

HISbox

■ DC / AC string boxes

HISbox®

Fault Detection and Insulation Monitoring



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Pinpoint Insulation Faults in PV Plants — Before They Affect Production

Utility-scale photovoltaic plants operate with thousands of DC strings distributed across large areas. Small insulation degradations caused by humidity, cable damage, connector failures, or aging components can develop unnoticed until they trigger inverter shutdowns or safety alarms.

Traditional monitoring systems can detect that a fault exists — but they cannot tell where it is.

HIS Insulation Monitoring identifies the exact combiner box and string where insulation degradation occurs, enabling faster maintenance, higher plant availability, and improved asset protection.

Why It Matters for PV Asset Owners

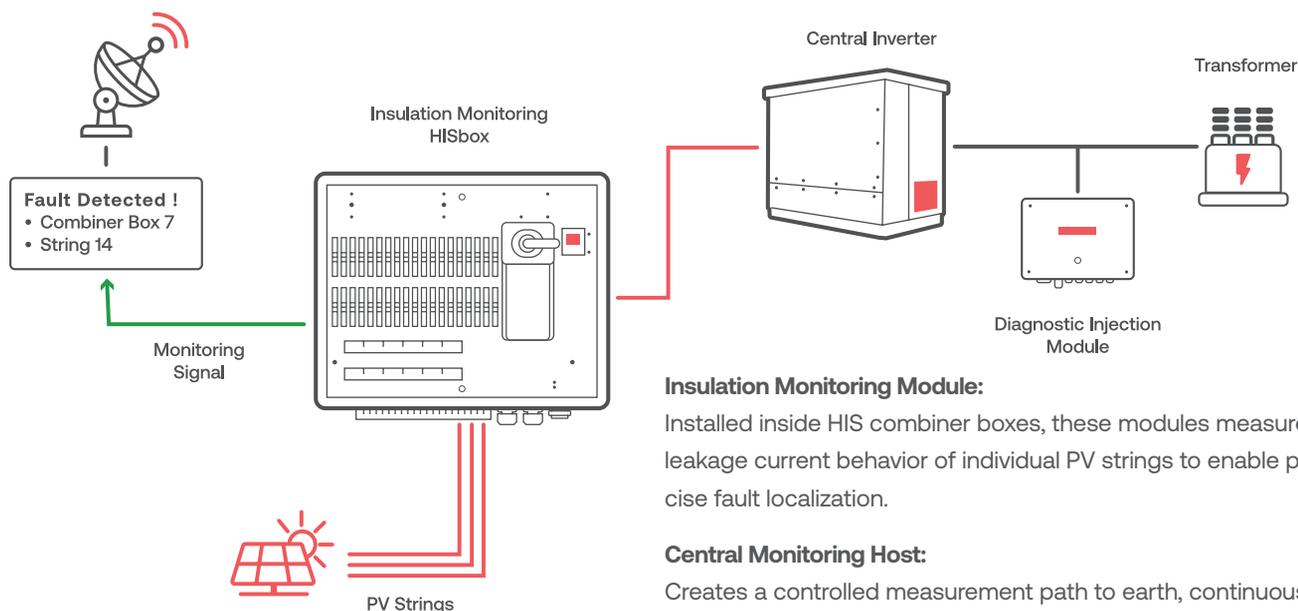
- Protect Energy Yield – Early detection prevents inverter shutdowns and production losses.
- Locate Faults Instantly – Identify the exact PV string where insulation degradation occurs.
- Reduce O&M Costs – Faster troubleshooting and reduced technician workload.
- Increase Plant Availability – Continuous monitoring while the PV plant remains operational.
- Improve Safety – Early detection reduces electrical fault risks.



Designed for Utility-Scale Solar Plants

Large PV plants typically use floating DC systems (IT earthing concept). This design allows plants to continue operating after the first insulation fault while operators diagnose and resolve the issue. HIS Insulation Monitoring integrates directly into PV combiner boxes and plant monitoring systems.

String-Level Insulation Monitoring Architecture



Insulation Monitoring Module:

Installed inside HIS combiner boxes, these modules measure leakage current behavior of individual PV strings to enable precise fault localization.

Central Monitoring Host:

Creates a controlled measurement path to earth, continuously evaluating overall insulation resistance and leakage capacitance of the PV plant.

Intelligent Fault Localization:

By analyzing string-level leakage currents, the system identifies the exact combiner box and PV string with insulation degradation.

How HIS insulation monitoring technology works?

- 01** The central monitoring host establishes a controlled measurement path to assess the overall insulation condition.
- 02** Combiner modules measure leakage current behavior of each PV string.
- 03** The system calculates insulation resistance and leakage capacitance of the plant.
- 04** If degradation occurs, the system pinpoints the exact combiner box and string.

Key Advantages

- ⊕ Continuous insulation monitoring during plant operation
- ⊕ String-level fault localization
- ⊕ Reduced troubleshooting time
- ⊕ Lower operational costs
- ⊕ Improved PV asset reliability

Typical Applications

- Large solar farms with distributed combiner boxes
- PV plants requiring high operational availability
- Utility-scale photovoltaic power plants
- Central inverter PV systems

Designed for floating DC systems (IT earthing concept). Not applicable for grounded systems (TN systems).

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