OxiTop®-IDS (/B)
Multi 3630/3620 IDS

WIRELESS OPERATION OF OXITOP®-IDS (/B) MEASURING HEADS

a **xylem** brand

Multi 3630/3620 IDS - Contents

1   Overview

Meters of the series MultiLine Multi 3630/3620 IDS can be wirelessly connected to the OxiTop®-IDS measuring heads.

The OxiTop®-IDS measuring heads in conjunction with a Multi 3630/3620 IDS meter add the following functions to the OxiTop® measuring system:

- wireless operation of several OxiTop®-IDS measuring heads at the same time

- convenient examination of measurement data at the meter

- transmitting the measurement data to a PC

- BOD special functions
  that cannot be carried out using the operating elements of the OxiTop®-IDS measuring head

Prerequisites

- Meter Multi 3630 IDS or Multi 3620 IDS
  (with current software version, software update possible)

- Adapter WLM-M (for wireless connection to IDS sensors)

- OxiTop®-IDS (/B) measuring heads

> The connection is established according to the same principle as the wireless communication with sensors via the WLM adapters (for details on the WLM system, see operating manual of the WLM system).

> Basic information on how to operate the meter is given in the operating manual of your meter.

Data exchange with the OxiTop®-IDS measuring head

OxiTop®-IDS measuring heads transmit the following data to the meter:

- Data of the OxiTop®-IDS measuring head
  - ID
  - Type designation of the OxiTop®-IDS measuring head (e.g. OxiTop®-IDS)
  - Series number of the OxiTop®-IDS measuring head
- Calibration data
- Measured data
- Measurement settings

2 Safety

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 meter. Read this operating manual thoroughly and make yourself familiar with the meter before putting it into operation or working with it. The operating manual must be kept in the vicinity of the meter 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 possibly dangerous situation where goods might be damaged if the actions mentioned are not taken.

2.1.2 Safety signs on the meter

Note all labels, information signs and safety symbols on the meter and in the battery compartment. 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 measuring heads and other accessories
• Safety datasheets of calibration or maintenance accessories (such as buffer solutions, electrolyte solutions, etc.)

2.2   Safe operation

2.2.1   Authorized use

Authorized use of the meter in operation with OxiTop®-IDS measuring heads is exclusively the pressure measurement with OxiTop®-IDS measuring heads in a laboratory.

Only the operation and running of the meter according to the instructions and technical specifications given in this operating manual is authorized (see section 16 TECHNICAL DATA, page 110).

Any other use is considered unauthorized.

2.2.2   Requirements for safe operation

Note the following points for safe operation:

* The meter may only be operated according to the authorized use specified above.
* The meter may only be supplied with power by the energy sources mentioned in this operating manual.
* The meter may only be operated under the environmental conditions mentioned in this operating manual.
* The meter may only be opened if this is explicitly described in this operating manual (example: Inserting the batteries).

2.2.3   Unauthorized use

The meter 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 section 16 TECHNICAL DATA, page 110).

3   Commissioning

> Information on how to put the Multi 3630/3620 IDS into operation is given in the operating manual of your meter.
>
> Information on how to put the WLM-M adapter into operation is given in the operating manual of the WLM system.

To carry out BOD measurements with the Multi 3630/3620 IDS meter, proceed as follows:

- If necessary, disconnect any other sensors from the meter (simultaneous operation with IDS sensors is not possible)

- Plug the WLM-M adapter to the Multi 3630/3620 IDS meter (see operating manual of the WLM system)

- Switch on the Multi 3630/3620 IDS meter (see operating manual of the Multi 3630/3620 IDS meter)

- For initial commissioning, press **<M_>** to switch the meter to operation with OxiTop®-IDS measuring heads.

- Switch on the OxiTop®-IDS measuring heads (see operating manual OxiTop®-IDS of the measuring head)

- Assign an extra ID to each OxiTop®-IDS measuring head (see operating manual OxiTop®-IDS of the measuring head)

4   Operation

> The basic information and general operating principles are given in the operating manual of your meter, e.g. operation, navigation in the menu, setting the date, time and language.

The meter can either be operated with IDS sensors or OxiTop®-IDS measuring heads. Operation with OxiTop®-IDS measuring heads is possible only wireless.

Using **<M_>**, switch between operating with IDS sensors and operating with OxiTop®-IDS measuring heads.

On delivery, operation with IDS sensors is preset.

Prerequisites   Prerequisites for operation with OxiTop®-IDS measuring heads:

● Meter Multi 3630 IDS or Multi 3620 IDS
  with current software version
  (software update possible
  show software version: see operating manual of the meter, chapter What to do if ...)

● Adapter WLM-M is connected to the Multi 3630/3620 IDS meter
  (for wireless connection with the OxiTop®-IDS measuring heads)

● OxiTop®-IDS (/B) measuring heads

● Undisturbed radio link between OxiTop®-IDS measuring head and meter

● The radio connection is active at the OxiTop®-IDS measuring head

● No IDS sensor is connected to the meter

> With operation with OxiTop®-IDS measuring heads, the keys **<STO>**, **<RCL>**, **<AR>** are not enabled.

Communication of OxiTop®-IDS measuring head and meter   Communication between the meter and OxiTop®-IDS measuring head only starts after an OxiTop®-IDS measuring head was assigned to a sample.

This communication is used for the following purposes:

● Exchanging data and settings between meter and OxiTop®-IDS measuring head

● Identifying OxiTop®-IDS measuring heads using the meter
  (the LED at the measuring head indicates the communication)

4.1   Measuring modes while operating the OiTop®-IDS measuring heads

Measuring mode		Explanation
BOD		• Measurement of up to 12 parallel sample processes per overall sample for a BOD_x (x = 0.5h ... 180d) • Automatic sample statistics with averaging • The *AutoTemp* function can be switched on
	BOD standard	• The measuring range and sample volume can be selected from seven fixed combinations. • The incubation temperature is 20 °C
	BOD special	• *Measuring range*, *Dilution 1 +*, *Sample volume* and *Bottle volume* can be freely adjusted • The incubation temperature (5 °C to 40 °C) can be set up

Pressure p		• Pure pressure measurement
		
		• Measuring range:
		
		  – 500 ... 1250 hPa (OiTop® i/OiTop®-IDS)
		
		  – 500 ... 1500 hPa (OiTop®-IDS /B)
		
		• A *Warning difference pressure* can be set

4.2 OxiTop® set management

4.2.1 Overview

After switching to operation with the OxiTop®-IDS measuring heads with **<M_>**, the display of the meter shows the *OxiTop set management* (overview of all set/samples started).

Set   A set can include several (max. 12) samples, for which the following joint settings are specified:

● *Measuring mode* (BOD [*BOD standard* / *BOD special*], *Pressure p*)

● *Duration*

● *Set name*

● Further settings depending on the selected *Measuring mode*

> Example:
> All samples started at the same time (e.g. on a common stirring platform) are included in a set with a common name.
>
> The meter automatically creates an identifiable name for the set. The name consists of the date (format JJMMTT) and an index (-x), which is automatically incremented for sets started on the same day, e.g. 190422-1. The automatically created name can be changed manually (max. 8 characters [numerals / letters])

Sample   To determine the BOD, one sample can be distributed to several (max. 12) measuring bottles (parallel determination), for which the following common settings are specified:

● *Sample name*

● Further settings depending on the selected *Measuring mode*

> In the *Measuring mode Pressure p*, a sample includes only one measuring bottle.

The meter automatically creates an identifiable name for the sample. The name consists of a letter (A) and an index (-x) that is automatically increased for further samples in the same set, e.g. A-1. The automatically created name can be changed manually (max. 8 characters [numerals / letters])

Meas. head   Each measuring bottle is closed with an OxiTop®-IDS measuring head. The OxiTop®-IDS measuring heads are always assigned to a sample by the meter.

4.2.2 Overview of the sets (*OxiTop set management*)

In the *OxiTop set management*, you can

● create new sets (**<F1>**/[*New*]),
  and within a set, new samples

  – max. 12 sets

  – per set up to 12 samples

  – per sample up to 12 OxiTop®-IDS measuring heads
    (the maximum number of OxiTop®-IDS measuring heads for a meter is
    limited to 100)

● Delete sets (**<F2>**/[*Delete*])

● Show details of each set (**<MENU/ENTER>**)
  e.g. overview of the samples in the set

● General settings (**<ENTER_>**)
  system settings for the meter (e.g. language etc.)

1 *Set name*

  – Check mark (✓ = finished):
    when the data of the measuring head have been transmitted to
    the meter at the end of the specified *Duration*

2 Status of the set
  Number of measured values / maximum number of measured values

3 *Type* (*Measuring mode, Duration*)

4 *End date* of the measurement

5 **<F1>**/[*New*] (creates a new set)

6 **<F2>**/[*Delete*] (deletes the highlighted set)
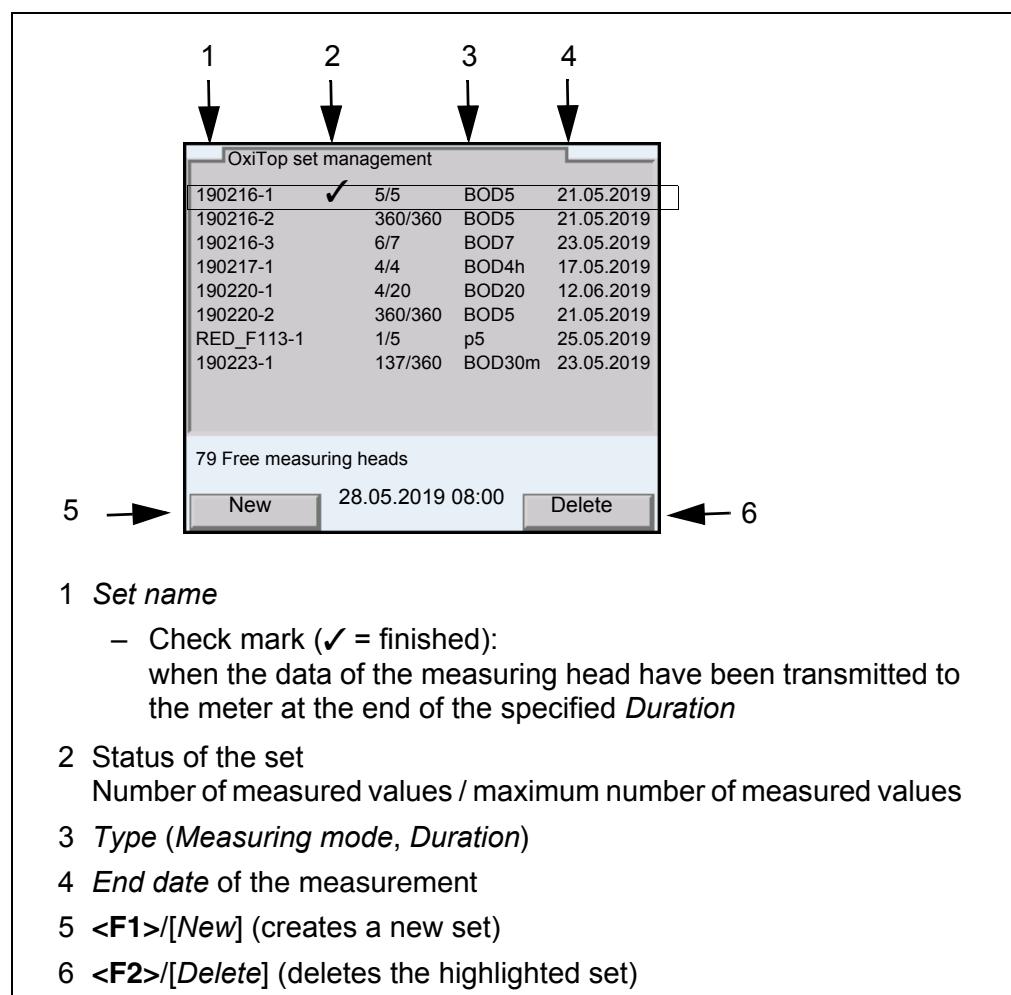
Using **<▲><▼>**, select a set.

4.2.3   Overview of the samples of the set

The current measured values of all samples are automatically called up when the details of a set are queried (with **<MENU/ENTER>** in the *OxiTop set management*).

```
1 ──►   ┌─ Set 190216-1 ──────────────────────────┐
2 ──►   │ A-1        ✓   4000 mg/l    BOD5    1/1  │
        │ A-2            357 mg/l     BOD5    2/3  │
        │                                          │
        │                                          │
        │                                          │
        │                                          │
3 ──►   │ 79 Free measuring heads                  │
        │  ┌──────┐     28.05.2019 08:00  ┌────────┐│
4 ──►   │  │  i   │                       │ Delete ││ ──► 5
        │  └──────┘                       └────────┘│
        └──────────────────────────────────────────┘
```

1 *Set name*

2 *Sample name*, measured value, type, OxiTop®-IDS measuring heads called up/number of OxiTop®-IDS measuring heads in the sample;

   – Check mark (✓ = finished) next to *Sample name* :
     when the data of the measuring head have been transmitted to the meter at the end of the specified *Duration*

   – Asterisk (***** = *Warning difference pressure* exceeded) next to measured value:
     if the *Warning difference pressure* is exceeded in at least one OxiTop®-IDS measuring head of the sample (only for *Measuring mode*: *Pressure p*)

3 Status line (number of OxiTop®-IDS measuring heads that can yet be registrated)

4 **<F1>**/[**i**]: the graphic evaluation of the OxiTop®-IDS measuring heads of the highlighted sample is displayed.

5 **<F2>**/[*Delete*] (deletes the highlighted sample)

> Selecting a sample with **<▲><▼>** and confirming with **<MENU/ENTER>** causes the overview of the OxiTop®-IDS measuring heads of the highlighted sample to be displayed.

After selecting a sample with **<▲><▼>** you can output the measurement data of the highlighted sample to the USB interfaces with **<PRT_>** or **<PRT>**.

Key	Explanation
<PRT_>	Output of the data as a *.csv file to the USB-A interface, to a connected USB memory device.
<PRT>	Output of the data in ASCII or CSV format (setting in the system menu) to the interface USB-A or USB-B. The meter recognizes whether a printer or PC is connected.

4.2.4   Overview of the OxiTop®-IDS measuring heads in a sample

The details of the OxiTop®-IDS measuring heads registered for a sample are listed in the overview of samples in the set and can be viewed by selecting a sample with <▲><▼> and displaying it with **<MENU/ENTER>**.

1 *Sample name*

2 Number of the OxiTop®-IDS measuring head (set at the OxiTop®-IDS measuring head)

   – Check mark (✓ = finished):
     when the data of the measuring head have been transmitted to the meter at the end of the specified *Duration*

3 Series number of the OxiTop®-IDS measuring head

4 Measured value
   (last value transmitted by the measuring head in the specified interval)

   – Asterisk (*** = *Warning difference pressure* exceeded):
     if the *Warning difference pressure* in the OxiTop®-IDS measuring head is exceeded (only for *Measuring mode*: *Pressure p*)

5 **<F1>**/[**i**]: the LED at the highlighted OxiTop®-IDS measuring head lights up red for a short time

6 **<F2>**/[*Delete*]: deletes the highlighted OxiTop®-IDS measuring head from the sample

4.3   Settings

4.3.1   Measurement settings of the set

The measurement settings for a set are defined while the set is being established.

Default settings are printed in bold.

Menu item	Possible setting	Explanation
Measuring mode	**BOD standard** *BOD special* *Pressure p*	Depending on the selected measuring mode, some of the following settings are enabled or grayed out
Set name	max. 8 characters	The 8 characters can be freely selected Preselected is a clear combination of numerals (date). An index is also assigned autimatically.
Duration	30 min,1 h ...1 d... **5** d... 180d	Duration of the measurement
Settings	General settings for the set	
AutoTemp	**on** *off*	Function to control the temperature adjustment. Measurement is started automatically (at least 1 hour, at most 3 hours after the OxiTop®-IDS measuring head is started). Pre-tempering the samples to exactly 20°C is not required. The samples can be inserted with a temperature in the range of 15°C ... 21°C. The *AutoTemp* function takes over the temperature control.
Warning difference pressure (Only for *Measuring mode*: *Pressure p*)	50 ...**150** ... 500 hPa	Difference pressure (negative or positive pressure difference compared to the start pressure). If it is exceeded, the meter marks the sample with an exclamation mark (**!**). The warning when the specified *Warning difference pressure* is exceeded is triggered when: – the measurement data have been transmitted to the meter and – the measured value that was last stored by the OxiTop®-IDS measuring head exceeds the difference pressure

Menu item	Possible setting	Explanation
Man. temperature (for *BOD special*)	5 ... **20** ... 40 °C	Manual setting of the temperature at which the measurement takes place
LED	***on*** *off*	Switching on/off the LED indication of the operating statuses (at the OxiTop®-IDS measuring head). The LED (at the OxiTop®-IDS measuring head) can be switched off to save energy.
Number of measured values	***Standard*** *Max.*	1 measured value per day 360 measured values for the specified measuring duration

4.3.2 Measurement settings of the sample

The general settings for the set apply to the entire meter. All other settings always apply to all OxiTop®-IDS measuring heads in the current set.

The measurement settings for the sample are defined when the sample is registered within a sample.

Default settings are printed in bold.

Menu item	Possible setting	Explanation
Sample name	max. 8 characters	The 8 characters can be freely selected Preselected is an A. An index is also assigned autimatically.
Measuring range (for *BOD standard*)	0 ... 40 / 80 / 200 mg/l 0 ... 400 mg/l 0 ... 800 / 2000 / 4000 mg/l	The measuring range expected for the sample can be selected from 7 permanent ranges. Selecting the measuring range defines the *Sample volume*. The corresponding *Sample volume* is displayed as Info.
Calculation (for *BOD special*)	***Measuring range*** *Sample volume* *Bottle volume*	Parameter to be calculated The parameters not calculated are set in the *Settings* menu.
Settings	The maximum setting ranges quoted here can be restricted by other settings. The setting selected in the *Calculation* menu is not available here.	
Measuring range	0 ... 400000 mg/l	Measuring range
Sample volume	10 ... [*Bottle volume* - 10] ml	Sample volume
Bottle volume	50 ... 9999 ml	Bottle volume
Dilution 1 +	0 ... 99	Dilution of the sample (1 part sample + x parts water)

5   Operation with OxiTop®-IDS measuring heads

5.1   Measuring

5.1.1   Preparing the measurement

Municipal wastewater does not normally contain any toxic or inhibiting substances. There are enough nutrient salts and suitable microorganisms present. Under these conditions, BOD determination in the undiluted sample using the OxiTop®-IDS measuring system is possible.

Prior to measuring, carry out the following preparatory activities:

- Keep ready the instruments and accessories required
    - OxiTop®-IDS measuring heads
    - Stirring platform
    - Thermostat cabinet/box (BOD standard: temperature 20 °C ± 1 °C)
    - Brown sample bottles (bottle volume 510 ml)
    - Magnetic stirring rods (1 stirring rod for each sample bottle)
    - Magnetic stirring rod remover
    - Suitable overflow volumetric flask
    - Rubber sleeves
    - Nitrification inhibitor ATH (NTH 600)
    - Sodium hydroxide tablets (NHP 600)
- Determine the sample volume
  (see operating manual of the OxiTop®-IDS measuring head)
- Prepare the samples
  (see e.g. operating manual of the OxiTop®-IDS measuring head or WTW application reports, chapter "Sample preparation")

Further documents on BOD determination

- Operating manual of your OxiTop®-IDS measuring head
- WTW application reports (see www.wtw.com)
- DIN EN 1899-2
  Water quality - Determination of the biochemical oxygen demand after n days (BOD) - part 2: Procedure for undiluted samples (ISO 5815:1989, modified)

Risks during determination of biogas (OxiTop®-IDS /B measuring head)

⚠️ **CAUTION**

During the anaerobic degradation of organic material in sealed equipment, high pressure can develop due to biogas (main components: methane and carbon dioxide).

The following hazards can occur:

● **Risk of bursting due to the high pressure and risk of injury caused by flying glass splinters.**

● **Risk of explosion due to development of flammable gas mixtures if high concentrations of methane escape.**

Take the following precautionary measures for safe operation:

● **Only use WTW measurement bottles of the MF/... series, which are especially designed for biogas determination (see WTW catalog).**

● **Only use measurement bottles that are not damaged (e.g. are not cracked, chipped or scratched).**

● **Determine the reaction conditions (temperature, quantity) under which no dangerous excess pressure develops by means of monitored preliminary tests (e.g. with diluted material).**

● **For unmonitored measurements, include a buffer for the developing pressure, as the composition of biological material can considerably vary. Therefore, a pressure that is higher than planned on can develop.**

● **Only use the corrosion resistant OxiTop®-IDS /B measuring heads. They were designed especially for biogas applications.**

● **OxiTop®-IDS /B measuring heads display measured values in the range 500 ... 1500 hPa. OFL (measuring range exceeded) is displayed if the pressure is higher.**

NOTE
The pressure sensor in the measuring head may be destroyed by a pressure of 2000 hPa or higher.

⚠️ **CAUTION**

If an OxiTop®-IDS /B measuring head displays OFL (measuring range exceeded) despite all precautionary measures, the actual pressure can already be considerably higher than 1500 hPa.
Terminate the measurement immediately:

● **Wear protective equipment (face shield, protective clothing, gloves).**

● **Wrap the bottle in a thick towel.**

● **Vent the bottle.**

5.1.2 The course of the measurement

1   Carry out the preparatory activities
     (see section 5.1.1 PREPARING THE MEASUREMENT):
     ● Keep ready the instruments and accessories required

     ● Determining the sample volume

     ● Preparing the samples

2   Switch on the meter with **<On/Off>**.

3   If necessary, use **<M_>** to switch to operation with the OxiTop®-IDS
     measuring heads.
     The *OxiTop set management* (overview of the sets started) is dis-
     played.

**Preparation before
starting the
measurement**

OxiTop set management			
190216-1 ✓	5/5	BOD5	21.05.2019
190216-2	360/360	BOD5	21.05.2019
190216-3	6/7	BOD7	23.05.2019
190217-1	4/4	BOD4h	17.05.2019
190220-1	4/20	BOD20	12.06.2019
190220-2	360/360	BOD5	21.05.2019
RED_F113-1	1/5	p5	25.05.2019
190223-1	137/360	BOD30m	23.05.2019

79 Free measuring heads

New	28.05.2019 08:00	Delete
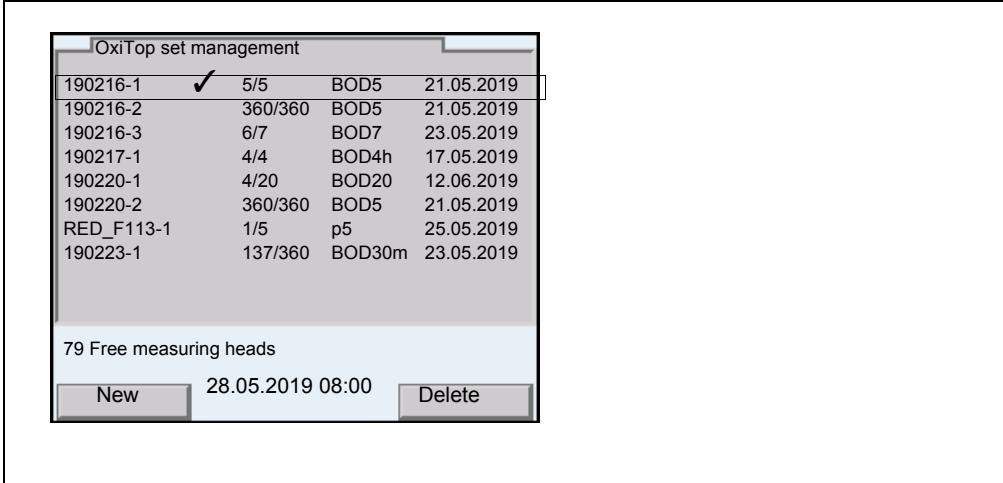
During the initial commissioning the list *OxiTop set management* is
empty.

The display shows *No data available!*.

4   In the *OxiTop set management*, use **<F1>**/[*New*] to create a new set of
     samples.
     The *Set* menu opens.

5   Adjust the temperature of the solutions and measure the current tem-
     perature if the measurement is made without a temperature sensor.

```
┌─Set──────────────────────────────┐
│ Measuring mode          BOD special│
│ Set name                190228-1   │
│ Duration                17 d       │
│ Settings                           │
│                                    │
│                                    │
│ i  BSB5 End date 23.02.2019        │
│ AutoTemp                           │
│ V_P 432 ml                         │
│                                    │
│ 79 Free measuring heads            │
│ ┌────────┐   28.05.2019 08:00      │
│ │ Sample │                         │
│ └────────┘                         │
└────────────────────────────────────┘
```
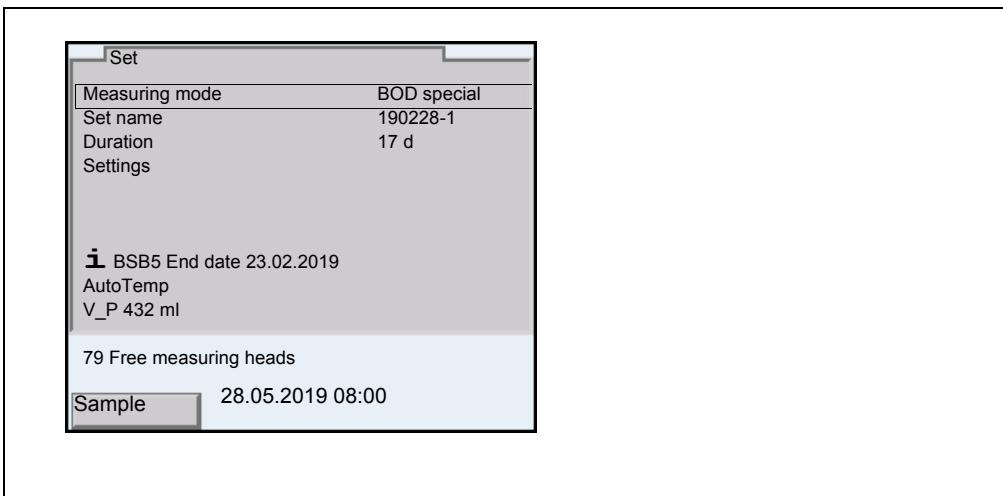
6   Check and, if necessary, change the settings in the *Set* menu.
    ● *Measuring mode*
      - BOD measurement (*BOD standard* / *BOD special*) or
      - pressure measurement (*Pressure p*)
      Depending on the selected measuring mode, further special settings for the sample are possible.

    ● *Set name*
      The current date with an index (consecutive number) is automatically preselected as name for the set. The name can be changed freely (max. 8 characters [numerals / letters])

    ● *Duration*

    ● *Settings*

7   Open the *Settings menu*.

```
┌─Settings─────────────────────────┐
│ AutoTemp                    on     │
│ Warning difference pressure 500 hPa│
│ Man. temperature            22 °C  │
│ LED                         on     │
│ Number of measured values   Standard│
│                                    │
│                                    │
│                                    │
│ 79 Free measuring heads            │
│         28.05.2019 08:00           │
└────────────────────────────────────┘
```
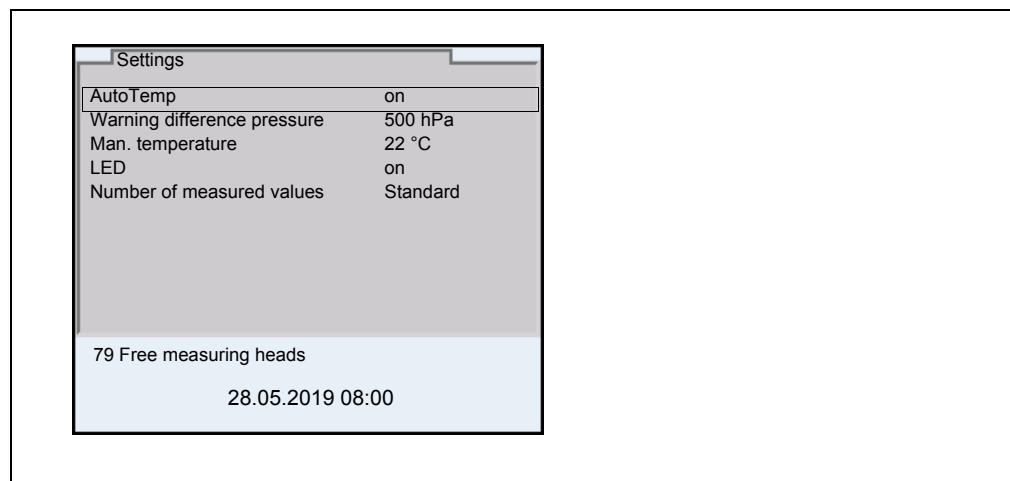
8   Check and, if necessary, change the settings for the set in the *Settings* menu (see section 4.3 SETTINGS).

9   Quit the *Settings* menu with **<ESC>**.

10 Using **<F1>**/[*Sample*] open the settings for the individual samples in the current set.

```
┌─ Sample ─────────────────────┐
│ Sample name          A-1     │
│ Calculation          Meas. range │
│ continue                     │
│                              │
│ ℹ Type BOD5, End date 23.02.2019 │
│ Mb 395 mg/l, V_P 432 ml      │
│ V_F 510 mg, 1+1, 22 °C       │
│ p = 800 mbar.                │
│ AutoTemp                     │
│                              │
│ 79 Free measuring heads      │
│ ┌─────────┐            ┌─────┐│
│ │Meas. head│ 28.05.2019 08:00 │New││
│ └─────────┘            └─────┘│
└──────────────────────────────┘
```
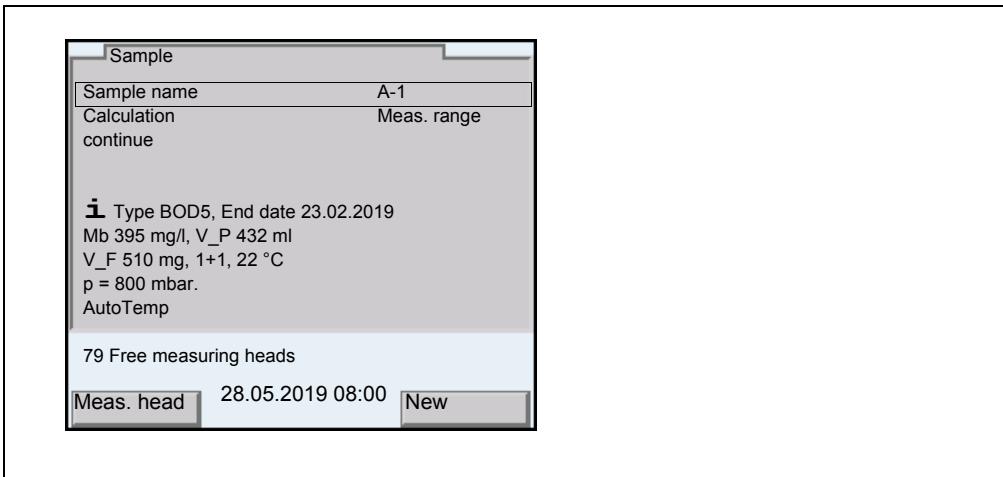
11 Check and, if necessary, change the settings in the *Sample* menu.
   ● *Sample name*
     An A with an index (consecutive number) is automatically prese-lected for the *Sample name*. The A can be changed freely (max. 8 characters [numerals / letters])

   ● *Measuring range* (only with *Type = Standard*)

   ● *Calculation* (only with *Type = BOD special*)

   ● *Settings* (only with *Type = BOD special*)

12 Further information and settings of the sample are displayed as an Info message.

13 Only for *Measuring mode = BOD special*:
    Open the *Settings* menu.

```
┌─ Settings ───────────────────┐
│ Measuring range      395 mg/l│
│ Bottle volume        510 ml  │
│ Sample volume        164 ml  │
│ Dilution 1 +         1       │
│                              │
│                              │
│                              │
│                              │
│                              │
│          28.05.2019 08:00    │
└──────────────────────────────┘
```
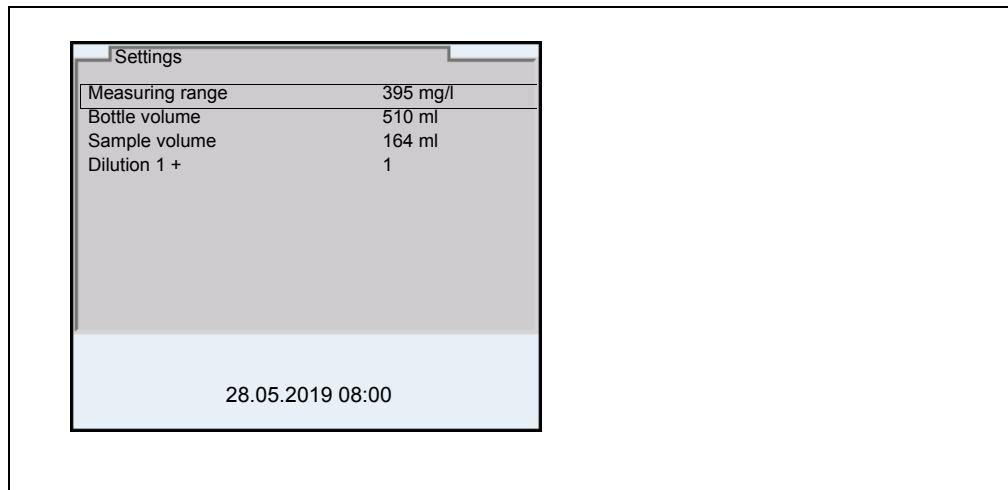
Check and, if necessary, change the settings in the *Settings* menu.
● *Measuring range*

● *Bottle volume*

● *Sample volume*

● *Dilution 1 +*

Quit the *Settings* menu with **<ESC>**.

14 Using **<F1>**/[*Meas. head*] start the assignment of a OxiTop®-IDS measuring head to the current sample.

15 Follow the instructions on the display.
Press the **<▲▼>** key of the OxiTop®-IDS measuring head (right-hand key) and keep it depressed until the LED flashes green.
When the OxiTop®-IDS measuring head has been identified by the meter, the following data of the head are displayed:
● *ID* (assigned at the measuring head)

● *Series number* of the OxiTop®-IDS measuring head


```
┌──────────────────────────────────┐
│  ┌─ Meas. head ──────┐           │
│  │ 38      12345678  │           │
│  │  ▲       ▲        │──────── 2 │
│  │  │                │──────── 1 │
│  │                   │           │
│  │ Reject measuring head │       │
│  │ Accept measuring head │       │
│  │                   │           │
│  │  28.05.2019 08:00 │           │
│  └───────────────────┘           │
└──────────────────────────────────┘
```
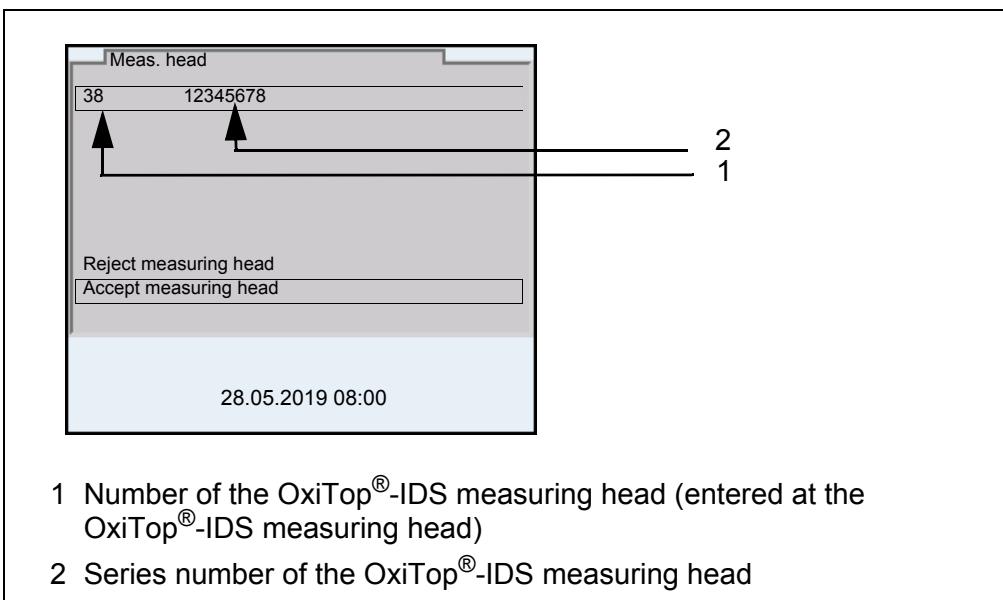
1 Number of the OxiTop®-IDS measuring head (entered at the OxiTop®-IDS measuring head)

2 Series number of the OxiTop®-IDS measuring head

16 Confirm the assignment of the OxiTop®-IDS measuring head with *Accept measuring head*.
or
Cancel the assignment of the OxiTop®-IDS measuring head with *Reject measuring head*.
The *Set* menu is open.

17 Assign further measuring heads of the current *Sample* in the *Set* (repeat steps 14-16).

18   If necessary, create another sample in the set with **<F2>**/[*New*].
      As the name for the *Sample*, a new number is automatically selected.
      The name can be changed freely (max. 8 characters [numerals / let-
      ters])

      Assign the OxiTop®-IDS measuring heads to the new sample (repeat
      steps 13-17).

Starting the
measurement

19   Using **<ESC>**, or with the menu item *continue* , switch to the *Set* menu.

20   Using *Start measurement*, start measurement for all samples in the set
      at the same time.
      The LEDs at the measuring head flash blue when the signal LED on
      the Measuring head is switched on.
      AutoTemp is displayed on the display when the *AutoTemp* function is
      switched on at the measuring heads.

      The settings cannot be changed for a measurement once it is
      started!
      Each OxiTop®-IDS measuring head connected to the meter can
      indicate the following data on the display :

      ● name of the set

      ● name of the sample

      ● settings

      For this press the <ENTER> key at the measuring head.

21   Keep the sample bottles (with the OxiTop®-IDS measuring heads
      screwed on) in a place that is controlled to 20°C (e.g. thermostat cabi-
      net/box) for the specified number of days.
      When the measuring temperature has been reached (function *Auto-*
      Temp: after at least 1 hour, at most approx. 3 hours), the OxiTop®-IDS
      measuring head automatically starts measuring the oxygen consump-
      tion.

22   During the specified measuring duration, stir the sample continuously
      (stirring platform, magnetic stirring rods) and keep the temperature
      controlled.
      The OxiTop®-IDS measuring head automatically stores the specified
      number of measured values each day during the selected measuring
      duration.

Completing the
measurement

23   At the end of a measurement, display the details of the *Set*.
      The measurement data of all measuring heads of the set are called up.

24   Using **<M>**, switch to the *OxiTop set management*.

25   Using <▲><▼>, select a set and open it with **<MENU/ENTER>**.
      The data of the measuring heads are read out.
      The reading out takes approx 5 seconds per OxiTop®-IDS measuring
      head, with many measurement data it may take longer.
      In the *OxiTop set management*, the set is given a checkmark [✓] in the
      status field.

26   If necessary, edit the evaluation of the sample
      (e.g. if an OxiTop®-IDS measuring head is missing, or if there are obvi-
      ously wrong values for an OxiTop®-IDS measuring head, see section
      5.3 EVALUATING THE SAMPLES).

27   Using **<M>**, switch to the *OxiTop set management*.

28   Using <▲><▼>, select the finished and read-out set.

29   Using <▲><▼>, select the finished and read-out set and, if necessary,
      delete it with **<F2>**/[*Delete*].
      The measuring heads are released for new measurements.

5.2   Displaying and saving the momentary value

This function enables you to display the momentary pressure value of an active
sample and to save up to 10 momentary values per sample during the runtime
of the sample.

When 10 momentary values have been saved, no further momentary value can
be displayed. In this case, the **<STO>** key is without function.

The saved momentary values are output as a block at the end of the output to
the interfaces USB-A and USB-B or at the end of the csv file.

**Displaying the
momentary value**

1   Using <▲><▼>, in the *OxiTop set management* highlight a *Set* with
     running pressure measurement (*Measuring mode Pressure p*).

2   Open the details of the selected set with **<MENU/ENTER>**.
     The measuring heads automatically call up the current data of the set.
     The reading out takes approx 5 seconds per OxiTop®-IDS measuring
     head, with many measurement data it may take longer.

3   Select a sample in the set and display the momentary value with
     <STO>.

4   Save the momentary value with **<MENU/ENTER>**.
     or
     Exit the display without saving with **<ESC>**.

## 5.3   Evaluating the samples

You can view the current measurement data for each OxiTop®-IDS measuring
head at any time (during or after the measurmeent).

1   Using <▲><▼> highlight a set in the *OxiTop set management Set*.

2   Open the details of the selected set with **<MENU/ENTER>**.
     The measuring heads automatically call up the current data of the set.
     The reading out takes approx 5 seconds per OxiTop®-IDS measuring
     head, with many measurement data it may take longer.

3   Select a sample of the set and open the details of the selected sample
     with **<MENU/ENTER>** or **<F1>**/[**i**].

```
┌─────────────────────────────────────────┐
│  ┌─Set name 190216-1──────────┐          │
│  │A-1          4000 mg/l    BOD180   1/1 ││
│  │A-2          357 mg/l     BOD180   2/3 ││
│  │                                       ││
│  │                                       ││
│  │                                       ││
│  │                                       ││
│  │                                       ││
│  │ 79 Free measuring heads               ││
│  ┌────────┐  28.05.2019 08:00  ┌────────┐ │
│  │   i    │                    │ Delete │ │
│  └────────┘                    └────────┘ │
└─────────────────────────────────────────┘
```
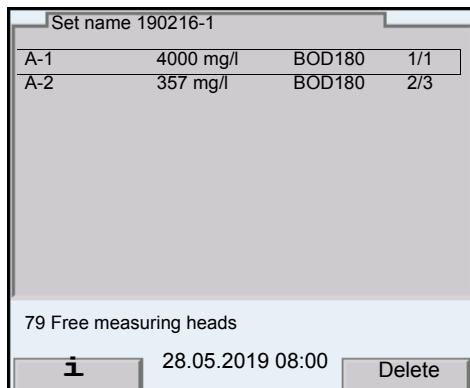
● Using **<MENU/ENTER>**, display the individual measuring heads of
  the selected sample. There you can

  – view the data of the individual measuring heads that were last
    stored

  – Display the current measured value and make the LED of the
    corresponding measuring head light up with **<F1>**/[**i**]

  – Delete individual measuring heads from the sample as neces-
    sary with **<F2>**/[*Delete*]

● Using **<F1>**/[**i**] display the graphic evaluation of the sample

● Using **<F2>**/[*Delete*] delete the sample

```
┌─────────────────────────────────┐
│  190216-1 A-1 BOD5          ◄─── 1
│      363 mg/l      210 mg/l  ◄─── 2
│                                  │
│                              ◄─── 3
│                                  │
│                                  │
│  79 Free measuring heads         │
│         28.05.2019 08:00         │
└─────────────────────────────────┘
```

1   Set name, *Sample name*, head ID and type

2   Mean value, standard deviation (with more than 2 measuring heads), number of measuring heads in the sample

3   Graphic display of the measured values of all measuring heads of the sample
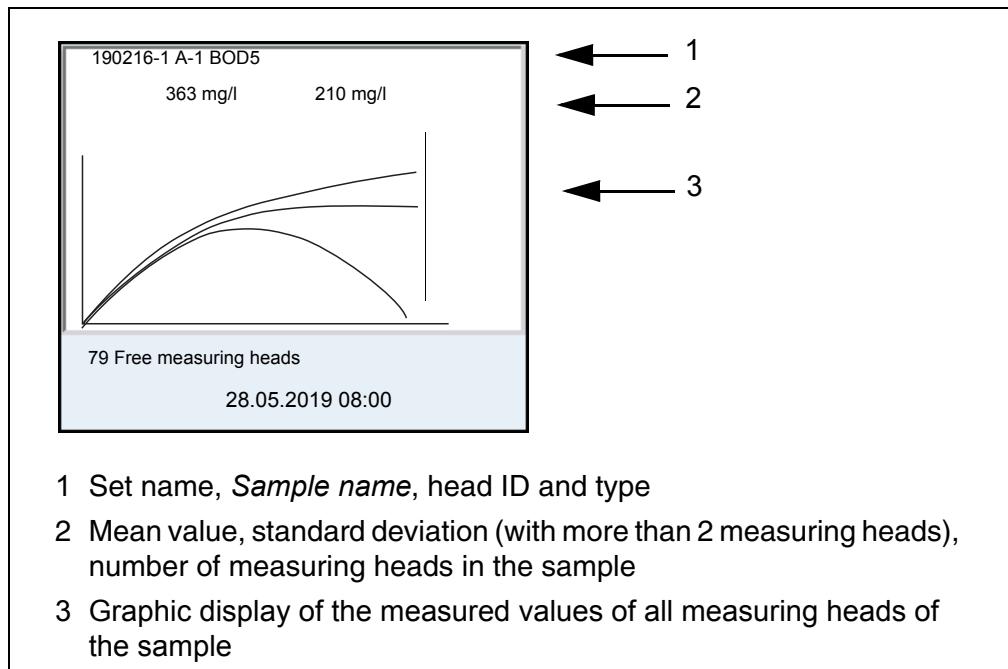
> ℹ️ More functions to evaluate the sample (see section 5.3 EVALUATING THE SAMPLES).

4   Using **<M>**, switch to the *OxiTop set management*.

5.4   Transmitting data (USB interfaces)

> ℹ️ Basic information on data transmission to the USB interfaces and on the settings for the USB interfaces is given in the operating manual of your meter.

1   Connect the output device to a USB interface.
   ● USB-A: USB printer, USB memory device
   ● USB-B: PC

2   Using **<M>**, open the *OxiTop set management*.

3   Using **<▲><▼>**, highlight a *Set*.

4   Open the details of the selected set with **<MENU/ENTER>**.
   The measuring heads automatically call up the current data of the set. The readout takes between 3 and 30 seconds per OxiTop®-IDS measuring head, depending on the number of measuring data. If there are many measuring data, it may take considerably longer.

5   Using **<▲><▼>**, select a sample.

6   Using **<PRT_>** or **<PRT>**, output the data to the USB interfaces.

Key	Explanation
<PRT_>	Output of the data as a *.csv file to the USB-A interface, to a connected USB memory device.
<PRT>	Output of the data in ASCII or CSV format (setting in the system menu) to the interface USB-A or USB-B. The meter recognizes whether a printer or PC is connected.

The data transferred to the USB memory device are in the directory "OxiTop".

5.5 Calibration

5.5.1 Why calibrate?

OxiTop®-IDS measuring heads age. This changes e.g. the tightness of the Oxi-Top®-IDS measuring heads and the accuracy of the pressure measurement. The condition of the measuring heads can be evaluated by checking their tightness and measuring accuracy (see BOD application report).

5.5.2 When do you have to calibrate?

Routinely within the framework of the company quality assurance

5.5.3 Calibration procedure

Creation of a defined negative pressure and balancing with the display (see BOD application report).

In contrast to physical or chemical measuring methods, BOD systems do not provide standardized values, as the use of microorganisms has a great spectrum depending on their composition and food supply. With the aid of testing tools and suitable tests, errors due to defective pressure sensors or untight OxiTop®-IDS measuring head threads can be identified.

You can check the OxiTop®-IDS measuring heads with the following procedures.

- OxiTop®-PM (Cal-Test)
- OxiTop®-PT (pneumatic test)

Details on the tests are given in the operating manual of your OxiTop®-IDS measuring head.

The test OxiTop®-PT (pneumatic test) is operated exclusively at the OxiTop®-IDS measuring head. The meter is not required for this.

5.5.4 OxiTop® PM-Test (Cal test)

The test checks the tightness and calibration of the pressure measuring system with the aid of a chemically simulated BOD.

The OxiTop®-PM calibration tablet contains, among other, a defined amount of sodium sulfite. The oxygen in the sample bottle oxidizes the sodium sulfite to sodium sulfate. This process consumes the oxygen present in the sample bottle. The reduction of oxygen causes a defined negative pressure. The BOD value corresponding to this negative pressure is given in the packet.

The procedure is similar to a BOD5 measurement with

● specified sample volume (164 ml) and

● addition of the calibration tablet

Details on sample preparation and steps of the test: see operating manual of the OxiTop®-PM test resource.

The test is started in one of the following ways:

● OxiTop®-IDS measuring head without wirelessly connected meter: BOD5-measurement (with defined sample volume)

● OxiTop®-IDS measuring head with wirelessly connected meter: BOD5-measurement (with defined sample volume, menu-guided test)

6   Technical data

The present operating manual only described operating with a MultiLine Multi 3630/3620 IDS.

The technical data of the individual devices of the OxiTop$^®$ measuring system are given in the following documents:

- Meter (Multi 3630/3620 IDS),

- IDS-WLM-M adapter,

- OxiTop$^®$-IDS measuring head.

Operation with OxiTop$^®$-IDS measuring heads	**Measuring ranges**	*Measuring mode BOD standard*	0 ... 40 / 80 / 200 / 400 / 800 / 2000 / 4000 mg/l BOD
		Measuring mode BOD special	0 ... 400000 mg/l BOD
		Measuring mode Pressure p	500 ... 1250 hPa (OxiTop$^®$ i/OxiTop$^®$-IDS) 500 ... 1500 hPa (OxiTop$^®$-IDS /B)
	Number of datasets per OxiTop$^®$-IDS measuring head	*Standard*	1 measured value per day
		Max.	360 measured values for the specified measuring duration
	Number of OxiTop$^®$-IDS measuring heads per meter	Max. 100	

7   What to do if...

	Cause	Remedy

An OxiTop®-IDS measuring head cannot be registered for a sample	The selected OxiTop®-IDS measuring head is already registered for a sample
	
	Example: A reset was carried out at an OxiTop®-IDS measuring head registered for a sample
		– Register a free OxiTop®-IDS measuring head
		– Release the OxiTop®-IDS measuring head
		  – Delete the individual OxiTop®-IDS measuring head from the sample for which it is registered
		  – Delete the set in which the OxiTop®-IDS measuring head is registered.

No measurement curves are displayed although the measurement has already been running for an extended period of time	– The *AutoTemp* phase is still running – The temperature control is incorrectly set or defective – An OxiTop®-IDS measuring head cannot be addressed	– Wait for the end of the *AutoTemp* phase then start the evaluation – Temper the sample more precisely – See error symptom, A OxiTop®-IDS measuring head cannot be addressed
An measuring head cannot be addressed	– The radio link was switched off at the OxiTop®-IDS measuring head, e.g. to save energy – The battery of the OxiTop®-IDS measuring head is empty – The radio link between OxiTop®-IDS measuring head and meter is interrupted – The OxiTop®-IDS measuring head is defective	– If necessary, read any measurement data available from the OxiTop®-IDS measuring head – Exchange the battery (all measurement data are lost) – Remove any barriers and sources of interference from the radio link (see operating manual of the WLM system). Re-establish the connection – Exchange the defective OxiTop®-IDS measuring head – Contact the service department
The Multi 3630/3620 IDS meter does not react	– The batteries of the meter are empty – Operating condition undefined or EMC load unallowed – The meter is defective	– Insert new batteries or connect the power pack – Carry out a reset at the meter (simultaneously press the keys **<MENU/ENTER>** and **<On/ Off>**) – Contact the service department

8   Firmware update for OxiTop®-IDS measuring heads

Available firmware updates for OxiTop®-IDS measuring heads are provided on the Internet. With the "Firmware Update " program and a PC you can update the firmware of a OxiTop®-IDS measuring head to the newest version.

For the update you have to connect the Multi 3630/3620 IDS meter to a PC via the USB interface and start the update program at the PC.

The update requires:

● a free USB interface (virtual COM port) on the PC

● the current driver for the USB interface
  (see operating manual of your meter)

● the current firmware for the meter
  (see operating manual of your meter)

● the current firmware for the WLM-M adapter
  (see operating manual of your WLM system)

● the USB cable (included in the scope of delivery of the Multi 3630/3620 IDS).

1   Install the downloaded firmware update on a PC.
     An update folder is created in the Windows start menu.
     If an update folder for the OxiTop®-IDS measuring head is already exist-ing, the new data are displayed there.

2   In the windows start menu, open the update folder and start the firm-ware update program for the OxiTop®-IDS measuring head.

3   Using the USB interface cable, connect the Multi 3630/3620 IDS to a USB interface (virtual COM port) of the PC.

4   Switch on the Multi 3630/3620 IDS.

5   At the OxiTop®-IDS measuring head in the *Service* menu, start the update (with *Update mode*, see operating manual OxiTop®-IDS mea-suring head). The firmware is loaded and automatically installed.

6   In the firmware update program at the PC, start the update process with OK.

7   Follow the instructions of the firmware update program.
     During the programming process, a corresponding message and a progress bar (in %) are displayed.
     The programming process takes up to 5 minutes. A terminatory mes-sage is displayed after a successful programming process. The firm-ware update is completed.

8   Disconnect the Multi 3630/3620 IDS from the PC.
     The meter and OxiTop®-IDS measuring head are ready for operation again.

After switching the Multi 3630/3620 IDS meter off and on you can check whether the OxiTop®-IDS measuring head has taken over the new software version (see Multi 3630/3620 IDS operating manual).

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