

FIBER OPTIC TEMPERATURE MONITORING SOLUTION
FOR TRANSFORMER WINDING HOT SPOTS



opSen's

Innovation. Precision. Solutions.

FIBER OPTIC TEMPERATURE MONITORING SOLUTION FOR TRANSFORMER WINDING HOT SPOTS

Opsens' transformer winding hot spot temperature monitoring solution is the most accurate fiber optic temperature system available today. Based on the field proven GaAs crystal technology used in transformers since the 1990's, Opsens' direct, accurate and real-time temperature measurement addresses the critical issues encountered by transformer manufacturers and electric utility managers; **sensor robustness, ease of installation, long-term reliability and easy system integration into existing infrastructures.**

Immune and transparent to electromagnetic fields (EMF) the sensors and the innovative connectivity system can be directly installed in transformer windings, providing crucial temperature data that enables users to optimize transformer loading, maintain maximum capacity and manage transformer life-span.

Opsens' transformer winding hot spot temperature monitoring solution offers the best total system accuracy

Optimize the life of your transformer

- Essential to evaluate accurate insulation aging
- Helps prevent transformer failure
- Facilitates cooling management
- Improves real time transformer load optimization
- Allows validation of theoretical calculations
- Improves ROI

Installation

FIBER OPTIC TEMPERATURE PROBE

The ruggedized probe tip, encapsulated in uniform size protective tubing, ensures full protection of tip against mechanical stress and transformer oil damage.



Tensile and bending strengths of the round perforated PTFE tubing provide the best protection during cable handling. The well defined round openings allow proper oil wetting along the fiber.

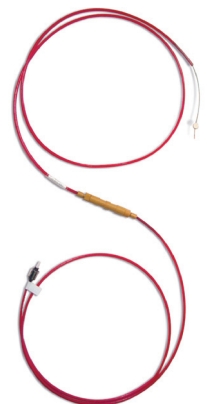
SPACER DISK

Our sensor tips can be supplied with a factory fitted Nomex™ spacer disk. The spacer disk allows for fast, easy and adhesive free mounting in the spacer key yielding optimal probe position for the best hot spot readings and ideal sensor protection, crucial during winding compression.



OTG-T SENSING SYSTEM

The robust perforated PTFE tubing and spiral wrap protection sheathing allow easy cable handling and guarantee sensor and cable integrity.



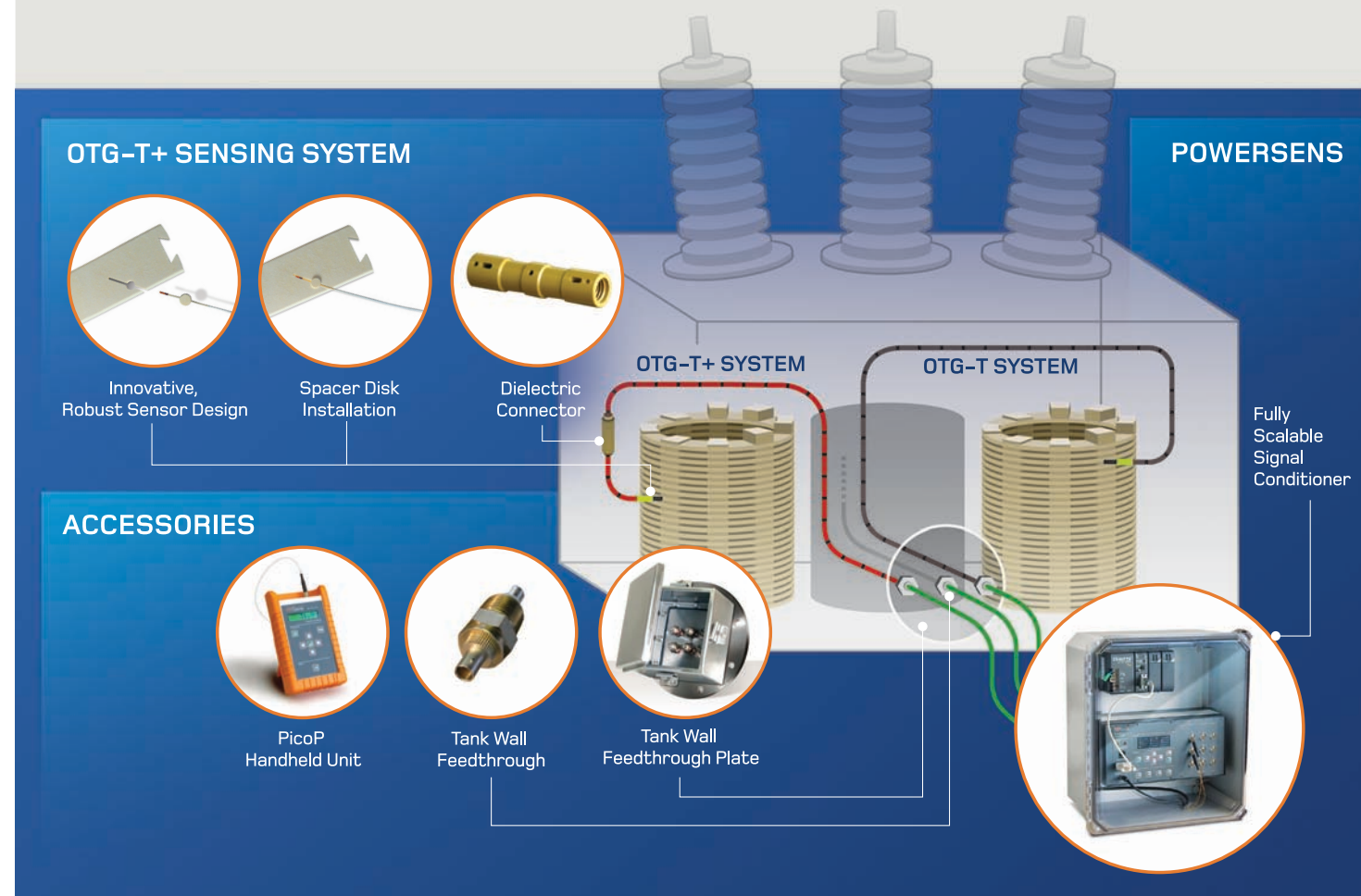
OTG-T+ SENSING SYSTEM

Our innovative 2-step fiber optic sensor winding installation process eliminates need for handling long fiber optic cable during transformer assembly.

In step one, **OTG-T+** sensors can be installed with cable length as short as possible. In step two, using Opsens' all-dielectric TC winding connector, final connection to the transformer tank wall can be done with the **OIC-SW** internal fiber optic extension cable.

This easy process reduces the cumbersome operation of cable spooling and handling to a minimum, thus minimizing the risks of inadvertent cable crunching or pulling during transformer assembly.

SMART GRID TEMPERATURE MONITORING



TRANSFORMER WALL OPTICAL INTERFACE

Installing leak-free solder glass design **OFT-N38** feedthroughs on the stainless steel **FWP-N38** tank wall plate will guarantee a transformer optical interface withstanding up to **20 BAR / 290 PSI** of oil pressure.

A **PCO-SS** stainless steel protective cover can be attached to the outside of the **FWP-N38** tank wall plate to safely guard the transformer optical interface assembly.

Operation



POWERSENS

This second generation, fully scalable signal conditioner, provides reliable & real-time temperature measurements with the Industry's Best Total System Accuracy. The **PowerSens** offers both direct on screen and on PC display, using the **SoftSens** application, of real-time winding temperature. Using its internal data logging capability, it can collect and store temperature data in memory over a selected period of time.



COMMUNICATION CAPABILITIES

IEC61850, DNP3, SCPI and Modbus protocols over RS-232, RS-485 or Ethernet and analog outputs (1/channel), allow fast and easy integration into existing communication networks.

FULLY PROGRAMMABLE RELAYS

The **PowerSens** is available with six individually fully programmable relays dedicated to alarm trigger, transformer cooling control or any other applications.

Reliability

INTERNAL REFERENCE

The **PowerSens** is now fitted with an internal reference that allows regular self verification and correction of system calibration. The internal reference guarantees long term accuracy in the most adverse conditions encountered in a transformer environment such as extreme temperature variations, component aging, mechanical shocks and transformer vibrations.

TRACEABILITY

A fully traceable calibration method assures long term traceability of both the **PowerSens** and the **OTG-T** family of sensors. System accuracy is then secured over lifetime.

SYSTEM SPECIFICATIONS

| | |
|------------------------------|---------------|
| Total system accuracy | ± 0.8° C |
| Sampling rate | 50 Hz |
| Resolution | 0.1° C |
| Sensor operating temperature | -40 to 250° C |
| Sensing body diameter | 1.1 mm O.D. |



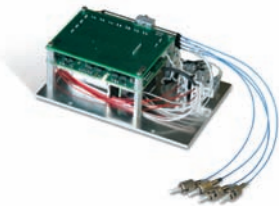
POWERSENS

The PowerSens is an accurate and reliable multi-channel signal conditioner built for smooth and easy field deployment. It distinguishes itself through innovation, simplicity and enhanced integration flexibility. The PowerSens can be used with SCPI and Modbus communication protocol over RS-232 or RS-485 interface to allow fast and easy integration. IEC61850 and DNP03 are also available.



PICOP

The PicoP is a rugged, handheld 50 Hz system designed for field test applications. Its large visible display make measurements simple and easy. It allows for quick and easy validation of sensor integrity throughout all steps of transformer assembly.



OEM-MNT

The OEM-MNT is a multi-channel OEM-type signal conditioner based on the GaAs (SCBG) technology. This compact conditioner offers OEM customers the best accuracy in a product package designed for their specific needs .

OUTSTANDING FIBER OPTIC SOLUTION FOR TRANSFORMER HOT SPOT MONITORING

KEY FEATURES

- Best Total System Accuracy in the industry at better than $\pm 0,8^{\circ}$ C (sensor & signal conditioner)
- Internal reference to guarantee long term accuracy in the most adverse conditions
- 6 year warranty on PowerSens and PicoP signal conditioners
- Robust sensors encapsulated in protective tubing to prevent stress and oil contamination
- Ease of installation using the flexible OTG-T+ Sensing System

To know more
call us at **1.418.682.9996**

Email us at info@opsens.com
or visit us at www.opsens.com

