

**ALADIN® AIR 2 Nitrox****OPERATING MANUAL**

English



Active Light

**UWATEC®**  
SWISS MADE BY UWATEC AG

The Aladin® Air Z Nitrox diving computer has been designed for diving on **Nitrox** (oxygen/ nitrogen mix with a max. of 50% O<sub>2</sub>) and air (21% O<sub>2</sub>). The diving computer displays the level of oxygen toxicity (CNS O<sub>2</sub> %) and gives out warnings on oxygen toxicity and on high oxygen partial pressure (ppO<sub>2</sub>). Without exchanging the diving computer a diver can dive on different mixtures (Nitrox and compressed air) during the day. Using the **dive planner** a diver can determine the best mix for a certain maximum depth and/ or find out the maximum operation depth (MOD) for a given mix.

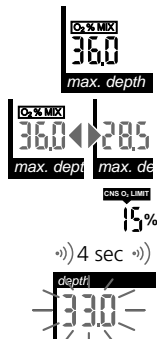
### Nitrox Information

The selected **percentage of oxygen (O<sub>2</sub>% Mix)** is displayed on the surface and during the first five minutes of a dive, until a first maximum depth is reached, which will then be displayed.

After the dive the display of oxygen percentage and maximum depth will alternate for a five-minute-waiting-period (Wait-Mode).

The danger of oxygen toxicity symptoms increases as the shown **oxygen toxicity percentage (CNS O<sub>2</sub>% LIMIT)** approaches 100%.

The figures for the set **maximum allowable partial pressure of oxygen (ppO<sub>2</sub> max)** will not be shown. However, the Aladin® Air Z Nitrox warns the diver as soon as he reaches the depth in which the maximum allowable partial pressure of oxygen will be reached.



### Setting the gas mixture (O<sub>2</sub>% Mix)

Bridge and then to switch from ready- or surface-mode to the O<sub>2</sub>%-mix-mode (Add).

Bridge and to select a level of O<sub>2</sub> between 21% and 50% (2% steps).

Bridge to confirm your entry. If you do not confirm your entry the O<sub>2</sub>%-mix-mode will turn off automatically after 3 minutes and your entry will not be accepted!



### Dive Planner

Press 2x and 1x to activate your dive planner.



The oxygen toxicity is not taken into account by calculations of the dive planner.

#### Planning a No-Stop Dive



The dive planner will only display depths which lie within the limits of the maximum allowable partial pressure of oxygen (ppO<sub>2</sub> max).

#### Planning a Nitrox-dive

The dive planner of the Aladin® Air Z Nitrox always plans dives based on the selected oxygen percentage. It can be used to:

- Calculate the maximum depth (MOD, Max. Operation Depth) to be reached with a given mixture.
- Calculate the necessary mixture (Best Mix) for a dive with a given depth.

#### Calculating the Max. Operation Depth (MOD)

Set the desired percentage of oxygen and activate the dive planner as described on page 66/67 of the Air Z manual.

Observe the depth indications and memorize the greatest depth displayed. This is your maximum depth for a dive with the set mixture and the set maximum partial pressure of oxygen.

#### Calculating of the mixture for a given depth (Best Mix)

Activate the dive planner (Air Z page 66/67) and observe the maximum depth displayed. If the desired depth is not reached or exceeded, leave the dive planner, alter the percentage of oxygen and return to the scrolling no-stop times. Repeat this procedure until the desired depth appears as the maximum depth. The ideal percentage of oxygen for this depth will now be displayed in the ready-mode.

## Nitrox Attention messages and Alarms

### Partial pressure of oxygen reaches limit (->ppO<sub>2</sub> max)

))) 4 sec )))



**Messages:** If the partial pressure of oxygen reaches the set value, the Aladin® Air Z Nitrox gives an acoustic warning and the depth indication is flashing.

**Response:** Ascend to a lower depth in order to diminish the danger of oxygen toxicity. Observe <CNS O<sub>2</sub>%-value> carefully.

### <CNS O<sub>2</sub>%-value> reaches 75%

))) 4 sec )))



**Messages:** An acoustic signal can be heard, the symbol <CNS O<sub>2</sub> LIMIT> flashes continuously.

**Response:** Avoid a further increase by beginning the ascent.

### <CNS O<sub>2</sub>%-value> reaches 100%

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Oxygen toxicity reaching 100% can lead to dangerous neurological symptoms.

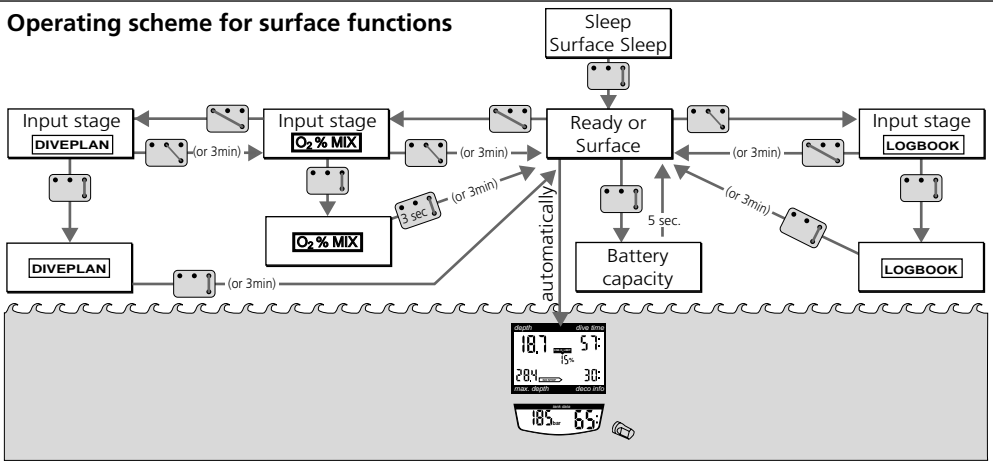
**Messages:** A visual alarm appears and an acoustic warning can be heard every 4 seconds. The CNS O<sub>2</sub>%-value and its symbol are flashing.

**Response:** Ascend immediately until the buzzer stops (ppO<sub>2</sub> is then less than 0.5 bar).



If the ascent speed is displayed and if the CNS O<sub>2</sub>% value does not increase anymore (due to a lower partial pressure of oxygen), the acoustic warning will be suppressed.

## Operating scheme for surface functions



**Oxygen toxicity (CNS O<sub>2</sub>% LIMIT)**

Oxygen toxicity is calculated on line as a function of depth values and the preset gas mixture. If the partial pressure of oxygen rises above 0.5 bar, the CNS O<sub>2</sub> value increases, if the partial pressure of oxygen is below 0.5 bar, the CNS O<sub>2</sub> value decreases.

The CNS O<sub>2</sub> status will only be displayed if higher than 5%. During the ascent the display of the oxygen toxicity is replaced by the ascent rate. See also -> Nitrox.

**Maximum allowable partial pressure of oxygen (ppO<sub>2</sub> max)**

The higher the percentage of oxygen in the used mixture, the sooner you will reach the limit of your allowable dive depth, as defined by your partial pressure of oxygen (ppO<sub>2</sub> max) settings. The maximum partial pressure of oxygen can be adjusted with the DataTalk Software between 1.20 and 1.95 bar. Standard value is 1,5 bar. A ppO<sub>2</sub> of more than 1.6 bar should not be set for safety reasons and is not recommended. The CNS O<sub>2</sub>%-value and -alarm is not influenced by the selected ppO<sub>2</sub> max. - setting.

**Partial pressure of oxygen (ppO<sub>2</sub>)**

The set value and the information about the actual ppO<sub>2</sub> are not displayed. See -> Maximum allowable partial pressure of oxygen.

**Surface-mode**

In the surface-mode the dive computer measures the build-up of micro gas bubbles and the nitrogen saturation as well as the oxygen toxicity of the tissue. The desaturation time is determined either by oxygen- or nitrogen saturation, depending on which gas takes longer. Oxygen saturation <CNS O<sub>2</sub> %> is displayed and adjusted until the value declines to 0%.

For calculations of the desaturation and No Fly Time it is assumed that the diver inhales air.

**Wait-mode**

If you need to change cylinders in this phase, make sure that the new mixture is exactly the same as the one previously used. If you want to dive with another mixture, you must have a 5-minute break at the surface to allow the Aladin® Air Z Nitrox to conclude the dive. You can then adjust the settings to the new mixture. Disregarding these rules causes the Aladin® Air Z Nitrox to calculate with wrong mixture data. This can lead to injury or death.

**Nitrox**

Nitrox is a gas mixture consisting of nitrogen and oxygen. The kind of air used for diving with compressed air is the same as the normal air of the earth's atmosphere (78% nitrogen, 21% oxygen and 1% inert gases). Therefore, normal air is also Nitrox!

However, Nitrox as a breathing gas for diving contains a higher percentage of oxygen than normal air. A higher percentage of oxygen (and therefore a reduced amount of nitrogen) has the advantage of lengthening the no-stop phase (or reducing the decompression phase), since less nitrogen is dissolved in the diver's body during the dive.

The higher percentage of oxygen in the Nitrox-mixture can cause additional physiological problems because of the toxic effects of a heightened partial pressure of oxygen (ppO<sub>2</sub>). When breathing oxygen at a higher partial pressure, two kinds of oxygen toxicity can occur:

- **CNS damages:**  
Symptoms of intoxication can occur at short notice in the central nervous system (CNS). Such symptoms are: irritation of the respiratory organs, sickness, headache, pulmonary oedema, cramps, unconsciousness. The symptoms can occur at a ppO<sub>2</sub> of essentially more than 1 bar and they depend on the length of exposure and on the partial pressure of oxygen.
- **Damages of the lungs:**  
Symptoms of pulmonary intoxication are long-term effects and may not occur immediately. The symptoms can occur at ppO<sub>2</sub> rates from 0.5 bar and higher and due to long time exposure in the range of several hours/ days.

Aladin® Air Z Nitrox considers the short term toxic effects of oxygen (CNS damages) by means of the so called "oxygen- clock". It is based on a list which shows the units of toxicity for oxygen per unit of time and is dependent on the ppO<sub>2</sub>. The indication of toxicity is shown as "CNS O<sub>2</sub> %" (= relative toxicity of oxygen for the central nervous system). CNS O<sub>2</sub> = 0% reflects a normal physical state before the first dive, CNS O<sub>2</sub> = 100% reflects

ts the critical upper limit. The list, initially published by the US Navy, is nowadays known as the IANTD- list. We modified this list for the use with Aladin® Air Z Nitrox in cooperation with Dr. Bill Hamilton, Hamilton Research Ltd. (Tarrytown, NY), a well-known specialist.

Since long term oxygen intoxication is almost irrelevant for diving with independent diving equipment it is therefore not considered in the calculations of Aladin® Air Z Nitrox.

Safety Considerations



- The Aladin® Air Z Nitrox is designed for dives with Nitrox (max.50% O<sub>2</sub>) and compressed air (21% O<sub>2</sub>) only. Do not use the Aladin® Air Z Nitrox for dives with other breathing mixes.
- It is essential to check the O<sub>2</sub> settings of your computer before each dive and to compare them with the gas mixture you are using. Always remember: Wrong mixture settings can result in insufficient calculations of decompression time and oxygen-toxicity, which can be fatal!
- The danger of nitrogen narcosis must always be taken into consideration, regardless of the gas mixture you are using. The Aladin® Air Z Nitrox gives no warning about this.
- Always check the diving limits considering the oxygen content and standard sports diving procedures. Do not dive deeper than 40 metres (130 feet).
- If the CNS O<sub>2</sub> status reaches 75% you must ascent immediatly!
- Only dive with Nitrox after you have been thoroughly instructed by a recognised institution.
- When diving with Nitrox only use components that have been authorized for diving with Nitrox equipment.
- Only use Aladin® Air Z Nitrox with open breathing systems. Aladin® Air Z Nitrox must be set for a determined gas mixture. In semi-closed and closed systems the gas mixture can vary considerably. The calculations may yield results different from those necessary for the actual mixture.
- Only use Aladin® Air Z Nitrox for diving with an independent breathing apparatus. Aladin® Air Z Nitrox is not designed for long-term exposure to Nitrox.
- Make sure your surface interval is long enough (just like diving with compressed air). Oxygen, too, needs sufficient time to leave the body. Do not start your next dive before your CNS O<sub>2</sub> % status has dropped below 40%.

This operating manual makes use of the following icons to indicate especially important comments:

Remarks:



Informations and tips which are important for optimal use of the functions of your Aladin® Air Z Nitrox.

Attention:



Informations and tips which are important for optimal use of the functions of your Aladin® Air Z Nitrox.

Danger!



Indicates a potentially hazardous situation which, if not avoided, could result in death or serious injury.



**Dealer address:**

(Dealer to affix stamp)