OPERATING MANUAL

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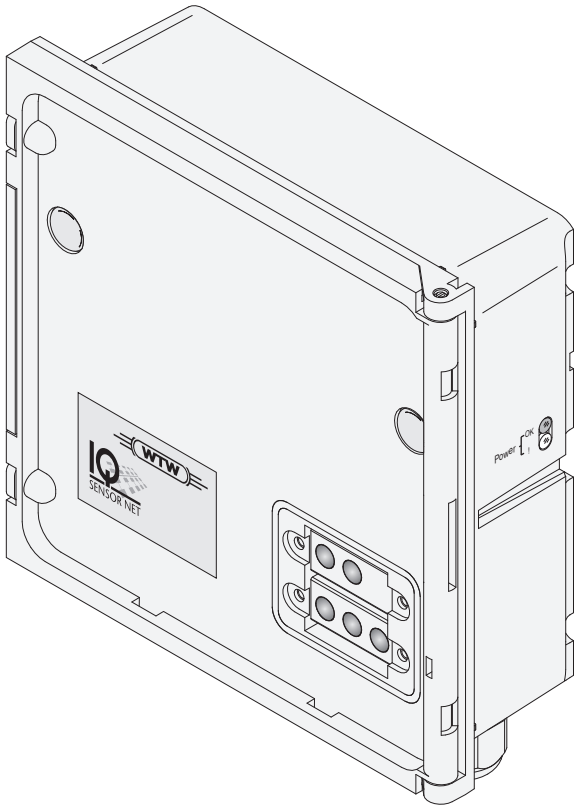


MIQ/IDS

IQ SENSOR NET MODULE WITH IDS INTERFACES

WTW

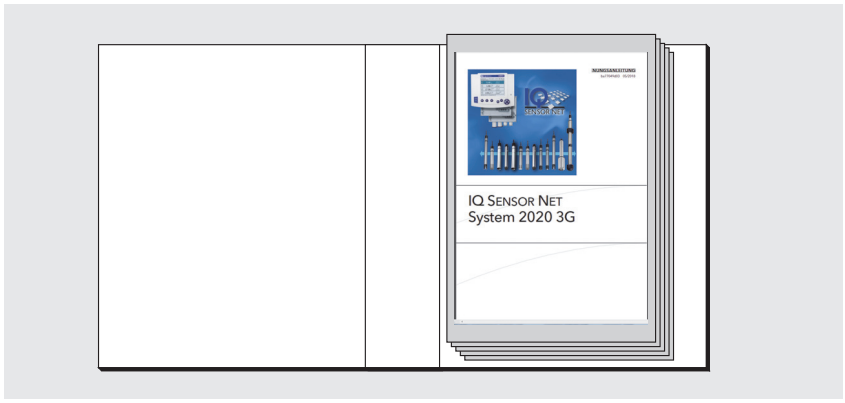
a xylem brand

Contents

1 Overview

1.1 How to use this component operating manual

Structure of the IQ SENSOR NET operating manual



IQ SENSOR NET system operating manual

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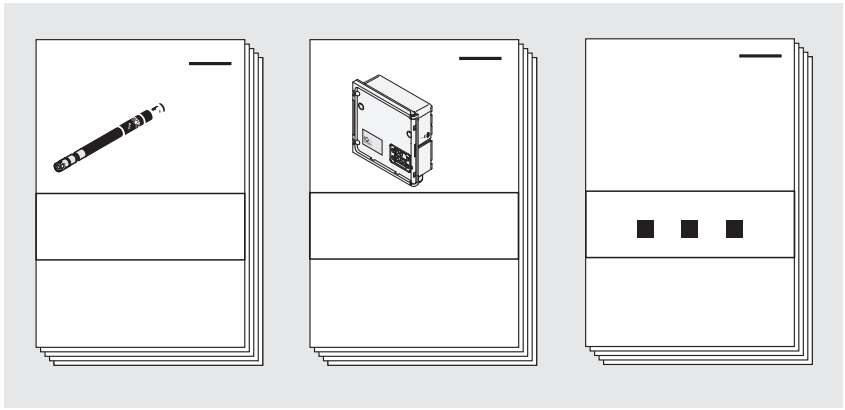


Operating manuals for components and options (e.g. IDS sensors)

figure 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 system itself. It consists of a system operating manual and the operating manuals of all the components used.

1.2 Characteristics of the MIQ/IDS

General characteristics

The MIQ/IDS module provides IDS interfaces for the IQ SENSOR NET. Approved sensors with IDS cables can be operated on the IQ SENSOR NET via the IDS interfaces.

The number of IDS interfaces is determined by the variant of the MIQ/IDS module.

MIQ/IDS variant	Number of IDS interfaces
MIQ/IDS1	1
MIQ/IDS2	2
MIQ/IDS4	4

The housing of the MIQ/IDS module is the MIQ standard module housing. The housing of the MIQ/IDS module has the same properties as other MIQ modules in terms of stability, tightness and weather resistance.
It also offers the same variety of installation options (stack mounting, canopy mounting, top hat rail mounting, etc.).

Clamping strip

The MIQ/IDS has the following electrical connections on the terminal strip inside the enclosure:

- 2 x SENSORNET connection
  (can be used for the MIQ/IDS1 and MIQ/IDS2 variants)

1.3 IDS sensors

For general information on the sensors, see the operating manuals for the sensors.

1.3.1 Functions and settings for sensors in the IQ SENSOR NET

General functions and settings for sensors in the IQ SENSOR NET, for example:

- Assign names to sensors
- Manage links with outputs
- Other general functions and settings

More information is available in the IQ SENSOR NET system operating manual.

1.3.2 Functions and settings for the measured parameter

Special functions and settings for the measured parameters, for example:

- Measuring
- Calibration
- Other special functions and settings

For more information, see the sections for the measured parameters in the present operating manual.

2 Safety instructions

2.1 Safety information

2.1.1 Safety information in the operating manual

This operating manual provides important information on the safe operation of the product. Read this operating manual thoroughly and make yourself familiar with the product before putting it into operation or working with it. The operating manual must be kept in the vicinity of the product so you can always find the information you need.

Important safety instructions are highlighted in this operating manual. They are indicated by the warning symbol (triangle) in the left column. The signal word (e.g. "CAUTION") indicates the level of danger:

WARNING
indicates a possibly dangerous situation that can lead to serious (irreversible) injury or death if the safety instruction is not followed.

CAUTION
indicates a possibly dangerous situation that can lead to slight (reversible) injury if the safety instruction is not followed.

NOTE
indicates a situation where goods might be damaged if the actions mentioned are not taken.

2.1.2 Safety signs on the product

Note all labels, information signs and safety symbols on the product. A warning symbol (triangle) without text refers to safety information in this operating manual.

2.1.3 Further documents providing safety information

The following documents provide additional information, which you should observe for your safety when working with the measuring system:

- Operating manuals of other components of the IQ SENSOR NET system (power packs, controller, accessories)
- Safety datasheets of calibration and maintenance equipment (e.g. cleaning solutions).

2.2 Safe operation

2.2.1 Authorized use

The authorized use of the MIQ/IDS is the provision of IDS interfaces in the IQ SENSOR NET. Only the operation and running of the product according to the instructions and technical specifications given in this operating manual is authorized (see chapter 11 TECHNICAL DATA). Any other use is considered unauthorized.

2.2.2 Requirements for safe operation

Note the following points for safe operation:

- The product may only be operated according to the authorized use specified above.
- The product may only be operated under the environmental conditions mentioned in this operating manual.
- The product may only be supplied with power by the energy sources mentioned in this operating manual.
- The product may only be opened if this is explicitly described in this operating manual (example: connecting electrical lines to the terminal strip).

2.2.3 Unauthorized use

The product must not be put into operation if:

- it is visibly damaged (e.g. after being transported)
- it was stored under adverse conditions for a lengthy period of time (storing conditions, see chapter 11 TECHNICAL DATA).

2.3 User qualification

Target group

The IQ SENSOR NET system was developed for online analysis. Some maintenance activities, e.g. changing the membrane caps in D.O. sensors, require the safe handling of chemicals. Thus, we assume that the maintenance personnel is familiar with the necessary precautions to take when dealing with chemicals as a result of their professional training and experience.

Special user qualifications

The following installation activities may only be performed by a qualified electrician:

- Connection of the MIQ/IDS to the power supply.

3 Installation

3.1 IQ SENSOR NET system requirements

Software versions of the controller and terminal components

The operation of the MIQ/IDS requires the following software versions in the IQ SENSOR NET:

- DIQ/S 282/284 Controller software: Version 4.00 or higher
- MIQ/MC3 Controller software: Version 4.00 or higher
- MIQ/MC2 Controller software: Version 4.00 or higher
- MIQ TC 2020 3G/XT Controller software: Version 4.00 or higher

3.2 Scope of delivery

- MIQ module
- Accessory set, including:
  - 4 x cable glands (clamping range 4.5-10 mm) with seals and blind plugs
  - 4x ISO blind nuts M4 with suitable socket head screws and plain washers
  - 2x countersunk screws M3x6 to close the module lid (+ 2 spare ones)
  - 1 x contact base with fixing screws
- Accessory set, including:
  - 1 x extension M16x1.5 to M20x1.5 with O-ring
  - 1 x cable gland
- Operating manual.

3.3 Basic principles of installation

3.3.1 Requirements of the measurement location

The measurement location must meet the environmental conditions specified in section 11.1 GENERAL DATA.

Controlled ambient conditions

Work on the open instrument (e.g. during mounting, installation, maintenance) may only be carried out under controlled environmental conditions:

Temperature	+ 5 °C ... + 40 °C (+ 41 ... +104 °F)
Relative air moisture	≤ 80 %

3.4 Safety requirements of the electrical installation

Electrical equipment (such as motors, contactors, cables, lines, relays, switches, instruments) must meet the following requirements:

- Compliance with national regulations (e.g. NEC, VDE and IEC)
  Compliance is given if the following conditions are met:
  - The MIQ/IDS module and all connected sensors are operated in one building.
  - The maximum length of the connected IDS cables is 30 m.
- Suitability for the electrical conditions at the place of installation
  - Maximum operational voltage
  - Maximum operational current
- Suitability for the ambient conditions at the place of installation
  - Temperature resistance (minimum and maximum temperature)
  - Stability against UV light in the case of outdoor usage
  - Protection against water and dust (Nema or IP type of protection).
- Suitable fuse protection of the electrical circuit
  - Overcurrent protection devices
    (according to the technical data of the instrument input or output)
  - Overvoltage limitations of overvoltage category II
- Suitable external separator (e.g. switch or circuit-breaker) for the power supply of permanently installed instruments with separate power connection
  - compliant with the following regulations
    - IEC 60947-1
    - IEC 60947-3
  - in the vicinity of the instrument (recommendation)
- Flame resistant (cable and lines),
  compliant with the following regulations
  - UL 2556 VW-1 (for USA, Canada)
  - IEC 60332-1-2 (outside the USA, Canada)

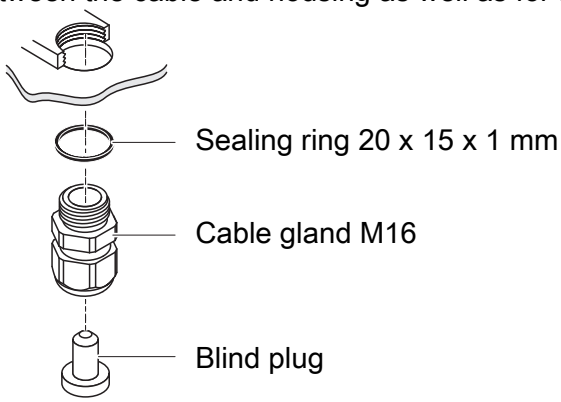
3.5 Installation in the IQ SENSOR NET

The IQ SENSOR NET provides a number of options for integrating the MIQ/IDS mechanically and electrically in the system (stacked mounting, distributed mounting, etc.). The individual types of installation are described in detail in the INSTALLATION chapter of the system operating manual.

3.6 Electrical connections: General instructions

Cable glands

All SACIQ cables are fed from below through prepared openings in the housing of the MIQ/IDS. Cable glands are provided with the MIQ/IDS to provide sealing between the cable and housing as well as for strain relief.



General installation instructions

Observe the following points when attaching connecting wires to the terminal strip:

- Shorten all the wires to be used to the length required for the installation
- Always fit all the ends of the wires with wire end sleeves before connecting them to the terminal strip
- Any wires that are not used and project into the enclosure must be cut off as closely as possible to the cable gland.
- In each of the remaining free openings, screw in a small cable gland with sealing ring and close them with a blind plug.

WARNING
No free wires must be allowed to project into the enclosure. Otherwise, there is a danger that areas safe to contact could come into contact with dangerous voltages. Always cut off any wires that are not in use as closely as possible to the cable gland.

3.6.1 Power supply

Component	Power supply
MIQ/IDS	Power is supplied via the IQ SENSOR NET system (see IQ SENSOR NET system operating manual).

Component	Power supply
IDS sensors	The connected IDS sensors are supplied with power via the MIQ/IDS module (see section 11.2).

3.7 Connecting the IDS sensor

1. Connect the IDS plug of the sensor cable to an IDS interface of the MIQ/IDS module.
   The sensor data are displayed on the IQ SENSOR NET terminal in the measured value display.

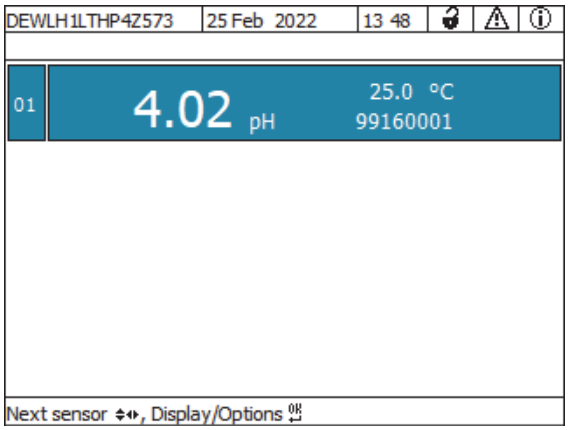


figure 3-1 Display of a sensor in the measured value display (example: pH sensor)

For functions, settings and further information on the connected sensor, see the following sections in the operating manual.

IDS sensors are displayed in the IQ SENSOR NET with a group name for the sensor type (e.g. "IDS pH").
The series number may be shortened.

The original sensor name and the original series number can be displayed in the status info of the sensor int he menu *Einstellungen/Settings/Service/List of all components* (see IQ SENSOR NET system operating manual).

4 pH

The MIQ/IDS module connects IDS sensors to the IQ SENSOR NET.

Suitable sensors: see section 4.5 ACCESSORIES

4.1 Measuring

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

Calibrate the sensor at regular intervals (depending on the application).

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or
   Submerse the sensor in the sample.

4.2 Calibration

4.2.1 General information on calibration

Calibration can be carried out on the following devices:

- on the IQ SENSOR NET
  (see section 4.2.2 CALIBRATION PROCEDURE ON THE IQ SENSOR NET)
- on an IDS meter
  (see operating manual of the meter)

Calibration details may vary depending on the device selected.

Why calibrate? During the operation of a pH sensor, the slope and asymmetry of the sensor change with time. The calibration procedure determines the current slope and asymmetry of the sensor.

When to calibrate? Calibrate before measuring and at regular intervals (depending on the application).

Calibration procedures The *CAL TEC AUTO* calibration procedure enables a fully automatic calibration with Technical buffer solutions.
Technical buffer solutions, see chapter 4.5 ACCESSORIES.

The *CAL CON 2P* calibration procedure enables the conventional 2-point calibration with two different buffers.

The calibration procedure *CAL CON 1P* enables the conventional single-point calibration with any one buffer.

4.2.2 Calibration procedure on the IQ SENSOR NET

Before starting, make sure that the correct calibration procedure is set (see section 4.3 SETTINGS).

Prepare the calibration standards.

Step 1: The sensor is in the sample.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During calibration, the sensor is in maintenance condition.
All linked outputs remain in their current status.

When operating the sensor in a flow through armature: Remove the sensor from the flow armature.

Step 2: Calibration:

Follow the instructions on the display.

For details on the selected calibration procedure, see:

- section 4.2.3 CALIBRATING WITH CAL TEC AUTO
- section 4.2.4 CALIBRATING WITH CAL CON 2P
- section 4.2.5 CALIBRATING WITH CAL CON 1P

Once the calibration routine is complete, the display returns to the measured value display.
The measured value flashes. The sensor is still in maintenance condition.

Step 3: Bring the sensor into the measuring position.
After the calibration procedure has been finished the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

4.2.3 Calibrating with *CAL TEC AUTO*

Display indications when calibrating with *CAL TEC AUTO*

Display	Explanation
** Have any two technical buffer solutions ready.*	You can use two different Technical buffer solutions for this. Confirm with **<OK>**.
** Rinse the sensor.* ** Immerse the sensor in the first buffer solution.* ** Wait for a stable measured value.*	Follow the instructions on the display. As soon as the measured value is stable, the next display indication appears.
** Rinse the sensor.* ** Immerse the sensor in the second buffer solution.* ** Wait for a stable measured value.*	Follow the instructions on the display. As soon as the measured value is stable, the next display indication appears.
Successfully calibrated. *End of the CAL_TEC_AUTO calibration.*	The values determined for *Slope* and *Asymmetry potential* are displayed. Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

4.2.4 Calibrating with *CAL CON 2P*

Display indications during 2-point calibration with *CAL CON 2P*

Display	Explanation
** Have buffer pH 7.0 ± 0.5 and any second buffer solution ready.*	For this calibration procedure, use two buffer solutions whose pH value is known at the current temperature: ● First buffer solution pH 7.0 ± 0.5 ● Second buffer solution: arbitrary

Display	Explanation
** Rinse the sensor.* ** Immerse the sensor in the first buffer solution.* ** Wait for a stable measured value.*	Follow the instructions on the display. As soon as the measured value is stable, the next display indication appears.
** Enter the pH value of the first buffer solution.*	Enter the nominal pH value of the first buffer solution according to the displayed temperature with **<▲▼◀▶>** and confirm with **<OK>**.
** Rinse the sensor.* ** Immerse the sensor in the second buffer solution.* ** Wait for a stable measured value.*	Follow the instructions on the display. As soon as the measured value is stable, the next display indication appears.
** Enter the pH value of the second buffer solution.*	Enter the nominal pH value of the second buffer solution according to the displayed temperature with **<▲▼◀▶>** and confirm with **<OK>**.
Successfully calibrated. *End of the CAL_CON_2P calibration.*	The values determined for *Slope* and *Asymmetry potential* are displayed. Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

4.2.5 Calibrating with *CAL CON 1P*

Display indications during 1-point calibration with *CAL CON 1P*

Display	Explanation
** Have any buffer solution ready.*	For this you can use any one buffer solution if its pH value at the current temperature is known. The calibration will be the more exact the nearer the pH value of the buffer solution is to that of the test sample.
** Rinse the sensor.* ** Immerse the sensor in the buffer solution.* ** Wait for a stable measured value.*	Follow the instructions on the display. As soon as the measured value is stable, the next display indication appears.

Display	Explanation
** Enter the pH value of the buffer solution.*	Enter the nominal pH value of the buffer solution according to the displayed temperature with **<▲▼◀▶>** and confirm with **<OK>**.
Successfully calibrated. *End of the CAL_CON_1P calibration.*	The values determined for *Slope* and *Asymmetry potential* are displayed. Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

4.2.6 Calibration result

Calibration evaluation

After calibrating, the calibration data and current state of the sensor are evaluated automatically. The asymmetry and slope are evaluated separately. The values must be within the following ranges:

Slope: - 50 ... -62 mV/pH
Asymmetry: -45 ... +45 mV

If one of the two values is outside the specified range the calibration is evaluated as not successful, i.e. the sensor could not be calibrated.

A calibration procedure can have the following results:

Possible calibration results

Display after calibrating	Log book entries (meaning/actions)
Measured value display	Sensor was successfully calibrated. Calibration data see calibration history.
"----"	Sensor could not be calibrated. Sensor blocked for measurement. – Carry out maintenance activities immediately (see operating manual). – View the calibration history. – Check the calibration conditions and calibration standard.

Information on the contents and structure of the log book, and how to call it up, is given in the Log book chapter of the IQ SENSOR NET system operating manual.

4.2.7 Calibration history

The calibration history contains the data of the active calibration and the chronological list with the last calibrations.

The calibration history provides the following information:

Date	Date of the calibration
Slope	Slope [mV/pH]
Asymmetry potential	Asymmetry potential [mV]
	Evaluation of the calibration *o.k.*: Successful calibration. The new calibration data are taken over for measurement. *Error*: Calibration unsuccessful. Sensor blocked for measurement. *default*: Default value (delivery status)
Tolerance	Tolerance range for slope and asymmetry potential

4.2.8 Reactivating a valid calibration

The Sentix® 945 provides a feature with witch you can reactivate the last valid calibration if necessary. Thus you can immediately continue to measure if a calibration failed.

Reactivating old calibration data is a temporary measure. Take into consideration that the sensor may provide wrong measured values. Ensure the correct functioning of the sensor by checking and/or recalibrating it.

Reactivating the calibration data

1. Open the setting menu of the sensor (see section 4.3).
2. In the *Calibration* menu, select the setting *last valid* and then exit the setting table with *Save and quit*.

4.3 Settings

Carrying out settings

Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The procedure is described in detail in the IQ SENSOR NET system operating manual.

Setting	Selection/Values	Explanation
Measuring mode	• *U (mV)* • *pH*	Unit of the measured value in the measured value display

Setting	Selection/Values	Explanation
Temperature mode	● *°C* ● *°F*	Unit of temperature data
Calibration proced. (only with measuring mode pH)	● *CAL TEC AUTO*	● Simplified 2-point calibration, with any two different Technical buffer solutions. The nominal values of the buffer solutions are stored in the sensor. The nominal values do not have to be entered manually.
	● *CAL CON 2P*	● 2-point calibration with any two different buffer solutions. The nominal values of the buffers solutions have to be entered.
	● *CAL CON 1P*	● 1-point calibration with any one buffer solution. The nominal value of the buffer solution has to be entered.
Calibration		Displays and specifies which calibration data the measured value calculation will be based on. The active calibration is displayed in the calibration history (see section 4.2.7).
	● *valid*	*valid* indicates that a valid calibration is available. The value cannot be changed.
	● *invalid*	*invalid* is displayed if the last calibration is invalid and the sensor is blocked for measurement. In this case you can change the value to *last valid*, provided there is a valid calibration stored in the sensor.
	● *last valid*	This activates the last valid calibration saved in the sensor when exiting the settings menu with *Save and quit* (see section 4.2.8).
Temp. adjustment	-1.5 °C ... +1.5 °C or -2.7 °F ... +2.7 °F	The temperature compensation function enables the temperature sensor to be balanced against a reference temperature measurement. Offset of the zero point: ±1.5 °C (±2.7 °F) Displayed unit of the temperature: see *Temperature mode* setting
Save and quit	-	The settings are stored. The display switches to the next higher level.
Quit	-	The settings are not stored. The display switches to the next higher level.

4.4 Messages

This chapter contains a list of all the message codes and related message texts for pH sensors.

For general information on the log book and message codes, see IQ SENSOR NET system operating manual.

All message codes of IDS pH sensors end with the number "313".

4.4.1 Error messages

Message code	Message text
EC1313	*Sensor could not be calibrated,* *Sensor blocked for measurement* ** Check calibration conditions and calibration standard* ** View calibration history* ** Service sensor immediately* *(see operating manual)*

4.4.2 Informative messages

Message code	Message text
IC1313	*Sensor has been successfully calibrated* ** For calibration data, see calibration history*
IC4313	*Last valid calibration has been activated. Make sure the sensor operates correctly.*

4.5 Accessories

IDS sensors

Description	Model	Order no.
IDS pH sensor	Sentix® 945	103743
	Sentix® 945-P	103764
IDS connecting cable, 1.5 m	AS/IDS-1,5	903850
Adapter for the connection of sensors with S7 plugs	ADA S7/IDS	108130

Standards for calibration

Buffer (bottles of 1 liter)	**pH value**	**Order no.**
TEP 4	4.01	108700
TEP 7	7.0	108702
TEP 10 Trace	10.01	108703

Buffer (bottles of 250 ml)	**pH value**	**Order no.**
Buffer pH 4.006 (DIN/NIST), 250 ml	PL 4	109110
Buffer pH 6.865 (DIN/NIST), 250 ml	PL 7	109120
Buffer pH 9.180 (DIN/NIST), 250 ml	PL 9	109130
Technical buffer, pH 4.01, 250 ml	TPL 4	108800
Technical buffer, pH 7.0, 250 ml	TPL 7	108802
Technical buffer, pH 10.01, 250 ml	TPL 10 Trace	108105

For more accessories, refer to the operating manual of the sensor.

5 ORP

The MIQ/IDS module connects IDS sensors to the IQ SENSOR NET.

Suitable sensors: see section 5.5 ACCESSORIES

5.1 Measuring

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

ORP sensors are not calibrated. You can, however, check ORP sensors by measuring the ORP of a test solution and comparing the value with the nominal value (see section 5.2).

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or
   Submerse the sensor in the sample.

5.2 Checking

Prepare the test solution.

Step 1:

The sensor is in the sample.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During the check, the sensor is in maintenance condition.
All linked outputs remain in their current status.

When operating the sensor in a flow through armature: Remove the sensor from the flow armature.

Step 2: Check:

1. Submerse the sensor in the test solution.
2. Compare the measured value to the nominal value.

Step 3: Bring the sensor into the measuring position.
Once the check has been completed, the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

5.3 Settings

Making the settings Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The procedure is described in detail in the IQ SENSOR NET system operating manual.

Setting	Selection/Values	Explanation
Measuring mode	*U (mV)*	Unit of the measured value in the measured value display.
Temperature mode	● *°C* ● *°F*	Unit of the temperature measured value (Celsius, Fahrenheit).
ORP shift (only with measuring mode mV)	-1250 mV ... +1250 mV	Here you can set the ORP zero point.
Temp. adjustment	-1.5 °C ... +1.5 °C or -2.7 °F ... +2.7 °F	The temperature compensation function enables the temperature sensor to be balanced against a reference temperature measurement. Offset of the zero point: ±1.5 °C (±2.7 °F) Displayed unit of the temperature: see *Temperature mode* setting
Save and quit	-	The settings are stored. The display switches to the next higher level.
Quit	-	The settings are not stored. The display switches to the next higher level.

5.4 Messages

This sensor does not generate any messages.

5.5 Accessories

IDS sensors

Description	Model	Order no.
IDS ORP sensor	SensoLyt® 900 ORP-P	103749
IDS connecting cable, 1.5 m	AS/IDS-1,5	903850
Adapter for the connection of sensors with S7 plugs	ADA S7/IDS	108130

For more accessories, refer to the operating manual of the sensor.

6 Dissolved oxygen

The MIQ/IDS module connects IDS sensors to the IQ SENSOR NET.

Suitable sensors: see section 6.5 ACCESSORIES

NOTE
The FDO® 925 oxygen sensor can be damaged by the presence of chlorine or ozone in the measured medium.

6.1 Measuring

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

Check the sensor at regular intervals (see section 6.2).

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or
   Submerse the sensor in the sample.

6.2 Check and calibration

6.2.1 General information

The check/calibration can be carried out on the following devices:

- On the IQ SENSOR NET
  (see section 6.2.2 FUNCTION CHECK,
  and section 6.2.3 CALIBRATION)
- on an IDS meter
  (see operating manual of the meter)

Details of the check or calibration may vary depending on the device selected.

Factory calibration

The FDO® 925 is factory calibrated. The measuring characteristics of the sensor cap remain stable for the specified service life. Thus, calibration is usually not required.

When does a check or calibration make sense?

A check or calibration can be useful in the following special cases:

- If the measured values appear to be implausible and it is assumed that the service life of the sensor cap is over
- Routinely within the framework of the company quality assurance

Principle

A check/calibration is carried out in water vapor-saturated air (test and storage vessel FDO® Check).

With the calibration procedure, the relative slope of the sensor is determined. The calibration is evaluated based on the relative slope and the intensity (successful <-> unsuccessful).

6.2.2 Function check

Procedure

Generally, a check on the IQ SENSOR NET is carried out as follows. For system specific details, please refer to the IQ SENSOR NET system operating manual.

Prepare the check and storage vessel FDO® Check.

The sponge in the FDO® Check check and storage vessel must be moist (not wet).

Step 1: The sensor is in the sample.
The sensor is selected in the measured value display.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During calibration, the sensor is in maintenance condition.
All linked outputs remain in their current status.

When operating the sensor in a flow through armature:
Remove the sensor from the flow armature.

Step 2: Check:

Follow the instructions on the display.

Display	Explanation
** Pull the sensor out of the sample* ** Put the sensor in the calibrating position*	Place the sensor in the FDO® Check check and storage vessel.
Select a procedure: *CHECK* *CALIBRATION*	Select the *CHECK* procedure. Confirm with **<OK>**. Leave the sensor in the check and storage vessel long enough so it can adapt to the ambient temperature (min. 15 minutes).

Display	Explanation
	Press **<OK>**. The sensor starts the check/ calibration. The display switches to the measured value display. The *CAL* indicator flashes instead of the main measured value. At the same time, the momentary relative slope flashes as the secondary measured value with the addition of *CHECK*. The process ends automatically as soon as the measured values meet the criterion for the stability control. With a great temperature difference between the sensor and the environment, this may take a while. Subsequently, the main measured value and temperature are displayed.
Calibration done.	Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

Step 3: Bring the sensor into the measuring position.
Once the check has been completed, the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

Canceling the check

As long as the determination of the relative slope has not yet been started (Step 2:, page 29), you can quit the check with **<M>** or **<ESC>**.

You can cancel the ongoing determination of the relative slope as follows:

1. Open the setting menu of the sensor (see section 6.3).
2. In the *Test* menu, select the setting *abort* and then exit the setting table with *Save and quit*.

Evaluation The result of the check is entered in the log book of the sensor. If the relative slope is outside the tolerance range (0.90 ... 1.10), the check is assessed as erroneous.

The basis for the evaluation is the accuracy required by the user. Together with the nominal value (100 %), this results in a validity range for the check.

If the measured value is within the validity range, no cleaning or calibration is required.

If the measured value is outside the validity range, the sensor shaft and membrane should be cleaned, and the check should then be repeated.

Example:

- Required accuracy: ± 2 %.
- In water vapor-saturated air or in air-saturated water, the nominal value for the relative oxygen saturation (in short: saturation) is 100 %.
- Therefore, the validity scope is 98 ... 102 %
- The check resulted in a measured value of 99.3 %

The measurement error is within the specified validity scope.
No cleaning or calibration is required.

6.2.3 Calibration

The sensor is factory-calibrated. The measuring characteristics of the sensor cap remain stable for the specified service life. Thus, calibration is usually not required.

Prepare the check and storage vessel FDO® Check.

The sponge in the FDO® Check check and storage vessel must be moist (not wet).

Step 1: The sensor is in the sample.
The sensor is selected in the measured value display.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During calibration, the sensor is in maintenance condition.
All linked outputs remain in their current status.

When operating the sensor in a flow through armature:
Remove the sensor from the flow armature.

Step 2: Calibration:

Follow the instructions on the display.

Display	Explanation
** Pull the sensor out of the sample* ** Put the sensor in the calibrating position*	Place the sensor in the FDO® Check check and storage vessel.
Select a procedure: *CHECK* *CALIBRATION*	Select the *CALIBRATION* procedure. Confirm with **<OK>**. Leave the sensor in the check and storage vessel long enough so it can adapt to the ambient temperature (min. 15 minutes). Press **<OK>**. The sensor determines the calibration data. The display switches to the measured value display. The *CAL* indicator flashes instead of the main measured value. At the same time, the momentary relative slope flashes as the secondary measured value. The process ends automatically as soon as the measured values meet the criterion for the stability control. With a great temperature difference between the sensor and the environment, this may take a while. Subsequently, the main measured value and temperature are displayed.
Calibration done.	Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

Step 3: Bring the sensor into the measuring position.
After the calibration procedure has been finished, the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

Canceling the calibration

As long as the determination of the calibration data has not yet been started (Step 2:, page 31), you can quit the calibration routine with **<M>** or **<ESC>**.

You can cancel the ongoing calibration data determination as follows:

1. Open the setting menu of the sensor (see section 6.3).
2. In the *Calibration* menu, select the setting *abort* and then exit the setting table with *Save and quit*.

After the calibration is canceled, the sensor works again with the calibration data that was used before the canceled calibration.

6.2.4 Calibration result

Possible calibration results

The calibration data are evaluated by the IQ SENSOR NET. A calibration procedure can have the following results:

Display	Explanation
Measured value display	Sensor was successfully calibrated. The calibration data can be viewed in the calibration history.
"----"	The sensor could not be calibrated. The sensor is blocked for further measurement. Notes on possible causes are given in the log book of the sensor.

Calibration history

The calibration history contains the data of the active calibration and the chronological list with the last calibrations.

The calibration history provides the following information:

Date	Date of the calibration
Rel.slope	Relative slope (non-dimensional)
	Evaluation of the calibration *o.k.*: Successful calibration. The new calibration data are taken over for measurement. *Error*: Calibration unsuccessful. Invalid calibration data were discarded. Measurement was continued with the last valid values. *default*: Default value (delivery status)

The calibration history is stored in the sensor.
The calibration history shows the calibrations of the sensor with the mounted sensor cap.

6.2.5 Reactivating a valid calibration

The FDO® 925 enables you to reactivate the last valid calibration or the factory calibration. Thus you can immediately continue to measure if a calibration failed or you suspect that the calibration conditions were not optimally met.

Reactivating old calibration data is a temporary measure. Take into consideration that the sensor may provide wrong measured values. Ensure the correct functioning of the sensor by checking and/or recalibrating it.

Reactivating the calibration data

1. Open the setting menu of the sensor (see section 6.3).
2. In the *Calibration* menu, select the setting *User calibration* or *Factory calibration* and then exit the setting table with *Save and quit*.

6.3 Settings

Making the settings

Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The procedure is described in detail in the IQ SENSOR NET system operating manual.

Setting	Selection/Values	Explanation
Measuring mode	• *Concentration* • *Saturation*	Unit of the measured value in the measured value display.
Measuring range Concentration	• *0 ... 20.00 mg/l* • *0 ... 20.00 ppm*	
Measuring range Saturation	• *0 ... 200.0 %*	The measuring range is permanently set.
Response time t90	• *30 .. 300 s*	Response time of the signal filter. Depending on the sample matrix, the measured values may fluctuate more or less. A signal filter in the sensor reduces the limits of variation of the measured value. The signal filter is characterized by the *Response time t90*. This is the time after which 90 % of a signal change is displayed.

Setting	Selection/Values	Explanation
Calibration	● *valid*	*valid* indicates that a valid calibration is available. The value cannot be changed.
	● *invalid*	*invalid* is displayed if the last calibration is invalid and the sensor is blocked for measurement. In this case, you can change the value to *User calibration* or *Factory calibration*, provided there is a valid calibration stored in the sensor. This activates the last valid calibration saved in the sensor when exiting the settings menu with *Save and quit* (see section 6.2.5). The next time the settings menu is opened, *valid* is displayed.
	● *User calibration*	The selection *User calibration* is only displayed if valid data of a *User calibration* is stored in the sensor.
	● *Factory calibration*	Determines which calibration data the measured value calculation will be based on. The active calibration is displayed in the calibration history.
	● *active*	*active* indicates that the sensor is being calibrated.
	● *abort*	Selecting *abort* cancels the active calibration when you exit the settings menu with *Save and quit*.
Test (is displayed only during the sensor check, see section 6.2.2)	● *active*	*active* indicates that the sensor is being checked.
	● *abort*	Selecting *abort* cancels the active check when you exit the settings menu with *Save and quit*.
Temperature mode	● *°C* ● *°F*	Unit of the measured temperature value (Celsius, Fahrenheit).
Temp. adjustment	-1.5 °C ... +1.5 °C or -2.7 °F ... +2.7 °F	The temperature compensation function enables the temperature sensor to be balanced against a reference temperature measurement. Offset of the zero point: ±1.5 °C (±2.7 °F) Displayed unit of the temperature: see *Temperature mode* setting
Salinity	● *On* ● *Off*	Determines whether the entered salinity should be taken into account.

Setting	Selection/Values	Explanation
Salinity input (only with *Salinity* = *On*)	2.0 ... 70.0	The entry of the salinity enables a salt content correction that compensates for the effect of salt contents > 0.1 % on the oxygen measurement. The salt content correction is recommended for measurements in salt-contaminated wastewater (salinity ≥ 2.0 corresponding to a conductivity of ≥ 3.4 mS/cm at a reference temperature T_{REF} = 20 °C).
Sensor cap data	● *Do not download* ● *Transmit to log book*	Generates a log book message with all data stored in the sensor cap when the settings menu is quit with *Save and quit* . When opening the menu again the setting is reset to *Do not download*.
Save and quit	-	The settings are stored. The display switches to the next higher level.
Quit	-	The settings are not stored. The display switches to the next higher level.

6.4 Messages

This chapter contains a list of all the message codes and related message texts for the oxygen sensors.

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

See IQ SENSOR NET system operating manual, chapter LOG BOOK.

All message codes of IDS oxygen sensors end with the number "339".

6.4.1 Error messages

Message code	Message text
EC8339	*Sensor could not be calibrated,* *sensor blocked for measurement* *Cause: instable signal* ** Check temperature adjustment* ** Check calibration conditions (see operating manual)* ** Repeat calibration*

Message code	Message text
EC9339	*Calibration error, measurement disabled* *Cause: Sensor cap is missing, leaky, depleted, or defective* ** Clean sensor and space between cap and sensor according to op.instructions* ** Screw on sensor cap securely* ** Repeat calibration* ** Replace sensor cap*

6.4.2 Informative messages

Message code	Message text
IC1339	*Sensor has been successfully calibrated* ** For calibration data, see calibration history*
IC3339	*Factory calibration has been activated. Make sure the sensor operates correctly.*
IC4339	*Last valid calibration has been activated. Make sure the sensor operates correctly.*
IC5339	*Invalid user calibration has been replaced by last valid user calibration. Caution! Wrong measured values possible. Carry out a new successful calibration to make sure the sensor operates correctly.*
IC6339	*The invalid user calibration was replaced by the factory calibration. Caution! Wrong measured values possible. Check whether the sensor operates correctly or carry out a new successful calibration.*
IC7339	This message shows the result of the last check (see section 6.2.2)
IS1339	This message shows the information stored in the sensor cap.

6.5 Accessories

IDS sensors

Description	Model	Order no.
Optical IDS oxygen sensor	FDO® 925	201300
	FDO® 925-P	201306
Replacement sensor cap	SC-FDO® 925	201310

Description	Model	Order no.
IDS connecting cable, 1.5 m	AS/IDS-1,5	903850
Adapter for the connection of sensors with S7 plugs	ADA S7/IDS	108130

For more accessories, refer to the operating manual of the sensor.

7 Conductivity

The MIQ/IDS module connects IDS sensors to the IQ SENSOR NET.

Suitable sensors: see section 7.5 ACCESSORIES

7.1 Measuring

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

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or

   Submerse the sensor in the sample.

7.2 Calibration

7.2.1 General information

Normally, the conductivity measuring cell does not age. Special measuring media (e.g. strong acids and bases, organic solvents) or temperatures that are too high may considerably reduce its lifetime or lead to damage.

The cell constant can be calibrated on an IDS meter (see operating manual of the meter).

7.3 Settings

Making the settings

Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The procedure is described in detail in the IQ SENSOR NET system operating manual.

Menu item	Selection/Values	Explanations
Measuring mode	● *Conductivity /cm* ● *Salinity* ● *TDS*	Measured parameter in the measured value display (*TDS* = total dissolved solids) Information on the determination of the TDS: see www.xylemanalytics.com)
Measuring range in *Measuring mode Conductivity /cm*	● *AutoRange* ● *0 ... 20.00 µS/cm* ● *0 ... 200.0 µS/cm* ● *0 ... 2000 µS/cm* ● *0 ... 20.00 mS/cm* ● *0 ... 200.0 mS/cm* ● *0 ... 2000.0 mS/cm*	These measuring ranges are available for selection. If the *AutoRange* menu item is selected, the measurement range selection and switchover is made automatically.
Measuring range in *Measuring mode Salinity*	*0 .. 70*	The measuring range is permanently set.
Measuring range in *Measuring mode TDS*	● *0 ... 2000 mg/l* ● *0.0 ... 20.0 g/l* ● *0.0 ... 200.0 g/l*	These measuring ranges are available for selection.
Temperature mode	● *°C* ● *°F*	Unit of the measured temperature value (Celsius, Fahrenheit).
Temp. compensation in *Measuring mode Conductivity* and *TDS*	● *none* ● *nonlinear* ● *linear with setting*	● For natural waters (groundwater, surface water, drinking water), salinity (seawater) according to IOT ● Other aqueous measuring media
Temp. compensation linear for *Measuring mode Conductivity* and *TDS*	0.5 ... 3.0 %/K	Factor for linear temperature compensation. This menu item only appears if linear temperature compensation is selected.
Reference temp. for *Measuring mode Conductivity* and *TDS*	● *Tref20* (20 °C) ● *Tref25* (25 °C)	The reference temperature is the basis for calculating the temperature compensation.
TDS factor in *Measuring mode TDS*	0.40 .. 1.00	Factor for automatic calculation of the total dissolved solids by the sensor.

Menu item	Selection/Values	Explanations
Cell constant (Sensor LR 925/01)	0.090 ... 0.110 cm^{-1}	Here you can set the cell constant if this is necessary for a special application, e.g. when using a flow-through armature.
Cell constant (Sensor TetraCon 925)	0.450 ... 0.500 cm^{-1}	
Temp. adjustment	-1.5 °C ... +1.5 °C or -2.7 °F ... +2.7 °F	Here you can balance the temperature sensor in the sensor against a reference temperature measurement.
Save and quit	-	The settings are stored. The display switches to the next higher level.
Quit	-	The settings are not stored. The display switches to the next higher level.

7.4 Messages

IDS conductivity sensors do not generate any messages.

7.5 Accessories

IDS sensors

Description	Model	Order no.
IDS conductivity measuring cell	TetraCon® 925	301710
	TetraCon® 925-P	301716
Ultrapure water conductivity measuring cell	LR 925/01	301720
	LR 925/01-P	301722
IDS connecting cable, 1.5 m	AS/IDS-1,5	903850

Standard for calibration

Description	Model	Order no.
KCL standard solution 0.01 M KCl, 6x 50 ml	E-SET	300572

For more accessories, refer to the operating manual of the sensor.

8 Chlorine

The MIQ/IDS connects IDS sensors and sensors with IDS adapter to the IQ SENSOR NET.

Suitable sensors: see section 8.5 ACCESSORIES

8.1 Measuring

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

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or
   Submerse the sensor in the sample.

8.2 Calibration

8.2.1 General information on calibration

Calibration adjusts the raw value measured directly in the test sample to an independently determined reference value ("lab value"). To determine the reference value, a sample is taken from the measuring solution and the relevant concentration is measured (e.g. photometrically).

A common method is the DPD method for free chlorine. Photometers and test sets for this can be found in the WTW catalog or on the Internet.

When does calibration make sense?

Calibrating can be useful in the following cases:

- If the measured values appear to be implausible
- Routinely within the framework of the company quality assurance

8.2.2 Calibration procedure on the IQ SENSOR NET

Step 1: The sensor is in the sample.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During calibration, the sensor is in maintenance condition.
All linked outputs remain in their current status.

Step 2: Calibration:

Follow the instructions on the display.

Display	Explanation
Reference voltage is determined. Take a sample now. *As soon as you have determined the chlorine concentration of the sample, you can continue with the entry of the determined concentration. To do this, please restart the calibration.*	Take a sample as close to the location and as soon as possible.
	Determine the chlorine concentration of the sample taken using a reference method. Measurement can be continued during the determination.
	Continue calibration by pressing **<C>** again.
How to proceed *- Resume cal.* *- Start new cal.* *- Cancel cal.*	Select the function *Resume cal.* to continue entering the reference value.
If *Resume cal.* is selected: *Please enter the concentration of sample.*	Enter the concentration of the sample with **<▲▼◀▶>**. Confirm with **<OK>**.
Calibration done.	Calibration is finished. Confirm with **<OK>**. The display returns to the measured value display.

Step 3: After the calibration procedure has been finished the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

8.2.3 Calibration result

Possible calibration results

The externally determined value of the chlorine concentration is evaluated during input together with the measured reference voltage from the IQ SENSOR NET.
A chlorine concentration outside the permitted limits cannot be entered.

Calibration history

The calibration history contains the data of the active calibration and the chronological list with the last calibrations.

The calibration history provides the following information:

Date	Date of the calibration
Raw	Raw value (reference voltage in mV)
Conc.	Concentration entered (mg/L)

8.3 Settings

Making the settings

Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The procedure is described in detail in the IQ SENSOR NET system operating manual.

Setting	Selection/Values	Explanation
Measuring mode	*Concentration (mg/l)* *Concentration (ppm)*	Measured parameter in the measured value display
Sensor	*FCML 412 M12-2* *FCML 412 M12-20*	Select the connected sensor. The sensor determines the measuring range.
Save and quit	-	The settings are stored. The display switches to the next higher level.
Quit	-	The settings are not stored. The display switches to the next higher level.

8.4 Messages

IDS chlorine sensors do not generate any messages.

8.5 Accessories

Sensors

Description	Model	Order no.
IDS chlorine sensor, free chlorine, pH 4…12, pH-compensated	FCML 412-M12-2	201189
	FCML 412-M12-20	201194
IDS adapter	ADA Cl/IDS	108155

For more accessories, refer to the operating manual of the sensor.

9 Turbidity

The MIQ/IDS module connects IDS sensors to the IQ SENSOR NET.

Suitable sensors: see section 9.5 ACCESSORIES

9.1 Measuring

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

Prerequisites

- The IQ SENSOR NET system is in operation (see IQ SENSOR NET system operating manual).
- The sensor is connected to the MIQ/IDS module (see section 3.7).

1. Install the sensor in a flow through armature and provide the sample flow.
   or
   For measurement and calibration in containers:
   Prepare the sensor for measurement (see PREPARATORY ACTIVITIES, page 46).

Preparatory activities

Perform the following preparatory activities when you want to measure:

- Avoid gas bubbles (e.g. air bubbles) in the test sample.
- Use suitable vessels for measurement and calibration (see operating manual of the VisoTurb® 900-P sensor).
- Heed the minimum depth of immersion for the sensor

1. Fill the test sample into a lightproof measuring beaker up to a level of at least 6 cm.
2. When immersing the sensor in the test sample, hold the sensor at an angle.
3. For measuring, position the sensor upright.

4. Position the sensor in a way that meets the following requirements:
   - Distance to the bottom: 6 cm
   - Distance to the walls of the beaker: 2 cm
   - Minimum depth of immersion: 2 cm

To position the sensor optimally and permanently while it is measuring, fix it on a support.

9.2 Calibration

9.2.1 General information on calibration

Calibration can be carried out on the following devices:

- on the IQ SENSOR NET
  (see section 9.2.3 CALIBRATION PROCEDURE ON THE IQ SENSOR NET)
- on an IDS meter
  (see operating manual of the meter)

Calibration details may vary depending on the device selected.

Why calibrate? The following factors can change with time and affect the measurement results:

- the optical characteristics, e. g. color and particle size, and the density of the measuring medium (e. g. dependent on the season)
- the conditions at the measuring location (e. g. due to growing deposits on the ground and walls)

When to calibrate? A new calibration is required if there is any change of the characteristics of the measuring medium or any change of the environment at the measuring location.

9.2.2 Calibration standards

Calibrate with 1 to 3 turbidity standard solutions. The standard solutions must be selected in the following order.

Standard solution	Range (FNU/NTU)
1	0.0 ... 1.0
2	5.0 ... 200.0
3	200.0 ... 4000.0

The turbidity expected in the measurement dictates the number and selection of the standards. Calibration has to be carried out for the range with the highest turbidity to be expected and for all lower ranges. The standard solutions for this have to be selected in ascending order, starting with standard 1.

The measurement precision is also dependent on the selected standard solutions. Therefore, the selected standard solutions should cover the value range expected of the turbidity measurement.

As the standard with turbidity value 0.0 FNU you can use clean tap water or filtered, deionized water in a suitable calibration vessel, depending on the required quality (see operating manual of the sensor VisoTurb® 900-P). This standard should be freshly prepared prior to every calibration. Suitable bottles are listed in the price list of the WTW catalog "Lab and field instrumentation".

The standards with turbidity values for the calibration ranges 2 and 3 are available as accessories. Calibration can be carried out in the bottles the standards are delivered in. The standards can be used several times within their shelf life.

Replace the standards solutions if you have any doubts concerning their quality or after the expiration date.

9.2.3 Calibration procedure on the IQ SENSOR NET

In general, a calibration procedure is carried out as follows on the IQ SENSOR NET. For system specific details, please refer to the IQ SENSOR NET system operating manual.

Prepare the calibration standards.

Step 1: The sensor is in the sample.
The procedure is started from the measured value display with **<C>** (see IQ SENSOR NET system operating manual).
During the check, the sensor is in maintenance condition.
All linked outputs remain in their current status.

When operating the sensor in a flow through armature:
Remove the sensor from the flow armature.

Step 2: Calibration
Follow the instructions on the display.

Display	Explanation
Init calibration	
** Rinse and dry the sensor.* ** Immerse the sensor at an angle in standard 1 (0 FNU/ NTU).* ** Position the sensor (see operating manual MIQ/IDS).*	Confirm with **<OK>**. *Measuring standard*. As soon as a stable measured value is detected, the next display appears.
** Rinse and dry the sensor.* ** Immerse the sensor at an angle in standard 2 (124 FNU/ NTU).* ** Position the sensor (see operating manual MIQ/IDS).*	Confirm with **<OK>**. *Measuring standard*. As soon as a stable measured value is detected, the next display appears.
** Rinse and dry the sensor.* ** Immerse the sensor at an angle in standard 3 (1010 FNU/ NTU).* ** Position the sensor (see operating manual MIQ/IDS).*	Complete the calibration as a 2-point calibration with **<M>**. or Confirm with **<OK>**. *Measuring standard*. As soon as a stable measured value is detected, the next display appears.
Storing calibration	Confirm with **<OK>**. The display returns to the measured value display. Calibration is finished.

Step 3: After the calibration procedure has been finished the maintenance condition has to be switched off manually. More detailed information on the maintenance condition is given in the IQ SENSOR NET system operating manual.

9.2.4 Calibration result

Calibration evaluation

After calibrating, the calibration data and current state of the sensor are evaluated automatically.

A calibration procedure can have the following results:

Possible calibration results

Display after calibrating	Log book entries (meaning/actions)
Measured value display	Sensor was successfully calibrated. Calibration data see calibration history.

Display after calibrating	Log book entries (meaning/actions)
"----"	Sensor could not be calibrated. Sensor blocked for measurement. – Carry out maintenance activities immediately (see operating manual). – View the calibration history. – Check the calibration conditions and calibration standard.

Information on the contents and structure of the log book, and how to call it up, is given in the Log book chapter of the IQ SENSOR NET system operating manual.

Calibration history

The calibration history contains the data of the active calibration and the chronological list with the last calibrations.

The calibration history provides the following information:

Date	Date of the calibration
Quality	Evaluation of the calibration *o.k.*: Successful calibration. The new calibration data are taken over for measurement. *Error*: Calibration unsuccessful. Invalid calibration data were discarded. Measurement was continued with the last valid values. *default*: Default value (delivery status)

9.3 Settings

Making the settings

Using **<S>**, switch from the measured value display to the main menu of the settings. Then navigate to the setting menu of the sensor. The exact procedure is given in the relevant IQ SENSOR NET system operating manual.

Setting	Selection/Values	Explanation
Measuring mode	● *FNU* ● *NTU*	– Turbidity unit **F**ormazine **N**ephelometric **U**nits – Turbidity unit **N**ephelometric **T**urbidity Units
Measuring range	● *0 ... 400 FNU* ● *0 ... 4000 FNU*	Measuring ranges for the measuring mode *FNUNTU*

Setting	Selection/Values	Explanation
Save and quit		The settings are stored. The display switches to the next higher level.
Quit		The settings are not stored. The display switches to the next higher level.

9.4 Messages

This chapter contains a list of all the message codes and related message texts for IDS turbidity sensors.

For general information on the log book and message codes, see IQ SENSOR NET system operating manual.

All message codes of IDS turbidity sensors end with the number "345".

9.4.1 Error messages

Message code	Message text
EC1345	*Sensor could not be calibrated,* *Sensor blocked for measurement* ** Check calibration conditions and calibration standard* ** View calibration history* ** Service sensor immediately* *(see operating manual)*

9.4.2 Informative messages

Message code	Message text
IC1345	*Sensor has been successfully calibrated* ** For calibration data, see calibration history*

9.5 Accessories

IDS sensors

Description	Model	Order no.
IDS turbidity sensor	VisoTurb® 900-P	600700
IDS connecting cable, 1.5 m	AS/IDS-1,5	903850

Standards for calibration

Description	Model	Order no.
Kit for turbidity calibration (turbidity standards 124.0 FNU/NTU and 1010.0 FNU/NTU)	Cal-Kit VT900	600702
Calibration and measurement bottle, 0.5 l	SB VT 900	600704

For more accessories, refer to the operating manual of the sensor.

10 Maintenance and cleaning

10.1 Maintenance

The MIQ/IDS module requires no special maintenance. The general maintenance of IQ SENSOR NET components is described in the IQ SENSOR NET system operating manual.

Maintenance activities for connected sensors

See operating manual of the connected sensor.

Software update for sensors on the IQ SENSOR NET

The software versions of the connected IDS sensors are displayed in the menu *Einstellungen/Settings/Service/List of all components* (see IQ SENSOR NET system operating manual).

Available software updates for IDS sensors are included in the IQ SENSOR NET software update.

A software update for IDS sensors is only carried out if the IDS sensor is connected to the IDS1 interface (see section 11.2).

Software update for sensors on IDS meters

Available software updates for IDS sensors are available on the Internet at Downloads for the IDS sensor.

Performing the software update on IDS meters (see operating manual for your IDS meter).

10.2 Cleaning

The cleaning of IQ SENSOR NET components is described in the IQ SENSOR NET system operating manual.

Cleaning activities for connected sensors, see operating manual of the connected sensor.

11 Technical data

11.1 General data

Dimensions

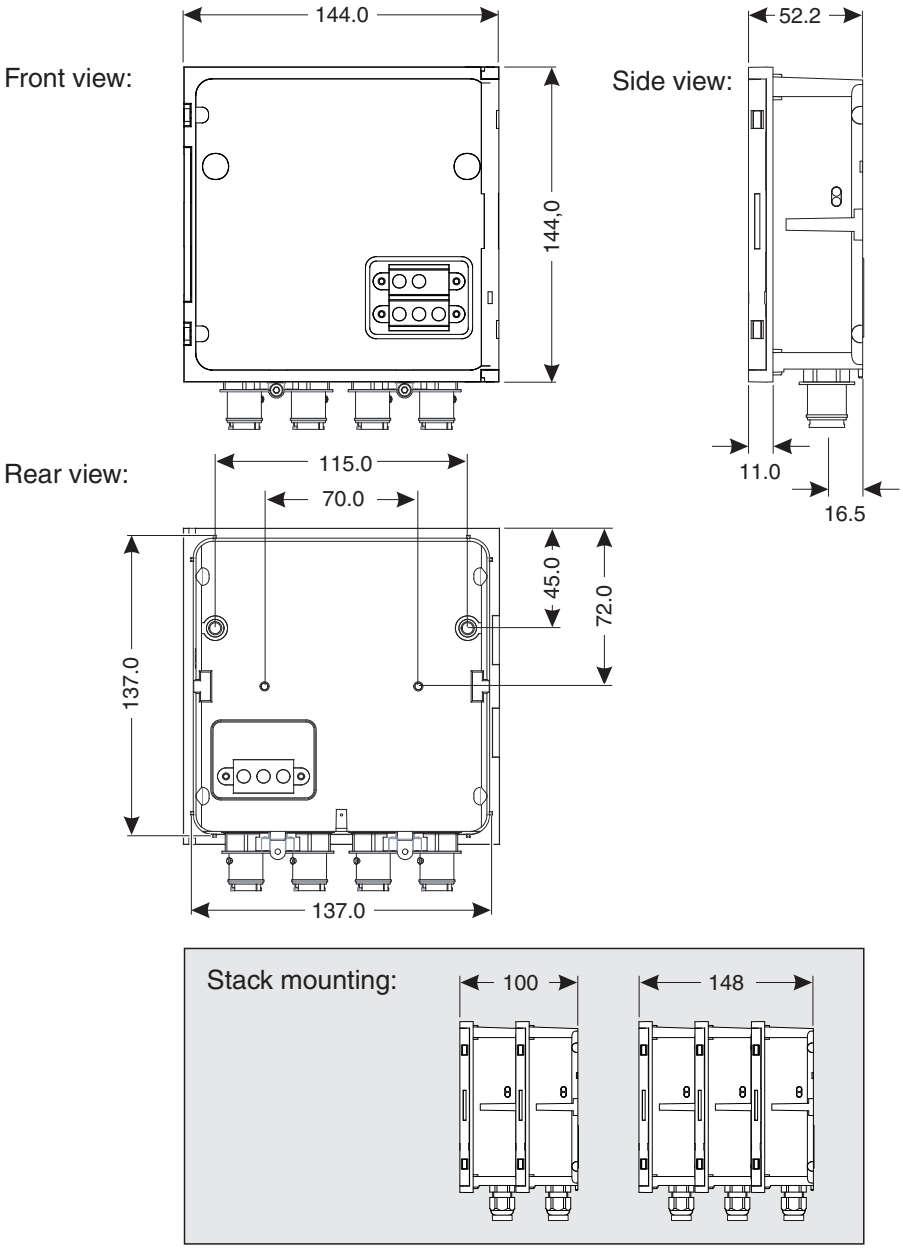


figure 11-1Dimension drawing of MIQ module (dimensions in mm)

Mechanical structure

Maximum number of MIQ modules in one module stack	3
Housing material	Polycarbonate with 20 % glass fiber
Weight	Approx. 0.5 kg

	Type of protection	IP 66 (not suitable for conduit connection)
Cable glands	Suitable for cable sheath diameter	4.5 - 10 mm or 9.0 - 13 mm

Ambient conditions

Temperature	
Mounting/installation/ maintenance	+ 5 °C ... + 40 °C (+ 41 ... +104 °F)
Operation	- 20 °C ... + 55 °C (- 4 ... + 131 °F)
Storage	- 25 °C ... + 65 °C (- 13 ... + 149 °F)

Relative air moisture	
Mounting/installation/ maintenance	≤ 80 %
Yearly average	≤ 90 %
Dew formation	Possible

Site	
Installation location	In a building (see section 11.3)
Site altitude	Max. 2000 m above sea level

Meter safety	Applicable norms	– EN 61010-1 – UL 61010-1 – CAN/CSA C22.2#61010-1
EMC product and system characteristics	EN 61326	EMC requirements for electrical equipment for control technology and laboratory use – Equipment for use in a general electromagnetic environment. – Interference emission limits Class A equipment
	FCC	class A

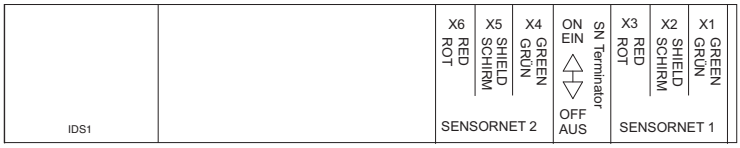
11.2 MIQ/IDS

Electrical data	Nominal voltage	max. 24 VDC via the IQ SENSOR NET (for details see IQ SENSOR NET system operating manual, chapter TECHNICAL DATA)
	Power consumption	
	MIQ/IDS1	1.5 W (with connected IDS sensor)
	MIQ/IDS2	1.5 W (with 2 connected IDS sensors)
	MIQ/IDS4	1.7 W (with 4 connected IDS sensors)
	Protective class	II
	Overvoltage category	II

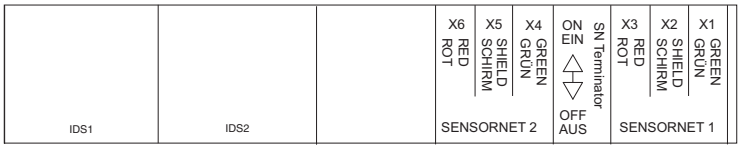
Interfaces	MIQ/IDS1	1 IDS interface 2 SENSORNET terminal connections
	MIQ/IDS2	2 IDS interfaces 2 SENSORNET terminal connections
	MIQ/IDS4	4 IDS interfaces 0 SENSORNET terminal connections

Terminal connections	IQ SENSOR NET connections	2 (MIQ/IDS1 and MIQ/IDS2) 0 (MIQ/IDS4) Additional switchable SENSORNET terminator (terminating resistor)
	Terminal type	Screw-type terminal strip, accessible by opening the lid
	Terminal ranges	Solid wires:0.2 ... 4.0 mm^2 AWG 24 ... 12 Flexible wires:0.2 ... 2.5 mm^2
	Cable cross-section of mains voltage leading cables	Europe:1.5 ... 4.0 mm^2 USA:AWG 14 ... 12
	Cable feeds	4 cable glands M16 x 1.5 on the underside of the module

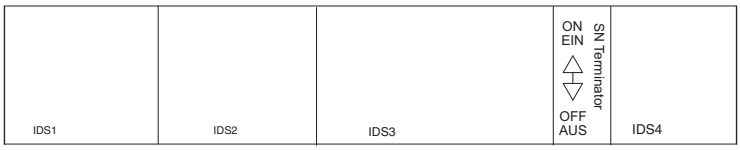
Terminal strip MIQ/IDS1



Terminal strip MIQ/IDS2



Terminal strip MIQ/IDS4



11.3 IDS cable

IDS cables may only be connected to the MIQ/IDS under the following conditions:

Ambient conditions	Operation in a building The IDS cable must not leave the building.
Length	Max. 30 m

12 Messages

12.1 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 MIQ/IDS module.

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.

All message codes of the MIQ/IDS output module end with the number "561".

12.1.1 Error messages

Message code	Message text
EI1561	*Operational voltage too low* ** Check installation and cable lengths, Follow installation instructions* ** Power supply module(s) overloaded, add power supply module(s)* ** Check terminal and module connections* ** Defective components, replace components*
EI2561	*Operational voltage too low, no operation possible* ** Check installation and cable lengths, Follow installation instructions* ** Power supply module(s) overloaded, add power supply module(s)* ** Check terminal and module connections* ** Defective components, replace components*

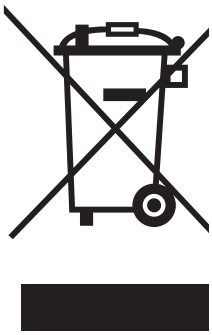
12.1.2 Informative messages

Message code	Message text
EX1561	*A non-permitted sensor has been connected.* ** Disconnect non-permitted sensor*

13 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.

Xylem |ˈzīləm|

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

We're a global team unified in a common purpose: creating advanced technology solutions to the world's water challenges. Developing new technologies that will improve the way water is used, conserved, and re-used in the future is central to our work. Our products and services move, treat, analyze, monitor and return water to the environment, in public utility, industrial, residential and commercial building services settings. Xylem also provides a leading portfolio of smart metering, network technologies and advanced analytics solutions for water, electric and gas utilities. 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 with a strong focus on developing comprehensive, sustainable solutions.

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