

OXY 7 Vio

%O₂ – mg/l – mbar - Temp

INSTRUCTIONS MANUAL

vio

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1. Introduction

XS Instruments, globally recognized as a leading brand in the field of electrochemical measurements, has developed this new line of portable instruments completely produced in Italy, finding the perfect balance between performance, attractive design and ease of use.

The robustness and integrity of the case, the integrated brightness sensor and the practical carrying case make this instrument ideal for measurements directly in the field.

Thanks to the triple power supply and the ability to manually change the contrast and brightness of the display, this instrument is also suitable for use in the laboratory.

The innovative high definition colour LCD display shows all the necessary information, such as the measurement, the temperature, the buffers used for the last calibration.

Everyone can use these tools thanks to the instructions that appear directly on the display. The calibration is guided step by step and the instrument configuration menu is easy to consult. In addition, a LED indicates the status of the system to the user.

Up to 2 calibration points can be carried out for the dissolved oxygen measurement with automatic recognition of values.

It is possible to consult the calibration data anytime and the representation makes the calibration process more efficient, through the icons of the buffers used.

2. Safety information

- **Definitions of warning words and symbols**

This manual contains extremely important safety information, in order to avoid personal injury, damage to the instrument, malfunctions or incorrect results due to failure to comply with them. Read entirely and carefully this manual and be sure to familiarize with the tool before starting to work with it.

This manual must be kept near to the instrument, so that the operator can consult it easily, if necessary.

Safety provisions are indicated with warning terms or symbols.

- **Reporting terms:**

ATTENTION for a medium-risk hazardous situation, which could lead to serious injury or death, if not avoided.

ATTENTION for a dangerous situation with reduced risk which can cause material damage, data loss or minor or medium-sized accidents, if not avoided.

WARNING for important information about the product

NOTE for useful information about the product

Warning symbols:



Attention

This symbol indicates a potential risk and warns you to proceed with caution.



Attention

This symbol draws attention to a possible danger **from electric current**.



Attention

The instrument must be used following the indications of the reference manual. Read the instructions carefully.



Advice

This symbol draws attention to possible damage to the instrument or instrumental parts.



Note

This symbol highlights further information and tips.



- **Additional documents for safety**

The following documents can provide the operator with additional information to work with the measuring system safely:

- operating manual for electrochemical sensors;
- safety data sheets for buffer solutions and other maintenance solutions (e.g. storage);
- specific notes on product safety.



- **Use according to destination**

This instrument is designed exclusively for electrochemical measurements both in the laboratory and directly in the field.

Pay attention to the technical specifications shown in the INSTRUMENT FEATURES / TECHNICAL DATA table; any other use is to be considered unauthorized.

This instrument has been manufactured and tested in compliance with EN 61010-1 safety standards relating to electronic instruments and has left the factory in perfect technical and safety conditions (see test report in each package).

The regular functionality of the device and the operator safety are guaranteed only if all the normal laboratory safety standards are respected and if all the specific safety measures described in this manual are observed.

- **Basic requirements for a safe use**



The regular functionality of the device and the operator safety are guaranteed only if all the following indications are respected:

- the instrument can be used in accordance with the specifications mentioned above only;
- use the supplied power supply only. If you need to replace the power supply, contact your local distributor;
- the instrument must operate exclusively in the environmental conditions indicated in this manual; no part of the instrument can be opened by the user. Do this only if explicitly authorized by the manufacturer.

- **Unauthorized use**



The instrument must not run, if:

- it is visibly damaged (for example due to transportation);
- it has been stored for a long period of time in adverse conditions (exposure to direct light, heat sources or places saturated by gas or vapours) or in environments with conditions different from those mentioned in this manual.

- **Device maintenance**



If used correctly and in a suitable environment, the instrument does not require maintenance procedures.

It is recommended to occasionally clean the instrument case with a damp cloth and a mild detergent. This operation must be performed with the instrument off.

The housing is in ABS / PC (acrylonitrile butadiene styrene / polycarbonate). This material is sensitive to some organic solvents, for example toluene, xylene and methyl ethyl ketone (MEK).

If liquids get into the housing, they could damage the instrument.

Do not open the instrument housing: it does not contain parts that can be maintained, repaired or replaced by the user. In case of problems with the instrument, contact your local distributor.

It is recommended to use original spare parts only. Contact your local distributor for information. The use of non-original spare parts can lead to malfunction or permanent damage to the instrument. Moreover, the use of spare parts not guaranteed by the supplier can be dangerous for the user himself.

For the maintenance of the electrochemical sensors, refer to the documentation present in their packaging or contact the supplier.

- **Responsibility of the owner of the instrument**

The person who owns and uses the tool or authorizes its use by other people is the owner of the tool and is responsible for the safety of all users of the tool and third parties.

The owner of the instrument must inform users of the use of the same safely in their workplace and on the management of potential risks, also providing the required protective devices.

When using chemicals or solvents, follow the manufacturer's safety data sheets.

3. Instrumental features

- **Parameters**



OXY 7 Vio: % O₂, mg/l, mbar, Temp



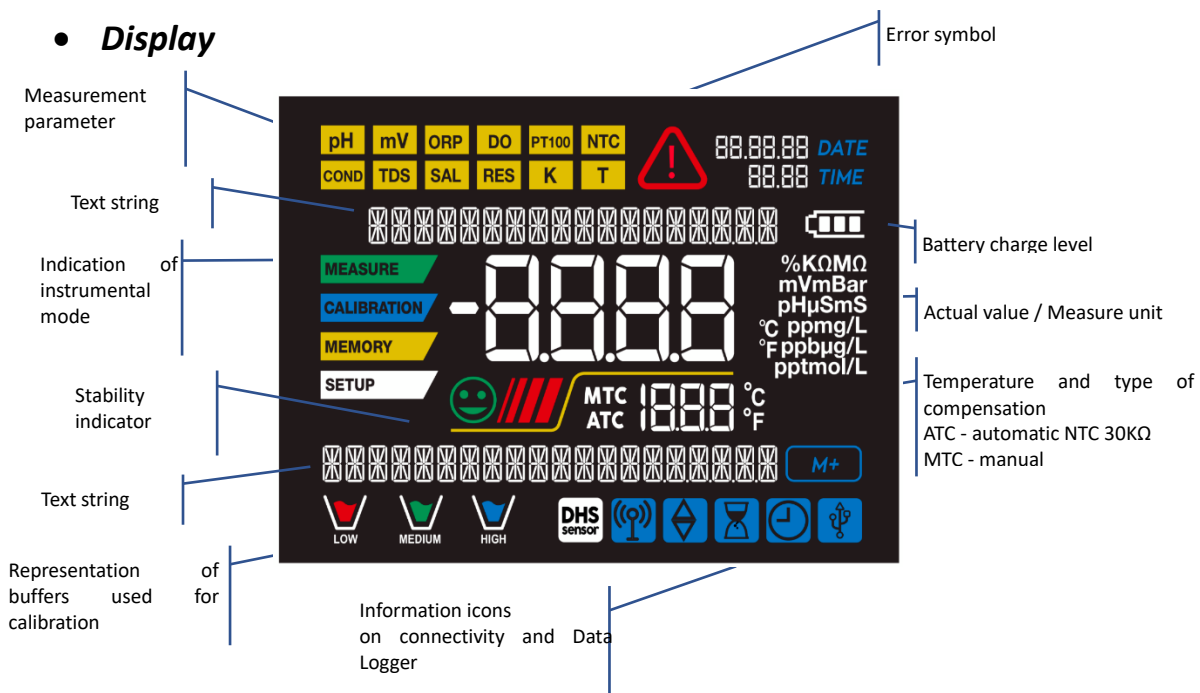
- **Datasheet**

	OXY 7 Vio (polarographic sensor)
Dissolved O₂	
Measuring range	0,00...19,99 mg/l / 20,0...50,0 mg/l - ppm
Resolution	0,1 / 0,01
Accuracy	± 1,5% F.S. (full scale)
Dissolved O₂ saturation measuring range	0,0...199,9 % / 200...400%
Resolution	0,1 / 1%
Accuracy (with sensor)	± 10%
Oxygen calibration points	1 or 2 automatic
Calibration points indication	Yes
Calibration report	Yes
Barometric pressure measuring range	0...1100 mbar
Resolution	1 mbar
Accuracy	± 0,5%

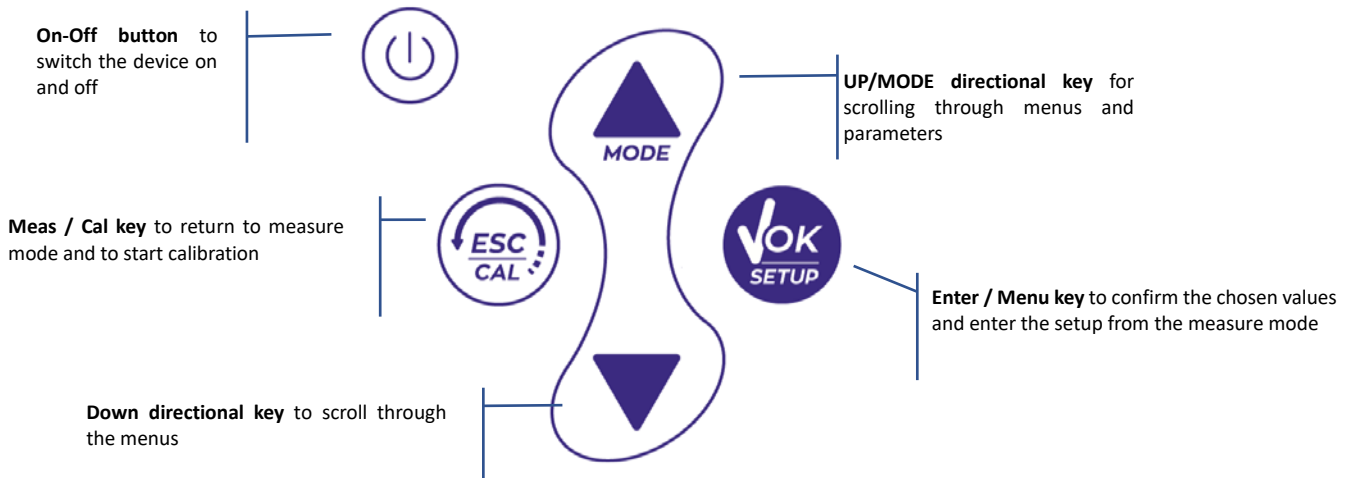
Automatic temperature compensation ATC	Yes
Temperature	
Measuring range	0,0...100,0 °C
Resolution	0,1°C
Accuracy	± 0,5°C
Temperature compensation ATC and MTC	Yes
Salinity	
Measuring range	0...50 ppt
Salinity compensation	Yes, manual
System	
Display	High definition color LCD
Brightness and contrast management	Manual
IP protection	IP 57
Power supply	AA 1,5 V – 3 batteries
Sound level during standard operation	< 80 dB
Environmental operating conditions	0 ... +60 °C
Maximum permissible humidity	< 95 % non-condensing
Maximum altitude of use	2000 m
System dimensions	185 x 85 x 45 mm
System weight	400 g
Reference regulations	EMC 2014/30/UE RoHS 2011/65/EU EN 61326-1 EN 61010-1

4. Instrument description

• Display



- **Keyboard**



- **LED**

All the instruments are equipped with a two-colour LED (red and green) which provides the user with important information on the status of the system:

Function	LED	Description
Power on	■	Fixed
Power off	■	Fixed
Standby	■	Flashing every 20 s
Stable measure	■	Flashing every 3 s
Errors during calibration	■	Flashing every 1 s
Errors during measurement	■	Flashing every 3 s
Selection confirmation	■	Switched on for 1 s
Timed screens	■	Fixed

5. Installation



- **Supplied components**


The instrument is always supplied inside the specific carrying case with these accessories:

batteries, standard O oxygen, paper tissues, screwdriver, beacker, multilingual user manual and test report. Contact your local distributor to be updated on the correct composition of the sales kit.

- **Start-up**

- The device leaves the factory ready to be used by the user.
- Batteries are included.

- **Turning on and off**

Turn on the system by pressing the button  . The display initially activates all segments and then appears:

- model and firmware of the instrument;
- settings relating to the most important parameters

Nota: every time the instrument is turned on after use, automatically the **Polarization Time** will start (next Paragraphs)



- **Replacement of batteries**

The instrument works with 3 AA 1.5V batteries.

To proceed with the replacement:

1. Turn off the device.
2. Turn the instrument over with the display facing down and place it on a stable surface.
It is advisable to put a cloth to avoid any scratching on display.
3. Using the screwdriver supplied, completely unscrew the screw close to the battery symbol.
4. Remove the battery stopper cap with the help of the lanyard.
5. Remove the 3 exhausted batteries (one in the left compartment and two in the right compartment) and insert the new ones. Pay attention to the correct polarity. Follow the diagram above the battery symbol in the rear compartment of the instrument.
6. Reinsert the battery holder and tighten the screw.





- **Instrument transportation**






The instrument is always supplied with the appropriate carrying case. Use the original case only, to transport the instrument. If you need to buy it again, contact your local distributor.

The interior of the case is shaped to be able to house the instrument and the sensors still connected.

- **Key functions**

Button	Pression	Function
	Short	Press to turn the device on or off.
	Short	In measure mode, press to scroll through the different parameters: <ul style="list-style-type: none"> • OXY 7 Vio: % O₂ → mg/l → mbar
	Short	<ul style="list-style-type: none"> • In calibration mode, press to return to measure mode. • In measure mode, press to start the calibration.
	Short	In measure mode, press to enter the setup. In the setup menus, press to select the desired program and / or value. During calibration, press to confirm the value.

	Short	In the setup and subset menus press to scroll In the setup submenus, press to change the value In MTC and customer calibration mode, press to change the value.
	Long-press (3s)	In measure mode, keep one of the two keys pressed to change the temperature in MTC mode (manual compensation, without probe). When the value starts to flash, the user can change the temperature value by entering the correct one and confirming with  .

IMPORTANT:

- When the Sleep mode is active (by default after two minutes of inactivity of the instrument) press any key to reactivate the brightness of the display.
- Only at this point do the keys regain their function.



- **Inputs / Outputs connections**



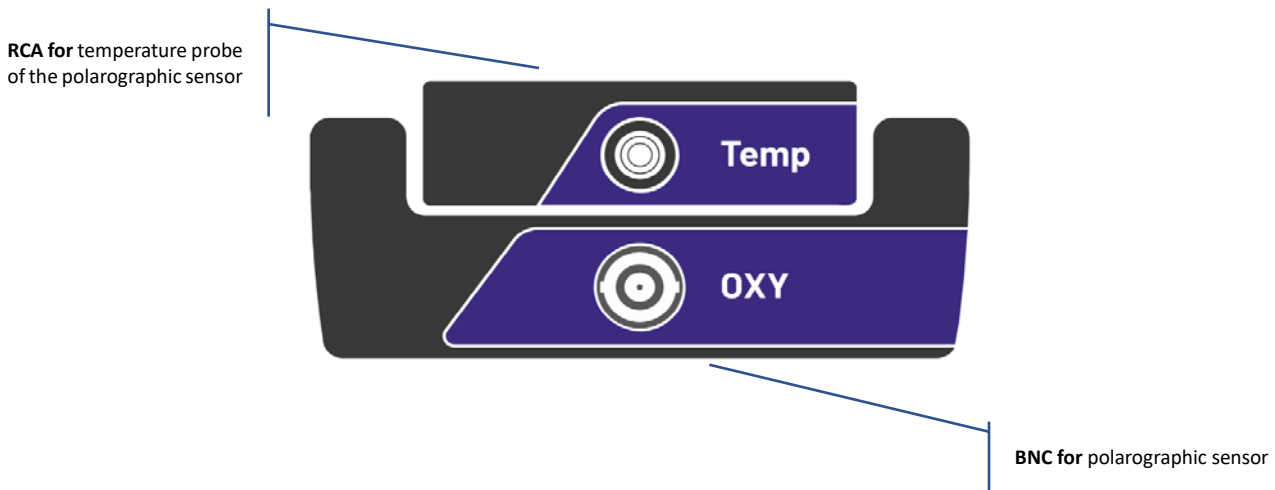
Use original accessories guaranteed by the manufacturer only.

If necessary, contact your local distributor.

The BNC connectors are protected by a plastic cap.

Remove the cap before connecting the probes.






OXY 7 Vio top panel




READ THE MANUAL BEFORE PROCEEDING TO CONNECT THE PROBES OR PERIPHERALS



- **Symbols and icons on the display**

Symbol	Description	Symbol	Description
	Press the directional keys to change the parameter or value on the display		Error in measurement or calibration
	Measurement stability indicator		Battery charge indication
	The bars scroll if the measurement is not stable		

6. Operation of the device

- After the switching on, the instrument enters measure mode in the last screen before turning off.
- To scroll through the different parameter screens, press the key .

Sequence of parameters in measure mode:

OXY 7 Vio


% O₂




mg/l



mbar

Note: Pressing the button  after the last parameter, the instrument automatically restarts from the first one.

In the measurement screen for %O₂ and mg/l, press the key  to start the calibration of the active parameter (next paragraphs).

On the left side of the display, through a string of different colours, it is always indicated how the instrument is located.

Note: in order to confirm to the user the switching from one mode to another, the string flashes.

String	Meaning
MEASURE	The instrument is in measure mode.
CALIBRATION	The instrument is in calibration
SETUP	The user is in the setup mode. The configuration menus can concern the characteristics of the parameters or the general setting of the instrument.

7. Setup Menu







SETUP

- In measure mode, press the key  to enter SETUP mode, select the parameter to edit by using the directional keys and confirming with key  .

OXY 7 Vio

DO SETTINGS



- Within the selected menu, move between the different programs using the directional buttons and press the button  to access the submenu you want to edit.
- Using the keys  and  choose the desired option or change the numerical value and confirm with  .
- The value or parameter that is being edited is recognizable as it **flashes** on the display.
- The icon  indicates that the value or parameter to choose is editable using the directional keys.
- Press the key  to return to the previous menu.

• **Setup menu structure**

P5.0 DO SETTINGS






- P5.1 Cal 0
- P5.2 Salt Compensation
- P5.6 Cal Data
- P5.8 Reset Settings
- P5.9 Temp Cal

P9.0 SETTINGS



- P9.1 Temperature U.M.
- P9.3 Backlight mode
- P9.4 Brightness
- P9.5 Sleep Mode
- P9.8 Reset Settings
- P9.9 Auto Power-Off

8. Temperature measurement ATC – MTC

- **ATC:** The direct measurement of the sample temperature for all parameters is carried out through the NTC 30KΩ probe, integrated into the sensor.
- **MTC:** If no temperature probe is connected, the value must be changed manually: keep pressed  or  until the value starts to flash; then adjust it by continuing to use the directional keys; press  to confirm.

Note: with the polarographic sensor supplied together with the instrument, the manual temperature compensation (**MTC**) **IS NOT TO BE PERFORMED.**



9. %O₂ Parameter

Connect the polarographic sensor to the RCA / CINCH Temp connectors in the top panel of the device. It is not necessary connect an external temperature probe, because it is already integrated.

• **O₂ parameter Setup**

- In measure mode press  to access the SETUP menu.
- Press the button  to access the **DO SETTINGS P5.0** menu.
- Move with the keys  and  to select the program to access.


The table below shows the setup menu structure for the O₂ parameter, and for each program the options

that the user can choose and the default value:

- **Composition of the Setup menu for O₂ Parameter**

Program	Description	Options	Factory Default Settings
P5.1	CAL 0	-	-
P5.2	SALT COMPENSATION	0.0 – 50.0	0.0
P5.6	CALIBRATION DATA	-	-
P5.8	RESET SETTINGS	YES – NO	NO
P5.9	TEMPERATURE CAL	YES – NO	-

P5.1 Cal 0 (Calibration with Standard Zero O₂)

- Access this setup menu to select the calibration with Standard (supplied together with the device in the carrying case) Zero Oxygen (next paragraphs “Calibration”).
- Once confirmed the operation, in measure mode on the lower left in the display, the beaker  indicates the point % O₂ = 0 on which the calibration was performed.

P5.2 Salt Compensation (manual)

The salinity of the sample to be measured influences the partial pressure of the dissolved oxygen. For a correct measurement, it is necessary to set the salinity value of the sample. If oxygen measurements are carried out on salt or sea water samples, it is important to modify the measurement by setting the indicative salinity value of the sample.

The default value is 0 ppt, access the parameter **SALT COMPENSATION P5.2** of the setup menu to change it and select the desired value between 0.0 ... 50ppt.

The average salinity of the sea water is 35ppt.


P5.6 Calibration data O₂

Access this menu to get information on the last performed calibration. The following screens will automatically scroll on the display:

- First screen: Beakers indicating the points (0% - 100% O₂) on which the calibration was performed.
- Second screen: OFFSET value of the sensor expressed in %.
- Third screen: EFFICIENCY of the sensor, expressed in Slope %.
- Fourth screen: Value of COMPENSATION of Salinity, expressed in ppt.
- Fifth screen: Value of BAROMETRIC PRESSURE, expressed in mbar, at which the calibration was performed.
- Sixth screen: TEMPERATURE at which the calibration was performed.




Note: The instrument accepts calibrations with Oxygen sensors with Slope % between 80 – 120%.

Outside this range of acceptability, the instrument does not allow to end the calibration and displays the error message  SLOPE OUT OF RANGE

(consult the paragraph 11 Probe Do 7 maintenance)

P5.8 Reset of the DO parameter (Reset Settings)




If the instrument does not work properly or incorrect calibrations have been carried out, confirm YES with

button  , in order to take all the parameters of the DO menu back to the default settings.



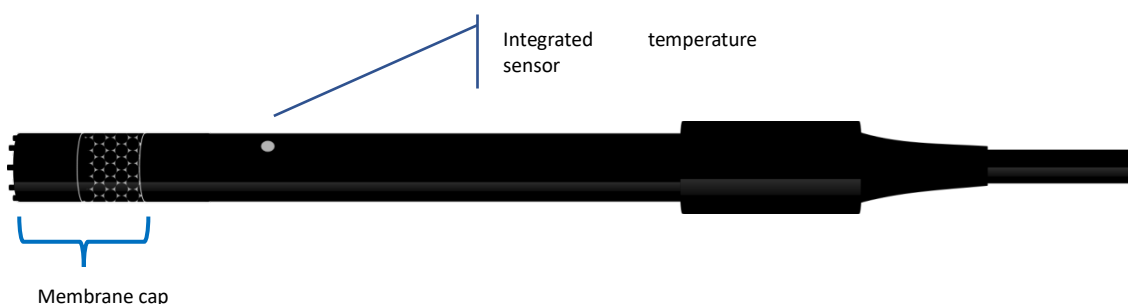
P5.9 Temperature calibration

All the instruments of this series are pre-calibrated for a correct temperature reading. However, if there is a difference between the measured and the real temperature (usually due to a probe malfunction), it is possible to perform an offset adjustment of $\pm 5^{\circ}\text{C}$.

After the connection of the temperature probe, use the keys  and  to correct the temperature offset value and confirm with  .

- **Information about sensor DO 7**

The probe DO7 is polarographic with integrated temperature sensor. The oxygen sensor uses a BNC connector, while the temperature sensor uses an RCA (Chinch) connector.



- **Sensing element**

The permeable membrane allows the passage of only gas present in the sample to be analysed, blocking the passage of liquids. The oxygen reacts with the electrolytic solution, after passing through the membrane, and changes its chemical and physical properties depending on oxygen concentration. The sensing elements detect this change and generate a signal depending on the amount of dissolved oxygen. The oximeter reads this signal and returns the value on the display.

- **Membrane**


The membrane, which must allow only passage of oxygen, must be in perfect conditions. If it presents any ripples, irregularities or is punctured, it must be replaced with a new one.

- **Electrolyte**

The electrolyte is an alkaline solution that reacts to the presence of oxygen, it saturates with wear and over time, therefore, it must be replaced regularly.

- **Polarization time**

The polarographic sensor needs to be polarized before performing the measurements.

Connect the probe to the instrument and switch on with button  ; the device turns on and starts the countdown for the polarization time. At the end of the countdown, the meter enters in measure mode and it is ready to perform measurements.

The polarization time is 10 minutes. However, if the instrument is turned off for less than an hour, the polarization time will reduce proportionally.

- ***New sensor with new instrument***

The sensor is supplied with the membrane filled with electrolyte; it is necessary to hydrate the membrane dipping it in distilled water for half an hour. Switch the device on and wait for the polarization time.

- ***Probe storage***

When the probe is not in use, store it in the storage cap containing distilled water. In this way, the membrane is protected and hydrated, ready for use.

- ***Not using the sensor for long period of time: over one month***

If the instrument and the sensor are not used for a long period of time (over one month), it is recommended to empty the membrane from the electrolyte and wash the probe accurately. Dry the sensor and screw the membrane without electrolyte, protecting the sensor with its rubber cap.

- ***Oxygen sensor calibration***

CALIBRATION

The polarographic sensor is an active sensor which changes its response with wear and aging; therefore, it is necessary to perform the calibration regularly in air.


- ***Calibration in air at 100%***


The ordinary calibration is performed at 100% in air.

Turn the instrument on, dip the probe in water and wait for the polarization time of 10 minutes.


Later, dry the probe thoroughly with paper towel and proceed as follows:

- Place the probe in air with the membrane facing downwards and wait for 2 minutes. Then, connect the sensor to the device.

- In measure mode, press the key  to enter in calibration mode. On the display, it appears the string "POINT OXY 100.0"; the device will look for the value %O₂ = 100 %. Keep the sensor in air in a vertical position with the membrane facing downwards.

- When the signal is stable, the red bands will be replaced by the stability icon .

Press the button , as indicated by the string "PRESS OK".

On the display, the measured value flashes, then the sensor and finally the beacker  appears below on the left and indicates that the instrument is calibrated on value 100%O₂.

- After the calibration, the instrument enters in measure mode automatically.

- **Calibration with zero oxygen standard**








Normally, it is enough to calibrate the instrument in air at 100%, as explained previously. However, sometimes it is also necessary to calibrate at 0%, for example when:

- A probe is replaced by a new one
- The probe is not used for a long period of time (over one month)
- A complete maintenance of the sensor is performed
- The instrument does not calibrate at 100%, in this case calibrate it before at 0%.
- The instrument does not measure correctly

For calibration at 0%, proceed as follows:

Before proceeding, perform a maintenance of the probe DO 7. (chapter 11)

Turn the instrument on, dip the probe in the water and wait for the polarization time of 10 minutes. Then, dry the probe thoroughly with paper towel and proceed as follows:

- Put the probe in the Zero Standard Oxygen and wait for 5 minutes.
- In measure mode, press the button  , remain in Menu **DO SETTINGS P5.0** and confirm pressing the button  again.
- Press the button  again, confirm the entry into submenu **CAL 0 P5.1**.
 - On the display, the string "POINT OXY 0.0" appears; the device will search for the value %O₂ = 0%.
- Gently stir the probe in the Standard and eliminate any air bubbles under the membrane, moving the sensor.
 - The scrolling on the display of four red bands  means that the measurement is not stable yet.
 - Consider the measurement truthful only when the stability icon appears .
- Confirm the value by pressing the button  .
 - The instrument automatically returns to measure mode.
- The beaker icon  appears at the bottom left, indicating that the instrument is calibrated on value 0% O₂.

ATTENTION: Before proceeding with the calibration operations, carefully consult the safety data sheets of the substances involved:

- *Zero oxygen Standard calibration solution*



Note: The Zero Oxygen Standard Solution is SINGLE DOSE! After its use, contact your local distributor for the purchase.

Perform the calibration in air at 100% too. This procedure remains saved, even after the turning off of the device.



- **Calibration range**

The time range between two calibrations (100% in air) depends on the type of the sample, the efficiency of the electrode and the researched accuracy; usually, it is necessary to calibrate the instrument at least once a week, but for a better accuracy, it is recommended to calibrate it more often.



The instrument must be recalibrated, if occurs one of the following conditions:

- New probe, or probe not used for a long time
- After the sensor maintenance.

- **Errors during calibration**



CALIBRATION

- **NOT STABLE:** The button  was pressed with still unstable signal. Wait for the icon  to appear to confirm the point.
- **WRONG BUFFER:** The buffer is polluted or not part of the recognized families.
- **SLOPE OUT OF RANGE:** The slope of the sensor calibration line is out of the acceptable range 80 - 120%.
- **CALIBRATION TOO LONG:** The calibration exceeded the time limit: only the points calibrated up to that moment will be kept.

10. Dissolved oxygen measurement

DO

- **Before starting**

In order to reduce measurement errors and get the greatest possible accuracy, observe the following rules before starting:

- The sensor must be calibrated;
- The sensor must be placed in a vertical position with the membrane downwards;
- Remove the protective cap;
- The sensor must be at the same temperature of the sample to analyse; if necessary, leave the probe immersed in the sample until the reaching of thermal equilibrium.


- **Measure Mode**

The instrument can work in two different measure modes:

- **Dissolved O₂ Saturation** expressed in %
- **Dissolved O₂ Concentration** expressed in mg/l, corresponding to ppm
mg/l = ppm
- **Barometric pressure**

During the measurement press the button , in order to change the unit of measurement.


- **Performing the measurement**

Remove the protective cap of electrode, rinse it with distilled water; dab it with paper towel and dip in the solution to analyse. Gently stir and wait until the value stability, when the icon  appears on the display, take the reading.

Note: the polarographic sensor tends to consume the oxygen, and thus reducing gradually the detected value. Make sure that there is a minimum flow in the sample to analyse; if you are working in a laboratory, keep the sample stirred.

- **Barometric pressure compensation**

Since the measurement of the partial pressure of the dissolved oxygen is related to the barometric pressure, this instrument is able to compensate each variation, thanks to the integrated barometric sensor.

In order to view the barometric pressure measured by the instrument, press the key  during measurement and scroll through the measurement parameters: %O₂ ↔ mg/l ↔ mbar.

11. Probe DO 7 maintenance

If the instrument does not calibrate or the reading does not stabilize, it is necessary to perform a maintenance of the probe. In order to perform the maintenance, follow these steps in order:

- Replacement of electrolyte
- Cleaning of anode and cathode
- Replacement of membrane

- **Electrolyte replacement**

- Remove the membrane cap from the sensor, check that it is not punctured or damaged; if it is intact, it can be used again, otherwise it must be replaced.
- Wash the membrane and the sensitive part of the sensor with distilled water; remove any salt residue and dry with paper towel. *Be very careful when handling the sensor and the membrane. Falls, shocks or crushing can damage the sensor and/or membrane.*
- Fill the membrane cap with distilled water at half level and screw it on the sensor (pay attention in the fixing phase, since the membrane does not have to be screwed strongly up to end run, because it can be damaged). Stir gently, unscrew the membrane and empty it completely; in this way, any traces of water or dust will be eliminated.
- Refill the membrane with new electrolyte; this time, fill it completely and screw the sensor making sure that no air bubbles appear inside. A light leakage of electrolyte during the screwing of membrane, ensures that no air bubble will be created.
- Wash the probe and leave it in distilled water for at least half an hour, in order to rehydrate the membrane.



Perform the **Calibration of the sensor**. If it does not work, proceed with the **Maintenance of the anode and the cathode**.

- **Maintenance of the anode and the cathode**

The sensitive part of the probe is composed by an anode and a cathode; the two elements are composed by precious metals. Over time, these metals can be passivated by decreasing the efficiency of the probe, up to the point that the probe does not calibrate.

In this case, remove the membrane and the passivation with very fine abrasive paper, gently scratching the metal parts; wash everything with distilled water and proceed with the **Replacement of Electrolyte**.

Perform the **Calibration of the sensor**. If it does not work, proceed with the **Replacement of the membrane**.

- **Replacement of the membrane**

If the membrane has ripples or irregularities, it must be replaced with a new one.





Remove the membrane cap and replace it with a new and intact one.

With the new membrane, follow the procedure of the **Replacement of Electrolyte**.

If, even after these procedures, the probe does not calibrate, replace the probe.

12. Instrument Setup Menu



- In measure mode, press key  to access the SETUP menu.
- Use the directional keys to move to **SETTINGS P9.0** and access the menu by pressing the key .
- Move with the keys  and  to select the program to access.

The table below shows the setup menu structure for the general settings of the instrument; for each program, there are the options that the user can choose and the default value:

- **Composition of the setup menu for Setting menu**

Program	Description	Options	Factory Default Settings
P9.1	TEMPERATURE U.M.	°C / °F	°C
P9.3	BACKLIGHT MODE	INDOOR – OUTDOOR	INDOOR
P9.4	BRIGHTNESS	LOW – MEDIUM - HIGH	MEDIUM
P9.5	SLEEP MODE	OFF – 2 MIN – 5 MIN	2 MIN
P9.8	RESET	YES - NO	NO
P9.9	AUTO POWER-OFF	YES – NO	YES

P9.1 Unit of measurement for temperature

Access this setup menu to select the temperature unit to use:

- °C -default-
- °F

P9.3 Backlight Mode

Access this setup menu to select the contrast mode to use for the display backlight:

- **INDOOR (In)** – Recommended if you use the device indoors.

- **OUTDOOR (Out)** – Recommended if you use the device outdoors.

P9.4 Brightness

Access this setup menu to choose between three different levels of display brightness:

- **LOW** – low
- **MEDIUM** – medium
- **HIGH** – high



Note: Keeping the display bright always adversely affects battery life

P9.5 Sleep mode

Access this setup menu to select whether and after how long activating the device Sleep mode:

- **OFF:** Sleep mode off.
- **2 MIN:** The instrument enters Sleep mode if no key is pressed for 2 minutes.
- **5 MIN:** The instrument enters Sleep mode if no key is pressed for 5 minutes.

When the device is in Sleep mode, the brightness of the display is reduced to a minimum, significantly saving battery consumption.

Note: Sleep mode only affects the brightness of the display. All other instrumental functions continue to operate normally.



To exit from the Sleep mode and return the display to normal brightness, press ANY button.

Once the display brightness is activated, the buttons reacquire their function (paragraph "Key function").

P9.8 Reset Settings

Access this setup menu to restore the instrument to factory conditions.

P9.9 Auto off

Access this setup menu to activate or deactivate the auto-shutdown of the instrument:

- **YES:** The instrument automatically turns off after **20 minutes** of inactivity.
- **NO:** The instrument remains always on, even if you are not using it.



IMPORTANT: The correct and systematic use of parameters P9.3 / P9.4 / P9.5 / P9.9 allows to significantly lengthen battery life.

13. Warranty



- ***Warranty period and limitations***

- The manufacturer of this device and its accessories offers the final consumer of the new device the five-year warranty from the date of purchase, in the event of state-of-the-art maintenance and use.
- During the warranty period, the manufacturer will repair or replace defective components.
- This warranty does not apply, if the product has been damaged, used incorrectly, exposed to radiation or corrosive substances, if foreign materials have penetrated inside the product or if changes have been made, which have not been authorized by the manufacturer.

14. Disposal of electrical devices



This equipment is subject to the regulations for electronic devices.
Dispose of in accordance with local regulations.

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