

HZ-9001B Handheld ultrasonic partial discharge line inspector

User Manual

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I、 Overview

In recent years, with the development of the national economy, power outages have become more and more difficult. With the promotion of state maintenance, live tests have become more and more important and have become an important means of ensuring the safe operation of the power grid.

Partial discharge monitoring of running electrical equipment is an important part of condition maintenance. When partial discharge of power equipment occurs, physical phenomena such as sound, light, electricity, heat, and magnetism are produced. The sound is ultrasound, and the ultrasound is a sound wave above 20 KHz, which cannot be heard by the human ear. It is centered on the sound source and propagates to the surroundings in the form of spherical waves. Ultrasonic waves are mechanical waves and are not affected by the electromagnetic environment. The method of judging the existence and location of partial discharge by receiving ultrasonic signals is easier to detect partial discharge failures than infrared cameras and ultraviolet cameras, because physical signals such as thermo-optical and magnetic signals are often generated after partial discharge occurs when the partial discharge occurs.

Our company concentrates on scientific research and has developed the HZ-9001B handheld ultrasonic partial discharge line detector device under the guidance of the principle of reducing the purchase cost of users, filling a domestic gap and suitable for promotion in the power, railway, and petrochemical industries. The device is a good helper for condition maintenance.

II、 Functions and features

1、 Functions

- (1) Find and locate insulator discharges on iron towers, creepage of open-air cable heads, and partial discharges of underground cables;
- (2) Car line-tracking function, line-tracking speed is about 30 miles.
- (3) Non-contact scanning of high-voltage primary equipment such as transformers, GIS, etc., to detect and locate external discharge;
- (4) On-line scanning of the open (open-air) equipment of the transformer station to find

and locate various discharges (corona, arc, flash-over, creepage, disconnection, pull arc, etc.);

(5) Scan the high-voltage switch-gear during operation, and find and locate faults such as partial discharge and loose screws;

(6) In the handover and preventive tests of the power system, in the partial discharge test of the main transformer and GIS, the device is used in conjunction with the partial discharge meter. If there is a partial discharge, it can be distinguished between internal discharge and external discharge. If it is external discharge To locate specific discharge points;

(7) In the factory test of large oil-filled transformers and GIS manufacturers, this device is used in conjunction with a partial discharge tester in a partial discharge test. If there is a discharge, it cannot be seen on the screen of the partial discharge device whether it is an internal discharge or an external discharge. Scanning with a hand-held line inspector can quickly find and locate external discharges. If there is no external discharge, it is judged as internal discharge. For the partial discharge test of dry-type transformers before leaving the factory, using this device with a partial discharge tester can quickly distinguish between internal discharge and external discharge. In addition, the dry-type transformer running on power can be scanned and found accurately and quickly regardless of internal or external discharge;

(8) Large mechanical equipment bearings, mechanical failure due to poor lubrication, can be detected and positioned using this device;

(9) Leak detection of high pressure sealed gas and liquid;

2、Features

(1) Horn-type concentrator, gun-shaped, hand-held, non-contact, visual, audible and stored display waveform, discharge waveform can be transmitted to the background, non-contact detection when charged.

(2) It has the function of vehicle line inspection.

(3) Signal receiving range: up to 50 m.

(4) Large signal amplification and high sensitivity.

(5) The green laser light with moderate intensity is easy to trace in the sun.

(6) The monitor can display waveforms from time to time, and can store valuable waveforms.

(7) Powerful, wide range of applications, suitable for power system, railway and petrochemical metallurgy industries such as power monitoring, mechanical failure monitoring, high pressure sealed gas liquid leakage monitoring.

(8) In addition to patrol and locate the discharge of the substation of the railway system, it is especially suitable for the various insulation and connection failures of the contact network of the railway power system, to find and locate. See the following description for details.

(9) Advanced safety and good helper for condition maintenance.

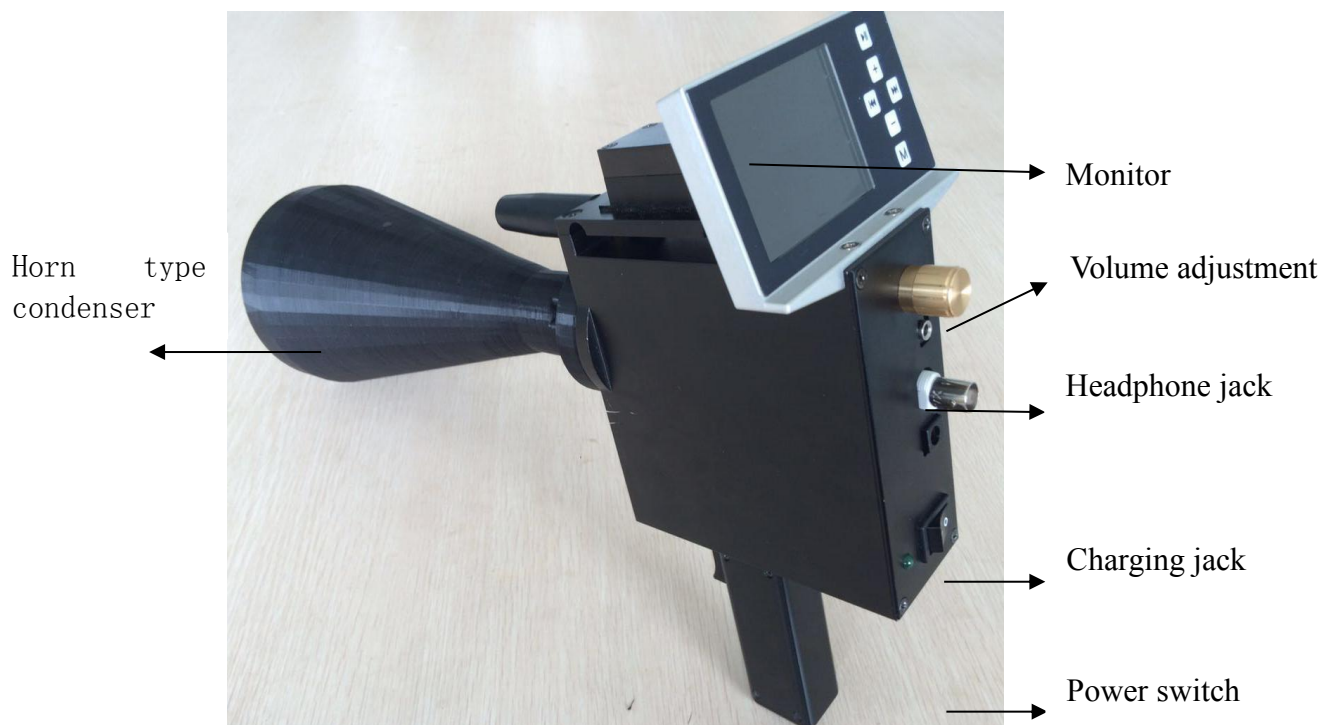
III、Technical index

Structure	Horn Concentrated Handheld
Electrical system	Analog circuit and digital circuit with anti-interference filtering
Frequency Range	40KHz (narrowband sensor) for abnormal ultrasonic signals
Display	LCD display with backlight
Storage	Can store and store 255 displayed waveforms
Antenna	Horn type condenser
Battery	lithium battery
Operating temperature	-10℃～50℃
Probe	Contact probe, non-contact probe
Headset	Luxury noise attenuation headphones, can be used with a helmet

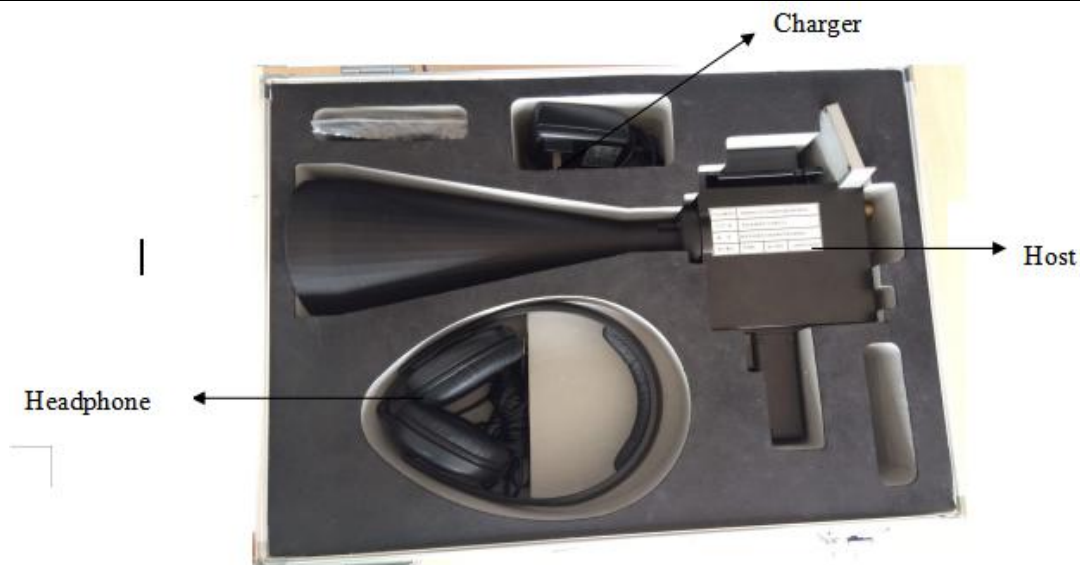
Instruction	dB value, frequency
Sensitivity	Lowest detectable discharge of -40dB (0dB at 1mv peak)
Size	Aluminum carrying case 49×38×18cm
Weight	Host: 1.5Kg Full set: 4Kg

IV、Instrument structure

The picture of HZ-9001B handheld ultrasonic partial discharge line inspector is as follows:



Line inspection host diagram



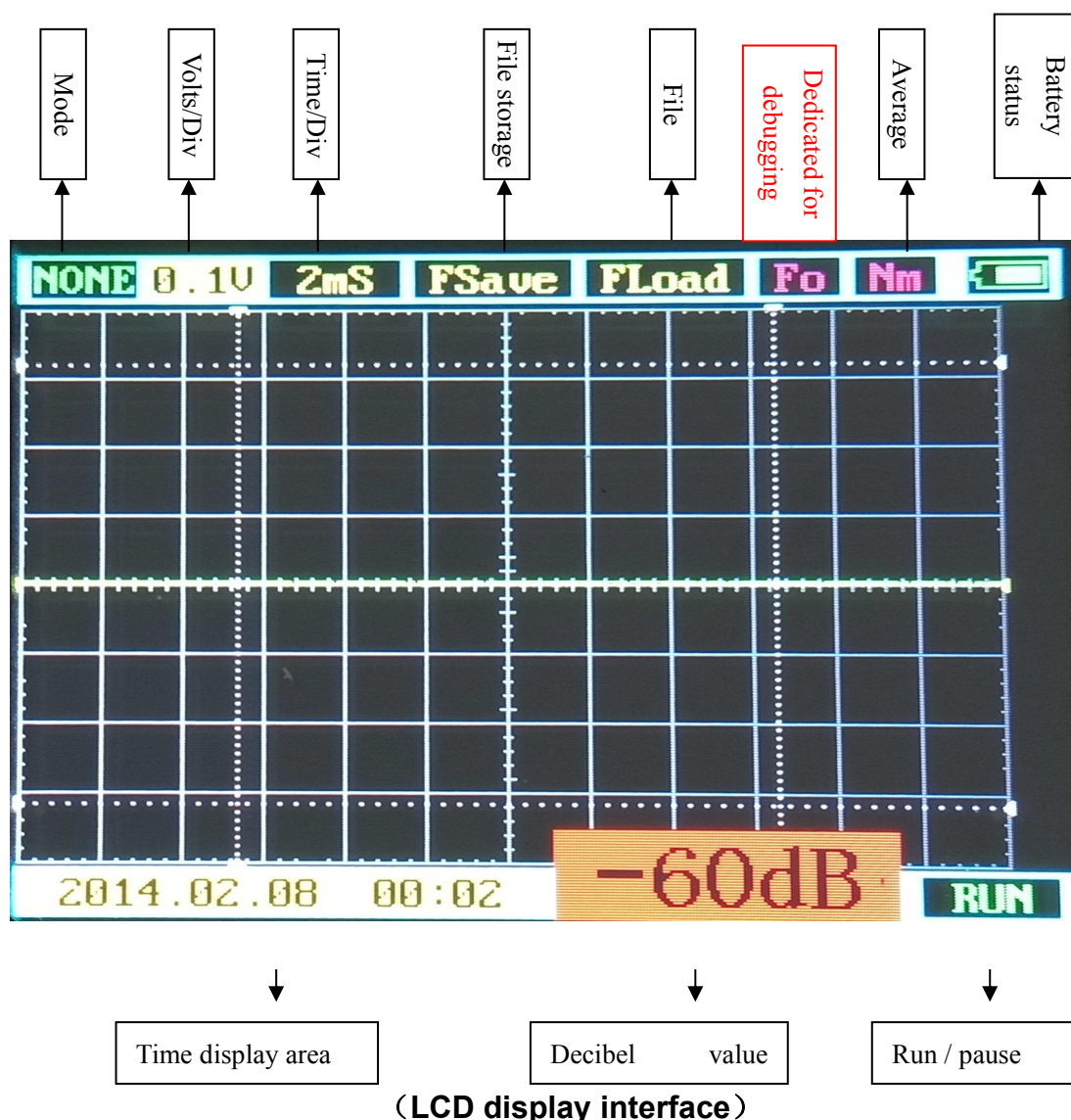
Line inspector configuration diagram

V、Instructions

1. The user wears the headset, holds the line-of-sight instrument, turns on the power, snaps his finger on the trigger, the laser is aimed at the detection object, and listens for a beep or a waveform on the display.
2. Establish the scanning cycle: once a month, once every ten days for low-noise devices, once a week for relatively loud devices, and once every three days for loudest devices. Users can formulate their own live monitoring cycle scheme according to their actual conditions.
3. On-line monitoring is different from outage detection. Outage testing is usually based on the standards specified in the regulations to determine whether the data is qualified or not, and whether the equipment is faulty. On-line monitoring must look at the change trend of the on-line monitoring data. Under normal circumstances, once When the high-voltage equipment is running under power, the ultrasonic background noise monitored by the instrument should be silent. Scan adjacent devices of the same type at the same time period, and compare the sounds emitted by them horizontally. These are divided into key monitoring objects, general monitoring objects, and neglecting objects (devices that basically have no sound) according to the size of the sound.

For the key monitoring objects, formulate the vertical ratio monitoring cycle plans at different times, such as monitoring once every ten days, once a week, and once every three days, to see the development trend of ultrasonic signals. After several periods of monitoring, the sound is getting louder and louder, and the specific trend analysis is performed to eliminate the normal causes such as excessive load. The sound is still getting louder and bigger. You can determine that the device has serious discharge and other problems. Find the cause without power failure. A major accident such as insulation breakdown will occur, which will seriously affect the operation of the entire power system.

4、Operation method of display storage function:



Mode selection	AUTO/SIGN/NONE Continuous detection / single detection / slow scan, select the default mode when testing, no need to select.
Volts/Div	Adjust the magnitude of the volt parameter by moving the “  ” “  ” keys.
Time/Div	Adjust the size of the time parameter by moving the “  ” “  ” keys
File storage FS	When the cursor is at this position, in the decibel value display area (lower right corner) A logo such as Save File001 will appear. Press the “  ” key to save.
File loading FL	When the cursor is at this position, in the decibel value display area (lower right corner) A logo such as Load File001 will appear. Press the “  ” key to save.
Dedicated Fo	During production, it is used for debugging and not used during use
Sampling average (Nm)	When the cursor is at this position, a sign such as NUMave = 025 will appear in the decibel value display area (lower right corner). Move the up and down keys to change the value and adjust the sampling frequency of the displayed waveform.
Battery status	Battery level indicator.
Time display area	Adjust the time by moving “  ” “  ”
Decibel value display	Used for dB value display.
Run / pause	Press the “  ” key to run and pause the switching state.

The left and right keys are the cursor keys.

① The first frame of the display from the upper left corner is the display mode. You do n't need to operate it after turning on the machine, and you can leave it in NONE mode.

② The second and third boxes are the vertical and horizontal coordinate scales. When the cursor is on them, press the "+" and "-" keys to change the size (where the vertical coordinate changes the scale size, long press "+", "-"key).

③ The fourth box FS is storage. When the cursor is on it, press the "+" and "-" keys to select the location file to be stored. Press M to store. The storage method is overwrite (no need to delete). Under normal working conditions of the display, press the M key. If the storage is successful, the storage location jumps to the next file.④ The fifth box FL is for reading. When the cursor is on it, press the "+" and "-" keys to select the file to be read, and the M key is the confirmation key. The displayed purple waveform is the read waveform. Can also be connected to a computer to read the waveform through special software.

⑤ The sixth and eight boxes need not be operated.

⑥ The seventh box Nm is the average number of samples displayed in dB. Press the "+" and "-" keys to change the average number.

7. The lower left corner is the display time box. You can set the time by moving the cursor and pressing the "+" and "-" keys. You must reset the time after powering on, so that you can check the date when reading the data.

8. The upper right corner is the battery status. The box in the lower right corner is the running status of the display. The top key is the pause key.

VI、The standard configuration

No.	Accessories	Quantity
1	Line inspection host	1 set
2	Headset	1 pc
3	Charger	1 pc
4	Data line	1 pc
5	Warranty card / certificate of conformity	1 copy
6	User Manual	1 copy
7	Packing List	1 copy

VII、Precautions

1. Ultrasonic waves are mechanical waves and are not affected by electromagnetic waves, but are affected by wind. At the same time, the water from the water pipe on the site will interfere with the measurement results. When testing, you should choose windless weather and turn off the sprinkler irrigation system. Sometimes the transformer fan also generates ultrasonic waves due to poor lubrication, but it is well distinguished from the partial discharge ultrasonic signals generated by the electrical failure of the equipment.
2. Don't draw conclusions easily when abnormalities are found. To analyze the cause in detail and exclude other influencing factors, the horizontal aspect ratio is repeated several times (see the discussion of the previous method).
3. Both partial discharge and mechanical vibration can generate ultrasonic waves, and the two must be clearly distinguished.
4. When scanning, the laser beam must not be scanned directly against the human eye.
5. Check whether the battery is fully charged before each live test.

VIII、After sales service

Within one year from the date of purchase, due to product quality issues, our company will provide free maintenance, lifetime warranty and technical services. If you find that the instrument is abnormal or faulty, please contact the company in time to arrange the most convenient solution for you.