakage current exceeds the trip level setting, the unit will trip. The "positive safety output" relay will de-energise and contacts **6** and **8** will open. The "standard output" relay will energise and contacts **12** and **14** will close. The red "fault" LED  will illuminate and the display will stop flashing.
- Pressing the "Test/Reset" button returns the unit back to normal operation, assuming the fault has cleared. Note that the level of current that caused the unit to trip is now stored and can be re-called by pressing the "Display" button (see Fig.1). Note that the recorded trip current is only stored whilst power is applied and cleared if the power supply is interrupted.

#### Toroid open circuit

- If the wiring between the unit and toroid becomes damaged (open circuit), the unit will trip.
- The display shows the following characters as in Fig.3
- After the fault has cleared, press the "Test/Reset" button to return the unit back to normal operation. Note that the unit cannot be reset remotely following an open circuit condition.

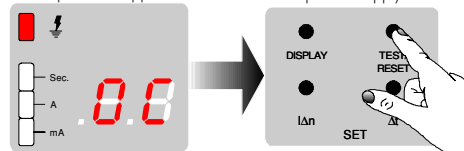


Fig. 3

#### Toroid short circuit

- Shorts that are present across terminals **11** and **13** (typically < 33Ω and purely resistive) will force the unit to display the characters as shown in Fig.4. However, the unit still remains functional other than not being able to detect and display fault currents.

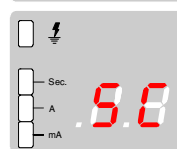


Fig. 4

#### Supply voltage fault

- If the applied supply voltage is <70% of U<sub>n</sub> (typical), the unit will not operate and the display shows the following characters as in Fig.5. During this condition and assuming the supply is also >50% of U<sub>n</sub>, the lamp connected to the fault level output will flash. After the correct voltage has been established, the unit will revert to normal operation.

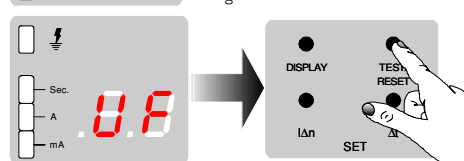


Fig. 5

### Troubleshooting

- If the unit fails to operate correctly other than that described above, then the fault will more than likely be with the wiring to the unit. Check all wiring and that the connections are good.
- Ensure the supply to the unit is present on terminals **1** and **3** and is within the operational limits specified. For DC units, ensure the polarity of the supply is correct.