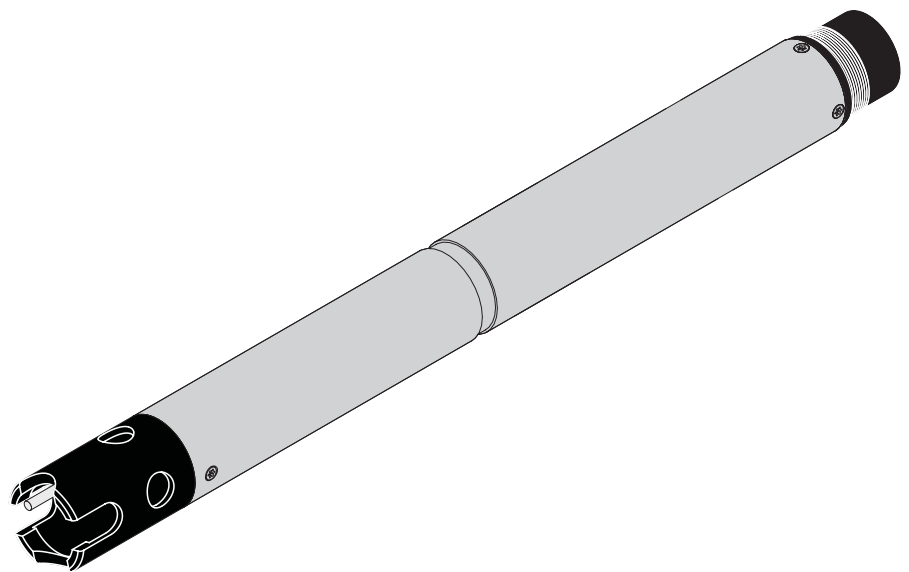


# NitraLyt 700 IQ



**IQ SENSOR NET nitrate sensor**

**Accuracy when going to  
press**

The use of advanced technology and the high quality standard of our products are the result of continuous development. This may result in differences between this operating manual and your sensor. Also, we cannot guarantee that there are absolutely no errors in this manual. Therefore, we are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions.



**Note**

The latest version of the present operating manual can be found on the Internet under [www.WTW.com](http://www.WTW.com).

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<b>1</b>	<b>Overview</b>	<b>2-1</b>
1.1	How to use this component operating manual	2-1
1.2	Structure of the NitraLyt® 700 IQ nitrate sensor	2-2
1.3	Recommended fields of application	2-2
<b>2</b>	<b>Safety</b>	<b>3-1</b>
2.1	Authorized use	3-2
2.2	General safety instructions	3-2
<b>3</b>	<b>Commissioning</b>	<b>4-1</b>
3.1	Scope of delivery	4-1
3.2	Installation	4-1
3.3	Commissioning / Getting the sensor ready for measuring	4-3
3.4	Carrying out the settings for the sensor on the terminal of the IQ SENSOR NET system	4-6
<b>4</b>	<b>Calibration and measuring</b>	<b>5-1</b>
4.1	Calibration	5-1
4.1.1	General information	5-1
4.1.2	Overview of the calibration procedures	5-2
4.1.3	Calibrating in practice	5-3
4.1.4	General course of a calibration	5-5
4.1.5	Calibration procedure, <i>1 point standard (1)</i>	5-8
4.1.6	Calibration procedure, <i>1 point ref. (2)</i>	5-10
4.1.7	Calibration procedure, <i>2 point stand. (3)</i>	5-13
4.1.8	Calibration procedure, <i>Simple std. add. (4)</i>	5-15
4.1.9	Calibration procedure, <i>Double std. add. (5)</i>	5-18
4.1.10	Calibration result	5-20
4.2	Measuring	5-23
4.2.1	Chloride compensation	5-23
4.2.2	Further influences on the measured value	5-24
<b>5</b>	<b>Maintenance and changing the electrode</b>	<b>6-1</b>
5.1	Disposal	6-4
<b>6</b>	<b>Replacement parts and accessories</b>	<b>7-1</b>
6.1	Sensor and electrodes	7-1
6.2	General accessories	7-1
<b>7</b>	<b>What to do if...</b>	<b>8-1</b>
<b>8</b>	<b>Technical data</b>	<b>9-1</b>
8.1	General features	9-1

8.2	Measurement conditions . . . . .	9-1
8.3	Characteristic data on delivery . . . . .	9-2
<b>9</b>	<b>Indexes . . . . .</b>	<b>10-1</b>
9.1	Explanation of the messages . . . . .	10-1
9.1.1	Error messages . . . . .	10-1
9.1.2	Info messages . . . . .	10-2
9.2	Status info . . . . .	10-3

# 1 Overview

## 1.1 How to use this component operating manual

### Structure of the IQ SENSOR NET operating manual

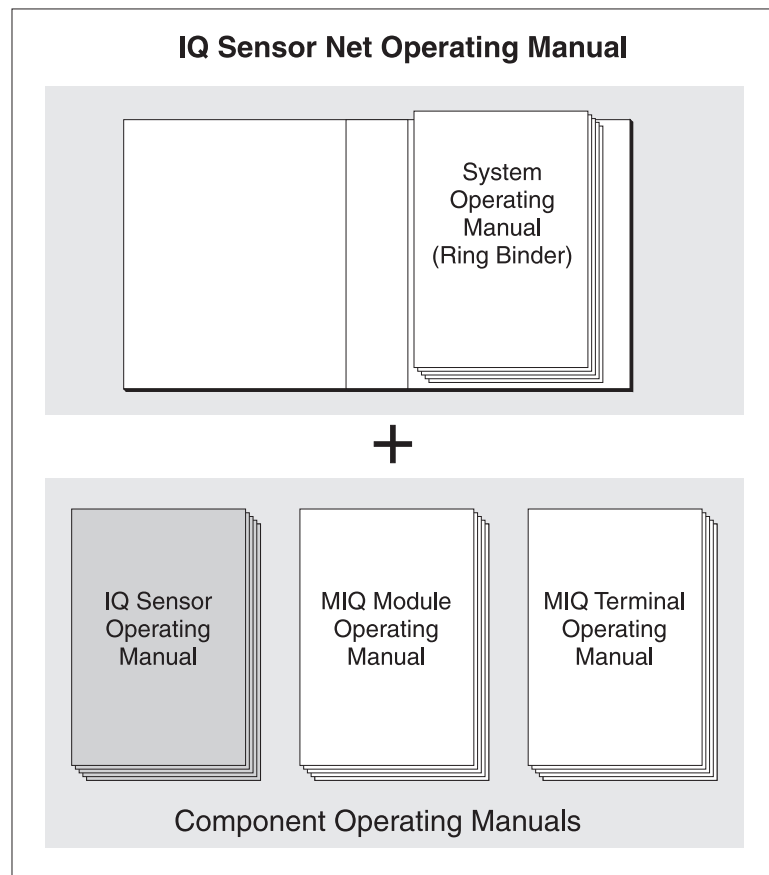


Fig. 1-1 Structure of the IQ SENSOR NET operating manual

The IQ SENSOR NET operating manual has a modular structure like the IQ SENSOR NET itself. It consists of a system operating manual and the operating manuals of all the components used.

Please file this component operating manual in the ring binder of the system operating manual.

1.2 Structure of the NitraLyt® 700 IQ nitrate sensor

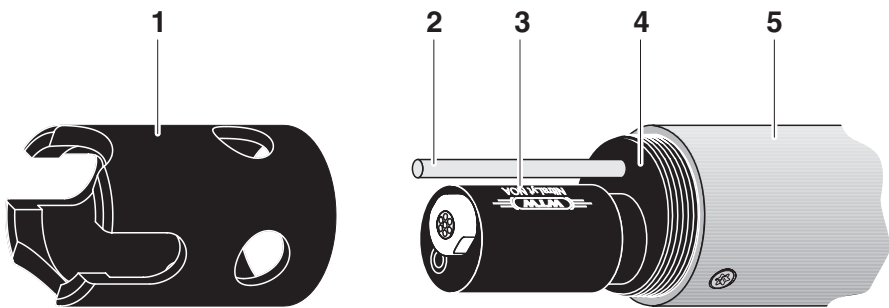


Fig. 1-2 Structure of the NitraLyt® 700 IQ nitrate sensor

1	Protective hood
2	Temperature probe
3	NitraLyt combination electrode with NitraLyt® NHA reference electrode and NitraLyt® NHA/AT exchange electrode (combination electrode not contained in the scope of delivery).
4	Receptacle for the NitraLyt combination electrode
5	Sensor shaft



**Note**  
The nitrate electrodes that can be used are available as accessories (see chapter 6 REPLACEMENT PARTS AND ACCESSORIES).

Screening of the nitrate sensor

The NitraLyt® 700 IQ nitrate sensor and the NitraLyt combination electrode together with the IQ SENSOR NET system form a measuring system that is protected to a high degree against low and high frequency interference as well as against the indirect effects of lightning strikes.

1.3 Recommended fields of application

The NitraLyt® 700 IQ nitrate sensor forms a measuring system for the online determination of nitrate ions. It supplements the oxygen measurement and/or the ammonium measurement in the aeration tank and enables an efficient aeration control.

The NitraLyt® 700 IQ nitrate sensor, together with the NitraLyt nitrate combination electrode, is suitable for stationary nitrate measurements in water/wastewater applications.

## 2 Safety

This component operating manual contains special instructions that must be followed in the operation of the NitraLyt® 700 IQ nitrate sensor. Thus, it is essential to read this component operating manual before carrying out any work using this sensor. In addition to this manual, the SAFETY chapter of the IQ SENSOR NET system operating manual must be followed.

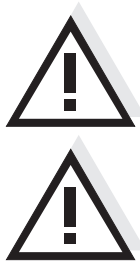
Always keep this component operating manual together with the system operating manual and any other component operating manuals in the vicinity of the IQ SENSOR NET system.

### Special user qualifications

The nitrate sensor was developed for applications in online measurement - essentially in the field of wastewater treatment. Thus, we assume that the operators are familiar with the necessary precautions to take when dealing with chemicals as a result of their professional training and experience.

### General safety instructions

The individual chapters of this operating manual use the following safety labels to indicate different levels of danger:



#### Warning

indicates instructions that must be followed precisely in order to prevent serious dangers to persons.

#### Caution

indicates instructions that must be followed precisely in order to avoid slight injuries or damage to the instrument or the environment.

### Other labels



#### Note

indicates notes that draw your attention to special features.



#### Note

indicates cross-references to other documents, e.g. operating manuals.

## 2.1 Authorized use

The authorized use of the NitraLyt® 700 IQ comprises its use as a nitrate sensor together with a nitrate combination electrode in the IQ SENSOR NET.

The technical specifications according to chapter 8 TECHNICAL DATA must be observed. Only operation according to the instructions given in this operating manual is considered to be authorized.

Any other use is considered to be **unauthorized**. Unauthorized use invalidates any claims with regard to the guarantee.



### Caution

Only connect and operate the sensor together with IQ SENSOR NET accessories.

## 2.2 General safety instructions

The sensor left the factory in a safe and secure technical condition.

### Function and operational safety

The failure-free function and operational safety of the sensor is only guaranteed if the generally applicable safety measures and the special safety instructions in this operating manual are followed during its use.

The failure-free function and operational safety of the sensor is only guaranteed under the environmental conditions that are specified in chapter 8 TECHNICAL DATA.

The specified temperature (chapter 8 TECHNICAL DATA) must be maintained during the operation and transport of the sensor. Protect the sensor, particularly against frost or overheating.



### Caution

The sensor may only be opened by specialists authorized by WTW.



**Safe operation**

If safe operation is no longer possible, the sensor must be taken out of operation and secured against inadvertent operation.

Safe operation is no longer possible if the sensor:

- has been damaged in transport
- has been stored under adverse conditions for a lengthy period of time
- is visibly damaged
- no longer operates as described in this manual.

If you are in any doubt, contact the supplier of your sensor.

**Obligations of the operator**

The operator of the sensor must ensure that the following rules and regulations are followed when dealing with hazardous substances:

- EEC directives for protective labor legislation
- National protective labor legislation
- Safety regulations
- Safety data sheets of the chemical manufacturer.



## 3 Commissioning

### 3.1 Scope of delivery

- NitraLyt® 700 IQ
- The sensor is fitted with a protective hood and protective caps
- Operating manual.

### 3.2 Installation

#### Connection cable

The SACIQ sensor connection cable is required to connect the sensor. Information on this and other IQ SENSOR NET accessories is given in the WTW catalog and on the Internet.



#### Note

How to connect the SACIQ sensor connection cable to the terminal strip of an MIQ module is described in chapter 3 INSTALLATION of the IQ SENSOR NET system operating manual.



#### Caution

The NitraLyt® 700 IQ nitrate sensor unit may only be immersed in conjunction with a mounted combination electrode. Moisture must be prevented from penetrating the nitrate sensor during the replacement of the electrode as, otherwise, the sensor could be destroyed. Which electrodes can be used in conjunction with the NitraLyt® 700 IQ nitrate sensor is given in section 6.1 SENSOR AND ELECTRODES.

#### Are the plug connections dry?

Before connecting the sensor and sensor connection cable, please make sure that the plug connections are dry. If moisture gets into the plug connections, first dry the plug connections (dab them dry or blow them dry using compressed air).



#### Note

Do not suspend the sensor on the sensor connection cable. Use an armature or electrode holder. Information on this and other IQ SENSOR NET accessories is given in the WTW catalog and in the Internet.

**Connecting the sensor  
to the sensor  
connection cable**

1	Take the protective caps off the plug connections of the sensor and the SACIQ sensor connection cable, and keep them safe.
2	Plug the jack of the SACIQ sensor connection cable onto the plug head connector of the sensor. At the same time, rotate the socket so that the pin in the plug head connector (1) clicks into one of the two holes in the jack.
3	Then, screw the coupling ring (2) of the sensor connection cable onto the sensor up to the stop.

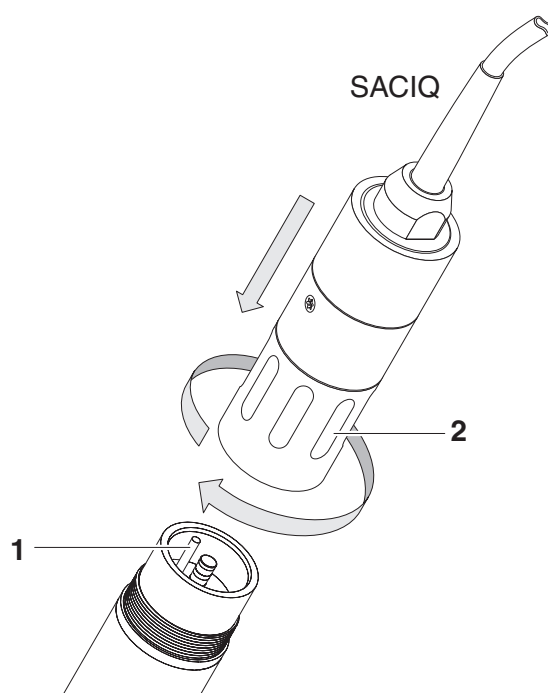
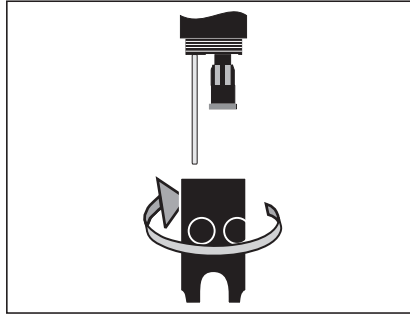


Fig. 3-1 Connecting the sensor

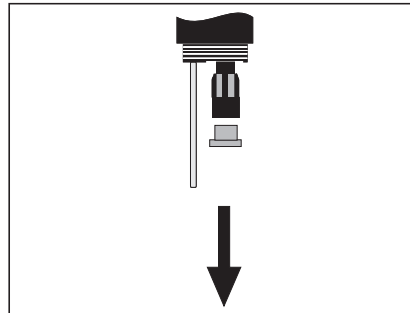
### 3.3 Commissioning / Getting the sensor ready for measuring

#### Mounting the combination electrode

- 1 Unscrew the protective hood from the sensor.



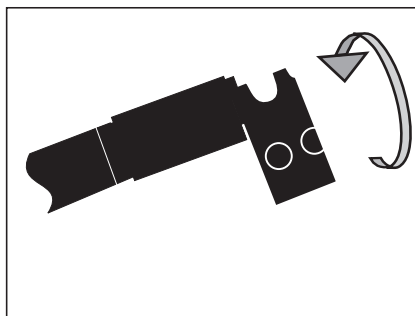
- 2 Pull off the blind plug from the plug head socket of the sensor.



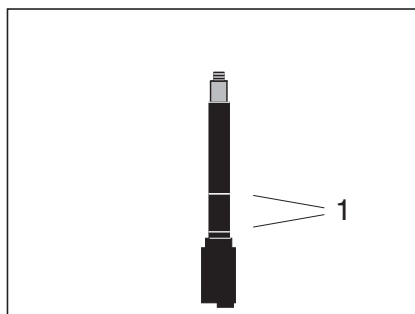
- 3 Prepare the combination electrode to be mounted in the sensor.  
To do so, screw the NitraLyt® NHA/AT exchange electrode onto the NitraLyt® NHA reference electrode without leaving any gap (see NitraLyt® NHA/AT operating manual).

**Note**

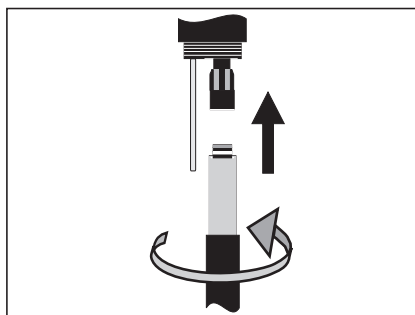
The protection hood of the NitraLyt® 700 IQ sensor can be used as a wrench.



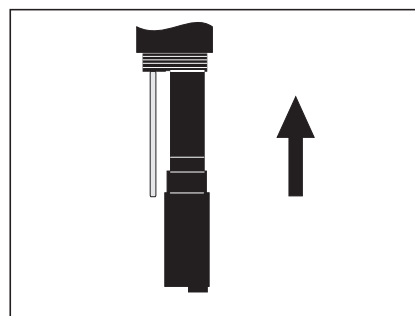
- 4 Grease the two sealing rings (1) of the NitraLyt® electrode using the grease from the tube supplied.



- 5 Screw the reference electrode into the plug head socket of the sensor.



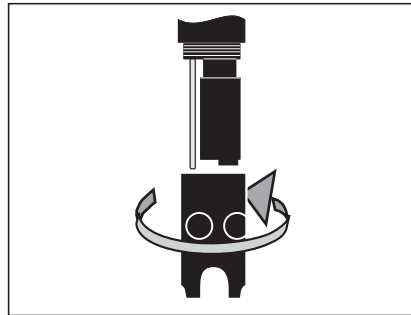
- 6 Push the unit into the sensor up to the stop.



**Caution**

Push the electrode into the sensor right up to the stop so that the connection is watertight. Leaks could lead to the destruction of the sensor.

- |   |  |
|---|--|
| 7 | Screw the protective hood onto the sensor. |
|---|--|



- |    |   |
|----|---|
| 8  | Carry out the settings for the sensor on the terminal of the measuring system (see section 3.4).  |
| 9  | In the case of initial commissioning, condition the sensor together with the mounted combination electrode in a diluted standard solution, e.g. ES/NO3_ISA-50 mg/l NO3-N for about 2 hours (see section 6.2). |
| 10 | Calibrate the sensor and the electrode with the measuring system (see section 4.1).   |

### 3.4 Carrying out the settings for the sensor on the terminal of the IQ SENSOR NET system

The following settings can be carried out for the sensor:






Menu item	Possible settings	Explanations
<i>Measuring mode</i>	<ul style="list-style-type: none"> <li>● <i>NO3</i></li> <li>● <i>NO3-N</i></li> <li>● <i>mV</i></li> </ul>	The citation form of the mass concentration or the voltage of the electrode.
<i>Measuring range (NO3)</i>	<ul style="list-style-type: none"> <li>● <i>AutoRange</i></li> <li>● <i>5 ... 4500 mg/l</i></li> <li>● <i>0.5 ... 450.0 mg/l</i></li> </ul>	Two measuring ranges can be selected. With <i>AutoRange</i> , the instrument automatically switches to the suitable measuring range.
<i>Measuring range (NO3-N)</i>	<ul style="list-style-type: none"> <li>● <i>AutoRange</i></li> <li>● <i>1 ... 1000 mg/l</i></li> <li>● <i>0.1 ... 100.0 mg/l</i></li> </ul>	Two measuring ranges can be selected. With <i>AutoRange</i> , the instrument automatically switches to the suitable measuring range.
<i>Measuring range (mV)</i>	<ul style="list-style-type: none"> <li>● <i>-2000 ... 2000 mV</i></li> </ul>	Fixed range
<i>Temperature mode</i>	<ul style="list-style-type: none"> <li>● <i>°C</i></li> <li>● <i>°F</i></li> </ul>	Unit of the measured temperature value (Celsius, Fahrenheit).



Menu item	Possible settings	Explanations
<i>Cal. procedure</i> (only in the <i>NO<sub>3</sub></i> and <i>NO<sub>3</sub>-N</i> measuring mode)	<ul style="list-style-type: none"> <li>● <i>1 point standard (1)</i></li> <li>● <i>1 point ref. (2)</i></li> <li>● <i>2 point stand. (3)</i></li> <li>● <i>Simple std. add. (4)</i></li> <li>● <i>Double std. add. (5)</i></li> </ul>	<ul style="list-style-type: none"> <li>● 1-point calibration with a standard solution. The concentration of the standard solution must be entered.</li> <li>● 1-point calibration in the test sample with independent determination of the <math>\text{NO}_3^-</math> concentration by a reference measurement. The concentration of the test sample determined in a reference procedure must be entered.</li> <li>● 2-point calibration using any two WTW standard solutions. The concentration of the standard solutions must be entered.</li> <li>● A known concentration of standard solution is added to the sample. The <math>\text{NO}_3^-</math> concentration in the test sample is determined from the change in potential.</li> <li>● A known quantity of a standard solution is added to the test sample in two steps. The <math>\text{NO}_3^-</math> concentration in the test sample is determined from the change in potential during the first and second standard addition.</li> </ul> <p><u>Note:</u> The calibration procedures are described in detail in section 4.1 CALIBRATION.</p>
<i>ORP offset</i> (only in <i>mV</i> measuring mode)	-100 mV ... +100 mV	You can set the voltage zero point here.
<i>Initial calibration</i>	On Off	<p>An <i>Initial calibration</i> is required when the sensor is calibrated for the first time or when an electrode or the entire combination electrode has been replaced. During initial calibration, the basis for the evaluation of the drift potential is determined. Here you can select whether the next calibration should be an <i>Initial calibration</i>. After the initial calibration has been carried out, the setting for <i>Initial calibration</i> automatically switches to <i>Off</i>.</p>

Menu item	Possible settings	Explanations
<i>Temp. adjustment</i>	$-1.5\text{ °C} \dots +1.5\text{ °C}$	<p>The temperature compensation function enables the temperature sensor to be balanced against a reference temperature measurement (displacement of the zero point by <math>\pm 1.5\text{ °C}</math>).</p> <p>Notes:</p> <ul style="list-style-type: none"> <li>● Due to the thermal capacity of the sensor, it is necessary to place it in a container with at least 2 liters of water.</li> <li>● Leave the sensor in this container for at least 15 minutes while stirring occasionally, then carry out the adjustment. If the temperature difference of the water and sensor is <math>&gt; 10\text{ °C}</math>, leave the sensor in the container for at least one hour while stirring occasionally.</li> </ul>
<i>Cl compens.</i>	<i>On</i> <i>Off</i>	<p>Chloride ions in the test sample interfere with the measurement and lead to increased values (see section 4.2.1). After determining the chloride content of the test sample by a reference measurement you can input the determined chloride content here. The chloride compensation corrects the measured value accordingly.</p>
<i>Cl conc.</i> (only with <i>Cl compens.: On</i> )	$0 \dots 1000\text{ mg/l}$	
<i>Save and quit</i>		The system confirms the saving of the settings and the display switches to the next higher level.
<i>Quit</i>		The display switches to the next higher level without saving the new settings.

### Carrying out settings

1	Switch to the measured value display with  .
2	Open the <i>Settings</i> menu with  .
3	Select and confirm the menu item <i>Settings of sensors and diff. sensors -&gt; Measuring range</i> column with  and  .
4	Select an entry with  .

Terminal PC	01 Jan 2001	00 43			
Settings of sensors and diff. sensors					140
&	No.	Sensor name	Measuring range		
	S01	99160001	N03-N AutoRange		
Select , edit sensor settings					

Fig. 3-2 140 - Settings of sensors and diff. sensors

- 5 Confirm the selection with .  
The settings of the sensor are displayed.





Terminal PC	01 Jan 2001 00 00			
S01 NitraLyt700IQ 99160001				
Measuring mode	N03-N			
Measuring range	AutoRange			
Temperature mode	°C			
Cal. procedure	1 point standard (1)			
Temp. adjustment	0.0 K			
no entry (e)	Off			
Initial calibration	On			
Save and quit				
Quit				
Select setting 				

Fig. 3-3 140 - Settings of sensors and diff. sensors

- 6 Make the sensor settings with and confirm each of them with .
- 7 Select the *Save and quit* menu item with and confirm with . The new settings are stored in the sensor.



## 4 Calibration and measuring

### 4.1 Calibration

#### 4.1.1 General information

##### Why calibrate?

When a nitrate electrode is operated its characteristic curve changes with the course of time. The characteristic curve is generally characterized by the slope and the axis intercept. The characteristic curve is the base for calculating the measured value from the electrode voltage.

With calibration, the current characteristic curve parameters are determined as follows:

- With all calibration procedures, i. e. 1-point and 2-point procedures, the change of the axis intercept is determined ("drift potential").
- All two-point calibration procedures additionally determine the slope.

##### Why calibrate?

Calibrate during the initial commissioning, after exchanging an electrode and at regular intervals (depending on the application).

##### Calibration log and calibration history

The calibration history contains the calibration log of the initial and last of the following calibrations. You can call up the calibration history via the *Calibration history of selected sensor* display option.

##### Citation form

There are two common citation forms for the specification of nitrate contents in a solution. The citation form, NO<sub>3</sub>, specifies the nitrate content (NO<sub>3</sub><sup>-</sup>). The citation form, NO<sub>3</sub>-N, specifies the amount of nitrate nitrogen only. You can select the required citation form in the settings for the sensor.

If the citation forms do not correspond, you can carry out the conversion yourself.

1 mg/l NO<sub>3</sub> = 0.226 mg/l NO<sub>3</sub>-N.

1 mg/l NO<sub>3</sub>-N = 4.427 mg/l NO<sub>3</sub>.



##### Note

Ordering information on nitrate standard solutions can be found in section 6.2.

#### 4.1.2 Overview of the calibration procedures

For nitrate measurements with the NitraLyt® 700 IQ sensor, the following calibration procedures can be selected:

**1 point standard (1)**

1-point calibration in a standard solution.

**1 point ref. (2)**

1-point calibration in the test sample. Calibration is carried out determining the nitrate concentration by an independent reference procedure, e. g. photometry.

**2 point stand. (3)**

2-point calibration in two standard solutions.

**Simple std. add. (4)**

Calibration in the test sample with a one-time addition of standard solution.

**Double std. add. (5)**

Calibration in the test sample with a double addition of standard solution.

**Determined calibration data**

Depending on the calibration procedure (single-point or two-point), the following data are determined during calibrating:

Calibration procedures	Drift potential:	Slope
1 point standard (1)	<input checked="" type="checkbox"/>	
1 point ref. (2)	<input checked="" type="checkbox"/>	
2 point stand. (3)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>
Simple std. add. (4)	<input checked="" type="checkbox"/>	
Double std. add. (5)	<input checked="" type="checkbox"/>	<input checked="" type="checkbox"/>

In the calibration log and calibration history (section 4.1.10), the slope and drift potential are output. The drift potential and slope inform about the age condition of the electrode.



**Note**

Single-point calibration procedures take over the slope of the last two-point calibration. If no valid data from a two-point calibration are available, the default setting (+59.16 mV) is used. In both cases the value is marked with \* in the calibration history.

### 4.1.3 Calibrating in practice

#### Initial calibration

The first calibration (initial calibration) is especially important as it is the reference point for all other calibrations (following calibrations).

An initial calibration is required each time an electrode is commissioned. The initial calibration is switched on and off in the setting menu of the sensor (see section 3.4).

With the initial calibration, the zero point for the drift potential is determined. It serves as the reference value for the drift potential, which is determined and recorded in the calibration log with every following calibration. In addition to the slope, the drift potential informs about the age condition of the electrode (see section 4.1.10).



#### Note

An optimum initial calibration is achieved by a calibration procedure that determines the current slope of the electrode (*2 point stand. (3)* or *Double std. add. (5)*). If the slope is not determined, the default setting (-59.16 mV) is taken over. A value that is taken over is marked with \* in the calibration history (see section 4.1.10).

Following the initial calibration, we recommend to carry out a calibration with the *1 point ref. (2)* procedure in order to compensate for matrix effects of the real test sample. Apart from that, the chloride content of the test sample should be determined and checked for whether a chloride compensation is required (see section 4.2.1).

#### Following calibrations

Basically, any calibration procedure can be used for the following calibrations. The slope of the electrode should be determined at regular intervals in any case in order to be able to evaluate the aging of the electrode. If the electrode cannot be calibrated any more because the slope is too low it is blocked for measurement and has to be exchanged.

#### "Emergency operation" with invalid slope

After determining an invalid slope, the sensor can be further operated with a subsequent valid single-point calibration as a stopgap solution until the electrode is exchanged. The last valid slope is used in the measuring operation. With the single-point calibration, a corresponding note appears quoting the slope that is used.

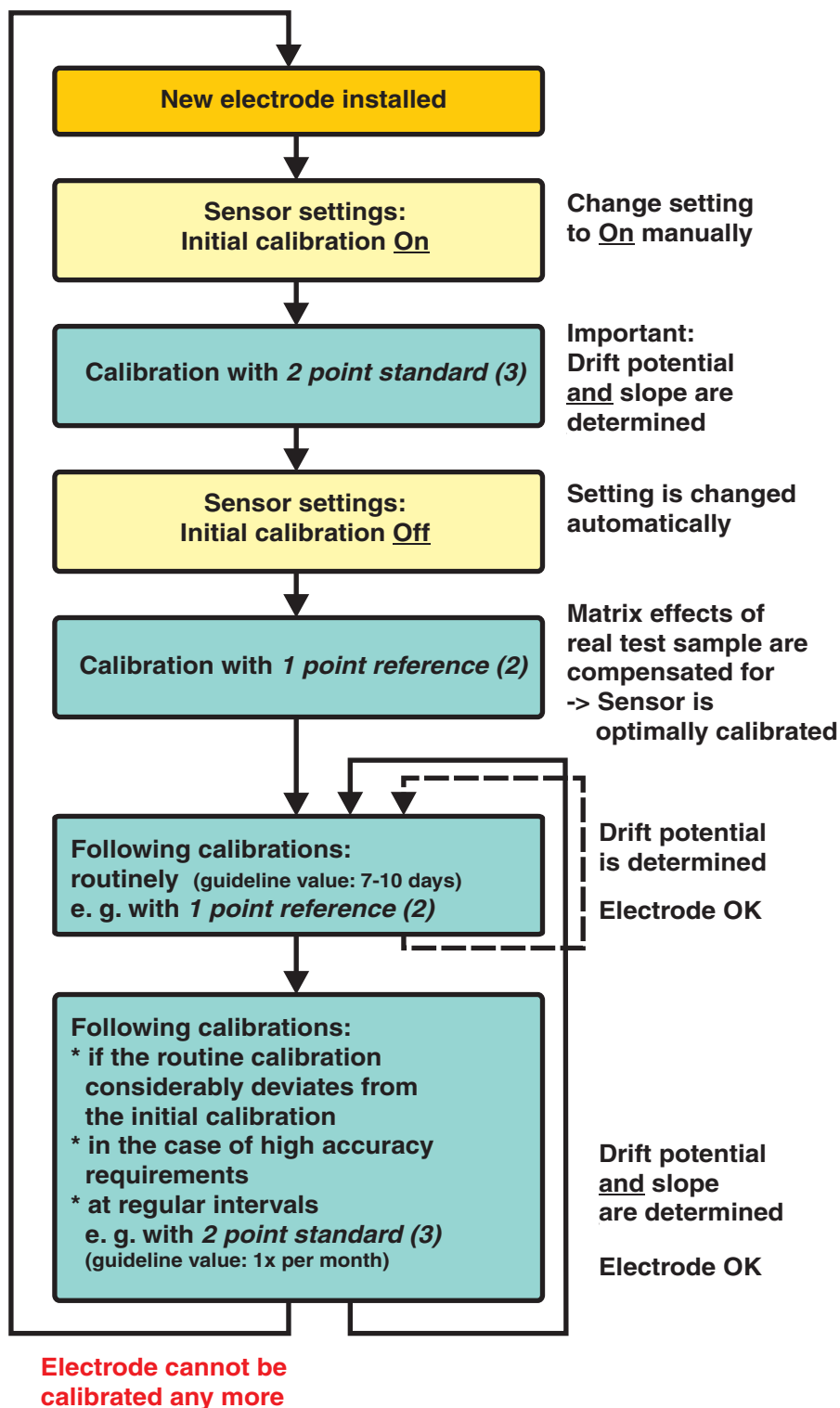
Optimum calibration of  
an electrode

Fig. 4-1 Sequence of calibrations



4.1.4 General course of a calibration

Preparatory activities

An optimum calibration result is possible if you,

- before calibrating,
  - condition the sensor in the ES/NO3\_ISA-50 standard solution with 50 mg/l NO3-N for approx. 10 min
  - set the required calibration procedure (see section 3.4).
- make sure the temperature of standard solution and test sample is similar while calibrating



Note

When exchanging an electrode or the entire combination electrode an initial calibration (see section 4.1.3) always has to be carried out.

Course

1	Switch to the measured value display with <b>(M)</b> .
2	Select the measured value display of the required sensor with <b>(C)</b> .
3	Call up the calibration with <b>(C)</b> . The <i>Maintenance condition: Linked outputs are frozen.</i> window appears.

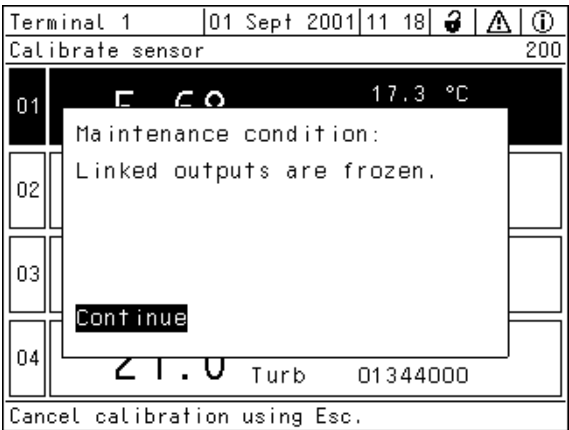


Fig. 4-2 Maintenance condition



Note

When the maintenance condition is activated, linked outputs remain in their current condition. In the measured value display, the measured value or the condition indicator of the sensor flashes.

Starting the calibration

4	Confirm with <b>(OK)</b> . The display appears with a note that an initial calibration may be necessary.
---	---

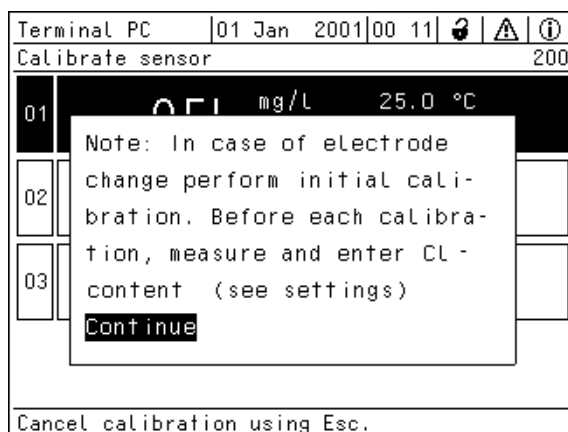


Fig. 4-3 200 - Calibrate sensor

- 5 Confirm with **OK**.  
The following display (or similar, depending on the selected calibration procedure) appears:

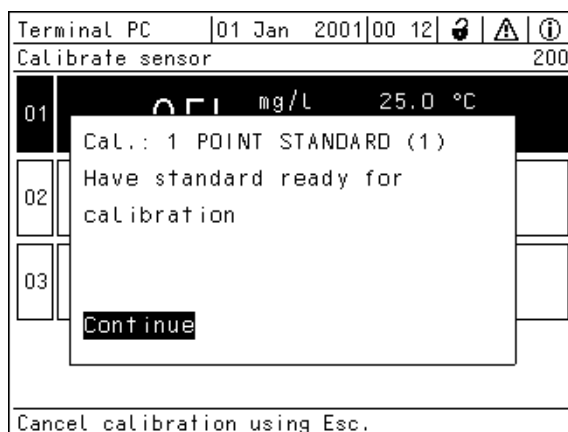


Fig. 4-4 200 - Calibrate sensor

- 6 The further course depends on the respective calibration procedure. The individual operating steps are given in the sections 4.1.5 to 4.1.9.

**Note**

You can break off the calibration procedure at any time with the **(ESC)** key. The system continues to work with the old calibration data. However, you have to switch off the maintenance condition in any case.

**Note**

The sensor determines a stable measured value with each measurement during the course of a calibration. The display shows a continuation display and the current electrode voltage in mV.

After calibrating, the following display appears:

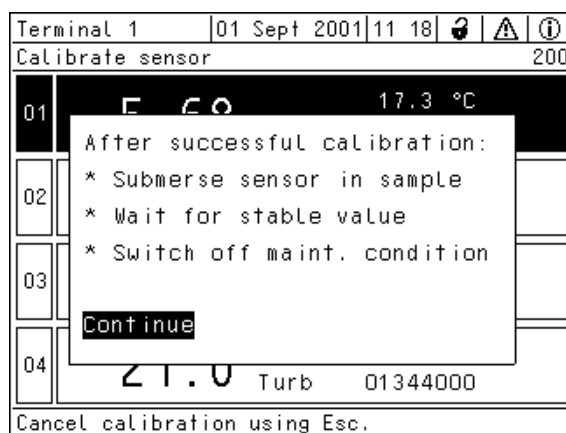


Fig. 4-5 After calibrating

### Completing the calibration

7	Confirm with <b>(OK)</b> . The measured value display appears again (the measured value flashes because the sensor is still in the maintenance condition).
8	If the calibration was successful, immerse the sensor in the sample.
9	Wait for a stable measured value.
10	Switch off the maintenance condition (press <b>(OK)</b> and, in the <i>Display/Options</i> menu, make the setting).
11	Switch to the measured value display with <b>(M)</b> . The measured value no longer flashes.

**Note**

If the calibration was not successful, "----" appears on the display and a corresponding entry with instructions appears in the log book. Follow the instructions and repeat the calibration.

#### 4.1.5 Calibration procedure, 1 point standard (1)

##### General information

The *1 point standard (1)* 1-point calibration is carried out using one standard solution. The procedure includes a conditioning process. The conditioning takes 15 min and is important so the temperatures of standard solution and electrode can adjust to each other and a stable concentration can be reached at the electrode membrane. During the conditioning process the remaining time is displayed on the screen. The process cannot be shortened. By pressing  $\text{ESC}$  or  $\text{M}$  you cancel the entire calibration and the old calibration data is used further. The time required for the entire calibration is approx. 25 min.





##### Note

Determine the chloride content of the test sample (see section 4.2.1). Activate the *Cl compens.* function and adjust the chloride content (see section 3.4)

The chloride content of the sample does not affect calibration but the following measurement.

##### Operating steps during calibration

Display	Explanation
<i>Unscrew protective hood. Clean and rinse sensor incl. electrode and protective hood, then reassemble them.</i>	Prepare the sensor as described. After completing the operating steps confirm with $\text{OK}$ .
<i>Cal.: 1 POINT STANDARD (1) Have standard ready for calibration</i>	You can use any standard solution. The nitrate value should be as close to the value expected for the test sample as possible. Confirm with $\text{OK}$ .
<i>Immerse sensor in standard. Observe minimum immersion depth (70mm).</i>	Confirm with $\text{OK}$ .
<i>Select standard concentration (5 / 50 / 500) mg/l NO<sub>3</sub>-N</i>	Enter the nominal concentration of the calibration standard and confirm with $\text{OK}$ . Subsequently wait for the conditioning time of 15 minutes to expire. The remaining time is shown on the display.

<i>Discard used standard. Immerse sensor in new standard with similar concentration. Start calibration.</i>	Immerse the sensor in fresh standard solution of similar concentration as described. After completing the operating steps confirm with  . The measurement is started.
<i>Calibration successful Conc. (NO3-N)    x mg/l Slope                y mV* Drift voltage        z mV End of 1 POINT STAND. (1) cal.</i>	The values for <i>Conc. (NO3-N)</i> , <i>Slope</i> and <i>Drift voltage</i> are displayed. The slope is taken over from the last calibration that determined the slope. The calibration is complete. Confirm with  . The display returns to the measured value display.

#### 4.1.6 Calibration procedure, 1 point ref. (2)

The *1 point ref. (2)* 1-point calibration is carried out with the sample and in two main steps, each of which is started with **C**.



##### Note

Determine the calibration value and take the sample from the aeration tank after the aeration phase is finished. The nitrate concentration is highest at this point of time. At the end of the phase without aeration the nitrate content can decrease to a value that lies close to the detection limit. It does not make sense to calibrate in this range.



##### Note

Determine the chloride content together with the reference value for the nitrate content in this calibration procedure.

#### Operating steps during step 1

Display	Explanation
<i>Cal.: 1 POINT REFERENCE (2) Step 1: Reference voltage is being determined</i>	Confirm with <b>OK</b> .
<ul style="list-style-type: none"> <li>* Rinse electrode.</li> <li>* Immerse electrode in sample.</li> <li>* Observe conditioning time of 15 minutes.</li> </ul>	<p>Before starting the calibration the sensor should be immersed in the test sample for conditioning for at least 15 min.</p> <p>Start the measurement with <b>OK</b>.</p> <p>This step determines and stores the reference voltage.</p> <p>As soon as a stable measured value is recognized, the next display appears.</p>
<i>Step 1 finished. Switch to the measured value display with 2x 'OK'. After det. The reference concentration, start calib. step 2 with 'C'.</i>	Step 1 of the calibration is finished. Press <b>OK</b> <u>twice</u> to switch to the measured value display. The sensor is in the maintenance condition.



##### Note

During the subsequent determination of the reference concentration in the laboratory you can use the sensor for measuring again by simply abolishing the maintenance condition.

The sensor continues to use the old calibration data. The reference voltage determined in step 1 of the calibration is not lost. It remains stored until step 2 of the calibration is completed. It does not have to be noted and entered again.

### Sampling and determining the reference concentration

You have to be in the measured value display to continue the calibration.


Continue with sampling and determining the reference concentration as follows.

- |   |                |
|---|----------------|
| 1 | Take a sample. |
|---|----------------|



















#### Note

The nitrate content has to be determined immediately after taking the sample as the nitrate content changes very quickly due to the micro organisms that are present. It is best to take the sample using a syringe filter for transport to the laboratory or to stabilize it otherwise. When adding stabilizing solutions, the dilution factor has to be taken into account.

- |   |   |
|---|---|
| 2 | Determine the concentration of nitrate and chloride in the laboratory. With this procedure, the chloride content of the sample affects calibration as well as measurement.  |
| 3 | In the <i>Settings of sensors and diff. sensors</i> menu (see section 3.4) <ul style="list-style-type: none"> <li>– Switch on the <i>Cl compens.</i> function and</li> <li>– enter the chloride content.</li> </ul> |
| 4 | Continue the calibration as follows with  .  |

### Operating steps during step 2



Display	Explanation
<i>Cal.: 1 POINT REFERENCE (2)</i> <i>Step 2: Enter reference concentration</i> <i>Reference voltage already determined</i>	Confirm with  .
<i>Continue with ...</i> <i>...Input ref. conc.</i> <i>...New calibration</i>	Here you can select whether you want to repeat step 1 of the calibration ( <i>...New calibration</i> ), or enter the reference concentration ( <i>...Input ref. conc.</i> ). Confirm with  Select the step with  Confirm with  Confirm with 
<i>Input reference concentration</i> <i>Citation form/Value range</i>	Confirm with  .

<i>Citation form of ref. conc.</i> <i>NO3 (0.5..450.0 mg/l)</i> <i>NO3 (5..4500 mg/l)</i> <i>NO3-N (0.1..100.0 mg/l)</i> <i>NO3-N (1..1000 mg/l)</i>	Confirm with  Select the citation form with  Confirm with  Confirm with 
<i>Input reference concentration</i> <i>Value determined</i>	Confirm with 
<i>Value of ref. concentration</i> <i>x mg/l NO3-N</i>	Confirm with  Set the reference concentration determined with  Confirm with  Confirm with 
<i>Calibration successful</i> <i>Conc. (NO3-N)      x mg/l</i> <i>Slope                      y mV*</i> <i>Drift voltage            z mV</i> <i>End of 1 POINT REF. (2) cal.</i>	The values for <i>Conc. (NO3-N)</i> , <i>Slope</i> and <i>Drift voltage</i> are dis- played. The slope is taken over from the last calibration that determined the slope. Calibration is complete. Confirm with  The display returns to the mea- sured value display.



#### 4.1.7 Calibration procedure, 2 point stand. (3)

##### General information

The *2 point stand. (3)* two-point calibration is carried out with two standard solutions of different concentrations. The procedure includes two conditioning processes. Each conditioning process takes 15 min and is important so the temperatures of standard solution and electrode can adjust to each other and a stable concentration can be reached at the electrode membrane. During the conditioning process the remaining time is displayed on the screen. The process cannot be shortened. By pressing  or  you cancel the entire calibration and the old calibration data is still used. The time required for the entire calibration is approx. 40 min.














##### Note

Determine the chloride content of the test sample (see section 4.2.1). Activate the *Cl compens.* function and adjust the chloride content (see section 3.4).

The chloride content of the sample does not affect calibration but the following measurement.

##### Operating steps during calibration

Displays	Explanation
<i>Unscrew protective hood. Clean and rinse sensor incl. electrode and protective hood, then reassemble them.</i>	Prepare the sensor as described. After completing the operating steps confirm with  .
<i>Cal.: 2 POINT STANDARD (3) Have standard with higher concentration ready for calibration</i>	Confirm with  .
<i>Immerse sensor in standard with higher concentration. Observe minimum immersion depth (70mm).</i>	Confirm with  .
<i>Select standard concentration (5 / 50 / 500) mg/l NO<sub>3</sub>-N</i>	Enter the nominal concentration of the first calibration standard ( <u>higher</u> concentration) and confirm with  . Subsequently wait for the conditioning time of 15 minutes to expire. The remaining time is shown on the display.
<i>Discard used standard. Immerse sensor in new standard with similar concentration. Start calibration.</i>	Immerse the sensor in fresh standard solution of similar concentration as described. After completing the operating steps confirm with  . The measurement is started.

Displays	Explanation
<i>Cal.: 2 POINT STANDARD (3) Calibration values for stand. with higher concentration determined. Have stand. with lower concentration ready</i>	Confirm with  .
<i>Rinse sensor with stand. with lower concentration. Immerse sensor in stand. with lower concentration. Observe minimum immersion depth (70mm).</i>	Confirm with  .
<i>Select standard concentration (5 / 50 / 500) mg/l NO<sub>3</sub>-N</i>	Enter the nominal concentration of the second calibration standard ( <u>lower</u> concentration) and confirm with  . Subsequently wait for the conditioning time of 15 minutes to expire. The remaining time is shown on the display.
<i>Discard used standard. Immerse sensor in new standard with similar concentration. Start calibration.</i>	Immerse the sensor in fresh standard solution of similar concentration as described. After completing the operating steps confirm with  . The measurement is started.
<i>Cal.: 2 POINT STANDARD (3) Calibration values for standard with lower concentration determined</i>	Confirm with  .
<i>Calibration successful Conc. (NO<sub>3</sub>-N)    x mg/l Slope                y mV Drift voltage        z mV End of 2 POINT STAND. (3) cal.</i>	The values for <i>Conc. (NO<sub>3</sub>-N)</i> , <i>Slope</i> and <i>Drift voltage</i> are displayed. Calibration is complete. Confirm with  . The display returns to the measured value display.

#### 4.1.8 Calibration procedure, *Simple std. add.* (4)

Calibration with simple standard addition is carried out in the sample while adding standard. The volumes of test sample and standard have to be exactly dosed.

The following appliances are suitable for dosing:

- Measuring cylinder to determine the volume of the sample
- Pipette (microliter pipette as necessary) for accurate dosing of the standard. The higher the concentration of the standard, the more important it is to measure the amount of calibration standard very carefully.



##### **Note**

**Before** calibrating, determine the chloride content of the sample (see section 4.2.1).

**Before** calibrating, activate the *Cl compens.* function and adjust the chloride content (see section 3.4).

The chloride content of the test sample affects the calibration result.

#### **Conditions and calibration range for simple standard addition**

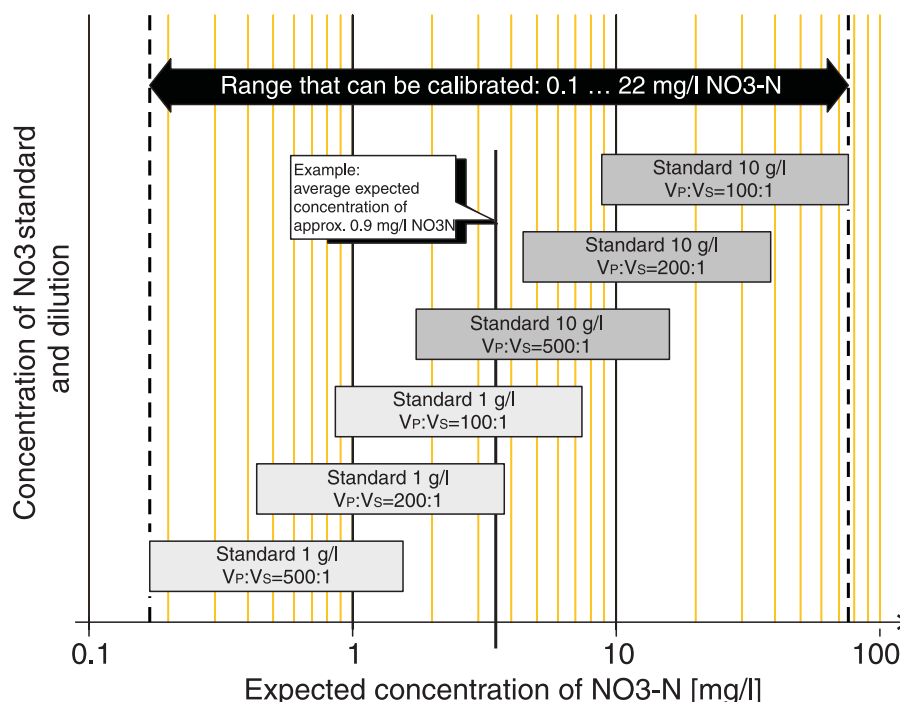
Observe the following points for the simple standard addition:

- The volume of the standard added to the test sample changes the test sample. Therefore, the volume of the standard should not be more than approx. 1 % of the volume of the sample.  
Example: With 100 ml sample volume, the added volume should not be more than 1 ml.
- Through the addition of standard solution, the nitrate content of the test sample should be increased at least twofold but not more than tenfold.

Based on these conditions, the range that can be calibrated is from 0.1 to 22 mg/l NO<sub>3</sub>-N (or 0.44 to 98 mg/l NO<sub>3</sub>). If the expected measured values are outside this range, a different calibration procedure has to be selected.

#### **Concentration and quantity of standard solution**

The concentration and quantity of the standard solution to be added depend on the measuring range expected. They can be determined by means of the following diagram. The requirements for the simple standard addition are automatically met while doing so.



$V_P:V_S$  is the volume ratio between the test sample and standard to be added. If several combinations for concentration/volume ratio (bars) are possible for the determination, select the bar where the expected NO<sub>3</sub>-N concentration is more in the center.

#### Example:

The expected average concentration is approx. 0.9 mg/l NO<sub>3</sub>-N. The vertical line in the diagram crosses three ranges:

- Concentration 1 g/l and volume ratio 200:1
- Concentration 1 g/l and volume ratio 100:1
- Concentration 10 g/l and volume ratio 500:1

Selection of the range: Basically, all of the three ranges are suitable. The lower bar is crossed by the line on the right edge only. Therefore, the other two ranges are better suited. For further selection, decide which bar covers the expected measuring range better, i. e. whether the expected values are rather lower or higher than the average value. Besides, the decision can be made according to practical points of view (availability of standard solution and suitable dosing equipment).



















#### Entry of volumes

The volume of standard to be added in this calibration procedure has to be entered on the terminal of the IQ SENSOR NET with an accuracy of 1/10 ml. Therefore, the volume has to be rounded up or down accordingly.

**Note**

Make sure the citation form is correct for all specifications of the concentration.

**Operating steps during calibration**

Display	Explanation
<i>Cal.: SIMPLE STD. ADD. (4)</i> <i>Have test sample ready for calibration</i>	Confirm with  .
<i>Input sample volume</i> <i>(100 ... 1000) ml</i>	Confirm with  Select the volume of the sample with  Confirm with  Confirm with  .
<i>* Wait for a stable measured value.</i>	Confirm with  .
<i>Cal.: SIMPLE STD. ADD. (4)</i> <i>Determine reference voltage of test sample</i> <i>Have standard ready</i>	Confirm with  The measurement of the test sample begins.
<i>Select standard concentration</i> <i>(1 / 10) g/l NO<sub>3</sub></i>	Confirm with  Select the concentration of the standard with  Confirm with  Confirm with  .
<i>Input standard volume</i> <i>(0.1 ... 20) ml</i>	Confirm with  Select the volume of the standard with  Confirm with  Confirm with  .
<i>Cal.: SIMPLE STD. ADD. (4)</i> <i>Add standard to test sample</i>	Add the quantity of standard that was entered to the test sample. Subsequently confirm with  .
<i>* Wait for a stable measured value.</i>	Confirm with  .
<i>Cal.: SIMPLE STD. ADD. (4)</i> <i>Reference voltage determined after standard addition</i>	Confirm with  .

Display	Explanation
<i>Calibration successful</i> <i>Conc. (NO<sub>3</sub>-N)      x mg/l</i> <i>Slope                      y mV*</i> <i>Drift voltage            z mV</i> <i>End of SIMPLE STD ADD (4) cal.</i>	The values for <i>Conc. (NO<sub>3</sub>-N)</i> , <i>Slope</i> and <i>Drift voltage</i> are displayed. Calibration is complete. Confirm with <b>OK</b> . The display returns to the measured value display.

#### 4.1.9 Calibration procedure, *Double std. add. (5)*

This calibration with double standard addition is carried out in the test sample while adding standard with a certain concentration in two steps. The volumes of test sample and standard have to be exactly dosed.

The following appliances are suitable for dosing:

- Measuring cylinder to determine the volume of the sample
- Pipette to exactly dose the standard



#### Note

**Before** calibrating, determine the chloride content of the sample (see section 4.2.1).

**Before** calibrating, activate the *Cl compens.* function and adjust the chloride content (see section 3.4).

The chloride content of the test sample affects the calibration result.

#### Concentration and quantity of standard solution

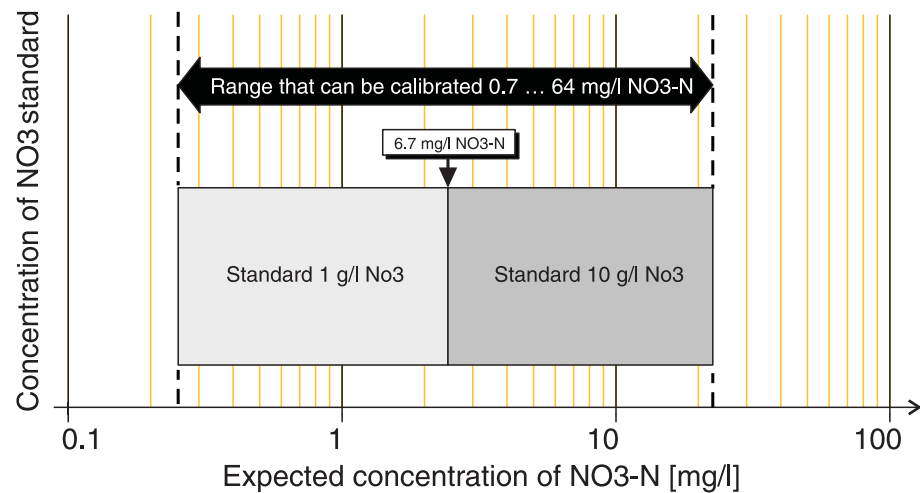
The quantity of standard solution to be added is permanently fixed for the double standard addition:

- First addition: 1 % of the sample volume
- Second addition: 2 % of the (original) sample volume

After both additions, the original nitrate content of the test sample should be increased at least twofold but not more than tenfold.












Based on these conditions, the range that can be calibrated is from 0.7 to 64 mg/l NO<sub>3</sub>-N (or 3.2 to 283 mg/l NO<sub>3</sub>). If the expected measured values are outside this range, a different calibration procedure has to be selected.








The concentration of the standard solution to be added depends on the measuring range expected. It can be determined by means of the following diagram. The requirements for the double standard addition are automatically met while doing so.



**Note**  
Make sure the citation form is correct for all specifications of the concentration.

**Operating steps during calibration**

Display	Explanation
<i>Cal.: DOUBLE STD. ADD. (5)</i> <i>Have test sample ready for calibration</i>	Confirm with  .
<i>Input sample volume</i> <i>(100 ... 1000) ml</i>	Confirm with  Select the volume of the sample with  Confirm with  Confirm with  .
<i>* Rinse electrode.</i> <i>* Immerse electrode in test sample.</i> <i>* Wait for a stable measured value.</i>	Confirm with  . The measurement of the test sample begins.
<i>Cal.: DOUBLE STD. ADD. (5)</i> <i>Determine reference voltage of test sample</i> <i>Have standard ready</i>	Confirm with  .
<i>Select standard concentration</i> <i>(1 / 10) g/l NO3</i>	Confirm with  Select the concentration of the standard with  Confirm with  Confirm with  .

Display	Explanation
<i>Add standard to sample</i>	Confirm with  .
<i>* Wait for a stable measured value.</i>	Confirm with  The measurement begins.
<i>Cal.: DOUBLE STD. ADD. (5) Reference voltage determined after first standard addition</i>	Confirm with  .
<i>Add standard to sample</i>	Confirm with  .
<i>* Wait for a stable measured value.</i>	Confirm with  The measurement begins.
<i>Cal.: DOUBLE STD. ADD. (5) Reference voltage determined after second standard addition</i>	Confirm with  .
<i>Calibration successful Conc. (NO<sub>3</sub>-N)    x mg/l Slope                y mV* Drift voltage        z mV End of DOUBLE STD ADD (5) cal.</i>	The values for <i>Conc. (NO<sub>3</sub>-N)</i> , <i>Slope</i> and <i>Drift voltage</i> are displayed. Calibration is complete. Confirm with  The display returns to the measured value display.

#### 4.1.10 Calibration result

##### Calibration evaluation

After calibrating the system automatically evaluates the calibration data and current state of the sensor. The drift potential and slope are evaluated separately. For a valid calibration, the values have to be within the following ranges:

Slope: -50 ... -70 mV

Drift potential: -100 ... +100 mV



A calibration can have the following results:

### Possible results of the calibration

Display after the calibration	Log book entries (meaning/actions)
Measured value display	Sensor was successfully calibrated. Slope and drift potential are within the valid range. For calibration data, see calibration history.
"----"	Sensor could not be calibrated. Slope and/or drift potential are outside the valid range. Sensor blocked for measurement. <ul style="list-style-type: none"> <li>– Service the sensor immediately (see chapter 5).</li> <li>– View the calibration history.</li> <li>– Check the calibration conditions and calibration standard.</li> </ul> <p><b>Note:</b> After determining an invalid slope, the sensor can be further operated with a subsequent valid single-point calibration as a stopgap solution until the electrode is exchanged. The last valid slope is used in the measuring operation. With the single-point calibration, a corresponding note appears quoting the slope that is used.</p>




### Note

Information on the contents and structure of the log book and how you can call it up is given in the LOG BOOK chapter of the IQ SENSOR NET system operating manual.

### Viewing the calibration data

The calibration data can be viewed as follows via the *Calibration history* display option.

1	Select the relevant sensor in the measured value display on the terminal.
2	Press the  key. The <i>Display/Options</i> menu appears.
3	Select the <i>Calibration history of selected sensor</i> menu item. The data of the last calibrations of the sensor appear on the display.

## Calibration history

Terminal PC	01 Jan 2005	00 03						
Calibration history of selected sensor 330								
S01 NitraLyt700IQ 99160001								
Date	S	DV	Ref1	Ref2	Cl-	P	T	R
01.12.04	59.2	0	50.0	5.0	100	3	25	+
01.12.04	59.2*	-21	5.5	-	105	2	17	+
02.12.04	59.2*	-21	5.0	-	105	1	24	+
25.12.04	59.2*	-104	3.7	-	108	2	17	-
26.12.04	51.3	-78	50.0	5.0	108	3	23	+
* Values unchanged								
Return ESC								

Calibration data of the initial calibration.

List with calibration data of the last calibrations

Fig. 4-6 330 - Calibration history of selected sensor

The calibration history contains the following information:

<b>Date</b>	Date of the calibration
<b>S(*)</b>	Slope [mV] of the electrode The value is indicated by * <i>Values unchanged</i> if the slope cannot be determined. Instead, the last determined slope value is taken over. This applies for all single-point calibration procedures, <i>1 point standard (1)</i> , <i>1 point ref. (2)</i> and <i>Simple std. add. (4)</i> .
<b>DV</b>	Drift potential [mV]
<b>Ref1/Ref2</b>	Concentration [mg/l NO <sub>3</sub> -N] <ul style="list-style-type: none"> <li>● of the standard with <i>1 point standard (1)</i></li> <li>● of the test sample (reference measurement) with <i>1 point ref. (2)</i></li> <li>● of the two standards with <i>2 point stand. (3)</i></li> <li>● of the test sample (calculated) with <i>Simple std. add. (4)</i> [Ref1/-]</li> <li>● of the test sample (calculated) with <i>Double std. add. (5)</i> [Ref1/Ref2]</li> </ul>
<b>Cl-</b>	Chloride content [mg/l]
<b>P</b>	Calibration procedures, number 1 ... 5
<b>T</b>	Temperature [°C]
<b>R</b>	Result of the calibration + : Calibration successful - : Calibration unsuccessful

**Note**

Only calibration data produced by the same calibration procedure can be compared.

## 4.2 Measuring

1	Submerge the sensor with the mounted combination electrode in the sample.
2	Read the measured value on the terminal of the IQ SENSOR NET system.



### Note

Please pay attention to:

- the minimum immersion depth of the sensor (> 70 mm)
- the measuring range of the electrode used (see operating manual of the electrode).



### Note

To keep the sensor clean, we strongly recommend to use the CH cleaning head (see chapter 6 REPLACEMENT PARTS AND ACCESSORIES).

### 4.2.1 Chloride compensation

Measuring nitrate in the presence of chloride leads to increased nitrate values:

Chloride contents	Increase of the measured nitrate value by approx.
100 mg/l Cl <sup>-</sup>	0.7 mg/l
500 mg/l Cl <sup>-</sup>	3.6 mg/l

Higher measured values caused by chloride can be compensated for by switching on the *Cl compens.* function and entering the chloride content in the *Settings of sensors and diff. sensors* menu (see section 3.4).

#### Chloride compensation for calibration

The presence of chloride affects the calibration results of the following calibration procedures:

- *1 point ref. (2)*
- *Simple std. add. (4))*
- *Double std. add. (5)*

For these calibration procedures, the current chloride content must always be determined and entered before or during calibration. The entered chloride compensation has an effect on the calibration result and thus on the subsequent measurements.

### Chloride compensation for measurements

The calibration procedures, *1 point standard (1)* and *2 point stand. (3)* are carried out in standard solutions. Chloride does not interfere here. An incorrectly set chloride compensation only affects the following measurement.

The function, *Cl compens.*, should always be used if the concentration of the interfering ion causes the measurement signal to leave the range of the required accuracy. To avoid calibration and measuring errors, we recommend to

- routinely determine the chloride content
- switch on the *Cl compens.* function
- enter the chloride content.

The more the actual chloride content deviates from the value entered for the chloride compensation, the more the displayed measured value deviates from the current nitrate content.

Fig. 4-7 shows the interrelationship of the real and displayed  $\text{NO}_3\text{-N}$  value for different chloride contents. The characteristic curve with optimum chloride compensation corresponds to the characteristic curve without chloride contents.

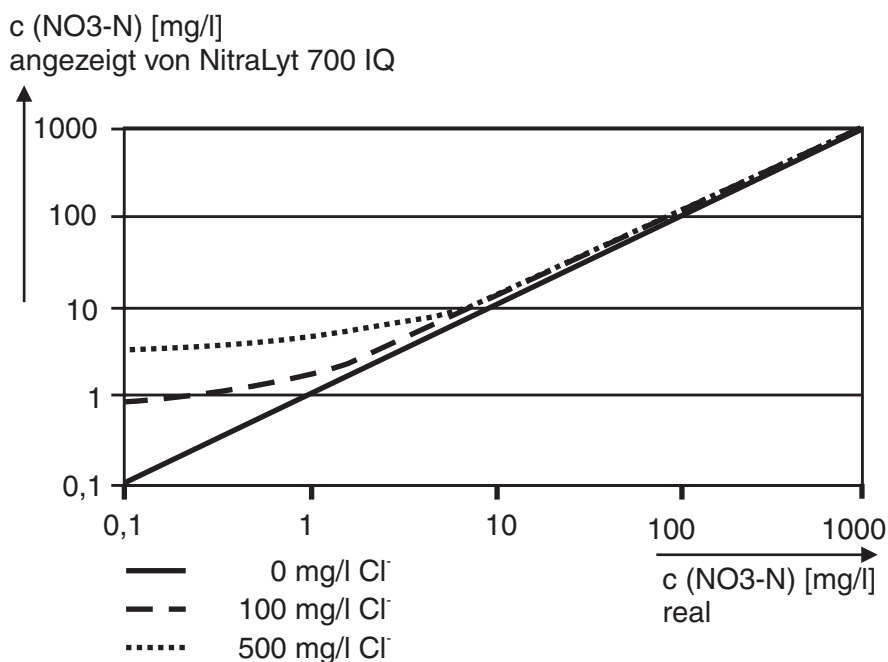


Fig. 4-7 Influence of chloride on the measured nitrate value

#### 4.2.2 Further influences on the measured value

Greases, oils, certain tensides and similar substances can shorten the operational lifetime of the NitraLyt® NHA/AT exchange electrode. Therefore, they should not be present in the test sample.

## 5 Maintenance and changing the electrode

The NitraLyt® 700 IQ nitrate sensor is maintenance-free.



### Warning

Contact with the sample can be dangerous for the user! Depending on the type of sample, suitable protective measures must be taken (protective clothing, protective goggles, etc.).



### Note

To keep the sensor clean we absolutely recommend to use the CH cleaning head (see chapter 6 REPLACEMENT PARTS AND ACCESSORIES).



### Note

Please read the maintenance of the combination electrode in the relevant operating manual of the electrode.



### Note

We do not recommend unscrewing the sensor from the sensor connection cable when changing the electrode. Otherwise, moisture and/or dirt can get into the plug connection where it can cause contact problems.

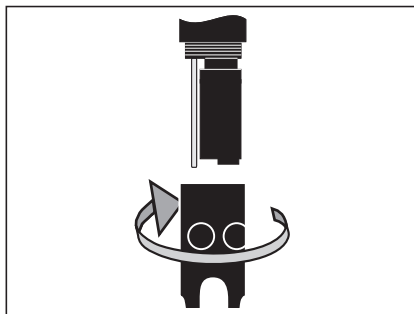
If you need to disconnect the sensor from the sensor connection cable, please note the following points:

- Before disconnecting the sensor from the SACIQ sensor connection cable, remove any larger pieces of contamination from the sensor, particularly in the area of the plug connection (brush it off in a bucket of tap water, wash it off with a hose or wipe it off with a cloth).
- Unscrew the sensor from the SACIQ sensor connection cable.
- Always place a protective cap on the plug head of the sensor and on the SACIQ sensor connection cable so that no moisture or dirt can get into the contacting surfaces.

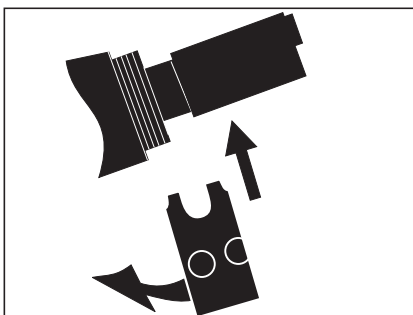
**Replacing the electrode**

If it is necessary to replace an electrode, proceed as follows:

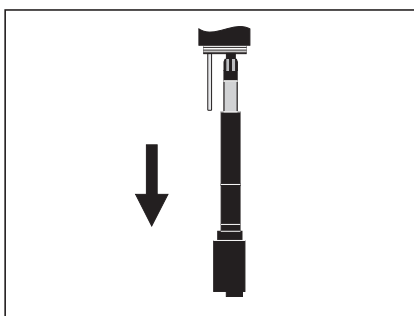
- 1 Unscrew the protective hood from the sensor.



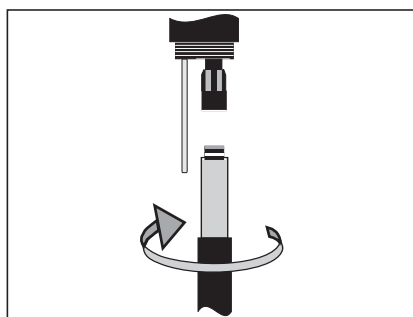
- 2 Use the protective hood as a tool to lever out the electrode.



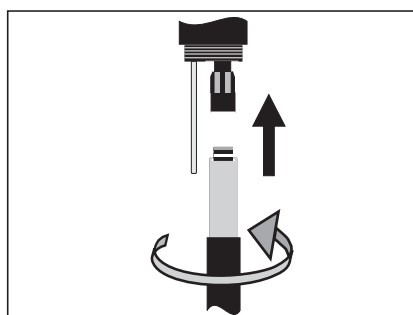
- 3 Carefully pull out the electrode until the plug head screwed fitting can be seen.



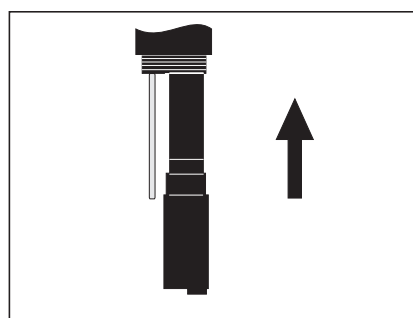
- 4 Unscrew the electrode from the plug head socket (for disposal, see section 5.1).



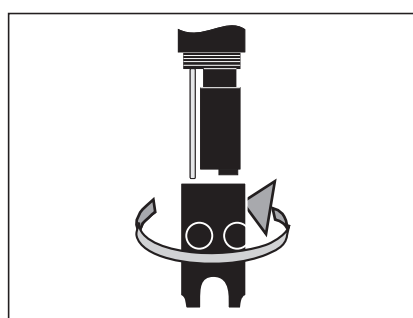
5 | Screw in a new electrode.



6 | Push the unit into the sensor up to the stop.



7 | Screw the protective hood onto the sensor.



- |   |   |
|---|---|
| 8 | Calibrate the sensor and the electrode with the measuring system (see section 4.1). |
|---|---|

## 5.1 Disposal

### Sensor

We recommend disposing of the sensor as electronic refuse.

### Electrodes

If no official regulations apply to the contrary, used and defective electrodes can be treated as household waste.



## 6 Replacement parts and accessories

### 6.1 Sensor and electrodes

<b>Nitrate sensor</b>	Model	Order no.
	NitraLyt® 700 IQ	107022
<b>Nitrate electrodes</b>	Model	Order no.
	Reference electrode NitraLyt® NHA	107024
	Exchange electrode NitraLyt® NHA/AT	107026

### 6.2 General accessories

<b>Protective hood</b>	Designation	Order no.
	AmmoLyt® IQ-SK (suitable for NitraLyt® 700 IQ)	107016
<b>Standard solutions for nitrate calibration</b>	For the calibration procedures, <i>1 point standard (1)</i> and <i>2 point stand. (3)</i> :	
	Designation	Order no.
	ES/NO3_ISA-5     5 mg/l NO3-N; 1000 ml	107030
	ES/NO3_ISA-50     50 mg/l NO3-N; 1000 ml	107032
	ES/NO3_ISA-500     500 mg/l NO3-N; 1000 ml	107034
	For the calibration procedures, <i>Simple std. add. (4)</i> and <i>Double std. add. (5)</i> :	
	Designation	Order no.
	SL NO3 19811     1000 mg/l NO3; 500 ml	250476
	ES/NO3     10 g/l NO3; 1000 ml	120220

Cleaning system	Model	Order no.
	CH Cleaning Head	900107
	MIQ/CHV Valve Module	900109

**Note**

Information on other IQ SENSOR NET accessories is given in the WTW catalog and in the Internet.

## 7 What to do if...

### No measured value

Cause	Remedy
– Sensor not connected	– Connect the sensor
– Unknown	– Look in the log book

### Measurement does not function

Cause	Remedy
– Electrode not connected	– Connect electrode
– Liquid has penetrated the sensor	– Sensor defective, send it back
– Sensor not connected	– Connect the sensor
– Instrument setting incorrect	– Correct instrument setting

### Measurement provides implausible measured values

Cause	Remedy
– No calibration performed	– Calibrate
– Electrode not connected or defective	– Check electrode and electrode connection
– Electrode contaminated	– Clean electrode
– Liquid has penetrated the sensor	– Sensor defective, send it back
– Instrument setting incorrect	– Correct the instrument setting ( <i>Measuring mode</i> mg/l or mV)
– Chloride compensation is switched off	– Switch on chloride compensation
– Chloride compensation with unsuitable value for chloride content	– Determine and enter chloride content – Recalibrate (see also section 4.2.1)

### System cannot be calibrated

Cause	Remedy
– Slope of the electrode not within tolerance (see section 4.1.10)	– Condition the electrode – If the slope is still outside the tolerance: Replace the electrode

Cause	Remedy
– Drift of the electrode too high	– Replace the electrode

## 8 Technical data

### 8.1 General features

#### Electrode that can be integrated

NitraLyt (The NitraLyt combination electrode consists of the NitraLyt® NHA reference electrode and the NitraLyt® NHA/AT exchange electrode.)

#### Temperature measurement

via integrated NTC

Range	- 5 °C ... + 40 °C
Accuracy	± 0.5 K
Resolution	0.1 K

#### Temperature compensation

0 °C ... + 40 °C

### 8.2 Measurement conditions

#### Measuring ranges and resolution

Measuring mode	Measuring range	Resolution
NO3	0.5 ... 450.0 mg/l 5 ... 4500 mg/l	0.5 mg/l 5 mg/l
NO3-N	0.1 ... 100.0 mg/l 1 ... 1000 mg/l	0.1 mg/l 1 mg/l
Voltage	-2000 ... 2000 mV (depending on the electrode)	1 mV

#### Temperature range

Measuring medium	0 °C ... + 40 °C
Storage/transport	0 °C ... + 40 °C

#### Max. allowed overpressure

0.2 bar (including sensor connection cable with installed NitraLyt combination electrode)

#### Connection technique

Connection via SACIQ sensor connection cable

<b>Type of protection</b>	Sensor with installed combination electrode and including SACIQ sensor connection cable	IP 68; 0.2 bar ( $2 \times 10^4$ Pa)
	Sensor plug head connector without sensor connection cable (sensor with installed combination electrode)	IP 67
<b>Depth of immersion</b>	Min. 70 mm; max. 2 m depth	
<b>Operating position</b>	pendulous to horizontal	
<b>Field of application</b>	Controlling / monitoring in the aeration tank of waste water treatment plants, water and waste water monitoring	

### 8.3 Characteristic data on delivery

**Response time of the temperature sensor**  $t_{99} < 15$  s

<b>Material</b>	Protective hood	PVC
	Electrode receptacle	POM
	Temperature sensor	VA steel 1.4571
	Plug head connector housing	POM
	Plug, 3-pole	ETFE (blue) Tefzel®
	Shaft	VA steel 1.4571
<b>Dimensions</b>	Shaft length	502 mm (incl. protective hood and socket of the SACIQ sensor connection cable)
	Shaft diameter	40 mm
<b>Weight</b>	Approx. 970 g (without electrode and without sensor connection cable)	

<b>Electrical data</b>	Nominal voltage	Max. 24 VDC via the IQ SENSOR NET (for more details, see TECHNICAL DATA chapter of the IQ SENSOR NET system oper- ating manual)
	Power consumption	0.2 W
	Protective class	III
<b>Instrument safety</b>	Applicable norms	<ul style="list-style-type: none"><li>– EN 61010-1</li><li>– UL 3111-1</li><li>– CAN/CSA C22.2 No. 1010.1</li></ul>

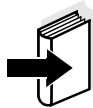




## 9 Indexes

### 9.1 Explanation of the messages

This chapter contains a list of all the message codes and related message texts that can occur in the log book of the IQ SENSOR NET system for the NitraLyt® 700 IQ sensor.



#### Note

Information on

- the contents and structure of the log book and
- the structure of the message code

is given in the LOG BOOK chapter of the IQ SENSOR NET system operating manual.



#### Note

All message codes of the NitraLyt® 700 IQ end with the number "361".

#### 9.1.1 Error messages

Message code	Message text
EA1361	<i>Meas. range exceeded or undercut</i> * Check process * Select other meas. range
EA2361	<i>Sensor temperature too high!</i> * Check process and application
EA3361	<i>Sensor temperature too low!</i> * Check process and application
EC1361	<i>Sensor could not be calibrated, Sensor blocked for measurement</i> * Check calibration conditions and calibration standard * View calibration history * Service sensor immediately (see operating manual)
EI1361	<i>Operational voltage too low</i> * Check installation and cable lengths, Follow installation instructions * Power unit(s) overloaded, add power unit(s) * Defective components, replace components

Message code	Message text
EI2361	<i>Operational voltage too low, no operation possible</i> <i>* Check installation and cable lengths,</i> <i>Follow installation instructions</i> <i>* Power unit(s) overloaded, add power unit(s)</i> <i>* Defective components, replace components</i>
ES1361	<i>Component hardware defective</i> <i>* Contact WTW</i>

### 9.1.2 Info messages

Message code	Message text
IC1361	<i>Sensor has been successfully calibrated</i> <i>* For calibration data, see calibration history</i>
IC2361	<i>Sensor still successfully calibrated,</i> <i>Calibration in limit range</i> <i>* Service sensor as soon as possible</i> <i>(see operating manual)</i> <i>* View calibration history</i> <i>* Check calibration conditions and calibration standard</i>
II1361	<i>Language not available,</i> <i>Default language German</i> <i>* Contact WTW</i>







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