

**Title: A Device For Identifying An Electric Cable,
And Methods of Obtaining the Device**

The invention relates to a device for identifying an electric cable and comprising a sleeve for coaxially mounting on the cable, a plate for visually identifying the cable, and means for positioning the plate on the sleeve.

The invention also relates to methods of manufacturing at least some components of the device.

Identification devices of this kind are of use in electric installations, inter alia when relatively complex. Owing to the large number of electric cables, each needs to be rapidly identifiable in order to avoid a tedious search and possible mistakes when connecting or disconnecting. Cable identification devices are also of use for locating faults.

An identification device of the previously-described kind is known from DE-C-883 005. However, the cited sleeve can slide and pivot on the cable, inter alia when the cable is manipulated during the wiring operations. Also the sleeve tends to slide through gravity towards the lowest point on the cable, and the identification plate tends to face the ground. The sleeve therefore moves away from its most efficient position near the terminal connecting the cable, and from the angle where the identification mark can be immediately read.

In order to be held in the desired position on the cable, the sleeve of the known device needs to have an inner diameter substantially equal to the cable diameter, so that it can be clamped with a sufficient

friction torque to prevent free sliding along or around the cable. Consequently different-sized cables are needed for fitting on different cable diameters, and it is less easy to slip the sleeve on to the cable.

Accordingly, fixed identification devices have been designed, the identification marking being made on a cable terminal of the kind comprising a conducting part for electrically connecting to a conducting cable core and an insulating body mechanically connected to the conducting part. This kind of cable terminal is for connecting a multi-strand cable conductor to a connecting terminal. In embodiments known e.g. from FR-A-1 468 859 and 2 477 330 or from EP-A-0 115 055, which relates specifically to an identification device of the kind described in the preamble, the identification marking is made on an appendage to the insulating body of the cable terminal.

The disadvantage of identification marking on the cable terminal is that the axial and/or radial bulk of the terminal is increased, which may cause trouble, and it may be impossible to position the mark except directly adjacent the cable terminal, with no possibility of changing the angle, so that visibility may be less than the optimum. If the marking is faulty, owing to the inaccessible position near the connecting terminal, the cable terminal has to be removed from the connecting terminal so as to change the marking on the sleeve. In order to change the angle of the identification device, the cable terminal bearing the identification mark has to be cut and the connection has to be re-made, which

takes time and involves destroying the cable terminal and the marking, and shortening the cable.

The invention aims to obviate these disadvantages by constructing an identification device bearing information which is directly accessible to the operator working on the cable connecting terminal.

Another aim of the invention is to construct an identification device which stays in the desired position, not only on cables having substantially the same diameter as the inner diameter of the sleeve, but also on smaller-diameter cables.

A third aim of the invention is great flexibility in the positioning and construction of the marking and in modifications thereof, more particularly without the need for another connection operation.

The invention relates to an electric cable identification device comprising a sleeve for coaxially mounting on the cable, a plate for visually identifying the cable, and means for positioning the plate on the sleeve, characterised in that the positioning means are designed so as to lock the sleeve on the cable when the plate is in position on the sleeve.

When the sleeve is immobilised on the cable by the plate-positioning means, the identification device can be positioned on the cable and marked if necessary at the required moment, once the sleeve has been threaded on to the cable. It is therefore possible to wait until the cable has been connected and until the

ambient conditions and the bulk of the entire circuit are known.

In one embodiment, the positioning means comprise at least one stud on the plate, for engagement in a corresponding orifice formed through the wall of the sleeve, so that after engagement the stud bears on the cable when the sleeve is mounted on the cable.

Accordingly, the stud on the plate and extending through the sleeve serves the double purpose of positioning the plate on the sleeve and locking the sleeve on the cable. Since also the stud is engageable, the plate is a movable component and it is therefore very easy to modify the positioning and marking.

The plate can be of opaque material suitable for marking to identify the cable. The marking can then be changed by changing the plate or by erasing the marking on the plate.

In a preferred method of marking, the opaque plates are automatically labelled by a computer plotting board, after the board has drawn the plan of the corresponding circuit.

In a variant embodiment, the plate is transparent and covers an identification mark without masking it. In a preferred embodiment, the marking is on a label positioned between the transparent plate and a substantially flat surface of the sleeve. Advantageously the plate comprises at least one stud,

in which case the label has at least one orifice for inserting the plate stud when the plate is positioned on the sleeve, the stud engaging in a corresponding orifice in the sleeve.

In a method for improving the efficiency of manufacture, the labels and plates are produced in the form of respective boards from which the labels and plates are individually separable, the labels being disposed in the same manner as the plates on the respective boards, and a board of plates are superposed on a board of labels so as to obtain engagement between each plate and a facing label and thus form a board of label and plate assemblies which can be separated from one another.

This is a method of mass-production of label-plate assemblies ready for engaging on the sleeves at the moment when the cables are identified.

As described in the case of opaque plates, the labels can be automatically marked by a computer plotting board.

In the previously-described method of constructing label-plate assemblies, it is normally assumed that the labels have been marked before the board of plates is superposed on the board of labels. Alternatively, at least in the case of some cables, the marking can be postponed until the final phase after the label-plate assembly has already been fitted on the sleeve. In this manner the transparent plate can serve as a direct

medium for marking in ink, identification also being assisted by the colour of the label.

In addition to the great flexibility of use, some aspects of which have already been mentioned, other features and advantages of the invention will be clear from the following description.

In the accompanying drawings, given by way of non-limitative examples:

Fig. 1 is a three-quarter perspective view of the device according to the invention, in a version secured to a cable terminal;

Fig. 2 is a longitudinal section through the device in Fig. 1, mounted on an electric cable;

Fig. 3 is a cross-section in the plane III-III in Fig. 2;

Fig. 4 is a perspective view of the device in Fig. 1, mounted on an electric cable and detached from the cable terminal;

Fig. 5 is a top plan view of a board of labels;

Fig. 6 is a top plan view of a board of plates;

Fig. 7 is a partly cut-away perspective view of a board of label-plate assemblies;

Fig. 8 is a diagram of an installation for producing identification markings and comprising a computer and a plotting board, and

Fig. 9 is a perspective view of the device according to the invention in a version where it is not secured to a cable terminal.

An identification device 10 according to the invention is shown in a self-contained version (Fig. 9) and in a version where it is associated with a cable terminal from which it can be detached (Figs. 1 to 4).

In the latter version, a cable terminal 1 comprises a tubular copper conducting part 2 secured to a funnel-shaped sheathed insulating body 3 coaxial with the conducting part 2. Part 2 is shaped so as to receive the conducting end 4, formed from multiple strands, of an electric cable 5, the end part of which has been bared by removing a sheath 6. The conducting part 2 thus serves as a casing at the end of cable 4 and is of use in connecting it to a connecting terminal (not shown).

On the side of the input opening 7 remote from part 2, the body is connected via a cuttable annular region 8 to the body of the identification device 10, which comprises a sleeve 11 coaxial with the terminal 1. During manufacture, terminal 1 and sleeve 11 are made of plastics integrally with the cuttable intermediate region 8, which e.g. comprises narrow bridges of material extending axially between the terminal and the sleeve.

This one-piece construction enables the cable terminal and sleeve to be simultaneously positioned on the cable. Since the connection between them can be cut, the two components can be separated if necessary, in which case the sleeve can be positioned independently of the fixed cable terminal.

Sleeve 11, which has a substantially cuboid outer shape in the example shown, is formed with a duct 12 having a diameter greater than the diameters of all the range of cables 5 for which it is intended. This makes it easier to fit the sleeve on the cable 5. Two opposite flat surfaces 14, 15 of sleeve 11 are formed with a pair of symmetrical orifices 16 axially remote from one another and extending through wall 17 and opening into duct 12. A label 20 bearing the cable identification marking is fitted on surface 14 of sleeve 11. Label 20 is covered by a transparent plate 21 forming a protective cover.

A pair of studs 22 are formed on one surface of plate 21 and are made integrally of the same material and are axially spaced so as to fit into the orifices 16 in the sleeve. Plate 21 is positioned on sleeve 11 by simple pressure, when studs 22 extend through a pair of orifices 23 in label 20 before fitting into orifices 16 and bearing against the sheath 6 of cable 5. The studs 22 and orifices 16, 23 at each end are symmetrical, so that label 20 and plate 21 can be disposed in either direction. This avoids the need, before the wiring operation, of planning the direction in which the marking will be read in the wired installation.

Since sleeve 11 is integral with terminal 1, the main function of plate 21 is to protect the label 20 or, in the absence of a label, to serve as a medium for direct marking. If labels are not used, the plates 21 can be opaque with a surface suitable for direct marking.

Since the studs are engageable, the plate is removable and can be positioned in either direction on the sleeve and on either surface 14 or 15 and at the desired time, and can be easily replaced.

Another function of the plate, via the studs bearing on the cable, is to lock the sleeve on the cable, which happens when sleeve 11 is detached from terminal 1 as shown in Fig. 4.

After the terminal 1 secured to the identification device 10 has been mounted on cable 5, it may be desirable to move the identification device 10 along the cable or place it at a different angle, to reduce the axial bulk or to improve the visibility of the identification marking. In that case, after removing the plate 21 if in position, it is only necessary to detach sleeve 11 by twisting it off the fixed terminal 1 in order to break the cuttable region 8. Once it has been decided to position the identification device 10, the plate 21 can again be engaged in sleeve 11 so as to lock it and prevent any accidental rotation or axial movement on the cable.

When the cuttable region 8 has been broken, the cable 5 can if required be bent substantially at the place where it comes out of the connecting terminal and

immediately behind the free end of funnel 3, as shown in Fig. 4.

There are a number of possible methods of marking. The identification marking can be made directly on the sleeve or on a label associated with a transparent plate as in the example shown, or directly on an opaque plate. Marking can be made in pencil or by typewriter or by any other suitable means.

In an advantageous method of manufacture, labels 20 and plates 21 are mass-produced in boards 30 and 40 respectively.

Labels 20, constructed in rows in polyester boards 30, can easily be separated from the bottom 31 of board 30, since the edges 25 of the labels are detachable along a dotted line. Two orifices 23 for the plate studs are formed in each label.

Plates 21, manufactured in polyamide boards 40, are also disposed in rows at the same intervals as the boards 30 of labels, so that a board 40 can be superposed on a board 30 and the respective components 20, 21 are opposite one another. Plates 21 are disposed in double rows in recesses 46 in the bottom 45 of board 40, each plate 21 being connected to bottom 45 by a cuttable bridge 47.

This is a method of rapidly obtaining label and plate assemblies by superposition of two boards 30, 40 (Fig. 7), when the studs 22 engage and fit into orifices 23, at least one dimension of which is less than the

maximum corresponding dimension of the studs. Each label and plate assembly, which is easily detached from the set, is ready for engagement on a sleeve 11 on a cable 5, in order to complete and position the identification device 10.

Fig. 8 is a diagram of an installation for marking by a preferred method according to the invention. A plotting board 50 controlled by a computer 60 marks a board 30 of labels in accordance with a circuit plan previously made by the plotting board. In the case where the identification marking is made directly on opaque plates, the plotting board 50 can simultaneously mark a board 40 of plates.

The device according to the invention can thus identify electric cables and is very versatile as regards positioning and marking. It is economic to manufacture and position on the cable, since it is made up of a small number of separate components, some of which are removable and increase the flexibility of operation.

As shown in Fig. 9, the identification device according to the invention can be self-contained, i.e. independent of any cable terminal. In the example shown, the identification device is identical with that in the first example as shown in Fig. 4, i.e. after separation from the cable terminal 1.

Of course, the invention is not limited to the embodiments described, and numerous modifications can be made thereto without departing from the scope of the invention.

The sleeve cross-section can be triangular or circular or hexagonal or any other appropriate shape. The identification mark can be directly inscribable on the sleeve, in which case the transparent plate prevents the marking from being erased, or is coloured so as to assist marking.

The plate can have a larger number of studs, so as to increase the friction on the electric cable.

The sleeve of the identification device can be secured to the cable terminal by annular engagement means or any other appropriate means, reversible or otherwise.

Reference is hereby made to co-pending U.K. Patent Application No. 9122741.3 (published as GB-A-2250389), which relates to an end terminal of an electric cable, comprising a conducting part for electrically connecting to a conducting core of the cable, and also comprising an insulating body mechanically connected to the conducting part, the body comprising an appendage for holding a cable identification mark, characterised in that the appendage is a tubular sleeve disposed around the cable and at least partly detachable from the body so as to rotate around the cable.



C L A I M S

1. An electric cable identification device comprising a sleeve for coaxially mounting on the cable, a plate for visually identifying the cable, and means for positioning the plate on the sleeve, characterised in that the positioning means (16, 22) are designed so as to lock the sleeve (11) on the cable (5) when the plate (21) is in position on the sleeve (11).
2. A device according to claim 1, characterised in that the plate (21) is made of opaque material suitable for marking so as to identify the cable (5).
3. A device according to claim 1, characterised in that the plate (21) is transparent and covers an identification mark without masking it.
4. A device according to claim 3, characterised in that it comprises a label (20) bearing the identification mark, the label being positioned between the transparent plate (21) and a substantially flat surface (14) of the sleeve (11).
5. A device according to claim 4, characterised in that the plate (21) comprises means (22) for engaging in label (20) so that a label and plate assembly can be formed by simple pressure.
6. A device according to claim 5, characterised in that the engagement means on the plate (21) comprise at least one stud (22), and the label (20) is formed with at least one orifice (23) enabling the stud (22) on the



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plate to extend through the label and into a corresponding orifice in the sleeve.

7. A device according to any of Claims 1 to 4, characterised in that the means for positioning the plate on the sleeve comprise at least one stud on the plate, for engagement in a corresponding orifice in the sleeve, so that the stud when engaged bears on the cable when the sleeve is mounted on the cable.

8. A method of manufacturing label and plate assemblies for an identification device according to Claim 5, characterised in that the labels and plates are produced in the form of respective boards from which the labels and plates are individually separable, the labels being disposed in the same manner as the plates on the respective boards, and a board of plates are superposed on a board of labels so as to obtain engagement between each plate and a facing label and thus form a board of label and plate assemblies which can be separated from one another.

9. A method according to Claim 8, characterised in that the labels are automatically marked by means of a computer plotting table before the board of plates is superposed on the board of labels.
