



GrainSense A-2 Handheld Analyzer User Manual

[Home](#) » [GrainSense](#) » GrainSense A-2 Handheld Analyzer User Manual



GrainSense

A-2 Handheld Analyzer
User Manual



Contents [[hide](#)]

- 1 A-2 Handheld Analyzer
- 2 Introduction
- 3 Safety and correct usage instructions
- 4 The Grain Sense Solution (with the A-2 Analyzer)
- 5 Setup and operation
- 6 Maintenance and servicing
- 7 Support
- 8 Declaration of Conformity
- 9 Documents / Resources
 - 9.1 References
- 10 Related Posts

A-2 Handheld Analyzer

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Manufacturer:

GrainSense Oy

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Contact details can be found on the back page of this manual.

Information

The information included in this manual corresponds to our current state of knowledge and is no claim for completeness.

This manual is only intended for the Grain Sense Analyzer (A-2). Before using the Grain Sense Analyzer, the operator must carefully read the detailed instructions for the safe and correct usage of the Grain Sense Analyzer.

Declaration of conformity

The Grain Sense Analyzer A-2 comes with a type label included. It proves that the device conforms with applicable regulations. The Declaration of Conformity is available upon request.

Introduction

Thank you for choosing Grain Sense.

In farming, timing is everything. You need to know when to act, when to harvest, in which order to harvest, when to store, which grains to select for feed, and when to trade. Grain quality data is key to making all of those decisions.

With Grain Sense, you know your grain. You can track your grain quality instantly, anywhere. You receive reliable data quickly, and you can store results in the cloud along with their GPS location— so you can make the right decisions to control your outputs.

The Grain Sense Analyzer is a battery-powered, handheld grain analyzer with advanced NIR (Near Infrared) technology. You get reliable protein, moisture, oil and carbohydrate contents in seconds from just a few kernels. Know your grain, grow your business.

Safety and correct usage instructions

2.1 Correct use

The following points must be observed in order to use the Analyzer in a correct manner:

- Set up and Operation
- Adherence to the maintenance and servicing instructions

- The Analyzer performs best under dry conditions

2.2 Avoiding measurement errors

Observe the following points in order to avoid incorrect measurements:

- Do not take measurements when kernels are green or unripened. Grain Sense calibrations do not include green kernels
- Do not perform all measurements on the same plant when measuring the average content for the field
- Do not perform all measurements on a small area of the field when measuring the average content for the field
- Do not measure using old calibration versions. Remember to regularly connect the Analyzer to your phone to save data and update the latest calibrations
- Do not measure if there is water/humidity on the tray, as it will affect moisture measurement
- Do not measure if batteries are too low. Change or recharge the batteries every 50 to 150 measurements depending on battery quality and usage
- Do not use samples containing dirt, leafs, straws, etc. since they may interfere measurements

2.3 Exclusion of warranty

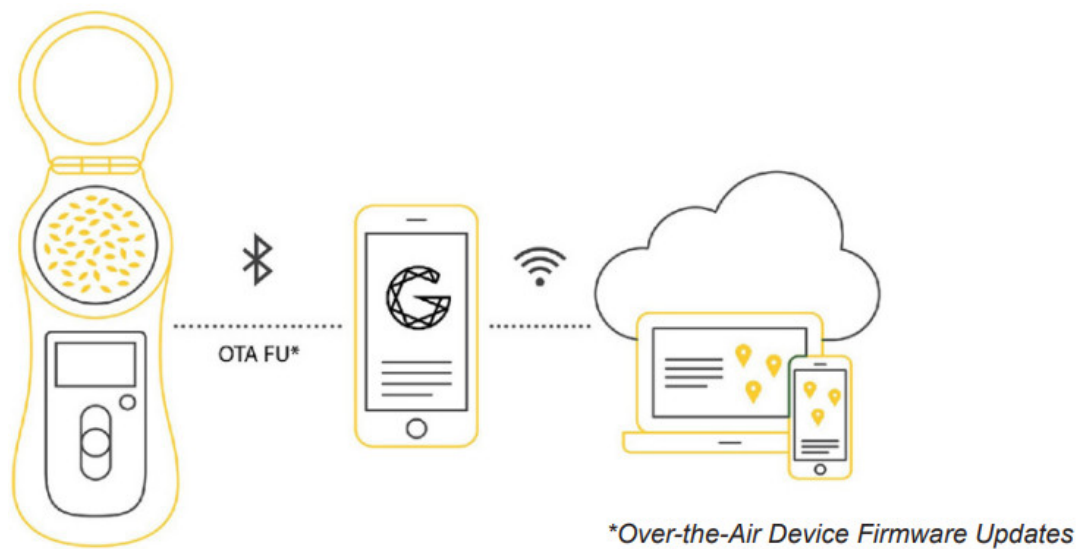
Grain Sense is not liable for the following damages to the Analyzer:

- Damage to the Analyzer following impacts or vibration
- Damage to the Analyzer resulting from moisture or dust
- Damage to the display resulting from applied pressure and scratches
- Malfunctions resulting from cleaning the sample tray with cleaning agents containing alcohol or other chemicals
- Damage caused by heat or intensive solar radiation: The Analyzer must not be placed in the immediate vicinity of heat sources or be exposed to direct sunlight
- Incorrect storage

The Grain Sense Solution (with the A-2 Analyzer)

3.1 Grain Sense solution architecture

The key components of the Grain Sense solution are the Grain Sense Analyzer A-2, the Grain Sense Mobile Application, and the Grain Sense cloud-based database.



The three pillars in the Grain Sense system are connected as follows:

1. The Grain Sense Analyzer measures the grain quality from a few kernels for any calibrated species. The protein, moisture, carbohydrates and oil contents are measured in a few seconds. The GrainSense Analyzer A-2 interacts with the GrainSense Mobile Application via Bluetooth and for Over-the-Air Firmware Updates
2. The Grain Sense App connects with the cloud to upload calibrations and other settings to the Grain Sense Analyzer and sends measurements results from the Analyzer to the cloud-based database.
3. The Grain Sense cloud-based database and API store the measurement results and provide updated calibrations/settings to the Grain Sense Analyzer (via the Mobile application). The cloud services include access to the Grain Sense App and the Grain Sense Dashboard.

3.2 The GrainSense Analyzer A-2

3.2.1 Package contents

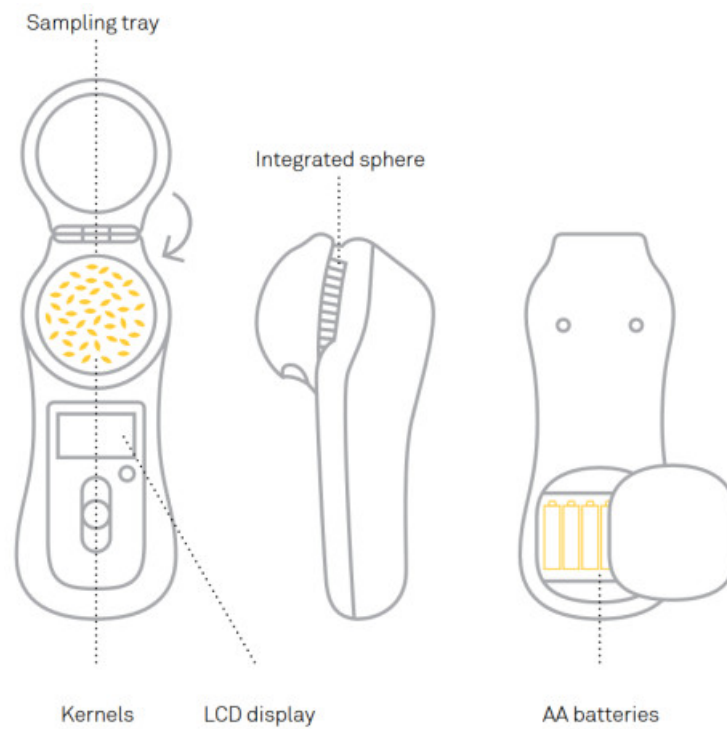
The Grain Sense Analyzer A-2 Package contains:

- Grain Sense Analyzer A-2
- AA batteries, rechargeable batteries are allowed
- Grain Sense Cap
- Quick guide
- Set of 4 Grain Sense sampling spoons
- Carrying bag
- Grain Sense cleaning cloth



3.2.2 Grain sense Analyzer A-2 overview

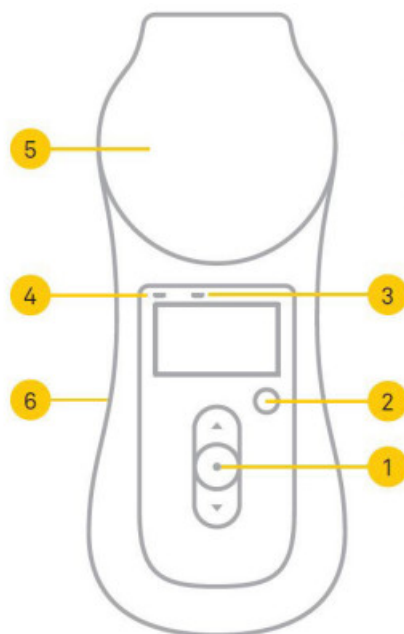
The Grain Sense Analyzer A-2 is a handheld and battery-powered device which measures grain kernels in the field and determines protein, moisture, carbohydrate, and oil contents.



The Grain Sense Analyzer has:

- An LCD display
- Up and down arrow buttons to select and change view content (If arrows are shown on the screen)
- Confirmation button to move to the next phase of the measurement process
- Dedicated power button
- Power on by pressing the button until the display turns on
- Power off by holding the button until the display turns off
- Battery light to indicate battery levels
- Green: battery level strong
- Red: batteries should be replaced soon
- Bluetooth light to indicate a connectio with the Grain Sense App
- Blink: seeking connection
- Steady: connected

1.



Up/ Select/ Down button

2. Power button
3. Battery light
4. Bluetooth light
5. Cover
6. Battery lid on backside

Note! As batteries differ widely in performance, the LED color is a rough indication and the user should change the batteries regularly (every 50-100 measurements).

3.3 Grain Sense Application

Grain Sense provides a mobile application for iOS and Android platforms. The App communicates with the Analyzer via Bluetooth and with the cloud database via REST API. The App downloads the calibrations and user settings from the cloud and sends measurement results back to the cloud. It also communicates with the Analyzer for Over The Air Firmware Updates.

Refer to the Grain Sense App sheet for more information.

3.4 Grain Sense Dashboard

The Grain Sense Dashboard is a great web tool to analyze and manage the measurements on computer or tablet. Visit it at <https://dashboard.grainsense.com/>. Use the same login and password for logging in the Grain Sense Mobile Application. The Grain Sense Dashboard also allows the user to export the data via an .xls or .csv file.

Refer to the Grain Sense Dashboard sheet for more information.

3.5 GrainSense Data collection

3.5.1 GDPR guidance

GrainSense is fully compliant with the General Data Protection Regulation (GDPR) The GDPR has been in place since 25.5.2018. and involves all companies handling data from EU citizens. Data controllers (i.e. company) and data processors (company or subcontractor) are required to comply and give more power to a person regarding his data, that includes to:

- Ask explicit consent for all different data types (GPS, email marketing, etc), describe how to data is used and for what purpose
- Allow users to control the data (delete and export)

Companies must also have an internal guidance (this chapter of the User Manual) on GDPR.

3.5.2 Data infrastructure and protection

Grain Sense acts as a data controller and processor, but for processing, it uses an outsourced infrastructure (Digital Ocean). Grain Sense has taken measures to protect user data by:

- Applying standard encrypted HTTPS (TLS) communication
- Using proper authorization and authentication methods
- Using enterprise level framework (Java Spring)
- Taking nightly backups of the data (last 30 days)
- Limiting admin rights to the databases (two key persons have access to user's personal data)

3.5.3 Data handling

Grain Sense gathers data of all registered users to:

- Provide calibrations and other data to users and to their GrainSense Analyzers
- Provide statistical analyses of the user-specific data, and to showing it only to the user itself
- Verify account status and level
- Store all measured data to provide an access anytime anywhere to the user
- Provide high level customer support and guidance
- Provide higher level statistical data of a specific reason (anonymized) and providing it to all users

3.5.4 User data control

The user can stop their subscription at any time and ask for their data to be deleted by sending a request to support@grainsense.com from the account email address.

Deletion is made by completely anonymizing the user data: User details (email, address, etc) are anonymized and GPS locations changed. However, measured data itself is not deleted and will be used for statistical purposes.

Setup and operation

4.1 Creating a Grain Sense User account

4.1.1 Downloading the Grain Sense Mobile App from the app store

Grain Sense Mobile App is available at official Google Play and iOS app stores. Search using "grain sense". Download and install the app for compatible Android (OS 7.0 or higher) and iOS (OS 12.0 or higher) phones.

4.1.2 Registering to Grain Sense cloud

Registration is done via a separate web application at www.grainsense.com/register.

There are two alternatives to do the registration:

- Alternative 1:
 - Open Grain Sense App on the mobile phone and click on the "Not yet registered?" link.
 - A web browser is opening from the mobile phone
 - Create a Grain Sense User Account by filling in the details
- Alternative 2:
 - Open a laptop or tablet and go to the registration URL www.grainsense.com/register
 - Create a Grain Sense User Account by filling in the details

Follow the instructions on the registration page and don't forget to verify your account by clicking on the email you received.

After successful registration, the user can open the Grain Sense App and log in using the email and password provided in the registration application.

4.3 Taking a measurement

4.3.1 Representative sample requirement for reliable measurements

The cornerstones to get reliable measurements with the Grain Sense Analyzer are representative samples and a correct use of the GrainSense Analyzer.

Obtaining a representative sample from a lot of grain is an important and essential part of the grain inspection

process. If the sample is not representative, the final quality results will not reflect the true quality of the lot.

Taking samples in the field:

- In order to obtain a representative average reading, the measurements must be carried out randomly distributed across the field.
- When measuring, avoid any atypical areas of the field (e.g. areas with distinctly different soil properties, such as sand banks or similar)!

Taking samples from the truck/silo:

- Different guides about grain sampling already exist, including:
- AHDB, UK: Grain sampling guide for cereals and oilseeds.
- USDA, USA: Grain Inspection Handbook – Book I – Sampling.

Note! It is not the responsibility of Grain Sense to provide a sampling guide, only recommendations can be given.

4.3.2 Sample size and placement of kernels on the tray

For most cereals, the size of the sample should be about 60–80 kernels corresponding to 3–5 grams. When kernels are bigger, the number of kernels can be reduced. For rapeseed, the amount of seed should correspond to about 2 grams.

For a more precise sampling, use the set of Grain Sense spoons and choose the proper spoon size according to the grain type selected (2.5ml for rapeseed and 5ml for cereals: wheat, barley, oats and rye). The 2.5ml spoon is also used to sample maize and soybean.

Sample size of different species		
Wheat	3g/5ml	Evenly spread across Tray
Barley	3g/5ml	Evenly spread across Tray
Oats	3g/5ml	Evenly spread across Tray
Rye	3g/5ml	Evenly spread across Tray
Rapeseed	2g/2.5ml	Towards bottom of Tray, no overlapping
Maize	2×2.5ml	Evenly spread across the Glassless Tray*. Refer to Instructions for the Glassless Tray.
Soybean	2×2.5ml	Evenly spread across the Glassless Tray*. Refer to Instructions for the Glassless Tray.

*** Glassless Tray is used for bigger kernels and sold as an additional accessory.**

The Grain Sense Analyzer will also tell you whether the sample is too big or too small with an error message. In this case, take the sample away from the tray and start from the beginning (as for a new measurement).

The tray shall be loaded as follows:



Wheat



Barley



Oat



Rye



Rapeseed



Maize



Soybean

When taking measurements from a larger batch of grain, it is important to remember the following:

- Make sure the subsample taken has come from a larger sample that has been mixed as well as possible.
- For better results, one should take several subsamples and average the results together in the app.
- Try to avoid any foreign matter from being placed on the tray in addition to the species being tested.

4.3.3 Doing a measurement

Connect the Analyzer to your phone

- **Turn on Bluetooth and location services**
 - Go to the settings of your smartphone and make sure both Bluetooth and the location services are on.
 - For the first connection, a working internet connection is needed on your smartphone.
- **Turn on the Grain Sense Analyzer and make the connection.**
 - Turn on your Analyzer
 - The blue light on it will blink while it searches for your phone.
 - In the Grain Sense App, go to the “Analyzer” tab and click on the button “Connect analyzer”.
 - The Grain Sense App will tell you once it is connected to your Analyzer. The Analyzer blue light will stop blinking and it will update settings.

Adjust your Analyzer settings from the App

- Select the species you want to analyze
 - In the App “Analyzer” tab, press the button “Select calibration” and choose the species you want to load onto your Analyzer.
 - Your Analyzer will update automatically. Only one species can be loaded at a time.
- **Configure an IBA (Individual Bias Adjustment) if needed**
 - You can use the IBA feature to adjust your Grain Sense Analyzer to a local reference.

- Click on “Configure corrections”.
- If needed, you can disable the auto shutdown of your Analyzer.

Please note that excel file for IBA calculation can be accessed from the Grain Sense Dashboard.

Make a measurement and send it to the App

- Make the reference measurement
 - Press (o), verify that the sphere is empty and press again (o).
 - The reference measurement takes only a couple of seconds.
- **Load your sample and analyze**
 - Open the cover and load the right amount of grains by using the Grain Sense spoons.
 - The sample size depends on the species you are analyzing
- **Send the results to the App**
 - Results are displayed on the Analyzer, press (o) twice to send them to the App
- **When you're done, remember to open the cover and completely empty the sample tray.**








4.4 Viewing the results, adding notes, averaging and sharing results

You can view the results and add notes to a measurement after you have sent the results from the Analyzer to your phone. You can also share the results from the App.

Refer to the Grain Sense App sheet for more information.

4.5 Error icons

7 error icons have been defined and can be displayed on the Grain Sense Analyzer A-2 screen, those icons are presented in the table below.

Icon	Instruction
	Wait
	Turn on/Turn off
	Try again
	Sample too big, try again with a smaller sample
	Sample too small, try again with a bigger sample
	Change the batteries
	Servicing required, contact your Distributor or Grain Sense at support@grainsense.com

A **combination of icons** can also be displayed. Each icon will correspond to a step you have to take in order to get a reliable measurement.

For example, the error icon combination on your Analyzer's screen below would mean:

Wait a bit, then try again, if the error persists servicing is required so contact your Distributor or Grain Sense at support@grainsense.com



Maintenance and servicing

5.1 Cleaning the sample tray

The sampling tray of the Grain Sense Analyzer should be kept clean and the batteries changed when needed. The tray is removable and opens by turning it counter clockwise, about 10 degrees.

Note! Never use running water or chemical cleaning agents on the sample tray (e.g. domestic cleaner, alcohol or cleaning solvent). If required, clean the sample tray with a dry, clean, soft cloth.

5.2 Replacing the batteries

The batteries should be changed when needed:

- Turn off the GrainSense Analyzer.
- Open the battery cover with a flathead screwdriver
- Replace the old batteries with new batteries of the same type: 6 x AA Alkaline. We recommend using AA batteries labelled for industrial use for maximum performance (i.e. optimized for high drainage) or rechargeable batteries.
- Make sure the batteries are inserted into the Analyzer properly.
- Close the cover tightly with a flathead screwdriver.

5.3 Transportation and storage

The Grain Sense Analyzer should always be transported and stored in the Grain Sense carrying bag. Avoid knocking the Analyzer or scratching the display. Only take the Analyzer out from the carrying bag when measuring.

5.4 Disposal

The Grain Sense Analyzer and batteries may not be disposed of in normal domestic rubbish. Please refer to your local regulations for disposal.

5.5 Updating the calibrations on the Grain Sense Analyzer

To assure the accuracy of the measurement, the Grain Sense Analyzer should be connected regularly to the Grain Sense App to upload the latest updates from the Grain Sense cloud.

When new calibration updates are available, the Grain Sense App and the Grain Sense Analyzer should be connected with internet connection on the phone. It is advised to push the button "Update settings" from the Grain Sense App "Analyzer" page in order to push the news settings to the Grain Sense Analyzer.

5.6 Over The Air Firmware Updates (OTA FU)

The Grain Sense Analyzer A-2 supports Over The Air Firmware Updates (OTA FU). This means that when a new firmware update is available, you will be able to download it from the Grain Sense App and then transfer the update to your Analyzer remotely!

If there is a firmware update available for your Analyzer and you have connected your Analyzer to your Grain Sense App, you will see in the "Analyzer" App tab a screen informing you that an update is available. You only need to push the button "Update now", and it will start the download. Firmware Update lasts usually from 5 to 10 minutes. During that time, the Analyzer should not be disconnected from your App. Please before doing a firmware update, verify that you have deactivated the auto shutdown of your Analyzer in the Grain Sense App's "Analyzer" tab.

Once the new software upload is complete, your Analyzer will disconnect, restart and install the new software. Do not touch the Analyzer during this process.

Support

Support materials are available on Grain Sense Website at any time.

In case you need further help, please contact your local Grain Sense distributor or send an email to the Grain Sense support team: support@grainsense.com. Contact details can be found in the Grain Sense App.

Declaration of Conformity

Grain Sense Oy (FI2630019-1)

Tutkijantie 9 B
90590 Oulu,
Finland

Declares under our sole responsibility that the product:
GrainSense Analyzer
Is compliant with the following directives:

- Radio Equipment Directive 2014/53/EU
- Low Voltage Directive 2014/35/EU
- RoHS III 2015/863
- WEEE 2012/19/EU

A digital version of this declaration is available from the manufacturer on request.

CONTACT

For any support, please contact your salesperson or support@grainsense.com




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GRAINSENSE.COM

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Documents / Resources

<p>GrainSense User Manual GrainSense® Analyzer A-2</p> 	<p>GrainSense A-2 Handheld Analyzer [pdf] User Manual A-2, Handheld Analyzer, A-2 Handheld Analyzer, Analyzer</p>
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References

-  [GrainSense](#)
-  [Account registration – GrainSense](#)
-  [Grainsense Dashboard](#)