

Dust Monitoring System_(Comparison Method)

Model ES-DC2



Introduction

ES-DC2 dust index meter is a method to quantify the impact of dust pollution on power generation efficiency by comparing the electrical performance parameters (such as short-circuit current, maximum power, etc.) of clean photovoltaic modules and dust-contaminated modules. Its core principle is to calculate the efficiency loss caused by dust pollution by measuring the difference in electrical performance between clean modules and contaminated modules under the same conditions.

ES-DC2 dust index meter is suitable for photovoltaic panels with a maximum adaptability of 30A, 50V and 700W. The included SMD Pt100RTD is used for the backside temperature measurement of the photovoltaic panel, and the output is via Modbus RTU (RS485).

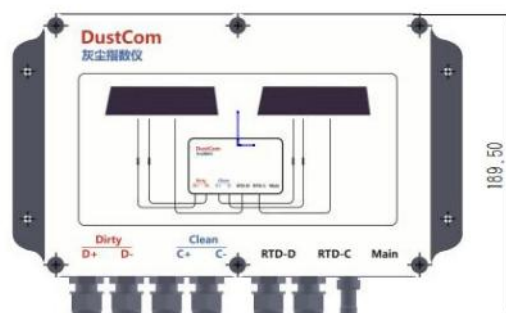
Main features

- Real-time Data Monitoring: Collects and analyzes four types of data: contamination ratio, cleanliness ratio, dust thickness assessment, and backplane temperature.
- Technologically Advanced Data Acquisition Unit: Employs a new generation 32-bit MCU processor with integrated 4G and Bluetooth
- Comparative Monitoring Technology: Utilizes a new generation of component comparison extreme value data analysis technology.
- Smart Power Station Cleaning: a built-in IoT module with four control modes: normally open/normally closed, cyclic control, time control, and manual control.
- Accuracy Self-Calibration: Integrates a one-button accuracy self-calibration button.

Measuring principle

The main principle of the reference method for measuring the pollution of photovoltaic modules is as follows: two photovoltaic modules of the same model batch are set up and placed in the same environment, one is kept clean and the other accumulates dust naturally. According to IEC 60904, the effective irradiance of the two photovoltaic modules is calculated by measuring the short-circuit current and the back temperature of the module. The pollution loss is calculated by comparing the effective irradiance of the polluted photovoltaic module with the effective irradiance of the clean reference photovoltaic module. The calculation formula of the pollution loss index SLI is as follows:

$SLI = (1 - \text{Geffs} / \text{Geffc}) \times 100\%$. Geffs is the effective irradiance calculated from the contaminated components, and Geffc is the effective irradiance calculated from the clean components.



Specification

Product Parameters	Parameter Description
Defacement rate	0 ~ 100%
Resolution	0.1 %
Measurement accuracy	1%
Component temperature measurement range	-40 ~+150°C
Component temperature measurement accuracy	±(0.15 + 0.002t) °C
Component temperature probe	PT100 Class A
Maximum short-circuit current of the component under test	30A
Maximum open circuit voltage of the component under test	50V
Reference Standards	EIC 61724-1(2021)
Power supply range	12~24V DC
Maximum power consumption	20mA @12V DC
Output signal form	RS485 standard modbus protocol
Operating temperature	-40°C~+70°C
Operating humidity	0-100%RH
Storage temperature	-50 – 85°C
Instrument size	283*165*66mm (width excluding waterproof joint)
weight	2.3KG
Waterproof grade	IP65

Installation

Mount the ES-DC2 to a customer-supplied bracket and then use clamps to secure it to the vertical mounting structure of your choice. Make sure the cable is secure and if using a tracker, that the cable has sufficient service length to accommodate the movement of the solar panel .

