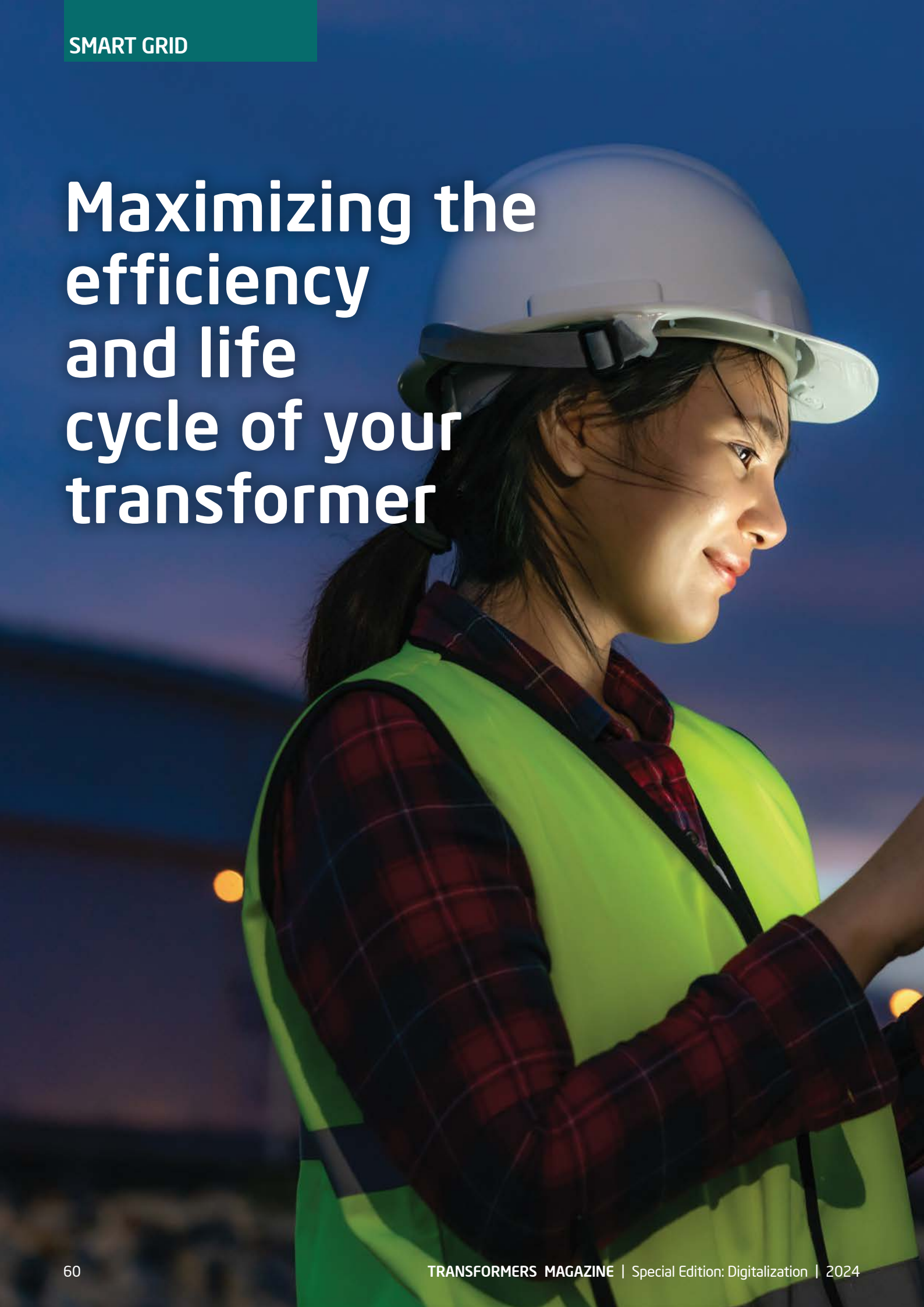
Maximizing the efficiency and life cycle of your transformer



The possibility of collecting and analyzing data about the transformer's health is becoming a key pillar for asset and service managers and transformer end-users

MeDICA provides the capability to monitor crucial parameters, collect comprehensive data, and facilitate the establishment of alarms and warnings in a unified portal

The power grid is going through significant changes due to advancements in technology and shifts in the needs of modern society. The integration of renewable energy sources adds complexity to the grid, which leads to fluctuations in power consumption and strains electrical infrastructure.

As energy demand increases, utility companies are forced to put more strain on existing infrastructure. Effective transformer maintenance is essential for optimizing efficiency, reducing costs, and extending the life cycle of transformers.

The need for grid resilience and predictive maintenance is driving the market for smart transformers, and hence, smart sensors are utilized in transformers.

Transformers play a crucial role in power grids, industrial plants, data centers, and other consumer sites. Although they are designed to last for 30 – 40 years, various factors, such as overloading, overheating, moisture, and several others, can cause them to age prematurely.

The possibility of collecting and analyzing data about the transformer's health is becoming a key pillar for asset and service managers and transformer end-users.

In this article, we will explore the possibilities of asset management through **MeDICA**.

The importance of asset management in transformers

MeDICA not only provides the capability to monitor crucial parameters and collect comprehensive data but also facilitates the establishment of alarms and warnings in a unified portal.

Furthermore, it empowers users to leverage asset health data for refining maintenance strategies and making informed decisions regarding the replacement of ageing assets. Through early identification of potential issues, proactive measures can be undertaken to prevent or mitigate potential problems.

We are dedicated to continuous improvement and ongoing research and innovation to provide greater value to our customers. In the context of transformer maintenance, the accurate interpretation of data is paramount. Managing data integrity and security within a dynamic team environment poses inherent challenges that merit careful consideration.

Data analytics

Data analytics for transformer health involves utilizing various data sources and

analytical techniques to monitor and predict the condition of transformers.

Here are some key aspects:

1. Data collection:

Install sensors: Equip transformers with sensors such as COMEM's eDevices to collect real-time data on temperature, load, voltage, and other critical parameters.

Conduct diagnostic tests: Regularly perform online and offline tests such as Dissolved Gas Analysis (DGA), oil quality tests, and electrical tests to gather detailed health data.

Include maintenance records and failure history: Don't forget to include historical data to be able to track trends over time.

2. Data integration:

Centralized data storage: Use a centralized database to store all collected data.

COMEM's **data aggregator type eDAC** is available as a cloud-based solution or as an on-premises database. As part of our **MeDICA** ecosystem, **eDAC** can collect data remotely from various sensors installed on the transformer, including COMEM eDevices and third-party sensors, and remote them through wires, fiber optic, or integrated 4G module.

3. Data analysis:

Advanced analytics and algorithms should be used to process and interpret the collected data. Techniques include:

- **Dissolved gas analysis (DGA)**: Identifies faults by analyzing gases dissolved in transformer oil.
- **Predictive maintenance:** Forecasts potential failures and schedules maintenance before issues arise.

4. Visualization and reporting:

Tools like the **MeDICA portal** provide visualizations and dashboards to help operators control the key health indications, track trends over time, and make informed decisions about the transformer maintenance strategy.

> **Tools like the MeDICA portal provide visualizations and dashboards to help operators control the key health indications**

You can also set alerts and notifications for critical transformer conditions that require immediate attention.

5. Benefits:

- **Improved reliability:** Early detection of issues prevents unexpected failures.
- **Cost savings:** Reduces maintenance costs by targeting only the transformers that need attention.
- **Extended lifecycle:** Proper maintenance based on accurate data can extend the life of transformers.

By leveraging these techniques, the end user can ensure the efficient and reliable operation of the transformer fleets.

A robust data management system is indispensable for gaining a comprehensive understanding of your data landscape

How to avoid data misinterpretation?

A robust data management system is indispensable for gaining a comprehensive understanding of your data landscape. Wrong or incorrect data interpretation can occur and can lead to wrong data-based decisions.

A proper data management system will help you to observe your data.

If you do not have an expert in your organization to handle data interpretation correctly, our service team is trained in the latest analytics techniques and tools to keep up with advancements in the field.

Should you need any help in building your maintenance strategy, **our service experts can support you with:**

- Data collection and integration – from online monitoring and offline testing.
- Data evaluation – to better predict and forecast the asset health status in the future.
- Reports generation and action recommendations.

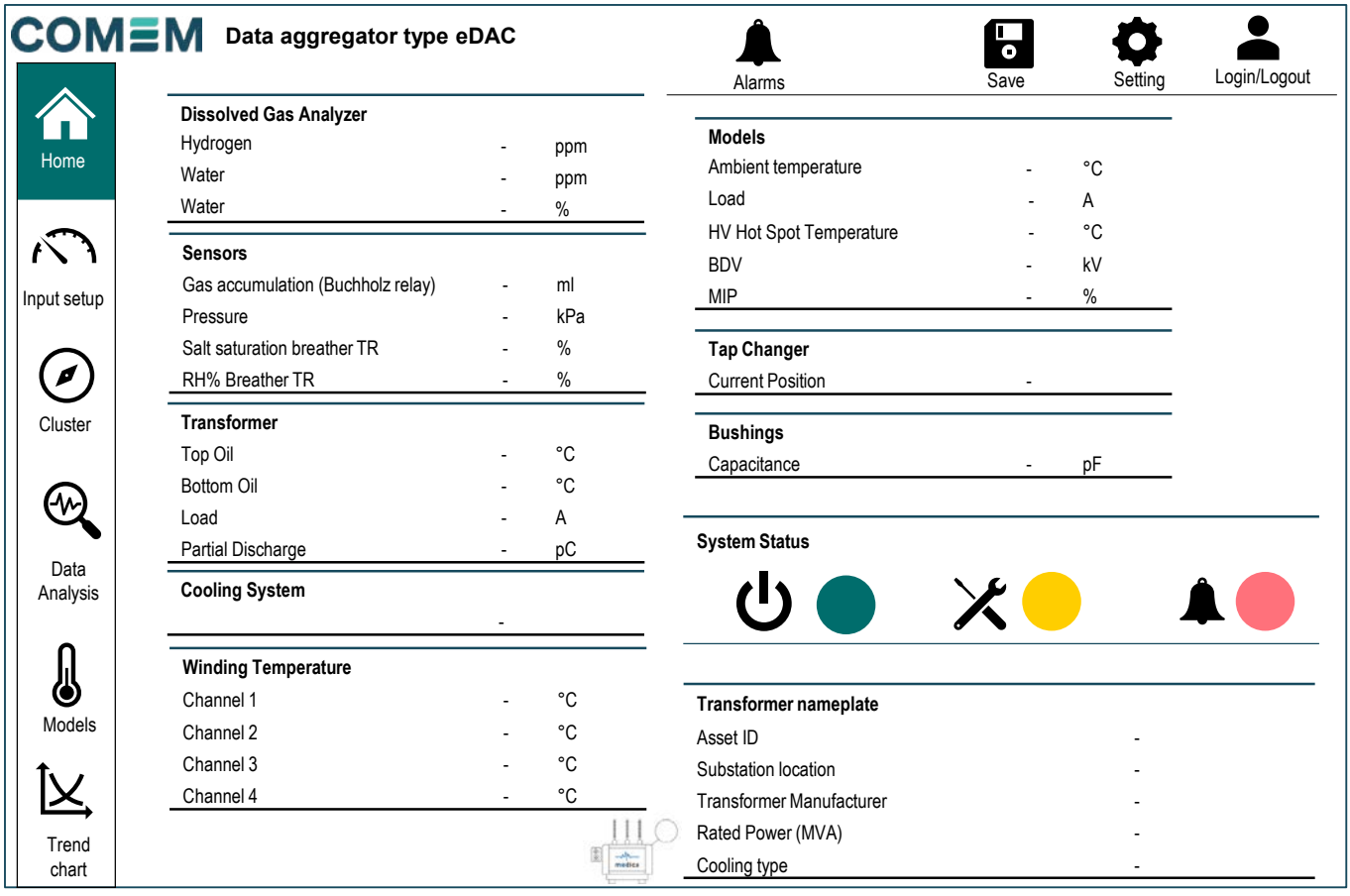
Choose MeDICA, an open monitoring ecosystem for transformer diagnostics with integrated customer services and analytics.

1. You will not miss any alarms due to continuous remote monitoring.
2. You will get a medical record of your transformer in just one click.
3. You do not need any expertise to work with the collected data.

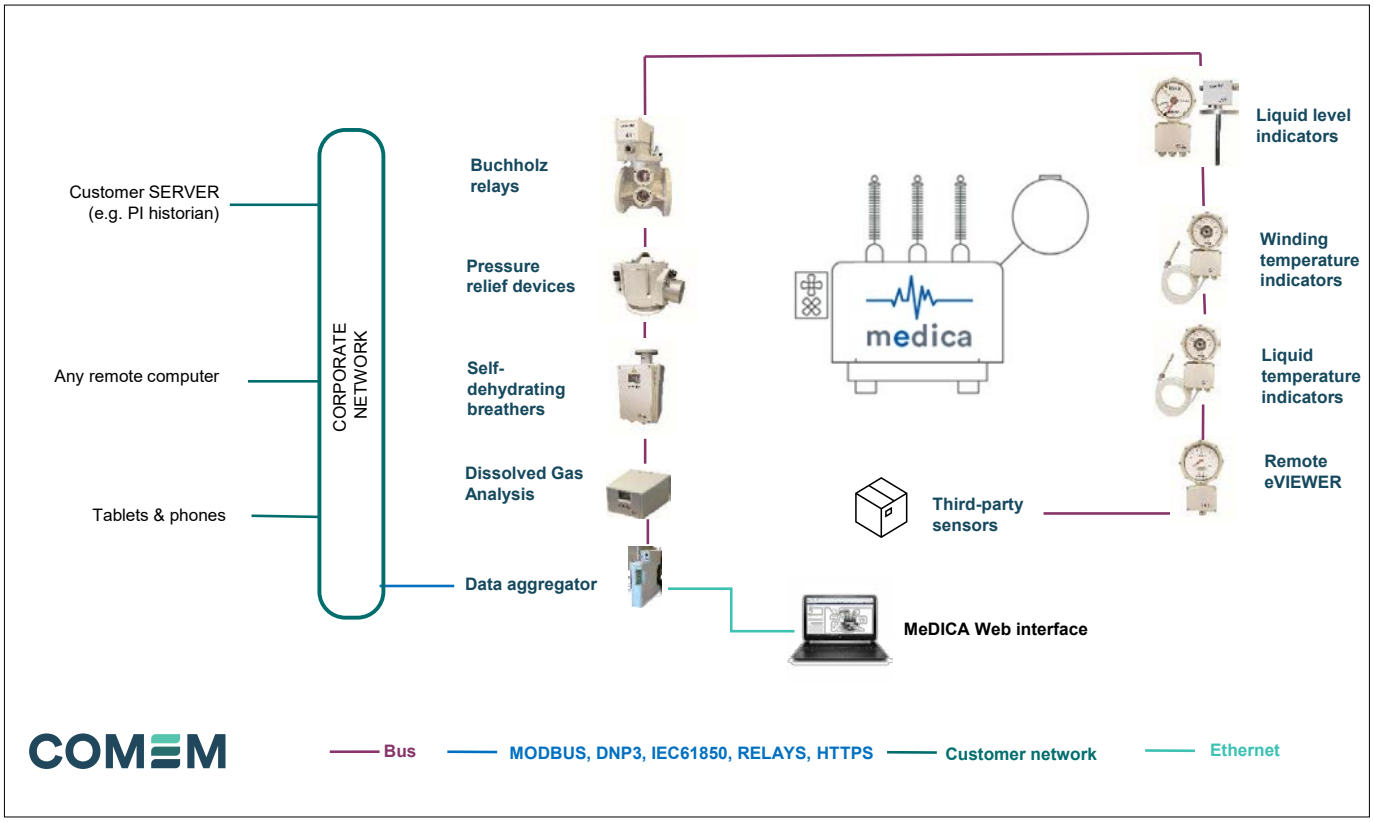
MeDICA provides a centralized storage platform for a diverse array of data sources, achieved through the eDAC data aggregator type. eDAC serves as a cornerstone in data integration, governance, and storage, guaranteeing high availability, resiliency, and recovery.

Key health parameters that you can monitor through **eDAC**, an integral part of our **MeDICA** solution include:

- **Thermal model** (IEC, IEEE, Dry-type transformers)
- **Hot spot temperature**
- **Breakdown voltage model**
- **Moisture in paper model**
- **Dissolved gas analysis**
- **Sensors**
  - Gas accumulation
  - Pressure
  - Salt saturation & relative humidity percentage in breathers
  - Temperature
- **Bushings**
- **On-load tap-changer**
- **Cooling system**
- **Ambient temperature**
- **Winding temperature measured through fiber optic systems**



MeDICA provides a centralized storage platform for a diverse array of data sources, achieved through the eDAC data aggregator type



Incorporating FOTEMP, a fiber optic temperature measurement system, into MeDICA can provide reliable and fast temperature data

With MeDICA you can forecast maintenance needs and plan accordingly, reducing downtime and extending the lifespan of transformers

Introducing fiber optic temperature measurement for transformer application

Incorporating **FOTEMP**, a **fiber optic temperature measurement system**, into **MeDICA** can provide reliable and fast temperature data, contributing to the safety, reliability, and efficiency of transformer operations.

Here are some key points about their use:

- **Precision and accuracy:** Fiber optic sensors provide precise temperature readings at various points within the transformer, including the critical hot spot areas.
- **Real-time monitoring:** These sensors offer continuous, real-time data, allowing for immediate detection of any abnormal temperature rises.
- **Immunity to electromagnetic interference:** Unlike traditional sensors, fiber optic sensors are immune to electromagnetic interference, making them highly reliable in the electrically noisy environment of a transformer.
- **Durability:** They are resistant to harsh conditions, such as high temperatures and acidic environments, ensuring long-term reliability. Once installed, fiber optic sensors require minimal maintenance.
- **Cost-effective in the long term:** Although the initial installation cost may be higher, the long-term benefits of reduced maintenance, increased reliability, and extended transformer life make fiber optic sensors a cost-effective solution.

Discover the significance of an open modular ecosystem.

What does it mean?

Understanding the unique complexities of your challenges is where COMEM truly excels. Our approach to tailored solutions is anything but one-size-fits-all.

We can guide you through the transition from time-based maintenance towards a condition-based approach, where maintenance is performed based on the actual condition of the transformers.

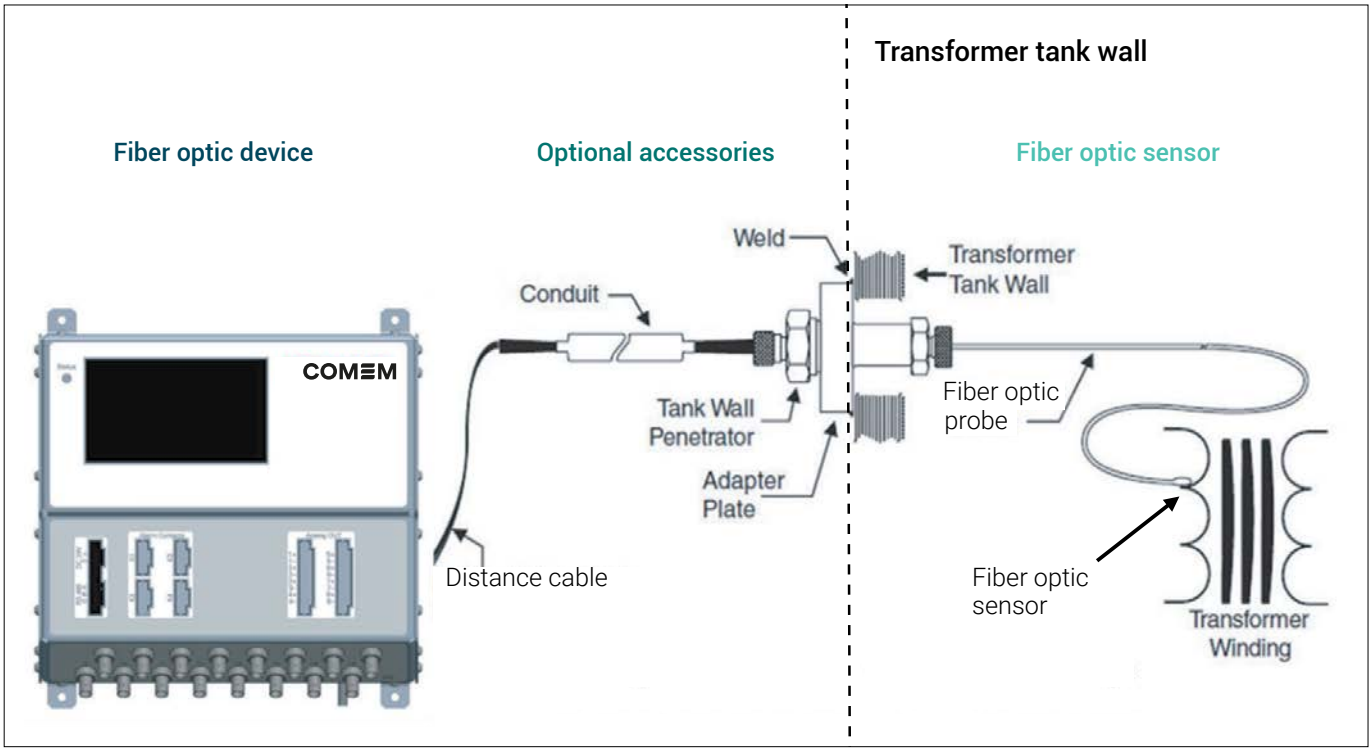
With **MeDICA** you can forecast maintenance needs and plan accordingly, reducing downtime and extending the lifespan of transformers.

Continuous improvement:

MeDICA is a modular solution that can meet specific customer needs that vary over time. We can assist you, make regular reviews, and refine your analytics models and processes to improve accuracy and effectiveness.

We can dynamically adjust the product mix and services to ensure not only more cost-effective and quality solutions but also adapt them to the specific challenges and objectives of your business.

The primary objective is to craft a solution that not only addresses specific problems but also adds significant value, enhances performance, and robustly supports the overarching business strategy.



Decide if you want to buy or rent

Are you unsure whether to buy or rent? At COMEM, we are here to provide you with guidance and support. We can work with you and develop a proper transformer maintenance plan based on data-driven preventive and predictive maintenance to increase the asset lifespan and optimize your maintenance cost.

By signing a Service Agreement with COMEM, as part of the plan, you will receive:

- A set of required sensors.
- Installation and commissioning.
- Web interface for remote access and monitoring of your equipment.
- Warranty for the period of the agreement and original spare parts.
- Dedicated assistance during the entire period of the agreement.
- Data collection and interpretation by our experts.

Choose **MeDICA** and get a complete customer solution that includes products and services to enable a longer and more efficient transformer life cycle.

Contact us and get support with the solution selection.

Choose MeDICA and get a complete customer solution that includes products and services to enable a longer and more efficient transformer life cycle

medica

Monitoring **E**cosystem
for transformer **D**iagnostics
with **I**ntegrated **C**ustomer services & **A**nalytics

Contact us & get support with the product selection:
medica@it.comem.com