NXAIR S
Withdrawable Medium-Voltage Circuit-Breaker Switchgear up to 12kV, Air-Insulated

SIEMENS

Contents

Types

Circuit-breaker switchgear NXAIR S,is factory-assembled, type-tested, metal-enclosed and metal-clad switchgear for indoor installation according to GB3906, DL404 (insulation) IEC 62 271-200

Loss of service continuity category:	LSC2B
Partition class:	PM
Internal arc classification:	IAC A FLR, $I_{sc} \leqslant 40kA$, arc durationt=1s

(see also Section "Classification" on page 3)

NXAIR S panel
Maximum ratings
12kV/40kA/3150A

Application

Typical uses

Application
Industry

Application
Public power
supply system

NXAIR S switchgear

Application
Industry

Typical uses

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

Application
Public power supply system
- Power supply companies

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 supplies

Classification

NXAIR S switchgear correspond to the following classifications according to GB3906, DL404(insulation) IEC62271-200

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-based
Connection compartment	Interlock-based

Internal arc classification	
The following internal arc classifications are fulfilled:	
IACAF LR, 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 S up to 40kA
t	= Arcing time 1 s
In this way,NXAIR S, are suitable for unrestricted application(wall or free-standing arrangement) inelectrical service locations up to the maximum short-circuit current ratings.	

Requirements

Customer benefits and features

Customer benefits	Features
Peace of mind For power supply companies and industrial plants, the certification of NXAIR S according to the latest standards has very concrete advantages: smooth operation, exemplary availability and maximum safety.	• Factory-assembled, type-tested switchgear according to GB, DL IEC Standard • Modular design with pressure-resistant partitions (switching-device, connection, busbar compartments and low-voltage compartment replaceable) • Bushing-type transformer principle (post insulator, current measurement, partition integrated in one unit) • More than 300,000 air-insulated switchgear panels from Siemens in operation worldwide • Use of maintenance-free vacuum circuit-breakers • Type testing of the vacuum circuit-breaker and make-proof earthing switch in the panel • Pressure-resistant partitions • Use of standard, worldwide available components • Quality management according to ISO 9001
Saves Lives (All switchgear types of the NXAIR S family are approved with internal arc classification IAC A FLR), loss of service continuity category LSC 2B, partition class PM. This makes them suitable for universal installation, meeting the highest requirements regarding personal safety.	• All switching operations with high-voltage door closed • Metallic enclosure, earthed shutters and partitions • Switchgear with internal arc classification according to IAC A FLR (front, lateral and rear accessibility) for all short-circuit currents and an arc duration of 1 s • Loss of service continuity category LSC 2B (separate partitions for busbar, connection and switching-device compartments) • Partition class PM (metal-clad in pressure-resistant design) • Clear switch position indicators and control elements on the high-voltage door • Use of vacuum circuit-breakers • Standard degree of protection IP4X • Positively driven shutters • Logical mechanical interlocking system
Increases productivity Features such as modular design, type tests of the circuit-breaker in the switchgear, selective shutdown of a possible arc-fault, confinement of an internal arc to the respective compartment and thus, maximum personal safety contribute to uninterrupted operation and a remarkable increase of productivity.	• Modular panel design enables fast replacement of the respective compartments • Selective shutdown of an arc fault possible • Loss of service continuity category LSC 2B (separate partitions for busbar, connection and switching-device compartments) • Cable testing without isolating the busbar • Bushing-type transformer principle (current measurement, partition integrated in one unit) • Confinement of internal arc • Use of maintenance-free vacuum circuit-breakers • Control cables in metallic wiring ducts
Saves money Thanks to the use of the new circuit-breaker series SION, the compact design of NXAIR S family pays twice for the owner. On the one hand building costs can be reduced, and on the other hand, the maintenance-free circuit-breakers and the modular design enable continuous operation without expensive shutdown times.	• Use of maintenance-free vacuum circuit-breakers • Maintenance intervals of the switchgear > 10 years • Interruption of operation reduced to a minimum by modular design, logical mechanical interlocking system • Enables selective shutdown of a possible arc fault • Minimized space requirements (reduced building investments) due to compact design

NXAIR S Electrical data

Rated values

Rated			
- voltage	kV	7.2	12
- frequency	Hz	50	50
- short-duration power-frequency withstand voltage (phase-to-phase, phase-to-earth)	kV	32	42
- lightning impulse withstand volt. (phase-to-phase, phase-to-earth)	kV	60	75
- short-circuit breaking current	max.kV	40	40
- short-time withstand current, 4s	max.kV	40	40
- peak withstand current	max.kA	100	100
- short-circuit making current	max.kA	100	100
- normal current of busbar	max.A	3150	3150
- normal current of feeders:			
with circuit-breaker	max.A	3150	3150
with contactor	max.A	400	400
with disconnector link	max.A	3150	3150
with switch-disconnector	max.A	400 3150	400 3150
bus sectionalizer	max.A	3150	3150

Dimensions

Dimensions in mm

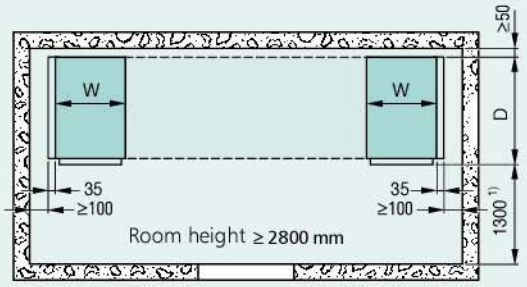
Width W	Circuit-breaker panel ≤2500A 3150 A	 800 1000
	Contactor panel ≤400A	600
	Disconnector link panel ≤2500A 3150A	 800 1000
	Switch-disconnector panel ≤400A	800
	Bus sectionalizer ≤2500A 3150A	 2 × 800 2 × 1000
	Metering panel	800
	Busbar connection panel ≤3150A	800
Height H1	With standard low-voltage compartment natural ventilation	2150
H2	With high low-voltage compartment or with additional compartment for busbar components	2430
Depth D	Single busbar ≤31.5kA, ≤2500A 40kA, 3150A	 1350 1450
Weight kg	7.2kV–12kV	700

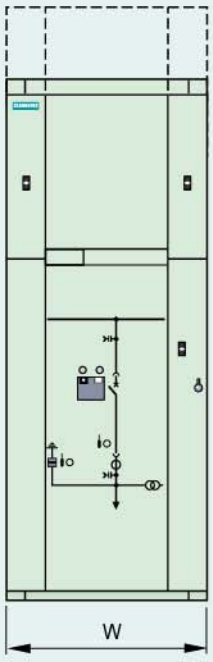
Technical data

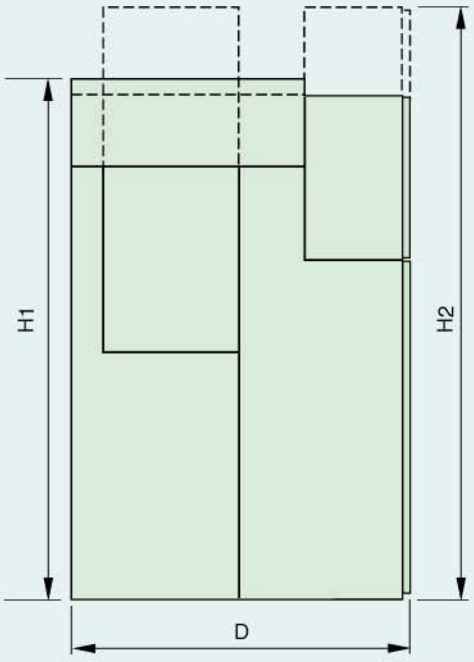
NXAIR S Electrical data

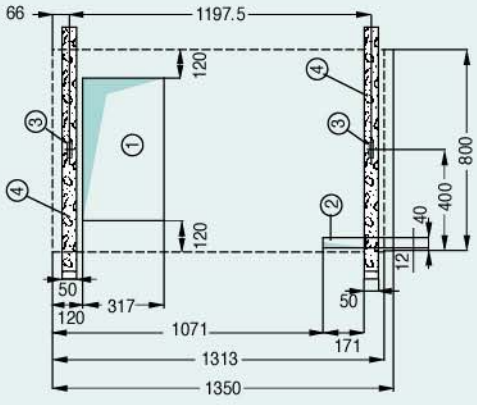
NXAIR S

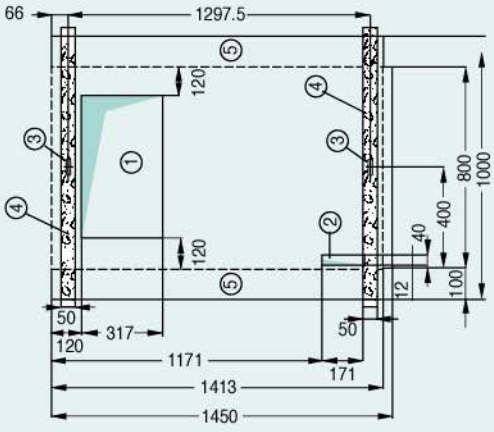
Single-row arrangement (plan view)
for single-busbar switchgear
For dimensions B (width) and T (depth) see table on page 6
1) For panel replacement: Control aisle ≥1300 mm
For back-to-back and face-to-face arrangement, the corresponding room dimensions apply as for single-row arrangement.For back-to-back arrangement, a 1300 mm wide control aisle is required on the left or on the right of the switchgear.
Room height ≥2800 mm







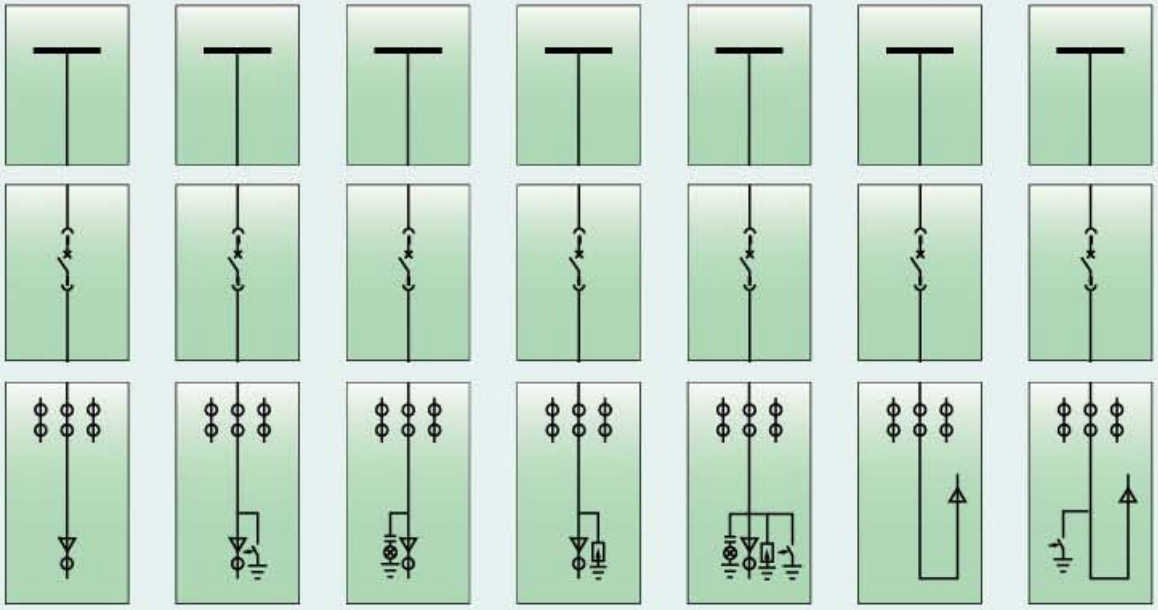


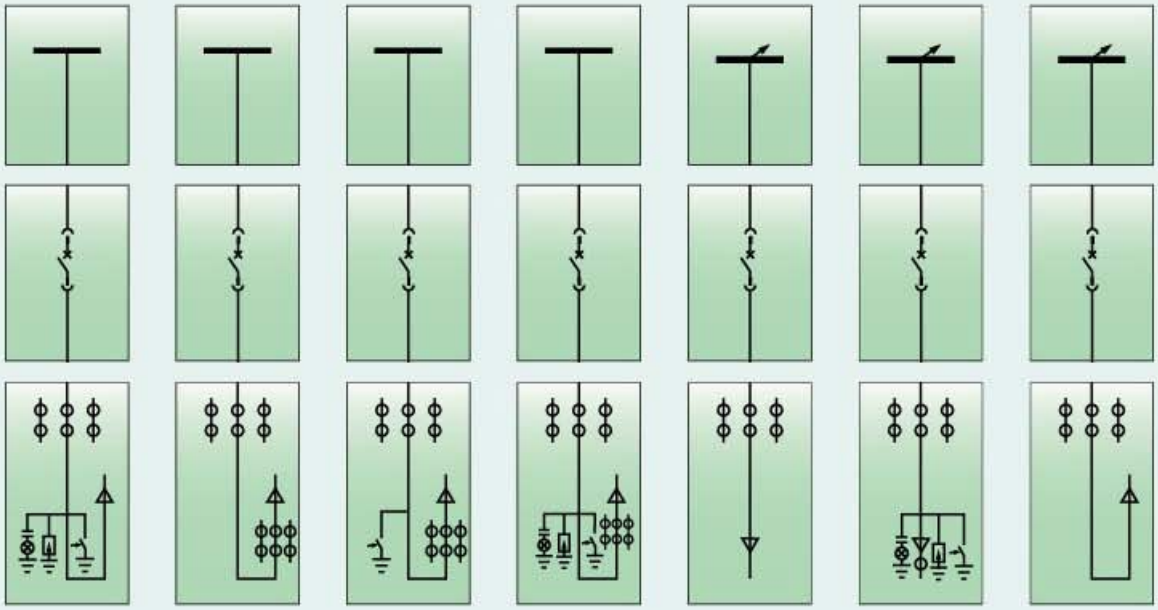


Dimension of the cutouts and fixing point for switchgear

① Cutout of the foundation for HV cable connection
② Cutout of the foundation for the control cable
③ Fixing point (20×60mm cutout)
④ Parallel installation rails
The rail must be flattened and straightened before secondray casted, horizontal tolerance≤0.2%(according to the design drawing when foundation construction)
⑤ Ventilation channel (above rated current 3150A panel)

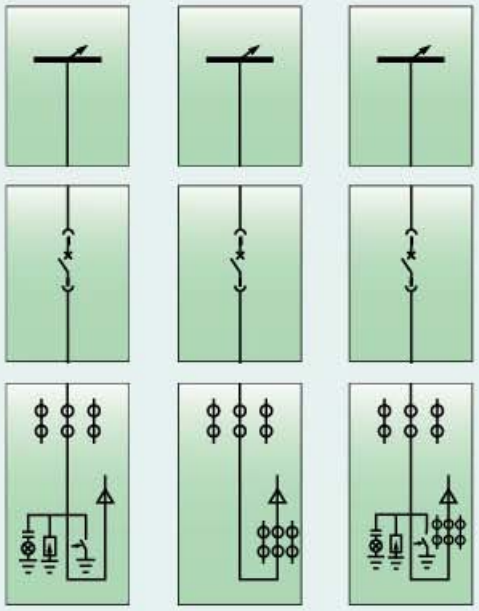
VCB incoming/outgoing panel A





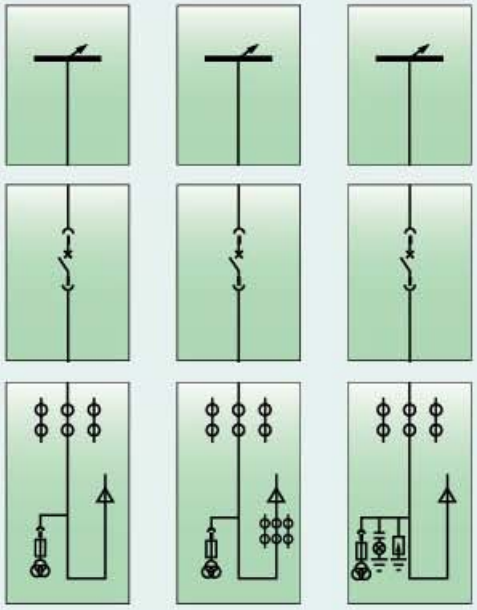
Product Range

VCB incoming/outgoing panel A



A 15 A 16 A 17

Only for rated current≤1250A



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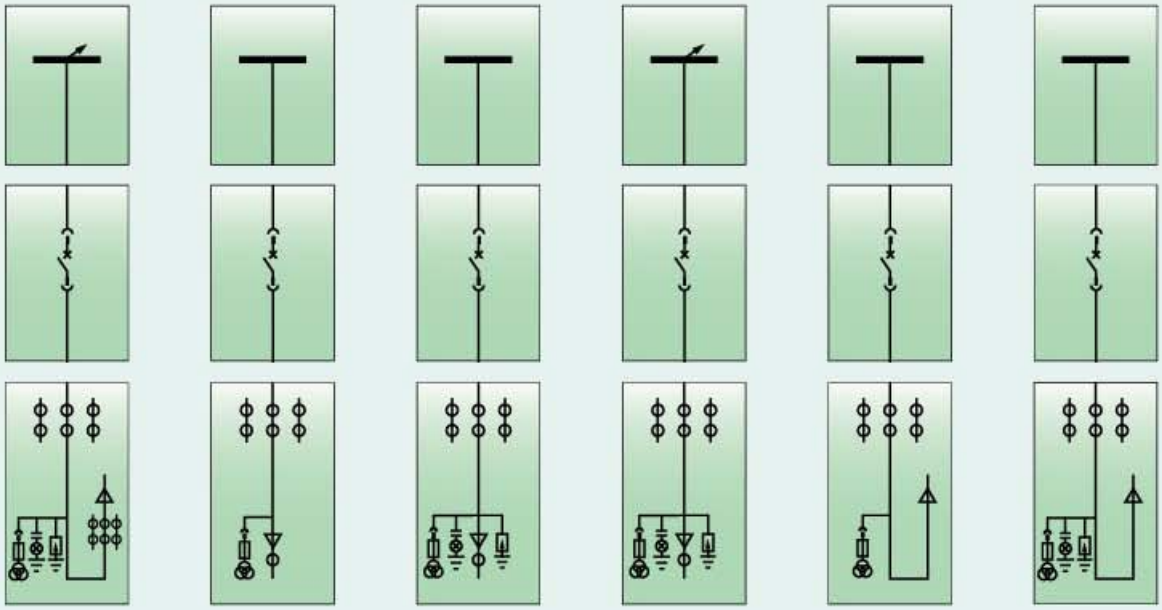
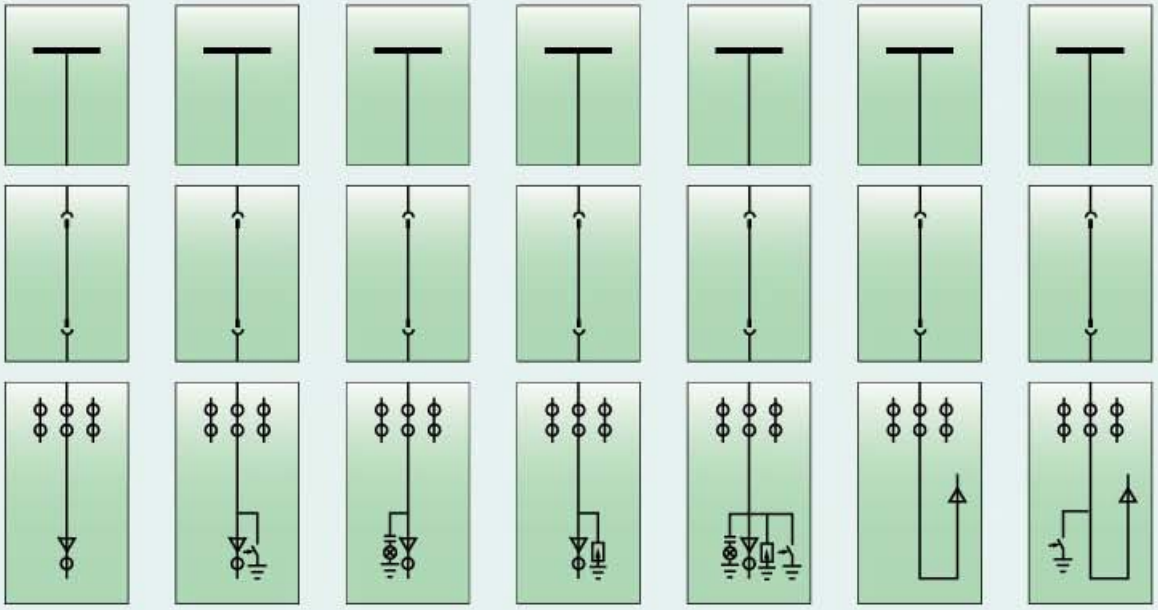
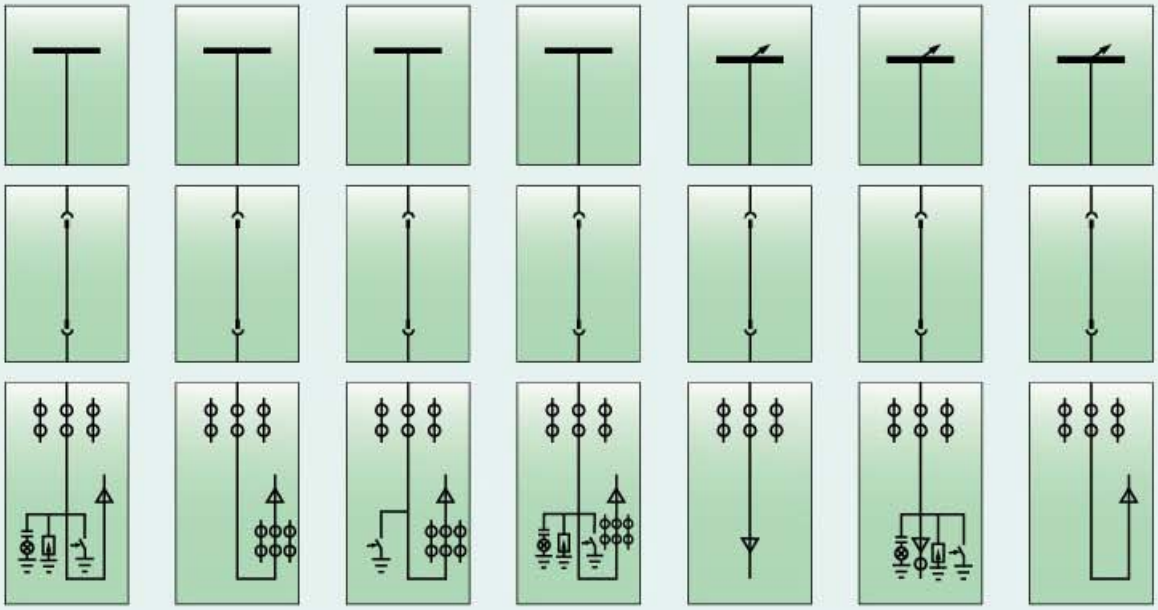


A 21 A 22 A 23 A 24 A 25 A 26

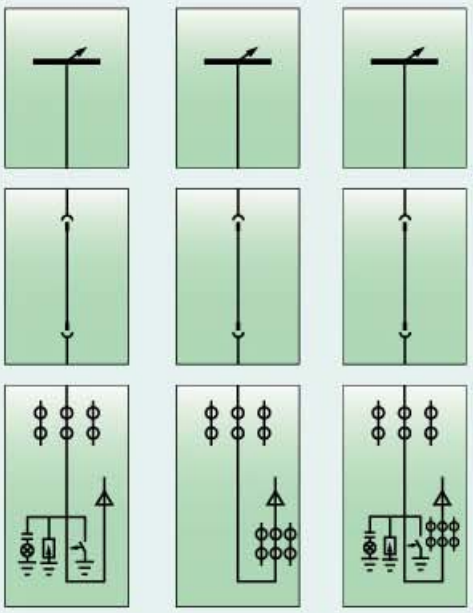
Disconnect truck incoming/outgoing panel B





Product Range

Disconnect truck incoming/outgoing panel B



B 15 B 16 B 17

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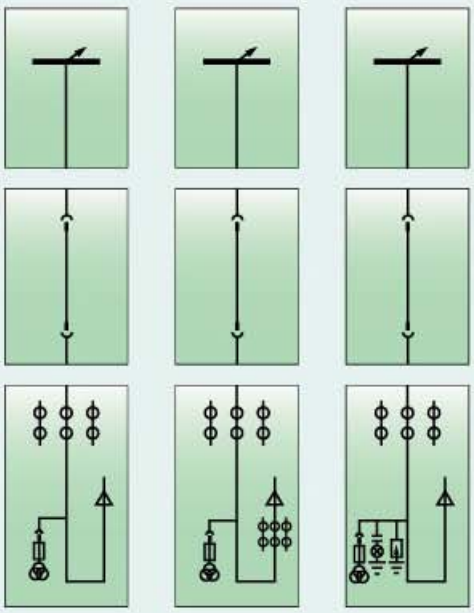

B 18 B 19 B 20

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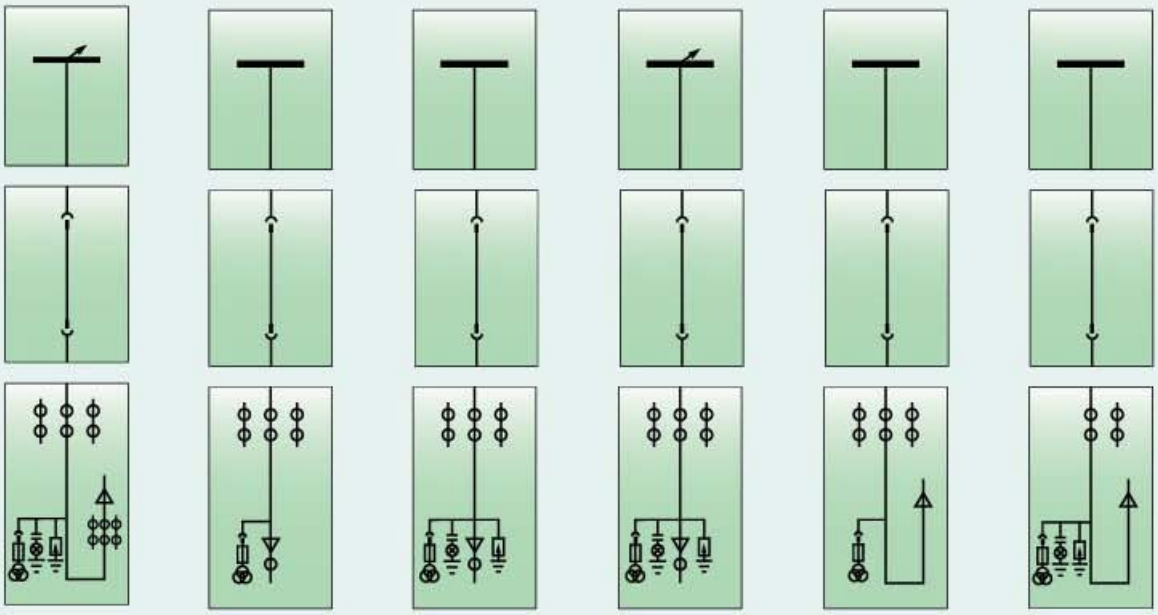
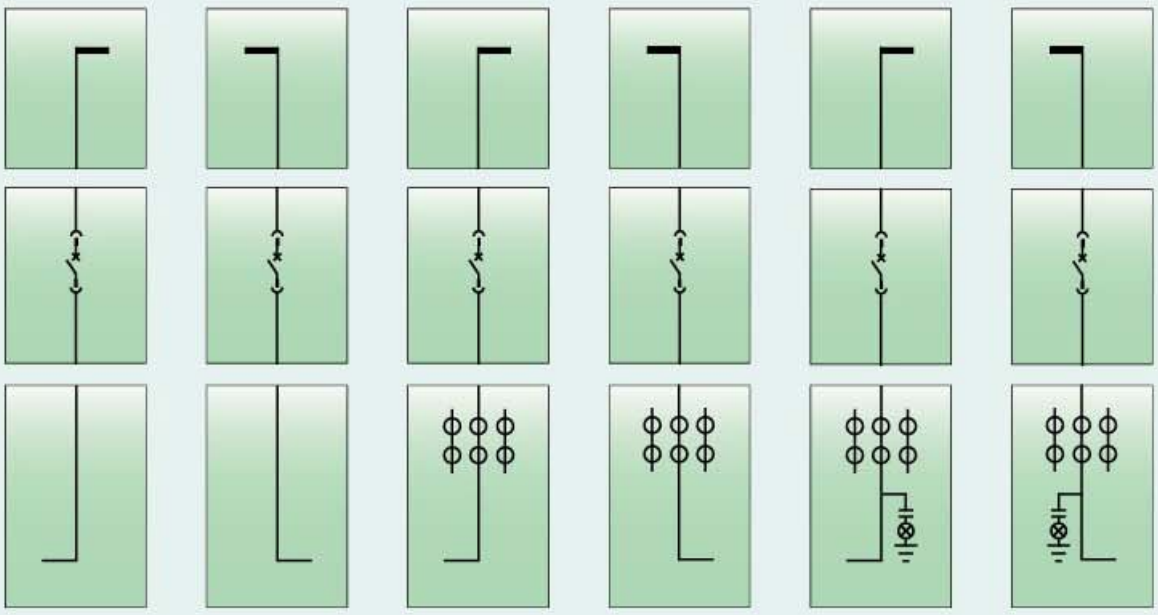
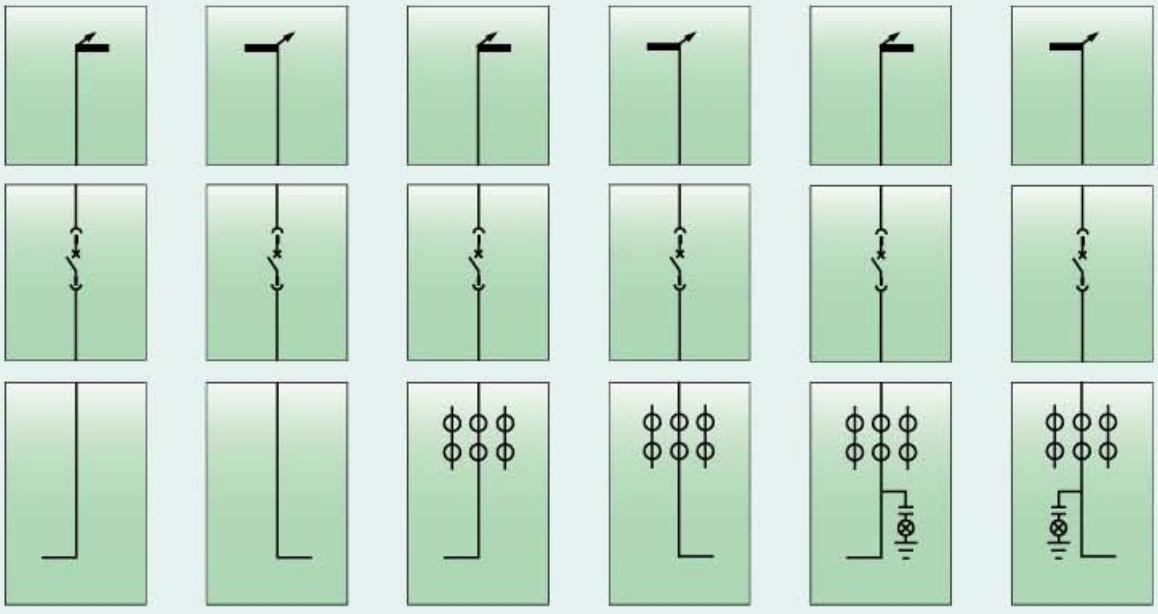


B 21 B 22 B 23 B 24 B 25 B 26

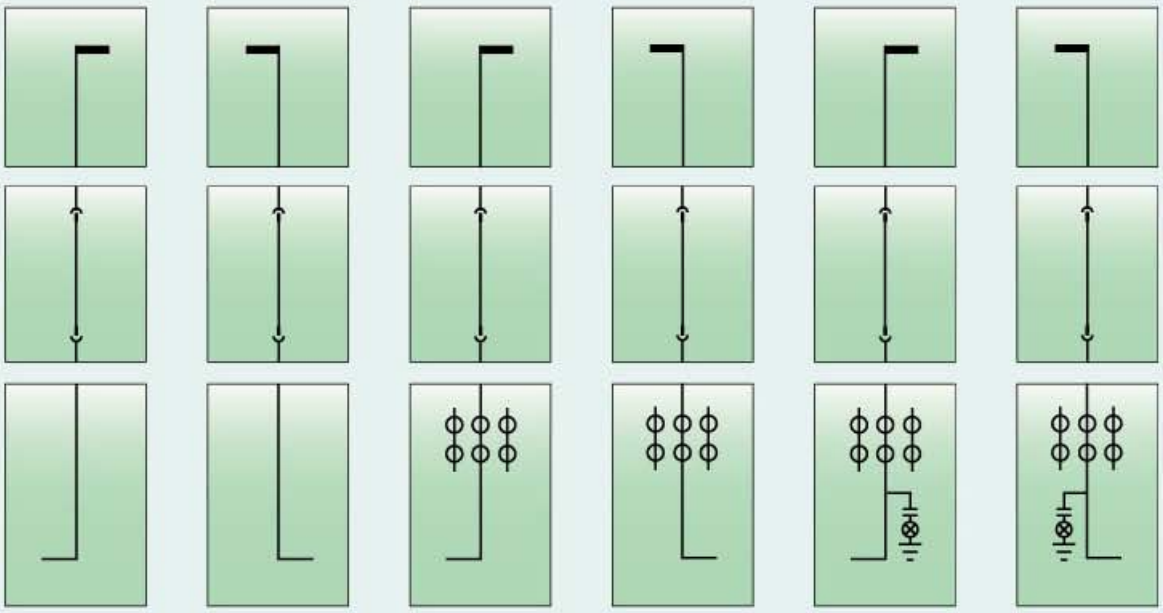
VCB sectionlizer panel C

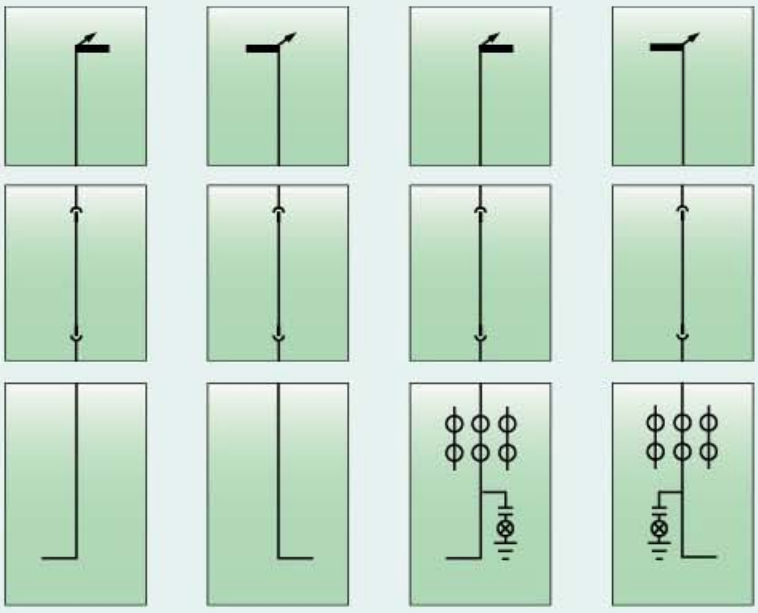




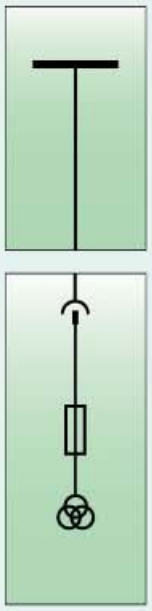
Product Range

Disconnect truck sectionlizer panel D





PT panel E



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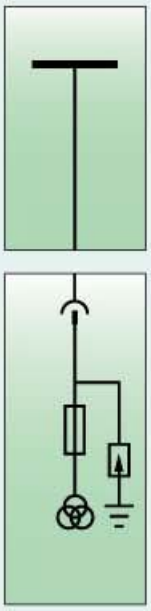

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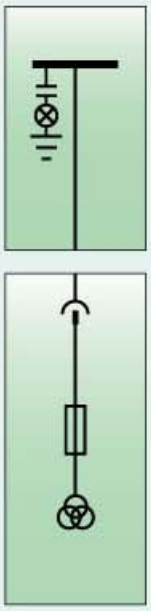

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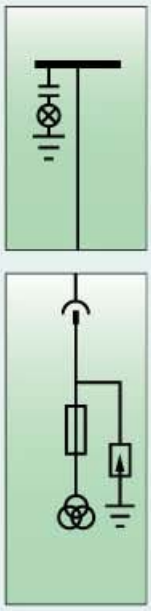

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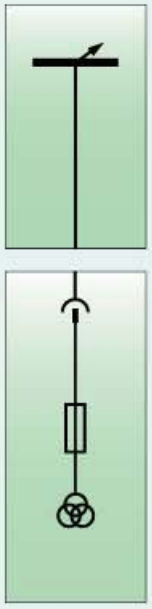

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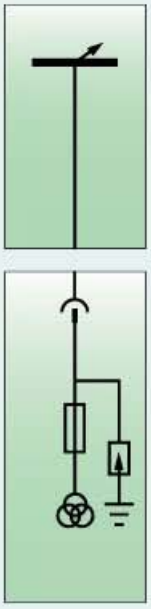

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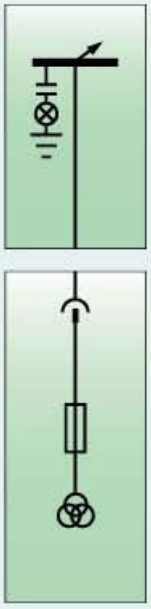

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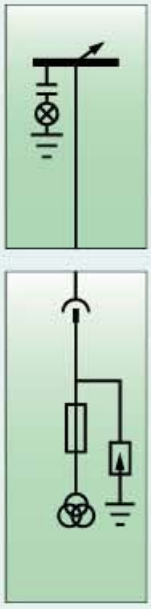
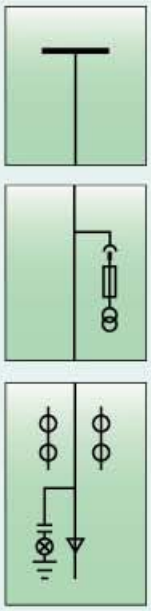


E 08

Product Range

Metering panel F



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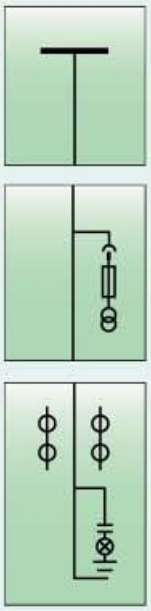

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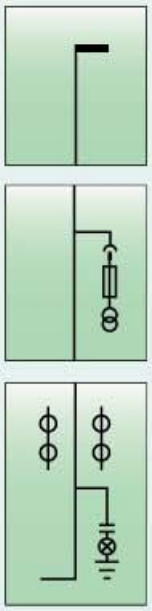

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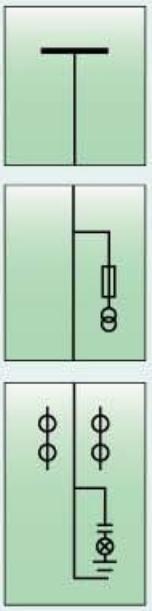

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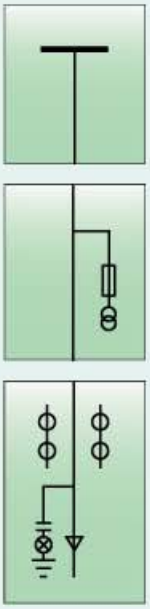

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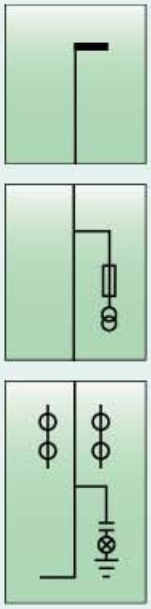

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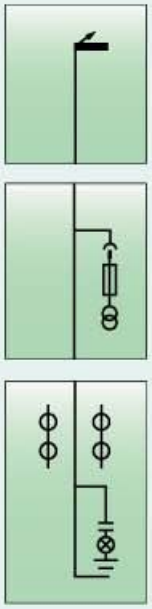

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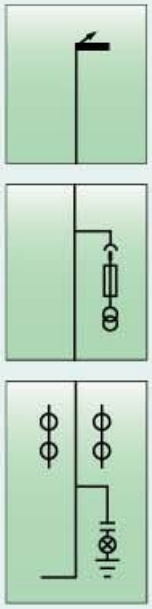
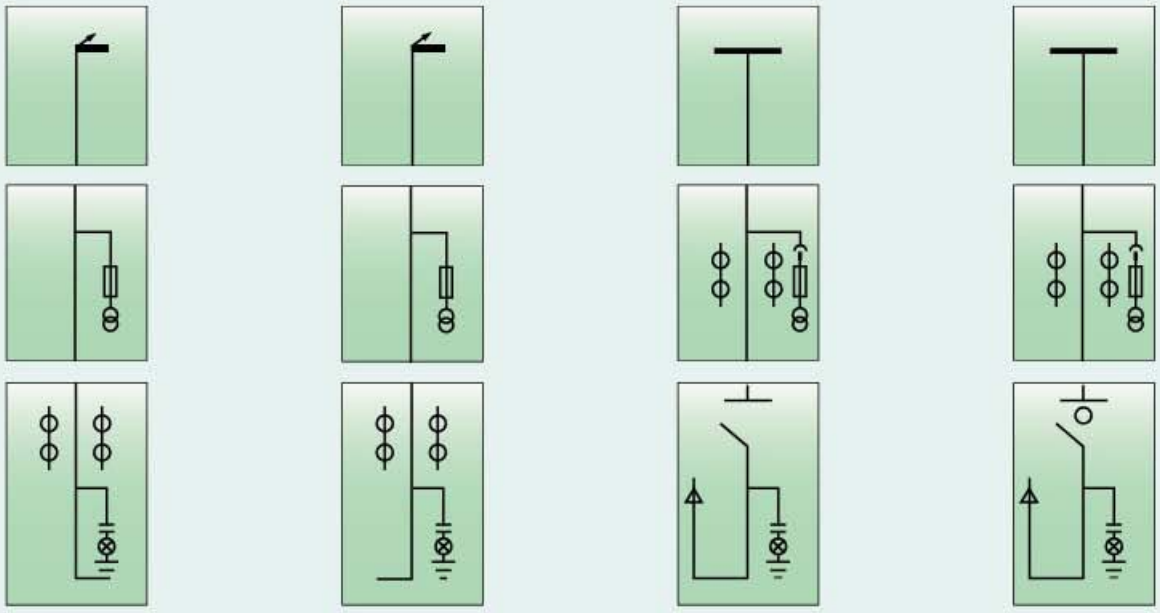


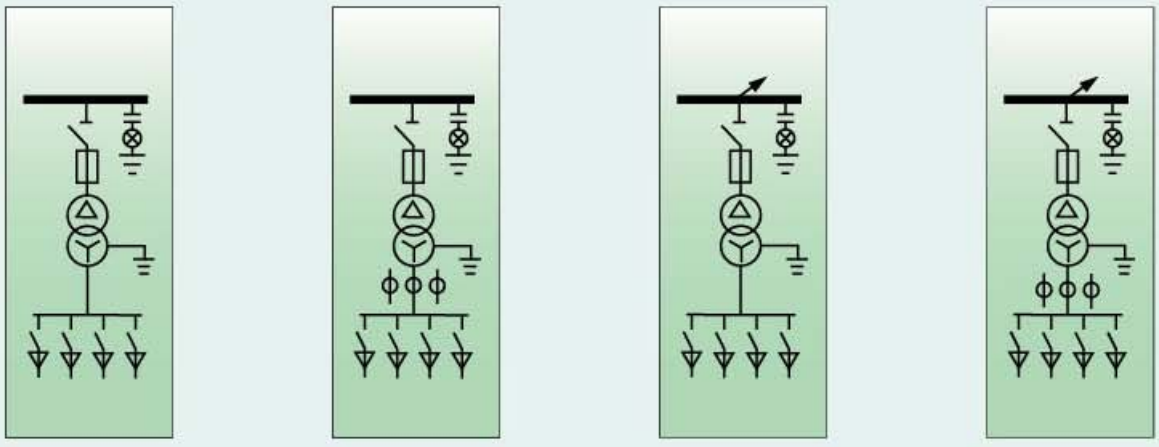
F 08

Metering panel F



F 09 F 10 F 11 F 12

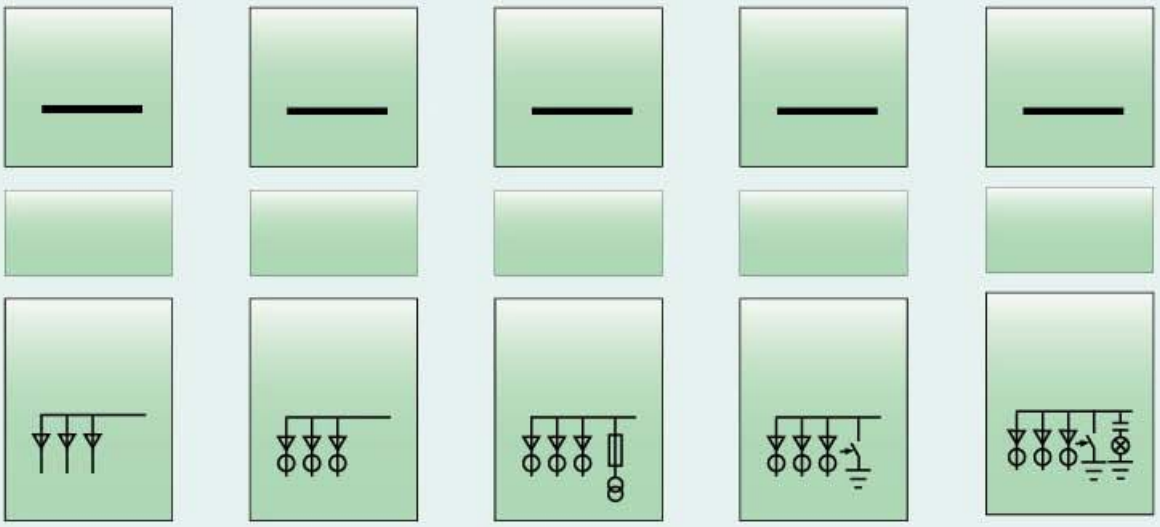
Station transformer panel G



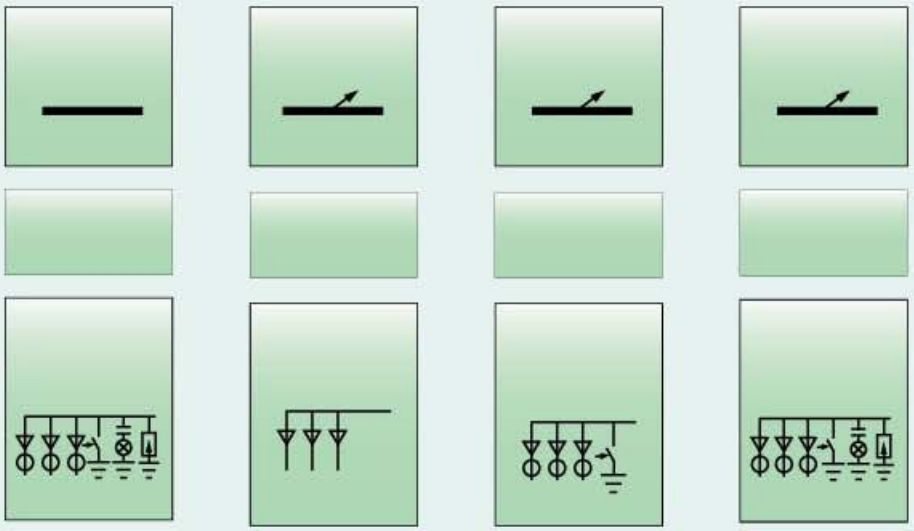
G 01 G 02 G 03 G 04

Product Range

Cable-connector panel H



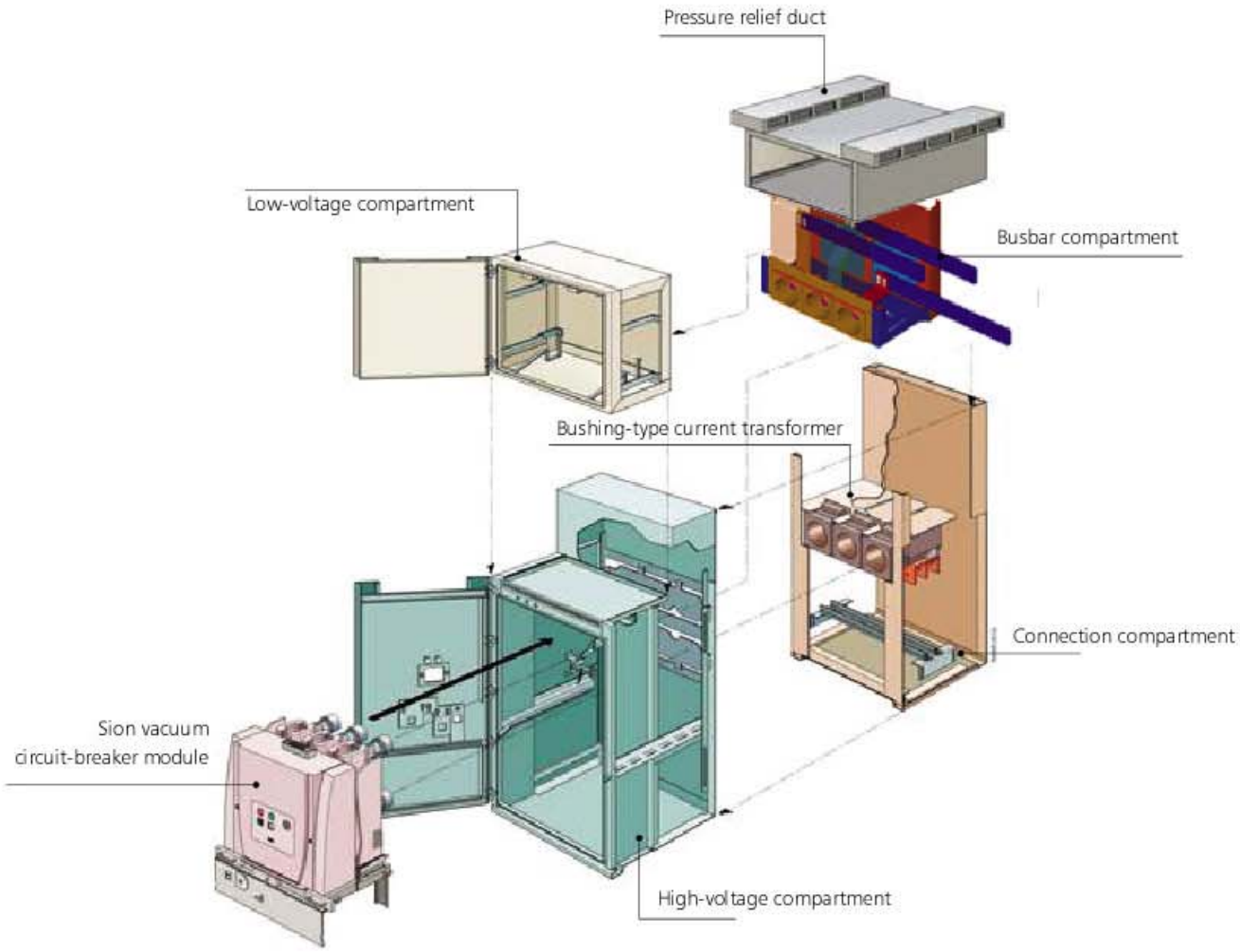
H 01 H 02 H 03 H 04 H 05



H 06 H 07 H 08 H 09

Note: We can offer the product with special design according to the requirement of project

Each compartment and components



Design

NXAIR S Panel design, operation

Operation at the panel

Features

- Integrated mimic diagram
- Recognition of the respective switch positions for circuitbreaker CLOSED/OPEN, disconnected position, earthing switch CLOSED/OPEN on the integrated mimic diagram
- Unambiguous assignment of actuating openings and control elements to the corresponding switch 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 – of feeder or busbar – by means of a capacitive voltage detection system with panel front closed

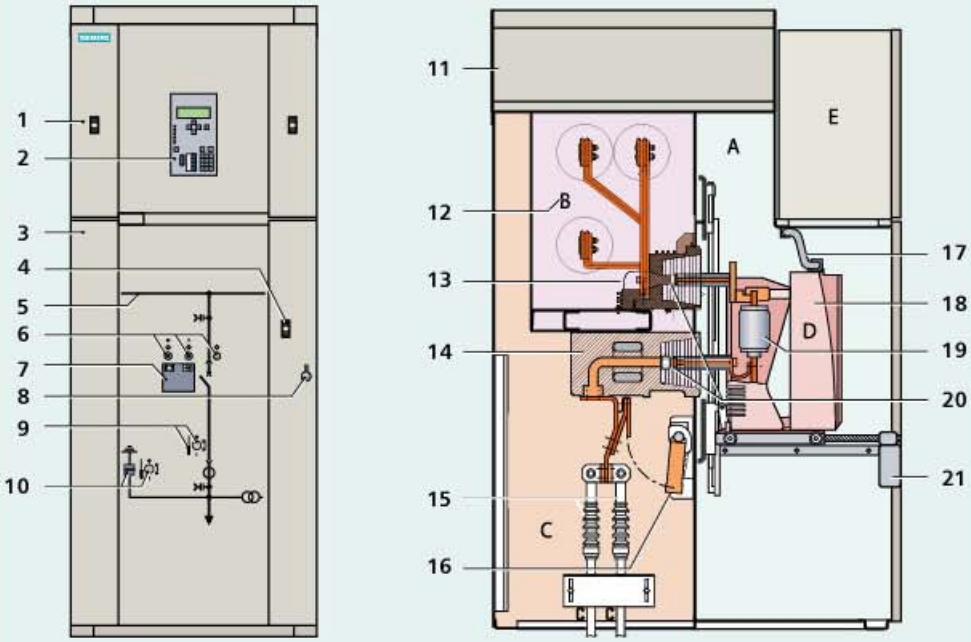
Interlocks

- Interlocking conditions are satisfied according to GB 3906 IEC 62 271-200
- Feeder earthing switch can only be operated with switching device in disconnected position
- Switching device can only be moved on the movable part with the associated switching device OPEN and earthing switch OPEN
- Switching device can only be operated in interlocked disconnected or service position

Beyond the specifications of the standards

- Mechanical coding prevents insertion of switching devices for lower rated normal currents into panels with higher rated normal currents
- Interlocking of high-voltage door against withdrawable part
- Option: Electromagnetic interlocks, padlocks

Basic panel design (example)



1 Door of low-voltage
2 Protection device
3 High-voltage door
4 Locking device for high-voltage door
5 Mimic diagram
6 "ON/OFF" actuating openings for the circuit-breaker, opening for spring charging
7 Inspection window to recognize the disconnected/service position, "CLOSED/OPEN" indication of the circuit-breaker, "closing spring charged" indication and operating cycle counter
8 Door knob for opening the high-voltage door
9 Actuating opening to move the switching device
10 Mechanical switch position indicator and actuating opening for the make-proof
11 Pressure relief duct
12 Busbars
13 Insulator
14 Bushing-type current transformer
15 Cable connection for 4 cables per phase
16 Make-proof earthing switch
17 Low-voltage plug connector
18 Operating and interlocking unit for the circuit-breaker
19 Vacuum interrupters
20 Contact system
21 Operating and interlocking unit for moving the circuit-breaker and for earthing

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

NXAIR S Panel

Switching-device compartment

- Enclosure made of sendzimir-galvanized sheet-steel
- Pressure relief upwards
- Panel front powder-coated with epoxy resin
- Shutter operating mechanism separately for closing and opening the
  – busbar compartment
  – connection compartment
- High-voltage door pressurere-sistant in the event of internal arcs in the panel
- For NXAIR S:
  Pressure-resistant partitions to connection and busbar compartments
- Metallic ducts on the side for laying 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
  Vacuum contactor
  Disconnector link
  Withdrawable metering unit
  – Fixed-mounted devices:

Busbar compartment

- Enclosure made of sendzimir-galvanized sheet-steel
- Pressure relief upwards
- Option: Inter unit bus support from panel to panel for NXAIR S
- Busbars made of flat copper, bolted from panel to panel
  – option: Insulated busbars
- For NXAIR S:
  Pressure-resistant partitions between connection and switching-device compartment, pressure-resistant rear wall
- Shutters to be opened separately and lockable
- Bushing-type insulators for supporting busbars and for accommodating upper mating contacts for the switching device
- Option: Max. 3 bushingstype current transformers
- Option: Coupling electrode for capacitive voltage detection system

Additional compartments (optional) for busbar components in NXAIR S, refer also to product range

- Separate, pressure-resistant compartment above busbar compartment
- Pressure-resistant partition with bushings between additional compartment and busbar compartment if voltage transformers are installed
- Separate pressure relief for additional compartment, upwards via pressure relief flaps
- Options: Possibility of installing the following components (but not for panels with natural ventilation, refer also to product range)
  – voltage transformers
  – current transformers in run of busbar
  – make-proof earthing switch
  – bus riser
  – surge arresters

Connection compartment

- Enclosure made of sendzimir-galvanized sheet-steel
- Pressure relief upwards through rear pressure-relief duct
- For NXAIR S
  Pressure-resistant partitions between connection and busbar compartment
- Shutters to be opened separately and lockable
- Earthing busbar
- Option: Installation of bushing-type insulators instead of bushing-type current transformers
- Option: Coupling electrode for capacitive voltage detection system
- Option: Pressure-resistant floor cover
- Option: Deep bottom pan, e.g. for connection of three core cables or cable-type current transformers
- Connection from front or rear, primary cables from below or above
- Suitable for connection of:
  – single-core XLPE cables up to 6 x 500mm2
  – three-core cables 3 x 240mm2 per panel
  – bars in flat copper with bushings in a floor cover or as fully-insulated bars including floor cover
- Installation of voltage transformers
  – cast-resin-insulated
  – 3 x 1-pole
  – fixed-mounted, without primary fuses
  – optionally withdrawable with primary fuses in separate compartment
- Make-proof earthing switch
  – with manual operating mechanism
  – in addition to the standard interlocking: Between earthing switch and withdrawable switching device, optionally lockable or with electromagnetic interlock
- Surge arresters or limiters
  – surge arresters for protecting the switchgear against external overvoltages
  – surge limiters for protecting consumers against switching overvoltages

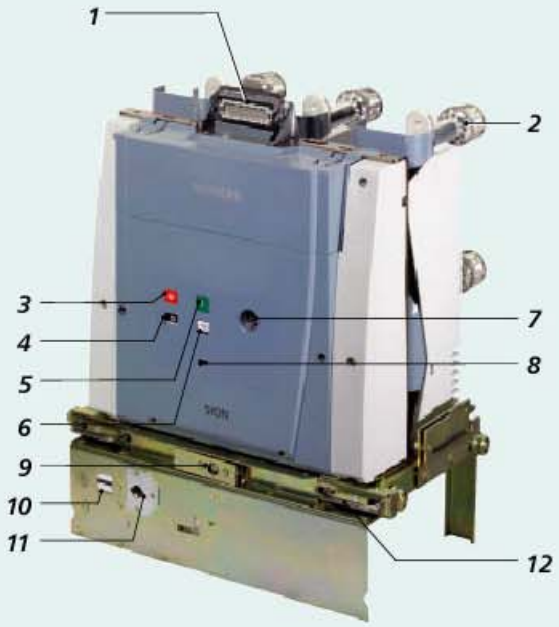
Components

Vacuum circuit-breakers

Features

- Corresponding to IEC 62 271-100 GB 1984-2003
- Suitable for all switching duties
- Circuit-breaker always with motor operating mechanism, manual operation always possible
- Moving the circuit-breaker with manual
- 64-pole low-voatage plug connector between circuit-breaker and fixed part
- Maintenance-free operating mechanisms under normal climatic conditions and max.permissible number of operating cycles
- Contact arms(optional)
  - special contacts
  - round contacts

SION



1 64-pole low-voltage pulg connector
2 Primary contacts
3 "OFF" pushbutton
4 Switch position indicator circuit-breaker
5 "ON" pushbutton
6 "Spring charged" indicator
7 Hand crank coupling for the spring energy store
8 Operating cycle counter
9 Actuating opening to moving mechanism
10 Position indicator earthing switch
11 Actuating opening earthing switch
12 Locking/unlocking of the withdrawable part

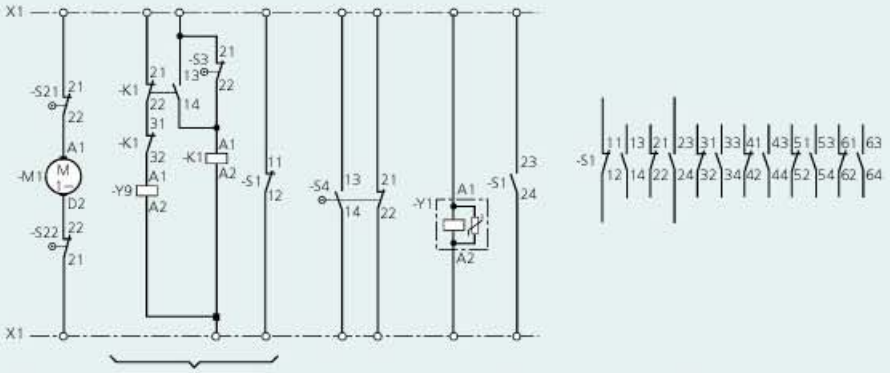
Electrical data for	NXAIR S
Rated operating voltage	up to 12kV
Rated short-circuit breaking current	up to 40kA
Rated short-time withstand current	up to 40kA/4s
Rated short-circuit making current	up to 100kA
Rated peak withstand current	up to 100kA
Rated normal current	up to 3150A

Schematic diagrams (not binding-examples only)

Legend

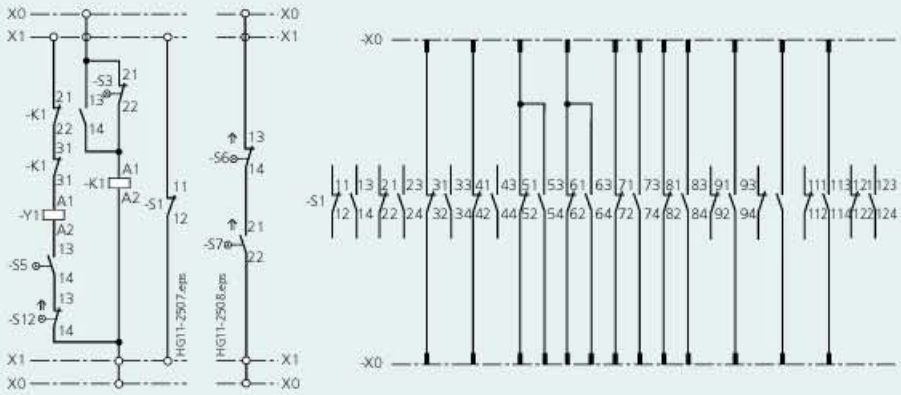
k1 Relay (anti-pumping)
M1 Motor-operated mechanism
R1 Resistor
S1 Auxiliary switch
S12 Position switch (Mechanical interlocking)
S21 Position switches
S22 (switch off motor-operated mechanism after spring charging)
S3 Position switch (switch off after spring charged)
S4 Position switch (signal of spring status)
S5 Electrical closing lock-out
S6 Breaker tripping signal
S7 Cut-out switch for breaker tripping signal
X0 24-pole or 64-pole plug connector
X1 27-Pole Terminal Strip
Y1 1st shunt release
Y2 2nd shunt release
Y4 Over-current release (rated current of 0.5A or 1A)
Y7 Undervoltage release
Y9 Closing coil

Basic equipment



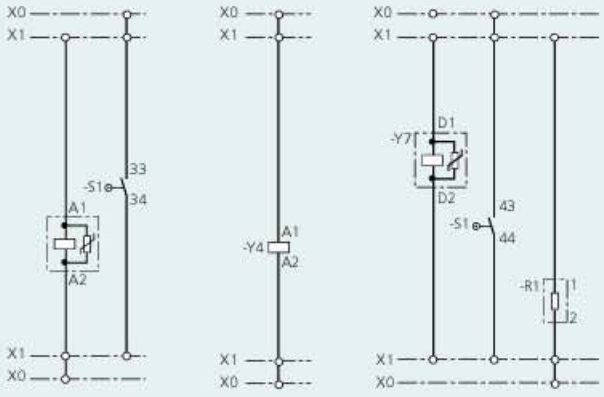
Motor-operated mechanism | Closing and anti-pumping for motor-operated stored-energy mechanism | "Closing spring charged" signal | 1st shunt release | Auxiliary switch

Additional equipment



Closing and anti-pumping for motor-operated stored-energy mechanism | Breaker tripping signal | Auxiliary switch (12NO+12NC)

Additional equipment releases



2nd shunt release | Over-current release 0.5 A or 1 A | Undervoltage release

Components

SION (3AE) vacuum circuit-breaker technical data

Vacuum circuit-breaker			
Type		3AE	
Rated voltage	kV	12	
Rated power frequency withstand voltage	kV	42	
Rated lightning impulse withstand voltage	kV	75	
Transient recovery voltage value	kV	20.6	20.6
Transient recovery voltage RRRV	kV/μs	0.34	0.34
First-pole-to-clear factor		1.5	1.5
Amplitude factor		1.4	1.4
VCB contacts material		Cr-Cu	Cr-Cu
Rated operating sequence		O-0.3s-CO-180s-CO(≤31.5kA),O-180s-CO-180s-CO(40kA)	
Pole-centre distance	mm	210	
Rated current	max. A	3150	
Rated short-circuit breaking current	max. kA	40	
Rated short-circuit duration	max. kA/s	40kA/4s	
Short-circuit current operating cycles		274(according GB1984-2003 to IEC62271-100)	
Rated current operating cycle		30000	
Rated short-circuit making current	kA	100	
Rated peak withstand current	kA	100	
Rated capacitor bank making and breaking capacity	A	630	
Break time	ms	≤75	
Closing time	ms	≤75	
Opening time	ms	35-60	
Arcing time	ms	15	
Reclosing time	sec	0.3	
Close-open-time	ms	<100	
1st shunt release current/DC 220V	A	0.65	
Closing solenoid/DC 220V	A	0.65	
1st shunt release current/DC 110V	A	1.30	
Closing solenoid/DC 110V	A	1.30	
1st shunt release tripping voltage range	%	65%-110%	
Closing solenoid tripping voltage range	%	85%-110%	
1st shunt release power consumption	W	140	
Closing solenoid power consumption	W	140	
Spring charging time	s	≤15	
Charging motor voltage	V	DC110, DC220, AC110, AC220	
Charging motor operating voltage range	%	85%-110%	

Other switching devices

Vacuum contactor

Features
- According to GB 14808, IEC 60 470
- Suitable for operating consumers with high switching frequencies
- Short-circuit protection for 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
- Moving of the contactor by manual operating mechanism
- 64-pole low-voltage plug connector between the contactor and the fixed part
- Maintenance-free operating mechanisms under normal climatic conditions and max. permissible number of operating cycles
- Contact arms generally with silver-plated round contacts

Switch-disconnector

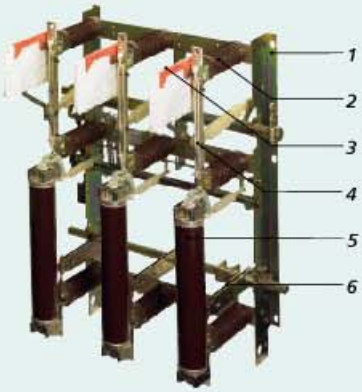
Features
- According to GB1985, GB16926 IEC 60 265-1,IEC 62 271-105,
- Suitable for operating station service transformers
- Short-circuit protection via HV HRC fuses
- Fixed-mounted switch disconnector
- Loss of service continuity category for this panel: LSC 2A
- Switch-disconnector always with manual operating mechanism
- 64-pole low-voltage plug connector

for NXAIR S

Vacuum contactor 3TL8

Electrical data for	3TL8
Rated operating voltage	up to 7.2kV
Rated short-time withstand current	up to 8kA
Rated normal current	400A
Number of operating cycles	250,000

for NXAIR S



1 Base frame
2 Cast-resin post insulator
3 Arcing chamber
4 Movable switching blade
5 HV HRC fuses
6 Make-proof earthing switch for feeder earthing

Electrical data for	NXAIR S
Rated operating voltage	up to 12kV
Rated short-time withstand current	up to 16kA/1s
Rated short-circuit making current	up to 40kA
Rated peak withstand current	up to 40kA
Rated normal current	up to 400A

Components

Current transformers

Features

According to GB 1208-1997
IEC 60 044-1

- Cast-resin insulated
- Integrated functions such as bushing through partition, post insulator function, current conductor and measurement, optionally coupling electrode for the capacitive voltage detection system
- In connection with pressure-resistant partitions, bushing-type current transformers enable selective shutdown of e.g. a cable fault by means of the associated circuitbreaker
- Completely replaceable from front
- Secondary multiratio possible
- Primary contacts generally with silver-plated round contacts
- Bushing-type current transformers can be certified

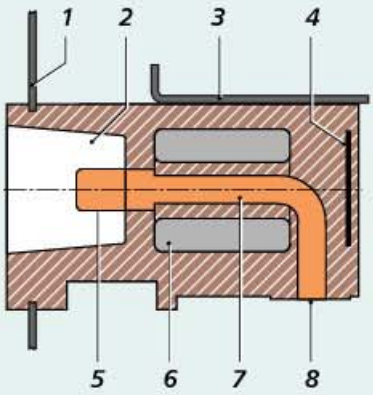
Legend

1 Partition between switching-device and connection compartment
2 Cup bushing
3 Mounting plate
4 Coupling electrode
5 Fixed contact
6 Core with secondary winding
7 Primary conductor
8 Primary connection

Bushing-type current transformers

for NXAIR S

Bushing-type current transformer up to 3150 A



Low-voltage equipment

Features

- For accommodation of all protection, control, measuring and metering devices
- Separated safe-to-touch from the high-voltage part
- Removable as all bus wires and control cables are plugged in
- Option: Test sockets for capacitive voltage detection system of feeders or busbar
- Option: Higher low-voltage compartment
- Option: Separation wall from panel to panel
- Low-voltage cables are flexible and have metal covers
- Connection of withdrawable part and panel wiring to low-voltage compartment via10-pole, coded plug connectors
- Bus wires are pluggable from panel to panel

Low-voltage compartment with equipment

Door of low-voltage compartment

Standards

Standards, specifications, guidelines

Current-carrying capacity

- According to GB 3906 / IEC 60 694 / GB/T11022 / IEC 62271-200 / VDE 0671-200 current carrying capacities refer to the following ambient temperatures:
  – Maximum of 24-hour mean + 35 °C
  – Maximum + 40 °C
- The current-carrying capacity of the panels and busbars depends on the ambient temperature outside the enclosure.

Protection against solid foreign bodies, electric shock and ingress of water

NXAIR S switchgear types fulfill acc. to the standards
– GB/T4208
– GB/T11022
– IEC 62 271-200
– IEC 60 529
the following degrees of

protection:

Panel	NXAIR S
Degree of protection of the enclosure optional	IP3XD IP4X IP51
Degree of protection of the enclosure with ventilation	IP3XD IP4X
Degree of protection of compartments	IP2X

Climate and ambient conditions

The switchgear may be used, subject to possible additional measures, under the following ambient conditions and climate

classes:
Ambient conditions
– Natural foreign materials
– Chemically active pollutants
– Small animals

Climate classes
– 3K3
– 3K5
– 3KX

The climate classes are classified according to IEC 60 721-3-3.

Aseismic capacity

NXAIR S switchgear types are tested in accordance with internationally accepted requirements.

Terms

"Make-proof earthing switches"are earthing switches with short-circuit making capacity according to GB 1985 / IEC 62 271-102

Internal arc classification

- Safety of operating personnel ensured by tests to verify internal arc classification
- Internal arc tests performed in accordance with IEC 62 271-200 / GB/T 3906-2006
- The switchgear complies with criteria 1 to 5 specified in the mentioned standards (page 24) for the basic version up to 40 kA.
- NXAIR S comply with the internal arc classification: IAC A FLR up to 40 kA, 1 s, providing for maximum personal safety of switchgear accessible from all sides.

- Definitions of criteria:
  – Acceptance criterion 1
  Covers and doors remain closed. Limited deformations are accepted.
  – Acceptance criterion 2
  No fragmentation of the enclosure. No projection of small parts above 60 g weight.
  – Acceptance criterion 3
  No holes in the accessible sides up to a height of 2 m.
  – Acceptance criterion 4
  Indicators do not ignite due to the effect of hot gases.
  – Acceptance criterion 5
  The enclosure remains connected to its earthing parts.
- This switchgear up to 40 kA is designed with confinement to internal arcs going beyond the scope of the mentioned standards; that means that in the event of an internal fault (arc) in a particular compartment, the effects of the arc remain confined to that compartment:
  – No burn-through of partitions to adjacent compartments
  – No burn-through of partition walls to adjacent panels
  – Pressure-resistant walls between adjacent compartments and panels.
- The confinement of an internal arc prevents
  – Restrike of an arc fault on live parts in adjacent compartments
  – Impermissible deformation of partitions.

Standards, specifications, guidelines

Standards

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

Overview of standards (May 2006)

		IEC standard	GB standard
Switchgear	NXAIR S	IEC 60 694	GB/T 11022
		IEC 62 271-200	GB 3906
Devices	Circuit-breaker	IEC 62 271-100	GB 1984
	Vacuum contactor	IEC 60 470	GB 14808
	Disconnector and earthing switch	IEC 62 271-102	GB 1985
	disconnector	IEC 60 265-1	GB 1985
	disconnector / fuse combination	IEC 62 271-105	GB 16926
	HV HRC fuses	IEC 60 282	GB 15166.2
	Voltage detection device	IEC 61 243-5	
Degree of protection	-	IEC 60 529	GB/T 4208
Insulation	-	IEC 60 071	GB 311.1
Transformers	Current transformer	IEC 60 044-1	GB 1208
	Voltage transformer	IEC 60 044-2	GB 1207
Installation	-	IEC 61 936-1	GB 50254-GB 50259

Type of service location

The switchgear can be used for indoor installation in accordance with GB50254-GB50259/IEC 61 936 (Power station installations above 1 kV AC)

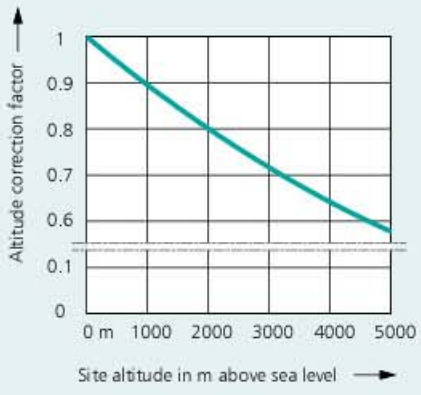
- Outside lockable electrical service locations at places which are not accessible to the public. Enclosures of switchgear can only be removed with tools.
- Inside lockable electrical service locations. A lockable electrical service location is a place outdoors or indoors that is reserved exclusively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

Table – Insulating capacity

Rated voltage (rms value))	kV	7.2	12
Rated short-duration power-frequency withstand voltage (rms value)			
– Across isolating distances	kV	36	48
– Between phases and to earth	kV	32	42
Rated lightning impulse withstand voltage (peak value)			
– Across isolating distances	kV	70	85
– Between phases and to earth	kV	60	75

Altitude correction factor *Ka*

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



Rated short-dur. power-freq. withstand volt. for site altitudes > 1000mto be selected
≥ Rated short-duration power-frequency withstand voltage up to w 1000 m-*Ka*
Rated lightning impulse withstand volt. for site altitudes > 1000 m to be selected
≥ Rated lightning impulse withstand voltage up to w 1000 m-*Ka*

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 volt. 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.

Insulating capacity

- The insulating capacity is verified by testing the switchgear with rated values of shortduration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 60 694/GB 3906 and DL 404 (see table "Insulating capacity").
- The rated values are referred to sea level and to normal atmospheric conditions (1013 hPa, 20 °C, 11 g/m3 humidity in accordance with IEC 60 071 and GB 311.1).
- The insulating capacity decreases with increasing altitude. For site altitudes above 1000 m (above sea level) the standards do not provide any guidelines for the insulation rating. Instead, special regulations apply to these altitudes.
- Site altitude

– As the altitude increases, the insulating capacity of insula tion in air decreases due to the decreasing air density. This reduction is permitted up to a site altitude of 1000 m according to IEC and GB.

– For site altitudes above 1000 m a higher insulation level must be selected. It results from the multiplication of the rated insulation level for 0 to 1000mwith the altitude correction factor Ka.

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