

Description

Device for coding plug-in slots

5 The invention relates to a device for coding plug-in slots as claimed in the precharacterizing clause of claim 1.

 DE 43 23 440 A1 discloses a device for the connection of external lines to a programmable
10 controller, which is coupled to this controller for signal transmission and can be set up physically independently of the programmable controller. The connecting device allows a modular design, in which one connecting point is provided per actuator/sensor
15 connection and, depending on the respective type of connection, can be provided with an electronic module for signal matching and conversion. Input and output modules can in this case be mixed as required. This has an advantageous effect on configuration, assembly,
20 installation, fault rectification and upgrading of the electronic appliance. The connecting device at the same time acts as a mounting unit for the electronic modules, and has a large number of identical plug-in slots for them. Supply lines and signal lines are in
25 each case passed to the electronic modules via a plug connector at the plug-in slot. Electronic modules having various operating voltages, for example 230 V AC or 24 V DC, may be used. Their wiring via the plug connector at the plug-in slot admittedly simplifies the
30 replacement of electronic modules, but at the same time increases the risk of confusion. This can lead to problems, since, once the device has been connected up, for the connection

on external lines, the respective type of electronic module which can be fitted at a plug-in slot, in particular its supply voltage, is fixed.

5 The invention is based on the object of providing a device for coding plug-in slots, which prevents electronic modules from being inserted into plug-in slots for which they are unsuitable.

10 In order to achieve this object, the new device of the type mentioned initially has the features specified in the characterizing part of claim 1. The dependent claims 2 to 4 describe advantageous developments of the device according to the invention. Claim 5 claims protection for a mounting unit or a module, which is designed for use with the new device
15 for coding of the plug-in slots.

The invention has the advantage that, apart from the mounting unit and electronic modules, no additional parts whatsoever are required for the coding process. The coding slide is permanently fitted to the
20 mounting unit, and can thus not be lost during transport or when the device is being prepared for the connection of external lines. Just one recess is provided for coding on the electronic modules and, depending on the module type, this is incorporated even
25 during production and does not involve any additional costs. If the wiring of the device is changed for a connection of external lines, the position of the slide can easily be adapted, so that the advantage of the capability to freely mix

electronic modules in the plug-in slots of the mounting unit is retained even after changes. If the slide can be moved only by using a tool, this prevents accidental manipulations when handling the mounting unit. It is
5 advantageous for the coding slide to have a position in which no module can be inserted into the respective plug-in slot. On delivery, all the coding slides in the mounting unit are in this position. This ensures, after wiring, that the coding slide must be deliberately
10 moved by the user to correspond to the chosen wiring. After this has been done, only the respective correct module type can be inserted into the plug-in slots. An advantageous feature is that the device for coding the plug-in slots requires no interfering parts whatsoever
15 projecting out of the mounting unit, provided the pins project into guide slots at the plug-in slots.

In order to increase the code variations at one plug-in slot, coding slides having a large number of latching positions can be used, or a plurality of
20 coding slides for one plug-in slot, offering a large number of combination options.

The invention as well as refinements and advantages will be explained in more detail in the following text, with reference to the drawings, in
25 which one exemplary embodiment of the invention is illustrated, and in which

Figure 1 shows a mounting unit,

Figure 2 shows a detail from Figure 1 with a coding slide, shown enlarged,

Figure 3 shows an electronic module for DC voltage supply, and

Figure 4 shows an electronic module for AC voltage supply.

5 A mounting unit as shown in Figure 1 is used as a device for the connection of external lines and, for this purpose, is provided on its front face with two rows of connecting terminals. Line ends from which the insulation has been stripped are inserted through
10 openings 1 into connecting terminals, which can be loosened by a tool through operating openings 2. The connecting device can be coupled via a cable connection 3 to a remote controller, for example a personal computer or an automation appliance, which have a
15 suitable communications interface. In order to convert the signal type on the connected external lines, electronic modules can be inserted into eight plug-in slots, which are arranged alongside one another in the upper part on the front face of the mounting unit. The
20 right-hand plug-in slot has the reference symbol 4. The electronic modules have standard external dimensions, and can thus be interchanged with one another as required. Both the signal lines and the lines to supply them with power are routed to the electronic modules
25 via the plug-in slots. Until the connecting terminals associated with the individual plug-in slots have been wired up, the operating voltage applied to a plug-in slot is not defined. After being wired up, the module type which can be fitted in a plug-in slot is, however,
30 predefined, and must be set by using a coding slide 5. On delivery, the coding slide 5 is in a "0" position, in

which no electronic module can be inserted into the plug-in slot. Depending on the wiring, the coding slide 5 is moved to a "DC" position or an "AC" position, in which, respectively, only a module with DC voltage supply as shown in Figure 3, or a module with AC voltage supply corresponding to Figure 4 can be inserted. This prevents modules with a 24 V DC voltage being inserted into plug-in slots which are connected to a 230 V AC voltage, and vice versa.

10 Figure 2 shows an enlarged illustration of the coding slide 5. The coding slide 5 has a pin 6 which projects into a guide slot 7, in which spring contacts are accommodated in order to make contact with contact surfaces on an electronic module. Located on the top
15 face of the coding slide 5 is a slot 8, into which a screwdriver blade can be inserted in order to change the plug-in slot coding. The dimensions of the coding slide and of its environment, as well as the forces required for movement, are designed such that it is
20 impossible to change the position without the assistance of a tool. This prevents accidental manipulations.

As shown in Figures 3 and 4, electronic modules essentially comprise a populated printed circuit board
25 9 or 10, respectively, which is accommodated in a housing 11 or 12, respectively, and projects out of this housing at the side, by means of which it is inserted into guide slots in the mounting unit. For insertion into the mounting unit shown in Figure 1, the
30 electronic modules are hooked in by means of a hinge pin 13 or 14, respectively, on

the upper edge of the mounting unit, and are pivoted downward so that contact surfaces located on the top of the side edges of the printed circuit board 9 or 10, respectively, produce a plug connection with contact springs in the guide slots. In order that an electronic module for a DC voltage supply can be inserted only into a plug-in slot connected appropriately, the side edge is provided with a recess 15 which corresponds to the position of the pin 6 when the coding slide 5 is in the "DC" position. In a corresponding manner, a recess 16 is positioned on the module (illustrated in Figure 4) for an AC voltage supply such that this module can be inserted only into a plug-in slot on which the coding slide is located in the "AC" position.

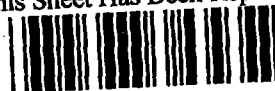
Although, in the exemplary embodiment, the invention has been described on the basis of a device for the connection of external lines as a mounting unit and conversion modules as electronic modules for the plug-in slots in the mounting unit, the invention is also suitable for any other mounting units for the coding of plug-in slots. For example, it can be used for coding plug-in slots for assemblies in a mounting rack or for coding plug-in slots for front connectors on a programmable controller which is fitted with input or output assemblies.

Patent claims

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1. A device for coding plug-in slots in a mounting
5 unit for electronic modules, characterized in that at
least one coding slide (5) which can be latched in a
number of positions, and has a pin (6), is provided for
each plug-in slot (4) on the mounting unit, so that
only those modules which have a recess (15, 16),
10 corresponding to the respective position of the coding
slide (5), for the pin (6) can be inserted at the
respective plug-in slot.
2. The device as claimed in claim 1, characterized
in that the coding slide (5) can be moved only by using
15 a tool.
3. The device as claimed in claim 1 or 2,
characterized in that the coding slide (5) has a "0"
position, in which no module can be inserted in the
respective plug-in slot (4).
- 20 4. The device as claimed in one of the preceding
claims, characterized
- in that the electronic modules are designed
as assemblies having a printed circuit board edge
(9, 10) which projects at the side and is provided with
25 contact surfaces,
 - in that the plug-in slots have guide slots
(7), which correspond to the printed circuit board
edges, with contact springs,
 - in that the pins (6) project into the
30 respective guide slots (7), and

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- in that the recesses (15, 16) for the pins (6) are fitted at the printed circuit board edges (9, 10).

- 5 5. A mounting unit or module for a device as claimed in one of the preceding claims.

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