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.

Features
- Precision digital settings
- LED bargraph 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
- UL 3111-1 File No: E203000
- CSA compliant
- EMC and LVD

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.
Specification - Earth Leakage

- Measuring input: From core balanced current transformer
- Overload: 20 x nominal for 1 second
- Frequency: 50Hz or 60Hz ±10%
- 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 bargraph 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
- Compliant with:
  - EMC and LVD, UL 3111-1 File No: E203000, CSA 22.2/1010.1-92 BSEN 50081-1, BSEN 50082-2, IEC 60255-22-1 (BS5992), IEC 60255-11, BSEN 61543 (IEC 1543), BSEN 61010 (IEC 1010), EN 60068 (IEC 68)
- Material: Flame retardant UL94V0
- Terminals: 1 to 4mm² 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

Dimensions:
- 71.0mm 2.79”
- 48.0mm 1.89”
- 62.5mm 2.46”
- 46.0mm 1.81”
- 90.5mm 3.56”
- 110.0mm 4.32”

Connections:
The equipment grounding conductor must bypass the CT

Product Codes - Double-pole Change Over Relay

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Auxiliary supply</th>
<th>Cat. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Hz</td>
<td>12-48V dc</td>
<td>373-ELRW-CBC5-A1-ST</td>
</tr>
<tr>
<td>50Hz</td>
<td>24-48V ac and dc</td>
<td>373-ELRW-CBC5-A2-ST</td>
</tr>
<tr>
<td>50Hz</td>
<td>100-250V ac and dc</td>
<td>373-ELRW-CBC5-A3-ST</td>
</tr>
<tr>
<td>60Hz</td>
<td>12-48V dc</td>
<td>373-ELRW-CBC6-A1-ST</td>
</tr>
<tr>
<td>60Hz</td>
<td>24-48V ac and dc</td>
<td>373-ELRW-CBC6-A2-ST</td>
</tr>
<tr>
<td>60Hz</td>
<td>100-250V ac and dc</td>
<td>373-ELRW-CBC6-A3-ST</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Auxiliary supply</th>
<th>Cat. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Hz</td>
<td>12-48V dc</td>
<td>373-ELRW-CBC5-A1-PA</td>
</tr>
<tr>
<td>50Hz</td>
<td>24-48V ac and dc</td>
<td>373-ELRW-CBC5-A2-PA</td>
</tr>
<tr>
<td>50Hz</td>
<td>100-250V ac and dc</td>
<td>373-ELRW-CBC5-A3-PA</td>
</tr>
<tr>
<td>60Hz</td>
<td>12-48V dc</td>
<td>373-ELRW-CBC6-A1-PA</td>
</tr>
<tr>
<td>60Hz</td>
<td>24-48V ac and dc</td>
<td>373-ELRW-CBC6-A2-PA</td>
</tr>
<tr>
<td>60Hz</td>
<td>100-250V ac and dc</td>
<td>373-ELRW-CBC6-A3-PA</td>
</tr>
</tbody>
</table>
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.

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 185
- VDE 0414

Specification

<table>
<thead>
<tr>
<th>System voltage</th>
<th>720V maximum</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test voltage</td>
<td>3kV ac for 1 minute</td>
</tr>
<tr>
<td>System frequency</td>
<td>50Hz or 60Hz</td>
</tr>
<tr>
<td>Primary ratings</td>
<td>From 30mA to 10A</td>
</tr>
<tr>
<td>Secondary terminals</td>
<td>Protected to IP20</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10°C to +50°C</td>
</tr>
<tr>
<td>Enclosure</td>
<td>UL94V0 flame retardant plastic</td>
</tr>
<tr>
<td>Compliant with</td>
<td>IEC185, VDE 0414</td>
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<tr>
<td>Mounting hardware</td>
<td>Steel mounting feet for wall or base mounting</td>
</tr>
</tbody>
</table>

Product Codes and Dimensions

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

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373-GFR Ground Fault Relay

The 373-GFR is designed to detect dangerous ground fault currents before damage is caused to expensive power assets. 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 grounded equipment, putting lives at risk. The 373-GFR ground fault relay allows the fault current to be continuously monitored and compared with the user selectable trip level. Should the fault 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 ground fault protection and monitoring for any type of electrical equipment, specifically switchboards, generator sets and transformers.

Features
- Precision digital settings
- LED bargraph display
- 10 selectable trip levels – 100 to 1200 amps
- 16 selectable time delay – 0ms to 10 seconds
- Less than 40ms response time
- 0-1mA analogue output
- User selectable input range of 0.2m ohms or 2m ohms
- User selectable latching/self-resetting
- Single-pole change over relay
- 8 amp 250V rated relay contacts

Benefits
- DIN rail 43880 enclosure
- Switched mode supply accepts a wide range of auxiliary voltages
- Isolation of faulty circuits
- Insulation monitoring
- Advanced warning of faults
- Protection of expensive power assets
- Current transformer not required

Applications
- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Utility power monitoring
- Transformer protection

Operation
The 373-GFR offers a single-pole change over relay contact incorporating a single set point, which will de-energise on trip. The relay senses the ground current by measuring the voltage developed across the N-G link impedance under a fault condition. We offer link selection of two standard N-G impedances, 0.2m ohms or 2m ohms. This is a very cost effective method, since a current transformer is not required.

The 373-GFR features two incremental rotary selector switches on the front panel and a series of LED annunciators. The 10 position trip current switch offers selectable ground fault current settings from 100 to 1200 amps and the 16 position time delay set point switch offers additional delay for fault discrimination, selectable from 0 to 10 seconds.

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 fault level has been exceeded, (after any selected time delay). The unit also incorporates a bargraph of 5 yellow LEDs providing indication of the level of fault in 20% increments. When all 5 LEDs are illuminated the fault level has reached 100% of the set point setting.

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. However, automatic reset can be achieved by fitting a wire between two terminals. The relay will de-energise on trip (fail safe) as standard.

Analogue Outputs
The 373-GFR unit incorporates an 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.

Product Codes - Single-pole change over relay

<table>
<thead>
<tr>
<th>Frequency</th>
<th>Auxiliary supply</th>
<th>Cat. no.</th>
</tr>
</thead>
<tbody>
<tr>
<td>50Hz</td>
<td>12-48V dc</td>
<td>373-GFRW-SHC5-A1-SP</td>
</tr>
<tr>
<td>50Hz</td>
<td>24-48V ac/dc</td>
<td>373-GFRW-SHC5-A2-SP</td>
</tr>
<tr>
<td>50Hz</td>
<td>100-250V ac/dc</td>
<td>373-GFRW-SHC5-A3-SP</td>
</tr>
<tr>
<td>60Hz</td>
<td>12-48V dc</td>
<td>373-GFRW-SHC6-A1-SP</td>
</tr>
<tr>
<td>60Hz</td>
<td>24-48V ac/dc</td>
<td>373-GFRW-SHC6-A2-SP</td>
</tr>
<tr>
<td>60Hz</td>
<td>100-250V ac/dc</td>
<td>373-GFRW-SHC6-A3-SP</td>
</tr>
</tbody>
</table>

Features
- Precision digital settings
- LED bargraph display
- 10 selectable trip levels – 100 to 1200 amps
- 16 selectable time delay – 0ms to 10 seconds
- Less than 40ms response time
- 0-1mA analogue output
- User selectable input range of 0.2m ohms or 2m ohms
- User selectable latching/self-resetting
- Single-pole change over relay
- 8 amp 250V rated relay contacts

Benefits
- DIN rail 43880 enclosure
- Switched mode supply accepts a wide range of auxiliary voltages
- Isolation of faulty circuits
- Insulation monitoring
- Advanced warning of faults
- Protection of expensive power assets
- Current transformer not required

Applications
- Switchgear
- Distribution systems
- Generator sets
- Control panels
- Utility power monitoring
- Transformer protection

Approvals
- UL 3111-1 File No: E203000
- CSA compliant
- EMC and LVD
**Dimensions**

![Dimensions Diagram]

**Specification - Ground Fault**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Specification</th>
</tr>
</thead>
<tbody>
<tr>
<td>Measuring input</td>
<td>AC voltage developed across N-G link</td>
</tr>
<tr>
<td>Measuring range</td>
<td>0.2Ω or 2Ω shunt impedance link selectable</td>
</tr>
<tr>
<td>Overload</td>
<td>Maximum input voltage 600V</td>
</tr>
<tr>
<td>Frequency</td>
<td>50/60Hz</td>
</tr>
<tr>
<td>Auxiliary voltage</td>
<td>12 - 48V dc, 24 - 48V ac and dc or 100 - 250V ac and dc</td>
</tr>
<tr>
<td>Auxiliary burden</td>
<td>Less than 1.5 Watts</td>
</tr>
<tr>
<td>Trip accuracy</td>
<td>50% of trip point current ≤100% in accordance with IEC 1543</td>
</tr>
<tr>
<td>Trip response time</td>
<td>&lt;40ms (at 5 x rated trip current, ignoring the selected time delay)</td>
</tr>
<tr>
<td>Time delay set points</td>
<td>Selectable 0ms, 50ms, 100ms, 150ms, 200ms, 300ms, 400ms, 500ms, 600ms, 700ms, 800ms, 900ms. 1 second, 2 seconds, 5 seconds, 10 seconds.</td>
</tr>
<tr>
<td>Indication</td>
<td>5 yellow LED bargraph for fault levels</td>
</tr>
<tr>
<td>Relay contacts</td>
<td>1-pole change over (SPCO or NO+NC) contacts</td>
</tr>
<tr>
<td>Relay contact rating</td>
<td>8 amps at 250V ac</td>
</tr>
<tr>
<td>Relay mechanical life</td>
<td>&gt;100,000 operations</td>
</tr>
<tr>
<td>Analogue output</td>
<td>0 to 1 mA = 0 to 100% of selected tripping level. Compliance 1V, accuracy 10%</td>
</tr>
<tr>
<td>Enclosure style</td>
<td>DIN 43880, rail width 70mm</td>
</tr>
<tr>
<td>Compliant with</td>
<td>EMC and LVD, UL 3111-1, File No: E203000, CSA 22.2/10101-92, BSEN 50081-1, BSEN 50082-2, IEC 60255-22-1 (BS5992), IEC 60255-11, BSEN 61543 (IEC 1543), BSEN 61010 (IEC 1010), EN 60068 (IEC 68)</td>
</tr>
<tr>
<td>Material</td>
<td>Flame retardant UL94VO</td>
</tr>
<tr>
<td>Terminals</td>
<td>1 to 4mm² solid or stranded conductors. IP20 protection</td>
</tr>
<tr>
<td>Operating temperature</td>
<td>-10°C to +60°C</td>
</tr>
<tr>
<td>Storage temperature</td>
<td>-20°C to +70°C</td>
</tr>
<tr>
<td>Relative humidity</td>
<td>&lt;95% non condensing</td>
</tr>
<tr>
<td>Weight</td>
<td>&lt;250g</td>
</tr>
<tr>
<td>Dimensions</td>
<td>71mm wide x 90.5mm high x 73mm deep</td>
</tr>
<tr>
<td>Connections</td>
<td>Install the neutral to ground shunt resistor in a suitable location. Connect the shunt sense wires directly to terminals N (neutral side) and G (ground side) on the relay. Cabling between the shunt resistor and the ground fault relay should be kept to a minimum.</td>
</tr>
</tbody>
</table>

**Connections Diagram**

**Terminal No.**

- **N**: Neutral input
- **G**: Ground input
- **13**: Fused auxiliary supply (-)
- **14**: Fused auxiliary supply (+)
- **15**: Default operation is non-latching
- **16**: Fit link to enable relay latch on trip
- **17/18**: Analogue output 0/1mA
- **19**: Default input range is for 2mΩ shunt
- **20**: Link to select 200µΩ shunt input
- **25**: Relay (NO)
- **24**: Relay (COM)
- **23**: Relay (NC)