

## Voltage Output Adapter for WATERMARK Soil Moisture Sensor – MODEL 200SS-VA and 200SS-V-6

# IRRIGOMETER®

*This electronic adapter provides a linear voltage output which makes the WATERMARK sensor very easy to read by most data loggers or devices that can read a voltage signal. The voltage output signal is directly proportional to the soil water tension measurement which represents the energy a plant's root system uses to draw water from the soil. It can be temperature compensated with the addition of a 200TS soil temperature sensor.*

*In use since 1978, the patented WATERMARK sensor is a solid-state electrical resistance sensing device. The sensor consists of a pair of highly corrosion resistant electrodes that are imbedded within a granular matrix. As the soil water tension changes with water content, the resistance changes as well. The sensor adapter translates the resistance value into a linear voltage output which can be read by a compatible reading device. The reading device can then be configured to display the voltage output in centibars (cb) or kilopascals (kPa) of soil water tension.*

### Model 200SS-VA — Voltage Output Adapter for the WATERMARK Soil Moisture Sensor

#### Specifications –

**MATERIALS:** Electronic Adapter is fully potted for outdoor installation and housed inside a plastic enclosure that is connected to the wires of the WATERMARK Sensor which has ABS plastic caps with stainless steel body over a hydrophilic fabric covered granular matrix.

**DIMENSIONS –** 1.5 in. high x 1.25 in. wide x .75 in. deep ( 38 mm high x 32 mm wide x 20 mm deep).

**WEIGHT:** .175 lb. (79.4 g)

**WIRE LEADS:** 18 in. (46 cm), 3 conductor AWG 22 direct burial cable output side, dual 18 in. (46 cm) 2 conductor AWG 20 sensor side.

**ELECTRICAL:** 3.2- 30 volt, 1.5 mA input, polarity protected / 0-2.8 volt output, linear / 0-239 cb (kPa) = 0 to 2.8 volts linear. **Sensor is not galvanically isolated and 200SS-VA does not provide galvanic isolation. The host logger must provide galvanically isolated power and analog port for each sensor to prevent cross talk between multiple sensors and sensor to earth currents. The sensor may be used singly in battery operated loggers without isolation, or in multiples if power and ground can be switched independently to each sensor. Additional circuitry may be necessary on earth grounded systems. (See 200SS-V-6 on reverse.)**

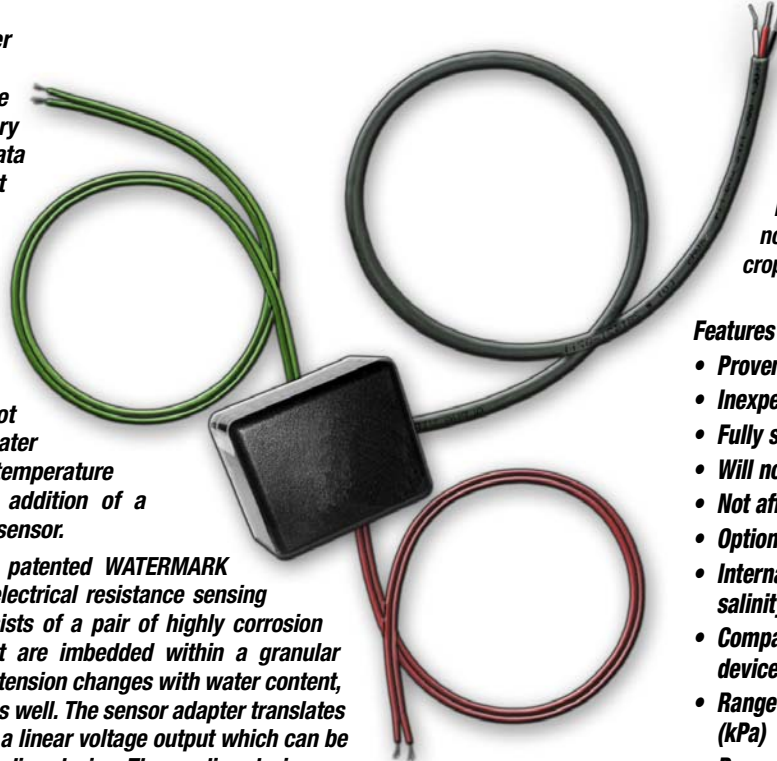
– Soil moisture readings will automatically be temperature compensated when adding a 200TS soil temperature sensor.

– When power is applied, a reading will be supplied within 500 ms.

– If power is left applied, a new reading will be provided every second.

– Once power is removed, a minimum off time of 30 seconds is required before power can be re-applied.

**WARRANTY:** One year



*The WATERMARK is designed to be a permanent sensor, placed in the soil to be monitored and “read” as often as necessary with a portable or stationary device. Internally installed gypsum provides some buffering for the effect of salinity levels normally found in irrigated agricultural crops and landscapes.*

#### Features of the WATERMARK with Adapter:

- Proven stable calibration
- Inexpensive, easy to install and use
- Fully solid-state
- Will not dissolve in soil
- Not affected by freezing temperatures
- Optional Temperature Compensation
- Internally compensated for commonly found salinity levels
- Compatible with many voltage reading devices
- Range of measurement from 0 to 239 cb (kPa)
- Does not require the reading device to have a custom electronic circuit to read the WATERMARK sensor
- NO maintenance required

#### APPLICATIONS INCLUDE

- Irrigation Scheduling • Water Table Monitoring • Leak Detection
- Agronomy Research • Environmental Monitoring
- Anywhere you need to know when or if the soil moisture status is changing

ORDERING INFORMATION: **Catalog #200SS-VA — Voltage Output Adapter for the WATERMARK Soil Moisture Sensor**

#### OPERATING PRINCIPLE OF THE WATERMARK WITH VOLTAGE ADAPTER:

The WATERMARK sensor is a resistive device that responds to changes in soil moisture. Once planted in the soil, it exchanges water with the surrounding soil thus staying in equilibrium with it. Soil water is an electrical conductor thereby providing a relative indication of the soil moisture status. As the soil dries, water is removed from the sensor and the resistance measurement increases. Conversely, when the soil is rewetted, the resistance lowers.

The WATERMARK sensor is unique in that it takes its resistive measurement within a defined and consistent internal matrix material, rather than using the surrounding soil as the measurement medium. This unique feature allows the sensor to have a stable and consistent calibration that does not need to be established for every installation.

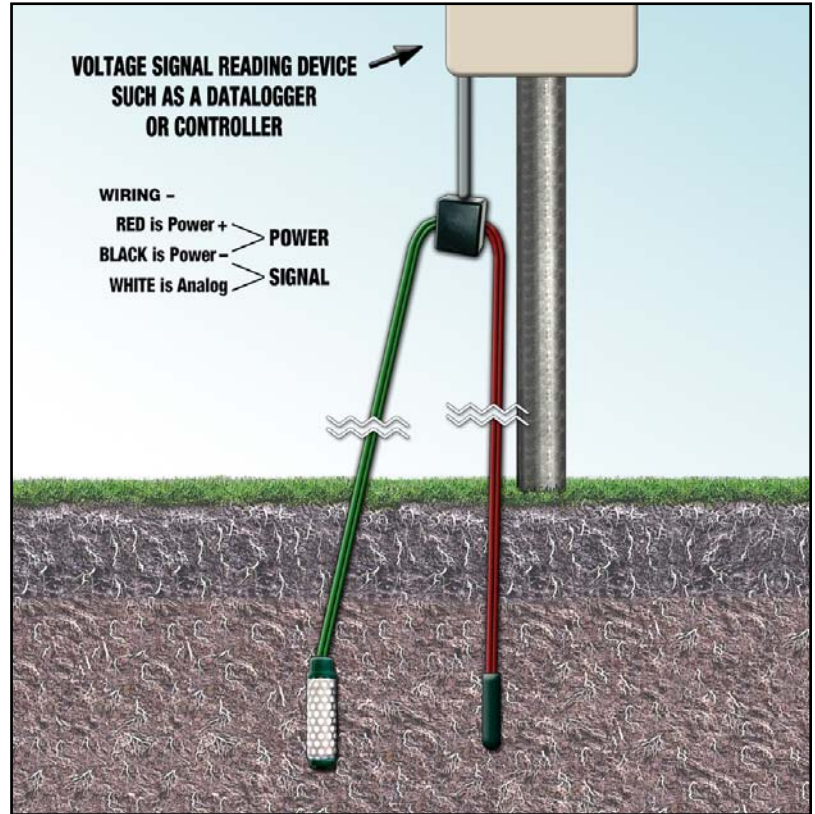
The relationship of ohms of resistance to centibars (cb) or kilopascals (kPa) of soil water tension is constant. The 200SS-VA converts the resistance value to a voltage output and can compensate the reading for temperature changes if a temperature sensor is added. Compatible reading devices such as a data logger can be scaled to

WATERMARK

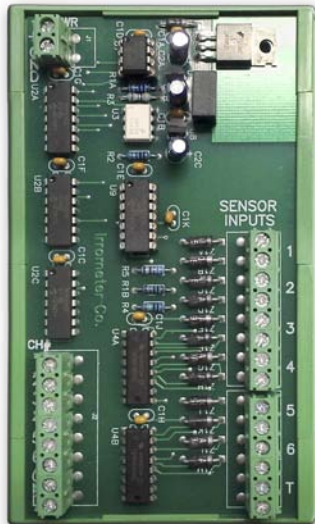
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report soil water tension, or matric potential, since that is the best reference of how readily available soil water is to a plant. The WATERMARK sensor consists of stainless steel electrodes imbedded in an internal granular matrix material that acts like a soil in the way it moves water. This matrix is encased in a hydrophilic material that establishes good hydraulic conductivity with the surrounding soil and is held in place by a durable stainless steel perforated shell with plastic end caps.

SPECIFICATION INFORMATION FOR SENSOR WITH ADAPTER: The soil moisture measurement device, or sensor, shall represent soil moisture status in units of soil water tension or matric potential, registering in centibars (cb) or kilopascals (kPa) when read with a compatible device using a linear voltage scale. Its construction shall be of the Granular Matrix Sensor (GMS) type and require no on-site calibration or routine maintenance. It shall be durable, long-lasting, not subject to dissolving in a wet soil environment with an outer surface of stainless steel and ABS plastic. It shall be the WATERMARK Sensor as manufactured by the IRROMETER Company, Inc. of Riverside, California.

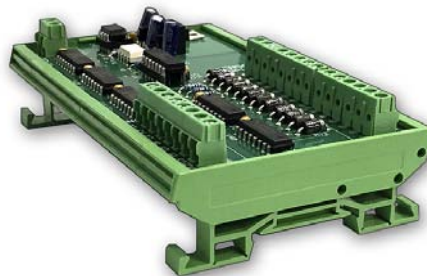


### 200SS-V-6 Isolator



When using an earth grounded reading device OR when using more than one WATERMARK per reading device, the 200SS-V-6 Channel Isolator provides these features:

- Reads and galvanically isolates up to six WATERMARK sensor inputs
- Uses one soil Temperature Sensor to compensate all six WATERMARK inputs. (*Optional*)
- Outputs values just like the 200SS-VA, as a 0-2.8 volt linear reference of soil water tension from 0 to 239 centibars (kPa)
- Input 12V DC 10 mA
- DIN rail mountable
- Measures 5.375" (13.65 cm) L x 3.25" (8.26 cm) W x 1.625" (4.13 cm) D
- Weighs 4.33 oz. (122.75 g)



WATERMARK

**IRROMETER®**

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