

OXY 7



Portable oximeter OXY 7

Polarographic sensor

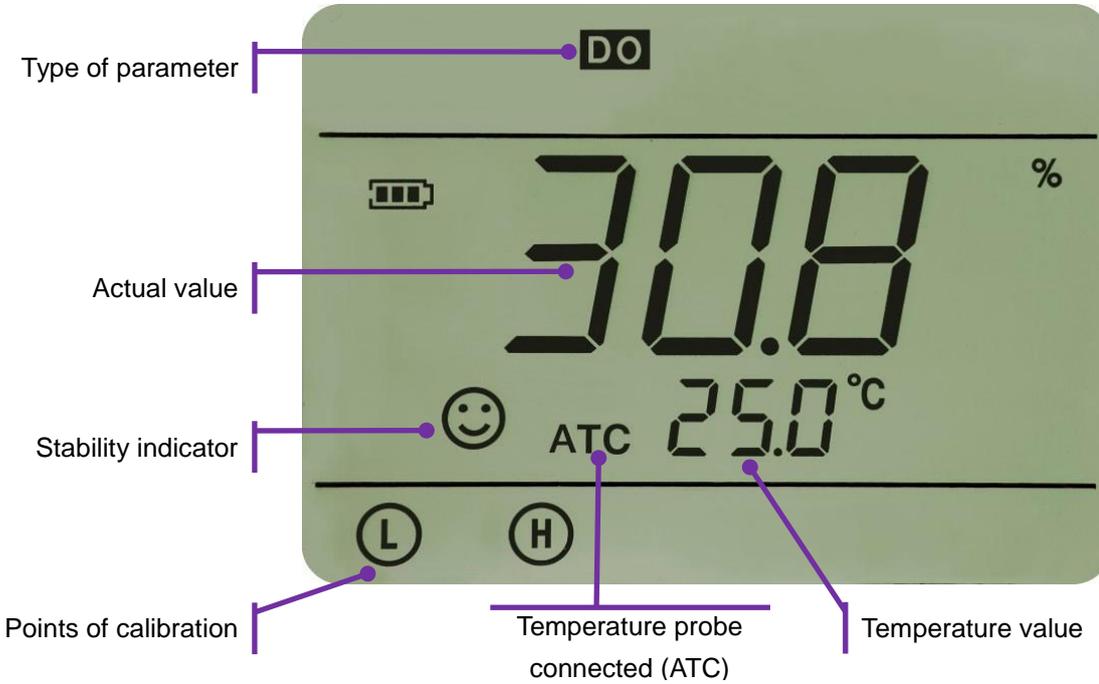
$\%O_2$ / mg/l / Temp. / mbar

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1. Description of the instrument

1.1 Display LCD

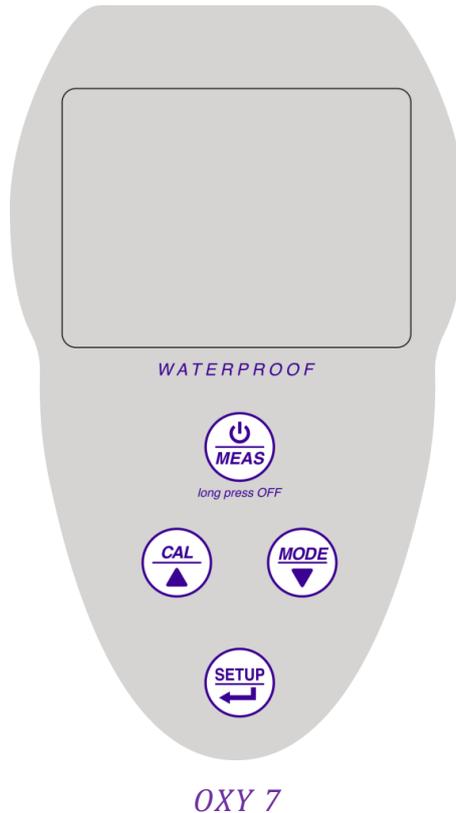


1.2 Connections for the probe

In the table below, are the connections for the probe:

Model	Description
 <p data-bbox="347 1556 424 1585">OXY 7</p>	<p data-bbox="655 1451 1315 1480">BNC – Connection for polarographic oxygen sensor DO7/3mt</p> <p data-bbox="655 1494 1230 1523">RCA (Temp) – Connection for the temperature sensor</p>

1.3 Keypad



1.3.1 Keypad operations

Momentary press <1,5 seconds , Long press >1,5 seconds.

1.3.2 Switching on the instrument

Press  to power on the instrument: The display shows all the segments → the firmware version and the internal settings → measurement in the last selected mode.

1.3.3 Switching off the instrument

In the measurement mode, press and hold  for 3 seconds to turn off the instrument.

1.3.4 Auto power off

This meter powers off automatically after 20 minutes of inactivity. To deactivate auto power-off go to the parameter **P6.8** of setup menu and select Off.

- On** Auto power off enabled
- Off** Auto power off disabled

Note:

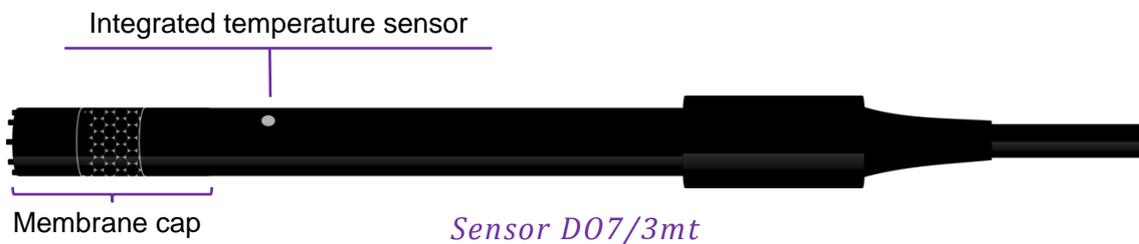
During calibration and setup, press  to exit and return to measurement mode, press again  for 3 sec. to switch off.

1.4 Function of the keys

Key	Press	Description
	Momentary press	<ul style="list-style-type: none"> With the meter turned off, press this button to turn it on During calibration or setup: press to exit and turn to measurement mode
	Long press	<ul style="list-style-type: none"> During measurement: press for 3 seconds to turn off the instruments
	Momentary press	<ul style="list-style-type: none"> During measurement: press to enter in calibration
	Momentary press	<ul style="list-style-type: none"> Press to change measurement mode between: %O₂ ↔ mg/l ↔ mbar
	Momentary press	<ul style="list-style-type: none"> During measurement: press to enter setup During calibration: press to confirm when stable During setup: press to select/confirm the program
 	Long press	<ul style="list-style-type: none"> When working with manual temperature compensation (MTC), to change the temperature value, keep pressing this button until the temperature value starts flashing, adjust the value with these keys and press  to confirm
	Momentary press	<ul style="list-style-type: none"> During setup: press to scroll in setup menu In setup parameter: press to change the value

2. Information about oxygen probe D07/3mt

The probe D07/3mt is a polarographic type with integrated temperature sensor. The oxygen sensor uses a BNC connector while the temperature sensor uses an RCA (Chinch) connector.



2.1 Sensing element

The sensitive part of the probe is composed of an anode and a cathode, the two elements, constructed with precious metals, are enclosed in a membrane filled with an electrolyte solution.

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

2.2 Membrane

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

2.3 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.

2.4 Polarization time

The polarographic sensor needs to be polarized prior to making 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 measurement mode and it is ready to make measurements.

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

2.5 New sensor with new instrument

The sensor is supplied with the membrane empty, so it must be filled with electrolyte before using for the first time. Read carefully the instructions and wait properly for the polarization time.

2.6 Probe storage

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

2.7 Not using the sensor for a 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 advisable to empty the membrane from its electrolyte, thoroughly wash the sensor. Dry the sensor and screw the membrane without the electrolyte to protect the sensor with its rubber cap.

3. Calibration of the oxygen sensor

The polarographic sensor is an active sensor that changes its response with wear and aging, so you need to calibrate it regularly in the air.

3.1 Calibration in air at 100%

The ordinary calibration is made at 100% in air.

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

- 1) Place the probe in the air with the membrane downwards and wait 2 minutes.
- 2) Press  to start the calibration process, the upper display will flash "CAL" and the lower right corner shows "100".
- 3) When the reading is stable and appears  icon, press  button to confirm, the display shows **End** and the meter enters measurement mode.

The oximeter is calibrated and is ready for use.

3.2 Calibration with zero oxygen standard

Normally it is sufficient to calibrate the instrument in air at 100%, as explained previously. However in some cases it may also be necessary to calibrate at 0%, for example when:

- You change the probe with a new one
- The probe is not used for long period (over one month)
- A complete maintenance of the sensor is performed
- The instrument does not calibrate at 100%, in which case calibrate before at 0%
- The instrument does not measure correctly

For the calibration at 0% proceed as follows:

Before proceeding, make a **Maintenance of the probe DO7/3mt**.

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

- 1) Put the probe in the zero standard oxygen and wait 5 minutes.
- 2) Go to the parameter **P5.1** of the setup menu, press the  key to start the calibration process, the upper display will flash "CAL" and the lower right corner shows "0", gently shake the probe in the standard.

- 3) When the reading is stable and appears  icon, press the  button to confirm, the display shows **End** and the meter enters in measurement mode.

Perform also the **Calibration in air at 100%**. The calibration remains in memory even after the instrument is turned off.

Note:

If the  key is pressed when the reading is not stabilized yet, **Er2** will appear on the display.

3.3 Calibration interval

The time interval between two calibrations (100% in air) depends on the type of sample, the efficiency of the electrode and the accuracy sought, it is usually necessary to calibrate the meter at least once a week, for greater accuracy calibrate the instrument more frequently.

You must recalibrate the instrument if occurs one of the following conditions:

- You change the probe with a new one
- The probe is not used for a long time
- After the sensor maintenance

4. Dissolved oxygen measurement

4.1 Before starting

In order to reduce measurement errors and achieve the greatest possible accuracy, observe the following rules before you begin:

- The sensor must be calibrated
- The sensor must be vertical with the membrane downwards
- Remove the protective cap
- The sensor must be at the same temperature of the sample to be analysed, if necessary leave the probe immersed in the sample until the thermal equilibrium is reached

4.2 Methods of measurement

This instrument can work in two measurement modes:

- **Dissolved O₂ Saturation** expressed in %
- **Dissolved O₂ Concentration** expressed in mg/L, equivalent of ppm
mg/L = ppm

During measurement press  key to change measuring method.

4.3 Making the measurement

Remove the electrode from the protective cap, rinse it with distilled water, blot with paper towels and immerse in the solution to be analysed, stir gently and wait until the stability of value, when the icon ☺ appears on the display, take the reading.

The polarographic sensor tends to consume the oxygen, which results in a gradual reduction of the value detected by the instrument, so make sure there is a minimum flow in the test sample, if you are working in the laboratory, put the sample in a gentle stirring.

4.4 Compensation of the barometric pressure

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

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

4.5 Salinity compensation (manual)

The salinity of the sample to be measured influences the dissolved oxygen partial pressure. For a correct measurement you must set the salinity value of the sample. If you make oxygen measurements on salt water or sea water it is important to correct the measurement by setting the salinity value indicative of the sample.

The value set by default is 0 ppt, to change access to **P5.2** parameter of the setup menu and set the desired value between 0 ... 50ppt.

The average salinity of sea water is 35ppt.

4.6 Automatic temperature Compensation (ATC)

The measurement of the partial pressure of the oxygen is strongly influenced by temperature. This instrument allows you to compensate for the change of the measurement made by the temperature thanks to a built in temperature sensor, the instrument will automatically recognize the presence and the display shows the ATC icon. During the measurements it is good to always check that the measured temperature is stable and aligned with the sample.

4.7 Manual Temperature Compensation (MTC)

When the temperature probe is not connected you have to manually set the temperature of the sample.

In the measurement mode press and hold the  or  button until the temperature value flashes.

With  and  buttons change the value, confirm with the  button.

5. Maintenance of the probe DO7/3mt

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

- Replace the electrolyte
- Clean the anode and the cathode
- Replace the membrane cap

5.1 Replacing the electrolyte

- 1) Remove the membrane cap from the sensor, check that it is not punctured or damaged, if intact it can be reused otherwise you have to replace it.
- 2) Wash the membrane and the sensitive part of the sensor with distilled water, remove any remaining salt and dry with paper towels.

Be very careful when handling the sensor and the membrane. Falls, shocks or crushing can damage the sensor.

- 3) Fill the membrane cap with electrolyte at half level and screw it on the sensor, stir gently. Unscrew the membrane and empty it completely, this will eliminate any remaining traces of water or dust.
- 4) Refill the membrane with electrolyte again, this time completely, and screw on the sensor making sure that no air bubbles inside. A light leakage of electrolyte during the screwing of the membrane ensures that inside there are no air bubbles.
- 5) Wash the probe and leave in distilled water for at least half an hour, to rehydrate the membrane.

Make a **Calibration of the oxygen sensor**. If doesn't work proceed with **Maintenance of the anode and the cathode**.

5.2 Maintenance of the anode and the cathode

The sensitive part of the probe is composed of an anode and a cathode, the two elements are constructed with precious metals. These metals, with time, 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 remove the passivation with super fine sandpaper, gently scratching the metal parts, wash everything with distilled water and proceed with **Replacing the electrolyte**.

Make a **Calibration of the oxygen sensor**. If doesn't work proceed with **Replacing the membrane cap**.

5.3 Replacing the membrane cap

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

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

With the new membrane follow the procedure of **Replacing the electrolyte**.

If even after all these steps the probe does not calibrate then replace the probe.

6. Error messages

During calibration and measurement, the instrument displays error messages in case of problems:

Error messages

Error	Description	Solution
Eρ1	During calibration, the value is out of the acceptable range	<ul style="list-style-type: none"> • Check the connection between the probe and the instrument • Make the maintenance of the probe • Calibrate with fresh and not contaminated 0% solution • Check the integrity of the probe
Eρ2	During calibration appears when you press the  button with unstable value	<ul style="list-style-type: none"> • Wait for  icon
Eρ3	It appears if during the calibration the value does not stabilize within 3 minutes	<ul style="list-style-type: none"> • Check that there are no air bubbles in the probe membrane • Make the maintenance of the probe
Eρ6	The reading is out of the measuring limits	<ul style="list-style-type: none"> • Check the connection between the probe and the instrument • Check the integrity of the probe • Perform a new calibration
Eρ9	The built-in barometric sensor is not working properly	<ul style="list-style-type: none"> • Replace the batteries • Contact technical support

7. Restore to factory default setting

To restore the factory settings, access the parameter **P5.5** setup menu.

Press , the display will show **NO** flashing.

With the  or  keys choose **Yes** and confirm with the  key.

This feature can be very useful in case of errors or when making incorrect calibrations and / or have calibration problems.

8. Replacing the batteries

The display shows the battery charge, when you get to the last bar replace the batteries with 3 alkaline batteries AA 1.5V, or if you are using rechargeable batteries, recharge them externally.

Avoid making measurements with dead batteries.

If the instrument is to remain unused for an extended period, remove the batteries and leave it without.

9. Parameter settings

During measurement mode press  to enter in the setup menu.

Press  and  keys to scroll setup menu: P5.0→P6.0

P5.0: Settings of the parameter Oxygen

P6.0: Settings of the meter

Press  key to enter in the selected menu and to confirm the changes.

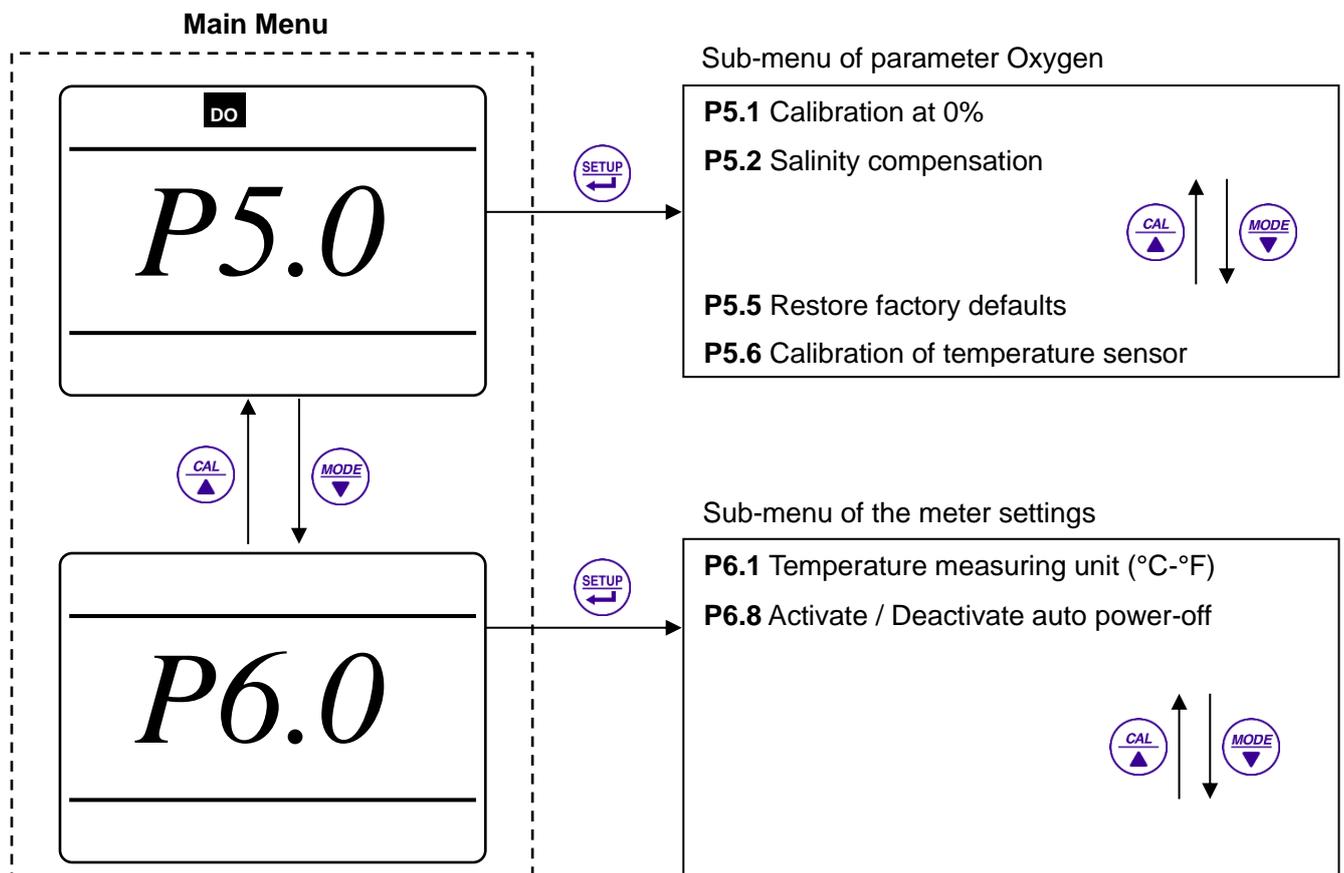
Press  and  keys to scroll the sub-menus and to change the values.

Anytime press  key to exit from setup menu and to return in the measurement mode, the changes made and confirmed with  key will be saved.

Note:

During SETUP menu, the instruments cannot be switched off, you first need to exit from SETUP with  key.

9.1 Setup Menu



9.2 Parameters of the setup menu and factory default settings

Parameter	Description	Display	Settings	Factory default
P5.1	Calibration at 0%	ΧΑΛ0	-	-
P5.2	Salinity compensation	ΣΑΛτ	0.0 - 50.0 ppt	0.0
P5.5	Restore factory defaults	ΦΣ	No - Yes	No
P5.6	Calibration of temperature sensor	/	± 5°C	-
P6.1	Temperature measuring unit	/	°C - °F	°C
P6.8	Auto Power-off	ΑοΦΦ	On - Off	On

10. Calibration of temperature sensor

10.1 Useful information

- The NTC temperature sensors used are very accurate and stable over time
- All instruments are pre-calibrated and normally does not require any further adjustment even after many years
- However, in case of reading errors it is possible to make an adjustment of ± 5 °C

10.2 Calibration procedure

Connect the temperature sensor to the instrument, immerse the probe into a thermostatic bath (pre-thermostated) together with the reference thermometer.

Wait 10 minutes for the stability, if the reading is equal to the reference sensor ± 0.5 °C then it is not necessary to perform any calibration, otherwise access the parameter **P5.6** of setup menu.

Press the  key to enter the calibration, the display will show the temperature value measured at that time.

Press the  and  buttons to adjust the temperature value, press the  button to confirm.

Press the  button to exit and return to measurement mode, the meter will save the adjustments made.

To restore the values of temperature to the factory settings, access the parameter **P5.5** of setup menu, select "YES" and press .

11. Technical specifications

Technical specifications	OXY 7 (polarographic sensor)	OXY 70 (optical sensor)
Dissolved Oxygen measuring range	0,00...19,99 mg/l-ppm / 20,0...	0,00...19,99 mg/l-ppm / 20,0...50,0 mg/l-ppm
Resolution	0,01 / 0,1	0,01 / 0,1
Accuracy (with sensor)	± 1,5% F.S.	± 0,2 up to 10 mg/l-ppm ± 0,3 from 10 to 20 mg/l-ppm ± 5% from 20 to 50 mg/l-ppm
Oxygen saturation measuring range	0,0...199,9 % / 200...400%	0,0...199,9 % / 200...400%
Resolution	0,1 / 1 %	0,1 / 1 %
Accuracy (with sensor)	± 10%	± 10%
Oxygen points of calibration	1 o 2 automatic	1 o 2 automatic
Barometric air pressure measuring range	0,0...1100 mbar	0,0...1100 mbar
Resolution	1 mbar	1 mbar
Accuracy	± 0,5%	± 0,5%
Automatic air pressure compensation	Yes	Yes
Temperature measuring range	0,0... 60,0 °C	0,0... 60,0 °C
Resolution	0,1 °C	0,1 °C
Accuracy	± 0,5 °C	± 0,5 °C
Automatic and manual temperature compensation	Yes	Yes (only automatic)
Salinity measuring range	0...50 ppt	0...50 ppt
Salinity compensation	Yes manual	Yes manual
GLP system	No	Yes
Display	LCD	LCD backlight
Data memory	No	Man / Auto 500 Data with date and time
Data logger function	No	Yes
Date and time	No	Yes
Memory data of calibration	No	Yes
CAL DUE (calibration timer)	No	Yes
IP protection class	Waterproof IP 57	Waterproof IP 57
Auto power off	Yes (after 20 min)	Yes (after 20 min)
Inputs	BNC / RCA (cinch)	DIN multipin
Communication interface	No	USB
Power supply	3 x 1,5V battery AA	3 x 1,5V battery AA AC/DC power with USB cable
Battery life	From 300 to 500 hours	From 300 to 500 hours
Dimensions / weight only meter	86 x 196 x 33 mm / 295 g	86 x 196 x 33 mm / 300 g
Dimensions / weight with carrying case	385 x 300 x 115 mm / 1720 g	385 x 300 x 115 mm / 1725 g

Specifications subject to change without notice

12. Accessories and spare parts

Code	Description
6030-0100	Polarographic sensor OXY DO7/3MT with 3 meter cable, 2 membrane and filling solution (30ml)
6030-0101	Kit 2 membranes, for sensor OXY DO7/3MT
6030-0070	Filling solution for electrode OXY DO7/3MT 1 x 30 ml
6030-0102	Plastic armature (PPE) for dip immersion electrode DO7/3MT (to be order with OXY 7)
6030-0071	Standard zero (0) Oxygen, single use, kit of 5 bottles for DO7/3MT, LDO70/2MT, LDO70/10MT
6030-0072	Standard zero (0) Oxygen, single use, 1 bottle for DO7/3MT, LDO70/2MT, LDO70/10MT

13. Disposal of electronic devices



The electrical and electronic equipment marked with this symbol cannot be disposed of in public landfills.

According to the UE Directive 2002/96/EC, the European users of electrical and electronic equipment can return it to the dealer or manufacturer upon purchase of a new one.

The illegal disposal of electrical and electronic equipment is punished with an administrative fine.