

## 373-ELR Earth Leakage Protection Relay



Residual current devices are used to detect potentially dangerous earth fault currents before damage is caused. An undetected fault current may lead to cables overheating, which could start a fire. If high fault currents are involved, hazardous voltages may also appear on earthed equipment, putting lives at risk. The 373-ELR earth leakage protection relay allows the fault current to be continuously monitored and compared with the user selectable leakage level. Should the leakage exceed this level, the relay will trip to indicate a fault condition. With a very fast response time of under 40ms, the supply can be disconnected before serious damage can occur. This product is intended to provide a high degree of earth leakage protection and monitoring for any electrical equipment, specifically motors and their control gear, generator sets and transformers.

### Description

The 373-ELR range offers a standard DPCO version, incorporating a single set point, LED leakage level indicator and double-pole change over relay contacts. The default relay operation is to de-energise on trip, however, relay operation can be reversed to energise on trip by fitting a wire link between two terminals. For additional functionality, an optional pre-alarm relay version is available where the main set point relay has two single-pole change over contacts, one which will de-energise on trip function and the other which will de-energise when the leakage level reaches 60% of the selected setting.

This protector does not check the continuity of any part of the earthing circuit. It is designed for secondary protection due to the externally connected current transformer and contactor components. Life protection devices require an integral CT and main contactor.

### Operation

The 373-ELR features two incremental rotary selector switches on the front panel and a series of LED annunciators. The 10 position trip current switch offers selectable earth leakage current settings from 30mA to 10 amps and the 16 position time delay set point switch offers additional delay for fault discrimination, selectable from 0 to 10 seconds. When the 30mA trip current leakage is selected, the time delay is disabled. Once the trip current and time delay selections have been made, a green LED provides indication of mains healthy supply. The red LED will automatically illuminate if the pre-set leakage level has been exceeded, after any selected time delay.

The unit also incorporates a bar graph of five yellow LEDs providing indication of the level of leakage in 20% increments. When all five LEDs are illuminated the leakage level has reached 100% of the set point setting. The enhanced pre-alarm single-pole change over relay contact version also incorporates a red LED providing indication that the level of leakage has reached 60% of the selected range and that the pre-alarm relay has operated.

The unit features a combined reset and test button. A short press of the button will reset the unit after a trip and one long press initiates an electronic confidence check. The relay latches on to a fault until the test/reset button is pressed or the auxiliary power is removed. The relay will de-energise on trip (fail safe) as standard. Fitting a link between two terminals will select energise on trip.

### Analogue Outputs

The 373-ELR unit incorporates a 0/1mA analogue output which equals 0% to 100% of the selected tripping level. It can be used to drive an external test meter or panel meter, thus providing measurements for test commissioning and a useful indication of potential problems. The analogue output also enables fault level diagnosis to be communicated into building management or intelligent SCADA systems, whereby insulation deterioration can be monitored over a period of time and preventative maintenance arrangements made prior to expensive equipment failure.

### Core Balanced Current Transformers

The leakage current is determined by passing the phase conductors (and neutral if present) through a core balanced current transformer. All supply cables must pass through the same aperture. The current transformers sum the currents flowing into and back from the load. Ideally, the load will have no leakage current, so current flow through the CT will completely cancel out. For example, 100 amps flowing into load and 97 amps flowing back provides an output of 3 amps. Crompton offers a full range of core balanced current transformers suitable for use with 373-ELR earth leakage protection relays.

### Features

- Precision digital settings
- LED bar graph display
- 10 selectable trip levels - 30mA to 10A
- 16 selectable time delay - 0ms to 10 seconds
- Less than 40ms response time
- 0-1mA analogue output
- 8 amp 250V rated relay contacts
- User selectable energise or de-energise link
- Double-pole change over relay
- Single-pole pre-alarm option

### Benefits

- DIN-rail 43880 enclosure
- Switched mode supply accepts a wide range of auxiliary voltages
- Detects residual current flow
- Isolation of faulty circuits
- Insulation monitoring
- Advanced warning of faults
- Complementary range of core balanced CTs
- Protection of expensive power assets

### Applications

- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Building management
- Utility power monitoring
- Process control
- Motor protection
- Transformer protection

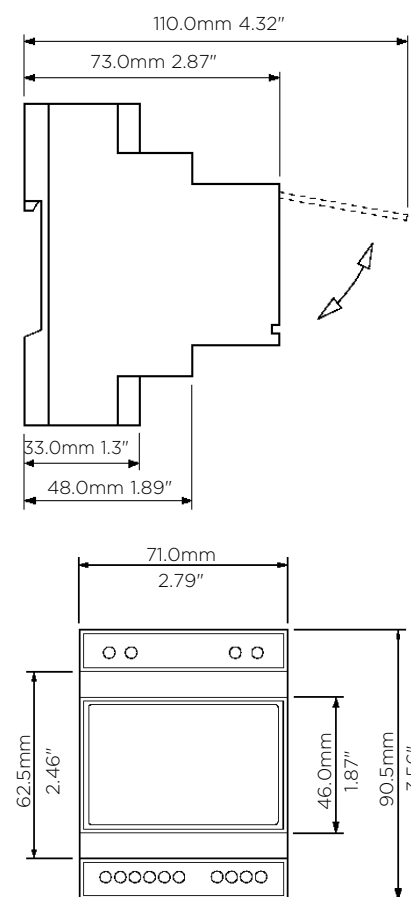
### Approvals

cRUus Approved File  
Number E203000

### Specification - Earth Leakage

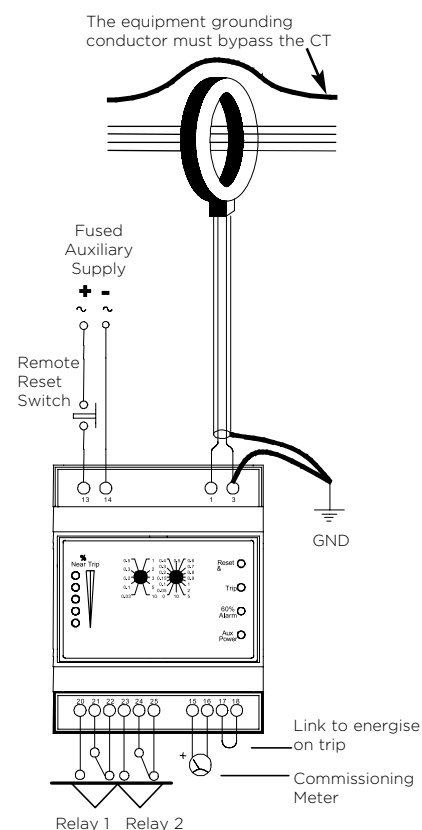
Measuring input	From core balanced current transformer
Overload	20 x nominal for 1 second
Frequency	50Hz or 60Hz 310%
Auxiliary voltage	12-48V dc, 24-48V ac and dc or 100-250V ac and dc
Auxiliary burden	Less than 1.5 Watts
Trip current settings	Selectable 30mA, 100mA, 200mA, 300mA, 500mA, 1A, 2A, 3A, 5A, 10A
Trip accuracy	50% <trip point current <100% in accordance with IEC 1543
Trip response time	<40ms (at 5 x rated trip current, ignoring the selected time delay)
Time delay set points	Selectable 0ms, 50ms, 100ms, 150ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms, 1 second, 2 seconds, 5 seconds, 10 seconds. When 30mA leakage is selected, the time delay is disabled
Indication	5 yellow LED bar graph for leakage levels Red LED indicated trip function Green LED indicated auxiliary power presence Red LED pre-alarm indication (SPCO version only)
Relay contacts	Standard: 2-pole change over Option: 2 1-pole change over (pre-alarm and main alarm)
Relay contact rating	8 amps at 250V ac 8 amps at 30V dc resistive
Relay mechanical life	>100,000 operations
Analogue output	0 to 1mA = 0 to 100% of selected tripping level. Compliance 1V, accuracy 10%
Enclosure style	DIN 43880, rail width 70mm
Material	Flame retardant UL94V0
Terminals	1 to 4mm <sup>2</sup> solid or stranded conductors. IP20 protection
Operating temperature	-10°C to +60°C
Storage temperature	-20°C to +70°C
Relative humidity	<95% non condensing
Weight	<250g
Dimensions	71mm wide x 90.5mm high x 73mm deep 2.79" wide x 3.56" high x 2.87" deep

### Dimensions



### DIN 43880

### Connections



### Product Codes - Double-pole Change Over Relay

Relay	Protection	Cat. no.
50Hz	12-48V dc	373-ELRW-CBC5-A1-ST
50Hz	24-48V ac and dc	373-ELRW-CBC5-A2-ST
50Hz	100-250V ac and dc	373-ELRW-CBC5-A3-ST
60Hz	12-48V dc	373-ELRW-CBC6-A1-ST
60Hz	24-48V ac and dc	373-ELRW-CBC6-A2-ST
60Hz	100-250V ac and dc	373-ELRW-CBC6-A3-ST

### Product Codes - Pre-Alarm Single-pole Change Over Relay

Relay	Protection	Cat. no.
50Hz	12-48V dc	373-ELRW-CBC5-A1-PA
50Hz	24-48V ac and dc	373-ELRW-CBC5-A2-PA
50Hz	100-250V ac and dc	373-ELRW-CBC5-A3-PA
60Hz	12-48V dc	373-ELRW-CBC6-A1-PA
60Hz	24-48V ac and dc	373-ELRW-CBC6-A2-PA
60Hz	100-250V ac and dc	373-ELRW-CBC6-A3-PA

# CBT-94F Core Balanced Current Transformers



The CBT-94F series of core balanced current transformers are **exclusively for use with our 373-ELR earth leakage protection relay**. The extremely sensitive toroidal core and secondary winding are encapsulated by a self extinguishing case providing excellent mechanical strength, protection from damage and electrical insulation.

### Description

Residual current devices are used to detect potentially dangerous earth fault currents before damage is caused. An undetected fault current may lead to cables overheating, which could start a fire. If high fault currents are involved, hazardous voltages may also appear on earthed equipment, putting lives at risk. An earth leakage protection relay is intended to provide a high degree of protection and monitoring for any electrical equipment, specifically motors and their control gear, generator sets and transformers. The leakage current is determined by passing the phase conductors (and neutral if present) through a core balanced current transformer.

### Operation

Primary conductors should be grouped together and fed through the current transformer aperture. It is essential that each conductor passes through the device in the same direction. Each phase conductor (and neutral if present) must pass through the current transformer. The current transformers sum the currents flowing into and back from the load. Ideally, the load will have no leakage current, so current flow through the CT will completely cancel out. For example, 100 amps flowing into load and 97 amps flowing back provides an output of 3 amps.

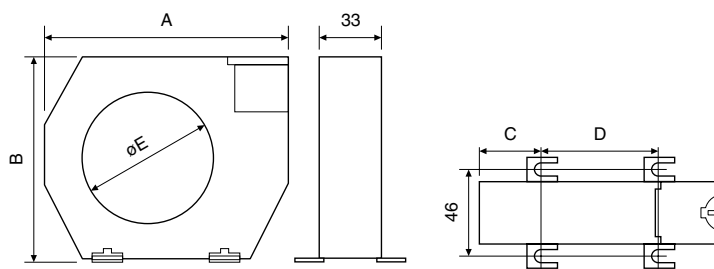
The equipment grounding conductor must always bypass the current transformer. The connections between the current transformer and protector should be kept as short as possible to minimise signal noise. For best results, use screened cable with the screen grounded at the protector.

### Specification

System voltage	720V maximum
Test voltage	3kV ac for 1 minute
System frequency	50Hz or 60Hz
Primary ratings	From 30mA to 10A
Secondary terminals	Protected to IP20
Operating temperature	-10°C to +50°C
Enclosure	UL94V0 flame retardant plastic
Compliant with	IEC 60044-1, VDE 0414
Mounting hardware	Steel mounting feet for wall or base mounting

### Product Codes

Aperture Dim E	Dim A	Dim B	Dim C	Dim D	Cat no.
35mm	100mm	79mm	26mm	48.5mm	CBT-94F-035
70mm	130mm	110mm	32mm	66mm	CBT-94F-070
105mm	170mm	146mm	38mm	94mm	CBT-94F-105
140mm	220mm	196mm	49mm	123mm	CBT-94F-140
210mm	299mm	284mm	69mm	161mm	CBT-94F-210
300mm	400mm	380mm	-	-	CBT-94F-300



### Features

- Leakage measurement range 0-10 amps
- 6 models available
- Integral wire sealable terminal cover
- Flame retardant high impact moulded case

### Benefits

- Reduction of high currents for ease of metering
- Wide operating temperature -10°C to +50°C
- Steel mounting feet supplied
- Long product life

### Applications

- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Motor protection
- Transformer protection
- Overload protection

### Approvals

IEC 60044-1