NOVALYNX CORPORATION

MODEL 110-WS-25
MODULAR WEATHER STATION

INSTRUCTION MANUAL

REVISION DATE: NOV 2017
**Receiving and Unpacking**

Carefully unpack all components and compare to the packing list. Notify NovaLynx Corporation immediately concerning any discrepancy. Inspect equipment to detect any damage that may have occurred during shipment. In the event of damage, any claim for loss must be filed immediately with the carrier by the consignee. Damages to equipment sent via Parcel Post or UPS require the consignee to contact NovaLynx Corporation for instructions.

**Returns**

If equipment is to be returned to the factory for any reason, call NovaLynx between 8:00 a.m. and 4:00 p.m. Pacific Time to request a Return Authorization Number (RA#). Include with the returned equipment a description of the problem and the name, address, and daytime phone number of the sender. Carefully pack the equipment to prevent damage or additional damage during the return shipment. Call NovaLynx for packing instructions in the case of delicate or sensitive items. If packing facilities are not available take the equipment to the nearest Post Office, UPS, or other freight service and obtain assistance with the packaging. Please write the RA# on the outside of the box.

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NovaLynx Corporation warrants that its products are free from defects in material and workmanship under normal use and service for a period of one year from the date of shipment from the factory. NovaLynx Corporation's obligations under this warranty are limited to, at NovaLynx's option: (i) replacing; or (ii) repairing; any product determined to be defective. In no case shall NovaLynx Corporation’s liability exceed product's original purchase price. This warranty does not apply to any equipment that has been repaired or altered, except by NovaLynx Corporation, or that has been subjected to misuse, negligence, or accident. It is expressly agreed that this warranty will be in lieu of all warranties of fitness and in lieu of the warranty of merchantability.

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MODEL 110-WS-25
EQUIPMENT CONFIGURATION AND IDENTIFICATION

110-WS-25
Modular Weather Station

110-WS-25DL-D Desktop Data Logger with Display with AC Power Adapter and Serial Output Cable

110-WS-25N
Modular Weather Station with Optional Solar Panel Charger

110-WS-25DL-N Data Logger in NEMA Enclosure with 12V 7AH Battery & AC Charger, Surge Protection

110-WS-25P
Portable Weather Station

110-WS-25DL-PA or PB Data Logger in Carrying Case with 12V 7AH Battery & AC Charger
1.0 INTRODUCTION

The 110-WS-25 Modular Weather Stations are meteorological systems designed to be a user friendly solution for data storage and real-time monitoring of weather conditions.

This manual covers all three versions: Desktop, NEMA, and Portable. The data logger and general operation are the same on all versions.

The standard sensor package includes 6 weather parameters, wind speed and direction, temperature and relative humidity, barometric pressure, and precipitation, (additional optional sensors can be added), a 5-foot tripod and 5-foot vertical mast for sensor mounting, and a data logger with LCD display. The portable systems have a 3-foot tripod with 6-foot mast assembly. Pressure and rain sensors are optional on portable stations.

No computer is required for setup and viewing data. A simple menu interface using the LCD display and three front panel buttons makes setup easy.

Data is recorded directly to a Secure Digital (SD™) memory card. A 500MB card is included, providing convenient data downloads and storage for many months of data. The data logger is compatible with standard SD™ cards up to 2GB. Logging at 1 minute intervals, a 2GB card will store over 5 years of data. A new file is created and saved to the card each day.

An RS232 serial output (9600baud N,8,1) is standard and allows real time viewing of the data on a personal computer with any terminal emulator program, for example HyperTerminal, Putty, or the optional 110-WS-25STR Graphical Display Software.

Using the stored recorded data is simple. The SD card is removed from the logger, inserted into the SD card reader, then plugged in to the USB port on your computer (Windows, Macintosh, and Linux). This will then show up as a drive. To view and graph the data, click on the file corresponding to the day of interest. Microsoft Excel, OpenOffice.org, or any spreadsheet program can be used to view, graph, and analyze your data.

Typical data sample showing one line:

2017-06-15 13:51:50,4.2,10.1,190,,,,,,,,,0.04,223,12.14,,,,57.807,67.471,28.700,,192
2.0 DESCRIPTION

The WS-25 Weather Station has been set up and configured for the six standard sensors: speed, direction, temperature, humidity, barometric pressure, and rainfall. It has been shipped for plug and play operation. Other optional sensors will also be setup if they are ordered with the logger.

Data Logger

The WS-25 data logger’s easy-to-use interface includes a 16-character by 2-line backlit LCD screen, which displays current information and is used for configuring the data logger. A simple menu-driven interface using the LCD and three front panel buttons makes setup easy. A bright back-light makes the data logger easy to use at night. A Secure Digital (SD™) card slot makes recording and accessing data easy.

Sensors

The standard WS-25 sensors have been designed to be rugged, compact, and lightweight. They interface directly to the data logger without the need for additional signal conditioning.

Wind Speed and Direction ~ 200-WS-02F

The wind sensor combines a three-cup anemometer and a wind vane on a single axis. The anemometer is a contact-type wind sensor which, when rotated by the wind, triggers a series of momentary switch closures that are directly related to wind speed. The wind vane uses a 20K ohm potentiometer to sense direction changes. Depending on the position of the potentiometer wiper, an analog voltage is output that corresponds to the position of the vane. By orienting the vane to North (360 degrees) during installation, wind can be easily calculated from the output voltage. The resolution of the wind vane is 1 degree (azimuth display) or 16 compass points (on LCD display only).

Barometric Pressure ~ 100-WS-25BP (optional on portable stations)

The barometric pressure sensor is set for sea level when it leaves the factory. It will read absolute pressure. Barometric pressure varies with elevation. The data logger can be set up to read corrected sea level pressure for the elevation at which it is installed. This is done by adding the correct offset in inches in the analog setup menu. Instructions on how to determine the correction in inches for your elevation are provided in the barometric pressure sensor manual.

Temperature and Relative Humidity ~ 110-WS-25THA (replaces WS-25TH)

The WS-25THA is a combination temperature and relative humidity sensor installed a solar radiation shield. Temperature and humidity are sensed using sensor elements which change voltage with temperature and humidity fluctuations.
Rain ~ 110-WS-25RG (optional on portable stations)

The 8-inch rain gauge with mast mounting arm provided with the WS-25 is a traditional tipping bucket design. Resolution is 0.01 inches (0.254 mm) per tip.

The 110-WS-25RG-P is a compact rain sensor (5.5" x 5.75" x 2.5") with a mast mounting bracket and 25 feet of cable. It is small enough to fit in the portable station carrying case. The resolution is 0.02 inches per tip.

3.0 CONFIGURATION AND OPERATION

Data Logger

Navigation Buttons

▼ Scrolls through display screens and allows user setup menus. Moves values in the negative direction.

SELECT Press to enter ‘Setup’ menu.

▲ Scrolls through display screens and allows user setup menus. Moves values in the positive direction.

All buttons respond to a single press. Holding a button will not cause multiple actions to occur.

Secure Digital™ Card Slot

The data logger has a spring-loaded memory card slot. To insert the Secure Digital™ (SD™) card, place it face up into the slot on the front panel and press inward until the card clicks into place. To remove the SD™ card, press it slightly inward and the card will release. The card should not be removed without first releasing it. If a card is pulled out in this manner, both the memory card and the card socket may be damaged.

Menus

On the data logger display, the primary menus are: Main Setup Menu, Wind Channels, Analog Channels, and Counter Channels. Sub-menus of the Main Setup Menu are: Date Setup, Time Setup, Anemometer Setup, Wind Vane Setup, Log Interval, Counter Setup, Analog Setup, Channels to Log, RS232 Setup, Wind Vane Setup, Site Name Setup, Sync Setup, and Restore Defaults. Since the WS-25 logger has been pre-configured, there is no need to go into the sensor setup menus.
Setting the Date and Time

Using the ‘Date’ and ‘Time’ screens, one can both view and set the current date and time. The data logger incorporates a real-time clock that keeps accurate time even while power is disconnected. The clock does not automatically adjust for daylight savings time, however it does automatically adjust for leap years. The date format used throughout the data logger is YYYY-MM-DD.

See the CONFIGURATION AND OPERATION Table below for sample screen shots and detailed instructions for changing time and date. The same method is used with all data logger setup screens.

<table>
<thead>
<tr>
<th>Display Screen</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date: 2013-07-13 Time: 13:00:00</td>
<td>Current date and time. Date is setup using the Date Screen in the Main Setup Menu. Time is setup using the Time Screen in the Main Setup Menu. Time is in 24-hour format.</td>
</tr>
<tr>
<td>Status: NOT RDY 00000/00060 sec</td>
<td>The Status Screen can be viewed by pressing the ▼ key.</td>
</tr>
<tr>
<td>Status: LOGGING 00000/00060 sec</td>
<td>Displays LOGGING when a Secure Digital™ card is inserted. Displays NOT RDY when no memory card is inserted or there is an error accessing the card. The first number shows the number of time (seconds) since the last write to the memory card. The second number shows the logging interval.</td>
</tr>
<tr>
<td>Main Setup Menu &lt;- SELECT -&gt;</td>
<td>Press the SELECT button to enter the Main Setup Menu. Use the screen in the Main Setup Menu to configure and calibrate the wind data logger. Use the ▼ and ▲ buttons to change user-calibrated values and SELECT to set values.</td>
</tr>
<tr>
<td>Logging Disabled while in setup!</td>
<td>Briefly displays to remind user that system is offline during setup.</td>
</tr>
<tr>
<td>Date: 2013-07-21 &lt;- Set -&gt;</td>
<td>The Date Setup Screen will display. Press the SELECT button to set the date.</td>
</tr>
<tr>
<td>Date: 2013-07-21 - Set +</td>
<td>The last digit of the year is underlined. Press ▼ to decrease the year or ▲ to increase the year. When year is correct, press SELECT to set the year and move to the month. Set the month and day using the same method. Press SELECT to return to the Date Setup Screen.</td>
</tr>
<tr>
<td>Time: 15:31:30 &lt;- Set -&gt;</td>
<td>Press ▲ to advance to the Time Setup Screen. Press SELECT to set the time.</td>
</tr>
<tr>
<td>Time: 15:31:30 - Set +</td>
<td>Note that the last digit of the hour is underlined. Press the ▼ to decrease the hour or ▲ to increase the hour. When the hour is correct, press the SELECT button to set the hour and move to the minutes. Set the minutes and seconds using the same method. Press SELECT to return to the Time Setup Screen.</td>
</tr>
</tbody>
</table>

1 minute logging at the top of the minute :00 has been selected rather than free running
Data Logging

The WS-25 data logger records measurements directly to an industry standard Secure Digital™ or Multi-Media Card™. The data logger records both raw and processed values in a simple text format that can be opened with any spreadsheet or text editor.

Starting and Stopping Logging

Logging commences after the memory card is inserted into the data logger and terminates when it is removed. Use the Logging Status screen to verify that the data logger is recording. If a memory card is inserted but the data logger shows ‘NOT READY’ then there is a problem and the data logger WILL NOT record anything. Check to be sure the card is fully inserted and meets the memory card requirements outlined below.

Memory Card Requirements

The WS-25 data logger is compatible SD™ (Secure Digital) or MMC™ (Multi-Media Card) memory cards. It will not work with SDHC™ (Secure Digital High Capacity) cards.

A 512MB SD™ card is included. There is no need to format the card before use.

Data

The WS-25 data logger generates one file per calendar day. The file name is YYYYMMDD.CSV (e.g. 20160713.CSV) where YYYY is the four-digit year, MM is the two-digit month, and DD is the two-digit day. Each file is stored in the main directory or folder of the SD™ or MMC™. The data logger also writes two other files that contain meta information about the channels being logged. For most applications these files can be ignored. The file consists of one record per line. On most computers, a single file can be opened in a text editor by simply double clicking on its icon.

The data logger records CSV files (Comma Separated Values) to the memory card. CSV data can be used by any spreadsheet software. First launch the program, then use the ‘Open’ command in the File menu to select the CSV file created by the data logger. (The date modified column has no function and can be ignored.)
Microsoft Excel, Gnumeric, and OpenOffice.org Calc are all good spreadsheet programs. Gnumeric and OpenOffice.org Calc are free and can be downloaded from the Internet.

2017-06-15 00:02:30,1.9,3.0,19,,,,,,,,,0.00,88,12.18,,,,,,,,,71.829,28.556,965.721,,67
2017-06-15 00:02:31,2.3,2.3,16,,,,,,,,,0.00,91,12.14,,,,,,,,,71.829,28.556,965.455,,120

4.0 INSTALLATION

Installation of the WS-25 is simple and straightforward, thanks to its modular design and terminal-strip connections.

1. Set up the tripod and vertical mast, and secure it.
2. Mount the sensors Wind, RH/T, Rain Gauge on the tripod.
3. Connect the sensor cable wires to the data logger. (Portable stations are pre-wired.)
4. Apply power the WS-25 Logger.
5. Confirm and/or set the correct date and time.
6. Scroll thru the channels to verify the proper readings on the display.
7. Insert the SD™ memory card into the logger. (Data is logged once a minute. This can be changed as needed.)
8. A RS232 serial output is available for direct connections to a computer. (9600 baud, 8, N, 1)
9. Done.

Refer to the Quick Start instructions for sensor wiring connections, power connections, and other special information.

Tripod Towers

The five-foot tripod tower provided with the WS-25 is constructed of steel tubing with horizontal bracing for durability and strength. The tripod’s foot brackets can be bolted onto a concrete foundation or a wooden platform. The wind speed and direction sensor mounts on top (the tapered end) of the five-foot aluminum sensor mast. The solar radiation shield (for the temperature and humidity sensor) and the rain gauge mounting arm are supplied with u-bolts to clamp onto this mast. For stability, we recommend the mast be inserted into both of the tripod’s collar clamps. Guy kits are recommended for areas of high winds and ground kits are recommended for areas with lightning activity.

The WS-25P Portable Stations include a 3-foot tripod with two 3-foot masts that connect together end to end and a ratchet tie down stake to secure the tripod in windy conditions.

Caution: When installing the wind sensor, make sure that the sensor and cable are well clear of any power lines.
Lightning Protection and Grounding

A copper lightning protection ground lug, located on the data acquisition NEMA module, is the path to ground for all of the lightning protection circuitry in the WS-25N.

Connect a heavy copper wire to this lug. The other end connects to a grounded outlet or water pipe or Earth ground. In areas subject to severe lightning activity, we recommend installing a grounding rod.

Power Connections

The WS-25 runs on 12Vdc power. It can be operated from a standard AC/DC power adapter connected to a 110-240 Vac outlet, or from a 12Vdc battery on the NEMA and portable versions.

Main Memory Battery Backup

The WS-25 main memory has a lithium battery backup so the date and time, sensor parameters, and stored data will be retained even if the primary power source is interrupted.

RS232 Interface

An RS232 interface is available, but is not needed to operate the station. The optional 110-WS-25 Graphical Display Software uses this serial connection to send data to the computer.

The standard text data can be viewed on any terminal program. A new line on data will be sent out every minute.

Sample data ....
2017-06-15 00:02:30,1.9,3.0,19,,,,,,,,,0.00,88,12.18,,,,71.829,28.556,965.721,,67
2017-06-15 00:02:31,2.3,2.3,16,,,,,,,,,0.00,91,12.14,,,,71.829,28.556,965.455,,120

The WS-25 serial data communication between the user and the WS-25 is accomplished using RS232 communications protocol designed for short-distance use.

The standard 6-foot serial interface cable that connects the data logger to the computer is terminated with a 9-pin D-sub connector. The serial cable may be extended up to 200 feet.

For computers without a serial port, a USB-to-Serial converter may be used. When installing the converter, be sure to note the Com port number it is assigned.
Certain communications parameters must be specified in the computer to enable the two devices to communicate. Using a communications software program such as HyperTerminal, TeraTerm, or Putty, set them as follows:

- Bits per second 9600
- Data bits 8
- Parity None
- Stop bits 1
- Flow control None
- Emulation ANSI

**Testing the Connection**

Once the WS-25 is connected to the computer, the connection can be tested by turning the power on to the WS-25. If the RS232 connection is sound, a line of data will show every minute.

2017-06-15 16:02:30,1.9,3.0,19,,,,,,,,,0.00,88,12.18,,,,71.829,38.556,29.721,,67

A RS232 output tester light is supplied with the unit. If the serial output is functioning, the red light should flash every minute.

If the WS-25 is functioning but you see nothing on the computer screen, the wrong serial port may be selected. Try selecting Com 3 or another functioning serial port. On a Windows computer, you can see a list of available ports in Control Panel > Device Manager > Ports.

**Sensor Installation**

Install the sensors in their chosen locations. Run cables from the sensors to the data logger location, with no cable exceeding the maximum allowable length listed below.

<table>
<thead>
<tr>
<th>Sensor</th>
<th>Maximum Cable Length</th>
</tr>
</thead>
<tbody>
<tr>
<td>Wind*</td>
<td>200’ (66m)</td>
</tr>
<tr>
<td>T/RH*</td>
<td>150’ (82m)</td>
</tr>
<tr>
<td>Rain*</td>
<td>200’ (66m)</td>
</tr>
<tr>
<td>Barometric Pressure**</td>
<td>10’ (3m)</td>
</tr>
<tr>
<td>Solar Radiation* (optional)</td>
<td>100’ (33m)</td>
</tr>
</tbody>
</table>

*Std cable length 40’ **Std cable length 18”

When the sensors have been installed and the cables run, connect and test them. Refer to the hook-up drawing in the quick start instructions to verify wire colors and physical connections.
Data Logger

The data logger is configured at the factory for the following sensors. US English units are the default, but metric units will be programmed on request. The units can be changed to English or metric, as needed, in the sensor setup menus.

1. Wind Speed and Direction
2. Barometric Pressure (optional on WS-25P portable stations)
3. Temperature and Relative Humidity
4. Rain Gauge (optional on WS-25P portable stations)
5. Other Optional Sensors (when ordered with the station)

CLOCK BATTERY BACKUP

The data logger’s real-time clock uses a 3-volt lithium coin cell battery, CR1225, or BR1225, or any 3-volt 12.5 by 2.5 mm battery may be used. These are common watch batteries and should be available from most stores.

The clock battery has an estimated 10 to 15 year life span in the Wind Data Logger. If your data logger “freezes” or does not retain its date and time without power, then the battery likely needs to be replaced. To replace the battery, use a small screwdriver or toothpick to pop the old battery out of the battery holder. Insert a new battery with the writing side up.

Data Logger circuit board.
Advanced Information
These are the NovaLynx WS-25 DEFAULT SETTINGS for programming each channel using standard
WS-25 sensors with English units. (Values shown on the right are for other scaling ranges.) Orders
shipped outside the US will be set for metric units. Do NOT select ‘restore defaults’ or all of the as shipped
settings will be set back to default English units.

Anemometer 0
m = +0001.2500 W S-02F (for m/s m = +0.567, for knots m = +1.10, for kmh m = +2.00)
b = +0000.0000
l = WIND SPEED
u = MPH (u = M/S, u = KTS, u = kmh)

Anemometer 1
m = +0001.2500
b = +0000.0000
l = WIND SPEED
u = MPH

Anemometer 2
m = +0001.2500
b = +0000.0000
l = WIND SPEED
u = MPH

WIND VANE SET UP
Linear *
Dir Offset 000°

Log Interval
Log Sec 00060

Counter Setup
Counter 0 OK as is
Counter 1 OK as is

Counter 2
m = +0000.0100 WS-25RG (for millimeters m = +0000.250)
b = +0000.0000
l = RAIN TODAY
u = IN (u = mm)

ANALOG SET UP

Analog 0 OK as is
m = +0008.000
b = +000.0000
l = INPUT VOLTAGE
u = VDC

Analog 1 OK as is
m = +0001.000
b = +0000.0000
l = WIND DIR
u = VDC

Analog 2
m = +0598.8020
b = +0000.0000
l = SOLAR RAD
u = W/M

Analog 3 Aux temp only
m = +0180.000 for degrees C m = +0100.0000
b = -0459.6900 for degrees C b = -0273.1500
l = AUX TEMP
u = °F for degrees C u = °C

Analog 4 These settings are for the WS-25TH. See Note A for WS-25THA settings.
m = +0070.9092 for degrees C m = + 0039.394
b = -0022.0000 for degrees C b = -0030.0000
l = TEMPERATURE
u = °F for degrees C u = °C
These settings are for the WS-25TH. See Note A for WS-25THA settings.

Analog 5
m = +0030.3030
b = +0000.0000
l = HUMIDITY
u = %

Analog 6
m = +0006.4375
b = +0003.6600 *
l = BARO.PRESSURE
u = IN

* The b value will be different for each sensor

Analog 7
m = +0001.0000
b = +0000.0000
l = EXT ADC
u = VDC

Channels to Log
(these 7 are enabled, the others are disabled)
Anemometer 0 (wind speed)
Counter 2 (rainfall daily total)
Wind Direction (wind direction)
Analog 0 (battery voltage or DC power input)
Analog 4 (temperature)
Analog 5 (humidity)
Analog 6 (barometric pressure)
RS232 Enabled
Baud: 9600
SITE NAME
WS25

NOTE A

With 110-WS-25THA, 110-WS-16THB, or 225-HMP155A Temp & Humidity Sensors

Analog 4
m = +0180.0000
b = -0040.0000
l = TEMPERATURE
u = °F

Analog 5
m = +0100.0000
b = +0000.0000
l = HUMIDITY
u = %

With Optional 230-278-8 Barometric Pressure Sensor

Analog 6
m = +0001.7718
b = +023.6240
l = BARO.PRESSURE
u = IN

With Optional 255-100 Evaporation Gauge (Pan Level)

Analog 7
m = +0001.8888
b = +0000.0000
l = EVAP.PAN.LEV
u = IN
Data Record Format Information on Memory Card

There are no description headers generated on the stored data. 23 Fields are generated, but only the ones being used are saved. The ,, is where the missing fields would appear if they were needed.

Sample Data with the 6 Standard Sensors connected WS-25DL 1 min logging, English units

Date and Time, Speed, Gust, Spd count, Rain, WDir, inVolts, Temp °F, Hum %, BP inhg, cksum
2017-06-15 02:19:00, 0.3, 0.9, 19,,,,,,,,, 0.00, 351, 12.14,,,,, 83.1, 26.7, 28.473,,, 230
2017-06-15 02:20:00,0.7,1.2,28,,,,,,,,,0.00,351,12.14,,,,,83.1,26.7,28.465,,95
2017-06-15 02:21:00,0.9,1.4,31,,,,,,,,,0.00,351,12.14,,,,,83.1,26.7,28.465,,8

Sample Data with the 4 Standard Sensors connected WS-25P 1 min logging, English units

Date and Time, Speed, Gust, Spd count, Wdir, Input Voltage, Temp °F, Humidity %, cksum
2017-06-15 17:58:00, 4.9, 22.2, 277,,,,,,,,,, 249, 13.08,,,,, 73.301, 18.088,,, 198
2017-06-15 17:59:00,2.7,12.6,128,,,,,,,,,,269,13.04,,,,73.387,18.310,,,36
2017-06-15 18:00:00,3.2,3.5,83,,,,,,,,,,315,13.08,,,,73.474,18.458,,,44

Many WS-25DL are setup in metric units with m/s, °C, millimeters, and millibars. Refer to the Quick Start ‘As Shipped’ sheet for your exact setup.

Converting Wind Speed Pulse Count to Average Wind Speed

The ‘Wind Pulses’ screen in the Main Display Loop shows the number of anemometer revolutions since the last write to the memory card. The pulse count information can easily be converted to average wind speed using the following formula:

\[
\text{Average Wind Speed} = ((\text{WC}_0 / \text{sample\_interval}) \times \text{anemo\_m}) + (\text{anemo\_b})
\]

Example using the following snippet of data from the data logger WS-02 sensor and a sampling interval of 60 seconds recording in MPH:

2016-06-15 16:11:00,18.0,19.4,810

As seen in the data snippet above or the reading from the data logger ‘Wind Pulse’ screen, WC0 = 810. This information can then be used with the formula above:

\[
\text{Average MPH} = ((810/60) \times 1.25) + 0.0 = 16.87 \text{ MPH}
\]

A complete data logger manual with internal PCB schematics is available upon request.
Understanding Logged Data

Logged data is stored on the SD™ memory card with a .csv extension. A new file is created each day at midnight. The logging interval is normally set for 60 seconds.

Data can be viewed in any text editor or spreadsheet application.

(Above) A typical file showing raw data viewed with Windows Notepad

The same data file is shown below opened with the OpenOffice Calc spreadsheet.

The Line 1 and Line 2 Headers and Descriptions were added manually to show what the data values and units represent.

Refer to the ‘As Shipped Data and Sample Screens’ under column heading information to see the actual column descriptions for your exact station.
Typical Column Heading for Various Systems Shown Below

Refer to the 'As Shipped Data and Sample Screens' to see the actual column descriptions for your system. Each system is different.

Column heading information  (these headings do not show in serial data stream or .csv file)

<table>
<thead>
<tr>
<th>mph, mph, count, Inches, deg, volts, °F, %, ln, hg</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>2016-08-09 15:46:26, 5.6, 5.8, 258,,,,,,,,, 0.01, 189, 13.39,,,,, 72.6, 42.4</td>
</tr>
<tr>
<td>27.234,,187</td>
</tr>
</tbody>
</table>

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Column heading information  (these headings do not show in serial data stream or .csv file)

<table>
<thead>
<tr>
<th>m/s, m/s, count, mm, deg, vdc, %, deg c°, %, mb, mm, num.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>2017-01-30 12:51:02, 2.7, 3.0, 395,,,,,,,,, 0.00, 226, 13.47,, 25.96,, 20.7, 39.0, 927.756, 1.873, 172</td>
</tr>
</tbody>
</table>

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Column heading information  (these headings do not show in serial data stream or .csv file)

<table>
<thead>
<tr>
<th>mph, mph, count, deg, volts, °F, %, number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Date</td>
</tr>
<tr>
<td>2014-05-20 14:39:33, 3.6, 3.9, 174,,,,,,,,, 164, 13.67,,,,, 84.1, 20.4,,, 222</td>
</tr>
</tbody>
</table>

Disregard the,,,,,,,,, they are for channels that are not being logged for your setup.