

FUSE UNIT

This invention relates to a unit, for accommodating a High Rupturing Capacity (HRC) cartridge fuse link in, for example, a domestic wiring system.

In a known fuse unit an insulating housing is provided with input and output terminals which are electrically connected to respective electrically conductive clips located within the housing. The clips are arranged so as to be able to grip and make electrical connection to the terminal end caps respectively of a cartridge fuse link, and the fuse link is supported by an electrically insulating carrier slidable relative to the housing between a first position wherein the fuse link is engaged in said clips, and so completes an electrical circuit therebetween, and a second position in which the fuse link is withdrawn from said clips and is accessible at the exterior of the housing for removal and replacement. In order to replace a faulty fuse link it is necessary for an operator to have access to a supply of replacement fuse links of the appropriate rating, and it is an object of the present invention to provide a fuse unit where fuse replacement may be accomplished in a simple and convenient manner.

In accordance with the present invention there is provided a fuse unit comprising a housing, first and second electrically conductive terminal clips within the housing and adapted to receive and make electrical connection to the terminal end caps respectively of a cartridge fuse link, and, an electrically insulating fuse link carrier mounted in the housing for sliding movement relative thereto between a first position wherein a cartridge fuse link supported by the carrier

has its terminal end caps engaged in said terminal clips respectively, and a second position in which the terminal end caps of the fuse link are withdrawn from said clips and said fuse link is accessible at the exterior of the housing, abutment means operable during movement of said fuse link carrier from said first position to define said second position said fuse link carrier having therein first recess means shaped to receive a cartridge fuse link in such a manner that said fuse link will be movable with the carrier and will have its terminal end caps exposed for engagement in said clips, a second recess means for receiving a spare cartridge fuse link in such a manner that said spare cartridge fuse link moves with said carrier, is accessible externally of the housing in said second position of the carrier, and is, in said first position of the carrier, within the housing, but spaced from said terminal clips, and said fuse link carrier and said housing being such that in said second position of said fuse link carrier access to said terminal clips from the exterior of the housing is prevented.

Preferably said second recess means is so dimensioned as to be able to receive and retain only a cartridge fuse link of the same dimensions as the cartridge fuse link intended to be received by said first recess means.

Desirably said electrically insulating carrier has therein an aperture which is exposed when the carrier is in its second position relative to the housing, and so can receive a blocking element for preventing movement of the carrier to its first position.

Desirably said carrier is provided with interlock receiving means whereby the carrier may be ganged to the carrier of an adjacently positioned, similar, fuse unit.

One example of the invention is illustrated in the accompanying drawings wherein,

Figure 1 is an exploded diagrammatic view, partly in section, of a fuse unit, and

Figure 2 is a sectional view on the line 2-2 in Figure 1 but to an enlarged scale, and illustrating the positioning of a fuse clip omitted from Figure 1 in the interests of clarity.

Referring to the drawings, the fuse unit comprises an electrically insulating, moulded synthetic resin housing 11, and an electrically insulating moulded synthetic resin carrier 12 slidable relative to the housing. It should be recognised that although Figure 1 illustrates the carrier 12 separate from the housing, in use it will not be possible to withdraw the carrier 12 completely from the housing by virtue of the engagement of outwardly extending lugs 13 of the carrier with internal shoulders 14 of the housing.

The carrier 12 is intended to support and carry a pair of HRC cartridge fuse links 15, 16 of conventional form, with the fuse link 15 being the active fuse link and the fuse link 16 being a spare for use in replacing the link 15 when necessary.

It will be understood that cartridge fuse links are of circular cylindrical form and include, at opposite axial ends respectively, terminal end caps whereby electrical connections are made to the fuse link. Located within the housing 11 are first and second generally U-shaped, electrically conductive, terminal clips 17 (one of which is illustrated in Figure 2). The clips 17 are positioned in spaced parallel relationship in regions 18 of the housing (Figure 1) and are electrically connected by means of respective conductive strips 19 to respective lead clamping terminals housed in regions 21 of the housing.

The spacing of the terminal clips 17 and the electrically insulating nature of the housing 11 ensures that in the absence of a fuse link 15 the clips 17, and therefore their respective terminals and electrical leads connected thereto, are electrically insulated from one another. Between the clips 17 the housing 11 defines a guide channel 22 within which a guide member 23 forming an integral part of the carrier 12 is slidably received. The cooperation of the guide member 23 and guide channel 22 serves to guide the carrier member 12 for rectilinear sliding movement into and out of the housing 11 between a first position in which the majority of the carrier 12 lies within the housing, and a manually gripable handle formation 24 at one end of the carrier 12 abuts an end surface 25 of the housing, and a second position in which the majority of the carrier 12 protrudes from the housing and said lugs 13 abut said shoulders 14 of the housing.

The carrier 12 has first recess means 26 for receiving the cartridge fuse link 15, and second recess means 27 for receiving the second cartridge fuse link 16 parallel to but spaced from the link 15. Considering the direction of movement of the carrier 12 relative to the housing as lengthwise movement of the carrier then it can be considered that the first recess means 26 is a passage extending transversely of the carrier 12 with sections of the wall of the passage removed at the front and rear of the carrier 12 to expose the terminal end caps of a cartridge fuse link 15 housed in the passage. The positioning of the first recess means 26 along the length of the carrier 12 is such that when the carrier 12 is in its first position relative to the housing the end caps of the respective fuse link 15 are engaged between the limbs of the U-shaped clip 17, so that the fuse link 15 electrically interconnects the clips 17, but when the carrier 12 is

in its second position the fuse link 15 is withdrawn from the housing beyond the end wall 25, and so is accessible to an operator for replacement. When replacement is required the operator withdraws the fuse link 15 transversely from the carrier 12 and substitutes a spare fuse link in its place. Conveniently the spare fuse link will be the fuse link 16 carried in the second recess means 27 of the carrier 12.

The second recess means 27 is an aperture extending completely through the carrier 12 and disposed between the recess means 26 and the outer face of the handle formation 24. The effective width and height dimensions of the aperture constituting the recess means 27 are such that a cartridge fuse link 16 can be received as a close fit therein, one end of the aperture having a transversely extending face 28 against which one end cap of the fuse link 16 bears and which may, as shown in Figure 1, be recessed to save moulding material. Adjacent the rear face of the carrier 12 the lower wall of the aperture constituting the recess means 27 is formed with a pair of upstanding projections 29 which prevent the fuse link 16 being displaced completely through the carrier 12. Thus the fuse link 16 is lightly gripped within the aperture such that the fuse link 16 is carried by the carrier 12.

Integral with the guide member 23 of the carrier 12 and on opposite sides thereof are wings 31 which in use lie between the limbs of the clips 17, and serve to maintain the limbs of the clips 17 spaced apart to facilitate entry therebetween of the terminal caps of the fuse 15 when the carrier 12 is moved to its first position relative to the housing 11. It will be noted that when the carrier 12 is in its first position the limbs of the clips 17, while gripping the terminal caps of the fuse link 15, are still inclined towards one

another, and thus exert upon the fuse link 15, and therefore upon the carrier 12, a force lightly retaining the carrier 12 in its first position.

The recess means 26 opens in one lateral edge of the carrier 12 to one side of the guide member 23 and extends completely through the guide member 23. At the opposite side of the guide member 23 the recess means 26 has a closed end 32. Since the carrier member 12 is cut away on both front and rear faces to permit the clip 17 to engage the terminal caps of the fuse then the closed end 32 and the guide member 23 together bound opposite sides of a rectangular aperture 33. When the carrier 12 is withdrawn to its second position, and the fuse link 15 is removed, then a blocking member such as the shackle of a padlock can be introduced through the aperture 33 to prevent the carrier 12 being returned to its first position. The use of a padlock or similar blocking member to prevent reintroduction of a fuse link into the first recess means 26, and to prevent movement of the carrier 12 back to its first position, might be appropriate where, for example, maintenance work is required to the circuit protected by the fuse link.

Cartridge fuse links are dimensioned in accordance with their rating. Thus a fuse link which is rated at 30 amps will be larger than a fuse link which is rated at 20 amps. Naturally the first recess means 26 is shaped to receive a fuse of a particular rating, and the second recess means 27 is shaped to receive and retain a fuse of the same rating.

It may occur, for example in a consumer unit, that a number of fuse units are to be mounted in side-by-side relationship. It may be a requirement that when one of the carriers is withdrawn to its

second position, then one or more adjacent carriers must automatically be similarly withdrawn. In order to facilitate ganging of the carriers 12 of a plurality of fuse units, the handle formation 24 of each carrier 12 is formed, in its side faces, with one or more transversely extending bores 34 for receiving one or more linking pins whereby a carrier 12 may be linked, and therefore ganged, to its neighbour.

It will be recognised that when the carrier 12 is in its second position, and further withdrawal movement of the carrier is prevented by abutment of the lugs 13 of the carrier with the shoulders 14 of the housing, then parts of the wings 31 still remain in the aperture in the housing, and thus prevent access being gained to the clips 17 within the housing by tools, wires or such objects of thickness greater than 1.25mm.. The construction and assembly of the unit(s) disclosed above is such that there is compliance with British Standards Institution (B.S.I.) enclosure protection classification I.P. 3X (See B.S. 5490: 1977 and I.E.C. 529: 1976).

In a modification the channel 22 is arcuate as is the guide member 23, the carrier 12 thus moving in an arcuate, rather than rectilinear, path as the carrier is moved between its first and second positions.



CLAIMS

1. A fuse unit comprising a housing, first and second electrically conductive terminal clips within the housing and adapted to receive and make electrical connection to the terminal end caps respectively of cartridge fuse link, and, an electrically insulating fuse link carrier mounted in the housing for sliding movement relative thereto between a first position wherein a cartridge fuse link supported by the carrier has its terminal end caps engaged in said terminal clips respectively, and a second position in which the terminal end caps of the fuse link are withdrawn from said clips and said fuse link is accessible at the exterior of the housing, abutment means operable during movement of said fuse link carrier from said first position to define said second position said fuse link carrier having therein first recess means shaped to receive a cartridge fuse link in such a manner that said fuse link will be movable with the carrier and will have its terminal end caps exposed for engagement in said clips, a second recess means for receiving a spare cartridge fuse link in such a manner that said spare cartridge fuse link moves with said carrier, is accessible externally of the housing in said second position of the carrier, and is, in said first position of the carrier, within the housing, but spaced from said terminal clips, and said fuse link carrier and said housing being such that in said second position of said fuse link carrier access to said terminal clips from the exterior of the housing is prevented.

2. A fuse unit as claimed in claim 1 wherein said second recess means is so dimensioned as to be able to receive and retain only a cartridge fuse link of the same dimensions as the cartridge fuse link intended to be received by said first recess means.

3. A fuse unit as claimed in claim 1 or claim 2



wherein said electrically insulating carrier has therein an aperture which is exposed when the carrier is in its second position relative to the housing, and so can receive a blocking element for preventing movement of the carrier to its first position.

4. A fuse unit as claimed in any one of claims 1 to 3 wherein said carrier is provided with interlock receiving means whereby the carrier may be ganged to the carrier of an adjacently positioned, similar, fuse unit.

5. A fuse unit substantially as hereinbefore described with reference to the accompanying drawings.

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