

USER MANUAL

GRAINSENSE® FLOW ANALYZER (GS-FLOW-ANLZR)



GrainSense



Imprint

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Manufacturer
GrainSense Oy
Tutkijantie 9
90590 Oulu
Finland

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

This manual is only intended for the GrainSense Flow Analyzer.

Before using the GrainSense Flow Analyzer, the operator must read carefully the detailed instructions for safe and correct use of the GrainSense Flow Analyzer.



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1. Introduction

Thank you for choosing GrainSense.

With GrainSense Flow Analyzer, you analyse your grain. You can track your grain quality real-time from flowing grain. You receive reliable data, and you can store results in the cloud – so you can make the right decisions to control your outputs.

The GrainSense Flow Analyzer is a revolutionary grain analyzer with advanced NIR (Near Infrared) technology. You get reliable protein, moisture, oil and carbohydrate contents instantly from flowing grain.

2. Safety and correct usage instructions

2.1 Safety

GS-Flow Analyzer is designed and manufactured in compliance with the latest applicable EU regulations, directives, and standards to ensure safety. It is essential to familiarize yourself with the information regarding product compliance and markings. GS-Flow Analyzer complies with all relevant EU regulations, directives, and standards applicable to its intended use. It has been designed and manufactured to meet the given requirements, ensuring its safe operation when used as directed.

Type Label: Please refer to the type label attached to the product for specific markings indicating compliance with relevant regulations, directives, and standards. The type label provides important information such as the CE marking and other possible and relevant certifications.

CE Marking: The CE marking on GS-Flow Analyzer indicates its compliance with the essential requirements of applicable EU directives and regulations. It demonstrates that the product has undergone assessment and meets the necessary safety, health, and environmental protection standards. Declaration of Conformity is available from request.

User Responsibilities: As a user of GS-Flow Analyzer, it is important to read and understand the user manual in its entirety. Follow all instructions, warnings, and precautions provided to ensure safe operation, prevent hazards, and maintain the product's performance.

If you have any questions regarding the safety, compliance, or operation of GS-Flow Analyzer, please contact our **customer support**: support@grainsense.com. Our team is available to provide guidance and address any concerns you may have.

Remember, it is crucial to adhere to safety guidelines, use the product as instructed, and exercise caution while operating GS-Flow Analyzer. Failure to follow these instructions may result in personal injury, property damage, or compromised product performance. By using GS-Flow Analyzer, you acknowledge that you have read and understood this safety chapter, and you agree to assume responsibility for using the product in a safe and responsible manner.



2.2 Correct use

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

Set up and operation

Adherence to the maintenance and servicing instructions

2.2 Exclusion of warranty

GrainSense is not liable for the following damages of the GrainSense Flow Analyzer:

- All damage to the Flow Analyzer misuse.
- Damage to the display resulting from applied pressure and scratches.
- Incorrect storage.
- Usage beyond the range of operational temperatures.

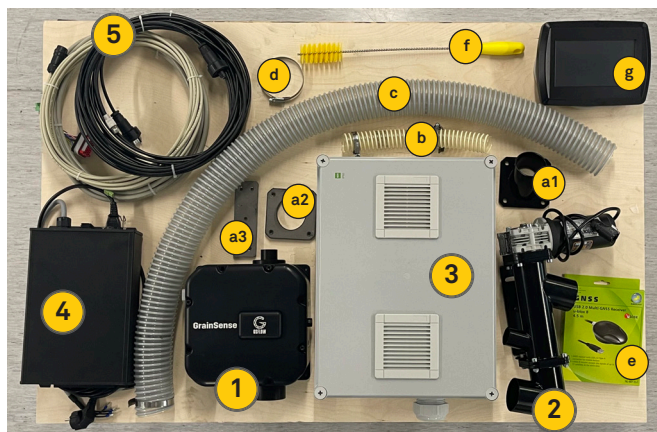
3. GrainSense Flow Analyzer

3.1 Product description

The GrainSense Flow Analyzer has been developed for analyzing real-time grain quality in environments

where grains are flowing. Whether installed in a silo, dryer, or combine harvester, the GrainSense Flow Analyzer measures protein, moisture, oil and carbohydrates online during harvesting or processing or storing.

From a grain entry and exit system, the GrainSense Flow Analyzer will continuously extract a sample of the grain from the connected system and perform a real-time quality analysis. The key values can be seen on the display of the device and the measurement data is sent to GrainSense Cloud, enabling the user to monitor the results in real time and to make quality-based decisions.



3.2 Package contents

1. GrainSense Flow Analyzer Sensor unit
2. GrainSense Flow Analyzer Dosing Auger
3. GrainSense Flow Analyzer Gateway unit
4. GrainSense Flow Analyzer Power unit (stationary version only)
5. Cables (display, 2x Ethernet, sensor)

GrainSense Flow Analyzer Installation parts:

- a) Mounting plates for Dosing Auger for input and output hoses: tube flanges (a1) 3 pcs, flanges (a2) 3 pcs, housing adapter (a3) 1 pcs
[Additional mounting plate for the sensor, not included into the picture, not commonly used]
- b) Connecting pipe (32 mm diameter) between dosing auger and sensor unit
- c) Input/output and bypass pipes (63 mm diameter)
- d) Hose clamps 8 pcs
- e) GPS unit (combine harvester version only)
- f) Brush for cleaning the glass tube
- g) Display

3.2.1 Additional equipment requirements

During installation and operation:

- Wifi- connection

During installation:

- A drill and a screwdriver
- Welding machine (if applicable)
- Alloy wrenches
- Drill bit hole saw 60 mm



GrainSense Flow Analyzer package unboxed for installation



3.3 GrainSense Flow Dashboard

The GrainSense Dashboard is a great web tool to analyze and manage the measurements on computer or tablet. Visit it at <https://flowdashboard.grainsense.com/>. The GrainSense Flow Dashboard also allows the user to export the data via an .xls or .csv file.

3.4 GrainSense Data collection

3.4.1 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.

3.4.2 Data infrastructure and protection

GrainSense acts as a data controller and processor, but for processing, it uses an outsourced infrastructure (Amazon AWS). GrainSense 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)

3.4.3 Data handling

GrainSense gathers data of all registered users to:

- Provide calibrations and other data to users and to their GrainSense Flow 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



3.4.4 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.

Technical specifications

Size	225x225x110 mm
Weight of the sensor	5 kg
Power	230/110/12 V
Rated current	25A
IP rating	IP54
Measurement principle	Near infrared transmittance spectroscopy
Sample size	100 grams per second flows through the sensor when measurement is ongoing
Species	Wheat, barley, soybean, maize, rapeseed, oats, rye
Storage temperature	-20 to +85 °C (-4 F to 185 F)
Operation temperature	0 to +45 °C (32 F to 113 F)

4. Installation and Operation

Continuous grain flow is extracted from e.g., combine harvester's elevator to GrainSense Flow Analyzer's dosing auger. Dosing Auger feeds a steady grain flow through the GrainSense Flow Analyzer sensor unit.

4.1 Installation instructions

This document describes the installation procedure of the GrainSense Flow Analyzer. The Flow Analyzer can be installed in a combine harvester or in a grain handling facility. Every location is somewhat unique and planning before starting the installation is recommended.

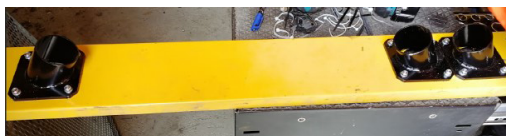
4.2 Package Contents (see 3.2)

Before starting the installation, check the installation location and carefully plan the exact place for the Sensor unit and the dosing auger. Same mounting plates can be used in combine harvester and in grain handling facility.

5. Installation in Combine Harvester

5.1 Installing the sensor unit and dosing auger

GrainSense Flow Analyzer is installed in the combine harvester's clean grain auger. The dosing auger and the input pipe are installed above the sensor unit. Before starting the installation, make sure there is enough space for the dosing auger and for the input pipe above the planned location of the sensor unit. Also, the input pipe acts as a grain buffer for the Flow Analyzer, so the longer the input pipe is, the bigger the grain buffer is.



After the installation location is decided, mark the correct place for the sensor unit's mounting plate. The mounting plate is welded (if applicable) on to the elevator, so make sure that the location is correct and exactly horizontal. After the location has been marked, weld the mounting plate to the elevator. **NOTE! The installation is performed in a dusty environment. Make sure, that all local regulations for welding are followed and take needed precautions to minimize the possibility of catching fire while welding.**

After the Sensor unit's mounting plate is welded, install the sensor unit. When sensor unit is in place, define the installation location for the dosing auger. The dosing auger should be installed above the sensor unit and the output of the dosing auger, and the input of the sensor unit must be aligned. When the correct location is decided, mark the correct place for the dosing auger's mounting plate. The mounting plate is welded the same way as the sensor unit's mounting plate. After the mounting is welded, install the mounting bracket and the dosing auger.

Next, the mounting plate for the dosing auger's input pipe and the bypass pipe and the output pipe for the sensor unit is installed. The mounting plate for the dosing auger's input pipe will be installed above the dosing auger and it must be aligned with the input of the auger. The more vertical distance between the mounting plate and the dosing auger, the bigger the grain buffer will be. After the location is defined, mark the location. Then weld the mounting plate same way as the other mounting plates.

The mounting plate for the dosing auger's bypass will be installed below the bypass and must be aligned with the bypass. Installation will be done the same way as the other mounting plates.

The mounting plate for the sensor unit's output will be installed below the sensor unit and must be aligned with sensor unit's output. Installation will be done the same way as the other mounting plates.

After all of the mounting plates have been welded, install the pipe connections and the input pipe, output pipe and the bypass pipe. Also, install the pipe between the dosing auger and the sensor unit. Use the included hose clamps for securing the pipes.



5.2 Installing the gateway

The gateway unit is installed in the combine harvester's cabin. Find a suitable location in the cabin and fix the gateway unit securely. When the gateway unit is installed, install the wiring between the gateway unit and the sensor unit. Make sure that the wiring is done securely and that the wiring is not subject to any damage.



Install a power cable for the Gateway unit following the schematics inside the gateway unit. If needed, use a professional electrician.

Find a suitable location in the cabin for the **display** and install it. **Finally, install the GPS receiver on the roof of the combine harvester. Make sure that the cable is not subject to any damage.**

6. Installation in Grain Handling Facility

6.1 Installing the sensor unit and dosing auger

GrainSense Flow Analyzer can be installed in various locations in a grain handling facility. The sensor unit and the dosing auger must be installed in a vertically level surface, but the input pipe, output pipe and the bypass pipe can also be installed in a round surface. The dosing auger and the input pipe are installed above the sensor unit. Before starting the installation, make sure there is enough space for the dosing auger and for the input pipe above the planned location of the sensor unit. Also, the input pipe acts as a grain buffer for the Flow Analyzer, so the longer the input pipe is, the bigger the grain buffer is.



After the installation location is decided, mark the correct place for the sensor unit's mounting plate. The mounting plate is welded (if applicable) on to the elevator, so make sure that the location is correct and exactly horizontal. After the location has been marked, weld the mounting plate to the elevator. **NOTE!** The installation is performed in a dusty environment. Make sure that all local regulations for welding are followed and take needed precautions to minimize the possibility of catching fire while welding.

After the Sensor unit's mounting plate is welded, install the sensor unit. When the sensor unit is in place, define the installation location for the dosing auger. The dosing auger should be installed above the sensor unit and the output of the dosing auger, and the input of the sensor unit must be aligned. When the correct location is decided, mark the correct place for the dosing auger's mounting plate. The mounting plate is welded the same way as the sensor unit's mounting plate. After the mounting is welded, install the mounting bracket and the dosing auger.

Next, the mounting plate for the dosing auger's input pipe and the bypass pipe and the output pipe for the sensor unit is installed. The mounting plate for the dosing auger's input pipe will be installed above the dosing auger and it must be aligned with the input of the auger. The more vertical distance between the mounting plate and the dosing auger, the bigger the grain buffer will be. After the location is defined, mark the location. Then weld the mounting plate the same way as the other mounting plates.

The mounting plate for the dosing auger's bypass will be installed below the bypass and must be aligned with the bypass. Installation will be done the same way as the other mounting plates.

The mounting plate for the sensor unit's output will be installed below the sensor unit and must be aligned with the sensor unit's output. Installation will be done the same way as the other mounting plates.

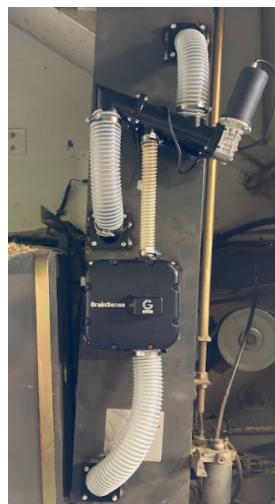
After all of the mounting plates have been welded, install the pipe connections and the input pipe, output pipe and the bypass pipe.

Also, install the pipe between

the dosing auger and the sensor unit. Use the included hose clamps for securing the pipes.

6.2 Installing the gateway

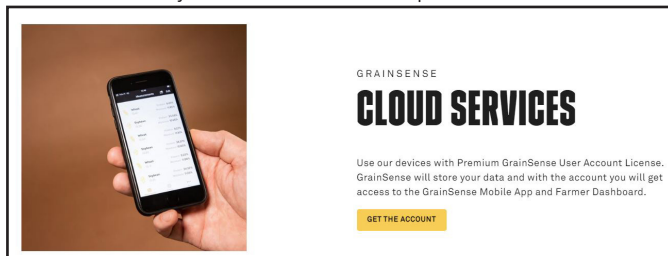
The gateway unit can be placed freely in the facility. It can be installed E.g., in a control room or close to the sensor unit. After the suitable location has been defined, the gateway unit is fixed securely. Connect the wiring between the gateway unit and the sensor unit so that the wiring is not subject to any damage.



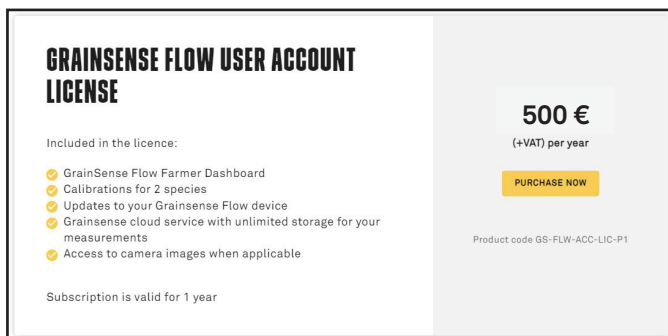


7. Registering to GrainSense cloud

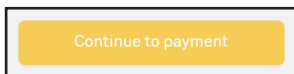
1. Go to www.grainsense.com
2. Scroll down until you see the Cloud services -part.



3. Click 'Get the account'
4. Scroll down and click 'Purchase now' - button on the GrainSense Flow user account license



5. Fill in the fields on the registration form.
6. Click 'Continue to payment'.





7. On the payment -page, select the payment method. Check the I'm not a robot -box (or alternatively, solve the reCAPTCHA challenge) and then click on the 'Register' - button.

REGISTER TO GRAINSENSE

PRODUCT :GRAINSENSE FLOW USER ACCOUNT LICENSE

PAYMENT

We partner with Paddle to handle software payments and billing. Paddle serves the checkout on our website through which you place an order. Amongst other payment methods, Paddle handles wire transfers on our behalf. GrainSense cloud services are billed annually. Please check your spam box!

Paddle buyer [terms and conditions](#)

☐ Cards, Paypal

☒ Invoice(Bank Wire Transfer)*

*An invoice will be sent to your email.
Note! For US business clients, only the bank wire transfer is available on the invoice. For paying with card, please select cards as your payment method.

Price:

500 €

(+VAT) Per year. No additional costs.

[Register](#)

8. You should see the thank you for registering message.

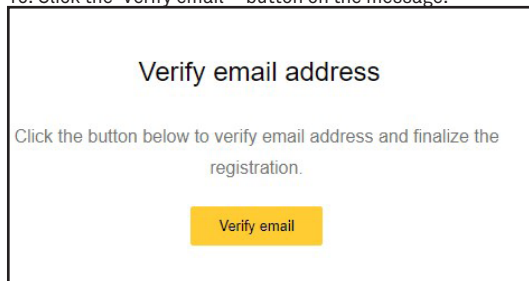
Thank you for registering. Please finish you account creation by clicking the confirmation link in the email you received.

9. Go to your email inbox and open the “Confirm your email with GrainsenSense” - message.

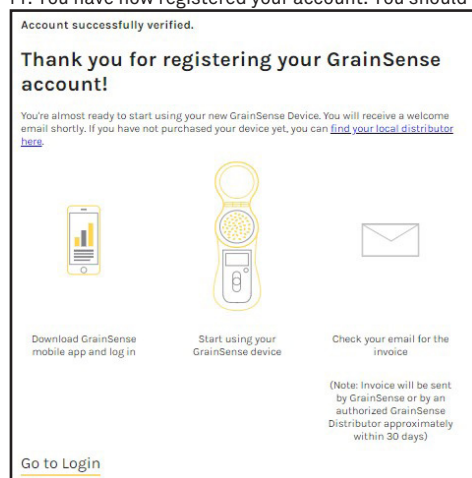
[no_reply](#) [Confirm your email with GrainSense](#) [GrainSense logo](#) [Verify email address](#) [Click the button below to verify email address and finalize the registration. Verify email GrainSense logo](#)



10. Click the 'Verify email' - button on the message.



11. You have now registered your account. You should see the confirmation message on your browser.



8. Operation Instructions

8.1 How does it work?

A dosing auger is installed close to a place where grain is flowing

The GrainSense Flow Analyzer controls the auger and electronics to perform measurements in configured intervals. Measurements are being done until the user ends the measurement session.

The measurements are collected by the Gateway unit and sent via WiFi or mobile network to the GrainSense Flow database.

The user can access the GrainSense Flow Analyzer measurement sessions anytime from the GrainSense Flow -dashboard with the provided credentials.



8.1.1 Powering up the GrainSense Flow Analyzer

1. Turn the power switch to ON from the GrainSense Flow Gateway unit.
2. Wait until you see the landing page on the screen.

8.1.2 Network settings

GrainSense Flow Analyzer uses Wi-Fi network for internet connection. To have the measurement results available real-time in the GrainSense cloud, Wi-Fi settings need to be configured. Insert SSID (name of your Wifi network) and password and select the security type of your network. Then tap “Connect”.

Log in with your account credentials in order to start a measurement.

GRAINSENSE

< Back Setup Wifi

SSID

Password

Connect

GRAINSENSE

Setup connection

Wifi

Log in

8.1.3 WiFi

You will be able to see “start measuring” and “settings” options on the screen.

GRAINSENSE

Wifi

Start measuring

Settings

Offline storage available: 80.0 GB

SW 1.2-12.0-1.1.1



8.1.4 Language selection

Go to **General settings**-> **Language**

Select the language you want use with GrainSense Flow Analyzer.

GRAINSENSE

< Back

Setup internet

If you log out offline data will be lost
Offline data 1.2 GB

Log out Language English

GRAINSENSE

English Suomi Português Française
Україна Español

8.1.5 Measurement settings

From the measurement settings main view, you can define measurement interval (how often the measurements are taken during measurement session) and camera interval (how often pictures are taken, if your GrainSense Flow Analyzer has the optional camera).

Start new session

< Back

Session name Measurement interval 5 seconds

Calibration Wheat Camera interval 5 seconds

Alarm 1 No alarm set
Alarm 2 No alarm set

Change alarm 1 Change alarm 2 Start



Tap on the Measurement interval value box to change the interval. Use the DEL -button to delete the old value and type in the new value with the keypad. Then tap “OK” to confirm the new value.

Tap on the Camera interval value box to change the interval. Use the DEL -button to delete the old value and type in the new value with the keypad. Then tap “OK” to confirm the new value.

8.1.6 Calibration selection

Go to **Measurement settings-> Calibration**

Select the calibration that you want to use for the measurement session.

8.1.7 Setting alarms

Go to **Measurement settings-> Change alarm**

Define the desired alarm parameters by using the radio -buttons and define the alarm threshold value in the field. Then tap “Save”.

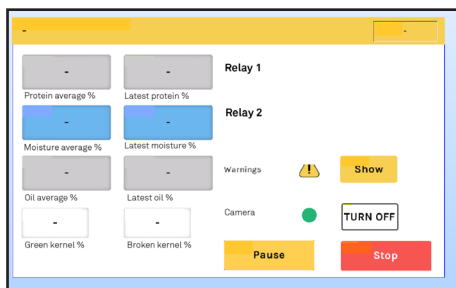
The alarm can be removed from the same dialog by using the “Remove” button.



8.1.8 Starting measurement session

After all the settings have been defined, the measurement session can be started by tapping the “Start” button.

- In the measurement session -view, the user will see the following information:
- Selected calibration (e.g. wheat)
- Latest protein and moisture percentage values
- Average protein and moisture percentage values from the whole duration of the measurement session
- Green kernel and broken kernel percentage values, if camera is included in the system
- If an alarm was defined in the settings, it will be displayed here
- Duration of the measurement session

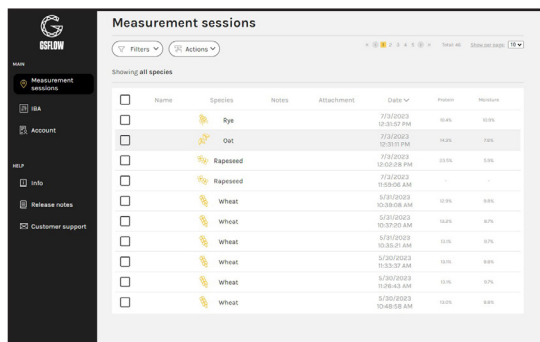


8.1.9 Stopping measurement session

When the batch of grain has been measured, the user can stop the measurement session by tapping the “Stop session” button.

8.1.10 Viewing results

The results are automatically uploaded to the GrainSense cloud. The user can log in and view the results in [GrainSense Flow dashboard](#). In GrainSense Flow dashboard, it is possible to add notes and attachments to measurement session and share the results via email.



Please note that Individual Bias Adjustment (IBA) can be set from the Dashboard. For IBA update the touchscreen has to be connected to the internet next time starting the session.



9. Maintenance and servicing

9.1 Preventive maintenance

We recommend cleaning the glass tube after every 20 h of operations.

Check the cables, connections, glass tube and lamp bulb annually.

If the lamp bulb or glass tube is broken, please contact your local distributor.

9.2 Cleaning the glass tube

The glass tube inside the sensor unit should be kept clean. Depending on the measured species and operating environment, the need for cleaning varies. We recommend cleaning the glass tube at least every fortnight, but a shorter interval might be needed.

To clean the glass tube, release the hose clamp on the output of the sensor unit. Remove the output tube and use the supplied brush. After the glass tube is clean, connect the output tube and tighten the hose clamp.

9.3 Updating the calibrations on the GrainSense Flow Analyzer

When the Grainsense Flow Analyzer is connected to the internet, it automatically checks and downloads new calibrations.

CONTACT

For any support, please contact your
local sales representative or
support@grainsense.com

www.grainsense.com