

Gas Insulated Switchgear



AVAILABLE FROM
NEPEAN POWER

NEPEAN Power is a proven leader in the supply and manufacture of quality engineered solutions, products and technologies. Established in 1994, through the commitment of our dedicated team we have become a supplier of choice.

The NEPEAN Power ZF10-72.5-145 gear combines circuit breaker, three-position switch, earthing switch, current transformer, voltage transformer, surge arrester, bus bar, outgoing(incoming) bush or cable termination in the grounded metal enclosure and uses SF6 gas as the insulating medium. This model can be applied in three-phase 50/60 Hz AC electrical systems at the rated voltage of 72.5kV up to 145 kV.

In accordance with IEC 62271-203 HV gas insulated metal enclosed switchgear and Controlgear standards and tested by KEMA.

According to the different secondary control methods, it can be utilized as either intelligent GIS using digital control technology or typical GIS using conventional control and monitoring technology.

Features

- A highly compact design where the bay width can be as low as 0.8m and occupies minimum 2.90 m²
- Simple and reliable self-energized arc control breaker, with strong breaking capability, short arcing time, long service time, less than 50 ms of total breaking time and 20 breaks at full capacity
- Simple and compact circuit breaker high reliability, low maintenance, long mechanical life up to 10000 times
- A modular design provides flexibility for various substation designs and future expansion. It can be assembled with multiple connection styles, such as single bus bar section, bridge connection, double bus bars
- The entire three phase structure is in one tank which greatly reduces eddy current losses and enhances the exterior aesthetics
- The enclosure is made of a corrosion resistant aluminium alloy which eliminates eddy current losses, is thermally insulated, and its light weight lessens the load requirement on the foundation.
- The intensive gas management system realizes the online calibration function, which facilitates the inspection and maintenance of the density relay
- The radio interference level < 500 μ V, allows the GIS to be installed in urban districts and residential areas
- The GIS can be operated in harsh environment such as heavy pollution, frequent hail, high altitude, frequent earthquakes, hard to dig mountainous terrain and crowded urban districts with limited space
- The GIS can be delivered fully assembled except the outgoing bushing and partial connection bus bars, allowing for fast and easy on-site installation
- The GIS can be installed either indoors or outdoors

Working Conditions

- Installation places: Indoor or Outdoor
- Ambient temperature: -30~+40°C (-30~+40°C for busbar or bushing of outgoing type); Altitude \leq 1000m (can be customised)
- Air humidity: within 95% daily average; within 90% monthly average (25°C)
- Wind velocity: within 35m/s (the wind pressure should be not above 700Pa)
- Solar intensity: within 0.1w/cm² (with wind velocity of 0.5m/s)
- Seismic intensity: horizontal acceleration within 0.4g; vertical acceleration within 0.2g
- Thickness of the ice covering on the GIS < 10mm
- Creepage distance: 25mm/kV (pollution class III), 31mm/kV (pollution class IV)

Gas Insulated Switchgear

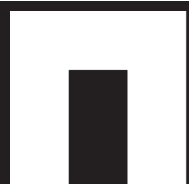
Technical Specifications

ZF10 Series	Unit			
Rated Voltage	kV	72.5	126	145
Rated Frequency	Hz	50 / 60	50 / 60	50 / 60
Rated Current	A	2000 / 2500 / 3150	2000 / 2500 / 3150	2000 / 2500 / 3150
Rated Short-time Withstand Current	kA/s	40 / 3	40 / 3	40 / 3
Rated Peak Withstand Current	kA	100 / 104	100 / 104	100 / 104
Rated Short Time Power Frequency Withstand Voltage (1Min), to Ground, Between Phases	kV	140	230	275
Rated Short Time Power Frequency Withstand Voltage (1Mi), Across Open Contact	kV	160	230+73	315
Withstand Voltage Under Zero Pressure (5min)	kV	109	109	109
Rated lightning impulse withstand voltage (peak), to ground, between phases	kV	--	--	--
Rated Lightning Impulse Withstand Voltage (peak), Across Open Contact	kV	350+60	550+103	750
Rated SF6 Gas Pressure/Alarm Value (20°C), Circuit Breaker	MPa	0.6 / 0.5	0.6 / 0.5	0.6 / 0.5
Rated SF6 Gas Pressure/Alarm Value (20°C), Other Components	MPa	0.5 / 0.4	0.5 / 0.4	0.5 / 0.4
Moisture Content of the SF6 Gas, Circuit Breaker	μL/L	≤150	≤150	≤150
Moisture Content of the SF6 Gas, Other Components	μL/L	≤150	≤150	≤150
Partial Discharge	pC	≤3	≤3	≤3
Annual SF6 Gas Leakage Ratio	%/year	≤0.1%	≤0.1%	≤0.1%

Main Technical Parameters of the Components

Circuit Breaker (Table 2)

Table 2 Parameter of GCB				
Technical Requirement		Unit	Data	
Rated short-circuit Breaking Current		kA	40	
Rated Short-circuit Making Current		kA	100	
Breaking Times with Full Capacity		times	20	
Rated Out-of-phase Breaking Current		kA	10	
Short-line Fault Breaking Current		kA	36/30	
First-pole-to-clear Factor			1.5	
Rated Operating Sequence			O-0.3s-CO-180s-CO	
Closing Time(Rated Pressure)		ms	<80±15	
Opening Time(Rated Pressure)		ms	<32±5	
Total Breaking Time		ms	≤60	
SF6 Lockout Pressure(20°C)		MPa	0.5	
Operating Mechanism			Spring, CT26	
Mechanical Life		times	10000	
Closing/Opening Coils of CT26 Mechanism	Voltage (DC)	V	220	110
	Resistance/current of the Closing Coil	Ω/A	78/2.8	19/5.7
	Resistance/current of the Opening Coil	Ω/A	65/23.4	19/5.7
Motor of CT26 Mechanism	Power	W	600	
	Voltage (DC/AC)/current		220V/2.3	



NEPEAN
Power

www.nepeanpower.com

For more information please contact:

P: +61 2 4088 2790

E: power@nepean.com

Gas Insulated Switchgear

Three Position Switch (Table 3)

Table 3 Parameter of Three Position Switch	
Rated Operating Time	Opening ∇ 3s
	Closing ∇ 3s
Rated Control Voltage/power	(DC/AC)220V/350W
Rated Operating Torque	20N.m
Rated Switching Busbar Changeover current/voltage	1600A/10V

Fast Earthing Switch (Table 4)

Table 4 Parameter of Fast Earthing Switch	
Rated Operating Time	Opening ∇ 3s
	Closing ∇ 3s
Rated Control Voltage/power	(DC/AC)220V/280W
Rated Operating Torque	50N.m
Rated short-circuit Switching Current	100kA
Switching Electromagnetic Inducing Current/voltage	100A/6kV
Switching Fixing Inducing Current/voltage	5A/6kV

Current Transformer (Table 5)

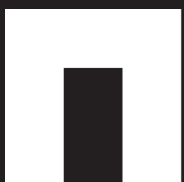
Table 5 Parameter of Current Transformer					
Rated Primary Current(A)	Rated Secondary Current(A)	Rated Output Capacity(VA)	Accuracy Class of the Measuring Coil	Protection Class of the Metering	Accuracy Class of the Protection Coil
300	5	30	0.5(0.2s)	5	5P20
400		30			
600		30			
800		40			
1000		50			
1200		50			
1600		50			
2000		50			

Note:

1. The coil with rated secondary current 1A is also available
2. Special technical requirements should be decided after mutual consultation

Voltage Transformer (Table 6)

Table 6 Parameter of Voltage Transformer					
Rated System Voltage	72.5KV		126kV		145KV
Rated Primary Voltage	66/ $\sqrt{3}$ kV		110/ $\sqrt{3}$ kV		132/ $\sqrt{3}$ kV
Rated Secondary Voltage	100/ $\sqrt{3}$ V		100/ $\sqrt{3}$ V		100/ $\sqrt{3}$ V
Winding Voltage of the Residual Voltage	100/3V		100V		100V
Secondary Winding			Residual Voltage Winding		
Winding I		Winding II		Accuracy Class	Rated Load (VA)
Accuracy Class	Rated Load (VA)	Accuracy Class	Rated Load (VA)		
0.2	100	--	--	3P	300
0.5	150	--	--	3P	300
3P	300	--	--	3P	300
0.2	75	0.5	75	3P	300
0.2	75	3P	100	3P	300
0.5	100	3P	100	3P	300



NEPEAN
Power

www.nepeanpower.com

For more information please contact:

P: +61 2 4088 2790

E: power@nepean.com

Gas Insulated Switchgear

Lightning Arrestor (Table 7)

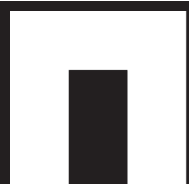
Table 7 Parameter of Lightning Arrestor				
Rated System Voltage	72.5KV	126kV	145KV	
Rated Voltage	90KV	100kV	120KV	
Continuous Operating Voltage	72.5KV	78kV	92KV	
Power Frequency withstand Voltage	140KV	230kV	275KV	
Lightning Impulse withstand Voltage	350KV	550kV	650KV	
DC 1mA Reference Voltage	≥128kV	≥145kV	≥175kV	
Continuous Resisting Current	≤300μA	≤300μA	≤300μA	
1/4μs Steep Impulse Residual Voltage	≤258kV	≤291kV	≤330kV	
8/20 μs Lightning Impulse Residual Voltage	≤224kV	≤260kV	≤345kV	
30/60 μs Lightning Impulse Residual Voltage	≤190kV	≤221kV	≤295kV	
Power Frequency Withstand Voltage-time	1.2Ur	1.15Ur	1.1Ur	1.0Ur
Characteristic	0.1s	1.0s	30s	1200s
Capacity of Withstanding 2ms Square Wave Current	600A, 20 times			
Capacity of Withstanding 4/10μs Impulse Current	65kA, 2 times			

Busbar (Table 8)

Table 8 Parameter of Busbar			
Rated Voltage	72.5kV	126kV	145kV
Rated Current	2000, 2500, 3150, 4000	2000, 2500, 3150, 4000	2000, 2500, 3150, 4000
Rated Short-time Power Frequency withstand voltage (between phases, to earth)	160kV, 1min	230kV, 1min	275kV, 1min
Rated Lightning Impulse Withstand Voltage (between phases, to earth)	350kV (peak value)	550 (peak value)	650 (peak value)

Outgoing Bushing (Table 9)

Table 9 Parameter of Outgoing Bushing			
Rated Voltage	72.5kV	126kV	145kV
Rated Short-time Power Frequency Withstand Voltage	160kV, 1min	230kV, 1min	275kV, 1min
Rated Lightning Impulse Withstand Voltage	350kV (peak value)	550 (peak value)	650 (peak value)
Symmetrical Creepage Distance	25mm/kV(III class), 31mm/kV(IV class)		



NEPEAN
Power

www.nepeanpower.com

For more information please contact:

P: +61 2 4088 2790

E: power@nepean.com