PDProbe Plus

Handheld Partial Discharge Detector

User Manual

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Contents:

Warning

Partial Discharge measurement is carried under high voltage environment.Therefore, all measuring operation must be performed within a safetydistance in order to avoid any possibility of electric shock.

All tests must be carried in accordance with safety rules, and done by field professionals.

If the safety rules are not followed, the partial discharge measurement may lead to fatal man-made accidents and equipment accidents.

- Excessive use of headphones for a long time may cause hearing damage.
- Do not disassemble or damage the battery parts of the product or use it in a damaged state.
- When repairing or upgrading the product, please back up important data stored in the product to a personal computer or storage device in advance or make a record. The main content or settings stored in the product may be deleted. The manufacturer is not responsible for any damage caused by data loss.
- Do not drop the product on the floor or apply severe impacts, which may cause personal injury or risk of damage.
- If the LCD of the product is broken, please be careful not to get cut or injured, and immediately contact the dealer for assistance.
- Do not allow foreign objects to enter the charging terminal or external connection terminal. Foreign objects may cause a short circuit or catch fire.
- Lithium-ion batteries are dangerous parts that may cause personal injury. Please use the original factory battery and charging accessories.
- Charging in a humid environment or when the charging terminal is wet may cause electric shock, burns, short circuit, fire, or equipment damage.

FEDERAL COMMUNICATIONS COMMISSION INTERFERENCE STATEMENT:

- NOTE: This equipment has been tested and found to comply with the limits for a Class A digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference when the equipment is operated in a commercial environment. This equipment generates, uses, and can radiate radio frequency energy and, if not installed and used in accordance with the instruction manual, may cause harmful interference to radio communications. Operation of this equipment in a residential area is likely to cause harmful interference in which case the user will be required to correct the interference at his own expense.

CAUTION:

- Any changes or modifications not expressly approved by the grantee of this device could void the user's authority to operate the equipment.

RF Exposure warning:

- This equipment must be installed and operated in accordance with provided instructions and the antenna(s) used for this transmitter must be installed to provide a separation distance of at least 20 cm from all persons and must not be co-located or operating in conjunction with any other antenna or transmitter. End-users and installers must be provide with antenna installation instructions and transmitter operating conditions for satisfying RF exposure compliance.

1 Device Overview

PDProbe is a hand-held partial discharge analyzer tailored for field partial discharge detection and measurement, and is a partial discharge field test equipment designed according to the IEC TS 62478 content specification. And has a special algorithm to determine the measured signal category according to the signal trend and map. PDProbe has the following characteristics:

Equipped with both electromagnetic and sound wave measurement channels.

It can be used with electromagnetic sensor or sound wave sensor to do the measurement of signal.

It can be used for partial discharge signal measurement, recording, monitoring, analysis and output.

Can display the discharge level , discharge phase mode, repetition rate, discharge identification... and other functions.

Comes with the synchronous frequency signal transmitter for pairing to the system voltage

The handheld unit does not need to be connected to the working power supply.

2D/3D PRPD, PRPS multiple display mode.

Built-in high-pass filter.

Universal Micro USB charging/charging connection outlet, providing charging and data download capability.

2 Product configuration

PDProbe

TX Synchronizer

Pulse Generator

UHF TM Sensor

HFCT

TEV Sensor

Eelectrical Sensor

Ultrasonic sensor
(Airborne)

Ultrasonic sensor
w/ Parabolic Disk

AE sensor

Acoustic sensor

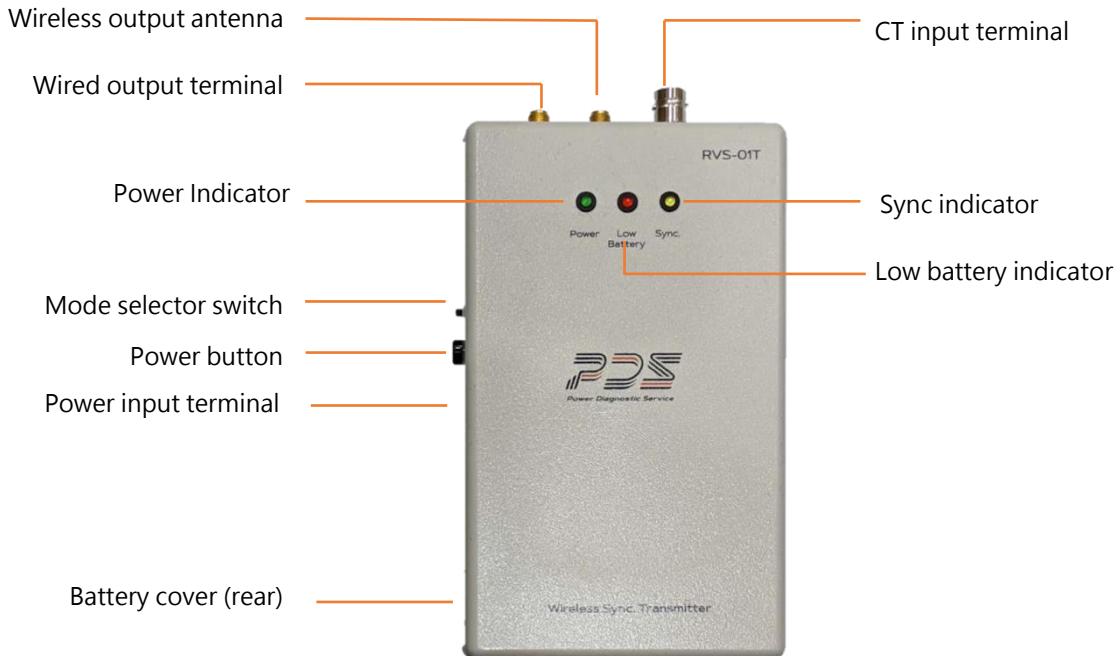
Coaxial Cable

Charging Stand
USB cable

Tolley & Protable
Hard Case

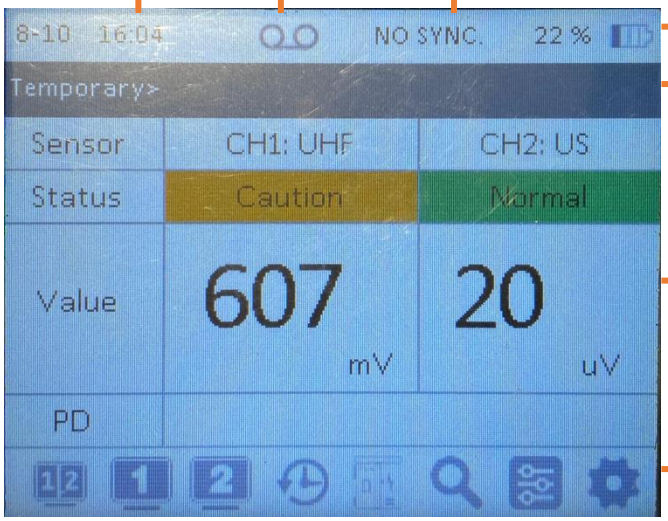
3 PDProbe External View

PDProbe



TX Synchronizer

4 Screen functions description



Current date and time

Data storing indicator

- Phase synchronizer indication (page 21)
- SYNC : Connected
- NO SYNC: Unconnected

Battery level indicator

Site and facility name

Partial discharge measurement value
(Refer to each function)

Menu icon

Back to the home display (page 8)

Switch to dual PRPD display (page 9)

Switch to CH1 PRPD display (page 10)

Switch to CH2 PRPD display (page 12)

Switch to PRPD display

Switch to PRPS display (page 11)

Switch to waveform display (page 13)

View stored data

Return to previous page

Delete the data displayed on the screen

Site/facility selection (page 18)

Retrieve stored data (page 19)

Settings (page 19)

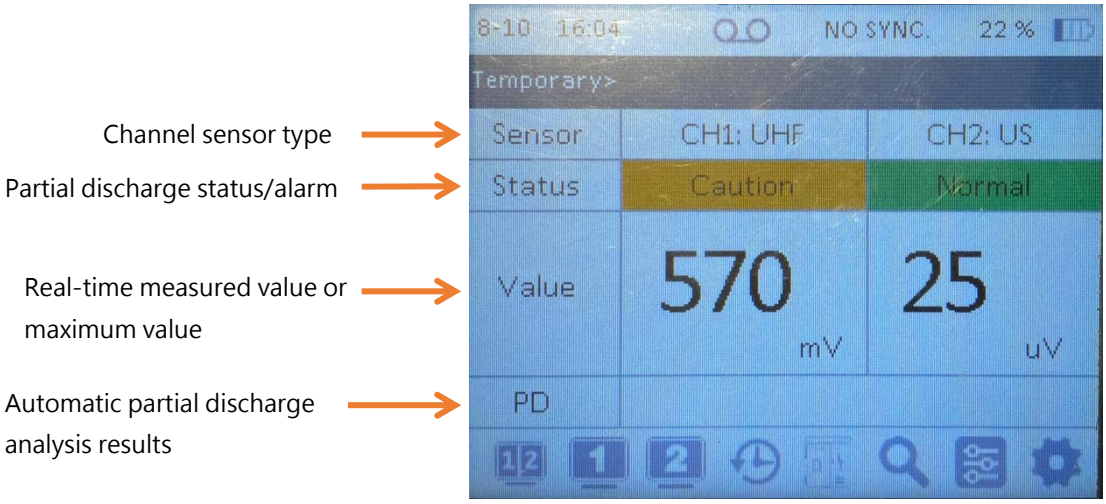
Control (page 19)

5 Home screen

✧ Functions

- CH1, CH2 real-time measurement value or maximum measurement value display
- Alarm level, displaying the results of partial discharge automatic analysis

✧ Display



• Buttons and icons

	Press the button to start saving the current measured value showing the recording state is ON **Setting**>**Max Rec Time**, automatically stop saving after setting time Press the button again in the record display state to manually stop storing The stored measurement values can be viewed on the history display
1 2	Switch to **dual channel PRPD** display (page 10)
1	Switch to **CH1 PRPD** display (page 10)
2	Switch to **CH2 PRPD** display (page 12)
	Switch to **history** display (page 14)
	Site/facility selection

✧ Remark

When the maximum hold mode (Max Hold) is turned off in the setting, the measured value displays the real-time value.

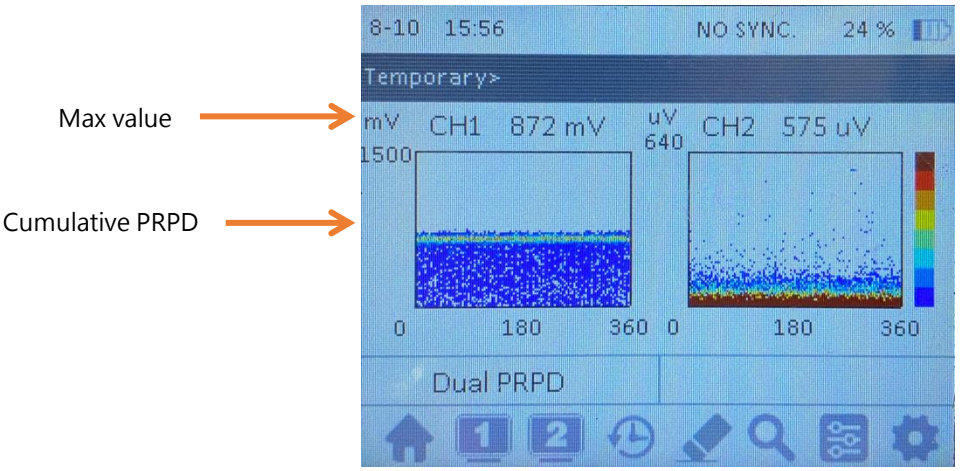
When the maximum hold mode (Max Hold) in the setting is ON, the measured value displays the maximum measured value.

6 Dual-channel PRPD display

✧ Functions

- Simultaneously display the PRPD of channel 1 and channel 2 in real time.
- PRPD cumulative display (Select this icon to clear accumulated PRPD)
- Measured value, showing the result of partial discharge automatic analysis.

✧ Display



- **Buttons and icons**

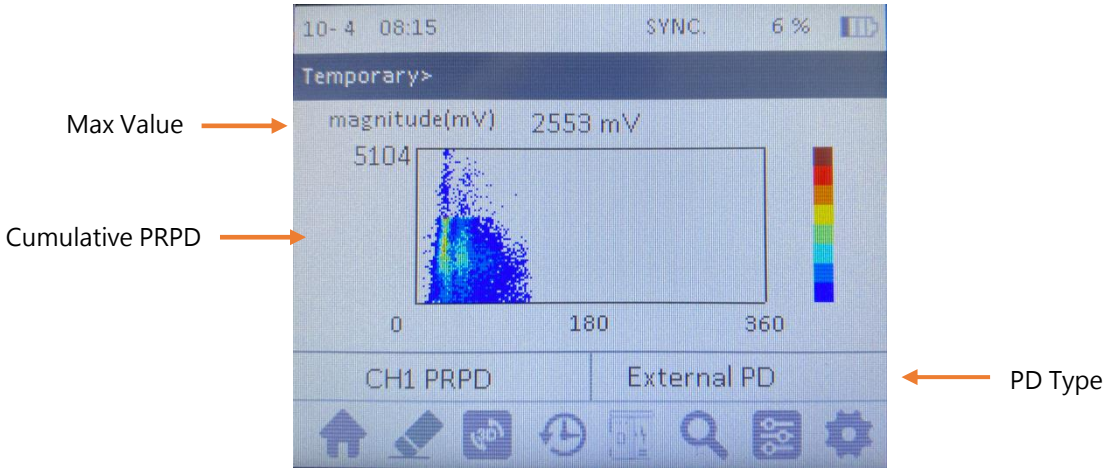
	Press the button to save the current display picture showing the recording state is ON
	Back to the home display (page 8)
	Switch to CH1 PRPD display (page 10)
	Switch to CH2 PRPD display (page 12)
	Switch to the save screen (page 16)
	Erase cumulative PRPD

7 Channel 1 PRPD display

- **Functions**

- Channel 1 real-time PRPD display
- PRPD cumulative display ( Select this icon to clear accumulated PRPD)
- PD type, showing the results of partial discharge analysis (Note: 3 mins recorded length at least for PD type idenfication)

✧ Display



✧ Buttons and icons

	Press the button to save the current display picture showing the recording state is ON
	Back to the home **display** (page 8)
	Switch to CH1 PRPS display (page 11)
	Switch to the save screen (page 16)
	Site/facility selection
	Erase cumulative PRPD

8 Channel 1 PRPS display

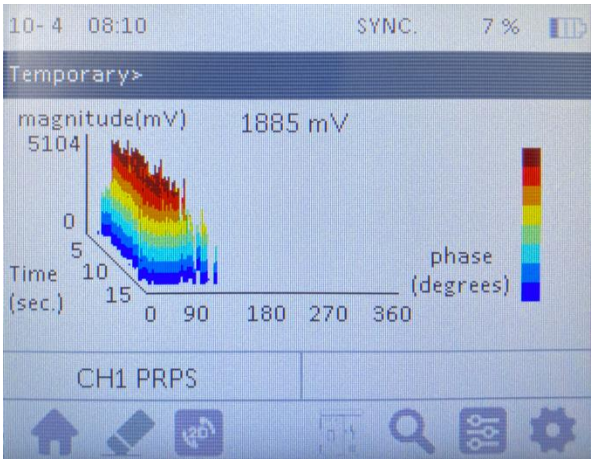
✧ Function

- Channel 1 real-time PRPS display

✧ Dispaly

Real-time measurement

Real-time PRPS



- **Buttons and icons**

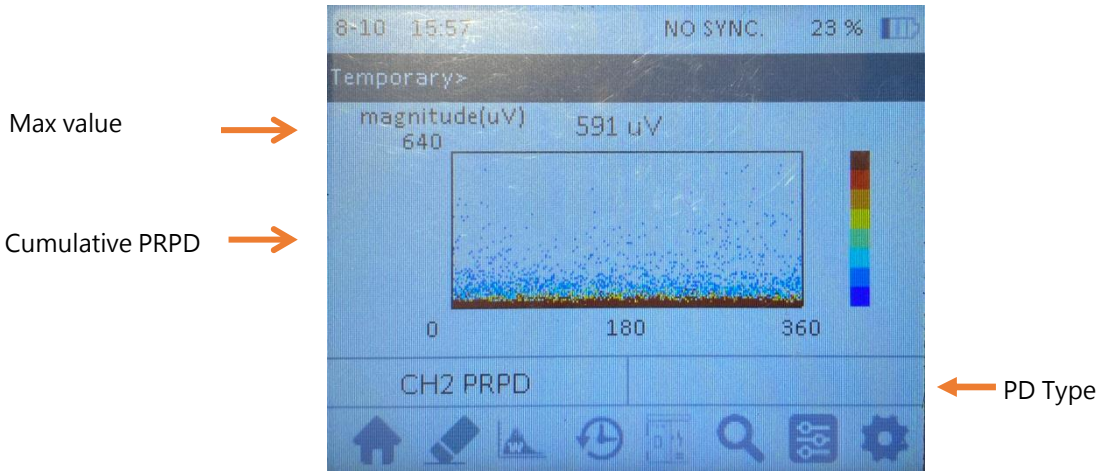
	Back to the home **display** (page 8)
	Switch to the PRPD display of CH1 (page 10)
	Erase PRPS
	Site/facility selection

9 Channel 2 PRPD display

✧ Functions

- Channel 2 real-time PRPD display
- PRPD cumulative display (Select this icon to clear accumulated PRPD)
- PD type, showing the results of partial discharge analysis

✧ Display



- **Buttons and icons**

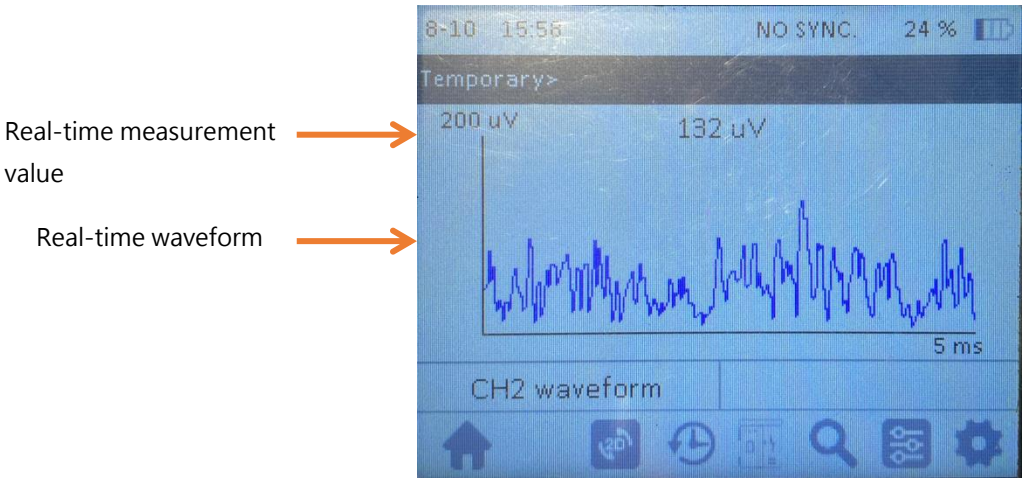
	Press the button to save the current display picture showing the recording state is ON
	Back to the home **display** (page 8)
	Return to the CH2 waveform display screen (page 13)
	Switch to the save screen (page 16)
	Site/facility selection
	Erase cumulative PRPD

10 Channel 2 waveform display

- **Function**

- Display the real-time waveform or maximum waveform of channel 2.

- **Display**



- **Buttons and icons**

	Press the button to save the current display picture showing the recording state is ON
	Back to the home **display** (page 8)
	Switch to CH2 PRPD display (page 12)
	Switch to the save screen (page 17)
	Site/facility selection

- **Remark**

If the maximum hold mode (Max Hold) is OFF in the setting, the measured value displays the real-time waveform.

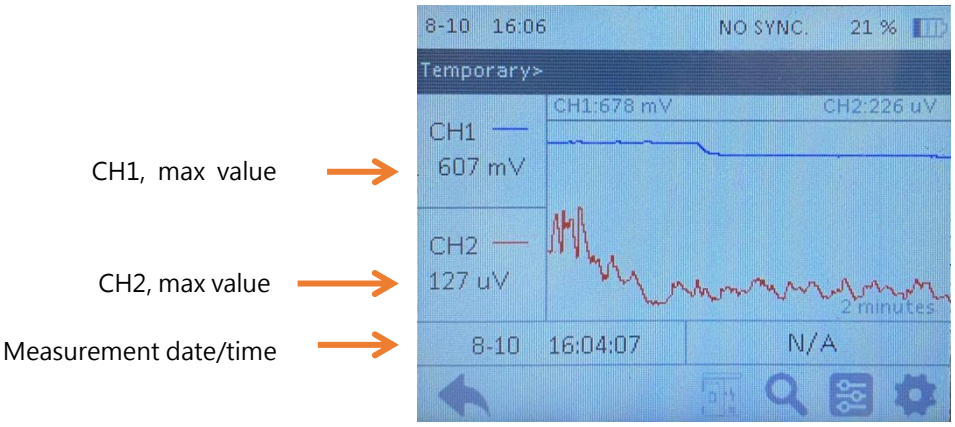
If the maximum hold mode (Max Hold) in the setting is ON, the measured value displays the maximum waveform.

11 Dual channel history record display

- **Functions**

- Graphically display the stored values of channel 1 and channel 2
- Horizontal axis: time
- Vertical axis: signal amplitude
- Measure date/time

- **Display**



- **Buttons and icons**

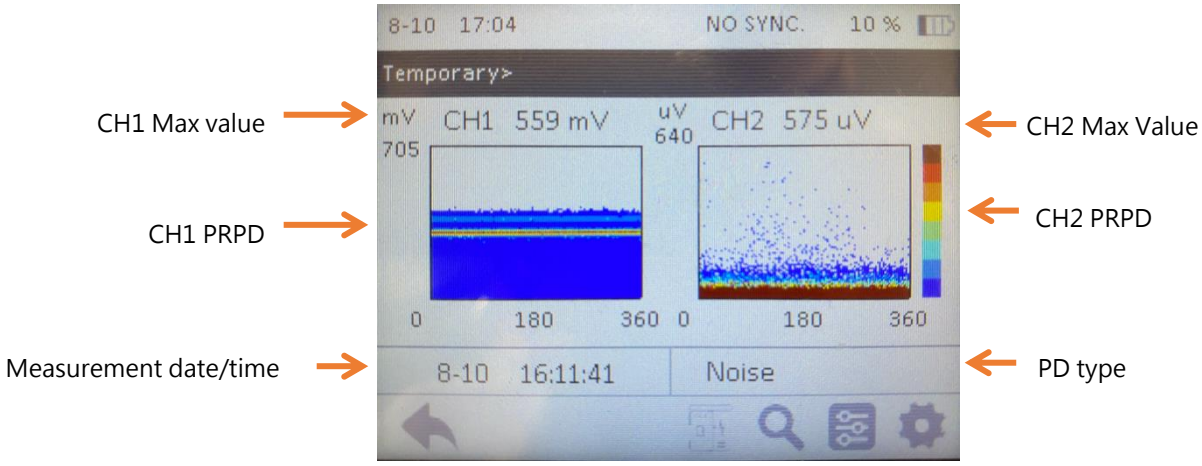
	Back to the home **display** (page 8)
	Site/facility selection
	View the previous stored data value
	View the next stored data value

12 Dual PRPD storage display

- ## Function

- Display the stored PRPD of channel 1 and channel 2
    - Measurement date/time.
- PD type, showing the results of partial discharge analysis (Note: 3 mins recorded length at least for PD type idenfication)

- ## Display



- ## Buttons and icons

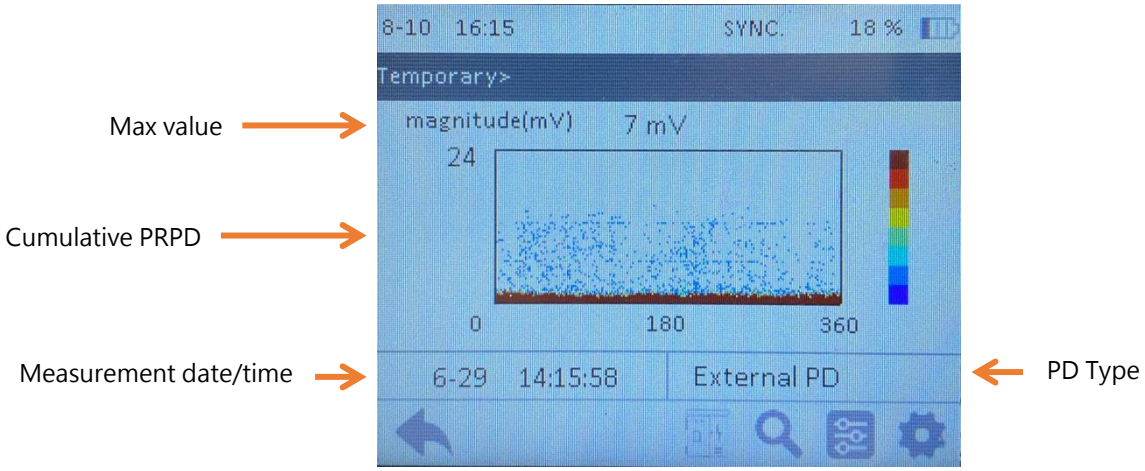
	Return to dual channel PRPD display (page 9)
	Site/facility selection
	View the previous stored data value
	View the next stored data value

13 PRPD storage display

- ## Functions

- Display the stored PRPD of channel 1 or channel 2
  - Measurement date/time
- PD type, showing the results of partial discharge analysis (Note:3 mins recorded length at least for PD type idenfication).

- ## Display



- ## Buttons and icons

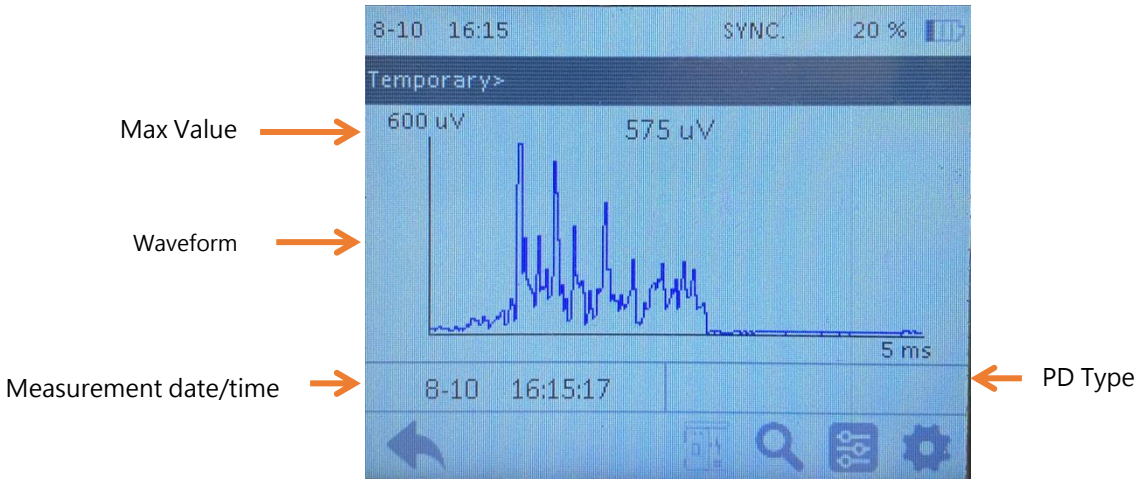
	Return to the previous display (page 10 or 12)
	Site/facility selection
	View the previous stored data value
	View the next stored data value

14 Channel 2 waveform storage display

- ## Functions

- Display the stored waveform of channel 2
- Measurement date/time
- PD type, showing the results of partial discharge analysis.

- ## Display



- ## Buttons and icons

	Return to channel 2 waveform display (page 13)
	Site/facility selection
	View the previous stored data value
	View the next stored data value

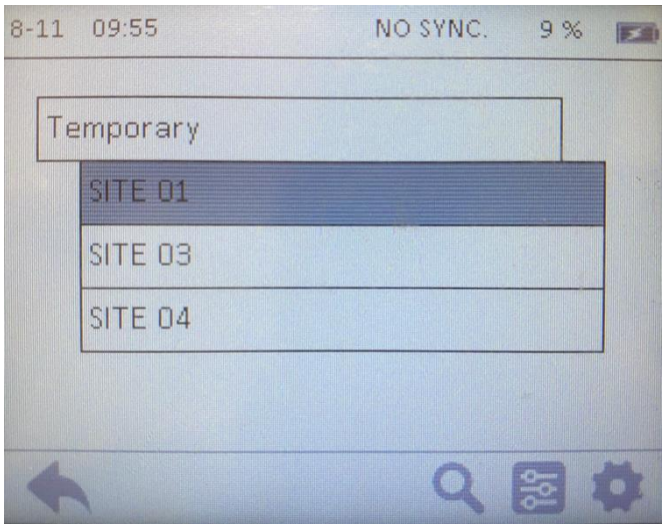
15 Installation Field/Device selection display

- Function

-  ,Select the record folder built by PDProbe SW (PDReporter) or NFC.

- Display

Select or build folder for data recording

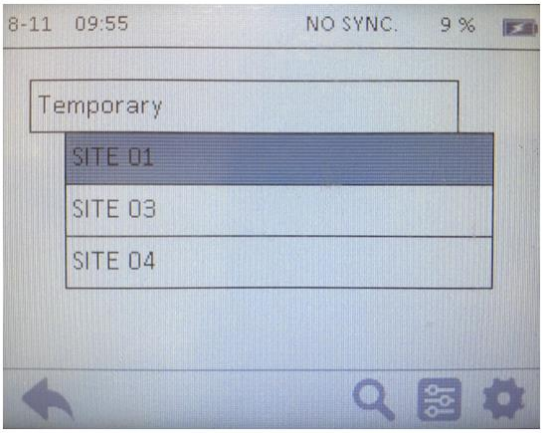


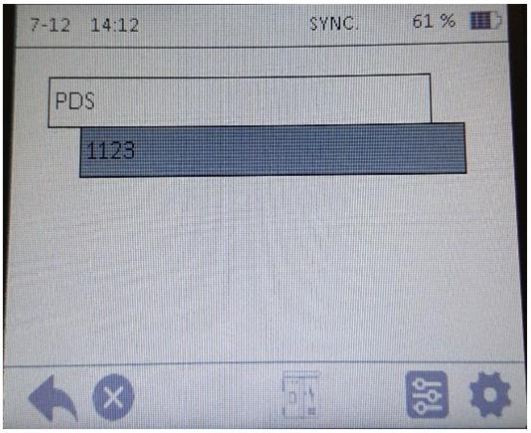
- Buttons and icons

	Return to upper folder or main page
	View the previous stored data value
	View the next stored data value

16 Stored data retrieval display

- ## Function
  - Retrieve or delete stored data
- ## Display



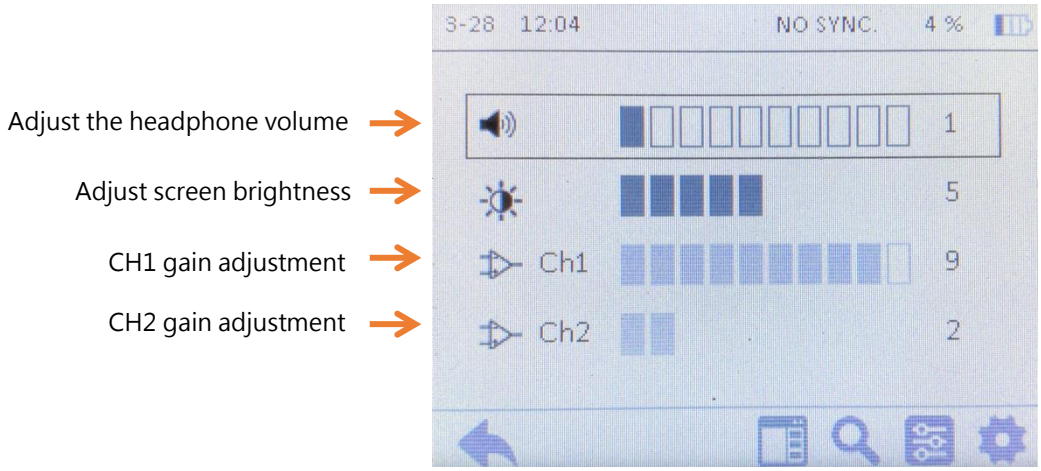


- ### Buttons and icons

	Date/List	Stored Data List
	Open the list of saved data on the selected date	Switch to the view screen of the selected data
	Select the item above the currently selected item	
	Select the item below the currently selected item	
	Return to the previous display	
	Delete all data of the selected date	Delete selected data

17 Screen display settings

- Display



- Buttons and icons

	Select the item above the currently selected item
	Select the item below the currently selected item
	Decrease the value of the currently selected item
	Increase the value of the currently selected item
	Return to the previous display

- Gain adjustment

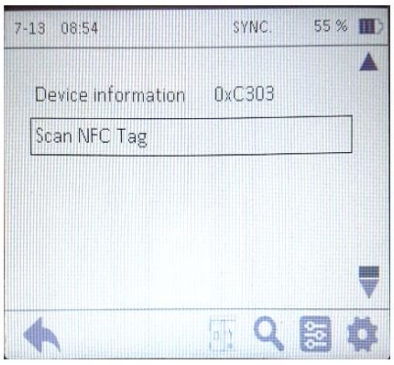
It can be set only when the gain is adjusted to manual during setting

PRPD, PRPS -Set the maximum signal size that can be displayed in the graph

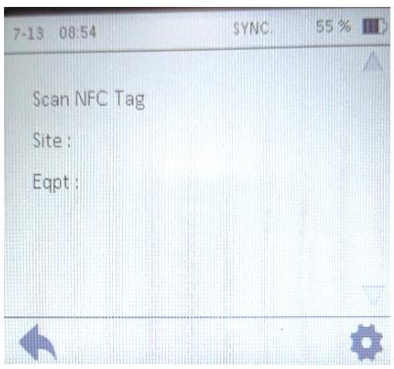
增益	CH1	CH2
1	2,913 mV	66dB (Low)
2	1,576 mV	76dB (High)
3	756 mV	-
4	382 mV	-
5	89 mV	-
6	94 mV	-
7	46 mV	-
8	26 mV	-
9	12 mV	-
10	6 mV	-

18 NFC function operation

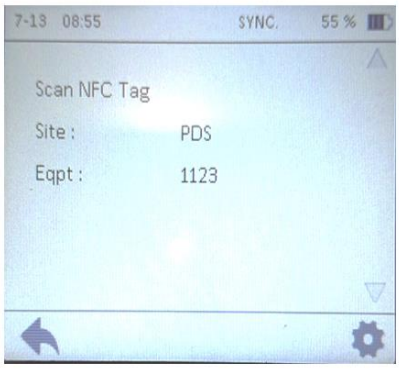
- Function
  - Scan NFC Tag to quickly build a list
- Display



Scan NFC tag function



Scan mode



Scan utility tag for site information

- **Buttons and icons**

	In the "Settings" list, move the cursor to the desired main item list to set the detailed item
	Return to upper folder or main page Return to the main menu without saving the modified value

- **NFC Tag Instructions**

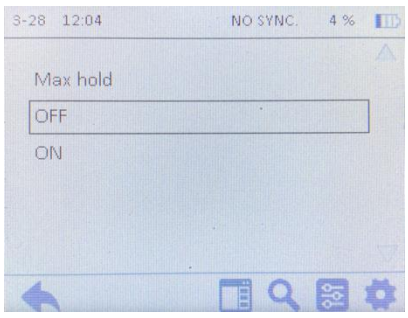
NFC type: NTAG213 (Type 2)

NFC writing format : site_equipment, with a limit of 10 English and numeric characters before and after "_"; for example: PDS_1123

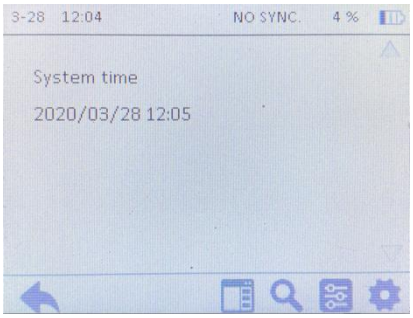
19 Measurement setting display

✧ Display

Setting item list



Detailed setting display
(Select from the list)



Editable Input details setting display
(Enter the value directly)

• Buttons and icons

	In the "Settings" list, move the cursor to the desired main item list for detailed settings Display of selected details: • Use the cursor to select a setting item from the list, then directly return to the main list after completion • Item detail setting method : ✓ Enter value modification mode (cursor appears) ✓ Save the modified value and exit the modified value mode
	Up options Value change: increase the value where the cursor is located
	Down options Value change: reduce the value where the cursor is located
	Cursor to the right
	Cursor to the left
	Return to the previous display Return to main menu Return to the main menu without saving the modified value

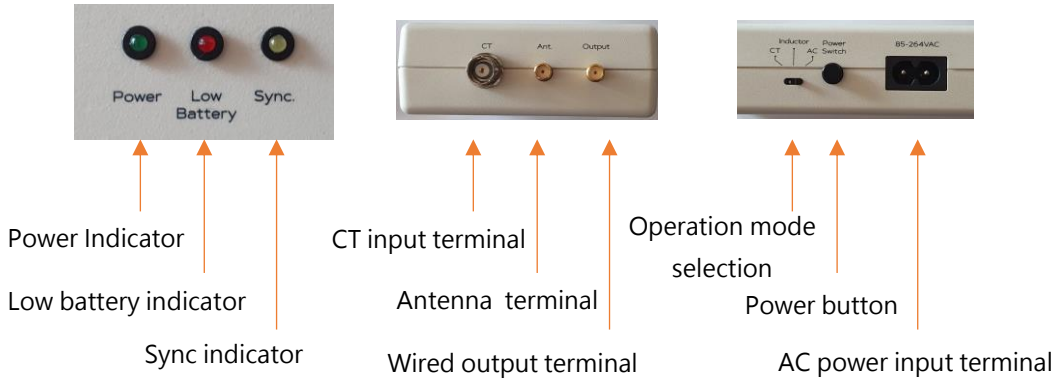
- **Setting Item**

Item	Function	Option
CH1 Sensor	Select the sensor type connected to channel 1.	UHF HFCT TEV
CH1 Filter	Select the measurement frequency of channel 1.	1. 10 ~ 1,500 MHz 2. 50 ~ 1,500 MHz 3. 150 ~ 1,500 MHz 4. 300 ~ 1,500 MHz
CH2 Sensor	Select the sensor type connected to channel 2.	US （UltraSound） AE （Acoustic Emission）
Max Hold	If this value is ON, the measured value will remain at the maximum value.	ON OFF
Alarm Threshold	• Set the alarm threshold according to the measured voltage value of the sensor. • **2-stage setting**, warning and alarm threshold can be set for each channel. • If the measured value of channel 1 is greater than or equal to the set value of "**CH1 Warning**", channel 1 will send out a "Warning" alarm. • If the measured value of channel 1 is greater than or equal to the set value of "**CH1 Alarm**", channel 1 will send out an "Alarm" signal. • If the measured value of channel 2 is greater than or equal to the set value of "**CH2 Warning**", channel 2 will send out a "Warning" alarm. • If the measured value of channel 2 is greater than or equal to the set value of "**CH2 Alarm**", channel 2 will send out an "Alarm" signal.	CH1 Alarm: ~ 999 mV CH1 Warning: ~ 999 mV CH2 Alarm: ~ 999 uV CH2 Warning: ~ 999 uV
Time constant	Set the sampling period as fast or slow.	FAST SLOW
Gain adjustment	• If this value is "Auto", the vertical axis scaling of PRPD and PRPS graphics will be automatically scaled according to the measured value. • If the value is "Manual", the ratio of the vertical axis of the PRPD and PRPS graphics is determined by the gain setting in the control item display (page 19).	Auto Manual

Item	Function	Option
Max recording time	Maximum recording time.	~ 600 Sec
Date/Time	Set the date and time of the device.	
Delete all history record	Delete all data stored on the device.	
Unit	Set the display measurement unit.	mV / uV dBmV / dBuV
Reference Frequency	Set the frequency in the target electrical device.	50 Hz 60 Hz
Button volume	Turn button sound on or off.	ON OFF
Acoustic trigger	Set the trigger voltage of channel 2 acoustic waveform.	2 uV 4 uV 6 uV 8 uV
Waveform time reference	Set the recording time length of the channel 2 waveform.	~ 10 ms
Device information	Regarding the device version.	

20 Synchronous frequency signal transmitter

- External View



- Working principle

AC Power	85 - 264 VAC or 6LF22 9V Battery	
Operation mode selection	AC Mode	• Acquire synchronization signal from AC power
	CT Mode	• Install the CT on the target device and connect it to the CT input terminal • Get synchronization signal from CT induced current
	Inductor Mode	• Put the phase synchronizer as close as possible to the target device • Obtain the synchronization signal from the electric field generated by the target device
Sync signal transmission method	• The synchronization signal is transmitted wirelessly through the antenna connected to the wireless output terminal • Wired synchronous signal transmission through a cable connected to the wired output terminal	
Start, Stop	Power button	
Status indicator	Power	When the power button is pressed, it is turned off
	Low Battery	When this indicator light is on, you must replace the battery or supply AC power
	Sync	• OFF：No sync • Flashing：Acquiring sync signal • ON：Sync state

21 PDProbe specifications

Item	Value
Main body	
Sensor channel	2 BNC terminals
Channel 1 measurement range	10 MHz – 1,500 MHz
Channel 2 Ultrasonic (US) sensor measurement range	40 ± 2 kHz
Channel 2 Acoustic Emission (AE) sensor measurement range	150 ± 2 kHz
Touch screen	3.5 inches/color
Button	Power, input, up, down, left, right
USB port	1 Micro-USB (PC connection, charging)
Battery	Lithium ion secondary battery 6600 mAh
IP class	IP54
Operating temperature	5 °C ~ 55 °C
Operating humidity	Relative humidity is 90%
Dimension	92 x 712 x 39 mm （連接器， 不包括保護蓋）
TX synchronizer	
Connection	Wireless
Battery	6LF22 9V x1
Simulated signal generator	
battery	AA x2