Kestrel®

Shooter's Weather Meter

with HORUS® Atrag™ Ballistics Software

INSTRUCTION MANUAL

HORUS©
AN UNDENIABLE ADVANTAGE

AVAILABLE WITH
Bluetooth
Wireless Data Transfer

⚠ CAUTION

Your Kestrel Ballistics Weather 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 (i.e., 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 Ballistics Weather Meter 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 Ballistics Weather 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 Ballistics Weather Meter to make any decisions regarding safety, health or property protection.

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*for BLUETOOTH®-enabled models ONLY

NK, manufacturer of Kestrel brand Ballistics 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: NKhome.com

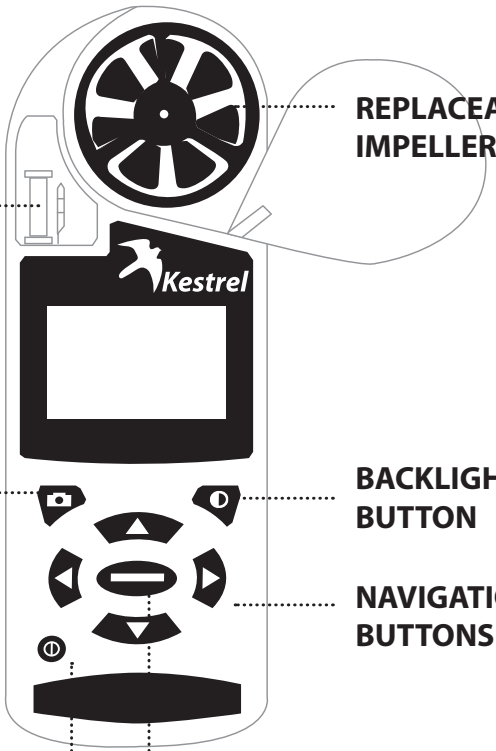
FEATURES & OPTIONS

Standard ● | *Optional* ○

Measurement/ Units of Measure	**Icon**	**4500** w/Horus
Wind Direction (Cardinal Points, Degrees)		●
Wind Speed | Air Speed (mph | fpm | Bft | m/s | km/h | kt)		●
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)		●
Dewpoint Temp (˚F | ˚C)		●
Wet Bulb Temp (˚F | ˚C)		●
Barometric Pressure (inHg | hPA | psi | mb)		●
Altitude, m | ft		●
Density Altitude, m | ft		●
Pressure Trend		●
Backlit Display		●
Data Storage Points		2500
BLUETOOTH®		○
NV Backlight		●

GETTING TO KNOW YOUR KESTREL

FRONT



HUMIDITY SENSOR

REPLACEABLE IMPELLER

MANUAL MEMORY BUTTON

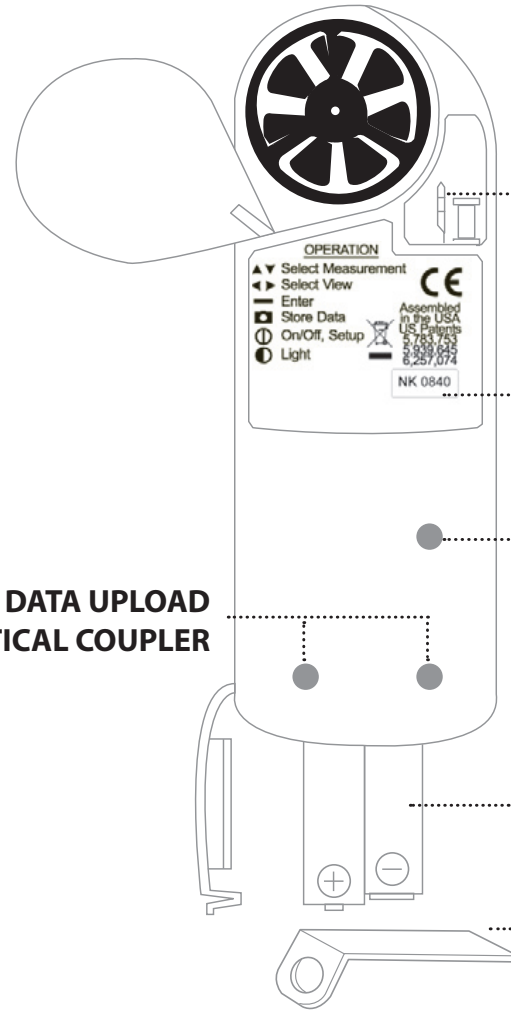
BACKLIGHT BUTTON

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

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.

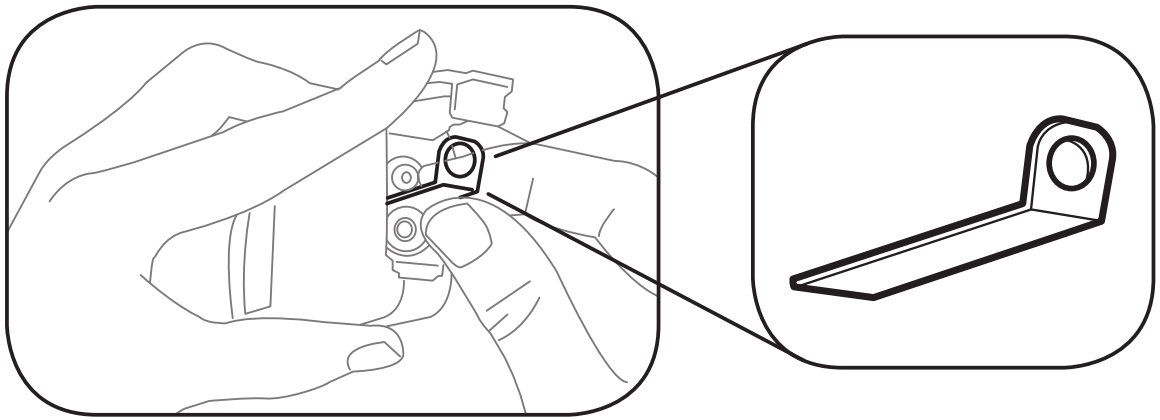
Date & Time

- 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.

KESTREL 4500:

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.

In addition to Wind Speed and Wind Chill, the **Kestrel with Horus Atrag Software** also measures 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:

- 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. Unit should be held vertically with the back facing the direction being measured.

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. Try opening the battery door, rotate one or both batteries, and run the calibration again. If error persists, try using a different brand of battery.
- *Too Slow:* The unit was spun too slowly during calibration.
- *Too Fast:* The unit was spun too quickly during calibration.

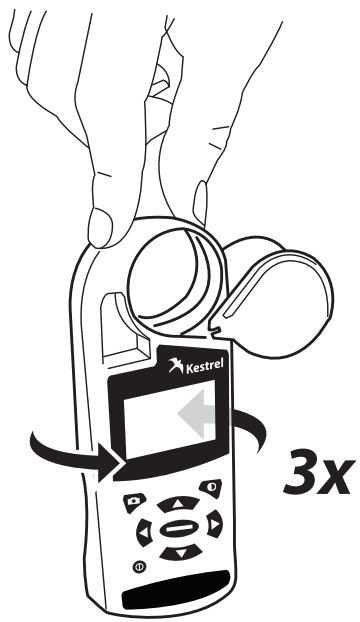


Figure 1

Measuring Direction

The Kestrel 4500's 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's default Direction display mode is Magnetic North.

To view Direction in True North mode:

- Go to weather 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 automatically calculates 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.

Info for Wind Speed & Direction of fire for ballistic solutions can be found on pg 16.

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.

Station pressure is displayed if the reference altitude is set to zero. This is needed for ballistics solutions as well.

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.

Obtaining Station Pressure

- In the Main Setup Menu, use ▲ or ▼ to highlight "Weather Mode", then press ⊖.
- Use ▲ or ▼ to scroll to highlight the "BARO" screen
- Press ⊖ to enter the "REF BARO" screen
- Set the reference altitude to zero for station pressure. Set it to your current altitude if you want barometric pressure

Baro—Displays current Barometric Pressure

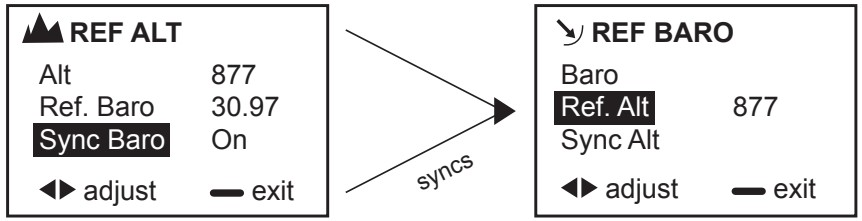
Ref Alt—Use ◀ or ▶ to set the known Altitude

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

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

"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.

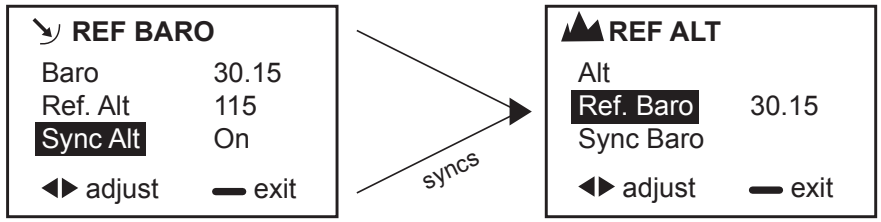
Barometric Pressure data is automatically used as a reference for Altitude, and both screens will show accurate readings.



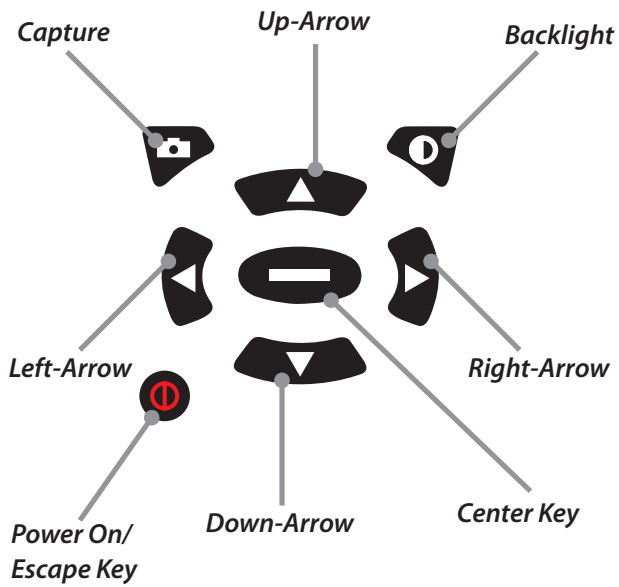
Setting Altitude

- In the Main Setup Menu, use ▲ or ▼ to highlight "Weather Mode", then press ⊖.
- Use ▲ or ▼ to highlight the "Baro" screen
- Press ⊖ to enter the "REF ALT" screen
- Set the reference altitude to your current altitude.

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.



THE KESTREL HAS SEVEN NAVIGATION KEYS:



Quick Tips:

Your Shooter's Weather Meter with Horus Atrag can operate in Weather mode or Horus mode. For instructions related to Weather Mode, see page 23.

Compass must be calibrated in order for directional features to work in Horus mode. Compass calibration can be done from the main menu screen. See page 7.

Pressing ⏻ will allow you to exit out of a particular screen.

When a ballistics parameter is underlined, this indicates that the value cannot be changed manually on the current screen. This is either because it is a calculated value or determined by the sensors. Press and hold ⏻ for 2 seconds to power down the Kestrel regardless of current screen. Press ◐ twice in rapid succession to instantly change between Weather mode and Horus mode. Any changes in information are automatically saved upon exiting the current screen.

Getting started with Horus Mode

The three main data input groups are gun, target and environment. The aiming solutions for Elevation, Windage and Coriolis are displayed on the Main Horus screen.

1. Gun Information

GUN	▶ Laru308
MV	2550FPS
BC	0.475
BW	175gr
BD	0.308in
ZR	100m
BH	2.75in
ZH	
ZO	
RT	11.25in
RTd	Right
EUNIT	mil
Eclck	n/a
Wunit	mil
Wclck	n/a
True Drop	

2. Target

TARGET	A
Active	Yes
TR	1000
DoF	000º
Ideg	0˚
Icos	1.000º
TS	0mph
TD	L-R
WD	12oc
WS1	5mph
WS2	10mph
Acc1st	

A box indicates amount of data shown on display.

Data below box indicates additional information available by pressing ▼.

**Note: Please see p. 28 for abbreviation glossary.*

3. Environment

ENVIRONMENT	
Update	No
Lat	42°N
Temp	75°F
SP	29.48inHg
RH	50%
Dalt	1729ft
Coriol	Yes
Wcap	Onetgt

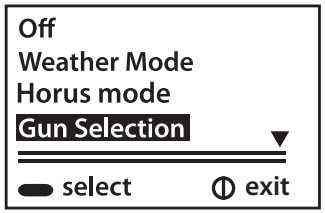
These three main data groups determine an accurate firing solution. The first step in getting a firing solution is selecting your gun.

Gun Selection

The Gun Selection screen allows you to choose a preconfigured gun or build your own. You may create and store up to 59 guns. A user-created gun is defined as a gun that has been modified for one or more parameter values of the New Gun or any of the preconfigured guns. A preconfigured gun is any gun preloaded onto the Kestrel or loaded using the HK Gun Loader software.

When a New Gun is modified, the name instantly changes to UserGunX (where X is a number suffix to ensure the name is unique). If a preconfigured gun (whose name ends in a letter) is modified, a number will appear at the end to create a unique name. If a preconfigured gun (whose name ends in a number) is modified, a letter will appear at the end to create a unique name.

- Turn on the unit. From the Main Horus screen, press ⏻ to access the Main Setup Menu.



- Press ▼ to highlight "Gun Selection."
- Press ▬ to enter Gun Selection Screen. Here, you may choose a preconfigured gun or build your own.

To Choose a Preconfigured Gun:

- Press ▲ or ▼ to scroll through the different guns.
- Press ▶ to turn your selected gun "on" or "off." "On" means the gun is available to be selected in Horus mode. "Off" means the gun is not available to be selected. For example, setting multiple guns to "On" allows you to quickly switch gun configurations without going back to the Main Setup Menu.

Gun select	11
▶Laru308	On
▶User Gun2	On
▶User Gun	Off
▶300WinMag2	Off

- Pressing ▬ on a gun gives you the option to edit or delete this gun.

To Build A Gun:

You can build and name your gun on the gun selection screen.

- Use ▼ to highlight New Gun and press ▬.
- This will take you to the gun information screen where you may adjust all gun parameters. Press up or down to highlight the gun parameters.

Gun select	11
▶MaruGun308	On
▶AR15a	On
▶300WinMag1	Off
▶New Gun	Off

GUN	New Gun
MV	2900fps
BC	0.533
BW	190gr
BD	0.308in

- Use ◀ and ▶ to adjust each value.
- To name your gun, scroll up to highlight "Gun" and press ▬.
- You will see a cursor appear under the first letter of New Gun.
- Use the ▲ and ▼ buttons to scroll through the alphabet and numbers 0-9 and several symbols. Pressing 0 inserts a space between characters. You can choose between upper and lowercase letters.

- Once you're on the desired letter, use ▶ to move the cursor to the next space in the gun name. Continue until the gun name is complete.
- When gun name is complete, press — button to save. (Gun will also automatically save upon exiting screen.)
- Press ⏻ to exit from the current screen.

Gun Library

There is room in the Kestrel for up to 59 guns. Several library guns are pre-programmed in each Kestrel, but this can be modified by building a new gun library on a computer using the Horus Gun Library software, and downloading the new gun library to the Kestrel (either via Bluetooth connection or the Kestrel wired interface). Downloading a new gun library will automatically overwrite the previous guns in the Kestrel (but not any user-created guns).

**Note: You should upload any user-created guns to the HK Gun Loader software that you want to save before down-loading new guns. The new guns will overwrite current stored Kestrel guns.*

Gun Information Screen

Once you have selected your gun, you're now ready to enter or modify all relevant parameters pertaining to the set-up of your rifle. These parameters include muzzle velocity, drag curve, ballistic coefficient, bullet weight, bullet diameter, zero range, zero height, zero offset, bore height, rifle twist, rifle twist direction and sight adjustment (click).

- On the Gun Information screen, use buttons to highlight the gun parameters.
- Use ◀ and ▶ to adjust the value.
- Press — to enter the highlighted parameter's screen. Here you are also able to adjust the parameter's value as well as the unit of measure. (For example, meters per second to feet per second.)
- Press ⏻ to exit to Main Horus screen once all values are correct.

See below for more information on Muzzle Velocity, and Ballistic Coefficient.

Muzzle Velocity

- Use ▲ and ▼ to highlight "MV."
- Press — to enter MV screen.
- Use ◀ and ▶ to adjust the value.

Notes on Muzzle Velocity

- When a bullet is in the transonic range, a small dot will appear to the left of the muzzle velocity value (figure 1).
- When a bullet is in the subsonic range, a larger dot will appear to the left of the muzzle velocity value (figure 2).

GUN	▶ Laru308
MV	·1360fps
BC	0.470
BW	175gr
BD	0.308in

Figure 1

GUN	▶ Laru308
MV	•1103fps
BC	0.470
BW	175gr
BD	0.308in

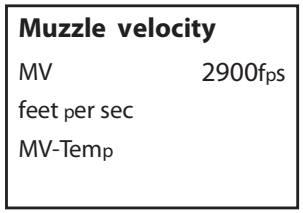
Figure 2

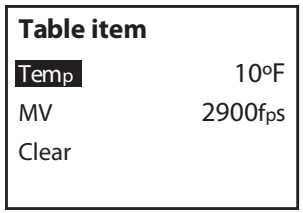
- In cases where the bullet is supersonic, there are no dots next to the muzzle velocity value.

MV-Temp Table

This allows you to enter and maintain a table of muzzle velocities based on temperature. If an entry is input into the table, the muzzle velocity is applied at all temperatures (this means that the value is then locked and cannot be altered by using ◀ and ▶ on the gun information screen). If two or more entries are input into the table, the Kestrel uses the linear interpolation and the temperature sensor to determine the appropriate muzzle velocity. (Note: this value will only change if the temperature changes and you exit and re-enter the gun information screen; once a muzzle velocity value is entered for a particular temperature, you can not make another muzzle velocity value for the same temperature.)

- To access MV-Temp table, scroll to MV (Muzzle Velocity) to highlight it and press ▬, then use ▼ to scroll to MV-Temp and press ▬ to enter.



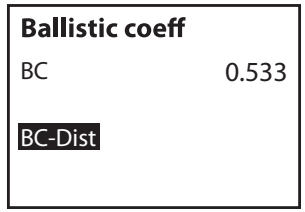


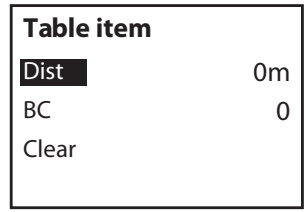
- Press ▬ while "New entry" is highlighted to enter the Table Item screen.
- Use ▲ or ▼ to scroll to "Temp" and "MV." Use ◀ and ▶ to adjust each value.
- To clear a Table Item, scroll down to Clear and press ▬.
- Press ⏻ to exit to return to the Gun Information screen.

BC-Dist Table

This allows you to enter and maintain a table of ballistic coefficients based on distance. If only one entry is input into the table, the ballistic coefficient is applied at all distances (this means that the value is locked and cannot be altered by using ◀ and ▶ on the gun screen). If two or more entries are input into the table, the Kestrel uses the linear interpolation and the target range to determine the appropriate ballistic coefficient. (Note: this value will only change if the target range changes; once a ballistic coefficient value is entered for a particular distance, you cannot make another ballistic coefficient value for the same distance.)

- To access the BC-Dist table, scroll to BC (Ballistic Coefficient) to highlight it and press ▬, then use ▼ to scroll to BC-Dist and press ▬ to enter.
- Use ▲ and ▼ to scroll to any existing parameters. Use ◀ and ▶ to adjust each value.
- To add a new entry, highlight "New Entry" and press ▬.
- Use ▲ and ▼ to scroll to "Dist" and "BC." Use ◀ and ▶ to adjust each value.
- To clear a Table Item, scroll down to Clear and press ▬.
- Press ⏻ to exit to return to the Gun Information screen.



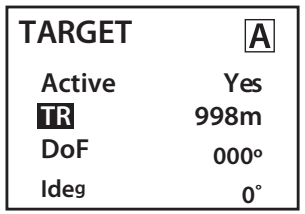


TARGET SCREEN

Target screen:

You can customize up to five targets for location, distance, direction, declination and wind.

- From the Main Horus screen, use ▲ or ▼ to highlight "Tgt" and press — to enter the Target screen.



- Use ▲ and ▼ to highlight a parameter.
- Use ◀ and ▶ to adjust values for each parameter.
- Press — to enter the highlighted parameter's screen.

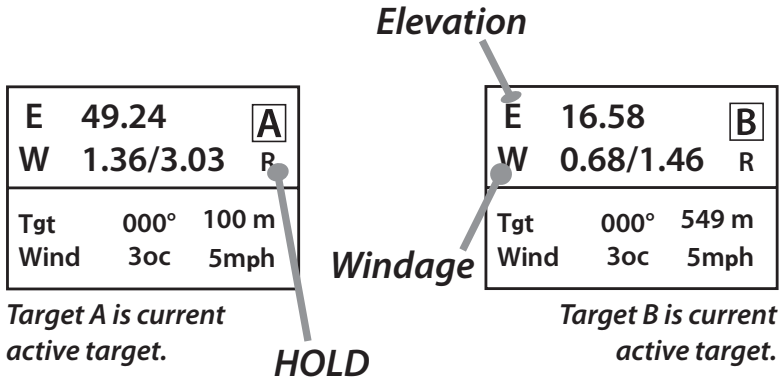
Here you are able to adjust the parameter values as well as the unit of measure. (For example, yards to meters.)

Multiple Targets

- You may create up to five targets (A-E) by highlighting "Target" and pressing ◀ or ▶ to move on to the next target. After changing targets, the parameters can be changed by repeating the steps outlined above.

Active

- The "Active" status of Target A defaults to "Yes" because the Kestrel must have at least one active target at all times.
- To make a target active, on the Target screen use ▲ or ▼ to highlight "Active" and use ◀ or ▶ to change to "Yes." To make a target inactive, use ◀ or ▶ to change to "No."
- Setting a target's "Active" status to "Yes" allows you to view the firing solution for that target on the Main Horus screen.
- If multiple targets are active, you can use ◀ or ▶ to scroll between all active targets (and their respective firing solutions) on the Main Horus screen.



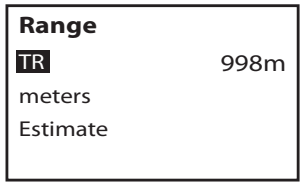
Target A is current active target.

Target B is current active target.

Target Range

- Use ▲ or ▼ to highlight "TR."
- Use ◀ and ▶ to adjust the value.

Target Range Estimator



This function estimates the range of a target based on size, image and calculated range.

- When "TR" is highlighted, press — button to enter Range screen.
- Use ▼ to highlight "Estimate" and press — to enter Range Estimate screen.
- Use ▲ or ▼ to highlight a parameter.
- Use ◀ and ▶ to adjust values for each parameter.
- When all parameters are set, press ⏻ to escape.
- An "Accept" screen will appear, scroll to "Yes" if you would like to accept values. Use — to select the highlighted option.

Wind Direction & Wind Speed

There are two wind speed measurements on the target screen (WS1 and WS2) for minimum and maximum wind speed as well as wind direction (WD). You have the option to manually adjust the wind speed and wind direction values or use the capture feature to automatically get a reading.

Manual mode

- Use ▲ or ▼ to highlight "WD," "WS1" or "WS2."
- Use ◀ and ▶ to adjust values for each parameter.

Capture mode

- In the Target screen, press — to enter into either the "WD," "WS1" or "WS2" screen.
- Press — to enter into capture mode.
- Face the back of the Kestrel meter directly into the wind and press — to start and stop the capture mode. Please ensure Kestrel impeller cover is open.
- The data collected in capture mode will automatically adjust the "WD," "WS1," and "WS2" values in the Target screen.

**Note: WS1 can never be greater than WS2 value. The WS2 value will automatically adjust to ensure that this remains true.*

Direction of Fire

Direction of Fire (DoF) is an absolute frame of reference to true north. The value is the direction the gun barrel is pointing with respect to the values on a compass. Direction of Fire can be manually adjusted or obtained using the "Capture" feature.

Manual mode

- Use ▲ or ▼ to ensure that "DoF" is highlighted.
- Use ◀ and ▶ to adjust the value.

Capture mode

- When "DoF" is highlighted, press — to enter the DoF screen.
- Use ▼ to scroll to "Capture."
- Press — to enter into the capture mode.
- Face the back of the Kestrel directly toward the target and press —.
- The data collected in capture mode will automatically adjust the DoF value in the Target screen.

**Note: Compass must be calibrated in order to capture DoF. See p. 7 for calibration steps.*

TARGET SCREEN (CON'T)

Inclination Angle

Inclination angle is the angle between the target and the horizontal as seen by the shooter. This variable is expressed in the Target screen as "Ideg" or "Icos," where Ideg is in degrees, and Icos is the cosine angle. These can be manually adjusted by highlighting one and using the ◄ and ► to change the value. Changing one will automatically change the other appropriately.

Target Speed

- Use ▲ or ▼ to highlight "TS."
- Use ◄ and ► to adjust the value.

Speed of motion	
TS	0mph
miles per hour	
Estimate	

Target Speed Estimator

This function estimates the speed of a target based on range, movement, and time.

- When "TS" is highlighted, press − button to enter Speed of Motion screen.
- Use ▼ to highlight "Estimate" and press − to enter Speed Estimate screen.
- Use ▲ or ▼ to highlight a parameter.
- Use ◄ and ► to adjust values for each parameter.
- When all parameters are set, press Φ to escape.
- An "Accept" screen will appear, scroll to "Yes" if you would like to accept values. Use − to select the highlighted option.

Target Direction

- Use ▼ to highlight "TD."
- Use ◄ and ► to adjust "L-R" (left to right) or "R-L" (right to left).

ENVIRONMENT SCREEN

ENVIRONMENT SCREEN:

The Environment screen contains all atmospheric parameters, such as temperature, station pressure, and relative humidity. Setting the "Update" parameter to "Yes" automatically imports the Kestrel's sensor data into the Environment screen. The "Update" parameter can also be set to "No" when it is highlighted by using ◄ or ►; while in this setting the temperature (Temp), station pressure (SP), and relative humidity (RH) can be manually adjusted.

ENVIRONMENT	
Update	No
Lat	42° N
Temp	75° F
SP	29.48inHg

- Use ▲ or ▼ to highlight a parameter.
- Use ◄ and ► to adjust the values for each parameter.

Coriolis will default to "Yes" unless you manually change it to "No." When on the "Yes" setting, the Coriolis is taken into account for the ballistics solutions.

**Note: station pressure ("SP") is pressure reading that is un-adjusted for sea level. Sometimes, this is mistakenly called barometric pressure in ballistics software. Barometric pressure is a pressure reading adjusted for sea level. When shooting, station pressure is required. Station pressure can be measured with the Kestrel by setting the reference altitude to zero on the Barometric Pressure screen in weather mode; although, the ballistics solution will use station pressure regardless of the altitude settings.*

RANGE CARD SCREEN

The Range Card screen shows detailed information about the ballistic solution at various ranges that apply to the currently selected target and gun. The screen displays three columns comprised of the Range and Elevation (in the left two columns) and one other variable. The other variable that can be displayed is ballistics solutions based on "Wnd1"; "Wnd2"; "Lead"; or further information on bullet flight characteristics such as remaining velocity ("RemV"); remaining energy ("RemE"); time of flight ("ToF"); and maximum ordinate, or height above the line of sight to the target ("MaxO"). Please see Page 29 for a sample Range Card.

- Use ▲ or ▼ to scroll to a particular range.
- Use ◀ and ▶ to scroll across and view all available parameters.

RANGE CARD A		
Rng	Elv	Wnd1
300	5.50	L0.13
400	9.42	L0.19
500	14.06	L0.27

RANGE CARD A		
Rng	Elv	RemV
300	5.50	1991
400	9.42	1823
500	14.06	1666

Example: "Rng" and "Elv" columns remaining fixed while third column can be changed.

Range Increment

- Use − while in the Range Card to enter the Range Settings screen.
- Use ◀ and ▶ to adjust the range increment to the desired value. You may adjust the increments to show in 10, 20, 25, 50, or 100 units of measure (yards or meters).
- Press ⏻ to exit "Range Increment" screen.

Note: The Range Card will display range values up to 4000 yards, or the closest equivalent in meters, depending on the range increment.

Remaining Velocity

- A small dot will appear to the left of the remaining velocity value to indicate the bullet is in the transonic range.
- A larger dot will appear to the left of the remaining velocity value to indicate the bullet is in the subsonic range.

RANGE CARD A		
Rng	RemV	RemE
800	.1272	629
900	.1177	538
1000	.1101	471

BALLISTICS SCREEN

The Ballistics screen displays complete information about the ballistic solution that pertains to the currently selected target and gun. The only parameter whose value can be altered in this screen is the "Range" (this can be done by using ◄ and ► to adjust the value).

- Use ▲ or ▼ to scroll to a particular parameter.
- Use — to enter into a parameter screen for further information about it or change unit of measure.
- Use Φ to return to the Ballistics screen.

Note: An R or an L will appear beside each solution to indicate which side of the target you should aim.

ATRAG SIGNATURE FEATURE

TRUE DROP

In an ideal world, shooters would go into the field knowing exactly how their chosen combination of gun and ammunition will perform, calculated ballistic solutions would always be correct, and a properly delivered shot would always hit the target. In the real world, ballistic data is often imperfect, and even well delivered shots often miss. The best way to deal with this is to allow ballistic parameters to be adjusted to reflect what is actually observed. When this is done correctly, overall accuracy can be significantly enhanced. The Horus Kestrel includes a Drop Truing screen to support this valuable function.

- When all parameters are set, press Φ to escape.
- On the Gun screen, use ▼ to highlight the "True Drop" item.
- Press — to enter the Drop Truing screen.
- In the Drop Truing screen, use ▲ or ▼ to highlight the parameter you wish to change.
- The parameters that can be adjusted are "BC" (ballistic coefficient), "MV" (muzzle velocity), or "Range."
- This adjustment is made so that the calculated elevation correction matches what is actually observed.

BLUETOOTH SETUP

To transfer your Kestrel's real-time and logged data wirelessly and automatically to a laptop, PDA or smartphone (Android only at this time), follow these setup steps. If you do not have a Bluetooth unit you will need the PC Interface cable.

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) or "High" (30ft). NK recommends using "High".

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 and your computer's Bluetooth are enabled. Open the Bluetooth management software on your computer to add a Bluetooth connection and follow the prompts to enter the PIN. A COM Port will be assigned in the communicator software. To understand which COM Port is being used, please check your computer control panel settings.*

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.*
Please see connecting my Kestrel using Bluetooth on www.nkhome.com for further information.

Set Up Kestrel Communicator Software

- Go to: www.nkhome.com/support/kestrel-support/manuals-and-downloads. 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.

HORUS Gun Library Software

Several library guns are pre-programmed in each Kestrel, but this can be modified by building a new gun library on a Windows based computer using the Horus Gun Library software, and downloading the new gun library to the Kestrel (either via Bluetooth connection or the Kestrel wired interface). You can find the latest HORUS Gun Library software at the following link: http://www.nkhome.com/support/kestrel-support/manuals-and-downloads Please note: Downloading a new gun library will automatically overwrite the previous library guns in the Kestrel (but not any user-created guns).

QUICK KEYS: DIRECTION OF FIRE & WIND SPEED

The Direction of Fire (DoF) and Wind Speed (WS1 & WS2) Quick Key feature allows you to quickly and easily change the values of these parameters from the Main Horus screen without entering into the Target screen. It minimizes the number of button presses and time by instantly capturing these values from one screen- the Main Horus screen.

Direction of Fire Quick Key

• Pressing the button while Tgt is highlighted will enter the DoF setting mode.

• The Tgt heading will change to T▶ to indicate the setting mode.

• The direction will be continuously updated on the target line.

• Pressing the button again will capture the current direction as DoF.

• The Tgt heading will return to its normal state.

Note: If the compass is not calibrated, a new screen will pop up to alert you that capture won't work until compass is calibrated.

Wind Speed Quick Key

• Pressing the button while Wind is highlighted will enter the Wind setting mode.

• The Wind heading will change to W▶ to indicate the setting mode.

• The moving 5-second average for windage and wind speed will be continuously updated on the wind line.

The Direction of Fire (DoF) and Wind Speed (WS1 & WS2) Quick Key feature allows you to quickly and easily change the values of these parameters from the Main Horus screen without entering into the Target screen. It minimizes the number of button presses and time by instantly capturing these values from one screen- the Main Horus screen.

SETUP & 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, 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."

Baro Cal

Recalibration of this sensor is not recommended without speaking to an NK technician. See "Barometric Pressure & Altitude Setup" section on page 9 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 ▶ .

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.

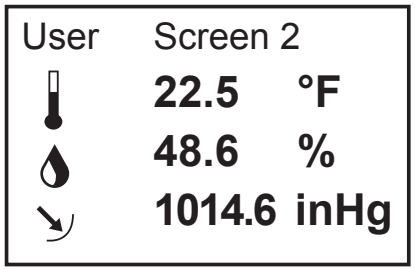
User Screens

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.

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.



Sample User Screen

Measurement Screens

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

Measurement Modes

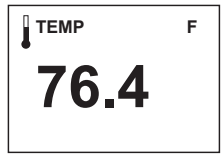
- From your chosen Measurement screen, use ◀ or ▶ to scroll through the Mode options:

Current: Displays instantaneous reading.

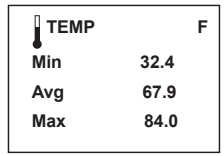
Min/Max/Avg: Displays the Minimum, Maximum, and Average readings from stored data (Displays --.- if no data has been stored).

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

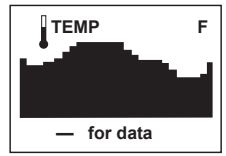
Current



Min/Max/Avg

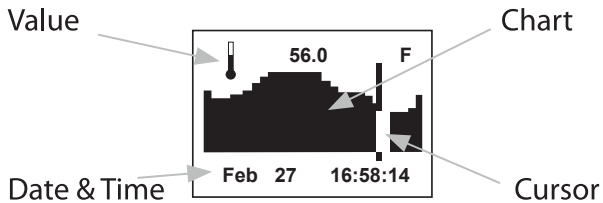


Chart



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

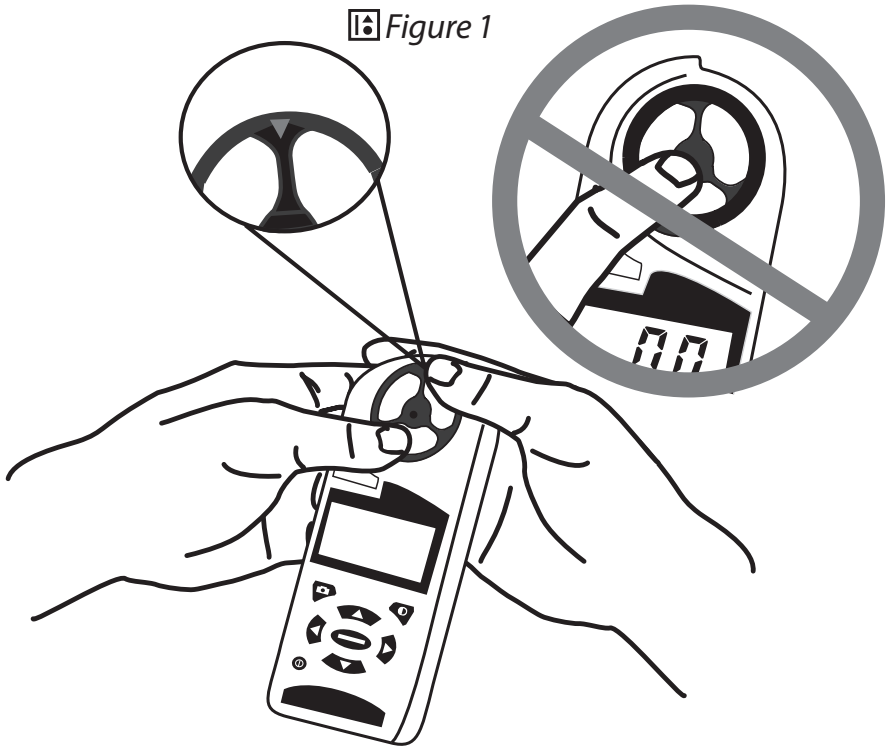
- Press 📷 to activate backlight for one minute.
- Press 📷 again to deactivate the light manually.

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.

Figure 1



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

Figure 2

GLOSSARY OF TERMS

Active gun: When a gun is made active, ballistic solutions for that gun pertaining to all active targets are readily displayed. Ballistic solutions for guns that are inactive are not displayed.

Aiming/Ballistic solution: This consists of sight corrections for windage, elevation, and in the case of a moving target, lead for a selected active gun and target, along with other calculated values such as bullet velocity and energy. On the main Horus screen, only elevation and windage are displayed. On the Range Card and
Ballistic Info screens, detailed ballistic solution data is available.

Subsonic: The speed at which the bullet is slower than the speed of sound. Bullet velocities in this range will be displayed with a large dot to the left of the value.

Supersonic: The speed at which a bullet is gonig faster than the speed of sound. Bullet velocities in this range will have no dot next to them.

Target: A target is characterized by its direction, range, inclination angle, and applicable wind; a moving target has a direction and speed of motion. Targets are identified by a single letter: up to five can be created, designated by the letters A through E. It's important to note that wind is specific to a target – each active target has its own wind specification.

Transonic: The speed at which the bullet slows to the speed of sound. This is also seen as the boundary between supersonic and subsonic. Bullet velocities in this range will be displayed with a small dot to the left of the value.

BALLISTIC & ENVIRONMENTAL QUICK REFERENCE

Target Screen

Active – tells whether this target is currently active
TR – target range
DoF – direction of fire (relative to true north)
Ideg – inclination angle (negative means the target is below the shooter)
Icos – inclination cosine (cosine of the inclination angle)
TS – target speed
TD – target direction of movement
WD – current wind direction (direction from which wind is blowing, relative to DoF)
WS1 – minimum current wind speed
WS2 – maximum current wind speed
Acc1st – For use with the Tremor 2 Horus reticle.

Gun Screen

MV – muzzle velocity
BC – bullet ballistic coefficient
BW – bullet weight
BD – bullet diameter
ZR – zero range
BH – bore height
RT – rifling twist rate (distance in which bullet achieves 360 degrees of rotation)
RTd – rifling twist direction (right = clockwise from the shooter's perspective)
Click – assigns an angular value to sight clicks
Eunit elevation unit – The units used for elevation adjustments (Eclick). Can be mils, clicks, tmoa (True Minute of Angle), smoa (Shooter's Minute of Angle).
Eclick – elevation adjustment necessary for the firing solution in the units specified above.
Wunit – windage unit – The units used for windage adjustments (Wclick). Can be mils, clicks, tmoa (True Minute of Angle), smoa (Shooter's Minute of Angle).
Wclick – windage adjustment necessary for the firing solution in the units specified above.

BALLISTIC & ENVIRONMENTAL QUICK REFERENCE

Environment Screen

Update – controls whether values for temperature, barometric pressure, and relative humidity are obtained automatically (yes) (from the Kestrel's weather-meter functions) or are manually set by the user (no)
Lat – allows the user to specify the latitude that will be used when calculating Coriolis corrections
Temp – temperature
SP – station pressure (actual pressure at the gun's location)
RH – relative humidity
Dalt – density altitude (calculated from pressure, temperature & humidity)
Coriolis – controls whether Coriolis corrections are included in ballistics calculations
Wcap – toggles between applying windage correction to just the current active target (one tgt) or to all targets

Range Card Screen

Elv – the elevation sight correction
Wnd1 – the windage sight correction based on WS1
Wnd2 – the windage sight correction based on WS2
Lead – the lead sight correction (for a moving target)
RemV – the downrange bullet velocity
RemE – the downrange bullet energy
ToF – the bullet's time of flight
Max O – Maximum ordinate(highest point a bullet reaches in flight)
Range – the range for which the ballistic solution is calculated
Elv – elevation correction
Wnd1 – windage correction (based on WS1)
Wnd2 – windage correction (based on WS2)
Lead – lead correction, based on specified target motion
vCor – vertical Coriolis correction
hCor – horizontal Coriolis correction
Drft – bullet drift correction
RemV – remaining velocity
RemE – remaining energy
ToF – time of flight
MaxO – maximum ordinate (highest point the bullet reaches in flight)
Drp – total drop distance
Rtrns – range at which transonic velocity transition begins
Rt 75% – distance at which a bullet is 75% through the transonic range
Rsubs – range at which bullet velocity becomes subsonic

Range Estimation Screen

Target – the size of the target on which estimation is based
Image – the apparent size of the target as it appears in a telescopic sight
Range – the calculated range, based on the target and image sizes

Speed Estimation Screen

Range – the range at which the speed estimation will be done
Mvmt – the apparent movement of the target as it appears in a telescopic sight
Time – the time (in seconds) during which movement was measured
Speed – the calculated speed, based on range, movement and time

FULL RANGE CARD DATA SAMPLE

Sample of full Range Card data relative to data seen on display.

Rng	Elev	Wnd1	Wnd2	Lead		RemV	RemE	ToF	MaxO
100	0.06	0.10L	0.21L	0.00		2355	2155	0.134	0.87
200	2.28	0.22L	0.47L	0.00		2169	1828	0.279	3.79
300	5.56	0.34L	0.72L	0.00		1991	1541	0.437	9.27
400	9.49	0.47L	0.99L	0.00		1823	1291	0.609	18.00
500	14.12	0.61L	1.31L	0.00		1666	1078	0.798	30.98
600	19.33	0.75L	1.62L	0.00		1520	897	1.004	48.99
700	25.34	0.90L	1.96L	0.00	.	1388	748	1.230	73.51
800	32.25	1.06L	2.31L	0.00	.	1272	629	1.477	106.0
900	40.21	1.22L	2.67L	0.00	•	1177	538	1.745	148.0
1000	49.24	1.36L	3.03L	0.00	•	1101	471	2.034	201.0
1100	59.34	1.49L	3.37L	0.00	•	1042	422	2.340	266.2
1200	70.40	1.63L	4.04L	0.00	•	995	385	2.662	344.5
1300	82.46	1.75L	4.29L	0.00	•	955	354	3.000	437.3
1400	95.35	1.82L	4.57L	0.00	•	920	329	3.350	545.3
1500	109.1	1.91L	4.84L	0.00	•	888	307	3.712	669.7
1600	123.7	2.00L	5.00L	0.00	•	860	287	4.088	812.3
1700	139.2	1.99L	5.22L	0.00	•	833	269	4.477	973.9
1800	155.5	2.04L	5.42L	0.00	•	808	253	4.876	1155
1900	172.7	2.08L	5.62L	0.00	•	784	239	5.287	1359
2000	190.9	2.11L	5.63L	0.00	•	761	225	5.713	1586

FULL RANGE CARD DATA SAMPLE (CON'T)

Rng	Elev	Wnd1	Wnd2	Lead		RemV	RemE	ToF	MaxO
2100	210.0	1.96L	5.78L	0.00	•	739	212	6.152	1839
2200	230.0	1.95L	5.93L	0.00	•	718	201	6.602	2118
2300	250.7	1.94L	6.06L	0.00	•	698	18	7.063	2424
2400	272.7	1.92L	6.19L	0.00	•	679	179	7.539	2762
2500	295.9	1.89L	5.90L	0.00	•	660	169	8.031	3134
2600	320.2	1.44L	5.93L	0.00	•	642	160	8.537	3542
2700	345.6	1.35L	5.97L	0.00	•	624	151	9.055	3985
2800	372.2	1.25L	6.03L	0.00	•	607	143	9.588	4468
2900	399.7	1.14L	6.08L	0.00	•	590	135	10.130	4990
3000	428.8	1.02L	6.11L	0.00	•	574	128	10.700	5560
3100	459.5	0.88L	6.14L	0.00	•	558	121	11.280	182
3200	491.6	0.23L	5.18L	0.00	•	542	114	11.880	6855
3300	525.2	0.46L	5.11L	0.00	•	527	108	12.490	7581
3400	560.1	0.71L	5.02L	0.00	•	512	102	13.120	8363
3500	596.6	0.98L	4.92L	0.00	•	498	96	13.760	9206
3600	635.0	1.28L	4.80L	0.00	•	484	91	14.430	10119
3700	675.8	1.59L	4.66L	0.00	•	470	86	15.120	11110

SPECIFICATIONS

	Feature	Abbreviation	Units	Minimum	Maximum
Target	Active Targets	N/A	A through E	1	5
	Target Range	TR	yards	25	4000
			meters	23	3658
	Wind Direction	WD	o'clock	1	12
			degrees	0	360
	Wind Speed	WS1 or WS2	mph	0	50
			m/s	0	22
			km/h	0	80
			fps	0	73
			knots	0	43
	Direction of Fire	DoF	degrees	0	360
			o'clock	1	12
	Inclination Angle	Ideg	degrees	-60	60
	Inclination Cosine	Icos	no units	1.000	0.500
	Target Speed	TS	mph	0	50
			m/s	0	22
			km/h	0	80
			fps	0	73
			knots	0	43
	Target Direction of Movement	TD	Left to Right OR Right to Left		
Gun	Name Characters	N/A	0 through 9; A-Z; a-z; -+/.:&* and space		
	Muzzle Velocity	MV	fps	300	4500
			m/s	91	1372
	Bullet Weight	BW	grains	10	1500
			grams	0.6	97.2
	Bullet Diameter	BD	inches	0.10	1.00

SPECIFICATIONS

	Feature	Abbreviation	Units	Minimum	Maximum
Gun	Bullet Diameter	BD	inches	0.10	1.00
			mm	2.54	25.40
	Bullet Length	BL	inches	0.10	3
			mm	2.54	76.2
	Zero Range	ZR	yards	25	1000
			meters	23	914
	Bore Height	BH	inches	0.10	5.00
			cm	0.25	12.70
	Rifling Twist	RT	inches/revolution	1.00	36.00
			cm/revolution	2.54	91.44
	Muzzle Velocity	MV	fps	300	4500
	Twist Direction	RTd	Left OR Right		
	Rifling	Click	/mil	1	10
			/tmoa	1	10
			/smoa	1	10
Environment	Station Pressure	SP	inHg	12.00	32.00
			mb	406.4	1083.6
			hPa	406.4	1083.6
			psi	5.89	15.72
	Relative Humidity	RH	%	1	100
			meters	-3271	9987
	Station Pressure	SP	inHg	12.00	32.00
			mb	406.4	1083.6
			hPa	406.4	1083.6
	Coriolis	Coriol	Yes OR No		

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!

We strongly recommend you use lithium or LSD NiMH batteries at all times to avoid battery corrosion damage. All alkaline batteries are prone to leaking, particularly as they near full discharge. The potassium hydroxide that leaks from an alkaline battery causes oxidation damage to the circuit and components which is often irreversible and is NOT covered under the Kestrel warranty.

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.
- Change your batteries when below 20% capacity to avoid fully discharging your batteries.
- Whatever batteries you choose:
- Use national name-brand batteries wherever possible. Do not mix brands or chemistries of batteries.
- Do not mix batteries of different ages or usage – replace both batteries at the same time with new batteries that have not reached their expiration date.
- Inspect your batteries occasionally (at least every three months) and remove immediately if you notice ANY moisture or white crystalline material at either end.
- 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 batteries installed inside a hot vehicle in the summer.

What to Do if you Have a Leak

If you notice you have a leaking 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 caustic and/or toxic. 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 and try installing fresh batteries. If your unit powers up you may continue to use it. If not, you may contract Kestrel Support to inquire about our Customer Loyalty Trade-In Program which provides a generous discount towards a replacement Kestrel meter.

WARRANTY CERTIFICATE

Your Kestrel Pocket Weather 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, 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; 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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Please register your Kestrel Meter at NKhome.com

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