(54) Title: SYSTEM FOR MOUNTING A CONTROL PANEL TO THE ENCLOSURE OF AN INVERTER

(57) Abstract: A system for mounting a control panel (2) to the enclosure (3) of an inverter (4) comprises at least one seat (5) for positioning the panel (2) and formed on the outside surface (6) of the enclosure (3), a locking device (7) by which the panel (2) is locked to the seat (5) and an engagement device (8) by which the panel (2) can be engaged with the seat (5) in at least two predetermined relative positions alternative to each other.
DESCRIPTION
SYSTEM FOR MOUNTING A CONTROL PANEL TO THE ENCLOSURE OF AN INVERTER

Technical field
This invention relates to a system for mounting a control panel to the enclosure of an inverter.

Background art
In the installation of an electric motor, an inverter is frequently used whose enclosure has a respective control panel mounted thereon. Generally speaking, the control panel of the inverter is not integrated in the enclosure but is locked in place in a seat after all the necessary electrical connections have been made. In practice, it has been found that in certain installations of the motor and/or the respective inverter, the control panel may be poorly visible and/or accessible to the operator.

Disclosure of the invention
This invention has for an aim to provide a system for mounting a control panel to the enclosure of an inverter to overcome the above mentioned disadvantage. This aim is fully achieved by the system for mounting a control panel to the enclosure of an inverter as set out in claim 1 appended hereto.

Brief description of drawings
The technical features and advantages of the invention are more apparent in the following description of a preferred but non-limiting embodiment of it. The description refers to the accompanying drawings, which are also provided purely by way of non-limiting example and in which:
- Figures 1 and 2 schematically illustrate an inverter enclosure which mounts a control panel (Figure 1 shows three alternative positions where the control
panel can be mounted on the enclosure); and
- Figures 3 and 4 show the control panel of Figures 1 and 2 in schematic rear and front perspective views, respectively.

5 **Detailed description of preferred embodiments of the invention**

With reference to the accompanying drawings, the numeral 1 denotes in its entirety a system for mounting a control panel 2 to the enclosure 3 of an inverter 4.

The panel 2 has a front face 2a on which the control panel 2 has a keypad of known type.

It should be noted, for completeness of description, and as will become clearer as this description continues, that Figure 1 shows three control panels 2 and Figure 2 shows two control panels 2. Usually, however, an inverter 4 comprises only one control panel 2.

The system 1 comprises at least one seat 5 for positioning the panel 2 and formed on the outside surface 6 of the enclosure 3, and a locking device 7 by which the panel 2 is locked to the seat 5.

In the example given, the enclosure 3 comprises three seats 5 for the panel 2 and the user chooses which seat to use to fit the control panel 2 according to where the inverter 4 is installed.

Preferably, in one embodiment, the locking device 7 comprises a threaded gland 8 (Figure 3), which protrudes from a cable through hole 9 made in the rear wall of the panel 2, projecting outwards from the rear wall of the panel 2, and which is inserted into a cable through hole 10 of the seat 5 (Figure 2).

Inside the enclosure 3, a nut (not illustrated) is screwed onto the free end of the threaded gland 8 and locks the panel 2 tightly to the seat 5.

Generally speaking, the panel 2 is mounted to the enclosure 3 preferably by means of a threaded connection.

In other words, the enclosure 3 comprises the seat 5 with the hole 10 made therein.

The panel 2, with the hole 9 made therein, comprises the locking device 7, for
example the gland 8, at the hole 9.
The locking device 7 comprises the aforementioned nut, not illustrated, which is associated with the gland 8.
According to the invention, the system 1 also comprises an engagement device 11 by which the panel 2 can be engaged with the seat 5 in at least two predetermined relative positions alternative to each other.
The purpose of the engagement device 11 is to give the panel 2 a predetermined orientation relative to the seat 5 before the panel 2 is secured tightly to the seat 5 by means of the aforementioned locking device 7.
According to the characteristic feature of the invention, the engagement device 11 allows N possible positions of coupling the panel 2 to the seat 5, where N is a whole number greater than or equal to 2 and where the coupling positions differ from each other in the angular orientation of the panel 2 on the seat 5.
In practice, the enclosure 3 and the control panel 2 can engage each other in a plurality of positions from which the preferred one can be selected for example according to where the inverter 4 has to be installed.
The engagement device 11 comprises at least one locating pin, or tooth, 12 and at least one slot 13 for receiving the pin 12, formed one on the outside surface 14 of the seat 5 and the other on the outside surface 15 of a wall of the control panel 2, for example a rear wall on the side opposite to the face 2a.
In other words, the enclosure 3 comprises the locating pin 12 on the outside surface 14 of the seat 5 and the control panel 2 comprises the slot 13 on its rear wall.
The pin 12 and the slot 13 define the aforementioned engagement system 11 by which the panel 2 can be fixed to the enclosure 3.
In the example given, the locating pin, or tooth, 12 is formed on the outside surface 14 of the seat 5, that is, on the enclosure 3, whereas the slot 13 for receiving the pin 12 is formed on the outside surface 15 of the rear wall of the control panel 2. In a variant embodiment not illustrated, however, the locating pin, or tooth, 12 is formed on the outside surface of the rear wall of the control panel 2, whereas the slot 13 for receiving the pin 12 is formed on the outside
surface 14 of the enclosure 3.

In the example given, the pin 12 is made in the form of a crosspiece, or protuberance, projecting from the outside surface 6 of the enclosure 3 of the inverter 4 and, more precisely, from the outside surface 14 of the seat 5 of the enclosure 3.

The slot 13 is made in the form of a groove on the outside surface 15 of the rear wall of the control panel 2.

The pin (crosspiece) and the slot (groove) are shaped to match so that one fits into the other snugly, without slack.

In the example given, the engagement device 11 comprises a pair of locating pins 12 joined to each without interruption, and four slots 13 arranged in a cross, with the cable through hole 9 of the panel 2 located at the centre between the slots 13 and the cable through hole 10 of the seat 5 located at the centre between the pins 12.

Thus, the engagement device 11 allows four possible positions of coupling the panel 2 to the enclosure 3, in particular to the seat 5, where the coupling positions differ from each other in the angular orientation of the panel 2 on the seat 5, in particular at angular intervals of 90° from each other. Only one type of orientation is illustrated in the accompanying drawings.

In a variant embodiment not illustrated, the engagement device 11 comprises four pins 12 arranged in a cross in the same way as the slots 13.

More generally speaking, the engagement device 11 comprises a plurality of pins 12 uniformly distributed at predetermined equal angular intervals, and a plurality of slots 13 uniformly distributed at predetermined equal angular intervals.

In an embodiment not illustrated, the number of pins 12 differs from the number of slots 13.

The invention described guarantees high level of installation versatility, thus overcoming the disadvantage described above with reference to the prior art.
CLAIMS

1. A system for mounting a control panel (2) to the enclosure (3) of an inverter (4), the mounting system comprising at least one seat (5) for positioning the panel (2) and formed on the outside surface (6) of the enclosure (3), and locking means (7) by which the panel (2) is locked to the positioning seat (5); the system being characterized in that it comprises engagement means (8) by which the control panel (2) can be engaged with the seat (5) in at least two predetermined relative positions alternative to each other.

2. The mounting system according to claim 1, characterized in that the engagement means (8) comprise at least one locating pin (12) and at least one slot (13) for receiving the pin (12), the pin (12) being formed on the enclosure (3) and the slot (13) being formed on the control panel (2).

3. The mounting system according to claim 2, characterized in that the engagement means (8) comprise at least two pins (12).

4. The mounting system according to claim 2 or 3, characterized in that the engagement means comprise at least two slots (13).

5. The mounting system according to claim 2, characterized in that the engagement means (8) comprise a plurality of pins (12) uniformly distributed at predetermined equal angular intervals.

6. The mounting system according to claim 2 or 5, characterized in that the engagement means (8) comprise a plurality of slots (13) uniformly distributed at predetermined equal angular intervals.

7. The mounting system according to any one of claims from 2 to 6, characterized in that the pin (12) is made in the form of a crosspiece, or protuberance, projecting from the outside surface (6) of the enclosure (3) of the inverter (4), the slot (13) being made in the form of a groove on the outside surface (15) of the control panel (2), the crosspiece and the slot being shaped so that one fits inside the other.

8. The mounting system according to claim 7, characterized in that the control panel has four slots (13) arranged in a cross and a cable through hole (9) located at the centre of the cross.
**INTERNATIONAL SEARCH REPORT**

**A. CLASSIFICATION OF SUBJECT MATTER**

INV. H05K7/14 H05K5/02 H05K5/00

ADD.

According to International Patent Classification (IPC) or to both national classification and IPC

**B. FIELDS SEARCHED**

Minimum documentation searched (classification system followed by classification symbols)

H05K H02G

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic database consulted during the international search (name of data base and, where practical, search terms used)

EPO-Internal

**C. DOCUMENTS CONSIDERED TO BE RELEVANT**

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