Published by and copyright © 2013:
Siemens AG
Wittelsbacherplatz 2
80333 Munich, Germany

Siemens AG
Infrastructure & Cities Sector
Low and Medium Voltage Division
Medium Voltage
Postfach 3240
91050 Erlangen, Germany
www.siemens.com/medium-voltage-switchgear

All rights reserved.
Unless stated otherwise on the individual pages of this catalog, we reserve the right to include modifications, especially regarding the stated values, dimensions and weights.

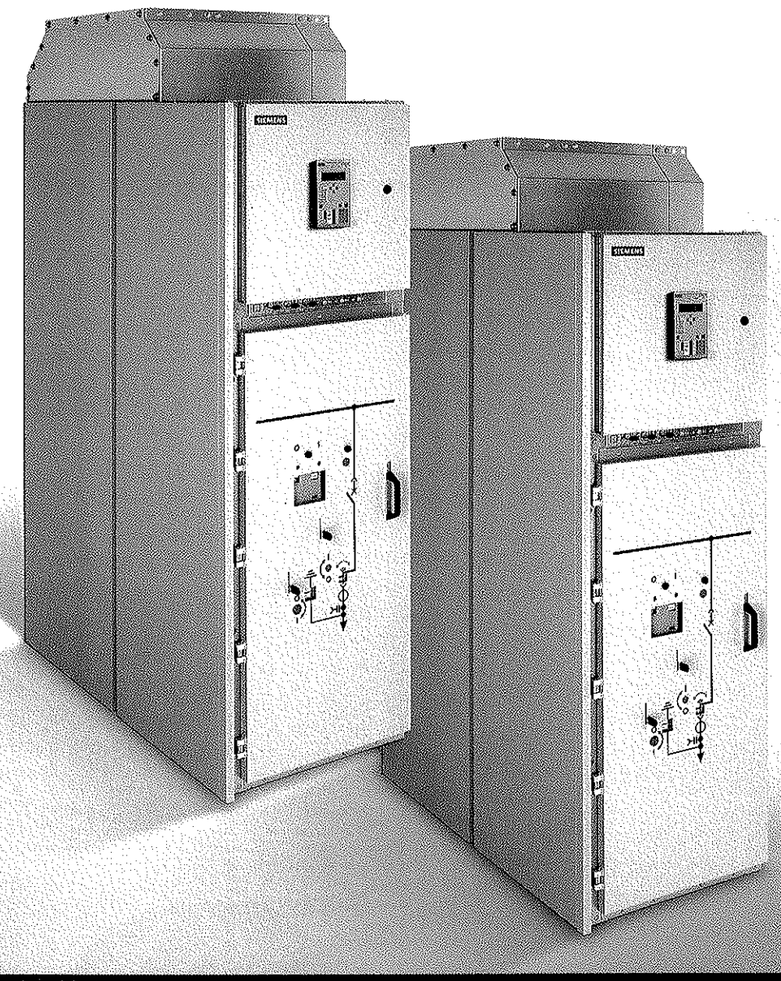
Drawings are not binding.
All product designations used are trademarks or product names of Siemens AG or other suppliers.
Unless stated otherwise, all dimensions in this catalog are given in mm.

Subject to change without prior notice.
The information in this document contains general descriptions of technical options available, which may not apply in all cases. The required technical options should therefore be specified in the contract.

For more information, please contact our
Customer Support Center.
Phone: +49 180 524 84 37
Fax: +49 180 524 24 71
(Charges depending on provider)
E-Mail: support.ic@siemens.com

Order No. IC1000-K1425-A811-B1-7600
Printed in Germany
KG 08.13 3.0 32 En
7400/48700 WÜ
Printed on elementary chlorine-free bleached paper.

SIEMENS

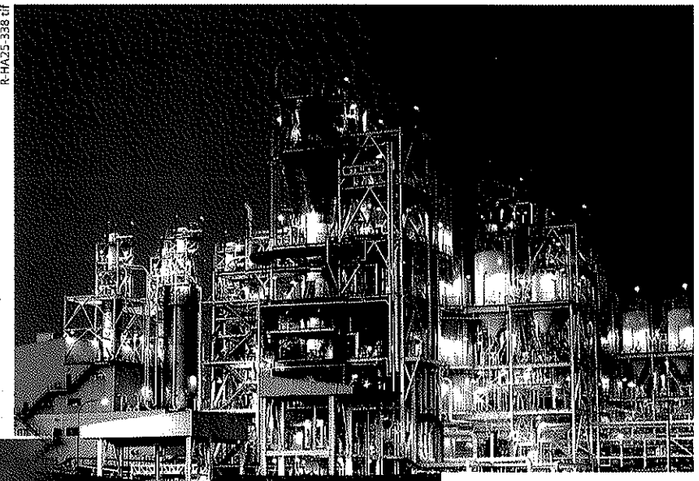


www.siemens.com/medium-voltage-switchgear

Air-Insulated Switchgear NXAIR, up to 24 kV

Medium-Voltage Switchgear · Catalog HA 25.71 · 2013

Answers for infrastructure and cities.



R-HA25-338.tif

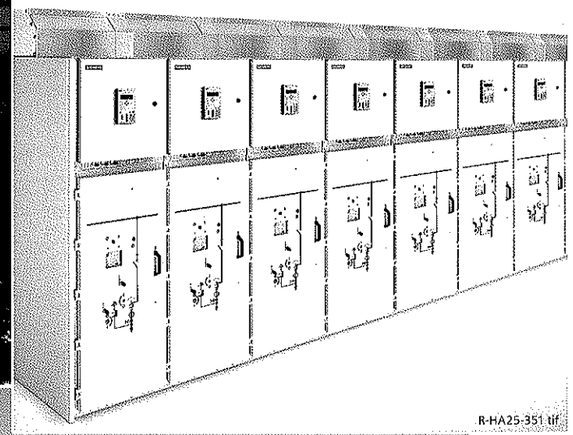
Application
Industry

NXAIR switchgear

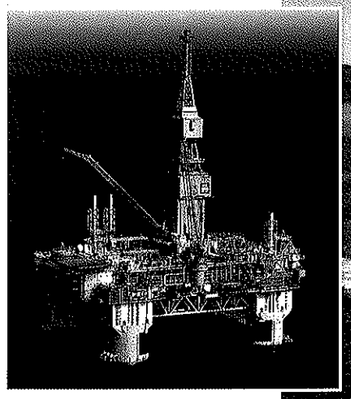


Application
Public power
supply system

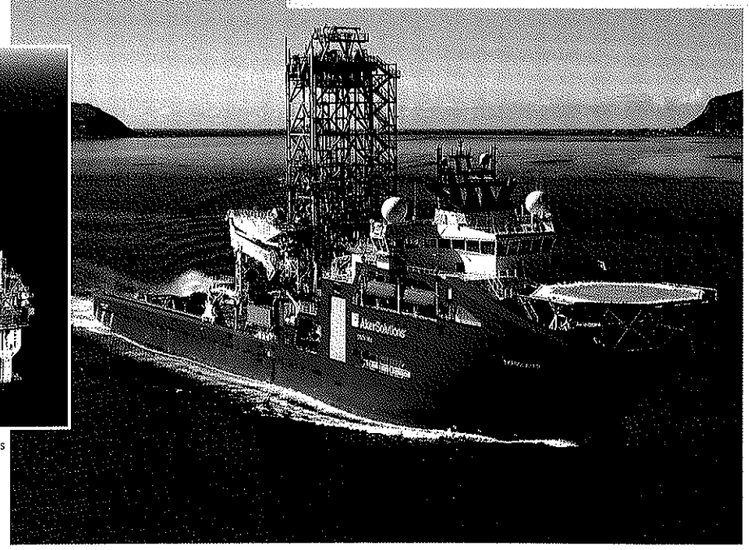
R-HA25-339.tif



R-HA25-351.tif



R-HA35-123.eps



R-HA35-0510-016.tif
Foto: Harald M. Valderhaug

Application
Industry and offshore

Air-Insulated Switchgear NXAIR, up to 24 kV

Medium-Voltage Switchgear

Catalog HA 25.71 · 2013

Invalid: Catalog HA 25.71 · 2012

www.siemens.com/medium-voltage-switchgear

Contents

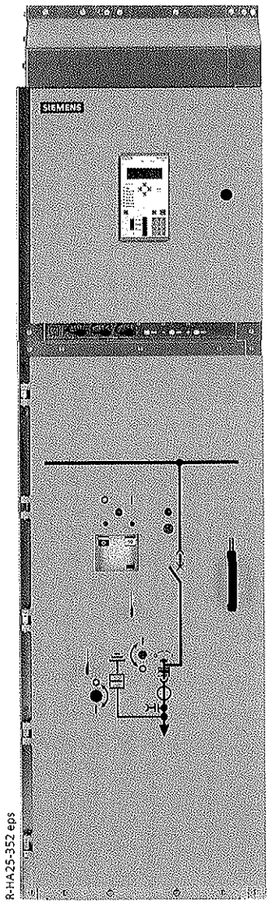
Application	Page
Types	4
Typical uses, classification	5
Customer benefit	
Peace of mind	6
Save lives	7
Increases productivity	8
Saves money	9
Preserves the environment	10
Technical data	
Electrical data, dimensions	11 to 13
Room planning	14
Product range	
NXAIR ≤ 17.5 kV	15 and 16
NXAIR 24 kV	17 and 18
NXAIR P	19 and 20
Design	
Basic panel design, operation, compartments	21 to 25
Components	
Vacuum circuit-breaker	26
Vacuum contactors, voltage transformers	27
Current transformers	28
Bushing-type insulators, low-voltage equipment	29
Standards	
Standards, specifications, guidelines	30 and 31

ISO 9001
ISO 14001
DNV
Certified Company

OHSAS 18001
DNV
Certified Company

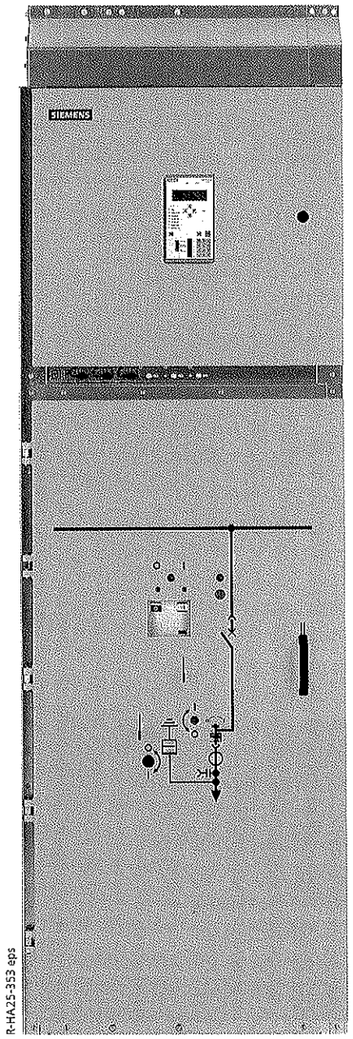
The products and systems described in this catalog are manufactured and sold according to a certified management system (acc. to ISO 9001, ISO 14001 and BS OHSAS 18001).

Types



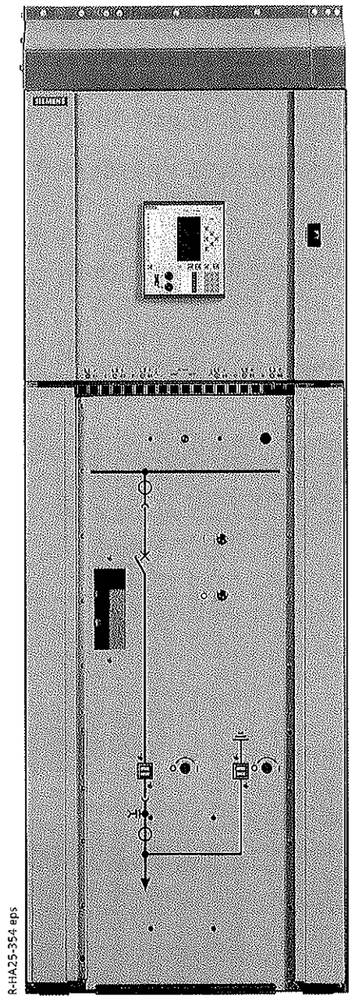
NXAIR panel ≤ 17.5 kV

Maximum values
17.5 kV / 40 kA / 4000 A



NXAIR panel 24 kV

Maximum values
24 kV / 25 kA / 2500 A



NXAIR P panel

Maximum values
17.5 kV / 50 kA / 4000 A

Typical uses

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

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

Application
Industry
- Power stations
- Cement industry
- Automobile industry
- Iron and steel works
- Rolling mills
- Mining industry
- Textile, paper and food industries
- Chemical industry
- Petroleum industry
- Pipeline installations
- Offshore installations
- Electrochemical plants
- Petrochemical plants
- Shipbuilding industry
- Diesel power plants
- Emergency power supply installations
- Lignite open-cast mines
- Traction power supply systems.

Classification

Circuit-breaker switchgear NXAIR and NXAIR P is factory-assembled, type-tested, metal-enclosed and metal-clad switchgear for indoor installation according to IEC 62271-200 / VDE 0671-200 and corresponds to the following classifications.

Loss of service continuity category and partition class	
Loss of service continuity category	LSC 2B
Partition class	PM
Accessibility to compartments Busbar compartment Switching device compartment Connection compartment	 Tool-based Interlock-controlled 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 ≤ 17.5 kV up to 40 kA = Test current for NXAIR 24 kV up to 25 kA = Test current for NXAIR P up to 50 kA
t	= Arc duration 1 s, optionally 0.1 s
In this way, NXAIR and NXAIR P switchgear is suitable for unrestricted application (wall or free-standing arrangement) in electrical service locations up to the maximum short-circuit ratings.	

Type approval
NXAIR switchgear has been type-approved by the following classification societies:
- Lloyds Register of Shipping (LRS)
- Det Norske Veritas (DNV)

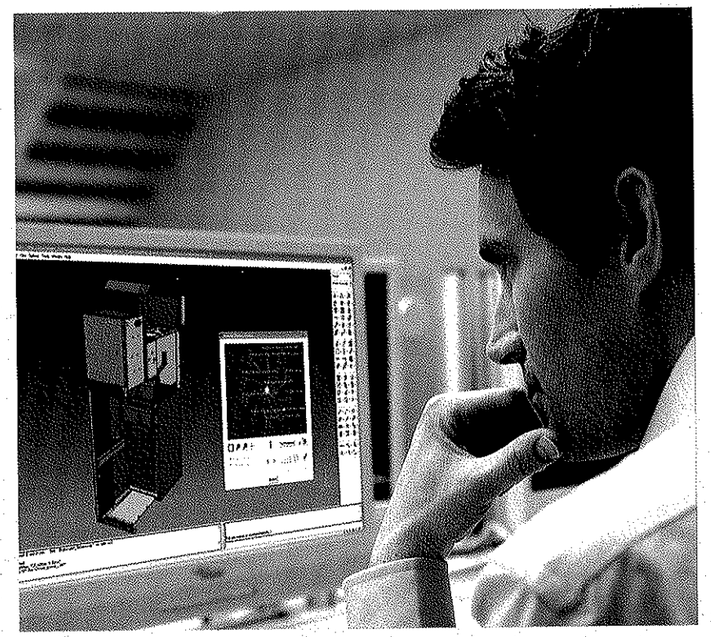
The switchgear is therefore also approved for application on ships and platforms.

National approval GOST
By certification in the system GOST R in Russia, NXAIR and NXAIR P switchgear is approved for application at the voltage levels 6 kV, 10 kV and 20 kV . Compliance with the requirements of the GOST standard has been confirmed in the Declarations No. POCC.DE.AB28.D04717 and No. POCC.DE.AB28.D01322. The approval is valid in the countries Russia, Belarus, Kazakhstan and Ukraine.

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

Customer benefit

Peace of mind



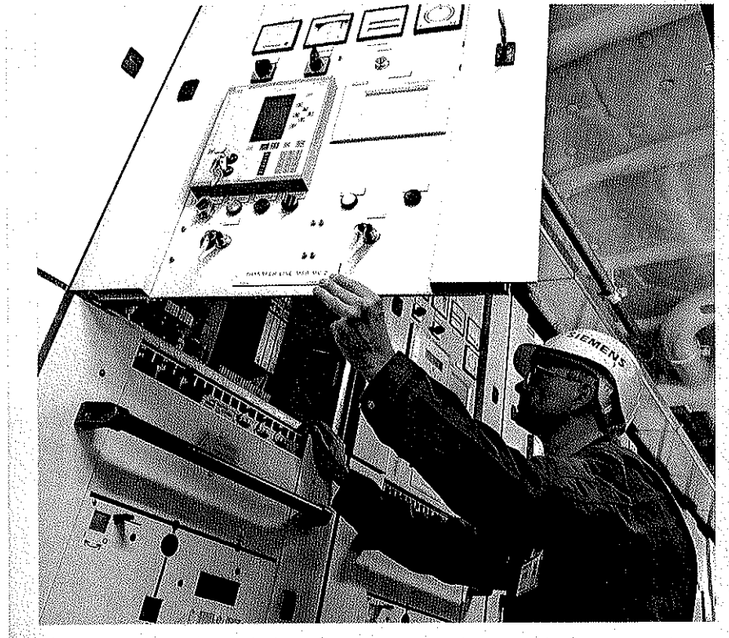
For power supply companies and industrial plants, the platform concept of the NXAIR family introduced at all production locations has very concrete advantages:

Smooth operation, exemplary availability and optimal safety.

Features

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

Save lives



All switchgear types of the NXAIR family are approved with internal arc classification IAC A FLR, loss of service continuity category LSC 2B and partition class PM.

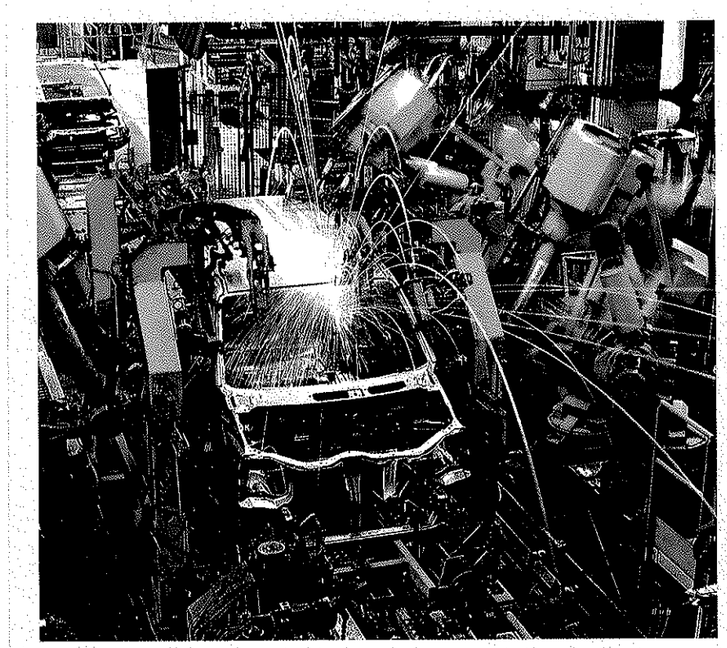
This makes them suitable for universal installation, meeting the highest requirements regarding personal safety.

Features

- All operations with closed high-voltage door
- Metallic enclosure, earthed shutters and partitions
- Internal arc classified switchgear according to IAC A FLR; front, lateral and rear accessibility; for all short-circuit currents and an arc duration of 1 s, optionally 0.1 s
- Loss of service continuity category LSC 2B (separate partitions for the busbar, connection and switching device compartments)
- Partition class PM (metal-clad in pressure-resistant design, NXAIR)
- Unambiguous position indicators and control elements on the high-voltage door
- Use of vacuum circuit-breakers or contactors
- Standard degree of protection IP3XD
- Positively driven shutters (separately lockable)
- Logical mechanical interlocking system.

Customer benefit

Increases productivity



Properties such as modular design, type tests of the circuit-breaker in the switchgear, confinement of an internal arc to the respective compartment, and thus maximum operational reliability, contribute to optimized operation and a remarkable increase of productivity.

Features

- Loss of service continuity category LSC 2B
  (separate partitions for the busbar, connection and switching device compartments)
- Partition class PM
- Maximum degree of protection IP51 possible
- Positively driven shutters
- Use of standardized block-type current transformers or bushing-type current transformers (NXAIR P)
- 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 (NXAIR)
- Use of maintenance-free vacuum circuit-breakers or contactors
- Control cables in metallic wiring ducts
- Easy access to all panel components.

Customer benefit

Saves money



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

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

Features

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

Customer benefit

Preserves the environment



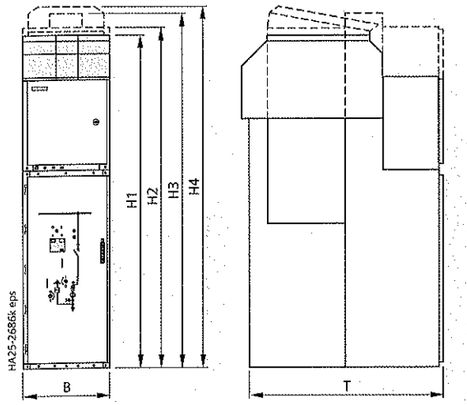
Air used as insulating medium, local production locations with short transportation ways and times, as well as a service life > 30 years, optimize the total energy balance.

Features

- As insulating medium, air is absolutely neutral to the environment
- Local production presence in all regions, minimized energy consumption (CO_2) regarding transport
- Service life > 30 years optimizes the energy balance additionally
- The materials used are fully recyclable without special knowledge
- Easy disposal.

Technical data

NXAIR ≤ 17.5 kV electrical data, dimensions



Transport

NXAIR 17.5 kV, NXAIR 24 kV and NXAIR P 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: Ship
– Panels on pallets
– In closed crates with sealed upper and lower PE protective foil
– With desiccant bags
– With sealed wooden base
– Max. storage time: 6 months.

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

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

1) 32 kV or 42 kV optional for GOST standard
2) Values for 50 Hz: 100 kA
60 Hz: 104 kA
3) Current values dependent on HV HRC fuses, for GOST standard max. 32 kV short-duration power-frequency withstand voltage. Lightning impulse withstand voltage across open contact gap of contactor: 40 kV at 7.2 kV, 60 kV at 12 kV.
4) ≤ 31.5 kA
5) Number of absorbers dependent on switchgear configuration
6) 1540 mm with voltage transformers in 3150 A/4000 panel
7) Average values depending on the degree to which panels are equipped

Rated values

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 contactor 3)	max. A	400	400	–
With disconnector link	max. A	4000	4000	4000
Bus sectionalizer	max. A	4000	4000	4000
Busbar connection panel	max. A	4000	4000	4000

Dimensions

in mm

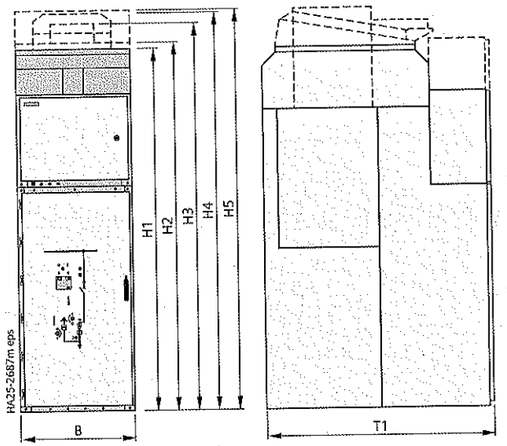
Width B	Circuit-breaker panel ≤ 1000 A ≤ 4000 A	600 4) 800/1000
	Contactor panel ≤ 400 A	435/600
	Disconnecting panel ≤ 4000 A	800/1000
	Bus sectionalizer ≤ 4000 A	2×800/1000
	Metering panel	800
	Busbar connection panel ≤ 4000 A	800/1000
	Transformer panel for auxiliaries service	1000
Height H1	Standard panel or standard panel with natural ventilation	2300
H2	With high low-voltage compartment or additional compartment for busbar components	2350
H3	With forced ventilation for 4000 A	2450
H4	With optional arc absorber 5) for 12 kV, > 25 kA, or generally for 17.5 kV	2500
Depth T	Single busbar, all panel types (except contactor panel)	1350 4)/1500 6)
	Contactor panel	1400 4)/1500

Transport dimensions, transport weights 7) for individual panels

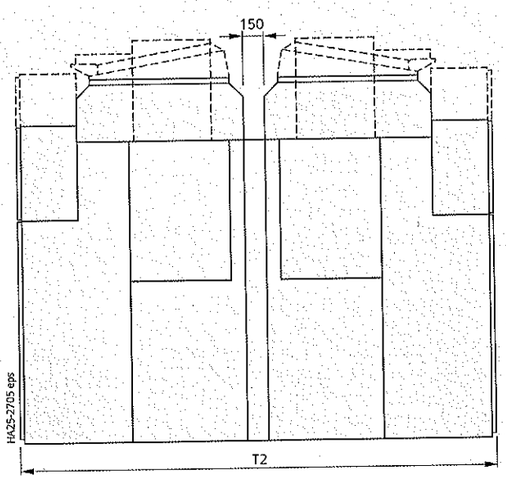
Panel widths mm	Transport dimensions Width × Height × Depth mm × mm × mm	Transport weight with packing approx. kg	without packing approx. kg
Transport with rail or truck			
1 × 435	800 x 1610 x 2510	750	720
1 × 600	800 x 1610 x 2510	900	870
1 × 800	1000 x 1610 x 2510	1175	1140
1 × 1000	1200 x 1610 x 2510	1410	1370
Transport with ship or airplane			
1 × 435	820 × 1830 × 2541	850	720
1 × 600	820 × 1830 × 2541	1000	870
1 × 800	1020 × 1830 × 2541	1285	1140
1 × 1000	1220 × 1830 × 2541	1525	1370

Technical data

NXAIR 24 kV electrical data, dimensions



Single busbar



Double busbar (back-to-back arrangement)

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 disconnector link	max. A	2500
Bus sectionalizer	max. A	2500

Dimensions

in mm

Width B	Circuit-breaker panel ≤ 1250 A	800
	2500 A	1000
	Disconnecting panel ≤ 1250 A	800
	2500 A	1000
	Bus sectionalizer ≤ 1250 A	2 × 800
	1600 A, 2000 A, 2500 A	2 × 1000
	Metering panel	800
Height H1	Standard panel	2510
H2	With high low-voltage compartment	2550
H3	With natural ventilation	2680
H4	With optional arc absorber [3]	2750
H5	With additional compartment for busbar components	2770
Depth T1	Single busbar	1600
T2	Double busbar (back-to-back)	3350

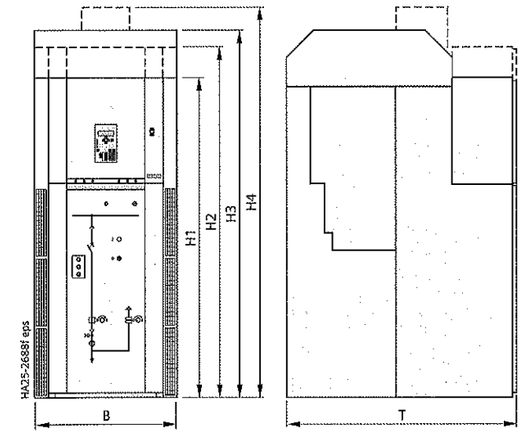
Transport dimensions, transport weights [4] for individual panels [5]

Panel widths	Transport dimensions Width × Height × Depth	Transport weight with packing	without packing
mm	mm × mm × mm	approx. kg	approx. kg
Transport with rail or truck			
1 × 800	1200 x 2980 [7] x 1810	1340	1200
1 × 1000	1200 x 2980 [7] x 1810	1440	1400
Transport with ship or airplane [6]			
1 × 800	1200 × 2500 × 2000	1410	1250
1 × 1000	1200 × 2500 × 2000	1410	1250

1) 65 kV optional for GOST standard
2) Values for 50 Hz: 63 kA, 60 Hz: 65 kA
3) Number of absorbers dependent on switchgear configuration
4) Average values dependent on equipping degree of the panels
5) The double-busbar panels (back-to-back arrangement) are delivered as individual panels. Back-to-back connection is done on site.
6) Pressure relief ducts or busbar components such as earthing switches or voltage transformers as separate delivery for 10 panels each (W 1100 x H 2000 x D 1800)
7) Height of 2450 mm possible by transporting the pressure relief duct on a separate pallet.

Technical data

NXAIR P electrical data, dimensions



Rated values

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	125/130	125/130
peak withstand current [2]	max. kA	125/130	125/130	125/130
normal current of busbar	max. A	4000	4000	4000
normal current of feeders:				
With circuit-breaker	max. A	4000	4000	4000
With contactor	max. A	400 [3]	400 [3]	–
With disconnector link	max. A	4000	4000	4000
Bus sectionalizer	max. A	4000	4000	4000

Dimensions

in mm

Width B	Circuit-breaker panel ≤ 2000 A	800
	> 2000 A	1000
	Contactor panel ≤ 400 A	400
	Disconnecting panel ≤ 2000 A	800
	> 2000 A	1000
	Bus sectionalizer ≤ 2000 A	2 × 800
	> 2000 A	2 × 1000
	Metering panel	800
Height H1	With standard low-voltage compartment (≤ 3150 A)	2225
H2	With high low-voltage compartment	2485
H3	With top-mounted pressure relief duct and arc absorber [4] as standard	2550
H4	With forced ventilation (4000 A)	2710
Depth T	Single busbar (except contactor panel)	1635
	Contactor panel	1650
	Double busbar in back-to-back arrangement (except contactor panel)	3320

Transport dimensions, transport weights [5] for individual panels

Panel widths	Transport dimensions Width × Height × Depth	Transport weight with packing	without packing
mm	mm × mm × mm	approx. kg	approx. kg
Transport with rail or truck			
1 × 800	1200 x 2750 x 1810	1175	1100
1 × 1000	1200 x 2750 x 1810	1475	1400
Transport with ship or airplane [6]			
1 × 800	1200 × 2550 × 1810	1350	1100
1 × 1000	1200 × 2550 × 1810	1650	1400

1) 32 kV or 42 kV optional for GOST standard
2) Values for 50 Hz: 125 kA, 60 Hz: 130 kA, make-proof earthing switch for 17.5 kV up to 100 kA
3) Dependent on rated current of HV HRC fuses used; dielectric strength of contactor panel: 20 kV short-duration power-frequency withstand voltage phase-to-phase, phase-to-earth, open contact gap, or 60 kV lightning impulse withstand voltage phase-to-phase, phase-to-earth, 40 kV open contact gap of the contactor.
4) Number of absorbers dependent on switchgear configuration
5) Average values depending on the degree to which panels are equipped
6) Pressure relief ducts as separate delivery for 10 panels each (W 1100 x H 2000 x D 1800)

Technical data

Room planning

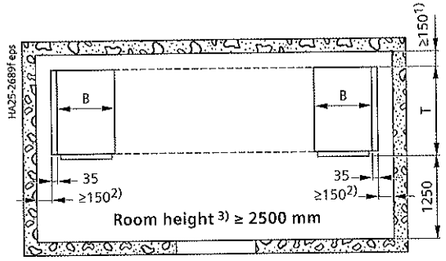
NXAIR ≤ 17.5 kV

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

Dimensions B (width) and T (depth) see table on page 11

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

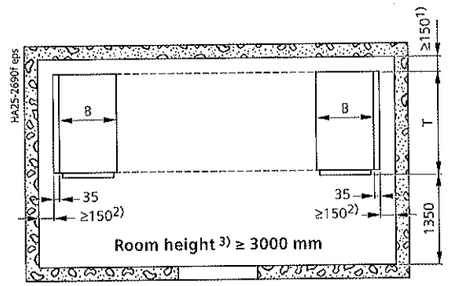
For back-to-back arrangement, a 1200-mm wide control aisle is required on the left or on the right of the switchgear.



NXAIR 24 kV

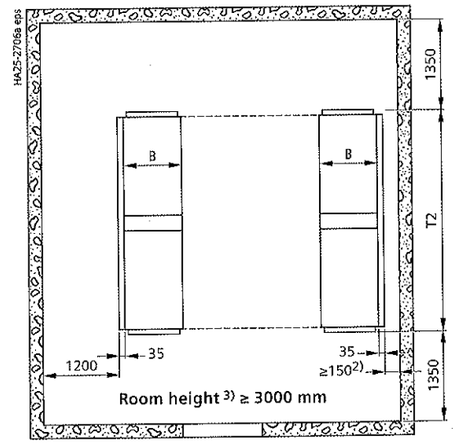
Arrangement (plan view)
for single-busbar switchgear

Dimensions B (width) and T (depth) see table on page 12



Double-busbar arrangement (top view)

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



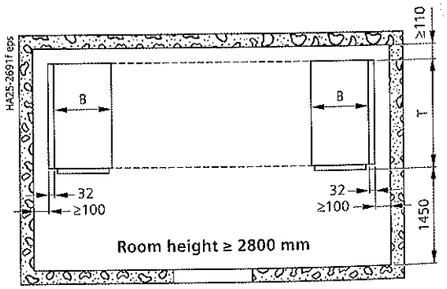
NXAIR P

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

Dimensions B (width) and T (depth) see table on page 13

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

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



1) For connection from front ≥ 150 mm, 100 mm for contactor panel, for connection from rear ≥ 500 mm

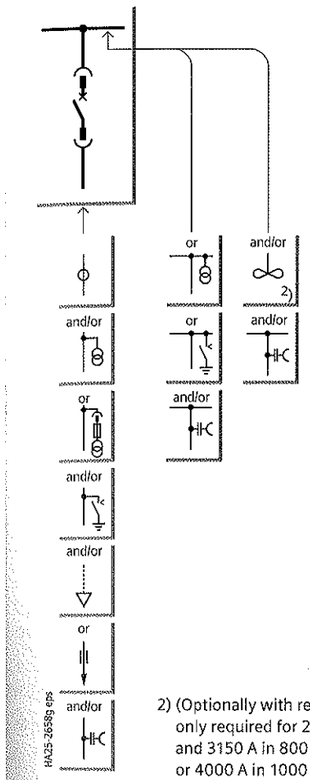
2) For designs with a closed pressure relief duct to the outside, a distance of ≥ 500 mm is required on one side

3) For designs with a closed pressure relief duct to the outside.
The room heights for designs with arc absorber are as follows:
NXAIR ≤ 12 kV, ≤ 25 kA: ≥ 2800 mm
NXAIR ≤ 12 kV, 31.5 kA: ≥ 3000 mm
NXAIR, 17.5 kV and ≤ 12 kV, 40 kA: ≥ 3500 mm
NXAIR 24 kV: ≥ 3300 mm

Product range

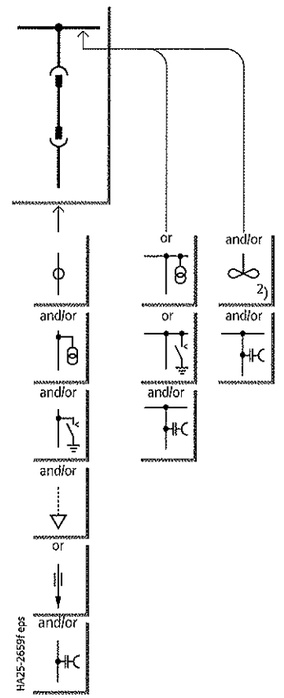
NXAIR ≤ 17.5 kV panels

Circuit-breaker panel

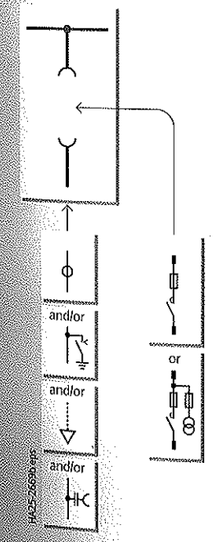


2) (Optionally with redundant fans) only required for 2500 A and 3150 A in 800 mm panels or 4000 A in 1000 mm panels.

Disconnecting panel

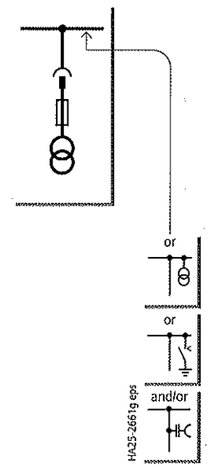


Contactor panel

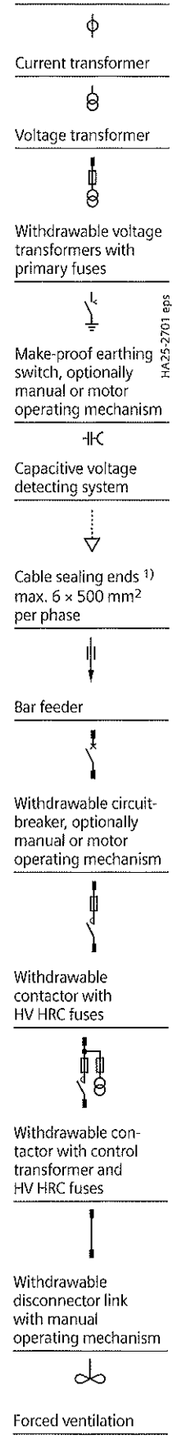


For other components in the busbar and connection compartments, see page 25.

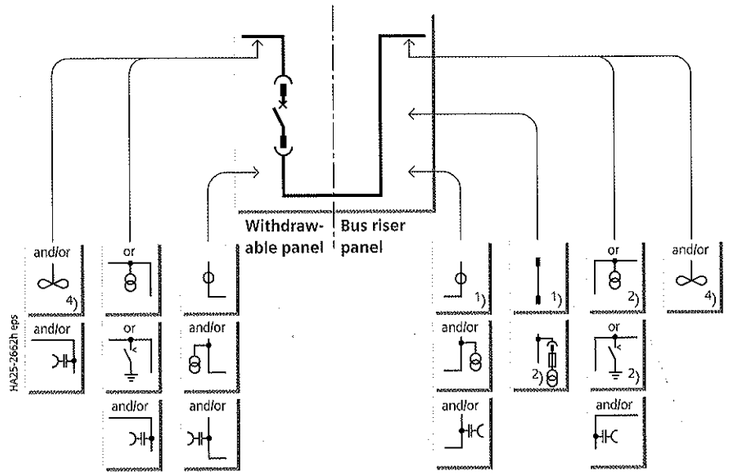
Metering panel



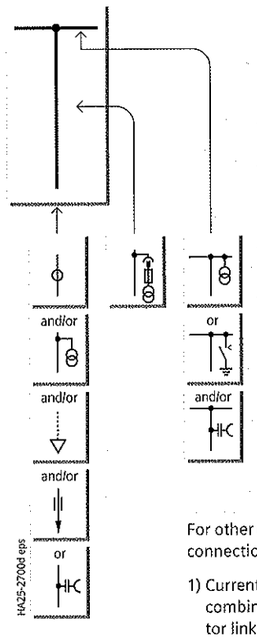
1) The details refer to conventional single-core sealing ends and depend on the rated normal current and other built-in components



Bus sectionalizer (mirror-image installation also possible)



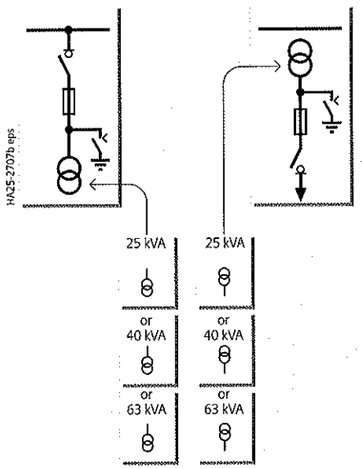
Busbar connection panel



Auxiliary transformer panel

a) Feeding from busbar

b) Feeding by cable from incoming panel



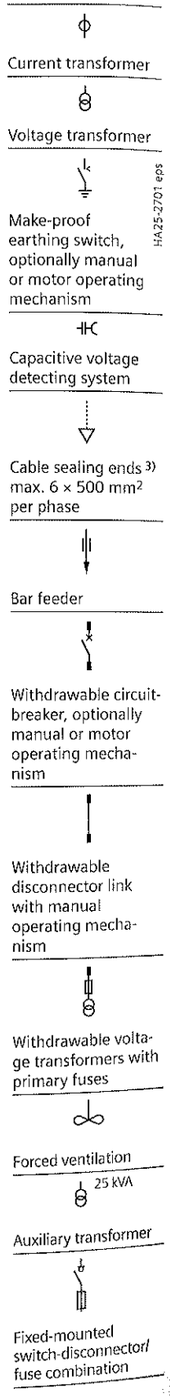
For other components in the busbar and connection compartments, see page 25.

1) Current transformers only possible in combination with withdrawable disconnector link.

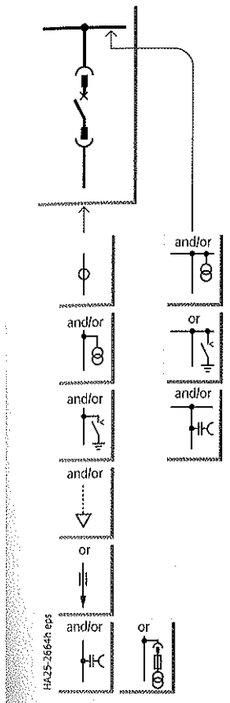
2) Current transformers only possible in combination with withdrawable disconnector link.

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

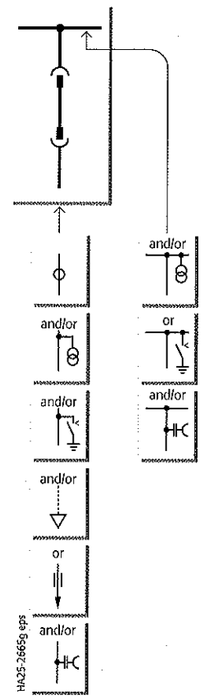
4) (Optionally with redundant fans) only required for 2500 A and 3150 A in 800 mm panels or 4000 A in 1000 mm panels.



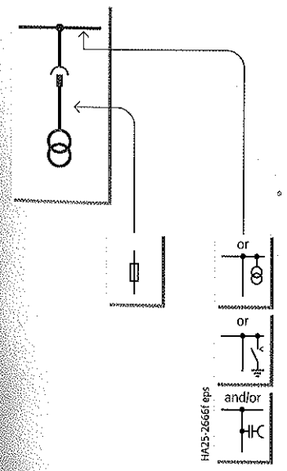
Circuit-breaker panel



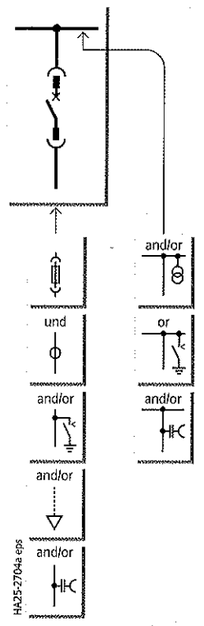
Disconnecting panel



Metering panel

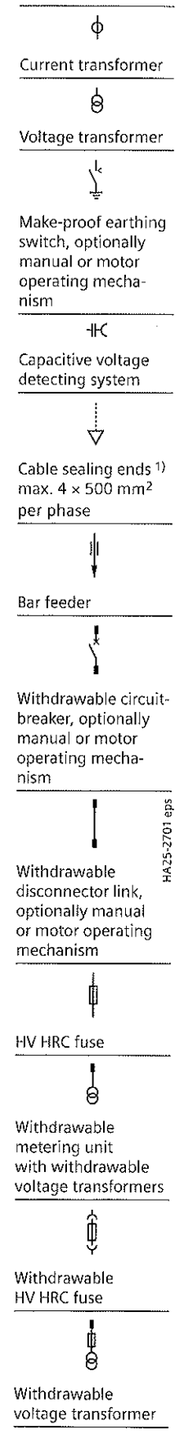


Switch panel

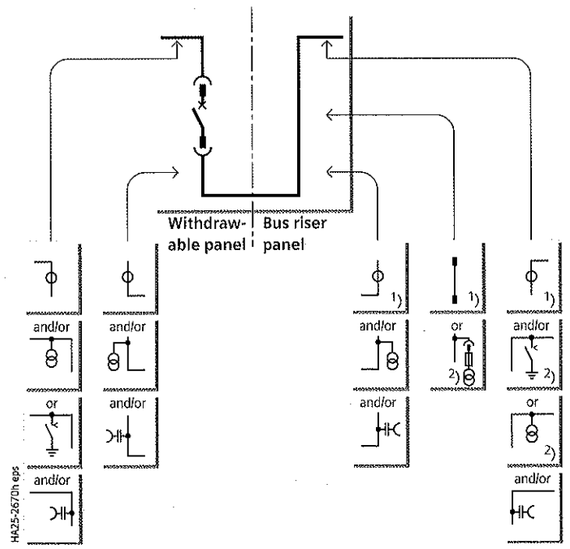


For other components in the busbar and connection compartments, see page 25.

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

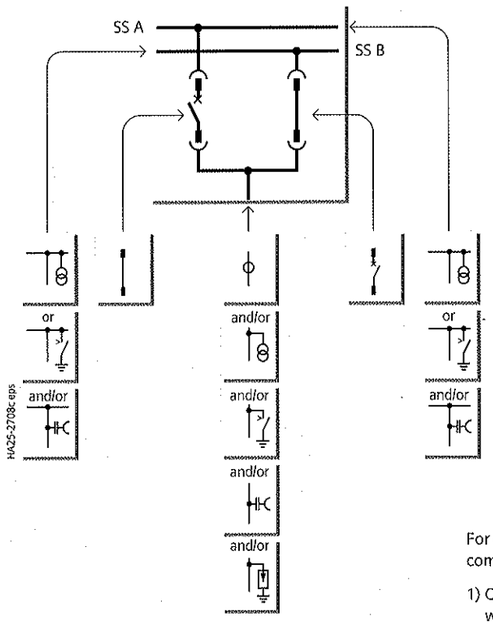


Bus sectionalizer (mirror-image installation also possible)

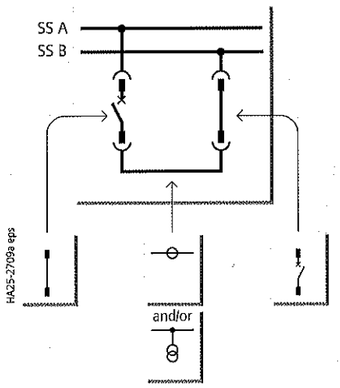


Double busbar (back-to-back arrangement)

Circuit-breaker panel (incoming sectionalizer)



Cross sectionalizer



For other components in the busbar and connection compartments, see page 25.

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

Current transformer

Voltage transformer

Make-proof earthing switch, optionally manual or motor operating mecha-nism

Capacitive voltage detecting system

Withdrawable circuit-breaker, optionally manual or motor operating mecha-nism

Withdrawable disconnector link, optionally manual or motor operating mechanism

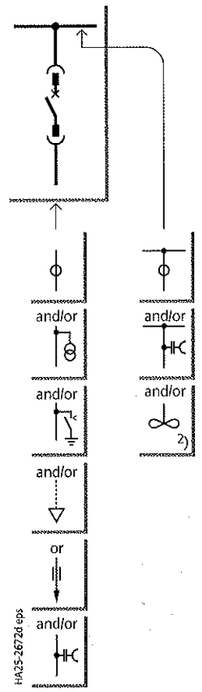
HA25-2701 eps

Withdrawable voltage transformers

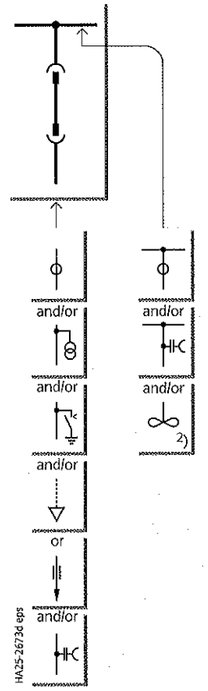
Withdrawable voltage transformers with primary fuses

Surge arresters/ limiters

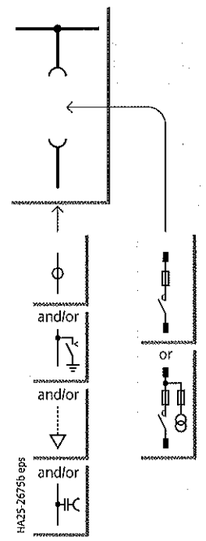
Circuit-breaker panel



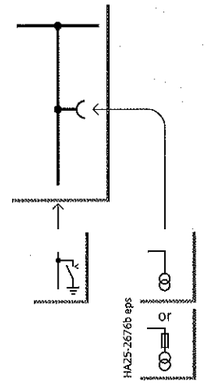
Disconnecting panel



Contactor panel



Metering panel



For other components in te busbar and connection compartments, see page 25.

1) The details refer to conventional single-core sealing ends and depend on the rated normal current and other built-in components.
2) (optionally with fan) only required for 4000 A

Current transformer

Voltage transformer

Make-proof earthing switch, optionally manual or motor operating mecha-nism

Capacitive voltage detecting system

Cable sealing ends [1] max. 6 × 500 mm² je Leiter

Bar feeder

Withdrawable circuit-breaker, optionally manual or motor operating mecha-nism

Withdrawable disconnector link with manual operating mecha-nism

HA25-2701 eps

Withdrawable contactor with HV HRC fuses

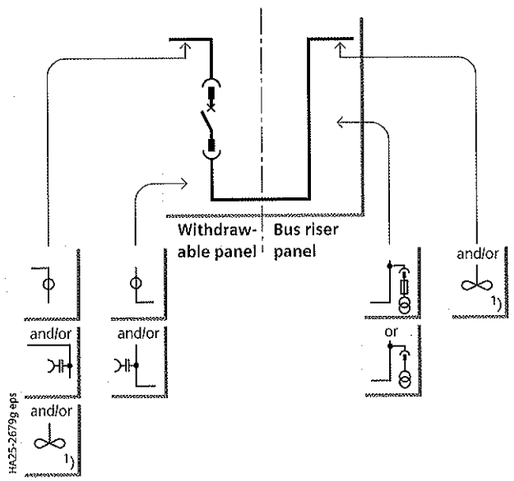
Withdrawable con-tactor with control transformer and HV HRC fuses

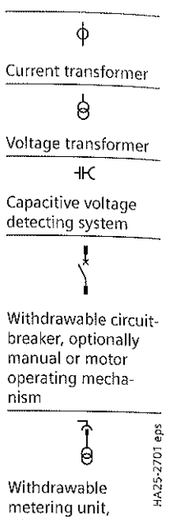
Withdrawable metering unit, with-drawable voltage transformers with primary fuses

Forced ventilation

NXAIR P panels

Bus sectionalizer (mirror-image installation also possible)





For other components in the busbar and connection compartments, see page 25.

1) (optionally with fan) only required for 4000 A

Double-busbar switchgear
Double-busbar switchgear consists of panels from the single-busbar product range.

It can be designed as follows:
- Face-to-face arrangement
- Back-to-back arrangement.

Face-to-face arrangement
- Panels from the single-busbar product range (circuit-breaker panel, disconnecting panel, bus sectionalizer and metering panel)
- The two switchgear rows are interconnected by means of cables or bars beneath the panels
- Bus coupler consisting of:
  – Circuit-breaker panel
  – Disconnecting panel.

Back-to-back arrangement
- Panels from the single-busbar product range (circuit-breaker panel, disconnecting panel, bus sectionalizer and metering panel)
- The two switchgear rows are interconnected by means of bars inside the panels
- Bus coupler consisting of:
  – Circuit-breaker panel
  – Disconnecting panel.

NXAIR ≤ 17.5 kV panel design, operation

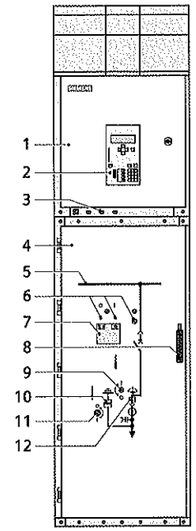
Operation at the panel

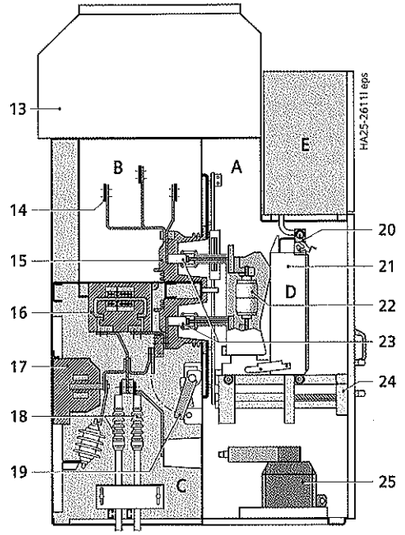
Features
- Integrated mimic diagram
- Recognition of the respective switch positions, circuit-breaker CLOSED / OPEN, disconnected position, earthing switch CLOSED / OPEN, on the integrated mimic diagram
- Unambiguous assignment of actuating openings and control elements to the corresponding position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

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

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

Basic panel design (example)





1 Door of low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Mimic diagram
6 "CLOSE-OPEN" actuating openings for the circuit-breaker, opening for spring charging
7 Inspection window to recognize the "CLOSED-OPEN" indicator of the circuit-breaker, "closing spring charged" indicator, operations counter
8 Handle for opening the high-voltage door
9 Actuating opening for racking the switching device
10 Mechanical position indicator for feeder earthing switch
11 Actuating opening for feeder earthing switch, manual or optionally motor operation
12 Mechanical position indicator for withdrawable part
13 Pressure relief duct, if required with top-mounted arc absorber
14 Busbars
15 Bushing-type insulator
16 Block-type current transformer
17 Voltage transformer
18 Cable connection for max. 6 cables per phase
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 circuit-breaker and for earthing, manual or optionally motor operation
25 Option: Withdrawable voltage transformers

A Switching device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment

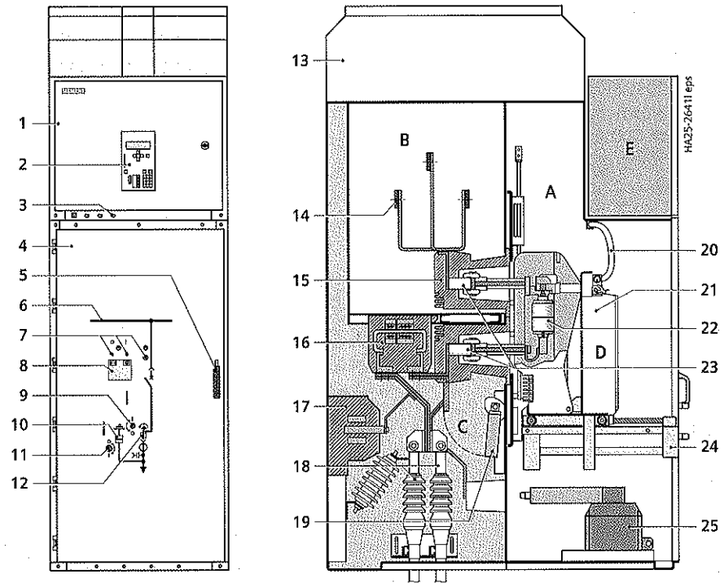
Operation at the panel

Features
- Integrated mimic diagram
- Recognition 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 always with high-voltage door closed
- Ergonomically favorable height for all control and indicator elements
- Option: Verification of safe isolation from supply for feeder or busbar by means of the capacitive voltage detecting system with panel front closed.

Interlocks
- Interlocking conditions specified according to IEC 62271-200 / VDE 0671-200 are fulfilled
- Feeder earthing switch can only be operated with switching device in disconnected position
- Switching device can only be racked on the movable part with the associated switching device in 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, padlocks, mechanical key interlocking systems.

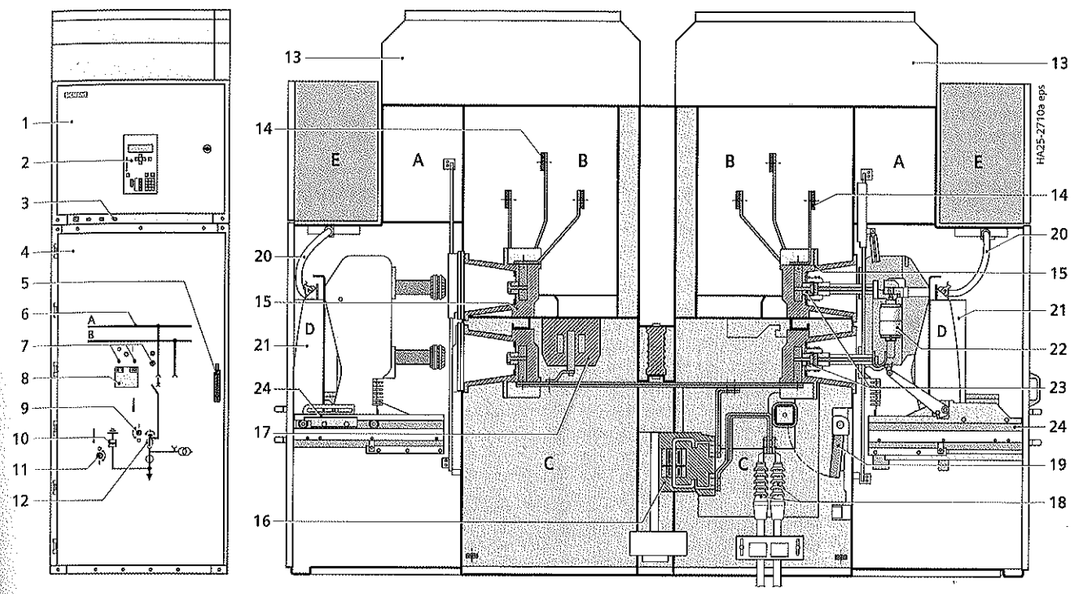
Basic panel design (example)



1 Door of low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Handle for high-voltage door
6 Mimic diagram
7 "CLOSE-OPEN" actuating openings for the circuit-breaker, opening for spring charging
8 Inspection window to recognize the "CLOSED-OPEN" indicator of the circuit-breaker, "closing spring charged" indicator, operations counter
9 Actuating opening for racking the switching device
10 Mechanical position indicator for feeder earthing switch
11 Actuating opening for feeder earthing switch, manual or optionally motor operation
12 Mechanical position indicator for withdrawable part
13 Pressure relief duct, if required with top-mounted arc absorber
14 Busbars
15 Bushing-type insulator
16 Block-type current transformer
17 Voltage transformer
18 Cable connection for max. 4 cables per phase
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 circuit-breaker and for earthing, manual or optionally motor operation
25 Option: Withdrawable voltage transformers

A Switching device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment

Basic panel design (example)



1 Door of low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Handle for high-voltage door
6 Mimic diagram
7 "CLOSE-OPEN" actuating openings for the circuit-breaker, opening for spring charging
8 Inspection window to recognize the "CLOSED-OPEN" indicator of the circuit-breaker, "closing spring charged" indicator, operations counter
9 Actuating opening for racking the switching device
10 Mechanical position indicator for feeder earthing switch
11 Actuating opening for feeder earthing switch, manual or optionally motor operation
12 Mechanical position indicator for withdrawable part
13 Pressure relief duct, if required with top-mounted arc absorber
14 Busbars
15 Bushing-type insulator
16 Block-type current transformer
17 Voltage transformer
18 Cable connection for max. 4 cables per phase
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 circuit-breaker and for earthing, manual or optionally motor operation

A Switching device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment

NXAIR P panel design, operation

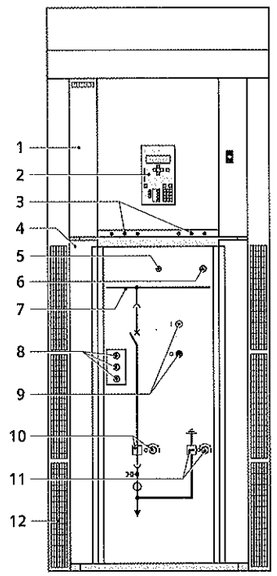
Operation at the panel

Features
- Integrated mimic diagram
- Recognition 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 always with high-voltage door closed
- Ergonomically favorable height for all control and indicator elements
- Option: Verification of safe isolation from supply for feeder or busbar by means of the capacitive voltage detecting system with panel front closed.

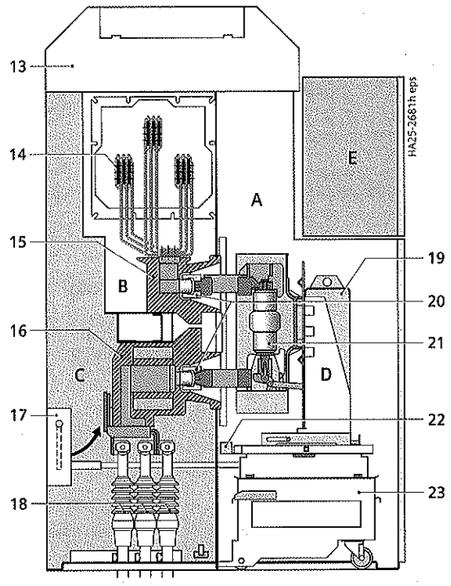
Interlocks
- Interlocking conditions specified according to IEC 62271-200 / VDE 0671-200 are fulfilled
- Feeder earthing switch can only be operated with switching device in disconnected position
- Switching device can only be racked on the movable part with the associated switching device in OPEN position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

Basic panel design (example)



Circuit-breaker panel



3150 A panel with natural ventilation

1 Door of low-voltage compartment
2 Protection device
3 Option: Capacitive voltage detecting system for feeder and busbar
4 High-voltage door
5 Mechanical lifting mechanism for opening the high-voltage door
6 Locking device for high-voltage door
7 Mimic diagram
8 "Closing spring charged" indicator, position indicator for the switching device, and operations counter
9 "CLOSE-OPEN" actuating openings for the circuit-breaker
10 Mechanical position indicator and actuating opening for the withdrawable part, manual or optionally motor operation
11 Mechanical position indicator and actuating opening for the make-proof earthing switch, manual or optionally motor operation
12 Ventilation duct up to ≥ 2500 A
13 Pressure relief duct, with arc absorber
14 Busbars
15 Bushing-type insulator
16 Bushing-type current transformer
17 Make-proof earthing switch
18 Cable connection for max. 6 cables per phase
19 Operating and interlocking unit for racking and operating the circuit-breaker
20 Contact system
21 Vacuum interrupters
22 Low-voltage connection, automatically coupling
23 Option: Truck

A Switching device compartment
B Busbar compartment
C Connection compartment
D Withdrawable circuit-breaker
E Low-voltage compartment

NXAIR ≤ 17.5 kV NXAIR 24 kV NXAIR P panels

Switching device compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Panel front powder-coated with epoxy resin
- Standard color RAL 7035
- Separate shutter mechanism for opening and closing the
- Busbar compartment
- Connection compartment
- High-voltage door pressure-resistant in the event of internal arcs in the panel
- For NXAIR: 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; automatically coupling in NXAIR P
- Switching device compartment for the different panel versions with withdrawable devices:
- Vacuum circuit-breaker [1)]
- Vacuum contactor
- Disconnector link
- Metering unit
- Endurance classes for:
- Circuit-breaker: E2, M2, C2
- Isolating distance (withdrawable part): M0 manually or partly motor-operated for withdrawable circuit-breaker and disconnector link
- Vacuum contactor 250,000, 500,000 and/or 1,000,000 × I_N
- Transformer panel for auxiliaries service with switch-disconnector/fuse combination, fixed-mounted (LSC 2A); endurance class for switch-disconnector E1, M0.

Busbar compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards
- Option: Transverse partition from panel to panel for NXAIR
- Standard: Transverse partition from panel to panel for NXAIR P
- Busbars made of flat copper, bolted from panel to panel:
- For NXAIR P, coated with epoxy resin powder
- Option: Insulated
- For NXAIR: Pressure-resistant partitions to connection and switching device compartment, pressure-resistant rear wall
- Shutters can be opened and locked separately
- Bushing-type insulators for supporting the busbars and for accommodating the upper fixed contacts for the switching device
- Option: Max. three bushing-type current transformers in NXAIR P
- Option: Coupling electrode for capacitive voltage detecting system.

Additional compartments (option) for busbar components in NXAIR, see also product range
- Top-mounted compartment above 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.

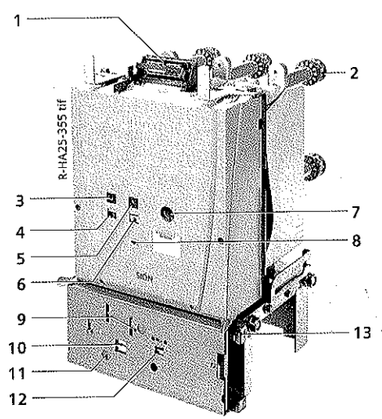
Connection compartment
- Enclosure made of sendzimir-galvanized sheet steel
- Pressure relief upwards through rear pressure relief duct
- For NXAIR: Pressure-resistant partitions to switching device and busbar compartment
- Shutters can be opened and locked separately
- Earthing busbar
- Option: Installation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

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

Vacuum circuit-breaker

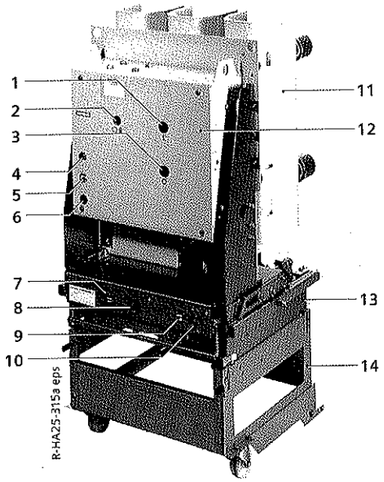
Features
- According to IEC 62271-100, VDE 0671-100
- Suitable for all switching duties
- Circuit-breaker always with motor operating mechanism, manual operation always possible
- Circuit-breaker in NXAIR 24 kV also available in combination with withdrawable HV HRC fuses in the connection compartment as switch-fuse function for particularly high demands regarding switching capacity and switching rate
- 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 (automatically coupling in NXAIR P)
- Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles.

for NXAIR ≤ 17.5 kV for NXAIR 24 kV



1 Low-voltage plug connector, 64-pole
2 Primary contacts
3 "OFF" pushbutton
4 Position indicator for circuit-breaker
5 "ON" pushbutton
6 "Spring charged" indicator
7 Hand crank coupling for the spring energy store
8 Operations counter
9 Actuating opening for the racking mechanism
10 Position indicator for earthing switch
11 Actuating opening for earthing switch
12 Position indicator for withdrawable part in disconnected or service position
13 Locking/unlocking the withdrawable part

for NXAIR P



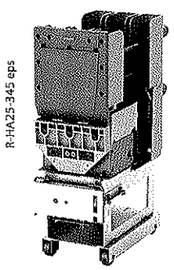
1 "ON" pushbutton
2 Hand crank coupling for the spring energy store
3 "OFF" pushbutton
4 Indicator for "closing spring of spring energy store charged"
5 Position indicator
6 Operations counter
7 Position indicator for disconnected or service position
8 Actuating opening for racking
9 Position indicator for earthing switch
10 Actuating opening for earthing
11 Pole columns with moving contacts
12 Operating unit
13 Interlocking unit
14 Truck (option)

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

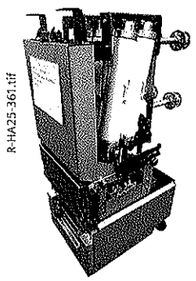
Vacuum contactors, voltage transformers

Vacuum contactors
Features
- According to IEC 62271-106, VDE 0670-501
- Suitable for operating consumers with high switching rates
- Short-circuit protection via up to 2 HV HRC fuses connected in parallel
- Voltage supply of contactor coil via primary-fused control transformer or via external power supply
- Optional latching module for the contactor
- Racking the contactor via manual operating mechanism
- 64-pole low-voltage plug connector between contactor and fixed part
- Maintenance-free operating mechanisms under normal climatic conditions and for the max. permissible number of operating cycles
- Contact arms generally with silver-plated round contacts.

for NXAIR ≤ 17.5 kV

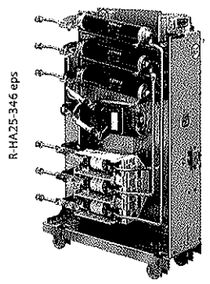


Withdrawable contactor 3TL6, HV HRC fuses and, if applicable, control transformer



Withdrawable contactor 3TL8, HV HRC fuses and, if applicable, control transformer

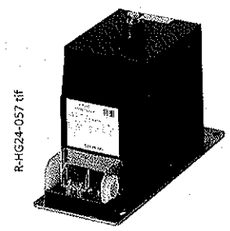
for NXAIR P



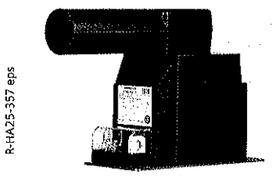
Withdrawable contactor 3TL6/8, HV HRC fuses and, if applicable, control transformer

Electrical data for	3TL6 in NXAIR	3TL8 in NXAIR	3TL6/8 in NXAIR P
Rated operating voltage	up to 12 kV	up to 7.2 kV	up to 12 kV
Rated short-time withstand current [1]	up to 8 kA	up to 8 kA	up to 8 kA
Rated normal current [2]	400 A	400 A	400 A
Number of mechanical operating cycles of the contactor	up to 1,000,000	up to 1,000,000	up to 3,000,000
Number of mechanical operating cycles of the interrupters	up to 1,000,000	up to 250,000	up to 1,000,000
Number of electrical operating cycles of the contactor I_N	up to 1,000,000	up to 250,000	up to 1,000,000

Voltage transformers
Features
- Inductive principle according to IEC 61869-3, VDE 0414-9-3
  - Cast-resin insulated, single-pole
  - Primary operating voltage up to 24 kV
  - Max. secondary operating voltage up to 120 V or divided by $\sqrt{3}$
  - Accuracy class 0.2; 0.5; 1
  - Rating up to 200 VA
  - Earth-fault winding optional
- Low-power principle according to IEC 60044-8, VDE 0414-44-8
  - Integrated in current-transformer housing, see page 28
  - Cast-resin insulated, single-pole
  - Constructional principle of resistive voltage divider
  - Adjusted numerical protection, control and measuring relays are available
  - Rated secondary voltage 3.25 V/$\sqrt{3}$
  - Accuracy class 0.5 or 3P



Voltage transformer, fixed-mounted



Voltage transformer, withdrawable type with primary fuses

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.

Current transformer

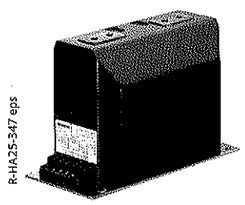
Current transformers

Features

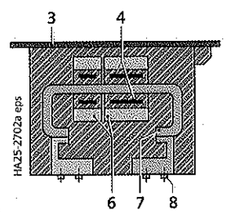
- Inductive block-type current transformer principle according to IEC 61869-2, VDE 0414-9-2, standardized, available worldwide, or inductive bushing-type current transformer principle for NXAIR P and switch panel of NXAIR 24 kV according to the same IEC/VDE standards
- Cast-resin insulated
- Optionally with coupling electrode for capacitive voltage detecting systems for bushing-type current transformers in NXAIR P
- Max. operating voltage up to 24 kV
- Max. rated primary current up to 4000 A
- Max. rated short-time thermal current up to 50 kA, 1 s or 3 s
- Max. rated peak withstand current up to 130 kA
- Max. 3 secondary cores
- Accuracy class 0.2 - 1, or FS5/FS10, or 5P/10P, rating up to 30 VA
- Secondary multiratio possible
- Current transformer certifiable
- Low-power principle for current measuring according to IEC 60044-7, VDE 0414-44-7
- Cast-resin insulated, in the same housing as block-type current transformer transformer or ring-core current transformer
- Constructional principle of ring-core current transformer with integrated precision shunt (burden)
- Transmits primary currents directly proportional to secondary voltages
- Adjusted numerical protection, control and measuring relays are available
- Max. rated primary current 50 to 2500 A
- Max. rated short-time thermal current up to 31.5 kA, 1 s or 3 s
- Max. rated peak withstand current up to 82 kA
- Secondary voltage: 225 mV
- Accuracy class up to 0.5 or 5P
- Low-power principle for voltage measuring
- Integrated in above housing
- Combined with current measuring in low-power technology
- For technical design, see page 27

Current transformer

for NXAIR ≤ 17.5 kV



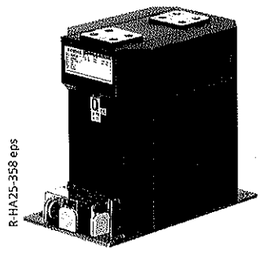
Block-type current transformer up to 4000 A



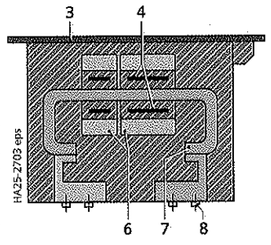
Section

1 Partition between switching device and connection compartment
2 Cup bushing
3 Mounting plate

for NXAIR 24 kV



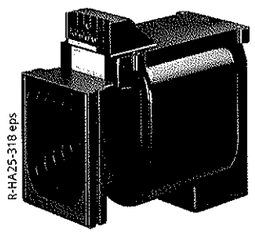
Block-type current transformer up to 2500 A



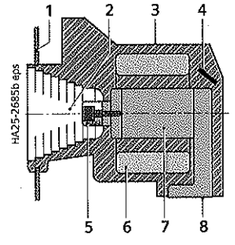
Section

4 Coupling electrode
5 Fixed contact
6 Core with secondary winding
7 Primary conductor
8 Primary connection

for NXAIR P



Bushing-type current transformer up to 4000 A



Section

Bushing-type insulators, low-voltage equipment

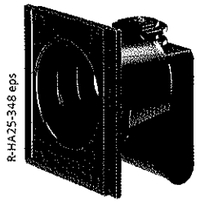
Bushing-type insulators

Features

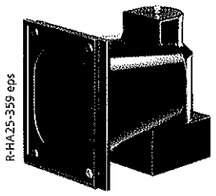
- Cast-resin insulated
- Optionally with coupling electrode for capacitive voltage detecting systems for NXAIR
- Max. operating voltage up to 24 kV
- Max. rated primary current up to 4000 A
- Max. short-time thermal current up to 50 kA, 1 s or 3 s
- Max. rated peak withstand current up to 130 kA.

Bushing-type insulators

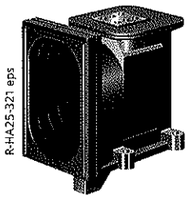
for NXAIR ≤ 17.5 kV



for NXAIR 24 kV



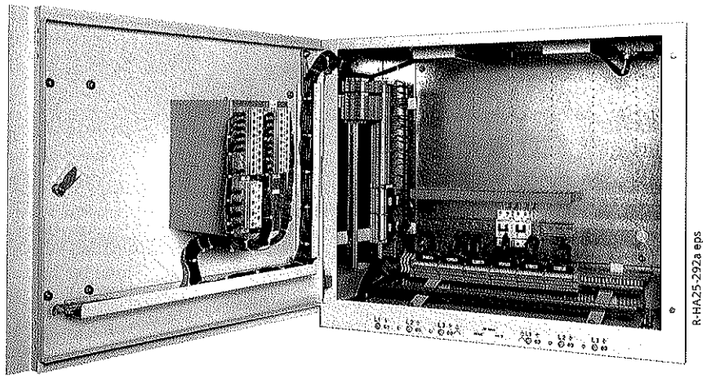
for NXAIR P



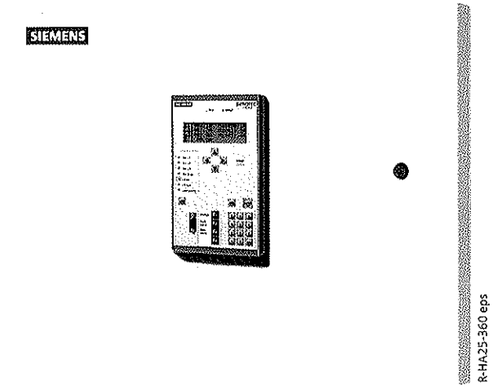
Low-voltage compartment

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: Test sockets for capacitive voltage detecting system at the feeders or the busbar
- Option: Higher low-voltage compartment
- Option: Separation wall from panel to panel
- Low-voltage cables are flexible and protected by metal covers
- Connection of withdrawable part and panel wiring to low-voltage compartment via 10-pole, coded plug connectors
- Bus wires are pluggable from panel to panel.



Low-voltage compartment with built-in equipment (example)



Door of low-voltage compartment (example)

Standards, specifications, guidelines

Type of service location

The switchgear can be used as indoor installation according to IEC 61936 (Power installations exceeding AC 1 kV) and VDE 0101

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

Dielectric strength

- The dielectric strength is verified by testing the switchgear with rated values of short-duration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 62271-1 / VDE 0671-1 (see table "Dielectric strength").
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m³ humidity 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.

Standards

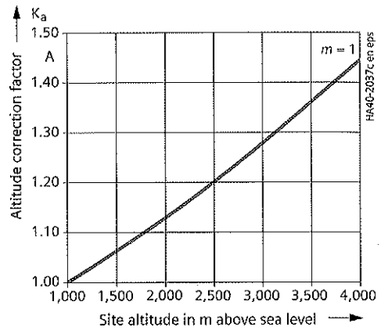
The switchgear complies with the relevant standards and specifications applicable at the time of type tests.
In accordance with the harmonization agreement reached by the countries of the European Union, their national specifications conform to the IEC standard.

Table – 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	35	38	50
– Across isolating distances	kV	23	32	39	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-dur. power-freq. withstand volt. to be selected for site altitudes > 1000 m

≥ Rated short-duration power-frequency withstand voltage up to ≤ 1000 m · K_a

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

≥ Rated lightning impulse withstand voltage up to ≤ 1000 m · K_a

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

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

Overview of standards (July 2013)

		IEC standard	VDE standard	EN standard
Switchgear	NXAIR, NXAIR P	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 0670-501	EN 62271-106
	Disconnectors and earthing switches	IEC 62271-102	VDE 0671-102	EN 62271-102
	Switch-disconnectors	IEC 60265-1	VDE 0670-301	EN 60265-1
	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	–	IEC 60529	VDE 0470-1	EN 60529
Insulation	–	IEC 60071	VDE 0111	EN 60071
Instrument transformers	–	IEC 61869-1	VDE 0414-9-1	EN 61869-1
	Current transformer	IEC 61869-2	VDE 0414-9-2	EN 61869-2
	Voltage transformer	IEC 61869-3	VDE 0414-9-3	EN 61869-3
Installation, erection	–	IEC 61936-1	VDE 0101	–

Standards, specifications, guidelines

Current carrying capacity

- According to IEC 62271-1 / VDE 0671-1 and IEC 62271-200 / VDE 0671-200, the rated normal current refers to the following ambient air temperatures:

– Maximum of 24-hour mean + 35 °C
– Maximum + 40 °C

- The rated normal current of the panels and busbars depends on the ambient air temperature outside the enclosure.

Protection against solid foreign objects, electric shock and water

NXAIR and NXAIR P switchgear fulfills according to the standards
– IEC 62271-200
– IEC 60529
– VDE 0470-1
– VDE 0671-200
the following degrees of protection:

Switchgear panel	NXAIR ≤ 17.5 kV	NXAIR 24 kV	NXAIR P
Degree of protection for the enclosure	IP3XD	IP3XD	IP3XD
optionally	IP4X, IP50, IP51	IP4X, IP50, IP51	–
Degree of protection for the enclosure with ventilation	IP3XD	IP3XD	IP3XD
	IP4X	IP4X	–
Degree of protection for the partitions	IP2X	IP2X	IP2X
Type of protection of enclosure against mechanical impact	IK07	IK07	IK07

Climate and environmental influences

NXAIR, NXAIR P switchgear are suitable for application in indoor installations under normal operating conditions as defined in standard IEC 62271-1 as follows:

- Max. value of ambient air temperature: + 40 °C, average value over period of 24 h: + 35 °C
- Minimum ambient air temperature: – 5 °C
  – 25 °C (on request)
- Altitude of installation ≤ 1000 m
- Average value of relative humidity over period of 24 h: ≤ 95%, over period of one month: ≤ 90%
- Ambient air not segnificantely polluted by dust, corrosive gases, vapours or salt.

The switchgear may be used, subject to possible additional measures, under the following environmental influences:
– Natural foreign materials
– Chemically active pollutants
– Small animals

and the climate classes:
– 3K3
– 3K5.

The climate classes are defined according to IEC 60721-3-3.

Aseismic capacity

NXAIR ≤ 17.5 kV, NXAIR 24 kV und NXAIR P switchgear is tested in accordance with following internationally accepted requirements: IEC 62271-210 (draft), IEC 68-3-3, IEC 68-2-6, IEEE 693, UBC Division IV

Internal arc classification

- Protection of operating personnel by means of tests for verifying the internal arc classification
- Internal arcing tests must be performed in accordance with IEC 62271-200 / VDE 0671-200
- The switchgear complies with all criteria specified in the a.m. standards (page 25) for the basic version up to 50 kA
- NXAIR and NXAIR P comply with the internal arc classification: IAC A FLR up to 50 kA, 1 s.
  This provides maximum personal safety of switchgear accessible from all sides
- Definition of criteria:

– Criterion 1
Correctly secured doors and covers do not open, limited deformations are accepted
– Criterion 2
No fragmentation of the enclosure, no projection of small parts above 60 g
– Criterion 3
No holes in accessible sides up to a height of 2 m
– Criterion 4
No ignition of indicators due to hot gases
– Criterion 5
The enclosure remains connected to its earthing point

- Beyond the specifications of the above-mentioned standards, NXAIR switchgear up to 31.5 kA / 1 s resp. 40 kA / 0.1 s optionally are designed with confinement of internal arcs to the respective compartment.

Terms

"Make-proof earthing switches" are earthing switches with short-circuit making capacity according to
– IEC 62271-102 and
– VDE 0671-102 / EN 62 271-102.