

# Full manual Sentron pH probe

Usage, cleaning and storage  
instructions for Sentron  
ISFET pH probes



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# GENERAL

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# Warning

- Do not open the probe as this may cause damage and will void the guarantee.
- All information provided in this manual is applicable at the moment of publication. Sentron holds the right to change components, functions and procedures as required.
- The Sentron wireless probes allow you to perform accurate pH measurements. We advise you to read the 'Quick Start' guide before use and keep this guide for future reference. We also advise you to read this manual to learn about the probe's maintenance and cleaning instructions.
- The Sentron pH probes are designed for pH measurements. Do not use the probes for other applications as this may cause damage.

# Notes before use

- The pH-sensitive element in a Sentron pH probe is the ISFET semi-conductor sensor. This sensing element needs to be driven by an electronic circuit that is built into the Sentron probe transmitter. Sentron probes are robust and built to last. The pH probe nonetheless requires periodic maintenance. This is described in this manual under 'Clean', 'Revitalize' and 'Store'.
- Do not use the probe outside the specified temperature range as this might result in probe failure or irreversible damage to the probe.
- Samples must be aqueous solutions or semi-solids and compatible with the probe's materials.
- If information is required regarding the chemical resistance of the probe, please contact your local dealer or Sentron.

# Operating tips

- Clean your probe regularly during use. For cleaning instructions see this manual under 'Clean'.
- Ensure samples or buffers are well mixed to obtain correct measurement values. This may be done by a magnetic stirrer or by stirring with the probe for at least 5 seconds. Stop stirring and record results when the read-out is stable.
- Make sure the medium is in contact with both the ISFET sensor and the diaphragm simultaneously.
- Make sure that the medium, which is being measured, is providing a "hydrogen ion bridge" between the ISFET and the diaphragm. Without a proper fluid (or semi-solid connection between these both, no (stable) measurement can be performed. A good rule of thumb is to have at least the first 10 mm from the probe tip to be immersed during measurements and calibrations. See also this manual under 'Probe specific information'.
- Buffer-handling: pH 7.00 buffers (phosphate-based) and pH 4.00 buffers (biphtalate based) are less susceptible to carbon dioxide contamination than pH 10.00 buffers (borax or carbonate based). When slope errors occur, it usually indicates a failing probe or a contaminated buffer. If slope errors occur when using a pH 10.00 buffer, try calibrating with pH 7.00 and pH 4.00 buffer. If a good slope is achieved, try a new bottle of pH 10.00 buffer. Buffers in a convenient twin neck bottle are available from Sentron or our dealers.
- Tris buffers and samples containing proteins form impermeable layers on surfaces and require special attention when being used. These types of samples should be measured quickly, and the probe should be rinsed thoroughly with demineralized water between samples. Avoid prolonged immersion in samples containing Tris or proteins. When testing is complete, first clean the probe with tap water and a laboratory detergent and subsequently rinse with demineralized water.
- When testing in direct sunlight or on a bright reflecting surface, please use brown, opaque or shielded sample containers. Very bright light might influence the performance of the sensor.

- Avoid prolonged immersion in samples expected to have pH values at the ends of the specified pH range. When prolonged exposure to very high or very low pH values does take place, rinse the probe with neutralizing agents and distilled water when the measurement is completed.
- Proper maintenance of a probe is important. If the probe is not cleaned properly and regularly, probe malfunction can occur due to a polluted diaphragm or ISFET. The cause for this pollution is usually the sample. Pollution on/or blockage of the sensor and reference electrode diaphragm surface is the most likely cause for probe failure. Revitalize your probe if any of the following events occur: low slope, drift, instability of the reading, slow calibration, probe will not calibrate, pH value doesn't change as expected when changing samples.
- Probe wear is another cause for probe failure. Probe wear is often, but not necessarily, preceded by a period of declining calibration slope values. Probe wear is dependent on how the probe is used and stored. Worn probes need to be replaced.

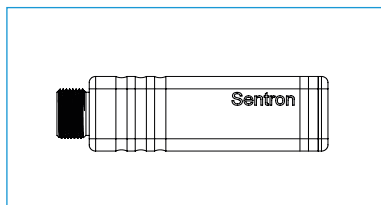
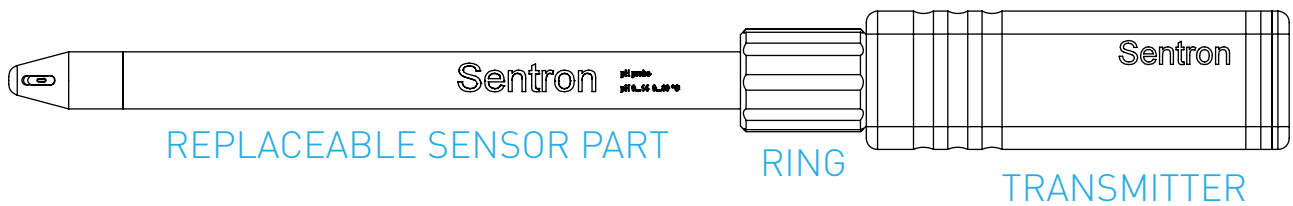


# PREPARE

Sentron

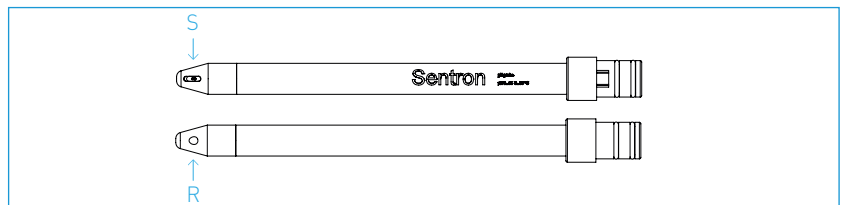


# Unpack the box



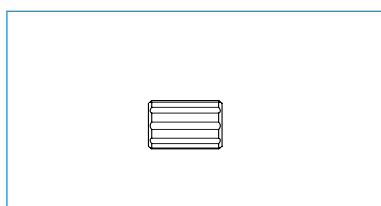
## Transmitter

- The transmitter includes the battery, the memory for the measurement values, and the recognition of the replaceable sensor part.



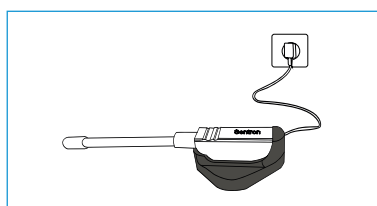
## Replaceable sensor part

- The replaceable sensor part includes the sensor and reference electrode. It is covered with a protective cap.
- The sensor is the metallic spot at the tip of the probe (S). The diaphragm of the gel-filled reference electrode is the white spot in the tip (R).
- NB in this manual we show pictures of the ConeFET pH probe. The other variants of the Sentron pH probes work in the same manner.



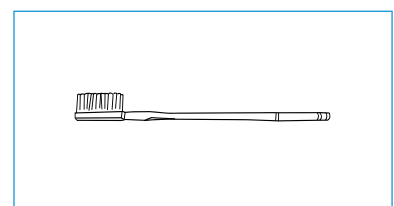
## Ring

- Through the ring the two parts of the probe are screwed together.



## Charger with USB cable








- The charger with USB cable charges the probe wirelessly.



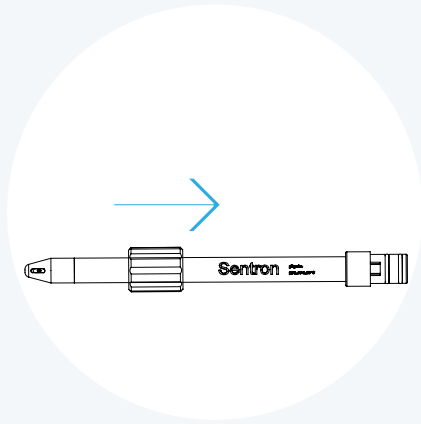
## Toothbrush

- The toothbrush is for cleaning purposes.

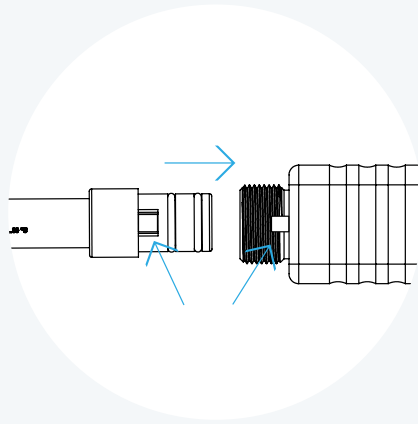
# Gather the following components

Item	Usage
Mobile device	 <p>Any smartphone or tablet that supports BLE (Bluetooth Low Energy), which is Bluetooth 5.0 or higher, can be used for the Sentron application for pH measurements: Minimum iOS version 13 Minimum Android version 5.0</p>
Calibration buffers	 <p>The Sentron pH calibration buffers are recommended, as these are specifically selected for the ISFET sensor use. Eventually DIN pH buffers, NIST pH buffers or JIS pH buffers can be used.</p>
Demineralized water	 <p>Demineralized water (= deionized water) is required for flushing the probe between buffers and samples. Distilled water is also appropriate.</p>
Labware	 <p>Beakers, tissues, and a siphon with demineralized water for flushing the probe tip are handy and recommended labware, especially for the calibration of the pH probes.</p>
USB charger adapter	 <p>The USB charger adapter connects the USB cable of the charger to the socket or 12V plug in, for example, the car.</p>
Internet	 <p>Access to internet (Wi-Fi or mobile internet) is required to download the Sentron app. After installation the app works offline unless you want to export your data to the cloud.</p>
Bluetooth	 <p>Bluetooth is required to connect the probe. After starting an interval, the connection can be disconnected. The probe will store the data and download them to the app as soon as the connection restored.</p>

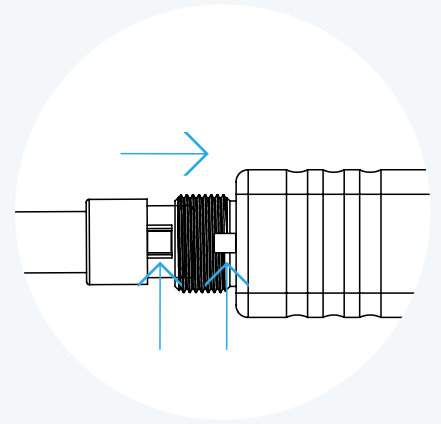
# Plug and screw the probe parts together



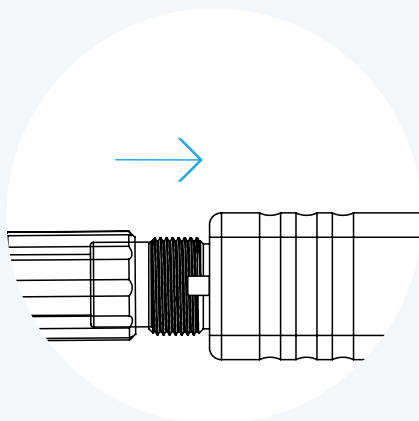
Step 1



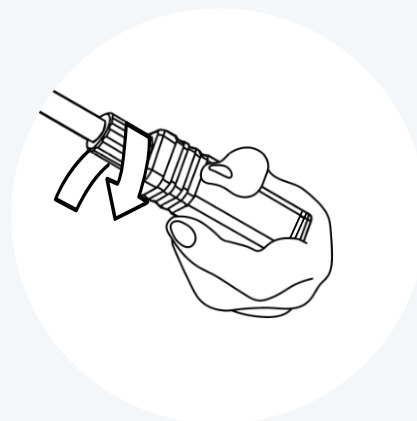
Step 2



Step 3



Step 4



Step 5

Note that the sensor part and the transmitter have a mark that helps you to complete your probe successfully.

## Step 1

- Put the ring on the replaceable sensor part.

## Step 2

- Align the replaceable sensor part and transmitter.

## Step 3 and step 4

- Plug the replaceable sensor part completely into the transmitter, as far as possible. Both black O-rings at the sensor part should fit nicely into the transmitter.

## Step 5

- Screw the ring to fasten it.

After attaching the replaceable sensor part, do not detach it during the complete experiment (including calibration).

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# Remove residues

When any residues are left at the sensor or diaphragm of the probe, these must be removed prior to use. Follow the instructions as described in this manual under 'Clean' and 'Store'.

## Download the app

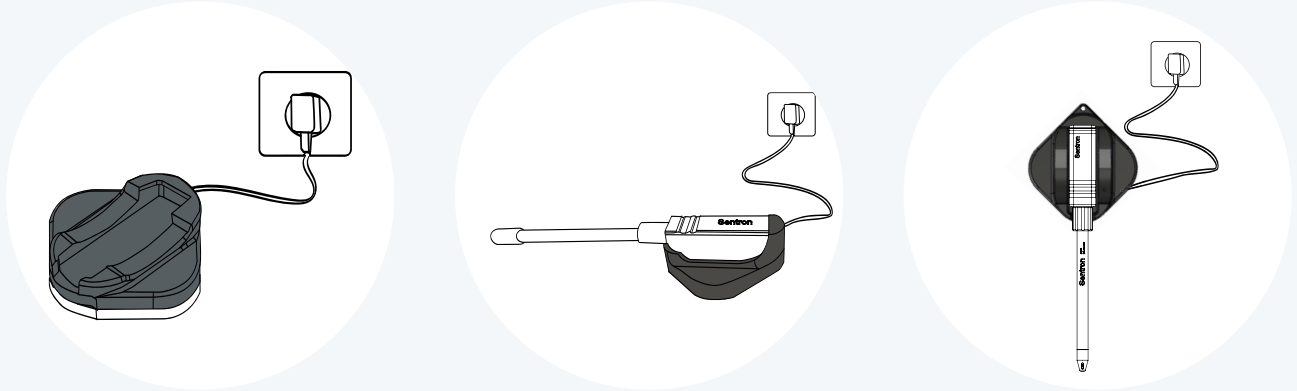


- Take the mobile device and enable the internet.
- Search for the Sentron app in the Store (red icon with white Sentron).
- Install and open the Sentron app on your mobile device.
- Provide 'access to the location of this device'. We recommend choosing the option 'while using the app' for Android and Harmony OS devices and 'always' for iOS devices.
- Make sure that the device settings enable automatic download of new releases. Otherwise check frequently for new releases yourself. We are improving the Sentron app on regular basis.



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# Charge the probe



- Place the probe onto the adapter with the Sentron logo facing up. The red tiny light at the charger itself will turn blue when charging.
- It can take up to 30 seconds before the LED of the probe indicates the status. It shows calm red pulsating light when charging up to 80%. Above 80% it turns into a calm green pulsating light.
- To start, see this manual under 'Get Started'.



# GET STARTED

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# Activate your probe

The LED of the probe is off when the probe is not yet registered and in standby mode.

You must activate your probe to perform measurements:

- Shortly tap the on/off sign on the head side of the probe.
- The LED will be blue and is searching for connection to the app.

NB The on/off sign on the head side of the probe is also used for a reset of the probe. In case you do not want to reset the probe, take off your finger immediately when the LED turns purple.

## First use of the probe?

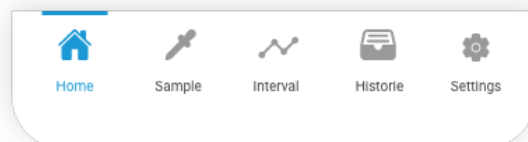
- Open the app. The app will directly search for available probes. In case no probes have been connected in a previous session, the app will ask you to search for probes.
- Read the text in the app 'Prepare for connection' and select the box 'Search for probes'. Take care that the probe is activated (see above).
- In the app your probe is listed at the 'Available probes'. Select your probe in the app and the LED will be green. The initial name of the probe is Sentron xxxxx (this is the serial number of transmitter).
- When the probe is new to the app, it requires a calibration. The app will guide you through the calibration steps. Save your calibration data and the app will go back to HOME.
- The app shows the probes in the list 'Connected devices'. The app shows the HOME menu at which the status is provided per probe.

## Repeated use of the probe?

- Open the app. The app will directly search for available probes. In case you have a probe that was connected in a previous session, the app will recognize this probe.
- When the probe is in standby mode, it is listed at 'Disconnected devices' in the app. Activate your probe (see above).
- When the probe is active, it is automatically connected to the app. The probe is transferred to the list of 'Connected devices'. In case the probe is not automatically connected to the app, you need to select 'Reconnect' in the list of 'Disconnected devices' in the app.
- Once connected, the LED of the probe is green. The app shows the HOME menu at which the status is provided per probe.

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# Connected devices



In the HOME menu, the overview of all connected probes is shown. At the bottom the other menu items are shown. Each of these menus are explained separately in this manual.

Home	start screen with list of (dis)connected probes
Sample	for single measurements
Interval	for continuous measurements
History	to resume your data
Settings	to select advanced mode (amongst others the mV value is provided per probe additional to the pH value)



# Start your measurements

Now you can start your pH measurements as described in this manual under 'Use'.

For more information on the connected probes, see the next paragraphs.

## Live parameter values

The values of the pH and temperature are the current values that refresh continuously.

The LED of the probe will flash green at each measurement. In between the measurement points the LED is off.

How to save any datapoints is described in this manual under 'Use'.

## Battery status of probes

In the app the battery status is shown as percentage per probe. When the battery of the probe falls below a critical value during use, the LED will show a red flash every 10 seconds (in between the datapoints) to warn you.

## Calibration

### Calibration status of probes

Last calibration:  
(date and time)

The last pH calibration is still valid. The probe is ready for use.

- The date and time stamp of the last calibration are indicated.
- Depending on the number of calibration points, the number of decimals is adapted for the pH value.
- The calibration is stored in the app and is coupled to the serial number of the sensor part of the probe. This means that even when the sensor part is coupled to another transmitter, the calibration will remain.

Calibration required:  
pH



The probe needs calibration because:

- There has not been any pH calibration, or
- The pH calibration is not valid anymore.

See this manual under 'Calibration'.

See for more information on the calibration in this manual under 'Device settings'.

## pH calibration

Select the probe in the app, scroll down to the 'Calibration information'. Select 'New pH calibration' and follow the instructions.

During measurements both the sensor and the reference diaphragm must be in the buffer. When the calibration is successful, the remark at the probe in the app will change into 'Last calibration: (date and time)'.

The pH calibration can be done with a single point (1 buffer) or multipoint (2, 3 or 5 buffers). The more points are taken for calibration, the more accurate the pH reading is. The more difference in pH of the samples, the more points for calibration are recommended.

1-point calibration	1 decimal accuracy	Recommended for quick pH measurements spanning 1 – 2 pH values.
2-point calibration	2 decimal accuracy	Recommended for accurate pH measurements spanning < 3 pH values and quick pH measurements spanning 3 – 6 pH values.
3-point calibration	2 decimal accuracy	Recommended for accurate pH measurements spanning 3 – 6 pH values and quick pH measurements spanning > 6 pH values.
5-point calibration	3 decimal accuracy	Recommended for accurate pH measurements spanning > 6 pH values.

When the calibration is successful, the slope between two points of the calibration is provided as percentage. Select the % to see which slope it refers to. Normal slope percentages should be between 105% and 95%. Slopes outside these values indicate that the measured pH may be less accurate. In that situation it is strongly advised to revitalize the probe or to replace the replaceable sensor part of the probe.

**NB** Per default, 24 hours after the last calibration the number of decimals is reduced to maximum 1 decimal. Perform a new multi-point calibration to resume the 2 or 3 decimal accuracy. This number of 24 hours can be adapted in the Settings.

The Sentron probes are Automatic Temperature Compensated (ATC) in the calibration procedure. The temperature sensor is close to the ISFET sensor in the tip of the probe (not visible). For the pH calibration the probe sensor temperature is taken for the calibration buffers temperature dependency.



## Temperature calibration

The temperature calibration in principle is not required.

However, when your procedure does require this, go to the menu Settings and activate 'Advanced mode'. Go back to HOME and select the probe. Scroll down to the 'Calibration information'. Select 'New temperature calibration' and follow the app.

By the temperature calibration the offset is calculated between the manually given temperature and the temperature reading of the probe itself. This offset temperature is mentioned in the 'Calibration information' of the probe.

## Add, disconnect or delete probes

Add probe 	Disconnect or delete probe 
<p>If you want to connect more probes, you must add these here. Select '+Add device' and follow the instructions as described in this manual under 'First use of the probe?'.  Up to 6 probes can be connected.</p>	<p>Swipe the probe to the left to disconnect or to delete that specific probe from the list of connected devices. The LED at the probe will be blue.  See also in this manual under 'Device settings'.</p>

## Standby mode of probes

When the probe is not in use and no interval measurement is running, the probe will go into standby mode. The LED will turn off.

- To reactivate your probe, see the description in this manual under 'Activate your probe'.
- To reset your probe, see the description in this manual under 'Reset your probe'.

## Reset your probe

To reset the probe, press the on/off sign on the head side of the probe for a few seconds until the purple LED turns off. The LED will either be green or blue:

- In case the probe is still connected to the app, the LED is green and ready to use.
- In case the app lost connection to the probe, the LED is blue. It must be reconnected via +Add device.

## Restart your probe

For a full restart of the probe, hold the on/off sign on the head side of the probe for a few seconds more. The LED will turn white. Hold it until the white LED turns off. All connection information is deleted. Any calibration information remains.

# Device settings

To see the details per probe, select the probe in the app. The current values of the pH and temperature are shown in a running graph. Select or deselect the parameter that you want to visualize in the graph by selecting the parameter just above the graph. How to save any datapoints is described in this manual under 'Use'.

## Calibration information

- **New pH calibration**  
The time stamp of the last calibration is indicated. Select the arrow to perform a new calibration.
- **New temperature calibration**  
The temperature calibration in principle is not required. See in this manual under 'Calibration'. In case the temperature calibration has been performed, the temperature offset is provided here.

## Probe settings

- **Serial number** of the replaceable sensor part.
- **pH drift per 24 hours**  
This is to compensate for eventual pH drift for a known application. E.g. when you fill in 3, the pH value will be increased with  $(3 / 24 = ) 0,125$  pH per hour.

## Transmitter settings

- **Serial number** of the transmitter
- **Name**  
The initial name of the probe is Sentron xxxxx (serial number of transmitter). To alter the name, select the name or the cross and type your own preferred name.

## Firmware update

- This is to check whether your firmware is up to date.

## Disconnect / Delete

- **Disconnect**  
The probe will still be recognized in the next session, but not automatically connected again. The calibration information and the history will remain. To use the probe the next time, follow the description in this manual under 'Repeated use of the probe'.  
The LED at the probe will be blue.
- **Delete**  
The probe will not be recognized in the next session. The calibration information and the history will be lost. To use the probe the next time, follow the description in this manual under 'First use of the probe?'.  
The LED at the probe will be blue.

# More probes and 1 mobile device

Up to 6 probes can be connected by the Sentron app to one mobile device.

# More mobile devices and 1 probe

Each probe can be connected to one mobile device at the same time. When you want to use mobile device B instead of mobile device A from now on, you have two options.

Starting point: mobile device A has connection with the probe. The LED is green (or off).

Mobile device B cannot find the probe; it keeps 'searching'.

1. Select the app and move it to the background of mobile device A.

The connection between mobile device A and the probe will be lost.

The LED is blue.

NB this disconnection will not happen during an interval measurement with use of thresholds.

2. Select the probe in the app at mobile device A.

Swipe the probe to the left and select the button for disconnection.

The connection between mobile device A and the probe will be lost.

The LED is blue.

Mobile device B will find the probe now. See for connection the description in this manual under 'Add or delete probes' (+Add device).

# Probe specific information

In this manual we show pictures of the ConeFET pH probe. The other variants of the Sentron pH probes work in the same manner. However, some variants need special attention. See this manual under 'Specification' for the specifications per probe.

## CupFET

Just a droplet of 20 microliter is required as sample. Realize that the pH of the sample (as well as of the pH buffers) is prone to decrease because of the high ratio surface-volume in the droplet.

Good practice is:

- Calibrate the probe using buffer in a large volume of buffer. E.g. several milliliters in a beaker.
- Use fresh sample.
- The droplet should be placed within the "cup" shaped tip of the probe. It should cover the sensor completely and at least part of the white diaphragm of the reference.
- Take the datapoints as soon as possible after applying the droplet to the probe.

## MicroFET

The diaphragm of the reference electrode in the MicroFET is ceramic instead of porous PFTE. Additionally, the volume of the reference chamber is less compared to the other Sentron ISFET probes.

The quality of the ISFET probe is similar to the ConeFET and other Sentron ISFET probes, except for that the ceramic diaphragm is more prone to dry out. In practice it would mean that the probe would need to be revived sooner compared to the other probe variants. See this manual under 'REVITALIZE'.

## ConeFET

The ConeFET is used often to monitor pH in soil. The sensor is prone to scratches in this application. When using the ConeFET with semi-solids, insert the probe to the desired depth. Then rotate left and right several times and tilt to ensure the sensor and diaphragm are in good contact with the sample. The predrill stick that is offered in the carry case, or agriculture and industrial packages, is to be used to prepare a pilot hole first. The pilot hole can be filled with demineralized water when the soil is very dry.

## LanceFET

The LanceFET is used often to monitor pH in slaughtered meat or in soil. The sensor is prone to scratches in these applications. The predrill stick that is offered in the carry case, or agriculture and industrial packages, is to be used to prepare a pilot hole first. The pilot hole can be filled with demineralized water when the soil is very dry.

When using the LanceFET with semi-solids, insert the probe to the desired depth. Then rotate left and right several times and tilt to ensure the sensor and diaphragm are in good contact with the sample.

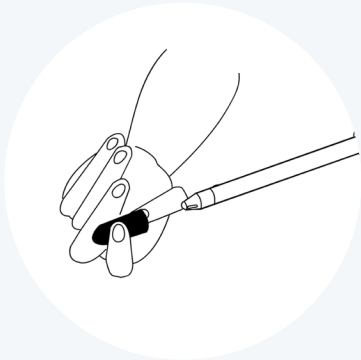


# USE

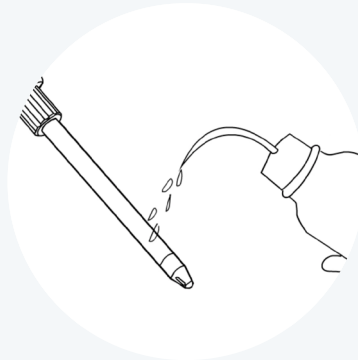
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# Rinse probe



Step 1



Step 2



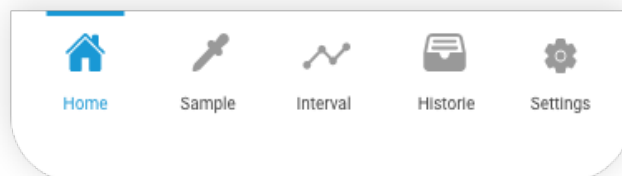
Step 3

Remove the protective cap from the probe tip (step 1). Keep the cap as it can be re-used later when storing the probe.

Always rinse the probe tip with demineralized water before use or when exchanging between samples or buffers (step 2). Remove any drops from the tip (step 3).

When the probe has been stored for longer periods of time, clean the probe as described in this manual under 'Clean'.

# Select probe



In the app, select the probe that you want to use. The current parameter values will appear in a running graph. Select or deselect the parameter that you want to visualize in the graph by selecting the parameter just above the graph. The LED is flashing green. No data are saved at this moment.

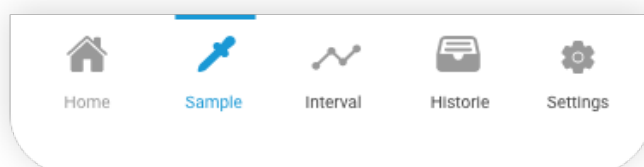
Select:

- '+Take sample' to take a single measurement, or
- '+New interval' to start an interval of multiple measurements, respectively.


NB

- The details of the last calibration are provided. When it states 'calibration required', the probe would need to be calibrated to provide a good pH value. This is described in this manual under 'Calibration status of probes'.
- The number of decimals is dependent on the calibration procedure (the number of points taken for calibration). This is described in this manual under 'Calibration status of probes'.
- pH 16 means that the probe is not measuring pH. Most probably the tip is not in the (liquid) sample.

# Sample



A sample measurement is meant for taking measurements manually. Several datapoints can be taken for one sample. A sample measurement can be initiated in two ways:



**Sample**

1. Select the probe in the Home menu when you are using just one probe. Press 'Take sample' to take the first datapoint.
2. Select 'Sample' at the bottom menu of the app (see icon) when you want to use multiple probes simultaneously. Select the probes that you want to use for the sample measurement. Press 'Take sample' to take the first datapoint.

The LED is still flashing green and the pH value is still live. Scroll down to see the information on the datapoint. Select +Take reading to take another datapoint in this sample set.

NB

- Always rinse the probe tip with demineralized water when changing between buffer and sample or between different samples.
- No information is saved automatically unless you save the sample set manually.

#### Information

- Sample set name. Select 'Sample set name' or press the cross to change the name.
- Notes. Type your notes here.

#### Datapoints

The information on the datapoint(s) (time stamp, pH value, temperature value, and the name of the probe) is listed. All datapoints belong to the same sample set.

- Per datapoint notes can be added: select the box in the datapoint.
- The datapoint can be deleted: select the dustbin icon.

## Save sample set

Select 'Save sample set' to save this sample with all its datapoints.

- Sample date. An overview is provided with the time stamp
- Number of datapoints.
- Information. Time, pH value, temperature and device name of all datapoints of this sample set. Notes can be added to the individual datapoints: select the box in the datapoint.
- The location of the mobile device that is used for the probe is indicated as a map.

NB At this point, the sample set cannot be opened anymore in the app to adapt datapoint notes or to add more datapoints.

## Export sample set

Select 'Export sample set' to export your data to a CSV file. Note that you require internet access for this last step.

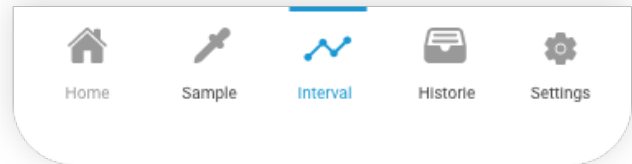
NB The export of data can also be done later on. See the description in this manual under 'History'.

#### CSV file


The CSV file contains the data: name of the probe and sample, timestamp of datapoints, temperature, mV, pH, what pH calibration buffers are used, slope and time stamp of pH calibration, datapoint notes, sample notes.

When appropriate: latitude / longitude (location permitted), temperature and time stamp of temperature calibration (NB 'Advanced mode' required).

# Interval



An interval measurement is meant for taking measurements automatically with a fixed logging time period in between datapoints. An interval measurement can be initiated in two ways:

Interval

1. Select the probe in the Home menu when you are using just one probe. Press '+New interval'.
2. Select 'Interval' at the bottom menu of the app (see icon) when you want to use multiple probes simultaneously. Select the probes that you want to use for the interval measurement. Press 'Next'.

Select and/ or adapt the parameters at 'Information' and 'Thresholds'. See below for more explanation.

The LED is still flashing green and the pH value is still live.

**NB** Always rinse the probe tip with demineralized water when changing between buffer and sample.

## Information

- Interval name. Select 'Interval name' or press the cross to change the name.
- Log every. Select the default setting of '5 minutes'. Adapt it to your preferences and confirm. The datapoints can be taken from every 1 second to every 100 days.
- Notes. Type your notes here.

## Thresholds

Eventually, the minimum limit and the maximum limit for the pH can be given. These limits are indicated in the running graph as dotted lines. When a limit has been set and the pH value exceeds this limit, a warning will be provided by the Sentron app: 'Boundary exceeded'.

NB

- Setting thresholds will keep the app open in the background so it can send you notifications. This will drain your battery faster.
- The boundary exceed warning is provided even if the Sentron app is running in the background (e.g. when using another app in the meantime).
- The boundary exceed warning is not provided when the Sentron app is closed down. The warning will appear once the Sentron app is reopened during the interval (you will see a notice at the probe in the app 'interval running').

## Start interval

Select 'Start interval' to start the interval measurement. Datapoints will be taken automatically and shown in the running graph. The LED flashes green at each measurement datapoint. In between the datapoints the LED is off. The app indicates 'Interval running'.

### During 'interval running'

The name of the interval can still be changed (select 'Interval name' or press the cross) and notes can be typed. Thresholds can still be adapted while the interval is running. The time stamp of the start of the interval is indicated, as well as the number of datapoints.

### App closed

When an interval is running, the Sentron app can eventually be closed. The datapoints will still be taken according to the running interval settings. The LED still flashes green at each measurement datapoint. The data are saved in the probe temporarily.

NB See thresholds above for a note on the battery drain.

### No Bluetooth

When an interval is running, the mobile device and probe can also be separated such that the Bluetooth connection fails. The datapoints will still be taken according to the running interval settings. The LED still flashes green at each measurement datapoint. The data are saved in the probe temporarily. The running graph in the app does not update.

When the Bluetooth connection is restored, the running graph will show all datapoints.

Make sure that the connection is indeed restored by checking the settings of your mobile device itself. The number of datapoints will also update to the last information available.

## Stop and export interval

### Stop interval.

Select 'Stop interval' to stop the interval measurement. The interval is saved automatically. The name of the probe, graph with pH and temperature values, start and end of the interval and the number of datapoints are visible.

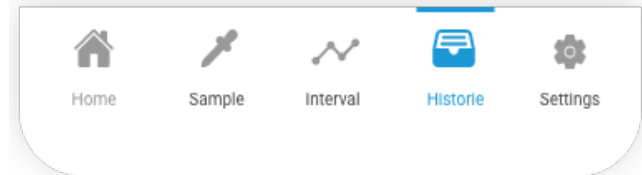
### Export interval.

See the description in this manual under 'Export sample set'.

### CSV file

See the description in this manual under 'Export sample set'.

# History



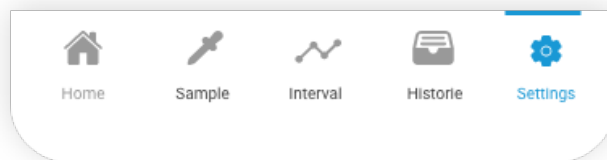
In the history all datapoint sets are listed. These are either sample or interval measurements, recognizable by the icon.

Select the one you want to export.

Select 'Export sample' or 'Export interval' (see above).

Delete the sets of datapoints by swiping it to the left. Select 'Delete'.

# Settings



## FAQ

Select 'Frequently asked Questions' and you will see most asked questions. In case your question is not listed, please check our website at [www.sentron.nl/help](http://www.sentron.nl/help).

## Settings

### Advanced mode

Select this (it turns green) and you will obtain more information/ functionality:

- Besides the pH value, the mV is indicated per probe.
- Temperature calibration can be performed.
- During pH calibration the standard deviation is indicated. For a successful pH calibration the standard deviation of at least 16 datapoints should be less than 250.

### Hours before a drift warning is shown

As default a new pH calibration is required after 24 hours. This number of hours can be adapted here. Realize that the pH drift might be too much when a pH calibration is not done in time.

### Language

If available, the language of the telephone is selected. If not available, English is selected as default. It can be adapted here to Dutch, German French, Chinese, Spanish, Russian, Japanese, Swedish, Korean.

### Temperature unit

Per default Celsius is selected. It can be adapted to Fahrenheit.

## Links

The Terms and Conditions and the Privacy Policy of Sentron Europe BV can be checked here.

## Database reset

To reset the entire local database. Note that all probes, measurements and settings will be lost and the app will be reset to factory settings.

### Version

The version of the Sentron app is provided at the bottom.

# Color codes of probe

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LED is off	Probe is in standby mode.
LED is pulsating in red	Probe is charging but not yet at 80%.
LED flashes in red every 10 seconds during measurements	Probe needs to be charged (below 10% charged).
LED is pulsating in green	Probe is charging and is between 80% and 100% charged. This code takes precedence over other codes.
LED is flashing fast in blue	Probe is searching for communication with the Sentron app. It is not connected to the app.
LED is slowly flashing in blue	Probe is searching for communication with the Sentron app (e.g. it is out of Bluetooth reach). It is connected to the app.
LED is flashing green	Probe is connected to the app and has communication with the Sentron app.
LED is flashing once in green	Probe is taking a measurement during the interval. In between the measurement points the LED is off.
LED is flashing fast in purple	Probe is resetting itself after the purple light turns off. For explanation, see this manual under 'Get Started'.
LED is white	Probe is restarting itself after the white light turns off. For explanation, see this manual under 'Get Started'.
LED is pulsating in orange	Something is wrong in the app or with the probe itself. For example, the sensor part is detached from the transmitter. When you have tried the suggestions in the app without success, please check our website at <a href="http://www.sentron.nl/help">www.sentron.nl/help</a> .





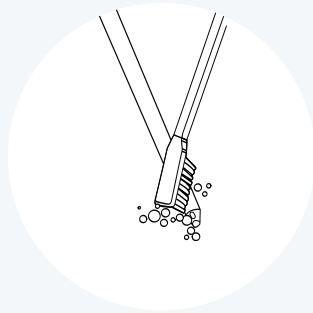
CLEAN

Sentron

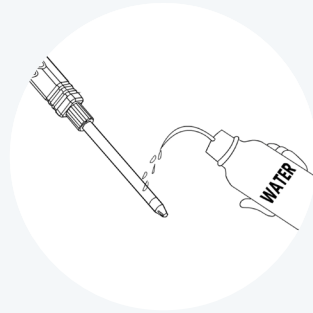
# Clean



Step 1



Step 2



Step 3



Step 4

The appropriate cleaning frequency is dependent on the type of sample being measured. A good rule of thumb to use when sampling colored liquids is when the reference diaphragm is no longer white, the probe should be cleaned. Both the surface of the sensor (the metallic spot at the probe's tip) and the diaphragm (the white surface on the probe tip) are to be cleaned.

## Step 1

- Place the probe in warm tap water (around 60°C / 140°F) with a mild detergent for 5 minutes. Stir periodically.

## Step 2

- Scrub the probe tip with the soft toothbrush in water with a mild detergent.

**NB** To prevent scratching of the sensor, always soak the probe thoroughly before brushing. Water temperature must not exceed 80°C / 180°F as this may damage the probe.

**NB** Proteins, fats and oils may be removed by scrubbing in a solution of Terg-A-Zyme (Alconox company), a pepsin solution or a similar product. Afterwards, rinse thoroughly with demineralized water.

**NB** Do not use hydrofluoric acid, acetone, MEK or similar agents.

## Step 3

- After scrubbing rinse with demineralized water.

## Step 4

- Remove any drops from the tip.

**NB** This procedure can be performed with the replaceable sensor part attached to the transmitter, as well as separate from the transmitter.

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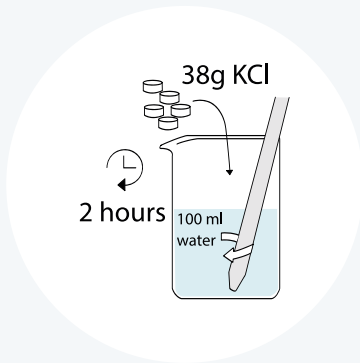


# REVITALIZE

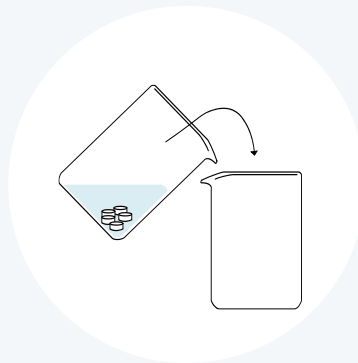
After when calibration the probe shows slow response or low slope values, a revitalization of the reference electrode should be performed.

Sentron

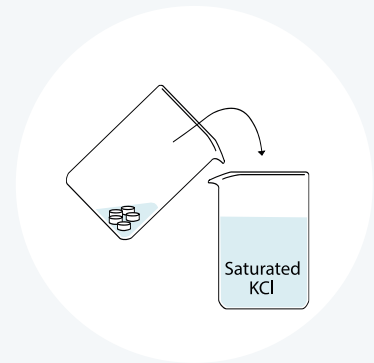
# Prepare saturated KCl



Step 1



Step 2



Step 3

Prepare saturated KCl (potassium chloride) solution:

## Step 1

- Add KCl-granules to distilled water until no more KCl will dissolve. Adding 38 grams of KCl to 100 ml water should be sufficient. Leave for at least two hours.

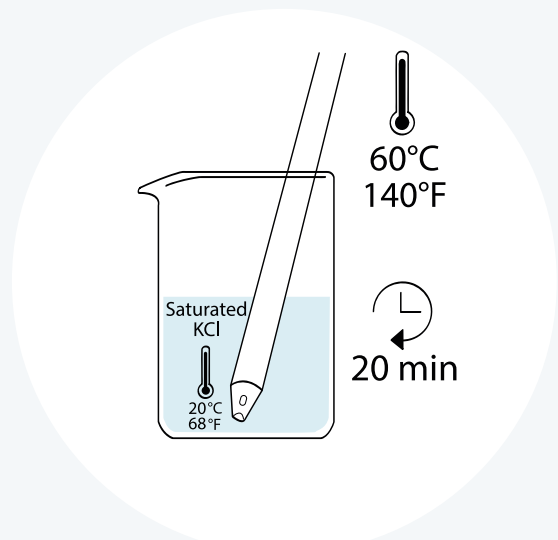
## Step 2 and step 3

- Decant the clear solution and leave any undissolved granules.
- Now you have saturated KCl.

# Revitalize



Step 1



Step 2

This 'cold' KCl-dip will regenerate the reference system and the diaphragm.

## Step 1

- Clean the probe as described in this manual under 'Clean'.

## Step 2

- Make sure the probe is still warm (around 60°C / 140°F)
- Place the probe directly (without flushing it with demineralized water or cooling it down) in a saturated KCl-solution at room temperature.
- Leave it for 20 minutes.

Before using the probe, a new calibration has to be performed. See in this manual under 'pH calibration'.

# Revive

In case the probe has not been used for more than 3 months, a longer revitalization is recommended:

## Step 1

- Follow the steps of the revitalization except for the last item in step 2: Leave it for 20 hours instead of the 20 minute 'cold' KCl-dip.

## Step 2

- After that, flush off any crystals from the probe tip with demineralized water.

NB these procedures can be performed with the replaceable sensor part attached to the transmitter, as well as separate from the transmitter.

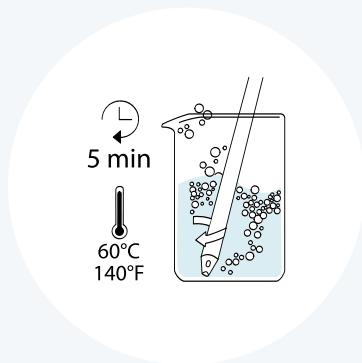
**Sentron**



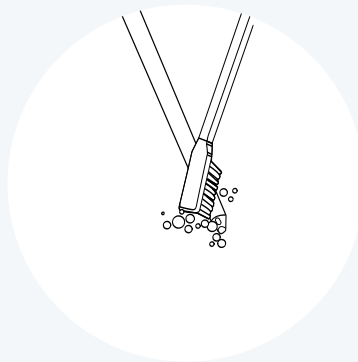
# STORE

Sentron

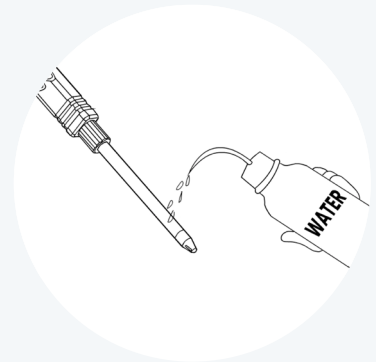
# Store for short time periods



Step 1



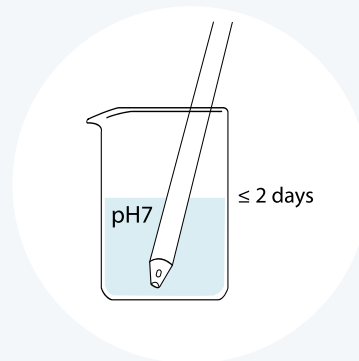
Step 2



Step 3



Step 4



Step 5

For short time periods ( $\leq 2$  days) probes can be best stored 'wet' in a beaker with pH7.

## Step 1 and step 2

- Clean the probe as described in this manual under 'Clean'.

## Step 3

- Rinse thoroughly with demineralized water.

## Step 4

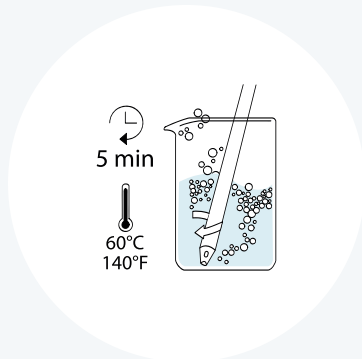
- Remove any drops from the tip.

## Step 5

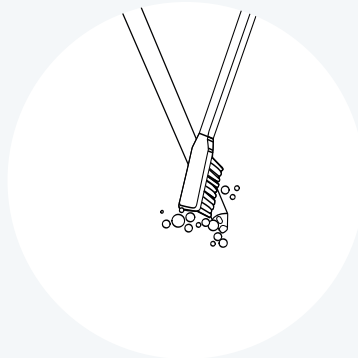
- Place it in a clean container with fresh pH7 buffer to prevent pollution of the probe directly after cleaning.

NB The replaceable sensor part can be stored attached to the transmitter, as well as separate from the transmitter.

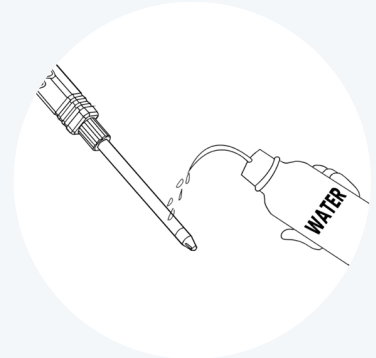
# Store for longer time periods



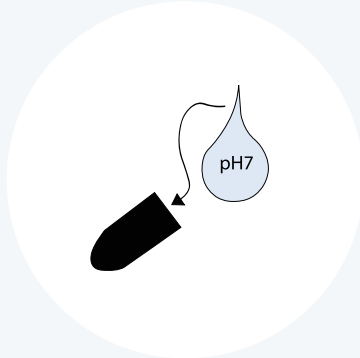
Step 1



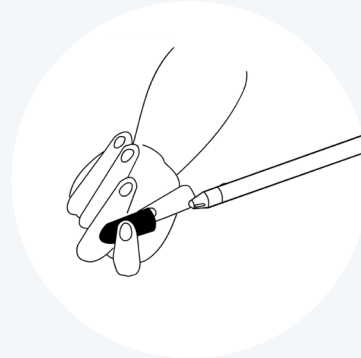
Step 2



Step 3



Step 4



Step 5

For longer time periods (>2 days) the probe can be best stored 'dry' in the shipping box.

## Step 1 and step 2

- Clean the probe first as described in this manual under 'Clean'.

## Step 3

- Rinse the probe in demineralized water. Do not dry the probe.

## Step 4

- Place one drop of pH7 buffer in the protective cap.

## Step 5

- Place the cap over the probe-tip.
- Store the probe in a safe place, free from mechanical stress.

NB After a long term storage always revitalize the probe before using it again.

NB The replaceable sensor part can be stored attached to the transmitter, as well as separate from the transmitter.

NB Mind the storage conditions as mentioned in the specifications.

NB After long storage, reference gel may be observed as a viscous material on the tip of the probe. Some gel seepage from a new probe is normal and will not affect the lifetime or performance of the probe. Clean the probe as described in this manual under 'Clean'.





# BUFFERS

We recommend to use the Sentron pH buffers for the calibration of the pH probes. These are selected specifically for the ISFET pH sensors. The twin neck bottles enable a convenient and easy to use way of providing the right amount of buffer without waste or contamination.

Sentron

# Sentron pH calibration buffers



Step 1



Step 2



Step 3

## Step 1

- Do not open the cap of the bottle itself, but open the cap (indicated in red) from the dispensing chamber of the twin neck bottle.

## Step 2

- Squeeze gently in the middle of the bottle to allow some buffer solution into the dispensing chamber.

## Step 3

- After calibration, throw out the used buffer and reclose the chamber again with the cap.

## Advantages of twin neck bottles

- No need for a separate container(s) when calibrating an electrode. Calibrate directly in the (small) dispensing chamber.
- No possibility of contamination between the dispensing chamber and the main repository.
- No waste: the dispensing chamber can hold the correct amount of buffer solution for various probe types.
- If desired, a separate container or a larger amount of buffer solution can be used by accessing the main repository directly.
- Easy to carry and dispense, ideally suited for field work but also convenient for table-top and laboratory use.





## Note

- Always use fresh and uncontaminated buffer when performing a calibration.
- Buffers can be polluted due to exposure to open-air or (UV)light. Reclose the cap on the bottle as soon as possible.
- Do not use the buffer solution in the dispensing chamber after more than 15 minutes.
- The buffers should be stored in the original bottle in upright position, at ambient temperature.
- Store away from strong light source (e.g. sunshine, UV lamp), heat sources and volatile chemicals.
- Record the first opening of the bottle, close it immediately after every use and discard the contents of the bottle when less than 10% of the original volume of the solution is left.
- The expiry date as outlined on the bottle label is valid, provided the bottle is properly stored and handled in compliance with Good Laboratory Practice.

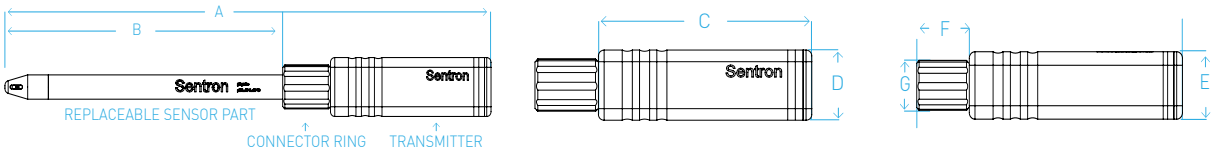


# SPECIFICATION

Sentron

ISFET pH probe	ConeFET	CupFET	LanceFET	MicroFET
Product order code	3380-100	3320-100	2370-100	9370-100
General description				
	Robust general purpose probe	Probe for measurements of small volumes (~ 20 µl)	Steel tipped probe for easy penetration of firm samples (e.g. meat, fruits, ground).	Laboratory probe of 3 mm diameter that fits tubes and mini-cuvettes
General fluids (low viscosity)	✓	✓	✓	✓
Semi fluids (low to medium viscosity)	✓	✓	✓	
Pastes and semi solids (medium to high viscosity)	✓		✓	
Piercing applications (normal to medium force penetration)			✓	
General beakers and containers	✓	✓	✓	✓
Small sample volumes (one drop ~20 µl)		✓		✓
Narrow vials / test tubes (as small as Ø 3 mm)				✓

Probe properties	ConeFET	CupFET	LanceFET	MicroFET
Connection	BLE (Bluetooth Low Energy) wireless connection to mobile device			
Compatibility	Compatible to the free Sentron app for Android, iOS and Huawei			
Status	RGB LED for status update / recognition to cloud-based application			
Data storage	Temporary data storage when mobile device is disconnected			
Mobile device minimal specs	Bluetooth 5.0			
Ingress protection	IP67 dust and waterproof			
Battery	Wireless chargeable battery			
Battery operation time	2...3 weeks			
Battery recharge time (wireless charger provided)	2 hours			
Operation and storage temperature	0...80 °C (32...176 °F)			
Operation and storage humidity	30%...80% relative humidity			

Probe dimensions	ConeFET	CupFET	LanceFET	MicroFET
				
Total length probe (A)	224 mm (8.8")	224 mm (8.8")	227.3 mm (8.9")	252 mm (9.9")
Length replaceable sensor part (immersible) (B)	128 mm (5.0")	128 mm (5.0")	131.3 mm (5.2")	110 mm (4.3")
Length x width x depth transmitter (C x D x E)	74 x 24.2 x 20 mm (2.9" x 1.0" x 0.8")			
Length x outer diameter connector ring (FxG)	22 x 18 mm (0.9" x 0.7")			
Materials transmitter / connector ring	ABS / PEEK			
Weight of complete probe	55.0 gr. (1.9 oz)	55.1 gr. (1.9 oz)	55.2 gr. (1.9 oz)	49.3 gr. ( 1.7 oz)

Sentron

Replaceable sensor part	ConeFET	CupFET	LanceFET	MicroFET
Product order code	3380-005	3320-005	2370-005	9370-005
Physical properties				
Barrel diameter (H)	10 mm (0.4")	10 mm (0.4")	10 mm (0.4")	3 mm (0.1")
Length adapter (I)				48 mm (1.9")
Diameter adapter (J)				10 mm (0.4")
Materials tip / barrel	PEEK / ABS	PEEK / ABS	Stainless steel point / PEEK / ABS	PEEK / PEEK
Weight	18.0 gr. (0.6 oz)	18.1 gr. (0.6 oz)	18.2 gr. (0.6 oz)	12.3 gr (0.4 oz)

pH	ConeFET	CupFET	LanceFET	MicroFET
Sensor	Glass-free Ion Sensitive Field Effect Transistor (ISFET) semiconductor			
Range	pH 0.00... 14.00			
Accuracy	+/- 0.02 pH			
Resolution	0.01 pH			
Drift maximal (in pH7 @ 25°C)	0.14 pH/day			
Drift typical (in pH7 @ 25°C)	0.05 pH/day and lower			
Calibration	1-, 2-, 3- and 5-point calibration			
Automatic Temperature Compensated (ATC) calibration	yes			
Calibration buffer types	Sentron buffers, DIN, NIST, JIS			

Reference system	ConeFET	CupFET	LanceFET	MicroFET
Type	non-flow			
Reference solution	gelled KCl			
Diaphragm	porous PTFE	porous PTFE	porous PTFE	ceramic

Temperature	ConeFET	CupFET	LanceFET	MicroFET
Sensor	NTC			
Accuracy	1%			
Resolution	0.1 °C (0.1 °F)			
Range	0...80 °C (32... 176°F)			

Application	ConeFET	CupFET	LanceFET	MicroFET
Application features	Cloud-based free, easy and intuitive application; Compatible to Android, Harmony OS and iOS; Calibration, acquisition, visualization, storage and export of measurement data; Up to 6 connectable probes for simultaneous wireless measurements; Real-time notifications whenever the pH value is out of reach; GPS location based pH map in Google maps; Language English, Dutch, Spanish, French, Chinese, Russian, Japanese, Swedish, Korean; Free downloadable in GooglePlay, Huawei App Gallery, AppStore.			

Sentron



# CONTACT

For inquiries, quotes, demo request and orders

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