

VYPER

USER'S GUIDE

Arrows:

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

Present Depth
Dive Counter

Logbook Symbol

Dive 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

Dive Planning Button
Scroll Button (increase value, ascend)

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

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

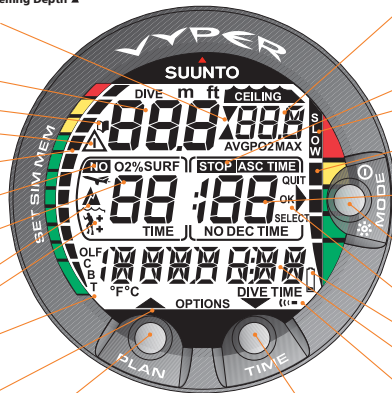
The Smart Button:
- Activation
- Backlight
- Mode Operations

Indicators for the Smart
Button

Low Battery Warning

Dive Time
Time
Month, Day

Daily/DiveTime/Depth
Alarm On Indicator



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1. WELCOME TO THE WORLD OF SUUNTO DIVE COMPUTERS




Suunto Vyper dive computer is designed to help you get the most out of your diving. The Vyper dive computer is a compact and sophisticated multipurpose dive instrument that will give you years of trouble-free and joyful diving.





The Suunto Vyper User's Guide contains vitally important information which enables you to become familiar with your Suunto wristop dive computer. To understand the use, displays, and limitations of the instrument before using it, please read this user's guide carefully, and save it for further reference. Note also that a glossary is included at the back of the user's guide to help you understand dive-specific terminology.

2. WARNINGS, CAUTIONS, AND NOTES

Throughout this user's guide, important safety icons are displayed. Three classifications are used to separate these icons 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 device*
-  **NOTE** *is used to emphasize important information*

Before you go on to read the user's guide itself, it is extremely important that you read the following warnings. These warnings are intended to maximize your safety while using Suunto Vyper and must not be ignored.

-  **WARNING** *YOU MUST READ the leaflet and user guide for your dive computer. Failure to do so may lead to improper use, serious injury or death.*
-  **WARNING** *ALLERGIC REACTIONS OR SKIN IRRITATIONS MAY OCCUR WHEN PRODUCT IS IN CONTACT WITH SKIN, EVEN THOUGH OUR PRODUCTS COMPLY WITH INDUSTRY STANDARDS. IN SUCH EVENT, STOP USE IMMEDIATELY AND CONSULT A DOCTOR.*

**WARNING**

NOT FOR PROFESSIONAL USE! Suunto dive computers are intended for recreational use only. The demands of commercial or professional diving may expose the diver to depths and conditions that tend to increase the risk of decompression illness (DCI). Therefore, Suunto strongly recommends that the device not be used for any commercial or professional diving activities.

**WARNING**

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

**WARNING**

THERE IS ALWAYS A RISK OF DECOMPRESSION ILLNESS (DCI) FOR ANY DIVE PROFILE EVEN IF YOU FOLLOW THE DIVE PLAN PRESCRIBED BY DIVE TABLES OR A DIVE COMPUTER. NO PROCEDURE, DIVE COMPUTER OR DIVE TABLE WILL PREVENT THE POSSIBILITY OF DCI OR OXYGEN TOXICITY! An individual's physiological make up can vary from day to day. The dive computer cannot account for these variations. You are strongly advised to remain well within the exposure limits provided by the instrument to minimize the risk of DCI. As an added measure of safety, you should consult a physician regarding your fitness before diving.

**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 SELECTED O₂% AND A MAXIMUM PO₂ OF 1.4 BAR! Exposure to greater depths increases the risk of oxygen toxicity and decompression illness.

**WARNING**

DIVES WITH REQUIRED DECOMPRESSION STOPS ARE NOT RECOMMENDED. YOU SHOULD ASCEND AND BEGIN DECOMPRESSION IMMEDIATELY WHEN THE DIVE COMPUTER SHOWS YOU THAT A DECOMPRESSION STOP IS REQUIRED! Note the blinking ASC TIME symbol and the upward pointing arrow.

**WARNING**

USE BACK-UP INSTRUMENTS! Ensure 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**

PERFORM PRE-CHECKS! Always activate and check the device before diving in order to ensure that all Liquid Crystal Display (LCD) segments are completely displayed, the device has not run out of battery power, and that the oxygen, altitude, personal, and Safety/Deep Stop are correct.



WARNING

YOU ARE ADVISED TO AVOID FLYING ANY TIME THE COMPUTER COUNTS DOWN THE NO-FLY TIME. ALWAYS ACTIVATE THE COMPUTER TO CHECK THE REMAINING NO-FLY TIME PRIOR TO FLYING! *Flying or traveling to a higher altitude within the no-fly time can greatly increase the risk of DCI. Review the recommendations given by Divers Alert Network (DAN). There can never be a flying after diving rule that is guaranteed to completely prevent decompression illness!*



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, the dive computer will give inaccurate information for subsequent dives. No dive computer can take into account dives made without the computer. Thus, any diving activity up to four days prior to initial use of the computer may cause misleading information and must be avoided.*



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. 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 PO_2 setting to affect oxygen exposure according to the entered $O_2\%$ and PO_2 values.



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 the decompression status. The dive computer is not intended for use at altitudes greater than 3000 m/10000 ft. Failure to select the correct Altitude Adjustment setting or diving above the maximum altitude limit will result in erroneous dive and planning data.



WARNING

SET THE CORRECT PERSONAL ADJUSTMENT MODE! Whenever it is believed that factors that tend to increase the possibility of DCI exist, it is recommended that you use this option to make the calculations more conservative. Failure to select the correct Personal Adjustment setting will result in erroneous dive and planning data.



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. If this Mandatory Safety Stop is not completed the decompression model will penalize your next dive(s).







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 during your decompression. In order to avoid doing so by accident, you should stay somewhat below the ceiling.*
-  **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** *DO NOT DIVE WITH A GAS IF YOU HAVE NOT PERSONALLY VERIFIED ITS CONTENTS AND ENTERED THE ANALYZED VALUE INTO YOUR DIVE COMPUTER! Failure to verify cylinder contents and enter the appropriate gas values where applicable into your dive computer will result in incorrect dive planning information.*
-  **WARNING** *Diving with gas mixtures exposes you to risks that are 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.*

**WARNING**

Traveling to a higher elevation can temporarily cause a change in the equilibrium of dissolved nitrogen in the body. It is recommended that you acclimatize to the new altitude by waiting at least three hours before diving.

**WARNING**

WHEN THE OXYGEN LIMIT FRACTION INDICATES THAT THE MAXIMUM LIMIT IS REACHED, YOU MUST IMMEDIATELY TAKE ACTION TO REDUCE OXYGEN EXPOSURE. Failure to take action to reduce oxygen exposure after the warning is given can rapidly increase the risk of oxygen toxicity, injury, or death

**WARNING**

Suunto also recommends that you receive training in Free diving techniques and physiology before conducting breath hold dives. No dive computer can replace the need for proper dive training. Insufficient or improper training may cause a diver to commit errors that may lead to serious injury or death.

**WARNING**

Using the Suunto Dive Planner software is not a substitute for proper dive training. Diving with mixed gases has dangers that are not familiar to divers diving with air. To dive with trimix, triox, heliox and nitrox or all of them, divers must have specialized training for the type of diving they are doing.

**WARNING**

Always use realistic SAC rates and conservative turn pressures during dive planning. Overly optimistic or erroneous gas planning can result in the exhaustion of breathing gas during decompression or in a cave or a wreck.

**WARNING**

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

**NOTE**

It is not possible to change between AIR, NITROX and GAUGE modes before the instrument has counted down the no-fly time. There is one exception to this: You can change from AIR to NITROX mode even during the no-fly time.

In GAUGE mode the no-fly time is always 48 hours.

3. SUUNTO USER INTERFACE

3.1. Navigating in the menus

Suunto Vyper multipurpose dive computer features three dive computer modes (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. 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.

The timekeeping display is the primary display of the instrument. 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.



Figure 3.1. Time keeping display. Press the PLAN or TIME button to activate the display.

3.2. Button symbols and functions

The list below explains the main functions of the dive computer's buttons. The buttons and their use is explained in more detail in the relevant sections of the user's guide.

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.

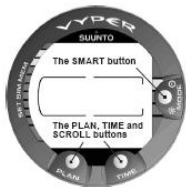


Figure 3.2. Push buttons of the dive computer.

SMART (MODE) button

- Activates the dive computer
- Switches from the Surface mode to menu based modes
- Selects, confirms or quits a submode (short press)
- Immediately exits any submode to the Surface mode (long press)
- Activates 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).

PLAN (arrow up) button

- Activates the timekeeping display, if the display is blank.
- Activates the Dive Planning in the Surface mode
- Makes a special bookmark in the profile memory during a dive
- Scrolls up the options (▲ increases values)

TIME (arrow down) button

- Activates the timekeeping display, if the display is blank.

- Activates the Time display(s) and/or alternative display(s).
- Scrolls down the options (▼decreases values)

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 Surface mode, press the **PLAN** button.

Menu modes: Press the **SMART (MODE)** button.

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

4. GETTING STARTED

To get the most out of your Suunto Vyper , use some time to personalize it and really make it YOUR computer. Set the correct time and date, the alarms, and backlight settings.

The main menu based functions are grouped under 1) memory, 2) dive simulation and 3) setting modes. User options for the Vyper are selected by using the push buttons. Pre Dive configuration and setup options include:

- Choice of operating mode - Air / Nitrox / Gauge
- Maximum depth alarm
- Dive time alarm
- Backlight settings
- Clock, calendar, daily alarm
- Mix Oxygen fraction % (Nitrox mode only)
- Maximum PO2 (Nitrox mode only)
- Altitude adjustment
- Personal adjustment

These options are introduced in more detail in *Section 4.1. SET MODES [3 SET]*.

THE LIST OF THE MENU BASED MODES

1. MEMORIES AND DATA TRANSFER [1 MEMORY]
 - Logbook and Dive Profile Memory [1 LOGBOOK]
 - Dive History Memory [2 HISTORY]
 - Data Transfer and PC-Interface [3 TR-PC]
2. SIMULATION MODE [2 SIMUL]
 - Dive Simulator [1 SIMDIVE]

- Dive Planning Simulator [2 SIMPLAN]
- 3. SET MODES [3 SET]
 - Dive Parameter Settings [1 SETDIVE]
 - Altitude Adjustment and Personal Adjustment Settings [1 AdJ MODE]
 - Dive Time Alarm Setting [2 d ALARM]
 - Maximum Depth Alarm Setting [3 MAX DPTH]
 - Nitrox/Oxygen Settings [4 NITROX]
 - Setting Time [2 SET TIME]
 - Adjusting Time [1 AdJ TIME]
 - Adjusting Date [2 AdJ DATE]
 - Adjusting Daily Alarm [3 T ALARM]
 - Setting Preferences [3 SET PREF]
 - Backlight Setting [1 LIGHT]
 - Dive Computer Model Setting [2 MODEL]

**NOTE**

The menu based modes cannot be activated until 5 minutes after the dive.

Memories and Data Transfer modes and Simulation Modes are introduced in *Section 7.4. Memories and Data Transfer [1 MEMORY]* and *Section 7.6. Simulation Mode [SIMUL]*.

Dive parameter settings are introduced in *Section 5.6. DIVE mode settings*.

THE USE OF THE MENU BASED FUNCTIONS

1. Activate the menu based modes by pressing once the SMART (MODE) button in the Dive Mode.



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

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.



Figure 4.2. Scroll the mode options by pressing the arrow up/ down buttons.

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).



NOTE

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. In the Simulation Mode, however, the equivalent time is 60 minutes.

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.

4.1. SET MODES [3 SET]

The Set Modes include dive configuration and setup options that have to be set before the dive. The Set Modes are divided into three submodes for setting the dive-related parameters, time related parameters and your personal preferences. In this section are introduced the time related parameters (Setting Time [2 SET TIME]) and personal preferences (Setting Preferences [3 SET PREF]). The dive-related parameters (Dive Parameter Settings [1 SET DIVE]) are introduced in more detail in *Section 5.6. DIVE mode settings*.



Figure 4.3. Setting Options [3 SET]

4.1.1. Setting Time [2 SET TIME]

To enter the Time Setting mode, select MODE- 3 SET- 2 SET TIME. The Time Setting mode has three options: 1 AdJ Time, 2 AdJ Date, and 3 T ALARM Daily Time Alarm.



Figure 4.4. Time Setting Mode [2 SET TIME]

Adjusting Time [1 AdJ TIME]

To enter the Time Setting mode, select MODE- 3 SET- 2 SET TIME- 1 AdJ TIME. 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.



Figure 4.5. Adjusting the Time setting.

Adjusting Date [2 AdJ DATE]

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



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.



Figure 4.6. Adjusting the Date setting mode [2 Adj DATE].

Adjusting Daily Alarm [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, select MODE- 3 SET- 2 SET TIME- 3 T ALARM. After entering this mode you are able to set the desired alarm time.



Figure 4.7. Adjusting the Daily Alarm setting mode [3 T ALARM]

4.1.2. Setting Preferences [3 SET PREF]

To enter the Setting Preferences mode, select MODE- 3 SET- 3 SET PREF. The Setting Preferences mode has two options: 1 LIGHT and 2 MODEL.

Backlight On Time Setting [1 LIGHT]

In the Backlight Setting 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 Setting mode, select MODE- 3 SET- 3 SET PREF- 1 LIGHT. After entering this mode you are able to set the desired backlight on time and to turn the backlight off or on.



Figure 4.8. Setting Backlight On Time. Press scroll buttons to change backlight on/off and to set time value.

Dive Computer Model Settings (Air/Nitrox/Gauge) [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.

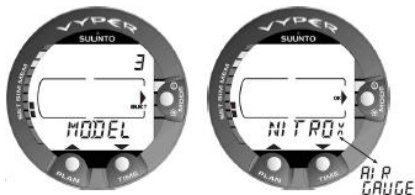


Figure 4.9. Setting Dive Computer model

4.2. AC water contacts

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

The water and data transfer contacts are located on bottom of the case. 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. The “AC” text will appear on display. The AC text will be shown until the water contact deactivates or the dive computer enters the Dive Mode automatically.

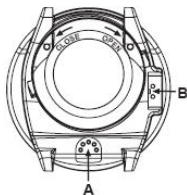


Figure 4.10. Depth sensor (A), water/data transfer contacts (B)

5. BEFORE DIVING

Do not attempt to use the dive computer without reading this user's guide in its entirety, including all the warnings. 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, Suunto Vyper is an outstanding tool for assisting properly trained, certified divers in planning and executing . It is **NOT A SUBSTITUTE FOR CERTIFIED SCUBA INSTRUCTION**, including training in the principles of decompression.

Do not attempt to dive with any gas mix other than standard air without first receiving certified training in this specialty.

5.1. The Suunto RGBM

Suunto's Reduced Gradient Bubble Model (RGBM), utilized in the Suunto Vyper, predicts both dissolved and free gas in the blood and tissues of divers. It is a significant advance on the classic Haldane models, which do not predict free gas. The advantage of Suunto RGBM is additional safety through its ability to adapt to a variety of situations and dive profiles.

In order to optimize the response to different increased risk situations, an additional category of stop, referred to as a Mandatory Safety Stop, has been introduced. The combination of stop types depends on the user settings and the specific dive situation. To get the most from the RGBM safety benefits, refer to *Section 10.2. RGBM*.

5.2. 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, follow these steps:

1. Assess the situation calmly and then move promptly to less than 18 m/60 ft.
2. At 18 m/60 ft, slow down your ascent rate to 10 m/33 ft per minute and move to a depth between 3 and 6 m/10 and 20 ft.
3. Stay there for as long as your air supply will safely allow. After reaching the surface, do not dive for at least 24 hours.

5.3. 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 theoretical mathematical models, which are intended to serve as a guide to reduce the probability of decompression illness.

5.4. Audible and visual alarms

The dive computer has audible and visual alarms that advise when important limits are approached or that prompt you to acknowledge preset alarms. The table below describes the different alarms and their meanings.

The **visual information** on the dive computer display is shown during the alarm breaks in order to save battery.

Table 5.1. Audible and visual alarm types

Alarm type	Alarm reason
Short single beep	<p>Dive computer is activated.</p> <p>Dive computer automatically returns to the TIME mode.</p>
Three single beeps with a two second interval and activated backlight for five (5) seconds	No-decompression dive turns into a decompression stop dive. An arrow pointing upwards and the blinking ascent warning ASC TIME appears.
Continuous beeps and activated backlight for five (5) seconds	<p>Maximum allowed ascent rate, 10 m per min/33 ft per min, is exceeded. A SLOW and STOP warnings appears.</p> <p>The Mandatory Safety Stop ceiling is exceeded. A downward pointing arrow appears.</p> <p>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.</p>

Table 5.2. Preset alarm types

Alarm type	Alarm reason
<p>Continuous beep series for 24 seconds or until any button is pressed.</p> <p>Maximum depth blinks as long as the current depth value exceeds the preset value.</p>	<p>Preset maximum depth has been exceeded.</p>
<p>Continuous beep series for 24 seconds or until any button is pressed.</p> <p>Dive time blinks for one minute if no button is pressed.</p>	<p>Preset dive time has been exceeded.</p>
<p>Continuous beep series for 24 seconds or until any button is pressed.</p> <p>Current time blinks for one minute if no button is pressed.</p>	<p>Preset alarm time is reached.</p>

Table 5.3. Oxygen alarms in NITROX mode

Alarm type	Alarm reason
Three double beeps and the backlight for five (5) seconds	<p>The OLF bar graph reaches 80%. The segments exceeding the 80% limit start to blink.</p> <p>The OLF bar graph reaches 100%. The OLF value will blink. The blinking of the segments exceeding 80% will stop, when the OLF is not loading anymore. At that point the PO₂ is less than 0.5 bar.</p>
Continuous beeps for three (3) minutes and activated back-light for five (5) seconds	Set oxygen partial pressure limit is exceeded. The alternative display is replaced with a current blinking PO ₂ value. You should immediately ascend above the PO ₂ depth limit.



NOTE

When the backlight is turned OFF, it does not illuminate when an alarm is activated.



WARNING

WHEN THE OXYGEN LIMIT FRACTION INDICATES THAT THE MAXIMUM LIMIT IS REACHED, YOU MUST IMMEDIATELY TAKE ACTION TO REDUCE OXYGEN EXPOSURE. Failure to take action to reduce oxygen exposure after the warning is given can rapidly increase the risk of oxygen toxicity, injury, or death.

5.5. Error conditions

The dive computer has warning indicators that alert you to react to certain situations that would significantly increase the risk of DCI. If you do not respond to its warnings, the dive computer will enter an Error mode, indicating that the risk of DCI has greatly increased. If you understand the dive computer and operate it sensibly, it is very unlikely you will ever put the instrument into the Error mode.

Omitted decompression

The Error mode results from omitted decompression, for example, 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 enters a permanent Error mode. The instrument will continue to function normally if you descend below the ceiling within this three-minute period.

When the dive computer is in the permanent Error mode, only the Er warning is shown in the center window. The dive computer does not show times for ascent or stops. However, all the other displays function as before to provide information for ascent. You must 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.

After surfacing, you should not dive for a minimum of 48 hours. During the permanent Error mode, the Er text is displayed in the center window and the planning mode is disabled.

5.6. DIVE mode settings

Suunto Vyper has several user-definable functions, as well as depth and time-related alarms that you can set according to your personal preferences. The DIVE mode settings are dependent on the dive submode chosen (AIR, NITROX, GAUGE), so that, for example, settings are only available in the submode.

The Set Modes [3 SET] include dive configuration and setup options that have to be set before the dive. The Set Modes are divided into three submodes for setting the dive-related parameters, time related parameters and your personal preferences.

Time related parameters [2 SET TIME] and personal preferences [3 SET PREF] are introduced in *Section 4.1. SET MODES [3 SET]*.

To enter the Dive Parameter Setting Mode, select MODE- 3 SET- 1 SET DIVE. The Dive Parameter Setting mode [1 SET DIVE] 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.

The figure below shows how to enter the DIVE mode settings menu.



NOTE

Some settings cannot be changed until five (5) minutes has elapsed after the dive.

5.6.1. Setting the personal/altitude adjustments [1 AdJ MODE]

The current Altitude and Personal Adjustment settings are displayed in the startup screen when diving at the surface. If the mode does not match the altitude or personal conditions (refer to *Section 5.7.4. Diving at altitude* and *Section 5.7.5. Personal adjustments*), it is imperative that you enter the correct selection before diving. Use Altitude Adjustment to select the correct altitude and use Personal Adjustment to add an extra level of conservatism.

To enter the Altitude Adjustment and Personal Adjustment Setting mode, select MODE-3 SET-1 SET DIVE-1 AdJ MODE. Now you are able to select from the three altitude modes and the three personal modes.

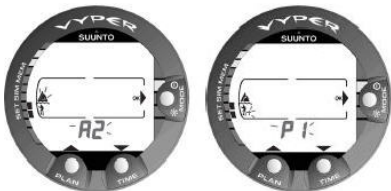


Figure 5.1. Setting Altitude adjustment and Personal adjustment. Press the scroll buttons to change the altitude mode.

5.6.2. Setting the dive-time alarm [2 d ALARM]

The Dive Time Alarm setting [2 d ALARM] can be activated and used for several purposes to add to your diving safety.

To enter the Dive Time Alarm Setting mode, select MODE- 3 SET- 1 SET DIVE- 2 d ALARM.



Figure 5.2. Setting Dive Time Alarm. Press scroll buttons to change alarm on/off and to set dive time value.

NOTE

With a range of 1–999 minutes, the alarm can be set to your planned bottom time, for example.

5.6.3. Setting the maximum depth alarm [3 MAXDPTH]

The depth alarm is set to 40 m [131 ft] at the factory, but you are able to adjust it according to 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].

To enter the Maximum Depth Alarm Setting, select MODE- 3 SET- 1 SET DIVE- 3 MAXDPH.



Figure 5.3. Setting Maximum Depth Alarm. Press scroll buttons to change alarm on/off and to set maximum depth value.

5.6.4. Setting the nitrox values [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 addition, the oxygen partial pressure limit must be set. When in the NITROX setting mode, the maximum operating depth (MOD), based on the chosen setting, will also be displayed.

To enter the Nitrox/Oxygen Setting mode, select MODE- 3 SET- 1 SET DIVE- 4 NITROX. The default oxygen percentage ($O_2\%$) setting is 21% (air) and oxygen partial pressure (PO_2) setting 1.4 bar.



Figure 5.4. Setting Oxygen Percentage and Partial Pressure. The equivalent maximum depth is displayed as 32.8 m / 107 ft. Press scroll buttons to change oxygen percentage and to set oxygen partial setting value.

5.7. Activation and pre-checks

This section describes how to activate the DIVE mode and explains the pre-checks that it is highly recommended you perform before you get into the water.

5.7.1. Accessing DIVE mode

The Suunto Vyper has three diving modes: AIR mode for diving with standard air only, NITROX mode for diving with oxygen enriched mixtures, and GAUGE mode for use as a bottom timer.

5.7.2. DIVE mode activation

The dive computer activates automatically when submerged deeper than 0.5 m/1.5 ft. **However, it is necessary to activate the DIVE mode BEFORE diving to check the altitude and personal adjustment settings, battery condition, oxygen settings, and so on.** Press the SMART (On) button to activate the instrument.



Figure 5.5. Startup I. All segments shown.

After activation, all display elements will turn on showing mostly figure 8's and graphical elements. A few seconds later the battery power indicator is shown, and the backlight and the buzzer are activated. If set to Air mode, the screen will enter the Surface mode. If set to Gauge mode, the text GAUGE is shown, and if set to Nitrox mode, the essential oxygen parameters are shown with the text "NITROX" before the Surface mode.



Figure 5.6. Startup II. Battery power indicator.

At this time, perform your pre-checks, and ensure that:

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

And, if set to NITROX mode, ensure that:

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

The dive computer is now ready for diving.



NOTE

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

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, unless you press any buttons or start a dive.

5.7.3. Battery power indication

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.

Temperature or internal oxidation of the battery affect the battery voltage. If the instrument is stored for a long period, or used in cold temperatures, the low battery warning may be displayed even though the battery has enough capacity. In these cases, re-enter DIVE mode to receive the battery power indication.

After the battery check, the low battery warning is indicated by the battery symbol.



Figure 5.7. Low Battery Warning. Battery symbol indicates that the battery is low and battery replacement is recommended.

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 battery replacement is recommended.



NOTE




For safety reasons, the backlight cannot be activated when the low battery warning is indicated by the battery symbol.

5.7.4. Diving at altitude

The dive computer can be adjusted both for diving at altitude and also to increase the conservatism of the mathematical nitrogen model.

When programming the instrument for the correct altitude, you need to select the correct Altitude Adjustment settings according to *Table 5.4, Altitude Adjustment settings*. The dive computer will adjust its mathematical model according to the entered altitude setting, giving shorter no-decompression times at higher altitudes.

Table 5.4. Altitude Adjustment settings

Alt. adjustment value	Symbol on display	Altitude range
A0		0–300 m / 0–1000 ft
A1		300–1500 m / 1000–5000 ft
A2		1500–3000 m / 5000–10 000 ft



NOTE

Section 5.6.1. Setting the personal/altitude adjustments [1 Adj MODE] describes how the Altitude value is set.



WARNING

Traveling to a higher elevation can temporarily cause a change in the equilibrium of dissolved nitrogen in the body. It is recommended that you acclimatize to the new altitude by waiting at least three (3) hours before diving.

5.7.5. Personal adjustments




There are personal factors that can affect your susceptibility to DCI, which you can predict in advance, and input into the decompression model. Such factors vary between divers and also for the same diver from one day to another. There is available a three-step Personal Adjustment setting if a more conservative dive plan is desired, and a two-step adjustment for RGBM effect on repetitive dives for very experienced divers.

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

- cold exposure —water temperature less than 20 °C/68 °F
- below average physical fitness level
- fatigue
- dehydration
- previous history of DCI
- stress
- obesity
- patent foramen ovale (PFO)
- exercise on or after dive

This feature is used to adjust the computer to be more conservative, according to personal preference, by entering the suitable Personal Adjustment setting with the help of *Table 5.5, Personal Adjustment settings*. In ideal conditions, retain the default setting, P0. If conditions are more difficult, or any of the factors which tend to increase the possibility of DCI exist, select P1, or even the most conservative P2. The dive computer then adjusts its mathematical model according to the entered Personal Adjustment setting, giving shorter no-decompression times.

Table 5.5. Personal Adjustment settings

Personal adjustment value	Sym- bol on Dis- play	Condition	Desired tables
P0		Ideal conditions	Default
P1		Some risk factors or conditions exist	Progressively more conservative
P2		Several risk factors or conditions exist	

5.8. Safety Stops

Safety Stops are widely considered good diving practice for recreational diving, and are an integral part of most dive tables. The reasons for performing a Safety Stop include: reducing sub-clinical DCI, microbubble reduction, ascent control, and orientation before surfacing.

The Suunto Vyper displays two different types of Safety Stops: Recommended Safety Stop and Mandatory Safety Stop.

The Safety Stops are indicated by:

- STOP label, when in the depth range 3–6 m/10–20 ft = Recommended Safety Stop Countdown

- STOP + CEILING label, when in the depth range 3–6 m/10–20 ft = Mandatory Safety Stop Time display
- STOP label, when deeper than 6 m = Mandatory Safety Stop scheduled

5.8.1. Recommended Safety Stops

With every dive over 10 meters, there is a three-minute countdown for the Recommended Safety Stop, to be taken in the 3–6 m/10–20 ft range. This is shown with the STOP sign and a three-minute countdown in the center window instead of the no-decompression time.



Figure 5.8. Ascent rate indicator. Two segments.

NOTE

The Recommended Safety Stop, as the name implies, is recommended. If it is ignored, there is no penalty applied to the following surface intervals and dives.

5.8.2. Mandatory Safety Stops

When the ascent rate exceeds 10 m/33 ft per minute continuously for more than five (5) seconds, the microbubble build-up is predicted to be more than is allowed for in the decompression model. The Suunto RGBM calculation model responds to this by adding a Mandatory Safety Stop to the dive. The time of this Mandatory Safety Stop depends on the severity of the ascent rate excess.

The STOP sign is shown in the display and when you reach the depth zone between 6 m and 3 m/20 ft and 10 ft, the CEILING label, ceiling depth, and the calculated Safety Stop time also appear in the display. Wait until the Mandatory Safety Stop warning disappears. 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.



Figure 5.9. 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. Press the TIME button to view the alternative display.

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. You should immediately descend to, or below, the Mandatory Safety Stop ceiling depth. If you correct this situation at any time during the dive, there are no effects on the decompression calculations for future dives.

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 that you prolong your surface interval time before your next dive.

6. DIVING

This section contains instructions on how to operate the dive computer and interpret its displays. The dive computer is easy to use and read. Each display shows only the data relevant to that specific diving mode.

6.1. Diving in AIR mode

This section contains information on diving with standard air. To activate the DIVE Air mode, please refer to *Section 5.7.1. Accessing DIVE mode.*



Figure 6.1. The dive has just began.



NOTE

The dive computer will remain in the SURFACE mode at depths less than 1.2 m/4 ft. At depths greater than 1.2 m/4 ft the instrument will go into the DIVE mode automatically. However, it is recommended that you activate the SURFACE mode manually before entering the water in order to perform the necessary dive pre-checks.

6.1.1. Basic dive data

During a No-decompression dive, the following information is displayed:

- your present depth in meters/feet
- the Altitude Adjustment setting on the left side of the center window with a wave and mountain symbols (A0, A1, or A2) (see *Table 5.4, Altitude Adjustment settings.*)
- the Personal Adjustment setting on the left side of the center window with a diver symbol and + signs (P0, P1, or P2) (see *Table 5.5, Personal Adjustment settings.*)
- the maximum depth during this dive in meters/ft, indicated as MAX
- the water temperature followed by °C for Centigrade /°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.



Figure 6.2. Diving display. Present depth is 19.3 m /63 ft and nodecompression stop time limit is 23 minutes in A0/P1 mode. Maximum depth during this dive was 19.8 m/65 ft, elapsed dive time is 16 minutes. The current time 10:20 [10:20 am] is shown for 5 seconds after pressing the TIME button.

Alternative displays, by pressing the TIME button, show:

- the current time, shown as TIME



NOTE

In Dive Mode the TIME display automatically changes back to DIVE TIME.

6.1.2. Bookmark

It is possible to make special marks in the profile memory during a dive. These Bookmarks will be shown as a 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.



Figure 6.3. Diving display. An annotation, Bookmark, is done in the profile memory during a dive by pressing the PLAN button. Note the Logbook symbol.

6.1.3. 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. 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 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 stop time 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 stop time has become zero and your dive has become a decompression stop dive (for more information see *Section 6.1.5. Decompression dives*).

6.1.4. Ascent rate indicator

The ascent rate is displayed graphically along the right hand side with a vertical bar. 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 current ascent rate is significantly above the allowed rate.

Table 6.1. Ascent rate indicator

Ascent rate indicator	The equivalent ascent speed
No segment	Below 4 m/min / 13 ft/min
One segment	4–6 m/min / 13–20 ft/min
Two segments	6–8 m/min / 20–26 ft/min
Three segments	8–10 m/min / 26–33 ft/min
Four segments	10–12 m/min / 33–39 ft/min
Four segments, the SLOW segment, blinking depth reading, the STOP sign and an audible alarm	Above 12 m/min / 39 ft/min or continuously 10 m/min / 33 ft/min

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, you should immediately slow down your ascent. When you reach the depth zone between 6 m to 3 m /20 ft to 10 ft, the STOP and CEILING depth labels will advise you to make a Mandatory Safety Stop. Wait until the warning disappears. You should not ascend shallower than 3 m/10 ft with the Mandatory Safety Stop warning on.



Figure 6.4. 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.

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. If this Mandatory Safety Stop is not completed, the decompression model will penalize your next dive(s).

6.1.5. Decompression dives

When your NO DEC TIME becomes zero, your dive changes into a decompression dive. Therefore, you must perform one or more decompression stops on your way to the surface. The NO DEC TIME on your display will be replaced by an ASC TIME, and a CEILING notation will appear. An upward pointing arrow will also prompt you to start your ascent.



Figure 6.5. Decompression dive.

If you exceed the no-decompression limits on a dive, the dive computer will provide the 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 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 three (3) minute Recommended Safety Stop
- the time needed to ascend to the ceiling at an ascent rate of 10 m/33 ft per minute. The ceiling is the shallowest depth to which you should ascend.
- the time needed at the ceiling
- the time needed at the Mandatory Safety Stop (if any)
- the time needed to reach the surface after the ceiling and Safety Stops have been completed



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/33 ft per minute or*
- *make your decompression stop deeper than at the ceiling*

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

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 all stops.
- The ceiling zone is the optimum decompression stop zone. It is the zone between the minimum ceiling and 1.4m/6 ft below the minimum ceiling.
- The floor is the deepest depth at which the decompression stop time will not increase. 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.

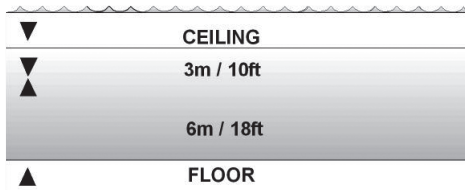


Figure 6.6. Ceiling and Floor zone. Recommended and Mandatory Safety Stop zone between 6 m and 3 m/20 ft and 10 ft.

The depth of the ceiling and floor depends 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 upwards while you are decompressing.

When conditions are rough, it may be difficult to maintain a constant depth near the surface. In such cases, it is more manageable to maintain an additional distance below the ceiling, to ensure 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.



WARNING

NEVER ASCEND ABOVE THE CEILING! You must not ascend above the ceiling during your decompression. In order to avoid doing so by accident, you should stay somewhat below the ceiling.

Display below the floor

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



Figure 6.7. Decompression dive, below floor. Upward pointing arrow, blinking ASC TIME label and an audible alarm tell you to ascend. Minimum total ascent time including safety stop is 7 minutes. Ceiling is at 3 m/10 ft.

Display above the floor

When you ascend above the floor, the ASC TIME sign stops blinking and the upward pointing arrow disappears. Below is an example of a decompression dive above the floor.



Figure 6.8. 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.

Decompression will now begin, but is very slow. Therefore, you should continue your ascent.

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). Below is an example of a decompression dive at the ceiling zone.



Figure 6.9. Decompression dive, at ceiling zone. Two arrows point at each other (“hour glass”). You are in the optimum ceiling zone at 3.5 m/11 ft and your minimum ascent time is 5 minutes. Pressing TIME button activates alternative display.

During the decompression stop, ASC TIME will count down towards zero. When the ceiling moves upwards, you can ascend to the new ceiling. You may surface only after the ASC TIME and CEILING labels have disappeared, which means that the decompression stop and any Mandatory Safety Stop have been completed. You are advised, however, to stay until the STOP sign has also disappeared. This indicates that the three (3) minute Recommended Safety Stop has also been completed.

Display above the ceiling

If you ascend above the ceiling during a decompression stop, a downward pointing arrow will appear and a continuous beeping starts.



Figure 6.10. Decompression dive, above ceiling. Note a downward pointing arrow, an Er warning and an audible alarm. You should immediately (within 3 minutes) descend to or below ceiling.

In addition, an Error warning (Er) reminds you that you have only three (3) minutes to correct the situation. You must immediately descend to, or below, the ceiling.

If you continue to violate the decompression, the dive computer will go 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 (refer to *Section 5.5. Error conditions*).

6.2. Diving in NITROX mode

This dive computer can be set for diving with standard air only (Air mode) or it can be set for diving with Enriched Air Nitrox (EANx) (Nitrox mode).

6.2.1. Before diving in the NITROX mode

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 accordingly. 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%. If you want to adjust the computer to provide more conservative calculations, use the personal adjustment feature to affect decompression calculations, or reduce the PO_2 setting to affect oxygen exposure according to the entered $O_2\%$ and PO_2 values. Calculations based on nitrox use result in longer no-decompression times and shallower maximum depths than diving with air.

When the dive computer is set in NITROX mode, the Dive Planning mode calculates using the $O_2\%$ and PO_2 values that are currently in the computer.

Default nitrox settings

In the NITROX mode, the default setting is standard air (21% O_2). It remains in this setting until the $O_2\%$ is adjusted to any other percentage of oxygen (22%–50%). The default setting for maximum oxygen partial pressure is 1.4 bar, however you are able to set it in the range of 1.2–1.6 bar.

If unused, the computer will retain the manually entered value for the selected oxygen percentage for about two hours, after which it will revert to the default setting of 21% O_2 .

6.2.2. Oxygen displays

When the NITROX mode is activated, the display will show the information in the figure below. In the NITROX mode, the maximum operational depth is calculated based on set $O_2\%$ and PO_2 values.

If set to the NITROX mode, the Suunto will additionally show on the alternative display:

- the oxygen percentage, labeled $O_2\%$
- the set oxygen partial pressure limit, labeled PO_2
- the current oxygen toxicity exposure, labeled OLF%
- maximum depth allowed based on the set oxygen percentage and partial pressure limit



Figure 6.11. Nitrox display. Maximum depth based on set $O_2\%$ (21%) and PO_2 (1.4 bar) is 54.1 m/177 ft.

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. 3.22. and Fig. 3.23.). The $O_2\%$ is shown until the remaining air time is less than 30 minutes. After this, the remaining air time is displayed in its place. 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.



Figure 6.12. Oxygen partial pressure and OLF displays. There is an audible alarm as oxygen partial pressure is greater than 1.4 bar or set value, and/or the OLF has reached 80% limit.

By pressing the TIME button during a nitrox dive, the alternative display appears, which includes:

- current time
- temperature
- Consumed Bottom Time

- maximum depth (during decompression stop dive)



Figure 6.13. Alternative display. Pressing the TIME button displays the current time, maximum depth and CBT.

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

6.2.3. Oxygen limit fraction (OLF%)

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

The dive computer calculates separately for Central Nervous System oxygen toxicity (CNS) and Pulmonary Oxygen toxicity, the latter measured by the addition of Oxygen Toxicity Units (OTU). Both fractions are scaled so that the maximum tolerated exposure for each is expressed as 100%.

The Oxygen Limit Fraction (OLF) has 11 segments, each representing 10%. The Oxygen Limit Fraction (OLF%) displays only the value of the higher of the two calculations. The oxygen toxicity calculations are based on the factors listed in *Section 10.3. Oxygen exposure*.

When the OTU value meets and exceeds the CNS value then in addition to displaying its percentage the lowest segment blinks to indicate that the value shown relates to OTU.



Figure 6.14. The lowest bar graph blinks to indicate that the OLF value shown relates to OTU.

6.3. Diving in the GAUGE mode

If set to Gauge mode, the dive computer can be used for diving with technical diving mixed gases. If you are trained for technical diving and you plan to use Gauge mode on a regular basis, it may be preferable to set the instrument permanently to its Gauge mode. If set to Gauge mode, the text GAUGE is shown after activation. In the Gauge mode the present depth, maximum depth, dive time, remaining air time and ascent rate indicator are displayed during the dive. In addition, temperature and current time are shown in the alternative display.



Figure 6.15. The Gauge mode. The present depth, maximum depth, dive time, remaining air time and ascent rate indicator are displayed during the dive.

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



NOTE

The mode does not provide decompression information.






NOTE

If you dive with the GAUGE mode, it is not possible to change between the modes before the no fly time has counted down.

7. AFTER DIVING

Once back at the surface, Suunto Vyper continues to provide post-dive safety information and alarms. Calculations to enable repetitive dive planning also help to maximize diver safety.

Table 7.1. Alarms

Symbol on display	Indication
	Diver Attention Symbol - Extend Surface Interval
	Violated Decompression Ceiling or Too Long Bottom Time
	Do Not Fly Symbol

7.1. Surface interval

An ascent to any depth shallower than 1.2 m/4 ft will cause the DIVE display to be replaced by the SURFACE display:



Figure 7.1. 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 diver attention symbol indicates that you should prolong your surface interval time.

- maximum depth of last dive in meters/feet
- dive time of last dive in minutes, shown as DIVE TIME
- present depth in meters/feet
- no-flying warning indicated by an airplane icon
- Altitude Adjustment setting
- Personal Adjustment setting
- Diver attention symbol indicates if you should prolong your surface interval time
- STOP label for 5 min, if the Mandatory Safety Stop was violated
- Er, if the decompression ceiling was violated (= Error Mode)
- the current temperature in °C/°F



Figure 7.2. Surface interval, the surface time and no-flying time displays: Pressing the TIME button once the surface time display is shown and by pressing the TIME button twice the no-flying time display is shown, indicated by the airplane symbol.

Or when the TIME button is pressed once or twice:

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

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

- the oxygen percentage labeled O₂%
- the current oxygen toxicity exposure labeled OLF%

7.2. Dive numbering

Several repetitive dives are considered to belong to the same repetitive dive series when the dive computer has not counted the no-fly 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, and so on.

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

7.3. Flying after diving

In the DIVE mode, the no-fly time is displayed in the center window next to the airplane image. In the TIME mode, the airplane image is shown in the top left corner. Flying or traveling to a higher altitude should be avoided at any time when the computer is counting down the no-fly 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-fly 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-fly time is 48 hours.

The Divers Alert Network (DAN) recommends the following on no-fly times:

- 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 2,400 m/8,000 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 a flight. Further, the Undersea and Hyperbaric Medical Society (UHMS) suggests divers using standard air cylinders and exhibiting no symptoms of decompression illness wait 24 hours after their last dive to fly in an aircraft with cabin pressure up to 2,400 m/8,000 ft. The only two exceptions to this recommendation are:
 - If a diver has less than two (2) hours total accumulated dive time in the last 48 hours, 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, as well as the dive computer's no-fly conditions, are satisfied.

7.4. Memories and Data Transfer [1 MEMORY]

The memory options for this dive computer include the combined Logbook and Dive Profile Memory, Dive History Memory and the Data Transfer and PC-Interface functions. The dive entry time and date is registered in the Logbook memory. Always check before diving that the time and date are correctly set, especially after travelling between different time zones.



Figure 7.3. Memory options [3 MEMORY].

7.4.1. Logbook and Dive Profile Memory [1 LOGBOOK])

The Suunto Vyper has a very sophisticated, high capacity Logbook and Profile Memory. The data is recorded in the profile memory based on the selected sample rate.

Dives shorter than the recording interval are not registered.

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 END text is displayed between the oldest and most recent dive. The following information will be shown on three pages:



Figure 7.4. Logbook, end of the memory. END text is displayed between oldest and the most recent dive.

Page I, main display

- date of dive
- dive start time
- dive number



Figure 7.5. Logbook, page I. Scroll different pages of specific dive.

Page II

- 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
- dive number in the dive series
- 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
- ASC TIME label, if the dive was a decompression stop dive
- Diver 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)



Figure 7.6. Logbook, page II. Main dive related data.

Page III

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



Figure 7.7. Logbook, page III. Surface interval time and average depth.

Page IV

- dive number in the dive series
- the profile of the dive profile, automatic scrolling during which:
logbook symbol blinks 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



Figure 7.8. Logbook, page IV. Profile of a specific dive.

Press the SMART (Select) button once to change the scroll buttons to scroll the different dives forward and backward. 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 1 is shown. The END text is displayed between the oldest and the most recent dive.



NOTE

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 when the battery is changed (providing that the battery has been replaced according to the instructions).



NOTE

Several repetitive dives are considered to belong to the same repetitive dive series if the no-fly time has not ended. See Section 7.2. Dive numbering for further information.

Dive Profile memory [PROF]

The scrolling of the profile will start automatically when the Logbook page IV (PROF) is entered. With the default setting, the dive profile is recorded and displayed in 20-second increments 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.

7.4.2. 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.



Figure 7.9. Dive History Memory Mode. [2 HISTORY]

The following information will be shown on the display:



Figure 7.10. Dive History information. Total number of dives, dive hours and maximum depth.

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 zero.



NOTE

The maximum depth can be reset to 0.0 m/0 ft using the PC Interface unit and the downloadable Suunto Dive Manager software.

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

The Suunto DM4 with Movescount (DM4) is an optional software that greatly enhances the functionality of your Suunto Vyper. With the DM4 software, you can download dive data from your dive computer to your laptop. After that, you can view and organize all the data recorded with your Suunto . You can plan dives (with Suunto Dive Planner), print copies of your dive profiles, and also upload your dive logs to share with your friends at <http://www.movescount.com> (see *Section 7.5. Movescount*). You can always download the latest version of the DM4 from <http://www.suunto.com>. Please check for updates regularly as new features are constantly being developed. The following data is transferred from your dive computer to your laptop (optional, cable required):

- depth profile of the dive
- dive time
- preceding surface interval time
- dive number
- dive start time (year, month, day, and time)
- dive computer settings
- oxygen percentage settings and maximum OLF (in the mode)
- tissue calculation data
- additional dive information (for example, SLOW and Mandatory Safety Stop violations, Diver Attention Symbol, Bookmark, Surfaced Mark, Decompression Stop Mark, and Ceiling Error Mark)
- dive computer serial number
- personal information (30 characters)

By using the DM4, you are able to enter setup options such as:

- input a personal, 30-character field into the Suunto instrument.

- reset the Scuba History's maximum depth to zero
- manually add comments, multimedia and other personal information to the PC-based dive data files
- change the sample rate for profile records/logbook from the default 20 second interval to 10, 30 or 60 seconds

To enter the Data Transfer mode, select MODE- 1 MEMORY- 3 TR - PC.



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. If a button is not pressed or no data is transferred within 5 minutes, the instrument beeps and returns to the timekeeping display automatically

7.5. Movescount

Movescount is an online sports community that offers you a rich set of tools to manage all you sports and create engaging stories about your diving experiences. Movescount offers you new ways to get inspired and share your best dives with other community members!

To connect to Movescount:

1. Go to www.movescount.com.
2. Register and create your free Movescount account.
3. Download and install the Suunto DM4 with Movescount software from the Movescount.com website if you do not already have the DM4 installed on your laptop

To transfer data:

1. Connect your dive computer to your laptop.
2. Download your dives to the DM4 on your laptop.
3. Follow the instructions on the DM4 on how to transfer your dives to your Movescount.com account.

7.6. Simulation Mode [SIMUL]

The Simulation mode can be used to acquaint yourself with the features and displays of the instrument before diving, to plan dives in advance, for demonstration or education purposes, or just for pleasure.

The dive computer has two simulation modes:

- The DIVE SIMULATOR
- The DIVE PLANNING SIMULATOR



Figure 7.11. Dive Simulation options [2 SIMUL]

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

7.6.1. Dive Simulator [1 SIMDIVE]

The Dive Simulator mode is an excellent tool for becoming familiar with the dive computer and planning your dives. Suunto recommends using the dive simulator to run through different dive scenarios. 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 SIMDIVE.



Figure 7.12. Dive Simulator mode [1 SIMDIVE]. Descend by pressing the arrow down (TIME) button and ascend by pressing the arrow up (PLAN) button.

7.6.2. Dive Planning Simulator [2 SIMPLAN]

The Dive Planning Simulator mode shows you the present no-decompression limits. In this mode, you are also 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 intervals for dive simulations. Add the desired surface interval increment to present surface interval by pressing the arrow down (TIME) and arrow up (PLAN) buttons.

To enter the Dive Planning Simulator mode select MODE- 2 SIMUL- 2 SIMPLAN.



Figure 7.13. Dive Planning Simulator mode [2 SIMPLAN]. Add desired surface interval increment (to present shown surface interval) by pressing TIME and PLAN buttons. This display is only shown for repetitive dives.



NOTE

This display is only shown for repetitive dives.

**NOTE**

The Dive Planning Simulator mode is disabled in Gauge mode and in Error mode.

8. CARE AND MAINTENANCE OF MY SUUNTO DIVING COMPUTER

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



WARNING

The built-in depth sensor 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.

- **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 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, which may create an 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.

- **CARE OF YOUR DIVE COMPUTER**

- NEVER try to open the case of the dive computer.

- Have your dive computer serviced 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 service. Do not attempt to do any servicing that you are not sure of.
- Should moisture appear inside the case, immediately have the instrument checked by your SUUNTO dealer or distributor.
- Should you detect scratches, cracks or other such flaws on the display that may impair its durability, immediately have it replaced 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, and so on. Chemical reactions with such agents will damage the 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.
- 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.

- **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 for possible moisture or water. **DO NOT** use the dive computer if you detect any moisture or water inside. Contact an authorized Suunto dealer for battery replacement or other service.

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.
- **WATER RESISTANCE INSPECTION**

The water resistance of the unit must be checked after replacing the battery or after other service operations. The check requires special equipment and training. You must frequently check 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 unless the instructions of this manual are carefully followed. In the event of a leak, immediately take the dive computer to an authorized SUUNTO dealer or distributor.

FAQs

For more information on service, please refer to FAQs on www.suunto.com.

9. BATTERY REPLACEMENT



NOTE

It is advisable to contact an authorized Suunto representative 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

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

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

9.1. 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.

9.2. Required tools

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

9.3. Replacing the battery

The battery and the buzzer are located in the back of the instrument in a separate compartment. To change the battery:

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 and turn the ring clockwise. Be careful not to damage any of the parts.
 4. Remove the ring.
 5. Carefully remove the lid with the beeper attached to it. You can remove the lid by pressing with your finger on the outermost edge of the lid while simultaneously pulling with your nail at the opposite side. Don't 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.
8. 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.
9. 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.
10. Check that the battery compartment, battery holder and lid are clean. Clean with soft cloth if necessary.
11. 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.
12. Reinstall the battery retainer in its correct position.
13. 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.
14. 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.
15. 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!
16. Turn the locking ring counterclockwise with your free thumb and fingers until it snaps into its locked position.
17. The dive computer should now active its 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.
18. 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.



Figure 9.1. Opening of the securing ring.

10. TECHNICAL DATA

10.1. Technical specifications

Dimensions and weight:

- Diameter: 61.0 mm/2.4 in
- Thickness: 28 mm/1.1 in
- Weight: 68 g/2.4 oz

Depth gauge:

- Temperature compensated pressure sensor
- Calibrated complying with EN 13319
- Maximum depth of operation: 80 m/262 ft (complying with EN 13319)
- Accuracy: $\pm 1\%$ of full scale or better from 0 to 80 m/262 ft at 20°C/68°F (complying with EN 13319)
- Depth display range: 0 to 150 m/492 ft
- Resolution: 0.1 m from 0 to 100 m/1 ft from 0 to 328 ft

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

Temperature display:

- Resolution: 1°C/1°F

- Display range: -9 to +50°C/-9 to +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

Displays only in NITROX mode:

- Oxygen %: 21–50
- Oxygen partial pressure display: 1.2–1.6 bar.
- Oxygen Limit Fraction: 1–110% with 10% resolution (bar graph)

Logbook/dive profile memory:

- Recording interval: 20 seconds adjustable (10, 20, 30, 60 s).
- Memory capacity: approximately 36 hours of diving with 20 second recording interval
- Depth resolution: 0.3 m/1 ft

Operating conditions:

- Normal altitude range: 0 to 3,000 m/10,000 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, BSc, MSc, 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 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/year → 3 years
 - 100 dives/year → 2 years
 - 400 dives/year → 1 year

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

- The length of the dives
- The conditions in which the unit is operated and stored (for example, 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 in the unit at the factory)



NOTE

Low temperature or an internal oxidation of the battery may activate the battery warning even though the battery has enough capacity. In this case, the warning usually disappears when the DIVE mode is activated again.

10.2. RGBM

The Suunto Reduced Gradient Bubble Model (RGBM) is a modern algorithm for predicting both dissolved and free gas in the tissues and blood of divers. It was developed in co-operation between Suunto and Bruce R. Wienke BSc, MSc, PhD. It is based on both laboratory experiments and diving data, including data from DAN.

It is a significant advance on the classical Haldane models, which do not predict free gas (microbubbles). The advantage of Suunto RGBM is additional safety through its ability to adapt to a wide variety of situations. Suunto RGBM addresses a number of diving circumstances outside the range of dissolved-gas-only models by:

- Monitoring continuous multiday diving
- Computing closely spaced repetitive diving
- Reacting to a dive deeper than the previous dive
- Adapting to rapid ascents which produce high microbubble (silent-bubble) build-up
- Incorporating consistency with real physical laws for gas kinetics

10.2.1. Suunto RGBM adaptive decompression

The Suunto RGBM algorithm adapts its predictions of both the effects of microbubble build-up and adverse dive profiles in the current dive series. It also changes these calculations according to the personal adjustment you select.

The pattern and speed of decompression at the surface is adjusted according to microbubble influence.

On repetitive dives, adjustment may also be applied to the maximum allowable nitrogen overpressure in each theoretical tissue group.

Depending on the circumstances, Suunto RGBM will adapt the decompression obligations by doing any or all of the following:

- Reducing No-decompression Stop dive times
- Adding Mandatory Safety Stops
- Increasing Decompression Stop times
- Advising an extended surface interval (Diver Attention symbol)

Diver Attention Symbol – Advice to Extend Surface Interval

Some patterns of diving cumulatively add a higher risk of DCI; for example, dives with short surface intervals, repetitive dives deeper than earlier ones, multiple ascents, and substantial multiday diving. When this is detected, in addition to adapting the decompression algorithm, the Suunto RGBM model will in some circumstances also advise, with the Diver Attention Symbol, that you extend your surface interval.

10.2.2. No-decompression limits for air

The no-decompression limits displayed by the dive computer for the first dive to a single depth (see *Table 10.1, No-decompression time limits for various depths (m)* and *Table 10.2, No-decompression time limits for various depths (ft)* .), are slightly more conservative than those permitted by the U.S. Navy tables.

Table 10.1. No-decompression time limits for various depths (m)

	No-decompression time limits (mins) 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

	No-decompression time limits (mins) 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
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 10.2. No-decompression time limits for various depths (ft)

	No-decompression time limits (mins) 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

	No-decompression time limits (mins) 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
90	21	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

10.2.3. Altitude diving

The atmospheric pressure is lower at high altitudes than at sea level. After traveling to a higher altitude, you will have additional nitrogen in your body, compared to the equilibrium situation at the original altitude. This "additional" nitrogen is released gradually over time and equilibrium is restored. It is recommended that you acclimatize to a new altitude by waiting at least three hours before making a dive.

Before high-altitude diving, the instrument must be set to the Altitude Adjustment 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-stop limits are considerably reduced.

10.3. 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. For example:

- The displayed oxygen exposure calculations are raised to the next higher percentage value.
- The CNS % limits up to 1.4 bar are based on 1991 NOAA Diving Manual limits
- The OTU monitoring is based on the long-term daily tolerance level and the recovery rate is reduced.
- for recreational scuba diving, the recommended upper limit of 1.4 bar PO₂ is used as a default
- the half time limit for the CNS recovery is 75 minutes
- the maximum depth warning limit based on 1.4 bar PO₂ is calculated and displayed. If extra conservatism for the depth limits is required the PO₂ can be adjusted to 1.2 or 1.3 bar.

Oxygen related information displayed by the dive computer is also designed to ensure that all warnings and displays occur at the appropriate phases of a dive. For example, the following information will be shown before and during a dive when the computer is set in mode:

- The selected O₂% on the alternative display
- OLF% alternative display for either CNS% or OTU% (whichever is larger)
- Audible alarms are given and the OLF value starts to blink when the 80% and 100% limits are exceeded.
- In dive planning, the maximum depth according to the O₂% and maximum PO₂ selected.
- the blinking of the bar graph stops, when the PO₂ is below 0.5 bar.
- the PO₂ is shown when it is greater than the preset limit.

11. INTELLECTUAL PROPERTY

11.1. Trademark

Suunto is a registered trademark of Suunto Oy.

11.2. Copyright

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11.3. Patent notice

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

12. DISCLAIMERS

12.1. CE

The CE mark is used to mark conformity with the European Union EMC directive 89/336/EEC.

12.2. EN 13319

EN 13319 is a European diving depth gauge standard. Suunto dive computers are designed to comply with this standard.

12.3. EN 250 / FIOH

The tank pressure gauge and dive instrument parts used in measuring the tank pressure meet the requirements set in the section of the European Standard EN 250 that concern tank pressure measurements. FIOH, notified body no.0430, has EC type-examined this type of personal protective equipment.

13. SUUNTO LIMITED WARRANTY

Suunto warrants that during the Warranty Period Suunto or a Suunto Authorized Service Center (hereinafter Service Center) will, at its sole discretion, remedy defects in materials or workmanship free of charge either by a) repairing, or b) replacing, or c) refunding, subject to the terms and conditions of this Limited Warranty. This Limited Warranty is only valid and enforceable in the country of purchase, unless local law stipulates otherwise.

Warranty Period

The Limited Warranty Period starts at the date of original retail purchase. The Warranty Period is two (2) years for display devices. The Warranty Period is one (1) year for accessories and consumable parts, including but not limited to chargeable batteries, chargers, docking stations, straps, cables and hoses.

Exclusions and Limitations

This Limited Warranty does not cover:

1. a) normal wear and tear, b) defects caused by rough handling, or c) defects or damage caused by misuse contrary to intended or recommended use;
2. user manuals or any third-party items;
3. defects or alleged defects caused by the use with any product, accessory, software and/or service not manufactured or supplied by Suunto;
4. replaceable batteries.

This Limited Warranty is not enforceable if item:

1. has been opened beyond intended use;
2. has been repaired using unauthorized spare parts; modified or repaired by unauthorized Service Center;

3. serial number has been removed, altered or made illegible in any way, as determined at the sole discretion of Suunto;
 4. has been exposed to chemicals including but not limited to mosquito repellents.
- Suunto does not warrant that the operation of the Product will be uninterrupted or error free, or that the Product will work in combination with any hardware or software provided by a third party.

Access to Suunto warranty service

Register your item at www.suunto.com/register and save the purchase receipt and/or registration card. For instructions how to obtain warranty service, visit www.suunto.com, contact your local authorized Suunto retailer, or call Suunto Help Desk +358 2 2841160 (national or premium rates may apply).

Limitation of Liability

To the maximum extent permitted by applicable mandatory laws, this Limited Warranty is your sole and exclusive remedy and is in lieu of all other warranties, expressed or implied. Suunto shall not be liable for special, incidental, punitive or consequential damages, including but not limited to loss of anticipated benefits, loss of data, loss of use, cost of capital, cost of any substitute equipment or facilities, claims of third parties, damage to property resulting from the purchase or use of the item or arising from breach of the warranty, breach of contract, negligence, strict tort, or any legal or equitable theory, even if Suunto knew of the likelihood of such damages. Suunto shall not be liable for delay in rendering warranty service.

14. DISPOSAL OF THE DEVICE

Please dispose of the device in an appropriate way, treating it as electronic waste. Do not throw it in the garbage. If you wish, you may return the device to your nearest Suunto representative.



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 stop dive.
ASC TIME	Abbreviation for ascent time.
Ceiling	On a decompression stop dive, the shallowest depth to which a diver may ascend based on computed nitrogen load.
Ceiling zone	On a decompression stop dive, the zone between the ceiling and the ceiling plus 1.8 m/6 ft. This depth range is displayed with two arrows pointing toward each other (the "hour glass" icon).
Central nervous system toxicity	Toxicity caused by oxygen. Can cause a variety of neurological symptoms. The most important of which is an epileptic-like convulsion which can cause a diver to drown.
CNS	Abbreviation for central nervous system toxicity.
CNS%	Central nervous system toxicity limit fraction. Also note Oxygen Limit Fraction
Compartment	See "Tissue group".
DAN	Abbreviation for Divers Alert Network.
DCI	Abbreviation for decompression illness.
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 stop dive, the depth range between the floor and the ceiling within which a diver must stop for some time during ascent.
Decompression illness	Any of a variety of maladies resulting either directly or indirectly from the formation of nitrogen bubbles in tissues or body fluids, as a result of inadequately controlled decompression. Commonly called "the bends" or "DCI".
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 nitrox or 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 stop 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 therefore not determined solely by the maximum depth attained.
Nitrox	In sports diving, refers to any mix with a higher fraction of oxygen than 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 during the subsequent ascent.
No decompression dive	Any dive which permits a direct, uninterrupted ascent to the surface at any time.
NO DEC TIME	Abbreviation for no decompression time limit.
OEA = EAN = EANx	Abbreviations for oxygen enriched air nitrox.
OLF	Abbreviation for oxygen limit fraction.
OTU	Abbreviation for oxygen tolerance unit.
Oxygen tolerance unit	Used to measure the whole-body-toxicity.
Oxygen limit fraction	A term used by Suunto for the values displayed in the oxygen toxicity bar graph. The value is either the CNS% or the OTU%.
O ₂ %	Oxygen percentage or oxygen fraction in the breathing gas. Standard air has 21% oxygen.
Oxygen partial pressure	Limits the maximum depth to which the nitrox mixture can be safely 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 risk immediate oxygen toxicity.

PO ₂	Abbreviation for oxygen partial pressure.
RGBM	Abbreviation for Reduced Gradient Bubble Model.
Reduced Gradient Bubble Model	Modern algorithm for tracking both dissolved and free gas in divers.
Repetitive dive	Any dive whose 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.



LCD & battery check
nitrox / gauge display



Year	1990	1991	1992	1993
1990	1990	1991	1992	1993

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DIVE MODE

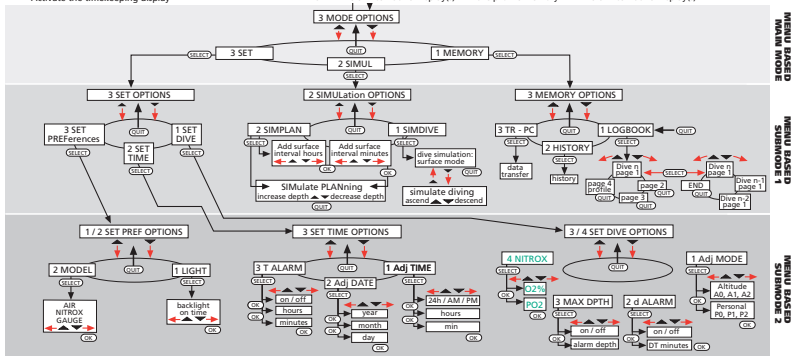
.2 M



Backlight

Time & Alternative Display(s)

VYPER MODES AND OPERATIONS





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