OPERATING MANUAL

English

NitrOX

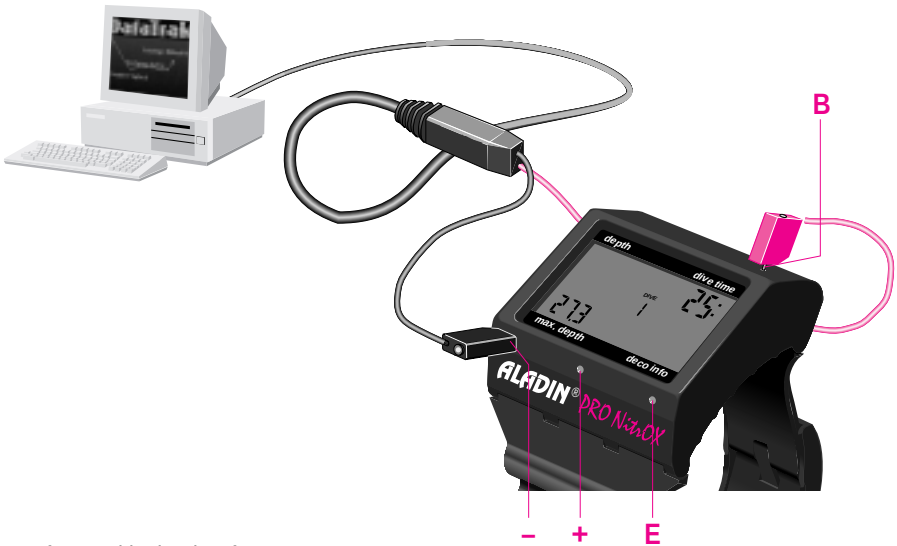
CE

ALADIN® PRO NitrOX
SWISS MADE BY UWATEC AG

You must carefully read this entire manual before using your Aladin® Pro Nitrox.

Diving has many inherent risks. Even if you follow the instructions of this manual in a careful fashion, it is still possible that you may be seriously injured or die from decompression sickness, oxygen toxicity or some other inherent risk of scuba nitrox. Unless you are fully aware of these risks and are willing to personally accept and assume responsibility for those risks, do not use the Aladin® Pro Nitrox!

The Aladin® Pro Nitrox is a decompression tool to assist a trained and certified diver in making decisions concerning dive planning and execution. As with any tool, the Aladin® Pro Nitrox may be misused if the following safety and operational precautions are not strictly followed. If they are followed, careful use of the Aladin® Pro Nitrox can increase your diving enjoyment and reduce your risk of decompression sickness. If they are not, you will be placing yourself at serious risk for decompression sickness.
While the Aladin® Pro Nitrox is a technically advanced tool based on biophysical models of decompression sickness and oxygen toxicity, neither it nor any other diving computer (or table) can actually monitor the physiological changes that occur in your body as you dive. In addition, each diver will vary in his or her susceptibility to decompression sickness. Not only that, but each individual diver‘s own susceptibility may vary from day to day. Combined with the fact that decompression modelling is an inexact science, and of necessity must be based at least partly on certain unproven assumptions, it is incumbent upon you, the individual diver, to dive responsibly and to carefully follow all standard safe diving practices as well as the admonitions contained in this manual.



Interface and logbook software
DataTrak (Option)

Dive Computer Aladin® Pro Nitrox

Important remarks concerning signal words and symbols

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® Pro Nitrox.

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

The following symbols are used in the operating manual:

Flashing display

Acoustic alarm signal

Operating instruction for manual input (Example: bridging contacts B and E)

Guidelines for the use of Aladin® Pro Nitrox:

The following guidelines for using Aladin® Pro Nitrox are derived from the latest medical research for diving with diving computers. Following these guidelines will greatly increase your safety while diving, but cannot guarantee that decompression sickness will not occur.

– The Aladin® Pro Nitrox is designed for dives made with nitrox and compressed air (21% O_2) only. Do not use the Aladin® Pro Nitrox for dives made with other mixed gases.

– It is essential to check the set mixture before each dive and to compare it to the gas mixture to be used.

  Always remember: Setting a wrong mixture causes either insufficient decompression calculations or a too low calculation of the oxygen-toxicity!

– Do not dive deeper than 40 metres.

– Always check the diving limits given by the chosen percentage of oxygen.

– On all dives with the Aladin® Pro Nitrox, make a safety stop for three to five minutes within the 3 to 9 metre zone.

– Always make the deepest dive of the day first when repetitive dives are planned, and for each successive dive make sure that the deepest portion of that dive is done at the beginning of the dive.

– All divers using dive computers to plan dives and indicate or determine decompression status must use their own computer.

– If the Aladin® Pro Nitrox fails at any time during the dive, the dive must be terminated, and appropriate surfacing procedures (including a slow ascent and a 3 to 5 minute safety stop) should be initiated immediately.

– On any given dive, all divers in a buddy group must follow the most conservative dive computer for that particular dive.

– You should not dive for a period of twenty-four hours before activating the Aladin® Pro Nitrox to use it to plan or control your diving.

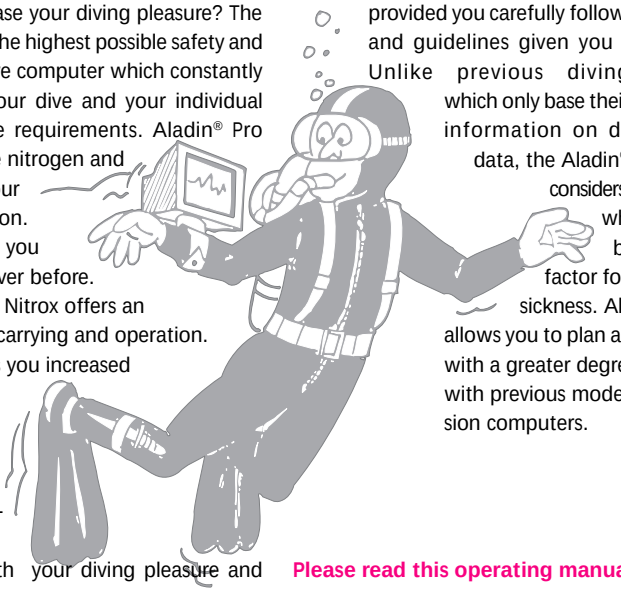
– Always observe the optical and acoustic alarm signals of the Aladin® Pro Nitrox. Avoid situations of increased risk which are marked with a warning sign in this operating manual.

LIST OF CHAPTERS

I INTRODUCTION

1 Aladin® Pro Nitrox – Introduction

What can further increase your diving pleasure? The good feeling of having the highest possible safety and freedom to move. A dive computer which constantly controls the data of your dive and your individual behaviour meets these requirements. Aladin® Pro Nitrox watches over the nitrogen and oxygen saturation of your body without interruption. With Aladin® Pro Nitrox you dive more safely than ever before. In addition, Aladin® Pro Nitrox offers an unmatched comfort in carrying and operation. Aladin® Pro Nitrox gives you increased safety due to the new calculation model. All informations necessary for safe diving are combined in one instrument. The Aladin® Pro Nitrox can increase both your diving pleasure and safety by reducing your risk of decompression sickness provided you carefully follow the instructions and guidelines given you in this manual. Unlike previous diving computers, which only base their decompression information on depth and time data, the Aladin® Pro Nitrox also considers the temperature which is known to be additional risk factor for decompression sickness. Aladin® Pro Nitrox allows you to plan and execute dives with a greater degree of safety than with previous models of decompression computers.



Please read this operating manual carefully and to the last page.

2 Aladin® Pro Nitrox – More Safety in Diving

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!

When talking of Nitrox as the breathing gas for diving, it describes a mixture with a higher percentage of oxygen. A higher percentage of oxygen (and automatically the reduction 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 share of oxygen in the Nitrox-mixture also causes additional physiological problems by the toxic effects at a higher partial pressure of oxygen (ppO_2). When breathing oxygen at a higher partial pressure, two kinds of oxygen toxicity can occur:

CNS damages:
Symptoms of poisoning occuring at short notice in the central nervous system(CNS). Such symptoms are: irritations of the respiratory organs, sickness, headache, pulmonary oedema, cramps, unconsciousness. The symptoms occur at a ppO_2 of more than 1 bar and depend on the term of exposure and on the partial pressure of oxygen.

Damages of the lungs:
Symptoms of pulmonary poisoning occuring in the long run. The symptoms occur at a ppO_2 from 0.5 bar and higher and with terms of exposure in the range of days/weeks.

Aladin® Pro Nitrox considers the short term toxic effect 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_2. The indication of toxicity is shown as „CNS O_2 LIMIT" (= relative toxicity of oxygen

for the central nervous system). CNS O_2 LIMIT 0% corresponds to the normal state before the first dive, and CNS O_2 LIMIT 100% corresponds to the critical upper limit. The list, initially published by the US Navy, is nowadays known by the names IANTD- or NOAA-list. We modified this list for the use with Aladin® Pro Nitrox in cooperation with Dr. Bill Hamilton, Hamilton Research Ltd. (Tarrytown, NY), a well-known specialist.

The long term kind of oxygen poisoning has practically no relevance for diving with independent diving equipment and is therefore not considered in the design of Aladin® Pro Nitrox.

If nitrox is used for diving profound additional training is needed because of the physiological peculiarities of oxygen and the changing decompression due to the reduced percentage of nitrogen.Additional technical problems with the use and the maintenance of parts of the equipment are additional potential dangers when diving with nitrox. Therefore, we recommend strict adherence to the following guidelines.

1. Only dive with nitrox if you have been trained thoroughly by a recognised agency.

2. Only use Aladin® Pro Nitrox with open breathing systems. Aladin® Pro Nitrox must be set for a determined gas mixture. In partially-open and in closed circulation-systems, the gas mixture can vary considerably. The calculations may yield results different from those necessary for the actual mixture.

3. Only use Aladin® Pro Nitrox for diving with an independent breathing apparatus. Aladin® Pro Nitrox is not designed for long-term exposures with Nitrox.

4. Aladin® Pro Nitrox always calculates considering the gas mixture set by the user. It is essential to check the mixture calculation before each dive and to compare it to the gas mixture to be used. Maximum deviation from the mixture calculation must not exceed 1% O^2. A wrong gas mixture can be lethal!

5. Aladin® Pro Nitrox has a ppO_2-warning, the default-limits of which are set at 1.5 bar ppO_2^{max}. This limit can be adjusted via Interface/Data Talk in the range of 1.2 to 1.95 bar. An alternation of the ppO_2^{max} to higher than 1.6 bar is risky and is not recommended.

6. Frequently check the „oxygen-clock“ (CNS O_2 Limit), especially when the ppO_2 is greater than 1.5 bar. Close the dive if the CNS O_2 Limit exceeds 75%.

7. Make sure you have a sufficiently long surface interval, just as when diving with compressed air. Oxygen also needs sufficient time to leave the body. Go on the next dive only when the CNS O_2 Limit has dropped below 40%.

8. Aladin® Pro Nitrox is a personal instrument like any other diving computer. This still applies when diving with compressed air (21% oxygen) between two nitrox-dives. Aladin® Pro Nitrox can be adjusted to compressed air and then also includes the calculation of the CNS O_2 Limit in the same way as with any other nitrox-dive.

9. Always remember: setting a wrong mixture causes either insufficient decompression calculations or a too low calculation of the oxygen-toxicity!

3 Aladin® Pro Nitrox – Your Personal Companion

Aladin® Pro Nitrox considers your individual gas mixture, depth and time profile and water temperature. Relying on the latest results of medical and physiological research for its decompression modelling, the Aladin® Pro Nitrox differs from earlier diving computers in a number of significant ways:

- The ZH-L8 ADT decompression calculation model considers eight body tissues as well as ambient temperature. This allows for a more precise calculation of a modelled risk for decompression sickness which can lead to greater diving safety.

- The Aladin® Pro Nitrox uses both optical and acoustic alarms. The acoustic alarm uses varied sound signals to assist in identifying the reason for the alarm.

You must strictly observe all optical and acoustic alarms and take appropriate action based upon those alarms to avoid serious injury or death from decompression sickness!

- By using the Aladin® Pro Nitrox's logbook, a diver may directly call up information from the last 19 dives. When interfaced with a personal computer, 37 dives and 200 minutes of dive profile in intervals of 20 seconds can be read out.

- The dive planner allows the advance planning of no stop dives with readily determinable surface intervals.

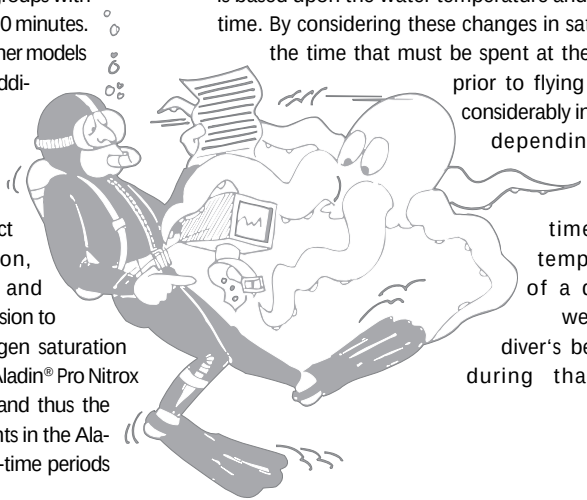
- The Aladin® Pro Nitrox is designed to be mounted on the diver's left or right wrist, which offers the maximum freedom of movement as well as easy operation and use.

4 The Calculation Model ZH-L8 ADT

4.1 Description

The Aladin® Pro Nitrox uses a new decompression calculation model known as the ZH-L8 ADT. This model uses eight compartments or "tissue" groups with nominal half time periods from 5 to 640 minutes. This model differs considerably from other models by its consideration of the following additional physiological processes:

1. Blood perfusion to the body's organs is not constant. Skin and muscle tissues are in particular subject to changes in blood perfusion, depending on temperature and workload. Changes in blood perfusion to these organs change their nitrogen saturation tolerance. The model used by the Aladin® Pro Nitrox takes these effects into account and thus the "skin" and "muscle" compartments in the Aladin® Pro Nitrox show variable half-time periods and saturation tolerances.



Decompression information is calculated according to the diver's individual behaviour and decrease in skin temperature. The decrease in skin temperature is based upon the water temperature and the dive time. By considering these changes in saturation, the time that must be spent at the surface prior to flying may be considerably increased, depending upon the depth, time, and temperature of a dive, as well as the diver's behaviour during that dive.

2. The decompression model used by the Aladin® Pro Nitrox considers nitrogen in both its dissolved as well as its gaseous phase (microbubbles). Formation of microbubbles is considered to be a strong indicator of a high risk of decompression sickness. The Aladin® Pro Nitrox model calculates the formation of microbubbles depending on various assumed influences in arterial and venous blood. In normal, slow ascents, microbubbles form mainly in venous blood. During fast ascents, microbubbles may also form in arterial blood and in the body's tissues as well. If a particular dive profile may result in the creation of microbubbles according to the Aladin® Pro Nitrox's model, decreased bottom time and/or increased decompression times as well as increased "no fly" time will be indicated.

- Microbubbles can form if the diver makes too fast an ascent, ignores required decompression stops, or makes repeated ascents during a dive (yo-yo diving). These microbubbles can form in arterial blood as well as in the body's tissues. If these microbubbles partially impair circulation, the rate of gas diffusion and saturation tolerance for those tissues immediately surrounding this area of impaired circulation are changed. If required, both decompression time and RBT will be adjusted in such a way that already existing microbubbles will stop growing. Increased decompression time will also assist those local areas of impaired circulation to desaturate with less risk of decompression sickness.

- The calculation of microbubbles results in altered ascent instructions. If microbubbles are assumed to be present based on the data used by the Aladin® Pro Nitrox, the ascent rate to the surface is reduced to 7 metres/minute. This will help prevent the formation of microbubbles in the arterial circulation and minimizes formation of microbubbles in the venous circulation after the dive.

4.2 Advantages

On the first dives following responsible diving procedures, a diver using the Aladin® Pro Nitrox should never require decompression stops, although a three to five minute safety stop between 3 and 9 metres is recommended for every dive. If, however, unplanned circumstances arise during the dive which increase the risk of decompression, the Aladin® Pro Nitrox can, if closely followed, reduce the risk of decompression sickness by reducing remaining bottom time and/or increasing decompression time. Some of the more common risk situations are as follows:

- Repetitive dives, especially those deeper than 20 metres and those with short surface intervals.
- Repetitive diving over the course of several successive days.
- Diving with increased workloads.
- Yo-yo diving (repeated descents and ascents to the surface during a given dive).
- Flying within 24 hours after diving.

If a diver experiences any of these risk factors while diving, the Aladin® Pro Nitrox will add required decompression time in order to help minimize the risk of decompression sickness.

If signs or symptoms of decompression sickness occur after diving with Aladin® Pro Nitrox, seek IMMEDIATE treatment at the nearest recompression facility.

With its new decompression model the Aladin® Pro Nitrox is an extremely versatile tool which can increase your diving comfort and safety. As with any diving tool, however, ultimate responsibility for diving safety remains with the individual diver. The same responsible diving practices taught by all diving certification agencies are still absolutely necessary in order to safely dive with the Aladin® Pro Nitrox.

Certain mistakes which may be made by a diver, such as ascending at an excessive rate, going too deep, or staying too long at depth, may be overcome if the diver carefully follows the Aladin® Pro Nitrox‘s

corrected ascent instructions. Of course, the Aladin® Pro Nitrox can do nothing to prevent the occurrence of lung overexpansion injuries or nitrogen narcosis, whose avoidance lies solely with the individual diver. The Aladin® Pro Nitrox is a highly sophisticated technical instrument which, if used and maintained properly, will have high reliability. Despite this no dive should be made with an Aladin® Pro Nitrox without a thorough understanding of decompression theory and dive table use, and every diver must have a set of decompression tables with him on every dive.

Do not use the Aladin® Pro Nitrox without a set of accepted nitrox diving tables with you as a back up decompression tool on every dive.

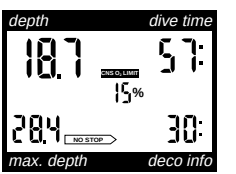
Should decompression sickness occur, whether the Aladin® Pro Nitrox was used correctly or not, a detailed history of the previous dives may be used to allow a better diagnosis and the most effective treatment for the diver.

1 Description

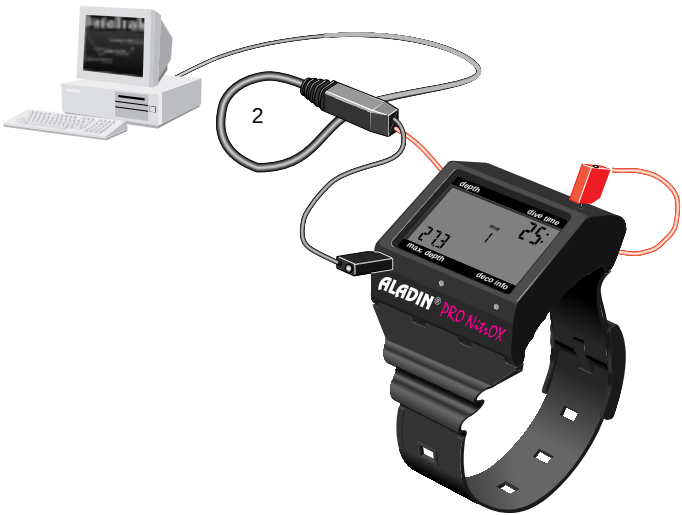
The Aladin® Pro Nitrox system consists of two units:

1 The dive computer displays the dive and decompression data.

1



2 The dive computer has a data memory which stores the dive data. The data can be transmitted to a MS-DOS personal computer with the logbook program *DataTrak* via an interface (available as an option).



2.1 Operation

Switching on display:

– automatically, on submerging in water or when adaptation to atmospheric pressure is necessary.

– manually by manipulating contacts on housing.

Switching off display:

– automatically, after three minutes without operation.

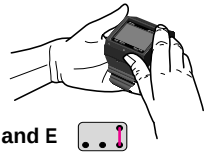
Aladin® Pro Nitrox has 4 operating contacts B, E, +, – on the outside of the housing. For manual operation, touch base contact B and any one of the other three contacts above the display with moistened fingers.

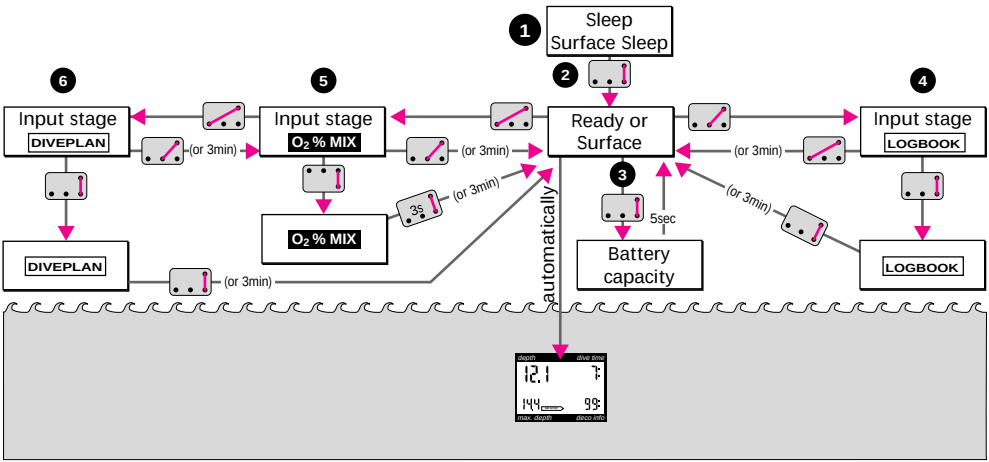
Contact B: Base contact, which has to be touched for all operations.

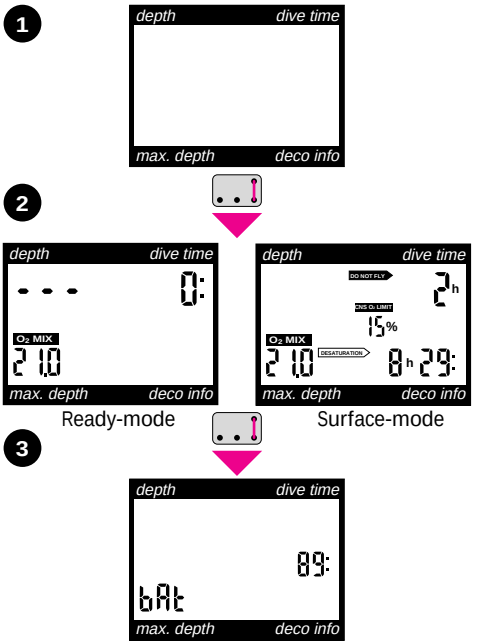
Contact E: Enter contact. It serves to switch on the computer, to activate the logbook and dive-plan mode and to switch between no-stop and decompression planning. It is also used to confirm inputs and is therefore comparable to the ENTER- or RETURN-key of a computer.

+ / – contacts: They initiate the selection of the logbook and dive-plan as well as the setting of values (time, depth, dive-number, O_2% mix etc.).

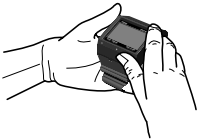
2.2 Operating scheme for surface functions







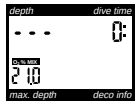
1. Aladin® Pro Nitrox is in a state of rest; no information is displayed (-> sleep-mode or -> surface-sleep-mode).



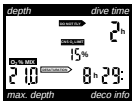
2. Bridging B and E activates the display -> ready-mode or -> surface-mode.

3. A second bridging of contacts B and E activates the display of the remaining battery capacity for approximately 5 seconds.
   As soon as the battery capacity is 0%, a battery alarm is sent (see page 37).
   There is still a small reserve left at bAt 0%.

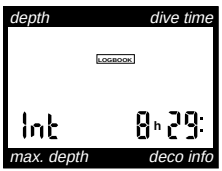
4

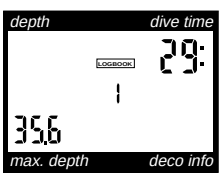


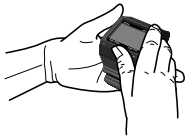
Ready-mode



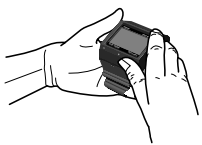
Surface-mode



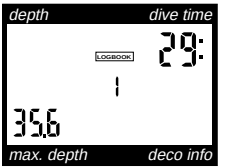


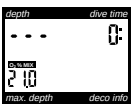


4.a) Selecting the logbook function:
B and +
Cancel: B and –
or automatically after three minutes

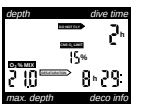


4.b) Activating the logbook:
B and E. Aladin® Pro Nitrox shows the most recent dive.





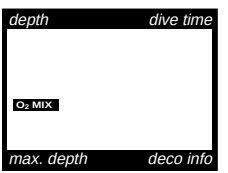
Ready-mode

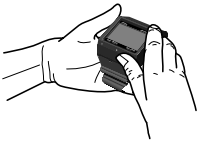


Surface-mode

5

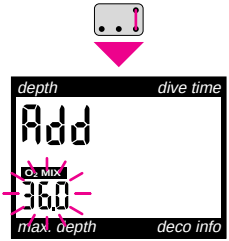
or after
3 minutes



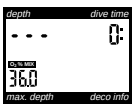


4.c) Leaving the logbook:
B and E
or automatically after three minutes.

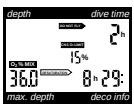
5. a) Selecting the O_2% Mix function:
B and –.
Cancel: B and +:
or automatically after three minutes.



or after
3 minutes



Ready-mode



Surface-mode

5.b) Activating the O_2% Mix function:

B and E

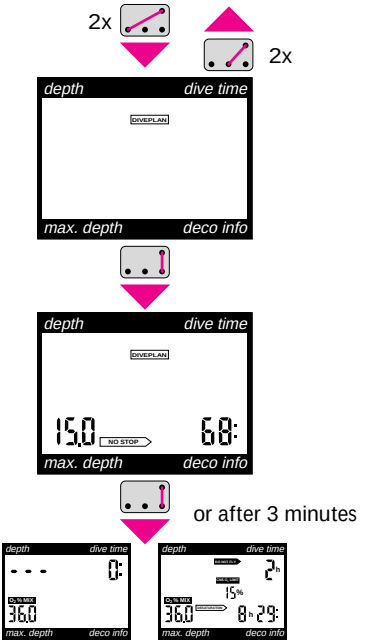
By B and + or B and – the percentage of oxygen is set.

5.c) Leaving the O_2% Mix function:

B and E

or automatically after three minutes
(new setting is not accepted).

6



6.a) Selecting the dive-plan function

From ready or surface mode:
Twice B and –
Cancel: Twice B and +
or automatically after three minutes without operation.

6.b) Activating the dive-plan

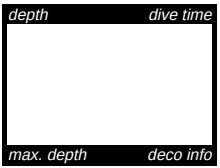
B and E. Aladin® Pro Nitrox starts by listing no-stop times. If the dive-plan is activated out of the surface-mode, first enter the desired interval by B and + or B and –. Confirmation with B and E.

6.c) Leaving the dive-plan:

B and E for approx. 3 seconds:
or automatically after three minutes.

2.3 Operating modes

Aladin® Pro Nitrox works in various operating modes:

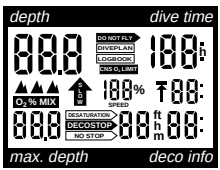


Sleep-mode:

Activation: automatically

When Aladin® Pro Nitrox is not used, it is in the sleep-mode.

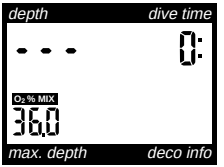
The display does not show any information. The computer is briefly activated once every minute to measure atmospheric pressure. The display remains switched off. If a change in altitude is recognized, Aladin® Pro Nitrox switches to -> surface-mode for 3 minutes.



Ready-mode:

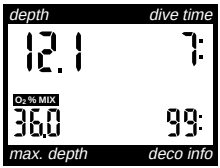
Activation: By touching contacts B and E from sleep-mode.

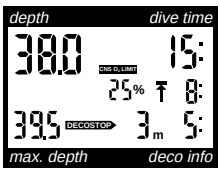
To check the display, all signs light up for 5 seconds.



After activation the Aladin® Pro Nitrox switches into ready-mode. Once in ready-mode, the display is switched on and the set percentage of oxygen is shown. In certain circumstances altitude sections are also displayed.

By touching contacts B and E in the ready-mode once more, Aladin® Pro Nitrox will display the remaining battery capacity in percent. Three minutes after activating the ready-mode, Aladin® Pro Nitrox will fall back into the -> sleep-mode.



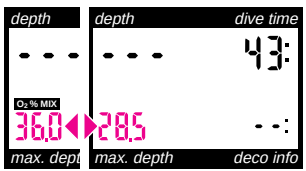


Dive-mode:

Activation: automatically at depth of about 0.5 m.

In dive-mode, all diving functions are monitored, i.e. depth and dive time are displayed, maximum depth is stored, saturation of tissues is calculated, no-stop time or decompression prognosis is determined, ascent rate is controlled and displayed and the correctness of the decompression procedure is supervised.

The set percentage of oxygen is displayed at the beginning of a dive until maximum depth is reached, but at least for the first 5 minutes of the dive.



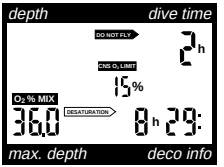
Wait-mode:

Activation: automatically on reaching the surface

The wait-mode is activated if the the diver surfaces (diving depth less than 0.5 m). At the surface, the dive is not completed and entered into the logbook for an interval of 5 minutes.

This allows the short surfacing for orientation or tank exchange.

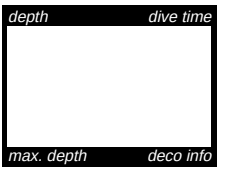
During the 5 minutes waiting time, the set percentage of oxygen is displayed alternatively with the maximum depth.



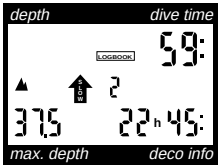
Surface-mode:

Activation: automatically after a dive or when changing altitude.

After a dive has been completed, Aladin® Pro Nitrox is in surface-mode. All data belonging to the surface interval are calculated and displayed: simulation of microbubble formation, actualization of oxygen toxicity and nitrogen saturation of the tissues depending on the calculated skin temperature and the assumed work load at the surface, calculation of desaturation time, and no fly interval. Desaturation time is determined either by oxygen- or nitrogen saturation, value becomes 0%.



In order to save energy, Aladin® Pro Nitrox falls into the "surface-sleep" after 3 minutes. The functions of surface-mode are then carried out in the background. The atmospheric pressure is measured in surface-sleep once every minute. If the atmospheric pressure decreases, for example in case of change of altitude, Aladin® Pro Nitrox switches from sleep-mode or from surface-sleep into surface-mode automatically and displays the adaptation time. The adaptation time is the time after which all body tissues have adapted to the ambient pressure (= desaturation time).

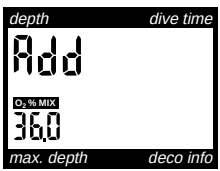


Logbook-mode:

Activation: manually by contacts

Data of 19 past dives can be called up in the logbook-mode. It shows maximum depth, dive time, preceding interval, altitude sections and, where appropriate, alarms. A dive is entered in the logbook if it has lasted more than 2 minutes. It also shows the interval which has passed since the last dive or a preceding change of altitude.

Aladin® Pro Nitrox can be connected with an MS DOS personal computer with an (optional) interface. The last 37 dives and the last dive-profiles can be read. The number of profiles depends on the length of the dives (a total of 200 diving minutes maximum).

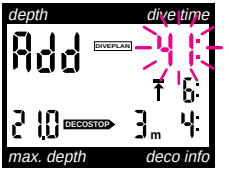


O_2-Mix-mode:

The O_2-Mix-mode serves to select the percentage of oxygen in the nitrox gas-mixture.

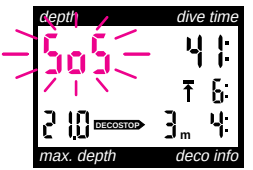
The percentage of oxygen can be set from 21% to 50%.

Before every dive, make sure that the setting of the gas mixture corresponds to the actual mixture used.



Diveplan-mode: Activation: manually by contacts

The diveplan-mode serves the planning of a future dive. It allows the planning of no-stop dives and decompression dives with determinable depth, dive time and composition of the gas mixture. On repetitive dives, the surface interval can also be chosen. Calculations are based on the temperature data of the last dive, assuming normal workload and on the set gas mixture.



SOS-mode: Activation: automatically

If the diver remains above a depth of 1.2 metres for more than three minutes without observing the prescribed decompression, the computer switches into SOS-mode after the dive and displays <SOS> instead of the depth. The computer is locked from use for the next 24 hours. Desaturation is still calculated including microbubbles in the tissues. Diving is again possible after 24 hours, but the SOS-mode can influence the calculations of Aladin® Pro Nitrox for three days after the incident due to the possible presence of microbubbles.

If a diver using Aladin® Pro Nitrox experiences a diving accident resulting in decompression sickness, the dive can be analyzed by means of the PC-interface and *DataTrak*-software.

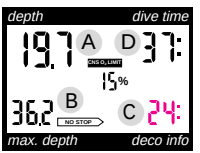
Serious injury or death may result if a diver does not seek immediate treatment at a recompression chamber should any signs or symptoms of decompression sickness occur after a dive.

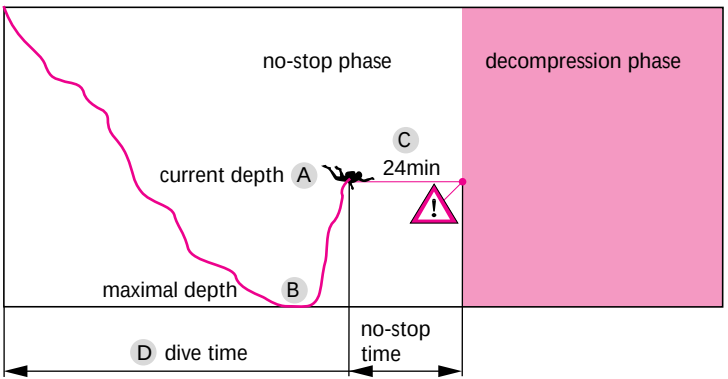
1 Terminology/Symbols

The information on the display of the Aladin® Pro Nitrox varies depending on the kind of dive and the dive phase.

1.1 Display during no-stop phase

No-stop phase: Dive phase during which ascent is allowed without decompression stops.
Dive time: Time of the dive below depth of 1.2 m.
CNS O_2 Limit: Oxygen toxicity





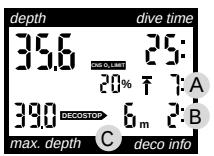
1.2 Display during decompression phase

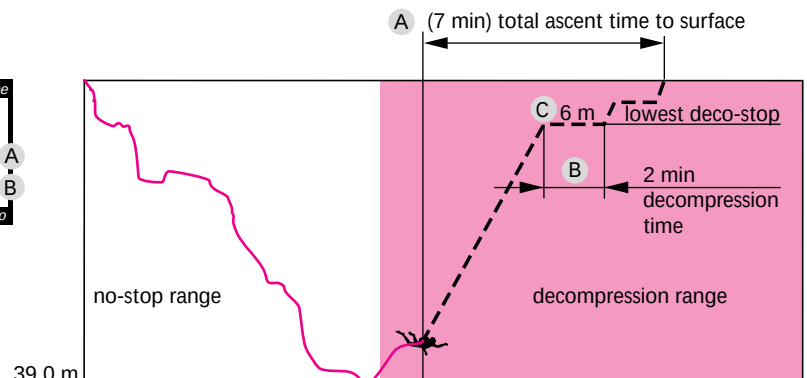
Decompression depth: Lowest stage is displayed.

Decompression time: Prescribed duration of the decompression stop at the displayed decompression stage.

Total ascent time to surface: Total ascent time including decompression stops.

CNS O_2% Limit: Oxygen toxicity





1.3 Nitrox information (O_2 information)

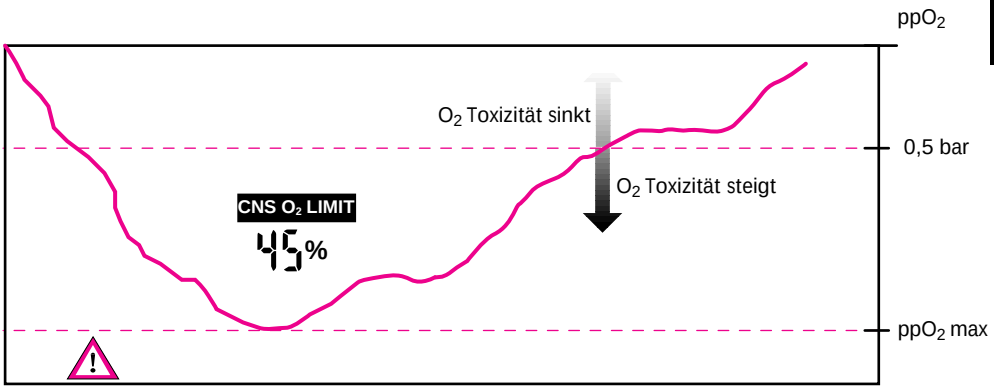
For dives with compressed air in normal recreational diving nitrogen is the decisive gas for the decompression calculations. When diving with nitrox, the toxicity of oxygen rises with the increase of the portion of oxygen and increasing depth and can limit dive time. Aladin® Pro Nitrox includes this in the calculations and displays the necessary information:

<O_2 % MIX> — Percentage of oxygen: The percentage of oxygen in the Nitrox mixture can be set between 21% (normal compressed air) and 50%.

ppO_2 max — Partial pressure of oxygen: The higher the percentage of oxygen in the used mixture, the smaller the dive depth at which the tolerable partial pressure of oxygen (ppO_2 max) is reached. Aladin® Pro Nitrox does not display the value, but warns the diver when he reaches the tolerable maximum depth.

<CNS O_2 LIMIT> — Oxygen toxicity: With the increased percentage of oxygen, the oxygen in the tissues, especially in the central nervous system (CNS) becomes important for the decompression calculations. If the partial pressure of oxygen rises above 0.5 bar, the tissues begin to saturate with O_2.

Nitrox diving may only be attempted by experienced divers with special training.



2 Attention Messages and Alarms

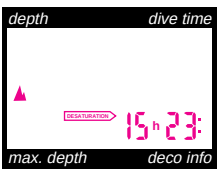
Aladin® Pro Nitrox draws the diver's attention to certain situations and warns the diver of unsafe diving practices. Attention messages and alarms are always optical and acoustic under water, only optical at the surface except the decompression alarm.

The acoustic attention messages (but not the alarms) can be switched off (see chapter VII Interface page 82).

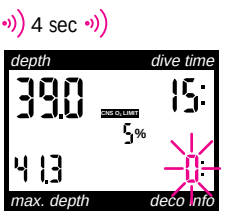
2.1 Attention messages

Attention messages are communicated to the diver visually by symbols, letters or flashing figures. In addition, two short acoustic sequences can be heard (in an interval of 4 seconds) in two different frequencies. Attention messages come up in the following situations:

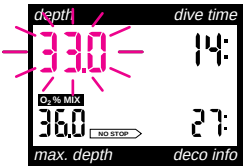
Dive in mountain lake
On a change of altitude, the altitude section (0-3) and adaptation time is shown. See page 53.



End of no-stop phase
In order to prevent a decompression dive: ascend a few metres.



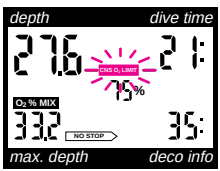
4 sec



Partial pressure of oxygen reaches limit

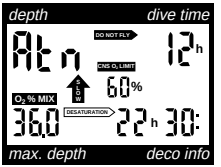
The partial pressure of oxygen reaches the set value (to be set not higher than 1.6 bar by interface and DataTalk-software)

4 sec



Oxygen toxicity

An oxygen toxicity of 75% is reached. Avoid a further increase of the value by beginning the ascent.



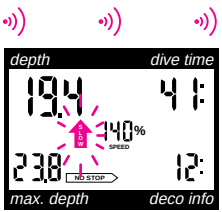
Warning of bubbles

Extension of the surface interval is recommended. See pages 52 and 75.

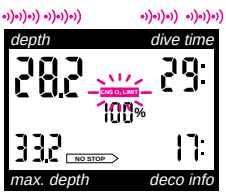
Serious injury or death may result from failing to immediately respond to alarms given by Aladin® Pro Nitrox.

2.2 Alarms

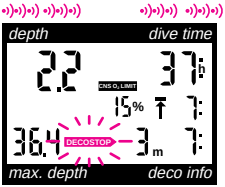
Alarms are given to the diver optically by flashing symbols, letters or figures and symbols. In addition, an acoustic sequence in one frequency can be heard during the whole duration of the alarm.
An alarm occurs in the following situations:



Excessive ascent rate.
Reduce ascent rate.

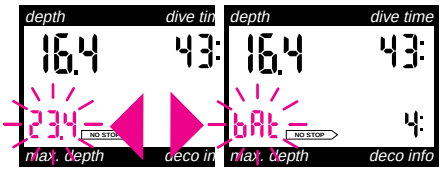


Oxygen toxicity
The oxygen toxicity reaches 100%. Start ascent at once!
Oxygen toxicity reaching 100% can lead to dangerous neurological symptoms.



Ignoring decompression stop
Descend to the prescribed decompression depth at once!

2.3 Alarm low battery



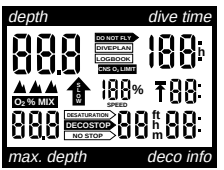
Computer battery low:

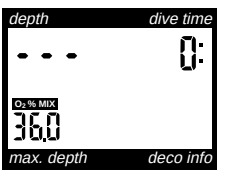
In dive-mode, <bAT> is indicated by a flashing display and alternating with the display of maximum depth as soon as battery capacity is 0%.

In ready-mode and surface-mode, <bAT> is shown instead of maximum depth. Take the unit to your authorized Uwatec Dealer!

3.1 Switching on

1. **Switching on Aladin® Pro Nitrox manually:**
   Bridge contacts B and E with moistened fingers. Check test display: are all displays lit?

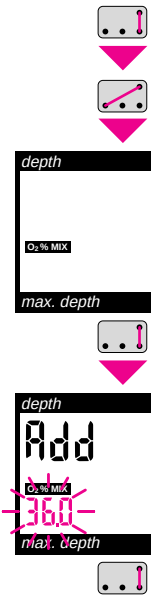




2. **The Aladin® Pro Nitrox is now in ready-mode.**
   It switches on automatically on being submerged in water and activates dive-mode, when a depth of more than 0.5 metre is reached. The depth indication may be delayed for a few seconds.

In extremely pure freshwater, it is possible that the Aladin® Pro Nitrox will not automatically activate into the dive-mode.

3.2 Setting the gas mixture



Before every dive, you must check if the setting of the gas mixture (percentage of oxygen) on your Aladin® Pro Nitrox corresponds to the mixture in your tank. Reset the mixture if necessary:

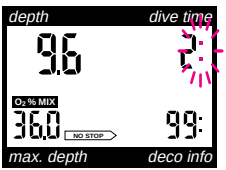
1. Switch on computer manually and check the set percentage of oxygen (O_2 %MIX).
2. Switch to O_2%MIX input stage by bridging B and –.
3. Confirm by bridging B and E.
4. Bridging B and + will increase the percentage of oxygen (from 21% to 50%), bridging B and – decreases the percentage of oxygen.
5. Confirm with B and E. Aladin® Pro Nitrox switches back into ready-mode.

Before every dive, make sure that the setting of the gas mixture corresponds to the actual mixture used. A wrong setting causes the Aladin® Pro Nitrox to miscalculation for this particular dive. If the percentage of oxygen is set too low this can lead to oxygen intoxication without warning. If the value is set too high decompression damages due to nitrogen saturation may occur without a warning from the Aladin® Pro Nitrox.

4 Functions during the Dive

4.1 Dive time

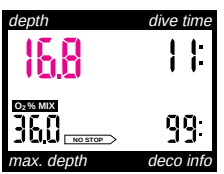
The whole time spent below a depth of 1.2 metres is displayed as dive time in minutes. While the dive time is running, the colon on the right of the figures is flashing in one second intervals. Maximum dive time displayed is 199 minutes.

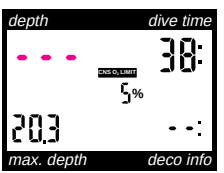


If a dive lasts longer than 199 minutes the dive time display starts again at 0 minutes, because the display cannot show a larger figure.

4.2 Current depth

Current depth is given in 10 cm-increments. On switching on and at a diving depth of less than 1.2 metres the void display <—> appears.

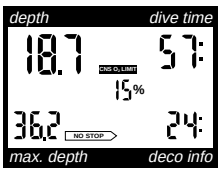




Depth measurement is based on fresh-water. Therefore, Aladin® Pro Nitrox shows a slightly greater depth than actually true when diving in salt water, depending on the salinity of the water.

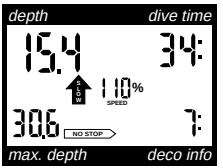
4.3 Maximum depth

The maximum depth is displayed if it is lower than the current depth. To prevent the display changing very frequently when diving in the vicinity of the maximum depth, it is only displayed if it exceeds the current depth by more than 1 metre.



The percentage of oxygen is displayed instead of the maximum depth until a first maximum depth is reached (but at least for the first 5 minutes of the dive).

4.4 Ascent rate



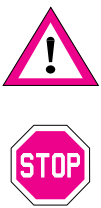
Optimal ascent rate varies depending on depth between 7 and 20 m/min. It is displayed in percent of the reference variable. If the ascent rate is greater than 100% of the set value, the black arrow <SLOW> appears. If the ascent rate exceeds 140%, the arrow starts flashing.

The Aladin® Pro Nitrox provides an acoustic alarm if the ascent rate is 110% or greater of the set value. The intensity of the alarm increases in direct proportion to the degree that the prescribed ascent rate is exceeded.

The prescribed ascent rate must be observed at all times! Exceeding the prescribed ascent rate can lead to microbubbles in the arterial circulation which can lead to serious injury or death due to decompression sickness.

- The Aladin® Pro Nitrox may require a decompression stop even within the no-stop phase because of the danger of formation of microbubbles due to an improper ascent.
- The decompression time necessary for the prevention of microbubbles can increase massively if the ascent rate is exceeded.
- From great depth, too slow an ascent may cause heightened saturation of tissues and an extension of both decompression time and total ascent time. At shallow depth, a slow ascent may shorten the decompression time because the tissues are desaturating during the slow ascent.
- The display of the ascent rate has priority over the <CNS O_2LIMIT>) display..

Messages:

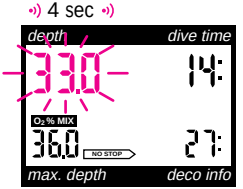


Ascent rate	Optical alarm	Acoustic alarm
110% SPEED	SLOW	
140% SPEED	SLOW	
160% SPEED	SLOW	
180% SPEED	SLOW	

Excessive ascent rates for longer periods are entered in the logbook.
Response: Reduce ascent rate

4.5 Partial pressure of oxygen

The tolerable partial pressure of oxygen can be set by means of an interface cable and the *DataTalk*-software to between 1.2 and 1.95 bar (see page 82).
The set value and the information about the actual ppO_2 are not displayed.

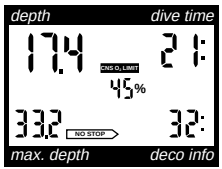


Messages: Depending on the mixture used and the setting of the maximum ppO_2 the limit for an attention message is reached at different depths. When the set tolerable partial pressure is reached Aladin® Pro Nitrox sends an acoustic attention message and the current depth display starts flashing.

Response: Ascend to a shallower depth in order to diminish the danger of oxygen toxicity.

The allowed maximum depth should not be exceeded or only for a short period. Disregarding the warning can lead to danger from oxygen toxicity.

4.6 Oxygen toxicity



Oxygen toxicity is calculated from depth values and the gas mixture. The toxicity is dipslayed in 5% increments as a percentage of the maximum value tolerated (O_2 clock), together with the symbol <CNS O_2 LIMIT>. This display is in the same place as the ascent rate display.

Messages: An acoustic signal is sent if oxygen toxicity reaches 75%. The symbol <CNS O_2 LIMIT> and the percentage value flashes continuously.

Response: As the value must no longer increase, go to a shallower depth if necessary.

When oxygen toxicity reaches 100%, an acoustic alarm is sent every 4 seconds. <CNS O_2 LIMIT> and the percentage value flashes continuously.

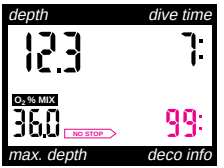
Response: Start ascent at once.

– During an ascent warning and if the partial pressure of oxygen drops below 0.5 bar the acoustic warning is suppressed.

– During the ascent, the display of the oxygen toxicity is replaced by the ascent rate display. If the ascent is stopped, the display changes back to the indication of oxygen toxicity.

4.7 Decompression information

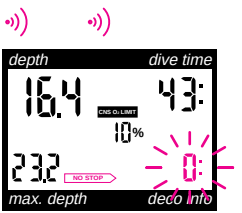
No-stop time is displayed if no decompression stops are necessary. The arrow <NO STOP> is visible if no decompression stops are necessary. The figures indicate no-stop time in minutes.



– No-stop display <99:> means remaining time of 99 minutes or more.
– No-stop time is calculated assuming normal workload and current water temperature.

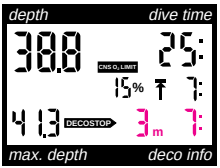
There is an acoustic signal if no-stop time is less than 1 minute. In this last minute, the no-stop display shows the flashing value <0>.

Response: In order to prevent a decompression dive, you must ascend a few feet after this message.



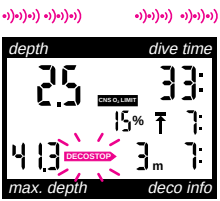
It is dangerous and an unsafe diving practice to "push" the Aladin® Pro Nitrox or any other decompression tool to its limits. Avoid no-stop times of less than three minutes at any given depth.

Decompression values



On entering the decompression phase, the arrow NO STOP disappears. The arrow DECOSTOP appears. Right beside the arrow, the deepest decompression stage in metres is displayed. Beside the decompression depth, the decompression time is displayed in minutes for this stage. The display <3m5:> means that a decompression stop of 5 minutes at a depth of 3 metres has to be made.
When a decompression stop has been finished, the next higher decompression stop is displayed. When all decompression stops have been made, the arrow DECOSTOP extinguishes and the arrow NO STOP reappears. The indication of time on the lower right shows the no-stop time again.

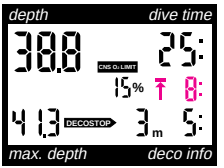
Messages:



The decompression alarm is activated if the decompression stop is ignored. The arrow DECOSTOP begins flashing and an acoustic alarm is initiated. Due to the formation of microbubbles decompression can increase massively if a decompression stop is ignored. When the surface is reached during the decompression alarm, the arrow DECOSTOP continues flashing, in order to point to the risk of a decompression accident. The SOS-mode is activated 3 minutes after the dive if corrective action is not taken.
If the total (cumulative) duration of the decompression alarm is longer than a minute, it is entered in the logbook.

Response: Descend to the prescribed decompression depth immediately!

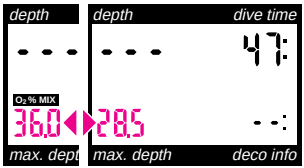
Total time of ascent



As soon as decompression stops are necessary, Aladin® Pro Nitrox shows the total time of ascent. The time of ascent to the first decompression stage and all decompression stops are included.

The time of ascent is calculated on the basis of the prescribed ascent rate. Total time of ascent can be subject to change if the ascent rate is not ideal (100%).

5.1 End of a dive



After reaching the surface, Aladin® Pro Nitrox switches into wait-mode automatically for five minutes. This is the time span necessary to recognize the end of the dive.

The delay allows for surfacing for a short period for orientation or for a change of tank.

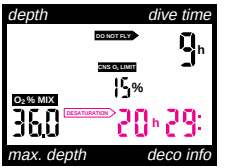
During the five minutes waiting time the percentage of oxygen display alternates with maximum depth display.

When the dive is closed after 5 minutes in wait-mode, it is entered into the logbook and Aladin® Pro Nitrox switches into surface-mode.

In surface-mode, Aladin® Pro Nitrox shows desaturation time, no fly time and <CNS O_2LIMIT>).

If the tank is changed in this phase, you must make sure that the mixture is exactly the same as the one previously used. If you want to dive with another mixture, you must wait at the surface for 5 minutes to allow the Aladin® Pro Nitrox to close the dive. Then the setting of the mixture must be adjusted to the new mixture. Disregarding this rule causes the Aladin® Pro Nitrox to calculate with wrong mixture data. This can lead to injury or death.

5.2 Desaturation time



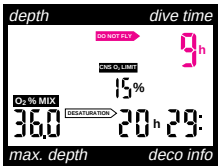
When DESATURATION appears, the Aladin® Pro Nitrox is in surface-mode. Desaturation time in hours and minutes, the set mixture (percentage of oxygen) and, if available, oxygen toxicity is displayed next to it. Desaturation time is continually indicated until the next dive or until it reaches zero. The display is switched off to save energy three minutes after the last manipulation is made (surface-sleep-mode).

– In some cases, desaturation times with the Aladin® Pro Nitrox are considerably longer than those of its predecessors. This is because the calculation model assumes reduced physical activity at the surface (therefore less nitrogen off gassing) and uses longer half-times.

– If desaturation time reaches zero, the "tissue" models of the Aladin® Pro Nitrox are desaturated and it switches into the sleep-mode.

– Desaturation time is determined either by oxygen or nitrogen saturation, depending on which gas requires the longer desaturation time.
Oxygen saturation (<CNS O_2LIMIT>) is displayed and adjusted until the value becomes 0%.

5.3 No fly time

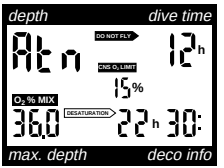


The waiting period until the next flight is indicated as follows: DO NOT FLY. Beside this the time in hours that should pass before a flight is displayed.

In some cases the no fly time is considerably longer than with previous models (because of recalibrated desaturation time).

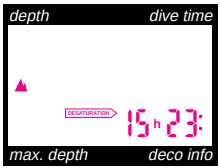
Flying while the Aladin® Pro Nitrox displays DO NOT FLY may lead to serious injury or death from decompression sickness.

5.4 Warning of bubbles



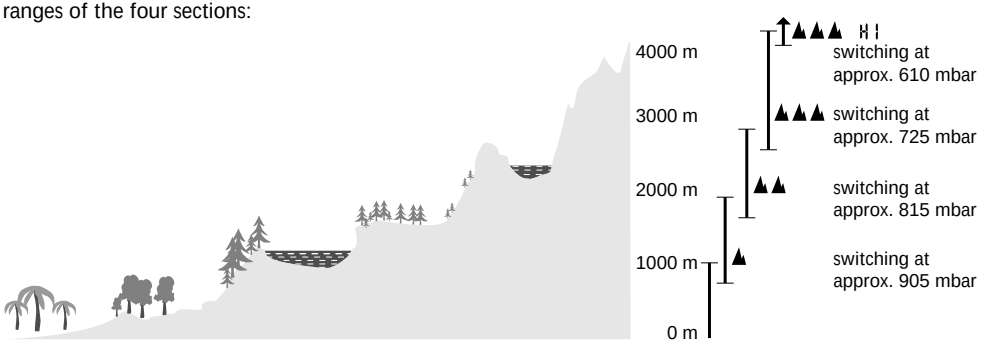
Through repetitive dives microbubbles accumulate in the lungs if the surface interval is not long enough. Ignoring decompression stops or an excessive ascent rate can also lead to bubbles in tissues. In order to reduce the risk of decompression sickness for future repetitive dives, the surface interval should be planned long enough to reduce the risk of decompression sickness. If Aladin® Pro Nitrox calculates that the formation of microbubbles occur during the surface interval, it will advise a diver to extend the surface interval. If the display <Atn> (=attention) is visible instead of the depth during the surface interval (surface-mode), the diver should not undertake another dive. Through the extension of the interval the diver may prevent a high concentration of bubbles in the lungs during the planned dive and avoid a higher risk situation.

- If the dive has to be made during <Atn>-time, the <Atn> time of the following dive can increase considerably.
- If the dive is made in spite of the display <Atn>, the diver must cope with a clearly shorter no-stop time and an extension of decompression.

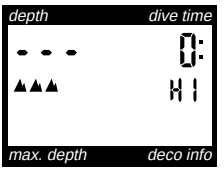


Aladin® Pro Nitrox measures the atmospheric pressure even while in sleep-mode. If the computer detects a higher altitude, it switches into surface-mode automatically. Desaturation time indicated at this moment refers to adaptation time at this altitude. If diving starts within this adaptation time, Aladin® Pro Nitrox treats it as a repetitive dive, since the body still has a higher saturation.

The entire altitude range is divided into four sections which are influenced by barometric pressure. That is why the defined altitude sections overlap on their fringes. The altitude section is indicated at the surface, in the logbook and in the dive planner by stylised mountains, if a mountain lake altitude is reached. Sea level to an altitude of approximately 1000 metres is not indicated. In the following, you can see the approximate altitude ranges of the four sections:



In order to assure optimal decompression even at higher altitudes, the 3 m decompression stage is divided into a 4 m stage and a 2 m stage (the pescribed decompression depths are, in sequence, 2 m, 4 m, 6 m, 9 m).



Aladin® Pro Nitrox can be used as a decompression computer in case of an emergency up to an altitude of 4000 m. If atmospheric pressure is below 620 mbar (altitude higher than 4000 m above sea level), no decompression information is displayed. Dive-plan-mode can no longer be started, since no decompression information is available. Beside the display of the altitude section 3, <HI> (=high) appears, telling the diver that he will not get any decompression information for the dive. Oxygen-toxicity is still calculated.

Very small differences in the pressure sensors can cause an indication of different altitude sections of two dive computers at the same altitude on the fringes of the altitude ranges. These differences are not meaningful and do not interfere with the functions of Aladin® Pro Nitrox. But if an altitude section is displayed at sea level or the altitude readouts of two computers differ by more than one altitude section (e.g. section 2 instead of 0), there may be a computer defect. In this case, send your computer back to your retailer for testing.

Diving while at altitude can considerably increase the risk of decompression sickness. Do not undertake high altitude diving without being specifically trained in the special techniques of such diving.

1 Diving at Reduced Risk with Aladin® Pro Nitrox

1 Diving at Reduced Risk with Aladin® Pro Nitrox

1.1 Diving at reduced risk

Aladin ® Pro Nitrox recognizes and reacts "intelligently" to certain risk situations, although of course it is much better that each individual diver avoid these higher risk situations altogether. If a decompression accident does occur, the optional PC-interface allows the analysis of the dive profile and certain risk parameters to provide for more complete information for treatment purposes.

Analysis of the most recent results of decompression research and statistical analysis of diving accidents involving decompression sickness support the creation of these guidelines for diving at reduced risk for decompression sickness.

The following are highly recommended suggestions:

Neither the Aladin ® Pro Nitrox nor any other diving computer or decompression table can guarantee that decompression sickness will not occur even if the computer or table is used correctly and all of the following precautions are followed.

– Check <O_2% MIX> (gas mixture) and the dive depth limit given by the maximum ppO$_2$ selected.

– In accordance with the recommended maximum diving limit, do not dive deeper than 40 metres.

– Observe <CNS O$_2$ LIMIT> (ascend at 75%).

– On all dives with the Aladin® Pro Nitrox, make a safety stop for three to five minutes within the 3 to 9 metre zone.

- Always make the deepest dive of the day first when repetitive dives are planned, and for each successive dive make sure that the deepest portion of that dive is done at the beginning of the dive.
- All divers using dive computers to plan dives and indicate or determine decompression status must use their own diving computer.
- On any given dive, both divers in a buddy pair must follow the most conservative dive computer for that particular dive.
- If the Aladin® Pro Nitrox fails at any time during the dive, the dive must be terminated, and appropriate surfacing procedures should be initiated immediately.
- You should not dive for a period of twenty-four hours before activating the Aladin® Pro Nitrox to use it to plan or control your diving.

– You MUST follow the ascent rates as indicated by the Aladin® Pro Nitrox and if the computer should fail for any reason, you must ascend at a rate of no greater than 17 metres per minute.

– You MUST be familiar with all signs and symptoms of decompression sickness before using the Aladin® Pro Nitrox! Seek IMMEDIATE treatment for decompression sickness should any of these signs or symptoms occur after a dive! There is a direct correlation between the efficacy of treatment and the delay between the onset of symptoms and the treatment for decompression sickness.

– Always observe the visual and acoustic alarm signals of the Aladin® Pro Nitrox. Avoid situations of increased risk which are marked with a warning sign in this operating manual.

– Avoid repeated ascents and descents (yo-yo diving) while using the Aladin® Pro Nitrox.

1.2 Minimizing risk on repetitive dives

With consecutive repetitive dives, there will be excess nitrogen in the body due to the accumulation of nitrogen on the preceding dive. Depending on the length of the surface interval, there could even be gaseous nitrogen (microbubbles) in your body. This accumulation of both soluble as well as potentially gaseous nitrogen in the body can greatly increase the risk of decompression sickness on subsequent dives. That risk can be minimized.

– Wait until <CNS O_2 LIMIT> is less then 30%.

– Match gas mixture to the intended dive.

- Always make your first dive the deepest dive of the day.
- Always make the deepest descent of each given dive on a particular day at the beginning of that dive.
- Never make "square" dive profiles of 18 metres or greater as repetitive dives.
- Avoid yo-yo diving.
- Plan for a minimum surface interval of three to four hours.
- Do not attempt to repetitive dive if the <Atn> is visible on the display.
- Take a day off from diving every three or four days.

1.3 Response in increased risk situations

If the dive includes an increased risk situation, Aladin® Pro Nitrox reacts automatically to warn the diver of this risk and to decrease RBT or increase required decompression, as the case may be. A change of decompression may be indicated to minimize the risk. The diver can further reduce the risk by following conservative diving practices on the next dive and at the same time avoiding long decompression stops.
A few examples are on the following pages:

Situation: The diver ascends too rapidly:

Reaction of computer: The model calculates the formation of bubbles due to the excessively rapid ascent. The no-stop time is shor tened or a longer (and eventually at gr eater depth) decompr ession pr escription is displayed in or der to assur e incr eased decompr ession.

Recommended response of the diver

During the dive:
- Obser ve the new decompr ession pr escription shown by Aladin® Pro Nitr ox.

After the dive:
- Watch for symptoms of ar terial gas embolism and decompr ession sickness.
- Seek immediate medical attention at a r ecompr ession chamber should any signs or symptoms of decompr ession sickness appear .
- Befor e the next dive, plan a suf ficiently long inter val (display <Atn> should have disappear ed).

An exessive ascent rate can lead to serious injur y or death fr om decompr ession sickness.
Failur e to seek IMMEDIA TE tr eatment for any signs or symptoms of decompr ession sickness after a dive may r esult in serious injur y or death.

Situation: The diver disregards the prescribed decompression depth.

Reaction of computer: The model calculates the for mation of bubbles due to ignoring decompr ession. A longer (and eventually at gr eater depth) decompr ession is displayed in or der to assur e suf ficient time for desaturation.

Recommended response of the diver

During the dive:
- Descend to the pr escribed decompr ession depth at once.
- Do not descend to gr eater depths during the dive.
- Obser ve the decompr ession pr escribed by Aladin® Pro Nitr ox.

After the dive:
- Watch out for symptoms of ar terial gas embolism and decompr ession sickness.
- Befor e the next dive, plan a suf ficiently long inter val (display <Atn> should have disappear ed).

Failur e to comply with all decompr ession infor mation on the Aladin® Pro Nitr ox may r esult in serious injur y or death due to decompr ession sickness.
Ther e is a risk of decompr ession sickness on ever y dive even if all pr ecautions described in this manual ar e taken.

Situation: It is very unlikely to have a surface interval long enough to clear the <Atn> prior to the next dive during an organized dive trip from a boat. This previous buildup of nitrogen must be taken into consideration for the next dive.

Reaction of computer: Aladin ® Pro Nitr ox calculates a shor ter no-stop time or decompr ession pr escription to r educe the risk of decompr ession sickness.

Recommended response of the diver

During the dive: Dive conser vatively on all r epetitive dives. Limit your maximum depth to no mor e than 25 metr es at the ver y beginning of the dive, do not allow the RBT to go below thr ee minutes, and make a ver y slow ascent.

After the dive: Befor e the next dive, plan a suf ficiently long sur face inter val (<Atn> display should disappear).

1 Diving at Reduced Risk with Aladin® Pro Nitrox

Situation: <CNS O_2 LIMIT> reaches 100%.

Reaction of computer: An acoustic and visual alarm is given.

Recommended response of the diver

- Ascend immediately until ppO_2 is less then 0.5 bar and the buzzer stops.

Situation: ppO_2 reaches the set value.

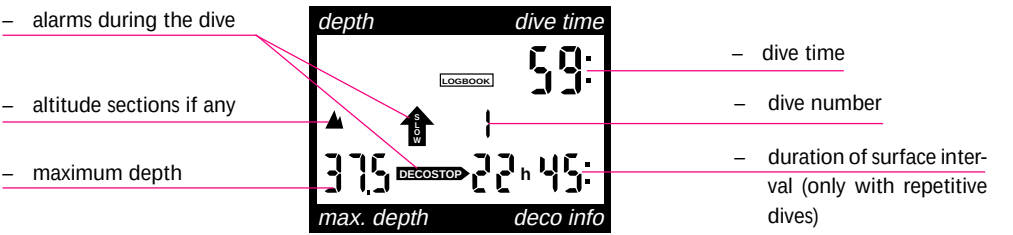
Reaction of computer: Depth indication is flashing (attention message).

Recommended response of the diver

– Ascend above critical depth limit.
– Observe <CNS O_2 LIMIT> carefully.

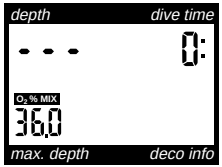
1 Survey

Aladin® Pro Nitrox features a logbook with the last 19 dives. A dive is only entered in the logbook if dive time is longer than 2 minutes. Displayed information of the dive:

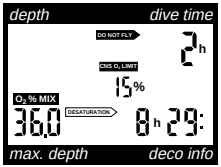


If a dive is started within adaptation time (after a change of altitude), the adaptation time is displayed instead of the surface interval.

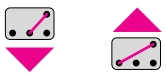
2 Selection and Activation

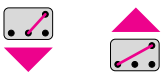


Ready-Modus



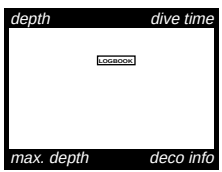
Surface-Modus

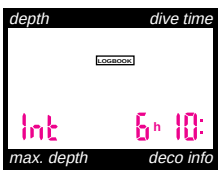


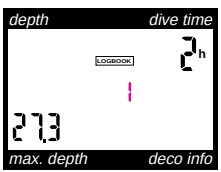


1. The logbook is selected by bridging contacts B and + in ready- or surface-mode. Indication <LOGBOOK> appears. If Aladin® Pro Nitrox has been in surface-mode before, the surface interval appears as well. You go back into ready- or surface-mode by B and –.

2. In order to activate the logbook, bridge contacts B and E. The most recent dive is displayed (DIVE I).

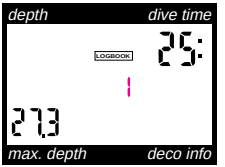






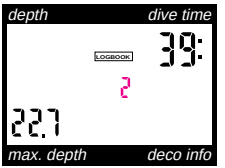
V

3 Selection of Dive



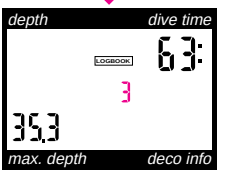
1. Bridge contacts B and + to get the information of the dive preceding the most recent one. Display <DIVE 2> appears.

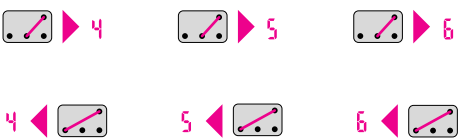
2. On additional bridging of B and + the logbook jumps to the next older dive (DIVE 3).

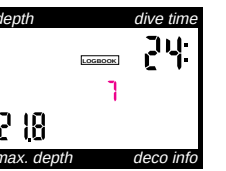


3. On constant bridging of the contacts all dives are displayed successively.

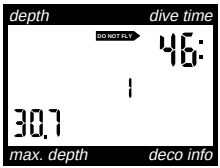
4. Bridging contacts B and – allows switching back from older dives to more recent ones.



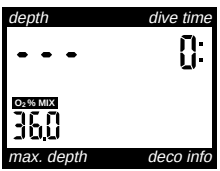


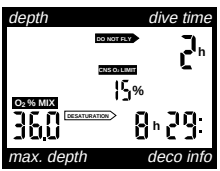


4 Leaving the Logbook-Mode



or after 3 minutes





Touch contacts B and E.
Aladin® Pro Nitrox switches back into ready- or surface-mode. This also happens 3 minutes after activating logbook-mode.

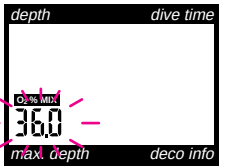
5 Output on PC

With the optional *DataTrak* interface and software information on the last 37 dives can be read out. The dive profiles of the last dives, up to a total of 200 minutes, can be reproduced.

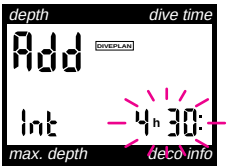
Time and date of the dive are entered automatically, based on the clock of the PC-system when the data are transferred via interface.

The possibilities and the procedure of this data transfer are described in a separate manual.

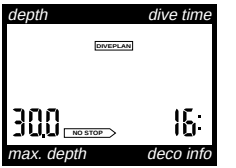
The Aladin® Pro Nitrox is equipped with a dive planner which allows the planning of no-stop dives with freely determinable surface intervals for the portion of oxygen set at the moment. The water temperature of the most recent dive and eventual altitude sections <▲▲> are incorporated in the calculation.



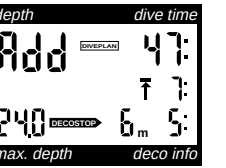
Planning of Nitrox- dives



Presetting the surface interval (only during desaturation)



Planning of no-stop dives

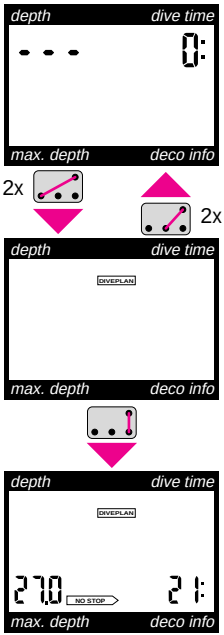


Planning of decompression dives

If you do not alter the setting of the gas mixture (portion of oxygen) the planning will be based on the already set mixture.

Planned decompression dives are not to be attempted by recreational scuba divers. Only divers with extensive experience, training and the appropriate equipment for decompression diving should attempt to plan a decompression dive!

2 Selection and Activation from Ready-Mode



1. From ready-mode, you switch into the diveplan input stage by twice bridging contacts B and –.

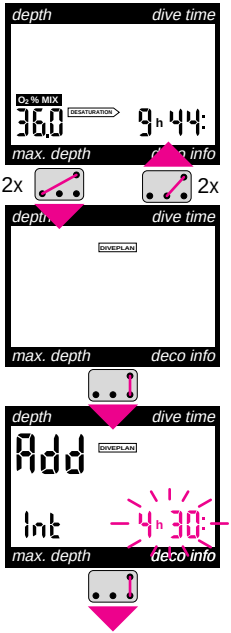
2. The display shows <DIVEPLAN>.
   You return to ready-mode by B and + twice.

3. Contacts B and E afterwards activate the planning mode.

4. The display shows no-stop times for increasing depths (scrolling no-stop times, see page 75, planning of a no-stop dive).

VI

3 Selection and Activation from Surface-Mode



1. From surface-mode, you switch into the diveplan input stage by twice bridging B and –.

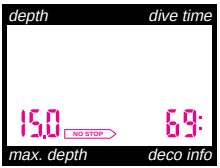
2. The display shows <DIVEPLAN>.
You return to surface mode by B and +.

3. After confirming by B and E, the display shows <Add>, <Int> and the interval (flashing). Aladin® Pro Nitrox expects your input for the duration of the dive interval.

4a. If no surface interval is to be entered, (diving at the present moment), confirm this with contacts B and E, and you switch into no-stop planning (page 75).

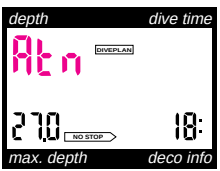
4b. You can extend the interval with contacts B and +.
B and – shorten the interval.

5. You confirm the new surface interval and get into no-stop planning (page 75).



After confirming the surface interval (if possible), no-stop times are displayed in 3 metre-increments. The process starts with 9 metres. The no-stop time for every 3 metre-increment is displayed for about 3 seconds (scrolling no-stop times).

No-stop times are displayed to the depth at which the partial pressure of oxygen (ppO_2) has not yet reached the set maximum value.



Repetitive dives usually cause more microbubbles in the lungs than on first dives if the surface interval is not long enough. Too rapid an ascent and/or disregarding decompression instructions can lead to microbubbles. By calculating the formation of bubbles, Aladin® Pro Nitrox is able to advise the diver to extend the surface interval if necessary. If <Atn> is displayed instead of the depth in addition to the no-stop times, the diver should plan an extension of the interval if possible.

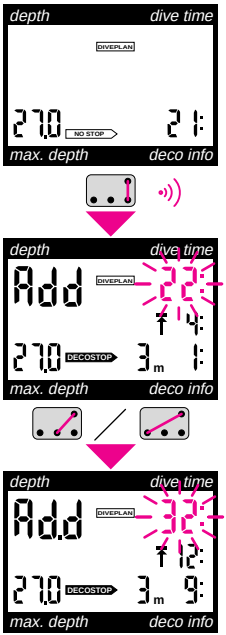
– By repeatedly recalling of the diveplan with varying surface intervals the minimum interval can be determined.

– Diving with the display <Atn>, a clear shortening of the no-stop time and/or an extension of decompression has to be expected.

– If a dive is made during <Atn>-time, the <Atn>-time following the dive can increase considerably.

– Making a repetitive dive when <Atn> is displayed will increased your risk of serious injury or death from decompression sickness!

5 Planning a Decompression Dive



1. In order to plan a dive that requires decompression, wait until the scrolling no-stop time shows the desired depth.

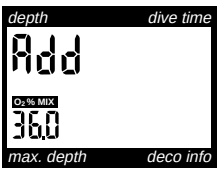
2. By means of contacts B and E you can switch into decompression planning. Dive time is now one minute longer than no-stop time, and the decompression information appears.

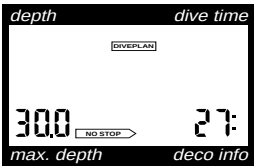
3. <Add> demands that you set the time. This is done with contacts B and +, B and – respectively. As soon as the contacts are no longer bridged, Aladin® Pro Nitrox calculates the decompression information for this set time. This calculation takes some time.

If you wish to plan a dive requiring decompression at another depth, switch from decompression planning to no-stop planning by means of B and E. Aladin® Pro Nitrox again shows the scrolling no-stop times. Now you can switch between no-stop planning and decompression planning at will with contacts B and E.

6 Planning a Nitrox-dive

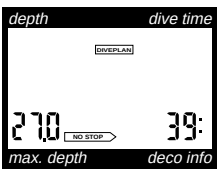
The dive-planner of the Aladin® Pro Nitrox always plans dives based on the selected oxygen percentage.
It can be used to:
- calculate maximum depth to be reached with the selected mixture.
- calculate the necessary mixture for a dive with a given depth.

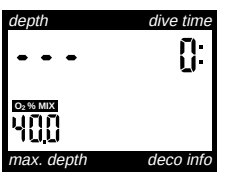




6.1 Calculation of maximum depth

1. Set the desired percentage of oxygen. (see page 39)
2. Activate the dive planner as described before.
3. Observe the depth indications and memorize the greatest depth displayed. This is also maximum depth for a dive with the set mixture and the set maximum partial pressure of oxygen.

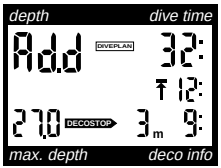




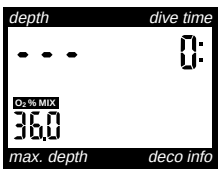
6.2 Calculation of the mixture for a given depth

1. Activate the dive-planner and observe the maximum depth displayed.
2. If the desired depth is 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 occurs as the maximum depth.
3. In ready-mode, the ideal percentage of oxygen for this depth is indicated.

7 Leaving the Diveplan-Mode



or after 3 minutes



If the contacts B and E are touched for about 3 seconds, Aladin® Pro Nitrox falls back into ready- or surface-mode. This also occurs three minutes after the activation of the diveplan-mode.

On a short touch of contacts B and E the Aladin® Pro Nitrox switches back to the scrolling no-stop times.
In order to completely leave the diveplan-mode, B and E must be continually bridged until two acoustic bleeps have occured.

If two or more divers using computers are planning a dive, planning for all divers has to be based on the dive computer showing the shortest no-stop times. Failure to do this may lead to serious injury or death from decompression sickness.

1 Interface

The Aladin® Pro Nitrox is able to communicate with a personal computer. The connection is established by contact sensors. A special interface cable and the necessary PC-software *DataTrak/DataTalk* (MS-DOS) is available on the market. Communication via interface has a number of advantages:

1.1 Personal programming of the dive computer

Several parameters can be set individually by the user, e.g.:

– The partial pressure of oxygen can be adjusted between 1.2 and 1.95 bar.
– The physical units of water depth and tank pressure can be selected (metric/imperial).
– The attention message acoustic signals can be switched off if desired (see pgs. 32, 33). The actual attention messages shown on the face of the Aladin® Pro Nitrox are not affected by the acoustic signal being switched off. (The acoustic messages for alarm cannot be switched off. Alarm messages are: not enough gas mixture for safe ascent, ignoring decompression stop, making too rapid an ascent, exceeding CNS O_2 limit).

ppO_2 max must not be set higher than 1.6 bar

If you switch off the acoustic attention buzzer of the Aladin® Pro Nitrox you must pay careful attention to the visual signals on the face of the Aladin® Air X Nitrox. Failure to follow all alarms whether audible or not may lead to serious injury or death due to decompression sickness, and/or drowning.

1.2 Analysis and storage of real dives

The last approx. 200 minutes of dive time are stored by the dive computer in increments of 20 seconds and can be transferred to the PC. The *DataTrak* software allows the representation and analysis of the profiles. By this means all relevant data are examined and displayed for every point in time. The *DataTrak* releases 1.6 and higher recognize the Aladin® Pro Nitrox and display the respective data.

The PC program enables the diver to keep a personal logbook. Apart from the last 200 minutes of diving, 37 dives are recorded in the logbook of Aladin® Pro Nitrox. If the data from Aladin® Pro Nitrox are transferred periodically, all dives are stored in the PC as profiles or in this short form. Time and date of the dives are automatically recorded and the dives can be printed out on a page for the diver's logbook.

VIII TROUBLE SHOOTING

symptom	possible reason(s)	response
Altitude section does not correspond to the current altitude.	Atmospheric pressure is especially high or low.	Check barometric information.
	Gas mixture pressure measured by the computer is wrong.	Send in dive computer for servicing (only if altitude section is wrong by more than one section, see chapter III 6).Review chapter III 5 very carefully.
Desaturation time and/or no fly time are very long.	Slow tissue and/or little workload at the surface.	Plan sufficiently long surface interval and dives at lower risk.
	Too many repetitive dives, yo-yo-diving, square profile repetitive dives or disregarding decompression stops. Dissolved nitrogen and/or microbubbles must be off gassed first.	
<Atn> appears in place of the diving depth on the display.	Too many repetitive dives, too fast ascents, yo-yo-diving, square profile repetitive dives or disregarding decompression stops. Dissolved nitrogen and/or microbubbles must be off gassed first.	Plan sufficiently long surface interval and dives at lower risk. Review chapters III 5 and IV very carefully.

symptom	possible reason(s)	response
An unexpected decompression stop appears in place of no-stop time or decompression increases rapidly.	Too rapid an ascent or ignoring decompression stops have caused a large number of microbubbles, which leads to an attention message (warning of bubbles).	Plan sufficiently long surface interval and dives at lower risk. Review chapters III 5 and IV very carefully.
Attention messages are not given acoustically.	The acoustic signal of the attention messages is switched off.	Reactivate attention messages by means of the interface.

IX APPENDIX

1 Maintenance of Aladin® Pro Nitrox Dive Computer

Your Aladin® Pro Nitrox is virtually maintenance free. All you need to do is to rinse it carefully with fresh water after each use and to have the batteries changed when needed. To avoid possible problems with your Aladin® Pro Nitrox, the following recommendations will help assure that it will give you years of trouble free service:

- Avoid dropping or jarring your Aladin® Pro Nitrox.
- Do not allow your Aladin® Pro Nitrox to be exposed to direct, intense sunlight.
- Rinse your Aladin® Pro Nitrox thoroughly with fresh water after each dive.
- Do not store your Aladin® Pro Nitrox in an gas mixture-tight area; make sure there is free ventilation.
- If there are problems with operating the contacts, the surface of your Aladin® Pro Nitrox housing can be treated with silicone grease. Use soapy water to clean the Aladin® Pro Nitrox before using silicone grease and dry it thoroughly.

– There are borings in two of the contacts for the reception of the PC interface connection. Free these borings from dirt with a needle if necessary.

Take the dive computer to an authorized Uwatec dealer in order to change the batteries. The actual change of the batteries is made at the manufacturer or the importer. The computer is checked for its technical functioning at the same time. Do not attempt to have the batteries changed by anyone other than an authorized dealer.

2 Technical Information

Operating altitude: with decompression information: sea level up to approx. 4000 metres
without decompression information: unlimited

Clock: quartz timer, display up to 199 minutes

Operating temperature: -10°C to +50°C

Power supply: Special battery Uwatec LR07

Life of the battery: (standard values)
For an average diving time of 60 minutes and a surface interval of 20 hours after every dive:

Number of dives per year		dive computer (years)
50		7
100		5,5
150		4
300		2,5

3 Warranty

Please pay attention to the following remarks on warranty claims:

3.1 Recognition of warranty

The warranty only covers dive computers which have been provably bought from an authorized retailer or from the manufacturer.

3.2 Scope of the warranty

The manufacturer will repair all defects which are provably traceable to defects of material or faults in production. The warranty covers the repair of the dive computer free of charge, the replacement of faulty parts or the entire dive computer, respectively.

UWATEC reserves the right to determine the merits of a warranty claim and to determine whether the computer will be repaired or replaced.

Excluded are faults or defects due to:

- excessive wear and tear
- exterior influences, e.g. transport damage, damage due to bumping and hitting, influences of weather or other natural phenomena
- servicing, repairs or the opening of the dive computer by anybody not authorized by the manufacturer. This especially concerns the change of batteries for the dive computer
- pressure tests which do not take place in water
- diving accidents

3.3 Warranty period and claim

The warranty is given for a period of 12 months.

Repairs or replacements during the warranty period do not increase the warranty period.

In order to put forward a warranty claim, send the dive computer together with a dated receipt of the purchase to your authorized retailer or an authorized servicing point.

The manufacturer does not have to accept extensions of the warranty granted by national importers.