

TECHNICAL SUPPORT

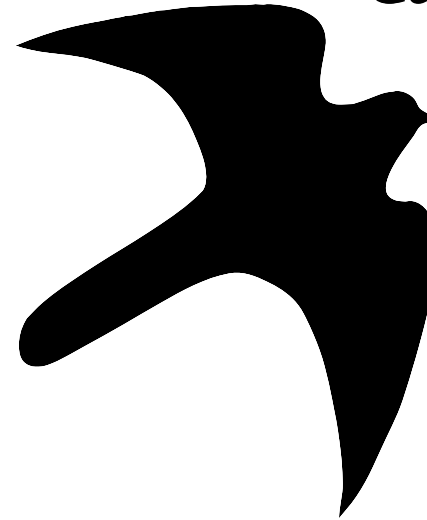
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***Relative Humidity
Calibration***



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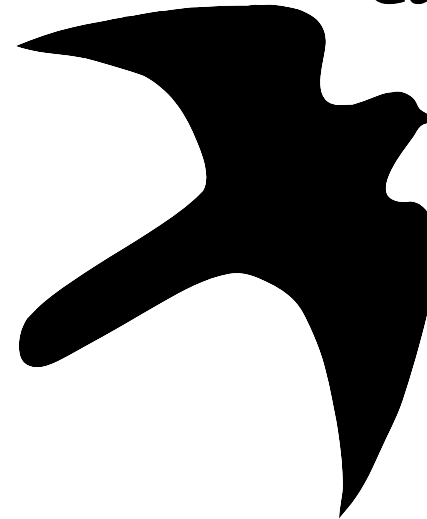
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***Relative Humidity
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RH Calibration Procedures

Factory Calibration

Each Kestrel® Pocket Weather Meter is individually calibrated after assembly. In essence, each unit is “taught” what the correct relative humidity (RH) values should be for given signals from the RH sensor.

NK calibrates at RH = 32.8% and RH = 75.3%. Calibration is done in two sealed environmental chambers maintained at 25°C. The humidity is held constant with saturated aqueous salt baths: magnesium chloride for the 32.8% chamber and sodium chloride for the 75.3% chamber. Chamber temperatures are held constant at 25°C ± 0.5°C.

The temperature and RH of each chamber is independently monitored using a precision chilled mirror dew point hygrometer (EdgeTech Model 2002) accurate to ± 0.1°C and NIST (National Institute of Standards and Technology) traceable.

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SALT BATH

PUBLISHED RH AT 25 ° C

LITHIUM BROMIDE	6.37%
LITHIUM CHLORIDE	11.30%
POTASSIUM ACETATE	22.51%
MAGNESIUM CHLORIDE	32.80%
POTASSIUM CARBONATE	43.16%
MAGNESIUM NITRATE	52.89%
SODIUM BROMIDE	57.57%
POTASSIUM IODIDE	68.86%
SODIUM CHLORIDE	75.30%
POTASSIUM CHLORIDE	84.34%
POTASSIUM SULFATE	97.30%

* Based on: *Humidity Fixed Points of Binary Saturated Aqueous Solutions, Greenspan, Lewis; Journal of Research of the National Bureau of Standards-A. Physics and Chemistry, Vol. 81A, No. 1, p. 89 January-February 1977*

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Verification of the RH Values

It is possible to test the Kestrel at humidity values other than 32.8% and 75.3%. To set up a test at another RH value, simply use a different saturated salt solution in the humidity chamber. Refer to the table on page 10 for various salts and their corresponding RH values.

To test the accuracy of the Kestrel at various RH values:

1. Set up a large container with a saturated salt solution using any one of the salts from the table on page 10.
2. Turn on the Kestrel and put it into relative humidity mode (RH%).
3. Place the Kestrel inside the sealed large container and let it sit for at least 30 minutes. After 30 minutes, the Kestrel should display an RH value within $\pm 3\%$ of the chart listing.

** Based on: Standard Practice for Maintaining Constant Relative Humidity by Means of Aqueous Solutions, ASTM Designation: E104-85 (reapproved 1996).*

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A proprietary auto calibration routine controls the calibration process. After 60 minutes this routine stores a calibration value which forces the Kestrel to be correct at the RH value of the chamber.

The response of the humidity sensor is a highly reproducible, non-linear curve. This non-linear characteristic is stored in the microprocessor used to compute RH, and in this manner we are able to maintain an accuracy of $\pm 3\%$ of scale over the relative range 5% - 95%.

Field Calibration

The Kestrel should be recalibrated if the RH sensor has been replaced or has shown drift in its RH measurement.

This manual explains the steps for calibrating the humidity measurement for the Kestrel. This process will take approximately 3 hours, including setup and calibration.

Please read the entire instructions before attempting to calibrate your Kestrel.

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Please read the entire instructions before attempting to calibrate your Kestrel.

Contents of the Humidity Calibration Kit

The RH calibration kit includes the following items:

- two clear, sealable containers
- one small container with magnesium chloride solution
- one small container with sodium chloride solution
- two wooden scrapers

The large containers are used to create a stable environment. The small containers are used to hold the saturated salt solution. The saturated salt solutions generate well-defined humidities when they are confined to a contained environment.

To Set Up the Humidity Chambers

1. Open the sodium chloride container and move all of the contents into one of the large containers. Use a scraper to make sure to collect ALL of the salt solution.

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To Set Up the Humidity Chambers

1. Open the sodium chloride container and move all of the contents into one of the large containers. Use a scraper to make sure to collect ALL of the salt solution.

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3. Press the MODE button. The display will alternate between "C 1" and a value, this will continue for 60 minutes. Place the unit into the sodium chloride chamber and immediately close the lid tightly. After 60 minutes, the unit will display "C 2", indicating that the first humidity chamber routine is complete, and the unit is ready for the second chamber.
4. Remove the unit from the sodium chloride chamber and press the MODE button. The display will alternate between "C 2" and a value, this will continue for 60 minutes. Wipe the sodium chloride from the unit. Place the unit into the magnesium chloride chamber and seal it immediately. After 60 minutes, the unit will display "End", indicating that the second humidity chamber routine is complete, and the unit has been calibrated.
5. Remove the unit from the magnesium chloride chamber and press the MODE button. The Kestrel is now fully calibrated and ready to take accurate humidity measurements.

If the ON button is pressed at any time during the above routine, the unit will shut off and the re-calibration will be aborted.

8

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digit. When the desired value is displayed, press the ON button to move to the middle digit.

- b. Press the MODE button to change the value of the middle digit. When the desired value is displayed, press the ON button to exit setting.

6. The display will return to the normal dew point mode. Please note that the RH measurement will NOT be any different than before setting the calibration values. The unit is now ready for calibration.

Running the Calibration Routine

Once the expected RH values have been programmed, the unit may be recalibrated:

1. Press the MODE button until the unit is in relative humidity mode(💧%).
2. Hold the ON and MODE buttons simultaneously until the display reads "C 1" (approximately 6 seconds).

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2. Hold the ON and MODE buttons simultaneously until the display reads "C 1" (approximately 6 seconds).

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2. **Tightly** screw the lid on the large container.
3. Open the magnesium chloride container and move all of the contents into the other large container. Use the OTHER scraper to make sure to collect ALL of the salt solution.
4. **Tightly** screw the lid on the large container.
5. Let these containers sit closed, containing the salt solutions, for **at least 1 hour**. Any less than 1 hour is insufficient for the chamber to settle and will yield poor calibration.

Removing the Lanyard from the Kestrel Unit

You may want to remove the neck lanyard from the Kestrel in order to avoid getting salt solution on the lanyard. The Kestrel can be rinsed after calibration to remove any salt solution.

1. Insert a small flat-head screwdriver into the end of the lanyard cordlock and pop it open.

4

2. **Tightly** screw the lid on the large container.
3. Open the magnesium chloride container and move all of the contents into the other large container. Use the OTHER scraper to make sure to collect ALL of the salt solution.
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2. Slide the cordlock and zip pull off the lanyard.
3. Remove the lanyard from the Kestrel unit.

Programming the Expected Humidity Chamber Values into the Kestrel® Weather Meter

Before recalibrating the Kestrel, the expected humidity values must be programmed into the unit:

1. Turn on the Kestrel. Press the MODE button until the unit is in dew point mode (☛).
2. Hold the ON and MODE buttons simultaneously until the display reads "P 1" (approximately 6 seconds).
3. Press the ON button. The display will show a value with the last digit blinking. This value represents the expected humidity of the sodium

5

2. Slide the cordlock and zip pull off the lanyard.
3. Remove the lanyard from the Kestrel unit.

Programming the Expected Humidity Chamber Values into the Kestrel® Weather Meter

Before recalibrating the Kestrel, the expected humidity values must be programmed into the unit:

1. Turn on the Kestrel. Press the MODE button until the unit is in dew point mode (☛).
2. Hold the ON and MODE buttons simultaneously until the display reads "P 1" (approximately 6 seconds).
3. Press the ON button. The display will show a value with the last digit blinking. This value represents the expected humidity of the sodium

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chloride chamber. If the value reads 75.3, simply press the ON button twice and skip to step 4. Otherwise, the value must be changed to 75.3 as described in the following 2 steps:

- a. Press the MODE button to change the value of the rightmost digit. When the desired value is displayed, press the ON button to move to the middle digit.
- b. Press the MODE button to change the value of the middle digit. When the desired value is displayed, press the ON button to exit setting.

4. The display will read "P 2". Press the ON button.
5. The display will again show a value with the last digit blinking. This value represents the expected humidity of the magnesium chloride chamber. If the value reads 32.8, simply press the ON button twice and skip to step 6. Otherwise, the value must be changed to 32.8 as described in the following 2 steps.

- a. Press the MODE button to change the value of the rightmost

6

chloride chamber. If the value reads 75.3, simply press the ON button twice and skip to step 4. Otherwise, the value must be changed to 75.3 as described in the following 2 steps:

- a. Press the MODE button to change the value of the rightmost digit. When the desired value is displayed, press the ON button to move to the middle digit.
- b. Press the MODE button to change the value of the middle digit. When the desired value is displayed, press the ON button to exit setting.

4. The display will read "P 2". Press the ON button.
5. The display will again show a value with the last digit blinking. This value represents the expected humidity of the magnesium chloride chamber. If the value reads 32.8, simply press the ON button twice and skip to step 6. Otherwise, the value must be changed to 32.8 as described in the following 2 steps.

- a. Press the MODE button to change the value of the rightmost

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