

Electrical low-voltage switchgear assemblyDescription

5 The invention relates to an electrical low-voltage switchgear assembly in accordance with the precharacterizing clause of claim 1.

Electrical low-voltage switchgear assemblies comprise
10 so-called power parts or power units and control units, of which the power units comprise switching devices, motor circuit breakers, contactors and the like, and control units, which are used for driving the power units and furthermore have control, measurement and
15 protective functions for the power units.

In the known switchgear assemblies, the control units and power units are accommodated in a single area, i.e. a common housing or module, for example in a
20 withdrawable part or insert.

If, owing to a fault, the problem is presented of replacing a power unit, at the same time the associated control unit, which is accommodated with the power unit
25 in one area, also needs to be replaced.

The object of the invention is to provide an electrical switchgear assembly of the type mentioned at the outset with which replaceability is simplified.
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This object is achieved by the features of claim 1.

According to the invention, the control units are therefore physically isolated from the power units and
35 power cables and are connected to one another via signal lines.

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This physical isolation means, on the one hand, that a control unit and/or a power unit can be replaced independently of one another. This is achieved in particular by virtue of the fact that the power units
5 and the control units are each accommodated in dedicated areas.

The control units are connected to the associated power units by signal lines, which are preferably in the form
10 of bus lines. This bus line brings about the independence of the two; an association with the corresponding power part is brought about exclusively by the software in the control unit.

15 Such control units are known, for example, from DE 103 49 906 or DE 103 15 623.

The access to the control units is ensured by a cabinet door, which protects the control units from
20 unauthorized access.

In accordance with a particularly advantageous configuration, the power units can be divided from the control units by a partition wall, with the result that
25 when a power unit has a fault, the door to the control unit area can remain open.

The use of a bus line as the signal line has the further advantage that the power units and the control
30 units can be developed further independently of one another, which means that the two can be adapted to meet further requirements or improved independently of one another. The use of signal lines which are not in the form of bus lines is possible in principle.

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The control units, which are installed at certain points associated with their power units, then also check themselves whether they have been inserted at the

correct point, as is described in DE 103 15 730 or DE 103 15 646. If the control unit has been installed at an inappropriate point, fault signaling takes place within a fault routine.

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Further advantageous configurations and improvements are described in the further dependent claims.

The invention as well as further advantageous configurations and improvements of the invention and further advantages will be explained and described in more detail with reference to the drawing, which schematically illustrates an exemplary embodiment of the invention and in which:

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figure 1 shows a plan view of a low-voltage switchgear assembly, and

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figure 2 shows a circuit arrangement for illustrating the assignment of the power units and control units.

Figure 1 shows a switchgear assembly 10, which has a central region 11, which has, in its upper section facing the cover wall 12, an area in which a central data interface 13 is located.

Located in the region beneath the central data interface 13 is a power part with compartments for power units 14, 15, 16, 17, 18 and 19. These power units 14 to 19 are accommodated in withdrawable parts, the power units 14 and 15 having a first physical size, the power unit 17 a second size, the power unit 18 a third size and the power units 16 and 19 a fourth and fifth size, respectively.

In the embodiment in figure 1, a vertically running area 20, in which control units 21, 22, 23, 24 and 25

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are accommodated, is located adjacent to the power section 11 but isolated therefrom. In this case, as many control units are provided as there are power units. An area 26 is provided in the base region of the power section 11 which is used, for example, for cooling by means of convection. The area 20 is isolated from the power section 11 by a partition wall 27, with the result that, if damage occurs in a power unit 16, the control area 20 is not influenced, with the result that, for example, the door which closes the control area 20 (not illustrated here, however) can remain open.

As mentioned above, the control units are described in the above-cited patent applications.

The control units are connected to the power units by signal lines in the form of bus lines 28; in this case, only the connection between the control unit 21 and the power unit 19 is provided with a reference numeral.

As can be seen in figure 1, the power units and control units are accommodated in isolated functional areas. Owing to the configuration according to the invention, the power units and control units are functionally independent of one another and can also be replaced functionally independently of one another. In this case, the control units check the electrical data of the associated power units and monitor, by means of a data comparison, the actual installation location with the switchpanel configuration provided, i.e. they monitor whether they have been installed correctly in the correct location.

The control units in the process store up-to-date parameters and data of the power units, even in the event of a voltage failure.

The data of the control units 21, 22, 23, 24 and 25 are transmitted via a signal line 29, which is connected to the individual control units, to the central data interface 13, where they are buffer-stored. If a
5 control unit, for example the control unit 21, is now intended to be replaced by a so-called virgin control unit, the data belonging to the old control unit are "newly" fed from the data interface 13, via the signal line 29, to the control unit 21, with the result that
10 the control unit 21 is "newly" parameterized and updated.

Figure 2 shows the assignment of the control unit to the power unit. For example, the control unit 22 is
15 illustrated as being connected to the power unit 18 and the control unit 21 as being connected to the power unit 19. The output signals of the control units 22, 21 are transmitted onto the data line 29, from where they are transmitted to the central data interface 13.

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The power supply to the power units takes place via power cables 31 laid in a power cable area 30. The power cable area 30 is located on that side of the central region 11 which is opposite the control unit
25 area.

Patent claims

1. An electrical low-voltage switchgear assembly having at least two power units accommodated in withdrawable parts or housings and control units associated with the power units, characterized in that the control units are physically isolated from the power units and power cables and are connected to one another via signal lines.
2. The electrical low-voltage switchgear assembly as claimed in claim 1, characterized in that the signal lines are in the form of bus lines.
3. The electrical low-voltage switchgear assembly as claimed in one of the preceding claims, characterized in that the power units and the control units are functionally independent of one another and can be replaced independently of one another.
4. The electrical low-voltage switchgear assembly as claimed in one of the preceding claims, characterized in that the power units and the control units are accommodated in dedicated areas.
5. The electrical low-voltage switchgear assembly as claimed in claim 4, characterized in that the area of the control units is isolated from the region of the power units by means of a partition wall.
6. The electrical low-voltage switchgear assembly as claimed in one of the preceding claims, characterized in that the area of the control units is protected against mechanical access by a separate cabinet door, and access to the control units is safely isolated from the power parts.