F-2000R

REED MOISTURE METER

OPERATION MANUAL

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Model F-2000R
Owner's Manual

TABLE OF CONTENTS

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

- 6% to 40% moisture range for reed
- For use on plywood and chipboard
- Digital readout
- Built-in calibration check
- Temperature stable circuit
- Averages up to 100 accumulated readings
- Displays average and highest of accumulated readings
- Ergonomic case design
- Includes (1) 9-volt battery
- Three year warranty
- Over 65 years of proven quality, accuracy and service

BEFORE YOU BEGIN

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

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

When the battery is replaced, the meter displays its software version for one second and then turns itself off. After replacing the battery, you must reset the meter as described below in the "Resetting the Meter" section.

NOTE, we recommend NOT to use a rechargeable battery and advise to only use 'ALKALINE' batteries.

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" (± .2) on the scale.

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 EUROPE for service. See "**Service for Your Meter"** section.

CHANGE THE SET-POINT

- **To change the set-point value, press the set-point button (#4)**. The meter will display the current set-point value.

- **To scroll forward** to a higher value, hold the set-point button (#4) while the current value is displayed and scroll to the set-point value desired.

- **To scroll backward** through the set-point values, press and release the set-point button (# 4). Within one second press and hold the set point decrease button (#3).

- **Continue** to hold the set point decrease button (#3) and the set-point will decrease.

- **When scrolling in either direction,** release the button to stop at your desired set-point.

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

TO CHECK THE ACCUMULATED READINGS

This feature allows you to view the total number of all accumulated readings, the average of those readings, and the highest stored reading.

- **To add a reading to the sum of all previously stored readings, release the read button (#1)** within 2 seconds. If you press and hold the read button #1, the meter will repeat its read cycle, but will not add a new reading to the storage until the button is released.

- **To view the readings** press and release the calibration check button (#2). First the meter displays the number of accumulated readings for one second, then the average of those readings for two seconds. Then it displays the highest stored reading for two seconds. The total "cycle" time is five seconds.

- **To erase all the accumulated readings**, hold the calibration check button (#2) for more than five seconds until the meter displays "0."

- **To keep the accumulated readings in memory,** release the calibration check button (#2) before the total cycle time is complete.

The meter will accumulate up to 100 readings. After all 100 readings are stored, it will not add new readings until the memory has been cleared. It will also continue to display the average of all 100 readings as a reminder that the memory is full.

Readings below 6% will be displayed as "0". Those above 40% will be displayed as "99.9." Neither will be added to the accumulated readings or used in calculation of average or highest reading.

TO RESET THE METER

- **Press and release** the calibration check button (#2).
- **Within one second**, press and hold the scale button (#3).
- **The meter will reset itself** and display "119." This indicates that the meter has been reset is returned to it's default set-point 19%. It will also clear all of the readings stored in memory.

RECOMMENDED ELECTRODES

- 830-x pen electrode together with H-4 handle. Two handed operation to minimize stress placed on the meter casing. For use on reed and stacked bundles
- Pen electrode 1235, mounted directly on the meter. One hand operation for measuring the MC of reed on the roof.
- Pin electrode 2-E for use on stems and roofing sheets

TAKING A READING

TESTING REED

- **Connect the pen electrode**, 830-X/H-4 or 1235, to the external connector on the top of the meter.
- **Insert the electrode into the reed (bundle)**
- **Press the read button (#1).** The meter displays the %MC for two seconds.

NOTES

- ✓ The reed electrode is electrically insulated, except at the metal points near the tip. The moisture content measured represents the reed in contact with the tip of the prod only. If possible, insert the electrode parallel to the reed
- ✓ Reed may have wide variations in moisture content throughout the bundle. Readings should be taken in several different parts of the bundle and the highest readings used as a guideline. The arrangement and compaction of the reed stems in a bundle may have an effect on meter readings.
- ✓ If you are testing high density bundles, 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 bundle.
- ✓ When using the 90cm prod, be sure to guide the prod into the bundle with one hand while pushing on the H-4 handle.

TESTING SEPARATE REED STEMS

- **Connect the pin electrode** 2-E to the external connector on the top of the meter.
- **Prepare a representative sample** by collecting 5 thick, slow drying reeds from various parts of the bundle.
- **Insert the electrode into each reed stem**
- **Press the read button (#1)** and take a reading.
- **The average outcome of the stems** will approximately 3-5% higher if compared with the pen test

NOTES

✓ Repeat the steps above if considerable variations are found in the meter readings

TESTING ROOFING SHEETS

- **Connect the pin electrode** 2-E to the external connector on the top of the meter.
- **Insert the pins** approx 5 mm into the sheet
- **Press the read button #1** and take a reading.
- **Make several tests** on the roofing sheets

NOTES

- The readings are not actual percentages but should be judged as reference.

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 use of reed.

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

RANGE OF MOISTURE CONTENT

The F-2000 is designed to test moisture in reed over a range of 6%-40%. 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 reed. As moisture content increases, so does the conductivity.

Tests on reed 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 reed 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.

REED TEMPERATURE

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

Reed 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 reed stems and in the bundles. These variations will be exposed by meter readings taken on different parts of the bundle. **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 reed to be tested. A firm contact of the electrode with the reed is important. The number of tests made should be increased whenever the initial readings show considerable variations.

DENSITY

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

- High pressed bundles may yield readings 1-2% points higher.
- Loose pressed bundles tend to yield 1-2% point lower.
- Tests in stacked loose reed stems usually yield readings 2%-3% lower.

USE OF PRESERVATIVES

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

Occasional higher readings may occur if, in addition to the effect of the increased conductivity due to the stabilizer, the bundles 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 bundle becomes progressively dryer.

IN GENERAL

When testing bundled reed, it is essential to take readings at several different points in the bundle. Reed moisture may vary a great deal in the same bundle. For example, at one point bundle 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.
- ✓ 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.

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.

DECLARATION OF CONFORMITY

Manufacturer's Name: Delmhorst Instrument Co.

Manufacturer's Address: 51 Indian Lane East
Towaco, NJ 07082
USA

Council Directive(s): 89/336/EEC - Meets EMC directive
73/23/EEC - Not required. Voltage used or generated is not within scope of Low Voltage Directive.

Standard(s) to which Conformity is declared :
EN 50082-1:1992- EMC Generic immunity standard
EN 50081-1:1992- EMC Generic emission standard
EN 55011:1991- Limits and methods of measurement of radio disturbance characteristics of (ISM) equipment.

Type of Product : Reed Moisture Meter

Model No. F-2000R

I, the undersigned, hereby declare that the product specified above conforms to the above Directive(s) and Standard(s).

Thomas Laurenzi, President
Delmhorst Instrument Co.
NJ, USA