

Mobile Substations

Application guide for use of medium
voltage switchgears in mobile substations

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1.1 Terms, abbreviations and symbols used

This manual uses certain terms and symbols. They warn about dangers or provide important information which must be complied with to avoid danger to personnel and damage to equipment:

**Danger**

This danger symbol warns about dangerous electrical voltage. Contact with voltage may result in fatal injury!

**Warning**

This danger symbol warns about the risk of injury. Please comply with all the provisions identified by this symbol in order to avoid death or serious injury.

**Important**

This instruction symbol is used for information which is important to avoid material damage.

1.2 Utilization in line with the intended purpose

Medium-voltage switchgear panels are exclusively intended for switching and distributing electrical energies. They may only be used in the scope of the specified standards and the switchgear-specific technical data. Any other utilization constitutes improper use and may result in dangers and damage.

Disclaimer of liability

The manufacturer shall not be held responsible for damage which occurs if

- instructions in this Technical Manual are not complied with;
- the switchgear is not operated according to its intended use (see above);
- the switchgear is assembled, connected or operated improperly;
- accessories or spare parts are used which have not been approved by the manufacturer;
- the switchgear is converted without the manufacturer's approval, or if inadmissible parts are attached.
- Disclaimer liability for transportation

No liability is accepted for parts provided by customers, e.g. current transformers.

1.3 Safety provisions

Read these instructions carefully before you work on the switchgear, and perform the work detailed in them as described. Do not perform any work which is not described in this manual.

Applicable standards and regulations:

- Common regulations for high-voltage switchgear and controlgear: IEC 62271-1
- Use and handling of sulphur hexafluoride (SF6) in high-voltage switchgear: IEC 62271-303
- The locally applicable accident prevention, operating and work instructions must be complied with
- Installation: IEC 61936-1 / HD 637 S1 ¹⁾
- Operation of electrical equipment: EN 50110-1 ¹⁾

¹⁾ The national standards applicable in the country where the equipment is to be installed must be complied with.

Before performing work on the panel, make sure that you comply with the following instructions:



Danger

Before starting work on high-voltage components, de-energize the system, verify it for zero voltage and earth the system in accordance with the applicable safety rules pursuant to EN 50110-1.



Warning

After removal of covers, operator safety in accordance with IEC 62271-200 may be restricted if the appropriate part of the switchgear panel has not been isolated from the power supply.



Danger

Before performing work on the drive mechanism, switch off the supply voltage and prevent it from reclosing.



Warning

There is a risk of injury when working on the drive mechanism. Before commencing work, release the energy-storing device by
- an OFF-ON-OFF operating sequence and
- closing via the make-proof earthing switch.

Behaviour in case of incidents or accidents

In case of fire or of internal faults, toxic and caustic decomposition products may be produced. Comply with the locally applicable accident and safety provisions.

In case of personal injury, take first-aid measures or cause them to be taken.

Mobile substations are flexible and effective solutions customized to customer's needs.

Possible applications are:

- temporary replacement of installations with similar voltages in emergencies caused by upgrades
- plant expansions
- prolonged authorisation processes
- breakdowns
- short-term peak energy demands
- natural phenomena
- maintenance and operation requirements.

The mobile substation is designed for easy relocation using conventional means of transportation. The mobile substations are completely assembled and tested according to the standards at the factory including all connections of the components to the integrated local control cubicle and to the common earthing point.

The primary distribution switchgears are designed for stationary service and operation to satisfy the needs of the medium voltage distribution network up to 52 kV and are fulfilling the requirements of international standards like IEC for normal service conditions, e.g. "vibration due to causes external to the switchgear and controlgear or earth tremors are negligible". [1]

3.1 Transportation

The following recommendations shall be taken into account prior to transportation:

- Transportation shall be with air-suspended trucks, equipped with shock absorbers on the seating of the container/trailer
- Hard landing of the container/trailer shall be avoided
- Railway transport and airfreight only on request
- Road transportation shall be on appropriate roads, see IEC EN [2]
- Inclination during lifting/settling of the container shall be avoided
- Torsion of the baseframe on which the switchgears are mounted shall be avoided

To monitor the threshold of acceleration during transport the container/trailer could be equipped with lead-sealable impact- and incline sensor with data logger.

3.2 Site connection and Commissioning

The site connection of the mobile substation is quick and simple, the commissioning and operation is easy and safe and does not require adjustments to begin service:

- Connection of the station earth to the common earthing point
- Connection of the plug-in power cables to the cable terminations and fixation on the pre-assembled auxiliary frames
- Connection of the remote control to the local control cubicle
- A visual control of the equipment and functional testing of all
- switching devices, gas monitoring systems and other components

3.3 Additional inspections

To ensure the functionality of the equipment for the lifetime of the switchgear, following inspections are recommended after an appropriate period mainly depending on transport.

- A detailed visual inspection shall be performed
- A comparative resistance measurement of the busbar phases shall be done
- A power frequency test and additionally a partial discharge test for Gas Insulated Switchgears shall be performed acc. IEC [1].



Important:

For further remarks please also refer to the installation and operation manual of the related product and also to chapter 1.

[1]

IEC 62271-200, AC metal-enclosed switchgear and control-gear for rated voltages above 1 kV and up to and including 52 kV
IEC 62271-1, Common specifications for high-voltage switchgear and controlgear standards

[2]

DIN EN 60721, Classification of environmental conditions

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