



NXAirS
Withdrawable Medium-Voltage Switchgear up to
24kV Air-Insulated

SIEMENS

Types

Application

Types
Typical uses
Classification

Requirements

Customer benefits and features

Technical Data

Electrical data and dimensions
Design data
Transportation and packing

Primary Solution

NXAirS 24kV

Design

Design of switchgear

Components

Vacuum circuit-breaker

Standards

Standards, specifications, guidelines

Circuit-breaker switchgear NXAirS, is factory-assembled, type-tested, metal-enclosed and metal-clad switchgear for indoor installation according to GB3906, DL404 (insulation) and IEC 62271-200..

Loss of service continuity category	LSC2B (Metal clad)
Partition class	PM(Metal)
Internal arc classification	IAC A FLR $I_{sc} \leq 31.5\text{kA}$ arc duration=1s



NXAirS panel

Maxium rating 24kV/31.5kA/3150A

Application Typical uses

NXAirS circuit-breaker switchgear is used in substations and distribution system, mainly at the primary distribution level. E.g.

Application Public power supply system

- Power supply companies

Application Industry

- Power plant
- Cement industry
- Automobile industry
- Iron and steel works
- Mining industry
- Textile, paper and food industries
- Chemical industry
- Petroleum industry
- Pipeline installations
- Offshore oil devices
- Electrochemical plants
- Petrochemical plants
- Diesel power plants
- Emergency power supply devices
- Coal exploitation

Classification

NXAirS switchgear correspond to the following classifications according to GB3906, DL404 (insulation) and IEC62271-200.

Loss of service continuity category and partition class		
Loss of service continuity category		LSC 2B (Metal clad)
Partition class		PM (Metal)
Accessibility to compartments		
Busbar compartment		Tool-based
Switching-device compartment		Interlock-based
Connection compartment		Interlock-based and use special tools
Internal arc classification		
The following internal arc classification are fulfilled		
IAC A FLR, I_{SC} , t		
	IAC	= Internal arc classification
	A	= 300mm 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 NXAirS up to 31.5kA
	t	= Arcing time 1s
In this way, NXAirS is suitable for unrestricted application (wall or free-standing arrangement) in electrical service locations up to the maximum short-circuit current rating.		

Requirements

Customer benefits and features

Benefits	Features
<p>Peace of mind</p> <p>For power supply companies and industrial plants, the certification of NXAirS according to the latest standards has very concrete advantages, whose smooth operation provide maximum safety for users.</p>	<ul style="list-style-type: none"> • Type-tested switchgear according to GB, DL and IEC standard. • Independent pressure-resistant partitions for each compartment. • Use of maintenance-free vacuum circuit breakers. • Type testing of the vacuum circuit breaker. • Pressure-resistant partitions. • Use of standard, worldwide available components. • Quality management according to ISO9001.
<p>Saves Lives</p> <p>All switchgear types of the NXAirS 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.</p>	<ul style="list-style-type: none"> • All switching operations with high-voltage door closed. • Metallic enclosure, earthed shutters and partitions. • Reliable interlock mechanism installed on high voltage door. • Switchgear with internal arc classification according to IAC A FLR. • Loss of service continuity category LSC2B. • Busbar, cable connection and switching-device compartments are divided into independent compartment. • Use of vacuum circuit breakers. • Standard degree of protection IP4X. • Shutters of busbar compartment cover the stationary contact for preventing electric shock to maintainer. • Reliable mechanical interlocking system.
<p>Save money</p> <p>The adoption of newly designed 3AE maintenance-free embedded pole breaker enable continuous operation without expensive shutdown times.</p>	<ul style="list-style-type: none"> • Stable insulation performance—the use of embedded pole type VCB avoids the environment influence maximumly. • Constant contact resistance—the absence of oxidation in a vacuum keeps the metal contact surfaces clean. For this reason, contact resistance can be assured to remain low throughout the service life of the equipment. • Large total breaking times—Under the rated normal current, the breaker can be interrupted up to 30,000 times. • Maintenance-free within 10,000 times operation cycles—throughout its entire service life, the vacuum interrupter operates reliably at all times—without any forms of maintenance within 10,000 times operation or 10 years. The arc voltage is thus extremely low-only 20 to 200V. And, on account of short arcing times of max. 15ms, the energy consumption in the contact gap is very low.

Electrical Data and Dimensions

Rated values

-Rated voltage	kV	24
-Rated frequency	Hz	50
-short-duration power frequency withstand voltage (phase-to-phase, phase-to-earth)	kV	65/79
-lightning impulse withstand voltage (phase-to-phase, phase-to-earth)	kV	125/145
-short-circuit breaking current (Max.)	kA	25, 31.5
-short-time withstand current, 4s (Max.)	kA	25, 31.5
-short-circuit making current (Max.)	kA	63, 80
-peak withstand current (Max.)	kA	63, 80
-busbar current	A	1250, 2000, 2500, 3150
-Feeder current	A	1250, 2000, 2500, 3150

Dimension

Width W	mm	1000
Height	mm	2854/2620/2695
Depth D	mm	1810/1848
Weight	kg	900 ~ 1300

Dimension of low-voltage compartment

	Standard
Width mm	1000
Height mm	630
Depth mm	400

Dimension of connection compartment

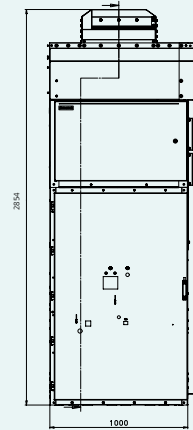
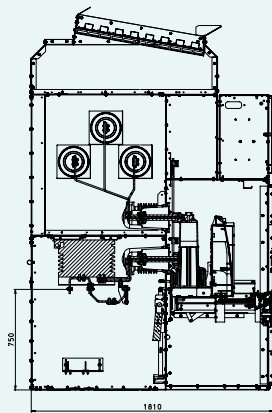
Width mm	1000
Height mm	1150
Cable terminal to earth mm	≥ 750

Technical Data

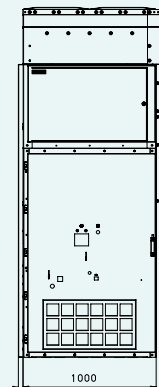
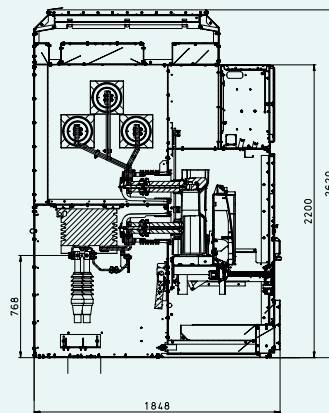
Design data

Structure view of panel body

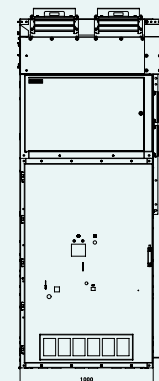
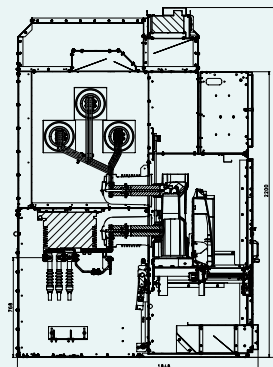
- Please consult for low indoor height.
- A passage with 1200mm width must be available alongside the panel so as to push the withdrawable part into this passage.



Structure view of NXAirS 25kA/1250A



Structure view of NXAirS 31.5kA/2500A



Structure view of NXAirS 31.5kA/3150A

Transportation and packing

Transportation

The following factors should be taken into account when deciding on the size of transport units to be selected:

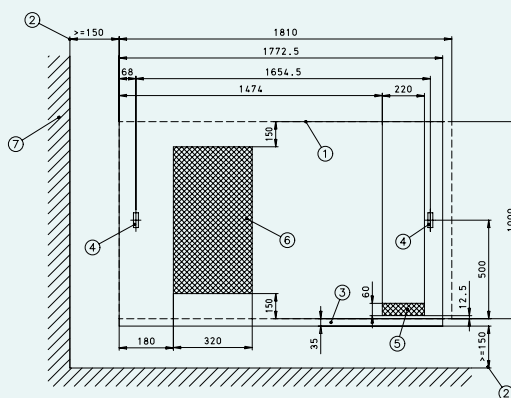
- Transport facilities on site
- Transport weights and dimensions
- Size of building doorways

Packing

	Dimensions, volume and weight				
	Width m	Depth m	Height m	Volume m ³	Total weight kg
One panel	1.30	2.07	2.93	7.88	1459
Two panels	2.47	2.07	2.93	14.98	1610
Three panels	3.48	2.07	2.93	21.11	1788

Packing type	Transport by	Method of packing
Simple	Road	Panels on wooden pallets and cover the panels with polyethylene sheets bag.
Standard	Rail and road	Panels on wooden pallets, cover the panels with polyethylene sheets bag and seal with wooden floor.
Export	Ship	Panels on wooden pallets, cover with polyethylene sheets bag by vacuumized treatment , welded together with desiccant bags and sealed with the fumigated wooden box board; max. storage:6 months

Floor cutouts and fixing points

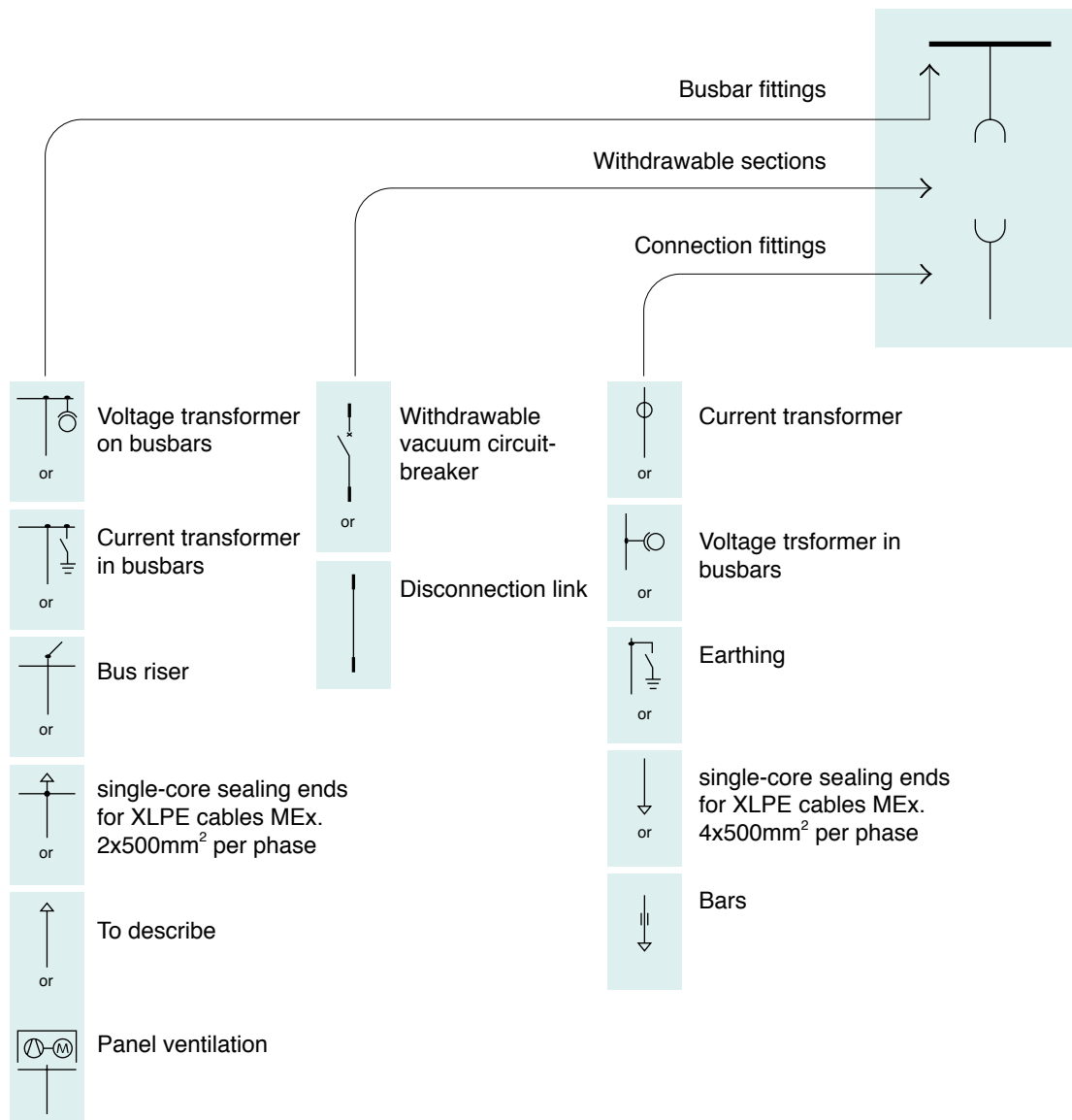


- 1.Foundation frame
- 2.Distance to the wall
- 3.Left-side wall
- 4.Fixing point, the rectangle hole is 60 × 20mm
- 5.Control cable cutout
- 6.High-voltage cable cutout
- 7.Building wall

Primary Solution

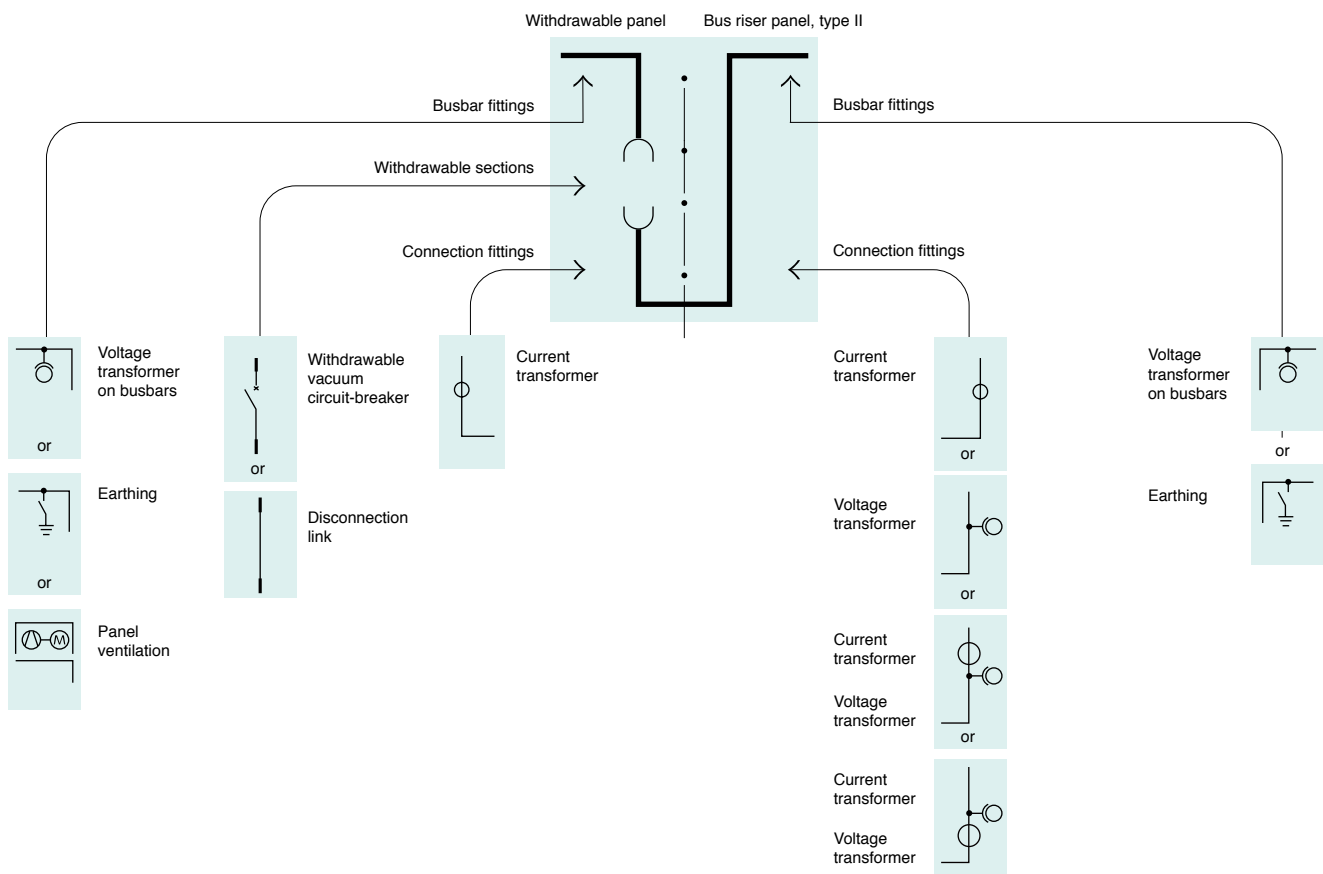
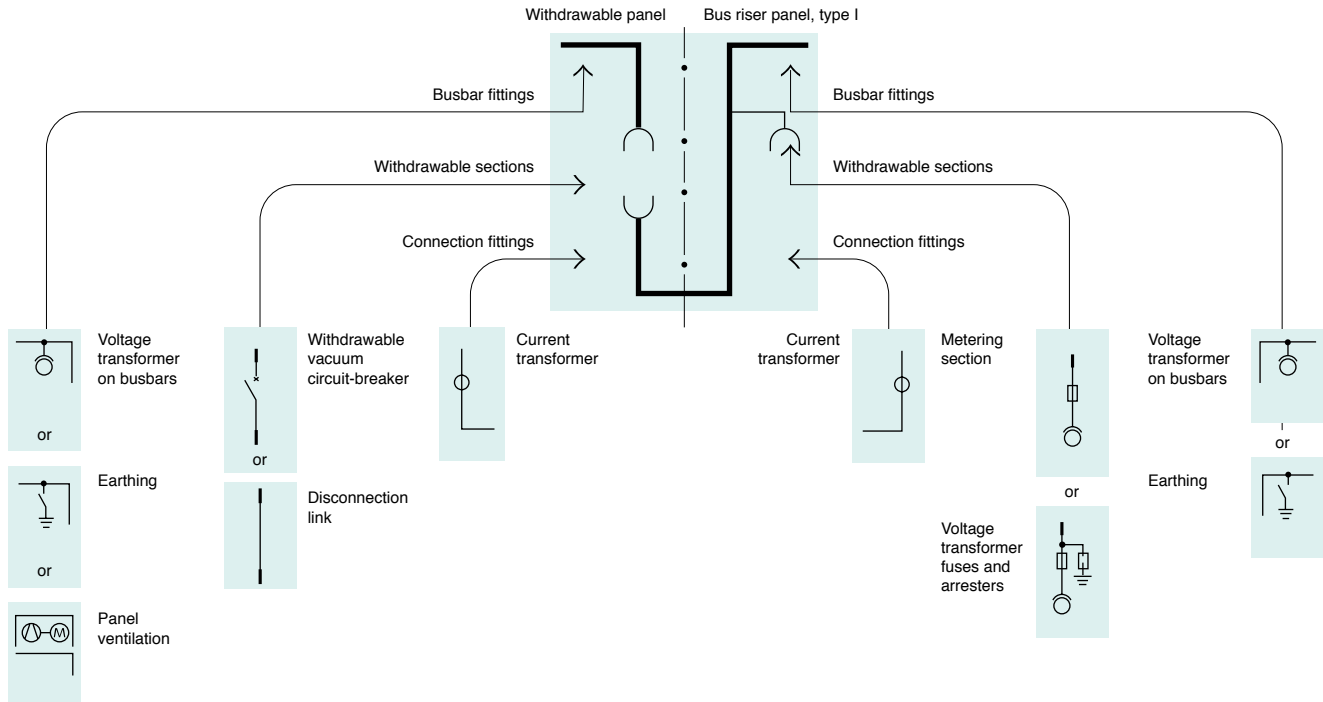
NXAirS 24kV

Withdrawable panel



NXAirS 24kV

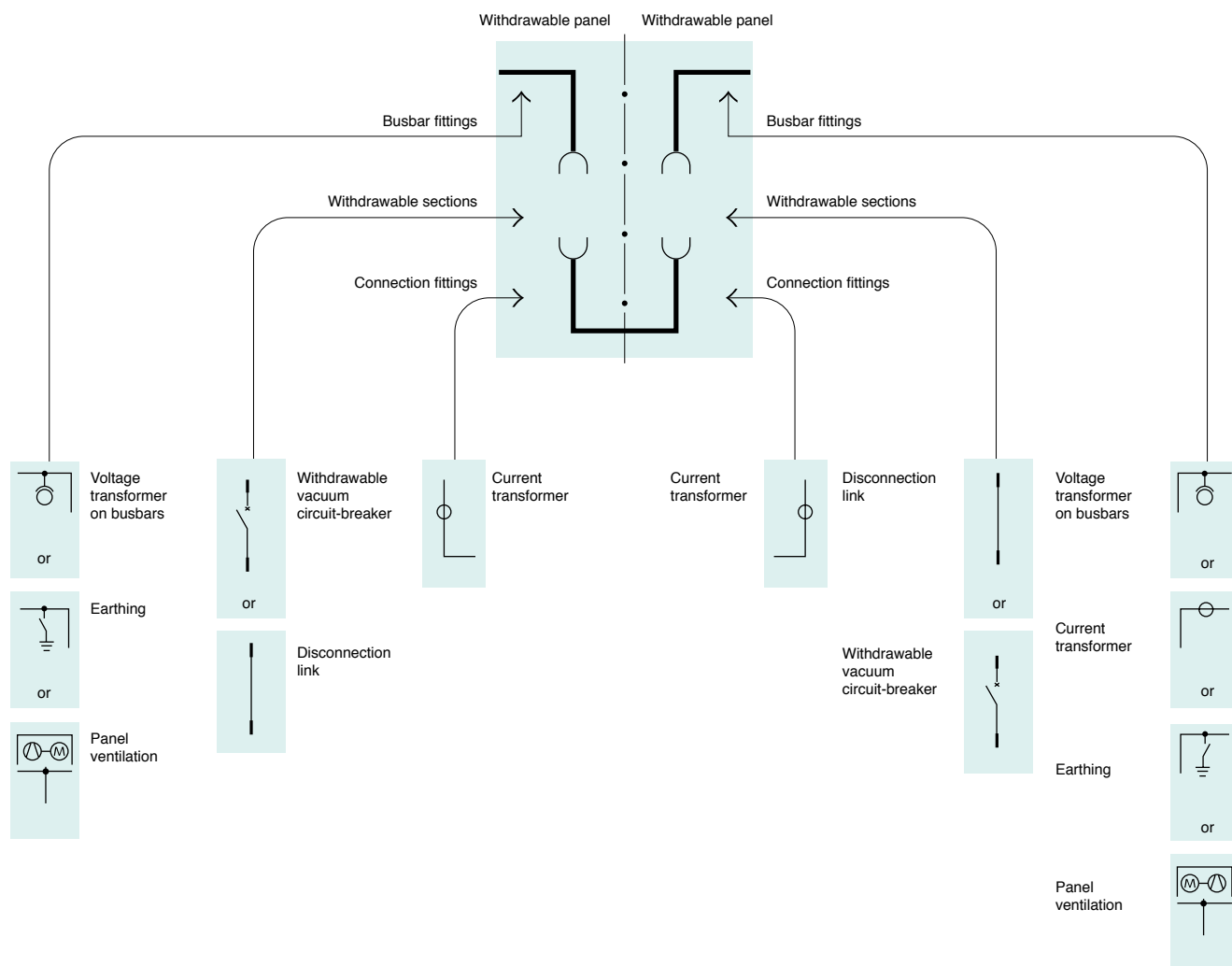
Subsection busbar connection panel



Primary Solution

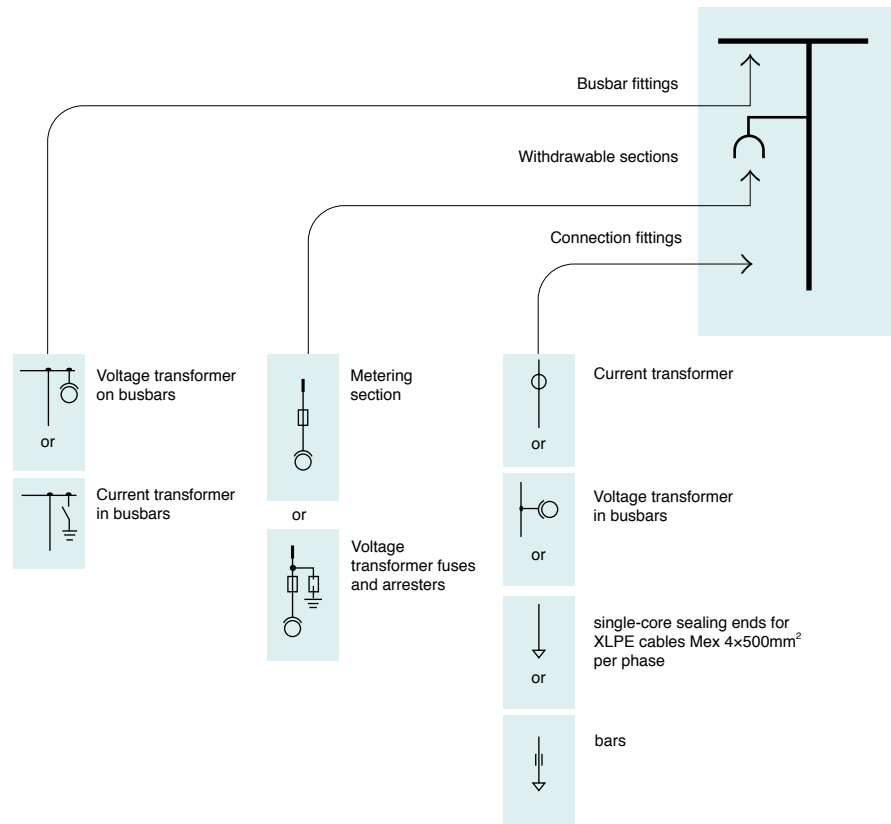
NXAirS 24kV

Subsection busbar connection panel

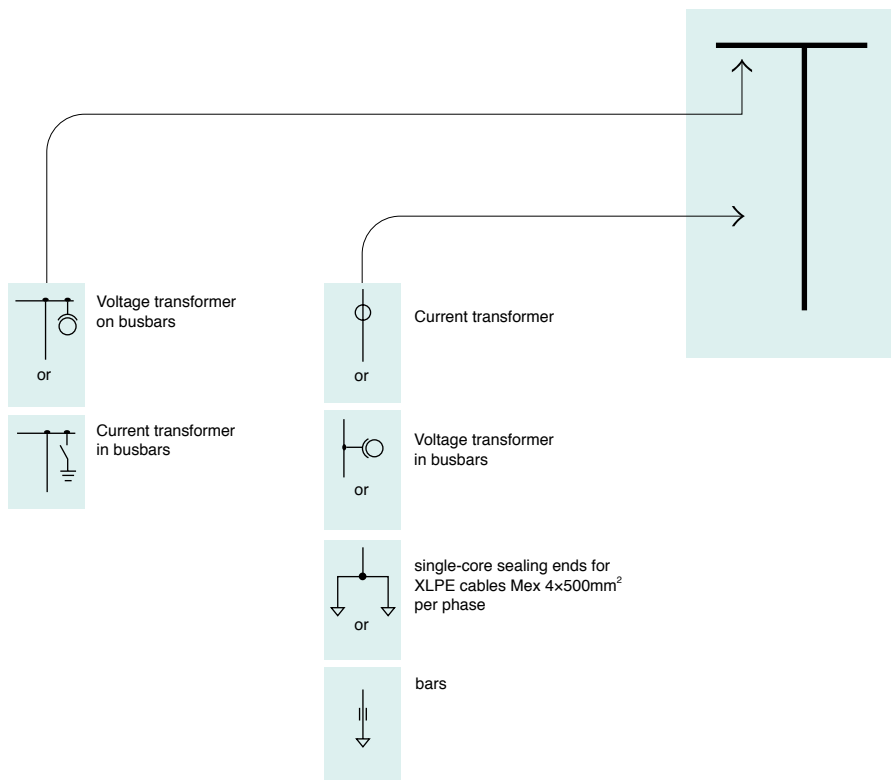


NXAirS 24kV

Busbar connection panels: Type I



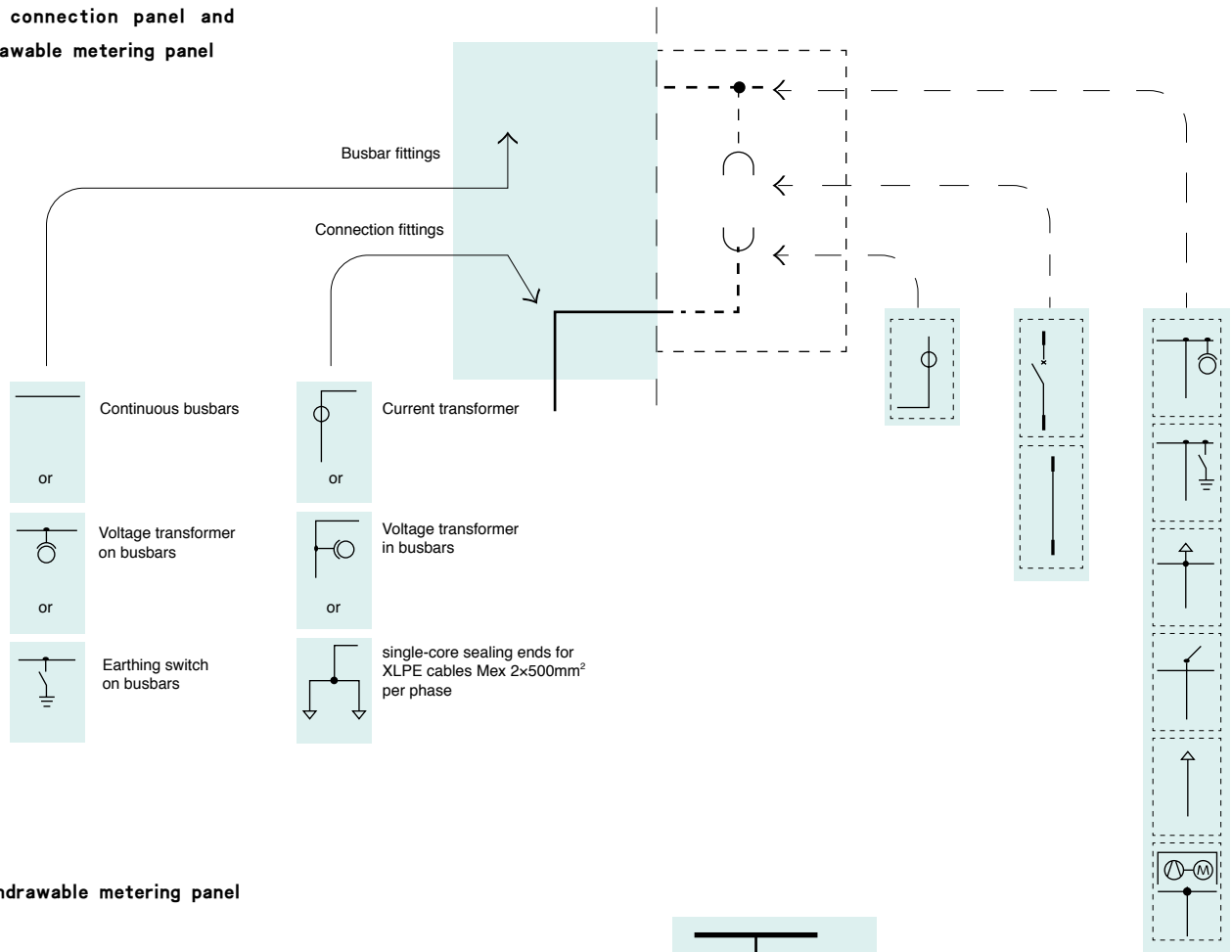
Busbar connection panels: Type II



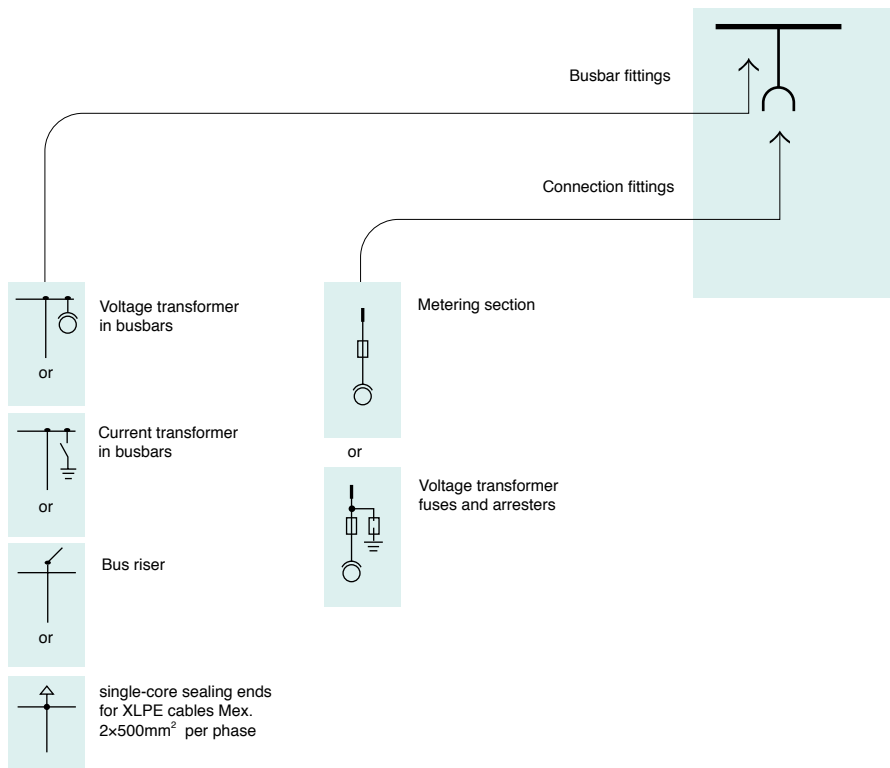
Primary Solution

NXAirS 24kV

Cable connection panel and withdrawable metering panel



Withdrawable metering panel



Design of Switchgear

Features

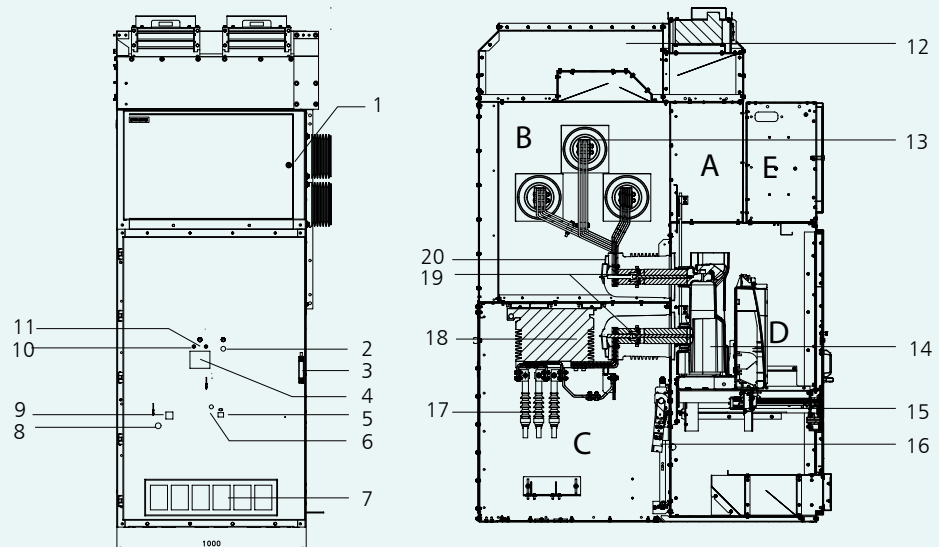
- All switching operations always with high-voltage door closed
- By operating a key the interlocking can be achieved by removing part of the withdrawable earthing and circuit-breaker of high-voltage
- Ergonomically favourable height for all control and indicator element
- Option: Verification of safe isolation from supply of feeder or busbar by means of a capacitive voltage detection system

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, earthing switch OPEN and the HV door closed
- Switching device can only be operated in testing, interlocked disconnected or service position
- The high-voltage door can be closed only if the withdrawable part is in testing position

Additional the safety interlocking

- 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: Withdrawable electromagnetic interlocks
- Option: Earthing electromagnetic interlocks



- | | |
|--|---|
| 1. Locking device of the low-voltage compartment | 11. "OFF" opening for circuit breaker |
| 2. Opening for spring charge | 12. Pressure release duct |
| 3. Door knob for opening the high-voltage door | 13. Busbars |
| 4. Indication of spring charge, circuit breaker & cycle counter of the circuit-breaker | 14. Embedded pole interrupter |
| 5. Operation hole for in-service position locking | 15. Mechanism and interlocking unit for the circuit-breaker |
| 6. Position to move off the switch mechanism for the operation of the hole | 16. Earthing switch |
| 7. Ventilation | 17. Cable connection |
| 8. Actuating opening to move the earthing switching device | 18. Current transformer |
| 9. Mechanical earthing switch position indicator | 19. Contact system |
| 10. "ON" opening for circuit breaker | 20. Contact box |
| A. Switching-device compartment | |
| B. Busbar compartment | |
| C. Connection compartment | |
| D. Withdrawable circuit-breaker | |
| E. Low-voltage compartment | |

Design

Design of Switchgear

Frame

- Bolted steel sections and sheets
- Rails to support the withdrawable section
- Steel sections and sheet galvanized
- Doors and front frame powder-coated, grey
- Installation side panels powder-coated, grey

Compartmentalization

- Bolted galvanized steel sheets divide the panel into the busbar compartment, withdrawable section compartment and connection compartment
- Degree of protection between individual compartments: \geq IP20
- Complete compartmentalization maintained even with withdrawable section in connected position on account of the fitted penetration-type bushings
- Upper and lower static contacts fixed in penetration-type bushings
- Enforced operated metal shutters for opening or closed the penetration-type bushings while the withdrawable section is being moved
- Metal shutters can be locked when the withdrawable section is racked out
- Upper shutter (access to busbar) or lower shutter (access to cable) can each be unscrewed independently of the other

Partitions

The use of partition is to separate the adjacent rooms into inaccessible compartment.

- Galvanized steel sheet
- Partition level PM
- IP4X protection class between busbar compartment and adjacent panels. The busbar compartment could choose the partition with bushing.

Pressure relief

Any overpressure inside the panel resulting from fault arcing is released by the pressure relief duct

- Galvanized sheet steel
- Separate pressure relief duct for busbar compartment, withdrawable section compartment and cable connection compartment



Pressure relief (part)



Cable compartment

Design of Switchgear

Busbar compartment

- Enclosure made of galvanized sheet-steel.
- Pressure is released upwards.
- Bushing disconnection is between switchgear and switchgear.
- Busbar adopts flat copper, bolted from panel to panel.
- Pressure-resistant partitions are between connection compartment and switching-device compartment.
- Option: Busbar earthing switch.
- Option: Busbar voltage transformer.
- Option: Coupling electrode for capacitive voltage detection system.

Switching-device compartment

- Enclosure made of galvanized sheet-steel.
- Pressure is released upwards.
- Panel front is coated with powder of epoxy resin.
- Shutter operating mechanism separately for closing and opening the busbar compartment and connection compartment. A padlock can be chosen.
- High-voltage door resistant pressure while arc produced in the panel.
- Metallic ducts on the side are for laying control cables.
- Low-voltage plug connector for connection of control cables between primary part and secondary part.
- Follows various removable devices are for different panel versions.
 - Vacuum circuit-breaker
 - Handcart for disconnection
 - Removable metering unit

Connection compartment

- Enclosure made of galvanized sheet steel.
- Pressure is released upwards.
- Pressure-resistant partitions are between connection and busbar compartment.
- Earthing busbar
- Option: Coupling electrode for capacitive voltage detection.
- Option: Current transformer.
- Option: Earthing switch.
- Option: Voltage transformer.
- Option: Arrester for protecting the switchgear against external over voltages.
- Suitable for connection of
 - Single-core XLPE cables up to $4 \times 500\text{mm}^2$
 - Three-core cables $3 \times 240\text{mm}^2$
 - Incoming copper bar with bushings.



Busbar compartment with rated current 3150A



Busbar compartment with rated current 1250A

Components

Vacuum circuit-breaker

Features

- Embedded pole type of 3AE
- Meet standards of IEC 62 271 and GB 1984-2003.
- Ideal contact material and figures to assure low chopping current and constant contact resistance.
- All parts meet Siemens Germany quality standard.
- Complete type test
- High mechanical operation life
Maintenance-free within 10, 000 operating cycles under normal conditions.
- Few components and compact structure to assure more reliable and safe operation. Ideal switching of inductive load and capacity banks.
- 64-pole low-voltage plugs connector between circuit-breaker and fixed part.



Standards, specifications, guidelines

Standards

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

		IEC标准	GB标准
Switchgear	NXAirS 24kV	IEC 60 694	GB/T 11022
		IEC 62 271-200	GB 3906
Devices	Circuit-breaker	IEC 62 271-100	GB 1984
	Disconnecter and earthing switch	IEC 62 271-102	GB 1985
	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

Type of service location

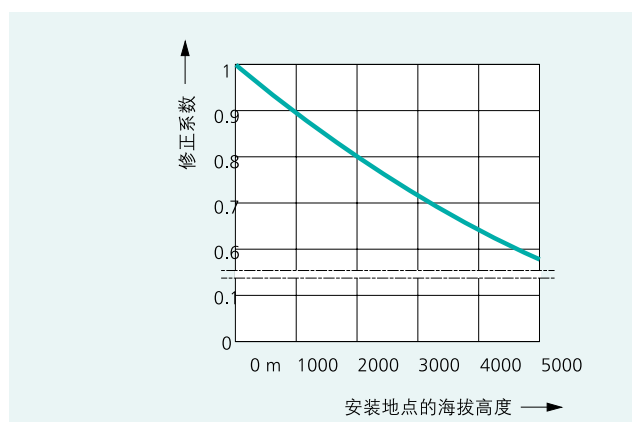
The switchgear can be used for indoor installation in accordance with GB50254-GB50259/IEC 61 936. (Substation installations above 1kV AC)

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.

Table—Insulating capacity

Rated voltage(rms value)	kV	24
Rated short-duration power-frequency withstand voltage (rms value)		
- Across isolating distances	kV	79
- Between phases and to earth	kV	65
Rated lightning impulse withstand voltage(peak value)		
- Across isolating distances	kV	145
- Between phases and to earth	kV	125

Altitude correction factor Ka



$$\text{Power-frequency test voltage} \geq \frac{\text{Rated power-frequency withstand voltage}}{1.1 \times K_a}$$

$$\text{Impulse test voltage} \geq \frac{\text{Rated power-frequency impulse withstand voltage}}{1.1 \times K_a}$$

Insulating capacity

- The insulating capacity is verified by testing the switchgear with rated values of short duration power-frequency withstand voltage and lightning impulse withstand voltage according to IEC 60 694/GB/T 11022 and DL404. (See table "Insulating capacity")
- The rated values are referred to sea level and to normal atmospheric conditions (101.3kPa, 20°C, 11g/m³ humidity in accordance with IEC 60 071 and GB 311.1).
- The insulating capacity decreases with increasing altitude. For site altitudes above 1000m (above sea level) the insulating capacity decreases, whose value is calculated by the correction factor Ka in the table. The correction factor Ka is determined by actual site altitude.

Standards

Standards, specifications, guidelines

Standards

According to GB 3906/DL404/IEC 60 694 and GB/T 11022/IEC 62 271-200. The earthing switch meets standard of GB1985/IEC62271-102.

Current carrying capacity

Current carrying capacities refer to the following ambient temperatures:

Maximum of 24 hour average temperature $+35^{\circ}\text{C}$

Maximum $+40^{\circ}\text{C}$

Switchgear can be used under the following climate classes and ambient conditions with additional measures.

Environment condition

- Natural foreign materials
- Chemical active pollutants
- Small animals

Climate classes

1. Ambient air temperature: $-15^{\circ}\text{C} \sim +40^{\circ}\text{C}$
 2. Site altitude: 1000m and below
 3. Relative humidity: Max.95% for 24 hours, max.90% for one month.
 4. Earthquake intensity is smaller than magnitude 8.
 5. Site without fire, blast danger, serious dirtiness and severe shocks.
- The climate classes are classified according to IEC60721-3-3 and GB3906-2006.

It protects against solid foreign bodies, electric shock and ingress of water.

Degree of protection of the switchgear: IP4X

Degree of protection of compartments: $\geq \text{IP20}$

Internal arc classification

Safety of operating personnel is ensured by passing internal arc test. Internal arc test performed in accordance with IEC62 271-200/GB3906 -2006.

NXAirS comply with the internal arc classification IAC A FLR up to 31.5kA, 1s, for maximumly ensure personal safety

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 60g weight.

Acceptance criterion 3

No holes in the accessible sides up to a height of 2m.

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.

Siemens Regional Offices(branches) in China

Beijing Branch
Siemens Center Beijing Tower, No.7,
Wangjing Zhonghuan Nan Lu, Chaoyang District, 100102, Beijing
Tel:(0086-10) 6476 8888
Fax:(0086-10) 6472 4912

Shenyang Branch
12-14F, Tower E, Fortune Plaza,
No.59 Beizhan Road, Shenhe District,
Shenyang 110013 Liaoning
Tel : (0086-24) 8251 8111
Fax : (0086-24) 8251 8597

Jinan Rep. Office
5/F, Shun Hua Yuan Commercial Club,
No.28 Shun Geng Road Jinan 250014
Shandong
Tel : (0086-531) 8266 6088
Fax : (0086-531) 8266 0836

Qingdao Rep. Office
Room 705-706, Crown Plaza, Qing Dao,
No. 76, Xiang Gang Zhong Rd.,
Qingdao, 266071, Shandong
Tel: (0086-532) 8573 5888
Fax: (0086-532) 8576 9963

Chengdu Branch
18/17F, Chuanxin Mansion 18, Sec.2,
Renmin South Road,
Chengdu 610016
Sichuan
Tel: (0086-28) 8619 9499
Fax: (0086-28) 8619 9488

Wuhan Branch
19-20F, Jian Yin Tower No.709 Jianshe
Avenue, Hankou Wuhan 430015 Hubei
Tel : (0086-27) 8548 6688
Fax : (0086-27) 8548 6777

Xi'an Rep. Office
F28, Hi-Tech International Business
Center No.33, Keji Road Gaoxin District
Xi'an 710075, P.R.China Shanxi
Tel : (0086-29) 8831 9898
Fax : (0086-29) 8833 8818

Shenzhen Branch 9/F, 1002 Hantang
Building,
Overseas Chinese Town,
Shenzhen 518053, Guangdong
Tel : (0086-755) 2693 5188
Fax : (0086-755) 2693 4476

Guangzhou Branch
9th Floor, Teem Tower, No.208
Tianhe Road,
Guangzhou 510620 Guangdong
Tel : (0086-20) 3718 2211
Fax : (0086-20) 3718 2183

Nanning Rep. Office
Room 935, 9F, King Wealth C.B.D,
No.63, Jin Hu Road, Nanning,
530022, Guangxi
Tel: (0086-771) 552 0700
Fax: (0086-771) 552 0701

Fuzhou Rep. Office
21F, China Bank Building ,No.136,
Wu Si Rd, Fuzhou 350003 Fujian
Tel: (0086-591) 8750 0888
Fax: (0086-591) 8750 0333

Kunming Rep. Office
27F, Bank Building, No.395, Youth
Rd. Kunming 650011, Yunnan
Tel: (0086-871) 315 8080
Fax: (0086-871) 315 8093

Chongqing Rep. Office
Rm.08A-11, 18/F,
Metropolitan Business Mansion 68,
Zourong Road, Yuzhong District
Chongqing 400010
Tel: (0086-23) 6382 8919
Fax: (0086-23) 6370 2886

Siemens Switchgear Ltd., Shanghai

For: 298 Tianning Road, Shanghai 2000245 P.R.China
Telephone: 0086-21-2408 4000
Fax: 0086-21-6492 4606

Order No.: JS035
Print Date: 2010.8
Print Quantity: 1500
SSLS-JS035-A