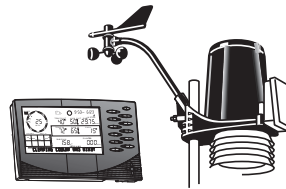# Cabled Vantage Pro2™
& Vantage Pro2 Plus™ Stations

6152C
6162C

Vantage Pro2™

The Vantage Pro2™ (# 6152C) and Vantage Pro2™ Plus (# 6162C) cabled weather stations include two components: the Integrated Sensor Suite (ISS) and the console. The ISS contains the sensor interface module (SIM), rain collector, an anemometer, and a passive radiation shield. The Vantage Pro2 console provides the user interface, data display, and calculations. The Vantage Pro2 Plus weather station includes two additional sensors that are optional on the Vantage Pro2 and purchased separately: the UV Sensor and the Solar Radiation Sensor. The console and ISS 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 WeatherLink® to let your weather station interface with a computer, log data, and upload weather information to the Internet. The 6152C and 6162C models rely on passive shielding to reduce solar-radiation induced temperature errors in the outside temperature sensor readings.

Integrated Sensor Suite (ISS)

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 bucket, 0.01" per tip (0.2 mm with metric rain adapter), 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, ASA plastic

Sensor Inputs

    RF Filtering . . . . RC low-pass filter on each signal line

ISS 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)

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) (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 . . . . ±3°F (±1.5°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 . . . . ±3°F (±1.5°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 . . . . ±3% (0 to 90% RH), ±4% (90 to 100% RH)

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 . . . . ±3% (0 to 90% RH), ±4% (90 to 100% RH)

Temperature Coefficient . . . . 0.03% per °F (0.05% per °C), reference 68°F (20°C)

Drift . . . . ±0.5% 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 4"/hr (100 mm/hr): ±4% of total or ± one tip of the bucket (0.01" /0.2 mm), 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 0.1mm (user-selectable) at typical rates (see Fig. 2 and 3)

Range . . . . 0, 0.04"/hr (1 mm/hr) to 96"/hr (0 to 2438 mm/hr)

Accuracy . . . . ±5% for rates less than 5" per hour (127 mm/hr)

Update Interval . . . . 20 to 24 seconds

Calculation Method . . . . Measures time between successive tips of rain collector. 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 . . . . ±1°F (±0.5°C)

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 . . . . ±1°F (±0.5°C) above 20°F (-7°C), ±2°F (±1°C) under 20°F (-7°C) (see Fig. 1)

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

Radiation Induced Error (Fan-Aspirated Shield) . . . . +0.6°F (0.3°C) at solar noon (insolation = 1040 W/m^2, avg. wind speed $\leq$ 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 . . . . 0 - 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 . . . . 1 to 200 mph, 1 to 173 knots, 0.5 to 89 m/s, 1 to 322 km/h

    Update Interval . . . . Instant Reading: 2.5 to 3 seconds, 10-minute Average: 1 minute

    Accuracy . . . . ±2 mph (2 kts, 3 km/h, 1 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
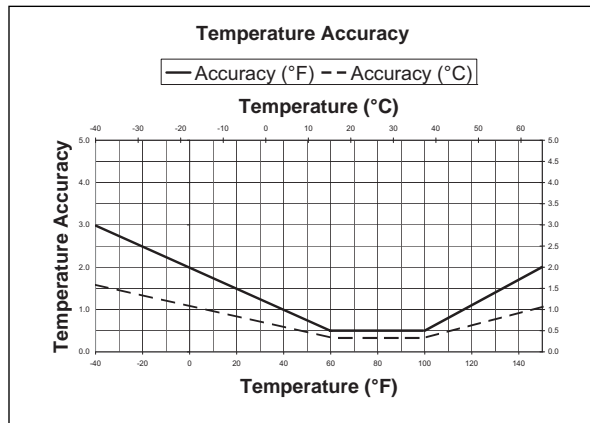
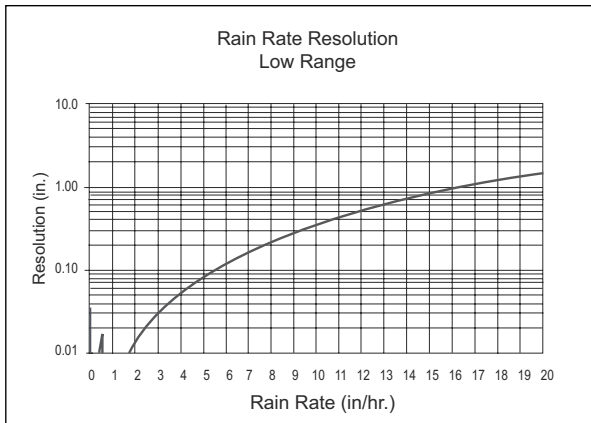## Sensor Charts

Figure 1. Temperature Accuracy

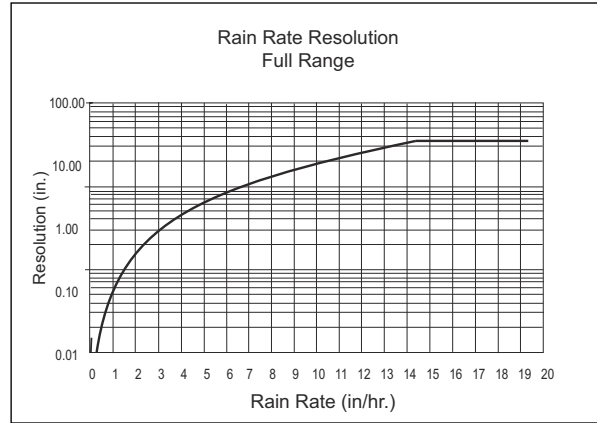*Figure 2. Low Range Rain Rate Resolution*

Figure 3. Full Range 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