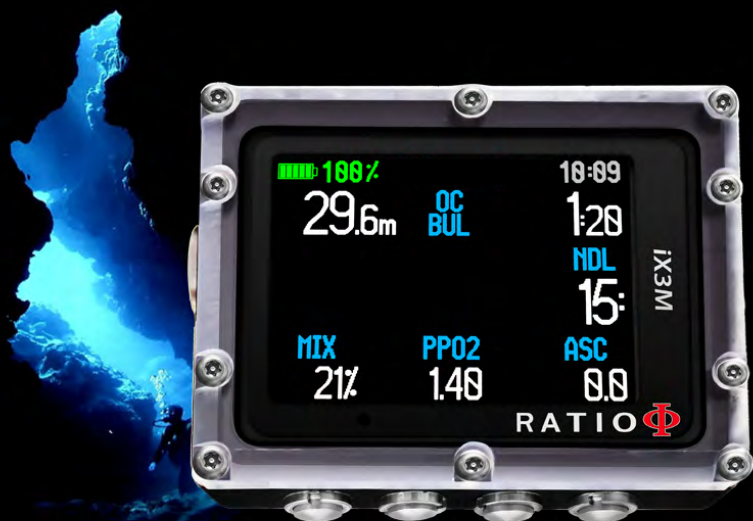




RATIO
COMPUTERS

Sensor Board

User Manual



ver. 1.1



Warning!



This is **NOT** the user manual of the iX3M dive Computer.

This is an intagrations about the optional sensor board for iX3M Reb.

You can download the iX3M user manual from:
www.ratio-computers.com
("support" area)



Warning!



This document DOES NOT replace an adequate diving training and should be used only by those divers who have been appropriately trained by a certified diver training organization.

To completely understand the terminology used in this document and the functions of the dive computer a proper diving training is required.

Think Green

If possible do not print this manual.
Use your tablet or your PC to read it.



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Important Warnings

General Warnings



It is necessary read this document carefully before using the computer RATIO®. A wrong use of this computer or its accessories will nullify the warranty and could cause permanent damages to the device and/or its accessories.

- The diving computer DOES NOT replace an adequate diving training and should be used only by those divers who have been opportunely trained.
- The RATIO® computer is an auxiliary instrument to the dive, so it is compulsory having always an appropriate diving chart in order to carry out the decompression phase in case the device is malfunctioning.
- Diving involves risks relating to decompression sickness, Oxygen toxicity and other risks relating to the diving itself. Even a careful reading of this manual and the use of this device don't prevent possible dangers. Anyone who doesn't know or doesn't accept consciously these risks, must not dive with iX3M computer.
- Diving has some intrinsic risks which cannot never be completely eliminated.
No computer or diving chart can guarantee that the risk of Decompression Sickness (DCS) or Oxygen toxicity to the central nervous system don't exist, even if the diver follows meticulously and accurately the indications given by the computer or the diving chart.
- The computer cannot take into consideration the individual physiological variations which might change day by day. For this reason it is good practice to use the device in a conservative and preventive way, remaining within the limits indicated by the computer, to minimize the risks of DD and Oxygen toxicity to the central nervous system.

- The computer doesn't replace the learning of the diving decompression charts which we recommend to have always as backup along with a depth gauge and a watch.
- Never share a unique computer for two divers while diving; every diver must have his/her device at his/her wrist, which can give information to him/her only.
- Never dive with a computer which has not taken into consideration the previous dives a diver made; the computer calculation CANNOT use unknown data or take into consideration dives which it has not done.

Danger Warning



The computer IS NOT meant for a PROFESSIONAL use.

The computer is meant exclusively for a sport, recreational or technical use.

- A use which is not compliant to what has been said above, could expose the diver to an increasing risk of incurring in the Decompression Sickness (DCS). For this reason we discourage its use in case of professional or commercial dives, unless it is used as an operator's further support device.
- Before diving it is necessary to check the battery autonomy. DO NOT dive if the battery level is at 30% or at lower percentages; make sure that the screen doesn't show malfunctioning signs. It must be read clearly.
- Check always that settings are the ones desired. Don't let the computer be manipulated by someone else before diving. In this case, check that settings are the ones you desire.
- Consider that our body experience changes everyday. The computer cannot take into consideration all these changes. If you don't feel at your best physical conditions or if you feel physical problems, don't dive.
- Avoid all behaviours increasing the risks connected to the DD such as rapid ascents, yo-yo dives, violation of compulsory decompressive stops, dives with too close surface intervals and any behaviour which is contrary to the common sense and to the training received.
- This device doesn't allow its use without having the due skill, given by a specific training.

The failure to comply with the basic rules of diving exposes the diver at death danger.

- We recommend to do dives within the safety curve, to reduce the risks inherent to the Decompression Sickness (DCS).
- We recommend dives not deeper than 40 mt or according to the oxygen percentage contained inside the tank.
Maximum PPO₂ 1,4 BAR
- Respect the ascent speed recommended by the device; an excessive ascent speed exposes the diver to death danger.
- The computer calculates the total ascent time but this could be longer than the one visualised, according to some parameters calculated by the computer during the whole dive. Trying to ascend at the correct speed and respect the visualised depth of the stops helps to respect this time.
- Respect always the No FLY Time: never take a plane if the No FLY Time icon is still visible on the screen. Remember to plan the last dive of the series taking into consideration the advices given by DAN (Divers Alert Network).
- Even respecting all expected intervals, the current Hyperbaric Medicine cannot exclude the onset of the Decompression Sickness in a plane after diving .

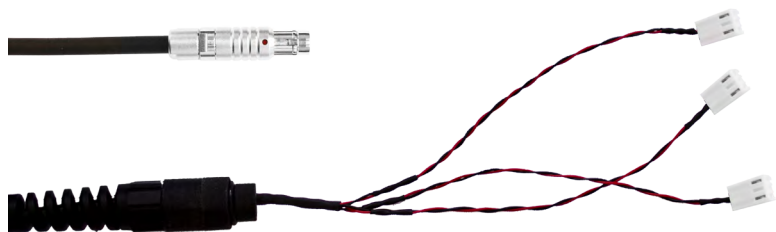
Models of Sensor Board

The iX3M Reb is equipped with a digital port that allows to connection with a sensor board.

A Sensor board compatible with your Rebreather model is required.

Refer to the manufacturer of your Rebreather in order to know the required technical specifications (screw pitch, number of sensors, etc.)

Example of Sensor board with 3 Oxy Molex connector.
(your sensor board could be different)



Example of Sensor board with SMB Molex connector.
(your sensor board could be different)



If you would like to use a Sensor Board with analogical Fisher plug, the dedicated RATIO® adapter "Analogical -> Digital" is required.



Connect the iX3M to the Sensor Board

Sensors of the Rebreather -> Sensor Board

Refer to the manufacturer of your Rebreather in order to know how to plug the sensors to the Rebreathers and to the Sensor Board (the procedure could be different according to the model of the Rebreather)

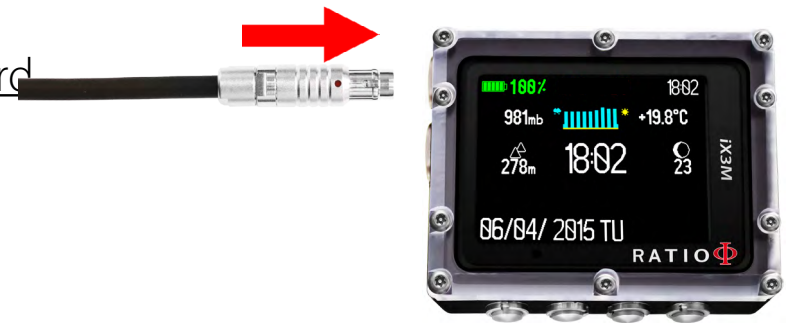
Plug the sensors to the Sensor Board before to plug the Sensor Board to the iX3M Reb.

Sensor Board -> iX3M Reb

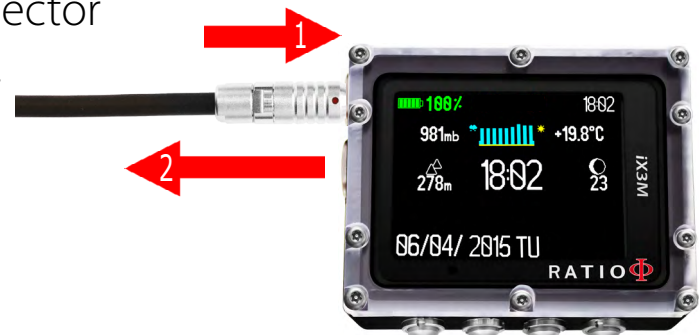
Remove the protection cap from the iX3M Reb (Warning: in order to use the iX3M reb without the Sensor board, the protection cap is needed! Diving without a sensor board or the protection cap will cause the flooding of the unit!)

Plug the sensor board as shown in the picture.

Always check that the red-dot on the connector of the sensor board and the red-dot on the connector of the iX3M Reb match up.

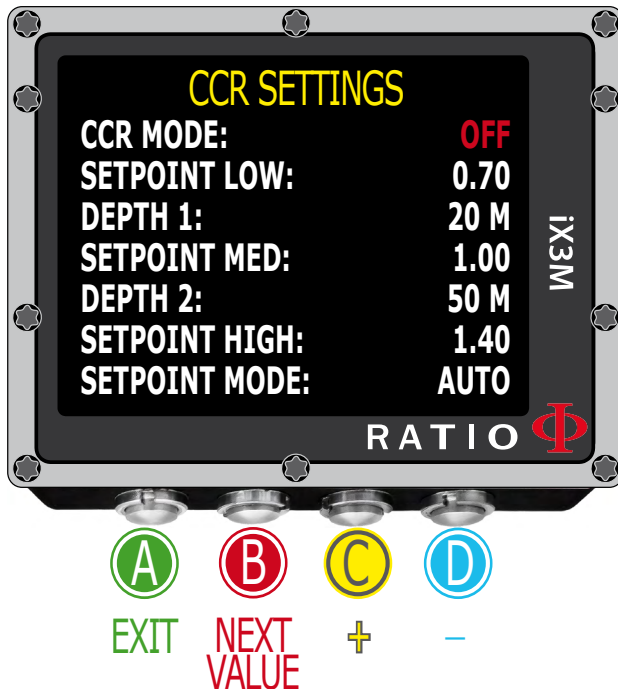


In order to unplug the Sensor board push the Sensor board's connector (in order to release the safety lock) and (gently) pull the connector. (Warning, grab the connector, do not grab the cable!)



iX3M in CCR mode

Activate the CCR mode



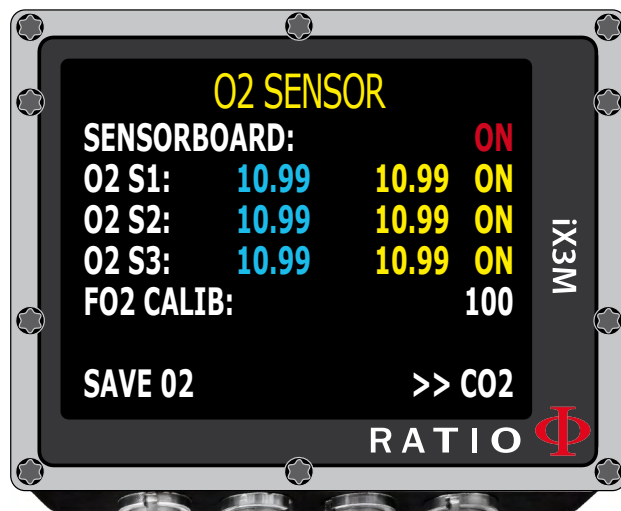
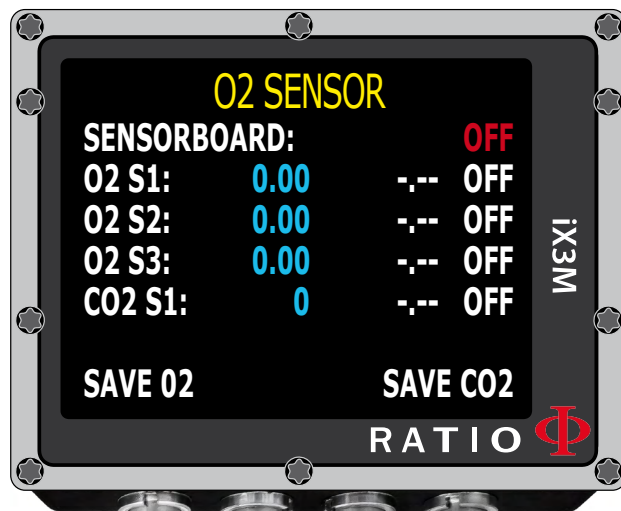
In order to use the iX3M with a Rebreather activate the CCR mode.

Browse for CCR SETTINGS and set CCR Mode = ON

Refer to the main iX3M manual in order to use the iX3M in CCR mode without using the Sensor Board.

The main manual of the iX3M is available at this link:
<http://www.ratio-computers.com/support>

Activate and calibrate the Sensor Board



If the Sensor Board is active the PpO2 detected by the Sensor board will be used for the deco calculations. **If the Sensor Board is active the iX3M will ignore the manually set "Set Point" in the CCR SET menu.**

In order to activate the sensor board set **SENSORBOARD = ON**

Activate (**ON**) one or more Oxy sensor (according to how many sensors are available/plugged to your rebreather).

Is possible to calibrate the Oxygen sensors of the sensor board using up to pure oxygen. Set the **F02 CALIB** value (from 18% to 100%) according to the mix you are using to calibrate the sensors. The oxygen partial pressure reading will be automatically compensated considering the current altitude

The iX3M will show the mV value sent from the sensor in Real Time.

Wait for a stable detection of each mV value, than browse with B button to SAVE O2 and save the values pressing C or D.

Press A to exit. (Warning: Saving the values is required in order to let the Sensor board works properly.)

Do not calibrate the sensors in a closed environment or in polluted air. Refer to the producer of your Rebreather in order to know the calibration procedure/requirements of your Rebreather model.

The iX3M with Sensor Board is a passive unit, no data is sent form the iX3M or from the Sensor Board to the Rebreather.

iX3M with Sensor Board during the dive

If the Sensor Board is active the iX3M will ignore the manually set “Set Point” in the CCR SET menu.

During the dive the values of the oxygen sensors are shown in the middle left part of the display of the iX3M. If one or more sensor is not active the symbol -- will be shown.

Voting logic

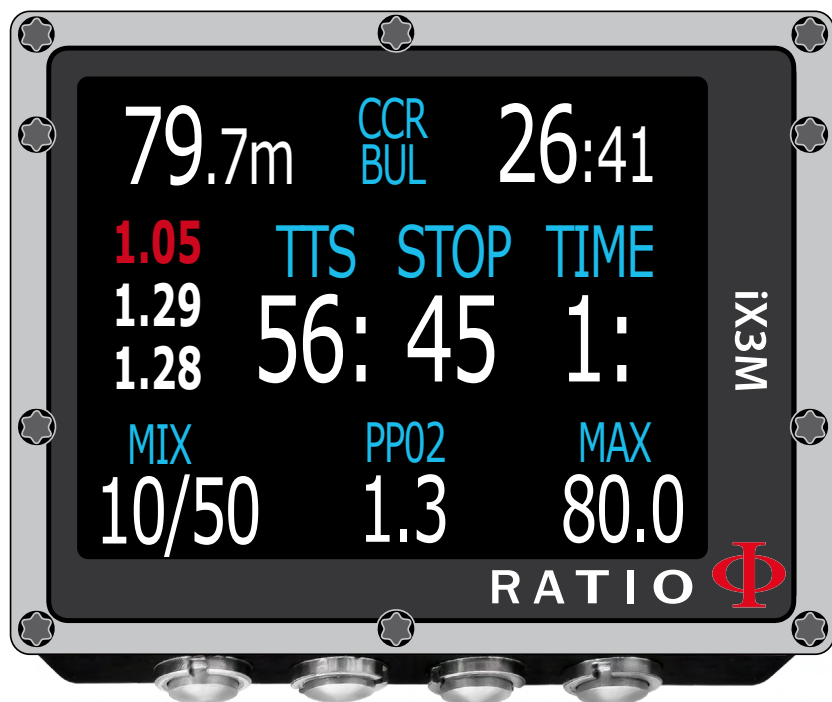
The iX3M Reb uses the “voting logic” to validate the sensor board readings. The PP02 value that is used for the deco calculation is shown in the middle-bottom part of the display (**PP02**)

The **PP02** value is the arithmetic average of the oxygen voted-in sensors values (validated using the “voting logic” system)

An alarm is activated if the PP02 value is above 1.75 or below 0.15

The single readings of the oxygen sensor are shown in the middle left part of the display. An oxy value is considered “not reliable” if its reading is 0.15 above or below the other two oxy sensors. The excluded oxygen value is displayed in red.

If an oxygen sensor is not updated for more than 5 seconds the value will be displayed in yellow.



WARNING, diving with Rebreathers requires a specific training.

This document DOES NOT qualify you to dive with a Rebreather.

Diving with Rebreather without a suitable training or without the due caution can cause injuries or death.

This document DOES NOT replace an adequate diving training and should be used only by those divers who have been appropriately trained by a certified diver training organization.

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