DIGI★STAR

PRECISELY

Moisture Tracker™

Operators Manual

DIGI★STAR

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Digi-Star International
Pannigen, The Netherlands
www.digi-star.com

D3973 Rev D

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LINKS

Follow the link below to a video on Digi-Star's web site showing how to use Moisture Tracker™.

digi-star.com/solutions/2-13/Moisture_Tracker

To activate the Moisture Tracker™ software license, see page 38 for a direct link to Digi-Star's software license activation page and instruction.

For Moisture Sensor v2.11F

D3973-US Moisture Tracker Operators Rev D SAC

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MOISTURE TRACKER™ FEATURES

Moisture Tracker™ determines percentage of moisture in ingredients fed to livestock and therefore dry matter can be determined. A photometer in this device measures light reflected from ingredient sample and determines moisture. Then a set of readings is averaged and results displayed for user and stored for transfer to a PC.

SAFETY

⚠ This SAFETY ALERT SYMBOL indicates important safety messages in the manual. When you see this symbol, be alert to the possibility of PERSONAL INJURY and carefully read the message that follows.

⚠ DANGER Indicated an imminent hazardous situation that, if not avoided, will result in serious injury or death.

⚠WARNING Indicates a potentially hazardous situation that, if not avoided, could result in death or serious injury, and includes hazards that are exposed when guards are removed.

⚠CAUTION Indicates a potentially hazardous situation that, if not avoided, may result in minor or moderate injury.

The functioning and operational safety of this device can only be ensured if user observes usual safety precautions as well as specific safety guidelines stated in these operating guidelines:

IMPORTANT: Before connecting device to electrical supply, ensure the operating voltage stated on power adapter corresponds to voltage supplied to adapter.

- Transmitter controls, maintenance and repair work must only be carried out by a qualified technician.
- If there is any reason to assume the product cannot be used without risk, it must be marked to prevent further use.

⚠ DANGER Do not take moisture measurements from open face of a feed bunk over 8 feet high due to risk of silage collapse. Do not stand closer than three times (3X) the height of the face. **Take samples from loader bucket or small pile after it has been moved a safe distance from the silage face.**

DEVICE OVERVIEW

The following items are included with the Moisture Tracker™:

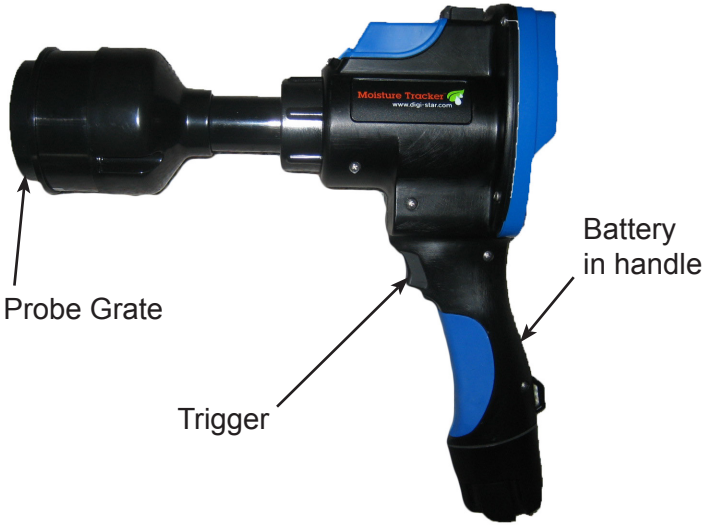
Case

115VAC Charger

Moisture Tracker™
with USB Memory Device

12VDC Charger

Calibration Target


Probe Grate
Battery
in handle
Trigger

Charging Port

Slide lock back to open USB drive cover

This port for factory use

USB drive port for data transfer

USB drive contains the Moisture Tracker™ PC Software, and this operators manual in PDF format.

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Number	Description	Function/Use /Operation
1	Power Button	Turns Moisture Tracker™ on/off
2	Home	Press to return to Main Menu screen
3	Back	Press to return to previous display mode screen
4	Select/Enter	Press to select highlighted item- Device Display Mode changes according to highlighted menu option; also can be used in place of trigger
5	Left Arrow/Reject	Press and release to scroll left; also used to delete or reject
6	Right Arrow/Accept	Press to scroll right; also used to accept
7	Down Arrow	Press to scroll down
8	Up Arrow	Press to scroll up
9	Preset 1	Press to select ingredient assigned to Preset 1 and proceed directly to measurement
10	Preset 2	Press to select ingredient assigned to Preset 2 and proceed directly to measurement
11	Preset 3	Press to select ingredient assigned to Preset 3 and proceed directly to measurement
12	Preset 4	Press to select ingredient assigned to Preset 4 and proceed directly to measurement
13	Indicator LEDs	Indicate system responses and errors

OPERATION

Install USB Drive

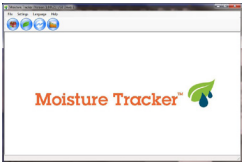
Before turning on device, install USB drive in USB port. See page 11. USB drive is required when software files need updating and data collection. Using the removable drive, data is downloaded to a PC for analysis using Digi-Star software. **Note:** Turn Moisture Tracker™ off before removing USB drive.

Updating Data Using USB Drive

(See page 34 for full procedure)

To update data, ingredient calibrations, software and firmware:

1. Load updates onto a USB drive from Moisture Tracker™ software loaded on a PC.
2. Insert the USB drive with updates into Moisture Tracker™ .
3. Power up device and it will automatically update software and data files.



Managing On-Board Data

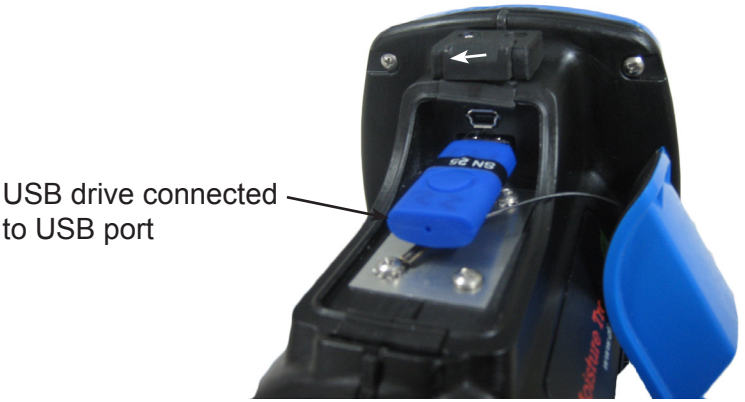
To manage on-board data, the USB containing the data must be removed from the Moisture Tracker™ and plugged into a PC with Moisture Tracker™ software loaded.

Cleaning Probe Head and Grate

- To clean probe head of debris that may cause measurement interference, remove probe grate by grasping grate in hand and turn counter clockwise to release.
- Wash grate with water or wipe clean using a damp towel.
- Clean window using a clean microfiber cloth dampened with water or methanol. Do not use window cleaner and a rag. Avoid excess liquid in this area.
- Reinstall grate positioning it over probe head and twist clockwise to attach, a slight click will occur once grate is seated properly.

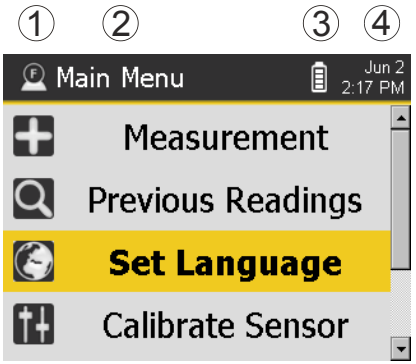
Turn On Moisture Tracker™ Device

To turn on Moisture Tracker™, depress the Power button for 2 seconds.

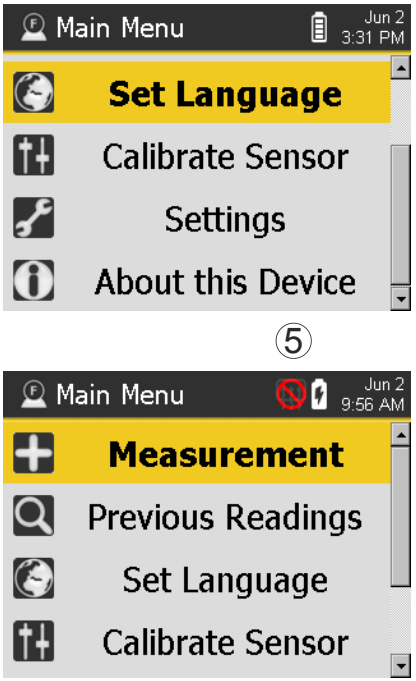


MAIN MENU

Reach Main Menu home display by pressing . Use and arrows then button for menus. See page 8 and 9.

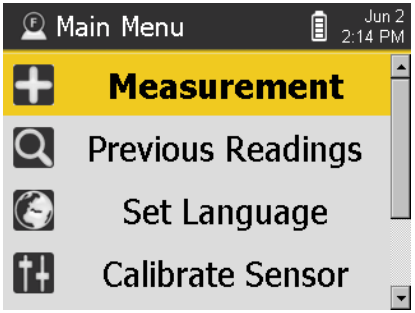


1. Menu Icon
   A= Administrator
   F=Farmer
   W=Worker
2. Menu Title
3. Battery Voltage Indicator
   1 Bar = Minimum
   4 Bars= Maximum
   Lightening Bolt= Charging
4. Date and Time
5. Charger plugged in-no measurements allowed.

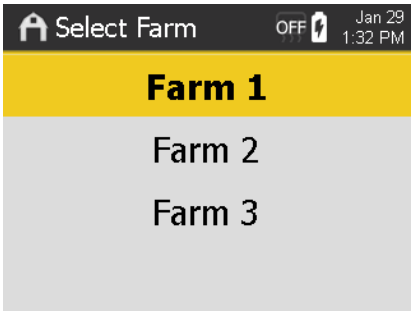


Main menu continued

MOISTURE MEASUREMENT

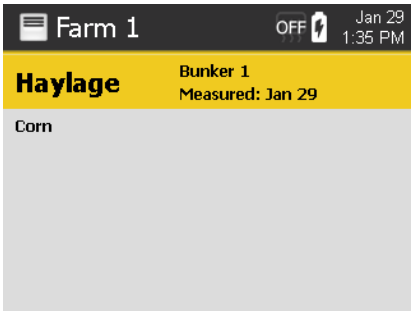


Select **Measurement** press

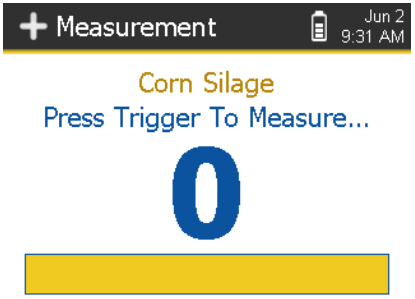


Information on farms and ingredients are first entered into the Moisture Tracker™ software on a PC, then downloaded to the device by means of a USB drive.

Select farm; shows ingredient list for that farm.

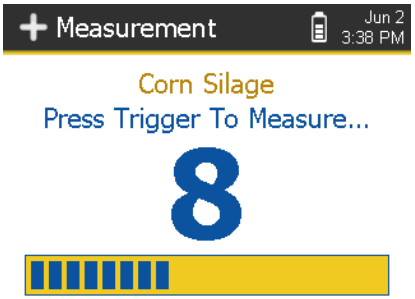


Select ingredient using and arrows, press

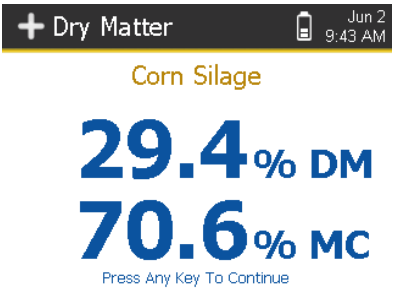


See **Notes** below.

Press **Trigger** or ↵
Number of trigger presses necessary for a moisture measurement is controlled by the Set Measurement Count screen. Default is 20.



Trigger pulls are counted and screen displays ingredient being measured. In this case, corn silage.



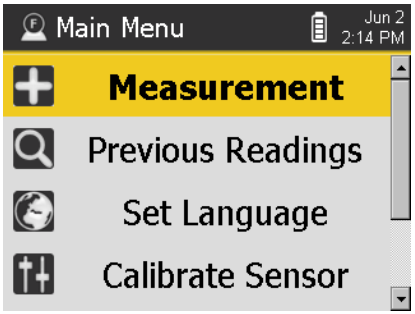
Results are displayed and information stored in USB drive for later uploading to PC. Press any key will return to the ingredient screen.
Note: The previous days DM measurement (if available) will show below the ingredient.

Notes on Taking Moisture Measurements

- USB drive must be in device to save measurements.
- Prior to taking first measurement, ensure probe grating is in place and free of debris interfering with light transmission.
- Hold probe head squarely against ingredient to make uniform contact with probe grate. The weight of the device is enough force. Be careful not to force ingredient through probe grate.
- Watch Video on Digi-Star.com or contact Dig-Star technical support for addition information on taking moisture measurements.

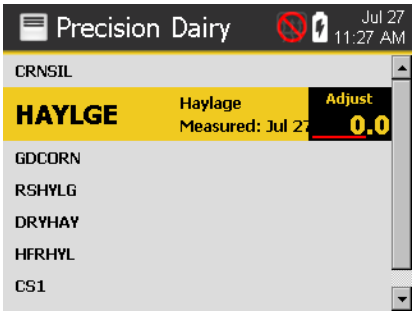
Individual Ingredient Moisture Adjustment

- Allows user to add an adjustment to each individual ingredient so the Moisture Tracker™ reading will match readings obtained from user reference dry-down methods such as lab, microwave, dehydrator etc. The adjustment is added to the calculated dry matter (DM) before the reading is displayed. The displayed value is the “adjusted” value.
- Worker may make this adjustment if **Ingredient Adjustment** is checked on the worker options screen. See page 28.



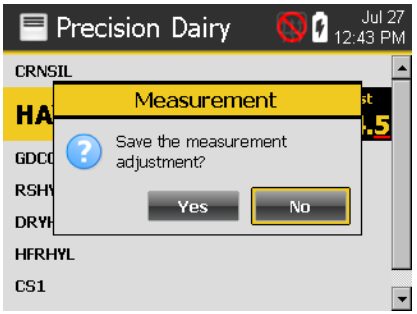
Select **Measurement** press ↵

Select desired **farm,** press ↵

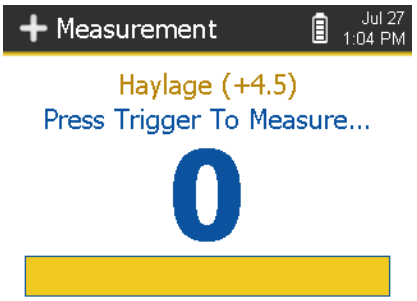


- Select ingredient using ▲ and ▼ arrows.
- Press ▶ for 5 seconds brings up an adjust window.
- Use the ◀ and ▶ arrows to move the red line before or after the decimal point.
- Use the ▲ and ▼ arrows to increase or decrease the number.
- Press ↵

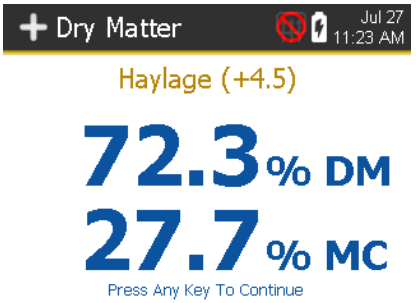
NOTE: The default range for adjustment is +/-5.0. The range can be expanded to +/-15.0. See next page.



- Press ◀ to select **Yes** and then press ↵
- Press ↵ selects **No**

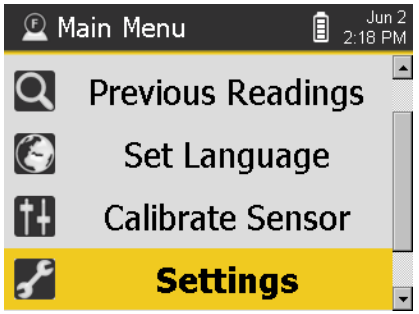


During measurement, adjustment value shows in parentheses.

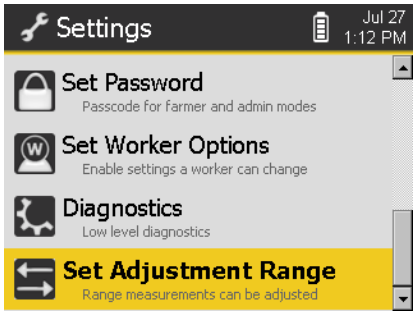


After measurement, adjustment value shows in parentheses.

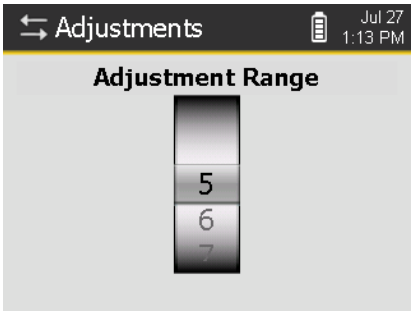
To Expand Adjustment Range



- At Main Menu press ▽ arrow to select **Settings**.
- Press ↵

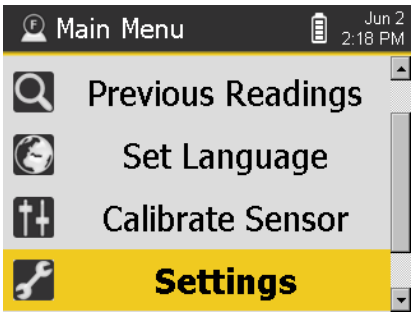


- At Settings press ▽ arrow to select **Set Adjustment Range**.
- Press ↵

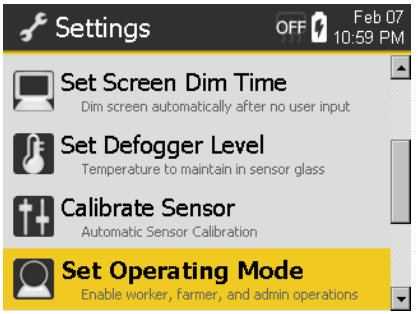


Press ▲ and ▼ arrows. to set adjustment range between 5 and 15. A setting of 10 means the ingredient can be adjusted between +10 and -10.

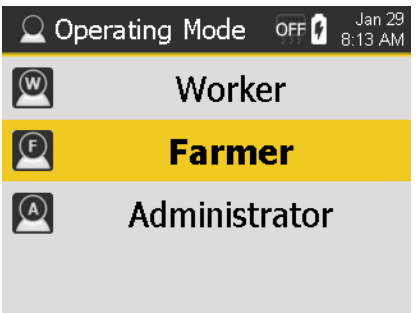
Farmer Mode



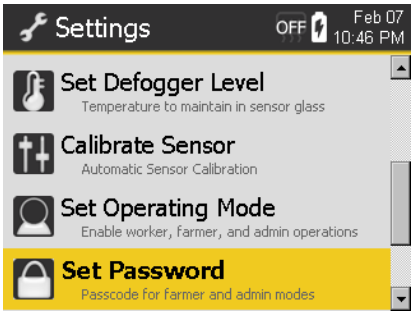
- For initial setup of the Moisture Tracker™, go to main menu by pressing the key.
- At Main Menu press arrow to select **Settings**.



- Press select **Set Operating Mode.**
- **Press**



Select **Farmer**



At Settings press ▽ and select **Set Password** then ↵

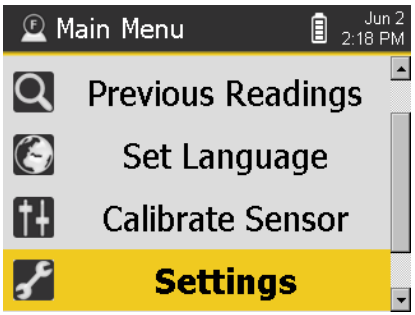
- Default password is 2468

- Press △ **or** ▽ , ◁ **or** ▷ press ↵ to enter a password of 4 characters minimum.
- Press ⌫ to erase any characters.
- When finished,press return then ↵

IMPORTANT: Write down your password below.

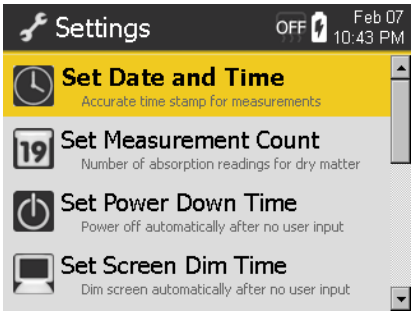
_____

Set Date and Time

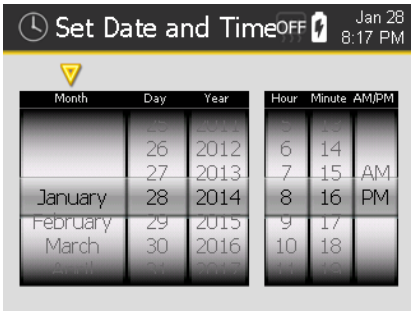


After initial farmer setup, Main Menu shows an F icon in top left hand corner.

To Set Date and Time select **Settings**,press ↵

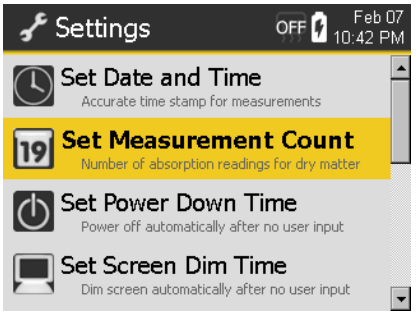


Select **Set Date And Time**

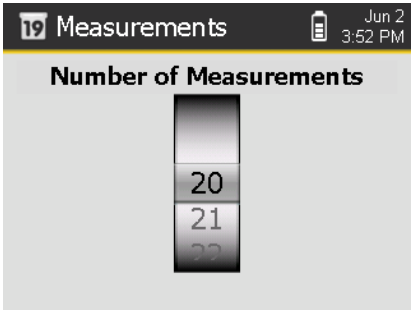


- Press **or** arrows to move yellow triangle.
- Press **or** arrows to change the month, day and time, then ↵

Set Measurement Count



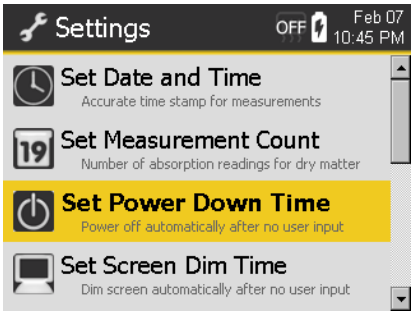
Select **Set Measurement Count** then ↵



Number of Measurements is number of times trigger is depressed when taking a moisture reading. Default is 20. Press **or** arrows to set number of measurements.

NOTE: Set Number of Measurements higher for better accuracy on inconsistent forage.

Set Power Down Time

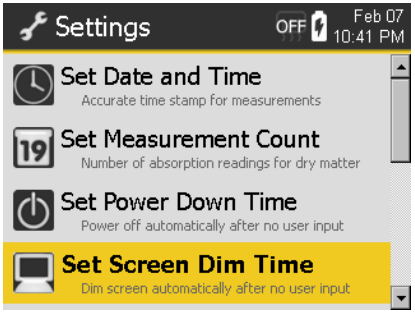


Select **Set Power Down Time**
Press ↵

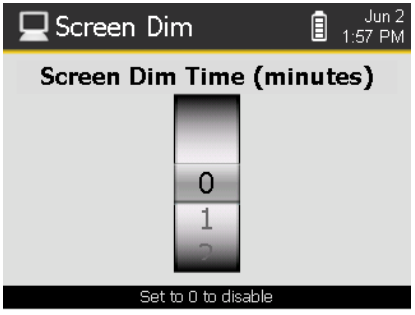
- Power Down Time is time device takes to power down after no user input.
- Use ▲ **or** ▼ arrows to change time, press ↵

NOTE: Device won't power down if set to zero.

Set Screen Dim Time



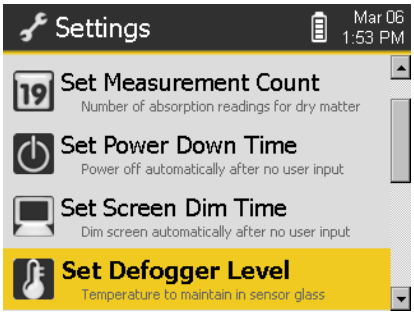
Select **Set Screen Dim Time**
press ↵



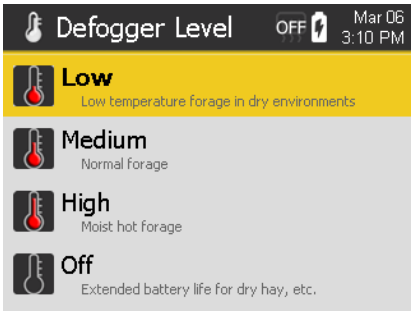
Screen Dim Time is time device takes to dim screen after no user input. Use ▲ **or** ▼ arrows to set time,press ↵

NOTE: Screen won't dim if set to zero.

Set Defogger Level



Select **Set Defogger Level** press ↵

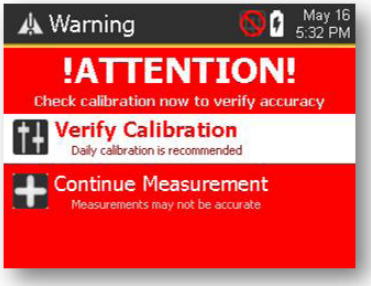


- Set Defogger Level to prevent moisture from condensing on probe glass. Periodically check the sensor glass for condensation, especially in cold temperatures. If condensation is found on the sensor glass, increase the Defogger level
- Use △ **or** ▽ arrows to change level, to match ingredient category, press ↵ to save.

Calibrate Sensor

For accurate measurements, the device must be calibrated using the calibration target supplied with the device. Each calibration target has a 6 digit number on the disk. Use this number during the calibration sequence shown on page 25.

IMPORTANT: Before calibrating, ensure that device glass and calibration target are clean, even a small amount of dirt can cause poor results.



The first time the Measurement section is entered on a new calendar day, this message will appear. Verify Calibration is strongly suggested to ensure best results.

- Press ↵ to start calibration procedure shown on page 25.

OR

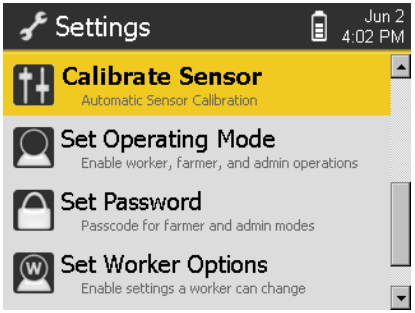
- Press ▽ and ↵ to continue with measurements.

For best accuracy:

- Keep the grate clear of debris while taking samples.
- Check glass for debris,even a small speck can affect readings.
- Turn the Moisture Tracker on to warm-up for 15 to 45 minutes before getting started. In hot or cold weather, place the unit outside to acclimate it to the temperature.
- Check calibration often using the Calibration Target provided. Every 10 to 30 minutes is recommended.
- Re-calibrate the moisture Tracker every-day and whenever the calibration percentage drops below 99.5%. If time permits, re-calibrate if results are below 99.8%. Better results will be generated when the calibration percentage is closer to 100%.
- See page 25 for procedure.

NOTE: If your calibration target is stained or damaged, replace with PN 409366.

Calibration Procedure



- Press (home) to return to main menu.
- Select **Calibrate Sensor,** press (enter) to go to calibration menu.

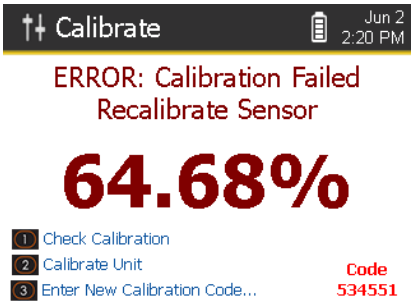
- Make sure the six digit Code in the lower right hand corner of the screen matches the calibration code on the calibration target.

IMPORTANT: If the codes do not match, see page 26 to set code in the device.

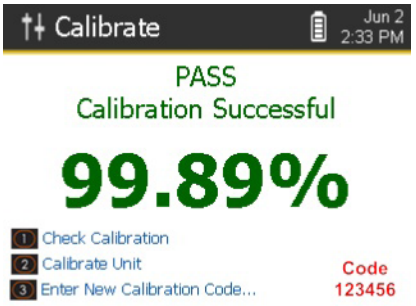
calibration target, inside view

- Remove probe grate from device. See page 6.
- Attach calibration target to device.
- Press 1 to do a quick check of the calibration. (This takes under 5 seconds.)
- There are 3 possible outcomes for calibration:
  - Pass is >/= 99.5%
  - Warning is between 99.00% and 99.49%
  - Fail is < 99.00%

calibration target, outside view



- If a warning appears, verify cleanliness of glass.
- Press 2 to re-calibrate if 99.5% or below. (This takes less than 1 minute.)

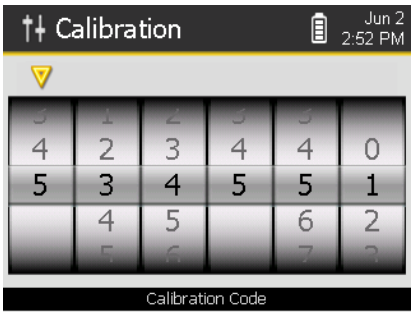


- If calibration is successful, a pass calibration screen will display. Device is now ready for use.
- Press to return to Main Menu.
- After calibration is complete, store calibration target in a safe place and install the probe grate on the device.

IMPORTANT: Measuring without the probe grate in place will result in incorrect readings.

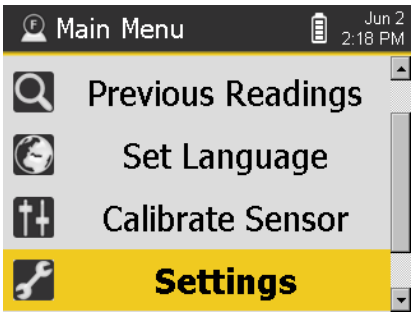
Enter New Calibration Code

For new device or if a new calibration target is purchased; the device calibration code must match the calibration target code.

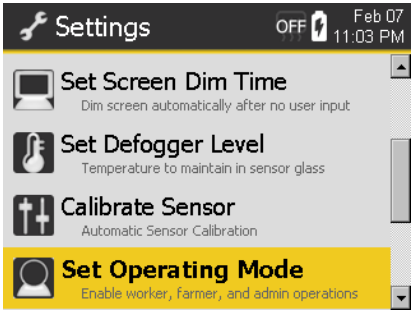


- Press 3 on Calibrate screen will display this screen.
- Press or to move yellow pointer.
- Press or to change numbers.
- Press
- Press to return to Main Menu.

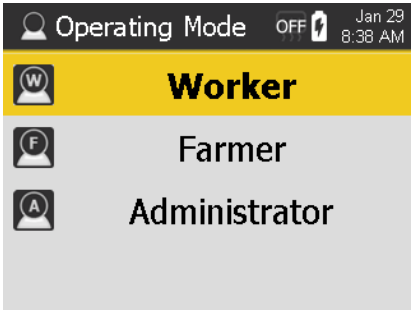
Set Worker Operating Mode



- From Main Menu select **Settings**
- Press ↵

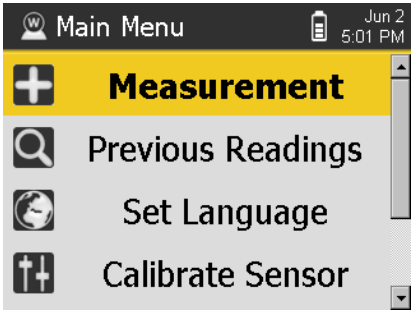


- Use ▲ or ▼ select **Set Operating Mode**
- Press ↵



Select **Worker** then ↵
Press ⌂

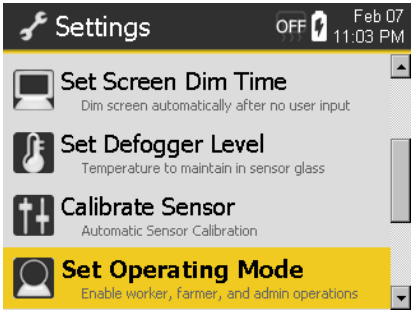
NOTE: To set worker options see page 28.
IMPORTANT: A password is required to return from Worker mode to Farmer or Administrator mode. See page 20.



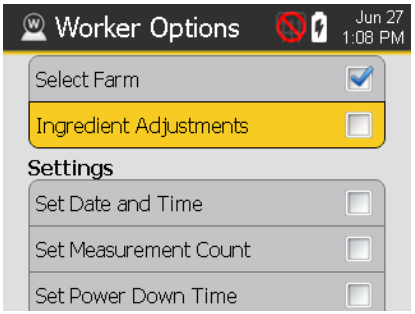
- A worker icon shows in upper left corner.

- Allows worker to take and store measurements. Worker can only change settings if given access to do so by the Farmer or Administrator through Worker Options.

Set Worker Options

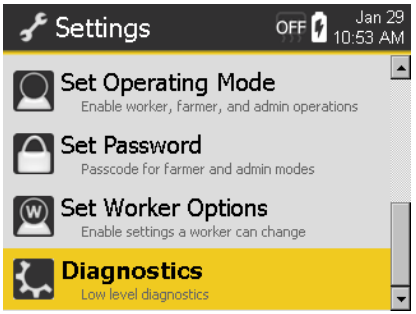


- From Main Menu in Farmer or Administrator Mode, Select **Settings** then Select **Set Worker Option**
- Press ↵

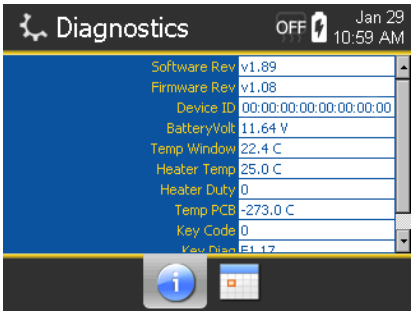


- Press ▲ **or** ▼ to select
- Press ▶ to check box
- Press ◀ to uncheck box

Diagnostics

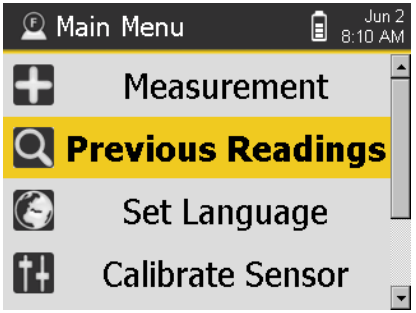


Select **Diagnostics** press ↵



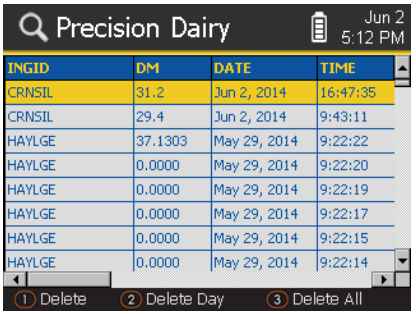
- Press ∧ and ∨ arrows to view information.
- Press 2 highlights calendar icon at bottom of screen.
- Use ‹ **or** › to show farm and ingredient information.
- Press 1 to go back

PREVIOUS READINGS



Use ∧ **or** ∨ arrow keys select Previous Readings, press ↵

- Use ∧ **or** ∨ arrow keys select farm, press ↵
- Press › to view all farms

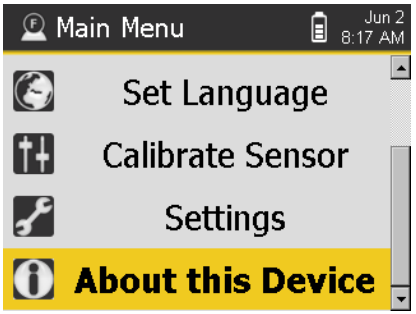


Note: All DM readings taken after software version v1.97 will only show 1 digit after the decimal point.

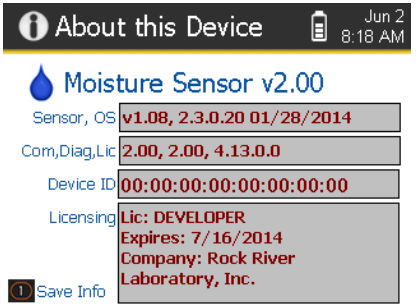
All previous measurements are displayed for that farm. Use ◁ **or** ▷ arrows to scroll screen

- Press and hold 1, after a warning, delete highlighted row.
- Press and hold 2, after a warning, deletes all measurements from a selected day.
- Press and hold 3, after a warning, deletes all measurements for this farm.

ABOUT THIS DEVICE



Select About this Device, press ↵



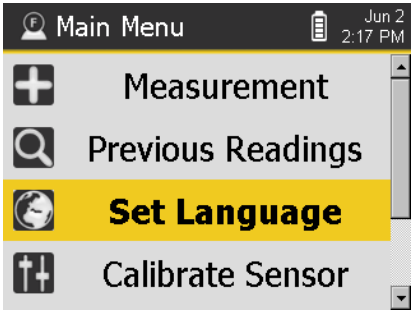
Information example, press ⌂ for Main Menu.

- Press 1 to save device information to USB drive.
- Press ↵ to cancel
- Press ◁ to highlight OK
- Press ↵

Device information is stored on USB drive.

- Press ↵
- Press ⌂

SET LANGUAGE



Select Set Language, press ↵

- Press ▲ or ▼ to select language.
- Press ↵

To return to previous screen.

- Press ▲ or ▼ to select Definir o Idioma
- Press ↵

MOISTURE TRACKER™ INFORMATION

Batteries

Moisture Tracker™ uses a rechargeable battery pack located in trigger handle. To remove or change batteries, use a Phillips head screwdriver to unscrew the cover.

IMPORTANT: Only use a battery pack supplied by Digi-Star. Part number 408985

Low Battery

- The battery icon will begin blinking red when battery voltage is critical (< 10%). The indicator LEDs will also flash.
- Charge battery before next use.

Charging Battery Pack

NOTE: Batteries will not charge below 32° F (0° C) or above 113° F (45° C)

- **IMPORTANT:** Use only AC or DC charger supplied with the device.
- Plug AC battery charger into a 115VAC outlet.
- DC battery charger uses a 12VDC outlet.
- Charger cord connects to charging port on side of device.
- A complete charge may take up to 12 hours if device is fully discharged.
- When fully charged, unplug the device. The displayed battery charge level shows 4 bars.

Repair Parts

405483 USB Memory Drive (Blank)
408305 Probe Cover Grate
408883 Cig. Lighter Adapter (12VDC)
408884 AC Power Adapter
408962 USB Latch Body Cover
408963 USB Latch Tab
409366 Calibration Target
408985 Battery Pack 7.2V NIMH
409093 USB Cover Assy.

UPDATING MOISTURE TRACKER ™ SOFTWARE

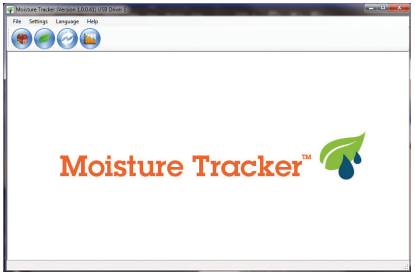
(HAND-HELD-DEVICE)

There are 3 parts to the Moisture Tracker™ software that can require periodic software updates:

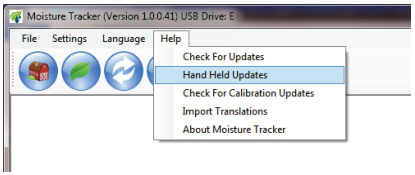
1. Moisture Tracker™ Software	Graphic User Interface
2. Moisture Tracker™ Calibration List	List of ingredient that can be measured
3. MoistureCompute DLL	Software that converts NIR readings to moisture content

Update Software

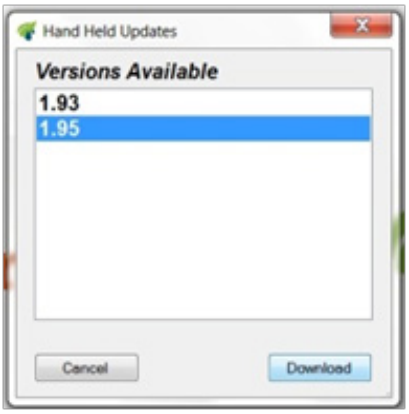
1. Remove the USB drive from the Moisture Tracker™ hand-held device.
2. Insert the USB drive into a port on the PC.



3. Start Moisture Tracker™ program on a PC.



4. Select “Help” and “Hand Held Updates” from the drop down menu.

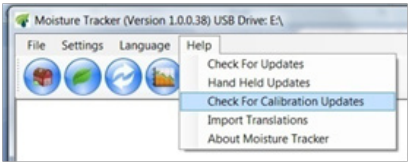


5. Select latest software revision.

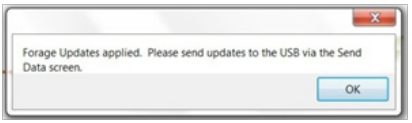
6. Select “Download”.

7. Verify “Download Com plete” message.

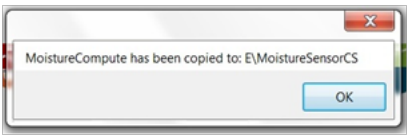
Update Calibration List and DLL



8. Select “Help” and “Check For Calibration Updates” from the drop-down menu.

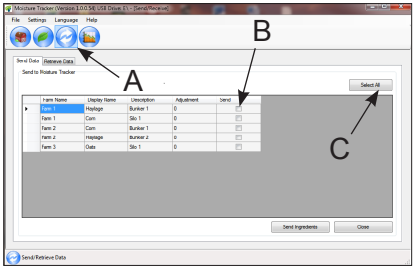


9. Follow the menu, update the calibration list and MoistureCompute if required.

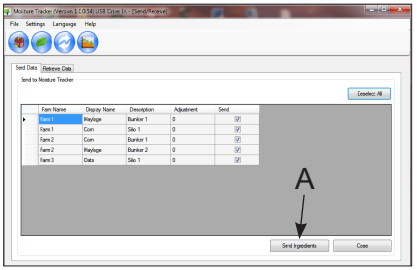


NOTE: The calibration list and the MoistureCompute DLL may have been automatically updated upon startup. See settings menu.

Send Ingredients to USB Drive



10. A. From the Moisture Tracker ™ main menu click on the Send/Retrieve Data icon.
    B. From the Send Data tab, in the Send column, click ingredients to be sent to the USB Drive.
    OR
    C. Click on Select All to check all ingredients.



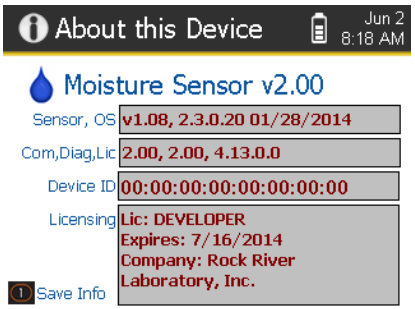
11. A. After selecting the ingredients to send to the USB drive, click on Send Ingredients. This will save the updated data to the USB drive.

12. Select “Safely Remove Hardware”
13. Select “Eject Mass Storage”
14. Remove USB drive.

Insert USB Memory Stick in Hand-Held Unit

15. Insert USB drive into Mois ture Tracker™ hand-held device.

16. Power Moisture Tracker™ on and it automatically loads the new software into mem- ory while starting up.



17. Select “About this Device” in the main menu to check the software revision.

LICENSE

A temporary license is included with the Moisture Tracker™. A 1 year license is included with the initial purchase and must be activated using the Digi-Star website below.

For first time Moisture Tracker™ software activation:

1. The link below leads to Digi-Star's software activation site.
   digi-star.com/store/mt_activate.php

2. At this site, Enter the 16 digit ID number found on the Moisture Tracker™ in the "About this Device" menu.
   ID#____:____:____:____:____:____:____:____

3. Click on "Activate and Download License" and follow the direction on the site to download the license to the USB drive and put the USB drive into the Moisture Tracker™ and turn on.

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