



WHEN ACCURACY IS THE POINT.™

F-2000T

TOBACCO MOISTURE METER

OPERATION MANUAL



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Model F-2000T
Owners Manual

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This product is covered by EU directive 2002/96/EC (WEEE). For disposal please contact your supplier or local authorities for instructions as to best do so.

FEATURES

- 8% to 37% moisture range for Burley Tobacco
- Digital readout
- Built-in calibration check
- Temperature stable circuit
- Ergonomic case design
- Includes (1) 9-volt battery
- Three year warranty
- Over sixty five years of proven quality, accuracy and service

BEFORE YOU BEGIN

The meter reads moisture in TOBACCO between 8.0 and 37.0%. It also stores the reading and displays the average and maximum of up to 100 accumulated readings.

The meter also has a set point and a buzzer. Whenever the displayed reading is above the set point value, the buzzer will sound. The meter will automatically correct the input reading for sample temperature, provided that the user has entered the correct temperature in the meter.

Whenever the battery is removed and then reconnected (i.e when power is applied), the meter will display the software version number (4.2) for one second and then shut off if no key is pressed.

NOTE The use of a rechargeable battery is not recommended. We advise to only use 'normal and good quality' batteries.

BUTTON FUNCTIONS



Read (#1): Reads the percent moisture content value %MC.



Calibration
Check (#2) Checks the meter calibration. Displays the average of up to 100 accumulated readings; displays the highest stored reading; erases the readings



Set Point
Button (#3): Acts as an arrow button when pressed after the set-point button to decrease the set point to a lower value.



Temperature
(#4): Displays the current set-point. Also acts as an arrow (scroll) button to increase the set-point value in 1% increments.

CHECK CALIBRATION

- **Remove the probe** from the top of the meter.
- **Press and hold** the read button (#1) and check button (#2) simultaneously. Meter is in calibration if it displays "12" (± 0.2) on the scale, regardless of the scale setting.

If you check the calibration and the display does not read "12," it is likely an indication of a low battery. If this occurs, change the battery immediately. Continued use with a low battery may cause the meter to go out of calibration. If you have a fresh battery and the instrument still does not indicate an acceptable calibration, return it to DELMHORST for service. See "**Service for Your Meter**" section.

CHANGE THE SET-POINT

The default set point value for the meter is 20.0%. The user can change the value between 8.0 and 37.0.

Press the "SET" key. The meter will display the current set point value. To increase the set point, keep the "SET" key pressed. The value will increase in steps of 1.0.

To decrease the value, press the "TEMP" key within two seconds after pressing the "SET" key. The value will decrease in steps of 1.0.

If the meter reads a %MC higher than that of the set-point, a buzzer will sound.

CHANGE THE TEMPERATURE SETTING

The meter will automatically correct the moisture reading for sample temperature, provided the user has entered the correct SAMPLE TEMPERATURE in the meter. The user can set the temperature between 18°C and 124°C (0°-255°F).

The default temperature setting is 27°C (80°F). The meter will correct the moisture value by 0.05% for every F degree change in the sample temperature.

Press the "TEMP" key. The meter will display the current temperature setting. To increase the setting, keep the "TEMP" key pressed. The temperature value will increase in steps of 5°. To decrease the value, press the "SET" key within two seconds after pressing the "TEMP" key. The value will decrease in steps of 5.0.

TO RESET THE METER

- **Press and release** the calibration check button (#2).
- **Within one second**, press and hold the scale button (#3).
- **Resetting the meter** will restore the default settings and erase all the stored readings. Press the "CHECK" key immediately, followed by the "SET" key. The meter will display "200" for two seconds and then shut off.

TAKING A READING

- **Connect the probe** to the external connector on the top of the meter.
- **Insert the probe into the bale.**
- **Press the read button (#1).**

Within 1 or 2 seconds, the meter will display the %MC between 8.0 and 37.0. The meter will automatically correct the reading for the sample temperature. The reading will be displayed for 2 seconds and if the "READ" key is still pressed, then the cycle will be repeated. The buzzer will sound if the displayed reading is above the set point value entered in the meter (default is 20.0).

The meter will "store" the reading, provided that the user releases the "READ" key, otherwise the meter will initiate another "READ" cycle without "storing" the previous reading. This feature lets the user take a number of readings in sequence and only "keep" the readings of his choice.

When the "READ" key is released, the meter will add the last displayed value to the sum of the previous readings (up to 100), provided the value is within the range. When all the 100 readings are taken, the meter will automatically display their average before turning off. No new value will be added to the sum unless the user erases the readings.

The reading below 8.0% will be displayed as ".0" and above 37.0% as "99.9". These are not considered valid readings and will not be stored.

NOTES

- ✓ The prod is electrically insulated, except at the metal points near the tip. The moisture content measured represents the tobacco in contact with the tip of the prod only.
- ✓ Partially cured tobacco may have wide variations in moisture content throughout the bale. Readings should be taken in several different parts of the bale and the highest readings used as a guideline. The arrangement and compaction of tobacco fibers in a bale may have an effect on meter readings.
- ✓ If you are testing high density bales, we recommend using the H-4 handle with the 830-2 25cm prod, 830-3 45cm prod, or the 830-4 90cm prod. Using the handle/prod combination eliminates excess stress on the instrument case that may occur when trying to insert the prod into a high density or large bale.
- ✓ When using the 90cm prod, be sure to guide the prod into the bale with one hand while pushing on the H-4 handle.

CHECKING THE AVERAGE AND MAXIMUM VALUE OF THE ACCUMULATED READINGS (And erasing them)

As mentioned before, the meter adds the value of the new reading (provided that the "READ" key is released) to the sum of the previous readings. The meter holds this sum, as well as the number of readings added so far and the HIGHEST reading. Up to 100 readings can be accumulated. After that, the meter will stop adding the new reading and display the average every time a new reading is taken to remind the user to erase the readings to start accumulating the new ones.

At any time, you can check the AVERAGE of the accumulated readings by pressing the "CHECK" key. The meter will display the number of readings accumulated for one second, followed by the AVERAGE value (displayed as "A xx.x") for two seconds and the MAXIMUM value for another two seconds. If at the end of the total period, the meter finds the "CHECK" key pressed, it will erase the 3 accumulated readings. Hence, you must release the key before four seconds if he wants to retain the readings. However, if all 100 readings are accumulated, then he should keep the key pressed to erase the readings so that the meter can accumulate the new ones.

FACTORS AFFECTING YOUR READINGS

Because of the many variables that affect the electrical meter readings, the indicated moisture content should not be used as an absolute quantitative measurement. Meter readings are very useful guidelines for safe storability of tobacco.

Meter readings become more significant when they are considered in the light of the density of the bales, anticipated handling and storage, and prevailing climate conditions.

RANGE OF MOISTURE CONTENT

The F-2000T is designed to test moisture in tobacco over a range of 8%-37%. Readings over 30% should be used only as a qualitative indication of high moisture content. Delmhorst moisture meters use the relationship existing between electrical conductivity and moisture content in tobacco. As moisture content increases, so does the conductivity.

Tests on tobacco at high moisture content, over 25%, are less accurate. This is mostly due to the variability in moisture distribution. The reduced level of accuracy in the high range does not significantly affect the usefulness of the meter, as a few high readings indicate that some action be taken to dry the tobacco to avoid spoilage or even self-combustion.

While it is important to note the average of several readings, it is even more important to note the high readings and the frequency at which they occur.

TOBACCO TEMPERATURE

The F-2000T has been calibrated at 27°C (80°F) on various samples of different types of tobacco, mostly burley, and on different cuttings and mixtures. The higher the temperature of the sample, the higher the meter readings will be. Temperatures lower than 27°C (80°F) cause lower meter readings. The correction is approximately 1% point for every 12°C/20° F difference. Refer to chart below:

Tobacco temperature	Add to reading	Subtract from reading
20°F/-7°C	3	--
40°F/ 5°C	2	--
60°F/15°C	1	--
80°F/30°C	0	0
100°F/40°C	--	1
120°F/50°C	--	2
140°F/60°C	--	3

Example:

Meter reading : 22%
 Temperature : 40°F/5°C
 Moisture Content : 24% (22 + 2)

CURING

Before proper curing has taken place, wide variations in moisture content should be expected in both recently baled tobacco and loose tobacco. These variations will be exposed by meter readings taken in different areas of the bale or loose tobacco . **The higher the moisture range, the wider are the variations. The more curing has been allowed to take place, the greater uniformity in moisture distribution can be expected.**

The validity of the meter readings is closely related to the care spent in sampling the tobacco to be tested. The number of tests made should be increased whenever the initial readings show considerable variations.

DENSITY

The calibration of the moisture testers applies to bales of normal "average" density. Generally:

- Denser bales may yield readings 1-2% points higher
- Looser bales tend to yield 1-2% point lower

Baling should be done according to the lower meter reading.

When testing baled tobacco, drive the prod across the slices of the bale, not between them. This will ensure firmer and more uniform contact.

USE OF PRESERVATIVES

Tobacco preservative or stabilizers may also have an effect on meter readings. Normally a bale of tobacco treated with preservative will read higher than a bale of the same tobacco that had not been treated. The readings typically increase by 2-4% points, and 24-48 hours after treatment, the readings between the bales tends to equalize.

Occasional higher readings may occur if, in addition to the effect of the increased conductivity due to the stabilizer, the bales tested also show an increase in temperature and "sweating." As the stabilizer becomes more thoroughly absorbed and the sweating subsides, the meter readings recede to the initial level and will continue to decrease, assuming that the bale becomes progressively dryer.

SAMPLE SIZE

When testing baled tobacco, it is essential to take readings at several different points in the bale. Tobacco moisture may vary a great deal in the same bale. For example, at one point bale moisture may be 20% and at another over 35%.

More tests must be made whenever the variations among readings are greater. If there is a possibility of high moisture areas, samples from these locations should be taken. Areas of high moisture content will spoil, resulting in loss.

It is extremely important to note the high readings and the frequency at which they occur.

CARE OF YOUR METER

To keep your meter in good working order:

- ✓ Store your meter in a clean, dry place. The protective carrying case provided is an ideal storage place when the meter is not in use.
- ✓ Change the 9-Volt battery as needed. Continued use with a low battery may cause the meter to go out of calibration.
- ✓ Change contact pins as needed. Keep pin retainers hand tightened.
- ✓ Clean the meter, contact pins, and probes with any biodegradable cleaner.
- ✓ Use the cleaner sparingly and on external parts only. Keep the cleaner out of the external connector.
- ✓ DO NOT IMMERSE THE METER OR ANY ELECTRODE IN WATER.
- ✓ Remove the battery if the meter will not be used for one month or longer.

SERVICE FOR YOUR METER

- ✓ Pack your meter securely. Enclose a purchase order or letter with a brief description of the problem.
- ✓ There is no need to call us for a return authorization number if you are within the EU. Customers outside the EU must contact us for more specific instructions prior to returning a meter.
- ✓ Include your name, address, daytime phone and fax numbers or e-mail address. If you believe the meter is under warranty, please provide the original sales slip or invoice.
- ✓ Ship via UPS, Express Mail, Priority Mail or any overnight courier who provides prompt service. Do not use standard parcel post.
- ✓ Insure your instrument for its full value and ship prepaid. We are not responsible for damage in transit.
- ✓ We do not accept COD shipments or cover any incoming freight or duty charges on returned merchandise
- ✓ Turnaround time on repairs is approximately two weeks.
- ✓ We will call you with an estimate if you specifically request one, or if we determine that the meter may be too costly to repair.
- ✓ Non-warranty repairs will be returned via UPS/COD unless you have already established other payment terms. There is no COD service outside the EU.
- ✓ Payments have to be made by Bank transfer prior to the return shipment. A Proforma invoice will be raised in advance.
- ✓ Warranty repairs will be returned at no charge if shipped within the EU via GLS Ground Service. Freight charges for expedited services (i.e., Federal Express, UPS/2 Day, UPS/1 Day, etc.) are the customer's responsibility and will be charged as per the above terms.

WARRANTY

DELMHORST EUROPE, referred to hereafter as DELMHORST, guarantees your moisture meter for three years from date of purchase and any optional electrodes against defects in material or workmanship for 90 days. If, within the warranty period of the meter, you find any defect in material or workmanship return the meter following the instructions in the "Service for Your Meter" section. This limited warranty does not cover abuse, alteration, misuse, damage during shipment, improper service, unauthorized or unreasonable use of the meter or electrodes. This warranty does not cover batteries, pin assemblies, or pins. If the meter or any optional electrodes have been tampered with, the warranty shall be void. At our option we may replace or repair the meter. DELMHORST shall not be liable for incidental or consequential damages for the breach of any express or implied warranty with respect to this product or its calibration. With proper care and maintenance the meter should stay in calibration; follow the instructions in the "**Care of Your Meter**" section.

Under no circumstances shall DELMHORST be liable for any incidental, indirect, special, or consequential damages of any type whatsoever, including, but not limited to, lost profits or downtime arising out of or related in any respect to the meters or electrodes and no other warranty, written, oral or implied applies. DELMHORST shall in no event be liable for any breach of warranty or defect in this product that exceeds the amount of purchase of this product. The express warranty set forth above constitutes the entire warranty with respect to Delmhorst meters and electrodes and no other warranty, written, oral, or implied applies. This warranty is personal to the customer purchasing the product and is not transferable.

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For already 65 years, Delmhorst is a leading brand for high-quality resistance moisture meters. Today the Delmhorst range consists of a complete line of portable moisture meters for a variety of different applications including woodworking / lumber, agriculture, construction and paper.



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