




SIVACON

# Temperature monitoring

Ensure high plant availability with the intelligent SIVACON technology

## Thermal monitoring

Faulty electrical connections result in impermissible temperature rises that can cause damage to the switchboard and failure of the power supply. This temperature rise can be detected using thermal sensors. Different temperature monitoring sensors that can be installed directly at the point to be monitored are available for the SIVACON S8 low-voltage switchboard. This creates the basis for permanent thermal monitoring. Problems can be detected long before a fault occurs in the switchboard.

## Intelligent technology

Various flexible solutions for temperature monitoring can be adapted perfectly to suit specific requirements. The rugged and cost-efficient temperature sensors do not require a voltage supply. Integration into the communication system of the switchboard enables continuous data acquisition. Forwarding to the control system (SCADA) enables operating and service personnel to respond quickly to faults. Integration into the maintenance system supports optimal plant maintenance. Downtime can thus be reduced, and plant availability increased.

## Highlights

- Thermal monitoring of electrical conductors and connections within the switchboard
- High flexibility thanks to a variety of sensor systems for every requirement
- Permanent monitoring to detect faults long before they occur

Answers for infrastructure and cities.

# Switchboards

## SIVACON S8 Power Distribution Boards and Motor Control Centers

### Temperature monitoring

#### Overview

##### Starting point

Faults and failures in low-voltage switchboards are frequently caused by poor contacts at busbar connections and cable connections. These are characterised in part by significant temperature rises that can result in destruction of the materials used and fire in the switchboard. This impermissible temperature rise can be detected using thermal sensors.

Periodically recorded thermal images using an infrared camera have proved to be of value over the last two decades as a recognised inspection method. With ever higher demands for plant availability, periodic inspection must be supplemented by permanent monitoring.

##### Frequency of inspections

With the annual check using an infrared camera, the switchboard is only monitored for a fraction of its operating time. These inspections are snapshots and do not enable permanent monitoring. They do not detect faults occurring between inspections.

##### External inspection

The points to be monitored are often inside the switchboard. With today's compact design with a high degree of internal separation, external inspection of many connection points is no longer possible without having to remove covers and enclosure parts. From the personnel safety perspective, this is only possible when the switchboard is de-energised.



##### Safety as the top priority

The SIVACON S8 low-voltage switchboard is a design verified power switchgear and controlgear assembly in accordance with IEC 61439-2. Design verifications – including temperature rise verification – are provided for SIVACON S8 by means of testing. The physical and electrical properties of the switchboard are verified during development both for operational and fault situations.

The busbar screw joints implemented at the factory are maintenance-free. Faults are ruled out thanks to consistent quality checks during production, and routine testing of every switchboard before shipping.

Busbar connections and cable connections established on-site require special attention. For busbar screw joints between transport units, for cable connection bars, or for individual requirements, SIVACON S8 offers economic and flexible solutions for temperature monitoring.

***Economic and flexible solutions***Pt100 temperature sensor

- Platinum temperature sensor in accordance with EN 60751
- Design as ring cable lug or pin cable lug
- Simple mounting direct at the measuring point
- Rugged, simple sensor
- Cost-efficient, tested solution
- Connection to different device systems with Pt100 interface possible
- Reduced space requirements

Infrared temperature sensor

- Temperature sensor for contact-free temperature acquisition
- No voltage supply required for the sensor
- Maintenance-free sensor with life-long calibration
- Data cards for several sensors with communication interface



Installation example of the IR temperature sensors for contact-free detection of temperature rise on the busbars

**Benefits**

With the temperature sensors, electrical conductors and connections can be monitored even at inaccessible points within the switchboard, without having to remove covers or enclosure parts. This does not affect the safety of personnel working on the switchboard.

The temperature can be monitored 24/7 without the need to shut down the switchboard for inspection purposes. Permanent monitoring makes it possible to detect faults long before they occur.

The data is available continuously for display, analysis and further processing in the control system or maintenance system.

Temperature monitoring creates a basis for condition-based and predictive maintenance to meet increasing demands for high availability of the switchboard.

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