

Delmhorst[®]
INSTRUMENT CO
WHEN ACCURACY IS THE POINT.®

CX-30 Owner's Manual



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1. Introduction

Thank you for purchasing the CX-30 cotton moisture meter, the latest in Delmhorst's legacy "C-series" conductance-type moisture meters, and one of the new Navigator™ family of meters. Delmhorst cotton moisture meters are known throughout the major cotton-producing regions worldwide for their unmatched reliability and ease of use.

The CX-30 offers the latest in features and functionality. It is packaged in a robust and ergonomically designed ABS case (patent pending). The meter has large, tactile buttons to provide a premium, tactile feel, and intuitive user interface with dashboard-like display.

Together with the new Delmhorst **EDGE**™ app, users can customize meter settings and share MC data or graphs from any location quickly and accurately.

The CX-30 carries a two-year limited warranty. [REGISTER YOUR METER](#) by using the QR code on the back of the meter to receive an additional three month's warranty.

We recommend that you read the following pages in detail to take full advantage of all the CX-30 has to offer.

Should you need assistance at any time, please contact us via email at info@delmhorst.com, or by calling 877-DELMHORST (335-6467).

2. Safety



Sharp Measurement Pins: The measurement pins on the external electrodes are very sharp as they are intended to penetrate through dense materials. Keep the electrode(s) in the carrying case when not in use to avoid unintentional injury.



Meter Calibration: Meters are factory-calibrated prior to shipment. Calibration should be checked periodically, using the internal Cal Check feature or external MCS calibration standard to ensure the meter is working correctly and electrically accurate.



Proper Use: When used properly, the CX-30 meter can help users make informed decisions on the moisture levels of cotton and textiles at the various stages of production. A moisture meter is a secondary method of determining moisture content, and users should be aware of other potential influences on the accuracy of conductance meter readings.

3. Meter Features



Figure 1: Meter components

1. **Display** - Easy to read, backlit LCD display.
2. **Read Button** - When in live reading mode, press this button to hold a reading. When in any other mode, press this button to enter live reading mode.
3. **Navigation Buttons** - Use the up/down/left/right buttons to navigate through the meter's display. Use the center button to confirm a selection.
4. **Easy Grip Handle** - The handle is contoured to provide a comfortable grip for right or left-handed users. This shape also allows for increased leverage when pushing the meter into hard materials. The battery door is located on the rear of the handle.
5. **Ambient Light Sensor** - When the backlight is set to Auto, the ambient light sensor will trigger the backlight to turn on or off (to the brightness level set by the user) according to ambient lighting conditions.
6. **Electrode Connector** - Connect any external special application Delmhorst electrode. Most common for cotton and textile applications are the 52-E/C, 30-E/C, 37-E/C and 830-T.

4. Menu Features

The Delmhorst CX-30 has three operating modes: **Read, Set, and Stats**. The currently selected menu is marked with an underline. To change the menu, press the up button until the menu underline is blinking. Then use the left and right buttons to switch between menus. Use the down or center button to enter the menu. When a line on the display (Material, Set Point, or Material Temp) is bracketed by the solid black left and right arrows, it is "active", and that selection can be changed by pressing either the left or right key.

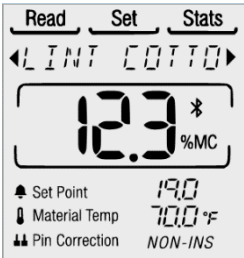

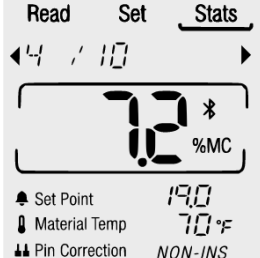
Read	Set	Stats
		
<ul style="list-style-type: none"> • Change species/material type • Take readings • Change set point • Change material temperature • Change pin type 	<ul style="list-style-type: none"> • Cal check • Bluetooth* • Temperature unit • Off Timer • Backlight ON/OFF/AUTO • Backlight brightness • Screen contrast 	<ul style="list-style-type: none"> • Total Readings • Average value • Highest value • Lowest value • Standard deviation • View data • Erase all reading data

Table 1: Menu Features

5. Read Menu

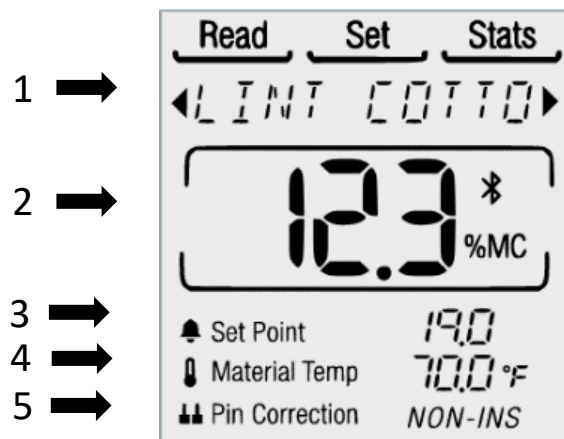


Figure 2: Read screen components

1. Material Selection and Correction

Info: The CX-30 includes 4 material calibrations: Lint Cotton, Seed Cotton, Viscose Rayon, and Wool. If desired, use the *EDGE™* app to remove any of the 4 materials from the meter that are not being used.

Use: Select the Read menu. While the underline flashes, press the down button to enter the material selection text field. Press the left or right buttons to scroll through available materials. Any changes to the material selection field will NOT be saved until the center button is pressed to confirm. **When the material is changed, the user will be asked if they want to erase the data in the meter. Selecting NO will return the user to the original material and keep all readings. Selecting YES will delete all saved readings within the meter and change the material.** If connected to the *EDGE™* app, users will be prompted to export readings before they are deleted from the app. Please see Delmhorst *EDGE™* App User Guide for further instructions regarding exporting readings and changing the available material calibrations in the CX-30.

2. Live Reading Area

Info: The live reading area displays the moisture value (%MC) of the selected material, corrected for Material Temperature (4) (see [Figure 2](#) above).

Indicated readings with a less than (<) or greater than (>) sign are considered out of range. Out of range readings can be saved to memory and exported but will not be used in stats calculations.

Use: Use the navigation buttons to move to the live reading area. Entry will be confirmed when a live reading appears on screen. **Tip: If a live reading is not currently being displayed, pressing the Read button will navigate to the live reading area.**

Take a Reading: Attach the appropriate electrode to the meter and make contact with the material being tested. (see **Application section below**) The moisture content of the material will appear in the live reading area.

Hold a Reading: Press the Read button to hold the reading on screen. HOLD will appear in the material selection line and the meter will beep. A held reading can be saved, if desired (see below). Saving a reading or pressing the Read button a second time will return the meter to live reading mode.

Save a Reading: Press the Center button to save a live or held reading. This will store the reading, material temperature, and pin correction type to meter memory. A 'Saved' message will appear followed by the memory slot which the reading occupies (ex. Lint Cotton 2/100). This message can be bypassed by pressing the Read button.

Memory: There are 100 memory slots available in the meter. As readings are saved, the memory slots will fill in order from lowest (1) to highest (100). After 100 readings are stored, newly saved readings will replace the oldest stored readings. Unlimited number of readings may be saved when connected to the app.

3. Set Point

Info: The Set Point is the user-selectable %MC level at which the alarm will sound. This feature allows users to quickly take readings without having to review each one individually, helping to quickly identify high moisture areas.

Use: When active, press the left and right buttons to adjust the Set Point down or up. Holding the left or right buttons will cause the Set Point to change more rapidly.

The Set Point alarm can be turned off by adjusting the set point value to zero (---).

When changing the active material of the meter, the Set Point will reset to the default values for the new material, with one exception. If the Set Point has been turned off (---), it will remain off for the new material.

4. Material Temperature

Info: The basic calibration of the meter assumes the cotton temperature to be 70°F. The material (cotton) temperature will typically be equivalent to the ambient temperature of the environment, unless you are testing bales or material from the dryer. As the temperature increases, the indicated moisture content will increase above the actual moisture content. Lower material temperatures result in a lower indicated moisture content. For best accuracy, use the temperature correction in the meter,

especially when working in extreme environments (outside 50-90°F or 10-32°C) and environments subject to temperature variation.

Use: When active, press the left and right buttons to adjust the Material Temperature down or up. Holding the left or right buttons will cause the temperature to change more rapidly.

6. Set Menu

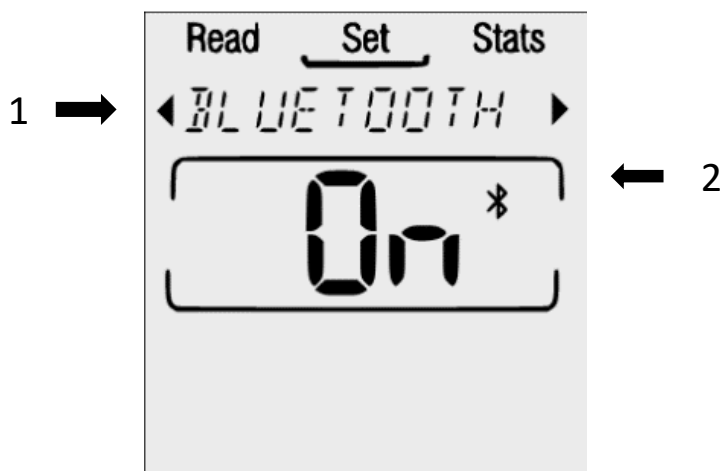


Figure 3: Set screen components

1. Setting Selection

The setting selection area will display all settings in a scrollable list. Each setting is listed and explained in Table 2 below. Press the left and right buttons to view settings. After locating the desired setting, press the down or center button to enter the setting state. Then press the Read button to enter the live reading screen.

2. Bluetooth® Indicator

The CX-30 is equipped with Bluetooth® technology, allowing users to connect their meter(s) to a mobile device (smartphone or tablet). The Bluetooth® icon is visible on all meter screens when turned on. Please refer to the Delmhorst *EDGE*™ App User Guide for more information.

Table 2: Settings options

Setting	Description
Cal Check	<ul style="list-style-type: none">Allows users to check the electrical calibration of the meter

	<ul style="list-style-type: none"> • A value between 11.8 and 12.2 means the meter is in calibration • A value of <11.8 or >12.2 means the meter is out of calibration - change the batteries (2 x AA alkaline)
Bluetooth®	<ul style="list-style-type: none"> • When Bluetooth is on but not connected, the Bluetooth symbol will be on screen and flashing • When Bluetooth is on and connected, the Bluetooth symbol will be on screen and solid • When Bluetooth is off, no symbol will be visible on screen • <i>Factory default is off</i>
Temperature Unit	<ul style="list-style-type: none"> • Changes the temperature unit between Fahrenheit and Celsius • <i>Factory default is Fahrenheit</i>
Off Timer	<ul style="list-style-type: none"> • Chose 1, 4, or 10-minute screen off timer • <i>Factory default is 1 minute</i> • Manually turn the meter off by depressing the center button until screen goes blank - approx. 3s
Backlight	<ul style="list-style-type: none"> • Turn backlight ON to enable, and OFF to disable • Turn the backlight ON when in low ambient light, and OFF when in bright ambient light • When set to AUTO, meter will automatically enable and disable backlight according to ambient light • <i>Factory default is off</i>
Brightness	<ul style="list-style-type: none"> • Adjust backlight brightness from 1 (low) to 10 (high) • The selected brightness level will be used whenever backlight is enabled (ON or AUTO) • <i>Factory default is brightness level 2</i>
Contrast	<ul style="list-style-type: none"> • Adjust the contrast level of the screen from 1 (low) to 10 (high) • <i>Factory default is contrast level 5</i>

7. Stats Menu

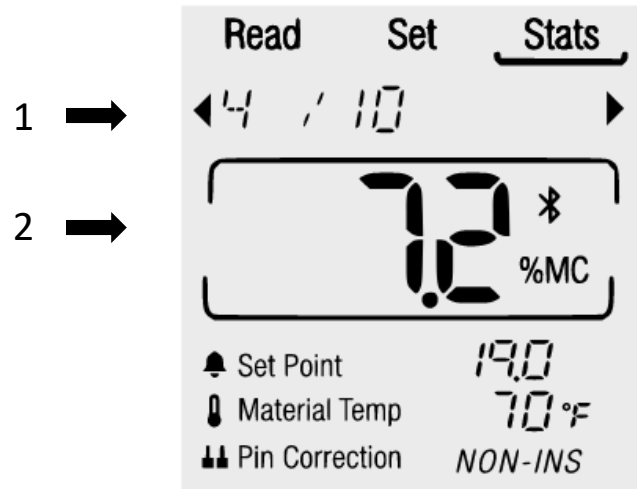


Figure 4: Stats screen components

1. Stats Selection

The stats selection area will display all statistics in a scrollable list (see Table 3 below). Press the left and right buttons to view statistics.

2. Stats Details

Statistics are calculated from the list of saved readings in meter memory, and only readings taken within the valid measurement range of the selected material are used for the calculations. Out of range readings are indicated as "<xx.x or >xx.x" and will not be included in statistical calculations for average and standard deviation.

The meter provides statistics (average, high, low, standard deviation) for the readings that are currently stored in the meter.

The stats details section can only be selected for the 'View Data' and 'Erase Data' options. For these two cases, press the down or center buttons to enter the stats details box from stats selection. Use the left and right buttons to scroll the list of latest readings or select the desired option for clearing readings. For all other statistics, stats details will simply reflect the details of the above statistic and cannot be selected.

Table 3: Available Stats

Statistic	Description
Readings	<ul style="list-style-type: none"> • Displays the total number of readings stored in the meter
Average	<ul style="list-style-type: none"> • Displays the average value of the saved readings.
High	<ul style="list-style-type: none"> • Displays the highest value of the saved readings.
Low	<ul style="list-style-type: none"> • Displays the lowest value of the saved readings.
Standard Deviation	<ul style="list-style-type: none"> • Displays the standard deviation of the saved readings.
View Data	<ul style="list-style-type: none"> • Displays a list of all saved readings. The %MC and temperature of each reading are displayed.
Erase Data	<ul style="list-style-type: none"> • Clears all saved readings and statistics from the meter.

8. Applications

The moisture content of the samples under test is the primary factor affecting meter readings. However, readings are also affected by the following:

Type of cotton, area where it is grown, impurities, compaction (density) around the electrode, temperature of the sample.

To minimize the effect of these factors and improve the repeatability of the meter readings, keep in mind the following points: Use samples with

minimum of impurities. Optimal accuracy may be obtained if meter readings are checked against %MC by means of properly run oven tests on the product being tested.

Testing Lint Cotton and Seed Cotton

Attach the 52-E/C Sample Cup Electrode to the connector on top of the meter. Select material - either Lint or Seed Cotton. Set the material temperature correction. Select the set point. Place the material in the sample cup. Press the cotton firmly into the cup with your finger. The sample in the cup should be overflowing during the test, even while you are pressing it with your finger. The meter will display the %MC.

Readings below 4% lint cotton will be displayed as a flashing "<xx.x". Readings above 16% lint cotton will be displayed as a flashing ">xx.x". Both the under range and overrange readings should be disregarded. They will not be added to the accumulated readings or used in calculation of the average.

Tests made on seed cotton may not be as accurate as those made on lint cotton. This is due to the fact that the seed cotton sample is made up of lint and seed, and the quantity of seed may vary from sample to sample. Also, the moisture content of the seed is usually higher than that of the lint. When testing seed cotton, direct contact is still made with the cotton fiber only and not with the seed of the sample. Variables in quantities and moisture content of the seed, during calibration and in field tests, may affect the accuracy and repeatability of the meter readings.

The seed cotton scale gives an indication of "total" moisture content (the moisture content of the seed and the lint in a sample as determined by oven tests) in the seed cotton sample. This may be of interest only in buying and selling seed cotton where some consideration may be given to the weight relationship between moisture content and dry matter.

Testing Baled Cotton

Attach the 30-E/C Electrode to the connector on top of the meter. Slide the plastic spacer over the #491 contact pins from the bottom of the pins, mount the pins in the chucks and tighten the set screws. (The #491 contact pins are not inserted into the chucks for shipping purposes).

Select material - either Lint or Seed Cotton. Set the material temperature correction. Select the set point. Insert the electrode pins into the bale. Place the pin spacers near the tips of the pins when contact is first made with the bale. This helps to keep the pins parallel as they are forced into the bale. The meter will display the %MC.

The #491 contact pins are insulated, except for 1-3/4" at the tip. The insulation helps to identify the area of moisture, since the reading is obtained from the tip of the pin. Keeping track of moisture readings as the pins are pushed into the bale will give an idea of the uniformity of moisture distribution in the bale. Higher moisture readings near the surface are an indication that the cotton has been exposed to higher moisture after baling. The CX-30 gives accurate results on normally compressed bales. If the bale is loosely packed, the meter will read lower than the actual moisture content. If the bale is very tightly packed, the readings will be only slightly higher than normal. Well-conditioned material will give uniform readings; however, material that is baled before it is dry will show a wide range of moisture content. Several tests should be made on each bale, and using the Stats function in the meter, note the average and the highest readings of these tests.

Note: The heavy duty 830-T electrode is also available for bales and modules.

Testing Wool, Viscose Rayon

Connect the 37-E/C multi-pin electrode to the connector on top of the meter. Set the scale to Wool or Viscose Rayon. Select a set point. Set the material temperature correction. Insert the electrode pins into the material. The meter will display the %MC.

Delmhorst *EDGE*™ App Features

The Delmhorst *EDGE*™ app expands upon many features found within the CX-30. These features include:

1. Export full data sets or selected readings from meter to app to be viewed on a single page and further analyzed.
2. Exclude extraneous readings from Statistics calculations.
3. View a customizable plot of all readings.
4. Export readings from app to spreadsheet for long term storage and analysis.
5. Change the materials available in the CX-30 meter.
6. Adjust the moisture values at which the LEDs change colors.
7. Upgrade meter firmware.

Please refer to the Delmhorst *EDGE*™ App User Guide for more details on how to connect the meter to the app and a detailed explanation of the features mentioned above.

Specifications and Operating Conditions

Temperature Compensation Range (not operating temp)

0-255 °F / -18-124 °C

Meter Range

Lint Cotton: 4%-16%

Seed Cotton: 6%-20%

Viscose Rayon: 6%-25%

Wool: 12%-30%

Power

2x AA Alkaline Batteries

Battery life while using the meter in reading mode and active LED's is estimated at 125-150 hours. A combination of alarm, backlight and Bluetooth will reduce expected life to a minimum of 35 hours. A "LOW BATT" warning will appear on screen when the meter is woken up if battery voltage is below 1.75V. At this level the meter has 1-2 hours of life depending on the functions being used. The same alert is sounded and displayed every 5 minutes. Continued use with a low battery may cause your meter to go out of calibration. **TIP:** Extend battery life by turning Bluetooth® off when not in use, setting the backlight brightness low, and using shorter timeout settings.

Size

8.6 in x 2.9 in x 1.6 in (22 cm x 7.4 cm x 4.1 cm)

Weight

6.9 oz (0.20 kg) without batteries

8.6 oz (0.24 kg) with batteries

Regulations/Compliance

WEE, RoHS, CE

Dispose of your Meter



Figure 5: WEEE symbol - crossed out wheeled bin

For private households: Information on Disposal for Users of WEEE

This symbol (figure 5) on the product(s) and / or accompanying documents means that used electrical and electronic equipment (WEEE) should not be mixed with general household waste. For proper treatment, recovery, and recycling, please take this product(s) to designated collection points where it will be accepted free of charge. Alternatively, in some countries, you may be able to return your products to your local retailer upon purchase of an equivalent new product.

Disposing of this product correctly will help save valuable resources and prevent any potential negative effects on human health and the environment, which could otherwise arise from inappropriate waste handling.

Please contact your local authority for further details of your nearest designated collection point.

Penalties may be applicable for incorrect disposal of this waste, in accordance with your national legislation.

For professional users in the European Union

If you wish to discard electrical and electronic equipment (EEE), please contact your dealer or supplier for further information.

For disposal in countries outside of the European Union

This symbol is only valid in the European Union (EU). If you wish to discard this product, please contact your local authorities or dealer, and ask for the correct method of disposal.

10. Meter Care, Service and Warranty

Care for 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 AA batteries as needed. Continued use with a low battery may cause the meter to go out of calibration. Remove the batteries if the meter will not be used for one month or longer.
- Change contact pins on electrodes as needed. Keep pins' retainers' hand tightened.
- Clean the meter and electrodes with any biodegradable cleaner. Use the cleaner sparingly and on external parts only. Keep cleaner out of the external connector.

Service Your Meter

If your meter is not working properly, replace the batteries and check the calibration. If this does not resolve the problem, go to www.delmhorst.com and follow the instructions under the Support tab. If you require further assistance, please call 877-DELMHORST (335-6467) or 973-334-2557.

Limited Warranty

Delmhorst Instrument Co. 51 Indian Lane East, Towaco, NJ 07082, referred to hereafter as Delmhorst, guarantees its CX-30 moisture meter against defects in material or workmanship for two years from date of purchase. Optional electrodes are guaranteed for 90 days. See the owner's manual or Delmhorst website (www.delmhorst.com) for warranty period on your specific product. If, within the warranty period of the product, you find any defect in material or workmanship, return the meter to Delmhorst or an authorized reseller, following instructions found on www.delmhorst.com. Include proof of purchase. Shipping charges to return the product are the customer's responsibility.

This warranty does not cover abuse, misuse, damage during shipment, improper service, unauthorized or unreasonable use of the meter or electrodes. This warranty does not cover normal wear and tear, batteries, or pins. If the meter or electrode have been altered or tampered with, the warranty shall be void. **DELMHORST RESERVES THE RIGHT TO REPAIR OR REPLACE THE PRODUCT AT ITS SOLE DISCRETION.**

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. The meter should stay in calibration indefinitely with proper care and maintenance. Follow the manufacture's guidelines in the owner's manual.

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 either from Delmhorst directly or through an authorized reseller. Purchases through unauthorized resellers, including but not limited to unauthorized e-commerce resellers, are not covered by this warranty, to the extent permitted by law.

This warranty extends to the original owner only and is not transferable.