



Pyranometers/ Albedometer

A. Pyranometers

Description

All Weather Inc. offers two pyranometer models. Both models are designed for measuring global (direct + diffuse) solar radiation (irradiance). The Model 3022 is a First Class Pyranometer – the second of three classes according to both WMO and ISO 9060 classification of thermopile-type Pyranometers. Its good directional response, spectral selectivity, and temperature dependence assures accurate and reliable measurements under normal environmental conditions. The Model 3022 is ideal for routine solar radiation measurements.

The Model 3016 Pyranometer is a Secondary Standard Pyranometer – the best of three classes according to both WMO and ISO 9060 classification of thermopile-type pyranometers. It is ideal for the most severe environmental conditions and because it exhibits no tilt dependence, it can measure solar radiation on inclined surfaces as well as on plane surfaces. For this reason, it is recommended by the International Energy Agency (IEA) for solar collector testing or similar applications.

Features

Both Pyranometers are built inside a rugged, weather-proof anodized aluminum case, the sensing element incorporates a thermopile element consisting of 64 thermocouple for the Model 3022, 100 thermocouple for Model 3016. In both models, the thermocouple are imprinted on a thick-film substrate. The sensors rest on a carbon-black disk, and is housed under double K-5 optical glass domes. Heating of the sensors by incoming solar radiation produces a directly proportional signal in the microvolt range. A replaceable desiccator cartridge in the case prevents dew build-up on the inner sides of the dome, and a white sun shield minimizes heating of the case. A spirit level allows accurate placement of the sensor.

Since a thermopile pyranometer generates its own output signal, no external



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power source is needed. Both models are provided with a shielded 3-wire 10 meter output cable. An internal surge arrester is installed to lead off induced lightning current to the case. Each pyra-



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nometer is supplied complete with an individual calibration certificate ($\ln \mu\text{V}/\text{Wm}^2$), installation guide, and operating instructions.

B. Albedometer

Description

The model 3024 Albedometer is designed for measuring net global radiation and/or albedo (the fraction or ratio of incident radiation reflected by a surface) over many different types of surface. It consists of two matched Model 3022 first class pyranometers mounted on a 500 mm long rod. The top sensor faces up and it measures incoming glob-

al radiation, while the lower sensor faces down and it measures reflected solar radiation. If the sensors are connected in anti-series, the net global radiation is measured. When the outputs are measured separately, the albedo can be calculated by dividing reflected by global radiation.

Features

Heating of each sensor by incoming or reflected solar radiation produces a directly proportional signal in the microvolt range. The upper sun shield prevents excessive heating of the pyranometer body by solar radiation, and the lower screen prevents direct illumination of the lower domes by the sun at sunrise and sunset. A drying cartridge keeps the interior free from humidity. The Model 3024 is equipped with a spirit level for accurate leveling. The compact construction minimizes the shadow effect.

A shielded 5-wire 10 meter output cable is provided. An internal surge arrester is installed to lead off induced lightning current to the case. Each albedometer is supplied complete with an individual calibration certificate ($\ln \mu\text{V}/\text{Wm}^2$), installation guide and operating instructions.

Specifications

Pyranometer Model 3022

Spectral range:	305–2800 nm (50% points)
Sensitivity:	9-15 $\mu\text{V}/\text{Wm}^2$
Impedance:	70-100 Ohm
Response Time:	1/e 5s, 99% 55s
Nonlinearity:	<1.5% (<1000 W/m^2)
Tilt error:	<1.5% at 1000 W/m^2
Operating temperature:	-40 to 80° C
Temperature dependence of sensitivity:	$\pm 2\%$ (-10 to +40° C)
Maximum irradiance:	2000 W/m^2
Directional error:	< ± 20 W/m^2 at 1000 W/m^2
Weight:	0.85 kg
Cable length:	10 m

Pyranometer Model 3016

Spectral range:	305-2800 nm (50% points)
Sensitivity:	4-6 $\mu\text{V}/\text{Wm}^2$
Impedance:	700-1500 Ohm
Response Time:	1/e 4s, 99% 24s
Nonlinearity:	$\pm 0.6\%$ (<1000 W/m^2)
Tilt error:	None
Operating temperature:	-40 to 90° C
Temperature dependence of sensitivity:	$\pm 1\%$ (-10 to +40° C)
Maximum irradiance:	4000 W/m^2
Directional error:	< ± 10 W/m^2 at 1000 W/m^2
Weight:	0.85 kg
Cable length:	10 m

Albedometer Model 3024

Spectral range:	305–2800 nm (50% points)
Sensitivity:	9-15 $\mu\text{V}/\text{Wm}^2$
Impedance:	70-100 Ohm
Response Time:	1/e 5s, 99% 55s
Nonlinearity:	$\pm 1.5\%$ (<1000 W/m^2)
Tilt error:	<1.5% at 1000 W/m^2
Operating temperature:	-40 to 80°C
Temperature dependence of sensitivity:	$\pm 2\%$ (-10 to +40°C)
Maximum irradiance:	2000 W/m^2
Directional error:	< ± 20 W/m^2 at 1000 W/m^2
Weight:	1.9 kg
Cable length:	10 m

Ordering Information

Pyranometer Model 3022

3022	Pyranometer
30318	Mast Adapter with 6' boom for mounting 3020 to Model 8500 tripod tower
30318-A	Mast Adapter without boom for mounting 3020 to 1.05" O.D. mounting stub
30310	Mast, 5' with Mounting Adapter
3079	Shadow Ring
T600502	Cable, 2-conductor, 20 AWG shielded

Pyranometer Model 3016

3016	Pyranometer
30318	Mast Adapter with 6' boom for mounting 3020 to Model 8500 tripod tower
30318-A	Mast Adapter without boom for mounting 3020 to 1.05" O.D. mounting stub
30310	Mast, 5' with Mounting Adapter
3079	Shadow Ring
T600502	Cable, 2-conductor, 20 AWG shielded

Albedometer Model 3024

3024	Albedometer; including 2 desiccant tubes and 10' of cable
30314	Mast, 5 with mounting adapter
T600504	Cable, 4-conductor, 20 AWG shielded