Air-Insulated Medium-Voltage Switchgear NXAirS, up to 12 kV

Medium-Voltage Switchgear

Catalog
HA 1702
Edition 2020 A
Air-insulated medium-voltage switchgear NXAirS 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.

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
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siemens.com/NXAirS

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).

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Customer benefit
Ensures peace of mind

For power supply companies and industrial plants, the platform concept of the NXAirS 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, GB 3906 and DL/T 404
• 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, under consideration of regional standards
• More than 510,000 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, the vacuum contactor 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 NXAirS 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.

In addition the arc quenching device SIQuench can be selected for protection beyond the standards.

Features

- All operations with closed high-voltage door including manual operation of vacuum circuit-breaker
- 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
- 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 Siemens 3AE vacuum circuit-breakers or 3TM contactors
- Standard degree of protection IP4X; different degrees of protection possible as an option
- Positively driven shutters (separately lockable)
- Logical mechanical interlocking system
- Optional available arc quenching device SIQuench
Customer benefit
Increases productivity

Properties such as modular design, type tests of the switching devices 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
- Partition class PM
- 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
- Use of maintenance-free Siemens 3AE vacuum circuit-breakers or 3TM contactors
- Control cables in metallic wiring ducts
- Easy access to panel components
The compact design of the NXAirS family pays twice for owners due to the use of the Siemens 3AE vacuum circuit-breaker.

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.

In case of an unlikely event of an internal arc, the optional available arc quenching device SIQuench reduces the system repair time from days and weeks to hours and minutes.

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**Features**

- Use of maintenance-free Siemens 3AE vacuum circuit-breakers or 3TM contactors
- 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
- Optional arc quenching device SIQuench
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 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 NXAirS is factory-assembled, type-tested, metal-enclosed and metal-clad switchgear for indoor installation according to IEC 62271-200, GB 3906 and DL/T 404 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>Tool-based</td>
</tr>
<tr>
<td>Busbar compartment</td>
<td>Interlock-controlled</td>
</tr>
<tr>
<td>Switching-device compartment</td>
<td>Interlock-controlled or tool-based</td>
</tr>
<tr>
<td>Connection compartment</td>
<td></td>
</tr>
</tbody>
</table>

#### Internal arc classifications

- **IAC A FLR, $I_{sc}$, t**
- **IAC** = Internal arc classification
- **A** = 300 mm distance of indicators for test (installation in closed electrical service location)
- **F** = Front arrangement of indicators for test
- **L** = Lateral arrangement of indicators for test
- **R** = Rear arrangement of indicators for test
- **$I_{sc}$** = Test current up to 40 kA
- **t** = Arc duration 1 s

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

### National approval GOST

By certification in the system GOST R in Russia, NXAirS switchgear is approved for application at the voltage levels up to 12 kV.

Compliance with the requirements of the GOST standard has been confirmed in the declaration.

The approval is valid in the countries Russia, Belarus, Kazakhstan and Ukraine.
Design
Basic panel design, operation

Features
• Integrated mimic diagram
• Indication 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 only 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 and GB 3906 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 and padlocks.

Operation at the panel

Basic panel design (example of circuit-breaker panel)
### 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
- Metallic shutters can be opened and locked separately
- High-voltage door pressure-resistant in the event of internal arcs in the panel
- Pressure-resistant partitions to connection and busbar compartments
- Lateral metallic wiring duct for laying the control cables
- Low-voltage plug connector for laying of control cables between primary part and secondary part
- Switching-device compartment for the different panel versions with withdrawable devices:
  - Vacuum circuit-breaker
  - Vacuum contactor
  - Disconnector link
  - Metering unit
  - Load-break switch and fuse combination equipment
- Endurance classes for:
  - Circuit-breaker: E2, M2, C2
  - Withdrawable part: M0, manually or partly motor-operated for withdrawable circuit-breaker and disconnector link
  - Vacuum contactor: 1,000,000 times for non-latching, 200,000 times for latching

### Busbar compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Transverse partition from panel to panel
- Busbars made of flat copper, bolted from panel to panel
  - Option: Insulated
- Pressure-resistant partitions to connection and switching-device compartment
- 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 voltage presence indicator

### 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
  - SIQuench arc quenching device

### 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
- Earthing busbar
  - Option: Installation of bushing-type insulators or block-type current transformers
  - Option: Coupling electrode for capacitive voltage presence indicator
- 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 4 x 500 mm² depending on the rated normal current and other built-in components
  - Three-core XLPE cables 3 x 240 mm² per panel depending 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 x 1-pole
  - Fixed-mounted, without primary fuses or optional with primary fuses
  - Or withdrawable with primary fuses in a separate compartment, with bushings and shutters to the connection compartment
- 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 over-voltages
  - Surge limiter for protecting consumers against switching overvoltages while operating motors with starting currents ≤ 600 A.
Components
Vacuum circuit-breaker

Features
- According to IEC 62271-100, GB 1984
- Suitable for all switching duties
- Stored-energy spring mechanism with motor operating mechanism, manual operation always possible
- 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.

3AE vacuum circuit-breaker

Different 3AE vacuum circuit-breakers on withdrawable part, with contacts

<table>
<thead>
<tr>
<th>Electrical data for</th>
<th>NXAirS ≤ 12 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating voltage</td>
<td>up to 12 kV</td>
</tr>
<tr>
<td>Rated short-circuit breaking current</td>
<td>up to 40 kA</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td>up to 40 kA/4 s</td>
</tr>
<tr>
<td>Rated short-circuit making current</td>
<td>up to 100/104 kA</td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>up to 100/104 kA</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>up to 4000 A</td>
</tr>
<tr>
<td>Endurance class</td>
<td>E2, M2, C2</td>
</tr>
</tbody>
</table>
Features

- According to IEC 62271-106, GB/T 14808
- Suitable for operating consumers with high switching rates
- Short-circuit protection via 1 HV HRC fuse per phase
- 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 tulip contacts.

### Electrical data for 3TM43 and 3TM45

<table>
<thead>
<tr>
<th>Parameter</th>
<th>3TM43</th>
<th>3TM45</th>
</tr>
</thead>
<tbody>
<tr>
<td>Rated operating voltage</td>
<td>12 kV</td>
<td>7.2 kV</td>
</tr>
<tr>
<td>Rated short-time withstand current</td>
<td>8 kA</td>
<td>8 kA</td>
</tr>
<tr>
<td>Rated normal current</td>
<td>160 A</td>
<td>250 A</td>
</tr>
<tr>
<td>Number of operating cycles:</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- of contactor, mechanical</td>
<td>up to 1,000,000</td>
<td>up to 1,000,000</td>
</tr>
<tr>
<td>- of contactor, electrical $I_n$</td>
<td>up to 200,000</td>
<td>up to 200,000</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.
Components
Current transformers

Features

• Inductive indoor support-type current transformer in block-type design according to IEC 61869-2, GB 20840.2, standardized, available worldwide
  - Cast-resin insulated
  - Insulation class E
  - Narrow design
  - Option:
    - With coupling electrode for capacitive voltage presence indicator for block-type current transformers
    - Secondary multi ratio possible
• Current transformer with type test certificate and declaration of conformity.

Electrical data for

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating voltage</td>
<td>12 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>max. 4 s</td>
</tr>
<tr>
<td>Rated peak withstand current</td>
<td>up to 104 kA</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></td>
</tr>
<tr>
<td>Measuring</td>
<td>0.2 - 0.5, depending on the type of CT</td>
</tr>
<tr>
<td>Protection</td>
<td>5P/30-10P/20, depending on the type of CT</td>
</tr>
<tr>
<td>Rating</td>
<td>up to 60 VA, depending on the type of CT</td>
</tr>
</tbody>
</table>
Features

- Inductive principle according to IEC 61869-3, GB 20840.3
  - Cast-resin insulated single-pole
  - Insulation class E
  - Secondary connection via screw-type terminals
- Option:
  - With earth-fault winding
  - Double-pole voltage transformer

Components

Voltage transformers

<table>
<thead>
<tr>
<th>Electrical data for</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Primary operating voltage</td>
<td>up to 12 kV</td>
</tr>
<tr>
<td>Secondary operating voltage</td>
<td>up to 100 V or up to 100 V/√3</td>
</tr>
<tr>
<td>Accuracy classes</td>
<td>0.2/0.5/1.0/3P/6P</td>
</tr>
<tr>
<td>Rating</td>
<td>up to 200 VA</td>
</tr>
</tbody>
</table>
Components
Low-voltage compartment

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
- Option: Higher low-voltage compartment with 980 mm height
- Low-voltage cables are flexible and protected by metal covers
- Connection of withdrawable part and panel wiring to low-voltage compartment via 64-pole, coded plug connectors
- Specific key for low voltage door.
Description

- SiQuench is an active arc detection system by Siemens, which quenches the internal arc in a time span of less than 5 milliseconds.

Benefits

- Considerable reduction of pressure and arc energy
- Prevents thermal, contamination and toxicity effects from damaging the equipment with its surroundings
- Fast restart
- Minimization of switchgear downtimes and reduction of economic losses.

Design and function

- Basic components
  - SiQuench main switch unit
  - Controller
  - Optical sensors
  - Time-overcurrent protection
- Continuous monitoring of light and overcurrent; in the event of an internal arc, SiQuench earths the switchgear quickly by means of a controlled mechanical 3-phase short circuit
- Definitive breaking of the short-circuit current through the circuit-breaker of the incoming feeder.

Technical data

- Up to 12 kV, up to 40 kA
- Fast mechanical stored-energy spring mechanism
- Continuous self-monitoring
- 5 switching operations at full rated short-time withstand current (with peak withstand current)
- Maintenance-free for 20 years
- Service life of 30 years as a minimum.

Installation possibilities

- In top box at the busbar (fixed mounted)
- Factory-assembled and -tested.
### Technical data

#### Electrical data

**Rated values up to 40 kA**

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Rated</th>
<th>kV</th>
<th>7.2</th>
<th>12</th>
</tr>
</thead>
<tbody>
<tr>
<td>short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth)</td>
<td>kV</td>
<td></td>
<td>20 (32)</td>
<td>28 (42)</td>
</tr>
<tr>
<td>lightning impulse withstand voltage (phase-to-phase, phase-to-earth)</td>
<td>kV</td>
<td></td>
<td>60</td>
<td>75</td>
</tr>
<tr>
<td>short-circuit breaking current max. kA</td>
<td></td>
<td></td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>short-time withstand current, 4 s max. kA</td>
<td></td>
<td></td>
<td>40</td>
<td>40</td>
</tr>
<tr>
<td>short-circuit making current max. kA</td>
<td></td>
<td></td>
<td>100/104</td>
<td>100/104</td>
</tr>
<tr>
<td>peak withstand current max. kA</td>
<td></td>
<td></td>
<td>100/104</td>
<td>100/104</td>
</tr>
<tr>
<td>normal current of busbar max. A</td>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>normal current of feeders:</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>With circuit-breaker max. A</td>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>With contactor max. A</td>
<td></td>
<td></td>
<td>250</td>
<td>160</td>
</tr>
<tr>
<td>With disconnecter link max. A</td>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Bus sectionalizer max. A</td>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Busbar connection panel max. A</td>
<td></td>
<td></td>
<td>4000</td>
<td>4000</td>
</tr>
<tr>
<td>Load-break switch and fuse combination panel max. A</td>
<td></td>
<td></td>
<td>250</td>
<td>140</td>
</tr>
</tbody>
</table>

1) Values for 50 Hz: 100 kA
   60 Hz: 104 kA

2) Current values dependent on HV HRC fuses
### Technical data

**Product range, switchgear panels**

#### Circuit-breaker panel

- **Make-proof earthing switch**, manual operated or optional motor operated mechanism
- **Capacitive voltage presence indicator**
- **Cable sealing ends**, max. 6 x 500 mm² per phase
- **Zero-sequence current transformer**
- **Bar feeder**
- **Withdrawable contactor and fuse combination equipment**
- **Surge arrester**
- **Busbar top in/out via rear duct**
- **Cable top in/out via rear duct**
- **Forced ventilation**
- **Bar connection**

#### Disconnecting panel

- **Current transformer**
- **Voltage transformer**
- **Withdrawable voltage transformer with primary fuses**
- **Capacitive voltage presence indicator**
- **Withdrawable disconnector link, optionally manual or motor operating mechanism**
- **Withdrawable disconnecter, optionally manual or motor operating mechanism**
- **Withdrawable circuit-breaker, optionally manual or motor operating mechanism**
- **Withdrawable contactor and fuse combination equipment**
- **Surge arrester**
- **Busbar top in/out via rear duct**
- **Cable top in/out via rear duct**

---

1) Contact Siemens Representative for details
2) Depending on the rating
3) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components
### Technical data
Product range, switchgear panels

**Bus sectionalizer (mirror-image installation also possible)**

<table>
<thead>
<tr>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
</tr>
</thead>
<tbody>
<tr>
<td>CT installation shall be combined with the withdrawable disconnector link</td>
<td>Withdrawable metering unit</td>
<td>The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components</td>
<td>Depending on the rating</td>
</tr>
</tbody>
</table>

---

### Available Components

- Current transformer
- Voltage transformer
- Withdrawable voltage transformer with primary fuses
- Make proof earthing switch, manual operated or optional motor operated mechanism
- Capacitive voltage presence indicator
- Cable sealing ends ²) max. 6 x 500 mm² per phase
- Bar feeder
- Withdrawable circuit-breaker, optionally manual or motor operating mechanism
- Withdrawable contactor and fuse combination equipment
- Withdrawable voltage transformer with primary fuses and surge arrester
- Surge arrester
- Busbar top-in/out via rear duct
- Zero-sequence current transformer
- Withdrawable disconnector link, optionally manual or motor operating mechanism
- Forced ventilation
- Bar connection
- Cable top in/out via rear duct
Bus sectionalizer (mirror-image installation also possible)

1) CT installation shall be combined with the withdrawable disconnector link
2) Withdrawable metering unit
3) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components
4) Depending on the rating
Technical data
Product range, switchgear panels

Bus sectionalizer (mirror-image installation also possible)

1) CT installation shall be combined with the withdrawable disconnector link
2) Withdrawable metering unit
3) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components
<table>
<thead>
<tr>
<th>Busbar connection panel and metering panel</th>
<th>Voltage transformer panel</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1" alt="Diagram" /></td>
<td><img src="image2" alt="Diagram" /></td>
</tr>
</tbody>
</table>

1) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components.
### Technical data

**Product range, switchgear panels**

<table>
<thead>
<tr>
<th>Vacuum contactor panel</th>
<th>SIQuench fixed - mounted</th>
</tr>
</thead>
</table>

1. The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components.

<table>
<thead>
<tr>
<th>1) Current transformer</th>
</tr>
</thead>
<tbody>
<tr>
<td>Voltage transformer</td>
</tr>
<tr>
<td>Withdrawable voltage transformer with primary fuses</td>
</tr>
<tr>
<td>Make proof earthing switch, manual operated or optional motor operated mechanism</td>
</tr>
<tr>
<td>Capacitive voltage presence indicator</td>
</tr>
<tr>
<td>Cable sealing ends 1), max. 6 x 500 mm² per phase</td>
</tr>
<tr>
<td>Bar feeder</td>
</tr>
<tr>
<td>Withdrawable circuit-breaker, optionally manual or motor operating mechanism</td>
</tr>
<tr>
<td>Withdrawable contactor and fuse combination equipment</td>
</tr>
<tr>
<td>Withdrawable voltage transformer with primary fuses and surge arrester</td>
</tr>
<tr>
<td>Surge arrester</td>
</tr>
<tr>
<td>Busbar top/inlet via rear duct</td>
</tr>
<tr>
<td>Zero-sequence current transformer</td>
</tr>
<tr>
<td>Withdrawable disconnector link, optionally manual or motor operating mechanism</td>
</tr>
<tr>
<td>Forced ventilation</td>
</tr>
<tr>
<td>Bar connection</td>
</tr>
<tr>
<td>Cable top/insout via rear duct</td>
</tr>
</tbody>
</table>
### Technical data

#### Product range, switchgear panels

<table>
<thead>
<tr>
<th>Self-used power transformer panel</th>
<th>Load-break switch and fuse combination panel</th>
</tr>
</thead>
<tbody>
<tr>
<td><img src="image1.png" alt="Diagram" /></td>
<td><img src="image2.png" alt="Diagram" /></td>
</tr>
</tbody>
</table>

1) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other build-in components.

- **Current transformer**
- **Voltage transformer**
- **Withdrawable voltage transformer with primary fuses**
- **Make-proof earthing switch, manual operated or optional motor operated mechanism**
- **Capacitive voltage presence indicator**
- **Cable sealing ends**, max. 6 x 500 mm² per phase
- **Bar feeder**
- **Withdrawable circuit-breaker, optionally manual or motor operating mechanism**
- **Withdrawable contactor and fuse combination equipment**
- **Withdrawable voltage transformer with primary fuses and surge arrester**
- **Surge arrester**
- **Busbar top IN/OUT via rear duct**
- **Zero-sequence current transformer**
- **Withdrawable disconnector link, optionally manual or motor operating mechanism**
- **Forced ventilation**
- **Bar connection**
- **Cable top IN/OUT via rear duct**
### Technical data

#### Dimensions

**NXAirS ≤ 12 kV ; ≤ 40 kA ; ≤ 4000 A**

<table>
<thead>
<tr>
<th>Panel type</th>
<th>Rated normal current</th>
<th>Short-time withstand current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width in mm</td>
<td></td>
<td>≤ 31.5 kA</td>
</tr>
<tr>
<td>Circuit-breaker panel, disconnecting panel</td>
<td>630 A 1250 A 1600 A 2000 A 2500 A 3150 A 4000 A</td>
<td>550 / 650 / 800 800 800 / 1000 1000 2 x 550 / 800 2 x 800 / 1000 2 x 1000 2 x 800 / 1000 2 x 1000</td>
</tr>
<tr>
<td>Bus sectionalizer</td>
<td>1250 A 2500 A &gt; 2500 A</td>
<td>2 x 550 / 800 2 x 800 / 1000 2 x 1000 2 x 800 / 1000 2 x 1000</td>
</tr>
<tr>
<td>Metering panel</td>
<td>–</td>
<td>550 / 800</td>
</tr>
<tr>
<td>Contactor panel</td>
<td>≤ 250 A 4)</td>
<td>650</td>
</tr>
<tr>
<td>Load-break switch and fuse combination</td>
<td>≤ 140 A 4)</td>
<td>800</td>
</tr>
<tr>
<td>Self-used transformer panel</td>
<td>–</td>
<td>550 / 800 / 1000</td>
</tr>
<tr>
<td>Busbar connection and metering panel</td>
<td>–</td>
<td>550 / 800 / 1000</td>
</tr>
<tr>
<td>Height in mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Standard panel or standard panel with natural ventilation</td>
<td>2200</td>
<td>2200</td>
</tr>
<tr>
<td>With higher low-voltage compartment</td>
<td>2350</td>
<td>2350</td>
</tr>
<tr>
<td>With forced ventilation</td>
<td>2380</td>
<td>2380</td>
</tr>
<tr>
<td>With optional arc absorber 2)</td>
<td>2400</td>
<td>2400</td>
</tr>
<tr>
<td>Depth in mm</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Single-busbar, all panel types (except load-break switch and fuse combination equipment panel)</td>
<td>1350 / 1500</td>
<td>1350 / 1500</td>
</tr>
<tr>
<td>550 mm width panel</td>
<td>1350</td>
<td>–</td>
</tr>
<tr>
<td>Load-break switch and fuse combination</td>
<td>1350</td>
<td>1500</td>
</tr>
</tbody>
</table>

1) 1000 mm depends on the rating
2) Number of absorbers depends on switchgear configuration
3) Rear duct with depth 150 mm / 300 mm / 450 mm is used for the special configuration
4) Depending on the HV HRC fuses installed and the rated voltage
**Technical data**

**Room planning**

---

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

---

**Pressure relief into the switchgear room through absorbers**

---

<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>≥ 2900</td>
</tr>
<tr>
<td>Pressure relief out of the switchgear room through a pressure relief duct</td>
<td>12 kV</td>
<td>≥ 2500</td>
</tr>
<tr>
<td>IP41/42</td>
<td>12 kV</td>
<td>2900</td>
</tr>
<tr>
<td>Width of control aisle E (min.) for panel replacement</td>
<td>12 kV</td>
<td>1800</td>
</tr>
</tbody>
</table>

---

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

For dimensions B (width) and T (depth), see table on Page 26. (unit, mm)

---

Switchgear free-standing arrangement with cable connection at the rear

Switchgear wall-standing arrangement with cable connection at the front

Recommended E value
- Single row arrangement ≥ 1800 mm
- Double rows arrangement ≥ 2500 mm

Please contact Siemens to know the details
Technical data

Typical for IP41/42

<table>
<thead>
<tr>
<th>Features</th>
<th>Dimensions</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Special design for application in marine, offshore, data center and some other areas, based on the NXAirS standard product range</td>
<td></td>
</tr>
<tr>
<td>• Available up to 12 kV, up to 40 kA, and up to 4000 A</td>
<td></td>
</tr>
<tr>
<td>• Factory-assembled, metal-enclosed and type-tested switchgear according to IEC 62271-200</td>
<td></td>
</tr>
<tr>
<td>• Internal arc classification IAC A FLR up to 40 kA for 1 second</td>
<td></td>
</tr>
<tr>
<td>• Pressure relief into the switchgear room through absorbers and exhaust, with an optimized ceiling height of 2900 mm</td>
<td></td>
</tr>
<tr>
<td>• Degrees of protection IP41 or IP42 are possible</td>
<td></td>
</tr>
</tbody>
</table>

![Switchgear with IP41/42 front / side view](image)

<table>
<thead>
<tr>
<th>Panel type</th>
<th>Rated normal current</th>
<th>Short-time withstand current</th>
</tr>
</thead>
<tbody>
<tr>
<td>Width mm</td>
<td></td>
<td>W</td>
</tr>
<tr>
<td>Circuit-breaker panel, disconnecting panel</td>
<td>630 A</td>
<td>550 / 650 / 800 / 1000</td>
</tr>
<tr>
<td>1250 A</td>
<td>550 / 650 / 800</td>
<td>-</td>
</tr>
<tr>
<td>2500 A</td>
<td>800 / 1000</td>
<td>800 / 1000</td>
</tr>
<tr>
<td>3150 A</td>
<td>1000</td>
<td>1000</td>
</tr>
<tr>
<td>4000 A</td>
<td></td>
<td>1000</td>
</tr>
</tbody>
</table>

| Height mm                                     |                      | H                           |
| Standard panel with higher low-voltage compartment | 2600          | 2600                         |

| Depth mm                                      |                      | D                           |
| Single busbar, all panel types with roof for IP41/42 | 2090           | 2090                         |
Transport

NXAirS 12 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 NXAirS product family. More information to transport dimensions/transport weights is given in the corresponding table and may change depending on the project.

<table>
<thead>
<tr>
<th>Panel widths</th>
<th>Transport dimensions</th>
<th>Transport weight</th>
</tr>
</thead>
<tbody>
<tr>
<td>mm x mm x mm</td>
<td>Width x Height x Depth with packing</td>
<td>kg</td>
</tr>
<tr>
<td>mm x mm x mm</td>
<td>without packing</td>
<td>kg</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport by rail or truck</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 550</td>
<td>900 x 2440 x 1700</td>
<td>800</td>
</tr>
<tr>
<td>1 x 650</td>
<td>1100 x 2420 x 1700</td>
<td>980</td>
</tr>
<tr>
<td>1 x 800</td>
<td>1100 x 2420 x 1700</td>
<td>1240</td>
</tr>
<tr>
<td>1 x 1000</td>
<td>1300 x 2700 x (1700 / 2000)</td>
<td>1390</td>
</tr>
<tr>
<td>1 x 1000</td>
<td>1300 x 2700 x (1700 / 2000)</td>
<td>1690</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Transport by seafreight or airfreight</th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>1 x 550</td>
<td>900 x 2440 x 1700</td>
<td>900</td>
</tr>
<tr>
<td>1 x 650</td>
<td>1100 x 2420 x 1700</td>
<td>1080</td>
</tr>
<tr>
<td>1 x 800</td>
<td>1100 x 2420 x 1700</td>
<td>1350</td>
</tr>
<tr>
<td>1 x 1000</td>
<td>1300 x 2700 x (1700 / 2000)</td>
<td>1510</td>
</tr>
<tr>
<td>1 x 1000</td>
<td>1300 x 2700 x (1700 / 2000)</td>
<td>1810</td>
</tr>
</tbody>
</table>

1) Average values depending on the degree to which panels are equipped
2) 4000 A panels (with forced ventilation) and 3150 A panels
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 and GB/T 11022 (see table “Dielectric strength”).
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m³ water content according to IEC 60071 and GB 311.1).
- 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 GB.
  - 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

<table>
<thead>
<tr>
<th></th>
<th>IEC standard</th>
<th>GB standard</th>
</tr>
</thead>
<tbody>
<tr>
<td>Switchgear</td>
<td></td>
<td></td>
</tr>
<tr>
<td>NXAirS</td>
<td>IEC 62271-1</td>
<td>GB/T 11022</td>
</tr>
<tr>
<td></td>
<td>IEC 62271-200</td>
<td>GB 3906</td>
</tr>
<tr>
<td>Devices</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Circuit-breakers</td>
<td>IEC 62271-100</td>
<td>GB 1984</td>
</tr>
<tr>
<td>Vacuum contactors</td>
<td>IEC 62271-106</td>
<td>GB/T 14808</td>
</tr>
<tr>
<td>Disconnectors and earthing switches</td>
<td>IEC 62271-102</td>
<td>GB 1985</td>
</tr>
<tr>
<td>Switch-disconnectors</td>
<td>IEC 62271-103</td>
<td>GB/T 3804</td>
</tr>
<tr>
<td>Switch-disconnector / fuse combination</td>
<td>IEC 62271-105</td>
<td>GB/T 16926</td>
</tr>
<tr>
<td>HV HRC fuses</td>
<td>IEC 60282-1</td>
<td>GB/T 15166.2</td>
</tr>
<tr>
<td>Voltage detecting systems</td>
<td>IEC 61243-5</td>
<td>-</td>
</tr>
<tr>
<td>Degree of protection</td>
<td></td>
<td></td>
</tr>
<tr>
<td>IP-Code</td>
<td>IEC 60529</td>
<td>GB/T 4208</td>
</tr>
<tr>
<td>IK-Code</td>
<td>IEC 62262</td>
<td>GB/T 20138</td>
</tr>
<tr>
<td>Insulation transformers</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Current transformers</td>
<td>IEC 61869-1</td>
<td>GB 20840.2</td>
</tr>
<tr>
<td>Voltage transformers</td>
<td>IEC 61869-3</td>
<td>GB 20840.3</td>
</tr>
<tr>
<td>Installation, erection</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>IEC 61936-1</td>
<td>-</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.

The switchgear NXAirS optional conforms to the GB standard.

### Table – Dielectric strength

<table>
<thead>
<tr>
<th>Rated voltage (r.m.s. value)</th>
<th>kV</th>
<th>7.2</th>
<th>12</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Rated short-duration power-frequency withstand voltage (r.m.s. value)</th>
<th>kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between phases and to earth</td>
<td>20 (30)</td>
</tr>
<tr>
<td>Across isolating distances</td>
<td>23 (34)</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Rated lightning impulse withstand voltage (peak value)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Between phases and to earth</td>
</tr>
<tr>
<td>Across isolating distances</td>
</tr>
</tbody>
</table>

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

\[
\text{≥ Rated short-duration power-frequency withstand voltage up to ≤ 1000 m} \cdot K_a
\]

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

\[
\text{≥ Rated lightning impulse withstand voltage up to ≤ 1000 m} \cdot K_a
\]

Example:

1500 m site altitude above sea level,
12 kV switchgear rated voltage,
75 kV rated lightning impulse withstand voltage
Rated lightning impulse withstand voltage to be selected = 75 kV x 1.063 = 80 kV

Result:

According to the above table, switchgear for a rated voltage of 12 kV with a rated lightning impulse withstand voltage of 85 kV for 2000 m application is to be selected.
Current carrying capacity

- According to IEC 62271-200 or IEC 62271-1, GB 11022 or GB 3906 the rated normal current refers to the following ambient air temperatures:
  - Maximum of 24-hour mean + 35 °C
  - Maximum + 40 °C
- The current carrying capacity of the panels and busbars depends on the ambient air temperature outside the enclosure.

Internal arc classifications

- 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 / GB 3906
- 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 standards mentioned above, NXAirS switchgear up to 40 kA/1 s is optionally provided with confinement of an internal arc to the respective compartment.

Seismic capacity (option)

NXAirS switchgear can be upgraded for regions at risk from earthquakes.

For upgrading, earthquake qualification testing has been carried out in accordance with the following standards:

- IEC 62271-2
  High-voltage switchgear and controlgear - Part 2: Seismic qualification for rated voltages of 72,5 kV and above
- IEC 62271-200
  High-voltage switchgear and controlgear - Part 200: AC metal-enclosed switchgear and controlgear for rated voltages above 1 kV and up to and including 52 kV
- GB/T 13540
  Seismic qualification for high voltage switchgear and controlgear
- GB 3906
  Alternating-current metal-enclosed switchgear and controlgear for rated voltages above 3.6 kV and up to and including 40.5 kV

Color of the panel front

RAL 7035 (light gray).

Climate and environmental influences

The NXAirS switchgear is suitable for application in indoor installations under normal operating conditions as defined in the standard IEC 62271-1 and GB 11022.

- Temperature - 5°C ~ +55°C
  -25°C ~ +55°C 1) (optional)
- Relative air humidity
  Mean value over 24 hours 1): ≤ 95 %
  Mean value over 1 month: ≤ 90 %
- Condensation
  Occasionally
  Frequently
- Site altitude
  Altitude correction to be considered (see page 30)
- No significant pollution of the ambient air (dust, gases, vapors, salts).

Recycling

The switchgear can be recycled in ecological manner in compliance with existing legislation. Auxiliary devices such as short-circuit indicators have to be recycled as electronic scrap. Batteries have to be recycled professionally.

Terms

“Make-proof earthing switches” are earthing switches with short-circuit making capacity according to
- IEC 62271-102
- GB 1985

Protection against solid foreign objects, electric shock and water

NXAirS switchgear fulfills according to the standards

<table>
<thead>
<tr>
<th>Switchgear panel</th>
<th>NXAirS ≤ 12 kV</th>
</tr>
</thead>
<tbody>
<tr>
<td>Degree of protection for the enclosure</td>
<td>IP3X</td>
</tr>
<tr>
<td>optionally</td>
<td>IP4X, IP41, IP42</td>
</tr>
<tr>
<td>Degree of protection for the partitions</td>
<td>IP2X</td>
</tr>
<tr>
<td>Degree of protection for the enclosure against mechanical impacts from outside</td>
<td>IK07</td>
</tr>
</tbody>
</table>

For secondary devices in the low-voltage door, the stipulations of the IP degree of protection apply according to the definitions for the switchgear enclosure.

1) Secondary devices (e.g. protection devices, meters, measuring transducers, etc.) must be suitable for the given operating conditions.
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