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Distribution Board

Description

10 The invention relates to an electric distribution board according to the preamble of Claim 1.

15 Distribution boards of the type mentioned at the beginning have become known which are installed, for example, in domestic wiring systems or building wiring systems and distribute the incoming feeder leading to the building between individual load network circuits. In this case, devices are inserted into the distribution board and connected to the incoming feeder and the outgoing feeders to the network circuits, 20 something which is performed by internal wiring, as a result of which the individual networks can, for example, be protected and/or, if appropriate, switched off.

25 Similar devices, such as circuit breakers, residual current devices, master switches or the like, are lined up next to one another on mounting rails, which are normally top-hat mounting rails, and connected on the input side by means of a busbar arrangement, with the 30 result that the devices are coupled to one another on the input side and are at the same potential, it being possible for this to be performed in a single-phase or multiphase fashion. The incoming feeder is then connected to the devices on these busbars.

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The outgoing sides of the devices are connected by means of connecting conductors to outgoing terminals at which the individual outgoing feeders are connected to the networks.

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The trend at present is to design the connections as pluggable. Thus, for example, a distribution board has become known in which the incoming side of the devices
5 is equipped on the underside with plug-in tabs which can be plugged into holder contacts for plug-in tabs on busbars, something which is performed when the devices are being snapped onto the mounting rail. The individual busbars in this case are located in a
10 housing which is arranged below the mounting rail.

It is known from DE 296 21 560 U1 for the terminal leads likewise to be designed as pluggable.

15 All these known distribution boards have the problem that erroneous installation cannot be excluded. It is possible, for example, for it to happen that, for example, a damp room which is to be protected by means of a residual current device to be connected
20 erroneously to a circuit breaker, with the result that protection of the damp room is not ensured, and the like.

It is the object of the invention to create a
25 distribution board in which erroneous connections are avoided.

This object is achieved according to the invention by the characterizing features of Claim 1.

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Thus, according to the invention, the devices are placed at predetermined locations, it being possible to provide a coding in each case for fastening and holding, with the result that specific respective
35 circuit breakers or residual current devices can be installed only at mounting locations provided therefor. This prevents, for example, a circuit breaker from being installed at a mounting location intended for a residual current device and vice versa, or circuit

breakers and/or fault-current breakers for specific current values from being installed at points at which devices with different current values should be located.

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The internal cable runs are used to connect the individual devices to the specific connecting points for the outgoing feeders, and it is then likewise possible, in turn, for these connecting points to be
10 connected only to those outgoing feeders which lead in each case to a network circuit which has to be protected with the relevant prescribed device: for example, the outgoing feeder for a damp room circuit (bathroom) is coded such that it can be connected only
15 where a residual current device is connected. As a result, as early as during the mounting of the distribution board and fitting, a network circuit which is, for example, to be protected with a residual current device is prevented from being connected to a
20 circuit breaker in error.

The internal cable runs can be formed by a busbar system which is composed of individual sections to which connecting elements can likewise be connected by
25 plugging.

As regards internal wiring, the distribution board according to the invention can thereby be produced and fitted at the factory, with the result that on site the
30 fitter need only mount the devices, that is to say latch them onto the mounting rails, and provide the coded terminal and connecting elements for the conduits for the terminal leads and/or outgoing or incoming feeders, located under the plaster and already laid
35 during construction of the building, for the individual network circuits, also termed mains conductors.

Further advantageous refinements of the invention are to be gathered from the further subclaims.





The invention and further advantageous refinements and improvements of the invention are to be explained in more detail and described with the aid of the drawing,
5 in which an exemplary embodiment of the invention is represented.

The sole figure shows an interior view of a distribution board according to the invention.

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The distribution board according to the invention has a pan-shaped wiring housing 10 (also termed housing 10 below, for short), which can be covered and closed at the front by means of a door (not represented in more
15 detail). Located on the bottom 11 of the housing 10 are top-hat rails 12, 13 and 14 onto which devices are snapped, it being the case, for example, that single-pole circuit breakers 15 are snapped onto the top-hat rail 12, three-pole circuit breakers 16 are snapped
20 onto the top-hat rail 13, and residual current devices 17 are snapped onto the top-hat rail 14. Inserted into the lower housing side wall 18 is an incoming cable 19 whose individual conductors 20 are fed to a plug-in adapter 21 on one side, while outgoing from the other
25 side thereof are a suitable busbar block 22 for three phases and, if appropriate, a PEN and an N conductor which are connected by means of a suitable plug-in technique to a busbar arrangement 23 which is guided upwards parallel to the left-hand side wall 24 and
30 perpendicular to the wall 18 in the vicinity of the side wall 24. The busbar arrangement 23 is plugged together here from preassembled units 23a, 23b and 23c which are coupled to one another with the aid of plug-in adapters 24a, 24b and 24c, and from which there are
35 outgoing, parallel to the individual top-hat rails, incoming busbars 25, 26 and 27 which carry the power to the individual devices 15, 16, 17 and are connected to the input terminals of the devices 15 to 17. In this case, the busbar 27 can be an individual busbar,



because single-pole circuit breakers 15 are connected to this busbar 27; the busbar 26 is a multipole busbar, corresponding to the number of the poles of the circuit breakers 16, and the busbar 25 is appropriately
5 designed in order to be able to connect the residual current devices 17. The individual rails are designed in this case as flat rails which are embedded in suitable housings or in plastic, the result being the formation of the busbar arrangements 23a, 23b and 23c.
10 The busbars 26 and 25 then correspond to the customary so-called busbar blocks, these phase busbar blocks 25, 26 and 27 being of plug-in design, with the result that they can be connected to the bars and/or conductors of the busbar arrangement 23 via the adapters 24a, 24b and
15 24c.

In a corresponding way, running parallel to the top-hat rails 12, 13 and 14 are outgoing busbars 28, 29 and 30 which are connected to a second busbar arrangement 31
20 in the same way as the busbars 25 to 27 are connected to the busbar arrangement 23, and so this will not be described in more detail here.

The upper end, that is to say the end of the busbar
25 arrangement 31, which is situated opposite the wall 18 and projects in the vicinity of the upper wall 32 is connected to a distribution board 33 in which, in a way not shown in more detail, individual conductors are embedded in the form of ribbon conductors which have
30 corresponding terminal contact pieces which are coded in accordance with use or in accordance with the device connected. It is possible to connect to these individual coded connecting parts or terminals connecting conductors 35, 36, 37... which lead to
35 entirely specific loads: thus, the interconnecting cable or outgoing feeder 35 leads to a load which is to be protected with a circuit breaker, whereas the cable 36 leads to a load which has to be protected with a residual current device. This load, which must be

protected with a residual current device, is automatically and positively connected to a residual current device 17 when the connecting cable or outgoing feeder 36 is plugged into the distribution board 33, whereas the load connected to the outgoing feeder 35 is positively connected to one of the circuit breakers 15. The outgoing feeder 37 is then connected to a three-phase circuit breaker, and the plug-in elements fitted on the outgoing feeders 37, 35 and 36 are coded for the corresponding connections in the distribution strip 33, with the result that, for example, the outgoing feeder 36 provided with the suitable connecting plug cannot be plugged in where the feeders 35 or 37 must be plugged in.

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This means a substantial simplification for the fitter: he lays an electric cable to a load which is to be protected with a residual current device, specifically the feeder 36, and connects a correspondingly coded terminal or terminal pin to the end of the outgoing feeder 36 on the distribution board side; then, when the distribution board 10 has been fitted, the connecting conductor 36 can be plugged on or inserted only at that appropriately matching point which leads to a residual current device 17.

A further advantageous refinement of the invention then consists in that the individual single-pole circuit breakers 15 likewise have a fastening coding to the effect that the single-pole circuit breakers 15 can be snapped only onto the top-hat rail 12, but not onto the top-hat rails 13 and 14. The same also holds for the multipole circuit breakers 16 and the residual current devices 17. Because of these corresponding fastening codings, it is impossible for a multipole circuit breaker 16 to be mounted on the top-hat rail 14 or on the top-hat rail 12 which, specifically, are reserved for fastening and snapping on residual current devices 17 and single-pole circuit breakers 15.



The adapter 21 is provided and designed as a plug-in adapter, with the result that when the adapter 21 is removed, a clearly visible isolating gap is provided
5 between the cable conductors 20 and the busbar arrangement 22. The adapter 21 can, moreover, contain a switchable contact point, so that the adapter 21 is simultaneously designed as a switch, as well.

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Patent Claims

1. Distribution board, having a housing which can be closed at the front and in which electric devices, for example residual current devices, circuit breakers and the like, are installed, having an incoming feeder, having outgoing feeders to individual network circuits, individual devices being assigned to the individual network circuits for the purpose of protecting them, controlling them and the like, and having internal cable runs which connect the incoming feeder to the devices and the devices to the associated outgoing feeders, characterized in that the individual devices (15, 16, 17) are arranged at predetermined locations in the housing (10), and in that they are connected by means of the internal cabling (21, 22, 23, 24, 25 to 30) to predetermined connecting points to which it is possible to connect only the outgoing feeders (36, 35, 37) belonging to specific network circuits to be protected according to specific regulations.
2. Distribution board according to Claim 1, characterized in that the outgoing feeders (35 to 37) inserted into the distribution board are each coded in accordance with a specific prescribed protection means, thus ensuring that the network circuits can be connected only to the devices associated with them.
3. Distribution board according to one of Claims 1 or 2, characterized in that the devices (15, 16, 17) have a mounting coding which is matched to a mounting coding at the mounting location in the distribution board, thus preventing erroneous occupancy by unsuitable devices.

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4. Distribution board according to Claim 3, characterized in that the mounting coding differs respectively for circuit breakers (15, 16), residual current devices (17) and other further devices, possibly with different current values, with the result that, for example, it is not possible to mount a residual current device at a point at which a circuit breaker is provided.
5. Distribution board according to one of Claims 2 to 4, characterized in that the devices (15 to 17) are provided with plug-in connections.
6. Distribution board according to one of the preceding claims, characterized in that the incoming feeders (19, 20) from the utility company into the distribution board are connected to a terminal strip (21) from which they can be connected in an electrically conducting fashion to the individual devices via prefabricated internal cable runs (22, 23, 24, 25 to 30) installed in the factory.
7. Distribution board according to Claim 6, characterized in that, for each internal cable, the terminal strip (21) has two connecting points which can be interconnected by means of a connecting coupling, with the result that the incoming feeders can be electrically connected to the preinstalled internal cable runs by means of the terminal strip.
8. Distribution board according to Claim 7, characterized in that the connecting coupling of the terminal board (21) is a coupling bridge.
9. Distribution board according to Claim 8, characterized in that the coupling bridge is pluggable.





10. Distribution board according to one of Claims 7 to 9, characterized in that protection elements are used in the respective cabling arrangements of the coupling bridge.
11. Distribution board according to Claim 10, characterized in that master switches, circuit breakers, fault-current breakers and/or overvoltage protection elements are present as protection elements.
12. Distribution board according to Claim 11, characterized in that the protection elements comprise current limiters.
13. Distribution board according to one of Claims 6 to 12, characterized in that a visible isolating gap is produced by removing the coupling bridge.
14. Distribution board according to one of the preceding claims, characterized in that the internal cable runs (22, 23, 24, 25 to 30) are formed by conductor rails.
15. Distribution board according to Claim 14, characterized in that the individual conductor rails are constructed from at least one conductor segment (23a, 23b, 24b, 25b to 30b).
16. Distribution board according to one of the preceding claims, characterized in that, inside the distribution board, the conductor segments (23a, 23b, 24b, 25b to 30b) which are connected to the coupling bridge are arranged on one side, and the conductor segments (31) connected to the devices for the individual networks are arranged on the opposite side.





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17. Distribution board according to Claim 16, characterized in that the conductor segments (23a, 24a, 25a to 30a, 31) are formed by ribbon conductors.

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18. Distribution board according to Claim 17, characterized in that the ribbon conductors are cast into curable material for insulating purposes.

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19. Distribution board according to Claim 18, characterized in that connections on the ribbon conductors for connection to busbars and for interconnection are plug-in connections.

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