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NES-40.5

Metal-clad withdrawable AC switchgear



NATUS ELECTRIC GROUP CO.,LTD.

Address : No.369 Laodong East Road,Tianning District,Changzhou,Jiangsu Province,China

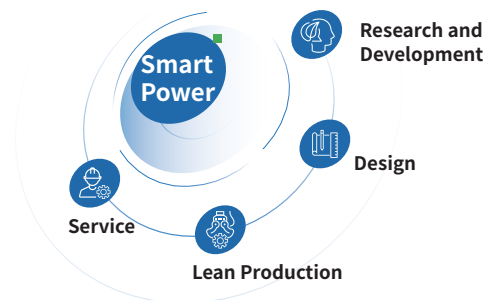
Telephone : 400-928-1888

E-mail : sales@natus-cn.com

Web : www.natus-cn.com
www.natus.de

NATUS ELECTRIC GROUP CO.,LTD.

Group Business



The Group specializes in system integration, EPC turnkey services, and the R&D, production, and sales of core products within the medium and low-voltage power industry. In the field of power equipment, we have deep expertise in intelligent electrical switchgear system, high-end power components, advanced power quality management products, intelligent control instruments, and control systems. Leveraging accumulated expertise in artificial intelligence and big data analytics, we provide comprehensive solutions for meteorological disaster prevention equipment and the safe operation of substations and transmission lines. In the domain of new technologies, we focus on small-area, low-altitude meteorological high-precision prediction technology, offering integrated products and services to support the development of the low-altitude economy.

Group Vision



Natus Electric Group originates from Germany, is firmly rooted in China, and serves the global market. Since its establishment in 1956, the group has built upon German technology deeply integrating Chinese expertise and a global perspective. Supported by a robust Chinese R&D and manufacturing team, we precisely respond to global market demands, delivering professional intelligent power solutions for clients across various industries. Adhering to a customer-centric approach, the group is committed to innovative products, reliable technology, and lean manufacturing.

Working hand-in-hand with global users to build a smarter, more efficient, and sustainable future for the power and energy sector.



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General Information



- The NES-40.5 withdrawable metal-clad enclosed AC switchgear (hereinafter referred to as switchgear) is an indoor complete set of power distribution equipment for three-phase AC 50 Hz systems with a rated voltage of 40.5 kV.
- It is used for receiving and distributing electrical energy in power plants, substations, industrial and mining enterprises, performing functions such as control, protection, monitoring and detection of circuits, and can also be applied in occasions requiring frequent operation.
- This switchgear complies with the standards including GB/T 11022-2011 Common technical requirements for high-voltage switchgear and controlgear standards, GB 3906-2006 3.6 kV ~ 40.5 kV AC metal-enclosed switchgear and controlgear, as well as IEC 62271.

Operating Environment Conditions

- Ambient temperature: maximum +40°C, minimum -5°C; the average value measured within 24 hours shall not exceed 35°C.
- Altitude: not exceeding 1000 m. For special requirements, please contact our company.
- Relative humidity: daily average not exceeding 95%, monthly average not exceeding 90%.
- Seismic intensity: not exceeding Grade 8.
- Water vapor pressure: daily average not exceeding 2.2 kPa, monthly average not exceeding 1.8 kPa.
- Surroundings: free from fire hazard, explosion hazard, severe pollution, chemical corrosion and severe vibration.



Product Characteristics

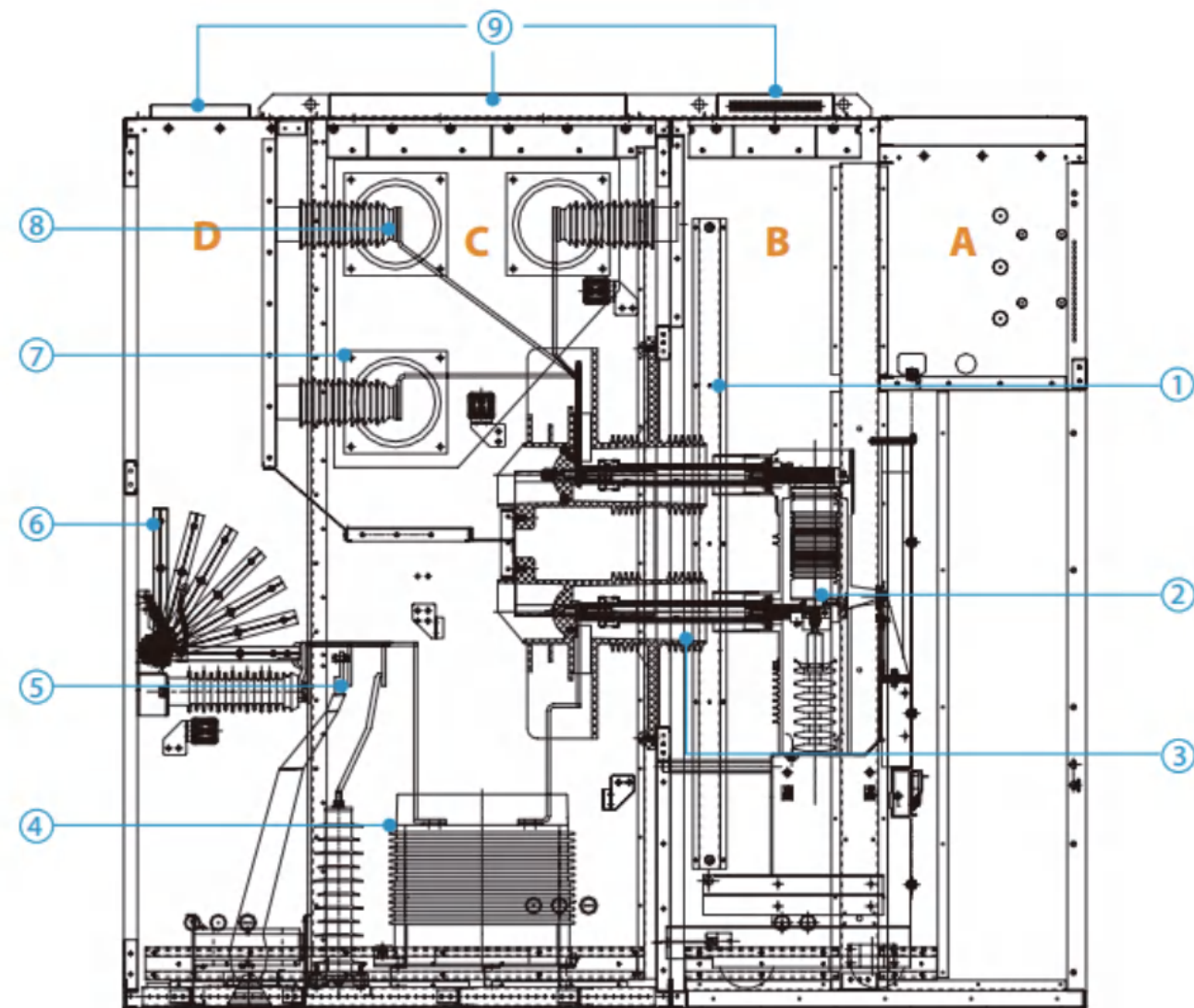


- The cabinet adopts an assembled structure with simple structure and convenient processing.
- It is equipped with a new composite insulated vacuum circuit breaker, featuring good interchangeability and easy replacement.
- The mechanical nut operating mechanism ensures smooth operation and prevents damage to the operating structure due to misoperation.
- Mandatory mechanical interlocking is adopted to meet the requirements of the "five-prevention" functions.
- The cable compartment has ample space, allowing flexible connection operations and accommodating multiple cables.
- The quick-operating earthing switch satisfies the requirements for earthing and making short-circuit current.
- The complete unit features a user-friendly layout and stable, reliable supporting interlocking operation.

Interlocking and Safety

- The NES-40.5 switchgear is equipped with reliable interlocking devices to effectively ensure the safety of operators and equipment.
- The circuit breaker can only perform closing and opening operations when the circuit breaker truck is at the test/isolation position or working position.
- Moreover, the circuit breaker truck can only be racked in or out when the circuit breaker is in the open state, thus preventing misoperation of pulling or pushing the circuit breaker under load.
- The circuit breaker truck can only be moved from the test/isolation position to the working position when the earthing switch is in the open position.
- The earthing switch can only be closed when the circuit breaker truck is at the test/isolation position, which preventing closing the earthing switch with live parts and closing the circuit breaker while the earthing switch is closed.
- The front lower panel and rear panel can only be opened when the earthing switch is in the closed state, and the earthing switch can only be opened after the rear door is closed, thus preventing accidental access to live compartments.
- The secondary plug can only be inserted or removed when the circuit breaker is at the test/isolation position.
- When the circuit breaker is at the working position, the secondary connector plug is locked and cannot be pulled out.
- electrical interlock can be installed on each cabinet.





- | | | | |
|-------------------------------------|--------------|---------------------------|-------------------------|
| A Low Voltage Compartment | ①Shutter | ④Current Transformer (CT) | ⑦Wall Bushing |
| B Circuit Breaker Truck Compartment | ②Truck | ⑤Cable Connection Bar | ⑧Main Busbar |
| C Busbar Compartment | ③Contact Box | ⑥Earthing Switch | ⑨Pressure Relief Device |
| D Cable Compartment | | | |

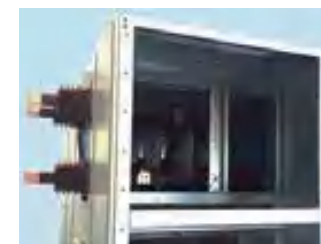
- NES switchgear is designed in accordance with GB 3906, the standard for metal-clad metal-enclosed switchgear. The complete assembly consists of two main parts: the cabinet frame and the withdrawable truck.
- The cabinet is divided into four separate compartments: circuit breaker truck compartment, busbar compartment, cable compartment and low voltage compartment.
- All three compartments except the low voltage compartment are equipped with independent pressure relief channels.
- In case of an internal fault in the cabinet, the top pressure relief channels will open automatically under pressure to release the internal pressure, thus ensuring the safety of operating personnel and equipment.



Circuit Breaker Truck Compartment

Circuit Breaker Truck Compartment

Special earthing devices that rub against the bottom of the truck and dedicated rails for truck movement are installed inside. When the circuit breaker moves between the test position and the working position, the isolation shutters open or close automatically, ensuring that personnel do not come into contact with live parts. The truck can be operated with the cabinet door closed. Its position inside the cabinet, as well as any functional indicators on the truck, can be observed through the viewing window.



Busbar Chamber

Busbar Chamber

The busbar chamber is used for installing the main busbars and branch busbars. The main busbars adopt rectangular-section insulated busbars, which are connected and fixed between adjacent cabinets through busbar bushings to restrict the spread of fault arcs. All busbars adopt a composite insulation method to make them safer and more reliable.



Cable Chamber

Cable Chamber

The cable chamber can accommodate an earthing switch with closing capability. The bevel gear transmission structure makes operation easier and more labor-saving. Sufficient space allows the installation of current transformers, voltage transformers, surge arresters, as well as incoming and outgoing cables.

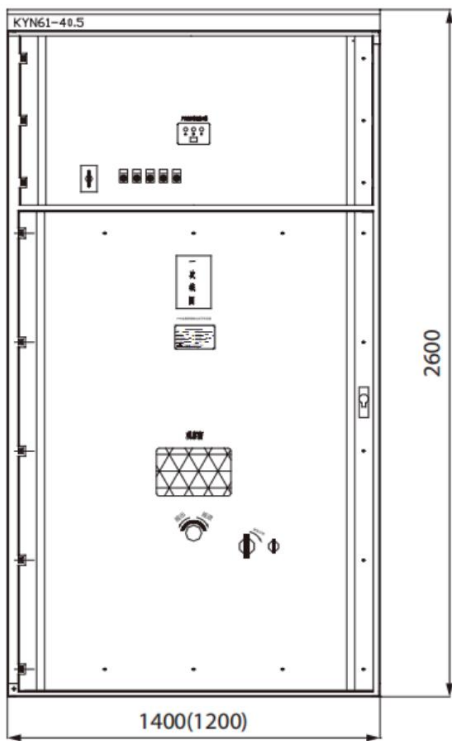
Low Voltage Chamber

It can be equipped with secondary electrical components such as control and protection elements, metering and display instruments, live line monitoring display, etc.

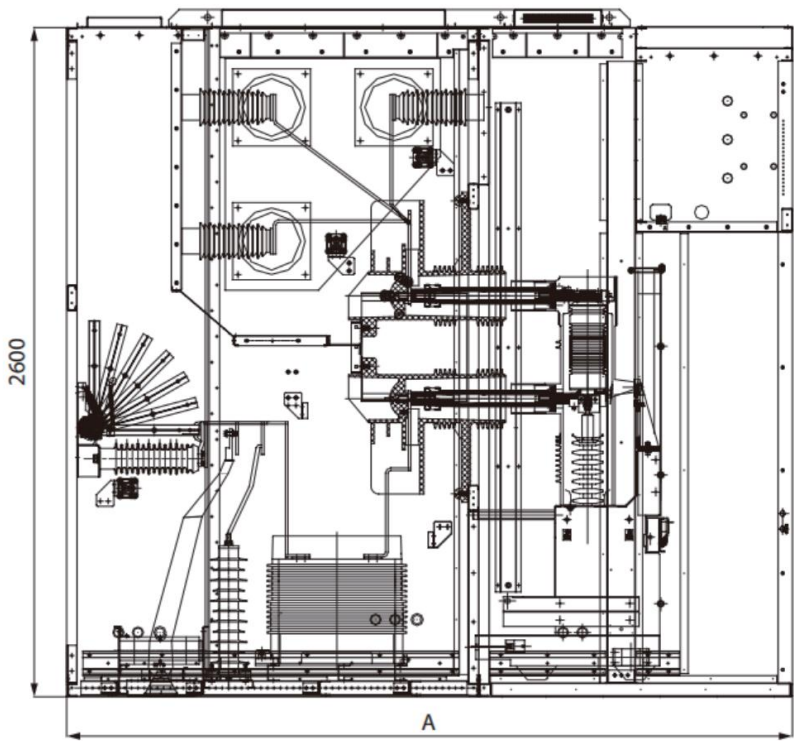
Product Structure

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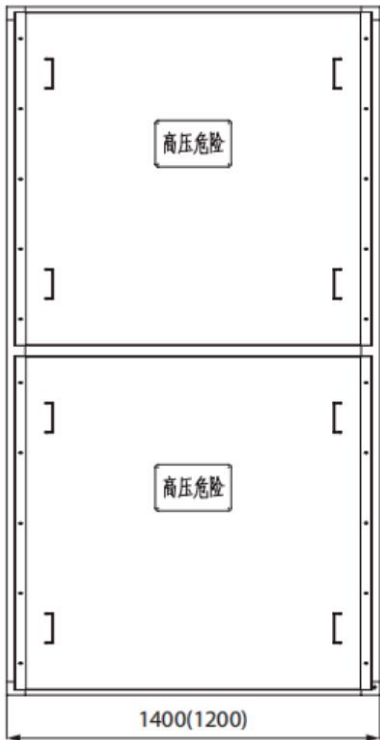
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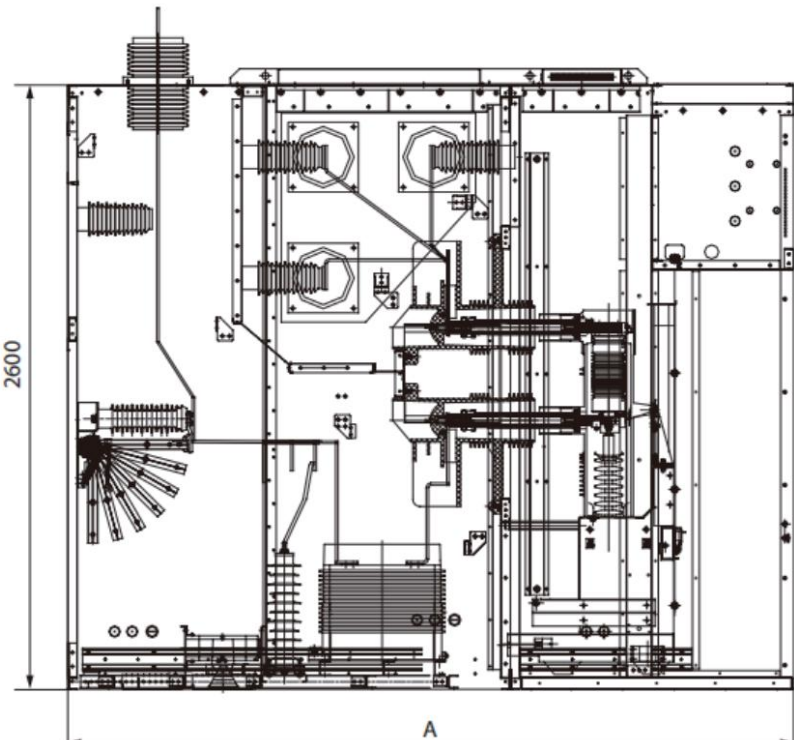
Front View



Bottom Inlet Side View



Rear View



Overhead Inlet Side View

Cabinet Width(mm)	Cabinet Depth A(mm)	Cabinet Height(mm)
1400(1200)	2800 Cable / Auxiliary Transformer	2600
	3100 Overhead	

Technical Specifications

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Main Technical Parameters of NES-40.5 Switchgear

Item	Unit	Parameter
Rated Voltage	kV	40.5
Rated Current	A	630, 1250, 2000, 2500
Rated Frequency	Hz	50
Rated Short-circuit Breaking Current	kA	25, 31.5
Rated Short-circuit Making Current	kA	63, 80
Rated 4s Thermal Stability Current	kA	25, 31.5
1min Power Frequency Withstand Voltage	kV	95
Lightning Impulse Withstand Voltage	kV	185
Protection Class		IP4X

Main Technical Parameters of NES-40.5 Vacuum Circuit Breaker

Item			Unit	Technical Data
Phase-to-phase distance			mm	300
Rated voltage			kV	40.5
Rated insulation level	Short-duration power-frequency withstand		kV	95
	Lightning impulse withstand voltage		kV	185
Rated frequency			Hz	50
Rated current			A	1250,1600,2000,2500
Rated peak withstand current			kA	63/80
Rated short-time withstand current (4 s)			kA	25/31.5
Rated short-circuit breaking current	Rated short-circuit breaking current		kA	25/31.5
	DC component percentage		%	36
Breaking current of unloaded cable			A	50
Rated operating sequence	0-0.3s-CO-180s-CO			●
	0-180s-CO-180s-CO			●
Switch Service Life Cyclic Mechanical and Electrical	Mechanical	Operating Mechanism	times	10,000
		Vacuum interrupter	times	30,000
	Electrical	Rated Current	times	10,000
		Full short-circuit current	times	100
Minimum/maximum closing time			ms	30~70
Minimum/maximum opening time			ms	20~50
Closing bounce			ms	≤2
Opening rebound			ms	≤2
Allowable contact wear thickness			mm	≤15
Energy storage time			S	≤15
Arcing time			ms	2~15

Note: The NES-40.5 switchgear can be equipped not only with the BV40-40.5 series vacuum circuit breakers, but also with other types such as Schneider HVX-40.5 series vacuum circuit breakers. For other special requirements, please consult our company.

Technical Specifications

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Main Technical Parameters of Current Transformer

Item	Unit	LZZB8-35
Rated Voltage	kV	35
Primary Current	A	20-2500
Rated Secondary Current	A	5A, 1A
Rated Load	VA	15-30

Main Technical Parameters of Voltage Transformer

Item	Unit	JDZX9-35	JDZ9-35
Rated Voltage	kV	35	35
Rated Voltage Ratio	kV	351 $\sqrt{3}$,0.1/3,0.1/3	35/0.1
Accuracy Class and Capacity	A	0.2/50,0.5/100,6P/100	0.2/75,0.5/150
Rated Load	VA	1000	1000

Main Technical Parameters of Earthing Switch

Item	Unit	JN15-40.5/31.5
Rated Voltage	kV	40.5
4s Thermal Stability Current	kA	31.5
Peak Withstand Current	kA	80
Making Speed	m/s	≥ 6
Main Circuit Contact Resistance	Ω	< 120

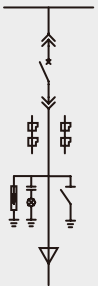
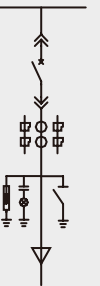
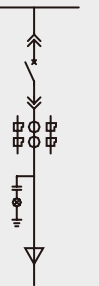
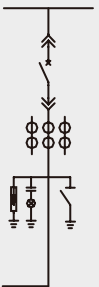
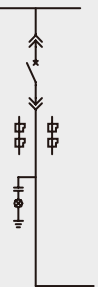
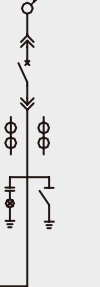
Main Technical Parameters of Surge Arrester

Item	Unit	HY5WZ-51/134
System Rated Voltage	kV	35
MOA Rated Voltage	kV	51
MOA Continuous Operating Voltage	kV	40.8
Maximum Lightning Residual Voltage	$< \text{kV}$	134
2 ms Square Wave Current Capacity	A	500
Minimum DC Reference Voltage (1mA)	$> \text{kV}$	75

Main wiring scheme diagram

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Scheme No.			001	002	003	004	005
Main Wiring Scheme							
Rated Current (A)			630-2500	630-2500	630-2500	630-2500	630-2500
Main Equipment	Main Switch	BV40	1	1	1	1	1
	Current Transformer		2	2	2	3	2
	Voltage Transformer						
	Earthing Switch		1	1	1		1
	High-Voltage Fuse						
	Surge Arrester			3	3		
	Live Line Indicator		1	1	1	1	1
Circuit Name			Incoming/Outgoing Compartment	Incoming/Outgoing Compartment	Incoming/Outgoing Compartment	Incoming/Outgoing Compartment	Bus Coupler Cabinet (Left)
Scheme No.			006	007	008	009	010
Main Wiring Scheme							
Rated Current (A)			630-2500	630-2500	630-2500	630-2500	630-2500
Main Equipment	Main Switch	BV40	1	1	1	1	1
	Current Transformer		3	2	2	3	2
	Voltage Transformer						
	Earthing Switch		1		1	1	
	High-Voltage Fuse						
	Surge Arrester		3				
	Live Line Indicator		1	1	1	1	1
Circuit Name			Bus Coupler Cabinet (Left)	Bus Coupler Cabinet (Right)	Overhead Incoming and Outgoing Cabinet	Overhead Incoming and Outgoing Cabinet	Overhead Incoming and Outgoing Cabinet

Main wiring scheme diagram

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Scheme No.			011	012	013	014	015
Main Wiring Scheme							
Rated Current (A)			630-2500	630-2500	630-2500	630-2500	630-2500
Main Equipment	Main Switch	BV40	1	1	1	1	1
	Current Transformer		3	3	2	2	3
	Voltage Transformer						
	Earthing Switch		1	1	1		
	High-Voltage Fuse						
	Surge Arrester		3		3	3	3
	Live Line Indicator		1	1	1	1	1
Circuit Name			Overhead Incoming and Outgoing Cabinet	Overhead Incoming and Outgoing Cabinet	Bottom Inlet and Bottom Outlet Cabinet	Bottom Inlet and Bottom Outlet Cabinet	Bottom Inlet and Bottom Outlet Cabinet

Scheme No.			016	017	018	019	020
Main Wiring Scheme							
Rated Current (A)			630-2500	630-2500	630-2500	630-2500	630-2500
Main Equipment	Main Switch	BV40	Isolation Trolley	Isolation Trolley	Isolation Trolley	PT Trolley	PT Surge Arrester Trolley
	Current Transformer						
	Voltage Transformer					2	2
	Earthing Switch				1		
	High-Voltage Fuse					3	3
	Surge Arrester					3	3
	Live Line Indicator		1	1	1	1	1
Circuit Name			Isolation Cabinet	Isolation and Bus Coupler Cabinet	Isolation Cabinet	PT Cabinet	PT Surge Arrester Cabinet

Main wiring scheme diagram

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Scheme No.			021	022	023	024
Main Wiring Scheme						
Rated Current (A)			630-2500	630-2500	630-2500	630-2500
Main Equipment	Main Switch	BV40	PT Surge Arrester Trolley	PT Trolley		
	Current Transformer			3		
	Voltage Transformer		2	2		
	Earthing Switch					
	High-Voltage Fuse		3	3		
	Surge Arrester		3			
	Live Line Indicator		1	1	1	
Circuit Name			PT Surge Arrester Cabinet	Metering and Bus Coupler Cabinet	Lead Cabinet	Bus Coupler Cabinet

Scheme No.			026	027
Main Wiring Scheme				
Rated Current (A)			630-2500	630-2500
Main Equipment	Main Switch	BV40		
	Current Transformer			3
	Voltage Transformer		2	
	Earthing Switch			1
	High-Voltage Fuse		3	
	Surge Arrester			3
	Live Line Indicator		1	1
Circuit Name			Service Transformer	Contactor Cabinet



PRECISION IN DETAIL