PDStar

Intelligent Handheld Partial Discharge Detector with Thermal Imaging Camera

Superior, Cutting-Edge, Handheld Partial Discharge Detector for Electric Power Equipment with Thermal Imaging Camera, 100 MSPS HFCT testing, a 4.3" Touch Screen, Multi-Sensor and Cloud Diagnostic Technology, 3G/4G/WI-FI communication, and Data Management Software

PMDT

Solutions for Condition-Based Maintenance

Our Mission

Increase the operational reliability and safety of power systems globally.

Global Application

Our products and services have been widely adopted by major electric utilities and industrial end users throughout the United States and in a number of countries and regions such as Canada, Switzerland, Saudi Arabia, Colombia, China, Singapore, India, Malaysia, Indonesia, Vietnam, South Korea, Philippines, Thailand, Hong Kong, Taiwan, and more.

With our proven, high-quality products and complete solutions, we possess notable references in various industries like Oil & Gas, Metals & Metallurgy, Chemical, Power Industry Manufacturing, Electronics Manufacturing, Commercial Buildings, Government, and more.

Customer Oriented

Customer satisfaction is of the utmost importance for PMDT. We strive to provide increased operational reliability and safety of power systems and are devoted to providing superior user experiences and consistently reliable customer support.

We aim to pursue long-term strategic partnerships with our customers, and to create added value for them now and into the future.

About PMDT

PMDT provides solutions worldwide for condition-based maintenance to the power industry. Our company has knowledgeable and experienced personnel that utilize the most advanced resources for online testing. Over 20 years of ongoing research and development into power asset condition assessment aids for our wide array of diagnostic and monitoring systems for medium and high voltage substations.

Our headquarters and manufacturing facility is located in San Jose, CA, US, which provides local access to high quality American-made components. We provide reliable and robust equipment with state-of-the-art capabilities for online testing of energized power equipment.

PMDT meets ISO9001: 2008 Quality Management System requirements and our products have passed laboratory tests and inspections.

PMDT continuously puts forth an abundant R&D investment to provide perpetually better solutions for condition-based maintenance programs.

PDStar

Intelligent Handheld Partial Discharge Detector with Thermal Imaging Camera

PMDT is proud to present one of our latest innovations, the PDStar. It integrates On-Line Partial Discharge (OLPD) testing and Infrared testing for MV and HV equipment, which combines UHF, AE, Ultrasonic, HFCT, TEV, and Infrared testing technologies. It is applicable for online PD testing, as well as abnormal heating and defect detection on all types of substation equipment. PD amplitude, PRPD, PRPS, and infrared spectrums provide critical data for determining the operational condition of electric power equipment. It connects to the PMDTCloud via Wi-Fi/3G/4G to upload test data, download test tasks, and receive diagnostic results in real time. Another uniquely advanced feature of the PDStar is that it integrates with a 100 MSPS (Mega-Samples per Second) HFCT signal processor, which greatly improves the performance for power cable OLPD testing.

The PDStar promotes a standardized, efficient way of online testing via the intelligent patrol, cloud data/job management, cloud diagnostic functions, automatic reporting, and paperless testing, which has made a major advancement in the concept of online condition assessment. It is the most powerful and helpful tool for electric utilities to conduct routine testing in a substation quickly, to determine what the issue is, and where it is located.

Applications

- MV & HV Switchgear
- Transformers
- Power Cables
- Gas Insulated Switchgear (GIS)
- And Other Equipment

Main Features

- Conducts OLPD testing with UHF, HFCT, TEV, AE, and Ultrasonic Sensors
- Conducts Infrared testing by simply attaching the Thermal Imaging Camera to the PDStar main unit
- 100 MSPS (Mega-Samples per Second) sampling rate available with a HFCT Signal Processor that features time and frequency analysis / cluster analysis capabilities for advanced OLPD testing and diagnostics for power cables
- Intelligent Patrol Function is used to create a test task with a set standard test procedure to improve testing efficiency
- RFID tags are used to standardize the field OLPD testing procedure to greatly improve testing efficiency and achieve asset management
- The PMDTCloud analyzes the data by utilizing Deep Learning Technology to produce a more accurate diagnostics of the data
- 4.3" touch screen and on-board data storage
- Eco-friendly paperless testing technology

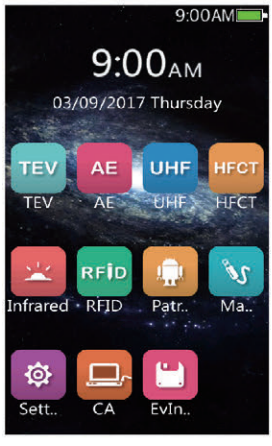
A Cutting-Edge Innovation! The New, Best Choice for Online Testing Tools to be Used by Substation Operators! The Definitive Solution for an Intelligent, Standardized, and Efficient Way of Online PD Testing.

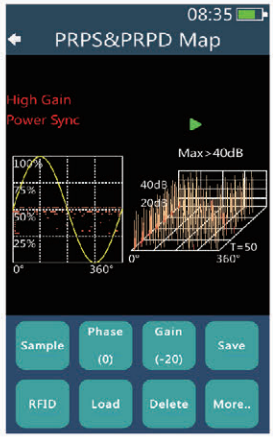
Multi-Sensor OLPD Testing

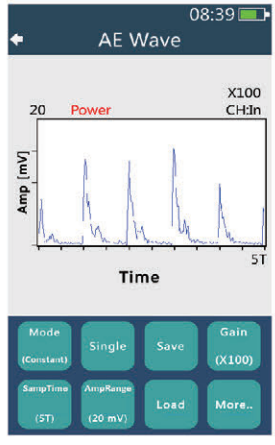
Enjoy OLPD Testing with the New Larger Touch Screen PDStar!
OLPD Testing is Now Like Operating a Smart Phone!

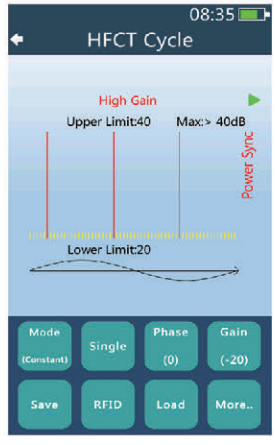
Features

- OLPD testing with UHF, HFCT, TEV, AE, and Ultrasonic Sensors
- PRPD, PRPS, Single-Cycle, Phase, Waveform, and Amplitude spectrums are used to determine PD types
- Wireless connection to UHF and HFCT sensors
- Power/light frequency synchronization functions
- Records up to 5 minutes of video while in the PRPS/PRPD Detection Modes of the UHF/HFCT PD Sensors
- Records ultrasonic sound in the AE detection mode
- Employs the Intelligent Patrol Function and the RFID Patrol Function
- Supports cloud data diagnostics and PC-based data management software
- Easy to operate, ideal for quick and efficient PD testing for a whole substation



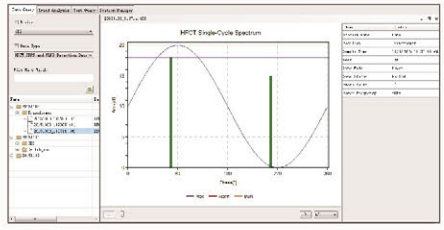




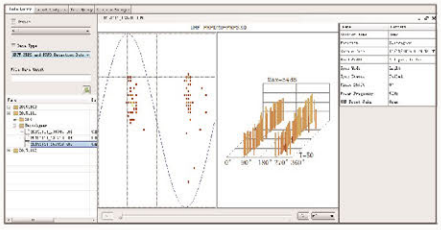


The core issue for analyzing the severity of the PD signal is to first determine what type of PD signal it is. PMDT utilizes PD type determination technique based on time domain spectrums. Each PD type has a typical characteristic which is useful in determining the PD's developing progress and critical level. The PDStar provides multiple kinds of data spectrums which are useful for data analysis and determining PD types.

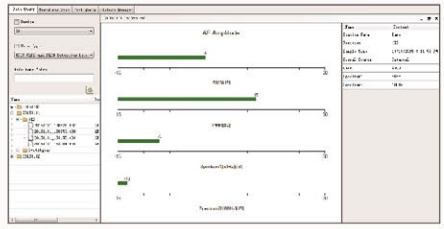
Multiple Detection Modes and Data Spectrums Used to Determine the PD Type



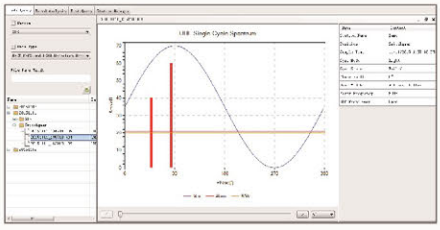
HFCT Single-Cycle Spectrum



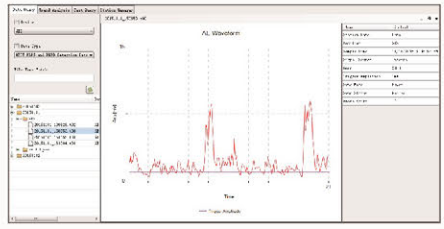
UHF PRPD-PRPS Spectrum



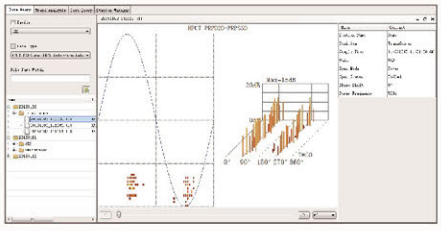
AE Amplitude Spectrum



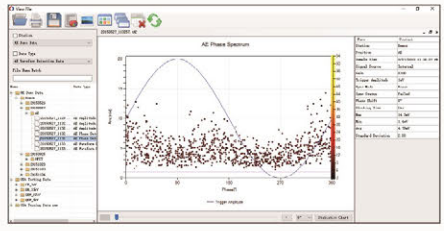
UHF Single-Cycle Spectrum



AE Waveform Spectrum



HFCT PRPD-PRPS Spectrum



AE Phase Spectrum

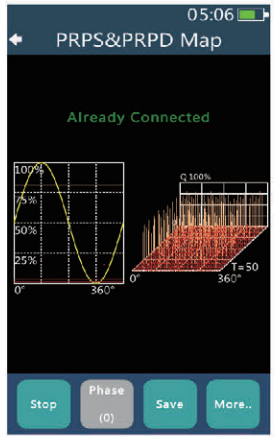
Advanced Solution for Power Cable OLPD Testing with 100 MSPS High Sampling Rate

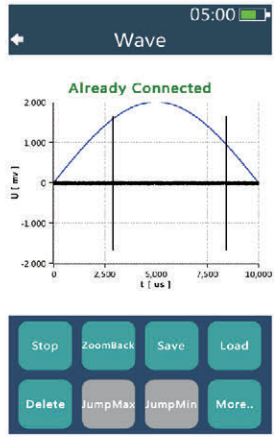
For substation operators, conducting OLPD testing on power cables has always been a challenge due to the dangerous aspects involving the close proximity to the online equipment the tester would have to be in order to perform the testing efficiently and accurately. The PMDT's PDStar provides advanced solution for this issue.

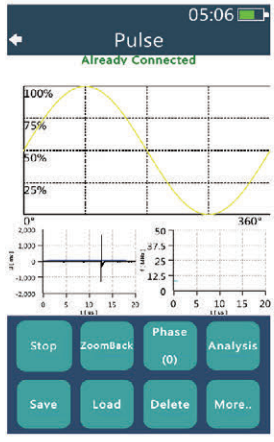
The PDStar features the superior Cluster Analysis (CA) function with a 100 MSPS HFCT Signal Processor that enables the user to conduct advanced OLPD testing and diagnostics on power cables. The PDSS (Partial Discharge Signals' Separation) technology is employed to separate noise from PD signals, and to separate different types of PD signals into different groups. Waveforms, PRPD & PRPS, and pulse spectrums are provided for data analysis to determine the PD type.

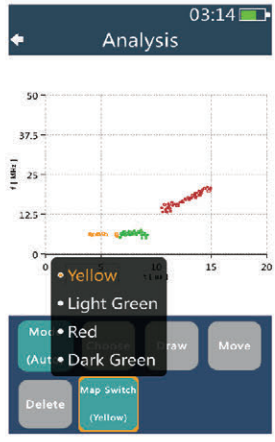
Features

- Conducts partial discharge signal sources separation under cluster analysis mode automatically or manually
- Three detection modes: Waveform, PRPD, PRPS, and Pulse
- 8 sampling rate options available: 500KHz / 1MHz / 2MHz / 5MHz / 10MHz / 20MHz / 50MHz /100MHz
- Adjustable sampling length, gain, and threshold









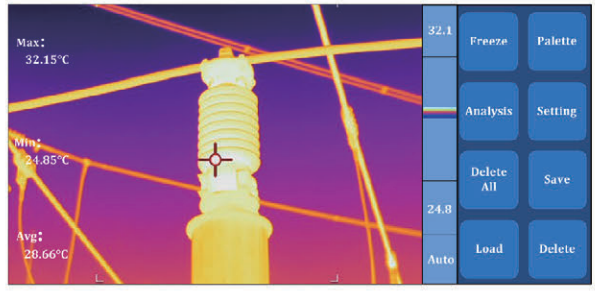
Thus far, infrared testing and OLPD testing have been important but independent for condition-based maintenance programs of power equipment. Substation operators have been conducting the two routine testing methods separately for many years. The PMDT's new innovative PDStar now makes it possible to test PD and IR together in one single tool, which brings a more productive, efficient, and cost effective online testing and maintenance program for customers.
The PDStar's Thermal Imaging Camera is convenient to use by simply attaching the Thermal Imaging Camera to the PDStar main unit. It has high resolution and can detect any abnormal heating and defects effectively.

Infrared Testing

Testing for PD and IR in one single tool is now available with PMDT's PDStar!

Features

- 320 x 256 native resolution
- 4.3" touch screen, shares the same screen of the PDStar main unit
- Images can be edited on the PDStar main unit directly. Tap the screen or buttons to quickly access temperature measurement tools, parameters, image modes, and more.
- Measure the temperature of one specific point or area
- Supports PC-based data management software
- Compact design and convenient to use



Wireless Sensor Connections and Frequency Synchronization

Wireless Sensor Connection

The most convenient feature of the PDStar is the wireless connectivity of the UHF and HFCT sensors. The sensors are equipped with wireless signal processors that transmit the test data wirelessly to the PDStar main unit.

Light Frequency Synchronization

Not only do the signal processors allow for wireless transmission of the UHF and HFCT sensor signals to the PDStar, but they can also reference the frequency of the power supply through a light sensor on the signal processors. This allows you to synchronize your signals up to the actual frequency, instead of having it fixed at either 50 or 60Hz.

Wireless Power Frequency Synchronization

Additionally, the USB charger also functions as a wireless transmitter of the local power frequency to the main handheld unit. Simply plug the charger into an outlet which is fed by one phase of the power system under test. The PDStar automatically detects and synchronizes the UHF/HFCT Single-Cycle, PRPD, and PRPS spectrums with the referenced local power frequency.

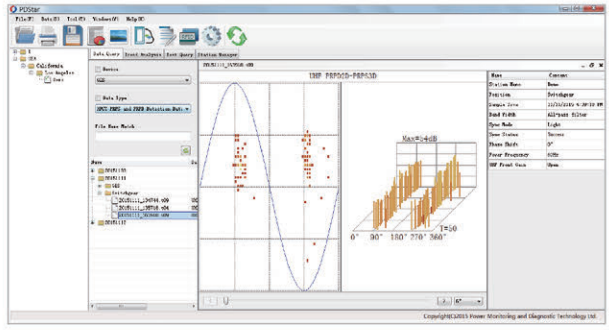
The frequency synchronization functions have enhanced the resolution of the PDStar and given us the ability to determine the exact type of PD activity.

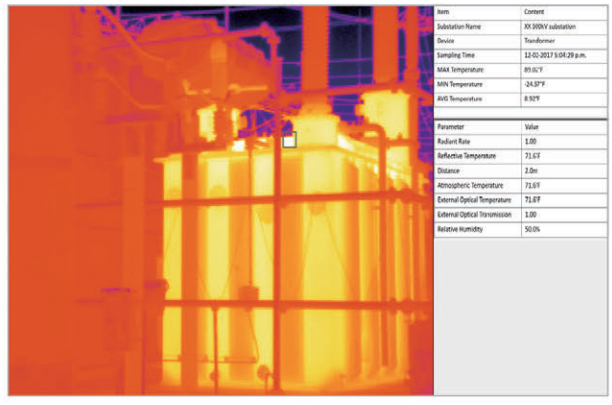
Data Management Software

The PDStar data management software is a powerful, PC-based tool that stores, manages, and analyzes the PD and IR test data.

Main Features

- Builds a network tree which includes all of the monitored assets.
- Generates analysis and management reports in JPEG/MS Word/PDF formats automatically.
- Manages historic data and produces PD trends.



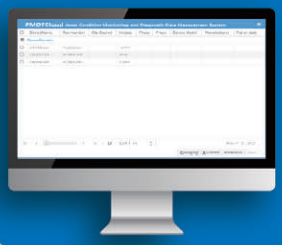


The PMDT's Field Test Procedure

Innovative, Standardized, and High-Efficiency

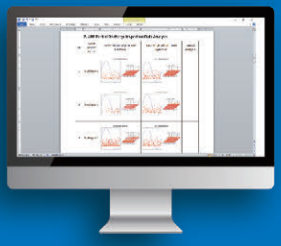
01 Create Test Jobs

02 Select the Test Instrument



Download and Load Test Jobs
via 3G/4G/WI-FI Communication

PMDTCloud



06
Automatic Reporting

03
Intelligent
Test Instrument

PDStar

Upload Test Data
via 3G/4G/WI-FI Communication

05
Data Analysis

04
Field Test
Intelligent Patrol

PMDTCloud

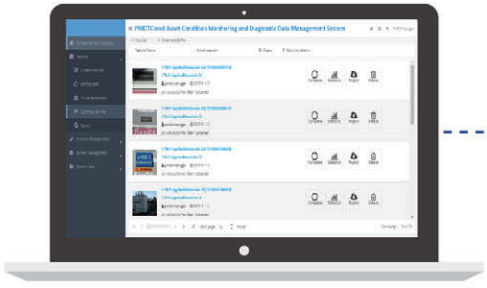
Asset Condition Monitoring and Diagnostic Data Management System

The PMDTCloud is a cutting-edge, cloud-based asset condition monitoring and diagnostic data management system software that communicates with various of our products to collect and analyze the test/monitoring data. It is developed based on the innovations in internet technologies and the Internet of Things. It employs a multi-dimensional cloud diagnostics algorithm developed by PMDT through the utilization of the latest big data computing, cloud calculation, and deep learning technology based on our abundant on-site field test data collected through the years.

The PMDTCloud provides users with a faster method to access the latest data and condition of the power assets from any authorized web enabled device via a login with a user ID and password. Diagnostic results with PD types are provided automatically.

Multiple Statistics Charts

Shows the important information for users to understand the status of power equipment effortlessly.

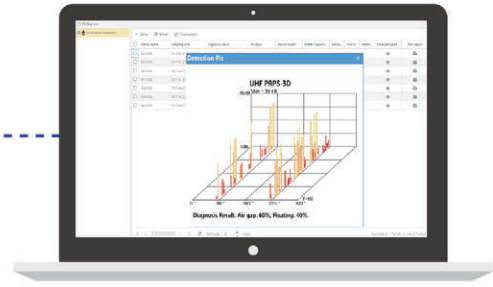


Test Job Management

Manages and controls the online testing process of power equipment, along with checking the progress of each test job in real time, and also conducts test data management, inquiry, and statistical analysis.

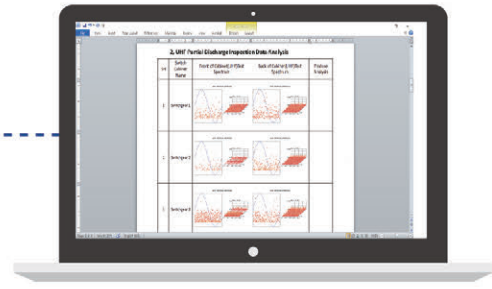
Test Point Management

Standardize the test points for each OLPD test method (TEV/Ultrasonic/AE/UHF/HFCT), test at the same test point for each test method every time with high efficiency, record and manage the test data, and conduct trend analysis.



Cloud Diagnostic Function

PMDT has developed the cutting-edge cloud diagnostic technology for the field testing data, based on big data mining and deep learning diagnostic algorithms. The testing data can be sent to the PMDTCloud for data analysis, and the Cloud provides diagnostics results with PD types automatically. This provides advanced and reliable technological support for the status analysis of power equipment.



Automatic Reporting

The PMDTCloud generates detailed, proficient test reports automatically after the test data is uploaded with one simple selection on the PMDTCloud webpage. Say goodbye to writing reports manually!

PMDTCloud

Improve Test Efficiency and Condition-Based Asset Management with the Intelligent Patrol Function

Are you still performing OLPD testing the traditional way? Spending an extensive amount of time testing all the power equipment in the substations and recording the data by pen and paper?
PMDT presents new, intelligent OLPD testing methods that will truly simplify your testing process!

Routine Patrol - Efficient OLPD Testing

Create Test Jobs

Create a new test job with all test points in a list on the PMDTCloud/PC-Based software and download it to the PDStar main unit.

Patrol the Substation and Test for PD Efficiently

Patrol the substation and test each programmed test point for the power equipment; the test data is then stored in the onboard memory.

Data Management, Analysis, and Report

Upload the test data to the PMDTCloud/PC-Based software after all tests are completed for data management and analysis.

RFID Patrol - The Most Accomplished OLPD Testing and Asset Management Technique

The PDStar provides an innovative PD asset management solution via RFID tagging based on the Internet of Things. With the RFID Patrol program, the OLPD testing procedure is standardized; thus, PD testing efficiency is greatly improved, data flow and accuracy are ensured, and your power assets are better managed.

Create Electronic IDs for Your Power Assets via RFID Tagging

The RFID tags can be affixed to your power assets and store the power equipment information such as asset name, asset ID #, substation name, and provides prompts for the appropriate tests for that asset. Each test is recorded with a unique test ID number and date/time stamp to ensure reliability, consistency, and credibility.

RFID Patrol Function - Provides Efficiency by Utilizing the Internet of Things

Following the routine patrol procedure to perform field testing will vastly improve the testing efficiency. Use the PDStar to scan the RFID tags and it will obtain the asset's information automatically. All the test data will then be imbedded with the asset's information after the scan is complete. This allows the system to automatically identify and link the data to each specific asset.

Dedicated to Asset Management

Achieves accurate management of the asset's ID, physical status, and test point information. Standardizes the field OLPD testing procedure and retains the PD test data accurately, consistently, and comparably.

Test PD Environmentally-Friendly

Eliminates the need to write down all the asset information and test data with the paperless OLPD testing realized with PMDT's innovative RFID function.

**Note: The Intelligent Patrol function is supplied with the PDStar. The RFID tags are additionally priced and programmed for your custom application. Please inquire for more information.*

Configurations

Hardware & Software Configurations	■ Main Unit ■ Internal TEV Sensor ■ Internal Ultrasonic Sensor ■ UHF Sensor with Wireless Signal Processor ■ HFCT Sensor with Wireless Signal Processor and 100 MSPS HFCT Signal Processor ■ AE Contact Sensor ■ Ultrasonic Parabolic Dish with Laser Sight ■ Ultrasonic Extension Wand ■ Thermal Imaging Camera ■ PDStar Software
Standard Accessories	■ TEV Function Checker ■ Vacuum Grease for the AE Contact Sensor ■ Magnetic Holder for the AE Contact Sensor ■ Basic Headphones ■ Mini USB Cable ■ Coaxial Cables for UHF and HFCT Sensors ■ Battery Charger & Synchronizer ■ Back up Lithium battery for the Thermal Imaging Camera ■ Carrying Case ■ Software Dongle

Four Recommended Kits Configured with Optional Combinations of TEV, UHF, HFCT, AE, Ultrasonic Sensors, and a Thermal Imaging Camera

Config.	Application	Internal TEV	UHF	HFCT	AE Contact	Internal Ultrasonic	Thermal Imaging Camera	HFCT 100 MSPS Signal Processor	Ultrasonic Parabolic Dish	Ultrasonic Wand
Kit 1	**PD & IR Test Kit, Multi-Function, Seven-in-One,** for GIS, MV Switchgear, Power Cables, and Transformers	√	√	√	√	√	√	√	√	√
Kit 2	**PD & IR Test Kit, Multi-Function, Six-in-One,** for GIS, MV Switchgear, Power Cables, and Transformers	√	√	√	√	√	√			
Kit 3	**PD Test Kit, Multi-Function, Six-in-One,** for GIS, MV Switchgear, Power Cables, and Transformers	√	√	√	√	√		√	√	√
Kit 4	**PD Test Kit, Multi-Function, Five-in-One,** for GIS, MV Switchgear, Power Cables, and Transformers	√	√	√	√	√				

* Configurations and functions are customizable upon your request.

Technical Specifications

Main Unit	
Display	4.3" touch screen
Dimensions	7.3" x 4.3" x 1.4" 185mm x 110mm x 35mm
Weight	1.23 lb / 0.56 kg
Communication	3G/4G/WI-FI/USB

Internal TEV Sensor	
Bandwidth	3MHz~100MHz
Measurement Range	0dB~60dB
Resolution	1dB
Accuracy	±1dB
Max Number of Pulses/Cycle	2000

AE & Ultrasonic Sensors	
Bandwidth of the AE Contact Sensor	20kHz~300kHz
Center Frequency of the Ultrasonic Sensors	40kHz
Measurement Range	-10dB~70dB
Resolution	1dB
Accuracy	±1dB

External UHF Sensor	
Bandwidth	300MHz~1.5GHz
Measurement Range	0dB~70dB
Resolution	1dB
Accuracy	±1dB
Filters	All pass, low pass, and high pass
Communication	Wireless communication with the detection unit

HFCT Sensor	
Bandwidth	500kHz~50MHz
Measurement Range	0dB~80dB
Resolution	1dB
Accuracy	±1dB
Communication	Wireless communication with the detection unit
Optional Part	Signal processor with 100 MSPS sampling rate

Thermal Imaging Camera	
IR Resolution	320 x 256 pixels
Focal Length	0.75" / 19 mm
Field of View (FOV)	24° × 19.2°
Image Frequency	10Hz
Object Temperature Range	-13°F~275°F (-25°C~135°C) -40°F~1022°F (-40°C~550°C)
Thermal Sensitivity/ NETD	< 32°F (0.05°C) @ 86°F (30°C) / 50 mK

Environmental	
Operating Temperature	32°F~131°F / 0°C~55°C
Humidity	0-90% RH non-condensing

Power Supply	
Internal Battery	Lithium-ion
Operating Time	Approx. 4 hours

Battery Charger & Synchronizer	
Input	85V~264V AC, 50/60Hz
Output	5V DC 1A

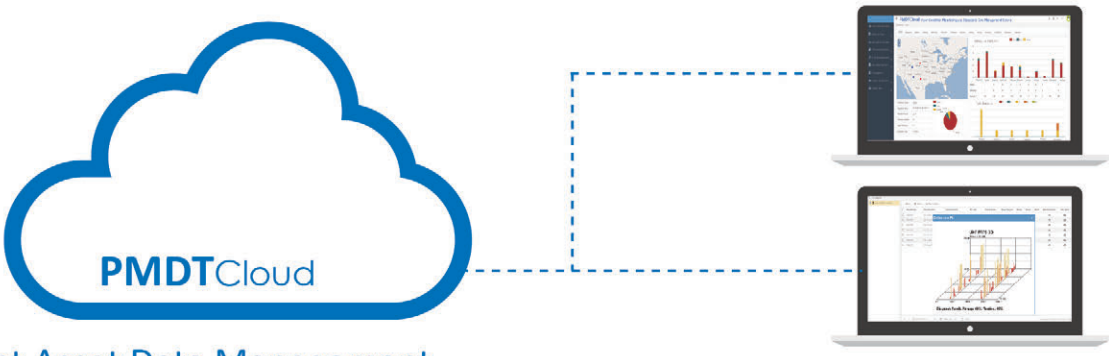
Global Testing Experiences

PMDT's unique experiences consist of over 20 years of R&D combined with many years of field work: testing PD and Infrared for over 180,000 various power assets in thousands of substations globally for a variety of electric utilities, industrial end users, and power equipment manufacturers. PMDT has the expertise needed to provide the best Condition-Based Maintenance Programs for your power assets.

Find PD Defects Before Equipment Failures Occur

The PMDT Solution

Solutions for Condition-Based Maintenance

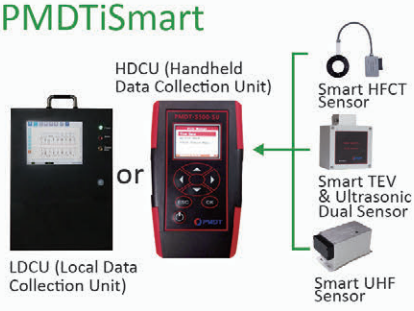


Intelligent Asset Data Management

Detection and Monitoring

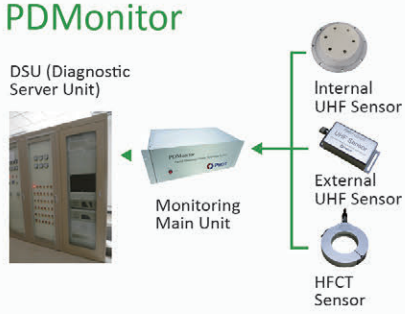
Online PD&IR Testing

PMDTiSmart



Wireless Autonomous Online PD Testing

PDMonitor



Permanent Online PD Monitoring

Diagnostic and Location

Online PD Diagnostic and Location

Online PD Expert Diagnostic and Location

Short-Term Online PD Monitoring for Critical Assets

Always Leading

Continuous Efforts to Provide New and Improved Solutions for Condition-Based Maintenance Programs

PMDTCloud

The PMDTCloud is a cutting-edge power asset condition monitoring data management system integrated with test and monitoring data collection, recording, management, trending, analysis, and diagnostic functions. PMDT's test instruments and monitoring systems connect to the PMDTCloud via 4G/3G/Wi-Fi to upload the data collected, download test tasks, and receive diagnostic results. The Cloud analyzes the data by utilizing the Deep Learning technology.

OLPD Testing

PDetector

The Handheld PDetector allows for quick OLPD testing to be conducted on all types of power equipment to identify which assets have abnormal PD signals, and determine the PD type by using multiple data spectrums analysis such as amplitude, waveforms, and PRPD-PRPS spectrums. A PDetector Smart Phone / Tablet Application and PC software are included, and optional PMDTCloud diagnostic service is available.

Combined OLPD & IR Testing

PDStar

Intelligent Handheld Partial Discharge Detectors with a 4.3" touch screen and a Thermal Imaging camera. A HFCT Signal Processor with 100 MSPS (Mega-Samples per Second) sampling rate is provided featuring time and frequency analysis for online power cable testing and diagnostics. PC software is included and optional PMDTCloud diagnostic service available.

Wireless Autonomous Online PD Testing

PMDTiSmart

The Smart Sensors are a revolutionary design which builds a wireless smart sensor network to autonomously sample asset condition data periodically from all kinds of power equipment. The test data is collected wirelessly and uploaded to the PC-based software and/or the PMDTCloud for data diagnostics. The system provides a solution for NFPA's 70E 2015 more restricted approach boundary for live assets. PC software is included and optional PMDTCloud diagnostic service available.

Permanent Continuous Online PD Monitoring

PDMonitor

Online PD Continuous Monitoring Systems used to monitor and analyze the PD signals emitted from the power equipment in real time. The software features historical trend statistics, data record inquiry, alarm functions, and a built-in database of PD & noise characteristics spectrums. The system features high speed data sampling & processing modules and supports the IEC 61850 communication protocol.

Online PD Diagnostic and Location

PDiagnostic

The portable, multi-channel PDiagnostic system locates PD on power equipment down to a meter by utilizing Acoustic-Electromagnetic Combination Location Technique, Time Difference of Signals' Arrival (TDOA), Partial Discharge Signals Separation (PDSS), and 3D Positioning Technologies with PC software included. The system features advanced PD diagnostic and location capabilities.

Online PD Expert Diagnostic and Location

PDExpert & Service

The portable multi-channel PDExpert system locates PD on power equipment within centimeters by analyzing original waveforms and using Acoustic-Electromagnetic Combination Location Technique. PC software is included. PMDT also provides Expert testing and location services.

Short-Term Online PD Monitoring for Critical Assets

PDiagnosticM

The portable, online PD monitoring system for short-term PD monitoring of a critical power asset, utilizing PMDT's proprietary Intelligent Cloud Diagnostic Technology. With 3G/4G data capability, this system allows for remote monitoring, alarm functions, and analyzing the data by utilizing the Deep Learning Technology.

Solutions for
Condition-Based Maintenance

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