



Cable Condition Assessment

Finding defective cables

With decades of expertise and countless satisfied customers, EA Technology is a world leader in providing solutions for power plant asset management.

Do You Understand Your Cable Condition?

Understanding the condition of your cables is essential for keeping networks running optimally. Tan Delta (TD) testing and Partial Discharge (PD) cable mapping provide us with an invaluable opportunity to detect potential faults before they arise, reducing both risk and cost by proactively repairing ageing assets when necessary, rather than replacing once failures have occurred - particularly in end-of-life networks.

Our testing services can detect PD faults as well as cable insulation conditions; working to ensure reliable operations in the public and private sectors. This service would benefit all owners and operators of MV and HV cables.

Ageing MV/HV networks are becoming a cause for serious concern globally, with asset managers and cable operators struggling to identify the most cost-effective solutions.

To ensure uninterrupted service and reliability of these essential cables, understanding their condition is absolutely necessary.

Problems we typically find

- Ageing cables.
- Poor joints or terminations.
- Deficient system design.
- Installation defects.

Avoid consequences

- Safety.
- Reliability.
- Maintenance/replacement planning.
- Investment prioritisation.

Solutions

Cable condition assessment service

Our cable condition assessment service offers a thorough review of the status of your cables with two unique offline testing methods. PD cable mapping reveals minor insulation failures before they become critical, while TD testing to IEEE 400.2 uncovers water tree growth that could otherwise go undetected and reduce the life expectancy of XLPE insulation. Detection through PD alone is not enough. Our process ensures thorough safeguarding for peace-of-mind assurance in each test.

Benefits of cable condition assessment

- Fast and accurate site service.
- Works with paper and polymeric insulated cables.
- Reduces the need for expensive excavation work.
- Ideal for pre-commissioning and post-repair tests.
- Locates PD activity in cables BEFORE it leads to failures.
- TD testing can detect water treeing of cable insulation, not detectable by PD testing.
- Reduces the risk of unplanned, expensive outages.

PD Cable mapping service testing

With over 60 years expertise in the electricity industry, our PD cable mapping Service works on the principle of energising HV cables at Very Low Frequency (VLF), making the system very portable and requiring only a 13Amp 230V supply.

Time-of-flight measurements are used to calculate cable length, and all captured data is processed using bespoke software to calculate the location and magnitude of recorded PD waveforms. Our system has a 25 year track record of success from the UK to the Far East.

High voltage power supply



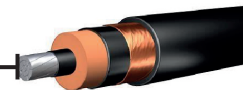
HV-filter



PD/TD-CC



Cable under test



Laptop Computer



Figure 1: Non-destructive VLF testing.

Phase-resolved PD pattern



Figure 2: Phase-resolved PD pattern

Cables and joints which exhibit deterioration in the form of PD activity are identified by the system as pulses of electrical energy, measured in pica-Coulombs. The magnitude of discharges in each phase is displayed as a function of distance along the cable.

Information from all the PD events can be combined to produce a 'discharge map': A comprehensive picture of the condition of the whole cable and its joints. This enables us to provide detailed reports on where PD is present and the likelihood of it developing into failures.

TD testing

TD testing allows condition assessment of existing networks and complements PD testing, providing additional information about insulation condition.



Figure 3: TD data over voltage.

TD testing measures the bulk of the insulation condition and has been proven to be effective for detecting extensive water treeing in cable insulation.

The IEEE 400.2 – 2013 'Guide for Field Testing of Shielded Power Cable Systems Using Very Low Frequency (VLF)' standard provides recommendations for acceptable parameters for TD testing.



Multiple applications

The service is effective on all types of HV cable. Paper insulated cables can be tested to approximately 6km in length and polymeric insulated cables up to approximately 10km in length.

Typical uses include:

Pre-commissioning	Checks the condition of cables and joints before they are put into service
Post-repair	Safely tests the integrity of cables that have been repaired WITHOUT the risk of overloading the cable, an inherent problem with 'withstand' tests
Fault Detection and Diagnosis	Identifies PD in cables and joints at an early stage of their development, BEFORE they lead to disruptive failures
Condition Data Gathering	Collects information on the condition of cable assets, including confirmation that cables are free of PD
Risk analysis	Enables the production of a Health Index for each cable asset so that the probability and consequences of failure may be calculated
Investment Prioritisation	Empowers asset managers to make intelligence based decisions on cable maintenance and replacement strategies

LIRA testing

Furthermore, our LIRA test can be carried out on electrical cables hundreds of kilometres in length and is becoming increasingly effective for condition monitoring, or fault location, in long length cables (for example submarine cables connecting off-shore platforms to the grid).

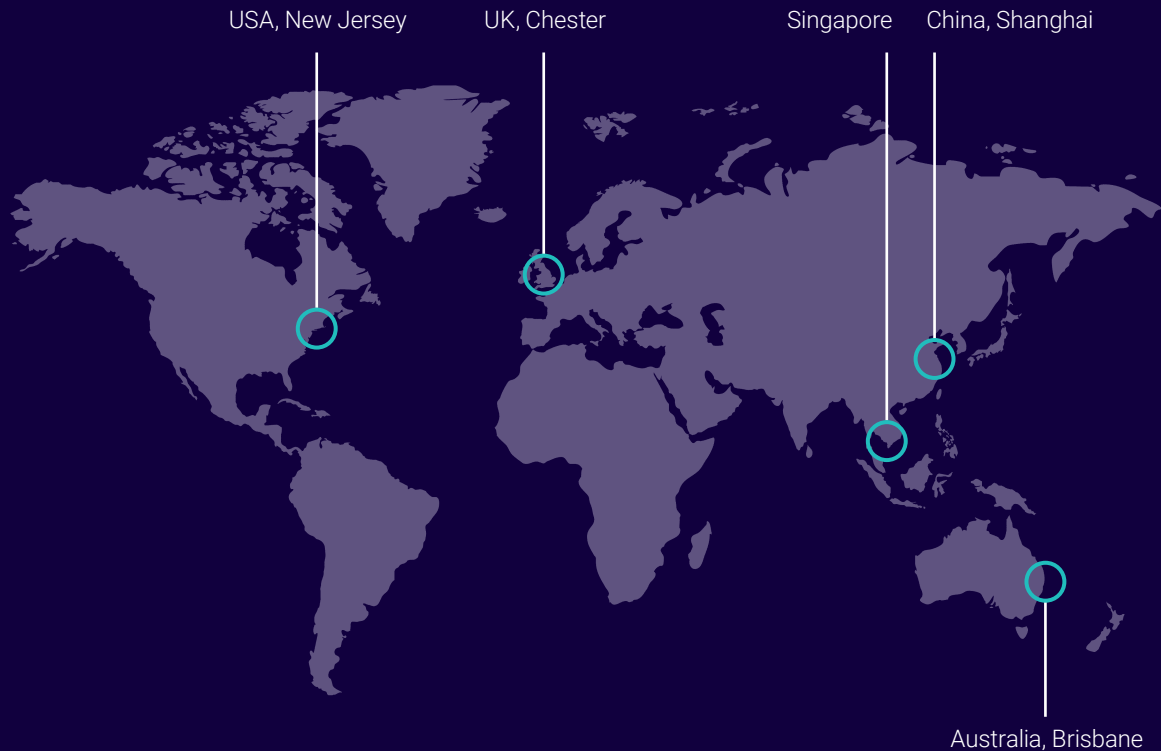
Conclusion

Cable operators now have access to a cost-effective way of testing their assets for fault finding and longevity. Testing serves as an invaluable process that can boost the life expectancy of crucial investments. By using PD cable mapping and TD testing, you get a better overview of the condition of your cable and identify the issues in a more accurate way. With this information, you can then decide on the best plan of action to take in order to fix any problems, ensuring that your cables have a long and healthy lifespan.



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 6 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 minimise cost.



Safer, Stronger, Smarter Networks

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