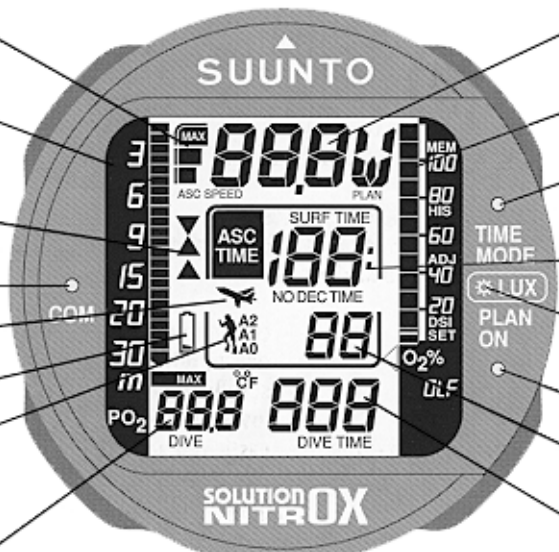
SOLUTION NITROX

Enriched Air Dive Computer

INSTRUCTION MANUAL

SUUNTO

Quick Reference Guide



Ascent Rate Indicator

Depth Bar Graph:
- Ceiling Depth
- Maximum Depth
- Present Depth

Arrows:
- Decompression Stop at the Ceiling Depth
- Ascent Recommended
- Must Descend

Common Contact

Do Not Fly Icon

Low Battery Warning

Personal Adjustment/
High Altitude Mode

Maximum Depth during Diving
Temperature
Oxygen Partial Pressure
Dive Counter
Day of the Month

Present Depth
Maximum Depth at the Surface
Fast Ascent Warning (SLOW)

Mode Indicator
Oxygen Limit Fraction Bar Graph
(OLF% = CNS% or OTU%)

Time Display/
Mode Selection Contact

Current Time Display
Surface Interval/No Flying Time
No-Decompression Time
Total Ascent Time

Tap Switch for
Electroluminescent Backlight

Activation/
Dive Planning Contact

Oxygen Percentage
(21% - 50%)

Dive Time
Month

The SOLUTION NITROX enriched air dive computer features:

Complete Nitrox Capabilities:
- programmable for nitrox mixtures from 21% to 50% oxygen in 1% increments
- adjustment for oxygen partial pressure (PO_2) warning from 1.2 bar to 1.6 bar
- displays oxygen partial pressure during diving when greater than the adjustment
- calculates maximum allowed depth based on set O_2 and PO_2
- color coded Oxygen Limit Fraction (OLF) bar graph for O_2 accumulation (shows CNS% or OTU%)
- separate nitrox display and adjustment mode for nitrox parameters (O_2, PO_2, maximum allowed depth, OLF and personal/altitude adjustment)
- stores the O_2 % and maximum OLF in the logbook/profile memories
- defaults to 50% O_2, 79% N_2 after activation; remembers the set value on repetitive dives and 1 hour after activation
- can be used as a regular dive computer, once set to standard air (21% O_2)

Basic features as in the SOLUTION α:
- built-in calendar clock
- personal adjustment
- adjustment for altitude
- built-in simulator for dive planning before and between dives
- complete memory capabilities including 25 hour profile memory and individual identification code
- history memory up to 999 dives and 999 hours of diving + maximum depth ever reached
- PC download to SUUNTO DIVE LOG for Windows™
- visual and audible alarms
- ascent rate indicator
- continuous decompression with decompression zone display
- desaturation/do not fly indicator/display
- scrolling menu mode selection
- low battery warning
- easily replaceable battery with a transparent battery compartment lid
- easily replaceable protective display shield and a protective boot

plus

- electroluminescent backlight

CE
The CE mark is used to mark conformity with the European Union EMC directive 89/336/EEC. The Suunto dive instruments fulfill all the required EU directives.

ISO 9001
Suunto's Quality Assurance System is certified by Det Norske Veritas to be according to the ISO 9001 in all Suunto Oy's operations (Quality Certificate No. 96-HEL-AQ-220).

DEFINITION OF WARNINGS, CAUTIONS AND NOTES

Throughout this manual, special references are made when deemed important. Three classifications are used to separate these references by their order of importance.

WARNING is used in connection with a procedure or situation that may result in serious injury or death.
CAUTION is used in connection with a procedure or situation that will result in damage to the product.
NOTE is used to emphasize important information.

⚠ WARNING! ⚠

READ THIS MANUAL!

Carefully read this instruction manual in its entirety, including Section 1, "For Your Safety". Make sure that you fully understand the use, displays and limitations of the **SOLUTION NITROX.**

⚠ WARNING! ⚠

NO PROCEDURE OR DIVE COMPUTER WILL PREVENT THE POSSIBILITY OF DECOMPRESSION SICKNESS (DCS) OR OXYGEN TOXICITY!

All divers must understand and accept that there is no procedure or dive computer that will totally prevent the possibility of a decompression accident or that oxygen toxicity will not occur, even within accepted limits. For example, the individual physiological make up can vary within an individual from day to day. A dive computer cannot account for these variations. As an added measure of safety, you should consult a physician regarding your fitness before diving with the **SOLUTION NITROX** dive computer.

DIVING WITH ENRICHED AIR MIXTURES (NITROX) EXPOSES THE USER TO RISKS DIFFERENT FROM THOSE ASSOCIATED WITH DIVING WITH STANDARD AIR. THESE RISKS ARE NOT OBVIOUS AND REQUIRE TRAINING TO UNDERSTAND AND AVOID. RISKS INCLUDE POSSIBLE SERIOUS INJURY OR DEATH.

DO NOT ATTEMPT TO DIVE WITH ANY GAS MIX OTHER THAN STANDARD AIR WITHOUT FIRST RECEIVING CERTIFIED TRAINING IN THIS SPECIALTY.

⚠ WARNING! ⚠

ONLY DIVERS TRAINED IN THE PROPER USE OF SCUBA EQUIPMENT SHOULD USE THE **SOLUTION NITROX**!

No dive computer can replace proper dive training.

⚠ WARNING! ⚠

NOT FOR PROFESSIONAL USE!

The **SOLUTION NITROX** dive computer is intended for use by recreational users that have received appropriate training in at least basic scuba diving and enriched air diving. Commercial or professional diving often exposes the diver to risks beyond those normally encountered in recreational diving and therefore this product is not recommended for applications other than recreational use.

⚠ WARNING! ⚠

PERFORM PRECHECKS!

Always check the **SOLUTION NITROX** before diving in order to ensure that all LCD segments are completely displayed, that the **SOLUTION NITROX** has not run out of battery power, and that the oxygen and personal/altitude adjustments are correct.

TABLE OF CONTENTS

INTRODUCTION

Congratulations on your choice of the SUUNTO **SOLUTION NITROX** Dive Computer. The **SOLUTION NITROX** is a compact and most sophisticated dive instrument that will give you years of trouble free and joyful diving. The **SOLUTION NITROX** dive computer will provide you with important information that you will need during, between, and after your dives.

KEY FEATURES

The **SOLUTION NITROX** monitors and reports vital information such as your dive time, current depth, maximum depth, no-decompression time, ascent rate and oxygen exposure. It will give you visual and audible warnings as required. Its built-in simulator allows you to get acquainted with the features and displays of the **SOLUTION NITROX** before diving and to plan dives before and between dives.

The **SOLUTION NITROX** will also give you information you may need, if through carelessness or emergency you exceed the no-decompression limits for any dive. The **SOLUTION NITROX** has a built-in calendar and clock, and it features versatile memory capabilities, including both detailed profiles and long-term historical data. It can interface with a PC, allowing for additional logbook features and dive simulation. The instrument can be adjusted for diving at different altitudes or to add an extra level of conservativeness if desired.

The **SOLUTION NITROX** is equipped with a sophisticated electroluminescent "LUX" backlight display. It will give excellent backlight quality in darkness and low ambient light conditions. The battery life is not significantly reduced, because of the highly energy efficient system design and because the illumination goes off automatically after approximately 10 seconds from activation.

The screen and case are protected against scratches and damage by a replaceable display shield and elastomer boot.

GETTING STARTED

A fast way for you to get started with the **SOLUTION NITROX** is to let the built-in dive simulator demonstrate its features and displays. This is described in Chapter 2, "Getting Acquainted with the **SOLUTION NITROX**". **Before your first actual dive you must also read and understand Chapter 1, "For Your Safety" and Chapter 3, "Diving with the SOLUTION NITROX" in their entirety.** Chapter 4, "Menu Based Functions" teaches you how to access the memory functions and simulator, and how to set the altitude/personal adjustment mode and the clock. Chapter 5, "PC-Interface" gives you some information on the capability of this optional package. Chapter 6, "Care and Maintenance" and Chapter 7, "Technical Description" give you detailed information on these two subjects. Finally, there is warranty information in Chapter 8, and a glossary in Chapter 9.

METRIC AND IMPERIAL UNITS

All examples in this manual are shown in metric units, including meters and °C. The corresponding imperial units are shown in brackets. The **SOLUTION NITROX** is also available with imperial units, i.e. feet and °F.

⚠ WARNING! ⚠

VERIFY THAT THE UNITS OF MEASURE, WHETHER METRIC OR IMPERIAL, ARE CORRECT BEFORE STARTING TO DIVE!

Any confusion resulting from improper selection of units may cause the diver to commit errors that may lead to serious injury.

1. FOR YOUR SAFETY

Always remember that THE DIVER IS RESPONSIBLE FOR HIS OR HER OWN SAFETY!

When used properly the **SOLUTION NITROX** is an outstanding tool for assisting properly trained, certified divers in planning and executing standard and multi-level sport dives within the described no-decompression limits. It is NOT A SUBSTITUTE FOR CERTIFIED SCUBA INSTRUCTION including training in the principles of decompression and enriched air diving.

DO NOT attempt to use the Suunto **SOLUTION NITROX** without reading this entire Instruction Manual. If you have any questions about the manual or the **SOLUTION NITROX**, contact your Suunto dealer before diving with the **SOLUTION NITROX**.

BACK-UP INSTRUMENTS

⚠ WARNING! ⚠

USE BACK-UP INSTRUMENTS!

Make certain that you use back-up instrumentation including a depth gauge, a submersible pressure gauge, a timer or watch, and have access to decompression tables whenever diving with the **SOLUTION NITROX**.

SHARING THE **SOLUTION NITROX**

⚠ **WARNING!** ⚠

THE **SOLUTION NITROX** SHOULD NEVER BE TRADED OR SHARED BETWEEN USERS WHILE IT IS IN OPERATION!

Its information will not apply to someone who has not been wearing it throughout a dive or sequence of repetitive dives. Its dive profiles must match that of the user. If it is left on the surface during any dive, it will give inaccurate information for subsequent dives.

No dive computer can take into account dives made without the computer. Thus any diving activity 48 hours prior to initial use of the computer may give misleading information and must be avoided.

PERSONAL/HIGH ALTITUDE ADJUSTMENT

More information about this is given in Section 3.5, "Personal Adjustment and High Altitude Dives".

⚠ WARNING! ⚠

SET THE CORRECT PERSONAL/ALTITUDE ADJUSTMENT MODE!

When diving at altitudes greater than 700 m [2300 ft] the personal/altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculation more conservative, whenever it is believed that factors which tend to increase the possibility of DCS exist (see Chapter 3.5). Failure to properly select the personal/altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of DCS.

⚠ WARNING! ⚠

THE **SOLUTION NITROX** IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Diving at altitudes above this limit may significantly increase the risk of DCS.

When diving at higher altitudes (above 700 m/2300 ft), it is essential that the entered altitude mode, i.e. the maximum altitude limit of the **SOLUTION NITROX**, exceeds or is equal to the altitude of the dive site. The altitude mode indicator must show either A1 or A2, depending on the altitude. More information about this is given in Chapter 3.5, "Personal Adjustment and High Altitude Dives".

DECOMPRESSION DIVES

⚠ WARNING! ⚠

DO NOT USE THIS INSTRUMENT TO CONDUCT DECOMPRESSION DIVES!

Suunto does not recommend this instrument to be used to conduct decompression dives. However, if through carelessness or emergency a diver is forced to exceed the no-decompression limits on a dive, the **SOLUTION NITROX** will provide decompression information required for ascent. After this the **SOLUTION NITROX** will continue to provide subsequent interval and repetitive dive information.

EMERGENCY ASCENTS

In the unlikely event that the **SOLUTION NITROX** malfunctions during a dive, follow the emergency procedures provided by your certified dive training or, alternatively, immediately ascend at a rate slower than 10 m/min [33 ft/min] to a depth between 3 and 6 meters [10 to 20 ft] and stay there as long as your air supply will safely allow.

HIGHER RISK DIVE PROFILES

The user must understand that all decompression devices (decompression tables and/or dive computers) are based on mathematical models and that many experts are currently concerned that these models may not under certain conditions adequately des-

cribe the physiological phenomena. These conditions are presently identified as dives which incorporate the following:

- REVERSE PROFILES — where the diver spends most of the dive at shallow depths and then descends to the maximum depth shortly before surfacing.
- SAWTOOTH PROFILES — where the diver alternates between greater and shallower depths repeatedly throughout the dive.
- CONSECUTIVE DIVES — where the diver performs repetitive dives to approximately the same maximum depth with only short surface intervals between dives. The risk of DCS increases when depth and the number of repetitive dives increase and when the surface intervals are decreased.
- MULTIDAY DIVES — repetitive dives performed during several consecutive days.
- DECOMPRESSION DIVES — any dive during which the no-decompression limit has been exceeded or the diver is advised by the computer that he may not return directly to the surface.

⚠ WARNING! ⚠

DIVE PRACTICES WHICH INCLUDE THE ABOVE DESCRIBED "HIGHER RISK DIVE PROFILES" ARE CONSIDERED POTENTIALLY DANGEROUS AND SHOULD BE AVOIDED EVEN IF THEY CONFORM TO THE MATHEMATICAL MODEL!

DIVE COMPUTER LIMITATIONS

While the **SOLUTION NITROX** is based on current decompression research and technology, the user/diver must realize that the computer cannot monitor the actual physiological functions of an individual diver. All decompression schedules currently known to the authors, including the U.S. Navy Tables, are based on a theoretical mathematical model which is intended to serve as a guide to reduce the probability of decompression sickness.

The mathematical model uses a fixed ascent rate of 10 m/min [33 ft/min] even at greater depths to reduce the build-up of micro-bubbles, which can grow larger and turn into harmful bubbles in the later phase of the dive. Therefore it is critical that a proper ascent rate is always used.

The reader/diver is forewarned that individual physiological differences, severe environmental conditions and predive activities, especially those which tend to increase dehydration, may increase the risk of decompression sickness.

As a safety precaution Suunto recommends that divers using the **SOLUTION NITROX** should maintain no less than 5 to 10 minutes of no-decompression time remaining at all times during the dive. This is especially important for divers in poor physical condition, in cold water or other arduous conditions.

Historically divers have been advised to always include a margin of safety in their diving activities. Suunto supports these practices and strongly recommends that the diver make the deepest portion of the dive near the beginning of the dive and gradually progress into shallower depth, allowing time for a 3 to 5 minute "safety stop" at a depth range of 3 to 6 meters (10 to 20 ft). This is believed to be effective in further reducing the risk of decompression sickness.

Furthermore, the reader/diver is advised that any dive carries some risk of decompression sickness and neither the authors, nor SUUNTO OY will assume any responsibility or liability for accidents or injuries which might occur for any reason.

ENRICHED AIR AND SAFETY

Diving with enriched air provides the diver an opportunity to reduce the risk of decompression sickness by reducing the nitrogen content in the breathing gas mix.

However, when the gas mix is altered the oxygen content of the mix is generally increased. This increase exposes the diver to an oxygen toxicity risk not usually considered in recreational diving. In order to manage this risk the **SOLUTION NITROX** tracks the time and intensity of the oxygen exposure and provides the diver with information to adjust the dive plan in order to maintain oxygen exposure within reasonably safe limits.

In addition to the physiological effects of enriched air on the body there are operational considerations to be addressed when handling altered breathing mixes. Elevated concentrations of oxygen present a fire or explosion hazard and you are advised to consult the manufacturer of the diving equipment you will be exposing to enriched air with regard to limitations.

⚠ WARNING! ⚠

DO NOT EXPOSE THE **SOLUTION NITROX** DIVE COMPUTER TO ANY GAS MIX CONTAINING MORE THAN 50% OXYGEN!

Enriched air with a greater oxygen content may present a risk of fire or explosion and serious injury or death.

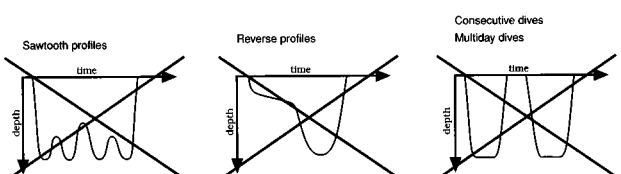


Fig. 1.1 HIGHER RISK DIVE PROFILES

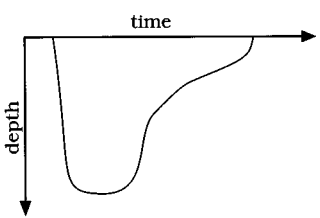


Fig. 1.2 RECOMMENDED PROFILE

2. GETTING ACQUAINTED WITH THE SOLUTION NITROX

This brief introduction will utilize the unique built-in dive simulator of the **SOLUTION NITROX**. Following the simple steps described below you can see what the display might show during different stages of a typical dive sequence.

⚠ WARNING! ⚠

READ AND UNDERSTAND THE ENTIRE OWNER´S MANUAL BEFORE DIVING!

Failure to complete this step may result in serious personal injury.

The purpose of this section is to provide the user with initial information to preview the operation of the computer. Since this information is limited, it is imperative that you read and understand the entire owner's manual before attempting to dive.

2.1 WATER CONTACTS

The **SOLUTION NITROX** has three water contacts on the face of the instrument:

- **COM:** common contact
- **ON/PLAN:** activation and dive planning contact
- **TIME/MODE:** time display and mode selection contact

Fig. 2.1 ACTIVATION
Touch the ON/PLAN and COM contacts with moistened fingers.

On the surface the **SOLUTION NITROX** is operated by simultaneously touching the COM contact and one or two of the other contacts. When doing this, your fingertips should be wet or moist to establish the necessary electric contact. When submerged these contacts are automatically connected by the conductivity of the water.

2.2 ACTIVATION

The **SOLUTION NITROX** is activated by touching the ON/PLAN and COM contacts (Fig 2.1). The **SOLUTION NITROX** confirms this with a short beep. The first display, the STARTUP, shows all available elements and immediately after this the serial number of the unit and the nitrox display. A few seconds later the READY display will appear, showing zero values (Fig. 2.2).

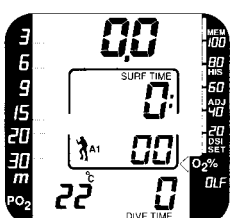


Fig. 2.2 READY DISPLAY

2.3 THE DIVE SIMULATOR - FOR EASY LEARNING

The **SOLUTION NITROX**'s built-in Dive Simulator is an excellent tool for becoming familiar with the **SOLUTION NITROX**. It will allow you to "perform" dive profiles of your choice and see what the display would look like during an actual dive. This includes basic dive information, as well as audible and visual warnings. However, **the Oxygen Limit Fraction bar graph is not shown in the Dive Simulator.**

In simulation mode the time has been speeded up, moving four times faster than real time when diving and 12 times faster than real time on the surface.

BEFORE ENTERING THE DIVE SIMULATION MODE

Before entering the Dive Simulation mode adjust the desired personal/altitude adjustment mode and oxygen adjustments in the Adjustment mode. For more information about how to perform these adjustments, see Chapters 3.5, 3.6 and 4.3.

TO ENTER THE DIVE SIMULATION MODE

To enter the Dive Simulation mode, keep your moistened fingers on the TIME/MODE and COM contacts. A bar on the right-hand side of the display will scroll through the different modes available. Lift your fingers when the scroll bar is in line with the letters dSI (dive simulation) next to the screen and the text dSi is shown on the display. If you accidentally enter the wrong menu selection, simply touch all three contacts simultaneously to return to the READY display.

BEFORE DIVING (SIMULATION)

When you enter the Dive Simulation mode as described above, the initial display is the READY display (Fig 2.2). Next, enter the Dive Planning mode by touching the ON/PLAN and COM contacts for about one second. Release your fingers immediately when you hear a short beep. The Dive Planning display will rapidly cycle through the no-decompression limits for various depths (Fig. 2.3, display A).

DIVING (SIMULATION)

To simulate a dive, use the three contacts as follows:

To descend: touch the ON/PLAN and COM contacts for as long as you want to descend.

To ascend: touch the TIME/MODE and COM contacts. You will have to lift your fingers momentarily to avoid an excessive ascent speed rate.

We are now ready to descend. Touch the ON/PLAN and COM contacts for a couple of seconds at a time. Descend step by step to about 30 m [100 ft] and after about 9 minutes of diving, start the ascent. Check your ascent rate on the ascent rate indicator. The ascent rate is indicated in the upper left corner by one, two (Fig. 2.3 B), or three bars indicating a maximum ascent rate of 5, 7.5, and 10 m/min [16, 25, and 33 ft/min] respectively. If you exceed the maximum allowed ascent rate of 10 m/min [33 ft/min], all three bars and a blinking SLOW will be shown. Remember to make a safety stop at a depth of about 3 to 6 m [10 to 20 ft] before surfacing (Fig. 2.3 C). Now it is time to surface.

SURFACE INTERVAL (SIMULATION)

Back on the surface the display shows the maximum depth and dive time of your simulated dive (Fig. 2.3, display D) and the elapsed surface interval time or the no-flying time display.

It is also possible to simulate repetitive dives and to see how the **SOLUTION NITROX** works e.g. during a decompression dive.

EXIT THE DIVE SIMULATION MODE

You may at any time exit the simulation mode by making contact between all three water contacts. This is most easily done by first covering the TIME/MODE and ON/PLAN contacts with your right thumb and then touching the COM contact with your left thumb. As usual, it helps if your fingers are wet or moist. This procedure will bring you back to the normal READY mode. The **SOLUTION NITROX** is now ready for a dive. It will automatically switch off after about 10 minutes of surface time in case you do not use it any more and no real dives have been performed.

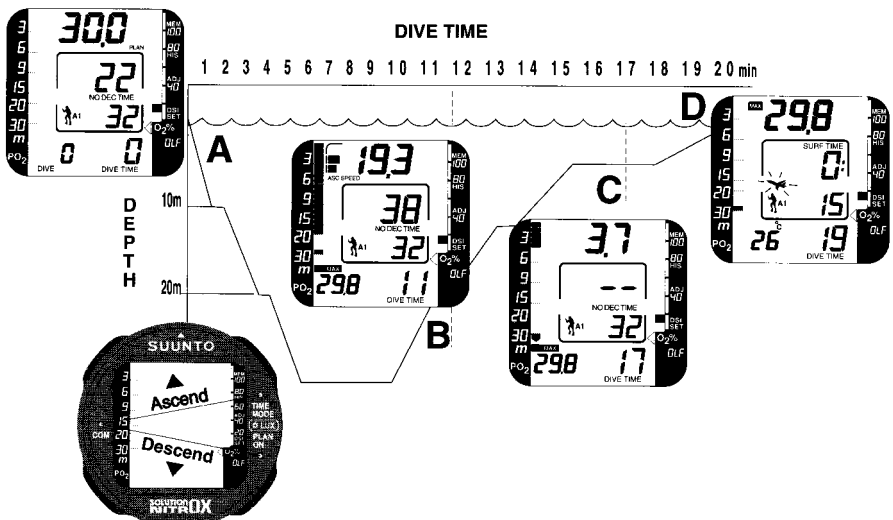
Fig. 2.3 SIMULATED DIVE PROFILE AND CORRESPONDING DISPLAYS

A) DIVE PLANNING: *At 30.0 m [100 ft] the no-decompression time is 22 minutes in A1 mode when the oxygen percentage is adjusted to 32%. The dive counter shows 0, i.e. no dive has been made.*

B) DIVING: *At a 19.3 m [63 ft] depth after 11 minutes of diving the no-decompression time is 38 minutes. The ascent speed is 5 - 7.5 m/min [16 - 25 ft/min] as shown by the two segments in the upper left corner.*

C) DIVING: *Safety stop at a depth range of 3 to 6 meters [10 to 20 ft].*

D) SURFACE: *The maximum depth was 29.8 m [98 ft], the dive time 19 minutes and the elapsed surface time is 15 minutes.*



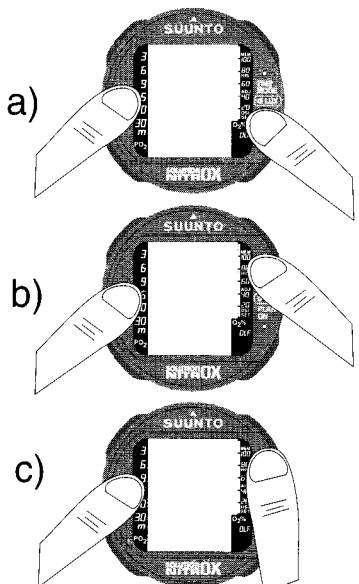


Fig. 3.1 USING THE WATER CONTACTS
a) Activation and dive planning
b) Time display and menu based modes
c) Exit the modes

3. DIVING WITH THE SOLUTION NITROX

This section contains instructions on how to operate the **SOLUTION NITROX** and interpret its displays. Each display has been carefully designed to provide important information you will need to plan your dive or dive series.

You will find that the **SOLUTION NITROX** is easy to use and read. Each display shows only the data relevant to that specific diving situation. For example, while you are on a dive, surface interval data is irrelevant and therefore not shown. On the other hand, while you are on the surface after a dive, remaining no-decompression time for that dive is irrelevant and therefore replaced with information for your next dive.

3.1 USE OF WATER CONTACTS AND TAP SWITCH

The Solution Nitrox has three water contacts on the face of the instrument:

COM:	common contact
ON/PLAN:	activation and dive planning contact
TIME/MODE:	time display and mode selection contact

The **SOLUTION NITROX** also has a movement sensitive tap switch on the face of the instrument between the ON/PLAN and TIME/MODE water contacts. This is used to activate the electroluminescent backlight.

3.1.1 Water Contacts

The **SOLUTION NITROX** is controlled with the COM (common), ON/PLAN, and TIME/MODE contacts (Fig. 3.1) as follows:

Activation: touch the ON/PLAN and COM contacts.
Dive planning: once the **SOLUTION NITROX** has been activated, touch the ON/PLAN and COM contacts.
Clock: touch the TIME/MODE and COM contacts for one second. The time is then displayed for four seconds.

When the TIME/MODE and COM contacts are being touched over two seconds, the display will start to scroll through the following modes. Lift your fingers when the desired mode is displayed:

Memory: at LOG the logbook and profile memories are accessed.
Dive history: at HIS the history memory is accessed.
O_2 and personal/altitude adjustments: at Adj the personal/altitude and/or oxygen adjustment can be set.
Dive simulator: at dSI the dive simulator is ready for use.
Time setting: at Set the clock can be adjusted.
Return: you can at any time exit the above modes by touching all three contacts at the same time. First make contact between the ON/PLAN and TIME/MODE contacts, e.g. by covering both contacts with your right thumb. Without lifting your right thumb, touch the COM contact with your left thumb. Alternatively, you can exit the modes simply by submerging the **SOLUTION NITROX** in water.

You may sometimes encounter problems in using the contacts, or the **SOLUTION NITROX** may activate on its own. The reason for this is probably contamination or invisible marine growth that may create an unwanted electric current between the water contacts. It is therefore important that the **SOLUTION NITROX** be carefully washed in fresh water after the day's diving is completed. The contacts can be cleaned with a soft pencil eraser.

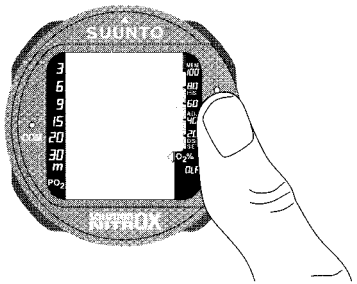


Fig. 3.2 ACTIVATING THE BACKLIGHT
Press or tap the movement sensitive area marked with a "¤" symbol.

3.1.2 Tap Switch and Electroluminescent Backlight

The movement sensitive tap switch is used to activate the electroluminescent backlight. The switch is used by pressing or tapping the movement sensitive area with your finger (Fig 3.2). This area is on the face of the instrument between the ON/PLAN and TIME/MODE water contacts marked with a "¤" symbol next to the text LUX.

The light can be activated in all modes when the computer is on. The illumination goes off automatically after approximately 10 seconds from activation. For safety reasons the illumination will not turn on or it will turn off after a couple of seconds, if the battery voltage is low.

With a little practicing you will quickly figure out how to use the tap switch. Do the practicing in a dark room so you can see when the light goes on.

3.2 BEFORE DIVING

3.2.1 Activation and Prechecks

The **SOLUTION NITROX** is always ready for use and will activate if submerged. However, it is necessary to turn it on before diving to check the personal/altitude adjustment setting, oxygen percentage, battery warning, etc. This is done, either by immersing it in water for a couple of seconds or by connecting the ON/PLAN and COM contacts with fingertips.

A short beep is heard. All display elements will turn on (showing mostly figure 8's and graphical elements) (Fig. 3.3). A few seconds later the serial number of the unit (Fig. 3.4) and the nitrox display (Fig. 3.5) are shown. Next, the screen will alternate between two READY displays, confirming that the activation is complete (Fig. 3.6). At this time, perform your precheck making sure that:

* the **SOLUTION NITROX** operates and provides a complete display
* the low battery indicator is not on (Fig. 3.7)
* the personal/altitude adjustment setting is correct
* the oxygen percentage is adjusted according to the measured enriched air blend in your cylinder

The **SOLUTION NITROX** is now ready for diving. If the **SOLUTION NITROX** is not taken on a dive after activation, it will automatically turn off in 10 minutes to conserve the battery power.

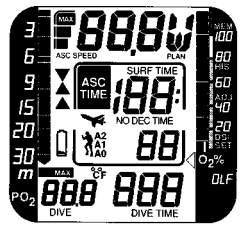


Fig. 3.3 STARTUP I
All segments shown.

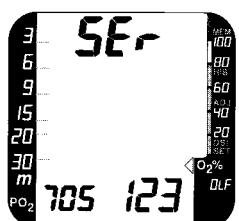


Fig. 3.4 STARTUP II
The serial number of the unit is 705 123. This means the unit was the 123rd unit made during week no 05 of the year 1997.

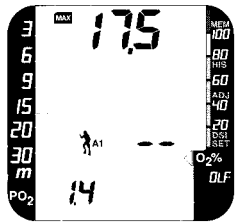


Fig. 3.5 STARTUP III
The Nitrox display shows the oxygen percentage adjustment ("--" for the default settings 50% O_2/79% N_2), altitude adjustment mode (A1), adjusted oxygen partial pressure (1.4 bar) and the calculated maximum depth (17.5 m [58 ft]).

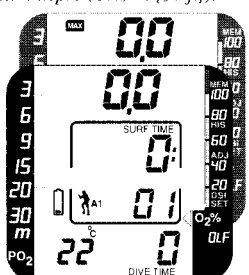


Fig. 3.6 READY DISPLAYS
The maximum depth and dive time are zeros (as no dives have yet been made), the surface interval time is 0 hours 1 minute (in this case one minute after activation), the temperature is 22°C [72°F] and the present depth is 0.0 m [0 ft]. The depth display will alternate between present and maximum depth.

The **SOLUTION NITROX** does not need to be reactivated for repetitive dives. It will remain active until it has calculated that all residual nitrogen has off-gassed. This may take up to 48 hours, as described in Chapter 7.1, "Operating Principles".

3.2.2 Battery Warning

If the battery symbol is displayed, the **SOLUTION NITROX** should not be used (Fig. 3.7). It indicates that the battery is too low to operate the **SOLUTION NITROX.** If the low battery symbol appears during a dive, you should abort the dive and begin ascent to the surface.

NOTE: Temperature affects the battery voltage. If the **SOLUTION NITROX** is stored at temperatures below freezing point, the low battery warning may be displayed even though the battery has enough capacity in warmer conditions. Make sure that the low battery warning disappears before diving.

3.2.3. Personal Adjustment and High Altitude Diving

⚠ WARNING! ⚠

SET THE CORRECT PERSONAL/ALTITUDE ADJUSTMENT MODE!

When diving at altitudes greater than 700 m [2300 ft] the personal/altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculations more conservative, whenever it is believed that factors which tend to increase the possibility of DCS exist (see Chapter 3.5). Failure to properly select the personal/altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of DCS.

⚠ WARNING! ⚠

THE **SOLUTION NITROX** IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Diving at altitudes above this limit may significantly increase the risk of DCS.

If you are diving at higher altitudes, make sure that the altitude mode has been set according to the altitude of your dive site.

For information on how to select the correct altitude setting and how to use the personal adjustment, see Chapter 3.5 "Personal Adjustment and High Altitude Dives" and how to adjust the mode see Chapter 4.3 "Oxygen and Personal/Altitude Adjustments.

3.2.4 Oxygen Adjustments

OXYGEN PERCENTAGE ADJUSTMENT

In addition to modeling nitrogen exposure, the **SOLUTION NITROX** models oxygen exposure based on the oxygen percentage **manually** entered into the computer before the dive starts. If you do not make a manual entry the computer **defaults to a 50% oxygen** value. In the default mode the **SOLUTION NITROX** computes nitrogen exposure based on a 79% nitrogen content even though oxygen exposure is treated as greater than that of standard air. In the default mode two horizontal bars will appear instead of the oxygen percentage in the lower center window of the display (Fig. 3.5).

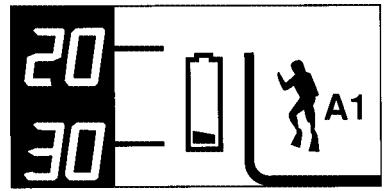


Fig. 3.7 BATTERY WARNING
The battery symbol indicates that the battery voltage is too low for diving.

Fig. 3.8 DIVE PLANNING I
The Nitrox display shows the oxygen percentage adjustment (32% O_2), altitude adjustment mode (A1), oxygen partial pressure (1.4 bar) and the maximum allowed depth (32.6 m [107 ft]) and the residual OLF bar graph for repetitive dives.

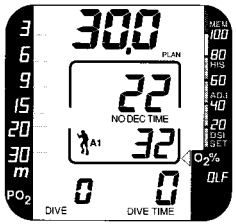


Fig. 3.9 DIVE PLANNING II
The no-decompression time limit at 30.0 m [100 ft] is 22 minutes in A1 mode for a nitrox mixture with 32% oxygen.

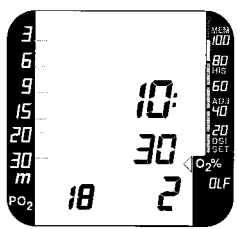


Fig. 3.10 TIME DISPLAY
The time is 10:30 [in case of imperial unit, A for a.m. and P for p.m. would be shown in the upper left corner of the display]. The date is 18.2. or February 18th. PLEASE NOTE: The date will always be displayed with the day of the month first, followed by the month.

The manually set oxygen percentage will remain active in the **SOLUTION NITROX** until

- one hour has elapsed between the initial start up and the first dive of a new dive series or
- the nitrogen desaturation/no fly time reaches zero following a dive series.

When set to standard air (21% O_2), the **SOLUTION NITROX** can be used as a regular dive computer. It remains in the air mode until the O_2% is adjusted to enriched air (22% to 50% O_2).

⚠ WARNING! ⚠

ALWAYS VERIFY THE OXYGEN CONTENT OF THE GAS MIX YOU PLAN TO USE AND MANUALLY ENTER THE MATCHING VALUE IN THE **SOLUTION NITROX** BEFORE YOU BEGIN A NEW DIVE SERIES!

Failure to make the correct entry could cause you to receive incorrect dive planning information and result in serious injury or death.

OXYGEN PARTIAL PRESSURE ADJUSTMENT

The default setting for the oxygen partial pressure warning limit is 1.4 bar. You will be able to set it from 1.2 to 1.6 bar, whenever you intentionally want to introduce different maximum depth and warning limits. The maximum allowed depth limit is calculated based on your O_2% and PO_2 adjustments. This adjustment does not affect the oxygen exposure tracking.

The oxygen partial pressure setting will remain dive after dive until set again.

For information on how to select the correct oxygen settings see Chapter 3.6, "Diving With Enriched Air" and how to adjust the oxygen percentage/partial pressure see Chapter 4.3 "Oxygen and Personal/Altitude Adjustments".

3.2.5 Dive Planning and Checking Your Oxygen Adjustments

It is possible at any time on the surface to enter the DIVE PLANNING mode, simply by touching the ON/PLAN and COM contacts. Immediately after access the Nitrox display will be displayed for 3 s showing the vital oxygen parameters and calculated maximum depth. After that the dive planning display will appear rapidly cycling through the no-decompression limits for various depths in 3 m [10 ft] increments starting at 9 m [30 ft] and ending at the maximum allowed depth (Fig.3.9). After the cycle the **SOLUTION NITROX** will automatically return to the READY display.

Higher personal/altitude adjustment modes will shorten and higher oxygen percentages will lengthen the no-decompression time limits. These limits at different personal/altitude adjustment mode selections and at adjustments for 21%, 32% and 36% of oxygen are shown in Tables 7.1 and 7.2 in Chapter 7.1,"Operating Principles".

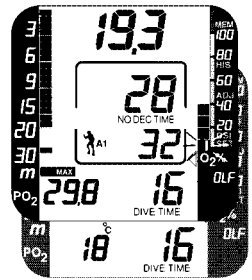


Fig. 3.11 DIVING DISPLAY
The present depth is 19.3 m [63 ft], the no-decompression time limit is 28 minutes in A1 mode and the dive time is 16 minutes. Maximum depth during this dive 29.8m [98 ft] and water temperature 18°C [64°F] are alternating in the lower left corner. The current depth is also shown on the left-hand side bar graph, with the maximum depth indicated by a single bar. The Oxygen Limit Fraction (OLF) is shown on the right-hand side bar graph. The OLF is between 30% and 40% and the blinking lowest segment in the bar graph indicates that the OTU is critical.

3.2.6 Calendar Clock Function

The TIME display can be retrieved at any time on the surface by touching the TIME/MODE and COM contacts for about one second. The current time and date will be shown for four seconds (Fig. 3.10). When diving, the dive entry time and date is registered in the logbook memory. Remember always to check before diving that the clock is

set, especially when traveling to different time zones. For adjusting the clock, refer to Chapter 4.5, "Setting Time and Date".

In the metric version of the **SOLUTION NITROX**, the 24-hour time system is used, while in the imperial version the 12-hour time system is used.

3.3 DIVING

3.3.1 Basic Dive Data

The **SOLUTION NITROX** will remain in the SURFACE mode at depths less than 1.5 m [5 feet]. At depths greater than 1.5 m the **SOLUTION NITROX** will go into DIVE mode.

All information on the display is labeled (Fig. 3.11). During a no-decompression dive, the following information will be shown:

- The available no-decompression time in minutes is shown as NO DEC TIME. It is calculated based on the six factors listed in Chapter 7.1, "Operating Principles".
- Your present depth is shown in meters [ft]. In addition to the digital display, the present depth is also displayed graphically with a depth bar graph along the left side of the display.
- The elapsed dive time in minutes in the lower right corner appears as DIVE TIME.
- The personal/altitude adjustment setting (A0, A1, or A2).
- The oxygen percentage (21% - 50% or "- -" for default settings 50%O_2/79%N_2).

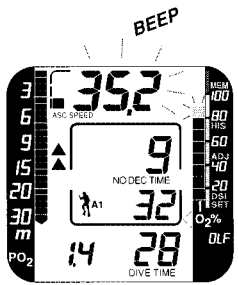


Fig. 3.12 DIVING DISPLAY
The maximum allowed depth is blinking and the PO_2 (1.4 bar) is shown in the lower left corner of the display, because the maximun allowed depth/PO_2 limit is exceeded. Two upward pointing arrows tell you to ascend. The 80% limit in the OLF bar graph is also exceeded and a douple beep is heard. The segments above the 80% limit are blinking. The blinking stops, when the PO_2 is less than 0.5 bar.

- The oxygen toxicity exposure shown with an Oxygen Limit Fraction (OLF) bar graph along the right side of the display. It is calculated based on the factors listed in Chapter 7.1, "Operating Principles".

In the lower left corner the following information will alternate, when the oxygen partial pressure is less than 1.4 bar or set value:

- The maximum depth during this dive in meters [ft], indicated as MAX, for about 7 seconds. A single bar on the depth bar graph also shows the maximum depth reached.
- The water temperature, followed by °C for Centigrade [or °F for Fahrenheit], for about 2.5 second.

When the oxygen partial pressure is greater than 1.4 bar or set value, the oxygen partial pressure is shown in the lower left corner (Fig. 3.12).

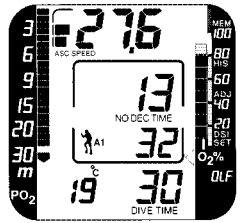


Fig. 3.13 ASCENT SPEED INDICATOR
Two segments shown: ascent rate 5 - 7.5 m/min [16 - 25 ft/min].

3.3.2 Ascent Rate Indicator

The ascent rate is shown graphically in the upper left corner, next to the notation ASC SPEED, as follows:

Ascent rate indicator	Ascent speed	Example in Fig.
no segments	Below 2.5 m/min [8 ft/min]	3.11
One segment	2.5 - 5.0 m/min [8 - 16 ft/min]	3.12

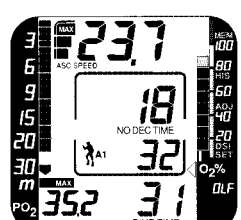


Fig. 3.14 ASCENT SPEED INDICATOR
Three segments shown: ascent rate 7.5 - 10 m/min [25 - 33 ft/min].

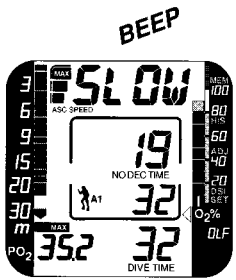


Fig. 3.15 ASCENT SPEED INDICATOR
Blinking SLOW and three segments shown: the ascent rate is more than 10 m/min [33 ft/min]. This is a caution to slow down!

Ascent rate indicator	Ascent speed	Example in Fig.
Two segments	5.0 - 7.5 m/min [16 - 25 ft/min]	3.13
Three segments	7.5 - 10 m/min [25 - 33 ft/min]	3.14
Blinking SLOW and three segments	Above 10 m/min [33 ft/min]	3.15

The SLOW warning alternates with the current depth. The SLOW warning is an indication that the maximum ascent rate has been exceeded continuously, whereas the ascent rate indicator shows present ascent speed.

Whenever the SLOW warning appears, you should immediately slow down or stop your ascent until the warning disappears. You must not ascend shallower than 3 m [10 ft] with the SLOW warning on. If you reach this depth with SLOW on, you must stop at this depth and wait until the warning disappears.

⚠ WARNING! ⚠

RAPID ASCENTS INCREASE THE RISK OF INJURY!

Do not exceed the maximum recommended ascent rate.

You must never surface with the SLOW warning on. If you do this, the warning will continue to flash until the unit deactivates itself in a normal manner. This may take up to 48 hours.

⚠ WARNING! ⚠

DO NOT ATTEMPT TO DIVE FOLLOWING A SURFACE INTERVAL DURING WHICH THE SLOW INDICATOR REMAINS ACTIVATED!

NOTE: SUUNTO highly recommends a safety stop at the end of every dive in the range of 3 m - 6 m [10 ft - 20 ft] for at least 3 - 5 minutes.

3.3.3 Oxygen Limit Fraction, OLF

In addition to tracking diver's exposure to nitrogen the **SOLUTION NITROX** tracks the exposure to oxygen. These are treated as entirely separate functions.

The oxygen toxicity exposure is shown with an Oxygen Limit Fraction (OLF) bar graph along the right side of the display (Fig. 3.11). The Oxygen Limit Fraction is a combination of two methods tracking the oxygen toxicity: the Central Nervous System Toxicity (CNS) and Oxygen Tolerance Unit (OTU). Both fractions are scaled so that the maximum exposure is expressed as 100%. Each of the 12 segments represents 10%. The fraction closest to the maximum limit is displayed. When OTU reaches the maximum limit the lowest segment starts to blink (Fig. 3.11). The OLF is calculated based on the factors listed in Chapter 7.1, "Operating Principles".

OXYGEN LIMIT FRACTION WARNINGS

When the OLF bar graph reaches 80%, a double beep is sounded and the segments exceeding the 80% limit start to blink (Fig. 3.12). A double beep is sounded again when the 100% limit is exceeded. The blinking of the segments exceeding 80% will stop, when the OLF is not loading anymore. At that point the PO_2 is less than 0.5 bar.

3.3.4 Decompression dives

⚠ WARNING! ⚠

DO NOT USE THIS INSTRUMENT TO CONDUCT DECOMPRESSION DIVES!

Suunto does not recommend this instrument to be used to conduct decompression dives. However, if through carelessness or emergency a diver is forced to exceed the no-decompression limits on a dive, the **SOLUTION NITROX** will provide decompression information required for ascent. After this the **SOLUTION NITROX** will continue to provide subsequent interval and repetitive dive information.

Rather than requiring you to make stops at fixed depths, the **SOLUTION NITROX** permits you to decompress within a range of depths.

BACKGROUND

When your NO DEC TIME becomes zero, your dive becomes a decompression dive, i.e. you must perform one or several decompression stops on your way to the surface. The NO DEC TIME on your display will be replaced by a flashing notation ASC TIME.

⚠ WARNING! ⚠

YOU SHOULD ASCEND AND BEGIN DECOMPRESSION IMMEDIATELY WHEN THE **SOLUTION NITROX** SHOWS YOU THAT DECOMPRESSION IS REQUIRED!

Note the upward pointing arrows.

The ascent time (ASC TIME) is the minimum amount of minutes needed to reach the surface in a decompression dive. It includes:
The time needed to ascend to the ceiling at an ascent rate of 10 m/min [33 ft/min],
plus
The time needed at the ceiling. The ceiling is the shallowest depth to which you should ascend,
plus
The time needed to reach the surface after the ceiling has been removed.

⚠ WARNING! ⚠

YOUR ACTUAL ASCENT TIME MAY BE LONGER THAN DISPLAYED BY THE **SOLUTION NITROX**!

The ascent time will increase if you:
- remain at depth,
- ascend slower than 10 m/min [33 ft/min], or
- make your decompression stop deeper than at the ceiling.

These factors will also increase the amount of air required to reach the surface.

⚠ WARNING! ⚠

NEVER ASCEND ABOVE THE CEILING!

You must not ascend above the ceiling. In order to avoid doing so by accident, you should stay slightly below the ceiling.

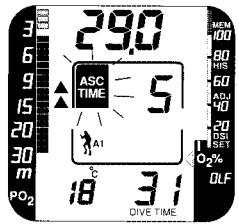


Fig. 3.16 DECOMPRESSION DIVE, BELOW FLOOR
The minimum ascent time is 5 minutes. Two upward pointing arrows tell you to ascend. The blinking ASC TIME tells you that you are below the floor. The ceiling is at 3 m [10 ft], as shown by the blinking section of the depth bar graph.

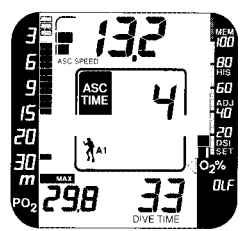


Fig. 3.17 DECOMPRESSION DIVE, ABOVE FLOOR
The blinking of the ASC TIME symbol has stopped and the two arrows disappeared. The present ASC TIME value is 4 minutes and the ceiling is at 3 m [10 ft].

CEILING, FLOOR, AND DECOMPRESSION RANGE

When in decompression, it is important that you understand the meaning of ceiling, floor, and decompression range:

- The ceiling is the shallowest depth to which you should ascend when in decompression. At this depth, or below, you must perform one or several decompression stops. All decompression stops must be performed at or below the ceiling depth.
- The floor is the deepest depth at which decompression takes place. Decompression will start when you pass this depth during your ascent.
- The decompression range is the depth range between the ceiling and the floor. Within this range, decompression takes place. However, it is important to remember that decompression will be very slow at or close to the floor.

The depth of the ceiling and floor will depend on your dive profile. They will be fairly shallow when you enter the decompression mode, but if you remain at depth, they will move downward and the ascent time will increase. Likewise, the floor and ceiling may change while you are decompressing.

The graphical depth scale on the **SOLUTION NITROX** will show your ceiling. All of the depth bars shallower than your ceiling will blink. For example, if your ceiling is at 3 m [10 ft], all of the bars between 0 and 3 m [10 ft] will blink.

When the sea is rough, it may be difficult to maintain a constant depth near the surface. In this case it will be more manageable to maintain an additional distance below to the ceiling, to make sure that the waves do not lift you above the ceiling. SUUNTO recom-

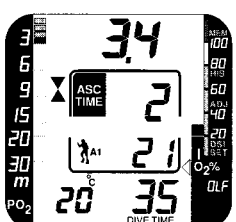


Fig. 3.18 DECOMPRESSION DIVE, AT THE CEILING
The two arrows point at each other ("hour glass"). You are at the ceiling at 3.4 m [11 ft] and your minimum ascent time is 2 minutes.

mends that decompression take place deeper than 4 m [13 ft], even if the indicated ceiling is shallower.

NOTE: It will take more time and more air to decompress below the ceiling than at the ceiling depth.

DISPLAY BELOW FLOOR

The blinking ASC TIME and two upward pointing arrows indicate that you are below the floor (Fig. 3.16). You should start your ascent immediately.

DISPLAY ABOVE FLOOR

When you ascend above the floor, the ASC TIME display stops blinking and the two upward pointing arrows disappear (Fig. 3.17). Decompression will now begin, but is very slow. You should therefore continue your ascent.

DISPLAY AT CEILING

When you reach the ceiling, the display will show you two arrows pointing toward each other (Fig. 3.18). Do not ascend above this depth. As described above, it is recommended to do the decompression stop below the ceiling to avoid accidental ascent above the ceiling.

DISPLAY ABOVE CEILING

If you ascend above the ceiling, a downward pointing arrow will appear and a continuous beeping starts (Fig. 3.19). In addition a blinking error warning Er reminds you

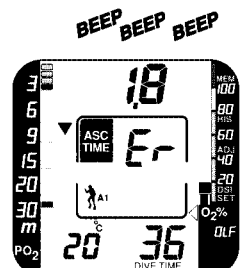


Fig. 3.19 DECOMPRESSION DIVE, ABOVE CEILING
Note the downward pointing arrow and the blinking Er warning. You will also hear an audible alarm. You should immediately descend to or below the ceiling.

that you have only three minutes to correct the situation. You must immediately descend to or below the ceiling.

If you continue to violate the decompression, the **SOLUTION NITROX** goes into a permanent ERROR MODE. In this mode the **SOLUTION NITROX** can only be used as a depth gauge and timer (Fig. 3.20). You must not dive again for at least 48 hours. See also Chapter 3.7, "Error Conditions".

During decompression, ASC TIME will count down toward zero. When the ceiling moves upwards, you can ascend to the new ceiling. You may surface only when the ascent time reaches zero and ASC TIME is replaced by NO DEC TIME.

3.3.5 Audible and Visual Alarms

The **SOLUTION NITROX** features audible and visual alarms to advise when important limits are approached or to acknowledge when certain commands are entered:

Acknowledgment of commands using the water contacts: a short single beep, occurs when:
- the **SOLUTION NITROX** is activated,
- the DIVE PLANNING mode is activated,
- scrolling the menu based functions, at each step,
- returning from the menu based modes.

A single beep, occurs when:
- a no-decompression dive turns into a decompression dive. Two arrows pointing upwards and the ascent warning ASC TIME will appear.

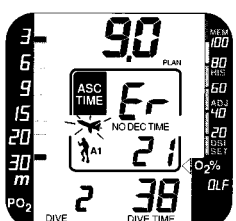


Fig. 3.20 DIVE PLANNING MODE AFTER VIOLATED DECOMPRESSION DIVE
The Er warning and the ASC TIME symbol indicate that you have violated the ceiling for more than three minutes. You must not dive again for at least 48 hours.

Continuous beeps, occur when:

- the maximum allowed ascent rate, 10 m/min [33 ft/min], is exceeded. A blinking SLOW warning will alternate with the depth display.
- the ceiling depth is exceeded. A blinking error warning Er appears. You should immediately descend to or below the ceiling. The **SOLUTION NITROX** will otherwise enter a permanent error mode after three minutes, indicated by a non-blinking Er.
- the calculated depth warning limit is exceeded (PO_2 greater than 1.4 bar or set value). The two arrows pointing upwards will appear, the current depth display will start to blink, the PO_2 appears in the lower left display and the beeping continues for three minutes, as dives below this depth will increase the risk of oxygen toxicity. You should immediately ascend above the depth warning limit.

⚠ WARNING! ⚠

WHEN THE OXYGEN EXPOSURE WARNING INDICATES THAT THE MAXIMUM LIMIT IS REACHED, YOU MUST IMMEDIATELY ASCEND UNTIL THE WARNING STOPS BLINKING!

Failure to take action to reduce oxygen exposure after the warning is given can rapidly increase the risk of oxygen toxicity and the risk of injury or death.

Oxygen Limit Fraction alarms: a double beep, occurs when:

- the OLF reaches 80%. The segments above the 80% limit blink when the OLF is increasing.
- the OLF reaches 100%.

NOTE: Suunto strongly recommends that sport divers limit their maximum depth to 40 m [130 ft] or to the depth calculated by the computer based on the entered O_2% and PO_2 of 1.4 bar settings. Exposure to greater depths increases the risk of oxygen toxicity and decompression sickness.

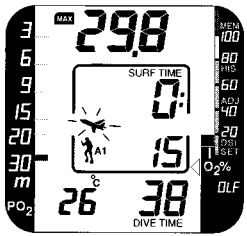


Fig. 3.21 SURFACE INTERVAL, DISPLAY I
You have surfaced 15 minutes ago from a 38 minute dive that reached a maximum depth of 29.8 m [98 ft] (also indicated by the single bar graph). The blinking airplane symbol indicates that you should not fly. The temperature is 26°C [79°F].

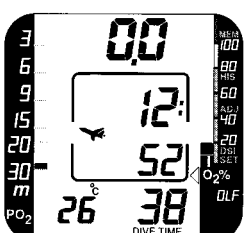


Fig. 3.22 SURFACE INTERVAL, DISPLAY II
The desaturation time/no-flying time, indicated by a non-blinking airplane symbol, is 12 h 52 min. The present depth is 0.0 m [0 ft].

3.4 AT THE SURFACE

3.4.1 Surface Interval

An ascent to any depth shallower than 1.5 m [5 ft] will cause the DIVING display to be replaced by the SURFACE displays, giving the following information (Fig. 3.21 and 3.22)

- The surface time in hours and minutes (separated by a colon), telling the duration of the present surface interval shown below SURF TIME in the center window of the display.
- The dive time in minutes, i.e. the total duration of the most recent dive displayed above DIVE TIME in the lower right corner.
- The maximum depth of your most recent dive in meters [ft] is shown in the same position as your depth readings during the dive. The MAX indicator is then shown in front of the value. In addition the graphical depth display shows a single bar at the maximum depth.
- The temperature in °C [°F] is shown in the lower left corner.
- The no-flying warning is indicated by a blinking airplane.
- The desaturation/no-flying time in hours and minutes is shown next to the non-blinking airplane in the center window of the display.
- The OLF bar graph along the right side of the display.

If you start a new dive after less than 10 minutes at the surface, the **SOLUTION NITROX** interprets this as a continuation of the previous dive. The DIVING display will return, the DIVE number will remain unchanged, and DIVE TIME will begin where it left off. After 10 minutes on the surface, subsequent dives are by definition repetitive. The DIVE counter displayed in the dive planning mode will progress to the next higher number if you make another dive.

DIVE PLANNING AND CHECKING YOUR OXYGEN ADJUSTMENTS

You may at any time on the surface enter the DIVE PLANNING mode in the manner described in Chapter 3.2.5, by touching the ON/PLAN and COM contacts. The **SOLUTION NITROX** will take into account the residual nitrogen caused by your previous dives. The no-decompression times given for different depths will therefore be shorter than before your first dive.

You may also read the time by touching the TIME/MODE and COM contacts, as described in Chapter 3.2.6.

3.4.2 Flying After Diving

The no-flying time is shown in the center window next to the non-blinking airplane image. The blinking airplane is a reminder, when the alternative display showing surface time is on (Figures 3.21 and 3.22). Flying or traveling to a higher altitude should be avoided at all times when the airplane symbol is displayed.

The no-flying time displayed by the **SOLUTION NITROX** is always at least 12 hours or equivalent to the so-called desaturation time (if longer than 12 hours). When this time has elapsed, the residual nitrogen/oxygen is no longer a factor for subsequent dives. At this time the **SOLUTION NITROX** will automatically deactivate itself.

In the permanent ERROR mode the no-flying time displayed is 48 hours.

Flying or traveling to a higher altitude after a dive may significantly increase the risk of decompression sickness.

⚠ WARNING! ⚠

YOU ARE ADVISED TO AVOID FLYING AT ALL TIMES WHEN THE COMPUTER DISPLAYS THE DO NOT FLY WARNING INDICATED BY AN AIRPLANE!

Further, the Divers Alert Network (DAN) advises as follows:

- A minimum surface interval of 12 hours would be required in order to be reasonably assured a diver will remain symptom free upon ascent to altitude in a commercial jetliner (altitude up to 2400 m [8000 ft]).
- Divers who plan to make daily, multiple dives for several days, or make dives that require decompression stops, should take special precautions and wait for an extended interval beyond 12 hours before flight. Further, the Undersea and Hyperbaric Medical Society (UHMS) suggests divers using standard air tanks and exhibiting no symptoms of decompression sickness wait 24 hours after their last dive to fly in an aircraft with cabin pressure up to 2400 m [8000 ft]. The only two exceptions to this recommendation are:
- If a diver had less than 2 hours total accumulated dive time in the last 48 hours, then a 12 hour surface interval before flying is recommended.
- Following any dive that required a decompression stop, flying should be delayed for at least 24 hours, and if possible, for 48 hours. Suunto recommends that flying be avoided until all the DAN and UHMS guidelines and the **SOLUTION NITROX** wait to fly conditions are satisfied.

⚠ WARNING! ⚠

THERE CAN NEVER BE A FLYING AFTER DIVING RULE THAT IS GUARANTEED TO PREVENT DECOMPRESSION SICKNESS COMPLETELY!

3.5 PERSONAL ADJUSTMENT AND HIGH ALTITUDE DIVES

The **SOLUTION NITROX** can be adjusted for increasing the conservatism of the mathematical model for nitrogen tracking or for diving at altitude. You should use this three-step personal adjustment feature to introduce the computer to a more conservative nitrogen calculation model according to personal preference instead of trying to set an incorrect oxygen percentage.

⚠ WARNING! ⚠

SET THE CORRECT PERSONAL/ALTITUDE ADJUSTMENT MODE!

When diving at altitudes greater than 700 m [2300 ft] the personal/altitude adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. The diver should also use this option to make the calculations more conservative, whenever it is believed that factors which tend to increase the possibility of DCS exist (see Chapter 3.5). Failure to properly select the personal/altitude adjustment mode correctly will result in erroneous data and can greatly increase the risk of DCS.

⚠ WARNING! ⚠

THE **SOLUTION NITROX** IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 2400 m (8000 ft)!

Traveling to a higher elevation can temporarily cause a change in the equilibrium of dissolved nitrogen in the body with the surroundings. It is recommended that the diver allow the body conditions to stabilize over a period of at least three hours before beginning to dive at altitude.

ALTITUDE ADJUSTABILITY

When programming the **SOLUTION NITROX** for the correct altitude, the diver needs to select the correct altitude mode according to Table 3.1. As a result the **SOLUTION NITROX** adjusts its mathematical model according to the entered altitude, giving shorter no-decompression times at higher altitudes (Tables 7.1 and 7.2).

The entered personal/altitude adjustment mode is indicated by A0, A1, or A2. Modes A1 and A2 are shown with a diver symbol. Chapter 4.3, "Oxygen and Personal/Altitude Adjustments" describes how the altitude mode is adjusted.

TABLE 3.1 ALTITUDE RANGES

Altitude mode	Altitude range	
A0	0–700 m	[0–2300 ft]
A1	700–1500 m	[2300–5000 ft]
A2	1500–2400 m	[5000–8000 ft]

PERSONAL ADJUSTABILITY

Factors that may affect susceptibility to decompression sickness vary between divers and also for the same diver from one day to another. The three-step personal adjustment mode is available to the user, if a more conservative dive plan is desired.

The factors, which tend to increase the possibility of DCS, include but are not limited to:

- cold exposure - water temperature less than 20 °C [68 °F]
- the diver is below average physical fitness level
- multiday or repetitive dive exposure

- diver fatigue
- diver dehydration
- previous history of DCS

This feature should be used to adjust the computer to intentionally introduce a factor to make it more conservative according to personal preference by entering a higher altitude mode than required in Table 3.1. In ideal conditions at sea level, retain the default setting, A0. If conditions are more difficult or other factors are a concern, select A1 or even the most conservative A2. The no-decompression limits are then shortened accordingly.

⚠ WARNING! ⚠

THERE IS ALWAYS A RISK OF DECOMPRESSION SICKNESS FOR ANY DIVE PROFILE EVEN IF YOU FOLLOW THE DIVE PLAN PRESCRIBED BY DIVE TABLES OR A DIVE COMPUTER. YOU ARE ADVISED TO REMAIN WELL WITHIN THE EXPOSURE LIMITS PROVIDED BY THE **SOLUTION NITROX** TO MINIMIZE THIS RISK. DECOMPRESSION SICKNESS CAN CAUSE SERIOUS INJURY OR DEATH.

3.6 DIVING WITH ENRICHED AIR

The **SOLUTION NITROX** can be used for diving with standard air or it can be adjusted for diving with enriched air nitrox (EANx). The oxygen percentage of the gas in your cylinder must be entered into the computer to ensure correct nitrogen and oxygen calculations. The **SOLUTION NITROX** adjusts its mathematical nitrogen and oxygen calculation models according to the entered O_2% and PO_2. Calculations based on enriched air result in longer no-decompression times, shallower maximum depths and dive plan information with regard to oxygen exposure.

⚠ WARNING! ⚠

DO NOT DIVE WITH A CYLINDER OF ENRICHED AIR IF YOU HAVE NOT PERSONALLY VERIFIED ITS CONTENTS AND ENTERED THE ANALYSIS VALUE INTO YOUR **SOLUTION NITROX**!

Failure to verify cylinder contents and enter the appropriate O_2% into your dive computer will result in incorrect dive planning information.

⚠ WARNING! ⚠

THE **SOLUTION NITROX** WILL NOT ACCEPT FRACTIONAL PERCENTAGE VALUES OF OXYGEN CONCENTRATION. DO NOT ROUND UP FRACTIONAL PERCENTAGES!

For example, 31.8% oxygen should be entered as 31%. Rounding up will cause nitrogen percentages to be understated and will affect decompression calculations which could result in dive planning with an increased risk of decompression sickness. If there is a desire to adjust the computer to provide more conservative calculations, use the personal/altitude adjustment feature to affect decompression calculations or reduce the PO_2 setting to affect oxygen exposure tracking.

DEFAULT MODE

When set to standard air (21% O_2), the **SOLUTION NITROX** can be used as an ordinary dive computer. It remains in this air mode until the O_2% setting is adjusted to any other possible percentage of oxygen (22% - 50%).

The **SOLUTION NITROX** will automatically shut off after sufficient time has passed for nitrogen and oxygen loading values

to become insignificant. If the oxygen percentage was set for air (21%) at this time, the computer will retain this setting the next time it is activated. If the oxygen setting was at any other value between 22 and 50%, the computer will automatically revert to the default setting the next time it is activated. The default setting is 50% for oxygen and 79% for nitrogen. The default mode is indicated by two bars in the O_2% display window (Fig. 3.23).

Manually entered values for oxygen percentage are retained for about one hour following activation, if a dive series has not started.

The default setting for maximum oxygen partial pressure is 1.4 bar, but you are able to set it from 1.2 to 1.6 bar.

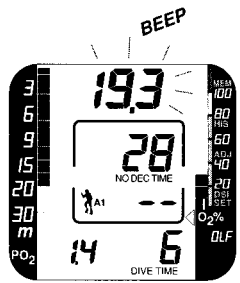


Fig. 3.23 DEFAULT NITROX ADJUSTMENTS
Two horizontal bars in the area where the O_2% setting normally appears indicate that the diver has not adjusted the oxygen percentage. The dive computer defaults to the OLF calculations where the oxygen content is 50% and for no-decompression calculations where the nitrogen content is 79% (air).

3.7 ERROR CONDITIONS

The **SOLUTION NITROX** is provided with warning indicators that advise the user to react to certain situations that would otherwise give rise to a significantly increased risk of DCS if left unattended. If you do not respond to its warnings, it will enter an ERROR MODE, indicating the risk of DCS has greatly increased. If you understand and operate the **SOLUTION NITROX** sensibly, it is very unlikely that you will ever put the **SOLUTION NITROX** into ERROR MODE.

The ERROR MODE is shown by a blinking Er in the center display. Once in ERROR MODE, the **SOLUTION NITROX** will continue to display current depth and dive time. You should immediately ascend to a depth of 3 to 6 m [10 to 20 ft] and

remain at this depth until air supply limitations require you to surface. When the surface has been reached, no further diving should take place for a minimum of 48 hours.

OMITTED DECOMPRESSION

The most common ERROR MODE results from omitted decompression, when the diver stays above the ceiling for more than three minutes. During this three-minute period the Er warning will blink and the audible alarm beep. The **SOLUTION NITROX** will continue to function normally if the diver descends below the ceiling within three minutes. After this the **SOLUTION NITROX** will enter a permanent ERROR MODE. In the permanent ERROR MODE the **SOLUTION NITROX** will not show ascent time. Only a permanent Er warning is shown in the center window. However, all the other displays will function as before, to provide information for ascent. At the surface, the ASC TIME symbol will be displayed in the center window.

OTHER ERROR MODES

Diving to a depth below 99 m [325 ft] will place the **SOLUTION NITROX** in ERROR MODE.

An OVERFLOW ERROR (blinking OE in the center window) will be shown when the microprocessor of the **SOLUTION NITROX** is not able to calculate any further nitrogen absorption in one or several compartments. This will, however, only occur under severe exposure conditions outside the limits of recreational diving. This feature can be observed in simulator mode.

If the entire **SOLUTION NITROX** display begins to blink, allow the computer to complete its functional cycle and to deactivate. If, when reactivated, the display continues to blink, do not use the computer. Return your **SOLUTION NITROX** to your dealer for service. The display will start to blink if the voltage of the battery occasionally drops to a level which is not sufficient for the operation of the **SOLUTION NITROX**. This may be due to very low battery, poor battery contacts or leakage of the battery compartment.

4. MENU BASED MODES

The menu based functions include the logbook, profile and history memories, the adjustment mode, the dive simulator and the date and time setting. The menu based functions are activated using the water contacts. Keep your fingers on the TIME/MODE and COM contacts while the **SOLUTION NITROX** scrolls through the menu (Fig. 4.1).

The desired mode is selected by breaking the finger contact when the desired mode appears on the display:

- **LOG:** Logbook and Dive Profile Memories. The Logbook gives a summary of each dive to approximately 25 hours of diving. The Profile Memory shows the detailed profile of these dives.
- **HIS:** Dive History Memory. The Dive History is a summary of all dives recorded by the **SOLUTION NITROX**.
- **Adj:** Oxygen and Personal/altitude Adjustments
- **dSI:** Dive Simulator
- **Set:** Date and Time Setting

When scrolling through the menu, a bar segment on the right-hand side of the display will indicate the scrolling sequence. Note that the menu based modes can be activated only when 10 minutes have elapsed after the dive. Make sure that the contacts and the instrument itself are dry and clean before trying to use the menu based modes.

All menu based modes can be deactivated by the RETURN command, i.e. by connecting all three contacts simultaneously, or by immersing the **SOLUTION NITROX** in water.

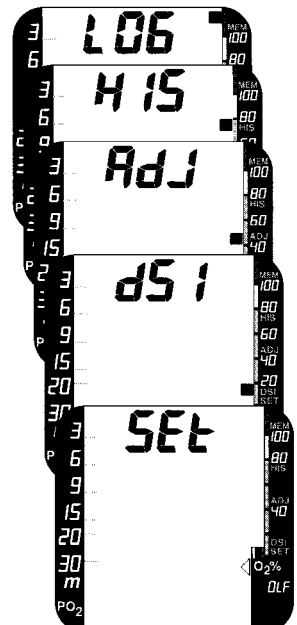


Fig. 4.1 MENU
The SOLUTION NITROX will scroll through the above displays.

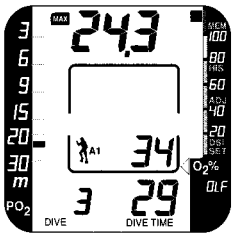


Fig. 4.2 LOGBOOK, DISPLAY I
The maximum depth of dive number 3 was 24.3 m [80 ft] and the total dive time 29 min. The personal/altitude adjustment mode was set to A1 and the oxygen was set to 34%. This display will alternate between DISPLAYS II and III.

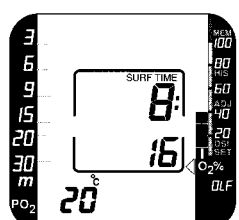


Fig. 4.3 LOGBOOK, DISPLAY II
The surface interval time before the dive was 8 h 16 min and the temperature at the maximum depth was 20°C [68°F]. The maximum OLF loading was between 30 and 40%.

4.1 LOGBOOK AND DIVE PROFILE MEMORY

The **SOLUTION NITROX** has a very sophisticated high capacity Logbook and Profile Memory, with data being recorded every 60 seconds. Dives shorter than the recording interval are not registered. This interval can be reduced to 20 or 30 seconds using the optional SUUNTO DIVE LOG for Windows ™ PC-Interface.

LOGBOOK MEMORY

The logbook memory is activated by touching the TIME/MODE and COM contacts until LOG appears. It will give access to approximately 25 hours of diving (14 or 9 hours in case the recording interval has been set to 30 or 20 seconds), starting with the most recent dive made. The following information will be shown on three alternating displays (Figs. 4.2 - 4.5):

DISPLAY I, MAIN DISPLAY:

- maximum depth
- dive time
- dive number
- personal/altitude adjustment setting
- oxygen percentage and following warnings, if occurred
- a blinking SLOW if the diver has surfaced with this warning on
- ASC TIME symbol if the dive became a decompression dive
- downward pointing arrow if the ceiling was violated

DISPLAY II:

- surface interval time before dive
- temperature at maximum depth
- maximum OLF during the dive

DISPLAY III:

- dive entry time and date

The data of the most recent dive is shown first. Preceding dives are recalled by touching the TIME/MODE and COM contacts. A brief touch of the contact will bring you to the previous dive, continuous contact scrolls backwards through the dives. Only DISPLAY I is shown, while scrolling the dives. The desired dive is selected by breaking the contact when that dive appears on the display.

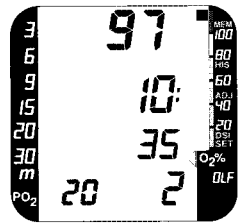


Fig. 4.4 LOGBOOK, DISPLAY III
The dive started on the 20th of February (2). 1997 at 10:35 [when set to imperial version. A for a.m. or P for p.m. are also shown in the upper left corner of the display].

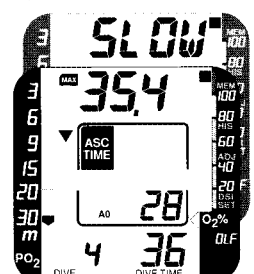


Fig. 4.5 LOGBOOK WARNINGS, DISPLAY I
DISPLAY I shows an ASC TIME symbol for a decompression dive, a downward pointing arrow for a violated ceiling, and a blinking SLOW warning for surfacing with the SLOW warning on.

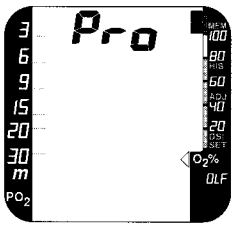


Fig. 4.6 PROFILE MEMORY
The profile of the dive shown in the logbook is accessed by touching the ON/PLAN and COM contacts. NOTE the two bar segments in the upper right-hand corner.

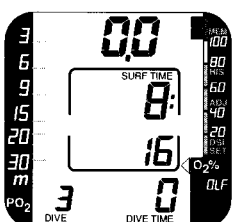


Fig. 4.7 PROFILE MEMORY
Automatic scrolling of the profile starts. The surface interval time before this particular dive was 8 h 16 min.

When new dives are added (after approximately 25 hours of diving), the oldest dives are deleted. The memory will always retain approximately the last 25 hours of dive time. The contents of the memory will remain even when the battery is changed (assuming that the replacement has been done according to instructions).

DIVE PROFILE MEMORY

The detailed profile of each dive shown in the logbook at that moment is accessed by touching the ON/PLAN and COM contacts. Two LCD bar segments in the upper right-hand corner show that the **SOLUTION NITROX** is now in the Dive Profile mode. When in the Logbook mode, only one segment is shown.

The scrolling of the profile will start automatically (Figs. 4.6 - 4.9). The dive time is displayed in one minute increments with each display being shown for about 4 seconds. The depths shown are the maximum values of each interval.

If the recording interval is set to 20 or 30 seconds, three or two maximum depth values, respectively, are shown within each time increment. A new depth value is marked with a beep. After the last depth figure of the selected profile, **SOLUTION NITROX** automatically returns to the same dive in the logbook. If desired, the profile of the same dive can be recalled again following the above procedure.

When scrolling the Profile Memory,
- surfacing (depth 0.0 m [0 ft]),
- surfacing with the SLOW warning on,
- the ASC TIME symbol and
- the downward pointing arrow for violation of the ceiling are shown when they occurred during the actual dive.

At the end of the profile the depth 0.0 m [0 ft] is displayed together with the total dive time of that dive.

DIVE NUMBERING

Several repetitive dives are considered to belong to the same repetitive dive series when the **SOLUTION NITROX** has not deactivated itself. Within each series, the dives are given individual numbers. Thus the memory will contain dives with the same dive numbers, as these dives have been made within different dive series. When the surface time is less than 10 minutes, the dives are considered to be one and the same. The dive number will not change for the second part of such a dive.

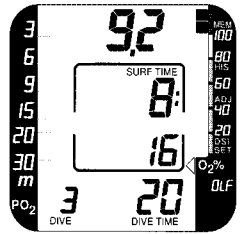


Fig. 4.8 PROFILE MEMORY
Between the diving time of 19 and 20 minutes (with a 1 minute recording interval) the maximum depth was 9.2 m [30 ft].

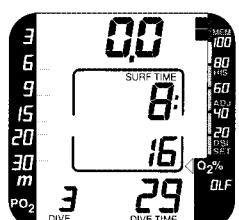


Fig. 4.9 PROFILE MEMORY
At the end of the profile the depth was 0.0 m and the total dive time 29 minutes. The SOLUTION NITROX will now automatically return to the corresponding dive in the logbook.

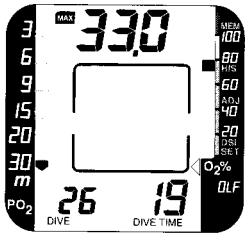


Fig. 4.10 DIVE HISTORY
The maximum depth ever reached is 33.0 m [108 ft], the total accumulated dive time 19 hours, and the total number of dives 26.

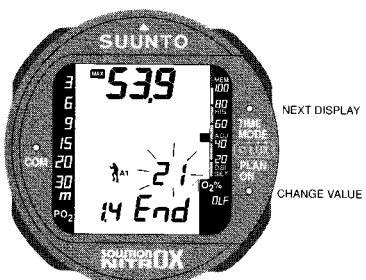


Fig. 4.11 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
The current oxygen percentage is 21%, the personal/altitude mode is set to A1 and the oxygen partial pressure limit is 1.4 bar. With these adjustments the maximum allowed depth is 53.9 m.

4.2 DIVE HISTORY MEMORY

The Dive History is activated by touching the TIME/MODE and COM contacts until HIS appears. This mode will show (Fig. 4.10):

- the maximum depth ever reached
- the total accumulated dive time in hours
- the total number of dives

999 dives and 999 hours of diving can be registered. When these maximum values are reached, the counters will start again from 0.

4.3 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENTS

The current personal/altitude mode and oxygen percentage adjustments are always shown when diving as well as in the dive planning mode. In addition, the set limit for the oxygen partial pressure warning, the corresponding maximum depth and the present oxygen loading are shown after activation, before the dive planning mode and in this adjustment mode. If the adjustments are not correct (see Chapter 3.5), it is imperative that the diver enter the correct selections before diving.

MANUAL DATA ENTRY PROCEDURE

The new oxygen and personal/altitude adjustment settings are entered in the following way. In these figures the contacts which are connected are shadowed.

1. Activate the adjustment mode by connecting the TIME/MODE and COM contacts continuously. Release your fingers immediately when Adj appears on the display. Within a couple of seconds the present oxygen and personal/altitude adjustment settings are shown (Fig. 4.11). The oxygen percentage is now blinking.

2. Connect the ON/PLAN and COM contacts to adjust the blinking value or connect the TIME/MODE and COM contacts to scroll through the oxygen percentage, personal/altitude adjustment setting, oxygen partial pressure and End (= save & exit) modes.

When connecting the ON/PLAN and COM contacts to adjust the blinking value:
- the O_2% adjustment increases by 1% increments from 21% to 50% or from the present value to 50%, 21%, 22% etc. (Fig. 4.12) .
- the personal/altitude adjustment setting scrolls through AO, A1 and A2 (Fig. 4.13 and 4.14).
- the oxygen partial pressure scrolls through 1.4, 1.3, 1.2, 1.6 and 1.5 bar (Fig. 4.15 and 4.16).

When adjusting the O_2% and PO_2 values the maximum allowed depth is calculated and shown in the upper display.

Fig. 4.12 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Adjusting the oxygen percentage.

Fig. 4.13 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Scrolling to the personal/altitude adjustment. The oxygen percentage was set to 32%.

Fig. 4.14 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Adjusting the personal/altitude adjustment setting from A1 to A2.

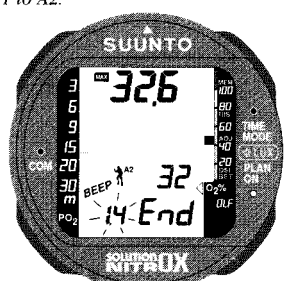


Fig. 4.15 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Scrolling to the oxygen partial pressure adjustment.

3. The process is completed and the adjustments are saved by the RETURN command, i.e. by connecting all three contacts at the same time when the End-text is blinking (Fig. 4.17). The **SOLUTION NITROX** will return to the surface mode and a double beep confirms that the adjustments have been saved.

NOTE! If you use the RETURN command when one of the adjustable values is blinking, the set values will not be saved. In that case the original settings will be restored.

⚠ WARNING! ⚠

ALWAYS RECHECK THE ADJUSTMENTS TO ENSURE THAT THE PERSONAL/ALTITUDE MODE IS NOT SET FOR AN ALTITUDE LESS THAN THAT OF THE DIVE SITE AND THAT THE OXYGEN PERCENTAGE CORRESPONDS TO THE MIXTURE IN YOUR CYLINDER!

Failure to enter this information could result in dive planning errors and risk exposure to decompression sickness or oxygen toxicity.

Fig. 4.16 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Adjusting the oxygen partial pressure from 1.4 to 1.3 bar.

Fig. 4.17 OXYGEN AND PERSONAL/ALTITUDE ADJUSTMENT SETTING
Ending and saving the adjustments (End = Save & Exit). The SOLUTION NITROX will return to the surface mode and a double beep confirms that the adjustments have been saved.

Fig. 4.18 TIME SETTING
Ready to adjust the hour reading (blinking).

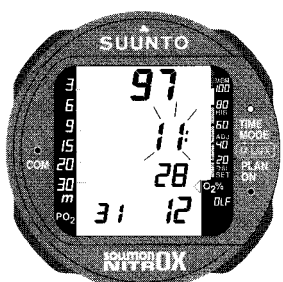


Fig. 4.19 TIME SETTING
Adjusting the hour reading, ON/PLAN & COM.

4.4 DIVE SIMULATOR

The simulation mode can be used to plan dives in advance, for demonstrational or educational purposes, or just for pleasure. The **SOLUTION NITROX** has complete dive simulating capabilities, including repetitive dive simulation. The simulator can also be used between dives. The simulator will take into consideration personal/altitude and oxygen adjustments as well as the nitrogen loading from previous dives and will modify the no-decompression times accordingly. The OLF bar graph is, however, not shown.

The dive simulator is activated using the menu selection. Lift your fingers when dSI is displayed. When in simulation mode, the depth is controlled using the three water contacts. This is described in detail in Chapter 2.3, "The Dive Simulator - For Easy Learning".

4.5 SETTING TIME AND DATE

The current time and date are read by connecting the TIME/MODE and COM contacts for about one second, as described in Chapter 3.2.6, "Calendar Clock Function". The principle when adjusting the clock is that the TIME/MODE and COM contacts scroll through the different displays, while ON/PLAN and COM change the values of the selected display. In these figures the contacts which are connected are shadowed.

Thus, to correct the time, do as follows:

1. Activate the Time Setting mode by connecting the TIME/MODE and COM contacts continuously to scroll through the menu. Release your fingers immediately when Set appears on the display. The Time Setting display will now be shown (Fig. 4.18). The hour display starts to blink immediately.

2. If you want to change the blinking value, keep the ON/PLAN and COM contacts connected. The blinking display (in this case the hours) will start to scroll. Release your fingers immediately when the correct value is displayed. [To change the A or P for a.m. or p.m. scroll the hours past 12:00] (Fig. 4.19).

To scroll through the minutes, month, date, and year keep the TIME/MODE and COM contacts connected. Release your fingers when the display you wish to change is blinking (Fig. 4.20). Repeat step 2 to change this value (Fig. 4.21).

NOTE! In case of the minutes, date and year, the change is made separately for both digits, as shown by the blinking digit. In case of the hours and month, the complete number is changed simultaneously.

Repeat the steps to change any additional values as many times as needed.

3. Restart the clock with the RETURN command, i.e. by connecting all three contacts at the same time. First make contact between the ON/PLAN and TIME/MODE contacts and after that with the COM contact.

Fig. 4.20 TIME SETTING
Scrolling through hours, minutes, month, date and year, TIME/MODE & COM.

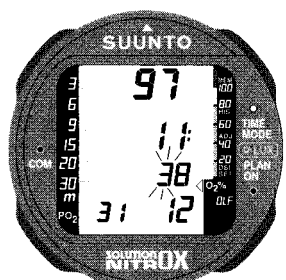


Fig. 4.21 TIME SETTING
Adjusting the ten minute reading (blinking).

If something goes wrong during this procedure, do not perform step 3. Within about two minutes the **SOLUTION NITROX** will automatically return to the normal surface mode and restore the original time setting. You can now repeat the time setting procedure. If you use the RETURN command, the modified time will be set.

NOTE! The time is not elapsing when being set. When returning from the time setting mode, the clock starts at the set time.

Remember to regularly check that the clock is on time especially when traveling to different time zones, as the entry time of all dives is stored in the memories.

5. PC-INTERFACE

The **SOLUTION NITROX** can be connected to an IBM compatible personal computer (PC), using the optional SUUNTO PC-Interface and its SUUNTO DIVE LOG for Windows™ software (version 2.0 or newer). With the Interface the **SOLUTION NITROX** dive data can be downloaded to a PC. The PC-Interface software can be used for educational and demonstrational purposes, for planning dives, as well as for keeping a complete record of your dive history with the **SOLUTION NITROX**. Complete logbook data can also be included. Paper copies of your dive log and profiles can then easily be printed.

The data transfer is carried out using the water contacts of the **SOLUTION NITROX**. The following data is transferred to the PC:

- depth profile of the dive
- dive time
- dive number
- temperature at maximum depth
- surface interval time
- dive entry time (year, month, day and time)
- personal/altitude adjustment setting
- oxygen percentage
- maximum Oxygen Limit Fraction (OLF)
- additional dive information (e.g. violations)
- serial number
- personal information code

It is also possible to manually add comments and other personal information to the PC based dive data file. The PC-Interface package comes complete with the interface box, the software on 3.5" diskettes, and an installation and getting started guide.

6. CARE AND MAINTENANCE

The Suunto **SOLUTION NITROX** dive computer is a sophisticated precision instrument. Remember to treat it as such! It has been designed to withstand the rigors of scuba diving. It can be installed in a durable thermoplastic console boot and its display can be protected by a replaceable display shield.

The user should wash and rinse the unit in fresh water after every use. Protect it from shocks, extreme heat or direct sunlight and chemical attack. The **SOLUTION NITROX** cannot withstand the impact of heavy objects like scuba cylinders, nor chemicals like acetone and alcohols (ethanol, isopropanol).

NOTE! Keep the water contacts clean to assure correct operation of the SOLUTION NITROX. Store the SOLUTION NITROX in a dry place.

NOTE! Frequently check the battery compartment for moisture through the transparent battery cover of the SOLUTION NITROX.

The **SOLUTION NITROX** should be serviced every two years or after 200 dives (whichever comes first) by an authorized dealer. This service will include a general operational check and battery replacement. The service requires special tools and training. Therefore, it is advisable to contact an authorized Suunto dealer for biennial service. Do not attempt to do any servicing that you are not trained for.

The **SOLUTION NITROX** will display a battery symbol as a warning when the power gets too low. When this happens the **SOLUTION NITROX** should not be used until the battery has been replaced (see also Chapter 3.2.2, "Battery Warning").

6.1 MAINTENANCE

If left without care for an extended period, a thin film (often invisible to the eye) may cover the unit. Much like the build-up on the glass of an aquarium, this film is the result of organic contaminates found in both salt and fresh water. Suntan oil, silicone spray and grease will speed up this process. As a result of this build-up, moisture will be trapped around the contacts and will not allow your **SOLUTION NITROX** to operate properly.

The water contacts can be cleaned with a soft pencil eraser.

IMPORTANT: The **SOLUTION NITROX** should be soaked, then thoroughly rinsed with fresh water after each dive.

If the unit is mounted in a console boot, the entire console should be soaked in fresh water and then rinsed. Make sure that all salt crystals and sand particles have been flushed out of the console.

At the end of a dive trip, the **SOLUTION NITROX** should be rinsed thoroughly and then dried with a soft towel. If the unit is mounted into a console boot, the computer unit will have to be removed from the console and cleaned before storage.

IMPORTANT: When removing the computer from the console, check the battery compartment for possible moisture or water. This is easily done through the transparent lid covering the compartment. DO NOT use the **SOLUTION NITROX** if you detect any moisture or water inside.

CAUTION!

- do not use compressed air to blow water off the unit
- do not use solvents or other cleaning fluids that might cause damage
- do not test or use the **SOLUTION NITROX** in pressurized air.

6.2 BATTERY COMPARTMENT INSPECTION

Frequently check for leaks in the battery compartment. This is important especially after battery replacement. If you find moisture inside the transparent battery compartment lid, there is a leak.

A leak must be corrected without delay, as moisture will seriously damage the computer, even beyond repair. Suunto does not take any responsibility for damage caused by moisture in the battery compartment, if the instructions of this manual are not carefully followed.

In case of a leak, immediately bring the **SOLUTION NITROX** to an authorized Suunto dealer/distributor.

7. TECHNICAL DESCRIPTION

7.1 OPERATING PRINCIPLES

The Suunto **SOLUTION NITROX** is a multi-functional sport diving instrument, which provides information on depths, times, and decompression requirements. Its electronic microprocessor mathematically models the absorption and release of nitrogen and oxygen during all phases of diving, including ascents, surface intervals and repetitive dives.

⚠ WARNING! ⚠

DO NOT ATTEMPT TO USE THE **SOLUTION NITROX** WITHOUT FIRST READING THE ENTIRE OWNER'S MANUAL!

The **SOLUTION NITROX** must be activated before diving and operated correctly to provide accurate and correct information.

7.1.1 No-Decompression Limits

The no-decompression limits displayed by the **SOLUTION NITROX** upon activation are for most dives to a single depth slightly more conservative than those permitted by the U.S. Navy tables, Tables 7.1-2.

TABLE 7.1 NO-DECOMPRESSION TIME LIMITS (min)
FOR STANDARD AIR (21% O_2), NOAA NITROX I (32% O_2) AND NOAA NITROX II (36% O_2) MIXTURES

	personal/altitude adjustment mode		
Depth [m]	AO	A1	A2
O_2%	21 / 32 / 36	21 / 32 / 36	21 / 32 / 36
9	----- / ----- / ----	154 / ----- / ----	104 / 168 / ----
12	127 / ----- / ----	90 / 148 / 184	67 / 101 / 121
15	72 / 133 / 165	58 / 92 / 120	43 / 69 / 84
18	52 / 78 / 98	40 / 62 / 75	30 / 47 / 58
21	37 / 57 / 67	30 / 45 / 55	23 / 33 / 40
24	29 / 43 / 52	24 / 33 / 40	19 / 26 / 30
27	23 / 33 / 40	19 / 27 / 31	15 / 21 / 24
30	18 / 27 / 32	14 / 22 / 26	12 / 18 / 20
33	13 / 22 / 27	11 / 18 / 21	9 / 15 / 17
36	11 / 18	9 / 14	8 / 12
39	9	8	6
42	7	6	5
45	6	5	5

TABLE 7.2 NO-DECOMPRESSION TIME LIMITS (min) FOR STANDARD AIR (21% O_2), NOAA NITROX I (32% O_2) AND NOAA NITROX II (36% O_2) MIXTURES

	personal/altitude adjustment mode											
Depth [ft]	AO			A1			A2			U.S. Navy/NOAA		
O_2%	21	32	36	21	32	36	21	32	36	21	32	36
30	----	-----	----	150	-----	----	102	162	----			
40	120	-----	----	86	144	177	65	99	118	200		
50	70	126	160	56	89	117	41	67	82	100	200	200
60	51	75	94	38	60	72	29	45	56	60	100	100
70	36	55	65	29	43	53	23	32	38	50	60	60
80	28	41	51	23	32	38	19	25	29	40	50	60
90	22	32	38	18	26	30	15	21	24	30	40	50
100	17	27	31	14	21	25	11	17	20	25	30	40
110	13	21		11	17		9	14		20	25	30
120	10	17		9	13		8	11		15		
130	9			7			6			10		
140	7			6			5			10		
150	6			5			4			5		

Unlike the U.S. Navy tables, the **SOLUTION NITROX** interpolates between depths, giving a diver "credit" for time spent in shallower water, rather than calculating no-decompression limits based on the maximum depth of a dive. As a result, no-decompression dive times permitted by the **SOLUTION NITROX** are often much longer than those that would be allowed by the U.S. Navy tables.

⚠ WARNING! ⚠

THE USER SHOULD BE AWARE THAT ANY DIVE, INCLUDING ONES WITHIN THE U.S. NAVY/NOAA TABLES OR THE **SOLUTION NITROX** LIMITS, DOES CARRY SOME RISK OF DECOMPRESSION SICKNESS.

COMPARTMENTS AND HALF TIMES

When you dive with the **SOLUTION NITROX**, it measures and displays depths and times as your dive progresses. It shows you available no-decompression time and possible decompression required based upon the following six factors:

1. your present depth,
2. excess nitrogen absorbed during earlier portions of the dive,
3. residual nitrogen remaining from previous dives,
4. the no-decompression limits that apply to that depth,
5. the personal/altitude adjustment mode in use, and
6. the oxygen percentage adjustment in use.

Back on the surface, the **SOLUTION NITROX** will continue to calculate the no-decompression dive times available for various depths on the next dive. As the surface interval increases, so does the available dive time for the next dive.

To perform these calculations, the **SOLUTION NITROX** continuously models the absorption and release of excess nitrogen from theoretical compartments. Each compartment absorbs and releases nitrogen at a different rate. The compartments that absorb and release nitrogen rapidly are believed to have a high tolerance for excess nitrogen, whereas compartments that

absorb and release nitrogen more slowly are believed to be more sensitive.

The no-decompression limits in the U.S. Navy tables are based upon six theoretical compartments for single dives, and one compartment for surface intervals and repetitive dives. If you are familiar with table theory, you may know that they are characterized by half times (i.e. the time required for 50 % equilibration to a pressure change) ranging from 5 minutes to 120 minutes.

The **SOLUTION NITROX** includes the same six compartments, and three additional compartments for an increased range of the mathematical model. The calculations are based on all nine compartments for all phases of diving, including surface intervals and repetitive dives. The **SOLUTION NITROX**'s half times range from 2.5 to 480 minutes.

ALTITUDE DIVING

The atmospheric pressure is lower at high altitudes than at sea level. After traveling to a higher altitude, the diver will have additional nitrogen in his body, compared to the equilibrium situation at the original altitude. This "additional" nitrogen is released gradually in time and equilibrium is reached within a couple of days. Do not dive until the equilibrium is reached.

Before high altitude diving the **SOLUTION NITROX** must be set to high altitude diving mode to adjust the calculations for the new altitude. The maximum partial pressures of nitrogen allowed by the mathematical model of the **SOLUTION NITROX** are reduced according to the lower ambient pressure.

As a result the allowed no-decompression limits are considerably reduced.

SURFACE INTERVALS

The **SOLUTION NITROX** requires a minimum surface interval of 10 minutes between dives. If a surface interval is shorter

than 10 minutes, the **SOLUTION NITROX** dive counter and dive timer treat the next dive as a continuation of the previous dive. It adds the dive times, and calculates no-decompression limits or decompression stops based on nitrogen absorbed on both dives. In this regard, it is similar to the U.S. Navy tables.

DEPTH LIMITS

⚠ WARNING! ⚠

SUUNTO STRONGLY RECOMMENDS THAT SPORT DIVERS LIMIT THEIR MAXIMUM DEPTH TO 40 m [130 ft] OR TO THE DEPTH CALCULATED AND SHOWN BY THE **SOLUTION NITROX** BASED ON THE ENTERED OXYGEN PERCENTAGE AND PARTIAL PRESSURE OF 1.4 bar.
EXPOSURE TO GREATER DEPTH INCREASES THE RISK OF OXYGEN TOXICITY AND DECOMPRESSION SICKNESS.

However, the **SOLUTION NITROX** will calculate at greater depths to provide a wide margin of flexibility, if through carelessness or emergency, you exceed this recommended or calculated depth limit for a dive.

7.1.2 Oxygen exposure

The oxygen exposure calculations are based on currently accepted exposure time limit tables and principles. In addition to this the **SOLUTION NITROX** uses several methods to conservatively estimate the oxygen exposure. These include e.g.:

- The displayed oxygen exposure calculations are rounded up to the next whole percentage value.
- For the recreational scuba diving recommended upper limit of 1.4 bar PO_2 is used as a default.
- The CNS% limits up to 1.4 bar are based on 1991 NOAA Diving Manual limits, but the limits higher than 1.4 bar are significantly shortened. Thus, if through carelessness or emergency a diver exceeds the PO_2 1.4 limit, the **SOLUTION NITROX** will still continue to calculate and show OLF% information.
- The uptake and recovery for both CNS% and OTU% is monitored.
- The OTU monitoring is based on the long-term daily tolerance level and the recovery rate is reduced.
- The half time limit for the CNS recovery is 75 min.
- The maximum depth warning limit based on 1.4 bar PO_2 is calculated and displayed. If required the PO_2 can be adjusted from 1.2 to 1.6 bar.

Oxygen related information displayed by the **SOLUTION NITROX** is also designed to ensure all warnings and displays in the appropriate phases of a dive. E.g. the following information will be shown during a dive:

- the adjusted O_2%, if not set to air,
- the color coded OLF% bar graph for both CNS% and OTU% monitoring,
- audible alarms are given and the OLF bar graph starts to blink when the 80% and 100% limits are exceeded,
- the blinking of the bar graph stops, when the PO_2 is below 0.5 bar,
- the PO_2 is shown when it is greater than the preset limit.

7.2 TECHNICAL SPECIFICATION

DIMENSIONS AND WEIGHT (WRIST MODEL):

- Diameter: 61.5 mm [2.42 in]
- Depth: 30 mm [1.18 in]
- Weight: 110 g [4 oz]

DEPTH GAUGE:

- Temperature compensated pressure sensor
- Salt water calibrated (in fresh water the readings are about 3% smaller)
- Depth display range: 0 to 99 m [325 ft]
- Accuracy: ± 1 % (0 to 60 m [200 ft])
- Resolution: 0.1 m [1 ft]

TEMPERATURE DISPLAY:

- Resolution: 1 °C [1.5 °F]
- Display range: - 20 °C ... +50 °C (-4 °F ... +122 °F)
- Accuracy: ± 2 °C (±3.6 °F within 20 minutes of temperature change)

CALENDAR CLOCK:

- Accuracy: ± 2 s /24 h
- 24 h display [12 h display in imperial version]

OTHER DISPLAYS:

- Dive time: 0 to 999 min
- Surface time: 0 to 48 h
- Dive counter: 0 to 99
- No-decompression time: 0 to 199 min (- - after 199)
- Ascent time: 0 to 99 min (- - after 99)
- Ceiling depths: 2.5 to 30 m [8 to 100 ft]
- O_2%: 21% to 50% with 1% increments (- - is shown in default mode, 50% O_2/79% N_2)
- PO_2: is shown, when greater than set value
- OLF% bar graph: 1% - 120% with 10% increments (1% - 254% with 2% increments via the PC-Interface)

LOGBOOK/DIVE PROFILE MEMORY:

- Sampling interval: 60 s (optional 20 s or 30 s)
- Memory capacity: approximately 25 hours of diving at a 60 s sampling interval
- Depth resolution: 0.3 m [1 ft]

OPERATING CONDITIONS:

- Normal altitude range: 0 to 2400 m [8000 ft] above sea level
- Operating temperature: 0 °C to 40 °C [32 °F to 104 °F]
- Storage temperature: -20 °C to +50 °C [-4°F to +122 °F]

However, it is recommended that the unit be stored in a dry place at room temperature.

NOTE! Do not leave the SOLUTION NITROX in direct sunlight!

BATTERY

- One 3,6 V lithium battery (Saft LS 14250), size 1/2 AA (ANSI) or 1/2 R6 (IEC), spare part number K5504 + O-ring 26,7 mm x 1,78 mm 70 ShA, spare part number K5508
- Battery life: typically 2000 hours (at 20 °C [68 °F]). The typical expected battery life of 2000 hours might go down to approximately 1900 hours if the backlight is used about 5000 times.

8. WARRANTY

NOTE: The warranty arrangements are different in different countries. The SOLUTION NITROX packaging contains further information regarding the warranty benefits and requirements applicable to your purchase.

The Suunto **SOLUTION NITROX** is warranted against defects in workmanship and materials for a period of two years after purchase to the original owner subject to and in accordance with the terms and conditions set forth below:

This warranty does not cover damage to the product resulting from improper usage, improper maintenance, neglect of care, alteration or unauthorized repair. This warranty will automatically become void if proper preventive maintenance procedures have not been followed as outlined in the use and care instructions for this product.

If a claim under this or any other warranty appears to be necessary, return the product, freight prepaid, to your Suunto Dealer or qualified repair facility. Include your name and address, proof of purchase and/or service registration card, as required in your country. The claim will be honored and the product repaired or replaced at no charge and returned in what your Suunto Dealer determines a reasonable amount of time, provided all necessary parts are in stock. All repairs made, not covered under the terms of this warranty, will be made at the owner's expense. This warranty is non-transferable from the original owner.

All implied warranties, including but not limited to the implied warranties of merchantability and fitness for a particular purpose, are limited from date of purchase and in scope to the warranties expressed herein. Suunto shall not be liable for loss of use of the product or other incidental or consequential costs, expenses or damage incurred by the purchase. All warranties not stated herein are expressly disclaimed.

Some states do not allow the exclusion or limitation of implied warranties of consequential damages, so the above exclusions or

limitations may not apply to you. This warranty gives you specific legal rights, and you may also have other rights that vary from state to state.

This warranty does not cover any representation or warranty made by dealers or representatives beyond the provisions of this warranty. No dealer or representative is authorized to make any modifications to this warranty or to make any additional warranty.

9. GLOSSARY

Altitude dive — A dive made at an elevation above 700 m [2300 ft] above sea-level.

Ascent speed (rate) — The speed at which the diver ascends towards the surface.

ASC SPEED — Abbreviation for ascent speed (ascent rate).

Ascent time — The minimum amount of time needed to reach the surface in a decompression dive.

ASC TIME — Abbreviation for ascent time.

Ceiling — On a decompression dive the shallowest depth to which a diver may ascend based on computer nitrogen load.

CNS — Abbreviation for central nervous system toxicity.

Central Nervous System toxicity — Toxicity caused by oxygen. Can cause a variety of neurological symptoms. The most important of which is an epileptic-like convulsion which can cause a diver to drown.

CNS% — Central Nervous System toxicity limit fraction. Also note Oxygen Limit Fraction and whole body toxicity.

Compartment — See "Tissue group".

DCS — Abbreviation for decompression sickness.

Decompression	Time spent at a decompression stop or range before surfacing, to allow absorbed nitrogen to escape naturally from tissues.
Decompression range	On a decompression dive the depth range, between the floor and ceiling, within which a diver must stop for some time during ascent.
Decompression sickness	Any of a variety of maladies resulting either primarily or secondary from the formation of nitrogen bubbles in tissues or body fluids, as a result of inadequately controlled decompression. Commonly called "bends" or "DCS".
Dive series	A group of repetitive dives between which the **SOLUTION NITROX** indicates that some nitrogen loading is present. When nitrogen loading reaches zero the **SOLUTION NITROX** deactivates.
Dive time	Elapsed time between leaving the surface to descend, and returning to the surface at the end of a dive.
EAD	Abbreviation for equivalent air depth.
EAN	Abbreviation for enriched air nitrox.
Enriched Air Nitrox	Also called Enriched Air = EANx Air that has some oxygen added. Standard mixes are EAN32 (NOAA Nitrox I = NN I) and EAN36 (NOAA Nitrox II = NN II).
Equivalent Air Depth	Nitrogen partial pressure equivalent table.
Floor Depth	The deepest depth during a decompression dive at which decompression takes place.

Half-time	After a change in ambient pressure, the amount of time required for the partial pressure of nitrogen in a theoretical compartment to go half-way from its previous value to saturation at the new ambient pressure.
Multi-level dive	A single or repetitive dive that includes time spent at various depths and whose no-decompression limits are not determined solely by the maximum depth attained.
NITROX	Any nitrogen-oxygen mix including standard air.
NOAA	United States National Oceanic and Atmospheric Administration.
No-decompression time	The maximum amount of time a diver may remain at a particular depth without having to make decompression stops or remain below a ceiling during the subsequent ascent.
No-decompression dive	Any dive which permits a direct, uninterrupted ascent to the surface at any time.
NO DEC TIME	Abbreviation for no-decompression time limit.
OEA = EAN = EANx	Abbreviation for Oxygen Enriched Air Nitrox.
OLF	Abbreviation for Oxygen Limit Fraction.
OTU	Abbreviation for Oxygen Tolerance Unit.
Oxygen Tolerance Unit	Is used to measure the Whole-Body-Toxicity.
Oxygen Limit Fraction	A term used by Suunto for oxygen accumulation/exposure. A combination of CNS% and OTU%.

O_2%	Oxygen percentage or oxygen fraction in the breathing gas. Standard air has 21% oxygen.
Oxygen partial pressure	Limits the maximum depth to which the used Nitrox mixture can safely be used. The maximum partial pressure limit for enriched air diving is 1.4 bar. The contingency partial pressure limit is 1.6 bar. Dives beyond this limit have the risk for immediate oxygen toxicity.
PO_2	Abbreviation for oxygen partial pressure.
Repetitive dive	Any dive whose no-decompression time limits are affected by residual nitrogen absorbed during previous dives.
Residual nitrogen	The amount of excess nitrogen remaining in a diver after one or more dives.
SURF TIME	Abbreviation for surface interval time.
Surface interval time	Elapsed time between surfacing from a dive and beginning a descent for the subsequent repetitive dive.
Tissue group	Theoretical concept used to model bodily tissues for the construction of decompression tables or calculations.
Whole-Body Toxicity	Another form of oxygen toxicity, which is caused by prolonged exposure to high oxygen partial pressures. The most common symptoms are irritation in the lungs, a burning sensation in the chest, coughing and reduction of the vital capacity. Also called Pulmonary Oxygen Toxicity. See also OTU.