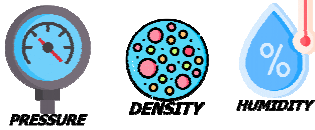


Online Monitoring System for Density Sensors in High Voltage Substations

SF6 Online Monitoring System



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Online Monitoring System for Density Sensors in High Voltage Substations**APPLICATIONS**

- SF6 Leakage and Humidity Monitoring Systems
- Breaker Condition Monitoring System
- Temperature Monitoring System
- Moisture in oil Monitoring System

HIGHLIGHTS

- Real-Time Monitoring: Keep track of insulating gas density at all times, ensuring maximum safety and reliability.
- Accurate Alarms and Alerts: Receive immediate notifications for any anomalies, allowing you to take swift action and prevent unexpected failures.
- Advanced Diagnostics: Benefit from detailed analysis to optimize operations and extend the lifespan of your equipment.
- User-Friendly Interface: Easily manage multiple switchgear systems from a single platform, streamlining your daily operations.
- Reduced Operational Costs: Minimize downtime and optimize maintenance, leading to a higher return on investment.

Electrical switchgear is crucial for the safe and reliable operation of electrical power systems. Any malfunction in switchgear can result in significant failures in transformers and other associated electrical equipment. Such failures can cause damage to electrical assets, lead to unplanned outages, and incur additional costs and resource expenditures. Therefore, continuous monitoring and performance tracking are essential for optimizing efficiency and extending the lifespan of these assets.

Electronsystem MD Monitoring provides a sophisticated and comprehensive condition monitoring solution tailored for various switchgear systems. Our offerings include sensors, monitoring devices, and software designed to assess and analyze the performance of switchgear equipment. We customize our condition monitoring solutions specifically for Gas Insulated Switchgear, based on unique operational requirements and applications.

Our condition monitoring systems can be seamlessly installed and integrated into both new installations and existing switchgear setups. This advanced monitoring solution equips operators with critical insights into the performance of switchgear systems, thereby enhancing asset effectiveness and reliability.

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Project and Solution Introduction - Assets

The online Condition Monitoring System will be implemented to identify incipient faults within the Gas Insulated Substation, thereby preventing unexpected outages and facilitating condition-based maintenance for our clients. ELECTRONSYSTEM MD specializes in condition monitoring solutions for medium and high voltage assets, including Gas Insulated Substations, switchgears, circuit breakers, cables, motors, and generators. Our condition monitoring solution features a diverse array of reliable sensors, advanced monitoring devices, and cutting-edge software analytics.

Additionally, we provide on-site commissioning services, maintenance contracts, and technical support to our global clientele. Our team comprises industry-leading experts with over 30 years of combined experience in SF6 leakage monitoring, leveraging our proprietary technology in both gas density monitors and electronic transmitters. Through continuous product innovation, our experts ensure the delivery of best-in-class reliability. We offer dependable, high-performance precision sensors and monitoring solutions tailored to meet the needs of our customers.

Typical assets:

- SF6 Leakage and Humidity Monitoring Systems
- Breaker Condition Monitoring System
- Temperature Monitoring System
- Moisture in oil Monitoring System

Benefits

Through continuous product innovation, our experts ensure the delivery of best-in-class electronic transmitters. Here are the benefits of implementing a condition monitoring system for switchgear:

1. **Increased Asset Life with Reduced Unplanned Outages:** By continuously monitoring the condition of switchgear, potential issues can be identified early, leading to timely maintenance and extending the lifespan of the equipment.
2. **Accurate Alarm and Alert System:** The system provides real-time alerts and alarms, ensuring that operators are immediately informed of any anomalies or potential faults, allowing for quick action to be taken.
3. **Greater Diagnostic Capability:** Enhanced diagnostic tools enable a deeper understanding of the equipment's performance, helping to pinpoint issues more effectively and facilitating informed decision-making.
4. **Increased ROI with Reduced Operation Costs:** By minimizing unplanned outages and optimizing maintenance schedules, organizations can significantly lower operational costs, leading to a better return on investment.
5. **Precise Fault Identification:** The system allows for accurate identification of faults, reducing downtime and improving the reliability of the electrical infrastructure.
6. **Ability to Monitor Multiple Switchgear Systems with One Software:** A unified software platform enables the monitoring of various switchgear systems simultaneously, streamlining operations and simplifying management.

These benefits collectively contribute to a more efficient and reliable electrical power system, enhancing overall operational performance.

Online Monitoring System for Density Sensors in High Voltage Substations

Complete data monitoring system

Data Output from SF6 Monitoring System:

The data output from SF6 monitoring System shall be as below for each sensor (as applicable)

- Pressure Monitoring
- Gas Temperature Monitoring
- Density calculations/monitoring
- Time to Refill for each gas chamber calculations.
- Time to Lockout for each gas chamber calculations.
- Any alarm / Alerts once generated (after meeting the threshold value) shall also be sent to third party system
- Visual indication, on replicated single line diagram of customer substation, of good or fail or leakage sensors by real time flag or indicators
- Trends of each parameter, specifically for density or equivalent pressure, for predictive maintenance in order to forecast the potential issues and give time of repairment
- Data log of each parameter in order to perform historical data analysis of critical situations
- IEC 61850 communications protocol to transfer data to remote control room or third parts
- Optical connections where the distance is longer or safety and speed connections is mandatory

Sensors available for monitoring

Why choose Electronsistem MD ?

Because we are all in one company able to develop internally and produce by its own expertise a large variety of gas density monitors and electronic transducers.

This is a very big advantage for customers, because they rely only on a single supplier which take the complete responsibility of project and acts as a system integrator.

Hence not only the SW for data analytic and monitoring with predictive maintenance but also the core sensors for capturing the data; moreover, we supply all the integration to customer apparatus like cables, fittings, block, pipes, programming, tool and so on.

Our capability of customization is very high: in few weeks we create new drawing according to specific customer's setpoint, graphic design of single line diagram and never abandon customer alone.

Here it is not comprehensive list of sensors available for online monitoring:

- Hybrid Gas Density monitor, code GDHC/xxx (mechanical contacts+ electronic output)



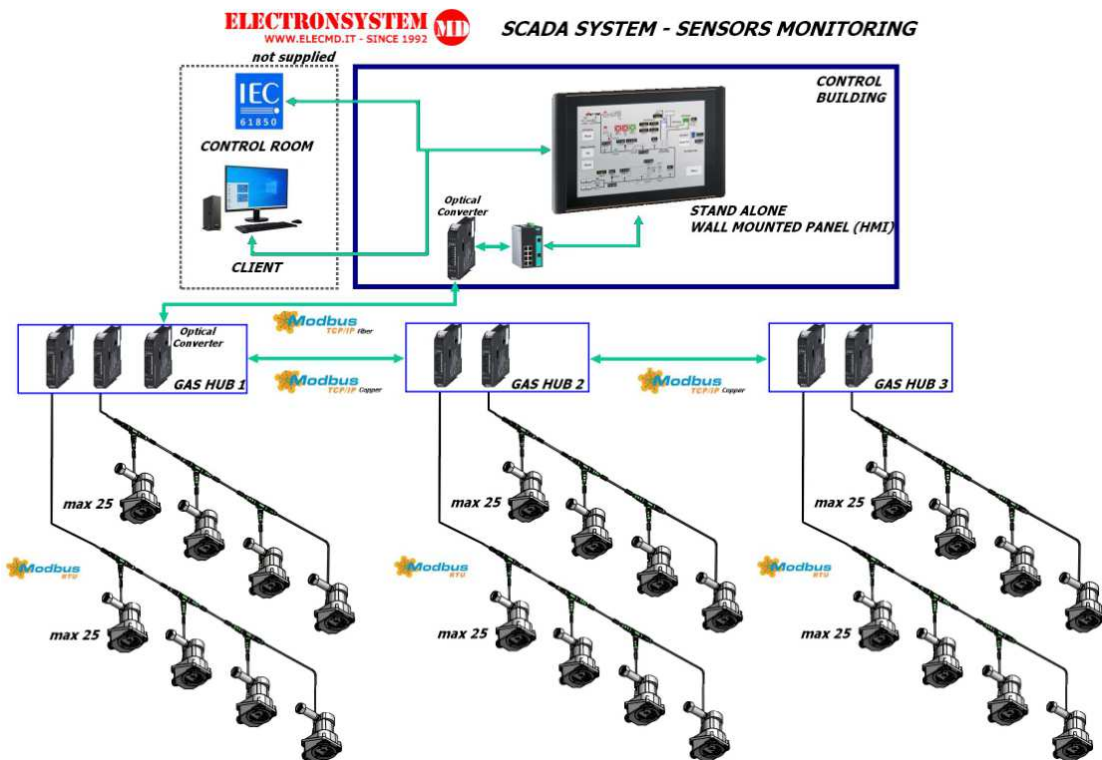
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Online Monitoring System for Density Sensors in High Voltage Substations

- Multiparameter transmitter, code SGM/M (electronic sensor with multiparameter, RS485 output)
- Dewpoint transmitter, code SGM/DEW (electronic sensor for moisture in gas, RS485 or analogue output)
- Density transmitter, code SGM/ABS (electronic sensor for gas density, RS485 or analogue output)



TYPICAL ARCHITECTURE OF MONITORING



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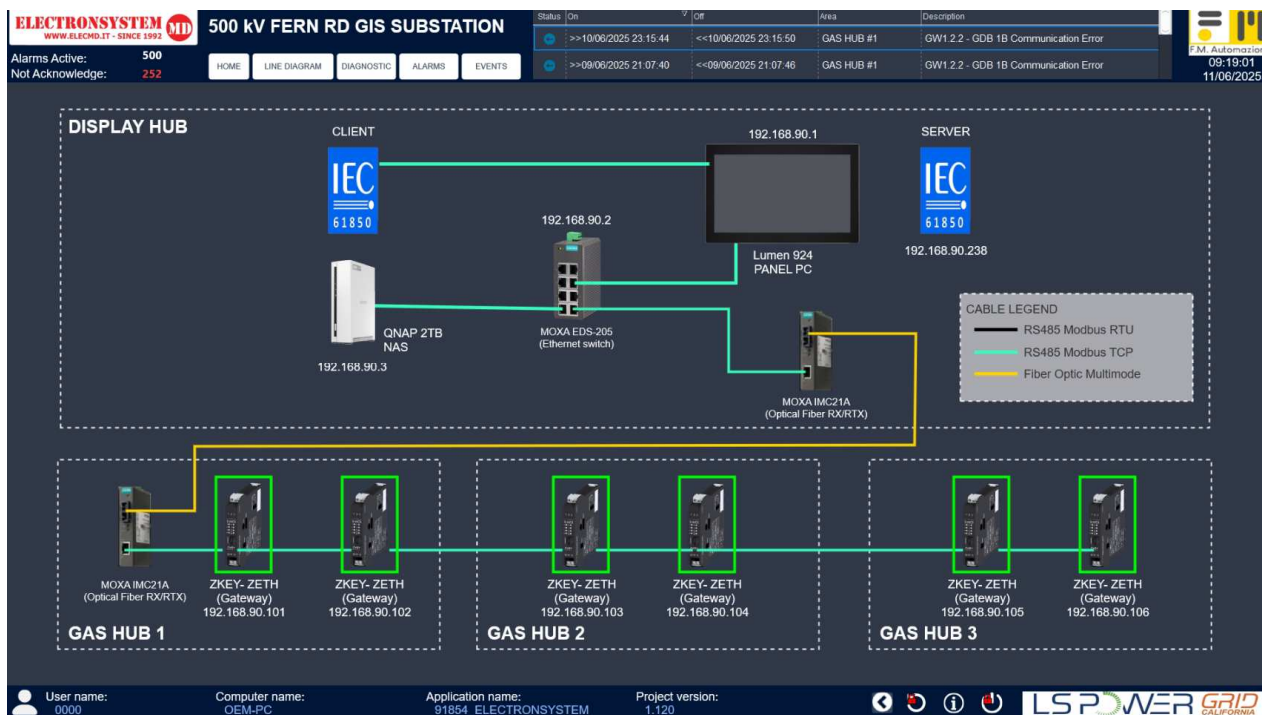
Online Monitoring System for Density Sensors in High Voltage Substations

We are able to propose an architecture as indicated above, which as an example, that shows how we manage the monitoring project of the entire substation.

The sensors are grouped taking into account the problems of absorption and signal loss in order to be associated with the respective gateways that will then manage the digital transmission towards the core of the monitoring system.

The core is able to read all the data and create graphic interfaces using a touchscreen PC panel and create navigation windows, local indication of all the sensors and the transmitted data, trends of possible loss, predictive analysis and data transmission towards the control room using the various protocols, including IEC 61850

EXAMPLES OF SOFTWARE PAGES



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Online Monitoring System for Density Sensors in High Voltage Substations

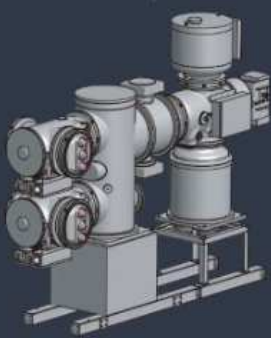


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Online Monitoring System for Density Sensors in High Voltage Substations

Popup_GDC_ThreePhases
✕

GAS HUB #1



- GW1.1.1 GDA 1A
- GW1.1.1 GDA 1B
- GW1.1.1 GDA 1C

MEASUREMENTS AND STATUS GW1.1.1 GDA 1A

Temperature: 302.1 °K | 28.9 °C | 84.1 °F

Pressure: 7.95 bar ABS | 100.5 psiG

Equivalent Pressure: 7.71 bar ABS | 97.2 psiG | NORMAL

Density: 46.22 kg/m3

MEASUREMENTS AND STATUS GW1.1.1 GDA 1B

Temperature: 302.5 °K | 29.3 °C | 84.8 °F

Pressure: 8.32 bar ABS | 106.0 psiG

Equivalent Pressure: 8.07 bar ABS | 102.3 psiG | NORMAL

Density: 48.33 kg/m3

MEASUREMENTS AND STATUS GW1.1.1 GDA 1C

Temperature: 301.3 °K | 28.1 °C | 82.6 °F

Pressure: 8.33 bar ABS | 106.2 psiG

Equivalent Pressure: 8.11 bar ABS | 103.0 psiG | NORMAL

Density: 48.61 kg/m3

ELECTRONSYSTEM MD 500 kV FERN RD GIS SUBSTATION

Alarms Active: 500
Not Acknowledge: 252

Status: On | Off

Area: GAS HUB #1

Description: GW1 2.2 - GDB 1B Communication Error

F.M. Automazione


09:01:54
11/06/2025

GW1.1.1 GDA 1B

Export data view...

1 MONTH DATALOG | 3 MONTHS DATALOG | 6 MONTHS DATALOG

1 MONTH TREND | 3 MONTHS TREND | 6 MONTHS TREND



Curve Name	Tag Name	Color	Active
GW1_1_1_GDA_1B_Math_Meas.Temp_C	Filter text	Blue	<input checked="" type="checkbox"/>
GW1_1_1_GDA_1B_Meas.Density	Filter text	Green	<input checked="" type="checkbox"/>
GW1_1_1_GDA_1B_Math_Meas.Pressure_psiG	Filter text	Yellow	<input checked="" type="checkbox"/>
GW1_1_1_GDA_1B_Math_MeasEq_Pressure_psiG	Filter text	Red	<input checked="" type="checkbox"/>

Date	Curve	Value	Measuring	Status
07/06/2025 20:15:00	GW1_1_1_GDA_1B_Math_Meas.Temp_C	30.5	°C	SPONT
07/06/2025 20:28:00	GW1_1_1_GDA_1B_Meas.Density	48.60	kg/m3	SPONT
07/06/2025 20:28:00	GW1_1_1_GDA_1B_Math_Meas.Pressure_psiG	107.1	psiG	SPONT
07/06/2025 20:28:00	GW1_1_1_GDA_1B_Math_MeasEq_Pressure_psiG	102.9	psiG	SPONT

User name: 0000

Computer name: OEM-PC

Application name: 91854_ELECTRONSYSTEM

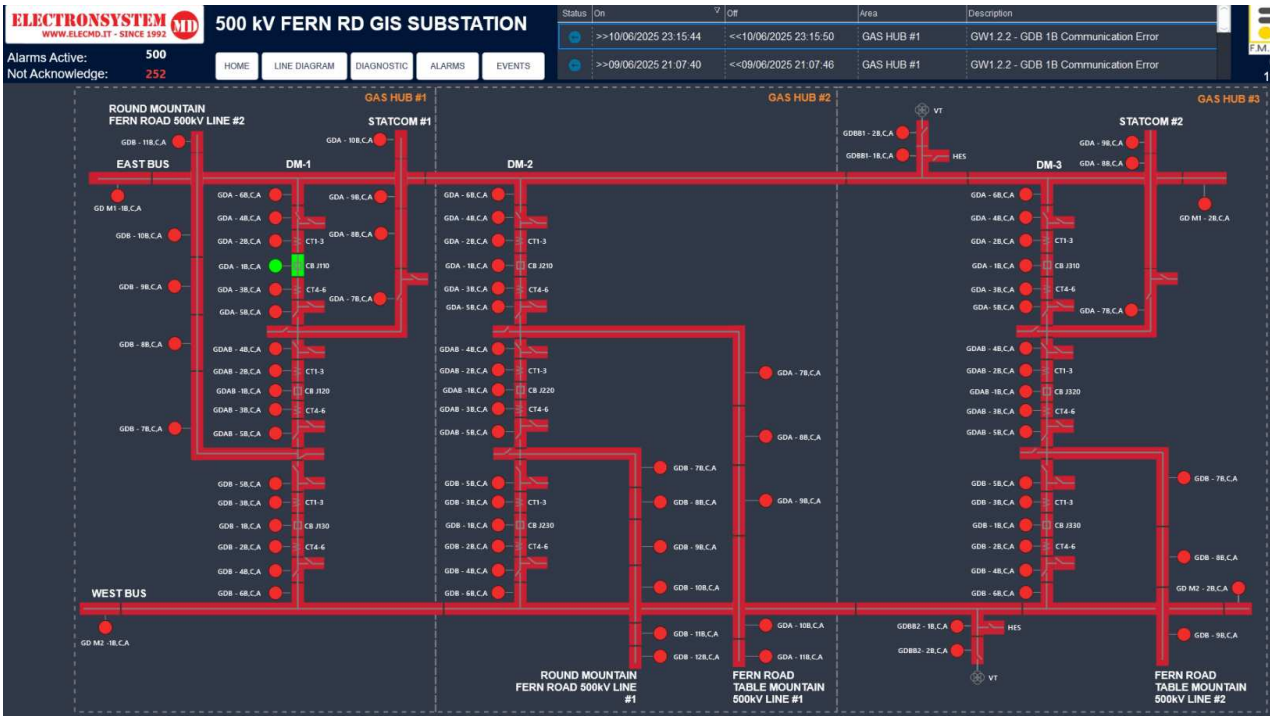
Project version: 1.120

LSP POWER GRID

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Online Monitoring System for Density Sensors in High Voltage Substations

STORAGE

If the device must be storage before use, please keep dry and repaired.

Do not leave outdoor.

Device is strongly sensitive to humidity hence avoid to store where relative humidity is more than 90%.

STORAGE TEMPERATURE: -30°C to +70°C

RELATIVE HUMIDITY: max 90% @ +40°C

MAINTENANCE

Maintenance of transmitter must be done compulsory in factory. We recommend every 5 years to send back transmitter for calibration check and inspection.

WARRANTY

Device is covered by 24 months after installation or max 36 months after delivery.

In case of service the transmitter must be sent back to factory for inspection.

DISCLAIMER NOTE:

While we provide application assistance it is up to the customer to determine the suitability for its use.

Specification may change without notice. The information we supply is believed to be accurate and reliable as of this printing. However we assume no responsibility for its use.

The quality of Electronsistem MD products is guaranteed by a Quality, Safety and Environmental management system certified by DNV according to ISO 9001, ISO 18001 and ISO 14001. Electronsistem MD works in partnership with its customers in designing customized executions in order to meet specific requirements, please contact us.

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