



Transformer Monitoring for Data Center Operators



Reducing risk and maximizing uptime
with holistic, secure and proven monitoring solutions

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Transformer monitoring: a critical part of your energy systems

The data center business model is built on 24/7 uptime and availability at peak efficiency levels. Avoiding downtime is the highest priority and a reliable electricity supply is a key element. Central to that is a power transformer, the critical link between data centers and the electricity grid or any onsite power generation.

Although power transformers do not fail regularly, when they do fail, the consequences are often severe: most transformers located at data center sites use oil for cooling and the consequences of fire or explosion in a faulty transformer can be serious. If redundancy has not been built into the system as part of a 2N design with two separate transformers or substations, the result is often a long wait for a replacement with consequential disruption or downtime.

Data center substations operate continuously and to minimize costly disruption, maintenance must be carefully pre-planned and understood.

By partnering with Camlin Energy, Asset and Operations managers can gain a deeper understanding of the risk, health, and performance of their transformers through our secure, online monitoring solution TOTUS. TOTUS monitors the most critical components of a transformer and is the only modular solution that encompasses Dissolved Gas Analysis (DGA), Partial Discharge (PD), Bushing Monitoring (BM), Through Fault Currents (TFC) and transformer analytics.

Over 1,700 TOTUS monitoring solutions installed at world leading energy utilities, data centers and renewable generation plants



This enhanced level of monitoring and insight enables Asset and Operations managers to develop and optimize proactive maintenance strategies.

- Significantly reduce the risk of sudden transformer failure, associated costs and lost revenues
- Improved availability and uptime
- Avoidance of unnecessary maintenance or replacement parts when transformers and their associated bushings are functioning normally
- End-to-end service offering with independent, extensive expertise packaged into the product offering



The challenge: Reduce risk of unplanned downtime

- Understand the health and risk of transformer assets
- Managing multiple transformers
- Avoiding unnecessary intervention and servicing
- Knowing the correct action to take and when to take it
- Shortage of transformer experts and dedicated resources
- Avoid costly contractual or regulatory penalties



The solution: Total transformer monitoring

- Real-time assessment of the condition of the transformer enables Asset Managers to react quickly to failure risks
- Easy to understand information with appropriate actions clearly prescribed – reduced need for in-house transformer experts
- Sophisticated data analysis tools and transformer models that cut through data noise to the real issues
- Cutting-edge sensor technology in a modular solution that can be tailored to the criticality and health of the transformer
- The ability to monitor all key parameters to give the most complete picture of transformer health in a single integrated solution (DGA, PD, Bushings, and Through Fault Current)

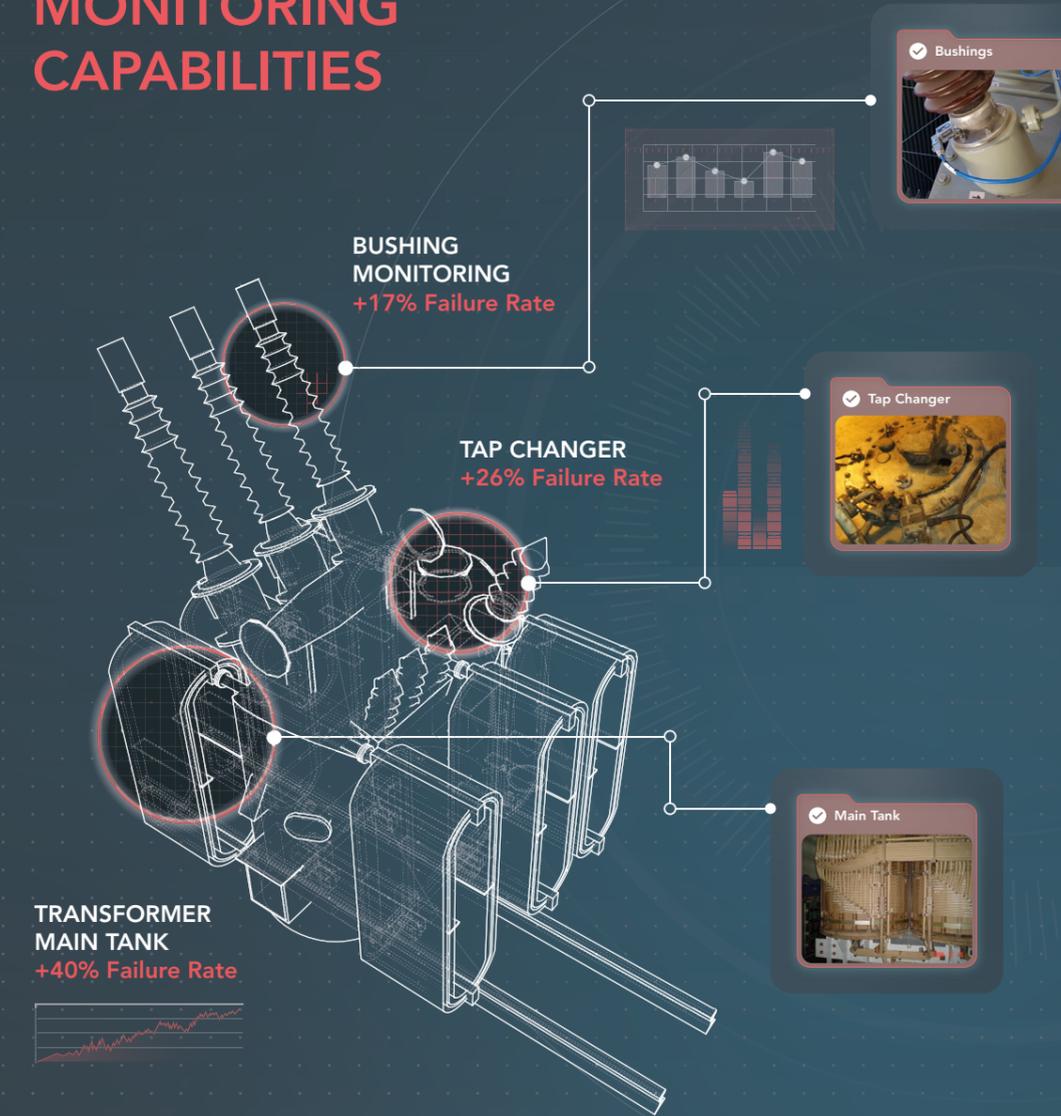


The result: Optimal transformer uptime

- The risk of sudden transformer failure is reduced significantly, protecting availability KPI's
- Resources are focused only on those transformers which represent a risk and preventative maintenance resolves faults before they become serious issues
- Condition-based maintenance avoids unnecessary intervention and servicing of healthy transformer assets
- Asset Managers receive the relevant information to make immediate decisions, reducing the volume of data that needs to be interpreted
- Facility management can focus on core operational issues, safe in the knowledge that critical transformer assets will be available



TOTUS MONITORING CAPABILITIES



Developed for mission-critical transformers, TOTUS provides asset managers with a deeper understanding of transformer failure modes and how to manage them.

More than 80% of transformer failures can be attributed to three key areas: Bushings, main tank, and on-load tap changer (OLTC). TOTUS monitors all key components on the transformer, giving a full picture of transformer health.

Bushings

TOTUS uses integrated intelligence and analytics to provide reliable and intuitive information to Asset Managers about bushing health.

Main tank

TOTUS monitors and correlates all key components in the main tank including DGA, Partial Discharge, High Energy Events & Through Fault Current.

On-load tap changer

TOTUS can monitor and integrate key parameters such as tap position, motor current and temperatures to highlight deviations over time.



Actionable information at your fingertips

A modular approach to software

Our TOTUSPRO Software Suite consolidates monitoring data from TOTUS to provide a clear picture of asset health and fleet health, reducing unplanned outages, boosting production, and increasing operational efficiency.

The suite is divided into three main applications: TOTUSPRO Web, TOTUSPRO Desktop and TOTUSPRO Access.

Every TOTUS unit is offered with TOTUSPRO Web while TOTUSPRO Desktop is an optional expert tool able to import offline data for deeper investigation into failure modes. TOTUSPRO Access provides Asset Managers with a comprehensive fleet view.

There are further options to expand software options depending on maintenance strategies.



Independent expertise

Our transformer experts are on hand to support you throughout your transformer asset management journey. Our in-depth reporting and expert advice provide an independent assessment of the transformer.

Expert consultancy

Pre-procurement design review for a new transformer to ensure requirements and planned performance is clearly understood by both parties (customer & transformer OEM).

Independent technical support for factory acceptance tests of new transformers at the transformer OEM facility.

On-site asset inspection (e.g., for investigation of issues, or for potential improvements to operation).

Forensic investigations following a serious or catastrophic transformer failure.

Condition assessments

The automated monitoring service available through the TOTUS software can be further extended to the most holistic transformer condition assessment that considers the online data as well as any relevant historical and offline data of the transformer's entire lifecycle.

Initial diagnostic assessments benchmark the health of the transformer when online monitoring is first installed. Periodic diagnosis reports trend the condition of the asset and create a full asset history that enables the earliest detection of any defects. Event diagnostics allow a rapid in-depth assessment following a significant alarm or detection of a defect and determines whether the continued operation is safe as well as recommending any interventions.

Knowledge sharing

Knowledge of the monitoring device ensures the best usage of the system and its provided information, enabling maximum benefit to be derived from your investment. Through product training, we cover not only the normal operation but also situations where alarms are reported and need to be investigated.

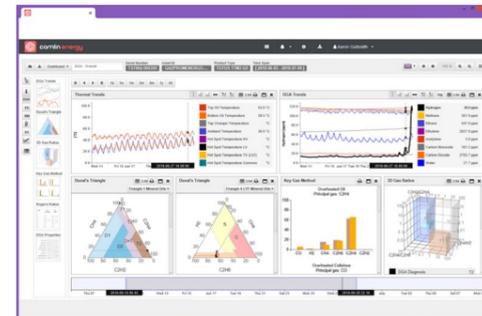
Performing the correct action based on the monitored data is often the most difficult step, even for experienced Asset Managers. Whilst our experts are on hand to support decision making, through our academic seminar programme you can access exclusive content to advance knowledge and expertise which enables better decision making.

TOTUSPRO ACCESS

Serial Number	Asset ID	Status	Condition Group	Alarm
TOT001-000022	ATR275	Online	1	●
INT001-000012	ATR275	Online	4	●
TOT001-000026	TR1	Online	2	●
TMT015-000011	US	Online	1	●
INT001-000056	PST2	Online	1	●
INT001-000057	PST3	Online	1	●

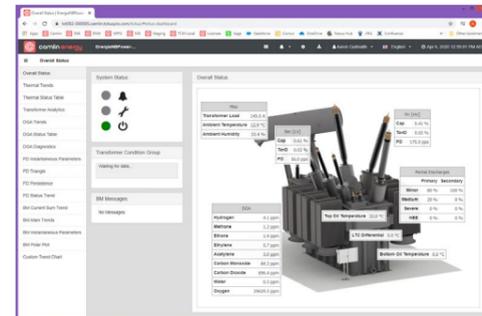
The TOTUSPRO ACCESS module immediately highlights which transformers are the greatest risk, sends email notifications, allowing asset managers to make decisions across the entire transformer fleet.

TOTUSPRO DESKTOP



TOTUSPRO Desktop, an optional expert tool for deeper investigation on failure modes, providing customizable widgets and the ability to import offline data archives.

TOTUSPRO WEB



Each TOTUS device comes embedded with TOTUSPRO Web and an online server that incorporates advanced diagnostics, providing key insights to asset condition in a graphical and easy to read display of information.



Optimizing Critical Infrastructures

With a history stretching back over 30 years, the foundations of the Camlin business are built on a core belief that innovation is key to driving improvements in the energy industry. We have been at the forefront of key innovations that have changed the face of the industry – including digital fault recorders; digital circuit breaker analyzers; advanced protection systems and network automation technologies. Camlin continues this track record of innovation, developing innovative and intelligent monitoring products and services that help make electricity and rail networks safer, more efficient, resilient, and sustainable.

We believe in leveraging our partners existing platforms and technology, partnering this with new developments to provide expert analysis into asset condition, translating diagnostic data into prescriptive actions. With headquarters in the UK, the US and China, and facilities in 21 cities across 17 countries, we are set up to deliver globally, ultimately our goal is to ensure our customers see real value from monitoring technology.



Holistic Asset Monitoring

Transformer, circuit breakers and rotating machines



Digital Solutions

Advanced analytics providing prescriptive actions on asset health



Asset Condition Assessment

Building a full picture of asset health



Expert Services

Focused seminars and training aimed driving knowledge sharing

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