

Lovibond® Water Testing

Tintometer® Group



Photometer-System MD100



CSB • COD • DCO • COD • DOC



Instruction Manual

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www.lovibond.com

CE-Konformitätserklärung / Declaration of CE-Conformity Déclaration de conformité CE / Dichiarazione di conformità CE / CE-Declaración de conformidad

Hersteller / manufacturer / fabricant / produttore / fabricante:
Tintometer GmbH / Schleefstraße 8-12 / 44287 Dortmund / Deutschland

Produktname / Product name / Nom du fabricant / Nome del prodotto / Nombre del
producer: **MD 100**

- (DE)** EG-Konformitätserklärung gemäß RICHTLINIE **2004/108/EG** DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 15. Dezember 2004 und RICHTLINIE **2011/65/EU** DES EUROPÄISCHEN PARLAMENTS UND DES RATES vom 8. Juni 2011. Der Hersteller erklärt, dass dieses Produkt die Anforderungen der folgenden Produktfamiliennorm erfüllt:
- (GB)** Declaration of EC-Conformity according to DIRECTIVE **2004/108/EC** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 2004, December the 15th and DIRECTIVE **2011/65/EU** OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 2011, June the 8th. The manufacturer declares that this product meets the requirements of the following product family standard:
- (FR)** Déclaration de conformité CE conformément à la DIRECTIVE **2004/108/CE** DU PARLEMENT EUROPÉEN ET DU CONSEIL du 15 décembre 2004 et DIRECTIVE **2011/65/UE** DU PARLEMENT EUROPÉEN ET DU CONSEIL du 8 juin 2011. La fabricant déclare que le produit est conforme aux exigences de la norme de famille de produits suivante :
- (IT)** Dichiarazione di conformità CE in conformità alla DIRETTIVA **2004/108/CE** DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 15 dicembre 2004 e DIRETTIVA **2011/65/UE** DEL PARLAMENTO EUROPEO E DEL CONSIGLIO del 8 Giugno 2011. Il produttore dichiara che il seguente prodotto soddisfa i requisiti della seguente norma per famiglia di prodotti:
- (ES)** CE - Declaración de conformidad conforme a la NORMA **2004/108/CE** DEL PARLAMENTO Y DEL CONSEJO EUROPEO del 15 de diciembre de 2004 y NORMA **2011/65/UE** DEL PARLAMENTO Y DEL CONSEJO EUROPEO del 8 de junio de 2011. El fabricante declara, que este producto cumple con las exigencias de la siguiente norma correspondiente a la familia de productos:

DIN EN 61326-1:2006

- (DE)** Gemäß den grundlegenden Prüfanforderungen für die Störfestigkeit (Tabelle 1) / Störaussendungen gemäß den Anforderungen für Geräte der Klasse B
- (GB)** Basic immunity test requirements (Table1) / Emission according to the requirements for class B equipment
- (FR)** Conformément aux exigences fondamentales relatives aux essais d'immunité (tableau 1) / Émissions parasites conformément aux exigences applicables aux appareils de la classe B
- (IT)** Conforme ai requisiti relativi al test di resistenza alle interferenze (Tabella 1) / Emissione in conformità ai requisiti per i dispositivi della classe B
- (ES)** De acuerdo a los requisitos básicos de verificación para la resistencia a interferencias (tabla 1) / Emisión de interferencias conforme a las exigencias para aparatos de clase B

Dortmund, 07.10.2014


Cay-Peter Voss, Managing Director

GB Important Information



The accuracy of the instrument is only valid if the instrument is used in an environment with controlled electromagnetic disturbances according to DIN 61326. Wireless devices, e.g. wireless phones, must not be used near the instrument.

Important disposal instructions for batteries and accumulators

EC Guideline 2006/66/EC requires users to return all used and worn-out batteries and accumulators. They must not be disposed of in normal domestic waste. Because our products include batteries and accumulators in the delivery package our advice is as follows :

Used batteries and accumulators are not items of domestic waste. They must be disposed of in a proper manner. Your local authority may have a disposal facility; alternatively you can hand them in at any shop selling batteries and accumulators. You can also return them to the company which supplied them to you; the company is obliged to accept them.



Important Information To Preserve, Protect and Improve the Quality of the Environment Disposal of Electrical Equipment in the European Union

Because of the European Directive 2012/19/EU your electrical instrument must not be disposed of with normal household waste!

Tintometer GmbH will dispose of your electrical instrument in a professional and environmentally responsible manner. This service, **excluding the cost of transportation** is free of charge. This service only applies to electrical instruments purchased after 13th August 2005. Send your electrical Tintometer instruments for disposal freight prepaid to your supplier.



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Display backlight



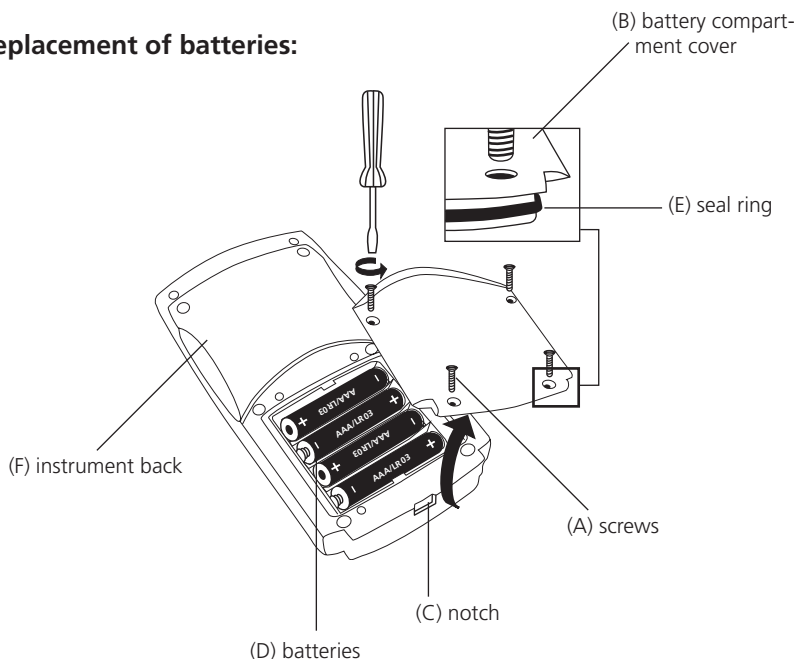
Press the [!] key to turn the display backlight on or off. The backlight is switched off automatically during the measurement.

Recall of stored data



If the instrument is switched on, press the [!] key for more than 4 seconds, then release the [!] key to access the recall menu.

Replacement of batteries:



CAUTION:

To ensure that the instrument is water proof:

- seal ring (E) must be in position
- battery compartment cover (B) must be fixed with the four screws

If the batteries are removed for more than one minute the date and time menu starts automatically when the photometer is switched on the next time.

Method notes

- Prior to measurement ensure that the sample is suitable for analysis (no major interference) and does not require any preparation i.e. pH adjustment, filtration etc.
- Different Refill Packs available on request.
- Reagents are designed for use in chemical analysis only and should be kept well out of the reach of children.
- Ensure proper disposal of reagent solutions.
- Material Safety Data Sheets: available on request.
(Internet: www.lovibond.com)

Chemical method notes:

Method:

The organic material present in the sample is oxidised by a standard amount of a potassium dichromate oxidising mixture. After oxidation is complete, the excess of this reagent is measured photometrically.

Application:

Samples can be measured if the chloride content does not exceed 1000 mg/l (LR/MR) or 10 000 mg/l (HR).

In exceptional cases, compounds contained in the water cannot be oxidized adequate. This results in minimum findings, compared with the reference method.

Different methods of sampling, preparation of the sample itself and the time elapsed between taking the sample and analysis can all affect the obtained results.

COD vario

Select the appropriate vial for the desired range:

Reagent	Form of reagent/Quantity	Order-No.
CSB VARIO LR 0 - 150 mg/l	1 Set (25 tests)	2420720
CSB VARIO MR 0 - 1500 mg/l	1 Set (25 tests)	2420721
CSB VARIO HR 0 - 15000 mg/l	1 Set (25 tests)	2420722

Preparing the Sample

Open a reaction vial with a white cap and add the specified volume.
(Ensure that appropriate personnel safety equipment is used.)

LR-/MR: 2 ml water sample

HR: 0.2 ml water sample

Prepare a **blank** (Note 1) by using deionised water (TOC-free) instead of the sample (LR/MR: 2 ml, HR: 0.2 ml).

Replace the cap **tightly**. Invert the vial gently several times to mix the contents (**The vial will become hot during mixing!**) and digest the vials for **120 minutes** in the reactor at a temperature of **150°C**. Remove the vials from the reactor and allow them to cool down to 60°C or less. Mix the contents by inverting each vial several times while still warm. Then allow the vials to cool to ambient temperature before measuring.



Measurement

Fix the adapter for 16 mm vials on the sample chamber.



RANGE



Switch the unit on using the [ON/OFF] key.

The display shows the following:


Select the required test using the [MODE] key.

Scroll Memory (SM)

To avoid unnecessary scrolling for the required test range, the instrument memorizes the last range used before being switched off. When the instrument is switched on again, the scroll list comes up with the last used test range first.

RANGE

The display shows the following:

Place the **blank** in the adapter (Note 1–4) making sure that the marks  are aligned.

Blanks are specially prepared for each individual test range.



RANGE

Press the [ZERO/TEST] key.

The "Range" symbol flashes for approx. 8 seconds.

0.0.0

The display shows the following:

After zeroing remove the vial from the adapter.

Place the **sample** in the adapter (Note 2–4) making sure that the marks \times are aligned.

Press the [ZERO/TEST] key.

The "Range" symbol flashes for approx. 3 seconds.

The result appears in the display.

LR-/MR-range: in mg/l

HR-range: in g/l

The result is saved automatically.

Tolerance: $\pm 3.5 \%$ (full scale)

Repeating the test:

Press the [ZERO/TEST] key again.

New zero calibration:

Press the [ZERO/TEST] key for 2 seconds.

Guidelines for photometric measurements

1. Run samples and blanks with the same batch of vials.
The blank is stable when stored in the dark and can be used for further measurements with vials from the same batch.
2. Don't place hot vials in the adapter. Allow the vials to cool to room temperature for minimum 45 minutes. It is recommended to leave the vials to cool over night.
3. Suspended solids in the vial lead to incorrect measurements. For this reason it is important to place the vials carefully in the adapter. The precipitant at the bottom of the sample should not be suspended.
4. Clean the outside of the vials with a towel to remove fingerprints or other marks.
5. Avoid spillage of water or reagent solution into the sample chamber because this can lead to incorrect test results.
6. Contamination of the transparent cell chamber can result in wrong readings. Check at regular intervals and – if necessary – clean the transparent cell chamber using a moist cloth or cotton buds.
7. Large temperature differences between the instrument and the environment can lead to errors – e.g. due to the formation of condensation in the cell chamber or on the vial.
8. To avoid errors caused by stray light do not use the instrument in bright sunlight.

Menu selections

Press the [MODE] key and **hold**.

Switch the unit on using the [ON/OFF] key.

Allow the 3 decimal points to be displayed before releasing the [MODE] key.

The [!] key allows for selection of the following menu points:

- ▲ diS recall stored data
- ▲ Prt printing stored data
- ▲ ▼ setting the date and time
- ▼ user calibration

The selected menu is indicated by an arrow in the display.



▲ diS – Recall of stored data

After confirming the selection with the [MODE] key the photometer shows the last 16 data sets in the following format (automatically proceeds every 3 seconds until result is displayed):

Number n xx (xx: 16...1)
 Year YYYY (e.g. 2014)
 Date mm.dd (month:month:day:day)
 Time hh:mm (hour:hour:minute:minute)
 Range Range
 Result x,xx

The [ZERO/TEST] key repeats the current data set.

The [MODE] key scrolls through all stored data sets.

Quit the menu by pressing [!] key.

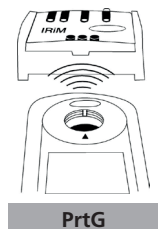


▲ Prt – Transmitting stored data (to Printer or PC)

Note: To print data, or to transmit to a PC, the optional IRiM (Infrared Interface Module) is required.

The IRiM Module and the connected printer/PC must be ready. Press the [MODE] key to start the transmitting, the instrument displays "PrtG" (Printing) for approx. 1 second followed by the number of the first data set and its transmission. All data sets will be transmitted one after the other. After finishing the instrument switches to test mode.

The print job can be cancelled by pressing the [On/Off] key. The instrument switches off.



E 132

If the instrument is not able to communicate with the IRiM, a timeout occurs after approx. 2 minutes. The error E 132 is displayed for approx. 4 seconds. Subsequently, the instrument switches to test mode (see also IRiM manual).



Mode

SET

DATE

YYYY

(2 sec.)

Mode

Zero
Test

!

2 3 Setting date and time (24-hour-format)

After confirming the selection with the [MODE] key the value to be edited will be shown for 2 sec.

The setting starts with the year (YYYY) followed by the actual value to be edited. The same applies for month (mm), day (dd), hour (hh) and minutes (mm). Set the minutes first in steps of 10, press the [!] key to continue setting the minutes in steps of 1.

Increase the value by pressing the [MODE] key.

Decrease the value by pressing [ZERO/TEST] key.

Proceed to the next value to be edited by pressing [!] key.

After setting the minutes and pressing the [!] key the display will show "IS SET" and the instrument returns to the measurement mode.



4 User calibration

Note:

user calibration (Display in calibration mode)

factory calibration (Display in calibration mode)

CAL

CAL

CAL

LR

After confirming the selection with the [MODE] key the instrument will show CAL/LR.

Scroll through ranges using the [MODE] key.

Place the **blank** in the adapter making sure that the marks \times are aligned.

Press the [ZERO/TEST] key.

The "Range" symbol flashes for approx. 8 seconds.

The display shows the following in alternating mode:

Perform measurement with a standard of known concentration as described.

Press the [ZERO/TEST] key.

The "Range" symbol flashes for approx. 3 seconds.

Zero
Test

≡ RANGE ≡




0.0.0

CAL

Zero
Test

≡ RANGE ≡

Calibration Mode

RESULT	The result is shown in the display, alternating with CAL.
CAL	If the reading corresponds with the value of the calibration standard (within the specified tolerance), exit calibration mode by pressing the [ON/OFF] key.
	Changing the displayed value: Pressing the [MODE] key once increases the displayed value by 1 digit.
	Pressing the [ZERO/TEST] key once decreases the displayed value by 1 digit.
CAL	Press the corresponding key until the reading equals the value of the calibration standard.
RESULT + x	By pressing the [ON/OFF] key, the new correction factor is calculated and stored in the user calibration software.
	
: :	Confirmation of calibration (3 seconds).

Note: The instrument calibration in the range MR is automatically taken also for HR.

Factory calibration reset

Resetting the user calibration to the original factory calibration will reset all methods and ranges.

A user calibrated method is indicated by an arrow while the test result is displayed.

To reset the calibration press both the [MODE] and [ZERO/TEST] key and **hold**.

Switch the unit on using the [ON/OFF] key.

Release the [MODE] and [ZERO/TEST] keys after approx. 1 second.

The following messages will appear in turn on the display:



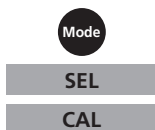
The factory setting is active.
(SEL stands for Select)

or:



Calibration has been set by the user.

(If the user calibration is to be retained, switch the unit off using the [ON/OFF] key).



Calibration is reset to the factory setting by pressing the [MODE] key.

The following messages will appear in turn on the display:



Switch the unit off using the [ON/OFF] key.

Technical Data

Instrument	double wavelength, automatic wavelength selection, direct reading colorimeter
Light source:	LEDs, interference filters (IF) and photosensor in transparent cell chamber. Wavelength specifications of the IF: 430 nm $\Delta \lambda = 5 \text{ nm}$ 610 nm $\Delta \lambda = 6 \text{ nm}$
Wavelength accuracy	$\pm 1 \text{ nm}$
Photometric accuracy*	3% FS (T = 20° C – 25° C)
Photometric resolution	0.01 A
Power supply	4 batteries (AAA/LR 03)
Operating time	17hr operating time or 5000 test measurements in continuous mode when display backlight is off
Auto-OFF	automatic switch off 10 minutes after last keypress
Display	backlit LCD (on keypress)
Storage	internal ring memory for 16 data sets
Serial Interface	IR interface for data transfer
Time	real time clock und date
Calibration	user and factory calibration resetting to factory calibration possible
Dimensions	155 x 75 x 35 mm (LxWxH)
Weight	approx. 260 g (incl. batteries)
Ambient conditions	temperature: 5–40°C rel. humidity: 30–90 % (non-condensing)
Waterproof	floating; as defined in IP 68 (1 hour at 0.1 meter)
CE	Certificate for Declaration of CE-Conformity at www.lovibond.com

**measured with standard solutions*

To ensure maximum accuracy of test results, always use the reagent systems supplied by the instrument manufacturer.

Operating messages

Hi

Measuring range exceeded or excessive turbidity.

Lo

Result below the lowest limit of the measuring range.



Replace batteries, no further tests possible.

btLo

Battery capacity is too low for the display backlight;
measurement is still possible.

Store Date
Cal Cal
Time Cal
RESULT ▼

A user calibrated method is indicated by an arrow while the test result is displayed (see "Factory calibration reset").

Error codes

E27 / E28 / E29

Light absorption too great. Reasons: e.g. dirty optics.

E 10 / E 11

Calibration factor "out of range"

E 20 / E 21

Too much light reaching the detector.

E23 / E24 / E25

Too much light reaching the detector.

E 22

Battery capacity was too low during measurement. Change battery.

E 70

LR: Factory calibration incorrect / erased

E 71

LR: User calibration incorrect / erased

E 72

MR: Factory calibration incorrect / erased

E 73

MR: User calibration incorrect / erased

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