EnergyTeam

GSL-IT-DA

Sensor for Solar Radiation and Temperature PT100 with pulse digital outputs, 4÷20 mA analog outputs and Modbus RTU

USER MANUAL



Warnings and Precautions

-Install the module only as described in this manual, don't violate the rules showed. Before using it, verify limits of applicability.

- Before supplying it, check that the connections correspond to those described on the manual. In addition, before beginning any maintenance, disconnect the electrical connections of the device.

- Don't modify the feature and the module, as: tampering with the sensor; removing the screws around it; making holes on the case; replacing its accessories with other coming from unknown manufacturers not described on the manual's list, because this operation may compromise the protection degree, causing also a malfunction and a damage of the instrument. In addition, don't modify the layout of the internal components.

- For any calibration and maintenance of the internal circuit, contact Energy Team. In case of malfunction or fault, send the device and include a precise description about the fault.

- Don't expose the module to temperature ranges outside those reported on the data-sheet. Don't install it in sites with strong vibrations, corrosive gases, excessive dirt or high humidity. Use it only in the operating limits.

- Always supply it using the voltage reported on the data-sheet and also check the power supply status. Pay attention to accidental overvoltage on the input or output terminals because it can damage the galvanic insulation.

<u>NOTE:</u> This manual is part of the product and therefore must be carefully preserved.

INTRODUCTION

This sensor can measure solar Irradiation and panel Temperature, then it sends the values to a processing unit. It's equipped by output channels which can be set both in digital-pulse mode and 4÷20 mA analog mode. Thanks to this module it's possible to detect accurately the Irradiation and the working temperature of the panels: main parameters for determining the performance of a photovoltaic plant. Only by taking into account of these measurements it's possible to monitor the real performance of the plant and detect eventual problems which may vary the performance than theoretical values.

Irradiation is measured by a sensor inserted into a waterproof structure with Protection Degree IP65. Within this module is also detected the sensor's temperature, useful for an accurate compensation. External temperature or panel temperature measurement is carried out by a PT100 probe supplied as an optional accessory to be connected to the module.

Thanks to RS-485 option it's possible to read the acquired values, through an insulated RS-485 serial port and by means of the Modbus protocol.

MAIN FEATURE AND COMPONENTS SUPPLIED









<u>STANDARD</u>

- Nr.1 Cable gland for power supply and outputs.
- Nr.1 Plug against condensation.
- Nr.1 Bling plug.

OPTION PT100

- Nr.1 Cable gland for power supply and outputs.
- Nr.1 Plug against condensation.
- Nr.1 Cable gland for PT100 probe.

NOTE: Proper sealing of the cable gland is constrained by the presence of the inserted cable.

MECHANICAL INSTALLATION

ORIENTATION



NOTE:

Install the module with the same inclination of the photovoltaic panel, so as to detect the same Irradiation intensity. WARNING: This positioning DOESN'T measure the global irradiation.

FIXING (DIMENSIONS ARE EXPRESSED IN MILLIMETERS):



FIXING SCREWS: Screw head Ø 6 mm; Body screw Ø 4 mm. There are no preferences on the thread.

ELECTRICAL INSTALLATION

To access to internal connections, unscrew the 4 fixing screws on the lid. Pay attention when removing the lid because it's connected by a cable to the electronic circuit fixed on the bottom side of the module.

<u>NOTE</u>: For a correct sealing of the Protection Degree IP65, before closing the module ensure that the heads of the inner seal are properly combined and the screws fixing the lid guarantee a perfect tightness. In addition, ensure a perfect tightness of the cable glands in output.



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TECHNICAL FEATURES

General			
Dimensions	120x80x45 mm.		
Weight	265 grams		
Case material	FG version (Photodiode – adapter in Teflon): Polycarbonate and Teflon for the		
	case. Polyamide for the accessories.		
Protection degree	IP65		
Power supply	from +12 to +24 Vdc, Power absorbed: 1W without current loop		
Working temperature	from -20°C to +70°C		
Relative humidity	90%		
Other features	Equipped by a device against the condensation		
Irradiation			
Sensor	Photodiode		
Range of measure	from 0 to 1200 Watt/m ²		
Ассигасу	Best than 5% withis the conditions specified on the calibration certificate		
Temperature			
Used sensors	Interface for PT100 with 2, 3, 4 wired (the PT100 probe is OPTIONAL)		
Connection	Watertight cable gland, with internal terminal board		
Range of measure	-40°C ÷ +180°C		
Ассигасу	±2°C in the whole measuring range		
Digital outputs			
Тіроlоду	Open-drain circuit free by voltage and protected against overvoltage		
Frequency	from 0 to 5 Hz		
Pulse duration	100 ms		
Maximum voltage	30 Vdc		
Maximum current	50 mA		
Characteristic of the Irradiation output	240 W /m ² / Hz (0 W/m ² a 0 Hz)		
Characteristic of the temperature output	44°C / Hz (-40°C a O Hz)		
Current outputs			
Туроlоду	Active current source from 4 to 20 mA and common negative, with limiter		
Characteristic of the Irradiation output	75W/m ² /mA (OW/m ² at 4 mA)		
Characteristic of the temperature	13.75°C/mA (-40°C at 4 mA)		
output			
Serial port			
Interface	RS-485 Half-duplex, 2 wires + screen		
Connectable devices	128		
Bit rate	from 2400 to 115200 bps selectable		
Parity	Parity selectable		
Protocol	RTU Modbus		
Insulation	2500 Volt		

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MAINTENANCE

In order to guarantee an accuracy of the instrument, a periodic cleaning of the "window" in Teflon is recommended. This operation can be made by using water and a suitable cloth; if this operation isn't enough, use pure ethyl alcohol and, after, clean with water. Ensure the proper tightening of the 4 screws for the sealing of the lid.

Absolutely DON'T remove the screws around the sensor.

WARRANTY

Energy Team guarantees that the supplied products are free from defects and suitable for use. If any malfunction occurs and these are due to manufacturing defects, E.T. will respond within the terms and modalities foreseen by General Conditions of Supply, with particular reference to articles **5B** (terms and duration), **1C** (limits), **5D** (other warranties). Whatever operation or manumission made by third parties not expressly authorized determines in each case the immediate termination of the warranty.

DISPOSAL



WASTE OF ELECTRICAL AND ELECTRONIC EQUIPMENT (WEEE) Don't dispose among generic waste but collect separately for recycling and disposal operations according by law.

CALIBRATION CERTIFICATE

The device calibration is carried out by comparing it with a Pyranometer used as a sample and by using the light produced by a halogen lamp; the light is perpendicular to sensor's surface.

The device was calibrated under these conditions:

Registration numb	er of the equipme	nt:		
Firmware Version ((1):	Firn	nware Version (2):	
Configuration:	PT100	Irradiation	ModBus	
	🗌 Pulses	Pulses		
	🗌 4 ÷ 20 m/	A. □ 4 ÷ 20 mA		
Sensor type: FG (Photodiode – adap	ter in Teflon)		
Test:	PT100	Irradiation	ModBus	
	🗌 Pulses	Pulses		
	🗌 4 ÷ 20 m/	A. □ 4 ÷ 20 mA		
Pyranometer used	as a sample: TYPE	LP PYRA 02 s/n 11	016261 – Pyranometer 1^	Class ISO 9060
Light source:	W/m² T _{AMB} :	°C	R.H:%	
The device is compl	iant with the stated	precision characteri	stics.	
Date:	Techr	nician:		
Ref Doc	PT/08-51 Rev 2	Date: 26/10/2012	Released by:	Annroved by M Bia

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Firmware Version (1): _		Firmware V	Version (2):			
Configuration:	PT100	Irradiation	ModBus			
	🗌 Pulses					
	🗌 4 ÷ 20 mA	☐ 4 ÷ 20 mA				
Sensor type: FG (Photodiode – adapter in Teflon)						
Test:	PT100	Irradiation	ModBus			
	🗆 Pulses					
	🗌 4 ÷ 20 mA	□ 4 ÷ 20 mA				
Pyranometer used as a sample: TYPE LP PYRA 02 s/n 11016261 – Pyranometer 1^ Class ISO 9060						
Light source:	_ W/m² T _{AMB} :	°C R.H:	%			
The device is compliant with the stated precision characteristics.						
Date:	Technic	ian:				
The device is compliant	with the stated p Technic	recision characteristics. ian:				