Switchgear Type 8BT1, up to 24 kV, air-insulated

Medium Voltage Switchgear · Catalog HA 26.31 · 2012

Answers for infrastructure and cities.
Switchgear type 8BT1 is a factory-assembled, type-tested switchgear for indoor installation according to IEC 62 271-200 and VDE 0671-200.

Benefits (see also page 10 for details)

- Saves lives
- Peace of mind
- Increases productivity
- Saves money
- Preserves the environment

8BT1 panel
Maximum ratings 24 kV / 25 kA / 2000 A

Typical uses
The 8BT1 switchgear can be used in transformer and switching substations, e.g.:

- Chemical industry
- Petroleum industry
- Pipeline installations
- Electrochemical plants
- Petrochemical plants
- Diesel power plants
- Emergency power supply installations
- Lignite open-cast mines
- Traction power supplies

The products and systems described in this catalog are manufactured and sold according to a certified quality and environmental management system (acc. to ISO 9001 and ISO 14001).
Application

Typical uses

Application

Industry

Public power supply system

Industry

8BT1 switchgear

Application

Industry
## Technical Data

### Ratings

#### Electrical data (maximum values) of 8BT1

<table>
<thead>
<tr>
<th>Switchgear 7.2 kV</th>
<th>Ratings</th>
<th>Rated values (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>7.2 kV</td>
<td></td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>Rated short-duration power-frequency withstand voltage</td>
<td>20 kV</td>
<td></td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage</td>
<td>60 kV</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current, 3 s</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated peak withstand current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated normal current of busbar</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with circuit-breaker</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector</td>
<td>630 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector with fuses</td>
<td>200 A ¹</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switchgear 12 kV</th>
<th>Ratings</th>
<th>Rated values (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>12 kV</td>
<td></td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>Rated short-duration power-frequency withstand voltage</td>
<td>28 kV</td>
<td></td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage</td>
<td>75 kV</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current, 3 s</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated peak withstand current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated normal current of busbar</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with circuit-breaker</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector</td>
<td>630 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector with fuses</td>
<td>200 A ¹</td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Switchgear 24 kV</th>
<th>Ratings</th>
<th>Rated values (max.)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated voltage</td>
<td>24 kV</td>
<td></td>
</tr>
<tr>
<td>Rated frequency</td>
<td>50 Hz</td>
<td></td>
</tr>
<tr>
<td>Rated short-duration power-frequency withstand voltage</td>
<td>50 kV</td>
<td></td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage</td>
<td>125 kV</td>
<td></td>
</tr>
<tr>
<td>Rated short-time withstand current, 3 s</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated peak withstand current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>25 kA</td>
<td></td>
</tr>
<tr>
<td>Rated short-circuit making current at 50 Hz</td>
<td>63 kA</td>
<td></td>
</tr>
<tr>
<td>Rated normal current of busbar</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with circuit-breaker</td>
<td>2000 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector</td>
<td>630 A</td>
<td></td>
</tr>
<tr>
<td>- with switch-disconnector with fuses</td>
<td>200 A ¹</td>
<td></td>
</tr>
</tbody>
</table>

1) Depending on the rated current of the HV HRC fuses installed.
### Technical Data

#### Classification, dimensions, room planning

**Classification of the 8BT1 switchgear acc. to IEC 62271-200**

<table>
<thead>
<tr>
<th>Internal arc classification</th>
<th>IAC</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition class for circuit-breaker</td>
<td>PM</td>
</tr>
<tr>
<td>Loss of service continuity category</td>
<td>LSC2A</td>
</tr>
<tr>
<td>Compartment accessibility (standard)</td>
<td>Tool-based</td>
</tr>
<tr>
<td>Busbar compartment</td>
<td>Interlock-based</td>
</tr>
<tr>
<td>Switching-device compartment</td>
<td>Interlock-based</td>
</tr>
<tr>
<td>Connection compartment, front connection</td>
<td>Interlock-based</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Accessibility</th>
<th>Type A</th>
</tr>
</thead>
<tbody>
<tr>
<td>Front</td>
<td>Type A</td>
</tr>
<tr>
<td>Lateral</td>
<td>Type A</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Test current (kA)</th>
<th>25</th>
</tr>
</thead>
<tbody>
<tr>
<td>Test duration (s)</td>
<td>0.1/1.0</td>
</tr>
</tbody>
</table>

### Dimensions

#### Dimensions for 7.2/12 kV

- **Width B**
  - For max. 1250 A vacuum circuit-breaker: 600 mm
  - For 2000 A vacuum circuit-breaker: 800 mm
  - For switch-disconnector: 600 mm

- **Height H1**
  - With standard low-voltage compartment: 2050 mm
  - With pressure relief system: 2300 mm

- **Height H2**
  - With lead-off duct: 2350 mm

- **Depth T1**
  - Without low-voltage compartment: 1200 mm

- **Depth T2**
  - With low-voltage compartment: 1410 mm

#### Dimensions for 24 kV

- **Width B**
  - For max. 1250 A vacuum circuit-breaker: 800 mm
  - For 2000 A vacuum circuit-breaker: 1000 mm
  - For switch-disconnector: 800 mm

- **Height H1**
  - With standard low-voltage compartment: 2050 mm

- **Height H2**
  - With pressure relief system: 2300 mm
  - With lead-off duct: 2350 mm

- **Depth T1**
  - Without low-voltage compartment: 1200 mm

- **Depth T2**
  - With low-voltage compartment: 1410 mm

### Construction and design

- **Compartment accessibility (standard)**:
  - Busbar compartment: Tool-based
  - Switching-device compartment: Interlock-based
  - Connection compartment, front connection: Interlock-based

### Room planning

- **(room height ≥ 2800 mm, ≥ 3000 mm ³, ≥ 2400 mm ²)**

#### Single-row arrangement (plan view)

For dimensions B (width) and T (depth) refer to the table on this page.

---

1) For panel replacement:
   - Control aisle ≥ 1600 mm

2) Lead-off duct required

3) For an arc fault duration of 1 s
**Product Range**

**Panels**

**Circuit-breaker panel**

**Disconnecting panel**

**Switch-disconnector panel**

**Components**

<table>
<thead>
<tr>
<th>Component</th>
<th>Symbol</th>
</tr>
</thead>
<tbody>
<tr>
<td>Current transformer</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Voltage transformer without primary fuses</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Capacitive voltage detection system</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Make-proof earthing switch</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Cable sealing ends 1) max. 4 x 500 mm² per phase</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>HV HRC fuse</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>SION vacuum circuit-breaker</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Disconnector</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
<tr>
<td>Switch-disconnector</td>
<td><img src="image" alt="Symbol" /></td>
</tr>
</tbody>
</table>

1) The details refer to conventional single-core sealing ends and are reduced by 1 cable when using surge arresters.
Bus sectionalizer I (mirror-image installation also possible)

Bus sectionalizer II (mirror-image installation also possible)

Components

- Current transformer
- Voltage transformer without primary fuses
- Capacitive voltage detection system
- Voltage transformer with primary fuses
- Make-proof earthing switch
- SION vacuum circuit-breaker
- Cable sealing ends 1) max. 4 x 500 mm² per phase

1) The details refer to conventional single-core sealing ends and are reduced by 1 cable when using surge arresters.
**Design**

**Panel design**

Legend for panel design:

1. Door of low-voltage compartment
2. Opening for locking or unlocking the low-voltage compartment door
3. Option: Capacitive voltage detection system for feeder and busbar
4. High-voltage door of switching-device compartment
5. Inspection window for checking the disconnected/service position of the switching-device truck
6. Opening for locking or unlocking the high-voltage door
7. Actuating opening for the busbar earthing switch
8. Actuating opening for mechanical charging of circuit-breaker closing spring
9. Openings for manual operation (ON/OFF) of the circuit-breaker
10. Inspection window for checking the CLOSED/OPEN indication of the circuit-breaker, the "spring charged" indication and operating cycle counter
11. Knob for opening the door
12. Actuating opening for moving the switching-device truck
13. Actuating opening for the earthing switch
14. Busbars
15. Make-proof busbar earthing switch
16. Bushings
17. Busbar voltage transformer
18. Current transformer
19. Voltage transformer
20. Make-proof earthing switch
21. Cable sealing ends
22. Pressure relief
23. Low-voltage plug connector
24. Switching-device truck
25. Switch-disconnector
26. HV HRC fuse
27. Integrated partition
28. Operating mechanism for switch-disconnector
29. Operating mechanism for earthing switch
30. Actuating opening for the switch-disconnector
31. Inspection window for checking the switch-disconnector position, the earthing switch position and the "fuse tripped" indication

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**A** Combined switching-device/ connection compartment
**B** Busbar compartment
**D** Switching-device truck
**E** Low-voltage compartment/ low-voltage niche

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Switchgear Type 8BT1, up to 24 kV, Air-Insulated · Siemens HA 26.31 · 2012
## Combined switching-device/ connection compartment
- All switching operations with high-voltage door closed
- Pressure relief upwards
- Doors, front frames and end walls are powder-coated with epoxy resin. Rear wall and ceiling components are made of galvanized sheet metal
- Partition class: Metallic, earthed shutters and partitions ensure partition class PM for circuit-breaker panel
- High-voltage door pressure-resistant in the event of internal arcs in the panel
- Metallic ducts on the side for laying control cables
- Interlocking between high-voltage door and circuit-breaker truck ensures interlock-based access
- Switching-device compartment to accommodate components for implementing various panel versions with
  - Vacuum circuit-breaker
  - Disconnecting truck
  - Metering truck
- Suitable for connection of
  - Single-core cables
  - Three-core cables
- Earthing busbar
- Connection from front interlock-based
- Option: Pressure-resistant floor cover
- Use of block-type current transformers
- Interlocked high-voltage door with connection from front provides interlock-based access

## Components at the panel connection (option)
- Single-core XLPE cables up to max. 4 x 500 mm² per phase
- Three-core XLPE cables up to max. 2 x 300 mm² per phase
- Coupling electrode for capacitive voltage detection system
- Voltage transformers
  - Cast-resin insulated
  - Max. 3 x 1-pole
  - Fixed-mounted, without primary fuses
- Make-proof earthing switches
  - With manual operating mechanism
  - In addition to standard interlocking of earthing switch/circuit-breaker truck, optionally lockable or with electromagnetic interlock
- Surge arresters
  - Surge arresters for protecting the switchgear against external overvoltages

## Busbar compartment
- Pressure relief upwards
- Busbar transverse partition between panels
- Busbars made of flat copper, bolted from panel to panel
  - For rated normal currents up to 2000 A
- Bolted front covers provide tool-based access
- Option: Coupling electrode for capacitive voltage detection system
- Options: Possibility of installing the following components
  - Voltage transformers
  - Busbar earthing switch

## Interlocks
- Interlocking conditions are satisfied according to IEC 62 271-200 / VDE 0671-200
- Earthing switch can only be operated with circuit-breaker truck in disconnected position
- Circuit-breaker truck can only be moved with circuit-breaker "OPEN" and earthing switch "OPEN"
- Circuit-breaker can only be operated in interlocked disconnected or service position
- Mechanical coding on the circuit-breaker truck prevents insertion of similar circuit-breaker trucks for lower rated normal currents into panels with higher rated normal currents
- Circuit-breaker truck can only be moved from disconnected to service position with door closed
- The high-voltage door can only be opened when the circuit-breaker truck is in disconnected position
- Option: Electromagnetic interlocks

## Low-voltage compartment
- Accommodates equipment for protection, control, measuring and metering
- Separated from the high-voltage part of the panel, safe-to-touch
- Low-voltage compartment can be removed, bus wires and control cables are plugged in
- Option: Test sockets for capacitive voltage detection system

## Low-voltage cables
- Control cables of the panel are flexible and have metallic covers
- Connection between switching-device truck and panel wiring to low-voltage compartment via 64-pole coded plug connectors
- Bus wires pluggable from panel to panel
## Design

### Benefits and features

<table>
<thead>
<tr>
<th>Benefits</th>
<th>Features</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Saves lives</strong></td>
<td>• All switching operations including emergency manual operations with high-voltage door closed</td>
</tr>
<tr>
<td></td>
<td>• Interlocking between high-voltage door and switching devices</td>
</tr>
<tr>
<td></td>
<td>• Rack-in, rack-out operations of the circuit-breaker truck with high-voltage door closed</td>
</tr>
<tr>
<td></td>
<td>• Metallic, earthed shutters and partitions, partition class: PM for circuit-breaker panels</td>
</tr>
<tr>
<td></td>
<td>• Internal arc classification up to 25 kA, 1 s, according to IEC 62 271-200, Annex A</td>
</tr>
<tr>
<td></td>
<td>• Use of vacuum circuit-breakers</td>
</tr>
<tr>
<td><strong>Peace of mind</strong></td>
<td>• Factory-assembled, type-tested switchgear according to IEC 62 271-200</td>
</tr>
<tr>
<td></td>
<td>• Type testing of the circuit-breaker and make-proof earthing switch inside the panel</td>
</tr>
<tr>
<td></td>
<td>• Use of standard, worldwide available components</td>
</tr>
<tr>
<td></td>
<td>• Use of maintenance-free vacuum circuit-breakers</td>
</tr>
<tr>
<td></td>
<td>• Quality management according to DIN EN ISO 9001</td>
</tr>
<tr>
<td></td>
<td>• Design based on global best practice sharing and experience, compact design with high flexibility</td>
</tr>
<tr>
<td><strong>Increases productivity</strong></td>
<td>• Use of metallic, earthed shutters and partitions ensures highest loss of service continuity</td>
</tr>
<tr>
<td></td>
<td>category of the switchgear (LSC2A according to IEC 62 271-200) during maintenance</td>
</tr>
<tr>
<td></td>
<td>• Use of maintenance-free vacuum circuit-breakers</td>
</tr>
<tr>
<td></td>
<td>• Cable testing without isolating the busbar</td>
</tr>
<tr>
<td><strong>Saves money</strong></td>
<td>• Use of maintenance-free vacuum circuit-breakers</td>
</tr>
<tr>
<td></td>
<td>• Compact design requires minimum space</td>
</tr>
<tr>
<td><strong>Preserves the environment</strong></td>
<td>• As insulating medium, air is absolutely neutral to the environment</td>
</tr>
<tr>
<td></td>
<td>• Service life &gt; 35 years optimizes the energy balance additionally</td>
</tr>
<tr>
<td></td>
<td>• The materials used are fully recyclable without special knowledge</td>
</tr>
</tbody>
</table>
### Standards

The switchgear complies with the relevant standards and specifications applicable at the time of type tests. In accordance with the harmonization agreement reached by the countries of the European Community, their national specifications conform to the IEC standard.

### Overview of standards (April 2012)

<table>
<thead>
<tr>
<th>Overview</th>
<th>IEC standard</th>
<th>VDE standard</th>
<th>EN standard</th>
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</thead>
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<tr>
<td>Switchgear 8BT1</td>
<td>IEC 62271-1</td>
<td>VDE 0671-1</td>
<td>EN 62271-1</td>
</tr>
<tr>
<td>Devices</td>
<td>Circuit-breaker</td>
<td>IEC 62271-100</td>
<td>VDE 0671-100</td>
</tr>
<tr>
<td></td>
<td>Disconnecter and earthing switch</td>
<td>IEC 62271-102</td>
<td>VDE 0671-102</td>
</tr>
<tr>
<td></td>
<td>Switch-disconnector</td>
<td>IEC 60265-1</td>
<td>VDE 0670-301</td>
</tr>
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<td></td>
<td>Switch-disconnector / fuse combination</td>
<td>IEC 62271-105</td>
<td>VDE 0671-105</td>
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<td></td>
<td>HV HRC fuses</td>
<td>IEC 60282-1</td>
<td>VDE 0670-4</td>
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<td>Voltage detection systems</td>
<td>IEC 61243-5</td>
<td>VDE 0682-415</td>
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<td>Transformer</td>
<td>Current transformers</td>
<td>IEC 60044-1</td>
<td>VDE 0414-1</td>
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<td>Voltage transformers</td>
<td>IEC 60044-2</td>
<td>VDE 0414-2</td>
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<tr>
<td>Installations</td>
<td>–</td>
<td>IEC 60529</td>
<td>VDE 0470-1</td>
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<td>–</td>
<td>–</td>
<td>IEC 60071</td>
<td>VDE 0111</td>
</tr>
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<td>–</td>
<td>–</td>
<td>IEC 60044-1</td>
<td>VDE 0414-1</td>
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<td>IEC 60044-2</td>
<td>VDE 0414-2</td>
</tr>
<tr>
<td>–</td>
<td>–</td>
<td>IEC 61936-1</td>
<td>VDE 0101</td>
</tr>
</tbody>
</table>

### Type of service location

The switchgear can be used for indoor installation in accordance with IEC 61936 (Power installations exceeding 1 kV AC) and VDE 0101.

- Outside lockable electrical service locations at places which are not accessible to the public. Enclosures of switchgear can only be removed with tools.
- Inside lockable electrical service locations. A lockable electrical service location is a place outdoors or indoors that is reserved exclusively for housing electrical equipment and which is kept under lock and key. Access is restricted to authorized personnel and persons who have been properly instructed in electrical engineering. Untrained or unskilled persons may only enter under the supervision of authorized personnel or properly instructed persons.

### Table – Insulating capacity

<table>
<thead>
<tr>
<th>Rated voltage (rms value) (kV)</th>
<th>7.2</th>
<th>12</th>
<th>15</th>
<th>17.5</th>
<th>24</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated short-duration power-frequency withstand voltage</td>
<td>K₂</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>– Across isolating distances (kV)</td>
<td>23</td>
<td>32</td>
<td>39</td>
<td>45</td>
<td>60</td>
</tr>
<tr>
<td>– Between phases and to earth (kV)</td>
<td>20</td>
<td>28</td>
<td>35</td>
<td>38</td>
<td>50</td>
</tr>
<tr>
<td>Rated lightning impulse withstand voltage (peak value) (kV)</td>
<td>70</td>
<td>85</td>
<td>105</td>
<td>110</td>
<td>145</td>
</tr>
<tr>
<td>– Across isolating distances (kV)</td>
<td>70</td>
<td>85</td>
<td>105</td>
<td>110</td>
<td>145</td>
</tr>
<tr>
<td>– Between phases and to earth (kV)</td>
<td>60</td>
<td>75</td>
<td>95</td>
<td>95</td>
<td>125</td>
</tr>
</tbody>
</table>

### Altitude correction factor Kₐ

For site altitudes above 1000 m, the altitude correction factor Kₐ is recommended, depending on the actual site altitude above sea level.

**Formula:**

\[
Kₐ = \frac{1}{\sqrt{1 - \frac{K_{1000}}{K}}}
\]

where:

- \(K_{1000}\) is the insulating capacity factor at 1000 m above sea level.

**Example:**

- 3000 m site altitude above sea level, 12.5 kV switchgear rated voltage
- 95 kV rated lightning impulse withstand voltage

**Result:**

- According to the above table, a switchgear for a rated voltage of 24 kV with a rated lightning impulse withstand voltage of 125 kV is to be selected.

### Insulating capacity

- The insulating capacity is verified by testing the switchgear with rated values of short-duration power-frequency withstand voltage and lightning impulse withstand voltage age according to IEC 62271-1/ VDE 0671-1 (see table "Insulating capacity").
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m³ humidity in accordance with IEC 60071 and VDE 0111).
- The insulating capacity decreases with increasing altitude. For site altitudes above 1000 m (above sea level) the standards do not provide any guidelines for the insulation rating. Instead, special regulations apply to these altitudes.
- Site altitude
  - As the altitude increases, the insulating capacity of insulation in air decreases due to the decreasing air density. This reduction is permitted up to a site altitude of 1000 m according to IEC 60071 and VDE.
  - For site altitudes above 1000 m a higher insulation level must be selected. It results from the multiplication of the rated insulation level for 0 to 1000 m with the altitude correction factor Kₐ.

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**Diagram:**

Altitude correction factor Kₐ

- Rated short-duration power-frequency withstand voltage up to 1000 m to be selected

- Rated lightning impulse withstand voltage up to 1000 m – Kₐ

**Example:**

- 3000 m site altitude above sea level, 12.5 kV switchgear rated voltage
- 95 kV rated lightning impulse withstand voltage

**Result:**

- According to the above table, a switchgear for a rated voltage of 24 kV with a rated lightning impulse withstand voltage of 125 kV is to be selected.
Terms
"Make-proof earthing switches" are earthing switches with
short-circuit making capacity according to
– IEC 62 271-102 and
– VDE 0671-102/
EN 62 271-102

Internal arc classification
• Safety of operating personnel
  ensured by tests to verify in-
  ternal arc classification.
• Internal arc tests in accord-
  ance with IEC 62 271-200/
  VDE 0671-200, Annex A.
• The switchgear complies with
  criteria 1 to 5 specified in the
  mentioned standards for the
  basic version up to 25 kA.
• Definitions of the criteria:
  – Acceptance criterion 1
    Covers and doors remain
    closed. Limited deformations
    are accepted.
  – Acceptance criterion 2
    No fragmentation of the
    enclosures. No projection of
    small parts above 60 g
    weight.
  – Acceptance criterion 3
    No holes in the accessible
    sides up to a height of 2 m.
  – Acceptance criterion 4
    Indicators do not ignite due
    to the effect of hot gases.
  – Acceptance criterion 5
    The enclosure remains
    connected to its earthing
    parts.

Current-carrying capacity
• According to IEC 60 694/
  VDE 0670-1000 and
  IEC 62 271-200/
  VDE 0671-200 current-
  carrying capacities refer to
  the following ambient
  temperatures:
  – Maximum of
    24-hour mean + 35 °C
  – Maximum + 40 °C
  • The current-carrying capacity
    of the panels and busbars
    depends on the ambient
    temperature outside the
    enclosure.
  • To attain the maximum rated
    normal currents, the panels
    are provided with natural or
    forced ventilation.

Climate and ambient
conditions
The switchgear may be used,
subject to possible additional
measures, under the following
ambient conditions and climate
classes:
Ambient conditions
– Natural foreign materials
– Chemically active pollutants
– Small animals
Climate classes
– 3K3
– 3K5
The climate classes are
classified according to
IEC 60 721-3-3.

Protection against solid
foreign bodies, electric shock
and ingress of water
8BT1 switchgear fulfills acc. to
the standards
– IEC 62 271-200/VDE 0671-200
– IEC 60 529/VDE 0470-1
the following degrees of
protection:
– Enclosure: IP 4X
– Compartments: IP 2X
Notes