Distributed Solar Energize

# Weather Monitoring Sensors Datasheet

# Solar Radiation Sensor Pyra 300 V

The Solar Radiation Sensor, or solar pyranometer, measures global radiation, the sum at the point of measurement of both the direct and diffuse components of solar irradiance.

The sensor’s transducer, which converts incident radiation to electrical current, is a silicon photodiode with wide spectral response. The console calculates and displays solar irradiance from the sensor's output voltage. It also integrates the irradiance values and displays total incident energy over a set period of time.

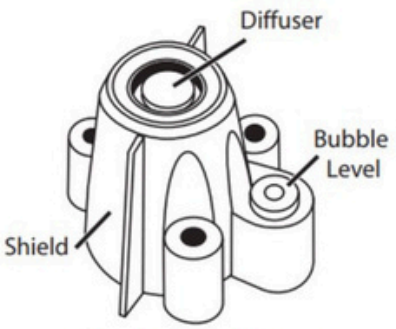
The outer shell shields the sensor body from thermal radiation and provides an airflow path for convection cooling of the body, minimizing heating of the sensor interior. It includes a cutoff ring for cosine response, a level indicator, and fins to aid in aligning the sensor with the sun’s rays.

The space between the shield and the body also provides a runoff path for water, greatly reducing the possibility of rain- or irrigation-water entrapment. The diffuser is welded to the body for a weather-tight seal; it provides an excellent cosine response.

The transducer is an hermetically-sealed silicon photodiode with integrated amplifier . Spring-loaded mounting screws, in conjunction with the level indicator, enable rapid and accurate leveling of the sensor. Each sensor is calibrated against a secondary standard Pyranometer in natural daylight. .

Specifications

| | |
|---|---|
| **Operating Temperature** | -40° to +65° C |
| **Storage Temperature** | -45° to +70°C |
| **Transducer** | Silicon photodiode |
| **Spectral Response** | 400 to 1100 nanometers |
| **Cosine Response** | |
| **Percent of Reading** | ±3% (0° to ±70°),<br>±10% (±70° to ±85°) |
| **Percent of Full Scale** | ±2% (0° to ±90°) |
| **Temperature Coefficient** | + 0.12% per °C |
| **Reference temperature** | 25°C |
| **Housing Material** | UV-resistant PVC plastic |
| **Weight** | 250 g |
| **Range** | 0 to 1800 W/m2 |
| **Accuracy** | ± 5% of full scale |
| **Drift** | up to ±3% per year |
| **Sensor Cable Length** | 2m |
| **Output**<br>A, B, C are 3 different models | A. 0-5 $V_{DC}$ (Voltage Type)<br>B. 4-20 mA (Current Type)<br>C. MODBUS RTU-RS485 |
| **Operating Voltage** | 7-24 $V_{DC}$, 2 to 5 mA |
| **Recommended calibration interval** | 1 Year |



Solar Radiation Sensor

# Surface Module Temperature Sensor

## Specifications

| | |
|---|---|
| Measuring Range | : 0 to 100 °C |
| Accuracy | : ± 0.5 ° C |
| Sensors | : Temperature : RTD Pt100Ω |
| Output | : 4-20mA |
| Supply Voltage | : 12 to 26 VDC |
| Housing | :Poly carbonate watertight enclosure |
| Protection | : IP-65 |
| Weight | : Approx 150gms |

## Temperature and Humidity Sensor with Solar Shield

It is a naturally aspirated, 6-plate radiation shield. Its louvered construction allows air to pass freely through the shield, serving to keep the probe at ambient temperature. The shield's white color reflects solar radiation. The most effective passive shelter. Protects temperature sensor from solar radiation and

| | |
|---|---|
| Construction | : UV-stabilized white thermoplastic plates, aluminum mounting Bracket, white powder-coated ,stainless-steel U-bolt clamp |
| Plate Diameter | :196 mm |
| Plate Height | :110mm |

### Sensor

| | |
|---|---|
| Measuring Range | : 0 to 100% RH , -40 to 65 °C |
| Accuracy @ 23°C | : ± 2 % RH , ± 0.5 ° C |
| Output | :Serial Communication |

# Wind Speed sensor WS102P

**Wind Speed Sensor is designed with rugged components stand up to hurricane-force winds, yet are sensitive to a light breeze. Includes sealed bearings for long life. The range and accuracy specifications have been verified in wind-tunnel tests. In areas where icing of the anemometer is a problem, drip rings deflect water from the joint between moving parts.**

## Specifications

- Sensor Type : Three cups
- Material : Control Head UV-resistant ABS
  Wind Cups : Polycarbonate

- Range : 0 to 250 km/hr
- Start up wind speed : 0.5m / s
- Accuracy : ± 3%
- Output :Pulse , 62 Hz = 250 km/hr
- Supply : 5 to 24 vdc
- Dimensions : 3 cup Dia 15 cms
- Cable length : 2 mts
- Temperature : - 40 ~ 75 ° C


Dynalab

# Ambient Temperature Sensor

## MODEL

DWT 8102

## DATASHEET

### Introduction

It is an ambient temperature with or without naturally aspirated, 6-plate radiation shield. Its louvered construction allows air to pass freely through the shield, serving to keep the probe at ambient temperature. The shield's white color reflects solar radiation.

**PRINCIPLE OF OPERATION:**

The sensor used for measurement is an RTD (PT 1000). Here the resistance of the element varies with temperature (increases with temperature), approximately 3.9 ohms/degree Celsius. The weather shield Is provided to avoid direct heating of the sensor by sun's radiation and to protect it from rain and snow

### Specifications

| | |
|---|---|
| Sensing | Standard Platinum RTD element PT1000 mounted inside a weather shield |
| Range | - 40 degrees to + 60 degrees Celsius. |
| Resolution | 0.1 degrees Celsius. |
| Accuracy | + 0.2 degrees Celsius. |
| Output | A: 0-5V<br>B: Modbus RTU |
| Weather Shield | ABS plastic molded Non-Aspirated weather shield coated with weather proof reflective white paint. |
| Size of body | 200(H) x 150 mm diameter (with weather shield). |
| Housing | Sensor mounted in a slotted tube on a Brass stem Inside a weather shield. The sensor is supplied with 10 Meters shielded cable |
| Power requirement | 5V |

# Module Temperature Sensor

## MODEL

DWMT 8104

## DATASHEET

### Introduction

The module temperature sensor is used by PV plant operators to know the temperature of the modules installed in the array. The module temperature sensor converts this reading into a voltage signal. This signal is sent back to the monitoring device.

As the system operator it's important to know the systems' performance. The module temperature sensor will help to enhance kWh performance by ensuring reliable access to the all necessary data.

Features

- Fast, Stable and accurate
- IP65 enclosure Excellent long term stability
- Onsite two point calibration
- Loop powered

### Specifications

| | |
|---|---|
| Sensing element | RTD (PT1000) |
| Measuring Range | - 40 to 100 deg C |
| Accuracy | ±0.3 Deg C |
| Output | Different Output Types available<br>A: Resistance<br>B: 0-5V<br>C: 4-20ma<br>D: Modbus RTU |
| Mounting | Encapsulated in a flanged plastic weather proof plastic enclosure |
| Operating Voltage for Output Type: B, C & D | 12 VDC |

# Humidity Sensor

## MODEL

DWT 8103

## DATASHEET

### Introduction

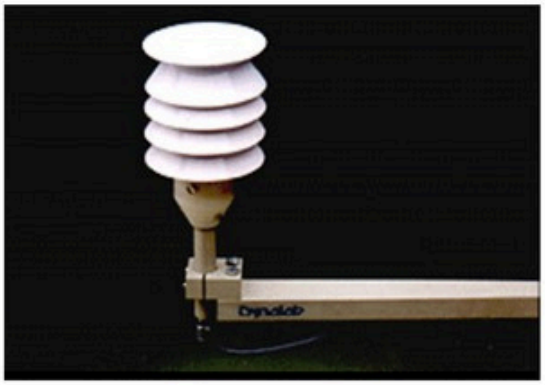
Humidity sensor features an improved design to provide highly accurate and rapid measurements.

**PRINCIPLE OF OPERATION:**
The humidity sensor is a thin film capacitor element. A dielectric polymer absorbs water molecules from the air through a thin metal electrode and this causes a capacitance change proportional to humidity. The response is essentially linear. A sintered filter is provided to protect the sensor element from dirt, atmospheric pollutant and water condensation.

A solid state electronic circuit is built in each probe to produce 0 to 5V output signal corresponding to relative humidity value 0 to 100%. The output is single ended.

### Specifications

| | |
|---|---|
| **Sensing** | Solid state capacity type sensor |
| **Range** | 0 to 100 % operating at -40 C to +50 C |
| **Resolution** | 0.1 % |
| **Accuracy** | +3% of full-scale reading |
| **Output** | A: 0-5V<br>B: Modbus RTU |
| **Weather Shield** | ABS plastic molded Non-Aspirated weather shield coated with weather proof reflective white paint. |
| **Size of body** | 250 (H) x 90 mm diameter. (with weather shield) |
| **Sensor Cable Length** | 10m |
| **Power requirement** | 5V ~ 4 mA. |



# Pyranometer

## MODEL

DWR 8101

## DATASHEET

### Introduction

The pyranometer measures radiation received on a horizontal surface from both the sun and the sky. When exposed to radiation, the temperature of the blackened horizontal surface rises. Heat is lost from the blackened surface by conduction, convection and radiation. The equilibrium temperature reached is a measure of the radiation. This temperature is measured by a thermopile.

SENSOR: A thin metallic film blackened with a special paint (which absorbs energy completely in the range of 0.3 to 3 µm) is the sensor. A 72-element copper constantan thermopile is in thermal contact with this thin metal film. Alternate junctions of this thermopile are in thermal contact with the massive body of the instrument at ambient temperature which serves as the cold junction. This way a millivolt output proportional to the radiation received (about 4 mV/kW/m²) develops across the thermopile. the instrument has a time constant less than 22 seconds

### Specifications

| | |
|---|---|
| Brand | Dynalabs |
| Model No. | DWR 8101 |
| Sensing | 72 element thermopiles |
| Spectral range | 0.3 to 3 µ meters |
| Measurement range | 0 to 1400 watts / Sq. Meter |
| Sensitivity | ~ 20 micro volts/W/M ². |
| Time constant | < 30 seconds. |
| Accuracy | ± 2% of reading on clear cloudless days |
| Output | 0 to 40 mv |

# Silicon Pyranometer

## MODEL

DWR 8102M

## DATASHEET

### Introduction

Dynalab Silicon Pyranometer model No. DWR 8102M uses a Silicon Photovoltaic cell for measurement of incoming Solar Radiation on a flat surface. The response of this sensor is limited to a wavelength band of approx 400 to 1100 Nanometers. However, most of the solar radiation reaching the surface of the earth falls within this wavelength band and if calibrated against a precision blackbody pyranometer this type of pyranometer can be used to acquire reasonably accurate values of incident Solar radiation especially on clear days. For use in studies in Agricultural Meteorology and Solar energy conversion using photo voltaic devices this model is adequate.

The sensor is mounted under a milky white diffuser positioned in such a way as to give good cosine response.

The device is calibrated against a secondary standard thermopile type pyranometer.

### Specifications

| | |
|---|---|
| Brand | Dynalabs |
| Model No. | DWR 8102M |
| Sensing | Silicon Photo voltaic cell |
| Wavelength range | 400 to 1100 nano meters |
| Measurement range | 0 to 2000 watts / Sq. Meter |
| Accuracy | + 3% of reading on clear cloudless days |
| Output | A. 0 to 5 VDC (0- 2000 W/m2)<br>B. MODBUS RTU |
| Input Operating Voltage | 12 V DC |
| Mechanical | Aluminum body with leveling screws and spirit level |

# Anemometer

## MODEL

DWA 8602M

## DATASHEET

### Introduction

Dynalab Weather Technologies anemometer is a fast response, low threshold up to electronic anemometer. When rotated by wind, a chopper on the anemometer shaft interrupts infrared light beam 18 times per revolution, generating pulses from a phototransistor. The signal is amplified and fed through a line driver who can drive 500 meters of cable. The frequency is proportional to wind speed. The anemometer is provided with 3 pin connector for easy replacement.

The anemometer comes with 10 meters of shielded cable.

### Specifications

| | |
|---|---|
| Wind speed Sensor | 3 Cup Anemometer |
| Sensing | 3 cup assembly mounted on friction free shaft and coupled to a chopper |
| Starting threshold | 0.25 meters/sec |
| Range | 0 to 50 meters/sec |
| Distance Constant | 2.5 m |
| Operating temp | -50 Degrees C to +65 Degrees C ** |
| Output | A: 0-5 V (Default)<br>B: Modbus RS485 (optional) |
| Operating Input Voltage | 12 VDC |
| Accuracy | Better than 0.5 m/s up to 10 m/s,<br>+/- 2% F S above 10 m/s |
| Diameter of cup | 50 mm |
| Diameter of cup assembly | 165 mm |
| Construction of sensor body | Brass housing and stainless-steel shaft |


DAVIS

# Temperature/Humidity Sensors

**6830**
**6832**

The Temperature/Humidity Sensors includes temperature and humidity sensors and a passive solar radiation shield (product number 6830), or a 24-Hour Fan-Aspirated Radiation Shield (product number 6832). The Temperature/ Humidity Sensor measures relative humidity and air temperature. The passive solar radiation shield is made of a proprietary plastic designed for high thermal reflectance and low thermal conductivity. The 24-Hour Radiation Shield includes a solar- and battery-powered fan that pulls air up through the shield and over the sensors for highest temperature accuracy.

## General

| | |
|---|---|
| Operating Temperature | -40° to +150° F (-40° to +65° C) |
| Storage Temperature | -40° to +158° F (-40° to +70° C) |
| Sensor Type: | |
| Temperature | PN junction silicone diode |
| Relative Humidity | Film capacitor element |
| Cable Length | 25 feet (7.6 meters) |
| Dimensions | |
| 6380: | .1" high x 9.5" wide x 7.8" deep (206 mm x 241 mm x 198 mm) |
| 6382 | 8.1" high x 9.5" wide x 7.8" deep (206 mm x 241 mm x 198 mm) |
| Weight | |
| 6380 | 3.5 lbs. (1.6 kg) |
| 6382 | 6.6 lbs. (3.0 kg) |

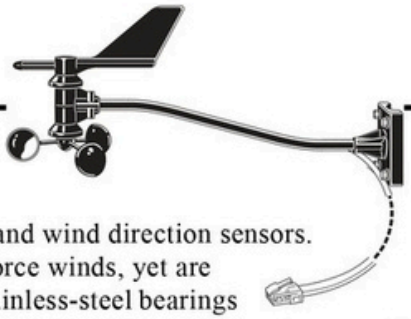
## Sensor Output

### Relative Humidity

| | |
|---|---|
| Range | 1 to 100% RH |
| Accuracy | ±2% |
| Drift | <0.25% per year |

# Anemometer

**7911**



**Perception and Wizard Sensors**

The Anemometer includes both wind speed and wind direction sensors. Rugged components stand up to hurricane-force winds, yet are sensitive to a light breeze. Includes sealed stainless-steel bearings for long life. The range and accuracy specifications of this unit have been verified in wind-tunnel tests (information available upon request). A model 7911 Anemometer reported wind speeds of 175 miles per hour before its tower collapsed during hurricane Andrew, 1992. Digital filtering, with time constant as specified below, is applied to wind direction measurements. In areas where icing of the anemometer is a problem, use Anemometer Drip Rings to deflect water from the joint between moving parts.

## General

| | |
|---|---|
| Sensor Type | |
| Wind Speed | Wind cups and magnetic switch |
| Wind Direction | Wind vane and potentiometer |
| Attached Cable Length | 40' (12 m) |

Note: On Monitor and Wizard stations, cable lengths longer than 140' (42 m) between sensors and console may artificially limit wind speed readings. That is, beyond that length, maximum recordable wind speed decreases as cable length increases. For example, with a length of 140' (42 m), the maximum recordable speed exceeds 175 mph. At 240' (72 m), however, the maximum recordable speed drops to less than 140 mph. Below that upper limit, however, the anemometer's accuracy is not affected.

| | |
|---|---|
| Cable Type | 4-conductor, 26 AWG |
| Connector | Modular connector (RJ-11) |
| Recommended Maximum Cable Length | |
| Wizard and Monitor | 140' (42 m) Sensor to Console |
| Material | |
| Wind Vane and Control Head | UV-resistant ABS |
| Wind Cups | Polycarbonate |
| Anemometer Arm | Black-anodized aluminum |
| Dimensions | 18.5" long x 7.5" high x 4.75" wide (470 mm x 191 mm x 121 mm) |
| Weight | 2 lbs. 15 oz. (1.332 kg) |

## Console Data

Note: These specifications apply to sensor output as converted by Davis Instruments weather station consoles.

| | |
|---|---|
| Range | |
| Wind Speed (large wind cups) (See Note 1) | 2 to 150 mph, 2 to 130 knots, 1 to 67 m/s, 3 to 241 km/h |
| Wind Speed (small wind cups) (See Note 1) | 3 to 175 mph, 3 to 150 knots, 1.5 to 79 m/s, 5 to 282 km/h |
| Wind Direction | 0° to 360° or 16 compass points |
| Wind Run | 0 to 1999.9 miles (1999.9 km) |
| Accuracy | |
| Wind Speed (large wind cups) | ±2 mph (2 kts, 3 km/h, 1 m/s) or ±5%, whichever is greater |
| Wind Speed (small wind cups) | ±3 mph (3 kts, 5 km/h, 1.5 m/s) or ±5%, whichever is greater |
| Wind Direction | ±7° |
| Wind Run | ±5% |
| Resolution | |
| Wind Speed | 1 mph (1 knot, 0.1 m/s, 1 km/hr) |
| Wind Direction | 1° (0° to 355°), 22.5° between compass points |
| Wind Run | 0.1 m (0.1 km) |

### Perception and Wizard Sensors

Measurement Timing

| | |
|---|---|
| Wind Speed Sample Period | 2.25 seconds |
| Wind Speed Sample and Display Interval | 2.25 seconds (Monitor & Wizard) |
| Wind Direction Sample Interval | 1 second (Monitor & Wizard) |
| Wind Direction Filter Time Constant (typical) | 8 seconds (Monitor & Wizard) |
| Wind Direction Display Update Interval | 2 seconds (Monitor & Wizard) |

## WeatherLink® Data

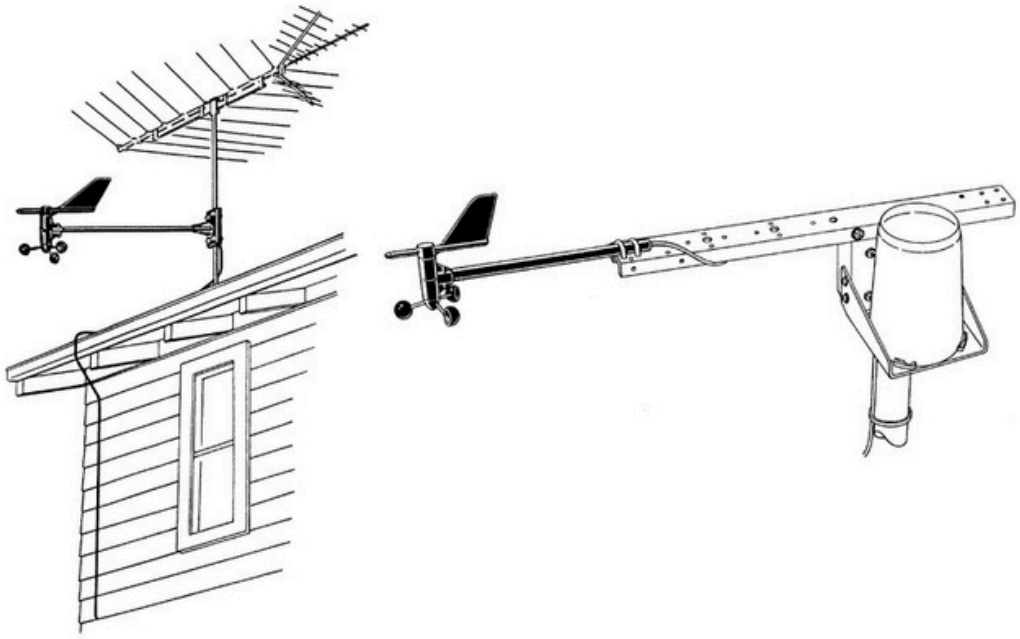
Note: These specifications apply to sensor output as logged and displayed by the WeatherLink.

| | |
|---|---|
| Wind Speed | Average during archive interval |
| High Wind Speed | Maximum during archive interval |
| Wind Direction | Dominant wind direction during archive interval |

## Input/Output Connections

| | |
|---|---|
| Black | Wind speed contact closure to ground |
| Green | Wind direction pot wiper (360° = 20 kOhm) |
| Yellow | Pot supply voltage |
| Red | Ground |

## Installation Options



## Package Dimensions

| Product # | Package Dimensions (Length x Width x Height) | Package Weight | UPC Codes |
|---|---|---|---|
| 7911 | 17.50" x 5.75" x 2.50" (445 mm x 146 mm x 64 mm) | 1.7 lbs. (.7 kg) | 011698 79110 1 |

# Reach out our Sales Team.

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