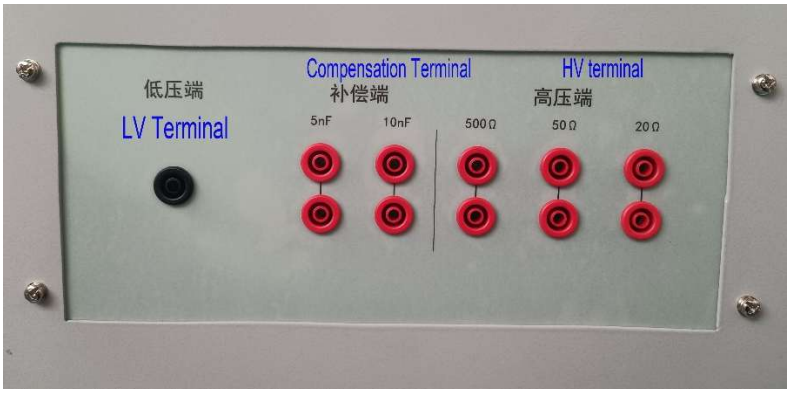
Technical Specification of
GSCW-20 Impulse Voltage Generator

1. General

GSCW-20 impulse voltage generator can be used to generate lightning impulse voltage (1.2/50 μs upto 20kV) for the testing of LV products.

The generator can test the load with maximum 30nF (measuring cable included).

Fig 1 impulse voltage generator
without test cabinet for test specimen



Impedance is adjustable.

Dimension:600*800*1200mm high.

2. Delivery List

SN	Name	Type/Data	Quantity	Note
1	Control system	20kV 1.2/50 μ s	1	20kV
2	SXCL-2 Measurement system	SXCL-2	1	Oscilloscope, 20kV voltage divider, measuring cable and computer
3	Technical services	We will give instruction online, not go abroad, it	1	

		is easy to operate the machine.	
4	Documents	User manual, test report and electrical drawing	1

The impulse voltage generator includes the below items:

1) Control system with Mitsubishi PLC (Japan brand) and touch panel;
2) Charging unit with rectifier: max. DC charging voltage is 22kV /max. charging current is 0.2A;
3) Impulse capacitor: 1uF, 22kV;
4) Discharge unit;
5) Automatic polarity change: positive and negative
6) Automatic earthing and safety interlock;
7) Impulse resistors of the generator;
8) Red and green lamp for indication ;
9) Emergency stop button;
10) Size: W*D*H=800*600*1200mm
11) Weight: about 200 kg

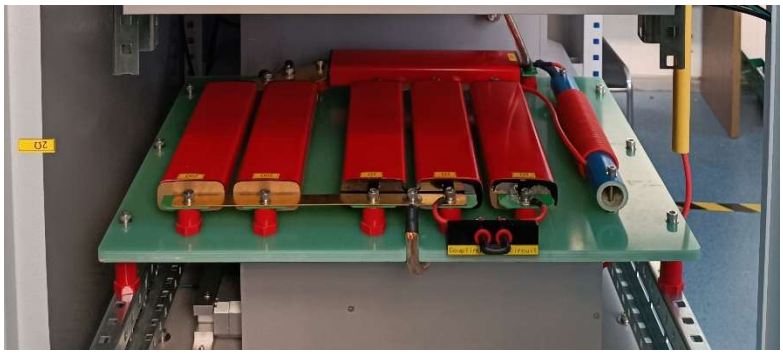


Fig 2 Impulse waveform module

Fig 3 Mitsubishi PLC

Fig 4 Touch Panel

a) SXCL-2 Measurement system

1) Lenovo computer with impulse analysis software, Window 10 operating system.

2) Voltage divider 1~20kV with BNC connector for 1.2/50 μ s to reduce the voltage signal to a value that the measurement system can receive.

Fig 5 20kV Voltage divider

3) US brand Tektronix oscilloscope: Tektronix brand TBS2102B oscilloscope (100 MHz analog bandwidth, 2 analog Channels, sample rate up to 1 GS/s, 20k sample record length, 8 bit vertical resolution),

Fig 6 Oscilloscope

4) Measuring cable

d safety connections for component testing.

3. Description

There are red and green warning lamps on top of the cabinet to indicate the safety.

The spark gap distance is adjusted remotely by the controls and is set in function of the pre-selected charging voltage. The generator has been designed for a very low inductance & resistance, to allow the biggest possible load range. The integrated earthing system consists of earth switches which discharge the impulse capacitors via the earthing resistors.

4. Features

1) Automatic polarity switching
2) Peak voltage and current monitoring
3) Easy operation and maintenance
4) Liquid insulation in the impulse capacitors offers optimal environmental compatibility (no PCBs). The impulse capacitors have very low inductance, high quality and long service life.
5) Considerate safety measures

- The whole cabinet is grounded to earth.
- Emergency stop button is equipped with magnetic materials and is removable on both sides according to the height of the operators.

- Manual earthing rod-- when the operator opens the back door of the cabinet to change the impulse module or do some maintenance work, the manual earthing rod should be hanged in the place to discharge the energy of HV terminal to ensure the safety of the operator.

Fig 7 Manual earthing rod

- Automatic earthing system--the machine will automatically discharge the energy through the earthing stick after each impulse.
- Green/Red warning lamp indication on top of the machine, which is easy to be watched. It is red when the test is going; It is green color when the test is finished.

5. Color

Insulating parts gray-white RAL1035 (Gray) and impulse capacitors blue RAL 5002 (Blue).

6. Ambient Conditions for the Surge Test System

Height above sea level <1000m (For higher altitudes special design will be required);
Relative humidity without condensation: <90%
Temperature average over 24h for high voltage parts: min. -5°C, max. +30 °C Extreme temperatures

for high voltage min. -5 °C, max. +40 °C Temperature for electronic controls and measuring equipment to operate with the specified measuring errors min. +15 °C, max. +25 °C

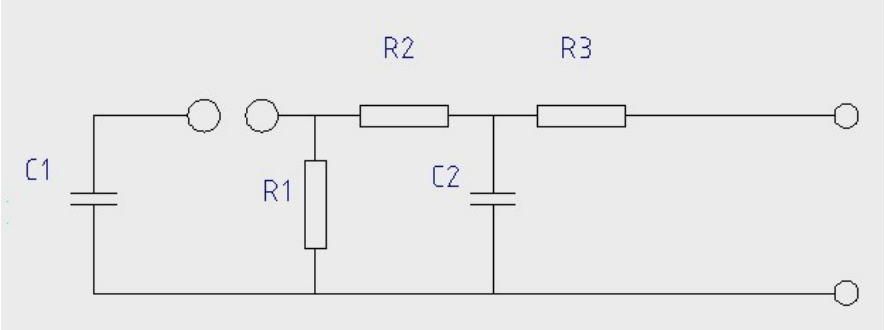
The room where the test system is located must be clean and dust-free.

Earth resistance must be less than 1Ω, with an independent earthing system;

7. Technical Data

1) Input voltage: phase to neutral, AC 220V, 3kVA;
2) Frequency: 50Hz;
3) Input power: 3kVA;
4) Maximum DC charging voltage: DC22kV; maximum charging current:0.2A; Charging time: reach @ 22kV within 50~60s;
5) Output Waveforms as the below table

No	Output waveform	Output range	Wave Front time T1 (μs)	Time to half value T2 (μs)	Output impedance	Load capacity
1	Open circuit voltage 1.2/50μs	2~20kV	1.2 ± 30%	50 ± 20%	500Ω, 50Ω, 20 Ω adjustable	⩽30nF (measuring cable included)



8. Touch panel and Control software

We use touch panel with the software as the control system.

The functions of control software are as below:

1) Set the charging voltage, interval time, number of test (can be from 1 till 99);
2) Safety: The system has set the maximum charging voltage for 1.2/50 μs. In case the operator sets the charging voltage above this value, the machine will not charge at all. It will give the error tips.
3) Select the positive polarity or negative polarity, the machine will change the polarity

automatically;

4) Once the charging voltage is set, the gap distance will be adjusted automatically to the desirable value.

5) There are information tips on the touch panel to show the error information or running condition.

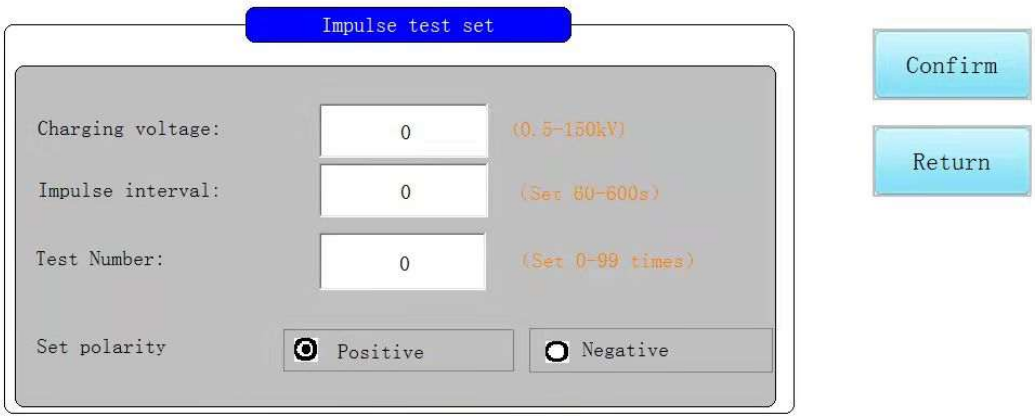


Fig 8 Set charging voltage, interval time and test numbers

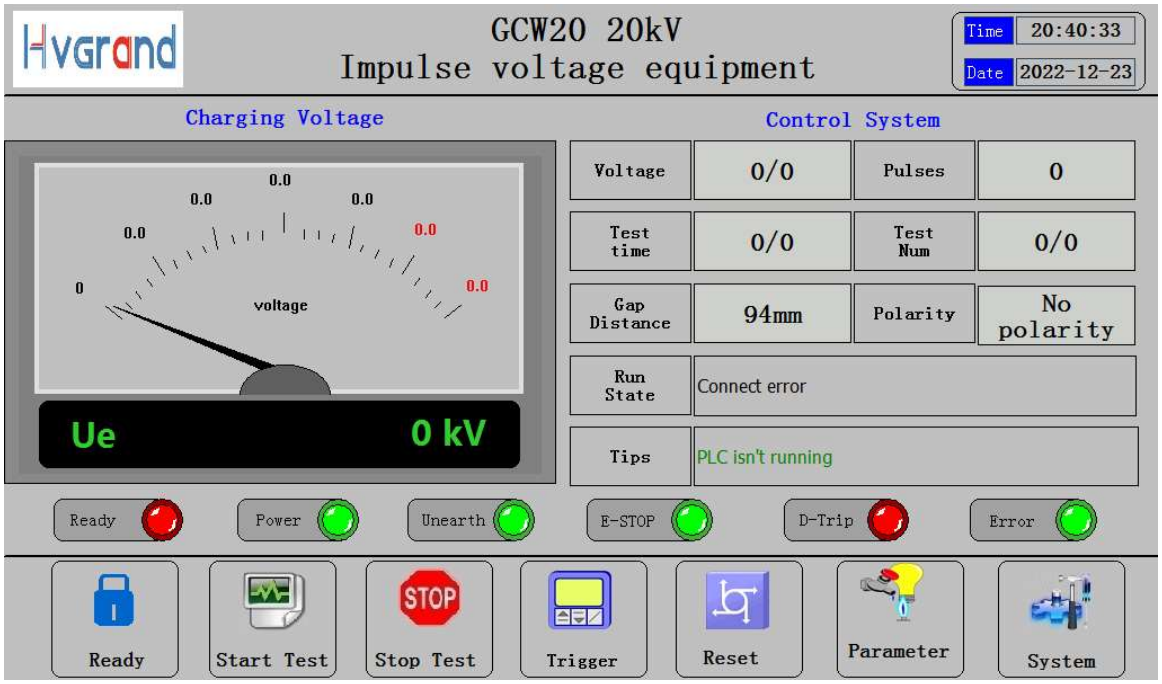


Fig 9 Main control software

9. Impulse analyzing software

The functions of the impulse analyzing software are as below:

1) Can input the name of the test person, name of the test object, model no of the test object;

2) The waveform can be stored in jpg or bmp format according to the customer's requirement. The

measurement software will automatically save the waveform after each discharge.

3) Some important remarks can be written on the output waveform.

4) The impulse waveforms can be displayed on the computer, showing wave front time T1, wave tail time T2, peak current and peak voltage.

5) The excel file test report can be achieved for convenient edit.

6) The waveforms can be copied to USB disk.

7) The color of the output waveforms can be changed according to the operator's requirement.

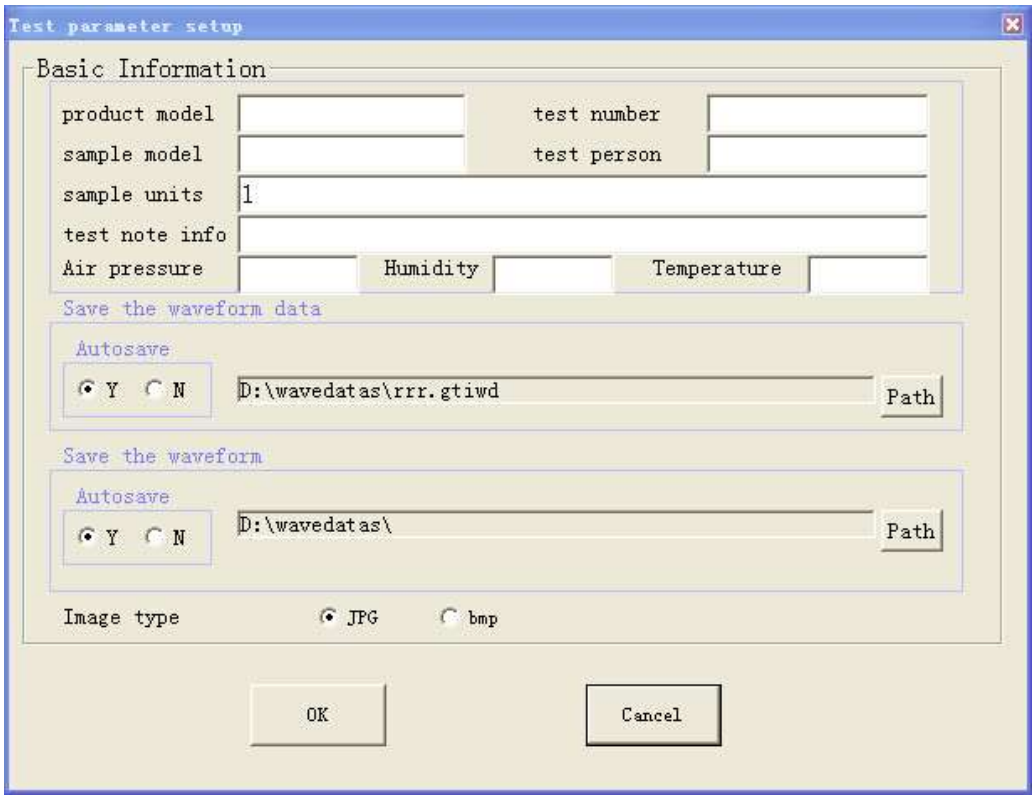


Fig 10 Test parameter setup

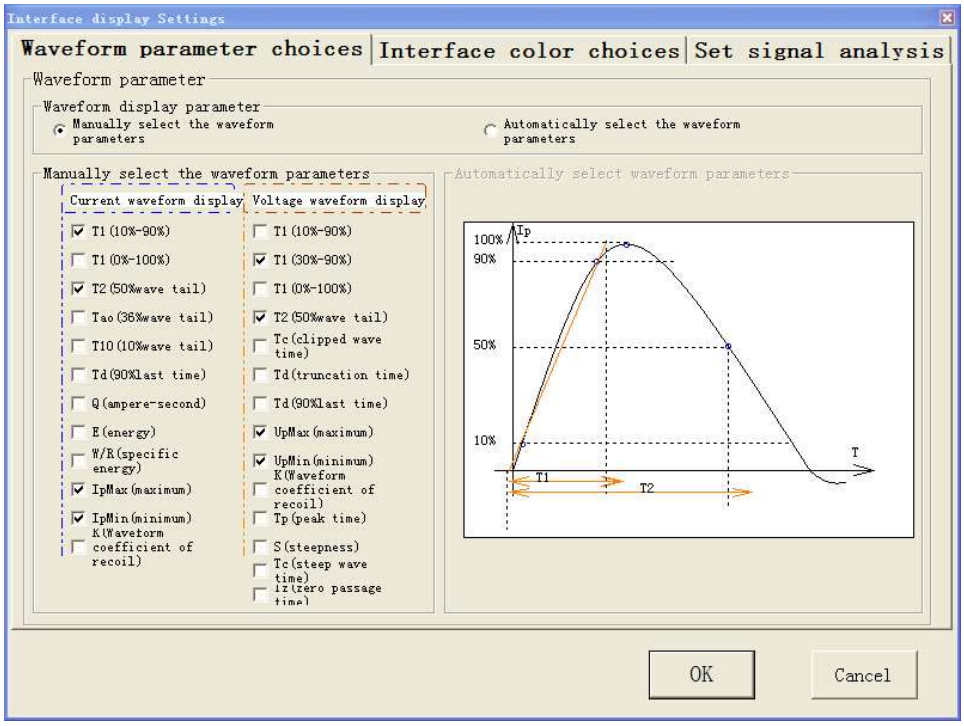


Fig 11 Interface display settings

Fig 12 lightning impulse voltage (1.2/50 μ s)

10. Quality guarantee

12 months quality guarantee after successful delivery in the customer's side

11. Documents (English)

Test reports

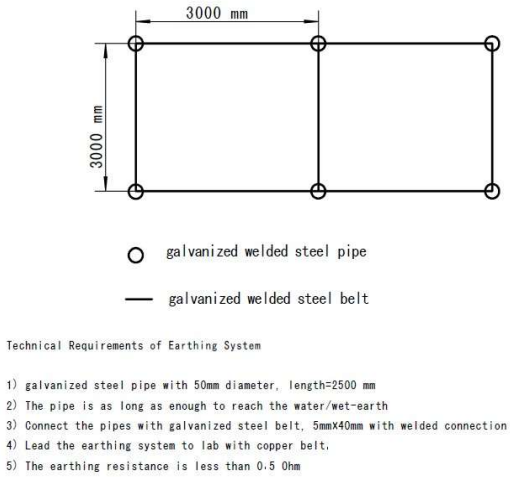
Circuit diagram

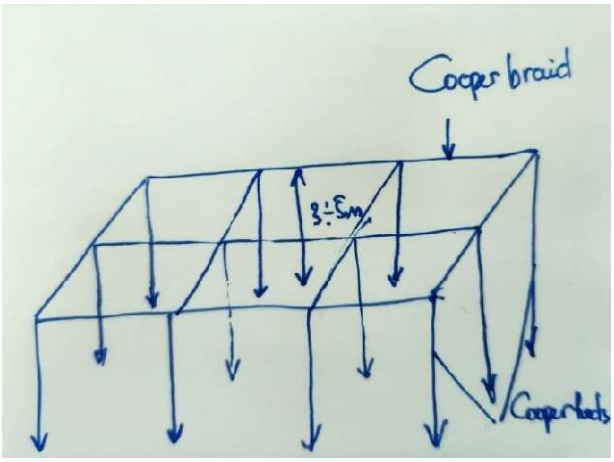
Operation and maintenance manuals

12. Recommended Spare Parts

Part Name	Model No	Quantity
Fuse	3A 10*38	2
Power supply	35W,24V	1
High voltage Diode	20kV/0.5A	1
Low inductance resistor	1 Ω/100W	2

13. Technical requirement of Earthing system (See the below drawing)





A good test field has a separate grounding. This ensures that no disturbances from surrounding machines enter the test field and - in case of a failure - the earth potential of the surrounding does not rise, causing damage to electrical equipment. It is necessary for the test field to have a lower grounding resistance than the surrounding building.