AES1003

HIGH FREQUENCY GROUNDING RESISTANCE METER

USER MANUAL

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1 APPLICATION

AES1003 High frequency grounding resistance tester is specially designed for the grounding resistance measurement at 21 frequency points between 47Hz and 500kHz on-site。By means of digital and micro-processing technology, AFC (automatic frequency control) technology, automatic identification of interference and proper selection of working frequency, the impact of interference is minimized, more accurate grounding resistance value is guaranteed。With unique anti-interference ability and environmental adaptability, the repeated test consistency is guaranteed which ensures long-term high precision and high stability.

Important:

Please note that this meter uses non shielded cables and this explains the limitation to 500 kHz. It is necessary to keep the cables at a distance of 1 m from each other. Cables provided with the device are 20 m long for injection spike (Z), 10 m long for voltage spike (Y), and 5 m long for connection to measured earth terminal (X).

At present time data transfer to computer is not available. Values to consider are only the impedance Z for each frequency. They should be reported manually on a data log. Data are not stored and a new measurement erases the previous one.

Reminder: an adequate HF earth frequency should have a mean value between 63 kHz and 500 kHz below 40 ohms (acceptable). A very good value is below 10 ohms, a good value is between 10 and 30 ohms. Above 40 ohms the earth impedance is generally considered as not adequate for lightning purpose.

1.1 Parameters

- Resistance Range： 0～60Ω
- Resolution： 0.1Ω
- Measuring Error： ±1Ω
- Working Frequency： 47Hz～500kHz
- Measuring Points： 21
- Current waveform： Sinusoidal
- Maximum Output Voltage： ±10V
- Power Supply： Built-in rechargeable Lithium battery (6000mAh)

- Test line: Copper core sectional area of current line ≥1.5mm²
  Copper core sectional area of voltage line ≥1.0mm²
- Measuring Time: ＜8 min @20 frequency points
- Duration of Test: 8 Hours Continuously
- Working Temperature: 0℃~40℃
- Storage temperature: -20℃～70℃
- Touch Screen: 5.0 Inch with 800x480 resolution

1.2 Dimensions

- Size: 270 x 246 x 174 mm
- IP Level: IP65
- Weight: ＜ 4Kg

1.3 Accessories

- Meter inside a watertight case

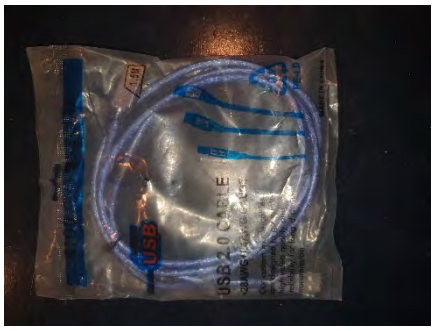
- Battery Charger：110～240V 50Hz/60Hz1 – UK plug (a French adapter is provided)

- Test cables： 20m (Red) 1

  10m (Yellow）

  5m (Green)

- USB Cable: PC to AES1003 – for future use (not used at present time)



2 PANEL

2.1 Panel View

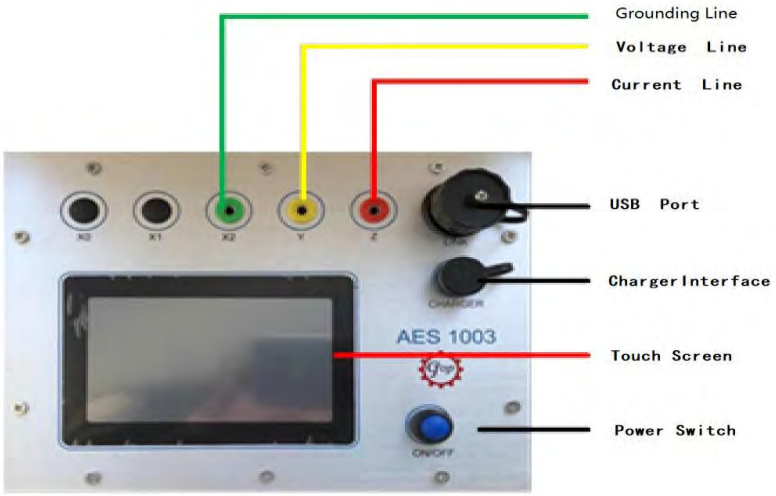


Fig.1 Panel View

2.2 Connection

Connect the tester according to Fig.2：

- Green Line to hole X2
- Yellow Line to hole Y
- Red Line to hole Z

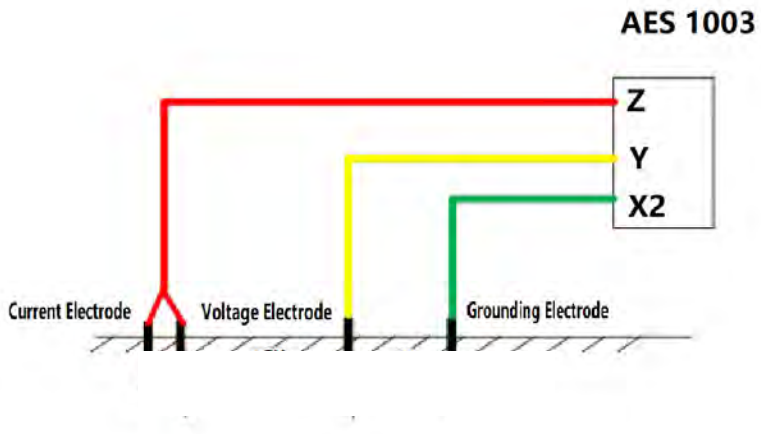


Fig.2 AES 1003 Connection

Attention：

1. Current electrode、Voltage electrode、grounding electrode are arranged in a straight line
2. Three test lines should be straightened in order to obtain measuring accuracy
3. Distance between electrode should fulfill the 62% rule (Y-Z = 62% X-Z)
4. If the grounding electrode to be tested has oxidation phenomenon, polish it by sandpaper before test in order to assure good connection

3 START/STOP

3.1 Start

Press the blue button ON/OFF。After 1 second, the touch screen will display the following interface:

Fig.3 Stat Interface

Choose the language preferred before further operation

3.2 Stop

Press and release the ON/OFF button to close AES1003.

4 HMI

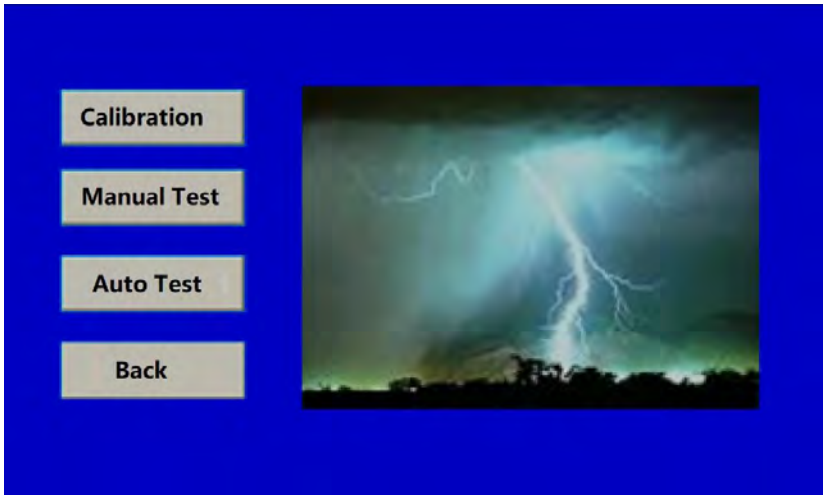


Fig.4 HMI

5 CALIBRATION

The calibration function is run once each time the AES1003 is started. This feature traverses all measurement points from the lowest test frequency to the highest test frequency, and saves the calibration results in volatile memory. When you close AES1003, you lose calibration data, which is why you run it once each time you start.

Click the "Calibrate" button to enter the calibration function interface：

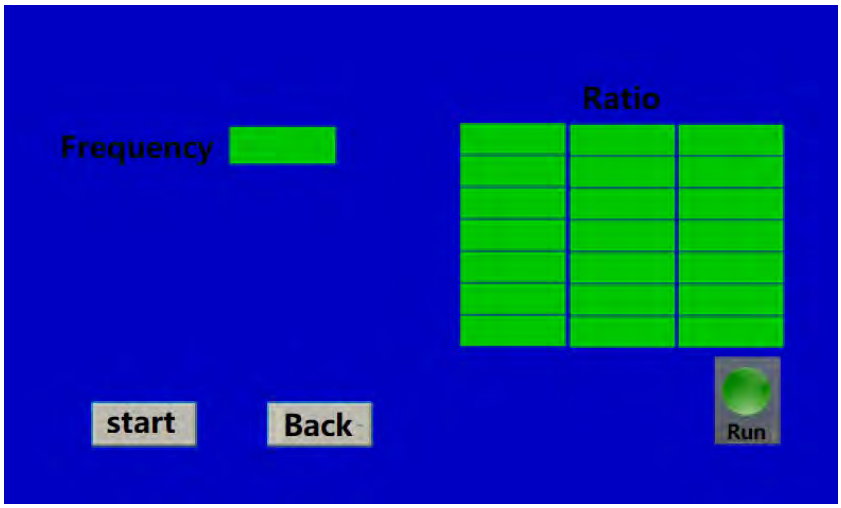


Fig.5 Calibration Interface

In Fig.5, ”Frequency” indicates the current measuring point number, from 1 to 21. A total of 21 test boxes correspond to the calibration results for each measuring point. The icon in the lower-right corner of the screen indicates the current program state, Green indicates that it is running, and red indicates that the operation stopped. The stop state is assumed after power is turned on

Click the "Start" button to start the calibration process, the icon will change to green. The calibration process lasts about 2 minutes until the icon turns red to indicate that the calibration process has ended. Click the "Back" button to go to the main menu and choose other features to continue the test.

Once the calibration process begins, the test cannot be stopped in the middle process.

6 MANUAL TEST

In the manual test interface, the user can specify the impedance characteristics of the test at a specific frequency

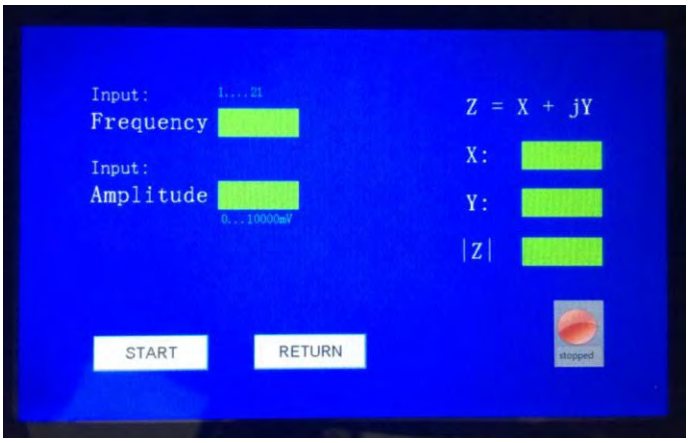


Fig.6 Manual Test Interface

Check the cabling, grounding pins, and AES1003 for proper connections before you start the test. On the left side of the screen, "Frequency sequence", enter the test frequency number, 1~21 the range of values, representing the test frequency between the 47hz ~ 500khz. Click on the text box, pop-up keypad, enter the value and click on the keypad on the ENTER key to confirm, the Fig.7：

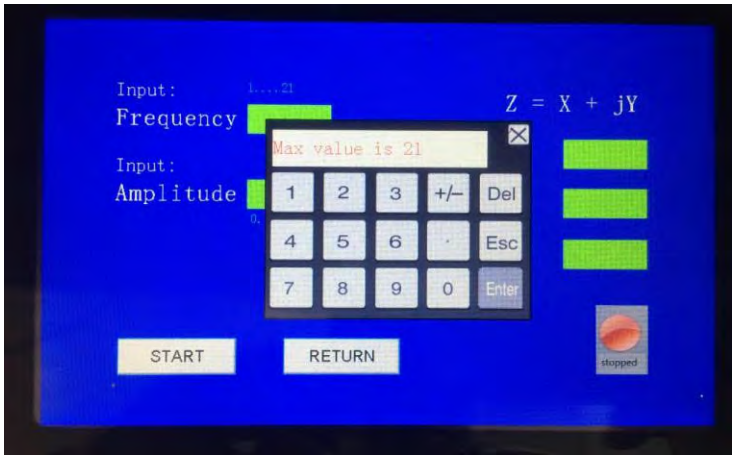


Fig.7 Frequency Sequence

The correspondence between the sequence number and the test frequency is shown in the following table：

S.N	Frequency	S.N	Frequency	S.N	Frequency
1	47Hz	8	5KHz	15	125 KHz
2	53Hz	9	10 KHz	16	156 KHz
3	57Hz	10	25 KHz	17	199 KHz
4	63Hz	11	40 KHz	18	250 KHz
5	79Hz	12	63 KHz	19	316 KHz
6	250Hz	13	80 KHz	20	398 KHz
7	1KHz	14	100 KHz	21	500 KHz

"Output amplitude" refers to the sine wave's unilateral amplitude value, the value range 0~10000, Unit mv. Click on the text box, and "Frequency serial number" the same operation method set output amplitude. The following figure sets the test frequency 79Hz, sine wave amplitude ±2000mv.

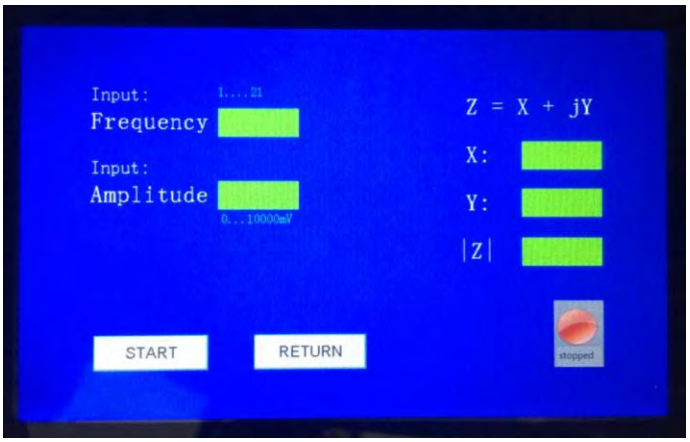


Fig.8 Set Test Frequency and Amplitude

Click on the "Start" button to start the test, waiting for about a few seconds to complete the test, the right side of the screen output test results. Status indicates that the icon shows the test status and run/stop.

After ending of current test frequency measuring， you can modify the test frequency or amplitude to start a new test, or you can repeatedly click the "Start" button to repeat the test. After completing the test, click the "Back" button to jump to the basic function interface.

7 AUTOMATIC TEST (full range of frequency)

Automatic test completion of the function is from 47Hz to 500KHz automatically traverse the test 21 frequency impedance characteristics. The operating interface is shown in the following illustration：

Fig.9 Auto Test Interface

Check the cabling, grounding pins, and AES1003 for proper connection before starting the test.

Click the "Start" button to start the full test, and the test status indicates that the icon has changed to green, indicating that the test is in progress. Please wait until the status icon turns red to indicate that the test is complete. After testing, click the "Curve" button to jump to the graph interface. The test process is usually around 2-8 minutes.

You can use the "uploaded" function to transfer the data to the PC for analysis. However, if you switch off the power button you will lose the data. Please note that each measurement erases previous one and thus should be either noted or stored in a PC after each measurement.

8 PC transfer

Not available presently.

9 BEFORE USING AES1003

9.1 Calibration

Calibration is the full measurement of AES1003@21 frequency points, it checks the device internal and operational status in normal, the calibration process lasted about 2 minutes。

9.2 Before Test

Check the grounding pins, test cables, and AES1003 panel connections correctly before starting manual or auto test.

9.3 Battery Charging

 Only allow charger provided with AES1003。

- Connect the charger with the AES1003 charger Jack, the socket has card slot
- Connect the charger to the power supply, when the charger LED is green
- Start charging after pressing AES1003 's On/off button
- Charger LEDs Show Red
- Wait about 2-3 hours to fill the electricity
- When the charger led turns green, the charge ends
- Close ON/OFF button

Pull out the Charger plug

 Cannot use AES1003 during charging。