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IMPROVEMENTS IN OR RELATING TO LIGHTING TRANSFORMERS

This invention relates to an improved housing for electrical components. A particular application is the housing for isolating transformers for airport runways.

5 In an airport runway lighting installation individual isolating transformers are used for each light in the array for the following reason(s):

There are a large number of lights associated with airport runways and the wiring
10 required to operate the lights in parallel would be very extensive. Without the transformers, the voltage drop at the more distant lights would be excessive and uniform brightness of the lights would not be obtained. The use of a number of
15 transformers with their primaries in series allows a high voltage, low current supply line to supply current without the losses associated with the supply current without the transformers, i.e. if the transformer is a 1:1 transformer the primary current
20 is merely the current required to operate one secondary coil and its lighting load. As there may be several thousand lights in such an installation, significant savings are achievable.

Due to the nature of the application these
25 transformers are exposed to extremes of weather. It is thus important to ensure that the transformer housings are able to withstand these severe conditions.

According to the invention there is provided a lighting transformer comprising a housing of thermoplastic rubber moulded around the transformer coils, the housing having a plurality of
5 moulded in connectors formed by plugs and/or sockets to provide electrical connection between the transformer coils and mating connectors.

In order that the invention and its various other preferred features may be understood more
10 easily, an embodiment thereof will now be described, by way of example only, with reference to the drawings, in which:-

Figure 1 is an elevational view of a transformer of known type as used in airport
15 lighting installations.

Figure 2 is an elevational view of a transformer constructed in accordance with the invention,

Figure 3 is a plan view of the transformer
20 of Figure 2, and

Figure 4 is a sectional view of the top portion of the housing of the transformer of Figures 2 and 3 taken in the vertical plane including the axis of X-X of Figure 3.

25 The transformer of Figure 1 has a housing body 1 which contains the transformer windings. A number of leads 2 project from the top of the housing. These have a radius limiting section 3 at their attachment to the housing and are terminated
30 with specified standard plugs and sockets 4, 5 and 6 at their distal ends.

In such known transformers the cables and body are made of neoprene rubber. It has been found that neoprene allows the absorption of water in the
35 centre conductors of the cable and into the

transformer winding. The imperfect bond between the cable and the encapsulating neoprene allows water to enter the transformer. These problems can cause early failure of the transformer.

5 The problem of the cable/body bonding may be exacerbated by handling of the transformer. The transformers are mounted in small recesses with restricted access and installation personnel occasionally use the leads to lift the transformer
10 thus putting strain on the cable/body bond.

 In the embodiment of the invention shown in Figure 2 the plugs and sockets, 4, 5 and 6 have been integrated into the housing 21, eliminating the cable and the concomitant problems of the cable to
15 encapsulation bond and water entering the cable. The housing is made of thermoplastic rubber (TPR) as this is much more effective in excluding water. It also forms virtually impervious seals around the contact elements to block the ingress of water.
20 Suitable ^(R.T.M.)TPRs include Uniroyal ^(R.T.M.)TPR 5260 or 5280 or Shell Elixar 8431 Z.

 The housing 21 is provided with a pair of handles 8 to facilitate installation and maintenance. The handles may also be used to mount
25 the installed transformer above the base of its field location to aid in avoiding contact with water. For example, hooks may be provided in the walls of the mounting recess to engage the handles. This also avoids the weakening of the cable/housing
30 joint by handling by the leads.

 As shown in Figure 3, a primary plug 31 and a primary socket 32 are each housed in an individual receptacle 35, 36 respectively, whilst a secondary connector comprises a pair of secondary sockets 33a,
35 33b housed in a common receptacle. The separation

of the connectors 31 and 32 may be useful in preventing leakage or arcing between the terminals.

The TPR forms a water-tight seal with the connectors. The TPR housing contracts slightly as
5 it sets.

In the manufacturing process the transformer is held in position within the mould. This is achieved by having two or more studs connected to the transformer laminations. The studs
10 may be brought out through the case and one of these may also be adapted to serve as an earth connection if so required. The water-tight seal around the studs may be further improved by the use of a bonding agent such as Lord Chemical 205, 222 or
15 252. The bonding agent is applied to the studs before the moulding operation. The bonding agent may also be applied to the surfaces of the connectors which are to be in contact with the housing.

20 Water-tight seals with the attached cables are achieved as the mating connectors in the housing retain resilience to tightly mate with the connector housings on the cable, which also may be resilient.

The moulding may be effected by an
25 injection moulding process.

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CLAIMS:

1. A lighting transformer comprising a housing of thermoplastic rubber moulded around the transformer coils, the housing having a plurality of moulded in connectors formed by plugs and/or sockets to provide electrical connection between the transformer coils and mating connectors.

2. A lighting transformer as claimed in claim 1, wherein the connections to a first coil of the transformer are contained in separate first and second connector receptacles, and the connections to the second transformer coil are contained in a third connector receptacle.

3. A lighting transformer as claimed in claim 1 or 2, wherein one or more handles are provided on the housing to facilitate handling and installation.

4. A method of manufacturing a transformer comprising fixing the transformer and electrical sockets in a mould by at least one locating means, coating the locating means with a bonding agent and filling the mould with thermoplastic rubber moulding material.

5. A method as claimed in claim 4, wherein the moulding process is an injection moulding process.

6. A lighting transformer substantially as described herein with reference to Figures 2, 3 and 4 of the drawings.

7. A method manufacturing a lighting transformer substantially as described herein with reference to Figures 2, 3 and 4 of the accompanying drawings.

