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# NAVPRO

## BUILDING MATERIALS MOISTURE METER OPERATION MANUAL



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# GENERAL DESCRIPTION/FEATURES

Thank you for your purchase of Delmhorst Instrument's **Navigator Pro** handheld moisture meter / thermo-hygrometer. **Navigator Pro** has been developed specifically with the restoration contractor in mind. It provides the user with a host of data acquisition capabilities, and offers the latest in features and functionality. Even with its wide range of functions, **Navigator Pro** is intuitive and easy to operate. We recommend that you read the following pages in detail to take full advantage of all that **Navigator Pro** has to offer.

## Outstanding Features:

- **Pin mode**
  - 5%-60% wood scale (Douglas Fir)  
Species corrections for SPF, Oak, Maple, Birch, Plywood, OSB and Particleboard
  - Temperature correction over the range of 0-255° F/-18-124°C
  - 0.1% - 6% Sheetrock® scale
  - 0-100 numerical reference scale for non-wood building materials, including Plaster and Concrete
  
- **Scan Mode**
  - 0-300 numerical reference scale
  
- **Thermo-hygrometer (RH/T-S1 sensor included)**
  - 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 158F (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 Celcius mode over the range of 0.01-545 GPK
  - Conforms to ASTM-F-2170 for in-situ concrete slab testing (RH/T-S3 sensor required)
  
- **General Features:**
  - Connector for external Electrodes
  - On-screen reading recall of stored readings
  - Date and time stamp for each stored reading
  - Set up to 5 job groupings with room and location definition
  - Optional infrared linking capability w/ application software
  - 9V battery
  - 1-year warranty
  - Carrying Case

# OPERATING INSTRUCTIONS

## -User Guide-

This guide provides step-by-step instructions on powering up, using and powering down the meter.

### **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.



Fig. 1 Keypad Layout

## 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.

### IMPORTANT NOTE:

**DO NOT REMOVE THE BATTERY WITHOUT TURNING THE METER OFF FIRST. BATTERY REMOVAL WHILE THE METER IS ON MAY CAUSE LOSS OF STORED READINGS AND MAY CORRUPT THE STORAGE MEMORY. IF THIS OCCURS, CERTAIN FUNCTIONS (SUCH AS STATISTICS, READING RECALL, ETC) WILL FAIL AND LOCK UP THE METER.**

*If the battery is removed by accident while the meter is ON, and if the readings already stored are important, DO NOT store additional readings. Turn the meter back on and perform a PC download. Beware that any readings stored during the power cycle that included the battery removal WILL NOT be available and CANNOT be recovered. Once the download is complete, perform a meter reset by choosing "RESTORE DEFAULTS" in the Storage Menu. If a download is not necessary, go directly to "RESTORE DEFAULTS".*

## 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 accompany a battery warning.

Once a permanent low battery condition is detected, all measurement functions are disabled. Enough power remains for other menu functions, including a PC download, although almost any user action at this time causes a low-battery warning to be generated. The battery should be replaced immediately. If the battery reaches critical 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:** *Stored readings are not lost during battery replacement or low battery conditions. Current meter settings are maintained as well.*

## 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 ← → ↑ ↓ keys to select the desired function/mode and then press **SELECT** to activate the function.

## METER USE

### BASIC AND ENHANCED MODES:

**Navigator Pro may be used as a BASIC meter**, which allows the user to begin taking readings in either the scan mode or pin mode, without having to set up a job definition. **BASIC** mode does not allow for data collection and is the default mode of the meter upon power up.

Or, **Navigator Pro may be used in ENHANCED mode**, which requires the user to set job definitions and materials for each location within a job. The meter also stores each reading in **ENHANCED** mode to allow for on screen reading recall or download to a PC.

### USING THE METER IN BASIC MODE:

Navigator Pro is shipped from the factory set to BASIC mode. Use this option if you wish to use the meter for scan or pin readings without having to set up a job.

Although Basic Mode does not allow for data acquisition, it does allow the user to set the type of material being tested, and set the alarm to sound if a pre-established %MC is exceeded.

BASIC MENU	
1. SCAN MODE	4. ENHANCED
2. PIN MODE	5. DEFAULTS
3. RH-T MODE	6. OFF

### TO TAKE PIN READINGS IN BASIC MODE:

1. From the **BASIC Main Menu**, use the ↓ key to highlight **PIN MODE**. Then, use the **SELECT** key to enter the pin mode.
2. The meter will display the main %MC **READ** screen, as shown below:

MC: 23.4 %	
DRY-----WET	
OAK	T: 70F
ALARM: OFF	EXIT

3. Use the ↓ key to highlight the default material (Oak) if you wish to change it to a different material. Press the **SELECT** key to get into the **SELECT MATERIAL** sub menu.

SELECT MATERIAL	
SHEETROCK	PLASTER
SPF	OAK
MAPLE	BIRCH
PLYWOOD	OSB
PARTICLE	CONCRETE
DOUGFIR	GYPCRETE

4. Use the  $\uparrow$   $\downarrow$  keys to highlight the material you are testing. Press the **SELECT** key to choose that material. This will bring you back to the main **%MC READ** screen.

You may begin taking readings by inserting the pins into the material and pressing the **SELECT** key. This will display a %MC reading. If you wish to hold a reading on screen, press the **SELECT** key again; otherwise remove the pins from the material being tested and take another reading.

### TO SET THE ALARM IN BASIC PIN MODE:

1. If you wish to set the alarm to beep after a pre-selected %MC value is reached, use the  $\uparrow$   $\downarrow$  keys from the %MC screen to highlight the **ALARM**. Press the **SELECT** key to enter the alarm sub menu.
2. The default status of the alarm is “OFF.” Press the **SELECT** key to turn it on.

ALARM:	OFF
DONE	

3. After the alarm is turned on, use the  $\leftarrow$   $\rightarrow$  keys to scroll up or down to a higher or lower alarm value.
4. After you have selected the alarm value, use the  $\downarrow$  key to highlight **DONE**. Press **SELECT** to get back to the **%MC READ** screen.

### Default alarm settings in pin mode are as follows for different materials:

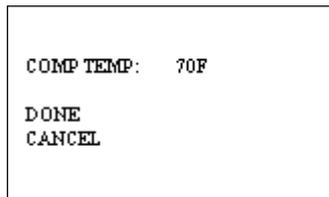
All wood materials:	12%
Sheetrock/Gypcrete:	1.0%
Plaster:	68 (on the 0-100 relative scale)
Concrete:	68 (on the 0-100 relative scale)

**Note: The default alarm setting in scan mode is 300.**

## TO CHANGE THE TEMPERATURE CORRECTION:

Navigator Pro 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.

1. **To change temperature**, use the ⇐ ⇒ keys from the %MC READ screen to highlight the **TEMPERATURE, T: 70°F**. Press the **SELECT** button to get into the **TEMPERATURE** sub menu.

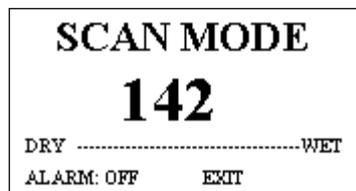


2. **To scroll through the temperature settings**, use the ⇐ ⇒ keys to scroll up or down to a higher or lower temperature value. Temperature values will change in 5°F increments.
3. **To change between °C and °F** press **SELECT** key when the **COMP TEMP** is highlighted.
4. **After you have selected the appropriate** temperature setting, use the ↓ key to highlight **DONE**. This will bring you back to the %MC READ screen and you may begin taking readings.

## TO TAKE SCAN READINGS IN BASIC MODE:

1. **From the BASIC Main Menu**, use the ↑ ↓ key to highlight **SCAN MODE**. Then, use the **SELECT** key to get into the **SCAN** mode main menu.

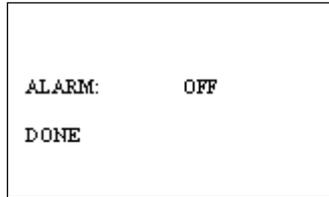
The meter will display the main **SCAN** mode main menu, as shown below:



2. **You may begin taking readings** by firmly pressing the back of the meter onto the material. This will display a relative reading that ranges between 0 and 300. If you wish to hold a reading on screen, press the **SELECT** key; otherwise move the meter to another area to take continued readings.

## TO SET THE ALARM IN BASIC SCAN MODE:

1. **If you wish to set the alarm** to beep after a pre-selected relative value is reached, use the  $\uparrow$   $\downarrow$  keys from the **SCAN** screen to highlight the **ALARM**. Press the **SELECT** key to enter the alarm sub menu.



2. **The default status of the alarm is “OFF.”** Press the **SELECT** key to turn it on.
3. **After the alarm is turned on,** use the  $\leftarrow$   $\rightarrow$  keys to scroll up or down to a higher or lower alarm value.
4. **After you have selected the alarm value,** use the  $\downarrow$  key to highlight **DONE**. Press **SELECT** to get back to the %MC **SCAN** screen.

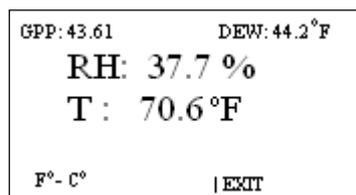
**Note: Default alarm setting for SCAN mode is 300.**

## TO TAKE TEMP/RH READINGS IN BASIC MODE:

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 BASIC Main Menu,** use the  $\uparrow$   $\downarrow$  key to highlight **RH-T MODE**. 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:



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 RESET THE METER TO DEFAULT SETTINGS IN BASIC MODE:

1. Use the ← ⇒ keys from the **BASIC** main menu to highlight #5: **DEFAULTS**. Press the **SELECT** key. The meter will display the following question:

```
SETTINGS WILL BE
DELETED
CONTINUE?
YES           NO
```

2. Use the ← ⇒ keys to answer “**YES**” or “**NO**.” If you answer “yes,” the meter will return to factory default settings in basic mode; i.e. Species = Oak, Temperature correction = 70° F, Alarm = OFF in pin mode. In Scan mode, Alarm = OFF.

## USING THE METER IN ENHANCED MODE:

To use Navigator Pro in enhanced mode, use the ↑ ↓ keys to highlight #4: **ENHANCED**. The Main Menu in ENHANCED mode is as follows:

```
TUE-10.12.04   9:28
MAIN MENU
1. SCAN MODE   6. JOB DEF
2. PIN MODE    7. IRLINK
3. RH-T MODE   8. BASIC
4. SETUP       9. OFF
5. STORAGE
```

Setting the meter to enhanced mode requires you to create job definitions and store readings as described below.

**NOTE:** Although Navigator Pro’s default mode is **BASIC**, it will remember the mode last saved at power off, and will remain in the saved mode at next power up.

**Settings stored in each particular mode will not be affected by restoring defaults in a different mode.**

### JOB DEFINITION:

Using Navigator Pro in **ENHANCED** mode allows you to define up to 5 jobs, and select locations and materials being tested for each location. In this mode, Navigator Pro also stores each reading and allows you to download the data to a PC or laptop via Infrared connection.

### TO CREATE OR MODIFY A JOB:

1. From the **Enhanced Main Menu**, use the ← ⇒ keys to highlight **JOB DEF**.
2. Select a job number (from 1 to 5), using the ← ⇒ keys.

```
JOB: 2
DONE
CANCEL
```

3. Press the ↓ key and highlight **DONE**. Press **SELECT**.

If the job was previously defined and used, you will be asked if you want to “Update” the job.

```
JOB 1 IN USE
UPDATE DATA?
YES          NO
```

4. Select **YES** if you want new measurements stored under the same job number.

If it is a new job, the next screen will allow you to completely define the job.

```
CREATE JOB 3
JOB TYPE: COMMERCIAL
ID: 245
T: 70 F
LOC DEF
DONE
CANCEL
```

**To define a job means** to choose between residential or commercial, allocate a 3 digit job ID number, specify the temperature at which measurements will be taken, select from a list of each of the rooms in which measurements will be taken, and select the materials used for each location.

### TO CHOOSE BETWEEN RESIDENTIAL AND COMMERCIAL:

Highlight the word **COMMERCIAL** and press the **SELECT** key. The following screen will appear:

```
JOB TYPE: COMMERCIAL
DONE
```

Use the ⇐ ⇒ keys to toggle between residential and commercial. After you have made your selection, highlight **DONE** and press **SELECT**.

Please refer to Appendix A for a list of location definitions for residential jobs.

## TO SET THE ID NUMBER:

From the “Create Job” screen, the ID field will display the last selected ID number. Press **SELECT** on “ID” to enter the ID screen

```
ID: 002
DONE
CANCEL
```

Select any number between 0 and 999 as the ID of your job, using the ⇐ ⇒ keys. Press the **SELECT** key after choosing the ID#.

## TO SET TEMPERATURE CORRECTION:

Navigator Pro 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.

1. **To change the temperature**, use the ↑ ↓ keys from the **CREATE JOB** sub menu to highlight the temperature, T: 70°F.
2. **Press the SELECT key** to enter the **COMP TEMP** sub menu.
3. **Using the ⇐ ⇒ keys**, scroll up or down to a higher or lower temperature value. Temperature values will change in 5° F increments.
4. **To change between C and F**, press the **SELECT** key when the **COMP TEMP** is highlighted.

```
COMP TEMP: 70F
DONE
CANCEL
```

## TO DEFINE ROOM LOCATION AND MATERIAL DESIGNATION:

1. Using the ↑ ↓ keys on the **CREATE JOB** sub menu, highlight **LOC DEF** and press the **SELECT** key.
2. Use the ↑ ↓ keys to choose different rooms and the ⇐ ⇒ keys to switch between **YES** and **NO** options. **YES** means measurements will be taken in that room. **NO** means that you are not going to test in that room. Residential jobs show a list of 32 rooms as listed below:

```
LR      YES
DR      NO
KIT     NO
E       YES
RE      YES
BATH1   NO
BATH2   YES
BACK    NEXT
```

Commercial jobs show a list of 32 numerical locations as listed below:

1	YES
2	NO
3	NO
4	YES
5	YES
6	NO
7	YES
BACK	NEXT

3. With **NEXT** and **BACK** you will be able to scroll five pages of room listings. **APPENDIX A** contains the list of all available rooms and the abbreviation used for each of them. To save your settings, use ↓ key to highlight **DONE** and press the **SELECT** key.

**Note:** In order to move more quickly through the five pages of room listings, you may use the ↑ key when the cursor is at the top of a page to bring you down to the bottom of the next page. By doing this and then using the ⇒ key to highlight **NEXT** you will scroll through the pages more quickly.

Each room will have up to three **AREAS** for measurements: **FLOOR**, **WALLS** and **CEILING**. If you choose **YES** for a room you may now select the material used for each location.

1. Press the **SELECT** key while the cursor highlights that room and the **SELECT MATERIAL** menu will be displayed.
2. Using the ⇐ ⇒ keys, select the material or species for that particular room.

SELECT MATERIAL:	
FLOOR	OAK
WALL	SHEETROCK
CEILING	SHEETROCK
DONE	

**Note:** The default selection is **OAK** for the floor and **SHEETROCK** for the wall and ceiling. If you are not going to test one of the materials in a room, use the ⇐ ⇒ keys until the word **NONE** is displayed. This will turn off the ability to read that particular area in a room.

3. After you have selected each material in a room, highlight **DONE** press the **SELECT** key so that your selections will be saved. This will bring you back to the list of available rooms. Continue the same procedure as above for each room that you are testing.

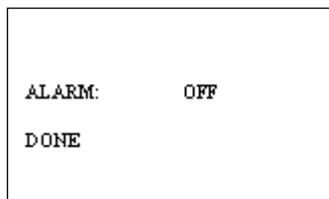
Available materials are: Sheetrock®, Plaster, Gypcrete, Concrete, SPF, Oak, Maple, Birch, Plywood, OSB, Particleboard , Douglas Fir. Select **NONE** if you are not testing that location.

4. After you have scrolled through all five room pages, select **DONE** if satisfied with your selections. This will take you back to the **CREATE JOB** sub menu.
5. Press **DONE** to save the job. This will bring you back to the main menu.

## TO TAKE SCAN READINGS IN ENHANCED MODE

### TO SET THE ALARM IN ENHANCED SCAN MODE:

1. If you wish to set the alarm to beep after a pre-selected relative value is reached, highlight option #1: **SCAN MODE** from the **ENHANCED** main menu. If you have already set up a job, this will bring you to the **SCAN** screen. If you have not set up a job, the meter will prompt you to create one and then will return to the **MAIN MENU**, at which point you may select #1: **SCAN MODE**.
2. Use the ↓ and ⇒ keys and highlight **ALARM: OFF**. Press the **SELECT** key to enter the alarm sub menu.
3. The default status of the alarm is “OFF.” Press the **SELECT** key to turn it on.



4. After the alarm is turned on, use the ⇐ ⇒ keys to scroll up or down to a higher or lower alarm value.
5. After you have selected the alarm value, use the ↓ key to highlight **DONE**. Press **SELECT** to get back to the **SCAN** screen.

**NOTE:** Default alarm setting for **SCAN** mode is **300**.

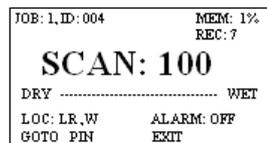
### TO TAKE A SCAN READING:

1. In the **MAIN Menu**, highlight option #1: **SCAN MODE**

If you have already set up a job, this will bring you to the **SCAN** screen. If you have not set up a job, the meter will prompt you to create one and then will return to the **MAIN MENU**, at which point you may select #1: **SCAN MODE**.

This screen contains the following information: Job # and ID, current location (LOC), number of records (REC) for the current room, and memory used (MEM).

Rooms are ordered as in **APPENDIX A**, Floor (F), Wall (W), and then Ceiling (C). Only locations for which a material was chosen can be selected for measurements.



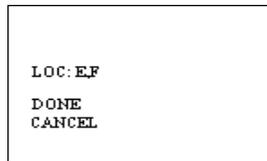
2. You may begin taking readings by firmly pressing the back of the meter onto the material.
3. This will display a relative reading that ranges between 0 and 300. Once you are satisfied with the value indicated for the selected location, press the **SELECT** key to store a reading.

4. **You will notice the word HOLD** in the right hand side of the screen. If you press the **SELECT** key again the meter will store that reading and automatically increment to the next defined location. (Example: LR, F then LR, W, then LR, C.)

If no storage is desired for this location, manually select a different location by doing the following:

1. Use the **↑ ↓** keys to highlight **LOC**. Press **SELECT** to get into the **LOCATION** definition sub menu.
2. Use the **← ⇒** keys to change the location.

**Note: You can only scroll through the pre-defined locations and areas as described above.**

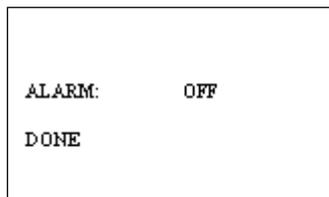


3. Select **DONE** to save your new location; **CANCEL** to leave the previous location.

## TO TAKE PIN READINGS IN ENHANCED MODE

### TO SET THE ALARM IN ENHANCED PIN MODE:

1. If you wish to set the alarm to beep after a pre-selected value is reached, use the **↓** key from the **ENHANCED** main menu, highlight Option #4: **SET UP**. Press the **SELECT** key to enter the **SET UP** sub menu.
2. Use the **↓** key and highlight **6: SET PIN MODE ALARM**. You will see a selection of materials to choose from. Highlight the desired material and press the **SELECT** key.



3. **The default status of the alarm is OFF.** Press the **SELECT** key to turn it on.
4. **After the alarm is turned on, use the ← ⇒** keys to scroll up or down to a higher or lower alarm value.
5. **After you have selected the alarm value, use the ↓** key to highlight **DONE**. Press **SELECT** to get back to the **SET ALARM** sub menu.

From here, you may continue to set the alarm value for other materials as described above, or you may scroll to **DONE** to get back to the **MAIN** menu.

**Default alarm settings in PIN mode are as follows for different materials:**

All wood materials:	12%
Sheetrock/Gypcrete:	1.0%
Plaster:	68 (on the 0-100 relative scale)
Concrete:	68 (on the 0-100 relative scale)

**Note: Default alarm setting for SCAN mode is 300.**

## TO TAKE A PIN READING:

1. **From the Enhanced Main Menu**, use the ↑ ↓ keys to highlight #2, **PIN MODE**. If you are already in the **ENHANCED SCAN** screen, use the ↑ ↓ keys to highlight **GOTO PIN**.
2. **Press the SELECT key to get into the ENHANCED READ screen**. The current location will stay the same while toggling between scan and pin modes.

JOB:1, ID:004	MEM: 1%
OAK	REC: 7
<b>MC: 19.2%</b>	
DRY -----WET	
LOC: EF	! T: 70F
GOTO SCAN	EXIT

This screen contains the following information: Job # and ID, current location (LOC), material, the number of records for the current room (REC), and memory used (MEM).

3. **Using the external probe, insert the pins into the material**, press the **SELECT** key and the meter will start taking measurements. Press **SELECT** again to store the measurement. The meter will display **HOLD**. Once you have stored a reading, the meter will automatically increment to the next available location. Remove the pins from the material, press **SELECT**, and move to the next defined location as indicated on the display.

At any time, you may modify Temperature (T), location (LOC), or switch to **SCAN** mode (**GOTO SCAN**).

The **EXIT** option in both **SCAN** and **PIN MODE** menus will cancel the measurement process and will put the meter in the **MAIN MENU**.

## TO TAKE TEMP/RH READINGS IN ENHANCED MODE:

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 **ENHANCED Main Menu**, use the  $\uparrow$   $\downarrow$  key to highlight **RH-T MODE**. 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:

```
JOB:1, ID:004          MEM: 1%
                    REC: 7
  RH: 37.7 %
  T : 70.6 F
GPP: 43.61          DEW: 44.2
ROOM: LR           |EXIT
```

2. The meter will begin taking readings.

## MAIN MENU OPTIONS:

### STORAGE:

1. While in the **ENHANCED** main menu, use the  $\uparrow$   $\downarrow$  keys to highlight option #5 **STORAGE**.
2. Press the **SELECT** key to enter the storage sub menu. There are three available selections in this menu:
  - **STORED READINGS** – choose either Pin readings or Scan readings.

```
SHOW PIN READINGS
SHOW SCAN READINGS
SHOW RH-T READINGS
CANCEL
```

1. By using the  $\leftarrow$   $\rightarrow$  keys you may select which job and location you wish to view. After you have made your selection, scroll to **DONE** and press the **SELECT** key. Below are three examples of possible screens at this point:

JOB: 3	JOB: 3	JOB: 3
ROOM: E	ROOM: BATH2	
READINGS: 2	NO READINGS	NO READINGS
VIEWSET: 1 - 2		
DONE	CANCEL	CANCEL
CANCEL		

3. A complete record of information per reading will be displayed. You will be able to scroll through each reading in a room, using the **NEXT** key.

```
JOB: 1,LOC:EF
RECORD: 1 OF 3

MC: 21.4%
OAK AT 70F
10.12.04 10:33AM
NEXT
DONE
```

- **CLEAR MEMORY:**  
This option will delete all the readings stored in the meter, but will keep the defined job structures and associated locations and areas in tact.

- **RESTORE DEFAULTS:**  
This will delete all defined parameters and readings stored in the meter. The meter will be now set to the factory parameters: T = 70°F, Non-insulated probe, Backlight = OFF, Power-off time = 2 min.

**Note: Memory deletion and restoring defaults are both irreversible.**

- **EXIT:**  
This menu option returns the meter to **MAIN MENU**.

## IR LINK:

This menu option initiates a wireless communication session during which the currently stored readings will be downloaded to a PC. Before using this feature, the target PC must be loaded with Delmhorst's Universal Application Program and a Delmhorst base unit must be connected to an available USB port.

## REQUIREMENTS:

The wireless communication technology employed in the meter requires line-of-sight access between the red side window of the meter and the receiving window of the base unit. Simply place the meter and base unit on a flat surface, with the red side window of the meter facing the receiving window of the base unit. Separation requirements between the meter and base unit are anywhere from 0 to 12 inches.

## OPERATION:

1. **Begin by starting the Delmhorst Instrument Co. Universal Application Program** (double click the application icon or choose the program from the Start Menu).
2. **Once the Navigator Pro and base unit** are lined up and the base unit is connected to a USB port (a green LED should be lit), select the **IR LINK** option in the Main Menu. The meter will display the message **"Linking..."** for a few seconds, followed by **"Link OK"** when successful communication is established with the base unit. The base unit will also indicate communication established by turning off the green LED and turning on a red LED.
3. **Press the "MANAGE DATA" button in the Delmhorst Instrument Co. Universal Application Program.** The meter will display **"Data"** on the screen and the base unit will alternately turn on a yellow and red LED while data transfer takes place (red indicates communication between the meter and Base Unit, while yellow indicates communication between the base unit and the PC). When finished, the meter will return to the Main Menu and the base unit will, once again, turn on its green LED. For further details on managing the meter data in the PC please refer to the HELP feature in the program.

**NOTE:** The above sequence of events in initiating communication between the PC and the meter is not mandatory. The Application Program may be started first, or the IR Link may be selected first. The **MANAGE DATA** button may also be pressed before communication is started between the Base Unit and the meter. The meter, base unit and Application Program all have ample delays built in to allow the other link components to come online in any sequence.

## TROUBLESHOOTING THE IR LINK:

Most problems tend to occur due to the positioning of the meter relative to the base unit. There are a few error messages that may appear on the meter's screen:

- a. **Timeout:** This error message occurs when too much time has passed between data sent by the meter and the response that should have been received from the base unit. Possible causes:
  - Meter misalignment with the Base Unit (make sure the communication windows are facing each other, within the distance indicated).
  - No connection to the PC. The Base Unit must be connected to the PC through a USB cable. Check connection.
- b. **KBD:** This message occurs when the user presses a key during communications. Do not push any key on the meter during data transfer. The meter interprets this as a request to escape this activity and returns to the Main Menu. The base unit should return to a green

LED status in a few seconds. A message should appear on the PC screen as well, indicating lost communications.

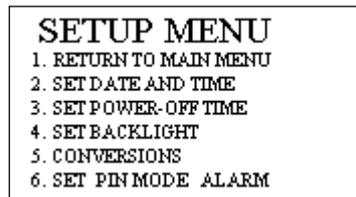
- c. **Sync:** This message occurs when data framing is lost during data transmission. This would only happen if the wireless link becomes unreliable. Ensure the meter and base unit are aligned and restart the session.
- d. **Data E:** This message occurs when the content of a correctly framed data packet is invalid. Again, this is an unreliable wireless link problem.

**NOTE:** Individual records cannot be downloaded to the PC. The entire storage content is delivered to the PC during a link session.

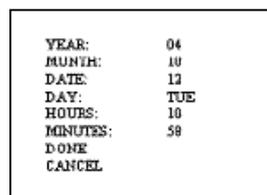
## SETUP MENU:

The Setup group of features allows access to the configurable parameters of the meter. They are: Date and Time, Power-off time, Backlight, Conversions (temperature mode and electrode type) and Pin Mode Alarm. All can only be accessed in the Setup Menu. **To get to the Setup Menu, use the ↑ ↓ keys to highlight option #4: SETUP.**

## SETUP MENU ENTRY DESCRIPTIONS:



- **Return to Main Menu:** This menu option returns the meter to Main Menu. The meter also returns to Main Menu if no user input is detected for 20 seconds.
- **Set Date and Time:** This menu option allows user access to the date and time set screen:



The Date and Time set screen is populated with the time and date values present in the meter at access time. ↑ ↓ key action switches the row selection among available parameters. ← → key action changes the selected parameter's value. All parameter values are incremented using the → key and decremented using the ← key. The DAY parameter moves forward through weekdays using the → key and backward using the ← key. The **SELECT** (center) key is only active when menu selection is applied to **HOURS, DONE** or **CANCEL**. Selecting **DONE** exits this screen back to the **SETUP MENU** and updates the clock with the newly chosen values. Selecting **CANCEL** exits this screen back to the **SETUP MENU** without updating the clock.

- **Set Power Off time:** This menu option allows the user to change the amount of time allowed to lapse between the last key press and meter shut-down. Allowable range is 1min – 9min, with a default value of 2min.

```
TIMEOUT:      02 MIN
DONE
CANCEL
```

- **Set Backlight:** This menu option allows the user to change the amount of time allowed to lapse between the last key press and backlight shutdown. The default setting for this feature is **NO**, where the backlight is completely disabled. Backlight shutdown delays are 10, 20, 30 seconds. It is recommended that the backlight delay be set to the minimum amount of time necessary in order to maximize battery life.

```
BACKLIGHT:    10 SEC
DONE
CANCEL
```

- **Conversions:** This menu option allows the user to change the temperature scale from Fahrenheit (default) to Celsius. You can also change the electrode type from 4-pin (or non-insulated) or 2-pin (insulated.)

**NOTE:** Except for clock settings, all other parameters will return to their default values, as indicated above, when the **RESTORE DEFAULTS** option is selected in the Storage Menu. The values chosen for the Setup Menu parameters will remain in effect even if the meter is turned off, and even if the battery is removed.

- **SET PIN MODE ALARM**

Refer to procedure on page 16.

## TAKING A READING – PRACTICAL APPLICATIONS

The following application notes are intended for use with the meter in PIN MODE.

### TESTING WOOD:

Mount the 26-ES directly to the external connector.

- ⇒ **Set the meter's parameters** as described previously in the owners' manual. If the species (construction-grade only) is unknown, set the meter to the reference calibration, Douglas Fir and take the readings at face value.
- ⇒ **To take a reading**, align the contact pins parallel to the grain and drive them to the desired depth. Insulated pins read only at the tip.
- ⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the %MC for two seconds.

#### NOTE: MC RANGE AND VALID READINGS

Readings below 5% or above 60% are displayed as LOW or HIGH, respectively. However, since the resistance of the wood also depends on the species and temperature of the wood, the meter may not always be able to read down to 5%. For different species and different wood temperatures, there is a minimum %MC limit below that the meter can not read. All readings below this "lowest limit" are displayed as LOW, and are not stored. These readings are not considered valid readings and are not used by the meter in any statistical calculations.

### USING 0-100 NUMERICAL REFERENCE SCALE (REL 0-100)

When taking a reading on hard materials such as concrete or masonry, set the meter to REL 0-100 for a **qualitative** indication of the moisture level.

Make the best use of reference scale by first establishing a benchmark for the material you are testing. Take readings in areas that you know are dry, or acceptable. Then 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.

The user-selectable alarm will sound if the displayed reading is above the alarm value.

## TESTING CONCRETE SLABS:

Moisture meters are an effective tool to check comparative moisture conditions in concrete. They can tell you where there may be excess moisture and help determine if you need to conduct further testing, and identify specific areas on which that testing should be performed. Meters do not provide quantitative results as a basis for acceptance of a slab for installation of moisture-sensitive flooring systems. ASTM Test Method F2170 (RH using in situ probes), F1869 (calcium chloride), and F2420 (RH on surface using insulated hood) provide quantitative information for determining if moisture levels are within specific limits.

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:

**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 touch

- **Touch the nails** with the electrode's contact pins.
- **Press the select key** and read the meter, set to 'concrete'. If the meter reads less than "68", the surface is dry. However, sub-surface tests should be made to verify if the slab is dry throughout.

### 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.

Even readings in the "wet" range can indicate relatively low moisture content in Concrete. For example, readings in the "68 to 77" range indicate approximately 2% to 4% moisture content.

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.

## MEASURING RH IN CONCRETE SLABS IN ACCORDANCE WITH ASTM F-2170:

Navigator Pro can be used to measure the RH in a concrete slab in accordance with the ASTM F-2170 Standard Test Method for Determining Relative Humidity in Concrete Floor Slabs.

### Basic Test Procedure:

- ⇒ Drill 5/8-inch hole in concrete to the appropriate depth and remove debris from the holes. Insert a CS-2 concrete sleeve into the hole and plug the sleeve with the cap that is provided with each sleeve.
- ⇒ Wait approximately 72 hours.
- ⇒ Remove protective cap from the concrete sleeve and insert the RH/T-S3 humidity sensor into the hole. Wait approximately 1hr to allow the sensor to acclimate to the RH in the hole.
- ⇒ Connect one end of the RH/T-C1 cable to the top of meter and the other end to the exposed end of the sensor. Take a RH reading using the RH/TEMP mode of Navigator Pro as described on pages 10 and 17. This reading is the RH of the concrete slab.

For a complete explanation of the ASTM F2170- standard, please visit [www.ASTM.org](http://www.ASTM.org) or contact Delmhorst Europe.

### TESTING INSULATION:

- ⇒ **Set the meter scale** for PLASTER as described in the Create/Modify a Job section on page 11.
- ⇒ **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.
- ⇒ **Press the SELECT button** and read the moisture content on the meter scale. The meter displays the "relative" moisture level for two seconds.

### TESTING DRYWALL

- ⇒ **Set the meter scale** for Sheetrock® as described in the Create/Modify a Job section on page 11.
- ⇒ **To take a reading**, push the contact pins into the Sheetrock® to 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.

**Note:**

Readings between 0.1% and 0.5% indicate a sufficiently dry moisture level. Readings between 0.5% and 1% indicate a borderline situation. Readings greater than 1% indicate material that is too wet for painting or wallpaper. A reading above 1% also indicates enough moisture present to allow mold growth to occur but only if other factors are also present such as a high RH level and food source.

## **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 Alkaline 9-Volt battery as needed. Continued use with a low battery may cause the meter to go out of calibration. We strongly recommend to **not** use rechargeable batteries.
- Change contact pins **5** 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 **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 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 one year 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.

### **ARTTEST B.V.**

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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.

## **APPENDIX A: Room list – Residential Jobs**

Number	Abbreviation	Description
Page 1		
1	LR	Living Room
2	DR	Dining Room
3	KIT	Kitchen
4	E	Entry
5	RE	Rear Entry
6	BATH1	Bathroom 1
7	BATH2	Bathroom 2
Page 2		
8	BATH3	Bathroom 3
9	BATH4	Bathroom 4
10	BR1	Bedroom 1
11	BR2	Bedroom 2
12	BR3	Bedroom 3
13	BR4	Bedroom 4
14	BR5	Bedroom 5
Page 3		
15	HLB	Hall Floor B
16	HL1	Hall1
17	HL2	Hall2
18	HL3	Hall3
19	DEN	Den
20	FR	Family Room
21	LAU	Laundry
Page 4		
22	CLT1	Closet 1
23	CLT2	Closet 2
24	CLT3	Closet 3
25	CLT4	Closet 4
26	GAR	Garage
27	STRB	Stairway B
28	STR1	Stairway 1
Page 5		
29	STR2	Stairway 2
30	STRA	Stairway A
31	MISC1	Miscellaneous
32	MISC2	Miscellaneous

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