

# WATERMARK Soil Moisture Sensor with Voltage Output – MODEL 200SS-V

# IRROMETER®

The WATERMARK 200SS-V voltage output sensor is an innovation that combines the patented WATERMARK soil moisture sensor with an integral electronic adapter. This feature provides a linear voltage output which makes the sensor very easy to read by most data loggers or devices that can read a voltage signal. The voltage output signal is temperature compensated and directly proportional to the soil water tension measurement. This value represents the energy a plant's root system uses to draw water from the soil.

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 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.

**OPERATING PRINCIPLE:**  
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 ohm of resistance to centibars (cb) or kilopascals (kPa) of soil water tension is constant. The 200SS-V is internally temperature compensated and converts the resistance value to a voltage output. Compatible reading devices such as a data logger can be calibrated to 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:** 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

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:

- Proven stable calibration
- Inexpensive, easy to install and use
- Fully solid-state
- Will not dissolve in soil
- Not affected by freezing temperatures
- Internally compensated for commonly found salinity levels
- Compatible with 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

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##### Specifications –

**MATERIALS:** Electronic Adapter is housed inside 1/2 in. PVC pipe and pre-mounted on the WATERMARK Sensor which has ABS plastic caps with stainless steel body over a hydrophilic fabric covered granular matrix.

##### DIMENSIONS –

DIAMETER: .875 in. (22 mm)

LENGTH: 7.25 in. (18.5 cm)

WEIGHT: .4 lb. (181 g)

**WIRE LEADS:** 10 ft. (3 m), 3 conductor AWG 22 direct burial cable

**ELECTRICAL:** 3.2-30 volt, 1.5 mA input, polarity protected / 0-3 volt output, linear / 0-239 cb (kPa) = 0 to 2.8 volts linear / 2.9 volts = frozen fault code / 3.0 volts = open circuit fault code.

– Soil moisture readings will automatically be temperature compensated.

– 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.

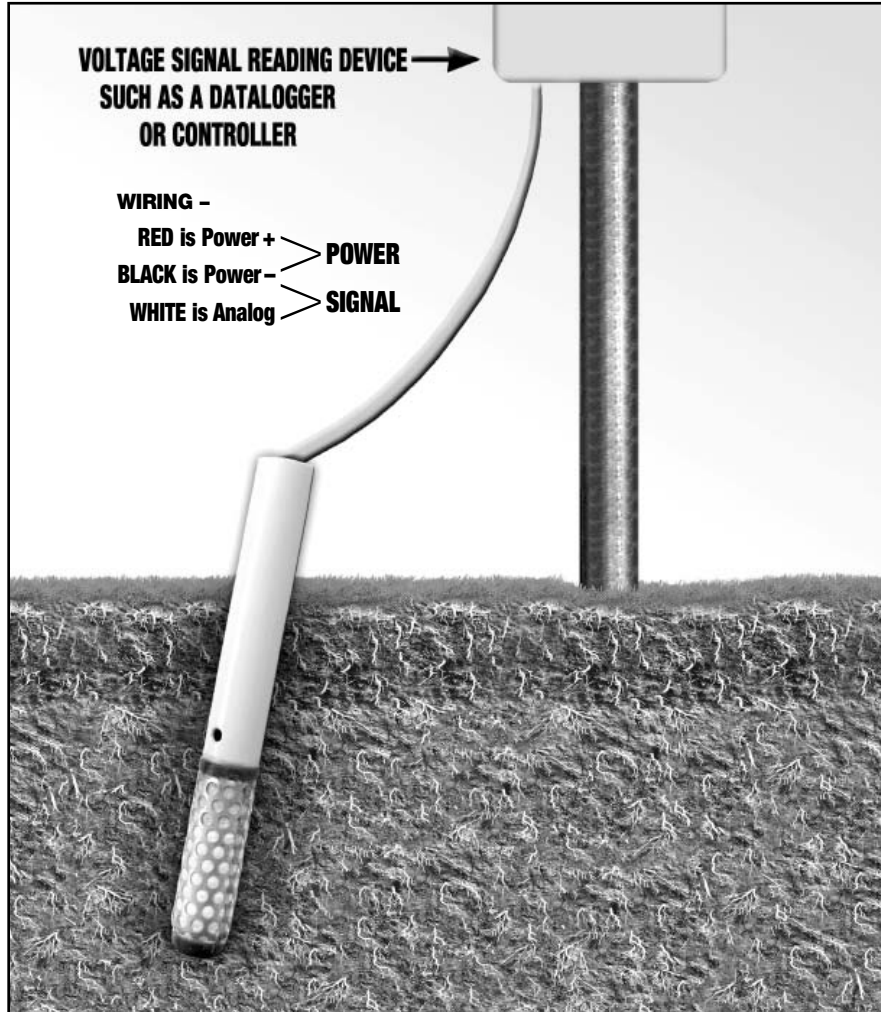
– Once power is removed, a minimum off time of 30 seconds is required before power can be re-applied.

**WARRANTY:** One year

**ORDERING INFORMATION:** Catalog #200SS-V — WATERMARK Soil Moisture Sensor with Voltage Output

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 and PVC plastic. It shall be the WATERMARK Sensor as manufactured by the IRROMETER Company, Inc. of Riverside, California.

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WATERMARK

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