

R-2000

owners manual



DELMHORST[®]
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DELMHORST R-2000



R-2000 FEATURES

- ▶ Resistance technology recognized around the world as the most accurate method for measuring moisture
- ▶ 6%-40% moisture range
- ▶ Digital readout
- ▶ Averages up to 100 accumulated readings
- ▶ Built-in correction for 48 different species
- ▶ Built-in temperature compensation both Fahrenheit and Celsius
- ▶ Proven microcontroller circuit for increased reliability and accuracy
- ▶ Includes (1) 9-Volt Battery
- ▶ Includes sturdy carrying case
- ▶ One-year warranty
- ▶ Over fifty years of proven quality, accuracy and service

BEFORE YOU BEGIN

Button Functions

- ➊ **Read Button** - Reads the Percent Moisture Content value (%MC), corrected for temperature and species.
- ➋ **Calibration Check Button** - Checks meter calibration. It also displays the average of up to 100 accumulated readings; displays the maximum stored reading; erases the readings.
- ➌ **Species Button** - Sets the species code for the wood you are using. Species are numbered from 1 to 48 and are listed on the Species Code Chart. This button also acts as a scroll key, depending on the function.
- ➍ **Temperature Button** - Sets the wood temperature and changes the temperature mode (Fahrenheit or Celsius). This button also acts as a scroll key, depending on the function.
- ➎ **Set-Point Button** - This button programs the set-point value. A buzzer will alert you if the meter reads higher than the selected value. Also operates the backlight.

CHECK CALIBRATION

- ▶ Press the calibration check button ➋ and read button ➊ simultaneously. Meter is in calibration if it displays 12% (+ or -.2).

If you check the calibration and the meter does not display 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 a proper calibration, return it to DELMHORST for service. See **Service for Your Meter** section.

When the battery is removed and then reconnected, 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 in **Resetting the Meter** section.

SET SPECIES

The R-2000 defaults to Species Code #1 - Douglas Fir - the USDA standard and basis for all calibrations. Because the electrical characteristics of different species vary, all species read differently at the same moisture content. For this reason you need to adjust for species. If you are working with a species other than Douglas Fir, set the species code using the species button **3**, and the meter will make the necessary corrections.

- ▶ To change species press the species button **3**. The meter will display the current species code for one second.
- ▶ To scroll forward through the species list hold the species button **3** while the current species code is displayed and scroll to the species number desired.
- ▶ To scroll backward through the species list, press and release the species button **3**. Within one second, press and hold the temperature button **4**. Continue to hold the temperature button **4** and the species number will decrease.
- ▶ When scrolling in either direction, release the button to stop at your desired species.

Species Code Chart

CODE / SPECIES		CODE / SPECIES	
1	Fir, Douglas	25	Magnolia
2	Pine, Southern	26	Mahogany, African (also Khaya)
3	SPF	27	Mahogany, Honduras
4	Alder	28	Mahogany, Philippine
5	Apitong	29	Maple, Hard/Soft
6	Aspen	30	Meranti, Dark Red
7	Ash, White	31	Oak, Red
8	Basswood	32	Oak, White
9	Birch	33	Pecan
10	Cedar, Eastern Red	34	Pine, Longleaf
11	Cedar, Incense	35	Pine, Ponderosa
12	Cherry	36	Pine, Shortleaf
13	Cottonwood	37	Pine, Sugar
14	Cypress	38	Pine, White
15	Elm, American	39	Poplar, Yellow
16	Fir, Red	40	Ramin
17	Fir, White	41	Radiata Pine
18	Gum, Black	42	Redwood
19	Gum, Red	43	Spruce, Sitka
20	Hemlock, Western	44	SPF, COFI*
21	Hackberry	45	Teak
22	Hickory	46	Virola
23	Keruing	47	Walnut, Black
24	Larch	48	Western Hemlock - COFI*

*Species and temperature correction data for both Western Hemlock-COFI (code #48) and SPF-COFI (code #44) were developed by COFI. When comparing readings between the model RDM-2/COFI or the RDM-2S/COFI, used with type 26-E electrode with insulated pins, and the R-2000, be sure both meters are set to 2-pin electrode (insulated pins).

SET TEMPERATURE

The R-2000 defaults to a temperature of 70°F. As wood temperature increases, its electrical resistance decreases and indicated moisture content rises. Lower wood temperatures result in lower indicated moisture content. A correction is necessary if the wood temperature is outside the range of 50°F (10°C) to 90°F (32°C). Set the temperature accordingly and the meter will make the correction.

- ▶ To change temperature press and release the temperature button **4**. The meter will display the current temperature for one second.
- ▶ To scroll forward through the temperature settings, press and hold the temperature button **4** while the current temperature is displayed.
- ▶ To scroll backward press and release the temperature button **4**. Within one second, press and hold the species button **3**. Continue to hold the species button **3** and the temperature will decrease.
- ▶ When scrolling in either direction, release the button to stop at the desired temperature.

Set Temperature Mode

- ▶ To change from Fahrenheit to Celsius mode or Celsius to Fahrenheit mode press the temperature button **4**.
- ▶ Press the calibration check button **2** within one second and release when you are in the mode needed.
- ▶ The meter will display the current temperature setting in the new mode and will wait one more second until shutting off so that you may change the temperature value as described above.

If the meter is in Fahrenheit mode, the letter "F" will display in the left-hand corner. If it is in Celsius mode, no letter will appear in the display.

In the Fahrenheit mode, the temperature will change in increments of 5°F. In Celsius, the temperature will change in increments of either 2°C or 3°C depending on its conversion from Fahrenheit.

In the Fahrenheit mode, the temperature value will display in whole numbers. In the Celsius mode, positive values will display in whole numbers; negative values will display with a decimal point and a "-" sign in the left-hand corner. (i.e.: -17.0)

SET PIN CALIBRATION

The basic factory calibration of the R-2000 is for use with a 2-pin or 4-pin electrode uninsulated pins. The difference in readings between insulated and uninsulated pins is small below 10% moisture content. The difference increases as moisture content increases above 10%. When using an electrode with insulated pins, such as the 26-ES, you can change the calibration to compensate for this difference.

- ▶ To change the pin setting, press and release the species button **3**, then press the calibration check button **2** within one second.
- ▶ The meter will display the current pin calibration as either 222 for insulated or 444 for uninsulated pins.
- ▶ If you continue to hold the calibration check button **2**, the meter will change pin calibration. The new calibration will remain in "memory" until you change it again, or you remove the battery.

CHANGE THE SET-POINT

- ▶ To change the set point press the set-point button **5**. The meter will display the current set-point value for one second.
- ▶ To scroll forward to a higher number, press and release the set-point button **5**. Within one second, press and hold the species button **3** and the set-point value will increase.
- ▶ To scroll backward through the set-point values, press and release the set-point button **5**. Within one second, press and hold the temperature button **4**. Continue to hold the temperature button **4** and the set-point will decrease.
- ▶ When scrolling in either direction, release the button you are holding to stop at your desired set-point.

TO OPERATE THE BACKLIGHT

- ▶ Press and hold the set-point button **5**. The meter will display the set-point and then the backlight will turn on.

You may also activate the backlight with the other four function buttons by pressing the set-point button **5** immediately after pressing one of the buttons.

The backlight remains on as long as the meter is on.

Keep use of the backlight to a minimum to avoid draining the battery.

TAKING A READING

On stock over 6/4 or for hardwoods over 4/4 we recommend using a probe such as the 26-ES ram-type electrode. Mount the 26-ES directly to the external connector **6**. See additional information under the **Pin Talk** section.

- ▶ **To take a reading**, align the contact pins of the external electrode parallel to the grain and push them to their full penetration into the wood, if possible. Insulated pins read only at the tip and can be driven to the desired depth.
- ▶ **Press the read button **1**** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.
- ▶ **To add a reading** to the sum of all the previously stored readings, release the read button **1** within 2 seconds.

INFORMATION ABOUT YOUR READINGS

Readings below 6% will be displayed as a numeric value, (-##.#), and will not be added to accumulation. A reading below 6% which is due to temperature and species adjustments will be shown as a numeric value with no minus sign and this reading will be added to the accumulation.

Readings above 40% are always displayed as 999 and are not added to the accumulation.

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.

When taking and storing readings for a specific wood species, be sure to “clear” the meter before moving on to the next species if you do not want to group all of the readings together.

TO CHECK ACCUMULATED READINGS

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

- ▶ **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 readings** hold the calibration check button **2** for 5 seconds. All accumulated readings will be erased and the meter will display "0".

TO RESET METER

- ▶ Press and release the calibration check button **2**.
- ▶ Within one second press the scale button **3**.
- ▶ The meter will reset itself the default setting of Scale #1 (wood) and 15% set-point, and clear all the readings stored in memory.
- ▶ Resetting the meter will erase any previously stored readings.

PIN TALK

There are two types of contact pins - uninsulated and insulated. When using uninsulated pins, push them in to the wood to their full length, if possible. This will give you the highest measured reading. Insulated pins read only at the tip and can be driven to a desired depth to gather shell and core (gradient) information. Additional types and lengths of both the insulated and uninsulated pins are available for specific applications.

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 contact pins hand tightened.
- ▶ Clean the meter and contact pins with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. Keep cleaner out of the external connector **6**.
- ▶ 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 U.S. Customers outside the U.S. 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 U.S. To pay by credit card, include the card number and expiration date with your repair. We accept Visa/MasterCard, American Express, and Discover.
- ▶ Warranty repairs will be returned at no charge if shipped within the U.S. via UPS 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.
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WARRANTY

Delmhorst Instrument Co., referred to hereafter as Delmhorst, guarantees its R-2000 meter for one year from date of purchase and any optional electrodes against defects in material or workmanship for 90 days. If, within the warranty period, 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 or contact 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 its 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.

For more detailed information about using a wood moisture meter, call us toll-free at 1-800-222-0638. Ask for your free copy of "Measuring Wood Moisture Content: Straight Talk from Delmhorst" .

Or find it on our web site at www.delmhorst.com.

For over 50 years, Delmhorst has been the leading manufacturer of high-quality resistance moisture meters.

Today we offer the innovative KIL-MO-TROL® in-kiln monitoring system, and Loadmaster®, a fully automated weight-based kiln control system for the ultimate in accuracy. We also offer a complete line of portable moisture meters for woodworking/lumber, agriculture, construction and paper.

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