O'Dive sensor
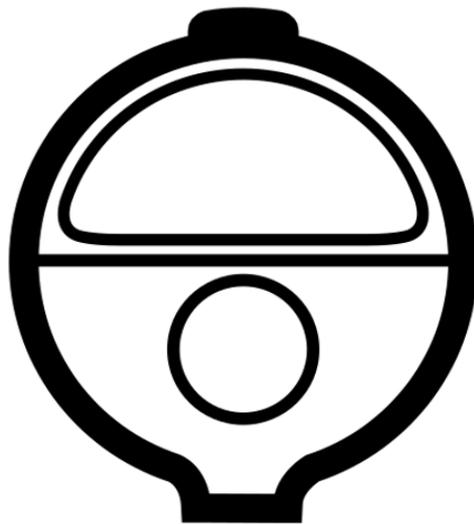# Complete instruction manual

Updated on 27/02/2020

Download of the O'Dive ONE or O'Dive TEK app is required

https://www.o-dive.com

WARNING

O'Dive (ONE or TEK) is a connected acoustic sensor that allows the measure of the decompression adequacy to the diver's practice.

The features of the service imply practicing diving in a club or individually. O'Dive is not a medical device and does not provide medical advice.

Any advice or other items available in our service are intended solely for general information purposes. They are not intended to serve as a reference or to substitute professional medical advice based on the personal situation of the user.

Azoth Systems disclaims any responsibility for actions taken by the user because of advice and information provided by the service. In particular, if the user has not consulted a medical doctor and does not have a medical certificate authorizing him to practice diving.

Direction of use

For a given set of dive parameters (depth, duration and decompression stops), it is recognized by the scientific community that a decompression procedure resulting in no or a few microbubbles is renowned safe.

The O'Dive solution assists the diver to help him adapt and improve his practice, limiting his bubble level, and therefore increasing his diving safety level.

The sensor measures the microbubble rate in the diver venous system following a dive. Combined to the diving parameters, these measurements allow the calculation of the quality of the decompression procedure used.

If the procedure is not optimal, the O'Dive app put at the diver's disposal a simulator allowing him to visualize the effects of several actions to improve the quality of his procedure while making progress in his practice.

By using regularly O'Dive technology, the diver will improve his self-understanding. He will therefore be more likely to wisely adjust his decompression procedures and diving practice.

Decompression sickness (DCS) are intrinsically related to the dissolved gas charge in the diver's body. The O'Dive solution is designed to help the diver advance his practice by better understanding the effects of decompression. It does not claim in any case, even when the quality index is 100%, that no risk of DCS is incurred by the diver. Zero risk does not exist. The only way to avoid exposure to DCS is not to dive.

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O'DIVE Perimeter and usage restriction

O'Dive ONE

O'Dive ONE allows for analyses of **open-circuit** dives with Air or Nitrox as bottom gas, with or without use of oxygen enriched mixtures for decompression stops.

Multi-level dives can be handled, as long as the **maximum depth is below 60m**. The algorithm will consider an equivalent square profile, based on the parameters input by the diver in the app: maximum depth, total duration and actual decompression duration provided by the dive computer. The additional stops eventually performed by the diver are taken into consideration to evaluate their benefit on the exposure severity.

Repetitive and multiple dives - i.e. with a surface interval below 12 hours – can be analysed (for example: cruise with several dive per day). The residual gas load is considered as long as the diver is using the same computer for all his dives.

Sawtooth profiles and inadequate **ascending speed** cannot be detected with the manual input mode offered by O'Dive One. Therefore, the results provided to the diver do not consider these additional risk factors.

O'Dive TEK

O'Dive TEK allows for analyses of **open-circuit** and **closed-circuit** with Air or Trimix as bottom gas, with or without use of oxygen enriched mixtures for decompression stops.

In any case, the nature of gases breathed at the bottom (diluent for CCR and bottom mix for OCR) or during the stops (PpO2 for CCR and gas switch for OCR) as well as the computer GF settings (GFLow/GFHigh) must be input in the app.

Incorrectly input fields can lead to results that don't reflect the actual quality of the decompression.

Two parameters input modes are available:

- Manual input: it is only to be used for **square profiles** or equated to square – i.e. profiles whose bottom depth change amplitude is low compared to the maximum depth reached (+/-5m), for example a wreck dive; the diver has to input all the fields required to characterized the exposure severity, among which the descending speed, the ascending speed to the first stop and the stops durations.
- Import mode: it allows a finer analysis of the actual profile based on the data stored on the dive computer ; the **multi-level** dives are handled as long as the **maximum depth is below 120m**; the additional stops eventually performed by the diver are taken into consideration to evaluate their benefit on the exposure severity.

Repetitive dives - i.e. with a surface interval below 12 hours – cannot be analysed.

Sawtooth profiles cannot be detected. Therefore, the results provided to the diver do not consider this additional risk factor.

Inadequate **ascending speed** are however taken into consideration in the results provided to the diver, whether they are manually input or deducted from the analysis of the computer data.

Step-by-step guide for using O'Dive

Step 1 – Charging the sensor

Before each use of the sensor, it is important to charge it in order to have the necessary autonomy to the realization of your measurements.
IMPORTANT: It is strongly advised to make sure that the sensor is properly charging before leaving it on its charging base, in order to avoid discharging and deterioration of the battery.

• Connect the induction charger to the provided 220V-60Hz adapter or to a USB port.
• Position the sensor on the charger, face with markings in contact with the induction charger. When the sensor is in the right position, the sensor LED will flash in green, indicating that the sensor is charging. If the battery is full enough, the LED will flash rapidly 5 times, then slowly 2 times, and will stop.

• If the sensor LED does not flash in green, adjust the sensor position on the charger.
• If the sensor LED is flashing in red, remove the sensor from the charging base, then put it back and adjust the sensor position on the charger.
• If the sensor starts (vibration + blue flashing), remove the sensor from the charging base and turn it off, then put it back and adjust its position on the charging base.
• At the end of the charge (maximum duration of 6 hours), the LED will stop. Your sensor is then ready to be used.

Step 2 – Downloading the O'Dive app

The sensor is operating with the O'Dive ONE & O'Dive TEK apps, available on the Apple Store and on Google Play.


Once the app is installed, you can use your sensor.

Step 3 – Taking in hand the sensor

Starting the sensor

To start the sensor, **press for 1 second** the button located on its top. The sensor vibrates and the LED will flash rapidly in blue (1 flash per second for 90 seconds) signaling the possibility of pairing a phone.
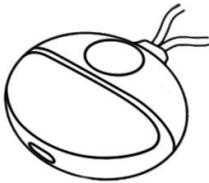
A **red flashing** LED indicates a low battery level. In this case, the sensor has to be charged as soon as possible. (see step 1).

button + LED
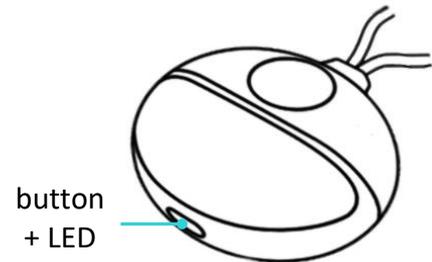
Turning the sensor off

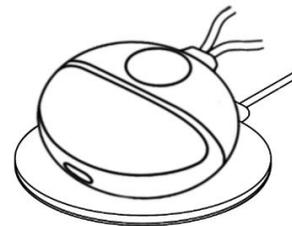There are 3 ways you can turn off your sensor:

- Press the on/off button for 3 seconds (the flashing LED stops and the sensor vibrates)	- Disable the WIFI connection on your smartphone	- Place the sensor on the induction charging station (see step 1)

OFF

Technical Characteristics

Weight	Less than 0,5kg
Sensor dimensions (L x W x H)	78,8 x 73,5 x 34,6 mm
Doppler frequency	2MHz
Endurance	3H continuous wave
Battery	LiPo (Lithium Polymère) rechargeable
Battery power	7,4V – 600mAh
Recharge	Induction – 2A
Wireless connection	Wi-Fi
Operation temperature range	0°C – 40°C
Storage temperature range	-35°C – 65°C
Humidity	35% - 85% RH
Conformity	CE

The sensor can be cleaned with a damp cloth after use.

Step 4 – Registering / Logging in

- Before using the sensor, you need to create an account on the app.
- Open the app and click on the button Register. If someone is already logged in, click on the name on the top right corner of the home page to join the section 'My account' and click on the button Register.
- Follow the steps.
- If you want to import your dives' profiles from Subsurface, fill in your Subsurface email address and password.
- In case you always use the same sensor, fill the field 'Sensor number' (you can scan the QR code on the tag, type the number with the keyboard, or select the sensor Wi-Fi - on Android only).
- Do not forget to accept the Terms of Use (TOU).

If you already have an account, go to Log in and fill in your email address and password.

Step 5 – Taking measurements

Measurements must be undertaken after diving, when the rate of gas microbubbles in the blood is potentially the highest.

Four measurements (each 20 seconds long) will be carried out:
- **30 minutes following the dive**: one under the left clavicle then one under the right clavicle;
- **60 minutes after the dive**: one under the left clavicle then one under the right clavicle.
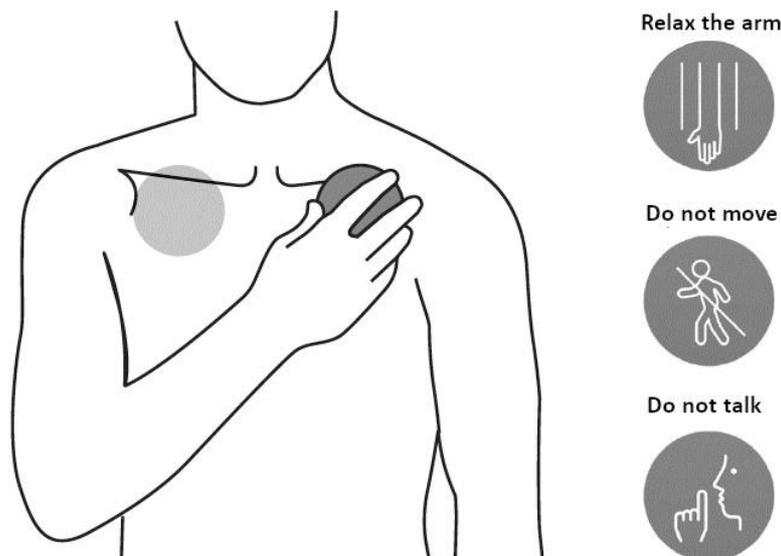
IMPORTANT: It is strongly advised to watch the tutorial on the app to fully understand how to position the sensor. An incorrect sensor positioning under the clavicle will result in bad measurements and, therefore, an impossibility to analyze the signals. Please practice positioning of the sensor in front of a mirror before making measurements after your dives.

Before any measurement, make sure that your name is displayed on the top right corner of the screen. If it is not the case, click on the other name to join the section 'My account' and log in or register (see step 4).

- Select New measurement: the app creates a new dive and requests you to start your sensor.
- Check that the proposed sensor number is matching your device. If not, click on Change sensor, fill the sensor number (see step 4) and validate. Start the measurement again by clicking New measurement then Use current dive.
- When the sensor number is correct, start your sensor (see step 3), then click Connect on the app. The sensor will now pair with your smartphone via Wi-Fi. **Important**: data sharing via Wi-Fi needs to be deactivated.
- When the pairing is done, the LED starts **flashing in green**, the Start button becomes accessible, and the battery pictogram on the top right corner of the screen gets activated.
- Follow the app's steps to perform the two measurements.
- Before starting the recording, a screen allows you to check the correct positioning of the sensor using a spectrogram.
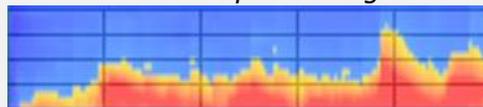

Recommendations:
- The visual objective is to obtain a periodic yellow-red signal whose height and length will be as large as possible.
- To confirm the positioning, stand still for a few seconds and breathe deeply.
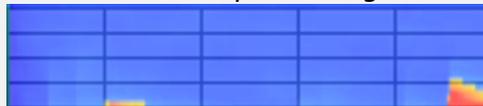- Apply moderate pressure so as not to "chase" the gel off the sides of the sensor.

Correct positioning:
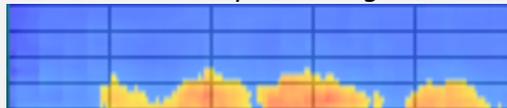
Excellent positioning:

Incorrect positioning:

- When you have found the correct positioning, press Start to launch the measurement. From this point on:
  - Do not try to "improve" the signal by moving the sensor.
  - Breathe very deeply without forcing, following the sinusoid.
  - Do not make any arm or shoulder movements and do not cause muscle contraction.

- If the measurement is unsatisfactory, the application will prompt you to repeat the measurement. Make sure that the sensor is correctly positioned and that you follow the instructions given (no talking, relaxed arm, forced breathing).
- At the end of a series of two measurements (left then right), the sensor switches off automatically.

- To perform the second series of measurements (30 minutes after the first one), select New measurement, press Use current dive so that all measurements are related to the same dive.

Step 6 – Validating and synchronizing measurements

Once the measurements are done, you must input your dive parameters and synchronize your data with Azoth Systems' server to get your results.

Note: synchronization of the data requires a connection to a Wi-Fi or a 4G network.

Input your dive parameters

If you use O'Dive ONE, go to My results. Select your dive under the 'Pending' tab, input your dive parameters and validate.

If you use O'Dive TEK, go to My results. Select your dive under the 'Pending' tab. You can then either import the dive profile or do a manual input.

For importing the profile, click on Import data then Import from a dive computer (works only under iOS with Shearwater) or Import from Subsurface cloud and select the corresponding dive. Then, fill in the fields left in blank and validate.

For a manual input, input your dive parameters and validate.

Synchronize your data on the server

- Once your parameters are input, go to the section My results and click on Synchronize on the top right corner of the screen. The dive and the related measurements are sent to our server to be analyzed and are now listed under the 'Dives' tab.
- In case there are still some dives under the 'Pending' tab with the pictogram ⓘ, you must input the dive parameters and synchronize one more time.

Step 7 – Evaluating your procedures

A few minutes after the dive, you will receive an email notification indicating that your dive has been analyzed. This recommendation is presented as a graph evaluating the level of adequacy of your decompression procedure to your diving practice.

- Go to the section My results and click on Synchronize. You will be able to see on the graph if your decompression procedure is optimal, perfectible or to be changed.
- A simulation tool is available to help you see the potential benefits of several factors on the quality of your decompression procedure. To use this tool, select the dive that

you want to simulate and change one or several of the proposed factors to improve your procedure quality.

Support - Contact

We are looking forward to hearing from you regarding the quality, functionalities or use of this product.

We are committed to reply to you without delay:

contact@azoth-systems.com

Legal Notice

This product and its battery pack cannot be discarded in the domestic waste. They require separate collection. Ensure that you dispose of your O'Dive electronic product and batteries in a sensible and considerate manner, at a collective recycling point. This valorization of your electrical waste contributes to protect the environment and your health.