



N2S / N2X

Environment-friendly Gas Insulated Metal-enclosed Switchgear

CGIS

Sino-German CGIS (Shanghai) Electrics Ltd.
Add: 868 Jiahang Rd., Jiading, Shanghai
201808 P. R. China
Tel"" +86-21-69900886 69900810
Fax"" +86-21-69900254
Http://www.cgis.cn
E-mail"" cgis@cgis.cn

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CGIS



SINO-GERMAN CGIS (SHANGHAI) ELECTRICS LTD.



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General

- Complying with:
China standards: GB3906, GB/T11022, DL/T593, DL/T404 etc.
International standards:
IEC62271-200 and IEC62271-100 etc.
- Environment-friendly switch-gear-non or less SF₆.
- Compact switchgear: Small dimension and less space requirement. The width of 12kV and 24kV panel is only 500mm while the width of 40.5kV panel is only 600mm.
- All high voltage elements are completely sealed from ambient air and therefore not influenced by the environment. Any accidents caused by congeal dew, dust, small animals or chemical vapors are excluded forever. The VEG vacuum circuit breaker used in this switchgear combines the most modern vacuum interrupter technology, the embedded pole design and a reliable magnetic or spring driving mechanism.
- 3-position switch can be operated manually or by a motor drive.
- Compact gas tank structure. Suitable schemes can be chosen depending on the detailed requirements to ensure the reliable and economic operation.
- Intelligent control and protection unit has varied function such as control, protection, measurement and communication, meeting the requirements of distribution automation.
- Reliable mechanical and electric interlocking has prevented the maloperation effectively.

- Busbar connector between panels provides the easy installation and flexible extension, which eliminates the treatment in the gas system.
- World first-class manufacturing technology such as laser welding, laser cutting and helium leakage detecting technology imported from Germany ensures the strict German process and non-fault operation of switchgear.

Normal Operating Conditions

- Ambient temperature:
Maximum temperature +40°C
Minimum temperature -25°C
 - Altitude
Up to 1000m*
 - Environment
The installation site shall not suffer distinctive pollution caused by corrosive or flammable gas, vapor etc.
- *Note: Please consult the manufacturer when the altitude >1000m

Special Operating Conditions

- If the operating conditions exceed the normal conditions listed in GB3906 or IEC 62271-200, please contact our technical department.

Applications

The products have been widely used in the fields of electric power, mine, oil, metallurgy, railway, highway, harbor, architecture and petrochemistry etc. The significant projects CGIS achieved are Shanghai Shimao North Bund Plaza, Shanghai Yanchuang Substation, Shanghai Zhongxia Substation, Shanghai Qingnan Substation etc.

About CGIS

CGIS (Shanghai) Electrics Ltd. Is a hi-tech enterprise set up by Shanghai Tianling Switchgear Co.,Ltd and DECOM GmbH and mainly engages in the business of research, development, manufacture and sales 12kV-40.5kV metal-enclosed gas insulated switchgear. The leading products, N2S/N2X gas insulated switchgear are designed by German switchgear specialists, integrated with new material, new process and new technology such as the most advanced computer control technology, and sensor technology in electric power system, high voltage insulation technology, gas-tight technology and so on. The products have the advantages of high reliability, maintenance free, less space requirements, environmentally friendly to meet the requirements of distribution automation and high reliable operation. All the products have passed the type tests in XIHARI, the China national laboratory which is the member of international organization CNAL as well as IPH, German national laboratory.

Applications



▲ Subway



▲ Grand Theatre



▲ Maglev Train



▲ Substation



▲ Architecture



◀ Bridge



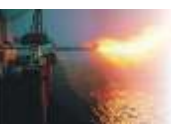
▲ Railway



◀ Highway



▲ Harbor



▲ Petrochemistry

Product Advantages

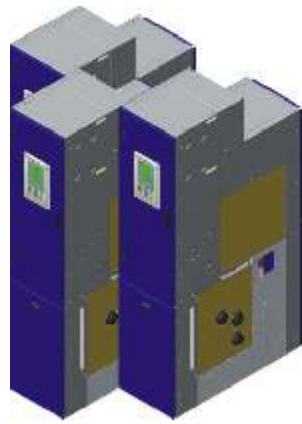
Environment-Friendly

SF6 is one of the six kinds of gases which have been regarded as the restricted emission gas by Kyoto Protocol. According to the research by scientists, the green house effect of SF6 is 23,900 times more than that of CO2. It will remain up to 3200 years after its emission to the atmosphere. Due to its good arcing and insulation performance, SF6 has been using widely in the HV and MV electrical industry. CGIS (Shanghai) Electrics Ltd. engages in the business of environmental protection by using non or less SF6 gas insulation. N2S/N2X gas insulated switchgear is just designed to meet this requirement.

Compact Design

- Separate gas tank structure of N2S ensures it easy to be replaced or maintained.
- N2X has the same function as N2S, but with higher performance at lower cost.

The Middle Panel-Withdrawable



For N2S:

- Silicon rubber bus bar connector is used to connect the upper gas tank, lower gas tank and between panels.
- When replacing or maintenance a single circuit breaker or outgoing cable on upper gas tank, other neighbor panels and the main busbar can remain in service.

For N2S/N2X:

- The middle panel can be withdrawn while other neighbour panels can remain in original position without removing the cables.

OEM Gas Tank



N2S circuit breaker gas tank



N2S busbar gas tank



N2X gas tank

- Provide OEM gas tank
- Provide technical support and training
- After-sales service will be provided by qualified and trained personnel to OEM partners

Main Components

IST 3-position Switch



N2S 3-position Switch

- 3-position switch is vertically arranged for N2S and horizontally arranged for N2X.
- The cylinder type 3-position switch driven by motor has the functions as follows :
 - 1.Connecting, disconnecting and earthing position.
 - 2.The middle position is disconnecting position.
 - 3.The other two positions: Disconnecter "closed" (connected); Earthing switch "closed" (earthed) position.
- Mechanical and electrical interlocking ensures the operation can be realized only in the opening position of circuit breaker, which prevents the maloperation.
- Driving mechanism is accessible outside the gas tank and the insulation axis driven by motor can realize the movement of movable contact. Earthing switch can be cancelled or blocked in 3-position switch on request.
- 3-position switch can be operated manually and added padlocks as per special requirement.
- It is equipped with mechanical position indicator.

VEG Embedded Pole Circuit Breaker



N2S circuit breaker



N2X circuit breaker

- Circuit breaker is vertically arranged for N2S and horizontally arranged for N2X.
- Circuit breaker is embedded-pole type with epoxy APG process.
- Driving mechanism is accessible outside the gas tank.
- Sealed bushing is used to connect the embedded pole of circuit breaker and the rod of driving mechanism.
- Interlocking device ensures that the closing operation can only be realized when the 3-position switch is in its proper position, which prevents the maloperation.

- Earthing function can be realized with 3-position switch and circuit breaker.
 - 1.Vacuum circuit breaker has more advantageous in making capability than conventional earthing switch, which makes earthing short-circuit become more easily via vacuum circuit breaker.
 - 2.More operations can be done for fault current.
 - 3.Arc is limited in the vacuum interrupter, which reduces the exhaust of insulation gas.

Dimension & Weight of N2S/N2X Switchgear

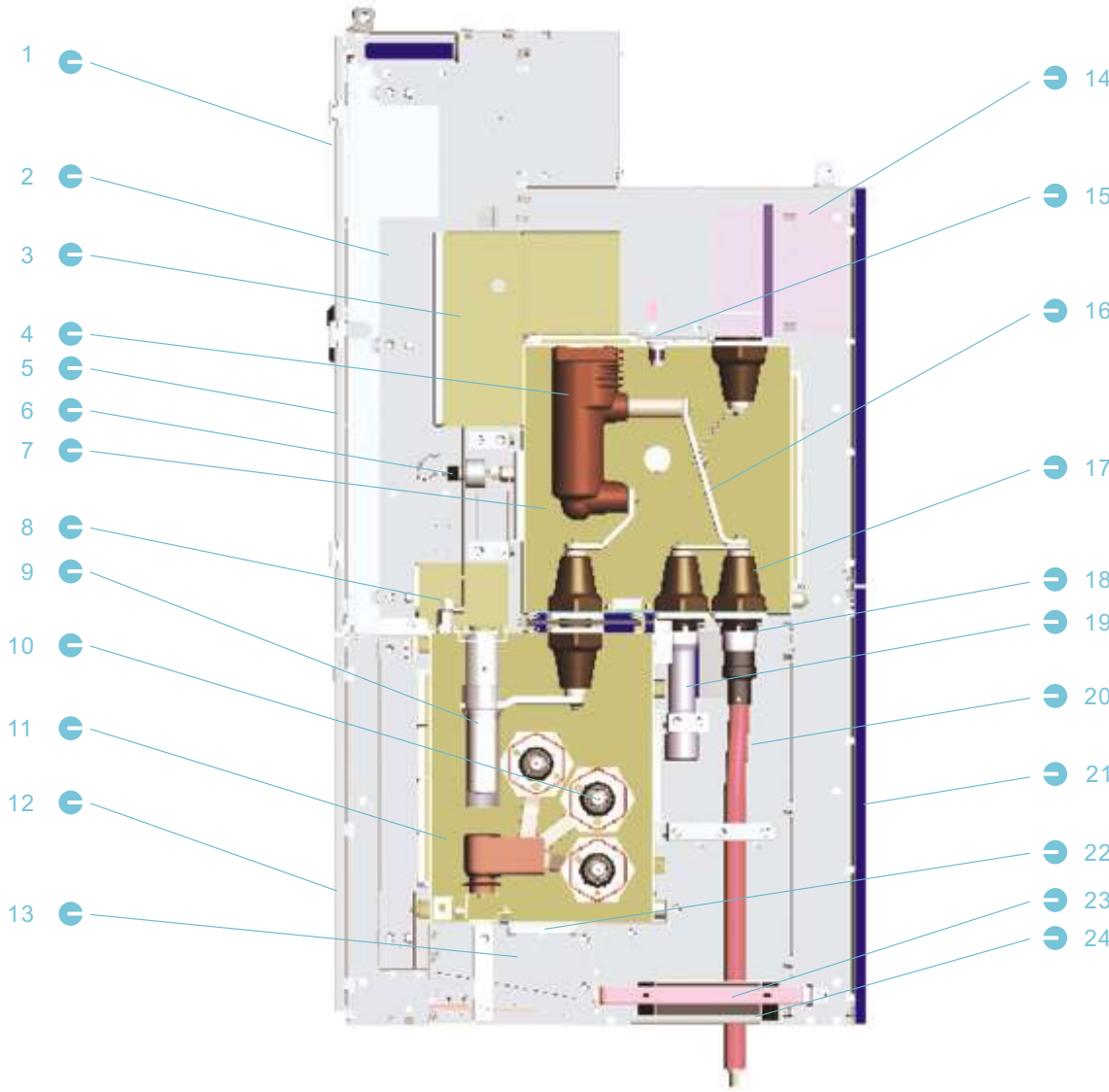
	Rated voltage	Rated current	W a (mm)	D b (mm)	H c (mm)	Weight (kg) Approx.
N2S Switchgear	12	≤1250	500	1200	2250	630
		≥1600	800	1500	2250	980
	24	≤1250	500	1200	2250	630
		≥1600	800	1500	2250	980
	40.5	≤1250	600	1500	2400	880
		≥1600	800	1600	2500	1100
N2X Switchgear	12	≤1250	500	1050	2250	530
		≥1600	800	1400	2250	880
	24	≤1250	500	1050	2250	530
		≥1600	800	1400	2250	880

Technical Specifications

No.	Item		Unit	Data (IEC/GB)		
1	Rated voltage		kV	12	17.5/24	36/38/40.5
2	Rated power frequency withstand voltage (1min)	Between phases and to earth	kV	28/42	50	95
		Across the isolating distance		32/48	60	118
3	Rated lightning impulse withstand voltage	Between phases and to earth	kV	75	125	185
		Across the isolating distance		85	145	215
4	Rated frequency		Hz	50, 60		
5	Rated current		A	630,800,1250,1600,2000,2500		
6	Making single/back to back capacitor bank current		A	630/400	400/400	400/400
7	Rated short-circuit breaking current		kA	25/31.5/40	20/25/31.5	20/25/31.5
8	Rated short-circuit making current (peak)		kA	63/80/100	50/63/80	50/63/80
9	Rated short-time withstand current/duration		kA/s	25/3, 31.5/3, 40/3	20/3, 25/3, 31.5/3	20/3, 25/3, 31.5/3
10	Rated peak withstand current		kA	63/80/100	50/63/80	50/63/80
11	Rated capacitor bank inrush making capacity		kA	20		
12	Rated cable-charging breaking current		A	25	31.5	50
13	Rated operating sequences			O-0.3s-CO-3min-CO		
14	Rated filling gas pressure (abs,20℃)		MPa	0.12		
15	Alarm pressure (abs,20℃)		MPa	0.11		
16	Minimum operating pressure (abs,20℃)		MPa	0.10		
17	Annual leakage rate		%/Y	<0.1		
18	Degree of protection	High voltage live parts		IP65		
		Low voltage compartment		IP4X		
19	Rated voltage of auxiliary circuit		V	DC24, 48, 110, 220 AC220		
20	Rated power frequency withstand voltage of auxiliary circuit (1 min)		kV	2		

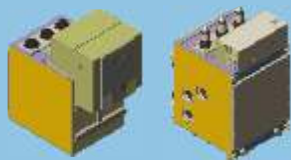
*Note: The insulating level is tested under 0.1 MPa or 1 bar (abs. 20°C) of insulating gas.

Panel Structure



- | | |
|-------------------------------------|---|
| 1. Protection and control unit | 13. Framework |
| 2. Low voltage compartment | 14. Voltage transformer (Optional) |
| 3. Vacuum circuit breaker mechanism | 15. Pressure relief of circuit breaker gas tank |
| 4. Vacuum circuit breaker | 16. Feeder bus |
| 5. Low voltage compartment door | 17. Inner-cone bushing |
| 6. Gas density sensor | 18. Inner-cone cable terminal |
| 7. Circuit breaker gas tank | 19. Plug-in surge arrester |
| 8. 3-position switch mechanism | 20. Cable |
| 9. 3-position switch | 21. Rear cover |
| 10. Main busbar and bushing | 22. Pressure relief of busbar gas tank |
| 11. Busbar gas tank | 23. Earthing busbar |
| 12. Front cover | 24. Current transformer (Optional) |

OEM Functional Unit

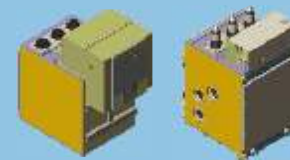


N2S

N2S offers OEM partners the following modular functional units:

No.	Scheme	Type	Denomination	Description
1		LNL LNTL	Incoming/outgoing panel – Cable top entry – Cable bottom entry	<p>–Include one busbar gas tank and one circuit breaker gas tank.</p> <p>–In busbar tank, there are one 3–position switch and three groups of inner–cone bushings, two for both–side extension of the busbar and one for plugging to upper circuit breaker gas tank.</p> <p>–In circuit breaker tank, there are one vacuum circuit breaker and four groups of inner–cone bushings, three for plug–in cable terminal, PT and surge arrester. For example, double incoming cables and PT can be plugged from outside of the gas tank. The other group is for plugging to lower busbar gas tank.</p> <p>–The empty bushings will be sealed by end plugs or by white plastics covers on request.</p> <p>–Earthing switch can be cancelled or blocked if necessary.</p>
2		LNCV–RD LNCV–LD	Sectionalizer panel – Panel busbar Right Direction extensible (RD) Connected with LNCD–LD panel busbar at right side, and connected with system main busbar at left side. – Panel busbar Left Direction extensible (LD) Connected with LNCD–RD panel busbar at left side, and connected with system main busbar at right side.	<p>–Include one busbar gas tank and one circuit breaker gas tank.</p> <p>–In busbar tank, there are one 3–position switch and two groups of inner–cone bushings, one for system main busbar extension and one for plugging to upper circuit breaker gas tank.</p> <p>–In circuit breaker tank, there are one vacuum circuit breaker and two groups of inner–cone bushings, one for connecting with neighbour panel busbar by plug–in type connectors and one for plugging to lower busbar gas tank. For example, LNCD–LD is a panel with busbar left side extension.</p> <p>–Earthing switch can be cancelled or blocked if necessary.</p>
3		LNCD–RD LNCD–LD	Busbar riser panel – Panel busbar Right Direction extensible(RD) Connected with LNCV–LD panel busbar at right side, and connected with system main busbar at left side. – Panel busbar Left Direction extensible(LD) Connected with LNCV–RD panel busbar at left side, and connected with system main busbar at right side.	<p>–Include one busbar gas tank and one CT gas tank.</p> <p>–In busbar tank, there are one 3–position switch and two groups of inner–cone bushings, one for system main busbar extension and one for plugging to upper circuit breaker gas tank.</p> <p>–In CT tank, there are three epoxy–casted CTs and two groups of inner–cone bushings, one for connecting with neighbour panel busbar by plug–in type connector and one for plugging to lower busbar gas tank. For example, LNCD–LD is a panel with busbar left side extension.</p> <p>–Earthing switch can be cancelled or blocked if necessary.</p>

OEM Functional Unit



N2S

Continued

No.	Scheme	Type	Denomination	Description
4		LNDL LNDTL	DS riser panel – Cable top entry – Cable bottom entry	<p>–Include one busbar gas tank and one busbar riser gas tank.</p> <p>–In busbar tank, there are one 3–position switch and two groups of inner–cone bushings, one for system main busbar extension and one for plugging to upper circuit breaker gas tank.</p> <p>–In busbar riser tank, there are four groups of inner–cone bushings, three for plug–in cable terminal, PT and surge arrester. For example, double incoming cables and PT can be plugged from outside of the gas tank. The other group is for plugging to lower busbar gas tank.</p> <p>–The empty bushings will be sealed by end plugs or by white plastics covers on request.</p> <p>–Earthing switch can be cancelled or blocked if necessary.</p>
5		LND–T2D	PT panel	<p>–Include one busbar gas tank equipped with one 3–position switch.</p> <p>–In busbar tank, there are two groups of inner–cone bushings, one for plug–in PT and one for plug–in surge arrester.</p>
6		LNМ	Metering panel	<p>–Include one busbar gas tank equipped with three epoxy–casted CTs .</p> <p>–In busbar tank , there are three groups of inner–cone bushings, one for plug–in PT and two for system main busbar extension.</p>
7		LNE LNE–RD LNE–LD	Busbar earthing panel –Right Direction extensible(RD) –Left Direction extensible(LD)	<p>–Include one busbar gas tank</p> <p>–In busbar tank, there are one earthing switch disconnector and one group of inner–cone bushings, for system main busbar extension. For example, LNE–LD is system main busbar Left Direction extension.</p>

Designation: Panels are designated as per above types plus the rated voltage in kV and rated current for feeder busbar in A. In case of the discrepancy for the rated current between the main busbar and feeder busbar, the rated current of the main busbar shall be specified in the bracket.

For example: N2S–LNL–12/1250: 12kV incoming panel, the rated current for the feeder busbar is 1250A while the rated current for the main busbar is 1250A.

N2S–LNL–12/1600 (2500): 12kV incoming panel, the rated current for the feeder busbar is 1600A while the rated current for the main busbar is 2500A.

Typical Schemes

Typical primary schemes-N2S

No .	1	2	3*	4*	5	6	7*
Primary circuit scheme							
VCB VEG	1	1	1	1			
3-position switch IST	1	1	1	1			
CT	KSOH Toroidal type	3	3	3	a)Optional 3	a)Optional 3	a)Optional 3
	GIS12L Post type				b)Optional 3	b)Optional 3	b)Optional 3
PT GBEA Inner-cone plug-in type			3	3			3
HV fuse EFEN (within PT)			3	3			3
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type	3		3		3	
	CJBKP Outer-cone plug-in type						
Remarks	Incoming/outgoing panel				Cable riser panel		

No .	8*	9	10	11*	12*	13	14
Primary circuit scheme							
VCB VEG						1	1
3-position switch IST		1	1	1	1	1	1
CT	KSOH Toroidal type	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	3	3
	GIS12L Post type	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3		
PT GBEA Inner-cone plug-in type	3			3	3		
HV fuse EFEN (within PT)	3			3	3		
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type	3		3	3		3
	CJBKP Outer-cone plug-in type						
Remarks	Cable riser panel	DS riser panel				Overhead incoming/outgoing panel	

Typical Schemes

Typical primary schemes-N2S

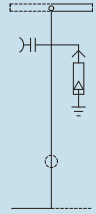
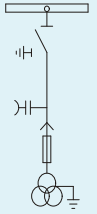
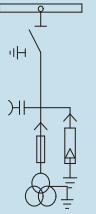
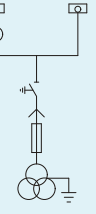
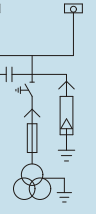
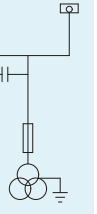

No .	15*	16	17	18*	19*	20	21
Primary circuit scheme							
VCB VEG	1						
3-position switch IST	1					1	1
CT	KSOH Toroidal type	3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3
	GIS12L Post type		b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3
PT GBEA Inner-cone plug-in type	3			3	3		
HV fuse EFEN (within PT)	3			3	3		
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type		3		3		3
	CJBKP Outer-cone plug-in type						
Remarks	Overhead incoming/outgoing panel	Overhead incoming/outgoing riser panel				Overhead DS riser panel	

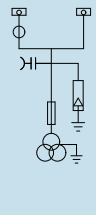
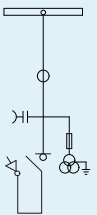
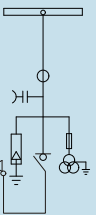
No .	22*	23*	24	25	26	27	28*
Primary circuit scheme							
VCB VEG			1				
3-position switch IST	1	1	1	1	1	1	
CT	KSOH Toroidal type	a)Optional 3	a)Optional 3				
	GIS12L Post type	b)Optional 3	b)Optional 3	Optional 3	Optional 3	Optional 3	Optional 3
PT GBEA Inner-cone plug-in type	3	3			3		3
HV fuse EFEN (within PT)	3	3			3		3
Voltage indicator	Available	Available		Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type	3				3	
	CJBKP Outer-cone plug-in type						
Remarks	Overhead DS riser panel		Sectionalizer panel	Busbar riser panel			Busbar coupler riser panel

Typical Schemes

Technical Specifications

Typical primary schemes-N2S

No .	29	30	31	32	33	34**	35**
Primary circuit scheme							
VCB VEG							
3-position switch		1	1				
CT	KSOH Toroidal type						
	GIS12L Post type	Optional	3		3	3	Upon Request
PT GBEA Inner-cone plug-in type		3	3	3	3	Upon Request	Upon Request
HV fuse EFEN (within PT)		3	3	3	3	XRNP	3
Voltage indicator	Available	Available	Available		Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type	3	3		3		
	CJBKP Outer-cone plug-in type						HY5WS
Remarks	Busbar riser panel	Voltage measuring panel	Voltage measuring panel with surge arrester	GIS metering panel		AIS metering panel	

No .	36**	37**	38**	39	40	41	42
Primary circuit scheme							
VCB VEG							
3-position switch IST		ISARC1-03	ISARC1-03				
CT	KSOH Toroidal type						
	GIS12L Post type	Upon Request	Upon Request	Upon Request			
PT GBEA Inner-cone plug-in type	Upon Request	Upon Request	Upon Request				
HV fuse EFEN (within PT)	XRNP	3	XRNP	3	XRNP	3	
Voltage indicator	Available	Available	Available				
Surge arrester	3EH2 Inner-cone plug-in type						
	CJBKP Outer-cone plug-in type			HY5WS	3		
Remarks	AIS metering panel						

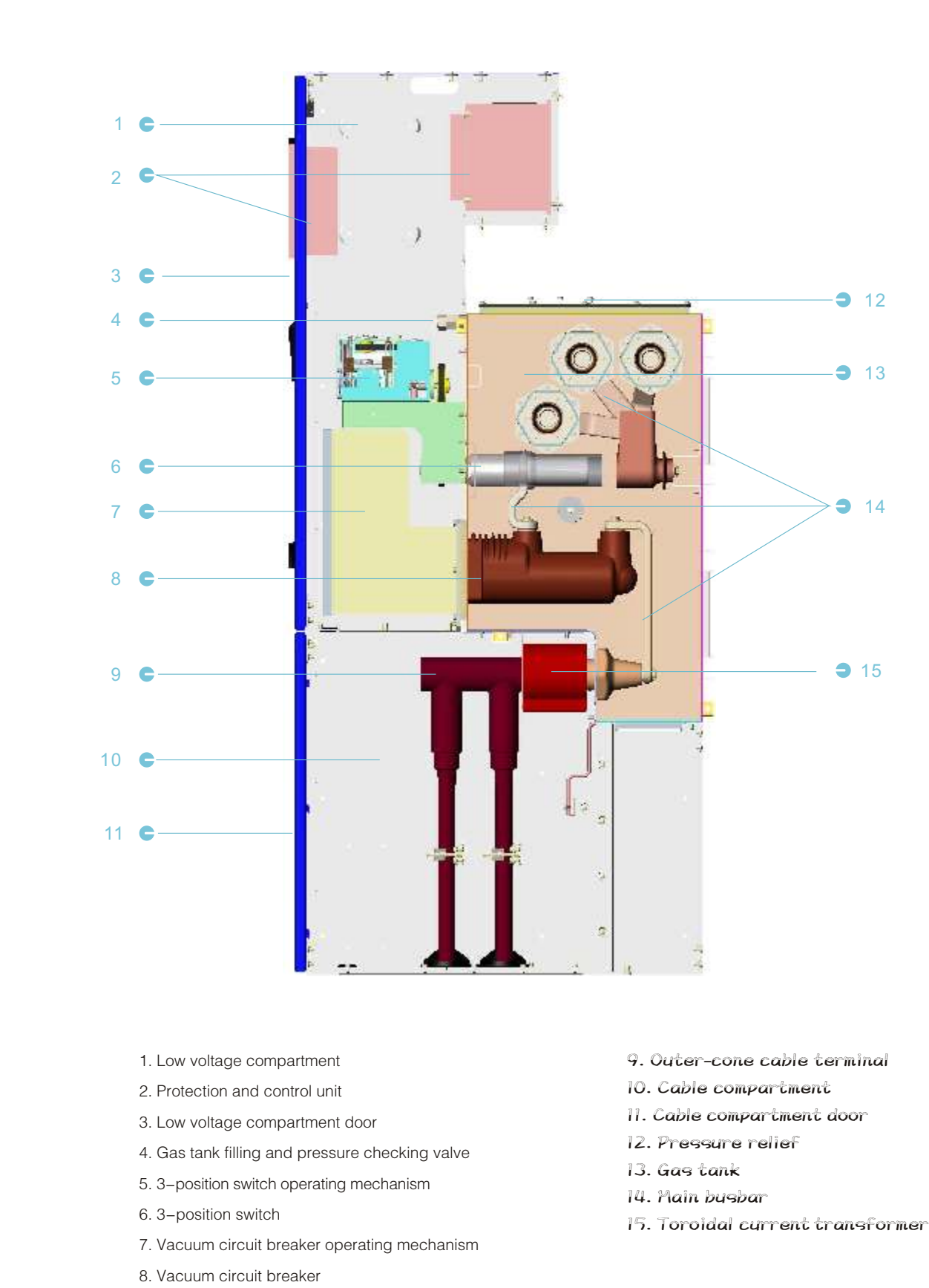
Note: * means PT can be installed with disconnector additionally;

** means the width a is 800mm;

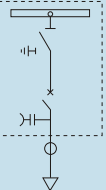
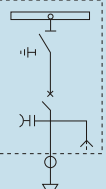
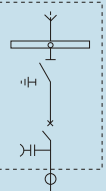
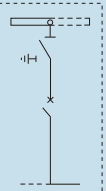
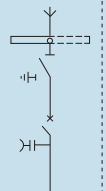
With regard to the type of all components in the schemes, the actual type in application shall prevail.

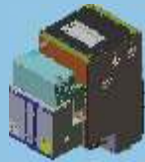
No.	Item		Unit	Data (IEC/GB)	
1	Rated voltage		kV	12	17.5/24
2	Rated power frequency withstand voltage (1min)	Between phases and to earth	kV	28/42	50
		Across the isolating distance		32/48	60
3	Rated lightning impulse withstand voltage	Between phases and to earth	kV	75	125
		Across the isolating distance		85	145
4	Rated frequency		Hz	50/60	
5	Rated current		A	630/1250	
6	Making single/back to back capacitor bank current		A	630/400	400/400
7	Rated short-circuit breaking current		kA	25/31.5	20/25
8	Rated short-circuit making current (peak)		kA	63/80	50/63
9	Rated short-time withstand current/duration		kA/s	25/3,31.5/3	20/3,25/3
10	Rated peak withstand current		kA	63/80	50/63
11	Rated capacitor bank inrush making capacity		kA	20	
12	Rated cable-charging breaking current		A	25	31.5
13	Rated operating sequences			O-0.3s-CO-3min-CO	
14	Rated filling gas pressure (abs,20°C)		MPa	0.12	
15	Alarm pressure (abs,20°C)		MPa	0.11	
16	Minimum operating pressure (abs,20°C)		MPa	0.10	
17	Annual leakage rate		%/Y	<0.1	
18	Degree of protection	High voltage live parts		IP65	
		Low voltage compartment		IP4X	
19	Rated voltage of auxiliary circuit		V	DC24, 48, 110, 220 AC220	
20	Rated power frequency withstand voltage of auxiliary circuit (1 min)		kV	2	

*Note: The insulating level is tested under 0.1 MPa or 1 bar (abs. 20°C) of insulating gas.



N2X offers OEM partners the following modular functional units:

No.	Scheme	Type	Denomination	Description
1		LNL	Incoming/outgoing panel	–Include one gas tank Type A. –Inside gas tank, there are one 3-position switch and one vacuum circuit breaker. –Two groups of inner-cone bushings for both-side extension of the system main busbar. – One group of outer-cone bushings for T and/or elbow type cable terminal and/or elbow type surge arrester. For example, double incoming cables and surge arrester can be plugged outside of the gas tank. –Earthing switch can be cancelled or blocked if necessary.
		LNL-BD	Incoming/outgoing panel – One more spare inner-cone bushing on cable side	Same as Type A. And –There are one more group of inner-cone bushings on Bottom Direction(BD), means cable side for plug-in PT or surge arrester.
		LNL-TD	Incoming/outgoing panel – One more spare inner-cone bushing on busbar side	Same as Type A. And –There are one more group of inner-cone bushing on Top Direction(TD), means main busbar side for plug-in PT or surge arrester.
2		LNCV-RD	Sectionalizer panel –Panel busbar Right Direction extensible(RD) Connected with LNCD-LD at panel busbar right side, and connected with system main busbar at left side.	–Include one gas tank Type B. –Inside tank, there are one 3-position switch and one vacuum circuit breaker. –Two groups of inner-cone bushings, one for system main busbar extension and one for connecting with neighbour panel busbar by plug-in type connectors. For example, LNCV-LD is a panel with busbar left side extension. –Earthing switch can be cancelled or blocked if necessary.
		LNCV-LD	–Panel busbar Light Direction extensible(LD) Connected with LNCD-RD at panel busbar left side, and connected with system main busbar at right side.	
		LNCV-RD-TD	Sectionalizer panel –Panel busbar Right Direction extensible(RD) One more spare inner-cone bushing on busbar side	Same as gas tank Type B. And –There are one more group of inner-cone bushings on Top Direction(TD), means main busbar side for plug-in PT or surge arrester.
		LNCV-LD-TD	–Panel busbar Light Direction extensible(LD) One more spare inner-cone bushing on busbar side	



Continued

No.	Scheme	Type	Denomination	Description
3		LNCD-RD	Busbar riser panel -Panel busbar Right Direction extensible(RD) Connected with LNCV-LD at panel busbar right side, and connected with system main busbar at left side.	-Include one gas tank Type C . -Inside tank , there is one 3-position switch . -Two groups of inner-cone bushings, one for system main busbar extension and one for connecting with neighbour panel busbar by plug-in type connectors. For example, LNCD-LD is a panel with busbar left side extension. -Earthing switch can be cancelled or blocked if necessary.
		LNCD-LD	-Panel busbar Light Direction extensible(LD) Connected with LNCV-RD at panel busbar left side, and connected with system main busbar at right side.	
		LNCD-RD-TD	Busbar riser panel -Panel busbar Right Direction extensible(RD) One more spare inner-cone bushing on busbar side	Same as gas tank Type C. And -There are one more group of inner-cone bushings on Top Direction(TD), means main busbar side for plug-in PT or surge arrester.
		LNCD-LD-TD	-Panel busbar Light Direction extensible(LD) One more spare inner-cone bushing on busbar side	
4		LNDL	DS riser panel	-Include one gas tank . -Inside tank , there is one 3-position switch . -Two groups of inner-cone bushings for both-side extension of system main busbar. -One group of outer-cone bushings for T and/or elbow type cable terminal and/or elbow type surge arrester. For example, double incoming cables and surge arrester can be plugged from outside of the gas tank. -Earthing switch can be cancelled or blocked if necessary.
5		LND-B2D	PT panel	-Include one gas tank special for PT panel. -Inside tank , there is one 3-position switch . -Four groups of inner-cone bushings, two for both-side extension of system main busbar, and two for plug-in PTs and surge arresters from Bottom Direction(B2D).
6		LNM	Metering panel	-Include one gas tank equipped with three epoxy-casted CTs . -Inside tank, there are three groups of inner-cone bushings, one for plug-in PT and two for system main busbar extension.
7		LNE LNE-RD LNE-LD	Busbar earthing panel - Main busbar Right Direction extensible(RD) - Main busbar Light Direction extensible(LD)	-Include one gas tank -Inside tank, there are one earthing switch disconnecter and one group of inner-cone bushings, for system main busbar extension. For example, LNE-LD is a system with main busbar left side extension.

Designation: Panels are designated as per above types plus the rated voltage in kV and rated current for feeder busbar in A. In case of the discrepancy for the rated current between the main busbar and feeder busbar, the rated current of the main busbar shall be specified in the bracket.

For example: N2X-LNL-12/1250: 12kV incoming panel, the rated current for the feeder busbar is 1250A while the rated current for the main busbar is 1250A.

N2X-LNL-12/630 (800): 12kV incoming panel, the rated current for the feeder busbar is 630A while the rated current for the main busbar is 800A.

Typical Schemes

Typical primary schemes-N2X

No .	1	2	3	4*	5*	6*	7*
Primary circuit scheme							
VCB VEG	1	1	1	1	1	1	1
3-position switch IST	1	1	1	1	1	1	1
CT	KSOH Toroidal type	3	3	3	3	3	3
	GIS12L Post type						
PT GBEA Inner-cone plug-in type					3	3	3
HV fuse EFEN (within PT)					3	3	3
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type		3	3			3
	CJBKP Outer-cone plug-in type	3				3	
Remarks	Incoming/outgoing panel						

No .	8	9	10	11*	12*	13*	14*
Primary circuit scheme							
VCB VEG							
3-position switch IST							
CT	KSOH Toroidal type	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3
	GIS12L Post type	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3
PT GBEA Inner-cone plug-in type					3	3	3
HV fuse EFEN (within PT)					3	3	3
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type		3	3			3
	CJBKP Outer-cone plug-in type	3				3	
Remarks	Cable riser panel						

Typical Schemes

Typical primary schemes-N2X

No .	15	16	17	18*	19*	20*	21*
Primary circuit scheme							
VCB VEG							
3-position switch IST	1	1	1	1	1	1	1
CT	KSOH Toroidal type	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3	a)Optional 3
	GIS12L Post type	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3	b)Optional 3
PT GBEA Inner-cone plug-in type					3	3	3
HV fuse EFEN (within PT)					3	3	3
Voltage indicator	Available	Available	Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type		3	3			3
	CJBKP Outer-cone plug-in type	3				3	
Remarks	DS riser panel						

No .	22	23*	24*	25	26*	27*	28
Primary circuit scheme							
VCB VEG	1	1	1				
3-position switch IST	1	1	1	1	1	1	
CT	KSOH Toroidal type						
	GIS12L Post type			Optional 3	Optional 3	Optional 3	Optional 3
PT GBEA Inner-cone plug-in type			3			3	
HV fuse EFEN (within PT)			3			3	
Voltage indicator							
Surge arrester	3EH2 Inner-cone plug-in type	3			3		
	CJBKP Outer-cone plug-in type						
Remarks	Sectionalizer panel			Busbar riser panel			Busbar coupler riser panel

Typical Schemes

Typical primary schemes-N2X

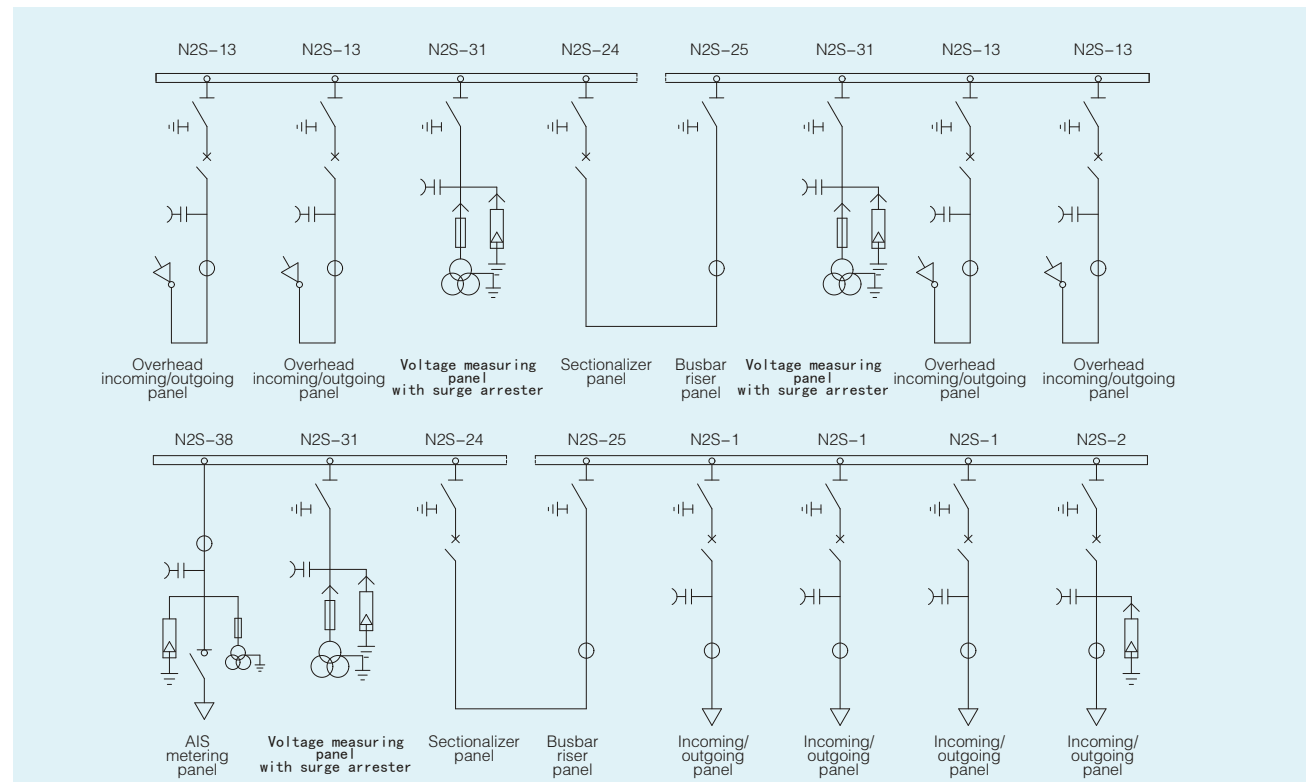
No .	29*	30*	31	32	33	34	35
Primary circuit scheme							
VCB VEG							
3-position switch IST			1	1	1	1	
CT	KSOH Toroidal type						
	GIS12L Post type	Optional 3	Optional 3				3
PT GBEA Inner-cone plug-in type	3		JDZR 2	3	JDZR 2	3	3
HV fuse EFEN (within PT)	3		XRNP 3	3	XRNP 3	3	3
Voltage indicator			Available	Available	Available	Available	Available
Surge arrester	3EH2 Inner-cone plug-in type	3				3	
	CJBKP Outer-cone plug-in type				3		
Remarks	Busbar coupler riser panel		Voltage measuring panel (AIS)		Voltage measuring panel with surge arrester (AIS)		AIS metering panel

No .	36	37**	38**	39**	40***	41***	42
Primary circuit scheme							
VCB VEG							
3-position switch IST						ISARC1-03	
CT	KSOH Toroidal type						
	GIS12L Post type	3	Upon Request	Upon Request	Upon Request	Upon Request	
PT GBEA Inner-cone plug-in type	3	Upon Request	Upon Request	Upon Request	Upon Request	Upon Request	
HV fuse EFEN (within PT)	3	XRNP 3	XRNP 3	XRNP 3	XRNP 3	XRNP 3	
Voltage indicator	Available	Available	Available	Available	Available	Available	
Surge arrester	3EH2 Inner-cone plug-in type	3					
	CJBKP Outer-cone plug-in type		HY5WS 3		HY5WS 3	HY5WS 3	
Remarks	GIS metering panel	AIS metering panel					

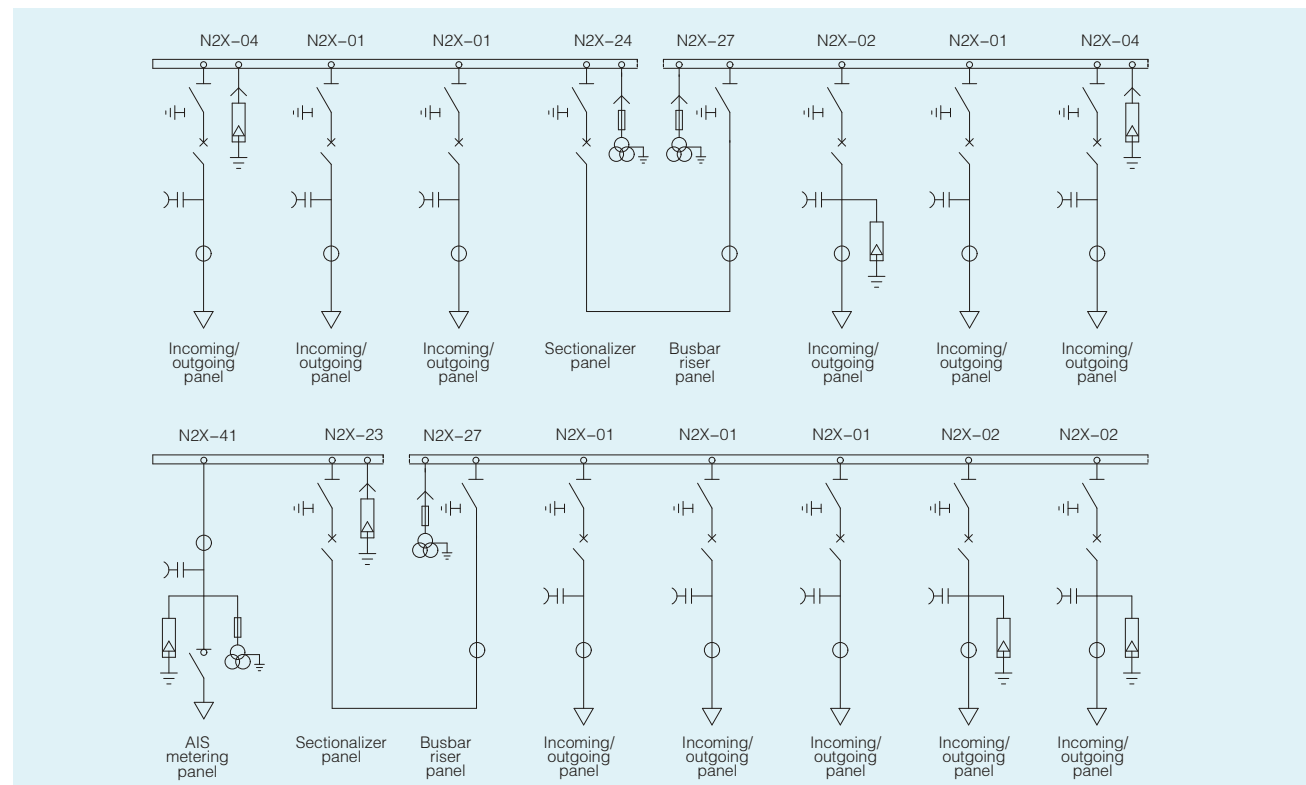
Note: * means the depth b shall be 150mm more. PT can be installed with disconnector additionally and installation against wall is not recommended;
 ** means the width a is 800mm; ***means the width a is 1000mm;
 With regard to the type of all components in the schemes, the actual type in application shall prevail.

Application Schemes

N2S Application Schemes



N2X Application Schemes

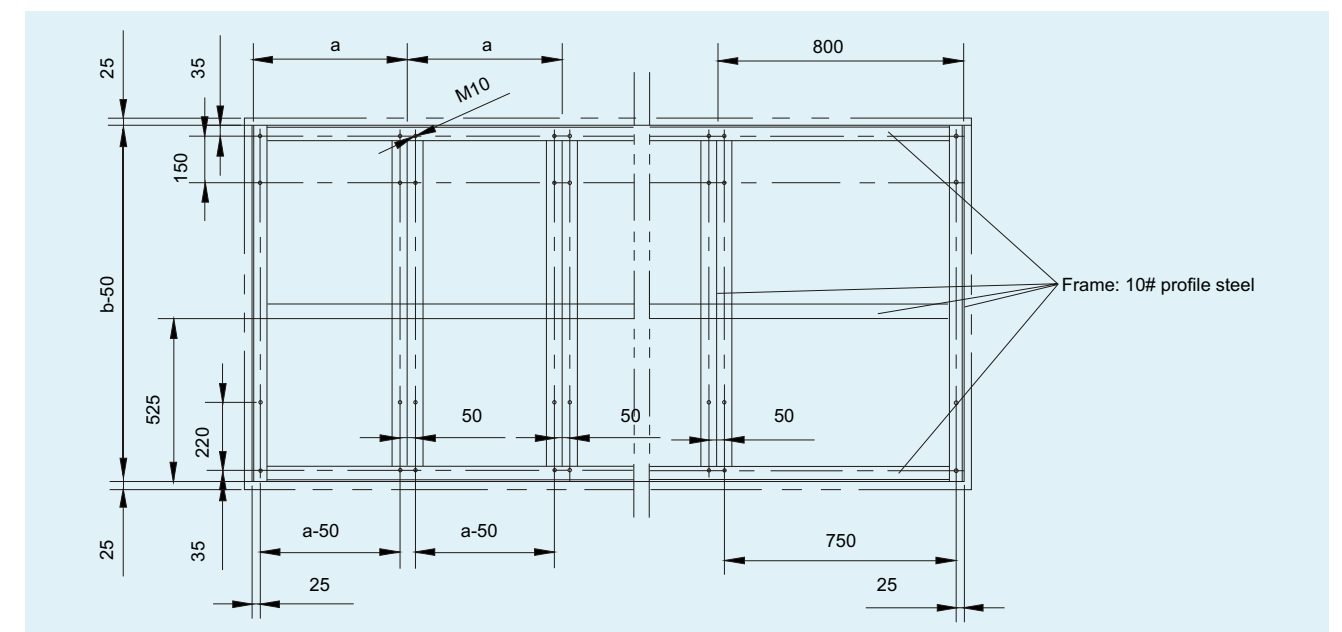


Foundation Frame

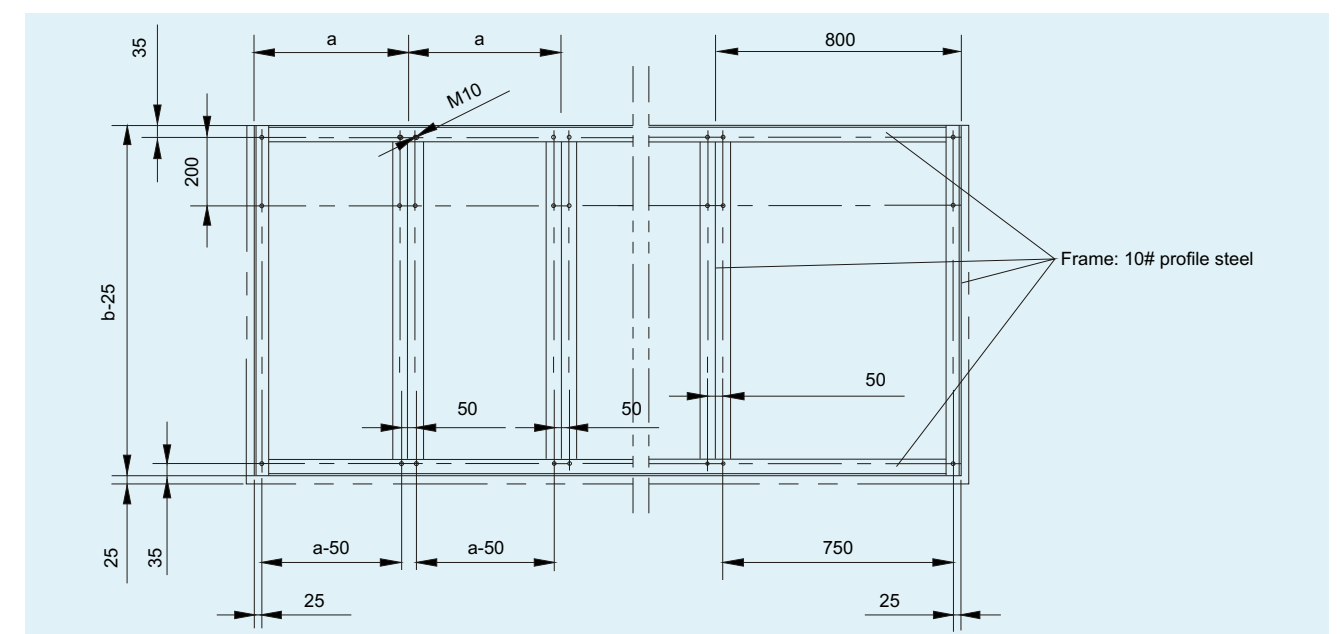
Foundation Frame

- For easy installation and proper long term function, it is recommended that N2S/N2X switchgear shall be mounted on foundation frame or profile steel which shall be laid by qualified personnel.
 - Detailed size for foundation frame of N2S/N2X switchgear or installation hole of profile steel, please refer to the below pictures.
 - Relevant standards are recommended to be complied when laying the foundation frame, in particular the evenness and straightness tolerances as a pre-condition for a perfect switchgear assembly.
- Tolerance conditions for laying the frame are:
 –Evenness tolerance: $\pm 1\text{mm/m}^2$
 –Straightness tolerance: Max.1 mm per meter, but max. 2mm for the entire length of the frame.

Foundation Frame of N2S Switchgear

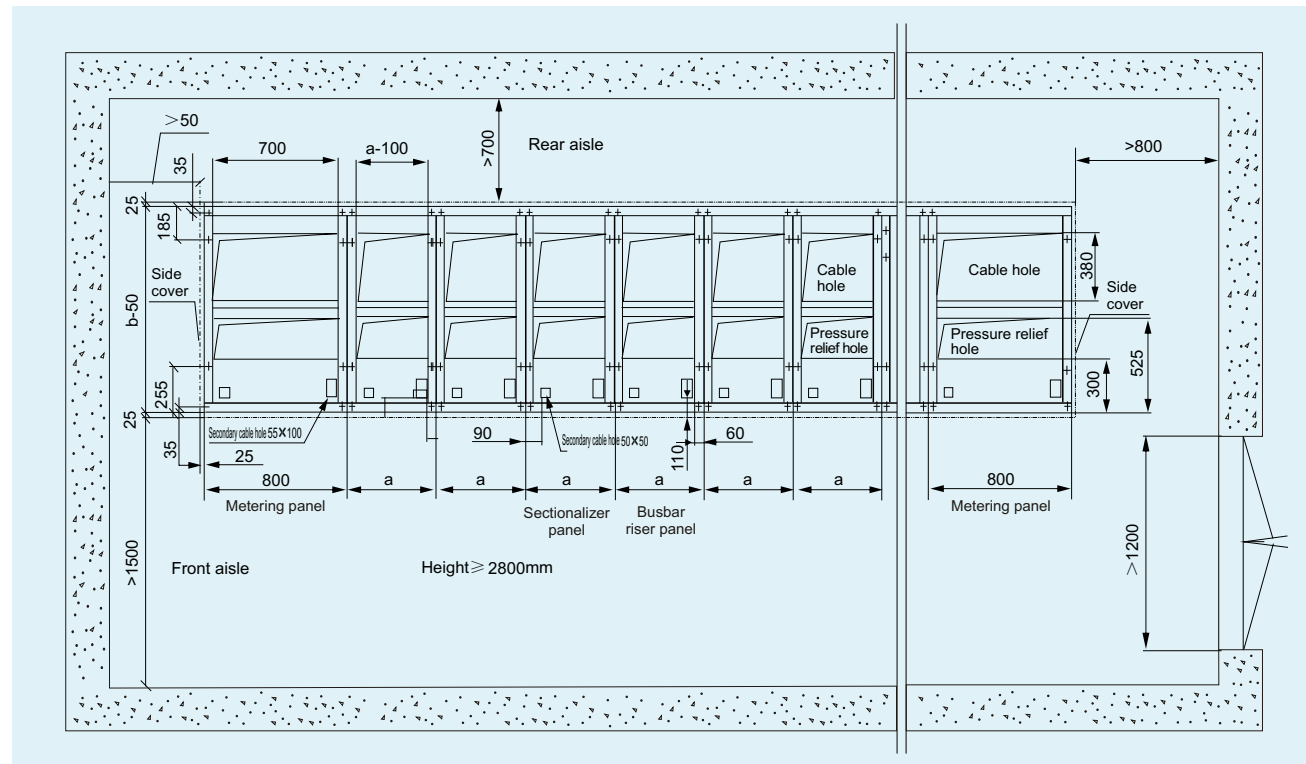


Foundation Frame of N2X Switchgear

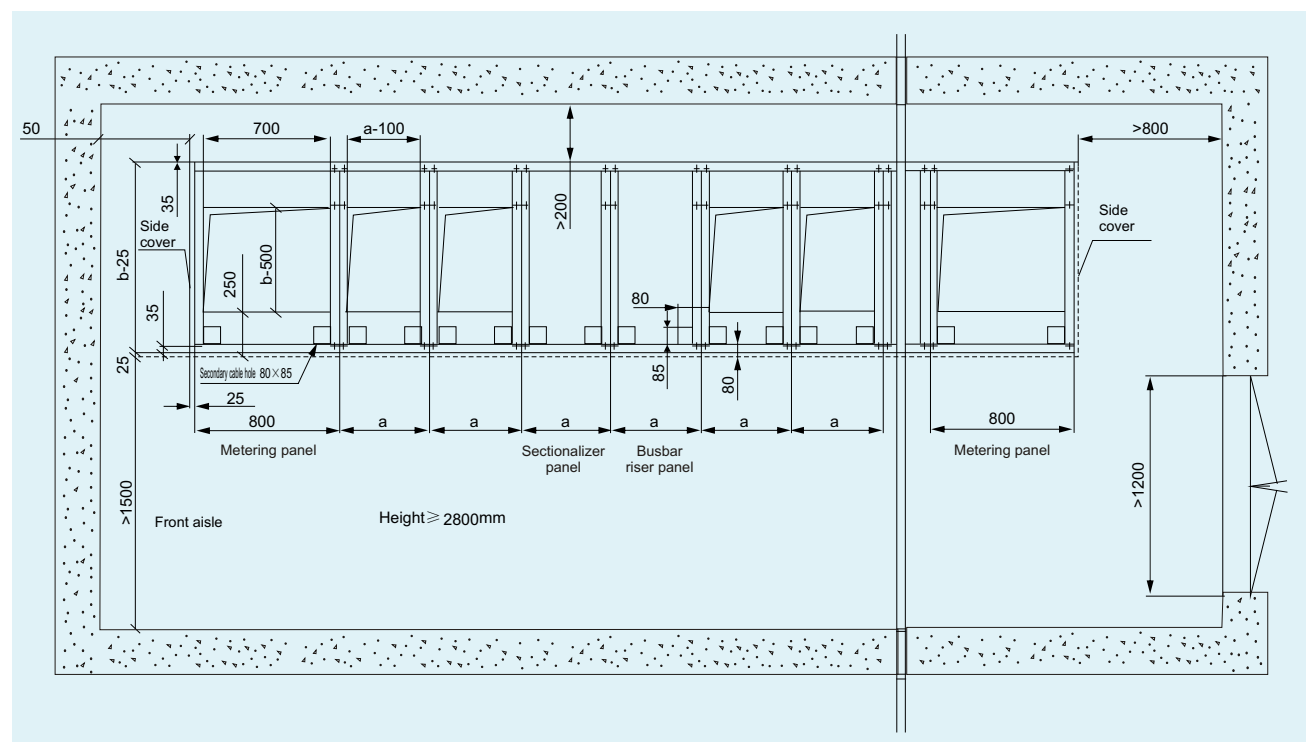


Layout Plan

N2S Switchgear

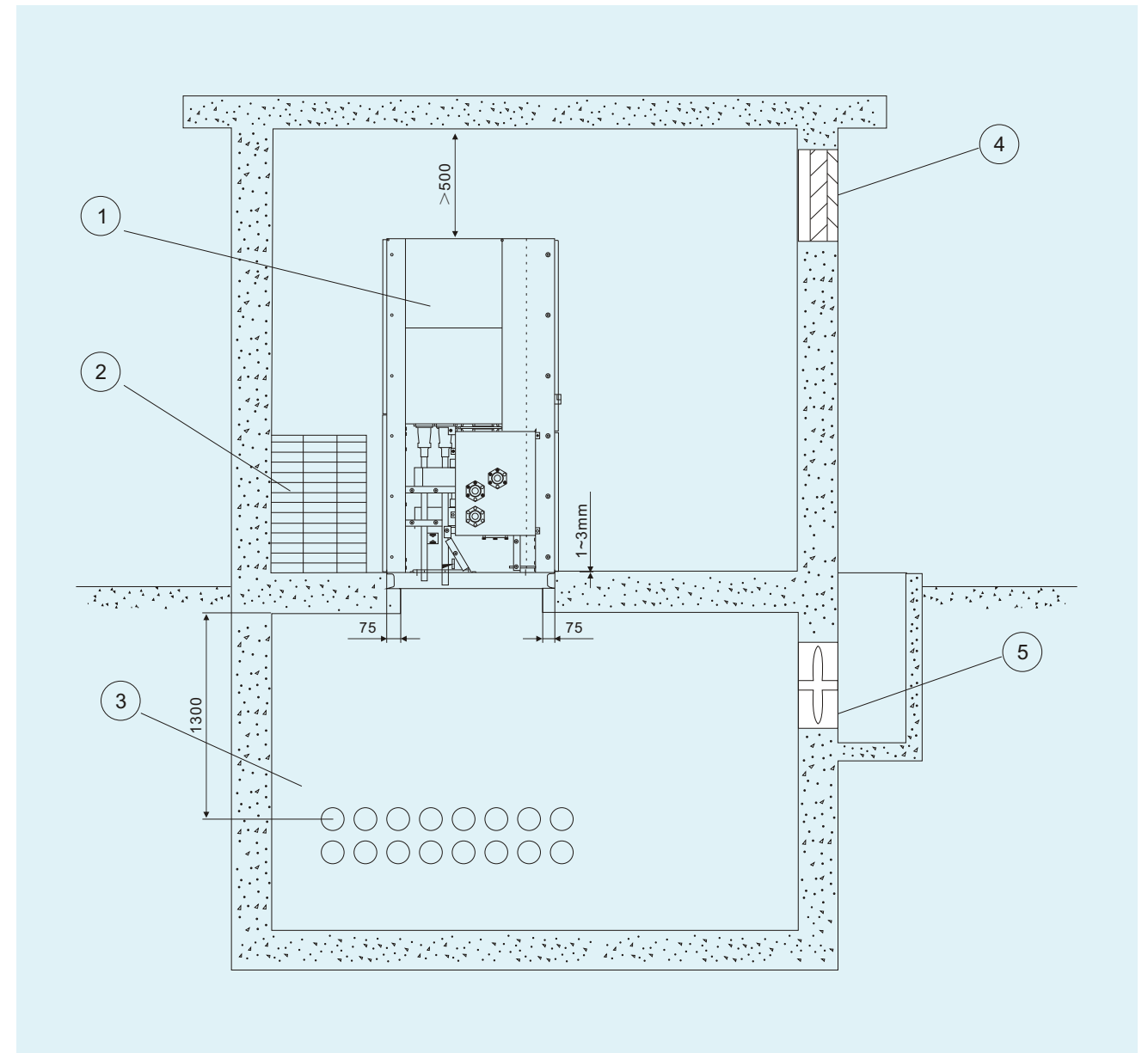


N2X Switchgear



Cable Layer

Cable layer for N2S/N2X Switchgear

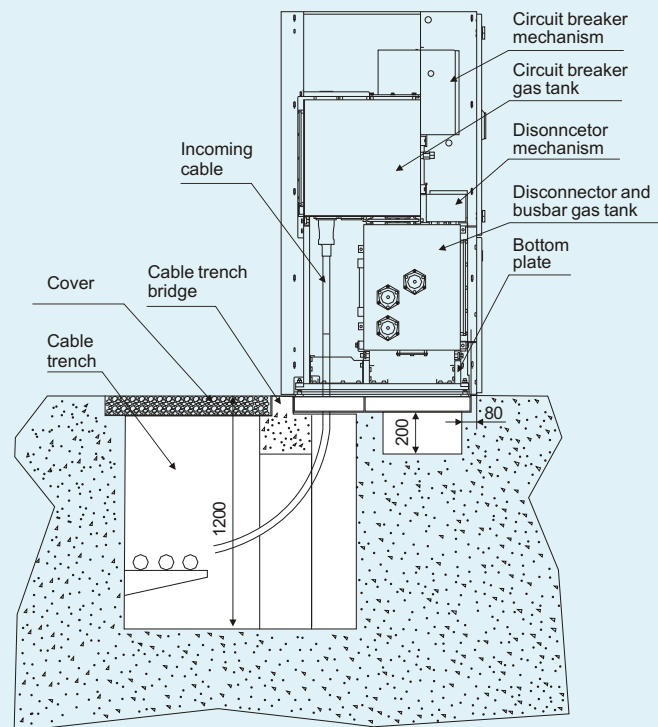


- 1.N2S/N2X switchgear 2.Lower ventilation 3.Cable layer 4.Upper ventilation 5.Cable layer ventilation

Cable Trench

Notes

Cable trench for N2S switchgear



Cable trench for N2X switchgear

