



THEIA ARRAY MONITOR

MULTI-STRING INTERFACE FOR SOLAR INVERTERS & PV PANELS

Able to monitor the environment, performance, and external parameters for multiple PV strings, the THEIA Array Monitor is an integral and critical part of the supervision and protection network for a photovoltaic power generation system.

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BACKGROUND

For photovoltaic power generation plants it is vital to maximize the efficiency of the power plant and guarantee successful operation during its expected lifetime. In very large plants, without effective monitoring and a prompt reporting system it may become very expensive, and very difficult, to determine if there is a possible malfunction of any single panel, which is why the THEIA Array Monitor was developed.

PRODUCT DESCRIPTION

Performance

The THEIA Array Monitor combines protection of the PV strings and solar inverter with comprehensive parameter monitoring to help ensure that the complete system is operating at its maximum efficiency

Protection

Within the monitor are input fuses and over-voltage devices, to protect the solar panels from short circuits or potentially damaging lightning strikes, along with a DC switch disconnect on the output for isolation. The protection and monitoring are all contained within an IP65 rated enclosure for external installation, with the enclosure arrangement specifically designed to make installation and maintenance as quick and easy as possible.

Monitoring

As a result of the measurement of a variety of parameters such as string current, voltage and, temperature, etc., the Array Monitor is able to detect the presence of anomalies in the PV array, and highlight deviations in the expected operation under various environmental conditions.

Flexibility

Analogue and digital inputs are provided to enable the monitoring of optional external systems for enhanced monitoring and security of the photovoltaic plant.

Communication

Using the standard Modbus protocol over RS485, the THEIA Array Monitor is able to communicate with all devices present in the PV field including Inverters, other Array Monitors, Central Supervision Units, etc. so that all data is available for remote supervision and control.

KEY FEATURES

- 10 individual monitoring channels for PV strings:
- Array surge arrestor status.
- 4 analogue inputs – 1 input reserved for a temperature probe
- 2 digital inputs for expanded monitoring and control.
- Fiber Optic termination for anti-theft device on the PV array
- Communication over RS485 independent of the inverters
- DC switch disconnect for isolation of PV array from inverter
- Options:
 - Solar radiation sensor
 - Temperature sensors
 - Wind speed monitor
- Connections for general sensors with 4-20mA, 0-5V, or 0-10V outputs
- Control of DC switch disconnect via:
 - Internal manual toggle
 - External push button
 - Remote via RS485

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TECHNICAL SPECIFICATIONS

INPUT DATA

Input voltage Range:	200 to 1000 V _{dc}
Number of PV input channels monitored:	10
Max current per input channel	16 A
Input string protection:	Fuse
Number of DC fuses	up to 10x +ve & 10x -ve
Fuse ratings	6A, 8A, 10A, 12A, 15A, 16A, and 20A
Number of PV strings per fuse	up to 2
Total number of PV strings	20 (2 strings in parallel per fuse)
Max. cable size for each input	up to 6mm ²
Input surge arrester	Replaceable varistor
Auxiliary supply (continuous)	24 to 48 V _{ac/dc}
Power Consumption: Nominal: Max. (during remote trip):	15 W 60 W

NOMINAL

Max. output current	160 A
DC connection (+ve & -ve)	M8 bolt
Earth connection	M8 bolt
Rating of DC switch disconnect	160 A / 1100 V _{dc}

MECHANICAL DATA

Protection degree (IEC529):	IP 65
Dimension (mm):	720mm (W) 205mm (D) 540mm (H)
Weight:	20 kg
Cable access:	Bottom

ENVIRONMENTAL DATA

Operating temperature:	-25 to +55°C
Storage temperature:	-35 to +70°C
Relative humidity (non-condensing):	15% to 95%

ANTI-THEFT DEVICE

Anti-theft device:	Coded wave optical fiber
Standard	2 x 100m fiber rings
Plastic Optical Fiber (POF) – not included	2.2mm diameter

INTERFACE

Communication:	RS485 Modbus protocol
Baud Rate:	9600 bps to 19200 bps
Available information:	String Current PV Voltage Status of string fuses Status of surge suppressor Monitoring of optional external sensors
Relay Outputs (optional)	4x volt-free outputs

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