

SCM-PDSW-HFCT

Cable Partial Discharge Monitoring

User Manual



Version: 1.10

Revision: 2025.07

Read me

When you use HFCT partial discharge monitoring, be sure to read this user manual carefully, and be able to fully understand the implications, the correct guidance of operations in accordance with user manual, which will help you make better use of HFCT partial discharge monitoring, and help to solve the various problems at the scene.

1. Always keep safe distance between the high voltage part and the instrument, probe and operator.
2. Measurements must not be taken when thunderstorms are nearby.
3. Do not operate the instrument or accessories in explosive atmospheres.
4. After the battery alarm of the instrument, please turn off the power to charge.
5. Do not open the instrument without permission, this will affect the warranty of the product. The factory is not responsible for self-disassembly.
6. When the instrument is transported, it should avoid rain erosion and prevent collision and falling.
7. When storing and keeping the instrument, attention should be paid to the ambient temperature and humidity, and it should be protected from dust, moisture, shock, acid, and corrosive gas.



- **Please read this user manual carefully**
- **Please save this document**

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1.- SUMMARIZE

The HFCT partial discharge sensor is designed specifically for monitoring partial discharge in high-voltage cables. It utilizes high-frequency pulse current detection technology and a Split-core type HFCT transformer to accurately sense the high-frequency pulse signals generated by partial discharge in the cable ground conductor, enabling real-time monitoring and early warning of cable insulation conditions.

The HFCT sensor features a built-in high-capacity lithium battery (with a service life of > 3 years) and utilizes LoRa (470-510MHz) technology for a wireless transmission range of > 300 meters. It supports scheduled sleep/wakeup, manual triggering, and automatic alarm functions. It offers advantages such as wiring-free, easy deployment, and low power consumption. It is suitable for online cable status monitoring in a variety of scenarios, including power generation, distribution, petrochemicals, and rail transit.

FEATURES

- Powered by a built-in lithium battery;
- LoRa wireless communication >300 meters;
- 1pC high sensitivity partial discharges detection;
- Split-core type HFCT for easy installation;
- Magnetic mounting adapts to various cable compartments;
- LED indicator displays real-time operating status;

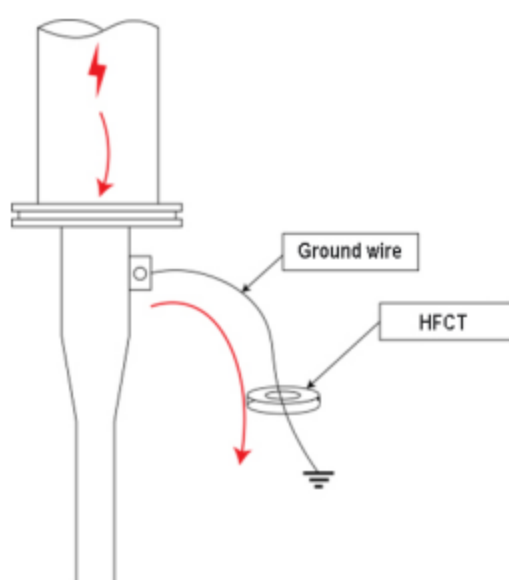
APPLICATIONS

- Power plants cable system status monitoring;
- GIS systems ground wire partial discharge monitoring;
- Substations, power distribution, and MV/HV transmission lines;
- Transportation infrastructure power line status monitoring ;
- Petrochemical industry Power supply systems;
- Urban distribution networks and underground cable tunnels;

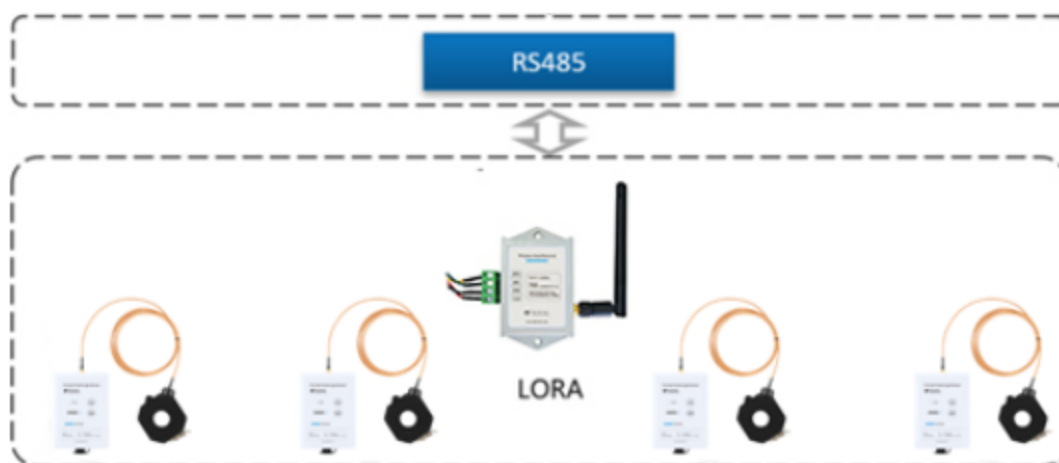
2.- WORKING PRINCIPLE

The High-Frequency Current Transformer (HFCT) method is a non-invasive technique for detecting partial discharges (PD) in medium- and high-voltage equipment such as cables, transformers, and switchgear. PD events generate high-frequency current pulses (in the MHz range) that propagate along the grounding path.

An HFCT sensor clamped around the grounding conductor captures these pulses and converts them into voltage signals via a high-bandwidth ferrite core. After amplification and filtering, the processed signals are analyzed to determine the type and severity of PD activity.



The wireless HFCT sensor transmits partial discharge data from the switchgear to the acquisition terminal via a LoRa dual-encrypted wireless receiver. Uploaded data includes peak and average discharge values, discharge count, alarm status, battery level, and other relevant parameters.



3.- SPECIFICATION

Partial discharge sensor

Power supply	7.2V 3000mAh lithium battery; battery life: >3 years
Monitoring type	High-frequency pulse current
Detection range	1-5000pC
Sensitivity	1pC
Acquisition frequency band	1MHz-100MHz
Wireless transmission frequency band	470-510MHz
Maximum transmission distance	>300 meters (line-of-sight range)
Operating temperature	-30-70°C
Sampling cycle	2 hours (default)
Power on/off method	Physical button
Uploading method	Single manual upload/ scheduled upload
Dimensions	134mm*100mm*42mm (W*H*D)
Mounting method	Magnetic mounting

High-frequency pulse CT

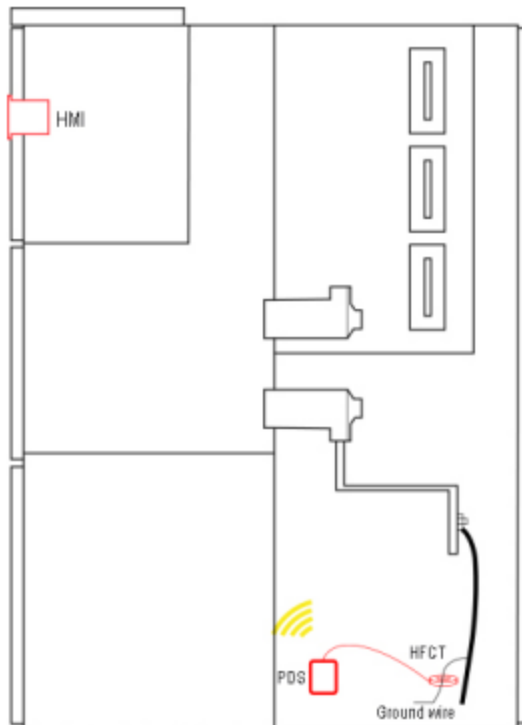
Monitoring principle	Rogowski Coil
Monitoring frequency band	3-80MHz
Sensitivity	1pC
Matching impedance	50Ω
Protection level	IP68
Dimensions	82*82*32mm (W*H*D), hole size: 30mm
Mounting method	Split-core current sensor
Mounting location	Cable Ground Wire
Operating temperature	-55°C to +85°C

Wireless Receiver

Power supply	12VDC
Networking mode	LORA self-organizing network
Uplink communication	RS485/Modbus

4.- INSTALLATION AND START-UP

4.1.- PD sensor Installation method

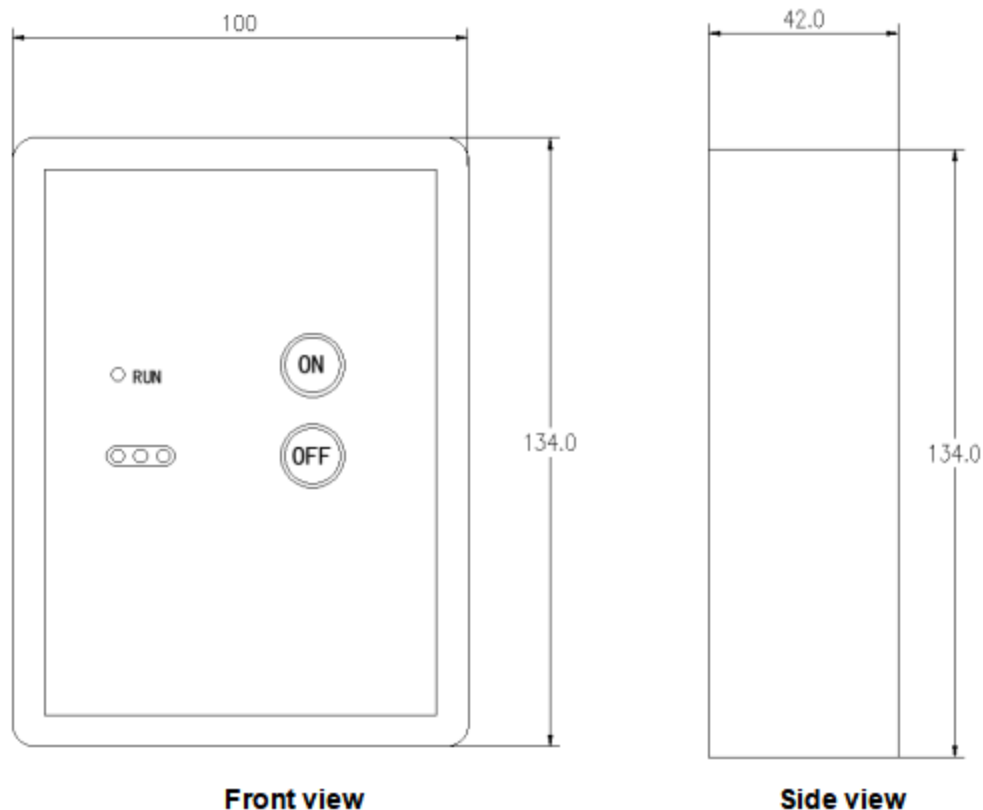


Step 1: Magnetically mount the PD sensor in the cable compartment.

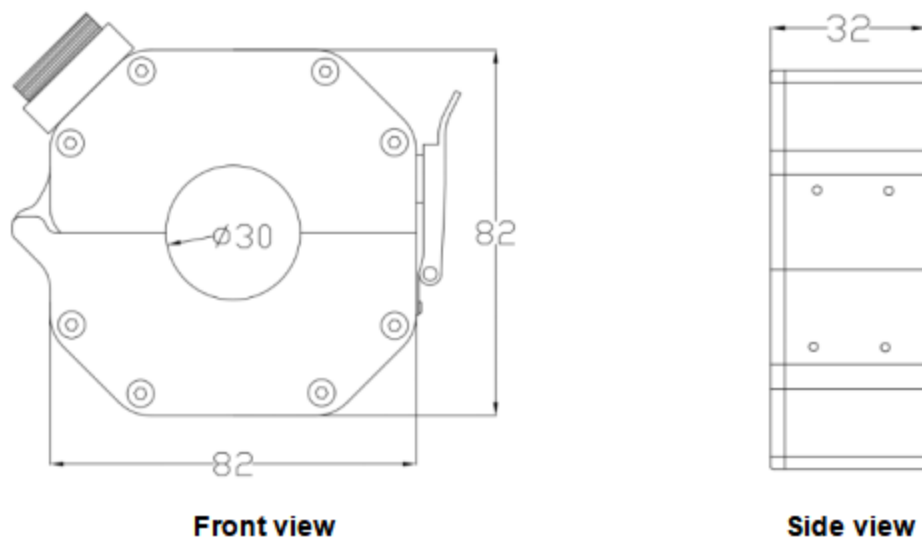
Step 2: Clamp the HFCT on the grounding wire with correct orientation.

Step 3: Connect the PD sensor and HFCT using a coaxial cable.

4.2.- PD sensor dimension: 134*100*42mm (W*H*D)



4.3.- HFCT dimension:82*82*32mm (W*H*D), hole size: 30mm



4.4.- Sensor startup/ shutdown instruction

Power on and operational sequence

The PD sensor defaults to powered-off status. Press and hold the "ON" button for 4 seconds to activate. The "Run" indicator illuminates, triggering automatic 3-second data acquisition. Acquiring PD data is transmitted to the acquisition terminal, then transmitted to the host computer. Post-transmission, the sensor enters dormancy (default: 2 hours) before auto-waking for the next cycle.

Real-time triggering

During operation, press "ON" to immediately wake the sensor for real-time data acquisition and transmission. After completion, the device returns to dormancy.

Battery management and power off

The battery sustains 3-year continuous operation. press "OFF" to check charge status (3 bars indicate full capacity). replacement is recommended when 1 bar remains. Press and hold "OFF" for 4 seconds to power off.

5.- COMMUNICATION INTERFACE

SCM-PDS-HFCT uses the LoRa wireless communication protocol and must be matched with a compatible LoRa receiver module for data acquisition, transmission Interval typically every 2 hours (configurable). The following details describe the data frame structure and communication format.

Field name	ID	Data length	Description
Frame Header	0x72	1 byte	Fixed header indicating start of frame
Direction	0x10	1 byte	Upstream data (Sensor → Receiver)
Data Length	0x00 0x1B	2 bytes	Data length (excluding CRC)
Terminal ID	0x00	8 bytes	Manufacturer info (default 0)
	0x00		
	0x00		Reserve
	0x18		Production Date (Year)
	0x0A		Production Date (Month)
	0x0F		Production Date (Day)
	0x00		Device number
	0x03		
Battery level	0x64	1 byte	Battery level (%), 0x64 = 100%
HFCT discharge times	0xFF 0xFF	2 bytes	HFCT discharge status
HFCT amplitude	0xFF 0xFF	2 bytes	
HFCT Average Value	0xFF 0xFF	2 bytes	
CRC code	0xFF 0xFF	2byte	High - Low

Example: Device ID: 0000002410150003

24: the year 2024

10: October

15: 15th of the month

0003: product code 0003

Battery level: 0x64 = 100% full.

6.- SAFETY CONSIDERATIONS



All installation specification described at the previous chapters named:
INSTALLATION AND STARTUP, INSTALLATION MODES and SPECIFICATIONS.

Please note that with the instrument powered on, the terminals could be dangerous to touching and cover opening actions or elements removal may allow accessing dangerous parts. This instrument is factory-shipped at proper operation condition.

- ◆ The device must have a professional installation and maintenance.
- ◆ Any operation of the device, you must cut off the input signal and power.

7.- TECHNICAL SERVICE

For any inquiry about the instrument performance or whether any failure happens, contact to Blue Jay's technical service.

Blue Jay - After-sales service

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