Windwatch *PRO*
Pocket Weather Station

Operating Manual

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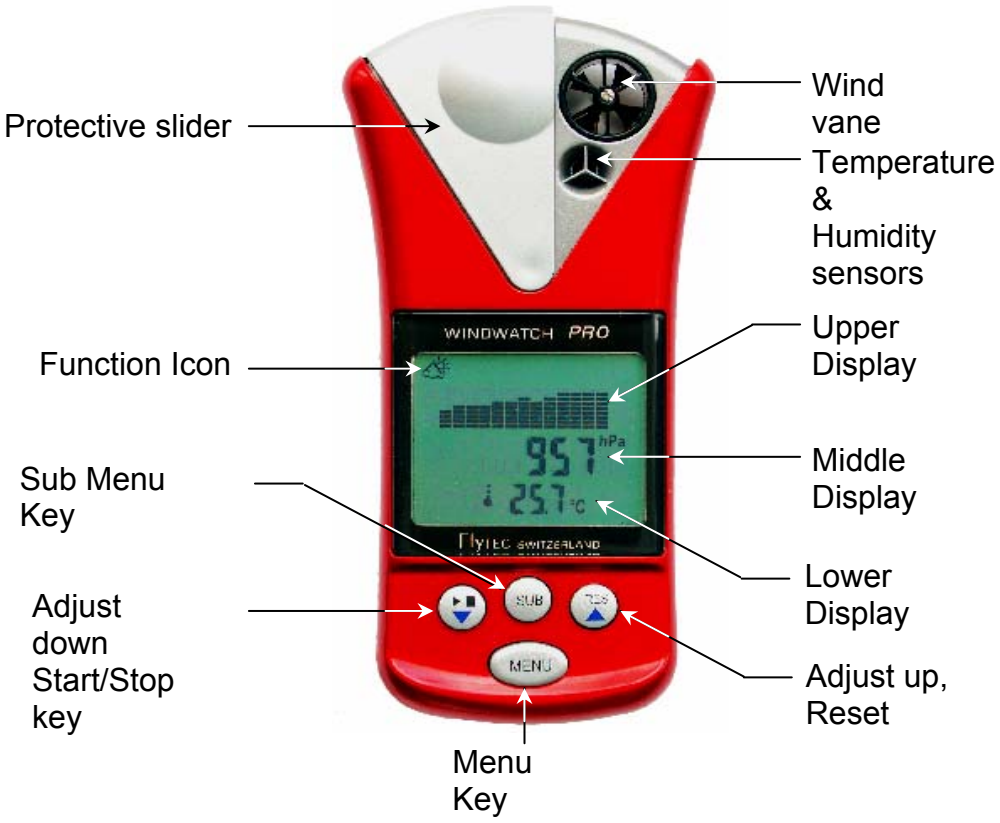
26.01.2008

Overview

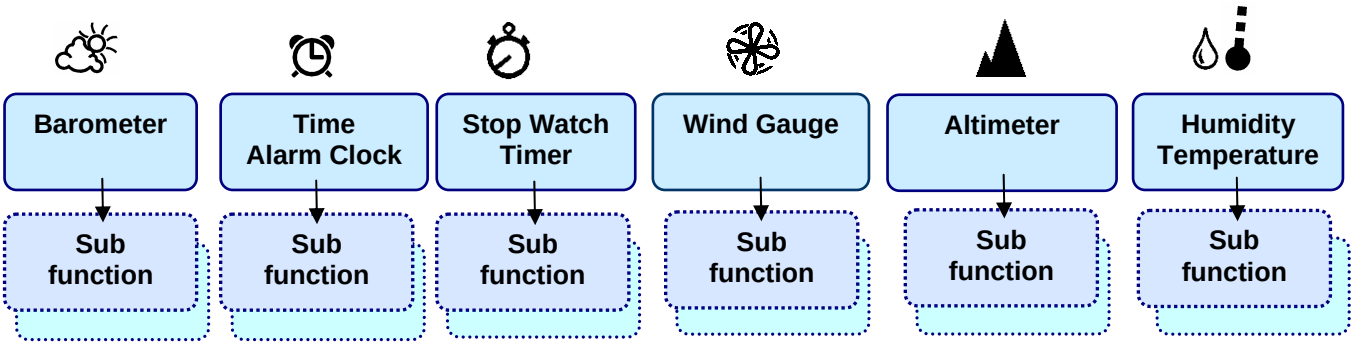


Congratulations!
on your purchase of the pocket weather station **Windwatch PRO**

This operation manual provides detailed information about the operating mode of the **Windwatch PRO** instrument. By using your new, multi function instrument which is equipped with four high precision sensors, you are able to measure wind, air pressure, altitude, temperature and relative air humidity. Moreover, your pocket weather station provides the feature of Windchill and dew point calculation, as well as very useful functions for timer, alarm and alarm clock. The purpose of this operating manual is to make yourself familiar with the easy handling of the instrument and to stimulate at the same time the comprehension for meteorological correlation. Some more comments related to meteorology-physical conditions are specifically addressed to the ambitious user.

Summary of Functions

The Windwatch *PRO* provides the following **six main function screens**, shown with corresponding symbols that are visible in the upper part of the display:



Within any main function screen it is possible to access one or two **sub-screens**

Operating Philosophy

Change Main function: MENU

A **short press** of the **MENU** key scrolls, in a loop, from one **main screen** to the next main screen (see page 6 chart of functions).

Change Sub function: SUB

A **short press** of the **SUB** key scrolls through the possible **sub-screens** within each main screen.

Backlight MENU 2 SEC

Long-press the MENU key for 2 seconds to activate the display backlight. The backlight consumes higher-than-normal battery power; therefore it is recommended that it only be used when the display could otherwise not be read. When the battery condition is weak, the backlight function is automatically disabled and a *"No Li"* message is briefly shown in the display upon the next menu change. All other functions of the instrument remain operative until the battery is completely exhausted.

Set-Mode for the Main Display Screen

A long press (4 seconds) of the MENU key brings up the **set-mode** for the current main function shown on the upper line of the display. With the WWP in set-mode, the value to be set will be flashing and can be adjusted with the UP and DOWN keys.

Example: When the WWP is in the Altimeter screen, pressing the MENU key for 4 seconds allows the altitude to be adjusted.

Use a short press of the MENU key to escape set-mode – or, if no key is pressed for 7 seconds, set-mode is automatically escaped.

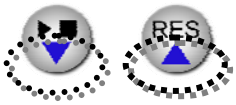
Set-Mode for Secondary Functions

A long press (4 seconds) of the SUB key gives access to the set-mode for that secondary function (the values on middle and lower lines of the display). When in set-mode, the value to be set will flash and can be adjusted with the ▲ and ▼ keys.

Example: When the WWP is in the Altimeter screen, pressing the SUB key for 4 seconds allows the adjustment of the Relative Altimeter.

A short press of the SUB key will accept the value that is flashing and will cause the next value that can be adjusted (if any) to flash. If there is no further value to be adjusted, a subsequent press of the SUB key will escape set-mode – or, if no key is pressed for 7 seconds, set-mode is automatically escaped.

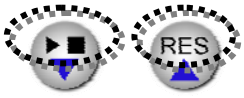
Select Measuring Units



A short press of the ▲ or ▼ key in any display screen will change the measuring units. If there are more than two possibilities, subsequent shot presses will scroll through the choices.

Example: In the Altimeter screen, a short press of either arrow key will change the display from meters (m) to feet (ft).

Start - Stop - Reset



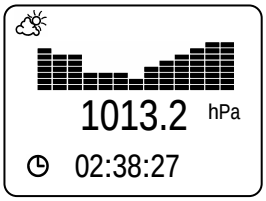
When the WWP is in the Stopwatch screen, the left key is used to start and stop the stopwatch. A short press of the right key marks the interval time, whereas a long press resets the stopwatch to zero.

A long press of the RES key resets the primary displayed value of the current function shown on the display. Example: in the Altimeter screen, the reference altimeter can be reset to zero with a long press of the RES key.

Chart of Functions

MENU

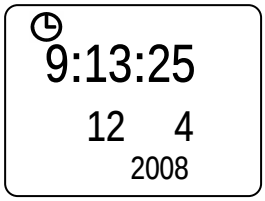
Barometer / Time



- Barograph
- Current air pressure
- Time

MENU

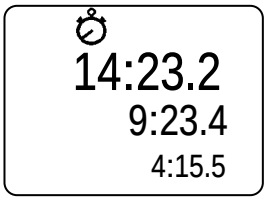
Time / Date/ Alarm



- Time of day
- Date
- Year

MENU

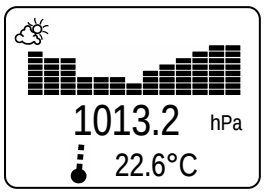
Stopwatch



- Stopwatch
- Interval (lap) time
- 2nd Interval time

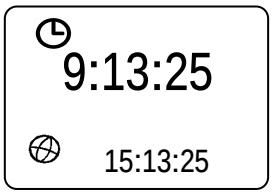
SUB

Barometer /Temp



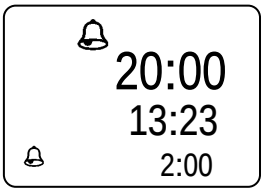
- Barograph
- Current air pressure
- Current Temperature

Time / 2nd Time



- Time
- Secondary time

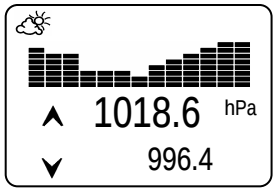
Timer



- Countdown timer
- Remaining time
- Pre-alarm interval

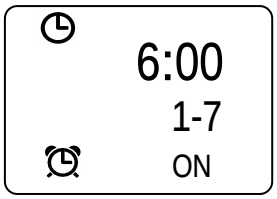
SUB

Barometer Max/Min



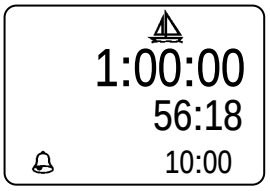
- Barograph
- Air pressure maximum
- Air pressure minimum

Alarm Clock



- Alarm time
- Alarm days or date
- Alarm ON / OFF

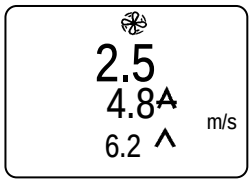
Race Timer



- Countdown timer
- Remaining time
- Pre-alarm interval

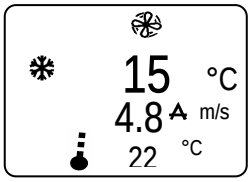
SUB

MENU → **Wind Speed**



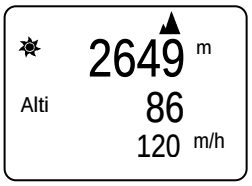
- Current wind speed
- Average
- Peak

Wind Chill



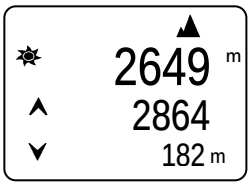
- Current temperature
- Wind speed
- Wind chill

MENU → **Altimeter**



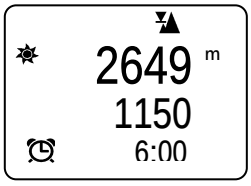
- Absolute alt. (MSL)
- Relative alt. (AGL)
- Rate of ascent/descent

Alt. Max / Min



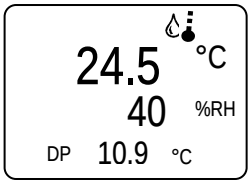
- Absolute alt. (MSL)
- Maximum altitude
- Minimum altitude

AutoSet



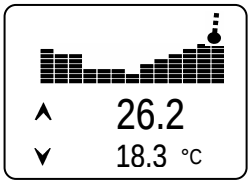
- Current alt. (MSL)
- Adjustment altitude
- AutoSet time

MENU → **Temperature Moisture**



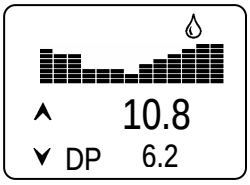
- Temperature
- Relative humidity
- Dew point

Temperature



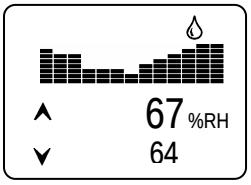
- Temperature graph
- Max. temperature
- Min. temperature

Dew Point



- Dew point graph
- Max. dew point
- Min. dew point

Rel. Humidity



- Rel. humidity graph
- Max. rel. humidity
- Min. rel. humidity

Barometer

By tracking air pressure trends at a given location it is possible to make predictions about approaching weather conditions. The **barograph** on the WWP Barometer main screen represents the air pressure progression over the past 3, 6, 12 or 24 hours (user selectable where each bar represents 1/12th of the period selected). The graph runs from left to right so that the value on the left is the oldest and the value on the right is the most recent. Each segment in a bar corresponds to a pressure change of 2 hPa. The WWP measures and updates the digital air pressure display every 7.5 minutes.

If the diagram is ascending from left to right, it signifies an increasing barometric pressure trend, which is generally associated with dry weather conditions, sunshine and blue skies. Conversely, if the graph is decreasing from left to right it indicates decreasing barometric pressure, generally associated with a warm or cold front. For alpinists, hikers, pilots and other outdoor sportsmen this is a warning sign for the possibility of bad weather and the need to watch for worsening conditions. These front systems very often produce a change in the weather, combined with low clouds and the possibility of persistent rains or snow.

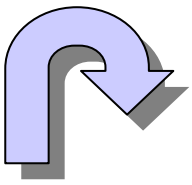
Barometer Pressure Display QNH / QFE

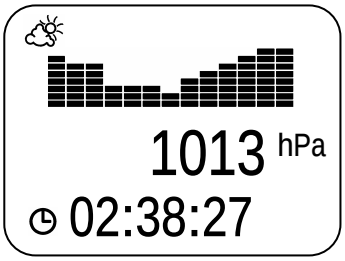
Because air pressure decreases with altitude, it is necessary to relate air pressure at a given elevation to the air pressure at sea level. In meteorology this value is referred to as **QNH**. The average pressure at sea level during one year over medium latitude is 1013.25 hPa; this was set as **standard pressure** by the ICAO for the flying sector in 1928.

To measure air pressure at an altitude other than sea level, you must enter the altitude of your current position into the barometer. In the WWP this height value is entered in the set-mode for the Barometer screen. This also means that if the instrument is moved to a location with a different elevation, the new reference elevation must be entered. If the altitude of the WWP changes by more than 50 meters within a short period of time, the barometric graph is automatically cleared and restarted.

If the reference altitude is set to zero, the displayed pressure is the actual air pressure at that elevation and is referred to as **QFE** (Absolute Pressure).

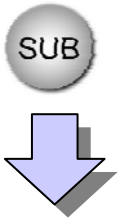
Barometer Screens

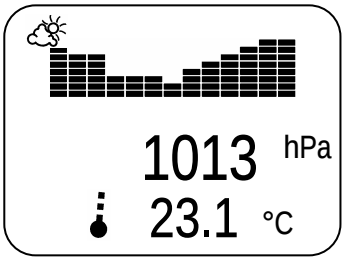




Barometer display with time of day

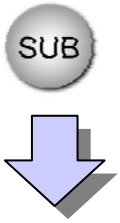
This display shows the barometric pressure trend, current pressure and time of day. The pressure can be changed to *hPa* or *inHg* with a short press of the ▲ or ▼ keys.

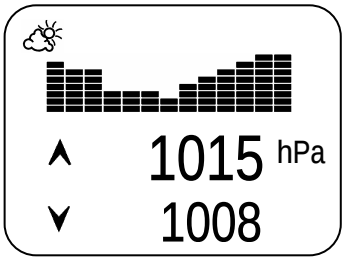




Barometer display with temperature

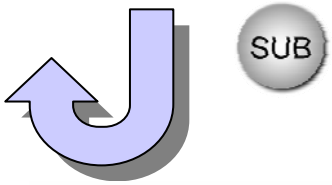
This display shows the barometric pressure trend, current pressure and temperature. The pressure units *hPa* or *inHg* can be selected with a short press of the ▲ or ▼ keys. The units for the temperature (°*C* or °*F*) can be set in the Temp/Humidity screen.



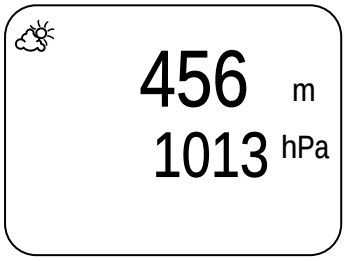


Barometer display with max and min pressure

This display shows the barometric pressure trend, current pressure and the maximum and minimum pressure value within the graph period. This period can be set in the Barometer set-mode. The pressure units *hPa* or *inHg* can be selected with a short press of the ▲ or ▼ keys.

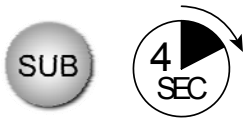


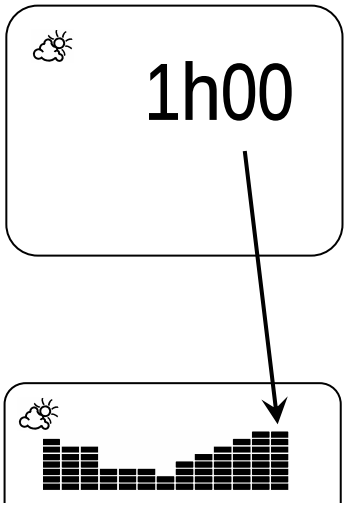
Barometer Set-Mode



Setting the Barometer altitude

A long press (4 seconds) of the MENU key gives access to the Barometer set-mode and will cause the barometer reference altitude to blink. Use the ▲ and ▼ keys to set the altitude for your current location. This setting is necessary to obtain a precise QNH indication (see barometer general information above).





Setting the time units for the pressure trend graph

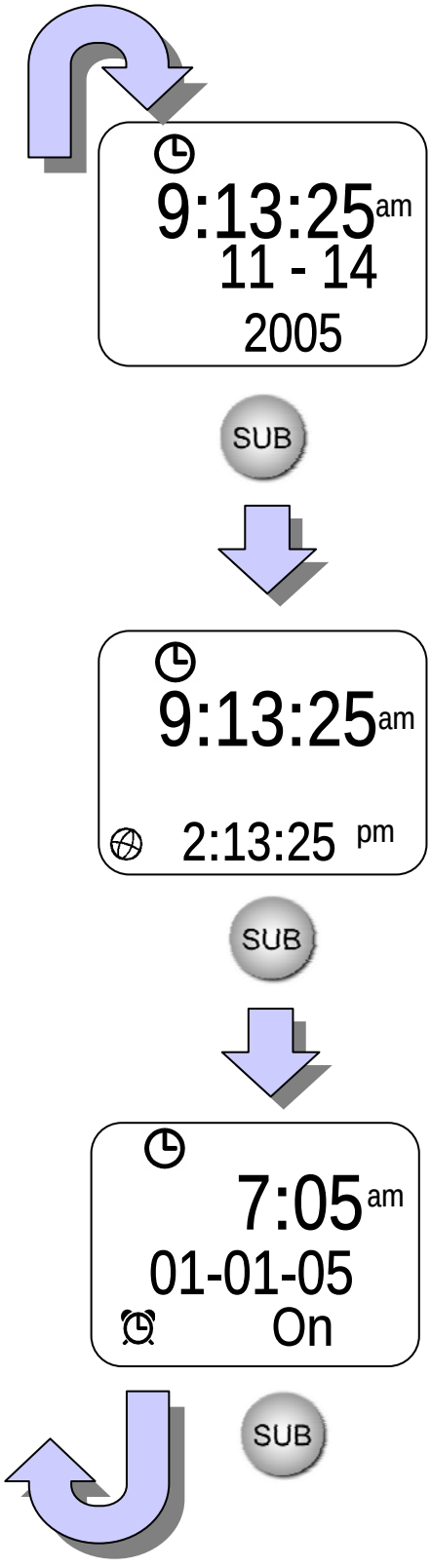
A long press of the SUB key allows the time period represented by each bar on the pressure trend graph to be set. Use the ▲ or ▼ keys to scroll through the values of 15 minutes, 30 minutes, 1 hour or 2 hours per bar. The WWP maintains the barometric pressure values for the past 24 hours regardless of the time period set for the graph. This means that you can reduce the time period at any time to show greater detail, or increase it to show the longer term trend.

Note: *When you select a screen containing a trend graph, the display will show the graph interval for 2 seconds before the graph appears, to remind you of the time period per bar of the graph (1 hour 0 minutes per bar in the example above).*

Time and Alarm Clock

Time and Alarm Clock Screens

This menu provides the time in 24h or 12h format, with an alarm clock as well as the time in a secondary time zone. The alarm clock can be set to a predetermined time of day, and to reoccur daily, week-days only, week-ends only, or on a specific date.



Time and date display

This screen shows the time and date. A short press of the ▲ or ▼ key will toggle the time between *24h* or *12h* (am/pm) format. In 12h format the date is shown as *mm-dd-yyyy*. In 24h format the date is shown in as *dd-mm-yyyy*.

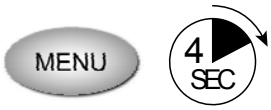
Time with secondary time

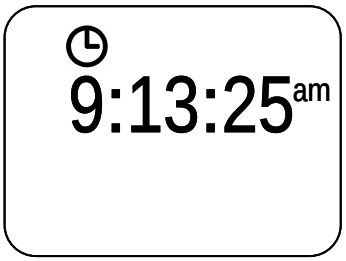
This screen shows the time and a secondary time. Normally the time shown in the upper line of the display would be set to the local time, and the secondary time, shown in the lower line, would be set to show the time in another time zone. Both times can be displayed in either 24h or 12h format with a short press of the ▲ or ▼ key.

Alarm clock time, date and status

This screen shows the alarm clock time on the top line, the alarm date on the second line (or recurring days as programmed in the Alarm set-mode), and the status of the alarm clock (*On* or *Off*) on the third line. The alarm clock is enabled or disabled with a long press of the ▲ or ▼ key.

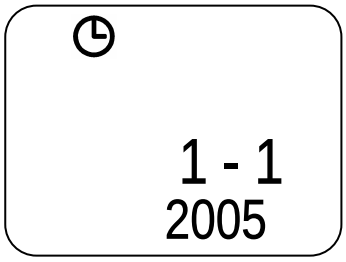
Time and Alarm Clock Settings





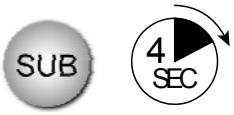
Setting time of day

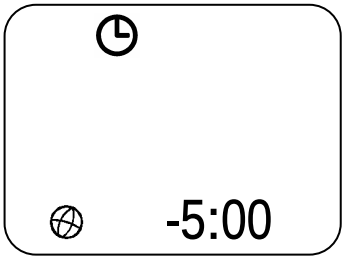
A long press of the MENU key allows the current time to be set. First the hour field will flash; adjust with the ▲ and ▼ keys, then short-press the MENU or SUB key to accept the hour setting and advance to the minutes field. Set the minutes with the ▲ and ▼ keys, then short-press the MENU or SUB key to accept the minutes setting and advance to the seconds field. Short-press the ▲ or ▼ key to set seconds to zero. Short-press the MENU key to return to the main screen – or, if no key is pressed for 7-seconds, the WWP will automatically return to the run mode.



Setting the date

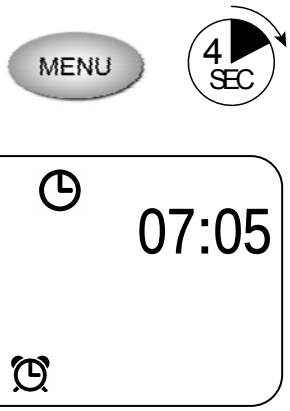
A long press (4 seconds) of the SUB key allows the current date to be entered. The blinking values can be adjusted with the ▲ and ▼ keys, and a short press of the SUB key accepts the setting and advances to the next field to be set. In 12h mode the date format is *mm-dd-yyyy* and in 24h mode the format is *dd-mm-yyyy*.





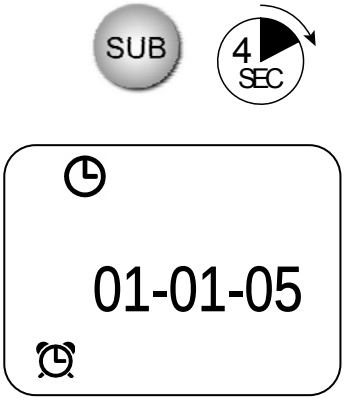
Setting the time for a second time zone

The WWP must be in the Secondary Time screen (with the globe symbol in the lower left corner of the display). Press the SUB key for 4 seconds, then set the hour offset between local time and the secondary time zone using the ▲ and ▼ keys. The hour offset is positive for time zones east of your local time zone and negative for time zones west of you local time zone. Japan, for instance, is ahead of the Central European time by eight hours (*+8:00*).



Setting the alarm time

The WWP must be in the Alarm sub-screen (alarm clock symbol in lower left corner of display). Press the MENU key for 4 seconds; the hour field will blink and can be set with the ▲ and ▼ keys. Short-press the MENU key to accept the hour setting and advance to the minutes field, then set the minutes and press MENU to accept the minutes and return to the run mode.



Setting the alarm day(s)

The WWP must be in the Alarm sub-screen (alarm clock symbol in lower left corner of display). Press the SUB key for 4 seconds to access the alarm day set-mode. The current setting will blink and can be changed with ▲ and ▼ keys. The following five alarm types are:

1-7	alarm clock rings every day
6-7	alarm clock rings Saturday and Sunday only
1-5	alarm clock rings Monday through Friday only
-dd-	alarm clock rings only on a pre-determined date
123_	alarm clock can be set to any day of the week

To set the WWP to ring on a recurring day of the week, select *"123_"* as described above, short-press the SUB key and select the desired day with the ▼ or ▲ keys (*1* =Monday and *7*=Sunday).

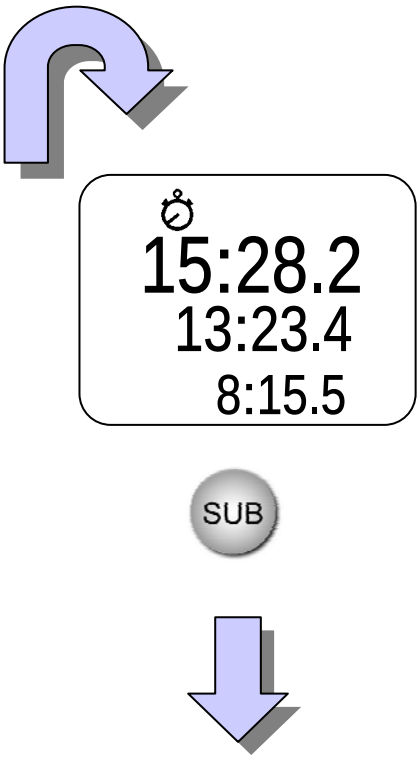
To set the WWP to ring on a specific day, select ***"-dd-"*** as described above, short-press the SUB key, and enter the date. The year will blink first and can be set with the▼ and ▲ keys, short-press the SUB key to accept and advance to the month, set the month and short-press the SUB key to accept and advance to the day field. Set the desired day and short-press the SUB key to return to the run mode.

Note: The alarm clock function is toggled *ON/OFF* with a long press of the ▼ or ▲ key (WWP must be in the Alarm sub-screen).

Stopwatch and Timer

Stopwatch and Timer Screens

The WWP features a full-function stopwatch with 1/10th second accuracy, a countdown timer and a sailing/race timer. Both timers feature a **pre-alarm** warning that can be user set. The pre-alarm for the racing timer was designed for regatta starts in sailing. If a pre-alarm is set, the WWP will beep for 3 seconds at the pre-set interval before the end of the timer period.



Stopwatch

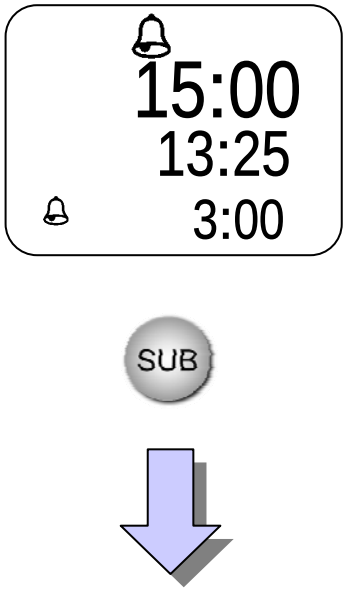
On this screen the top line shows the running time in minutes, seconds and tenths of a second. The middle line shows the new interval (lap) time and the bottom line presents the previous interval time.

Short-press to **start** and **stop** stopwatch

Short-press to record interval (lap) time while the stopwatch is running

A long press resets the stopwatch back to 0.0. The lap times are maintained.

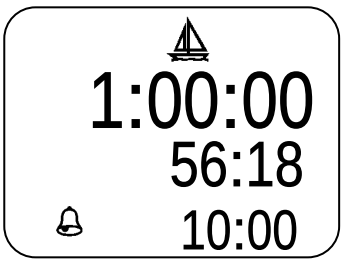
A long press resets the stopwatch and interval times to 0.0.

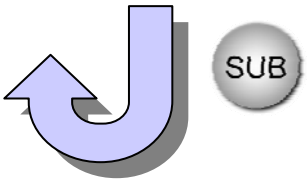


Timer

The top line shows the user-set timer period, the second line shows the remaining countdown time, and the bottom line shows the period of time that the pre-alarm will sound in advance of the timer alarm (countdown time=0). The timer is started and stopped with the ▶ key.

A long press of the RES key sets the countdown time (middle line) back to the timer setting as shown on the top line of the screen. When the countdown timer reaches the pre-alarm value, the WWP will beep for 3 seconds. When the countdown time reaches 0, a final alarm sounds and will continue until any key is pressed



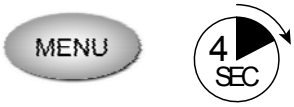


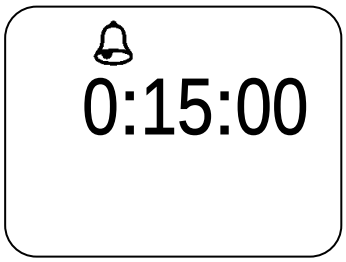
Race/Sail timer for regatta start

The race timer is differentiated from the normal countdown timer by a sailboat icon in the top of the display. When the race timer is selected, the WWP will beep once per second during the last 5 seconds of the countdown period, followed by a longer beep when the countdown reaches 0. The pre-alarm still functions for the race timer in the same way as for the standard timer.

Timer Settings

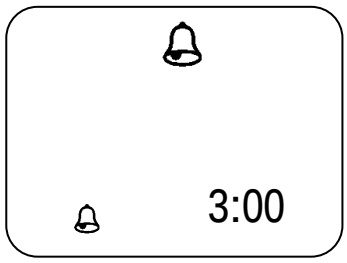
The settings for the standard timer and the race timer are the same.





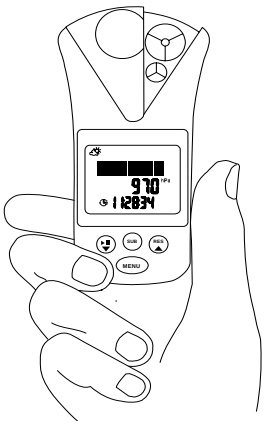
Setting the timer

With either the bell or sailboat icon showing in the top of the display, press the MENU key for 4 seconds to set the timer period. The hour field will blink first and can be set with the ▼ and ▲ keys; short-press the MENU key to accept and advance to the minutes field, then set the minutes and short-press the MENU key to accept and advance to the seconds field. Set the desired value and short-press the MENU key to return to the run mode. The maximum timer setting is 99 hours, 59 minutes and 59 seconds. The timer is started with a short press of the ▶ key, which is also the stop key.



Setting the pre-alarm

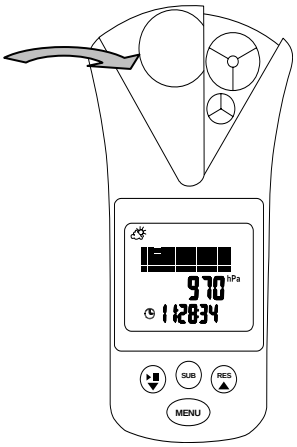
The WWP must be in the Timer screen (bell or sailboat icon in the top of display). Press the SUB key for 4 seconds, then set the pre-alarm period in the same way as the timer period (above). The maximum time for the pre-alarm is 99 hours, 59 minutes and 59 seconds and the minimum time is 10 seconds. A setting of 0:00 deactivates the pre-alarm.



Wind Speed/Wind Chill

Measuring Wind Speed

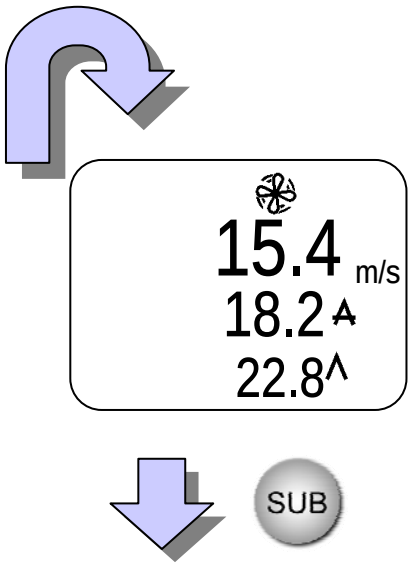
The Windwatch *PRO* is designed to precisely measure the wind speed regardless of the prevailing air density. In order to obtain optimal results, the instrument should be held vertically into the wind with an outstretched arm. To insure the greatest accuracy, measurements should be taken where there are minimal obstructions upwind of your position that might cause turbulence.



Using the protective slider

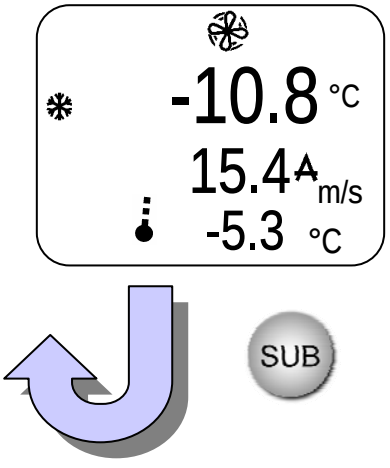
The internal impeller in the WWP is precisely balanced and suspended on two sapphire bearings and is sensitive to dust, dirt and impact. To protect the impeller and the temperature and humidity sensors, the WWP is equipped with a convenient protective slider that should be closed whenever measurements are not being taken. Using the protective slider will insure many years of reliable service from the internal sensors.

Wind Speed Screens



Wind speed display

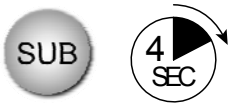
The top line shows the current measured wind speed, the middle line shows the average wind speed, and the bottom line shows the peak wind speed value during the measuring period. The speed can be displayed in the units *m/s*, *km/h*, *knt*, *beauf*, *ft/s* and *mph*. Scroll through the measuring units with the▼ or ▲ key.

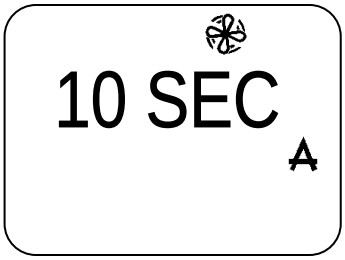


Wind chill display

Wind chill is the **perceived** temperature when the wind speed is applied to the **ambient** temperature. The top line shows the wind chill temperature value, the middle line shows the average wind speed, and the bottom line shows the ambient temperature without the wind chill factor. The measuring units for the wind speed can be scrolled with the▼ or ▲ key.

Wind Speed Settings





Setting the wind speed averager

With the WWP in the Wind Speed screen (propeller icon shown in the top of the display) press the SUB key for 4 seconds to bring up the wind speed averaging period. Set the period between 5 and 30 seconds (in 1-second increments) using the ▼ and ▲ keys. Press the SUB key to accept the setting and advance to select the averaging method for the average wind speed display. The options are **normal average** and **peak average**, and are selected with the ▼ or ▲ key.

Normal Average value

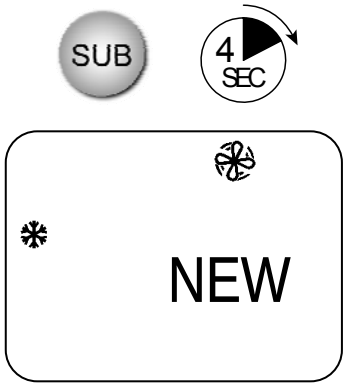
This method displays a running average of the wind speed over the selected period. Each second, the oldest wind speed value is deleted and the average is recalculated with the most recent wind speed reading.

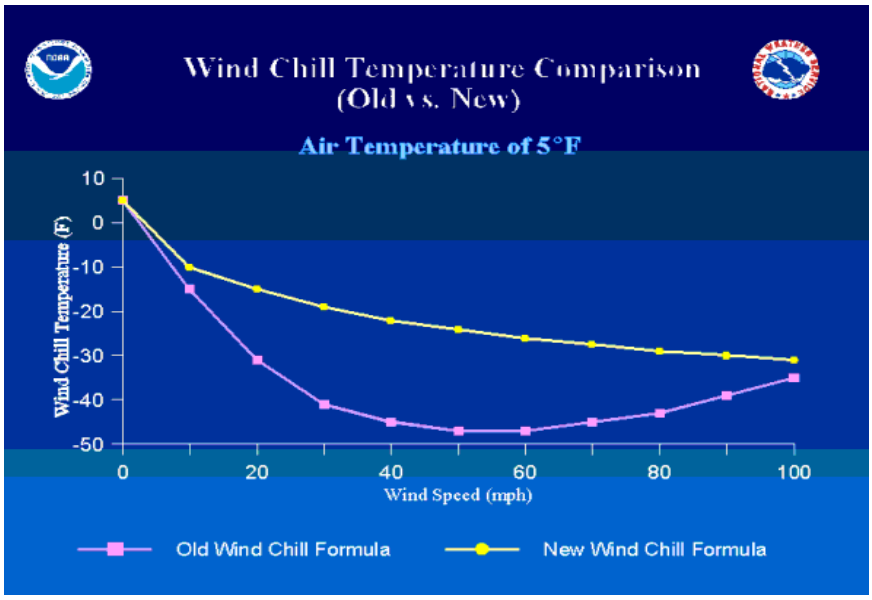
Peak Average value

This method displays and maintains the maximum average wind speed value with no time limit. The peak average value display is reset by pressing the RES key for 4 seconds.

Setting wind chill calculation method

With the WWP in the Wind Chill screen (propeller icon shown in the top of the display and the snowflake icon shown in the left of the display) press the SUB key for 4 seconds and select the wind chill calculation method. In 2000 the formula for calculating wind chill was changed; use the ▼ or ▲ key and select the *OLD* or *NEW* formula. The graph below shows the difference between the two calculation methods. More detailed information on the two calculation methods can be found on meteorological websites.





Altimeter

The Windwatch *PRO* has a state-of-the-art pressure sensor that, in addition to providing precise barometric pressure readings, provides a fully developed and highly accurate altimeter. The altimeter is fully temperature compensated so that the displayed altitude does not change when the temperature of the WWP changes.

General Information about Altimeters

Barometric altimeters calculate altitude based on air pressure. Air pressure decreases as altitude increases. Due to the fact that air is compressible, the pressure decrease is not linear, but exponential. The calculation for deriving altitude from air pressure is based on an international formula (Commision International de Navigation Aérienne) and assumes a **standard atmosphere** with idealized characteristics. The CINA standard atmosphere assumes that the pressure at sea level is **1013.25 hPa (Hektopascal) at 15°C**. A continuous decrease in temperature at the rate of **0.65 °C per 100 meters** of ascent is also assumed. Consequently, a barometric aviation altimeter only displays the correct altitude if weather conditions are consistent with the standard atmosphere.

In practice, these conditions are more likely to be an exception! The WWP incorporates a Flytec innovation that significantly improves the altitude accuracy by correcting for air column temperatures. If this feature is used, the correction is applied to the CINA altitude formula, making the altitude readings on the WWP more accurate than standard altimeters. The correction need not be used, in which case the altitude readings will coincide with aircraft altimeters.

Atmospheric pressure also changes due to prevailing weather conditions. Depending on the weather, the air pressure at sea level (QNH) may vary from 950 to 1050 millibars (mb). Even on a stable day, temperature-induced differences in air pressure of $\pm$ 1 mb may occur, equivalent to a height difference of $\pm$ 8 meters. During rapid weather changes, such as the passage of a cold front, the air pressure may change up to 5 mb within one day, corresponding to an altitude change up to 40 meters. Consequently, an altimeter must be calibrated prior to each use. This means the altimeter must be set to a known benchmark altitude (e.g., airport, launch site, topo map, elevation marker, etc.). An alternate method for setting an altimeter is to enter the current QNH pressure reported by local aeronautical weather reports or reliable meteorological institutions.

The Windwatch *PRO* features another Flytec innovation (patented), called **AutoSet**. When this feature is enabled, the instrument automatically factors out changes in the altitude reading that were caused by changes in the weather. For more information on this feature see the AutoSet heading later in this section.

Altimetry For the Ambitious User

Temperature of the air column

The standard altimetry formula was developed for aircraft in 1928. It is based upon an average temperature of 59ºF (15°C) at sea level and an average temperature drop of 0.65°C per 100 meters. In the case where the actual air column is warmer, the air will be packed less densely. If you are standing on top of a mountain, there will be more air particles above you than normal and the air pressure will be somewhat higher. Therefore the altitude calculated according to the standard formula will be too low. In the case where the actual air column is colder, the cold air will be more dense and concentrated at ground level with fewer air particles above. Therefore on top of a mountain the air pressure will be slightly lower at your position and the altitude displayed will be higher than actual. On top of a 14,000 ft peak this situation can result in a 500 ft error!

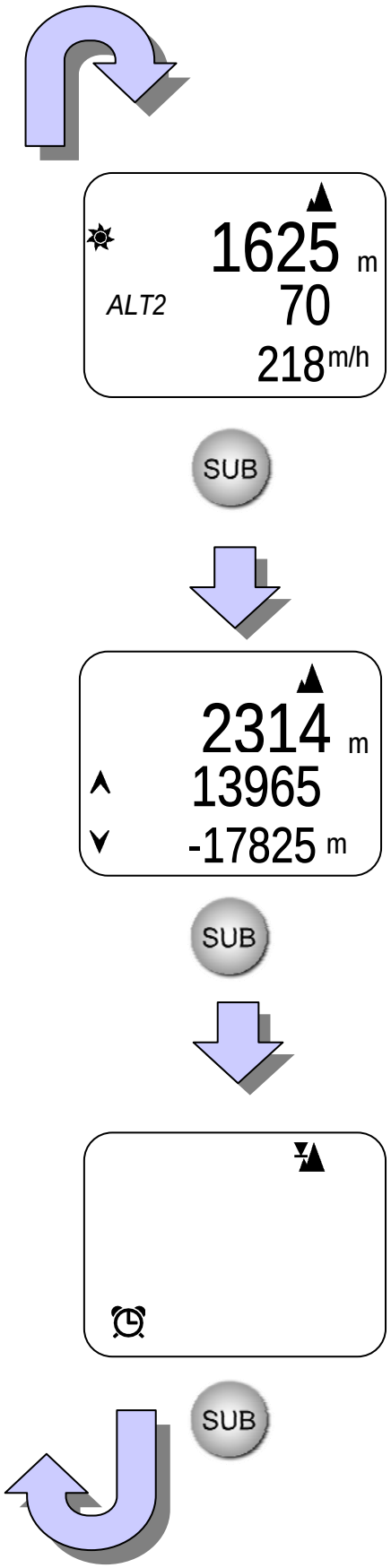
Example: A temperature gradient deviation of 1°C per 1000 meters induces approximately a 4-meter error (this empirical formula is valid for up to 4000m). At an altitude of 2000m during summer where the air mass is 16°C warmer compared to the standard atmosphere, a standard altimeter will display 2 x 4 x 16 = 128m lower than actual.

Note about correcting air column temperature: While the Windwatch *PRO* makes it possible to increase altimeter accuracy by compensating for air column temperatures that deviate from standard, total compensation is not always possible due to the layered structure of the atmosphere. When setting a correction, the WWP proposes a +8ºC setting for warmer than standard and -8ºC setting for colder than standard. This is based on the typical temperature deviation for the summer and winter months in geographical mid-latitudes. If you suspect that an air column correction other than the proposed ± 8ºC should be used, ambient temperature measurements should be taken outside in the shade and compared to the table below. Note also that the measured air temperature may be warmer than the overall air mass due to localized thermal activity, and that should be factored out. If the air column temperature correction is properly applied, a significant increase in accuracy can be achieved.

Table normal atmosphere

Alt. Meter	Temperature ºC	Pressure hPa
0	15.0	1013.2
1000	8.5	898.7
2000	2.0	794.9
3000	-4.5	701.1
4000	-11.0	616.4

Altimeter Screens



Absolute and relative altimeter display

The top line shows the current altitude (elevation). The middle line shows the altitude difference since the last reset of **ALT2**. This **relative altimeter** can quickly be zeroed with a long press of the RES key so that a vertical ascent/descent can be easily measured. The bottom line shows the rate of ascent/descent per hour. The units for this screen can be toggled between *m* and *m/h* or *ft* and *ft/h* with a short press of the ▼ or ▲ key.

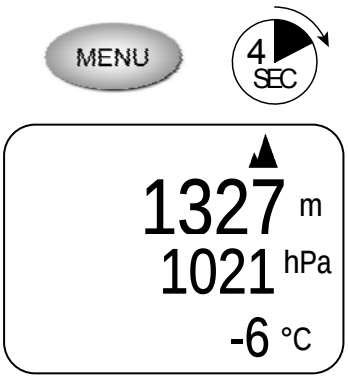
Cumulative ascent and descent display

The top line shows the current altitude (elevation). The middle line shows the accumulated ascent and the bottom line shows the accumulated descent since the last reset. Reset of the ascent and descent totals is performed by a long press of the RES key. Units (*ft* or *m*) can be toggled with a short press of the ▼ or ▲ key.

AutoSet display

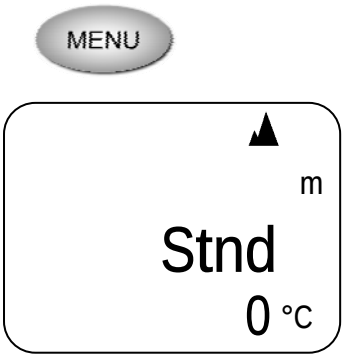
The top line shows the current altitude (elevation). The middle line indicates the altitude that will be set by the **AutoSet** function (if enabled). The bottom line shows the time when AutoSet will set the altitude shown on the middle line (if enabled). See the detailed instructions in section on AutoSet below. AutoSet is toggled on/off with a long press of the ▼ or ▲ key.

Altimeter Settings



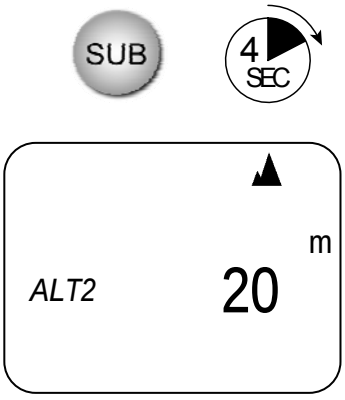
Setting altimeter/ QNH pressure

With the WWP in the Altimeter screen (mountain icon shown in the top of the display) press the MENU key for 4 seconds and the altitude and QNH will blink. Set your current altitude or QNH with ▼ and ▲ keys. Note that these two values are interdependent and will change together. Alternatively, a long press of the MENU key will set the reference altitude/QNH to the standard pressure of 1013.25 hPa, or a long press of the SUB key will set to the altitude to the AutoSet altitude. When the WWP is in set-mode (altitude/QNH flashing) a short press of the MENU key allows the **air column temperature** correction to be set (see below). If no key is pressed, the WWP will briefly show the air column temperature correction factor (default is *Stnd 0ºC*) and will then automatically escape set-mode.



Setting the air column factor

The default is no correction, which means the WWP will display altitudes consistent with normal aviation altimeters. If greater accuracy is desired, and if consistency with aircraft altimeters is not a concern, a correction factor can be set as follows. Enter the Altimeter set-mode as described above. When the altitude and QNH is blinking, short-press the MENU key. This will cause the display to go to the air column correction set-mode, and the current setting will blink (default is *Stnd 0ºC*). One press of the ▲ key will set the correction to *Hot +8°C* (shown with a sun icon); conversely, a short press of the ▼ key will set the correction to *Cold -8°C* (shown with a snowflake icon). The ± 8ºC shift is the typical deviation for the summer and winter months in geographical mid-latitudes. However, further presses of the ▲ and ▼ keys allow the correction to be set precisely in 1°C increments. If a correction has been entered, the sun icon or snowflake icon will be shown on the Altimeter screens in the run mode.

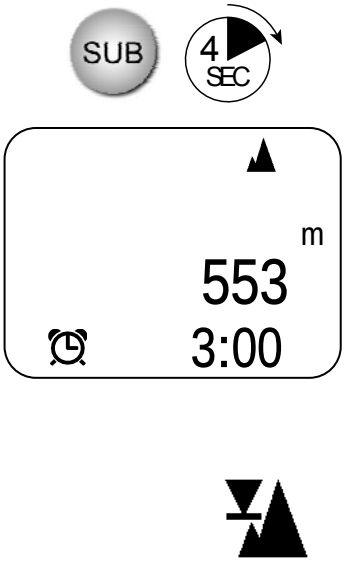


Setting the reference altimeter (ALT 2)

With the WWP in the Altimeter/Relative Altitude screen (mountain icon and ALT2 shown) press the SUB key for 4 seconds and the ALT2 value will blink. Use the ▲ and ▼ keys to set the desired value. A long press of the SUB key sets ALT2 to 0; a long press of the MENU key sets the value of ALT2 to the current absolute altitude.

AutoSet

This Flytec exclusive function allows the WWP to automatically rectify, every day at a pre-determined time, altitude discrepancies that are due to changes in weather conditions. For example, the AutoSet feature can be programmed so that the altimeter will be set every morning at 05:00h to a predetermined altitude such as your home, base camp, airport, ski lodge, hang glider/paraglider launch, etc. The WWP only performs the AutoSet function if the change in air pressure is realistic for a change in weather conditions, meaning that the discrepancy does not exceed plus or minus 100m. In a case where the change in pressure results in a change in altitude reading greater than 100m, the instrument assumes you have changed elevation.



Setting the time and altitude for AutoSet

With the WWP in the AutoSet screen (mountain icon and clock icon shown in the display) press the SUB key for 4 seconds and the AutoSet time will blink. Use the ▲ and ▼ keys to set the desired hour; press the SUB key and set the desired minutes; press the SUB key once more and set the desired altitude. A long press of the MENU or SUB key sets the AutoSet altitude to the international standard pressure of 1013.25 hPa. After you have set the AutoSet time and altitude and returned the WWP to the run mode (by pressing the SUB key or by automatic escape), the AutoSet function is enabled and is confirmed by the addition of a down arrow on the mountain icon (shown left) at the top of the Altimeter screen. AutoSet can be toggled on/off with a long press of the ▲ or ▼ key in the AutoSet screen.

Temperature and Humidity

Temperature and Humidity Sensors

The Windwatch *PRO* is equipped with rapid-reacting, high-sensitivity and digitally-synchronized humidity and temperature sensors that are located in the small opening below the wind speed impeller opening. Therefore the protective slider must be open to perform accurate temperature and humidity measurements. Since the accuracy of the relative humidity reading depends on the temperature of the sensor, and the temperature of the sensor is influenced by the temperature of the instrument's housing, the difference between housing temperature and ambient temperature must be compensated electronically. To perform this compensation, the current temperature of the sensor is taken into account. You will achieve the most accurate and conclusive readings by allowing air to flow freely though the sensor openings. This is accomplished by holding the Windwatch *PRO* in the same way as when taking wind measurements (i.e., WWP held vertically, upwind, and with an outstretched arm).
See the section below on Temperature Measurement.

Dew Point

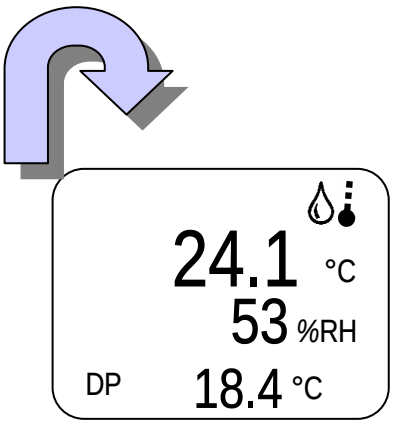
The **dew point** is the temperature at which 100 percent relative humidity is reached and fog or clouds begin to form. The difference between the current temperature and the dew point is an important indicator in determining the likelihood of fog developing. Based upon the altitude-related cooling formula (0.65 °C per 100 m height), it is also possible to predict the altitude at which fog or clouds will form. A rule of thumb with respect to fog is that is that if, during evening hours, the air temperature and dew point value move towards each other, there is a high likelihood of fog during the night.

Temperature Measurement

The measurement of air temperature is one of the most difficult challenges in meteorology. The official measurement setup for meteorological temperature measurement is as follows: the sensor is mounted inside a test tube 2 meters above a freshly mown grass field. For ten minutes before the measurement is to be taken, air is aspirated by a ventilator through the test tube and directed at the sensor; only then is the temperature value read.
The Windwatch *PRO* was designed to approximate this procedure as closely as possible using a handheld instrument. The small opening with three protective ribs is used to channel the air and to direct its flow at the sensor. The sensor is thermally decoupled from the housing as much as is possible inside a narrow housing.

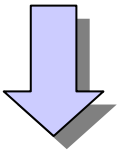
To obtain precise and rapid temperature measurements, hold the WWP with the slider open, facing the prevailing breeze. If there is no wind, wave the WWP back and forth several times, or swing it in circles by its lanyard. This step helps to equalize the temperature of the WWP housing with the ambient air. The housing temperature will be in equilibrium with the ambient air when moving the WWP through the air no longer changes the temperature reading. The temperature reading at that point will be the actual air temperature.

Temperature and Humidity Screens

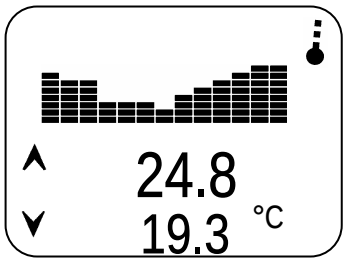


Temperature and humidity display

The top line shows the current temperature, the middle line shows the current relative humidity, and the bottom line shows the current dew point (based on the temperature and humidity readings).

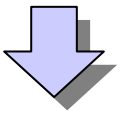


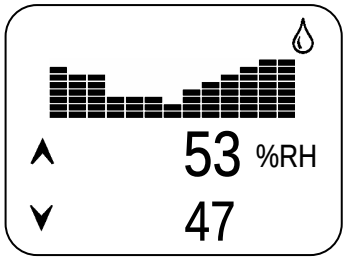
Note: the following sub-screens contain trend graphs. When the SUB key is pressed to access these sub-screens, the display will show (for 2 seconds) the time period corresponding to one bar of the graph, reminding you of the time period represented by one bar.



Temperature graph with minimum/maximum values

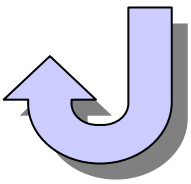
This screen shows the temperature trend over time. The middle line shows the maximum temperature captured by the graph and the bottom line shows the minimum value of the graph. Select temperature units (*ºC* or *ºF*) with a short press of the ▲ or ▼ key. The time span for the graph can be set in the Temperature/Humidity set-mode.



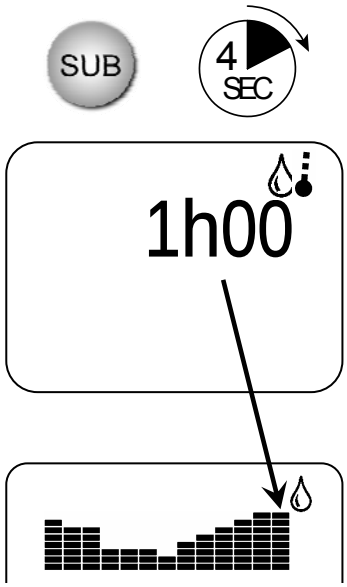


Humidity graph with minimum-/maximum values

This screen shows the relative humidity trend. The middle line shows the maximum value of the graph and the bottom line shows the minimum value. The graph and max/min values can be toggled between relative humidity (*%RH*) and dew point (*DP*) with a short press of the ▲ or ▼ key. The time span for the graph can be set in the Temperature/Humidity set-mode.



Temperature and Humidity Screen Settings



Setting the time units for the trend graph

With the WWP in the Temperature/Humidity screen (droplet or thermometer icon shown in top of the display) press the SUB key for 4 seconds. The time period represented by each bar on the trend graph will blink and can be set to 15 minutes, 30 minutes, 1 hour or 2 hrs using the ▲ and ▼ keys. The WWP maintains temperature and humidity values for the past 24 hours regardless of the time period set for the graph. This means that, at any time, the time period can be reduced to show greater detail or increased to show the long term trend.

General information

Battery

The Windwatch *PRO* is supplied with a CR2032 3-Volt lithium battery installed. Because the Windwatch *PRO* uses state-of-the-art technology, the battery should last through approximately 18 months of normal use. When the battery becomes weak, a low battery message *"Lo Po"* will flash on the display and the battery should be replaced. After you replace the battery, the WWP will be initialized with the factory configuration, consequently, you will need to reset the barometer, time and altimeter. If the instrument is locked up after battery replacement, please follow the instructions in the Malfunction section below.

The WWP is equipped with a backlight that turns on momentarily with a 2-second press of the MENU key. However, the backlight has relatively high battery power consumption. When the battery is at such a low level that reasonable operation of the backlight is no longer possible, the backlight feature is disabled. However, the instrument is otherwise still operative because the other functions are significantly less power consuming. If you press the MENU key for 2 seconds when the backlight feature is disabled, a no light message *"No Li"* will briefly appear on the display.

Malfunction

In case of malfunction, remove the battery and re-insert it upside-down for a short moment (this will not damage the WWP). Then insert the battery again in the correct position. This will reset the entire memory of the instrument. Following this reset the instrument will perform a self-test. If this procedure does not remedy the malfunction, please return the instrument with a precise description of the problem to your FLYTEC dealer or direct to the manufacturer: FLYTEC AG, Ebenaustrasse 18, CH-6048 Horw, Switzerland.

Care and Maintenance

The sensors in the WWP are very accurate and are calibrated at the factory. If after time any of the functions need to be recalibrated, this can be done by the user; it is not necessary to send the WWP in for service. Please contact Flytec for the procedure.

Warranty

The Windwatch *PRO* is warranted against material and manufacturing defects for two years. Physical damage such as a broken housing or display window, as well as damage resulting from abuse, battery leakage, improper care, exposure to excessive heat or opening the housing are excluded from this warranty. In the event a defect is encountered during the two-year warranty period, please contact your FLYTEC dealer for service instructions. **Please carefully read this operation manual before you contact FLYTEC for operation or service issues.**

Water Damage

The Windwatch *PRO* is water resistant and can also withstand temporary immersion in water. If the immersion is in salt water, precautions should be taken to prevent damage to the various components: thoroughly rinse the sensor area with fresh water (no pressure) and then leave the instrument to dry for 24 hours. **Caution:** Never try to accelerate the drying process with heat devices and never by using a microwave stove. **Microwave radiation will destroy the instrument!**

Disclaimer

FLYTEC (Flytec AG and Flytec USA) accept no liability for faults arising from any abuse or unapproved use of the Windwatch *PRO*. Outdoor weather-dependent activities are generally hazardous by nature. In rare cases, it may happen that the WWP provides incorrect data or does not provide any data at all. FLYTEC is not responsible for any damages or injury due to the incorrect functioning of the instrument. When engaging in weather-dependent activities, the responsibility for safety lies solely with the participant.

Specifications

Barometer

Format:	0.00 inHg or 0 hPa
Range:	6.49 inHg to 37.80 inHg or 220 hPa to 1280 hPa
Resolution:	0.03 inHg or 1 hPa
Barograph	
Resolution:	1 hPa in Min/Max sub-screen, 2 hPa in Time & Temp sub-screens
Interval:	0h15, 0h30, 1h00, 2h00
Time scale:	195 min to 26 hrs

Altimeter

Range:	-6,600 to 33,000 ft or -2,000 to 10,000 m
Resolution:	2 ft, 1m
Update Rate:	Based on ascent/descent rate of user
Rapid Mode:	Measuring 0.5s, Display 1s
Slow Mode:	Measuring 2s, Display 2s
Ascent/descent	
Range:	±93,750 ft/h or 28,575 m/h
Format:	x ft/h or x m/h
Resolution:	10 ft/h or 10 m/h

Hygrometer

Format:	
Humidity:	x% RH
Dew Point:	x.x° F or 0.0° C
Range	
Humidity:	1% RH to 100% RH
Dew Point	-76° F to 140°F or ±60 °C
Resolution	
Humidity:	1% RH or
Dew Point:	0.1° F or 0.1° C
Graph	
Resolution:	1 % RH or 0.2° C Dew Point
Interval:	0h01, 0h05, 0h15, 0h30, 1h00, 2h00
Display range:	13 min to 26 hrs
Accuracy:	± 3.5% RF (correctable)

Thermometer

Format:	xx.x°
Range:	-11.2° F to 140°F or -24°C to 60° C
Resolution:	0.1° F or 0.1° C
Graph	
Resolution:	min 0.2°C
Interval:	0h01, 0h05, 0h15, 0h30, 1h00, 2h00
Display range:	13 min to 26 hrs
Accuracy:	± 1.5° C (correctable)

Clock

Format	
Time:	hh:mm:ss or h:mm:ss (pm)
Date:	DD MM YYYY or MM DD YYYY
Resolution:	1 sec
Accuracy:	Approx. 32 sec/yr

Alarm

Format	
Time:	hh:mm resp. h:mm PM
Date:	DD MM or MM-DD or
Interval:	Every day: 1-7
	Week days only: 1-5
	Week-ends only: 6-7
	Recurring day of the week: 1, 2, 3, 4, 5, 6, 7
Resolution:	1 min

Stopwatch

Range:	0 to 99hrs 59min 59sec
Format:	mm:ss:1/10s if time < 1hr
	hh:mm:ss if time ≥1hr
Lap Display:	mm:ss.1/10s if time < 1hr
	hh:mm:ss if time ≥ 1hr
Resolution:	0.1 sec if time < 1hr
	1 sec if time ≥1hr

Timer

Range:	10sec to 99hrs 59min 59sec
Pre-alarm range:	0, 10sec up to 99hrs 59 min 59sec
Display format:	hh:mm:ss
Resolution:	1 sec

Speed

Range:	2 mph to 89 mph, 2.6 ft/s to 130.9 ft/s,0.8m/s to 39.9m/s,
	3km/h to 144km/h, 2 kts to 78 kts, 0 to 12 beauf
Format:	x.x if unit = ft/s or m/s, x if unit = mph or km/h or kts or beauf
Resolution:	1 mph, 0.1 ft/s, 0.1 m/s, 1 km/h, 1 kts, 1 beauf
Accuracy:	± 4% correctable
Update rate:	1/sec
Integration:	5 to 50 seconds (1s increments)

Physical

Weight:	2.3 oz or 67 g
Size:	4.68 x 2.28 x 0.75 in or 11.9 x 5.8 x 1.9 cm
Housing:	ABS, water resistant
Battery type:	3V Lithium-Battery, Type CR2032
Battery life:	± 1.5 year, automatic with low battery warning