

## Portable pH-meter mod. HI 98165

### portable pH meter for cheese

The HI98165 Professional Portable pH Meter is a portable meter supplied complete with an FC2423 pH electrode, specially designed for cheese analysis.

The pH measurement is essential during the entire cheese making process; pH is the most important parameter for controlling the safety and quality of the cheese.

The acidification of the milk begins with the addition of bacterial cultures and rennet. Bacteria consume lactose and form lactic acid as a result of fermentation. The lactic acid produced will decrease the pH value of the milk. When the milk reaches a certain pH value, rennet is added. The enzymes contained in the rennet accelerate the curdling and form a more solid substance. For cheese producers who dilute the rennet, the pH of the dilution water is also important; water with a pH value close to pH 7 or higher can disable the function of the rennet, causing problems with the coagulation process.



Once the curd is cut, mixed and cooked, the liquid whey needs to be purged. The pH of the whey during purging directly affects the composition and consistency of the final product. Whey with a relatively high pH contributes to raising calcium and phosphate levels, thus forming a harder curd. Usually the pH values during the purging phase can vary according to the type of cheese; for example, Swiss cheese is purged at pH values between 6.3 and 6.5, while Cheddar cheese is purged at pH values between 6.0 and 6.2.

During the salting phase, the cheese absorbs the salt from the brine and loses excess moisture. The pH of the brine must be close to the pH of the cheese, ensuring the balance of ions such as calcium and hydrogen. In case of any imbalances during the salting phase, the final product may have defects in the rind, discolouration, a weaker structure and a shorter duration.

Cheeses must have pH values within a narrow range in order to provide optimal environmental conditions for microbial and enzymatic processes that occur during the ripening phase. The bacterial cultures used in the ripening phase are responsible for particular characteristics such as holes in Swiss cheese, white mold on the rinds of Brie and the aroma of Limburger cheese. A change in the ideal pH value causes not only harmful effects to the microbial ecology, but also to the structure of the cheese. Higher pH levels result in the production of more elastic cheeses, while lower pH values can cause brittleness.

Measuring the pH in cheeses is very important. Cheeses can have a consistency ranging from solid to semi-solid and both tend to have a high fat content which will cover the sensitive surface of the glass membrane and / or obstruct the reference junction.

The FC2423 electrode supplied with the HI98165 is specifically designed for pH measurement in cheeses. The shape of the conical tip and the sturdy 5 mm diameter stainless steel body ensure easy penetration into the cheese without leaving large holes. In addition, the electrode has an open junction which resists occlusions. The FC2423 is an ideal general purpose pH electrode in cheese that connects to the HI98165 meter via a quick-DIN connector, ensuring a secure, watertight, threadless connection.

The HI98165 pH meter uses **the FC2423 pH electrode**, which offers multiple functions to improve pH measurement in cheeses. The robust stainless steel body and the conical tip allow the cheese to penetrate at various points in the production process. In addition, a built-in temperature sensor ensures temperature compensated pH measurements without the need for a separate probe.

#### Body in stainless steel

The AISI 316 stainless steel body guarantees resistance and is able to withstand concentrations of chloride that cause corrosion in other types of alloys.

### Conical glass tip

The conical tip allows penetration into solid, semisolid and emulsion samples for direct pH measurement in food products, such as cheeses.

### Built-in temperature sensor

Thanks to the automatic temperature compensation, provided by the temperature sensor inside the pH electrode, errors during calibration and measurement are reduced.

The HI98165 is a professional pH meter specific for cheeses and is equipped with the CAL Check™ function that alerts the user if problems occur during calibration.

This function is very useful as the probe is able to detect the presence of a film of fat present in the analyzed food. By comparing the previous calibration data with the current calibration data, the instrument will indicate on the display, that the probe needs to be cleaned, replaced, or that the calibration solution may have become contaminated. After calibration, the general condition of the probe will be shown on the display as a percentage from 0 to 100% in 10% increments. The state of the probe is affected by the slope and offset values, which can be found in the GLP information.

By pressing the virtual button “AutoHold” in measurement mode, the instrument will automatically lock and record a stable measurement. The “out of calibration range” message, if enabled, will alert the user when the measurement is outside the range of the calibrated pH values.

The manual recording mode allows the user to save up to 200 samples. The recorded data, together with the GLP information, can be transferred to a PC with the micro USB cable and viewed through the appropriate software. GLP information includes date, time, calibration solutions, offset and slope and can be accessed directly by pressing the GLP key.

It is possible to consult the online help at any time by pressing the HELP key.

The high contrast graphic display always ensures excellent viewing even outdoors both in sunlight and in poorly lit areas using the backlight. It is also possible to select the language choice in a simple and intuitive way.

The HI98165 pH meter is supplied with a stainless steel body pH electrode (FC2423), pH 4.01 standard solution (230 mL), pH 7.01 standard solution (230 mL), cheese residue cleaning solution (2 sachets), plastic beaker 100 mL, 1.5V AA batteries (4), PC software, micro USB cable, instruction manual with quick reference guide, quality certificate and HI720165 hard case.

### Ergonomic, robust, watertight design (IP67 protection)

#### Supplied with FC2023 food grade pH / temperature electrode

- PVDF plastic body ideal for food
- Tapered tip for easy penetration into semisolids
- Open joint that prevents occlusions
- Glass tip for low temperatures (LT) ideal for frozen products
- Built-in temperature sensor for measurements with automatic temperature compensation

#### Up to five point calibration with seven stored and five customizable standard solutions

#### CAL Check

- Alerts the user if problems occur during calibration, even when electrode cleaning is required or the standard solution may be contaminated.
- Displays the general condition of the probe, based on the offset and slope values after calibration.

## Manual registration

- Stores the measurement value by pressing a key.

## AutoHold

- Freeze stable measurement on display.

## GLP information

- GLP data including date, time, pH calibration solutions, offset and slope values
- GLP data stored, for traceability, together with the recorded data

"Calibration timeout" function to notify the user, after a defined interval, when the calibration has expired

Selectable language

Battery life up to 200 hours, with battery charge percentage displayed

Display of a help menu for the user during the use of the instrument, with a virtual keyboard that offers greater functionality

Online help at the push of a button

Backlit LCD graphic display

PC connection

- Connection to PC via micro USB cable and software

## Technical data

PH scale:	from -2.0 to 20.0 pH; from -2.00 to 20.00 pH; from -2,000 to 20,000 pH
PH resolution	0.1 pH; 0.01 pH; 0.001 pH
PH accuracy:	± 0.1; ± 0.01; ± 0.002 pH
PH calibration:	up to five points, seven standard solutions available (1.68, 4.01, 6.86, 7.01, 9.18, 10.01, 12.45) + five customizable
Check pH calibration	Yup
PH input impedance:	10 <sup>12</sup> Ohms
MV scale:	± 2000 mV
MV resolution:	0.1 mV
MV accuracy:	± 0.2 mV
Temperature scale:	-20.0 to 120.0 ° C
Resolution Temperature:	0.1 ° C
Temperature Accuracy:	± 0.4 ° C (± 0.8 ° F) (excluding probe error)
Temperature Compensation:	manual or automatic from -20.0 to 120.0 ° C

PH electrode:	FC2023 pH electrode with PVDF body for food use, with internal temperature sensor, quick-DIN connector and 1 m cable
Registration Type	200 samples (100 for pH and 100 for mV)
Registration Memory	200 samples (100 pH and 100 mV range)
Connection	optically isolated USB input, with optional software and micro USB cable
Automatic shutdown:	user selectable
Battery Type / Duration:	1.5V AA batteries (4) / approx.200 hours of continuous use without backlight (50 hours with backlight)
GLP:	Yup
IP protection:	IP67
Terms of use:	from 0 to 50 ° C; RH max 100% (IP67)
Dimensions:	185 x 93 x 35.2 mm
Weight:	400 g

Code	Description
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