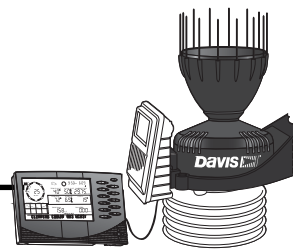# Cabled Vantage Pro2™
& Vantage Pro2 Plus™ Stations

6152C
6162C

Vantage Pro2™

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

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

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).

Wind Speed Sensor	Solid state magnetic sensor
Wind Direction Sensor	Wind vane with potentiometer
Rain Collector Type	Tipping spoon, 0.01" or 0.2 mm per tip, 33.2 in^2 (214 cm^2) collection area
Temperature Sensor Type	PN Junction Silicon Diode
Relative Humidity Sensor Type	Film capacitor element
Housing Material	UV-resistant ABS, polypropylene
Sensor Inputs	
RF Filtering	RC low-pass filter on each signal line

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-Asprated 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)

DAVIS

3465 Diablo Avenue, Hayward, CA 94545-2778 USA • 510-732-9229 • www.davisinstruments.com

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, 1000 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) (Note that console screen limits entry of lower elevation to -999' when using feet as elevation unit.)
Uncorrected Reading Accuracy	±0.03" Hg (±0.8 mm Hg, ±1.0 hPa/mb) (at room temperature)
Sea-Level Reduction Equation Used	United States Method employed prior to use of current "R Factor" method
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
Overall Accuracy.	±0.03" Hg (±0.8 mm Hg, ±1.0 hPa/mb)
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

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 Calculation; Daily, Monthly High
Historical Graph Data	Hourly Calculations; Daily, Monthly Highs
Alarm	High Threshold from Instant Calculation

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 grater.

Update Interval . . . . 20 to 24 seconds

Storm Determination Method . . . . 0.02" (0.4 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

Calculation Method . . . . Measures time between successive tips of spoon. Elapsed time greater than 15 minutes or only one tip of the rain collector constitutes a rain rate of zero.

Current Display Data . . . . Instant

Current Graph Data . . . . Instant and 1-min. Reading; Hourly, Daily, Monthly and Yearly High

Historical Graph Data . . . . 1-min Reading; Hourly, Daily, Monthly and Yearly Highs

Alarm . . . . High Threshold from Instant Reading

Solar Radiation (requires solar radiation sensor)

Resolution and Units . . . . 1 W/m^2

Range . . . . 0 to 1800 W/m^2

Accuracy . . . . ±5% of full scale (Reference: Eppley PSP at 1000 W/m^2)

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 High

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

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.	up to ±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

Equation Used. . . . . Osczevski (1995) (adopted by US NWS in 2001)

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
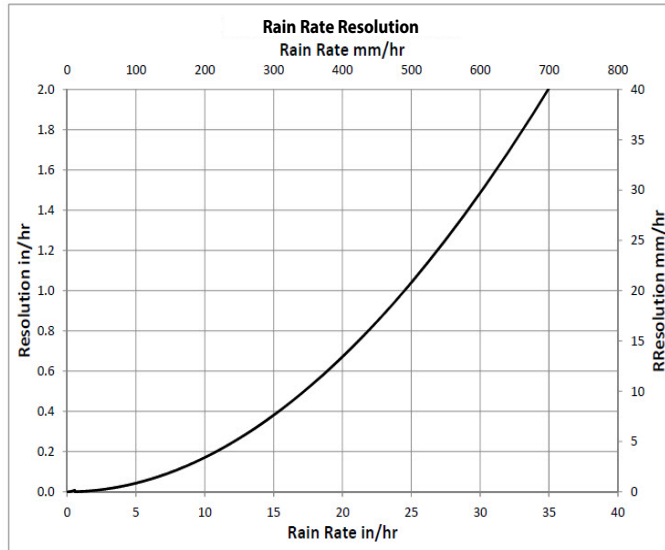
Sensor Charts

Figure 1: Rain Rate Resolution

Package Dimensions

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