



Bio Instruments S.R.L.

**SENSORS AND SYSTEMS
FOR MONITORING GROWING PLANTS**

TIR-4M

Pyranometer

Quick Start Guide



Series 2000

phyto-sensor.com

Introduction

The TIR-4M Pyranometer is a silicon-cell photodiode device based on the [SP-110-SS](#) Pyranometer (Apogee Instruments, USA), and calibrated to estimate all of the solar radiation energy in Watts per square meter.

All silicon-cell photodiode pyranometers sub-sample the shortwave radiation spectrum (from 360 to 1120 nm), and are calibrated to predict all of the solar radiation (from 280 to 2800 nm). For this reason, they should only be used to measure unobstructed solar radiation. The pyranometers should not be used to measure electric lights, under canopies of vegetation or to measure reflected radiation.

This cosine-corrected sensor is designed to maintain its accuracy when radiation comes from low zenith angles.

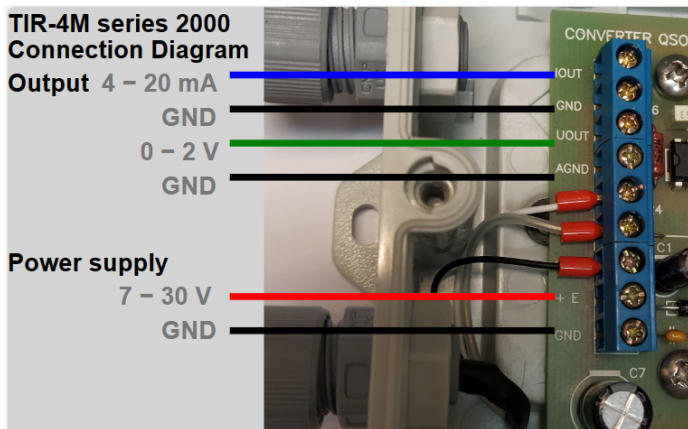
Installation

Keep TIR-4M at vertical position.

Connection

Please use a four-core cable with 3 to 6 mm outer diameter.

The connection diagram is shown in the picture below:



First, please choose a right output cable for connecting the sensor to a datalogger. The cable must be round with four wires. The maximal diameter of the cable is 6.5 mm. The cable length shall not exceed 10 m for 0 to 2 Vdc output and with about 1 km maximal length for 4 to 20 mA.

Power supply

The 7 to 30 Vdc @ 6 mA (+20 mA for current output) regulated power supply may be used.

In case of using the intermittent power supply, please respect the following recommendations:

When using analog outputs, all possible measures for reducing instrumental errors shall be undertaken:

- Screened cables.
- Cables with low impedance.
- Filtration of the signal with low cutoff frequency.
- Digital filtration of the signal.

Calibration equations

0 to 2 Vdc Output

$$TI = 500 \times U$$

4 to 20 mA Output

$$TI = 6.5 \times I - 250$$

where:

TI — measured total irradiation, $W \cdot m^{-2}$

U — output voltage, V

I — output current, mA

Calibration table

U, Volts	I, mA	$TI, \text{W} \cdot \text{m}^{-2}$
0.0	4.0	0
0.2	5.6	100
0.4	7.2	200
0.6	8.8	300
0.8	10.4	400
1.0	12.0	500
1.2	13.6	600
1.4	15.2	700
1.6	16.8	800
1.8	18.4	900
2.0	20.0	1000

Specifications

Calibration	Natural sunlight
Measurement range	0 to 1000 $W \cdot m^{-2}$
Absolute accuracy	$\pm 5\%$
Repeatability	$\pm 1\%$
Cosine response	$\pm 5\%$ at 75° zenith angle
Field of View	180°
Spectral Range	360 to 1120 <i>nm</i>
Output	0 to 2 V 4 to 20 <i>mA</i>
Supply voltage	7 to 30 <i>Vdc</i>
Current consumption	6 <i>mA</i> (+20 <i>mA</i> for current output)
Operating temperature	0 to 50 °C
Dimensions	24 \emptyset × 33 H <i>mm</i>
Mass (without cable)	180 <i>g</i>
Protection index	IP67

Customer Support

If you ever need assistance with your sensor, or if you just have questions or feedback, please e-mail at support@phyto-sensor.com. Please include as part of your message your name, address, phone, and fax number along with a description of your problem.

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