

HOUSING FOR AN ELECTRICAL INSTALLATION DEVICE

The invention relates to a housing for an electrical installation device, in particular a circuit breaker, comprising markings formed in the walls of the housing by indentations, along which markings wall sections can
5 be removed in order to form openings.

Circuit breakers are usually produced so as to be unipolar, such that one pole is disposed with all the functional parts in a single housing. If a plurality of housings of this kind are assembled to form a multipolar
10 circuit breaker, or if additional auxiliary switches are laterally mounted, openings may have to be made at the sides of the housing, for example to pass through electrical connecting leads or to permit coupling elements to be provided, by means of which the movement
15 of the switching mechanism of one circuit breaker pole can be transmitted to the switching mechanisms of the other circuit breaker poles.

It is known to provide appropriate openings in all housing parts before the device is assembled, which
20 openings are closed again by covers immediately after the housing has been produced. If an opening is then

needed in the housing, the cover is removed from the finished housing as required, and discarded.

5 In a further arrangement the openings are produced by removing sections from the component parts of the housing before the latter is assembled, and then also closed again by means of a cover. These two solutions described above entail a considerable amount of energy and material expenditure.

10 It is also known to provide markings in the walls of the housing parts, along which markings the inner wall sections can be removed in order to form the openings. However in order to permit removal tools to be inserted, increasingly small holes were generally provided in the walls. In the latter solution the electrical insula-
15 tion is reduced and specifications concerning tracking and air gaps, the ability of live parts to contact wires and so on are often not complied with.

20 The object of the invention is therefore to provide a housing of the above-mentioned type in which it is possible to form openings in the finished device without the necessity of providing small openings in the relevant walls or at the relevant places in order to insert removal tools etc.

According to the invention, markings or indentations are arranged opposite one another on both sides of the housing wall in an approximately circular manner, the inner diameter, or the diameter which surrounds the inner contour, of the marking on the outside surface of the housing wall, is greater than the outer diameter of the marking on the inside of the housing wall, so that the removable wall section within the markings has a greater diameter than the opening produced by the removal operation, and the latter operation is carried out by rotating the removable wall section.

The inner contour of the outer surface marking is advantageously formed in the manner of a polygon, e.g. triangular, rectangular, square or hexagonal; it is then possible to apply a correspondingly shaped tool, particularly in the case of the hexagonal arrangement, e.g. a ring or box spanner

It is also possible to provide a slot within the inner contour of the marking on the outside surface of the housing in order to receive a screw driver.

By means of the opposite markings according to the invention, a fracture zone is produced which can be broken by rotating the wall section within it for example by means of a screw driver or a wrench, and the section which has been removed has greater dimensions

than the opening and thus cannot fall into the device when it is removed. Furthermore, the arrangement is such that it is almost impossible for fragments to enter the interior of the device.

5 Further features of the invention will become apparent from the following description with reference to the accompanying drawing, which shows by way of example two embodiments of the invention.

In the drawing:

10 Figure 1 is an elevation of part of a housing according to the invention,

Figure 2 is a sectional view along the line II-II in Fig. 1,

15 Figure 3 is an elevation of part of a housing with a second arrangement of markings; and

Figure 4 is a sectional view along the line IV-IV of Figure 3.

20 Figures 1 and 2 show part of the housing wall 10 of a conventional circuit breaker, the details of which are not shown as they are not of importance to the invention. The wall 10 has in the outer surface 12 a

first pre-formed indentation or recess 14, with which a second pre-formed indentation or recess 16 on the inner surface 18 of the housing wall 10 is associated. The inner and outer indentations are circular and coaxial.

5 The first indentation 14 is defined externally by a frusto-conical outer annular surface, which has an outer diameter D_1 measured at the outer surface 12, and internally by a cylindrical annular inner surface having an inner diameter D_a . Between the cylindrical inner
10 surface and the frusto-conical outer surface the indentation 14 is bounded by a flat annular bottom surface. The second or inner indentation 16 is defined externally by a cylindrical annular outer surface having a diameter D_i and internally by an annular inner
15 surface which intersects the outer surface and tapers outwards in the manner of a truncated cone and has an inner diameter D_2 measured at the inner wall surface 18. The depth of impression of both indentations 14 and 16 is such that residual wall material remains which
20 is in the form of an annular surface 20 connecting the two indentations. The outer diameter D_i of the indentation 16 is smaller than the inner diameter D_a of the indentation 14, so that the annular surface 20 widens outwardly towards the outer wall surface 12 in
25 the manner of a truncated cone. The annular surface 20 is the shortest connecting surface between the contour lines of the two indentations.

A slot 22, which in use receives a screw driver, is provided inside the diameter D_a , so that the circular wall section 24 formed by the indentations 14 and 16 can be rotated and thereby broken away from the wall 10 along the annular surface 20. The annular surface 20 thus forms a fracture zone or zone of weakness along which the wall section 24 can be removed in order to form an opening. The opening thus formed is defined by the cylindrical outer surface of the indentation 16, which extends at a right angle to the inner wall surface 18 of the housing, the frusto-conical annular surface 20, and the bottom and outer surfaces of the indentation 14. It can be seen from Figure 2 that the outer diameter of the wall section 24, on the outside of the housing wall, is greater than the inner diameter, and therefore in this case the smallest inner diameter of the opening, so that there is no danger of the wall section 24 falling into the housing, i.e. on the left hand side of the housing wall 10. The wall section 24 basically remains outside the wall.

As mentioned above, in Figs. 1 and 2 the wall section 24 is to be rotated by means of a screw driver inserted in the slot 22. In the arrangement according to Figures 3 and 4 the wall section 30 which is to be removed is formed by a pre-formed indentation 32, the inner contour 34 of which has a hexagonal shape like a hexagon nut. The inner indentation 36 is simply formed

by a circular imprint, the depth t_1 of which is such that its base surface 38 lies approximately at the level of the flat base surface 40 of the outer indentation 32. A narrow annular fracture zone 42 is thus defined
5 by the thin wall region between the deepest part of the inner indentation 36, and the inner contour 34 and base 40 of the outer indentation 32. In the illustrated embodiment the indentations 36, 32 have a combined depth greater than the wall thickness so that their respective
10 side walls overlap, thus giving the thinnest possible fracture zone.

To break out the wall section 30, it is rotated by means of a hexagonal box spanner or a hexagonal ring spanner. It can be seen that the width S over the faces
15 of the wall section 30 or the diameter D_a of the outermost circle which circumscribes its contour 34 is greater than the diameter D_i of the indentation 36, so that the removed wall section 30 cannot fall into the housing.

20 It is thus possible, owing to the arrangement according to the invention of the housing walls at the relevant places, for the wall sections 24 and 30 to be removed from the wall without the possibility of fragments entering the interior of the circuit breaker.

The wall section 24 or 30 can be removed along the fracture zone formed by the annular surface 20 or 42, the dimensions of the removed wall section 24 or 30 being greater than the inside diameter of the opening remaining after the wall section 24 or 30 has been removed.

The indentation markings are produced during manufacture, that is during the transfer moulding of the housing or the housing shell.

10 It is also possible to combine the arrangements according to Figures 1 and 2 or 3 and 4, respectively, i.e. to provide the slot 22 within a hexagonal contour 34 and to form the indentation 16 similar to the one in Figure 4 instead of as shown in Figure 2, in which it is
15 wedge-shaped.



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CLAIMS:

1. A housing for an electrical device having indentations formed in the housing wall to form zones of weakness along which an integral wall section can be removed in order to form an opening, characterised in that respective indentations are arranged opposite and generally coaxial with one another on opposite sides of the housing wall and are approximately circular, the transverse extent of the indentations in the outer and inner surfaces of the walls are respectively such that the removable wall section defined by the indentations is wider than the opening in the inner wall surface formed by removal thereof whereby the removable wall section cannot enter the housing, and the removable wall section is detachable from the wall by rotation.
2. A housing for an electrical device, having a housing wall formed with indentations defining zones of weakness along which a section of the wall can be removed in order to form an opening, characterised in that respective indentations are arranged opposite on opposite sides of the housing wall and are approximately circular and generally coaxial, the indentation in the outer surface of the wall having an inner diameter which is greater than the outer diameter of the indentation formed in the inner surface of the wall, whereby the removable wall section defined by the indentations has a



greater diameter than the opening produced in the inner wall surface by removal of the said section, the removable section being detachable from the wall by rotation.

- 5 3. A housing according to claim 1 or 2 characterised in that the indentation in the outer surface of the housing wall has an inner contour formed as a polygon to receive a spanner or similar tool.
- 4. A housing according to claim 3, characterised in
10 that the said inner contour is triangular.
- 5. A housing according to claim 3, characterised in that the said inner contour is quadrilateral, in particular square.
- 6. A housing according to claim 3, characterised in
15 that the said inner contour is hexagonal.
- 7. A housing according to any one of the preceding claims, characterised in that a slot is provided within the inner contour of the indentation on the outside surface of the husing in order to receive a screw driver.
- 20 8. A housing according to any one of the preceding claims, characterised in that the indentation in the inside surface of the housing is defined by an outer



contour which is circular and defines the opening after the removable wall section has been removed.

9 A housing according to any one of the preceding claims, characterised in that the indentation in the inside surface of the housing is a pot-like indentation, the base surface of which is disposed approximately at the level of the base surface of the indentation in the outside surface of the housing.

10. A housing for an electrical device, substantially as herein described with reference to Figures 1 and 2 or Figures 3 and 4 of the accompanying drawings.
