Hassas eRCBO
DIN-rail and Plug-in
PARTNERSHIP

SAFETY

DURABILITY
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A registered signature design style for all alfamar modular products that reflect alfamar’s originality and commitment to quality.

Our eRCBO’s are patent-protected. The whole eRCBO is also protected as an industrial design.

Patented tripping device: uncompromising safety (unique arrangement for quick opening under fault condition).

Aesthetics: alfamar Identity
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alfamar Patented Design
Our eRCBO’s are patent-protected. The whole eRCBO is also protected as an industrial design.

Patented tripping device: uncompromising safety (unique arrangement for quick opening under fault condition).
Safety Features

**Energy Class 3**
Energy Class 3 ensures the lowest possible flow of energy through the circuit in case of fault, preventing damage to surrounding and downstream equipment and networks.

**Contact Separation**
In normal ON/OFF operation current separation is 8mm, in case of abnormal/fault conditions the contacts get separated by 10mm, which prevents the arc from restriking and ensures effective arc quenching.

**Sealable Handle**
Safe and effective method for locking out circuit breakers in ON and OFF positions. This enables user to securely lock the breaker, control the supply, prevent tampering and perform safe maintenance of end equipment.

**IP20 Protection**
A rating of “IP20” denotes protection from solid objects approximately 12mm in size, such as adult fingers.

**True Contact Indication**
Red and green color flags provide a clear visual indication of the contact status inside, irrespective of handle position.

**Contact Separation Benefits**
- Prevents arc re-striking
- Foolproof breaking of circuit
- Higher voltage withstand capability
Reliability Features

Ready for Connection
A box clamp is provided in an open condition so that the breaker is ready for Cable/Busbar connection which reduces installation time.

Biting teeth only on incoming terminals for both cable and busbar termination.

Benefits
• World class terminal reliability
• Excellent electrical joint
• Excellent mechanical joint
• 2.8 N-m torque
• Firm cable grip
• Excellent cable pull Withstand
• Excellent temperature performance

Reliable Termination
Conforms to Major International Standard
Tests as per IEC 61099-1

Performance Features

Unique Patented Quick Tripping Arrangement
The mechanism is arranged to transform linear force into rotary force for quick opening of the contacts which reduces the energy inside the breaker to a minimal level during the clearance of fault. The effectiveness of this action remains the same up to the last shot of short circuit sequence.

Contact Tip
Silver graphite contact tips ensures longer life and maximum safety against contact welding due to superior anti-welding properties enhancing safety and life of system.
Installation Features

Ergonomics: Better Grip
With its wide surface area and prominent strips around the periphery, the ergonomically designed handle assists with the manual operation of the circuit breaker from single pole to four poles with optimum force, and ensures a secure grip while operating the handle.

Terminal Shutter
Insertion of cable in the wrong place below the wrong termination is not possible.
Flat locking shutters cover the gap behind the box to eliminate the possibility of the wrong entry of wire during installation.

Suitable for Multiple Tools
Space for insulated screwdrivers - the larger hole allows the use of an insulated screwdriver to tighten the screws of both wire terminals, ensuring maximum operational safety.

Ease of Mounting
Two-position DIN clip, facilitates easy mounting and removal of DIN type eRCBO from DIN rail channel for convenient installation.
eRCBO is also available in Plug-in form which is very easy and quick to install.

Snap Locking
• Snap locking at load side provides an additional locking feature and prevents the formation of a gap between the base and cover, and dislocation of terminals due to cable loads.
• Excellent mechanical joint
• Excellent cable pull withstand
Environment Features

RoHS compliant – alfanan uses environmentally friendly state-of-the-art housing material. With the latest generation of halogen free thermoplastics for eRCBOs, it is now possible to recycle the eRCBOs completely which reduces environmental pollution. alfanan’s entire range of circuit protection devices conform to RoHS Standards.
# Performance and Technical Specifications

<table>
<thead>
<tr>
<th>eRCBO Technical Data</th>
<th>DIN rail</th>
<th>Plugin</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Product standard</strong></td>
<td>IEC 61009-1</td>
<td></td>
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<tr>
<td><strong>Tripping characteristics</strong></td>
<td>C Curve</td>
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## Electrical

<table>
<thead>
<tr>
<th><strong>Rated current range In (A)</strong></th>
<th>6, 10, 16, 20, 25, 32, 40</th>
<th>6, 10, 16, 20, 25, 32, 40</th>
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<tbody>
<tr>
<td><strong>Rated leakage current IΔn (mA)</strong></td>
<td>30,100</td>
<td>30,100</td>
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<tr>
<td><strong>Number of poles</strong></td>
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<tr>
<td><strong>Type</strong></td>
<td>AC, A</td>
<td>AC, A</td>
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<tr>
<td><strong>Rated frequency (Hz)</strong></td>
<td>50/60</td>
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<tr>
<td><strong>Rated voltage (Un)</strong></td>
<td>240V</td>
<td>240V</td>
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<tr>
<td><strong>Rated insulation voltage (Ui) V AC</strong></td>
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<tr>
<td><strong>Rated impulse voltage (Uimp) kV</strong></td>
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<td>4</td>
</tr>
<tr>
<td><strong>Protection degree</strong></td>
<td>IP20</td>
<td>IP20</td>
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<tr>
<td><strong>Rated short circuit capacity Icn (kA)</strong></td>
<td>10kA</td>
<td>10kA</td>
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<tr>
<td><strong>Rated service short circuit breaking capacity Ics (A)</strong></td>
<td>7.5kA</td>
<td>7.5kA</td>
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<tr>
<td><strong>Rated residual making and breaking capacity IΔm (kA)</strong></td>
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<td>6kA</td>
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<tr>
<td><strong>Suitability for isolation</strong></td>
<td>Yes</td>
<td>Yes</td>
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<tr>
<td><strong>Thermal tripping characteristics</strong></td>
<td>&gt; 1 hour @ 1.13 In @ 50°C</td>
<td>&gt; 1 hour @ 1.13 In @ 50°C</td>
</tr>
<tr>
<td></td>
<td>&lt; 1 hour @ 1.45 In @ 50°C</td>
<td>&lt; 1 hour @ 1.45 In @ 50°C</td>
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<tr>
<td><strong>Endurance</strong></td>
<td>As per IEC 61009-1</td>
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## Mechanical

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<tr>
<th><strong>Protection degree</strong></th>
<th>IP 20</th>
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<tbody>
<tr>
<td><strong>Maximum terminal capacity (mm²)</strong></td>
<td>Line 35</td>
<td>Plugin terminal</td>
</tr>
<tr>
<td><strong>Tightening torque (Nm)</strong></td>
<td>Line 2.8</td>
<td>Plugin terminal</td>
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<tr>
<td><strong>Method of connection</strong></td>
<td>Cables / Busbar / Cables + Busbar</td>
<td>Cables</td>
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## Environmental/General

<table>
<thead>
<tr>
<th><strong>Energy limiting class</strong></th>
<th>3</th>
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<tbody>
<tr>
<td><strong>Reference ambient air temperature</strong></td>
<td>50°C</td>
<td>50°C</td>
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<tr>
<td><strong>Operating temperature range</strong></td>
<td>-5°C to +70°C</td>
<td>-5°C to +70°C</td>
</tr>
<tr>
<td><strong>Storage temperature range</strong></td>
<td>-5°C to +70°C</td>
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</table>
General Characteristics

The electronic residual current circuit breakers with overcurrent protection (eRCBO) meet the demand for devices that fully protect modern installations against short circuit currents, overloads, earth fault currents, and indirect contacts, providing additional protection against direct contacts.

Each eRCBO is fitted with a functional earth wire to guarantee the highest level of safety, even in case of loss of neutral.

In only one module width, these electronic residual current circuit breakers with overcurrent protection offers a technologically advanced and comprehensive range with outstanding features, sizes and tripping characteristics.

The electronic eRCBOs share the same profile as Hassas MCB, offering a smart retrofit solution for space constrained applications.

These electronic eRCBOs can be installed in countries where the use of 1P+N eRCBO with functional earth is consolidated.

Working of eRCBO

eRCBO is an abbreviation for “Residual Current Breaker with integral Overcurrent protection”. Basically, it is a technical combination of two products, namely the MCB and RCCB. That means one product can provide all protection functions:

• Overcurrent protection for overloads and short circuits, same as MCB
• Fault protection with residual current behavior, the same as RCCB
• Additional protection in case of direct contact with live parts, the same as RCCB with 30mA rated residual current.

Residual Leakage Tripping

When the load is connected to the supply through the eRCBO, the line and neutral conductors are connected through primary windings on a toroidal transformer. In this arrangement the secondary winding is used as a sensing coil and is electrically connected to a sensitive relay or solid state switching device, the operation of which triggers the tripping mechanism.

When the line and neutral currents are balanced, as in a healthy circuit, they produce equal and opposite magnetic fluxes in the transformer core with the result that there is no current generated in the sensing coil. When the line and neutral currents are not balanced they create an out-of-balance flux. This will induce a current in the secondary winding which is used to operate the tripping mechanism. It is important to note that both the line and neutral conductors pass through the toroid.

Thermal Release

To protect against fault arising due to overloading or increase in temperature, a bimetallic strip is used. The thermal action of the eRCBO is achieved with a bimetallic strip whenever continuous overcurrent flows through eRCBO, the bimetallic strip is heated and bends the trip. This deflection of the bimetallic strip releases a latch. As this mechanical latch is attached to the operating mechanism, it causes the miniature circuit breaker contacts to open.

The thermal release consists of a bimetallic strip which becomes deformed when heated beyond the normal operating values, releasing the latch that holds the contacts. The reaction time of a bimetallic strip is inversely proportional to the intensity of the current. As a result of its thermal inertia, the bimetallic strip reacts faster when a second overload follows the first in quick succession.
General Characteristics

Magnetic Release
The eRCBO functions by interrupting the continuity of electrical flow through the circuit once a fault occurs and hence overcurrent is detected. Simply stated, the RCBO is a switch which automatically turns off when the current flowing through it passes the maximum allowable limit.
There are two contacts in the eRCBO
• Fixed contact
• Moving contact

When the current exceeds its pre-determined value, the solenoid forces the moveable contact to open and the eRCBO turns off, discontinuing the current flow to the circuit. To resume the flow of the current, the eRCBO needs to be turned on manually. This protects the circuit from faulty current flowing due to overload and overcurrent.

During a short circuit condition, there is a sudden rise of current; which causes the electromechanical movement of the plunger that is connected with a tripping coil or solenoid of eRCBO. The plunger strikes the trip lever causing instant release of the latch mechanism subsequently opening the circuit breaker contacts.

An energy limiting class number denotes the maximum I²t let-through energy by a circuit breaker under short circuit or earth fault conditions. This information may be used by the electrical installation designer for the same purposes as the information obtained from the I²t characteristic.
Class 3 is the highest current limiting classification and may be used to offer protection to cables having a smaller cross-sectional area.

Rated Operational Voltage (Ue)
This is the voltage(s) at which the circuit breaker can be used. The value indicated is usually the maximum value. At lower voltages, certain characteristics may differ, or even be improved, such as the breaking capacity.

Rated Insulation Voltage (Ui)
This value acts as a reference for the insulation performance of the device. The insulation test voltages are determined based on this value.

Rated Impulse Withstand Voltage (Uimp)
This value characterizes the ability of the device to withstand transient overvoltage such as lightning (standard impulse 1.2/50 μs).

Rated Current (In)
This is the maximum current value the circuit breaker can withstand on a permanent basis. This value is always given for an ambient temperature around the device of 30°C in accordance with Standard IEC 61009-1. alfanar products go beyond this standard by offering no derating up to 50°C. If this temperature is higher, a derating factors tables must be used to select the suitable breaker.

Rated Short Circuit Capacity (Icn)
In Standard IEC 61009-1, the breaking capacity of the device is tested in a similar way but is called Icn. After the test, the circuit breaker must retain its dielectric properties and be able to trip in accordance with the specifications in the standard.

Rated Service Short Circuit Capacity (Ics)
This is the value expressed as a percentage of Icn. It will be one of the following values: 25% (category A only), 50%, 75% or 100%. The circuit breaker must be capable of operating normally after breaking the Ics current several times using the sequence O-CO-CO.
Dimensions

### Hassas eRCBO Din–Rail type

- Dimensions:
  - 68.4
  - 43.7
  - 58.0
  - 19.0
  - 45.0
  - 109.8

### Hassas eRCBO Plug–In type

- Dimensions:
  - 76.7
  - 38.2
  - 3.2
  - 66.2
  - 52.1
  - 60.1

- Pozidriv, phillips
  - Chisel head M5x13.1L
  - Chisel head M4x10L

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  - Chisel head M4x10L
## Ordering Data

Hassas eRCBO DIN-Rail type

<table>
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<tr>
<th>Ampere</th>
<th>Leakage current</th>
<th>Description</th>
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<tbody>
<tr>
<td>06A</td>
<td>30mA</td>
<td>AeRCBO DIN rail Type-A 06A 30mA 10KA C</td>
<td>HERD40N030M06C</td>
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<td>30mA</td>
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