Lovibond® Water Testing

Tintometer® Group

Photometer-System MD100



Cl Powder • pH

GB **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 productor: **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

⚠ CAUTION ⚠

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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GB General notes

Guidelines for photometric measurements

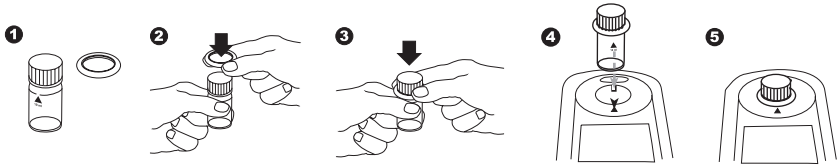
1. Vials, caps and stirring rods should be cleaned thoroughly **after each analysis** to prevent interference. Even minor reagent residues can cause errors in the test result.
2. The outside of the vial must be clean and dry before starting the analysis. Clean the outside of the vials with a towel to remove fingerprints or other marks.
3. Zero calibration and test must be carried out with the same vial as there may be slight differences in optical performance between vials.
4. The vials must be positioned in the sample chamber for zeroing and test with the Δ mark on the vial aligned with the ∇ mark on the instrument.
5. Always perform zeroing and test with the vial cap tightly closed. Only use the cap with a sealing ring.
6. Bubbles on the inside wall of the vial lead to incorrect measurements. To prevent this, remove the bubbles by swirling the vial before performing the test.
7. Avoid spillage of water into the sample chamber because this can lead to incorrect test results.
8. 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.
9. 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.
10. To avoid errors caused by stray light do not use the instrument in bright sunlight.
11. The reagents must be added in the correct sequence.

Method notes

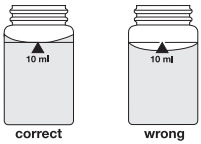
- Prior to measurement ensure that the sample is suitable for analysis (no major interferences) and does not require any preparation i.e. pH adjustment, filtration etc.
- Different Refill Packs available on request.
- Reagents are designed for use in chemical analysis only and should be kept well out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

GB General notes

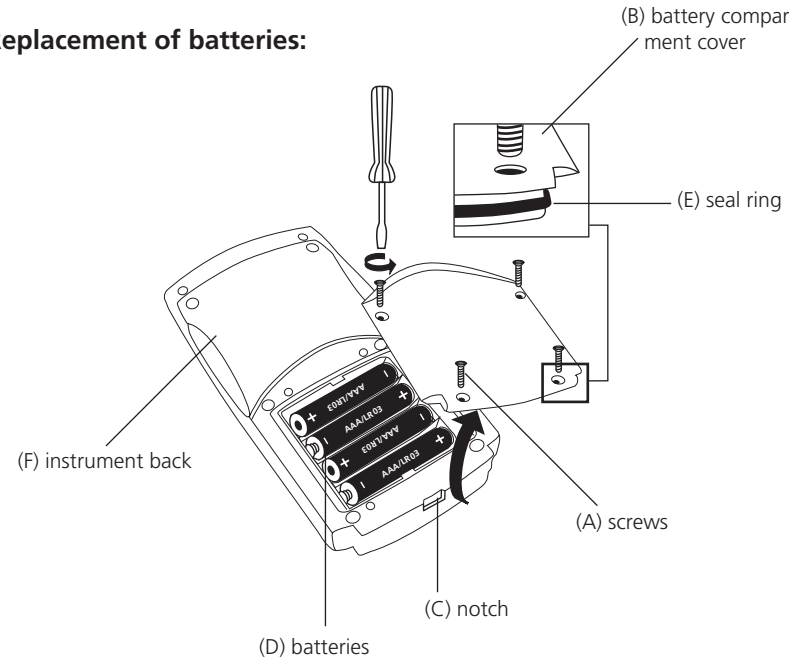
Correct position of the vial (Ø 24 mm):



Correct filling of the vial:



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.

Operation

On/Off

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

METHOD

The display shows the following:

Mode

Select the required test using the [MODE] key.

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

METHOD

The display shows the following:

Fill a clean vial with the water sample up to the 10 ml mark, screw the cap on and place the vial in the sample chamber making sure that the ⧖ marks are aligned.

Zero/Test

Press the [ZERO/TEST] key.

METHOD

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

0.0.0

The display shows the following:

After zero calibration is completed, remove the vial from the sample chamber. The characteristic coloration appears after the addition of the reagents.

Replace the cap on the vial and place in the sample chamber making sure that the ⧖ marks are aligned.

Zero/Test

Press the [ZERO/TEST] key.
(For Countdown/reaction period see page 27)

METHOD

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

RESULT

The result appears in the display.

The result is saved automatically.

Repeating the test:

Zero/Test

Press the [ZERO/TEST] key again.

Repeating the zero:

Zero/Test

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

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.

Countdown / reaction period

If a reaction period is included in a method a countdown function can be used:



Press the [!] key and hold.
Press the [ZERO/TEST] key.
Release the [!] key; the countdown starts.
After the countdown is finished the measurement starts automatically.

It is possible to interrupt the countdown by pressing the [ZERO/TEST] key. Measurement starts immediately.

Caution:
An incomplete reaction period can lead to incorrect test results.

CL 2
Tablet Powder

Chlorine with VARIO Powder Pack 0.02 – 2.0 mg/l

a) free Chlorine

0.0.0
Tablet Powder

Fill a clean vial (24 mm Ø) with **10 ml of the water sample** and perform zero calibration (see "Operation").

Remove the vial from the sample chamber.

Add the contents of **one VARIO Chlorine Free-DPD/F10 Powder Pack** straight from the foil into the water sample.

Close the vial tightly with the cap and invert several times to mix the contents (20 sec.).

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.

Zero Test

Press the [ZERO/TEST] key.

CL 2
Tablet Powder

The method symbol flashes for approx. 3 seconds.

RESULT
Tablet Powder

The result is shown in the display in mg/l free Chlorine.

b) total Chlorine

Remove the vial from the sample chamber.

Rinse the vial and the cap several times and then fill the vial with 10 ml of water sample (Note 2 and 3).

Add the contents of **one VARIO Chlorine Total-DPD/F10 Powder Pack** straight from the foil into the water sample.

Close the vial tightly with the cap and invert several times to mix the contents (20 sec.).

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.

! Zero Test

Wait for a reaction period of 3 minutes.
(Countdown can be activated, see page 27)

CL 2
Tablet Powder

The method symbol flashes for approx. 3 seconds.

RESULT
Tablet Powder

The result is shown in the display in mg/l total Chlorine.

c) combined Chlorine

combined Chlorine = total Chlorine – free Chlorine

Tolerances:

0 – 1 mg/l: ± 0.05 mg/l
> 1 – 2 mg/l: ± 0.10 mg/l

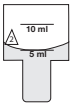
Notes:

1. Vial cleaning:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, the subsequent determination of Chlorine may show lower results. To avoid any measurement errors, only use glassware free of Chlorine demand.
   Preparation: Put all applicable glassware into Sodium hypochlorite solution (0.1 g/l) for one hour, then rinse all glassware thoroughly with deionised water.
2. For individual testing of free and total Chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3).
3. Do not use the same sample vial for free and total chlorine without thoroughly rinsing the vial between the two different tests.
4. Preparing the sample:
   When preparing the sample, the lost of Chlorine, e.g. by pipetting or shaking, must be avoided. The analysis must take place immediately after taking the sample.
5. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment.
   Strong alkaline or acidic water samples must be adjusted between pH 6 and pH 7 before the reagent is added (use 0.5 mol/l Sulfuric acid resp. 1 mol/l Sodium hydroxide).
6. Exceeding the measuring range:
   Concentrations above 2 mg/l Chlorine can lead to results showing 0 mg/l. In this case, the water sample must be diluted with water free of Chlorine and the measurement repeated.
7. Oxidising agents such as Bromine, Ozone etc. interfere as they react in the same way as Chlorine.

Reagent	Form of reagent/Quantity	Order-No.
VARIO Clorine Free-DPD/F10	Powder Pack / 100	530100
VARIO Chlorine Total-DPD/F10	Powder Pack / 100	530120

CL 8
Tablet Powder

Chlorine with VARIO Powder Pack (plastic vial type 2, ⊔ 10 mm) 0.1 – 8.0 mg/l



0.0.0
Tablet Powder

a) free Chlorine

Fill a clean vial (10 mm ⊔) with **5 ml of the water sample** and perform zero calibration (see "Operation").

Add the contents of **two VARIO Chlorine Free-DPD/F10 Powder Pack** straight from the foil into the water sample.

Close the vial tightly with the cap and invert several times to mix the contents (20 sec.).

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.

Zero Test

Press the [ZERO/TEST] key.

CL 8
Tablet Powder

The method symbol flashes for approx. 3 seconds.

RESULT
Tablet Powder

The result is shown in the display in mg/l free Chlorine.

b) total Chlorine

0.0.0
Tablet Powder

Fill a clean vial (10 mm ⊔) with **5 ml of the water sample** and perform zero calibration (see "Operation").

Add the contents of two **VARIO Chlorine Total-DPD/F10 Powder Pack** straight from the foil into the water sample.

Close the vial tightly with the cap and invert several times to mix the contents (20 sec.).

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.

Wait for a reaction period of 3 – 6 minutes.

Zero Test

Press the [ZERO/TEST] key.

CL 8
Tablet Powder

The method symbol flashes for approx. 3 seconds.

RESULT
Tablet Powder

The result is shown in the display in mg/l total Chlorine.

c) combined Chlorine

combined Chlorine = total Chlorine – free Chlorine

Tolerances:

2 – 3 mg/l: ± 0.2 mg/l
> 3 – 4 mg/l: ± 0.3 mg/l
> 4 – 8 mg/l: ± 0.4 mg/l

Notes:

1. Vial cleaning:
   As many household cleaners (e.g. dishwasher detergent) contain reducing substances, the subsequent determination of Chlorine may show lower results. To avoid any measurement errors, only use glassware free of Chlorine demand.
   Preparation: Put all applicable glassware into Sodium hypochlorite solution (0.1 g/l) for one hour, then rinse all glassware thoroughly with deionised water.
2. For individual testing of free and total Chlorine, the use of different sets of glassware is recommended (EN ISO 7393-2, 5.3)
3. Do not use the same sample vial for free and total chlorine without thoroughly rinsing the vial betweeen the two different tests.
4. Preparing the sample:
   When preparing the sample, the lost of Chlorine, e.g. by pipetting or shaking, must be avoided. The analysis must take place immediately after taking the sample.
5. The DPD colour development is carried out at a pH value of 6.2 to 6.5. The reagents therefore contain a buffer for the pH adjustment.
   Strong alkaline or acidic water samples must be adjusted between pH 6 and pH 7 before the reagent is added (use 0.5 mol/l Sulfuric acid resp. 1 mol/l Sodium hydroxide).
6. Concentrations above 8 mg/l Chlorine can lead to results showing 0 mg/l. In this case, the water sample must be diluted with water free of Chlorine and the measurement repeated.
7. If chlorine is at concentrations under 2 mg/l the 0.02 - 2 mg/l measure range would be used (CL 2).
8. Oxidising agents such as Bromine, Ozone etc. interfere as they react in the same way as Chlorine.

Reagent	Form of reagent/Quantity	Order-No.
VARIO Clorine Free-DPD/F10	Powder Pack / 100	530100
VARIO Chlorine Total-DPD/F10	Powder Pack / 100	530120



pH-value with Tablet
6.5 – 8.4

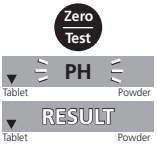


Fill a clean vial (24 mm Ø) with **10 ml of the water sample** and perform zero calibration (see "Operation").

Add **one PHENOL RED PHOTOMETER tablet** straight from the foil to the 10 ml water sample and crush the tablet using a clean stirring rod.

Close the vial tightly with the cap and swirl gently several times until the tablet is dissolved.

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.



Press the [ZERO/TEST] key.

The method symbol flashes for approx. 3 seconds.

The result is shown in the display as pH-value.

Tolerance: ± 0.1 pH

Notes:

1. For photometric determination of pH-values only use PHENOL RED tablets in black printed foil pack and marked with PHOTOMETER.
2. Water samples with low values of Alkalinity-m (below 35 mg/l $CaCO_3$) may give wrong pH readings.
3. pH-values below 6.5 and above 8.4 can produce results inside the measuring range. A plausibility test (pH-meter) is recommended.
4. The accuracy of the colorimetric determination of pH-values depends on various boundary conditions (buffer capacity of the sample, salt contents etc.).
5. Salt error
   Correction of test results (average values) for samples with salt contents of:

Indicator	Salt contents		
Phenol red	1 molar – 0.21	2 molar – 0.26	3 molar – 0.29

The values of Parson and Douglas (1926) are based on the use of Clark and Lubs buffers.
1 Mol NaCl = 58.4 g/l = 5.8 %

Reagent	Form of reagent/Quantity	Order-No.
PHENOL RED PHOTOMETER	Tablet / 100	511770BT



pH-value with liquid reagent
6.5 – 8.4



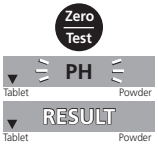
Fill a clean vial (24 mm Ø) with **10 ml of the water sample** and perform zero calibration (see "Operation").

Fill the vial with drops of the same size by holding the bottle vertically and squeeze slowly:

6 drops of PHENOL RED solution.

Close the vial tightly with the cap and invert several times to mix the contents.

Place the vial in the sample chamber making sure that the ⧖ marks are aligned.



Press the [ZERO/TEST] key.

The method symbol flashes for approx. 3 seconds.

The result is shown in the display as pH-value.

Tolerance: ± 0.2 pH

Notes:

1. When testing chlorinated water the residual chlorine contents can influence the colour reaction of the liquid reagent. This can be avoided (without interfering with the pH measurement) by adding a small crystal of Sodiumthiosulfate ($Na_2S_2O_3 \cdot 5\ H_2O$) to the sample before adding the PHENOL RED solution. PHENOL RED tablets already contain Thiosulfate.
2. Due to differing drop sizes results can show a discrepancy in accuracy by comparison with tablets. This can be minimised by using a pipette (0.18 ml PHENOL RED solution is equivalent to 6 drops).
3. After use replace the bottle cap securely.
4. **Store the reagent in a cool, dry place ideally between 6 °C and 10 °C.**

Reagent	Form of reagent/Quantity	Order-No.
PHENOL RED solution	Liquid reagent / 15 ml	471040

Menu selections

Mode

On/Off

!

Store Print 1 Cal | Date Time 2

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:

- 1 diS recall stored data
- 1 Prt printing stored data
- 2 setting the date and time
- Cal user calibration

Store Print 1 diS | Date Time

1 diS – Recall of stored data

Mode

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 (monthmonth:dayday)
Time	hh:mm (hourhour:minuteminute)
Test	Method
Result	x,xx

Zero/Test

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

Mode

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

!

Quit the menu by pressing [!] key.

Store Print 1 Prt | Date Time

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



PrtG

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.

On/Off

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

If the instrument is not able to communicate with the IRiM, a timeout

E 132

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).



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

Mode

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

SET
DATE
YYYY
(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.

Mode

Increase the value by pressing the [MODE] key.

Zero Test

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.



Cal User calibration

Note:

cAL

user calibration (Display in calibration mode)

CAL

factory calibration (Display in calibration mode)

CAL
METHOD

After confirming the selection with the [MODE] key the instrument will show CAL/"Method".
Scroll through methods using the [MODE] key.

Fill a clean vial with the standard up to the 10 ml mark, screw the cap on and place the vial in the sample chamber making sure that the ⧖ marks are aligned.

Zero Test

Press the [ZERO/TEST] key.

METHOD

The method symbol flashes for approx. 8 seconds.

0.0.0

The display shows the following in alternating mode:

CAL

Perform calibration with a standard of known concentration (see "Operation").

Zero Test

Press the [ZERO/TEST] key.

METHOD

The method symbol flashes for approx. 3 seconds.

RESULT

CAL

The result is shown in the display, alternating with 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

RESULT + x

Press the corresponding key until the reading equals the value of the calibration standard.



By pressing the [ON/OFF] key, the new correction factor is calculated and stored in the user calibration software.

: :

Confirmation of calibration (3 seconds).

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 a "Cal" symbol 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: 530 nm $\Delta\lambda$ = 5 nm 560 nm $\Delta\lambda$ = 5 nm
Wavelength accuracy	± 1 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
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

Hı	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 Print Time Cal RESULT	A user calibrated method is indicated by a "Cal" symbol 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	CL 2:	Factory calibration incorrect / erased
E 71	CL 2:	User calibration incorrect / erased
E 72	CL 8:	Factory calibration incorrect / erased
E 73	CL 8:	User calibration incorrect / erased
E 74	pH:	Factory calibration incorrect / erased
E 75	pH:	User calibration incorrect / erased

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Technische Änderungen vorbehalten
Printed in Germany 07/16
No.: 00 38 62 50

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