Operating Manual

System OxiTop® Control

OxiTop® OC100
Controller

OxiTop®-C
Measuring Heads

OC Model

BA31114e5 07/2006

Please read these safety instructions carefully before installing the instrument!

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.

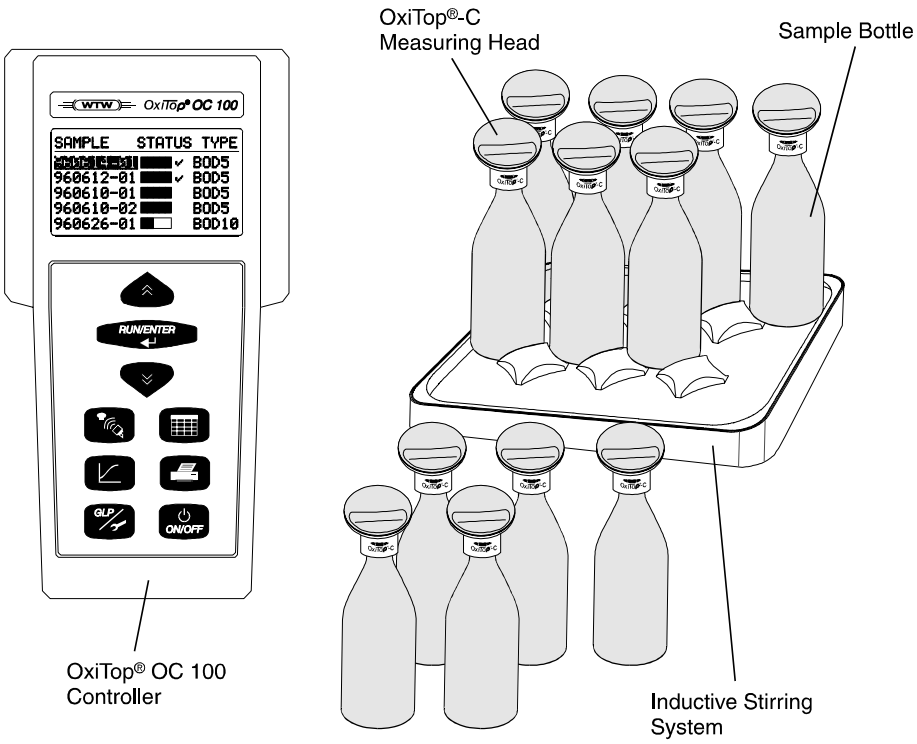
– If safe operation is no longer possible, the equipment must be taken out of service and secured against inadvertent operation by labeling with warning signs.

– 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".

Contents

Note:
This operating manual refers to software release 1.xx.
The right to implement minor changes is reserved.



The OxiTop® Control system provides a further development of the mercury-free, measured value storing OxiTop® BOD measurement system. The instrument provides a multitude of new technological features that simplify the whole process of the BOD determination for the user. Furthermore, the instrument is almost unlimited with respect to its sample capacity and use. It can also be expanded flexibly to fulfill its tasks. In addition to its application in the water economy, the OxiTop® Control with its "respirometric" measuring principle can also be used in other areas such as

- Evaluation of biological degradability, i.e. testing aerobic degradation (e.g. test according to OECD 301F)
- 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

In addition, in conjunction with the enhanced OxiTop® Controller **OC110** and relevant accessories, the OxiTop®-C measuring heads can also be used to

- Measure anaerobic degradation processes (e.g. biogas evaluation)

The measuring principle

The sample bottles are filled according to the data visible in the display (BOD measuring range with assigned water sample amount). The microorganisms draw oxygen to degrade organic substances from the amount of air remaining in the closed system. The carbon dioxide formed by this process is absorbed. Due to the reduction in the amount of oxygen, the pressure in the bottle sinks. This change is detected and stored by the measuring head. After the data transfer to the controller, it is used to determine the BOD value.
Further information is given in the WTW BOD handbook.

The OxiTop® Control measuring system

The 6 or 12 position OxiTop® Control systems are configured for BOD determination and consist of the OC100 OxiTop® controller, the OxiTop®-C measuring heads, the inductive stirring system and various accessories.
The measured value determination and storage of the measurement data is performed in the measuring head. This data is transmitted via "infrared to the controller" without the need for wires and then calculated to the BOD value. The user can start his individual measuring program and printout the calculated data via the TD100 IR printer or further process it via a PC program using the "Routine BOD" and "Standard BOD" operating modes described in detail in this operating manual. The user interface appears in one of 5 selectable languages. An overview of the entire sample management together with the status and function response is shown on the display. With the aid of the display function, sample identification is no longer required. Via the OxiTop®-C IS 6/12 expansion sets, the system can be extended up to 144 measuring positions.

An overview of the essential advantages

- DIN procedure
- Mercury-free
- Precise
- Automatic sample management
- Automatic measurement report
- Modular extensions
- Data storage
- Comfortable handling
- Wireless data transfer, (even through glass or transparent plastic)

Operating modes

The OC100 controller has 2 standard operating modes that differ from one another as described below:

"Routine BOD"
This mode provides the user-friendly "quick introduction". The samples are managed as single samples. The setting functions are logically restricted.

"Standard BOD"
The main difference to the "Routine BOD" mode is in the parallel sample process for up to 12 measuring heads per whole sample with mean value formation and statistical evaluation. The setting is made via the function "GLP/Tools". The extended setting functions allow a multitude of further options (see chapter "GLP/Tools"). The samples plotted in the "Standard BOD" mode are not displayed in the "Routine BOD" mode.

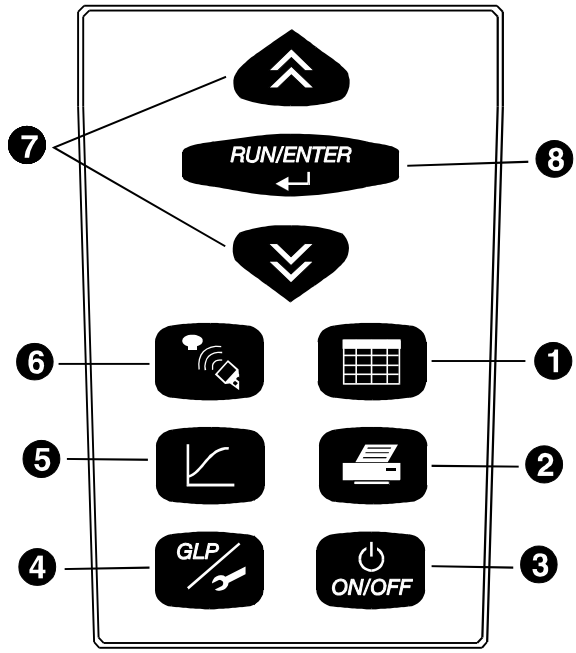
A table of the settings in the delivery state is given in the chapter "GLP/Tools".

Literature

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

- BOD handbook
- Application reports
- Special printouts

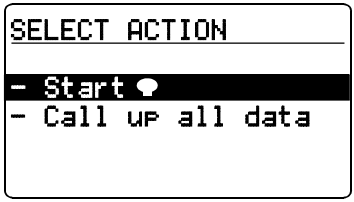
Controller keyboard



1. **Sample management:** List of samples, reading the data of individual measuring heads or samples, displays of measuring heads or samples
2. **Printing** of measurement data and settings
3. **Switching on/off**
4. **GLP / Tools:** Display free measuring heads, display or change settings, perform checks or maintenance
5. **Evaluation:** Graphic and numerical display of measuring data
6. **Communication with measuring heads:** Start measuring, call up data
7. **Select**
8. **Confirmation** of entries

Representation of keys and displays:

Example: Pressing the ”Communication” button causes the mode to change to the ”Communication with the measuring heads” mode of operation:

Required action: press button.	***The instrument displays:***	***Description of what the action caused and possible further request:***
		Starting communication with the measuring heads. Select a menu item using  .

Function keys:

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

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

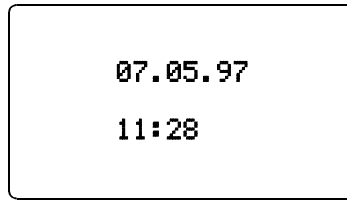
Measuring head:

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

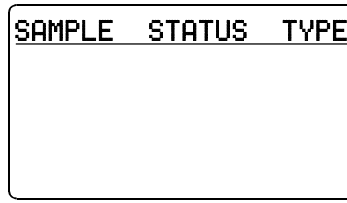
Signal tone:  This symbol means: A signal tone sounds.

Notes:
Instructions and additional information appear in italics.

Switching on the controller



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



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

Switching on the measuring heads

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

To avoid malfunctions:
In case of using two or more controllers please pay attention to the following:

Absolutely avoid starting measuring heads simultaneously if the distance between controllers is less than 3 meters when doing this.

Operating mode: Routine BOD

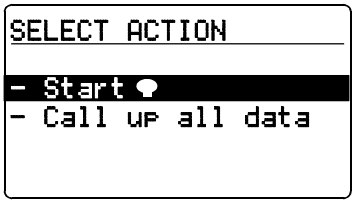
Sample preparation

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

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

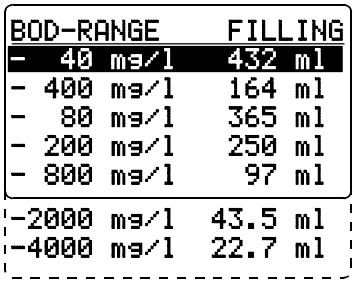
Important note:
Never use joint grease or other lubricant for your OxiTop®-C measuring heads. Some of these products contain solvents that can cause severe damage to the plastic housing.
The sealing of the BOD bottles is also perfectly adequate without grease. However, you should always wipe off heavy 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



Entry into the mode "Communication with the measuring heads".

Preselected:
Start (measuring head).



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      970613-01
Type              BOD5
Meas. range  40 mg/l
Final date  18.06.97
- I.D. number     001
- Start          Temp
```

Confirm the selected measurement range 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 set as a default in the routine mode.

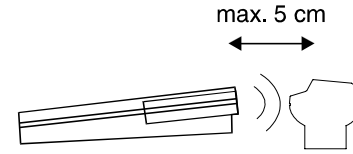
Change the Id number of the additional identification of the sample (e.g. extraction location) as follows:

- 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.

RUN/ENTER

```
Sample      970613-01

Please hold
controller to !

↵ Stop    start
```

Confirm the start of the measurement. Contact selection:



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

Displays “Started“. From this point in time, the sample exists within the sample management. Subsequently, the controller returns automatically to the input menu.

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

The sample start was stopped.

Use RUN/ENTER to confirm “Continue start“ and hold the controller to the measuring head (see above).

Use “Stop start“ if you want to return to the entry menu.

If an attempt is made to start an already started sample:

Display shows “Measuring head already used!”

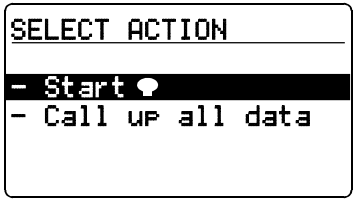
Use RUN/ENTER to confirm “New ” and hold the controller to the measuring head (see above).

Use “Stop start“ if you want to return to the entry menu.

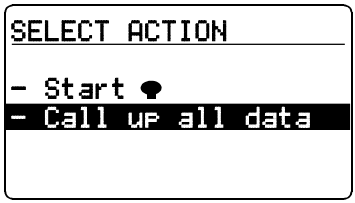
In the delivery state, the controller automatically makes space when “Start ” is selected if the measured value memory is full. To do this, it erases the oldest finished sample (if a finished sample is available). You can change this setting in “manual erase” (see the chapter “GLP/Tools - Settings”).

Call up all data

This function is used to **call up the data of all measuring heads**.
For the call up of the data of individual measuring heads: see the chapter on sample management.

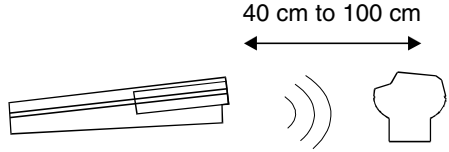


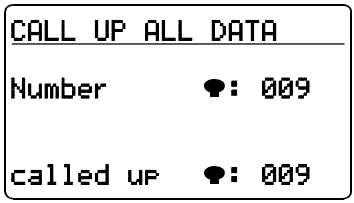
Entry menu “Communication with the measuring heads“.



Use 
to select “Call up all data“.

Point the controller at the measuring heads:

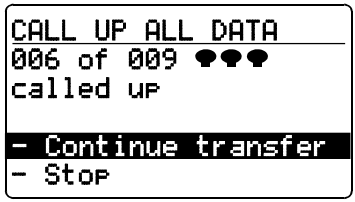




Queries the data of all active measuring heads in the scanner mode.

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.

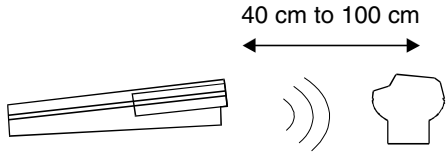
If all the measuring heads do not respond in the 1st pass of the data query, the controller searches for the missing measuring heads for approximately a further 7 seconds in the scanner mode. Without having to press another key, you can continue the data queries at other locations (e.g. other stirring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



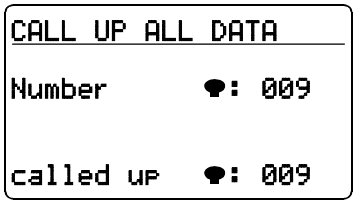
"Continue transfer" (preselected): A new pass is made only for measuring heads that have not yet responded.

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

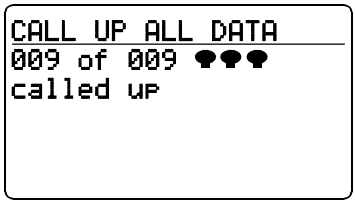
Point the controller at the measuring heads:



RUN/ENTER



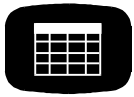
The call up of further measuring heads takes place in the scanner mode.



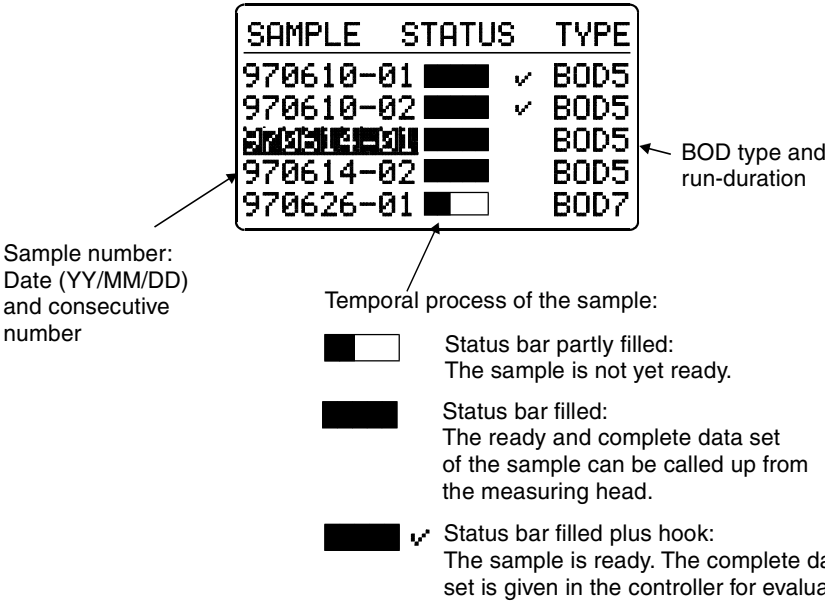
Message that the data of all measuring heads has been called up. The instrument subsequently returns to the input menu.

Immediately after the data call up of the complete measurement data records of a finished measuring head, this measuring head is set to the “free“ status. The measuring head is now available for a new measurement. The sample allocated in the sample management is “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):



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.

Data of samples that have been started in the standard BOD operating mode, are not listed in the routine BOD operating mode.

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

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

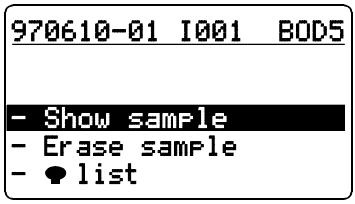
Select a sample.

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

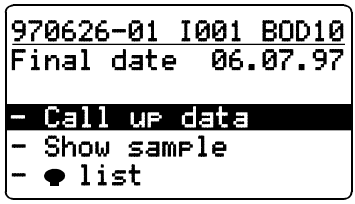
- sample number
- Id number (e.g. I001)
- BOD type and run time

of the selected sample.

Finished sample

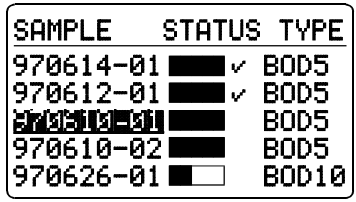


Current sample

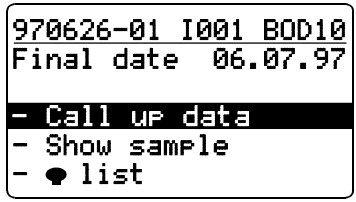


Show sample

This function is used to find the measuring heads. A sample labeling is not necessary.

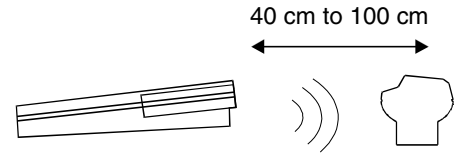


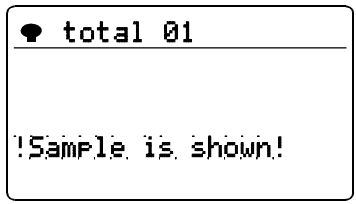
Starting point: sample management .
Use ▼/▲ to select a sample.



Use ▼/▲ to select “Show sample“.

Point the controller at the measuring heads:



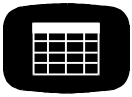


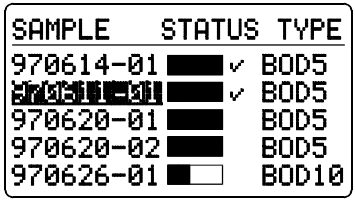
The controller transmits the call up of the selected sample. The allocated measuring head flashes for approx. 5 seconds.

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

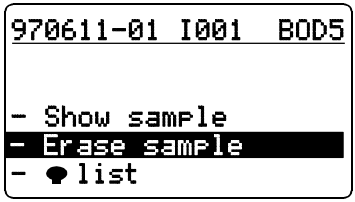
Erase data of finished samples

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.

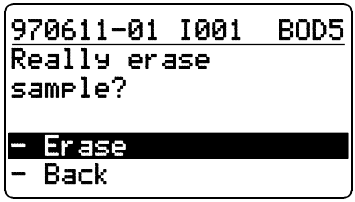




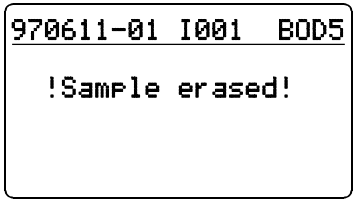
Starting point: sample management .
Use ▼/▲
to select a finished sample.



Use ▼/▲
to select the “Erase sample“ submenu.



Safety query with possibility to return.

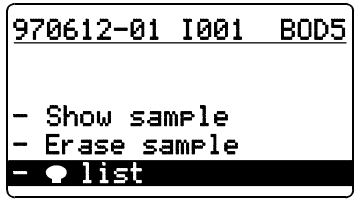


The sample has been erased.

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

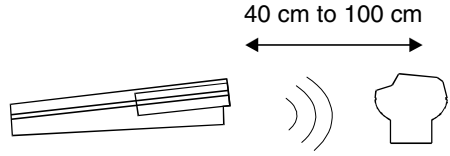
Show measuring head list

This function is used to allocate a measuring head to the relevant sample.

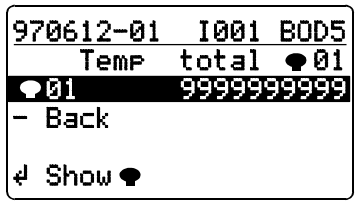


Use ▼ to select "list".

Point the controller at the measuring heads:



RUN/ENTER

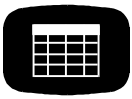


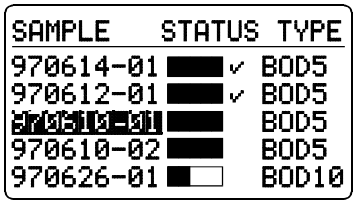
"List", i.e. a measuring head is displayed together with the serial number of the measuring head.

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

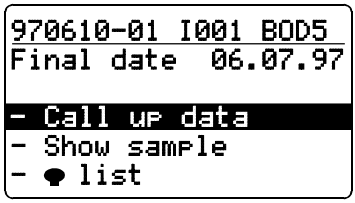
Call up data

This function is used to call up the data of individual measuring heads. To call up the data of all measuring heads, see the chapter “Call up all data“.



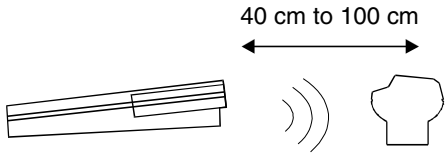


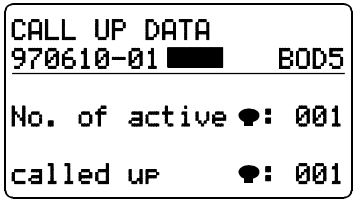
Use ▼/▲ to select a sample whose
- run time is not yet completed (bar not yet full)
- data after complete measurement that has not yet been called up (bar full, no tick)



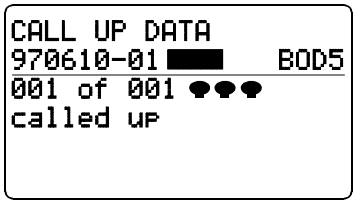
Jumps to the submenu of the selected sample.
Preselected: “Call up data“

Point the controller at the measuring heads:

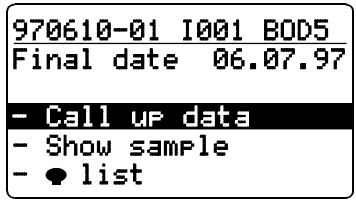




Call up the measuring head allocated to the sample in the scanner mode:
The controller
- stores the data obtained
- updates the lists of the sample management

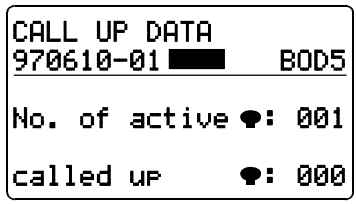


The controller confirms the call up performed.

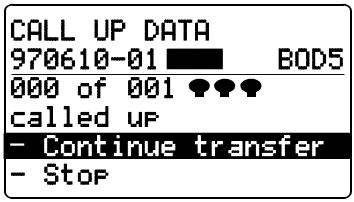


The controller then returns automatically to the submenu.

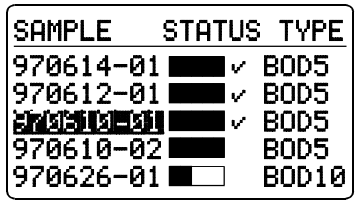
If the measuring head does not respond, the following display appears:



The controller continues to search for the measuring head 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). After approx. 7 seconds, the scanner mode automatically breaks off and the following display appears:

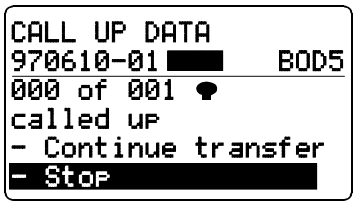


Use RUN/ENTER to restart the call up of the data (see above).



Return to the main menu, “Sample management“. Samples that were called up and completed appear with a tick next to them.

Call up data - Stop

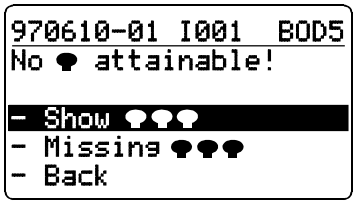


If a measuring head is missing or defective and the controller cannot transfer the data as a result, the menu item “Stop“ is provided.

RUN/ENTER

After confirmation, the display message shown here appears.

Then:

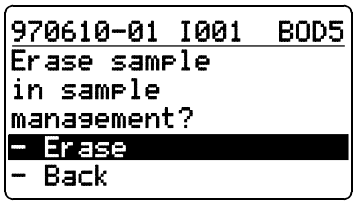


“Show ”:

As in “Show sample“ but used selectively for missing measuring heads (identification option if only the sender of the measuring head is defective. Otherwise identify missing measuring heads using “Show all“ (see the chapter “GLP/Tools”).

“Missing ”:

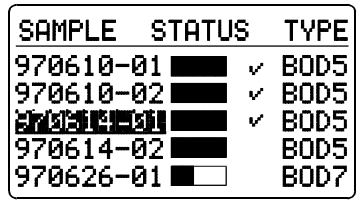
Using this you can remove the data of a missing or defective measuring head from the sample management of the controller.



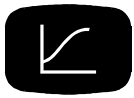
Erase:
Removes missing samples from the data stock.

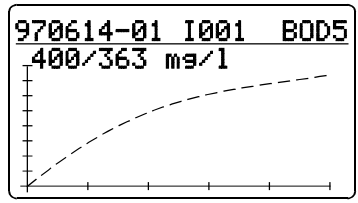
Return:
Jumps back to the previous menu.

Evaluation



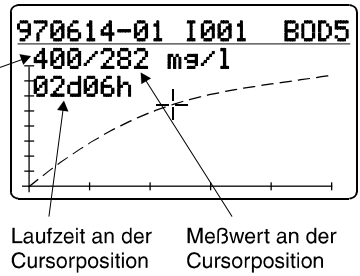
Starting point: sample management.
Use ▼/▲ to select a sample.





Enters into the evaluation: Display of the selected sample as a curve together with measured value data.

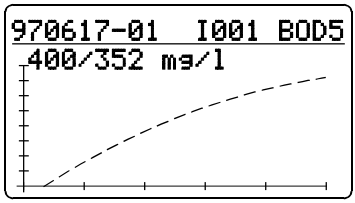
Change to cursor prompt:



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.

Pressing RUN/ENTER changes between the cursor prompt and display of the curve together with the measured value data.

Curve display of samples that are too cold



Display of a curve

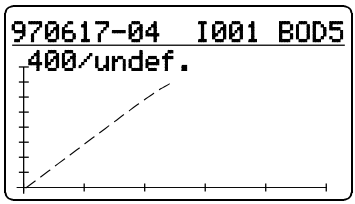
In using samples that are too cold, the maximum AutoTemp time is not sufficient to reach the temperature adaption of the sample: By warming the sample, excess pressure can result.

Display: Negative values of the curve are truncated and the curve emerges from the time axis but not from the origin.

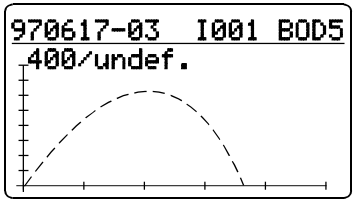
Measured values outside the measurement ranges

In the following cases, the evaluation displayed is not the measured value but “undef.“ (undefined):
- The measurement curve exceeds the measurement range at some point of its path.
- The measurement curve undercuts the measurement range at its end point.

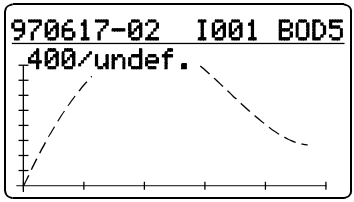
Sample displays:



The measured value exceeds the measurement range (overflow).



The measured value undercuts the measurement range (underflow).

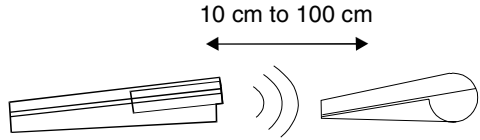


The measured value temporarily leaves the measurement range.

Printing

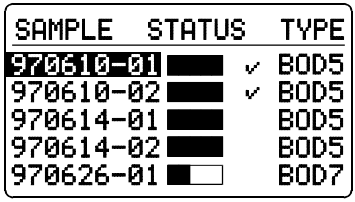
Switch on the TD 100 IR printer.

Point the controller at the printer:

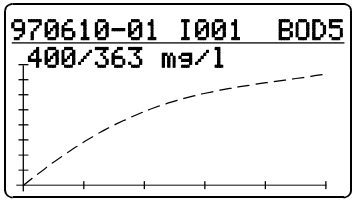


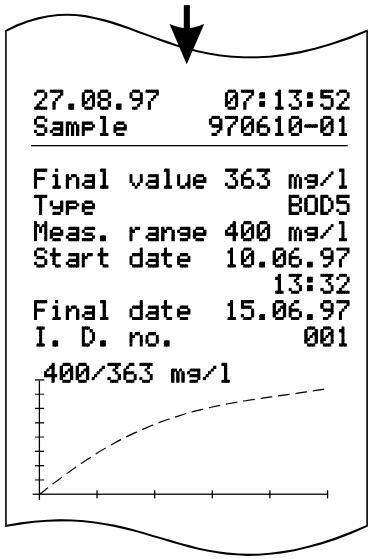
The controller outputs the report data of the selected sample on the IR interface.
Printout of:
- sample information
  (start date and time, final date, type, measurement range, identification number)
- curve + BOD final value
- report printouts:
  - current settings
  - start information
  - info
  - controller info

From the sample management:



From the evaluation:





Operating mode: Standard BOD

Sample preparation

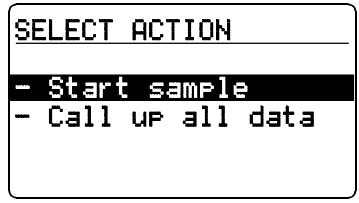
See WTW application reports
(contained within the scope of delivery of the accessories supplied).

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

Important note:
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.
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.

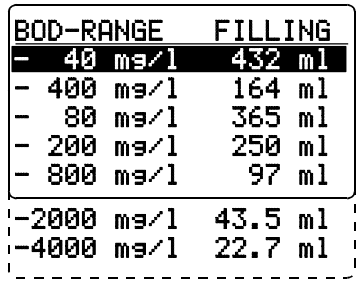
Start the measurement

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



"Communication with the measuring heads" mode.

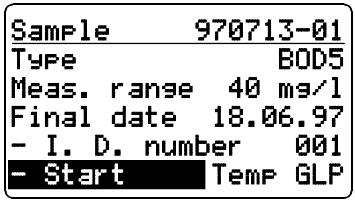
Preselected: "Start sample".



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



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.

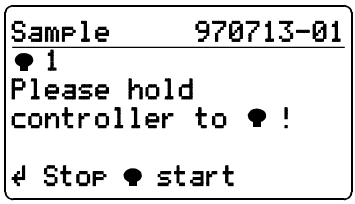
Additional information:
Type of measurement, run time, measurement range, final date, Id number.
“Temp“ display => the AutoTemp function (see the chapter “GLP/Tools”) is switched on.

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

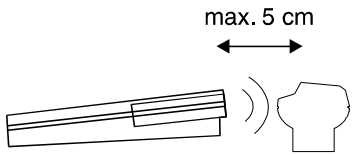
- Use ▲ to move the cursor to the Id number,
- Press RUN/ENTER and
- Use ▼/▲ to set the Id number required (setting range 001 ... 255).
- Use RUN/ENTER to confirm this.

Use 🖶 to print out the entire sample information possible (see the chapter “Standard BOD - Print”).

RUN/ENTER



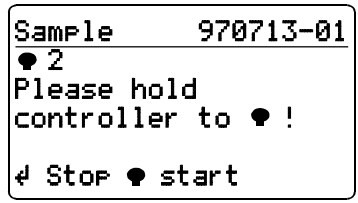
Confirm the start of measurement.
Contact selection:



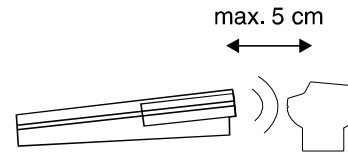
The controller repeatedly sends the start information in the scanner mode until successful feedback is received from the OxiTop®-C measuring head. After the successful start message from the measuring head:

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.



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



The number of the measuring head is automatically incremented.

The controller continues to work with the stirring selection, i.e. you can now start a sequence of measuring heads (parallel sample start) 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 input menu.

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

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:

Displays "Measuring head already used!"

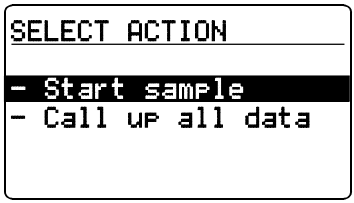
Use RUN/ENTER to confirm "New " and hold the controller to a free measuring head (see above).

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

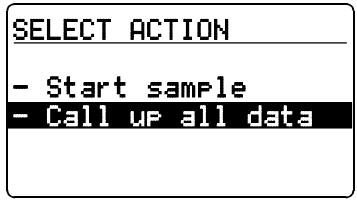
In the delivery state, the controller automatically makes space when "Start " is selected if the measured value memory is full. To do this, it deletes the oldest finished sample (if a finished sample is available). You can change this setting in "manual erase" (see the chapter "GLP/Tools - Settings").

Call up all data

This function is used to **call up the data of all measuring heads**.
To call up the data of individual measuring heads: see the chapter " Sample management".

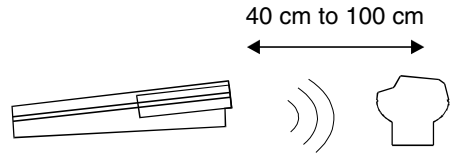


Entry menu "Communication with the measuring heads".

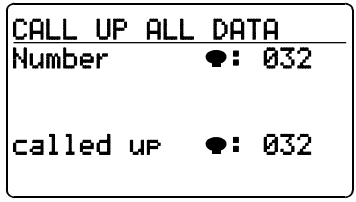


Use
to select “Call up all data”.

Point the controller at the measuring heads:



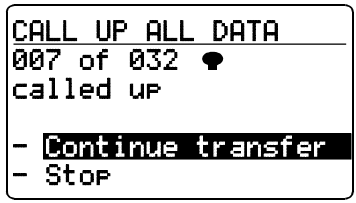
RUN/ENTER



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:

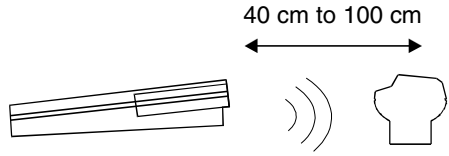


“Continue transfer“ (preselected): A new pass is made only for measuring heads that have not yet responded.

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:



RUN/ENTER

```
CALL UP ALL DATA
Number      : 032

called up   : 032
```

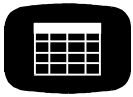
The call up of further measuring heads is performed in the scanner mode.

```
CALL UP ALL DATA
032 of 032
called up
```

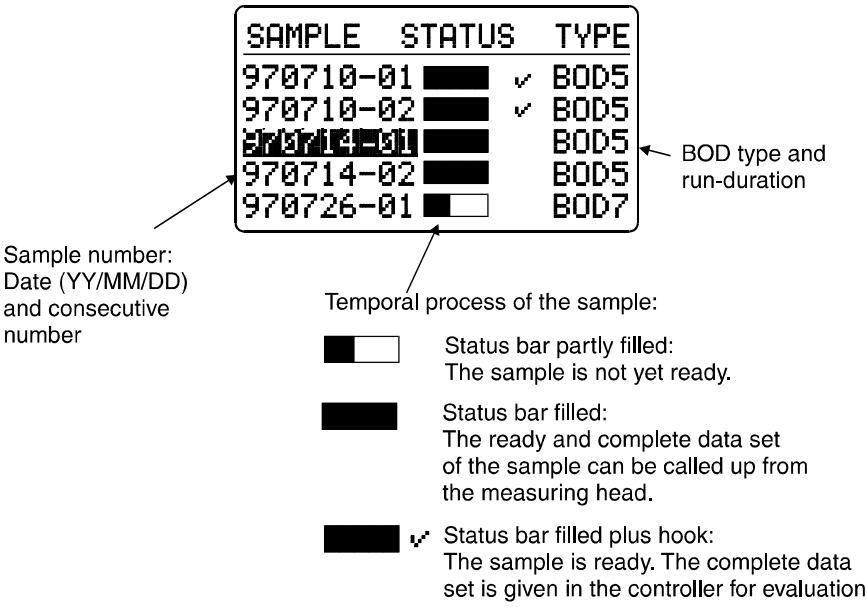
Message that all the data of all the measuring heads has been called up. The instrument then returns to the input menu.

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):



Data of samples that have been started in the standard BOD operating mode is not listed in 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.

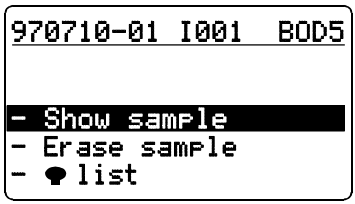
RUN/ENTER

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

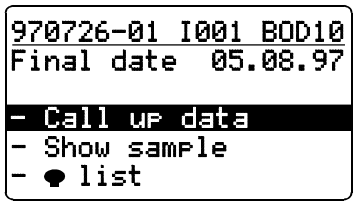
- sample number
- Id number (e.g. I001)
- BOD type and run time

of the selected sample.

Finished sample

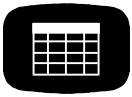


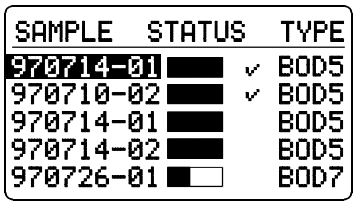
Current sample



Show sample

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



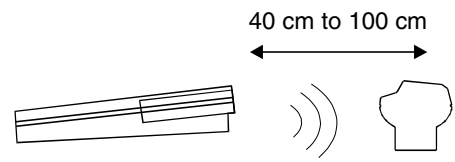


Starting point: sample management .

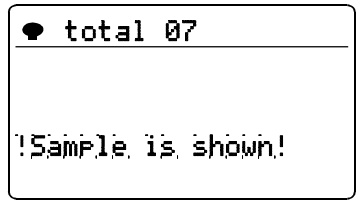
Use ▼/▲ to select a sample.

RUN/ENTER

Point the controller at the measuring heads:



RUN/ENTER

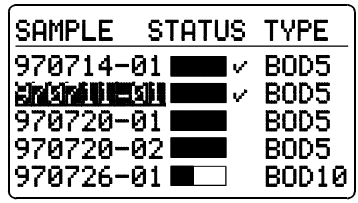


The controller transmits the call up of the selected sample. The allocated measuring head flashes for approx. 5 seconds.

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

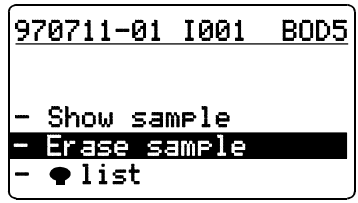
Erase data of finished samples

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.



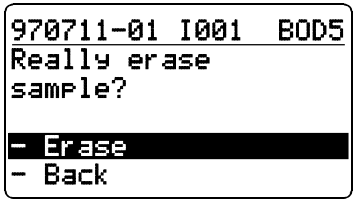
Starting point: sample management .
Use ▼/▲ to select a finished sample.

RUN/ENTER



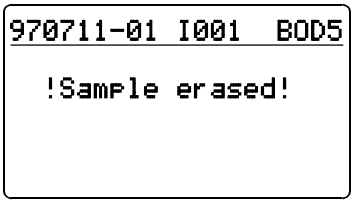
Use ▼/▲ to select the “Erase sample“ submenu.

RUN/ENTER



Safety prompt with possibility to return.

RUN/ENTER

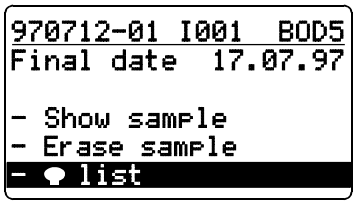


The sample has been erased.

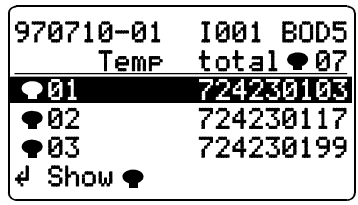
After the message, the controller automatically returns to the starting menu, “Sample management“.

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.

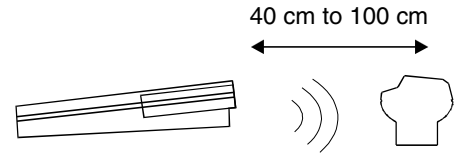


Use / to select “Measuring head list”.



List of measuring heads of the selected sample is displayed together with the serial numbers of the measuring heads.

Point the controller at the measuring heads:

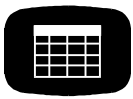


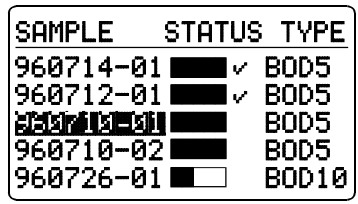
Use / to select the measuring head and use RUN/ENTER to confirm.
The controller again transmits the call up of the selected sample.
The measuring head flashes for approx. 5 seconds.

Use 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“.





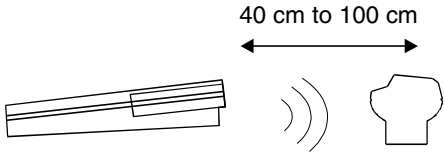
Use /
to select a sample whose
- run time is not yet completed (bar not yet full)
- data after complete measurement that has not yet been called up (bar full, no tick)

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:



RUN/ENTER

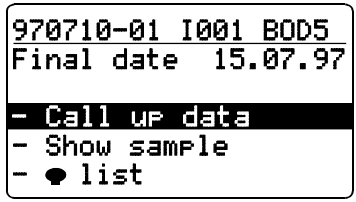
```
CALL UP DATA
970710-01 ■■■■    BOD5

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.

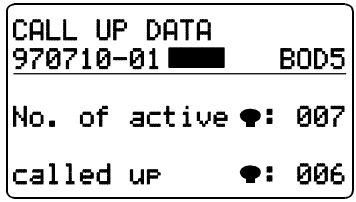
```
CALL UP DATA
970710-01 ■■■■    BOD5
007 of 007 ●
called up
```

The controller confirms the call up performed.



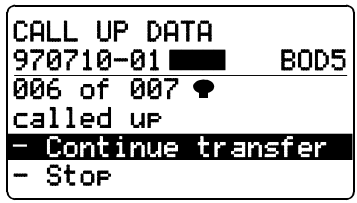
The controller then returns automatically to the submenu.

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



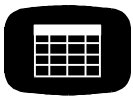
Renewed start of the data call up.

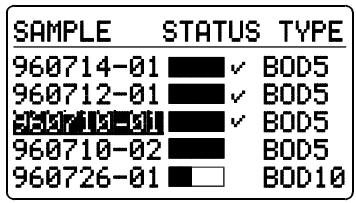
The controller continues to search for missing measuring heads in the scanner mode. Without pressing any further keys, the data call up can be continued at other locations (e.g. other stirring platforms or other thermal cabinets). Approximately 7 seconds after the last request was performed, the scanner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



Use 

to restart the the data transfer (see above).

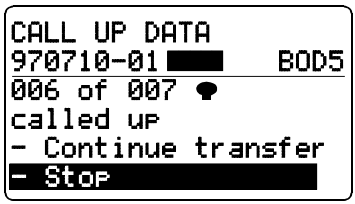




Return to the main menu, “Sample management“. Transferred and completed samples appear with a tick next to them. (The complete measurement data records of all finished measuring heads of the sample have been procured.)

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



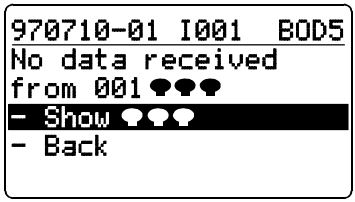
If a measuring head is missing or defective and the controller cannot completely call up the sample as a result, the menu item “Stop“ is provided to stop the data transfer.

RUN/ENTER

After confirmation, the display message shown here appears.

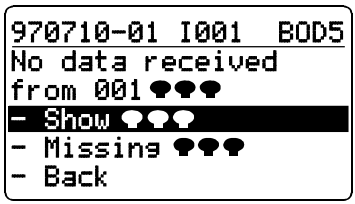
Three displays are then possible:

Case 1

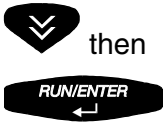


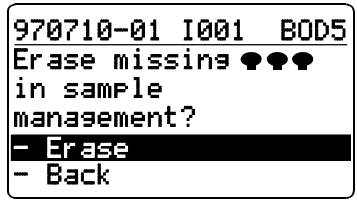
The sample is still running and individual measuring heads of the sample are not attainable.

Case 2



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



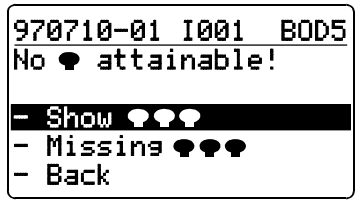


Erase:
Removes missing measuring heads from the data stock. The completed sample is given the "finished" status.

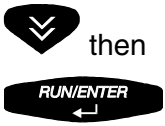
Back:
Jumps back to the previous menu.

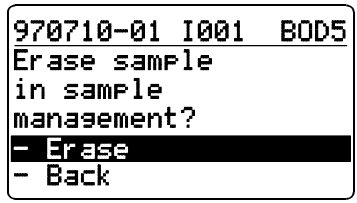
Abort using a function key: The stopped sample is not declared as "finished".

Case 3:



No measuring head of a sample is attainable.





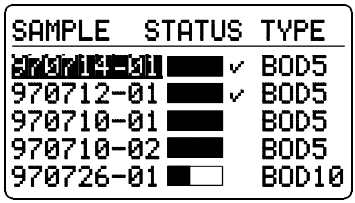
Erase:
Removes a sample from the data stock.

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. 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.

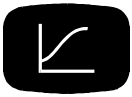
Evaluation

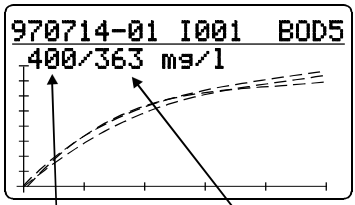


Starting point: Sample management.

Use / to select the sample.

Printout of the results with curves.

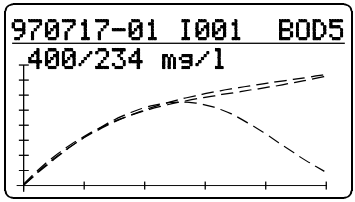




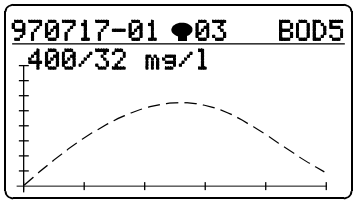
Measuring range Mean value

Evaluation of the whole 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“)



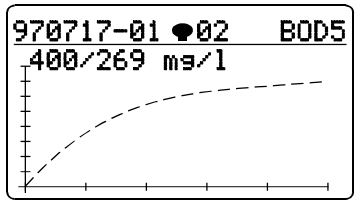
Example: Whole sample with outliers.



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



Starting point: display of a single curve.

RUN/ENTER

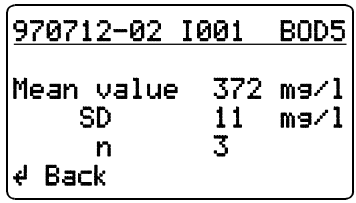
Changes to sample statistics.

The menu selection shown here only appears if n (the number of measuring heads) is at least 2. If n = 1, see the chapter “Routine BOD - Evaluation”.

When jumping to the pull-down menu from “Show all curves“, the menu item “Exclude curve“ disappears.

RUN/ENTER

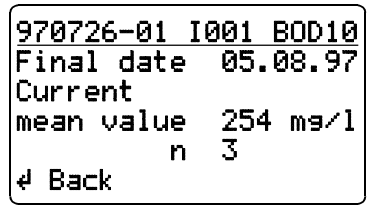
Results of the **finished** sample:



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

Printout of the results with curves

Data of the **current** sample:



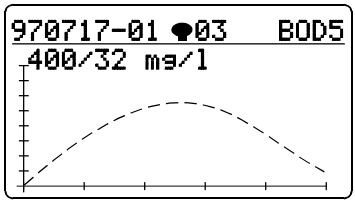
- end date
- current mean value
- n: number of measuring heads

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

Excluding a curve

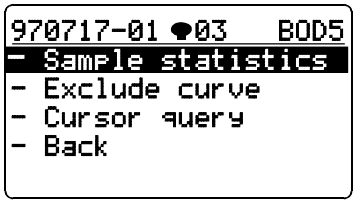
This function is used to temporarily exclude a single curve (e.g. an outlier) from the evaluation and averaging of a whole sample**.**
The curve is only excluded temporarily! The data stock of the sample management does not change. The excluded curve is present again when the call is repeated.

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

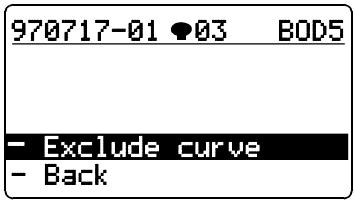


Display of the single curves:

Select curve.




:
Change to
“Exclude curve“.

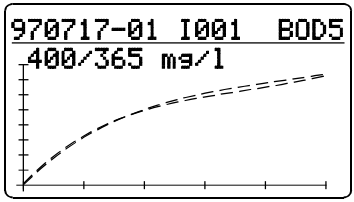


“Exclude curve“
is preselected.

“Return“: Returns to the previous menu.

RUN/ENTER

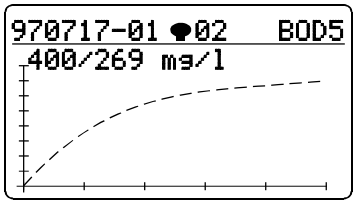
Message
“Curve excluded“.



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

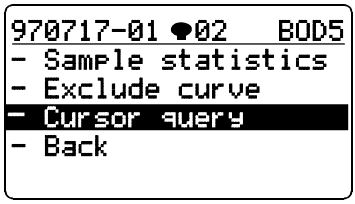
Printout of the updated results with curves
(without the excluded curve).

Cursor interrogation



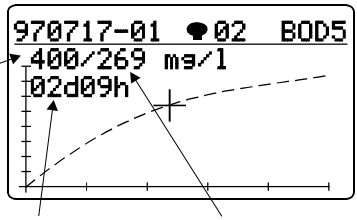
Starting point:
Display of a single curve with measured value data.

RUN/ENTER



Use ▼/▲ to change to “Cursor query“.

RUN/ENTER



Measuring range

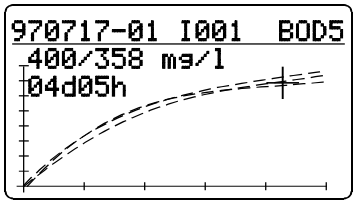
Measuring time at the cursor position

Measured value at the cursor position

Use ▼/▲ to run through the curve values.

Use 🖶 to print out the current display.

Or from the display of all the single curves:



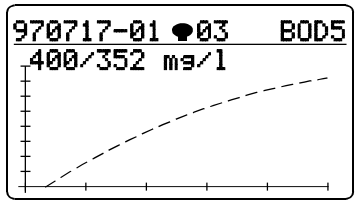
Use ▼/▲ to run through the curve mean values.

Use 🖶 to print out the current display.

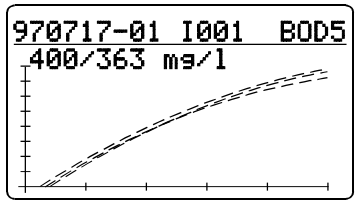
Return to the previous menu using RUN/ENTER.

Return to the display of all the single curves using 📈.

Curves display for cold samples



Display of a single curve.



Display of all curves.

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

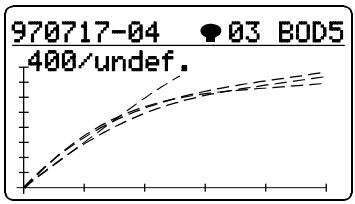
Display: Negative values of the curve will be truncated and the curve arises from the time axis but not the origin.

Measured values outside the measuring range

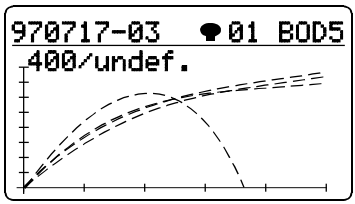
In the following cases, “undef.“ (undefined) is displayed instead of the measured value or mean value during evaluation:
- A measured curve exceeding the measuring range at any point of its path.
- A measured curve undercutting the measuring range at its end point.

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

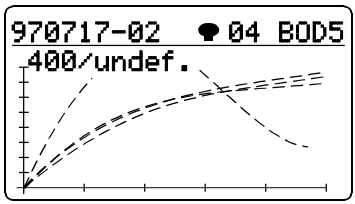
Sample displays:



A measured value exceeding the measuring range (Overflow).



A measured value undercuts the measuring range (Underflow).

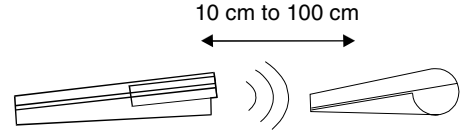


A measured value temporarily leaves the measuring range.

Print

Switch on the TD100 IR printer.

Point the controller at the printer:

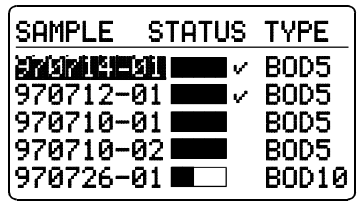


The controller outputs the **report data of the selected sample** to the IR interface.

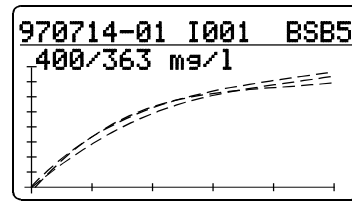
Printout of

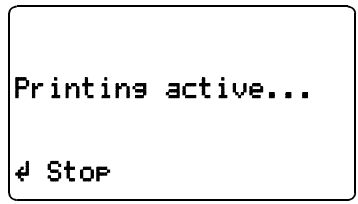
- sample statistics (mean value, SD, n)
- sample information (type, running time, measuring range, start date and start time, end date, identification no.)
- curve + BOD final value
- with GLP On: additional information on the system status and list of the series nos. of the measuring heads allocated to the sample
- If AutoTemp is switched on: note “AutoTemp on“
- Report printouts:
  - current settings
  - start information
  - ❣ info
  - controller info

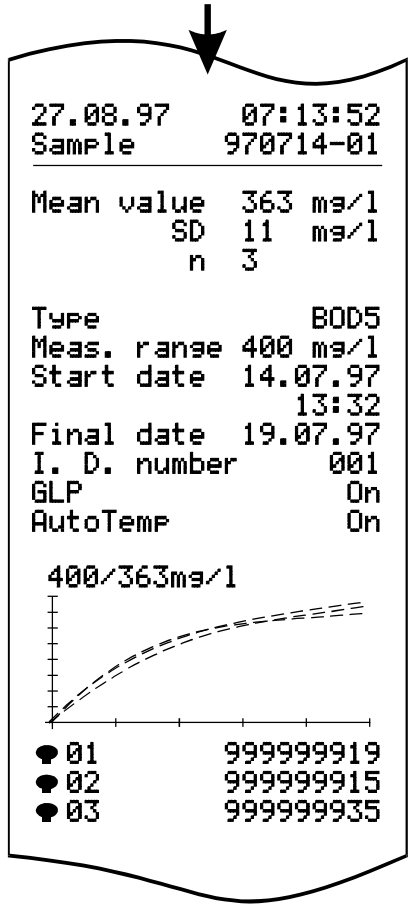
From the sample management:



From the evaluation (display of all the curves):







Print from the evaluation:

If the controller is located

- in the display of all the curves with cursor display or
- in the display of single curves with or without cursor query, the printout shows a copy of the relevant display.

GLP/Tools main menu

Main menu:
Use ▼/▲
to select a submenu

Use RUN/ENTER
to change to the submenu

Submenus of the GLP/Configuration:

Show free
This function is used to identify free measuring heads without requiring sample labeling. Free measuring heads can be used to start new samples.

Show settings
The current settings are displayed here.
(The table shows the settings in the delivery state):

Setup point	**Preset**	
Operating mode	Routine BOD	
	Routine BOD:	**Standard BOD:**
BOD type and measuring time	BOD5 (5 days)	BOD5 (5 days)
Date	Current	Current
Time	Current	Current
GLP: ON or OFF	Off (fixed setting)	On
Calibrating interval	---	12 months
Erase memory	auto (automatic erase)	auto (automatic erase)
AutoTemp: ON or OFF	On (fixed setting)	On
Switch-off interval	5 minutes (fixed setting)	5 minutes
Language	German	German

Settings

Here you can undertake or change the following settings:

Operating mode
Measuring time
Date/time
* GLP; calibrating interval
Memory
* AutoTemp
* Switch-off interval
Language

Check

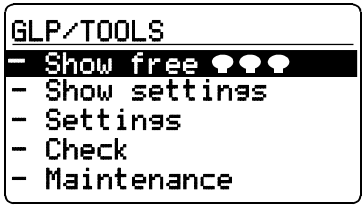
Show (finished/all)
info (with report printout)
Controller info (with report printout)
Cal test
Pneumatic test

Maintenance

Erase finished samples (in the controller - sample management)
Reset/release

* only in the standard BOD operating mode

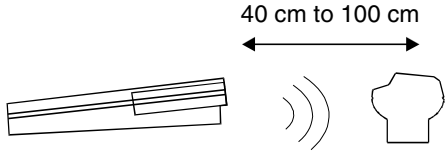
Show free



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

Press RUN/ENTER.

Point the controller at the measuring heads:

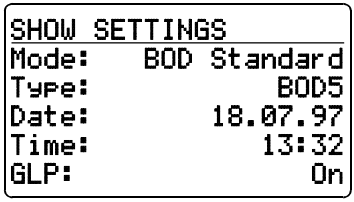


All free measuring heads flash for approx. 5 seconds.

Show settings

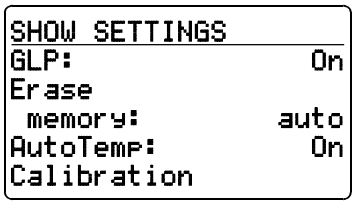
Main menu, “GLP/Tools“.
Use ▼/▲ to select the “Show settings“ menu.

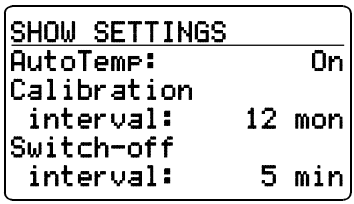
The following example illustrates the presettings in the Standard BOD operating mode.



“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





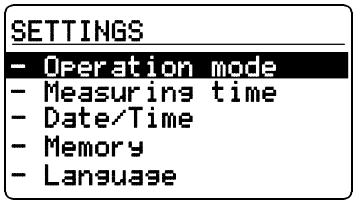
In the “Show settings“ submenu:
Print out the whole list of current settings (as in the display).

Settings

Operating mode

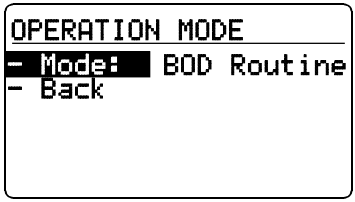
Main menu, “GLP/Tools“.
Use ▼/▲
to select the “Settings“ menu.

RUN/ENTER



“Settings“ submenu:
Use ▼/▲
to select “Operating mode“.

RUN/ENTER



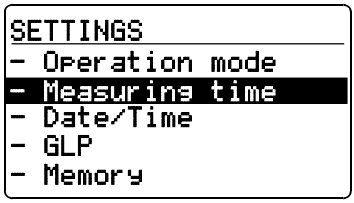
Use RUN/ENTER to acknowledge it and ▼/▲ to select between the operating modes, Routine BOD and Standard BOD.

Confirm using RUN/ENTER.

Return to the “Settings“ main menu:
▼, then RUN/ENTER.

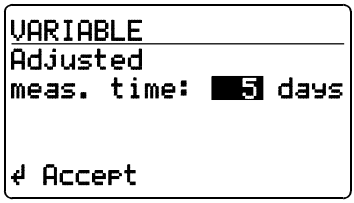
Measuring time

Set the type and measuring time of the BOD measurement here.



"Settings" submenu:
Use ▼/▲
to select the "Measuring time" submenu.

RUN/ENTER

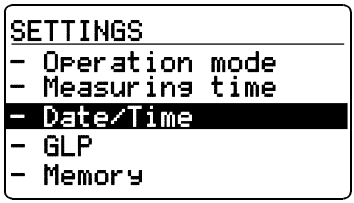


Use ▼/▲
to set the days (1 to 99) or hours (0.5 to 23).
Confirm using RUN/ENTER.

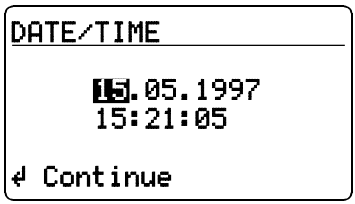
Display:
preset measuring time.
Default on delivery: 5 days.

Date/Time

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



"Settings" submenu:
Use ▼/▲
to select the "Date/Time" submenu.



Set each of the number blocks underlaid in black using  .

Confirm and continue with 

.

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

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

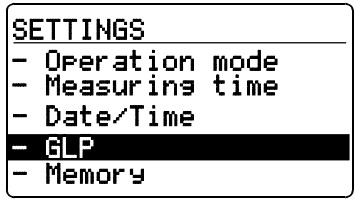
GLP

The GLP (Good Laboratory Practice) set of rules presents particular requirements concerning **test resource monitoring for the measuring systems implemented** (quality assurance).
The following points must be fulfilled to comply with the requirements of GLP,:

1. **Documentation of the calibration intervals.**
2. **Reporting of the calibrations**:
   Identification no. of the measuring head/controller
   Date and signature of the operator.
3. **Determination of the calibration frequency and instructions for the performance**:
   The frequency depends on the operating conditions and the data of the test plan.

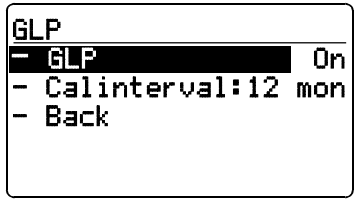
The OxiTop® Control system supports these standards using an **add-on GLP mode**: This mode inhibits measuring if the calibrating interval is exceeded.
As a result of these restrictions, the GLP mode effects a standardization of the calibrating and measuring conditions that are indispensable for working from the aspect of quality assurance.

Switch the GLP function on or off (only in the standard BOD operating mode):



"Settings" submenu:
Use ▼/▲
to select the "GLP" submenu.

RUN/ENTER

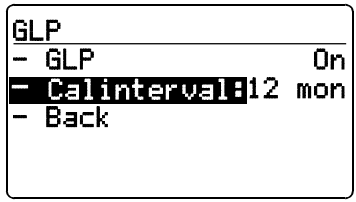


"GLP" submenu.
"GLP" is preselected.
Press RUN/ENTER,
then use ▼/▲ to select
either GLP "On" or "Off"
Confirm using RUN/ENTER.

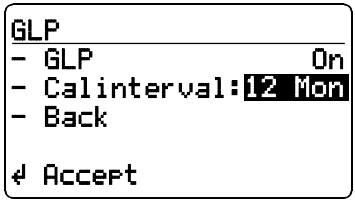
GLP - calibrating interval ("Calinterval")

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".

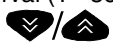
If the end of the calibrating interval set up lies within the measuring time of a measurement to be started, this measurement cannot be started.



"GLP" submenu.
Use ▼/▲ to select the
subitem, "Calinterval".



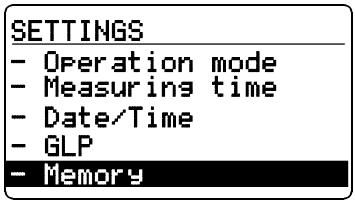
Press 

,
then set the time period for the calibrating interval (1 - 36 months) using  .
Default: 12 months.
Confirm by 

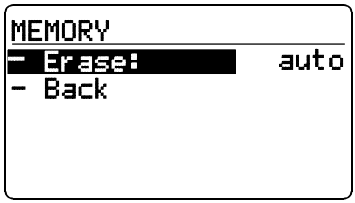
.

Memory

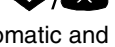
Here, you can set whether the controller should automatically erase the oldest finished samples if the memory is full to create space for new measurement data (setting “auto“).
With the “manual“ setting, the message “Lack of memory! Erase finished samples!“ is displayed if the memory is full (See chapter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



“Settings“ menu:
Use 
to select the “Memory“ submenu.



Erase memory is preset to “automatic“.
To change it:
Press 

and use  to select between automatic and manual and use 

to acknowledge it.

Return to the “Settings“ menu:
 , then 

.

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**.

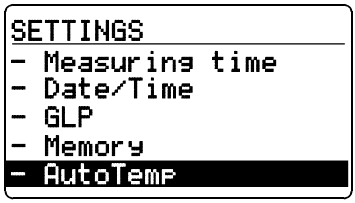
Adaption phase
The phase without evaluation of the pressure process. The duration of the adaption phase is defined for the various measuring times according to the table.
The adaption of the microbiology to the characteristics of the sample is made in this phase and small temperature deviations, too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

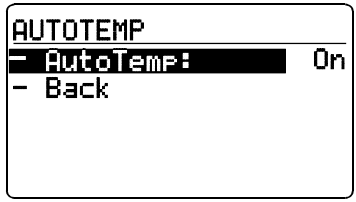
BOD measuring time	***Adaption phase duration***	***Test phase duration***
0.5 to 23 hours	Since the measurement times are very short, the system always suppresses the *AutoTemp phase* here even if the AutoTemp function is switched on in the settings.	
1, 2, 3, 4, 5 days	14, 28, 42, 56, 70 minutes	Maximum 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 (only in the standard BOD operating mode):



"Settings" menu:
Use ⏬/⏫
to select "AutoTemp" submenu.

RUN/ENTER



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.

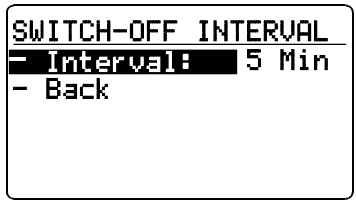
Return to the “Settings“ menu:
▼, then RUN/ENTER.

Switch-off interval

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, only in the standard BOD operating mode.)

“Settings“ menu:
Use ▼/▲
to select the “Switch-off interv.“ submenu.

RUN/ENTER

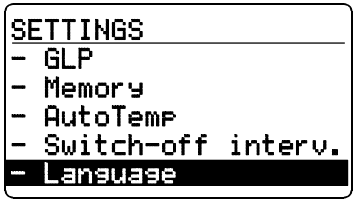


The switch-off interval is preset to 5 minutes.
To change it:
Press RUN/ENTER and
use ▼/▲ to set the no. of minutes required and
RUN/ENTER again to confirm it.

Return to the “Settings“ menu:
▼,then RUN/ENTER.

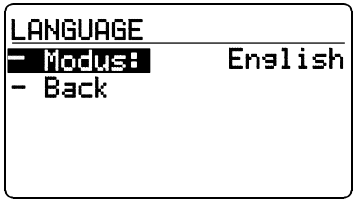
Language

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.



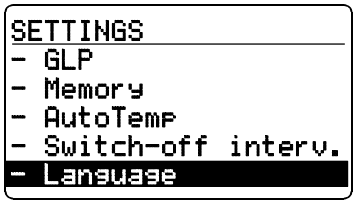
"Settings" menu:
Use ▼/▲
to select the "Language" submenu.

RUN/ENTER



The default language is "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.



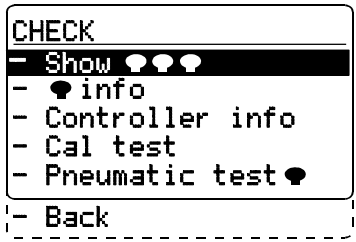
"Settings" menu.
Return to the main menu, "GLP/Tools":
▼, then RUN/ENTER
or
using GLP.

Check

Main menu, “GLP/Tools“.
Use ▼/▲ to select the “Check“ menu.

Show

RUN/ENTER

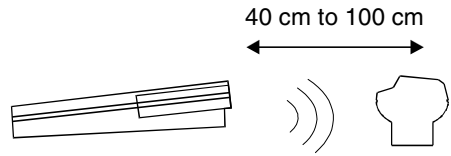


“Check“ menu.
“Show “ preselected.

RUN/ENTER

“Show “ submenu.
Use ▼/▲ to select between “Show free “ and “Show all “.

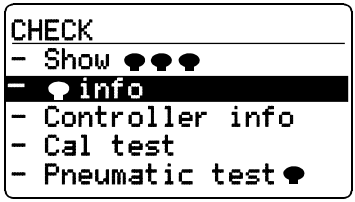
Point the controller at the measuring heads:



RUN/ENTER

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

info

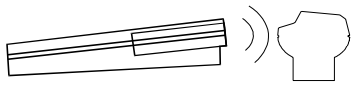


"Check" menu.

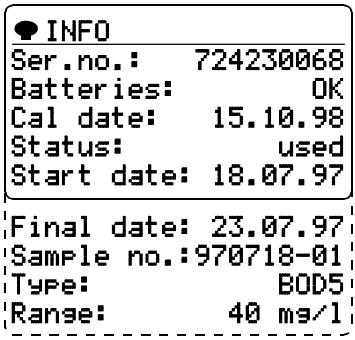
Use / to select "info".

RUN/ENTER

max. 5 cm



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



- serial number of the measuring head,
- battery status (OK/LOBAT/EMPTY!!),
- the next calibration date (only in the measuring mode, Standard BOD 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

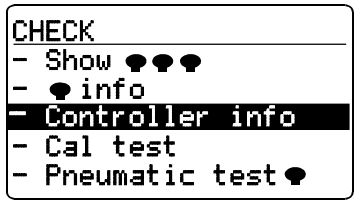
Return to the "Check" menu using RUN/ENTER.

Repeat the procedure for each measuring head.

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

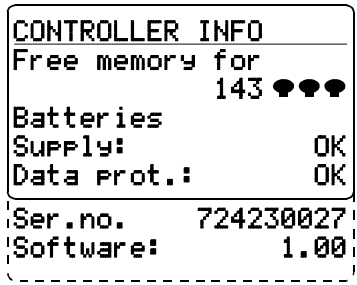
The query was stopped.
You can select between
- continue query (see above) and
- Stop (return to the "Check" menu

Controller info



"Check" menu.
Use ▼/▲ to select "Controller info".

RUN/ENTER



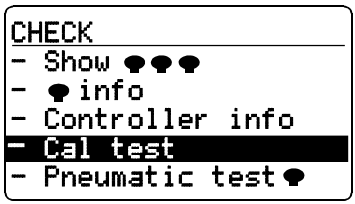
The display shows the following information:
- number of measuring heads for which there is still memory capacity
- status of the supply batteries
- status of the data backup batteries (OK/LOBAT).

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

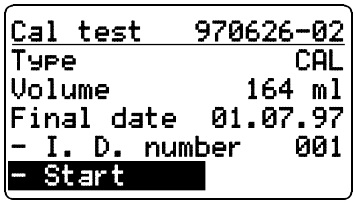
Return to the "Check" menu using RUN/ENTER.

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.



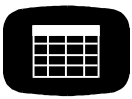
“Check“ menu.
Use / to select “Cal test”.

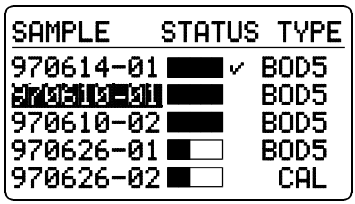


The instrument automatically allocates the sample number (in the header line).
The filling volume (164 ml) and the type together with the run time of 5 days are preset.

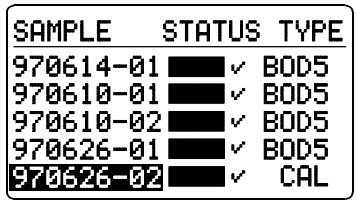
For information on the further handling of the sample up to the “finished” status: See the chapter “Start”.

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

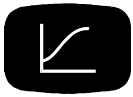


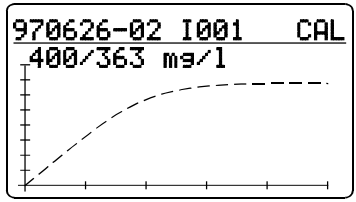


Evaluation of the Cal test



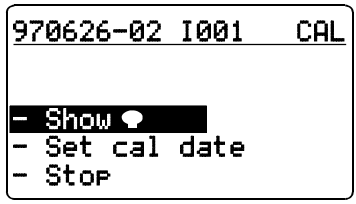
Starting point: sample management.
Use ▼/▲ to select the test sample.





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

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



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

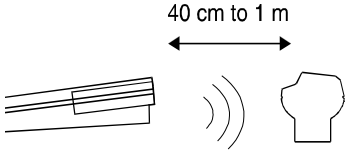
- "Show" (to find the relevant measuring head): Function and messages as described in the chapter "Sample management".
- "Set cal date" (appears only if the Cal test is finished and the controller is in the standard BOD operating mode, GLP is switched on and the test is finished).
- see below.
- "Stop": Return to the curve display.

In the standard BOD operating mode and GLP "On":

Use ▼/▲ to select "Set cal date".

RUN/ENTER

```
970626-02 I001    CAL

Please direct
controller to !
```



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
```

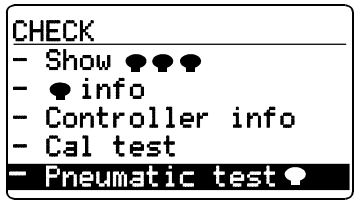
Repeat the procedure using RUN/ENTER, then continue as described above.

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 testing agent, OxiTop® PT (WTW order number 209 334).

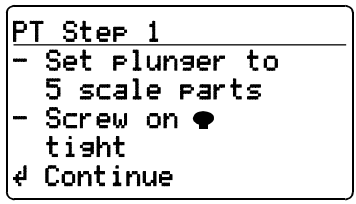
The user interface of the controller guides you through the test:



"Check" menu.

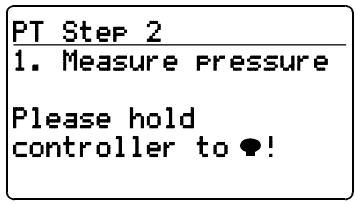
Use ▼/▲ to select the menu item "Pneumatic test".

RUN/ENTER

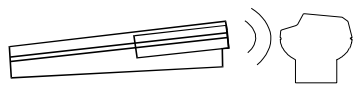


Set the plunger of the siringe on the OxiTop® PT testing agent to 5 scale parts.
Tightly screw the measuring head to be tested onto the OxiTop PT tesing agent.

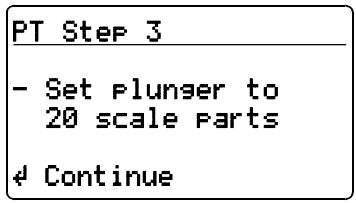
RUN/ENTER



max. 5 cm



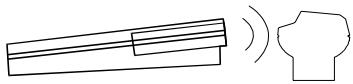
(Exceeding the time causes a return to the "Check" menu").



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 “Maintenance“ menu.

Erase finished samples

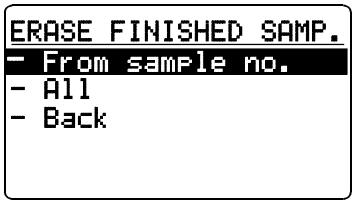
Here you can erase the data of finished samples that is already evaluated or no longer required in order to free memory in the controller.

RUN/ENTER

```
MAINTENANCE
- Erase samples
- Reset/release
- Back
```

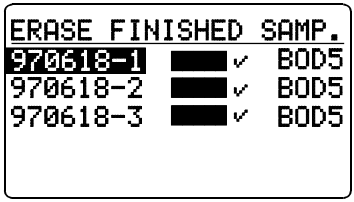
Menu item “Erase samples“ is preset.

RUN/ENTER

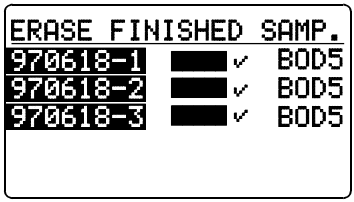


A submenu appears with the selection:
- From sample no. (preselected)
- All
- Back (from the “Maintenance” submenu)

RUN/ENTER



The controller displays the list of finished samples.
The oldest finished sample is marked.



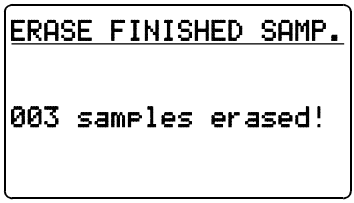
With , you can mark further samples.

With , you can remove the marking again.

RUN/ENTER

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

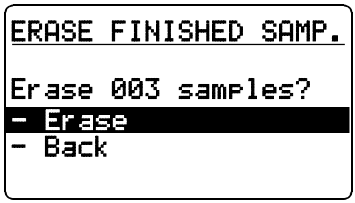
RUN/ENTER



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



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

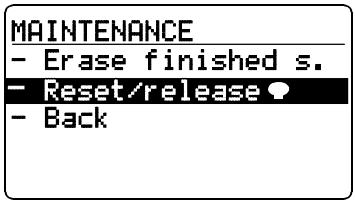
Further: See above.

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

Reset/release

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

Caution: After carrying out the “Reset/release“, the data of the measuring head is erased!

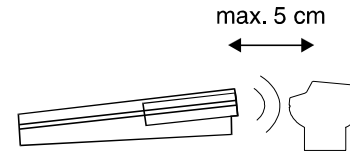


Use / to select the Reset/release menu item.

RUN/ENTER

RUN/ENTER

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




```
RESET/RELEASE
Ser.no.  : 999999017
Sample no.:970611-01
- 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 it with “Return“.)

```
RESET/RELEASE
Reset performed!
↲ Continue
```

Display message: The release/ reset has been performed.

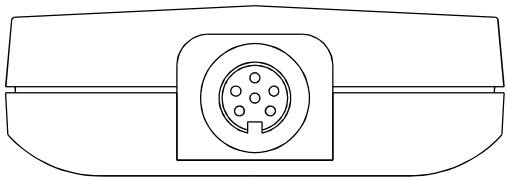
Repeat the process for each of the measuring heads to be released.

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

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

Use RUN/ENTER to return to the Reset/release menu.

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 available from 1998).

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 operating mode: 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:

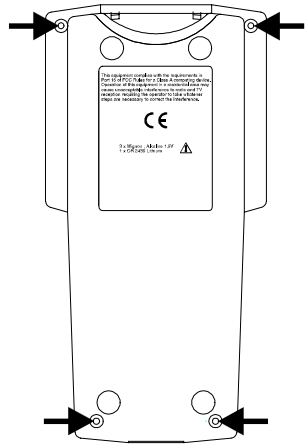
- Switch off the OxiTop®-OC100 controller.
- Loosen the 4 screws underneath the housing using a Phillips screwdriver (see figure ❶).
- Place the controller on the lower case.
- Remove the upper case and put it down to the right next to the lower case with the display downwards (see figure ❷).
- Remove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

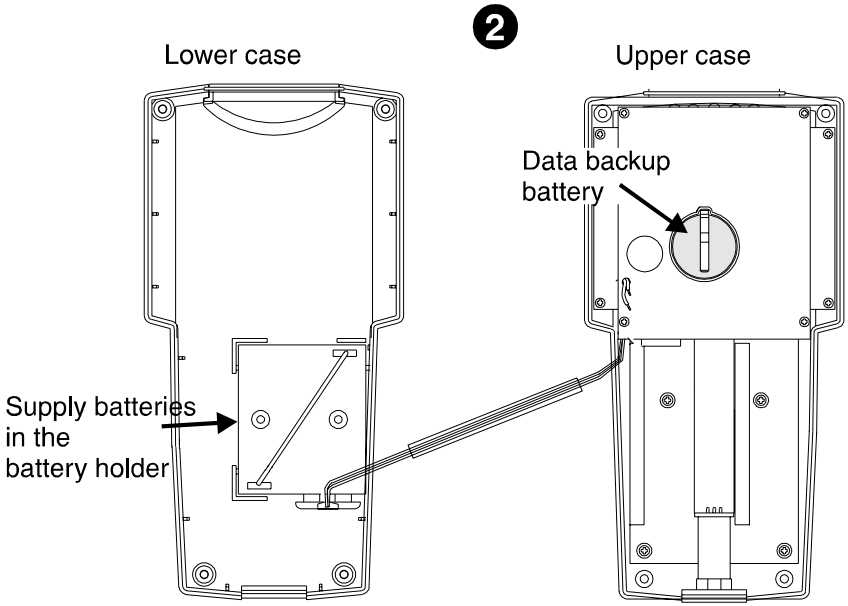
- Insert new supply batteries - 3 pieces, alkaline (alkaline manganese), size: Mignon, AA, AM3, LR6).
  Ensure that they are the right way round!
  (The poles are marked in the supply battery holder)
  Always replace the complete set of batteries.

- 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





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/ies 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.

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.

OxiTop®-C measuring head

Supply batteries

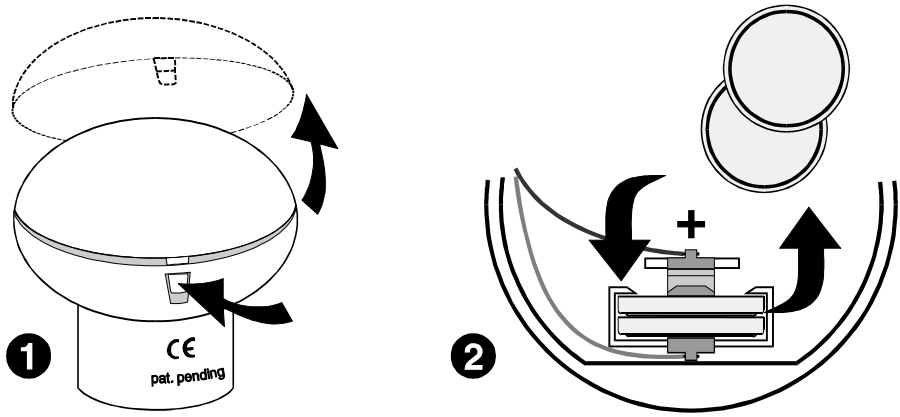
Batteries: 2 x lithium batteries, CR2430, e.g. WTW type **Batt/OxiTop®**,
order no. 209 012
These batteries ensure the energy supply of the OxiTop®-C measuring head.
Run time: typically 2 years
The OxiTop®-C measuring head does not require any batteries for data backup.

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
Batteries 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!
Battery/ies 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.



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

❷ - 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 	Cause: This message is used as information in the standard 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 ). Problem solution, if necessary: • 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!	Cause: 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. Problem solution: • 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 are 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 (smaller 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)	Cause: • 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 Problem solutions: • 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)	Cause: • 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. Problem solutions: • 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: • You started samples in the operating mode „BOD Standard“. Then you switched over to the operating mode „BOD Routine“. Problem solution: • Switch the instrument to the operating mode „BOD-Standard“ (see chapter GLP/Tools - Settings - Operating mode).
At the beginning of the measurement, no measurement curves are displayed Measurement curves does 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 operating mode, 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”.

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.
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”)

Requirements / Problems	Procedure / Problem solutions
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

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 0 ... 40/ 80/ 200/ 400/ 800/ 2000/ 4000 mg/l BOD

Run times and data sets

Measurement period	Run time of the measurement	Data records
	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

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 EN 50081-1, FCC Class A
-interference immunity 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 B x T)

Weight approx. 390 g

Test certificates CE, TÜV, UL, CUL(UL/CSA)

Warranty 1 year

OxiTop®-C measuring head

Measuring principle	manometric by means of a pressure measuring head
Measured of	BOD_n (oxygen drift according to DIN 38409 T 52)
Pressure range	500 ... 1350 hPa (mbar).
Accuracy	± 1% of measured value ± 0.7 % of the measuring range
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, Ø 70 mm
Weight	95 g
Test certificates	CE, TÜV, UL, CUL(UL/CSA)
Warranty	1 year

SENTON
EMV-Prüfzentrum EMI/EMC-Testcenter

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

Straubing, April 30, 1997

Senton GmbH
Johann Roidt

SENTON GmbH - EMV-Prüfzentrum - Äußere Frühlingsstraße 45 - D-94315 Straubing - Tel. 09421/42081

Supplement to the operating manual

OxiTop® Control

System OxiTop® Control

Controller

OxiTop® OC100

Measuring heads

OxiTop®-C

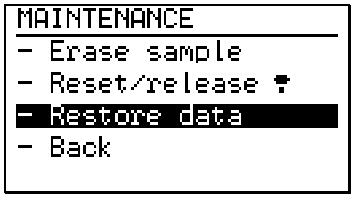
This sheet is a supplement to the present operating manual and contains the chapter "Restore data" and some notes.

Always keep this sheet together with the operating manual.

Restore data

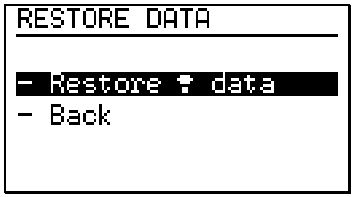
In case you lost your controller or your controller is defective, the “Restore data“ function facilitates to restore the data of running measurements using a new or another controller. This means the data are not lost.

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.



Use ▼/▲ to select the “Restore data“ submenu.

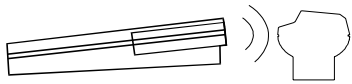
RUN/ENTER



RUN/ENTER

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.

After reconfirming the data of the measuring head is read out and stored in the controller.

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

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 was already restored the following is displayed for approx. 3 seconds:

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:

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

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

Notes

- The present operating manual and this supplement refer to the software release 2.xx.
  The right to implement minor changes is reserved.

- The OxiTop Control 100 measuring system can be extended up to 120 measuring positions (measuring heads) – in the operating manual there are 144 measuring positions mentioned.

- The OC100 controller reliably saves your measuring data. However, please back up your data regularly as usual.

Wissenschaftlich-Technische Werkstätten GmbH

Dr.-Karl-Slevogt-Straße 1
D-82362 Weilheim

Germany

Tel: +49 (0) 881 183-0
+49 (0) 881 183-100
Fax: +49 (0) 881 183-420
E-Mail: Info@WTW.com
Internet: http://www.WTW.com