

# **SETRON MICRO ELECTRODE**

## **User manual**

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## Introduction

Congratulations!

You have just bought a SENTRON MICRO ELECTRODE; one of the finest pieces of pH-measuring equipment available in the world today. This MICRO ELECTRODE is the smallest electrode in the SENTRON product range (a diameter of only 3 mm) and therefore a product that can be used for special measurements on very small volumes.

With proper care and following the given instructions you are likely to enjoy the benefits of your SENTRON pH-system for a long time.

In the box you find the MICRO ELECTRODE as well as a sponge, a bottle of detergent and a bottle for water. These can be used for the cleaning procedure of the electrode (see paragraph 3).

The SENTRON MICRO ELECTRODE series are a series of electrodes for use in demanding applications: where valuable and very small samples or volumes are used, with elevated sample temperatures up to 75°C, or in small sample cups.

The Micro Electrode series is available as the standard model made of PEEK, with a ceramic diaphragm, but on request, as special product also made of stainless steel.

Sentron has a whole family of electrodes with different type of tips for all kind of applications.

The other members of this family are:

- The SENTRON Hot-Line electrodes, for use in demanding applications where higher sample temperatures, up to 105°C, or contact with more aggressive chemicals are to be expected, but a flowing reference system is not required.
- The SENTRON Stream-Line electrodes, specially designed for low conductivity applications or highly contaminating samples, this electrode features a refillable reference-liquid compartment with constant reference liquid outlet through a large area, porous PTFE diaphragm. The Stream-Line electrodes are equally resistant to temperatures and chemicals as the SENTRON Hot-Line electrodes.

All SENTRON pH-electrodes contain an Ion Sensitive Field Effect Transistor (ISFET) sensor, a silver/silverchloride – potassiumchloride reference system and a thermistor for Automatic Temperature Compensation. Each electrode also has an identity of its own, a “fingerprint” so to speak, enabling your SENTRON meter to identify your (new) electrode’s fingerprint through calibration.

## 1. Safety and care.

The pH-sensitive element in a SENTRON electrode is an ISFET semi-conductor. This sensing element needs to be driven by an electronic circuit that is built into the SENTRON pH meters. The micro electrode can only perform up to its specification when used in combination with one of the SENTRON pH-meters. Any other combination might cause loss of performance and irreversible damage to both electrodes and meter.

The fact that SENTRON electrodes are ruggedly build to last, even in harsh conditions, does not mean that the electrode needs no maintenance at all. Read the operating tips well, to ensure lasting satisfaction.

Tris buffers and samples containing proteins should be read quickly and the electrode should be rinsed thoroughly with de-ionized water between samples. When testing is complete, clean with water and a mild detergent. Just lay the Micro Electrode on a wet sponge. Put one drop of mild detergent on a sponge and clean the electrode with the wet toothbrush. Afterwards rinse with de-ionized or distilled water.

Avoid prolonged immersion in samples containing Tris or proteins and in samples expected to have pH-values at the ends of the specified pH-range or temperature Range.

When unavoidable, rinse with ample water in between samples. Rinse with neutralizing agents and distilled water when the measurement is completed and prior to storage.

Do not use the electrode outside the specified temperature range as this might result in electrode failure or irreversible damage to the electrode.

Samples must be aqueous solutions or semi-solids and compatible with the electrodes wetted materials.

If information is required regarding the chemical resistance of the electrode, please refer to your SENTRON meter manual or contact your local dealer.

## 2. Daily use

Reference gel may be observed as a viscous material on the tip of the electrode. Some gel seepage from a new electrode is normal and will not effect the longevity or performance of the electrode.

Prior to daily use, flush the electrode with water.

Rinse with de-ionized or distilled water. Soak the electrode in pH 7.00 buffer or pH 4.00 buffer with the meter ON (in any mode) prior to calibration for at least 10 minutes.

If the electrode has not been used for two or more days and has been stored dry, clean as described in point 3. Place in saturated KCl solution (See Tip 1) for 10 to 15 minutes, then in pH 7.00 or pH 4.00 buffer as described above.

For maximum stability and accuracy, perform the calibration sequence twice.

To store the electrode, clean it thoroughly with water (again, a mild detergent may be used) and rinse with de-ionized or distilled water.

### 3. Cleaning tips

#### Soapy water method for cleaning the electrode

To have most pleasure of your electrode, good cleaning is a must! If the electrode is not properly cleaned it can happen that the electrode does not work due to a polluted diaphragm or ISFET. The fluid in which you are measuring can cause this. Is the electrode not cleaned regularly, the diaphragm will block the internal electrode. In such case there is no electrical contact between the electrode and the ISFET chip and the electrode will not work properly.

To prevent this, you must clean the electrode regularly. The frequency is depending of the sample you are measuring in.



#### Cleaning

Put the electrode in water with a constant temperature of 60°C for minimal 5 minutes. Then lay the electrode on a **soft wetted sponge**. **Put one drop of detergent on a sponge and clean the probe with the toothbrush..** After this the probe can be rinsed with clear water. *Never clean the probe with hard or sharp material.*

**Note:** When used in samples containing small hard particles (e.g. pigments, titanium-oxides, silicates etc.) first rinse the electrode with ample water.

### 4. Operating tips

- Tip 1: To prepare saturated KCl (potassium chloride) solution: Add KCl-granules to distilled water until no more KCl will dissolve. Adding 38 grams of KCl to 100 ml water is sufficient. Let this stand for at least two hours and decant the clear solution. Now you have saturated KCl.
- Tip 2: To ensure correct measurement values, samples or buffers need to be mixed well. This may be done by a magnetic stirrer or by stirring with the electrode for at least 5 seconds. Stop stirring and record results when the read-out is stable.
- Tip 3: 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 de-ionized or distilled water. Cleaning agents are available at Sentron, ask your local dealer. Do not use hydrofluoricacid, acetone, MEK or similar agents to clean the electrode.
- Tip 4: 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.
- Tip 5: 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 electrode or a contaminated buffer. If seen when using 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 or different lot pH 10.00 buffer. Fresh buffers are available at Sentron, ask your local dealer.

### 5. Trouble shooting

If any of the following events occur: low slope, drift, instability of the reading, slow calibration, electrode will not calibrate, pH value doesn't change as expected when changing samples,.....

Soak the electrode in warm (40°C / 104°F) tap water for 5 to 10 minutes. Clean electrode with tap water and use a mild detergent (e.g. a non abrasive soft soap). Then place in a saturated KCl solution (see Tip 1) at room temperature for 10 to 15 minutes with the meter on in any mode.

## 6. Specifications

Sensor:	Semi-conductor Ion Sensitive Field Effect Transistor (ISFET) sensor with patented ESD protection circuit.
Operating temperature:	-5°C to 75°C
pH-range:	pH 0 to pH 14
Temperature range / accuracy	-5°C to 75°C ± 5°C
Reference compartment:	saturated KCl-gel, non-refillable
Dimensions:	Electrode length: 120 mm
	Electrode diameter: 3 mm
	Cable length: 1.5 mtr
	Diaphragm: ceramic
Material shaft: Standard model	PEEK
Meat model	Stainless steel
Connector:	There are different types of connector available. Please make sure that the electrode you have received has a connector that matches with your meter. This can be done by checking the last two digits of your electrode label: for the Argus and Titan series 008

## Storage

You can store the electrodes dry or for some days in KCl solution. If stored in a KCl solution the value of the pH measurement can be influenced by the KCl. To prevent this and to have a good measurement we advise you to clean the electrode after the storage for some minutes (at least 5 minutes) in demineralized water on room temperature..

## **7. Warranty**

This SENTRON electrode is produced, packed and shipped with the utmost care. If, notwithstanding, defects do arise, be advised that this SENTRON electrode is warranted to be free from defects in material and craftsmanship for the period of half a year.

SENTRON will repair or replace, at SENTRON's option, any defective part free of charge if this product fails within 6 months from the date of purchase, provided that the failure is due to defective material or lack of craftsmanship and has occurred under normal conditions of usage, to be judged by SENTRON.

SENTRON disclaims any liability to customers, to users of its products, or to any other person or persons for any special or consequential damage that might arise out of, or that might in any way be connected with, the use of this electrode

The warranty described in this paragraph shall be in lieu of any other warranty, expressed or implied, including but not limited to any implied warranty or merchantability or fitness for a particular purpose. The buyer's sole and exclusive remedy is for repair or replacement of defective parts as provided therein.

Representations and warranties made by any person, including dealers, representatives and employees of SENTRON, which are inconsistent or in conflict with the terms of this warranty, shall not be binding upon SENTRON unless in writing and signed by one of its officers.

SENTRON reserves the right to ask for proof of purchase, such as the original invoice or packing slip.

All information contained in this manual is current at the time of publication. Our commitment to product improvement requires that we reserve the right to change equipment, procedures and specifications at any time.