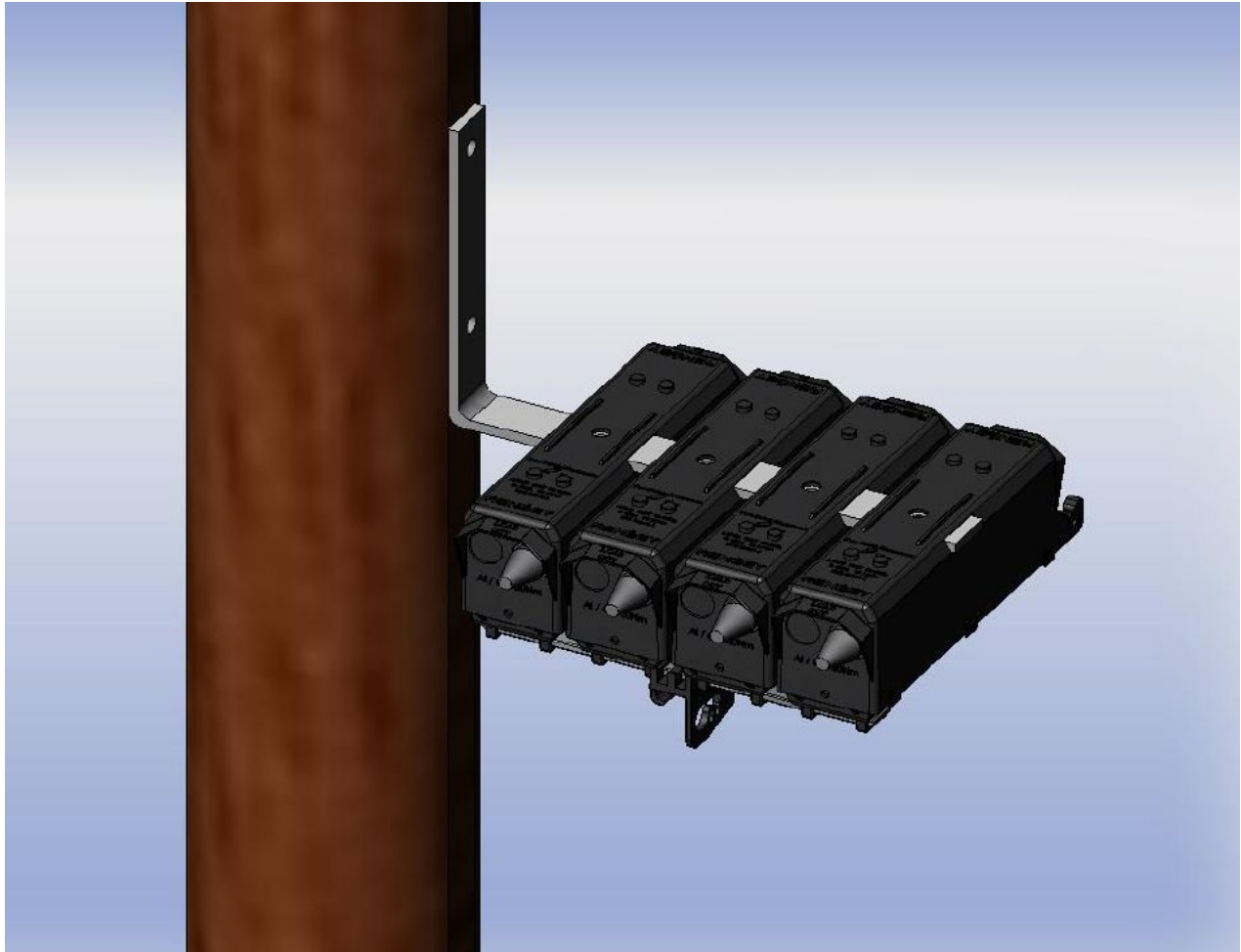


POLE MOUNTED FUSE SWITCH



Fuse Switch Disconnecter



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1.1 General Specification

Renley's new range of Fuse Switch Disconnectors have been designed using state of the art 3 Dimensional CAD packages in Renley's Product Design and Development Department. The new designs use a unique modular architecture which offers the flexibility to connect the units in single, double, triple or quadruple pole applications. The units are 'ganged' together using integrated interlocking technology which increases the ease of operation through a smooth opening and closing action.

The new range of Fuse Switch Disconnectors are versatile and can accommodate a wide range of cables sizes, fuses and are compatible with both Aluminium and Copper cables. Each device is constructed from high grade Polyamide. The Polyamide is a flame retardant, UV resistant glass filled compound which has passed stringent testing in accordance with IEC, BS and ASTM standards. This high quality material, together with a robust construction guarantees consistent performance even under adverse climatic conditions.

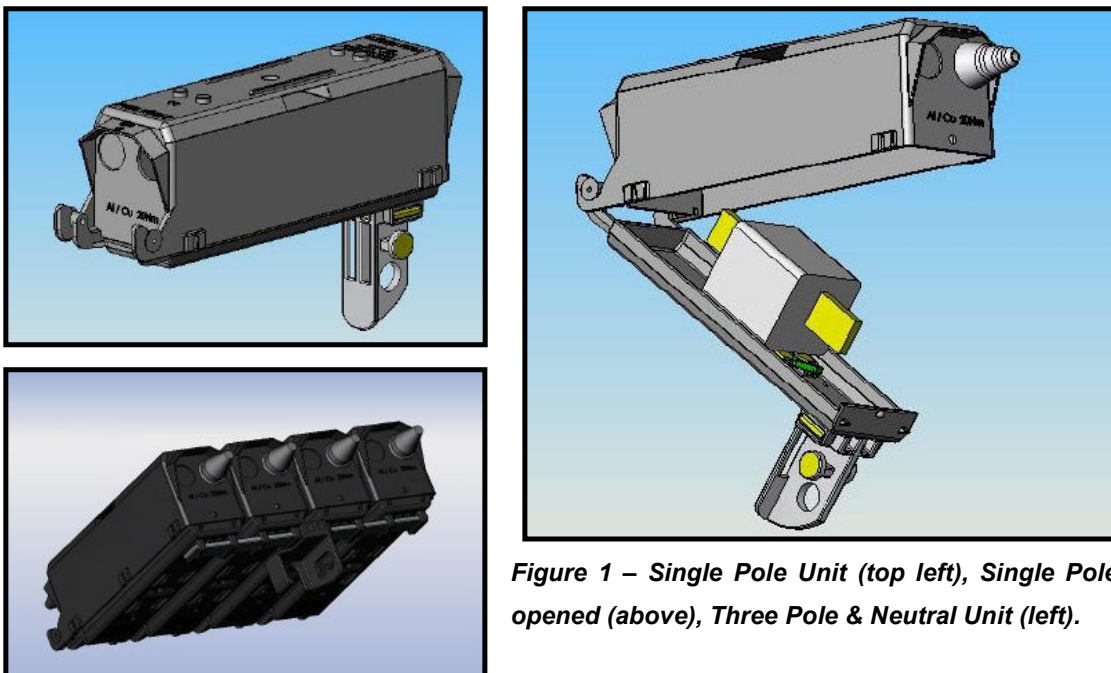


Figure 1 – Single Pole Unit (top left), Single Pole opened (above), Three Pole & Neutral Unit (left).

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Renley's pole mounted fuse-switch-disconnectors are for use on 230/400 volt, single/three phase, aerial bundled conductor and open wire networks. The device has been designed for operation from ground level thereby offering a high degree of operator safety.

Renley's Fuse Switch Disconnectors have been constructed in accordance with BS EN 60947-3 and consist of a fuse base and fuse carrier, with spring assisted connection between the respective contacts. The device accommodates both NH1 and NH2 size HRC fuses in accordance with IEC 60269-2-1. The fuse bases are suitable for mounting on wood poles, steel poles or walls.

The units have been designed to offer maximum flexibility by connecting single pole units in single, double, triple or quadruple phase applications. The units are ganged together on the mounting bracket and can be operated either individually or as a combined unit.

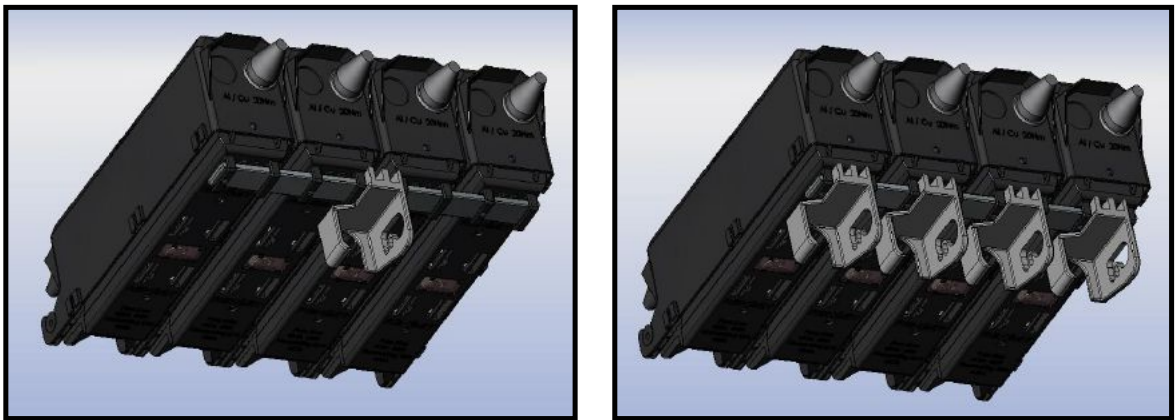


Figure 1 – Three pole & Neutral device operated together (left), operated individually (right).

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1.2 Electrical Specification

Renley's Fuse Switch Disconnectors can be operated as either a single pole 230 volt unit or as a three pole unit with a rated voltage of 400 volts. The units accept HRC cartridge type fuse links in accordance with IEC 60269-2-1. The technical electrical specification is outlined below in Table 1.

Model	400Amp Three Pole & Neutral
Housing	High Grade Polyamide
Rated Operation Current	400 Amps (630A Solid Link)
Rated Operational Voltage	400 volts, 50Hz
Rated Insulation Voltage	1000 volts
Cable Range	2 x 16mm ² up to 2 x 240mm ²
Fuse Link Size	NH 1 and 2 to IEC 269-2-1
Fuse Power Loss	40 Watts
Solid Link	630 Amps
Utilization Category	AC 22 B to IEC 947-3
Pollution Degree	3
Overvoltage Category	4
IP Rating	IP23

Table 1 – Technical Specification for 400A Fuse Switch Disconnecter

Contacts

The key to Renley's Fuse Switch Disconnecter is the NH Contacts used in the unit. These contacts have been extensively researched and tested for optimal arc control and switching performance. The contact has been designed with a large surface area to ensure good heat dissipation, thus protecting against ageing and increasing the contact reliability over a long operational lifetime.

The design of the contact is such that the arc erosion process occurs specifically outside the areas of contact on the arcing contact. This is particularly designed for the making and breaking of fault currents. The key design features of the Renley NH contact are outlined in Table 2.

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Feature	Advantage
2 Line Support	<ul style="list-style-type: none">• Low, constant contact resistance• Good contact connection at all immersion depths
2 separately sprung contact supports	<ul style="list-style-type: none">• Compensates for production tolerances of fuse links• Compensate for thermal expansion during ageing
Large surface area design	<ul style="list-style-type: none">• Low contact temperatures• Good thermal behaviour

Table 2 – Features of Renley NH Contact Design

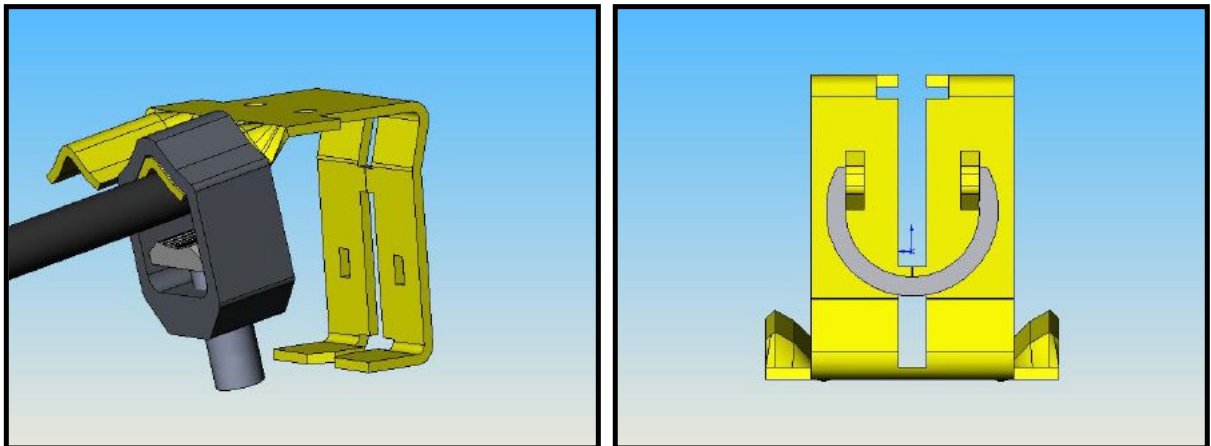


Figure 2 – NH Contacts used in Renley's Fuse Switch Disconnecter

The terminal blocks used are made from high grade aluminium and are tin plated to allow for both copper and aluminium cabling. The cables are secured by use of an insulated allen key to a torque of 20Nm. The design of the terminal blocks is such that any oxide layer that may form on the cable is penetrated by the compression piece of the terminal block thus offering excellent connection for years. This is illustrated in Figure 2.

POLE MOUNTED FUSE SWITCH



Compression piece pierces through any oxide layer that may have built up on the cable

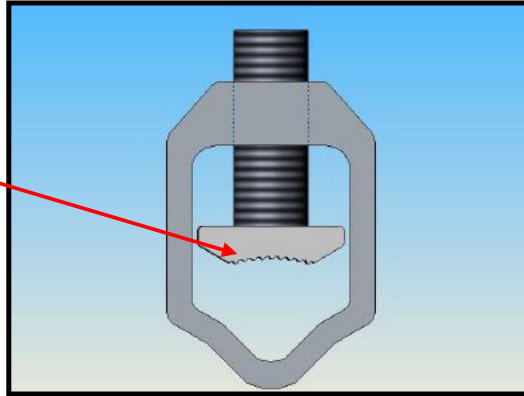


Figure 3 – Terminal Block used in Fuse Switch Disconnecter

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1.3 Testing

Renley's Fuse Switch Disconnecter fully complies with all the testing requirements set down in BS EN 60947-3 Section 8. Type testing undertaken by Renley include:

- Temperature Rise Test
- Dielectric Properties Test
- Load make/break capacity testing
- Mechanical Operational Test
- Impact Strength Test
- Flame Retardance Test
- Weathering Test

In addition to the type tests set down by BS EN 60947-3 Renley conducted additional testing through the development of their Fuse Switch Disconnecter. Among the additional tests was a Mould Flow analysis on the polymer housing to ensure minimum stresses are exerted on the device while in service. A detailed Mould Flow report commissioned by Renley is included in the Appendix of this document.

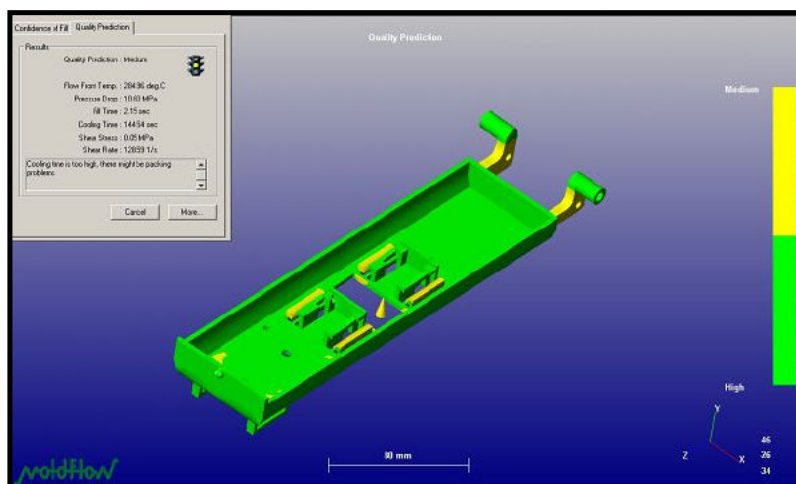


Figure 4 – Image from Mould Flow analysis of Renley's Fuse Switch Disconnecter

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Renley also undertook Salt Spray testing to validate material selection of metallic parts. These tests were to ensure the device was not affected by corrosion. Below is a photograph of some of the results of these Salt Spray Tests. The image shown is of a silver plated copper contact; from the results we were able to establish the unsuitability of silver as a coating material for the contact. Further testing showed that a tin plating to BS 1872 with a minimum thickness of 20µm ensured that the contact was not penetrated by the salt spray and thus not affected by corrosion.



Figure 5 – Results of Salt Spray testing on silver plated copper NH contacts

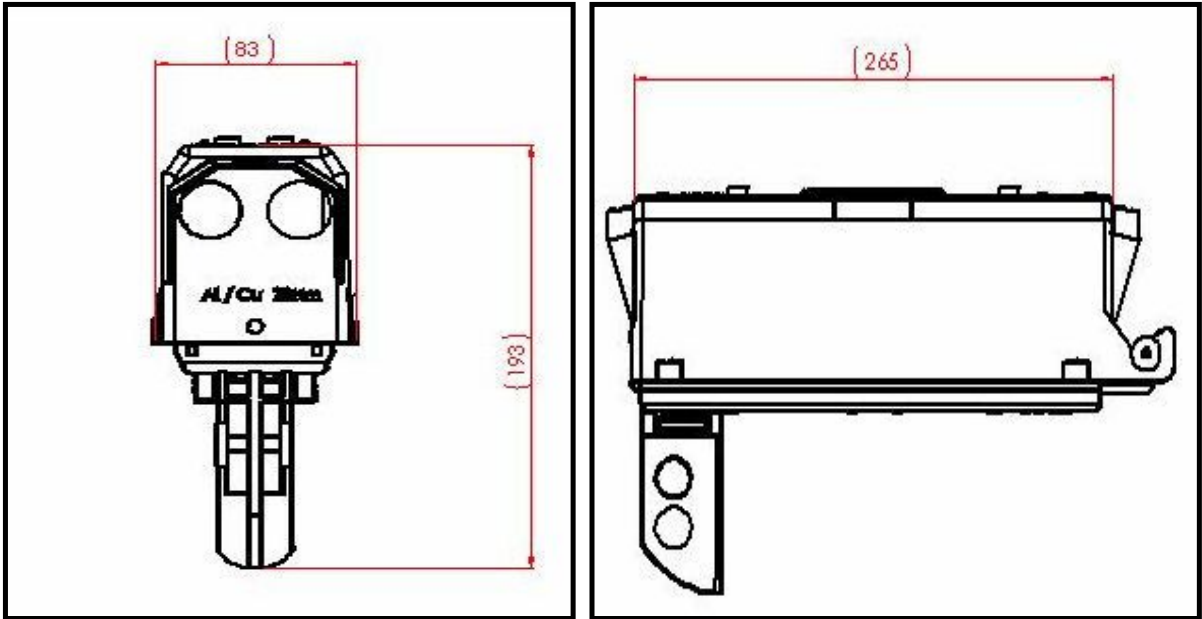
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1.4 Physical Specification

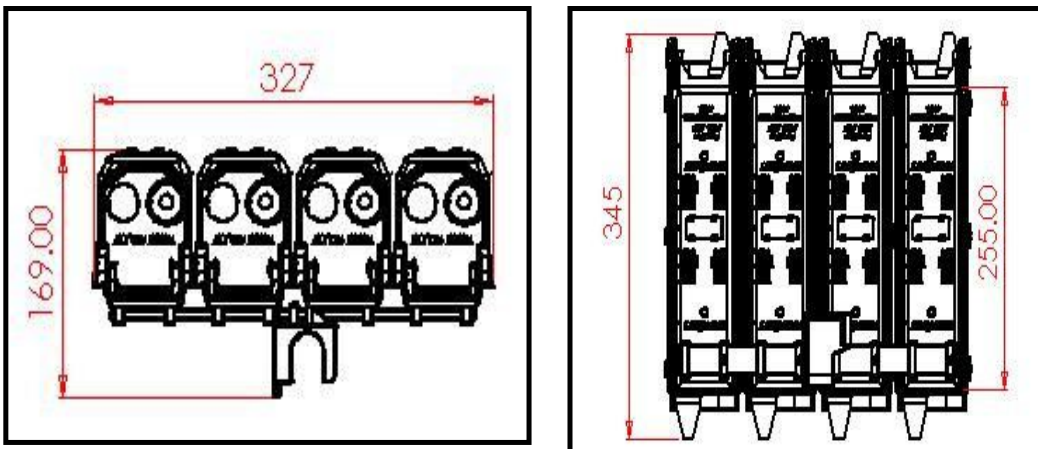
The outer dimensions with and without mounting bracket of both the single pole and three pole devices are shown in the diagrams which follow.

400A Single Pole Unit



Weight: 1.2Kg w/o mounting bracket

400A Three Pole & Neutral Unit



Weight: 3.5Kg w/o mounting bracket

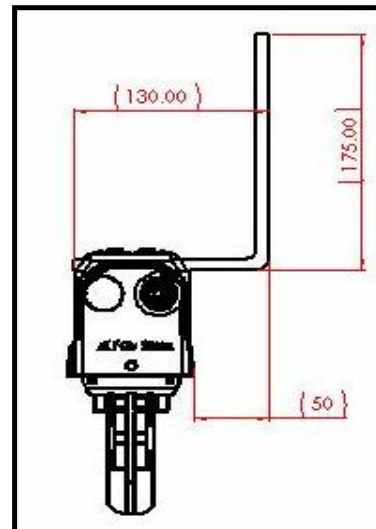
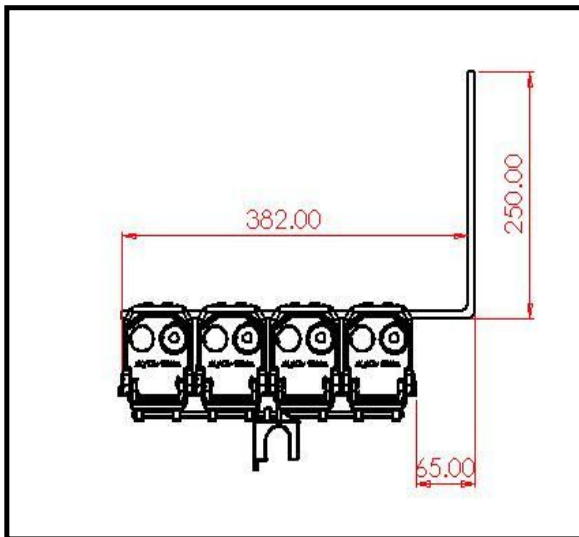
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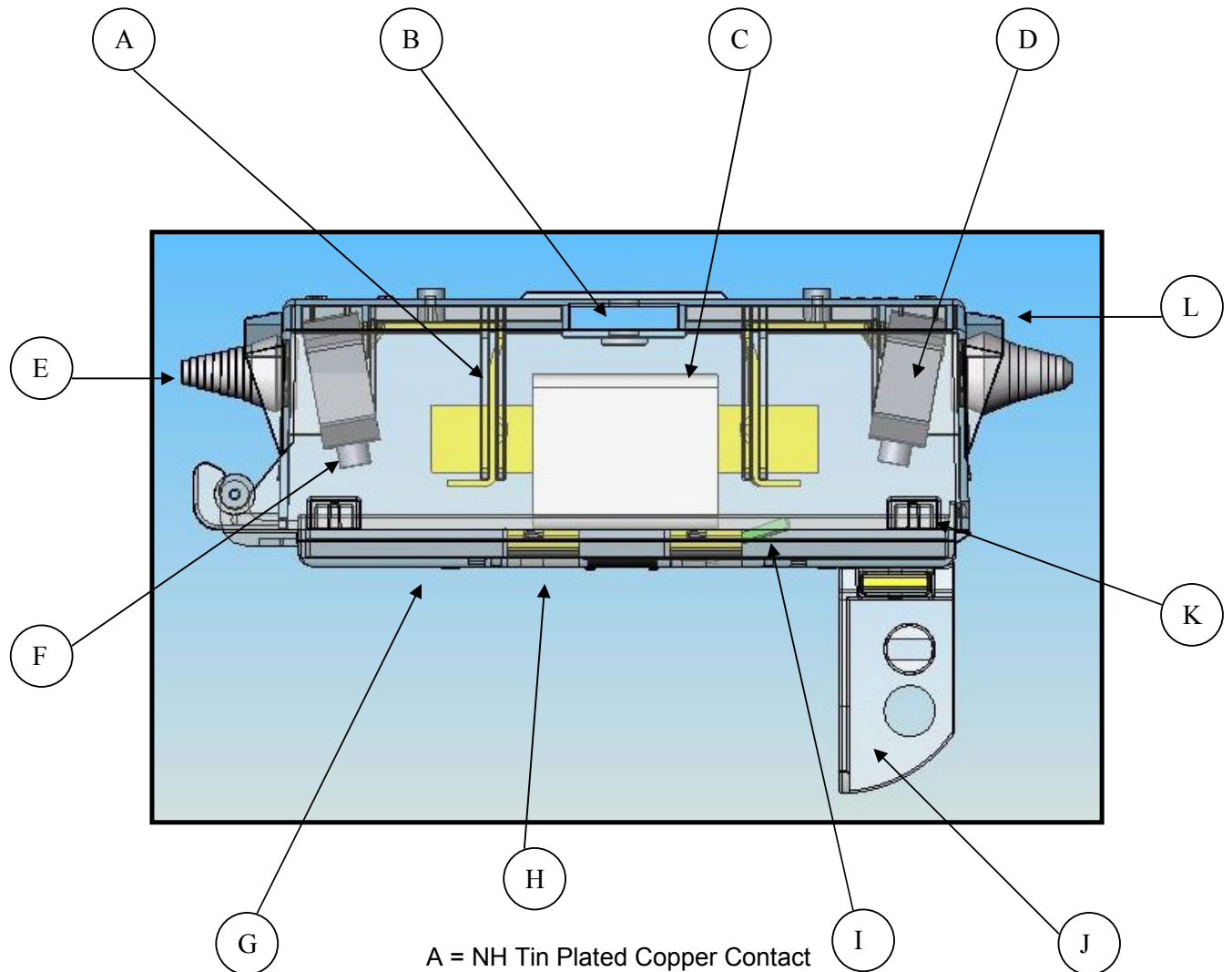
Mounting Bracket Dimensions



1.5 Drawings

Complete catalogue of technical drawings for all components is available at Renley Ltd. Ballymount, Dublin 12.

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- A = NH Tin Plated Copper Contact
- B = Mounting Bracket Slot
- C = NH Fuse Link
- D = Aluminium Terminal Block
- E = Cable Grommet
- F = Allen Key Terminal Bolt
- G = Cover Housing
- H = Stainless Steel Fuse Insert
- I = Fuse Clip
- J = Operating Handle
- K = Interlocks for ganging single pole units