

240-8101 Star Pyranometer

The **Model 240-8101 Star Pyranometer** (ISO First Class) is a basic instrument for measuring direct and diffuse solar radiation (global radiation). The sensing element is composed of 12 wedge-shaped, thin copper sectors arranged radially, 6 white alternating with 6 black. Six chromel-constantan thermocouples are embedded in each sector to produce a 72 junction thermopile. Output from the thermopile is approximately $15\mu\text{V}/\text{W}/\text{m}^2$. The white sectors of the sensing element are painted with a Kodak paint that yields an almost perfect reflective surface. The black sectors are painted a highly absorbent flat black. When the sensor is exposed to solar radiation, a temperature difference is created between the black and white sectors. This temperature difference is proportional to the radiation intensity and is not affected by ambient temperature.

The windshield protecting the sensor is a 2.75" diameter, polished crystal glass dome which admits electromagnetic radiation between 0.3 and 3 microns. The highly reflective outer surface, along with the mass of the case, keeps the case interior at ambient temperature. Instrument leveling is accomplished by means of a bull's-eye level and three leveling feet.

When used in conjunction with an optional shadow band, the star pyranometer will measure diffuse solar radiation. Direct radiation can be measured using two star pyranometers: one, with a shadow band, to measure diffuse radiation and a second, without the shadow band, to measure both direct and diffuse. The difference between the two measurements is direct radiation.



240-8101 Star Pyranometer
with 240-8106 Protective Housing

The **Model 240-8106 Protective Housing** uses a ventilator to blow air from the bottom to the top of the star pyranometer, keeping the glass dome free of condensation, dew, and rain. In addition, there is an electric heater that turns on at approximately $+10^\circ\text{C}$ ($+50^\circ\text{F}$) which assists



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in keeping the glass dome clear when it snows. This unit will help keep maintenance to a low level. The glass dome must be kept clean at all times to provide accurate readings. The unit requires 24 Vac at 80 Va for proper operation.

Specifications

Sensing element: 12 black & white copper segments with 6 thermocouples each
Spectral sensitivity: 0.3 to 3 μm
Azimuth response: < 3% of the value
Cosine response: < 3% of the value, zenith angle 0-80°
Response time: < 25 sec(95%), < 45 sec (99%)
Measuring range: 0-1500 W/m^2
Resolution: <1 W/m^2
Stability: < 1% per year (temporary operation)
Temperature effect: < 1% of the value between -20°C to $+40^\circ\text{C}$
Linearity: < 0.5% in the range 0.5-1330 W/m^2
Impedance: About 35 ohm
Output: About $15\mu\text{V}/\text{W}/\text{m}^2$ or 4-20 mA = 0-1500 W/m^2
Ambient temperature: -40°C to $+60^\circ\text{C}$ / -40°F to $+140^\circ\text{F}$
Size: 5.4" Dia x 3.6" H
Weight/shipping: 1.9 lbs/4 lbs

Ordering Information

240-8101	Star Pyranometer (mV output), with 3 meters cable
240-8102	Star Pyranometer (4-20mA output), with 3 m cable
240-153-8101	Tower Mount, 1' boom with tower mounting hardware
240-153-8106	Tower Munt, 22" boom with tower mounting hardware
240-8101-A5	Amplifier PCB 0-5V Output
240-8101-C	Additional Cable, per meter
240-8101-D	Glass Dome
240-8101-OR	O-Rings, set of 3
240-8101-SG	Silica Gel, 100 grams
240-8101-SGC	Silica Gel Container, filled
240-8106	Protective Housing, 24 Vac
240-8106PS110	Power Adapter for 240-8196, 110 Vac to 24 Vac
240-8106PS220	Power Adapter for 240-8106, 220 Vac to 24 Vac