

TYPE : HG4-12/24 CGIS

Environmentally Friendly, N2 Compact GIS

Complete with Condition Monitoring 24/7

Rating : 630,1250A, 25kA@3sec



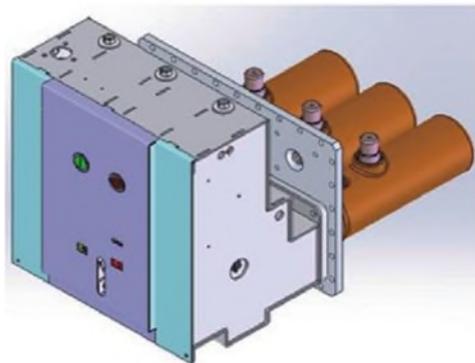
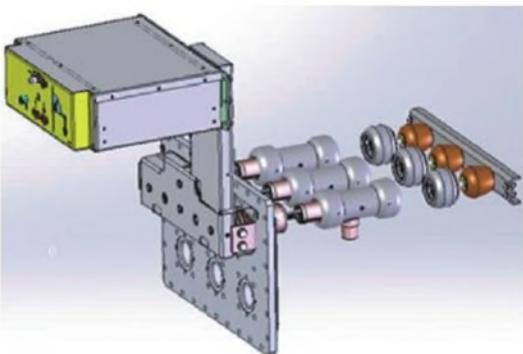
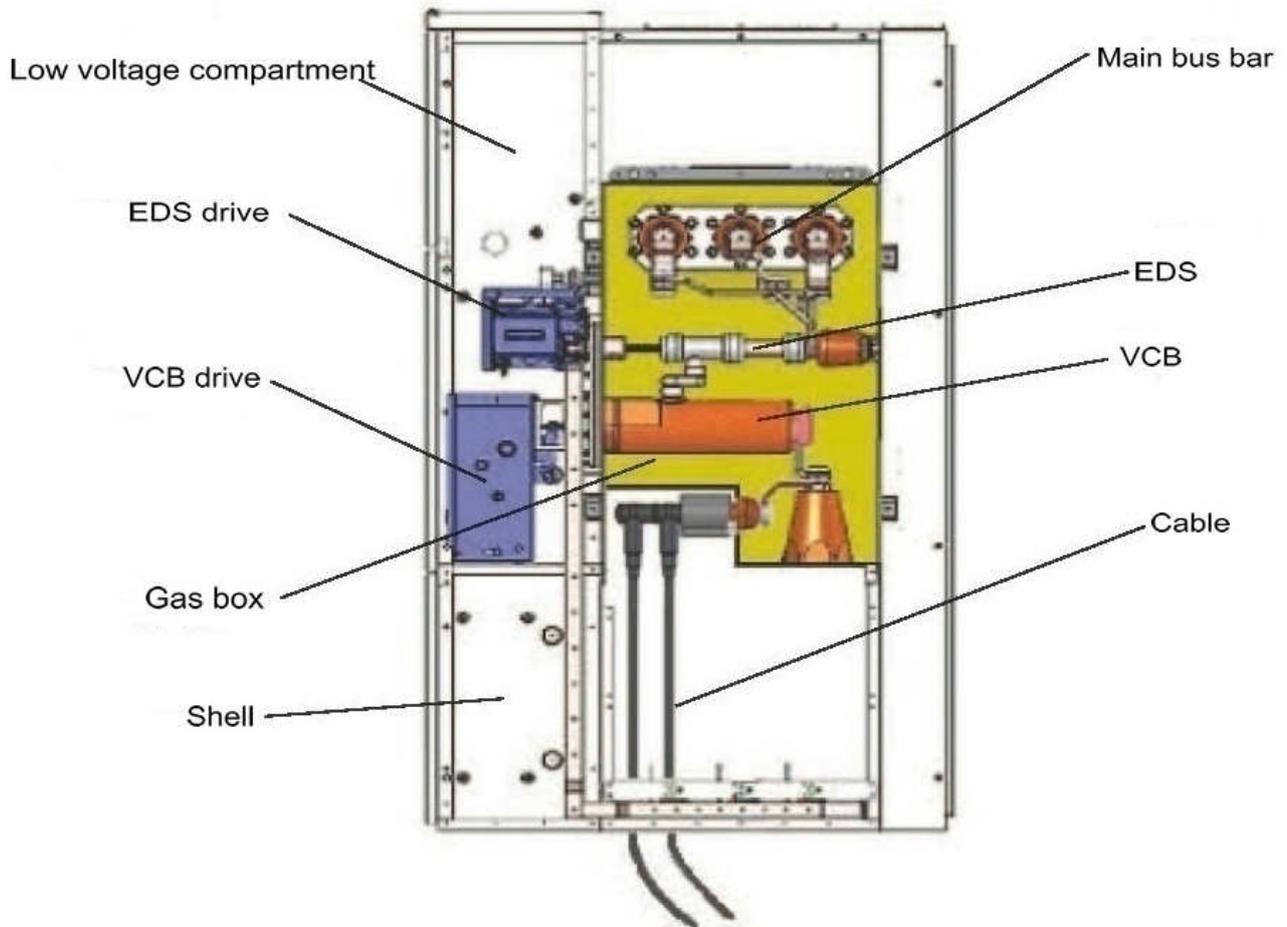
Fig. 1..... 12kv, 630A CGIS

HG4-12 KV Cubical Type Green Gas Insulated Metalclad Switchgear (C-GIS) is a new environmental product designed and developed independently by our company. HG4 switchgear is a new generation of Metalclad products combined with vacuum-interrupting technology, gas insulation technology as well as the interface insulation technology.

All the middle voltage components are completely sealed in the gastight box, with no surroundings influence and maintenance free; the adoption of spring operation drive and embedded CB pole vacuum interrupter reduces the number of components. HG4 switchgear adopts intelligent control and protection units, which have powerful functions of control, protection and measurement to meet requirements of automatization in the electricity distribution grid. The design of reliable mechanical and electrical interlock can effectively avoid maloperation.



Diagram of Product Structure



TECHNICAL HIGHLIGHTS

- Maintenance free
- All high voltage components are completely sealed in the gastight box, therefore it is environmental independent (such as dew, dust, humidity, ect.) .HG4-12kv switchgear combines the most modern vacuum interrupter technology, the embedded pole design and a reliable spring drive so that highest breaking capacity can reach 31.5kA and the mechanical life can reach 10000 times. The installation, operation, expansion and replacement of the switchgear can be undertaken without operation of dry compressed air.
- Safety and reliability
- HG4 switchgear has passed all type tests. It is confirmed that this product has proprietary intellectual property right, which is the first C-GIS of 12/24kV level using dry air/N₂ as insulation gas to fill the gaps in this field in the world, whose technology has reached international advanced level. The product is produced through standardized numerical control work flow. The quality control is in compliance with ISO9001 standard.
- The earthed shell is safe and touchable. All high voltage components including cable plugs, busbar and VT are sealed in the shell earthed to the ground. The protection degree of all the high voltage parts in the primary circuit is IP65, and the protection degree of the shell is IP40. Logic mechanical interlocking can avoid maloperation.
- Stable Operation
- The gastight welded panel is not influenced by environment. The CT is of low voltage ring shape iron core structure, suiting on the cable. The VT and surge arrester are all in plug-in type outside the panel, which are equipped outside the gas tank, which are easy to install or change. The circuit breaker with the embedded pole and the three position switch can be operated manually or by a motor drive, the reliable mechanical interlock is set between the CB and the three position switch. The maintain-free circuit breaker is installed in fixed type.

Item	Name		Unit	Technical parameter	
1.	Rated voltage		kV	12/24	
2.	Rated frequency		Hz	50	
3.	Rated insulating level	Power frequency withstand voltage (1min.)	Phase to ground, phase to phase, DS isolation distance and CB isolation distance	kV	42/65
		Lightning withstand voltage (peak value)	Phase to ground, phase to phase	kV	75/125
			DS isolation distance and CB isolation distance	kV	85/145
		Aux. and control circuit PF withstand voltage (1 min.)		kV	2.0
		Rated current		A	1250/2500/3150
5.	Maximum partial discharge		Pc	10	
6.	Rated short circuit breaking current		kA	31.5	
7.	Rated short circuit making current (peak value)		kA	80	
8.	Rated short time withstand current		kA	31.5	
9.	Rated short circuit duration		s	4	
10.	Rated peak withstand current		kA	80	
11.	Insulation gas			Clean dry air or N2	
12.	Water content in the gas tank		ppm	≤225	
13.	Leakage rate/year		%	≤0.5	
14.	Rated filling pressure (20℃)		MPa	0.12	
15.	Alarm pressure (20℃)		MPa	0.1	
16.	Minimum function pressure (20℃)		MPa	0.08	
17.	Gas filled compartment design pressure		MPa	0.18	
18.	(20℃) Pressure-relief device released pressure		MPa	≥0.3	
19.	Vacuum circuit breaker level			E2, C2, M2,	
20.	Rated operation sequence			0-0.3s-C0-180s-C0	
21.	Vacuum circuit breaker mechanical life		次 time	10000	
22.	EDS mechanical life		次 time	2000 (M1)	
23.	Protection degree of the sealing housing			IP4X	
24.	Dimensions (W*D*H) Double/single bus bar		mm	550*1200*2250	

IDEA OF SMART GRID

The trend for most Power Grids in the world is moving towards the idea of a SMART Grid concept , where the application of computer intelligence and networking abilities changes a “dumb” electricity distribution system to that of a “ Smart “ one . In the case of the former , the power utility will only know that service is lost only when a customer rings up to complain. In the case of a smart grid , however, if service is interrupted the power company will know right away because certain components of the grid e.g. smart meters in the affected area, stop sending data back to the control room . Hence if by ensuring that all the components of the power system from transformers to power lines to home electric meters are capable of two-way communication, able to send information of the real time status of the component , then the company can manage distribution of power very efficiently, be proactive about maintenance and respond to outages faster , sometimes even before it happening. .This is possible only if advance sensing and measurement technologies are available that will constantly inform the Control Engineers of the “health “of the system components such as that of a Distribution switchgear .

The intelligent HG4-12 switchgear, a product development of Power T & D Ltd sets the standard for such a modern intelligent switchgear

Well, then how intelligent can it be ? .



Well, It is able to monitor ONLINE continuously the following Parameters

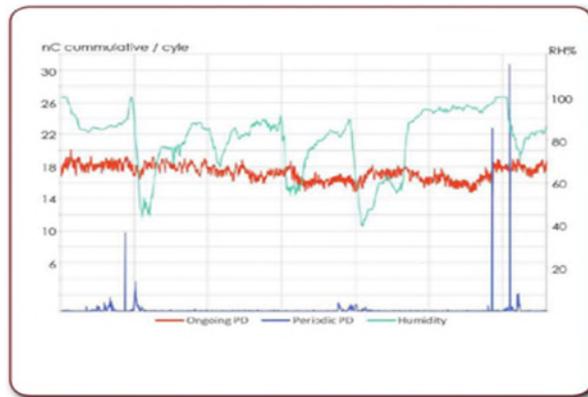
- Partial Discharge Detection –Insulation degradation
 - Condition of SF6 Gas, Gas Density, Temperature and humidity
 - Temperature rise of the Cable Termination , Circuit Breaker Contact points , Busbar
 - Arc Fault Detection
-

Consequently, vital measurements required for predictive condition-based monitoring of the switchgear, circuit breakers, and bus ducts is available on both the local HMI on the switchgear, or sent through a Modbus-RTU for easy substation SCADA integration. Thus the switchgear is now brought closer to the Power Company.

- Partial Discharge Detection Sensors :-

From Switchgear

From Cable Termination



PD Measurements display on HMI

This broadband (300 MHz to three gigahertz) detection method monitors PD transient electromagnetic waves through a Sensor attached by a Electromagnet affixed to the Panel of the switchgear ..

It is capable of avoiding strong interfering signals at close proximity while advanced digital filtering methods are capable of detecting the presence of partial discharge—even with residual, unfiltered noise.

The Pd Detector for cable terminations consist of a High frequency Split Core CT mounted on the core of the incoming cable

The utilization of both sensors together significantly make 24/7 monitoring possible hence providing historical trending and information for the maintenance engineers to look out for any abnormalities.

Continuous, real-time trending of partial discharge events capturing periodic PD spikes due to condensing humidity; these events are unrecognizable with traditional (non-continuous) detection methods

Temperature Monitoring

This consist of a Panel mounted monitoring unit and six separate temperature sensors mounted on the cable terminations point , Busbar surfaces and the LV Control compartment of the switchgear .Non –invasive , 24/7 real time monitoring using Surface Acoustic Wave Technology , it is great aid to the Operations and Maintenance Engineer



Monitoring of the Condition of SF6 Gas, Gas Density, Temperature and humidity

Here the focus is on the loss rate and the humidity content of the SF6 used in the switchgear . This in- built sensor is capable of measuring the relative humidity, pressure and temperature precisely over a wide measuring range.The multi-functionality of the sensor ensures continuous, and at the same time proactive, monitoring. With this, trends can be identified and maintenance planned in a targeted manner. This ultimately leads to a move from a time-based maintenance strategy to a condition-based one.

The sensor features a standardised RS485 interface and also an established MODBUS protocol



Communication :

All the acquired information is sent from the data concentrator located in the CGIS Switchgear and sent back to the Control room via IEC 60870-5-104 over Ethernet or GSM /GPRS. No hard wired wiring is necessary .

CABLE TERMINATIONS



One Panel Can be separated from next Panel by simple Removal of the above bus Link



Elbow type of Termination is used for cable Connection.



FOUNDATION DRAWINGS



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