

SIEMENS



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Air-Insulated Medium-Voltage Switchgear NXAIR and NXAIR M

Medium-Voltage Switchgear

[siemens.com/nxair](https://www.siemens.com/nxair)

Application

Typical applications

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NXAIR and NXAIR M 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.

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Photo: Harald M. Valderhaug

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.

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Air-Insulated Medium-Voltage Switchgear NXAIR and NXAIR M

Medium-Voltage Switchgear

Catalog HA 25.71 · 2019

Invalid: Catalog HA 25.71 · 2017

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The products and systems listed in this catalog are manufactured and distributed using a certified management system (according 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 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 no 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, considering 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 main switching devices 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.



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.

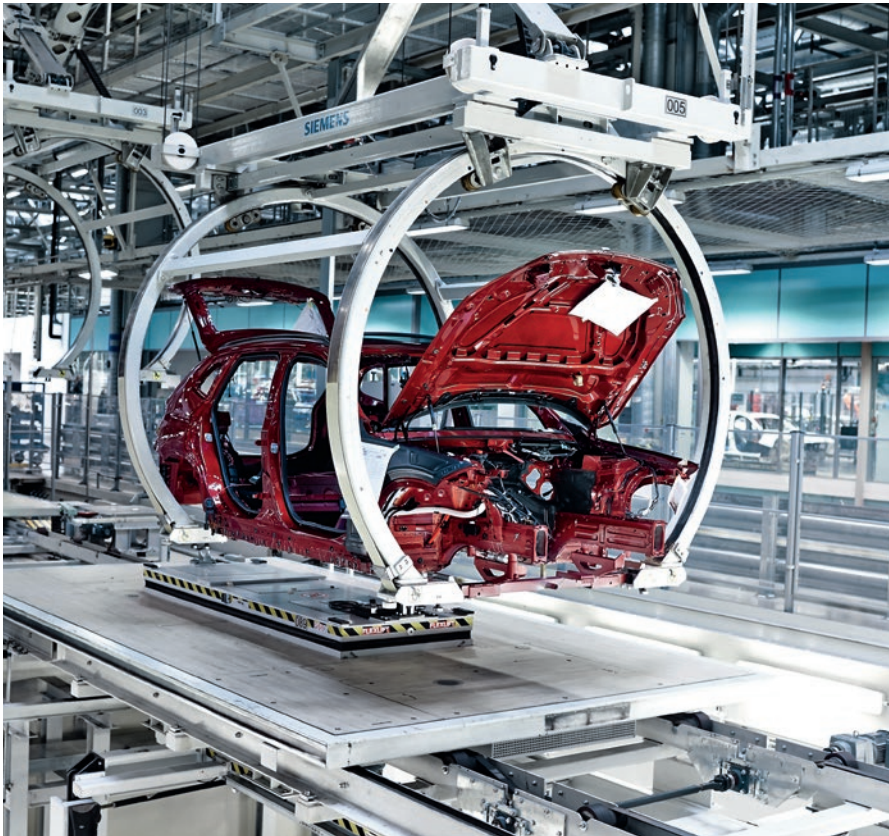
This makes them suitable for universal installation, meeting the highest requirements regarding personal safety.

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
- Loss of service continuity category LSC 2B (separate partitioning of the 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.

Customer benefit

Increases productivity



Properties such as modular design, types 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
- 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 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 and NXAIR M is factory-assembled, metal-enclosed and type-tested 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

| | |
|-------------------------------------|------------------------------------|
| Loss of service continuity category | LSC 2B |
| Partition class | PM |
| Accessibility to compartments | |
| Busbar compartment | Tool-based |
| Switching-device compartment | Interlock-controlled |
| Connection compartment | Interlock-controlled or tool-based |

Internal arc classifications

| | |
|--|---|
| The following internal arc classifications are fulfilled: 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 for NXAIR up to 50 kA = Test current for NXAIR M up to 25 kA |
| t | = Arc duration 1 s |
| In this way, NXAIR and NXAIR M 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:

Lloyd's Register
DNV GL

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 up to 12 kV.

Compliance with the requirements of the GOST standard has been confirmed in the Declaration No. POCC DE.AГ35.Д00475.

The approval is valid in the countries Russia, Belarus, Kazakhstan and Ukraine.



Design

Basic panel design, operation – Circuit-breaker panel

Operation at the panel

Features

- Integrated mimic diagram
- Indication of the respective switch positions, 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 can only be performed with closed high-voltage door
- 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.

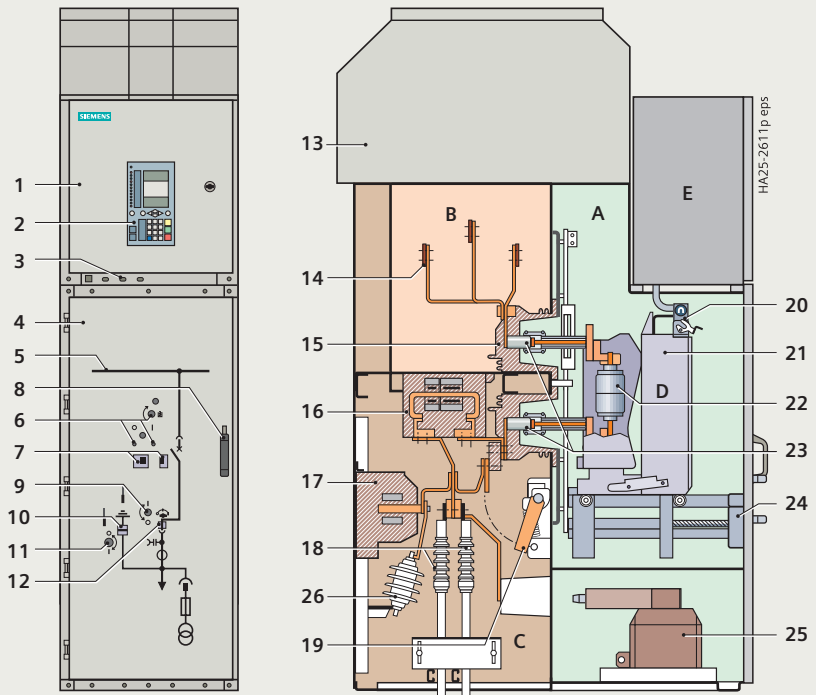
Interlocks

- 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 in OPEN position and with feeder earthing switch OPEN
- Switching device can only be operated in interlocked disconnected or service position

Beyond the specifications of the standards

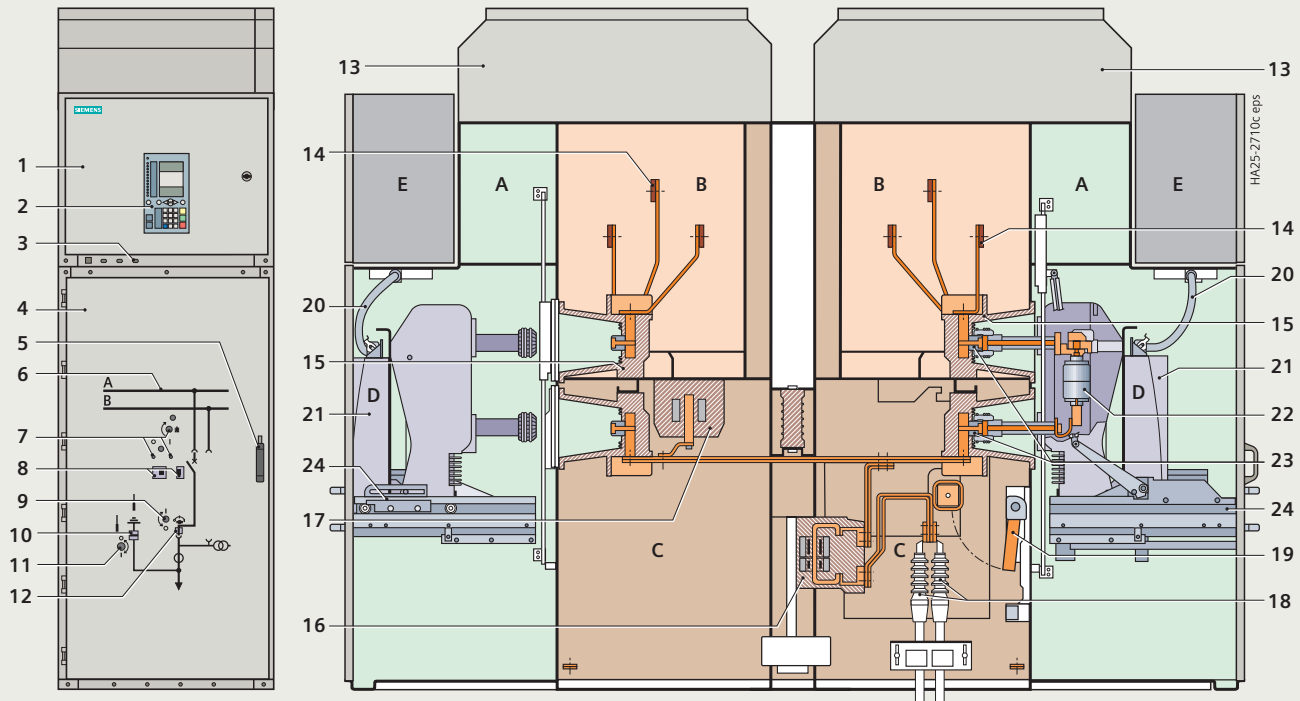
- Coding prevents insertion of switching devices with a lower rated normal current into panels with a higher rated normal current
- Interlocking between the high-voltage door and the position of the withdrawable part
- **Option:** Electromagnetic interlocks, mechanical key interlocking systems, padlocks.

Basic panel design (example) NXAIR and NXAIR M



- | | |
|---|--|
| <ul style="list-style-type: none"> 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 "CLOSE-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 position | <ul style="list-style-type: none"> 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 Operating and interlocking unit for racking the switching device and for earthing, manual or optionally motor operation 25 Option: Withdrawable voltage transformers 26 Option: Surge arresters |
|---|--|
-
- | |
|---|
| <ul style="list-style-type: none"> 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) NXAIR and NXAIR M



- | | |
|---|--|
| <ul style="list-style-type: none"> 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 "CLOSED-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 position | <ul style="list-style-type: none"> 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 |
|---|--|
-
- | |
|---|
| <ul style="list-style-type: none"> A Switching-device compartment B Busbar compartment C Connection compartment D Withdrawable circuit-breaker E Low-voltage compartment |
|---|

Design

Basic panel design, operation – Switch-disconnector panel with HV HRC fuses (NXAIR)

Operation at the panel

Features

- Integrated mimic diagram
- Indication of the respective switch positions for switch-disconnector 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 can only be performed with closed high-voltage door
- 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
- "HV HRC fuse tripped" visible with closed door
- **Option:** Electrical signal "HV HRC fuse tripped" via signaling switch.

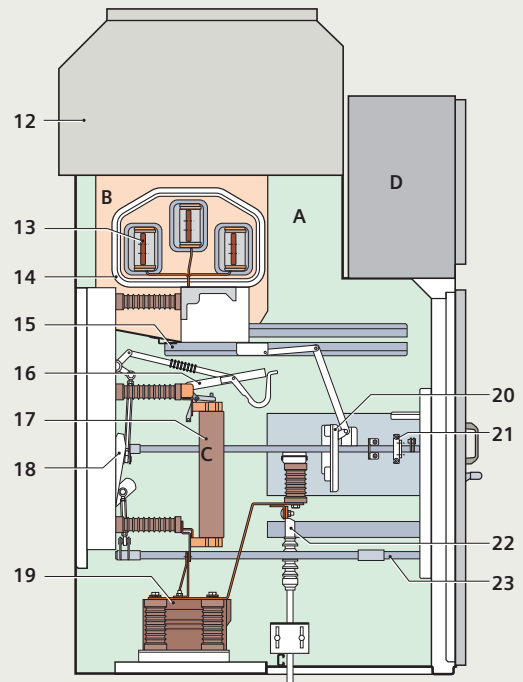
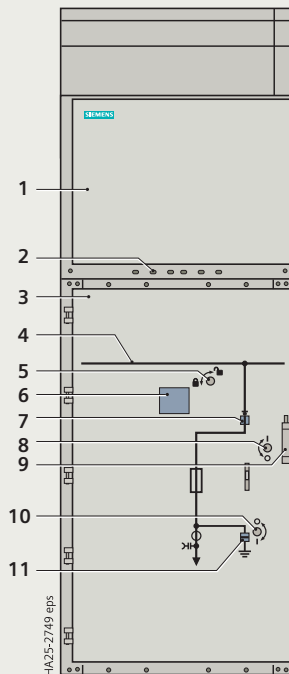
Interlocks

- 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 operated with earthing switch open.

Beyond the specifications of the standards

- Interlocking between the high-voltage door and the position of the switch-disconnector
- **Option:** Electromagnetic interlocks, mechanical key interlocking systems, padlocks.

Basic panel design (example) NXAIR



- | | |
|---|---|
| 1 Door to low-voltage compartment | 13 Busbars |
| 2 Option: Capacitive voltage detecting system for feeder and busbar | 14 Bushing plate |
| 3 High-voltage door | 15 Shutter |
| 4 Mimic diagram | 16 Switch-disconnector |
| 5 Interlocking of high-voltage door | 17 HV HRC fuse |
| 6 Inspection window to recognize the switching position of the switch-disconnector and "HV HRC fuse tripped" indication | 18 Make-proof earthing switch |
| 7 Mechanical position indicator for switch-disconnector | 19 Block-type current transformer or insulator |
| 8 Actuating opening for operating the switch-disconnector | 20 Operating unit for shutter |
| 9 Handle for opening the high-voltage door | 21 Operating and interlocking unit for switch-disconnector |
| 10 Actuating opening for feeder earthing switch, manual operation | 22 Cable connection |
| 11 Mechanical position indicator for feeder earthing switch | 23 Operating and interlocking unit for earthing, manual operation |
| 12 Pressure relief duct | A Switching-device/connection compartment |
| | B Busbar compartment |
| | C Switch-disconnector/fuse combination |
| | D Low-voltage compartment |

Operation at the panel

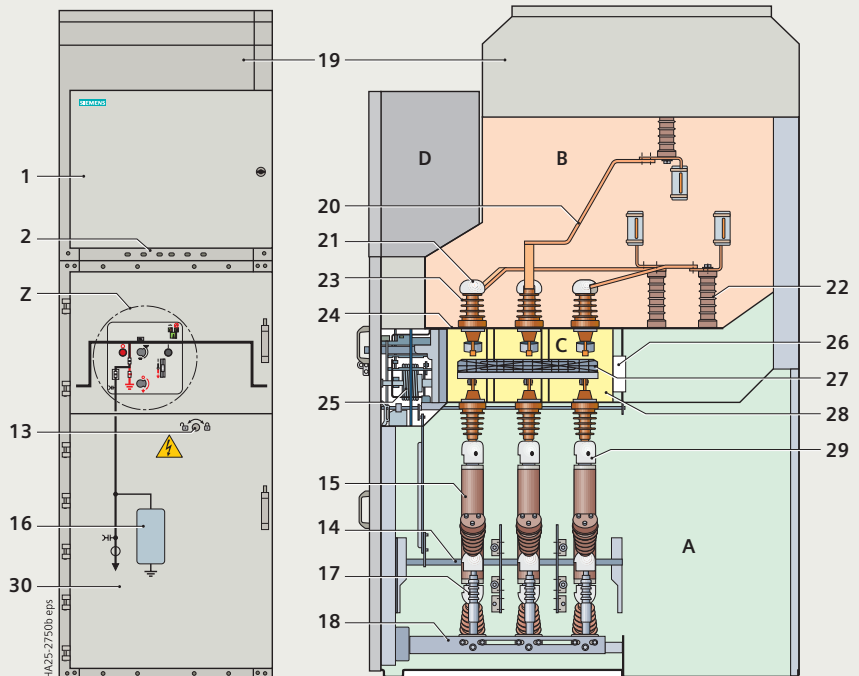
Features

- Integrated mimic diagram
- Indication of the respective switch position for three-position switch-disconnector CLOSED/OPEN/EARTHED on the integrated mimic diagram
- Unambiguous assignment of actuating openings and control elements to the corresponding position indicators
- All operations with closed high-voltage door
- Ready-for-service indicator integrated in the operating front
- Actuating openings are functionally interlocked against each other, and are optionally lockable
- Separate operating levers for disconnecting and earthing function.

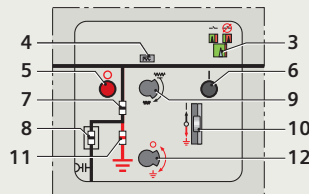
Interlocks

- Interlocking conditions specified according to IEC 62271-200 / VDE 62271-200 are fulfilled
- Three-position switch: Disconnecting function against earthing function
- Access to cable compartment is generally only possible if:
 - The feeder is isolated
 - The feeder is earthed ("EARTHED" position).
- The three-position switch-disconnector cannot be switched from "EARTHED" position to "OPEN" position when the high-voltage door is open and the HV HRC fuse compartment is open.
- **Optional:** Locking device for padlock available for three-position switch-disconnector and lockable on the operating mechanism side in every switch position.

Basic panel design (example) NXAIR M



Detail Z:



- | | |
|---|--|
| <p>4</p> <p>5</p> <p>7</p> <p>8</p> <p>11</p> <p>11</p> | <p>3</p> <p>6</p> <p>9</p> <p>10</p> <p>12</p> |
|---|--|
- 1 Door to low-voltage compartment
 - 2 **Option:** Capacitive voltage indicating system
 - 3 Ready-for-service indicator
 - 4 "Spring charged" indicator for stored-energy mechanism "OPEN"
 - 5 Operation for stored-energy mechanism "OPEN", red
 - 6 Operation for stored-energy mechanism "CLOSED", black
 - 7 Position indicator for switch-disconnector
 - 8 "Fuse tripped" indicator
 - 9 Manual operation for "spring charging"
 - 10 Control gate for the "disconnecting / earthing" functions of the three-position switch
 - 11 Position indicator for earthing switch
 - 12 Manual operation for earthing function
 - 13 Manual operation for earthing function on feeder side
 - 14 Earthing switch on feeder side
 - 15 HV HRC fuse-link (e = 442 mm)
 - 16 Inspection window
 - 17 Post insulator for the cable connection
 - 18 Cable bracket for fastening cables
 - 19 Pressure relief duct
 - 20 Busbar
 - 21 Insulating cap at the busbar
 - 22 Post insulator for the busbar
 - 23 Upper bushing-type insulators for three-position switch-disconnector
 - 24 Metallic partition of busbar compartment
 - 25 Spring-operated/stored-energy mechanism for three-position switch-disconnector
 - 26 Pressure relief device for switching device
 - 27 Three-position switch-disconnector
 - 28 Gas-insulated vessel for switching device, filled with SF₆ gas
 - 29 Terminal for HV HRC fuse assembly (with tripping)
 - 30 High-voltage door
- A Switching-device/connection compartment
 B Busbar compartment
 C Three-position switch-disconnector
 D Low-voltage compartment

Design

Compartments – Circuit-breaker panel (NXAIR and NXAIR M)

Switching-device compartment

- Enclosure made of sendzimir-galvanized sheet steel, alternatively with cast-resin powder-coated 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
- 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 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
 - Withdrawable disconnecter link
 - Withdrawable metering part
 - SIQuench arc quenching device on withdrawable part
- Endurance classes for
 - Circuit-breaker: E2, M2, C2
 - Isolating distance (withdrawable part): M0 manually or partly motor-operated for withdrawable circuit-breaker and withdrawable disconnecter link
 - Vacuum contactor $500,000 \times I_N$.

Busbar compartment

- Enclosure made of sendzimir-galvanized sheet steel, alternatively with cast-resin powder-coated sheet steel
- Pressure relief upwards
- **Option:** Transverse partition from panel to panel for NXAIR and NXAIR M
- **Standard:** Transverse partition from panel to panel in 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 compartments, 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.

1) Available for NXAIR M in combination with withdrawable HV HRC fuses as circuit-breaker/fuse combination for particularly high demands regarding switching capacity and switching rate.

2) See also product range.

Additional compartments (option) for busbar components²⁾

- 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, alternatively with cast-resin powder-coated 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 $6 \times 500 \text{ mm}^2$ depending on the rated normal current and other built-in components
 - Three-core cables $3 \times 240 \text{ mm}^2$ 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
 - 3×1 -pole
 - Fixed-mounted, without primary fuses
 - Or withdrawable with primary fuses in a separate compartment with bushings and shutters towards the connection compartment for NXAIR $\leq 17.5 \text{ kV}$; for NXAIR M, 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 arresters or surge limiters
 - Surge arresters for protecting the switchgear against external overvoltages
 - Surge limiters for protecting consumers against switching overvoltages while operating motors with starting currents $\leq 600 \text{ A}$.

Busbar compartment

- Enclosure made of sendzimir-galvanized sheet steel, alternatively with cast-resin powder-coated sheet steel
- Pressure relief upwards
- Transverse partition from panel to panel
- Busbars made of flat copper and insulated
- Positively driven shutter between busbar compartment and switching-device/connection compartment
- Shutter made of insulating material, partition class PI
- **Option:** Coupling electrode for capacitive voltage detecting system.

Switching-device/connection compartment

- Enclosure made of sendzimir-galvanized sheet steel, alternatively with cast-resin powder-coated sheet steel
- Pressure relief upwards
- Panel front powder-coated with epoxy resin
- Standard color RAL 7035
- Shutter mechanism coupled with switch-disconnector operation
- High-voltage door pressure-resistant in the event of internal arcs in the panel
- Lateral metallic wiring duct for laying the control cables
- Firmly wired cable harness for connection of control cables between primary part and secondary part
- Switching-device/connection compartment with fixed-mounted switch-disconnector/fuse combination (LSC 2A)
- Endurance classes for switch-disconnector/fuse combination:
 - Mechanical endurance: M1
 - Electrical endurance: E1
- HV HRC fuses tested according to IEC 60282-1, VDE 0670-4
 - 1 fuse per phase
 - Reference dimension: 442 mm
- 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/top
- Suitable for connection of:
 - Single-core XLPE cables up to $2 \times 300 \text{ mm}^2$ depending on rated normal current and other built-in components
 - Three-core cables $2 \times 100 \text{ mm}^2$ per panel depending on the rated normal current and other built-in components
- Make-proof earthing switch
 - With manual 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.

Design

Compartments – Three-position switch-disconnector panel with HV HRC fuses (NXAIR M)

Busbar compartment

- Enclosure made of sendzimir-galvanized sheet steel, alternatively with cast-resin powder-coated sheet steel
- Pressure relief upwards
- **Option:** Transverse partition from panel to panel
- Busbars made of flat copper, bolted from panel to panel
 - **Option:** Insulated
- Bushing-type insulators for supporting the busbars
- Pressure-resistant partition to switching-device/connection compartment
- **Option:** Coupling electrode for capacitive voltage detecting system.

Switching-device/connection compartment

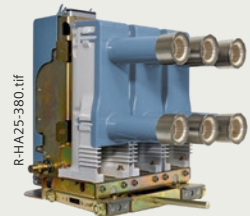
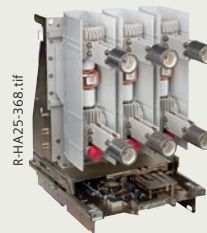
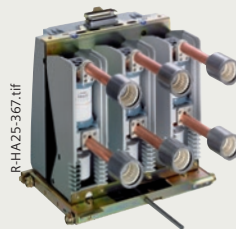
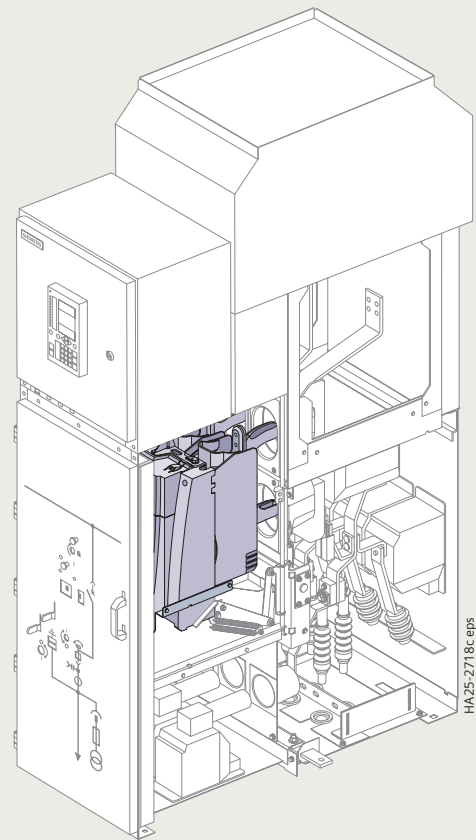
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Panel front powder-coated with epoxy resin
- Standard color RAL 7035
- High-voltage door pressure-resistant in the event of internal arcs in the panel
- Pressure-resistant partition to busbar compartment
- Lateral metallic wiring duct for laying the control cables
- Firmly wired cable harness for connection of control cables between primary part and secondary part
- Switching-device/connection compartment with fixed-mounted three-position switch-disconnector/fuse combination (LSC 2)
- Endurance classes for three-position switch-disconnector/fuse combination
 - General-purpose switch: M1, E3
 - Earthing switch: M0, E2
- HV HRC fuse
 - 1 fuse per phase
 - Reference dimension: 442 mm
- Earthing busbar
- Connection from front/bottom
- **Option:** Coupling electrode for capacitive voltage detecting system
- Pressure-resistant floor cover
- Suitable for single-core XLPE cables with $1 \times 120 \text{ mm}^2$ as a maximum
- Earthing switch, arranged on feeder side, downstream from HV HRC fuse:
 - With manual operating mechanism
 - Endurance class: M0, E1
 - Standard interlock against high-voltage door
 - In addition to the standard interlock, optionally lockable
- **Option:** Installation of cable-type current transformer 4MC7033
 - Arranged on the cable at the panel connection
 - For shielded cables.

Features

- According to IEC 62271-100, VDE 0671-100
- In NXAIR for 15 kV/ 50 kA, also available as generator circuit-breaker according to IEC/IEEE 62271-37-013
- Suitable for all switching duties
- Stored-energy spring mechanism with motor operation; manual operation always possible
- Circuit-breaker also available in combination with withdrawable HV HRC fuses as circuit-breaker/ fuse combination for particularly high demands regarding switching capacity and switching rate (for NXAIR M only)
- Racking the circuit-breaker with manual operating mechanism, optionally with motor operating mechanism
- 64-pole low-voltage plug connection between circuit-breaker and fixed part
- Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles.



SION vacuum circuit-breaker 3AE5 with withdrawable module



Different SION vacuum circuit-breakers on withdrawable part, with contacts

| Electrical data for | | NXAIR | NXAIR | NXAIR M |
|--------------------------------------|--------|---------------|-----------------------------|-------------|
| Rated operating voltage | kV | up to 17.5 | up to 17.5 | 24 |
| Rated short-circuit breaking current | kA | up to 40 | 50 kA | up to 25 |
| Rated short-time withstand current | kA/3 s | up to 40 | 50 | up to 25 |
| Rated short-circuit making current | kA | up to 100/104 | up to 125/130 ¹⁾ | up to 63/65 |
| Rated peak withstand current | kA | up to 100/104 | up to 125/130 ¹⁾ | up to 63/65 |
| Rated normal current | A | up to 3150 | up to 4000 | up to 2500 |
| Endurance class | | E2, M2, C2 | E2, M2, C2 | E2, M2, C2 |

1) Max. 137 kA in combination with generator circuit-breaker according to IEC/IEEE 62271-37-013

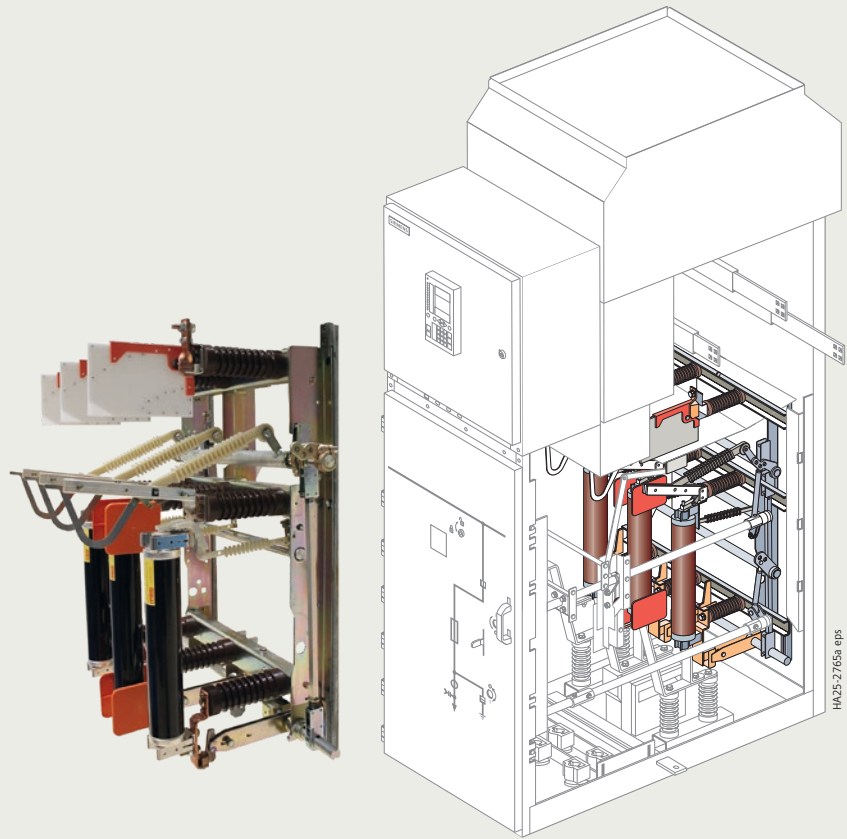
Components

Switch-disconnector/fuse combination (NXAIR)

Features

Switch-disconnector/fuse combination according to IEC 62271-105, VDE 0671-105

- For switching and protecting auxiliary transformers and small distribution transformers up to 1250 kVA
- Fixed-mounted switch-disconnector, endurance classes M1 and E1
- Stored-energy mechanism, manual operating mechanism
- Use of HV HRC fuses with a reference dimension of 442 mm
- With all-pole mechanical tripping through the striker of the HV HRC fuse
- **Option:**
 - Tripping through electrical shunt release
 - Fuse trip indication through signaling switch (electrical)
- Earthing switch with short-circuit making capacity, manual operating mechanism, endurance class MO, E1
- Maintenance-free operating mechanisms under normal ambient conditions and for the max. permissible number of operating cycles.



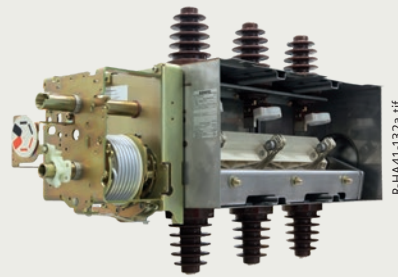
Electrical data for switch-disconnector/fuse combination

| | | | | |
|--|-----|-------------------|-------------------|-------------------|
| Rated voltage | kV | 7.2 | 12 | 17.5 |
| Rated short-circuit breaking current (max.), 3 seconds | kA | 31.5 | 31.5 | 31.5 |
| Rated peak withstand current (max.) | kA | 82 | 82 | 82 |
| Rated short-circuit making current (max.) | kA | 82 | 82 | 82 |
| Rated normal current | A | 200 ¹⁾ | 200 ¹⁾ | 200 ¹⁾ |
| Rated transfer current (max.) | A | 800 | 800 | 800 |
| Transformer rating (max.) | kVA | 500 | 800 | 1250 |
| Earthing switch | | | | |
| Rated short-time withstand current (max.), 1 second | kA | 16 | 16 | 16 |
| Rated peak withstand current (max.) | kA | 40 | 40 | 40 |
| Rated short-circuit making current (max.) | kA | 40 | 40 | 40 |

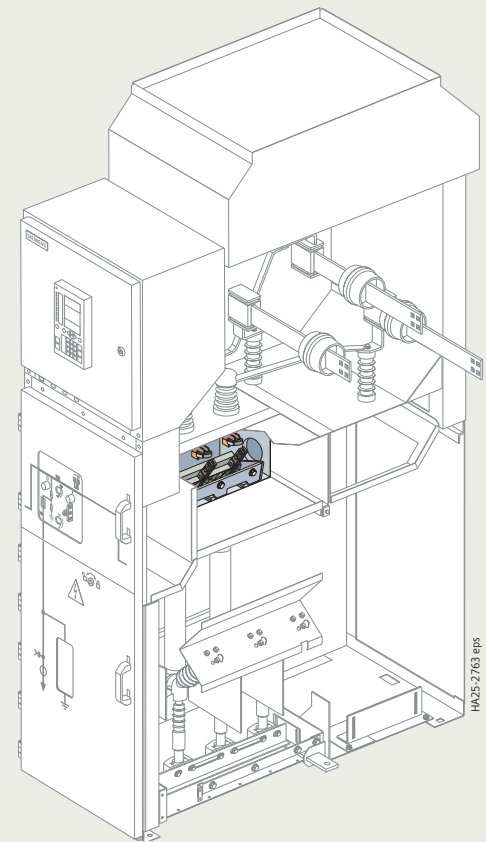
1) Depending on the HV HRC fuses installed

Features

- Switch positions:
CLOSED – OPEN – EARTHED
- Switching function as general-purpose switch-disconnector (class E3) according to IEC 72271-103
- Designed as a three-position switch with the functions
 - Switch-disconnector and
 - Make-proof earthing switch
- Climate-independent switching element in the gas-filled switching-device vessel
- Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles
- Spring-operated/stored-energy mechanism
- Switching movement independent from the operating speed
- The closing and opening springs are both charged during the charging process
- Closing and opening via push-buttons
- **Option:** With electrical shunt release.



R-HA41-132a.tif



HA25-2763-605

Features of HV HRC fuse assembly

- Use in panels with three-position switch-disconnector/fuse combination
- HV HRC fuse-links acc. to DIN 43625 (main dimension) with striker in "medium" version acc. to IEC 60282/VDE 670-4 *)
- As short-circuit protection before transformers
- Requirements according to IEC 62271-105 fulfilled in the high-voltage switch-fuse combination
- Selection of HV HRC fuses for transformers
- Fuse replacement:
 - Only possible when the feeder is earthed
 - Without additional tools
- **Option:** Fuse trip indication through signaling switch (electrical).

*) For standards, see pages 45/46

Electrical data for three-position switch-disconnector/fuse combination

| | | |
|--|-----|---------------------------|
| Rated voltage | kV | 24 |
| Rated short-time withstand current $t_k = 1$ s | kA | up to 25 |
| Rated peak withstand current | kA | up to 63/65 ¹⁾ |
| Rated short-circuit making current | kA | up to 63/65 ¹⁾ |
| Rated normal current | A | up to 200 ²⁾ |
| Endurance class for general-purpose switch | | M1, E3 |
| Endurance class for earthing switch | | M0, E2 |
| Maximum transformer rating | kVA | 2000 |
| Rated transfer current (max.) | A | 1400 |

Electrical data for earthing switch on feeder side downstream from HV HRC fuse

| | | |
|--|----|--------|
| Rated short-time withstand current $t_k = 1$ s | kA | 2 |
| Rated short-circuit making current | kA | 2 |
| Endurance class for earthing switch on feeder side | | M0, E1 |

1) Value applies to 60 Hz

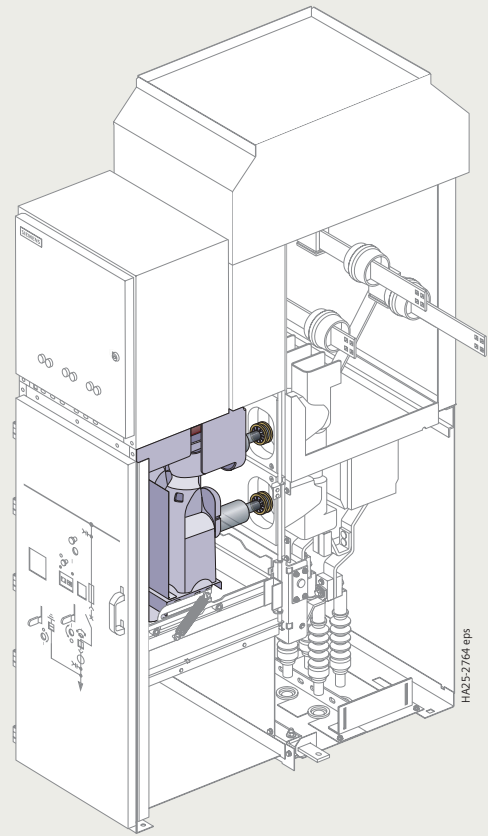
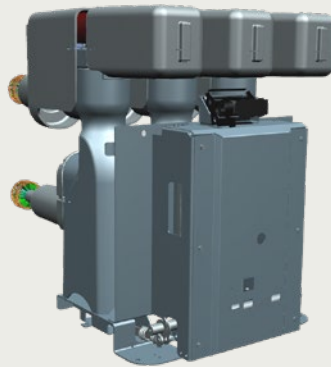
2) Depending on the HV HRC fuses installed

Components

Circuit-breaker/fuse combination (NXAIR M)

Features

- Circuit-breaker/fuse combination according to
 - IEC 62271-107 and
 - VDE 0671-107
- Circuit-breaker on withdrawable part due to requested switching rate $I_n = 10,000$
- For switching and protecting auxiliary transformers up to 2000 kVA
- Racking the circuit-breaker with manual operating mechanism
- Use of HV HRC fuses with a reference dimension of 442 mm
- Maximum rated current of fuse 125 A
- With all-pole mechanical tripping through the striker of the HV HRC fuse
- **Option:** Fuse trip indication through signaling switch (electrical)
- Fuse replacement always outside the panel and without tools
- Confinement of an internal arc to the respective compartment (pressure-resistant partitions), beyond the specifications of the standard.

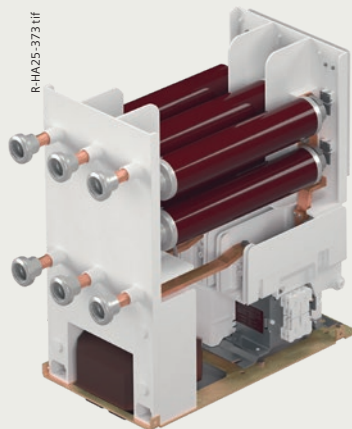


Electrical data for circuit-breaker/fuse combination

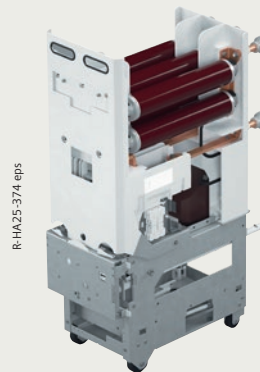
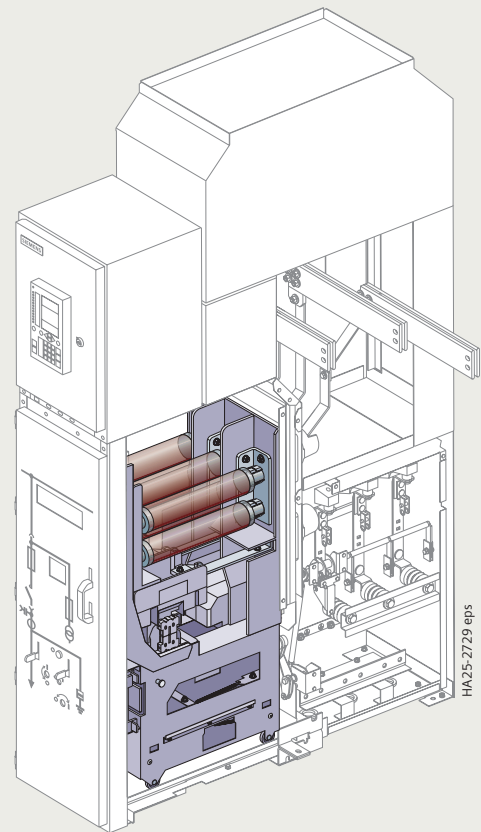
| | | |
|---|----|-------|
| Rated voltage | kV | 24 |
| Rated short-circuit breaking current (max.) | kA | 25 |
| Rated short-time withstand current (3 s) (max.) | kA | 25 |
| Rated short-circuit making current (max.) | kA | 63/65 |
| Rated peak withstand current (max.) | kA | 63/65 |
| Rated normal current of the feeder | A | 800 |
| Rated normal current of the HV HRC fuse (max.) | A | 125 |
| Permissible load current at 40°C (max.) | A | 73 |

Features

- According to IEC 62271-106, VDE 0670-106
- Suitable for operating consumers with high switching rates
- For switching and protecting MV motors up to 3 MW
- 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 connection between contactor and fixed part
- Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles.



Contactor-fuse combination 3TM3



Withdrawable contactor with 3TM3, HV HRC fuses and, if applicable, control transformer

Electrical data for 3TM3 in NXAIR

| | | |
|--|----|-----------------|
| Rated operating voltage | kV | up to 12 |
| Rated short-time withstand current ¹⁾ | kA | up to 8 |
| Rated normal current ²⁾ | A | 450 |
| Number of operating cycles: | | |
| of the contactor, mechanical | | up to 1,000,000 |
| of the interrupters, mechanical | | up to 500,000 |
| of the contactor, electrical I_N | | up to 500,000 |

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

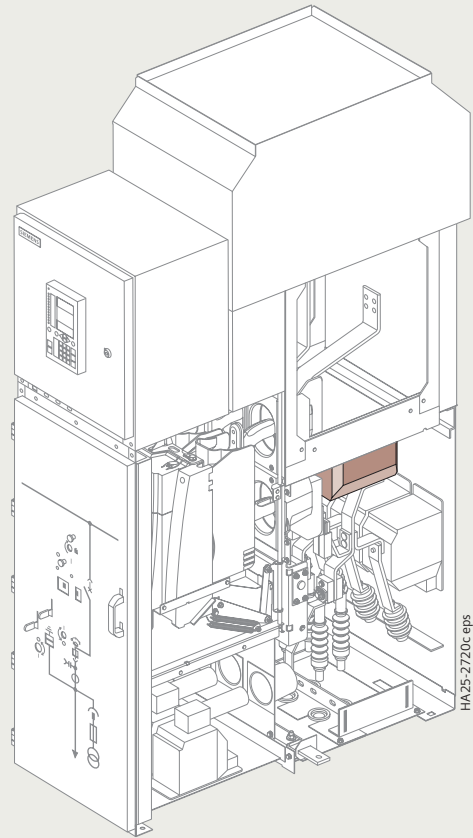
Features

- Inductive indoor support-type current transformer, block type, according to IEC 61869-2, VDE 0414-9-2, standardized, available world-wide
 - Cast-resin insulated
 - Insulation class E
 - Narrow design according to DIN 42600 Part 8
 - **Option:**
 - With coupling electrode for capacitive voltage detecting systems when using bushing-type current transformers
 - Secondary multiratio possible
- Current transformer with type approval and declaration of conformity.



R-HA25-347 eps

Block-type current transformer up to 4000 A



HA25-2720c eps

| Electrical data for | | NXAIR | NXAIR M |
|--------------------------------|------------|-------------------------|------------------|
| Operating voltage | kV | up to 17.5 | 24 |
| Rated primary current | A | up to 4000 | up to 2500 |
| Short-time thermal current | kA | up to 50 | up to 25 |
| Duration of short-time current | s | 1 or 3 | 1 or 3 |
| Rated peak withstand current | kA | up to 130 ¹⁾ | up to 65 |
| Number of secondary cores | nos. | up to 3 | up to 3 |
| Secondary current | A | 1 or 5 | 1 or 5 |
| Accuracy classes | Measuring | 0.2 – 1 FS5/FS10 | 0.2 – 1 FS5/FS10 |
| | Protection | 1 5P/10P | 1 5P/10P |
| Rating | VA | up to 30 | up to 30 |

1) 137 kA possible in combination with generator circuit-breaker

Features

- Inductive principle according to IEC 61869-3, VDE 0414-9-3
 - Cast-resin insulated, single-pole
 - Insulation class E
 - Secondary connection by means of screw-type terminals
 - **Option:**
 - With earth-fault winding
 - Double-pole voltage transformer
 - Secondary multiratio possible.



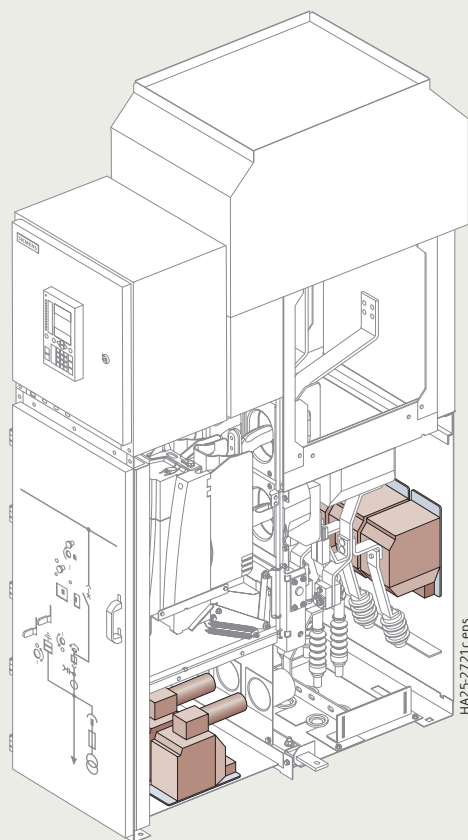
R-HG24-057 ttf

Voltage transformer, fixed-mounted



R-HA25-357 eps

Voltage transformer, withdrawable with primary fuses



HA25-2721c eps

Electrical data for

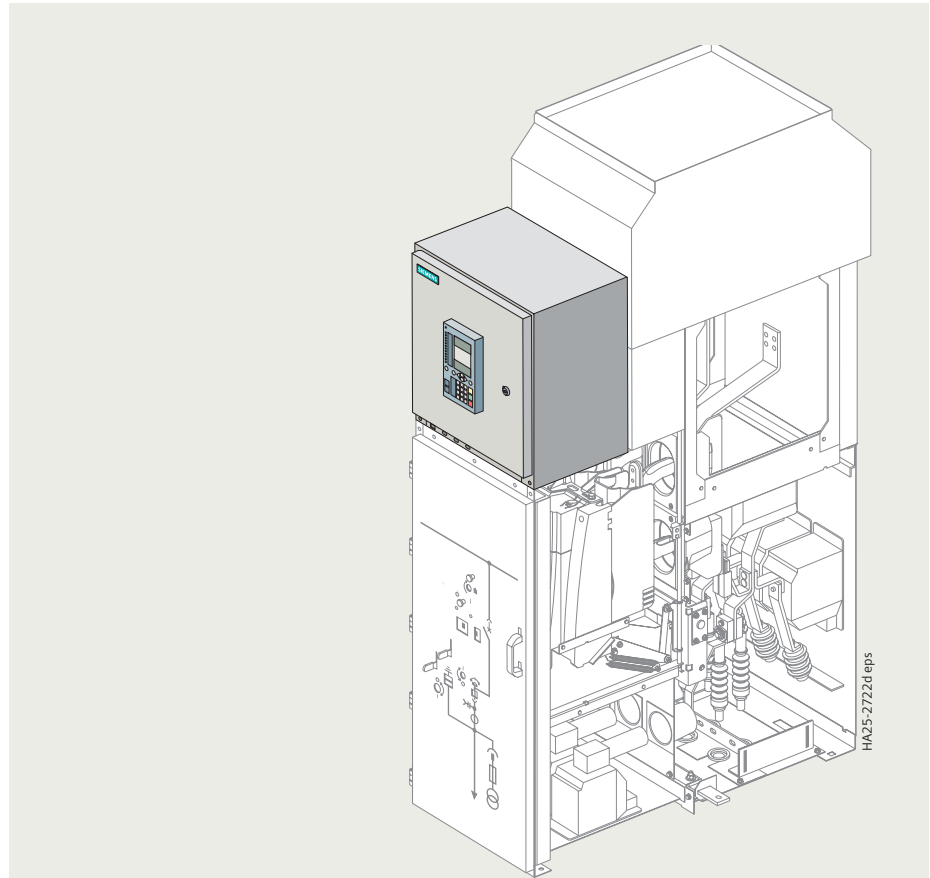
| | |
|-----------------------------|---|
| Primary operating voltage | up to 24 kV |
| Secondary operating voltage | up to 120 V or up to $120 V / \sqrt{3}$ |
| Accuracy classes | 0.2/0.5/1.0 |
| Rating | up to 200 VA |

Components

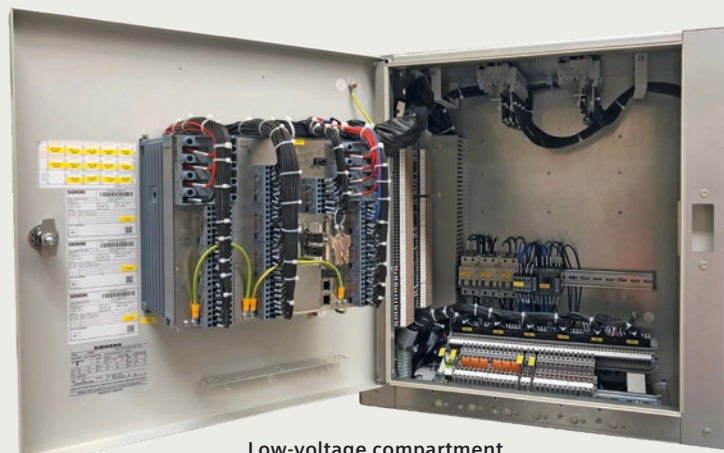
Low-voltage compartment

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, as all bus wires and control cables are plugged in
- **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 wiring 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)

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

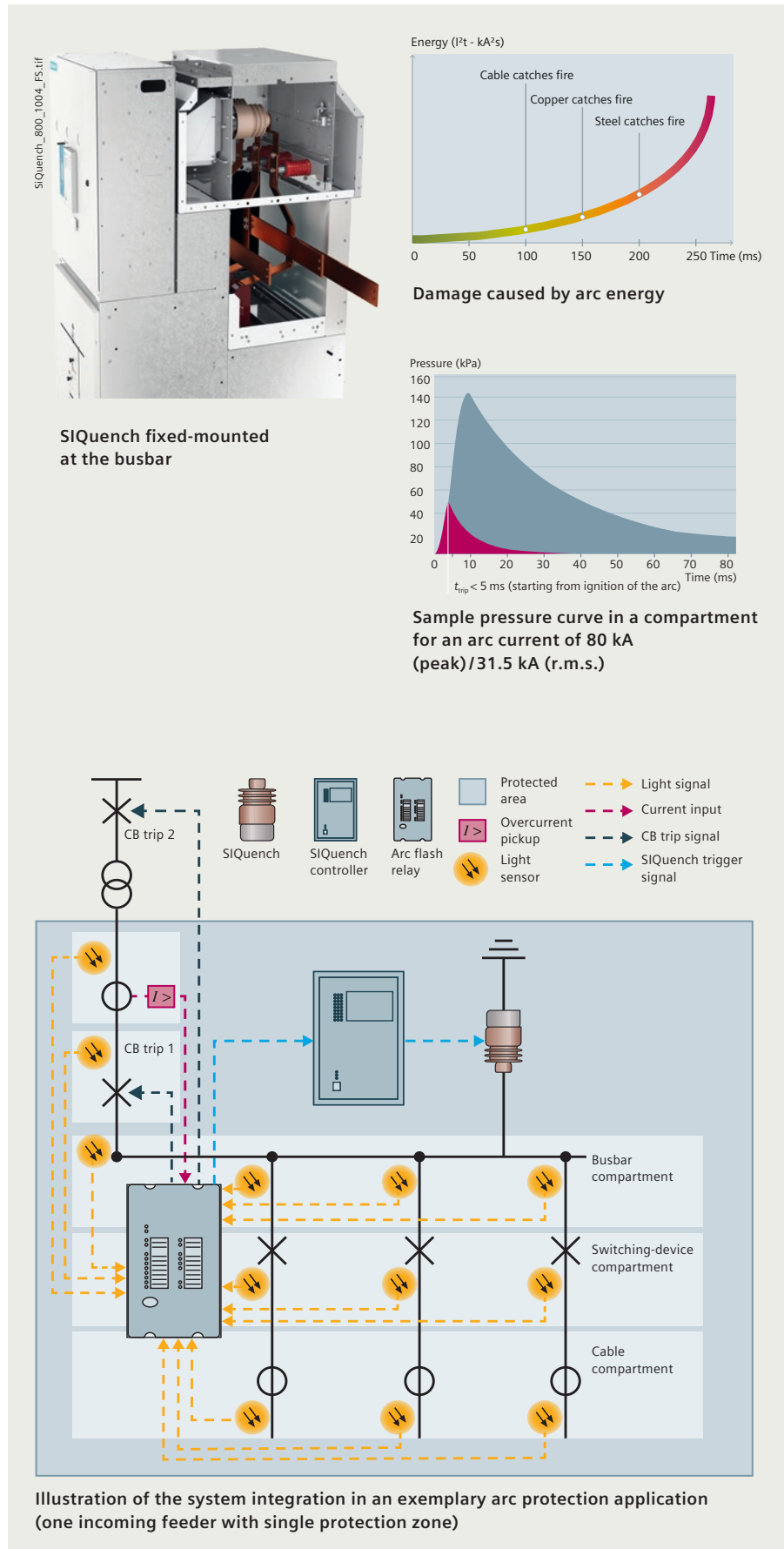
- Basic components
 - SIQuench main switch unit
 - Controller
 - Optical sensors
 - Time-overcurrent protection
- Continuous monitoring of light and overcurrent; in the event of an internal arc, SIQuench earths the switchgear quickly by means of a controlled mechanical 3-phase short circuit
- Definitive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

Technical data

- Up to 17.5 kV, up to 50 kA
- Fast mechanical stored-energy spring mechanism
- Continuous self-monitoring
- 5 switching operations at full rated short-time withstand current (with peak withstand current)
- 30 switching operations without load possible for testing or commissioning purposes
- Maintenance-free for 20 years
- Service life of 30 years as a minimum.

Installation possibilities

- In top box at the busbar (fixed-mounted)
- On withdrawable part
- Factory-assembled and -tested.



Technical data NXAIR

Electrical data



Maximum values 17.5 kV; 40 kA; 4000 A



Maximum values 17.5 kV; 50 kA; 4000 A

| Rated values up to 40 kA | | | | |
|---|---------|------------------|------------------|---------|
| Rated | | | | |
| voltage | kV | 7.2 | 12 | 17.5 |
| frequency | Hz | 50/60 | 50/60 | 50/60 |
| short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth) | kV | 20 ¹⁾ | 28 ¹⁾ | 38 |
| lightning impulse withstand voltage (phase-to-phase, phase-to-earth) | kV | 60 | 75 | 95 |
| short-circuit breaking current | max. kA | 40 | 40 | 40 |
| short-time withstand current, 3 s | max. kA | 40 | 40 | 40 |
| short-circuit making current ²⁾ | max. kA | 100/104 | 100/104 | 100/104 |
| peak withstand current ²⁾ | max. kA | 100/104 | 100/104 | 100/104 |
| normal current of busbar | max. A | 4000 | 4000 | 4000 |
| normal current of feeders: | | | | |
| With circuit-breaker | max. A | 4000 | 4000 | 4000 |
| With withdrawable contactor ³⁾ | max. A | 400 | 400 | – |
| With withdrawable disconnecter link | max. A | 4000 | 4000 | 4000 |
| With switch-disconnector/fuse combination ³⁾⁵⁾ | A | 200 | 200 | 200 |
| Bus sectionalizer | max. A | 4000 | 4000 | 4000 |
| Busbar connection panel | max. A | 4000 | 4000 | 4000 |

| Rated values 50 kA | | | | |
|---|---------|------------------------------|------------------------------|------------------------------|
| Rated | | | | |
| voltage | kV | 7.2 | 12 | 17.5 |
| frequency | Hz | 50/60 | 50/60 | 50/60 |
| short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth) | kV | 20 ¹⁾ | 28 ¹⁾ | 38 |
| lightning impulse withstand voltage (phase-to-phase, phase-to-earth) | kV | 60 | 75 | 95 |
| short-circuit breaking current | max. kA | 50 | 50 | 50 |
| short-time withstand current, 3 s | max. kA | 50 | 50 | 50 |
| short-circuit making current ²⁾ | max. kA | 125/130 137 ⁴⁾ | 125/130 137 ⁴⁾ | 125/130 137 ⁴⁾ |
| peak withstand current ²⁾ | max. kA | 125/130 137 ⁴⁾ | 125/130 137 ⁴⁾ | 125/130 137 ⁴⁾ |
| normal current of busbar | max. A | 4000 | 4000 | 4000 |
| normal current of feeders: | | | | |
| With circuit-breaker | max. A | 4000 | 4000 | 4000 |
| With withdrawable contactor ³⁾ | max. A | 400 | 400 | – |
| With withdrawable disconnecter link | max. A | 4000 | 4000 | 4000 |
| Bus sectionalizer | max. A | 4000 | 4000 | 4000 |
| Busbar connection panel | max. A | 4000 | 4000 | 4000 |

1) 32 kV or 42 kV optional for GOST standard

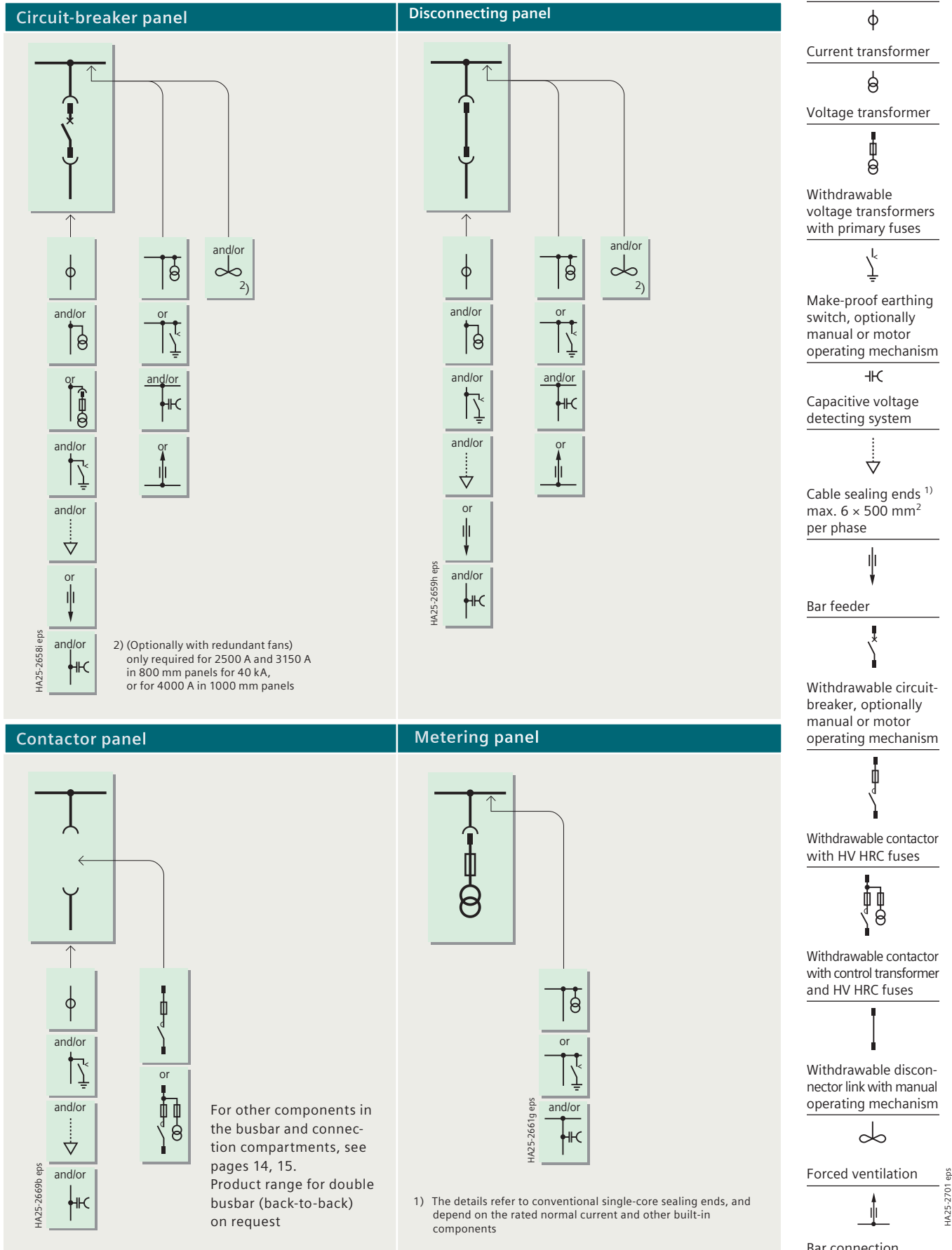
2) Values for 50 Hz: 100 kA or 125 kA
60 Hz: 104 kA or 130 kA

3) Current values dependent on HV HRC fuses,

for GOST standard max. 32 kV short-duration power-frequency withstand voltage

4) 137 kA in combination with 3AK7 generator circuit-breaker

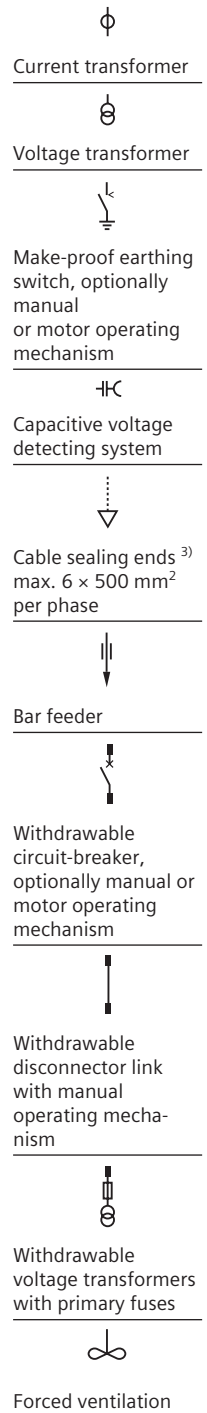
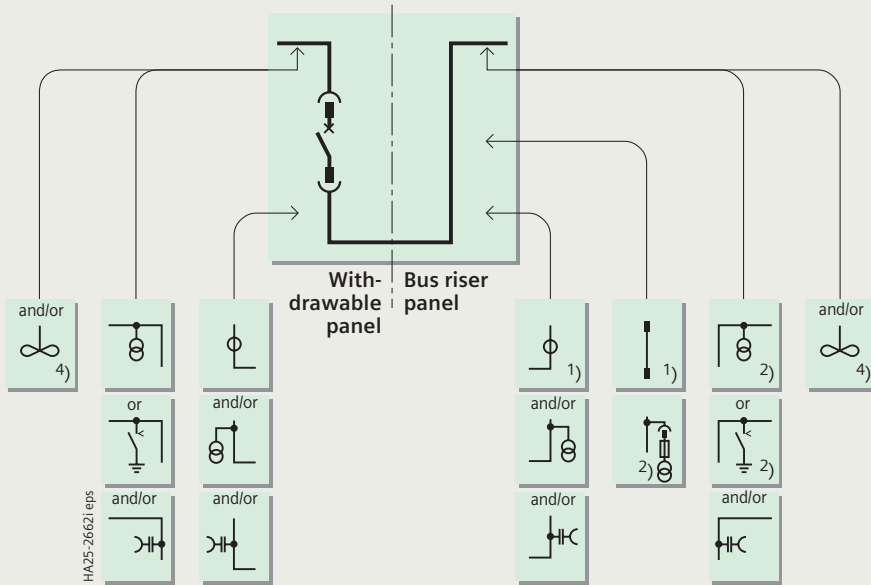
5) Switch-disconnector/fuse combination only up to 31.5 kA



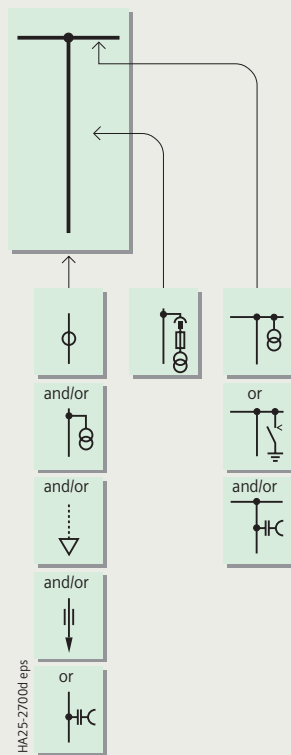
Technical data NXAIR

Product range, switchgear panels

Bus sectionalizer (mirror-image installation also possible)



Busbar connection panel

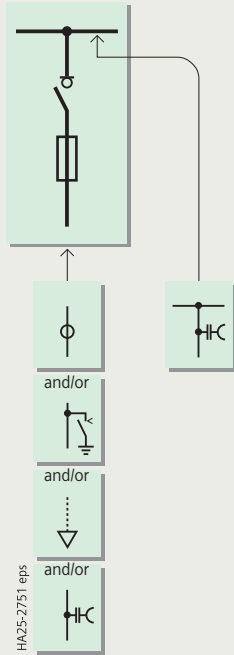


For other components in the busbar and connection compartments, see pages 14, 15.

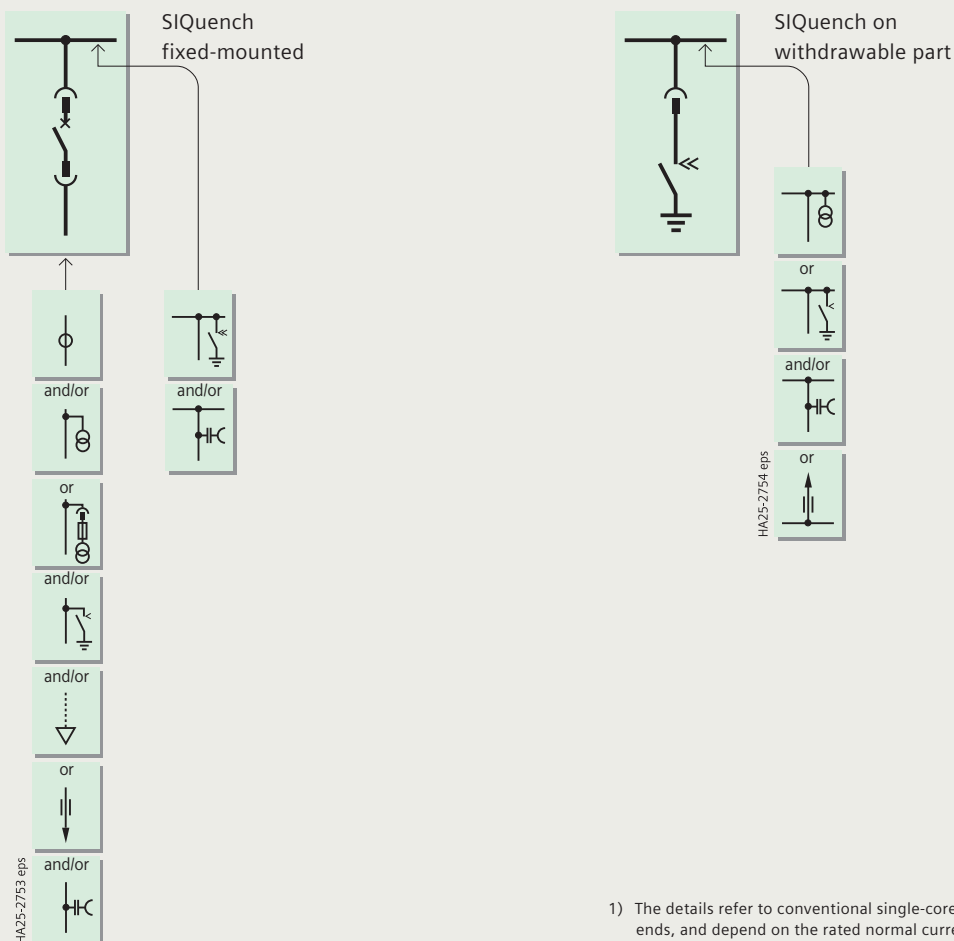
- 1) Current transformers only possible in combination with withdrawable disconnecter link
- 2) In case of withdrawable metering part, voltage transformers and earthing switches on the busbar are not possible
- 3) The details refer to conventional single-core sealing ends, and depend on the rated normal 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

HA25-2701 eps

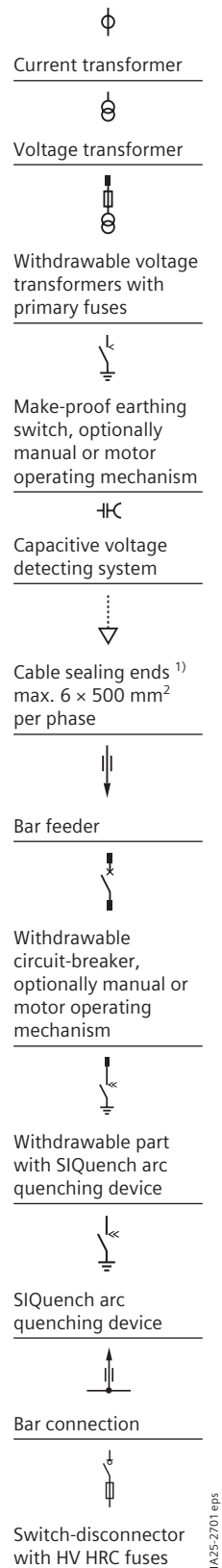
Switch-disconnector panel with HV HRC fuses



Switchgear panels with SIQuench arc quenching device



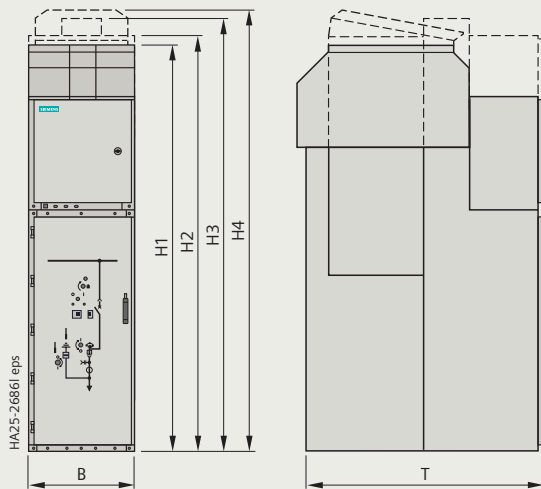
1) The details refer to conventional single-core sealing ends, and depend on the rated normal current and other built-in components.



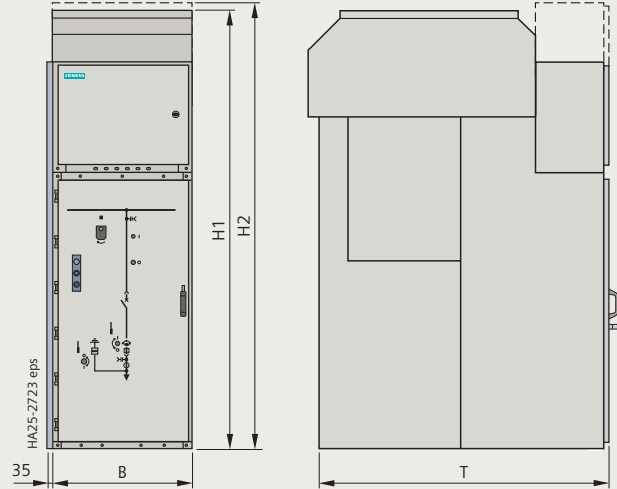
Technical data NXAIR

Dimensions

NXAIR ≤ 17.5 kV



NXAIR ≤ 17.5 kV; ≤ 40 kA; ≤ 4000 A



NXAIR ≤ 17.5 kV; 50 kA; ≤ 4000 A

| | Panel type | Rated normal current A | Short-time withstand current | | | |
|---|---------------------|---|------------------------------|--------------------|------------------------|------|
| | | | ≤ 31.5 kA mm | 40 kA mm | 50 kA mm | |
| Width | B | Circuit-breaker panel, disconnecting panel | 630 | 600 ⁴⁾ | – | – |
| | | | 1000 | 600 ⁴⁾ | 800 | – |
| | | | 1250 | 800 | 800 | 800 |
| | | | 2000 | 800 | 800 | – |
| | | | 2500 | 1000 | 800/1000 ¹⁾ | 1000 |
| | | | 3150 | 1000 | 800/1000 ¹⁾ | 1000 |
| Bus sectionalizer | 1250 | 2 × 800 | 2 × 800 | 2 × 800 | | |
| | ≥ 2500 | 2 × 1000 | 2 × 1000 | 2 × 1000 | | |
| Metering panel | – | 800 | 800 | 800 | | |
| Contactactor panel | ≤ 400 ⁶⁾ | 435 | 435 | 435 | | |
| Switch-disconnector panel with HV HRC fuses | ≤ 200 ⁶⁾ | 800 | – | – | | |
| Height | H1 | Standard panel or standard panel with natural ventilation | 2300 | 2300 | 2500 | |
| | H2 | With higher low-voltage compartment or additional compartment for busbar components | 2350 | 2350 | 2550 | |
| | H3 | With forced ventilation | 2450 | 2450 | 2650 | |
| | H4 | With optional arc absorber ³⁾ for 12 kV, > 25 kA, or generally for 17.5 kV | 2500 | 2500 | 2680 | |
| Depth | T | Single busbar, all panel types (except contactactor panel) | 1350 ⁵⁾ | 1500 ⁵⁾ | 1650 | |
| | | Contactactor panel | 1400 | 1500 | 1650 | |

1) 800 mm with forced ventilation

2) Dependent on rated normal current and design of bus riser panel

3) Number of absorbers depending on switchgear configuration

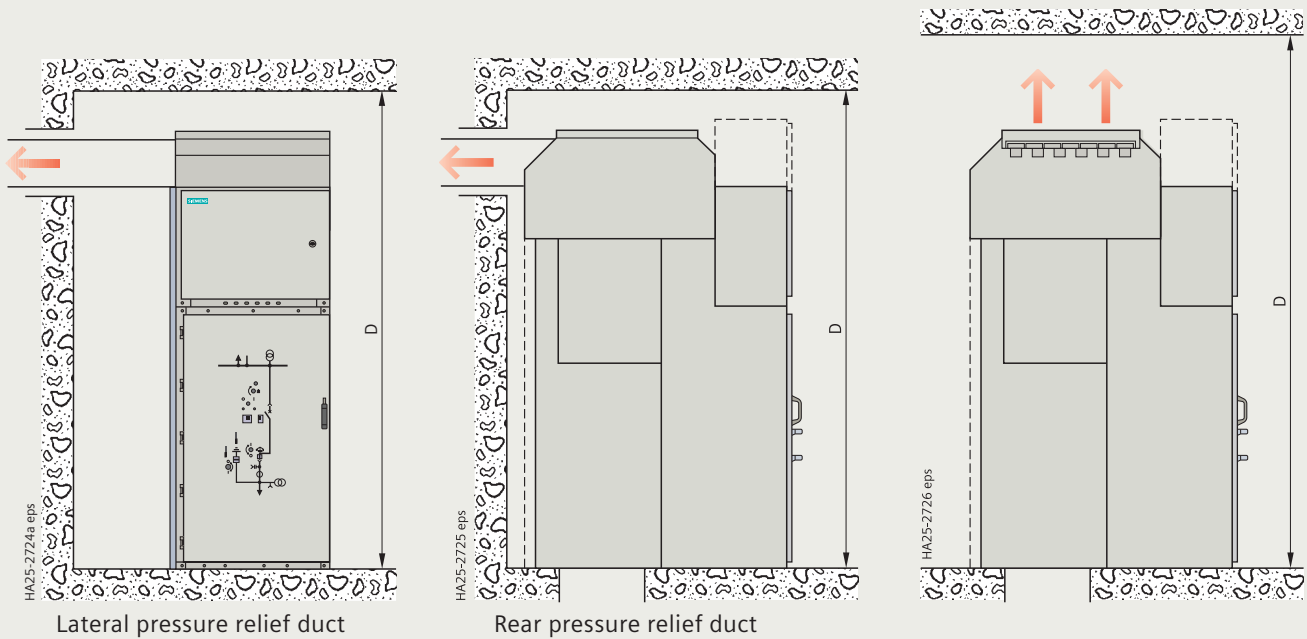
4) Disconnecting panel not in 600 mm

5) Panels with a rated normal current of 3150 A or 4000 A in a depth of 1540 mm

6) Depending on the HV HRC fuses installed

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

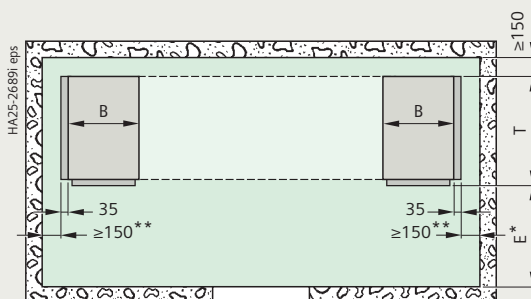
Pressure relief into the switchgear room through absorbers



| Type of pressure relief | Rated voltage kV | Ceiling height D at a short-circuit current of | | | |
|---|---------------------|--|------------------|------------------|------------------|
| | | 25 kA mm | 31.5 kA mm | 40 kA mm | 50 kA mm |
| Pressure relief into the switchgear room through absorbers | 12 17.5 | ≥ 2800 ≥ 3500 | ≥ 3000 ≥ 3500 | ≥ 3500 ≥ 3500 | ≥ 3500 ≥ 3500 |
| Pressure relief out of the switchgear room through a pressure relief duct ¹⁾ | ≤ 17.5 | ≥ 2500 | ≥ 2500 | ≥ 2500 | ≥ 2700 |

¹⁾ For designs with a closed pressure relief duct to the outside, a distance of ≥ 500 mm is required on this side for installation

Wall-standing arrangement for single busbar



All panels with cable connection at the front

* Control aisle E depending on national requirements:

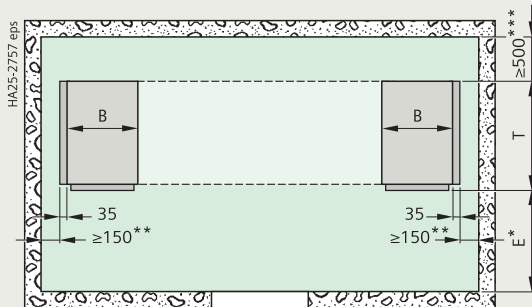
- For replacement of switching devices
≥ 1250 mm recommended (≤ 40 kA)
- ≥ 1350 mm recommended (50 kA)

- For extension / panel replacement
≥ 1700 mm recommended (≤ 40 kA)
- ≥ 1800 mm recommended (50 kA)

** Lateral wall distances on the left or on the right:

- ≥ 150 mm recommendable (acc. to IEC 62271-200)
- For installation and maintenance (acc. to IEC 61936-1)
≥ 500 mm recommendable

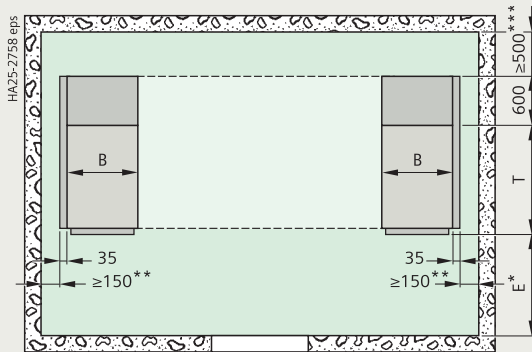
Free-standing arrangement for single busbar



All panels with cable connection at the front or at the rear

- * Control aisle E depending on national requirements:
 - For replacement of switching devices
 - ≥ 1250 mm recommended (≤ 40 kA)
 - ≥ 1350 mm recommended (50 kA)
 - For extension / panel replacement
 - ≥ 1700 mm recommended (≤ 40 kA)
 - ≥ 1800 mm recommended (50 kA)
- ** Lateral wall distances on the left or on the right:
 - ≥ 150 mm recommended (acc. to IEC 62271-200)
 - For installation and maintenance (acc. to IEC 61936-1)
 - ≥ 500 mm recommendable
- *** ≥ 500 mm aisle for installation and maintenance (acc. to IEC 61936-1)
- ≥ 800 mm aisle for operation (acc. to IEC 62271-200)

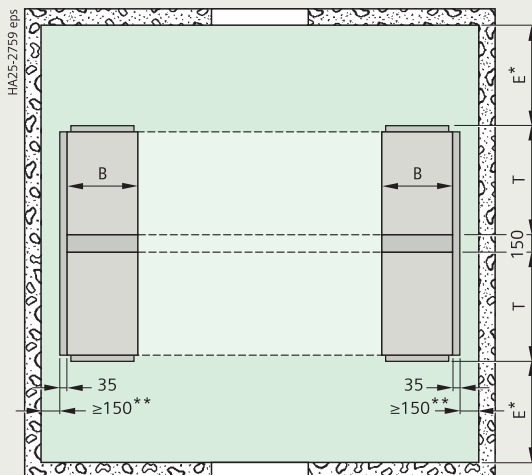
Free-standing arrangement for single busbar



All panels with top-rear cable connection and rear cable duct

- * Control aisle E depending on national requirements:
 - For replacement of switching devices
 - ≥ 1250 mm recommended (≤ 40 kA)
 - For extension / panel replacement
 - ≥ 1700 mm recommended (≤ 40 kA)
 - ≥ 1800 mm recommended (50 kA)
 - ** Lateral wall distances on the left or on the right:
 - ≥ 150 mm recommended (acc. to IEC 62271-200)
 - For installation and maintenance (acc. to IEC 61936-1)
 - ≥ 500 mm recommendable
 - *** ≥ 500 mm aisle for installation and maintenance (acc. to IEC 61936-1)
 - ≥ 800 mm aisle for operation (acc. to IEC 62271-200)

Free-standing arrangement for Duplex design (back-to-back)



All panels with cable connection at the front

- * Control aisle E depending on national requirements:
 - For replacement of switching devices
 - ≥ 1250 mm recommended (≤ 40 kA)
 - ≥ 1350 mm recommended (50 kA)
 - For extension / panel replacement
 - ≥ 1700 mm recommended (≤ 40 kA)
 - ≥ 1800 mm recommended (50 kA)
- ** Lateral wall distance ≥ 150 mm optionally possible on the left or on the right:
 - ≥ 500 mm aisle for installation and maintenance (acc. to IEC 61936-1)
 - ≥ 800 mm aisle for operation (acc. to IEC 62271-200)
 - ≥ 1000 mm for panel replacement (panels of 435 mm, 600 mm, 800 mm)
 - ≥ 1200 mm for panel replacement (panels of 1000 mm)

Features

- Special design for application in marine and offshore areas, based on the NXAIR standard product range
- Available up to 12 kV, up to 40 kA, and up to 2500 A
- Factory-assembled, metal-enclosed and type-tested switchgear according to IEC 62271-200
- Type approvals from DNV-GL and LRS
- Internal arc classification IAC A FLR up to 40 kA for 1 second
- Pressure relief into the switchgear room through absorbers and exhaust, with an optimized ceiling height of 2700 mm
- Compact design and low panel heights allow for installation even in rooms with a low ceiling height or in rooms with girders
- Degrees of protection IP31, IP32, IP41 or IP42 are possible
- Verification by an inclination test with an inclination angle of $\pm 22.5^\circ$ in all directions
- Verification of vibration or shock tests in conformity with the main shipping registers
- Operation possible at ambient air temperatures from -5°C to $+55^\circ\text{C}$
- For temperature supervision of cable connections, IR-permeable inspection windows or wireless temperature sensors can optionally be used
- Minimum use of insulating material as well as halogen-free wires reduce the possible fire load.

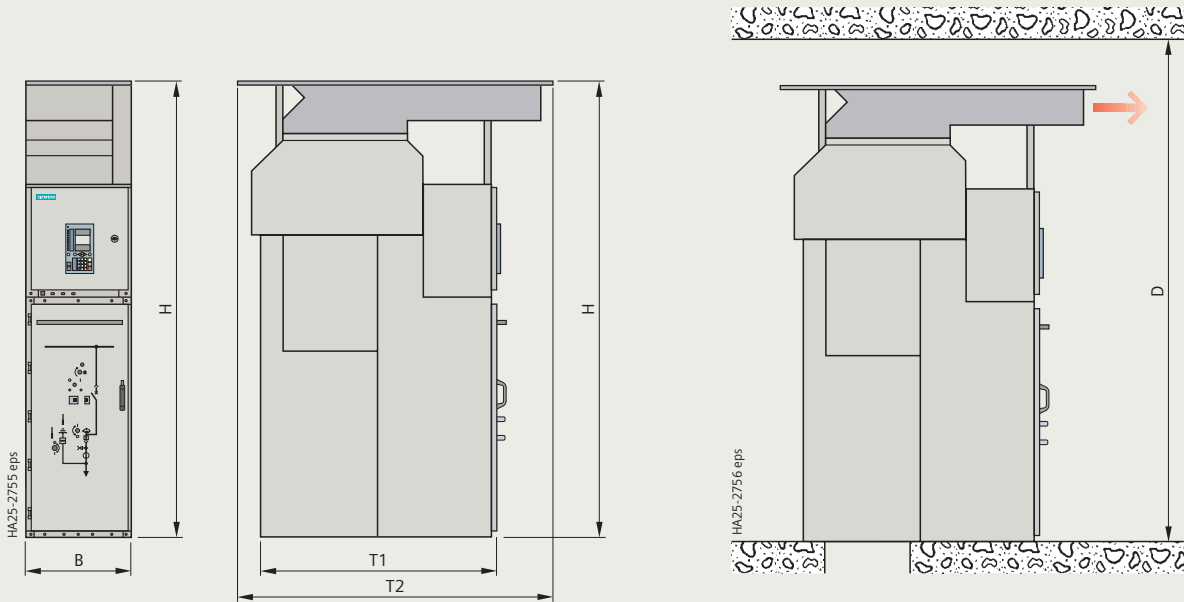


Technical data NXAIR

Typical for marine / offshore

Dimensions

Pressure relief into the switchgear room through absorbers



NXAIR ≤ 12 kV; ≤ 40 kA; ≤ 2500 A with roof
for upgrading the degree of protection IPX1/IPX2

| | Panel type | Rated normal current A | Short-time withstand current | |
|-------------|---|---------------------------|------------------------------|-----------------------------------|
| | | | ≤ 31.5 kA mm | 40 kA mm |
| Width B | Circuit-breaker panel, disconnecting panel | 630 | 600 ³⁾ | – |
| | | 1000 | 600 ³⁾ | 800 |
| | | 1250 | 800 | 800 |
| | | 1600 | 800 | – |
| | | 2500 | 1000 | 800/1000 ¹⁾ |
| Height H | Bus sectionalizer | 1250 | 2 × 800 | 2 × 800 |
| | | 2500 | 2 × 1000 | 2 × 1000 2 × 800 ²⁾ |
| | | – | 800 | 800 |
| | | ≤ 400 | 435/600 | 435/600 |
| | | ≤ 200 ⁵⁾ | 800 | – |
| Depth T1 | Single busbar, all panel types (except contactor panel) | | 1350 ⁴⁾ | 1500 ⁴⁾ |
| | | Contactor panel | 1400 | 1500 |
| Depth T2 | Single busbar, all panel types with roof for IPX1/IPX2 | | 1820 | 1970 |

1) 800 mm with forced ventilation

2) Dependent on rated normal current and design of bus riser panel

3) Disconnecting panel not in 600 mm

4) Panels with a rated normal current of 3150 A or 4000 A in a depth of 1540 mm

5) Depending on the HV HRC fuses used

| Type of pressure relief | Rated voltage | Ceiling height D in mm for short-circuit current | | |
|--|---------------|--|-------------|-------------|
| | | 25 kA | 31.5 kA | 40 kA |
| Pressure relief into the switchgear room through absorbers | 12 kV | ≥ 2700 | ≥ 2700 | ≥ 2700 |

Single-row arrangement (plan view) for single-busbar switchgear, see pages 31 and 32

Transport

NXAIR switchgear is delivered in form of individual panels. The following must be observed:

- 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 film.

Means of transport: Ship

- Panels on pallets
- Sealed in PE protective film, with closed wooden box
- 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 film.

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

NXAIR up to 40 kA

Transport dimensions, transport weights¹⁾ for individual panels

| Panel spacings | Transport dimensions width × height × depth | Transport weight | |
|----------------|--|------------------|-----------------|
| | | with packing | without packing |
| mm | mm × mm × mm | approx. kg | approx. kg |

Transport by rail or truck

| | | | |
|------------------------|--------------------|------|------|
| 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 × 1000 ²⁾ | 1200 × 2510 × 1610 | 1690 | 1650 |

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 × 1000 ²⁾ | 1220 × 2541 × 1830 | 1810 | 1650 |

NXAIR up to 50 kA

Transport dimensions, transport weights¹⁾ for individual panels

| Panel spacings | Transport dimensions width × height × depth | Transport weight | |
|----------------|--|------------------|-----------------|
| | | with packing | without packing |
| mm | mm × mm × mm | approx. kg | approx. kg |

Transport by rail or truck

| | | | |
|------------------------|--------------------|------|------|
| 1 × 435 | 800 × 2650 × 1850 | 820 | 780 |
| 1 × 800 | 1000 × 2650 × 1850 | 1400 | 1350 |
| 1 × 1000 | 1200 × 2650 × 1850 | 1460 | 1400 |
| 1 × 1000 ²⁾ | 1200 × 2650 × 1850 | 1760 | 1700 |

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 × 1000 ²⁾ | 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 NXAIR M

Electrical data



Maximum values 24 kV; 25 kA; 2500 A

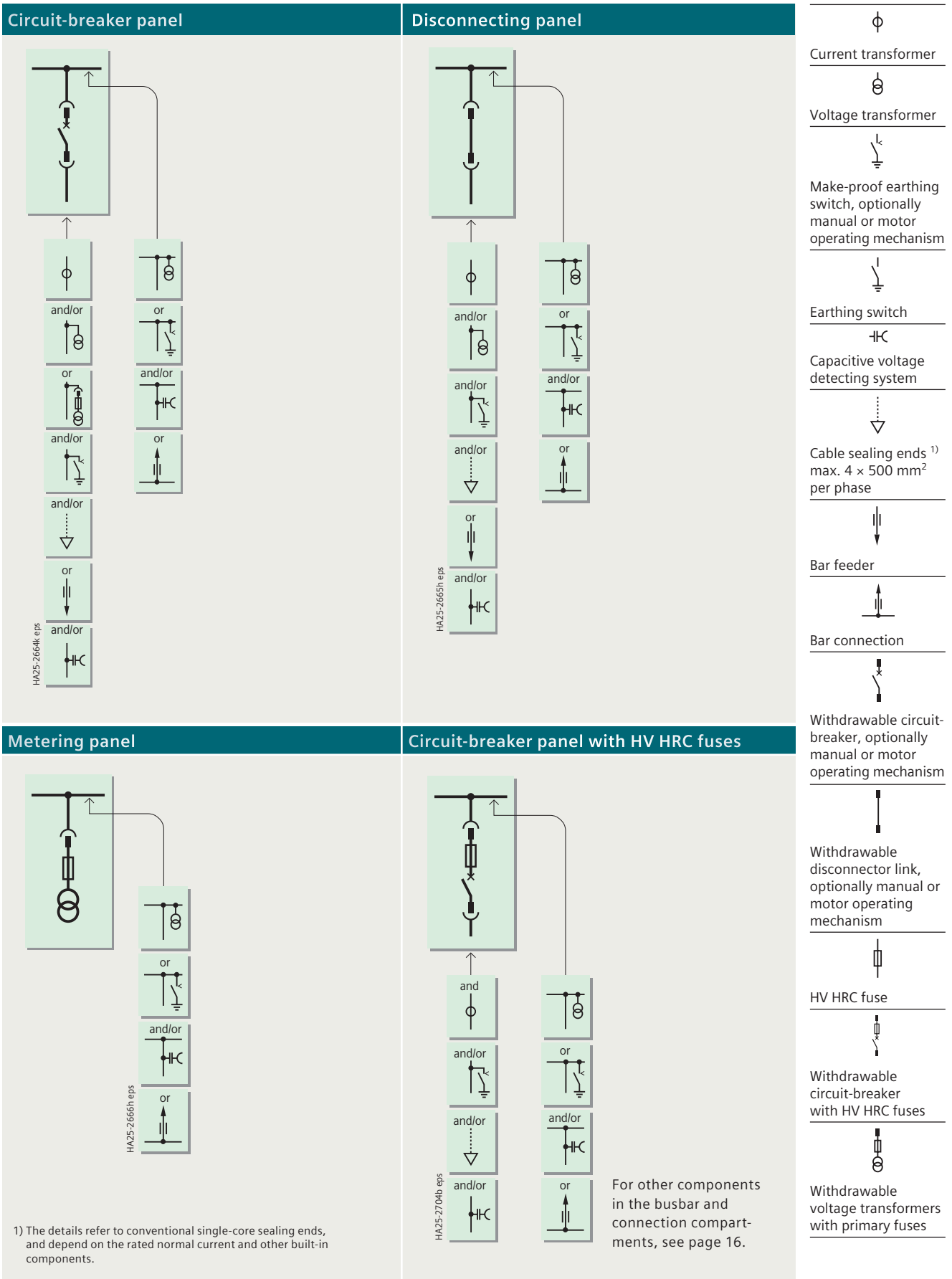


Motor-operated panel

| Rated values | | |
|---|---------|------------------|
| Rated | | |
| voltage | kV | 24 |
| frequency | Hz | 50/60 |
| short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth) | kV | 50 ¹⁾ |
| lightning impulse withstand voltage (phase-to-phase, phase-to-earth) | kV | 125 |
| short-circuit breaking current | max. kA | 25 |
| short-time withstand current, 3 s | max. kA | 25 |
| short-circuit making current ²⁾ | max. kA | 63/65 |
| peak withstand current ²⁾ | max. kA | 63/65 |
| normal current of busbar | max. A | 2500 |
| normal current of feeders: | | |
| With circuit-breaker | max. A | 2500 |
| With withdrawable disconnector link | max. A | 2500 |
| With circuit-breaker/fuse combination | max. A | 800 |
| With three-position switch-disconnector/fuse combination | max. A | 200 |
| Bus sectionalizer | max. A | 2500 |

1) 65 kV optional for GOST standard

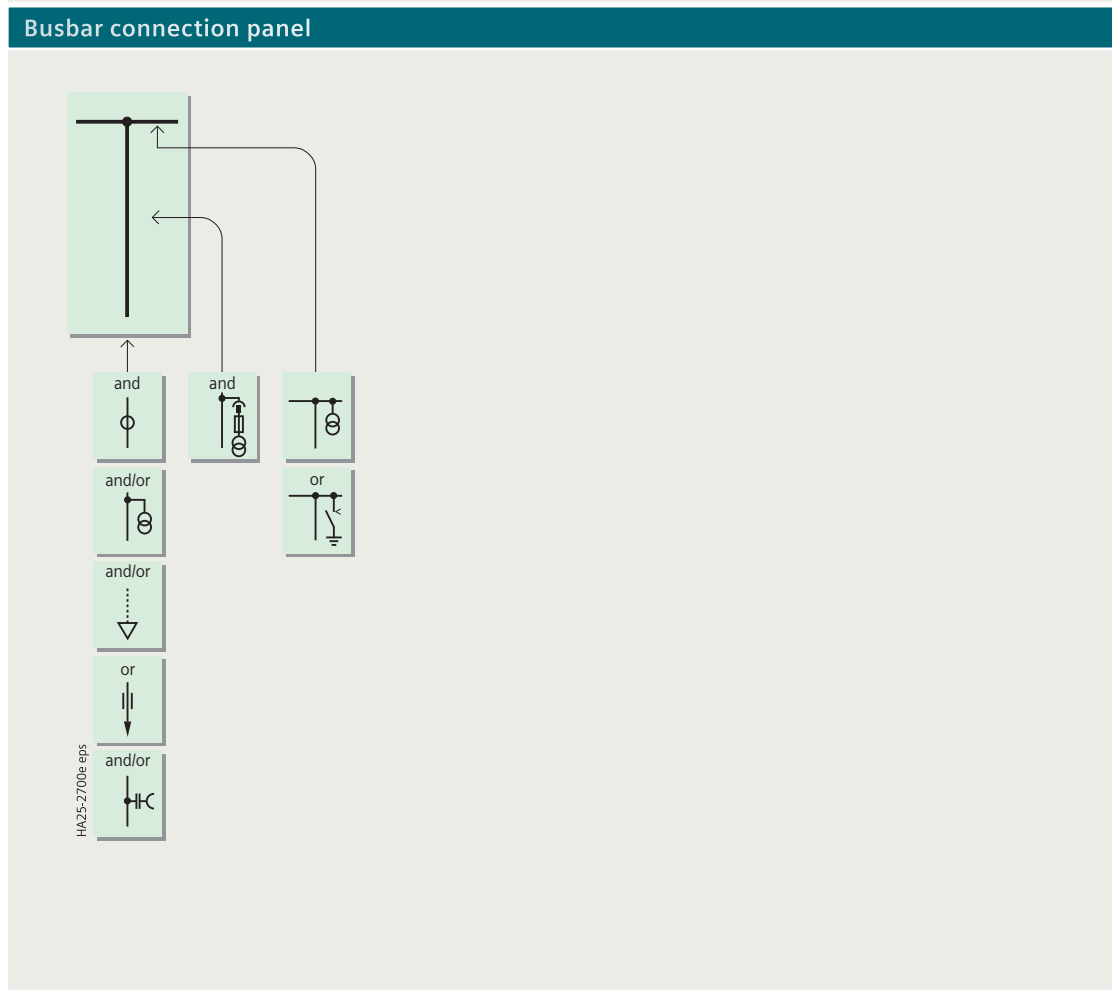
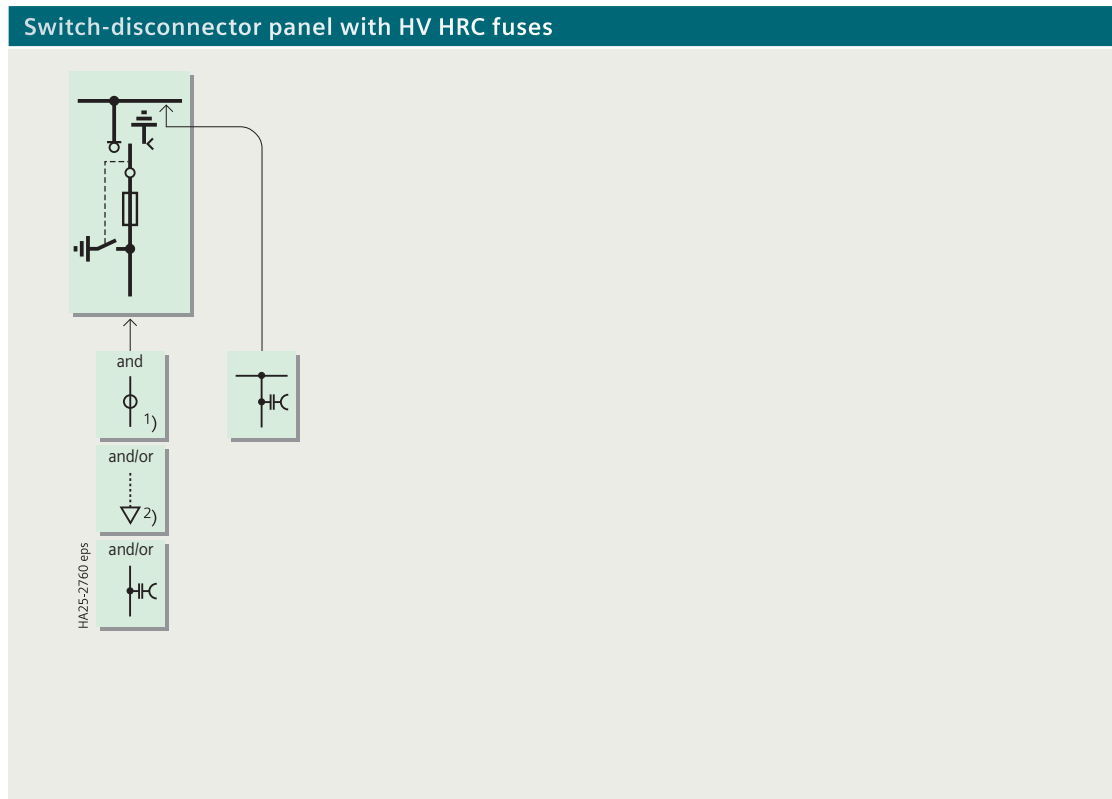
2) Values for 50 Hz: 63 kA, 60 Hz: 65 kA



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

Technical data NXAIR M

Product range, switchgear panels



- ϕ

- Current transformer
- Θ

- Voltage transformer
- \downarrow^k

- Make-proof earthing switch, optionally manual or motor operating mechanism
- HC

- Capacitive voltage detecting system
- ⋮
 ∇

- Cable sealing ends ²⁾
max. 1 × 120 mm²
per phase

- ⏚

- Bar feeder
- Θ

- Withdrawable voltage transformers with primary fuses
- \downarrow^k

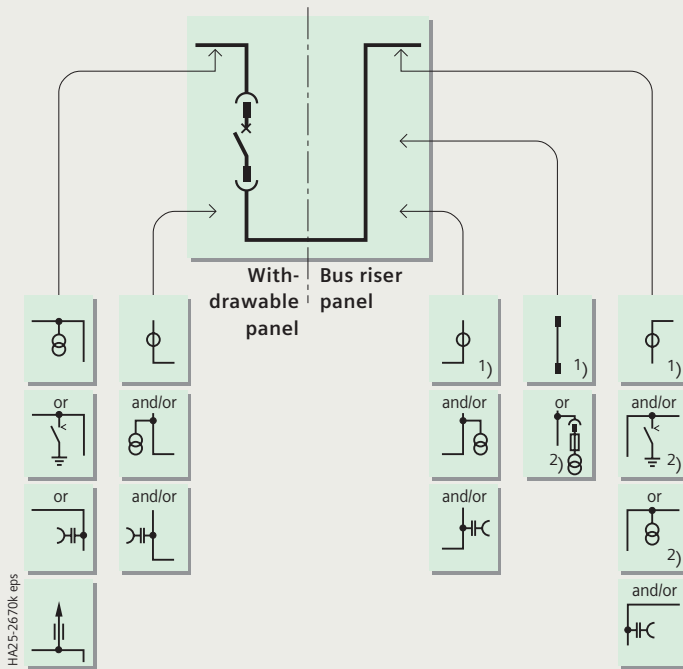
- Three-position switch-disconnector
- HC

- HV HRC fuse
- HC

- Discharge switch
- $\phi_{1)}$

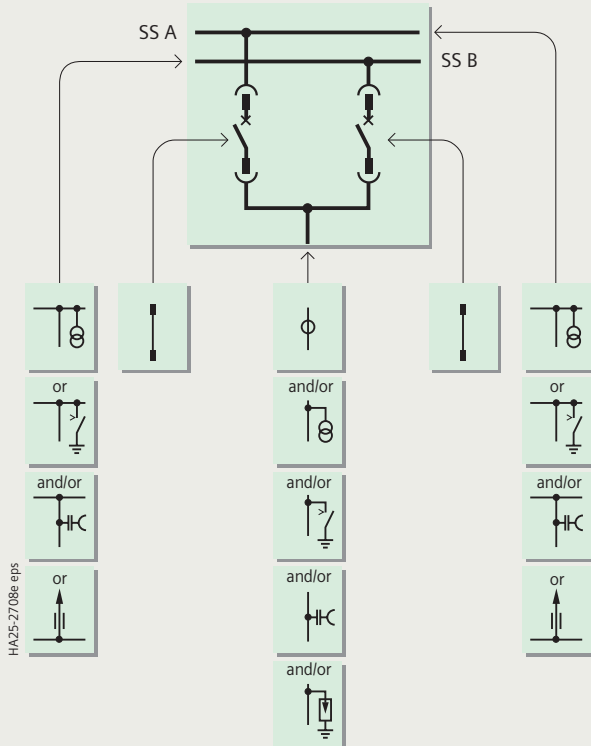
- Cable-type current transformer,
4MC7033

Bus sectionalizer (mirror-image installation also possible)

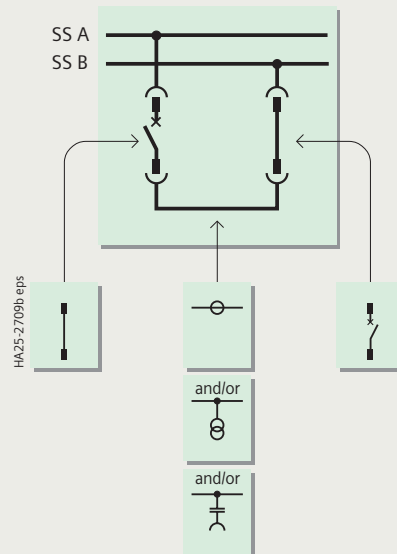


- ϕ
Current transformer
- Voltage transformer
- Make-proof earthing switch, optionally manual or motor operating mechanism
- HC
Capacitive voltage detecting system
- Withdrawable circuit-breaker, optionally manual or motor operating mechanism
- Withdrawable disconnecter link, optionally manual or motor operating mechanism

Double busbar (back-to-back arrangement) Circuit-breaker panel (incoming sectionalizer)



Bus coupler



- Withdrawable voltage transformers with primary fuses
- Surge arresters / surge limiters
- Bar connection

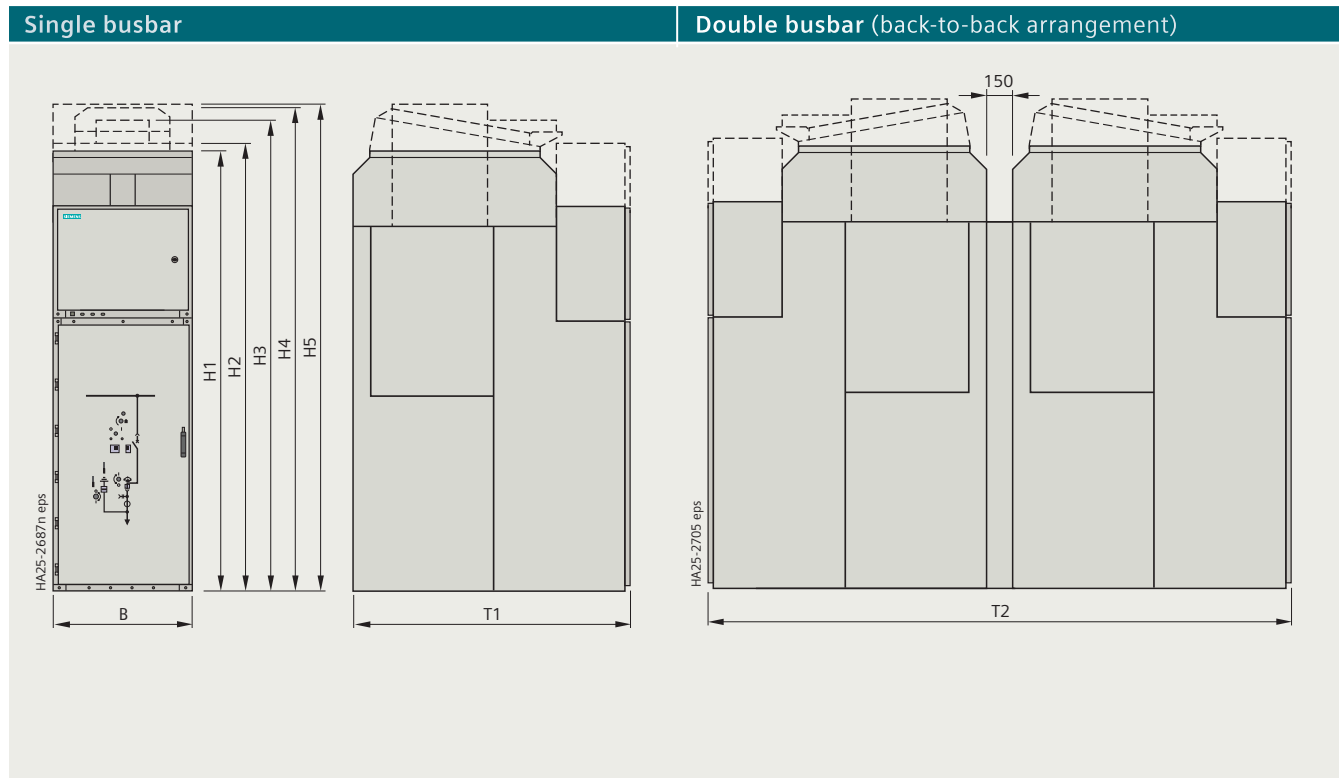
For other components in the busbar and connection compartments, see page 16.

- 1) Current transformers only possible in combination with withdrawable disconnecter link
- 2) In case of withdrawable metering part, voltage transformers and earthing switches on the busbar are not possible
- 3) Capacitive voltage detecting system only possible in combination with withdrawable disconnecter link

SS A = Busbar A
SS B = Busbar B

Technical data NXAIR M

Dimensions



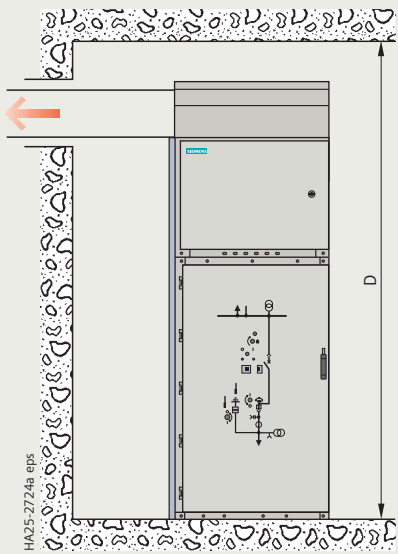
| | Panel type | Rated normal current | Short-time withstand current | | | |
|--------|---|---|------------------------------|---------------------|---------------------|------|
| | | | 16 kA | 20 kA | 25 kA | |
| | | A | mm | mm | mm | |
| Width | B | Circuit-breaker panel, disconnecting panel | 800 | 800 | 800 | 800 |
| | | | 1000 | 800 | 800 | 800 |
| | | | 1250 | 800 | 800 | 800 |
| | | | 2000 | 1000 | 1000 | 1000 |
| | | | 2500 | 1000 | 1000 | 1000 |
| | Bus sectionalizer | 1250 ≤ 2500 | 2 × 800 2 × 1000 | 2 × 800 2 × 1000 | 2 × 800 2 × 1000 | |
| | Metering panel | – | 800 | 800 | 800 | |
| | Circuit-breaker panel with HV HRC fuses | 800 ²⁾ | 800 | 800 | 800 | |
| | Busbar connection panel | 1250 2500 | 800 1000 | 800 1000 | 800 1000 | |
| | Switch-disconnector panel with HV HRC fuses | 200 | 800 | 800 | 800 | |
| Height | H1 | Standard panel | | 2510 | 2510 | 2510 |
| | H2 | With higher low-voltage compartment | | 2550 | 2550 | 2550 |
| | H3 | With natural ventilation | | 2700 | 2700 | 2700 |
| | H4 | With optional arc absorber ¹⁾ | | 2750 | 2750 | 2750 |
| | H5 | With additional compartment for busbar components | | 2770 | 2770 | 2770 |
| Depth | T1 | Single busbar | | 1600 | 1600 | 1600 |
| | T2 | Double busbar | | 3350 | 3350 | 3350 |

1) Number of absorbers depending on switchgear configuration

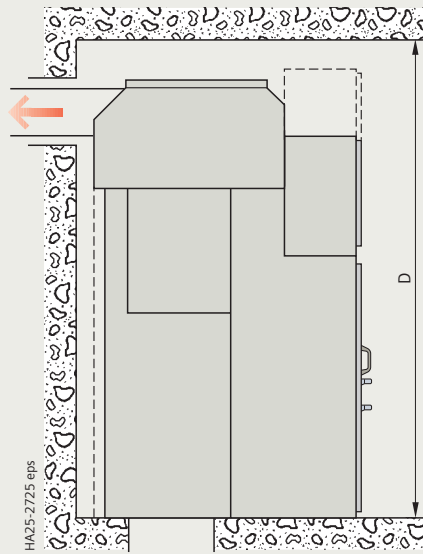
2) Depending on the HV HRC fuses installed

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

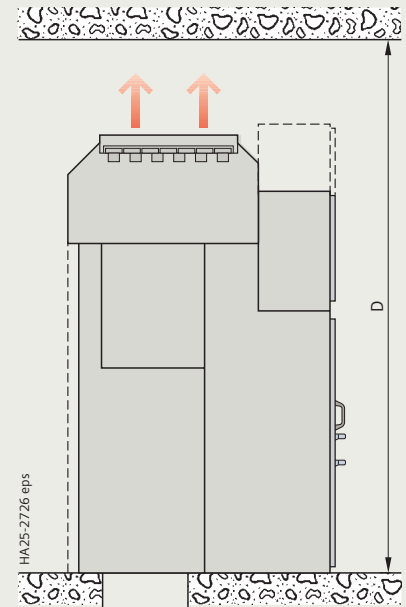
Pressure relief into the switchgear room through absorbers



Lateral pressure relief duct



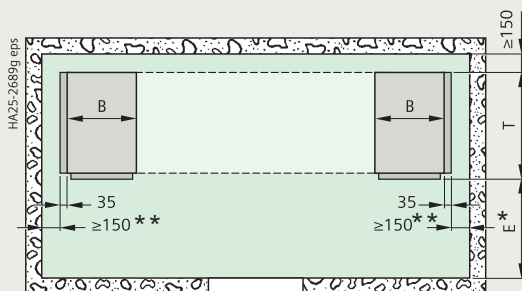
Rear pressure relief duct



| 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 ¹⁾ |

1) For designs with a closed pressure relief duct to the outside, a distance of ≥ 500 mm is required on this side for installation
In case of a lower ceiling height, please contact your Siemens partner

Wall-standing arrangement for single busbar



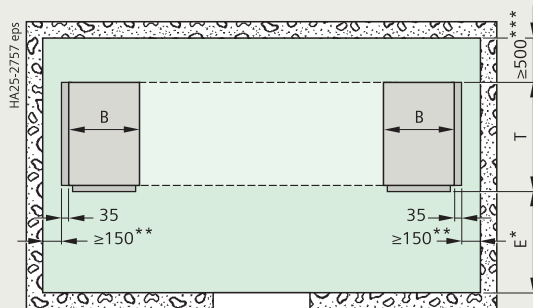
All panels with cable connection at the front

- * Control aisle E depending on national requirements:
 - For extension / panel replacement ≥ 1800 mm recommended
 - For replacement of switching devices ≥ 1350 mm recommended
- ** Lateral wall distances on the left or on the right:
 - ≥ 150 mm recommended (acc. to IEC 62271-200)
 - For installation and maintenance ≥ 500 mm recommendable (acc. to IEC 61936-1)

Technical data NXAIR M

Room planning

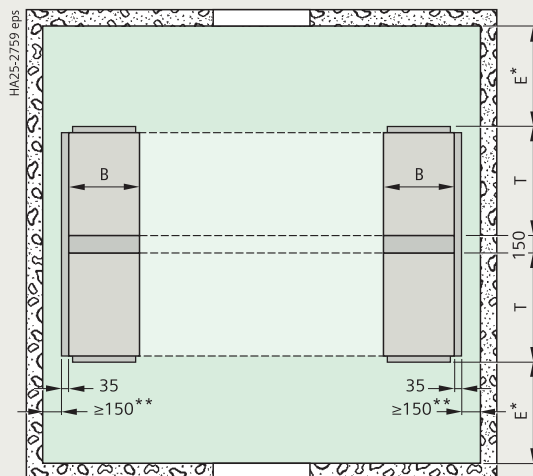
Free-standing arrangement for single busbar



All panels with cable connection at the front or at the rear and with rear cable duct

- * Control aisle E depending on national requirements:
 - For extension / panel replacement ≥ 1800 mm recommended
 - For replacement of switching devices ≥ 1350 mm recommended
- ** Lateral wall distances on the left or on the right:
 - ≥ 150 mm recommended (acc. to IEC 62271-200)
 - For installation and maintenance ≥ 500 mm recommendable (acc. to IEC 61936-1)
- *** Rear wall distance
 - ≥ 500 mm aisle for installation and maintenance (acc. to IEC 61936-1)
 - ≥ 800 mm aisle for operation (acc. to IEC 62271-200)

Free-standing arrangement for Duplex design (back-to-back)



All panels with cable connection at the front

- * Control aisle E depending on national requirements:
 - For extension / panel replacement ≥ 1800 mm recommended
 - For replacement of switching devices ≥ 1350 mm recommended
- ** Lateral wall distances on the left or on the right:
 - ≥ 150 mm recommended (acc. to IEC 62271-200)
 - For installation and maintenance ≥ 500 mm recommendable (acc. to IEC 61936-1)
 - ≥ 800 mm aisle for operation (acc. to IEC 62271-200)
 - ≥ 1000 mm for panel replacement (panels of 800 mm)
 - ≥ 1200 mm for panel replacement (panels of 1000 mm)

Transport

NXAIR M switchgear is delivered in form of individual panels.

The following must be observed:

- 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 film.

Means of transport: Ship

- Panels on pallets
- Sealed in PE protective film, with closed wooden box
- 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 film.

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 M

Transport dimensions, transport weights¹⁾ for individual panels ²⁾

| Panel spacings | Transport dimensions width × height × depth | Transport weight | |
|--|--|----------------------------|-------------------------------|
| | | with packing approx. kg | without packing approx. kg |
| mm | mm × mm × mm | | |
| Transport by rail or truck | | | |
| 1 × 800 | 1200 × 2980 ⁴⁾ × 1810 | 1340 | 1200 |
| 1 × 1000 | 1200 × 2980 ⁴⁾ × 1810 | 1440 | 1400 |
| Transport by seafreight or airfreight ³⁾ | | | |
| 1 × 800 | 1200 × 2500 × 2000 | 1410 | 1250 |
| 1 × 1000 | 1200 × 2500 × 2000 | 1410 | 1250 |

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 × H 2000 × 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 (NXAIR and NXAIR M)

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

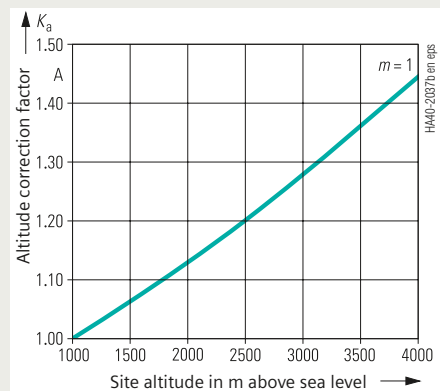
- The dielectric strength is verified by testing the switchgear with rated values of short-duration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 62271-1/VDE 0671-1 (see "Table for dielectric strength").
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m³ water content according to IEC 60071 and VDE 0111).
- 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
 - The dielectric strength of air insulation decreases with increasing altitude due to low 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 .

Table for dielectric strength

| Rated voltage (r.m.s. value) | kV | 7.2 | 12 | 15 | 17.5 | 24 |
|--|----|-----|----|-----|------|-----|
| 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
 \geq Rated short-duration power-frequency withstand voltage up to $\leq 1000 \text{ m} \cdot K_a$

Rated lightning impulse withstand voltage to be selected for site altitudes > 1000 m
 \geq Rated lightning impulse withstand voltage up to $\leq 1000 \text{ m} \cdot K_a$

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 =
 $95 \text{ kV} \cdot 1.28 = 122 \text{ kV}$

Result:

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

| Overview of standards (August 2019) | | | | |
|-------------------------------------|--|---------------|--------------|--------------|
| | | IEC standard | VDE standard | EN standard |
| Switchgear | NXAIR | IEC 62271-1 | VDE 0671-1 | EN 62271-1 |
| | | IEC 62271-200 | VDE 0671-200 | EN 62271-200 |
| Devices | Circuit-breakers | IEC 62271-100 | VDE 0671-100 | EN 62271-100 |
| | Vacuum contactors | IEC 62271-106 | VDE 0671-106 | EN 62271-106 |
| | Disconnectors and earthing switches | IEC 62271-102 | VDE 0671-102 | EN 62271-102 |
| | Switch-disconnectors | IEC 62271-103 | VDE 0671-103 | EN 62271-103 |
| | Switch-disconnector/fuse combination | IEC 62271-105 | VDE 0671-105 | EN 62271-105 |
| | HV HRC fuses | IEC 60282-1 | VDE 0670-4 | EN 60282-1 |
| | Voltage detecting systems | IEC 61243-5 | VDE 0682-415 | EN 61243-5 |
| Degree of protection | IP code | IEC 60529 | VDE 0470-1 | EN 60529 |
| | IK code | IEC 62262 | VDE 0470-100 | EN 50102 |
| Insulation | – | IEC 60071 | VDE 0111 | EN 60071 |
| Instrument transformers | – | IEC 61869-1 | VDE 0414-9-1 | EN 61869-1 |
| | Current transformers | IEC 61869-2 | VDE 0414-9-2 | EN 61869-2 |
| | Voltage transformers | IEC 61869-3 | VDE 0414-9-3 | EN 61869-3 |
| Installation, erection | – | IEC 61936-1 | VDE 0101-1 | EN 61936-1 |
| Insulating gas SF ₆ | Specification for sulfur hexafluoride (SF ₆) | IEC 60376 | VDE 0373-1 | EN 60376 |

Standards

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

Current-carrying capacity

- According to IEC 62271-200 or IEC 62271-1, VDE 0671-200 or VDE 0671-1, 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 or VDE 0671-200
- 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, switchgear NXAIR up to 31.5 kA/1 s and NXAIR M up to 25 kA/1 s are optionally designed with confinement of internal arcs to the respective compartment.

Standards

Standards, specifications, guidelines (NXAIR and NXAIR M)

Seismic withstand capability (option)

NXAIR and NXAIR M switchgear can be upgraded for regions at risk from earthquakes. For this upgraded design, earthquake qualification testing has been carried out in accordance with the following standards:

- IEC/TS 62271-210 "Seismic qualification for metal enclosed switchgear and controlgear for rated voltages above 1 kV"
- IEC 60068-3-3 "Guidance – seismic test methods for equipment"
- IEC 60068-2-57 "Test Ff: Vibration – Time-history method"
- IEC 60068-2-6 "Environmental testing – Part 2–6: Test Fc: Vibration (sinusoidal)"
- IEEE 693-2005 "Recommended Practice for Seismic Design of Substations".

For installation on even and rigid concrete or steel structure (without considering building influences), the tested ground accelerations meet the following requirements:

- Uniform Building Code 1997 (UBC) – Zone 4
- IEEE 693-2005 – High required response spectrum (Fig. A.1).

Shock, vibration (option)

NXAIR and NXAIR M switchgear can be upgraded to withstand stress caused by shock and vibration. For upgrading, shock and vibration tests have been carried out in accordance with the following standards:

- ETSI EN 300 019-2-2; T2.3 Public Transportation
- IEC 60721-3-2 "Classification of environmental conditions Section 2: Transport".

Color of the panel front

RAL 7035 (light gray).

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

- Temperature -5 °C to +55 °C
-25 °C to +55 °C ¹⁾ (option)
- Rel. air humidity Mean value over 24 h ¹⁾: ≤ 95 %
Mean value over 1 month: ≤ 90 %
- Condensation Occasionally
Frequently (degree of protection min. IP31D, with anti-condensation heater in LV part ²⁾)
- Site altitude Observe altitude correction (see page 44)
- No significant pollution of the ambient air (dust, gases, vapors, salts).

Furthermore, the high-voltage part of NXAIR and NXAIR M switchgear can be used in environmental conditions of the climatic categories 3K3 and 3K5 according to the standard IEC 60721-3-3. NXAIR and NXAIR M has been subjected to a climatic test according to IEC 60932, Level 2, and is suitable for operating conditions according to "Design Class 2". This test also meets the requirements of IEC 62271-304 for "Design Class 2".

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 and
 - VDE 0671-102/EN 62271-102.

Protection against solid foreign objects, electric shock and water

NXAIR and NXAIR M switchgear fulfills according to the standards

| | |
|---------------|-----------------------------|
| IEC 62271-1 | VDE 0671-1, EN 62 271-1 |
| IEC 62271-200 | VDE 0671-200, EN 62 271-200 |
| IEC 60529 | VDE 0470-1, EN 60 529 |
| IEC 62262 | VDE 0470-100, EN 50 102 |

the following degrees of protection:

| Switchgear panel | NXAIR | NXAIR M |
|--|---|-----------------------------|
| Degree of protection for the enclosure, optionally | IP3XD, IP31, IP32 IP4X, IP41, IP42 IP50, IP51 | IP3XD IP4X IP50, IP51 |
| Degree of protection for the enclosure, with ventilation | IP3XD, IP31, IP32 IP4X, IP41, IP42 | IP3XD IP4X |
| Degree of protection for the partitions | IP2X | IP2X |
| Degree of protection for the enclosure against mechanical impacts from outside | IK07 | IK07 |

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
- 2) Heater in the LV compartment and in the operating mechanism box of the circuit-breaker

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