

VYPER
INSTRUCTION MANUAL

QUICK REFERENCE GUIDE

Arrows:

- Decompression Stop at the Ceiling Depth ▲
- Mandatory Safety Stop Zone
- Ascent Recommended ▲
- Must Descend ▼

Present Depth Dive Counter

Bookmark Symbol

Diver Attention Symbol

Bar Graph:

- Mode Indicator
- Consumed Bottom Time
- Oxygen Limit Fraction

Do Not Fly Icon

Oxygen Percentage in Nitrox Mode

Altitude Adjustment Mode

Personal Adjustment Mode

Temperature Week Day Mode Text

Indicators for the Scroll Buttons

Maximum Depth
Ceiling Depth on Decompression
Mandatory Safety Stop Depth
Average Depth on Logbook
Oxygen Partial Pressure
AM/PM Indicator

Safety Stop Warning
Safety Stop Indicator

Fast Ascent Warning (SLOW)

Bar Graph:

- Ascent Rate Indicator
- Battery Power Indicator
- Logbook Page Indicator

Current Time Display
Surface Interval Time
No Flying Time
No-Decompression Time
Total Ascent Time
Safety Stop Time

The Smart Button:

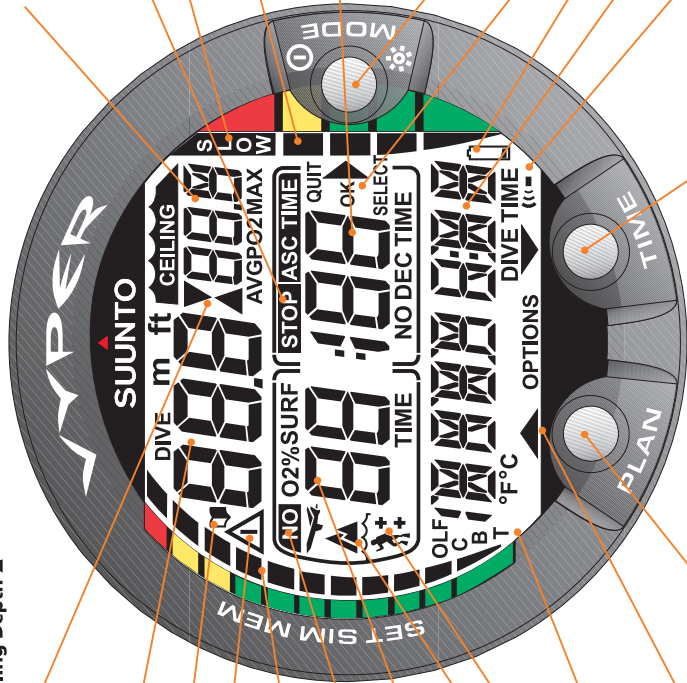
- Activation
- Backlight
- Mode Operations

Smart Button Indicators

Low Battery Warning

Dive Time
Time
Month, Day

Daily/DiveTime/Depth
Alarm On Indicator



Time (alternative display) Button
Scroll Button (decrease value, descend)

Dive Planning Button
Scroll Button (increase value, ascend)

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.

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Patents have been issued or applied for one or several features of this product.

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.

PREN 13319

PrEN 13319 "Diving accessories - Depth gauges and combined depth and time measuring devices - Functional and safety requirements, test methods" is an European diving depth gauge standard draft. The VYPER is designed to comply with this standard draft.

ISO 9001

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

SUUNTO Oyj does not assume any responsibility for losses or claims by third parties, which may arise through the use of this device.

Due to continuous product development the VYPER is subject to change without notice.

WARNING!

READ THIS MANUAL! Carefully read this instruction manual in its entirety, including section 1.1. "Safety Precautions". Make sure that you fully understand the use, displays and limitations of the dive computer. Any confusion resulting from improper use of this device may cause diver to commit errors that may lead to serious injury or death.

WARNING!

ALWAYS ACTIVATE THE COMPUTER TO CHECK THE NO-FLYING TIME REMAINING PRIOR TO FLYING. The computer goes into the stand-by display automatically 5 minutes after the dive has ended. The stand-by display shuts off after two hours. Failure to check the remaining no-flying time prior to flying can greatly increase the risk of DCS.

WARNING!

IN THE DATA TRANSFER MODE THE DIVE MODE IS NOT AUTOMATICALLY ACTIVATED. You must exit this mode before diving.

NOTE!

IT IS NOT POSSIBLE TO CHANGE BETWEEN THE AIR, NITROX AND GAUGE MODES BEFORE THE INSTRUMENT HAS COUNTED DOWN THE NO-FLYING TIME.

IF YOU DIVE WITH THE GAUGE MODE, IT IS NOT POSSIBLE TO CHANGE BETWEEN THE MODES WITHIN 48 HOURS.

WHEN PLANNING SUBSEQUENT AIR AND NITROX DIVES DURING THE SAME DIVE SERIES, YOU SHOULD HAVE THE DIVE COMPUTER SET IN THE NITROX MODE AND MODIFY THE GAS MIX ACCORDINGLY.

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1. INTRODUCTION

Congratulations on your choice of the SUUNTO VYPER advanced dive computer. This dive computer is a compact and sophisticated multipurpose dive instrument that will give you years of trouble-free and joyful diving.

1.1. SAFETY PRECAUTIONS

Do not attempt to use the dive computer without reading this instruction manual in its entirety, including all the warnings below. Make sure that you fully understand the use, displays and limitations of the instrument. If you have any questions about the manual or the dive computer, contact your SUUNTO dealer before diving with the dive computer.

Always remember that **YOU ARE RESPONSIBLE FOR YOUR OWN SAFETY!**

When used properly the dive computer 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.

WARNING!

ONLY DIVERS TRAINED IN THE PROPER USE OF SCUBA EQUIPMENT SHOULD USE THE DIVE COMPUTER! No dive computer can replace the need for proper dive training. Insufficient or improper training may cause diver to commit errors that may lead to serious injury or death.

WARNING!

NOT FOR PROFESSIONAL USE! SUUNTO dive computers are intended for recreational use only. The demands of commercial or professional diving often expose the diver to depths and prolonged exposures including multiday exposures that tend to increase the risk of decompression sickness. Therefore, SUUNTO specifically recommends that the device be not used for commercial or other severe diving activity.

WARNING!

PERFORM PRECHECKS! Always activate and check the device before diving in order to ensure that all LCD segments are completely displayed, that the device has not run out of battery power, and that the oxygen, altitude and personal adjustments are correct.

WARNING!

NO PROCEDURE, DIVE COMPUTER OR DIVE TABLE WILL PREVENT THE POSSIBILITY OF DECOMPRESSION SICKNESS (DCS) OR OXYGEN TOXICITY! You must understand and accept that there is no procedure, dive computer or dive table 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. The 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 dive computer. Decompression sickness can cause serious injury or death.

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!

USE BACK-UP INSTRUMENTS! Make sure that you use back-up instrumentation including a depth gauge, submersible pressure gauge, timer or watch, and have access to decompression tables whenever diving with the dive computer.

WARNING!

THE DIVE COMPUTER 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, which may substantially increase the risk of decompression sickness and must be avoided.

WARNING!

SET THE CORRECT ALTITUDE ADJUSTMENT MODE! When diving at altitudes greater than 300 m [1000 ft] the Altitude Adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. Failure to properly select the Altitude Adjustment Mode correctly will result in erroneous data and can greatly increase the risk of DCS.

WARNING!

THE DIVE COMPUTER IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 3000 m [10000 ft]! Diving at altitudes above this limit may significantly increase the risk of DCS.

WARNING!

SET THE CORRECT PERSONAL ADJUSTMENT MODE! The diver should use this option to make the calculations more conservative, whenever it is believed that factors, which tend to increase the possibility of DCS exist. Failure to properly select the Personal Adjustment Mode correctly will result in erroneous data and can greatly increase the risk of DCS.

CAUTION!

ENSURE THE WATER RESISTANCE OF THE DEVICE! Always check the water resistance of the battery compartment when replacing the battery. Moisture inside the device or battery compartment will seriously damage the unit. Only an authorized SUUNTO dealer or distributor should do service activities.

1.1.1. Emergency Ascents

In the unlikely event that the dive computer malfunctions during a dive, follow the emergency procedures provided by your certified dive training agency or, alternatively,

- STEP 1: Assess the situation calmly and then move promptly to less than 18 m [60 ft].
- STEP 2: At 18 m [60 ft], slow down your ascent rate to 10 m/min [33 ft/min] and move to a depth between 3 and 6 meters [10 to 20 ft].
- STEP 3: Stay there as long as your air supply will safely allow. After reaching the surface stay out of the water at least 24 hours.

1.1.2. Dive Computer Limitations

While the dive computer is based on current decompression research and technology, you 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 models, which are intended to serve as a guide to reduce the probability of decompression sickness.

1.1.3. 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 dive computer 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!

IF YOUR DIVE COMPUTER IS INSTALLED IN A CONSOLE, DO NOT EXPOSE THE PRESSURE GAUGE TO ANY GAS MIX CONTAINING MORE THAN 40% OXYGEN! Enriched air with greater oxygen content may present a risk of fire or explosion and serious injury or death.

2. GETTING ACQUAINTED

2.1. FUNCTIONS

The VYPER multipurpose dive computer features three dive computer models (AIR, NITROX, GAUGE), three main operating modes (TIME/STAND-BY, SURFACE, DIVING), three menu based main modes (MEMORY, SIMULATION, SET) and 15 - 17 menu based submodes (see figure in the back cover). You can scroll through the modes using the push buttons. The mode indicator at the left side and the mode text at the bottom of the display indicate the selected mode.

You can select the dive computer model between the Regular Air Dive Computer, Enriched Air Dive Computer and Depth Gauge and Timer modes.

The timekeeping display is the primary display of the instrument (Fig. 2.1).

In other Modes (except in the Diving or Simulator Modes), if no button is operated within 5 minutes, the dive computer beeps and returns to the timekeeping display automatically. The timekeeping display shuts off after two hours, but pressing the PLAN or TIME button activates it.

When diving, the dive entry time and date is registered in the Logbook Memory. Remember always to check before diving that the time and date are correctly set, especially when traveling to different time zones. To set the time and date, refer to section 4.3.2. "Setting Time".

2.2. PUSH BUTTONS

The dive computer has easy-to-use push buttons and an advising display, which guides the user. The **SMART (MODE)** button is the key of the system. The two scroll buttons, PLAN and TIME, are used for scrolling up and down the menus and to get the alternative displays visible. The dive computer is controlled with these three push buttons as follows (see Fig. 2.2).

Press the SMART (MODE) button

- To activate the dive computer.
- To change from the Surface Mode to the menu based modes.
- To select, confirm or quit a submode (short press).
- To immediately exit any submode to the Surface Mode (long press).
- To activate the electroluminescent backlight (in the Surface Mode hold down the mode button for more than two (2) seconds, during a dive for one (1) second).

Press the arrow up scroll (PLAN) button

- To activate the timekeeping display, if the display is blank.
- To activate the Dive Planning in the Surface Mode.
- To make a special mark in the profile memory during a dive.
- To scroll up the options (▲, increase).



Fig. 2.1 The time keeping display. Pressing the PLAN or TIME button activates the display.

Press the arrow down scroll (TIME) button

- To activate the timekeeping display, if the display is blank.
- To activate the Time display(s) and/or alternative display(s).
- To scroll down the options (▼,decrease).

The dive computer is controlled with the **SMART (MODE/On/Backlight//Select/OK/Quit)** and the PLAN ▲ and TIME ▼ push buttons and with the water contacts as follows:

Activation	press the SMART (On) button or immerse the instrument in water for five (5) seconds.
Dive Planning	in the Dive Mode, press the PLAN (▲) button.
Menu Modes	press the SMART (MODE) button.

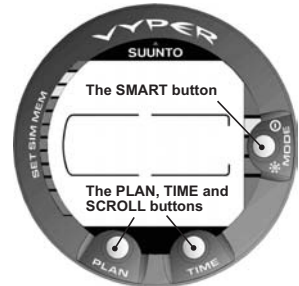


Fig. 2.2 The push buttons of the dive computer.

The display is illuminated by holding down the **SMART** button for more than two seconds.

2.3. WATER CONTACTS

The water contacts control the automatic activation of the Dive Mode.

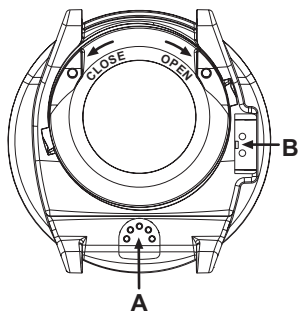


Fig 2.3 The depth sensor (A), the water/data transfer contacts (B).

The water and data transfer contacts are located on bottom of the case (Fig 2.3). When submerged the water contacts are connected to the push buttons (which are the other pole of the water contact) by the conductivity of the water and an AC text (Active Contacts, Fig. 2.4) will appear on display. The AC text will be shown until the water contact deactivates or the dive computer enters the Dive Mode automatically.

Contamination or dirt on the water contacts or push buttons may prevent their automatic operation. It is therefore important that the water contacts and push buttons are kept clean. If the water contacts of the dive computer are active (AC-text remains on display) or the Dive Mode activates on its own, the reason for this is probably contamination or invisible marine growth that may create an unwanted electric current between the contacts. It is therefore important that the instrument is carefully washed in fresh water after the day's diving is completed. The contacts can be cleaned with fresh water and, if necessary, a mild detergent. Sometimes it might be necessary to remove the instrument from the protective boot for cleaning.



Fig. 2.4 Active water contacts are indicated by the text AC.

3. DIVING WITH THE DIVE COMPUTER

This section contains instructions on how to operate the dive computer and interpret its displays. You will find that this dive computer is easy to use and read. Each display shows only the data relevant to that specific diving situation. The instrument's dive functions are operated in the Dive Mode.

3.1. BEFORE DIVING

3.1.1. Activation and Prechecks

The dive computer will activate, if submerged deeper than 0.5 m [1.5 ft]. However, it is necessary to turn on the Dive Mode before diving to check the altitude and personal adjustment settings, battery warning, oxygen adjustments, etc. Press the **SMART** (On) button to activate the instrument.

After activation all display elements will turn on showing mostly figure 8's and graphical elements (Fig. 3.1). A few seconds later the battery power indicator is shown and the backlight and the buzzer are activated (Fig. 3.2 display a, b, c or d depending on the battery voltage). If set to AIR Mode (default) the screen will enter the Surface Mode (Fig. 3.4). If set to GAUGE Mode the text GAUGE is shown (Fig. 3.3) and if set to NITROX Mode the essential oxygen parameters are shown with the text NITROX (Fig. 3.20) before the Surface Mode.



Fig. 3.1 Startup I. All segments shown.

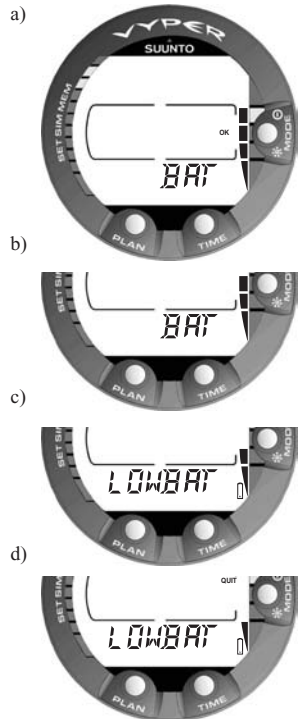


Fig. 3.2 Startup II. The battery power indicator.



Fig. 3.3 Startup III. The Gauge Mode.

At this time, perform your precheck making sure that:

- the instrument operates in the correct mode and provides a complete display
- the low battery indicator is not on
- the altitude and personal adjustment settings are correct (AIR and NITROX Modes)
- the instrument displays correct units
- the instrument displays correct temperature and depth (0.0 m [0 ft])
- the buzzer beeps.

And if set to NITROX mode, make sure that:

- the oxygen percentage is adjusted according to the measured enriched air blend in your cylinder
- the partial pressure limit of oxygen is set correctly.



Fig 3.4 Startup IV. The Surface Mode: The depth and dive time are zeros (as no dives have yet been made), and the temperature is 20°C [68°F].

The dive computer is now ready for diving.

NOTE! The surface interval time is not shown before the first dive.



Fig. 3.5 Low Battery Warning. The battery symbol indicates that the battery is low and battery replacement is recommended.

After activation of the Dive Mode or after the dive has ended, the instrument will automatically switch to show the time keeping display within 5 minutes to conserve the battery power, if you do not press any buttons or if you don't start a dive.

3.1.2. Battery Power Indicator and Low Battery Warning

This dive computer has a unique graphic Battery Power Indicator designed to give you an advance notice of impending need to change the battery.

The Battery Power Indicator can always be seen, when the Dive Mode is activated. The electroluminescent backlight will be on during the battery check. The following Table and Figure show the various warning levels.

TABLE 3.1 BATTERY POWER INDICATOR

Display	Operation	Figure 3.2
BAT + 4 segments + OK	Normal, full battery	a)
BAT + 3 segments	Normal, battery power is getting low or the temperature is low. Battery replacement is recommended if you are going to colder conditions or if you are planning to make a dive trip.	b)
LOWBAT + 2 segments + low battery symbol	Battery power is low and the battery replacement is recommended. The battery symbol is displayed. The backlight is disabled.	c)
LOWBAT + 1 segment + QUIT + low battery symbol	Change the battery! Returns to the Time display. Activation and all functions are disabled.	d)

NOTE! Temperature or an internal oxidation of the battery affects the battery voltage. If the instrument is stored for a long period, the low battery warning may be displayed even though the battery has enough capacity. The low battery warning may also be displayed at low temperatures, even though the battery has enough capacity in warmer conditions. In these cases repeat the battery check procedure.

In all the other modes the Low Battery Warning is indicated by the battery symbol.

If the battery symbol is displayed in the Surface Mode or if the display is faded or weak, the battery may be too low to operate the dive computer and the battery replacement is recommended.

NOTE! For safety reasons the backlight can not be activated when the low battery warning is indicated by the battery symbol.

3.1.3. Dive Planning [PLAN]

It is possible at any time in the Surface Mode to enter the Planning Mode, simply by pressing the PLAN button. After showing the text PLAN (Fig. 3.6), the display will show the no-decompression limit for the depth of 9 m [30 ft]. By pressing the arrow down TIME (▼) button, the dive computer will calculate and show the next deeper no-decompression limits in 3 m [10 ft] increments ending at 45 m [150 ft]. By pressing the arrow up PLAN (▲) button the next shallower depth will be shown again.

The Planning Mode can be canceled by pressing the SMART (QUIT) button.

NOTE! The Planning Mode is disabled in GAUGE mode and in the Error Mode (see section 3.8. "Error Conditions").

Higher Altitude or Personal Adjustment Modes will shorten the no-decompression time limits. These limits at different Altitude and Personal Adjustment Mode selections are shown in Table 6.1 and 6.2 in Section 6.1. "Operating Principles".

Planning Mode also accounts for the following information from previous dives:

- calculated residual nitrogen or
- surface intervals up to four days between the dives.

The no-decompression times given for different depths will therefore be shorter than before your first "fresh" dive.

DIVE NUMBERING SHOWN DURING DIVE PLANNING

Repetitive dives belong to the same repetitive dive series if the instrument still has been counting no-flying time.

When the surface time is less than 5 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 and the dive time will continue where it left off (see also section 3.5.2. "Dive Numbering").

3.1.4. User Definable Functions and Alarms

This dive computer has several User Definable Functions and depth and time related alarms to be preset according to your personal preference.

The dive computer model, units and backlight on time preferences can be set in the MODE- SET- SET PREF submode. The dive time and the depth alarms can be set in the MODE- SET- SET DIVE submode and the alarm clock can be set in the MODE- SET- SET TIME submode. Setting of the user definable functions and alarms are explained in detail in section 4.3. "Set Modes".



Fig. 3.6 Dive Planning. The Planning mode is indicated by the PLAN text. The no-decompression time limit at 30.0 m [100 ft] is 14 minutes in A0/P1 mode.

3.2. DIVING WITH AIR

3.2.1. Basic Dive Data

The dive computer will remain in the Surface Mode at depths less than 1.2 m [4 feet]. At depths greater than 1.2 m the instrument will go into the Diving Mode (Fig. 3.7).

All information on the display is labeled (Fig. 3.7 and 3.8). During a no-decompression dive, the following information will be displayed:

- your present depth in meters [ft]
- the Altitude Adjustment setting on the left side of the center window with a wave and a mountain symbols (A0, A1, or A2) (see Table 3.3)
- the Personal Adjustment setting on the left side of the center window with a diver symbol and + signs (P0, P1, or P2) (see Table 3.4)
- the maximum depth during this dive in meters [ft], indicated as MAX
- the water temperature followed by °C for Centigrade [or °F for Fahrenheit] in the lower left corner
- the elapsed dive time in minutes, shown as DIVE TIME in the lower right corner
- the available no-decompression time in minutes in the center window as NO DEC TIME and as a bar graph on the left side of the display. It is calculated based on the five factors listed in Section 6.1. "Operating Principles".

Alternative displays by pressing the TIME button in the lower right corner (Fig. 3.8):

- the current time, shown as TIME.

NOTE! The TIME display automatically changes back to DIVE TIME display in the Diving Mode.

BOOKMARK

It is possible to make special marks in the profile memory during a dive. These bookmarks will be shown as a blinking dive log symbol when scrolling the profile memory on the computer display. The bookmarks will also be shown as annotations in the PC-software, Suunto Dive Manager. To make a bookmark on the profile memory during a dive press the PLAN button (Fig. 3.9).

3.2.2. Consumed Bottom Time (CBT)

The available no-decompression time is also shown visually in the multi-function bar graph on the left side of the display (Fig. 3.7, 3.8 and 3.9). When your available no-decompression time decreases below 200 minutes, the first (lowest) bar graph segment appears. As your body absorbs more nitrogen, more segments start to appear.

Green Zone - As a safety precaution SUUNTO recommends that when using this dive computer you should maintain the no-decompression bar graph within the green zone. Segments start to appear when the available no-decompression time decreases below 100, 80, 60, 50, 40, 30 and 20 minutes.

Yellow Zone- As the bars reach the yellow zone, your no-decompression limit is less than 10 or 5 minutes and you are getting very close to no-decompression limits. At this point, you should start your ascent towards the surface.

Red Zone - As all of the bars appear (red zone), your no-decompression limit has become zero and your dive has become a decompression dive (for more information see section 3.2.5. "Decompression dives").



Fig. 3.7 A dive starts.



Fig. 3.8 Diving display. The present depth is 19.3 m [63 ft] and the no-decompression time limit is 23 minutes in A0/P1 mode. The maximum depth during this dive was 19.8 m [65 ft], the elapsed dive time is 16 minutes and the water temperature 18°C [64°F]. The current time 10:20 [10:20 am] is shown for 5 seconds after pressing the TIME button.



Fig. 3.9 Diving display. An annotation, Bookmark, is done in the profile memory during a dive by pressing the PLAN button. Note the Logbook symbol.



Fig. 3.10 Ascent rate indicator. Two segments.



Fig. 3.11 Ascent rate indicator. Three segments.



Fig. 3.12 Ascent rate indicator. Four segments.

3.2.3. Safety Stop Displays

Two different type of safety stops are being displayed in this dive computer: Recommended Safety Stop and Mandatory Safety Stop.

The STOP label indicates:

- Recommended Safety Stop 3 minute countdown in the range of 3 m - 6 m [10 ft - 20 ft].
- Mandatory Safety Stop Indicator deeper than 6 m [20 ft].
- Mandatory Safety Stop Time display with the CEILING label in the range of 3 m - 6 m [10 ft - 20 ft].

RECOMMENDED SAFETY STOP

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 minutes. This is shown with the STOP sign and a three-minute countdown in the center window instead of the no-decompression time (Fig. 3.10).

MANDATORY SAFETY STOP

When the maximum allowed ascent rate is exceeded continuously the dive computer highly recommends an extra-prolonged Mandatory Safety Stop in the range of 3 m - 6 m [10 ft - 20 ft] for the calculated period. In this case the STOP sign will appear in the display and when you reach the depth zone between 6 m to 3 m [20 ft to 10] also the CEILING label, depth and the calculated Safety Stop time appear in the display. You should wait until the Mandatory Safety Stop warning disappears (Fig. 3.14).

The Mandatory Safety Stop time always includes the three-minute Recommended Safety Stop time. The total length of the Mandatory Safety Stop time depends on the seriousness of the ascent rate violation.

You must not ascend shallower than 3 m [10 ft] with the Mandatory Safety Stop warning on. If you ascend above the Mandatory Safety Stop ceiling, a downward pointing arrow will appear and a continuous beeping starts (Fig. 3.15). You should immediately descend to or below the Mandatory Safety Stop ceiling depth. However, if you correct the situation whenever during that dive there are no affects to the tissue calculations.

If you continue to violate the Mandatory Safety Stop, the tissue calculation model is affected and the dive computer shortens the available no-decompression time for your next dive. In this situation it is recommended to prolong your surface interval time before your next dive.

3.2.4. Ascent Rate Indicator

The ascent rate is shown graphically along the right side of the display as follows:

TABLE 3.2 ASCENT RATE INDICATOR

Ascent Rate Indicator	The equivalent ascent speed	Example in Fig.
No segments	Below 4 m/min [13 ft/min]	3.8.
One segment	4 - 6 m/min [13 - 20 ft/min]	3.9.
Two segments	6 - 8 m/min [20 - 26 ft/min]	3.10.
Three segments	8 - 10 m/min [26 - 33 ft/min]	3.11.
Four segments	10 - 12 m/min [33 - 39 ft/min]	3.12.
Four segments, the SLOW segment, blinking depth reading, the STOP sign and an audible alarm	Above 12 m/min [39 ft/min] or continuously above 10 m/min [33 ft/min]	3.13.



Fig. 3.13 Ascent Rate Indicator. Blinking depth reading, SLOW and four segments shown: ascent rate is more than 10 m/min [33 ft/min]. This is a caution to slow down! The STOP sign means that you are advised to make a Mandatory Safety Stop when you reach the depth of 6 m [20 ft].

When the maximum allowed ascent rate is exceeded the fifth SLOW warning segment and the STOP sign appear and the depth reading starts to blink indicating that the maximum ascent rate has been exceeded continuously or that the ascent rate is above the allowed maximum rate.

Whenever the SLOW warning segment and the STOP sign appear (Fig. 3.13), you should immediately slow down your ascent. When you reach the depth zone between 6 m to 3 m [20 ft to 10 ft] you are advised to make a Mandatory Safety Stop with the STOP and CEILING depth signs and wait until the warning disappears (Fig. 3.14). You must not ascend shallower than 3 m [10 ft] with the Mandatory Safety Stop warning on.



Fig. 3.14 A Mandatory Safety Stop. You are advised to make a Mandatory Safety Stop in the depth zone between 6 m and 3 m [20 ft and 10 ft]. Pressing the TIME button shows the alternative display.

WARNING!

DO NOT EXCEED THE MAXIMUM ASCENT RATE! Rapid ascents increase the risk of injury. You should always make the Mandatory and Recommended Safety Stops after you have exceeded the maximum recommended ascent rate. Violation of the maximum ascent rate may invalidate the calculations for the next dive.



Fig. 3.15 Violated Mandatory Safety Stop. You should descend to the ceiling zone.

3.2.5. Decompression dives

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 an ASC TIME notation and the maximum depth will be replaced by a CEILING notation and an upward pointing arrow (Fig. 3.16).

WARNING!

DECOMPRESSION DIVES ARE NOT RECOMMENDED! Decompression diving limits the divers ability to ascend directly to the surface and may substantially increase the risk of decompression sickness.

However, if through carelessness or emergency you are forced to exceed the no-decompression limits on a dive, the dive computer will provide decompression information required for ascent. After this, the instrument will continue to provide subsequent interval and repetitive dive information.

Rather than requiring you to make stops at fixed depths, the dive computer lets you to decompress within a range of depths (Continuous Decompression).

The ascent time (ASC TIME) is the minimum amount of time 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 at the Mandatory Safety Stop (if any)
plus
- the recommended 3 minute Safety Stop
plus
- the time needed to reach the surface after the ceiling and safety stops have been removed.

WARNING!

YOU SHOULD ASCEND AND BEGIN DECOMPRESSION IMMEDIATELY WHEN THE DIVE COMPUTER SHOWS YOU THAT DECOMPRESSION IS REQUIRED! Note the blinking ASC TIME symbol and the upward pointing arrow.

WARNING!

YOUR ACTUAL ASCENT TIME MAY BE LONGER THAN DISPLAYED BY THE INSTRUMENT. 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.

CEILING, CEILING ZONE, 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 ceiling zone is the optimum decompression stop zone. It is the zone between the minimum ceiling and 1.8 m [6 ft] below the minimum ceiling.
- 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 floor. Within this range, decompression takes place. However, it is important to remember that the decompression will be very slow at or close to the floor.

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

When the sea surface 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 the ceiling, to make sure that the waves do not lift you above the ceiling. SUUNTO recommends that decompression takes 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.

DISPLAY BELOW THE FLOOR

The blinking ASC TIME and an upward pointing arrow indicate that you are below the floor (Fig. 3.16). You should start your ascent immediately. The ceiling depth is shown on the right corner and the minimum total ascent time on the right side of the center window.

DISPLAY ABOVE THE FLOOR

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



Fig. 3.16 Decompression dive, below the floor. The upward pointing arrow and the blinking ASC TIME label tell you to ascend. The minimum total ascent time including the safety stop is 7 minutes. The ceiling is at 3 m [10 ft].



Fig. 3.17 Decompression dive, above the floor. The upward pointing arrow has disappeared and the ASC TIME label has stopped blinking, which means that you are in the decompression range.



Fig. 3.18 Decompression dive, at the ceiling zone. The two arrows point at each other ("hour glass"). You are at the optimum ceiling zone at 3.5 m [11 ft] and your minimum ascent time is 5 minutes. By pressing the TIME button you can display maximum depth and time.



Fig. 3.19 Decompression dive, above ceiling. Note the downward pointing arrow and the Er warning. You will also hear an audible alarm. You should immediately (within 3 minutes) descend to or below the ceiling.

DISPLAY AT THE CEILING ZONE

When you reach the ceiling zone, the display will show you two arrows pointing at each other (the "hour glass" icon, Fig 3.18). Do not ascend above this depth zone.

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

DISPLAY ABOVE THE CEILING

If you ascend above the ceiling, a downward pointing arrow will appear and a continuous beeping starts (Fig. 3.19). In addition, an error warning Er reminds you 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 dive computer goes into a permanent Error Mode. In this mode the instrument can only be used as a depth gauge and timer. You must not dive again for at least 48 hours (see also section 3.8. "Error Conditions").

3.3. DIVING WITH ENRICHED AIR NITROX

3.3.1. Before Diving

This dive computer can be used for diving with standard air only (AIR Mode) or it can be set for diving with Enriched Air Nitrox (EANx) (NITROX Mode). If you are educated for nitrox diving and you plan to make nitrox dives, it is recommended that you set the dive computer permanently to its NITROX Mode (see chapter 4.3. "Set Modes").

If set to the NITROX Mode, the correct oxygen percentage of the gas in your cylinder must always be entered into the computer to ensure correct nitrogen and oxygen calculations. The dive computer adjusts its mathematical nitrogen and oxygen calculation models according to the entered O₂% and PO₂ values. 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 DIVE COMPUTER! Failure to verify cylinder contents and enter the appropriate O₂% into your dive computer will result in incorrect dive planning information.

WARNING!

THE DIVE COMPUTER 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 adjustment feature to affect decompression calculations or reduce the PO₂ setting to affect oxygen exposure tracking.



Fig. 3.20 Nitrox display. The maximum depth based on set $O_2\%$ (21%) and PO_2 (1.4 bar) is 54.1 m [177 ft].



Fig. 3.21 Surface display in the NITROX Mode.

WARNING!

IF YOUR DIVE COMPUTER IS INSTALLED IN A CONSOLE, DO NOT EXPOSE THE PRESSURE GAUGE TO ANY GAS MIX CONTAINING MORE THAN 40% OXYGEN! Enriched air with greater oxygen content may present a risk of fire or explosion and serious injury or death.

DEFAULT NITROX SETTINGS

In the NITROX Mode, when set to standard air (21% O_2), the instrument can be used as an air dive computer. It remains in this air mode until the $O_2\%$ setting is adjusted to any other percentage of oxygen (22% - 50%).

NOTE! The computer will automatically revert to the air (21% O_2) setting when a new dive series is started, if it is not set to any other mix during the last two hours. When the oxygen percentage is set for air, the computer will retain this setting.

Manually entered values for oxygen percentage are retained for about two hours after the setting if a dive series has not started. In case a dive series is started, the set value is retained until a new dive series is started or a new value is entered manually.

The default setting for maximum oxygen partial pressure is 1.4 bar, however you are able to set it between the range of 1.2 - 1.6 bar.

3.3.2. Oxygen Displays

If set to NITROX Mode the NITROX display, with all labeled oxygen information and the label NITROX, is shown after activation and before the Dive Planning mode. The NITROX display shows (Fig. 3.20):

- the oxygen percentage labeled with $O_2\%$ is shown in the left side of the center window
- the set oxygen partial pressure limit labeled with PO_2 is shown in the upper right display
- the maximum allowed depth based on the set oxygen percentage and partial pressure limit
- the current oxygen toxicity exposure shown with an Oxygen Limit Fraction (OLF) bar graph along the left side of the display (instead of the CBT).

In the DIVE Modes, the oxygen percentage labeled with $O_2\%$ and the current oxygen toxicity exposure shown with an Oxygen Limit Fraction (OLF) bar graph are shown (Fig. 3.21 and 3.22). During a dive, the oxygen partial pressure labeled with PO_2 is also shown instead of the maximum depth in the upper right display, if the partial pressure is greater than 1.4 bar or the set value (Fig. 3.23).



Fig. 3.22 Diving in the NITROX Mode. The $O_2\%$ is set to 32%.



Fig. 3.23 Oxygen partial pressure and OLF displays. There is an audible alarm as the oxygen partial pressure is greater than 1.4 bar or the set value and the OLF has reached the 80% limit.



Fig. 3.24 Alternative display. Pressing the TIME button displays the current time, maximum depth and CBT.



Fig. 3.25 The lowest bar graph blinks to indicate that the OLF value shown relates to OTU.

By pressing the TIME button during a nitrox dive, the alternate display appears, which includes (Fig. 3.24):

- the current time
- Consumed Bottom Time
- maximum depth (during decompression display)

After five seconds the display will automatically revert to the original display.

3.3.3. Oxygen Limit Fraction, OLF

In addition to tracking diver's exposure to nitrogen, the instrument tracks the exposure to oxygen, if set to NITROX Mode. These calculations are treated as entirely separate functions.

The Oxygen Limit Fraction (OLF) 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 11 segments represents 10%. The fraction closest to the maximum limit is displayed. When OTU% reaches the CNS% limit the lowest segment starts to blink (Fig. 3.25). The OLF is calculated based on the factors listed in chapter 6.1. "Operating Principles".

3.4. GAUGE MODE

If set to GAUGE Mode, the dive computer can be used for diving with TRIMIX or other technical diving gas mixes. If you are educated for technical diving and you plan to make these kind of dives, it is recommended that you set the instrument permanently to its GAUGE Mode (see chapter 4.3. "Set Modes").

This mode can also be used for other purposes like snorkeling, free diving, depth measurements etc.

If set to GAUGE Mode the text GAUGE is shown after activation (Fig. 3.3). In the GAUGE Mode the present depth, maximum depth, dive time, time of day, temperature, and ascent rate indicator are shown during the dive (Fig. 3.26).

NOTE! After a dive, the no-flying time is always set to 48 hours. During that period it is not possible to change the dive computer mode.



Fig. 3.26 Diving with the GAUGE Mode.

3.5. AT THE SURFACE

3.5.1. Surface Interval

An ascent to any depth shallower than 1.2 m [4 ft] will cause the DIVING display to be replaced by the SURFACE display, giving the following information (Fig 3.27):



Fig. 3.27 Surface display. You have surfaced from a 18 minute dive, which maximum depth was 20.0 m [66 ft]. The present depth is 0.0 m [0 ft]. The airplane symbol indicates that you should not fly and the dive attention symbol indicates that you should prolong your surface interval time.



Fig 3.28 Surface interval, Surface time display. Pressing the TIME button will show the surface time display.

- the maximum depth in meters [ft]
- the present depth in meters [ft]
- the no-flying warning indicated by an airplane icon
- the Altitude Adjustment setting
- the Personal Adjustment setting
- the dive attention symbol indicates that you should prolong your surface interval time
- the STOP label for 5 min, if the Mandatory Safety Stop was violated
- Er in the center window, if the decompression ceiling was violated (= Error Mode) (Fig. 3.30)
- the current temperature with °C for Centigrade [or °F for Fahrenheit]
- the dive time in minutes, i.e. the total duration of the most recent dive, shown as DIVE TIME.

Or when the TIME button is pressed once or twice:

- the current time, shown as TIME instead of the DIVE TIME
- the surface time in hours and minutes (separated by a colon), telling the duration of the present surface interval (Fig. 3.28)
- the no-flying time in hours and minutes is shown next to the airplane in the center window of the display (Fig. 3.29).

If set to NITROX Mode, the following information will also be shown:

- the oxygen percentage labeled with O₂% is shown on the left side of the center window
- the current oxygen toxicity exposure shown with an Oxygen Limit Fraction (OLF) bar graph along the left side of the display (instead of the CBT).



Fig. 3.29 Surface interval, no-flying time. Pressing the TIME button twice will show the no-flying time, indicated by an airplane symbol.

3.5.2. Dive Numbering

Several repetitive dives are considered to belong to the same repetitive dive series when the dive computer has not counted the no-flying time to zero. Within each series, the dives are given individual numbers. The first dive of the series will be numbered as DIVE 1, the second as DIVE 2, the third as DIVE 3, etc.

If you start a new dive in less than 5 minutes at the surface, the dive computer interprets this as a continuation of the previous dive and the dives are considered to be one and the same. The diving display will return, the dive number will remain unchanged, and the dive time will begin where it left off. After 5 minutes on the surface, subsequent dives are by definition repetitive. The dive counter displayed in the Planning Mode will progress to the next higher number if another dive is made.



Fig. 3.30 Surface Mode after a violated decompression dive. The Er symbol indicates that you have violated the ceiling for more than three minutes. You must not dive again for at least 48 hours.



Dive Attention Symbol



Violated Decompression Ceiling



Do Not Fly Symbol

3.5.3. Flying After Diving

The no-flying time is shown in the center window next to the airplane image. Flying or traveling to a higher altitude should be avoided at any time the computer counts down the no-flying time.

NOTE! The airplane symbol is not shown on the stand-by display. You should always activate the dive computer and check that the airplane symbol is not displayed prior to flying.

The no-flying time is always at least 12 hours or equivalent to the so-called desaturation time (if longer than 12 hours). In the permanent Error Mode and GAUGE Mode the no-flying time 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 ANY TIME THE COMPUTER COUNTS DOWN THE NO-FLYING TIME! 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 is avoided until all the DAN and UHMS guidelines and the dive computer wait to fly conditions are satisfied.

WARNING!

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

3.6. AUDIBLE AND VISUAL ALARMS

The dive computer features audible and visual alarms to advise when important limits are approached or to acknowledge preset alarms.

A short single beep occurs, when:

- the dive computer is activated
- when the dive computer automatically returns to the TIME Mode.

Three single beeps with a two second interval and the backlight activated for 5 seconds occur, when:

- the no-decompression dive turns into a decompression dive. An arrow pointing upwards and the blinking ascent warning ASC TIME will appear.

Continuous beeps and the backlight for 5 seconds occur, when:

- the maximum allowed ascent rate, 10 m/min [33 ft/min], is exceeded. A SLOW and STOP warnings will appear (Fig. 3.13)
- the Mandatory Safety Stop ceiling is exceeded. A downward pointing arrow will appear (Fig. 3.15)
- the decompression ceiling depth is exceeded. An error warning Er and a downward pointing arrow appear. You should immediately descend to or below the ceiling. The instrument will otherwise enter a permanent Error Mode within three minutes, indicated by a permanent Er (Fig. 3.19).



Fig. 3.31 Preset time alarm is activated.



Fig. 3.32 Preset dive time alarm is activated.



Fig. 3.33 Preset maximum depth alarm is activated.

You are able to set alarms before the actual dive. The preset user programmable alarms can be set for time, dive time and maximum depth. The alarms activate when:

- The preset alarm time is reached (Fig. 3.31)
 - the current time is shown
 - continuous beep series for 24 seconds or until any button is pressed
 - the current time blinks for one minute, if no button is pressed.
- The preset dive time is reached (Fig. 3.32)
 - continuous beep series for 24 seconds or until any button is pressed
 - the dive time blinks for one minute, if no button is pressed.
- The preset maximum depth is reached (Fig. 3.33)
 - continuous beep series for 24 seconds or until any button is pressed
 - the maximum depth blinks as long as the present depth value exceeds the adjusted value.

OXYGEN WARNINGS IN THE NITROX MODE

Three double beeps and the backlight for 5 seconds activate when:

- the OLF bar graph reaches 80%. The segments exceeding the 80% limit start to blink (Fig. 3.23)
- the OLF bar graph reaches 100%.

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.

Continuous beeps for 3 minutes and the backlight for 5 seconds, occur when:

- the set oxygen partial pressure and equivalent depth limit is exceeded. The maximum depth is replaced with a current blinking PO_2 value. You should immediately ascend above the PO_2 depth limit (Fig. 3.23).

WARNING!

WHEN THE OXYGEN EXPOSURE WARNING (OLF) 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.

WARNING!

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 O₂ AND PO₂ OF 1.4 BAR SETTINGS. Exposure to greater depths increases the risk of oxygen toxicity and decompression sickness.




3.7. HIGH ALTITUDE DIVES AND PERSONAL ADJUSTMENT

The dive computer can be adjusted for increasing the conservatism of the mathematical nitrogen model and for diving at altitude.

3.7.1. Altitude Adjustment

When programming the instrument for the correct altitude, you need to select the correct Altitude Mode according to Table 3.3. As a result, the dive computer adjusts its mathematical model according to the entered altitude mode, giving shorter no-decompression times at higher altitudes (see Section 6.1. "Operating Principles", Table 6.1. and 6.2.)

TABLE 3.3 ALTITUDE ADJUSTMENT RANGES (NEW RANGES 0 - 300m -1500m - 3000m)

<i>Altitude mode</i>	<i>Symbol on display</i>	<i>Altitude range</i>
A0		0 – 300 m [0 - 1000 ft]
A1		300 – 1 500 m [1000 - 5000 ft]
A2		1 500 – 3 000 m [5000 - 10000 ft]

The entered Altitude Adjustment Mode is indicated by mountain symbols (A0, A1 = one mountain, or A2 = two mountains). Section 4.3.1.1. "Altitude Adjustment and Personal Adjustment Setting" describes how the Altitude Mode is adjusted.

WARNING!

SET THE CORRECT ALTITUDE ADJUSTMENT MODE! When diving at altitudes greater than 300 m [1000 ft] the Altitude Adjustment feature must be correctly selected in order for the computer to calculate no-decompression status. Failure to properly select the Altitude Adjustment Mode correctly will result in erroneous data and can greatly increase the risk of DCS.

WARNING!

THIS DIVE COMPUTER IS NOT INTENDED FOR USE AT ALTITUDES GREATER THAN 3000 m [10000 ft]! Diving at altitudes above this limit may significantly increase the risk of DCS.

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 you allow the body conditions to stabilize over a period of at least three hours before beginning to dive at altitude.

3.7.2. Personal Adjustment

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, 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 fatigues
- diver dehydration
- previous history of DCS.

The Personal Adjustment Mode is indicated by a diver symbol and plus signs (P0 = a diver, P1 = diver +, or P2 = diver ++). Section 4.3.1.1. "Altitude Adjustment and Personal Adjustment Setting" describes how the Personal Mode is adjusted.

This feature should be used to adjust the computer to be more conservative, according to personal preference, by entering the suitable Personal Adjustment Mode with the help of Table 3.4. In ideal conditions, retain the default setting, P0. If conditions are more difficult or other mentioned factors which tend to increase the possibility of DCS exist, select P1 or even the most conservative P2. As a result the dive computer adjusts its mathematical model according to the entered Personal Adjustment Mode, giving shorter no-decompression times (see section 6.1. "Operating Principles", Table 6.1 and 6.2).

TABLE 3.4 PERSONAL ADJUSTMENT RANGES

<i>Personal mode</i>	<i>Symbol on display</i>	<i>Condition</i>	<i>Desired</i>
P0		<i>Ideal condition</i>	<i>Default</i>
P1		<i>Some mentioned factors or conditions exist</i>	<i>Progressively more conservative</i>
P2		<i>Several mentioned factors or conditions exist</i>	

WARNING!

SET THE CORRECT PERSONAL ADJUSTMENT MODE! You should use this option to make the calculations more conservative, whenever it is believed that factors, which tend to increase the possibility of DCS exist. Failure to properly select the Personal Adjustment Mode correctly will result in erroneous data and can greatly increase the risk of DCS.

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 instrument to minimize the risk of DCS. Decompression sickness can cause serious injury or death.

3.8. ERROR CONDITIONS

The dive computer has warning indicators that alert 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, the dive computer will enter an Error Mode, indicating that the risk of DCS has greatly increased. If you understand and operate the dive computer sensibly, it is very unlikely you will ever put the instrument into the Error Mode.

OMITTED DECOMPRESSION

The Error Mode results from omitted decompression, when you stay above the ceiling for more than three minutes. During this three minute period the Er warning is shown and the audible alarm beeps. After this, the dive computer will enter a permanent Error Mode. The instrument will continue to function normally if you descend below the ceiling within three minutes.

Once in the permanent Error Mode the dive computer will not show no-decompression or ascent times. 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. 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. During the permanent Error Mode, the Er text will be displayed in the center window and the Planning Mode cannot be entered.

4. MENU BASED MODES

The main menu based functions include the 1) memory, 2) dive simulator and 3) setting modes.

THE USE OF THE MENU BASED FUNCTIONS

1. Activate the menu based modes by pressing once the **SMART** (MODE) button in the Dive Mode (Fig. 4.1).
2. Scroll the mode options by pressing the arrow up/down buttons. When scrolling the options, the label and an equivalent number are shown on the display (Fig. 4.2 - 4.4).
3. Press the **SMART** (Select) button once to select the desired option.
4. Scroll the submode options by pressing the arrow up/down buttons. When scrolling the options, the label and an equivalent number are shown on the display.
5. Select the desired option by pressing once the **SMART** (Select) button. Repeat the procedure, if there are more submodes.
6. Depending on the mode, you are now able to have a look at the memories, simulate a dive, or make desired settings (use the the arrow up/down buttons). The **SMART** button is used to Quit or to confirm the settings (OK).

If you do not press any of the buttons for 5 minutes while in a Menu based mode, the instrument beeps and returns to the timekeeping display automatically. In the Simulation Mode, however, the equivalent time is 60 minutes.

TIP!

By pressing the **SMART** button for more than 1 second, any menu based function or submode can be quit and the dive computer will return directly to the Dive Mode.



Fig. 4.1 Main menu based Mode options. [3 MODE].



Fig. 4.2 Memory option. [1 MEMORY].



Fig. 4.3 Simulation option. [2 SIMUL].

THE LIST OF THE MENU BASED MODES

1. MEMORIES AND DATA TRANSFER [1 MEMORY]

1. *Logbook and Dive Profile Memory* [1 LOGBOOK]
2. *Dive History Memory* [2 HISTORY]
3. *Data Transfer and PC-Interface* [3 TR-PC]

2. SIMULATOR MODE [2 SIMUL]

1. *Dive Simulator* [1 SIM DIVE]
2. *Dive Planning Simulator* [2 SIM PLAN]

3. SET MODES [3 SET]

1. *Dive Parameter Settings* [1 SET DIVE]
 1. *Altitude Adjustment and Personal Adjustment Mode Settings* [1 AdJ MODE]
 2. *Dive Time Alarm Setting* [2 d ALARM]
 3. *Maximum Depth Alarm Setting* [3 MAX DPTH]
 4. *Nitrox/Oxygen Percentage Setting* [4 NITROX]
2. *Setting Time* [2 SET TIME]
 1. *Adjusting Time* [1 AdJ TIME]
 2. *Adjusting Date* [2 AdJ DATE]
 3. *Adjusting Daily Time Alarm Setting* [3 T ALARM]
3. *Setting Preferences* [3 SET PREF]
 1. *Backlight On Time Setting* [1 LIGHT]
 2. *Dive Computer Model Setting* [2 MODEL]

NOTE! After diving, the Menu based modes cannot be accessed until 5 minutes after the dive.



Fig. 4.4 Set option. [3 SET].



Fig. 4.5 Memory options. [3 MEMORY].



Fig. 4.6 Logbook option. [1 LOGBOOK].

4.1. MEMORIES AND DATA TRANSFER [1 MEMORY]

The memory options (Fig. 4.5) for this dive computer include the combined Logbook and Dive Profile Memory (Fig. 4.6 - 4.12), Dive History Memory (Fig. 4.13 - 4.14) and the Data Transfer and PC-Interface functions (Fig. 4.15).

4.1.1. Logbook and Dive Profile Memory [1 LOGBOOK]

This instrument has a very sophisticated high capacity Logbook and Profile Memory, with data being recorded every 20 seconds. Dives shorter than the recording interval are not registered.

NOTE! The recording interval can be set to 10s, 30s or 60s with the optional PC-interface and its software.

To enter the Logbook Memory Mode select MODE-1 MEMORY-1 LOGBOOK.

For each dive there are four pages of logbook dive information. Use the scroll buttons to scroll the display between Logbook pages I, II, III and IV. The data of the most recent dive is shown first.

The following information will be shown on four pages:

Page I, main display (Fig. 4.7)

- dive number in the dive series
- dive entry time and date.



Fig. 4.7 Logbook, page I, main display. Scroll the different pages of that dive.



Fig. 4.8 Logbook, page II. The main dive related data.



Fig. 4.9 Logbook, page III. The surface interval time and average depth.

Page II (Fig. 4.8)

- dive number in the dive series
- maximum depth
(NOTE! Due to lower resolution, the reading may differ from the maximum depth reading of the Dive History up to 0.3 m [1 ft].)
- total dive time
- temperature at the maximum depth
- Altitude Adjustment setting (not displayed in GAUGE Mode)
- Personal Adjustment setting (not displayed in GAUGE Mode)
- SLOW label if the diver has violated the maximum ascent rate
- STOP label if the Mandatory Safety Stop was violated
- the ASC TIME label, if the dive becomes a decompression dive
- dive attention symbol, if the dive was started while symbol was displayed
- downward pointing arrow, if the ceiling was violated
- oxygen percentage (only in NITROX Mode)
- maximum OLF during the dive (only in NITROX Mode).

Page III (Fig. 4.9)

- dive number in the dive series
- average depth
- surface interval time before the dive.

Page IV (Fig. 4.10)

- dive number in the dive series
- the profile of the dive; automatic scrolling during which:
- blinking logbook symbol, when the user has pressed the PLAN button for Bookmark
- blinking SLOW label when registered
- blinking ASC TIME label when the dive became a decompression dive.

Press the **SMART** (Select) button once to change the scroll buttons to scroll the different dives forward and backward (Fig. 4.11). Press the **SMART** (>Select) button again to change function of the scroll buttons back to scroll the different pages of the selected dive. When searching the dives, only the page I is shown. The **END** text is displayed between the oldest and the most recent dive (Fig. 4.12).

The memory will retain approximately the last 36 hours of dive time. After that, when new dives are added, the oldest dives are deleted. The contents of the memory will remain even when the battery is changed (assuming that the replacement has been done according to the instructions).

DIVE PROFILE MEMORY [PROF]

The scrolling of the profile will start automatically when the Logbook page IV (PROF) is entered.

The dive time is displayed in 20 second increments (the recording interval can be set to 10s, 30s or 60s increments with the optional PC-interface and its software) with each display being shown for about three seconds. The depths shown are the maximum values of each interval.

Pressing any button stops the scrolling of the profile.

NOTE! Several repetitive dives are considered to belong to the same repetitive dive series if the no-flying time has not ended. See "Dive Numbering" in section 3.5.2. for further information.



Fig. 4.10 Logbook, page IV. Profile of the dive.



Fig. 4.11 Logbook, page I. Press the **SMART** (Select) button once to be able to scroll between the different dives.

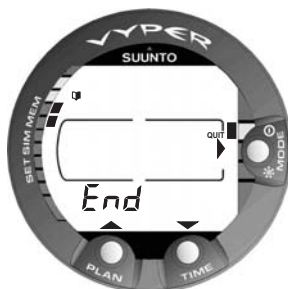


Fig. 4.12 Logbook, end of the memory. The **END** text is displayed between the oldest and the most recent dive.

4.1.2. Dive History Memory [2 HISTORY]

The Dive History is a summary of all the dives recorded by the dive computer. To enter the Dive History Memory Mode select MODE- 1 MEMORY- 2 HISTORY (Fig. 4.13).

The following information will be shown on the display (Fig. 4.14):

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

The Dive History Memory can hold a maximum of 999 dives and 999 diving hours. When these maximum values are reached, the counters will start again from 0.

NOTE! The maximum depth can be reset to 0.0 m [0 ft] using the optional PC-Interface and its software, Suunto Dive Manager.

4.1.3. Data Transfer and PC-Interface [3 TR-PC]

The instrument can be connected to an IBM compatible personal computer (PC), using the optional PC-Interface and its software. With the PC-Interface, dive data from the dive computer can be downloaded to a PC. The PC-Interface software can be used for educational and demonstration purposes, for planning dives, and for keeping a complete record of your dive history with the instrument. Complete Logbook data can also be included. Paper copies of your dive log and profiles can then easily be printed.



Fig. 4.13 Dive History Memory Mode. [2 HISTORY].



Fig. 4.14 Dive History information.



Fig. 4.15 Data Transfer Mode. [3 TR-PC].

The data transfer is carried out using the connector on the bottom of the unit. The following data is transferred to the PC:

- depth profile of the dive
- dive time
- surface interval time
- dive number
- Altitude and Personal adjustment settings
- oxygen percentage setting and maximum OLF (in NITROX Mode)
- tissue calculation data
- temperature at the maximum depth, beginning of the dive, and end of the dive
- dive entry time (year, month, day and time)
- additional dive information (e.g. SLOW and Mandatory Safety Stop violations, Dive Attention Mark, Bookmark, Surfaced Mark, Decompression Mark, Ceiling Error Mark)
- identity number of the dive computer
- personal information.

It is also possible to manually add comments and other personal information to the PC based dive data files. The PC-Interface package comes complete with the interface unit, the software, and an instruction and getting started guide.

To enter the Data Transfer select MODE- 1 MEMORY- 3 TR - PC (Fig. 4.15).

NOTE! While in the Data Transfer Mode, the connector/water contacts are used only for the data transfer. The Dive Mode IS NOT automatically activated if the contacts are submerged.

After you have finished the data transfer, press the **SMART** (Quit) to exit Data Transfer Mode [TR-PC]. If no button is operated or no data is transferred within 5 minutes, the instrument beeps and returns to the timekeeping display automatically.

4.2. SIMULATION MODE [2 SIMUL]

The Simulation Mode can be used to get acquainted with the features and displays of the instrument before diving, to plan dives in advance, demonstrational or educational purposes, or just for pleasure.

The dive computer has two simulation modes (Fig. 4.16):

- The DIVE SIMULATOR (Fig. 4.17) and
- The DIVE PLANNING SIMULATOR (Fig. 4.19).

In Simulation Mode, time moves four times faster than real time (when diving), i.e., 15s = 1min.

4.2.1. Dive Simulator [1 SIM DIVE]

The Dive Simulator is an excellent tool for becoming familiar with the dive computer and planning your dives. The Dive Simulator 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.

To enter the Dive Simulator Mode select MODE-2 SIMUL-1 SIM DIVE (Fig. 4.17 and 4.18).



Fig. 4.16 Dive Simulation Options. [2 SIMUL].



Fig. 4.17 Dive Simulator Mode. [1 SIM DIVE].



Fig. 4.18 Selected Dive Simulator Mode. Descent by pressing the arrow down (TIME) button and ascent by pressing the arrow up (PLAN) button.

4.2.2. Dive Planning Simulator [2 SIM PLAN]

The Dive Planning Simulator Mode shows you the present no-decompression limits. In this mode, you are able to add the desired surface interval increment to present surface interval time, which allows you to plan your dives in advance.

This mode is also used to add the desired surface interval increments for dive simulations. Add the desired surface interval increment to present surface interval by pressing the arrow down (TIME) and arrow up (PLAN) buttons.

NOTE! This display is only shown for repetitive dives.

To enter the Dive Planning Simulator Mode select MODE- 2 SIMUL- 2 SIM PLAN (Fig. 4.19).



Fig. 4.19 Dive Planning Simulator Mode. [2 SIM PLAN].



Fig. 4.20 Selected Dive Planning Simulator Mode. Add the desired surface interval increment (to present shown surface interval) by pressing the TIME and PLAN buttons. NOTE! This display is only shown for repetitive dives.



Fig. 4.21 Dive Planning Simulation.



Fig. 4.22 Setting Options. [3 SET].

4.3. SET MODES [3 SET]

The Set Modes (Fig. 4.22) are divided into three submodes for setting the dive-related parameters, time related parameters and your personal preferences.

4.3.1. Dive Parameter Settings [1 SET DIVE]

To enter the Dive Parameter Setting Mode select MODE-3 SET- 1 SET DIVE (Fig. 4.23). The Dive Parameter Setting mode has two to four options depending on the dive computer mode. In GAUGE Mode there are two options, in AIR Mode three options and in NITROX Mode four options.



Fig. 4.23 Dive Parameter Setting Mode. [1 SET DIVE].

4.3.1.1. Altitude Adjustment and Personal Adjustment Settings

[1 AdJ MODE]

The current Altitude and Personal Adjustment Modes are shown when diving and at the surface. If the mode does not match the altitude or personal conditions (see section 3.7. "High Altitude Dives and Personal Adjustment"), it is imperative that you enter the correct selection before diving. Use the Altitude Adjustment to select the correct altitude mode. Use the Personal Adjustment to add an extra level of conservatism.



Fig. 4.24 Altitude Adjustment and Personal Adjustment Setting Mode. [1 AdJ MODE].

NOTE! New altitude and personal adjustment selections cannot be made until 5 minutes after the dive.

To enter the Altitude Adjustment and Personal Adjustment Setting Mode select MODE- 3 SET- 1 SET DIVE- 1 AdJ MODE (Fig. 4.24). Now you are able to select from the three altitude modes (Fig. 4.25) and the three personal modes (Fig. 4.26).

WARNING!

ALWAYS RECHECK THE ALTITUDE AND PERSONAL ADJUSTMENT TO ENSURE THAT THE ALTITUDE IS NOT SET FOR AN ALTITUDE LESS THAN THAT OF THE DIVE SITE AND THAT THE PERSONAL MODE CORRESPONDS TO THE DESIRED CONSERVATISM. Failure to enter this information could result in dive planning errors and risk exposure to decompression sickness.

4.3.1.2. Dive Time Alarm Setting

[2 d ALARM]

The instrument has one Dive Time Alarm Setting, which can be used for several purposes to add your diving safety. The alarm can be set, for example, to your planned bottom time.

To enter the Dive Time Alarm Setting Mode select MODE- 3 SET- 1 SET DIVE- 2 d ALARM (Fig. 4.27). The Dive Time alarm can be set on or off and the time from 1 to 999 minutes.



Fig. 4.25 Adjusting The Altitude Setting. Press the scroll buttons to change the altitude mode.

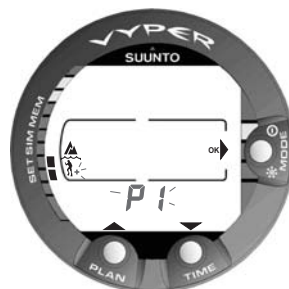


Fig. 4.26 Adjusting The Personal Setting. Press the scroll buttons to change the personal mode.



Fig. 4.28 Setting The Dive Time Alarm. Press the scroll buttons to change the alarm on/off and to set the dive time value.



Fig. 4.27 Dive Time Alarm Setting Mode. [2 d ALARM].

4.3.1.3. Maximum Depth Alarm Setting [3 MAX DPTH]

You can set one depth alarm in the dive computer.

To enter the Maximum Depth Alarm Setting select MODE-3 SET-1 SET DIVE-3 MAX DPTH (Fig. 4.29).

The depth alarm is set to 40 m [131 ft] at the factory, but you are able to adjust it according your personal preference or switch it off. The depth range can be set from 3.0 m to 100 m [9 ft to 328 ft] (Fig. 4.30).

4.3.1.4. Nitrox/Oxygen Setting [4 NITROX]

If set to the NITROX Mode, the correct oxygen percentage of the gas in your cylinder must always be entered into the computer to ensure correct nitrogen and oxygen calculations. In this mode also the oxygen partial pressure limit can be set. The dive computer calculates the equivalent allowed maximum depth based on the set parameters.

To enter the Nitrox/Oxygen Setting Mode select MODE-3 SET-1 SET DIVE-4 NITROX (Fig. 4.31). The default oxygen percentage (O₂%) setting is 21% (air) and oxygen partial setting 1.4 bar (PO₂) (Fig. 4.32).



Fig. 4.29 Maximum Depth Alarm Setting Mode. [3 MAX DEPTH].



Fig. 4.30 Setting The Maximum Depth Alarm. Press the scroll buttons to change the alarm on/off and to set the maximum depth value.



Fig. 4.31 Nitrox/Oxygen Setting Mode. [4 NITROX].



Fig. 4.32 Setting Oxygen Percentage and Partial Pressure. The equivalent maximum depth is 32.8 m [107 ft]. Press the scroll buttons to change the oxygen percentage and to set the oxygen partial setting value.

4.3.2. Setting Time [2 SET TIME]

To enter the Time Setting Mode select MODE- 3 SET- 2 SET TIME (Fig. 4.33). The Time Setting mode has three options: 1 Time, 2 Date and 3 Daily Time Alarm.



Fig. 4.33 Time Setting Mode. [2 SET TIME].

4.3.2.1. Adjusting Time [1 AdJ TIME]

To enter the Time Setting Mode to adjust the time select MODE- 3 SET- 2 SET TIME- 1 AdJ TIME (Fig. 4.34). After entering this mode you are able to select between 12 h and 24 hour time formats and set the correct time by using the SMART (MODE) and scroll buttons (Fig. 4.35).

4.3.2.2. Adjusting Date [2 AdJ DATE]

To enter the Date Setting Mode to adjust the date select MODE- 3 SET- 2 SET TIME- 2 AdJ DATE (Fig. 4.36). After entering this mode you are able to set the correct year, month and day in this order (Fig. 4.37).



Fig. 4.34 Adjust Time Setting Mode. [1 AdJ TIME].

NOTE! The day of the week is automatically calculated in accordance with the date. The date can be set within the range of Jan 1, 1990 to Dec. 31, 2089.



Fig. 4.36 Adjust Date Setting Mode. [2 AdJ DATE].



Fig. 4.35 Adjusting the Time.



Fig. 4.37 Adjusting The Date.

4.3.2.3. Adjusting Daily Alarm Setting [3 T ALARM]

You can set one daily alarm in the dive computer. When the daily alarm activates, the time symbol blinks for 1 minute and the alarm sounds for 24 seconds. The alarm is given at the preset time each day. Press any button to stop the audible alarm, after it has activated.

To enter the Daily Alarm Setting Mode to adjust the alarm select MODE- 3 SET- 2 SET TIME- 3 T ALARM (Fig. 4.38). After entering this mode you are able to set the desired alarm time (Fig. 4.39).



Fig. 4.38 Adjust Daily Alarm Setting Mode. [3 T ALARM].

4.3.3. Setting Preferences [3 SET PREF]

To enter the Setting Preferences Mode select MODE- 3 SET- 3 SET PREF (Fig. 4.40). The Setting Preferences mode has two options: 1 LIGHT and 2 MODEL.

4.3.3.1. Backlight On Time Setting [1 LIGHT]

In the Light Mode the backlight can be turned off or on and the on time can be set to be 5 to 30 seconds.

To enter the Backlight On Time Setting Mode select MODE- 3 SET- 3 SET PREF- 1 LIGHT (Fig. 4.41). After entering this mode you are able to set the desired backlight on time and to turn the backlight off or on (Fig. 4.42).



Fig. 4.39 Adjusting the Daily Alarm.

4.3.3.2. Dive Computer Units Setting [2 UNITS]

To enter the Dive Computer Units Setting mode, select MODE- 3 SET- 3 SET PREF- 2 UNITS. This will enable you to choose between metric and imperial units (Fig. 4.43 and Fig. 4.44).

4.3.3.3. Dive Computer Model Setting [3 MODEL]

In the Dive Computer Model Setting Mode the dive computer can be set to be an AIR computer, NITROX computer or a depth GAUGE with a timer.

To enter the Dive Computer Model Setting Mode select MODE- 3 SET- 3 SET PREF- 3 MODEL (Fig. 4.45). After entering this mode you are able to change between AIR, NITROX and GAUGE modes (Fig. 4.46).



Fig. 4.40 Setting Preferences Mode. [3 SET PREF]



Fig. 4.41 Backlight Setting Mode. [1 LIGHT].

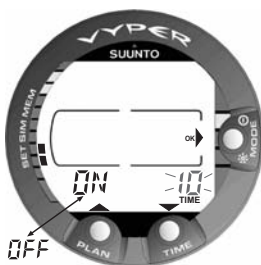


Fig. 4.42 Setting The Backlight On Time. Press the scroll buttons to change the backlight on/off and to set the time value.



Fig. 4.43 Dive Computer Units Setting Mode. [2 UNITS].

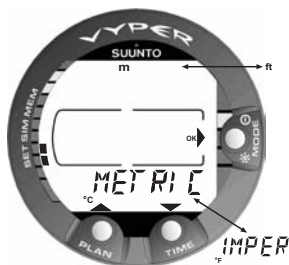


Fig. 4.44 Setting Metric/Imperial units.



Fig. 4.45 Dive Computer Model Setting Mode. [3 MODEL].



Fig. 4.46 Setting Dive Computer Model.

5. CARE AND MAINTENANCE

This SUUNTO dive computer is a sophisticated precision instrument. Though designed to withstand the rigors of scuba diving you must treat it with proper care and caution as any other precision instrument.

5.1. IMPORTANT INFORMATION

WATER RESISTANCE

This device will be watertight up to a static pressure of 10 ATM (100 m [328 ft]). Note, however, that dynamic pressure generated by movement underwater is greater than static pressure.

DEPTH SENSOR

The built-in depth sensor of the dive computer is a sophisticated precision component. Keep the area around the depth sensor clear from dirt, sand, dust or other substances. Rinse the device thoroughly with fresh water and dry it with a soft towel. Never use pins, needles or other objects to clean the depth sensor (Fig. 2.3).

WATER CONTACTS AND PUSH BUTTONS

Contamination or dirt on the water contacts/connector or push buttons may prevent the automatic activation of the Dive Mode and cause problems during the data transfer. Therefore, it is important that the water contacts and push buttons are kept clean. If the water contacts of the instrument are active (AC-text remains on display) or the Dive Mode activates on its own, the reason for this is probably contamination or invisible marine growth that may create an unwanted electric current between the contacts. It is important that the dive computer is carefully washed in fresh water after the day's diving is completed. The contacts can be cleaned with fresh water and, if necessary, a mild detergent and a soft brush. Sometimes it might be necessary to remove the instrument from the protective boot for cleaning.

5.2. CARE OF YOUR DIVE COMPUTER

- NEVER try to open the case of the dive computer.
- Service your dive computer every two years or after 200 dives (whichever comes first) by an authorized dealer or distributor. This service will include a general operational check, replacement of the battery, and water resistance check. The service requires special tools and training. Therefore, it is advisable to contact an authorized SUUNTO dealer or distributor for biennial service. Do not attempt to do any service that you are not sure about how to do.
- Should moisture appear inside the case or battery compartment have the instrument checked immediately by your SUUNTO dealer or distributor.
- Should you detect scratches, cracks or other such flaws on the display that may impair its durability, have it replaced immediately by your SUUNTO dealer or distributor.
- Check the spring bars holding the strap and the buckle for flaws. If the flexibility of the spring bars has reduced, have them replaced immediately by your SUUNTO dealer or distributor.
- Wash and rinse the unit in fresh water after every use.
- Protect the unit from shock, extreme heat, direct sunlight, and chemical attack. The dive computer cannot withstand the impact of heavy objects like scuba cylinders, nor chemicals like gasoline, cleaning solvents, aerosol sprays, adhesive agents, paint, acetone, alcohol etc. Chemical reactions with such agents will damage seals, case and finish.
- Store your dive computer in a dry place when you are not using it.
- The dive computer will display a battery symbol as a warning when the power gets too low. When this happens, the instrument should not be used until the battery has been replaced (see also section 3.1.1. "Activation and Prechecks").
- Do not fasten the strap of your dive computer too tightly. You should be able to insert your finger between the strap and your wrist. Shorten the strap by cutting it, if you do not expect to need the extra length of it.

5.3. MAINTENANCE

The instrument should be soaked, thoroughly rinsed with fresh water, then dried with a soft towel after each dive. Make sure that all salt crystals and sand particles have been flushed out.

Check the display and the transparent battery compartment cover for possible moisture or water. **DO NOT** use the dive computer, 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 dive computer in pressurized air.

5.4. WATER RESISTANCE INSPECTION

Water resistance of the unit must be checked after replacement of the battery or after other service operations. The check requires special equipment and training.

You must frequently check the transparent battery compartment cover and the display for any sign of leaks. If you find moisture inside your dive computer, there is a leak. A leak must be corrected without delay, as moisture will seriously damage the unit, even beyond repair. SUUNTO does not take any responsibility for damage caused by moisture in the dive computer, if the instructions of this manual are not carefully followed.

In case of a leak, immediately take the dive computer to an authorized SUUNTO dealer or distributor.

5.5. BATTERY REPLACEMENT

NOTE! It is advisable to contact an authorized Suunto dealer for battery replacement. It is imperative that the change is made in a proper manner to avoid any leakage of water into the battery compartment or computer.

CAUTION!

Defects caused by improper battery installation are not covered by the warranty.

CAUTION!

When the battery is changed all nitrogen and oxygen uptake data is lost. Therefore, the no-flying time shown by the computer should have reached zero or you must wait for 48 hours or preferably even 100 hours between dives before you may dive again.

All history and profile data, as well as the altitude, personal and alarm settings, will remain in the dive computer memory after the battery change. However, the clock time and time alarm setting is lost. In the NITROX Mode also the nitrox settings are reverted back to default settings (21 % O₂, 1.4 bar PO₂).

When working with the battery compartment, cleanliness is extremely important. Even the smallest dirt particles may cause a leakage when you dive.

BATTERY KIT

The battery kit includes a 3.0 V coin type lithium cell battery and a lubricated O-ring. When handling the battery do not make contact with both of the poles at the same time. Do not touch the surfaces of the battery with your bare fingers.

TOOLS REQUIRED

- A flat 1.5 mm screwdriver or a special tool for spring bars (K5857).
- Soft cloth for cleaning.
- Needlenose pliers or large screwdriver for turning securing ring.

BATTERY REPLACEMENT

The battery and the buzzer are located in the back of the instrument in a separate compartment, the parts of which are shown in Fig. 5.1. To change the battery, follow the procedure below:

1. Remove the computer from the console or boot.

Wrist model:

- Pull off the boot. Remove it first from the front end with the longer part of the strap.
- Disassemble the shorter part of the strap with a flat 1.5 mm screwdriver or a special tool for spring bars. The longer part of the strap may stay on but removing it may ease the work later on.

Console model:

- Remove the dive computer from the console according the instructions of the console.

2. Thoroughly rinse and dry the computer.
3. Open the securing ring of the battery compartment lid by pushing it down and rotating it clockwise. You may use a pointed nose pliers or a small screwdriver as an aid in the rotating. Put the pliers ends into the holes of the securing ring or the screwdriver onto the side of the right tooth on the ring (Fig. 5.2) and turn the ring clockwise. Care should be taken not to damage any of the parts.
4. Remove the ring.
5. Carefully remove the lid with the beeper attached to it. The lid can be removed by pressing with your finger on the outermost edge of the lid while at the same time pulling with your nail at the opposite side. Do not use sharp metal objects as they might damage the O-ring or the sealing surfaces.
6. Remove the O-ring and the battery retainer.
7. Carefully remove the battery. Do not damage the electrical contacts or the sealing surface.

Check for any traces of flooding, particularly between the beeper and the lid, or for any other damage. In case of a leak or any other damage, bring the dive computer to an authorized SUUNTO dealer or distributor for check and repair.

8. Check the condition of the O-ring; a defective O-ring may indicate sealing or other problems. Dispose the old O-ring, even if it seems to be in good condition.

9. Check that the battery compartment, battery holder and lid are clean. Clean with soft cloth if necessary.
10. Gently insert the new battery in the battery compartment. Check the polarity of the battery: the "-" mark should point toward the bottom of the compartment and the "+" mark upwards.
11. Reinstall the battery retainer in its correct position.
12. Check that the new lubricated O-ring is in good condition. Put it in the right position on the battery compartment lid. Be very careful not to get any dirt on the o-ring or its sealing surfaces.
13. Carefully press the lid onto the battery compartment with your thumb, while making sure that the O-ring is not at any point protruding out on the edge.
14. Put your other thumb through the locking ring. Press this thumb firmly against the lid and release the other one. Make sure that the lid is pressed completely down!
15. Turn the locking ring counterclockwise with your free thumb and fingers until it snaps into its locked position.
16. The dive computer should now active it's timekeeping mode and show time 18:00 [6:00 PM] and date SA 01,01. Activate the instrument. Check that:
 - All display segments work.
 - The low battery warning is off.
 - The buzzer beeps and backlight works.
 - All the settings are correct. Reset if necessary.
17. Install the dive computer back into the console or boot and reassemble the strap. The instrument is now ready for use.

Wrist model:

- Assembling into the boot: First insert the longer strap in its hole in the front of the boot and then the dive computer into its cavity in the boot starting at the back end. Then snap also the long strap end of the instrument into the boot. Stretch the boot as needed.
- Assemble the shorter part of the strap. Use the spring bar tool or small screwdriver to compress the spring bars. Make sure that the spring bars get fully seated so they will not come off their holes.

Console model:

- Refit the dive computer in the console according the instructions of the console.

CAUTION!

Check after the first dives for possible moisture under the transparent battery compartment lid, indicating a leak.

Securing Ring
V5844

Battery Compartment
Lid with buzzer V5843

O-Ring K5664

Spring Bar K5588

Long Strap
K5592

Complete Strap
V5841



Vyper Case

Battery K5597

Battery Retainer
V5842

Boot K5593

Spring Bar
K5588

Short Strap with
buckle
V5836

Fig. 5.1 Instrument parts. The code after the name stands for spare part order number.



Fig. 5.2 Opening of the securing ring.

6. TECHNICAL DESCRIPTION

6.1. OPERATING PRINCIPLES

NO-DECOMPRESSION LIMITS

The no-decompression limits displayed by the dive computer in a fresh start are (see Table 6.1 and Table 6.2), for most dives to a single depth, slightly more conservative than those permitted by the U.S. Navy tables.

TABLE 6.1 NO-DECOMPRESSION TIME LIMITS (min) FOR VARIOUS DEPTHS (m) FOR THE FIRST DIVE OF A SERIES



















Depth [m]	Personal Mode / Altitude Mode								
	P0/A0 	P0/A1 	P0/A2 	P1/A0 	P1/A1 	P1/A2 	P2/A0 	P2/A1 	P2/A2 
9	--	163	130	163	130	96	130	96	75
12	124	89	67	89	67	54	67	54	45
15	72	57	43	57	43	35	43	35	29
18	52	39	30	39	30	25	30	25	21
21	37	29	23	29	23	20	23	20	15
24	29	24	19	24	19	16	19	16	12
27	23	18	15	18	15	12	15	12	9
30	18	14	12	14	12	9	12	9	7
33	13	11	9	11	9	8	9	8	6
36	11	9	8	9	8	6	8	6	5
39	9	8	6	7	6	5	6	5	4
42	7	6	5	6	5	4	5	4	4
45	6	5	5	5	5	4	5	4	3

TABLE 6.2 NO-DECOMPRESSION TIME LIMITS (min) FOR VARIOUS DEPTHS [ft] FOR THE FIRST DIVE OF A SERIES

Depth [ft]	Personal Mode / Altitude Mode								
	P0/A0 	P0/A1 	P0/A2 	P1/A0 	P1/A1 	P1/A2 	P2/A0 	P2/A1 	P2/A2 
30	--	160	127	160	127	93	127	93	73
40	120	86	65	86	65	53	65	53	43
50	69	56	41	56	41	34	41	34	28
60	50	38	29	38	29	25	29	25	20
70	36	29	23	29	23	20	23	20	15
80	28	23	19	23	19	15	19	15	11
90	22	18	15	18	15	11	15	11	9
100	17	14	11	14	11	9	11	9	7
110	13	11	9	11	9	7	9	7	6
120	10	9	8	9	8	6	8	6	5
130	9	7	6	7	6	5	6	5	4
140	7	6	5	6	5	4	5	4	4
150	6	5	4	5	4	4	4	4	3

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 instrument must be set to the 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 dive computer are reduced according to the lower ambient pressure.

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

SURFACE INTERVALS

The dive computer requires a minimum surface interval of 5 minutes between dives. If a surface interval is shorter than 5 minutes, the instrument 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 excess nitrogen absorbed on both dives.

6.2. REDUCED GRADIENT BUBBLE MODEL, SUUNTO RGBM

The Reduced Gradient Bubble Model (RGBM) is a modern algorithm for tracking both dissolved and free gas in the tissues of divers performing a wide variety of maneuvers. Unlike the classical Haldane models, the RGBM can address a number of circumstances outside the range of just dissolved gas models by:

- monitoring continuous multiday diving
- tracking closely spaced repetitive diving
- accounting for diving deeper than previous dive
- regulating rapid ascents with high degrees of Doppler bubble formation
- incorporating consistency with real physical laws for gas kinetics
- taking a modern approach to a difficult problem.

The SUUNTO RGBM algorithm is developed in co-operation with SUUNTO and Bruce R. Wienke. It is based both on laboratory experiments and diving data (for example DAN's dive data).

6.3. OXYGEN EXPOSURE

The oxygen exposure calculations are based on currently accepted exposure time limit tables and principles. In addition to this the dive computer uses several methods to conservatively estimate the oxygen exposure. These include for example:

- the displayed oxygen exposure calculations are rounded to the next higher whole percentage value
- for recreational scuba diving, the 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 you exceed the 1.4 bar PO_2 limit, the dive computer will still continue to calculate and show OLF% information
- the uptake and recovery for both CNS% and OTU% are 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 minutes
- the maximum depth warning limit based on 1.4 bar PO_2 is calculated and displayed. If extra conservatism for the depth limits is required the PO_2 can be adjusted to 1.2 or 1.3 bar.

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

- the adjusted $O_2\%$
- 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.

6.4. TECHNICAL SPECIFICATION

Dimensions and weight without the boot and strap:

- Diameter: 61 mm [2.4 in]
- Thickness: 28 mm [1.1 in]
- Weight: 68 g [2.4 oz]

Depth Gauge:

- Temperature compensated pressure sensor
- Salt water calibrated, in fresh water the readings are about 3% smaller (calibrated complying with prEN 13319)
- Maximum depth of operation: 80 m [262 ft] (complying with prEN 13319)
- Accuracy: $\pm 1\%$ of full scale or better from 0 to 80 m [262 ft] at 20°C [68°F] (complying with prEN 13319)
- Depth display range: 0 ... 100 m [328 ft] (over range up to 150 m [492 ft] in an emergency situation)
- Resolution: 0.1 m from 0 to 100 m [1 ft from 0 to 328 ft]

Temperature display:

- Resolution: 1°C [1.5°F]
- Display range: -9 ... +50°C [-9 ... +122°F]
- Accuracy: $\pm 2^\circ\text{C}$ [$\pm 3.6^\circ\text{F}$] within 20 minutes of temperature change

Calendar Clock:

- Accuracy: ± 25 s/month (at 20°C [68°F])
- 12/24 h display

Other displays:

- Dive time: 0 to 999 min, counting starts and stops at 1.2 m [4 ft] depth
- Surface time: 0 to 99 h 59 min
- Dive counter: 0 to 99 for repetitive dives
- No-decompression time: 0 to 199 min (- - after 199)
- Ascent time: 0 to 99 min (- - after 99)
- Ceiling depths: 3.0 to 100 m [10 to 328 ft]

Displays only in NITROX Mode:

- Oxygen%: 21 - 50
- Oxygen partial pressure display: 1.2 - 1.6 bar depending on the limit setting
- Oxygen Limit Fraction: 1 - 110% with 10% resolution (bar graph)

Logbook/Dive Profile Memory:

Recording interval: 20 seconds (the recording interval can be set to 10s, 30s or 60s with the optional PC-interface and its software), records the maximum depth of each interval.

- Memory capacity: approximately 36 hours of diving with 20 seconds recording interval
- Depth accuracy: 0.3 m [1 ft]

Operating Conditions

- Normal altitude range: 0 to 3000 m [10000 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]

It is recommended that the instrument be stored in a dry place at room temperature.

NOTE! Do not leave the dive computer in direct sunlight!

Tissue Calculation Model

- SUUNTO RGBM algorithm (developed by SUUNTO and Bruce R. Wienke, BS, MS and PhD)
- 9 tissue compartments
- Tissue compartment halftimes: 2.5, 5, 10, 20, 40, 80, 120, 240 and 480 minutes (on gassing). The off gassing halftimes are slowed down
- Reduced gradient (variable) "M" values based on diving habit and dive violations. The "M" values are tracked up to 100 hours after a dive
- The EAN and oxygen exposure calculations are based on recommendations by R.W. Hamilton, PhD and currently accepted exposure time limit tables and principles

Battery

- One 3 V lithium battery; CR 2450 (K5597) and O-ring 1,78 mm x 31,47 mm 70 ShA (K5664)
- Battery storage time (shelf life): Up to three years
- Replacement: Every two years or more often depending on dive activity
- Life expectancy at 20°C [68°F]:
 - 0 dives/y -> 3 years
 - 100 dives/y -> 2 years
 - 400 dives/y -> 1 year

The following conditions have an affect on the expected battery lifetime:

- The length of the dives.
- The condition in which the unit is operated and stored (e.g. temperature/cold conditions). Below 10°C [50°F] the expected battery lifetime is about 50-75% of that at 20°C [68°F].
- The use of the backlight and audible alarms.
- The quality of the battery (some lithium batteries may exhaust unexpectedly, which cannot be tested in advance).
- The time the dive computer has been stored until it gets to the customer. The battery is installed into the unit at the factory.

NOTE! Low temperature or an internal oxidation of the battery may cause the battery warning even though the battery has enough capacity. In this case, the warning usually disappears when the Dive Mode is activated again.

7. WARRANTY

NOTE! The warranty arrangements are different in different countries. The dive computer packaging contains information regarding the warranty benefits and requirements applicable to your purchase.

This SUUNTO dive computer 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:

The dive computer should be serviced or repaired only by an authorized SUUNTO dealer or distributor.

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 distributor 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 or distributor 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 representation is authorized to make any modifications to this warranty or to make any additional warranty.

Battery replacement is not covered by this warranty.

This Instruction Manual should be kept with your dive computer.

8. GLOSSARY

Altitude dive	A dive made at an elevation greater than 300 m [1000 ft] above sea level.
Ascent rate	The speed at which the diver ascends toward the surface.
ASC RATE	Abbreviation for ascent rate.
Ascent time	The minimum amount of time needed to reach the surface on 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.
Ceiling Zone	On a decompression dive the zone between the ceiling and the ceiling plus 1.8 m [6 ft]. This depth range is displayed with the two arrows pointing toward each other (the "hour glass" icon).
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 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".
DAN	Divers Alert Network.
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 dive computer indicates some nitrogen loading is present. When nitrogen loading reaches zero the dive computer 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

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.
NODEC 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%.
O2 %	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.
PO₂	Abbreviation for oxygen partial pressure.
RGBM	Abbreviation for Reduced Gradient Bubble Model.
Reduced Gradient Bubble Model	Modern algorithms for tracking both dissolved and free gas in the tissues of divers performing a wide variety of maneuvers.
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.

▲ SUUNTO

TWO YEAR WARRANTY

This product is warranted to be free of defects in material and/or workmanship to the original owner for the above noted period (does not include battery life). Keep a copy of the original purchase receipt and make sure to get this warranty card stamped at the place of purchase. The warranty originates from the date of purchase.

All warranties are limited and are subject to the restrictions given in the instruction manual. This warranty does not cover the damage to the product resulting from improper usage, improper maintenance, neglect of care, alteration, improper battery replacement or unauthorized repair.

Model of
Computer:

Serial
number:

Date of purchase_____

Place of purchase/Store name_____

Store City_____ Store Country_____

Store stamp with date of purchase

--

Name_____

Address_____

City_____ Country_____

Telephone_____ E-mail_____

Signature_____



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