



PFEUFFER

Operating instructions



NIR analyzer

Granolyser[®] / Granolyser[®] HL

S/N 1181

from software version 1.0.3.1



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Revision 4/31.07.2025
Translation of the original operating instructions

Item number operating instructions:
Artikelnummer Betriebsanleitung: **1180 9011**



These Operating Instructions are a constituent part of the NIR analyzer GRANOLYSER and must be available to all operating personnel at all times. They are intended for the operating company of the system, the operating personnel and the specialists who are responsible for the transport, assembly, installation, operation, maintenance, cleaning, disassembly and disposal.

Pfeuffer GmbH has prepared and reviewed these Operating Instructions with the greatest care. However, no guarantee is made for its completeness or accuracy.

Subject to technical modifications.

Translation

In the event of delivery of subsequent sale to the countries of the European Economic Area (EEA), the operating instructions must be translated into the corresponding language of the country of use. In the event of discrepancies in the translated text, the original operating instructions (German) must be used for clarification, or the manufacturer must be contacted.

Operating instructions in electronic format

The original operating instructions (German) and translations of the original operating instructions can be requested as PDF files by e-mail from Pfeuffer GmbH. Specifying the correct type designation and serial number is important for further processing!

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(DIN ISO 16016)

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1 Introduction

1.1 Designated use

The GRANOLYSER is an NIR (near infrared) analyzer for the examination of whole grain samples. Optimal measurement results are achieved with cleaned, untreated samples. These include various types of grain crops, maize, pulses and oilseeds. The sample is filled into the instrument. The measurement is started and settings are made using the integrated touchscreen. The analysis parameters are defined visually. An integrated weighing system is used to determine the bulk density (Variant HL). Various parameters are defined depending on the selected product: Moisture, protein, sedimentation index (sedi), gluten, oil content, starch and for Variant HL additionally bulk density = mass per hectoliter [kg/hl] (informal: hectoliter weight).

The instrument has two USB interfaces and one RJ45 interface for outputting and processing the measurement results. It is designed as a portable tabletop instrument with a mains plug for indoor use (laboratory environment). Private use is not permitted.

NOTICE

The GRANOLYSER is exclusively intended for the indicated purpose.

Any use beyond the designated use or any modification of the instrument without the prior written consent of the manufacturer shall be considered improper use. If the instrument is operated in a way not intended by the manufacturer, the protection provided by the instrument may be impaired. The manufacturer accepts no liability for any resulting damage – the risk is borne solely by the operator.

The instrument is only allowed to be taken into operation if it can be ensured that all safety instruments are functioning.

The instrument is not suitable for measuring liquids, sticky substances or very fine products (e.g. flour).

Heavily contaminated products may block the conveyor wheel, which may require the instrument to be sent in for servicing.

The products required for designated use are to be provided by the operator. The operator is also responsible for their proper handling, any associated hazards, and for providing the necessary safety and disposal information.

The instrument is not approved for use in potentially explosive environments.

The designated use also includes complying with the operating instructions as well as the maintenance and servicing conditions as defined in these operating instructions.

These operating instructions do not release the owner from the responsibility to develop and apply, or have applied, health and/or safety regulations appropriate for the requirements of the overall system, and to monitor compliance with the same.

1.2 Structural features of the danger notes

The operating instructions from Pfeuffer GmbH contain instructions that you must comply with for your personal safety as well as to avoid damage to property. The instructions for your personal safety are highlighted by a warning triangle. Comply with the following categories of danger notes and explanations of symbols:

Pictogram

SIGNAL WORD



Type of danger and its source

Possible consequence of failure to comply

⇒ Measure to guard against the danger.

DANGER

This is a warning about a highly dangerous situation that will lead to serious or fatal injuries.

WARNING

This is a warning about a dangerous situation that may result in serious or fatal injuries.













CAUTION

This is a warning of a possibly dangerous situation that will lead to slight or moderate injuries.

NOTICE

This is a warning about harmful situations for the product and/or environment.

1.3 Pictograms in the operating instructions

	Comply with the operating instructions		Warning of electrical voltage
	Notes of particular importance and/or additional information		Warning of hot surfaces
	Pull out mains plug		Falling down - Danger to the feet
	Use light respiratory protection		Falling down - Danger to hands
	Protective earth connection		Recycling marking – Supply refuse for recycling
	General warning symbol Indicates safety-related instructions – the operating manual must be read and followed.		Disposal with the household garbage is forbidden!

1.4 Identification

The information in these operating instructions applies exclusively to the instrument with the type designation indicated on the title sheet. The type plate with the type designation can be found on the side of the machine housing (rear right). It is important for all questions to specify the correct type designation, serial number and year of manufacture. Only in this way will rapid processing be possible.

If you have questions about the software, please also specify the version, see imprint **chapter 7.7.8**.

2 Safety

NOTICE

It is strictly prohibited to deactivate the safety devices or modify their mode of effect.

2.1 Built-in safety systems

The built-in safety systems must be checked at regular intervals with the corresponding test methods, see the following table:

Test intervals	
d	daily
w	weekly
m	monthly
¼ y	every three month
½ y	every six month
y	yearly

Test methods	
V	visual inspection
F	function test
M	measurement

Mains disconnecter for a portable instrument

Test	
Interval	Method
y	F

The main switch **I/O** is the mains disconnecter, and also serves as the EMERGENCY OFF function. It is located on the rear of the instrument.

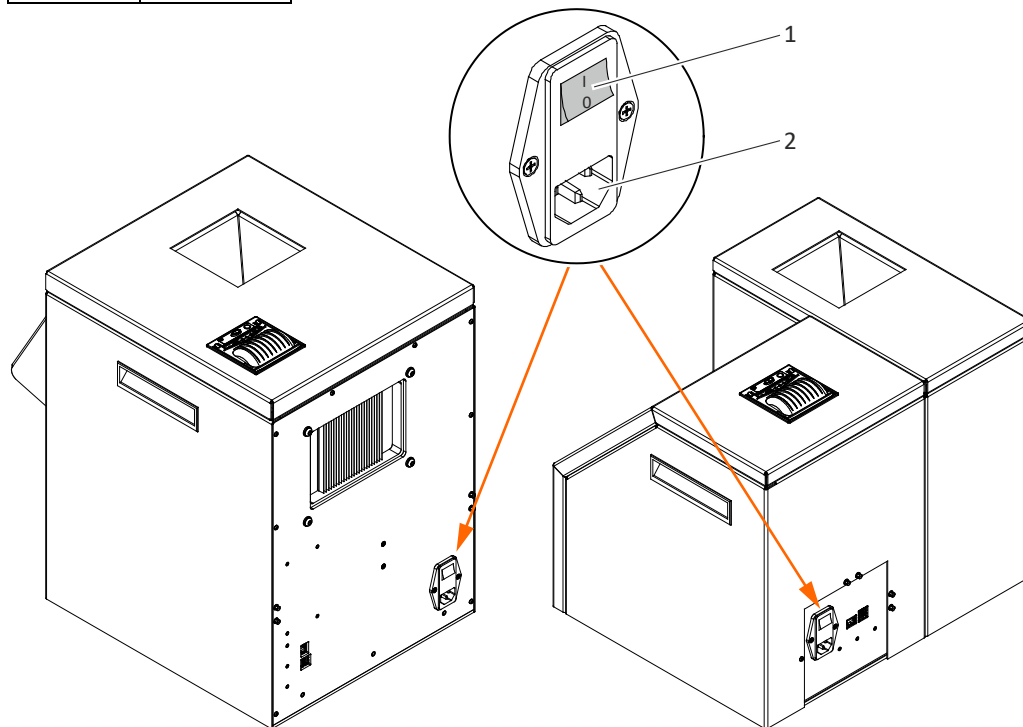


Figure 1: Rear Granolyser HL main switch

Rear Granolyser main switch

Item	Designation
1	Main switch I/O
2	Mains cable connection – (built-in socket IEC 60320 C14)

The connection for the mains cable is located on the rear of the instrument below the main switch.

NOTICE

Only mains cables conforming to the technical specifications (see **chapter 3.2**) are permitted. Do not use any other type of cable.



- ⇒ Switch off the instrument using the main switch in position **O** (OFF).
- ⇒ Disconnect the mains cable from the power supply (i.e. unplug the IEC 60320 C13 appliance connector).



- ⇒ **In an emergency** (e.g. smoke, fire hazard or mechanical blockage) switch off the instrument immediately and disconnect the mains cable from the power supply.
- ⇒ Ensure the mains cable remains under your direct supervision at all times and cannot be unintentionally reconnected.



The instrument must only be operated with the specified voltages. The fuse must always be replaced with one of the same rating (see **chapter 3.2** and the specifications on the type plate, which are binding).



The instrument is in protection class I, and may only be connected to a socket which has been grounded in accordance with regulations with a ground wire. The instrument may only be operated on a power supply that is protected by an RCCB (**R**esidual **C**urrent operated **C**ircuit **B**reaker).



Arrange the plug/socket combination at the place of installation so that it can be observed clearly and reached quickly in an emergency.

Protective covers

Test	
Interval	Method
m	V

The instrument is protected against interference during operation by its closed housing and the drawer.



Pulling out the drawer during the measurement process will immediately stop the motor and the conveyor wheel!

2.2 Connecting USB devices

NOTICE

The two USB interfaces on the GRANOLYSER are only suitable for connecting USB devices with low power consumption, such as data memory devices, barcode scanners or keyboards. To avoid damage and overheating on the instrument, do not connect USB devices that require high power consumption. That means **no** charging of smartphones, tablets, etc.

2.3 Operating and danger areas

Operating area

Make sure the installation height is sufficient (according to the stature of the operating personnel). Use a suitable base for this (e.g. table) so that the operating personnel can reach the drawer ergonomically.

Danger area

The entire area one meter around the instrument is a danger area during maintenance and repair work.

- ⇒ Keep the area around the instrument clear of objects.

2.4 Operating and maintenance personnel

Operating and maintenance personnel are people who are responsible for transport, installation, setup, operation and cleaning of the GRANOLYSER, and for eliminating malfunctions.

1. The instrument may only be operated by professionally qualified, authorized, and trained personnel. Operation by untrained individuals, unauthorized personnel, or persons without proper instruction is not permitted.

2. Responsibilities for operation must be clearly defined and followed to avoid safety risks due to unclear responsibilities.
3. The operator must not apply any working method that compromises the safety of the instrument.
4. Any changes to the instrument that affect safety must be reported to the operator without delay.
5. Before carrying out any work (operation, maintenance, repair, etc.), the instrument must be safely shut down (see **chapter 2.8**).
6. The operator is responsible for ensuring that only authorized personnel work on the instrument.
7. The operator must equip the operating personnel with suitable personal protective equipment (PPE) in accordance with legal requirements.
8. The operator must regularly instruct personnel to use the PPE and monitor its proper use.

Authorized personnel and qualifications according to DIN EN ISO 20607

Instructed person: A person who has been informed by a qualified specialist about their tasks and potential hazards and who is aware of the necessary protective measures.

Qualified person (specialist): A person who, due to their professional training, experience, and knowledge is capable of identifying hazards and implementing appropriate safety measures.

Electrically qualified person: A qualified person with additional electrical training and knowledge of applicable standards and regulations, who is authorized to carry out work on electrical systems independently and safely.

Hazards for persons with reduced capabilities:

This instrument may be used by persons with reduced physical, sensory, or cognitive abilities, or lack of experience and/or knowledge, provided they are supervised or have received proper instruction on the safe use of the instrument and understand the associated risks.

2.5 Safety measures to be carried out by the owner

1. Proper installation and commissioning

- Ensure that the instrument is set up in accordance with the operating manual.
- Before commissioning, check the instrument for any visible damage and ensure that it is standing securely.
- Installation and commissioning must be carried out by qualified personnel only.

2. System responsibility

- The safety of a complete system in which this instrument is integrated is the responsibility of the system integrator or operator. The manufacturer assumes no responsibility for the safe operation of the overall system.

3. Selection and instruction of personnel

- Only trained and qualified personnel may operate, maintain, or clean the instrument.
- Instruction in the safe handling of the instrument as described in the operating manual is recommended.
- Documentation of trained personnel is recommended.

4. Regular inspections

- Periodic safety inspections in accordance with BetrSichV¹ must be carried out (e.g., by an electrically qualified person).
- Check for wear, damage, or missing safety devices. The inspection intervals described in **chapter 8.3** must be observed.
- Inspection records must be retained.

¹ German Ordinance on Industrial Safety and Health

5. Provision of personal protective equipment

- PPE² must be provided according to the risk involved, e.g., gloves, hearing protection, safety glasses.
- Ensure that personnel use PPE properly.

6. Implementation of safety warnings

- Attach and maintain all warning labels on the instrument.
- Forward all safety warnings from the operating manual to the personnel.

7. Protection of persons with medical implants

- Identify individuals who may be affected.
- Provide instruction on maintaining safe distances from electromagnetic fields.
- In case of uncertainty, a case-by-case risk assessment should be carried out.

8. Compliance with safe disconnection procedure, see chapter 2.8.

9. Proper disposal of consumables and packaging

- Environmentally sound disposal in accordance with local regulations.
- Remove any hazardous residues before disposal.

10. Storage of the operating instructions

- The operating instructions must be accessible at the location of use at all times.
- Any changes or additions must be documented.

2.6 Obligations on the owner



Within the European Economic Area (EEA), the national implementations of Directives 89/391/EEC and 2009/104/EC, as well as applicable national regulations (e.g. the German Ordinance on Industrial Safety and Health – BetrSichV), must be observed.

In addition, he/she must comply with the local legal requirements on:

- Safety of personnel (accident prevention regulations)
- Safety of work equipment (protective equipment and maintenance)
- The permissible noise load (depending on the location and the time of day)
- Product and material disposal (waste legislation)
- Cleaning (cleaning agents and disposal)
- Hazardous substances (in Germany, TRGS³ 555 apply)
- Environmental protection regulations.



The entire system must be inspected regularly in accordance with DGUV⁴ Regulation 3 (Electrical Installations and Equipment).

2.7 General safety notes and residual dangers



Safety requirements and instructions in this operating instructions are mandatory.



1. Disconnect the appliance from the power supply if faults occur or when cleaning work is being carried out.
2. Be particularly careful when working on electrically operated components, as these can be dangerous due to electric current.



3. Never leave the appliance unattended during operation. To reduce the risk of accidents, always disconnect it from the power supply and switch it off when it is not in use.
4. Never touch the mains cable with wet hands to avoid the risk of electric shock.

² Personal protective equipment

³ Technical rule for hazardous substances

⁴ Association of German statutory insurance

5. To prevent overloads and potential hazards, never connect several instruments to the same socket at the same time (e.g. via a multiple plug).
6. Route the mains cable so that it does not come into contact with hot or sharp objects to avoid damage.
7. Make sure that the mains cable never becomes a tripping hazard or that someone can get caught or step on it.
8. Never wrap or bend the mains cable around the instrument, as this may cause the cable to break and endanger safety.
9. Ensure that the appliance always remains dry during transportation, storage, cleaning and operation. Moisture can damage the instrument or impair safety.
10. Only use the instrument when it is in proper working order and ensure that all components are functional.
11. Only use original spare parts and accessories.

2.8 Safety disconnection

DANGER



Danger of death by electric shock!

Touching live parts can be fatal.

Cleaning, maintenance, and repair work must only be carried out by **qualified personnel**. Before starting these tasks, be sure to follow the procedure below:

1. Completely empty the GRANOLYSER and switch off the instrument using the main switch in position **O** (OFF). The location of the main switch is shown in *Figure 1*.
2. Disconnect the mains cable from the power supply (i.e. unplug the IEC 60320 C13 appliance connector).
3. **In an emergency** (e.g. smoke, fire hazard or mechanical blockage) switch off the instrument immediately and disconnect the mains cable from the power supply.
4. The mains cable must be able to be kept under the direct supervision of the person in the danger area.
5. During cleaning, make sure that no water, steam or dust can penetrate the electronics area.

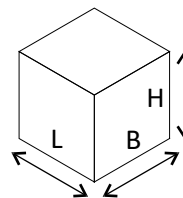


3 Technical data

GRANOLYSER/GRANOLYSER HL	NIR analyzer
Sample amount	600 ml
Products	Cereals, maize, pulses, oil seeds
Parameters	Moisture, protein, sedimentation index, gluten, oil content, starch
Additional parameter variant HL	Bulk density = mass per hectoliter [kg/hl]
Measuring time GRANOLYSER	less than 20 seconds (up to S/N 1181 2014 approx. 30 seconds)
Measuring time variant HL	approx. 30 seconds (up to S/N 1181 3013 approx. 50 seconds)
Wavelength range	950-1540 nm
Interfaces	2x USB (5 V/250 mA per connection), see chapter 2.2 1x Ethernet via RJ45 socket (LAN)
Display	Capacitive color touchscreen, screen diagonal size 17.8 cm (7")

3.1 Dimensions and weight

	GRANOLYSER	GRANOLYSER HL
Length	363 mm	500 mm
Width	452 mm	349 mm
Height	383 mm	501 mm
Weight	20 kg	28 kg



3.2 Power supply

Operating voltage/frequency	100-240 V AC ±10 % 50/60 Hz
Power consumption	70 VA
Pollution degree	2 (for use in a normal indoor environment, according to EN 61010-1)
Number of phases	1 Ph / PE
Protective earth conductor	PE (yellow/green) in the mains cable
Frequency	±1 %
Internal fuse	4 A T slow-blow glass micro fuse 5x20 mm (The rating on the type plate is binding!)
Mains cable	Mains cable with detachable IEC 60320 C13 device plug, 10 A, 250 V
Installation regulations	Configured according to VDE ⁵ – protection class I / protective earth

3.3 General data

Temperature storage and transport	-10 °C to +60 °C
Temperature measurement	+10 °C to +40 °C
Atmospheric humidity	20 % to 80 % non-condensing
Permissible altitude	max. 2000 m above sea level
Installation requirement	Flat and vibration-free table surface

⁵ German association for electrical, electronic and information technologies

4 Delivery, transport and storage



The delivery, transport and storage chapter is only intended for **qualified personnel**.

4.1 Scope of delivery

The standard scope of delivery to the owner comprises: NIR analyzer GRANOLYSER (GRANOLYSER HL), measuring beaker 0.5 l, 5 thermal paper rolls, mains cable with detachable IEC 60320 C13 device plug, cleaning brush, Operating and Expert instructions.

4.2 Transport and packaging

Systems, machines and instruments from Pfeuffer GmbH are carefully tested and packaged prior to dispatch, however it is not possible to exclude the risk of damage during transport.

Incoming check: Check for completeness with reference to the delivery note.

In case of damage: Check the delivery for damage (visual inspection).

In case of complaints: If the delivery suffered damage in transit:

- ⇒ Keep the packaging (to allow it to be checked subsequently by the forwarding company, or for sending back).
- ⇒ **Immediately** inform the supplier or Pfeuffer GmbH.

4.3 Intermediate storage

The freight packaging of the GRANOLYSER and the accessory/replacement parts is configured for a storage duration of up to six months from delivery.

- ⇒ Do not place any heavy objects on the packaging.

Storage conditions: Enclosed, dry room with a room temperature between min. -10 °C and max. +60 °C.

4.4 Transport to the installation site (by the customer)



The transport is only allowed to be undertaken by specialist personnel according to the local conditions and any information indicated on the packaging material.

Unpacking

To avoid damage to the housing and other components:

- ⇒ Open the packaging
- ⇒ Remove the accessory box and the upper packaging elements



CAUTION

Falling instrument!

Risk of injury to hands and feet!

The instrument may only be lifted by a person with sufficient physical strength. Note: The total weight of the instrument is approx. 20 kg or approx. 28 kg.

- ⇒ Only lift the instrument using the two holding handles provided.

- ⇒ Lift the GRANOLYSER out of the box using its holding handles
- ⇒ Move the GRANOLYSER to the installation location, see **chapter 5**
- ⇒ Keep the original packaging in case you need to send the equipment back.

WARNING



Risk of suffocation

Packaging materials (e.g. film, polystyrene, cardboard boxes) can be dangerous to children.

⇒ Keep packaging material away from children.



⇒ Do not leave packaging material lying around carelessly.

⇒ Dispose of packaging material in an environmentally friendly way.

Packaging for return delivery

⇒ To avoid transport damage, package the GRANOLYSER as shown in the following illustrations.

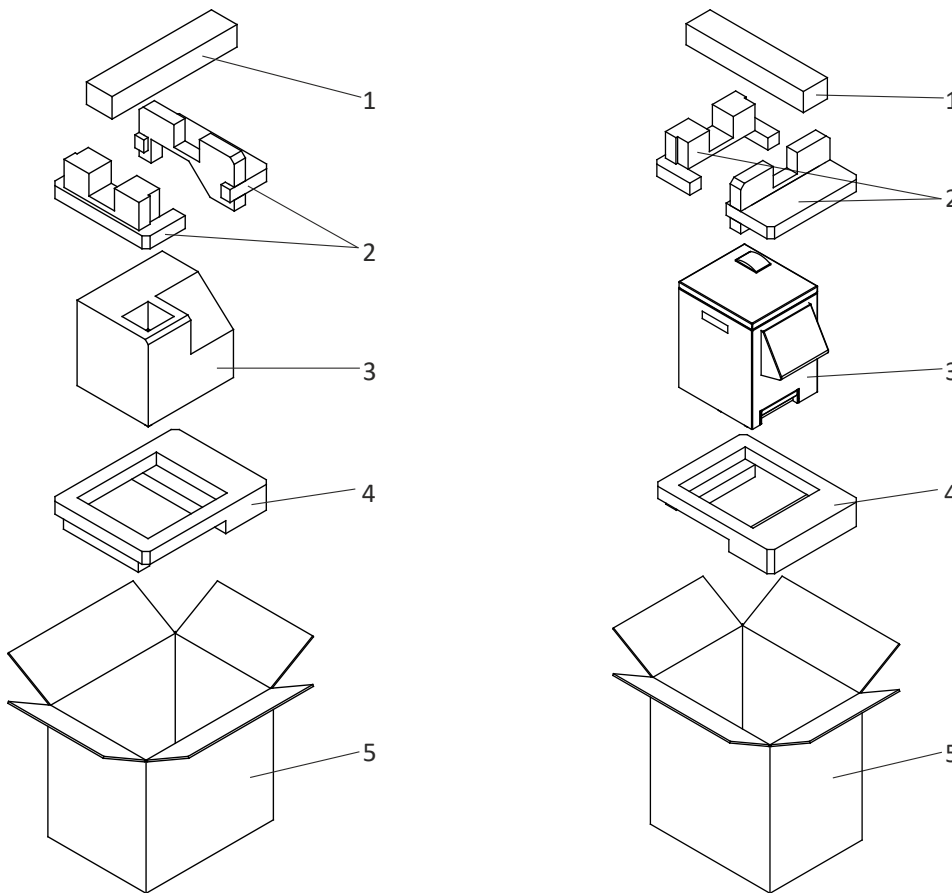


Figure 2: Unpacking and packing Granolyser Unpacking and packing Granolyser HL

Item	Designation
1	Box with accessories
2	Upper parts (PE foam padding, 2 pieces)
3	GRANOLYSER / GRANOLYSER HL
4	Lower part (PE foam padding)
5	Cardboard box

⇒ If possible, use the original packaging and the original packaging material. If neither is available any longer, request new packaging from Pfeuffer GmbH.

5 Installation and commissioning



The Installation and commissioning chapter is only intended for **qualified personnel**.

Electrical connections



The instrument must only be operated with the specified voltages (see **chapter 3.2** and the specifications on the type plate, which are binding).

Installation



CAUTION

Falling instrument!

Risk of injury to hands and feet!



The instrument may only be lifted by a person with sufficient physical strength. Note: The total weight of the instrument is approx. 20 kg or approx. 28 kg.



⇒ Only lift the instrument using the two holding handles provided.

- ⇒ Carefully unpack the GRANOLYSER (see **chapter 4.4**).
- ⇒ Place it horizontally on a solid table with a smooth, clean surface.
- ⇒ Ensure that a firm footing on a non-slip surface is provided.
- ⇒ The table must be protected against shocks.
- ⇒ Do not place any vibrating instruments, such as sorting machines or shaking apparatus on the same table.
- ⇒ Make sure there is an adequate distance to all sides so that no heat buildup can occur.
- ⇒ Avoid exposure to direct sunlight and extreme ambient conditions.
- ⇒ Make sure that the installation height is ergonomic according to the stature of the operating personnel.



Installation in unheated, draughty and dusty surroundings can have a negative effect on the service life of the instrument.

- ⇒ Connect the supplied mains cable with detachable IEC 60320 C13 device plug to the GRANOLYSER.
- ⇒ Route the mains cable so that it does not come into contact with hot or sharp objects to avoid damage.
- ⇒ Make sure that the mains cable never becomes a tripping hazard or that someone can get caught or step on it.



⇒ Connect the mains plug to a suitably earthed socket with protective earth conductor.

- ⇒ Switch on the GRANOLYSER via the main switch position **I** (ON).
- ⇒ Observe the information on operation in **chapter 7**.

6 Function

6.1 Components

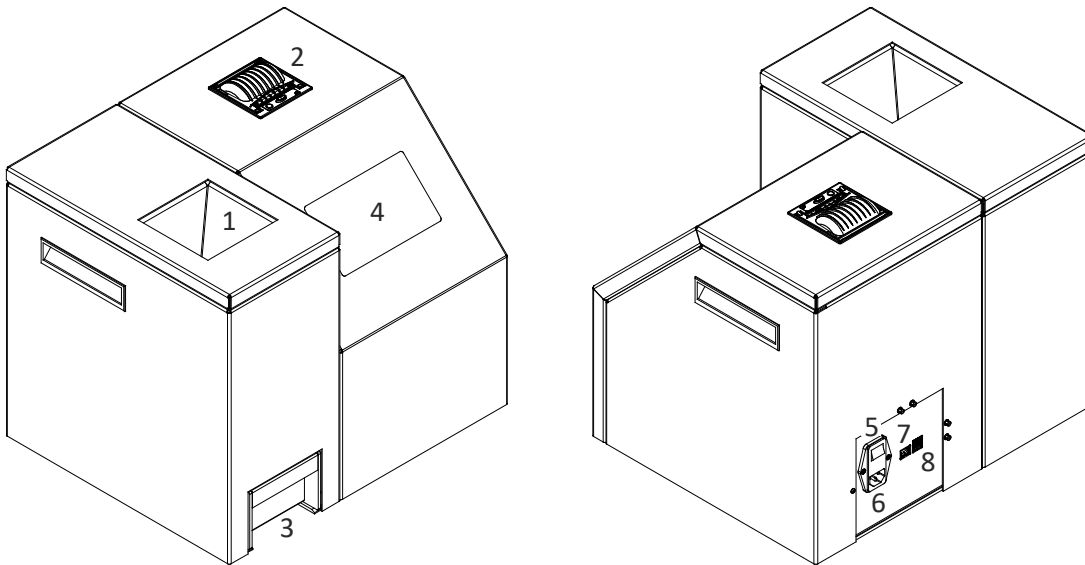


Figure 3: Granolyser overview

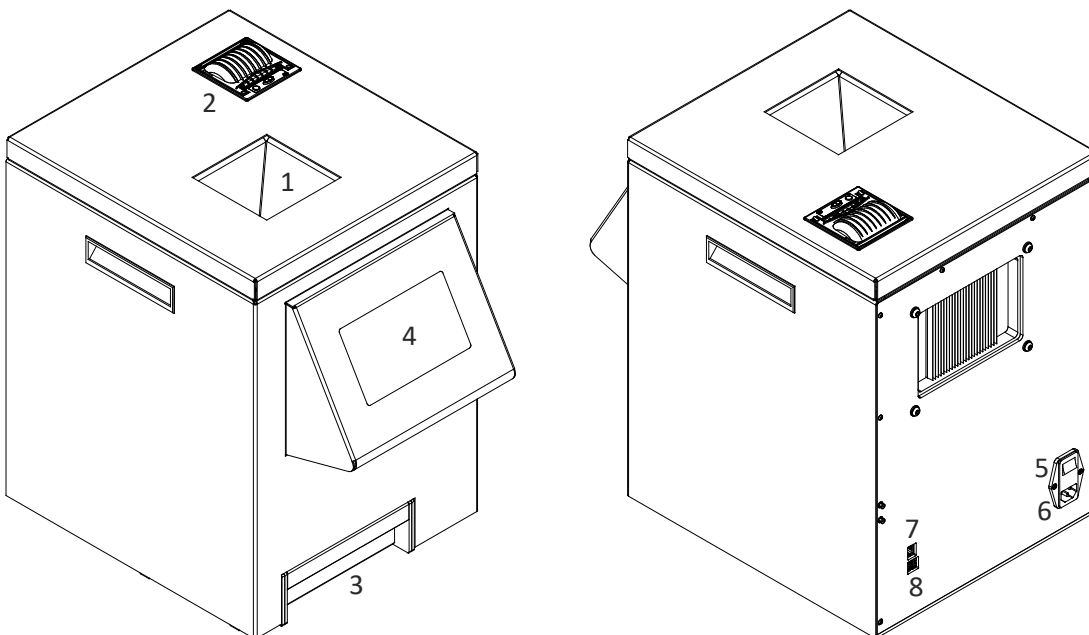


Figure 4: Granolyser HL overview

Item	Designation
1	Filling funnel
2	Printer
3	Drawer
4	Display (touchscreen)
5	Main switch I/O (ON/OFF)
6	Mains cable connection (built-in socket IEC 60320 C14)
7	RJ45 interface for connecting to a network, hub, switch or router
8	2 USB interfaces → see also important notice in chapter 2.2 . Connection for an optional adapter (USB to serial COM port), USB data memory, barcode scanner, keyboard, etc.

6.2 Sequence of functions

The GRANOLYSER is an NIR analyzer for whole grain samples such as various cereal types, maize, pulses and oil seeds. Switch on the GRANOLYSER using the main switch (position I). The operating system starts. Following the warmup phase, fill the sample contained in the supplied 600 ml measuring beaker into the filling funnel. Select a product on the display and start the measuring procedure. The electric motor connected to the conveyor wheel is started.

A halogen lamp with controlled light intensity illuminates the sample. The GRANOLYSER uses the reflected constituents in the range from 950 to 1540 nm (NIR) to detect the presence of a sample.

The conveyor wheel ensures the most homogeneous possible density during the measurement. By even rotation, the material is continuously transported past the detector, and the reflection from the sample in the NIR range is measured. The spectra recorded by the detector are processed in the evaluation electronics. The measurement result is shown on the display.

In the apparatus GRANOLYSER HL, the bulk density [kg/hl] (hectoliter weight) is also determined by means of an integrated weighing instrument for all products

For precise information about operation, refer to **chapter 7**.

6.3 Reference methods for calibration

Pfeuffer GmbH uses the following reference measures, amongst others:

Parameters	Reference method
Moisture	Dry cabinet (cereal, maize, leguminous crops and oil seeds)
Protein	Kjeldahl or Dumas process Conversion factors 5.7 (wheat, durum, spelt, rye) or 6.25 (barley, triticale, oats, maize, soya beans, peas)
Oil	Soxhlet extraction or NMR – nuclear magnetic resonance spectroscopy
Gluten	Mechanical process for determining the wet gluten
Sedimentation index	Zeleny test
Starch	Polarimetric determination
Bulk density (hectoliter weight)	EEC ⁶ bulk density















DIN EN ISO 7971-3 (Cereals – Determination of bulk density, Part 3 – Routine method) specifies various equations for the analysis, and these are applied by Pfeuffer GmbH. For durum, triticale and spelt the wheat equation is used.

The bulk density (hectoliter weight) result of the GRANOLYSER HL

- is based on the actual moisture result of the sample, and is not adjusted to a lower moisture value (9 % to 14 %).
- does not equal the EEC bulk density according to directive 71/347/EWG and may not be used in legal transactions.

⁶ EEC = European Economic Community

6.4 Products and measuring ranges

	Wheat	Moisture	9-30 %	
		Protein	7-25 %	DM
		Starch	60-80 %	
		Gluten	10-55 %	
		Sedi	10-80 ml	
	Rye	Moisture	9-30 %	
		Protein	5-20 %	DM
	Barley	Moisture	9-30 %	
		Protein	7-20 %	DM
	Triticale	Moisture	9-30 %	
		Protein	7-25 %	DM
	Oats	Moisture	9-30 %	
		Protein	5-18 %	DM
	Durum	Moisture	9-30 %	
		Protein	7-25 %	DM
	Maize	Moisture	10-45 %	
		Protein	7-15 %	DM
		Starch	64-78 %	
	Sorghum	Moisture	10-45 %	
	Rapeseed	Moisture	3-30 %	
		Oil	30-60 %	OS
		Oil 9%m.c.		
	Sunflower seeds	Moisture	3-30 %	
		Oil	30-60 %	OS
	Soya beans	Moisture	5-30 %	
		Protein	25-55 %	DM
		Oil	10-30 %	DM
	Peas	Moisture	9-23 %	
		Protein	15-32 %	DM

Legend:

Sedi	OS	DM	Oil 9%m.c.
Sedimentation index	In the original substance	In dry matter	Oil content at 9 % moisture*



* The moisture reference value 9 % can be set, see **Expert instructions**.

7 Operation



The GRANOLYSER is only allowed to be operated by personnel who have been qualified and trained in its operation.

NOTICE

The owner is responsible for ensuring the accuracy of results. This can be done by the following measures, for example:

- Regular control samples for monitoring the instrument
- Regular comparisons with a recognized reference laboratory

As well as this, the owner must ensure that all the information in these operating instructions regarding carrying out measurements is complied with.

Pfeuffer GmbH will not accept liability for damage caused by incorrect measurement results.



In order to reduce energy consumption and heat generation, the screen is darkened after approx. 20 minutes. Operation is reactivated by simply tapping the screen.

7.1 Preparation of a sample

NOTICE

⇒ Select a **representative sample** for the measurement.

For information and notes about sampling, refer to the standard:
DIN EN ISO 24333: 2010 Cereals and cereal products – Sampling

Optimum, repeatable results can be achieved with **cleaned samples**.

⇒ **Extraneous components** must be removed prior to the measurement!

Measuring temperature	Atmospheric humidity
+10 °C to +40 °C	20 % to 80 %, non-condensing

Measurements below the limit of +10 °C are possible, but represent a risk of inaccurate measurement values!

⇒ Allow the product samples to acclimatize to room temperature!

This applies in particular to:

- Frozen samples, because the condition of aggregation of water is significant for the measurement.
- Hot samples taken during the drying process, for example.

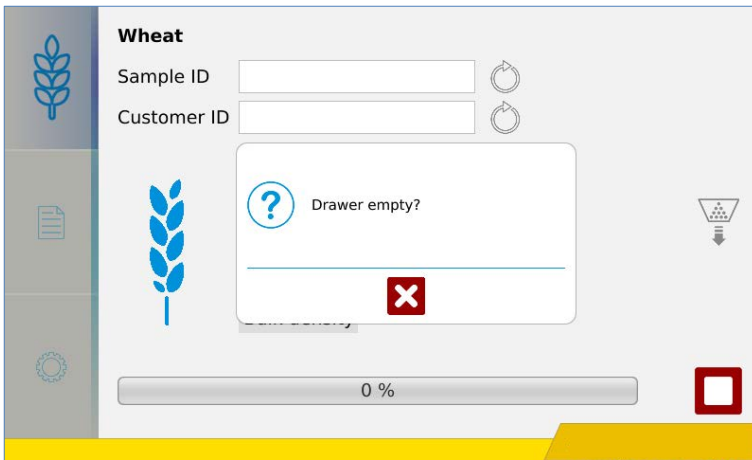
In products with an extreme **surface moisture level**, drying is required for homogenization.

Measurement results from samples that are already releasing a fermentation odor can display greater errors than freshly harvested samples.

To achieve an accurate measurement result, it is necessary to have a **sample quantity** of **600 ml**.

7.2 Drawer mechanism

The GRANOLYSER displays the "Drawer empty?" message by default prior to measurement if the drawer has not been pulled out. This ensures that there is no sample in the drawer and mixing takes place. Check that the drawer is empty before every measurement.



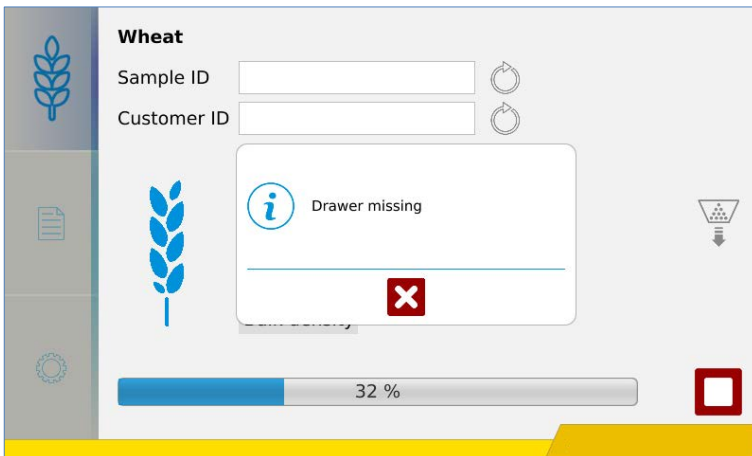
Pull out the drawer, check the contents and slide the drawer back in again.

The message is canceled automatically.



If you pull out the drawer during the measuring procedure, the conveyor motor is stopped immediately.

The message "Drawer missing" is displayed. Push the drawer back in. The message is ended automatically. The sample continues to be conveyed and a measurement result is output.



If you confirm the message with this icon, the measurement is aborted and no measuring result is output.

Push the drawer back in. The sample is emptied.

Then start a new measurement.

To guarantee that the drawer mechanism functions properly, there are two magnets on the back of the drawer.

⇒ Regularly check that the magnets are firmly attached.

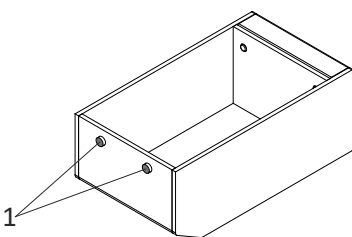


Figure 5: Granolyser drawer

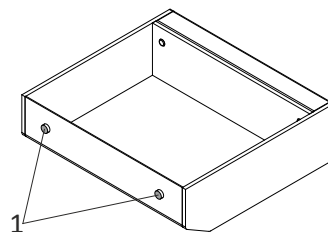


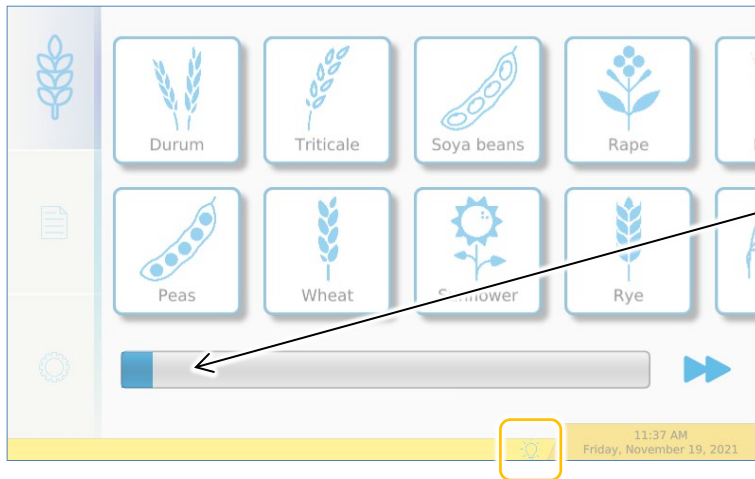
Figure 6: Granolyser HL drawer

Item	Designation
1	Magnets

7.3 Switch on/off GRANOLYSER – Warm-up phase

⇒ Switch ON the GRANOLYSER using the main switch (position I).

- The operating system starts up.
- The halogen lamp switches on.
- The motor starts so that any remaining sample is transported out of the instrument.
- A 10-minute warm-up phase starts.



Progress of the warm-up phase

▶ Skip warm-up phase.

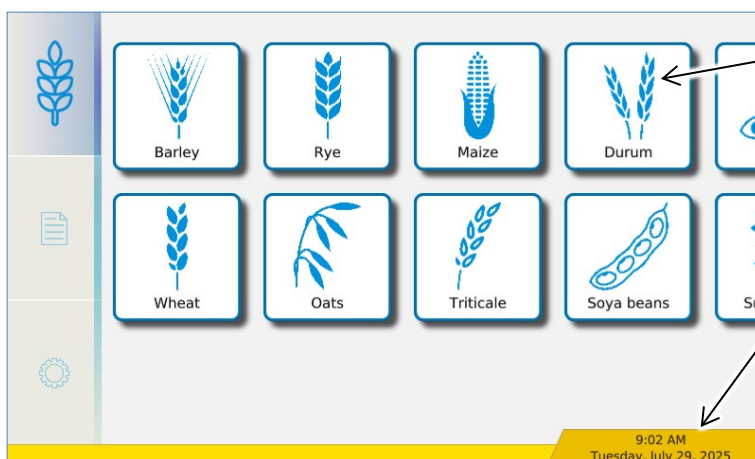
💡 During the warm-up phase, a flashing lamp icon appears in the yellow status bar.

NOTICE

If the warm-up phase is skipped, there can be deviations or fluctuations in the measurement result. In the case of approved instruments, a measurement is only possible after the warm-up phase.

⇒ Switch off the GRANOLYSER using the main switch in position O (OFF).

7.4 Start menu product selection



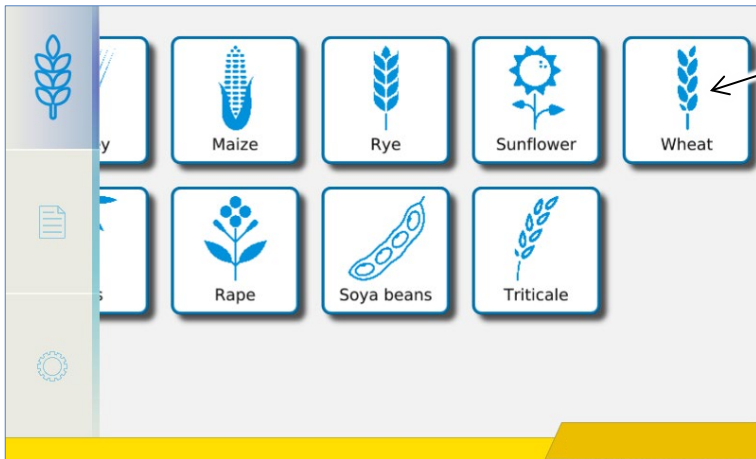
Product selection

↔ Scroll product selection to left and right.

Display time and date

Information, operating instructions and messages are displayed in dialog boxes.

7.5 Carrying out a measurement



Select a product by tapping on it.



Use the supplied 600 ml measuring beaker to fill the sample into the filling funnel.

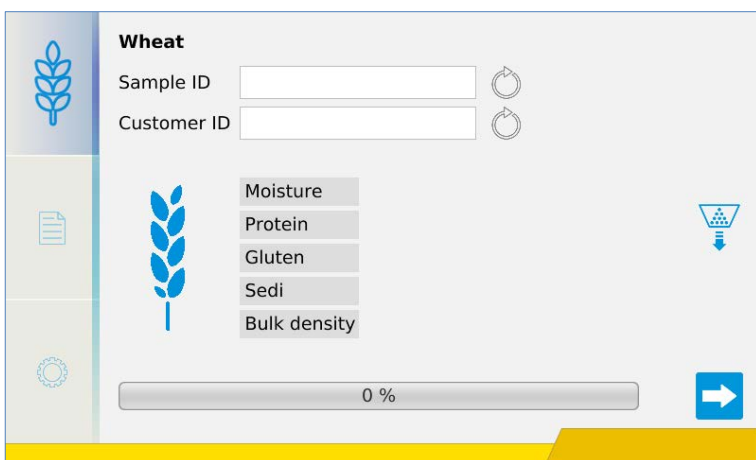
Figure 7: Filling the sample

NOTICE

To avoid damage:

- ⇒ Make sure that no objects are lying on the instrument, which could drop into the filling funnel!
- ⇒ Do not insert any long, pointed objects into the filling funnel and measuring chamber!

Measuring menu:



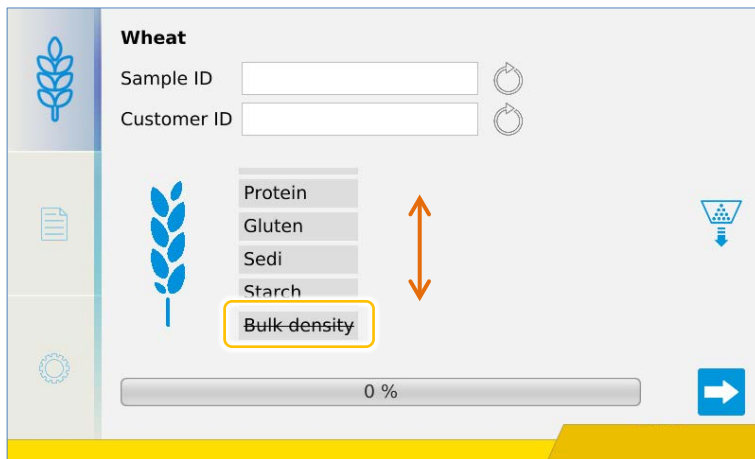
Empty GRANOLYSER:

Start the conveyor motor – the icon turns gray. To stop, tap on the gray icon.



Start measurement.

The text fields for entering the sample ID and the customer ID can be disabled in the measurement settings menu, see **chapter 7.7.5.1**.



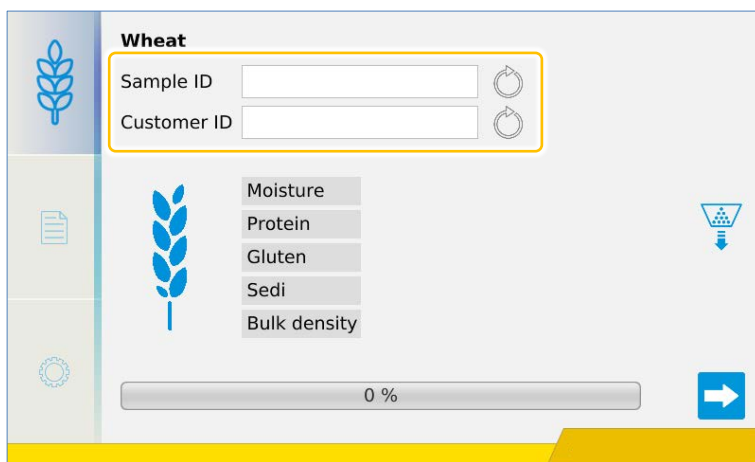
Variant HL:

By pressing and holding (long touch) the “Bulk Density” parameter, the bulk density measurement for the currently selected product can be temporarily enabled or disabled. When disabled, the label appears with a strikethrough: ~~Bulk density~~

The disabled state remains active until the instrument is next powered on.

If the bulk density parameter is not visible, scroll up or down in the list.

To permanently disable the bulk density parameter for all products, see **chapter 7.7.5.2**.



Text field Sample ID:

Input field for the sample designation or the barcode of the sample for exact assignment of the measurement in the measurement results.







Text field Customer ID:

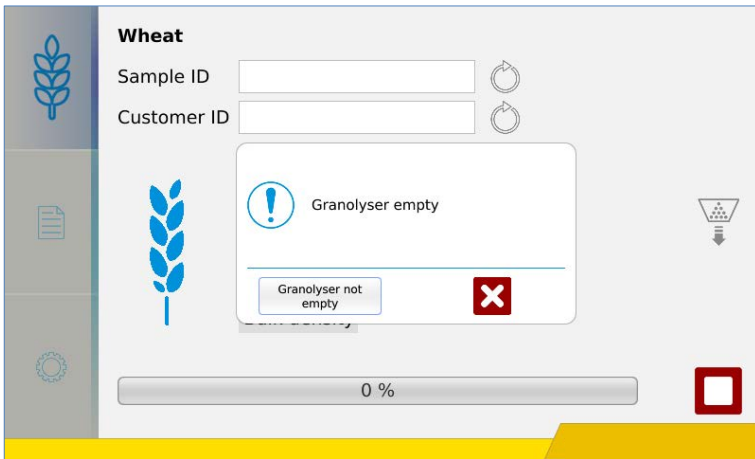
Input field for an individual customer text.

The input fields also remain active after starting the measurement.



The input fields can be filled by entering them using the integrated screen keyboard, a connected USB keyboard or a USB barcode scanner, see also **chapter 7.7.5.3**.

-  The keys with a superscript character contain additional special characters. You select these by touching the respective key for a longer time.
-  Select keyboard layout of the on-screen keyboard
-  Hide screen keyboard
-  Enter a sample/customer ID. Confirm your entry with the Enter key. The measurement is started. After scanning a barcode, the measurement starts automatically.
-  If the input fields remain empty, the measurement does not start automatically. Then tap on “Start measurement”.
-  If this icon next to the input fields is active, you can repeat the measurement with the sample ID or the customer ID. Refill the product from the drawer back into the instrument. Tap this icon, and the previous ID will be retrieved and displayed. The measurement will start automatically.



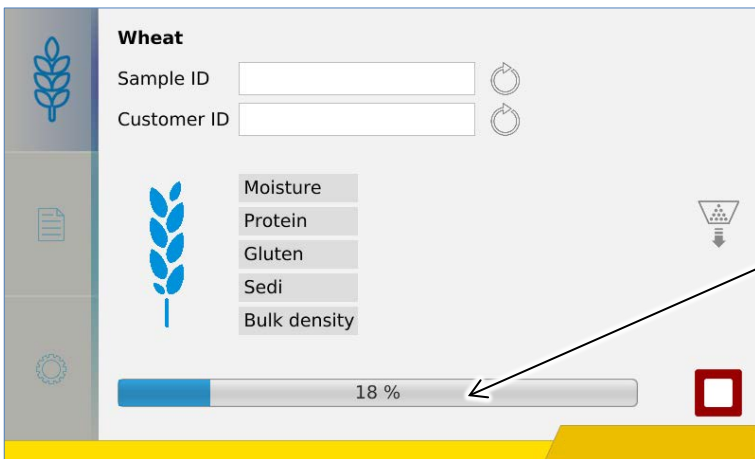
“Granolyser empty” message

There is no sample in the instrument:

- ⇒ Put in a sample (600 ml).
The message ends automatically and the measurement starts.

A sufficient amount of sample has been put into the instrument:

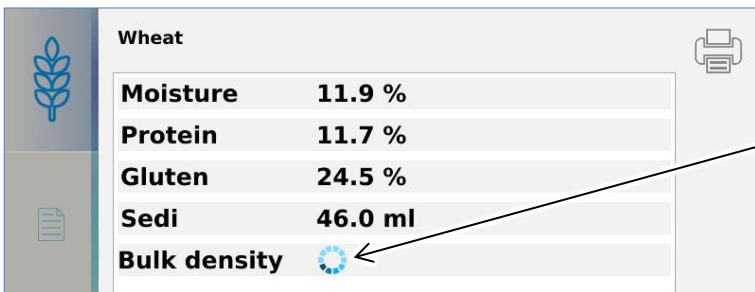
- ⇒ Tap on the “Granolyser not empty” button.
The measurement starts.



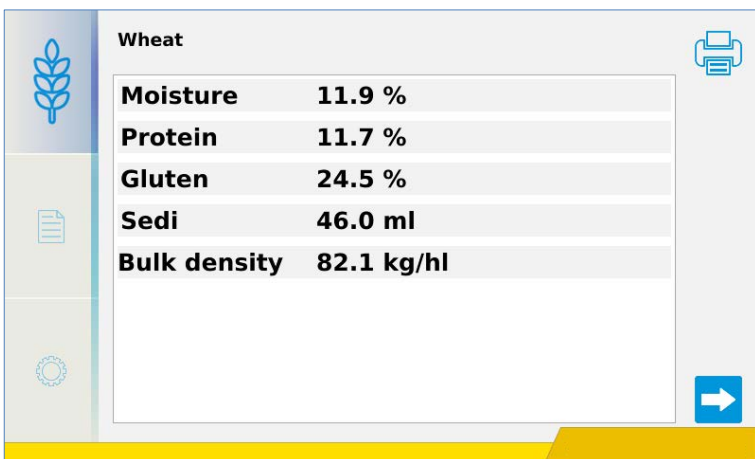
Progress of optical measurement in percent

- Abort measurement.

7.6 Display measurement result



With the **HL** variant, the bulk density (weight/hectoliters) is not determined until after the optical measurement has taken place.



Print measurement result on the integrated thermal printer.

(For printing older measurement results, see **chapter 7.8.2**)

Back to measuring menu with same product.

Back to product selection.

NOTICE

⇒ Empty the drawer after each measurement!

If products are very moist, there is a possibility of condensation buildup, mold or fermentation.

⇒ Clean the filling funnel and the drawer regularly to prevent mixing samples together.



An application *Pfeuffer DataGateway* is available as an accessory that stores the data from the GRANOLYSER into an MS Access® database on a server or external PC. Contact Pfeuffer GmbH if you have any questions.



Products and measuring ranges, see **chapter 6.3**.
Measurement settings, additional functions see **chapter 7.7.5** and **Expert instructions**.



Measurement results outside the calibration range are displayed with a comparison character (< or >).

Wheat	
* Moisture	11.9 % *
Protein	10.6 %
Gluten	27.3 %
Sedi	71.6 ml
Bulk density	---

Approved values are *enclosed* by asterisks

With an approved instrument (in D/A) the approved value (moisture) is enclosed in asterisks.

The approved measurement ranges for the moisture can be found on the type plate.



The bulk density result of the GRANOLYSER HL

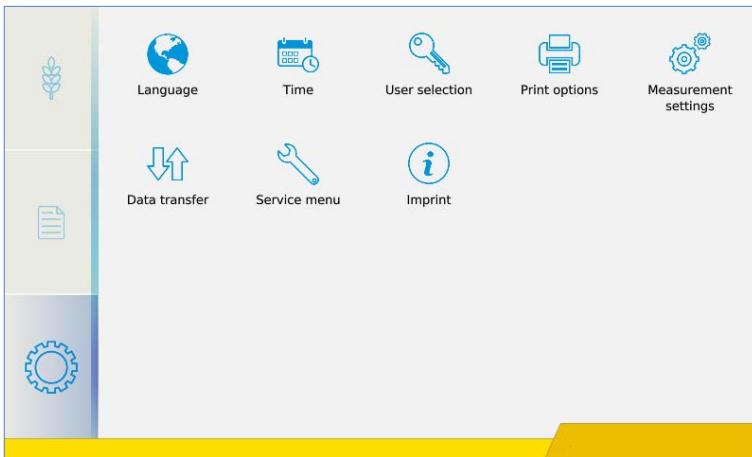
- is based on the actual moisture result of the sample, and is not adjusted to a lower moisture value (9-14 %).
- does not equal the EEC bulk density according to directive 71/347/EEC and may not be used in legal transactions.

Wheat	
Moisture	12.2 %
Protein	11.8 %
Gluten	24.2 %
Sedi	46.8 ml
Bulk density	82.0 kg/hl[†]

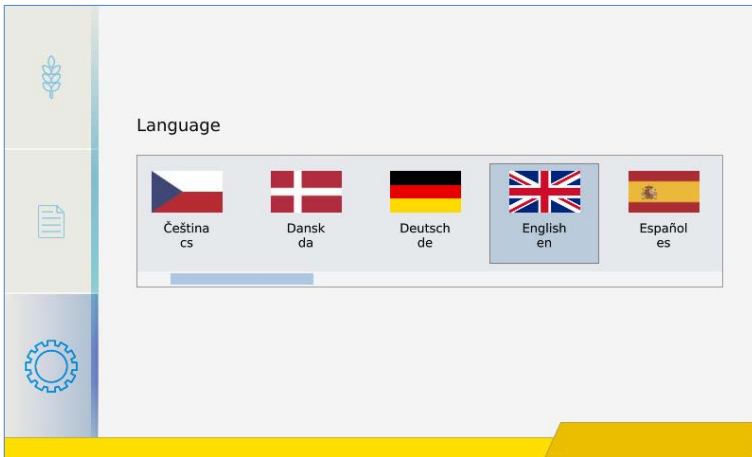
†Tare error: 2.4 g

Display of red cross icon † after the result value, see **chapter 9**.

7.7 Settings menu



7.7.1 Language

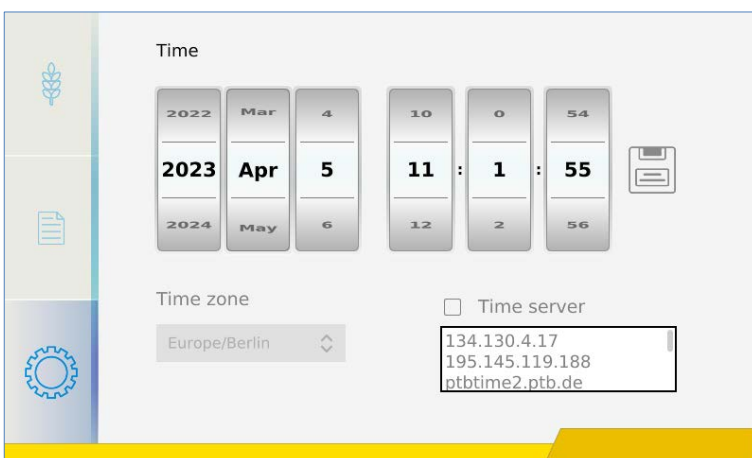


Select language for user interface by scrolling to left or right.


20 languages are available.

The selected language has a blue background.

7.7.2 Time



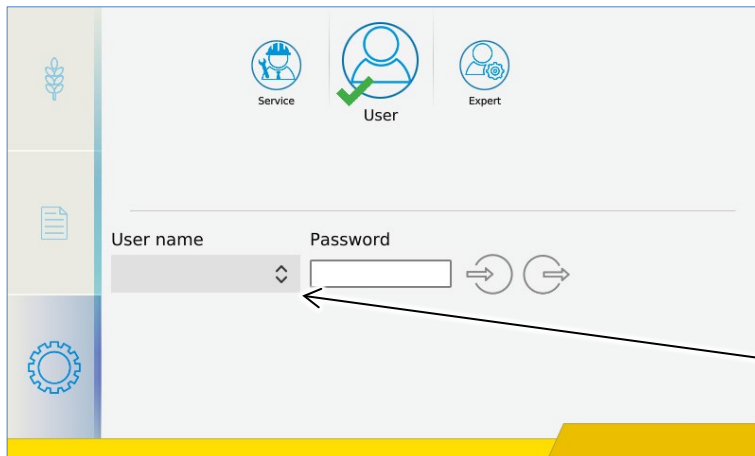
Set the date and time by scrolling up or down.

 Save settings.



Select time zone and activate time server, see **Expert instructions**.

7.7.3 User selection



A change of user is required to make certain settings.

The **Expert** and **Service** users are password protected.

The measurements can be assigned to a specific person by selecting an individually created user name.

Select user name and enter password.

An empty user name is set by default (i.e. a blank line), without a password.



Log in



Log out

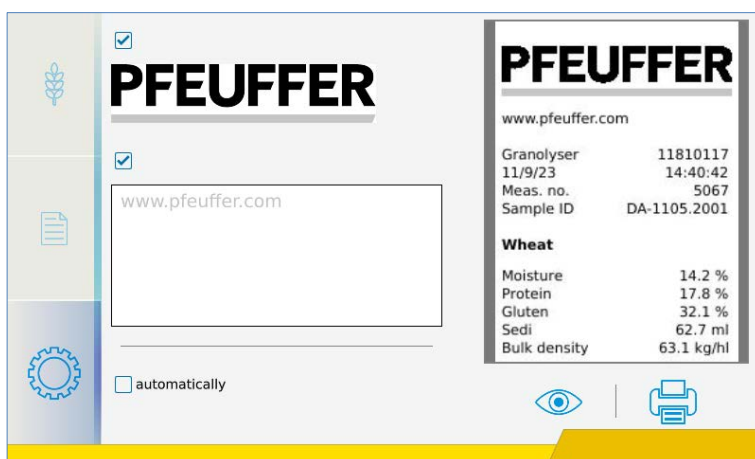
Whenever the GRANOLYSER is switched on (restarted), no user name is selected. Following a change of user, the user is personally responsible for canceling the “User name” selection again (logging out) or selecting a new user name. If you would like to actively log out your own user name without logging in under another user name at the same time, select the empty user name without a password. The user name is not associated with an authorization.

The user name is stored with the measurement results and printed.



Define user names and passwords, see **Expert instructions**.

7.7.4 Print options



Selection checkboxes:

- Printout with/without logo
- Printout with/without text
- **Printout automatically**
After each measurement, the measurement result is automatically printed out.



Generates the print preview on the right-hand side.



Test printout (without measurement results)



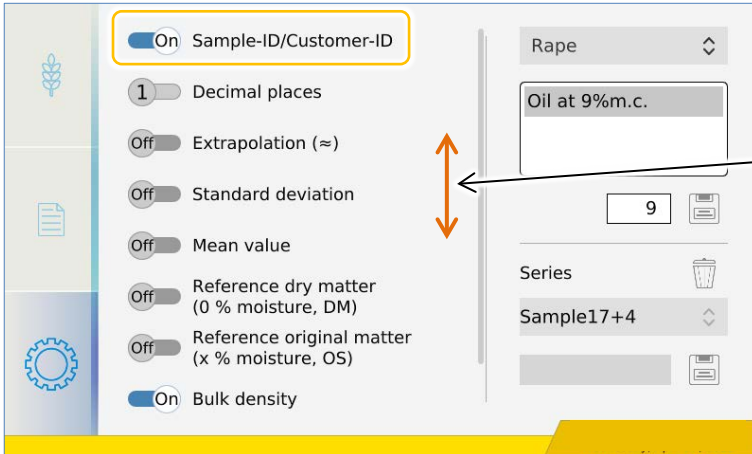
Insert another logo and change text, see **Expert instructions**.

7.7.5 Measurement settings



Inactive functions, see **Expert instructions**.

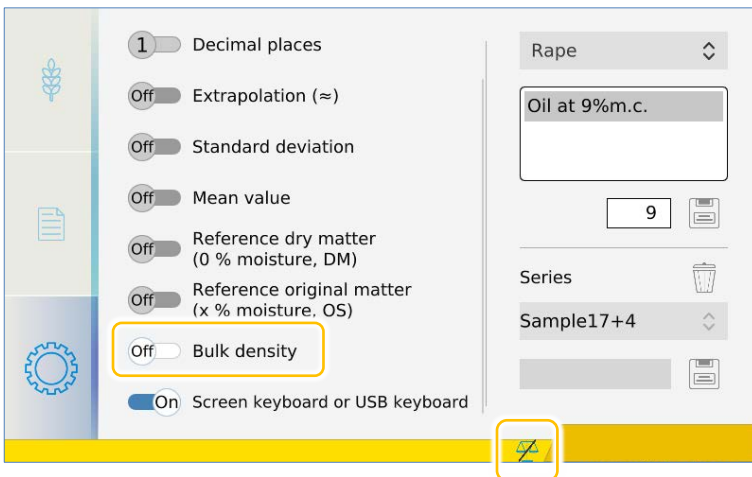
7.7.5.1 Sample ID/Customer ID



Enable/disable input fields for sample and/or customer ID in the measurement menu.

Scroll for more functions.

7.7.5.2 Bulk density

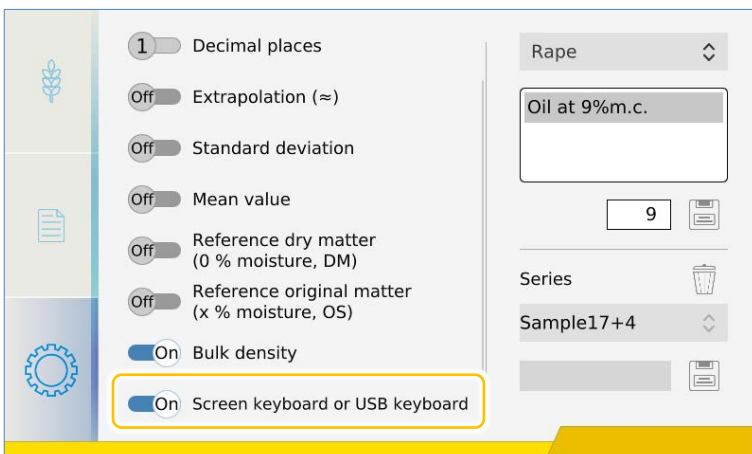


Enable or disable bulk density measurement for all products.

If bulk density measurement is disabled (Off), the following icon is displayed in the yellow status bar:



7.7.5.3 Screen keyboard or USB keyboard



Off (default setting)

Input is made with the integrated on-screen keyboard or with a connected USB keyboard.

On

The on-screen keyboard is not displayed if a USB keyboard is connected to the instrument.

Note that if a USB barcode scanner is connected, password entry is then not possible (e.g. during user selection).

7.7.6 Data transfer



During the data transfer, a folder with the name “Granolyser” is automatically created on the USB stick. This is where the exported files can then be found.

- Measurement results

File “Exp-1181XXXX.csv” containing all of the measurement results on the instrument is automatically created on your USB data memory. The CSV file can be opened using MS Excel®, for example.

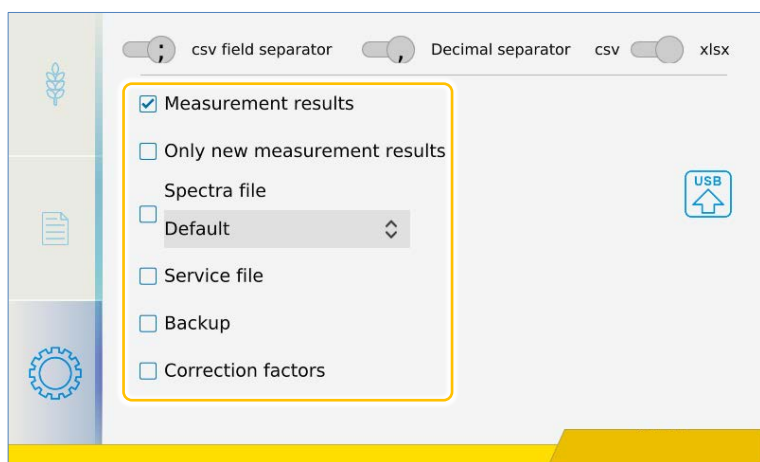
- only new measurement results

Only the results of measurements which have been carried out since the last transfer are output.

- Spectrum file, service file, backup and correction factors



In the event of complaints it can be useful to send these files to the contact person at Pfeuffer GmbH by e-mail.

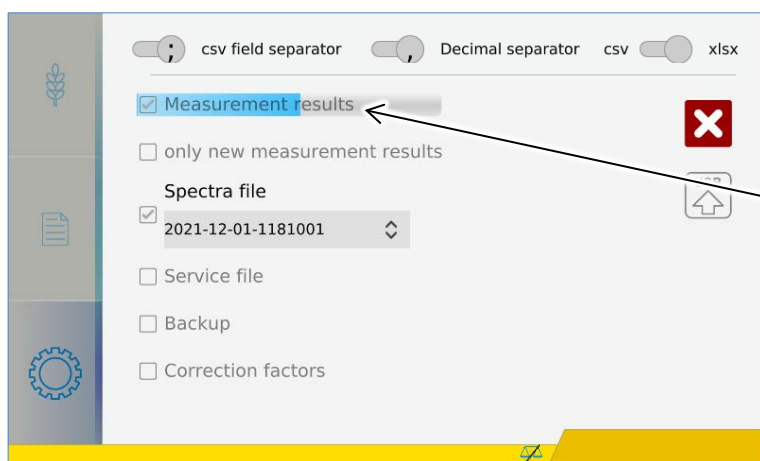


Plug a USB data memory into a free USB interface on the GRANOLYSER.

Select one or more output files.



Tap on the USB Export icon. The icon is not activated until a USB data memory has been plugged into the instrument.

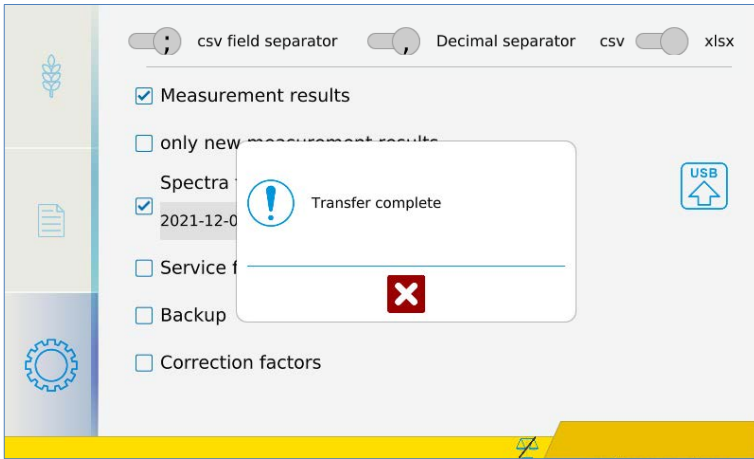


The selected files are exported to the USB data memory one after the other.

Progress of the transfer.



Abort transfer.



The end of the transfer is indicated by the "Transfer complete" message:

X Confirm the message.

Only now may the USB data memory be removed!



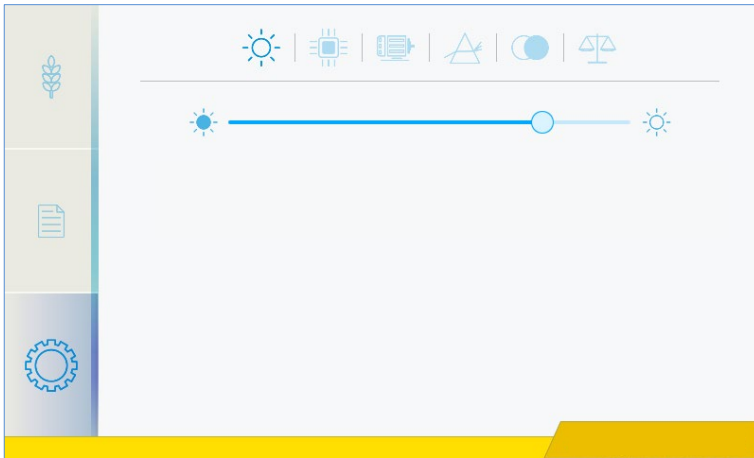
Please note that existing data on the USB data memory will be overwritten during a new transfer!



Install update, see **Expert instructions**.

7.7.7 Service menu

Display brightness



Here you can set the display brightness.



Further functions, see the **Expert instructions**.

7.7.8 Imprint



Print imprint.



Show public key. With the public key and the signature, the user **Service** can check the readings for authenticity.

7.8 Measurement results



Floating button: filtering measurement results (see **chapter 7.8.1**)



Floating button: additional functions

The measurement results are sorted by date in ascending order. You can mark one or more measurement results and print them on the integrated thermal printer or export them to a USB data memory.

Date Time	Product	Parameter	Value	Parameter	Value
7/24/23 14:35	Weizen	Feuchte	11.5%	Protein	11.0%
7/27/23 07:21	Weizen	Feuchte	12.6%	Protein	7.6%
7/27/23 07:23	Weizen	Feuchte	12.7%	Protein	7.6%
7/27/23 07:25	Weizen	Feuchte	12.4%	Protein	12.6%
7/27/23 07:27	Weizen	Feuchte	12.2%	Protein	12.5%
7/27/23 07:28	Weizen	Feuchte	12.5%	Protein	9.6%
7/27/23 07:30	Weizen	Feuchte	12.7%	Protein	9.6%
7/27/23 07:33	Weizen	Feuchte	13.5%	Protein	11.9%
7/27/23 07:35	Weizen	Feuchte	13.6%	Protein	12.1%
7/27/23 07:37	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:39	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:41	Roggen	Feuchte	11.8%	Protein	8.6%
7/27/23 07:45	Roggen	Feuchte	11.8%	Protein	8.6%

There is a scroll bar on the right-hand edge of the screen for scrolling in the measurement results. You can jump to the start and end of the measurement results using the arrow icons.

- First data record
- Last data record



The floating button and the open floating bar can be moved anywhere on the screen by tapping and holding down.

If you move the button outside the screen where it is no longer accessible, the GRANOLYSER will restart. The button will then be returned to its default position.

Date Time	Product	Parameter	Value	Parameter	Value
7/24/23 14:35	Weizen	Feuchte	11.5%	Protein	11.0%
7/27/23 07:21	Weizen	Feuchte	12.6%	Protein	7.6%
7/27/23 07:23	Weizen	Feuchte	12.7%	Protein	7.6%
7/27/23 07:25	Weizen	Feuchte	12.4%	Protein	12.6%
7/27/23 07:27	Weizen	Feuchte	12.2%	Protein	12.5%
7/27/23 07:28	Weizen	Feuchte	12.5%	Protein	9.6%
7/27/23 07:30	Weizen	Feuchte	12.7%	Protein	9.6%
7/27/23 07:33	Weizen	Feuchte	13.5%	Protein	11.9%
7/27/23 07:35	Weizen	Feuchte	13.6%	Protein	12.1%
7/27/23 07:37	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:39	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:41	Roggen	Feuchte	11.8%	Protein	8.6%
7/27/23 07:45	Roggen	Feuchte	11.8%	Protein	8.6%


Floating bar:

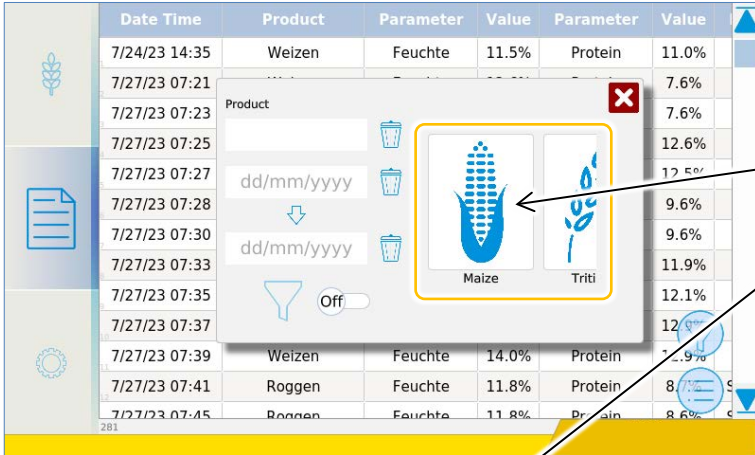
- Print measurement results see **chapter 7.8.2**.
- Transfer measurement results see **chapter 7.8.3**.
- Select all measurement results
- Close floating bar

Table conditions:

- Mark a line by tapping on it.
- A long press of a line marks all lines between the last line to be marked and the currently marked line.
- Cancel the marking of a line by tapping on it.
- A long press of a marked line cancels the entire selection.
- The column width can be changed and stored beyond an instrument restart;
 - Tapping on a column makes it narrower, and tapping on it again makes it wider again.
 - The width can be modified individually by dragging.

7.8.1 Filtering

 The filter button opens a dialog menu. There, the measurement results can be filtered by product and/or date so that only a specific selection of measurements is displayed or exported.




Filter product

Either select the product from the image list (scroll to navigate), or press and hold (long touch) the "Product" input field to automatically display the on-screen keyboard.

To simplify filtering, an asterisk * can be used as a wildcard at the end of a term or partial term.

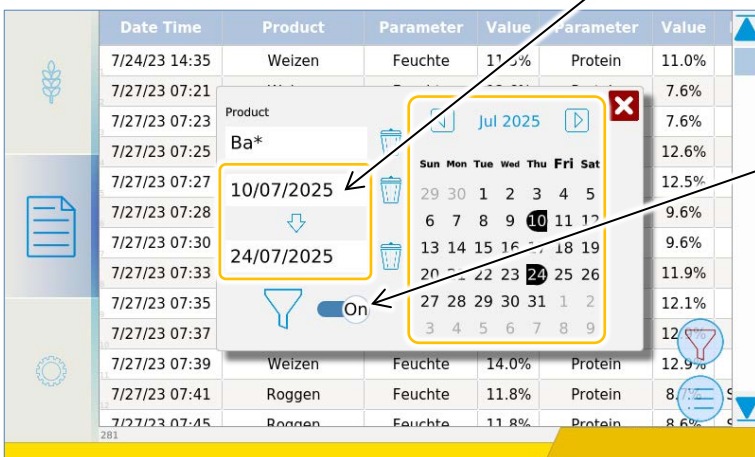
Example: To filter for a product that starts with "Ba" enter "Ba*".

 Clear the contents of the respective input field.




Filter date

Tapping into the date fields automatically opens the calendar. Manual entry in these fields is not intended. A "from/to" period can be selected in the calendar.




Apply filter

Apply filter (slide switch to On)

 Close the dialog menu. Filtered measurement results will be displayed.


If the view is empty: check filter settings; the selected time range or product may be invalid.

Reset filter

 An active filter is indicated by the red filter button. Tapping the button reopens the dialog menu, allowing the filter to be deactivated (slide switch to Off) or adjusted.

Notes on data transfer:

 Only the currently filtered selection is exported in the measurement result view.

 All measurement results are exported unfiltered in the Data Transfer menu.

7.8.2 Printing

Date Time	Product	Parameter	Value	Parameter	Value
11/9/23 12:54	Mais	Feuchte	24.7%	Protein	8.5%
11/9/23 12:53	Mais	Feuchte	24.9%	Protein	8.5%
11/9/23 12:55	Mais	Feuchte	21.9%	Protein	8.8%
11/9/23 12:57	Mais	Feuchte	22.3%	Protein	9.0%
11/9/23 12:59				Protein	7.4%
11/9/23 13:01				Protein	8.1%
11/9/23 13:03				Protein	7.9%
11/9/23 13:05				Protein	7.9%
11/9/23 13:07				Protein	8.5%
11/9/23 13:08				Protein	8.3%
11/9/23 13:09				Protein	8.0%
11/9/23 13:10	Mais	Feuchte	25.3%	Protein	8.1%
11/9/23 13:12	Mais	Feuchte	25.3%	Protein	8.4%
11/9/23 13:12	Mais	Feuchte	25.6%	Protein	8.1%



Print selected measurement result (on the integrated thermal printer!). The icon is not activated until one or more measurements have been selected.

If more than three measurement results have been selected, the "Print selection (4)?" message is displayed to you. The number in brackets shows the number of selected measurement results.



Confirm



Cancel



The measurement results are printed one after the other on the integrated thermal printer, which can lead to increased paper consumption!

7.8.3 Transferring

Plug a USB data memory into a free USB interface on the GRANOLYSER.

Date Time	Product	Parameter	Value	Parameter	Value
11/9/23 12:54	Mais	Feuchte	24.7%	Protein	8.5%
11/9/23 12:53	Mais	Feuchte	24.9%	Protein	8.5%
11/9/23 12:55	Mais	Feuchte	21.9%	Protein	8.8%
11/9/23 12:57	Mais	Feuchte	22.3%	Protein	9.0%
11/9/23 12:59				Protein	7.4%
11/9/23 13:01				Protein	8.1%
11/9/23 13:03				Protein	7.9%
11/9/23 13:05				Protein	7.9%
11/9/23 13:07				Protein	8.5%
11/9/23 13:08				Protein	8.3%
11/9/23 13:09				Protein	8.0%
11/9/23 13:10	Mais	Feuchte	25.3%	Protein	8.1%
11/9/23 13:12	Mais	Feuchte	25.3%	Protein	8.4%
11/9/23 13:12	Mais	Feuchte	25.6%	Protein	8.1%

Select the measurement results to be transferred.



Tap on the USB Export icon. (The icon is not activated until a USB data memory has been plugged into the instrument.)

The message "Export all measurement results?" or "Export selection (4)?" message is displayed to you:



Confirm



Cancel

Date Time	Product	Parameter	Value	Parameter	Value
11/9/23 12:54	Mais	Feuchte	24.7%	Protein	8.5%
11/9/23 12:53	Mais	Feuchte	24.9%	Protein	8.5%
11/9/23 12:55	Mais	Feuchte	21.9%	Protein	8.8%
11/9/23 12:57	Mais	Feuchte	22.3%	Protein	9.0%
11/9/23 12:59				Protein	7.4%
11/9/23 13:01				Protein	8.1%
11/9/23 13:03				Protein	7.9%
11/9/23 13:05				Protein	7.9%
11/9/23 13:07				Protein	8.5%
11/9/23 13:08				Protein	8.3%
11/9/23 13:09				Protein	8.0%
11/9/23 13:10	Mais	Feuchte	25.3%	Protein	8.1%
11/9/23 13:12	Mais	Feuchte	25.3%	Protein	8.4%
11/9/23 13:12	Mais	Feuchte	25.6%	Protein	8.1%

The end of the transfer is indicated by the "Transfer complete" message:



Confirm

Only now may the USB data memory be removed!

A folder with the name "Granolyser" is automatically created on the USB data memory. The CSV file containing the measurement results "Exp-1181XXXX.csv" can then be found in this folder. The Xs represent the serial number of the GRANOLYSER.



NOTE: Delete the contents of your USB data memory before transferring data again to avoid overwriting files!

You can open the CSV file e.g. with MS Excel®.

Sample ID	Measurement no.	Product	Date/Time	Customer ID	User	Param 1	Val 1	Param 2	Val 2
WZ-141218	1	Wheat				Moisture [%]	12.3	Protein [%]	10.4
WZ_141124	2	Wheat				Moisture [%]	12.3	Protein [%]	10.6
HA-123456	3	Oats				Moisture [%]	13.8	Bulk density [kg/hl]	80.1
HA-123789	4	Oats				Moisture [%]	13.9	Bulk density [kg/hl]	79.5
WZ-145555	5	Wheat				Moisture [%]	12.3	Protein [%]	10.8
WZ-145556	6	Wheat				Moisture [%]	12.1	Protein [%]	10.8
WZ-145557	7	Wheat				Moisture [%]	12.3	Protein [%]	10.6

Table 1: Output of the measurement results in tabular form

Column	Explanation
Sample ID	Sample ID that is entered manually or with a barcode scanner at the start of the measurement.
Measurement no.	Serial measurement number that is automatically incremented by the GRANOLYSER.
Product	Product selected for the measurement.
Date/Time	Date and time when the measurement was performed.
Customer ID	Customer ID that is entered manually or with a barcode scanner at the start of the measurement.
User	Selected username
Param 1 to 8	Name of the measured parameter with the unit in square brackets.
Val 1 to 8	Measurement result for each individual parameter. The precise designation and sequence is defined by the calibration, see next table.

Table 2: Explanation of the column names



To delete measurement results and arrange table columns, see **Expert instructions**.

8 Maintenance and cleaning



The maintenance and cleaning chapter is only intended for **qualified personnel**.

NOTICE

Opening the housing and inappropriate operation will invalidate the warranty.

To ensure trouble-free operation, it is essential for the GRANOLYSER to be cleaned and maintained at regular intervals.



DANGER

Danger of fatal electric shock!

Touching live parts can be fatal.



Before performing cleaning, maintenance, or repair work, ensure the instrument is safely powered off (see **chapter 2.8**)!

- ⇒ During all work that is required, wear personal protective equipment according to the company health and safety regulations.
- ⇒ Pay attention to local statutory accident prevention regulations!



The times for carrying out cleaning and maintenance work are based on one-shift working (8 hour/day, 22 days/month, 12 months/year).

d = daily **¼ y** = every three month **ar** = as required
w = weekly **½ y** = every six month
m = monthly **y** = yearly

NOTICE

The operating company must provide hazard and disposal information.

NOTICE

Following cleaning, maintenance or exchanging wearing parts, check that all safety devices are functioning correctly.

8.1 Cleaning

NOTICE

Do not use any sharp objects or tools for cleaning. Only use objects that are expressly intended for this purpose. During cleaning, make sure that no water, steam or dust can penetrate the electronics area.

8.1.1 Housing

Cleaning	Rectification	Interval
Filling funnel	With a clean, dry and lint-free cloth. Use a moist cloth in case of heavy contamination.	d
Drawer	With a clean, dry and lint-free cloth. Use a moist cloth in case of heavy contamination.	d
Pane of glass in the measuring chamber	Carefully with the soft brush supplied with the instrument, or using a moist eyeglasses cleaning cloth.	ar
Housing	With a clean, dry and lint-free cloth. Use a moist cloth in case of heavy contamination.	w
Touchscreen	Carefully with a clean, dry and lint-free cloth or a moist screen cleaning cloth.	ar



Pfeuffer GmbH recommends a complete cleaning or covering of the instrument before a longer standstill, in order to preserve the operational readiness of the GRANOLYSER.

8.1.2 Variant HL – Volume measuring cell and weighing equipment

Interval
3 m

Inside the GRANOLYSER HL arise dust deposits and impurities.

- ⇒ Remove the drawer.
- ⇒ Lay the GRANOLYSER HL carefully on the side.
- ⇒ Remove the impurities inside carefully with a soft brush.

⇒ You can also use a vacuum cleaner for heavy contamination. This must be used without contact to prevent damage to the measuring cell and weighing cell.

CAUTION



Dust Warning

Dust may contain harmful substances, such as mycotoxins. There is a risk of respiratory problems or infections.



- ⇒ Check whether inhalation of dust poses health risks (e.g. irritation or respiratory diseases).
- ⇒ If necessary, take appropriate protective measures (e.g. wear respiratory protection, use extraction systems).

⇒ Place the instrument again properly and slide in the drawer.

8.1.3 Printer

CAUTION



Burns of hands and fingers!

The print head becomes very hot during operation!

- ⇒ Allow the print head to cool sufficiently before cleaning.

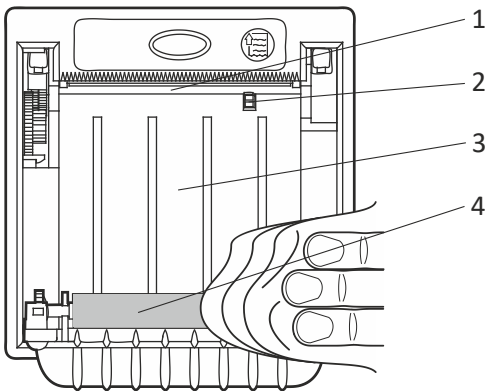


Figure 8: Clean the printer

The figure is for illustrative purposes. The type of printer used may vary.

Item	Designation
1	Print head
2	Paper detection sensor
3	Paper compartment
4	Print roller

Cleaning	Rectification	Interval
Print head	With a clean, dry and lint-free cloth. If required cloth moistened with isopropanol.	After each paper change
Print roller	With a clean, dry and lint-free cloth. If required cloth moistened with isopropanol.	After each paper change
Paper detection sensor	With compressed air (spray can)	After every fifth paper change
Paper compartment	With compressed air (spray can)	After every fifth paper change
Housing	With compressed air (spray can) or a soft cloth.	ar

8.2 Maintenance

Maintenance is a part of servicing and refers to the scheduled cleaning, checking and replacement of wearing parts. The aim of maintenance is to maintain the full functionality of the instrument over its lifetime. The GRANOLYSER should therefore be checked for wear and tear at regular intervals. The inspection intervals depend on the frequency of use and the ambient conditions to which the GRANOLYSER is exposed. Only through regular checks (visual inspection) can damage to the instrument caused during use be detected early and reliably. If you are unsure whether your instrument is still completely ready for use, Pfeuffer GmbH's professional service team will be pleased to assist you.

8.3 Inspection interval and function test

Sub-assembly	Interval in one-shift working				
	w	m	¼ y	½ y	y
Normal function tests:					
Main switch I/O		X			
Touchscreen		X			
Firm seating of magnets at the back on the drawer		X			
Mains cable and connection					X
Labels and warning notes in place and legible (by visual inspection)					X
Check the correctness and firm fit of the entire machine			X		
Check all cables for damage and aging				X	
Check protective covers for defects, as well as for correct and tight fit		X			
Check all plug-in, screw-in and clamp connections for firm fit, tighten if necessary			X		
Electrical test according to VDE ⁷	See DGUV ⁸ regulation 3				

DANGER



Risk of electric shock due to damaged cables!



- ⇒ Never touch damaged cables (e.g. with cuts in the jacket or damaged insulation).
- ⇒ Disconnect the cable immediately from the power supply.
- ⇒ Replace the cable with a new, undamaged one.

NOTICE

Only mains cables conforming to the technical specifications (see **chapter 3.2**) are permitted. Do not use any other type of cable.

⁷ German Association for Electrical, Electronic and Information Technologies

⁸ Association of the German Statutory Accident Insurance

9 Malfunctions – causes and rectification



The information provided in this chapter about possible malfunctions is structured to be understood by specialists in electrical, electronic or mechanical maintenance. Appropriate tools and test instruments must be provided to these personnel. If the specified measures do not prove successful, contact Pfeuffer GmbH.

It is important for all questions to specify the correct type designation, serial number and year of manufacture. Only in this way will rapid processing be possible. The information can be found on the type plate on the side of the machine housing (rear right). If you have questions about the software, please additionally specify the version, see imprint in **chapter 7.7.8**.



DANGER



Danger of fatal electric shock!

Touching live parts can be fatal.




Before performing cleaning, maintenance, or repair work, ensure the instrument is safely powered off (see **chapter 2.8**)!

Problem	Cause	Rectification
The GRANOLYSER is not working at all.	No mains voltage. Main switch I/0 (ON/OFF) is in position 0 (OFF). Internal fuse in the mains switch defective.	Have the mains voltage checked by a qualified electrician and switched on. Set the main switch to position I (ON). Test and replacement by a qualified electrician , see chapter 9.2 .
Red stripes on the printout.	Thermal paper roll is reaching the end.	Install a new thermal paper roll, see chapter 9.3 .
The LED on the printer flashes 3 times in succession.	Thermal paper roll is finished.	Install a new thermal paper roll, see chapter 9.3 .
The conveyor wheel no longer turns.	Possibility of trapped grains or defective motor.	Contact Pfeuffer GmbH.
The motor no longer runs.	Defective motor	Contact Pfeuffer GmbH.
The GRANOLYSER does not detect the drawer.	One of the magnets on the back of the drawer has dropped off.	Attach the magnets (item 1) with superglue in the places intended, see figures in chapter 7.2 .
Variant HL : Measurement result: Red cross icon † behind the value for bulk density	Jammed grain at the hectoliter module. This might affect the balance leading to incorrect bulk density results.	Cleaning the balance module. You can request a corresponding service instruction from Pfeuffer GmbH, stating the serial number.

Problem	Cause	Rectification
Fast blue and gray flashing thermometer icon in the status bar: 	The temperature of the spectrometer is in the critical range. There are no restrictions, measurements are still possible.	The temperature is checked by the software every 5 minutes. If the temperature falls, the thermometer icon disappears automatically. If the temperature rises, an error message is also displayed, see chapter 9.1 .
Red USB icon in the status bar: 	The internal USB data memory has no connection to the system.	Switch the instrument off and on again using the main switch. If the fault has not been remedied, contact Pfeuffer GmbH.

9.1 Status messages

The following overview contains messages which can be displayed in dialog boxes on the display and the measures that are required to remedy them.

Status message	Measure
Drawer empty?	Empty the drawer and put it back into the compartment.
Drawer missing	Insert the drawer properly.
Service required	Switch off the instrument using the main switch. Possibly the luminosity of the lamp has decreased. Contact Pfeuffer GmbH.
Granolyser empty	There is no sample in the instrument: Put in a sample (600 ml). See explanation in chapter 7.5 .
Granolyser not empty	See explanation in chapter 7.5 .
Conveyor motor overload	Switch off the instrument using the main switch. Contact Pfeuffer GmbH.
Sample amount too small	Put in a bigger sample.
Variant HL : Sample amount too small for bulk density	Put in a bigger sample.
WARNING! Diskspace low	Contact Pfeuffer GmbH.
 System error	Confirm the message. A red exclamation mark is displayed in the status bar. <u>No</u> measurement is possible. Switch the instrument off and on again using the main switch. If the fault has not been remedied, contact Pfeuffer GmbH.

Over temperature spectrometer

If the critical temperature is exceeded at the spectrometer, the message "The temperature is too high! Switch off Granolyser!" is displayed.



A red exclamation mark is displayed in the status bar in addition to the thermometer icon .

Measurements are no longer possible.

Confirm the message and switch off the GRANOLYSER immediately!

The cooling down of the spectrometer may take some time depending on the ambient temperature. Switch the GRANOLYSER back on after the cooling time. If the temperature icon is no longer displayed in the status bar, the GRANOLYSER is ready for operation again.

9.2 Renewing the internal fuse

There is a plug connection in the mains switch on the back of the instrument. An internal glass micro fuse is incorporated in this.

NOTICE

Fuse replacement should only be performed by **qualified electrical personnel**. The fuse must always be replaced with one of identical ratings (see **chapter 3.2** and the information on the type plate, which is binding).



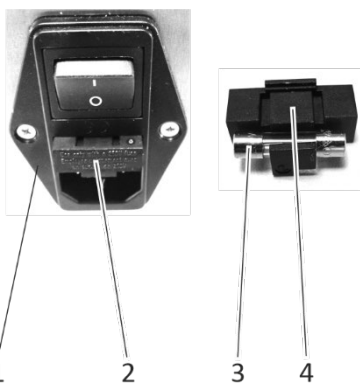
DANGER

Danger of fatal electric shock!

Touching live parts can be fatal.



Before performing cleaning, maintenance, or repair work, ensure the instrument is safely powered off (see **chapter 2.8**)!



- ⇒ Pull out the plug connection.
- ⇒ Renew the glass micro fuse.
- ⇒ Insert the plug connection back into the mains switch.
- ⇒ The GRANOLYSER is ready for operation.

Item	Designation
1	Mains switch
2	Pull out the plug connection.
3	Glass micro fuse
4	Plug connection

Figure 9: Exchanging the internal fuse

9.3 Exchanging the thermal paper roll in the printer



The printer in the GRANOLYSER is only designed for use with thermal paper. Dimensions of the thermal paper roll: Ø 50x57 mm (length 30 m)



Thermal paper is not waste paper and must be disposed of as **residual waste**.

CAUTION



Burns of hands and fingers!

The print head becomes very hot during operation!
 ⇒ Allow the print head to cool sufficiently before cleaning.

At the end of the thermal paper roll, red stripes are displayed on the printout. If there is no paper left, the LED on the printer flashes 3 times in quick succession if there is no more paper available.

- ⇒ Open the flap of the printer and remove the consumed paper roll.
- ⇒ Remove any shreds of paper inside the printer each time you change the paper. How to clean the printer, see **chapter 8.1.3**.
- ⇒ Insert the new paper roll in the paper compartment (see *Figure 10*, item 2). Pull out the paper for a few centimeters.
- ⇒ Close the flap and tear off the surplus paper. The printer is ready to operate again.

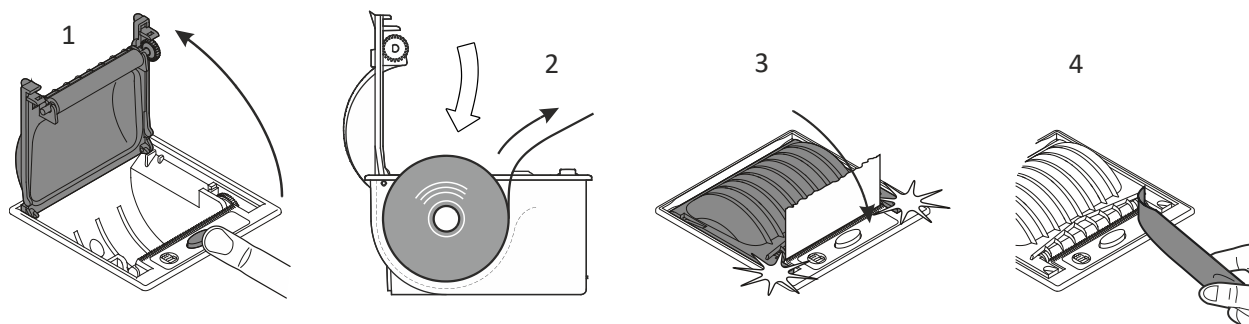


Figure 10: Changing the thermal paper roll
 The figure is for illustrative purposes. The type of printer used may vary.

Item	Designation
1	Open the flap
2	Insert paper roll
3	Close the flap
4	Tear off surplus paper

10 Supplements, accessories and spare parts

NOTICE

We wish to point out expressly that replacement and accessory parts not supplied by us will not have been tested and approved by us either. Installing and/or using such products can therefore result in the design properties of the instrument being negatively impaired. Pfeuffer GmbH cannot be held liable for damage attributable to the use of non-genuine parts and non-genuine accessories. Standard parts can be obtained from the dealer.

Product	Item number
NIR analyzer GRANOLYSER	1180 0002
NIR analyzer GRANOLYSER, approved	1180 0003
NIR analyzer GRANOLYSER HL	1180 0007
NIR analyzer GRANOLYSER HL, approved	1180 0008
Measuring beaker 0.5 l	3112 8605
Thermal paper rolls (5 pieces)	3262 8601
Mains cable with detachable IEC 60320 C13 device plug	2290 0100
Cleaning brush	3190 0020
Glass micro fuse 4 A T (slow-blow), 5x20 mm (10 pieces)	3253 0228
USB Barcode scanner	1920 0900
Database application for MS Access® <i>Pfeuffer DataGateway</i>	1180 0121

11 Emergency



⇒ **In an emergency** (e.g. smoke, fire hazard or mechanical blockage) immediately switch off the instrument using the main switch in position **O** (OFF).



⇒ Disconnect the mains cable from the power supply (i.e. unplug the IEC 60320 C13 appliance connector).

⇒ Ensure the mains cable remains under your direct supervision at all times and cannot be unintentionally reconnected.

12 Dismantling and disposal



Dismantling and disposal is only allowed to be carried out by **qualified personnel**.



DANGER

Danger of fatal electric shock!

Touching live parts can be fatal.

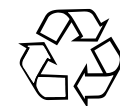


Before performing cleaning, maintenance, or repair work, ensure the instrument is safely powered off (see **chapter 2.8**)!



Special waste

Oil, cleaning agents, contaminated cleaning tools (brush, rags, etc.) must be disposed of according to the local regulations and in accordance with the notes in the manufacturers' safety data sheets.



Thermal paper is not waste paper and must be disposed of as **residual waste**.



Disposal with the household garbage is forbidden! The instrument must be disposed of in accordance with the applicable local environmental regulations (directive for electrical and electronic equipment waste WEEE 2012/19/EU).



PFEUFFER

Expert instructions



NIR analyzer

Granolyser[®] / Granolyser[®] HL

S/N 1181

from software version 1.0.3.1

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Revision 5/31.07.2025

Item number expert instructions:
Artikelnummer Expertenanleitung: **1180 9031**



These expert instructions are based on the GRANOLYSER original operating instructions. A change of user is required to make certain settings. These instructions describe the functions for the **Expert** user.

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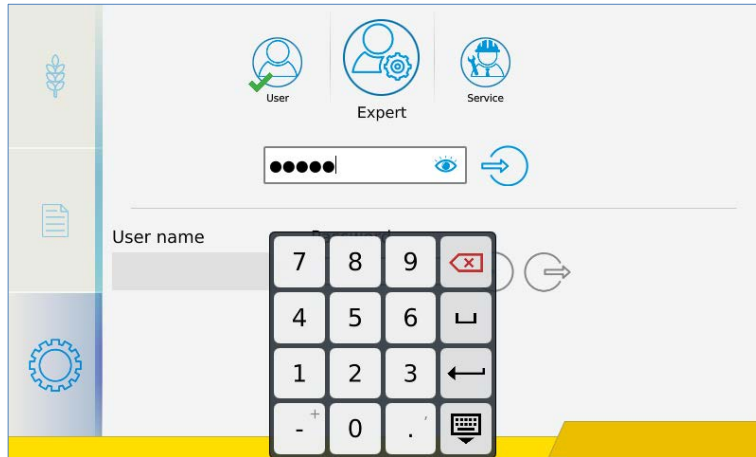
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(DIN ISO 16016)

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1 Expert user selection

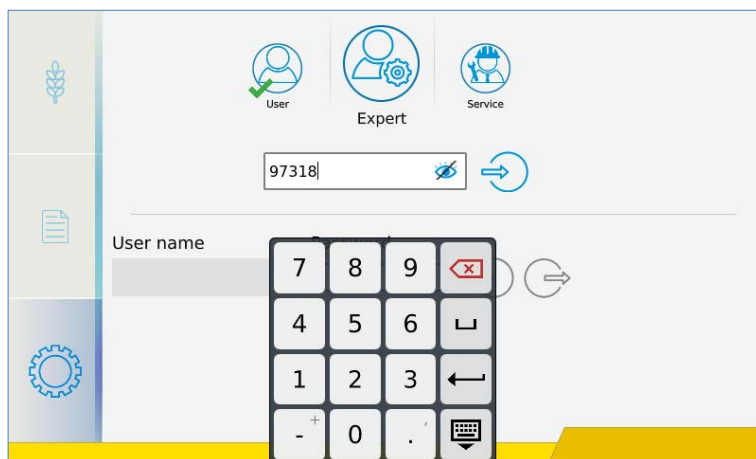
 Reset the user to "User" after making your settings.



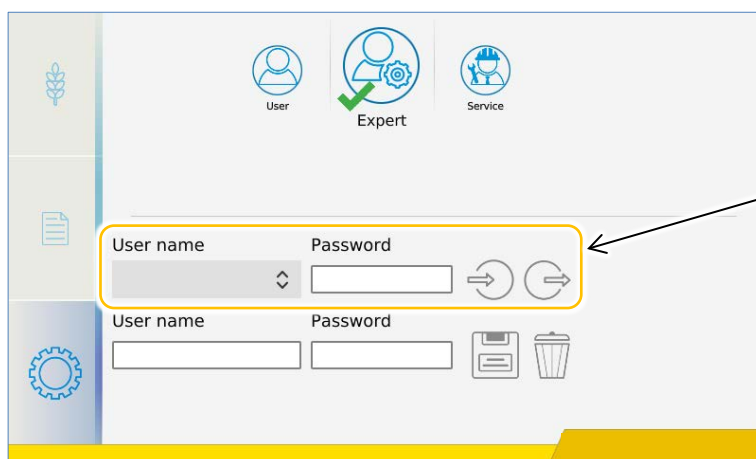
Tap on the **user selection menu** in the **Settings menu**.

Select the **Expert** user.

Enter password: **97318**

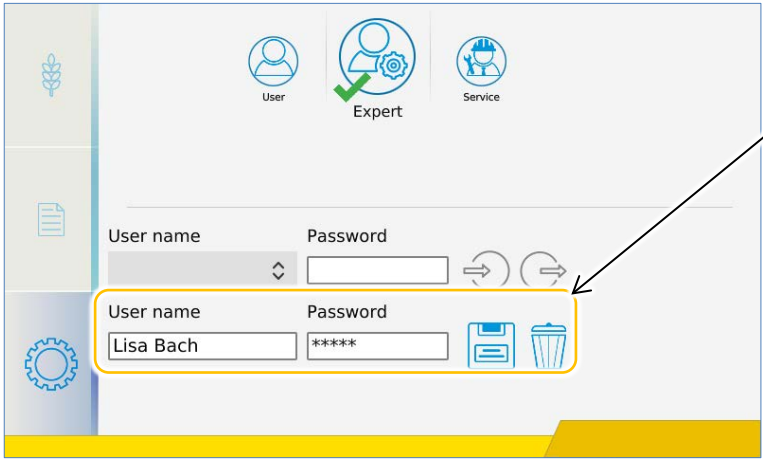


You can make the password visible to check the entry using the eye icon.





The measurements can be assigned to a specific person by selecting an individually created user name.

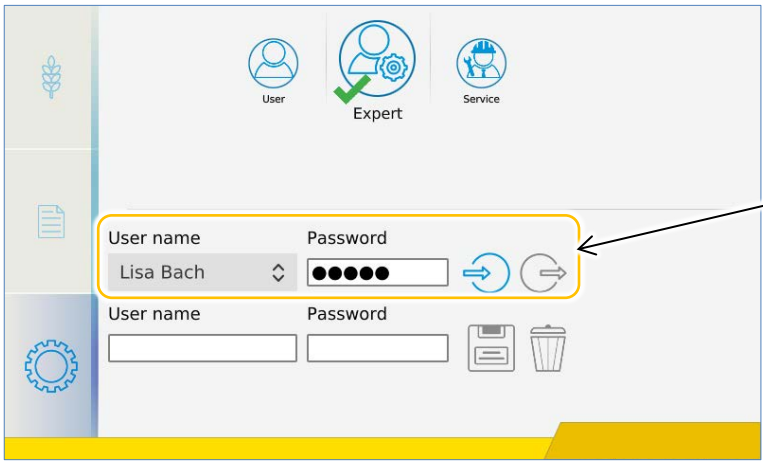
An empty user name is set by default (i.e. a blank line), without a password.




Enter a user name such as “Name Surname” and assign a password.

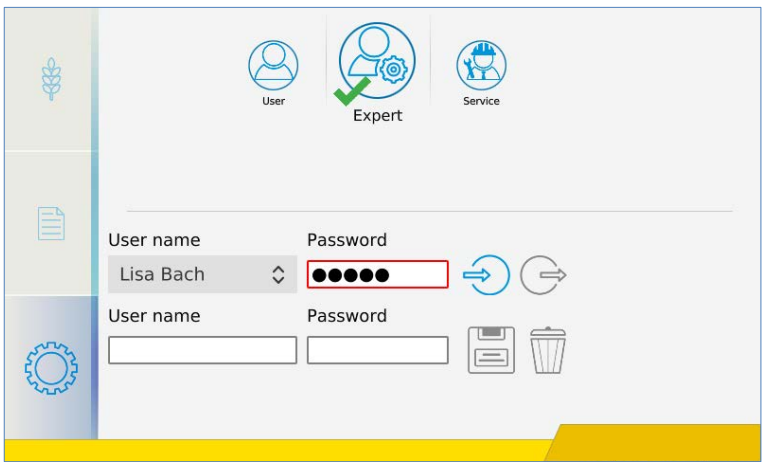
 Save user name and password.

 Delete user name and password.

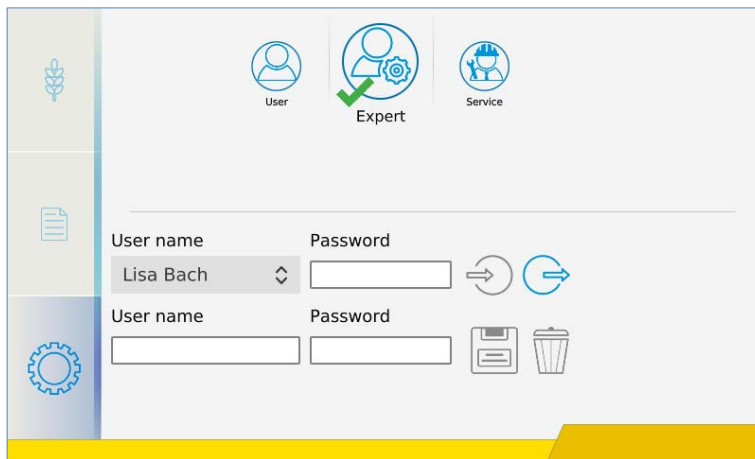



Select created user name and log in with the password.

 Log in user.



If the password is wrong, a red frame is displayed around the input field.



 Log out user.



Whenever the GRANOLYSER is switched on (restarted), **no** user name is selected.

Following a change of user, the user is personally responsible for canceling the “User name” selection again (logging out) or selecting a new user name. If you would like to actively log out your own user name without logging in under another user name at the same time, select the empty user name without a password. The user name is not associated with an authorization. The user name is saved with the measurement results and can be found on the paper printout.

2 Measurement results menu



Additional functions

Date Time	Product	Parameter	Value	Parameter	Value
7/24/23 14:35	Weizen	Feuchte	11.5%	Protein	11.0%
7/27/23 07:21	Weizen	Feuchte	12.6%	Protein	7.6%
7/27/23 07:23	Weizen	Feuchte	12.7%	Protein	7.6%
7/27/23 07:25	Weizen	Feuchte	12.4%	Protein	12.6%
7/27/23 07:27	Weizen	Feuchte	12.2%	Protein	12.5%
7/27/23 07:28	Weizen	Feuchte	12.5%	Protein	9.6%
7/27/23 07:30	Weizen	Feuchte	12.7%	Protein	9.6%
7/27/23 07:33	Weizen	Feuchte	13.5%	Protein	11.9%
7/27/23 07:35	Weizen	Feuchte	13.6%	Protein	12.1%
7/27/23 07:37	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:39	Weizen	Feuchte	14.0%	Protein	12.9%
7/27/23 07:41	Roggen	Feuchte	11.8%	Protein	8.6%
7/27/23 07:45	Roggen	Feuchte	11.8%	Protein	8.6%



Floating button: Opens a floating bar with more icons:



Print measurement results.



Transfer measurement results.



Delete measurement results, see **chapter 2.1.**



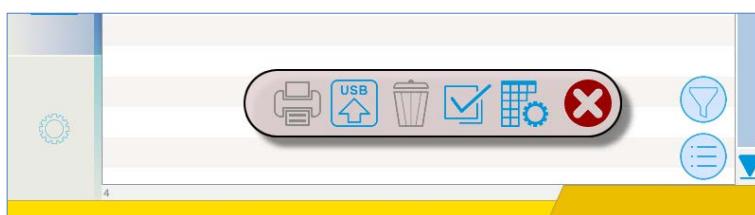
Select all measurement results.



Arrange table columns, see **chapter 2.2.**

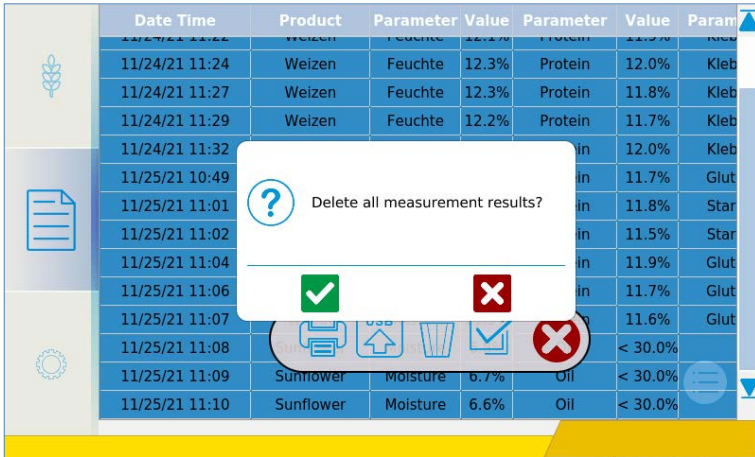


Close floating bar.



2.1 Delete measurement results

The **Expert** can delete individual, several or all measurement results. Raw data and spectra remain stored internally.

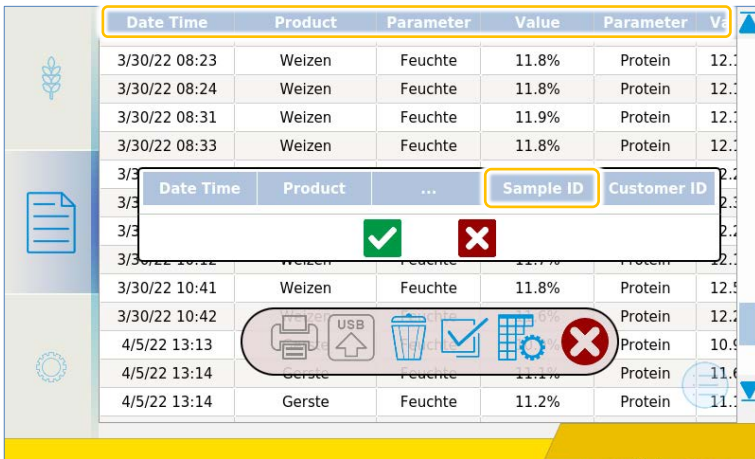


After tapping on the garbage can icon, the message “Delete all measurement results?” or “Delete selection (4)?” message is displayed. The number in brackets shows the number of selected measurement results.

Confirm Cancel

2.2 Arrange table columns

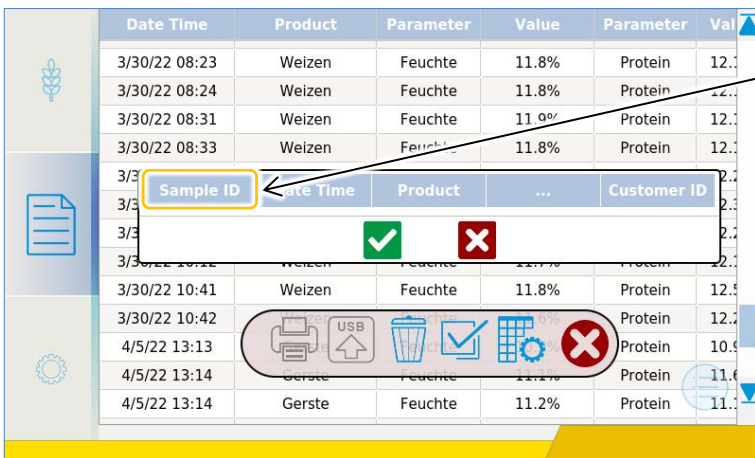
By default, the columns are arranged as shown in the adjacent figure. The **Expert** can move the columns Date, Product, Sample ID and Customer ID individually for the screen view. During data transfer, the original arrangement is retained. Tip: Connect a USB computer mouse for more convenient operation.



Touch the column header in the dialog box and drag it to the desired position.

The column with the three dots (...) stands collectively for the parameters and result values. These cannot be rearranged individually.

The four column headers displayed can only be moved in front of or behind the parameter/result value column.

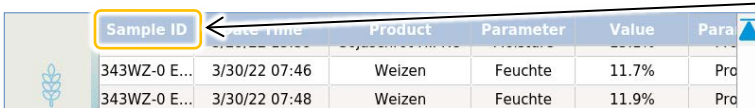


Here in the example, the Sample ID column is now the 1st column.

Setting:

Confirm Cancel

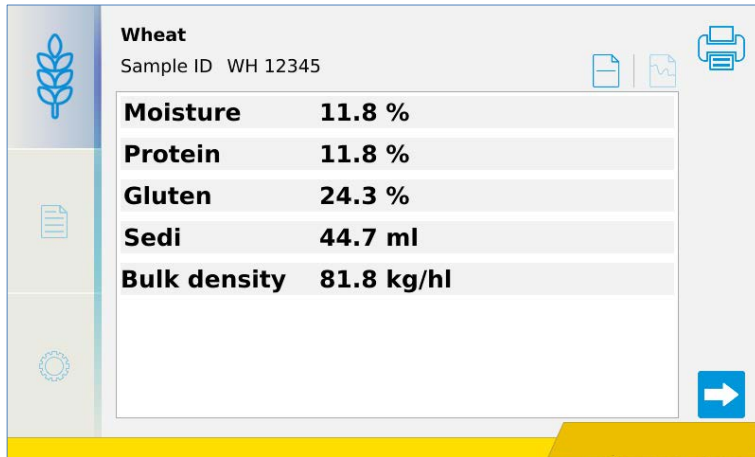
In order for the display to be updated, you must exit the Measurement Results menu once and call it up again.



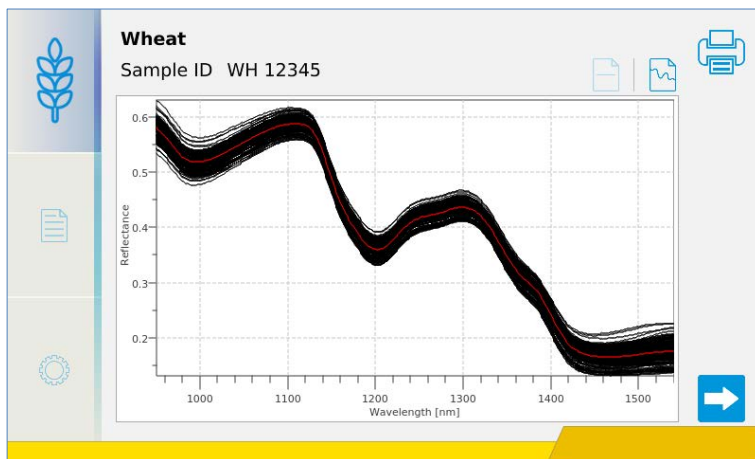
The sample ID is now the 1st column.

The settings are retained when the instrument is restarted.

3 Display measurement result



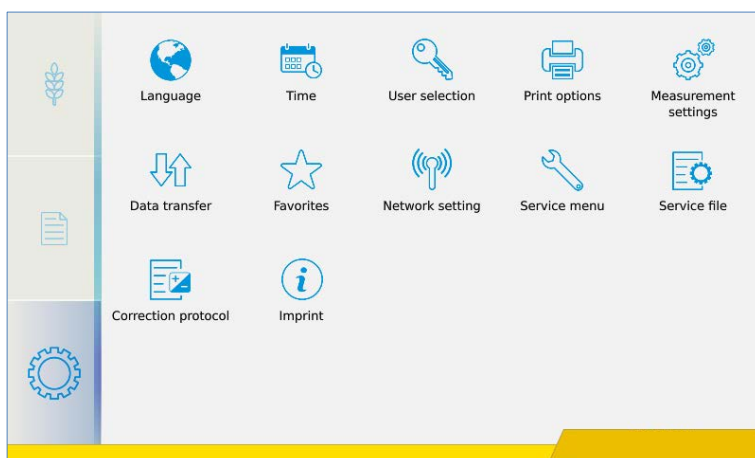
Measurement result default view



Change view to individual spectra.

The average spectrum is displayed in red.

4 Expert settings menu

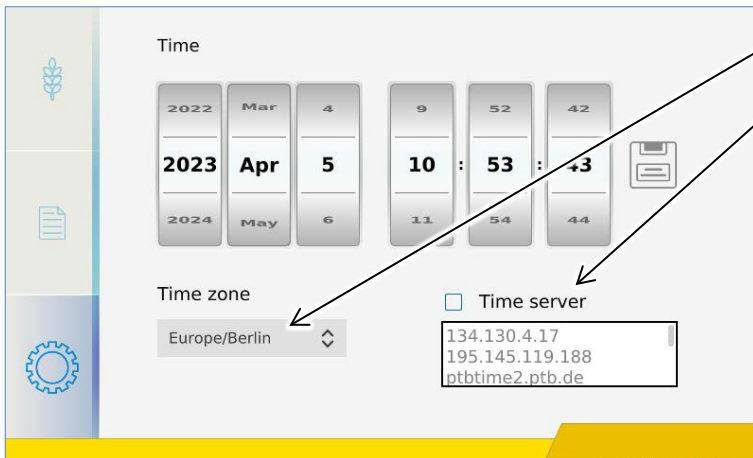


After entering the **Expert** user, the following sub-menus can also be selected:

- Favorites
- Approval information
- Network setting
- Service menu – extended functions
- Service file
- Correction protocol

The **Approval information** menu is only present if the instrument has been approved.

5 Time



Select **time zone**

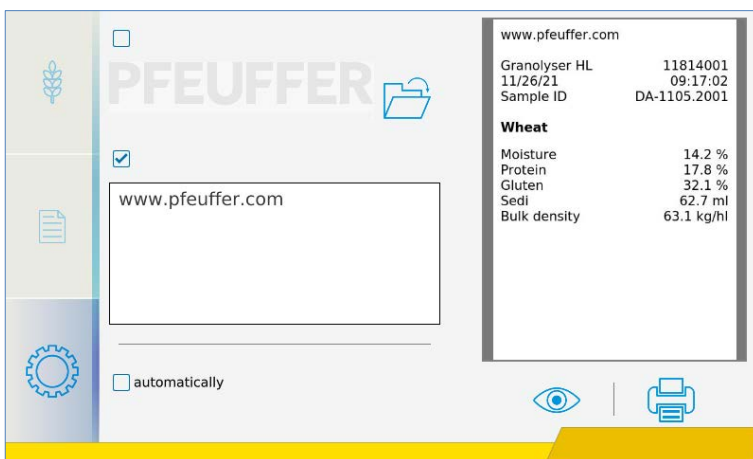
Select **time server**

The time server synchronizes the time at the GRANOLYSER (= radio clock) in certain intervals.

The field below contains IP addresses of known time servers. These can be edited. Each line must contain an IP address.

These two settings are necessary for automation.

6 Print option



Check box selection:

– **Printout with/without logo**

– **Printout with/without text**

Select and tap in the address field. The on-screen keyboard will be displayed automatically.

Tip: Connect a USB keyboard for easier input.

– **Printout automatically**

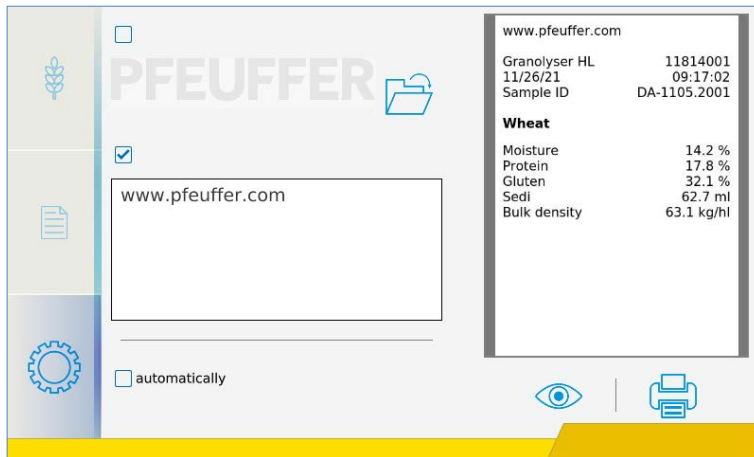
The measurement result is printed automatically after every measurement.

Open files on the USB data memory.

Generates the print preview on the right-hand side.

Test printout (excluding measurement results)

6.1 Insert own logo




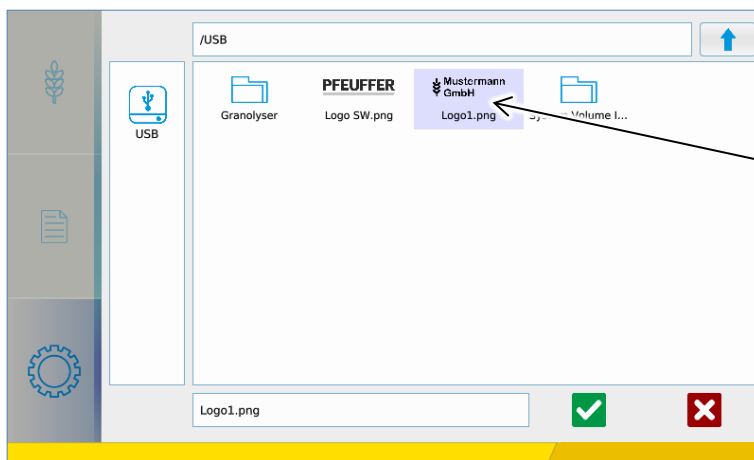
File specifications:

Format: PNG

Color: Pure black RGB: 0, 0, 0

Connect USB data memory with your logo.

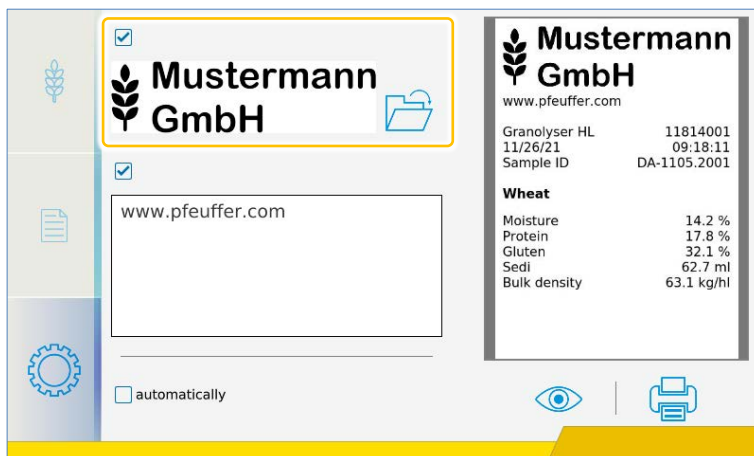
 Tap on the icon.



A new window opens containing the contents of the connected USB data memory.

Select your logo.


 Confirm selection.



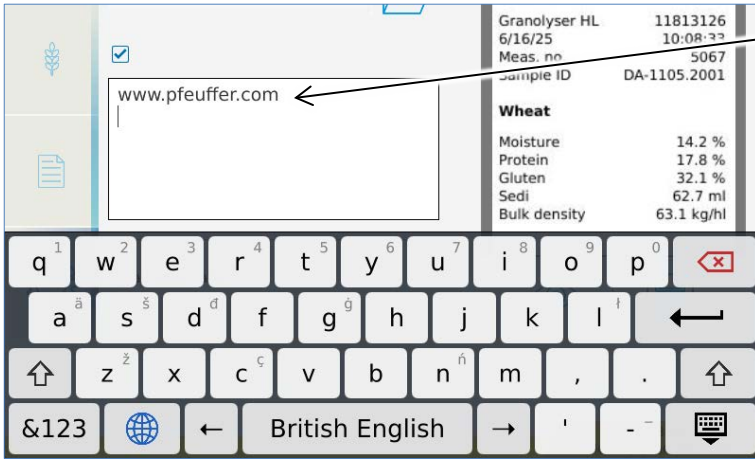
The new logo is inserted.

Select the “Printout with logo” check box.

 Print preview

 Test printout

6.2 Modify customer text



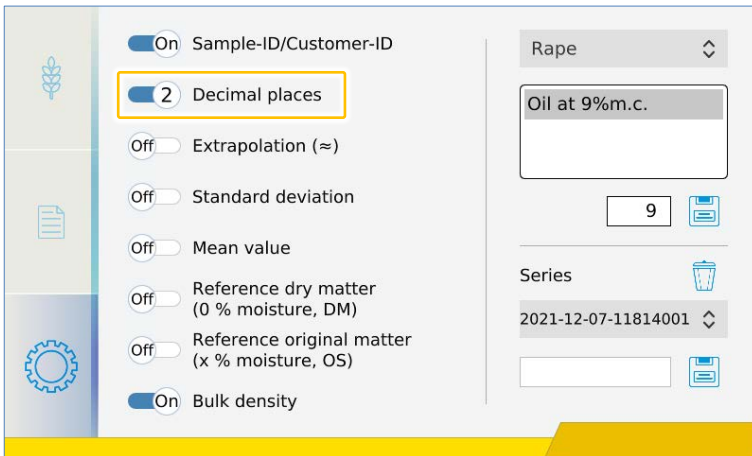
Select the “Printout with text” check box and tap in the address field. The on-screen keyboard will be displayed automatically. Press the Return key to insert a line break.

Tip: Connect a USB keyboard for easier input.

7 Measurement settings

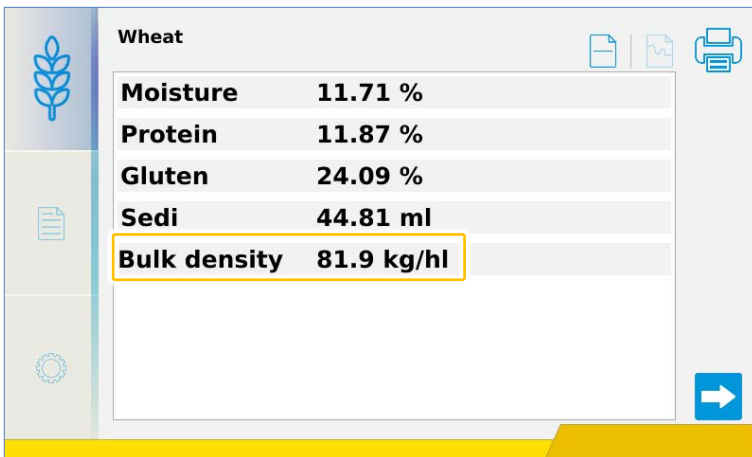


7.1 Decimal places



Option to select whether parameter values in the measurement results are displayed with one or two decimal places.

This setting is saved, transferred and printed.



Exceptions:

- parameter bulk density (hecto-liter weight)
- approved parameters

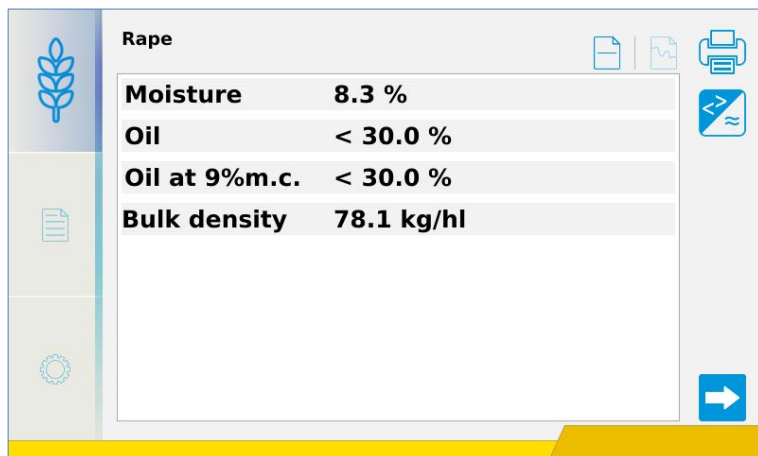
These values are displayed with only one decimal place.

7.2 Extrapolation

For measurement results below (<) 9 % or above (>) 30 %, it is possible to display and print an extrapolated measurement value.

NOTICE

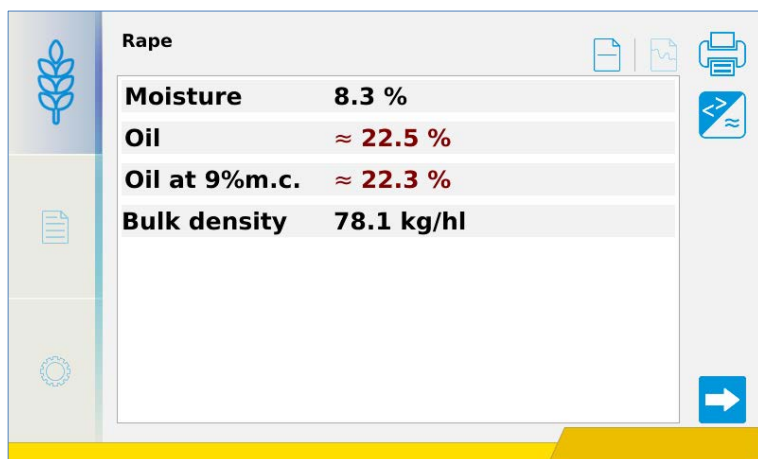
Please note that the extrapolated measurement values have greater uncertainty!



When extrapolation is activated, a new icon is displayed in the measurement result.



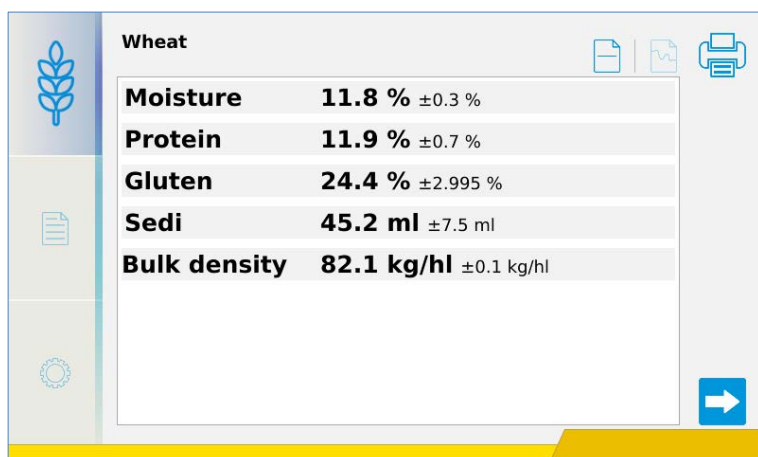
Tap on this icon for a display of the extrapolated measurement value.



The extrapolated measurement values are not saved and not transferred.

Attention: Only the extrapolated measurement value is printed with the “≈” character on the printout.

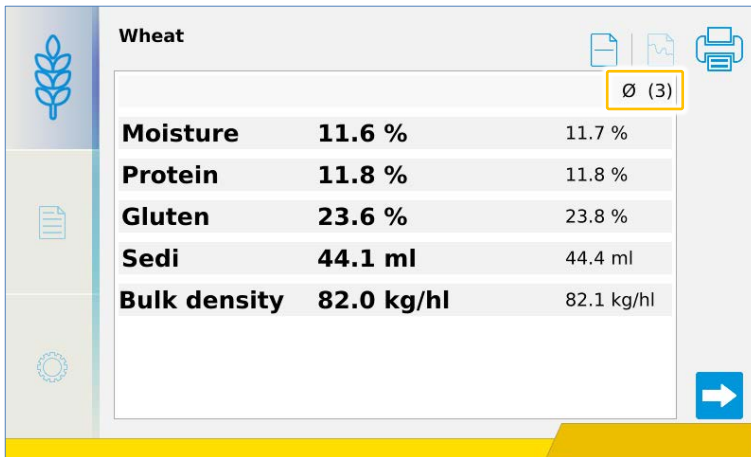
7.3 Standard deviation



The standard deviation of the moisture, protein, gluten, starch, oil and sedi parameters results from the deviation of the values from the individual spectra.

The standard deviation of the bulk density is 0.1 %, and results from the accuracy of the balance.

7.4 Mean value



The screenshot shows a software interface for measuring wheat. At the top, it says 'Wheat'. Below this is a table of measurement results. A yellow box highlights the text 'Ø (3)' in the top right corner of the table area, indicating the number of averaged measurements. The table contains the following data:

Parameter	Value	Reference Value
Moisture	11.6 %	11.7 %
Protein	11.8 %	11.8 %
Gluten	23.6 %	23.8 %
Sedi	44.1 ml	44.4 ml
Bulk density	82.0 kg/hl	82.1 kg/hl

The number of averaged measurements is shown in brackets.

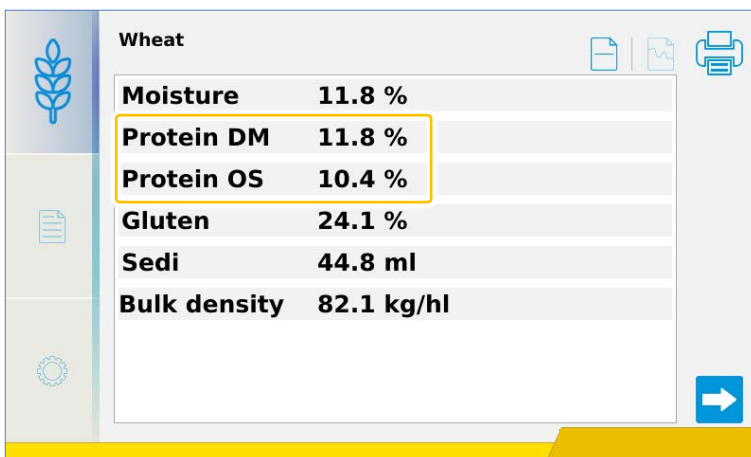
A running mean value is formed from sequential measurements with the same product and the same sample ID.

A sample ID must be specified - a running mean value cannot be displayed without a sample ID!

The mean value is not saved and not printed.

7.5 Dry matter/original substance reference parameter

The **Expert** can select that parameters which relate to the dry matter DM (or the original substance OS) as specified in these original operating instructions are also output in relation to the original substance (or the dry matter). These measurements are saved, transferred and printed.



The screenshot shows the same software interface as in 7.4, but with different parameters displayed. A yellow box highlights 'Protein DM 11.8 %' and 'Protein OS 10.4 %'. The table contains the following data:

Parameter	Value
Moisture	11.8 %
Protein DM	11.8 %
Protein OS	10.4 %
Gluten	24.1 %
Sedi	44.8 ml
Bulk density	82.1 kg/hl

In this example, the wheat protein parameter is measured in the dry matter as standard.

OS and DM have been selected in the **measurement settings menu**, i.e. the parameters are measured, displayed and saved in both DM and OS.

If only OS (or only DM) is selected in the **result display menu**, no additional OS (or DM) is displayed in the measurement result if the standard procedure is already measuring in OS (or DM).

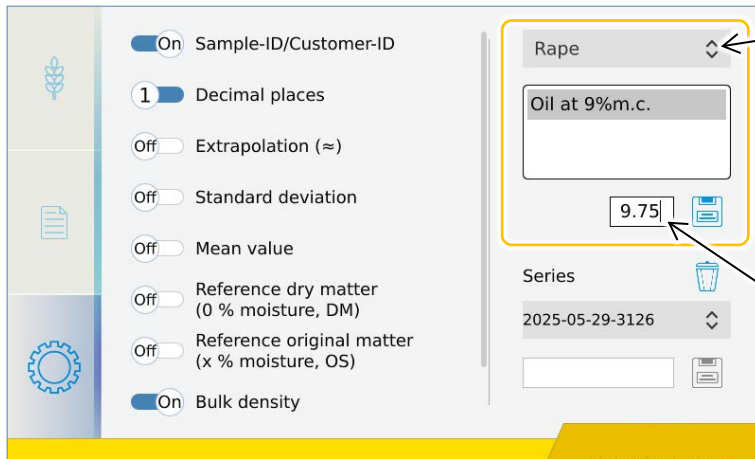
With parameters for which the method is not specified, no differentiation (conversion into DM or OS) takes place!

The measurements are stored in the database with the relevant details (OS/DM).



For products and measuring ranges see original operating instructions, chapter Function – Products and measuring ranges.

7.6 Configurable moisture reference values



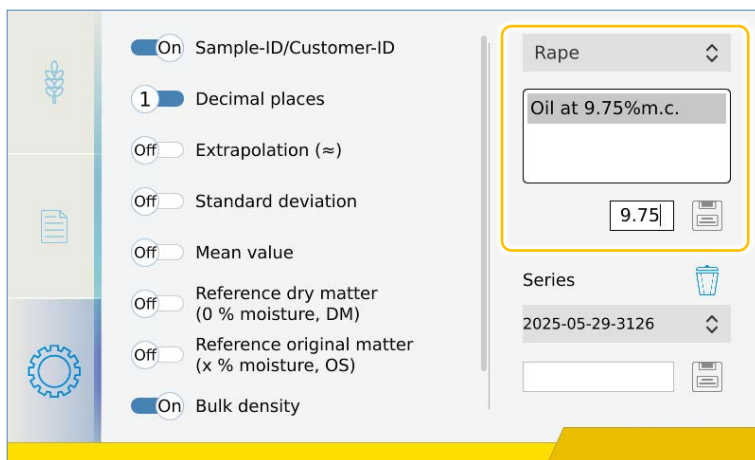
Select product.

This is where the products are displayed for which a configurable parameter has been defined in the acceptance (currently only implemented for rapeseed).

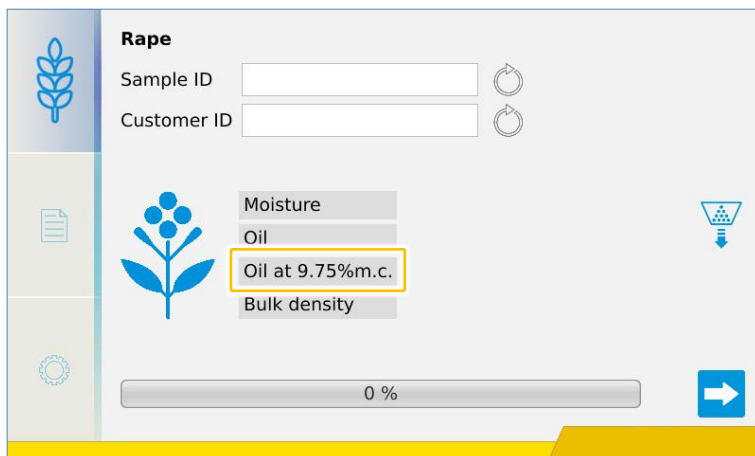
Enter percentage.

Values can be entered with up to two decimal places.

 Save entry.



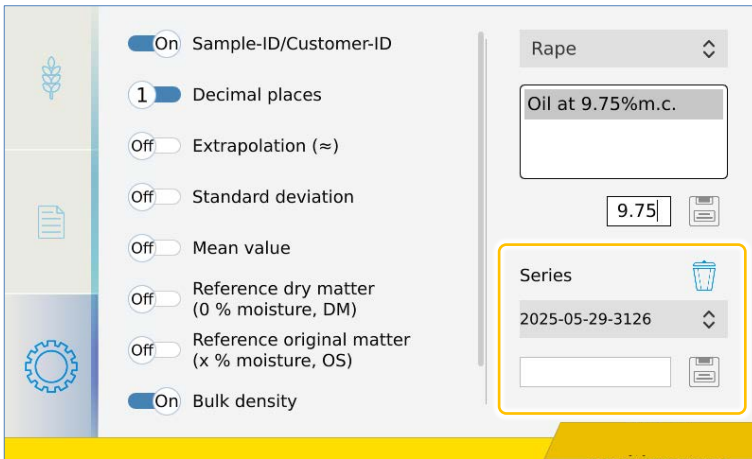
This setting is saved, transferred and printed.




The “Oil #%m.c.” parameter is calculated from the moisture and oil parameters (in the original substance) and the defined moisture reference values in accordance with the following equation:

$$\text{Oil \#m.c.} = \frac{\text{Oil} \times (100 - \#)}{100 - \text{Moisture}}$$

7.7 Deleting series (spectra file)



If necessary, the series can be deleted after the spectra file has been transferred.

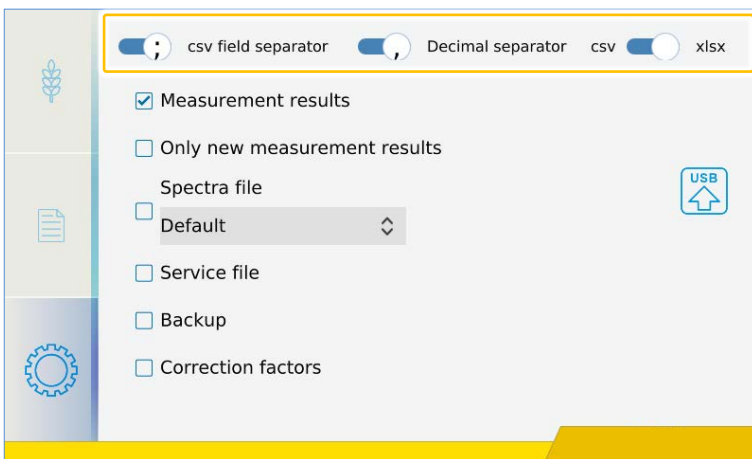
 The garbage can icon becomes active only after the transfer.

A series that does not contain a spectrum can also be deleted.

8 Data transfer



Settings



Exporting measurement results

The table of measurement results can be exported in CSV (default) or XLSX format.

For CSV export, the field separator and decimal separator can also be specified individually.

Examples:

CSV field separator: Semicolon	Decimal separator: Comma	;Moisture [%];13,6;Protein [%];15,3;Gluten [%];32,2;
-----------------------------------	-----------------------------	------------------------------------------------------

CSV field separator: Comma	Decimal separator: Dot	,Moisture [%],13.6,Protein [%],15.3,Gluten [%],32.2,
-------------------------------	---------------------------	------------------------------------------------------



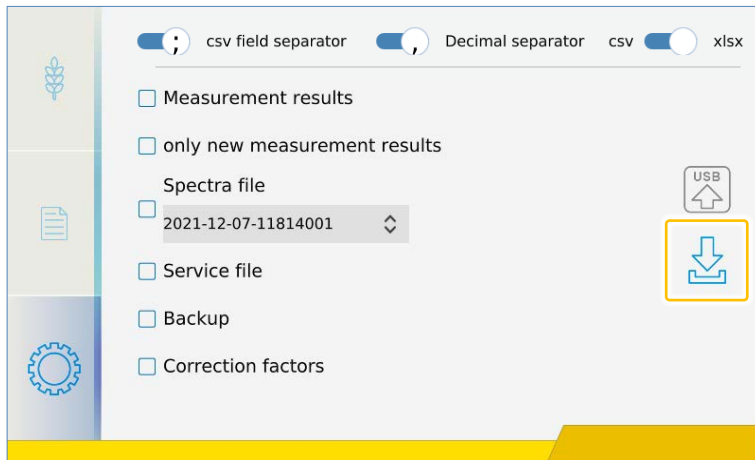
Notes on exporting as an XLSX file:

Purely numerical values are exported as numbers and the corresponding cells are formatted as "Number." Values preceded by "<," ">," or "≈" are exported as text and the cells are formatted accordingly as "Text."

If the program crashed during export, it is possible that too much data was exported. In such cases, it is recommended to export in CSV format, as there is no size limit for this.

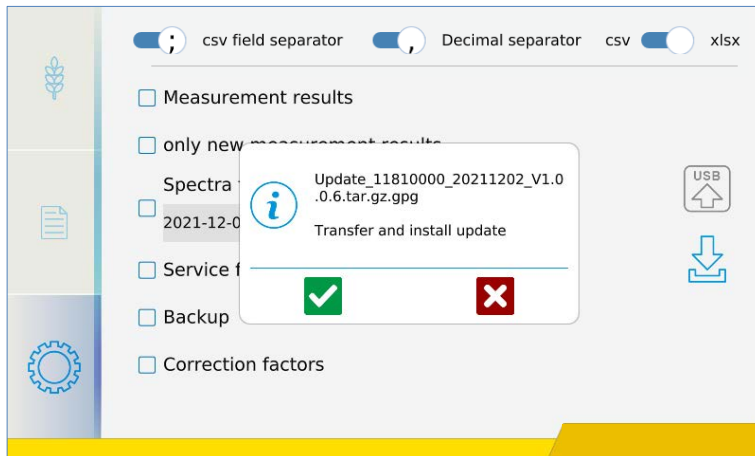
9 Install update

You have received a software update from Pfeuffer GmbH via download or email in the form of a file, e.g., "Update_11810000_20211126_V0.0.0.0.x.tar.gz.gpg." Copy the file to a USB data memory.



Connect the USB data memory to the instrument.

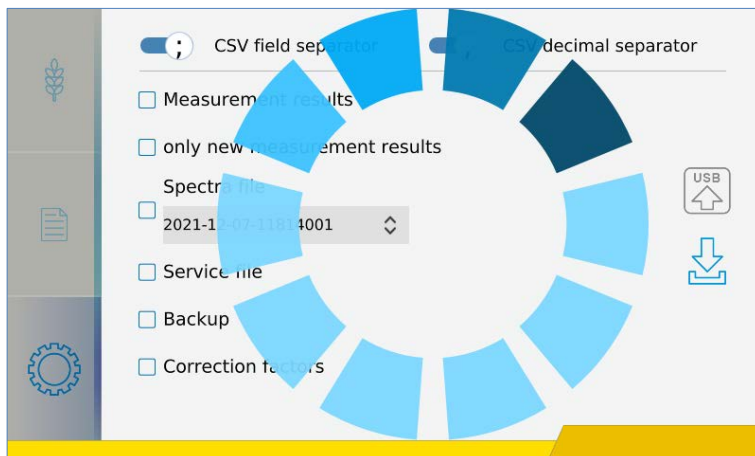
↓ If the GRANOLYSER recognizes a suitable update on the USB data memory, the update function is enabled.



↓ Tap on the Update icon.

Message: "Transfer and install update"

✓ Confirm the message.



The data is read from the USB data memory and unpacked.

Please wait! This can take a few seconds to several minutes depending on the size of the update.

Depending on the update, different backgrounds can be displayed.

Then the program is terminated and the GRANOLYSER is restarted.

Only now may the USB data memory be removed!

10 Favorites



Favorites list			Product list	
Pos.	Nr.	Produkt		
1	1301 0	Durum		
2	1701 0	Peas		
3	1204 0	Barley		
4	1203 0	Oats		
5	1201 0	Maize		
6	1407 0	Rape		
7	1305 0	Rye		
8	1501 0	Soya beans		
9	2001 0	Sunflower		

Printout of the **Favorite list**

Favorite list (selected products) for the product menu on the start screen.

With a new instrument, all products are stored in the favorite list.

Product list (non-selected products). With a new instrument, this list is empty.

Remove product from favorite list.

Favorites list			Product list	
Pos.	Nr.	Produkt		
1	1301 0	Durum		
2	1701 0	Peas		
3	1204 0	Barley		
4	1203 0	Oats		
5	1201 0	Maize		
6	1305 0	Rye		
7	1202 0	Triticale		
8	1305 0	Wheat		

1407 0	Rape
1501 0	Soya beans
2001 0	Sunflower

To do this, the product must be selected in the favorite list.

The product is not deleted, it is moved to the product list.

Add product in product list to favorite list.

To do this, the product must be selected in the product list.

Favorites list			Product list	
Pos.	Nr.	Produkt		
2	1701 0	Peas		
3	1204 0	Barley		
4	1203 0	Oats		
5	1201 0	Maize		
6	1305 0	Rye		
7	1202 0	Triticale		
8	1305 0	Wheat		
9	1501 0	Soya beans		
10	2001 0	Sunflower		

1407 0	Rape
--------	------

Move position of marked product up/down in favorite list.

Example if you only want to measure the barley, wheat, rye and oats products:

Pos.	Nr.	Produkt
1	1204 0	Barley
2	1305 0	Wheat
3	1305 0	Rye
4	1203 0	Oats

1201 0	Maize
1202 0	Triticale
1301 0	Durum
1407 0	Rape
1501 0	Soya beans
1701 0	Peas
2001 0	Sunflower

Barley

Rye

Wheat

Oats

Self-selected product menu via the favorite list.

11 Network setting

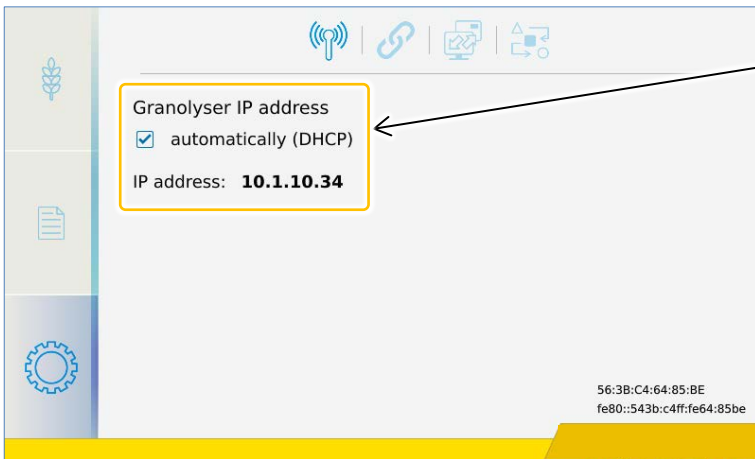
The GRANOLYSER has a network connection (RJ45, LAN) for automatic transfer of results, for example to an ERP system. The RJ45 interface is located on the rear of the instrument.



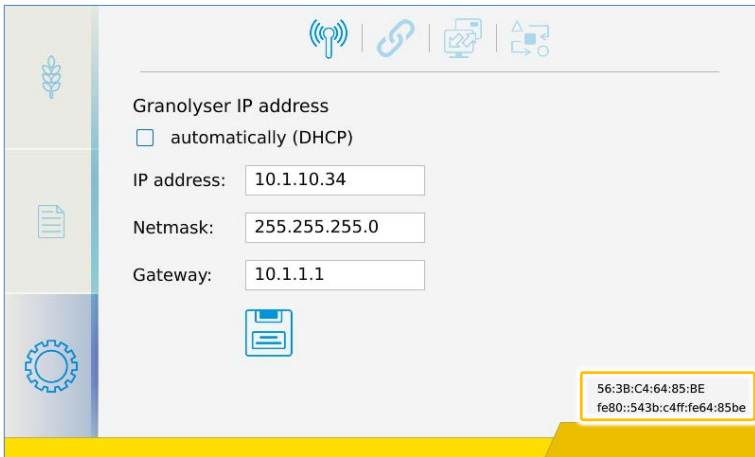
An optional accessory is the *Pfeuffer DataGateway* application, which stores GRANOLYSER data in an MS Access® database on a server or external PC. You can download a trial version: [PfeufferDataGateway](#) or scan the QR code. If you have any questions, please contact Pfeuffer GmbH.



11.1 IP address GRANOLYSER



The IP address of the GRANOLYSER (panel PC) is automatically assigned via DHCP, provided that DHCP is enabled.



When DHCP is disabled, a static IP address can be configured manually.

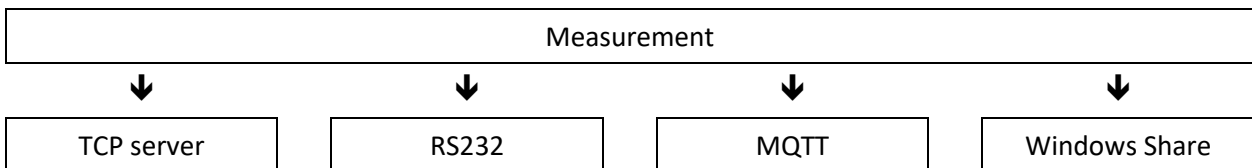
Save entry.

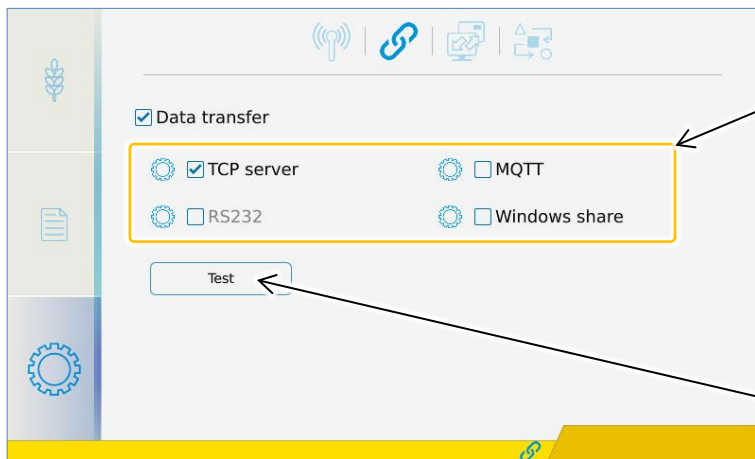
Display of the MAC and IPv6 address of the panel PC

11.2 Data transfer




There are four different transfer options for data transfer after a measurement.






Select the type of data transfer here.

Several transfer types can also be selected at the same.

 Use the small gear wheel icon to open the respective configuration settings.

Verification of correct data transfer.

11.2.1 TCP server settings

 Configuration settings:

IP adress:	IP address of the remote station (receiving server)
Port number:	Port number of the remote terminal
Text codec:	Encoding of the text characters to be transmitted. UTF-8 is recommended here (UTF-8 is a Unicode type).

Server examples

The LAN connection is established as a TCP socket connection (Stream Socket). The GRANOLYSER takes over the client role. The server address and the server port are set on the GRANOLYSER as described. A TCP server which listens on the relevant port can be easily implemented in any programming language. Numerous examples can be found on the Internet.

Example in Python

```
#!/usr/bin/env python
# -*- encoding: latin1 -*-
from socket import *

# Standard Port ist 1024
PORT = 1024
BUFSIZE = 1024

def main():
    # Create socket and bind to port
    s = socket(AF_INET, SOCK_STREAM)
    s.bind(('', PORT))
    s.listen(1)

    print "Server started"

    # Wait for a connection
    conn, (remotehost, remoteport) = s.accept()
    print 'Connected with %s:%s' % (remotehost, remoteport)

    while 1:
        # Receive data
        data = conn.recv(BUFSIZE)
        print "Echo: %s" % (data)
        if not data:
            # The connection has been disconnected
            break # Abort

    # Close socket
    s.close()

main()
```

Example in Perl

```

use IO::Socket;
use strict;

my $server_port = 1024;
my $server = IO::Socket::INET->new(LocalPort => $server_port,
                                   Type       => SOCK_STREAM,
                                   Reuse     => 1,
                                   Listen   => SOMAXCONN )
    or die "Couldn't be a tcp server on port $server_port : $@\n";
while (my $client = $server->accept())
{
    # $client is the new connection
    my $request = <$client>;
    chomp($request);
    print "Request: $request\n";
    close($client);
    print "\nWaiting for next connection ... \n\n";
}
close($server);

```

11.2.2 Data structure – structure of the transfer (example)

11810258;1;1201WZ;Wheat;16.06.202112:48:16;1;BIASMeasurement06.2021;|;Moisture;13,6;%;|;
Protein; 15,3;%;|; Gluten;32,2;%;|;Sedi;52,2;ml;|;CR+LF

Granolyser serial number	11810258;
Measurement number	1;
Sample ID	1201WZ;
Product	Wheat;
Date and time	16.06.2021 12:48:16;
User ID	1;
Series	BIAS Measurement 06.2021;
Separator	;
Parameter name	Moisture;
Measurement	13,6;
Units	%;
Separator	;
Parameter name	Protein;
Measurement	15,3;
Units	%;
Separator	;
Parameter name	Gluten;
Measurement	32,2;
Units	%;
Separator	;
Parameter name	Sedi;
Measurement	52,2;
Units	ml;
Separator	; CR+LF

Explanation of the data structure:

- Individual entries are separated by a semicolon “;”.



If semicolons are present in the sample ID, user ID, or series name, they are replaced with spaces to preserve the integrity of the data structure.

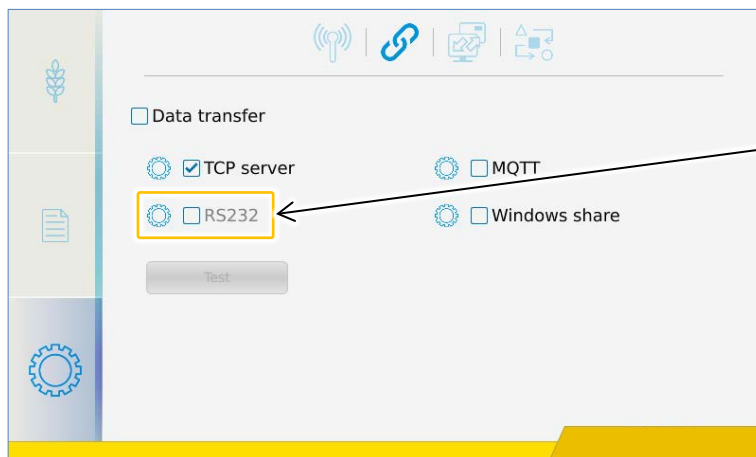
2. A complete data record is terminated with “CR+LF”.
3. The order of the entries of GRANOLYSER serial numbers until the first separator | is fixed.
4. The structure can be extended with additional entries at a later date if required after the final entry before the first separator (series).
5. A parameter set (= parameter name with units and measurement) is always between two separators |.
6. The order of the three entries (parameter name; unit; measurement) is fixed.
7. A parameter set can be supplemented with additional entries separated by a semicolon “;” at a later date if required. The number of additional entries can be variable.
8. The number of parameter sets is variable and is oriented to the number of measured parameters.
9. The coding of the transferred data is ANSI, or the code page specific to the country which is set on the GRANOLYSER.

11.2.3 RS232 settings



Connect an adapter (USB plug to RS232 plug) to one of the two USB interfaces on the rear panel of the instrument.

An adapter is available from Pfeuffer GmbH (item no. **2820 1522**).



☑ The text “RS232” only becomes active (black) when an adapter has been detected!

Configuration settings:

Baud:	9600
Data bits:	8
Parity:	None
Stop bits:	1
Flow Control:	None
Text codec:	Encoding of the text characters to be transmitted. UTF-8 is recommended here (UTF-8 is a Unicode type).

11.2.4 MQTT settings

The MQTT client integrated in the GRANOLYSER can send the data record to an MQTT server.



Configuration settings:

IP-Adresse:Port	IP address and TCP port of the MQTT server, e.g. <i>10.13.8.6:1883</i>
Topic	Topic under which the event is registered, e.g. <i>measurements/granolyser/11819906</i> or <i>granolyser/measurements</i>
Client ID	Identification of the client, here that of the GRANOLYSER, e.g. <i>GLS11819906</i>
User name	User name for logging on to the MQTT server (if required)
Password	Password for logging on to the MQTT server (if required)
Detailed logging	If this box is checked, detailed messages are logged in the service file. This serves to simplify troubleshooting.

After a measurement, a data record is sent to the MQTT server with the specified parameters. The data record (technical term: MQTT payload) is a JSON object. The MQTT payload is UTF-8 encoded. The JSON object has the following structure:

Example:

```
{ "device" : "11819906", "currenttime" : "06/01/23 10:06:54", "measurement" : {
  "Datetime" : "01 Jun 2023 10:06:54 +0200", "ID" : "11", "Product" : "WEIZEN", "Series"
  : "Default", "Customer" : "", "ProductText" : "Weizen", "User" : "", "Sample" : "",
  "parameter" : [ { "Parameter" : "MOISTURE", "UnitText" : "%", "ParameterText" :
  "Feuchte", "ValueText" : "11.7"}, { "Parameter" : "PROTEIN", "UnitText" : "%",
  "ParameterText" : "Protein", "ValueText" : "9.8"}, { "Parameter" : "GLUTEN", "UnitText"
  : "%", "ParameterText" : "Kleber", "ValueText" : "25.1"}, { "Parameter" : "SEDI",
  "UnitText" : "ml", "ParameterText" : "Sedi", "ValueText" : "49.9"} ] }
```

Some explanations of the format:

device	Serial number GRANOLYSER																																								
currenttime	Transfer time: MM/DD/YY HH:MM:SS																																								
Datetime	Measurement time																																								
Product	Language-independent standardized designation of the product <table border="1" style="margin-left: 20px;"> <thead> <tr> <th><i>Existing keyword for products</i></th> <th><i>Product text</i></th> </tr> </thead> <tbody> <tr><td>BOHNEN</td><td>Beans</td></tr> <tr><td>BUCHWEIZEN</td><td>Buckwheat</td></tr> <tr><td>DINKEL</td><td>Spelt</td></tr> <tr><td>DURUM</td><td>Durum</td></tr> <tr><td>EMMER</td><td>Emmer wheat</td></tr> <tr><td>ERBSEN</td><td>Peas</td></tr> <tr><td>GERSTE</td><td>Barley</td></tr> <tr><td>HAFER</td><td>Oats</td></tr> <tr><td>LEINSAMEN</td><td>Linseed (test)</td></tr> <tr><td>MAIS</td><td>Maize</td></tr> <tr><td>RAPS</td><td>Rape</td></tr> <tr><td>ROGGEN</td><td>Rye</td></tr> <tr><td>SOJABOHNEN</td><td>Soya beans</td></tr> <tr><td>SOJASCHROT</td><td>Soybean meal</td></tr> <tr><td>SENF</td><td>Mustard</td></tr> <tr><td>SONNENBLUMEN</td><td>Sunflowers</td></tr> <tr><td>SORGHUM</td><td>Sorghum</td></tr> <tr><td>TRITICALE</td><td>Triticale</td></tr> <tr><td>WEIZEN</td><td>Wheat</td></tr> </tbody> </table>	<i>Existing keyword for products</i>	<i>Product text</i>	BOHNEN	Beans	BUCHWEIZEN	Buckwheat	DINKEL	Spelt	DURUM	Durum	EMMER	Emmer wheat	ERBSEN	Peas	GERSTE	Barley	HAFER	Oats	LEINSAMEN	Linseed (test)	MAIS	Maize	RAPS	Rape	ROGGEN	Rye	SOJABOHNEN	Soya beans	SOJASCHROT	Soybean meal	SENF	Mustard	SONNENBLUMEN	Sunflowers	SORGHUM	Sorghum	TRITICALE	Triticale	WEIZEN	Wheat
<i>Existing keyword for products</i>	<i>Product text</i>																																								
BOHNEN	Beans																																								
BUCHWEIZEN	Buckwheat																																								
DINKEL	Spelt																																								
DURUM	Durum																																								
EMMER	Emmer wheat																																								
ERBSEN	Peas																																								
GERSTE	Barley																																								
HAFER	Oats																																								
LEINSAMEN	Linseed (test)																																								
MAIS	Maize																																								
RAPS	Rape																																								
ROGGEN	Rye																																								
SOJABOHNEN	Soya beans																																								
SOJASCHROT	Soybean meal																																								
SENF	Mustard																																								
SONNENBLUMEN	Sunflowers																																								
SORGHUM	Sorghum																																								
TRITICALE	Triticale																																								
WEIZEN	Wheat																																								

Parameter	Language-independent standardized designation of the parameter	
	<i>Existing keyword for parameter</i>	<i>Parameter text</i>
	MOISTURE	Moisture
	PROTEIN	Protein
	GLUTEN	Gluten
	SEDI	Sedi
	STARCH	Starch
	OILASIS	Oil
	OIL	Oil
	OILAT%	Oil%1%F
	CRUDE FIBER	Crude fiber
	ACID	Acid value
	SILICA	Silica
TESTGEWICHT	Bulk density	
ValueText	Value as displayed in the results window (also values with < or >)	

11.2.5 Windows Share settings

Another option for data transfer is to save the data record of a measurement to Windows Share. A file with the measured values is created.



Configuration settings:

Server	IP address of the Windows server or the computer that has shared a directory, e.g. 10.13.14.15
Windows Share	Path of the share including all subdirectories. The storage directory on the server/computer, e.g. /f/data/Granolyser/measurement_2023
User name	Windows login name
Password	Windows password

The file name of the measurement data set is GLS<serial number>.<yyyyMMddhhmmss>.txt e.g. *GLS11819906.20230531124408.txt*

After the measurement file has been created, a file with the same name and the file extension “_done” is created, e.g. *GLS11819906.20230531124408.txt_done*. This signals the successful completion of the transfer. From this point onwards, the data record can be processed further on the target system.

GLS11819906.20230531124408.txt	Data record is being transferred.	Text document
↓		
GLS11819906.20230531124408.txt_done	Transfer completed.	TXT_DONE file

Format of the text file, example:

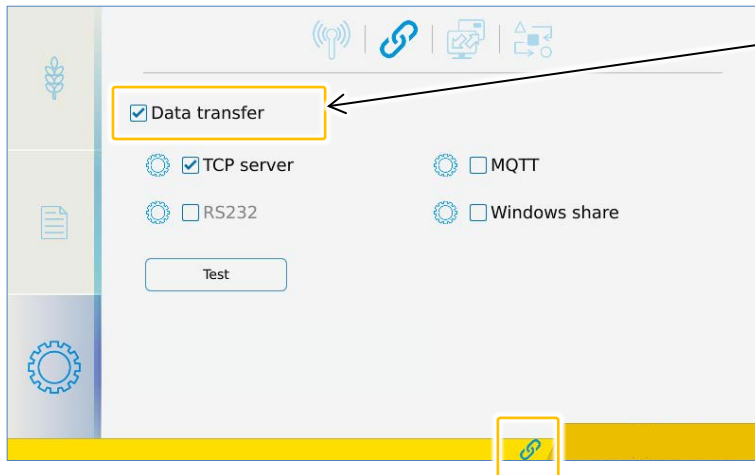
```

Serial=11811234
ID=12345
Sample=Test Sample
Product=WHEAT
ProductText=Wheat
Datetime=Wed May 31 10:13:58 2023
Customer=
Series=Default
-----
Parameter=MOISTURE
ParameterText=Moisture
ValueText=12.3
UnitText=%
-----
Parameter=PROTEIN
ParameterText=Protein
ValueText=98.7
UnitText=%
    
```

Each line begins with a keyword followed by an equal sign (=). General information on the measurement is given first, followed by the individual parameters, separated by hyphens. The following keywords are implemented.

Measurement																																									
Series	Series name of the measurement																																								
Sample	Sample ID (if one has been assigned)																																								
Product	Product as standardized keyword																																								
	<table border="1"> <thead> <tr> <th><i>Existing keyword for products</i></th> <th><i>Product text</i></th> </tr> </thead> <tbody> <tr><td>BOHNEN</td><td>Beans</td></tr> <tr><td>BUCHWEIZEN</td><td>Buckwheat</td></tr> <tr><td>DINKEL</td><td>Spelt</td></tr> <tr><td>DURUM</td><td>Durum</td></tr> <tr><td>EMMER</td><td>Emmer wheat</td></tr> <tr><td>ERBSEN</td><td>Peas</td></tr> <tr><td>GERSTE</td><td>Barley</td></tr> <tr><td>HAFER</td><td>Oats</td></tr> <tr><td>LEINSAMEN</td><td>Linseed (test)</td></tr> <tr><td>MAIS</td><td>Maize</td></tr> <tr><td>RAPS</td><td>Rape</td></tr> <tr><td>ROGGEN</td><td>Rye</td></tr> <tr><td>SOJABOHNEN</td><td>Soya beans</td></tr> <tr><td>SOJASCHROT</td><td>Soybean meal</td></tr> <tr><td>SENF</td><td>Mustard</td></tr> <tr><td>SONNENBLUMEN</td><td>Sunflowers</td></tr> <tr><td>SORGHUM</td><td>Sorghum</td></tr> <tr><td>TRITICALE</td><td>Triticale</td></tr> <tr><td>WEIZEN</td><td>Wheat</td></tr> </tbody> </table>	<i>Existing keyword for products</i>	<i>Product text</i>	BOHNEN	Beans	BUCHWEIZEN	Buckwheat	DINKEL	Spelt	DURUM	Durum	EMMER	Emmer wheat	ERBSEN	Peas	GERSTE	Barley	HAFER	Oats	LEINSAMEN	Linseed (test)	MAIS	Maize	RAPS	Rape	ROGGEN	Rye	SOJABOHNEN	Soya beans	SOJASCHROT	Soybean meal	SENF	Mustard	SONNENBLUMEN	Sunflowers	SORGHUM	Sorghum	TRITICALE	Triticale	WEIZEN	Wheat
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ParameterText	Language-specific parameter text (as displayed during the measurement)																																								
ValueText	Value as displayed in the results window (also values with < or >)																																								
UnitText	Language-specific unit (e.g. % or ml)																																								

11.2.6 Activate data transfer




☑ To activate, tap on the “Data transfer” check box after you have entered your data.

The GRANOLYSER connects to your PC/server.

 Connection active

The blue Connect icon in the status bar is displayed permanently.

 No connection

The Connect icon in the status bar flashes in red and blue.

Check the following:

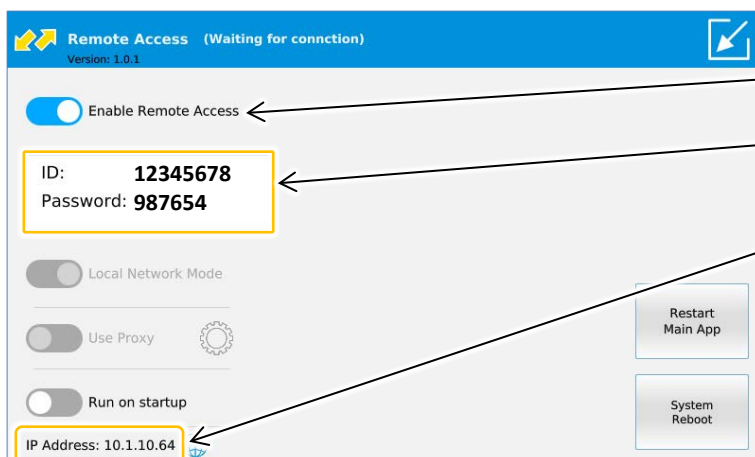
- The IP address/port number is incorrect.
- The network cable is not correctly connected.
- The Internet connection is interrupted.
- The PC/server is not switched on.

11.3 Remote access



A Pfeuffer GmbH service employee or an authorized dealer can connect to your GRANOLYSER via a PC remote control. To do this, the GRANOLYSER must be connected to the Internet/company network via a network cable at the RJ45 interface and remote access must be activated in the software.

Full screen mode



Switch **Remote Access** on/off!

ID and password for the service employee to log in

IP address of the GRANOLYSER (panel PC)

The name and status of the connection are displayed in the title bar. The icon also changes depending on the status.

Icon	Text	Meaning
	Enable Remote Access	Switch on/off remote access
	Local Network Mode	Only for local network mode NOTE! Must be selected before switching on remote access. NOTE! When accessing via the Internet, this slide switch must be OFF!
	Use Proxy	Connection via a proxy server NOTE! Must be selected and set before switching on remote access if used. settings
	Run on startup	Switch on remote access with every restart
	Restart Main App	Restart program
	System Reboot	Restart instrument
	Internet/network connection available	
	<u>No</u> internet/network connection	
	<i>Service disabled</i>	Remote access deactivated
	<i>Waiting for connection</i>	Remote access has been started and is waiting for a connection to the remote server.
	<i>Connected</i>	Remote access activated and connected
	<i>Check internet connections</i>	Check that the network cable is correctly seated or check your Internet/network connection!
	Switching to tray mode	
	Close menu. The message “Stop remote access?” is displayed for control purposes.	
		Confirm Cancel

Table 1

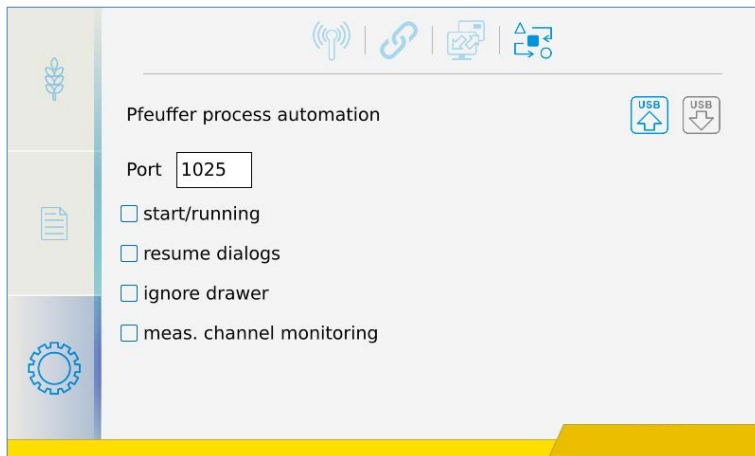
Tray mode

Icon	Meaning
	In tray mode, the menu is visible as a floating button on the top. This floating button shows the status of the remote access, see <i>Table 1</i> . Tapping the floating button opens the Remote Access program in full screen mode.
	You can easily move the floating button on the screen by tapping and holding it.



Please do not press any buttons during the remote access session (green icon). Only follow the instructions you receive from our service engineer.

11.4 Process automation



Configuration page for process automation.

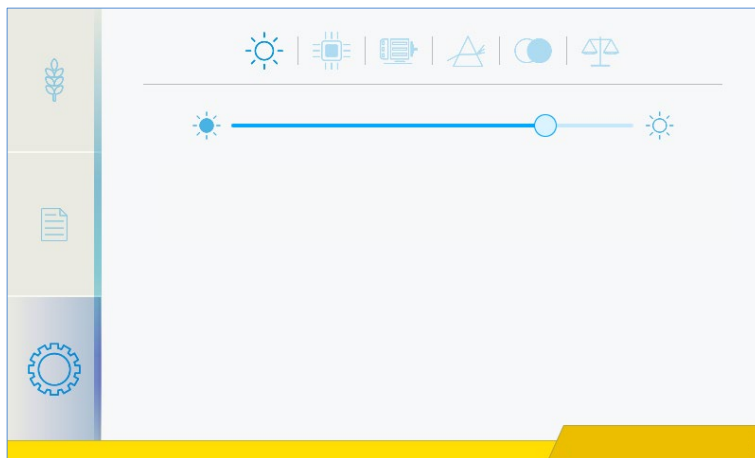
The two USB keys can be used to write the ini file for automation to a USB data memory and read it in.

For more detailed information please contact Pfeuffer GmbH.

12 Service menu

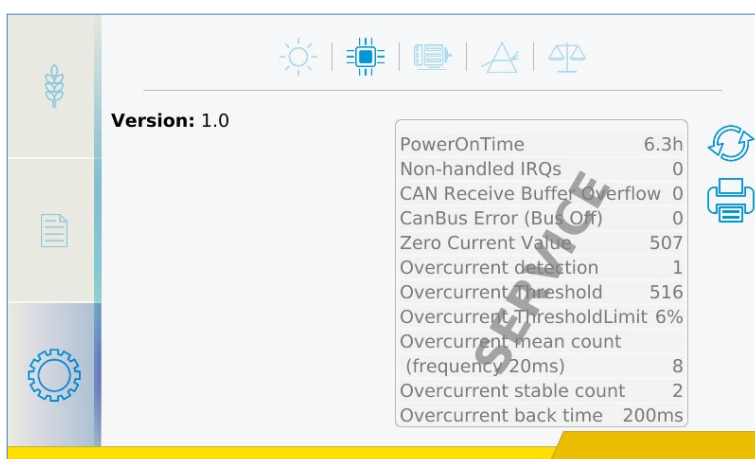


12.1 Display brightness



Adjusting the display brightness

12.2 Firmware

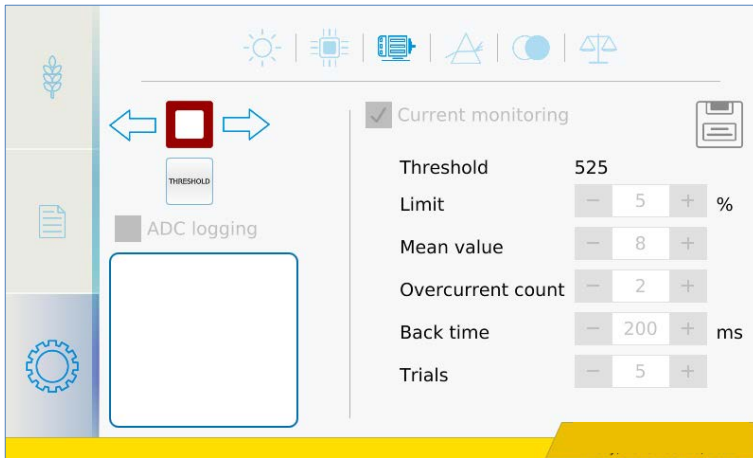


Display of information for the service department of Pfeuffer GmbH.

Update data.

Print data.

12.3 Servo motor



You can carry out a function test of the servo motor here.

ATTENTION! The measuring chamber must be empty to do this!

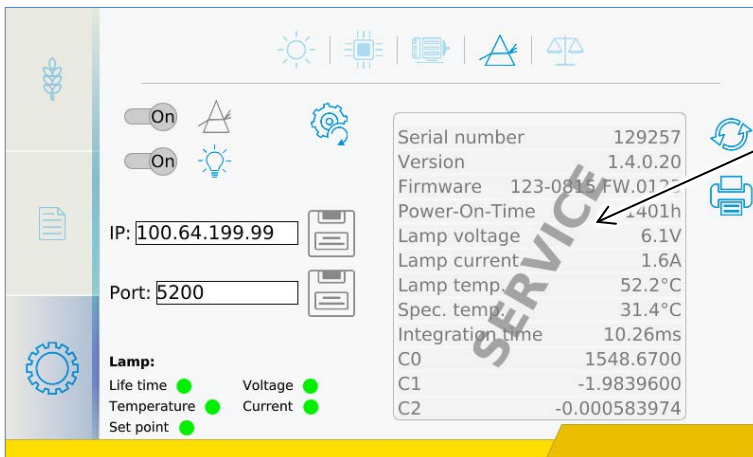
Rotate servo motor in transport direction (forwards)

Rotate servo motor in opposite direction (backwards)

Stop servo motor

Check traction of servo motor with idle and save.

12.4 Spectrometer



Display of information for the service department of Pfeuffer GmbH.

If this field is empty, there is no connection to the spectrometer.

For a "Reset", tap on the gear icon and until the icon turns blue again.

Then update the data. If the field remains empty, contact Pfeuffer GmbH.

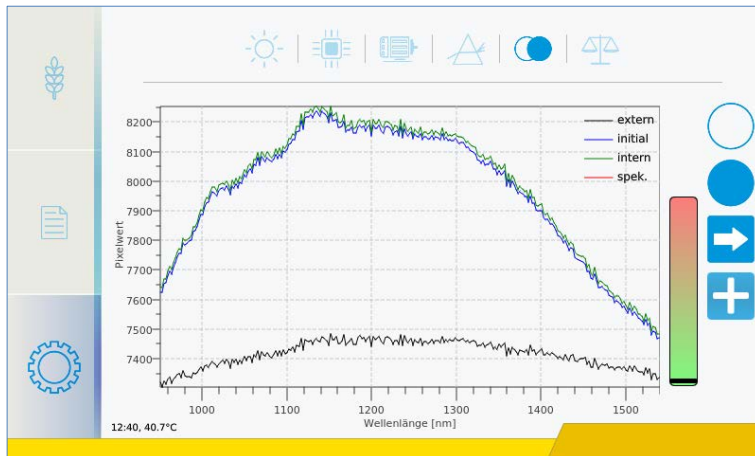
Print data.

12.5 Internal referencing



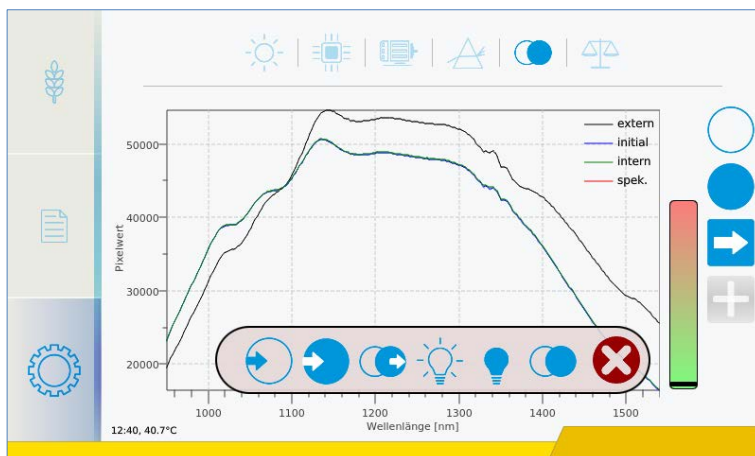
Internal referencing is performed automatically by the GRANOLYSER after each measurement.

Display of white reference



Display of black reference

Recording and display of a spectrum



Floating button: Opens a floating bar with other icons, see below:

Close floating bar.

Move in white disk.

Switch on lamp.

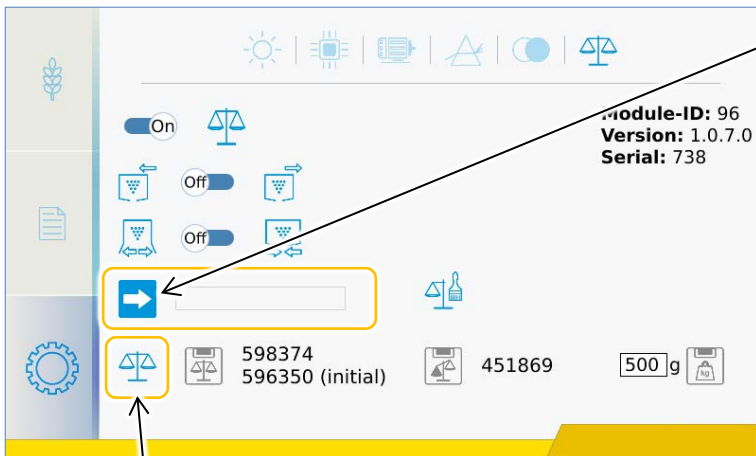
Move in black disk.

Switch off lamp.

Move out both disks.

Perform manual referencing as a function test.

12.6 Balance module (only for variant HL)



Weigh contents of measuring cell or empty measuring cell:

- Short tap: weigh (show mass)
- Touching for a longer time switches on the continuous weighing mode.
- Tapping again ends the continuous weighing mode again.

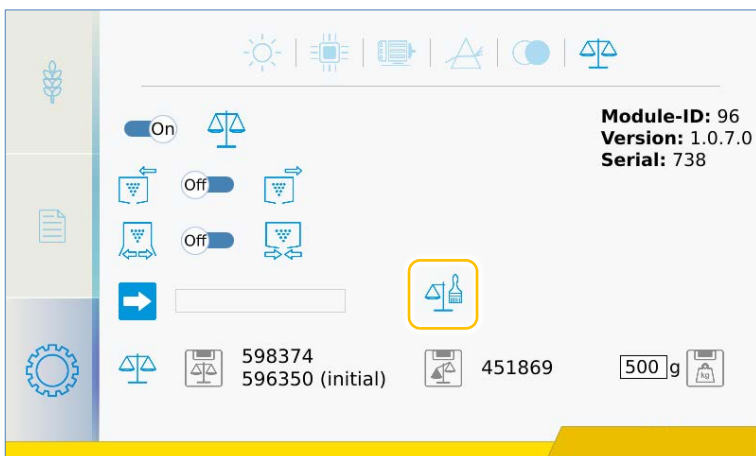
By tapping this icon, a weighing is performed. The measured value is applied as a temporary tare (temporary empty weight) for as long as this window stays open or until the tare is remeasured.

12.6.1 Tare balance

NOTICE

The measurement cell must be empty!

Before taring the balance, carefully clean the weighing module using a soft brush. In case of heavy contamination, an industrial vacuum cleaner may be used. The vacuum cleaner must be used without touching the weighing or measuring cell to avoid damage.

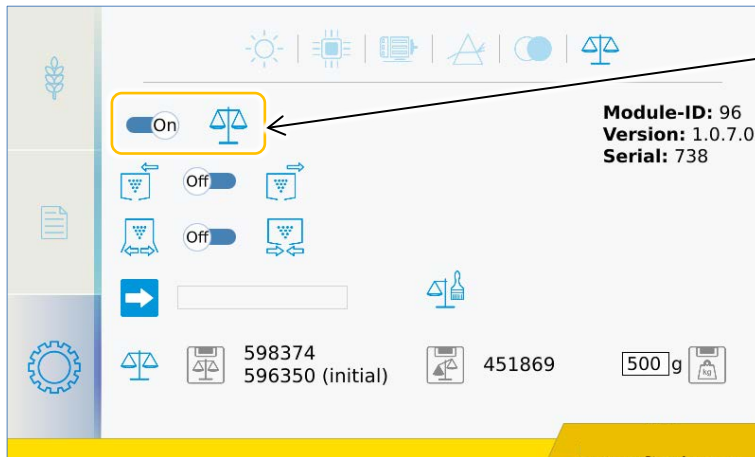


After cleaning the balance module, tap on this icon.

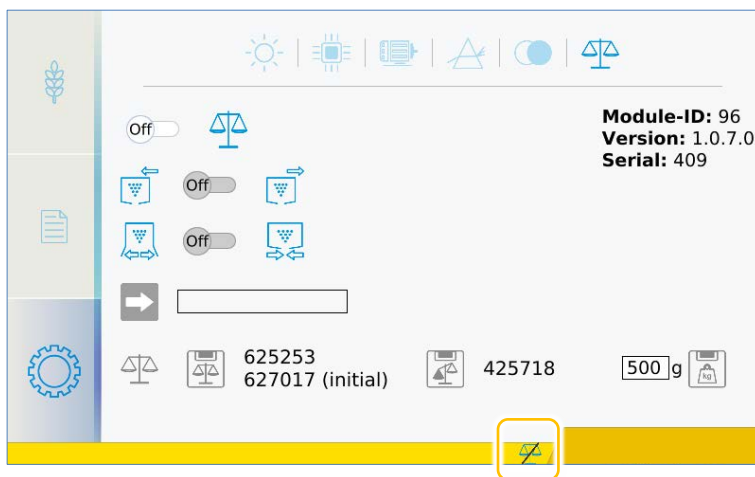
Confirm "Balance cleaned?" message.

The balance will be tared, and the value stored.

12.6.2 Switch off balance module



Activating/Deactivating the balance module (bulk density determination).



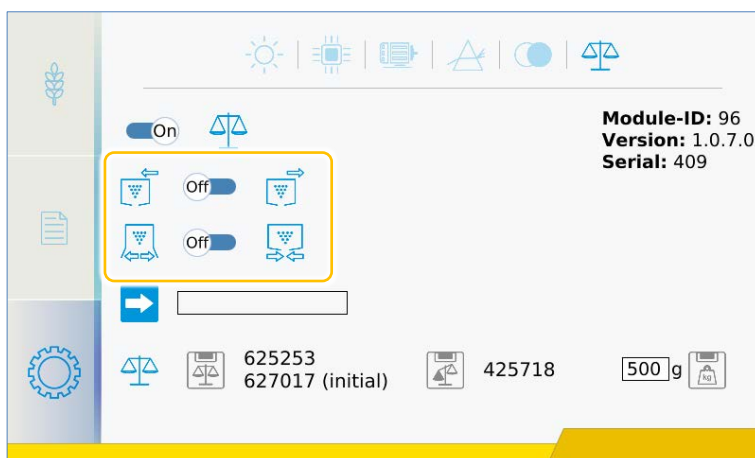
When the balance module is deactivated, all related functions are disabled, and the following icon is displayed in the yellow status bar:







12.6.3 Function test for flaps and scraper

NOTICE

Here you can perform a function test for the scraper and the flaps of the measuring cell. The measuring cell must be empty to do this!



Measuring cell:

-  Move scraper to the left (Off).
-  Move scraper to the right (On).
-  Open flap (Off).
-  Close flap (On).

13 Service file

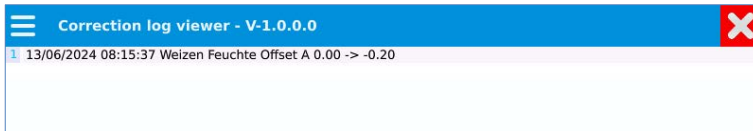


Display of information for the service department of Pfeuffer GmbH.

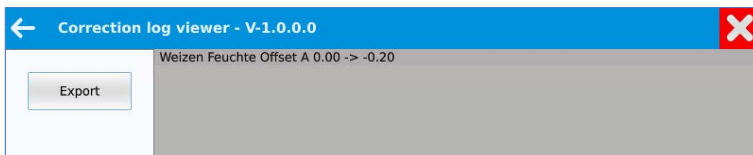
14 Correction protocol



Display of adjustments to correction factors on the GRANOLYSER.



Tap the hamburger menu and then the “Export” button to export the log file for documentation purposes to a USB storage device.



File name:
“correctionlog_1181XXXX_Date.txt”
The Xs represent the serial number of the GRANOLYSER.

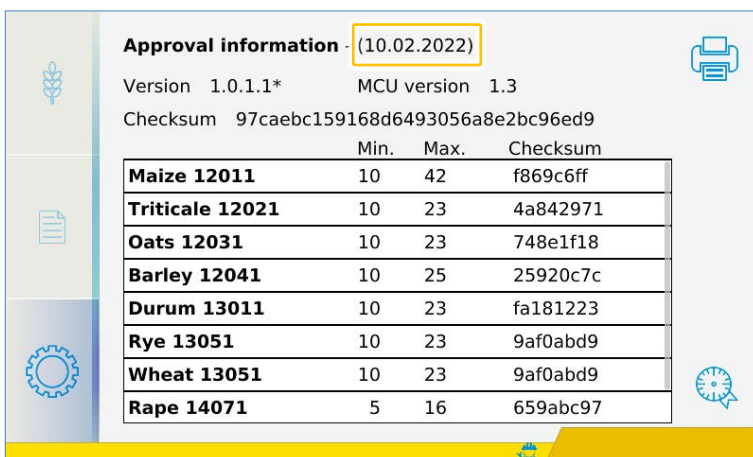
15 Preparation of a calibration

You can request separate instructions from Pfeuffer GmbH in order to create your own calibrations or to make it possible to create, improve or validate calibrations in agreement with Pfeuffer GmbH.

16 Approval information



This sub-menu contains all of the information that is needed to validate the GRANOLYSER during approval.



Date of last approval

Printout of software version and checksums.