

# TORO Weather Station

## T.Weather T107

For turf grass water management applications, Campbell Scientific's T.Weather T107 station and Toro's Central Irrigation and Control System<sup>1</sup> automatically monitors meteorological conditions that affect turf grass water consumption. This information is used by the Central Irrigation System to analyze current irrigation requirements.

The T.Weather T107 station consists of meteorological sensors, an aluminum mounting pole, and an environmental enclosure that houses a Campbell Scientific CR1000M Measurement and Control Module and a 7 Ahr sealed rechargeable battery. The battery is recharged via an ac transformer or a 10 W solar panel. Sealed circular connectors are provided on the outside of the enclosure to simplify sensor hookup.

Meteorological sensors included with the T.Weather T107 are the CS305-ET Solar Radiation Sensor, HMP50-ET Air Temperature and Relative Humidity Probe, TE525-ET Tipping Bucket Rain Gage, and 034B-ETM Wind Set. The sensor measurements (excluding wind direction) are inputs for a modified Penman equation that calculates evapotranspiration ( $ET_0$ ).

Phone or "short haul" modems are used to transfer hourly weather data between the weather station and a central computer. The central computer calculates  $ET_0$  and programs each controlling "satellite" with the appropriate irrigation cycles.

### CR1000M Specifications<sup>2</sup>

Temperature Range:  $-25^{\circ}$  to  $+50^{\circ}\text{C}$

Accuracy of Voltage Measurement:  $\pm(0.06\%$  of reading + offset),  $0^{\circ}$  to  $+40^{\circ}\text{C}$ ;  $\pm(0.12\%$  of reading + offset),  $-25^{\circ}$  to  $50^{\circ}\text{C}$

Memory: 2 Mbytes Flash for operating system; 2 Mbytes for CPU usage, program storage, and data storage

Power Supply Requirements: 9.6 to 16 Vdc

Typical Current Drain:  $\sim 0.6$  mA (sleep mode);  
1 to 16 mA (w/o RS-232 communication);  
17 to 28 mA (w/RS-232 communication)



#### NOTES:

1. Information on TORO Irrigation Systems is available from your local TORO distributor.
2. Additional specifications are provided on our CR1000 product literature.
3. A summary of the sensor specifications are provided on the back page.

## Sensor Specifications

### CS305-ETM Pyranometer with Mount

Sensor: Silicon photocell

Accuracy:  $\pm 5\%$  for daily total radiation

Output: 0.2 mV per  $W m^{-2}$

### HMP50-ET Air Temperature and Relative Humidity Probe

Measurement Range:  $-25^{\circ}$  to  $+60^{\circ}C$ ;  
0 to 98% RH

Temperature Sensor: 1000 ohm  
Platinum Resistance Thermometer

Temperature Accuracy:  $\pm 0.8^{\circ}C$

Relative Humidity Sensor:  
Vaisala's INTERCAP capacitive chip

RH Accuracy:  $\pm 3\%$ , 0 to 90% range;  
 $\pm 5\%$ , 90 to 98% range

### TE525-ET Tipping Bucket Rain Gage

Sensor: Magnetic reed switch

Orifice: 6.0" diameter

Sensitivity: 1 tip per 0.01" (0.25 mm)

Accuracy:  $\pm 1\%$  accuracy @ 2" per hr  
(50.8 mm per hr) or less

### 034B-ETM Wind Set with Mount

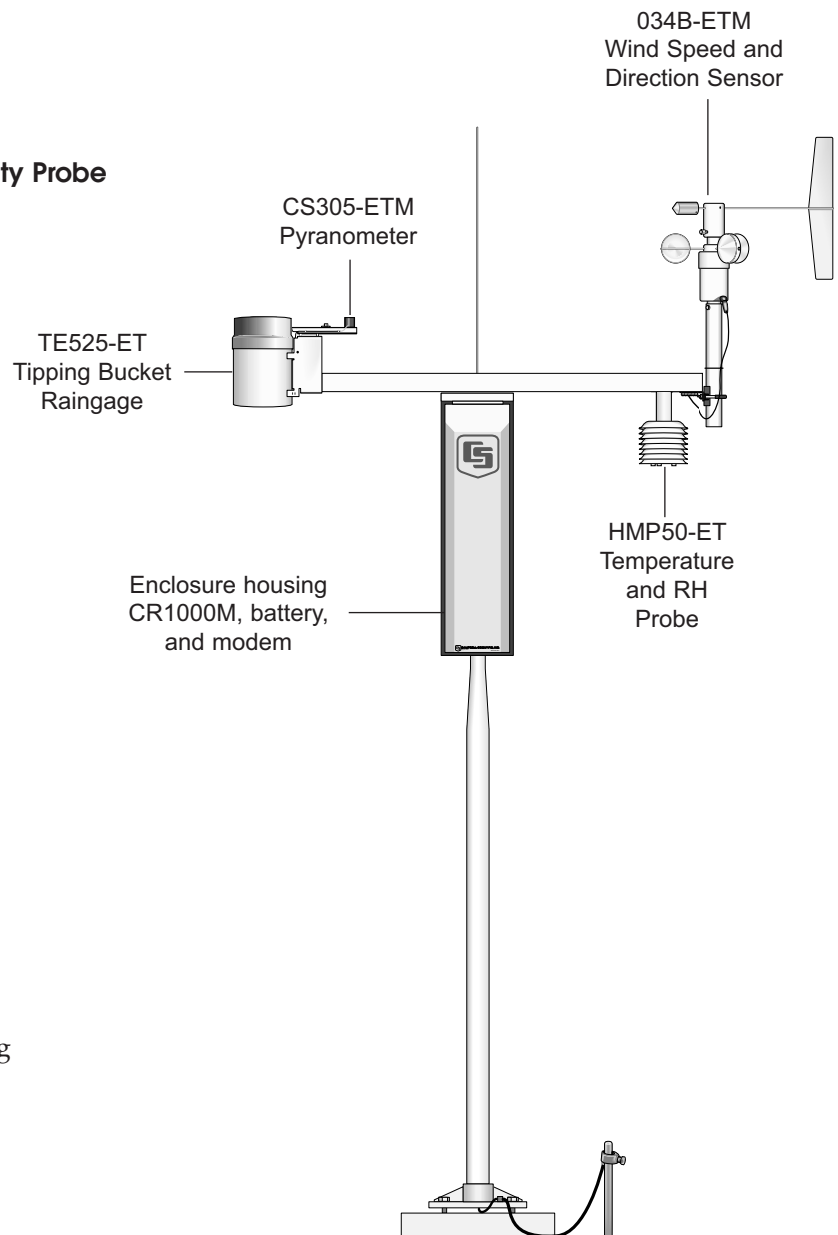
Sensor: cup anemometer (wind speed),  
vane (wind direction)

Wind Speed Range: 0 to  $49.5 m s^{-1}$  with a starting  
threshold of  $0.4 m s^{-1}$

Wind Direction Range:  
 $0^{\circ}$  to  $360^{\circ}$  mechanical;  
 $0^{\circ}$  to  $356^{\circ}$  electrical

Wind Speed Accuracy:  
 $\pm 0.11 m s^{-1}$  when less than  $10.1 m s^{-1}$ ;  
 $\pm 1.1\%$  of true when greater than  $10.1 m s^{-1}$

Wind Direction Accuracy:  $\pm 4^{\circ}$



## NOTES:

1. Additional specifications are provided on our CS300, HMP50, TE525, and 034B product literature. The CS300 and CS305 are essentially the same sensor except the CS305 has a different fixed multiplier.
2. Sensor manufactures are Apogee, Inc., (CS305), Vaisala, Inc., (HMP50), Texas Electronics, Inc., (TE525), and Met One (034B).

