HZJF-9008 Handheld Partial Discharge Detector

USER MANUAL

Huazheng Electric Manufacturing(Baoding) Co.,Ltd

Safety Terms and Symbols

This manual may contain the terms:

 Warning!

Indicate the conditions and actions that may endanger the life and safety of the operator.

 Attention!

Indicate the conditions and actions that may cause product damage or data loss.

The product may contain the terms:

Danger: when doing this, it may hurt you.

Warning: when doing this, it may cause potential dangers to you.

Attention: when doing this, it may cause damage to this product or other device connected to this product.

The product may contain the symbols:

High Voltage!

Please refer to the manual!

Protective Earthing!

Attention! Keep the safety distance with the live device on field when working!!!

Product Certification and Standards

This product is suitable for the partial discharge test of high voltage equipment, for example, the safely isolated transformer.

Normative References

The terms in following documents are the standard terms after they are referred by this standard. For the references with dates, all subsequent modifications (exclusive of error published contents) or revised editions are not applicable to this standard. For the references without dates, the latest version is applicable to this standard.

GB/T 2423 Environmental test of electrical and electronic products

GB/T16927 High voltage test technology

GB/T 17626 Electromagnetic compatibility test and measurement technology

GB 2421 Basic environmental test rules for electrical and electronic products

GB7354 Partial discharge measurement

GB 11022 General technical conditions for high voltage switchgear

DL/T 417 Guide for partial discharge field measurement of electric power equipment

DL/T 593 Common technical requirements for high voltage switchgear and control equipment standards

DL/T 595 Preventive test rules for electric power equipment

Safe conditions and actions, and conditions and actions may damage the product

Notice for Operations Security

Understand the following safety precautions to avoid injury and prevent product damage or other products connected to this device. As to avoid possible dangers, please use this product in accordance with the regulations.

Use correct charger!

Use the special battery charger of this instrument. Otherwise, it may damage the battery of the instrument.

Don’t open the cover for operations!

Don’t open the instrument case and operate this product.

Don’t operate when the product is suspected of failure!

If you suspect this product fails, please contact our maintenance staff for inspection. Any maintenance and adjustment must be carried out by the maintenance staff of our company.

Please keep the product surface dry and clean.

As to avoid the equipment performance affected by the dust or moisture in the air, please keep the product surface dry and clean.

Notice for Transport Safety

In order to avoid the screen, press key, knob or interface parts on equipment panel damage due to the dropping during transport, please pay attention to the safety during transportation.

Be careful when inspecting on site!

Be careful when inspecting on site, as to avoid being knocked off by the equipment on field. Make sure to keep the safe distance from the high-voltage electrified equipment on field to avoid working under high risk field strength.

Contents

I. Product overview

This handheld partial-discharge instrument is mainly used for the detection of high-voltage electrical equipment. This product is simple to operate and adopts portable structure design which can inspect on line. It equips with specific sensors to detect various high-pressure devices, which can detect the insulation state changes inside the equipment timely. So the insulation failure could be dealt with in time

II. Product configuration

Items	Description
Display screen	3.5 inch color LCD display screen; display resolution: 320 x 240
Sensor	Built-in AE\TEV
External interface	AE\TEV external interface, external synchronization interface, headphone jack, Micro SD card (16G), charging port, USB port (Backup Interface, extensible)
Signal interface mode	Front-end built-in AE\TEV sensor; External sensor (Backup Interface, extensible with Lemo connector)
Shape & size	Length × Width × Height (225mm × 100mm × 40mm)
Weight	0.5kg

III. Technical parameters

1. Conditions of usage

The instrument is internally installed 18650 lithium battery, and the ambient temperature under normal use condition: -20℃ - 60℃, charging environment: 0℃- 45℃, storage environment: -20℃ - 45℃.

Attention: The instrument must be shut down when charging. If the device is on charge, it cannot be started up for measurement.

2. Technical performance

1) sensor: built-in TEV sensor, ultrasonic sensor

2) range of frequency band: TEV: 3M-60MHz; ultrasonic: 40KHz

3) measurement range: TEV: 0dB-80dB; ultrasonic: 0dB-40dB

4) Tap: TEV: 0 -3 tap, total 4 adjustable taps; ultrasonic: 1 tap

5) maximum pulse / cycle number: 600

6) measurement display: current real-time value, historical maximum value, real-time oscillogram, fingerprint diagram, trend diagram, pulse count

7) trigger mode: internal / external synchronization trigger

8) Power-on self-test function

9) data storage, query playback and derivation functions

10) interference suppression function

11) alarm threshold setting and indicating function: partial-discharge alarm indication (the color indicator bar at right side), tap shift indication (suggest shifting tap in case of red), battery power-quantity indication.

12) working power supply: high-capacity lithium battery pack, working for 6 hours with one time charge.

13) peripheral storage interface: 16G MicroSD card

IV. Appearance of equipment

No.	Instruction
1	Built-in TEV sensor
2	Built-in ultrasonic sensor
3	External sensor signal interface (using the special signal-line to connect the sensor, for expanding backup)
4	External synchronization interface
5	Headphone jack
6	Charging interface
7	USB interface
8	SD card slot

4.1 Appearance diagram of handheld partial-discharge patrolling measurement instrument

V. Introduction of software operation

1. Introduction of key and boot

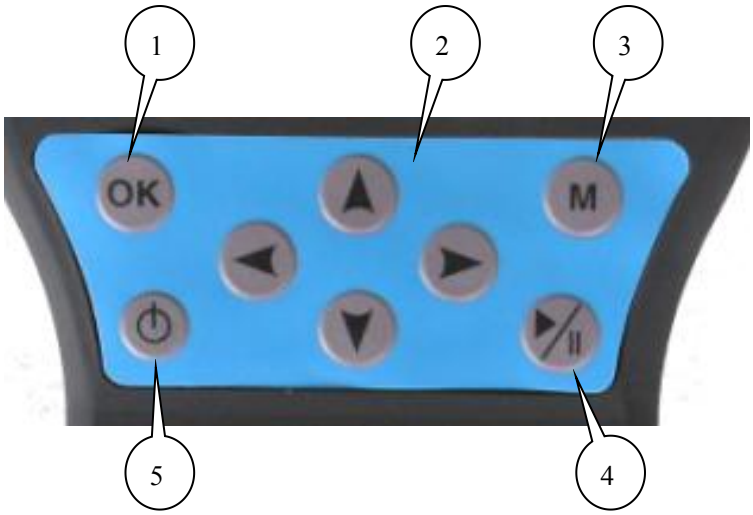


Fig.5.1.1 Key

1. OK key; 2, direction key; 3, menu key; 4, start / pause key; 5, power key

As shown in the figure above, long press the power key on the lower-left corner of the keypad panel to enter the self-checking screen as the figure below; after successful self-checking, the program is started up and entered the partial discharge measurement interface.

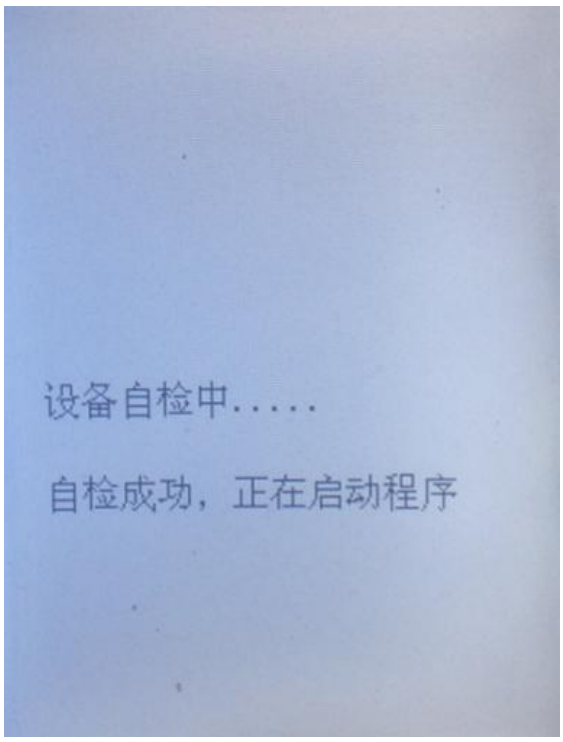


Fig. 5.1.2 Self-checking screen when starting

2. Introduction of TEV partial discharge measurement interface

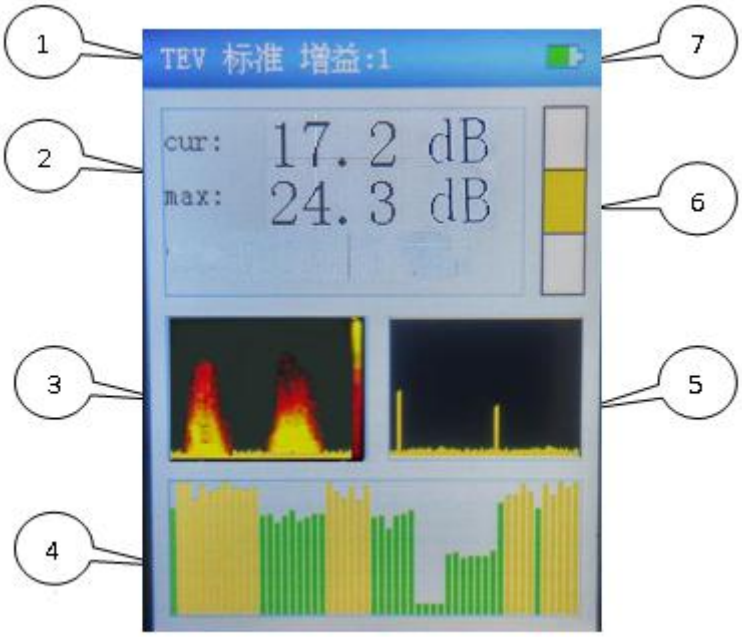


Fig. 5.2 Main interface of TEV partial discharge measurement

The main interface of software startup is as shown in the figure above, total 7 parts; ① sensor measurement mode and gain display, ② partial-discharge indicating value (current value, maximal value in turn), ③ finger-print diagram, ④tendency chart, ⑤oscillogram, ⑥partial-discharge warning diagram, ⑦ display of electricity quantity.

3. TEV pulse-count measurement interface

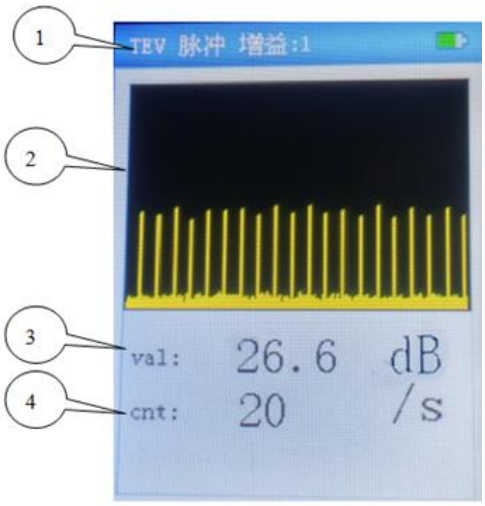


Fig. 5.3.1 TEV pulse count measurement interface

It can be switched to TEV pulse-count measurement interface by press the right key on TEV

partial discharge measurement interface; the software interface is shown as figure above; and there are total 4 parts; ① sensor measurement mode and gain display, ②partial-discharge waveform display area, ③ display of maximal value, ④ pulse number / s.

4. AE partial discharge measurement interface

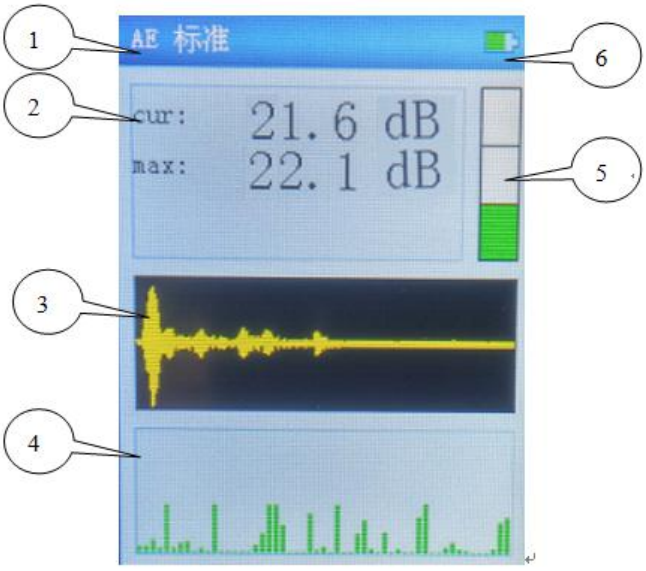


Fig.5.4 AE partial discharge measurement interface

It can enter the parameter setting interface by press the menu key on TEV partial discharge measurement interface; press the up and down keys to select the sensor settings and press the left key to switch to AE sensor; after choosing the save & exit key, press the OK key to exit the menu and enter the AE partial-discharge measurement interface, as shown in figure above; and there are total 6 parts; ① sensor measurement mode display, ② partial-discharge indicating value (current value, maximal value in turn), ③oscillogram, ④tendency chart, ⑤ partial-discharge warning diagram, ⑥display of electricity quantity.

5. Parameter setting interface

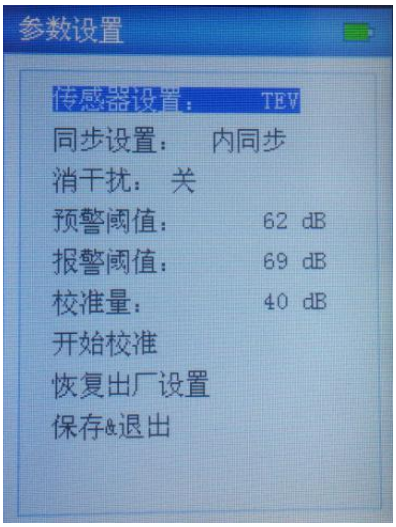


Fig.5.5.1 Parameter setting interface

Press the menu key to enter the parameter setting interface; press the up and down keys to select the options need changing; there will be blue background displayed after selecting, and then press the left and right keys to switch the parameters of this option, including:

1, sensor settings: TEV\AE switching.

2, synchronous setting: internal synchronization / external synchronous switching.

3, interference-elimination switch: the left and right keys are utilized to choose to open or close the interference-elimination function. This function can filter the background noise to achieve the purpose of interference suppression.

4, early-warning threshold: this default value is recommended, and no adjustment is needed in the test process.

5, alarm threshold: this default value is recommended, and no adjustment is needed in the test process.

6, calibration quantity: this default value is recommended, and no adjustment is needed in the test process.

7, calibration-starting: if some test environments need calibrating, press the OK key to start the calibration after changing calibration quantity; then press Save Key to save the data; after calibration, press Save & Exit. The value has been calibrated before delivery; don't conduct this operation unless in special circumstances; press the Restore the Factory Setting to restore the default value in case of careless operation.

8, factory-setting restoring: press to restore the factory default value.

9, Save & Exit: after setting all the parameters, press OK key to save and exit, and then continue to measure.

6. Data storage, query playback and synchronization-frequency setting interface

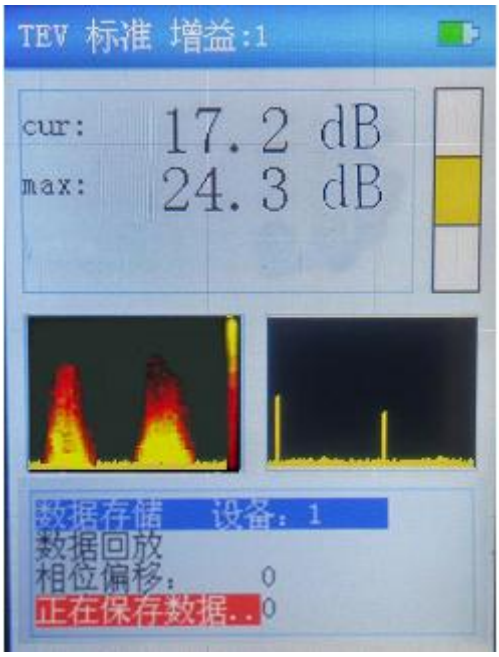


Fig.5.6.1 Storage, phase, and synchronization settings interface

The menu option in the figure will appear when press the OK key on the TEV partial discharge measurement interface and AE partial discharge interface; press the up and down keys to switch to the data storage menu; after determining the number of equipment, press the OK key to store the current data into SD card; it will prompt " date is being saved, the data is saved successfully".

Data playback: select the up and down keys to enter the data playback bar; press the OK key to enter the data playback interface as the figure below:

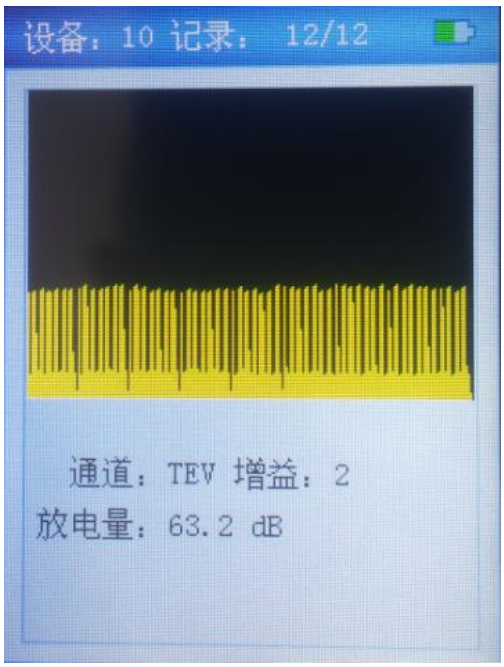


Fig. 5.6.2 Data playback interface

Press the left and right keys to switch different equipments, and the up and down keys to examine the data records saved in the equipment; and the real-time waveform, data, channel and gain of the record under the selected equipment number can be displayed.

The prompt that "whether to delete the current record" will appear when press the OK key on this interface; press the OK key to confirm the deletion, and press other keys to cancel the deletion.

After the playing back, press the menu key to return to the measurement interface.

Select the phase deviation, and then press the left and right keys to adjust the deviation value; it will be found that the real-time waveform changes the phase position as the adjusted value; the synchronization frequency is selected to adjust the deviation of the internal and external synchronization. Internal and external synchronization setting shall be in reference to the parameter interface. Then press the left and right keys to adjust the value, it will be found that the real-time waveform gradually slows or stops, indicating that the synchronization frequency is consistent with the synchronization source. The cooperative utilization of two functions of phase deviation regulation and synchronous frequency can be regarded as the general basis for judging the discharge signal (this function cannot be used for simple patrolling-measurement operations).

7. Detailed introduction of each functional interface

7.1 Status indicator bar

TEV standard mode and gain option will appear on the upper indicator bar of TEV partial discharge measurement interface; press the up and down key to adjust the gain; there are 0-3 option in total, and the battery indicator is displayed on the right side.

TEV pulse mode and gain option will appear on the upper indicator bar of TEV pulse counting measurement interface (the option cannot be adjusted on this interface), and the battery indicator is displayed on the right side.

AE sensor and battery indicator are displayed up the AE partial discharge measurement interface.

The elimination-interference prompt will appear in the State Bar when the elimination-interference function is opened.

The red rectangle-frame prompt will appear in Abnormal State when the external synchronization is selected. After the external synchronization is normal, the red indicator will disappear.

7.2 Partial-discharge indicating value

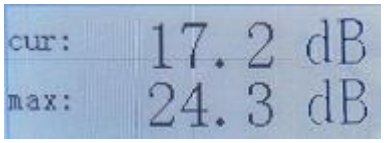


Fig. 7.2 partial-discharge indicating value

The current partial-discharge indicating value and the maximum partial-discharge indicating value are shown in the figure above.

7.3 Fingerprint atlas

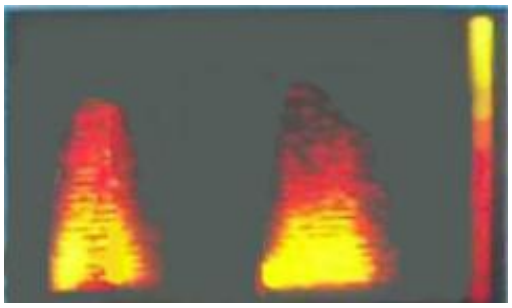


Fig. 7.3 Fingerprint atlas

The fingerprint reflects the value of 0~360° partial-discharge capacity. The upper limit of discharge capacity changes with the gain adjustment, and the red & yellow tapered ribbon on the right side indicates the range of partial-discharge capacity.

7.4 Historical trend chart

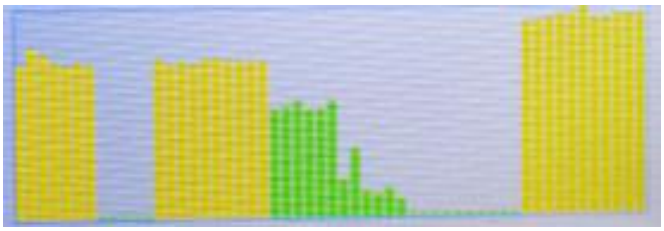


Fig. 7.4 Historical trend chart

The histogram is utilized to display the historical discharge records; each vertical column represents the historical discharge capacity; green represents normal, yellow represents the early warning and red represents warning.

7.5 Discharge capacity diagram

Fig. 7.5 Discharge capacity diagram

As shown in the figure, the diagram shows the current partial-discharge capacity level; green represents normal, yellow represents the early warning and red represents warning.

VI. Introduction of partial discharge measurement

The measurement method of HZJF-9008 handheld partial discharge detector is simple; the equipment needs no recalibration in actual measurement since the value has been calibrated before delivery; it only needs to select the appropriate test mode (TEV\AE) and measure directly with the built-in sensor.

1. TEV measurement:

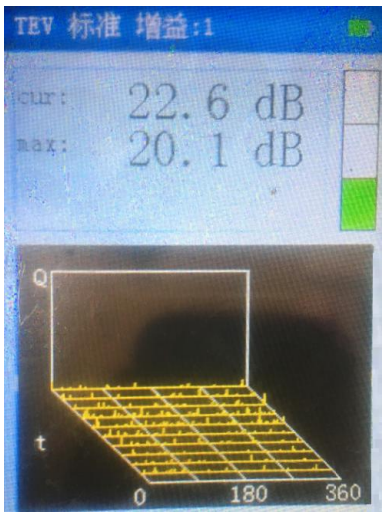
The host shall be perpendicular to the surface of the equipment being tested so that the front-end TEV sensor can place on the surface of high-voltage equipment, and then test different locations to observe the changes of data and waveform, then the recorded data can be read.

2. AE measurement:

The AE sensor at the front of host shall be aimed at the gap of the measured equipment and observe along the gap if the AE data and waveform changes, then read and record the data.

3. TEV external synchronization measurement:

External synchronization module can be added for testing when finding the suspicious discharge signals and further measurements are needed. And then check the synchronization of waveform and the Q- Φ -T diagram. The figure below shows the relation between the quantity of electricity, phase and time.



Select the external synchronization in parameter settings, and red rectangle-frame prompt will appear in the state indicator bar upside the equipment; then the external synchronization module shall be connected with the 220VAC of the same power of the measured equipment. Then the signal output end of the module is connected with the external synchronization interface of the main engine using the special signal line; the red prompt rectangle in the state indicator bar upside the equipment will disappear. The main engine shall be perpendicular to the surface of the equipment being tested so that the front-end TEV sensor can place on the surface of high-voltage equipment, and then test the suspicious discharge locations to observe the changes of data and waveform as well as Q-Φ-T diagram with cooperation of synchronous frequency regulation, and then further analysis and judgement are carried out to determine whether it is a discharge signal.

VII. Partial discharge configuration table of HZJF-9008 switch cabinet

No.	Name & Content	Quantity
1	HZJF-9008 handheld partial discharge Detector	1 set
2	HZJF-9008 handheld partial-discharge patrolling measurement instrument embedded software	1 set
3	HZJF-9008 External synchronization module and twin-core power line	1 set
4	Charger and twin-core power line	1 set
5	Outer synchronous connecting line	1 pc
6	TEV sensor	1 set
7	Partial-discharge ultrasonic sensor	1 set
8	Wiring	1 set
9	Protective housing	1
10	"Product Factory Materials"	1 set
11	"User Manual"	1