

4110(W)

4110-3

4140(W)

41x0(W)

pH ELECTRODES WITH GEL ELECTROLYTE



a xylem brand



For the most recent version of the manual, please visit
www.ysi.com.

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1 General information

Automatic sensor recognition

The sensor electronics with the stored sensor data are in the connecting head of the electrode. The data include, among other things, the sensor type and series number. In addition, the calibration data are stored in the sensor with each calibration and the calibration history is recorded (the last 10 calibrations). The data is recalled by the meter when the sensor is connected and is used for measurement and for measured value documentation.

Storing the calibration data in the sensor ensures that the correct slope and asymmetry are automatically used if the sensor is operated with different meters. On the other hand, different calibrated sensors can be used with one meter without the need to recalibrate.

The digital transmission technique guarantees the failure-free communication with the meter even with long connection cables. The sensor firmware can be updated via the meter.

2 Commissioning, measuring, calibration

2.1 Commissioning

Scope of delivery

- Electrode 41x0(W)
- Operating manual

Commissioning

Prepare the electrode for measuring as follows:

- Remove the watering cap from the electrode tip. Possible salt deposits in the area of the watering cap do not affect the measuring characteristics and can easily be removed with deionized water.



Please keep the watering cap. It is required for the electrode to be stored. Always keep the watering cap clean.

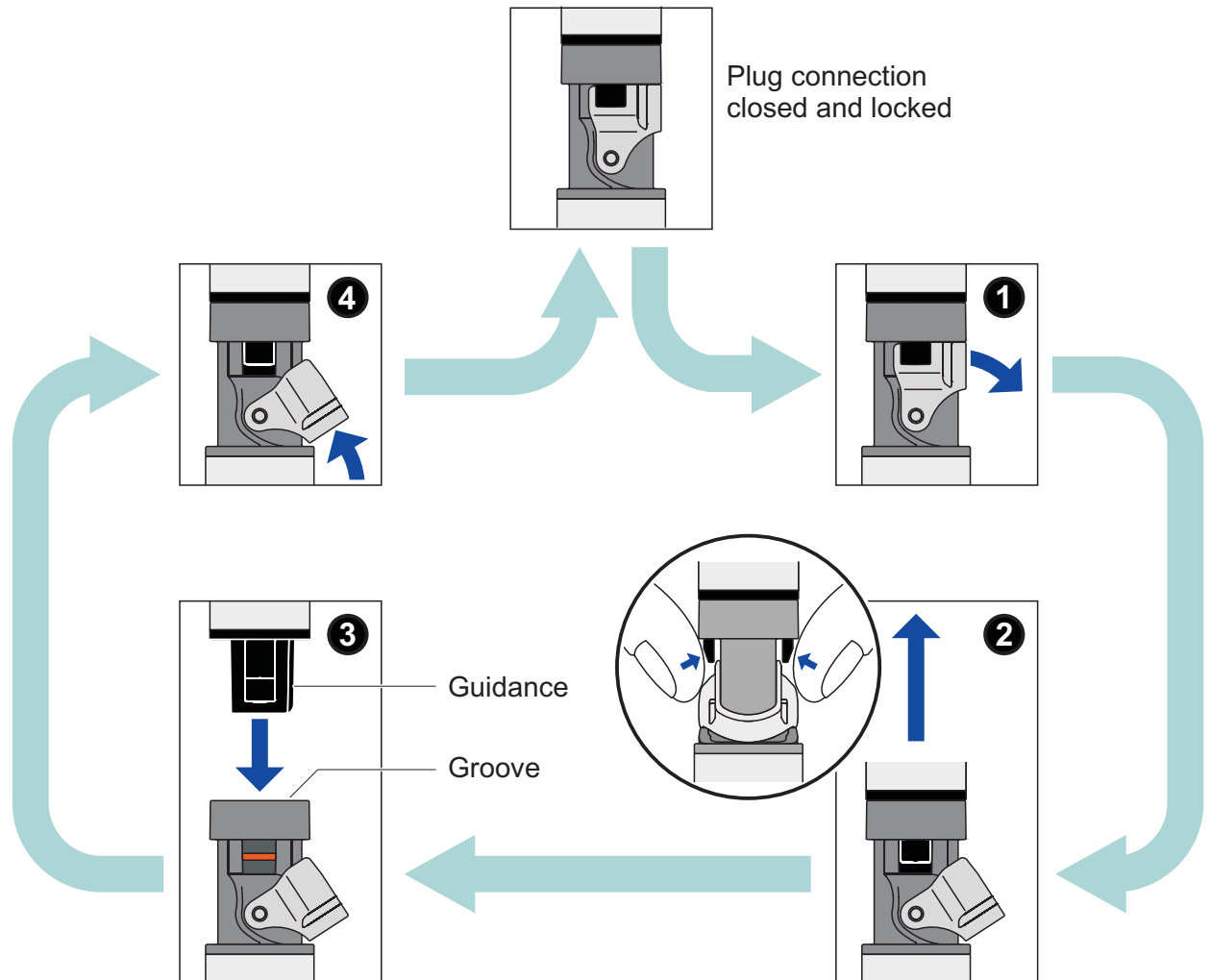
- Remove any gas bubbles behind the pH membrane by shaking.
- Connect the electrode to the meter.

| | |
|-------|--|
| 41x0 | – via the sensor cable to a free IDS connector on the meter |
| 41x0W | – via a connecting cable (accessory) to a free IDS connector on the meter or – wireless via an IDS WA-S adapter (accessory) to a WA-capable meter Accessories for the connection of the 41x0W sensor to the meter: See chapter 7 WEAR PARTS AND ACCESSORIES. Opening and closing the IDS plug connection, see section 2.2 OPENING AND CLOSING THE IDS PLUG CONNECTION. |

- Calibrate the electrode according to the operating manual of the meter and observe the following rules while doing so.

2.2 Opening and closing the IDS plug connection

This section only applies to IDS plug variants 41x0W.



Opening the plug connection

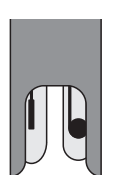
- If necessary, clean the plug connection.
- Open the locking device (step 1).
- Use your thumb and index finger to press the clips of the connector together, and pull the connector out of the plug (step 2).

Closing the plug connection

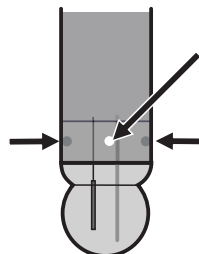
- Make sure that the plug connection is completely dry and clean.
- Align the guidance of the connector with the groove in the plug and insert the connector in the unlocked plug until it catches (step 3).
- Close the locking device (step 4).

2.3 Calibration and measurement: General rules

- Avoid the carryover of any solution (sample or buffer solution) from one measurement to the next by taking the following measures:
 - Shortly rinse the calibration and sample beakers with the solution the beakers are to be filled with next.
 - Between measurements, rinse the electrode with the solution that follows. Alternatively, you can also rinse the electrode with deionized water and then carefully dab it dry.
- To measure in aqueous solutions, it is recommended to immerse the electrode in a vertical or slightly tilted position.
- Observe the correct depth of immersion and make sure the contact between the junction and test sample is thorough. The junction is in the area of the bottom end of the shaft (see arrow).



4110(W)



4140(W)

Caution: Only the shaft part of the electrode may be immersed!

- For measurements in aqueous solutions, provide approximately the same stirring conditions for measuring as for calibrating.

Subsequent calibrations

The frequency of subsequent calibrations depends on the application. Many meters provide an option where you can enter a calibration interval. After the calibration interval has expired, the meter will automatically remind you of the due calibration.

3 Storage

During short measuring breaks

Immerse the electrode in reference electrolyte (KCl 3 mol/l, Ag⁺ free). Prior to the next measurement, shortly rinse the electrode with the test sample or deionized water.



Do not scratch the pH membrane.

Overnight or longer

Put the clean electrode in the watering cap that is filled with reference electrolyte (KCl 3 mol/l, Ag⁺ free).

NOTE
pH electrodes must not be stored dry or in deionized water. The electrode could be permanently damaged by this. If the liquid in the watering cap has dried up, condition the electrode in reference electrolyte (KCl 3 mol/l, Ag⁺ free) for at least 24 hours.



During longer storing periods, salt sediments may develop on the watering cap. They do not affect the measuring characteristics and can easily be removed with deionized water when the electrode is put into operation again.

4 Aging

pH electrodes are consumables. Every pH electrode undergoes a natural aging process. With aging, the responding behavior becomes slower and the electrode slope and asymmetry change. Moreover, extreme operating conditions can considerably shorten the lifetime of the electrode. These are:

- Strong acids or lyes, hydrofluoric acid, organic solvents, oils, fats, bromides, sulfides, iodides, proteins
- High temperatures
- High changes in pH and temperature.

The warranty does not cover failure caused by measuring conditions and mechanical damage.

5 Maintenance and cleaning

Cleaning

Remove water-soluble contamination by rinsing with deionized water. Other types of contamination have to be removed as follows while the contact time with the detergents should be kept as short as possible:

| Contamination | Cleaning procedure |
|-----------------------------|---|
| Fat and oil | Rinse with water containing household washing-up liquid |
| Lime and hydroxide deposits | Rinse with citric acid (10 % by weight) |

NOTE
Hydrofluoric acid, hot phosphoric acid and strong alkaline solutions destroy the glass membrane.

After cleaning

Rinse the electrode with deionized water and condition it in reference elec-

trolyte solution for at least 1 hour. Then recalibrate the electrode.

6 Technical Data

| | | |
|--|------------------------------|---|
| Measurement | pH measuring range | 0.000 ... 14.000 |
| | Allowed temperature range | <ul style="list-style-type: none"> ● 41x0(W): 0 ... 80 °C ● |
| Accuracy of the IDS measuring technique | Measured parameter | Accuracy (± 1 digit) |
| | pH | ± 0.004 |
| | U [mV] | ± 0.2 |
| | T [°C] | ± 0.1 |
| General features | Reference electrolyte | <ul style="list-style-type: none"> ● 41x0(W): Gel ● |
| | Junction | <ul style="list-style-type: none"> ● 4110(W): Fiber ● 4140(W): 3 x Ceramic ● Hole |
| | Temperature sensor | Integrated NTC 30 (30 kΩ at 25 °C / 77 °F) |
| Connection cable | Lengths | 4110: 1,5 4110-3: 3 m 41x0W: see section 7 WEAR PARTS AND ACCESSORIES |
| | Diameter | 4.3 mm |
| | Smallest allowed bend radius | Fixed installation: 20 mm Flexible use: 60 mm |
| | Plug type | Socket, 4 pins |
| | | |
| Shaft dimensions, material | Shaft length | 120 mm |
| | Shaft diameter | 12 mm |
| | Shaft material | <ul style="list-style-type: none"> ● 4110(W): PPE/PS ● 4140(W): Glass ● |
| | IDS plug | <ul style="list-style-type: none"> ● Synthetic materials: Glass fiber reinforced Noryl, TPU, TPC-ET, POM, PVC, PEEK, PBT ● O-ring: FPM ● Contacts gold41x0Wlated |

| | | |
|-----------------|--|--|
| IDS plug | Connection type | 4 pole, watertight plug connection with lock, reverse polarity protected |
| Storage | With watering cap; filled with KCl 3 mol/L, Ag ⁺ free | |

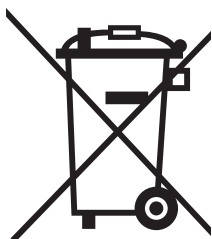
7 Wear parts and accessories

| | | | |
|---------------------------------------|---|---------------|------------------|
| Maintenance equipment | Description | Model | Order no. |
| | Reference electrolyte solution 250 ml to fill the watering cap (KCl 3 mol/l, Ag ⁺ -free) | KCl-250 | 109 705Y |
| Connection cable 41x0W - meter | Description | Model | Order no. |
| | IDS connection cable, 1.5 m | IDS-CABLE-1.5 | 903 850Y |
| | IDS connection cable, 3 m | IDS-CABLE-3 | 903 851Y |
| Radio connection 41x0W - meter | Description | Model | Order no. |
| | WA capable IDS meter + radio module for IDS meter | see Internet | |
| | Radio module for plug head sensor | IDS WA-S | 108 141Y |

8 Disposal

Handle and dispose of all waste in compliance with local laws and regulations.

EU only: Correct disposal of this product — WEEE Directive on waste electrical and electronic equipment



This marking on the product, accessories or literature indicates that the product should not be disposed of with other waste at the end of its working life.

To prevent possible harm to the environment or human health from uncontrolled waste disposal, please separate these items from other types of waste and recycle them responsibly to promote the sustainable reuse of material resources.

Waste from electrical and electronic equipment can be returned to the producer or distributor.

Contact Information

Ordering & Technical Support

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When placing an order please have the following information available:

- YSI account number (if available)
- Model number or brief description
- Quantity
- Name and Phone Number
- Billing and shipping address
- Purchase Order or Credit Card

Service Information

YSI has authorized service centers throughout the United States and Internationally. For the nearest service center information, please visit www.ysi.com and click 'Support' or contact YSI Technical Support directly at 800-897-4151.

When returning a product for service, include the Product Return form with cleaning certification. The form must be completely filled out for an YSI Service Center to accept the instrument for service. The Product Return form may be downloaded at www.ysi.com and clicking on the 'Support' tab.

Xylem |'zīləm|

- 1) The tissue in plants that brings water upward from the roots;
- 2) a leading global water technology company.

We're 12,500 people unified in a common purpose: creating innovative solutions to meet our world's water needs. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. We move, treat, analyze, and return water to the environment, and we help people use water efficiently, in their homes, buildings, factories and farms. In more than 150 countries, we have strong, long-standing relationships with customers who know us for our powerful combination of leading product brands and applications expertise, backed by a legacy of innovation.

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