EXTENDED CONTACT STRIP

FIELD OF THE INVENTION

The present invention relates to electrical contacts, and particularly although not exclusively to extended electrical contact strips.

BACKGROUND OF THE INVENTION

It is known to provide extended electrical contact strips which permit a user to press at any point along the strip. These are used in applications such as police stations where an elongate extended switch is required to be available around a room as an easily reached alarm, or in industrial plants where an extended switch which can be activated along its length is required to trigger a machine safety cut out. Such extended switches are variously known as "press at any point switches", "tape switches", or "ribbon switches" or "linear switches".

The majority of prior art extended or strip contact systems are constructed by having a backing strip of a flexible plastics material, the backing strip having an elongate flat copper strip, and an upper flexible plastics cover, which in cross section has a bridge shaped profile, and to which is attached a second elongate copper or wire strip, facing opposite the first copper or wire strip and spaced apart therefrom. The cover strip is attached to the backing strip along the outer edges, either by glue, or by welding.

Pressing the outer strip causes the cover to deform, and the second metal strip to come into contact with the first metal strip, thereby effecting electrical contact.

Known "press at any point" switches use an open pair of parallel contacts separated by an electrical isolator, usually air, and are encased in a polymer or rubber body. The shape of the switch body and the ability of the polymer or rubber body to deform and return to its original shape is critical to the operation of such known switches.

The body shape, and hence the separation between electrical contacts in these known devices are maintained by one of three methods.

In a first method, two contacts are manufactured from metal springs and encased in a polymer or rubber body.

In a second method, a single metal spring is concealed in a polymer or rubber body.

In a third method, a polymer or rubber body having a shape memory is used, with electrical contacts separated by an air gap.

For the third method, press at any point switches manufactured with a polymer or rubber body rely on the deformation of the switch body to cause a pair of electrical contacts to touch each other, creating an electrical circuit.

The switch contacts in this type of press at any point switch are strips of copper or other suitable electrical conductor, backed with laminated polyester or other suitable sacrificial membrane which enables the contact to adhere to, or be welded to an opposing internal face of the switch body to create a pair of contacts separated by an air gap. The body is usually tubular or semi circular in cross-sectional shape.

When an external pressure or force is applied to the switch body, the external walls deform allowing the contacts to touch, creating an electrical circuit. When the pressure or force is removed, the internal forces created by the material shape memory cause the contacts to separate and the body to return to its original shape.

To control the sensitivity of the strip, ridges are sometimes included in the base contact either longitudinally or across the width of the switch. These ridges are used to reduce the effects of poor mechanical and memory properties of the material by reducing the space and distance between the supports of the contact.

In known switch strips, the materials of choice for creating the switch body are PVC and Nitrite rubber. One concern when using flexible PVC to construct a switch body is the weak positional memory of the body shape. PVC material memory can be improved by the addition of elastomers such as Nitrite. The final blend of PVC and Nitrite rubber is therefore a matter of compromise between the characteristics of flexibility (memory), elasticity, and transparency, all of which are desirable in the contact strip.

Depending on the application of the switch strip, the two main components of the switch, the base plate and the cover may be manufactured from differing blends of PVC Nitrite, with the specific blend being determined usually on the grounds of cost considerations.

One particular form of prior art contact strip product comprises a backing plate or base plate of a flexible plastics sheet material; a cover strip of a flexible plastics material, the cover strip having a bridge or arch shape in cross-sectional view; a first electrically conductive strip bonded to the base plate, and extending along a length of the base plate, and a second electrically conducting strip bonded to an inner surface of the cover strip such that it faces opposite the first conductive strip, there being a gap there between.

The edges of the cover strip are bonded to adjacent surfaces of the base plate.

In use, the base plate of the strip is attached to a surface, for example a wall, and persons may press the strip, making contact between the two electrical contacts. When pressed, the cover member deforms to allow the second contact strip to come into contact with the first contact strip, making electrical connection. The two contacts can be connected into a circuit, such as a switch circuit.

U.S. Pat. No. 3,732,384 discloses a linear switch having a pair of superposed metal strip conductors positioned within a centrally located cavity within a resilient non-conductive casing.

U.S. Pat. No. 4,940,426 discloses a high density electrical connector assembly which uses a woven mesh of conducting filaments.

U.S. Pat. No. 5,260,530 discloses an illuminated press-at-any-point switching device which can be actuated by the application of or the removal of pressure at different points along its outer surface.

U.S. Pat. No. 5,693,921 discloses a linear contact switch having first and second resilient strips and first and second electrically conductive strips.

U.S. Pat. No. 6,455,793 B1 discloses a continuous length switch having first and second electrode plates separated by a plurality of cavities.

U.S. Pat. No. 6,593,537 B2 discloses a membrane switch having a hemispherical metal click spring.

U.S. Pat. No. 6,898,842 B2 discloses a method for manufacturing a continuous length switch having first and second electrodes with a plurality of cavities there between.

U.S. Pat. No. 7,094,064 B2 discloses an electrical switch comprising woven conductors.

U.S. Pat. No. 7,230,196 B2 discloses an illuminated switch device.

U.S. Pat. No. 7,373,754 B2 discloses a safety edge for a motor driven rolling gate having a pair of extended electrical conductors spaced apart within a flexible housing.

EP 2 154 699 A2 discloses an illuminated switch device of the press button type.