Vantage Pro2™ cabled weather stations include two components: the sensor suite and the console. The sensor suite contains the sensor interface, rain collector, anemometer, temperature and humidity sensors in a passive or aspirated radiation shield. The Vantage Pro2 Plus (6162C) includes two additional sensors that are optional on the Vantage Pro2 and purchased separately: the UV Sensor and the Solar Radiation Sensor. The 6152C and 6162C models rely on passive shielding to reduce solar-radiation induced temperature errors in the outside temperature sensor readings. Cabled GroWeather stations include a solar radiation sensor and either a passive radiation shield (6820C), a Daytime Fan Aspirated Radiation Shield (6334C) or a 24-Hour Fan-Aspirated Radiation Shield (6825C).

The Vantage Pro2 console contains the barometer, inside temperature and humidity sensors and provides the user interface, data display, and calculations. The console and sensor suite are powered by an AC-power adapter connected to the console. Batteries can be installed in the console to provide a backup power supply.

Use with an EnviroMonitor Gateway or WeatherLink® data loggers to let your weather station interface with a computer, log data, and upload weather information to the Internet.

**Sensor Suite**

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Operating Temperature</td>
<td>-40° to +150°F (-40° to +65°C)</td>
</tr>
<tr>
<td>Non-operating Temperature</td>
<td>-40° to +158°F (-40° to +70°C)</td>
</tr>
<tr>
<td>Current Draw</td>
<td>5 mA (average) at 4 to 6 VDC for ISS only. 10 mA average for both console and ISS</td>
</tr>
<tr>
<td>Connectors, Sensor</td>
<td>Modular RJ-11</td>
</tr>
<tr>
<td>Cable Type</td>
<td>4-conductor, 26 AWG</td>
</tr>
<tr>
<td>Cable Length, Anemometer</td>
<td>40' (12 m) (included); 240' (73 m) (maximum recommended)</td>
</tr>
</tbody>
</table>

Note: Maximum displayable wind decreases as the length of cable increases. at 140' (42 m) of cable, the maximum wind speed displayed is 135 mph (60 m/s); at 240' (73 m), the maximum wind speed displayed is 100 mph (34 m/s).

<table>
<thead>
<tr>
<th>Specification</th>
<th>Details</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind Speed Sensor</td>
<td>Solid state magnetic sensor</td>
</tr>
<tr>
<td>Wind Direction Sensor</td>
<td>Wind vane with potentiometer</td>
</tr>
<tr>
<td>Rain Collector Type</td>
<td>Tipping spoon, 0.01&quot; or 0.2 mm per tip, 33.2 in³ (214 cm³) collection area</td>
</tr>
<tr>
<td>Temperature Sensor Type</td>
<td>PN Junction Silicon Diode</td>
</tr>
<tr>
<td>Relative Humidity Sensor Type</td>
<td>Film capacitor element</td>
</tr>
<tr>
<td>Housing Material</td>
<td>UV-resistant ABS, polypropylene</td>
</tr>
<tr>
<td>Sensor Inputs</td>
<td>RC low-pass filter on each signal line</td>
</tr>
</tbody>
</table>

Sensor suite dimensions(not including anemometer or bird spikes):

- Vantage Pro2 with Standard Rad Shield: 14.0" x 9.4" x 14.5" (356 mm x 239 mm x 368 mm)
- Vantage Pro2 with Fan-Aspirated Rad Shield: 20.8" x 9.4" x 16.0" (528 mm x 239 mm x 406 mm)
- Vantage Pro2 Plus with Standard Rad Shield: 14.3" x 9.7" x 14.5" (363 mm x 246 mm x 368 mm)
- Vantage Pro2 Plus with Fan-Aspirated Rad Shield: 21.1" x 9.7" x 16.0" (536 mm x 246 mm x 406 mm)
**Console**

- **Console Operating Temperature**: +32° to +140°F (0° to +60°C)
- **Non-Operating (Storage) Temperature**: +14° to +158°F (-10° to +70°C)
- **Current Draw**: 5 mA average for console only, 10 mA average for both console and ISS
- **AC Power Adapter**: 5 VDC, 300 mA, regulated
- **Battery Backup**: 3 C-cells
- **Battery Life (no AC power)**: 1 month (approximately)
- **Connectors**: Modular RJ-11
- **Cable Type**: 4-conductor, 26 AWG
- **Cable Length, Console**: 100' (30 m) (included); 1000' (300 m) (maximum recommended)
- **Housing Material**: UV-resistant ABS plastic
- **Console Display Type**: LCD Transflective
- **Display Backlight**: LEDs
- **Dimensions (console: length x width x height, display length x height)**:
  - Console: 9.63" x 6.125" x 1.625" (245 mm x 156 mm x 41 mm)
  - Display: 5.94" x 3.375" (151 mm x 86 mm)
- **Weight (with batteries)**: 1.88 lbs. (.85 kg)

**Data Displayed on Console**

Data display categories are listed with General first, then in alphabetical order.

**General**
- **Historical Graph Data**: Includes the past 24 values listed unless otherwise noted; all can be cleared and all totals reset
- **Daily Data**: Includes the earliest time of occurrence of highs and lows; period begins/ends at 12:00 am
- **Monthly Data**: Period begins/ends at 12:00 am on the first of the month
- **Yearly Data**: Period begins/ends at 12:00 am on the first of January unless otherwise noted
- **Current Display Data**: Current display data describes the current reading for each weather variable. In most cases, the variable lists the most recently updated reading or calculation. Some current variable displays can be adjusted so there is an offset for the reading.
- **Current Graph Data**: Current data appears in the right most column in the console graph and represents the latest value within the last period on the graph; totals can be set or reset. Display intervals vary. Examples include: Instant, 15-min., and Hourly Reading; Daily, Monthly, High and Low
- **Graph Time Interval**: 1 min., 10 min., 15 min., 1 hour, 1 day, 1 month, 1 year (user-selectable, availability depends upon variable selected)
- **Graph Time Span**: 24 Intervals + Current Interval (see Graph Intervals to determine time span)
- **Graph Variable Span (Vertical Scale)**: Automatic (varies depending upon data range); Maximum and Minimum value in range appear in ticker
- **Alarm Indication**: Alarms sound for only 2 minutes (time alarm is always 1 minute) if operating on battery power. Alarm message is displayed in ticker as long as threshold is met or exceeded. Alarms can be silenced (but not cleared) by pressing the DONE key.
- **Update Interval**: Varies with sensor - see individual sensor specifications
**Barometric Pressure**

- **Resolution and Units**: 0.01" Hg, 0.1 mm Hg, 0.1 hPa/mb (user-selectable)
- **Range**: 16.00" to 32.50" Hg, 410 to 820 mm Hg, 540 to 1100 hPa/mb
- **Elevation Range**: -999' to +15,000' (-600 m to 4570 m)
- **Uncorrected Reading Accuracy**: ±0.03" Hg (±0.8 mm Hg, ±1.0 hPa/mb) (at room temperature)
- **Equation Source**: Smithsonian Meteorological Tables
- **Equation Accuracy**: ±0.01" Hg (±0.3 mm Hg, ±0.3 hPa/mb)
- **Elevation Accuracy Required**: ±10' (3m) to meet equation accuracy specification
- **Trend (change in 3 hours)**: Change 0.06" (2 hPa/mb, 1.5 mm Hg) = Rapidly
  Change 0.02" (.7hPa/mb,.5 mm Hg)= Slowly
- **Trend Indication**: 5 position arrow: Rising (rapidly or slowly), Steady, or Falling (rapidly or slowly)
- **Update Interval**: 1 minute or when console BAR key is pressed twice
- **Current Display Data**: Instant
- **Current Graph Data**: Instant, 15-min., and Hourly Reading; Daily, Monthly, High and Low
- **Historical Graph Data**: 15-min. and Hourly Reading; Daily, Monthly Highs and Lows
- **Alarms**: High Threshold from Current Trend for Storm Clearing (Rising Trend)
  Low Threshold from Current Trend for Storm Warning (Falling Trend)
- **Range for Rising and Falling Trend Alarms**: 0.01 to 0.25" Hg (0.1 to 6.4 mm Hg, 0.1 to 8.5 hPa/mb)

**Clock**

- **Resolution**: 1 minute
- **Units**: Time: 12 or 24 hour format (user-selectable)
- **Date**: US or International format (user-selectable)
- **Accuracy**: ±8 seconds/month
- **Adjustments**: Time: Automatic Daylight Savings Time (for users in North America and Europe that observe it in AUTO mode, MANUAL setting available for all other areas)
  Date: Automatic Leap Year
- **Alarms**: Once per day at set time when active

**Dewpoint (calculated)**

- **Resolution and Units**: 1°F or 1°C (user-selectable) °C is converted from °F rounded to nearest 1°C
- **Range**: -105° to +130°F (-76° to +54°C)
- **Accuracy**: ±2°F (±1°C) (typical)
- **Update Interval**: 10 to 12 seconds
- **Source**: World Meteorological Organization (WMO)
- **Equation Used**: WMO Equation with respect to saturation of moist air over water
- **Variables Used**: Instant Outside Temperature and Instant Outside Relative Humidity
- **Current Display Data**: Instant Calculation
- **Current Graph Data**: Instant Calculation; Daily, Monthly High and Low
- **Historical Graph Data**: Hourly Calculations; Daily, Monthly Highs and Lows
- **Alarms**: High and Low Threshold from Instant Calculation
Vantage Pro2™

**Evapotranspiration (calculated, requires solar radiation sensor)**
- **Resolution and Units**: 0.01" or 0.1 mm (user-selectable) °C is converted from °F rounded to nearest 1°C
- **Range**: Daily to 32.67" (832.2 mm); Monthly & Yearly to 199.99" (1999.9 mm)
- **Accuracy**: Greater of 0.01" (0.25 mm) or ±5%, Reference: side-by-side comparison against a CIMIS ET weather station
- **Update Interval**: 1 hour
- **Calculation and Source**: Modified Penman Equation as implemented by CIMIS (California Irrigation Management Information System) including Net Radiation calculation
- **Current Display Data**: Latest Hourly Total Calculation
- **Current Graph Data**: Latest Hourly Total Calculation, Daily, Monthly, Yearly Total
- **Historical Graph Data**: Hourly, Daily, Monthly, Yearly Totals
- **Alarm**: High Threshold from Latest Daily Total Calculation

**Forecast**
- **Variables Used**: Barometric Reading & Trend, Wind Speed & Direction, Rainfall, Temperature, Humidity, Latitude & Longitude, Time of Year
- **Update Interval**: 1 hour
- **Display Format**: Icons on top center of display; detailed message in ticker at bottom
- **Variables Predicted**: Sky Condition, Precipitation, Temperature Changes, Wind Direction and Speed

**Heat Index (calculated)**
- **Resolution and Units**: 1°F or 1°C (user-selectable) °C is converted from °F rounded to nearest 1°C
- **Range**: -40° to +165°F (-40° to +74°C)
- **Accuracy**: ±2°F (±1°C) (typical)
- **Update Interval**: 10 to 12 seconds
- **Source**: United States National Weather Service (NWS)/NOAA
- **Formulation Used**: Steadman (1979) modified by US NWS/NOAA and Davis Instruments to increase range of use
- **Variables Used**: Instant Outside Temperature and Instant Outside Relative Humidity
- **Current Display Data**: Instant Calculation
- **Current Graph Data**: Instant; Hourly Reading; Daily, Monthly High
- **Historical Graph Data**: Hourly Calculations; Daily, Monthly Highs
- **Alarm**: High and Low Threshold from Instant Reading

**Humidity**

*Inside Relative Humidity (sensor located in console)*
- **Resolution and Units**: 1%
- **Range**: 1 to 100% RH
- **Accuracy**: ±2%
- **Update Interval**: 1 minute
- **Current Display Data**: Instant (user-adjustable offset available)
- **Current Graph Data**: Instant; Hourly Reading; Daily, Monthly High and Low
- **Historical Graph Data**: Hourly Readings; Daily, Monthly Highs and Lows
- **Alarms**: High and Low Threshold from Instant Reading

*Outside Relative Humidity (sensor located in ISS)*
- **Resolution and Units**: 1%
- **Range**: 1 to 100% RH
- **Accuracy**: ±2%
- **Drift**: <0.25% per year
- **Update Interval**: 50 seconds to 1 minute
- **Current Display Data**: Instant (user-adjustable offset available)
- **Current Graph Data**: Instant and Hourly Reading; Daily, Monthly High and Low
- **Historical Graph Data**: Hourly Readings; Daily, Monthly Highs and Lows
- **Alarms**: High and Low Threshold from Instant Reading
**Moon Phase**

- **Console Resolution**: 1/8 (12.5%) of a lunar cycle, 1/4 (25%) of lighted face on console
- **WeatherLink Resolution**: 0.09% of a lunar cycle, 0.18% of lighted face maximum (depends on screen resolution)
- **Range**: New Moon, Waxing Crescent, First Quarter, Waxing Gibbous, Full Moon, Waning Gibbous, Last Quarter, Waning Crescent
- **Accuracy**: ±38 minutes

**Rainfall**

- **Resolution and Units**: 0.01" or 0.2 mm (user-selectable) (1 mm at totals ≥ 2000 mm)
- **Daily/Storm Rainfall Range**: 0 to 99.99" (0 to 999.8 mm)
- **Monthly/Yearly/Total Rainfall Range**: 0 to 199.99" (0 to 6553 mm)
- **Accuracy**: For rain rates up to 10"/hr (250 mm/hr): ±3% of total or ± one tip of the spoon (0.01"/0.2mm), whichever is greater.
- **Update Interval**: 20 to 24 seconds
- **Storm Determination Method**: 0.02" (0.5 mm) begins a storm event, 24 hours without further accumulation ends a storm event

**Current Display Data**
- Totals for Past 15-min

**Current Graph Data**
- Totals for Past 15-min, Past 24-hour, Daily, Monthly, Yearly (start date user-selectable) and Storm (with begin date); Umbrella is displayed when 15-minute total exceeds zero

**Historical Graph Data**
- Totals for 15-min, Daily, Monthly, Yearly (start date user-selectable) and Storm (with begin and end dates)

**Alarms**
- High Threshold from Latest Flash Flood (15-min. total, default is 0.50", 12.7 mm), 24-Hour Total, Storm Total,

**Range for Rain Alarms**: 0 to 99.99" (0 to 999.7 mm)

**Rain Rate**

- **Resolution and Units**: 0.01" or 0.1 mm (user-selectable) (See Figure 1 on page 8)
- **Range**: 0, 0.4"/hr (1 mm/hr) 0 to 30"/hr (0 to 762 mm/hr)
- **Accuracy**: ±5% for rain rates up to 10"/hr (250 mm/hr)
- **Update Interval**: 20 to 24 seconds

- **Current Graph Data**
  - Instant Reading and Hourly Average; Daily, Monthly and Yearly Highs

**Solar Radiation (requires solar radiation sensor)**

- **Resolution and Units**: 1 W/m²
- **Range**: 0 to 1800 W/m²
- **Accuracy**: ±5% of full scale (Reference: Eppley PSP at 1000 W/m²)
- **Drift**: up to ±2% per year
- **Cosine Response**: ±3% for angle of incidence from 0° to 75°
- **Temperature Coefficient**: -0.067% per °F (-0.12% per °C); reference temperature = 77°F (25 °C)
- **Update Interval**: 50 seconds to 1 minute (5 minutes when dark)

- **Current Graph Data**
  - Instant Reading and Hourly Average; Daily, Monthly Highs

- **Historical Graph Data**
  - Hourly Average, Daily, Monthly Highs

- **Alarm**
  - High Threshold from Instant Reading

**Sunrise and Sunset**

- **Resolution**: 1 minute
- **Accuracy**: ±1 minute
- **Reference**: United States Naval Observatory
Vantage Pro2™

Temperature

Inside Temperature (sensor located in console)

Resolution and Units: Current Data: 0.1°F or 1°F or 0.1°C or 1°C (user-selectable) °C is converted from °F rounded to nearest 1°C
Historical Data and Alarms: 1°F or 1°C (user-selectable)

Range: +32° to +140°F (0° to +60°C)

Sensor Accuracy: ±0.5°F (±0.3°C) (typical)

Update Interval: 1 minute

Current Display Data: Instant (user-adjustable offset available)
Current Graph Data: Instant Reading; Daily and Monthly High and Low
Historical Graph Data: Hourly Readings; Daily and Monthly Highs and Lows

Alarms: High and Low Thresholds from Instant Reading

Outside Temperature (sensor located in ISS)

Resolution and Units: Current Data: 0.1°F or 1°F or 0.1°C or 1°C (user-selectable) nominal °C is converted from °F rounded to nearest 1°C
Historical Data and Alarms: 1°F or 1°C (user-selectable)

Range: -40° to +150°F (-40° to +65°C)

Sensor Accuracy: ±0.5°F (±0.3°C) (typical)

Radiation Induced Error (Passive Shield): +4°F (2°C) at solar noon (insolation = 1040 W/m², avg. wind speed ≤ 2 mph (1 m/s)) (reference: RM Young Model 43408 Fan-Aspirated Radiation Shield)

Update Interval: 10 to 12 seconds

Current Display Data: Instant (user-adjustable offset available)
Current Graph Data: Instant; Daily, Monthly, Yearly High and Low
Historical Graph Data: Hourly Readings; Daily, Monthly, Yearly Highs and Lows

Alarms: High and Low Thresholds from Instant Reading

Temperature Humidity Sun Wind Index (requires solar radiation sensor)

Resolution and Units: 1°F or 1°C (user-selectable) °C is converted from °F rounded to nearest 1°C

Range: -90° to +165°F (-68° to +74°C)

Accuracy: ±4°F (±2°C) (typical)

Update Interval: 10 to 12 seconds

Sources and Formulation Used: United States National Weather Service (NWS)/NOAA Steadman (1979) modified by US NWS/NOAA and Davis Instruments to increase range of use and allow for cold weather use

Variables Used: Instant Outside Temperature, Instant Outside Relative Humidity, 10-minute Average Wind Speed, 10-minute Average Solar Radiation

Formulation Description: Uses Heat Index as base temperature, affects of wind and solar radiation are either added or subtracted from this base to give an overall effective temperature

Current Graph Data: Instant and Hourly Calculation; Daily, Monthly High
Historical Graph Data: Hourly Calculation; Daily, Monthly Highs
Alarm: High Threshold from Instant Reading

Ultra Violet (UV) Radiation Dose (requires UV sensor)

Resolution and Units: 0.1 MEDs to 19.9 MEDs; 1 MED above 19.9 MEDS

Range: 0 to 199 MEDS

Accuracy: ±5% of daily total

Drift: ±2% per year

Update Interval: 50 seconds to 1 minute (5 minutes when dark)

Current Graph Data: Latest Daily Total (user resetable at any time from Current Screen)
Historical Graph Data: Hourly, Daily Totals (user reset from Current Screen does not affect these values)

Alarm: High Threshold from Daily Total

Alarm Range: 0 to 19.9 MEDS
Ultra Violet (UV) Radiation Index (requires UV sensor)

Resolution and Units .................................................. 0.1 Index
Range ........................................................................... 0 to 16 Index
Accuracy ...................................................................... ±5% of full scale (Reference: Yankee UVB-1 at UV index 10 (Extremely High))
Cosine Response .......................................................... ±4% FS (0° to 90° zenith angle)
Update Interval ............................................................ 50 seconds to 1 minute (5 minutes when dark)
Current Graph Data ...................................................... Instant Reading and Hourly Average; Daily, Monthly High
Historical Graph Data .................................................. Hourly Average, Daily, Monthly Highs
Alarm ............................................................................ High Threshold from Instant Calculation

Wind

Wind Chill (Calculated)

Resolution and Units .................................................. 1°F or 1°C (user-selectable); °C is converted from °F and rounded to the nearest 1°C
Range ........................................................................... -110° to +135°F (-79° to +57°C)
Accuracy ....................................................................... ±2°F (±1°C) (typical)
Update Interval ............................................................ 10 to 12 seconds
Source .......................................................................... United States National Weather Service (NWS)/NOAA
Variables Used ............................................................. Instant Outside Temperature and 10-min. Avg. Wind Speed
Current Display Data .................................................. Instant Calculation
Current Graph Data ...................................................... Instant Calculation; Hourly, Daily and Monthly Low
Historical Graph Data .................................................. Hourly, Daily and Monthly Lows
Alarm ............................................................................ Low Threshold from Instant Calculation

Wind Direction

Range ........................................................................... 1 - 360°
Display Resolution ...................................................... 16 points (22.5°) on compass rose, 1° in numeric display
Accuracy ....................................................................... ±3°
Update Interval ............................................................ 2.5 to 3 seconds
Current Graph Data ...................................................... Instant Reading (user adjustable); 10-min. Dominant; Hourly, Daily, Monthly Dominant
Historical Graph Data .................................................. Past 6 10-min. Dominants on compass rose only; Hourly, Daily, Monthly Dominants

Wind Speed

Resolution and Units .................................................. 1 mph, 1 km/h, 0.4 m/s, or 1 knot (user-selectable) Measured in mph; other units are converted from mph and rounded to nearest 1 km/hr, 0.1 m/s, or 1 knot.
Range ........................................................................... 0 to 200 mph, 0 to 173 knots, 0 to 89 m/s, 0 to 322 km/h
Update Interval ............................................................ Instant Reading: 2.5 to 3 seconds, 10-minute Average: 1 minute
Accuracy ....................................................................... ±2 mph (2 kts, 3.2 km/h, 0.9 m/s) or ±5%, whichever is greater
Maximum Cable Length ............................................... 540’ (165 m) (Note that maximum wind speed reading decreases as length of cable from anemometer to ISS increases.)
Current Display Data .................................................. Instant
Current Graph Data ...................................................... Instant Reading; 10-minute and Hourly Average; Hourly High; Daily, Monthly and Yearly High with Direction of High
Historical Graph Data .................................................. 10-min. and Hourly Averages; Hourly Highs; Daily, Monthly and Yearly Highs with Direction of Highs
Alarms ......................................................................... High Thresholds from Instant Reading and 10-minute Average
## Sensor Charts

### Package Dimensions

<table>
<thead>
<tr>
<th>Product #</th>
<th>Package Dimensions (Length x Width x Height)</th>
<th>Package Weight</th>
<th>UPC Codes</th>
</tr>
</thead>
<tbody>
<tr>
<td>6152C</td>
<td>17.50” x 10.4” x 16.0” (445 mm x 264 mm x 406 mm)</td>
<td>12 lbs. 15 oz. (5.9 kg)</td>
<td>011698 00755 4 011698 00772 1 011698 00773 8</td>
</tr>
<tr>
<td>6152CEU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6152CUK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6162C</td>
<td></td>
<td>13 lbs. 4 oz. (6.0 kg)</td>
<td>011698 00756 1 011698 00774 5 011698 00775 2</td>
</tr>
<tr>
<td>6162CEU</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6162CUK</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6322C</td>
<td>17.50” x 10.4” x 16.0” (445 mm x 264 mm x 406 mm)</td>
<td>9 lbs.. 1 oz. (4.1 kg)</td>
<td>011698 00777 6 011698 01048 6</td>
</tr>
<tr>
<td>6322CM</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>6327C</td>
<td></td>
<td>11 lbs. 2 oz. (5.0 kg)</td>
<td>011698 00782 0 011698 01049 3</td>
</tr>
<tr>
<td>6327CM</td>
<td></td>
<td></td>
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</tbody>
</table>

Figure 1. Rain Rate Resolution

Figure 2: External Temperature Probe Accuracy