Kestrel®

USER GUIDE
Kestrel 5500 Weather Meter

CONTENTS

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MEASUREMENTS	Icon	5000 Environmental	5100 Racing	5200 Professional	5500 Weather	5400 HST
Wind Speed | Air Speed (mph | fpm | Bft | m/s | km/h | kt)		•	•	•	•	•
Temperature (˚F | ˚C)		•	•	•	•	•
Wind Chill (˚F | ˚C)		•	•	•	•	•
Relative Humidity (%)		•	•	•	•	•
Heat Stress Index (˚F | ˚C)	HI	•	•	•	•	•
Dewpoint Temp (˚F | ˚C)	DP	•	•	•	•	•
Wet Bulb Temp (˚F | ˚C)	WB	•	•	•	•	•
Station Pressure (inHg | hPA | psi | mb)		•	•	•	•	•
Barometric Pressure (inHg | hPA | psi | mb)		•	•	•	•	•
Altitude(m | ft)		•	•	•	•	•
Density Altitude (m | ft)	D	•	•	•	•	•
Wind Direction (Cardinal Points, Degrees)					•	o
Crosswind (mph | fpm | Bft | m/s | km/h | kt)					•	o
Headwind | Tailwind (mph | fpm | Bft | m/s | km/h | kt)					•	o

o *optional*

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MEASUREMENTS	Icon	5000 Environmental	5100 Racing	5200 Professional	5500 Weather	5400 HST
Moisture Content | Humidity Ratio (Grains) (gpp, g/kg)	HR		•	•		
Air Density (lb/ft^3, kg/m^3)			•	•		
Relative Air Density (RAD) (%)			•	•		
Evaporation Rate (lb/ft^2/hr, kg/m^2/hr)				•		
Volume Air Flow (%)				•		
Delta T (˚F | ˚C)	DT			•		
Wet Blub Globe Temperature (WBGT) (˚F | ˚C)	WB					•
Thermal Work Limit (TWL) (˚F | ˚C)						•
Globe Temperature (˚F | ˚C)	G					•
Naturally Aspirated Wet Bulb Temp (˚F | ˚C)	WB N					•

FEATURES		5000 Environmental	5100 Racing	5200 Professional	5500 Weather	5400 HST
LiNK Connectivity & Kestrel LiNK Mobile App	N/A	o	o	o	o	o
Backlit Display switchable white or Night-Vision preserving red	N/A	•	•	•	•	•

o *optional*

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GETTING TO KNOW YOUR KESTREL

FRONT

BACK

REPLACEABLE IMPELLER

IMPELLER COVER

TEMPERATURE SENSOR

SERIAL NUMBER

HUMIDITY SENSOR

PRESSURE SENSOR

SUNLIGHT READABLE DISPLAY

AA BATTERY (1)
(Lithium recommended)

CAPTURE

OPTIONS/EXIT

BACKLIGHT

BATTERY DOOR

DATA TRANSFER PORT

SELECT

SCROLL/ADJUST

LANYARD ATTACHMENT

POWER

BATTERY DOOR LATCH

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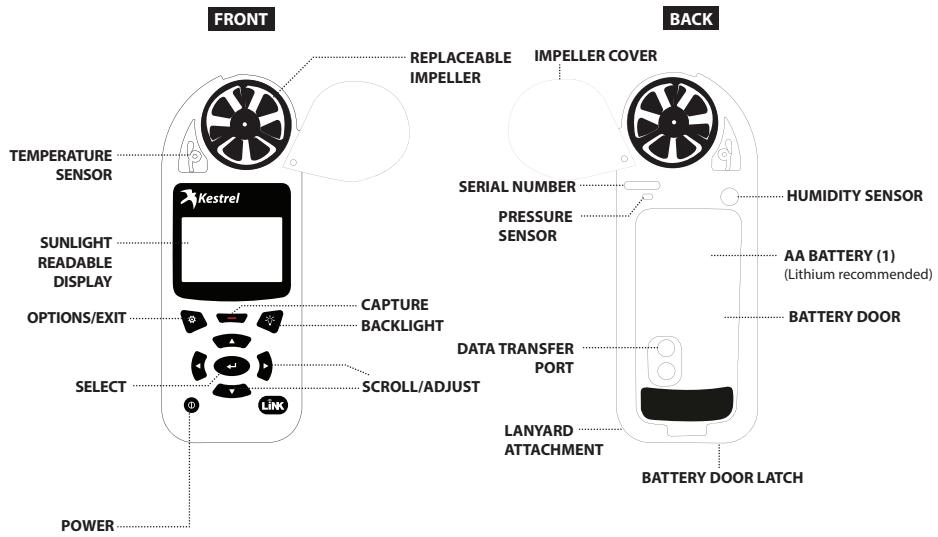
BUTTONS

Button	Name	Function
⏻	POWER	Turns Kestrel on and off. Press for on, hold for two seconds to turn off.
⚙	OPTIONS/EXIT	Enter the main Options menu or exit a menu.
↵	SELECT	Access Settings on any measurement screen or select a menu option to enter its submenu or confirm a task.
▲▼	UP/DOWN	Scroll up and down through measurement screens or menus. Adjust values when entering text in name menus.
◀▶	LEFT/RIGHT	Scroll options left and right. Adjust values in combo menus and setting submenus.
—	CAPTURE	In Weather Mode, manually capture all environmental values.
☼	BACK-LIGHT	Turn backlight on or off. (Also turns off automatically after one minute.)

KESTREL OPTIONS MENU

Most system-wide and weather setup options are accessed from the main Options menu by pressing the ⚙ button from any Weather Measurement Screen or the main Targeting Screen.

- **BLUETOOTH**
  - » Bluetooth On/Off
  - » Conct
- **DATA PORT**
- **MEMORY OPTIONS**
  - » Clear Log
  - » Auto Store
  - » Store Rate
  - » Overwrite
- **GRAPH SCALE**
- **DISPLAY**
  - » Auto Shutdown
  - » Contrast
  - » Backlight
- **SYSTEM**
  - » Time & Date
  - » Compass Cal
  - » Measurements
  - » Units
  - » Lang
  - » Batt
  - » Factory Restore
- **ABOUT**
  - » Version
  - » Legal

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TYPES OF MENU ITEMS

Task	**Go**
Submenu...	
Setting	**On**
Combo Field...	**Yes▼**
☼ exit	◄► adjust
Locked Value	
Locked Value...	

»Tasks are executed by highlighting the field and pressing Select.

»The presence of a submenu is indicated by a "…" following a field.

» Highlight the field and press Select to enter a submenu.
» Adjust a setting by pressing left or right.

» An arrow indicates there are additional fields off screen.

» Adjust the value of a Combo Field by pressing left or right.
» Enter the Combo Field sub menu by pressing select.

» Navigation buttons indicate available actions on the current screen.

» Locked values are either driven by another value or cannot be edited on the current screen.

» Locked values may have submenus which are entered by pressing select.

MORE MEASUREMENTS

Measurement & Icon — Units

Graph of Stored Data Log — Data Point Value — Data Point Scroll Bar

Temp	°F
76.5	
settings	

Temp	°F
Min	40.8
Avg	67.5
Max	80.3
start	

Temp	°F
data	

	69.3
	°F
25 June	4:48:31pm

Data Point Time Stamp
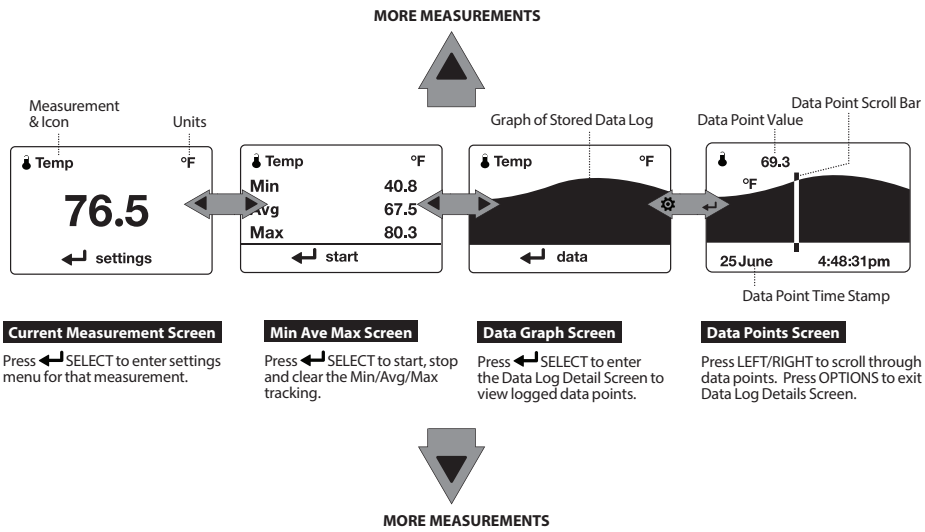
Current Measurement Screen

Press ⏎ SELECT to enter settings menu for that measurement.

Min Ave Max Screen

Press ⏎ SELECT to start, stop and clear the Min/Avg/Max tracking.

Data Graph Screen

Press ⏎ SELECT to enter the Data Log Detail Screen to view logged data points.

Data Points Screen

Press LEFT/RIGHT to scroll through data points. Press OPTIONS to exit Data Log Details Screen.

MORE MEASUREMENTS

» The ▲▼ UP/DOWN buttons navigate between all weather measurements set to "On" in Options|Measurements.
» The ◄► LEFT/RIGHT buttons scroll between the three display screens for the measurement.

» The ⚙ OPTIONS button exits the **settings** submenu and Data Log Detail Screen.

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1. **INSTALL BATTERY.** Slide the battery door latch and open door. Insert the provided AA lithium battery as indicated by the label. Replace the battery door, ensuring it "clicks" fully into place.
2. **POWER ON KESTREL.** Press ⏻ to power on Kestrel.
3. **ENTER OPTIONS MENU.** Press ⚙ to enter the Options Menu.
4. **CALIBRATE THE COMPASS.** Scroll to and select **System**. Scroll to and select **Compass Cal**. Follow the on-screen instructions:

Place the base of the Kestrel on a flat surface at least 3 feet from any large metal objects.
Start the calibration routine. Rotate the Kestrel around its vertical axis 3 times, keeping the unit as vertical as possible and taking approximately 10 seconds per full rotation. You may need to restart the routine a few times until you get the timing correct.

❏ *Note: Note: When taking compass readings, keep the Kestrel as vertical as possible for maximum accuracy.*

5. **EXIT OPTIONS MENU.**

ADDITIONAL SETTINGS

All additional settings are accessed from the options menu

1. **SET AUTO STORE RATE.** Scroll to and select **Memory Options**. Scroll to **Auto Store** and ensure it is set to **ON**. Scroll to **Store Rate** and adjust to desired frequency of automatic weather data logging.

2. **SET OVERWRITE.** Scroll to and select **Memory Options**. Scroll to **Overwrite** and set to **On** to allow the data log to wrap once full and to **OFF** to stop logging when full.
3. **SET GRAPH SCALE.** Scroll to and select **Graph Scale**. Scroll to and select the desired measurement type. Adjust the **Set High** and **Set Low** values to bound the desired display values.
4. **SET AUTO SHUTDOWN.** Scroll to and select **Display**. Scroll to **Auto Shtdwn** and choose a time window after which the Kestrel will shut down without any button presses.
5. **SET BACK LIGHT COLOR.** Scroll to and select **Display**. Scroll to **Backlight** and set to either **White** or **Red**. White is very bright and ideal for any dim light use. Red is reduced brightness and a wavelength selected to preserve adapted night vision for true dark operations.
6. **SET DATE AND TIME.** Scroll to and select **System**. Scroll to and select **Time & Date**. Adjust the time and date.
7. **TURN ON/OFF MEASUREMENT SCREENS.** Scroll to and select **System**. Scroll to and select **Measurements**. Set measurement screens to either **On** or **Off** as desired.
8. **SET UNITS.** Scroll to and select **System**. Scroll to and select **Units**. To change all units select **Global**, then set **Global to Imperial** or **Metric,** and then scroll to **Apply** and select **Go.** To set units individually, scroll to each measurement type in the **Units** submenu and set to the desired units. Units can also be set in the **Settings** menu for each measurement.
9. **SET LANGUAGE.** Scroll to and select **Lang.** Adjust to desired language: **English, Deutsche, Francais, Espanol.**

ALTIMETER AND BAROMETER

The Kestrel employs a stable, accurate pressure sensor to measure station pressure, the unadjusted air pressure in your location.

» To use your Kestrel to measure barometric pressure (station pressure adjusted for local elevation), you must enter a correct reference value for your altitude. Accurate barometric readings require that no elevation changes be made while taking measurements.

» To use your Kestrel to measure altitude changes (changes in station pressure associated with changes in elevation), you must enter a correct reference value for your starting barometric pressure. Accurate altitude readings depend on stable, weather related barometric air pressure while measurements are taken.

» Synched values between the Altitude and Barometer measurement screens allow reference value updates on either screen to automatically update reference values on the other.

❏ Note! You cannot use your Kestrel as a barometer and altimeter simultaneously.

SETTING REFERENCE VALUES ON BARO MEASUREMENT SCREEN:
» Scroll to the **Baro** measurement screen and select **Settings.**
» Adjust either the Altitude or the Barometric Pressure value to a local, known value obtained from a mapping reference, GPS, or accurate weather station in the same location.

SETTING REFERENCE VALUES ON ALTITUDE MEASUREMENT SCREEN:
» Scroll to the **ALTITUDE** measurement screen and select **Settings**.
» Adjust either the Altitude or the Barometric Pressure value to a local, known value obtained from a mapping reference, GPS, or accurate weather station in the same location.

❏ Note! You should enter new reference values whenever you are using the Altimeter or Barometer functions and your location or the weather conditions have changed.

USING MIN/ AVG/ MAX

Pressing the right scroll button from any Current Measurement Screen will open the Min/Avg/Max Screen. The capture process is linked for all measurement screens, capturing Min/Avg/Max values on one measurement screen will capture Min/Avg/Max values over the same time period for all measurements. Each new Min/Avg/Max capture overwrites the previously captured value from all measurements.

CAPTURING MIN/AVG/MAX VALUES:
» Scroll to the Min/Avg/Max Screen of the desired measurement. This can be done by scrolling right from the desired Current Measurement Screen or scrolling vertically from another measurement's Min/Avg/Max Screen.
» Press Select to **Start** a new Min/Avg/Max capture.
» Press Select to **Stop** the capture period and view Min, Avg, and Max values.
» Press Select to **Clear** the Min/Avg/Max values.

MEASURING DIRECTION
» The Kestrel's compass is intended for measuring wind direction. The Kestrel must be held vertically with the back of the unit pointed towards the direction to be determined.
» Using a Kestrel Vane mount adjusted to level will provide the most accurate wind and direction measurements.

CONNECTING TO DEVICES USING LINK

If your Kestrel is marked LiNK on the bottom front label, it can be connected wirelessly to other LiNK-compatible devices. LiNK is powered by *Bluetooth* Low Energy®, also known as *Bluetooth*® LE, which is available in most iOS devices and Andriod devices, as well as in a USB Dongle available from Kestrel that supports connectivity to Windows and Mac OS devices. LiNK-enabled Kestrel units can connect to mobile devices running Kestrel LiNK to install firmware updates. LiNK-enabled units can can be run wirelessly to computers using the Kestrel Dongle.

CONNECTING TO A COMPUTER, MOBILE PHONE OR TABLET:
»

OR
» On your computer, follow the links at **www.kestrelinstruments.com** and install on your computer. Insert your Kestrel USB Dongle (available separately) into an open USB port.
» On the Kestrel, open the Options Menu and select **Bluetooth**. Set **Bluetooth** to **On**.
» On your Kestrel select **Conct** from the Bluetooth Options menu and set to **PC/Mobile**. In **PC/Mobile mode,** the Kestrel's Status will change to **Available**, indicating that it is available for pairing with a computer or mobile device.
» **CONNECTING TO A NEW LINK-COMPATIBLE DEVICE:**

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» Ensure the computer or mobile device is searching and in range. When **Status** changes from **Available** to **Connected**, the pairing is active and your Kestrel is ready to communicate.

CONNECTING TO A NEW LINK-COMPATIBLE DEVICE:

» Follow directions for your LiNK-compatible Device to power it on and put it in pairing mode.
» On the Kestrel, open the Options Menu and select **Bluetooth**. Set **Bluetooth** to **On**.
» Set **Conct** to **Device.**
» Scroll to **Name** and select **New**, then wait for the list of available devices in range to populate.
» Select a device from the available list. Once connected, the settings menu for that device will open, allowing you to manage the device's settings.
» Exit to the Bluetooth menu**. Status** should indicate **Connected**, meaning the pairing is active and your Kestrel is ready to communicate.

CONNECTING TO/ADJUSTING A PREVIOUSLY PAIRED LINK-COMPATIBLE DEVICE:

» Follow the directions for connecting to a new device except instead of selecting **New** in the **Name** field, scroll left or right to find the desired device.
» **Status** will change to **Searching**. If the device is in range and in active pairing mode, a connection will be made and **Searching** will

change to **Connected,** indicating that the pairing is active and your Kestrel is ready to communicate.

BLUETOOTH CONNECTION INDICATOR:

» When connected to any LiNK compatible device, a ⁂ icon will appear in the in the upper right.
» If the paired device goes to sleep or if the connection is lost, the ⁂ icon may disappear but waking the device up or returning within range should automatically reestablish the connection and the icon should reappear.

Note! LiNK range is typically 100 ft/30M line of sight. Shorter distances should be expected if there are obstacles such as walls or metal enclosures. Range is also impacted by the signal strength of the other device.

⬚ **CONNECTING TO COMPUTERS USING USB CABLE:**

All Kestrel 5 Series units can connect to a computer via the Data Transfer Port using the USB Data Transfer Cable available separately. Kestrel LiNK software is available for Windows and Mac for downloading logged weather. data and installing firmware updates.

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CREATING, VIEWING, & EXPORTING DATA LOGS

In addition to taking live measurements, your Kestrel 5 Series weather meter is a powerful data logger. The Kestrel will automatically create a time stamped data log of all measurements at the logging interval you set. Additional log points can also be captured manually. Logged data can be accessed four ways:

» Viewed on the Kestrel Meter on the Data Graph Screen and Data Log Detail Screens.
» Kestrel LiNK mobile apps available in the App Store and Google Play Store. Requires a Kestrel LiNK-enabled meter and compatible Bluetooth® LE devices.
» Exported to a PC or Mac using Kestrel LiNK software and a Kestrel USB Dongle (available separately). Requires a Kestrel LiNK-enabled meter
» Exported to your Windows or Mac computer using Kestrel LiNK software and a Kestrel USB Data Transfer Cable (available separately). All 5 Series Kestrel meters can connect to Kestrel LiNK using a Kestrel USB Data Transfer Cable.

TURNING ON AND ADJUSTING AUTOMATIC DATA LOGGING:

» In the main Options menu, scroll to and select **Memory Options**. Scroll to and select **Auto Store** and set to **ON**. Scroll to **Store Rate** and adjust to desired frequency of automatic weather data logging.
» In the Memory Options sub menu scroll to **Overwrite** and set to **On** to allow the data log to wrap once full and **Off** to stop logging when full.
» When **Auto Store** is set to **On**, the Kestrel unit will automatically begin logging at the rate set in **Store Rate**.

MANUAL DATA LOGGING:

» Individual data points can be added to the log at any time by pressing the Capture button.
» Manual capture simply adds every measurement to the data log at the capture time/date.

VIEWING LOGGED DATA ON THE KESTREL METER:

» Scroll to the Graph Data Screen of the desired measurement. This can be done by scrolling right from the desired Current Measurement Screen or scrolling vertically from another measurement's Graph Data Screen.
» A graph of the most recently logged data points will be displayed and continue to grow at the selected store rate.
» To view individual data log points, or to view graph data older than what is shown in the Graph Data Screen, press Select to open the Data Log Detail Screen. Scrolling left or right will move the bar highlighting individual data points. Log values are shown in the upper left and the time stamp is shown along the bottom. Press Exit to return to the Graph Data Screen.
» To change the resolution of the graph, scroll to and select **Graph Scale** in the Options menu. Scroll to and select the desired measurement

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type. Adjust the **Set High** and **Set Low** values to bound the desired display values.

EXPORTING DATA LOGS TO A MOBILE DEVICE:

» Follow the links at **www.kestrelinstruments.com** to locate Kestrel LiNK in the App or Play store and install on your mobile device.

» Follow the directions in the Kestrel LiNK app and in the section of this manual titled Pairing with a Computer, Mobile Phone or Tablet: to connect the mobile device to the Kestrel.

» The Kestrel's new logged data will automatically be added to the app's log whenever the devices are connected.

» To export logged data to a .csv file for further analysis, go to the **Stats** page of the app or the **Manage Data Logs** screen on the **Manage** page.

» Hit the **Export Data** button. Choose a method for exporting the data and follow the in-app prompts to send.

EXPORTING DATA LOGS TO A COMPUTER:

» Follow the links at **www.kestrelinstruments.com** to download Kestrel LiNK to a PC or Mac computer. Install.

Use one of the following two methods to connect your Kestrel to your computer.

1. **Connect your LiNK-enabled Kestrel Meter to your computer wirelessly:**

    » Purchase a Kestrel LiNK Dongle and install in your computer's USB port.

    » Follow the instructions in the "Pairing with a Computer, Mobile Phone or Tablet" section of this manual along with the Kestrel LiNK program to pair the Kestrel and your computer.

2. **Connect your Kestrel 5 Series Meter to your computer using a Kestrel USB Data Transfer Cable:**

    » Purchase a Kestrel USB Data Transfer Cable.

    » In the main Options menu, scroll to and select **Data Port** and set to **On**.

    » Insert the USB Data Transfer Cable into an open USB port and the Data Transfer Port on the back of the Kestrel unit.

Once connected

» Follow the directions in the Kestrel LiNK program to confirm the connection.

» In the Kestrel LiNK software, choose a data log from the Logs window and click on the Export to File button.

» Choose a file export directory on your computer and click on the Ok button.

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IMPELLER REPLACEMENT

❏ *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.

 Figure 1

» Orient one "arm" of the module straight up . [Figure 2]. The impeller can be pushed in from either side.

 Figure 2

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5 YEAR LIMITED WARRANTY

Your Kestrel instrument 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 product or part when notified within the warranty period, and will return the product 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, storage, maintenance or handling (including corrosion); damage caused by severe or excessive impact, damage caused by failed or leaking batteries, 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 and failed batteries. Measurement accuracy is warranted to be within the specifications on the supplied Certificate of Conformity including specified drift since date of manufacture. If no warranty registration or proof of purchase is provided, the warranty period will be measured from the product'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 recalibration, 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.

FIVE-YEAR
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LIMITED WARRANTY

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WEATHER GLOSSARY

DIRECTION – Compass heading in true or magnetic

WIND SPD – Wind Speed is the measurement of the wind passing through the impeller. For greatest accuracy, point the back of the Kestrel directly into the wind.

CROSWND – Crosswind uses the internal compass and a user selected heading to calculate the crosswind component of the full wind.

HEADWND – Headwind uses the internal compass and a user selected heading or target direction to calculate the headwind component of the full wind.

TEMP – Ambient Temperature is the temperature measured at the thermistor. For best results, ensure the thermistor is not exposed to direct sunlight and is exposed to good airflow.

CHILL – Wind Chill is a calculated value of the perceived temperature based on temperature and wind speed.

HUMIDITY – Relative Humidity is the amount of moisture currently held by the air as a percentage of the total possible moisture that the air could hold.

HEAT INDEX – Heat Index is a calculated value of the perceived temperature based on temperature and relative humidity.

DEW POINT – Dew Point is the temperature at which water vapor will begin to condense out of the air.

WET BULB – Wet Bulb is the lowest temperature that can be reached in the existing environment by cooling through evaporation. Wet Bulb is always equal to or lower than ambient temperature.

BARO – Barometric Pressure is the local station (or absolute) pressure adjusted to mean pressure. An accurate reading depends on a correct altitude input and unchanging altitude while measuring.

ALTITUDE – Altitude is the vertical distance associated with given atmospheric pressure. An accurate reading depends on correct initial barometric pressure input and stable barometric pressure while measuring.

STATION – Station Pressure (Absolute Pressure) is the pressure exerted by the atmosphere at the location.

DENS ALT – Density Altitude is the altitude at which the density of the theoretical standard atmospheric conditions (ISA) would match the actual local air density.