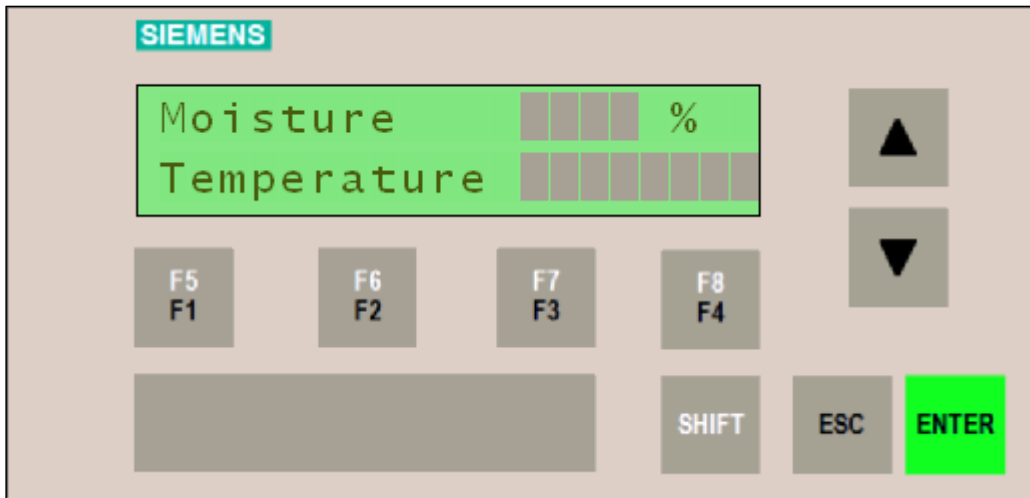


## FP Moisture Monitor Operation Guide

The new Mathews Company Moisture Monitor consists of a Flat Plate moisture sensor, 2 Line Text display (HMI), PLC controller, panel mount printer and 12vdc power supply.



### Function Buttons:

F1 (Start Print)-Enables communication from the PLC to the printer and starts the print timer  
F2 (Stop Print)-Disables communication from the PLC to the printer  
F3 (Alarm Reset)-Clears the moisture alarm and resets the alarm timer  
F4 (Calib Sensor)-Calibrates moisture reading to match entered test moisture value from the calibration screen. If printing is enabled, a header line will print each time calibration is performed. See page 4 for detailed procedure.

### Standard Buttons:

Arrow Keys-Moves cursor on menu screens, changes settings on some screens when value is blinking  
Shift-Pressed at the same time as function buttons for second functions as described below.  
Esc-Used to navigate between menus and exit screens  
Enter-Used to select menu choices and save settings




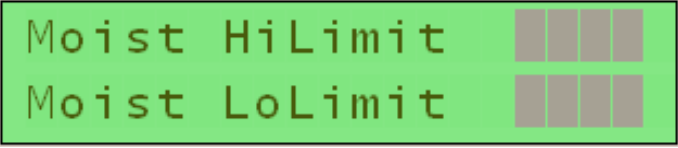
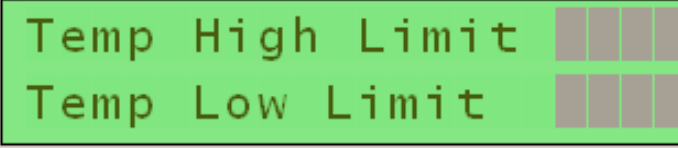



### Shift + Function Buttons:

Shift F1-Resets the running average moisture that prints at the end of each interval print.  
Shift F2-Changes temperature units from Fahrenheit (F) to Celsius (C).  
Shift F3-Resets all settings to factory defaults  
Shift F4-Changes temperature units from Celsius (C) to Fahrenheit (F).

### Moisture Calibration Tip:

Before attempting to calibrate moisture, make sure that the temperature reading is accurate using the Temperature Bias control. When temperature is correct and grain is flowing across the sensor, the moisture can be calibrated.

## User Screen Menu and Screen Views

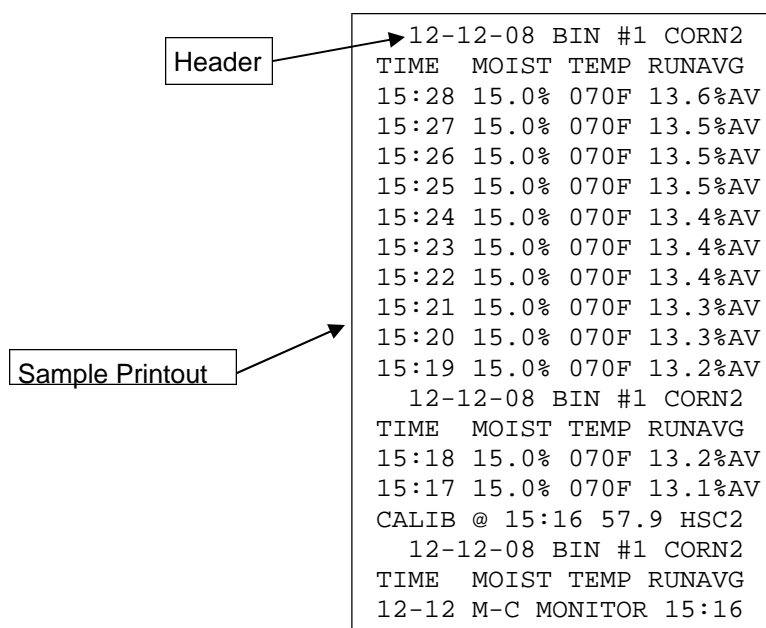
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Grain Moist &amp; Temp</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Moisture Calibration</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Temperature Bias</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Moisture Scaling</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Temperature Scaling</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Printer Control</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Header Information</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content;">Moisture Alarm SP</div>	
<div style="border: 1px solid black; padding: 5px; width: fit-content; background-color: #cccccc; text-align: center;">ESC</div>	<p>Use the Escape key to go back to the previous menu at any point. Continuing to press ESC will return the program back to the main menu.</p>
<div style="border: 1px solid black; padding: 5px; width: fit-content; background-color: #00ff00; text-align: center; color: black;">ENTER</div>	<p>Use the ENTER key to move forward from one screen to the next while making selections.</p>

## User Screen Menu and Screen Views Description

- The Grain Moist & Temp screen is the primary (default) display. After the initial power-up, the screen will display this information. The moisture value is a 15-second average. The temperature units are Fahrenheit as a default but can be changed by pressing Shift+F2.
- On the Moisture Calibration screen, enter a moisture value from a tested sample and press Enter to save, then press the F4 function button to calibrate the sensor to match that reading. It will take approximately 15 seconds for the adjusted value to appear
- The Temperature Bias screen is to offset the temperature reading if necessary. Note that the temperature will affect the moisture reading as we compensate moisture based on temperature.
- The Moisture Scaling screen shows the values that the sensor signal is scaled against to display moisture. High scale value is automatically adjusted by the calibration procedure.
- The Temperature Scaling screen shows the values that the sensor signal is scaled against to display temperature.
- Press Shift F2 to change temperature units from Fahrenheit to Celsius and back to Fahrenheit.
- The Printer Control screen is to select the time interval between printing. The interval begins when F1 (Start Print) is pressed.
- The Header Information screen allows adjustment of the grain and bin descriptions printed in the header.
- The Moisture Alarm SP screen shows the moisture limits against which the alarm is monitoring the current moisture. The moisture must be outside the limits for 5 minutes to cause the alarm. This function is disabled per factory default.
- If an alarm occurs, the text display will show a flashing exclamation point in a triangle. To view the alarm text, press ESC twice and you will see the menu choice "*Display Alarms.*" press ENTER to display. This function is disabled per factory default.

## Printer Output

The printer output on the interval basis is formatted as follows: time (24hr format), current moisture (interval average), current temperature and running average moisture. The printed header consists of the date (MM-DD), Bin number and Grain type. The header will print as part of calibration and periodically (after ten interval prints) if no calibrations are performed.



## Changing Parameters

### Setting the Date and Time

1. Starting at the Grain & Moisture Temperature Screen (default), press **ESC** twice to display menu options on the screen.
2. Arrow down to "Set Time and Date" and press **Enter**.
3. The screen will show the date and time with the date flashing.
4. Use **Arrow Keys** to adjust and **Enter** to save the value and move the cursor to the next space.
5. After adjusting the month, year, hours, minutes and seconds this way, pressing **Enter** after changing each setting to save. Press **ESC** at any point to cancel changes.
6. When date and time are correct, press **Enter** once more to save all.
7. Press **ESC** three times to return to the main menu.

### Temperature Bias

**\*Note:** Adjusting the temperature will change the moisture reading.

1. Starting at the Grain & Moisture Temperature Screen (default), press the **ESC** key to display menu options on the screen.
2. Scroll down to "Temp. Bias" and press **Enter** to select. A cursor will appear in place of the smallest digit.
3. Use the **Arrow keys** to adjust the temperature up or down to equal the difference between the actual temperature and the displayed temperature.
4. Press **Enter** when the temperature is at the desired level.
5. Press **ESC** three times to go back until the Grain & Moisture Temperature Screen is displayed once again.

### Moisture Calibration

**\*Note:** Temperature must be correct before adjusting moisture settings.

1. Starting at the Grain & Moisture Temperature Screen (default), press the **ESC** key to display menu options on the screen.
2. Scroll down to "Moisture Calibration" and press **Enter** to select. A cursor will appear in place of the smallest digit.
3. Use the **Arrow keys** to adjust the moisture % level up or down.
4. Press **Enter** when the moisture % is at the desired level.
5. Press F4 to lock in the selected moisture %. **For an Accurate Reading, Do Not Press F4 Until Grain is Flowing Across the Sensor.**

Press **ESC** three times to go back until the Grain & Moisture Temperature Screen is displayed once again.

**NOTE:** When changing moisture value, it will take 15-30 seconds to display correct value.

### Printer Control

1. Starting at the Grain & Moisture Temperature Screen (default), press the **ESC** key to display menu options on the screen.
2. Scroll down to "Printer Control" and press **Enter** to select. A cursor will appear in place of the smallest digit.
3. Use the **Arrow Keys** to choose an interval between 1 minute and 30 minutes. This is how often a new script will print.
4. Press **Enter** to save value.
5. Press the **ESC** key three times to go back until the Grain & Moisture Temperature screen is displayed again.

## Changing Parameters Continued

### Changing Header Information

\*The header prints out only once for every ten readings.

Header is shown in diagram on page 3.

1. Starting at the Grain & Moisture Temperature Screen (default), press the **ESC** key to display menu options on the screen.
2. Scroll down to "Header Info" and press **Enter** to select. Press **Enter** again to make the cursor appear in the "Grain #" space.
3. Use the **Arrow Keys** to scroll up or down to select the desired grain number. To select the grain type, press **Enter** when the desired number has been selected. This will display the selection on the screen. The grain numbers allow the user to assign various designations to a number of different types of grain, correspondent with the following table:

Grain #	Grain Type
1	Corn1
2	Corn2
3	Corn3
4	Wheat1
5	Wheat2
6	Soybn1
7	Canola
8	Rapesd
9	Milo
10	Sunflr
11	Other1

4. After finding the desired Grain Number, press **Enter** to select and the cursor will move to "Bin #". Use the **Arrow Keys** to scroll up or down and select the desired Bin number between 1 and 12. Press **Enter** to save selections.
5. Press **ESC** 4 times to return to the main menu.

### Moisture Scaling

\***Note:** Moisture and temperature scaling should be used as a last resort if calibration is unsuccessful. Consult factory for technical support if needed.

Factory default settings should not be changed. The default settings should be:

Auger High Limit: 100

Auger Low Limit: 0

Gravity Flow High Limit: 50

Gravity Flow Low Limit: 0

If the numbers do not match these defaults, contact Mathews Company for reprogramming guidelines.

### Temperature Scaling

\***Note:** Moisture and temperature scaling should be used as a last resort if calibration is unsuccessful. Consult factory for technical support if needed.

Factory default settings should not be changed. The default settings should be:

Temperature High Limit: 525

Temperature Low Limit: 0

If the numbers do not match these defaults, contact Mathews Company for reprogramming guidelines

### Moisture Alarm SP

Factory default settings should not be changed. The default settings should be:

High Alarm: 17.0

Low Alarm 13.0

If the numbers do not match these defaults, contact Mathews Company for reprogramming guidelines.

## Component Parts List

Text Display HMI (Siemens TD 200)	1237010
PLC Controller (Siemens S7 224XP)	1236989
Moisture Sensor (Flat Plate)	1256884
Panel Mount Printer (Custom Plus)	1247021
12VDC Power Supply (30W)	1247023
Communications converter	1237063
Comms cable (Converter to printer)	1247024
Comms cable (PLC to converter)	1247025
Circuit Breaker (2 amp)	1257059
<i>Thermal Printer Paper (58mm Wide)</i>	1237065

## Troubleshooting Guide

Problem	Possible cause	Suggested action
No data on the text display unit	Loose cable connections, improper TD200 setup	Check cable at HMI and PLC, Go to the diagnostic menu to confirm factory setup
No printer output	Printing not enabled, 12vdc power loss, communication issue	Press F1 (Start print), check cables at printer, converter, PLC and power supply, check printer setup
Temperature reading off	Time lag in temperature, Grain flow problem, sensor wiring connections, sensor needs cleaning	Check to see if grain is present, confirm wiring to sensor, clean sensor, confirm grain temperature and offset if necessary
Moisture reading off	Grain flow problem, sensor needs cleaning, check temperature, calibration overdue	Check grain flow, clean sensor, adjust temperature offset if necessary, calibrate to tested value
No display at all	No power	Check cable, look for lights on the PLC, check breaker