

## Datalogger for reference photovoltaic modules

Entec Solar - Through the combined use of an E-Ref and a reference module, know precisely all the operating conditions of your PV power plants: RMS irradiance, front and back irradiance, and cell temperature.



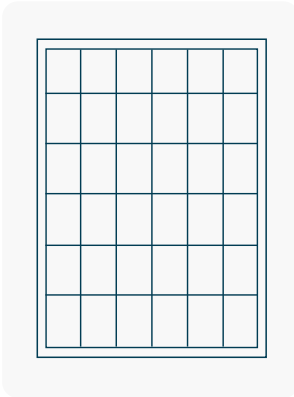
## Operating principles:

The E-ref measures the short-circuit current ( $I_{sc}$ ) and open-circuit voltage ( $V_{oc}$ ) of a reference module, calculates the corresponding irradiance and cell temperature values, and communicates them directly to SCADA via ModBus. It is available for monofacial (E-Ref/01) and bifacial (E-Ref/03) reference modules.

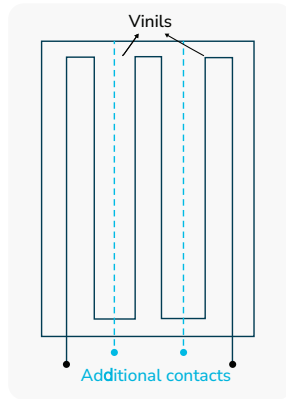
## Work mode diagram:

### 1. Modules to be utilized

Monofacial module



Bifacial module



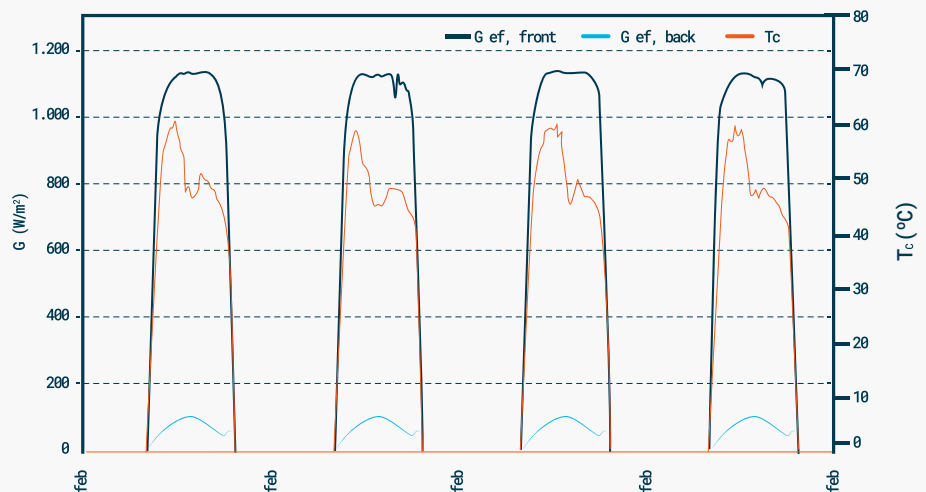
### 2. Devices to be installed

E-Ref/01

E-Ref/03



### 3. Irradiance and cell temperature curves obtained



# Main features



- ✔ Prevents continuous short circuits in the reference modules for measuring Isc and thus protects them against hot spots.
- ✔ Directly returns radiation and cell temperature values obtained from reference modules without the need for additional conversion.
- ✔ Avoids the use of two different modules for radiation and temperature or the need for module operation.
- ✔ Direct communication with the plant's SCADA by Modbus.
- ✔ Independent calibration of reference and E-ref module.
- ✔ Up to 12 days of data storage.
- ✔ Conforms to ISO 9060, IEC 61724-1 (Class A for POA), IEC 60904-6 (calibration), IEC 60904-5 (preeminence in TC)

## Technical specifications:

	E-Ref/01	E-Ref/03
Maximum voltage	60V	
Maximum current	20A	20A (Ch 1 y 2) & 5A (Ch3)
Quantity of inputs	1	3
Measurement resolution	1mV/0,3mA	1mV/0,3mA (Ch 1 y 2)
Communication protocol		
Communication ports	RJ45	
IP protection	20	
Mounting	DIN rail	
Power supply	12/24 Vdc	
Current consumed	30mA	60mA
Dimensions	54x90x58	90x90x58
Weight (X-Y-Z)	90 grams	150 grams

Device



**“Innovative technological developments for the photovoltaic solar energy industry”**

