



HarvestMaster™

BY JUNIPER SYSTEMS



GrainGage™

H2 Stationary

USER'S MANUAL

H2 Stationary GrainGage User's Guide

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Cautions

-  **CAUTION:** This symbol indicates that failure to follow directions could result in damage to equipment or loss of information.



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Contents

- 1 Introduction to the H2 Stationary GrainGage 8**
 - 1.1 Set Up the Mesa 3 8
 - 1.1.1 Configure an Account on the Mesa 3 9
 - 1.1.2 Turn Tablet Mode Off 9
 - 1.1.3 Configure Power Settings 10
 - 1.1.4 Download and Install Mirus 10
 - 1.1.5 Set Up the Barcode Scanner 11
 - 1.1.6 Update Mirus 12
 - 1.2 Set Up the GrainGage 12
 - 1.2.1 Unpack the GrainGage 13
 - 1.2.2 Remove the Shipping Stops 15
 - 1.2.3 Install the Mesa 3 and Cradle 16
 - 1.2.4 Connect the Battery 17
- 2 Mirus and H2 Stationary GrainGage Setup 19**
 - 2.1 Start Mirus 19
 - 2.1.1 Load the H2 GrainGage Plugin 19
 - 2.2 Setup Mirus Preferences 21
 - 2.2.1 Open Setup 21
 - 2.2.2 Set Preferred Units of Measure 21
 - 2.2.3 Set Preferred Language 22
 - 2.2.4 Set Preferred Backup Log Location 23
 - 2.2.5 Clear Cached Settings 23
 - 2.2.6 Set Low Disk Space Warnings 24
 - 2.3 Setup the H2 Stationary GrainGage 24
 - 2.3.1 Open Setup 24
 - 2.3.2 Configure Actuator 25
 - 2.3.3 View GrainGage Info 27
 - 2.3.4 Configure Weight Sensors 27
 - 2.3.5 Configure Moisture Sensors 29
 - 2.3.6 Configure Level Detect Sensor 30

- 2.3.7 Configure H2 Stationary GrainGage System Settings 30
- 2.3.8 Reset the H2 Stationary GrainGage to Factory Settings 31
- 2.3.9 Update H2 Stationary GrainGage Firmware 32
- 2.3.10 Create and Record Barcode Traits 32
- 2.3.11 View Information About Mirus 35
- 3 H2 Stationary GrainGage Diagnostics and Alerts 37**
 - 3.1 Diagnostics Dialog Box 37
 - 3.1.1 Tare the GrainGage 38
 - 3.1.2 Open and Close All Gates 39
 - 3.1.3 Weight Diagnostics 39
 - 3.1.4 Moisture Diagnostics 40
 - 3.1.5 Level Detect Diagnostics 41
 - 3.1.6 Health Diagnostics 41
 - 3.1.7 Actuators Diagnostics 41
 - 3.2 Alerts 42
- 4 H2 Stationary GrainGage Calibration 45**
 - 4.1 Weigh Bucket Calibration 45
 - 4.1.1 Calibrate Weigh Bucket 45
 - 4.1.2 Check Weigh Bucket Calibration 48
 - 4.2 Moisture Curve Calibration 49
 - 4.2.1 Prepare Samples 49
 - 4.2.2 Moisture Calibration Overview 50
 - 4.2.3 Moisture Calibration 50
 - 4.2.4 Test and Tune a Moisture Curve 54
 - 4.2.5 Manually Adjust a Moisture Curve 57
 - 4.2.6 Manual Calibration Using Excel 59

- 5 Field Maps 61**
 - 5.1 Create a Field Map 61
 - 5.1.1 Create a Standard Plot ID Map..... 61
 - 5.2 View a Map64
 - 5.3 Delete a Map.....65
 - 5.4 Copy a Map66
 - 5.5 Export Map Data.....67
 - 5.5.1 Export Data67
- 6 Harvest Mode70**
 - 6.1 Options for Opening Harvest Mode.....70
 - 6.2 Open Harvest Mode70
 - 6.3 Configure Harvest Screen Options.....74
 - 6.3.1 Configure Cycle Settings.....75
 - 6.3.2 Quad View.....76
 - 6.3.3 Diagnostics Screen78
 - 6.3.4 Navigation Screen.....79
 - 6.3.5 Observations Screen80
 - 6.3.6 Graph View81
 - 6.3.7 List View82
 - 6.3.8 Configure Weight in Spatial Display.....83
 - 6.3.9 Configure Moisture in Spatial Display84
 - 6.3.10 Configure Plot Size and Yield in Spatial Display84
 - 6.4 Collect Harvest Data.....85
 - 6.4.1 Harvest with Cycle Button.....85
- 7 Appendix A: Standard Grain Information88**
 - 7.1 Standard Moisture and Test Weight88

- 8 Appendix B: Troubleshooting Mirus.....90**
 - 8.1 Error Logs90
 - 8.1.1 Flag Errors90
 - 8.1.2 Find and Send Error Logs.....90
 - 8.2 Enable Debug Streaming91
 - 8.3 Common Errors.....91
 - 8.3.1 Inaccurate Plot Weight.....91
 - 8.3.2 Can't Connect to GrainGage92
 - 8.3.3 Tare Warnings92
 - 8.4 Contact HarvestMaster.....93
 - 8.4.1 Instructional Content93
 - 8.4.2 Contact a HarvestMaster Field Service Engineer93
- 9 Appendix C: Limited Warranty.....95**
 - 9.1 Software.....95
 - 9.2 Disclaimer of Warranties.....95
 - 9.3 Updates or Modifications.....95
 - 9.4 Removal of Serial Number.....95
 - 9.5 Extended Warranties95

GrainGage™

H2 Stationary



CHAPTER ONE

Introduction

1 Introduction to the H2 Stationary GrainGage

The H2 Stationary is an affordable, entry-level option for acquiring accurate data measurements off-combine. This simplified GrainGage is ideal for hand harvesters requiring a mobile option for measuring grain weight and moisture.



This section explains how to set up the H2 Stationary GrainGage and the Mesa 3 Rugged Tablet that operates it.

1.1 Set Up the Mesa 3

Each H2 Stationary GrainGage is operated by the Mirus Harvest Software running on a Mesa 3 Rugged Handheld Tablet.



1.1.1 Configure an Account on the Mesa 3

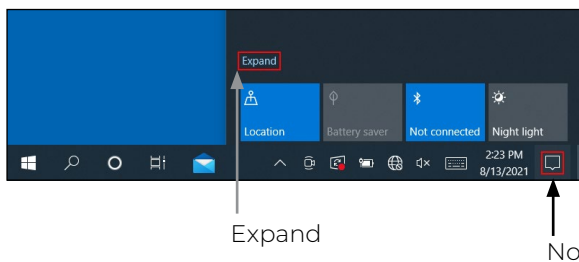
To set up the Mesa for the first time, turn it on and set up an account.

To set up with an offline account,

1. Select "Set up for an organization."
2. Tap **Next**.
3. Tap **Domain join instead** in the lower-left corner of the screen.
4. On the "Who's going to use this PC?" screen, enter a username.
5. You will be prompted to "Create a super memorable password."
6. If you do not want a password for your unit, leave the field blank and click **Next**.

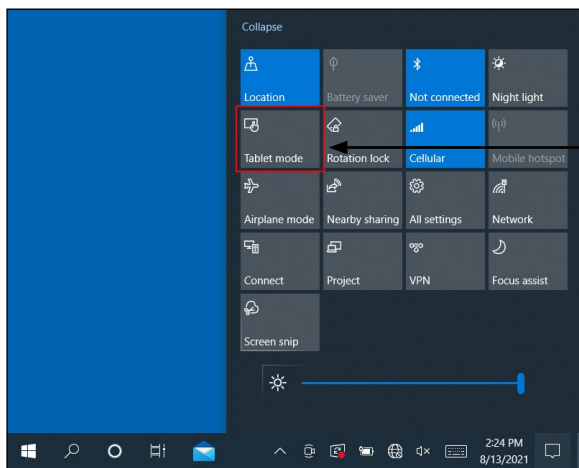
After you have set up your account, connect your device to Wi-Fi and restart it so Windows will fully activate.

1.1.2 Turn Tablet Mode Off



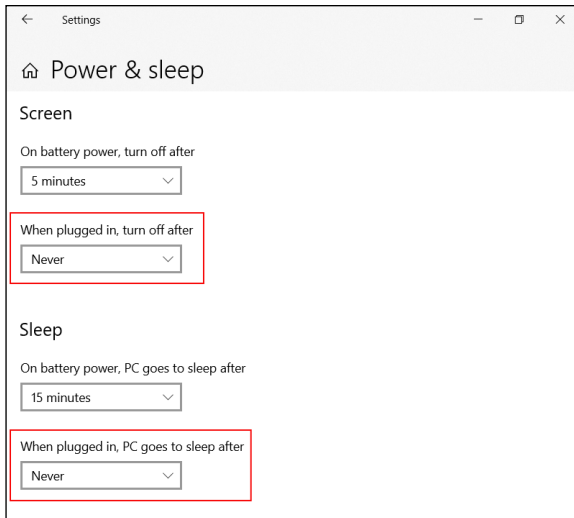
On the Mesa 3,

1. Open the notification area on your Mesa 3.
2. Expand it if necessary.



3. Tap Tablet Mode to turn it from blue to gray.

1.1.3 Configure Power Settings



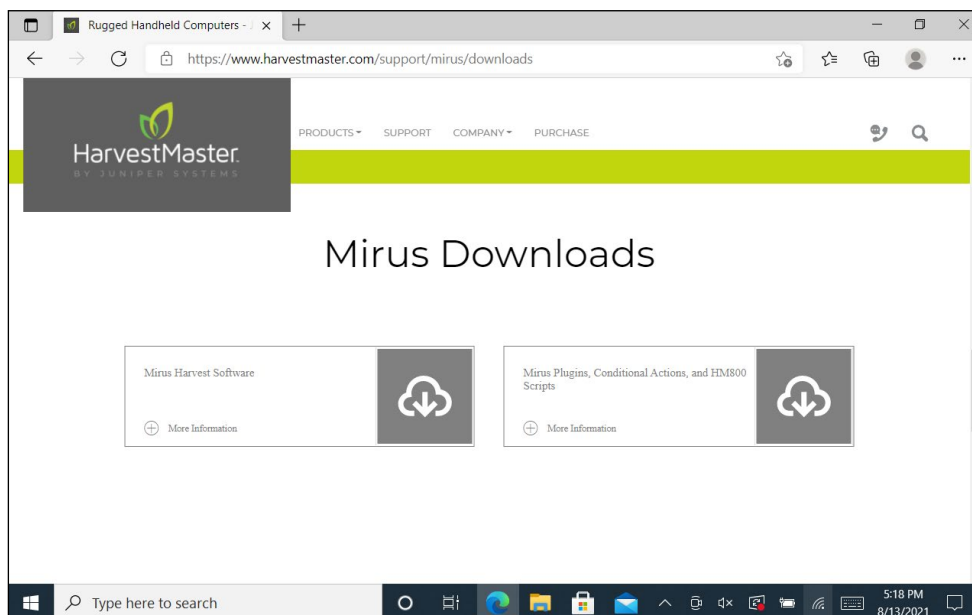
On the Mesa 3,

1. Go to **Settings** > **Power & sleep**.
2. Select **Never** under “When plugged in, turn off after.”
3. Select **Never** under “When plugged in, PC goes to sleep after.”

1.1.4 Download and Install Mirus

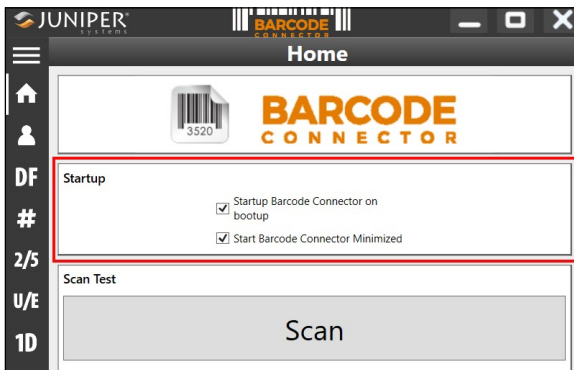
After you have purchased a license for Mirus, using the Mesa 3,

1. Go to <http://www.harvestmaster.com/support/mirus/downloads>.



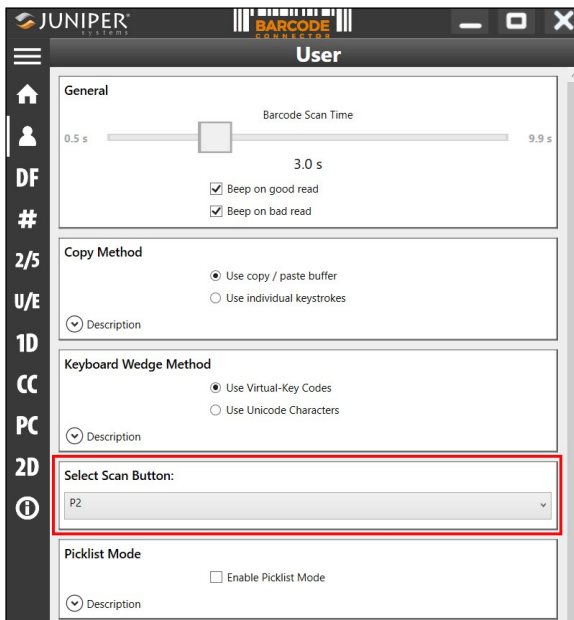
2. Tap the down arrow for Mirus Harvest Software.
3. Select and download the most recent Mirus release.
4. Open the file and follow the installation instructions.
5. Go to <http://www.harvestmaster.com/activate> and fill out the form.
6. HarvestMaster will send the unlock code via email.
7. Return to the Mirus activation screen and input the unlock code.

1.1.5 Set Up the Barcode Scanner



On the Mesa 3,

1. Open Barcode Connector.
2. On the Home screen under Startup, verify the following are checked:
 - Start up Barcode Connector on bootup
 - Start Barcode Connector minimized
3. Tap the Menu icon in the top left corner.



4. Select **User**.
5. Verify **P2** is selected under “Select Scan Button.”

The barcodes can now be scanned when P2 is pressed on the Mesa 3.

6. Minimize Barcode Connect.

Note: Barcode Connector should be open and running in the background on each Mesa 3. It can be minimized.

1.1.6 Update Mirus

Mirus is updated about once a year. Check online or with a HarvestMaster Field Service Engineer to ensure you have the latest version before harvest season.

To update to the latest Mirus version, do the following:

1. Go to <http://www.harvestmaster.com/support/mirus/downloads>.
2. Tap the down arrow for the Mirus Harvest Software.
3. Check for a newer version of Mirus.
4. If there is a newer version, download it.
5. Follow the installation instructions.

1.2 Set Up the GrainGage

The H2 Stationary GrainGage comes fully assembled. Included in the assembly is a cable for connecting the GrainGage to a 12 V battery as well as cables for connecting to and powering a Mesa 3 Rugged Tablet. It also ships with a toolkit for on-site maintenance of the GrainGage.



1.2.1 Unpack the GrainGage



1. Use the folded legs of the GrainGage to lift it out of the box.

Bubble Level

Legs



2. Adjust the leg position by removing the leg pins and rotating the legs down.

Cycle position holes

Leg pin

3. Align the pinhole in each leg with a cycle position hole in the GrainGage.
4. Insert the leg pin for each leg.



5. Use the bubble level on top of the GrainGage to verify the GrainGage is level and stable.

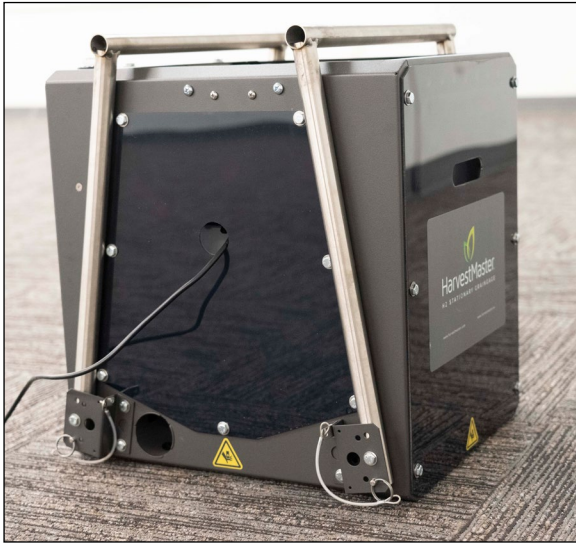


The H2 Stationary has two cycle positions:

Tall Cycle Position (34 in.)



Short Cycle Position (27 in.)



With the legs folded, the H2 Stationary GrainGage is in the carry or storage position.

1.2.2 Remove the Shipping Stops

The H2 Stationary GrainGage has two shipping stops on each lateral edge of the weigh bucket. The shipping stops keep the weigh bucket stable during long transport. They are not necessary for normal transport and must be removed in order for the weigh bucket to function.

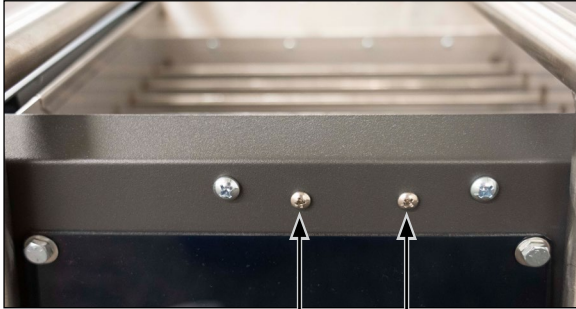


Shipping Stops

1. Remove all four shipping stops.

1.2.3 Install the Mesa 3 and Cradle

The Mesa 3 can be mounted on either side of the H2 Stationary GrainGage, but it is recommended that you mount it on the side with the USB and power cable.



Cradle Mount Bolts

1. Remove the cradle mount bolts on one side of the GrainGage. Set aside.



2. Attach the Mesa 3 cradle using the mount bolts.



3. Place the Mesa 3 in the cradle.
4. The Mesa 3 power cable and USB cable extend from a hole in one side of the GrainGage. Plug them into the Mesa 3.

Note: Remove the Mesa 3 during transport.

1.2.4 Connect the Battery



1. Connect the leads on the battery cable to the appropriate terminals on a 12 V battery:

Red = Positive

Black = Negative

Note: Mirus warns the user when the battery or power source drops below 11 V.

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CHAPTER TWO

Mirus and H2 Stationary GrainGage Setup

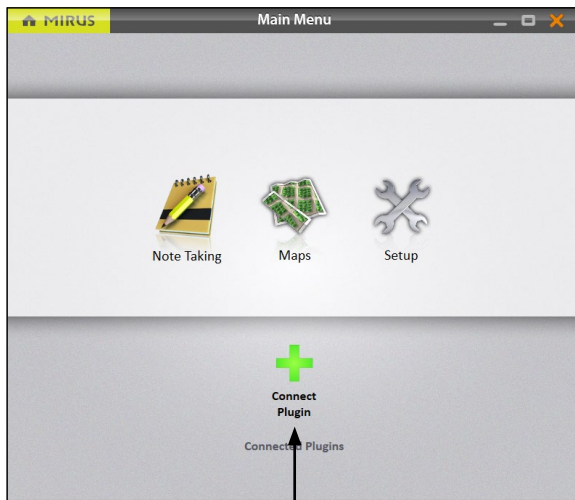
2 Mirus and H2 Stationary GrainGage Setup

2.1 Start Mirus

Double tap the Mirus icon  on your Windows desktop.

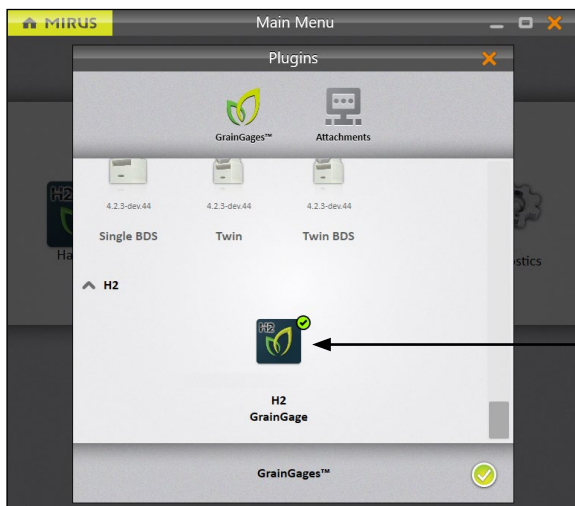
Mirus opens the Home screen.


2.1.1 Load the H2 GrainGage Plugin



On the Mirus Home screen,

1. Tap **Connect Plugin**.



2. Tap **H2 GrainGage**.
3. Tap the check icon .

Note: Mirus for H2 GrainGages doesn't display the specific type of GrainGage for you to select. The software can detect which GrainGage is connected.

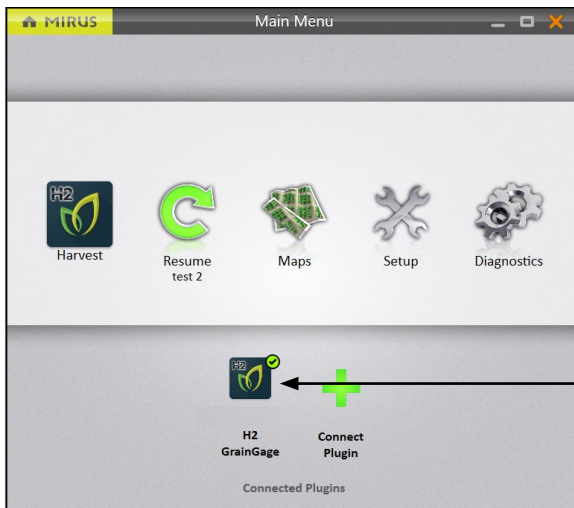


If Mirus is unable to detect the H2 GrainGage, the software may display a device connection error.

- Check the GrainGage power source and cables.

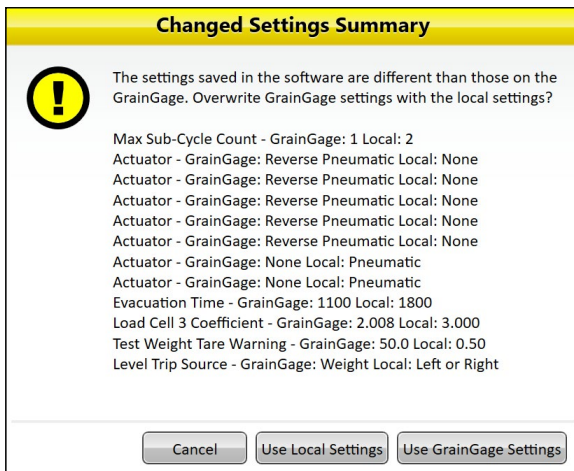
Or

- Select the **Use Emulator** option to proceed without connecting the H2 GrainGage. Emulator Mode is not recommended for setting up the H2 Stationary GrainGage.



After adding the H2 GrainGage plugin, Mirus displays an icon for the H2 GrainGage on the Main Menu screen.

H2 GrainGage



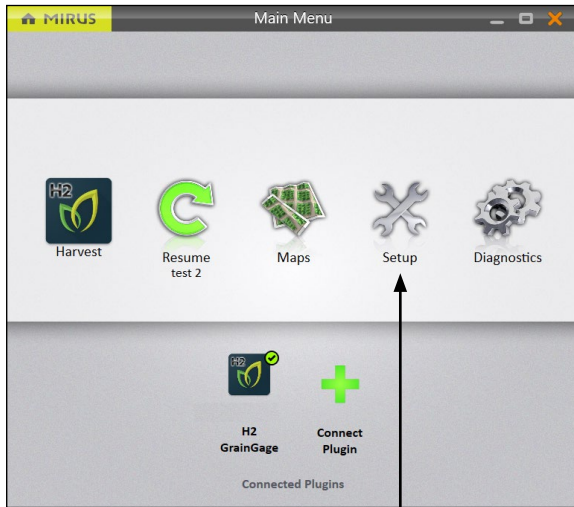
If you upgraded Mirus to a new version before connecting to the GrainGage, Mirus might display a Changed Settings Summary warning. You will be prompted to **Use Local Settings** or **Use GrainGage Settings**.

- Local settings use the current settings on the tablet.
- GrainGage settings use the old settings saved to the GrainGage from the previous Mirus version.

*Note: HarvestMaster recommends choosing **Use GrainGage Settings**.*

2.2 Setup Mirus Preferences

2.2.1 Open Setup

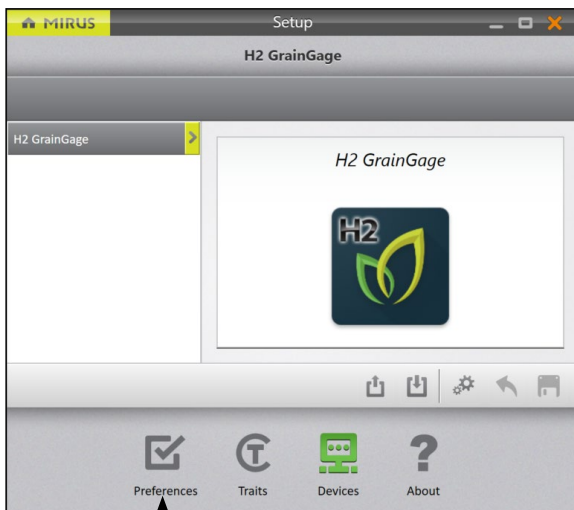


On the Home screen,

1. Tap **Setup**.

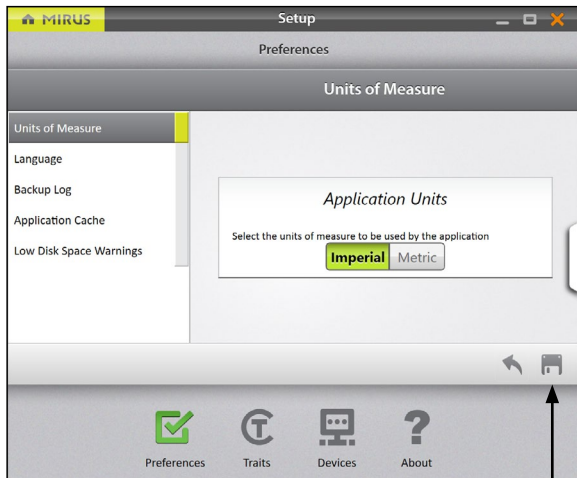
Mirus opens the Setup screen.

2.2.2 Set Preferred Units of Measure



On the Setup screen,

1. Tap **Preferences**.

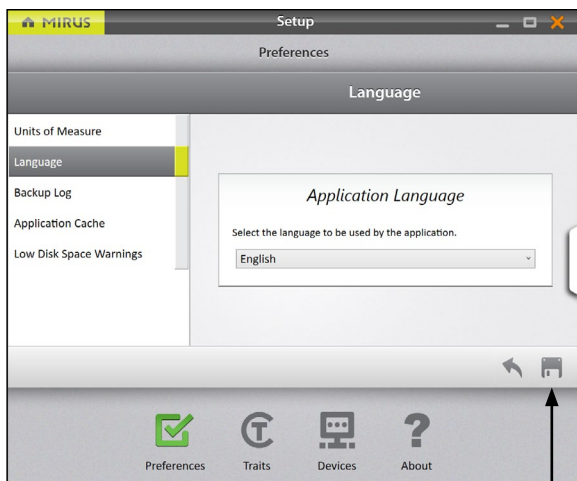


Save

On the **Setup > Preferences** screen,

2. Tap **Units of Measure**.
3. Select your preferred units of measure.
4. Tap **Save**.

2.2.3 Set Preferred Language

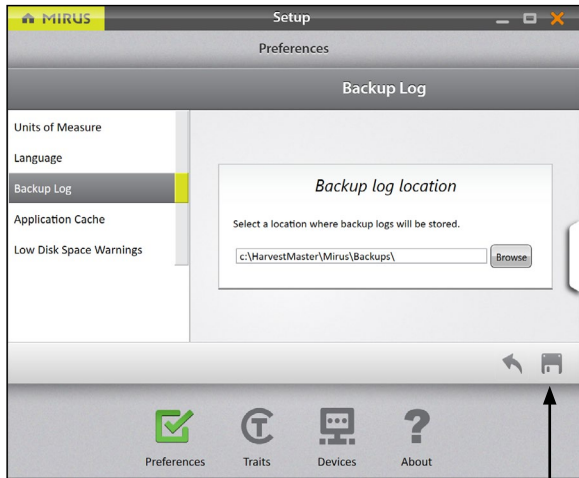


Save

On the **Setup > Preferences** screen,

1. Select **Language**.
2. Choose your preferred language.
3. Tap **Save**.

2.2.4 Set Preferred Backup Log Location

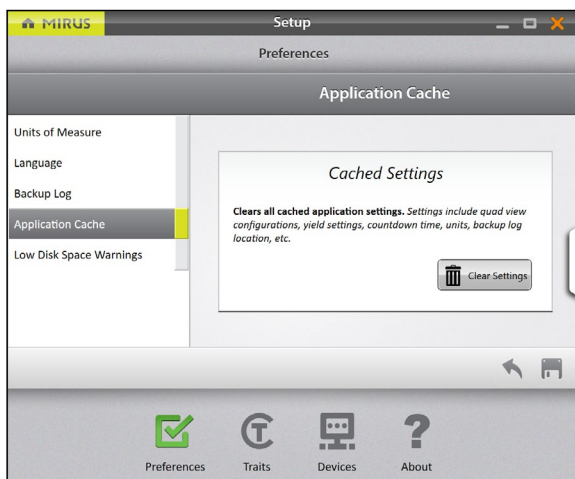


On the **Setup > Preferences** screen,

1. Tap **Backup Log**.
2. Enter your preferred file path for the Mirus backup log.
3. Tap **Save**.

Note: Changing the Backup Log location is not recommended. If you do change it, be sure to record the new location.

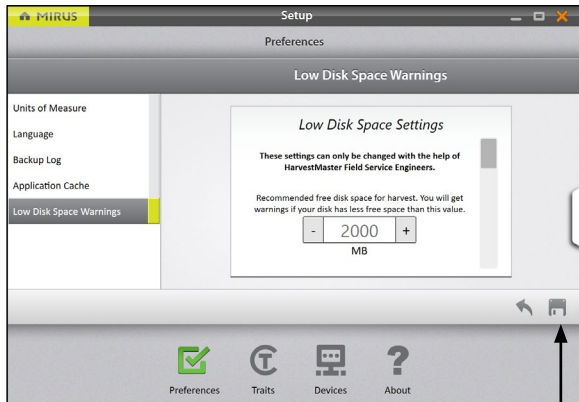
2.2.5 Clear Cached Settings



This option can be found on the **Setup > Preferences** screen.

⚠ CAUTION: This cannot be undone! Clearing the cache will erase all application settings and restart Mirus. This should only be done in consultation with a HarvestMaster Field Service Engineer.

2.2.6 Set Low Disk Space Warnings



Save

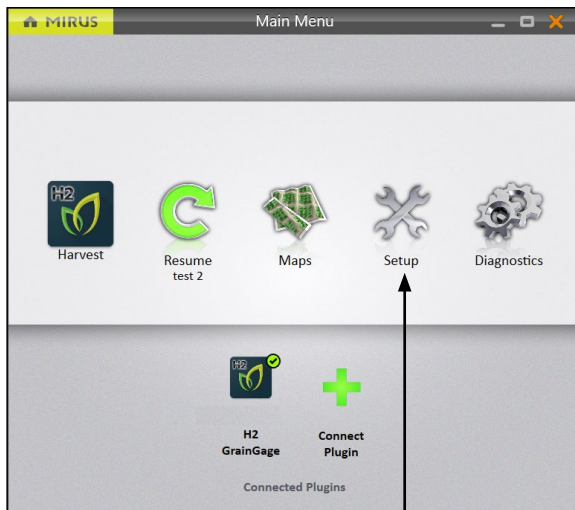
On the **Setup > Preferences** screen,

1. Tap **Low Disk Space Warnings**.
2. Set the amount of available disk space left that will trigger a warning.
3. Set the minimum amount of disk space to allow harvest.
4. Tap **Save**.

! **CAUTION: This should only be done in consultation with a HarvestMaster Field Service Engineer.**

2.3 Setup the H2 Stationary GrainGage

2.3.1 Open Setup



Setup

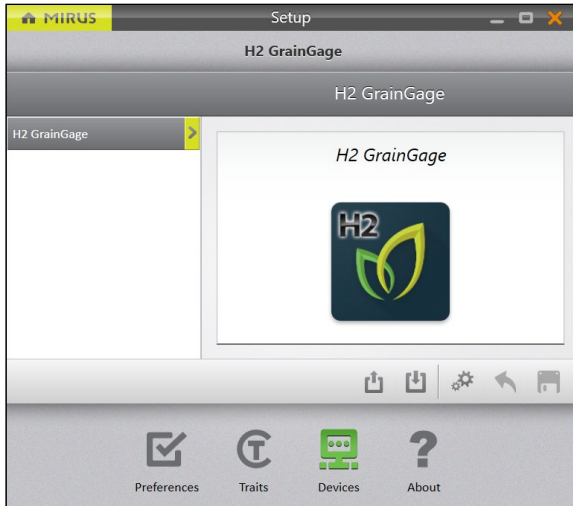
On the Home screen,

1. Tap **Setup**.

Mirus opens the Setup screen.

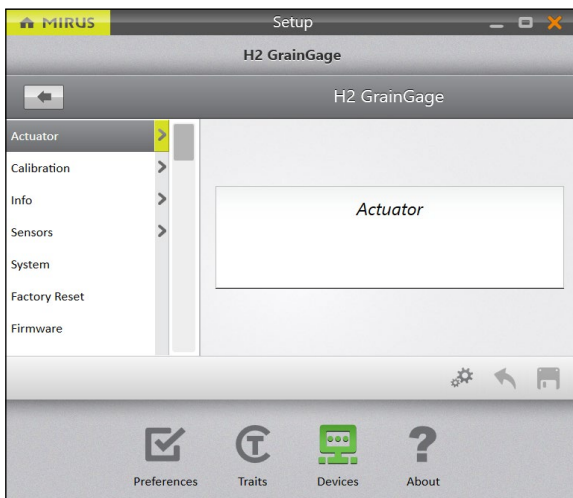
2.3.2 Configure Actuator

Note: Changing actuator times should only be done under the direction of a HarvestMaster Field Service Engineer. This is especially true if you intend to shorten the times.



The Setup screen opens by default to Devices. This is where you will set up your GrainGage.

1. Tap **H2 GrainGage**.



2. Tap **Actuator**.

Mirus opens the Actuator Setup screen. This is where you can configure settings for the actuator in the GrainGage.



Tap **Description** for more information about each option.

The following tables display the default values for each actuator:

Evacuation Gate Settings		
Setup Parameter	Default Value	Description
Actuator	Electro-Mechanical	The type of actuator.
Limit Switch on Close	No	Enables the limit switch when the gate closes.
Limit Switch on Open	No	This is not supported in the H2 Stationary. Enables the limit switch when the gate opens.

*Note: Preconfigured values are default values based on generalized harvest conditions. They may not reflect the optimum settings for the harvest conditions for your particular climate, fields, or grains. Changing default values requires a certain level of experience. Please contact HarvestMaster Field Service Engineers when adjusting these settings. See **8.4.2 Contact a HarvestMaster Field Service Engineer** on page 93.*

*Note: For calibration instructions, see **Chapter 4 H2 Stationary GrainGage Calibration** on page 45.*

2.3.3 View GrainGage Info

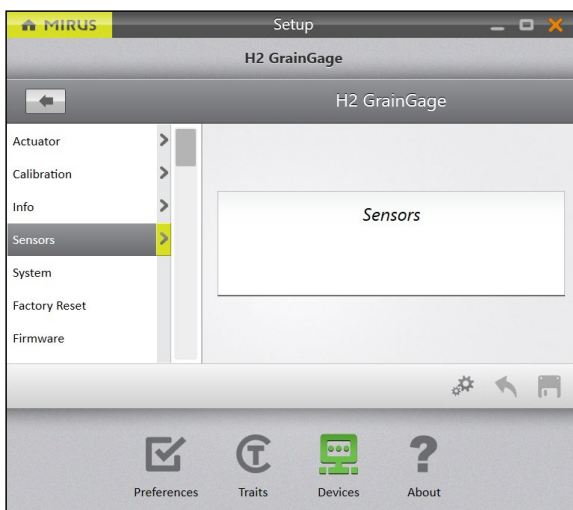


On the **Setup > H2 GrainGage** screen,

1. Tap **Info**.

Mirus opens the Info screen where you can view Chamber, Module, and Sensor information for the H2 GrainGage.

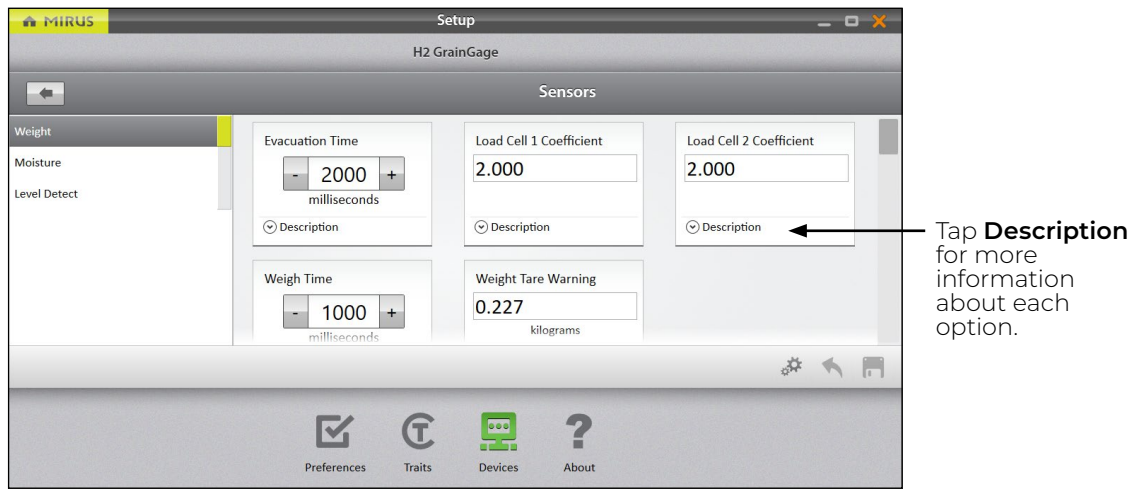
2.3.4 Configure Weight Sensors



On the **Setup > H2 GrainGage** screen,

1. Tap **Sensors > Weight**.

Mirus opens the Weight Sensors Setup screen where you can configure weigh bucket settings for the GrainGage.



The following table displays the typical preferred setting for each item on this screen.

Weight Sensors Settings		
Setup Parameter	Default Value	Description
Evacuation Time	2000 msec	The amount of time the evacuation gate remains open to allow for the evacuation of all grain from the weigh bucket. This setting overrides the open state time for the evacuation gate. <i>Caution: Wetter grain or oil seeds may require longer evacuation times.</i>
Load Cell Coefficients	2.000	The default values for load cell coefficients are placeholders. These are custom values that are generated during weight calibration. They are used to convert millivolt readings from the load cells into pounds or kilograms.
Weigh Time	1000 msec	The period over which weight readings are averaged. A shorter weigh time may reduce the accuracy of the measurement.
Weight Tare Warning	0.500 lb (0.227 kg)	This is the threshold above which a tare warning is generated after weigh bucket evacuation.

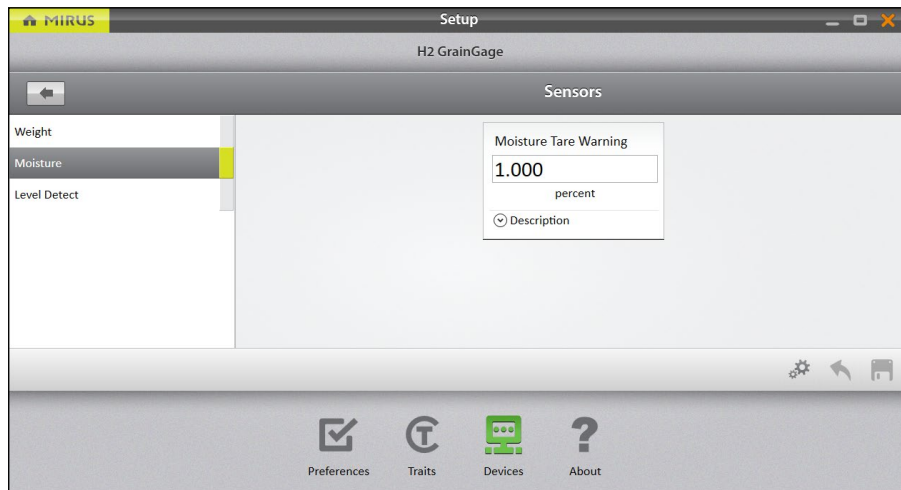
*Note: Preconfigured values are default values based on generalized harvest conditions. They may not reflect the optimum settings for the harvest conditions for your particular climate, fields, or grains. Changing default values requires a certain level of experience. Please contact HarvestMaster Field Service Engineers when adjusting these settings. See **8.4.2 Contact a HarvestMaster Field Service Engineer** on page 93.*

2.3.5 Configure Moisture Sensors

On the **Setup > H2 GrainGage > Sensors** screen,

1. Tap **Moisture**.

Mirus opens the Moisture Sensor Setup screen where you can configure the moisture setting for the GrainGage.



Moisture Sensor Settings

Setup Parameter	Default Value	Description
Moisture Tare Warning	1%	A tare warning is generated above this threshold when the chamber is empty.

Note: To edit other moisture settings see **4.2.3 Moisture Calibration on page 50**.

2.3.6 Configure Level Detect Sensor

Level Detect is not used with the H2 Stationary GrainGage.

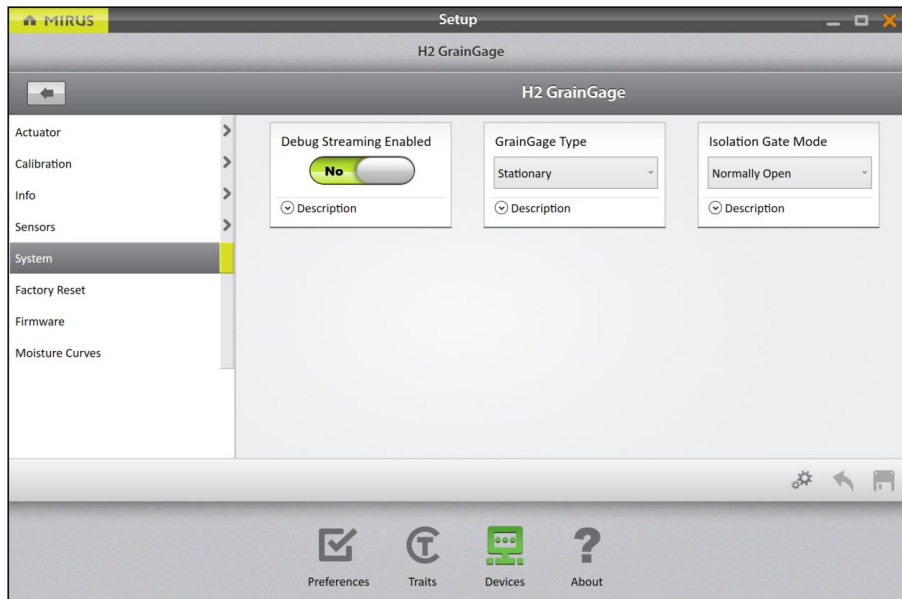
2.3.7 Configure H2 Stationary GrainGage System Settings

On the **Setup > H2 GrainGage** screen,

1. Tap **System**.



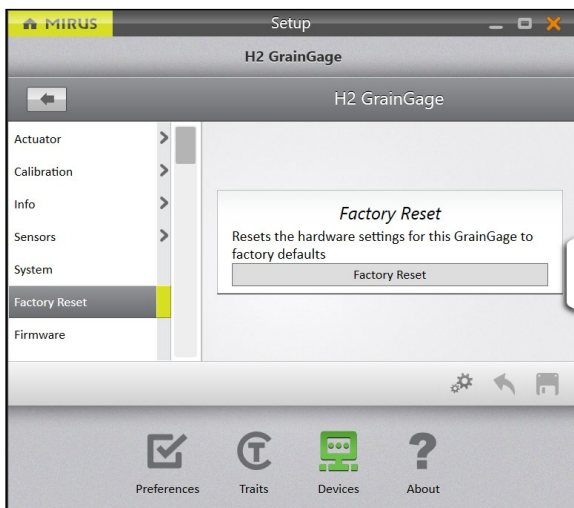
Mirus opens the System Setup screen. This is where you can configure GrainGage settings.



The following table displays the typical preferred setting for each item on this screen.

System Settings		
Item	Default Value	Description
Debug Streaming Enabled	No	This enables debug streaming messages for the DSP module. Enabling this is only recommended when troubleshooting the GrainGage with a HarvestMaster Field Service Engineer.
GrainGage Type	Stationary	Designates which GrainGage type is connected to Mirus.
Isolation Gate Mode	Normally Open	Not used with the H2 Stationary GrainGage. Controls the initial state of the isolation gate. In some situations, closed is preferred.

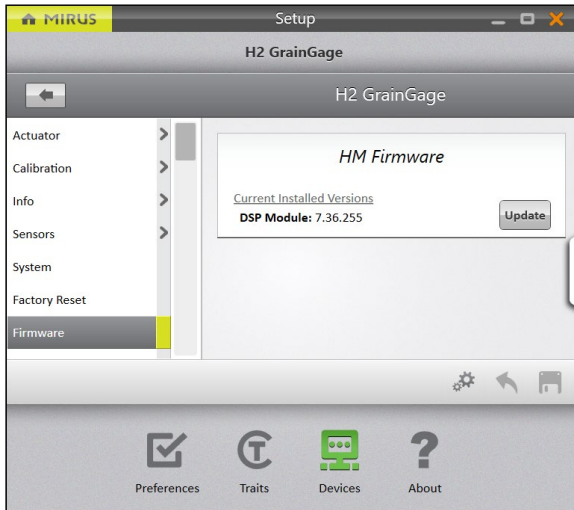
2.3.8 Reset the H2 Stationary GrainGage to Factory Settings



This option can be found on the **Setup > H2 GrainGage > Factory Reset** screen.

⚠ CAUTION: This cannot be undone! Resetting the GrainGage to factory defaults will clear all your settings, including actuator timers and weight calibrations. This should only be done in consultation with a HarvestMaster Field Service Engineer.

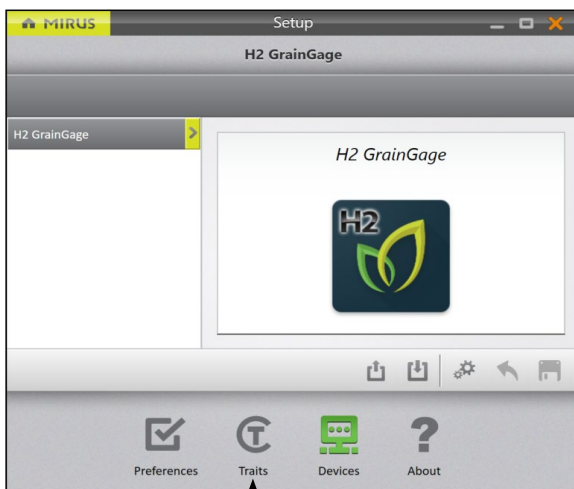
2.3.9 Update H2 Stationary GrainGage Firmware



This option can be found on the **Setup > H2 GrainGage > Firmware** screen.

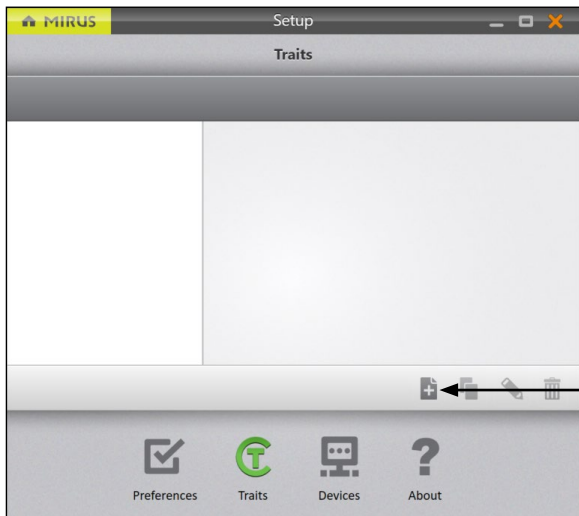
As an operator, it is unlikely you will need this screen. When you install or update Mirus, the program will check for the latest firmware and update it then. The purpose of this screen is mostly to help HarvestMaster Field Service Engineers during troubleshooting procedures.

2.3.10 Create and Record Barcode Traits



This option can be found on the **Setup > Traits** screen.


Traits




To create a new trait,

1. Tap the new icon .

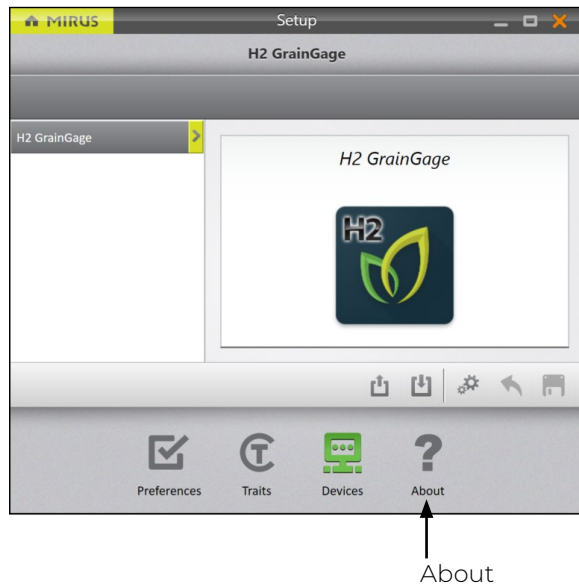
New Trait

2. Enter a **Name** and **Description** for the new trait.
3. Select the **Text** trait **Type**.
4. Select **After Plot**. This determines you want Mirus to prompt the operator to record the trait after you cycle the plot.
5. Specify the **Length**, or number of characters allowed in the record field. This should be determined by the number of characters in the barcode. Mirus will auto advance once the character length is met.
6. Select **No** to indicate the trait is not **Repetitive**.
7. It is not necessary to fill in a **Default Value**.
8. Tap the next arrow  to save the trait.

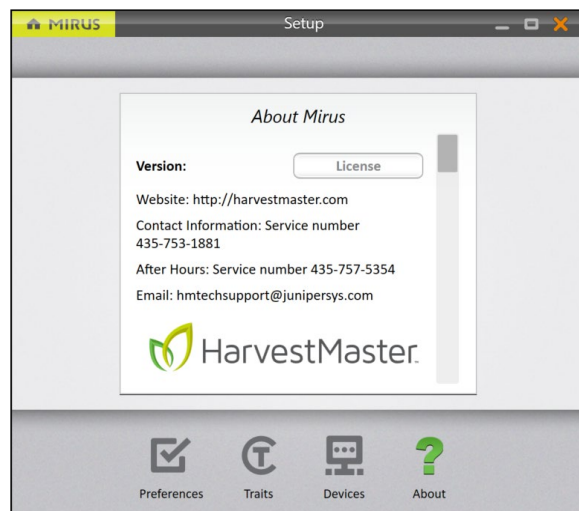
The following table describes the settings for each item on this screen.

New Trait Settings	
Item	Description
Name	This is the name of the trait.
Description	This describes the type of data to be recorded within the trait.
Type	<ul style="list-style-type: none"> • Text: A text trait allows the user to record text relative to the individual plot. You can set a character limit (Length) and/or a Default Value for quick selection. • Number: A number trait allows the user to record a number (e.g., a score) relative to an individual plot. You can set a character limit (Length) and/or a Default Value for quick selection. • List: A list trait allows the user to select a value from a list of options. The list is created by entering the values in the Default Value field. To add multiple values, tap the plus icon  on the right side of the window. This feature functions best when selecting from no more than five different trait values. • Date: A date trait records dates. The Default Value is the current date, but a user may select a different date.
Harvest Collection Time	Specifies whether trait data will be collected before or after cycling the plot.
Length	This setting helps Mirus know when to move on to the next trait. After the allotted number of characters is entered, Mirus moves on automatically so the operator doesn't need to press enter.
Repetitive	Selecting "Yes" indicates data for that trait will be collected multiple times on different days. For example, if you wanted to rate your grain for disease three times a year, you would have a repetitive disease trait.
Default Value	This is the most common or most expected value for this trait. Mirus will automatically populate the record field with this value to save the operator time. The operator only needs to press or tap Enter. If the value is different from the default value, the operator can enter the new value then press Enter.

2.3.11 View Information About Mirus



This option can be viewed on the **Setup > About** screen.



This screen shows information about Mirus, including the version number, license information, website, and contact information.

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H2 Stationary

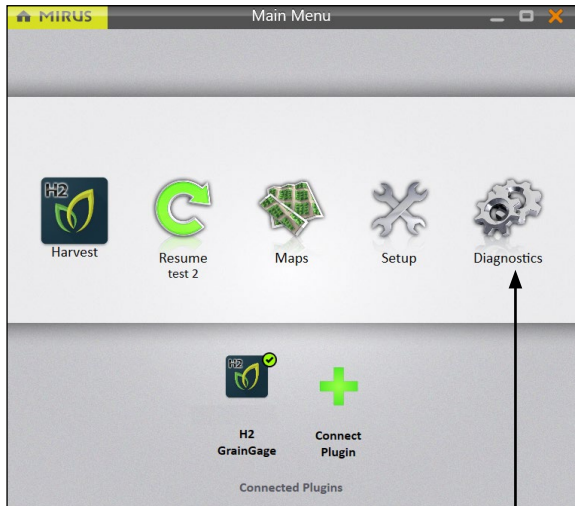


CHAPTER THREE

H2 Stationary GrainGage Diagnostics and Alerts

3 H2 Stationary GrainGage Diagnostics and Alerts

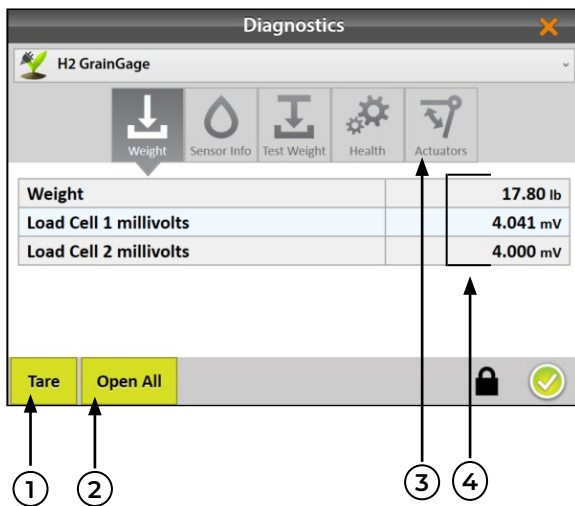
3.1 Diagnostics Dialog Box



Diagnostics

On the Home screen,

1. Tap **Diagnostics**.
Mirus opens the Diagnostics dialog box.



In Diagnostics, Mirus:

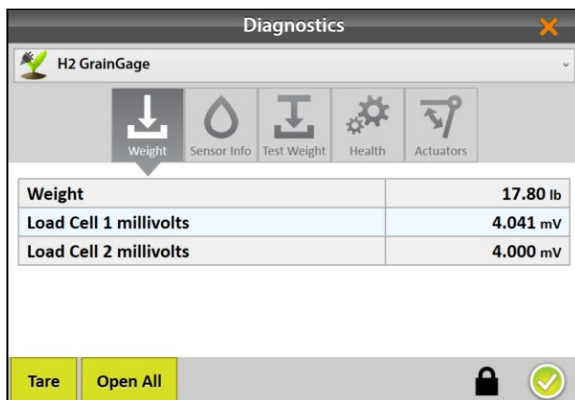
1. Allows the operator to tare all load cells and the moisture sensor in the GrainGage.
2. Allows the operator to open and close all the gates in the GrainGage and allows the grain to flow straight through. This function is not necessary in the H2 Stationary GrainGage.
3. Provides direct access for manually opening and closing the actuators.
4. Displays live readings from the GrainGage.

*Note: Tapping **Tare** in any Diagnostics tab tares all sensors (load cells and moisture). Mirus does not allow taring of individual sensors.*


The icon panel across the top of the Diagnostics dialog box allows you to access each diagnostic category. All Diagnostics screens show the **Tare** and **Open All** (or **Close All**) buttons, as explained in the following table:

Diagnostics Tare and Open/Close Gates	
Item	Description
Tare button	<p>Use the Tare button to zero all load cells and the moisture sensor. The tare process is as follows:</p> <ul style="list-style-type: none"> • Check the GrainGage and make sure it is free of grain or debris. • Tap Tare. • The gates open and clear the GrainGage. • The gates close. • Load cell voltages average over 4 seconds. • Mirus then uses that average to establish the zero weight readings for the empty weigh bucket. • Mirus also resets the moisture to zero.
Open All button	<p>This function is not used with the H2 Stationary GrainGage.</p> <p>Use the Open All button to put the GrainGage in Glean Mode. This mode opens all gates in the GrainGage so that grain flows straight through unimpeded. Use Glean Mode when you need to glean off border plots. In this mode, the button changes to Close All. No data will be collected or recorded in Glean Mode.</p>
Close All button	<p>This function is not used with the H2 Stationary GrainGage.</p> <p>Use the Close All button to put the GrainGage into Harvest Mode and return to measuring the grain and recording data.</p>

3.1.1 Tare the GrainGage



In the Diagnostics box,

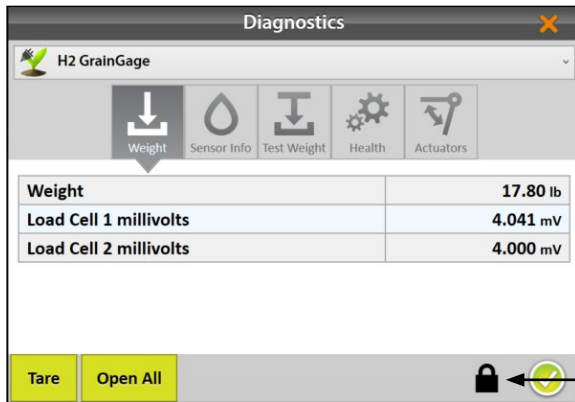
1. Tap **Tare**.
2. After the tare is complete, tap the check icon  to exit Diagnostics.

Note: Taring should be the last thing you do before you start to harvest.

3.1.2 Open and Close All Gates

This function is not used with the H2 Stationary GrainGage.

3.1.3 Weight Diagnostics



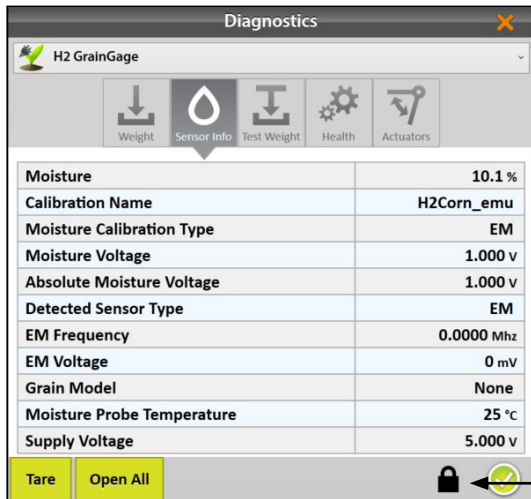
On the Weight Diagnostics screen, live values are shown for the load cells.

Unlock the screen to view additional information.

Weight Diagnostics	
Item	Description
Weight	Shows the weight of the contents in the weigh bucket. Depending on the preferred units of measure, weight will be shown in pounds or kilograms. To change the units of measure see 2.2.2 Set Preferred Units of Measure on page 21.
Load Cell 1 millivolts / Load Cell 2 millivolts	These readings are for the two load cells that measure plot weight. The millivolt readings vary linearly with weight added. The empty weigh bucket causes the load cells to read between 3 and 4 mV.

3.1.4 Moisture Diagnostics

On the Moisture Diagnostics screen, live values are shown for the moisture sensor in the GrainGage.



Unlock the screen to view additional information.

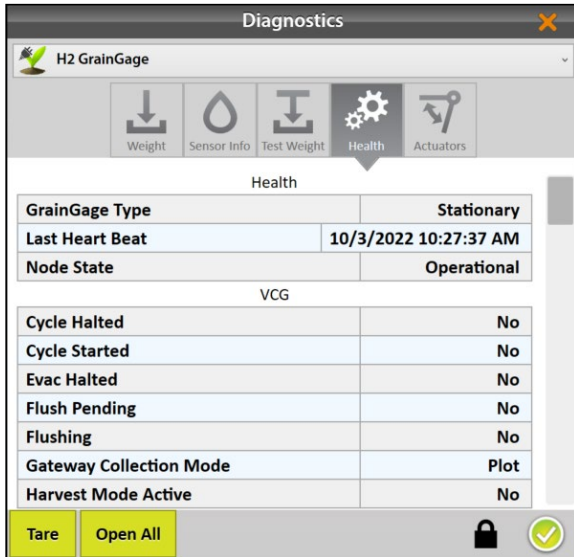
Moisture Diagnostics

Item	Description
Moisture	This is the moisture measurement for grain in the area around the moisture blade.
Curve Name	This is the name of the grain moisture curve that is applied. It is typical to have a moisture curve for each type of grain being harvested (e.g. corn, wheat, soy beans, etc.).
Moisture Curve Type	This displays the type of the active moisture calibration.
Insert Count	This function is not used with the H2 Stationary GrainGage. The number of inserts specified in the active chamber calibration.
Moisture Voltage	This is a relative voltage reading that is calculated based on the EM sensor reading and empty chamber voltage. This voltage is part of moisture curve calculations. It can be used to tune or generate a new moisture curve.
Absolute Moisture Voltage	This is the raw moisture sensor reading without any offset applied from a moisture curve. This is primarily used for troubleshooting.
EM Frequency	This is a basic measure used for calculating grain moisture. This value is typically between 1.5 and 1.8 V for an empty chamber.
EM Voltage	This is a basic measure used for calculating grain moisture. This value is typically about 1.600 V for an empty chamber.
Moisture Probe Temperature	This is the temperature measured by the moisture probe. Since the sensed signal from moist grain decreases with temperature, the temperature measurement is used to apply a correction in calculating grain moisture. It is measured in degrees Celsius.
Supply Voltage	The amount of supply voltage the moisture sensor is receiving. This value is typically between 11 and 14 V.

3.1.5 Level Detect Diagnostics

Level Detect is not used with the H2 Stationary GrainGage.

3.1.6 Health Diagnostics



The Health Diagnostics screen is used by HarvestMaster Field Service Engineers.




3.1.7 Actuators Diagnostics

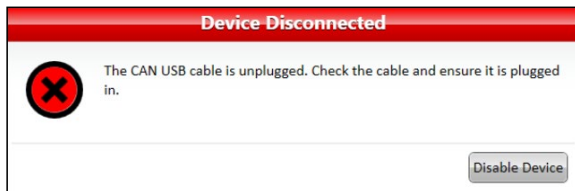


Use the Actuators Diagnostics screen to manually test the actuator controlling the evacuation gate in the GrainGage. For more information about actuators see **2.3.2 Configure Actuator on page 25**.

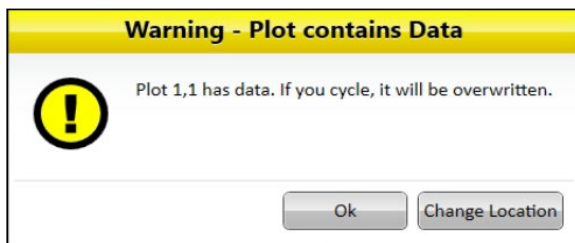
3.2 Alerts

Mirus uses three categories of user messages, distinguishable by the icon and color used with the message.

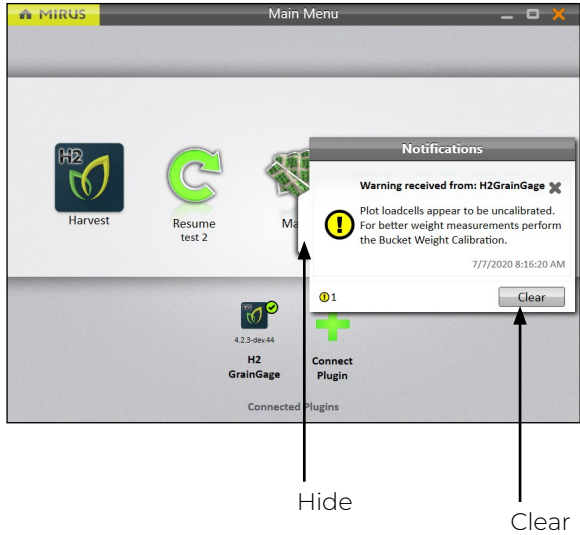
Mirus Alerts		
Icon	Category	Description
	Error	An error message describes a problem that prevents the user or GrainGage from completing a task. The problem could cause erroneous measurements, data corruption, data loss, or some other system malfunction.
	Warning	A warning message provides cautionary information.
	Confirmation	A confirmation message provides status information about the changing nature of an activity. These messages provide information to explain that the GrainGage is operating as expected.



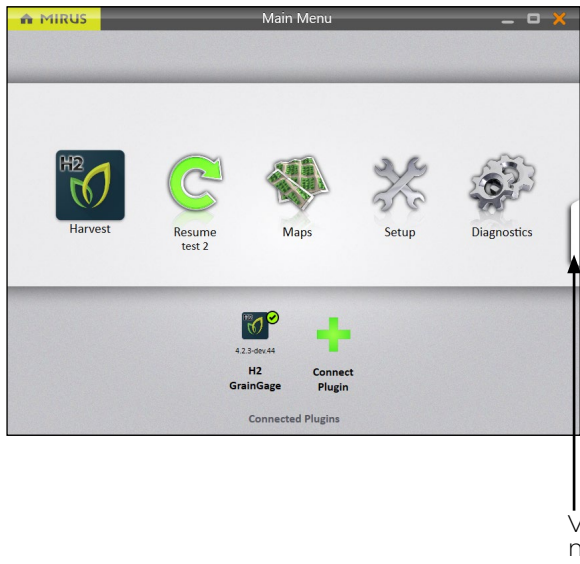
Messages requiring action appear in a dialog box. Click the button to acknowledge the message or to choose an option. The images below display examples of these messages.



Other messages appear as notifications that pop out from the right side of the window.



- Tap the white tab to hide the message.
- Or
- Tap the **X** or **Clear** to clear it.
- Or
- Do nothing and Mirus will automatically hide the message.



Messages that have been hidden can be viewed again by clicking on the notifications tab on the right edge of the window.

This tab is only visible if there are messages, and it disappears when there are no messages or when all messages have been cleared.



A message you might see when using the H2 Stationary GrainGage is an Excessive Vibration warning. This occurs if the GrainGage is not placed on solid ground.

GrainGage™

H2 Stationary



CHAPTER FOUR

H2 Stationary GrainGage Calibration

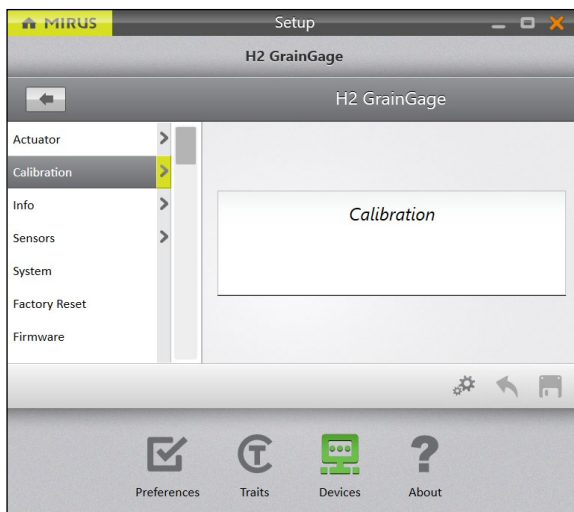
4 H2 Stationary GrainGage Calibration

4.1 Weigh Bucket Calibration

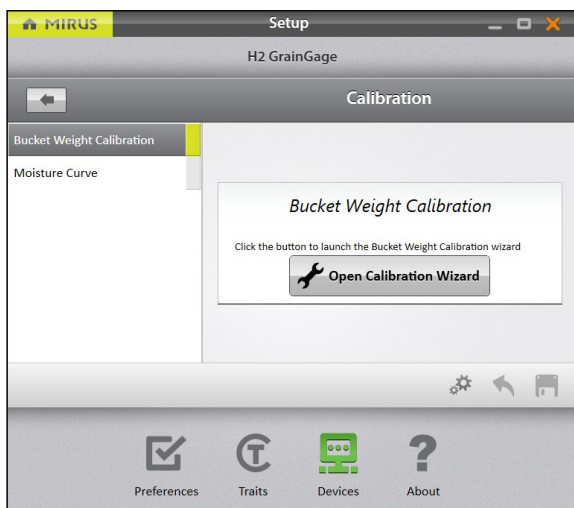
Weigh bucket calibration ensures the accuracy of the GrainGage's weight calculations. This calibration should be done on initial setup.

4.1.1 Calibrate Weigh Bucket

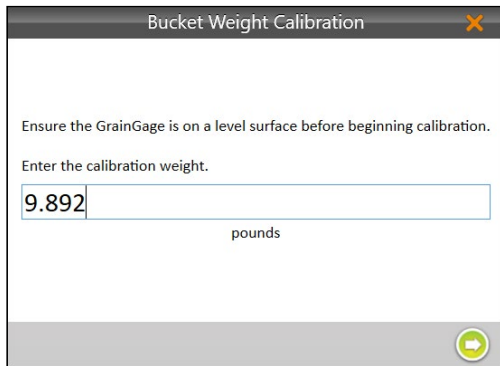
Use the weight calibration wizard and the weight included with the GrainGage to calibrate the weigh bucket.




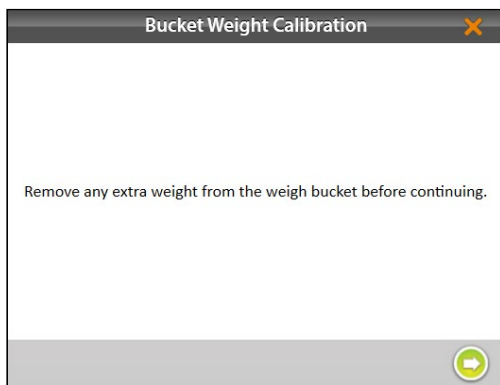
1. Ensure the weigh bucket is empty.
2. Go to **Home > Setup > H2 GrainGage**.
3. Tap **Calibration**.




4. Tap **Bucket Weight Calibration**.
5. Select **Open Calibration Wizard**.
6. Follow the on-screen instructions.



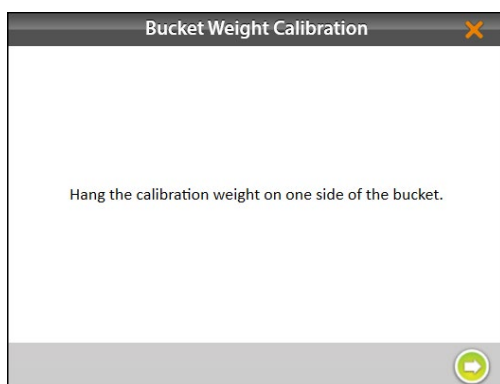
7. Find the value stamped on the side of the weight.
8. Enter that value in the prompt.
9. Tap the next arrow  to initiate the calibration.



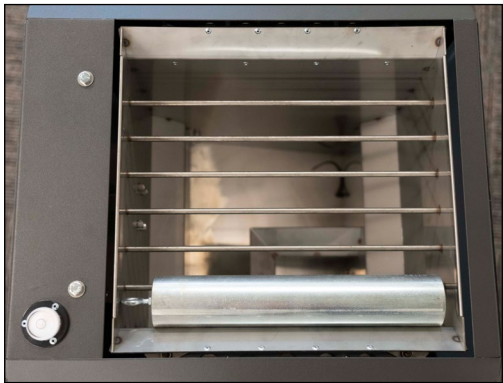
10. Check for and remove any extra weight from the weigh bucket.
11. Tap the next arrow  to continue.



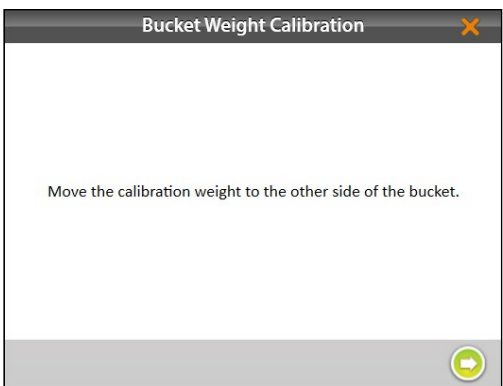
12. Place the weight on one side of the grill.



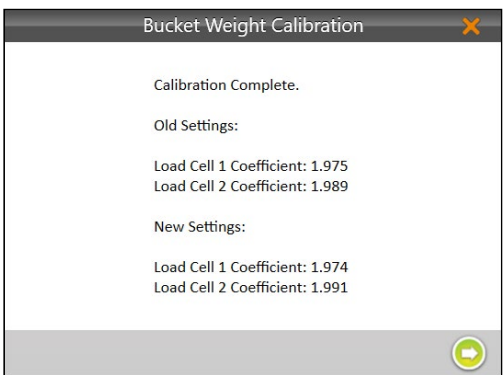
13. Tap the next arrow .



14. Place the weight on the other side of the grill.

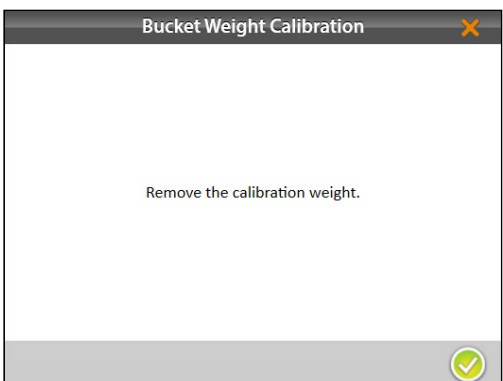


15. Tap the next arrow .




16. Mirus displays the old and new load cell coefficients.

17. Tap the next arrow .

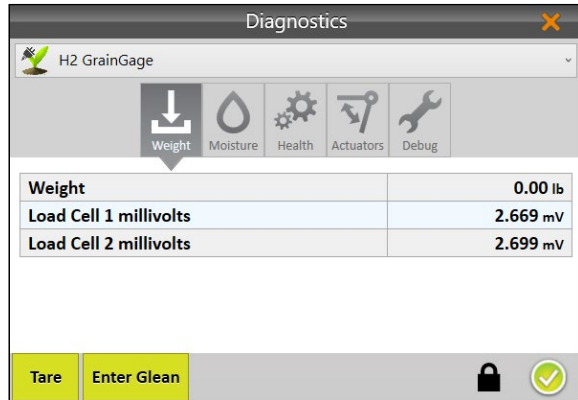


18. Remove the calibration weight.

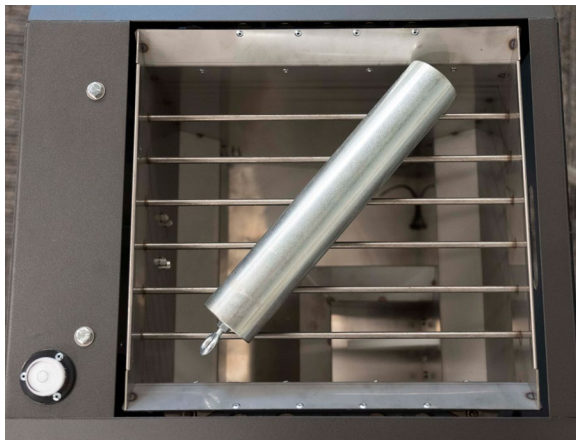
19. Tap the next arrow . The system will tare and show the new calibration values.

4.1.2 Check Weigh Bucket Calibration

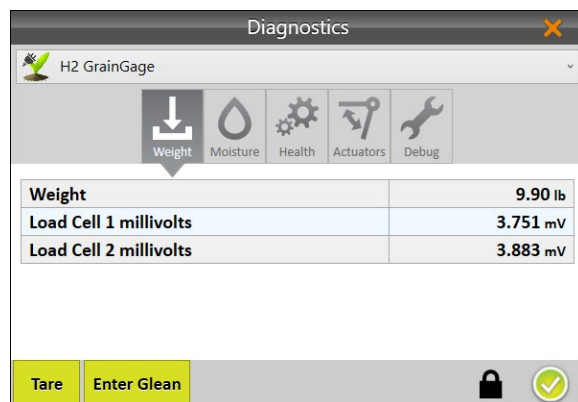
Weigh bucket calibration is stable. It rarely changes or loses accuracy. However, because the consequences of poor calibration can be devastating to your research data, HarvestMaster highly recommends checking the weigh bucket calibration every year before the harvest season begins, as well as every day before harvest. This can be done on the Weight Diagnostics screen.




1. After calibrating the weigh bucket, tap the gear icon  below the calibration wizard to open Diagnostics.



2. Place the calibration weight diagonally across the grill.



3. The Diagnostics screen should report Weight readings that are very close to the value stamped on the calibration weight. If it's not within .05 lb (23 g) HarvestMaster recommends a new weight calibration.
4. Tap the check icon  to close Diagnostics.

4.2 Moisture Curve Calibration

⚠ CAUTION: Do not re-wet grain samples. If you need to adjust the moisture content, take a natural sample and dry it down.

Before harvesting, you need to generate a chamber calibration (moisture curve). Chamber calibrations align the moisture reading with a benchtop lab sensor.

For better accuracy, the practices in this guide are designed to streamline the calibration process and teach users how to create moisture curves.

4.2.1 Prepare Samples

Preparing your samples is a critical first step towards creating and maintaining an effective moisture curve.

Step 1: Plan ahead for calibration. Creating an accurate moisture curve requires using grain samples with a range of moisture percentages. Collecting enough samples to calibrate properly requires some advanced planning. HarvestMaster recommends two separate strategies: planting grain varieties that will be available for harvest before test plots are ready or harvesting border plots early and drying them to varying moistures.

Step 2: Imitate harvest conditions. When calibrating, it is recommended that you imitate harvest conditions as close as possible. This means the grain has enough time to equilibrate to ambient outdoor temperature before calibrating. The grain should be cycled through the hopper to reduce grain packing differences.

HarvestMaster recommends cycling samples 3–5 times each in both the benchtop sensor and the GrainGage and then averaging the moisture readings. When possible, grain samples should be tested in the lab and in the GrainGage within an hour of each other.

Step 3: Collect and prepare samples. Your challenge is to create a moisture curve that is representative of the moisture range that will be encountered during harvest. The more samples available during calibration, the more accurate the curve will be. HarvestMaster recommends:

- Using a minimum of three samples to generate a curve. The more samples the better.
- Each sample should be at least 6 pounds.
- At least a 3% moisture range from lowest moisture to highest moisture.
- The more samples within about a 10% range the better, but two or three samples will suffice.

Step 4: Adjust for high moisture corn harvest. If you have high moisture samples, HarvestMaster recommends initially calibrating with samples below 26% to set the curve and then manually calibrating the curve above 26% for the high moisture samples. A split curve will generate better data than an average curve.

Step 5: Position a bucket or bin under the GrainGage to catch grain samples. Ensure the bucket or bin is at least 12 in (30.5 cm) tall, 15 in (38 cm) wide, and 15 in (38 cm) deep.

Step 6: Annually check and tune moisture curves. Checking and tuning moisture curves each season will give you the best data quality.

4.2.2 Moisture Calibration Overview

To begin the calibration you will need one sample that is at least 6 lb (2.7 kg). Cycle this sample three times after providing the Known Moisture. These values do not change between cycles of the same sample.

Continue the calibration with more samples. Start with the driest sample and move to the wettest. Each sample should be cycled at least three times. After the first cycle, the moisture values can be input by using the **Last Value** option.

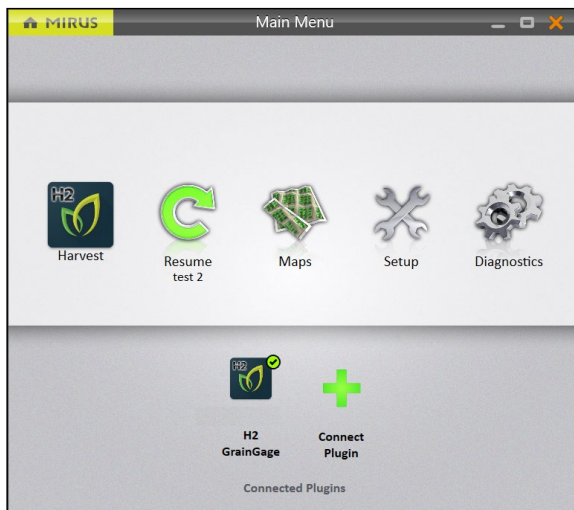
Calibration Steps		
	Cycle	Moisture
1.	Sample A	Driest sample
2.	Cycle Sample A two more times.	
3.	Sample B	Next sample going from driest to wettest.
4.	Cycle Sample B two more times.	
5.	Sample C	Wettest sample
6.	Cycle Sample C two more times.	

Note: This table reflects the minimum number of cycles needed to create a moisture curve. To improve your moisture curve, cycle several more moisture samples.

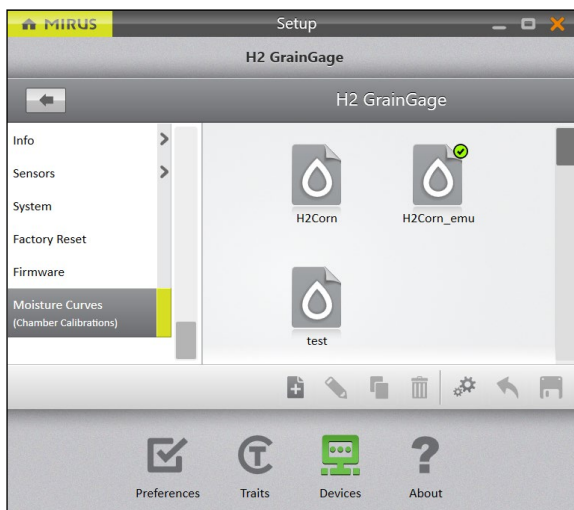
4.2.3 Moisture Calibration


To create a new moisture curve in Mirus for the H2 Stationary GrainGage, do the following:

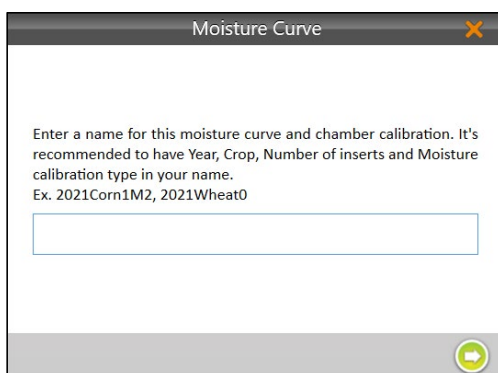
1. If the grain samples have been in air conditioning or cold storage, acclimate them by spreading them out on a clean surface in the shop overnight. **Do not** leave them in the sun to warm up.
2. Test the ambient samples in a benchtop sensor by cycling sub-samples from each larger sample 3–5 times and then average the moisture readings. This is the Known Moisture.
3. Within the hour, take the samples to the GrainGage. If you are calibrating outside, make sure the samples stay in the shade.




4. Open Mirus.
5. Make sure the **H2 GrainGage plugin** is loaded.
6. Select **Setup > H2 GrainGage**.



7. Scroll down and select **Moisture Curves**.
8. Tap the new icon .

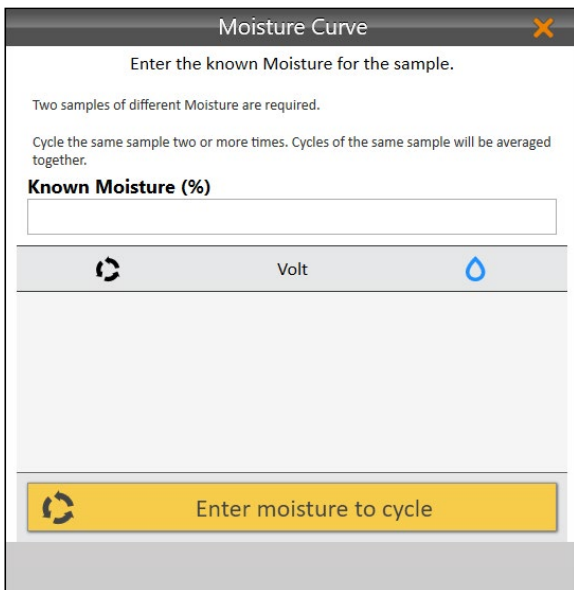


9. Enter a **Name** for the moisture curve.
10. Tap the next arrow .
11. Calibrate the chamber starting with the driest sample.



- Pour a grain sample into the GrainGage directly onto the moisture blade.

Note: The picture to the left shows the minimum amount of grain needed to cover the moisture blade.



- Enter the Known Moisture.
- Tap **Click to run a sample**.

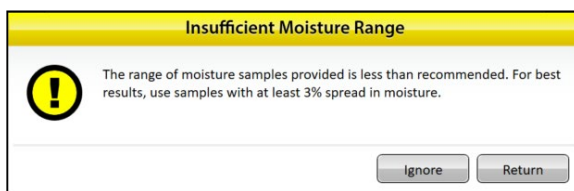
The GrainGage cycles the grain, and Mirus displays the voltage and moisture percentage.

- Collect the same sample and pour it into the GrainGage again.

Tap **Last Value** to automatically populate the Known Moisture with the same value as the previous sample.

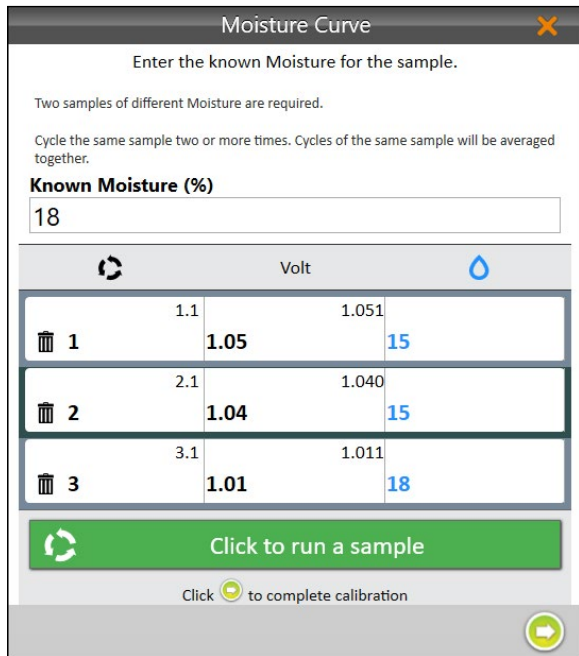
- Repeat steps 12–15 until all grain samples have been cycled through the GrainGage.

Note: HarvestMaster recommends using three to four samples and cycling them three times each.



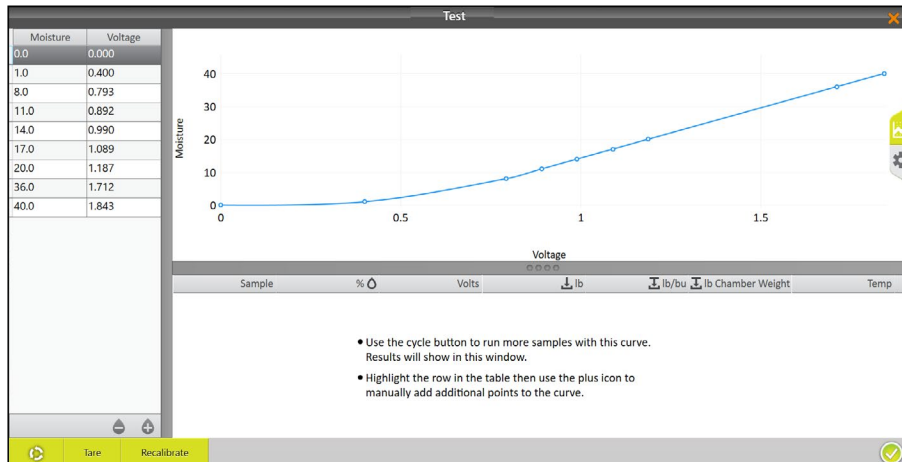
If the moisture content of your samples does not cover a range of at least 3%, Mirus displays an Insufficient Moisture Range warning.

- Tap **Ignore** to continue with the current samples.
- Tap **Return** to add more samples with a variety of moisture percentages.



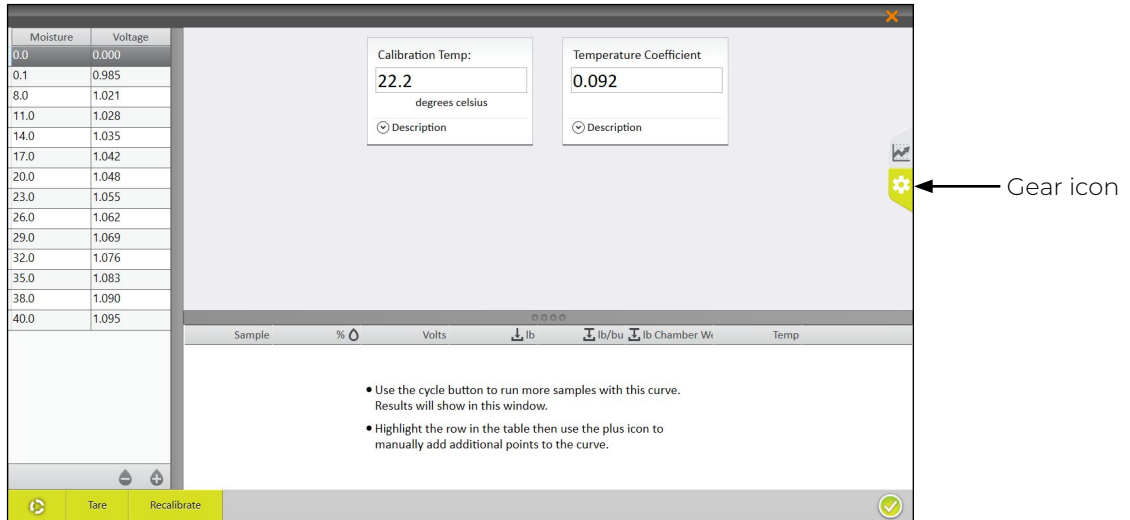
17. Tap the next arrow to complete the calibration.
18. Tap the check icon.

19. Mirus displays the moisture curve and voltages graphically.
20. Tap the check icon to save the new moisture curve.



If desired, first tap the gear icon  on the right for more information about this moisture curve.

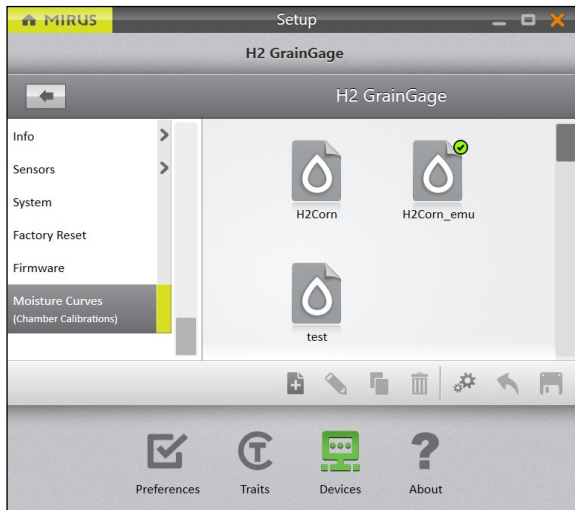
Note: Only adjust these settings if a HarvestMaster Field Service Engineer tells you to.





4.2.4 Test and Tune a Moisture Curve

HarvestMaster recommends testing the new moisture curve against other grain samples to confirm the moisture.

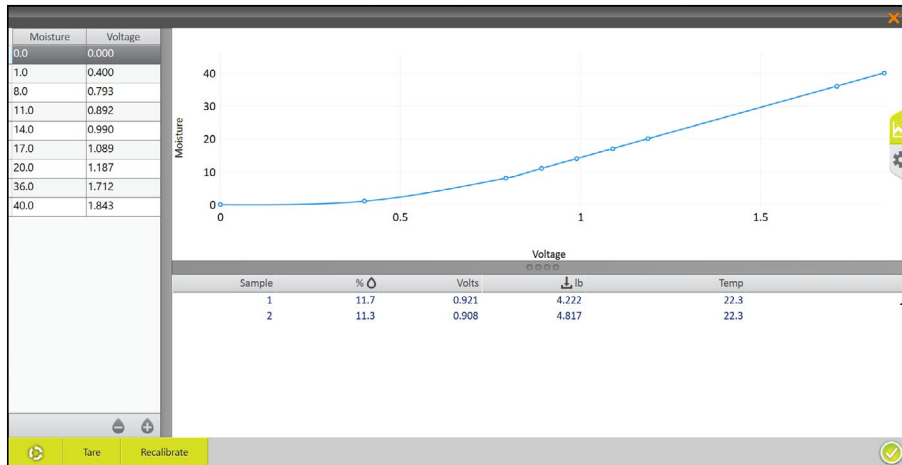
1. Test the grain sample in a benchtop sensor by cycling sub-samples from the larger sample 3–5 times and averaging the moisture readings. The averages are the Known Moisture.
2. Within the hour, take the sample out to the GrainGage. If you are calibrating outside, make sure the sample stays in the shade.



3. Open Mirus.
4. Go to **Setup > H2 GrainGage > Moisture Curves**.
5. Select the moisture curve you want to test.
6. Tap the edit icon .

7. Pour the grain sample into the hopper (to simulate harvest).
8. Tap the **Cycle** button .

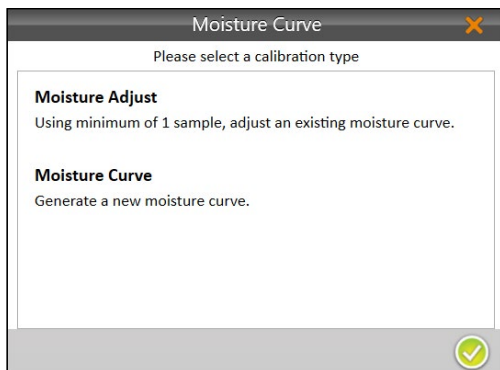
Mirus displays the moisture, voltage, bucket weight, and temperature of the sample.



New sample readings

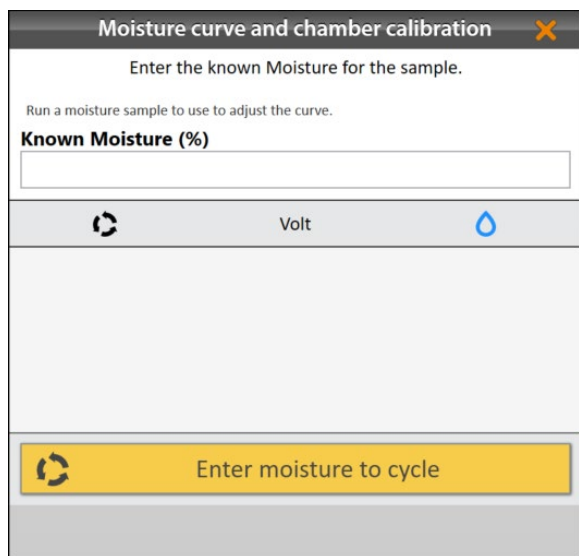
9. Cycle the sample through the GrainGage (repeat steps 7 and 8) two more times. This allows Mirus to average the moisture readings for the sample.
10. If the moisture curve needs to be tuned to match the sample, tap **Recalibrate**.

The Recalibrate feature is designed to adjust previously created moisture curves to match a new grain sample. The slope of the curve is not changed. The entire curve shifts to match the new sample. Fine tuning of a curve is often done later in the season as additional moisture samples are available.

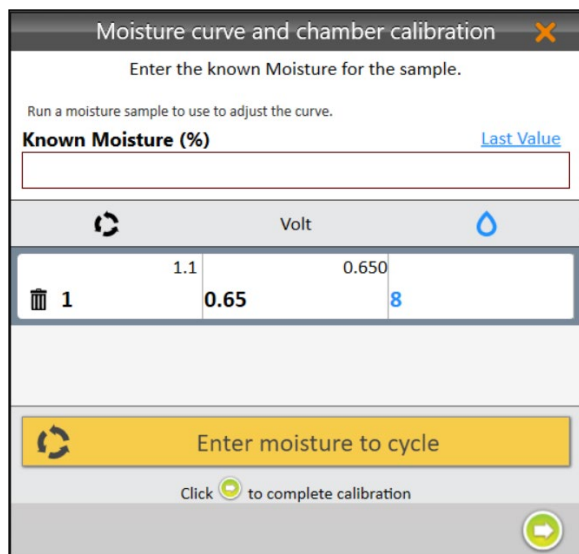


11. Select **Moisture Adjust** and tap the next arrow .

Note: Multiple samples can be used to adjust an existing moisture curve.



12. Pour the grain sample directly onto the moisture blade.
13. Enter the Known Moisture percentage.
14. Tap **Click to run a sample**.



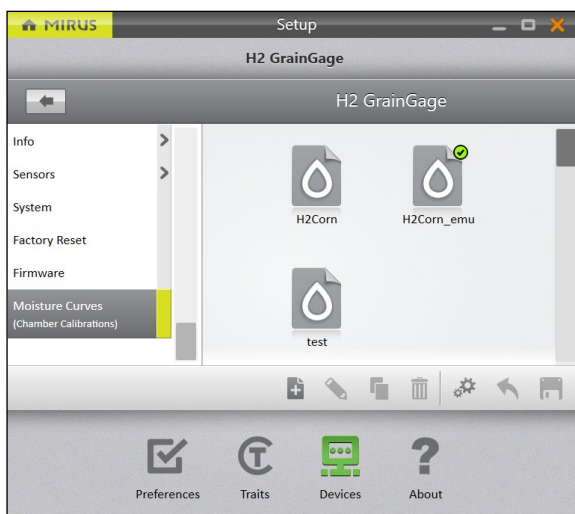
15. Repeat steps 12–14 with the same sample at least two more times.
*Note: The **Last Value** button can be used to fill the Known Moisture field with the previous percentage when the same sample is run multiple times.*
 16. Tap the next arrow ➡ to complete the recalibration.
 17. Tap the check icon ✓.
- Mirus displays the adjusted moisture curve with its moisture percentages and voltages.

4.2.5 Manually Adjust a Moisture Curve

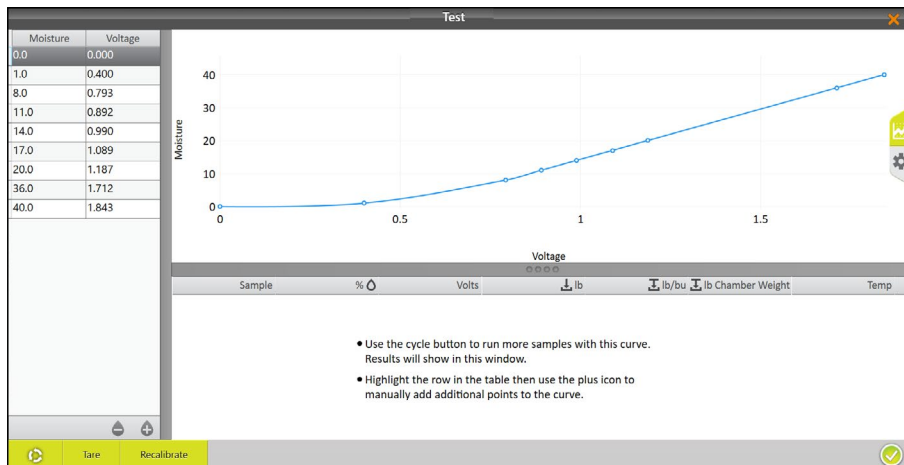
If desired, you can manually adjust a moisture curve using one or more grain samples.

*Note: Manually adjusting the curve should be done by more experienced users. If you are unfamiliar with moisture curves, call a HarvestMaster Field Service Engineer to walk you through the adjustment. See **8.4.2 Contact a HarvestMaster Field Service Engineer** on page 93.*

1. Test the grain samples in a benchtop sensor by cycling sub-samples from each larger sample 3–5 times and averaging the moisture readings. This is the Known Moisture.
2. Within the hour, take the samples out to the GrainGage. If you are calibrating outside, make sure the samples stay in the shade.



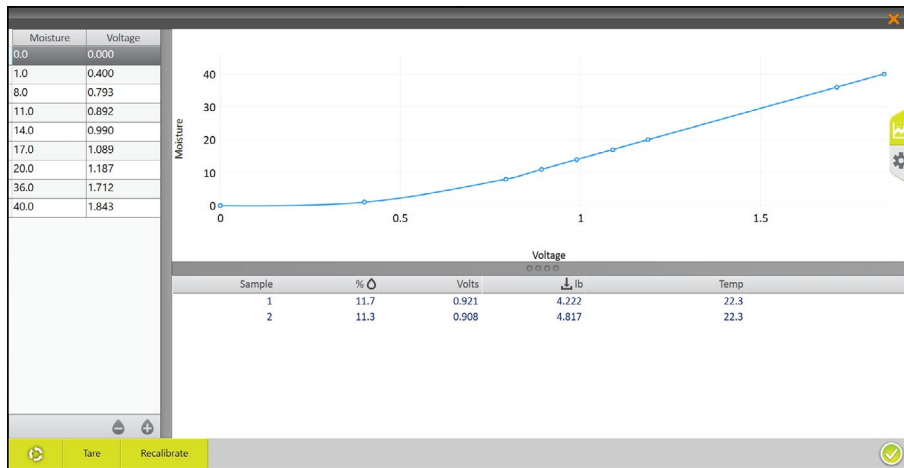
3. Open Mirus.
4. Go to **Setup > H2 GrainGage > Moisture Curves**.
5. Select the moisture curve you want to test.
6. Tap the edit icon




7. Pour the grain sample into the hopper (to simulate harvest).

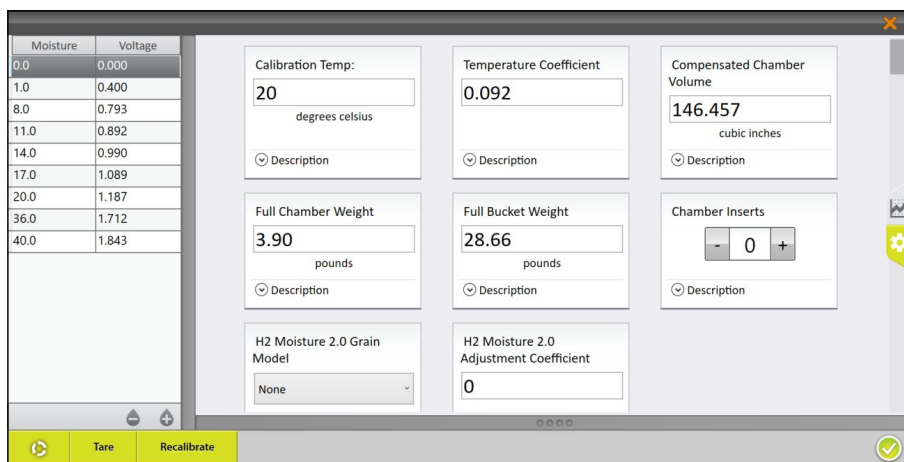
- Tap the **Cycle** button .

Mirus displays the moisture, voltage, bucket weight, and temperature of the sample.



If desired, tap on the gear icon  on the right for more information about the moisture curve.

Note: Only adjust these settings if a HarvestMaster Field Service Engineer tells you to.



- Cycle the same sample through the GrainGage (repeat steps 7 and 8) two more times. This allows Mirus to average the moisture readings for each sample.
- Repeat steps 7–9 for all prepared samples. Each grain sample should be cycled 3–5 times.
- Calculate the moisture percentage offsets.

The adjustment is the difference between the benchtop sensor's moisture measurement and the GrainGage's moisture measurement.

For example, Sample One has the following moisture measurements:

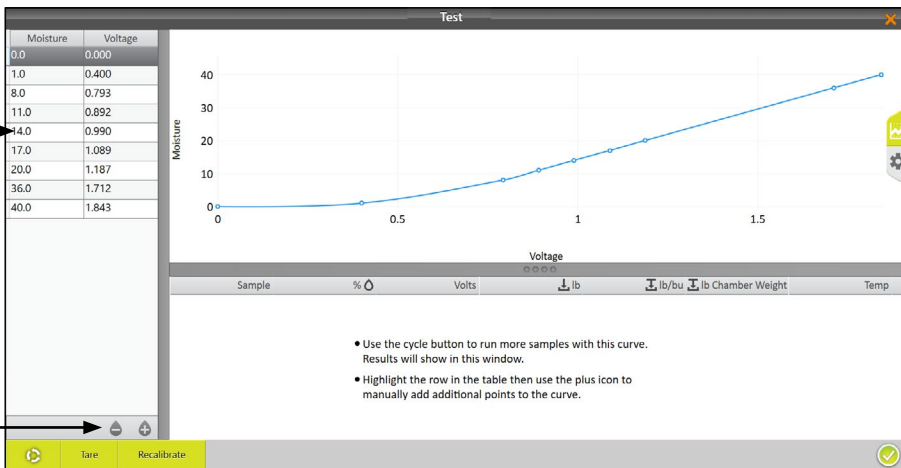
- Benchtop sensor: 18%
- GrainGage: 16.8%

The adjustment would be $18\% - 16.8\% = +1.2\%$

12. Average the sample offsets.

For example, if your benchtop sensor says Sample One is +1.2% more than the GrainGage measurement and Sample Two is +0.8%, the average offset is +1.0%.

13. Add the average adjustment to each moisture point with the exception of the 0 and 1 moisture points (never adjust 0 or 1). Subtract for a negative average offset. Do not adjust voltages.



Add or subtract the offsets here.

As needed, add or remove points in the curve here.

Moisture	Voltage
0.0	0.000
1.0	0.400
8.0	0.793
11.0	0.892
14.0	0.990
17.0	1.089
20.0	1.187
36.0	1.712
40.0	1.843

Use the cycle button to run more samples with this curve. Results will show in this window.
 Highlight the row in the table then use the plus icon to manually add additional points to the curve.

Tare Recalibrate

In the example above, readings from the benchtop sensor indicate that the samples have, on average, 1% higher moisture than the percentages in the previously calculated moisture curve.

The following tables illustrate this type of adjustment:

Original Curve	
Moisture	Voltage
0.0	0.000
1.0	0.400
8.0	0.793
11.0	0.892
14.0	0.990
17.0	1.089
20.0	1.187
36.0	1.713
40.0	1.845

Adjusted Curve	
Moisture	Voltage
0.0	0.000
1.0	0.400
9.0	0.793
12.0	0.892
15.0	0.990
18.0	1.089
21.0	1.187
37.0	1.713
41.0	1.845

4.2.6 Manual Calibration Using Excel

HarvestMaster provides a spreadsheet for creating a two-point calibration online. It can be downloaded at www.harvestmaster.com/data/files/mirus/EM2_Sample_Curves_2018.xlsx. Follow the instructions in the spreadsheet for creating the curve.

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CHAPTER FIVE

Field Maps

5 Field Maps

5.1 Create a Field Map

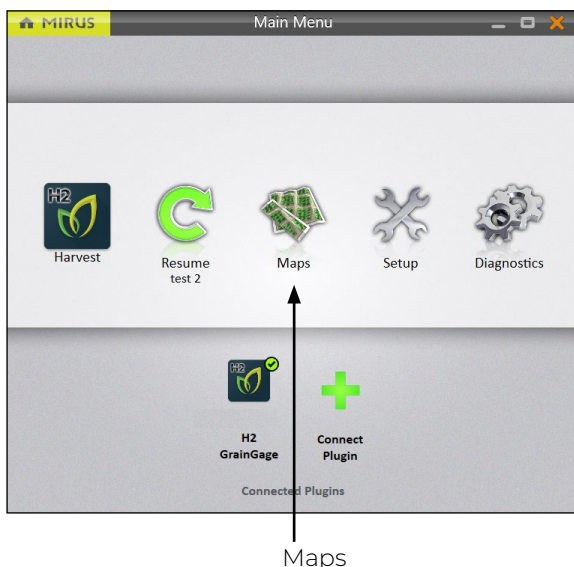
This section explains how to create a Standard Plot ID map. Mirus also offers an option for a Range Row map.

5.1.1 Create a Standard Plot ID Map

A Standard Plot ID map gives a unique ID number to each individual plot. The number of Ranges and Rows can reach up to 999. However, the display number can reach up to five digits, depending on how you choose to number the plots.

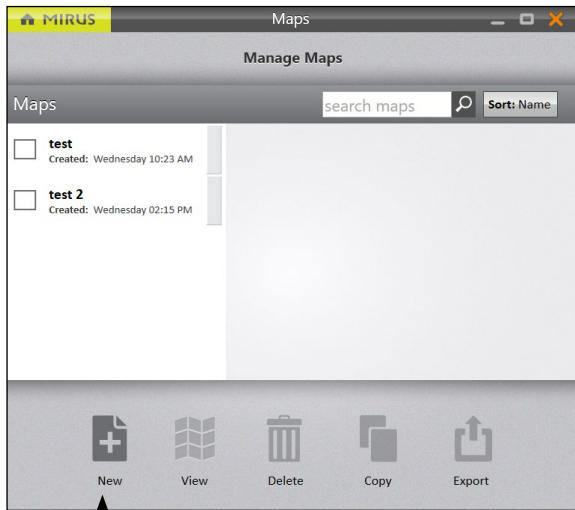
- **Range** indicates a horizontal group of plots.
- **Row** indicates a vertical group of plots.
- **Replication**: indicates the same horizontal group of plots in a particular range. However, in some cases a replication will extend beyond a range.

The following instructions walk you through creation of a Standard Plot ID map.



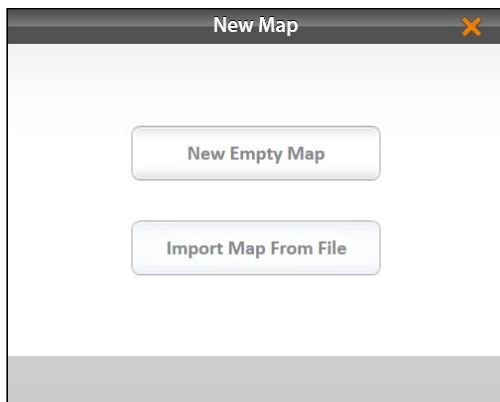
On the Mirus Home screen,

1. Tap **Maps** .

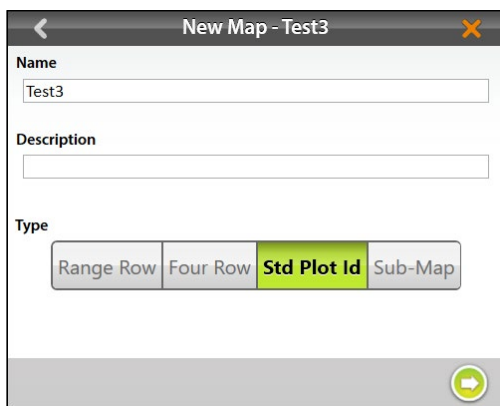


New

2. Tap **New**.



3. Select **New Empty Map**.

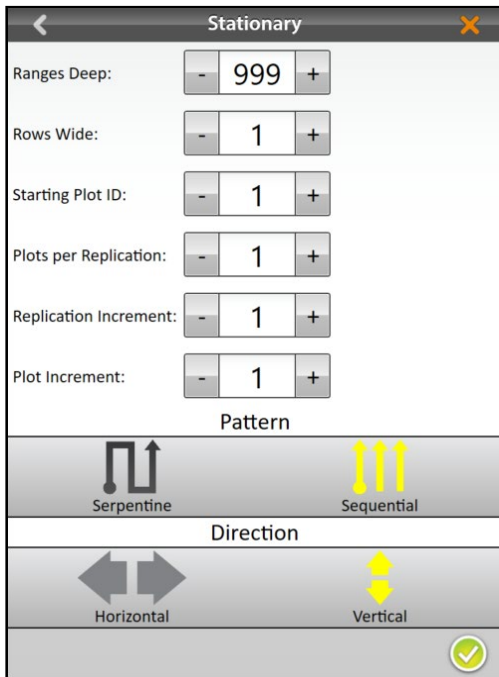


4. Name and describe the map.

5. Tap **Std Plot Id**.

6. Tap the next arrow .

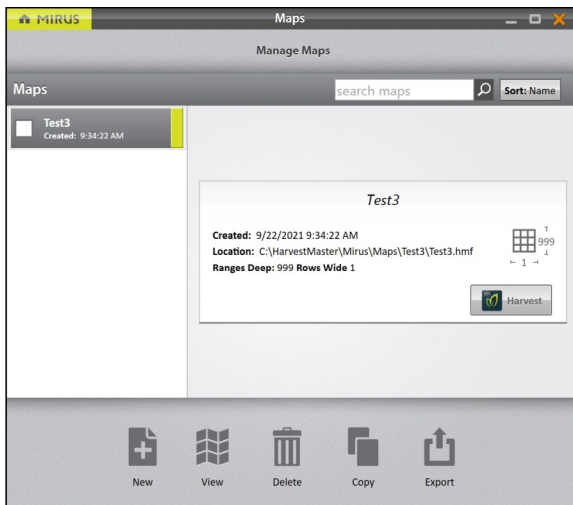
*Note: The **Name** box will only accept basic letters and numbers. Do not use emojis or the following special characters: > < : " \ ? | / **



7. Set the following:

- **Ranges Deep** indicates the number of ranges within a given field. Set to 999.
- **Rows Wide** indicates the number of rows within a given field. Set to 1.
- **Starting Plot ID:** The number of the first plot. Set to 1.
- **Plots per Replication:** indicates the number of plots in each replication. Set to 1.
- **Replication Increment:** the numeric interval between the first plots in each replication (e.g., 100, 1000, or 10000). Set to 1.
- **Plot increment** is the numeric interval between plots. This will usually be 1. Set to 1.
- **Pattern:** indicates the layout sequence for the plot increments. Set to Sequential.
- **Direction:** indicates the direction in which plot increments increase. This is not applicable for the H2 Stationary. Set to Vertical.

8. Tap the check icon  to save the map.

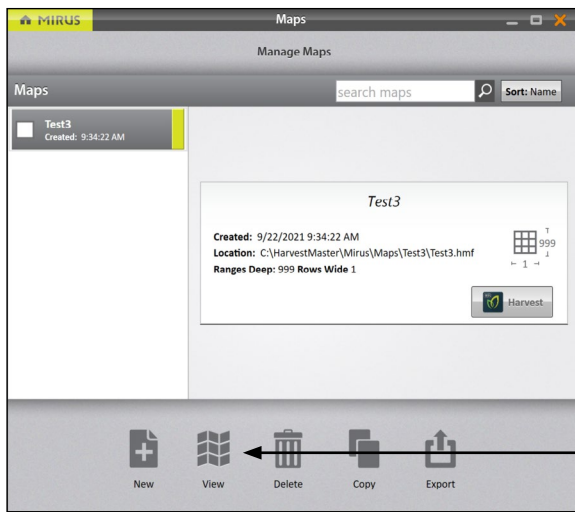


Mirus displays a description of the map on the Manage Maps screen. From this screen, Mirus allows you to do the following with your maps:

- Create new
- View
- Delete
- Copy
- Export

You also have the option to begin harvest.

5.2 View a Map

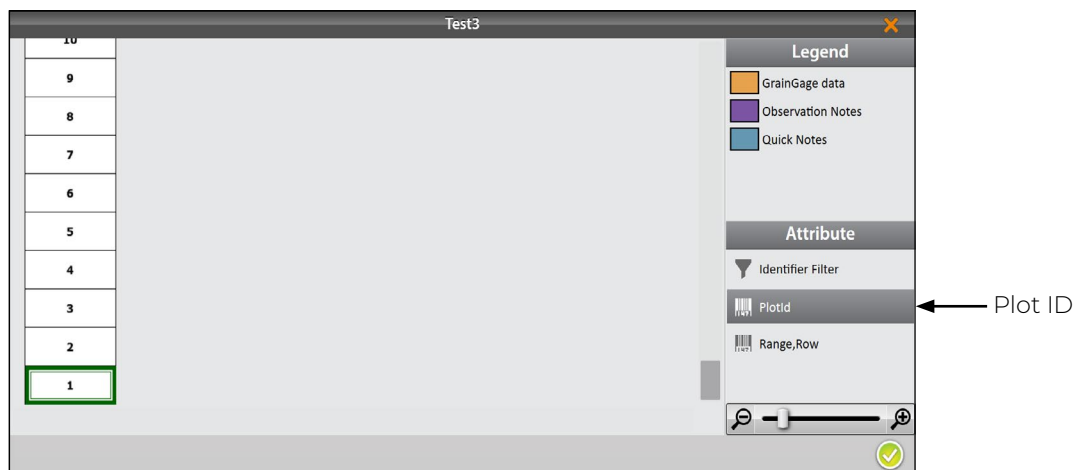


On the Manage Maps screen,

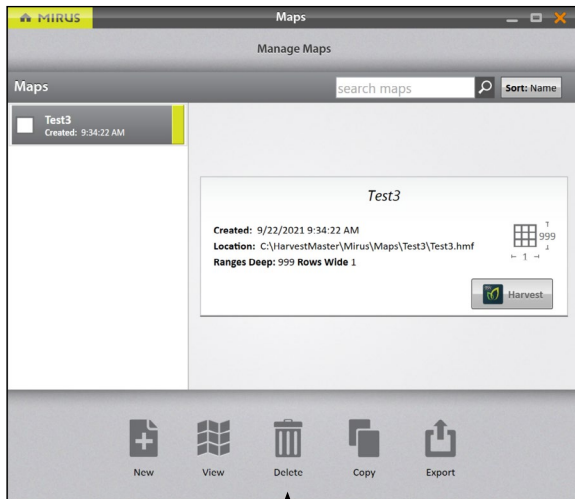
1. Select the map you want to view.
2. Tap **View**.

Mirus opens the Map View screen. The image below displays a map that has not yet been harvested:

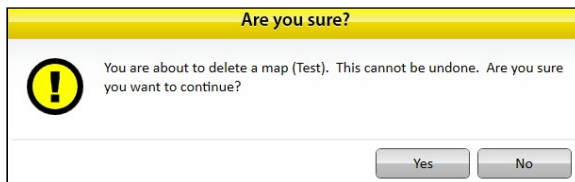
*Note: In Map View, Mirus initially displays Standard Plot ID maps as Range Row maps. To display the plot IDs, select **Plot ID** under Attribute.*



5.3 Delete a Map



Delete



On the Manage Maps screen,

1. Select the map you want to delete.
2. Tap **Delete**.

Mirus asks if you are sure.

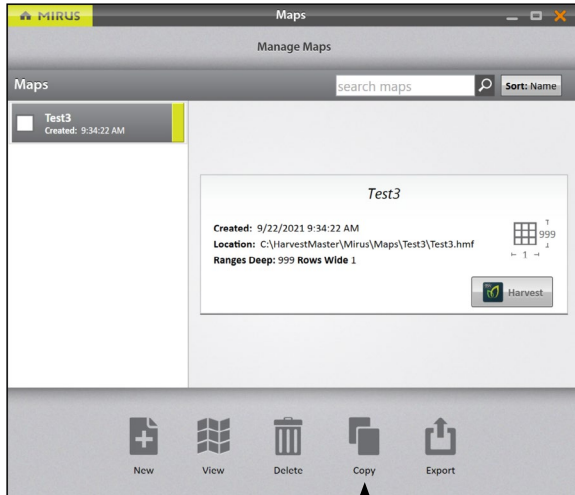
CAUTION: This cannot be undone! You cannot recover a deleted map.

If you choose to proceed, tap **Yes**.

Mirus deletes the map, and it is no longer available in the list on the Manage Maps screen.

5.4 Copy a Map

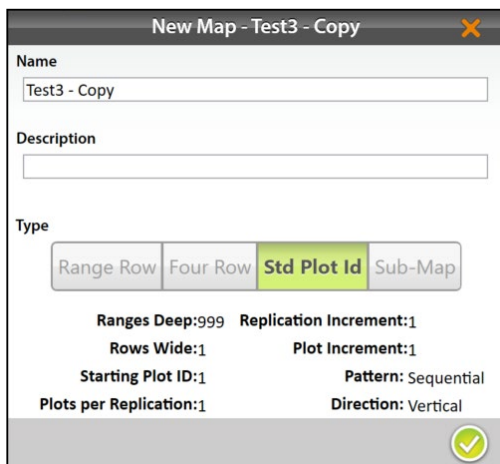
Maps can be reused from year to year. To do so, simply copy the map in Mirus.




Copy

On the Manage Maps screen,

1. Select the map you want to copy.
2. Tap **Copy**.



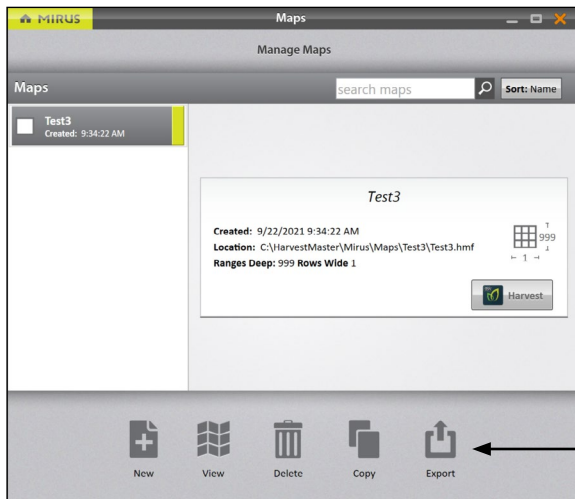
3. Enter the name and description for the map.
4. Tap the check icon  to save the new copy.

Mirus adds it to the list of maps on the Manage Maps screen.

5.5 Export Map Data

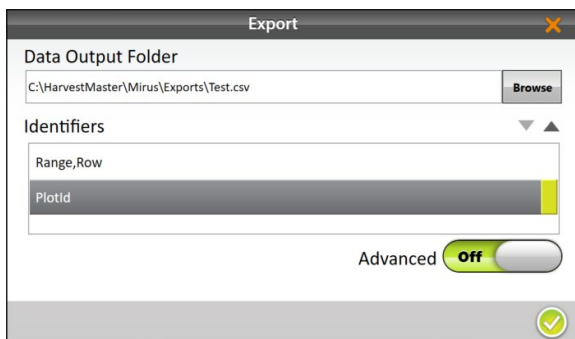
The Manage Maps screen allows you to export maps as data and as heat maps. The export data option creates a detailed spreadsheet of your data. The heat map option creates a color-coded visual map (in a spreadsheet) of the parameters you set for each color.

5.5.1 Export Data

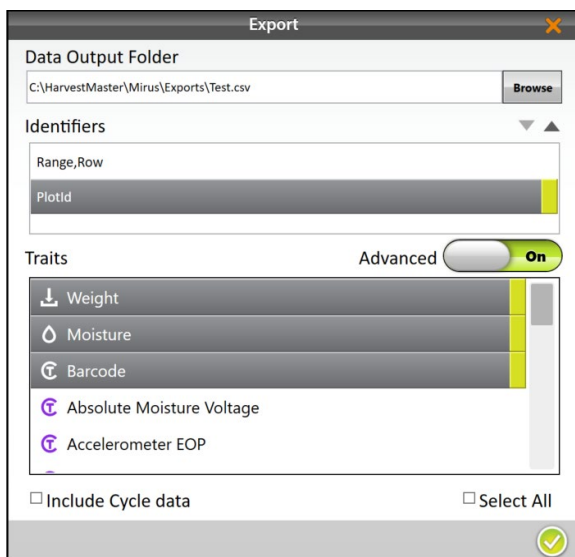


On the Manage Maps screen,

1. Select the map you want to export data from.
2. Tap **Export**.



3. Enter the file path for the exported data.
4. Select your preferred Identifiers.

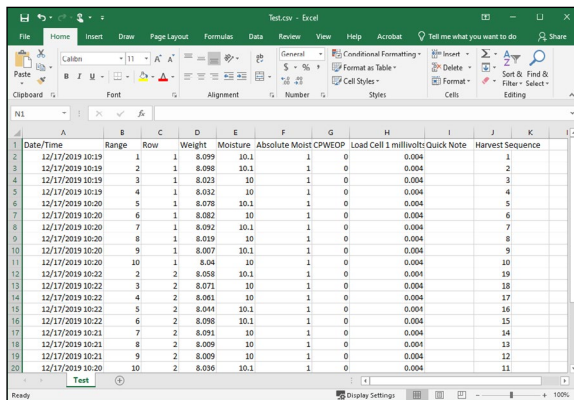


5. Toggle **Advanced On**.
When **Advanced** is switched to **On**, Mirus displays a list of available traits to export with the data.
6. Select your preferred traits including the Barcode trait.
*Note: If you check **Include Cycle Data**, the export will include sub cycle and weight trip data.*
7. Tap the check icon to finish exporting the data.



Mirus notifies of the successful export.

- Tap **Ok** to finish the export
- Tap **Open** to finish the export and open the CSV file.



Mirus exports the data into CSV (comma delimited) form. This allows you to import the data into other programs for analysis.

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H2 Stationary



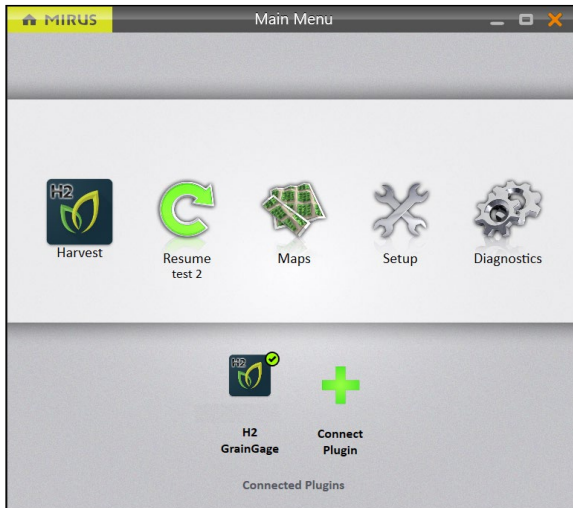
CHAPTER SIX

Harvest Mode


6 Harvest Mode

6.1 Options for Opening Harvest Mode


You must create a map before you can harvest. Mirus offers three different routes for initiating or re-entering Harvest Mode.




On the Mirus Home screen,

- Tap **Harvest** . Mirus asks you to select from a list of previously created maps for this harvest.
Note: If the Harvest icon is not visible, see page 19 for instructions on loading the H2 GrainGage plugin.

Or

- Tap **Maps** . Mirus opens the Manage Maps screen. From there, select a map and tap **Harvest**.

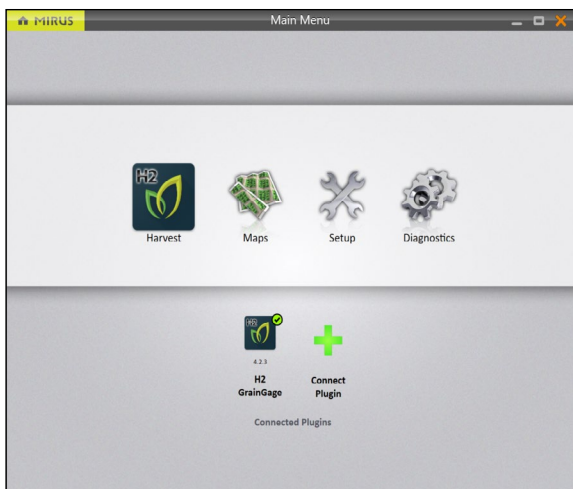
Or

- Tap **Resume** . Mirus resumes harvest in the last map used (including the direction, navigation type, and moisture curve).

If you have already begun to harvest a particular map, Mirus displays that map name below the Resume icon .

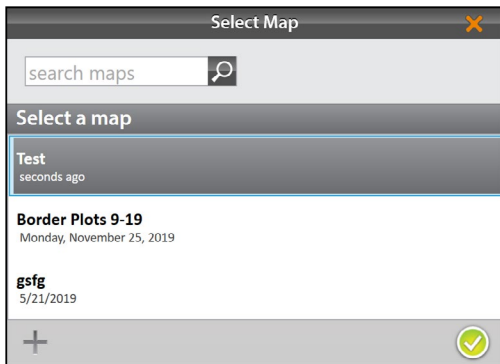
6.2 Open Harvest Mode



This section describes the first option for opening Harvest Mode.

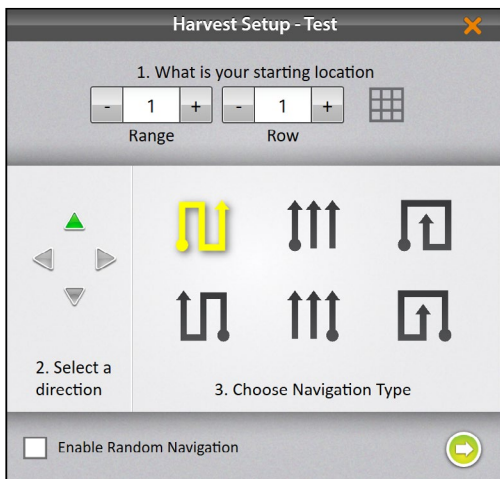



On the Mirus Home screen,

1. Tap **Harvest** .

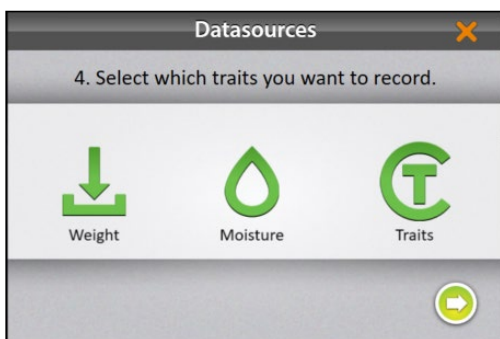


2. Select a map or tap the plus icon  to create a new map.
3. Tap the check icon .



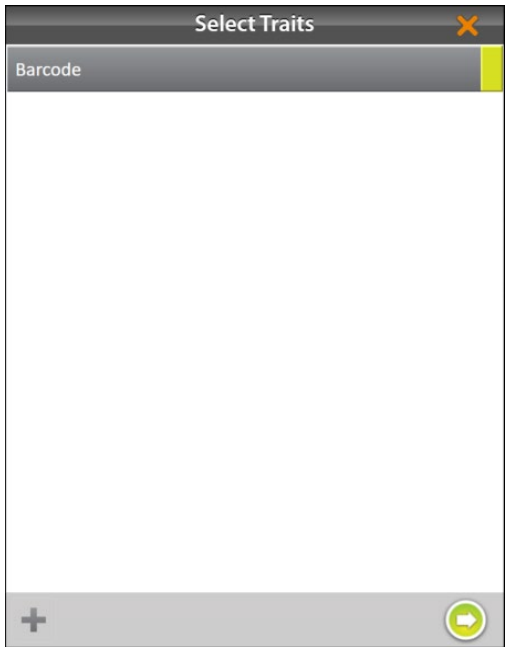
4. Enter the starting location.
5. Select the direction of harvest.
6. Select a navigation type from the top row. These are the navigations that start in the lower-left corner of the map.
7. Tap the next arrow .

*Note: If you check **Enable Random Navigation**, you will be able to change your location on the main Harvest screen by tapping on the desired plot. This is mostly used for note taking.*



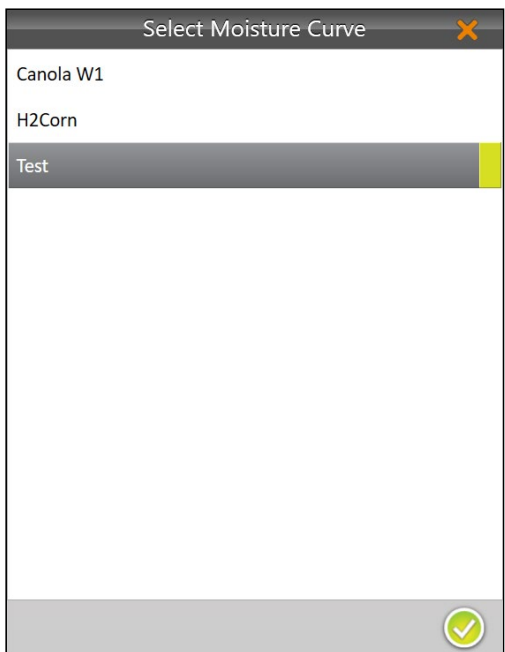
8. Select which attributes you plan to record.

*Note: Ensure **Traits** is selected to record the barcode information.*



If you selected **Traits**, you will be prompted to choose a previously configured trait or create a new one. For more information about configuring Traits from the Setup screen, see **2.3.10 Create and Record Barcode Traits on page 32**.

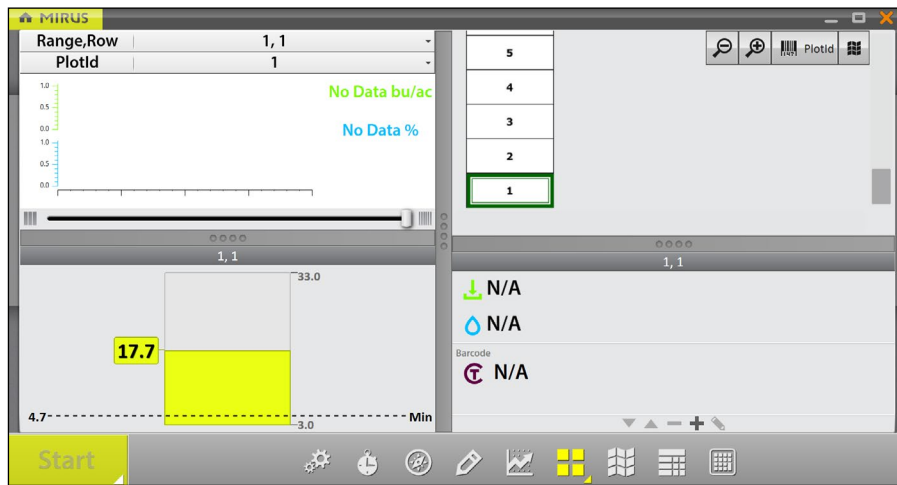
9. Select one or all of the traits to include.
10. Tap the next arrow ➡.



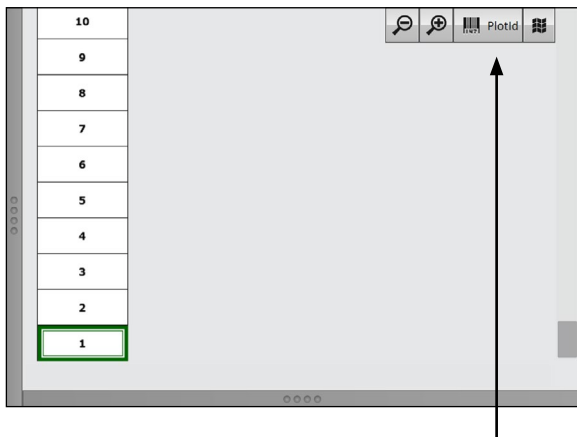
If you selected **Moisture**, Mirus prompts you to select a moisture curve. For more information about calibrating moisture curves, go to **4.2.2 Moisture Calibration Overview on page 50**.

11. Select a **Moisture Curve**.
12. Tap the check icon ✓.

Mirus opens the Harvest screen and is ready to be configured or to collect data.

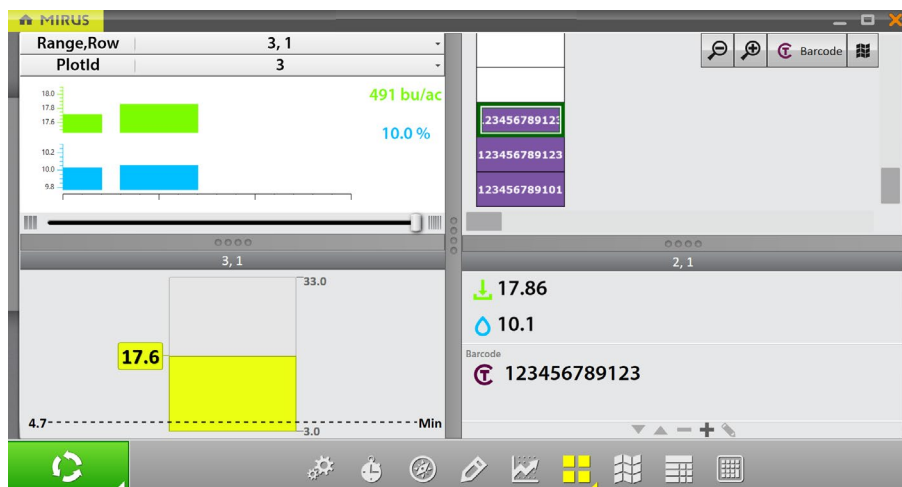


The Spatial Display can show the barcode trait numbers for each plot.



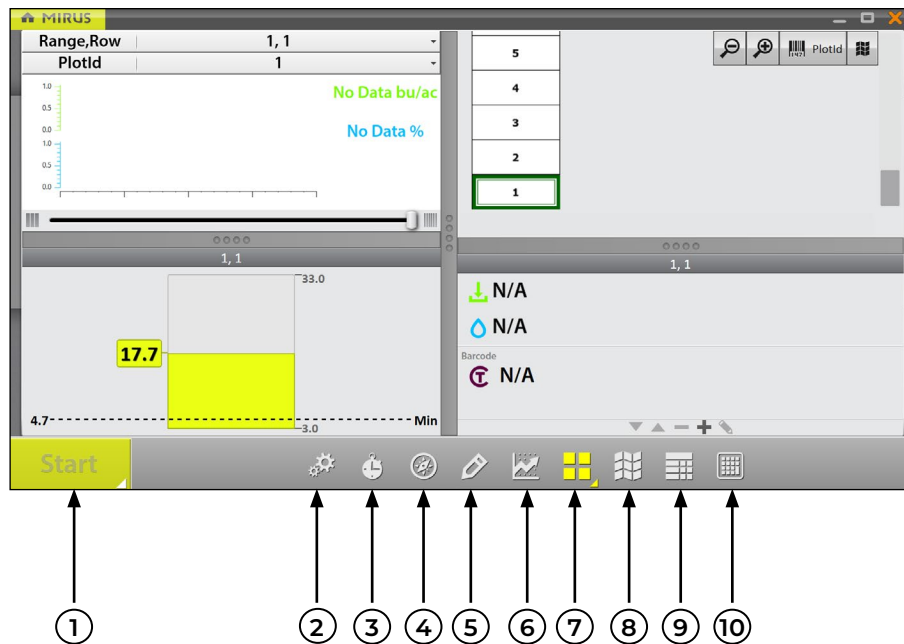
To turn on this feature,

1. Tap on the spatial attributes and select the trait.



6.3 Configure Harvest Screen Options

The Harvest screen provides several options for configuring how data is collected and presented during harvest.

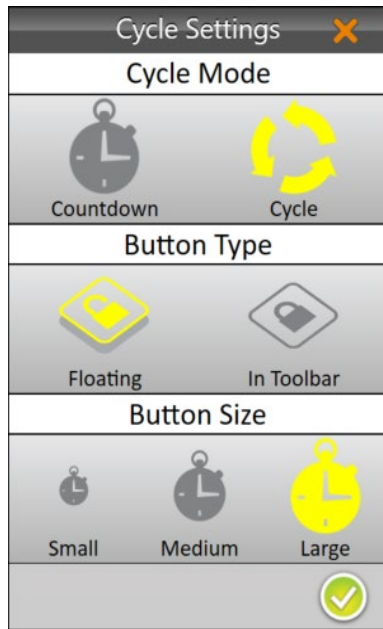


1. **Start/Cycle/Go Button:** **Start** initiates harvest. **Cycle** initiates measurements and data collection for a specific plot. **Go** indicates it's time to move to the next plot.
2. **Diagnostics:** Opens the **Diagnostics** dialog box for monitoring during harvest.
3. **Cycle Settings:** Allows the operator to change the settings for the **Start/Cycle/Go** button.
4. **Navigation:** Opens the **Change Location** dialog box and allows the operator to make changes to location, direction, and navigation type. This feature is not needed with the H2 Stationary GrainGage.
5. **Observations:** Opens a dialog box in which the operator can record notes for each plot during harvest. This is also where you can add information about any traits you configured.
6. **Graph View:** Displays accumulating data as a graph.
7. **Quad View:** Divides the display into four smaller windows. The operator can adjust the size of each window and customize them each to display data in **Cycle Data**, **Diagnostics**, **Graph**, **Info**, **List**, **Spatial**, or **Real Time Weight** view.
8. **Map View:** Opens the **Spatial Display**, also referred to as a **heat map**. This display can be configured to show attribute data plot by plot.
9. **List View:** Displays accumulating data as a list.
10. **Ten Key:** Numeric keypad for fast entry of trait and note data.

6.3.1 Configure Cycle Settings

The cycle settings determine the settings of the **Start/Cycle/Go** button. These settings can change the Countdown Mode, Button Type, Toolbar Position, and the Countdown Time.

The countdown timer sets a wait time at the start of each cycle to ensure all the grain in the current plot reaches the GrainGage before cycling.

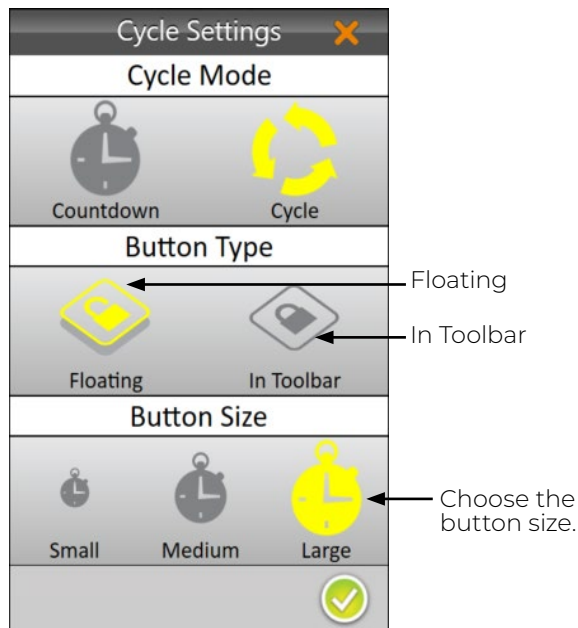


To configure the Cycle Settings,


1. Tap the cycle settings icon  in the toolbar.
2. Select **Cycle**.

The Countdown option is not needed with the H2 Stationary GrainGage.

3. Tap the check icon .

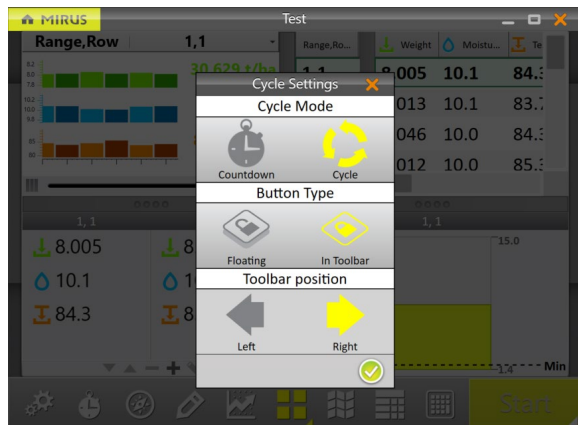


To change the Button Type,

1. Tap the cycle settings icon  in the toolbar.
2. Select **Floating** or **In Toolbar**.

When you select **Floating**, Mirus prompts you to choose the size of the floating **Start/Cycle/Go** button.

If you choose **Floating**, the **Start/Cycle/Go** button appears as a separate dialog box that can be moved to any location.



To change the Toolbar position of the button,


1. Select **In Toolbar**.
2. Select **Left** or **Right**.

The default position is left. If you select right, Mirus moves the **Start/Cycle/Go** button to the other side of the screen.



3. Tap the check icon .

← **Start/Cycle/Go**

6.3.2 Quad View

Mirus provides the option of viewing four screens at once when **Quad View**  is selected. Each screen can be configured to display the data differently. The screen options are as follows:

- **Diagnostics:** Displays the Diagnostics dialog box for monitoring during harvest.
- **Graph:** Shows the plot progression of weight and moisture in a graph.
- **Info:** Displays the weight and moisture of the most recent plot.
- **List:** Displays accumulating data as a list.
- **Spatial:** Also referred to as a heat map, shows attribute data plot by plot.
- **Real Time Weight:** Displays the real time weight of the weigh bucket.

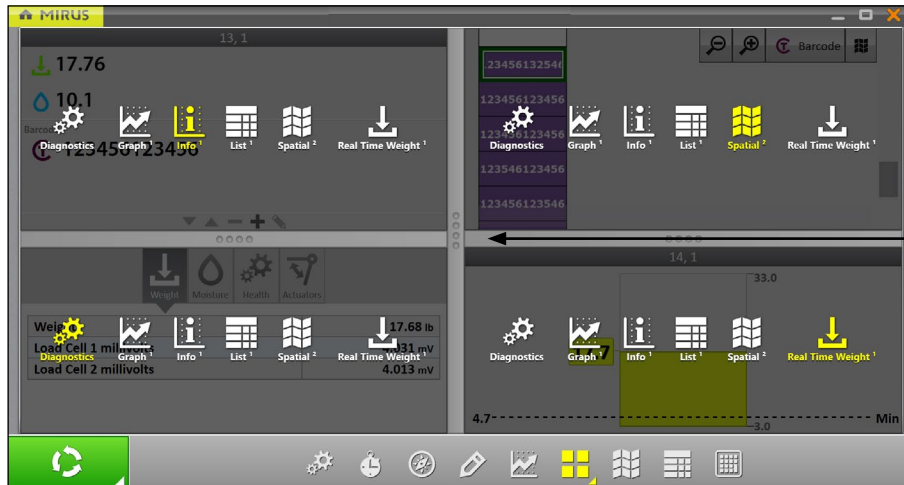
Each of the above options are available on the main toolbar in Harvest Mode except for the options to view **Real Time Weight**  and **Info** .

To configure the Quad View screens:

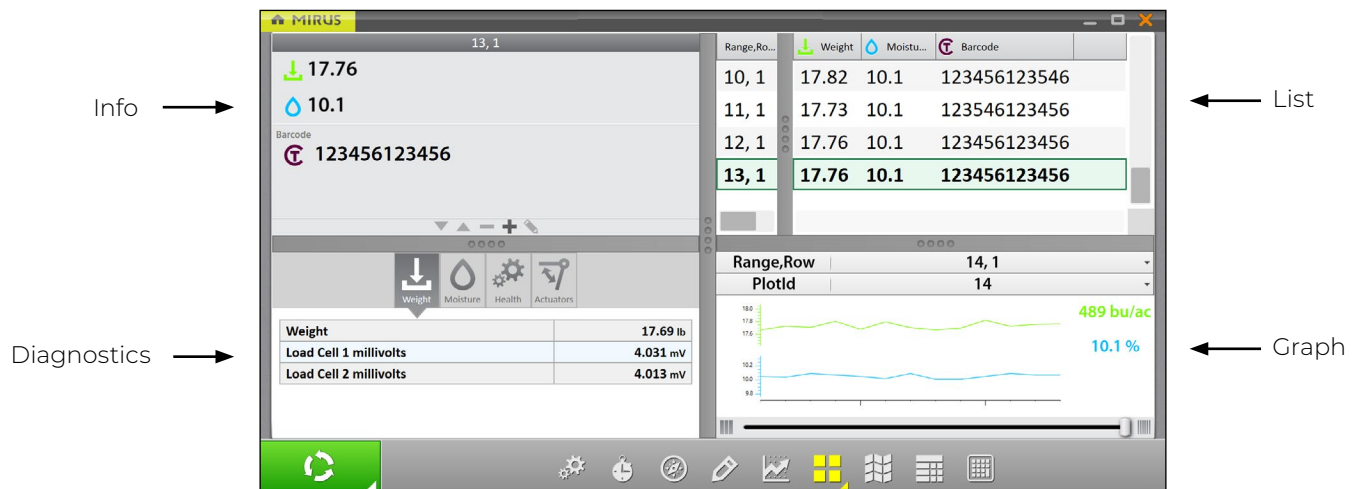
1. Enter **Quad View** by tapping the Quad View icon

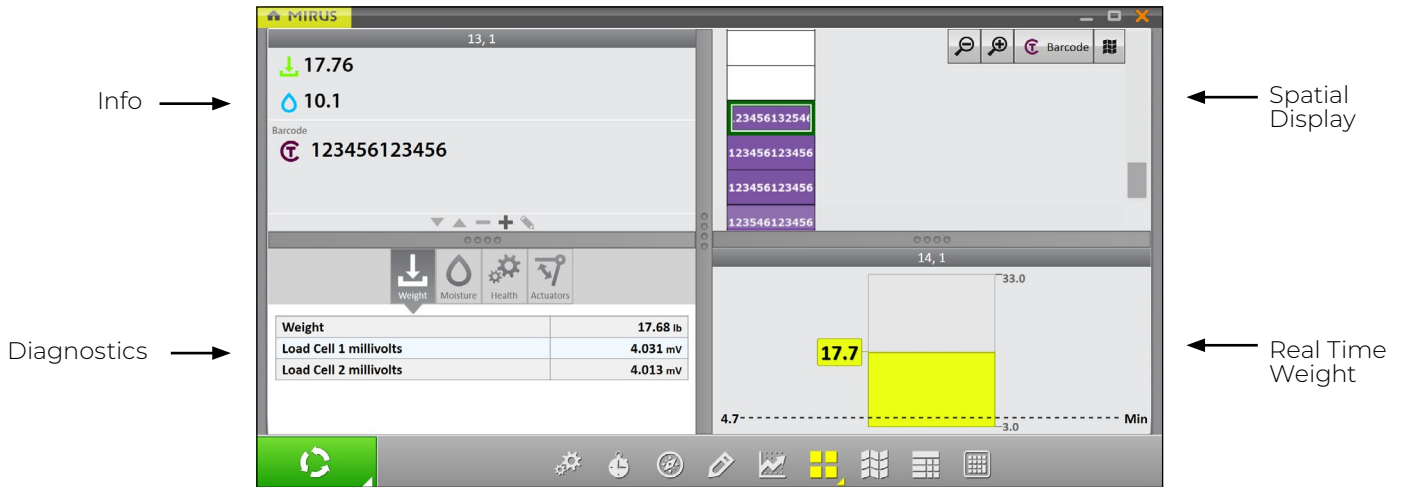
If desired, enlarge and shrink specific screens by dragging the borders of the Quad View screens.

2. Tap the Quad View icon a second time. Mirus displays options for each of the four screens.




3. Tap the Quad View icon again. Mirus exits the configuration screens.



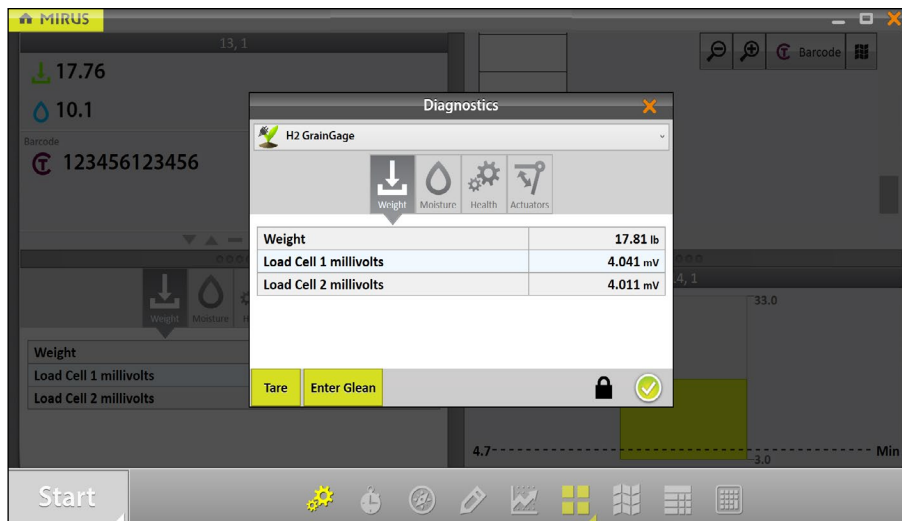


6.3.3 Diagnostics Screen

To access the Diagnostics screen in Harvest Mode,

1. Tap the gear icon  on the toolbar.

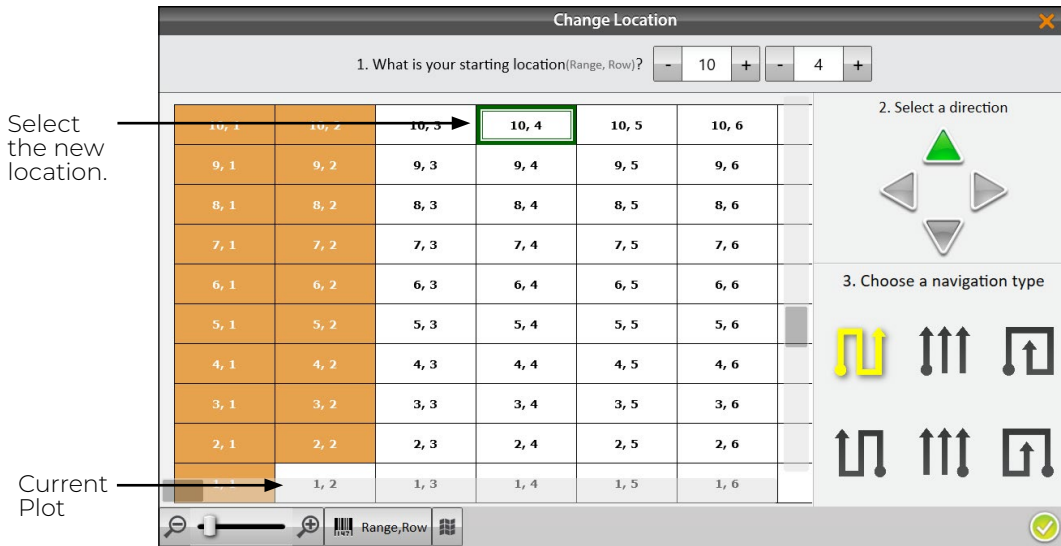
Note: The Diagnostics screen will not open while the GrainGage is cycling.



6.3.4 Navigation Screen


The navigation feature is not needed with the H2 Stationary GrainGage.

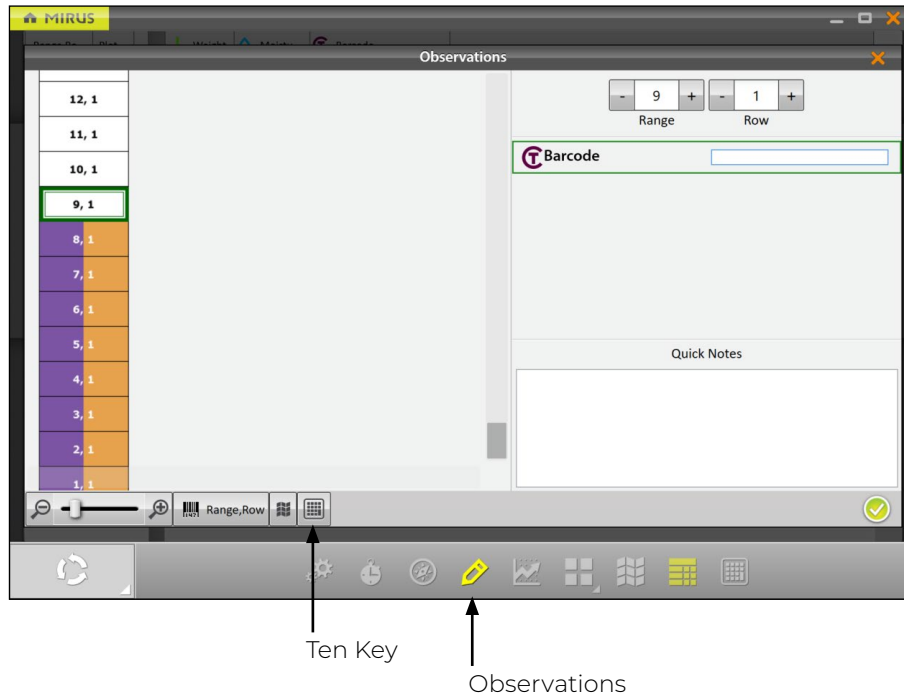
This screen allows you to change your location, direction, or navigation type.



6.3.5 Observations Screen

On the Harvest screen,

1. Tap the pencil icon  to open the Observations window.




The Observations screen shows plot position and provides character fields for notes on each trait and a Quick Notes text box to record any other observations for each plot. Mirus stores the quick notes and trait notes alongside harvest data.



1. Tap the Ten Key icon  for a floating dialog box that can also enter trait notes and quick notes.

The Ten Key dialog box can also be found on the main toolbar.

6.3.6 Graph View

To view the harvest data in graph form, tap the graph icon  in the toolbar.

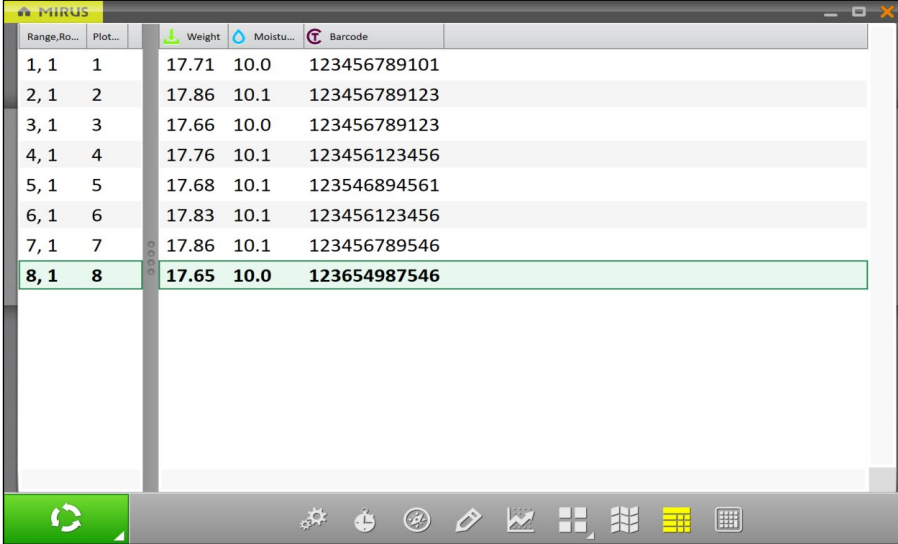
The column to the right of the graph shows the data for the current plot.

In the graph, each bar (or point in the line graph) represents a plot. Each graph represents the map for two different traits: weight (green) and moisture (blue). The values shown at the end of the graphs show the averages. The green average shows the yield based on the weight measurements and plot size. To set the yield parameters see **6.3.10 Configure Plot Size and Yield in Spatial Display on page 84**.



6.3.7 List View




In List View, you can see the data in the form of a chart.



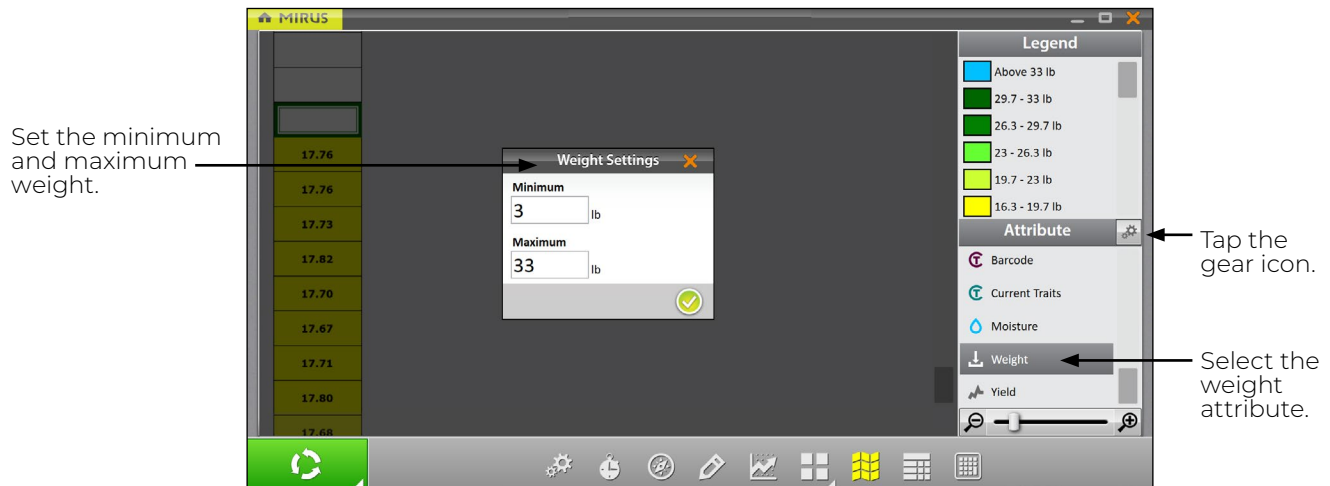
Range, Ro...	Plot...	Weight	Moistu...	Barcode
1, 1	1	17.71	10.0	123456789101
2, 1	2	17.86	10.1	123456789123
3, 1	3	17.66	10.0	123456789123
4, 1	4	17.76	10.1	123456123456
5, 1	5	17.68	10.1	123546894561
6, 1	6	17.83	10.1	123456123456
7, 1	7	17.86	10.1	123456789546
8, 1	8	17.65	10.0	123654987546

6.3.8 Configure Weight in Spatial Display

To set the minimum and maximum weight,

1. Tap the Spatial Display icon  to display data in a heat map format.
2. Select the **Weight** attribute.
3. Tap the gear icon  in the Attribute bar.
4. Set the **Minimum** and **Maximum** Weight.
5. Tap the check icon .

Adjusting the minimum and maximum values helps to create a more detailed legend and define the scope of the graphs and maps. The narrower the minimum and maximum range, the more detailed the information displayed becomes.






This setting adjusts the maximum weight on the Real Time Weight display, which allows you to track how full the GrainGage is getting with each plot. This is important to monitor so the GrainGage doesn't overflow.

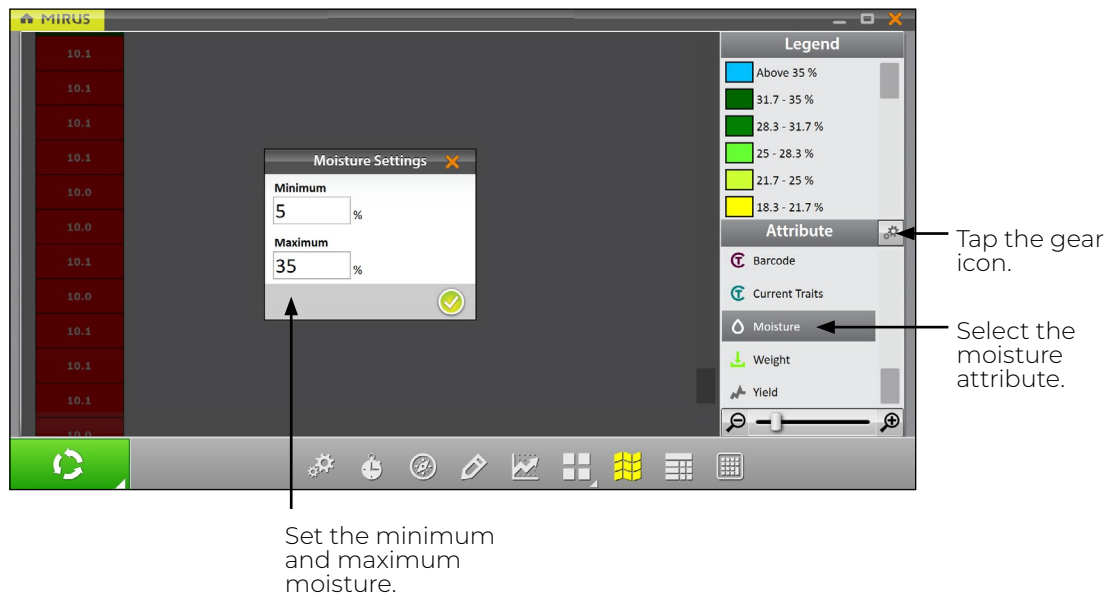


6.3.9 Configure Moisture in Spatial Display

To set the minimum and maximum moisture,




1. Tap the Spatial Display icon  to display data in a heat map format.
2. Select the **Moisture** attribute.
3. Tap the gear icon  in the Attribute bar.
4. Set the **Minimum** and **Maximum** moisture.
5. Tap the check icon .

Adjusting the minimum and maximum values helps to create a more detailed legend and define the scope of the graphs and maps. The narrower the minimum and maximum range, the more detailed the information displayed becomes.

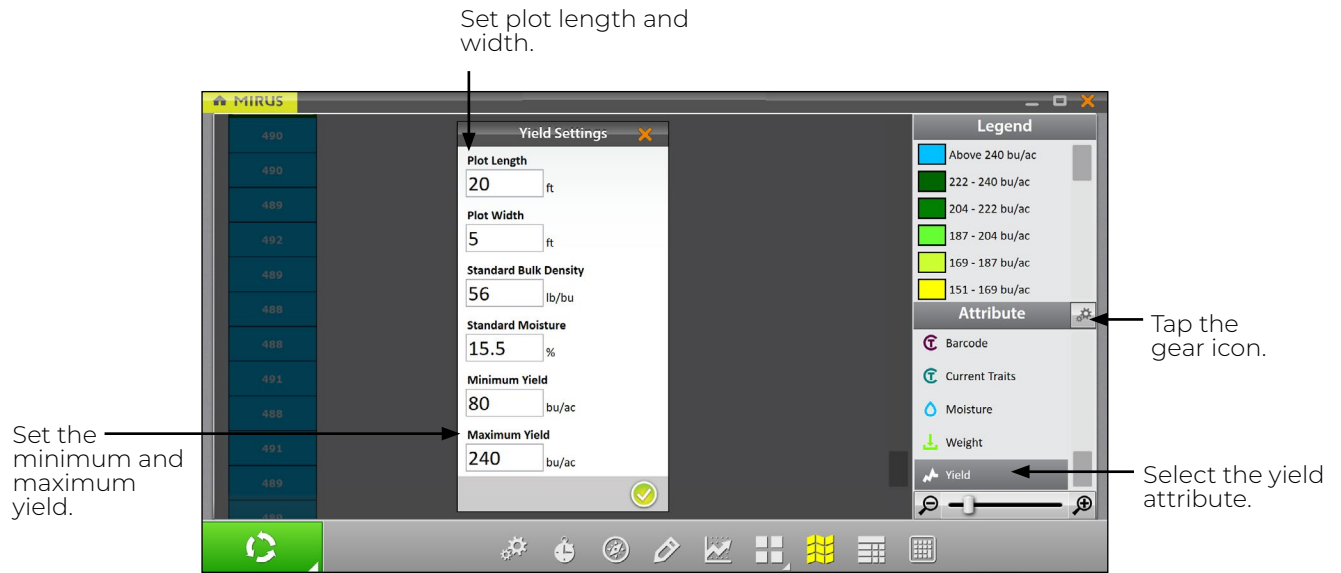


6.3.10 Configure Plot Size and Yield in Spatial Display

To set the minimum and maximum plot size and yield,

1. Tap the Spatial Display icon  to display data in a heat map format.
2. Select the **Yield** attribute.
3. Tap the gear icon  in the Attribute bar.
4. Set the **Plot Length** and **Width**.
5. Set the **Minimum** and **Maximum Yield**.
6. Tap the check icon .

The values set here help calculate the yield per acre (bu/ac, kg/ha) using the weight measurements divided by the plot area. For each minimum and maximum changed, the Legend will change to match the correct values.



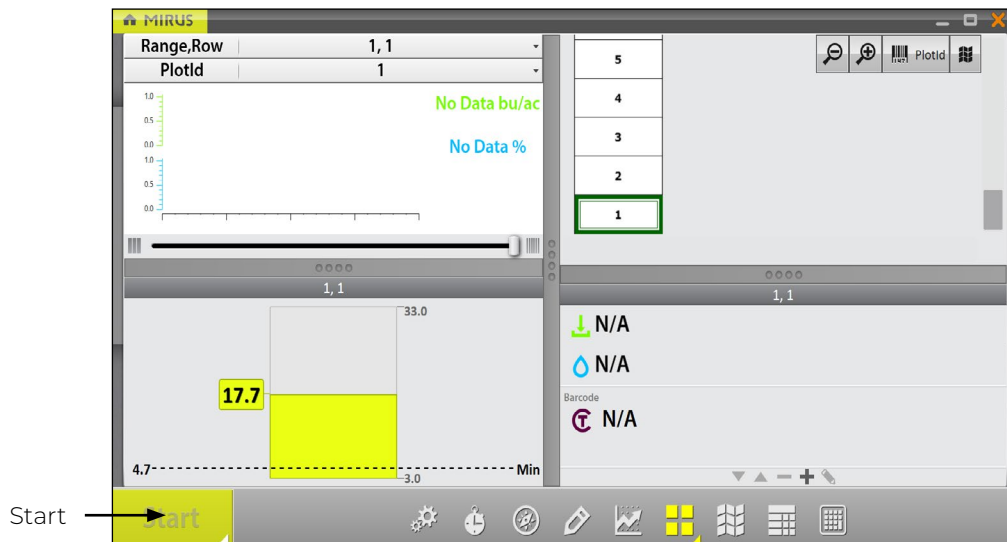
Adjusting the minimum and maximum values helps to create a more detailed legend and define the scope of the graphs and maps. The narrower the minimum and maximum range, the more detailed the information displayed becomes.

For examples of standard bulk density and standard moisture values see **7 Appendix A: Standard Grain Information on page 88**.

6.4 Collect Harvest Data

6.4.1 Harvest with Cycle Button


1. Open the Mirus Harvest screen.
2. Select a map, configure the harvest setup, choose traits, and a moisture curve. See **6.2 Open Harvest Mode on page 70** for specifics.
3. Tare the GrainGage if necessary.
4. Tap the **Start** button in Mirus.

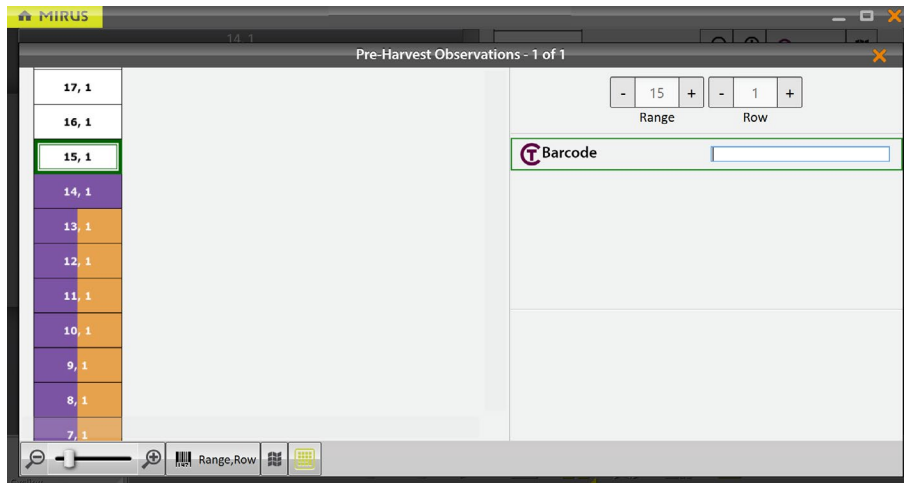


5. Dump the grain into the GrainGage.



Note: HarvestMaster recommends having the same person dump the grain directly onto the moisture blade in the same way every time. The picture to the left shows the minimum amount of grain needed to cover the moisture blade.

6. Tap **Cycle**  when all the grain is in the GrainGage.
7. Scan the barcode.



8. When prompted with a green **Go** button , dump the grain for the next plot.
9. Repeat for each plot.

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APPENDIX A

Standard Grain Information

7 Appendix A: Standard Grain Information

7.1 Standard Moisture and Test Weight

Test weight should always be calculated with a sample that is as close to the industry moisture standard as possible. The table below shows some examples of the industry moisture standard. Test weight is not used with the H2 Stationary GrainGage.

Standard Moisture and Test Weight		
Grain	Moisture	Test Weight
Wheat	13.5%	60 lb/bu (77 kg/hL)
Canola	8.5%	47 lb/bu (60 kg/hL)
Soybean	13%	55 lb/bu (71 kg/hL)
Barley	14.5%	48 lb/bu (62 kg/hL)
Corn	15.5%	56 lb/bu (72 kg/hL)
Rye	14%	56 lb/bu (72 kg/hL)
Sorghum	13%	56 lb/bu (72 kg/hL)
Oats	13.5%	32 lb/bu (41 kg/hL)
Sunflower	10%	25 lb/bu (32 kg/hL)

*These measurements are based on the United States (Winchester) bushel.

References for Standard Moisture and Test Weight

Devkota P., & Mulvaney M. J. (2020, May). *Adjusting crop yield to a standard moisture content*. IFAS Extension, University of Florida. <https://edis.ifas.ufl.edu/pdf%5CAG%5CAG44200.pdf>.

Isleib, J. (2012, August 6). *Test weight in small grains*. Michigan State University Extension. https://www.canr.msu.edu/news/test_weight_in_small_grains.

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APPENDIX B

Troubleshooting Mirus

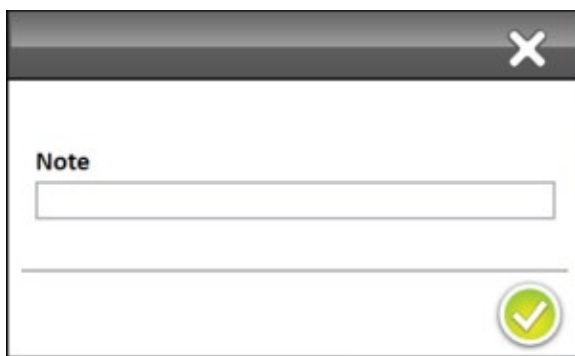
8 Appendix B: Troubleshooting Mirus

8.1 Error Logs

Error logs are used by HarvestMaster Field Service Engineers to pinpoint the problem occurring in Mirus.

8.1.1 Flag Errors

When experiencing an error, in Mirus version 4.3.0 and later, you can flag the error for the HarvestMaster Field Service Engineers. When an error has been flagged, the engineers can find it easily within the error logs.



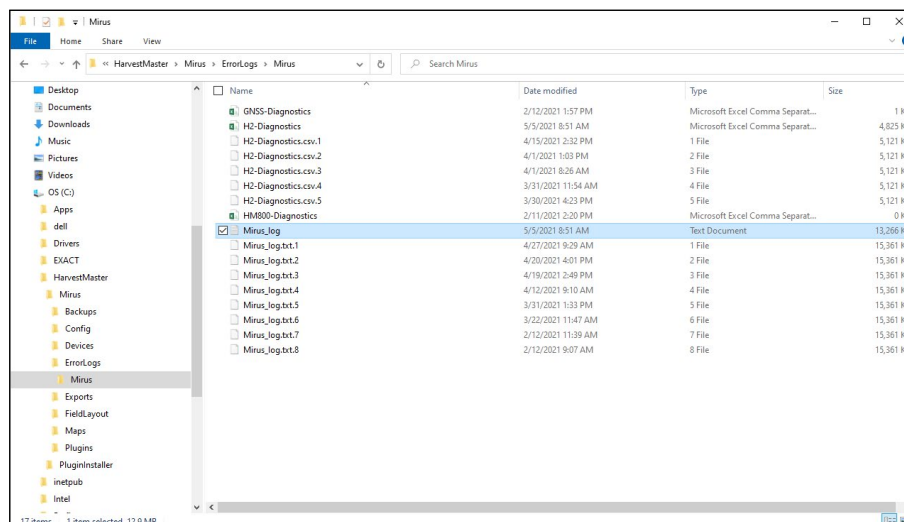
- Use F5 to flag the error in the error log.
- Use F6 to flag and leave a message in the error log.

8.1.2 Find and Send Error Logs

After an error has occurred, copy the error log file as soon as possible to send to the HarvestMaster Field Service Engineers.

To find and send the error logs to the HarvestMaster Field Service Engineers,

1. Open File Explorer on your device.
2. Go to C:\HarvestMaster\Mirus\Errorlogs\Mirus.
3. Send the Mirus_log text document to the HarvestMaster Field Service Engineers.



8.2 Enable Debug Streaming

This option enables debug streaming messages from the DSP module. Enabling this is only recommended when troubleshooting the GrainGage with a HarvestMaster Field Service Engineer as it provides them with a more detailed error log. Be sure to turn off debug streaming when you are not using it.

To enable debug streaming,



Save

1. Enter the Mirus Home screen.
2. Select **Setup > H2 GrainGage > System**.
3. Change Debug Streaming Enabled to **Yes**.
4. Tap **Save**.

8.3 Common Errors

8.3.1 Inaccurate Plot Weight

If weight values are inaccurate, open Diagnostics and follow the steps listed below.

1. Ensure the weigh bucket of the GrainGage is in the tracks.
2. Clean inside the bucket, around the bucket, and around the load cells of the GrainGage with compressed air.
3. Ensure there is nothing putting positive or negative tension on the weigh bucket/load cells (air hoses, cables, overload protection pin, etc.).
4. Apply negative and positive pressure to the bucket while watching the weight values in Diagnostics. Remove the pressure to ensure the weight returns to zero. Do this several times to ensure repeatability.
5. Put the HarvestMaster calibration weight in the bucket with the top gate closed and check it against the calibration weight in Diagnostics.
6. If the problem persists, contact the HarvestMaster Field Service Engineers.

8.3.2 Can't Connect to GrainGage

If you are having trouble connecting to the GrainGage,

1. Ensure the H2 System Controller is turned on.
2. Ensure the H2 GrainGage plugin is enabled. For instructions on how to enable the plugin see **2.1.1 Load the H2 GrainGage Plugin on page 19**.
3. Check there is a solid green power light and flashing yellow status light on each of the modules.
4. Ensure all the cables are properly connected.
 - A USB or serial cable between the dock and the H2 System Controller.
 - A CAN cable between the H2 System Controller and the H2 GrainGage.
5. Turn off the H2 System Controller, Mirus, and the tablet, leave them off for 30 seconds, then turn them back on and attempt to connect.
6. Unplug the CAN and power cables on the modules, leave them for 30 seconds, then plug them back in and attempt to connect.
7. If the problem persists, contact the HarvestMaster Field Service Engineers.

8.3.3 Tare Warnings

A tare warning can be prompted for the reasons explained in the table below.

Tare Warnings	
If	Then
Debris is in the bucket or test chamber.	Check the bucket and test chamber to ensure that there is nothing remaining (grain, debris, trash, etc.).
Positive or negative tension is on the weigh bucket or load cells.	Move any air hoses, cables, or overload protection pins putting tension on the weigh bucket or load cells.
Leftover grain is in the weigh system.	<p>The evacuation time is not long enough for the grain to fully empty out of the GrainGage.</p> <ul style="list-style-type: none"> • Go to Setup > Sensors > Weight > Evacuation Time. • Lengthen the evacuation time by 500 milliseconds. • Harvest another plot and check again.
Tare warning values have been adjusted.	Restore the values to the default setting. See the Weight Sensors Settings on page 28 .

If the problem persists, contact the HarvestMaster Field Service Engineers.

8.4 Contact HarvestMaster

8.4.1 Instructional Content

Visit the [HarvestMaster YouTube](#) channel and the [HarvestMaster Support](#) page for instructional videos and help articles on Mirus and the H2 GrainGage.

This instructional content includes (but is not limited to):

- [Mirus Overview](#)
- [Weight Tare Warnings](#)
- [Errors on Power Up with Mirus](#)
- [Mirus Locks Up](#)
- [GrainGage Will Not Connect](#)

8.4.2 Contact a HarvestMaster Field Service Engineer

Phone Number: 435-753-1881

Email: hmtechsupport@junipersys.com

Address: 1132 W 1700 N, Logan, UT 84321

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APPENDIX C

Limited Warranty

9 Appendix C: Limited Warranty

9.1 Software

Software products that are designed by Juniper Systems for use with a hardware product and that are properly installed on that hardware product are warranted to the end user not to fail to execute their programming instructions due to defects in material or workmanship for a period of one year from the date of delivery.

If Juniper Systems receives notice of such defects during the one year warranty period, Juniper Systems shall, at its option, repair or replace the defective software media. Warranty is limited to repair or replacement of software media.

The warranties provided herein do not apply in the case of improper or inadequate maintenance or in the case of repair by any person not previously authorized in writing by Juniper Systems to do such maintenance or make such repairs.

These warranties likewise do not apply where the products have been operated outside the environmental specification of the product, where software products other than those specified by Juniper Systems have been used, or where attempts at software interface have been made by any person not previously authorized by Juniper Systems to perform such interfacing operations.

9.2 Disclaimer of Warranties

The warranties set forth herein are in lieu of all other warranties of Juniper Systems, whether written, oral or implied. Juniper Systems makes no warranties regarding its products (hardware or software), including without limitation warranties as to merchantability, fitness for a particular purpose, any warranty arising from course of performance, course of dealing, or usage of trade whether any of the foregoing warranties are either expressed or implied. Juniper Systems specifically makes no warranties as to the suitability of its products for any particular application. Juniper Systems shall in no event be liable for special, incidental, or consequential damages in connection with or arising out of the furnishing, performance or use of any product covered by this agreement whether such claim is based upon warranty (express or implied), contract, strict liability, negligence or otherwise.

9.3 Updates or Modifications

Juniper Systems shall be under no obligation to update or modify its products except as herein noted to correct program errors. Furthermore, the customer agrees that all representations and warranties contained herein shall be immediately null and void in the event of any modification, alteration or change in or to any product affected by or on behalf of the customer except for a change made by Juniper Systems.

9.4 Removal of Serial Number

Removal of the Juniper Systems serial number label from an instrument will void any warranty on the said instrument. Juniper Systems will not repair or update an instrument and return it to an individual if the instrument is without the said serial number label.

9.5 Extended Warranties

Juniper Systems offers a variety of warranty options to extend coverage beyond the standard warranty. You can contact Juniper Systems Customer Service Department for details at (435) 753-1881 (6 am – 5 pm MT, Mon–Fri).