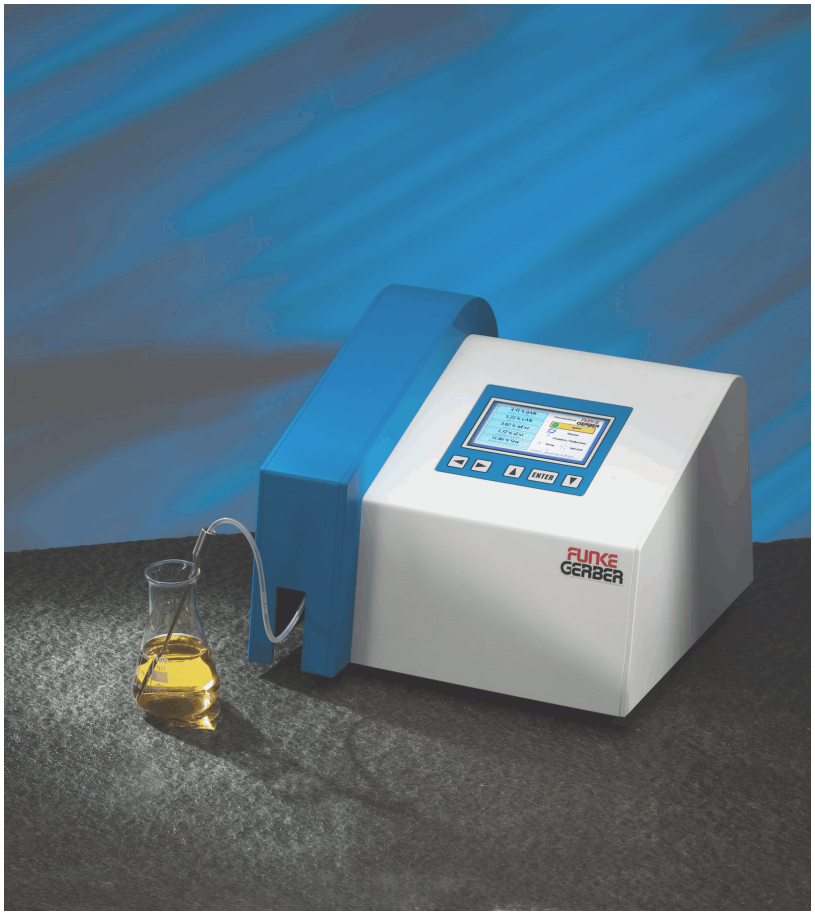
Device for analysing various ingredients of beer



Article - No : 3572

FermentoFlash

User manual and reference guide
Date : August 2010

Contents

Note:
If case of using deionized water instead of distilled water, the water should be degassed.
This can be done by following:

a) the water is degassed by using fold filter.
or
b) the water is boiled.

Installation and Initial Operation

1.	**Initial Operation / Unpacking and checking package contents**
The following parts must be available: a) FermentoFlash b) 1 mains cable c) 1l Cleaning solution d) Report printer e) Power supply cable (6 V) for report printer f) Parallel cable for connecting the printer g) Operating instructions for the FermentoFlash and for the printer h) 1 hose for the output (waste) i) 1 Erlemeyer flask, 100 ml	
2.	**Initial Operation / Installation** Place the machine on a horizontal surface**.**

3.	**Initial Operation / Connect machine to the power.**
Power connection: 230 V / 180 VA or 115 V / 180 VA The power connection is located on the back side of the device together with the on/off switch, voltage selector switch and mains fuse. **First** select the correct mains voltage using the voltage selector switch: 230 V or 115 V.	
4.	**Initial Operation / Connect mains cable**
Ensure that the machine is connected to an earthed socket which complies with safety regulations.	
5.	**Initial Operation / Connecting the Hose**
Connect the waste hose to the connector located on the back of the device and lead the end of the hose either to a waste vessel of corresponding size (approx. 5-10 l) or directly to a drain.	
6.	**Initial Operation / Connect printer**
Plug the printer cable into the 6 V connection on the rear of the machine. Plug the other end of the cable into the corresponding socket on the back of the printer. Proceed in a similar way with the parallel cable. Both cables have different types of connectors so that it is impossible to make incorrect connections.	
7.	**Initial Operation / Turning the Device on**
Turn the device on by the power switch. After a 15 minutes warm-up phase the device can be used.	

8.	Initial Operation / Turning the Printer on

Switch on the printer using the sliding switch on the left side of the printer. (See also the operating instructions for the printer).
Open the printer paper tray. Remove the thermal paper roll and thread the thermal paper into the slot provided. As soon as the paper is detected in the slot, the printer draws the paper in. Put the printer into “online mode” afterwards by pressing the left button. “Online mode” is indicated by the LED next to the button lighting green. The printer is now ready for printing. If you want to feed the paper further, put the printer into “offline mode” with the left button. Afterwards, press the right button “Feed” - this feeds the paper.

9.	Initial Operation / Operating the Device

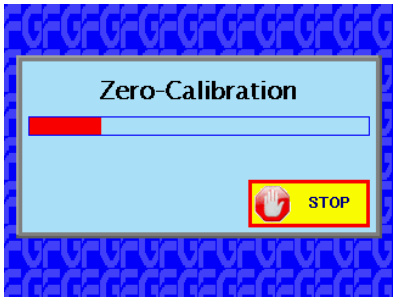
The machine has four arrow keys and an “Enter” key. Pressing the “Enter” key starts the function or action which has been selected with the arrow keys.

10.	Initial Operation / Turning the Device off / on

Before being turned off the device must be cleaned in order that no residues can remain in the device.
Zero calibration has to be performed after the warming-up. The zero calibration lasts approximately 5 minutes.

11.	Initial Operation / Zero calibration	6 minutes

After the warming time up the zero calibration can be started.
Starting zero calibration:
a) Place the sample suction tube in a sample glass filled with the distilled water. There should be at least 50 ml of distilled water present. Otherwise the device would draw in air, which would then call up the error message “No Plateau”.
b) Use the arrow keys to select the “Zero-Cali” menu item.
c) Press the “Enter” button -- zero calibration starts. Progress is shown by means of a moving bar.



After zero calibration the device is ready for operation.

Zero calibration is used to calibrate the hardware. It is **not** calibration of the substances in the beer. This is performed with the B calibration. If you would like to check the zero calibration process, please carry out a control measurement with distilled water. For this control measurement profile 0 must be used. Profile 0 cannot be calibrated and is therefore suitable for this control measurement.

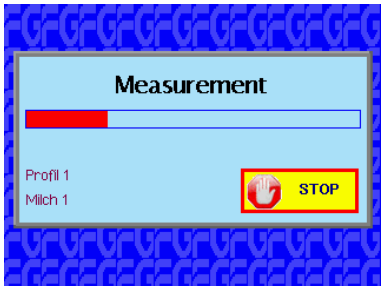
Operation

1.	Operation / Measuring	1 minute

First, select the desired product. There is a total of 18 different products available (e.g. for export beer, Pils, strong beer, malt beer etc.). (See also section 3. Operation / Product Selection / Example) Put the suction tube into a sample container filled with the degassed beer sample. There should be at least 100 ml of beer available (proportionately more for multiple analyses). Otherwise the machine will suck in air which will result in the “no plateau” error message. You will find the applicable conditions for the beer samples on page 19.
a) Navigate to the “Start Measurement” menu point using the arrow keys.
b) Press the “Enter” key - the analysis starts.
Initially, 10 ml of the beer sample are sucked into the machine.
The following four steps are performed for every analysis:
1) Suck in the sample
2) Warming up the sample
3) Fine tempering
4) Measuring
The respective analysis phases are displayed. An analysis takes approx. 1 minute (depending on configuration).

The progress of the measurement is shown by a moving bar. One measurement lasts approximately 1 minute (depending on the setting).

When the analysis is finished, the result is both displayed as well as printed out on the report printer.



2. Operation / Rinsing — Approx. 5 seconds

Place a suitable canister with approx. 100 ml of distilled water in front of the machine and put the suction tube into this canister.

a) Select the “Rinsing” menu point using the ”▲” or “▼” arrow keys.
b) Press the “Enter” key - the machine rinses.

A specified quantity of water is pumped through the analysis cells for the rinsing. Rinsing can be repeated as often as you like.

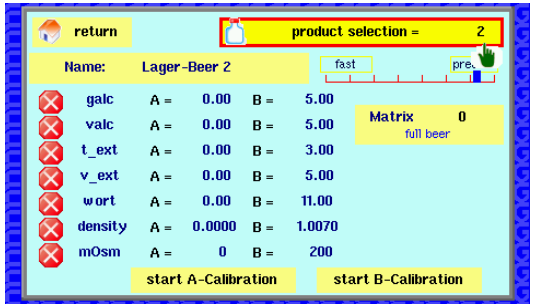
3. Operation / Product Selection / Example

It is possible to calibrate and store 18 different product profiles. The following is an example of a product selection:

Select product 3:
a) Use the arrow keys to select “Products/Calibration”.
b) Press the “Enter” button . - -

The following image appears:

c) Use the arrow buttons to select “Product Selection”.
d) Press the Enter button.
e) Use the arrow buttons to select the desired number. In this case the number “3".



4. Operation / Cleaning

4. Operation/cleaning — approx. 7 minutes

For this approximately 50 ml of cleaning agent solution is required. Cleaning takes around 7 minutes. The cleaning agent that we recommend is **P3-topax 66** in a dilution of 2% (2% cleaning agent, 98% Water).

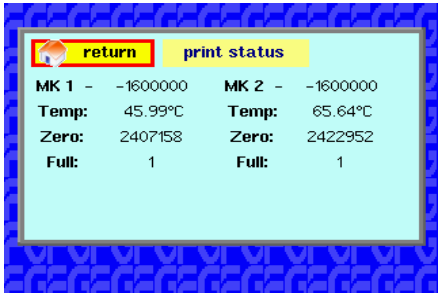
Cleaning procedure:
a) Use the arrow keys to select “Measure”.
b) Press the “Enter” button . - - The cleaning starts. Please ignore the “measuring values” because it is insignificant. Please repeat the cleaning approx. 3 times. After the cleaning the device should be rinsed 3-4 times.

5. Operation / Setup

5.1 **Return:** After the Enter button has been pressed the display returns to the main menu.

5.2 **System Status:** After the Enter button has been pressed, the following image appears:

The system status can be printed out if necessary for error diagnosis.

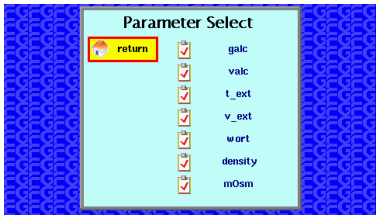


5.3 **Intensive Cleaning** — Approx. 1 hour

Performing Intensive Cleaning:
a) Place the sample suction hose in a sample vessel filled with approximately 200 ml of intensive cleaning agent. The intensive cleaning agent that we recommend is “P3-topax 66" made by the firm “ECOLAB” in a dilution of 1:10 (9 parts water, 1 part P3-topax 66)
b) Also place the waste water hose in this sample vessel. This creates a closed circuit.
c) Navigate to ”Intensive Cleaning”
d) Start the process with the “Enter” button -- intensive cleaning begins. Intensive cleaning is continued until you stop it by pressing the Enter button or an arrow button. After intensive cleaning the device has to be carefully rinsed, i.e. start “Rinsing” (see Operation / Rinsing) five times. We recommend that intensive cleaning should be carried out once a month.

5.4 **Configure Parameters:** After the Enter button has been pressed, the following image appears:

From this list you can select the relevant parameters. The selected parameters are shown by a tick, those that are not selected by an X.
Selected parameters are printed out and shown on the display, while those that are not selected are disabled.



5.5 **English:** Language selection: the desired language can be selected (“Deutsch” or “English”).

5.6	**Adjust Pump:** You can adjust the sample pump in such a way that the sample quantity displayed is the same as the actual sample volume. This is necessary because the sample quantity can vary according to how the hose pump is used and may therefore have to be adjusted.
5.7	**Measurements per Sample:** You can set the number of measurements from 1 up to 9. Please ensure that in the case of very many repeat measurements there is enough sample volume present.
5.8	**Date:** The date can be set here.
5.9	**Time:** The time can be set here.

Overview of the maintenance work arising

Description	**Frequency**
Rinse with distilled water	1. Several times daily, especially before long breaks between analyses. 2. After analyses of liquids with strong sugar content.
Zero calibration	1. Daily, before starting analyses 2. Before a calibration
Cleaning	1. Daily, after finishing the analyses 2. After analysis of liquids with strong sugar content
Intensive cleaning	Monthly, approx. 1 hour
Pump head replacement	Annually, depending on the number of analyses

Calibration
The FermentoFlash has been precalibrated at the factory (fundamental calibration) and is delivered with standard settings. For operation, the calibration for the beer to be analysed must be checked and corrected (calibration) if there are strong deviations in the analysis values.
The FermentoFlash stores a total of 18 different calibration records for different types of products. Thus, it is possible (after corresponding calibration) to switch between different products without recalibration - e.g. from Pils to strong beer and back.

The calibration consists of two calibrations (two point calibration) while only one calibration is necessary for most types of beer. **A two point calibration is only necessary for non-typical types of beers** with very low alcohol content, e.g. alcohol-free beer, malt beer, shandy etc., or for types of beer with very high alcohol content, e.g. strong beer.
In the case of a two point calibration, the A-calibration is performed with a beer having low substance content in all parameters (A-Beer) and the B calibration is carried out with a high substance content reference beer (B-beer). The A-beer is obtained from the B-beer by dilution (e.g. 20% distilled water, 80% reference beer) It is important that this dilution is made using an accurate scale and that it is well-mixed in order to minimise dilution errors.
The machine places certain requirements on the respective reference beer which consist of this beer showing similarity in the basic ingredients or shows a similar matrix to the beer to be analysed. In principle, both the reference beers, A-beer and B-beer, should cover the expected measurement range.
Attention: A new calibration in a different product profile must be performed for types of beer (types of product) with severe deviations.

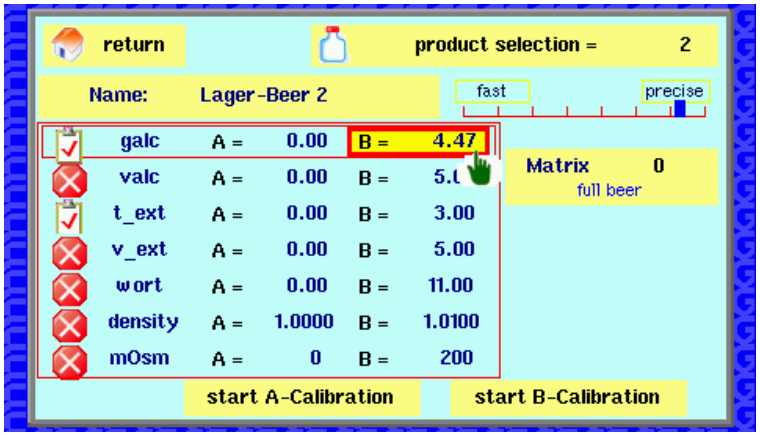
These product specific calibrations only have to be performed once. Afterwards the daily zero calibration is sufficient to compensate for drift and ageing.
As previously mentioned, a so-called "fundamental" calibration of the machine is made at the factory. This calibration features a rather high accuracy for the "Beer" matrix (Pils/Export/Lager). This calibration is often sufficient to completely meet requirements. In these cases, the machine does not have to be calibrated; the daily zero calibration with distilled water is sufficient, which, as already mentioned, is performed automatically.
In other cases, it is only necessary to calibrate a single ingredient, e.g. only alcohol. It is possible to do this with the parameter selection (see page 15, Selection of the ingredient parameters to be calibrated).

The non-alcoholic beers form an exception: please proceed by following:

1st Step
A calibration with the undiluted reference beer. Please activate only the alcoholic content and put in the refence values for alcohol (all other contents substances are deactivated; see under 3.7; Choice of the contents substance parameters to be calibrated). Now start the A calibration.

2nd Step
B calibration with the undiluted reference beer. Please activate all parameters with the exception of alcohol, and put in the reference values (extract, original worth, app. extract etc.). Now start the B calibration.

Note: The ingredient calibration is based on the zero calibration. Thus it is recommended to perform a zero calibration (see page 9) shortly before the ingredient calibration.

6.	**Operation / Products / Calibration**
6.1	Performing Calibration Use the arrow buttons to select the "products / calibration". Then press the Enter button – the following image appears:
	
6.2	**return:** After the Enter button has been pressed, the display returns to the main menu**.**

6.3	**Name:** Profile name. Any name can be entered. With the help of the arrow buttons it is possible to select and enter the respective letters. Example: The profile name to be entered is "Pils". a) Press the "Enter" button b) Keep the arrow button "▲" or "▼" pressed until the desired letter "P" appears. c) Use the "right-hand" arrow button to position the next letter. d) Keep the arrow button "▲" or "▼" pressed down until the desired letter "I" appears. Note: the capital letters are followed by the small letters. e) Continue the procedure until the entire word has been entered. f) Press the "Enter" button. This confirms and stores what has been entered.
6.4	**Matrix:** There are four different product matrices available: Beer, Strong Beer, Non Alcoholic Beer, etc. Please select the corresponding matrix.
6.5	**Product Selection:** See 3. "Operation / Product Selection / Example"
6.6	**Fast / precise:** The device can be set to "fast measurement" (35 seconds = 100 samples per hour) and "precise measurement" (60 seconds = 60 samples per hour).
6.7	**Selection of the Substance Parameters to be Calibrated** a) Use the arrow buttons "▲" or "▼" to select the desired substance (e.g. alcohol, extract, original wort, etc.). b) Press the "Enter" button -- the "√" symbol appears in place of the "X" symbol. c) Continue in the same manner until all of the desired substance parameters have been selected. Between 1 and 7 parameters can be selected for calibration.
6.8	**Entering the Reference Values (Reference Beer Values)** a) Navigate with the arrow buttons to the respective B value. b) Press the "Enter" button. c) Use the arrow buttons to set the desired value, figure for figure. d) Press the "Enter" button. This confirms and stores the setting. e) Continue in the same manner until all of the desired values have been entered.

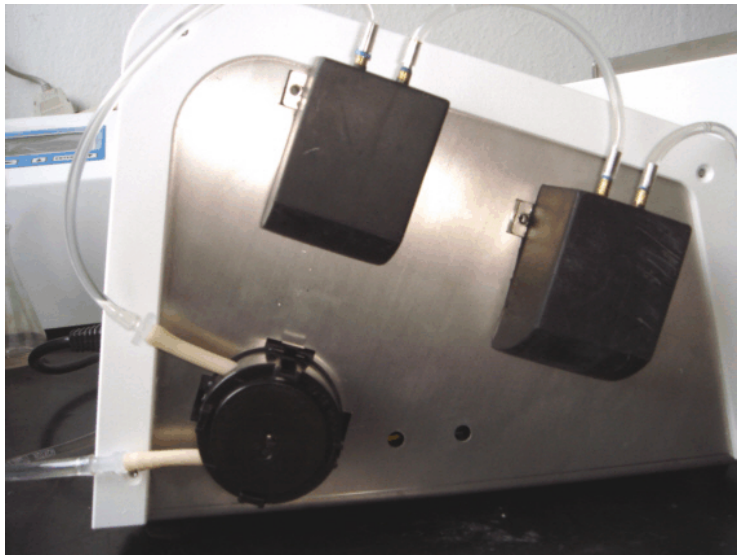
6.9	**Starting B Calibration** Place the sample suction hose in a sample vessel filled with reference beer. There must be at least 80 ml of reference beer available. a) Navigate with the help of the arrow buttons to the menu item ”Start B”. b) Press the “Enter” button -- automatic B calibration begins. After approximately 5 minutes B calibration is finished. Now it is possible to measure unknown beers of the same type with the previously selected profile, e.g. no. 3.

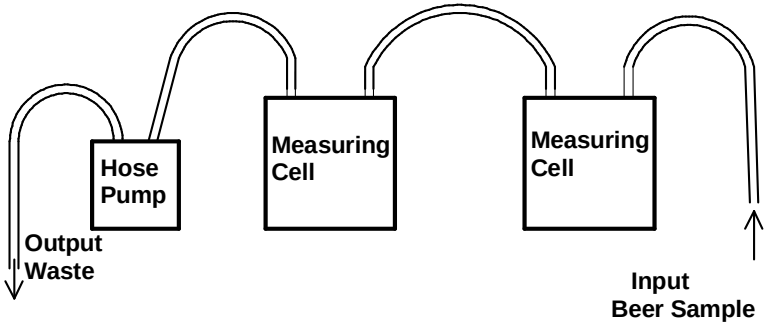
Note:
Do not perform any calibrations immediately after cleaning the device with cleaning liquid or other cleaning agents. Such agents falsify the measurement results to a significant extent. As they strongly moisten the surfaces of the measurement chambers, they have to be rinsed very thoroughly after use.

Never operate the FermentoFlash without rinsing or cleaning after finishing the measurements. The device contains two sensitive measurement chambers which are kept at a certain temperature. If beer precipitates in such a measurement chamber and is deposited on the walls, the measurement chamber will be destroyed.

How the FermentoFlash works

1. Structure of the device
As can be seen from the picture and the operating principle diagram, the device is equipped with 2 measurement cells.



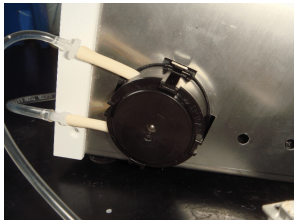


2. Description
These modules there are thermo analytical measurement cells which operates at two different measurement temperatures. Measurement cells are hermetically sealed for thermal reasons (insulation).

3. Sample suction tube
The suction tube should be inserted at least 30 mm deep into the beer sample.

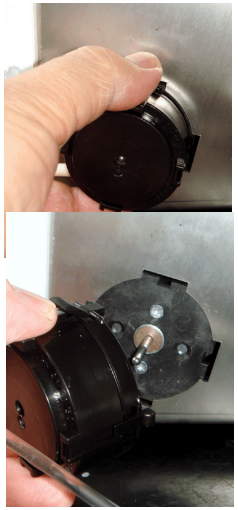
The suction tube can be removed from the beer sample after the suction process unless several analyses have been configured.

4. Pump



The pump discharge in a common line, which runs first through the measurement cells and afterwards into the waste hose.
The sample taken from a milk sample container is not pumped back there. The sample quantity taken approx. 10 ml is thus not available for further examination.
The pump head is located on the left side of the instrument. As this is a hose pump, the pump head must be replaced from time to time. This is a consumable part which can be obtained as Item No. 3530-023 A. We recommend replacing these pump head at least once per year, possibly more often depending on usage.

5. Replacing the pump head



The following steps must be taken for replacing the pump head:

5.1. Remove the pump head: Press both plastic lugs simultaneously and remove the pump head.

5.2. Undo the hose connections: Detach the hoses from the hose connectors.

5.3. Install new pump head: Move the new pump head carefully onto the motor axle. Press further until the plastic lugs engage in the holder.

5.4. Connect hoses: Trim the hoses to the correct length and push the hose ends onto the respective connectors. Please ensure that the hoses are not too long.

Requirements for the beer samples to be analysed

1. Free of interfering gas bubbles
Remove the CO_2 content using appropriate measures.
Procedure: Manual: Shaking, swirling — folded filter
Electric: Mixer — folded filter
Ultrasonic bath: approx. 3 minute. Attention: keep the bath temperature cool with ice cubes.

2. The sample must be liquid. It must not contain any solids.

3. Sample temperature: From 5℃ to 35℃. The beer samples should preferably show a standard temperature.

The FermentoFlash is a physical properties analysis machine. It does not perform any chemical analyses. Therefore, some basic chemical properties of the sample must be met for successful usage of the FermentoFlash:

It must actually be a beer. Other liquids such as, e.g. wine, spirits and similar have properties which deviate too much from beer to expect reliable results.

Entrainment

As with all measurement equipment where samples are pumped through internal measurement chambers, the FermentoFlash also has the interference effect of entrainment. This consists of the precious sample or previous rinsing water not being exactly 100 % flushed out so that small residues of this are mixed with the current sample in the measurement section and can therefore falsify the measurement result.
For beers of the same class (e.g. different export beers or different pils) the falsification by entrainment is below the dissolving limit and thus insignificant.
However, if you switch to a very different product e.g. from non alcoholic beer to strong beer or vice versa the first measurement in the new area must be discarded as it is falsified by entrainment.

Error messages / troubleshooting
The following error messages are displayed and/or printed.

Error message	Cause Resolution
Error **error on the first measuring cell**	1. There was not enough sample quantity in the bottle -- the device has sucked in air. 2. Leak in the hose. Check the hose for leaks. 3. The sample quantity is too small. Due to wear of the pump head, the specified minimum quantity can no longer be sucked in. Check sample quantity, replace pump head if necessary. 4. Fault in the one or both measuring cells. Please contact Funke-Gerber in order to replace.
Error **error on the second measuring cell**	
Error **error on both measuring cells**	
Error **measurement is not usable**	Software failure: measurement value is not reliable. Please repeat measurement.
Error **sample not measureable**	Sample too "thick". The extract content is too high. The sample must either be diluted or cannot be analysed.

Technical data:

Connection values: 230V / 115V AC (50..60 Hz) 180 W

Resolutions: **0,01 %**

Maximum values:
not larger than:
Alcohol: 25 %
Extract: 10 %
App. Extract: 10 %
Original Wort: 25 %
Osmotic pressure: unlimited, as only calculated

Sample flow rate: up to 100/h (typical 60/h)
Sample volumes: 10 ml
Interfaces: 1 x parallel, 1 x serial (RS 232/ 9600 Baud) 6 Volt power supply for thermal printer (Item No. 7151)

Dimensions: 30 x 24 x 33 cm (W x H x D)
Weight: approx. 5.kg (net)

Ordering data

3572 * FermentoFlash
3563 * Cleaner, 0,5 litre
8818* Erlemeyer flask, 100 ml
7151* Thermal printer, incl. 1 roll thermal paper
*(items marked with * are included in the 3572 package)*

Accessories (optional)
7157 Thermal paper roll for thermal printer

Spare and consumable parts
3572-023 Hose pump, complete
3572-023 A Pump head (attachment for hose pump)
7157 Thermal paper roll for thermal printer

Guarantee conditions

1. Guarantee period
The guarantee period is 12 months from the date of invoice.

2. Guarantee terms
During this period replacement parts will be exchanged at no cost.

The measuring cells will only be exchanged after they have been returned at no cost to us and under the condition that they are intact, i.e. no attempts of repair or opening have been made. After expiry of the guarantee period, these analyser units are only sold after return of the defective unopened components.

The attachment for the hose pumps (hoses) is a consumable part. Depending on the sample applications, these pump heads must be replaced from time to time (e.g. annually).

Funke-Dr.N.Gerber Labortechnik GmbH
Ringstraße 42
12105 Berlin

CE

EC declaration of conformity
according to EU-Directive Machines 06/42/EC

We hereby declare that the machine specified below complies with the basic health and safety requirements of the EC Machines Directive in its design and construction and in the configuration put on the market by us. This declaration is invalid if the machine is modified without our agreement.

Machine description:	FermentoFlash
Machine type:	Beer analyser
Machine No:.	3572-
Applicable EC Directives:	EC Machines Directive 06/42/EC EC Low Voltage Directive 73/23/EC EC Electromagnetic Compatibility Directive 89/336/EC

Berlin,
Funke-Dr.N.Gerber Labortechnik GmbH

Dipl.-Ing. K. Schäfer, CEO