Kestrel® 3500 Delta T Pocket Weather® Meter

with Backlight

Thank you for purchasing the Kestrel 3500 Pocket Weather Meter.
This instrument will measure the following environmental conditions:

- wind speed
- maximum wind gust
- average wind speed
- temperature (air, water snow)
- relative humidity
- delta T
- dewpoint
- wet bulb temperature
- barometric pressure
- altitude

Plus additional features:

- clock
- data hold function
- automatic power-down function
- 3-hour pressure trend
- backlight

INSTRUCTION MANUAL

Revised 05/08

OPERATION

1. **Slide off cover**.
2. **Turn on**. Press the center button (◐) to turn on the unit.
3. **Select operating mode**. Press the right arrow (▶) to scroll through the measurements listed below. Press the left arrow (◀) to scroll through the measurements in reverse order. The instantaneous measurements will be displayed. Each measurement screen is preceded by a brief hint to clarify which measurement is being displayed. (See Understanding the Measurements section for more information.)
4. **Select the unit of measure**. While holding ◐, press ▶ to scroll through the units of measure listed below.

Mode	Hint	Icon	Units of Measure
Clock	---	---	12-hr, 24-hr
Wind Speed	SPd		m/s, ft/min, km/h, mph, kt, B
Max Gust	SPd	MAX	m/s, ft/min, km/h, mph, kt, B
Avg Speed	SPd	AVG	m/s, ft/min, km/h, mph, kt, B
Temperature	dEG		C, F

Mode	Hint	Icon	Units of Measure
Humidity	r.h.	%	%
Delta T	dELt		C, F
Dewpoint	d.P.		C, F
Wet Bulb Temp	bulb		C, F
Barometric Pressure*	bAro		hPa, inHg
Altitude	Alt		m, ft

** Only one of the pressure icons will be displayed, indicating the 3-hour pressure trend.*

- ↑ *pressure rising quickly (rise more than +0.18 inHg)*
- ↗ *pressure rising (rise within +0.06 inHg and +0.18 inHg)*
- → *pressure stable (remain within -0.06 and +0.06 inHg)*
- ↘ *pressure falling (drop within -0.06 inHg and -0.18 inHg)*
- ↓ *pressure falling quickly (drop more than -0.18 inHg)*

5. **Hold mode**. While holding ◐, press ◀ to hold the time and all of the measured values. The word "HOLD" will blink to indicate the Hold Mode. Press ◀ or ▶ to view the other measurements in Hold Mode. While holding ◐, press ◀ to exit the Hold Mode. This mode can be useful for taking measurements when unable to view the display.

6. Turn on the backlight. Press ◐ to activate the backlight for 10 seconds. If ◀ or ▶ are pressed while the backlight is illuminated, the backlight will remain illuminated for another 10 seconds. Press ◐ while the backlight is illuminated to manually turn off the backlight.
7. Adjust the clock. Simultaneously press ◀ and ▶ to adjust the clock. While the clock is blinking, press ◀ or ▶ to adjust the clock. Hold ◀ or ▶ to adjust the times quickly. Simultaneously press ◀ and ▶ to exit the clock adjustment.
8. Adjust the reference altitude. Obtain your altitude from a topographic map or landmark to use as your reference altitude. From the barometric pressure screen, simultaneously press ◀ and ▶ buttons to adjust the reference altitude. Press ◀ or ▶ to adjust the reference altitude, or hold ◀ or ▶ to adjust the value quickly. Simultaneously press ◀ and ▶ to exit the reference altitude adjustment.
9. Adjust the reference pressure. Obtain your barometric pressure reading from a local weather source to use as your reference pressure. From the altitude screen, simultaneously press ◀ and ▶ buttons to adjust the reference pressure. Press ◀ or ▶ to adjust the reference pressure, or hold ◀ or ▶ to adjust the value quickly. Simultaneously press ◀ and ▶ to exit the reference pressure adjustment.
10. Turn off. Hold ◐ for 2 seconds to manually turn off the unit. The unit will automatically turn off if no buttons have been pressed for 45 minutes.

UNDERSTANDING THE MEASUREMENTS

Wind Speed - average over the previous three seconds. The measurement will be accurate for air flow through the front or rear of the unit.

Maximum Wind Gust - maximum 3 - second wind speed since the unit was turned on.

Average Wind Speed - average wind speed since the unit was turned on.

Temperature - instantaneous temperature of the thermistor, which is located at the end of the long coiled leads in the open cavity below the impeller. The exposed thermistor will respond quickly to changes in temperature when air flows past it. For fastest response, either hold the unit into the wind or wave the unit side to side for 15 seconds. Readings should be taken in the shade. Water and snow temperatures can be taken by hold the unit in the water or snow.

Relative Humidity - amount of moisture in the air compared to the amount of moisture the air can hold for the given temperature, represented as a percent. Because relative humidity is also a function of the temperature, the response time will be dependent on the temperature response time (see temperature section above). Readings should be taken in the shade.

Dewpoint – calculated based on temperature and humidity measurements, as a measure of moisture content in the air. If the dewpoint is very close to the temperature, the air is humid. If the temperature and dewpoint are the same, dew will form. If this happens below freezing, frost will form.

Wet Bulb Temperature - calculated based on temperature and humidity measurements, as a measure of evaporation rate. If the wet bulb temperature is very close to the air temperature, the air is humid. Wet bulb temperature is typically measured by swinging a mercury thermometer with a wet sock on its end for several minutes.

Delta T - calculation of the dry bulb temperature minus the wet bulb temperature as a measure of evaporation rate. Primarily used in spraying applications, this measure provides an indication of droplet survival. For example, it is not recommended to apply pesticides when Delta T is above 10. A range of 2 to 8 (degrees C) is ideal. The Kestrel 3500 Delta T uses a pressure-corrected wet bulb temperature, ensuring accuracy in all conditions.

Altitude and Barometric Pressure - the Kestrel 3500 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 topographic map or local landmark. Set this value as your reference altitude on the BAROMETRIC PRESSURE screen to determine your barometric pressure.

There are two examples for when and how to use the BAROMETRIC PRESSURE and ALTITUDE screens.

First, assume that you know the altitude from one of the sources above. Set the reference altitude on the BAROMETRIC PRESSURE 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 in 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 BAROMETRIC PRESSURE screen. You can now track the altitude as you hike. You can ignore the values on the BAROMETRIC PRESSURE screen, since the pressure changes are predominantly due to changes in elevation.

As with all pressure 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 weather.

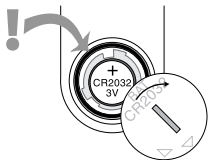
MAINTENANCE & TROUBLESHOOTING

Environmental
Every Kestrel Meter is fully waterproof and floats, and has passed mil-spec drop testing.

Storing Your Kestrel
Avoid storing your Kestrel where it will be exposed to temperatures below -30°C [-22°F] or above 60° C [176° F] for extended periods of time. Doing so may cause permanent damage. (Note that the inside of a car parked in the hot sun can reach very high temperatures.)

Use of the Lanyard and Cover
The cover can be captured on the lanyard to avoid loss. First, remove the cord poplock. Then feed the lanyard end through the large opening in the over and out the slot. Replace the poplock on the lanyard.

Replacing the Battery
When your display becomes dim or disappears, replace the battery. Use a large coin to open the battery compartment. Use only new CR2032 coin cell batteries (available where



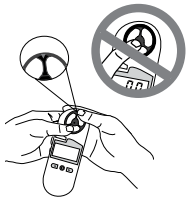
Replacing the Battery

watch batteries are sold). Wipe the battery clean of any fingerprints and insert the positive (+) pole up, angling the battery downward and pressing it firmly into place. When replacing the battery door, be sure to keep the black rubber o-ring seated in the groove on the case back.

Why does the Impeller Appear Imbalanced?
It is NORMAL for the impeller to oscillate as it comes to a stop. It is NOT imbalanced. Rather, it contains a very small magnet that responds to the earth's magnetic fields. This does not affect the accuracy of the wind speed readings because the magnetic field applies both a braking and an accelerating force which cancel each other. The impeller has been calibrated to provide wind speed readings accurate to within at least ± 3%.

High Speed Use
After several hours of sustained operation over 25 M/S (~49 KT, 90 KM/H, 56 MPH or 4,923 FPM), the Kestrel will lose some accuracy due to wear of the sapphire bearings in the impeller.

Replacing the Impeller
You may recalibrate the wind speed readings by replacing the impeller. Press FIRMLY on the sides of the black impeller housing with your thumbs to remove the entire assembly. When inserting the new impeller, be sure the arrow is facing the display side of the unit, and is aligned with the top of the meter. Press on the sides of the housing rather than the center.



Replacing the Impeller

Taking Accurate Humidity and Dewpoint Measurements
The patented system for measuring relative humidity allows for extremely fast and accurate readings. The sensor is located in the large hole on the rear of the unit. Even extreme and abrupt changes in the surrounding humidity will be measured within several minutes. To test this, place your hand around the rear of the unit. Within several seconds, the humidity will increase dramatically. After removing your hand, the humidity will quickly begin to decrease. Next, place your hand near the rear of the unit and wave the unit back and forth. The humidity will not change because the air flow is diluting the humidity from your hand.

This example shows the importance of keeping air flow past the sensor while taking a measurement. If there is no natural air flow past the sensor, wave the unit back and forth. It is also reasonable to lay the unit down on a solid surface for several minutes to allow the sensor to adjust.

Sensor Calibration
All the sensors have been factory calibrated to be accurate within specifications. For recalibration, you may either return it to Nielsen-Kellerman for factory calibration, or contact NK for field calibration instructions. Humidity Field Calibration Kits are also available for sale online.

BEAUFORT SCALE

The Beaufort Scale is a system for estimating wind force without the use of instruments based on the visible effects of the wind on the physical environment. The behavior of smoke, waves, trees, etc., is rated on a 13 point scale. The scale was devised in 1805 by the British naval Commander Sir Francis Beaufort (1774-1857) and is still commonly used by mariners.

Force	Description	Kts
0	Calm	0
1	Light Air	1-3
2	Light Breeze	4-6
3	Gentle Breeze	7-10
4	Moderate Breeze	11-16
5	Fresh Breeze	17-21
6	Strong Breeze	22-27
7	Near Gale	28-33
8	Gale	34-40
9	Strong Gale	41-47
10	Storm	48-55
11	Violent Storm	56-63
12+	Hurricane	64+

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 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 Pocket Weather Meters are covered by the following patents: 5,783,753, 5,939,645, 6,257,074, and 7,059,170.

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.

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 highest 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).

Register your Kestrel® Pocket Weather® Meter online at www.kestrelweather.com.

NK

ADDITIONAL INFORMATION

What is a "Kestrel"? The American Kestrel is the smallest North American falcon. Beautiful and highly adaptable, it can be found virtually everywhere in North America. It is unique among falcons for its ability to both hover at very low speeds and dive at very high speeds.