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PVSoilMax100

Maximum Power PV Soiling Loss Measurement System

Image Not Available

For Resource and Operational Assessment

Overview

Soiling is specific to the location. Local climate, pollution including agricultural impacts, and ground type all contribute uniquely to differences in soiling impact and rate. A soiling rate evaluation that considers the relative impact of these parameters produces a more reliable power optimization strategy. The complex analysis of soiling impact requires accurate data. It also requires accurate data with context.

The PVSoilMax100 delivers maximum power soiling data for quantifying site-specific effects of soiling on PV power production. Soiling loss ratio and soiling rate are calculated in real time and updated daily. The PVSoilMax100 extracts more information from the data. For example, key events are identified and flagged such as soiling events, self-cleaning events, and scheduled cleaning operation.

The PVSoilMax100 is deployed during pre-construction resource assessment and during plant operation to improve the quality of power performance modeling and verification. An accurate assessment of the soiling rate, which can be applied as a derate factor, significantly reduces the uncertainty in revenue forecast.

Benefits and Features

- Real-time maximum power soiling ratio and soiling rate
- IEC 61724-1 compliant maximum power measurement method
- Identifies and flags soiling and self-cleaning events
- On-board data filtering assures quality data
- Modbus, DNP3, WebAPI, data encryption, and PakBus protocols supported
- Complete system offering to simplify installation, operation, and maintenance
- Flexible system configuration—stand-alone soiling or complete MET solution
- Remote field and data services available

Detailed Description

The core components of the PVSoilMax100 Maximum Power Soiling Loss Measurement System include the Atonometrics RDE300 series and either a MeteoPV, CR310, CR1000X, or CR6 Campbell Scientific datalogger. The RDE300, coupled with a soiled PV module, functions as a smart IV curve tracing sensor that is controlled and measured by the data logger using a built-in solar position calculator and algorithms that detect stable environmental conditions. The data logger records the

soiled PV module temperature, maximum power, short-circuit current, and open-circuit voltage determined from the measured IV sweep. These measurements are made only when particular characteristics of global solar irradiance and temperature are met, avoiding any difference in soiling due to environmental instability, cloud influence, zenith angle of the sun, module current dependence on irradiance level, and—to an extent—spectral effects. A quality factor is calculated to give the user some feedback on the number of qualified measurements.

The Campbell Scientific data logger also measures the short-circuit current and temperature of a clean reference PV device, pyranometers, and ambient weather conditions. From these data, effective irradiance of each module is calculated in accordance with IEC 60904, and a soiling ratio is calculated per IEC 61724-1. The daily average soiling loss index is calculated, made available for SCADA, and stored in on-board memory. For immediate feedback, a real-time soiling loss index and quality factor are available. Short-term soiling events and self-cleaning events are identified and flagged within the data set. Raw measured data—including an IV sweep consisting of 1,000 values before, during, and after each IV sweep—are stored and available for the analyst or researcher who wants to perform independent post-processing.

For comprehensive details, visit: www.campbellsci.com/pvsoilmax100

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