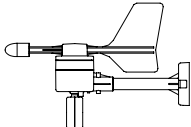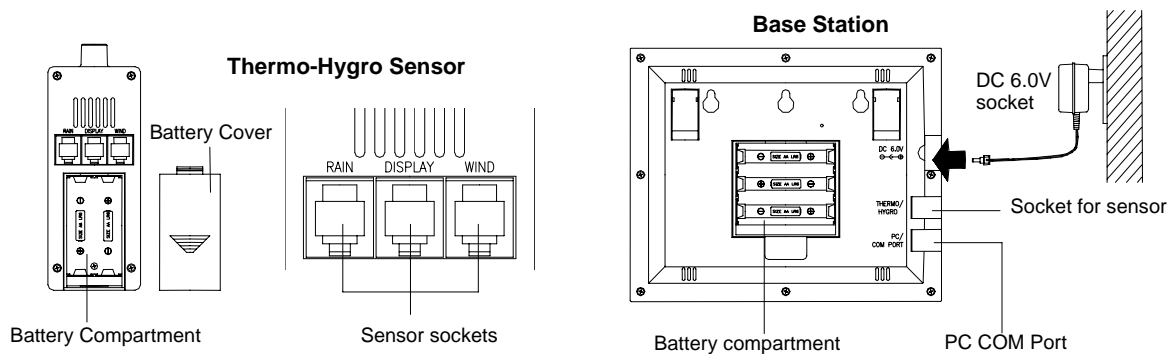# Quick Set Up Manual – WS-2310 Weather Station

Using cable connection or 433MHz for wireless transmission of weather data, this unique weather station can be powered using batteries or AC power (or both at the same time) for all your weather needs in the home or office.

Carefully open and check that the following contents are complete:

Item:	Consisting of:	Fittings:	Illustration:
Base Station	1) Main unit	1) AD/DC 120V power Adaptor - optional use (included)	
Thermo-Hygro Sensor	1) Main unit 2) Rain protection cover	1) 32ft cable - optional connection to the base station (included) 2) Wall mounting screws 3) Plastic anchors for screws	
Wind Sensor	1) Main unit with wind vane 2) 32ft cable (already attached the main unit) 3) Mast holder	1) 2 x U-bolts for mast holder 2) 4 x Washers 3) 4 x Nuts 4) 1 x screw (to secure main unit to the mast holder)	
Rain Sensor	1) Base and funnel 2) 32ft cable (already attached the main unit)		
'Heavy Weather" PC software	CD-ROM (English and German version only)	1) 6.5 ft computer cable for PC function only - optional use (included)	

Setting Up:

Important: Operating power is supplied to both the wind and rain sensors by the thermo-hygro sensor

Thermo-Hygro Sensor

Battery Cover

RAIN DISPLAY WIND

Battery Compartment   Sensor sockets

Base Station

DC 6.0V socket

Socket for sensor

Battery compartment   PC COM Port

Setting up using batteries:
1) **Sensors:** Pull and remove the protective rain cover to reveal three socket ports and the battery cover. Insert the cables of the wind and rain sensors in the correctly marked sockets. Slide open the battery compartment and checking the correct polarity insert 2 x AA 1.5V batteries and replace the cover and rain cover
2) **Base Station:** Now open the battery cover at the back of the unit and checking the correct polarity insert 3 x AA 1.5V batteries and replace the battery cover

Setting up using the AC/DC power adaptor:
1) **Sensors:** Set up the sensors as described above in **Setting up using batteries**.
2) **Base Station:** Using the AC power adaptor (included in this set) plug it into mains supply and connect it to the 6.0V DC adaptor socket located at the side of the base station.

Performing a function test:
After powering up the units, the base station has to synchronize to the sensors before the weather data can be received. The synchronization mode lasts for 15 minutes. Pressing the MIN/MAX key at any time will send the base station into the WWVB radio controlled time reception mode. Under normal conditions the radio controlled time is usually received within 3-5 minutes before returning to the normal operation. During the synchronization mode, perform the following function test to check operation:

1) Check that the wind-vane and fan of the wind sensor can freely rotate by moving the vane gently and also blowing into the fan to emulate wind speed and direction
2) Holding the rain sensor in both hands with the longest side facing you, tilt the unit from side to side and hear the rain counter flip which emulates rainfall
3) The base station will start to receive the 433MHz data transmitted from the sensors. Data such as rainfall will not be updated as regularly as the outdoor temperature since it does not rain constantly all the time. Therefore these readings may take up to two minutes before being shown on the LCD.
4) Now using the DISPLAY key on the base station, toggle between different weather modes on the LCD to check that the weather readings can be received for the relevant sections, for example outdoor temperature and humidity and etc.

Note: Should any outdoor data not be received from the sensors (when "- - -" is displayed), check all cables are correctly inserted and/ or the batteries or AC cord are plugged in, press and hold the PLUS(+) key for 2 seconds to hear a beep and the base station will synchronize to the sensors transmitting signal. Wind speeds that read zero does not mean reception failure, it simply means that there was no wind at the time of reading the data.

Mounting the units:
Users must take their surroundings into consideration before deciding which method is best suited for them. Connection by cable is advantageous in that data from the sensors to the base station is interference free. Using 433MHz wireless transmission gives users little restriction on placement as that all units can be positioned virtually anywhere to within a 100ft radius of the base station. You must decide which method is best suited to you. For cable connecting, please ensure that the 10 meters cable included in this set meets with your distance requirements (see accessories in the main user manual for adding extension cables).

To change from 433MHz to cable connection (or vice versa) simply connect (or disconnect) the 32ft cable from the base station to the sensor. The base station will automatically detect the connection and read the weather data. If the data cannot be received then press and hold the PLUS(+) key for 2 seconds to synchronize the base station with the sensor.

Important: Ensure all signals including the radio controlled time can be received and/or all cable distances meet with your requirements at the point of fixing particularly before you start drilling any mounting holes.

Wind sensor
Secure the main unit to the shaft of the mast holder using the single screw provided with the front of the sensor (marked E) facing in the East-West direction otherwise wind direction will not be accurate. Now fix the entire unit to a suitable mast using the 2 two U-bolts, 4 washers and nuts found in this set.

Note: For best results mount the wind sensor onto a mast to allow the wind to freely travel from all directions to enable an accurate reading (ideal mast size should be from Ø6.3" – Ø1.3"). Ensure that the 10 meter cable of the wind sensor meets your distance requirements.

Rain sensor
The rain sensor should be mounted horizontally about 2-3ft off from the ground in an open area away from trees or other coverings to allow rain to fall naturally for an accurate reading.

Note: For best results ensure the base is horizontal to allow maximum drainage of any collected rain

Thermo-hygro Sensor
To wall mount the thermo-hygro sensor, fix the wall holder onto the desired wall (2 screws are supplied), plug the sensor firmly into the wall holder and then carefully replace the rain cover back over the thermo-hygro sensor.

Note: After mounting the units, should the weather data not be received then press and hold the PLUS(+) key for 2 seconds to synchronize the base station with the sensor.

Weather station for use with your PC
Use your PC to read the latest weather data collected by the weather station. Just simply install the software from the enclosed CD-ROM onto your PC. For full details see the "Heavy Weather " PC software instructions in the CD-ROM (English version only).

System Requirements:
The minimum system requirement for use of "Heavy Weather" PC software is:
- Operating system: Windows 98 or above
- Processor: Pentium 166 MHz or above processor
- RAM: 32MB or above
- Hard-disc: 20MB free space
- CD-ROM drive

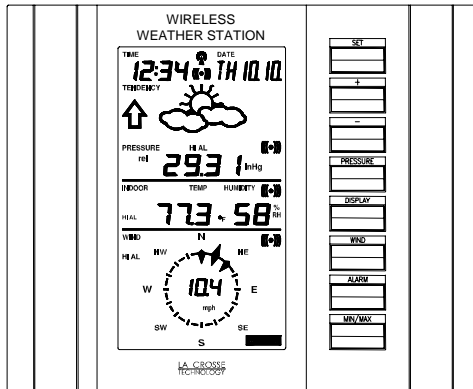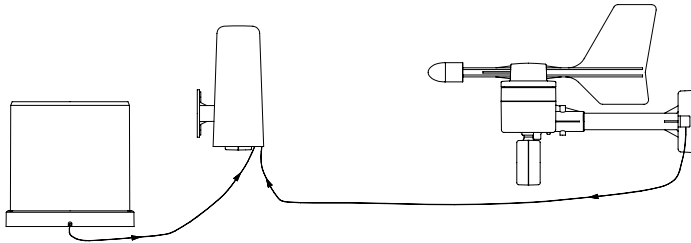# Operation Manual
Professional Remote Weather Station

Table of Contents

WIRELESS
WEATHER STATION

This Operation Manual is part of this product and should be kept in a safe place for future reference. It contains important notes on setup and operation.
Please see www.heavyweather.info for a complete IM, FAQ and downloads of the most current software.

1.   Introduction

Thank you for purchasing this Professional Remote Weather Station.

Designed for everyday use, the weather station will prove to be an asset of great value for your personal use in the home or office.

Please read this instruction manual thoroughly to fully understand the correct operation of your weather station and benefit from its unique features.

2.   Intended Use

Weather Station
The base station measures the indoor environment of its surrounding area and receives weather data from the following three outdoor sensors:
1)   Thermo-Hygro Sensor
2)   Wind Sensor
3)   Rain Sensor

The received data is continuously updated to bring you the latest weather information on the base station's LCD. The outdoor thermo-hygro sensor is the main data communication unit since both the wind and rain sensors are connected to the thermo-hygro sensor for operating power and rely on it to communicate to the base station. Weather data sent from the thermo-hygro sensor can be done by wireless 433MHz transmission (up to 100ft in open space) or by cable connection.

Using the enclosed 6.5ft computer cable and CD-ROM, you can install the Heavy Weather software to your PC and access the latest weather information from your PC and upload up to 175 sets of recorded weather data received by the base station. Recorded data can be used to generate statistics and charts onto your spreadsheets (175 sets of data is stored in the base even if the PC is switched OFF). The software itself does not set any limits as to how many data sets can be transferred to PC.

This weather station is designed to work easily with your PC, simply connect and disconnect the PC cable at any time.

System Requirements for PC use:
The minimum system requirement for use of this "Heavy Weather" software is:

Operating system: Windows 98 or above
Processor: Pentium 166 MHz or above
RAM: 32MB of RAM or above
Hard disk: 20MB free space
CD-ROM drive

For full details on operation and installation of the "Heavy Weather" software refer to the PC manual in PDF format on the CD-ROM.

Features of the base station:
- Receives and displays the WWVB radio controlled time and date
- Display of extensive weather data, in all cases with programmable alarm functions for certain weather conditions as well as records of all minimum and maximum values along with time and date of their recordings
- Indoor and outdoor temperature displays in degrees Fahrenheit or Celsius (user selectable)
- Indoor and outdoor relative humidity displays
- Air pressure reading in inHg or hPa, absolute or relative (user selectable)
- Detailed display of rainfall data in 1 hour, 24 hours, total since last reset (user selectable in mm or inch)
- Wind speed in mph, km/h, m/s, knots or Beaufort (user selectable)
- Wind direction display with LCD compass as well as numerical (e.g. 225°) and abbreviated characters (e.g. SW)
- Wind chill temperature display
- Dew point temperature display
- Weather forecast display by weather icons (sunny, cloudy, rainy)
- Weather tendency indicator
- Storm warning alarm
- LED back light
- Simultaneous display of all weather data with individual settings by the user
- COM port for easy connection to your PC
- All the weather data from the base station and up to 175 sets of weather history data with user adjustable measuring intervals can be recorded and uploaded to your PC

Features of the Thermo-Hygro Sensor

The thermo-hygro sensor measures the outdoor temperature and relative humidity. It also collects the readings from the rain and wind sensors before transmitting the data to the base station by wireless 433MHz or by the 32ft cable included in this set.

Features of Wind sensor

The wind sensor measures wind speed and wind direction and sends the data to thermo-hygro sensor, which in turn transmits the data to the base station. Operating power is taken from the thermo-hygro sensor using a 32ft cable connection.
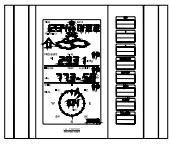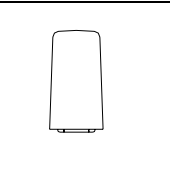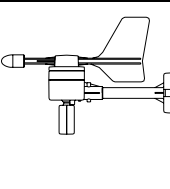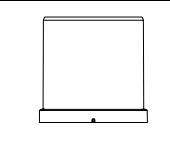
Features of Rain sensor

The rain sensor measures the rainfall and sends the data to thermo-hygro sensor, which in turn transmits the data to the base station. Operating power is taken from the thermo-hygro sensor by a 32ft cable connection.

3.   Safety Notes

- Damage caused by failure to comply with this instruction manual will invalidate any guarantee! The manufacturer and supplier will not be held liable for damages due to failure to comply with this instruction manual or from data inaccuracies that may occur with this product!

- In case of harm or damage to a person or property caused by improper handling or failure to comply with this instruction manual, the manufacturer and supplier cannot be held liable.

- For reasons of safety and operation, alterations to this device are strictly prohibited.

- To operate the weather station, use only supplied adaptor and batteries of the recommended type.

- Do not leave discharged batteries in the device as these may corrode and release chemicals that may damage the unit.

- Inserting batteries in an incorrect polarity will cause damage to this product.

- This product is not a toy kept out of the reach of children.

- Do not dispose of new or used batteries in a fire as they may explosion or release dangerous chemicals.

- This product is not to be used for medical purposes or for public information.
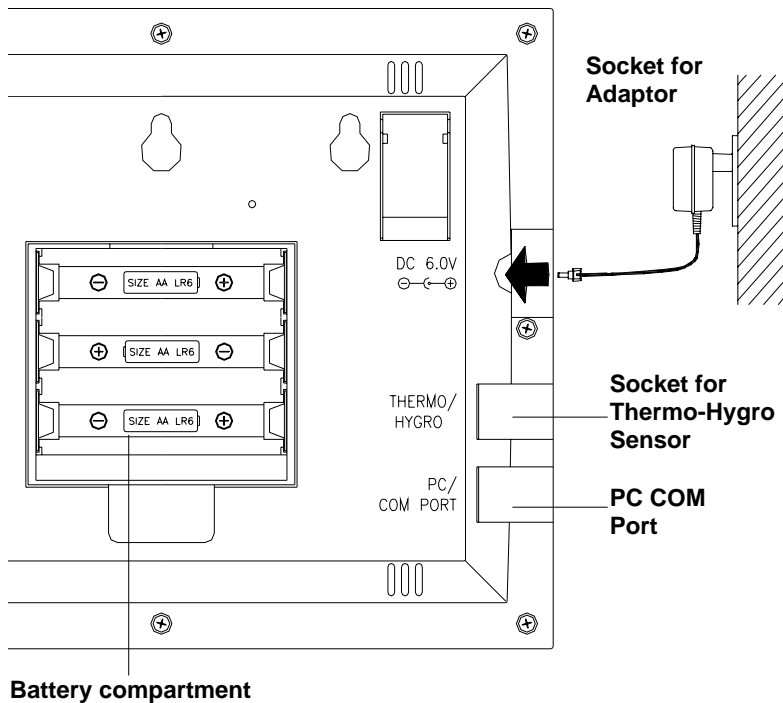
4.   Packaged Contents

Before setting up, carefully unpack the contents onto a table or flat surface and check that the following are complete:

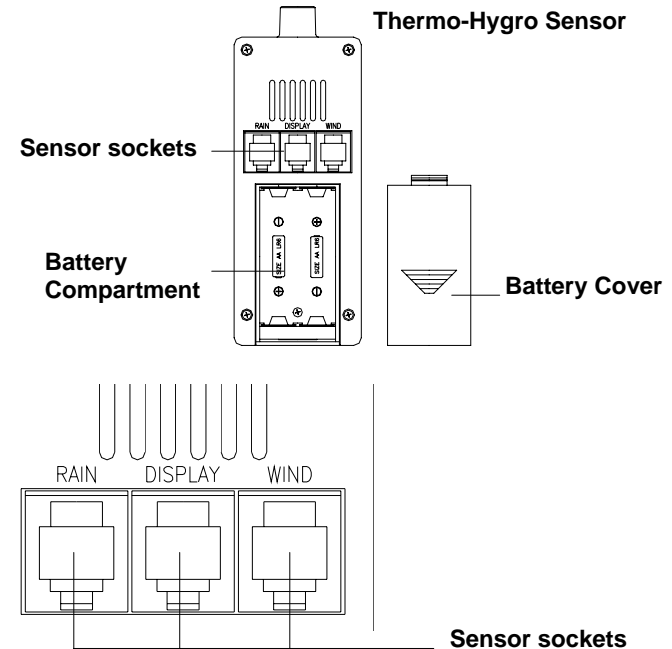| Item:	Consisting of:	Fittings:	Illustration:
Base Station	• Main unit	• AD/DC 120V power Adaptor - optional use (included)	
Thermo-Hygro Sensor	• Main unit • Rain protection cover	• 32ft cable - optional connection to the base station (in-cluded) • Wall mounting screws • Plastic anchors for screws	
Wind Sensor	• Main unit with wind vane • 32ft cable (already attached to the main unit) • Mast holder	• 2 x U-bolts for mast holder • 4 x Washers • 4 x Nuts • 1 x screw (to fix main unit to the mast holder	
Rain Sensor	• Main unit (base and funnel) • 32ft cable (already attached to the main unit)		
Heavy weather PC software	CD-Rom format (English and German language)	• 6.5ft PC cable for PC connection - optional use (included)	

5. Setting up

First, choose to use the adaptor (included in this set) or batteries for operation. Both these methods allow for operation using wireless 433MHz transmission or cable connection between the base station and the sensors and setting up for both methods is as follows:

Base Station:

Socket for Adaptor

DC 6.0V

THERMO/ HYGRO — Socket for Thermo-Hygro Sensor

PC/ COM PORT — PC COM Port

Battery compartment

Setting up using batteries:

Thermo-Hygro Sensor

Sensor sockets

Battery Compartment

Battery Cover

RAIN   DISPLAY   WIND

Sensor sockets

Important: To avoid operating problems, please take note of battery polarity if inserting any batteries

1) Pull away the rain cover of the thermo-hygro sensor to reveal the three sockets (for the wind sensor, rain sensor and the base station)
2) Connect the attached cables of wind and rain sensors to the corresponding sockets of the thermo-hygro sensor by clicking them into place
3) Open the battery cover of the thermo-hygro sensor located below the three sockets and insert 2 x AA, IEC LR6, 1.5V batteries and close the cover
4) Open the base station's battery cover located at the back of the unit and insert 3 x AA, IEC LR6, 1.5V batteries into the battery compartment and close the battery cover

Setting up using the AC adaptor:

1) Power up all the sensors as described in setting up using batteries above
2) Using the AC adaptor (included), plug it into the mains outlet and power up the base station by inserting the adaptor jack into the DC 6.0V socket located on the side of the base station

Every time the thermo-hygro sensor is powered up (for example after a change of batteries), a random security code is transmitted and this code must be synchronized with the base station to receive weather data.

When the base station is powered up, a short beep will sound and all LCD segments will light up for about 5 seconds before it enters into a 15 minute learning mode to learn the sensors security code. After the learning mode (or by pressing the MIN/MAX key at anytime), the base station will start the WWVB radio controlled time reception.

Note for WWVB Radio Controlled Time:
The time and date display is based on the signal provided by the highly accurate government operated atomic clock in Ft. Collins, Colorado. This radio-controlled clock does not only provide for the weather station's time and date display but also functions as the time and date source for all of this weather station's memory and history values using time and date information.

LCD backlight:
When using the power adaptor, the LCD backlight is switched on continuously. Under battery operation, the LCD backlight is switched on for 15 seconds intervals when any key is pressed.

6.   Operation using cable connection or wireless 433MHz

Cable Connection:
Using this method of operation will provide interference free transfer of the weather data from the sensors to the base station. The data sending interval from the sensors to the base station will also be more frequent compared to using 433MHz transmission and will result in higher power consumption. Therefore batteries will have a shorter life span for cable connection compared to using 433MHz.

To operate using cable connection, simply use the enclosed 32ft cable and connect the thermo-hygro sensor to the base station. Once the connection is detected, the base station will automatically continue reading the data from the sensor.

The user may at any time switch from cable connection to using 433MHz (or vice versa) by simply disconnecting (or connecting) the cable from the base station to the sensor. When the base station detects no cable connection to the sensors the base station will automatically change to using 433 MHz for reception of the weather data from the sensors.
The data receiving intervals are as follows:
 -Using cable connection data is updated every 8 seconds.
 -Using wireless 433 MHz data is updated from 16 to 128 second intervals depending on wind speed and rain activity.

Using the AC adaptor to operate the base station will also supply power to the sensor if the cable is connected to it. Batteries used for 433MHz transmission may be left in the sensor when using cable connection for power back up in case of AC power failure. A loss of power would desynchronize the base station and the sensor and no weather data will be received. To Synchronize the units so that the weather data can be received, press and hold the PLUS (+) key for 2 seconds. However in general, batteries that will not be used for long periods should be removed to avoid leakage.

Wireless 433MHz transmission:
Using 433MHz wireless transmission of weather data from the sensor to the base station will provide users greater freedom as to where units can be positioned without the need to be restricted by cable.

Note:
If no outdoor weather data is displayed or the signal to the sensors is lost during setting up, mounting, changing of batteries to the sensor or plugging or unplugging cables, simply press and hold the PLUS (+) key for 2 seconds and a short beep will sound to synchronize the base station to sensors. Without being synchronized, weather data will not be received.

7. LCD Overview

The following illustration shows the full segments of the LCD for description purposes only and will not appear like this during normal operation and use.
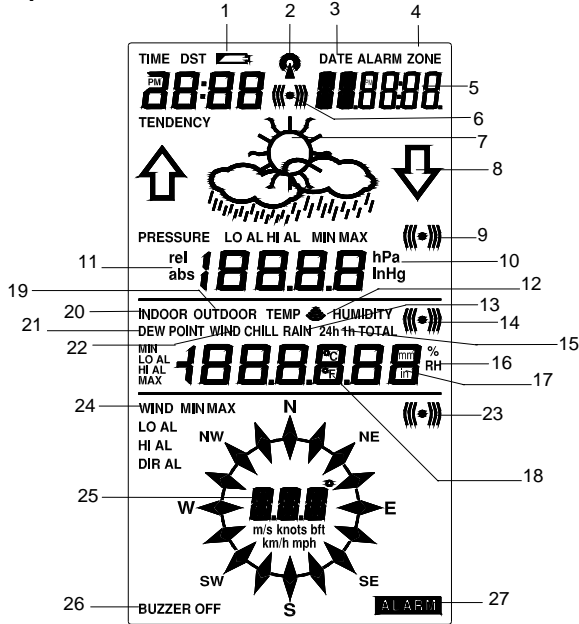
1. Low battery indicator
2. WWVB radio controlled time icon
3. Date display
4. Time zone display
5. Date, seconds, alarm time and time zone
6. Alarm icon
7. Weather forecast icons
8. Weather tendency indicator
9. Pressure alarm display
10. hPa/inHg air pressure unit
11. Pressure units (relative or absolute)
12. 433MHz reception icon
13. Rainfall display
14. Indoor, outdoor, humidity, dew point, wind chill, rainfall alarm icon
15. 24h, 1h or total hour display
16. Humidity display as RH%
17. Rainfall units (inch or mm)
18. Temperature display units (ºC or ºF)
19. Outdoor temperature/humidity display
20. Indoor temperature/humidity display
21. Dew point temperature display
22. Wind chill temperature display
23. Wind alarm icon
24. Wind information for Min/Max speed and wind speed low, high, direction alarm
25. Wind direction and speed (m/s, knots, Beaufort, km/h or mph) display
26. Alarm buzzer ON/OFF icon
27. General alarm icon

8. Function test:

Once the weather station is powered up, perform a function test by checking that the weather data is received. To do this, press the DISPLAY, PRESSURE or WIND keys to toggle through the relevant LCD sections:

1) Indoor temperature and humidity
2) Outdoor temperature and humidity
3) Outdoor wind chill
4) Dew point
5) Rainfall 24 hour
6) Rainfall 1hour
7) Rainfall Total
8) Relative and absolute pressure
9) Wind speed, wind direction and wind direction in degrees

If any readings cannot be received from the sensors, lines (- - -) will be displayed in the respective weather sections of the LCD. In this case, check that all cables are correctly inserted into the correct sockets and/or check the batteries in the outdoor thermo/hygro sensor and press and hold the PLUS (+) key for 2 seconds and a short beep will sound to synchronize the base station to the sensors otherwise no weather data will be received.

Some weather readings such as wind speed and direction may not appear immediately on the LCD if the wind-fan or vane of the wind sensor is moved. This is due to the set reading time intervals for the wind readings. However the current wind speed or direction will be displayed once the time reading interval is reached. For rainfall, the interval readings may take up to 2 minutes before the data is displayed on the LCD.

9. Mounting

Important Note

Prior to drilling mounting holes and permanently affixing any of the units, please ensure the following points are considered:

- Cable lengths of the units meet with your distance requirements at the point of fixing

- Signals from the sensors can be received by the base station at points of mounting
- Radio controlled time signal can be received at the point of mounting

NOTE: The WWVB receiver is located in the base station.

Base Station

With two foldable legs at the back of the unit, the base station can be placed onto any flat surface or wall mounted at the desired location by the hanging holes also at the back of the unit. It is important to check that the 433MHz (if using wireless connection) and the WWVB radio controlled time signal can be received before permanently mounting any of the units. Should the base station not display the 433MHz weather data from the sensors or the radio controlled time from the desired location, then relocate the units. Once the signals are received, the system can be affixed. Also if you have selected to use cable connection, ensure that distances can reach all desired locations before affixing any unit permanently

NOTE: For reception of WWVB time/date signal, do not mount the base station closer than 5 feet from a computer, florescent lights or other electrical appliances. Do not mount the base station on a wall that has metal heat/AC ductwork in the wall behind the base station. For best WWVB reception place the base station near a window facing Colorado. WWVB reception will be obtained easiest in the nighttime hours when the WWVB signal is strongest.

Mounting the Wind Sensor onto a mast

Wind-vane

Mast
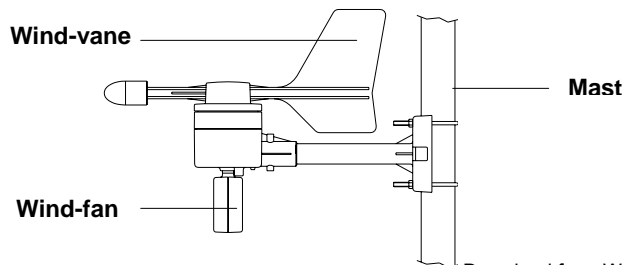
Wind-fan

Firstly, check that the wind-fan and the wind-vane can rotate freely before fixing the unit. For correct and accurate readings it is important to mount the sensor so that the front (marked E) is pointing in East-West direction. The wind sensor should now be mounted using the screw provided onto a mast to allow the wind to travel around the sensor unhindered from all directions (ideal mast size should be from Ø.63" – Ø1.3").

Once the wind sensor is fixed onto the mast, connect the cable to the corresponding thermo-hygro sensor socket so that operating power supply can be received and data can be transmitted to the base station.

**Mounting the Rain Sensor**

Funnel portion

Base portion
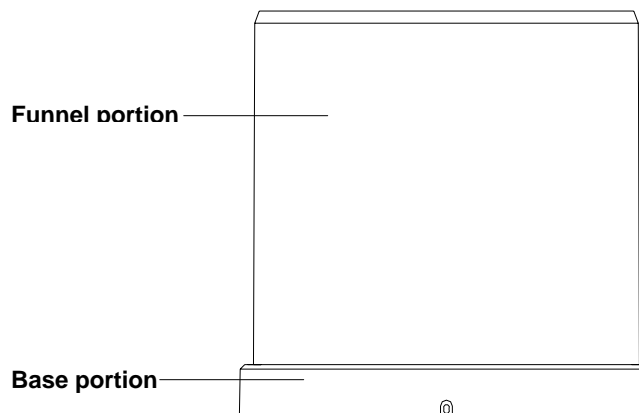
For accurate results, the rain sensor should be securely mounted onto a horizontal surface about 2-3ft above the ground and in an open area away from trees or other coverings where rainfall may be reduced causing inaccurate readings.

When securing into place, check that rain excess will not collect and store at the base of the unit but can flow out between the base and the mounting surface (test by pouring clean water).

After mounting the rain sensor, connect the cable to the thermo-hygro sensor at the corresponding socket so power supply can be received and data be transmitted to the base station

The rain sensor is now operable. For testing purposes, very slowly pour a small amount of clean water into the rain sensor funnel. The water will act as rainfall and will be received and displayed at the base station after about 2 minutes delay i.e. when the reading interval is reached (to clear this testing data on the base station, refer to the section "**MIN/MAX Mode**" below).

Mounting the thermo-hygro Sensor

Rain Cover

Wall Bracket

Main Unit
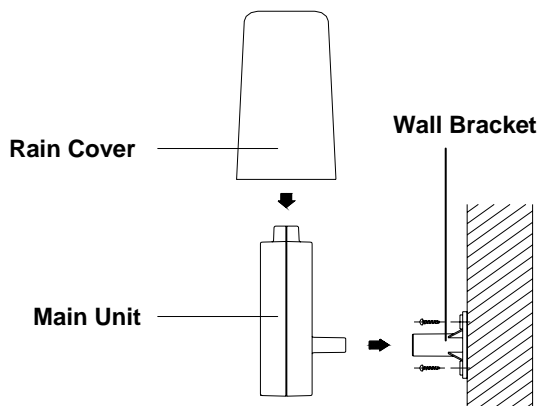
An ideal mounting place for the thermo-hygro sensor would be the outer wall beneath the extension of a roof, as this will protect the sensor from direct sunlight and other extreme weather conditions.

To wall mount, use the 2 screws to affix the wall bracket to the desired wall, plug in the thermo-hygro sensor to the bracket and secure both parts by the use of the supplied screw and ensure that the cables from the wind and rain sensors are correctly plugged in otherwise data transmission errors could occur.

NOTE: For best 433 MHz reception mount the thermo-hygro sensor on an outside wall near the location of the base station.

10.   Resetting & factory settings:

As previously mentioned, in the event of a power reset to the sensor (for example a change of batteries), the base station has to synchronize to the sensor again otherwise no weather data will be received. To do this, simply press and hold the PLUS (+) key for 2 seconds and a short beep will sound to synchronize the base station to the sensor. When the units are synchronized, the data will be received again and the base station will return to normal operation mode.

Do not remove batteries or unplug the AC adaptor of the base station otherwise all 175 sets of recorded weather history data for transferring to the PC will be lost (for full details of PC use, please see PC user manual in the enclosed Heavy Weather CD-ROM).
However if you wish to make a full reset of the base station and return to the original factory settings, simultaneously press and hold the PRESSURE and WIND keys for about 5 seconds. The base station will beep once and the entire LCD will light up for 5 seconds and go back to the original factory settings. This process with clear all previous user defined values and all weather history recordings.

Factory default settings:

The following table shows the factory default values of the weather station:

| Matter:	Default Setting:	
Time	0:00	
Date	01.01.2001	
Time zone	-5 ET	
Alarm time	12:00 am	
Relative air pressure	29.91 inHg	
Weather-picture threshold	0.09 inHg	
LCD contrast level	5 (1-8 levels)	
Rainfall per impulse	0.0204 inches	
Storm alarm	0.09 inHg	
Relative air pressure alarm	28.34 inHg (low)	30.71 inHg (high)
Indoor temperature alarm	50ºF (low)	86ºF (high)
Outdoor temperature alarm	32ºF (low)	104ºF (high)

Indoor humidity alarm	35%RH (low)	65%RH (high)
Outdoor humidity alarm	45%RH (low)	70%RH (high)
Wind chill alarm	50ºF (low)	86ºF (high)
Dew point alarm	32ºF (low)	68ºC (high)
Rainfall 24h alarm	1.96 inches	
Rainfall 1h alarm	0.03 inches	
Wind Speed	1.0 mph (low)	62 mph (high)
Wind direction alarm	None set	

Note:
All alarm default values are deactivated at the start up and any alarm must be activated by the user otherwise it will not sound.

11.   Function Description of the Weather Station

After setting up, the following data will be displayed in different sections on the LCD. If this is not the case please observe the notes on "**Interferences**" below.
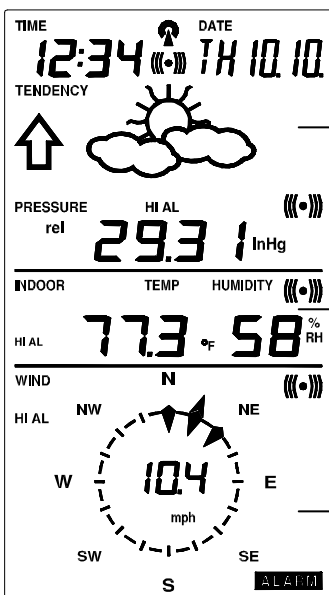
LCD Section 1:
Time, date, seconds, time zone, weather forecasting icons with tendency arrows, air pressure, and respective alarms sections

LCD Section 2:
Indoor and outdoor temperature and relative humidity, wind chill, dew point, rainfall, and respective alarms sections

LCD Section 3:
Wind direction, wind speed, and respective alarms sections

Time & Date (LCD Section 1)
If the WWVB icon (icon 2) is ON and not flashing, it means that the WWVB radio-controlled time and date are has been received. Press the PLUS (+) key to change the format of date display between date/month/year, weekday/date/month, seconds, alarm set time and time zone.

Weather forecasting (LCD Section 1)
The three weather icons Sunny, Cloudy and Rainy represent the weather forecasting. There are also two weather tendency indicators to show the air pressure tendency either side of the weather icons.

| Sunny | Cloudy | Rainy |
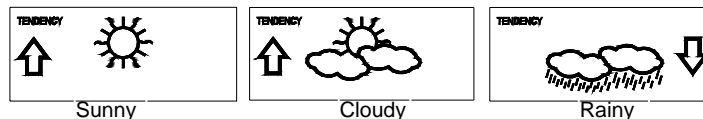
Notes to hPa sensitivity setting for weather forecasting:
The hPa (Hekto-Pascal) pressure sensitivity can be set to suit the user's requirement for weather forecasting from 6 inHg, 9 inHg to 12 inHg (see **Basic Programming** below). For areas that experience frequent changes in air pressure (which does not necessarily reflect a change in the weather) requires a higher inHg setting compared to an area where the air pressure is stagnant. For example if 6 inHg is selected, then there must be a fall or rise in air pressure of at least 6 inHg before the weather station will register this as a change in weather.

Air Pressure (LCD Section 1)
The air pressure reading is displayed here. Press the PRESSURE key to toggle between relative and absolute air pressure displays.

Notes to Absolute and Relative Air Pressure:
Absolute air pressure provides the display of the true measured air pressure of the current time and location. This is not programmable and the absolute air pressure range of the weather station is from

8.85 inHg to 32.45 inHg (standard air pressure at an altitude of 30,000ft is around 8.85 inHg).

Relative air pressure is the one value that is calculated back to sea level from the local absolute air pressure and can thus be taken as a reference for weather condition and weather development for the entire country. It can be programmed to represent your local sur-roundings. Since the relative air pressure is also the one value given by various newspapers, TV and radio broadcasting stations in their daily weather forecasts for their respective locations, users can set the relative air pressure of the weather station to this value to repre-sent readings your their area (see **Basic Programming Modes** be-low).

Weather Data (LCD Section 2)
Indoor temperature and humidity are displayed simultaneously in this section. Use the DISPLAY key to toggle through the displays for other weather information:
- Outdoor temperature/humidity
- Outdoor wind chill
- Outdoor dew point
- Rainfall 24h
- Rainfall 1h
- Rainfall total.

Notes to Dewpoint and Windchill:
Air can at a certain temperature only carry a certain amount of water (water vapor), which also increases and decreases with temperature. If the air temperature decreases below the dewpoint (saturation point), the excessive water vapor will condense and fall out in form of dew, fog or rain. At a temperature of e.g. 59°F and a relative humidity of 50% the dewpoint will be about 41°F, at 80% humidity about 53.6°F. At a relative humidity of 100% saturation is reached, i.e. the dewpoint is 59°F. At a dewpoint below freezing the fallout will become frost or snow.

Windchill has been introduced for battle planning during World War II. It represents not the real measured but the temperature a person feels in open area under the influence of wind and cold. Windchill is laid out in tables for various temperatures and wind speeds. At an outdoor temperature of e.g. 46.4°F and calm winds a person moving at a speed of 13 mph will already feel a windchill temperature of 32°F.

Wind Data (LCD Section 3)
The current wind direction will be displayed on the LCD compass on the wind section. Press the WIND key to toggle between wind direc-tion as numerical (e.g. 225°) and abbreviated characters (e.g. SW) as well as numerical wind speed display inside the compass circle.

12. Operation keys

The base station has 8 keys for easy operation. Please refer to the following table for use and function of each key: Further descriptions of the key functions with regard to their immediate range of application can be found in the Programming modes:

SET - key	- In normal mode to enter the manual basic programming mode - In basic programming mode to select the following setting modes: - LCD contrast setting - Manual time setting (hours/minutes) - 12/24 time format display - Calendar setting (year/month/date) - Time zone setting - °C/°F temperature setting - Wind speed unit setting - Rainfall unit setting - Pressure unit setting - Relative air pressure setting - Weather picture threshold setting - Storm warning setting - Audible storm alarm setting - In setting modes confirmation of the selected values - In alarm modes alarm ON/OFF - In alarm mode to enter programming of alarm values (long pressing) - To exit MIN/MAX modes
PRESSURE - key	- Toggle between Absolute and Relative air pressure displays
DISPLAY - key	- Toggle between the following current/ maximum/ minimum display modes: - Indoor temperature and humidity - Outdoor temperature and humidity - Outdoor wind chill - Outdoor dew point - Rainfall (24h, 1h, total)
WIND - key	To toggle between the following settings: - Wind speed - Wind direction - Wind direction display in degrees

ALARM - key	- In normal mode to enter the alarm programming mode - In alarm programming mode to select the following setting modes: - Time alarm setting - Indoor temperature alarm (high & low) - Outdoor temperature alarm (high & low) - Indoor humidity alarm (high & low) - Outdoor humidity alarm (high & low) - Outdoor wind chill alarm (high & low) - Outdoor dew point alarm (high & low) - Rainfall alarm (24h, 1h) - Pressure alarm (high & low) - Wind speed alarm (high & low) - Wind direction alarm - In setting modes confirmation of the selected values - To exit MIN/MAX modes - To reset general alarm symbol
MIN/MAX - key	- In normal display mode to toggle between display of MIN/MAX values - To toggle between MIN/MAX values in MIN/MAX mode - To exit any programming mode
PLUS (+) – key	- In normal display mode to toggle between format of date display, seconds, time alarm and time zone - To increase the values in the setting modes - To exit MIN/MAX modes - In normal display mode to re-enter data learning mode (long pressing for 2 seconds)
MINUS (-) – key	- In normal display mode to enable/disable the buzzer alarm (long pressing) - To decrease the values in the setting modes - In basic programming mode audible storm alarm ON/OFF - To snooze the alarms off 24 hours when the alarm is sounding - In MIN/MAX modes to reset recorded values and recorded dates and times

13. Basic Programming Modes

Manual Setting modes
The manual setting mode allows the user to change several basic settings, which is done by accessing one mode after the other simply by pressing the SET key. After the final mode, or if no key is pressed for 30 seconds, the manual setting returns to the normal display mode.

The manual setting takes the user through the following modes:
1. 8 level LCD contrast setting (default level 5)
2. Manual time setting (hours/minutes)
3. 12/24h time display select (default 12 hours)
4. Calendar setting (year/month/date)
5. Time zone setting from 0 to +12 hrs, -1, -2, -3, AT -4, ET -5, CT -6, MT -7, PT -8, AL -9, HA -10, -11, -12 (default ET -5)
6. Temperature display unit degree Celsius or Fahrenheit (default degree Fahrenheit)
7. Wind speed display units in m/s, km/h, mph, Beaufort, knots (default setting mph)
8. Rainfall display in mm or inch (default setting inch)
9. Air pressure display in hPa or inHg (default setting inHg)
10. Relative air pressure setting from 27.10 inHg – 31.90 inHg (default 29.98 inHg)
11. Weather forecast sensitivity setting 6, 9, 12 inHg (default setting 9 inHg)
12. Storm warning sensitivity setting 9, 12, 15, 18, 21, 24, 29 inHg (default 9 inHg)
13. Audible storm alarm On/OFF (default ON)

To change any of the above values, once your are in the setting mode, use the PLUS (+) or MINUS (-) keys to select the values followed by the SET key to enter the next setting. Continue to press the SET key to toggle through the setting mode until the LCD returns to the normal display mode or press the MIN/MAX key at any time to exit.

Note!
Keeping the PLUS (+) or MINUS (-) key depressed when setting certain units in the manual setting mode will increase/decrease digits in greater steps.

Manual time setting
The base station will continue to scan for the radio controlled time signal from 12am-6 am (1am-6pm summer time) each day despite it being manually set. During reception attempts the WWVB tower icon will flash.

- If reception has been unsuccessful, then the WWVB tower icon will not appear but reception will still be attempted the following hour within the time frame
- If reception has been successful, the received time and date will overwrite the manually set time and date and no further reception is attempted until the following day

14. MIN/MAX Programming Modes

MIN/MAX display Mode
The MIN/MAX Mode provides the user with information about the MIN/MAX values of all weather data together with the time and date at which these values were recorded.

Entering each MIN/MAX mode
In the normal display mode for e.g. the indoor temperature and humidity, press MIN/MAX key to toggle the display between the maximum, minimum and current records. While the maximum or minimum values are shown press the DISPLAY key once to show the time and date that value was received. Now press the MIN/MAX key to toggle from the minimum and maximum readings and the time and dates records were received are also shown. Still in the MIN/MAX mode (where the time and date for a value are shown), press the DISPLAY key to move through each respective unit as follows:

- **Indoor temperature** (max or min with time and date)
- **Indoor humidity** (max or min with time and date)
- **Outdoor temperature** (max or min with time and date)
- **Outdoor humidity** (max or min with time and date)
- **Outdoor wind chill** (max or min with time and date)
- **Outdoor dew point** (max or min with time and date)
- **Rainfall 24 hours** (max or min with time and date)
- **Rainfall 1 hour** (max or min with time and date)
- **Rainfall total** (max only with time and date)

When in any of the above modes, press the MIN/MAX key to toggle between the maximum or minimum values of those records and their respective time and dates will also be shown.

For the wind and pressure minimum and maximum readings, the same would apply except that the WIND or PRESSURE keys would be used instead of the DISPLAY KEY.

Exiting the MIN/MAX modes
If the maximum and minimum modes with times and dates are displayed, press the PLUS (+) key twice to return the normal display mode.

Resetting the MIN/MAX records
While in the minimum or maximum mode, the time and dates are also displayed along with the recorded values. If the MINUS (-) key is pressed while any of these values are displayed, that particular minimum or maximum record will be reset to current reading together with the current time and date with the exception of the following:

- The first case is Rainfall Total, which has neither maximum nor minimum records since it will show only the total rainfall. Pressing the MINUS (-) key will reset the rainfall total value to zero and the time recording to current time.
- The second case is Rainfall 24h or 1h, which records maximum rain count only for these respective times. Pressing the MINUS (-) key in either of these two modes will reset the rain count to the current rain count and time and date.
- The third case is wind speed, which will only reset the recorded time to current time when the MINUS (-) key is pressed.

15.   Alarm Programming Modes

Alarm Modes
As well as the normal time alarm, this feature will allow users to set a range of specific alarms to meet specific weather and temperature conditions set by the user. The weather station allows for the following 13 alarms modes to be set:

1. Time alarm
2. Indoor temperature high alarm and low alarm
3. Outdoor temperature high alarm and low alarm
4. Indoor humidity high alarm and low alarm
5. Outdoor humidity high alarm and low alarm
6. Wind chill high alarm and low alarm
7. Dew point alarm high alarm and low alarm
8. Rainfall 24h alarm
9. Rainfall 1h alarm
10. Pressure high alarm and low alarm
11. Wind speed high alarm and low alarm
12. Wind direction alarm
13. Storm warning alarm

Setting Alarms:
For alarm setting, press the ALARM key once while in normal operation mode to enter the normal alarm time and by further pressing the ALARM key will toggle through each of the alarm modes:

Note:
The alarm icon will automatically appear upon pressing the SET key to tell the user the alarm is activated. Further pressing the SET key will deactivate/reactivate the alarm.

Time alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Press and hold the SET key to enter the alarm hour time set mode (the hour digits will flash) and set the desired hour by using the PLUS (+) or MINUS (-) keys
3) Press the SET key to enter the alarm minute time set mode (the minutes digits will flash) and set the desired minutes using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm followed by the MIN/MAX key to return to the normal display mode.

Indoor temperature high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Press the ALARM key again to enter indoor temperature high alarm set mode
3) Press and hold the SET key to enter the indoor temperature high setting values (digits will start flashing) and set the desired indoor temperature high by using the PLUS (+) or MINUS (-) keys

4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM once more to toggle to the indoor temperature low alarm set mode.
5) Press and hold the SET key to enter the indoor temperature low setting values (temperature digits will start flashing) and set the desired indoor temperature low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Outdoor temperature high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the outdoor temperature high alarm set mode
3) Press and hold the SET key to enter the outdoor temperature high setting values (temperature digits will start flashing) and set the desired outdoor temperature high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM once more to toggle to the outdoor temperature low alarm set mode.
5) Press and hold the SET key to enter the outdoor temperature low setting values (digits will start flashing) and set the desired outdoor temperature low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Indoor humidity high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the indoor humidity high alarm set mode
3) Press and hold the SET key to enter the indoor humidity high setting values (% digits will start flashing) and set the desired indoor humidity high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM once more to toggle to the indoor humidity low alarm set mode.

5) Press and hold the SET key to enter the indoor humidity low setting values (digits will start flashing) and set the desired indoor humidity low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Outdoor humidity high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the outdoor humidity high alarm set mode
3) Press and hold the SET key to enter the outdoor humidity high setting values (digits will start flashing) and set the desired outdoor humidity high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to the outdoor humidity low alarm set mode.
5) Press and hold the SET key to enter the outdoor humidity low setting values (digits will start flashing) and set the desired outdoor humidity low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to the to enter another alarm setting mode.

Wind chill high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the wind chill high alarm set mode
3) Press and hold the SET key to enter the wind chill high setting values (digits will start flashing) and set the desired wind chill high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to the wind chill low alarm set mode.
5) Press and hold the SET key to enter the wind chill low setting values (digits will start flashing) and set the desired wind chill low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Dew point alarm high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the dew point high alarm set mode
3) Press and hold the SET key to enter the dew point setting values (digits will start flashing) and set the desired dew point high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to the dew point low alarm set mode.
5) Press and hold the SET key to enter the dew point low setting values (digits will start flashing) and set the desired dew point low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Rainfall 24h alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the rain 24 hour alarm set mode
3) Press and hold the SET key to enter the rain setting values (digits will start flashing) and set the desired rain values by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to another alarm setting mode.

Rainfall 1h alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the rain 1 hour alarm set mode
3) Press and hold the SET key to enter the rain setting values (digits will start flashing) and set the desired rain values by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to another alarm setting mode.

Pressure high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the pressure high alarm set mode
3) Press and hold the SET key to enter the pressure setting values (digits will start flashing) and set the desired pressure high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to the pressure low alarm set mode.
5) Press and hold the SET key to enter the pressure low setting values (digits will start flashing) and set the desired pressure low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Wind speed high alarm and low alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the wind speed high alarm set mode
3) Press and hold the SET key to enter the wind speed setting values (digits will start flashing) and set the desired wind speed high by using the PLUS (+) or MINUS (-) keys
4) Press ALARM key to confirm and press the MIN/MAX key to return to the normal display mode or press the ALARM key once more to toggle to the wind speed low alarm set mode.
5) Press and hold the SET key to enter the wind speed low setting values (digits will start flashing) and set the desired pressure low by using the PLUS (+) or MINUS (-) keys
6) Press ALARM key to confirm and press the MIN/MAX key to return the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Wind direction alarm setting
1) Press the ALARM key to enter the normal time alarm
2) Continue to press the ALARM key until you reach the wind direction alarm set mode
3) Press and hold the SET key to enter the wind direction setting values.

4) Using the PLUS (+) or MINUS (-) keys select the desired wind direction and use the SET key to confirm or cancel each direction input
5) Press ALARM key to confirm and press the MIN/MAX key to re-turn the normal display mode or press the ALARM once more to toggle to another alarm setting mode.

Storm warning alarm setting
Unlike the other weather alarms, the storm warning alarm is set by entering the main manual setting mode as follows:
10) Press the SET key to enter the manual setting mode
11) Continue to press the SET key until the Storm warning icon flashes (tendency arrow flashing downwards with the pressure values flashing)
12) Set the desired inHg pressure value (9, 12, 15, 18, 21, 24, 27 inHg) using the PLUS (+) or MINUS (-) keys
13) Press the MIN/MAX key to confirm and return to the normal dis-play.

Storm warning alarm ON/OFF
After storm warning alarm setting, the next mode to appear after pressing the SET key is the storm warning ON/OFF. Use the PLUS (+) or MINUS (-) key to change the status to AON or AOFF. Default setting is ON:

Should the air pressure drop equal or below the pre-set inHg value within the last 6 hour period, then the downward tendency arrow will flash as an indication of possible storm. The base station will take hourly measurements as a point of reference. The storm-warning indicator will stop flashing once the air pressure becomes more sta-ble.

Master Alarm – BUZZER OFF
The time and all the weather alarms may have buzzer sound set to OFF by holding the MINUS (-) key down for about 3 seconds in nor-mal display mode and the BUZZER OFF icon appears on the bottom left of the LCD. When the BUZZER OFF is displayed, the time and all other weather alarms when activated will only flash but not sound regardless if that particular alarm has been set to the ON. To deacti-vate the BUZZER OFF, press the MINUS (-) key once more.

General Alarm Icon
The general alarm icon on the bottom right corner of the LCD will appear when any weather alarm is activated to show the user that a set weather condition has been reached. The activated alarm can be determined by checking the set alarm values against the MIN/MAX values reached. To deactivate the general weather alarm icon, press the ALARM key.

Important
When entering the alarm set mode for a specific weather or tempera-ture condition, the corresponding alarm is automatically enabled (ON) when the SET key is pressed, regardless of its previous setting and the alarm value will flash to indicate that it has been activated. Press the ALARM key to confirm the setting and continue pressing the ALARM key to toggle through each alarm mode until it returns to the normal display mode or press the MIN/MAX key at any time to exit the alarm setting modes.

When a set weather alarm condition has been activated, that particu-lar alarm will sound and flash for approximately 2 minutes but will continue to flash until weather conditions have become more steady.

Weather Alarms
The weather alarms are settable for when certain weather conditions are met according to the users requirements. For example, the user can set the thresholds for the outdoor temperature to +86°F (high) and 14°F (low), while only enabling the high alarm and disabling the low alarm (i.e. temperatures <-14°F won't trigger alarm, but tempera-tures >+86°F will).

Alarm setting	Minimum	Maximum
Storm threshold	0.09 inHg	0.27 inHg
Relative Air Pressure	27.10 inHg	31.89 inHg
Outdoor Temperature	-21.8°F	+157.8°F
Indoor Temperature	14.1°F. No alarm will sound if the minimum indoor temperature alarm is set below this value.	+139.8°F
Humidity (all)	20% RH	95% RH
Rainfall 24h	0.0 inch	39.37 inch
Rainfall 1h	0.0 inch	39.37 inch
Wind	0.0 mph	111.8 mph

Hysteresis

To compensate for fluctuation of the measured data, which may cause the weather alarm to sound constantly if the measured reading is close to user set level, a hysteresis function has been implemented for each weather alarm. For example, if the high temperature alarm is set to +77°F and the current value moves to +78°F, the alarm will be activated (if it has been enabled). Now when the temperature drops to +76°F or below and thereafter again increases to beyond +77°F, the data will be blinking, but no alarm will be activated. It has to drop to below +75.2°F (with a pre-set hysteresis of 1.8°F) so that the alarm can be produced again. Hysteresis values for the various weather data types are given in the following table:

Weather data	Hysteresis
Temperature	1.8°F
Humidity	3% RH
Air pressure	0.0295 inHg
Rainfall 24h	0.1968 inch
Rainfall 1h	0.01968 inch
Wind	3.1 mph

16.   Auto memory for stored values

The base station has a memory back up system, which is used to memorize user-defined settings for when the batteries are changed or if a power failure occurs. User defined units are automatically updated each time these are changed. The base station will memorize the following user defined units:

- Time zone
- 12/24h time display mode
- Unit settings (temperature, pressure, rainfall, wind)
- Air pressure offset for calculation of relative air pressure
- Weather picture threshold
- Storm warning threshold
- LCD contrast
- Alarm time
- Weather Alarm thresholds
- State of alarms (enabled/disabled)
- Rainfall total value and reset time/date

17.   Accessories: adding cable extensions

For your convenience, additional telephone cables to increase the connection distance between each of the units may be purchased from any reputable hardware store. Simply add these to the current cables to extend your cable connection distance.

Telephone Extension Cables
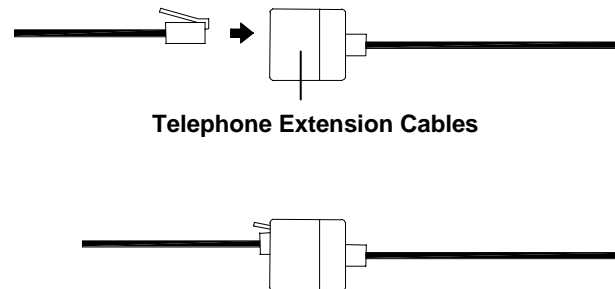
When securing the cables during mounting, ensure that base station can receive the weather data since increasing the cables lengths may also increase levels of interference and result with reception difficulties. Interference levels will greatly depend on the surrounding area for example setting up on or near metal piping may considerably reduce reception.

For best results, do not to add more than 32ft of extension cable from item to item onto the existing cable lengths as this may reduce reception levels. Again, reception and interference levels will greatly depend on the surrounding environment at your point of mounting.

Note:
It is important to keep all the connected extension heads away from rain, moisture and other extreme weather conditions as exposure can cause short circuits and damage to this item.

18.   Changing batteries:

Battery change only in the thermo-hygro-sensor:
1. Open the battery cover
2. Remove the old batteries and insert with new ones of the rec-ommended type and replace the cover

Once the sensor is powered up, press and hold the PLUS (+) key for approx. 2 seconds in the normal display mode, the base station will sound a short beep and synchronize to the sensor otherwise no weather data will be received.

Battery change only in the base station:
1. Connect power adaptor to base station and power outlet.
2. Open the battery cover located at the back of the base station.
3. Remove the old batteries, insert with new ones of the recom-mended type and replace the cover

This method of battery replacement will result in no loss of MIN/MAX and history data. However in case of possible power failure, the base station will lose the MIX/MAX and all weather data recordings and will need to be synchronized to the sensors again by pressing the PLUS (+) key for 2 seconds.

Note:
When batteries require replacement for the base station, the low battery indicator will light up on the LCD.

Please participate in the preservation of the environment by properly disposing of all used-up batteries and accu-mulators at designated disposal points. Never dispose of batteries in a fire as this may cause explosion, risk of fire or leakage of dangerous chemicals and fumes

19.   Interferences and problems with operation

Problem & cause	Remedy
Distance between transmitters and re-ceiver too long.	*Reduce distance between transmitters and receiver to receive signal*
High shielding materi-als between the units (thick walls, steel, con-crete, isolating alumi-num foil and etc.)	*Find a different location for sensors and/or receiver. See also Item 'Trans-mission Range' below.*
Interference from other sources (e.g. wireless radio, headset, speaker, etc. operating on the same frequency)	*Find a different location for the sensors and/or base station. Neighbors using electrical devices operating on the 433MHz signal frequency can also cause interference with reception*
No Reception after adding extension ca-bles	*Find a new location for the sensors and/or base station. Recommend not adding more than 32ft extension ca-bles between units to the existing cable lengths, as this will increase the chance of data reception problems.*
Reception then no reception - loss of transmission signal from the sensor to the base station	*Press and hold the PLUS (+) key for 2 seconds to synchronize the base sta-tion to the sensors for weather data reception. If still no signal, then change the sensor batteries and syn-chronize the units again.*
Poor contrast LCD or no reception or low batteries in sensors or receiver.	*Check the LCD contrast setting or change batteries (check low battery indicator on the LCD)*

Quite frequently interferences are only of a temporary nature and may be easily overcome. If there are wireless headsets, remote babysit-ters or other devices working on 433MHz in your house or in the vicin-ity, their switch-on time is mostly limited. Furthermore most of these devices allow the change to an interference-free frequency. Such measures will effectively overcome interferences.

20.   Transmission Range

The transmission distance from the thermo-hygro sensor to the base station in open space under optimum conditions is 100ft. Although the signal transmission may travel though solid surfaces or objects, the following points should be avoided if possible:

- High frequency interferences of any kind.
- High densities of trees.
- Broadband interferences in municipal areas can reach levels reducing the signal/noise ratio over the entire frequency band, thus also reducing the transmission distance.
- Devices working close by (example a neighbor's house) may also influence reception.
- Poorly shielded PCs can cause interferences that will reduce or in some cases stop reception
- The transmitter and receiver should not be mounted on metal surfaces as this will reduce transmission range.

21.   Cleaning and Maintenance

- Clean the housing and screen of the base station only with a soft damp cloth. Do not use abrasives or solvents.
- Ensure that the rain sensor does not collect leaves or other dirt by checking the funnel for blockages every now and then. Also clean the seesaw of the sensor with a damp cloth and check by lightly tapping with your finger that it can move freely from side to side.
- Do **not** clean the funnel with the bottom half of the rain sensor attached nor the bottom part itself under running water. This may bear the danger of water entering the unit's inner parts and cause damages.
- Do not immerse the base station in water.
- Should there be damage to this product, please do not attempt to make any repairs. Please take this unit to a qualified technician. Opening or improper handling of the units will invalidate any guarantee.

22.   Specifications

Outdoor data

Transmission Distance in Open Field:		100ft max.
Temperature Range	:	-21.8°F to +157.8°F (show OFL" if outside range)
Resolution	:	0.2°F
Measuring Range Rel. Humidity	:	20% to 95% (if the relative humidity is less than 20% or greater than 95%, it will display 19% or 96%)
Rain Volume Display	:	0 to 39.37 inches (1h and 24h rainfall) 0 to 98.38 inches (Total rainfall)
Resolution	:	0.1mm
Wind Speed	:	0 to 111.8 mph
Resolution	:	0.1 mph
Wind Direction	:	Graphic Resolution 22.5 Degrees, Numerical Resolution, Letter format

Using 433MHz wireless data transmission:

Measuring interval thermo-hygro sensor	:	32 sec (if wind factor>22.36 mph) or 128sec (if wind factor< 22.36mph) 10 minutes (if the base station fails to receive any data after 5 attempts in a row, all outdoor data readings will display "---", except for the rain value)

With cable connection for data transmission:

Measuring interval thermo-hygro sensor	:	8 seconds

Indoor data

Pressure/ temperature	:	4 times per minute
Indoor Temperature Range	:	14.1°F to + 139.8°F (shows "OFL" if outside range)
Resolution	:	0.2°F

Measuring Range Rel. Humidity	:	20% to 95% (if the relative humidity is less than 20% or greater than 95%, it will display 19% or 96%)
Resolution	:	1%
Measuring Range Air Pressure	:	8.85 inHg to 32.45 inHg (Standard air pressure at an altitude of 30,000 ft is around 8.85 inHg)
Resolution	.	0.01 inHg
Relative humidity checking interval	:	every 30 seconds
Alarm duration	:	2 minutes (approx.)

Power consumption
Base Station

Batteries	:	3 x AA, IEC LR6, 1.5V (Alkaline recommended)
or AC power	:	INPUT 120V AC 60HZ (use the provided AC/DC adapter only)
Thermo-hygro sensor	:	2 x AA, IEC LR6, 1.5V (or can draw power from the adapter if used)
Battery life using 433MHz:	:	approximately 12 months (alkaline batteries recommended)
Battery life using cable connection	:	approximately 6 months (alkaline batteries recommended)

Dimensions (L x W x H):

Base Station	:	170 x 35 x 138 inches
Thermo-hygro sensor	:	71.5 x 73 x 136 inches
Rain sensor	:	140 x 70 x 137 inches
Wind sensor	:	60 x 197 x 291 inches

For warranty work, technical support, or information contact:

La Crosse Technology, Ltd
2809 Losey Blvd. S.
La Crosse, WI 54601
Phone: 608.782.1610
Fax: 608.796.1020

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sales@lacrossetechnology.com
(information on other products)

web:
www.lacrossetechnology.com

Questions ? Instructions? Please visit:
www.lacrossetechnology.com

"HEAVY WEATHER" SOFTWARE
For use with the WS-2310 Weather Station (English version CD-ROM)

Contents

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Appendix 1

Working example on how to save a text file and creating useful graphs on other applications.

1.0 General Information
This weather station is a high quality, easy to use weather monitoring system that reads, displays and records the weather data from three external sensors. One sensor will take data for temperature and humidity; one for wind and the other for rainfall measurement. Operation of this unit can either be by cable connection or by wireless 433MHz to the base station.

In stalling the "Heavy Weather" program on this CD-ROM will display all the weather data from the base station received from the three external sensors onto your PC. For operation, simply use the PC cable supplied and connect the base station to the PC using the desired COM port on your PC (see Installing the **4.0 Installing PC Software** below).

2.0 System Requirements
To install the "Heavy Weather" software onto your PC, the minimum system requirement is:

- Operating system: Windows 98 or above
- Processor: Pentium 166 MHz or above processor
- RAM: 32MB of Ram or above
- Hard disk: 20MB free space
- CD-ROM drive

3.0 Basic settings of the base station and sensors:
This section describes the set up and settings of the weather station and sensors necessary for operation with the Heavy Weather software. For a complete and detailed explanation of the weather station, **please refer to the main instruction manual enclosed with the purchase of this set.**

3.1 Base station (receiver)
The base station reads the indoor and outdoor weather the data from the thermo-hygro, wind and rain sensors. Together with the radio controlled time, all the data is displayed on the large LCD with LED back-light.

- The base station can be battery operated using 3 x AA, IEC LR6, 1.5V batteries or with the AC/DC adapter provided.

3.2 Thermo-hygro sensor
The thermo-hygro sensor measures the temperature and the humidity of it's surrounding outdoor environment and at the same time, collects the data from the rain and wind sensors before transmitting all the weather data to the base station by wireless 433MHz or by a cable connection.

- Using wireless 433MHz, the thermo-hygro sensor requires 2 x AA, IEC, LR6, 1.5V batteries.
- Using cable connection from the base station to the sensors, power is supplied by either the AC/DC power adaptor (included) or 2 x AA, IEC, LR6, 1.5V batteries.

3.3 Wind sensor
The wind sensor collects both the wind speed and wind direction data at the point of mounting and sends this to the thermo-hygro sensor for transmitting to the base station.

- Install the wind sensor onto an outdoor mast in open space since it is important for the wind sensor to be fully exposed to allow for accurate wind measurements from unhindered wind directions
- For operation, it is necessary to connect the wind sensor to the thermo-hygro sensor for transmission of data and also for operating power.

3.4 Rain sensor
The rain sensor collects rainfall data and displays this on the base station.

- It is recommended to install the rain sensor on a flat surface securely in the open and free from any obstructions (i.e. falling leaves, roof coverings and etc.)
- For operation, it is necessary to connect the rain sensor to the thermo-hygro sensor for transmission of data and also for operating power.

4.0 Installing the PC software
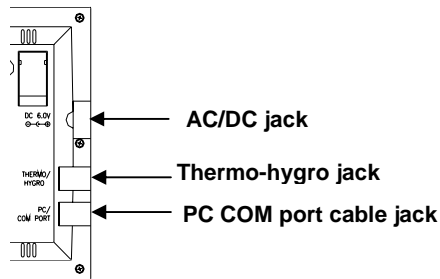
First, the weather station and the outdoor sensors should all be connected for operation and checked that it is functioning correctly. After checking, install the "Heavy Weather" PC software as follows:

1) Switch on your PC and insert the Heavy Weather CD-ROM into the ROM drive and the program will begin to auto install
2) The "Heavy Weather Installation" window will now open so the user can change the directory or confirm the directory automatically set by the installation process (directory will be used for data saving from the weather station)
3) Click the Finish button to confirm and the software will be installed
4) After successfully installing the software, the OK prompt appears for successful installation, click the OK button to complete the process
5) The Heavy Weather directory is opened onto the screen, click to open the "Heavy Weather" icon to run the program or open the program from the shortcut created your desktop
6) Once the Heavy Weather program is open, click the Setup button at the bottom right of the window to select the COM port used for connection between the PC and base station (as shown below) and press the OK button.
7) Now using the 6.5ft computer cable (included), connect the base station to the PC COM port. The program will automatically detect the connection between the base station and the PC and will display the weather data in the appropriate boxes.

Note: In the event the auto-install did not start, double click the set.exe file found in the root directory of the CD-ROM to start the installation of the Heavy Weather software
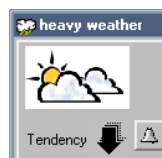
5.0 Features and displayed weather information
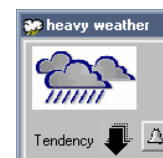
5.1 Weather icons
The three weather icons can appear in the following combinations, provide a weather forecast upon reading of any significant changes in air pressure:
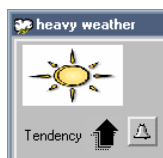
| **Sunny** | **Cloudy with sunny intervals** | **Rainy** |

For every sudden or significant change in air pressure, the weather icons will update accordingly to represent the change in weather. If the icons do not change, then it means either the air pressure has not changed or the change has been too slow for to register a reading. However, if the icon displayed is a sun or raining cloud, there will be no change of icon if the weather gets any better (with sunny icon) or worse (with rainy icon) since the icons are already at their extreme points.

The icons displayed forecasts the weather in to terms of getting better or worse and not necessarily sunny or rainy as each icon may indicate. For example, if the current weather is cloudy and the rainy icon is displayed, it does not mean that forecast is not accurate because it is not raining, it means that the air pressure has dropped and the weather is expected to get worse but not necessarily rain.

Note: After setting up, readings for weather forecasts should be discarded for the next 12-24 hours. This will allow sufficient time for the unit to operate at a constant altitude and therefore result in a more accurate forecast.

5.2 Storm Warning
The "lightening" icon next to the weather icon will appear when the storm alarm has been reached to indicate a possible storm according to the user settable air pressure values set in the base station (see storm warning alarm setting below). For storm warning air pressure sensitivity setting on the base, please refer the main instruction manual.
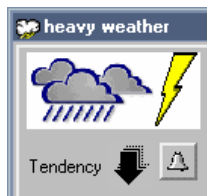
Storm warning icon

5.3 Weather tendency indicator
The weather tendency indicator arrow is located below the weather symbols. It indicates the air pressure development and provides a forecast of the weather to be expected by the decreasing or increasing air pressure. With the tendency arrow pointing upwards, it means that the air pressure is increasing and the weather is expected to improve but if the tendency arrow is pointing downwards, the air pressure is decreasing and the weather is expected to become worse.

5.4 Relative/Absolute Pressure
Relative air pressure is calculated at sea level from the local absolute air pressure and is thus valid as a reference for weather conditions and weather developments. For example an absolute air pressure of 28.40 inHg in a city at an approximate altitude of 1500ft above sea level corresponds to a relative air pressure of 29.91 inHg at sea level. The relative unit pressure can be displayed in inHg or hPa

The recorded minimum and maximum pressure values within a period are also displayed along with the corresponding dates and times and are automatically updated when a new minimum or maximum values are reached.

5.5 Indoor and Outdoor Temperature/Humidity
The weather data recorded by the thermo-hygro sensor (for outdoor data transmission) and base station (for indoor data) is displayed accordingly to the temperature, humidity section on the screen numerically and graphically (for temperature data only)

The recorded minimum and maximum temperature and humidity values within a period are also displayed along with the corresponding dates and times and are automatically updated when a new minimum or maximum values are reached.

5.6 Dew point
Dew point occurs when the temperature and humidity is at such level that the humidity becomes a liquid on a surface. The dew point data is displayed with current, minimum and maximum information.

The recorded minimum and maximum dew point values within a period are also displayed along with the corresponding dates and times and are automatically updated when a new minimum or maximum values are reached.

5.7 Wind chill
The wind chill data recorded by the wind sensor is displayed with current temperature, minimum and maximum temperature recording.

The recorded minimum and maximum wind chill values within a period are also displayed along with the corresponding dates and times and are automatically updated when a new minimum or maximum values are reached.

5.8 Wind speed and direction
The wind data recorded by the wind sensor are received and displayed on the base station and heavy weather program. The wind direction data is simply indicated by letters (for example N=North, NE=North East, E, SE and etc.) or in degrees.

The wind speed unit is user selectable to display the wind speed in km/h, mph, meters-per-second and knots. The bft (Beaufort scale) at the top of the wind section displays the velocity of each wind measurement in the form of a bar for easy reference.

The recorded minimum and maximum wind speed values within a period are also displayed along with the corresponding dates and times and are automatically updated when a new minimum or maximum values are reached.

5.9 Rainfall
Three sets of rain data are recorded by base station and displayed on the on the base station and heavy weather program as total rain, rain in the last 24 hours and rain in the last 1 hour. The information is displayed numerically and graphically for easy reference. The scale in the total rainfall column will automatically increase should the rainfall surpass the initial scale maximum displayed.

The recorded maximum rainfall value for 24 hour and 1 hour within a period is also displayed along with the corresponding date and time and is automatically updated when a new maximum value is reached.

5.10 Weather History
Here the Heavy Weather program automatically records all the weather data from the current period onwards to form a history of the weather events. The recording interval can be set from 1 minute to up to 60 hours in the history section (default setting 1 hour) together with the option of recording a next set of data. The next set of data option can be used for example if the user set the initial recording interval to every 1 hour and required the next set of data for in 5 minutes time, the program would then initiate recording of the weather data in 5 minutes before reverting to the previous setting of 1 hour. However based on the previously given example, due to the mass communication of weather data and high frequency transmission from the sensors to the base station to the PC and back again, it is possible that the next set of data recording i.e. 5 minute interval will be missed and will not in fact be executed in exactly 5 minutes time as will be seen from the history file.

From the main Heavy Weather window, the history section will show the file name used to save the weather data together with the date and time and the total number of sets of data recorded. Each set of data consists of pressure, indoor temperature, indoor humidity, outdoor temperature, outdoor humidity, dew point, wind chill, wind speed, wind direction, total rain, time and date. The user can also select to record a new history file at anytime by changing the history file or revert to any saved history file that had been previously saved. The initial history file name is history.dat. If a previously saved history file is used again, the current recording interval will be regarded as the latest setting and all new data will be recorded into that file (see 8.0 Settings below for working detail). The history file can be displayed in a window parallel in running to the Heavy Weather program. If desired the saved files can be saved as text files and opened in other formats.

Once the PC is switched off, connection to the base station will be lost but the base station will record all weather events for up to 175 records in it's memory bank according the interval set from the PC at the time of power off. For example if the user set a history recording interval of 5 minutes, then the base station will store all the weather data from 5 minute intervals for up to 175 sets of data until the Heavy Weather program is used again. However there are no limitations for the number of history files saved onto the PC providing there is sufficient space available on the hard disk.

Regardless of the interval setting on the software for reading data from the base station onto your PC, when the base station has stored the maximum 175 sets of weather data into it's memory, new sets of data received at the set interval will begin overwriting the oldest records on the base station and it is important to upload the data to your PC before it gets lost. For example if the interval is set to take hourly readings, then the base station will take 175 hourly readings which works out to a little over 7 days meaning that users have this length of time to upload the data to their PC's as to not lose any data.

6.0 Using the Heavy Weather software

6.1 Activating the weather software

Once the weather station is connected to the PC, run the "Heavy Weather" program and it will automatically detect the connection to the base station and start transferring the weather data from on the PC. All the weather data; wind; rain; relative pressure; indoor and outdoor temperature/humidity; dew point and wind chill will almost be simultaneously received and displayed in the relevant sections of the Heavy Weather program.

During High Frequency Reception (reception of data from the outdoor sensors to the base station), the HF icon on bottom right hand corner of the Heavy Weather window will flash in red to indicate that high frequency reception is taking place between the sensors and the base station and the received data will soon be received and displayed by the Heavy Weather program.
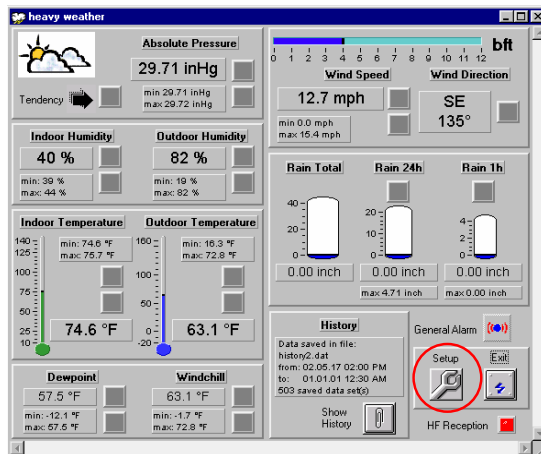
6.2 Main Heavy Weather window
Below are two windows of the Heavy Weather program before and after reception of the weather data from the base station.
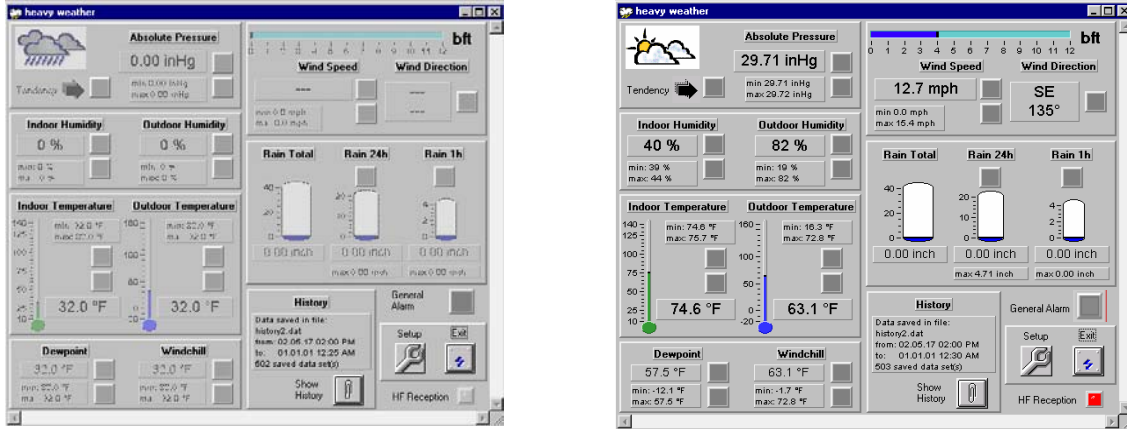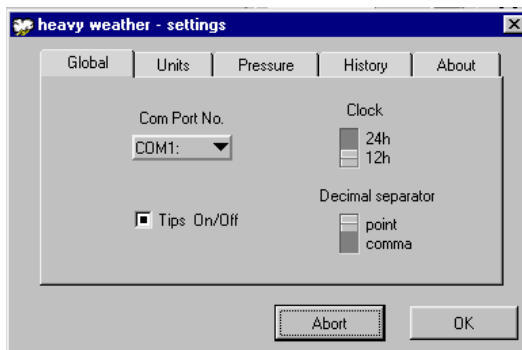

7.0 Basic Settings
Click the "Setup" button located at the bottom to the Heavy Weather window to enter the Settings window to select the basic settings for operation.


Heavy Weather program main window

Heavy Weather Settings window
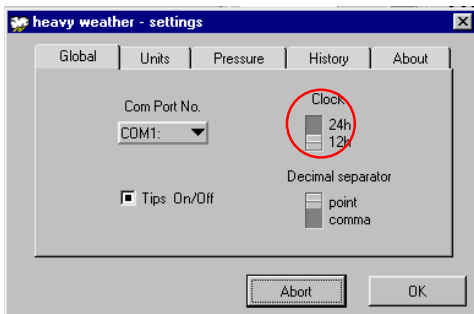
7.1 Heavy Weather Settings - Global tab:

1) The COM Port used for connection from the PC the base station must be selected in order for correct operation
2) Screen tips On/Off can be selected here. If selected On, screen tips will automatically pop-up to familiarize users with the first time operations of the Heavy Weather program when the mouse is dragged specified areas of the main Heavy Weather window
3) Clock setting for 12 or 24 hour is for displaying the time format in the history file and will not effect the time format display in the base station
4) The decimal separator is for users of countries that recognizes the comma or point as the decimal separator. When the decimal point or comma is selected, the data digits on the main Heavy Weather window and history file(s) will be updated accordingly (this option is not available on the base station)
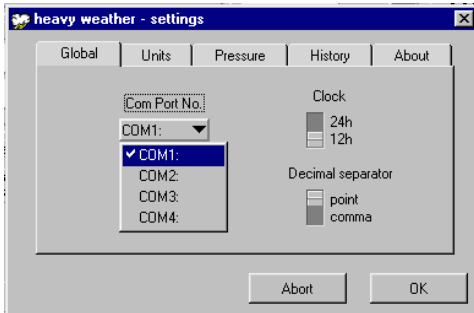
COM Port no. (COM Port: 1-4)
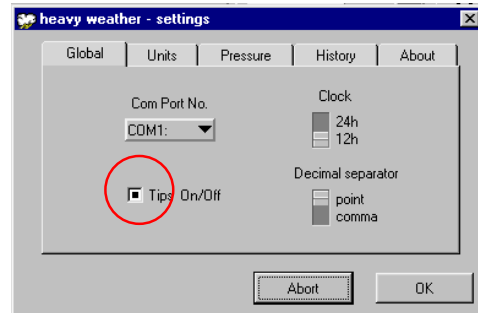
Pop-up screen tips (on/off)

Clock (12/24 hour display mode)
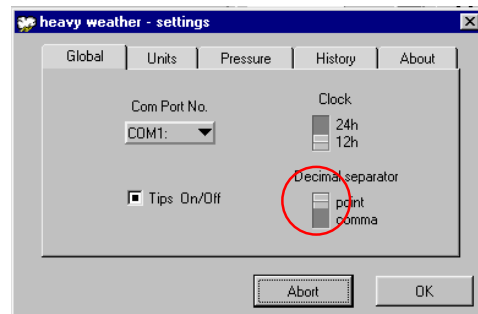
Decimal separator (point/comma)

7.2 Heavy Weather Settings - Units tab:
Here the units of display for the pressure, temperature, rainfall and wind speed can be set according the users preference. Once set, the weather data on the main Heavy Weather window and history file(s) will be updated accordingly. Setting the displayed units from the Heavy Weather program does not affect the units set in the base station.
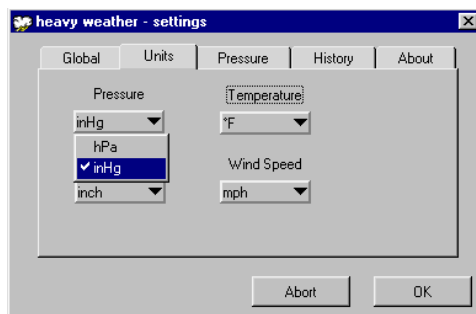
Pressure (hPa/inHg)
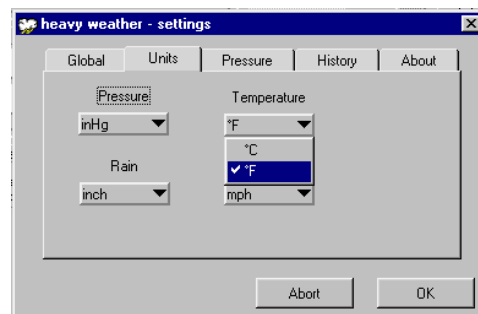
Temperature (ºC/ºF)
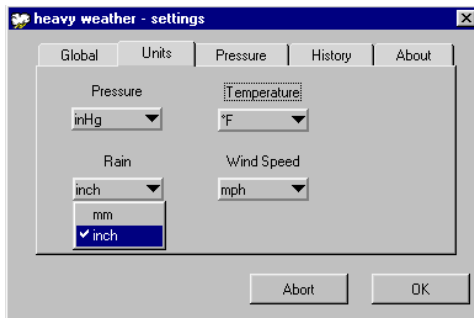
Rain (mm/inch)
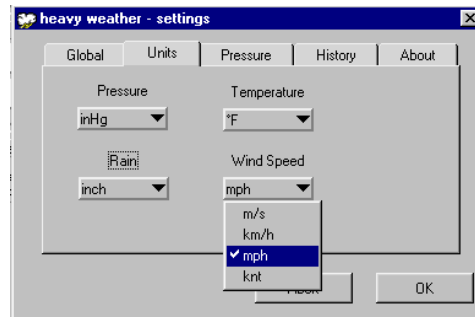
Wind speed (m/s, km/h, mph, knots)

7.3 Heavy Weather Settings - Pressure tab:

Selected the air pressure display required. The air pressure display unit set on the Heavy Weather program from the PC does not affect the air pressure display unit on the base station

Absolute/Relative Air Pressure

Note: For actual air pressure settings on the base station, please see the main instruction manual

7.4 Heavy Weather Settings - History tab:

Changing history files:

Here the user can change the history file used to save the weather data received from the base station. Simply click the change history file button, select the file to be changed and click OK to confirm the file c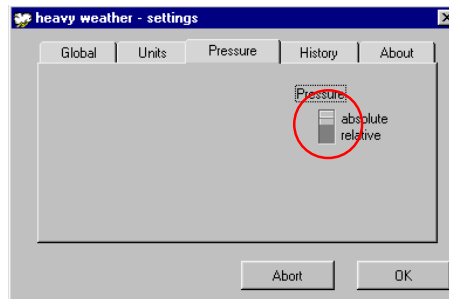hange. However, the user must create new history files since there must be more than one file saved in order to select a file change.
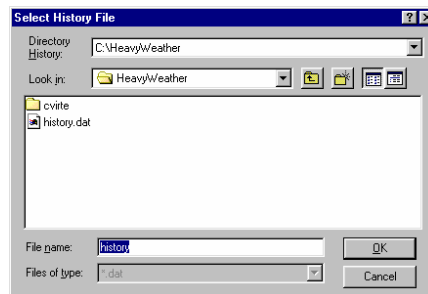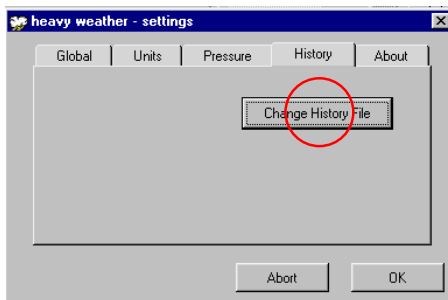
Creating new history files:
1) Click Change History File button to open the Select History File window
2) Type in a new file name and click OK
3) The file will be saved in the Heavy Weather directory that was created during installation of the Heavy Weather software and will automatically point here when the history files are opened again.

Deleting history files:
1) Use the mouse and click once to highlight the file to be deleted and press the delete key on your keyboard to deleted the file(s)
2) After the file(s) are deleted and before exiting the Select History File window, the user must select or create a history file for the weather data otherwise the weather history cannot register and a error prompt will appear for the user to create or select a history file
3) Alternatively, delete the file directly from the Heavy Weather directory

7.5 Changing of the history file from the history window:
As described in features and displayed information above, the weather data is automatically saved from the current period to form a history of the weather events. The illustrations below provide the full setting features of the history file for the Heavy Weather program:
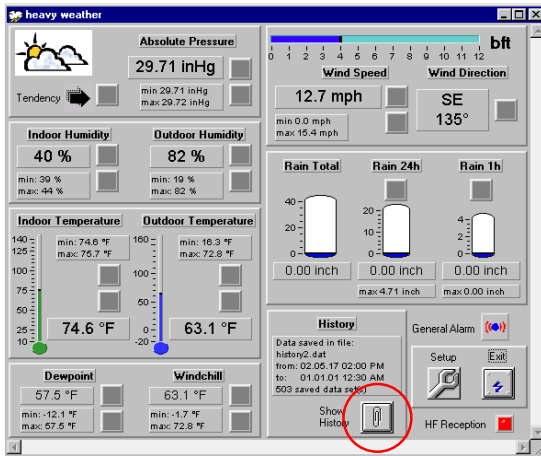
Right click to enter History File
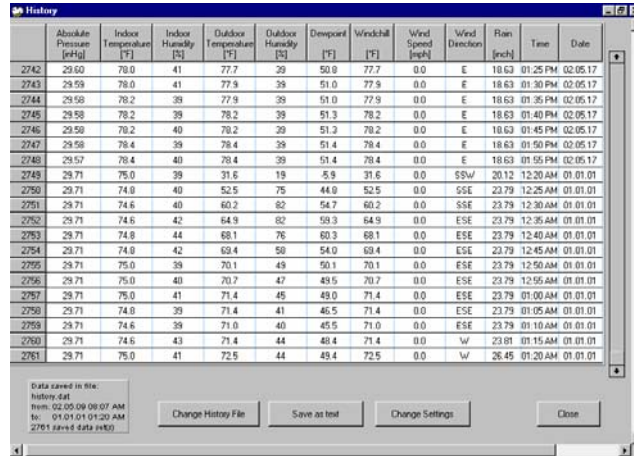
History file

7.5.1 Changing the history file from the history window
1) Click the change history file button to open the select history file window
2) Click the file name to highlight selection or type in the file name and click OK to confirm and return to the history file window
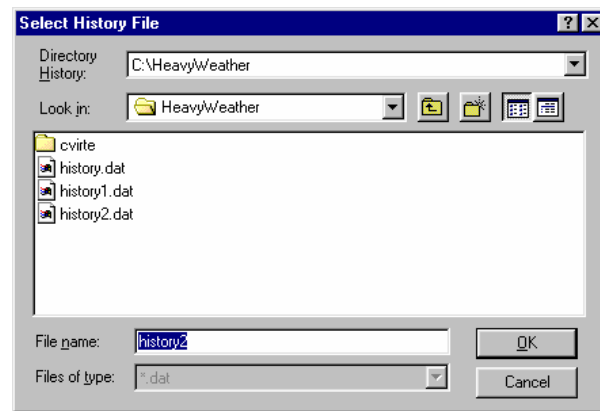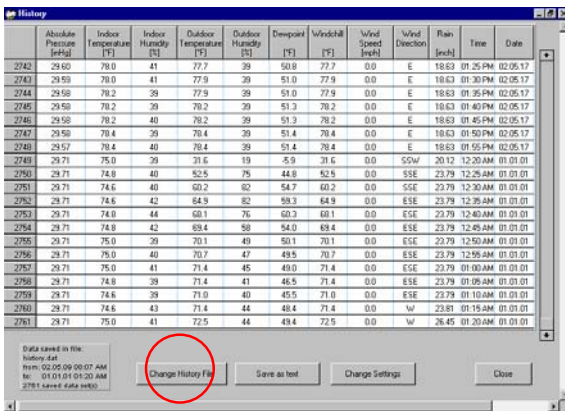
7.5.2 Save as text file:
1) Click the save as text button to open the select text file window
2) Enter the file name you wish to save (example weather.txt) and click OK to confirm and return back to the history file window
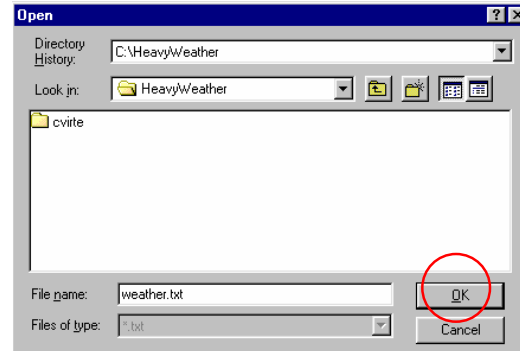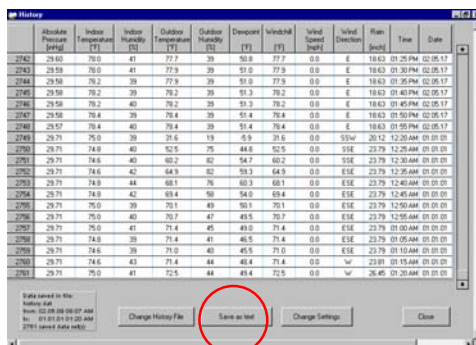
Note: For a detailed explanation on how to save a text file and create useful statistics and graphs for your saved weather history, please see appendix 1 at the end of this manual.

7.5.3 Recording interval setting from 1 minute up to 60 hours (default setting 1 hour)

1) Click the change settings button to open the change history settings window
2) Select the desired hour and minutes setting in the history period box and click the change button to confirm and return back to the history file window

7.5.4 Setting of interval for reading the next set of weather data from 1 minute up to 60 hours

1) Click the change settings button to open the change history settings window
2) Select the desired hour and minutes setting in the next data set in and click the change button to confirm and return back to the history file window

Note: To return to the main Heavy Weather window, click the close button in the history file or the window can be minimized

8.0 Alarms setting
The Weather Station has a total 13 alarm modes:
1. Time alarm
2. Storm warning alarm
3. Indoor temperature alarm (high) and Indoor temperature alarm (low)
4. Outdoor temperature alarm (high) and Outdoor temperature alarm (low)
5. Indoor humidity alarm (high) and Indoor humidity alarm (low)
6. Outdoor humidity alarm (high) and Outdoor humidity alarm (low)
7. Wind chill alarm (high) and Wind chill alarm (low)
8. Dew point alarm (high) and Dew point alarm (low)
9. Rainfall 24h alarm
10. Rainfall 1h alarm
11. Pressure alarm (high) and Pressure alarm (low)
12. Wind speed alarm (high) and Wind speed alarm (low)
13. Wind direction alarm

"Heavy Weather" program allows the programming of a multitude of alarm capabilities at various weather conditions. For alarm setting capabilities, see table below.

Item	Alarm	Low Alarm	High Alarm
Time alarm			
Storm warning alarm	●		
Indoor temperature alarm		●	●
Indoor humidity alarm		●	●
Outdoor temperature alarm		●	●
Outdoor humidity alarm		●	●
Rainfall 24 hour	●		
Rainfall 1 hour	●		
Dew point alarm		●	●
Pressure alarm		●	●
Wind chill alarm		●	●
Wind velocity alarm		●	●
Wind direction alarm	●		

Set each alarm as follows:

8.1 Storm Warning alarm - setting

1) Place your cursor over the tendency alarm box and right click the mouse open the storm warning alarm window
2) Click the alarm active box to set the storm alarm
3) Click the set button to confirm
4) The storm alarm is now set and will activate when the inHg level set into the base station is reached (for setting the storm warning from the base station or for setting the inHg thresholds for weather forecast sensitivity, see main instruction manual).
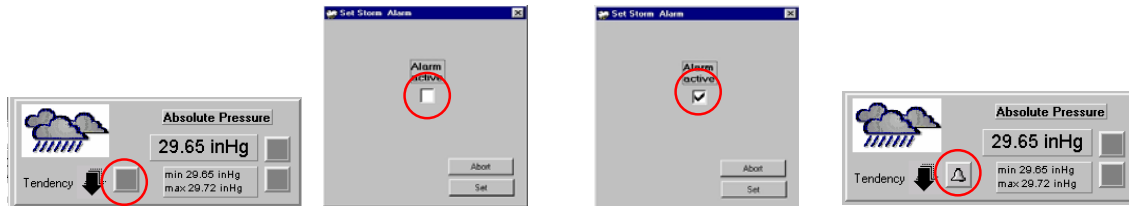
Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.2 Relative or Absolute Pressure High Alarm Setting

1) Place your cursor over the relative or absolute pressure high alarm box and right click the mouse to open the relative or absolute pressure alarm high window
2) Drag the cursor over the sliding scale to set the desired inHg pressure high or enter the inHg quantity in the box provided
3) Click the alarm active box to set the relative or absolute pressure high alarm
4) Click the set button to confirm
5) The relative or absolute pressure alarm high alarm is now set and will activate when the set inHg level is reached (for setting relative or absolute pressure high alarm setting from the base station, see main instruction manual).

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.3 Absolute or Relative Pressure Low Alarm Setting

1) Place your cursor over the absolute or relative pressure low alarm box and right click the mouse to open the relative or absolute pressure low alarm window
2) Drag the cursor over the sliding scale to set the desired inHg pressure low or enter the inHg in the box provided
3) Click the alarm active box to set the absolute or relative pressure low alarm
4) Click the set button to confirm
5) The absolute or relative pressure low alarm is now set and will activate when the set inHg level is reached (for setting the absolute or relative pressure low alarm setting from the base station, see main instruction manual).

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.4 Indoor Humidity High Alarm Setting

1) Place your cursor over the indoor humidity high alarm box and right click the mouse to open the indoor humidity high alarm window
2) Drag the cursor over the sliding scale to set the desired indoor humidity high or enter the humidity in the box provided
3) Click the alarm active box to set the indoor humidity high alarm
4) Click the set button to confirm
5) The indoor humidity high alarm is now set and will activate when the set indoor humidity level is reached (for setting the indoor humidity high alarm setting from the base station, see main instruction manual).

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.5 Indoor Humidity Low Alarm Setting

1) Place your cursor over the indoor humidity low alarm box and right click the mouse to open the indoor humidity low alarm window
2) Drag the cursor over the sliding scale to set the desired indoor humidity low or enter the humidity in the box provided
3) Click the alarm active box to set the indoor humidity low alarm
4) Click the set button to confirm
5) The indoor humidity low alarm is now set and will activate when the set humidity level is reached (for setting the indoor humidity low alarm setting from the base station, see main instruction manual).

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.6 Outdoor Humidity High Alarm Setting

1) Place your cursor over the outdoor humidity high alarm box and right click the mouse to open the outdoor humidity high alarm window
2) Drag the cursor over the sliding scale to set the desired outdoor humidity high or enter the humidity in the box provided
3) Click the alarm active box to set the outdoor humidity high alarm
4) Click the set button to confirm
5) The outdoor humidity high alarm is now set and will activate when the set outdoor humidity level is reached (for setting the outdoor humidity high alarm setting from the base station, see main instruction manual).
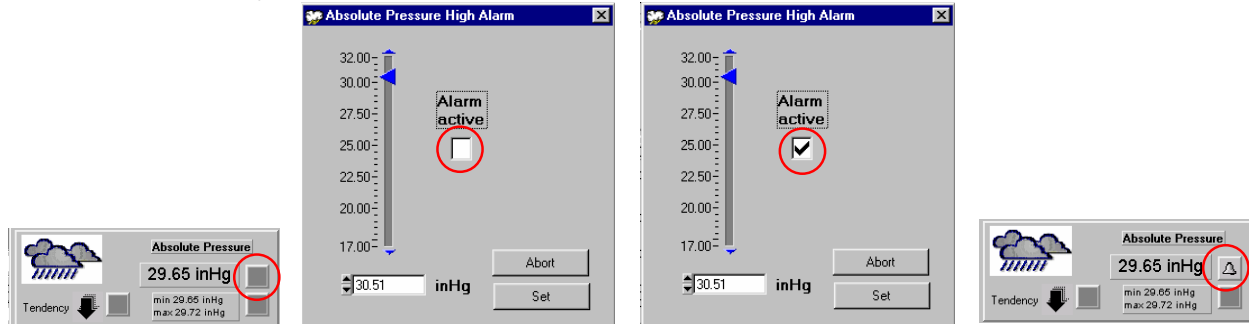
Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.7 Outdoor Humidity Low Alarm Setting

1) Place your cursor over the outdoor humidity low alarm box and right click the mouse to open the outdoor humidity low alarm window
2) Drag the cursor over the sliding scale to set the desired indoor humidity low or enter the humidity in the box provided
3) Click the alarm active box to set the outdoor humidity low alarm
4) Click the set button to confirm
5) The outdoor humidity low alarm is now set and will activate when the set humidity level is reached (for setting the outdoor humidity low alarm setting from the base station, see main instruction manual).
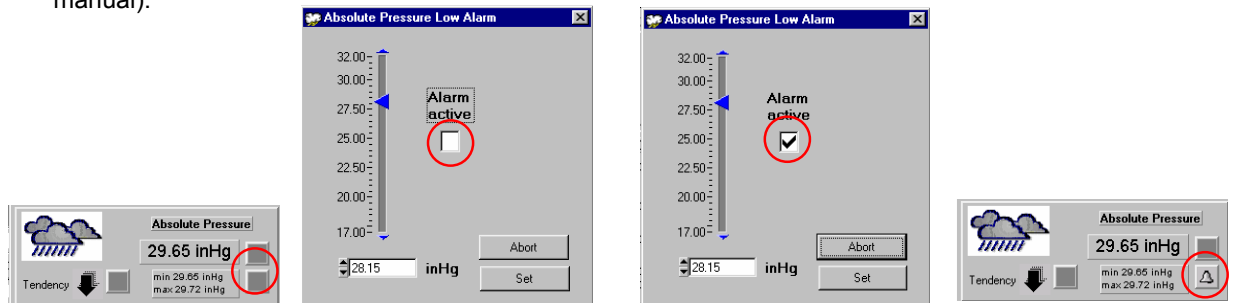
Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.8 Indoor Temperature High Alarm Setting

1) Place your cursor over the Indoor temperature high alarm box and right click the mouse to open the indoor temperature high alarm window
2) Drag the cursor over the sliding scale to set the desired indoor temperature high or enter the temperature in the box provided
3) Click the alarm active box to set the indoor temperature high alarm
4) Click the set button to confirm
5) The indoor temperature high alarm is now set and will activate when the set indoor temperature level is reached (for setting the indoor temperature high alarm from the base station, see main instruction manual).
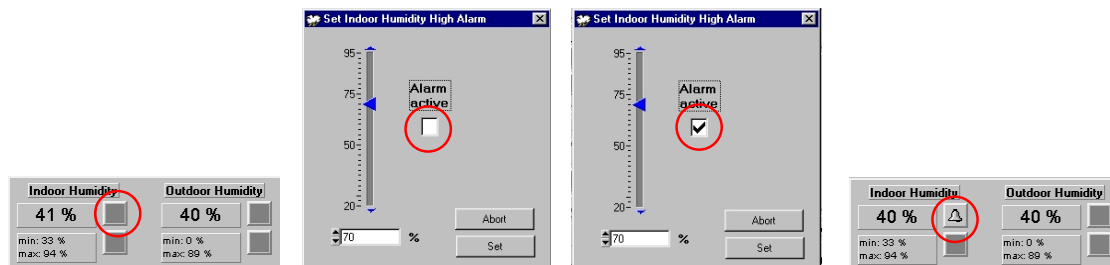

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.9 Indoor Temperature Low Alarm Setting

1) Place your cursor over the Indoor temperature low alarm box and right click the mouse to open the indoor temperature high alarm window
2) Drag the cursor over the sliding scale to set the desired indoor temperature low or enter the temperature in the box provided
3) Click the alarm active box to set the indoor temperature low alarm
4) Click the set button to confirm
5) The indoor temperature low alarm is now set and will activate when the set indoor temperature level is reached (for setting the indoor temperature low alarm from the base station, see main instruction manual).
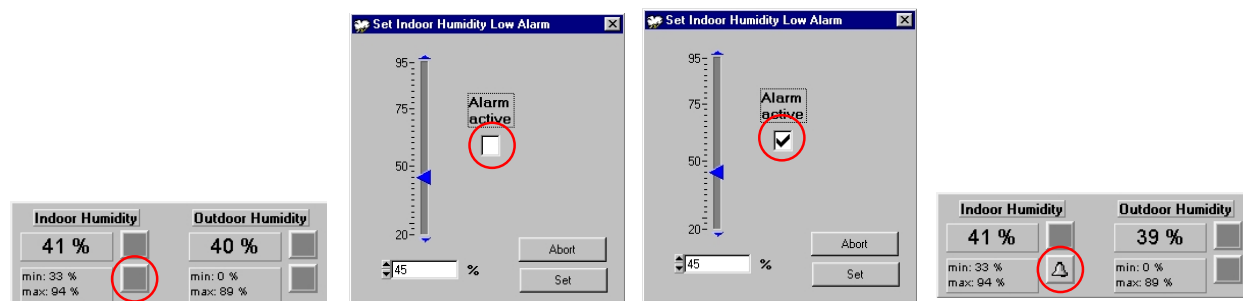

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.10 Outdoor Temperature High Alarm Setting

1) Place your cursor over the outdoor temperature high alarm box and right click the mouse to open the outdoor temperature high alarm window
2) Drag the cursor over the sliding scale to set the desired outdoor temperature high or enter the temperature in the box provided
3) Click the alarm active box to set the outdoor temperature high alarm
4) Click the set button to confirm
5) The outdoor temperature high alarm is now set and will activate when the set outdoor temperature level is reached (for setting the outdoor temperature high alarm from the base station, see main instruction manual).
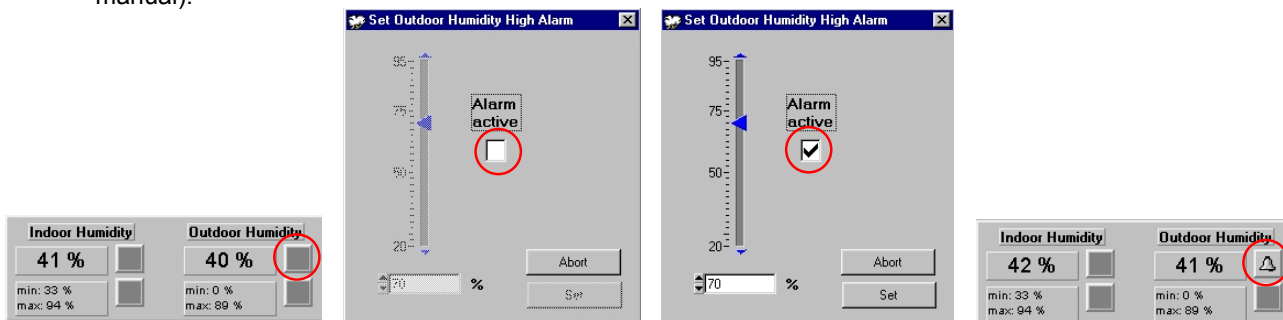

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.11 Outdoor Temperature Low Alarm Setting

1) Place your cursor over the outdoor temperature low alarm box and right click the mouse to open the outdoor temperature low alarm window
2) Drag the cursor over the sliding scale to set the desired outdoor temperature low or enter the temperature in the box provided
3) Click the alarm active box to set the outdoor temperature low alarm
4) Click the set button to confirm
5) The outdoor temperature low alarm is now set and will activate when the set outdoor temperature level is reached (for setting the outdoor temperature low alarm from the base station, see main instruction manual).
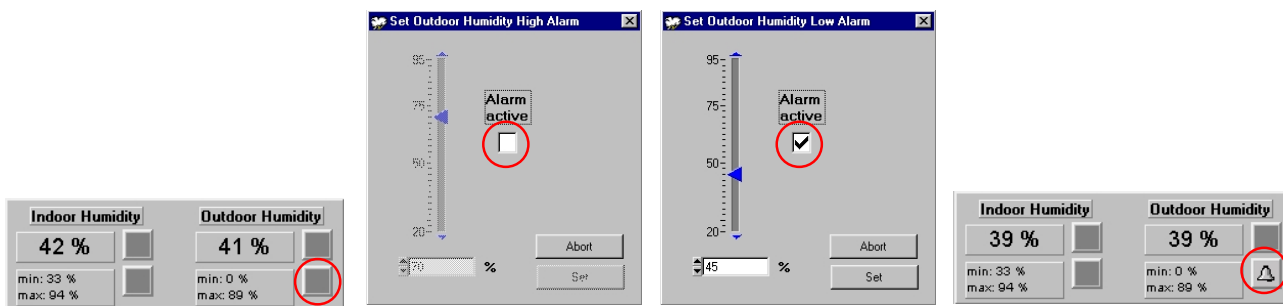

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting
Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.12 Dew Point High Alarm Setting

1) Place your cursor over the dew point high alarm box and right click the mouse to open the dew point high alarm window
2) Drag the cursor over the sliding scale to set the desired dew point temperature or enter the temperature in the box provided
3) Click the alarm active box to set the dew point high alarm
4) Click the set button to confirm
5) The dew point high alarm is now set and will activate when the set dew point temperature level is reached (for setting the dew point high alarm from the base station, see main instruction manual).
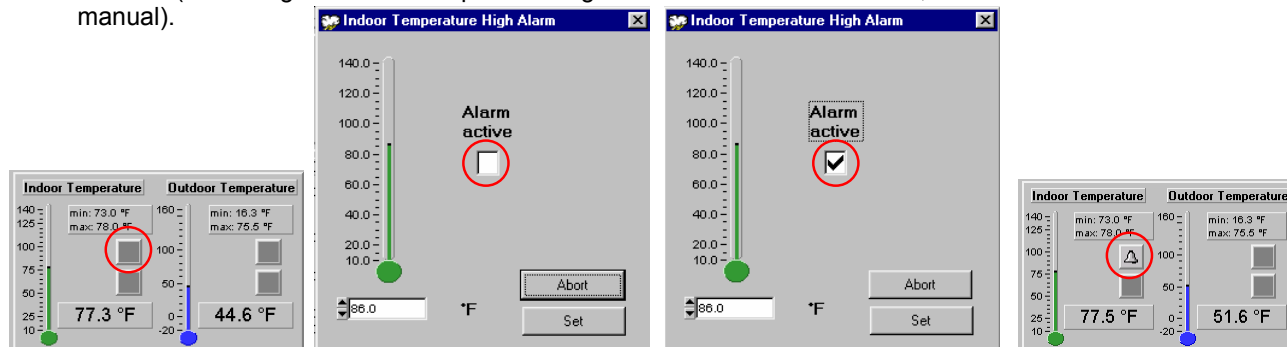

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.13 Dew Point Low Alarm Setting

1) Place your cursor over the dew point low alarm box and right click the mouse to open the dew point low alarm window
2) Drag the cursor over the sliding scale to set the desired dew point temperature or enter the temperature in the box provided
3) Click the alarm active box to set the dew point low alarm
4) Click the set button to confirm
5) The dew point low alarm is now set and will activate when the set dew point temperature level is reached (for setting the dew point low alarm from the base station, see main instruction manual).
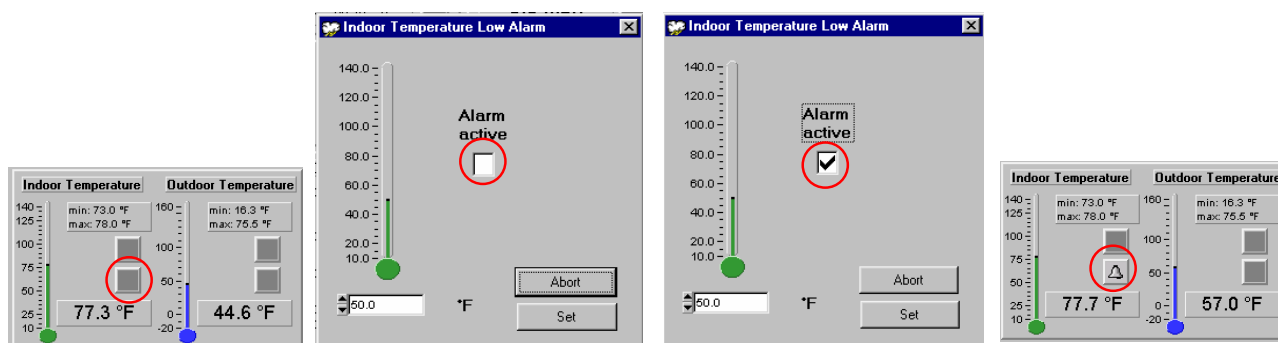

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.14 Wind Chill High Alarm Setting

1) Place your cursor over the wind chill high alarm box and right click the mouse to open the wind chill high alarm window
2) Drag the cursor over the sliding scale to set the desired wind chill temperature or enter the temperature in the box provided
3) Click the alarm active box to set the wind chill high alarm
4) Click the set button to confirm
5) The wind chill high alarm is now set and will activate when the set wind chill temperature level is reached (for setting the wind chill high alarm from the base station, see main instruction manual).
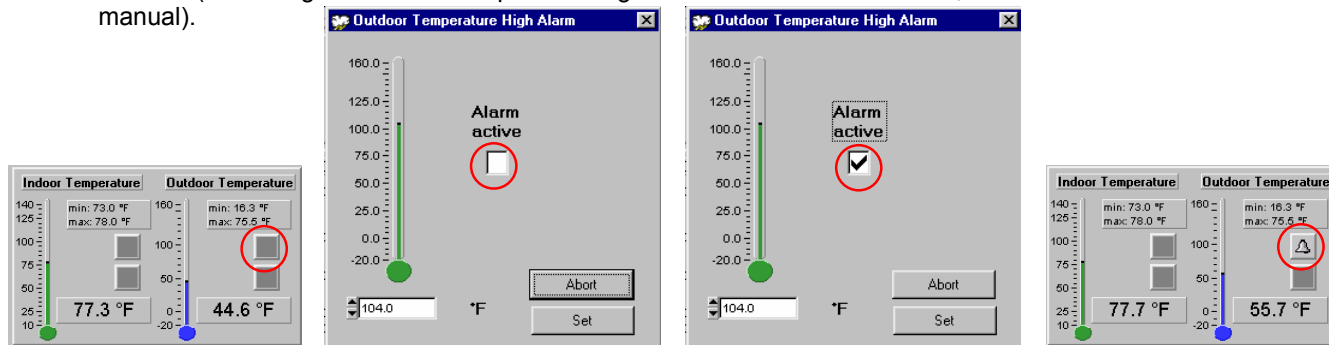

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.15 Wind Chill Low Alarm Setting

1) Place your cursor over the wind chill low alarm box and right click the mouse to open the wind chill low alarm window
2) Drag the cursor over the sliding scale to set the desired wind chill temperature or enter the temperature in the box provided
3) Click the alarm active box to set the wind chill low alarm
4) Click the set button to confirm
5) The wind chill low alarm is now set and will activate when the set wind chill temperature level is reached (for setting the wind chill low alarm from the base station, see main instruction manual).
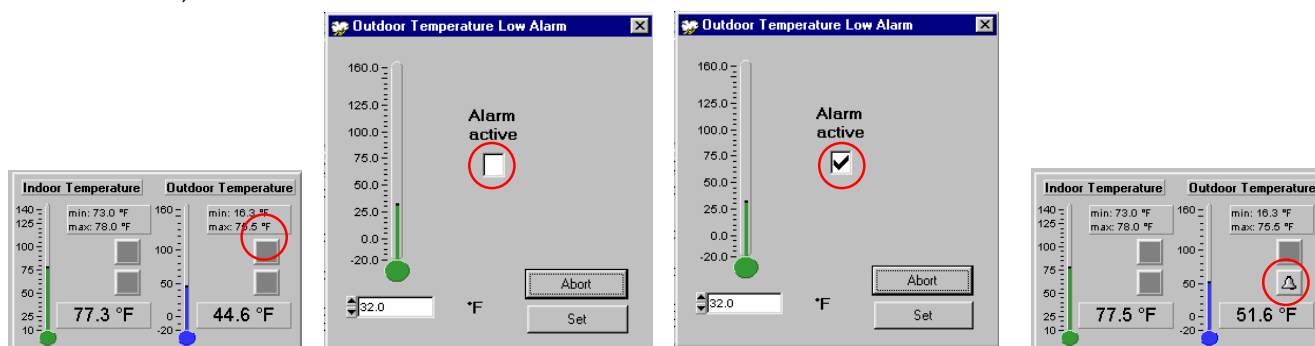

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.16 Wind Speed High Alarm Setting

1) Place your cursor over the wind speed high alarm box and right click the mouse to open the wind speed high alarm window
2) Drag the cursor over the sliding scale to set the desired wind speed or enter the wind speed in the box provided
3) Click the alarm active box to set the wind speed high alarm
4) Click the set button to confirm
5) The wind speed high alarm is now set and will activate when the set wind speed is reached (for setting the wind speed high alarm from the base station, see main instruction manual).

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.17 Wind Speed Low Alarm Setting

1) Place your cursor over the wind speed low alarm box and right click the mouse to open the wind speed low alarm window
2) Drag the cursor over the sliding scale to set the desired wind speed or enter the wind speed in the box provided
3) Click the alarm active box to set the wind speed low alarm
4) Click the set button to confirm
5) The wind speed low alarm is now set and will activate when the set wind speed is reached (for setting the wind speed low alarm from the base station, see main instruction manual).
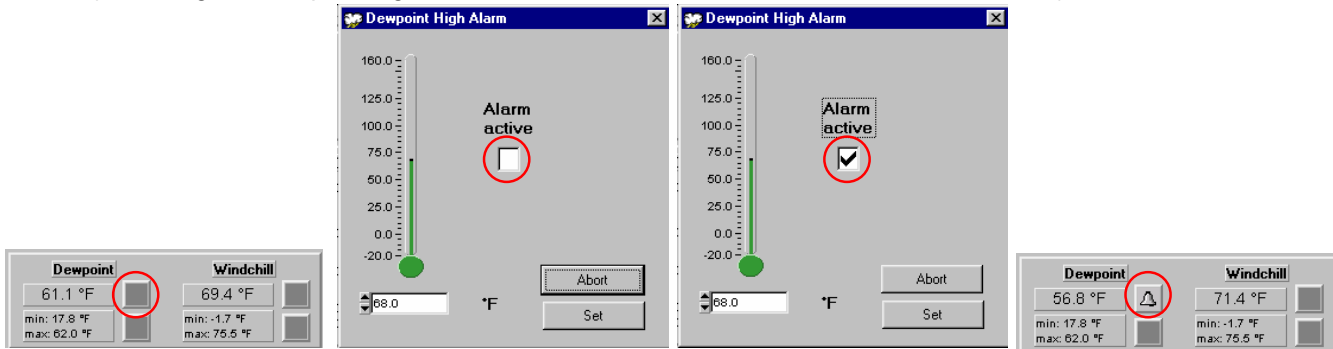
Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.18 Wind Direction Alarm Setting

1) Place your cursor over the wind direction alarm box and right click the mouse to open the wind direction alarm window
2) Click on the wind direction(s) required for activating the wind direction alarm (the example below uses North East, East and South East direction settings, if these wind directions are reached, then the alarm will activate)
3) Click the alarm active box to set the alarm
4) Click the set button to confirm
5) The wind direction alarm is now set and will activate when the set wind direction is reached (for setting the wind direction alarm from the base station, see main instruction manual).
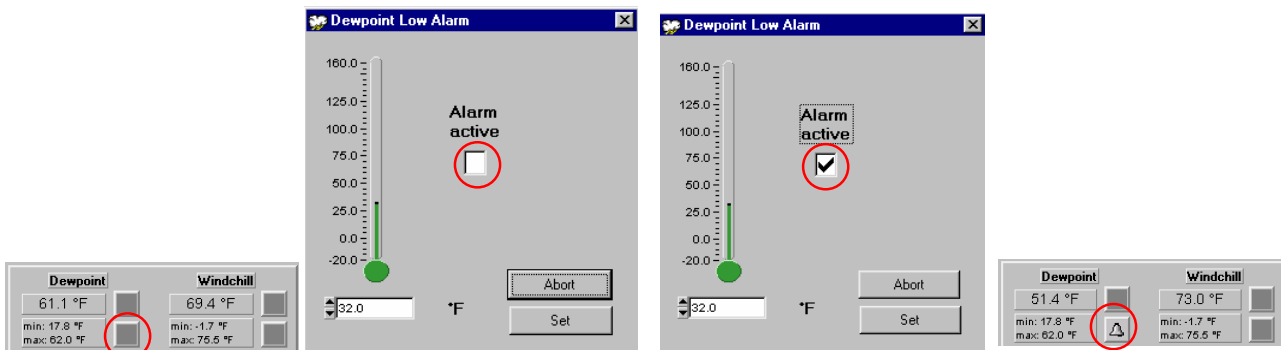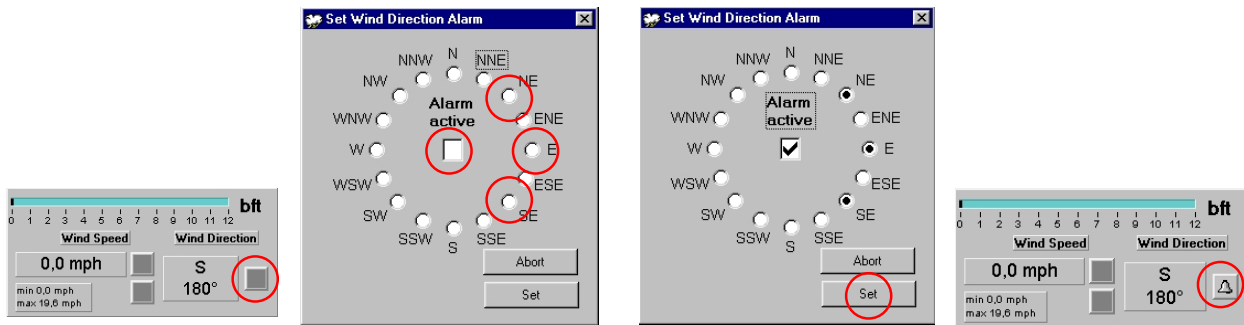

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.19 Rainfall 24 Hour Alarm Setting

1) Place your cursor over the rain 24 hour alarm box and right click the mouse to open the rain 24 hour alarm window
2) Drag the cursor over the sliding scale to set the desired rainfall level or enter the rainfall in the box provided
3) Click the alarm active box to set the alarm
4) Click the set button to confirm
5) The rainfall 24 hour alarm is now set and will activate when the set rainfall level is reached within a 24 hour period (for setting the rainfall 24 hour alarm from the base station, see main instruction manual).
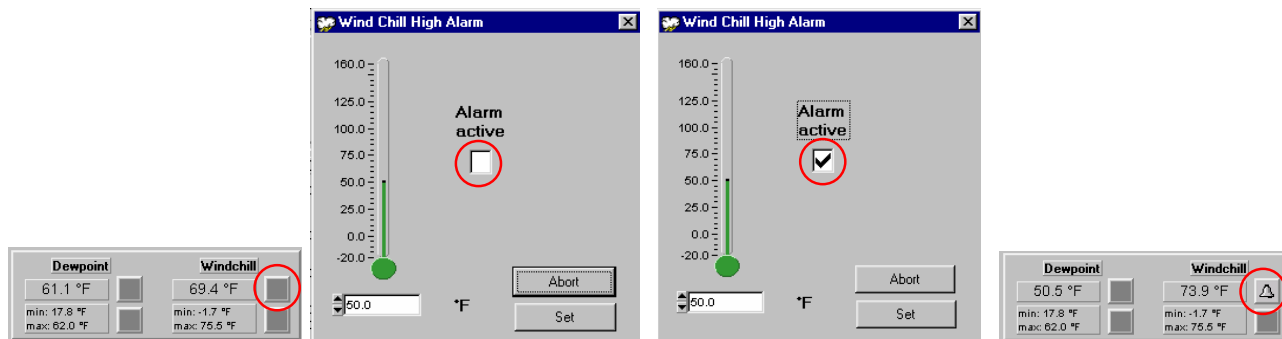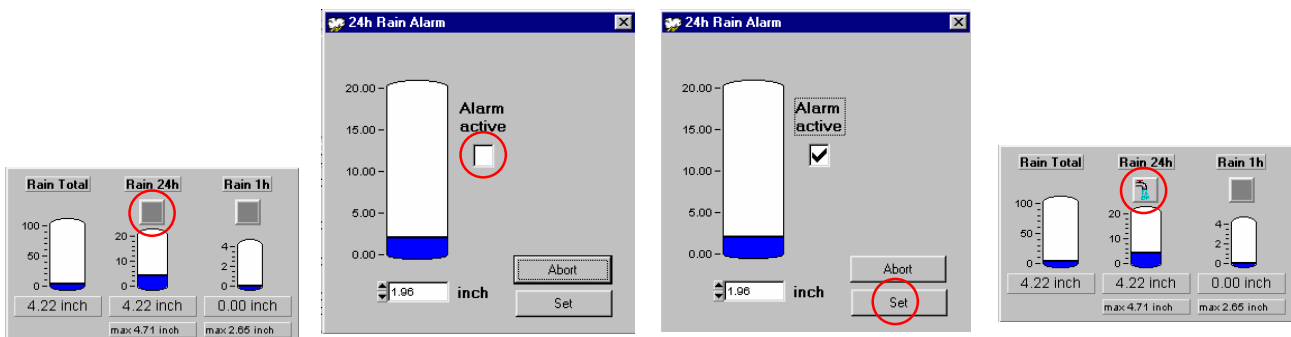

Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.20 Rainfall 1 Hour Alarm Setting

1) Place your cursor over the rain 1 hour alarm box and right click the mouse to open the rain 1 hour alarm window
2) Drag the cursor over the sliding scale to set the desired rainfall level or enter the rainfall in the box provided
3) Click the alarm active box to set the alarm
4) Click the set button to confirm
5) The rainfall 1 hour alarm is now set and will activate when the set rainfall level is reached within a 1 hour period (for setting the rainfall 1 hour alarm from the base station, see main instruction manual).
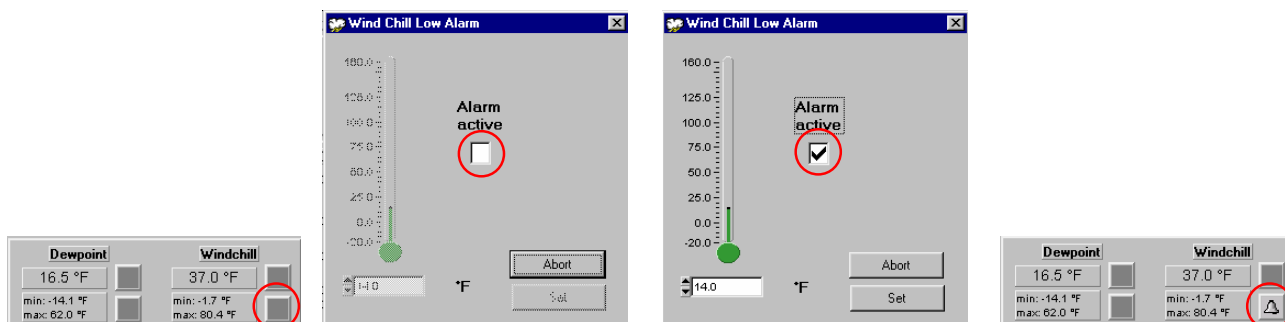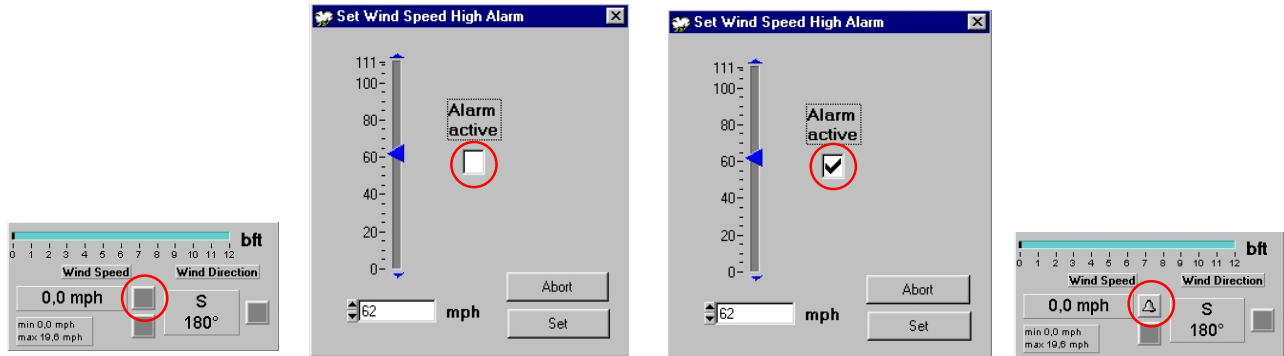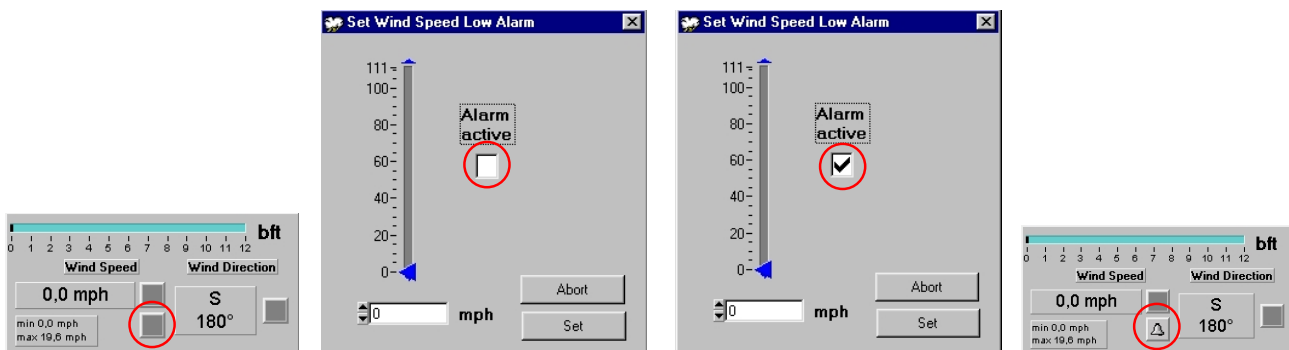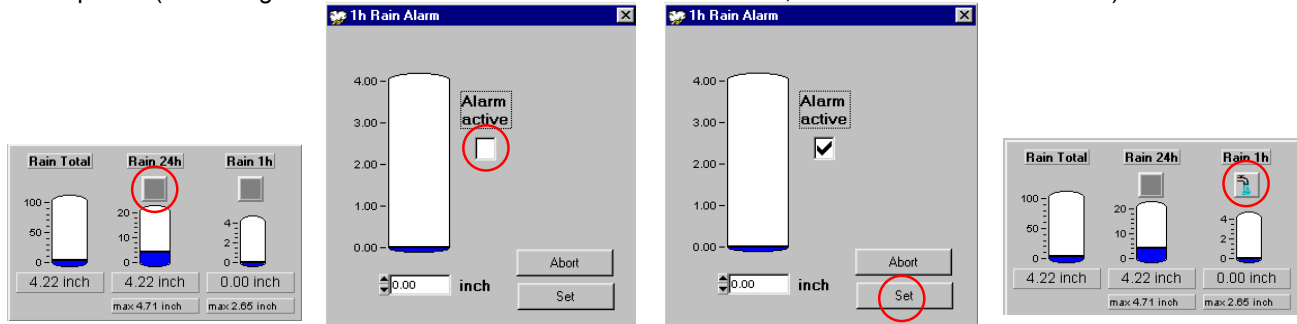
Note: The alarm bell icon may not appear immediately on the Heavy Weather program since it may take few seconds for the program to calculate and confirm the setting

Once the alarm is entered into the Heavy Weather program, the information will be transferred to the base station. In some situations, the alarm icon may not appear immediately on the base station's LCD but will appear after a short delay due the constant data communication between all the sensors, base station and the PC.

8.21 General Alarm Icon
The general alarm icon will light up when any weather condition has been met for the weather alarm settings. This notifies the user that a set weather alarm condition has been reached. To cancel and prpapre the general alarm icon for the next weather event simply right click the mouse to enter clear general alarm window and press the clear button.

8.22 Weather Alarm Notes:
To compensate for fluctuation of the weather data, which may cause the weather alarms to sound constantly if the received data from the sensors is close to user set level, a hysteresis function has been implemented for each weather alarm. For example, if the temperature high alarm is set to **+77°F** and the current temperature value moves to **+78°F**, the alarm will be activated. When the temperature drops to **+76°F** or below and thereafter again increases to beyond **+77°F**, the alarm bell icon will blink, but no alarm will be sounded. The temperature has to drop to below **+75.2°F** (with a pre-set hysteresis of **1.8°F**) so that the alarm can be produced. This function will compensates for the need of constant and unnecessary alarm sounds

Hysteresis values created are given in the following table:

Condition	Hysteresis
Temperature	**1.8ºF**
Humidity	3% RH
Air pressure	**0.0295 inHg**
Rainfall 24h	**0.1968 inch**
Rainfall 1h	**0.01968 inch**
Wind	**3.1 mph**

Important!
If any alarm has been programmed through the Heavy Weather program to the base station, the alarm status will remain in the PC if there is no connection between the base station and the PC or if the base station did not read the alarm setting before the PC is switched off.

In any power reset, for example a change of batteries, the base station will not save any alarm status into its memory bank. All previously set data will be lost and the alarm status is cancelled for both the receiver and PC since the Heavy Weather program will read new data from the base receiver.

9.0 Resetting recorded values
The following recorded values can be reset. Once executed, the records will be reset to their current respective readings:
- Absolute or relative air pressure
- Indoor and outdoor humidity
- Indoor and outdoor temperature
- Dew point
- Wind chill
- Wind speed
- Rainfall in past 24 hours
- Rainfall in the last 1 hour:

9.1 Resetting the min/max absolute or relative air pressure
1) Right click the min/max button to open the pressure min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: **The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.**

9.2 Resetting the min/max indoor humidity
1) Right click the min/max button to open the indoor humidity min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.3 Resetting the min/max outdoor humidity
1) Right click the min/max button to open the outdoor3 humidity min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.4 Resetting the min/max indoor temperature

1) Right click the min/max button to open the indoor temperature min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.5 Resetting the min/max outdoor temperature

1) Right click the min/max button to open the outdoor temperature min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.6 Resetting the min/max dew point
1) Right click the min/max button to open the dew point min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.7 Resetting the min/max wind chill
1) Right click the min/max button to open the wind chill min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.8 Resetting the min/max wind speed
1) Right click the min/max button to open the wind speed min/max details window
2) Click clear min/max details button to return to the Heavy Weather window

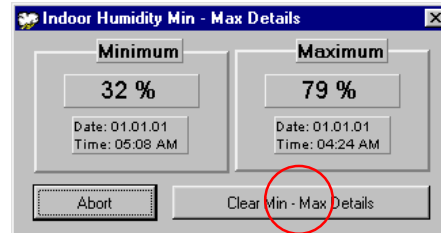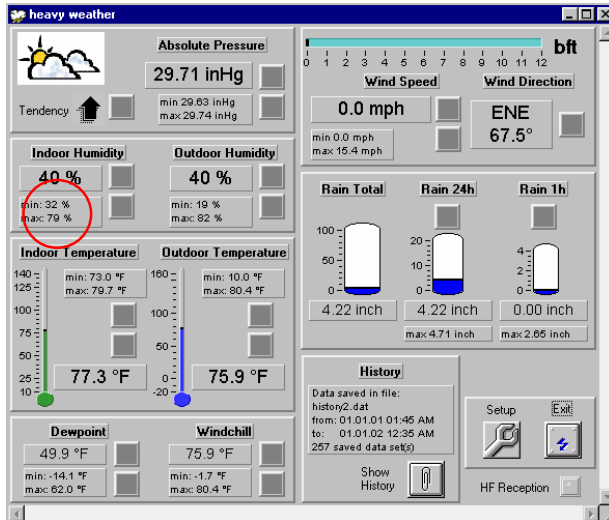**Note:** The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.9 Resetting the rain counter for the rain total
1) Right click the total rain count button to open the clear total window
2) Click clear rain counter button to return to the Heavy Weather window
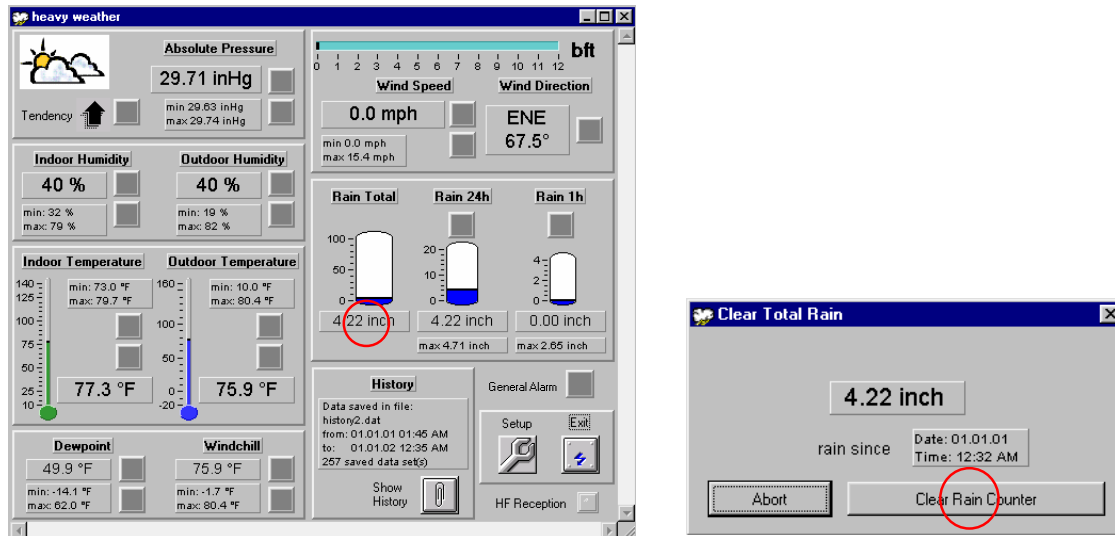
Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.10 Resetting the rain counter for the rain 24 hour
1) Right click the rain 24 hour count button to open the clear rain 24 hour window
2) Click clear rain counter button to return to the Heavy Weather window
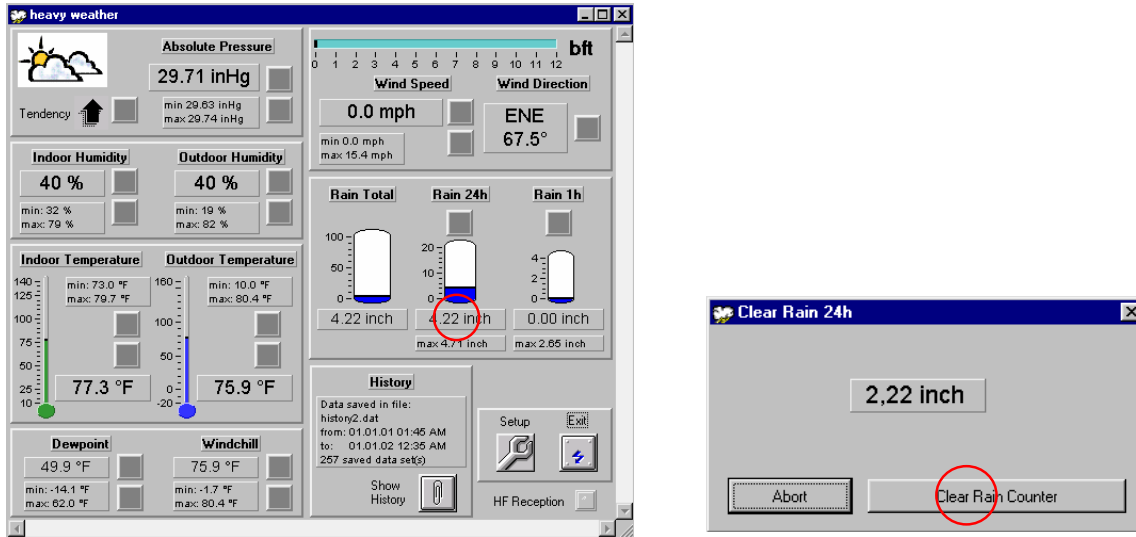
Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.
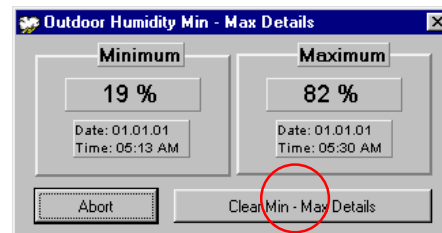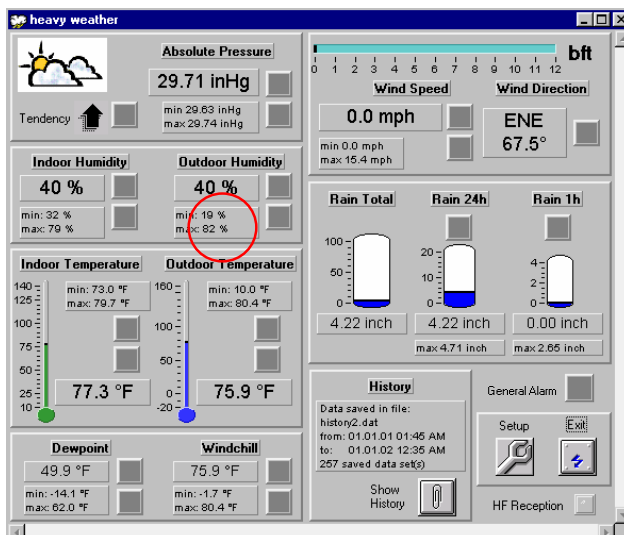
9.11 Resetting the rain counter for the rain 1 hour
1) Right click the rain count 1 hour button to open the clear rain 1hour window
2) Click clear rain counter button to return to the Heavy Weather window
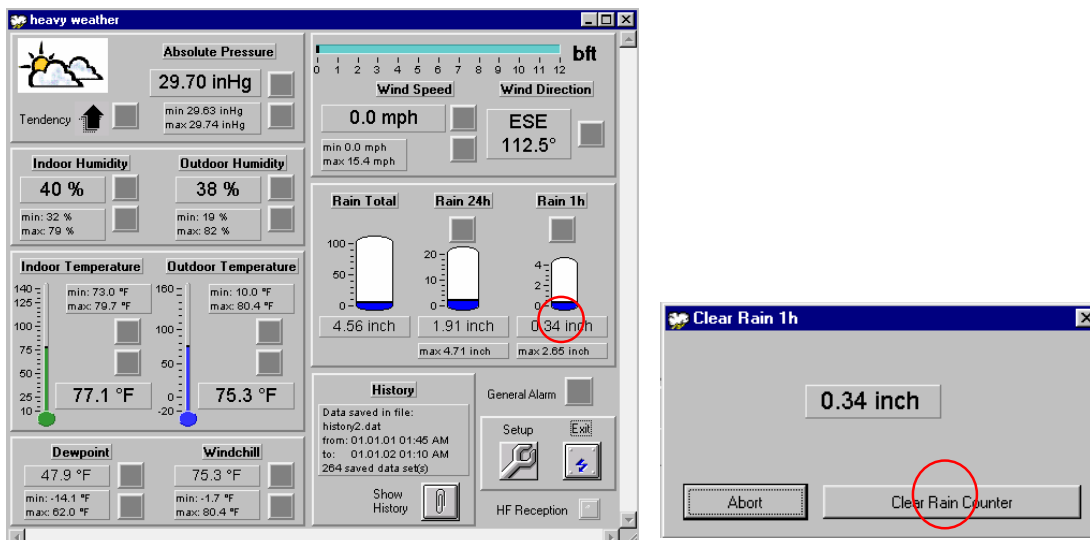
Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.12 Resetting the maximum record for rain 24 hours
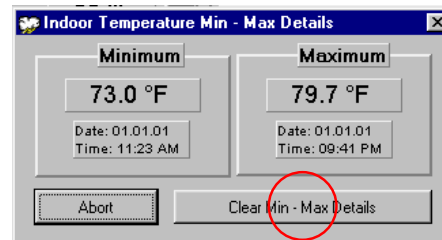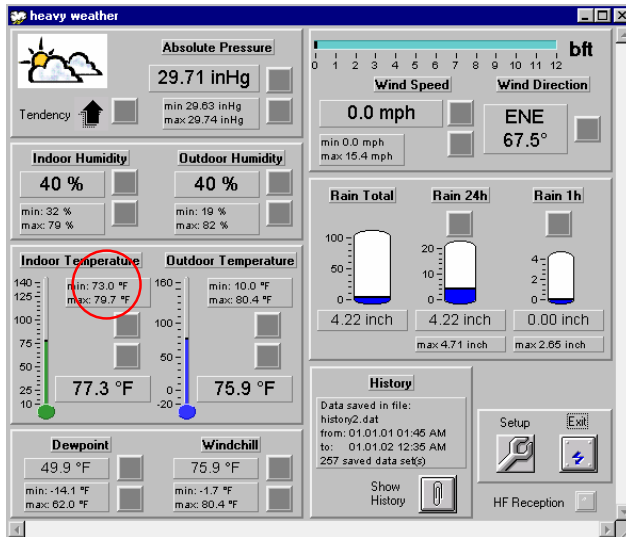1) Right click the max button to open the rain 24h max details window
2) Click clear max details button to return to the Heavy Weather window
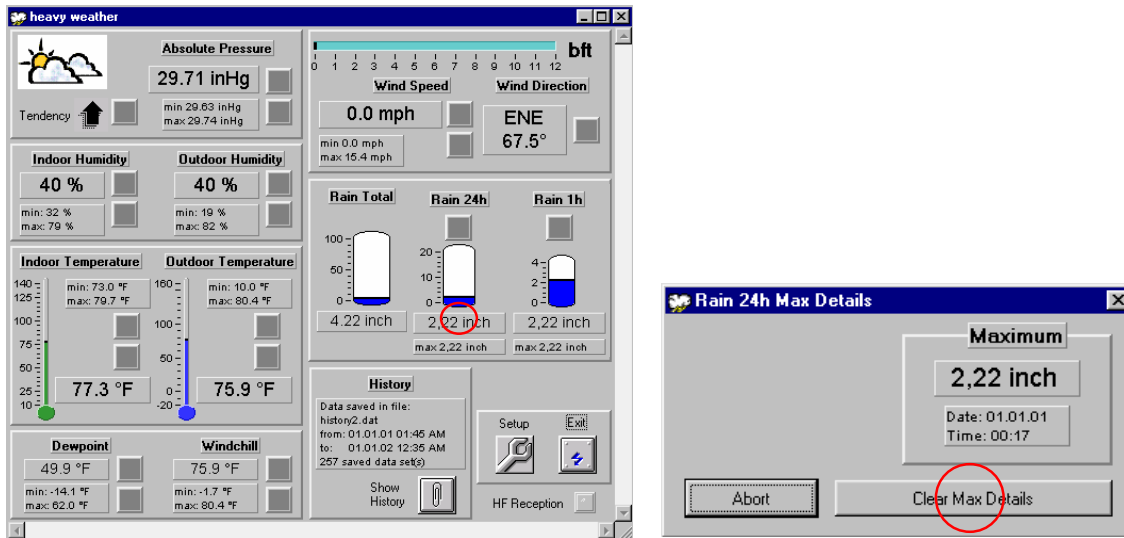
Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.

9.13 Resetting the maximum record for rain in the past 1 hour
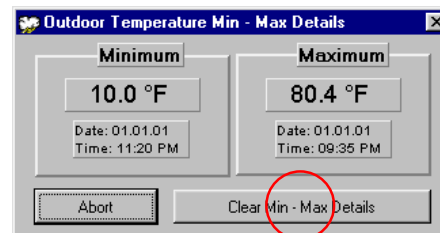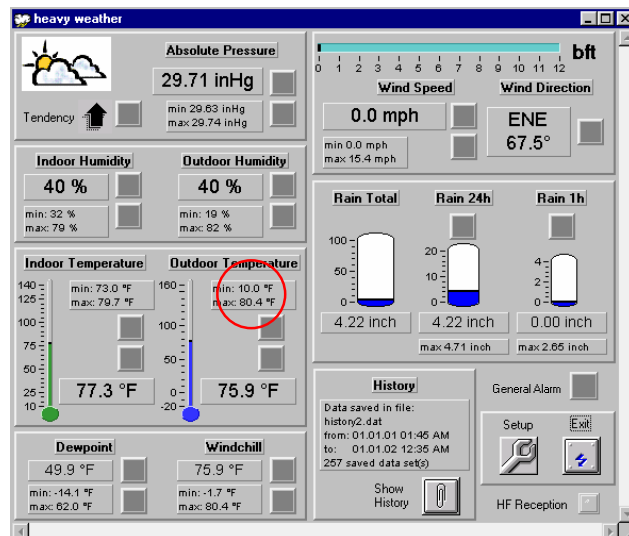3) Right click the max button to open the rain 1h max details window
4) Click clear max details button to return to the Heavy Weather window
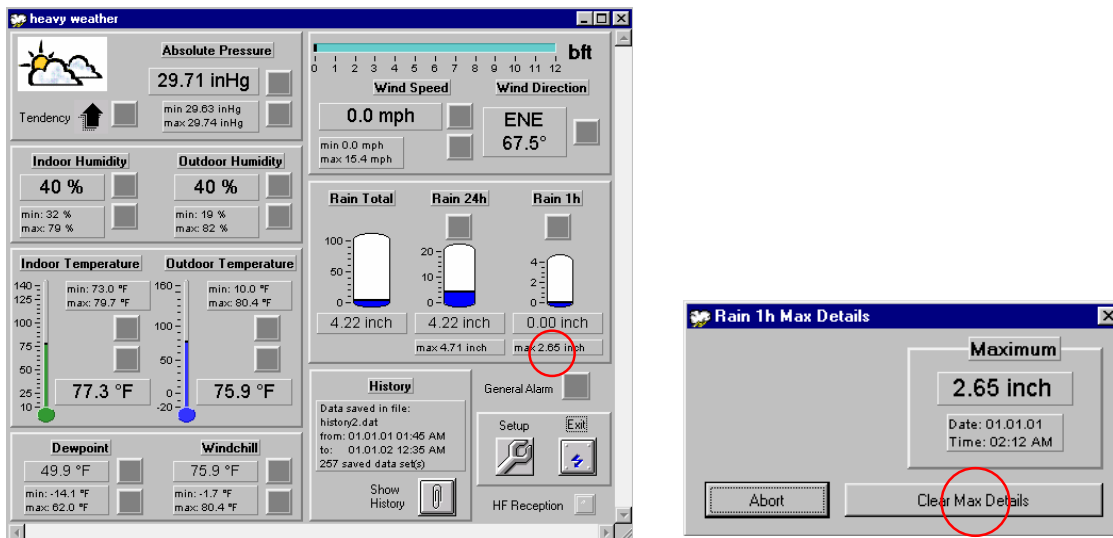
Note: The reset values will flash and may not register on the heavy weather display immediate because the program is still reading the current data from the base station. Due to the masses of data communication between the external sensors, base station and the PC including the high frequency reception, makes a delay of this kind normal. Please note that values cannot be set or reset until the program has executed the current command. Resetting the records on the Heavy Weather program also resets the same-recorded data on the base station.
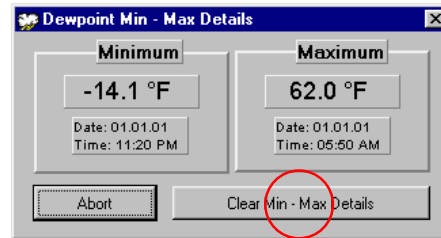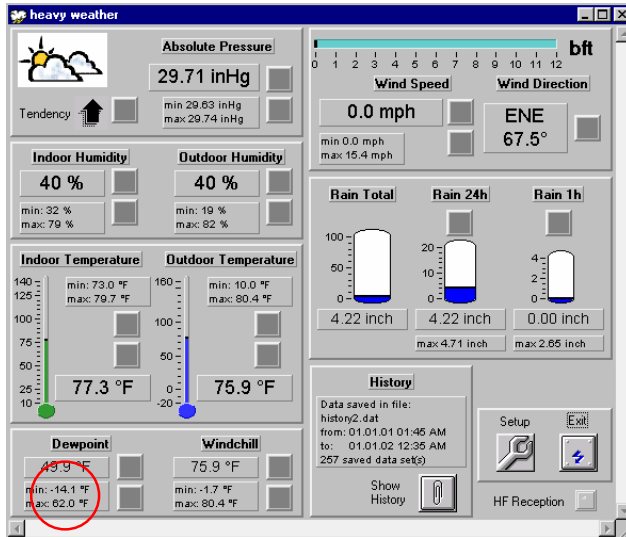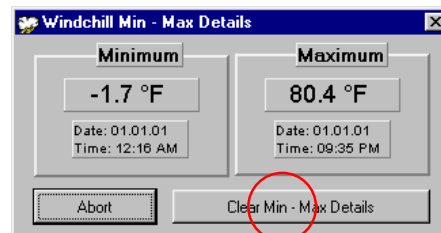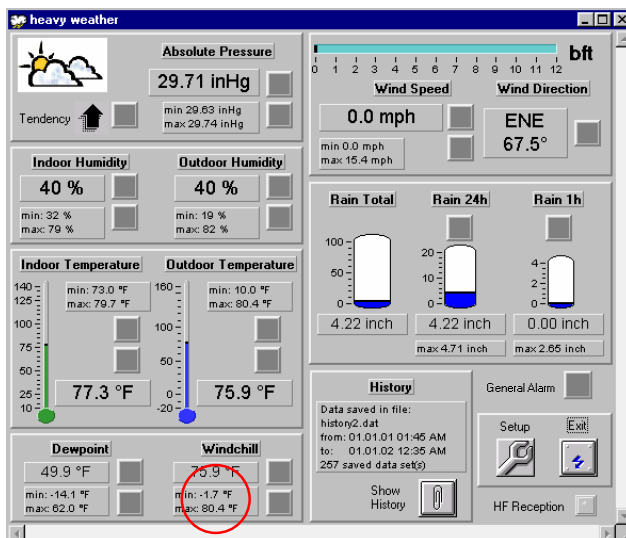
10.0 Exiting the Heavy Weather program
To close the "Heavy Weather" software, simply click on the "Exit" icon
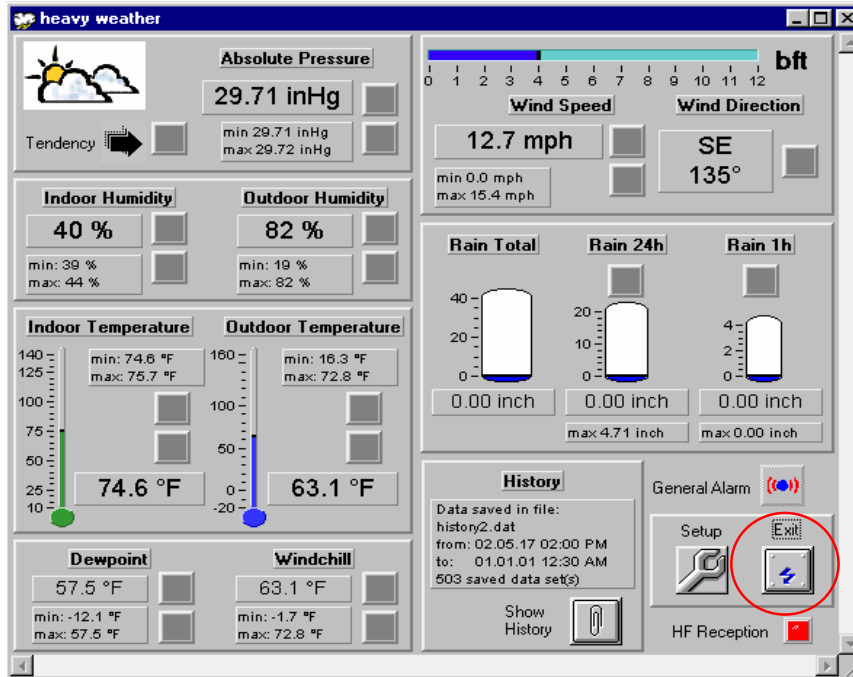
11.0 Technical Data
The following information provides an overview of the technical data of the weather station.

Outdoor data

Transmission Distance in Open Field	:	82ft max.
Outdoor Temperature Range	:	-21.8ºF to +157.8ºF (show "OFL" if outside range)
Resolution	:	0.2ºF
Measuring Range Rel. Humidity	:	20% to 95% (if the relative humidity is less than 20% or greater than 95%, it will display 19% or 96%)
Resolution	:	1%
Rain Volume Display	:	0 to 39.37 inch (1h and 24h rainfall)
		0 to 98.38 inch (Total rainfall)
Resolution	:	0.01 inch
Wind Speed	:	0 to 111.8mph
Resolution	:	0.1mph
Wind Direction	:	Graphic resolution 22.5 Degrees, Numerical Resolution, Letter format

433MHz transmission:

Measuring interval thermo-hygro sensor	:	32 seconds (if wind factor≥22.36 mph) or 128seconds (if wind factor< 22.36mph)
		10 minutes (if the base station fails to receive any data after 5 attempts in a row; all outdoor data readings will display "---", except for the rain value)

With wire data transmission:

Measuring interval thermo-hygro sensor	:	8 seconds

Indoor data

Pressure/ temperature	:	4 times per minute
Indoor Temperature Range	:	-14.1ºF to +139.8ºF (shows "OFL" if outside range)
Resolution	:	0.2ºF
Measuring Range Rel. Humidity	:	20% to 95% (if the relative humidity is less than 20% or greater than 95%, it will display 19% or 96%)
Resolution	:	1%
Relative humidity checking interval	:	every 30 seconds
Measuring Range Air Pressure	:	27.16 inHg to 31.89 inHg
Resolution	:	0.01 inHg

Alarm duration	:	2 minutes (approx.)

Power consumption
Base Station

Batteries	:	3 x AA, IEC LR6, 1.5V (Alkaline recommended)
or AC power	:	Input 120V AC 60HZ (use the provided AC/DC adapter only)
Thermo-hygro sensor	:	2 x AA, IEC LR6, 1.5V (or can draw power from the adaptor if used)

Dimensions (L x W x H):

Base Station:	:	6.7 x 1.4 x 5.5 inches (6.5ft cable for connection to the PC)
Thermo-hygro sensor	:	2.8 x 2.9 x 3.3 inches (16ft cable for connection to base station)
Rain sensor	:	5.5 x 2.7 x 5.4 inches (plus 32ft cable connects to thermo-hygro sensor)
Wind sensor	:	2.4 x 7.8 x 11.5 inches (plus 32ft cable connects to thermo hygro sensor)

12.0 Operating Range

Under optimum conditions in an open field a range of up to 82ft wireless transmission is possible, i.e. when there is 'visual' contact between the sensors and base station. Walls and reinforced concrete constructions can be passed through, but they do reduce the operating distance accordingly. A reduced operating range may be due to the following reasons:

- High frequency interference from other sources.
- Buildings of all types and trees.
- Especially in the case of the wind sensor, metal roofs or roof insulation with foil sealed glass wool can reduce the range.
- Transmitter and receiver clearance from conductive surfaces or objects that give radiation characteristic and thus the range
- Neighboring using units operating on the same frequencies may affect the receiver.
- Poorly screened PCs may affect the receiver and reduce the reception ranges

13.0 Understanding Displayed Weather Data

When the transfer of the updated weather information occurs or the user has entered new settings (for example setting high and low alarms) from the base station to the PC, there may be a very small time delay until the data is updated to the PC. For this reason new data may not be displayed immediately onto your PC even though it has been changed on the base station. The base station experiences this same short time delay when new data settings are entered from the PC before the base station can recognize and shows this on the LCD.

During the high frequency reception periods from the outdoor sensors to the base station, any data transfer from the base station to the PC or vice versa will experience a longer time delay due to the mass amounts of weather information being simultaneously received and transmitted from the sensors to the base station which is why any data changes made by the user may not register immediately. Time delay of data reception and transfer is normal so when newly entered data does not immediately register from the base station to the PC or vice versa it is due to the frequent communication between all the sensors and base station and the PC.

Furthermore, due the constant weather information updating from the sensors to the base station, the data displayed on the PC may not be the updated information received by the base station since the data may not have been transferred to the PC yet. Therefore users may experience different sets of data shown on the base station and the Heavy Weather program until such time the data is updated to the PC. The Heavy

Weather program only displays the information received by the base station and does not receive any data directly from the sensors.
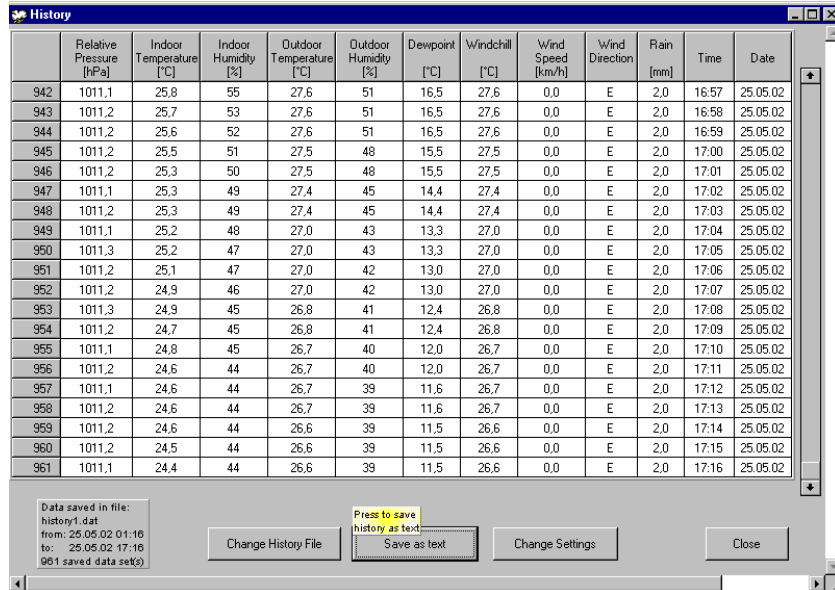
14.0 Problems and Solutions

Problems	Cause	Solutions
Undefined values after starting up on the PC	Loose connection of cables	- Ensure that the PC COM port cable is properly connected to the base station (receiver). - Ensure that the correct COM is selected in the set up menu on the program
No 433MHz reception	Distance between the base station and the sensors are too great	Reduce the distance between sensors and receiver to ensure reception
No reception within a short distance	Interfering material between sensor and receiver (thick walls	Find a new location for the transmitter or receiver or use cable connection between the base station and the sensors
Batteries of sensors or receiver empty	Faulty batteries	Change batteries to use those of the recommended type
Sensors superimposed by source of interference	Radios, headphones or loudspeakers and items operating on the same 433MHz frequency	Eliminate the source of the interference or find a new location for the sensor. Faults are often restricted for limited periods (radio communication) or can be easily eliminated. If a unit, e.g. radio headphones, remote babysitter, etc is operated nearby at 433 MHz, the period of activity is normally limited. Most of these units can be changed to an interference-free frequency. Such measures can normally eliminate faults effectively**.**

The following is a working example of how to save text files and create charts on other applications.

1. Using the Heavy Weather program, open the History window and save the weather data from the desired history file as a text file by clicking on the Save as text button, enter a text file name and click OK.

History

	Relative Pressure [hPa]	Indoor Temperature [°C]	Indoor Humidity [%]	Outdoor Temperature [°C]	Outdoor Humidity [%]	Dewpoint [°C]	Windchill [°C]	Wind Speed [km/h]	Wind Direction	Rain [mm]	Time	Date
942	1011,1	25,8	55	27,6	51	16,5	27,6	0,0	E	2,0	16:57	25.05.02
943	1011,2	25,7	53	27,6	51	16,5	27,6	0,0	E	2,0	16:58	25.05.02
944	1011,2	25,6	52	27,6	51	16,5	27,6	0,0	E	2,0	16:59	25.05.02
945	1011,2	25,5	51	27,5	48	15,5	27,5	0,0	E	2,0	17:00	25.05.02
946	1011,2	25,3	50	27,5	48	15,5	27,5	0,0	E	2,0	17:01	25.05.02
947	1011,1	25,3	49	27,4	45	14,4	27,4	0,0	E	2,0	17:02	25.05.02
948	1011,2	25,3	49	27,4	45	14,4	27,4	0,0	E	2,0	17:03	25.05.02
949	1011,1	25,2	48	27,0	43	13,3	27,0	0,0	E	2,0	17:04	25.05.02
950	1011,3	25,2	47	27,0	43	13,3	27,0	0,0	E	2,0	17:05	25.05.02
951	1011,2	25,1	47	27,0	42	13,0	27,0	0,0	E	2,0	17:06	25.05.02
952	1011,2	24,9	46	27,0	42	13,0	27,0	0,0	E	2,0	17:07	25.05.02
953	1011,3	24,9	45	26,8	41	12,4	26,8	0,0	E	2,0	17:08	25.05.02
954	1011,2	24,7	45	26,8	41	12,4	26,8	0,0	E	2,0	17:09	25.05.02
955	1011,1	24,8	45	26,7	40	12,0	26,7	0,0	E	2,0	17:10	25.05.02
956	1011,2	24,6	44	26,7	40	12,0	26,7	0,0	E	2,0	17:11	25.05.02
957	1011,1	24,6	44	26,7	39	11,6	26,7	0,0	E	2,0	17:12	25.05.02
958	1011,2	24,6	44	26,7	39	11,6	26,7	0,0	E	2,0	17:13	25.05.02
959	1011,2	24,6	44	26,6	39	11,5	26,6	0,0	E	2,0	17:14	25.05.02
960	1011,2	24,5	44	26,6	39	11,5	26,6	0,0	E	2,0	17:15	25.05.02
961	1011,1	24,4	44	26,6	39	11,5	26,6	0,0	E	2,0	17:16	25.05.02

Data saved in file:
history1.dat
from: 25.05.02 01:16
to: 25.05.02 17:16
961 saved data set(s)

Press to save history as text

Change History File   Save as text   Change Settings   Close

Open

Directory History: C:\history

Look in: history

File name: history1.txt   OK

Files of type: *.txt   Cancel
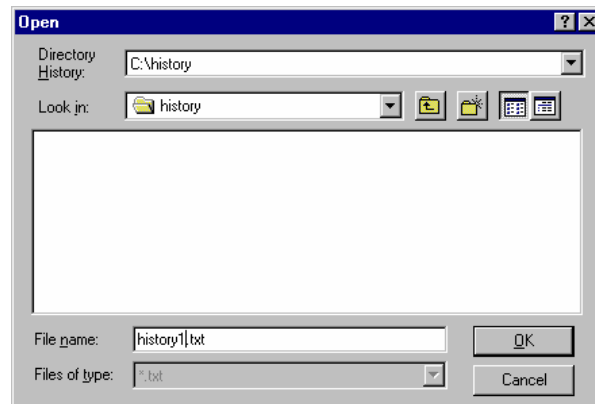
2. Then open the text file that you have just saved (in Heavy Weather directory or your specific directory) using a spreadsheet program like Excel.
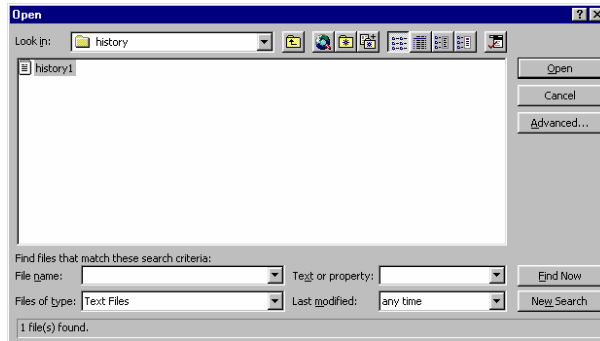
3. The text import wizard window will open. Choose delimited as the separator for each data column and click the next button.
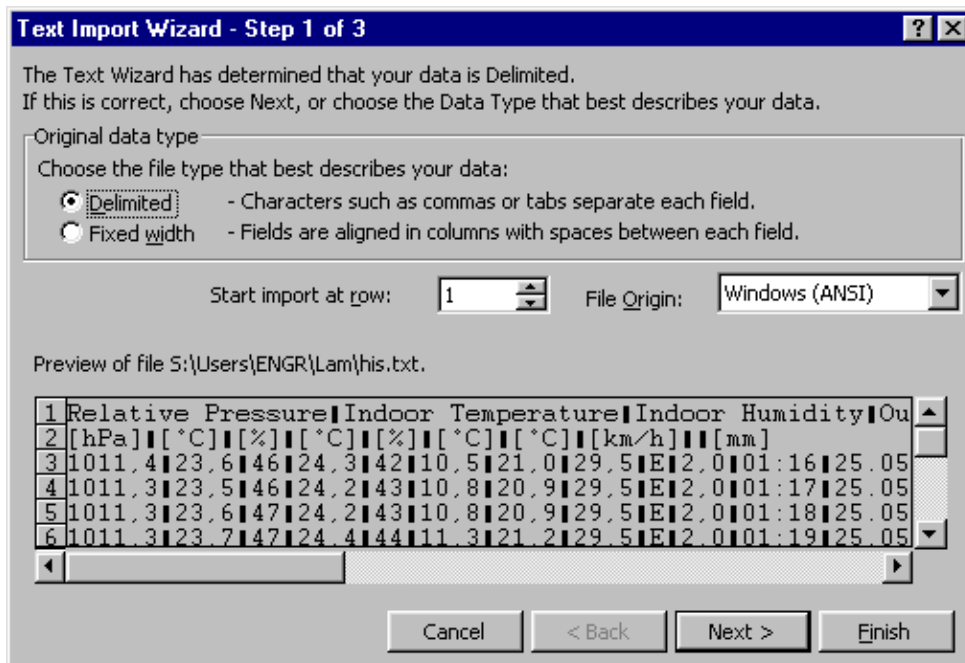
4. The Heavy Weather program uses "tab" to separate data, so you should choose "tab" as delimiter in the Excel program and click the next button
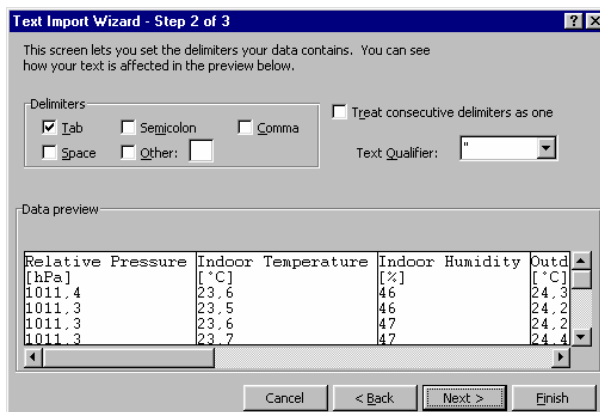
5. Next, select the appropriate data type (such as text or numbers) for each column of data. The default setting General and this is usable and click the Finish button
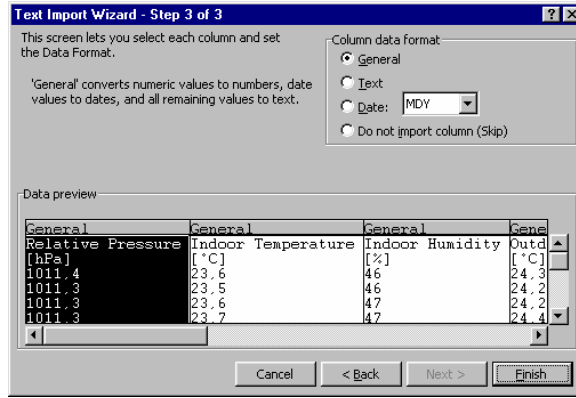
6. The data is then imported into the Excel ready for the user to plot a graph. In this example we will use the indoor temperature.
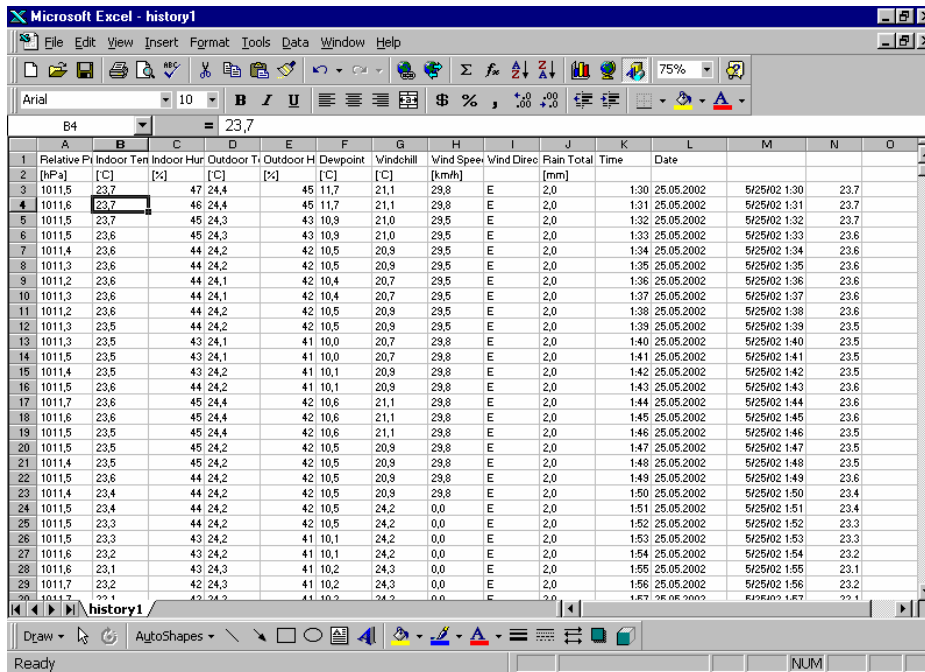
7. Next, the user has to create a valid time column as X-axis. In this example we have typed a date which can be recognize by Excel manually in the cell M3, "2002/5/25 1:30"

Microsoft Excel - history1

File Edit View Insert Format Tools Data Window Help

Arial   10   B I U $ % ,

M3   =   2002/5/25 1:30

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Relative Pr	Indoor Ter	Indoor Hur	Outdoor T	Outdoor H	Dewpoint	Windchill	Wind Spe	Wind Dire	Rain Total	Time	Date	
2	[hPa]	[°C]	[%]	[°C]	[%]	[°C]	[°C]	[km/h]		[mm]			
3	1011,5	23,7	47	24,4	45	11,7	21,1	29,8	E	2,0	1:30	25.05.2002	2002/5/25 1:30
4	1011,6	23,7	46	24,4	45	11,7	21,1	29,8	E	2,0	1:31	25.05.2002	
5	1011,5	23,7	45	24,3	43	10,9	21,0	29,5	E	2,0	1:32	25.05.2002	
6	1011,5	23,6	45	24,3	43	10,9	21,0	29,5	E	2,0	1:33	25.05.2002	
7	1011,4	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:34	25.05.2002	
8	1011,3	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:35	25.05.2002	
9	1011,2	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:36	25.05.2002	
10	1011,3	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:37	25.05.2002	
11	1011,2	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:38	25.05.2002	
12	1011,3	23,5	44	24,2	42	10,5	20,9	29,5	E	2,0	1:39	25.05.2002	
13	1011,3	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:40	25.05.2002	
14	1011,5	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:41	25.05.2002	
15	1011,4	23,5	43	24,2	41	10,1	20,9	29,8	E	2,0	1:42	25.05.2002	
16	1011,5	23,6	44	24,2	41	10,1	20,9	29,8	E	2,0	1:43	25.05.2002	
17	1011,7	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:44	25.05.2002	
18	1011,6	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:45	25.05.2002	
19	1011,5	23,5	45	24,4	42	10,6	21,1	29,8	E	2,0	1:46	25.05.2002	
20	1011,5	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:47	25.05.2002	
21	1011,4	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:48	25.05.2002	
22	1011,5	23,6	44	24,2	42	10,5	20,9	29,8	E	2,0	1:49	25.05.2002	
23	1011,4	23,4	44	24,2	42	10,5	20,9	29,8	E	2,0	1:50	25.05.2002	
24	1011,5	23,4	44	24,2	42	10,5	24,2	0,0	E	2,0	1:51	25.05.2002	
25	1011,5	23,3	44	24,2	42	10,5	24,2	0,0	E	2,0	1:52	25.05.2002	
26	1011,5	23,3	43	24,2	41	10,1	24,2	0,0	E	2,0	1:53	25.05.2002	
27	1011,6	23,2	43	24,2	41	10,1	24,2	0,0	E	2,0	1:54	25.05.2002	

history1

Draw   AutoShapes

Enter   NUM

8. Since the weather data in this example is generated with a 1-minute interval, we can use a formula to generate the time column, we type "+M3+1/(24*60)" in the cell M4. This means adding 1 minute with respect to cell M3 in cell M4 for the next set of data. Since Excel uses 1 day as a unit for time, we add 1/(24 x 60) = 1 minute with respect to the cell above.

Microsoft Excel - history1

File Edit View Insert Format Tools Data Window Help

Arial   10   B I U $ % ,

SUM   =   +M3+1/(24*60)

	A	B	C	D	E	F	G	H	I	J	K	L	M
1	Relative Pr	Indoor Ter	Indoor Hur	Outdoor T	Outdoor H	Dewpoint	Windchill	Wind Spe	Wind Dire	Rain Total	Time	Date	
2	[hPa]	[°C]	[%]	[°C]	[%]	[°C]	[°C]	[km/h]		[mm]			
3	1011,5	23,7	47	24,4	45	11,7	21,1	29,8	E	2,0	1:30	25.05.2002	5/25/02 1:30
4	1011,6	23,7	46	24,4	45	11,7	21,1	29,8	E	2,0	1:31	25.05.2002	+M3+1/(24*60)
5	1011,5	23,7	45	24,3	43	10,9	21,0	29,5	E	2,0	1:32	25.05.2002	
6	1011,5	23,6	45	24,3	43	10,9	21,0	29,5	E	2,0	1:33	25.05.2002	
7	1011,4	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:34	25.05.2002	
8	1011,3	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:35	25.05.2002	
9	1011,2	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:36	25.05.2002	
10	1011,3	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:37	25.05.2002	
11	1011,2	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:38	25.05.2002	
12	1011,3	23,5	44	24,2	42	10,5	20,9	29,5	E	2,0	1:39	25.05.2002	
13	1011,3	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:40	25.05.2002	
14	1011,5	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:41	25.05.2002	
15	1011,4	23,5	43	24,2	41	10,1	20,9	29,8	E	2,0	1:42	25.05.2002	
16	1011,5	23,6	44	24,2	41	10,1	20,9	29,8	E	2,0	1:43	25.05.2002	
17	1011,7	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:44	25.05.2002	
18	1011,6	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:45	25.05.2002	
19	1011,5	23,5	45	24,4	42	10,6	21,1	29,8	E	2,0	1:46	25.05.2002	
20	1011,5	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:47	25.05.2002	
21	1011,4	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:48	25.05.2002	
22	1011,5	23,6	44	24,2	42	10,5	20,9	29,8	E	2,0	1:49	25.05.2002	
23	1011,4	23,4	44	24,2	42	10,5	20,9	29,8	E	2,0	1:50	25.05.2002	
24	1011,5	23,4	44	24,2	42	10,5	24,2	0,0	E	2,0	1:51	25.05.2002	
25	1011,5	23,3	44	24,2	42	10,5	24,2	0,0	E	2,0	1:52	25.05.2002	
26	1011,5	23,3	43	24,2	41	10,1	24,2	0,0	E	2,0	1:53	25.05.2002	
27	1011,6	23,2	43	24,2	41	10,1	24,2	0,0	E	2,0	1:54	25.05.2002	

history1

Draw   AutoShapes

Enter   NUM

9.   Then we copy this formula to all cells in column K. The time axis is now complete.

Before plotting weather graph, please check that the decimal separator of the weather data is comma or point. If comma is used (preferred by some European users), Excel will not be able to read the weather data directly. Excel will define the data with comma as text format and thus will not be suitable for graph plotting as co-ordinates. There are two solutions to solve this problem. First and most the simplest way is to go into Heavy Weather software and change the decimal separator to point in setup menu and then save the text file again. Second, follow below procedures to change the decimal separator from comma to point from Excel.

A) Use the indoor temperature as the example. Go into to a new cell (for example, N3), type "=VALUE(SUBSTITUTE(B3,",",".”))" . Then an Excel readable indoor temperature reading is created

Microsoft Excel - history1

File Edit View Insert Format Tools Data Window Help

SUM   =VALUE(SUBSTITUTE(+B3,",","."))

	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Indoor Tei	Indoor Hu	Outdoor T	Outdoor H	Dewpoint	Windchill	Wind Spee	Wind Dire	Rain Tota	Time	Date		
2	[°C]	[%]	[°C]	[%]	[°C]	[°C]	[km/h]		[mm]				
3	23,7	47	24,4	45	11,7	21,1	29,8	E	2,0	1:30 25.05.2002	5/25/02 1:30		=VALUE(SUBSTITUTE(+B3,",","."))
4	23,7	46	24,4	45	11,7	21,1	29,8	E	2,0	1:31 25.05.2002	5/25/02 1:31		
5	23,7	45	24,3	43	10,9	21,0	29,5	E	2,0	1:32 25.05.2002	5/25/02 1:32		
6	23,6	45	24,3	43	10,9	21,0	29,5	E	2,0	1:33 25.05.2002	5/25/02 1:33		
7	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:34 25.05.2002	5/25/02 1:34		
8	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:35 25.05.2002	5/25/02 1:35		
9	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:36 25.05.2002	5/25/02 1:36		
10	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:37 25.05.2002	5/25/02 1:37		
11	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:38 25.05.2002	5/25/02 1:38		
12	23,5	44	24,2	42	10,5	20,9	29,5	E	2,0	1:39 25.05.2002	5/25/02 1:39		
13	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:40 25.05.2002	5/25/02 1:40		
14	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:41 25.05.2002	5/25/02 1:41		
15	23,5	43	24,2	41	10,1	20,9	29,8	E	2,0	1:42 25.05.2002	5/25/02 1:42		
16	23,6	44	24,2	41	10,1	20,9	29,8	E	2,0	1:43 25.05.2002	5/25/02 1:43		
17	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:44 25.05.2002	5/25/02 1:44		
18	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:45 25.05.2002	5/25/02 1:45		
19	23,5	45	24,4	42	10,6	21,1	29,8	E	2,0	1:46 25.05.2002	5/25/02 1:46		
20	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:47 25.05.2002	5/25/02 1:47		
21	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:48 25.05.2002	5/25/02 1:48		
22	23,6	44	24,2	42	10,5	20,9	29,8	E	2,0	1:49 25.05.2002	5/25/02 1:49		
23	23,4	44	24,2	42	10,5	20,9	29,8	E	2,0	1:50 25.05.2002	5/25/02 1:50		
24	23,4	44	24,2	42	10,5	24,2	0,0	E	2,0	1:51 25.05.2002	5/25/02 1:51		
25	23,3	44	24,2	42	10,5	24,2	0,0	E	2,0	1:52 25.05.2002	5/25/02 1:52		
26	23,3	43	24,2	41	10,1	24,2	0,0	E	2,0	1:53 25.05.2002	5/25/02 1:53		
27	23,2	43	24,2	41	10,1	24,2	0,0	E	2,0	1:54 25.05.2002	5/25/02 1:54		
28	23,1	43	24,3	41	10,2	24,3	0,0	E	2,0	1:55 25.05.2002	5/25/02 1:55		
29	23,2	42	24,3	41	10,2	24,3	0,0	E	2,0	1:56 25.05.2002	5/25/02 1:56		
30	23,1	42	24,3	41	10,2	24,3	0,0	E	2,0	1:57 25.05.2002	5/25/02 1:57		
31	23,2	42	24,3	41	10,2	24,3	0,0	E	2,0	1:58 25.05.2002	5/25/02 1:58		
32	23,1	42	24,2	40	9,7	24,2	0,0	E	2,0	1:59 25.05.2002	5/25/02 1:59		

history1

Draw AutoShapes

Edit   CAPS NUM

B) Then we copy this formula to all cells in column N. A set of valid indoor temperature readings are ready for graph plotting

Microsoft Excel - history1

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P12   =

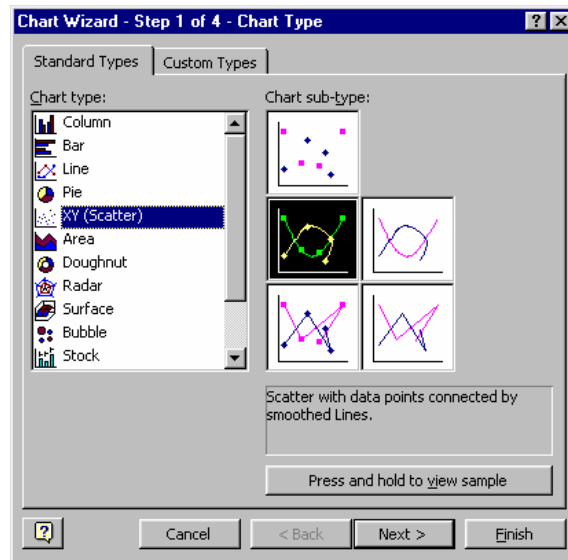|	B	C	D	E	F	G	H	I	J	K	L	M	N
1	Indoor Tei	Indoor Hu	Outdoor T	Outdoor H	Dewpoint	Windchill	Wind Spee	Wind Dire	Rain Tota	Time	Date		
2	[°C]	[%]	[°C]	[%]	[°C]	[°C]	[km/h]		[mm]				
3	23,7	47	24,4	45	11,7	21,1	29,8	E	2,0	1:30 25.05.2002	5/25/02 1:30		23,7
4	23,7	46	24,4	45	11,7	21,1	29,8	E	2,0	1:31 25.05.2002	5/25/02 1:31		23,7
5	23,7	45	24,3	43	10,9	21,0	29,5	E	2,0	1:32 25.05.2002	5/25/02 1:32		23,7
6	23,6	45	24,3	43	10,9	21,0	29,5	E	2,0	1:33 25.05.2002	5/25/02 1:33		23,6
7	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:34 25.05.2002	5/25/02 1:34		23,6
8	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:35 25.05.2002	5/25/02 1:35		23,6
9	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:36 25.05.2002	5/25/02 1:36		23,6
10	23,6	44	24,1	42	10,4	20,7	29,5	E	2,0	1:37 25.05.2002	5/25/02 1:37		23,6
11	23,6	44	24,2	42	10,5	20,9	29,5	E	2,0	1:38 25.05.2002	5/25/02 1:38		23,6
12	23,5	44	24,2	42	10,5	20,9	29,5	E	2,0	1:39 25.05.2002	5/25/02 1:39		23,5
13	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:40 25.05.2002	5/25/02 1:40		23,5
14	23,5	43	24,1	41	10,0	20,7	29,8	E	2,0	1:41 25.05.2002	5/25/02 1:41		23,5
15	23,5	43	24,2	41	10,1	20,9	29,8	E	2,0	1:42 25.05.2002	5/25/02 1:42		23,5
16	23,6	44	24,2	41	10,1	20,9	29,8	E	2,0	1:43 25.05.2002	5/25/02 1:43		23,6
17	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:44 25.05.2002	5/25/02 1:44		23,6
18	23,6	45	24,4	42	10,6	21,1	29,8	E	2,0	1:45 25.05.2002	5/25/02 1:45		23,6
19	23,5	45	24,4	42	10,6	21,1	29,8	E	2,0	1:46 25.05.2002	5/25/02 1:46		23,5
20	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:47 25.05.2002	5/25/02 1:47		23,5
21	23,5	45	24,2	42	10,5	20,9	29,8	E	2,0	1:48 25.05.2002	5/25/02 1:48		23,5
22	23,6	44	24,2	42	10,5	20,9	29,8	E	2,0	1:49 25.05.2002	5/25/02 1:49		23,6
23	23,4	44	24,2	42	10,5	20,9	29,8	E	2,0	1:50 25.05.2002	5/25/02 1:50		23,4
24	23,4	44	24,2	42	10,5	24,2	0,0	E	2,0	1:51 25.05.2002	5/25/02 1:51		23,4
25	23,3	44	24,2	42	10,5	24,2	0,0	E	2,0	1:52 25.05.2002	5/25/02 1:52		23,3
26	23,3	43	24,2	41	10,1	24,2	0,0	E	2,0	1:53 25.05.2002	5/25/02 1:53		23,3
27	23,2	43	24,2	41	10,1	24,2	0,0	E	2,0	1:54 25.05.2002	5/25/02 1:54		23,2
28	23,1	43	24,3	41	10,2	24,3	0,0	E	2,0	1:55 25.05.2002	5/25/02 1:55		23,1
29	23,2	42	24,3	41	10,2	24,3	0,0	E	2,0	1:56 25.05.2002	5/25/02 1:56		23,2
30	23,1	42	24,3	41	10,2	24,3	0,0	E	2,0	1:57 25.05.2002	5/25/02 1:57		23,1
31	23,2	42	24,3	41	10,2	24,3	0,0	E	2,0	1:58 25.05.2002	5/25/02 1:58		23,2
32	23,1	42	24,2	40	9,7	24,2	0,0	E	2,0	1:59 25.05.2002	5/25/02 1:59		23,1

history1

Draw AutoShapes

Select destination and press ENTER or choose Paste   NUM

10. Next step is to make the plotting. From Excel, select Insert from the pull down menu then select Chart. You will see the below screen. Then select XY as the chart type and click next

11. The Chart Source Data window is now open then select "Series" tab and click Next
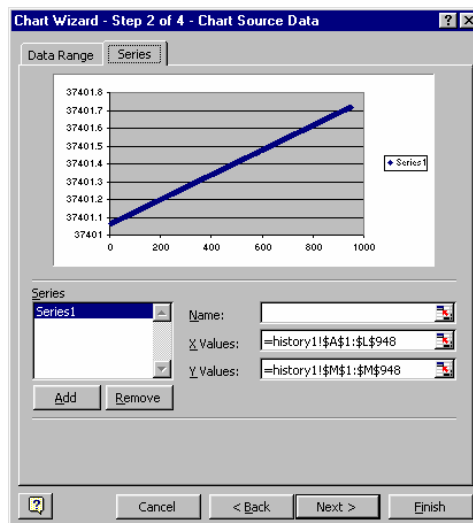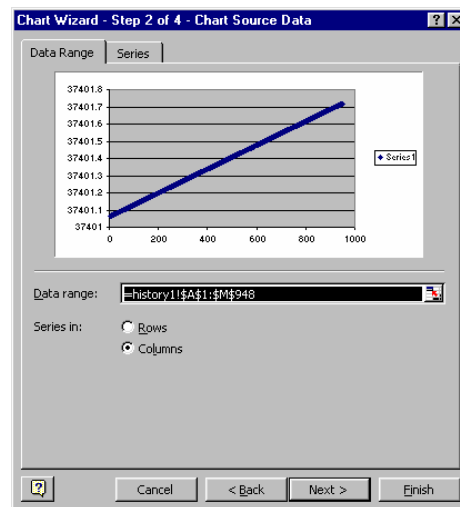
12. Next, select the X-axis data by clicking the right-most icon in the "X Values :" And then, Choose the appropriate data range. In this example, we select the time column we just made as the X-axis, since it is located in a sheet named history1 and is from cell M3 to M62 (plot a graph between 1:30 to 2:29. The "=history1!$M$3:$M$62" is now written in the box.

Chart Wizard - Step 2 of 4 - Chart Source Data - X Values: [?] [X]
=history1!$M$3:$M$62

13. Next select the weather data as Y-Axis, we choose the indoor temperature as Y-Axis, so we have the following screen.
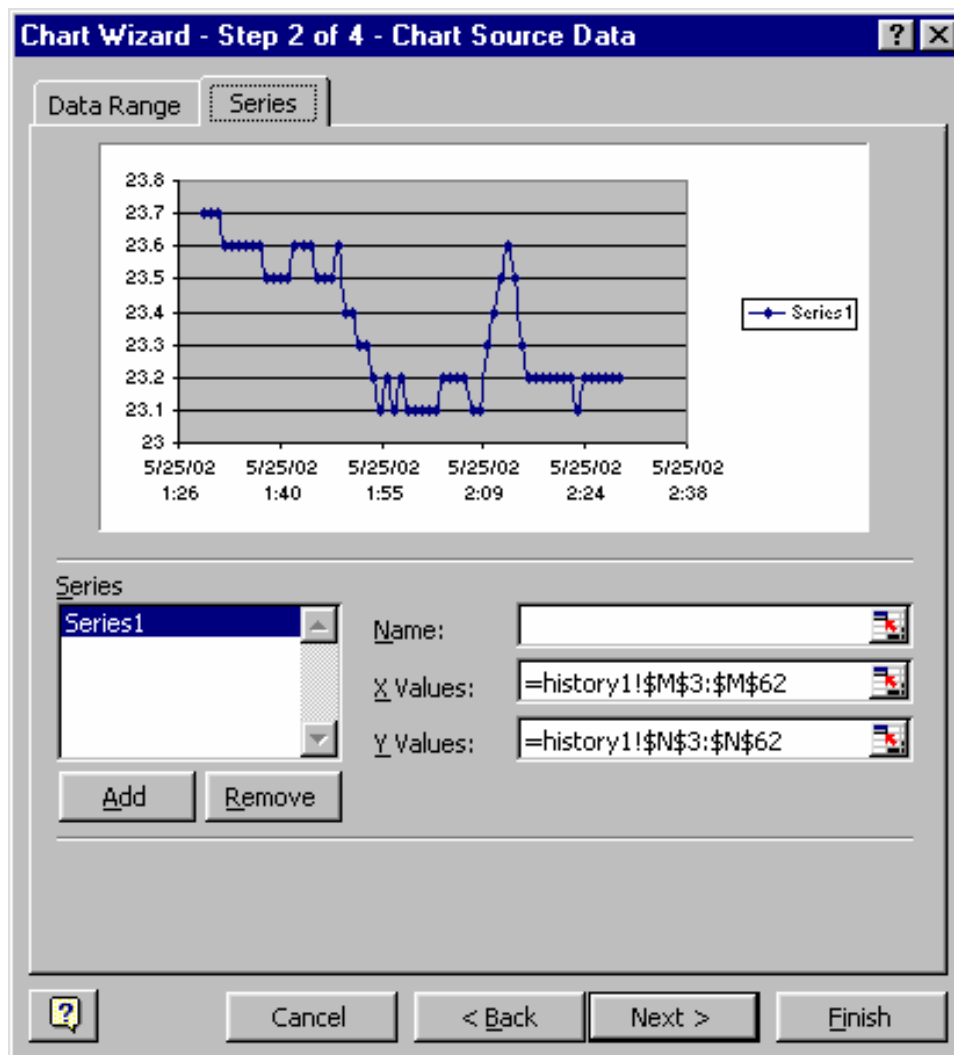   A) When decimal separator is comma Choose column N.

Chart Wizard - Step 2 of 4 - Chart Source Data - Values: [?] [X]
=history1!$N$3:$N$62

   B) When decimal separator is point. Choose column B.

Source Data - Values: [?] [X]
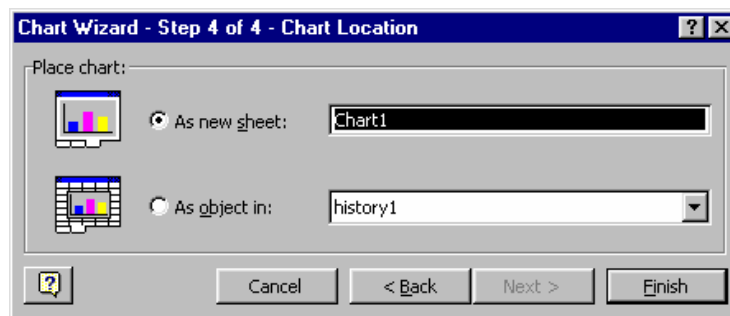=history1!$B$3:$B$62

14. As shown below, both the X and Y axis data range are selected. The variation of temperature within 1:30 to 2:29 can now be seen.
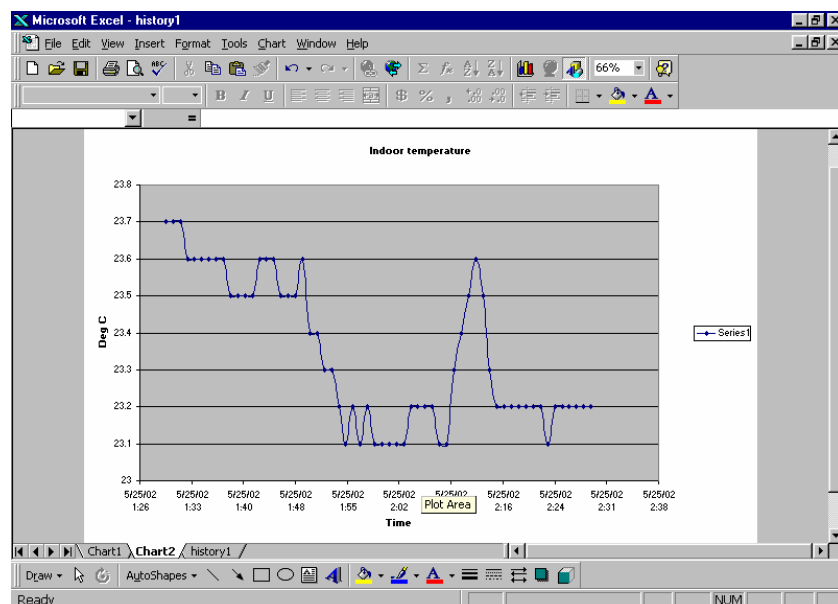
15. Click next to enter the below screen to dress up the chart, you can customize the Titles / Axes / Gridlines / Legend / Data Labels.
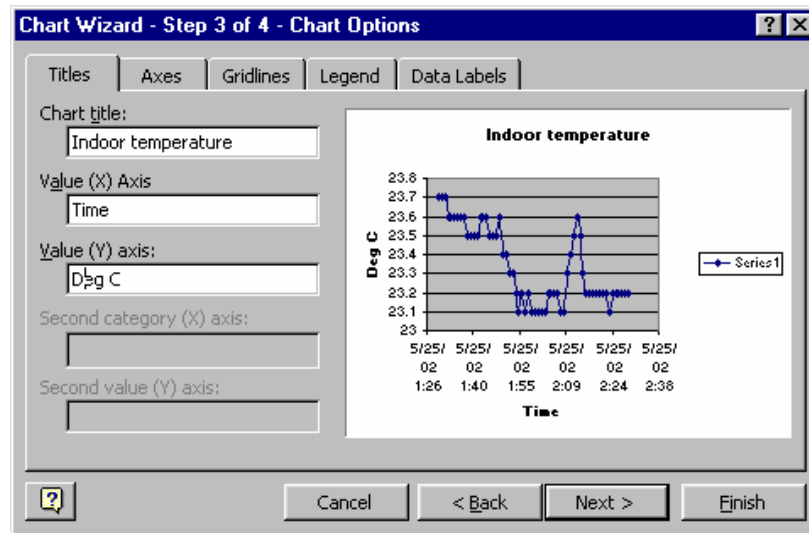
16. Click next, then select whether you want a separate sheet or a chart inside the data sheet.

17. Click finish to see the chart. In this chart, the variation of indoor temperature within 1 hour (1:30 to 2:39) is plotted.

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