



Avoiding Outages on Your HV Electrical Network:

The UltraTEV[®] Plus² Solution



Make partial discharge discovery simple

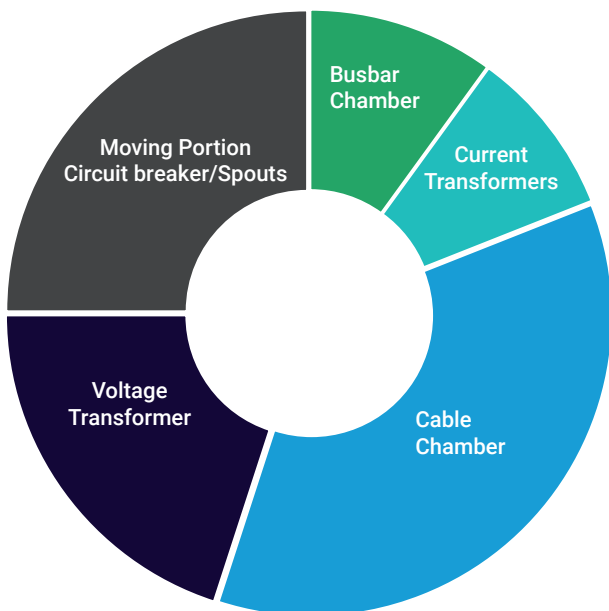
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The Imperative of PD Surveys

Regardless of whether you have encountered challenges with Partial Discharge (PD), it is crucial to understand its risks. Industry studies reveal that insulation degradation is the primary cause of failure in switchgear with 80-85% of disruptive failures stemming from insulation issues.

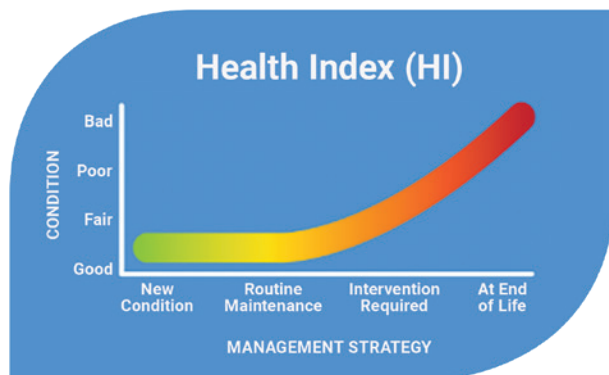
Through proactive PD detection, you can significantly mitigate risk through early detection and prevention of potential failures.

Where PD is typically found in Switchgear



Safeguarding Against Catastrophic Failures

PD activity in high-voltage assets can lead to serious issues such as sudden outages, costly repairs, and reputational damage. Proactive PD surveys provide advanced warning of incipient failures, allowing for timely interventions that prevent potentially costly and dangerous outages.



Managing Asset Ageing and Degradation

The reliability of high-voltage assets follows the traditional bathtub curve with a significant increase in failures at either end of its lifespan. Taking proactive action informed by PD Measurement at any stage of the asset life will substantially mitigate the risk of failure.

Supporting your Safety and Regulatory Compliance

UK Health & Safety Executive guidance document HSG230 highlights that PD measurements serve as a useful indicator of insulation condition in high-voltage electrical assets. By incorporating PD surveys into their proactive condition-based maintenance strategies, businesses can enhance operational integrity and safety.



Why UltraTEV® Plus²?

Prevent costly asset failures by using UltraTEV Plus².

Our on-device prompts guide the user through the PD detection process. This approach delivers a step change in PD data quality, providing many operational benefits when compared to traditional survey methods.



Advanced PD Detection and Analytics

The device builds on generations of expertise to enable accurate decision-making at the site. Features such as our advanced ultrasonic analysis algorithms provide instant feedback on the presence of PD, whilst our unique 'guided mode' supports users throughout the entire measurement process.

Both operators and management can leverage comprehensive PD data to identify issues early and enhance efficiency, by making informed decisions on maintenance planning, regulatory compliance, and asset lifespan optimisation.

Simplified User Experience

The intuitive user interface leads operators of all levels through efficient data collection and analysis. Through the on-device and cloud-based algorithms, PD is separated from background activity, enabling maintenance decisions to be made with confidence.

Legacy of Excellence

With a history rooted in research excellence, we have evolved to become a leading provider of asset management solutions. Our UltraTEV Plus² already has an established global client base and continues to be recognised as delivering outstanding value. Our history gives us the experience to set action levels (Red, Amber Green etc).

Flexible Detection Technology

This is a one-tool solution for online PD detection. The platform is supported by a range of advanced sensors that cover all HV network assets, including switchgear, cables, transformers, and overhead lines.



Leveraging Data Insights: From Spot Measurement to Data-Driven Action

The UltraTEV Plus² has transformed from a periodic inspection tool into an integral part of proactive switchgear maintenance plans. It now delivers a structured approach to PD Detection, guiding users throughout the process and seamlessly transferring data to our cloud-based Managed Surveys platform.

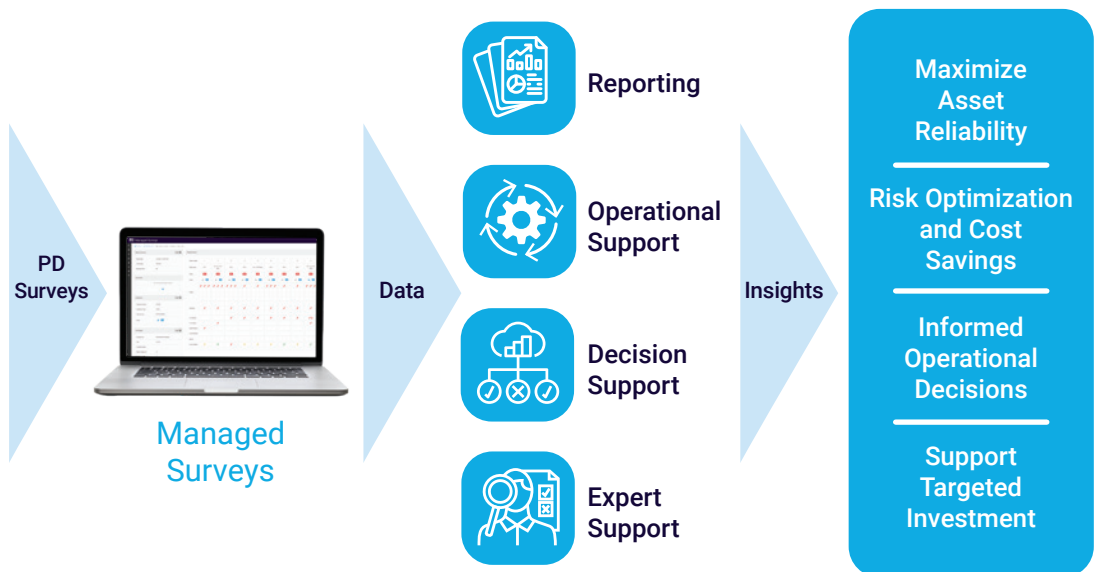
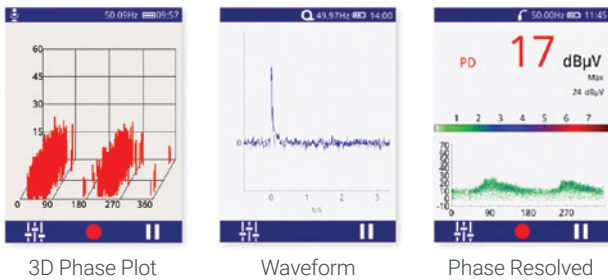
Extracting Actionable Insights from Quality Data

This is a single solution for all HV assets, seamlessly integrating data from a wide range of sensors to provide a comprehensive view of PD activity.

The rich dataset is class-leading, providing valuable insight for your maintenance actions, with centralised access to full measurement data, including waveforms, phase plots, and audio files.

Capture wider asset data with structured on-device question sets, helping provide a holistic view of your substation condition.

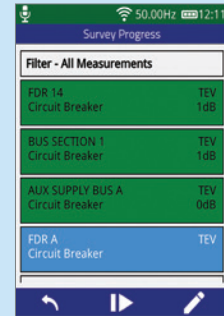
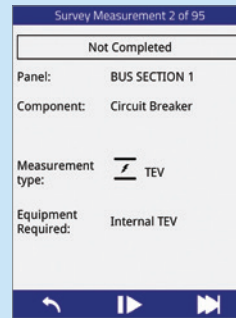
If you need assistance, our PD experts can remotely support data collection, review results, and provide advice on next steps, whether from a one-off reading or as part of a wider asset management strategy.



Why Choose Managed Surveys?

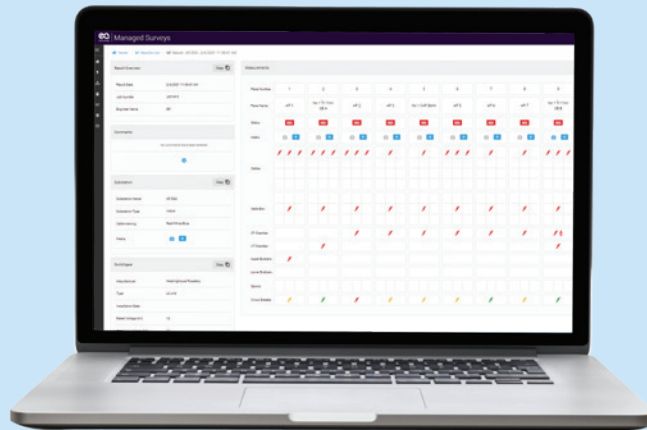
On-device

Simplifying your onsite activities, UltraTEV Plus² guides you through the measurement process, reducing the demands on the user and improving overall data quality.



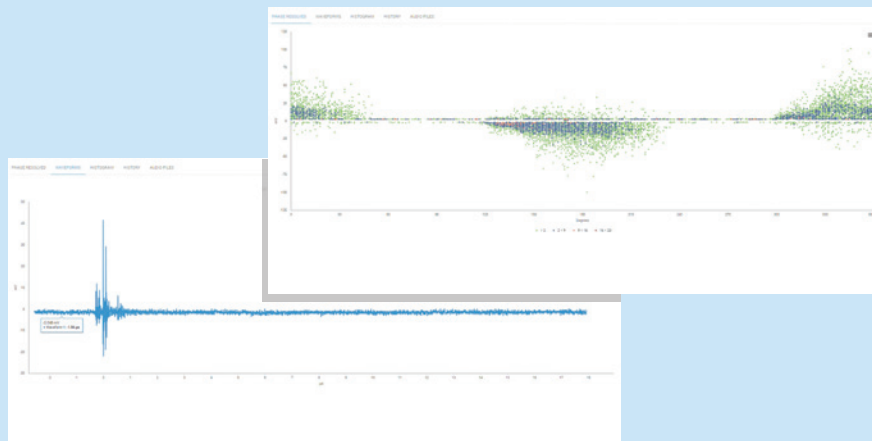
Centralize your data

Our cloud-based system provides a central view of all PD activity, giving a clear indication of areas of increased concern.



Confidence to act

Full technical data, waveforms, audio, PRPD provide the engineering certainty to act.



Accessories for Evolving Challenges

The UltraTEV Plus², with its built-in TEV, ultrasonic sensors and SMART-IO expansion, ensures comprehensive PD detection for all electrical assets in a single instrument.

Our range of accessories provides the ideal mix of sensing technologies, enabling confident decision-making while proactively preventing equipment failures and operational disruptions. We have the right accessories to support all asset types.

Accessory	Air Insulated Switchgear	Gas Insulated Switchgear	Open Terminal Switchyards & Overhead Lines	Underground Cables	Power Transformers
Ultrasonic Flexi-Sensor	●				●
Ultrasonic Contact Probe	●	●			
HFCT	●	●	●	●	●
VPIS	●	●			
TEV Locator Probe	●	●	●		●
UHF Receiver	●	●	●	●	●
UHF Barrier Spacer Sensor		●			
UltraDish			●		●
UHF Directional Antenna			●		●
Wireless Phase Reference	●	●	●	●	●

Some of our accessories:



Wireless Phase Reference

Sends phase reference reliably and securely to the UltraTEV Plus².



VPIS

Connects directly to VPIS/VDS terminals, providing whole panel coverage from a single measurement.

UHF Receiver

Connects to pre-installed internal PD couplers and our wide range of UHF antennas.



Barrier Spacer Sensor

Detects PD externally at insulated barriers.



TEV Locator Probe

Works with the UltraTEV Plus²'s built-in TEV sensor to pinpoint internal PD sources using time-of-flight measurements

Directional Antenna

Quickly identifies internal PD while ignoring corona in various switchyards.



Ultrasonic Flexi-Sensor



Detects surface PD activity in hard-to-reach or limited access areas.

UltraDish

Detects ultrasonic Surface PD activity in overhead assets.



Ultrasonic Contact Probe

Identifies surface PD in sealed chambers.



HFCT

Split core CT allows easy application and visibility of local and remote PD activity.



Real stories. Real results.

“ We were very fortunate to find EA Technology, who introduced us to PD technology, they surveyed all site HV switchgear within a day and submitted a detailed report. The survey (using UltraTEV Plus²) was able to find a failing CT which we have been able to change at our convenience, rather than it fails in production. ”

Gary Crask,
Engineering Production Manager,
TRINITY MIRROR PRINT

Preventing Failure

In a recent case study, Lightsource, a global leader in solar PV projects, utilised the UltraTEV Plus² during routine maintenance. Technicians swiftly identified elevated PD readings in substation switchgear cells, allowing for prompt rectification. The device confirmed the elimination of the PD source, preventing potential flashovers that could render the switchgear unusable and necessitate costly cable re-termination. Without the UltraTEV Plus², the issue may have gone unnoticed, leading to significant operational disruption.



Transitioning Maintenance

Tenaga Nasional Berhad (TNB), Malaysia's leading electricity provider, transitioned from time-based to condition-based maintenance that integrates EA Technology's UltraTEV handheld devices to tackle switchgear failures. This shift resulted in a 71% decrease in failures over five years. Leveraging a Health Index approach, TNB streamlined asset management, meeting regulatory standards efficiently. EA Technology's solutions empowered TNB to pinpoint faults, undertake maintenance tasks proactively and achieve cost savings effectively.

Tailored Solutions for Specific Challenges

At EA Technology, we recognize the complexities and challenges of high-voltage asset management. That's why we offer a comprehensive suite of solutions and services designed to empower you at every step of your journey.



Product Solutions

Astute HV Monitoring®: By watching your cables and switchgear, EA Technology's Astute® HV service can alert you to early PD activity and pinpoint which parts of your HV system should be investigated.

Power System Analysis

Gain actionable insights and recommendations to optimize your network's performance and improve security of supply through our thorough system analysis.

Condition Assessment Services

Includes both remote monitoring and on-site options with everything from predictive monitoring to interrogating failures. Expert engineers provide detailed reports and recommendations for you to take remedial action. Our services include:

Switchgear: Our experienced engineers work worldwide, drawing on their expertise to safely complete site-based work producing management-friendly reports and recommendations.

Cables: Use our Cable Condition Assessment service to understand the condition of your cables – even when they're buried – so that you can pre-empt early failures and take remedial action.

Transformers: Power transformers are among the most valuable assets in any network, making precise insights into their condition essential. Discover how we can help you detect potential faults before they cause failures, enabling you to troubleshoot and plan proactively.

Training

Enhance your team's skills with our industry-leading High Voltage Electrical Engineering training at the EA Technology Power Skills Centre.

Software Solutions

Invest: A powerful online tool for asset management and investment decision support.

Specification: UltraTEV® Plus²

TEV	
Sensor	Capacitive
Measurement Range	0 – 60dBmV
Resolution	1dB
Min Pulse Rate	10Hz (rolling displays only)
Discharge Pattern Phase Reference	Optical, E-Field and Manual
ULTRASONIC	
Measurement Range	-7dBµV to 71dBµV
Resolution	1dB
Accuracy	±1dB
Transducer Sensitivity	-65dB (0dB = 1volt/µbar RMS SPL)
Transducer Centre Frequency	40 kHz
Transducer Diameter	16mm
Heterodyning Frequency	38.4 kHz
CABLE PD	
Sensor	HFCT
Measurement Range	100 - 100 000 pC
Resolution	98pC
Accuracy	±98pC
Min Pulse Rate	10Hz
HARDWARE	
Enclosure	Self-colour injection moulded plastic case
Indicators	Colour back-lit LCD Charging indicator LED
Controls	Touch screen Keypad
Connectors	Micro USB connection port Micro SD slot 2 x Lemo accessory connection ports 3.5mm headphone jack
Headphones	Min. 8 ohms
ENVIRONMENTAL	
Operating Temperature	-20 to 50 degrees C
Humidity	0 – 90% non-condensing
IP Rating	42
POWER SUPPLIES	
Internal Batteries	3.7V rechargeable Lithium-Ion
Typical Operating Time	approx. 8 hours
Battery Conservation	Automatic low battery voltage 'switch off'

Specification: UltraTEV[®] Plus² Locator probe

TEV	
Sensor	Capacitive
Measurement Range	0 – 60dBmV
Resolution	1dB
Measurement Bandwidth	3 - 80 MHz
Accuracy	±1dB
Locator probe precedence	0.3ns equivalent to 10cm
HARDWARE	
Enclosure	Self-colour injection moulded plastic case
Indicators	Power indicator LED
Controls	3 x push-buttons
Connectors	Cable to UltraTEV [®] Plus ²
DIMENSIONS	
Size	201mm x 76mm x 34mm with 2m long cable
Weight	00.36kg
ENVIRONMENTAL	
Operating Temperature	-10 to 55 degrees C
Humidity	0 – 90% non-condensing
IP Rating	42

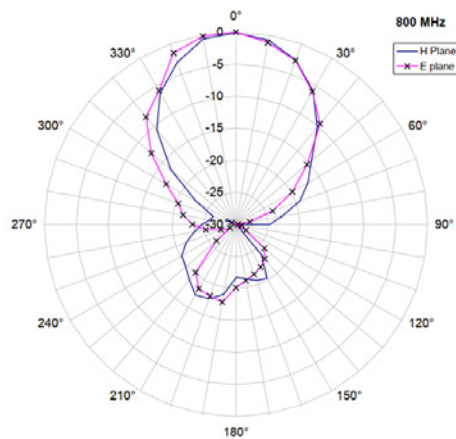
Specification: UltraTEV® Plus² UHF Receiver

HARDWARE MEASUREMENTS	
Enclosure	Aluminium
Indicators	None
Controls	None
Connectors	1x BNC antenna port 1x LEMO (UltraTEV Plus ² connection)
DIMENSIONS	
Size	81mm x 40mm x 35mm
Weight	0.1kg
POWER SUPPLIES	
Power supply	Powered from UltraTEV Plus ²
Supply voltage	5V
ENVIRONMENTAL MEASUREMENTS	
Operating temperature	0 - 55 °C
Humidity	0 - 90 % non-condensing
IP rating	42 (EN 60529)
UHF MEASUREMENT - GENERAL	
Modes	Switchable narrowband/wideband
Resolution	1 dBm
Measurement bandwidth	50Ω
UHF MEASUREMENT - NARROWBAND	
Measurement range	-85 – +5 dBm
Tuning frequency	47 – 1000 MHz
Bandwidth	8 MHz
Gain setting	-10 – +40 dB
Accuracy	±2 dB (0 dB gain; -50 dBm – 0 dBm input, 25°C)
UHF MEASUREMENT - WIDEBAND	
Measurement range	-61 – -1 dBm
Bandwidth	5 – 3300 MHz
Accuracy	±2 dB
COMPLIANCE	
Electromagnetic compatibility (EMC)	EN 61326-1:2013 (Electrical equipment for measurement, control and laboratory use – EMC requirements. General requirements.)
	EN 61000-6-2:2019 (Electromagnetic compatibility. Generic standards. Immunity standard for industrial environments.)
	EN 55011:2016+A1:2017 (Industrial Scientific and Medical equipment – Radio frequency disturbance characteristics – Limits & methods of measurement)

*Please note this accessory requires UltraTEV Plus² V8 Hardware or higher.

Specification: UltraTEV[®] Plus² UHF Directional Antenna

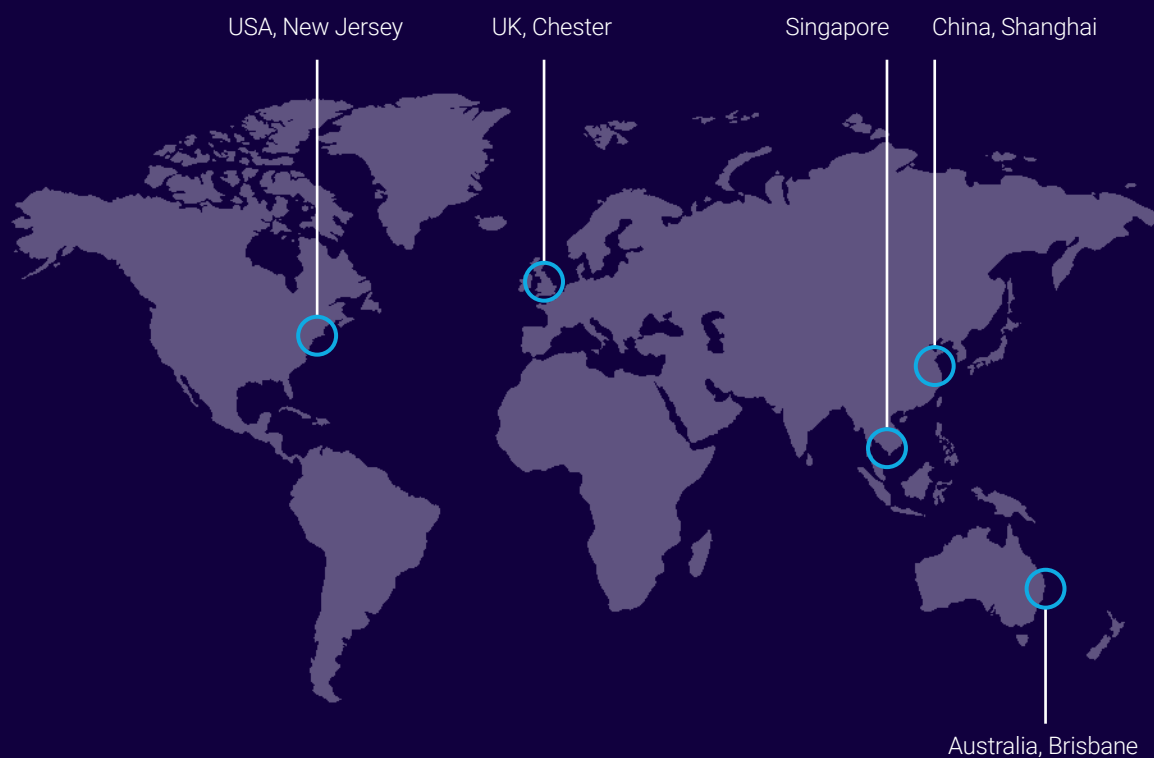
HARDWARE MEASUREMENTS	
Enclosure	Self-coloured vacuum formed plastic case
Indicators	None
Controls	None
Connectors	1x BNC signal port
DIMENSIONS	
Size	440mm x 440mm x 110mm
Weight	2.1kg
ENVIRONMENTAL MEASUREMENTS	
Operating temperature	0 - 55 °C
Humidity	0 - 90 % non-condensing
IP rating	42 (EN 60529)
ANTENNA	
Forward gain	13.6 dBi at 800 MHz
Beamwidth	40° in E-plane and 50° in H-plane
Approximate bandwidth	100 MHz centred on 800 MHz
Maximum sensitivity frequency	800 MHz
Front to back ratio	Approximately 20 dB
Radiation pattern (800 MHz)	Normalized Radiation Pattern diagram



* Please note this accessory requires UltraTEV Plus² V8 Hardware or higher and a UHF Receiver.

Global Footprint

EA Technology is an engineering and technology business that provides intelligent energy solutions for designers, installers, operators, and owners of power network assets.



Founded in 1966 we have over 50 years' experience in the industry and 5 regional offices around the world to support our global customer base.

We work with a lot of our clients on a long-term basis to help them safeguard their power networks.

We advise our clients on strategy and implementation of a range of technology solutions to manage power assets, delivering maximum life and minimize cost.

Schedule a personalized demo of the UltraTEV Plus² tailored to your organization's needs by booking via <https://eatechnology.com/americas/request-demo/>

For more information, or to book a FREE demo, scan the QR code.



Safer, Stronger, Smarter Networks

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