Air-Insulated Medium-Voltage Switchgear NXAIR, up to 24 kV

Medium-Voltage Switchgear
NXAIR circuit-breaker switchgear is used in transformer and switching substations, mainly at the primary distribution level, e.g.:

Application
Public power supply
- Power supply companies
- Energy producers
- System operators.

Application
Industry and offshore
- Automobile industry
- Traction power supply systems
- Mining industry
- Lignite open-cast mines
- Chemical industry
- Diesel power plants
- Electrochemical plants
- Emergency power supply installations
- Textile, paper and food industries
- Iron and steel works
- Power stations
- Petroleum industry
- Offshore installations
- Petrochemical plants
- Pipeline installations
- Data centers
- Shipbuilding industry
- Steel industry
- Rolling mills
- Cement industry.
The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).
Customer benefit
Ensures peace of mind

For power supply companies and industrial plants, the platform concept of the NXAIR family introduced at all production locations has very concrete advantages:

Smooth operation, exemplary availability and optimal safety.

Features

- No handling of insulating gas and low and high pressure monitoring required
- As insulating medium, air is always available
- Factory-assembled, type-tested switchgear according to IEC 62271-200 or VDE 0671-200
- Platform concept introduced worldwide, centrally controlled development, local manufacture
- Use of standardized block-type current transformers
- Use of standard components available worldwide, locally manufactured components, and consideration of regional standards
- More than 450,000 air-insulated switchgear panels of Siemens in operation worldwide
- Use of maintenance-free vacuum circuit-breakers or contactors
- Type testing of the vacuum circuit-breaker and the make-proof earthing switch in the panel
- Pressure-resistant partitions
- Flexibility regarding the low-voltage equipment (removable compartment, plug-in wires)
- Quality assurance in accordance with DIN EN ISO 9001.
Customer benefit
Saves lives

All switchgear types of the NXAIR family are approved with internal arc classification IAC A FLR, loss of service continuity category LSC 2B and partition class PM.
This makes them suitable for universal installation, meeting the highest requirements regarding personal safety.

Features

- All operations with closed high-voltage door
- Metallic enclosure, earthed shutters and partitions
- Internal arc classified switchgear according to IAC A FLR; front, lateral and rear accessibility; for all short-circuit currents and an arc duration of 1 s, optionally 0.1 s
- Loss of service continuity category LSC 2B (separate partitions for busbar, connection and switching-device compartments)
- Partition class PM (metal-clad in pressure-resistant design)
- Unambiguous position indicators and control elements on the high-voltage door
- Use of vacuum circuit-breakers or contactors
- Standard degree of protection IP3XD; different degrees of protection possible as an option
- Positively driven shutters (separately lockable)
- Logical mechanical interlocking system.
Properties such as modular design, type tests of the circuit-breaker in the switchgear, confinement of an internal arc to the respective compartment, and thus maximum operational reliability, contribute to optimum operation and a remarkable increase of productivity.

### Features

- Loss of service continuity category LSC 2B  
  (separate partitions for busbar, connection and switching-device compartments)
- Partition class PM
- Maximum degree of protection IP51 possible
- Positively driven shutters
- Use of standardized block-type current transformers
- Cable testing without isolating the busbar
- Functions such as establishment of the isolating distance, as well as feeder and busbar earthing, can be completely controlled from remote
- Confinement of an internal arc to the respective compartment up to 31.5 kA
- Use of maintenance-free vacuum circuit-breakers or contactors
- Control cables in metallic wiring ducts
- Easy access to all panel components.
Customer benefit
Saves money

The compact design of the NXAIR family pays twice for owners due to the use of the new SION circuit-breaker series.

On the one hand, building costs can be reduced in this way, and on the other hand, the maintenance-free circuit-breakers and the modular design enable continuous operation without expensive shutdown times.

Features

- Use of maintenance-free vacuum circuit-breakers or contactors
- Maintenance-free switchgear within up to 10 years
- Interruption of operation reduced to a minimum by logical mechanical interlocking system
- Minimized space requirements (reduced building investments) due to compact design and flexible cable connection options and/or flexible pressure relief duct systems.
Customer benefit
Preserves the environment

Air used as insulating medium, local production locations with short transportation ways and times, as well as a service life of more than 30 years, optimize the total energy balance.

Features

- As insulating medium, air is absolutely neutral to the environment
- Local production presence in all regions, minimized energy consumption (CO₂) regarding transport
- Service life of more than 30 years optimizes the energy balance additionally
- The materials used are fully recyclable without special knowledge
- Easy disposal.
Circuit-breaker switchgear NXAIR is factory-assembled, type-tested, metal-enclosed and metal-clad switchgear for indoor installation according to IEC 62271-200/ VDE 0671-200 and corresponds to the following classifications.

### Loss of service continuity category and partition class

<table>
<thead>
<tr>
<th>Loss of service continuity category</th>
<th>LSC 2B</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition class</td>
<td>PM</td>
</tr>
<tr>
<td>Accessibility to compartments</td>
<td></td>
</tr>
<tr>
<td>Busbar compartment</td>
<td>Tool-based</td>
</tr>
<tr>
<td>Switching-device compartment</td>
<td>Interlock-controlled</td>
</tr>
<tr>
<td>Connection compartment</td>
<td>Interlock-controlled or tool-based</td>
</tr>
</tbody>
</table>

### Internal arc classifications

<table>
<thead>
<tr>
<th>IAC = Internal arc classification</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>300 mm distance of indicators for test (installation in closed electrical service location)</td>
</tr>
<tr>
<td>F</td>
<td>Front arrangement of indicators for test</td>
</tr>
<tr>
<td>L</td>
<td>Lateral arrangement of indicators for test</td>
</tr>
<tr>
<td>R</td>
<td>Rear arrangement of indicators for test</td>
</tr>
<tr>
<td>$I_{sc}$</td>
<td>Test current for NXAIR ≤ 17.5 kV up to 50 kA</td>
</tr>
<tr>
<td></td>
<td>Test current for NXAIR 24 kV up to 25 kA</td>
</tr>
<tr>
<td>t</td>
<td>Arc duration 1 s, optionally 0.1 s</td>
</tr>
</tbody>
</table>

In this way, NXAIR switchgear is suitable for unrestricted application (wall- or free-standing arrangement) in electrical service locations up to the maximum short-circuit ratings.

### Type approval

NXAIR switchgear has been type-approved by the following classification societies:
- Lloyds Register (LR)
- Det Norske Veritas (DNV)

The switchgear is therefore also approved for application on ships and platforms.

### National approval GOST

By certification in the system GOST R in Russia, NXAIR switchgear is approved for application at the voltage levels 6 kV, 10 kV and 20 kV. Compliance with the requirements of the GOST standard has been confirmed in the Declarations No. POCC DE.ММ04.Д02090 and No. POCC DE.ММ04.Д01640. The approval is valid in the countries Russia, Belarus, Kazakhstan and Ukraine.

The application of NXAIR in all transmission and distribution systems in Russia is additionally authorized by the FSK/MRSK Approval No. 36-12 of May 17, 2012.
Design
Basic panel design, operation

Operation at the panel

Features

- Integrated mimic diagram
- Display of the respective switch positions for circuit-breaker CLOSED/OPEN, disconnected position, earthing switch CLOSED/OPEN, on the integrated mimic diagram
- Unambiguous assignment of actuating openings and control elements to the corresponding position indicators
- All switching operations always with high-voltage door closed
- Ergonomically favorable height for all control and indicator elements
- Option: Verification of safe isolation from supply for feeder or busbar by means of the capacitive voltage detecting system with panel front closed.

Interlocks

- Interlocking conditions specified according to IEC 62271-200/ VDE 0671-200 are fulfilled
- Feeder earthing switch can only be operated with switching device in disconnected position
- Switching device can only be racked on the movable part with the associated switching device OPEN position and with earthing switch OPEN
- Switching device can only be operated in interlocked disconnected or service position.

Beyond the specifications of the standards

- Coding prevents insertion of switching devices with a lower rated normal current into panels with a higher rated normal current
- Interlocking between the high-voltage door and the position of the withdrawable part
- Option: Electromagnetic interlocks, mechanical key interlocking systems, padlocks.

Basic panel design (example)

1 Door to low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Mimic diagram
6 “CLOSE-OPEN” actuating openings for the circuit-breaker, opening for spring charging
7 Inspection window to recognize the “CLOSED-OPEN” indicator of the circuit-breaker, “closing spring charged” indicator, operations counter
8 Handle for opening the high-voltage door
9 Actuating opening for racking the switching device
10 Mechanical position indicator for feeder earthing switch
11 Actuating opening for feeder earthing switch, manual or optionally motor operation
12 Mechanical position indicator for withdrawable part
13 Pressure relief duct, if required with top-mounted arc absorber
14 Busbars
15 Bushing-type insulator
16 Block-type current transformer
17 Voltage transformer
18 Cable connection
19 Make-proof earthing switch
20 Low-voltage connection, plug-in type
21 Operating and interlocking unit for circuit-breaker
22 Vacuum interrupters
23 Contact system
24 Withdrawable part for racking the switching device and for earthing, manual or optionally motor operation
25 Option: Withdrawable voltage transformers

A Switching-device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment
Basic panel design (example) – Duplex (back-to-back)

1 Door to low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Handle for high-voltage door
6 Mimic diagram
7 “CLOSE-OPEN” actuating openings for the circuit-breaker, opening for spring charging
8 Inspection window to recognize the “CLOSED-OPEN” indicator of the circuit-breaker, “closing spring charged” indicator, operations counter
9 Actuating opening for racking the switching device
10 Mechanical position indicator for feeder earthing switch
11 Actuating opening for feeder earthing switch, manual or optionally motor operation
12 Mechanical position indicator for withdrawable part
13 Pressure relief duct, if required with top-mounted arc absorber
14 Busbars
15 Bushing-type insulator
16 Block-type current transformer
17 Voltage transformer
18 Cable connection
19 Make-proof earthing switch
20 Low-voltage connection, plug-in type
21 Operating and interlocking unit for circuit-breaker
22 Vacuum interrupters
23 Contact system
24 Withdrawable part for racking the switching device and for earthing, manual or optionally motor operation

A Switching-device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment
Switching-device compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Panel front powder-coated with epoxy resin
- Standard color RAL 7035
- Separate shutter mechanism for opening and closing the
  - Busbar compartment
  - Connection compartment
- High-voltage door pressure-resistant in the event of
  internal arcs in the panel
- Pressure-resilient partitions to connection and
  busbar compartments
- Lateral metallic wiring duct for laying the control cables
- Low-voltage plug connector for connection of control
  cables between primary part and secondary part
- Switching-device compartment for the different panel
  versions with withdrawable devices:
  - Vacuum circuit-breaker 1)
  - Vacuum contactor
  - Disconnecter link
  - Metering unit
- Endurance classes for:
  - Circuit-breaker: E2, M2, C2
  - Isolating distance (withdrawable part): M0
  manually or partly motor-operated for withdrawable
  circuit-breaker and disconnecter link
  - Vacuum contactor 250,000, 500,000 or 1,000,000 × Iₐ
Busbar compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Option: Transverse partition from panel to panel for NXAIR
  Standard: Transverse partition from panel to panel for
  NXAIR for 40 kA and 50 kA
- Busbars made of flat copper, bolted from panel to panel
  - Option: Insulated
- Pressure-resistant partitions to connection and switching-
  device compartment, pressure-resistant rear wall
- Shutters can be opened and locked separately
- Bushing-type insulators for supporting the busbars and for
  accommodating the upper fixed contacts for the switching
  device
- Option: Coupling electrode for capacitive voltage
  detecting system.

Additional compartments (option) for busbar components,
see also product range
- Top-mounted compartment over the busbar compartment,
  within the pressure relief duct
- Separate pressure relief of the additional compartment
  via pressure relief flaps
- Options: Possibility of installing the following components
  (but not for panels with natural and forced ventilation,
  see also product range)
  - Voltage transformers
  - Make-proof earthing switch (endurance class: M0, E1),
    manual or optionally motor operation
  - Bar or cable connection.

Connection compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards through rear pressure relief duct
- Pressure-resistant partitions to switching-device and
  busbar compartments
- Shutters can be opened and locked separately
- Earthing busbar
- Option: Installation of bushing-type insulators or
  block-type current transformers
- Option: Coupling electrode for capacitive voltage
  detecting system
- Pressure-resistant floor cover
- Connection from front/bottom, or from rear/bottom,
  or from rear/top
- Suitable for connection of:
  - Single-core XLPE cables up to 6 x 500 mm² depending
    on the rated normal current and other built-in compo-
    nents
  - Three-core XLPE cables 3 x 240 mm² per panel depend-
    ing on the rated normal current and other built-in
    components
  - Flat copper bars with bushings in a base plate or
    fully-insulated bars including floor cover
- Installation of voltage transformers
  - Cast-resin insulated
    - 3 × 1-pole
  - Fixed-mounted, without primary fuses
  - Or withdrawable with primary fuses in a separate
    compartment, with bushings and shutters to the con-
    nection compartment for NXAIR ≤ 17.5 kV;
    for NXAIR 24 kV withdrawable with fuses
- Make-proof earthing switch
  - With manual operating mechanism, optionally motor
    operating mechanism
  - In addition to the standard interlock: Earthing switch
    optionally lockable or electromagnetically interlocked
    against the withdrawable switching device
- Endurance class for earthing switch: M0, E1
- Surge arrester or surge limiter
  - Surge arrester for protecting the switchgear against
    external overvoltages
  - Surge limiter for protecting consumers against switch-
    ing overvoltages while operating motors with starting
    currents ≤ 600 A.

1) Available for NXAIR 24 kV in combination with withdrawable
HV HRC fuses in the connection compartment as switch-fuse function
for particularly high demands regarding switching capacity and
switching rate.
Features

• According to IEC 62271-100, VDE 0671-100
• In NXAIR for 15 kV, 50 kA also available as generator circuit-breaker according to IEEE C37.013
• Suitable for all switching duties
• Stored-energy spring mechanism with motor operating mechanism, manual operation always possible
• Circuit-breaker also available in combination with withdrawable HV HRC fuses in the connection compartment as switch-fuse function for particularly high demands regarding switching capacity and switching rate, for NXAIR 24 kV
• Racking the circuit-breaker with manual operating mechanism, optionally with motor operating mechanism
• 64-pole low-voltage plug connector between circuit-breaker and fixed part
• Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles.

<table>
<thead>
<tr>
<th>Electrical data for</th>
<th>NXAIR ≤ 17.5 kV</th>
<th>NXAIR ≤ 17.5 kV</th>
<th>NXAIR 24 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating voltage</td>
<td>up to 17.5 kV</td>
<td>up to 17.5 kV</td>
<td>24 kV</td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>up to 40 kA</td>
<td>50 kA</td>
<td>up to 25 kA</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td>up to 40 kA/3 s</td>
<td>50 kA/3 s</td>
<td>up to 25 kA/3 s</td>
</tr>
<tr>
<td>Rated short-circuit making current</td>
<td>up to 100/104 kA</td>
<td>up to 125/130 kA</td>
<td>up to 63/65 kA</td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>up to 100/104 kA</td>
<td>up to 125/130 kA</td>
<td>up to 63/65 kA</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>up to 3150 A</td>
<td>up to 4000 A</td>
<td>up to 2500 A</td>
</tr>
<tr>
<td>Endurance class</td>
<td>E2, M2, C2</td>
<td>E2, M2, C2</td>
<td>E2, M2, C2</td>
</tr>
</tbody>
</table>

1) Max. 137 kA in combination with generator circuit-breaker according to IEEE C37.013
Components
Vacuum contactor

Features
• According to IEC 62271-106, VDE 0670-106
• Suitable for operating consumers with high switching rates
• Short-circuit protection via up to 2 HV HRC fuses connected in parallel
• Voltage supply of contactor coil via primary-fused control transformer or via external power supply
• Optional latching module for the contactor
• Racking the contactor via manual operating mechanism
• 64-pole low-voltage plug connector between contactor and fixed part
• Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles
• Contact arms generally with silver-plated round contacts.

<table>
<thead>
<tr>
<th>Electrical data for</th>
<th>3TL6 in NXAIR</th>
<th>3TL8 in NXAIR</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating voltage</td>
<td>bis 12 kV</td>
<td>up to 7.2 kV</td>
</tr>
<tr>
<td>Rated short-time withstand current 1)</td>
<td>up to 8 kA</td>
<td>up to 8 kA</td>
</tr>
<tr>
<td>Rated normal current 2)</td>
<td>400 A</td>
<td>400 A</td>
</tr>
<tr>
<td>Number of operating cycles: of contactor, mechanical of interrupters, mechanical of contactor, electrical ( t_e )</td>
<td>up to 1,000,000</td>
<td>up to 250,000</td>
</tr>
</tbody>
</table>

1) Can be used in switchgear with short-time withstand currents up to 50 kA due to the current limitation provided by HV HRC fuses.
2) Depending on the HV HRC fuses installed.
Features

- Inductive block-type current transformer principle according to IEC 61869-2, VDE 0414-9-2, standardized, available worldwide, or inductive bushing-type current transformer principle for the switch panel of NXAIR 24 kV according to the same IEC/VDE standards
  - Cast-resin insulated
  - Option: With coupling electrode for capacitive voltage detecting systems for bushing-type current transformers
  - Secondary multiratio possible
  - Current transformer certifiable

- Low-power principle for current measuring according to IEC 60044-7, VDE 0414-44-7 as option
  - Cast-resin insulated, in same housing as block-type current transformer, or as ring-core transformer
  - Secondary voltage: 225 V
  - Accuracy class up to 0.5 or 5P
  - Adjusted numerical protection, control and measuring relays are available

- Low-power principle for voltage measuring
  - Integrated in above housing
  - Combined with current measuring in low-power technology
  - For technical design, see page 16.

<table>
<thead>
<tr>
<th>Electrical data for</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>up to 24 kV</td>
</tr>
<tr>
<td>Rated primary current</td>
<td>up to 4000 A</td>
</tr>
<tr>
<td>Short-time thermal current</td>
<td>up to 50 kA</td>
</tr>
<tr>
<td>Duration of short-time current</td>
<td>1 s or 3 s</td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>up to 130 kA 1)</td>
</tr>
<tr>
<td>Number of secondary cores</td>
<td>up to 3</td>
</tr>
<tr>
<td>Secondary current</td>
<td>1 A or 5 A</td>
</tr>
<tr>
<td>Accuracy classes</td>
<td>Measuring 0.2 – 1 FS5/FS10</td>
</tr>
<tr>
<td></td>
<td>Protection 0.2 – 1 SP/10P</td>
</tr>
<tr>
<td>Rating</td>
<td>up to 30 VA</td>
</tr>
</tbody>
</table>

1) 137 kA, possible when combined with generator circuit-breakers
Components

Voltage transformers

Features

- Inductive principle according to IEC 61869-3, VDE 0414-9-3
  - Cast-resin insulated, single-pole
  - **Option:**
    - With earth-fault winding
    - Double-pole voltage transformer
- Low-power principle according to IEC 60044-8, VDE 0414-44-8
  - Integrated in current transformer housing, see page 15
  - Cast-resin insulated, single-pole
  - Constructional principle of resistive voltage divider
  - Adjusted numerical protection, control and measuring relays are available
  - Rated secondary voltage 3.25 V/√3
  - Accuracy class 0.5 or 3P.

**Electrical data for**

- **Primary operating voltage** up to 24 kV
- **Secondary operating voltage** up to 120 V or up to 120 V/√3
- **Accuracy classes** 0.2/0.5/1.0
- **Rating** up to 200 VA
Features

- Low-voltage compartment for accommodation of all protection, control, measuring and metering equipment
- Partitioned safe-to-touch off the high-voltage part
- Low-voltage compartment can be removed, as all bus wires and control cables are plugged in
- **Option**: Test sockets for capacitive voltage detecting system at the feeders or the busbar
- **Option**: Higher low-voltage compartment
- **Option**: Separation wall from panel to panel
- Low-voltage cables are flexible and protected by metal covers
- Connection of withdrawable part and panel wiring to low-voltage compartment via 10-pole, coded plug connectors
- Bus wires are pluggable from panel to panel.

Door of low-voltage compartment (example)

Low-voltage compartment with built-in equipment (example)
## Technical data 17.5 kV

### Electrical data

#### Rated values up to 40 kA

<table>
<thead>
<tr>
<th>Rated</th>
<th></th>
<th>7.2</th>
<th>12</th>
<th>17.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>voltage (kV)</td>
<td></td>
<td>7.2</td>
<td>12</td>
<td>17.5</td>
</tr>
<tr>
<td>frequency (Hz)</td>
<td>Hz</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
</tr>
<tr>
<td>short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth) (kV)</td>
<td>20</td>
<td>28</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>lightning impulse withstand voltage (phase-to-phase, phase-to-earth) (kV)</td>
<td>60</td>
<td>75</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>short-circuit breaking current (max. kA)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>short-time withstand current, 3 s (max. kA)</td>
<td>40</td>
<td>40</td>
<td>40</td>
<td></td>
</tr>
<tr>
<td>short-circuit making current (max. kA)</td>
<td>100/104</td>
<td>100/104</td>
<td>100/104</td>
<td></td>
</tr>
<tr>
<td>peak withstand current (max. kA)</td>
<td>100/104</td>
<td>100/104</td>
<td>100/104</td>
<td></td>
</tr>
<tr>
<td>normal current of busbar (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>current of feeders:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With circuit-breaker (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>With contactor 3) (max. A)</td>
<td>400</td>
<td>400</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>With disconnector link (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>Bus sectionalizer (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>Busbar connection panel (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
</tbody>
</table>

#### Rated values 50 kA

<table>
<thead>
<tr>
<th>Rated</th>
<th></th>
<th>7.2</th>
<th>12</th>
<th>17.5</th>
</tr>
</thead>
<tbody>
<tr>
<td>voltage (kV)</td>
<td></td>
<td>7.2</td>
<td>12</td>
<td>17.5</td>
</tr>
<tr>
<td>frequency (Hz)</td>
<td>Hz</td>
<td>50/60</td>
<td>50/60</td>
<td>50/60</td>
</tr>
<tr>
<td>short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth) (kV)</td>
<td>20</td>
<td>28</td>
<td>38</td>
<td></td>
</tr>
<tr>
<td>lightning impulse withstand voltage (phase-to-phase, phase-to-earth) (kV)</td>
<td>60</td>
<td>75</td>
<td>95</td>
<td></td>
</tr>
<tr>
<td>short-circuit breaking current (max. kA)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>short-time withstand current, 3 s (max. kA)</td>
<td>50</td>
<td>50</td>
<td>50</td>
<td></td>
</tr>
<tr>
<td>short-circuit making current (max. kA)</td>
<td>125/130</td>
<td>125/130</td>
<td>125/130</td>
<td></td>
</tr>
<tr>
<td>peak withstand current (max. kA)</td>
<td>125/130</td>
<td>125/130</td>
<td>125/130</td>
<td></td>
</tr>
<tr>
<td>normal current of busbar (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>current of feeders:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With circuit-breaker (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>With contactor 3) (max. A)</td>
<td>400</td>
<td>400</td>
<td>–</td>
<td></td>
</tr>
<tr>
<td>With disconnector link (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>Bus sectionalizer (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
<tr>
<td>Busbar connection panel (max. A)</td>
<td>4000</td>
<td>4000</td>
<td>4000</td>
<td></td>
</tr>
</tbody>
</table>

---

1) 32 kV or 42 kV optional for GOST standard
2) Values for 50 Hz: 100 kA or 125 kA
   60 Hz: 104 kA or 130 kA
3) Current values dependent on HV HRC fuses, for GOST standard max. 32 kV short-duration power-frequency withstand voltage
4) 137 kA in conjunction with 3AK7 generator circuit-breaker
The details refer to conventional single-core sealing ends, and depend on the rated normal current and other built-in components.

For other components in the busbar and connection compartments, see page 12.

2) (Optionally with redundant fans) only required for 2500 A and 3150 A in 800 mm panels for 40 kA, or for 4000 A in 1000 mm panels.

Forced ventilation
For other components in the busbar and connection compartments, see page 12.

1) Current transformers only possible in combination with withdrawable disconnector link.
2) In case of withdrawable metering unit, voltage transformers and earthing switches on the busbar are not possible.
3) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other built-in components.
4) (Optionally with redundant fans) only required for 2500 A and 3150 A in 800 mm panels for 40 kA, or for 4000 A in 1000 mm panels.
### Dimensions

<table>
<thead>
<tr>
<th>Panel type</th>
<th>Rated normal current</th>
<th>Short-time withstand current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>≤ 31.5 kA</td>
<td>40 kA</td>
</tr>
<tr>
<td><strong>Width in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>B Circuit-breaker panel, disconnecting panel</td>
<td>≤ 1000 A</td>
<td>600 4)</td>
</tr>
<tr>
<td></td>
<td>1250 A</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>1600 A</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>2000 A</td>
<td>800</td>
</tr>
<tr>
<td></td>
<td>2500 A</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>3150 A</td>
<td>1000</td>
</tr>
<tr>
<td></td>
<td>4000 A</td>
<td>1000</td>
</tr>
<tr>
<td>Bus sectionalizer</td>
<td>1250 A</td>
<td>2 x 800</td>
</tr>
<tr>
<td></td>
<td>≥ 2500 A</td>
<td>2 x 1000</td>
</tr>
<tr>
<td>Metering panel</td>
<td>–</td>
<td>800</td>
</tr>
<tr>
<td>Contactor panel</td>
<td>≤ 400 A</td>
<td>435/600</td>
</tr>
<tr>
<td><strong>Height in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>H1 Standard panel or standard panel with natural ventilation</td>
<td>2300</td>
<td>2300</td>
</tr>
<tr>
<td>H2 With higher low-voltage compartment or additional compartment for busbar components</td>
<td>2350</td>
<td>2350</td>
</tr>
<tr>
<td>H3 With forced ventilation</td>
<td>2450</td>
<td>2450</td>
</tr>
<tr>
<td>H4 With optional arc absorber 3) for 12 kV, &gt; 25 kA, or generally for 17.5 kV</td>
<td>2500</td>
<td>2500</td>
</tr>
<tr>
<td><strong>Depth in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>T Single busbar, all panel types (except contactor panel)</td>
<td>1350 5)</td>
<td>1500 5)</td>
</tr>
<tr>
<td>Contactor panel</td>
<td>1400</td>
<td>1500</td>
</tr>
</tbody>
</table>

1) 800 mm with forced ventilation
2) Dependent on rated normal current and design of bus riser panel
3) Number of absorbers dependent on switchgear configuration
4) Disconnecting panel not in 600 mm
5) Panels with a rated normal current of 3150 A or 4000 A in 1540 mm depth
Technical data 17.5 kV

Room planning

Pressure relief out of the switchgear room through a pressure relief duct

Pressure relief into the switchgear room through absorbers

Lateral pressure relief duct

Rear pressure relief duct

<table>
<thead>
<tr>
<th>Type of pressure relief</th>
<th>Rated voltage</th>
<th>Ceiling height D in mm for short-circuit current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>25 kA</td>
<td>31.5 kA</td>
</tr>
<tr>
<td>Pressure relief into the switchgear room through absorbers</td>
<td>12 kV</td>
<td>≥ 2800</td>
</tr>
<tr>
<td></td>
<td>17.5 kV</td>
<td>≥ 3500</td>
</tr>
<tr>
<td>Pressure relief out of the switchgear room through a pressure relief duct</td>
<td>≤ 17.5 kV</td>
<td>≥ 2500</td>
</tr>
<tr>
<td>Width of control aisle E (min.)</td>
<td>≤ 17.5 kV</td>
<td>1250</td>
</tr>
</tbody>
</table>

Single-row arrangement (plan view)
for single-busbar switchgear

For dimensions B (width) and T (depth), see table on page 21

For back-to-back and face-to-face arrangement, the room dimensions apply accordingly to those for single-row arrangement.

For back-to-back arrangement, a 1200 mm wide control aisle is required on the left or on the right of the switchgear.

1) For connection from the front ≥ 150 mm, 100 mm for contactor panel; for connection from the rear ≥ 500 mm
2) For designs with a closed pressure relief duct to the outside, a distance of ≥ 500 mm is required on one side
Transport

NXAIR 17.5 kV switchgear is delivered in form of individual panels.

Please observe the following:
• Transport facilities on site
• Transport dimensions and transport weights
• Size of door openings in building.

Packing

Means of transport: Rail and truck
– Panels on pallets
– Open packing with PE protective foil.

Means of transport: Seafreight
– Panels on pallets
– Sealed in PE protective foil, with closed wooden crate
– With desiccant bags
– With sealed wooden base
– Max. storage time: 6 months.

Means of transport: Airfreight
– Panels on pallets
– In wooden latticed crate with sealed upper and lower PE protective foil.

These transport and packing stipulations apply to the complete NXAIR product family. More information to transport dimensions/transport weights is given in the corresponding table.

**NXAIR up to 40 kA**

<table>
<thead>
<tr>
<th>Panel widths</th>
<th>Transport dimensions</th>
<th>Transport weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm × mm × mm</td>
<td>with packing</td>
</tr>
</tbody>
</table>

| | Transport by rail or truck | | Transport by seafreight or airfreight | |
| | 1 × 435 | 800 × 2510 × 1610 | 800 | 770 |
| | 1 × 600 | 800 × 2510 × 1610 | 980 | 950 |
| | 1 × 800 | 1000 × 2510 × 1610 | 1240 | 1200 |
| | 1 × 1000 | 1200 × 2510 × 1610 | 1390 | 1350 |
| | 1 × 1000² | 1200 × 2510 × 1610 | 1690 | 1650 |

| | Transport by rail or truck | | Transport by seafreight or airfreight | |
| | 1 × 435 | 820 × 2541 × 1830 | 900 | 770 |
| | 1 × 600 | 820 × 2541 × 1830 | 1080 | 950 |
| | 1 × 800 | 1020 × 2541 × 1830 | 1350 | 1200 |
| | 1 × 1000 | 1220 × 2541 × 1830 | 1510 | 1350 |
| | 1 × 1000² | 1220 × 2541 × 1830 | 1810 | 1650 |

**NXAIR up to 50 kA**

<table>
<thead>
<tr>
<th>Panel widths</th>
<th>Transport dimensions</th>
<th>Transport weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm</td>
<td>mm × mm × mm</td>
<td>with packing</td>
</tr>
</tbody>
</table>

| | Transport by rail or truck | | Transport by seafreight or airfreight | |
| | 1 × 435 | 820 × 2650 × 1850 | 820 | 780 |
| | 1 × 800 | 1000 × 2650 × 1850 | 1400 | 1350 |
| | 1 × 1000 | 1200 × 2650 × 1850 | 1460 | 1400 |
| | 1 × 1000² | 1200 × 2650 × 1850 | 1760 | 1700 |

| | Transport by rail or truck | | Transport by seafreight or airfreight | |
| | 1 × 435 | 822 × 2676 × 1872 | 930 | 780 |
| | 1 × 800 | 1022 × 2676 × 1872 | 1520 | 1350 |
| | 1 × 1000 | 1222 × 2676 × 1872 | 1580 | 1400 |
| | 1 × 1000² | 1222 × 2676 × 1872 | 1880 | 1700 |

1) Average values depending on the degree to which panels are equipped
2) 4000 A panels (with forced ventilation) and 3150 A panels

---

Technical data 17.5 kV
Transport and packing

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## Technical data 24 kV

### Electrical data

<table>
<thead>
<tr>
<th>Rated values</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>voltage</td>
<td>24 kV</td>
</tr>
<tr>
<td>frequency</td>
<td>50/60 Hz</td>
</tr>
<tr>
<td>short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth)</td>
<td>50 kV</td>
</tr>
<tr>
<td>lightning impulse withstand voltage (phase-to-phase, phase-to-earth)</td>
<td>125 kV</td>
</tr>
<tr>
<td>short-circuit breaking current max. kA</td>
<td>25 kA</td>
</tr>
<tr>
<td>short-time withstand current, 3 s max. kA</td>
<td>25 kA</td>
</tr>
<tr>
<td>short-circuit making current 2) max. kA</td>
<td>63/65 kA</td>
</tr>
<tr>
<td>peak withstand current 2) max. kA</td>
<td>63/65 kA</td>
</tr>
<tr>
<td>normal current of busbar max. A</td>
<td>2500 A</td>
</tr>
<tr>
<td>normal current of feeders:</td>
<td></td>
</tr>
<tr>
<td>With circuit-breaker max. A</td>
<td>2500 A</td>
</tr>
<tr>
<td>With withdrawable disconnector link max. A</td>
<td>2500 A</td>
</tr>
<tr>
<td>Bus sectionalizer max. A</td>
<td>2500 A</td>
</tr>
</tbody>
</table>

1) 65 kV optional for GOST standard
2) Values for 50 Hz: 63 kA, 60 Hz: 65 kA
1) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other built-in components.
Technical data 24 kV
Product range, switchgear panels

Bus sectionalizer (mirror-image installation also possible)

Double busbar (back-to-back arrangement)

Circuit-breaker panel (incoming sectionalizer)  Bus coupler

For other components in the busbar and connection compartments, see page 12.

1) Current transformers only possible in combination with withdrawable disconnector link.
2) In case of withdrawable metering unit, voltage transformers and earthing switches on the busbar are not possible.

SS A = Busbar A
SS B = Busbar B
## Technical data 24 kV

### Dimensions

<table>
<thead>
<tr>
<th>Panel type</th>
<th>Rated normal current</th>
<th>Short-time withstand current</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>16 kA</td>
<td>20 kA</td>
</tr>
<tr>
<td><strong>Width in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single busbar</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit-breaker panel, disconnecting panel</td>
<td>800 A</td>
<td>800</td>
</tr>
<tr>
<td>1250 A</td>
<td>800</td>
<td>800</td>
</tr>
<tr>
<td>2000 A</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>2500 A</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>Bus sectionalizer</td>
<td>1250 A</td>
<td>2 x 800</td>
</tr>
<tr>
<td>≤ 2500 A</td>
<td>2 x 1000</td>
<td>2 x 1000</td>
</tr>
<tr>
<td>Metering panel</td>
<td>–</td>
<td>800</td>
</tr>
<tr>
<td>Switch-disconnector panel with HV HRC fuses</td>
<td></td>
<td></td>
</tr>
<tr>
<td><strong>Height in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard panel</td>
<td></td>
<td>2510</td>
</tr>
<tr>
<td>With high low-voltage compartment</td>
<td></td>
<td>2550</td>
</tr>
<tr>
<td>With natural ventilation</td>
<td></td>
<td>2680</td>
</tr>
<tr>
<td>With optional arc absorber</td>
<td>2750</td>
<td>2750</td>
</tr>
<tr>
<td>With additional compartment for busbar components</td>
<td>2770</td>
<td>2770</td>
</tr>
<tr>
<td><strong>Depth in mm</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single busbar</td>
<td></td>
<td>1600</td>
</tr>
<tr>
<td>Double busbar</td>
<td></td>
<td>3350</td>
</tr>
</tbody>
</table>

1) Number of absorbers dependent on switchgear configuration

---

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Technical data 24 kV

Room planning

Pressure relief out of the switchgear room through a pressure relief duct

Pressure relief into the switchgear room through absorbers

Type of pressure relief | Ceiling height D in mm for short-circuit current ≤ 25 kA
--- | ---
Pressure relief into the switchgear room through absorbers | ≥ 3300
Pressure relief out of the switchgear room through a pressure relief duct | ≥ 3000 (3)

NXAIR 24 kV

Arrangement (top view)
for single-busbar switchgear
For dimensions B (width) and T (depth), see table on page 27

Double-busbar arrangement (top view)
For back-to-back arrangement, a 1200 mm wide control aisle is required on the left or on the right of the switchgear to have the possibility (if required) to bring a circuit-breaker from one row to the other.

1) For connection from the front ≥ 150 mm
   for connection from the rear ≥ 500 mm
2) For designs with a closed pressure relief duct to the outside, a distance of ≥ 500 mm is required on one side
3) In case of a lower ceiling height, please contact your Siemens partner
Transport
NXAIR 24 kV switchgear is delivered in form of individual panels. Please observe the following:
• Transport facilities on site
• Transport dimensions and transport weights
• Size of door openings in building.

Packing
Means of transport: Rail and truck
– Panels on pallets
– Open packing with PE protective foil.

Means of transport: Seafreight
– Panels on pallets
– Sealed in PE protective foil, with closed wooden crate
– With desiccant bags
– With sealed wooden base
– Max. storage time: 6 months.

Means of transport: Airfreight
– Panels on pallets
– In wooden latticed crate with sealed upper and lower PE protective foil.

These transport and packing stipulations apply to the complete NXAIR product family. More information to transport dimensions/transport weights is given in the corresponding table.

<table>
<thead>
<tr>
<th>Panel widths</th>
<th>Transport dimensions</th>
<th>Transport weight</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Width x Height x Depth</td>
<td>with packing</td>
</tr>
<tr>
<td>mm</td>
<td>mm x mm x mm</td>
<td>approx. kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport by rail or truck</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 × 800</td>
</tr>
<tr>
<td>1200 x 2980 x 1810</td>
</tr>
<tr>
<td>1340</td>
</tr>
<tr>
<td>1200</td>
</tr>
<tr>
<td>1 × 1000</td>
</tr>
<tr>
<td>1200 x 2980 x 1810</td>
</tr>
<tr>
<td>1440</td>
</tr>
<tr>
<td>1400</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport by seafreight or airfreight</th>
</tr>
</thead>
<tbody>
<tr>
<td>1 × 800</td>
</tr>
<tr>
<td>1200 x 2500 x 2000</td>
</tr>
<tr>
<td>1410</td>
</tr>
<tr>
<td>1250</td>
</tr>
<tr>
<td>1 × 1000</td>
</tr>
<tr>
<td>1200 x 2500 x 2000</td>
</tr>
<tr>
<td>1410</td>
</tr>
<tr>
<td>1250</td>
</tr>
</tbody>
</table>

1) Average values depending on the degree to which panels are equipped
2) The double-busbar panels (back-to-back arrangement) are delivered as individual panels. Back-to-back connection is done on site
3) Pressure relief ducts or busbar components such as earthing switches or voltage transformers as separate delivery for 10 panels each (W 1100 x H 2000 x D 1800)
4) A height of 2450 mm is possible if the pressure relief duct is transported as a separate delivery
Standards
Standards, specifications, guidelines

Type of service location
The switchgear can be used as indoor installation according to IEC 61936 (Power Installations exceeding AC 1 kV) 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
• In 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.

Dielectric strength
• The dielectric strength is verified by testing the switchgear with rated values of short-duration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 62271-1 / VDE 0671-1 (see table “Dielectric strength”).
• The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11g/m3 water content according to VDE 0111 and IEC 60071).
• The dielectric strength decreases with increasing altitude. For site altitudes above 1000 m (above sea level) the standards do not provide any guidelines for the insulation rating, but leave this to the scope of special agreements.
• Site altitude
  – As the altitude increases, the dielectric strength 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 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 $K_a$.

Standards
The switchgear complies with the relevant standards and specifications applicable at the time of type tests.

Overview of standards (May 2016)

| Type          | IEC standard          | VDE standard          | DIN EN standard
<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchgear</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>NXAIR</td>
<td>IEC 62271-1</td>
<td>VDE 0671-1</td>
<td>DIN EN 62271-1</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-200</td>
<td>VDE 0671-200</td>
<td>DIN EN 62271-200</td>
</tr>
<tr>
<td>Devices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit-breakers</td>
<td>IEC 62271-100</td>
<td>VDE 0671-100</td>
<td>DIN EN 62271-100</td>
</tr>
<tr>
<td>Vacuum contactors</td>
<td>IEC 62271-106</td>
<td>VDE 0671-106</td>
<td>DIN EN 62271-106</td>
</tr>
<tr>
<td>Disconnectors and earthing switches</td>
<td>IEC 62271-102</td>
<td>VDE 0671-102</td>
<td>DIN EN 62271-102</td>
</tr>
<tr>
<td>Switch-disconnectors</td>
<td>IEC 62271-103</td>
<td>VDE 0671-103</td>
<td>DIN EN 62271-103</td>
</tr>
<tr>
<td>Switch-disconnector/fuse combination</td>
<td>IEC 62271-105</td>
<td>VDE 0671-105</td>
<td>DIN EN 62271-105</td>
</tr>
<tr>
<td>HV HRC fuses</td>
<td>IEC 60282-1</td>
<td>VDE 0670-4</td>
<td>DIN EN 60282-1</td>
</tr>
<tr>
<td>Voltage detecting systems</td>
<td>IEC 61243-5</td>
<td>VDE 0682-415</td>
<td>DIN EN 61243-5</td>
</tr>
<tr>
<td>Devices</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Degree of protection</td>
<td>IEC 60529</td>
<td>VDE 0470-1</td>
<td>DIN EN 60529</td>
</tr>
<tr>
<td>Instrument transformers</td>
<td>IEC 60071</td>
<td>VDE 0111</td>
<td>DIN EN 60071</td>
</tr>
<tr>
<td>Insulation</td>
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<td></td>
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<tr>
<td>Instrument transformers</td>
<td>IEC 61869-1</td>
<td>VDE 0414-9.1</td>
<td>DIN EN 61869-1</td>
</tr>
<tr>
<td>Current transformers</td>
<td>IEC 61869-2</td>
<td>VDE 0414-9.2</td>
<td>DIN EN 61869-2</td>
</tr>
<tr>
<td>Voltage transformers</td>
<td>IEC 61869-3</td>
<td>VDE 0414-9.3</td>
<td>DIN EN 61869-3</td>
</tr>
<tr>
<td>Installation, erection</td>
<td>IEC 61936-1</td>
<td>VDE 0101-1</td>
<td>DIN EN 61936-1</td>
</tr>
</tbody>
</table>

In accordance with the harmonization agreement reached by the countries of the European Union, their national specifications conform to the IEC standard.

Table – Dielectric strength

<table>
<thead>
<tr>
<th>Rated voltage (r.m.s. value) kV</th>
<th>7.2</th>
<th>12</th>
<th>15</th>
<th>17.5</th>
<th>24</th>
</tr>
</thead>
</table>
| Rated short-duration power-frequency withstand voltage (r.m.s. value)
  – Between phases and to earth kV | 20  | 28 | 36 | 38   | 50 |
  – Across isolating distances kV | 23  | 32 | 40 | 45   | 60 |
| Rated lightning impulse withstand voltage (peak value)
  – Between phases and to earth kV | 60  | 75 | 95 | 95   | 125|
  – Across isolating distances kV | 70  | 85 | 105| 110  | 145|

Altitude correction factor $K_a$

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

Rated short-duration power-frequency withstand voltage to be selected for site altitudes $> 1000$ m

≥ Rated short-duration power-frequency withstand voltage up to $\leq 1000$ m · $K_a$

Rated lightning impulse withstand voltage to be selected for site altitudes $> 1000$ m

≥ Rated lightning impulse withstand voltage up to $\leq 1000$ m · $K_a$

Example:
3000 m site altitude above sea level, 17.5 kV switchgear rated voltage, 95 kV rated lightning impulse withstand voltage
Rated lightning impulse withstand voltage to be selected = 95 kV · 1.28 = 122 kV

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.
Current carrying capacity
• According to IEC 62271-1/VDE 0671-1 and IEC 62271-200/VDE 0671-200, the rated normal current refers to the following ambient air temperatures:
  – Maximum of 24-hour mean: + 35 °C
  – Maximum: + 40 °C
• The rated normal current of the panels and busbars depends on the ambient air temperature outside the enclosure.

Protection against solid foreign objects, electric shock and water
NXAIR fulfills according to the standards
– IEC 62271-200
– IEC 60529
– VDE 0470-1
– VDE 0671-200
the following degrees of protection:

<table>
<thead>
<tr>
<th>Switchgear panel</th>
<th>NXAIR ≤ 17.5 kV</th>
<th>NXAIR 24 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection for the enclosure optionally</td>
<td>IP3XD</td>
<td>IP3XD</td>
</tr>
<tr>
<td>Degree of protection for the enclosure with ventilation</td>
<td>IP3XD</td>
<td>IP3XD</td>
</tr>
<tr>
<td>Degree of protection for the partitions</td>
<td>IP2X</td>
<td>IP2X</td>
</tr>
</tbody>
</table>

Seismic withstand capability
NXAIR ≤ 17.5 kV and NXAIR 24 kV switchgear is tested in accordance with the following internationally accepted requirements: IEC/TS 62271-210, IEC 60068-3-3, IEC 60068-2-6, IEEE 693, UBC Division IV.

Internal arc classification
• Protection of operating personnel by means of tests for verifying the internal arc classification
• Internal arcing tests must be performed in accordance with IEC 62271-200/VDE 0671-200
• The switchgear complies with all criteria specified in the a.m. standards (page 30) for the basic version up to 50 kA.
• NXAIR complies with the internal arc classification: IAC A FLR up to 50 kA, 1 s.
  This provides maximum personal safety for switchgear accessible from all sides.
• Definition of criteria:
  – Criterion 1
    Correctly secured doors and covers do not open, limited deformations are accepted
  – Criterion 2
    No fragmentation of the enclosure, no projection of small parts above 60 g
  – Criterion 3
    No holes in accessible sides up to a height of 2 m
  – Criterion 4
    No ignition of indicators due to hot gases
  – Criterion 5
    The enclosure remains connected to its earthing point.
• Beyond the specifications of the above-mentioned standards, NXAIR switchgear up to 31.5 kA / 1 s resp. 40 kA / 0.1 s is optionally designed with confinement of internal arcs to the respective compartment.

Terms
“Make-proof earthing switches” are earthing switches with short-circuit making capacity according to
– IEC 62271-102 and

Climate and environmental influences
NXAIR switchgear is suitable for application in indoor installations under normal operating conditions as defined in IEC 62271-1, as follows:
• Maximum value of ambient air temperature: + 40 °C, of 24-hour mean: + 35 °C
• Minimum value of ambient air temperature: –5 °C
• Site altitude ≤ 1000 m above sea level
• Relative air humidity over 24 h: ≤ 95 %, over a month: ≤ 90 %
• No significant pollution of the ambient air (dust, gases, vapors, salts).
The switchgear may be used, subject to possible additional measures, under the following additional environmental influences:
– Natural foreign materials
– Chemically active pollutants
– Small animals
and the climate classes:
– 3K3
– 3K5.
The climate classes are defined according to IEC 60721-3-3.