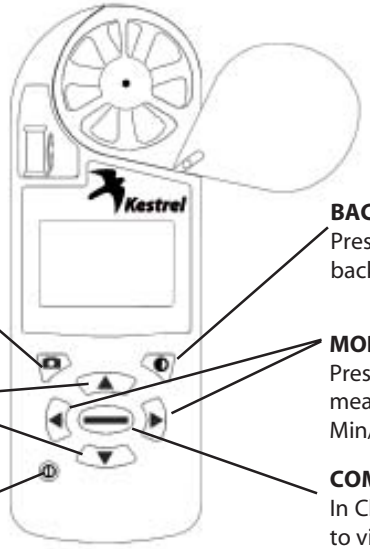
Kestrel® 4300
Construction Weather Tracker

Instruction Manual

NK

Kestrel® 4300 Construction Weather Tracker
FRONT



MANUAL MEMORY BUTTON
Press to manually store current conditions to memory.

MEASUREMENT BUTTONS
Press to scroll between screens: Date/Time, Measurements, User Defined Screens

POWER/SETUP BUTTON
Hold to turn power on or off. Press to enter and exit Main Setup Menu.

BACKLIGHT BUTTON
Press to activate backlight for 1 minute.

MODE BUTTONS
Press to change mode of measurements: Current, Min/Max/Avg, Chart.

COMMAND BUTTON
In Chart Screens, press to view data points. In Setup Menus, press to make selection.

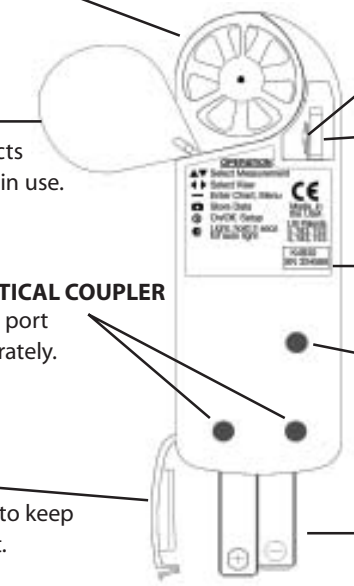
Kestrel® 4300 Construction Weather Tracker
BACK

IMPELLER
Sapphire jewel bearings on a user-replaceable impeller.

IMPELLER COVER
Swivel cover protects impeller when not in use.

DATA UPLOAD OPTICAL COUPLER
Software and serial port interface sold separately.

BATTERY DOOR
Sealed with o-ring to keep product watertight.



TEMPERATURE SENSOR
Hermetically sealed precision thermistor coiled to isolate from case temperature.

HUMIDITY SENSOR
Capacitive sensor with secondary thermistor to improve accuracy and response.

SERIAL NUMBER

PRESSURE SENSOR
Monolithic silicon piezoresistive sensor. *Do NOT insert any objects into this hole.*

2 AAA BATTERIES

Congratulations on the purchase of your Kestrel 4300 Construction Weather Tracker! The Kestrel 4300 not only measures EVERY environmental condition easily, accurately, and right in the palm of your hand, but now also allows users to input a concrete temperature and determine the evaporation rate.

While the Kestrel 4300 is user-friendly and simple to use, reading the instruction manual is recommended in order to use the Kestrel 4300 to its fullest potential.

NK, manufacturer of Kestrel Pocket Weather Meters, is available to answer questions and provide support. Contact NK by phone: 610.447.1555, fax: 610.447.1577, email: info@nkhome.com, or web: www.nkhome.com.

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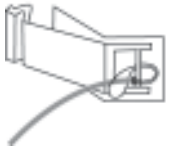
Getting Started

Pouch and Lanyards
A neck lanyard and a small pouch have been provided. To install the lanyard, feed the thin end of the lanyard around the metal post on the battery door (as shown in diagram). Feed the thick end of the lanyard through the loop on the thin end. Using tweezers can help.

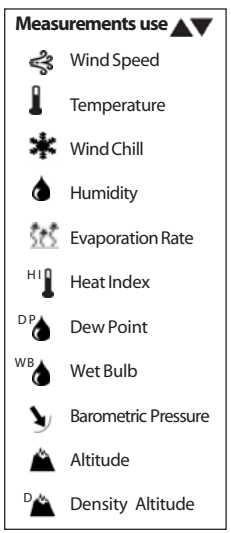


Battery Installation
Use only AAA batteries. Install batteries as indicated on the battery door. After installing the batteries, the Kestrel 4300 will automatically start in the Date and Time setting mode. (See Date and Time Setup below.) Custom settings and chart data will be saved during a battery change; only the date/time and MMA values will be lost.

Turning the Kestrel Meter ON and OFF
To turn the Kestrel Meter ON, press ⏻ the button. To turn the Kestrel Meter OFF, hold the ⏻ button for two seconds. Or, press the ⏻ button, then press the ▬ button with the word OFF highlighted. (Note: your unit will continue to automatically store data when the power is turned off.) When first turned on, the Kestrel Meter will display a splash screen displaying the model number, the battery indicator, and the code version. This battery indicator will indicate the percentage of battery life remaining, which is helpful in preventing unexpected dead batteries.

Date and Time Setup
The first time that you turn on your Kestrel 4300, as well as after a battery change, you will need to set the date and time. The Introduction Screen will appear for 3 seconds, followed by the Date/Time Setup Screen. Press the ▲ and ▼ buttons to scroll through the settings. Press the ◀ and ▶ buttons to scroll through the setting options. After entering the date and time, press the ⏻ button to exit the Date/Time Setup. Then press the ⏻ button again to exit the Main Setup Menu.

Navigation



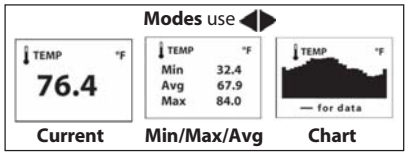
The Kestrel 4300 is set up to display *11 Measurements* (some are calculations) in *3 Modes*. The *Measurements* are listed to the left with their corresponding screen icon. In addition to these Measurements and Modes, there are also 3 User Screens, which simultaneously show 3 current measurements, and the Date & Time Screen, which gives the current date and time. Use the ▲ and ▼ buttons to scroll through the various Measurements, followed by the 3 User Screens and the Date/Time Screen.

The *Modes* are displayed below. Use the ◀ and ▶ buttons to scroll through the various Modes. From any mode, you may still scroll to a different Measurement by pressing the ▲ and ▼ buttons.

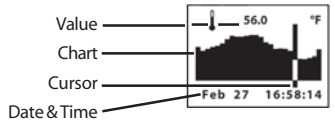
Current - displays the instantaneous reading

Min/Max/Avg -displays the Minimum/Maximum/Average readings from stored data. If there is no stored data, the values will be displayed as --.-.

Chart - displays a graphical representation of up to 1800 stored data points foreach measurement. If there is no stored data, the axis will appear, but the will be blank. (See the following page for information on Chart Navigation.)



Navigation of Charts
The Kestrel 4300 is capable of storing up to 1800 data points for each measurement. To review the data, press the ▬ button while viewing a chart. A cursor will appear on the most recent data point. Press the ◀ and ▶ buttons to scroll through the data points. The date and time at which the data was stored will be displayed at the bottom of the screen, and the data value will be displayed at the top of the screen. Hold down the ◀ or ▶ button to scroll quickly through the data points.



Press the ▲ or ▼ button to review the data for the other measurements. Please note that the cursor will remain at the same date and time. If new data is stored while viewing chart data, the entire chart will shift left with the new data point charted on the right. The cursor will not shift with the chart.

Press the ▬ button to return to the Chart Mode.

Special Functions

Evaporation Rate
The Kestrel 4300 will display the evaporation rate, based on the instantaneous air velocity, relative humidity, ambient temperature and concrete temperature. The 4300 eliminates the need to reference the American Concrete Institute issued charts.

To measure the evaporation rate, you will need to input the concrete temperature. The Kestrel 4300 does not measure this, you will need to use a separate temperature measuring device to obtain the concrete temperature.

Once you have measured the concrete temperature, to enter the concrete temperature into the Kestrel 4300, scroll to the evaporation rate screen, then press the ▬ button. Now you can use the ◀ and ▶ buttons to adjust the concrete temperature. Press the ▬ button again to exit the setting screen.

To accurately measure the evaporation rate, a few precautions must be taken. The readings must be taken into the wind, and approximately 20 inches above the concrete. Additionally, it is extremely important that the temperature reading is not taken in direct sunlight. You may need to shade the Kestrel Meter if the area is not normally in the shade. For example, hold a notebook or piece of plywood above the Kestrel so that it is shaded while taking the

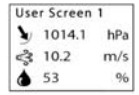
readings. (Be careful not to obstruct the air flow while doing so.) **Failure to shade the unit may cause inaccurate Evaporation Rate readings, and will not meet the criteria in the ACI 308.**

Find the direction that the wind is blowing from and hold the Kestrel 4300 into the wind. You may want to scroll up to the Current Wind Speed Screen to find the direction that the wind is strongest. Hold the unit vertical, and rotate it slightly to find the maximum wind speed. Then scroll back to the evaporation rate screen and hold the Kestrel 4300 facing that direction. The Kestrel 4300 will automatically display the instantaneous evaporation rate.

Since the wind rarely blows at a constant rate, you may notice that the evaporation rate fluxuates. For the most accurate evaporation rate readings, press the > button to enter the averaging screen. This allows you to average the evaporation rate over a set time. The ACI recommends averaging for 6-10 seconds. On the average screen, press the – button to start the averaging. Position the Kestrel into the wind, 20 inches above the concrete and shaded, and count 6-10 seconds, then press the – button again to stop. The screen will display the average and minimum evaporation rate readings. To clear the data, press the – button again. Press the < button to return to the current evaporation rate screen, or the > button to view the chart.

Note that you may change the units of measure for Evaporation Rate under the Main Setup Menu (see the Main Menu setup section instructions). Choices are lb/sf/h and kg/sm/h.

User Screens
The Kestrel 4300 has three User Screens which can be customized to display three current measurements simultaneously. (See the Main Menu Setup section for more information.)



Max/Avg for Wind Speed & Wind Chill
The Max/Avg values for the Wind Speed values are measured independently from the stored and charted data. This allows the user to start and stop the averaging period in the most appropriate manner for their application. Averaging on all wind-related values (Wind Speed and Wind Chill) will be started and stopped together.

While viewing the Min/Max/Avg screen for any of these measurements, hold the unit into the wind, and press the - button when the screen displays "—average" to begin collecting data for all measurements, and again when the screen displays "—stop" to stop collecting data and hold the values on the display. Press the - button when the screen displays "—clear" to clear the data. This routine will work simultaneously for all measurements, regardless of which one is displayed while the routine is run. The Max/Avg for these wind values will not affect any other Min/Max/Avg or stored data.

Manual Data Storage
To manually store data, press the 📷 button. One of the following will appear: Data Stored (data has been captured and will appear on chart), Full (Overwrite is off and data log is full), or Off (Manual Store button has been disabled). See the Main Setup Menu section for more information on Memory.

Backlight
Press the ◐ button to activate the backlight. The light will remain activated for one minute. Press the ◐ button within one minute to deactivate the light manually.

Relative Humidity
The Kestrel 4300 is capable of measuring RH to a high accuracy: +/- 3% RH. To ensure the Kestrel 4300's ability to operate within these specifications, follow these recommendations:

- Avoid taking measurements in direct sunlight, which will heat the air inside the humidity sensor enclosure and cause inaccurate readings.
- If your circumstances force you to expose the Kestrel to a large temperature swing prior to taking a relative humidity reading (such as when taking a Kestrel stored inside at 70° F outside to a temperature of 40° F), you will need to take additional steps to ensure that the Kestrel's external temperature sensor is in thermal equilibrium.
  - Ideally, provide an airflow of at least 1 M/S (2.2 MPH), over the temperature sensor, moving from the back of the unit towards the front. (In other words, point the Kestrel into the airflow.) If there is no airflow, simply wave the Kestrel back and forth so air passes over the sensors. With airflow over the temperature sensors and humidity chambers, readings within specifications will be provided within two to three minutes, even after a large temperature shift.
  - If no airflow can be provided, you must allow sufficient time for the RH value to stabilize. This can take as long as 20 minutes- the greater the temperature change, the greater the time. You can use the logging capability of the Kestrel 4300 to confirm that the unit has stabilized to a correct reading: Set the memory options to a relatively short logging interval (20 seconds works well, see Main Setup Menu for more information), select the graphical display of RH, and you can see when the value is no longer changing significantly. At that point, the RH value is stable and can be relied upon to be within the accuracy specifications.

Barometric Pressure and Altitude Adjustment
The Kestrel 4300 measures station pressure - the actual air pressure in the measurement location - and uses this value to calculate barometric pressure and altitude. Station pressure changes in response to two things - changes in altitude and changes in the atmosphere. Because the Kestrel 4300 is constantly changing location and altitude, it is important to enter adjustments or "references" when accurate pressure and altitude readings are needed.

Barometric pressure is station pressure corrected to sea level. In order to make the correction, the Kestrel 4500 needs an accurate reference altitude. Altitude is the height above sea level. In order to correctly calculate altitude, the Kestrel 4500 needs an accurate barometric pressure reference, also known as an "altimeter setting". You only need to know ONE of these values (current barometric pressure or current altitude) in order to set your Kestrel up to show accurate readings.

Starting with the known barometric pressure for your location

You can obtain your current barometric pressure by checking an internet weather site for a nearby location, or contacting a local airport. Set this value as your reference pressure on the ALTITUDE screen to determine your correct altitude: Press the — button to enter the reference setting mode. Press the ▶ button to increase the reference pressure or the ◀ button to decrease the reference pressure. You will notice that the altitude will change with changes in the reference pressure. Press the — button to exit the adjustment mode. Set your Kestrel down on a table and allow the altitude reading to stabilize. (Note: very small changes in pressure generate noticeable changes in altitude. In order to provide meaningful readings for activities where altitude changes quickly, the Kestrel 4000 features rapid altitude response. This is why the altitude readings tend to fluctuate by a few feet.) After obtaining a current altitude from the ALTITUDE screen, move to the BARO screen and enter this value as your reference altitude by following the same procedure. Both readings will now be accurate.

Starting with a known altitude for your location

You can obtain your altitude from a topographical map or local landmark. Google Earth is an excellent free program that provides the exact altitude for any given address: earth.google.com/. Set this value as your reference altitude on the BARO screen to determine your barometric pressure: Press the — button to enter the reference setting mode. Press the ▶ button to increase the reference altitude or the ◀ button to decrease the reference altitude. You will notice that the barometric pressure will change with changes in the reference altitude. Press the — button to exit the adjustment mode.

Again, allow the Kestrel to stabilize, then enter the value from the BARO screen as your reference pressure on the ALTITUDE screen by following the same procedure. Both readings are now accurate.

When reviewing stored data, remember that changes in pressure AND changes in location/altitude will affect the stored values. When tracking pressure changes relative to weather, set the reference altitude on the BARO screen and keep the Kestrel in one location. Your graph history will now show trends in barometric pressure. Your altitude as shown on the ALTITUDE screen will change as the weather changes, but you can ignore this screen for this purpose.

If you are planning a day hike would like to track your altitude, you'll need to enter the correct reference pressure on the ALTITUDE screen as described above in "starting with the known barometric pressure." You can now track the altitude changes as you hike. In this instance, you should ignore the values on the BARO screen, since the pressure changes will be due to changes in elevation far more than to changes in the weather.

In general, changes in barometric pressure associated with weather changes are small over the course of one day, but they will affect the accuracy of the altimeter over time. This is why aircraft reset their altimeters at every airfield by entering the field's "altimeter setting" or reference pressure. Accordingly, if accurate altitude readings are your primary interest, you should reset the reference pressure on your Kestrel regularly. If you encounter an elevation landmark, you can adjust the reference pressure until the altitude matches the landmark elevation. This will correct the altitude for any pressure changes due to the weather. (Or, you can obtain an updated reference pressure from the sources described above.)

Some final notes - If you wish to know the *actual or station pressure* for your location (such as for engine tuning), simply set the reference altitude on the BARO screen to "0". In this case, the Kestrel will not make any adjustment and will display the measured value. And, the above discussion applies to ALL pressure altimeters, including one you may have in a watch or other device, but not to GPS altimeters which use satellite triangulation to determine altitude. Note that with present GPS technology, pressure altimeters remain more accurate for measuring altitude change. This is why airplanes still rely on pressure altimeters, not GPS. Finally, the DENSITY ALTITUDE screen is calculated from the absolute values of station pressure, relative humidity and temperature, and is not affected by the reference values entered in the BARO and ALTITUDE screens.

Main Setup Menu

You can customize your Kestrel 4500 in multiple ways. Press the ⏻ button to access the Main Setup Menu. Press the — button to select the highlighted setting. The Main Setup Menu contains: OFF, Memory Options, Measurements, Graph Scale, Units, User Screens, System, Date & Time, Language and Restore.

Off - Press the ⏻ or the — button to turn the display off. Even when the Kestrel's display is turned off, the unit will continue to automatically store data at the defined Store Rate. Wind speed will NOT be stored when the unit is off. To continuously measure wind speed, turn the auto shutdown off, and see page 8 for more information on how this data is stored. The battery life will be decreased if data is stored frequently. The only way to completely shut off the unit is to remove the batteries. Custom settings and data will be stored when the batteries are removed.

Memory Options - These settings control the data storage properties.

Setting	Description	Operation
Clear Log (Go/Done)	All stored data is cleared. This will also clear Min/Max/Avg data.	Press ◀ or ▶ to clear the log.
Reset MMA (Go/Done)	All Min/Max/Avg data is cleared. Chart data will remain intact.	Press ◀ or ▶ to clear the MMA.
Auto Store (On/Off)	When On, data is automatically stored at preset Store Rate. When Off, data is only stored when manually captured with the 📷 button.	Press ◀ or ▶ to toggle between On and Off.
Store Rate* (2 sec - 12 hr)	The frequency at which data sets are automatically stored. (Battery life may be shortened if data is stored frequently.)	Press ◀ or ▶ to increase or decrease Store Rate frequency.
Overwrite (On/Off)	This setting only applies when the data log is full. When On, oldest data point is discarded to allow memory for the new data point. When Off, new data points are not saved.	Press ◀ or ▶ to toggle between On and Off.
Man Store (On/Off)	When On, data is stored when the 📷 button is pressed. When off, the 📷 button is disabled.	Press ◀ or ▶ to toggle between On and Off.

* When unit is off, data is NOT stored for 2 sec and 5 sec Store Rates.

Measurements - Measurement screens can be hidden from the normal measurement navigation. For example, if wind chill is not of interest, it can be hidden. Press the ◀ or ▶ button to toggle between ON and OFF for each individual measurement. Press the ▲ or ▼ button to highlight the desired measurement. Press the ⏻ button to return to the Main Setup Menu.

Graph Scale - These settings control the chart limits of your meter. Depending on the conditions, the lower and upper limits of the chart scale may need to be adjusted in order to get the best view of the data. Highlight the desired measurement by pressing the ▲ or ▼ button. Select the highlighted measurement by pressing the — button. Press the ◀ or ▶ button to increase or decrease the value of the limits. Press the ▲ or ▼ button to change between the upper and lower limits. Press the ⏻ button to exit and return to the measurement selection screen. Press the ⏻ button to return to the Main Setup Menu.

Units - The units of measure can be adjusted to best suit the application. The following units are available:

Wind Speed m/s meters per second km/h kilometers per hour kt knots mph miles per hour ft/m feet per minute Bft Beaufort	**Temperature, Dewpoint, Wet Bulb Temp, Wind Chill & Heat Index** ℃ Celsius ℉ Fahrenheit	**Evaporation Rate** lb/sf/h pounds per square feet per hour kg/sm/h kilograms per square meter per hour
Pressure inHg inches mercury hPa hectopascals psi pound per square inch mb millibar		**Altitude, Density Alt.** m meters ft feet

Highlight the desired measurement by pressing the ▲ or ▼ button. Press the ◀ or ▶ button to scroll through the available units. Press the ⏻ button to return to the Main Setup Menu.

User Screens - The three User Screens can be reconfigured to display the most appropriate information for the application. Only current measurements can be selected for the User Screens - Min/Max/Avg and Charts are not available.

Highlight the desired User Screen by pressing the ▲ or ▼ button. Press the — button to select the highlighted User Screen. Press the ▲ and ▼ buttons to change lines, and the ◀ or ▶ button to scroll through the available measurements for each highlighted line. Press the ⏻ button to return to the User Screen Setup Menu. Repeat above process for the other User Screens or press the ⏻ button to return to the Main Setup Menu.

System - The display Contrast and Auto Shutdown can be reconfigured as required. The relative humidity and pressure sensors can also be recalibrated. Press the ▲ and ▼ buttons to highlight the appropriate selection, and the ◀ or ▶ button to adjust or select.

The Contrast can be adjusted for better visibility depending on the ambient lighting conditions. Press the ◀ or ▶ button to increase or decrease the contrast from 0 to 20 (0 is lightest, 20 is darkest).

The display can be set to automatically turn off in order to conserve the battery life. Auto Shutdown will only occur after the preset time has elapsed without any button presses. Press the ◀ or ▶ button to scroll through the Auto Shutdown options (15 minutes, 60 minutes, Off).

Baro Cal - The pressure sensor can be calibrated if necessary. It is extremely important to know the precise altitude and mean sea level barometric pressure at the time of calibrating the sensor. First, set the reference altitude on the BARO measurement screen to the known altitude (see Pressure Adjustment on page 9). Then adjust the calibrating setting on the Baro Cal screen to the known mean sea level barometric pressure. *Recalibration of this sensor is not typically required, and it is not recommended that you recalibrate without speaking to an NK technician.*

Humidity Cal - The humidity sensor can be calibrated by "teaching" it the correct humidity. Some special equipment is required for this calibration, including two hermetically sealed containers and saturated salt solutions. NK offers a calibration kit, and instructions are available on www.nkhome.com. *Recalibration of this sensor is not typically required, and it is not recommended that you recalibrate without speaking to an NK technician.*

Date & Time - The date and time, as well as date and time formats, can be adjusted. The Time Formats available are: 12 hour and 24 hour. The Date formats available are day/month/year and month/day/year. Press the ⏻ button to return to the Main Setup Menu.

Language - Displayed text can be set in one of five languages: English, French, German, Italian or Spanish. To choose a language, use the ▲ and ▼ buttons to highlight the desired language. Press the — button to select the language and return to the Main Setup Menu. Otherwise, press the ⏻ button to return to the Main Setup Menu without changing languages.

Restore - Default settings for units of measure, date and time formats, and system settings can be restored. (See page 21 for a list of the default settings.) Press the ▲ or ▼ button to highlight the desired default setting: Metric, Imperial or Defaults. Press the ◀ or ▶ button to reset the factory setting. Press the ⏻ to return to the Main Setup Menu.

Application Examples

This section provides examples of applications where a Kestrel might be used, and the appropriate memory settings.

Concrete Placement
Auto Store On
Store Rate 1 minute
Overwrite On
Manual Store On
These settings will record continuously so you can monitor the conditions on the job site. With the automatic store rate set to 1 minute, you can store over 24 hours of data for later review. Use the manual store button to capture individual evaporation rate readings when you are measuring right over the concrete.

Weather Monitoring
Auto Store On
Store Rate 1 hr
Overwrite On
Man Store Off
These settings will allow you to track conditions for almost 3 months. When the memory is full, each new measurement will be stored in place of the oldest data point. The charts will provide a quick look at the recent weather conditions. Keep an eye out for falling barometric pressure, which indicates a storm is coming.

Hiking/Camping for the Weekend
Auto Store On
Store Rate 20 min
Overwrite Off
Man Store On
These settings will allow you to track the conditions for almost 26 days. Measurements will be stored every 20 minutes, and stop storing when the log is full. This will let you review the trip at your convenience when you return. You can also manually store the conditions, in case you get caught in 40 mile per hour winds or make it to the top of a mountain. For more detailed information on your trip, set the Store Rate to 2 hours overnight, and 10 minutes during the day.

Soaring/Hang Gliding
Auto Store On
Store Rate 2 min
Overwrite Off
Man Store On

These settings will allow you to track all conditions for 66 hours. Chart your altitude changes, watch how the temperature and humidity vary with altitude, and log your apparent speed. Data will no longer be stored once the log is full, in order to preserve it until it can be reviewed later. Be sure to clear the data log just before your flight.

Skydiving
Auto Store On
Store Rate 2 sec
Overwrite Off
Man Store Off

These settings will allow you to record a detailed account of your jump. Be sure to clear the data log just before jumping. As you descend toward the ground, you will be tracking the altitude every two seconds, as well as the conditions at that altitude. The chart will clearly show the point at which the parachute opens, as well as the point you get back on the ground.

HVAC - Environmental Monitoring
Auto Store On
Store Rate 5 min
Overwrite On
Man Store Off
These settings will record conditions every five minutes, for a total storage of almost 2 days. You can monitor the conditions in a laboratory or manufacturing plant, both day and night, to determine if the climate control is working properly. Or you can examine the effect on the environment when employees enter and exit the building.

HVAC/R - System Balancing
Auto Store Off
Store Rate —
Overwrite Off
Man Store On
These settings will require you to press the Manual Store Button in order to store any data at a duct, hood, vent, or other air system. The meter will not store any data automatically. Be sure to record the location and date/time of storage for reference when reviewing the data. After storing the conditions at each location, simply review the data and balance the system.

Memory Capabilities

Store Rate	Total Memory	Store Rate	Total Memory
2 sec	59 min, 44 sec	10 min	12 days, 10 hr, 40 min
5 sec	2 hr, 2 min, 20 sec	20 min	24 days, 21 hr, 20 min
10 sec	4 hr, 58 min, 40 sec	30 min	37 days, 8 hr
20 sec	9 hr, 57 min, 20 sec	1 hr	74 days, 16 hr
30 sec	14 hr, 56 min	2 hr	149 days, 8 hr
1 min	1 day, 5 hr, 52 min	5 hr	373 days, 8 hr
2 min	2 days, 11 hr, 44 min	12 hr	896 days
5 min	6 days, 5 hr, 20 min		

Glossary

The below definitions have been greatly simplified in order to keep this section brief. We strongly recommend that anyone who wishes to make use of these measurements refer to one of the many excellent weather references available for a more in-depth definition. On the internet, visit www.usatoday.com or www.noaa.gov. Or, locate the USA Today publication, *The Weather Book*. Please note that any words in a definition printed in *italics* are themselves defined in this glossary.

Altimeter Setting: An aviation term for the local barometric pressure. Same as reference pressure.

Altitude: The distance above sea level. The Kestrel 4500 calculates altitude based on the measured *station pressure* and the input *barometric pressure* - or "reference pressure".

Barometric Pressure: The air pressure of your location reduced to sea level. Pressure will change as weather systems move into your location. Falling pressure indicates the arrival of a low pressure system and expected precipitation or storm conditions. Steady or rising pressure indicates clear weather. A correct altitude must be input for the Kestrel to display barometric pressure correctly.

Density Altitude: The *altitude* at which you would be, given the current air density. Often used by pilots in order to determine how an aircraft will perform. Also of interest to individuals who tune high performance internal combustion engines, such as race care engines.

Dewpoint: The *temperature* to which air must be cooled in order for condensation to occur. The difference between *dewpoint* and *temperature* is referred to as the "temperature/dew point spread". A low dewpoint spread indicates high *relative humidity*, while a large dewpoint spread indicates dry conditions.

Heat Index: A practical measure of how hot the current combination of *relative humidity* and *temperature* feels to a human body. Higher *relative humidity* makes it seem hotter because our ability to cool ourselves by evaporating perspiration is reduced.

Reference Pressure: The local barometric pressure. Input to the altitude screen to provide correct altitude readings. Also known as the altimeter setting.

Relative Humidity: The amount of water vapor actually in the air divided by the maximum amount of water vapor the air could hold at that *temperature*, expressed as a percentage.

Station Pressure: The *air pressure* of your location, NOT reduced to the sea level equivalent.

Temperature: The ambient air temperature.

Wet Bulb Temperature: The lowest *temperature* to which a thermometer can be cooled by evaporating water into the air at constant pressure. This measurement is a holdover from the use of an instrument called a sling psychrometer. To measure wet bulb temperature with a sling psychrometer, a thermometer with a wet cloth covering over the bulb is spun rapidly through the air. If the relative humidity is high, there will be little evaporative cooling and the wet bulb temperature will be quite close to the ambient temperature. Some exercise physiology guides use *wet bulb temperature*, rather than *heat index*, as a measure of the safety of exercise in hot and humid conditions.

Wind Chill: The cooling effect of combining wind and temperature. The wind chill gives a more accurate reading of how cold it really feels to the human body. The Kestrel wind chill is based on the National Weather Service standards as of November 1, 2001.

Default Settings

UNIT	METRIC	IMPERIAL
Wind Functions	m/s	mph
Temperature Functions	℃	℉
Evaporation Rate	$Kg/m^2/h$	$lb/ft^2/h$
Barometric Pressure	hPa	inHg
Altitude Functions	m	ft
Time Format	24 hour	12 hour
Date Format	day/month/year	month/day/year

SETTING	FACTORY DEFAULT
Automatic Data Store	On
Data Store Rate	1 hour
Data Overwrite	On
Manual Data Store	On
User Screen 1	wind speed, temperature, humidity
User Screen 2	humidity, dewpoint, wet bulb
User Screen 3	pressure, altitude, density altitude
Display Contrast	10
Automatic Shutdown	15 minutes
Language	English

PC Upload

Stored data may be uploaded to a PC with the optional Kestrel PC Interface, NK part number 0804.

Customer Service

Kestrel Pocket Weather Meters Warranty
NK does not believe in "disposable electronics." We know that Kestrel Meters don't typically lead pampered lives, and we design them for years of performance in tough conditions. Every Kestrel is designed and manufactured at NK's facility in Boothwyn, PA. We guarantee every Kestrel Pocket Weather Meter to be free of defects in materials and workmanship for a period of FIVE YEARS from your date of purchase. We will repair or replace any defective product or part when notified within the warranty period, and will return the product via domestic ground shipping at no charge. Additionally, each Kestrel has a 30-day money back guarantee.

The following issues do not result from a manufacturing defect and are not covered under this warranty: damage due to improper use or neglect (including corrosion), impact damage, modifications or attempted repairs by someone other than an authorized NK repair agent, impeller failure not caused by a manufacturing defect, normal wear from use of the product, failed batteries, and re-calibration beyond 30 days from your date of purchase.

Your warranty period will be measured from your date of purchase. The best way to ensure full warranty coverage is to REGISTER your NK product promptly on our website: www.kestrelweather.com. We keep your registration information strictly confidential and do not sell it, share it, or use it for anything but product-related information bulletins (which you may decline receiving). If you do not register and cannot provide proof of purchase, your warranty period will be measured from our date of manufacture, determined by serial number.

We request that you contact NK or Richard Paul Russell LTD if you feel your product is not working properly. We can often solve product issues by phone or e-mail, saving you the time and expense of returning the unit. If we require the product to be returned, we will issue a Return Authorization to expedite the handling of your warranty claim.

The Kestrel 4300 is covered by the following US patents: 5,783,753, 5,939,645, 6,257,074, and 7,059,170.

Calibrations, Certifications and Service
Every NK product is tested and calibrated before it leaves our factory. We guarantee that it will perform within specifications when you receive it. Each Kestrel comes with a Certificate of Conformity, with the stated specifications for that product on the back. If you feel an NK product is not meeting specs when you receive it, call

us and we'll make sure you are operating it correctly. If it still appears that it may be out of spec, return it to us within 30 days of purchase and we will test and recalibrate all values at no charge. Beyond 30 days, we offer reasonably-priced tests, calibration services and N.I.S.T. certified calibrations as well as Kestrel tune-ups.

All of our measurements are traceable to the National Institute of Standards and Technology, ensuring the hightest level of accuracy. Our primary Calibration Standards are sent for calibration in accordance with N.I.S.T. requirements and based on a regular schedule. Only approved laboratories and N.I.S.T themselves are used for these calibration services. Incoming and outgoing data is supplied with the certificate of calibration.

We also offer full factory service on every product we manufacture for as long as we make the product (and as long after as component availability permits). If we can't repair a product, we will offer you a brand-new replacement under our Customer Care Program (even for accidental damage and misuse).Cost of repairs and other important information can be found here.

We request that you contact NK or Richard Paul Russell LTD if you feel your product is not working properly. We can often solve product issues by phone or e-mail, saving you the time and expense of returning the unit. If we require the product to be returned, we will issue a Return Authorization to expedite the handling of your claim.

Visit www.kestrelweather.com for more information and pricing for these services.

Lifetime Customer Care Warranty
NK wants you to be an NK customer for life, so we take care of you even beyond the terms of the above warranty with our Customer Care Program. Trade-in any Kestrel Pocket Weather Meter, no matter the age or condition, and receive a generous discount on the replacement product (same model only). Our Customer Care Program applies only as long as we manufacture the product, and does not cover product upgrades.

Kestrel® Pocket Weather® Meters
are designed and manufactured in the USA by:

NIELSEN-KELLERMAN
610.447.1555
www.kestrelweather.com
info@kestrelweather.com

Instruction Manual for Kestrel 4300 version: 4.24 ALL

Please register your Kestrel at www.KestrelWeather.com