DO8500

Portable Optical Dissolved Oxygen Meter

Instruction Manual

APERA INSTRUMENTS (Europe) GmbH

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v1.2

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1 Overview

Thank you for purchasing Apera Instruments DO8500 Portable Optical Dissolved Oxygen Meter. The DO8500 measures dissolved oxygen in water using luminescence technology through an optical sensor and displays data with intelligent instrumentation. Compared to conventional electrochemical dissolved oxygen meter, the DO8500 is more accurate and stable, and easier to use.

Before you use the instrument, please carefully read the instruction manual to help you properly perform tests and maintainenance.

1.1 Luminescent optical sensor.

- Stability and Accuracy: Oxygen is not consumed during measurements. It is not affected by sample flow rate and thus provides a stable measurement.
- Easy to Use: No electrolytes and membranes are present in the meter; no warm-up required; frequent calibration is not necessary.
- Interference-Free: Sensor cap is coated with a light-shielding layer and minimizes the impact from external light sources. The use of non-chemical sensors helps reduce a variety of heavy metal ions interference in the aqueous environment, along with H_2S and NH_4 and other chemical substances.
- Long service life. Other than mechanical deterioration (such as scratches to the light shielding layer), the sensor cap has up to 8000 hours of service life.
- Easy to calibrate and maintain. Probe is equipped with a calibration/storage sleeve, which makes calibration and maintenance more convenient and reliable.

1.2 Intelligent Instrumentation

- Built-in microprocessor chip, featured with Auto. Temperature Compensation, Auto. Air Pressure Compensation, Auto. Salinity Compensation and parameter setting, auto. power off, and low power indication.
- Meter meets with the requirement of international GLP standards, clock display, manual storage and automatic timing storage. USB data output.
- Stable reading and automatic locking modes available.
- Clear large-size LCD display with white backlight.
- Meets IP57 waterproof rating; In addition, a rugged instrument suitcase is provided.

Special Notes

- **Sensor cap surface coating can not withstand high temperatures, so the optical dissolved oxygen electrode can not test the water of more than 50 ℃.**
- **When the electrode is not in use, it should be kept in the storage sleeve, and keep the sponge in moist, so that the fluorescent cap will not dry out. If the sponge is dry out or the probe is exposed in dry air for more than 8 hours, soak the electrode in tap water for 24~48 hours (see article 4.2), otherwise it may cause unstable measurements or slow response.**
- **Before get readings or perform other operations, wait about 30 seconds after meter is powered on.**

2 **Technical Specifications**

Dissolved Oxygen	Dynamic Range	(0-20.00) mg/L (ppm), (0-200.0)%
	Resolution	0.01/0.1mg/L (ppm), 0.1/1%
	Accuracy	±2% reading or ±0.2 mg/L, whichever is greater ±2% reading or ±2% saturation, whichever is greater
	Response Time	≤30 s (25℃ , 90% response)
	Calibration Points	Saturation Point & Zero Oxygen
	Temperature Compensation	Automatic, (0 to 50)℃
	Pressure Compensation	Automatic, (60 to 120) kPa
	Salinity Compensation	Manual or automatic, (0 to 45) ppt
Temperature	Range	(0 to 50.0)℃
	Resolution	0.1 ℃
	Accuracy	±0.5℃
Other	Data Storage	500 groups (with time and date)
	Output	USB
	Batteries	AA x 3 (1.5V×3)
	IP Rating	IP57
	Dimensions and Weight	Meter: 88×170×33 mm/313g With case: 360×270×76 mm/1.3kg
	Product Certificate	RoHs, CE & ISO9001:2015

3 Instructions

3.1 LCD Screen

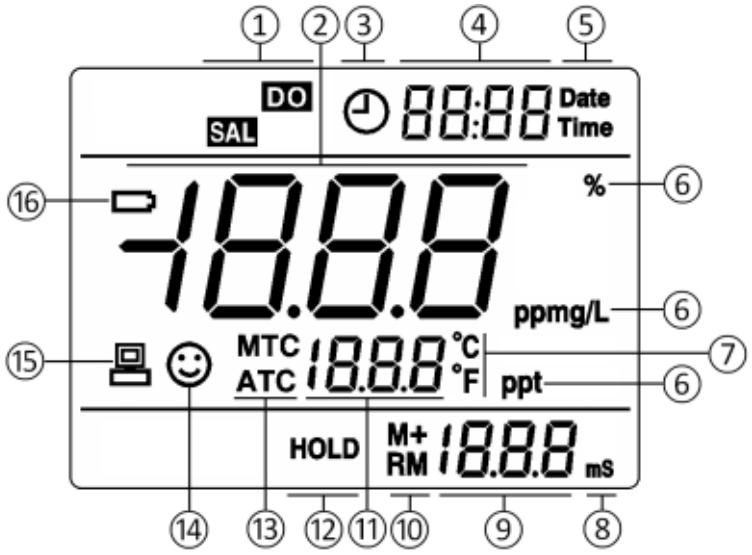


Fig.-1

①	Measurement mode	⑨	Serial number of storage and prompts of special display mode
②	Reading/Measured Value	⑩	M+ — Measurement to be stored RM — Reading to be recalled
③	Timing storage	⑪	Temperature value and prompts of special display mode
④	Date.time and prompts of special display mode	⑫	Automatic reading lock-up
⑤	Units of date and time	⑬	ATC—Auto temperature compensation MTC—Manual temperature compensation
⑥	Units of measurement	⑭	Stability icon of readings
⑦	Units of temperature	⑮	USB communication
⑧	Units during calibration	⑯	Low power indication

3.2 Key Operation

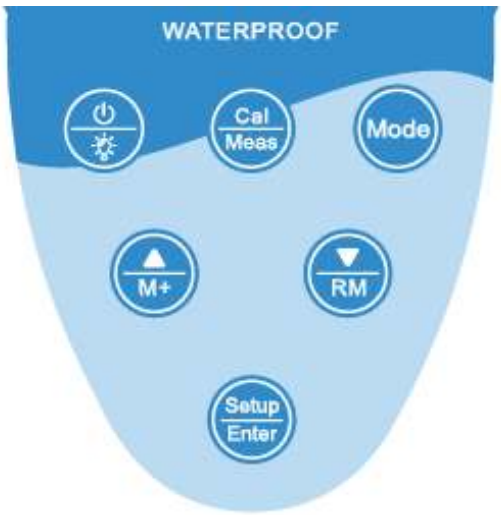


Fig.-2

Short press: key press time < 2 s; Long press: key press time> 2 s.

Power on: Press to turn on. Shutdown: long press 2 seconds off.

First time use: see parameter setting P4.7 & P4.8 to set correct date and time (as Clause 8.3)

Special notes: Before get readings or do other operations, wait about 30 seconds after meter powered on.

Table - 1 Key operation and functions

Key	Operation	Functions
	Short Press	● When powered off, press the key to power on ● In measurement mode: press to turn backlight on or off
	Long Press	● Press and hold for 2 seconds to turn off
Mode	Short Press	● In measurement mode: press the key to switch unit: %→mg/L or %→ppm
Cal Meas	Long Press	● In the measurement mode: press the key for 2 seconds to enter the calibration mode
	Short Press	● To cancel any operation, press to return to measurement mode
Setup Enter	Short Press	● In measurement mode: press to enter menu mode; ● In calibration mode: press key to calibrate; ● In the menu mode: press key to confirm the parameter.
M+ RM	Short Press or Long Press	● In measurement mode: press M+ key to change the serial number or press RM to recall the measurement value. ● In recall mode(RM), short press to change serial number of stored measurement value, or long press to conduct rapidly change; ● In the menu mode:press the key to change the serial number or select the parameter

3.3 Batteries

The instrument uses three AA alkaline batteries. Battery life > 200 hours (without backlight). When the display shows symbol as shown in Figure-3, replace the battery.

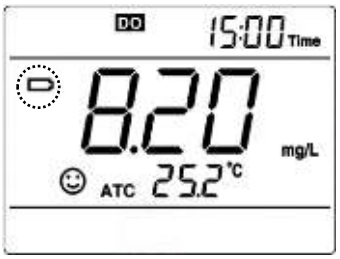


Fig.-3

3.4 Instrument Socket

The instrument socket protected by grey rubber sealing cap, as shown in Figure-4.

Eight-pin socket (right) - connect DO electrode. When inserting the probe plug, please insert it after the notch position, and tighten the plug nut. The end face of the socket and the plug connection has the sealing ring, which can effectively maintain the waterproof protection of the socket.

BNC socket (left) - connect salinity electrode

RCA socket (middle) - connect temperature probe

Fig.-4

3.5 Display mode

3.5.1 Main Display Screen

If the salinity probe is not connected or salinity is lower than 1ppt, only the DO value and temp value will be displayed on the LCD screen as shown in Figure-5, DO value: 8.18mg/L; temp. value: 25.2℃.

Fig.-5

When salinity probe is connected and salinity is higher than 1ppt, salinity will be displayed on right bottom of the LCD screen, as shown in Figure-6,DO value: 6.97mg/L, Temp value: 25.2℃; Salinity: 32ppt, Press Mode key to switch beteen unit of mg/L→%. Or select unit of mg/L or ppm

in parameter setting P3.1, time displays on top right of LCD screen.

Fig.-6

3.5.2 Reading Stability Mode

When the measured value is stable, the LCD screen displays the icon ☺ as shown in Figure-7. If there is no ☺ icon or icon flashing, indicates that the measured value is not stable, the measured value should not be read or calibrated.

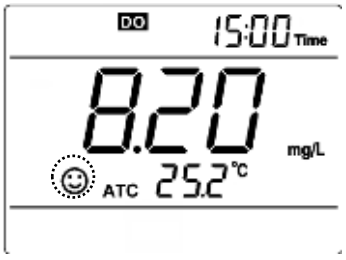


Fig.-7

3.5.3 Auto Lock Mode

In parameter setting P4.3 you can select the auto-lock mode (Off-On) , Select **On** to turn on automatic locking. When the reading is stable for more than 10 seconds, the meter automatically locks the measured value and displays the **HOLD** icon, as shown in Figure - 8.When auto locked, press Cal Meas to unlock. Select **Off** to turn off automatic locking.

Fig.-8

3.6 Data storage, recall, and clear.

3.6.1 Manual storage

When the measurement is stable, press M+ key, the meter will store measureent value, **M+** icon and storage serial number will be displayed on botton right of LCD sreen, as shown in Figure-9. First group of data was stored.If connect salinity probe, press M+ key, **M+** icon and storage serial number will be displayed for 2 seconds, then salinity displays on LCD screen continously. As shown in Figure-6

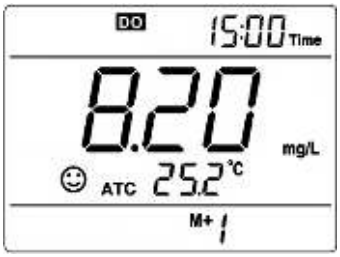


Fig.-9

3.6.2 Automatic timing storage

Set the storage timing (e.g. 3 minutes) from parameter P4.1, icon displays on LCD screen, the meter enters the timing storage mode. When press M+ key, icon flashes and the first measuring value is stored. After 3 minutes, the 2nd measuring value is stored automaticly. See Figure-10 the meter stores eight measuring values automatically. When press M+ key, icon stops flashing and the meter stops automatic storage. In automatic storage mode, manual storage does not work.

Set time 0 in parameter P4.1 to exit from the automatic storage mode.

Fig.-10

3.6.3 Recall stored value

In the measurement mode, press RM key to recall the last stored measured value. See Figure 11: Pressing M+ key or RM key to change the recalled measuring value. Press and hold M+ key or RM key to change the recalled measuring value quickly.

Fig.-11

3.6.4 Clear stored value

Select **YES** in parameter P4.4 to clear all stored value.

3.7 Backlighting

The Instruments LCD screen has a white backlight suitable for use in dimly lit environments. Turning on the backlight will consume more power. There`s two backlighting mode. **On** and **Off,** you can select in the parameter setting P4.5. Select **On**, press backlight will be on for a minute then automatically shuts off. Select **Off,** when the key is pressed, backlight will be on and will be off only when is pressed again.

3.8 Automatic Power-Off

In the parameter setting P4.6, you can set the auto power off function (On-Off), select **On** to turn on auto power off function, the instrument will shut down automatically if no operation within 20 minutes, select **Off** to disable this function.

4 Optical Dissolved Oxygen Probe

4.1 Probe Structure

The instruments DO803 optical dissolved oxygen probe has a cable length of 3m and a built-in temperature sensor for automatic temperature compensation. The electrode structure is as shown in Figure.-12

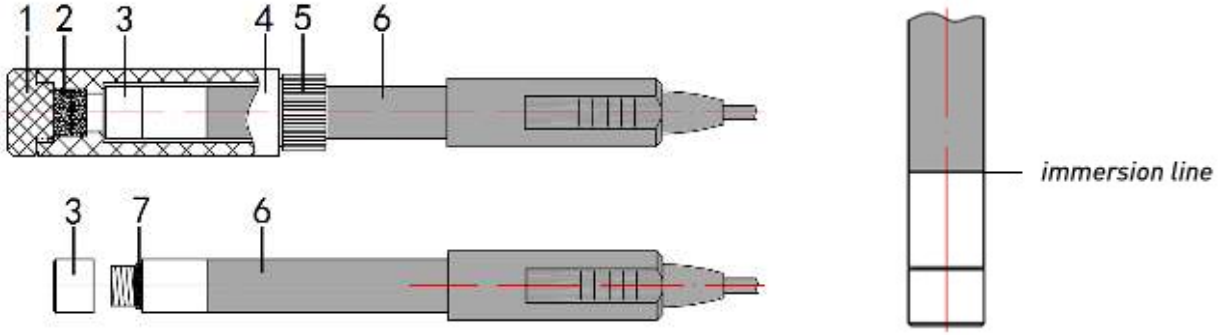


Fig.-12

1. Bottom cover of the calibration sleeve	5. Locking cap
2. Sponge for water storage	6. Optical DO electrode
3. Sensor cap	7. O ring
4. Calibration/Storage sleeve	Immersion line: The test sample should be above this line

4.2 Probe Maintenance

The sensor cap of the optical DO electrode must be kept in a moist environment. If the surface coating of the sensor cap dries out, the measured value will be unstable, or the response will be slow. The electrode calibration sleeve is used to store the probe.

(A) Short-term storage (less than 30 days): The probe head is kept in the calibration sleeve. Always keep the sponge inside the calibration sleeve wet. Several drops of clean water should be added to a dry sponge (let the sponge be saturated, but not dripping), and tighten the lock cap, so that the sensor cap is kept in the moist-saturated air.

(B) Long-term storage (greater than 30 days): The probe head is kept in the calibration sleeve. Check whether the water storage sponge is moist every 30 days or user can store the electrode in a beaker containing water.

(C) Before the first use, unscrew the calibration sleeve to check if the sponge is wet. If the sponge is dry or if the electrode is exposed to dry air for more than 8 hours, the surface coating of the sensor cap may be completely dry. So the electrode should be

immersed in tap water at room temperature 25℃ for 24 hours. If the water temperature is low, soaking time is 48-72 hours.

(D) The sponge can not be allowed to get stained or moldy, otherwise it will consume or produce oxygen. If stained or moldy, please replace it immediately.

4.3 Sensor Cap

(A) The sensor cap is an important part of the optical DO probe. The surface coating of the cap cannot be scratched or mechanically worn. Otherwise, the life of the sensor cap will be reduced or the probe will be damaged. Please pay special attention to it when using the probe.

(B) The surface coating of the sensor cap cannot withstand high temperatures, so the optical DO probe can not be tested in water above 50 ℃.

(C) If the surface of the sensor cap is contaminated, please do not use alcohol and organic solvents to clean, otherwise it may damage the probe. It can be gently wiped with a soft cloth or paper towels. To disinfect the probe, immerse it in 3% hydrogen peroxide for 15 to 30 minutes and then rinse off with water.

(D) The sensor cap has a service life of more than 8000 hours. When the probe is not being used, it does not "bleach" luminescence layer; in addition, the storage time will not reduce the life of the probe, so the actual use time of the sensor cap is far more than a year. The major factor affecting the service life of the sensor cap is the surface coating being damaged under external force. So the key is to protect the sensor cap from external damage.

(E) If the sensor cap is damaged or deteriorated, users need to purchase a new one. Every new cap has a set of calibration codes which need to be input into the instrument. The specific input method will be described in the instruction manual of sensor cap.

(F) The probe that comes with the instrument can be used directly without the input of the calibration codes. So users should not take off the sensor cap when it is not in use. Nor should one swap the caps from different instruments. When being installed, the sensor cap must be tightened, and the interior can not be contaminated or wet.

5 Preparation for Calibration

5.1 Dissolved Oxygen Units Selection

Dissolved oxygen units displays in two forms: mg / L and %, and ppm and %. Press Mode to switch between mg / L → %, or ppm → %. Users can choose mg / L or ppm in parameter setting P3.1, but only a percentage (DO%) is displayed in probe calibration.

5.2 Resolution Selection

The resolution unit can be selected in parameter setting P3.2: 0.01 or 0.1mg/L (ppm), After setting, the meter will display resolution of 0.1 or 1 in according to %.

5.3 Temperature Unit Selection

The temperature unit can be selected in parameter setting P4.2: ℃ or ℉.

5.4 Air Pressure Compensation

The instrument has automatic air pressure compensation function. The instrument has been performed the air pressure calibration before it leaves the factory. So generally users do not have to calibrate the air pressure. If necessary, calibrate it according to standard value measured by aneroid barometer. Refer to parameter setting P3.5 for the procedure of aneroid barometer calibration.

5.5 Salinity Compensation

Generally, salinity of freshwater is 0 to 0.5ppt, salinity of seawater is 35ppt. As the salinity of the solution increases, the level of DO decreases. Refer to parameter setting P3.3, for selection of auto salinity compensation or manual salinity compensation. If manual salinity compensation selected in P3.3, please enter the parameter setting P3.4 to input salinity value (see clause 5.5.1); if auto salinity compensation selected, should connect the salinity electrode, then conduct calibration in parameter setting P3.4 (see clause 5.5.2).

5.5.1 Manual salinity compensation (Hnd)

(A) In parameter setting P3.3, select manual salinity compensation
(Hnd). Operation refers to P3.3.

(B) In parameter setting P3.4, input salinity value (0~45ppt), Operation refers to P3.4.

(C) Connect DO electrode to conduct measurement.

5.5.2 Auto salinity compensation (Aut)

(A) Connect salinity electrode to meter;

(B) Switch parameter setting to P3.3, select auto salinity compensation (**Aut**), Operation refers to P3.3.

(C) Switch parameter setting to P3.4, press Setup/Enter to enter salinity calibration mode. Submerge the salinity electrode in 12.88mS/cm conductivity calibration solution, stir gently and allow it to stay in the calibration solution for a while. When the

Fig.-13

reading is stable and ☺ displays on the LCD, press Setup Enter key to calibrate, LCD displays correct salinity value (the calibration procedure refer to Figure –13). Press Cal Meas key to return to the measurement mode.

Special notes:

(A) Use 12.88mS/cm conductivity calibration solution to calibrate salinity. If the the standard solution is wrong, **Err** icon will be flashing at the bottom right of LCD if Setup Enter is pressed, indicating invalid calibration.

(B) Since salinity calibration is done by factory before delivery, so it is not necessary to perform salinity calibration during initial use. Only make salinity calibration when replace with a new electrode, or when the electrode is unused for a long time.

(C) For auto salinity compensation, salinity probe must be connected, As shown in figure-14. Users can fit DO probe and salinity probe together into the clip to measure simultaneously.

Fig.-14

6 Calibration

6.1 Saturated Oxygen Calibration

(A) This procedure requires the use of a calibration sleeve to allow the probe to be calibrated in a humidity-saturated atmosphere

(B) Check that the sponge in the calibration sleeve is wet. Attach the calibration sleeve to the probe. Tighten the locking cap. Be careful not to have water droplets on the head of the cap. Wait for 5 to 10 minutes after turning on the instrument. Saturate the air in the calibration sleeve with water vapor. In addition, wait for the temperature to completely stablize.

Long press the Cal Meas key to enter the calibration mode, and the CAL is flashing in the upper right corner of the LCD. Wait for the stable ☺ icon to appear and stay, press the key Setup Enter to calibrate, once the instrument displays a stable 100%, it is ready to use.

6.2 Zero-Oxygen Calibration

Zero-Oxygen calibration is only performed when a probe or sensor cap is replaced or the probe has not been used for a long period. It is usually not necessary to conduct zero oxygen calibration. Zero-Oxygen calibration is done by factory before shipment, so it is not necessary to perform a zero-oxygen calibration during initial use. Zero-oxygen calibration should follow these steps:

(A) Preparation of 100ml of oxygen-free water: in the 100ml beaker, weigh 2g anhydrous sodium sulfite (Na_2SO_3) and add 100ml of pure water or tap water to dissolve. Oxygen-free water is effective within 1 hour.

(B) Put the electrode into the oxygen-free water, wait for 3 to 5 minutes after the instrument is turned on, and wait for the temperature and measured value to completely stabilize. The measured value should be very low, 0.1mg / L or so.

(C) Long press Cal Meas to enter the calibration mode. The upper right corner of the LCD will flash **CAL**. Wait for a stable ☺ icon. Press Setup Enter and the zero-oxygen calibration is completed.

6.3 Special Notes for Calibration

(A) Please note that the closer the temperature of the sample solution to the calibration solution, the more accurate readings. So it is recommended that the oxygen saturation calibration to be performed according to section 6.1 before use every day.

(B) Drying of the surface coating of the sensor cap can adversely affect the stability of the measurement. Please pay special attention to this situation. See Section 4.2 (Probe Maintenance) for details.

(C) The instrument has factory default setting function, select YES in parameter setting P3.6, the meter will be calibrated to the theory value.

7 **Measurement**

7.1 When measuring, place the probe in sample solution, stir quickly in the solution for a few seconds and rest it to remove bubbles from the measuring surface of the sensor cap. The solution must be above the immersion line of the probe. Note that brief shaking the probe in solution is only to eliminate bubbles. Not like conventional electrochemical electrodes, the measuring via optical dissolved oxygen probes does not require constant stirring of the solution or flowing fluid.

7.2 Users can read the measured values when the icon ☺ appears and stays. Note that the measurement time is related to temperature. When the solution temperature and the probe temperature is close, it takes about one minute to get the readings stablized. When the solution temperature and the electrode temperature differ a lot, it takes about 3 minutes to reach a stable reading. This is because the reading of dissolved oxygen is heavily influenced by temperature, and the probe senses temperature much more slowly than dissolved oxygen.

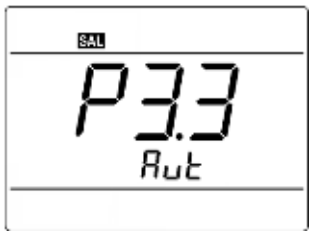
8 **Parameter Settings**

Press the Setup/Enter key in the measurement mode to enter the parameter setting mode P3.0, press the M+ key to switch the menu P3.0 →P4.0; In P3.0 mode, press Setup/Enter to enter P3.1, press M+ to switch submenu P3.1→P3.6; In P4.0 mode, press Setup/Enter to enter P4.1,press M+ to switch submenu P4.1→P4.8. See Table 2 for details.

Table-2 Parameter Setting List

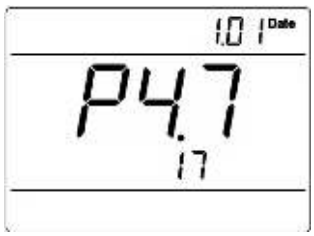
Menu	**Submenu**	**Parameter**	**Code**	**Content**
P3.0 DO parameter	P3.1	DO Units Selection	/	mg/L—ppm
	P3.2	Resolution Selection	/	0.01/0.1 mg/L(ppm)
	P3.3	Salinity Compensation Mode	/	Aut—Hnd
	P3.4	Salinity Compensation	/	(0 to 45) ppt
	P3.5	Air Pressure Calibration	AP	(60 to 120) kPa
	P3.6	Back to Factory Default	FS	**No—Yes**
P4.0 Basic parameter	P4.1	Timing Storage	/	**0:00**
	P4.2	Temp. Unit Selection	/	**℃—℉**
	P4.3	Auto Lock	/	**Off—On**
	P4.4	Clear Storage	CLr	**No—Yes**
	P4.5	Auto Backlight	bL	On—Off
	P4.6	Auto Power Off	AC	On—Off
	P4.7	Adjust Date	/	/
	P4.8	Adjust Time	/	/

DO Parameter setting (press M+ or RM to switch)

	P3.1—Dissolved Oxygen Unit (mg/L—ppm) 1. In P3.0 mode, press the Setup/Enter key to enter P3.1 mode. 2. Press the Setup/Enter key, **mg / L** flashes, press the M+ key to select mg/L → ppm, press Setup/Enter to confirm. 3. Press M+ to enter P3.2 mode, or press Cal/Meas to return to measurement mode.
	P3.2—Resolution (0.01-0.1mg/L) 1.Press the Setup/Enter key, **0.01** flashes, press the M+ key to select resolution (0.01-0.1mg/L), press Setup/Enter to confirm. 2. Press M+ to enter P3.3 mode, or press Cal/Meas to return to measurement mode.
	**P3.3—Salinity Compensation Mode** (Aut-Hnd) 1. Press the Setup/Enter key, **Aut** flashes.Press M+ to select auto salinity compensation (**Aut**) or manual salinity compensation(**Hnd**),Press Setup/Enter key to confirm. 2. Press M+ to enter P3.4 mode,or press Cal/Meas to return to measurement mode.
	P3.4—Salinity Compensation (0~45 ppt) 1. Press the Setup/Enter key to input salinity value, when manual salinity compensation selected in P3.3, operation refers to clause 5.5.1. 2. Press the Setup/Enter key to enter salinity calibration mode, when auto salinity compensation was selected in P3.3, operation refers to clause 5.5.2
	P3.5—Air Pressure Calibration (60 to 120 kPa) 1. Press the Setup/Enter key, **101.3** flashes, according to standard pressure value of aneroid barometer. Press M+ or RM key to adjust, Press Setup/Enter key to confirm. 2. Press M+ to enter P3.6 mode, or press Cal/Meas to return to measurement mode.
	P3.6—Back to Factory Default (No—Yes) Press Setup/Enter key, **No** flashes, Press M+ key to select **No** →**Yes**, Press Setup/Enter key to confirm. Meter returns to measurement mode. No—cancel restore. Yes—restore

Basic Parameter setting (press M+ or RM to switch)

	P4.1—Adjust timing storage time 1. In P4.0 mode, Press Setup Enter key to enter P4.1 mode. 2. Press Setup Enter key,"**00**" flashes, Press M+ or RM key to adjust minute (0~59); Press Setup Enter key,"**0**" flashes,Press M+ or RM to adjust hour (0~99), Press Setup Enter key to confirm; 3. Press M+ key to enter P4.2 mode, or Cal Meas key to return to measurement mode.
	P4.2— temperature unit (℃—℉) 1. Press Setup Enter key, ℃ flashes, Press M+ key to select ℃→℉, Press Setup Enter key to confirm. 2. Press M+ key to enter P4.3 mode, or Cal Meas key to return to measurement mode.
	P4.3—Auto Lock (Off—On) 1. Press Setup Enter key, **Off** flashes, Press M+ key to select Off→On, Press Setup Enter key to confirm. Off—turn off lock function; On—turn on lock function (If reading stays stable for more than 10 seconds, it auto locks). 2. Press M+ key to enter P4.4 mode, or Cal Meas key to return to measurement mode.
	P4.4. – Clear all the stored value （No—Yes） 1. Press Setup Enter key, " No " flashes, then press M+ key to select between No—Yes, press Setup Enter key to confirm No: not delete, Yes: delete. 2. After confirm the parameter, press M+ to enter in P4.5 mode or press Cal Meas key to return to the measurement mode.
	P4.5—Auto Backlight (On—Off) 1. Press Setup Enter key, **On** flashes, Press M+ key to select On→Off, Press Setup Enter key to confirm. On – turn on auto backlight off function, Off – turn off auto backlight off function. 2. Press M+ key to enter P4.6 mode, or press Cal Meas key to return to measurement mode.

	P4.6—Auto Power Off (On—Off) 1. Press Setup Enter key, **On** flashes，Press M+ key to select On→Off，press Setup Enter key to confirm. On—turn on auto power off function Off—turn off auto power off function. 2. Press M+ key to enter P4.7 mode, or press Cal Meas key to return to measurement mode.
	**P4.7. – Adjust date** 1. Press Setup Enter key, “Month” flashes, then press M+ key, “Date” flashes, then press Setup Enter key, “Year” flashes. When the number flashes, press M+ key or RM key to adjust date, then press Setup Enter key to confirm. 2. Press M+ key to enter in P4.8 mode or press Cal Meas key to return to the measurement mode.
	P4.8. – Adjust time 1. Press Setup Enter key, “15” flashes, then press Setup Enter key, “06” flashes. When the number flashes, press M+ key and RM key to adjust time, and then press Setup Enter to confirm. 2. After confirm the parameter, press Cal Meas key to to return to the measurement mode.

9 USB Communication

The meter uses “PC-Link” software with USB communication function. The port is USB.

Software interface (as shown in Figure – 15.)

① —Stored value display area

(a) Press “Download” to download the data from the meter to the computer, measuring date.time.value and temperature and so on.

(b) Connect meter to computer, then press M+ key, or set the timing sorage function, The measuring information will be displayed on the computer through USB, and will not be stored in the meter as shown in Figure – 15.

② — Mode and Serial Number

③ — Parameter setting information

④ — Port type and press key

The port number is software connected to computer, each computer recognizes different port number, as shown in Figure – 15, the port number is **COM3**.

Open/Close — press this key to turn on or off software, Icon indicates that software is activated.

Refresh — press this key to reset COM port to COM1

SyncTime — press this key to set time of meter same with computer.

Download — press this key to download the data from the meter to the computer,

Clear — press this key to clear all the stored value.

Export — press this key to export the stored value to Microsoft Excel file.

Exit — press this key, PC-Link program exists from the computer interface.

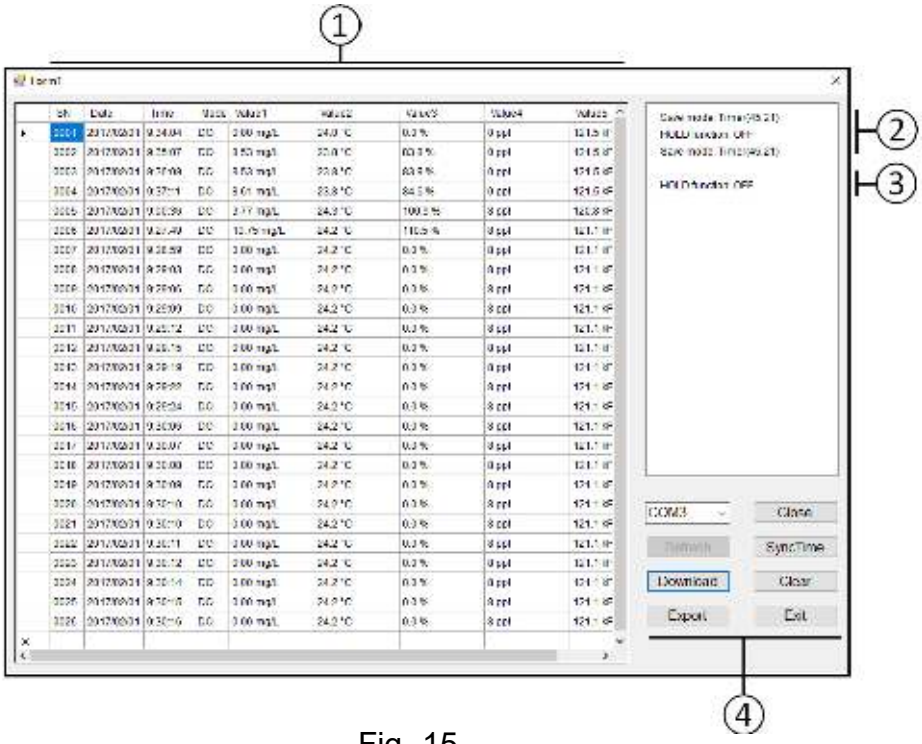


Fig.-15

9.2. Run software

Load PC-Link to the computer, open “PC-Link” file, which inclucing **PCLink** software file and **driver** Compressor file, Generally, open **PCLlink** file directly. If the meter can`t be connected to software, please install **USB driver** firstly.

9.3. Connection port selection

Connect USB cable to the meter and the computer, open **PC-Link** program, program interface shows in computure, press the arrow icon next to **COM1,** then pres **Open** key, LCD will displays , or please confirm the port number in “ device manager” of the computer.

9.4. Software operation

9.1.1 Upload the stored value

Press “**Download**” key, all the data stored in the meter is downloaded to the computer. The

data will be listed by category.

9.1.2 Storage during operation

(a) During operation, press M+ key to store or set timing storage. The measuring information is downloaded to the computer through USB and will not be stored in the meter.

(b) The stored mode and unit during operation is same as the data shown on the meter. press Mode to change.

9.1.3 Data processing

Press "**Export**" key to export the stored value to Microsoft Excel file and then analyze or print the stored data.

10 Complete Kit

10.1 What's in the box

	Content	Quantity
1.	DO8500 Portable Optical Dissolved Oxygen Meter	1
2	DO803 Optical Dissolved Oxygen Probe	1
3	Probe Calibration/storge sleeve	1
4	Conductivity Electrode 2301-3M	1
5	PC-Link Communication Software disk	1
6	USB Communication Cable	1
7	Combined electrode clip	1
8	Small Screwdriver	1
9	Carrying Case	1
10	Sponge for Water Storage (spare)	4
11	Instruction Manual	1

10.2 Accessories for separate purchase

Model	Name
DO803	Optical DO probe（3m cable，with sensor cap and calibration sleeve)
DO810	Optical DO probe（10m cable, with sensor cap and calibration sleeve)
DO8032	Sensor cap
DO8031	Calibration/Storage sleeve

11 Warranty

11.1 We warrant this instrument to be free from defects in material and workmanship and agree to repair or replace free of charge, at option of APERA INSTRUMENTS (Europe) GmbH, any malfunctioned or damaged product attributable to responsibility of APERA INSTRUMENTS (Europe) GmbH for a period of 3 YEARS from the date of purchase. That of DO803 optical DO probe (excluding sensor cap) is 2 years from the date of purchase. That of DO8032 sensor cap is 1 year from the date of purchase.

11.2 Damage and malfunction of the product caused by the following reasons are not covered by the warranty:

(A) Fails to install, operate, or use the product in accordance with the instruction manual, or if the product is damaged by abuse or incorrect use;
(B) The sensor cap is damaged by external force and can not work; or the electrode cable is damaged or twisted due to external force;
(C) Fails to maintain the product in accordance with the requirements of this manual and the industry standard process;
(D) Any unauthorized repairs, and the use of defective or incorrect components to repair the product;
(E) Any modification of the product unauthorized by the Company.

11.3 Product Warranty Period is the free of charge service time for the user who purchase the product, not the service life of the instrument or the probe.

12 Trouble Shooting

Error	Solutions
The instrument does not turn on	1. The battery is not installed correctly. Check the polarity. 2. Battery low voltage, replace the battery. 3. Instrument freezes. Unplug the battery and then install.
The instrument can not calibrate	1. Check calibration procedure: correct atmospheric pressure, salinity input and temperature. 2. The measured value is not stable, prolong the stabilization time, until the demonstration ☺ then presses the Setup Enter key. 3. Check the sensor cap. If it is contaminated, it can be cleaned; if dry, it can be hydrated; if damaged it can be replaced.
DO readings are not accurate	1.Check whether the temperature is stable, the salinity input and barometric pressure are accurate. 2. If the probe calibration is not good, recalibrate. 3. Check the sensor cap. If it is contaminated, it can be cleaned; if dry, it can be hydrated; if damaged it can be replaced. 4. Unscrew the sensor cap, check whether there is moisture inside, if so, wipe off, dry, and tighten it.
The display value stays 200% or 20.0 mg/L. No change	1. Check whether the concentration of the sample is higher than 200% or 20.0 mg / L (ppm). 2. Check if the temperature reading is accurate. 3. If the probe calibration is not good, recalibrate. 4. Check the sensor cap. If it is contaminated, it can be cleaned; if dry, it can be hydrated; if damaged, it can be replaced.

11 Appendix A: Oxygen Solubility Table (760mm Hg)

Temp °C	Chlority: 0 Salinity: 0	5.0 ppt 9.0 ppt	10.0 ppt 18.1 ppt	15.0 ppt 27.1 ppt	20.0 ppt 36.1 ppt	25.0 ppt 45.2 ppt
0.0	14.62	13.73	12.89	12.10	11.36	10.66
1.0	14.22	13.36	12.55	11.78	11.07	10.39
2.0	13.83	13.00	12.22	11.48	10.79	10.14
3.0	13.46	12.66	11.91	11.20	10.53	9.90
4.0	13.11	12.34	11.61	10.92	10.27	9.66
5.0	12.77	12.02	11.32	10.66	10.03	9.44
6.0	12.45	11.73	11.05	10.40	9.80	9.23
7.0	12.14	11.44	10.78	10.16	9.58	9.02
8.0	11.84	11.17	10.53	9.93	9.36	8.83
9.0	11.56	10.91	10.29	9.71	9.16	8.64
10.0	11.29	10.66	10.06	9.49	8.96	8.45
11.0	11.03	10.42	9.84	9.29	8.77	8.28
12.0	10.78	10.18	9.62	9.09	8.59	8.11
13.0	10.54	9.96	9.42	8.90	8.41	7.95
14.0	10.31	9.75	9.22	8.72	8.24	7.79
15.0	10.08	9.54	9.03	8.54	8.08	7.64
16.0	9.87	9.34	8.84	8.37	7.92	7.50
17.0	9.67	9.15	8.67	8.21	7.77	7.36
18.0	9.47	8.97	8.50	8.05	7.62	7.22
19.0	9.28	8.79	8.33	7.90	7.48	7.09
20.0	9.09	8.62	8.17	7.75	7.35	6.96
21.0	8.92	8.46	8.02	7.61	7.21	6.84
22.0	8.74	8.30	7.87	7.47	7.09	6.72
23.0	8.58	8.14	7.73	7.34	6.96	6.61
24.0	8.42	7.99	7.59	7.21	6.84	6.50
25.0	8.26	7.85	7.46	7.08	6.72	6.39
26.0	8.11	7.71	7.33	6.96	6.62	6.28
27.0	7.97	7.58	7.20	6.85	6.51	6.18
28.0	7.83	7.44	7.08	6.73	6.40	6.09
29.0	7.69	7.32	6.93	6.62	6.30	5.99
30.0	7.56	7.19	6.85	6.51	6.20	5.90
31.0	7.43	7.07	6.73	6.41	6.10	5.81
32.0	7.31	6.96	6.62	6.31	6.01	5.72
33.0	7.18	6.84	6.52	6.21	5.91	5.63
34.0	7.07	6.73	6.42	6.11	5.82	5.55
35.0	6.95	6.62	6.31	6.02	5.73	5.46
36.0	6.84	6.52	6.22	5.93	5.65	5.38
37.0	6.73	6.42	6.12	5.84	5.56	5.31
38.0	6.62	6.32	6.03	5.75	5.48	5.23
39.0	6.52	6.22	5.98	5.66	5.40	5.15
40.0	6.41	6.12	5.84	5.58	5.32	5.08
41.0	6.31	6.03	5.75	5.49	5.24	5.01
42.0	6.21	5.93	5.67	5.41	5.17	4.93
43.0	6.12	5.84	5.58	5.33	5.09	4.86
44.0	6.02	5.75	5.50	5.25	5.02	4.79
45.0	5.93	5.67	5.41	5.17	4.94	4.72

Salinity = Dissolved salts in water.

Chlorinity = Measure of chloride content, by mass, of water.

S (‰) = 1.80655 x Chlorinity (‰)

12 **Appendix B: DO % Calibration Values**

Cal. value	Pressure				Cal. value	Pressure			
D.O.	in Hg	mmHg	kPa	mbar	D.O.	in Hg	mmHg	kPa	mbar
101%	30.22	767.6	102.34	1023.38	86%	25.73	653.6	87.14	871.40
100%	29.92	760.0	101.33	1013.25	85%	25.43	646.0	86.13	861.26
99%	29.62	752.4	100.31	1003.12	84%	25.13	638.4	85.11	851.13
98%	29.32	744.8	99.30	992.99	83%	24.83	630.8	84.10	841.00
97%	29.02	737.2	98.29	982.85	82%	24.54	623.2	83.09	830.87
96%	28.72	729.6	97.27	972.72	81%	24.24	615.6	82.07	820.73
95%	28.43	722.0	96.26	962.59	80%	23.94	608.0	81.06	810.60
94%	28.13	714.4	95.25	952.46	79%	23.64	600.4	80.05	800.47
93%	27.83	706.8	94.23	942.32	78%	23.34	592.8	79.03	790.34
92%	27.53	699.2	93.22	932.19	77%	23.04	585.2	78.02	780.20
91%	27.23	691.6	92.21	922.06	76%	22.74	577.6	77.01	770.07
90%	26.93	684.0	91.19	911.93	75%	22.44	570.0	75.99	759.94
89%	26.63	676.4	90.18	901.79	74%	22.14	562.4	74.98	749.81
88%	26.33	668.8	89.17	891.66	73%	21.84	554.8	73.97	739.67
87%	26.03	661.2	88.15	881.53	72%	21.54	547.2	72.95	729.54

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