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Description



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Gas-insulated switchgear assembly having a three-phase
5 busbar system

The invention relates to a gas-insulated switchgear assembly having busbars for a three-phase busbar system, in particular for medium-voltage technology,
10 and having a number of circuit breakers (which can be controlled via switch disconnectors), and panel or cable connections, corresponding to the number of poles to be switched.

Gas-insulated switchgear assemblies of the type defined
15 initially are known, inter alia, from the Company document from Siemens AG, "Mittelspannungsanlagen" [medium-voltage systems], Catalogue HA 35.11, pages 16,17 and 21. Both in single busbar systems and in double busbar systems, the busbars are in this case
20 each arranged in separate gas areas which are located one behind the other and are themselves each connected to a further gas area, located underneath, for the respective switch disconnector and circuit breaker. Depending on the requirement, the switchgear assemblies
25 are provided with circuit breakers for connection of panel or cable connections.

Furthermore, a gas-insulated switchgear assembly is likewise known from DE 198 09 839 A1, which has gas-filled containers and in each of which a number of
30 busbars are accommodated, together with their three-position switches, in a single container. The circuit breakers which are located underneath and are arranged, in the same way, with a number of them in a further container, are electrically conductively connected to
35 the busbars via so-called gas-tight module coupling devices, with the number of module coupling devices depending on the number of poles to be connected. Switchgear assemblies having

a number of switch panels are designed with a modular structure, together with the module coupling devices. The object on which the invention is based is to considerably increase the extent of modularization for such gas-insulated switchgear assemblies, while at the same time reducing the required volume. In this case, one particular aim is to simplify the capability to expand the switchgear assemblies, while restricting to a minimum the gas work when replacing individual functional elements.

According to the invention, this is achieved by the following features,

- 1.1 each busbar system is accommodated in a hermetically sealed busbar module within a busbar area of the switchgear assembly,
- 1.2 the busbars are arranged horizontally in the busbar module and vertically in the outer area of it,
- 1.3 the busbar module can be connected by means of screw couplings for panel expansion,
- 1.4 each circuit breaker is accommodated in a circuit breaker module inside the switchgear assembly, and
- 1.5 each busbar module is electrically conductively connected to the corresponding circuit breaker module by means of a module coupling.

The compact, triangular arrangement of the busbars in the hermetically sealed busbar module reduces virtually to a minimum extent the space required for accommodation of the busbars in the common busbar area of the switchgear assembly. In comparison to known switchgear assemblies, the switch panel or panels is or are in this way considerably shortened, so that a correspondingly smaller physical volume is required. Furthermore, the effort required to replace the hermetically sealed busbar module in the event of a defect is considerably simplified, thus noticeably

reducing the time

duration of the interruption for the power supply and distribution.

The use of screw couplings allows the switchgear
5 assemblies to be expanded in a simple manner, without any additional complexity, when required.

In the case of the double busbar systems as claimed in patent claim 2, these and further advantages are
10 evident to a greater extent in comparison to known switchgear assemblies. This is because the double busbar system itself is formed from two busbar modules, which are arranged mirror-image symmetrically with respect to one another, are approximately of the same
15 type, are likewise each hermetically sealed, and are arranged interleaved(?) inside the busbar area of the switchgear assembly. In conjunction with the screw couplings, which can be used in a flexible manner, the use of the individual welded hermetically sealed busbar
20 modules makes it possible to expand the switchgear assembly by the addition of additional switch panels, without having to take the switchgear assembly out of use.

Furthermore, the interleaved arrangement of the busbar
25 modules, which are otherwise arranged mirror-image symmetrically with respect to one another, allows the drive kinematics of the three-positioned switches, which are functionally linked to the busbars, for both busbar modules to be equipped in an identical manner,
30 and to be operated from the front face of the switchgear assembly.

With the same arrangement of the busbar modules, the circuit breaker module for longitudinal couplings in
35 single busbar systems can also be used for longitudinal and transverse coupling springs for double busbar systems. This results in a considerable reduction in the number of assembly variants, furthermore resulting

in economic, cost-effective production.

The invention will be explained in more detail using an exemplary embodiment, which is illustrated in the figures, in which:

- 5 Figure 1 shows a side view of the gas-insulated switchgear assembly with those components which are essential to the invention, and Figure 2 shows a front view of the same system

- 10 The side view in Figure 1 shows the gas-insulated switchgear assembly with a three-phase double busbar system which, in the common busbar area SR, is equipped with the busbar modules SM1 and SM2, which are opposite one another with mirror-image symmetry and are arranged
15 interleaved. This illustration shows, particularly clearly, that the space requirement for the busbars, which are not annotated, within the busbar modules in the busbar area SR is very small.

- In that the switch disconnectors TS..., which are
20 generally in the form of three-position switches and are controlled by the disconnector drive TA associated with them all, are accommodated in a known manner in the common busbar area SR, which is sealed in a gas-tight manner of the top of the busbar cover SA.

- 25 The circuit breaker modules LS... are provided in the circuit breaker area LR, which is immediately adjacent underneath, and they are electrically conductively connected to the corresponding switch disconnectors TS... by means of the module couplings MK... associated
30 with the poles.

- The figure furthermore indicates that the outputs of the circuit breaker modules LS... are passed via the corresponding cable connection KA into the cable connection area KR, from where the panel and/or cable
35 connections, which are not illustrated, are installed.

Figure 2, which shows an approximately transparent front view of the switchgear assembly, illustrates in particular the busbars SM1 and SM2 which, if required, can be connected at the side by means of the screw couplings SK... for panel expansion to the first and second busbars SS1,2. Furthermore, the functional breakdown of the switchgear assembly into the busbar area SR, circuit breaker LR and cable connection area KR is shown in particular, and the parallel electrical connection of the two busbar modules SM1,2 to the single associated circuit breaker module LS... for the double busbar system by means of the module couplings MK... can be seen.

Patent Claims

1. A gas-insulated switchgear assembly having busbars
5 for a three-phase busbar system, in particular for
medium-voltage technology, and having a number of
circuit breakers (which can be controlled via switch
disconnectors), and panel or cable connections,
corresponding to the number of poles to be switched,
10 characterized by the following features:

1.1 each busbar system is accommodated in a
hermetically sealed busbar module (SM1,2) within a
busbar area (SR) of the switchgear assembly,

1.2 the busbars are arranged horizontally in the
15 busbar module (SM1,2) and vertically in the outer area
of it,

1.3 the busbar module (SM1,2) can be connected by
means of screw couplings (SK...) for panel expansion,

1.4 each circuit breaker is accommodated in a circuit
20 breaker module (LS...) inside the switchgear assembly,
and,

1.5 each busbar module (SM1,2) is electrically
conductively connected to the corresponding circuit
breaker module (LS...) by means of a module coupling
25 (MK...).

2. A gas-insulated switchgear assembly having busbars
for a three-phase double busbar system, in particular
for medium-voltage technology, and having a number of
30 circuit breakers (which can be controlled via switch
disconnectors), and panel or cable connections,
corresponding to the number of poles to be switched,
characterized by the following features:

2.1 the double busbar system is formed from two busbar
35 modules (SM1, SM2), which are arranged mirror-image
symmetrically with respect to one another, are each
hermetically sealed and are accommodated interleaved
(?) inside a busbar area (SR) in the switchgear

assembly,

2.2 the busbars are arranged horizontally in the busbar module (SM1,2) and vertically in the outer area of it,

5 2.3 the busbar module (SM1,2) can be connected by means of screw couplings (SK...) for panel expansion,

2.4 each circuit breaker is accommodated in a circuit breaker module (LS...) inside the switchgear assembly, and,

10 2.5 each busbar module (SM1,2) is electrically conductively connected to the corresponding circuit breaker module (LS...) by means of a module coupling (MK...).

15 3. The gas-insulated switchgear assembly as claimed in patent Claim 1 or 2, characterized by the following feature:

3.1 the circuit breaker modules (LS...) are arranged in a common circuit breaker area (LR) in the switchgear
20 assembly.