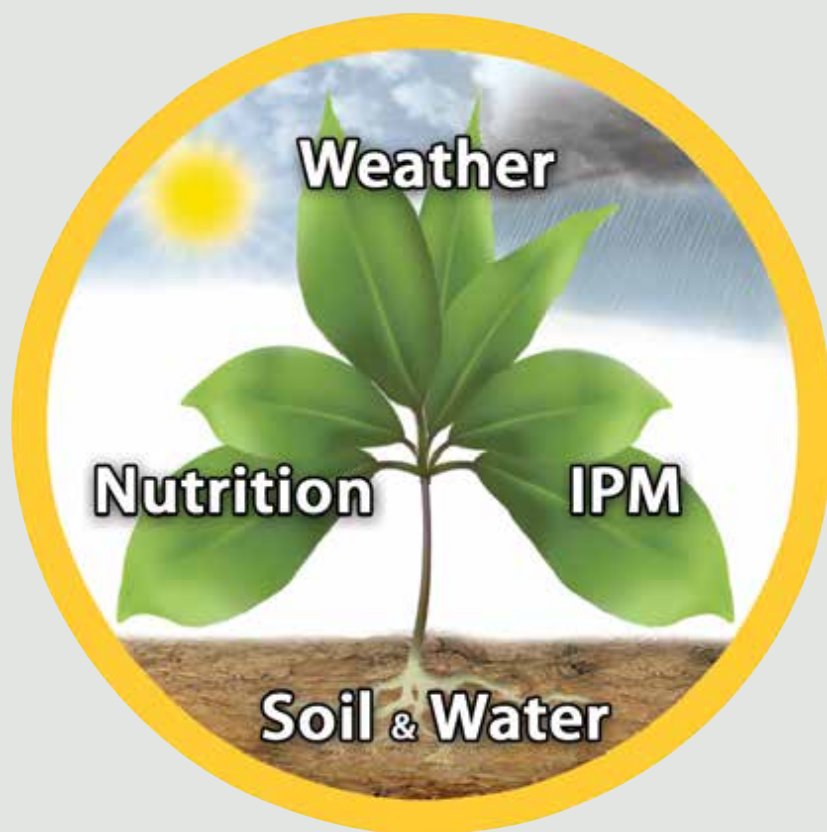


# SMARTGROWTH™

TO MEASURE IS TO KNOW™



**Spectrum®**  
Technologies, Inc.

# SMARTGROWTH™

Welcome!

As Spectrum enters our 32nd year, I can't help but think about the unique journey we've experienced that could not have occurred without the efforts from our valued customers and our dedicated team around the world. We take pride in enhancing the work you do by providing you with the tools needed to make informed crop management decisions.

The Spectrum team often asks, "What do you want to measure?" because we are all about plant and soil measurement. As an innovator, Spectrum continues to develop new products for weather and environmental monitoring, nutrient management, plant health and soil moisture measurement tools.

We are committed to meeting your needs and exceeding your expectations by offering research grade products at affordable prices. Our comprehensive product range combined with proactive customer support provides you the ability to convert real-time data into profitable decisions.

We always welcome your feedback and suggestions.

Sincerely,



Mike Thurow  
CEO & Founder  
Spectrum Technologies, Inc.



***Spectrum®***  
***Technologies, Inc.***

## EASY TO CONTACT US

 **Online**

**[www.specmeters.com](http://www.specmeters.com)**

**E-mail**

**[info@specmeters.com](mailto:info@specmeters.com)**

 **Phone**

**1 (800) 248-8873** (U.S. & Canada)

**1 (815) 436-4440**

 **Fax**

**1 (815) 436-4460**

**3600 Thayer Court**

**Aurora, IL 60504 USA**



The AE50 Award recognizes products ranked highest in innovation, significant engineering advancement, and impact on the market served.

### Award Winning Products

Since 1987, Spectrum Technologies has received 24 AE50 Awards from the American Society of Agricultural and Biological Engineers, which demonstrates our deep commitment to innovation and quality.

- 2018** FieldScout® TDR 350 Soil Moisture Meter
- 2015** SpecConnect Web Portal  
WatchDog® Retriever & Pups Wireless Network
- 2013** FieldScout® GreenIndex+ SmartPhone App  
WatchDog® Cellular Alert Stations
- 2012** WaterScout® SMEC 300 Soil Moisture/EC/Temp Sensor
- 2011** WatchDog® 1000 Series Micro Station  
LightScout® DLI 100 Light Meter
- 2008** WatchDog® Sprayer Station  
SpecMaps™ Web Mapping Utility Software
- 2007** WatchDog® 2000 Series Mini Weather Station
- 2005** SpecWare™ Software
- 2004** FieldScout® Direct Soil EC Probe  
FieldScout® TCM 500 Turf Color Meter  
WeatherTracker Greenhouse Growth Tracker
- 2003** WatchDog® WeatherTracker  
FieldScout® SC 900 Soil Compaction Meter
- 2002** WatchDog® Weather Station  
FieldScout® TDR 300 Soil Moisture Meter
- 2001** FieldScout® CM 1000 Chlorophyll Meter
- 2000** WatchDog® Data Logger
- 1999** StarLogger Data Logger  
Investigator Soil Compaction Meter  
WatchDog® Leaf Wetness/Temperature Logger

## Table of Contents

### WEATHER MONITORING

- 6-7 SpecConnect Solution
- 8-11 WatchDog® Retriever & Pups
- 13 WatchDog® Products Comparison Chart
- 14 WatchDog® Retrievers and Accessories
- 15 DataScout® Modems
- 16 WatchDog® 2000 Series Weather Stations
- 17 WatchDog® 2000 Series Mini Stations
- 18 WatchDog® Pre-Packaged Stations
- 19 WatchDog® 1000 Series Micro Stations
- 20 WatchDog® A-Series & B-Series Data Loggers
- 21 WatchDog® Accessories & Communication Options
- 22-23 WatchDog® Sensors and Cables
- 24-25 SpecWare™ Software & Disease Models
- 26 WatchDog® Sprayer Station
- 27 WatchDog® WeatherTrackers
- 28 Weather Stations
- 29 Frost Alerts
- 31-33 LightScout® Light Meters

### IPM/PLANT HEALTH

- 7 IPM/Plant Health
- 18 WatchDog® Stations
- 24-25 SpecWare™ Software Disease Models
- 27 WatchDog® WeatherTrackers
- 30 Digital Microscopes & Macroscopes

### SOIL MOISTURE

- 34 FieldScout® TDR 350 Soil Moisture Meter
- 34-35 FieldScout® Mobile App
- 35 FieldScout® TruFirm Turf® Firmness Meter
- 36 FieldScout® TDR 150 Soil Meter & TDR Accessories
- 37 Soil Compaction Meters
- 38-39 WaterScout® Soil Moisture Sensors and Reader
- 40 WatchDog® Irrigation Stations
- 41 Soil Moisture Sensors & Testers

### NUTRIENT MEASUREMENT

- 42-43 LAQUA Twin Meters
- 44 Nutrient Meter Accessories & Brix Meters
- 45-48 FieldScout pH and EC Meters
- 49-51 Chlorophyll and NDVI Meters



## COMPANY OVERVIEW



Spectrum Technologies, Inc. manufactures affordable, leading-edge measurement information technology for the agricultural market throughout the world.



We develop peak plant performance tools for better field output. Using the most advanced plant measurement technology, we provide growers with actionable plant health data that translates into more profitable decisions.



## INDUSTRY FUTURE

With consumers demanding higher quality food and environmental conditions, the need for measurement and monitoring technology will continue to grow. The need to conserve resources such as soil and water will drive the need to CREATE more measurement information technology.

## PRODUCTS

1

### WEATHER

Temperature, Light, Wind, Rain, Relative Humidity and Leaf Wetness Monitoring



2

### INTEGRATED PEST MANAGEMENT (IPM) TOOLS

Insect and Disease Models, IPM Scopes



3

### SOIL MOISTURE & QUALITY MEASUREMENT

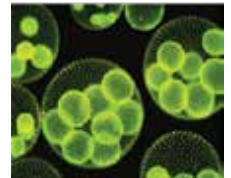
Soil Moisture, Soil Compaction and Water Quality Meters



4

### NUTRIENT MANAGEMENT

Nutrient, Chlorophyll, pH, EC and Nitrogen Meters



## CUTTING EDGE TECHNOLOGY

We are constantly developing exciting new products while offering our customers an amazing, award winning array of products, every year.

Imagine a meter that can measure light as it hits your plant, or receivers that send information about soil moisture so your crops can be managed on the fly.

We're innovating for you.

**Spectrum<sup>®</sup>**  
**Technologies, Inc.**



# PEAK PLANT PERFORMANCE TOOLS FOR BETTER CROP PRODUCTION

# NEW FROM SPECTRUM



P 34

TDR 350 WITH INFRARED  
TEMPERATURE SENSOR



WIRELESS RAIN COLLECTOR



P 21

BIRD GUARD



WIRELESS IN-SITU SOIL MOISTURE SENSOR

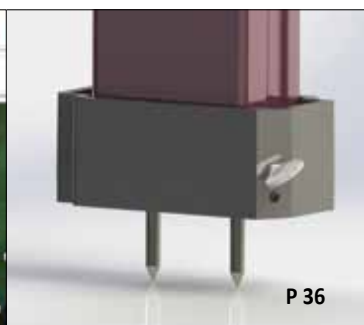


P 23

ASPIRATED RADIATION SHIELD  
WITH DIGITAL TEMP/RH SENSOR



SMART IRRIGATION AUDIT



P 36

TDR SPACER FOR 1/2 AND 1 INCH  
SOIL MOISTURE MEASUREMENTS



WIRELESS SOIL MOISTURE SENSOR



# SPECCONNECT - DEVICE TO CLOUD

# SPECTRUM TO YOU



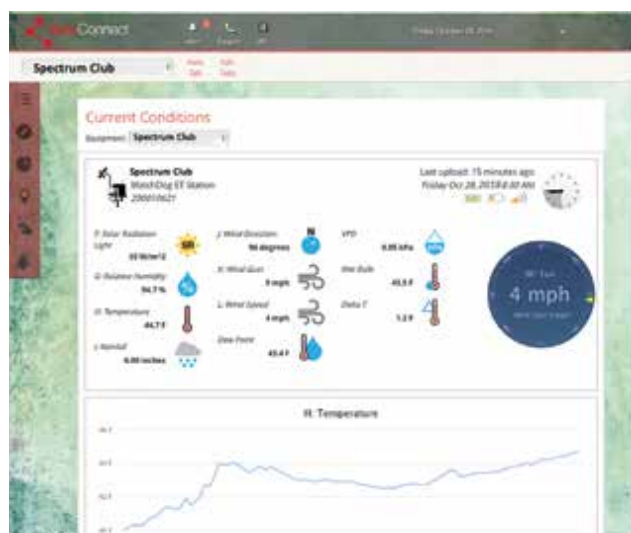
Bluetooth

SpecConnect

## SpecConnect >

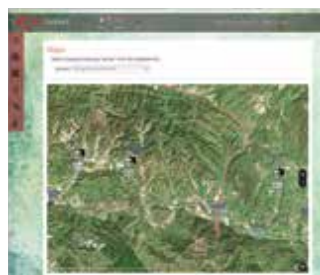
### DASHBOARD

YOUR NETWORK



What will you see when using SpecConnect software to monitor your system?

- Customized Alerts
- Current Conditions
- Multi-Sensor Station Report
- Equipment Inventory & Activity
- Area Map with Sensor Placement





- Web Portal connection requires a WatchDog Retriever & Pup network or any 2000 Series Weather Station to collect and log data, and DataScout Modem to send data to the internet
- FieldScout subscriptions require a TDR or TruFirm Meter and the free FieldScout Mobile App
- For more information about the FieldScout Mobile App, see pages 34-35

### Pro WatchDog Subscriptions (includes one device)

3010US	SpecConnect Pro 1-yr Subscription - Cellular, US/Canada For WatchDog devices, includes cellular plan
3030	SpecConnect Pro 1-yr Subscription - WiFi
3000	SpecConnect Initial Set Up Fee

### Additional Devices and Services

3045US	Additional WatchDog Device - Cellular (1-yr) Needed per Pup or Station, includes cellular plan
3046	Additional WatchDog Device - Low-Cellular (1-yr) (15-60 minutes, internal mean sensor values only)
3055	Additional WatchDog Device - WiFi (1-yr) Needed per Pup or Station
3040	Additional Login (1-yr) Limit of three users per subscription
3070	Alerts Function (1-yr) Needed per device
3065	API Service - (one-time-charge)

### Pro FieldScout Subscriptions (includes one device)

3035A	SpecConnect FieldScout Pro (1-yr) 1-3 devices
3035B	SpecConnect FieldScout Pro (1-yr) 4-7 devices
3035C	SpecConnect FieldScout Pro (1-yr) 7 or more devices

#### SpecConnect WATCHDOG SUBSCRIPTION FEATURES

Customizable Dashboard	✓
Current Conditions	✓
Basic Wind Speed/Direction & Temp Gauges	✓
Advanced Wind Rose	✓
Data Storage	✓
Mapping	✓
Calibration Adjustment	✓
Disease Models (additional fee)	✓
Reports	
Basic Reporting	✓
Custom Reporting	✓
Evapotranspiration (ET) Reports	✓
Degree Days Reports	✓
Daily Light Integral (DLI) Reports	✓
Chill Hours/Units/Portions Reports	✓
Other	
Alerts (additional fee)	✓
API Service (additional fee)	✓

## Disease & Insect Forecast Model Packages

### 1-YR SUBSCRIPTIONS

Become more proactive in your management of diseases and insects by adding forecast models to your SpecConnect subscription

- Each package uses field-tested and validated algorithms along with your data to forecast the potential for the appearance of your crop's most notorious enemies
- Save money by spraying only when necessary
- Quickly produce the documentation needed to support your IPM decisions
- 1-yr subscriptions

#### 3095APP SpecConnect Apple/Pear Alert Package

Required Sensors:	Leaf wetness and temperature
Models Included:	Apple Scab (Modified Mills, Cornell, UC Davis California) Fire Blight (Maryblyt, Cougarblight) Sooty Blotch/Flyspeck Insect Models

#### 3095CHP SpecConnect Cherry Alert Package

Required Sensors:	Leaf wetness and temperature
Models Included:	Leaf Spot Insect Models

#### 3095GAP SpecConnect Grape Alert Package

Required Sensors:	Leaf wetness, relative humidity, and temperature
Models Included:	Powdery Mildew (Thomas-Gubler) Black Rot (Spotts) Downey Mildew Botrytis Phomopsis Cane Leaf Spot Insect Models

#### 3095POP SpecConnect Potato Alert Package

Required Sensors:	Temperature, relative humidity, and rain
Models Included:	Early Blight Late Blight (BliteCast) Insect Models

#### 3095TOP SpecConnect Tomato Alert Package

Required Sensors:	Leaf wetness and temperature
Models Included:	Tomcast Insect Models

#### 3095TUP SpecConnect Turf Alert Package

Required Sensors:	Air and soil temperature, relative humidity, and rain
Models Included:	Brown Patch (Schumann) Pythium (Nutter, Schein) Dollar Spot (Hall, Mills/Rockwell) Insect Model

#### 3095NUP SpecConnect Nut Alert Package

Required Sensors:	Temperature, leaf wetness, relative humidity, rain
Models Included:	Almond Alternaria Leaf Spot Almond Anthracnose Pecan Scab Pistachio Panicle and Shoot Blight Walnut Blight Insect Models



## THE RETRIEVER & PUPS SYSTEM. LET YOUR PLANTS TALK TO YOU.

GROWERS, WINEMAKERS, FARMERS  
AND RESEARCHERS USE IT TO EXPERTLY  
MONITOR THEIR FIELDS, GREENHOUSES AND  
ORCHARDS WHEN THEY AREN'T AROUND.

Our Retriever & Pups System brings real time  
data to your mobile device anywhere you  
can access the internet.

Smarter decisions just got easier.

Each Retriever can support up to 16 Pups.  
Each Pup can hold four different sensors.  
And, you can send threshold alerts!

Our sensors measure everything from moisture to  
light, wind, rain, humidity, temperature and more.  
We can customize your setup, even add weather  
stations, to bring data from every nook and cranny  
of your property directly to you.

With SpecConnect Wireless Pups & Retrievers,  
send data to your personal dashboard and view  
the measurements instantly. Trust the data and  
eliminate the guesswork.

### INNOVATIVE AGRONOMY

### SPECCONNECT INTEGRATED WIRELESS SOLUTION



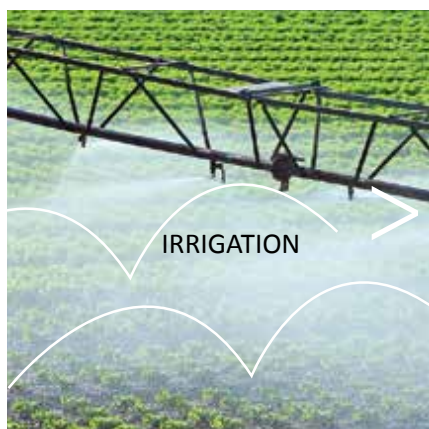


# In-Field Applications



## VINEYARDS & ORCHARDS

Easily spot frost and be alerted of conditions in your crops, monitor and note site-specific conditions for insect and disease pressures, and monitor soil moisture remotely.



## IRRIGATION SOLUTIONS

Flexibly monitor both soil moisture and EC in a variety of soil textures for better irrigation decisions.

Connect WatchDog Weather Stations to the network using a Station Pup.



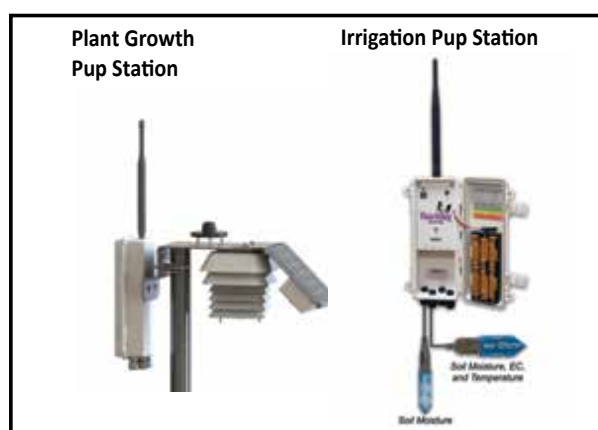
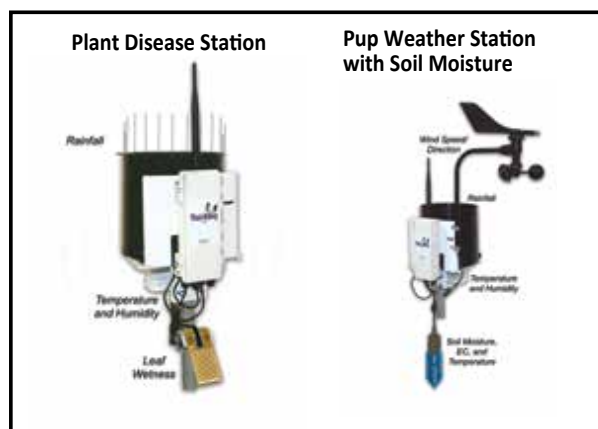
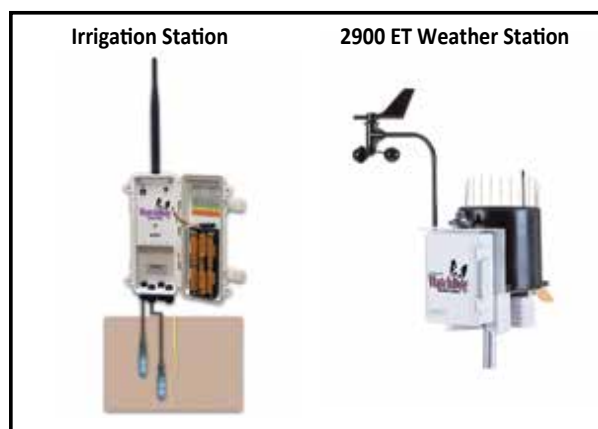
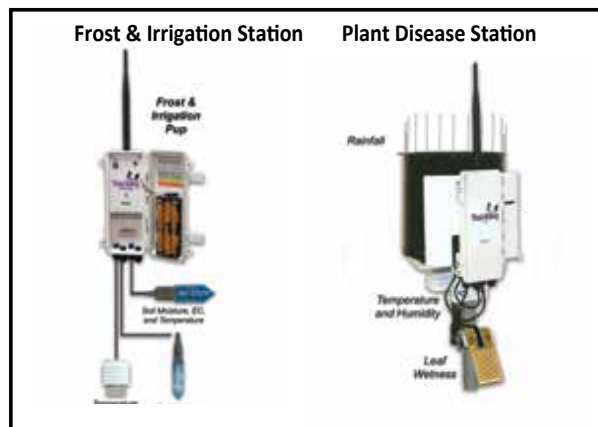
## RESEARCH PLOTS/ FARM & GREENHOUSE STUDIES

Capture site-specific conditions remotely for insect and disease pressures, soil moisture monitoring, weather conditions, light and more.



## GREENHOUSES & NURSERIES

Measure DLI (Daily Light Integral) and intensity for consistently better plant quality across greenhouse and high-tunnel structures. For outdoor growing, monitor soil moisture, temperature and EC for more efficient irrigation practices.





## Pups

### SETUP A NETWORK



Multiple Pups with a variety of sensors to choose from give you unlimited measurement options within a single network.

## 3 models



Sensor Pups  
Station Pups  
Repeater Pups

- Single button operation: check battery status, signal strength, and join sensor network
- Tri-colored LEDs indicate battery level, signal strength, and data communication status
- Communication range of 2,500 ft (about 1/2 mile), line-of-sight installation between devices
- Pups act as repeaters to get data to the Retriever
- 900 MHz radios in this catalog; 868 MHz and 2.4 GHz also available for international use - Call for details

### WatchDog Sensor Pup

- Connect up to 4 external sensor inputs per Pup
- Transmits data to Retriever (directly or via other Pups)
- Includes 6 alkaline non-rechargeable AA batteries (solar-power option below)
- Available as Pre-Packaged Pup Stations, including sensors on facing page

3900 WatchDog Sensor Pup

### Most Popular Sensors

Choose what you will measure. Choose up to 4 per Sensor Pup.

3613ARS	Temperature/RH Sensor with Aspirated Radiation Shield
3613THS	Temperature/RH Sensor with Passive Radiation Shield
3665RD	Digital Rain Collector with Bird Guard
3305ADD	Digital Anemometer
6470-20	WaterScout SMEC 300 Sensor with 20 ft (6.1 m) Cable
6460-20	WaterScout SM 100 Sensor with 20 ft (6.1 m) Cable
6450WD20	Watermark Sensor with 25 ft (7.6 m) Cable
3667	External (Soil) Temperature Sensor with 6 ft (1.8 m) Cable
3666	Leaf Wetness Sensor
3670I	LightScout Silicon Pyranometer
3668I	LightScout Quantum Light Sensor

### WatchDog Station Pup

- Connects to WatchDog 2000 Series Full or Mini Weather Stations and transmits all station sensor data to the network
- No external sensors
- Includes 66 alkaline non-rechargeable AA batteries (solar-power option below)

3901 WatchDog Station Pup

### WatchDog Repeater Pup

- Serves as "signal booster" to help provide a path for the transmission signal around obstacles or to extend range; no sensor inputs of its own
- Includes 66 alkaline non-rechargeable AA batteries (solar-power option below)

3902 WatchDog Repeater Pup

## Retriever



COLLECT THE DATA

### WatchDog Retriever

- Receives all data from Pup network, each Retriever supports up to 16 Pups
- Includes USB Flash Drive and USB data cable
- Includes 6 standard non-rechargeable batteries. Can also be powered by DataScout modem, Direct-Connect cable or Solar Power Package

3910 WatchDog Retriever

## Solar Power

POWER UP

3999 Solar Power Package for Pups & Retrievers  
Includes 5W solar panel and 6V 4.5Ah rechargeable battery





# Pre-Packaged >

## Sensor Pup Stations

- The most common Sensor Pups and sensors have been bundled together to simplify ordering
- Pup Stations are built on a unique mounting bracket to allow for simple installation
- Pup Stations (except ET Pup) have available sensor ports, allowing for additional/future expansion
- 900 MHz radio; 868 MHz and 2.4 GHz also available for international use - Call for details

**NEW FOR 2018  
BIRD GUARD  
INCLUDED WITH ALL  
RAINFALL SENSORS!**



3900ET

### WatchDog ET Pup Station

- Includes Pup and sensors:  
Rainfall  
Temperature/RH  
Solar Light  
Wind Speed/Direction
- No available sensor ports

**3900ET**

**WatchDog ET Pup Station**

**3396TPS**

**Tripod Mount with Stakes**



3900WS

### WatchDog Pup Weather Station

- Includes Pup and sensors:  
Rainfall  
Temperature/RH  
Wind Speed/Direction
- One available sensor port

**3900WS**

**WatchDog Pup Weather Station**

**3396TPS**

**Tripod Mount with Stakes**



3900PG

### WatchDog Plant Growth Pup Station

- Includes Pup and these sensors:  
PAR Light  
Temperature/RH with Aspirated  
Radiation Shield and solar  
charging system
- Two available sensor ports

**3900PG WatchDog**

**Plant Growth Pup Station**

**3396TPS**

**Tripod Mount with Stakes**



3900PD

### WatchDog Plant Disease Pup Station

- Includes Pup and these sensors:  
Rainfall  
Temperature/RH  
Leaf Wetness
- One available sensor port

**3900PD WatchDog**

**Plant Disease Pup Station**

**3396TPS**

**Tripod Mount with Stakes**



100% Customizable

Digital Rain Collector

Digital Anemometer

Pressure Transducer

Irrigation On/Off Sensor

LightScout UV / Solar Radiation / PAR Light Sensors

CO2 Sensor

Barometric Pressure Sensor

LightScout Quantum Sensor Bars

External (Soil) Temperature Sensor

WaterScout SM 100 Soil Moisture Sensor

Temperature (Micro) Sensor

WaterScout SMEC 300 Soil Moisture, EC, and Temperature Sensor

Watermark Soil Moisture Sensor

Leaf Wetness Sensor

Digital Temperature / Humidity Sensor with Passive Radiation Shield

Digital Temperature / Humidity Sensor with Aspirated Radiation Shield

Sensor Specifications on Pages 22-23



# WatchDog® Weather Stations & Data Loggers Comparison Chart



Item # Model

## 2000 Series Weather Stations

Item #	Model	SpecConnect Compatible	LCD Display	Wireless	Evapotranspiration	Alarm Output-Ready	Air Temperature Sensor	Relative Humidity Sensor	Dew Point	Wind Speed & Direction	Tipping Bucket Rain Collector	Solar Radiation Sensor	Available Sensor Ports	Quantum Light Sensor	Ext. (Soil) Temperature Sensor	Leaf Wetness Sensor	WaterScout Soil Moisture Sensor	WaterScout Soil Moisture/EC/Temperature Sensor	Digital Sensor Compatible	Radiation Shield (P=Passive or A=Aspirated)
3350WD2	2900ET	✓	✓	Opt	✓	✓	✓	✓	✓	✓	✓	✓	5	Opt	Opt	Opt	Opt	Opt		P
3345WD2	2800	✓	✓	Opt		✓	✓	✓	✓		Opt	Opt	9	Opt	Opt	Opt	Opt	Opt		P
3340WD2	2700	✓	✓	Opt		✓	✓	✓	✓	✓	✓	Opt	6	Opt	Opt	Opt	Opt	Opt		P
3320WD2	2550	✓	✓	Opt		✓	✓	✓	✓	✓		Opt	6	Opt	Opt	Opt	Opt	Opt		P

## 2000 Series Mini Station

3684WDPD	Plant Disease Station	✓	✓	Opt		✓	✓	✓	✓		✓		0			✓				P
3686WD	2475	✓	✓	Opt		✓	✓	✓	✓		Opt	Opt	1	✓	Opt	Opt	Opt	Opt		P
3684WD	2450	✓	✓	Opt		✓	✓	✓	✓		Opt	Opt	2	Opt	Opt	Opt	Opt	Opt		P
3683WD	2425	✓	✓	Opt		✓	✓	✓	✓		Opt	Opt	3	Opt	Opt	Opt	Opt	Opt		P
3685WD	2400	✓	✓	Opt		✓					Opt	Opt	4	Opt	Opt	Opt	Opt	Opt		P

## Retriever & Pups Wireless Sensor Network

3900ET	ET Pup Station	✓		✓	✓		✓	✓		✓	✓	✓	0						✓	P
3900WS	Pup Weather Station	✓		✓			✓	✓		✓	✓	Opt	1	Opt	Opt	Opt	Opt	Opt	✓	P
3900PD	Plant Disease Pup Station	✓		✓			✓	✓		Opt	✓	Opt	3	Opt	Opt	✓	Opt	Opt	✓	P
3900PG	Plant Growth Pup Station	✓		✓			✓	✓		Opt	Opt	Opt	2	✓	Opt	Opt	Opt	Opt	✓	A
3900	Sensor Pup	✓		✓			Opt	Opt		Opt	Opt	Opt	4	Opt	Opt	Opt	Opt	Opt	✓	P
3901	Station Pup	✓		✓									0							
3902	Repeater Pup	✓		✓									0							

## 1000 Series Micro Stations

3685SM14	Irrigation Station		✓										0				✓ (4)			
3685SM13	Irrigation Station		✓								Opt	Opt	1	Opt	Opt	Opt	✓ (3)	Opt		
3684PD1	Plant Disease Station		✓				✓	✓			✓		0			✓			P	P
3684PAR1	Plant Growth Station		✓				✓	✓					1	✓	Opt	Opt	Opt	Opt		P
3688WD1	1650		✓				✓	✓			Opt	Opt	4	Opt	Opt	Opt	Opt	Opt		
3687WD1	1525		✓				✓	✓			Opt	Opt	4	Opt	Opt	Opt	Opt	Opt		
3684WD1	1450		✓				✓	✓			Opt	Opt	2	Opt	Opt	Opt	Opt	Opt		
3683WD1	1425		✓				✓				Opt	Opt	3	Opt	Opt	Opt	Opt	Opt		
3685WD1	1400		✓								Opt	Opt	4	Opt	Opt	Opt	Opt	Opt		
3682WD1	1250		✓				✓	✓					0							
3681WD1	1225		✓				✓				Opt	Opt	1	Opt	Opt	Opt	Opt			
3680WD1	1200		✓								Opt	Opt	2	Opt	Opt	Opt	Opt	Opt		

## A-Series Loggers

3611A	A160 Temp/RH/CO <sub>2</sub>		✓				✓	✓					0					+	CO <sub>2</sub>	
3612A	A150 Temp/RH		✓				✓	✓					0							
3610A	A130 Leaf Wetness/Temp		✓				✓	✓					0			✓				
3617ARS	A125 Soil/Air Temp Station		✓				✓	✓					0		✓					P
3617A	A125 Soil/Air Temp		✓				✓	✓					0		✓					
3618A	A110 Temperature		✓				✓						0							

## Sprayer Station

3349SSCH	Sprayer Station with Console		✓				✓	✓	✓	✓			0							
----------	------------------------------	--	---	--	--	--	---	---	---	---	--	--	---	--	--	--	--	--	--	--

### REFERENCE:

✓ STANDARD Opt OPTIONAL BLANK NOT AVAILABLE





## Retriever

COLLECT THE DATA



### WatchDog Retriever

- Receives all data from Pup network, each Retriever supports up to 16 Pups
- Includes USB Flash Drive and USB data cable
- Includes alkaline Non-Rechargeable Batteries. Can also be powered by DataScout modem, Direct-Connect cable or Solar Power Package
- Single button operation: switch modes, download data, upload configuration, and check battery status
- Tri-colored LEDs indicate mode, battery level, data communication status, and configuration status
- Non-volatile memory preserves your logged data, even when the batteries are removed
- 900 MHz radios; 868 MHz and 2.4 GHz also available for international use - Call for details

**3910 WatchDog Retriever**

### Optional Accessories

- 3999 Solar Power Package**  
Includes 5W solar panel and 6V 4.5Ah rechargeable battery
- 3396TPS Tripod Mount with Stakes**
- 3925 Antenna Extension Cable - 10 ft (3 m)**  
Includes Mounting Bracket and Hardware
- 3388USB Replacement USB Flash Drive**
- 3927C75 PC Direct Connection Cable - 75 ft**  
Connect your Retriever directly to your PC. Includes power and data cables, AC/DC power adapter, and DC plug adapter  
*Has 9-pin serial connection on PC end, may require USB adapter (Item 366IU9)*
- 3926 AC/DC Power Adapter**

### SpecWare Software

- SpecWare Pro software version 9.6 or later may be used to view Pup data on PC
- If using the SpecConnect Web Portal, then all data can be viewed online (SpecWare software not required)

**3654P9 Spec 9 Pro Software**

## **Modems**



3920 DataScout Wi-Fi Modem



3922 DataScout  
CDMA Modem

3922 DataScout  
Modem mounted  
with a WatchDog  
Retriever



3923 DataScout Modem  
mounted with a WatchDog  
2000 Series Full Weather  
Station

- Communicate data to the web using either a Cellular or Wi-Fi signal
- Single button operation: test communications, pair with station, and check battery status
- Tri-colored LEDs indicate battery level, data communication, and wireless signal/connection status
- Power options: Choose between Solar power package which includes rechargeable battery and 5W solar panel, or the AC/DC power adapter (Max 17VDC)
- Required for connection to SpecConnect, sold separately
- Provides power to attached Watchdog Stations and Retrievers

### Compatibility Requirements:

- WatchDog Retriever - Item 3910 WatchDog Retriever (with non-rechargeable batteries). The DataScout Modem and the Retriever will share the power from the solar power package
- 2000 Series Weather Stations - the station must be running firmware version 7.6 or above.
- WatchDog 2000 Series Mini Stations - The station must be running firmware version 4.1 or above.

### Cellular Modems

**3922 CDMA Cellular Modem (US)**  
Includes solar panel and rechargeable battery pack

**3923 3G HSPA+ Cellular Modem (US, Canada)**  
Includes solar panel and rechargeable battery pack

**3924M 3G HSPA+ Cellular Modem (International)**  
Requires power selection from options below.

### Wi-Fi Modems

**3920 Wi-Fi Modem - AC/DC Powered**  
Includes 3926 AC/DC Power Cord

**3920S WiFi Modem - Solar Powered**  
Includes solar panel and rechargeable battery pack.

**3926 AC/DC Power Adapter**

### Power Options

**3999 Solar Power Package**  
Includes 5W solar panel and 6V 4.5Ah rechargeable battery

**3926 AC/DC Power Adapter**

### What Do You Want To Measure?

You can customize your WatchDog network, using different sensors based on the data you want to collect and analyze for better output performance. See WatchDog Sensors and Accessories, pages 12, 22-23

# 2000 Series Weather Stations



**NEW!**  
Bird Guard  
Included!

**Model 2900ET**  
Shown with  
optional Tripod  
Mount  
(not included)  
and 3999WD Solar  
Power Package  
(not included).

**NEW!**  
Solar Power  
Option

**3999WD Solar  
Power Package**

Includes 5W  
solar panel  
and 6V 4.5 AH  
rechargeable  
battery



Our award winner for Innovation in Technology. Manage your crop based on YOUR weather, not the airport's.

- Full-featured weather stations measure temperature, humidity, rainfall, wind, and solar radiation (varies by model). Also calculates degree days and chill hours
- Customize your station with plug-in sensors to meet your needs
- Accurate, real-time weather information directly from your field, orchard, vineyard or golf course
- Monitor, record, and analyze over a dozen important environmental inputs
- Log your data in fail-safe, non-volatile memory

- Communicate via wireless, cellular, shuttle, or direct connect, also compatible with the new WatchDog Station Pups and DataScout™ Modems
- Powered by four AA batteries - 10 months battery life with alkaline (included), 12 months with lithium
- Requires SpecWare™ Pro software or DataScout Modem and SpecConnect



2550

## Model 2550

- Ideal for fast, on-demand deployment without measuring rainfall
  - Measures wind direction, wind speed, air temperature, relative humidity, dew point, with 6 available external sensor ports
- 3320WD2 WatchDog® 2550 Weather Station**



2800

## Model 2800

- Ideal where multiple sensor measurements are required for temperature, soil moisture, crop canopy light, or leaf wetness data
  - Plug in up to 8 external sensors, plus 1 optional rainfall sensor
- 3345WD2 WatchDog® 2800 Weather Station**

## Model 2900 ET

- The most powerful package for optimizing your irrigation and IPM decisions
  - Measures wind direction, wind speed, air temperature, relative humidity, dew point, rainfall, solar radiation, evapotranspiration, with 5 available external sensor ports
- 3350WD2 WatchDog® 2900ET Weather Station**

## Model 2700

- Affordable and versatile solution for growers, researchers, and consultants
  - Measures wind direction, wind speed, air temperature, relative humidity, dew point, rainfall, with 6 available external sensor ports
- 3340WD2 WatchDog® 2700 Weather Station**

### WATCHDOG 2000 SERIES WEATHER STATION FEATURES

Sensors	2900ET	2700	2550	2800	Specifications	Accuracy
Wind Direction	✓	✓	✓		1°	±3°
Wind Speed	✓	✓	✓		0, 1 to 200 mph (0, 1 to 322 km/h)	±2 mph (±3 km/h), ±5%
Air Temperature	✓	✓	✓	OPT	-40° to 257°F (-40° to 125°C)	±0.54°F at -40 to 194°C(±0.3°C)
Relative Humidity	✓	✓	✓		0% to 100%	±2% at 25°C
Dew Point	✓	✓	✓		-99° to 140°F (-73° to 60°C)	±4°F (±2°C)
Rainfall	✓	✓		OPT	0.01 in (0.25 mm)	±2% at < 2 in (5 cm) per hour
Solar Radiation	✓	OPT	OPT	OPT	0 to 1500 W/m²	±5%
Evapotranspiration	✓					
External Sensor Ports	5	6	6	9		
Available ports for SMEC 300 Sensors	1	2	2	2		
Operating temperature range: -22 to 130°F (-30 to 55°C)						

# WatchDog® 2000 Series Mini Stations



## 2000 Series Mini Stations

Monitor microclimates with up to 4 external sensor channels.

- Same power, flexibility, and accuracy as the 2000 Series Weather Stations
- Measure temperature, humidity, quantum light, and more (varies by model).
- Customize your Mini Station with 1 to 4 plug-in sensors to meet your needs
- Custom measurement intervals
- Reliable NEMA-4 type IP 66 enclosure and weatherproof connectors
- Communicate via wireless, cellular, shuttle, or direct connect. Also compatible with the new WatchDog® Station Pups, DataScout™ Modems
- 12-month battery power source (four AA alkaline batteries included)
- Requires SpecWare™ Basic or Pro software, or DataScout™ Modem and SpecConnect



### Model 2475 Plant Growth Station

- Ideal for greenhouses - includes sensors for quantum (PAR) light, air temperature, relative humidity, with 1 available external sensor port
- Computes and displays Daily Light Integral (DLI), dew point and degree days; live display of current light and cumulative light over the day
- Computes and displays DIF – Average day/night temperatures differences
- Computes and displays VPD – Vapor Pressure Deficit

**3686WD Model 2475**  
**WatchDog® Weather Station**

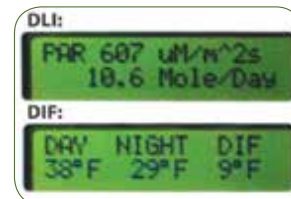


### Model 2400 External Sensor Station

- Ideal where multiple sensor measurements are required for temperature, soil moisture, crop canopy light, or leaf wetness data
- Plug in up to 4 external sensors

**3685WD Model 2400**  
**WatchDog® Weather Station**

LCD display on all  
2000 Series  
Mini Stati



- Use the LCD display to check current and daily high/low readings without a PC

## What Do You Want To Measure?

You can customize your WatchDog network, using different sensors based on the data you want to collect and analyze for optimal system performance.

### Model 2425 Temperature Station

- Measures air temperature with 3 available external sensor ports
- Plug in up to 3 external sensors

**3683WD Model 2425**  
**WatchDog® Weather Station**

### Model 2450 Temperature/RH Station

- Measures air temperature, relative humidity, with 2 available external sensor ports
- Computes and displays dew point

**3684WD Model 2450**  
**WatchDog® Weather Station**



## WATCHDOG® 2000 SERIES MINI WEATHER STATION FEATURES

Sensors	2475	2450	2425	2400	Specifications	Accuracy
Air Temperature	✓	✓	✓	OPT	-25° to 212°F (-32° to 100°C)	±1°F (±0.5°C)
Relative Humidity	✓	✓			10% to 100%	±3% at 20% to 100% and 25°C
Dew Point	✓	✓			-99° to 140°F (-73° to 60°C)	±4°F (±2°C)
Quantum Light (PAR)	✓	OPT	OPT	OPT	0 to 2500 $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$	±5%
External Sensor Ports	1	2	3	4		
Available ports for SMEC 300 Sensors	1	2	3	4		
Operating temperature range: -22 to 130°F (-30 to 55°C)						



# Pre-Packaged Stations



NEW FOR 2018  
BIRD GUARD INCLUDED  
WITH ALL RAINFALL  
SENSORS!



## WatchDog® 2000 Series Plant Disease Station

- Includes WatchDog Mini Station Model 2450, leaf wetness sensor and rainfall sensor
- View current conditions on LCD screen, as well as track severity indicators from onboard plant disease models
- Requires SpecWare™ Pro software or a DataScout Modem and SpecConnect
- University published disease models (sold

separately) can be added to Specware or SpecConnect (**Pro version required**) for more accurate disease and pest monitoring

- Optional Wireless communication allows you to receive real-time conditions and send condition alarms to your PC

• **Buy a package and save!**

**3684WDPD WatchDog® 2000 Series Plant Disease Station**



## WatchDog® 1000 Series Plant Disease Micro Station

- Includes Watchdog Model 1450 Micro Station, leaf wetness sensor, tipping bucket rain gauge, and radiation shield
- Data log current conditions and historical plant disease severity indicators
- Requires SpecWare™ Basic or Pro software

University published disease models (sold separately-**requires SpecWare 9 Pro**) can be added for more accurate disease and insect monitoring

• **Buy a package and save!**

**3684PD1 WatchDog® Plant Disease Micro Station**



## Soil/Air Temperature Station

- Study soil and air temperature trends across multiple microclimates
- Includes Model A125 Data Logger, external

temperature sensor and radiation shield

- SpecWare 9 Basic or Pro and the A-Series PC Connection Cable are required

**3617ARS Soil/Air Temperature Station**



## Plant Growth Micro Stations

- Includes a WatchDog Model 1450 Micro Station, Quantum/PAR light sensor and radiation shield
- Monitor conditions crucial to growing

high quality plants

- Requires SpecWare 9 Basic or Pro software
- **Buy a package and save!**

**3684PAR1 WatchDog® Plant Growth Micro Station**



# WatchDog® 1000 Series Micro Stations



## 1000 Series Micro Stations

Micro Stations offer a cost-effective way to record multiple environmental conditions.

- Internal sensors can include temperature and humidity (radiation shield required)
- Up to 4 external sensor ports
- Up to 8 sensor values with the Model 1650 using the WaterScout® SMEC 300 Soil Moisture/EC/Temperature Sensor
- LCD displays sensor readings and battery level
- Select measurement intervals from 1 to 60 minutes
- Log 10,584 (8,064 with SMEC 300) intervals (220 days at 30 minute intervals)
- Water-resistant case (radiation shield or enclosure recommended for outdoor use)
- 12-month battery life (CR2450, included)
- Transfer data with a PC cable (supplied with SpecWare) or Data Shuttle
- Requires SpecWare™ 9 Basic or Pro software



DESCRIPTION	INTERNAL SENSOR	EXTERNAL PORTS	MAX. NUMBER OF SMEC 300 SENSORS
<b>MODEL 1650</b> Item 3688WD1	TEMPERATURE RELATIVE HUMIDITY	4	2
<b>MODEL 1525</b> Item 3687WD1	TEMPERATURE	4	2
<b>MODEL 1450</b> Item 3684WD1	TEMPERATURE RELATIVE HUMIDITY	2	1
<b>MODEL 1425</b> Item 3683WD1	TEMPERATURE	3	1
<b>MODEL 1400</b> Item 3685WD1	NONE (EXTERNAL ONLY)	4	2
<b>MODEL 1250</b> Item 3682WD1	TEMPERATURE RELATIVE HUMIDITY	NONE	0
<b>MODEL 1225</b> Item 3681WD1	TEMPERATURE	1	0
<b>MODEL 1200</b> Item 3680WD1	NONE (EXTERNAL ONLY)	2	1
<b>MODEL 1120</b> Item 3554WD1	RAINFALL (SEE BELOW FOR DETAILS)	NONE	0
<b>MODEL 1115</b> Item 3635WD1	REQUIRES EXTERNAL RAINFALL (SEE WEBSITE FOR DETAILS)	1	0

**NEW IN '18**  
**BIRD GUARD**  
**INCLUDED!**



### 1120 Data-Logging Rain Gauge

High accuracy, low-maintenance tipping bucket rain collector

- Meets NWS guidelines with an 8 in (20.5 cm) diameter collector
- The included data logger can log up to 10,584 intervals
- Select intervals from 1 to 60 minutes [maximum 10.23 in (26.0 cm) per interval]
- Rain collector mounting bracket and hardware included
- Record rainfall in either metric (mm) or US (in) units
- Accuracy:  $\pm 2\%$  at  $< 2$  in (5 cm) per hour
- Requires SpecWare 9 Basic or Pro
- Includes Bird Guard to reduce maintenance



**3554WD1**

**Data-Logging Rain Gauge**

# WatchDog® A-Series and B-Series Data Loggers



## A-Series Data Loggers

The most affordable way to track environmental conditions for analysis.

- Measure temperature, humidity, leaf wetness and CO<sub>2</sub>
- LCD display confirms logger operation and displays last sensor readings
- Select measurement intervals from 1 to 120 minutes
- Log 4,000 to 8,000 intervals in fail-safe EEPROM data memory
- Water-resistant case (IP65 for A150 and A110, IP54 for A125 and A130); A160 is for indoor use only and must be protected from moisture
- Removable soft caps keep ports clear of debris

- Includes CR2 battery, 12-month life (except A160, which requires AC power; international adapter included)
- SpecWare™ 9 Basic or Pro (Page 24) and the A-Series PC Connection Cable are required (see below)

Operating temperature range: -22 to 140°F (-30 to 60°C); A160: 32 to 122°F (0 to 50°C)  
 Temperature range: -40 to 185°F (-40 to 85°C); A160: 14 to 140°F (-10 to 60°C)  
 Accuracy: ±1.1°F (±0.6°C) at -4 to 122°F (-20 to 50°C), else ±2.2°F (±1.2°C); A160: ±1.0°F (±0.6°C)  
 RH range: 0 to 100%, Accuracy: ±3% from 10-90% at 77°F (25°C), else ±5%  
 CO<sub>2</sub> range: 0 to 9999 ppm, Accuracy: ±50 ppm ±5% of reading (0 to 2000 ppm), else unspecified

DESCRIPTION	INTERNAL SENSOR	INTERVALS	RADIATION SHIELD
<b>MODEL A160</b> <b>3611A</b>	AIR TEMPERATURE RH, CO <sub>2</sub>	5,333	INDOOR USE ONLY (NO SHIELD AVAILABLE)
<b>MODEL A150</b> <b>3612A</b>	AIR TEMPERATURE RELATIVE HUMIDITY	5,333	OPTIONAL
<b>MODEL A130</b> <b>3610A</b>	AIR TEMPERATURE EXTERNAL LEAF WETNESS	4,000	INCLUDED
<b>MODEL A125</b> <b>3617A</b>	AIR TEMPERATURE EXTERNAL TEMPERATURE	4,000	RECOMMENDED
<b>MODEL A110</b> <b>3618A</b>	AIR TEMPERATURE	8,000	OPTIONAL



3611A



3612A



3617A

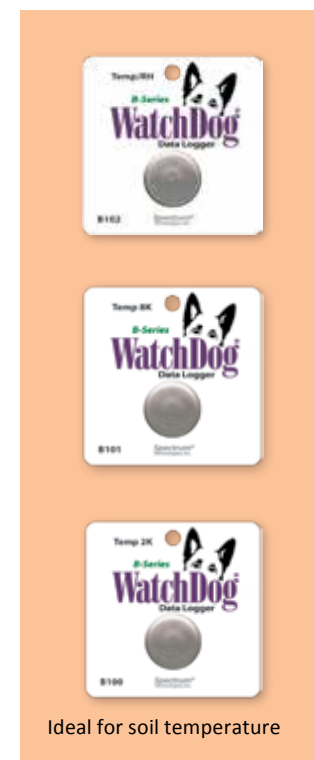
**3661A** WatchDog A-Series PC Connection Cable - USB  
**3663A** Radiation Shield (needed for outdoor use)

## B-Series Data Loggers

Space efficient and inexpensive logging technology.

- Ideal for shipping containers or situations where multiple areas need to be monitored
- Choose from temperature-only or temperature/humidity models
- Water resistant (IP56) stainless steel case
- Select measurement intervals from 1 to 120 minutes
- Log 2,000 to 8,000 intervals
- Integral non-replaceable battery
- SpecWare Basic or Pro software and the B-Series Docking Station are required

DESCRIPTION	INTERNAL SENSOR	INTERVALS	LCD DISPLAY
<b>MODEL B102 T/RH</b> <b>3621WD</b> Temp Range: -4 to 185°F (-20 to 85°C) Temp Accuracy: ±1.1°F from 5 to 149°F (±0.6°C from -15 to 65°C) Humidity: 0 to 100%, ±5%	TEMPERATURE RELATIVE HUMIDITY	4000	NO
<b>MODEL B101 8K</b> <b>3620WD</b> Range: -40 to 185°F (-40 to 85°C) Accuracy: ±1.1°F from 5 to 149°F (±0.6°C from -15 to 65°C)	TEMPERATURE	8000	NO
<b>MODEL B100 2K</b> <b>3619WD</b> Range: -40 to 185°F (-40 to 85°C) Accuracy: ±1.8°F from -22 to 158°F (±1.0°C from -30 to 70°C) <i>Use included plastic bag when measuring soil temperature</i>	TEMPERATURE	2000	NO



Ideal for soil temperature

**Docking Station**  
**3655K1** WatchDog B-Series Docking Station - USB

# WatchDog® Accessories & Communication Options

## Accessories

3396TPS



3665BG



3658A



3663A



3672



3659WD1



### Tripod Mount

Rugged galvanized steel folding tripod and 3 ft (1 m) pole  
**3396TPS Tripod Mount with Ground Stakes**

### Bird Guard

Reduce debris and maintenance. Improve accuracy. Adjustable to fit 8" diameter rain collectors  
**3665BG Bird Guard**

### Radiation Shield

Protect your Micro Station or logger from rain and measurement-distorting solar radiation. Compatible with 1000 Series Micro Stations and A-Series Data Loggers  
**3663A Radiation Shield**

### Sliding Enclosure

Water resistant - mounts to pole or post. Compatible with 1000 Series Micro Stations  
**3658A Sliding Enclosure**

### Waterproof Enclosure

Clamshell enclosure. Compatible with 1000 Series Micro Stations (Models 1400 or 1200, plus soil sensors)  
**3659WD1 Waterproof Enclosure**

### Alarm Output Module

Triggers an external device based on a sensor reading. Compatible with WatchDog 2000 Series Stations (Full and Mini)  
**3672 Alarm Output Module**

## Communication Options



3679WD1

### Mid Range Wireless Communications - up to 2 mi (3 km)

Experience the advantages of real-time weather information by connecting your 2000 Series Remote Weather Stations to a PC up to 2 mi (3 km) away (requires line of sight from Station to Base). Base station features a weatherproof case and 50 ft (15 m) cable (terminating in a 9-pin serial connection) to allow high mounting for the greatest range. Remotes include whip antenna, solar panel, and rechargeable batteries. 900 MHz

**3393B Mid Range Wireless Base Station**

**3393W Mid Range Wireless for Remote Station**

Optional Yagi antennas increase line of sight range to 7 mi (11 km); see website for details

### WatchDog® 1000/2000 Series Data Shuttle

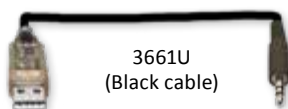
Transport weather data from your 2000 Series Stations or 1000 Series Micro Stations to your host PC. Holds data for multiple stations (up to 5 Full, 10 Mini, or 12 Micro Stations). Includes soft-sided case (also available separately as Item 7500, see page 39). Requires SpecWare 9 Basic or Pro or greater (page 24).

**3679WD1 WatchDog 1000/2000 Data Shuttle**

## Cables & Adapters



3660-75SP



3661U  
(Black cable)



3661U9  
(White cable)

### Short Range Modem Pair

Use short-range modems to maintain signal on wired connections up to 4,000 ft (1.2 km). Has 9-pin serial connection on PC end.

**3365WD2 Short Range Modem Pair**

### Direct Connect Cables for Weather Stations

Connect your WatchDog Weather Station directly to your PC with a 75 ft (22.8 m) cable. Has 9-pin serial connection on PC end, may require USB adapter (Item 3661USB or 3661U9)

**3660-75SP 75 ft (22.8 m) Direct Connect Cable**

**Includes surge protectors for both ends of the cable connection**

**3660DP 75 ft (22.8 m) Powered Direct Connect Cable**

**Includes AC adapter; no surge protectors**

### USB-to-3.5mm-Stereo-Plug Adapter

Connect WatchDog and FieldScout® devices directly to your computer's USB port

**3661U USB-to-3.5mm-Stereo-Plug Adapter**

### USB-to-9-Pin-Serial Adapter

Connect 9-pin Serial cables (such as Item 3660-75SP) directly to your computer's USB port.

**3661U9 USB-to-9-Pin-Serial Adapter**

## Soil Sensors



6470-6



6460



6450WD



3667



3669



6451

### WaterScout® SMEC 300 Soil Moisture/EC/Temperature Sensor

Measures soil moisture (Volumetric Water Content), EC, and temperature. Range: VWC: 0 to saturation (typically 50%), Accuracy:  $\pm 3\%$ ; EC: 0 to 10 mS/cm, Accuracy:  $\pm 2\%$ . May require WaterScout Calibration Device. See page 39 for more information. Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 6470-6** WaterScout SMEC 300 Sensor with 6 ft (1.8 m) Cable
- 6470-20** WaterScout SMEC 300 Sensor with 20 ft (6.1 m) Cable
- 6470CAL3V** WaterScout Calibration Device
- 2251** Conductivity Standard, 1.41 mS/cm, 250 mL

### WaterScout® SM 100 Soil Moisture Sensor

Measures soil moisture (Volumetric Water Content) with little or no disturbance to the root zone. Range: 0 to saturation (typically 50%), Accuracy:  $\pm 3\%$ . Optional WaterScout Calibration Device. See page 38 for more information. Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 6460** WaterScout SM 100 Sensor with 6 ft (1.8 m) Cable
- 6460-20** WaterScout SM 100 Sensor with 20 ft (6.1 m) Cable
- 6470CAL3V** WaterScout Calibration Device

### Watermark Soil Moisture Sensor

Measures soil moisture tension from 0 to 200 centibars. May require Watermark Adapter to connect original Watermarks to stations. See page 43 for more information. Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 6450WD** Watermark Sensor with 11 ft (3.3 m) Cable
- 6450WD20** Watermark Sensor with 25 ft (7.6 m) Cable

### External (Soil) Temperature Sensor

Measure soil, air, or water temperature with a resistance-based sensor. Range:  $-25$  to  $212^{\circ}\text{F}$  ( $-32$  to  $100^{\circ}\text{C}$ ). Accuracy:  $\pm 1^{\circ}\text{F}$  ( $\pm 0.5^{\circ}\text{C}$ ). Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 3667** External (Soil) Temperature Sensor with 6 ft (1.8 m) Cable
- 3667-20** External (Soil) Temperature Sensor with 20 ft (6.1 m) Cable

### Pressure Transducer

Adapts to Irrometer tensiometers and utilizes the dial gauge for measurements. See page 41 for more information. Accuracy:  $\pm 2\%$ . Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 3669** Pressure Transducer

### Irrigation On/Off Sensor

Record and analyze relationships between irrigation periods and soil moisture. Does not control irrigation system, but monitors on/off periods. Range: On at 5psi. Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 6451** Irrigation On/Off Sensor

## Light Sensors



3668I / 3676I



3668I6

### LightScout® Silicon Pyranometer

Measure solar radiation between 300 and 1100 nanometers. Range: 2000 Series & Pups: 0 to 1500 W/m<sup>2</sup>, Accuracy:  $\pm 5\%$ ; Micro Stations: 0 to 1250 W/m<sup>2</sup>, Accuracy:  $\pm 5\%$ . Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 3670I** LightScout Silicon Pyranometer

### LightScout® UV Light Sensor

Measure UV radiation between 250 and 400 nanometers.. Range: 0 to 200  $\mu\text{mol m}^{-2} \text{s}^{-1}$ , Accuracy:  $\pm 5\%$  Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 3676I** LightScout UV Light Sensor

### LightScout® Quantum Light Sensors

Measure PAR light between 400 and 700 nanometers. Sensor bars average PAR light readings to minimize the effects of small shadows. Sensor bars are 19 in (48 cm) long and include mounting brackets. Range: 2000 Series & Pups: 0 to 3000  $\mu\text{mol m}^{-2} \text{s}^{-1}$ , Accuracy:  $\pm 5\%$ ; Micro Stations: 0 to 2500  $\mu\text{mol m}^{-2} \text{s}^{-1}$ , Accuracy:  $\pm 5\%$ . Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

- 3668I** LightScout Quantum Light Sensor
- 3668I3** LightScout Quantum 3 Light Sensor Bar
- 3668I6** LightScout Quantum 6 Light Sensor Bar

## Environmental Sensors

### Temperature (Micro) Sensor

Measure surface temperature of leaves, buds, and other tiny mediums.

Range: -25 to 212°F (-32 to 100°C). Accuracy:  $\pm 1^\circ\text{F}$  ( $\pm 0.5^\circ\text{C}$ ). Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

3667S

Temperature (Micro) Sensor

### Tipping Bucket Rain Collector

Measure rainfall in 1/100 inch increments. Self-emptying and freeze resistant. Range: 0.01", 0.25 mm, Accuracy:  $\pm 2\%$  at  $< 2$  in (5 cm) per hour. Compatible with WatchDog 2000 Series Stations (Full and Mini) and 1000 Series Micro Stations

3665R

Tipping Bucket Rain Collector

### Leaf Wetness Sensor

Measure leaf wetness with a resistance-based sensor designed to replicate a leaf. Range: 0 (dry) to 15 (wet). Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

3666

Leaf Wetness Sensor

### Barometric Pressure Sensor

Measure atmospheric pressure. Range: Standard Sensor: 26 to 32 inHg, 880-1080 hPa, Accuracy:  $\pm 0.05$  inHg,  $\pm 1.7$  hPa; High Altitude Sensor: 18.75 to 33.1 inHg, 635-1121 hPa, Accuracy:  $\pm 0.057$  inHg,  $\pm 1.9$  hPa

Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

3671

Barometric Pressure Sensor - Standard

3671M

Barometric Pressure Sensor - High Altitude

### CO<sub>2</sub> Sensor

Measure CO<sub>2</sub> levels in ppm using NDIR technology. Requires AC power. Not waterproof. Range: 0 to 4000 ppm, Accuracy:  $\pm 5\%$  or 50 ppm. Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

2655

CO2 Sensor

2655X

International Power

### Sensor Extension Cable

20 ft (6 m) extension for all sensors (except digital sensors), connect up to 3 cables per sensor

3664

Sensor Extension Cable

### General Input Cables

Connect non-WatchDog sensors to your WatchDog Station. (Item 3673) Range: 0 to 3v, Accuracy:  $\pm 0.005\text{V}$ . (Item 3674) Range: 0 to 20.1 mA, Accuracy:  $\pm 1\%$ . Compatible with WatchDog 2000 Series Stations (Full and Mini), 1000 Series Micro Stations, and Pups

3673

0-3V Input Cable

3674

4-20mA Input Cable

## Miscellaneous Cables

### Digital Sensors (for Pups only)

### Digital Temperature/RH Sensor with Aspirated Radiation Shield

Digital temperature and RH sensor with 6 ft (2 m) cable, includes solar charging system to power internal fan. Range: -40 to 212°F (-40 to 100°C), 0 to 100% RH, Accuracy:  $\pm 0.54^\circ\text{F}$  from 50 to 131°F ( $0.3^\circ\text{C}$  from 10 to 55°C),  $\pm 2.5\%$  RH. Compatible with WatchDog Pups only. Operating temperature 14 to 140°F (-10 to 60°C)

3613ARS

Temperature/RH Sensor with Aspirated Radiation Shield

### Digital Temperature/RH Sensor with Passive Radiation Shield

Digital temperature and RH sensor with 6 ft (2 m) cable. Range: -40 to 212°F (-40 to 100°C), 0 to 100% RH, Accuracy:  $\pm 0.54^\circ\text{F}$  from 50 to 131°F ( $0.3^\circ\text{C}$  from 10 to 55°C),  $\pm 2.5\%$  RH. Compatible with WatchDog Pups only

3613THS

Temperature/RH Sensor with Passive Radiation Shield

### Digital Rain Collector

Measure rainfall in 1/100 inch increments. Self-emptying and freeze resistant. Range: 0.01", 0.25 mm, Accuracy:  $\pm 2\%$  at  $< 2$  in (5 cm) per hour. 6 ft cable. Compatible with WatchDog Pups only

3665RD

Digital Rain Collector

3665DC

Digital Cable - 6 ft

Cable with tinned wire termination - for Pup connection to existing rain collectors only

### Digital Anemometer

Measure wind speed and direction. 40 ft cable. Range: 0 - 359°, Accuracy:  $\pm 3^\circ$ , Range: 0, 1 to 200 mph (0, 1 to 322 km/h, Accuracy:  $\pm 2$  mph ( $\pm 3$  km/h),  $\pm 5\%$ . Compatible with WatchDog Pups only

3305ADD

Digital Anemometer

NEW IN '18

BIRD GUARD INCLUDED!



3667S



3665R



3666



3671



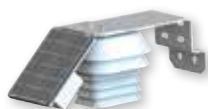
2655



3664



3673



3613ARS



3613THS



3665RD



3305ADD



# SpecConnect



- Monitor your crops from wherever you are with the SpecConnect cloud solution
- See real-time conditions on your computer, smart phone, or tablet
- View current conditions with a mapped view of your stations
- Set custom thresholds to send alerts via text message and/or email
- Configure your equipment network from your computer
- Choose among a wide selection of standard reports for your weather data
- Create your own customized reports
- Proactively manage disease and insects using forecast models (optional subscription)
- Easily export data and reports to share or import to other applications
- For SpecConnect details, see pages 6-7

# SpecWare 9 Basic



- Easily download, analyze, and produce basic reports from the weather data collected on your WatchDog® Micro Stations and data loggers
- Eliminate valuable time exporting the data and performing calculations in tedious spreadsheet programs
- Spec 9 Basic automatically assigns each WatchDog Data Logger Station to its own "logger location" directory, which is appended every time you download new data
- Includes USB cable and manual
- Download the software from specmeters.com (activation required)

Spec 9 Basic does not support disease models, or the 2000 Series Full or Mini Weather Stations, or Retriever & Pups

3654B9	Spec 9 Basic Software
3654B9X	Spec 9 Basic Extra User License
3654B9U	Spec 9 Basic Upgrade*
3661U	USB-to-3.5mm-Stereo-Plug Adapter

\* Does not include USB cable

# SpecWare 9 Pro



Powerful analysis tools that are easy to use.

- Graph on-the-fly with an interactive graphing window
- Build, customize, and save your most important report formats or choose from 15 standard reports
- Add optional insect and disease models to forecast pest pressures and reduce pesticide costs; produce reports with graphs for each pest
- Set a frost alarm that will call your phone at frost temperatures or other sensor conditions
- Automate logger downloads with wireless or directly connected stations
- Generate scheduled log files for data-to-web applications or create an XML file that can be posted on the web
- Find and use data easily with an open file management system - all logger data is stored in one file per month, simplifying data sharing and exporting
- Import data files from other applications
- International features include handling date, time, and numbers with regional formats and Metric or US measurements
- Includes USB cable and manual
- Download the software from specmeters.com (activation required)

3654P9	Spec 9 Pro Software
3654P9X	Spec 9 Pro Extra User License
3654P9U	Spec 9 Pro Upgrade*
3661U	USB-to-3.5mm-Stereo-Plug Adapter

\* Does not include USB cable

## BASIC VS. PRO

COMPARING SPEC 9 BASIC TO SPEC 9 PRO

	Basic	Pro
<b>View Data</b>		
On-demand graphing	✓	✓
<b>Manage Data</b>		
Calibration adjustment	✓	✓
Automatic data append	✓	✓
Single file per logger	✓	✓
International data format	✓	✓
<b>Reports</b>		
Standard reports	✓	✓
Custom reports		✓
Disease & Insect models		OPT
"Pest Alert" report models		OPT
<b>Communications</b>		
Direct connect or modem	✓	✓
Wireless capability		✓
Cellular or wi-fi modem		✓
Auto download		✓
<b>Supported Products</b>		
2000 Series Full Stations		✓
2000 Series Mini Stations		✓
Retriever & Pups		✓
1000 Series Micro Stations	✓	✓
A-Series & B-Series	✓	✓

SpecWare™ 9 software is compatible with Windows XP and later.

GO TO SPECMETERS.COM/UPDATES TO ENSURE YOUR SOFTWARE VERSION IS COMPATIBLE WITH OUR NEWEST WATCHDOG MODELS.

# Disease & Insect Models

Become more proactive in your management of disease and insects by adding forecast modules to your Spec 9 Pro software.

Each package uses field-tested and validated algorithms along with your data to forecast the potential for the appearance of your crop's most notorious enemies.

Quickly produce the documentation needed to support your IPM decisions.

## Forecast Model Packages for SpecWare Pro

<b>3656AP</b>	<b>Apple/Pear Alert Package</b>
<b>Required Sensors:</b>	Leaf wetness and temperature
<b>Models Included:</b>	Apple Scab* (Modified Mills, Cornell, Washington State) Fire Blight (Maryblyt, Cougarblight) Sooty Blotch/Flyspeck* Insect Models

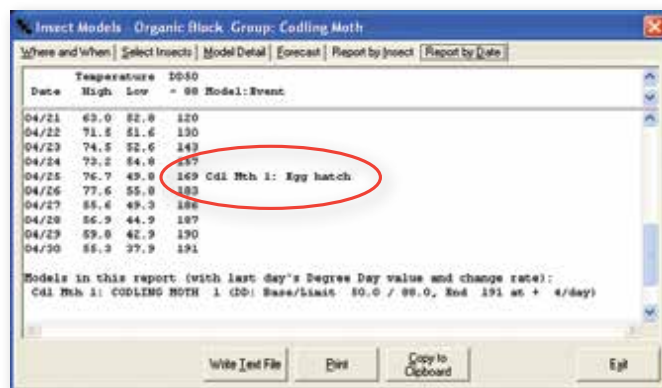
<b>3656CH</b>	<b>Cherry Alert Package</b>
<b>Required Sensors:</b>	Leaf wetness and temperature
<b>Models Included:</b>	Leaf Spot Insect Models

<b>3656GA</b>	<b>Grape Alert Package</b>
<b>Required Sensors:</b>	Leaf wetness, relative humidity, and temperature
<b>Models Included:</b>	Powdery Mildew* (Thomas-Gubler) Black Rot* (Spotts) Downey Mildew Botrytis Phomopsis Cane Leaf Spot Insect Models

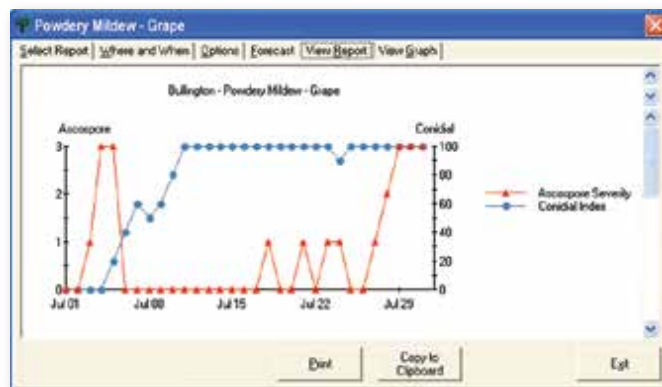
<b>3656PO</b>	<b>Potato Alert Package</b>
<b>Required Sensors:</b>	Temperature, relative humidity, and rain
<b>Models Included:</b>	Early Blight Late Blight (BliteCast) Insect Models

<b>3656TO</b>	<b>Tomato Alert Package</b>
<b>Required Sensors:</b>	Leaf wetness and temperature
<b>Models Included:</b>	Tomcast* Insect Models

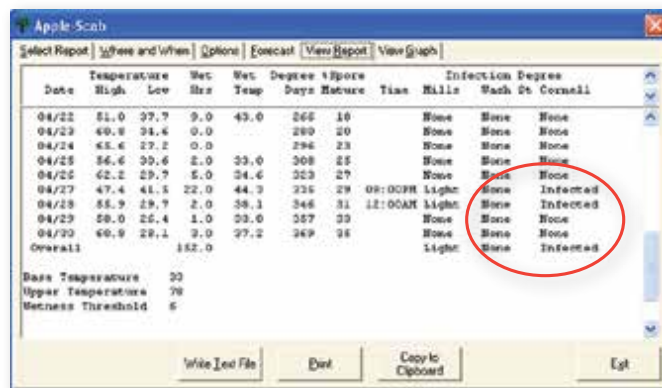
<b>3656TU</b>	<b>Turf Alert Package</b>
<b>Required Sensors:</b>	Air and soil temperature, relative humidity, and rain
<b>Models Included:</b>	Brown Patch (Schumann) Pythium (Nutter, Schein) Dollar Spot (Hall, Mills/Rockwell) Insect Models



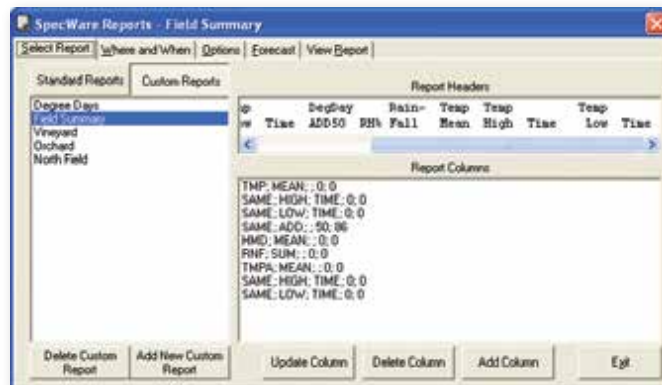
Codling Moth Insect Model



Powdery Mildew Report for Grapes



Apple Scab Report



Custom Reports

\*Can be displayed on WatchDog® 2000 Series Mini Stations



## GO-TO STRATEGY

**KEEP SPRAY WHERE IT BELONGS  
FOR SAFE, PRECISE CHEMICAL  
APPLICATION**

Reduce pesticide drift complaints and monitor your current weather conditions. Mount it right on your equipment or vehicle!

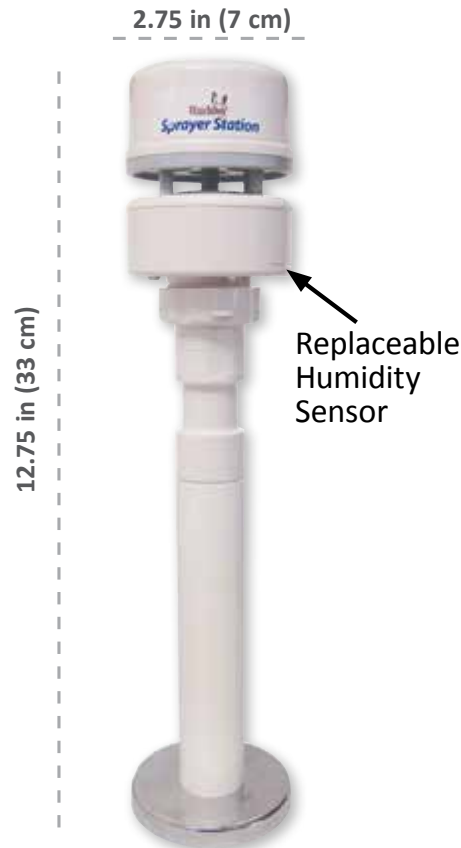
Pesticide drift is increasingly important to commercial applicators. Now you can monitor wind speed and direction and log weather conditions with the ultrasonic WatchDog® Sprayer Station. Accurate data helps pesticide applicators make important decisions regarding weather conditions that affect safety, drift, and proper pesticide application. User-controlled data logging of weather conditions provides evidence of suitable conditions for pesticide application.

**Weather uncertainty will never be an issue for you with this tool.**

- This all-in-one weather station measures air temperature, humidity, dew point, wind chill, barometric pressure and apparent wind speed and direction
- Station uses an internal compass and GPS to adjust the wind sensor values by subtracting the vehicle speed and direction to compute the true values
- Field replaceable humidity sensor
- Handles adverse conditions with a UV-stabilized, compact housing that is fully waterproof and resistant to chemicals
- Reliability is enhanced by eliminating moving parts: the traditional wind vane and cups have been replaced with ultrasonic transducers
- Continuously log your weather parameters at a user-selectable rate or hit the snapshot button to capture current conditions at a specific moment



WatchDog® Sprayer Station Console



WatchDog® Sprayer Station



**Integrates with Raven® Envizio Pro, Viper Pro and Viper 4**

## Sprayer Station

**3349SSCH**

**WatchDog® Sprayer Station with Console**

Buy them together and save!

**3349SSH**

**WatchDog® Sprayer Station**

Includes sensor unit with magnetic base, 21 ft (7 m) cable with vehicle power and 9-pin serial connectors, and display/logging program for Windows Mobile PDA or Windows Laptop

**3349CN**

**WatchDog® Sprayer Station Console**

Includes console with built-in data logger, USB-to-3.5mm stereo cable, and software CD

**3349H**

**Replacement Humidity Sensor**

**3661U9**

**USB-to-9-Pin-Serial Adapter**

### SPECIFICATIONS FOR SPRAYER STATION

Wind Resolution - Speed: 0.1 mph (0.2 km/h); Direction 1°

Wind Speed Range: 0 to 90 mph (0 to 145 km/h)

Wind Speed Accuracy: <12 mph (19 km/h): ±1.1 mph (1.7 km/h) ±10%;  
>12 mph (19 km/h): ±2.3 mph (3.7 km/h) or ±5%

Wind Direction Accuracy: 4 to 11 mph (6 to 18 km/h): ±5°; >12 mph (19 km/h): ±2°

Wind Accuracy Temperature Range: 32° to 131°F (0° to 55°C)

Operating Temperature: -13° to 131°F (-25° to 55°C)

Temperature Accuracy: ±2°F (±1.1°C) with wind above 4.6 mph (7.4 km/h)

Relative Humidity Range: 10 to 95%

Relative Humidity Accuracy: ±5% with wind above 4.6 mph (7.4 km/h)

Barometric Pressure Range: 24 to 33 in-Hg (800 to 1100 hPa)

Barometric Pressure Accuracy: ±0.029 in-Hg (±1 hPa)

Power Supply Voltage: 9 to 40 VDC; Current: <90 mA@12VDC



## WeatherTrackers

Monitor weather conditions without the need for a computer.

- Record and display conditions in your orchard, vineyard or greenhouse that can alert you to insect and plant disease pressure
- Values are calculated based on sensor readings taken every 15 minutes

### Degree days:

- Program up to three degree-day memories and one chill-hour memory
- Solar radiation shield and 15-minute degree-day data point intervals result in exceptionally accurate degree-day calculations

### Built-in Data Logger:

- Store your events in fail-safe, non-volatile memory
- Replace the batteries without losing valuable weather data
- More than enough memory for a complete growing season

### LCD display:

- Displays the current conditions in addition to the daily high/low temperature readings, degree days, leaf wetness hours\*, disease pressure\*, DLI/DIF (Daily Light Integral and day/night temperature difference)\*
- Recall the last 30 days of detail data, as well as 12 months of summaries
- Current readings are updated every 15 seconds

\* on applicable models

### Battery powered:

- 8-month battery power source (9V battery included) means no solar panels to purchase or maintain

**NO PC  
NEEDED!**



3501PAR



3512

### SPECIFICATIONS FOR WEATHERTRACKERS

Item #	Model #	Air Temp	Quantum Light	Leaf Wetness	Disease Forecast
Greenhouse Growth Tracker <b>3501PAR</b>	305	Yes	Yes	No	No
Degree Day Tracker <b>3500</b>	300	Yes	No	No	No
Apple/Pear Pest Alert <b>3504</b>	320	Yes	No	Yes	Apple Scab Sooty Blotch
Grape Pest Alert <b>3512</b>	330	Yes	No	Yes	Powdery Mildew Black Rot

80°F  
3520h  
AVG 79°F  
6.6h/DAY

Greenhouse Growth Tracker Monitor both current and cumulative light levels

APPLE SCAB  
INFECT = NONE

Apple/Pear Pest Alert

DD#1 50-860 18  
SINCE 04/12 0377

All Models Show current degree days

POWDERY MILDEW  
ASC=NONE CON=70

Grape Pest Alert  
Built-in disease models allow you to make adjustments as soon as it is needed.



## Multi-Parameter U-50 Series Meters

Simultaneously monitor, collect, and store up to 11 water quality parameters with these high-performance meters. Measured parameters include pH, ORP, dissolved oxygen, salinity, TDS, seawater specific gravity, temperature, turbidity, and water depth. The waterproof control unit is designed to be both rugged and easy to operate, making it a perfect match for fieldwork – ideal for sampling rivers, groundwater, wells, lakes, runoff / drainage, and a myriad of other ecological and agricultural applications. Refer to the chart below to help decide which model best fits your needs.

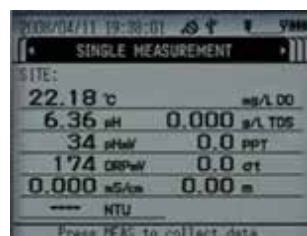
### Control Unit Features:

- Easy to read, backlit display
- Display up to 11 parameters simultaneously
- Auto-calibration feature for pH, dissolved oxygen, turbidity, and depth provides hassle-free calibration
- One-hand operation
- Quick-connect connector (cable to control unit)
- Shock resistant cover

### Sensor Probe Unit Features:

- Ultra-sensitive turbidity sensor
- Minimum dissolved oxygen sensor maintenance with screw-on type membrane cap
- Chemical resistant construction materials
- Field replaceable sensors

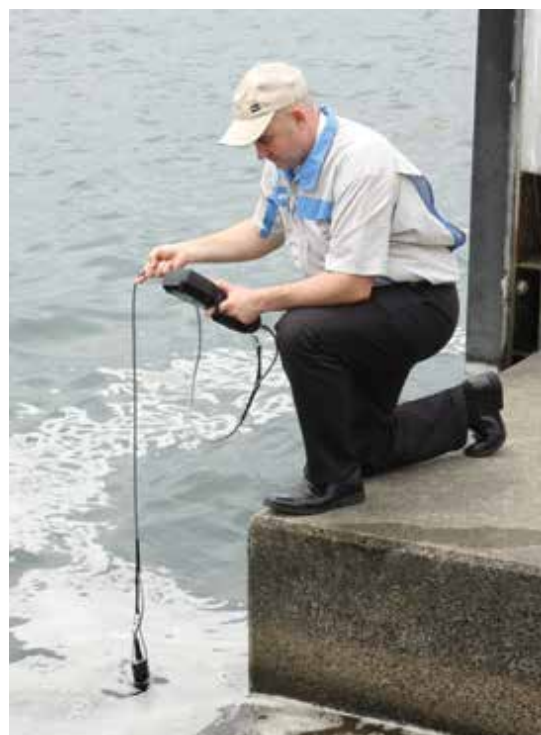
Item 2195-2	U51-2 Meter with 2m Cable
Item 2195-10	U51-10 Meter with 10m Cable
Item 2196-2	U52-2 Meter with 2m Cable
Item 2196-10	U52-10 Meter with 10m Cable
Item 2196-30	U52-30 Meter with 30m Cable
Item 2197-2	U52G-2 Meter with 2m Cable
Item 2197-10	U52G-10 Meter with 10m Cable
Item 2197-30	U52G-30 Meter with 30m Cable
Item 2198-2	U53-2 Meter with 2m Cable
Item 2198-10	U53-10 Meter with 10m Cable
Item 2198-30	U53-30 Meter with 30m Cable
Item 2199-2	U53G-2 Meter with 2m Cable
Item 2199-10	U53G-10 Meter with 10m Cable
Item 2199-30	U53G-30 Meter with 30m Cable



Water quality monitor displays 11 parameters simultaneously

### U-50 SERIES COMPARISON

	U-51	U-52	U52G	U-53	U-53G
pH	✓	✓	✓	✓	✓
ORP (Oxidation Reduction Potential)	✓	✓	✓	✓	✓
Dissolved Oxygen	✓	✓	✓	✓	✓
Conductivity	✓	✓	✓	✓	✓
Salinity	✓	✓	✓	✓	✓
TDS (Total Dissolved Solids)	✓	✓	✓	✓	✓
Seawater Specific Gravity	✓	✓	✓	✓	✓
Temperature	✓	✓	✓	✓	✓
Turbidity (LED)		✓	✓		
Turbidity (Tungsten lamp)				✓	✓
Water Depth			✓	✓	✓
GPS			✓		✓







## Frost Cellular Alert

Ideal for temperature-sensitive fruits and vegetables - be alerted when frost conditions are near.

- LCD display (current settings, signal strength, etc.)
- Key pad for user set up: user-defined thresholds, system test operation
- Relay terminal connections to control an external device
- NEMA 4 (IP66) enclosure
- GSM 3G/HSPA+ cellular module included (user provides SIM card and service plan —Pay-As-You-Go recommended)
- CDMA model for Verizon Wireless (service plan required)
- Set a second limit to periodically send texts with current conditions
- Makes voice call or sends text message (or both) to up to 4 phone numbers
- Makes voice call again, if calls go unanswered
- Requires 6-volt lantern battery (not included)
- Includes 6 ft (1.8 m) external temperature sensor

Temperature range: -22 to 130°F (-30 to 55°C)

Accuracy:  $\pm 1.1^{\circ}\text{F}$  ( $\pm 0.6^{\circ}\text{C}$ ) at -4 to 122°F (-20 to 50°C), else  $\pm 2.2^{\circ}\text{F}$  ( $\pm 1.2^{\circ}\text{C}$ )

**3453** WatchDog® Frost Cellular Alert Pro - GSM 3G HSPA+  
**3452** WatchDog® Frost Cellular Alert Pro - CDMA



## Visual Frost Alert

Spot frost conditions easily in your vineyard or orchard.

- When temperatures approach freezing, the high-powered LED light (visible from about two miles) changes flash frequency and pattern to indicate temperature conditions at a glance
- Sensor cable is 6 ft (1.8 m) long for ease of placement
- Requires 3 AAA lithium batteries (not included)

**3435** WatchDog® Visual Frost Alert  
**3435PK3** BUY TOGETHER AND SAVE!



## Color Frost Alert

Protect your high-value crops.

- Easy visual signal for helicopter pilots or distance viewing
- When temperatures approach freezing, the high-powered LED light (visible from about two miles) changes color and flash frequency to indicate temperature conditions at-a-glance
- Shuts off above 37°F (2.8°C) to conserve power
- Requires 6V lantern battery (not included)

**3430** WatchDog® Color Frost Alert

## Color Frost Alert Warning Colors

Lights will warn you of falling temperatures and risk of frost.



Green – Above 34°F (1°C)  
 White – 32° to 34°F (0-1°C)  
 Red – Below 32°F (0°C)  
 Flashing Red – Below 30°F (-1°C)

Temperature	Interval	Flashes per Interval
Above 37°F (3°C)	30 Seconds	1
34 to 37°F (1 to 3°C)	30 Seconds	2
32 to 34°F (0 to 1°C)	15 Seconds	3
30 to 32°F (-1 to 0°C)	5 Seconds	4
Below 30°F (-1°C)	1 Second	1



IPM Scope

Portable digital microscope at an affordable price.

The IPM Scope combines a digital camera, precision optics, and LED lighting into a powerful handheld microscope that connects to your computer via USB

- 40x and 140x magnification
- View magnified image right on your computer screen
- Included software allows you to customize your images with labels, markers, time stamps, and measurement scales
- Archive still images or send files via e-mail
- Requires computer connection to operate, includes software
- Video software upgrade provides the ability to capture live videos and time lapse sequences of insect movement

2860	IPM Scope
2860V	Video Software Upgrade
2860UV	IPM Scope-Ultra Violet
2860MP	IPM Scope-Mega Pixel
2860HS	Plastic Horseshoe-3D images
2860MAC	Software for Mac Computers

Go to [www.specmeters.com](http://www.specmeters.com) for more models and accessories



IPM Scope shown with optional Plastic Horseshoe to view 3D images

SPECIFICATIONS FOR IPM SCOPE			
Image Sensor: 1/3 in CMOS		Pixels: 640 x 480	
Power: USB Port		Light Source: Super-bright LEDs	
Field of View: @40x: 7.5 x 10 mm @140x: 1.8 x 2.5 mm		Resolution: 4 microns	



Image taken by IPM Scope - Mega Pixel



Image taken by IPM Scope

Macroscopes

Identify pests and diseases up close.

- Macroscope 25 provides 25X magnification over a wide 5 mm (3/16 in) field of view
- Macroscope 45 provides 45X magnification over a wide 3 mm (2/16 in) field of view
- Positionally correct image includes an interchangeable scale
- Incorporates a measuring scale providing measurements in inches or millimeters
- Can be used for distance viewing when close-up lens is removed

2851	Macroscope 25 with hard carrying case
2852	Macroscope 45 with hard carrying case



photo courtesy of Derek Settle

# Sunlight > How much or how little?



Put as many as you like anywhere you like to find out exactly what light is available in that precise location. A simple way to measure how much sunlight even a shaded area really gets. Stick it in a pot, in your turf or anywhere!

Growers can position the meters throughout the greenhouse, as well as outside, to compare differences in light levels and the effect on plant growth and quality.



## Works Everywhere!

## LIGHTSCOUT® DLI 100 Light Meter

Greenhouse and Turf Models  
Measure the light “falling” on your plants.

- Measures PAR light (Photosynthetically Active Radiation)
- Meter runs for 24 hours to calculate the Daily Light Integral (DLI)
- Real-time intensity levels are shown in  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  every 4 seconds
- Greenhouse and Turf models available - each model provides greater resolution where it's needed most
- Helps you make decisions to increase plant growth and quality
- Simultaneously compare light between multiple locations
- Simple, one button operation
- Affordable, first step in measuring light
- Battery included

**3405G3** LightScout® DLI 100 Meter - Greenhouse (set of 3)  
**3405G** LightScout DLI 100 Meter - Greenhouse (1 unit)

**3405T3** LightScout® DLI 100 Meter - Turf (set of 3)  
**3405T** LightScout DLI 100 Meter - Turf (1 unit)

**BUY TOGETHER AND SAVE!**

**BUY TOGETHER AND SAVE!**



“Measuring DLI inside the greenhouse can be very revealing, since growers usually rely on their eyes to determine the light levels and the human eye is a terrible light sensor because it is so effective at adjusting to different light environments.”

James E. Faust  
Associate Professor of Horticulture  
Clemson University

### GENERALIZED PLANT RESPONSES TO DIFFERENT LIGHT LEVELS

Relative Light Level	DLI* - Daily Light Integral	Light Intensity** at Noon	Generalized Plant Growth Response
Very Low	2 to 5	100 to 200	Poor quality
Low	5 to 10	200 to 400	Minimum acceptable
Medium	10 to 20	400 to 800	Good quality
High	20 to 30	800 to 1,200	Excellent quality
Very High	30 to 60	1,200 to 2,000	Excellent quality

\* Moles  
\*\* Micromoles ( $\mu\text{mol}/\text{m}^2\cdot\text{s}$ )

Note: It is not possible to make a direct conversion between an instantaneous light measurement and the Daily Light Integral. Also, temperature is a key factor in plant quality and growth. Source: Hamrick, Debbie, ed. *Ball Red Book*. Batavia, IL: Ball Publishing, 2003.



3412

## LIGHTSCOUT® Red/Far-Red Meter

Red/Far-Red light ratio helps plants determine their proximity to each other, which affects how tall or full they grow.

- Cost-effective Red/Far-Red measurement
- Displays the Red/Far-Red ratio on the LCD screen
- Press a button to display 660 nm and 730 nm readings
- Includes soft-sided case (also available separately as Item 7500)

**3412**      **LightScout® Red/Far-Red Meter**



3414F

## LIGHTSCOUT® UV Meter

Handheld meter monitors critical UV radiation (250-400 nm).

- Determine UV filtering capacity of greenhouse shades and glass barriers
- Range is 0 to 200.0  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$  (full sunlight)

**3414F**      **LightScout® UV Meter**  
**7500**      **Soft-Sided Carrying Case**



3415FXSE

## LIGHTSCOUT® Quantum/PAR Meters

Measure the light used for plant growth - PAR is a more valuable measurement than foot-candles, as it measures only the light used by plants for photosynthesis.

- Measures photosynthetically active radiation (PAR) from 400 to 700 nm
- Range of 0 to 2,000  $\mu\text{mol}\cdot\text{m}^{-2}\cdot\text{s}^{-1}$
- Available in a variety of configurations for your convenience

**3415F**      **LightScout® Quantum Meter**  
**3415FSE**      **LightScout® Dual Solar/Electric**  
                 **Quantum Meter**  
**3415FXSE**      **LightScout® Dual Solar/Electric**  
                 **Quantum Meter - External Sensor**  
**3415FQF**      **LightScout® Quantum and Foot-Candle Meter**  
**7500**      **Soft-Sided Carrying Case**

## LIGHTSCOUT® Foot-Candle Meter

Displays immediate light level in units of foot-candles.

- An affordable light measurement solution
- Precision photodiode with cosine correction

**3413F**      **LightScout® Foot-Candle Meter**  
**7500**      **Soft-Sided Carrying Case**



# LIGHTSCOUT<sup>®</sup> External Light Sensor Reader

Reads any of Spectrum's external light sensors.

- Plug in a sensor, choose it on the LCD, and start measuring UV, Quantum Light, or Solar Radiation
- Sensors can also be used with WatchDog<sup>®</sup> Weather, Mini, and Micro Stations
- LightScout<sup>®</sup> External Light Sensor Reader includes soft-sided case (also available separately as Item 7500)

3415FX	LightScout <sup>®</sup> External Light Sensor Reader
3668I	Compatible light sensors sold separately: LightScout <sup>®</sup> Quantum Light Sensor (PAR Light)
3668I3	LightScout <sup>®</sup> Quantum Light 3 Sensor Bar
3668I6	LightScout <sup>®</sup> Quantum Light 6 Sensor Bar
3670I	LightScout <sup>®</sup> Silicon Pyranometer Sensor (Solar Radiation)
3676I	LightScout <sup>®</sup> UV Sensor



3415FX



3670I



3668I6

## WatchDog<sup>®</sup> Model 2475 Plant Growth Station

Ideal for Greenhouses - monitor microclimates with four sensor channels.

- Computes and displays Daily Light Integral (DLI), current light levels, dew point, degree day models, and chill hours
- Computes and displays DIF – Average day/night temperature difference
- Computes and displays VPD – Vapor Pressure Deficit
- Measure temperature, humidity and light conditions, plus 1 additional sensor port
- Check current conditions or 12 months of historical data on the LCD display
- Requires SpecWare<sup>™</sup> software



3686WD WatchDog<sup>®</sup> Model 2475 Plant Growth Station

### Plant Growth Report

Template: Plant Growth (DIF/DLI) w/VPD							Equipment	North - Aspatial	
Timestamp	VPD	PAR Int.	DLI	Temp DIF	Day Mean Temp	Night Mean Temp	High	Low	
8/1/2017	1.11	12.25	31.88	11.68	60.56	68.88	91.00	64.40	
8/2/2017	.81	12.75	34.32	10.78	70.62	67.86	89.70	80.40	
8/3/2017	.78	13.00	38.82	9.39	77.96	68.66	90.90	81.30	
8/4/2017	.85	12.75	17.02	7.10	77.48	70.38	84.20	66.60	
8/5/2017	.55	12.00	18.60	5.54	76.94	71.40	86.00	69.60	
8/6/2017	.77	12.25	29.72	7.86	77.82	69.97	86.90	68.20	
8/7/2017	.89	12.50	36.55	8.51	71.94	69.43	80.70	62.90	
8/8/2017	.58	11.50	26.58	6.58	72.30	66.71	83.60	64.10	
8/9/2017	.74	12.00	32.68	8.32	77.45	68.13	87.60	65.60	
8/10/2017	.71	13.00	32.82	9.51	78.05	68.54	89.40	65.80	

SpecWare plant growth report

## WatchDog<sup>®</sup> WeatherTracker Model 305 Greenhouse Growth Tracker

No computer necessary! Stand-alone device - LCD Display - no PC interface!

- Temperature sensor tracks degree-days without a computer
- Quantum light sensor measures your plants' light exposure over time (in moles/day) - displays current and cumulative DLI (Daily Light Integral)
- Computes and displays DIF – average day/night temperature difference
- Comprehensive tool to assess physiological maturity of your plants
- Stand-alone device – all information is shown on the LCD display
- One-button review of 30 days of values and 12 months of summaries
- 9V battery with 8-month life; memory protection in case of power loss

3501PAR WeatherTracker<sup>®</sup> Model 305 Greenhouse Growth



Displays Daily Light Integral (DLI) and Day/Night Temperature Difference on the LCD



# FieldScout® TDR 150 & TDR 350 Soil Moisture Meter



## FIELDSCOUT® TDR 350

Offering the proven time-domain measurement technology, the TDR 350 accurately measures soil moisture across the full range of soil conditions. Improved ergonomic design provides quick and easy measurements. Validate your cultural practices with hands free data collection integrated with Bluetooth and GPS.

- Measures soil moisture (Volumetric Water Content), Electrical Conductivity, and Turf Surface Temperature
- Integrated Bluetooth and GPS
- Industry exclusive backlit display
- Improved shaft-mounted probe with telescoping tubular frame
- Transfer data with USB flash drive - no PC connection needed
- Powered by 4 AA batteries (lithium included)
- Compatible with SpecConnect and FieldScout Mobile App
- Optional IR sensor to measure turf surface temperature



### 6435 TDR 350

Includes carrying case. Rods required and sold separately (Pg 36)

**Note: Rods are required for TDRs to function**

**6435TS Infrared Temperature Sensor for TDR350** (Pg 36)

**6435SP Rod Spacer for 0.5" and 1" depths** (Pg 36)

### SPECIFICATIONS FOR TDR SOIL MOISTURE METERS

VWC Range: 0% to saturation, Resolution: 0.1%, Accuracy:  $\pm 3.0\%$  VWC

EC Range: 0 to 5 mS/cm, Resolution: 0.01 mS/cm, Accuracy:  $\pm 0.1$  mS/cm

Temperature Range:  $-22^{\circ}$  to  $140^{\circ}$ F ( $-30^{\circ}$  to  $60^{\circ}$ C), Resolution:  $0.1^{\circ}$ , Accuracy:  $\pm 1.8^{\circ}$ F ( $1^{\circ}$ C)

IR Temperature Range:  $32^{\circ}$  to  $140^{\circ}$ F ( $0^{\circ}$  to  $60^{\circ}$ C), Resolution:  $0.2^{\circ}$ F ( $0.1^{\circ}$ C), Accuracy:  $\pm 0.2^{\circ}$ F ( $0.1^{\circ}$ C)

SpecConnect Web Portal  
showing TDR 350 data



## SMARTIRRIGATION:

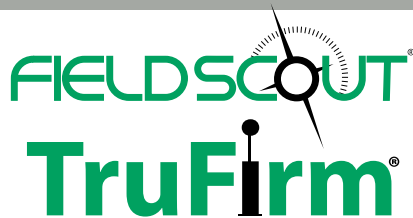
Maximize Irrigation Audits with TDR



### FIELDSCOUT MOBILE APP

Capture and analyze measurements on your turf using Bluetooth wireless technology on our FieldScout TDRs 350, 300, 150 and Trufirm.

- Visualize field readings in real time and e-mail relevant information
- Upload to SpecConnect Web Portal and view your entire course's data at once and export for further analysis (Pro Features)
- Color-coded to represent a scale of turf firmness, moisture, surface temperature and EC
- Free download from App store or Google Play
- Works on iOS and Android devices



**LOWER PRICE**

Based on technology developed by the United States Golf Association (USGA), the FieldScout® TruFirm® offers a quick, easy, and affordable method to measure the firmness of turf, bunker sands, and other playing surfaces. Data acquired from the device allows researchers and turf management professionals to measure the relationship between the compaction of the soil and the moisture level, in order to quantify playing conditions.

- View measurement on LCD Display
- Evaluate trends and monitor sections of turf relative to one another
- With FieldScout® Mobile App, instantly see your data on your smartphone or tablet
- The lower the value, the firmer the turf or surface
- Measures depth of travel in inches (range 0.1 in-1.5 in)
- Logged data can be sent via Bluetooth to a iOS or Android device for plotting specific greens or other surfaces
- Includes soft-sided carrying case

**6490S**      **FieldScout® TruFirm® Turf Firmness Meter**      **PRICE REDUCTION**  
with Bluetooth LE



### SPECIFICATIONS FOR TRUFIRM

Range: 0.1 in - 1.5 in (2.54 mm - 38.1 mm)
Resolution: 0.01 in at 1.00 in - 1.50 in (0.25 mm at 25.4 mm - 38.1 mm)
0.003 in at 0.00 in - 0.999 in (0.076 mm at 0 mm - 25.4 mm)
Diameter of Hammer: 1.68 in (4.45 cm)
Height: 27 in (69 cm)
Weight: 4.3 lb (1.95 kg)
Measurement Units: Depth of travel (inches)
Power: 2 AA batteries (included)

### FieldScout Mobile App

**FREE**

3035A	SpecConnect FieldScout Pro Subscription (1-yr)	1-3 Devices
3035B	SpecConnect FieldScout Pro Subscription (1-yr)	4-7 Devices
3035C	SpecConnect FieldScout Pro Subscription (1-yr)	7+ Devices
6453BT	FieldScout Bluetooth Device for TDR 300	



### FIELDSCOUT MOBILE APP BASIC vs. PRO

	Basic	Pro
Basic Grid of Zones	✓	✓
Change Number of Zones	✓	✓
Customizable Google Map Image		✓
Saves the Average Measurement by Zone	✓	✓
Email the Map/Results View	✓	✓
Freeform Notes		✓
Freeform Mode		✓
Guided Mode (Auto-Advancing through Zones)		✓
SpecConnect Data Sharing		✓
Auto-Upload to SpecConnect		✓
Add User Note or Comment to Individual Reading or Zone		✓
Irrigation/Soil Moisture Audit		✓

## FIELDSCOUT® TDR 150 Soil Moisture Meters

Portable soil moisture meter allows you to obtain readings on the go at the press of a button. Variable rod length options provide soil moisture measurements at your ideal root zone. With new enhancements, the TDR 150 provides significant improvements in performance and measurement accuracy for optimal turf and soil environments.

- Increased accuracy of soil moisture (Volumetric Water Content)
- Measures EC (Electrical Conductivity)
- Measures Turf Surface Temperature
- Option to add on Bluetooth and GPS
- Data logger records approximately 50,000 measurements
- Industry exclusive backlit display
- Data collected with USB flash drive
- Powered by 4 AA lithium batteries, (lithium included)
- Ideal for measuring containers on benches
- Optional IR Temp sensor to measure canopy or turf temperature

Note: Rods are required for TDRs to function

<b>6445</b>	<b>TDR 150</b>
	Includes carrying case. Rods sold separately (below)
<b>6445TS</b>	<b>Infrared Temperature Sensor-TDR 150</b>
<b>6435SP</b>	<b>TDR Rod Spacer (1" &amp; 1/2" depth)</b>
<b>6445GBU</b>	<b>Bluetooth and GPS Upgrade</b>
<b>6445S</b>	<b>Replacement TDR 150 Probe Block</b>

### TDR Rods

Multiple depth options for varying root zones.

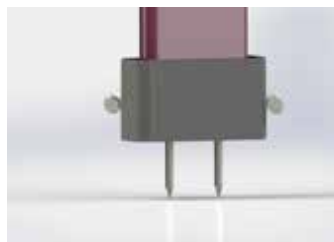
- Sturdy stainless-steel construction
- Field replaceable

NOTE: Required for TDRs to function. Must be fully inserted for valid measurements.

<b>6428FS4</b>	<b>Two 1.5 inch (3.8 cm) Rods</b>
<b>6429FS4</b>	<b>Two 3 inch (7.5 cm) Rods</b>
<b>6431FS4</b>	<b>Two 4.8 inch (12 cm) Rods</b>
<b>6432FS4</b>	<b>Two 8 inch (20 cm) Rods</b>
<b>6430PH</b>	<b>Pilot Hole Maker for TDR Meters</b>
	Includes two 3 inch (7.5 cm) rods

### TDR Spacers - NEW!

- Measure Soil Moisture at 0.5 " to 1"
- Expand the measurement range of our FieldScout TDR Soil moisture probes
- Using 1.5" (3.9 cm) rods, the TDR Rod Spacer enables easy measurement of 0.5" and 1" depths
- Flip to switch between the two depths
- Easily attach and detach from any Spectrum TDR meters



FOR TDR350/TDR150

**6435SP Rod Spacer**

FOR TDR300/TDR 100 with serial numbers 20000 or greater (firmware v7.0 and later)

**6430SP Rod Spacer and Software Activation**

FOR TDR300/TDR100 with serial numbers less than 20000 (firmware v6.9 and earlier)

**6430SPU Rod Spacer and Activation Processor**



### Infrared Temperature Sensor

<b>6435TS</b>	<b>Infrared Temperature Sensor for TDR350</b>
<b>6445TS</b>	<b>Infrared Temperature Sensor for TDR150</b>

- Predict turf wilt with higher accuracy
- Easily correct a moisture deficit earlier and reduce heat stress to the green
- Quickly and accurately monitor canopy and soil temperatures
- Use IR temperature real-time
- Easy installation to our FieldScout TDR350 and TDR150



## FIELDSCOUT® SC 900 Soil Compaction Meter



Help make decisions regarding areas of the field that require tillage, changes to crop rotation, and planting of cover crops.

- Includes 1/2 in and 3/4 in cone tip
- Takes compaction readings every inch from 0 to 18 in (45 cm)
- Exclusive ultrasonic depth sensor captures readings in 1 in (2.5 cm) increments
- Penetration resistance measured by internal load cell
- Compaction data is displayed in PSI or kPa (1 psi = 6.9 kPa)
- Connects to any GPS receiver that has a serial output option\*
- Equipped with internal data logger and RS-232 port
- Configure and download meter with FieldScout® software (included)\*\*
- Upload your data to Spec Connect for maps of compaction by depth, or depth to hard pan layer. See pages 6-7 & 34-35 for SpecConnect FieldScout subscriptions.
- Includes USB cable, carrying case, and depth target

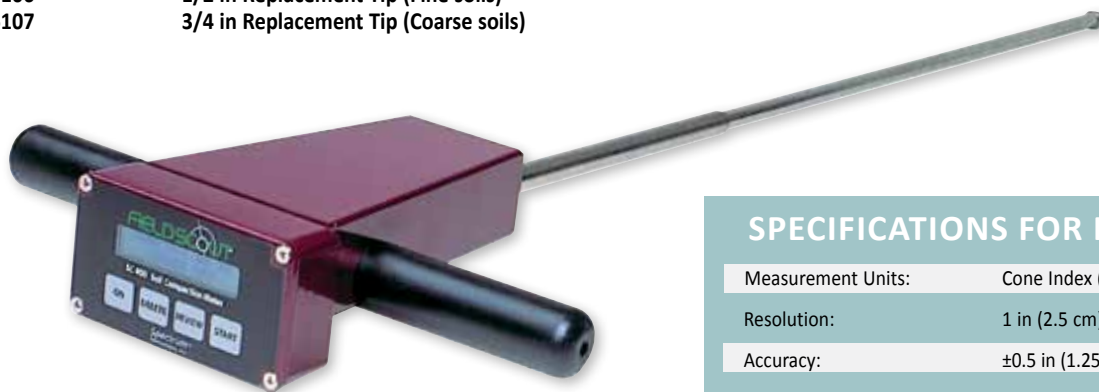
\* GPS interface requires two cables. The GPS/DGPS cable (item 2950CV5) is available from Spectrum. A PC serial interface cable supplied by the manufacturer of the GPS receiver is also required.

\*\* PC cable connects to a computer USB port. See our website for other cable connection options.



FieldScout SC 900

- |                |   |
|----------------|---|
| <b>6110FS</b>  | <b>FieldScout® SC 900 Soil Compaction Meter</b> |
| <b>2950CV5</b> | <b>GPS/DGPS Cable</b>                           |
| <b>7250</b>    | <b>GPS Unit Mounting Bracket</b>                |
| <b>6110FST</b> | <b>Replacement Depth Target</b>                 |
| <b>6106</b>    | <b>1/2 in Replacement Tip (Fine soils)</b>      |
| <b>6107</b>    | <b>3/4 in Replacement Tip (Coarse soils)</b>    |



### SPECIFICATIONS FOR FIELDSCOUT SC 900

Measurement Units:	Cone Index (PSI or kPa)
Resolution:	1 in (2.5 cm), 5 PSI (35 kPa)
Accuracy:	±0.5 in (1.25 cm) Depth, ±15 PSI (103 kPa) Pressure
Range:	0 to 18 in (0 to 45 cm), 0 to 1,000 PSI (0 to 7,000 kPa)
Battery/Life:	4 AAA alkaline batteries; approximately 12-month life
Data Logger Capacity:	772 profiles without GPS; 579 profiles with GPS

## Soil Compaction Tester

Economical way to measure soil compaction with analog read out.

- Large and small tip included with convenient storage in tester housing
- 24 in stainless steel rod with adjustable shock collar to prevent damage to the gauge during transport or storage
- Easy to read, color-coded, stainless steel dial that is liquid filled to reduce shock
- Durable molded housing with rubber grip handles
- Penetration Depth: Up to 24 in (60 cm) in 3 in (7.6 cm) increments

- |             |  |
|-------------|--|
| <b>6120</b> | <b>Soil Compaction Tester</b>                |
| <b>6121</b> | <b>1/2 in Replacement Tip (Fine Soils)</b>   |
| <b>6122</b> | <b>3/4 in Replacement Tip (Coarse Soils)</b> |





Actual size



## SM 100 Soil Moisture Sensor

Place at multiple depths to help determine both when and how much to water.

- Measures Volumetric Water Content (VWC) of soil
- Capacitance-type sensor responds immediately to changes in soil moisture content for better irrigation decisions
- Calibrated for mineral soils or soilless media
- Installs easily into 3/4 in (1.9 cm) hole
- Install permanently or use to take spot measurements
- Can be read with the FieldScout® Soil Sensor Reader (Item 6466) or WatchDog® 2000, 1000 Series Stations, and WatchDog Pups
- Connect up to 8 sensors to one station
- WaterScout Calibration Device can be used to reset the baseline reading

6460

WaterScout® SM 100 Sensor - 6 ft (1.8 m)

6460-20

WaterScout SM 100 Sensor - 20 ft (6 m)

6470CAL3V

WaterScout Calibration Device

### SPECIFICATIONS FOR WATERSCOUT SM 100 SENSOR

Standard Interface: WatchDog weather station, Pups, and FieldScout soil moisture reader

Range: 0% VWC to saturation

Power Requirements: 3 to 5V @ 6 to 10 mA

Output: Analog voltage 0.5 - 1.5V for a 3V excitation (ratiometric for other excitation voltages)

Resolution: 0.1% VWC

Cable Length: 6 ft (1.8 m) and 20 ft (6 m) standard, extendable up to 50 ft (15 m)

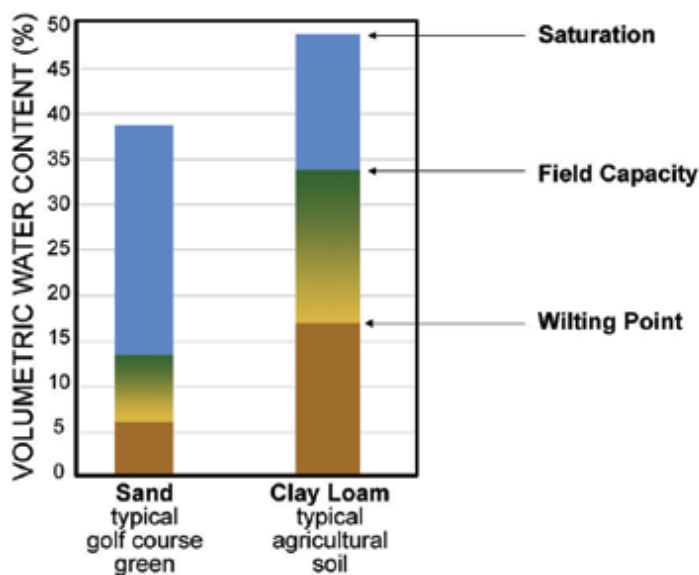
Accuracy: 3% VWC @ EC < 8 mS/cm

Sensing Area: 2.4 in (6 cm) x 0.8 in (2 cm)



Shown measuring in soilless media mode to gather immediate data

### Water Holding Capacity By Soil Type







## SMEC 300 Soil Moisture/EC/Temperature Sensor

Identify situations where soil salinity is an issue or where certain moisture and temperature conditions facilitate soil-borne diseases.

- Capacitance-type soil moisture sensor
  - Carbon ink electrodes provide large measuring surface for electrical conductivity (EC)
  - Easy, 1-step EC calibration process
  - Can be read with the FieldScout® Soil Sensor Reader (Item 6466) or WatchDog® 2000, 1000 Series Stations, and WatchDog Pups
  - Connect up to 4 sensors per station
- Recommended placement of sensors is 10 feet separation to prevent EC interference when in the same medium
- WaterScout® Calibration Device required unless using Soil Sensor Reader (Item 6466)

WatchDog Stations sold prior to 2012 must be upgraded (Contact for support)

6470-6	WaterScout SMEC 300 Sensor - 6 ft (1.8 m)
6470-20	WaterScout SMEC 300 Sensor - 20 ft (6 m)
6470CAL3V	WaterScout Calibration Device
2251	Conductivity Standard, 1.41 mS/cm, 250 mL



Actual size

### SPECIFICATIONS FOR WATERSCOUT SMEC 300

Standard Interface: WatchDog weather station, Pups, and FieldScout soil moisture reader

Range: VWC: 0% VWC to saturation, EC: 0 to 10 mS/cm, Temp: 33 - 175°F (0.5 - 80°C)

Resolution: VWC: 0.1%, EC: 0.01 mS/cm, Temp: 0.1°F (0.1°C)

Accuracy: VWC: 3%, EC: ±2%, Temp: ±1°F (0.6°C)

Cable Length: 6 ft (1.8 m) and 20 ft (6 m) standard, extendable up to 50 ft (15 m)

Power Requirements: 3V @ 6 to 10 mA

Output: Analog voltage, time division multiplexed

Sensing Area: 2.25 in. x 0.75 in. (5.7 x 2 cm)



Spot-check WaterScout SM 100 and SMEC 300 sensors in the field.

- Also reads Watermark sensors (page 41) (requires separate adapter)
- Includes soft-sided case (also available separately)

6466	FieldScout® Soil Sensor Reader
6450FSADPT	Watermark Adapter for Soil Sensor Reader

7500	Soft-Sided Carrying Case*
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\* Item 7500 will also fit the WatchDog 1000/2000 Series Data Shuttle (Item 3679WD), LightScout Red/Far-Red Meter (Item 3412), LightScout Quantum Light Meters (four models) and the LightScout External Light Sensor Reader (Item 3415FX)





**3680SM12**  
WatchDog® 1000  
Series Micro  
Station with Sliding  
Enclosure and two  
WaterScout SM 100  
Sensors

**2**  
DEPTHS

**3685SM13**  
WatchDog® 1000  
Series Micro Station  
with Sliding Enclosure  
and three WaterScout  
SM 100 Sensors

**3**  
DEPTHS

**3900SM14**  
WatchDog® Sensor  
Pup shown with four  
WaterScout® SM 100  
Sensors

**4**  
DEPTHS

## WatchDog® Irrigation Stations with WaterScout® Sensors and Watermark Sensors

Affordably monitor, compare and evaluate soil moisture levels from two, three, or four user-defined soil depths.

- Includes WatchDog® Station and WaterScout® Sensors with 20 ft (6 m) cables - save money when purchased as a system

- Micro Stations also include the Protective Sliding Enclosure
- Watermark Stations include Watermark Soil Moisture Sensors with 11 ft (3.3 m) cables
- Add soil moisture sensors to your WatchDog Pup network and see your data on SpecConnect.net
- Add a WaterScout® SMEC 300 Soil Moisture/EC/Temp Sensor (Item 6470-20) and monitor soil temperature and EC levels
- Requires SpecConnect, SpecWare 9 Basic or Pro software
- **Buy them together and save!**

	MODEL 1200 MICRO STATION	MODEL 1400 MICRO STATION	SENSOR PUP IRRIGATION STATION		MODEL 1200 MICRO STATION	MODEL 1400 MICRO STATION
2 WaterScout SM 100 Soil Moisture Sensors	3680SM12	3685SM12	3900SM12	2 Watermark Soil Moisture Sensors	3680WM12	3685WM12
3 WaterScout SM 100 Soil Moisture Sensors		3685SM13	3900SM13	3 Watermark Soil Moisture Sensors		3685WM13
4 WaterScout SM 100 Soil Moisture Sensors		3685SM14	3900SM14	4 Watermark Soil Moisture Sensors		3685WM14



6450

## Watermark Soil Moisture Sensor

Economical way to measure soil moisture tension.

- Works with FieldScout® Soil Sensor Reader (Item 6466, page 39)
- Reads moisture tension from 0 (saturated) to 200 (dry) centibars

<b>6450</b>	<b>Watermark Sensor with 5 ft (1.5 m) cable</b>
<b>6450FSADPT</b>	<b>Watermark Adapter for Soil Sensor Reader</b>

## Watermark Sensors for WatchDog® Weather Stations

<b>6450WD</b>	<b>Watermark Sensor for WatchDog® Stations &amp; Pups with 11 ft (3.3 m) cable</b>
<b>6450WD20</b>	<b>Watermark Sensor for WatchDog® Stations &amp; Pups with 25 ft (7.6 m) cable</b>
<b>6450AH</b>	<b>Watermark Adapter for WatchDog® Stations &amp; Pups</b>



6421

## Irrrometer Tensiometers

Schedule irrigation based on how hard plant roots are working to draw water from the soil.

- “R” models (items 6419 thru 6423) are for general use with field or tree crops
- Low Tension (LT) models (see [www.specmeters.com](http://www.specmeters.com)) are for coarse soils or soilless media
- Portable models for specialized applications (see [www.specmeters.com](http://www.specmeters.com))
- Can be connected to WatchDog® Data Loggers and Stations with Pressure Transducer (Item 3669)
- Pressure gauge has a quarter inch pipe thread
- Service kit required (Item 6425)

<b>6425</b>	<b>Service Kit - Required</b>
<b>6419</b>	<b>R Model 6 in (15 cm) Depth</b>
<b>6420</b>	<b>R Model 12 in (30 cm) Depth</b>
<b>6421</b>	<b>R Model 18 in (45 cm) Depth</b>
<b>6422</b>	<b>R Model 24 in (60 cm) Depth</b>
<b>6423</b>	<b>R Model 36 in (90 cm) Depth</b>

- Connect your “R” model (Items 6419 thru 6423) tensiometer to your weather station. The Pressure Transducer adapts to Irrrometer tensiometers and allows use of the dial gauge for in-field measurements

<b>3669</b>	<b>Pressure Transducer</b>
-------------	----------------------------



6400

## Economy Soil Moisture Tester

Analog soil moisture meter measures any type of soil with just one calibration.

- Resistance-type sensor located at the tip of the shaft
- Provides instant results ranging from 0 (dry) to 10 (saturated)
- 3-month warranty

<b>6400</b>	<b>9 in (22 cm) Soil Moisture Tester</b>
<b>6405</b>	<b>24 in (60 cm) Soil Moisture Tester</b>

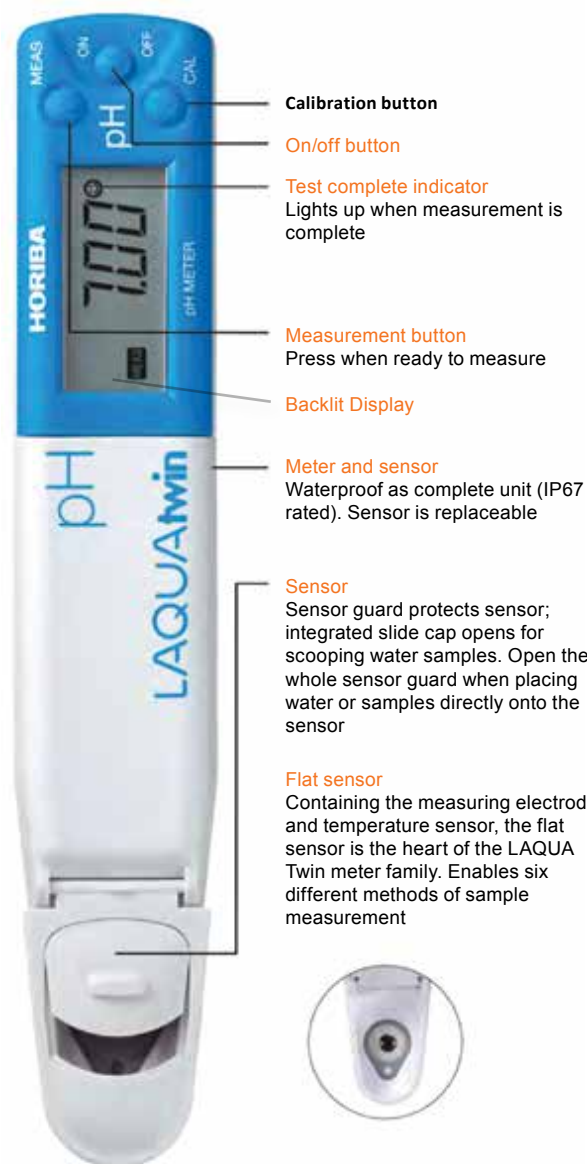


## LAQUA twin



Put the power of a laboratory right in your hands.

- Professional grade meters
- Measure samples in nutrient solutions, water, soils, and tissue sap (Two plant sap press options available on page 44)
- Waterproof pocket-sized meter with digital calibration
- Sensors store dry and are field replaceable
- Accuracy correlates well with laboratory analysis
- Unique flat sensor allows you to conveniently and accurately measure samples as small as 0.3 ml
- Automatic temperature compensation, waterproof, auto power-off
- Includes two CR2032 batteries, case and calibration standards



### LAQUA Twin pH Meter

Ideal for testing irrigation water, leachate, pesticides, or dairy rumen pH.

**2103ALP**

**LAQUA Twin pH meter**

Includes case, batteries, and pH 4 & 7 standards

**2110**

**Refill Solutions - pH 4 and 7, 60 mL ea.**

**2143L**

**LAQUA Twin pH Replacement Sensor**

**2135L**

**Sampling Sheets - 100 pieces**

LAQUA Twin EC Meter

Ideal for water quality and greenhouse applications.

**2205LP**

**LAQUA Twin EC Meter**

Includes case, batteries, and calibration standards

**2210L**

**Conductivity Standard, 1.41 mS/cm**

**(6 - 14 mL bottles)**

**2242L**

**Replacement Sensor**



**pH**

**Conductivity (EC)**

**Sodium**

**Potassium**

**Nitrate**

**Calcium**

<b>Measurement Principle:</b>	Glass electrode method	2 AC bipolar	Ion electrode method	Ion electrode method	Ion electrode method	Ion electrode method
<b>Sample Volume Required:</b>	0.1 mL to 2.0 mL	0.12 mL to 2.0 mL	0.3 mL to 2.0 mL	0.3 mL to 2.0 mL	0.3 mL to 2.0 mL	0.3 mL to 2.0 mL
<b>Measurement Range:</b>	2 to 12 pH	0 to 19.9 mS/cm	23 to 2300 ppm	39 to 3900 ppm	62 to 6200 ppm	40 to 4,000 ppm
<b>Calibration:</b>	pH 4 and pH 7	1.41 mS/cm	150 ppm and 2000 ppm*	150 ppm and 2000 ppm*	34 ppm and 450 ppm*	150 ppm and 2000 ppm*
<b>Reproducibility:</b>	± 0.1 pH	± 2%	± 10% or ± 10 ppm	± 10% or ± 10 ppm	± 10% or ± 10 ppm	± 20% or ± 20 ppm
<b>Display:</b>	4-digit digital LCD display with Backlight (New)					
<b>Power:</b>	CR2032 coin batteries (x2)					
<b>Battery Life:</b>	400 hours continuous operation with Backlight Off (New)					
<b>Operating Range:</b>	40°F (5°C) to 105°F (40°C), 85% relative humidity					
<b>Dimensions:</b>	164mm x 29mm x 20mm					

\* High and low calibration points can be changed (customer must provide custom solutions)

#### LAQUA Twin Sodium Na<sup>+</sup>

- 2500GL** LAQUA Twin Sodium (Na<sup>+</sup>) Meter  
Includes case, batteries, and calibration standards
- 2540L** Replacement Sodium Sensor
- 2514L** 150 ppm Na<sup>+</sup> Standard, 6 - 14 mL bottles
- 2518L** 2000 ppm Na<sup>+</sup> Standard, 6 - 14 mL bottles
- 2535** Na<sup>+</sup> Soil Test Kit w/30 Samples  
Includes filter paper, cups, and soil scoop
- 2135L** Sampling Sheets - 100 pieces

#### LAQUA Twin Potassium K<sup>+</sup>

- 2400GL** LAQUA Twin Potassium (K<sup>+</sup>) Meter  
Includes case, batteries, and calibration standards
- 2440L** Replacement Potassium Sensor
- 2414L** 150 ppm K<sup>+</sup> DI Standard, 6 - 14 mL bottles
- 2418L** 2,000 ppm K<sup>+</sup> DI Standard, 6 - 14 mL bottles
- 2434** K<sup>+</sup> Soil Test Kit w/30 Samples  
Includes solutions, filter paper, cups, and soil scoop
- 2135L** Sampling Sheets - 100 pieces

#### LAQUA Twin Nitrate NO<sub>3</sub><sup>-</sup>

- 2305GL** LAQUA Twin Nitrate (NO<sub>3</sub><sup>-</sup>) Meter  
Includes case, batteries, and calibration standards
- 2345L** Replacement Nitrate Sensor
- 2311** 450 ppm NO<sub>3</sub><sup>-</sup>-N Standard, 6 - 14 mL bottles
- 2312** 34 ppm NO<sub>3</sub><sup>-</sup>-N Standard, 6 - 14 mL bottles
- 2330** NO<sub>3</sub><sup>-</sup> Soil Test Kit w/30 Samples  
Includes solutions, filter paper, cups, and soil scoop
- 2135L** Sampling Sheets - 100 pieces

#### LAQUA Twin Calcium Ca<sup>2+</sup>

- 2450L** LAQUA Twin Calcium (Ca<sup>2+</sup>) Meter  
Includes case, batteries, and calibration standards
- 2455L** Replacement Calcium Sensor
- 2460L** 150 ppm Ca<sup>2+</sup> Standard, 6 - 14 mL bottles
- 2461L** 2000 ppm Ca<sup>2+</sup> Standard, 6 - 14 mL bottles
- 2135L** Sampling Sheets - 100 pieces







2726

## Handheld Plant Sap Press

- Use with LAQUA Twin meters or Brix meters (see below) for on-site testing
- Made of high quality, non-corrosive metal
- Includes cleaning device

**2726 Hand Held Plant Sap Press**



2720

## Hydraulic Plant Sap Press

- Speed up collection of large or less succulent samples
- Hydraulic press extracts sap into a collection vial
- Includes plunger, grate, cylinder, expeller rod and six collection vials

**2720 Hydraulic Plant Sap Press**



2812

## Digital Refractometer

Easy and convenient way to measure Brix.

- Small sensor area allows measurement of minute samples
- Measures Brix from 0 to 53.0% (Accuracy  $\pm 0.2\%$ )
- Automatic temperature compensation
- Large digital display of Brix and temperature
- Operates on two AAA batteries (included)

**2812 Digital Refractometer**



## Handheld Refractometers

Compact meter ideal for field or lab use.

- Measures Brix from 0 to 32.0% (Accuracy  $\pm 0.2\%$ )
- Place a couple drops of sample on the scale and read the results in Brix through the shaded area on the eyepiece
- Available with or without automatic temperature compensation
- Includes case and instructions

**2801 Refractometer 0–32% Brix**

**2806 Refractometer 0–32% with Automatic Temperature Compensation**



## SoilStik pH Meter

Easy to use and cost-efficient meter.

- Flat surface electrode measures pH in soils, semi-solids, solids, and liquids
- RENEW indicator tells you when it's time to replace your electrode - eliminates guesswork
- CAL alert tells you it's time to recalibrate to ensure accuracy
- Memory records and recalls 15 sequentially tagged readings, allowing detection of changes over time
- 1- or 2-point calibration: automatically recognizes buffer solutions
- Automatic temperature compensation
- Simultaneous display of pH and temperature
- Display indicates when the reading has stabilized
- Data Hold, auto power off, and low battery indication
- Water resistant design (IP57) floats in water and protects the meter in wet environments
- Includes protective sensor cap, rinse bottle, two CR2032 batteries, pH 4 & 7 standard solutions, and soft case

2105 FieldScout® SoilStik pH Meter

2106 Flat Sensor, Replacement

2110 Refill Solutions - pH 4 and 7, 60 mL ea.



SoilStik shown in use with Item 6510  
Model HC Soil Sampler (available online)

### SPECIFICATIONS FOR SOILSTIK pH METER

pH: 0.00 to 14.00 pH

Temperature: 23°F to 194°F (-5°C to 90°C)

Resolution: 0.01 pH, 0.1°

Accuracy: ±0.01 pH, ±1.8°F/±1°C

Dimensions: 1.4 x 6.8 x 1.6 in (35.6 x 172.7 x 40.6mm)

Weight: 3.8 oz (110 g)



Measuring the pH of the pesticide spray solution or fertilizers is important to ensure performance.



Flat end electrode works in liquids, semi-solids, and soils



## pH 400 and 600 Meters

Fast, easy and accurate “direct” soil pH measurement.

### Modern User Interface

- The FieldScout pH 400 & 600 Meters have a modern, intuitive, and user friendly interface that allows users to quickly access the meter's advanced features and settings
- Temperature and pH data remain visible, so monitoring does not stop when settings are changed or options are selected
- Large backlit 3.2” LCD color display ensures measurement values and menu options are easy to read

### Rugged and Ergonomic Design

- Both the FieldScout pH 400 & 600 Meters are lightweight, and their compact design makes them highly suitable for field use and handheld applications.
- Dust and splash resistant – IP65 rating
- Meters are fitted with a rubber boot to help absorb shock
- The USB port is protected by a tightly sealed cover and the casing and battery door are fitted with rubber seals
- 1 year warranty on meter

### ISFET (Ion Sensitive Field Effect Transistor) Probes

Glass Free and Durable Probe - 2 Options to Fit Your Needs

- Unlike glass electrodes, the FieldScout 400 and 600 pH Meters feature ISFET pH electrodes that will not shatter. Neither model requires wet storage
- Both come with a 6-month warranty
- Spectrum ISFET probes are made of high quality materials such as PEEK, ABS, and PVC
- Sample directly in plug trays, pots, containers, solutions, and soilless media

2107	FieldScout pH 400 Meter Meter includes case, batteries, AC adapter, brush, and pH 4 & 7 standards *Does not include pH Probe - order separately below
2108	FieldScout pH 600 Meter Meter includes case, batteries, AC adapter, brush, and pH 4 & 7 standards *Does not include pH Probe - order separately below
2127	FieldScout pH Meter Blunt Tip ISFET Probe
2128	FieldScout pH Meter Pin Point Tip ISFET Probe
2110	Refill Solutions - pH 4 and 7, 60 mL each



Robust probe design makes it easy to go from sample to sample



## pH 400

- Professional grade quality
- Intelligent calibration wizard simplifies the calibration process
- Supports 1-and 2-point calibration
- Powered by 3 rechargeable AA-batteries (AC adapter included)



## pH 600

Includes all features of the FieldScout pH 400 Meter, plus...

- Internal storage of measured data points, up to 65,000 measurements
- Ability to query both momentary pH value and temperature
- Supports up to 5-point calibration



### Pin Point Tip ISFET Probe

- Uses patented non-glass ISFET technology for the smallest pH measurement
- Sharp and to the point for pH measurement of materials that need to be penetrated
- Eliminates clogging from dirty samples or semi-solids



### Blunt Tip ISFET Probe

- Uses patented non-glass ISFET technology for general purpose pH measurement
- Ideal for liquids, hydroponics, and soilless media



## Direct Soil EC Meter

Instant and accurate direct EC and temperature measurements.

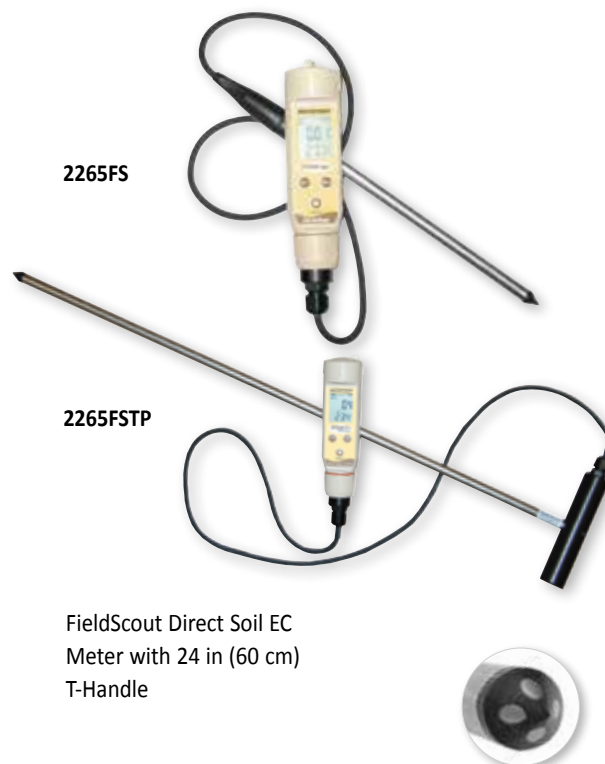
- Professional-grade meter - Patented
- No need to prepare samples - simply sample through the profile
- Patented paired sensor tip provides maximum soil-sensor contact and higher accuracy
- Sample directly in plug trays, pots, containers, solutions, or ground soils
- 0 to 19.9 mS/cm (Accuracy  $\pm 1\%$ , resolution 0.01 mS/cm)
- Automatic temperature compensation, long lasting, and waterproof
- Includes battery and EC calibration standard

### 8 in (20 cm) Probe Option

<b>2265FS</b>	FieldScout® Direct Soil EC Meter w/ 8 in Probe Includes Carrying Case and 2.76 Standard
<b>2265PROBE</b>	FieldScout EC 8 in Probe (Replacement)
<b>2254</b>	Conductivity Standard, 2.76 mS/cm, 250 mL
<b>2251</b>	Conductivity Standard, 1.41 mS/cm, 250 mL

### 24 in (60 cm) Probe Option

<b>2265FSTP</b>	FieldScout Direct Soil EC Meter w/ 24 in T-Handle Probe and Replaceable Tip
<b>2265FST24P</b>	FieldScout T-Handle EC 24 in Probe w/ Replaceable Tip
<b>2266</b>	Replaceable Tip For T-Handle EC Probe
<b>2254</b>	Conductivity Standard, 2.76 mS/cm, 250 mL
<b>2251</b>	Conductivity Standard, 1.41 mS/cm, 250 mL



FieldScout Direct Soil EC  
Meter with 24 in (60 cm)  
T-Handle



Exclusive Paired Sensor



## Waterproof



## Waterproof EC Meter

Economic meter for measuring salinity.

- Measures four parameters; conductivity, TDS, salinity, and temperature
- 6 units of measurement:  $\mu\text{S}/\text{cm}$ ,  $\text{mS}/\text{cm}$ , ppm, ppt,  $\text{mg}/\text{L}$ , and  $\text{g}/\text{L}$
- Internal memory stores up to 15 labeled readings for easy recall
- Adjustable conductivity-to-TDS ratio factor (0.4 to 1.0)
- Accuracy:  $\pm 2\%$
- Automatic temperature compensation
- Measurement ranges:
  - Conductivity: 0.00 to 199  $\mu\text{S}/\text{cm}$ , 200 to 1,999  $\mu\text{S}/\text{cm}$ , or 2.00 to 19.99  $\text{mS}/\text{cm}$
  - TDS: 0 to 99.9  $\text{mg}/\text{L}$ , 100 to 999  $\text{mg}/\text{L}$ , or 1.00 to 9.99  $\text{g}/\text{L}$
  - Salinity (fixed ratio of 0.5): 0 to 99.9 ppm, 100 to 999 ppm, or 1.00 to 9.99 ppt
  - Temperature: 32 to 194°F (0.0 to 90.0°C)
- Includes conductivity cell, protective sensor cap, sample cup with cap, four SR44W button batteries, and 48 in (1.2 m) neckstrap
- Calibration standard sold separately

**2246**

**Waterproof EC Meter**

**2246SENSOR**

**Replacement Sensor**

**2251**

**Conductivity Standard, 1.41  $\text{mS}/\text{cm}$ , 250 mL**

## Economical



## Economy pH/EC Meter

Affordable way to monitor pH and EC levels in any liquid.

- Combination pH and electrical conductivity (EC) probe
- 150-hour battery life
- Automatic temperature compensation
- 0.68 TDS ratio calculation
- Accuracy:  $\pm 0.2$  pH and 2% EC scale
- Range: 0 - 6  $\text{mS}/\text{cm}$
- Includes handheld meter, probe, calibration solutions, and carrying case

**2182A**

**Economy pH/EC Meter**

**2183A**

**Replacement pH/EC Probe**

**2110**

**Refill Solutions - pH 4 and 7, 60 mL ea.**

**2251**

**Conductivity Standard, 1.41  $\text{mS}/\text{cm}$ , 250 mL**



## Green = Nitrogen >

### Chlorophyll Meters

Research supports the correlation between SPAD measurements and the nitrogen in your leaf. Support and defend the health of your plants.

### SPAD 502 Plus Chlorophyll Meter

Quantifies the health of your crops.

- Instantly measures chlorophyll content or “greenness” of your plants on a scale of -9.9 to 199
- Non-invasive, non-destructive measurement
- Trend graph stores and displays up to 30 measurements
- Water resistant design (IPX4)
- Compare in-field SPAD readings to university guidelines
- Research shows a strong correlation between SPAD measurements and leaf N content
- Available with or without a built-in data logger
- Includes hard carrying case and batteries

### Data-Logging Model (2900PDL)

- Connects to any GPS receiver that has a serial output option\*
- Equipped with internal data logger and RS-232 port
- Records 4,096 measurements (1,488 with added GPS/DGPS option)
- Configure and download meter with FieldScout® software (included)\*\*

\* GPS interface requires two cables. The GPS/DGPS cable (item 2950CV5) is available from Spectrum. A PC serial interface cable supplied by the manufacturer of the GPS receiver is also required.

\*\* PC cable connects to a computer USB port. See our website for other cable connection options.

**2900PDL**      **Minolta SPAD 502DL Plus Chlorophyll Meter with RS-232 Data Port and Built-In Data Logger (includes software and USB PC cable)**

**2900P**      **Minolta SPAD 502 Plus Chlorophyll Meter Basic version, no Data Logger**

**2950CV5**      **GPS/DGPS Cable**  
**2900CASE**      **Hard Carrying Case**



Non-invasive measurement with readings in less than 2 seconds

#### SPECIFICATIONS FOR SPAD 502 PLUS

Optical Density Difference at two wavelengths: 650 nm and 940 nm

Measurement Area: 2 mm x 3 mm (Approximately 3/32 in x 1/8 in)

Light Source: 2 LEDs

Receptor: Silicon Photodiode

Power Source: 2 AA alkaline batteries (1.5V)

Repeatability: Within  $\pm 0.3$  SPAD unit

SPAD Value: Index of relative chlorophyll content; -9.9 to 199

## **CM 1000 Chlorophyll Meter**

“Point-and-shoot” technology to instantly measure relative chlorophyll content.

- Detects stress earlier than visual monitoring
- Technology based on an exclusive patent license from NASA
- Laser guides outline the edges of the measured sample area
- Calculates and displays a running average for multiple readings
- Connects to any GPS receiver that has a serial output option\*
- Equipped with internal data logger and RS-232 port
- Records 3,250 measurements (1,350 with added GPS/DGPS option)
- Configure and download meter with FieldScout® software (not included)\*\*
- Includes hard carrying case and batteries

\* GPS interface requires two cables. The GPS/DGPS cable (item 2950CV5) is available from Spectrum. A PC serial interface cable supplied by the manufacturer of the GPS receiver is also required.

\*\* PC cable connects to a computer USB port. See our website for other cable connection options.

**2950**                      **FieldScout CM 1000 Chlorophyll Meter**  
**2950S**                   **Software To Activate Data Logger**  
                               (includes PC cable)  
**2950CV5**              **GPS/DGPS Cable**



2950



## **CM 1000 NDVI Meter**

“Point-and-shoot” technology to instantly measure red (660 nm) and near infrared (840 nm) spectral bands.

- Detects stress earlier than visual monitoring
- Computes Normalized Difference Vegetative Index (NDVI)
- Laser guides outline the edges of the measured sample area
- Calculates and displays a running average for multiple readings
- Connects to any GPS receiver that has a serial output option\*
- Equipped with internal data logger and RS-232 port
- Records 3,250 measurements (1,350 with added GPS/DGPS option)
- Configure and download meter with FieldScout® software (included)\*\*
- Includes hard carrying case and batteries

\* GPS interface requires two cables. The GPS/DGPS cable (item 2950CV5) is available from Spectrum. A PC serial interface cable supplied by the manufacturer of the GPS receiver is also required.

\*\* PC cable connects to a computer USB port. See our website for other cable connection options.

**2953**                      **FieldScout CM 1000 NDVI Meter**  
**2950CV5**              **GPS/DGPS Cable**



2953



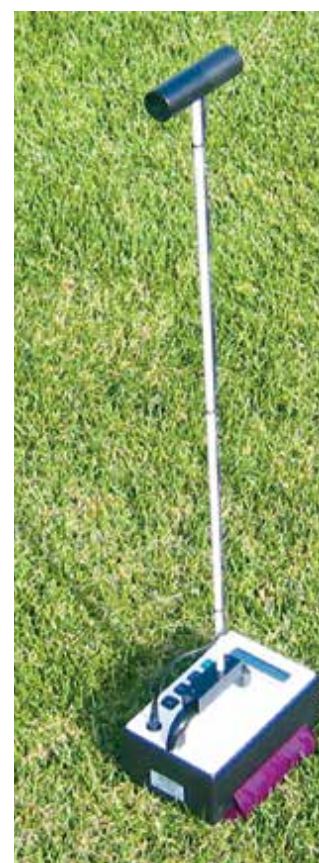
# FIELDSCOUT<sup>®</sup> TCM 500 NDVI Turf Color Meter

Helps diagnose plant health based on color.

- Measures reflected light from approximately a 3 inch (7.6 cm) diameter section of turfgrass
- Uses an internal light source to negate the effect of sunny versus cloudy conditions
- Measures reflectance in the red (660 nm) and near infrared (850 nm) spectral bands
- Displays result as NDVI, percent reflectance, or as a user-adjustable grass index from 1 to 9
- Connects to any GPS receiver that has a serial output option\*
- Equipped with internal data logger and RS-232 port
- Records 3,250 measurements (1,350 with added GPS/DGPS option)
- Configure and download meter with FieldScout<sup>®</sup> software (included)\*\*
- Includes hard carrying case, batteries, and TCM 500 T-Handle (item 2975H)

\* GPS interface requires two cables. The GPS/DGPS cable (item 2950CV5) is available from Spectrum. A PC serial interface cable supplied by the manufacturer of the GPS receiver is also required.  
 \*\* PC cable connects to a computer USB port. See our website for other cable connection options.

2975NDVI      FieldScout TCM 500 NDVI Turf Color Meter  
 Includes TCM 500 T-Handle  
 2975H      FieldScout TCM 500 Replacement T-Handle  
 2950CV5      GPS/DGPS Cable



## SPECIFICATIONS FOR TCM 500

Measurement Sample: Turf grass canopy

Measurement System: Reflectance of red (660 nm) and NIR (850 nm) light

Measurement Area: Approx. 3.0 in (7.6 cm)

Measurement Units: Percent reflectance (0.0 to 99.9) of Red and NIR

NDVI (0.000 to 1.000)

Grass Index (1.00 to 9.00)

Power Source: 1 9 V alkaline battery (included); approx. 3,000 measurements

Repeatability:  $\pm$  5% of measurement



Displays Turf Color Index and NDVI on the LCD

# **Spectrum<sup>®</sup>** **Technologies, Inc.**

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