System OxiTop® Control

OxiTop® OC110
Controller

OxiTop®-C
Measuring Heads

OC Model

Notes on this operating manual

To ensure that you become rapidly acquainted with your controller and the measuring heads, you will find notes for safe operation in the Safety chapter.
The next chapter provides general information for measuring with the OxiTop® Control.
The remaining chapters provide a comprehensive description of the functions and technical data of the OxiTop® Control System.

Symbols used

⚠ **indicates notes that you must read - for your own safety, the safety of others and to protect your meter from being damaged.**

i **indicates notes that inform you of special features.**

♪ **means: A signal tone sounds.**

Scope of delivery

- **See enclosed sheet**

Recommended accessories

- **Printer TD100**
- **Software Achat OC**

Warranty

The designated instrument is covered by a warranty of 1 year from the date of purchase.
The instrument warranty extends to manufacturing faults that are determined within the period of warranty. The warranty excludes components that are replaced during maintenance, such as batteries etc.
The warranty claim extends to restoring the instrument to readiness for use but not, however, to any further claim for damages. Improper handling or unauthorized opening of the instrument invalidates any warranty claim.

To ascertain the warranty liability, return the instrument and proof of purchase together with the date of purchase freight paid or prepaid.

Accuracy when going to press

The use of advanced technology and the high quality standard of our instruments are the result of continuous development. This may result in differences between this operating manual and your instrument. We cannot guarantee that there are absolutely no errors in this manual. We are sure you will understand that we cannot accept any legal claims resulting from the data, figures or descriptions. The information in this manual is subject to change without notice.

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Note:
This operating manual refers to software release 2.xx.
The right to implement minor changes is reserved.

⚠ **Please read these safety instructions carefully before putting the instrument into operation!**

This instrument is built and checked according to IEC 1010, safety rules for electronic measuring instruments and left the factory secure from a safety engineering aspect.

The smooth functioning and operational safety of the equipment can only be guaranteed by following the general safety precautions applicable and the special safety instructions given in this operating manual.

– The trouble-free function and operational safety of the instrument can only be guaranteed by following the climate conditions specified in the chapter "Technical data" in this operating manual.

– If the system is transported from a cold environment to a warm environment, its function can be impaired as a result of condensation forming. In this case, the temperature of the equipment must be allowed to adapt to room temperature before putting it into operation again.

– Adjustment of the equipment and maintenance or repair work must only be performed by personnel authorized by WTW.

– If safe operation is no longer possible, the equipment must be taken out of service and secured against inadvertent operation by labeling with warning signs.

– The safety of the user can be affected by the instrument if, for example,
  ❍ the instrument is visibly damaged,
  ❍ the instrument no longer operates as prescribed,
  ❍ the instrument has been stored under adverse conditions for a lengthy period of time,
  ❍ the instrument was exposed to adverse transport conditions.

– Basically, if you are in any doubt, please return the instrument for repair or maintenance to the manufacturer of the equipment, "Wissenschaftlich-Technische Werkstätten GmbH".

The OxiTop Control system

The classical application field for the OxiTop® Control measuring heads and controller ist the BOD_x determination (BOD_x = Biochemical Oxygen Demand for the time x). The evaluation of biological degradability (e.g. test according to OECD 301F) is also part of this field.

OxiTop®-C
Measuring Head

Sample Bottle

OxiTop® OC 110
Controller

Inductive Stirring
System
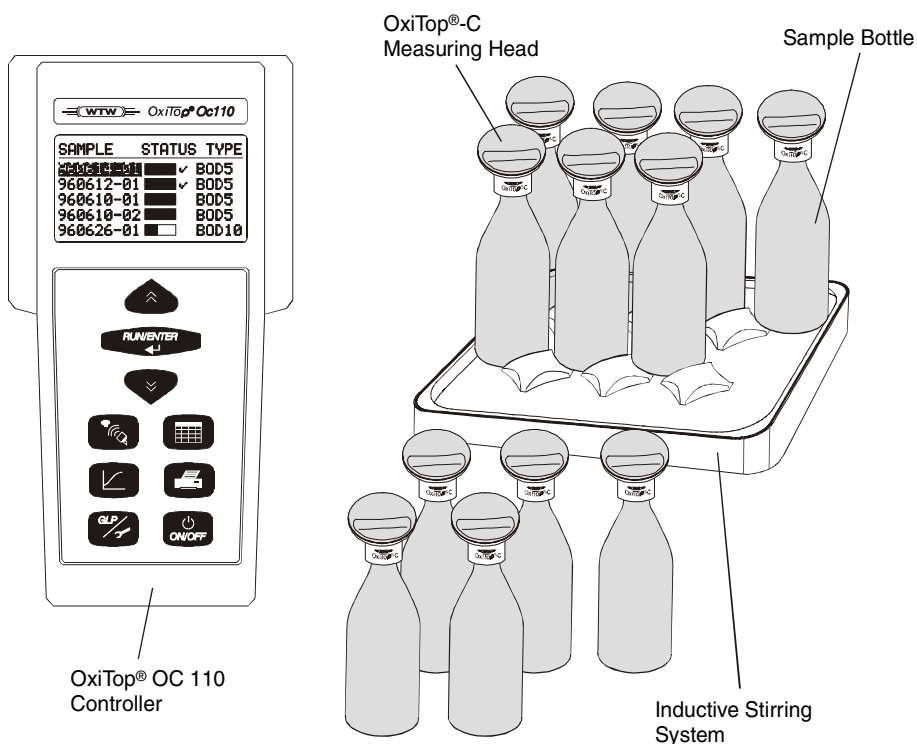
With different sample vessels, the OxiTop®-C measuring heads in conjunction with the OxiTop® Controller 110 can also be used in other areas such as

- Evaluation of respiration and toxicity in earth, sludge, waste and sediment (e.g. extraction of earth contaminated according to recovery concepts)

- Evaluation of the respiration rate of cell cultures

- Microbiological growth and stress examinations

- Measurement of anaerobic degradation processes (e.g. biogas evaluation)

OxiTop®-C
Measuring Head
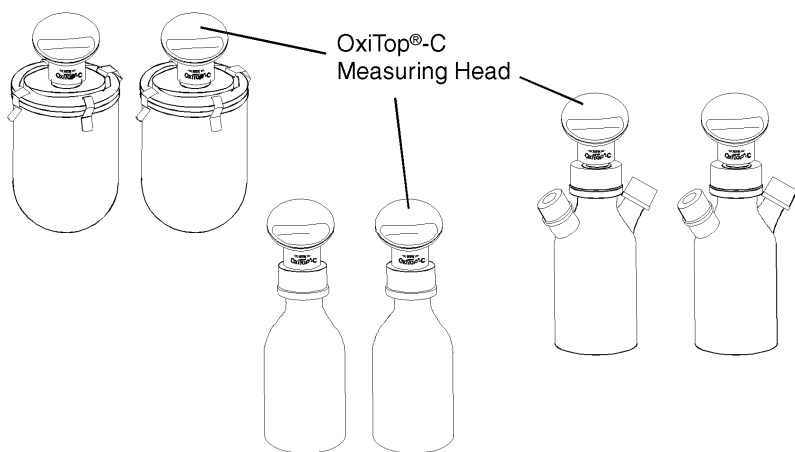
The measuring principle

The respirometric measurement is a pressure measurement. If oxygen is consumed in a closed vessel at a constant temperature, a negative pressure develops. If a gas is released, an overpressure develops.
The OxiTop®-C measuring head measures and stores this pressure for the whole duration of a measurement once started.

The OxiTop® OC110 controller collects the pressure values from the measuring heads and processes them.
The formula shown below is the basis for all calculations for the BOD using the values from the OxiTop®-C measuring head.

$$BOD = \frac{M(O_2)}{R \cdot T_m} \cdot \left(\frac{V_t - V_l}{V_l} + \alpha \frac{T_m}{T_0} \right) \cdot \Delta p(O_2)$$

$M(O_2)$	Molecular weight (32000 mg/mol)
R	Gas constant (83.144 l·mbar/mol·K)
T_0	Reference temperature (273.15 K)
T_m	Measuring temperature
V_t	Bottle volume (nominal volume in ml)
V_l	Sample volume in ml
α	Bunsen absorption coefficient (0.03103)
$\Delta p(O_2)$	Difference of the oxygen partial pressure (mbar)

The interpretation of the pressure differences in the temporal course depends on the measured material and its preparation and on the sample manipulation (e. g. intermediate aerations) during the measuring period.

The data management

The measuring head records the measured values and stores the measuring data. Using the controller, the collected and stored data are read out from the measuring head and stored in the "sample management". Starting at the OxiTop® Control sample management, it is possible to make the graphical and statistical evaluation of the sample data. Additionally, the data can be transferred from the controller to a printer or computer via the interfaces (IR or RS232). The read-out software Achat OC facilitates to process the stored data further.

Literature

Further information on this subject can be obtained at no cost from WTW:

BOD handbook
- Application reports
- Special printouts

The operating modes

The OC110 controller has 4 different operating modes:

Routine BOD:
- Measurement of single samples for a BOD_x (x = 0.5h to 99d) at 20 °C.
- Measuring range and filling volume can be selected out of seven fixed ranges and the corresponding filling volumes.
- The AutoTemp function is switched on (fixed).

Standard BOD: (default)
- Measurement of up to 12 parallel processes combined to a sample for a BOD_x (x = 0.5h to 99d) at 20 °C.
- Measuring range and filling volume can be selected out of seven fixed ranges and the corresponding filling volumes.
- Automatic sample statistics with averaging.
- The AutoTemp function and the GLP mode can be switched on.

Special BOD:
- Measurement of up to 12 parallel processes combined to a sample for a BOD_x (x = 0.5h to 99d).
- Measuring range, dilution, bottle volume and sample volume can be set.
- The altitude above sea level and the starting air pressure respectively can be set.
- The incubation temperature (5 °C to 40 °C) can be set up.
- Automatic sample statistics with averaging.
- The AutoTemp function and the GLP mode can be switched on.

Pressure p:
- The operating mode pressure p is a pure pressure measurement.
- The absolute pressure of single samples is measured between 500 hPa and 1350 hPa
- A „limit pressure" can be set.
- Up to 10 manually triggered measurements (momentary values) are saved with pressure value and point in time.
- The GLP mode can be switched on.

Controller keyboard
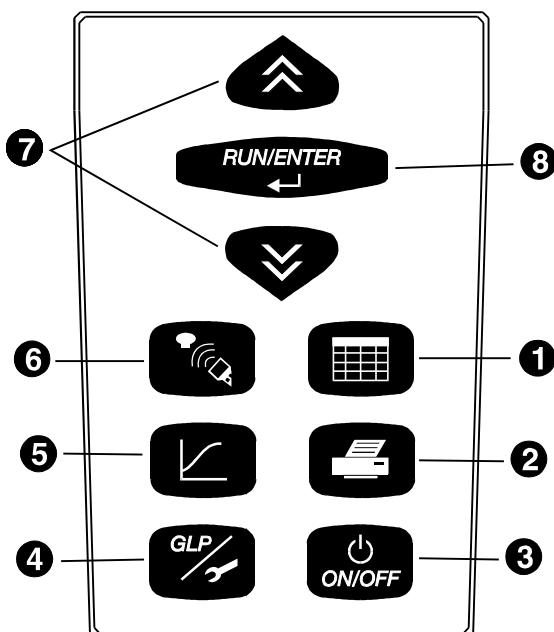
❶ **Switching on/off**

❷ **Printing** of measurement data and settings via IR interface

❸ **Confirmation** of entries

❹ **Select,** change settings

Function keys:

❺ **Sample management:** List of samples, reading the data of individual measuring heads or samples, shows measuring heads or samples

❻ **Communication with measuring heads:** Start measuring, change or show settings, call up data

❼ **Evaluation:** Graphic and numerical display of measuring data

❽ **GLP / Tools:** Display free measuring heads, display or change settings, perform checks or maintenance

The function keys are used to start a function or to change to another function. Confirmed data and settings are preserved.

Representation of keys and displays:

Example: Pressing the "Communication" button causes the controller to change to the "Communication with the measuring heads" function: select action.

Action: press button.	*The instrument displays:*	*Description of what the action caused and possible further request:*
| | ```
SELECT ACTION



─ Start sample
─ Call up all data
``` | Starting communication with the measuring heads. Select a menu item using ⌄/⌃. |

Display:

– In selection menus, the selected function or line appear in a lighter font on a dark background
– 🔊 : Symbol for an OxiTop®-C measuring head

Measuring head:

Each measuring head that receives a command from the controller, indicates this by a short flashing signal.

The course of the measurement

① **Preparation before starting the measurement:**

GLP
– Select operating mode
– Select settings

i Operating mode and settings cannot be changed for a measurement once it is started!

② **Measurement:**

Start of measurement   End of measurement

Time

AutoTemp   Measurement

Starting the measuring heads   Data transfer

Print   Sample management

                                                      Evaluation

                                                      Print

Switching on the controller

⏻
ON/OFF

```
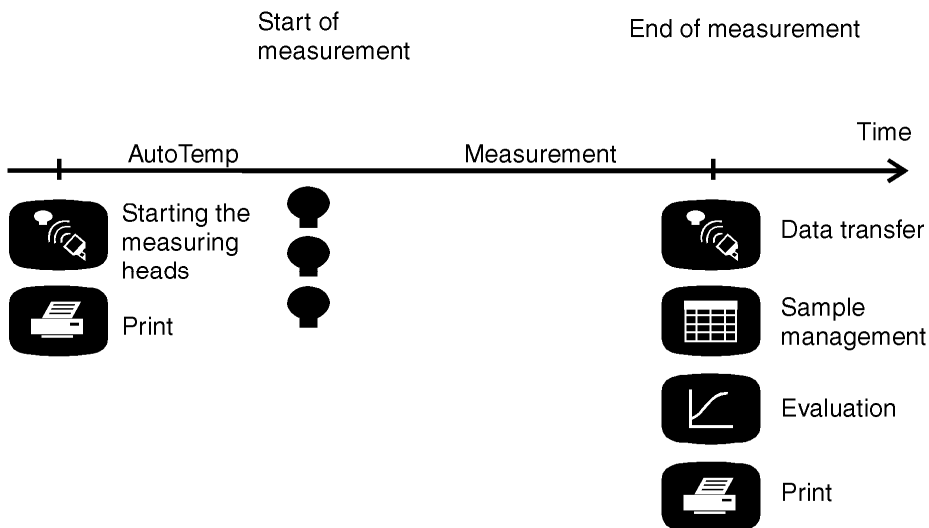    27.10.98

    15:06
```

The current date and time appear for approx. 2 seconds (important for the allocation of sample numbers).
If the date/time is incorrect, undertake corrections in "GLP/Tools".

```
SAMPLE    STATUS TYPE
```

The instrument is in the sample management
(Standard BOD mode,
in the delivery state).

Switching on the measuring heads

The measuring heads are immediately ready for operation. The controller switches the measuring heads on and off during communication.

i **To avoid malfunctions:**
If you use two or more controllers simultaneously make sure that the distance between the controllers is at least 3 meters!

Operating mode: Standard BOD / Routine BOD

The Standard BOD operating mode (parallel sample process for up to 12 measuring heads per overall sample) is preset in the delivery condition of the controller.
To change to the Routine BOD operating mode (single samples) see chapter GLP/Tools - Settings – Operating mode.
The handling of controller and measuring heads is basically the same in both operating modes. *Where there are differences for the Routine BOD operating mode they are mentioned.*

Sample preparation

See WTW application reports
(contained within the scope of delivery of the accessories supplied).

Screw the OxiTop®-C measuring heads onto the BOD bottles and close them tightly.

Never use joint grease or other lubricant for your OxiTop®-C measuring heads. Some of these products contain solvents that can cause severe damage to the plastic housing of the measuring head.

The sealing of the BOD bottles is also perfectly adequate without grease. However, you should always wipe off heavy contamination and particles on the sealing surfaces of the rubber sleeves and OxiTop®-C. WTW accepts no liability for damage due to the use of joint grease.

Start the measurement


```
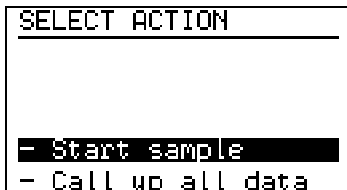SELECT ACTION




- Start sample
- Call up all data
```

"Communication with the measuring heads" mode.

Preselected: "Start sample".

("Start ● " appears in the Routine BOD operating mode).

RUN/ENTER ↵

```
BOD-RANGE    FILLING
-  40 mg/l    432 ml
- 400 mg/l    164 ml
-  80 mg/l    365 ml
- 200 mg/l    250 ml
- 800 mg/l     97 ml
-2000 mg/l    43.5 ml
-4000 mg/l    22.7 ml
```

Use ⌄/⌃
to select the measurement range. The filling volume required is given in the right hand column.

The controller stores the setting (memory function: the last selected measurement range is set).

RUN/ENTER ↵

```
Sample      970713-01
Type            BOD5
Meas. range  40 mg/l
Final date  18.06.97
- I. D. number    001
- Start      Temp GLP
```

Confirm the selected measurement range for the sample. The automatically assigned sample number (YY/MM/DD and sequential number) is given in the header line.

Additional information:
Type of measurement, run time, measurement range, final date, Id number.
"Temp" display => the AutoTemp function (see the chapter GLP/Tools) is switched on.
"GLP" display => the GLP function (see the chapter GLP/Tools) is switched on.

Change the Id number for the additional identification of the sample (e.g. sampling location) as follows:

- Use ⌃ to move the cursor to the Id number,

- Press RUN/ENTER ↵ and

- Use ⌄/⌃ to set the Id number required
              (setting range 001 ... 255).

- Use RUN/ENTER ↵ to confirm this.

Use 🖨 to print out the entire sample information
(see the chapter "Print").

RUN/ENTER ↵

```
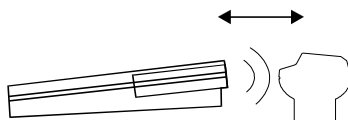Sample      970713-01
● 1
Please hold
controller to ● !

↵ Stop ● start
```

Confirm the start of measurement.
Contact selection:

max. 5 cm

The controller repeatedly sends the start information in the scanner mode until successful feedback is received from the OxiTop®-C measuring head. After the successful start message from the measuring head:

♪

```
Sample      970713-01
● 1

   !started!
```

Displays "!Started!". From this point in time, the sample exists within the sample management.

Subsequently, the request to start the next measuring head is made automatically.

In the Routine BOD operating mode there is no "● 1" identifier in the display, and the controller automatically returns to the entry menu after starting the measuring head.

```
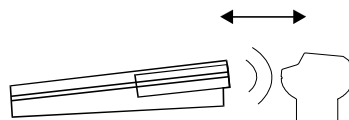Sample      970713-01
● 2
Please hold
controller to ● !

↵ Stop ● start
```

Start the next measuring head (●2).
Contact selection:

max. 5 cm

The number of the measuring head is automatically incremented.

The controller continues to work with the contact selection, i.e. you can now start a sequence of measuring heads (parallel sample process) without having to press any further keys by holding the controller to the next measuring head to be started.

When all the measuring heads provided for this sample have been started:

Use [RUN/ENTER ↵] to selecct "Stop ● start":
The controller returns to the entry menu.

If no measuring head is started (e.g. because the controller was not held to - or not close enough to - a measuring head):

♪

```
Sample      970713-01

● start stopped!

- Continue ● start
- Stop ● start
```

The start was stopped.
Use [RUN/ENTER ↵] to confirm "Continue ● start" and hold the controller to a measuring head (see above).

Select "Stop ● start" to return to entry level menu.

If an attempt is made to start a measuring head that was already started:

```
Sample      970713-01

●already used!

- New ●
- Stop ● start
```

Displays "Measuring head already used!"
Use [RUN/ENTER ↵] to confirm "New ●" and hold the controller to a free measuring head (see above).

Select "Stop ● start" to return to entry level menu.

i In the delivery state, the controller automatically makes space when "Start ●" is selected if the measured value memory is full. To do this, it deletes the oldest finished sample (if a finished sample is available). You can change this setting in "manual erase" (see the chapter GLP/Tools - Settings).

Call up all data

This function is used to **call up the data of all measuring heads,** no matter in which operating mode they were started.
To call up the data of individual measuring heads: see the chapter, Sample management.

```
SELECT ACTION
────────────────────


─ Start sample
─ Call up all data
```

Entry menu "Communication with the measuring heads".

```
SELECT ACTION
────────────────────


─ Start sample
─ Call up all data
```

Use ⥥
to select "Call up all data".

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER ↵

```
CALL UP ALL DATA
────────────────────

Number      ☂: 011


Called up   ☂: 011
```

Queries the data of all active measuring heads in the scanner mode.
The controller stores the data obtained and updates the list of the sample management.
Duration of a pass: approx. 3 seconds for 12 measuring heads in a stirring system.

If the measuring heads do not all respond in the 1st pass of the data query, the controller searches for the missing measuring heads in the scanner mode for approximately a further 7 seconds. Without having to press another key, you can continue the data queries at other locations (e.g. other stirring platforms or other

thermal cabinets).
Approximately 7 seconds after the last call up was performed, the scanner mode breaks off automatically and the following display appears:

```
CALL UP ALL DATA
010 of  011 ▀▀▀
called up


▬ Continue transfer
─ Stop
```

"Continue transfer" (preselected): A new pass is made only for measuring heads that have not yet responded.

Stop: The instrument returns to the entry menu.
For information on searching for missing measuring heads, see the chapter "What to do if..."

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER ↵

```
CALL UP ALL DATA


Number       ▼: 011



Called up    ▼: 011
```

The call up of further measuring heads is performed in the scanner mode.

```
CALL UP ALL DATA
011 of  011 ▀▀▀
called up
```

Message that all the data of all the measuring heads has been called up. The instrument then returns to the entry menu.

ℹ️ Immediately after the the complete measurement data records of a finished measurement have been called up, the corresponding measuring head is given the "free" status. The measuring head can be used for a new measurement. The relevant sample in the sample management is marked as finished (see the chapter "Sample management"), as soon as the measurement time has expired and the data of all measuring heads of this sample have been called up.

Sample management

Entry into the sample management.
A list of samples appears in the display (if samples are available):

```
SAMPLE  STATUS  TYPE
970710-01 ■■■  ✓  B20h
970710-02 ■■■  ✓  BOD5
970714-01 ■■■      BOD5
970714-02 ■■■      BOD5
970726-01 ■□      BOD7
```

BOD type and run-duration. Examples:
BOD5: BOD with
5 days run-duration.
B20h: BOD with
20h run-duration

Sample number:
Date (YY/MM/DD)
and consecutive
number

Temporal process of the sample:

■□   Status bar partly filled:
     The sample is not yet ready.

■■   Status bar filled:
     The ready and complete data set
     of the sample can be called up from
     the measuring head.

■■ ✓ Status bar filled plus hook:
      The sample is ready. The complete data
      set is given in the controller for evaluation.

i Data of samples that have been started in the Routine BOD operating
mode are also listed in the sample management of other operating modes.
Data of samples that have been started in other operating modes do not
appear in the sample management of the Routine BOD operating mode.

Reporting order:
- At the upper end of the list: finished samples (if available)
- Under this: current samples

Sorting of the samples: according to date and
sequential number 01 ... 99 from the oldest to the newest sample.

Select a sample.

RUN/ENTER

According to the sample selected, one of the two following menus appears. The header line contains the:

- sample number
- Id number (e.g. I001)
- BOD type and run time

of the selected sample.

Finished sample

```
970710-01 I001  BOD5



- Show sample
- Erase sample
-  ● list
```

Current sample

```
970726-01 I001 BOD10
Final date  05.08.97

- Call up data
- Show sample
-  ● list
```

Show sample

This function is used to find the measuring heads or samples. Sample labeling is not necessary.

```
SAMPLE  STATUS  TYPE
970714-01 ■■■   ✓ BOD5
970710-02 ■■■   ✓ BOD5
970714-01 ■■■     BOD5
970714-02 ■■■     BOD5
970726-01 ■□□     BOD7
```

Starting point: sample management .

Use ⌄/⌃

to select a sample.

RUN/ENTER

```
970714-01 I001  BOD5



- Show sample
- Erase sample
-  ● list
```

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER ↵

```
● total 07
──────────────
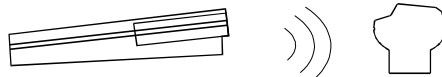
!Sample is shown!
```

The controller transmits the call up of the selected sample. The allocated measuring heads flash for approx. 5 seconds.

After the message, the controller automatically returns to the previous menu.

Erase data of finished samples

This function erases the data of finished samples from the sample management of the controller. You can only erase a sample if it is finished; in non-finished samples, the menu item "Erase sample" does not appear.

```
SAMPLE  STATUS  TYPE
970714-01 ███ ✓ BOD5
970711-01 ███ ✓ BOD5
970720-01 ███   BOD5
970720-02 ███   BOD5
970726-01 █▢▢   BOD10
```

Starting point: sample management .
Use ⊗/⊗
to select a finished sample.

RUN/ENTER ↵

```
970711-01 I001  BOD5


- Show sample
- Erase sample
- ● list
```

Use ⊗/⊗
to select the "Erase sample" submenu.

RUN/ENTER
↵

```
970711-01 I001   BOD5
Really erase
sample?

- Erase
- Back
```

Safety prompt with possibility to return.

RUN/ENTER
↵

```
970711-01 I001   BOD5

  !Sample erased!
```

The sample has been erased.

After the message, the controller automatically returns to the starting menu, "Sample management".

Show measuring head list

This function is used to allocate individual measuring heads to the relevant sample in the sample management and to find individual measuring heads.

```
970712-01 I001   BOD5
Final date  17.07.97

- Show sample
- Erase sample
- ● list
```

Use ⌄/⌃

to select "Measuring head list".

RUN/ENTER
↵

```
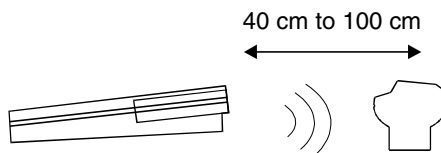970710-01  I001 BOD5
     Temp    total ●07
●01         724230103
●02         724230117
●03         724230199
↵ Show ●
```

List of measuring heads of the selected sample is displayed together with the serial numbers of the measuring heads.
(*In the Routine BOD operating mode, this list always contains only one measuring head.*)

Point the controller at the measuring heads:

40 cm to 100 cm

Use ⧩/⧨ to select the measuring head and use **RUN/ENTER** ↵ to confirm.
The controller again transmits the call up of the selected sample.
The measuring head flashes for approx. 5 seconds.

Use [grid button] to return to the sample management.

Call up data

This function is used to call up the data of individual samples. To call up the data of all samples, see the chapter "Call up all data".

[grid button]

```
SAMPLE    STATUS TYPE
960714-01 ███  ✓ BOD5
960712-01 ███  ✓ BOD5
960710-01 ███     BOD5
960710-02 ███     BOD5
960726-01 █▭▭    BOD10
```

Use ⧩/⧨
to select a sample whose
- run time is not yet completed (bar not yet full)
- data after complete measurement that has not yet been called up (bar full, no tick)

RUN/ENTER ↵

```
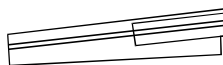970710-01 I001 BOD5
Final date  15.07.97

- Call up data
- Show sample
- ● list
```

Jumps to submenu of the selected sample.
Preselected: "Call up data"

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER ↵

```
CALL UP DATA
970710-01▮▮▮   BOD5

No. of active ●: 007

called up     ●: 007
```

Sequential call up of the measuring heads allocated to the sample (in this example: 7) in the scanner mode:
The controller
- stores the data obtained
- updates the list of the sample management

Duration of a pass:
approx. 3 seconds for 12 measuring heads in a stirring system.

```
CALL UP DATA
970710-01▮▮▮   BOD5
007 of 007 ●
called up
```

The controller confirms the call up performed.

```
970710-01 I001 BOD5
Final date  15.07.97

- Call up data
- Show sample
- ● list
```

The controller then returns automatically to the submenu.

If the measuring heads do not all respond, the following display appears:

RUN/ENTER ↵

```
CALL UP DATA
970710-01 ■■■    BOD5

No. of active ●: 007

called up     ●: 006
```

Renewed start of the data call up.

The controller continues to search for missing measuring heads in the scanner mode. Without pressing any further keys, the data call up can be continued at other locations (e.g. other stirring platforms or other thermal cabinets). Approximately 7 seconds after the last request was performed, the scanner mode automatically breaks off and the following display appears:

```
CALL UP DATA
970710-01 ■■■    BOD5
006 of 007 ●
called up
- Continue transfer
- Stop
```

Use RUN/ENTER ↵ to restart the the data transfer (see above).

```
SAMPLE    STATUS TYPE
960714-01 ■■■ ✓ BOD5
960712-01 ■■■ ✓ BOD5
960710-01 ■■■ ✓ BOD5
960710-02 ■■■   BOD5
960726-01 ■□    BOD10
```

Return to the main menu, "Sample management". Transferred and completed samples appear with a tick next to them. (The complete measurement data records of all finished measuring heads of the sample have been procured.)

i Immediately after the successful data transfer of a sample, the allocated measuring heads are given the "free" status. The measuring heads can be used for a new measurement.

Call up data - Stop

```
CALL UP DATA
970710-01 ▮▮▮▮    BOD5
006 of 007  ●
called up
- Continue transfer
━ Stop▮▮▮▮▮▮▮▮▮
```

If a measuring head is missing or defective and the controller cannot completely call up the sample as a result, the menu item "Stop" is provided to stop the data transfer.

RUN/ENTER ↵

```
970710-01 I001   BOD5

   Data transfer

   !STOPPED!
```

After confirmation, the display message shown here appears.

Three displays are then possible:

Case 1

```
970710-01 I001   BOD5
No data received
from 001 ●●●
━ Show ●●●▮▮▮▮▮
- Back
```

The sample is still running and individual measuring heads of the sample are not attainable.

Case 2

```
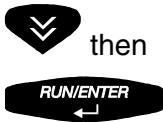970710-01 I001   BOD5
No data received
from 001 ●●●
━ Show ●●●▮▮▮▮▮
- Missing ●●●
- Back
```

The run time of the sample has ended and the finished, complete data of the attainable measuring heads has been transferred.

⏷ then

RUN/ENTER ↵

```
970710-01 I001  BOD5
Erase missing ●●●
in sample
management?
- Erase
- Back
```

Erase:
Removes missing measuring heads from the data stock. The completed sample is given the "finished" status.

Back:
Jumps back to the previous menu.

Abort using a function key: The stopped sample is not declared as "finished".

Case 3:

```
970710-01 I001  BOD5
No ● attainable!

- Show ●●●
- Missing ●●●
- Back
```

No measuring head of a sample is attainable.
(Routine BOD operating mode: The relevant measuring head is not attainable.)

⏷ then

RUN/ENTER ↵

```
970710-01 I001  BOD5
Erase sample
in sample
management?
- Erase
- Back
```

Erase:
Removes a sample from the data stock.

Back:
Jumps back to the previous menu.

"Show ●●●":

As in "Show sample" but selectively for missing measuring heads (Identification option if only the sender of the measuring head is defective. Otherwise, see the chapter "What to do if...?")

"Missing ●●●":

Only appears when the run time of the sample has expired. Here you can remove the data of a missing or defective measuring head from the sample management of the controller. It is used to set the sample to the "finished" status (ticked) if all the other measuring heads are already "finished": Erases the missing measuring heads from the sample management.

Evaluation

```
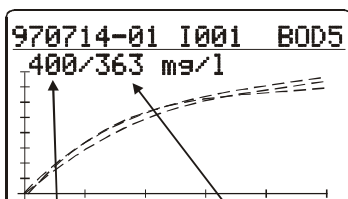SAMPLE  STATUS TYPE
970714-01 ███ ✓ BOD5
970712-01 ███ ✓ BOD5
970710-01 ███   BOD5
970710-02 ███   BOD5
970726-01 █▒▒  BOD10
```

Starting point: Sample management.
Use ⚡/⚡ to select the sample.

Printout of the results with curves.

```
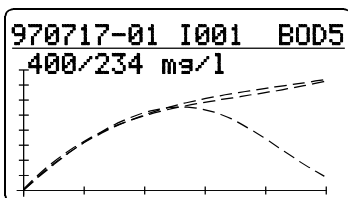970714-01 I001  BOD5
 400/363 mg/l
```

Measuring range   Mean value

Evaluation of the overall sample:
Display of all the curves together with mean value data.
Check the display for outliers.

Printout of the results with curves (according to printing format - see the chapter "Print")
Example: Overall sample with outliers.

```
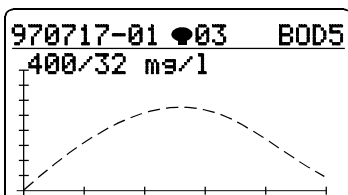970717-01 I001  BOD5
 400/234 mg/l
```

In the Routine BOD operating mode, the evaluation shows the selected sample as a single curve with the measured value data. Pressing of **RUN/ENTER** *changes between the cursor interrogation (see chapter "Cursor interrogation" and display of the curve with measured value data.*

⚡/⚡

```
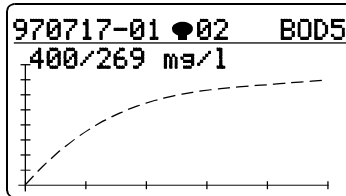970717-01 ●03  BOD5
 400/32 mg/l
```

Scroll through the parallel samples: Display of individual curves (cyclical pass) with data of the BOD final value.

Printout of a single result with a single curve.

Sample statistics (Standard BOD operating mode)

```
970717-01 ●02    BOD5
 400/269 mg/l
```

Starting point: display of a single curve.

RUN/ENTER ↵

```
970717-01 ●02    BOD5
- Sample statistics
- Exclude curve
- Cursor query
- Back
```

Changes to sample statistics.

The menu selection shown here only appears if the number of measuring heads (n) is at least 2.

If n = 1, pressing of RUN/ENTER ↵ changes directly to the cursor interrrogation.

ⓘ When jumping to the selection menu from "Show all curves", the menu item "Exclude curve" is not displayed.

RUN/ENTER ↵

Results of the **finished** sample:

```
970712-02 I001   BOD5

Mean value    372 mg/l
    SD         11  mg/l
     n          3
↵ Back
```

- mean value
- SD: standard deviation
  (from n = 3)
- n: number of measuring heads

Printout of the results with curves

Data of the **current** sample:

```
970726-01 I001 BOD10
Final date    05.08.97
Current
mean value    254 mg/l
        n      3
↵ Back
```

- end date
- current mean value
- n: number of measuring heads

Printout of the data (current mean value, n, sample information) with curve paths to date

Excluding a curve (Standard BOD operating mode)

This function is used to temporarily exclude a single curve (e.g. an outlier) from the evaluation and averaging of an overall sample**.**
The curve is only excluded temporarily! The data stock of the sample management does not change. The excluded curve is present again when the call is repeated.

The function "List of measuring heads" (see the chapter "Sample management") is used to find leaky or defective single samples.

∀/∧

```
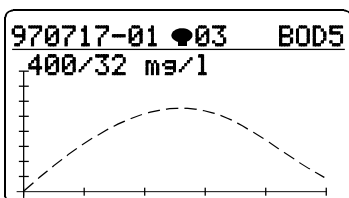970717-01 ●03   BOD5
_400/32 mg/l
```

Display of the single curves:

Select curve.

RUN/ENTER ↵

```
970717-01 ●03   BOD5
- Sample statistics
- Exclude curve
- Cursor query
- Back
```

∀/∧:
Change to
"Exclude curve".

RUN/ENTER ↵

```
970717-01 ●03   BOD5




- Exclude curve
- Back
```

"Exclude curve"
is preselected.

"Return": Returns to the previous menu.

RUN/ENTER ↵

```
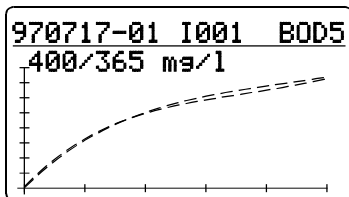970717-01 ●03    BOD5

Curve
excluded!
```

Message
"Curve excluded".

```
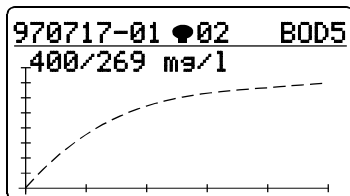970717-01 I001   BOD5
 400/365 mg/l
```

Updated display
(curve excluded, mean value newly calculated).

Printout of the updated results with curves
(without the excluded curve).

Cursor interrogation

```
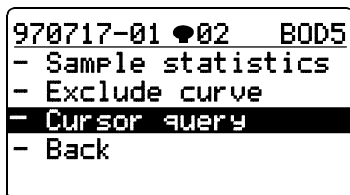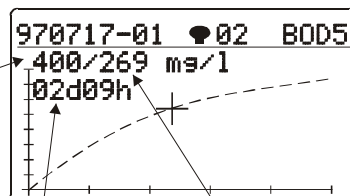970717-01 ●02    BOD5
 400/269 mg/l
                    _ _ _ _
              _ _ -
         _ -
     _ /
   /
  /
 /
```

Starting point:
Display of a single curve with
measured value data.

RUN/ENTER
↵

```
970717-01 ●02    BOD5
- Sample statistics
- Exclude curve
= Cursor query
- Back
```

Use ∨/∧
to change to "Cursor query"
(this menu is not displayed in the
Routine BOD operating mode).

RUN/ENTER
↵

```
970717-01  ●02   BOD5
▼400/269 mg/l
 02d09h ↗
                _ _ _ _
           _ -
       _ / +
    _ -
   ↑
  /
 /
```

Measuring
range end

Use ∨/∧
to run through the curve values.

Use 🖨 to print out the
current display.

Measuring time   Measured value at
at the cursor   the cursor position
position

Or from the display of all the single curves:

```
970717-01 I001   BOD5
 400/358 mg/l
 04d05h      _ = = = =
         _ = +
      _ =
    = =
   /
  /
 /
```

Use ∨/∧ to run through the
curve mean values.

Use 🖨 to print out the
current display.

Return to the previous menu using **RUN/ENTER** ↵.

Return to the display of all the single curves using [⎘].

Curves display for cold samples

```
970717-01 ●03    BOD5
 400/352 mg/l
```

Display of a single curve.

```
970717-01 I001    BOD5
 400/363 mg/l
```

Display of all curves.

When using samples that are too cold, the maximum AutoTemp time is not sufficient for the sample temperature to reach the incubation temperature: Warming the sample can cause excess pressure.

Display: Negative values of the curve will be truncated and the curve arises from the time axis but not the origin.

Measured values outside the measuring range

In the following cases, "undef." (undefined) is displayed instead of the measured value or mean value during evaluation:
- A measured curve exceeding the measuring range at any point of its path.
- A measured curve undercutting the measuring range at its end point.

Sample displays:

```
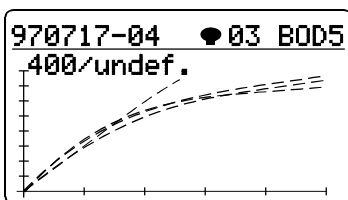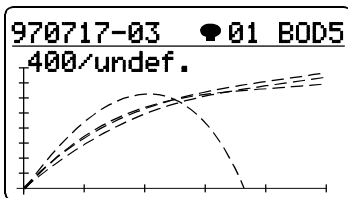970717-04    ● 03 BOD5
400/undef.
```

A measured value exceeds the measuring range (Overflow).

```
970717-03    ● 01 BOD5
400/undef.
```

A measured value undercuts the measuring range (Underflow).

```
970717-02    ● 04 BOD5
400/undef.
```

A measured value temporarily leaves the measuring range.

After the exclusion of the defective curve (see chapter "Exclude curve"), the controller displays the mean value again.

Operating mode: Special BOD

To change to the operating mode Special BOD refer to chapter GLP/Tools - Settings - Operating mode.

Sample preparation

See WTW application reports
(contained within the scope of delivery of the accessories supplied).

Screw the OxiTop®-C measuring heads onto the BOD bottles and close them tightly.

⚠️ **Never use joint grease or other lubricant** for your OxiTop®-C measuring heads. Some of these products contain solvents that can cause severe damage to the plastic housing of the measuring head.

The sealing of the BOD bottles is also perfectly adequate without grease. However, you should always wipe off heavy contamination and particles on the sealing surfaces of the rubber sleeves and OxiTop®-C. WTW accepts no liability for damage due to the use of joint grease.

Start the measurement

Before starting the measurement, set the temperature and air pressure (see chapter GLP/Tools).

```
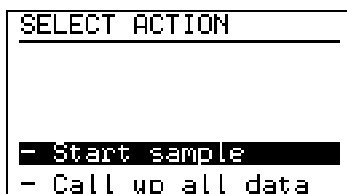SELECT ACTION
─────────────
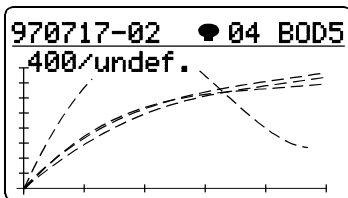
■ Start sample
─ Call up all data
```

"Communication with the measuring heads" mode.

Preselected: "Start sample".

In the Special BOD operating mode, there are 6 variable parameters:

Parameter	Delivery setting	Admissible setting range
• Bottle volume	510 ml	50 to 9.999 ml
• Filling volume	164 ml	10 ml to bottle volume minus 10 ml
• Dilution	1 + 0	1 + 0 to 1 + 99
• Measuring range (BOD)	395mg/l	to 400.000 mg/l
• Temperature	20 °C	5 °C to 40 °C (setting: see chapter GLP/Tools)
• Air pressure	954 hPa	500 hPa to 1100 hPa (setting: see chapter GLP/Tools)
• Height above sea level	500 m	-698 m to 5572 m (setting: see chapter GLP/Tools)

In the "Select Calculation" menu you can select one parameter out of bottle volume, filling volume and measuring range to be calculated by the controller based on the other parameters. Enter the respective other parameters using ∨/∧ or confirm the presettings using RUN/ENTER. When doing this the parameter to be calculated is changed simultaneously.


```
SELECT CALCULATION

- Reset parameters
- Bottle volume
- Filling volume
- Measuring range
```

With ∨/∧ select the parameter the controller will calculate. The controller stores the settings. "Measuring range" is preselected in the delivery state.

Selecting and confirming the menu item „Reset parameters" resets the settings to the delivery state.

| RUN/ENTER ↵ | SETTINGS
- Bottle   ml   510
- Fill.vol. ml   164
- Dilution 1+   0
Meas.r.mg/l   395
- Continue | After confirming, the display shows the values last set up for bottle volume, filling volume of the sample, dilution (these can be changed), and the measuring range that the controller calculated from these.
marks the parameter calculated by the controller. |

Example: Change parameters to:
Filling volume of the sample to be calculated by the controller,
Bottle volume 900 ml, Dilution 1 + 1, Measuring range 2000 mg/l.

	SELECT CALCULATION - Reset parameters - Bottle volume - Filling volume - Measuring range	Select the "Filling volume" menu item in the "Select Calculation" menu using ⌄/⌃.
RUN/ENTER ↵	SETTINGS - Bottle ml 510 # Fill.vol. ml 164 - Dilution 1+ 0 - Meas.r.mg/l 395 - Continue	The "Settings" menu is displayed.
⌃	SETTINGS - Bottle ml 510 # Fill.vol. ml 164 - Dilution 1+ 0 - Meas.r.mg/l 395 - Continue	Select the "Bottle ml" menu item.
RUN/ENTER ↵	SETTINGS - Bottle ml 900 # Fill.vol. ml 289 - Dilution 1+ 0 - Meas.r.mg/l 395 - Continue	With ⌄/⌃ set the bottle volume to 900 ml and confirm with RUN/ENTER. Then select the menu item "Dilution" using ⌄/⌃.

| RUN/ENTER ↵ | ```
SETTINGS
- Bottle    ml   900
# Fill.vol.  ml   441
- Dilution 1+      ▮
- Meas.r.mg/l    395
- Continue
``` | With ⌄/⌃ set the dilution to 1 + 1 and confirm with RUN/ENTER ↵. Then select the menu item "Measuring range" using ⌄/⌃. |
| RUN/ENTER ↵ | ```
SETTINGS
- Bottle    ml   900
# Fill.vol.  ml   141
- Dilution 1+      1
- Meas.r.mg/l   2000
- Continue
``` | With ⌄/⌃ set the measuring range(mg/l) to 2000 and confirm with RUN/ENTER ↵. |

ℹ If, while setting the parameters, the value calculated by the controller is above or below the admissible range for the relevant parameter, the controller displays UFL or OFL for this parameter. After the ⌄/⌃ key is no longer pressed, the controller displays the last admissible setting for the respective parameter to be calculated.

| ⌄ | ```
SETTINGS
- Bottle    ml   900
# Fill.vol.  ml   141
- Dilution 1+      1
- Meas.r.mg/l   2000
- Continue
``` | When the settings are correct, select the "Continue" menu item. |
| RUN/ENTER ↵ | ```
Sample    981012-04
Type           BOD5
Meas.rng.  2000mg/l
Final date 17.10.98
- I.D. number   001
- Start    Temp GLP
``` | Confirm the settings for the sample. The automatically allocated sample number is given in the header line (YY/MM/DD and sequential number). |

Additional information:
Type of measurement, run time, measurement range, final date, Id number.
"Temp" display => the AutoTemp function (see the chapter

"GLP/Tools") is switched on (only with run times ≥ 1 day).
„GLP" display => the GLP function (see the chapter "GLP/Tools") is switched on.

Change the Id number for the additional identification of the sample (e.g. sampling location) as follows:

- Use ⚌ to move the cursor to the Id number,

- Press **RUN/ENTER** ↵ and

- Use ⚌/⚌ to set the Id number required
  (setting range 001 ... 255).

- Use **RUN/ENTER** ↵ to confirm this.

- Use 🖨 to print out the entire sample information (see the chapter "Print").

RUN/ENTER ↵

```
Sample     981012-04

Please hold
controller to ☝!

↵ Stop ☝ start
```

Confirm the start of the measurement. Contact selection:

max. 5 cm

ℹ The calculation of the BOD value is based on the assumption that the oxygen partial pressure in the bottle is at least 60 hPa after the measurement is finished.

Further proceeding from starting the sample to the evaluation as described for the Standard BOD mode (see chapter Operating mode: Standard BOD / Routine BOD).

Operating mode: Pressure p

To change to the operating mode Pressure p refer to chapter GLP/Tools - Settings - Operating mode.

Sample preparation

See WTW application reports
(contained within the scope of delivery of the accessories supplied).

Screw the OxiTop®-C measuring heads onto the BOD bottles and close them tightly.

⚠ **Never use joint grease or other lubricant** for your OxiTop®-C measuring heads. Some of these products contain solvents that can cause severe damage to the plastic housing of the measuring head.

The sealing of the BOD bottles is also perfectly adequate without grease. However, you should always wipe off heavy contamination and particles on the sealing surfaces of the rubber sleeves and OxiTop®-C. WTW accepts no liability for damage due to the use of joint grease.

Start the measurement

```
SELECT ACTION
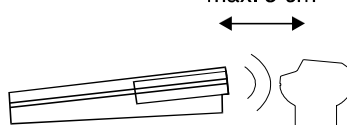
─ Start sample
─ Call up all data
```

"Communication with the measuring heads" mode.

Preselected: "Start sample".

RUN/ENTER

```
Sample     981012-01
Type            p5d
Meas.rng.   Pressure
Final date  17.10.98
- I.D. number    001
- Start
```

The automatically assigned sample number (YY/MM/DD and sequential number) is given in the header line.

Additional information:
Type of measurement, run time, measurement range, final date, Id number.
"GLP" display => if the GLP function (see the chapter "GLP/Tools") is switched on.

Change the Id number for the additional identification of the sample (e.g. sampling location) as follows:

- Use ⌃ to move the cursor to the Id number,

- Press **RUN/ENTER** and

- Use ⌄/⌃ to set the Id number required
　　　　　　(setting range 001 ... 255).

- Use **RUN/ENTER** to confirm this.

Use 🖨 to print out the entire sample information (see the chapter "Print").

RUN/ENTER

```
Sample     981012-01

Please hold
controller to ◆!

◆ Stop ◆ start
```

Confirm the start of measurement.
Contact selection:

max. 5 cm

The controller repeatedly sends the start information in the scanner mode until successful feedback is received from the OxiTop®-C measuring head.

```
┌─────────────────────────────┐
│ Sample        981012-01     │
│ ☗ 1                         │
│                             │
│ ☗ started ☗                 │
│                             │
└─────────────────────────────┘
```

Displays "!Started!". From this point in time, the sample exists within the sample management. Then the controller automatically returns to the entry level menu. (In the Pressure p operating mode, samples can only be started as single samples.)

If no measuring head is started (e.g. because the controller was not held to - or not close enough to - a measuring head):

```
┌─────────────────────────────┐
│ Sample        981012-01     │
│                             │
│ ☗ start stopped!            │
│                             │
│ ─ Continue ☗ start          │
│ ─ Stop ☗ start              │
└─────────────────────────────┘
```

The start was stopped.

Use [RUN/ENTER ↵] to confirm "Continue ● start" and hold the controller to a measuring head (see above).

Select "Stop ● start" to return to entry level menu.

If an attempt is made to start a measuring head that was already started:

```
┌─────────────────────────────┐
│ Sample       981012-02      │
│                             │
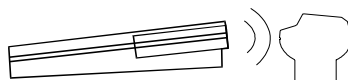│ ☗ already used!             │
│                             │
│ ─ New ☗                     │
│ ─ Stop ☗ start              │
└─────────────────────────────┘
```

Displays "Measuring head already used!"

Use [RUN/ENTER ↵] to confirm "New ●" and hold the controller to a free measuring head (see above).

Select "Stop ● start" to return to entry level menu.

i In the delivery state, the controller automatically makes space when "Start ●" is selected if the measured value memory is full. To do this, it deletes the oldest finished sample (if a finished sample is available). You can change this setting in "manual erase" (see the chapter "GLP/Tools - Settings").

Call up all data

This function is used to **call up the data of all measuring heads** (no matter in which operating mode they were started).
To call up the data of individual measuring heads: see the chapter " Sample management".

```
SELECT ACTION
─────────────────

─ Start sample
─ Call up all data
```

Entry menu "Communication with the measuring heads".

```
SELECT ACTION
─────────────────



─ Start sample
─ Call up all data
```

Use ⌄
to select "Call up all data".

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER ↵

```
CALL UP ALL DATA
─────────────────

Number      ☂: 009


Called up   ☂: 009
```

Queries the data of all active measuring heads in the scanner mode.

The controller stores the data obtained and updates the list of the sample management. Duration of a pass: approx. 3 seconds for 12 measuring heads in a stirring system.

After calling up the data of all measuring heads the controller checks for all samples started in the pressure p mode the maximum difference pressure (negative or positive) compared to the start pressure. The controller lists all samples the value of which exceeds the amount of the difference pressure in a table (to set up the difference pressure see the chapter GLP/Tools – Settings – Limit pressure).

```
Pressure >= Limit
981012-05  000000017
981012-08  000000018
981012-09  000000019
```

Example list with samples the value of which exceeds the maximum limit pressure.
Use ⌄/⌃ to select a sample.

RUN/ENTER
```
981012-05 I001   p5d
Limit pr.:+/-150 hPa
Pressure:   -153 hPa

- Show sample
- Back
```

The set limit pressure and the currently measured pressure of the sample selected are displayed.

Point the controller at the measuring heads:

40 cm to 100 cm

RUN/ENTER
```
⬩ total 01



↑Sample is shown↑
```

The allocated measuring head flashes for approx. 5 seconds.

```
981012-05 I001   p5d
Limit pr.:+/-150 hPa
Pressure:   -153 hPa

- Show sample
- Back
```

Then the controller displays the pressure values again. To return to the list press ⌄ then **RUN/ENTER**.
To exit the list press any function key.

i Immediately after the data transfer of the complete measurement data records of a finished measuring head, this measuring head is given the "free" status. The measuring head can be used for a new measurement. The relevant sample in the sample management is marked as finished (see the chapter "Sample management").

Sample management

Entry into the sample management.
A list of samples appears in the display (if samples are available):

```
SAMPLE   STATUS TYPE
981012-15▉  ✓   B5h
981012-16▉  ✓   B5h
981012-17▉  ✓  p0.5h
981012-01□     p5d
981012-02□     p5d
```

Type and run-duration
of the pressure measurement
Examples:
p5d: run-duration 5 days
p0.5h: run-duration 0.5 hours.

Sample number:
Date (YY/MM/DD)
and consecutive
number

Temporal process of the sample:

Status bar partly filled:
The sample is not yet ready.

Status bar filled:
The ready and complete data set
of the sample can be called up from
the measuring head.

✓ Status bar filled plus hook:
The sample is ready. The complete
data set is given in the controller for
evaluation.

i Data of samples started in other operating modes are also shown in the sample list.

Reporting order:
- At the upper end of the list: finished samples (if available)
- Under this: current samples

Sorting of the samples: according to date and
sequential number 01 ... 99 from the oldest to the newest sample.

Select a sample.

According to the sample selected, one of the two following menus
appears. The header line contains the:
  - sample number
  - Id number (e.g. I001)
  - BOD type and run time
of the selected sample.

Finished sample   ### Current sample

```
981013-04 I001 p0.5h        981013-01 I001    p5d
                            Final date  18.10.98
— Show sample               — Call up data
— Momentary value           — Show sample
— Erase sample              — Momentary value
— 🍷 list                   — 🍷 list
```

For the menu items 'Show sample'; 'Erase sample'; " 🍷 list" und 'Call up data" refer to the corresponding paragraphs in the chapter, Standard BOD / Routine BOD.

Call up momentary value

With this function you can call up and store the momentary pressure value of a sample. The controller can store up to 10 momentary values per sample. They appear as vertical lines on the curve in the evaluation.

i   Do not change date and time in the controller while a measurement is running. Otherwise, momentary values cannot be stored correctly.

⌨	Starting point: Sample management.

```
SAMPLE   STATUS TYPE
981013-04 ███ ✓ p0.5h
981013-05 ███ ✓ p0.5h
981013-01 [   ]    p5d
981013-02 [   ]    p5d
981013-03 [   ]    p5d
```

Starting point: Sample management.
With ⌄/⌃ select a sample.

RUN/ENTER ↵

```
981013-01 I001   p5d
Final date  18.10.98
─ Call up data
─ Show sample
─ Momentary value
─ ⬆ list
```

A list with menu items for the sample appears.

⌄

```
981013-01 I001   p5d
Final date  18.10.98
─ Call up data
─ Show sample
─ Momentary value
─ ⬆ list
```

Select menu item "momentary value".

RUN/ENTER ↵

```
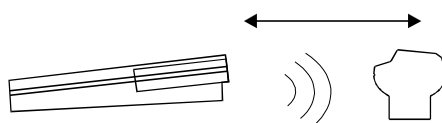Call up momentary v.


Please direct
controller to ⬆!
```

Point the controller at the measuring heads: 40 cm to 100 cm

RUN/ENTER

```
Call up momentary v.
Current Value
         -10 hPa

- Save
- Stop
```

The momentary value of the sample is called up and displayed.

Selecting and confirming "Stop" leads to the next display but one without saving.

RUN/ENTER

```
Call up momentary v.



Momentary 1
value no. saved!
```

The controller saves the momentary value with a sequential number (1 to 10).

```
981013-01 I001   p5d
Final date  18.10.98
- Call up data
- Show sample
- Momentary value
- ⬆ list
```

The controller returns to the entry menu. Up to 10 momentary values can be stored at selectable points in time within the run time of the sample.

This message is displayed for approx. 3 seconds if already 10 momentary values have been stored for a sample:

```
981013-01 I001   p5d
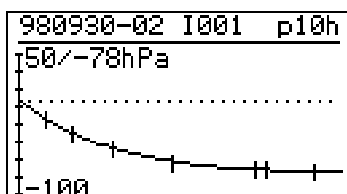
Maximum number
of momentary values
saved!
```

Then the previous display appears again.

Evaluation

```
PROBE     STATUS   TYP
980930-01 ■■■  ✓  p10h
980930-02 ■■■  ✓  p10h
980930-03 ■■■  ✓  p10h
```

Starting point: Sample management.
With ⌄/⌃
select a sample.

```
980930-02 I001  p10h
┌50/-78hPa
├
├·····························
├
├
├
├
└-100
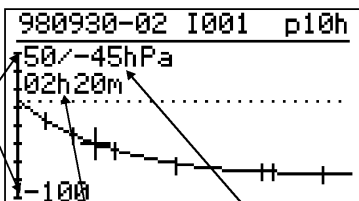```

Enters into the evaluation: Display of the selected sample as a curve together with measured value data.
Stored momentary values appear additionally as vertical lines on the curve.

Change to cursor query:

**RUN/ENTER**

Scaling of the y-axis is automatically adjusted to the measured value

```
980930-02 I001  p10h
┌50/-45hPa
│02h20m
├·····················
├
├
├
└-100
```

Pressing ⌄/⌃ causes the cursor (crosswire) to run through the points of the curve. The allocated run time and the corresponding measured value are each displayed.

Measuring time at the cursor position

Measured value at the cursor position

Pressing **RUN/ENTER** changes between the cursor query and the dispay of the curve together with the measured value data.

Sample display for a measurement with intermediate aerations without any saved momentary values:

```
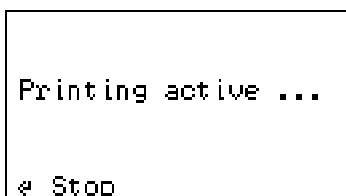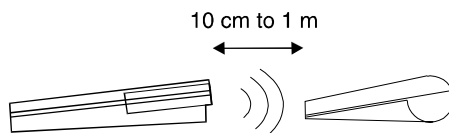981013-02 I001  p10h
┌50/-11hPa
├
├··········
├
├
├
├
└-100
```

Interventions in the course of the measurement, for example intermediate aerations, are visible in the curve.

Print

Switch on the TD100 IR printer.

Point the controller at the printer: 10 cm to 1 m

```
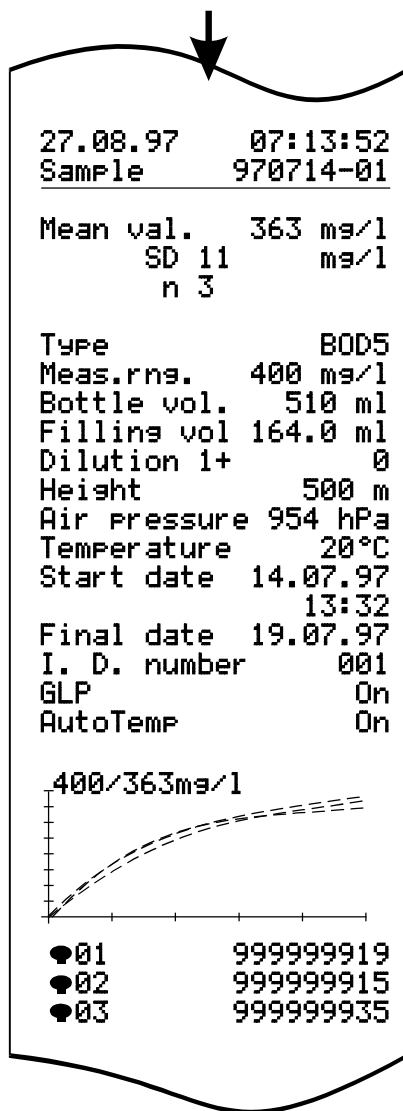Printing active ...

⏎ Stop
```

When printing from the sample management or from the evaluation:
The controller outputs the **report data of the selected sample** to the IR interface.
– Printing date and time
– Sample number
– Measured value: Mean value, SD, n (with parallel samples) or Final value (with single samples)
– Type and running time, measuring range
– Additional sample information for samples started in the Special BOD operating mode: bottle volume, filling volume, dilution, height, air pressure, temperature)
– Start date and time, final date, I. D. number
– If GLP is switched on: Note "GLP On"
– If AutoTemp is switched on: Note "AutoTemp On"
– Curve(s) + BOD mean value or final value
– with „GLP On": List of the serial numbers of the measuring heads allocated to the sample (only when sample was started in the Special BOD or Standard BOD operating mode)
– With samples started in the Pressure p operating mode: Saved momentary values with call-up time

Sample printout for a sample with 3 measuring heads started in the Special BOD measuring mode:

```
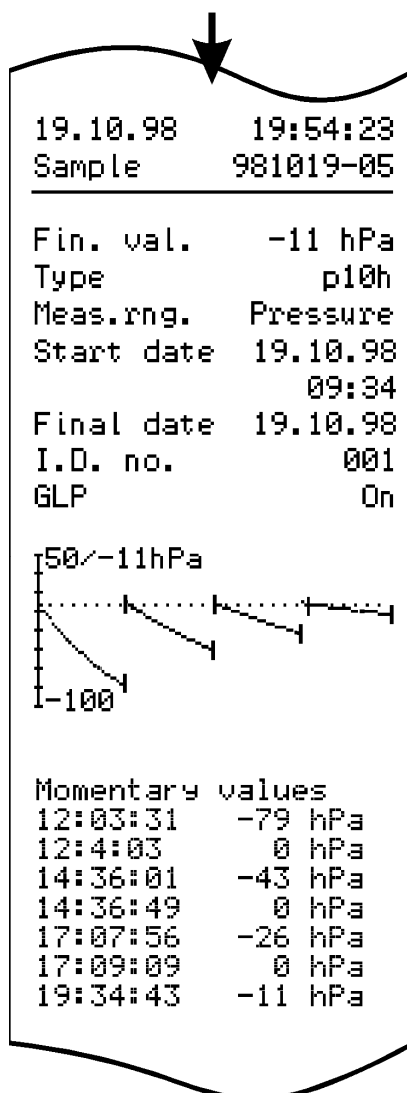27.08.97      07:13:52
Sample        970714-01

Mean val.    363 mg/l
        SD 11      mg/l
         n 3

Type             BOD5
Meas.rng.    400 mg/l
Bottle vol.   510 ml
Filling vol 164.0 ml
Dilution 1+        0
Height        500 m
Air pressure 954 hPa
Temperature     20°C
Start date   14.07.97
                13:32
Final date   19.07.97
I. D. number     001
GLP               On
AutoTemp          On

400/363mg/l




●01          999999919
●02          999999915
●03          999999935
```

Printing from the evaluation:
The printout always shows the curve(s) that is shown in the display.

Sample printout for a sample started in the Pressure p measuring mode:

```
19.10.98      19:54:23
Sample       981019-05
_____

Fin. val.      -11 hPa
Type              p10h
Meas.rng.     Pressure
Start date    19.10.98
                 09:34
Final date    19.10.98
I.D. no.           001
GLP                 On

50/-11hPa

-100

Momentary values
12:03:31    -79 hPa
12:4:03       0 hPa
14:36:01    -43 hPa
14:36:49      0 hPa
17:07:56    -26 hPa
17:09:09      0 hPa
19:34:43    -11 hPa
```

Printing from the evaluation:
The printout always shows the curve that is shown in the display.

Pressing **:**

- When starting a sample prints the start data of the sample
- In the "Show settings" submenu (chapter GLP/Tools) prints a list with the current settings
- In the "●-Info" submenu (chapter GLP/Tools - Check) prints a list with information on the measuring head
- In the "Controller-Info" submenu (chapter GLP/Tools - Check) prints a list with information on the controller.

GLP/Tools main menu

```
GLP/TOOLS
- Show free ███
- Show settings
- Settings
- Check
- Maintenance
```

Main menu:
Use ⬇/⬆
to select a submenu

Use [RUN/ENTER]
to change to the submenu

Submenus of the GLP/Tools:

Show free ●●●
This function is used to identify free measuring heads. Thus an additional sample labeling is not required. Free measuring heads can be used to start new samples.

Show settings
The current settings are displayed here.

Settings
Here you can undertake or change the following settings:

Operating mode
Measuring time
Date/time
GLP; calibrating interval   (Standard/Special BOD, Pressure p mode)
Erase memory
AutoTemp (Standard BOD and Special BOD operating mode)
Switch-off interval (Standard/Special BOD and Pressure p mode)
Temperature (Special BOD operating mode)
Height (Special BOD operating mode)
Air pressure (Special BOD operating mode)
Limit pressure (Pressure p operating mode)
Language

Check
Show ●●● (finished/all)
● info (with report printout)
Controller info (with report printout)
Cal test ●
Pneumatic test ●

Maintenance
Erase finished samples (from the sample management)
Reset/release ●
Restore data

Show free ♥♥♥

This function serves to recognize free measuring heads. Free measuring heads can be used to start new samples.

```
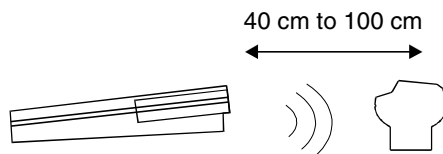GLP/TOOLS
- Show free ↑↑↑
- Show settings
- Settings
- Check
- Maintenance
```

Main menu, "GLP/Tools".
The "Show free ♥♥♥ " menu is preselected.

Press RUN/ENTER ↵ .

Point the controller at the measuring heads:

40 cm to 100 cm

All free measuring heads flash for approx. 5 seconds.

Show settings

```
GLP/TOOLS
- Show free ⠿
- Show settings
- Settings
- Check
- Maintenance
```

Main menu, "GLP/Tools".
Use ⌄/⌃ to select
the "Show settings" menu.

The following example illustrates the presettings in the Standard
BOD operating mode.

RUN/ENTER ↵

```
SHOW SETTINGS
Mode:   BOD Standard
Type:           BOD5
Date:       19.10.98
Time:          14:45
GLP:              On
```

"Show settings" menu: A list
containing the current settings is
displayed.

Use ⌄/⌃

to scroll through the list where
the scrolling stops at the
beginning and end of the list

⌄

```
SHOW SETTINGS
GLP:              On
Erase
 memory:         auto
AutoTemp:         On
Cal-
```

⌄

```
SHOW SETTINGS
AutoTemp:         On
Cal-
 interval:   12   mon
Switch-off
 interval:    5   min
```

🖶

In the "Show settings" submenu:
Print out the whole list of current settings (as in the display).

Settings

With this function you can undertake or change settings. The table below shows the settings in the delivery state.

```
GLP/TOOLS
- Show free ▐▐▐
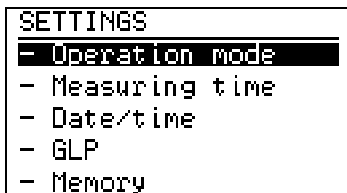- Show settings
- Settings
- Check
- Maintenance
```

Main menu, "GLP/Tools".

Use ⌄/⌃
to select the "Settings" menu.

Setting point	Default setting (bold) and setting range			
Operation mode	**Standard BOD:**	Routine BOD:	Spezial BOD	Pressure p
Measuring time	**5 days** (0.5 h to 99 days)	**5 days** (0.5 h to 99 days)	**5 days** (0.5 h to 99 days)	**5 days** (0.5 h to 99 days)
Date	current	current	current	current
Time	current	current	current	current
GLP	**On** / Off	**Off** (fixed setting)	**On** / Off	**On** / Off
Calibration interval	**12 months** to 36 months	---	**12 months** to 36 months	**12 months** to 36 months
Erase memory	**automatically** or manually	**automatically** or manually	**automatically** or manually	**automatically** or manually
AutoTemp	**On** / Off	**On** (fixed setting)	**On** / Off	**Off** (fixed setting)
Switch-off interval	**5 minutes** to 15 minutes	**5 minutes** (fixed setting)	**5 minutes** to 15 minutes	**5 minutes** to 15 minutes
Temperature	**20 °C** (fixed setting)	**20 °C** (fixed setting)	**20 °C** (5 °C to 40 °C)	---
Height	**500 m** (fixed setting)	**500 m** (fixed setting)	**500 m** (-698 - 5572 m)	---
Air pressure	**954 hPa** (fixed setting)	**954 hPa** (fixed setting)	**954 hPa** (500 - 1100 hPa)	---
Limit pressure	---	---	---	**150 hPa** (50 - 500 hPa)
Language	**German**	**German**	**German**	**German**

Operating mode

With the OC110 controller you can select between 4 operating modes: Standard BOD (delivery setting), Routine BOD, Special BOD and Pressure p (see also the chapter "The OxiTop® Control System – The operating modes").

RUN/ENTER ↵

```
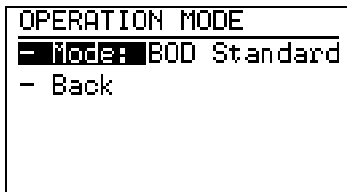SETTINGS
■ Operation mode
─ Measuring time
─ Date/time
─ GLP
─ Memory
```

"Settings" submenu:
Use ⌄/⌃
to select "Operating mode".

RUN/ENTER ↵

```
OPERATION MODE
■ Mode: BOD Standard
─ Back
```

Use **RUN/ENTER** ↵ to acknowledge
it and ⌄/⌃ to select the
operating mode.

Confirm using
RUN/ENTER ↵ .

Return to the "Settings" main menu:
⌄, then **RUN/ENTER** ↵ .

Measuring time

Set the measuring time of the BOD measurement here.

```
SETTINGS
- Operation mode
- Measuring time
- Date/time
- GLP
- Memory
```

"Settings" submenu:
Use ⌄/⌃
to select the "Measuring time" submenu.

RUN/ENTER
↵

```
VARIABLE
Adjusted
meas. time:  ▮5 days


⏎ Accept
```

Use ⌄/⌃
to set the days (1 to 99) or hours (0.5 to 23).
Confirm using RUN/ENTER ↵ .

Display:
preset measuring time.
Default on delivery: 5 days.

Date/Time

Set the date and time in the controller here (important for sample number allocation).

```
SETTINGS
- Operation mode
- Measuring time
- Date/time
- GLP
- Memory
```

"Settings" submenu:
Use ⌄/⌃
to select the "Date/Time" submenu.

RUN/ENTER ↵

```
DATE/TIME
─────────────────

    15.10.1998
    15:40:04


↵ Continue
```

Set each of the number blocks underlaid in black using ⩔/⩓.

Confirm and continue with **RUN/ENTER ↵**.

Set the day, month, year, hours, minutes, seconds consecutively.

i

The measuring time of samples already started is not affected by a change of date and time.

Exception: Do not change date and time in the controller while a measurement is running in the Pressure p operating mode as otherwise momentary values cannot be stored correctly.

GLP (Standard BOD, Special BOD, Pressure p operating modes)

The GLP (Good Laboratory Practice) set of rules requires a detailed description of all equippings and procedures in a laboratory.
These descriptions include the room equipment of the laboratory, the instruments used, and the measuring procedures laid down, and require the complete documentation of the samples tested. The type and frequency of the use of test resources is to be described and documented as well.

To make the documentation of the test resource monitoring easier and simpler the OxiTop® Control system has a GLP mode. When this mode is switched on,
• the calibration intervals that have been set and
• the calibrations that have been performed
are documented. The reports contain the series numbers of the measuring head and controller and the date of the calibration. The GLP mode monitores the calibration intervals and blocks the start of a new measurement if a calibration will be due within the measuring time.

Switch the GLP function on or off:

```
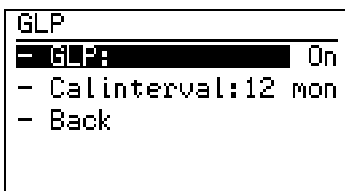SETTINGS
- Operation mode
- Measuring time
- Date/time
- GLP
- Memory
```

"Settings" submenu:
Use ⌄/⌃
to select the "GLP" submenu.

RUN/ENTER ↵

```
GLP
- GLP:            On
- Calinterval:12 mon
- Back
```

"GLP" submenu.
"GLP" is preselected.
Press RUN/ENTER ↵ ,
then use ⌄/⌃ to select
either GLP "On" or "Off"
Confirm using RUN/ENTER ↵ .

GLP - calibrating interval ("Calinterval")

Set the time period (1 to 36 months) here. When it expires, the instrument registers that the next test resource monitoring of the measuring heads is due. After the calibrating interval expires, measuring is blocked until the calibration is performed or the GLP setting is set to "Off".

ℹ️ If the end of the calibrating interval set up lies within the measuring time of a measurement to be started, this measurement cannot be started.

```
GLP
- GLP:            On
- Calinterval:12 mon
- Back
```

"GLP" submenu.
Use ⌄/⌃ to select the
subitem, "Calinterval".

RUN/ENTER

```
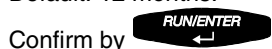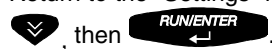GLP
 - GLP:          On
 - Calinterval:12 mon
 - Back
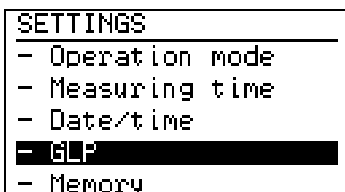
↵ Accept
```

Press RUN/ENTER ,
then set the time period for the calibrating interval (1 - 36 months) using ⌄/⌃.
Default: 12 months.
Confirm by RUN/ENTER .

Memory

Here, you can set whether the controller should automatically erase the oldest finished samples if the memory is full to create space for new measurement data (setting "auto").
With the "manual" setting, the message "Lack of memory! Erase finished samples!" is displayed if the memory is full (See chapter "What to do if ...?).

ℹ️ Back up your data regularly!

```
SETTINGS
 - Operation mode
 - Measuring time
 - Date/time
 - GLP
 - Memory
```

"Settings" menu:
Use ⌄/⌃
to select the "Memory" submenu.

RUN/ENTER

```
MEMORY
 - Erase:      auto
 - Back
```

Erase memory is preset to "automatic".
To change it:
Press RUN/ENTER and
use ⌄/⌃ to select between automatic and manual and
use RUN/ENTER to acknowledge it.

Return to the "Settings" menu:
⌄, then RUN/ENTER .

AutoTemp

The AutoTemp function controls the automatic start of the measurement after
checking the temperature adaption.
The pretemperature regulation to the precise incubator temperature is
recommended but not essential. Recommendation: e.g. regulate the temperature
of the sample for BOD5 measurements from 15 °C up to 20 °C.
You can tightly close the sample bottle with the measuring head immediately and
start the measurement. The AutoTemp function then automatically triggers the start of
the actual measuring after checking the temperature adaption. The measuring time of
the AutoTemp phase (adaption phase plus the test phase) is added to the sample
measuring time selected in the settings.

Pretemperature regulation of the sample
With the AutoTemp function switched on and, adhering to the recommendation
according to the table, the error quota that results from the temperature adaption of
the sample to the incubator temperature, $T_{Incubator}$, is smaller than 1% of the
selected measurement range final value.

Measuring time of the measurement	Recommended sample temperature at the start of the measurement
1 day	$T_{Incubator}$-0.5K ... $T_{Incubator}$
2 days	$T_{Incubator}$-1K ... $T_{Incubator}$
3 days	$T_{Incubator}$-2K ... $T_{Incubator}$
4 days	$T_{Incubator}$-3K ... $T_{Incubator}$
5 ... 99 days	$T_{Incubator}$-5K ... $T_{Incubator}$
BOD5	15°C ... 20°C

AutoTemp function in detail
The AutoTemp function is made up of the **adaption phase** and the **test phase**.

Adaption phase
The phase without evaluation of the pressure process. The duration of the adaption
phase is defined for the various measuring times according to the table.
The adaption of the microbiology to the characteristics of the sample is made in this
phase and small temperature deviations, too high and too low temperatures of the
sample, can be compensated.

Test phase
The phase in which the further pressure process direction in the sample bottle is
checked. The test phase is defined for various measuring times according to the
table. In this phase, the continuing temperature deviation can be compensated if the
temperature of the sample is too low.

Sequence of the test phase:

With a further drop in pressure (consumption) or constant pressure after the adaption phase, the pressure value at the end of the adaption phase is the starting point of the measurement.

On a further increase of pressure following the adaption phase (the sample is still too cold), the turning point of the pressure process at which the pressure increase changes into a pressure drop, is the starting point of the measurement. If the sample is too warm the test phase is dropped (temper the sample according to the table on the last page).

If no starting point is found (according to the procedure given in points 1 and 2) after the termination of the AutoTemp phase (time limit exceeded), the last measuring point of the AutoTemp phase forms the starting point.

This means that the BOD curve in the graphical evaluation does not emerge from the coordinate origin at the zero time point. A sample that was too cold was started.

BOD measuring time	Adaption phase duration	Test phase duration
0.5 to 23 hours	Since the measurement times are very short, the system always suppresses the *AutoTemp phase* here even if the AutoTemp function is switched on in the settings.	
1, 2, 3, 4, 5 days	14, 28, 42, 56, 70 minutes	Maximum of 28, 56, 84, 112, 140 minutes
6 to 99 days in a 1 day pattern	70 minutes	Maximum of 140 minutes

Switch the AutoTemp function on or off (Standard BOD and Special BOD operating mode):

```
SETTINGS
 - Measuring time
 - Date/time
 - GLP
 - Memory
 - AutoTemp
```

"Settings" menu:

Use ⌄/⌃

to select "AutoTemp" submenu.

```
AUTOTEMP TEMP
- AutoTemp:        On
- Back
```

AutoTemp is preset to "On".
To change:
Press [RUN/ENTER]
and use ⌄/⌃ to select between AutoTemp "On" and "Off" and
use [RUN/ENTER] to confirm it.

Return to the "Settings" menu:
⌄, then [RUN/ENTER].

Switch-off interval (not in Routine BOD operating mode)

The time interval after the last time a key is pressed can be set here. After this time interval expires, the controller switches itself off to save energy. (Settings of 5 to 15 minutes are possible, default setting: 5 minutes.)

```
SETTINGS
- Date/time
- GLP
- Memory
- AutoTemp
- Switch-off interv.
```

"Settings" menu:
Use ⌄/⌃
to select the "Switch-off interv." submenu.


```
SWITCH-OFF INTERVAL
- Interval:      5 min
- Back
```

The switch-off interval is preset to 5 minutes.
To change it:
Press [RUN/ENTER] and
use ⌄/⌃ to set the no. of minutes required and
[RUN/ENTER] again to confirm it.

Return to the "Settings" menu:
⌄, then [RUN/ENTER].

Temperature (Special BOD operating mode)

Here you can set the temperature (incubation temperature) of the sample.
The temperature influences the quantity of oxygen dissolved in the sample.
The setting range is 5 °C to 40 °C. The default setting is 20 °C.

```
SETTINGS
- Switch-off interv.
- Temperature
- Height
- Air pressure
- Language
```

"Settings" menu:
Use ⩔/⩓
to select the "Temperature" submenu.

RUN/ENTER ↵

```
TEMPERATURE
- Temperature: 20 °C
- Back
```

The temperature is preset to 20 °C.
To change it:
Press RUN/ENTER ↵ and
use ⩔/⩓ to set the requried
temperature and RUN/ENTER ↵
again to confirm it.

Return to the "Settings" menu:
⩔ ,then RUN/ENTER ↵ .

Height (Special BOD operating mode)

Here you can set the height above sea level at the measuring location. The setting range is from –698 m to 5572 m. The default setting is 500 m.
The height above sea level is directly connected to the air pressure (the air pressure influences the equation for the BOD determination). Therefore, if you change one of these two parameters, the other one is also changed automatically.

```
SETTINGS
-  Temperature
-  Height
-  Air pressure
-  Language
-  Back
```

"Settings" menu:
Use ⌄/⌃
to select the "Height" submenu.

RUN/ENTER ↵

```
HEIGHT
-  Height:        500 m
-  Back
```

The default height is 500 m.
To change this:
Press RUN/ENTER and
use ⌄/⌃ to set the height required and
RUN/ENTER again to confirm it.

Return to the "Settings" menu:
⌄ , then RUN/ENTER .

Air pressure (Special BOD operating mode)

Here you can set the air pressure at the measuring location. The setting range is 500 hPa to 1100 hPa. The default setting is 954 hPa. The air pressure (it influences the equation for the BOD determination) is directly connected to the height above sea level at the measuring location. Therefore, if you change one of these two parameters, the other one is also changed automatically.

```
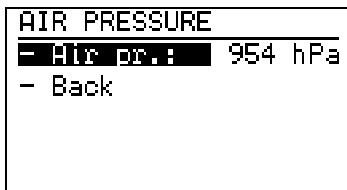SETTINGS
- Temperature
- Height
- Air pressure
- Language
- Back
```

"Settings" menu:
Use ⌄/⌃
to select the "Air pressure" submenu.

RUN/ENTER ↵

```
AIR PRESSURE
- Air pr.:    954 hPa
- Back
```

The default air pressure is 954 hPa.
To change this:
Press **RUN/ENTER** ↵ and
use ⌄/⌃ to set the pressure required and
RUN/ENTER ↵ again to confirm it.

Return to the "Settings" menu:
⌄ ,then **RUN/ENTER** ↵ .

Limit pressure (Pressure p operating mode)

Select the limit pressure here, i. e. the pressure difference compared to the starting pressure (negative or positive pressure) at which the controller takes the relevant sample into a list which is automatically displayed after the data have been called up.

With this function, the course of the test can be monitored.
The setting range is from 50 hPa to 500 hPa. The default setting is 150 hPa.

```
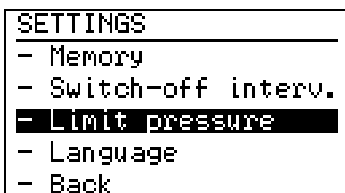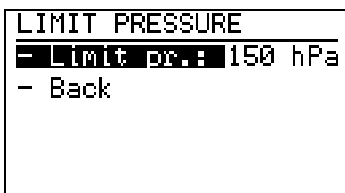SETTINGS
- Memory
- Switch-off interv.
- Limit pressure
- Language
- Back
```

"Settings" menu:
Use ⧨/⧨
to select the "Limit pressure" submenu.

RUN/ENTER
↵

```
LIMIT PRESSURE
- Limit pr.: 150 hPa
- Back
```

The default limit pressure is 150 hPa.
To change this:
Press RUN/ENTER and
use ⧨/⧨ to set the pressure required and
RUN/ENTER again to confirm it.

Return to the "Settings" menu:
⧨, then RUN/ENTER.

i   The limit pressure can be changed for a running measurement. After the data have been called up once again the new limit pressure is taken into account.

Language

Select the language here in which the displays of the OxiTop® Controller appear. The controller has the following 5 languages stored in it (default German): German - English - French - Italian - Spanish.

```
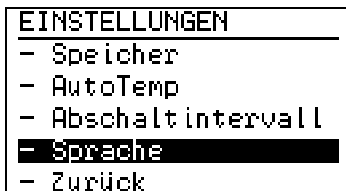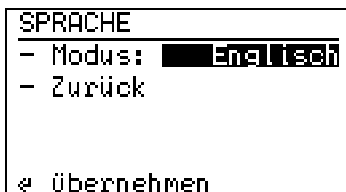EINSTELLUNGEN
- Speicher
- AutoTemp
- Abschaltintervall
- Sprache
- Zurück
```

"Einstellungen" (Settings) menu:
Use ⇩/⇧
to select the "Sprache"
(Language) submenu.

RUN/ENTER ↵

```
SPRACHE
- Modus:    Englisch
- Zurück

⊄ Übernehmen
```

The default language is "Deutsch" (German) .
To change this:
Press **RUN/ENTER ↵** and
use ⇩/⇧ to set the language required and
RUN/ENTER ↵ again to confirm it.
From now on the displays appear in the selected language.

Return to the "Settings" menu:
⇩ , then **RUN/ENTER ↵** .

```
SETTINGS
- Memory
- AutoTemp
- Switch-off interv.
- Language
- Back
```

"Settings" menu.
Return to the main menu, "GLP/Tools":
⇩ , then **RUN/ENTER ↵**
or
using **GLP** .

Check

```
GLP/TOOLS
- Show free ▀▀▀
- Show settings
- Settings
- Check
- Maintenance
```

Main menu, "GLP/Tools".
Use ⬇/⬆
to select the
"Check" menu.

Show 🍄🍄🍄

RUN/ENTER
↵

```
CHECK
- Show ▀▀▀
- 🍄 info
- Controller info
- Cal test
- Pneumatic test 🍄
- Back
```

"Check" menu.
"Show 🍄🍄🍄" preselected.

RUN/ENTER
↵

```
SHOW ▀▀▀
- Free ▀▀▀
- All ▀▀▀
- Back
```

"Show 🍄🍄🍄" submenu.
Use ⬇/⬆ to select between
"Show free 🍄🍄🍄" and
"Show all 🍄🍄🍄".

Point the controller at the measuring
heads:

40 cm to 100 cm

RUN/ENTER
↵

All the measuring heads that are addressed flash for 5 seconds.

☝ info

```
CHECK
- Show ███
- ☝ info
- Controller info
- Cal test
- Pneumatic test ☝
```

"Check" menu.
Use ⌄/⌃ to select "☝ info".

RUN/ENTER ↵

```
☝ INFO
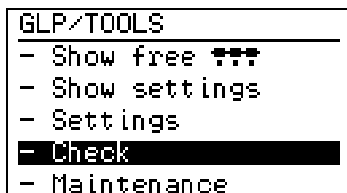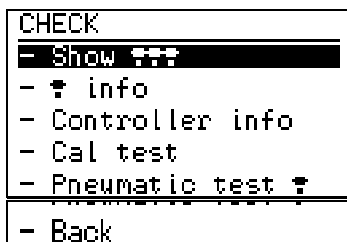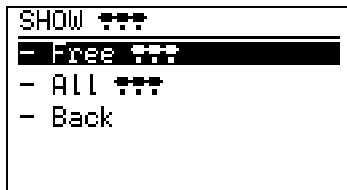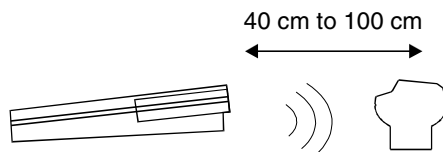

Please hold
controller to ☝!
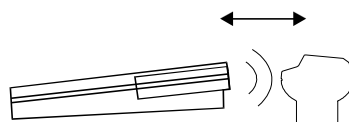
```

max. 5 cm

The measuring head flashes and a display appears on the controller giving the following information:

```
☝ INFO
Ser.no.:   000000001
Batteries:       OK
Cal date:  21.10.98
Status:        used
Start date: 20.10.98
Final date: 20.10.98
Sample no.:981020-01
Type:          B10h
Range:     40 mg/l
```

- serial number of the measuring head,
- battery status (OK/LOBAT/EMPTY!!),
- the next calibration date (only in the measuring modes, Standard, Special, Pressure p and GLP "On")
- status of the measuring head (free/used/defective).

If the measuring head is "used",

use ⌄ to scroll through the display of further information:
- start date
- final date
- sample number
- type and
- range for the measurement

Return to the "Check" menu using **RUN/ENTER** ↵.
Repeat the procedure for each

measuring head.

If the measuring head does not respond, the following display appears after approximately 7 seconds:

```
⬆ INFO

Query stopped!

— Continue query
— Stop
```

The query was stopped.
You can select between
- continue query (see above) and
- Stop (return to the
  "Check" menu

Controller info

```
CHECK
— Show ☷
— ⬆ info
— Controller info
— Cal test
— Pneumatic test ⬆
```

"Check" menu.
Use ⬇/⬆ to select
"Controller info".

RUN/ENTER

```
CONTROLLER INFO
Free memory for
              119 ☷
Batteries
Supply:          OK
Data prot.:      OK
Ser.no.  724230027
Software:      1.00
```

The display shows the following information:
- number of measuring heads for which there is still memory capacity
- status of the supply batteries
- status of the data backup batteries
  (OK/LOBAT).

Use ⬇ to scroll to the specification of the
- software version
- Ser.no.
  (can differ from the example shown here)

Return to the "Check" menu using **RUN/ENTER** .

Cal test

The Cal test is used to test **the sealing of the system measuring head - rubber sleeve - sample bottle and the operability of the systems OxiTop® Control.**
In the Standard BOD operating mode with the "GLP ON" setting, the controller indicates when the next Cal test is due after each set up calibration interval (see the chapter "GLP/Tools - GLP").
To perform the test, you need the WTW test resource, OxiTop® PM, order number 209 333.
Sample preparation: see operating manual, OxiTop® PM test resource.

```
CHECK
- Show ▒▒▒
- ☁ info
- Controller info
▬ Cal test
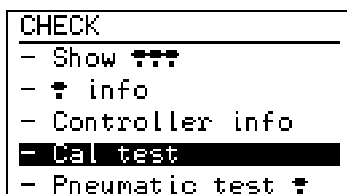- Pneumatic test ☁
```

"Check" menu.
Use ⌄/⌃ to select "Cal test".

RUN/ENTER

```
Cal test    970626-02
Type             CAL
Volume        164 ml
Final date  01.07.97
- I. D. number   001
▬ Start
```

The instrument automatically allocates the sample number (in the header line).
The filling volume (164 ml) and the type together with the run time of 5 days are preset.

For information on the further handling of the sample up to the "finished" status: See the chapter "Start the measurement".

The Cal sample appears together with the other samples in the sample management. The BOD type is "CAL":

```
SAMPLE    STATUS TYPE
970614-01 ███ ✓ BOD5
970610-01 ███   BOD5
970610-02 ███   BOD5
970626-01 █▯   BOD5
970626-02 █▯    CAL
```

Evaluation of the Cal test

```
SAMPLE    STATUS TYPE
970614-01 ■■■ ✓ BOD5
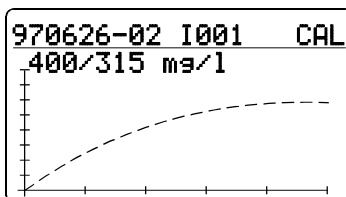970610-01 ■■■ ✓ BOD5
970610-02 ■■■ ✓ BOD5
970626-01 ■■■ ✓ BOD5
970626-02 ■■■ ✓  CAL
```

Starting point: sample management.
Use ∨/∧
to select the test sample.

```
970626-02 I001    CAL
 400/315 mg/l
```

Enter the evaluation.
Display of the selected sample as a curve with measurement value data.

Compare measurement values with lot test value
(according to operating manual, OxiTop® PM).

RUN/ENTER

```
970626-02 I001    CAL
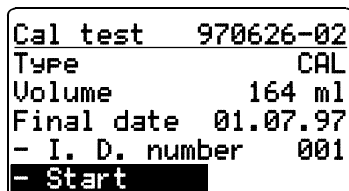


- Show ♟
- Set cal date
- Stop
```

Now you can set a new calibration date for the measuring head with the controller.

- "Show ♟" (to find the relevant measuring head):
  Function and messages as described in the chapter "Sample management".

```
970626-02 I001    CAL

- Show ♟
- Set cal date
- Stop
```

Select "Set cal date". This menu item only appears if the Cal test is finished and the controller is in the Standard BOD operating mode and GLP is switched on

- "Stop": Return to the curve display. The Cal test is considered as not performed.

RUN/ENTER ↵

```
970626-02 I001   CAL

Please direct
controller to ●!
```

40 cm to 1 m

The controller sets a new test date in the measuring head. The controller calculates the new test date from the current date + the check interval set up (see the chapter "GLP/Tools - Settings - GLP - Check interval").

♪

```
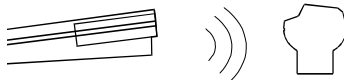970626-02 I001   CAL

Cal date set!
```

The controller displays the setting of the calibration date.

If the date was not set successfully (e.g. because the controller was not held to - or not held close enough to - the measuring head):

♪

```
970626-02 I001   CAL

Setting of cal date
stopped!
- Repeat
- Stop
```

Repeat the procedure using

RUN/ENTER ↵ ,

then continue as described above.

Pneumatic test ♟

The pneumatic test tests the measurement precision of the measuring head. It says nothing about the long-term impermeability of the system.

To perform the pneumatic test, you require the test resource, OxiTop® PT (WTW order number 209 334).

The user interface of the controller guides you through the test:

```
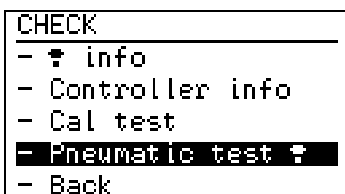CHECK
- ♟ info
- Controller info
- Cal test
- Pneumatic test ♟
- Back
```

"Check" menu.
Use ⌄/⌃ to select the menu item "Pneumatic test ♟".

RUN/ENTER ↵

```
PT Step 1
- Set plunger to
  5 scale parts
- Screw on ♟
  tight
↵ Continue
```

Set the plunger of the siringe on the OxiTop® PT test resource to 5 scale parts.
Tightly screw the measuring head to be tested onto the OxiTop PT test resource.

RUN/ENTER ↵

```
PT Step 2
1.Measure pressure
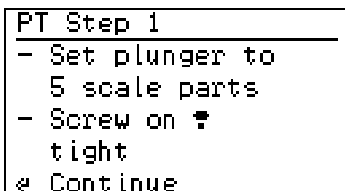
Please hold
controller to ♟!
```

max. 5 cm

(Exceeding the time causes a return to the "Check" menu").

```
PT Step 3
- Set plunger to
  20 scale parts
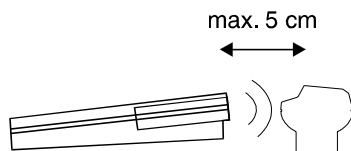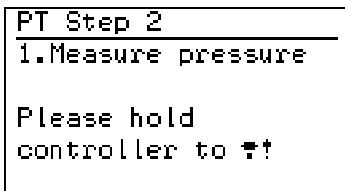
↵ Continue
```

RUN/ENTER ↵

```
PT Step 4
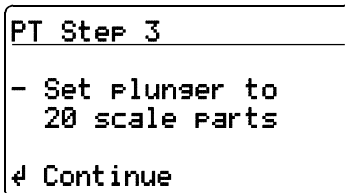2. Measure pressure
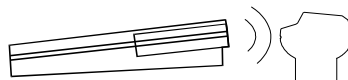
Please hold
contoller to ●!
```

max. 5 cm

(Exceeding the time causes a return to the "Check" menu).

```
PT Step 5
Pressure values:

Ideal  125 .. 135hPa
Actual        128hPa
↵ Back
```

The controller display shows the result of the pneumatic test.

Use RUN/ENTER ↵ to return to the "Check" menu.

Maintenance

```
GLP/TOOLS
- Show free ▄▄▄
- Show settings
- Settings
- Check
- Maintenance
```

Main menu, "GLP/Tools".
Use ⌄/⌃
to select the "Maintenance" menu.

Erase finished samples

Here you can erase the data of finished samples that is already evaluated or no longer required in order to free memory in the controller.

RUN/ENTER ↵

```
MAINTENANCE
- Erase sample
- Reset/release ▲
- Restore data
- Back
```

Menu item "Erase samples" is preset.

RUN/ENTER ↵	ERASE FINISHED SAMP. – From sample no. – All – Back	A submenu appears with the selection: - From sample no. (preselected) - All - Back (from the "Maintenance" submenu)

RUN/ENTER ↵	ERASE FINISHED SAMP. 981020-02 ✓ BOD5 981020-03 ✓ BOD5 981020-04 ✓ BOD5	The controller displays the list of finished samples. The oldest finished sample is marked.

⌄	ERASE FINISHED SAMP. 981020-02 ✓ BOD5 981020-03 ✓ BOD5 981020-04 ✓ BOD5	With ⌄, you can mark further samples. With ⌃, you can remove the marking again.

RUN/ENTER ↵	ERASE FINISHED SAMP. Erase 003 samples? – Erase – Back	The controller asks again if you really want to erase the marked samples from the memory.

RUN/ENTER ↵	ERASE FINISHED SAMP. 003 samples erased!	After confirmation, the display message shown here appears for 2 seconds and then the controller returns to the menu "Erase finished samples".

In the selection of erase "All" samples, the following display appears:

RUN/ENTER ↵

```
ERASE FINISHED SAMP.

Erase 003 samples?
─ Erase
─ Back
```

The controller asks again if you really want to erase the samples from the memory.

Further: See above.

If no finished samples are available in the memory, the following display appears:

```
ERASE FINISHED SAMP.


No samples
available!
```

Reset/release ♥

This function can be used to release measuring heads again that were unintentionally started.

i After carrying out the "Reset/release", the data of the measuring head is erased!

```
MAINTENANCE
─ Erase sample
─ Reset/release ♥
─ Restore data
─ Back
```

Use ⩔/⩓ to select the Reset/release ♥ menu item.

RUN/ENTER ↵

```
RESET/RELEASE ♥
─ Reset/release ♥
─ Back
```

RUN/ENTER ↵

```
RESET/RELEASE ☀
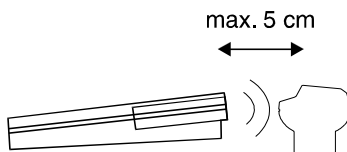
Please hold
controller to ☀!
```

max. 5 cm

```
RESET/RELEASE ☀
Ser. no.:  000000011
Sample no.:981020-01
─ Reset/release ☀
─ Back
```

The serial number of the measuring head and the sample number appear on the display.

Press **RUN/ENTER** ↵ if you want to release the measuring head.

(If you do not want to release the measuring head, select and confirm "- Back".)

```
RESET/RELEASE ☀

Reset performed!

↵ Continue
```

Display message: The release/reset has been performed.

Repeat the process for each of the measuring heads to be released.

Display message when the last measuring head of a sample has been released:

```
RESET/RELEASE ☀
Reset performed!
Last ☀ of the sample
! Sample erased !

↵ Continue
```

Use **RUN/ENTER** ↵ to return to the Reset/release ● menu.

Restore data

In case you lost your controller or your controller is defective, the „Restore data"
function facilitates to restore the data of running measurements using a new or other
controller. This means the data are not lost!

ℹ️ To perform this function the memory of the controller must be absolutely
empty! The data of each single measuring head are restored one after the
other in a sequence. It is not possible to leave this function and to continue
it afterwards because then the memory would no longer be empty.

```
MAINTENANCE
- Erase sample
- Reset/release ⬆
█ Restore data
- Back
```

Use ⬇/⬆ to select the
"Restore data" submenu.

RUN/ENTER ↵

```
RESTORE DATA

█ Restore ⬆ data
- Back
```

RUN/ENTER ↵

```
RESTORE ⬆ DATA

Please hold
controller to ⬆!
```

Confirm the restoration for one
measuring head and hold the
controller to the measuring head.
Contact selection:

max. 5 cm
↔

The controller displays the serial
number of the selected
measuring head.

```
RESTORE ⬆ DATA
Ser. no.:   000000016
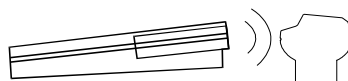
█ Restore ⬆ data
- Stop
```

RUN/ENTER
↵

```
RESTORE ☗ DATA
Ser. no.:   000000016

☗ data restored!
```

After confirming again the data of the measuring head are read out and stored in the controller.

i The Id number of the sample is not restored, it is always I999.

```
RESTORE DATA

- Restore ☗ data
- Back
```

The controller returns to the „Restore data" menu.
Perform this procedure for every measuring head with a measurement running, without leaving the "Restore data" function.

If the data of a measuring head were already restored the following is displayed for approx. 3 seconds:

```
RESTORE ☗ DATA
Ser. no.:   000000001

Already restored!
```

Then the controller returns to the „Restore data" menu.
Perform the restoration with another measuring head.

If the memory of the controller is not empty the following is displayed for approx. 3 seconds:

```
RESTORE DATA
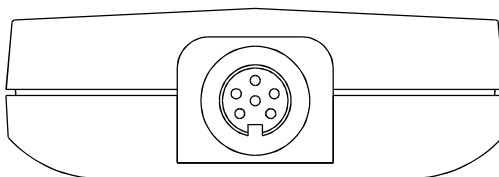
Inadmissible!
Memory not empty!
```

After this, the "maintanance" menu is displayed again.
It is not possible to restore the data with the controller.
Contact the WTW service department.

i It is possible to restore the data of all running measurements if the controller is in the Routine BOD operating mode. In the sample administration however, only the samples started in the Routine BOD mode are shown in this case. To have all samples shown, switch over to another operating mode (see chapter GLP/Tools).

RS232 interface

RS232 interface

The RS232 interface is used for communication with the computer (PC).
The RS232 interface is provided solely for the implementation of the WTW software, "Achat OC" (WTW software "ACHAT OC" and RS232 interface cable AK 540/B are part of the scope of delivery of the OC110 Set or are available as accessories).

Brief information about the software "Achat OC" (requires Microsoft Windows)

- Downloads the sample management of the controller to the PC
- Comfortably displays the sample management together with additional information on the screen
- Enables the selection of samples in the PC and transfers the measurement data of the selected samples from the controller to the PC
- Creates files from the measurement data for further processing with tabular calculation programs

Cleaning the sample bottles

See the WTW application report.

Cleaning the controller and measuring heads

• **Do not use any solvent** (such as alcohol or acetone)!

• Use a soft, damp cloth and dilute soapy solution for cleaning.

The OxiTop®-OC100 and OxiTop®-C instruments are battery-powered.
To ensure reliable operation, both instruments have a 2-stage battery status monitor
1st level = warning level   : Batteries LoBat !
2nd level = error level   : Batteries empty !

OxiTop®-OC100 controller

Economy circuit (automatic switch off)
The instrument switches off automatically following the last key actuation after expiry
of the set switch-off interval.

Switch-off interval:
• Routine BOD operating mode: preset to a fixed period of 5 min.
• Standard BOD, Special BOD,
  Pressure p operating modes: delivery state of 5 min.,
                                 settings of 5...15 min. possible

Supply batteries

Batteries: 3 pcs, alkaline (alkaline manganese), size: Mignon, AA, AM3, LR6
These batteries ensure the energy supply of the OxiTop® OC100.
Run time: > 100 h (approx. 1000 start-ups in normal use)

Supply batteries status signals
are given on switching on the instrument by display messages and a signal tone
or can be called up under "GLP/Tools - Check - Controller info".

Display message	Note / Meaning
Supply Battery/ies LoBat ! Please change!	The warning appears for approx. 3 seconds. The instrument then continues to run normally. The instrument can still be safely operated within the specifications. When the message first appears, there is still a running reserve available. Please obtain new batteries and replace the old ones!
Supply Battery/ies empty ! Please change!	The message appears for approx. 3 seconds. The instrument then switches itself off. The instrument can no longer be used. The supply batteries must be replaced by new ones.

Changing supply batteries:

- Switch off the OxiTop®-OC100 controller.
- Loosen the 4 screws underneath the housing using a Phillips screwdriver (see figure ❶).
- Place the controller on the lower case.
- Remove the upper case and put it down to the right next to the lower case with the display downwards (see figure ❷).
- Remove the supply battery holder from the fixing in the lower case and turn it around.
- Remove the empty supply batteries.

⚠️
- Insert new supply batteries - 3 pieces, alkaline (alkaline manganese), size: Mignon, AA, AM3, LR6).
  Ensure that they are the right way round!
  (The poles are marked in the supply battery holder)
  Always replace the complete set of batteries.

- Turn the supply battery holder around again and place it in the fixing in the lower case.
- Set the upper case on top of the lower case, turn the controller and tighten the housing screws using the screwdriver (see figure ❶).
- Switch on the controller. The battery change was successful if no error message appears concerning the supply batteries.
- It is recommended to use only brand name batteries of the type specified as "Alkaline". Using other types of battery can affect reliable functioning.
- The supply batteries have no influence on data integrity.

❶
Controller underside

❷

Lower case   Upper case

Data backup
battery →

Supply batteries
in the
battery holder →

Data backup battery

1 x lithium battery, CR2430, e.g. WTW type **Batt/OxiTop®**,
order no. 209 012. This battery ensures that your measurement data and the
instrument settings in the OxiTop®- OC100 controller are saved. Run time: typically 4
years

Data backup battery - status messages
are given on switching on the instrument by display messages and a signal tone
or can be called up under "GLP/Tools - Check - Controller info".

Display message	Note / Meaning
Data protection battery LoBat ! Please change!	The warning appears for approx. 3 seconds. The instrument then continues to run normally. The instrument can still be operated within the specifications. When the message first appears, there is still a running reserve available. Please obtain new batteries and replace the old ones.

Display message	Note / Meaning
```Data protection battery empty ! Please change immediately!```	The warning appears for approx. 3 seconds. The instrument then continues to run normally. The battery must urgently be replaced by a new one. The data security of test data and settings are endangered in case of further decrease of battery condition.

Changing the data backup battery:

- Evaluate and save all the measurement data.
  Options available :
  - print out the results, see the chapter on printing
  - save the data in the PC using the software "Achat OC", see the chapter "RS232 interface"
  - handwritten documentation of the results.
- Documentation of your instrument settings:
  - printout of your instrument settings, see the chapter "GLP/Tools - Settings - Show settings".
- Switch off the OxiTop®-OC100 controller.
- Loosen the 4 screws underneath the housing using a Phillips screwdriver (see figure ❶).
- Place the controller on the lower case.
- Remove the upper case and put it down to the right next to the lower case with the display downwards (see figure ❷).
- Remove the supply battery holder from the fixing in the lower case and turn it around.
- Remove the empty data backup battery.

⚠️   • Insert the new data backup battery (1 piece, lithium battery, CR2430, e.g. WTW type **Batt/OxiTop®**, order no. 209 012) Ensure that the battery is the right way round! The positive pole must be at the top.

- Set the upper case on top of the lower case, turn the controller and tighten the housing screws using the screwdriver (see figure ❶).
- Switch on the controller. The message "Please set the system clock!" appears. This message is a reminder and should be acknowledged by [RUN/ENTER ↵].
- The battery change was successful if no error message appears concerning the data backup battery.
- Enter the current date/time and your settings.

ⓘ Removing the data backup battery and the supply battery simultaneously will erase all data (instrument reset)!

OxiTop®-C measuring head

Supply batteries

Batteries: 2 x lithium batteries, CR2430, e.g. WTW type **Batt/OxiTop®**, order no. 209 012
These batteries ensure the energy supply of the OxiTop®-C measuring head.
Run time: typically 2 years
The OxiTop®-C measuring head does not require any batteries for data backup.

Supply batteries status messages
- are given on starting the measuring head via the OxiTop® OC100 controller by display messages and a signal tone
- can be called up in the menu "GLP/Tools - Check - ● info".

Display message	Note / Meaning
Sample 981029-01 Battery LoBat ! ↵ Start	The instrument can still be safely operated within the specifications. The running reserve of the instrument is still sufficient for the measurement to be started. Please obtain new batteries and replace the old ones!
Sample 981029-02 Battery empty ! – New ⬍ – Stop ⬍ start	The instrument can no longer be used. The supply batteries must be replaced by new ones. It is possible to start a new measuring head or to complete a sample start.

Changing the supply battery

- Change the battery after the measurement has been terminated.

➊ - Press in the snap-action holder.
- Open the upper case.

➋ - Remove the batteries.
- Insert new batteries (2 x lithium batteries, CR2430, e.g. WTW type **Batt/OxiTop®**, order no. 209 012). Ensure the batteries are inserted the right way round!
- Insert the upper case with the lug in the locking pin (lower case). Caution! Do not crush the cable connection!
- Close the upper case (let the hook snap into place).

Check if the battery change was successful:
"Batteries: OK" must appear in "GLP/Tools - Check - ♣ info".

The batteries have no effect on the data integrity of the OxiTop®-C

Disposing of the batteries

ⓘ   Properly dispose of used batteries at a battery collection point.

Display messages

Messages	Explanations, causes and problem solutions
☻ already used !	Cause: • The selected measuring head has already been started for a measurement and can only be used for a new measurement after the current measurement is finished and the measurement data completely retrieved. Problem solutions: • Select new and free measuring head or • Stop ☻ start or • Release measuring head (chapter "Maintenance - Release/reset")
Set system clock !	Cause: Data backup battery was changed! Problem solution: Set the clock (see the chapter "GLP/Tools - Settings - Date/Time").
☻ defective !	Causes: The selected measuring head is defective. Please send it to WTW. Problem solutions: • Select new and free measuring head or • Stop ☻ start
No samples available !	Cause: There are no finished samples stored in the sample management. Problem solution: • Transfer the unfinished samples of the sample management to "finished" status. To do this, the measurement data of all measuring heads must be called up and evaluation and documentation of the measurement data of the finished samples performed. • If the measurement data of the measuring heads is not yet finished, no instant remedy is possible! The memory capacity limit of the instrument has been reached.

Messages	Explanations, causes and problem solutions
No active 🍄!	Causes: • No measurement has been started. • The measuring heads are placed at another location (e.g. other levels in the incubator, other incubators, further storage locations). • The measuring heads have no optical contact with the controller: - Distance too great, angular position imprecise - IR window of the measuring head averted from the controller - Shading by other objects. • Controller defective Problem solutions: • Modification of the distances or angle • Search other storage locations • Check controller • Test the measuring heads (see section "Requirements/Problems")
Cal test due on 18.07.97! (example date)	Causes • GLP is switched on • The test resource monitoring is due within the measuring time of measurement for the selected measuring head. • Date/time is not correctly set in the controller. Problem solutions • Use another free measuring head that has been checked • Start the due measuring head with the Cal test (see chapter "Check - Cal test") • Switch off GLP and start measuring head (if your laboratory practice permits). • Set the date/time in the controller.

Messages	Explanations, causes and problem solutions

Lack of memory possible ! Memory for 11 🍄 free ! Continue⏎	<u>Cause:</u>
	This message is used as information in the Standard BOD or Special BOD operating mode.
	There is a lot of sample data stored in the sample management. The memory is almost full.
	It is still possible to start a sample as a parallel sample start with 11 measuring heads (the number 11 🍄 used here is an example, possible numbers: 1...11 🍄).
	<u>Problem solution, if necessary:</u>
	• Erase finished samples:
	   Chapter "GLP/Tools - Maintenance- Erase finished samples"
	
	• Alternative: Changing the instrument setting to automatic erasing of finished samples:
	   Chapter "GLP/Tools - Settings - Memory - Erase: auto"

Memory lack ! No ready samples autom. erasable!	<u>Cause:</u> The instrument works with the setting, Erase memory "auto" (automatically). The memory is full and only unfinished samples are stored in the sample management. The instrument can only erase finished samples automatically. <u>Problem solution:</u> • Transfer the unfinished samples of the sample management to the "finished" state. • To do this, call up the measurement data of all measuring heads and perform the evaluation and documentation for the measurement data of the finished samples. • If the measurement data of the measuring heads is not yet finished, no instant remedy is possible! The memory capacity limit of the instrument has been reached.

Messages	Explanations, causes and problem solutions
Memory lack ! Erase finished sample/s!	Cause: • The instrument is working with the "manual" setting of Erase memory. The memory is full. Problem solutions: • Transfer the unfinished samples of the sample management to "finished" status • Call up the measurement data of all the measuring heads • Perform evaluation and documentation of the measurement data of finished samples. • Erase finished samples from the sample management: Chapter "GLP/Tools - Maintenance- Erase finished samples" Note: Only the finished samples in the sample management can be erased.
undef. (Display in the curve presentation or sample statistics)	Causes: • The selected measurement range has been exceeded. • The sample filled was too warm. • The AutoTemp function is switched off. • The sample filled was very cold and has a low consumption behavior (small BOD value). • The system is not sealed (bottle internal pressure = atmospheric pressure). Avoiding the problem: • Select the correct measurement range (see WTW application report). • Pretemper the sample more precisely. • Switch on the AutoTemp function (only effective for measuring times longer than one day). • Check the system for leaks by means of visual checks: Are the sealing surfaces of bottle and measuring head clean and fault-free? Are there cracks in the sleeve, bottle or measuring head? • Perform "Cal test" (see chapter "Check"). • Check the incubator temperature.

Messages	Explanations, causes and problem solutions

10 of 12 🎈
called up
 	
(sample message, no. is variable)
	<u>Cause:</u>
	• Two measuring heads have not been found by the controller
	• The measuring heads are positioned at another location, e.g. other levels in the incubator, other incubators, further storage positions
	• The measuring heads have no optical contact with the controller:
	  - Distance too great, angular position imprecise
	  - IR window of the measuring head averted from the controller
	  - Shading by other objects.
	• The missing measuring heads are defective
	<u>Problem solutions:</u>
	• Modification of the distances or angle
	• Search other storage locations
	• Search for and check measuring heads (see section "Requirements/Problems")

0 of 19 🎈
called up
 	
(sample message, no. is variable)
	<u>Cause:</u>
	• No measuring head has been found by the controller.
	• The measuring heads are positioned at another location, e.g. other levels in the incubator, other incubators, further storage positions
	• The measuring heads have no optical contact with the controller.
	  - Distance too great, angular position imprecise
	  - IR window of the measuring head averted from the controller
	  - Shading by other objects.
	• The controller is defective.
	<u>Problem solutions:</u>
	• Modification of the distances or angle
	• Search other storage locations
	• Check the controller (section "Requirements/Problems")

Requirements / Problems

Requirements / Problems	Procedure / Problem solutions
No or missing samples in the sample management	Cause: • The controller is in the operating mode „BOD Routine". The samples were started in other operating modes. Problem solution: • Switch the instrument to the operating mode Standard BOD, Special BOD or Pressure p (see chapter GLP/Tools - Settings - Operating mode).
At the beginning of the measurement, no measurement curves are displayed Measurement curves do not emerge from the origin	Causes: • The sample filled and started was too cold. • AutoTemp function is switched off. Problem solution: • Temper the sample more precisely. • Switch on the AutoTemp function (only effective for measuring times longer than one day).
No measurement curves are displayed although the measurement has already been running for an extended period of time	Causes: • No data was retrieved from the measuring heads. • The AutoTemp phase is still running (see the chapter "AutoTemp function in greater detail"). Problem solution: • Call up the data of the measuring heads. See chapter "Call up all data". • Wait for the end of the AutoTemp phase then start the evaluation.
Search for free measuring heads for a new measurement	Procedure: Perform the function "Show free ♥♥♥ " (see chapter "GLP/Tools"). The controller causes the free measuring positions to flash for 5 seconds.

Requirements / Problems	Procedure / Problem solutions
Measuring head unintentionally started for measurement Measuring head started with incorrect settings Measuring head is required for another sample	Problem solution The measuring head can be released again through the command Reset/release: Chapter "GLP/Tools - Maintenance - Reset/release ●". The controller guides you further through the operation. If only one measuring head is stored under the corresponding sample number (in the Routine BOD and Pressure p operating modes, this is always the case), the controller automatically erases the sample in the sample management.
Search for the defective measuring head	Procedure: • Perform a measuring head reaction test (see above). A measuring head that repetitively shows no reaction to the test is defective. • If the defective measuring head cannot be established in this way, perform the measuring head check (see "Single check"). In doing this, each individual measuring head must be checked until the defective measuring head has been found.
A measuring head is missing or is defective. Requirement: To determine the corresponding sample	Procedure: Call up the function "Call up data" from the sample management for each individual unfinished sample. The corresponding sample can be determined by this. For subsequent error handling, see the chapter "Sample management - Call up data".
Which measuring head belongs to which measurement curve?	Procedure: • Prepare the relation separate curve – number of measuring head. (See chapter evaluation – scroll through the parallel samples). • Read number of measuring head out of headline. • Have measuring head shown: See chapter sample administration – Select ● number - Show ●.

Requirements / Problems	Procedure / Problem solutions
The precision and sealing of the system sample bottles plus measuring head should be checked	Procedure: See the chapter "GLP/Tools - Check - Cal test "
Measuring head check (single check) (To which running sample does the selected measuring head belong?)	Procedure: Single check method: menu "GLP/Tools - Check - 🔘 info" • The controller guides you further through the operation. • All single information on the state of the measuring heads is listed, i.e. the measuring head responds. • The check can be undertaken at any time without affecting the measurement that is running. • If no reaction at all can be determined, the batteries should be changed and the measuring head check repeated. • The measuring precision cannot be checked with this!
The measuring precision of the measuring head should be checked.	Procedure: Pneumatic test (PT) of the measuring head: see the chapter "GLP/Tools - Check - Pneumatic test"
Perform measuring head reaction test	Procedure: • Menu "GLP/Tools - Check - Show all 🔘🔘🔘": • All optically attainable measuring heads must flash for approx. 5 seconds independent of their status. • The check can be undertaken at any time without affecting the measurement that is running. • This test only checks the reaction to commands. • If no measuring head reacts, the controller should be checked.

Requirements / Problems	Procedure / Problem solutions
Checking the controller	Problem solution: Controller info • See the chapter "GLP/Tools ‑ Check - Controller info" All single information on the state of the controller is listed. • The check can be undertaken at any time without affecting the measurement that is running. • Perform the command: "Show all ♟♟♟ ". See "GLP/Tools ‑ Check - Show ♟♟♟". (The check is used in this case to test the IR interface.) All working measuring heads must flash for 5 seconds. • Perform a measuring head check - see the chapter "GLP/Tools ‑ Check - ♟ info" (The check is used in this case to test the IR interface). Here, a working measuring head should supply its status data. • Keyboard, display and signal tone should show the required reaction. • Check the function of the clock (prerequisite: clock is available). Switch off the instrument and switch it on again. Time and date each appear showing the current values. • Check RS232 interface (only required when using the WTW software, ACHAT OC): - Connect controller to your PC by means of the interface cable AK540/B. - Switch on controller and start the PC program, ACHAT OC. In doing so, the PC program checks the RS232 interface.
The controller does not react / is defective – the data of the running measure-ments should be restored	Problem solution: Send the controller to WTW. Using a repaired or new controller (memory must be empty!) perform the "Restore data" procedure (see the chapter GLP/Tools - Maintenance)

Requirements / Problems	Procedure / Problem solutions
Incorrect time display on being switched on	Cause: • Data backup battery has been changed! • Summer/winter time change has taken place. Problem solution: Set the clock (see the chapter "GLP/Tools - Settings - Date/Time") Attention: Do not alter the time and date between start and end of a sample started in the Pressure p operating mode, as otherwise the momentary values cannot be stored correctly.

The IR printer does not react	Causes:
	• Printer is not switched on.
	• The printer has no optical contact with the controller:
	  - Distance too great, angular position imprecise
	  - IR window of the measuring head averted from the controller
	  - Shading by other objects.
	• Printer batteries are empty.
	• No paper or the wrong paper is loaded.
	• Printing is not possible in the operating state of the controller selected.
	• The printer or the controller is defective.
	Action:
	• Switch on the printer
	• Establish optical contact
	• Check or change the printer batteries. Please read the operating instructions of the printer.
	• Check in the operating manual of the controller whether printing is possible in the state selected.
	Note: During printing, the message "Printing active" always appears on the display.

Power supply / Battery status

For battery status messages, see the chapter "Power supply".

Accessories / Spare parts

See WTW General Catalog and WTW application reports.

Spare parts

Description	Type	Order no.
BOD bottle (Sample bottle, amber, contents 510 ml), minimum order 3 pcs	PF 600	209100
Rubber sleeve, minimum order 3 pcs	GK 600	209170
Stirrer bar, minimum order 3 pcs	RST 600	209120
Stirrer bar remover	REF 600	209130
2 bottles of sodium hydroxide pellets (of 50 g)	NHP 600	209140
Nitrification inhibitor	NTH 600	209331
Spare batteries (1 set)	Batt/OxiTop®	209012
Spare OxiTop®-C measuring head	OxiTop®-C	208830

OxiTop® OC 100 controller

Measurement ranges	Standard BOD and Routine BOD operating modes: 0 ... 40/ 80/ 200/ 400/ 800/ 2000/ 4000 mg/l BOD Special BOD operating mode: 0 ... 400,000 mg/l BOD; Pressure p operating mode: 500 ... 1350 hPa	
Run times and data sets	**Run time of the** **measurement**	**Data records**
Measurement period	0.5 hours	180
	1.5 hours	270
	2.5 hours	300
	3.5 hours	315
	4.5 hours	324
	5.5 hours	330
	all whole hours (1, 2, 3 to 23 hours)	360
	all whole days (1, 2, 3 to 99 days)	360
Display	LCD graphics display 64 x 128 pixels	
Memory capacity	Data of 120 measuring heads	
Power supply	Supply batteries: 3 pcs, alkaline (alkaline manganese), Size: Mignon, AA, AM3, LR6 Data backup battery: 1 x lithium battery, CR2430, WTW order no. 209 012	
Battery run time Supply battery	> 1000 switchings in case of normal use; (the instrument has an automatic shut off)	
Data backup battery	Typically 4 years	
Safety class	3, equipment safety: IEC 1010, EN 61010 part 1	
Protection type	IP 41 DIN 40050	
EMC **-Interference emission** **-interference immunity**	EN 50081-1, FCC Class A EN 50082-1	
Climate class	2, VDI/VDE 3540	
Ambient temperature	Storage: -25°C ... +65°C Operation: +5°C ... +40°C	
Dimensions	45 x 100 x 200 mm (H x W x D)	
Weight	approx. 390 g	
Test certificates	CE, UL/cUL	

OxiTop®-C measuring head

Measuring principle	Piezoresistive pressure sensor
Pressure range	500 ... 1350 hPa (mbar).
Accuracy	± 1% of measured value ± 1 hPa
Resolution	1 hPa
Display	LED pilot lamps
Power supply	2 x lithium batteries, CR2430, e.g. WTW type **Batt/OxiTop®**, order no. 209 012)
Battery run time	Typically 2 years, in case of normal use
Safety class	3, equipment safety: IEC 1010, EN 61010 part 1
Protection type	IP 54 DIN 40050
EMC **-Interference emission** **-interference immunity**	 EN 50081-1, FCC Class A EN 50082-1
Climate class	2, VDI/VDE 3540
Ambient temperature	Storage: -25°C ... +65°C Operation: +5°C ... +50°C
Dimensions	H: 70 mm, ⌀ 70 mm
Weight	95 g
Test certificates	CE, UL/cUL

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CERTIFICATE
to the Electromagnetic Compatibility

to Test Report No. 52501-70303 /-2

Sample:	OxiTop Control Manometric BOD Measuring system
Devices:	OxiTop OC100, OxiTop-C
Uniform EMC design:	OxiTop OC110 identical with OxiTop OC100
Applicant:	WTW GmbH
Regulations:	EN 50081-1:1992 EN 50082-1:1992

Testresult:

The samples are in compliance with the RFI requirements and the immunity requirements according to above referenced regulations. The following severity levels have been achieved:

RFI Emissions

Requirements according to EN 50081-1:1992
Requirements according to FCC part 15 subpart B limit class A

Immunity

Electrostatic Discharge IEC 801-2:1984	Air discharge	8 kV
Electromagnetic Fields IEC 801-3:1984	27 MHz - 500 MHz	3 V/m
Electrical Fast Transients IEC 801-4:1988	V.24 interface	4 kV

Ze Oöl

Senton GmbH
Johann Roidt

Straubing, April 30, 1997

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