



12kV&24kV

Free SF6 RMU



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Product Overview

XGN118 series pure air/nitrogen (environmentally friendly gas) insulated switchgear from the design project, R & D simulation, test verification, to mass production, optimization and upgrading has been nearly ten years, in the domestic switching field of senior experts, a number of joint development of the joint efforts of enterprises in the mechanical life of the product, partial discharge, insulation strength, weathering performance, arc-firing level of a number of aspects with significant advantages.

We attach great importance to product quality and manufacturing process, and treat every link of product production with the heart of fine craftsmanship. Only the insulating gas compares heated dry air, nitrogen, carbon dioxide and pure air, and chooses the pure air with extremely low moisture content and high purity as the preferred insulating gas for replacing SF6. The core switch unit of XGN118 series products adopts the new vacuum interrupter soft package casting process, together with the well-designed rotary three-position switch, the overall structure is simple and compact; the pure air is used to replace SF6 in the fully sealed gas box, and with the advantageous electric field distribution design, the local discharge of the whole cabinet is lower than 5pC; the zinc-nickel alloy surface treatment process of the actuator has a salt spray resistance of more than 168 hours, and its maximum service life is up to 30,000 times.

The products are continuously optimized and improved by widely absorbing feedback during the process of product use, and have formed a diversified product portfolio with more than ten specifications of four series, including different current levels of 630A and 1250A, different structural types of upper isolation and lower isolation and lower grounding, and different specifications of compact and standardized sizes.

Conditions of use

Ambient temperature: upper limit +55℃, lower limit -40℃;
Altitude: no more than 3000m;
Relative humidity: daily average value ≤95%; monthly average value ≤90%;
Water vapor pressure: daily average value ≤2.2kPa; monthly average value ≤1.8kPa;

Workplace: the surrounding air is not obviously polluted by dust, smoke, corrosive and/or combustible gases, vapors or salt spray; no fire house explosion, serious filth, serious chemical corrosion and severe vibration.

The amplitude of electromagnetic interference induced in the secondary system ≤ 1.6kV.

Standard

- GB1984 High-voltage AC Circuit Breakers
- GB1985 High-voltage AC disconnecting and grounding switches
- GB3804 3.6~40.5kV high voltage AC load switch
- GB3804 3.6~40.5kV AC load switch
- GB3906 3.6~40.5kV AC metal-enclosed switchgear and control equipment
- GB4208 Enclosure protection level (IP code)
- GB/T11022 Common technical requirements for high-voltage switchgear and controlgear standards
- GB/T16927.1 High voltage test technology Part 1: General definitions and test requirements
- DL/T403 12~40.5kV "High-voltage AC Vacuum Circuit Breaker" Ordering Technical Conditions
- DL/T404 3.6~40.5kV AC metal-enclosed switchgear and controlgear
- DL/T486 High-voltage AC disconnecting and earthing switches
- DL/T593 Shared Technical Requirements for Standards of High Voltage Switchgear and Controlgear
- Customized Scheme for Standardized Design of 12 kV Ring Network Cabinets (Boxes) (2019 Edition)
- GB/T17467 High-voltage/Low-voltage Preassembled Substation

Switchgear technical parameter table

		Breaker cabinet		Load Switch Cabinet
Item		Unit	numerical value	
Rated Voltage		kV	12	
Rated Frequency		Hz	50 60	
Rated current		A	630 1250	
Arc extinguishing method		/	Vacuum	
Insulation mode		/	Pure air/pure nitrogen (Note: Pure air and pure nitrogen refer to the preparation of synthetic high-purity air or ammonia with a moisture content of less than 15 ppm)	
Rated frequency withstand voltage	To Ground, Interphase	kV	42	
	Between breaks	kV	48	
Rated lightning impulse voltage	To Ground, Between Phases	kV	75	
	Between breaks	kV	85	
Short-time withstand	Main circuit	kA/S	20/4 25/4	
	Ground Loop	kA/S	17.4/4	
Rated peak withstand current	Main circuit	kA	50 63	
	Ground circuit	kA	43.5	
Rated short-circuit closing current (peak)		kA	50 63	
Rated short-circuit breaking current		kA	20 25	/
Rated short-circuit breaking current breaking number of times E2 class		time	30	/
Rated sequence of operation of circuit breaker unit		/	0-0.3S-C0-180S-C0	/
Rated cable/line charging breaking test		/	C2	/
Divergent phase ground fault breaking current		KA	17.4	/
Rated active load breaking current		A	/	630
Rated closed loop breaking current		A	/	630
Rated cable charging on-off test		A	/	10
5% rated active load switching opening current		A	/	31.5
Ground switch closing times		time	5 (Note: XGN118C-12, XGN118D-12 series under the isolation under the grounding program for two times)	
Loop resistance		μΩ	≤ 140	
Rated gas pressure (20℃ gauge pressure)		MPa	0.02	
Minimum operating gas pressure		MPa	0	
Mechanical life	Circuit Breaker/Load Switch	time	10000 30000	
	Disconnect Switches	time	3000 6000	
	Grounding Switch	time	3000 6000	
Protection class	Gas Boxes	/	IP67	
	Enclosures	/	IP4X	
Rated annual air leakage rate		%	0.01	
Resistance to internal arc failure		kA/S	20/0.5(20/1) 25/0.5(25/1)	
Moisture content in gas tank		ppm	≤ 150	

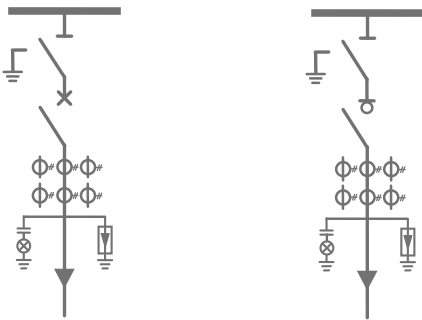
Vacuum Switch Parameter Table

Item	Unit	Circuit breaker	Load switch
Contact opening distance	mm	9±1	
Contact overtravel	mm	3±1	
Average opening speed	m/s	1.4±0.3	
Average closing speed	m/s	0.8±0.2	
Bounce time of contact closing	ms	≤ 2	
Three-phase closing asynchrony	ms	≤ 2	
Three-phase switching non-synchronous	ms	≤ 2	
Closing time	ms	30-60	≤90
Split time	ms	18~40	
Center distance between phases	mm	150±1.5	
Split contact rebound amplitude	mm	≤ 1.5	
Amplitude of overshoot of tripping contact	mm	≤ 2	
Rated contact pressure	N	1800±160	1100±100

Disconnecting and Grounding Switch Parameter Table

Item	Unit	Disconnecting switch	Grounding switch
Rated Voltage	kV	12	
Rated Frequency	Hz	50	
Rated current	A	630/1250	/
1min frequency withstand voltage	To Ground, Interphase	kV	42
	Between breaks	kV	48
Lightning impulse withstand voltage	To Ground, Between Phases	kV	75
	Between breaks	kV	85
Short-time withstand current and duration	kA/S	20/4 main circuit, 17.4/2 grounding circuit	
Rated peak withstand current	kA	50/63	
Mechanical life	time	3000	
Contact pressure	N	160±20	
Manual closing force	N	≤ 200	
Manual opening force	N	≤ 200	
Opening distance of movable and static contacts	mm	≥ 110	110
Phase center distance	mm	150±1.5	
Ground switch closing synchronization	ms	/	≤ 2

XGN118A-12/630-20(25)
compact pure air/nitrogen (environmentally friendly gas) insulated ring main unit

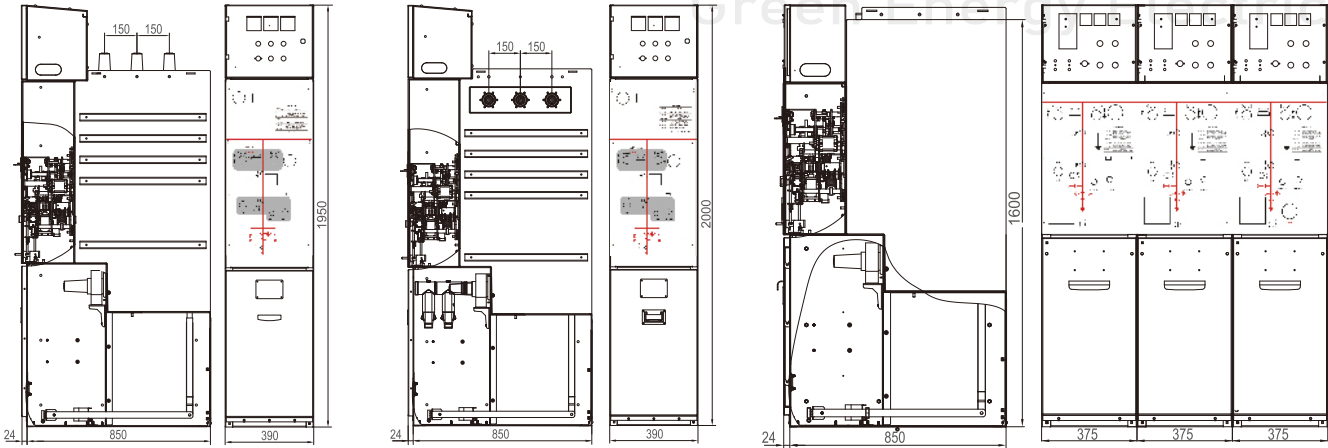


XGN118A-12 circuit breaker unit XGN118A-12 load switch unit

Cabinet Size Table

Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	390*850*1950	390*850*2000	375*850*1600
Load switch cabinet	390*850*1950	390*850*2000	375*850*1600
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1600
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1600
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1600
Metering Cabinet	750*850*1950	750*850*2000	750*850*1600

External Form Figure

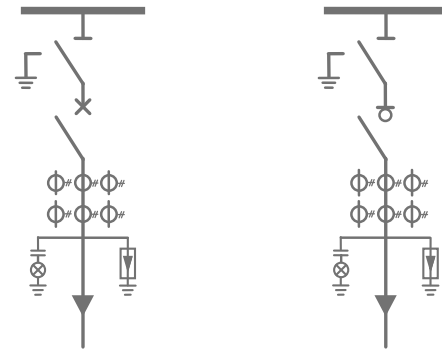


Top Expansion Program

Side Expansion Solution

Co-boxing program

XGN118B-12/630-20(25)
 standardized and customized solutions pure
 air/nitrogen (environmentally friendly gas)
 insulated ring main unit

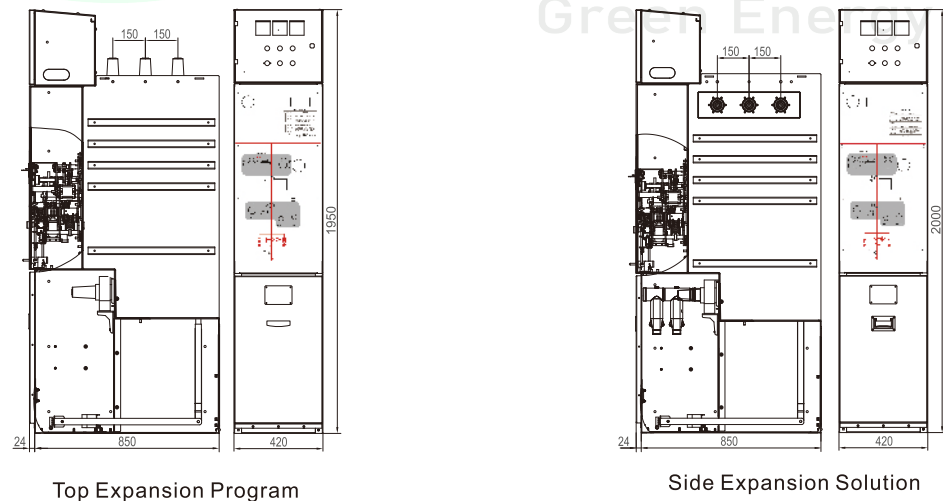


XGN118B-12 circuit breaker unit XGN118B-12 load switch unit

Cabinet Size Table

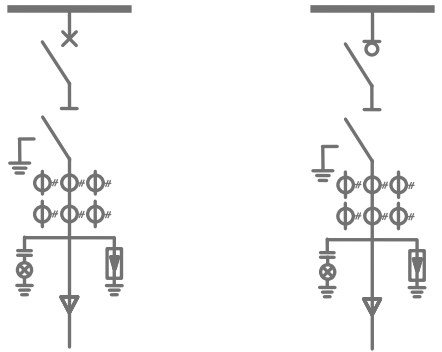
Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	420*850*1950	420*850*2000	420*850*1950/2000
Load switch cabinet	420*850*1950	420*850*2000	420*850*1950/2000
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1950/2000
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1950/2000
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1950/2000
Metering Cabinet	750*850*1950	750*850*2000	750*850*1950/2000

External Form Figure



Top Expansion Program Side Expansion Solution

XGN118C-12/630-20(25)
 atmospheric pressure sealed air
 (environmentally friendly gas)
 insulated ring main unit

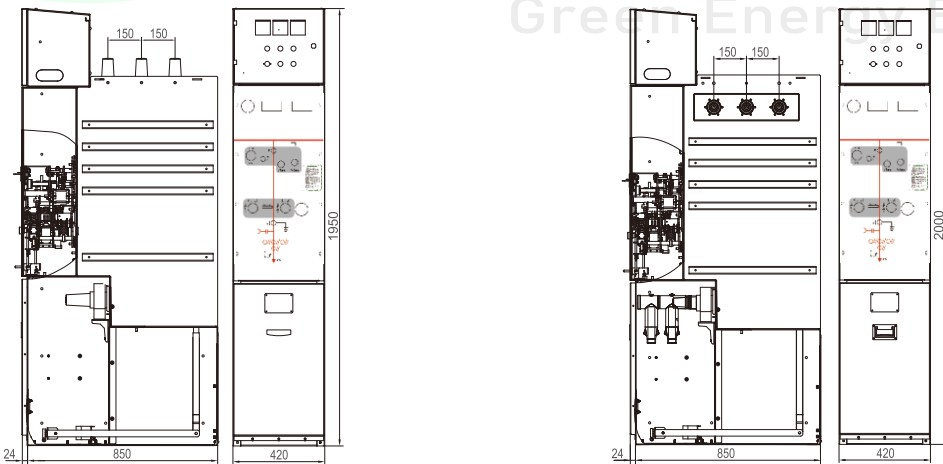


XGN118C-12 circuit breaker unit XGN118C-12 load switch unit

Cabinet Size Table

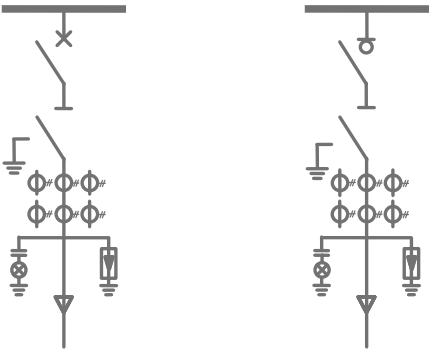
Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	420*850*1950	420*850*2000	420*850*1950/2000
Load switch cabinet	420*850*1950	420*850*2000	420*850*1950/2000
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1950/2000
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1950/2000
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1950/2000
Metering Cabinet	750*850*1950	750*850*2000	750*850*1950/2000

External Form Figure



Top Expansion Program Side Expansion Solution

XGN118D-12/630-20(25)
Pure air/nitrogen
(environmentally friendly gas)
insulated ring main unit

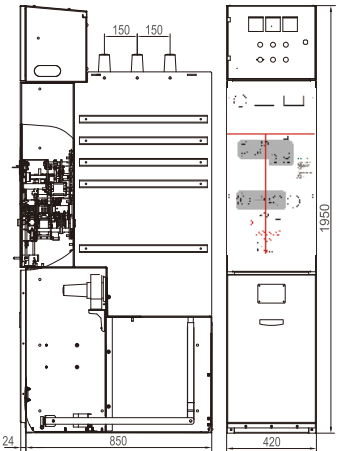


XGN118D-12 circuit breaker unit XGN118D-12 load switch unit

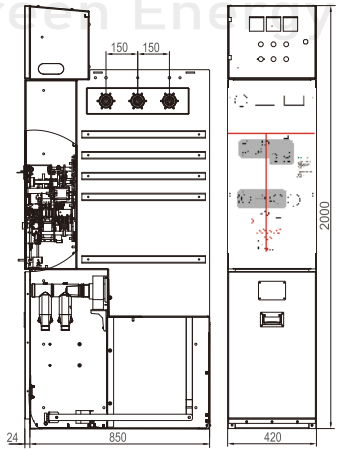
Cabinet Size Table

Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	420*850*1950	420*850*2000	420*850*1950/2000
Load switch cabinet	420*850*1950	420*850*2000	420*850*1950/2000
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1950/2000
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1950/2000
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1950/2000
Metering Cabinet	750*850*1950	750*850*2000	750*850*1950/2000

External Form Figure

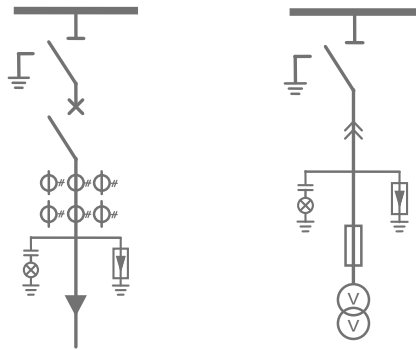


Top Expansion Program



Side Expansion Solution

XGN118B-12/1250-25
1250A pure air/nitrogen
(environmental protection gas)
insulated ring network cabinet

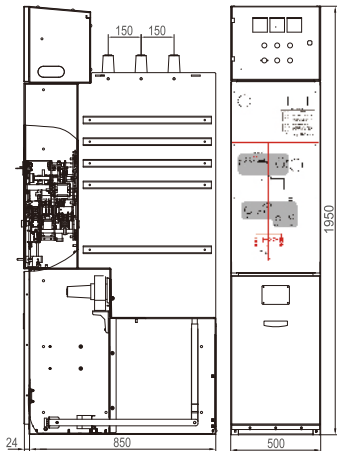


XGN118D-12 circuit breaker unit XGN118D-12 Disconnect Switch

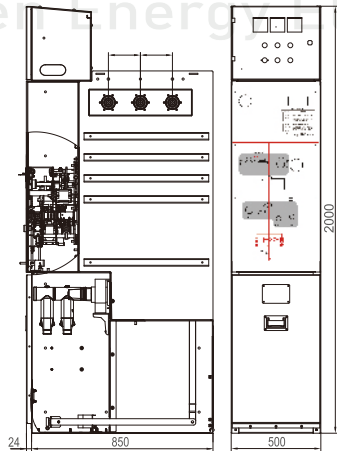
Cabinet Size Table

Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	420*850*1950	420*850*2000	420*850*1950/2000
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1950/2000
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1950/2000
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1950/2000
Metering Cabinet	750*850*1950	750*850*2000	750*850*1950/2000
Busbar contact cabinets	750*850*1950	750*850*2000	750*850*1950/2000

External Form Figure

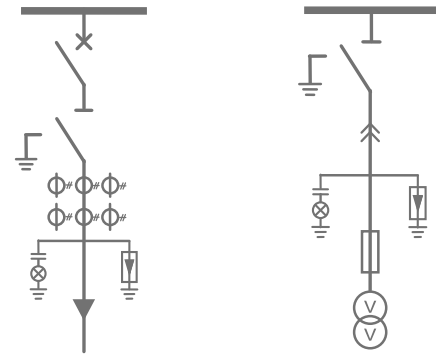


Top Expansion Program



Side Expansion Solution

XGN118d-12/1250-25
 1250A pure air/nitrogen
 (environmental protection gas)
 insulated ring main unit

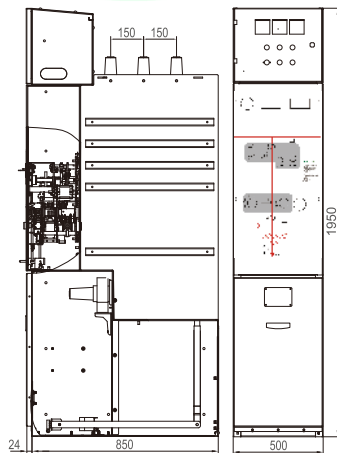


XGN118D-12 circuit breaker unit XGN118D-12 Disconnect Switch

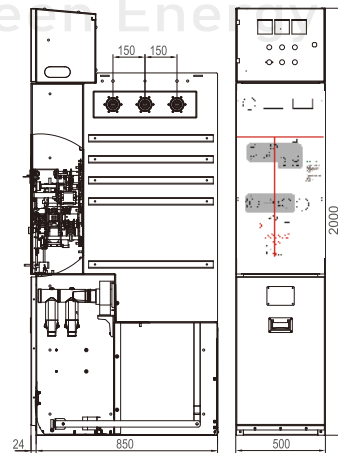
Cabinet Size Table

Cabinet Type	Single Cabinet Top Expansion	Single Cabinet Side Expansion	Co-boxing single cabinet size
Circuit Breaker Cabinet	500*850*1950	500*850*2000	500*850*1950/2000
PT cabinet (with 3-phase 5-post)	600*850*1950	600*850*2000	600*850*1950/2000
PT cabinet (with single-phase transformer)	420*850*1950	420*850*2000	420*850*1950/2000
Cable Lifting Cabinet	375*850*1950	375*850*2000	375*850*1950/2000
Metering Cabinet	750*850*1950	750*850*2000	750*850*1950/2000
Busbar contact cabinets	750*850*1950	750*850*2000	750*850*1950/2000

External Form Figure



Top Expansion Program



Side Expansion Solution

XGW -12
 Environmentally friendly
 gas-insulated ring box/
 -secondary fusion complete sets of ring box

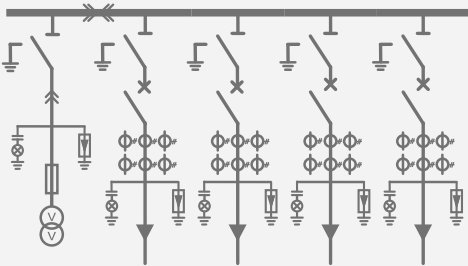
Standard.

- Customized Scheme for Standardized Design of 12 kV Ring Main Units (Boxes) (2019 Edition)
- GB/T17467:High-voltage/Low-voltage Pre-assembled Substations
- IEC466:AC Insulated Enclosed Switchgear and Control Equipment for Rated Voltages above 1KV and below 38kV

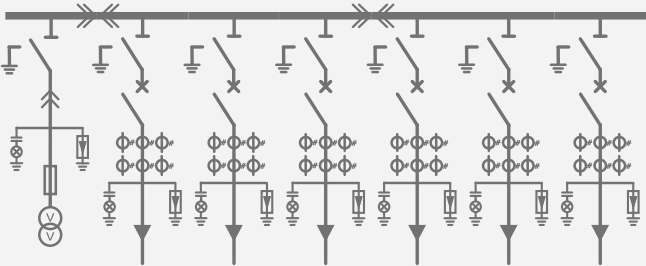


Standardized customized solutions one or two times fusion complete ring grid box single line diagrams

PT+VVVV standardized programme



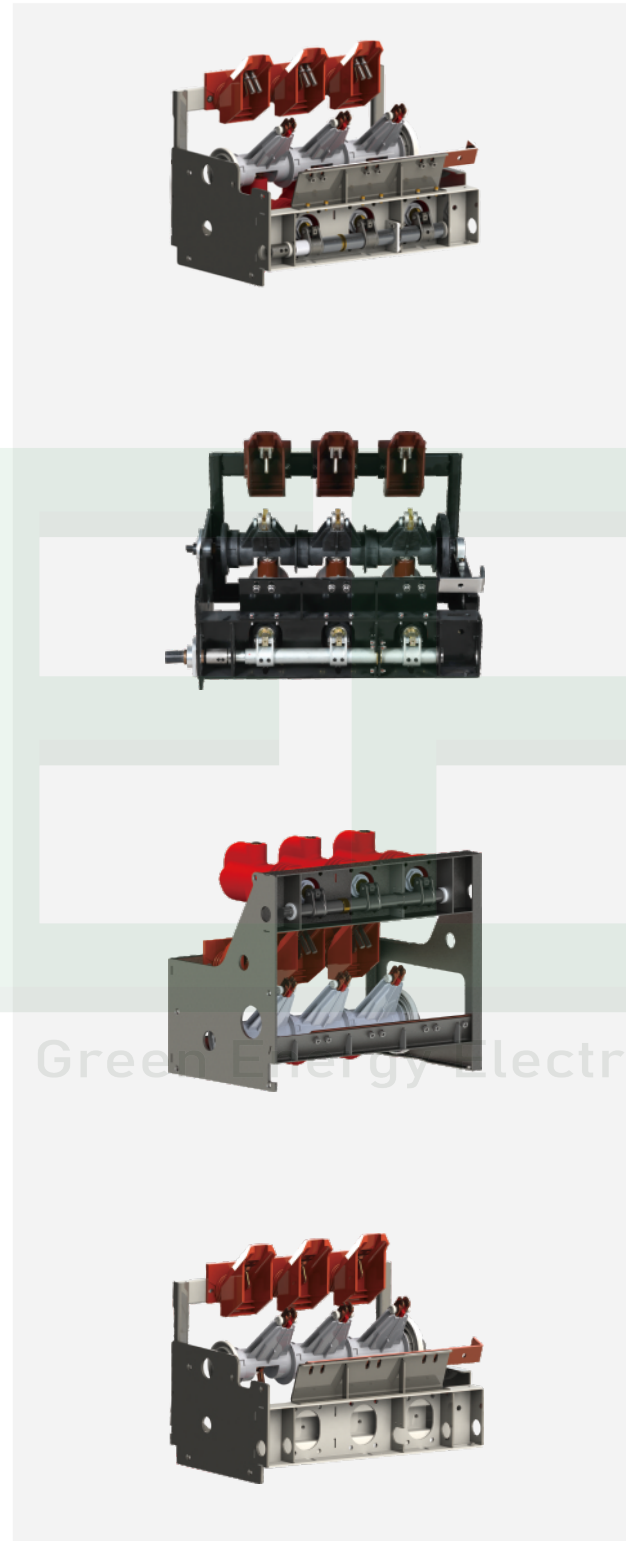
PT+VVV+VVV standardized programme



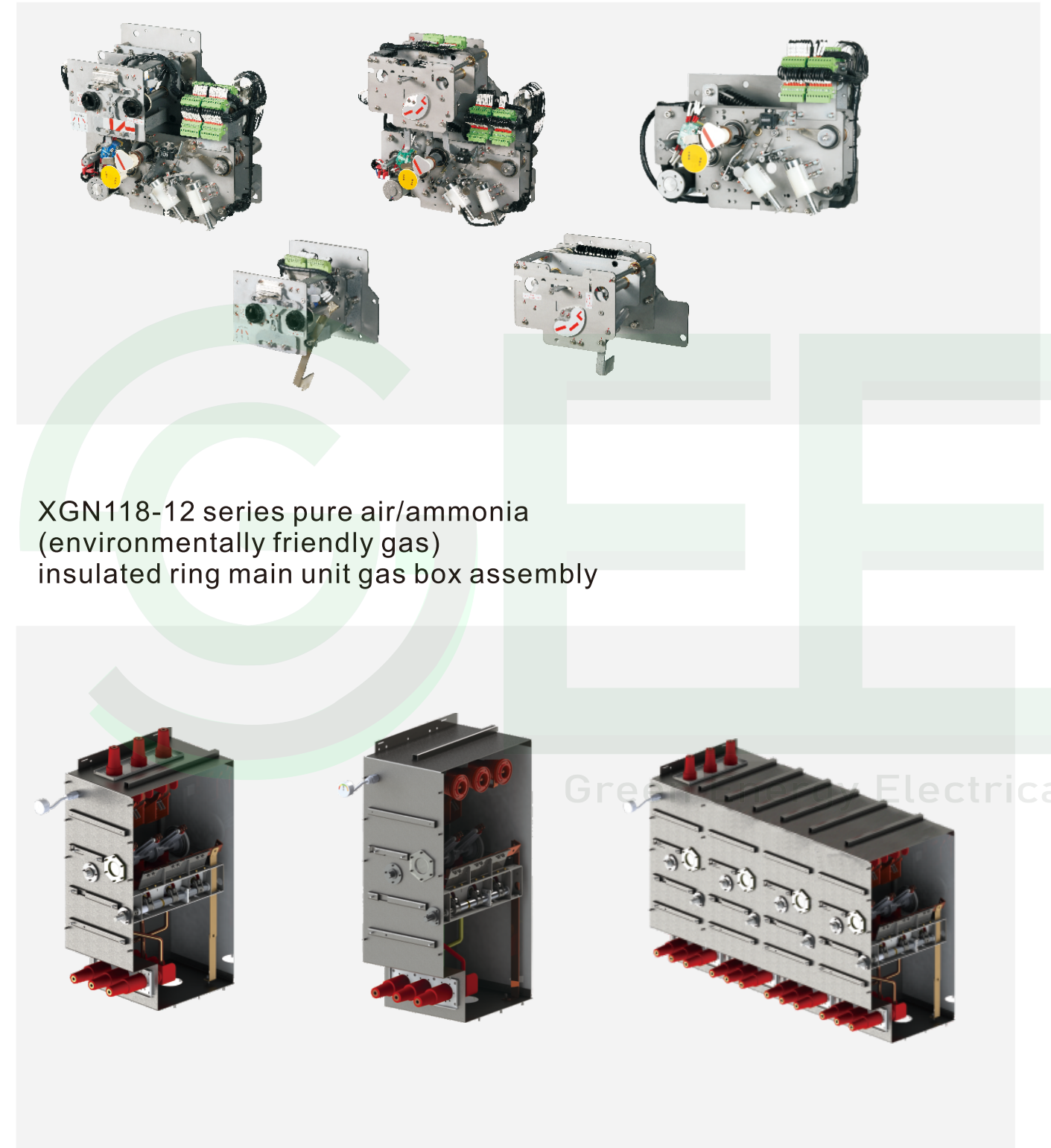
XGN118-12 series pure air/nitrogen
(environmentally friendly gas) insulated ring network core
switching unit and actuating mechanism

VX-12 Series Core Switching Unit Features.

- 1.The core switching unit adopts solid-sealed pole design, miniaturized vacuum interrupter and new casting process, innovative structural design, local discharge, dynamic heat, temperature rise and life are all reliably guaranteed.
- 2.Circuit breaker and three-station switch are assembled as a whole, complete testing of break-in, characteristics and insulation is completed before leaving the factory, no need for partners to repeat the test, and it is convenient to install into the cabinet.
- 3.After simulation, physical testing and optimization enhancement, the switching unit not in the box after the frequency withstand voltage test for less than 3pC
- 4.Eaton's vacuum interrupters are available upon request.



XGN118-12 series pure air/nitrogen
(environmentally friendly gas)
insulated ring network VK series operating mechanism



XGN118-12 series pure air/ammonia
(environmentally friendly gas)
insulated ring main unit gas box assembly

IXR□B-24/630-20
Environmental protection gas-insulated ring
network cabinet circuit breaker cabinet technical parameters table

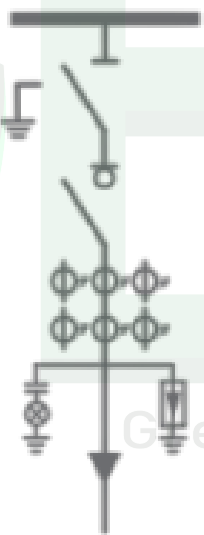
I. Mainly implemented standards

GB 1984-2014 High-voltage AC circuit breakers
(IEC 62271-100:2008,MOD)
GB 1985-2014 High voltage a.c. disconnecting and earthing switches
(IEC 62271-102:2001 +A1:2011,MOD)
GB 3906-2020 3.6kV 40.5kV AC metal-enclosed switchgear and controlgear
(IEC 62271-00:2021, MOD)
DL/T 404-2023 3.6kV 40.5kV AC metal-enclosed switchgear and controlgear
(IEC 62271-200:2021, MOD)

II Single-line diagrams



Circuit breaker unit

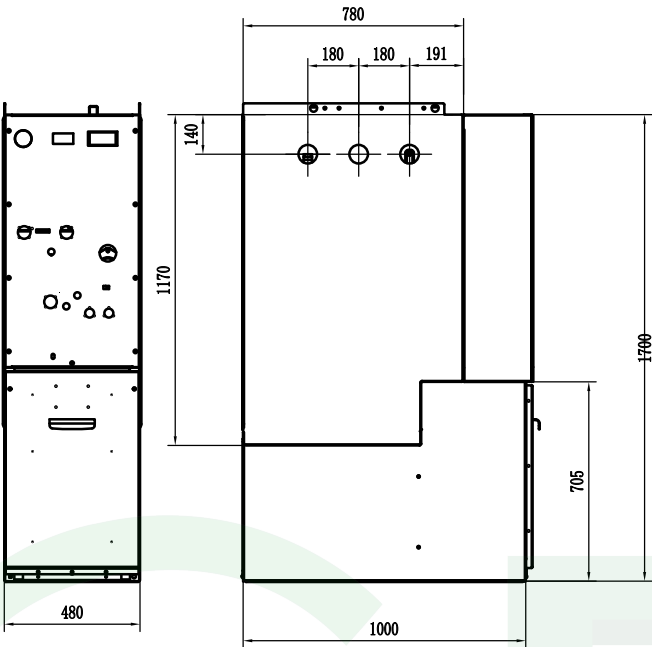


Load switch unit
(Circuit breaker unit acting as load switch unit used)

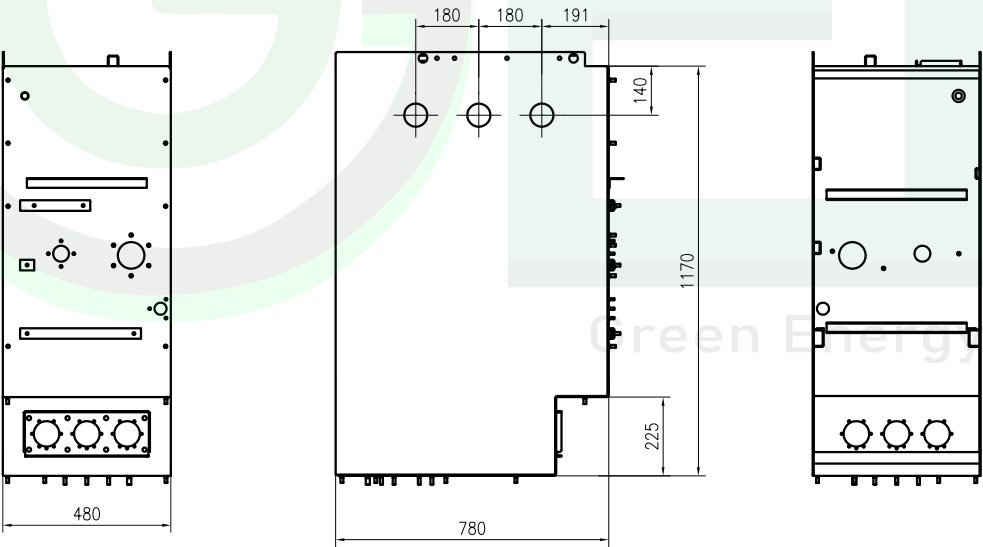
III. Technical parameters

No.	Description			Unit	numerical
1	Rated voltage(Ur)			kV	24
2	Rated frequency(fr)			Hz	50
3	Rated current(Ir)			A	630
4	Rated insulation level	Rated frequency withstand voltageUa(effective value)1min	Relatively, inter-phase	kV	50
			Isolation/vacuum disconnect		60
		Rated lightning impulse withstand voltage Up(peak value)	Relatively, inter-phase		125
			Isolation/vacuum disconnect		145
		Auxiliary and control circuits 1min			2
5	Rated short-time withstand current		main circuit	kA	20/21
			grounding circuit		20/21
6	Rated peak withstand current		main circuit	kA	50/52.5
			grounding circuit		43.5
7	Rated short circuit duration		main circuit	S	4
			grounding circuit		4
8	Rated short-circuit closing current			kA	50
9	Rated short-circuit breaking current(Isc)			kA	20/21
10	Rated cable\line charge break test				C2
11	electric life		circuit breaker(E2)	time	30
			Rated short-circuit shutdown current of the grounding switch	kA	50/52.5
			Rated number of short-circuit closures of the grounding switch(E2)	time	5
12	Heterophase ground fault breaking current			kA	17.4
13	Rated sequence of operation			0-0.3s-co-180s-co	
14	Mechanical operations		Mechanical life of circuit breaker(M2)	time	10000
			Mechanical life of disconnecting switches(M1)		5000
			Mechanical life of grounding switches(M1)		5000
15	Annual gas leakage rate			year	≤0.01%
16	Rated filling level (Pre) for insulation (20°C, relative pressure)			MPa	0.02
17	Internal Arc Class (IAC) Ratings		Types of permissible exposure	/	A
			Types of panels	/	FLR
			Rated arc fault current (IA, IAe)	kA	20/21
			Rated Arc Fault Duration (tA, tAe)	S	1
18	Partial discharge measurement (switchgear)			pC	≤10
19	LSC category			/	LSC2
20	Gases for insulation			/	dry air
21	protection class		gas tank(IP)	/	IP67
			cabinet(IP)	/	IP4X
			cabinet(IK)	/	IK07
22	circuit resistance		main circuit	μO	≤140
23	Constant supply voltage (Ua) for switching and closing devices and auxiliary and control circuits		V	V	DC48\DC220
24	Three-position switch position				Upper three positions

External Dimensions

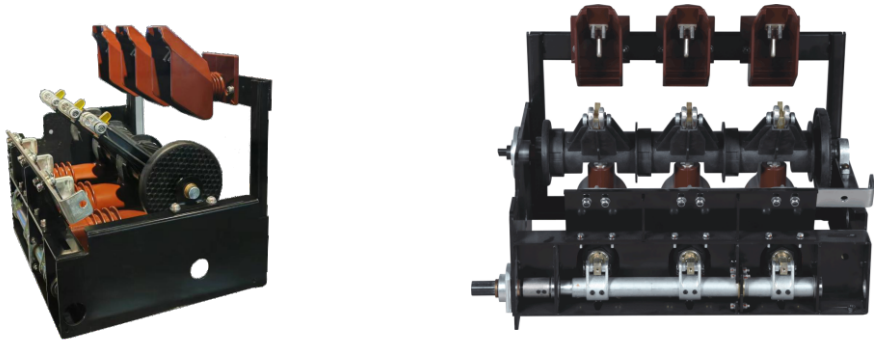


Complete unit cabinet external dimensions: side expansion / top expansion: 1000mmX480mmX1700mm



Air tank external dimensions: side expansion/top expansion: 780mmX480mmX1170mm;

V Product Photos



VII Product Differences

No.	Item		unit		
1	Rated Current		A	630/1250	630
2	Rated short-time withstand current and duration	Main circuit	kA	20(25)/4S	20/4S
3	Rated peak withstand current	Main circuit	kA	50 (63)	50
4	Rated short-circuit breaking current		kA	20/25	20
5	Mechanical life	circuit breaker		10000/15000	10000
6	Isolating movable and static contact opening distance		mm	≥ 125	≥ 110
7	Grounding dynamic and static contact opening distance			≥ 110	≥ 90
8	Local discharge 14.4		PC	≤ 5	≤ 10