

# From Partial Discharge Detection to Data-Driven Insight

Early partial discharge (PD) testing methods focused on simple amplitude-based measurements, providing a basic indication of whether PD activity was present. As instrumentation evolved, additional parameters such as pulse repetition rate, phase-resolved patterns and waveform analysis were introduced, improving diagnostic confidence and enabling the detection of lower-level PD sources.

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Modern handheld PD instruments, such as the UltraTEV Plus<sup>2</sup>, now bring these capabilities together within a single device, enabling far richer data capture during routine testing.

At the same time, the operating environment for electrical networks has changed. Increased asset criticality, reduced redundancy and higher outage costs mean that each site visit must deliver more than a snapshot assessment. Modern PD testing is now expected to generate datasets that are complete, accurate and suitable for long-term use, rather than relying solely on interpretation at the time of testing.

Advances in testing capability and data recording allow field technicians to focus on efficient, repeatable data capture, while detailed interpretation and decision-making take place off-site. As a result, PD testing is transitioning from a detection-led exercise to an insight-led process that supports broader asset management objectives.

## THE CHANGING ROLE OF PD TESTING

With this transition, the role of Partial Discharge testing itself has shifted. The primary question is no longer simply whether discharge is present, but whether sufficient information has been recorded to fully understand its nature, significance and potential impact over time. In practice, this requires moving away from selective or summary measurements toward more comprehensive recording during routine surveys.

Modern PD testing instruments, such as the UltraTEV Plus<sup>2</sup>, can capture detailed PD analytical data alongside contextual asset information within a single test. This enables the transition away from surveys being designed around minimal data recording or on-site judgement alone.

There has also been a deliberate effort to simplify on-site testing. Structured testing modes, backed by a centralised database like Managed Surveys, ensure consistent data collection independent of the level of expertise of the test technician. As a result, PD testing is increasingly defined



by the quality and completeness of the recorded dataset, rather than by individual inspection outcomes.

## THE VALUE OF RICH PD DATA

A single Partial Discharge magnitude can confirm that discharge activity exists, but it provides limited insight into defect type, severity or progression. A combination of phase-resolved analysis, waveform characteristics and pulse rate offers a far stronger basis for distinguishing true PD from noise and understanding how insulation defects are developing over time.

When complete datasets are recorded during surveys, results can be revisited and reassessed as analytical methods improve, rather than being constrained by what was initially reviewed in the field. This allows asset owners to extract additional value from historical data as understanding evolves.

Context adds further depth. Precise measurement locations, asset configuration details, environmental conditions, notes and images all provide essential background that supports confident post-analysis. When this contextual information is captured and stored centrally, its value increases significantly, enabling more reliable comparison and interpretation over time.

## CONSISTENCY, CONTEXT, AND REPEATABILITY IN PD SURVEYS

For Partial Discharge data to support long-term decision-making, it must be comparable across time. Consistency in how and where measurements are taken is critical, particularly in networks where surveys may be conducted by different technicians or contractors over multiple years. Without this consistency, apparent changes in PD activity may reflect differences in testing practice rather than genuine changes in asset condition.

Repeatable survey structures help address this challenge by ensuring that measurements are taken at the same locations using the same methods on each visit. Guided workflows connected to a centralised data management platform, reduce dependence on individual judgement in the field and improve confidence that like-for-like comparisons are being made.

Context strengthens this further. The ability to record precise locations, asset details and supporting observations allows engineers to interpret results with a clear understanding of how measurements relate to the physical asset. Centralised, owner-controlled datasets ensure that this knowledge is retained regardless of who

performs the testing, preserving continuity of insight and supporting informed asset management decisions.

**ADVANCED ANALYSIS: THE POWER OF LARGE PD DATASETS**

As partial discharge surveys generate larger and more consistent datasets, the focus shifts from analysing individual results to extracting insight at scale. When data is captured in a structured and repeatable way across assets on a global scale, patterns can be identified that would not be apparent from isolated assessments.

Access to large volumes of high-quality PD data has enabled EA Technology to develop and refine analytical algorithms capable of automatically recognising characteristic phase-resolved discharge patterns. By training these algorithms on rich, global datasets, built from contributions across multiple network operators, PD behaviour can be classified more reliably, supporting earlier identification of emerging issues and greater confidence in interpretation.

As datasets become richer, incorporating detailed waveforms, contextual information and analytical capability can be further refined and increasingly automated. In turn, participating network operators benefit directly from these advances, as improvements in pattern recognition and analysis are fed back into the tools and methodologies they use.



**CONCLUSION: DESIGNING PD SURVEYS FOR INSIGHT, NOT JUST DETECTION**

Partial discharge testing is no longer defined by what can be identified during a single inspection. Its value lies in the completeness, consistency and context of the data recorded, and in how that data can be used over time. As networks become more critical, asset owners must consider not only whether PD is detected, but whether sufficient information is being captured to support confident long-term decisions.

By separating straightforward field data capture, using modern instruments such as the UltraTEV Plus<sup>2</sup>, from detailed off-site analysis supported by centralised platforms

like Managed Surveys, PD testing can deliver simplicity in execution alongside depth of insight. Designing surveys for insight rather than detection ensures consistent trending, data ownership independent of service providers, and a stronger evidence base for asset management, supporting safer, more resilient networks built on understanding rather than assumption. [T&D](#)

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**Finding Partial Discharge before it finds you...**

Make Partial Discharge (PD) detection easy with the **UltraTEV Plus<sup>2</sup>**

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