Kestrel®

4000 Series Weather & Environmental Meters

by NK

INSTRUCTIONAL MANUAL

AVAILABLE WITH Bluetooth® WIRELESS DATA TRANSFER

NKhome.com 800.784.4221

⚠ CAUTION

Your Kestrel brand Weather & Environmental Meter is designed to provide accurate measurement of current conditions only. Depending on your location and environment, conditions may change rapidly.

Rapid temperature and humidity changes (ie moving your meter from indoors to outdoors) may cause inaccurate readings of temperature and humidity as well as all readings that rely on either of these values. Before relying on a Kestrel Meter's readings, use care to either a) force air flow over the sensors by waving or slinging your meter through the air; or b) wait until your unit's readings have stabilized, indicating it has equilibrated to its new environment.

To maximize the accuracy and reliability of your readings:

- ***Ensure that your Kestrel Meter is in good repair and within factory calibration.***
- ***Take readings frequently and carefully according to the guidelines above.***
- ***Allow your meter's readings to stabilize after significant changes in temperature or humidity (i.e., changing location from indoors to outdoors).***
- ***Allow a margin of safety for changing conditions and reading errors (2-3% of reading is recommended).***

Use extra care and good judgment when referring to your Kestrel Meter to make any decisions regarding safety, health or property protection.

⚠ WARNING

To reduce the risk of injury or death to persons, read and follow these guidelines!

The Heat Stress, Wind Chill and Thermal Work Limit indices are published indices developed by the National Weather Service to provide decision guidance based on average human physiological response. Certain individuals, animals, equipment or property may be more susceptible to harm relating to environmental conditions, requiring additional precautions. For example, very young or elderly individuals, individuals with asthma or sickling trait, and individuals who have not become acclimated to hot conditions are likely to be more prone to heat illness, heat exhaustion, heat stroke or death.

Know yourself and the individuals and items you are responsible for.

- ***Where appropriate, seek the guidance of a medical professional.***
- ***Know what to do in the event of heat illness.***
- ***Be prepared with supplies to treat heat illness.***
- ***Have and practice a heat illness action plan.***

Your Kestrel Weather & Environmental Meter is an environmental meter, not a medical device. It is only one source of information and must be employed with care and good judgment.

OVERVIEW

SETUP & FUNCTIONS

** for BLUETOOTH®-enabled models ONLY*

SPECIAL SETUP (KESTREL 4500 & SPECIALTY MODELS)

CUSTOMER SUPPORT

NK, manufacturer of Kestrel Weather & Environmental 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: NKhome.com

FEATURES & OPTIONS

Standard ● | *Optional* ○

Measurement/ Units of Measure	Icon	4000	4200	4250	4300	4400	4500	4600
Wind Speed | Air Speed mph | fpm | Bft | m/s | km/h | kt		●	●	●	●	●	●	●
Volume Air Flow (CFM) Cfm | M^3/h | M^3/m | M^3/s | L/s			●					
Wind Direction Cardinal Points, Degrees							●	●
Crosswind Calculation mph | fpm | Bft | m/s | km/h | kt							●	●
Headwind | Tailwind mph | fpm | Bft | m/s | km/h | kt							●	●
Temperature* ˚F | ˚C		●	●	●	●	●	●	●
Wind Chill ˚F | ˚C		●	●		●	●	●	●
Relative Humidity Gpp | G/kg		●	●	●	●	●	●	●
Heat Stress Index ˚F | ˚C	HI	●	●		●	●	●	●
Dewpoint Temp ˚F | ˚C	DP	●	●	●	●	●	●	●
Humidity Ratio Gpp | G/kg	HUM RATIO		●	●				
Evaporation Rate $lb/ft^2/hr$ | $kg/m^2/hr$					●			

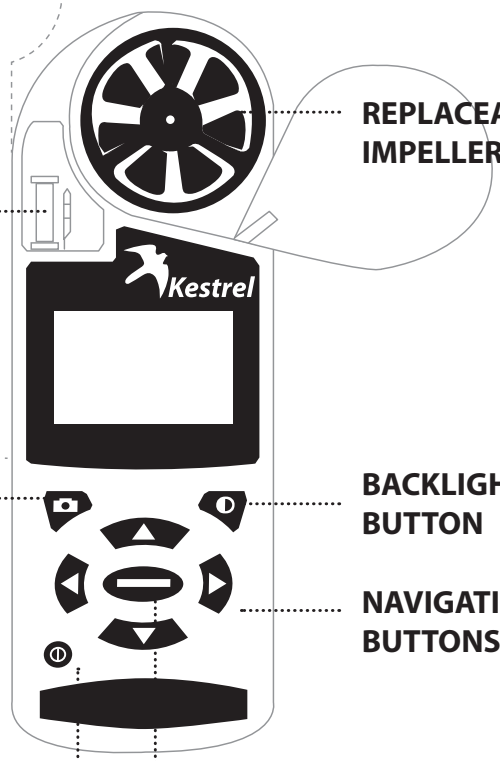
FEATURES & OPTIONS (CONT.)

Standard ● | *Optional* ○

Measurement/ Units of Measure	Icon	4000	4200	4250	4300	4400	4500	4600
Relative Air Density lb/ft3 | kg/m3				●				
Barometric Pressure inHg | hPA | psi | mb		●	●	●	●	●	●	●
Absolute Pressure inHg | hPA | psi | mb			●			●		●
Altitude, m | ft		●	●	●	●	●	●	●
Wet Bulb Temp, ˚F | ˚C	WB	●	●		●	●	●	●
Density Altitude, m | ft	D	●	●	●	●	●	●	●
Pressure Trend		●	●		●	●	●	●
Backlit Display		●	●	●	●	●	●	●
Data Storage Points		4000	3200	3200	3600	2300	2900	2500
BLUETOOTH®		○	○	○	○	○		○
NV Backlight		○						●
Wet Bulb Globe Temp (WBGT), ˚F | ˚C						●		●
Thermal Work Limit (TWL), w/m2						●		
Naturally Aspirated Wet Bulb Temp ˚F | ˚C	NWB					●		●
Globe Temp, ˚F | ˚C						●		●

GETTING TO KNOW YOUR KESTREL

FRONT



BLACK GLOBE SENSOR
Kestrel 4400 + 4600 Only

REPLACEABLE IMPELLER

HUMIDITY SENSOR

MANUAL MEMORY BUTTON

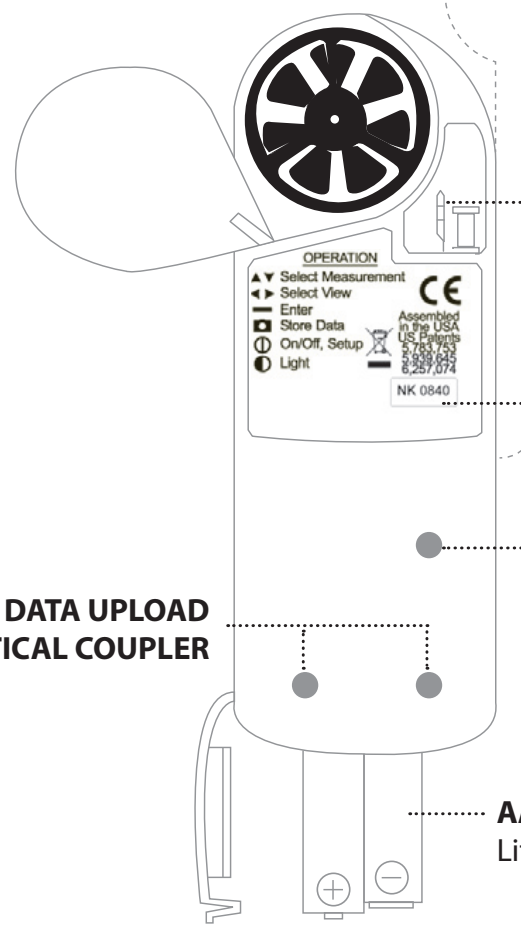
BACKLIGHT BUTTON

NAVIGATION BUTTONS

POWER / SETUP BUTTON

SELECT / EXIT BUTTON

BACK



AMBIENT TEMPERATURE SENSOR

SERIAL NUMBER

WIDE RANGE PRESSURE SENSOR

DATA UPLOAD OPTICAL COUPLER

AAA BATTERIES (2)
Lithium recommended

STABILIZING BATTERY ORIENTATION SHIM
Kestrel 4500s, 4600 & BALLISTICS Versions Only

Even when the Kestrel display is off, the unit will still automatically collect and store data at the defined rate (see "Memory Options"). To completely power down the unit, you must remove the batteries (and lose time / date and other settings)

** All Kestrel Meters with temperature measurement allow you to measure air, water, and snow temperature.*

BATTERY INSTALLATION

- Insert batteries into bottom of Kestrel unit as shown on battery door.
- Snap door closed.

TURNING ON AND OFF

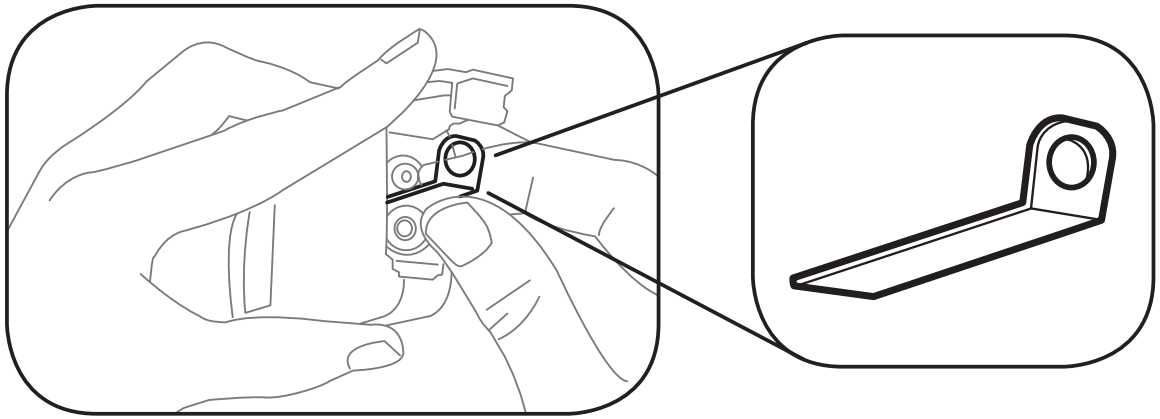
- Press ⏻ to turn on the meter.
- Hold ⏻ for 3 seconds to turn off the meter.

You can also select "Off" on the Main Setup Menu options.

KESTREL 4500 & 4600:

AAA batteries have a magnetic signature strong enough to affect the Kestrel 4500's compass readings. Please follow this extra step to ensure the batteries stay in proper orientation.

Before closing the door, push the plastic shim (provided with unit) between batteries and place clear ring on end over positive battery "bump."



When replacing batteries in the Kestrel 4500, always keep the shim and re-insert with new batteries as described.

SETUP AND OPTIONS

MAIN SETUP MENU

- When unit is on, press ⓘ to access the Main Setup Menu, which is used to customize preferences.
- Press ▲ and ▼ to scroll through the options.
- Press — to select the highlighted option.

DATE AND TIME SETUP

- After battery installation, the meter will automatically enter the Date and Time Setting mode.
- Press ▲ and ▼ to scroll to each option.
- Press ◀ and ▶ to adjust each option.
- Press the ⓘ button to exit to the Main Setup Menu.

SYSTEM

Contrast, auto shutdown, batteries and calibrations can be reconfigured as needed in the System screen.

- Use ▲ or ▼ to highlight one of the following options:

Contrast

- Press ◀ or ▶ to increase or decrease the display contrast from 0 (lightest) to 20 (darkest).

Auto Shutdown

- Press ◀ or ▶ to set the time at which the display will automatically shut off after non-use (choose 15 min, 60 min, or Off to de-activate auto shutdown).

Battery life will be shortened if the Auto Shutdown is turned to "Off."

Batteries

- Press ◀ or ▶ to select the appropriate battery type in use (choose Lithium, NiMH or Alkaline).

Baro Cal

Recalibration of this sensor is not recommended without speaking to an NK technician. See "Barometric Pressure & Altitude Setup" section on page 12 for calibration instructions.

Humidity Cal

Recalibration of this sensor is not recommended without speaking to an NK technician. Full humidity calibration instructions are provided with the Kestrel RH Calibration Kits. The unit may also be returned to NK for calibration. Visit www.nkhome.com for more information.

DATE & TIME

- Press ⓘ to enter the Main Setup Menu.
- Use ▲ or ▼ to highlight Date & Time.
- Press — to enter the Date & Time Screen.
- Press ◀ or ▶ to change each value.

LANGUAGE

Display text can be set to 1 of 5 languages: English, French, German, Italian, and Spanish.

- Press ▲ or ▼ to scroll the desired language.

• Press ⊖ to select the highlighted language.

RESTORE

This menu contains options for global settings of all units to metric or imperial, and returning the reference values for the Alt and Baro screens to default (0 ft, 29.92 inHg).

To change units:

• Press ▲ or ▼ to scroll to the desired setting and press ◀ or ▶.

To return the reference values for the Baro and Alt screens to default:

• Scroll to Defaults and press ◀ or ▶.

The global units setting option is found on the "Units" sub menu on the Kestrel 4500 with HORUS Ballistics.

MEMORY OPTIONS

• Press ▲ or ▼ to scroll to one of these options:

Clear Log	Go	Press ◀ or ▶ to clear stored data (will also clear Min/Max/Avg log).
Reset MMA	Go	Press ◀ or ▶ to clear Min/Max/Avg data (Chart data will remain intact).
Auto Store	On	Press ◀ or ▶ to turn "On" (data will automatically store at Store Rate) or "Off" (data will only store when manually captured with the button).
Store Rate*	1hr	Press ◀ or ▶ to increase or decrease frequency at which data is stored (from 2 sec - 12 hr).
Overwrite	On	Press ◀ or ▶ to turn "On" (will discard oldest data point to capture new data when log is full) or "Off" (will not capture new data when log is full).
Man Store	On	Press ◀ or ▶ to turn "On" or "Off" (Off will disable 📷 button).

** When unit is off, data will continue to be stored unless the 2 sec or 5 sec Store Rates have been selected.*

Data Storage

To manually store data, press the 📷 button. The screen will confirm data storage status.

- **Data Stored:** verifies that data was captured and will appear on chart.
- **Full:** indicates overwrite is off and data log is full.
- **Off:** indicates that the Manual Store button has been disabled.

See Main Setup Menu for more information on memory.

MEASUREMENTS

Use this setup to "hide" unwanted Measurement screens from the normal Measurement navigation.

- Use ▲ or ▼ to scroll to the desired Measurement screen.
- Press ◀ or ▶ to turn screen "On" and "Off".

The Kestrel Meter will continue to log data for hidden measurements. To view logged data of the hidden measurement, go to Measurement setup, select the Measurement screen you want to view, and turn it back "On."

When the Kestrel is in Chart mode, the upper and lower limits of the graph scale may need to be adjusted to fully view all data points. You can customize these value limits using the Graph Scale setup.

- Press ▲ or ▼ to scroll to the Measurement you want to adjust, then press —.
- In the new screen, use ▲ or ▼ to highlight "Set High" or "Set Low".
- Press ◀ or ▶ to adjust the value limit of your chosen option.

UNITS

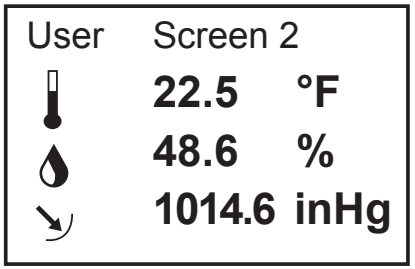
This setup option lets you select units of measure to best suit your application.

- Use ▲ or ▼ to scroll to each measurement.
- Press ◀ or ▶ to change the unit of measurement.

USER SCREENS

The Kestrel allows you to set up to 3 customized User Screens that will display 3 **current** Measurement values on the same screen. These screens are helpful for quick reference if you need to monitor multiple measurements at once. The User Screen option allows you to customize your user screens.

- Press ▲ or ▼ to highlight . User Screen 1, 2 or 3, then press —.
- Use ◀ or ▶ to set your preferred measurement option.
- Press ▲ or ▼ to highlight the remaining lines, and use ◀ or ▶ to set those Measurement options.



Sample User Screen

Repeat these steps to set up the other User Screens. When accessed through the Measurement navigation, each User Screen will display current data for the chosen measurements as programmed.

SCREEN NAVIGATION

MEASUREMENT SCREENS

- Press ▲ or ▼ to scroll through the Measurement screens.

MEASUREMENT MODES

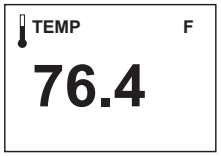
- From your chosen Measurement screen, use ◀ or ▶ to scroll through the Mode options:

Current: Displays instantaneous reading.

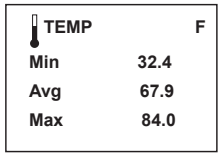
Min/Max/Avg: Displays the Minimum, Maximum, and Average readings from stored data (Displays --.- if no data has been stored).

Chart: Displays graph of stored data points for each measurement.

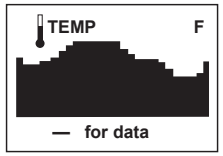
Current



Min/Max/Avg

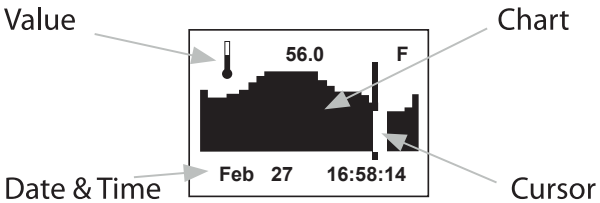


Chart



To View Chart Data:

- Press — while viewing a chart. A cursor will appear on the most recent data point.
- Press ◀ or ▶ to scroll through saved data:



The data value will be displayed at the top of the screen. The date and time when each data point was stored will be displayed at the bottom of the screen.

- Press ▲ or ▼ to review the chart data for other measurements.

MAX/AVG FUNCTIONS - WIND SPEED & WIND CHILL

These values are measured independently from stored and charted data to allow the user to start and stop the averaging period in the manner most appropriate for their application. Averaging on all wind-related values will be started and stopped together.

To measure these values:

- Press ▲ or ▼ to scroll to a wind measurement screen, then use ◀ or ▶ to select Min/Max/Avg screen.
- Press — to begin collecting data.
- Press — again to stop data collection and display the Maximum and Average values.

☐ *This routine will work simultaneously for both measurements, regardless of which one is displayed when run. No other Min/Max/Avg or stored data will be affected.*

- To clear data, press — when the screen says "— clear".

☐ *Other measurements will display min / max / avg data*

based on the data stored in the log (using either auto-stored or manually captured data). This data can be cleared by using "Reset MMA" under memory options.

BACKLIGHT

- Press to activate backlight for one minute.
- Press again to deactivate the light manually.

SETTING BAROMETRIC PRESSURE & ALTITUDE

The Kestrel meter measures "station pressure", which changes in response to both changes in altitude and changes in atmosphere. Barometric pressure is a measurement of the air pressure adjusted to sea level. To obtain accurate barometric pressure and altitude readings, you must first know EITHER your location's current barometric pressure OR your current altitude.

Station pressure is displayed if the reference altitude is set to zero.

Be sure to adjust your reference measurements for altitude and/or barometric pressure when you change your location or when there have been dramatic changes in weather conditions.

OPTION 1

Start with Known Altitude for your Location

- Use or to scroll to highlight the "BARO" screen
- Press to enter the "REF BARO" screen

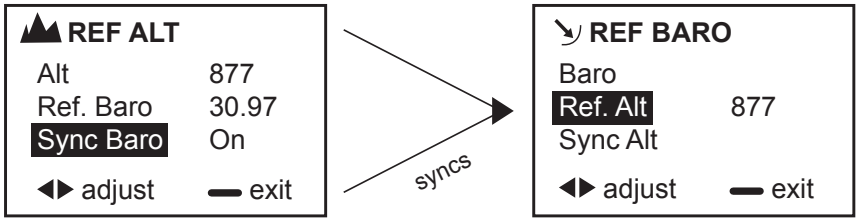
Baro—Displays current Barometric Pressure

Ref Alt—Use or to set the known Altitude

Sync Alt—Use or to switch "On" and sync the Baro reading to the "Altitude" screen

When "Sync Alt" is turned "On," the current

Barometric Pressure data is automatically used as a reference for Altitude, and both screens will show accurate readings.

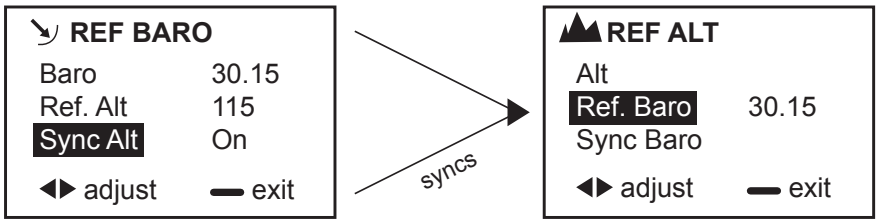


OPTION 2

Start with Known Barometric Pressure for your Location

- Use ▲ or ▼ to highlight the "Altitude" screen
- Press — to enter the "REF ALT" screen

When "Sync Baro" is turned "On," the current Altitude data is automatically used as a reference for Barometric Pressure, and both screens will show accurate readings.



"Density Altitude" screen data is calculated from the absolute values of station pressure, relative humidity and temp., and is not affected by the reference values entered in the "Baro" and "Altitude" screens.

To transfer your Kestrel's real-time and logged data wirelessly and automatically to a laptop or PDA, follow these set up steps.

ENABLE THE KESTREL'S BLUETOOTH CAPABILITY

- Press ⓘ to enter the Main Menu.
- Use ▲ or ▼ to highlight "Bluetooth," then press —.
- Use ◀ or ▶ to change from "Off/Disabled" to "On/Ready".

Set BLUETOOTH Range

In Bluetooth screen:

- Use ▲ or ▼ to highlight "Range".
- Use ◀ and ▶ adjust the range to "Low" (3ft), "Medium" (10ft), or "High" (30ft).

Obtain your Kestrel BLUETOOTH PIN and ID

For added security, each Kestrel comes with a unique PIN and ID number to ensure proper pairing.

In the Bluetooth screen:

- Use ▲ to highlight "Info," then press — to view your unique ID and PIN.

Pair Your Kestrel with Your Computer

First, make sure your Kestrel unit's Bluetooth is set to ON. Open the Bluetooth management software on your computer and follow the prompts to enter the PIN. A COM Port will be assigned and displayed in the software once connection to the Kestrel is established.*

This is a general guideline for pairing your Kestrel with your computer. Individual Bluetooth software programs and navigation may vary, and some computers do not come equipped with Bluetooth capability and will need additional products to communicate via Bluetooth.

** A "Bluetooth Error" screen will appear on the Kestrel if pairing is unsuccessful.*

Set Up Kestrel Communicator Software

- Go to: www.nkhome.com/support/kestrel-support/manuals-and-downloads.
- Scroll down to software under Kestrel.
- Download and install the Kestrel Communicator Software from this link.
- Once installed, the "Kestrel Communicator" icon will appear on your desktop. Click on the icon and use the "Help" tab to find full instructions for use.

Replacing the Kestrel impeller

Press only the sides of the impeller when removing and inserting to avoid damaging the precision hub bearing. [*Figure 1*] .

- Press FIRMLY on the impeller module to remove it.
- Insert the new impeller so the side that has the small triangle (close to the perimeter) faces the front of the Kestrel when installed.
- Orient one “arm” of the module straight up . [Figure 2]. The impeller can be pushed in from either side.

Figure 1

Figure 2

In addition to Wind Speed and Wind Chill, the **Kestrel 4500** and **Kestrel 4600** also measure Direction, Headwind/Tailwind and Crosswind.

Digital Compass Calibration

The Kestrel meter's digital compass must be calibrated to correct for the AAA batteries' magnetic field. It must be re-calibrated every time the battery door is opened, and it will not display or log any direction values until calibration is complete.

***Impeller should be removed during calibration for best results.*

- Remove the impeller by pressing the edges to pop it out (reinsert after calibration is complete).

To Calibrate:

- In Main Setup Menu, use ▲ or ▼ to highlight "System", then press —.
- Press ▼ to highlight "Compass Cal", then press —.

Follow the prompts on screen:

- Hold the Kestrel meter vertically in your hand (alternatively support unit vertically on a table).
- Press — to start.
- Slowly spin the upright meter around three (3) full times.
- Each rotation should take approximately 10 seconds.
- When calibration is finished, the screen will read "Cal Complete".
- Press ⏻ to exit to Main Menu.

To verify the digital compass' accuracy, test it against a compass; the Kestrel meter readings should be within ±5° of the reference compass or better. If readings appear incorrect, simply run the calibration routine again.

Calibration Error Messages

There are three error messages that the meter may display during calibration. Press ⏻ to exit the error screen and run the calibration again.

- *Magnetic Batteries:* The magnetic field of the Kestrel's batteries is interfering with calibration. Simply open the battery door, rotate one or both batteries, and run the calibration again.
- *Too Slow:* The unit was spun too slowly during calibration.
- *Too Fast:* The unit was spun too quickly during calibration.

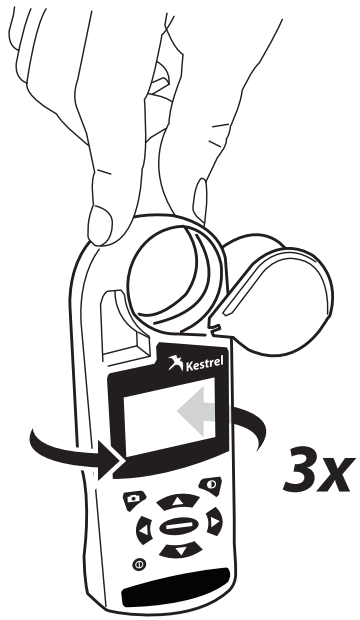


Figure 1

MEASURING DIRECTION

The Kestrel 4500's and 4600's digital compass must be vertical to achieve accurate readings. Keep the unit positioned as close to vertical as possible when using any compass-related feature. After opening the battery door, you must re-run the calibration routine or readings will not register. For maximum accuracy, the impeller should be spinning while measuring to eliminate its magnetic pull.

True North vs. Magnetic North Readings

The Kestrel 4500 and 4600 default Direction display mode is Magnetic North.

To view Direction in True North mode:

- In the Direction screen press .
- Use or to choose your mode.
- If you choose True North, use to highlight "Variation", then use or to input the Variation for your location.

To measure Direction:

- Hold the unit vertically and point the BACK of the unit toward the direction you want to measure.
- The unit will display the cardinal direction and degrees.

The Direction measurement does not record Max and Average and will display N/A on that mode screen.

MEASURING HEADWIND/TAILWIND & CROSSWIND

The Kestrel 4500 and Kestrel 4600 automatically calculate Headwind and Crosswind with respect to a runway or target direction. You must first set the "Heading" to view these measurements:

- Press while on the Headwind or Crosswind screen.
- Use or to choose "Auto Set" or "Manual Set", then press .

In Auto Set: *Point the unit down the runway or target, then press to automatically set the heading.*

In Manual Set: *Use or to enter the known runway or target heading, and press to save.*

Both screens will always display the Magnetic North heading at the top (even if the Direction screen is set to True North mode).

- After setting the heading, scroll to the desired parameter and orient the Kestrel so the wind blows directly through the impeller.

KESTREL 4200 AIR FLOW ENVIRONMENTAL METER:

Air Flow Volume & Max/Avg for Air Flow

In addition to full Kestrel 4000 measurements, the **Kestrel 4200** also measures Volume Air Flow.

Measuring Volume Air Flow

The unit will display Air Flow Volume based on instantaneous data of Air Velocity and the Dimensions of the opening through which the air is flowing.

To set opening Dimension & obtain Air Flow data:

- Press ⊖ while on the Air Flow screen to enter the "Dimensional Setting" screen.
- Use ◂ or ▸ to change the "Shape" setting of your opening to "Round" or "Rectangular".
- Scroll down then use ◂ or ▸ to set the size of the opening to the appropriate Diameter or Length and Width.
- Press ⊖ to exit the Dimensional Setting screen and view Air Flow data.

Max/Avg for Air Flow

Follow the same steps listed to obtain "Max/Avg Wind Speed & Wind Chill" to acquire this additional data. The routine will work simultaneously for all 3 measurements, regardless of which one is displayed when running. No other Min/Max/Avg or stored data will be affected.

Humidity Ratio

Humidity ratio is a measure of the relative humidity of the air, expressed as grains of water per pound of dry air. This is displayed on the "Hum Ratio" screen.

KESTREL 4250 RACING WEATHER TRACKER:

The **Kestrel 4250** will display the actual air pressure, or Absolute Pressure, of your location on the "Pressure" screen. If your racing software asks for Station Pressure or Absolute Pressure, use the data from the Kestrel's "Pressure" screen. If it asks for Barometric Pressure and Altitude, scroll to the Baro or Alt screen and follow the steps on page 12.

Relative Air Density

Relative Air Density is the ratio of measured air density compared to standard air density and expressed as a percentage. Standard air density conditions are defined by the ICAO as 29.92 inHg, 0% relative humidity, and 59 degrees F. The Kestrel 4250 will display this value on the RAD screen.

Moisture Content

Moisture content is a measure of the relative humidity of the air, expressed as grains of water per pound of dry air. This is displayed on the "Moisture" screen.

KESTREL 4300 CONSTRUCTION WEATHER TRACKER:

Evaporation Rate

The **Kestrel 4300** will display the Evaporation Rate, as defined in ACI 308, based on instantaneous Wind Speed, Relative Humidity, Ambient Temperature and Concrete Temperature readings.

Evaporation is a guide to how quickly concrete will lose moisture in their pour location conditions.

To measure Evaporation Rate:

- First, use a separate measuring device to obtain the Concrete Temperature.
- Use ▲ or ▼ to scroll to the Evaporation Rate screen, then press ⊖.
- Use ◀ or ▶ to enter the Concrete Temperature you obtained.
- Press ⊖ to exit the Setting Screen, then press ▶ to enter the Averaging Screen.

Make sure the Kestrel 4300 is shaded while it takes the reading. Failure to shade the unit may cause inaccurate readings that will not meet ACI 308 criteria.

- Position the Kestrel 20 inches above the concrete and facing the wind, and press ⊖ to begin readings.
- Count 6-10 seconds, then press ⊖ again to stop collection.
- The screen will display Avg/Min Evaporation Rate readings.
- To clear data, press ⊖.

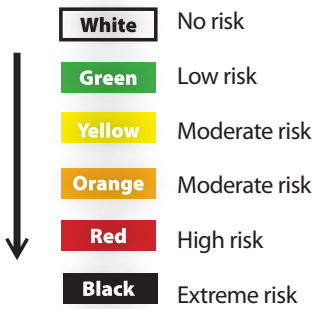
KESTREL 4400 + 4600 HEAT STRESS TRACKERS:

Measuring

The unit will calculate and display Wet Bulb Globe Temperature based on Globe Temperature, Relative Humidity, Ambient Temperature, Barometric Pressure and Wind Speed.

To Change WBGT settings:

- Press ⊖ while on the Wet Bulb Globe Temperature screen.
- Use ◀ or ▶ to change the "Type" setting between outdoor and indoor, (see glossary for more info).
- Use ▼ to scroll to "App", then use ◀ or ▶ to change the Application.
- Press ⏻ to exit the WBGT settings screen.



SIX USER-SETTABLE WARNING ZONES

The Kestrel Heat Stress Trackers allow you to customize the settings of your heat-related warning zones based on your specific needs.

Your Kestrel Heat Stress Tracker allows you to activate and set up to six customized heat stress warning zone thresholds to trigger warnings identified by color names on screen. The warnings are in increasing order of severity of risk of heat injury as shown.

Batteries

Kestrel Weather & Environmental Meters require 2 AAA batteries. Average battery life is 300 hours based on typical use. Lithium batteries are strongly recommended.

**For the Kestrel 4500 & 4600, it is important to re-insert the shim along with the new batteries then re-calibrate the digital compass to ensure correct wind direction readings.*

- *When using the Kestrel Meter in extremely cold weather, it is recommended to use lithium batteries for optimal performance.*

Maintenance & Storage

To avoid scratching the window, store the Kestrel Tracker in the soft pouch.

Software

To download the Kestrel Communicator software visit: www.nkhome.com/support/kestrel-support/manuals-and-downloads.

Calibrations, Certifications & Service

Every NK product is tested and calibrated before it leaves our factory. We warrant that it will perform within specifications when you receive it. The unit may be returned to NK for factory calibration, or you can contact NK for field calibration instructions (RH Calibration Kits are available on our website).

Each Kestrel Meter comes with a Certificate of Conformity, stating the specifications for that product.

If you are concerned your Kestrel is not performing within specifications upon receipt, please contact us and we will review your concerns. If necessary, we will test or recalibrate any unit within 30 days of purchase.

Beyond 30 days, we offer reasonably-priced tests, calibration services, NIST-traceable calibrations, and full Kestrel Meter tune-ups.

We 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 cannot repair a product, we will offer you a replacement under our Customer Care Discount* (even for accidental damage and misuse).

Please contact NK 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, you can obtain a Return Authorization to expedite the handling of your return.

Made in the USA

Your Kestrel Weather & Environmental Meter was designed, developed, and built in the USA by Nielsen-Kellerman Co. of US and imported components. We are a lean manufacturing enterprise committed to continuous improvement of our products, processes, people and partners.

We strive to conduct our business in a sustainable manner and minimize harm to the environment by actively implementing company-wide plans to conserve energy, reduce waste, and recycle.

This device complies with Part 15 of the FCC Rules. Operation is subject to the following two conditions: (1) this device may not cause harmful interference, and (2) this device must accept any interference received, including interference that may cause undesired operation.

We ship every Kestrel 4000 Series Meter exclusively with Made in the USA Energizer® Brand Ultimate Lithium AAA batteries for improved reliability, capacity, cold-weather performance and weight. We strongly recommend that you use only Energizer Ultimate Lithium batteries in your Kestrel Meter.

NK no longer installs or recommends installing "regular" alkaline batteries in your Kestrel Meter. Alkaline batteries are prone to leaking potassium hydroxide, particularly as they near full discharge due to the pressure of the hydrogen gas formed internally. Once a leak has occurred, the potassium hydroxide and carbon dioxide from the air form potassium carbonate crystals that grow and follow along the metal electrodes to the circuit board, causing oxidation of the circuit and components. This damage is usually irreversible.

IF YOU CHOOSE TO USE ALKALINE BATTERIES due to cost or availability, you MUST:

Remove the batteries for long-term storage (more than one month of non-use). If you have your Kestrel set to log data while off, it will slowly drain the batteries, increasing the likelihood of leaking.

Set your system battery selection to "Alkaline" to

obtain accurate capacity readings:

- Press ⏻ to enter the setup menu.
- ▼ to “System”, ⏺ to enter, ▼ to “Battery.”
- ◀ ▶ to select the correct battery type.
- ⏻ to exit system setup.

And remember, always store your Kestrel meter within the specified temperature limits: -22.0 °F to 140.0 °F | -30.0 °C to 60.0 °C. Be particularly careful not to leave a Kestrel meter with any type of batteries installed inside a hot car in the summer.

WHAT DO TO IF YOU HAVE A LEAK

If you notice you have a leaking alkaline battery, be careful not to touch it with your bare skin or allow it to come in contact with your eyes as the leaking material is very caustic. Remove and dispose of both batteries. If possible, loosen and vacuum out any white powder. DO NOT BLOW INTO THE COMPARTMENT TO REMOVE THE POWDER – it can cause eye or skin damage and will be driven further inside the unit. You may attempt to use a cotton swab moistened with white vinegar to clean the contacts and gently swab out the battery compartment. Do not exert any force against the contacts inside the battery compartment or you may bend or break them. Allow the battery compartment to dry completely, install fresh batteries, and test the unit.

For units made prior to 2014, and shipped by NK with alkaline batteries installed, NK will provide full warranty coverage for battery corrosion damage for two years. For units more than two years old, or for units made after January 1, 2014 and shipped with lithium batteries installed, battery corrosion damage is covered under our Customer Loyalty Trade-In Program, which provides a generous discount toward a replacement Kestrel meter. Please contact NK Support to arrange a replacement under this program.

CHOOSING & USING BATTERIES FOR YOUR KESTREL

Your Kestrel meter is powered by two AAA size batteries. Here is a guide to selecting the right chemistry/type of battery for your meter:

BATTERY TYPE	EXAMPLE BRAND NAMES	SELECTION CONSIDERATIONS
Lithium AAA Recommended by Kestrel for most applications!	Energizer® Ultimate Lithium *Energizer owns a patent on Lithium chemistry batteries in the USA.	• Improved cold-weather operational range. • Best capacity when streaming data via Bluetooth®. • Relatively high cost. (Note: because the Kestrel is a low power circuit, there is little advantage to the higher priced "Ultimate" batteries.) • Somewhat less available – need to purchase spares in advance.
Low Self-Discharge Rechargeable NiMH	Eneloop® Duracell® StayCharged® Tenergy® Centaura® Energizer® Recharge PowerPlus®	• Precharged rechargeable batteries which hold their charge for up to one year. • Lowest capacity option. • Option to charge multiple sets for use in the field offers cost savings, particularly with Bluetooth® data streaming. • LESS likely to leak and cause corrosion when left in the Kestrel.
Alkaline AAA	Duracell® Ultrapower Duracell® Procell® Energizer® Max Rayovac® (many others)	• Lowest cost option. Most readily available. • Easy to obtain and use for intensive, short-term operations. • Restricted cold weather performance – Kestrel circuitry will not operate below 0°F/-18°C. • Environmental impact of disposal. • MOST likely to leak and cause corrosion when left in the Kestrel. Follow below guidelines for storage and removal carefully!

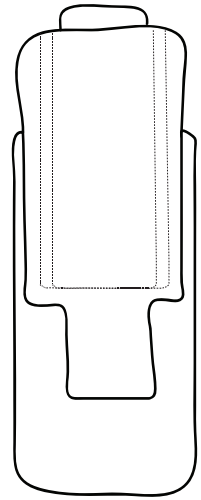
ACCESSORIES

Visit **www.nkhome.com** for the complete line of Kestrel Weather and Environmental Meters Accessories

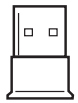
Replacement Impeller
Item # 0801

Screen Protector & Cleaning Kit
Item # 0794

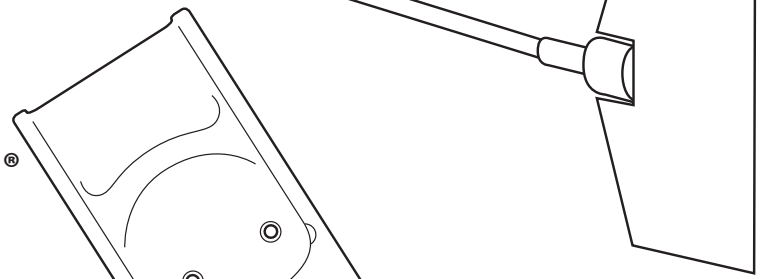
Vane Mount
Item # 0791

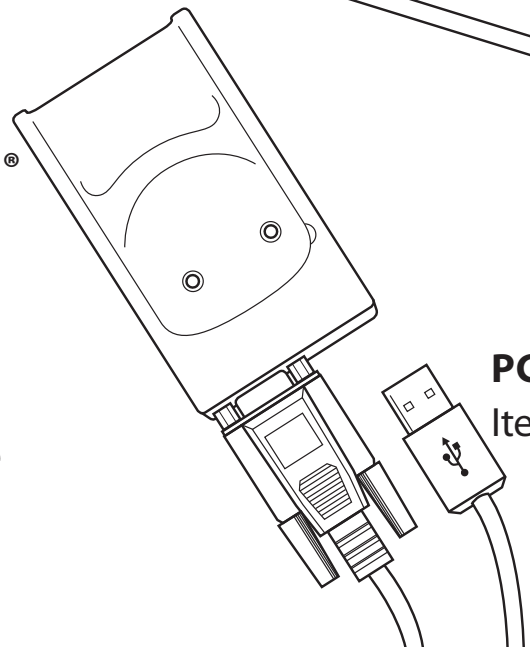


Tactical Carry Case
Item # 0806
Color Options:
- Black
- Camo
- Olive Drab
- Desert Tan

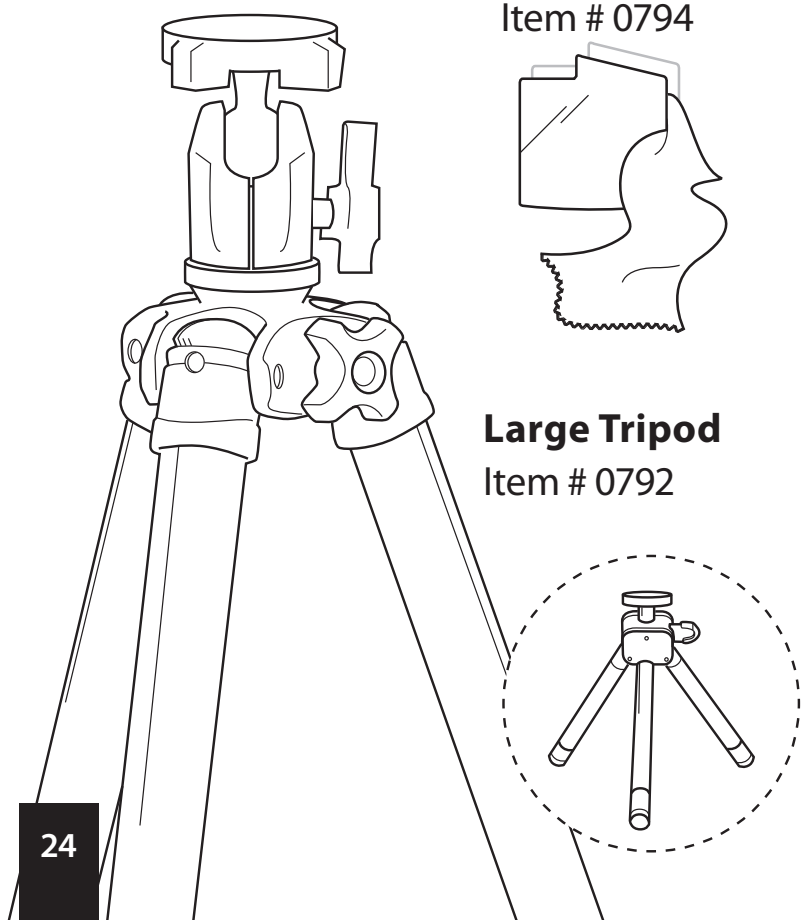


BLUETOOTH® Dongle
Item # 0790





PC Interface
Item # 0804USB



Also available Mini Tripod
Item # 0807

WARRANTY CERTIFICATE

Your Kestrel Weather & Environmental Meter is warrantied to be free of defects in materials and workmanship for a period of FIVE YEARS from the date of its first consumer purchase. NK will repair or replace any defective meter or part when notified within the warranty period, and will return the meter via domestic ground shipping or NK's choice of method of international shipping at no charge. The following are excluded from warranty coverage: damage due to improper use or neglect (including corrosion); damage caused by severe or excessive impact, crushing or mechanical harm; modifications or attempted repairs by someone other than an authorized NK repair agent; impeller failure not caused by a manufacturing defect; normal usage wear; failed batteries; and accuracy issues resolvable by recalibration. If no warranty registration or proof of purchase is provided, the warranty period will be measured from the meter's date of manufacture.

Except for the warranties set forth herein, NK disclaims all other warranties, expressed, implied or statutory, including, but not limited to, the implied warranties of merchantability or fitness for a particular purpose. Any implied warranties that may be imposed by applicable law are limited to the term of this warranty. In no event shall NK be liable for any incidental, special or consequential damages, including, but not limited to, loss of business, loss of profits, loss of data or use, whether in an action in contract or tort or based on a warranty, arising out of or in connection with the use or performance of an NK product, even if NK has been advised of the possibility of such damages. You agree that repair, and (upon availability) replacement, as applicable, is your sole and exclusive remedy with respect to any breach of the NK Limited Warranty set forth herein.

All **product liability** and **warranty options** are governed exclusively by the laws of the **Commonwealth of Pennsylvania.**

by NK

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Fax: (610) 447-1577
Web: NKhome.com
Email: info@NKhome.com

Kestrel® Weather & Environmental Meters are designed and manufactured in the USA.

Please register your Kestrel Meter at NKhome.com

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