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GTPD-3

Ultrasonic Partial Discharge Tester

User Guide





WARNING

- Please carefully read the instrument operation instruction before using.
- Unplug the charger when cleaning, and scrub with a soft cloth dipped in a small amount o f water.
- For the user's safety and in case of the accident, it is recommended to use the recommended attachments by the manufacturer. When charging, please select the power prescribed by this specification.
- Avoid places of more dust, high humidity and high temperature to preserve the products.
- ☞It is forbidden to touch or operate the instrument with wet hand.
- The state of the s
- Avoid placing the instrument near flammable or explosive objects.
- Prevent the equipment from falling or being hit by external force.
- Don't let foreign body into the sensor of detector or the sensor be oppressed by external force.
- Don't press the screen hard, which may lead to the showing image unclear or screen damage.
- In low temperature environment, the start speed of the LCD screen is slower than in normal condition, and the LCD display color is not stable. When using the device in low temperature environment, firstly, please start it at normal temperature, when it runs normally, then operate it in low temperature condition.

1. Product overview

Partial discharge phenomena of the electrical equipment have different impacts on equipment itself and the power grid, seriously leading to equipment scrapped and grid collapse. So, it plays an essential role to monitor partial discharge of electrical equipment early, master the equipment running state accurately, eliminate the problems existing in the equipment timely and effectively for ensuring the safety of the equipment and the power grid itself.

There are many ways for electrical equipment PD test, such as pulse current method, DGA method, ultrasonic method, RIV method, optical method, radio frequency method and chemical method, etc. Each method has its own strong points, in comparison, ultrasonic method is simpler and more suitable for daily equipment spot inspection and timely mastering electrical equipment running state. The common PD faults of electrical equipment are corona, arc and tracking. Corona an early tracking will not generate heat, and the high temperature environment cover these phenomena, so they can not be detected by infrared thermal imager. But the phenomena will generate high heat, so the instrument can be used to test at a distance. Corona a serious tracking will generate both ultrasonic and high heat, therefore infrared and ultrasonic method can be used. When partial discharge happens in the equipment, it cannot be found with the infrared method, while it can be tested with GTPD-3 Ultrasonic PD Detector on the surface or interface of electrical equipment.

GTPD-3 Ultrasonic PD Detector is a detection device for diagnosing power line faults and hidden troubles by collecting abnormal ultrasonic signal in power lines and then through software analysis. It can judge hidden fault position and fault type without power cut. The device collects abnormal ultrasonic signal by ultrasonic detector (ultrasonic sensor), then transmit the signals to the host, diagnose the fault and hidden trouble type and severity level, and convert to audible sound signal and the output waveform. It can help inspectors accurately find out faults and hidden dangers, prevent malignant faults happening, avoid unnecessary power cut, increase the reliability of power supply, Improve the efficiency of inspection personnel, and reduce the labor intensity of inspection personnel.

2. Function features

- > Portable design, small size, light weight, and easy to carry, so that one person can operate.
- > High brightness laser transmitter can realize fault location.
- 3 mega-pixel high-definition camera can easily focus detection point of failure and take photos of tower identification and faulty equipment.
- Convert the abnormal ultrasonic signals detected by the instrument to audible sine signal and intuitive waveform, from which inspection personnel can clearly identify the discharge intensity.
- Embedded GPS receiver automatically stores the coordinate data and provides GPS navigation, which convenient for query and save detection path.
- With the function of testing temperature and humidity to test environmental temperature and humidity in real time.
- With data storage capability to realize data playback.
- > The display is color touchscreen which is convenient for detection personnel to test and use.
- > High sensitivity and directivity can accurately locate the line fault.
- Light weight, easy to carry, easy to operate make the test be carried out in a vehicle with a speed of 30km / h.
- Ultrasonic test can be applied to a noisy environment, which cannot be influenced by surrounding sound.
- No-contact test whose effective testing distance is up to 30 meters makes test safe and reliable.
- Live test does not affect the power grid's normal operation.
- The use of "HC-ADMIN " patrol background software can easily conduct data management and evaluation.

3.Technical parameters

System	WINCE6.0
CPU	Main frequency of 533MHz
Memory	RAM of 256MB DDR2, 1GB NandFlash
Screen	TFT true color touch screen of 4.3" , resolution of 480 * 272
Interface	SD memory card, USB, serial port, earphones
SD memory card	TF card of more than 8G
Camera	3 mega-pixels high-definition camera
Accessories	GPS, temperature /humidity measurement device, high brightness laser pointer
Storage function	GPS coordinate, time/date, temperature/humidity
Frequency range	20—150kHz
Sensor	40kHz x 1Ea
Working condition	-25℃ ~ 70℃
Relative humidity	0 - 95%
Charger	Input : 100-240V, 50/60Hz
specification	Output : voltage of 20V, current of 3.25A
Power supply	Battery power: lithium battery Working hours: about 8 hours Battery protection: LCD backlight will go dark, when there is no operation within 5 minutes. The instrument will automatically shutdown, when there is no operation within 20 minutes. When the battery power is less than 5%, system will beep hinting users to save data timely, then users need power it off and recharge.

4. Product composition

Name	Real photo	Function / Description
Host		Camera and laser detector can accurately locate the place to inspect. The instrument will receive ultrasonic signal (whose frequency ranges from 35 to 45kHz) in the air through the ultrasonic sensor and electrical circuits, and convert the received ultrasonic audio signal and oscillogram to audible sound and visual waveform file. The screen is color touchscreen, which can display information such as waveform, dB values, temperature, humidity and GPS.
Charger		Input: 100-240V, 50/60Hz Output: voltage: 20V current: 3.25A power: 65W Interface size : outer diameter is 5.5mm;inner diameter is 2.5mm
SD card		TF memory card of 8GB is provided to save ultrasonic signals and other data.
Tem& Hum sensor		Temperature and humidity sensor is provided to detect the surrounding temperature and humidity. Current environment temperature and humidity will show when the host is turned on.
earphones	State	High-performance soundproof stereophonic earphones are provided for detectors to easily listen to ultrasonic sound, avoiding the interference from outer sound.
Security seal box		Special and high-grade security seal box is provided to preserve the instrument.

Laptop (optional device)	0	High-end laptop is used for installing HC-ADMIN patrol background software to provide users with convenient management functions after testing.
Camera (optional device)		High-performance Digital Single Lens Reflex can be used to take pictures of fault spots and related positions for later filing and analysis.
Telescope (optional device)		A high magnification telescope can be used for detailed view of the fault locations.

5. Product structure



Structural position	Function / Description
Power switch	Startup & Shutdown
Earphones interface	Used for audio output.
SD card slot	Used to insert the SD memory card. The maximum capacity is 32 GB
RS232	A serial port used for debugging.
Min USB	USB1.1, used for debugging.
USB interface	USB1.1, used for connecting with external mouse, keyboard and so on.
Charge interface	Used for plugging the charger whose input voltage is 20VDC.
Charge indication	When the instrument is connected with the charge, yellow light indicates the
	battery is not fully charged, while green light means the battery is fully charged.
Battery	Supply power to equipment.
Comore	3 mega-pixels high-definition camera can realize manual adjustment of the
Camera	focus.
GPS	Used for receiving GPS signals.
	Used for measuring surrounding temperature and humidity. Current
Tem& Hum sensor	environment temperature and humidity will display after the host power up.
Volume +	Used for increasing the earphones' output volume.
Volume -	Used for reducing the earphones' output volume.
Photograph	To take photos of the fault position.
Data storage	To store the audible sound and intuitive waveform files.
Laser switch	Used to start and shut down the laser transmitter.
Signal receiver	Used for receiving outer ultrasonic signals.

6. operation methods

6.1 The main interface of boot



NO.	Function / Description
1	Number management : management catalogue to identify current storage data, pictures and playback data.
2	Showing current date and time.
3	Showing battery level, when the power is less than 5%, the system will beep hinting users power off and recharge.
4	Displaying area of the 3 mega-pixels high-definition camera which is used for fault location and image acquisition.
5	Data and waveform analysis area is used for displaying acoustic waveform, providing real-time ultrasonic signal intensity and displaying the maximum value. Red horizontal line is used to identify detection background. When signals are greater than the background, the instrument will output acoustic audio signal.
6	Used for setting main parameters for the system.
7	System volume control and detection background control
8	Showing data such as frequency, sensitivity, volume, temperature, humidity, distance, latitude and longitude.
9	Conducting playback, browse and analysis of the stored data.
10	Used to store acoustic wave files and related information.

11	To take pictures of the detection fault point.
12	To browse or delete the stored pictures.

6.2 System set

System set

key to enter system setting interface.

1) Number management

Press the



- Create number: used to create new management number, which is named in the rule of current date/time to guarantee the uniqueness.
- Set current number: select the management number in the list, setting it as the current management number, then add, play back or analyze data.
- Del number: eliminate the selected management number.
- The measurement distance of the current management number can be set by pressing "



2) Date / time

Number manage	Date/Time	Data storage	GPS navigation
GPS mode	+ + +		
201	4Y 07M 200	D 15H 44N	1in 025
Manual mode	-		-
Data export	Screen calibration	Factory reset	Back

- When GPS mode is selected, the GPS will automatically enter time calibration mode.
 - When the manual mode is selected, the date and time can be set by adjusting the "



- The data storage waiting time can be set by " and " button, and the default value is 10s.
- The data storage time can be set by "" and "" button, and the default value is 1min.
- 4) GPS navigation

	Number manage	Date/Time	Data storage	GPS navigation		A DEST OFFICE ADDRESS
		Start GPS	navigation			Careland 後 成 方 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 前 版 一 新 版 新 新 版 一 新 版 新 新 版 新 新 版 新 新 版 新 新 版 新 新 版 新 新 新 新 新 新 新 新 新 新 新 新 新
						导航快乐生活
*	Data export	Screen calibration	Factory reset	Back	S	凯立德移动导航系统C-PND版

navigation" is selected, it enters the GPS navigation state, which is similar to the navigation

function in daily use.

5) Data export

Date/Time	Data storage	navigation
SD>U	SB Copy	
SD>U	SB Move	
Screen calibration	Factory reset	Back
	SD>U SD>U SD>U Screen calibration	SD>USB Copy SD>USB Move Screen calibration Factory reset

- Select the option of SD-->USB Copy to copy the files in SD card to the USB memory.
- Select the option of SD-->USB Move to move the files in SD card to the USB memory.
- 6) Screen calibration

Number manage	Date/Time	Data storage	GPS navigation
	Stylus ca	libration	
	Screen		
Data export	calibration	Factory reset	Back

- Click the "Stylus calibration" and enter the state of touch screen calibration to finish the calibration work.
- 7) Factory reset

Number manage	Date/Time	Data storage	GPS navigation
	Restore fa	ctory settings	
	Software v	ersion: 1.1	.7.0
Data export	Screen calibration	Factory reset	Back

- When you click the option of "Restore factory settings", all settings can be set to the default factory configuration.
- 8) BACK

 When the option of "BACK" is pressed, the instrument will exit the function menu interface and return to the initial interface.

6.3 Background control

Click the "^{BG} " key to enter the background control interface.

"Background" is the background noise of the detection environment, which can be set according to the site environment. When volume is over the background noise, the audio will output different levels of audio signal according to ultrasonic signal intensity.

The system volume level can be set by "

6.4 General Information



Click "^{General}" to enter the interface of general information.

The default frequency is 40kHz; the default sensitivity value is 120dB; the volume can be adjusted by volume control key; temperature and

humidity can be automatically detected; the default detection distance is 10M, which can be set by "System set" \longrightarrow "Number manage"; Latitude and longitude can be automatically detected.

6.5 Data playback



Click "playback" to enter the data playback interface.

File list area: showing all stored files and deleting the files;

Waveform play bar: playing the recorded waveform and with the function such as play,

pause and stop.

Information display area: showing the selected file content.

When the " ' key is clicked, it returns to the initial interface.

6.6 Data storage



When unusual ultrasonic signal is checked and its data need to be stored, press "storage" key or the " the " button, then it turns to " turns to " turns". Wave display area will show the storage waiting countdown, then enter the storage state, meanwhile the wave display area will display the storing time, and is accompanied by alternately flashing yellow and red logo. When the storage key returns to "Data storage", it means the storage finishes, then next storage is ready. During the storage, it can be manually stopped by clicking "Stop" key.

Data

6.7 Photograph

The "photo" key or the "COO" button can be pressed to photograph and record the fault spots.

6.8 Photo preview



The "Wey can be clicked to enter photo preview interface.

Preview operation on the photos is allowable in this interface, at the same time the useless

photos can be deleted.

7. Field testing process

Inspectors who carry GTPD-3 Ultrasonic PD Detector, a live detection device, can walk or drive along the testing lines. The process is as follows:



8. GTPD-3 software

software overview

Inspection data can be exported to the PC via SD card or USB disk, etc., thus completing the creation of user reports. Report generation requirements for PCs: System: XP system or WIN7 system.

Software: Microsoft Word2003, Word2007 or Word2010 should be installed.

operation steps

Line name		Report date	2021/ 3/ 3	Testing staff			
record							
Tower No.							
Diagnostic advice			_				
Tower No. picture			Browse				
Entirety picture			Browse				
equipment picture			Browse				
Acoustic data file			Browse				
Acoustic data file			Browse				Add record
Acoustic data file			Browse				Add record
Acoustic data file Test Info File Id Record Seria Tower N	o. Diagnostic	: advice	Browse Browse Tower No. picture	Entirety picture	Faulty equipment picture	Acoustic data file	Add record Test Info File
Acoustic data file Test Info File td Record Seria Tower N	o. Diagnostic	: advice	Browse Browse Tower No. picture	Entirety picture	Faulty equipment picture	Acoustic data file	Add record Test Info File
Acoustic data file Test Info File d Record Seria Tower N	o. Diagnostic	: advice	Browse Browse Tower No. picture	Entirety picture	Faulty equipment picture	Acoustic data file	Add record
Acoustic data file	o. Diagnostic	: advice	Browse Browse	Entirety picture	Faulty equipment picture	Acoustic data file	Add record Test Info File
Acoustic data file	o. Diagnostic	c advice	Browse Browse	Entirety picture	Faulty equipment picture	Acoustic data file	Add record Test Info File

Run the software PDDR-2000 and enter the main interface of the system

Figure 2-1 Main interface

The software consists of three main parts: basic information, add record and added record. Basic information

The basic information mainly includes the line name, the report date, and the testing staff.

Line name Report date 2021/ 3/ 3 Testing staff

Figure 2-2 Basic infographic

• Add record

For each test record to be added contains pole tower number, diagnostic advice, Tower number picture, Entirety picture, Faulty equipment picture, Acoustic data file, Test information file.

添加记录				2 2
杆塔编号	52号		dB -	检测时间:2016.01.08 10:04:07 频率(kHz):40 同時時(dD):120
诊断建议	无放电		56-	元敬度(db):120 距离(M):10 温度(°C):24
电杆编号照片	C:\Users\Administrator\Desktop\20160108100221\Picture\20140818162023.jpg	浏览	37-	湿度(%):79 经度:110.042381
整体照片	C:\Users\Administrator\Desktop\20160108100221\Picture\t01492937083526e5a9.jpg	浏览		纬度:19.5/11/1 最大值(dB):12 亚均值(dB):11
不良设备照片	لاس C:\Users\Administrator\Desktop\20160108100221\Picture\20160108100402.jpg	浏览	18	
声波数据文件	C:\Users\Administrator\Desktop\20160108100221\Data\20160108100407.dat	浏览	0-	
检测信息文件	C:\Users\Administrator\Desktop\20160108100221\File\20160108100407.bxt	浏览	最大 12 dB	添加记录

Add record			
Tower No.			
Diagnostic advice			
Tower No. picture	rowse		
Entirety picture	rowse		
Faulty equipment picture	rowse		
Acoustic data file	rowse		
Test Info File	rowse		Add record



When adding the Acoustic data file the interface will display the sonic chart, and when adding the test information file the interface will also display the current information content.

Click the button 'Add record' to finish.

• Added record

All currently added records are saved in the added records list. and take relative actions on the record selected.

3	杆塔编号	诊断建议	电杆编号照片	整体照片	不良设备照片	声波数据文件	检测信息文件
1	52号	无放电	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk.
2	30号	正常,无放电	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk	C:\Users\Administrator\Desk.
				m			•
ed Record				U)	全选	<u><u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u><u></u></u></u>	●●除 生成报告
ed Record Seria	Tower No.	Diagnostic advice	Tower No. picture	m.	全选 Faulty equipment picture	反注 Acoustic data file	, 聯除 生成报告 Test Info File
ed Record Seria	Tower No.	Diagnostic advice	Tower No. picture	m Entirety picture	全选 Faulty equipment picture	反选 Acoustic data file	, 瞬隙注 生成报告 Test Info File
ed Record Seria 1 2	Tower No. 1 111	Diagnostic advice 111 1111	Tower No. picture	" Entrety picture	全选 Faulty equipment picture	反进 Acoustic data file	, 删除 生成报告 Test Info File
ed Record Seria 1 2	Tower No. 1 111	Diagnostic advice 111 1111	Tower No. picture	III	全选 Faulty equipment picture	反选 Acoustic data file	, 删除 Test Info File
ed Record Seria 1 2	Tower No. 1 111	Diagnostic advice 111 1111	Tower No. picture	" Entirety picture	全选 Faulty equipment picture	反进 Acoustic data file	, 勝略 生成报告 Test Info File

Figure 2-4 added records

Select All: Select all records.

Select Invert: Select the record that is opposite to the currently selection

Delete: Delete the currently selected record.

Generate Report: The selected record generates a report in Word document.

During the process of generating a report, the progress bar shows the progress of generating the report. The following prompt appears after the report is generated. Click Y to open the generated Word document. Clicking on the N to exit to the main interface.

完成	Complete	X
完成报告,是否查看报告?	Report completed, do you want to view the report?	
是(Y) 否(N)	[是(Y) 否(N)	

Figure 2-5 Report generated prompt

The report generated.(sample)





9. After-sale Service

This instrument is provided with free repairing and replacement in case of quality issues within 1 year since the date of purchase, also with life-long maintenance and technical service. If abnormal condition or malfunction is found, please contact us timely so that we can provide you

the most convenient solution.

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