Congratulations on the purchase of your Kestrel 4000 Pocket Weather Tracker! The Kestrel 4000 is the next generation of weather monitoring. Now, you can instantly measure EVERY major environmental condition easily, accurately, and right in the palm of your hand.

While the Kestrel 4000 is user-friendly and simple to use (and the Quick Start Card will help get you started), reading the instruction manual is recommended in order to use the Kestrel 4000 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
Wrist and neck lanyards 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 4000 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 4000 ON and OFF
ON: Press the button. 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.)

Date and Time Setup
The first time that you turn on your Kestrel 4000, 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.

Measurement Navigation
Starting on the Date & Time Screen...
...Press the button to scroll to the Current Wind Speed Screen.
Press the button again to scroll to the Current Temperature Screen.
Continue pressing the button to scroll through the Current Measurement Screens, listed on the previous page, followed by the 3 User Screens. Press the button to scroll through these screens in reverse order.

Mode Navigation
While in a Current Screen, press the button to view the Min/Max/Avg for a measurement. If there is no stored data, the values will be displayed as --.--. Press the button again to view a chart for the measurement. If there is no stored data, the axis will appear, but the chart will be blank.
Press the button to return to the Min/Max/Avg and Current Screens. From either Min/Max/Avg or Chart Screen, press the or button to scroll through the Min/Max/Avg or Chart Screen for other measurements.

Navigation of Charts
The Kestrel 4000 is capable of storing up to 480 data points. To review the data, press the button while viewing a chart. A cursor will appear on the most recent data point. Press the button to scroll through older data points and the button to scroll through more recent data points. The date and time at which the data was stored will be displayed at the bottom of the screen. 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.

Navigation
The Kestrel 4000 is set up to display 10 Measurements (some are actually calculations) in 3 Modes.

The Measurements are listed to the right with their corresponding screen icon. Use the and buttons to scroll through the various Measurements.

The Modes are:
- **Current** - displays the instantaneous reading
- **Min/Max/Avg** - displays the Minimum/Maximum/Average readings from stored data
- **Chart** - displays a graphical representation of up to 480 stored data points

Examples of each of these screens are shown below. Use the and buttons to scroll through the various Modes.

In addition to these Measurements and Modes, there are also 3 User Screens, which simultaneously show 3 current measurements (see pages 8 and 11 for more information); and the Date & Time Screen, which gives the current date and time.

Special Functions

User Screens
The Kestrel 4000 has three User Screens which can be customized to display three current measurements simultaneously. (See page 11 for setup instructions.)

- **Min/Max/Avg for Wind Speed and Wind Chill**
  The Min/Max/Avg values for Wind Speed and Wind Chill are measured independently from the stored and charted data. While viewing the Min/Max/Avg screen for either Wind Speed or Wind Chill, press the button when the screen displays “— Average” to begin collecting data for both measurements. Press the button 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 both measurements, regardless of which one is displayed while the routine is run. The Min/Max/Avg for Wind Speed and Wind Chill will not affect any other Min/Max/Avg or stored data.

Relative Humidity
The Kestrel 4000 is capable of measuring RH very accurately (+/- 3% RH). However, there are a number of circumstances that can reduce the Kestrel 4000’s ability to perform within these specifications:

- Direct sun will heat the air inside the humidity sensor enclosure and cause inaccurate readings. Keep the Kestrel 4000 in the shade when taking RH measurements.
- Rapid large temperature changes, such as when taking a Kestrel stored inside at 70°F outside to a temperature of 40°F, can require as long as 30 minutes to force the temperature inside the RH enclosure to match the temperature outside, permitting the unit to provide accurate RH readings. Any air flow over the RH sensor enclosure, even as low as 2 mph, significantly speeds up the response time. When taking measurements under conditions where there is a significant change in temperature (more than 2C or 4F) be sure to allow enough time for the RH value to stabilize. The greater the temperature change, the longer the time. You can use the logging capability of the K4000 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 page 10 for instructions), 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 4000 will measure station pressure in order to calculate barometric pressure and altitude. Changes in either air pressure or altitude will affect these readings, so it’s important to make adjustments as necessary.

First, you will need to obtain either (a) the current barometric pressure or (b) the altitude of your location. You can obtain your current barometric pressure by contacting a local airport or weather service. Set this value as your reference pressure on the ALTITUDE screen to determine your altitude. Otherwise, you can obtain your altitude from a topographical map or local landmark. Set this value as your reference altitude on the BARO screen to determine your barometric pressure.
There are two basic examples for when and how to use the BARO and ALTITUDE screens. First, assume that you know the altitude from one of the sources above. Set the reference altitude on the BARO screen to this elevation. As long as you remain at home, you can accurately track changes in the barometric pressure. However, the measurement on the ALTITUDE screen also changes. This value will fluctuate as pressure fronts pass through your location. Since you know your house is not changing elevation, you can ignore this screen. Now let’s assume that you are planning a day hike, and you’d like to track your altitude. Before starting, you’ll need to adjust the reference pressure on the ALTITUDE screen. You can do this by simply adjusting the reference pressure until you reach the elevation of your house. The reference pressure will be the same as the pressure reading on the BARO screen. You can now track the altitude changes as you hike. You can ignore the values on the BARO screen, since the pressure changes are predominantly due to changes in elevation.

As with all altimeters, it must be assumed that any change in pressure due to weather is small over the course of one day. If you were to 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.

Altitude Adjustment

Obtain a barometric pressure reading from a local weather source to use as your reference pressure. From the Current Altitude Screen, press the button to enter the adjustment mode. Press the button to increase the reference pressure or the button to decrease the reference pressure. You will notice that the Barometric Pressure will change with changes in the reference altitude. Press the button to exit the adjustment mode.

Pressure Adjustment

Obtain your altitude from a topographical map or landmark to use as your reference altitude. From the Current Barometric Pressure Screen, press the button to enter the adjustment 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.

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 page 10 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.

Measurements - Settings 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 or button to change between the lower and upper limits. Press the button to exit and return to the measurement selection screen. Press the button to return to the Main Setup Menu.

Systems - 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 then press 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 the calibration kit, and instructions are available on www.nkh.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. (See page 5 for instructions on how to set the date and time.) 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 17 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 return to the Main Setup Menu.
This section provides examples of applications where a Kestrel 4000 might be used, and the appropriate memory settings.

**Weather Monitoring**
- **Auto Store**: On
- **Store Rate**: 1 hr
- **Overwrite**: On
- **Man Store**: Off

These settings will allow you to track conditions for 20 days. 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.

**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 16 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.

**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 7 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.

**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.

**Memory Capabilities**

<table>
<thead>
<tr>
<th>Store Rate</th>
<th>Total Memory</th>
</tr>
</thead>
<tbody>
<tr>
<td>2 sec</td>
<td>16 min</td>
</tr>
<tr>
<td>5 sec</td>
<td>40 min</td>
</tr>
<tr>
<td>10 sec</td>
<td>1 hr, 20 min</td>
</tr>
<tr>
<td>20 sec</td>
<td>2 hr, 40 min</td>
</tr>
<tr>
<td>30 sec</td>
<td>4 hr</td>
</tr>
<tr>
<td>1 min</td>
<td>8 hr</td>
</tr>
<tr>
<td>2 min</td>
<td>16 hr</td>
</tr>
<tr>
<td>5 min</td>
<td>1 day, 16 hr</td>
</tr>
</tbody>
</table>

**Default Settings**

**Setting**
- **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 0830.
## Specifications

<table>
<thead>
<tr>
<th>Measurement</th>
<th>Units</th>
<th>Operational Range</th>
<th>Resolution</th>
<th>Accuracy (+/-)</th>
<th>Specification Range</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Wind Speed</strong></td>
<td>MPH</td>
<td>0.8 to 135.0</td>
<td>1</td>
<td>3% of reading</td>
<td>0.8 to 89.0 MPH</td>
</tr>
<tr>
<td></td>
<td>fpm</td>
<td>59 to 11,948</td>
<td>1</td>
<td>3% of reading</td>
<td>59 to 7877 fpm</td>
</tr>
<tr>
<td></td>
<td>Knots</td>
<td>0.6 to 118.3</td>
<td>0.1</td>
<td>3% of reading</td>
<td>0.6 to 78 Knots</td>
</tr>
<tr>
<td></td>
<td>Beaufort</td>
<td>0 to 12</td>
<td>1</td>
<td>3% of reading</td>
<td>0 to 12</td>
</tr>
<tr>
<td></td>
<td>m/s</td>
<td>0.4 to 60.0</td>
<td>0.1</td>
<td>3% of reading</td>
<td>0.4 to 40.0 m/s</td>
</tr>
<tr>
<td></td>
<td>KPH</td>
<td>1.0 to 218.0</td>
<td>0.1</td>
<td>3% of reading</td>
<td>1.0 to 144 KPH</td>
</tr>
</tbody>
</table>

1 inch diameter impeller with precision axle and sapphire bearings, individually tested in NIST-traceable wind tunnel. Calibration drift < 1% after 100 hours use at 16 MPH / 7 m/s. Sustained operation above 60 MPH / 27 m/s will wear impeller rapidly and may cause destruction of impeller. Replacement impeller, PN-0801, may be field-installed without tools (US Patent 5,783,753).

<table>
<thead>
<tr>
<th>Temperature</th>
<th>°F</th>
<th>-5.0 to 260.0</th>
<th>1</th>
<th>-20 to 158 °F</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>-25.0 to 137.8</td>
<td>0.1</td>
<td>-2 to 70 °C</td>
</tr>
</tbody>
</table>


<table>
<thead>
<tr>
<th>Relative Humidity</th>
<th>%RH</th>
<th>0.0 to 100.0</th>
<th>0.1</th>
<th>3.0 %RH</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>5 to 95 % non condensing</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Polymer capacitive humidity sensor mounted in thin-walled chamber external to case for rapid, accurate response (US Patent 6,257,074). Response specification is time to achieve 95% or better of stated accuracy. Calibration drift +/-2% over 24 months. Relative humidity may be recalibrated at factory or in field (facilitated by Kestrel Computer Interface, PN 0830).

<table>
<thead>
<tr>
<th>Pressure</th>
<th>inHg</th>
<th>8.86 to 32.48</th>
<th>0.01</th>
<th>0.05 inHg</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>hPa/mb</td>
<td>300.0 to 1100.0</td>
<td>0.1</td>
<td>1.5 hPa/mb</td>
</tr>
<tr>
<td></td>
<td>PSI</td>
<td>43.5 to 159.5</td>
<td>0.1</td>
<td>0.02 PSI</td>
</tr>
</tbody>
</table>

Monolithic silicon piezoresistive pressure sensor with second-order temperature correction. Maximum error beyond specified temperature, +/- 0.99 inHg / 3.0 hPa. Calibration drift typically -0.03 inHg / -1.0 hPa per year. Pressure sensor may be recalibrated at factory or in field using Kestrel Calibration Kit, PN-0824.

| Wind Chill | °F | -49.0 to 257.0°F | 0.0 to 100.0 %RH, 8.86 to 32.48 inHg | 0.1 |
|           | °C | -25.0 to 137.8°C | 0.0 to 100.0 %RH, 45.0 to 125.0°C | 0.1 |

The above values are calculated from the primary measurements of wind speed, temperature and relative humidity.

<table>
<thead>
<tr>
<th>Wet Bulb</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Altitude</th>
<th>ft</th>
<th>-6000 to 30000 ft</th>
<th>1</th>
<th>50 ft</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>-2000 to 9000 m</td>
<td>1</td>
<td>15 m</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Density Altitude</th>
<th>ft</th>
<th>-49.0 to 257.0°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>m</td>
<td>-45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heat Index</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Dewpoint</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Beaufort</th>
<th>1 second</th>
<th>5 to 95% RH, -49.0 to 257.0°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>1 minute</td>
<td>5 to 95% RH, -49.0 to 257.0°F</td>
<td>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</td>
<td>1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Heat Index</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

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<tr>
<th>Dewpoint</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Wet Bulb</th>
<th>°F</th>
<th>0.0 to 100.0 %RH, 8.86 to 32.48 inHg</th>
<th>0.0 to 100.0 %RH, 45.0 to 125.0°C</th>
<th>0.1</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.0 to 100.0 %RH, 45.0 to 125.0°C</td>
<td>0.1</td>
</tr>
</tbody>
</table>

### Data Display and Storage

- Minimum, maximum, average and logged history stored and displayed for every measured value. 480-point data logger with graphical display. Auto data storage; interval settable from 2 seconds to 12 hours. Manual data capture.
- Multifunction, multi-digit programmable dot-matrix display.
- 1 second display update.
- English, French, German, Italian, Spanish.
- Choice of aviation green or visible red electroluminescent backlight. Automatic or manual operation.
- The operational temperature range of the liquid crystal display and batteries is 0°F to 131°F -18°C to 55 °C. Beyond the limits of this range, the unit must be maintained within range and exposed for minimum time necessary to take reading.
- -22°F to 140°F / -30°C to 60 °C
- User-selectable: 15 minutes, 60 minutes or disabled
- AAA Alkaline, two, included. Average life, 400 hours of use, +/- depending on backlight use.
- Waterproof (IP69 standard)
- 5.0 x 1.8 x 1.1 in / 12.7 x 4.5 x 2.8 cm
- 3.6 oz / 102 gm
- Dark grey, safety orange or olive drab (FED-STD-595B, Color 34088).