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A PIR sensor device.

A miniaturised and sealed PIR sensor device adapted to be positioned within the body of a lighting appliance and comprising a housing (10) with integrally moulded lens (12) and containing a PIR sensor (14) behind the lens (12) and associated switching circuitry (15) contained within the housing (10). A sealing substance (16) fills the remaining space of the housing (10) beneath a welded-on back plate (11). The device may be located conveniently behind the mounting plate of a wall mounted lighting appliance with the lens (12) exposed by or projecting through a small aperture in the appliance. The device obviates the need for a separate PIR housing alongside of beneath the appliance.

THIS INVENTION concerns passive infra-red (PIR) sensors which are commonly used to actuate lighting appliances when movement is detected in the vicinity of the sensor.

PIR sensors are usually contained within a housing of a non-translucent material to which is attached a multi-facet lens. The housing contains a printed circuit board and switching components.

In order that the PIR sensor should be contained inconspicuously as part of a lighting appliance, there is a desire to house the essential components in as small a space as possible and preferably such that it can be positioned behind the mounting plate of a typical domestic exterior light.

It is an object of the present invention to provide a PIR sensor device in which the electronic components of the switching circuit, together with a lens and the PIR sensor itself are all contained in a single housing of minimal dimensions.

According to the present invention there is provided a PIR sensor device comprising a moulded housing having an open back and adapted to contain electronic switching components, a lens integrally moulded with and positioned on a front face of the housing and adapted to contain a PIR sensor, and a closure for the open back, the housing and lens being moulded from a material which is translucent to infra-red light.

An embodiment of the invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a side elevation of a PIR sensor device made in accordance with the invention;

and Fig. 2 is a horizontal section taken on line II-II of Fig. 1.

The device essentially comprises a housing 10 and a back plate 11. The housing 10 is injection moulded from a material which is translucent to infra-red light and includes a lens 12 of generally hemispherical shape which extends forwardly from the otherwise flat front face of the housing. The internal surface of the lens 12 is formed with facets 13.

Thus there is formed a generally rectilinear box into which a PIR sensor 14 and a printed circuit board with electronic switching components generally indicated at 15, are housed. The printed circuit board may be retained by bonding or by fastening screws within the housing.

After insertion of the PIR sensor and circuit-board any residual space within the housing 10 is filled with a wax or similar sealing material 16. Finally, the back plate 11 is applied as a further closure for the housing, preferably by ultrasonic welding. Alternatively, the back may be a snap-on fit and sealed with an adhesive or other sealing compound.

The material from which the housing is injection moulded is translucent to infra-red light and the external surface other than the lens housing 12 may be

textured to render the internal components substantially invisible from the outside of the housing whilst the lens 12 will usually be smooth.

Typically, the housing will be 60mm long, 40mm wide and 15mm deep (excluding the lens housing 12).

For connection to a lighting appliance, usually 3 wires will extend through the housing wall from the circuitry contained therein.

It will be appreciated that the miniaturised and sealed PIR sensor device described herein may be positioned conveniently within the back plate of a wall-mounted lighting appliance, with the lens 12 exposed by or projecting through an aperture of some 20mm in diameter in the appliance. With this arrangement the need for a separate PIR housing beneath the appliance is avoided.

Claims

1. A PIR sensor device comprising a moulded housing having an open back and adapted to contain electronic switching components, a lens integrally moulded with and positioned on a front face of the housing and adapted to contain a PIR sensor, and a closure for the open back, the housing and lens being moulded from a material which is translucent to infra-red light.
2. A PIR sensor device according to Claim 1, wherein the lens is of generally hemi-spherical shape and extends forwardly from an otherwise flat front face of the housing, the internal surface of the lens being formed with facets.
3. A PIR sensor device according to Claim 1 or Claim 2, wherein said housing further contains a printed circuit board with said electronic switching components.
4. A PIR sensor device according to any preceding claim, wherein, behind the PIR sensor and the switching components, any residual space within the housing is substantially filled with a sealing material.
5. A PIR sensor device according to Claim 1, wherein a printed circuit board is fixed within said housing and carries the PIR sensor on one face thereof behind the lens.
6. A PIR sensor device according to any preceding claim, wherein the external surface of the housing, other than the lens, is textured to render the internal components substantially invisible from the outside of the housing.
7. A PIR sensor device according to any preceding

claim, wherein the closure for the open back of the housing is applied by ultrasonic welding, and wherein a number of wires extend through the housing wall for connection to, for example, a lighting appliance.

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8. A PIR sensor device according to any preceding claim, when positioned within a lighting appliance with the lens exposed by or projecting through an aperture in the appliance the remainder of the device being concealed therewithin.

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9. A PIR sensor device substantially as hereinbefore described with reference to and as illustrated in the accompanying drawings.

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