

QuickNav

MOISTURE METER

Owner's Manual

Version 2.01

For Meters starting with Serial # 12545

**Delmhorst Instrument Co.
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GENERAL DESCRIPTION & FEATURES

Thank you for your purchase of Delmhorst Instrument Co's newly designed **QuickNav** handheld moisture meter. The **QuickNav** offers the latest in features and functionality, and is intuitive and easy to operate. We recommend that you read the following pages in detail to take full advantage of all that the **QuickNav** has to offer.

Outstanding Features:

Pin mode

- 6%-60% MC range on wood (Douglas Fir)
- 0.1% - 6% MC range on gypsum/drywall scale

Scan Mode

- 0-300 numerical reference scale

Thermo-hygrometer

- Conforms to ASTM F-2170 standard for concrete testing
- Measures RH over the range of 0-100% (with accuracy of +/- 2% over 10%-90%)
- Measures temperature over the range of -40°F-255°F with accuracy of +/- 1.8°F over -4°F to 158°F (range of -40°C - 124°C with accuracy of +/- 1°C over -20° to 70°C)
- Calculates Dew Point over the range of -40°F - 176°F (-40°C - 80°C)
- Calculates GPP (Grains Per Pound) when in Fahrenheit mode over the range of 0.1-3820 GPP
- Calculates GPK (Grains Per Kilogram) when in Celsius mode over the range of 0.01-545 GPK
- Calculates Vapor Pressure

Other Features:

- Built in back-light makes it easy to read in low-light settings
- Alarm lets you know when your pre-selected moisture threshold is reached
- Hold readings on-screen to make even the most demanding inspection more manageable
- Auto shutoff timer saves battery life
- Rugged construction ensures years of reliable use
- Sturdy plastic carrying case
- 9-V Battery
- 1 year warranty

OPERATING INSTRUCTIONS

-User Guide-

NAVIGATION:

The meter uses an on-screen, menu-driven approach to navigate through the meter features, allowing for an intuitive understanding of keypad functions. Each screen presents the user with a number of selectable options. One of the options is always selected and the user can move (navigate) the selection to any other available option. The keypad is aimed at providing navigational control, and not at accessing specific features. There are four directional keys aligned intuitively around a middle (fifth) key (see Figure 1): Above (UP), below (DOWN), to the right (RIGHT) and to the left (LEFT). The middle key is used to SELECT the option highlighted on the screen. For purposes of this owner's manual, the five keys will be referred to as     and SELECT.

INSTALLING THE BATTERY:

The battery compartment is located on the underside of the case, at the bottom of the handle.

1. Open the battery compartment by sliding the lid back while pressing on the release indent.
2. Ensure correct polarity, and push the battery in flush with the bottom board until the connectors snap together on both sides.
3. Replace the battery compartment lid.

LOW BATTERY:

The meter features a battery status monitor designed to warn the user as well as protect measurement accuracy from impending battery failure conditions. The battery warning is triggered by either continuous or temporary low voltage conditions. Visible (a battery icon on the top right side of the display) and audible (buzzer warble) indicators will appear when these low voltage conditions occur.

Once a permanent low battery condition is detected, all measurement functions are disabled. The battery should be replaced immediately. If the battery reaches critically low levels, the meter will refuse to stay on at power-up. This gradual warning system is intended to provide the user advanced battery status notice and give ample time for replacement before operational limitations occur.

NOTE: *Current meter settings are not lost during battery replacement or low battery conditions.*

TO POWER THE METER ON:

To turn the meter on, press and hold the **SELECT** button for approx. 2 seconds.

The first screen will temporarily display the meter name and the software revision level. Refer to this revision level whenever you call Customer Service.

The next screen is the **MAIN MENU**. Use the ← → ↑ ↓ keys to select the desired function/mode and then press **SELECT** to activate the function.

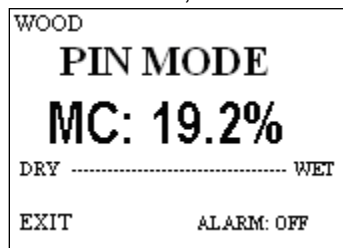


Keypad Layout

METER USE

TO TAKE WOOD READINGS:

1. From the Main Menu, use the ↓ key to highlight **WOOD**. Then, use the **SELECT** key to enter the **WOOD** screen.
2. The meter will display the **WOOD** screen, as shown below:



3. Push the contact pins into material to be tested. Any Delmhorst electrode may also be used in **WOOD** mode by simply attaching it to the connector on top of the meter.

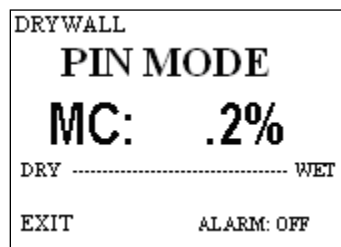
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4. The unit will read %MC on a wood scale between 6% and 60%.
5. To hold a reading on-screen, press the **HOLD (SELECT) KEY**. Press the **HOLD (SELECT) KEY** again to return to measuring mode.
6. Use the $\downarrow$ key to highlight **EXIT**. Then, use the **SELECT** key to return to the **MAIN MENU** when finished.

NOTE: The **QuickNav** is calibrated to give %MC readings on Douglas Fir. If you are taking readings on other species of wood, refer to the species correction table on page 16.

TO TAKE DRYWALL READINGS:

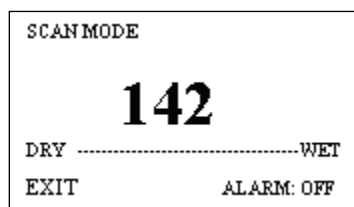
1. **From the Main Menu**, use the $\downarrow$ key to highlight **DRYWALL**. Then, use the **SELECT** key to enter the pin mode.
2. The meter will display the **DRYWALL** screen, as shown below:



3. Push the contact pins into the drywall. Any Delmhorst electrode may also be used in **DRYWALL** mode by simply attaching it to the connector on top of the meter.
4. The unit will read %MC on a drywall scale between .1% and 6%.
5. To hold a reading on-screen, press the **HOLD (SELECT) KEY**. Press the **HOLD (SELECT) KEY** again to return to measuring mode.
6. Use the $\downarrow$ key to highlight **EXIT**. Then, use the **SELECT** key to return to the **MAIN MENU** when finished.

TO TAKE SCAN READINGS:

1. **From the Main Menu**, use the $\uparrow$ $\downarrow$ key to highlight **SCAN**. Then, use the **SELECT** key to enter the **SCAN** mode.
2. The meter will display the **SCAN** screen, as shown below:



3. **You may begin taking readings** by firmly pressing the back of the meter onto the material to be tested. This will display a relative reading that ranges between 0 and 300.
4. To hold a reading on-screen, press the **HOLD (SELECT) KEY**. Press the **HOLD (SELECT) KEY** again to return to measuring mode.

NOTE: The **SCAN** mode will give relative readings only, not %MC. The numbers displayed represent the relative dryness or wetness of the material on a scale of 0 to 300. In order to accurately interpret your readings, first establish a baseline reading by taking a reading in an area you know to be unaffected or dry, then take a reading in the affected or wet area and compare the two readings.

TO TAKE TEMP/RH READINGS:

Before entering the RH-T mode, firmly insert the RH/T-S1 sensor into the top of the meter, making sure to align the pin-out on the DIN connector.

1. **From the Main Menu**, use the $\uparrow$ $\downarrow$ key to highlight **RH-T**. Then, press the **SELECT** key to get into the **RH-T** mode main menu.

The meter will display the main **RH-T** mode main menu, as shown below:

```

RH-TMODE
RH: 37.7%
T: 70.6 F      DEW: 44.2 F
GPP: 43.61     VP : 0.388
EXIT

```

2. **The meter will begin taking readings.**

Note: You may change the temperature mode between °F and °C by highlighting the F° C° in the lower left hand corner of the screen and pressing the SELECT key. When in °F mode, Absolute Humidity will be displayed in GPP. When in °C mode, Absolute Humidity will be displayed in GPK.

TO SET THE ALARM FOR WOOD, DRYWALL, OR SCAN MODE:

1. If you wish to set the alarm to beep after a pre-selected value is reached for **WOOD**, **DRYWALL**, or **SCAN** use the $\uparrow$ $\downarrow$ keys from the **MAIN MENU** screen to highlight the **ALARM**. Press the **SELECT** key to enter the alarm sub menu.
2. **The default status of all alarms is "OFF."** Press the **HOLD (SELECT)** key on the desired alarm to turn it on.

```

ALARM
WOOD:  OFF
DRYWALL: OFF
SCAN:  OFF
EXIT

```

3. After the alarm is turned on, use the $\Rightarrow$ key to increase the alarm value, and the $\Leftarrow$ key to decrease alarm value.
4. After you have selected the alarm value, use the $\Downarrow$ key to highlight **EXIT**. Press the center **HOLD (SELECT)** key to return to **MAIN MENU**.
5. The chosen alarm value will be displayed on the **WOOD**, **DRYWALL**, or **SCAN** mode screen and an audible alarm will sound if that value is reached.

Note: Default alarm settings are: WOOD - 15% DRYWALL – 1%, SCAN - 300.

MAIN MENU OPTIONS:

- **METRIC/IMPERIAL:**

This option will toggle between Imperial units of measure and Metric units of measure when the meter is in RH/T Mode. Pressing **SELECT** key on this option when displayed as **METRIC** will change the units used to **metric**. Pressing the **SELECT** key on this option when displayed as **IMPERIAL** will change the units used to **imperial**.

MAIN MENU	
1. WOOD	5. RH-T
2. DRYWALL	6. IMPERIAL
3. SCAN	7. OFF
4. ALARM	

- **OFF:**

This menu option will power down the meter.

TAKING A READING – PRACTICAL APPLICATIONS

The following application notes are intended for use with the meter in **PIN MODE** except where otherwise indicated.

TESTING WOOD:

The contact pins on the 2-E electrode are best for materials up to approximately 1" in thickness. On materials over 1", we recommend using a probe such as the 26-ES ram-type electrode. Mount the 26-ES directly to the external connector. **To take a reading**, align the contact pins 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.

PAINT FAILURE AND MOISTURE

Moisture is by far the most frequent cause of paint failure. The key to preventing paint failure is to insure that moisture is not absorbed through the wood to the back of the paint film. So, in order to insure quality paint jobs, wood must remain dry after the application of paint.

Outdoor wood can be safely painted without danger of peeling if the %MC is 15% or less. In drier climates, the maximum reading should be 10% to 11%. Indoor wood should be between 7% and 8% prior to painting.

The following conditions may cause high moisture content in wood:

- ⇒ Leaky gutters and down spouts
- ⇒ Leaky pipes or condensation on cold water lines in attic or hollow walls
- ⇒ Faulty flashing around windows, doors and where porch and dormer roofs meet sidings
- ⇒ End-grain wood that is not sealed with paint at all joints around windows, corners, and butt joints
- ⇒ Porch columns that do not have good drainage and ventilation where they rest on porch floors
- ⇒ Siding or any other wood that is in contact with the ground may absorb moisture
- ⇒ Siding and shingles without sufficient lap so that water is forced up through cracks by wind pressure
- ⇒ Ice dams
- ⇒ Condensation of vapor within hollow walls

EIFS (Exterior Insulation & Finish Systems)

Moisture intrusion problems in EIFS (also known as synthetic stucco) stem from leaking window frames, improper use of or lack of sealant, and faulty installation of flashing.

If you suspect a problem take a visual inspection. Look for gaps around windows, doors, air conditioning units, light fixtures, hose bibs, dryer vents and other areas of potential penetration. Also look for visible signs of water damage. If you feel a problem exists, use the **21-E electrode**. This electrode uses the **608 (4") insulated pins** or **608/001 (7") insulated pins**.

Procedure:

- ⇒ **Drill two 1/4" holes** about 3/4" apart at an upward 45° angle.
- ⇒ **Push the 21-E Electrode into the holes** through the polystyrene and into the substrate and read the moisture content on the meter scale. When used on materials other than wood, the meter's **PIN** mode will give relative readings only, not %MC. The numbers displayed

represent the relative dryness or wetness of the material on a scale of 5 to 60. In order to accurately interpret your readings, first establish a baseline reading by taking a reading in an area you know to be unaffected, then take a reading in the affected area and compare the two readings.

MEASURING RELATIVE HUMIDITY IN CONCRETE FLOOR SLABS IN ACCORDANCE WITH ASTM STANDARD F2170:

Select test locations to provide information about moisture distribution across the entire concrete slab, especially areas of potentially high moisture, or if the slab is thick (>4 in.) and air circulation is poor. For slabs on-grade and below-grade, include a test location within 3ft of each exterior wall. Perform minimum three tests for the first 1000 ft sq and at least one additional test for each additional 1000 ft sq.

1. Drill a 5/8" hole to a depth of 40% of the slab thickness using a rotary hammer drill. Use a drill bit specially designed for rotary drills and with 3 or 4 cutting edges to insure a smooth, round hole. Surface preparation is not required.
2. Vacuum the hole thoroughly, then use a wire brush to clean and loosen any concrete remaining in the hole. Vacuum again and repeat the process a second time.
3. Insert the yellow sleeve (sold separately) into the hole. use silicone (or other water-resistant sealant) to seal the interface between the collar of the sleeve and the concrete surface. Use a hammer to insure the sleeve is fully inserted into the hole and sealed to the concrete.
4. Insert the protective yellow cap into the sleeve and let the hole acclimate for 72h.
5. Remove the cap and immediately insert the sensor to full hole depth. Wait a minimum of 1h and then take RH readings by connecting one end of the RH/T-C1 cable to the top of the meter and the other end to the exposed connector on the sensor housing. Check to ensure the meter's displayed RH reading is no longer changing. The reading must not change more than 1% RH over 1 hour. If the reading does change, allow more time for acclimation.
6. Alternately, insert the RH sensor into the sleeve immediately after setting the sleeve. Readings can then be taken as soon as the hole has acclimated.

The complete ASTM document is available at: <http://www.astm.org/Standards/F2170.htm>

TESTING CONCRETE SLABS FOR FLOORING APPLICATIONS

Moisture meters are an effective tool to check moisture in concrete. They can tell you where there may be excess moisture and help determine if you need to conduct further testing.

It is important to test both the surface and mid-section of the slab, especially if the slab is on or below grade. This will help determine if there is continuous moisture migration toward the surface. If this condition exists, the moisture movement may be so slow that once it reaches the surface, moisture evaporates and causes a "dry" reading when a surface test is made.

However, if a sub-surface test is made, the meter may read "wet" indicating the presence of moisture. When the slab is covered and the upward movement of moisture continues, moisture will move into a hygroscopic (wood) floor, or build-up pressure under a non-breathing synthetic floor, causing delamination.

Taking a surface reading:

USING PIN MODE

- **Drive two hardened-steel masonry nails** about 3/4" apart into the finish coat of concrete floor. Drive them about 1/8" deep so they make firm contact with the concrete and do not move when touched.
- **Touch the nails** with the contact pins. Remember that when used on materials other than wood, the meter's **PIN** mode will give relative readings only. Establish a baseline reading by taking a reading in an area you know to be unaffected, then take a reading in the affected area and compare the two readings.

USING SCAN MODE

- First establish a benchmark. Take readings in areas that you know are dry, or acceptable.
- Take readings on areas that are wet. These "dry to wet" readings can be used as reference points against which subsequent readings are compared. Understanding the meter's behavior on a particular material, along with these comparative readings, your experience, and visual clues will all help determine the overall condition. All readings should be evaluated in the light of factors such as type of paint, type of construction, and climatic conditions.

Subsurface test:

- **Drill two 1/4" holes**, 3/4" apart and 1/2" to 2" deep.
- **Drive the masonry nails** into the bottom of the holes and make the tests as described above. Nails must not touch sides of drilled holes.

If the meter still indicates a "dry" condition, the floor is ready for covering. Tests should be made at several points, especially when the slab is thick (4" or more) and air circulation is poor. Make tests only in newly drilled holes.

When evaluating a slab for readiness, always consider its age, thickness, whether the slab is on grade or suspended, whether a vapor barrier is present and the drainage condition of the ground. These characteristics can influence the normal or acceptable moisture reading obtained by this measurement. A control measurement in an unaffected area should be obtained to assist in establishing an appropriate target.

TESTING INSULATION:

To take a reading, attach a 21-E electrode with 4" insulated contact pins to the meter. Push the contact pins through the Drywall into the insulation behind it. Remember that when used on materials other than wood, the meter's **PIN** mode will give relative readings only. Establish a baseline reading by taking a reading in an area you know to be unaffected, then take a reading in the affected area and compare the two readings.

TESTING DRYWALL

USING PIN MODE

To take a reading, set the meter scale for drywall and push the contact pins on the 2-E electrode into their full penetration, if possible.

Press the SELECT button and read the moisture content on the meter scale. The meter displays the %MC for two seconds.

USING SCAN MODE

You can also take a reference reading on drywall using the meter's **SCAN** mode. **To take a reading**, firmly press the back of the meter onto the material to be tested while in **SCAN** mode. This will display a relative reading that ranges between 0 and 300. Remember to establish a baseline reading by taking a reading in an area you know to be unaffected, then take a reading in the affected area and compare the two readings.

CARE OF YOUR METER

- 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. If the meter has been left in a hot or cold environment overnight or for an extended period, the calibration of the pinless mode may be adversely affected. Under these conditions, allow the meter to acclimate to the temperature conditions in which it will be used for minimum of 1–2 hours, or as long as possible.
- Change contact pins as needed. Keep pin retainers 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.
- Remove the battery if the meter will not to be used for one month or longer.

SPECIES CORRECTION TABLE

SPECIES	METER READINGS WITH NON-INSULATED PINS										
	7	8	9	10	12	14	16	18	20	22	24
ALDER	8	9	10	11	13	15	17.5	19.5	21.5	24	27
APITONG	8	9	10	11	13	15	17	20	22	24	27
ASPEN	7	8	9	10	11.5	13	15	16.5	18	20	21
ASH, WHITE	6.5	7.5	8	9	11	13	14.5	16	18	19.5	21
BASSWOOD	7	8	8	9	10.5	13	15	17	19	20.5	22
BIRCH	8	9	10	11	13	15	17	19	21.5	23.5	25.5
CEDAR, EAST. RED	8	9.5	10.5	12	14	17	19	21	23	25	26
CEDAR, INCENSE	7	8	9.5	10.5	12.5	15	17	19	21	23	25
CHERRY	8	9	10	11	13.5	15.5	18	20	22	24	26
COTTONWOOD	6	7.5	8.5	9.5	12	14	15	17	19.5	21	23
CYPRESS	7	8	9	10	12	14	16	18	19.5	21.5	23.5
ELM, AMERICAN	7	7.5	8	8.5	10	11.5	13	15	16	18	19
FIR, DOUGLAS	7	8	9	10	12	14	16	18	20	22	24
FIR, RED	7	8	9	10	12.5	15	17	19	21	23	25
FIR, WHITE	8	9	9.5	10.5	12.5	15	17	19	21	23	25
GUM, BLACK	7.5	9	10	11	13	15	16	18	19	20.5	22
GUM, RED	7	8	9	10	12.5	14.5	16.5	19	20.5	22.5	24
HEMLOCK, WESTERN	7	8	9	10.5	13	15	17	19	20.5	22	23.5
HACKBERRY	7	8.5	9	9.5	12	13	15	17	18.5	20	22
HICKORY	8	8.5	9	10	11	12.5	14	15.5	17	19	20.5
KERUING	8	9	10	11	13	15	17	20	22	24	27
LARCH	7.5	9	10	11	13	15	17	19	21	23	25.5
MAGNOLIA	7.5	9	10	11.5	14	16	17.5	19	21	22.5	24.5
MAHOGANY, AFRICAN (ALSO KHAYA)	8	9.5	10.5	12	15	17	19.5	22	24	26	28
MAHOGANY, HOND.	7	8	9	10.5	12.5	14.5	16	18	19.5	21.5	22.5
MAHOGANY, PHIL.	6	7	7.5	8	9.5	11	13	14	15.5	17	18
MAPLE, HARD/SOFT	8	9	9.5	10	12	14	16	18	20	22.5	25
MERANTI, DARK RED	8.5	9.5	10.5	11.5	12.5	16	18	20.5	22.5	24.5	26.5
OAK, RED	7	8	9	10	12	14	16	18	20	22	24
OAK, WHITE	7	8	8.5	9.5	11.5	13.5	15	17	18.5	20	22
PECAN	6.5	8	9.5	11	12.5	14	16	17.5	19	22	24
PINE, LONGLEAF	8	8.5	10	11	13	15.5	17.5	19.5	21	23	25
PINE, PONDEROSA	7.5	8.5	10	11	13.5	15.5	17.5	19.5	21	23	25.5
PINE, SHORTLEAF	7.5	9	10	11	13	15.5	17.5	19.5	21.5	23.5	25
PINE, SO. YELLOW*	8	9.5	10.5	12	14.5	16.5	19	21	23	25	28
PINE, SUGAR	7	8	9	10	12	15	17	19	21	23	25
PINE, WHITE	7	8	9	10	13	15	17	19	21	23	25.5

SPECIES	METER READINGS WITH NON-INSULATED PINS										
	7	8	9	10	12	14	16	18	20	22	24
POPLAR, YELLOW	8	8.5	10	11	13	15.5	17.5	19.5	22	24	26
RAMIN	7	8	9	10	11	13	15	16	18	20	21
SPECIES	7	8	9	10	12	14	16	18	20	22	24
RADIATA PINE	10	11	11	12	14	16	18	20	23	25	27
REDWOOD	7	8	9	10	12	13.5	15	17	19	22	24
SPRUCE, SITKA	7	8	9	10	12.5	14.5	17	19	21	23.5	26
SPF**	9	10	11.5	13	15.5	18	20.5	23	25	28	30
SPF/COFI	8	9	10	11	13	15	17	19	21	23	25

TEAK	7	8	8.5	9	11	12	14	15	17	18.5	20
VIROLA	6.5	7	8	9	11	12.5	14	16	18	18.5	20.5
WALNUT, BLACK	7.5	8.5	9.5	10.5	12.5	14.5	16	18	20	22	23.5

The species correction values shown in this chart have been rounded for easy reference.

*Meter readings taken with 26-E 2-pin electrode. Do not apply 2-pin correction.

**SPF correction based on 2-pin 26-E reading with insulated pins. It is based on USDA/Forintek data and can be used for the following species:

Lodgepole Pine
Alpine Fir