Turf grass water management can be handled automatically with Campbell Scientific’s T. Weather Stations and Toro’s Central Irrigation and Control System. *

The weather station 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 weather station continuously monitors the following meteorological parameters:

- Solar radiation
- Air Temperature
- Relative humidity
- Wind speed
- Wind direction
- Rainfall

These parameters (excluding wind direction) are inputs for a modified Penman equation that calculates evapotranspiration ($\text{ET}_o$).

Phone or “short haul” modems are used to transfer hourly weather data between the weather station and a central computer. The central computer calculates $\text{ET}_o$ and programs each controlling “satellite” with the appropriate irrigation cycles.

The T. Weather Station incorporates the Campbell Scientific CR10X Measurement and Control Module to measure sensors, process and store data, and communicate with the central computer. Simple specifications for the CR10X and sensors are listed on the back of this page.

*Information on TORO Irrigation Systems is available from your local TORO distributor.
Sensor Specifications

**034B-ET Wind Speed and Direction**
- **Wind Speed Sensor**: 3-cup anemometer
- Operating temperature range: -30° to +70°C
- Operating range: 0-110 mph
- Starting Threshold: 0.9 mph
- Accuracy: ± 0.25 when less than 22.7 mph
  ± 1.1% of true when more than 22.7 mph

**Wind Direction Sensor**
- Range: 360° mechanical, 356° electrical
- Starting Threshold: 0.9 mph
- Accuracy: ±4°

**LI200X-ETM Solar Radiation**
- Sensor: Silicon photocell
- Accuracy: Absolute error in natural daylight is ±5%
  maximum, ±3% typical
- Sensitivity: 0.2 kW m⁻² mV⁻¹

**HMP45C-ET Temperature and Relative Humidity**
- Temperature sensor: 1000 Ω PRT
- Range: -40° to +60°C
- Accuracy: Typically ±0.2°C
  
  RH Sensor: HUMICAP H-sensor
  RH range: 0-100% non-condensing
  RH accuracy (at 20°C):
  
  - against factory reference: ±1% RH
  - field calibration against references: ±2% RH
    (0-90% RH)
  - field calibration against references: ±3% RH
    (90-100% RH)

**TE525-ET Rain Gage**
- Sensor: Magnetic switch
- Orifice: 6.04 inch diameter
- Sensitivity: 1 tip per 0.01 inch
- Accuracy: ±1.0% up to 1 inch/hour

**CR10X Specifications**
- Temperature range: -25° to 50°C
- Accuracy of voltage measurement:
  ±0.1% of FSR, ±0.05% FSR (0° to 40°C)
- Data storage: At least 2 months
- System power requirements:
  - Voltage: 9.6 to 16 volts
  - Average system current drain: 1.5 mA