

WATERMARK

Optimizing Irrigation... Maximizing Conservation... Worldwide - Since 1951

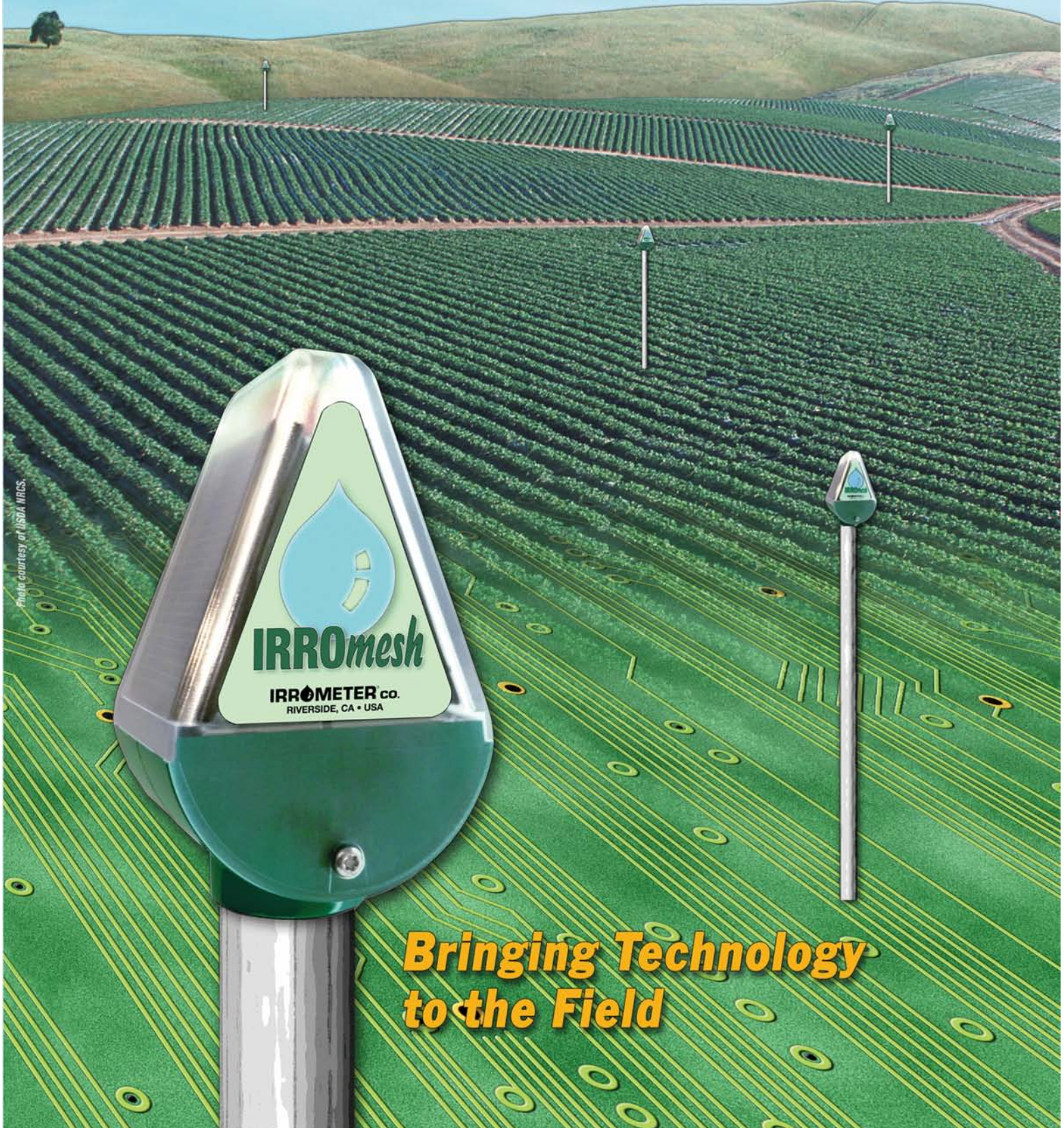


Photo courtesy of USDA NRCS.

IRROMesh

IRROMETER co.
RIVERSIDE, CA • USA

**Bringing Technology
to the Field**

Soil Moisture Management

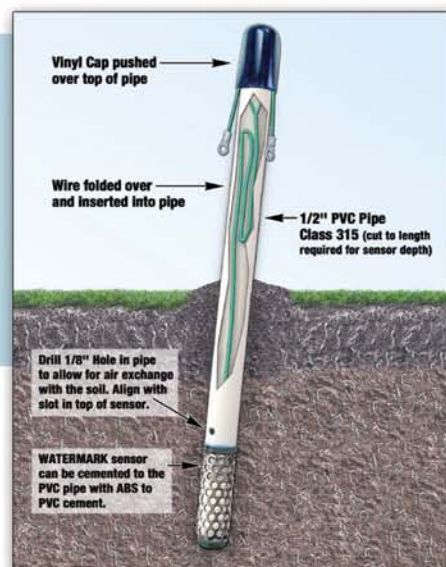
Irrigation water management is a critical element in agriculture. Many agronomists, crop consultants and growers agree that monitoring soil moisture is an essential tool to manage irrigation. Since 1951, IRROMETER has been a leader in soil moisture monitoring products that help growers maximize irrigation efficiency and minimize costs.

In 1985, IRROMETER introduced the patented WATERMARK Sensor which uses electrical resistance to measure soil moisture status. Since soil water is an electrical conductor, resistance is lower when the soil is wet and higher when it's dry. The sensor is placed in the soil at the root level and exchanges water with the surrounding soil thus staying in equilibrium with it. As the soil dries, water is removed from the sensor and the resistance measurement increases. This resistance is displayed in centibars/kilopascals (cb/kPa) of soil tension and is a direct indicator of how hard the plant's root system has to work to extract water from the soil. The higher the tension reading the drier the soil.

Deciding when and how long to irrigate can then be based on soil moisture status saving you time, labor, water and energy costs. The sensor can be read manually by the WATERMARK Meter or automatically by WATERMARK Monitoring Systems.

WATERMARK Soil Moisture Sensor – 200SS

- Range of 0-200 centibars (kPa) of soil water tension
- Not affected by freezing temperatures
- Durable construction provides years of service
- Requires no maintenance
- Automatically compensates for varying salinity levels
- Can be installed on pipe (see illustration to right)



Digital Meter – 30-KTCD-NL

- Digital Readout with self test function
- Manual Temperature Compensation
- 9-Volt battery lasts an entire year
- One Meter reads all WATERMARK Sensors

WATERMARK Sensor Installation Tools

Auger, Coring and Slide Hammer tools available. Insertion Tool has ejection rod to ensure proper installation.



WATERMARK Automatic Data Monitoring

Automatic Data Collection systems provide a graphical record of soil moisture trends to assist the grower in making critical irrigation scheduling decisions. The equipment is simple to install and use. Designed for harsh outdoor installations, all our enclosures are weather tight. WaterGraph software is included and takes only a few minutes to set up. Data can be read in the field or downloaded to a shuttle. The remote data access option permits viewing the data in alternate locations via cellular service (see back panel for details). Data display can be customized to the user's application by inputting program characteristics such as monitor location, sensor type and location, reading frequency, etc.



900M Monitor

- **Collects and records up to eight sensor inputs**
- **Reading intervals selected by the user**
- **Soil moisture readings can be temperature compensated**
- **Downloadable WaterGraph software included**
- **Display shows the sensor name, type and current status**
- **Wire strain relief connectors keep enclosure sealed**
- **Low cost battery (9-volt) lasts up to one year**

The WATERMARK Model 900M comes complete with the following items – Monitor in a heavy duty outdoor enclosure, seven WATERMARK soil moisture sensors with 15' (4.5m) wire leads, one soil temperature sensor, 9V battery, and instruction manual. Available without sensors and with other sensor combinations. (WaterGraph software available as a FREE download.)

Remote Data Access Option – Extend Your Range

900 Series remote data access improves productivity by bringing important soil moisture information to the user. Remote areas and multiple crop locations can be monitored from a central location saving time and travel. Irrigation decisions can be made after reviewing all monitored locations, maximizing utility usage and improving irrigation efficiency. The remote access components are modular in design and can easily be added to an existing Monitor installation. World-wide access to 900M data is simple with the use of a Cellular Gateway and the Internet.

EXTENDED RANGE (Internet, 900 Series) — from Monitor location to WEB

- **Cost Effective** – view multiple monitor locations from a centralized off-site location
- **Convenient** – view data any time from anywhere
- **Secure** – allows multiple users to share the password protected data
- **Accessible** – Cellular Data Service provides Internet access. Performance is limited only by service provider's coverage
- **Connected** – allows viewing of latest soil moisture readings 24/7. Helps user make scheduling decisions





SOLAR POWERED - *Wireless* - DATA LOGGING SYSTEM

**NEW
Product!**



975 Node

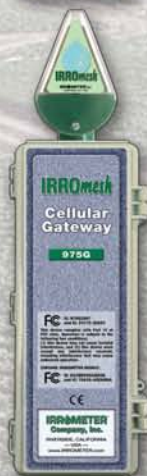
Base – 975B
*Receives data from Nodes
and transmits to selected
Data Collection Device.*



PC Link – 975P
*Desktop Data Collection
Device continuously streams
data to the WEB portal
through your computer.*



Cellular Gateway – 975G
*Cellular Data Collection
Device mounts outdoors at
the IRROmesh Base location
and provides dedicated
cellular connection hardware
for Internet access.*



Logger – 975L
*Manual Data Collection
Device to manually
download and view data
in the field on a laptop.*



System Features:

- **NO Batteries Required** – Solar Panels on two sides for optimal charging
- **Self-Initializing** – Nodes power up with initial sun exposure and associate themselves with the base receiver
- **Self-Routing** – Nodes route communication for maximum efficiency
- **Self-Healing** – Nodes will re-route for maximum efficiency
- **In-Field Logging Capability**
- **Small Size** – Easy field installation
- **WEB Based Data Management and Display** – Store and analyze data through the Internet
- **Data is Recorded every 30 Minutes**
- **Automatically Manages Power** – Unique sleep/wake cycling ensures continuous reliable transfer during all light conditions



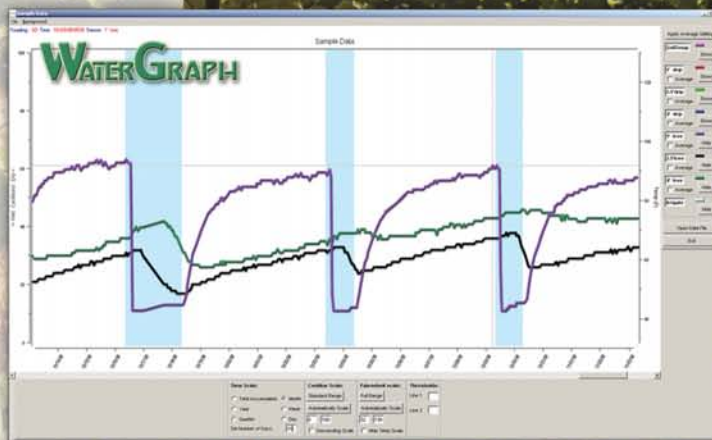
IRROmesh uses a 902–928 and 863–870 MHz Frequency Hopping Spread Spectrum type radio. It is manufactured with license compliance for the US, Canada, Australia, New Zealand and ETSI countries. Frequencies for use in other countries will become available as they are developed. Patented.

Graphing Features

WaterGraph and **SensMit Web Portal** are software programs that automatically record and display sensor readings. This data can be graphically displayed on your computer to provide a vivid picture of the soil conditions. Reporting sensors indicate soil moisture, soil temperature, irrigation run time, rainfall and other conditions. The data can be evaluated to determine methods of improving irrigation scheduling for optimum results. For example, the graph below indicates soil moisture at three root zone levels before and after irrigation events. This information helps you decide when and how long your irrigation cycles should be. Monitoring the moisture and its “rate of change” will help maximize crop production while minimizing water, power, fertilizer and labor use. The SensMit Web screen shot below shows sensor locations in a map view.

Shared Features –

- Soil moisture at multiple depths
- Soil Temperature Sensor
- Irrigation event
- Rain Gauge Sensor
- Time Scale – view data history as you prefer
- Mouse Over Data Line for detailed time stamp
- Individual Data Control – allows you to highlight or hide sensor records



WaterGraph Features –

- Centibar Scale – allows you to view range applicable to crop needs
- Threshold Limits – allows you to set reference lines for quick review
- Apply Average Settings – gives you the option of reviewing data as an average






























SensMit Web Features –

- Alarm Email notifications
- Dashboard view shows current system status
- Download data file for use in WaterGraph software to perform additional analysis



The SensMit Web Portal is required with the use of the IRRomesh Cellular Gateway and PC Link systems and optional with the IRRomesh Logger. Subscription fees apply when using SensMit Web.

Monitor Options and Accessories

SENSING OPTIONS		900 SERIES	975 SERIES	
	200SS- ** — WATERMARK Soil Moisture Sensor. ** Specify wire lead length of 5' (1.5m), 15' (4.5m), no lead or custom length.	 	 	200TS — Temperature Sensor. Reads range 32° to 122°F (0° to 50°C) on 900M and range 14° to 149°F (-10° to 65°C) on 975. 
	200TSX — Extended Range Temperature Sensor. Reads range 0° to 239°F (-18° to 115°C). (Includes new monitor firmware.)	 		RSU — Remote Sensing Unit option for IRROMETER. Tensiometer equipped with a 4-20mA transducer. Requires an "RSU" wiring adapter for each unit and 12-24v power supply. 
	E — Electronic Gauge option for IRROMETER. Tensiometer equipped with an electronic soil tension gauge. (Requires "E" adapter.)	 		7- ** - AD* — Automatic Switching Pressure Gauges. User rotates switch pointer (mounted on gauge face) to desired set point. Monitor records switch activity (on/off position). (**Select from 15 to 400 PSI and *open or closed switch past setting.) 
	7- ** - E — Electronic Pressure Gauges. Indicates irrigation pressures by visual and electronic methods. Monitor records electronic pressure readings. (**Select from 15 to 200 PSI) (Requires "E" adapter.)	 		900RG — Tipping bucket style Rain Gauge. (Requires "900M-RGA" adapter when used with 900M.) 
	900M-DS — Data Shuttle for downloading data from monitor.	 		900M-RGA — Rain Gauge Adapter allows 900RG Rain Gauge to be read by 900M Monitor. 9V battery included. Suitable for outdoor mounting. 
	900M-MCC — Monitor Communication Cable connects a USB port on a laptop to a monitor port. (USB to Serial Adapter & Serial Cable.) 	 		900M-E — "E" Wiring Adapter for reading IRROMETER Option "E" Gauge. One Adapter accepts eight "E" inputs. 

900 SERIES DATA ACCESS OPTION



900M-CG — Cellular Gateway mounts outdoors at the monitor location and provides dedicated cellular connection hardware for Internet access.

POWER SUPPLIES



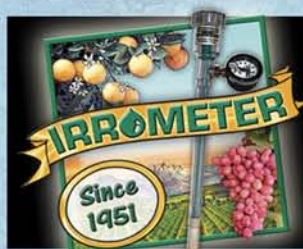
900M-BP-20W — 20 Watt Battery Pack for 900M Cellular Gateway provides power source when line power is not available. Includes solar recharging panel with charge controller, sealed maintenance-free battery in outdoor enclosure, mounting kit and 9' (2.7m) cable.



20 Watt Solar Panel



900M-BP-5W — 5 Watt Battery Pack for 975 Cellular Gateway provides power source when line power is not available. Includes solar recharging panel with charge controller, sealed maintenance-free battery in outdoor enclosure, mounting kit and 9' (2.7m) cable.



IRROMETER

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