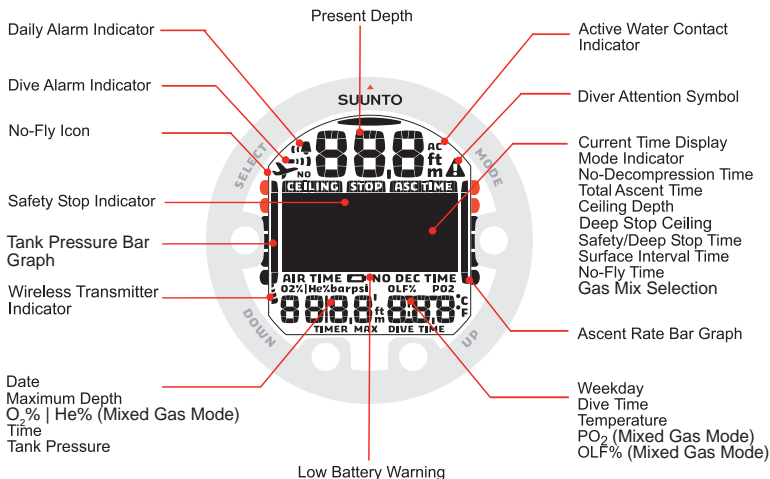


HelO₂

USER'S GUIDE





1. WELCOME TO THE WORLD OF SUUNTO DIVING INSTRUMENTS	5
1.1. Using HeO ₂ with Dive Manager and Dive Planner	5
2. WARNINGS, CAUTIONS, AND NOTES	6
3. SUUNTO HeO ₂ AT A GLANCE	9
3.1. Navigating in the menus	9
3.2. Button symbols and functions	9
4. GETTING STARTED WITH YOUR SUUNTO HeO ₂	11
4.1. TIME mode settings	11
4.1.1. Setting the time	11
4.1.2. Setting the date	11
4.1.3. Setting the units	11
4.1.4. Setting the backlight	12
4.1.5. Setting the tones	12
4.2. AC water contacts	12
5. BEFORE DIVING	13
5.1. Planning your dives	13
5.2. The Suunto Technical RGBM	13
5.3. Emergency ascents	14
5.4. Dive computer limitations	14
5.5. Mixed gas diving	14
5.6. Audible and visual alarms	15
5.7. Error conditions	16
5.8. Wireless transmission	17
5.8.1. Installing the wireless transmitter	17
5.8.2. Pairing and code selection	17
5.8.3. Transmitting data	18
5.9. MIXED GAS DIVE mode settings	19
5.9.1. Setting the gases	19
5.9.2. Setting the depth alarm	20
5.9.3. Setting the dive-time alarm	20
5.9.4. Setting the personal/altitude adjustments	20
5.9.5. Setting the sample rate	21
5.9.6. Setting the tank pressure alarm	21
5.9.7. Setting the tank pressure	21
5.9.8. Setting the HP code	21
5.9.9. Setting the units	22
5.10. Activation and pre-checks	22
5.10.1. Accessing DIVE mode	22
5.10.2. DIVE mode activation	22
5.10.3. Battery power indication	23
5.10.4. Diving at altitude	23
5.10.5. Personal adjustments	24
5.11. Safety Stops	25
5.11.1. Recommended Safety Stops	25
5.11.2. Mandatory Safety Stops	25
5.12. Deep stops	26
6. DIVING	27
6.1. Diving-related information	27
6.1.1. Basic dive data	27
6.1.2. Bookmark	28
6.1.3. Ascent rate indicator	28
6.1.4. Safety Stops	28

6.1.5. Decompression dives	28
6.2. Diving in MIXED GAS mode	31
6.2.1. Before diving in MIXED GAS mode	31
6.2.2. Oxygen and helium displays	31
6.2.3. Oxygen limit fraction (OLF)	32
6.2.4. Gas change and multiple breathing gas mixes	32
6.3. Diving in GAUGE mode	33
7. AFTER DIVING	34
7.1. Surface interval	34
7.2. Dive numbering	34
7.3. Repetitive dive planning	35
7.4. Flying after diving	35
7.5. PLAN mode	35
7.5.1. Dive Planning mode (PLANnodec)	35
7.6. MEMORY mode	36
7.6.1. Dive logbook (MEMLogbook)	37
7.6.2. Dive history	38
7.7. Suunto Dive Planner (SDP)	38
7.8. Suunto Dive Manager (SDM)	39
7.9. www.suuntosports.com and Suunto Diving World at www.suunto.com/diving	39
8. CARE AND MAINTENANCE OF MY SUUNTO DIVING COMPUTER	41
9. BATTERY REPLACEMENT	43
9.1. Battery kit	43
9.2. Required tools	43
9.3. Replacing the battery	43
9.4. Wireless transmitter battery replacement	44
9.4.1. Transmitter battery kit	45
9.4.2. Required tools	45
9.4.3. Replacing the transmitter battery	45
10. TECHNICAL DATA	47
10.1. Technical specifications	47
10.2. RGBM	48
10.2.1. Suunto Technical RGBM decompression model	49
10.2.2. Diver safety and Suunto Technical RGBM model	49
10.2.3. Altitude diving	50
10.3. Oxygen exposure	50
11. INTELLECTUAL PROPERTY	51
11.1. Copyright	51
11.2. Trademark	51
11.3. Patent notice	51
12. DISCLAIMERS	52
12.1. User's responsibility	52
12.2. CE	52
13. SUUNTO LIMITED WARRANTY FOR SUUNTO DIVING COMPUTERS AND SUUNTO DIVING COMPUTER ACCESSORIES	53
14. DISPOSAL OF THE DEVICE	56
GLOSSARY	57

1. WELCOME TO THE WORLD OF SUUNTO DIVING INSTRUMENTS

Suunto HelO₂ was designed to help you get the most out of your diving.

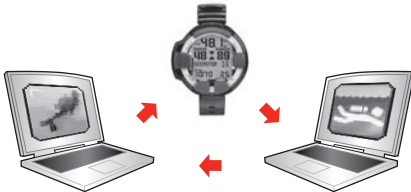


With easy-to-use PC dive planner and gas switching, Suunto HelO₂ simplifies your diving experience because all the information you need relating to depth, time, tank pressure, and decompression status is available on one easy-to-read screen.

To get the most out of your Suunto HelO₂, please read this instruction manual carefully and make sure you understand the use, displays, and limitations of the instrument before using it. To make life easier, we've included a glossary of dive-specific terminology at the back of the manual.

1.1. Using HelO₂ with Dive Manager and Dive Planner

Suunto HelO₂ is designed to be used together with Suunto Dive Planner and Suunto Dive Manager. They both are PC programs for planning and managing your dive data. While HelO₂ is used during a dive, the Dive Manager is used for uploading the dive data to your PC and the Dive Planner for planning any subsequent dives using the uploaded dive data as a basis.



2. WARNINGS, CAUTIONS, AND NOTES

Throughout this manual, 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 could result in serious injury or death*

CAUTION *is used in connection with a procedure or situation that could result in damage to the device*

NOTE *is used to emphasize important information*

Before you go on to read the manual itself, it is extremely important that you read the following warnings. These warnings are intended to maximize your safety while using Suunto HeO₂ and must not be ignored.

WARNING *READ THIS MANUAL! Carefully read this manual in its entirety, paying close attention to all the warnings listed below, including Section 5. BEFORE DIVING. Make sure that you fully understand the use, displays and limitations of the dive computer, because any confusion resulting from neglecting to follow this user's manual or from improper use of this device could cause you to commit errors that may lead to serious injury or death.*

WARNING *NOT FOR PROFESSIONAL USE! Suunto dive computers are intended for recreational use only. The demands of commercial or professional diving 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 is not used for any commercial or professional diving activities.*

WARNING *ONLY DIVERS TRAINED IN THE 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 you 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 CAN 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 precaution, 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!*

- WARNING** *DIVES THAT REQUIRE 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! Make sure that you use back-up instrumentation, including a depth gauge, submersible pressure gauge, timer or watch, and have access to decompression tables whenever diving with the dive computer.*
- WARNING** *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, that the device has not run out of battery power, and that the oxygen, altitude, personal, Safety/Deep Stop, and RGBM adjustments 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) in Section 7.4. Flying after diving.*
- 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** *DO NOT EXPOSE THE SUUNTO He/O₂'S OPTIONAL PRESSURE TRANSMITTER TO ANY GAS MIX CONTAINING MORE THAN 40% OXYGEN! Gas with greater oxygen content presents a risk of fire or explosion and serious injury or death.*
- 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 O₂% and He% into your dive computer will result in incorrect dive planning information.*
- WARNING** *THE DIVE COMPUTER WILL NOT ACCEPT FRACTIONAL PERCENTAGE VALUES OF OXYGEN CONCENTRATION. DO NOT ROUND UP FRACTIONAL PERCENTAGES! For example, 31.8% oxygen should be entered as 31%. Rounding up will cause nitrogen percentages to be understated and will affect decompression calculations. If you want to adjust the computer to provide more conservative calculations, use the personal adjustment feature to affect decompression calculations, or reduce the PO₂ setting to affect oxygen exposure.*

WARNING *SELECT THE CORRECT ALTITUDE ADJUSTMENT SETTING! When diving at altitudes greater than 300 m/1,000 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 3,000 m/10,000 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 *SELECT THE CORRECT PERSONAL ADJUSTMENT SETTING! 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 *This device contains a Lithium cell battery. To reduce the risk of fire or burns, do not disassemble, crush, puncture, short external contacts, or dispose of in fire or water. Replace only with manufacturer-specified batteries. Recycle or dispose of used batteries properly.*

NOTE *It is not possible to change between MIXED GAS and GAUGE modes before the instrument has counted down the no-fly time.*

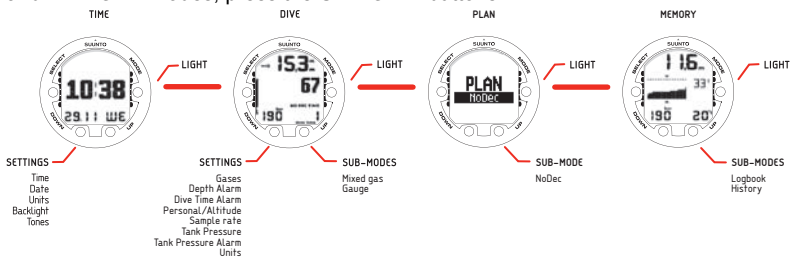
3. SUUNTO HELO2 AT A GLANCE

3.1. Navigating in the menu

Suunto Helo₂ has four main operating modes:

1. TIME mode
2. DIVE mode (MIXED GAS, GAUGE)
3. PLAN mode (NODEC)
4. MEMORY mode (HISTORY, LOGBOOK)

To toggle between the main modes, press the MODE button. To select a submode in DIVE and MEMORY modes, press the UP/DOWN buttons.




3.2. Button symbols and functions

The table 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 manual.

Table 3.1. Button symbols and functions

Symbol	Button	Press	Main functions
	MODE	Short	Switch between main modes Switch from submode to main mode Activate backlight in DIVE mode
	MODE	Long	Activate backlight in other modes
	SELECT	Short	Select a submode Select and accept settings
	UP	Short	Toggle between alternative displays Change submode Increase values
	UP	Long	Activate gas switching in MIXED GAS mode
	DOWN	Short	Toggle between alternative displays Change submode Decrease values

Symbol	Button	Press	Main functions
	DOWN	Long	Enter Setting mode

4. GETTING STARTED WITH YOUR SUUNTO HELO2

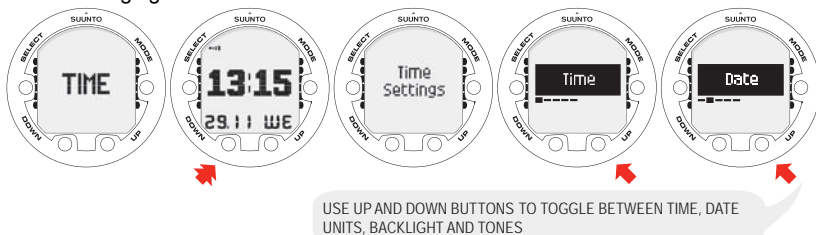
To get the most out of your Suunto HeLO₂, take some time to personalize it and really make it YOUR computer. Set the correct time and date, tones, unit and backlight settings. Suunto HeLO₂ is a very user-friendly dive computer, and you will quickly become familiar with its functions. Make absolutely sure that you know your computer and have it set up as you want it BEFORE getting into the water.

4.1. TIME mode settings

The first thing you'll want to do with your Suunto HeLO₂, is to modify the TIME mode settings: the time, date, units, backlight, and tones. In this section, we look at how to do this.

NOTE *The display is illuminated by holding down the MODE button for more than 2 seconds.*

The following figure shows how to enter the TIME SETTINGS menu.



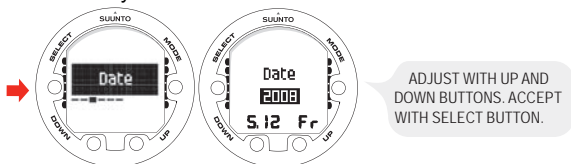
4.1.1. Setting the time

In the TIME SETTING mode, you are able to set the hour, minute, and second, as well as choose between 12 and 24 hour display.



4.1.2. Setting the date

Use the DATE SETTING mode to set the year, month, and day. The day of the week is automatically calculated in accordance with the date.



4.1.3. Setting the units

In the UNITS SETTING mode you can choose to have the units displayed in either the metric or imperial system - meters/feet, Celsius/Fahrenheit etc.



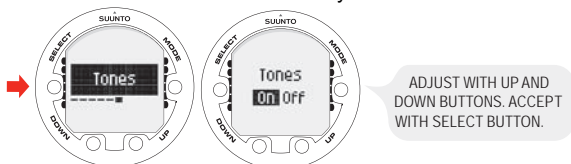
4.1.4. Setting the backlight

Use the BACKLIGHT SETTING mode to turn the backlight on or off and to define how long it stays on for (5, 10, 20, 30, or 60 seconds). When the backlight is turned off, it does not illuminate when an alarm sounds.



4.1.5. Setting the tones

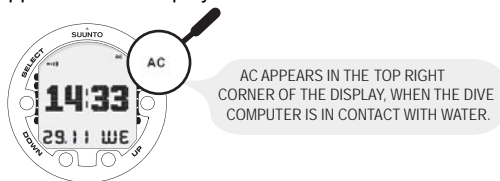
The TONE SETTING mode allows you to activate or deactivate the tones.



NOTE *When the tones are off, there are no audible alarms.*

4.2. AC water contacts

The water and data transfer contact is located on the rear of the case. When submerged, the water contact poles are connected by the conductivity of the water and the "AC" symbol appears on the display. The AC text is shown until the water contact deactivates.



Contamination or dirt on the water contact may prevent this automatic activation. It is therefore important that the water contact is kept clean. The contact can be cleaned with fresh water and a soft brush, for example a tooth brush.

5. BEFORE DIVING

Do not attempt to use the dive computer without reading this user's manual 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 Suunto HelO₂, please contact your Suunto representative before diving with the dive computer.

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

When used properly, Suunto HelO₂ is an outstanding tool for assisting properly trained, certified divers in planning and executing technical dives. It is **NOT A SUBSTITUTE FOR CERTIFIED SCUBA INSTRUCTION**, including training in the principles of decompression and/or multi-gas diving.

WARNING

Diving with gas mixtures (nitrox, trimix, heliox, oxygen) 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.

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

5.1. Planning your dives

The Suunto HelO₂ is designed for computer-aided technical diving. You plan and modify your dive profiles with Suunto Dive Planner and download the gases required for the profile to the dive computer. During a dive, the dive computer alerts you about the gas switches and stops, as well as monitors the dive. The dive computer records data of the actual dive. After a dive you upload the data back to the Suunto Dive Planner for comparing the plan to the actual dive and adjusting the plan for the next dive.

The Suunto HelO₂ can store up to eight different gas mixes of oxygen, helium or nitrogen into its memory. The minimum O₂% on the dive computer is 8%.

With the Suunto Dive Planner you can:

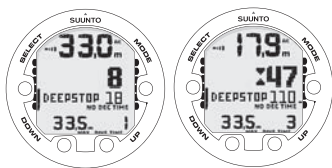
1. plan a dive including a depth plan, decompression schedule, and gas mixes for use during a dive.
2. simulate the dive and create backup plans for printing them on slates. The information on a slate includes the gases, depth, dive time, and ascent profile.
3. create recipes for gas mixes, either for partial pressure or continuous flow filling, and print them out for ordering or mixing.
4. download gases, maximum PO₂, alarms and settings to the dive computer, as well as confirm and set primary and secondary gases.
5. upload data of the last dive to Suunto Dive Planner and use the data for planning the next dive or for comparing the actual dive to the planned one.

After filling the cylinders with the required gas mixes, their oxygen and helium percentages must be analyzed and the dive computer settings modified accordingly either with the Suunto Dive Planner or directly in the dive computer.

When creating a dive series, the real tissue pressures are calculated by uploading the actual dives to the Suunto Dive Planner with the Suunto Dive Manager. You can then plan the next dive based on this information.

5.2. The Suunto Technical RGBM

Suunto's Reduced Gradient Bubble Model (RGBM), utilized in the Suunto HelO₂, 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*.

5.3. Emergency ascents

Before you dive, you must have the dive plan created with the Suunto Dive Planner printed out on a slate. You must also have a back-up plan for lost gases. In the unlikely event that the dive computer malfunctions during a dive, start using an alternative depth gauge and timer and following the ascent schedule and gas switches that are on the slate. If you dive using only air, 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 gas supply will safely allow. After reaching the surface, do not dive for at least 24 hours.

In the event that the dive computer functions but a required gas is not available, you can use your diving partner's gas, which is set as a secondary gas on the dive computer. Displayed ASC TIME is not correct, but the decompressions are calculated correctly.

In the event that a required gas is not available at all, decompress for as long as you can by using the next most suitable gas that has the highest oxygen content. Notice that the oxygen content should be low enough to not violate the maximum partial pressure of oxygen (PO_2).

5.4. Dive computer limitations

While the dive computer's calculations are based on current decompression research and technology, it is important to 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.

5.5. Mixed gas diving

Diving with gas mixes provides you with an opportunity to increase bottom times, shorten decompression times, decrease the oxygen partial pressure at depth, and reduce the risk of nitrogen narcosis or decompression illness by reducing the nitrogen content in the gas mix.

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

In addition to the physiological effects of enriched air on the body, there are operational considerations to be addressed when handling altered breathing mixes. Elevated concentrations of oxygen present a fire or explosion hazard. Consult the manufacturer of your equipment to check its compatibility with nitrox.

5.6. 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.

Table 5.1. Audible and visual alarm types

Alarm indication	Alarm reason
Three beeps with a one second interval for the maximum of three minutes. The PO ₂ value blinks.	PO ₂ value is greater than the adjusted value. Current depth is too deep for the gas in use. You should immediately ascend or change to a gas with a lower oxygen percentage.
Three beeps with a one second interval for the maximum of 24 seconds. The PO ₂ value blinks.	PO ₂ value is smaller than 0.18 bar. The depth is too shallow and the ambient pressure is too low for the current gas. The oxygen content is too low to keep you conscious. You should immediately switch the gas.
Two beeps with a one-and-a-half second interval. The OLF% value blinks if the PO ₂ value is greater than 0.5 bar.	In MIXED GAS mode, the OLF value reaches the fixed 80% or 100%. You can acknowledge the alarm.
Two beeps with a one-and-a-half second interval for three minutes. The Er symbol blinks and an arrow points downwards.	Decompression ceiling depth is exceeded. You should immediately descend to, or below, the ceiling.
Two beeps with a one-and-a-half second interval for three minutes. An arrow points downwards.	Mandatory safety stop is violated. You should immediately descend.
Three beeps with a one second interval for 24 seconds. The SLOW symbol blinks.	Maximum allowed ascent rate, 10 m per min / 33 ft per min, is exceeded.
Two beeps with a one and a half second interval for the duration of the deepstop violation. DEEPSTOP blinks and an arrow points downwards.	Mandatory deepstop is violated. You should immediately descend.
Two beeps with a one-and-a-half second interval. Tank pressure blinks.	Cylinder pressure reaches the selected alarm pressure, 10 - 200 bar.
	Cylinder pressure reaches the fixed alarm pressure, 50 bar.
Two beeps with a one-and-a-half second interval for 24 seconds. ASC TIME blinks and an arrow points upwards.	No-decompression dive turns into a decompression stop dive.
	Depth is below the decompression floor level. You should immediately ascend to, or above, the floor.
Two beeps with a one-and-a-half second interval. Gas mix value (O ₂ %, O ₂ % He%) blinks.	Gas change is required. You should immediately change to a gas more favorable to decompression. ASC TIME assumes that the gas is changed immediately and is accurate only if you change the gas.
Three beeps with a one second interval.	The deepstop depth is reached. Make the mandatory deepstop for the duration shown by the timer.

Alarm indication	Alarm reason
Three beeps with a one second interval for 24 seconds. Maximum depth blinks.	The selected depth (3 - 120 m / 10 - 394 ft) is exceeded.
	The fixed maximum depth (120 m / 394 ft) is exceeded.
Three beeps with a one second interval for 24 seconds. Dive time blinks.	The selected dive time (1 - 999 min) is exceeded.

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.*

5.7. 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.

Out of calculation limits

Suunto uses state of the art memory and microprocessors, however, there are limitations to the memory capacity of decompression calculations. Therefore Suunto must limit the maximum saturation of tissues on Suunto HeO₂ and limit the maximum bottom times on dives performed using the dive computer. The bottom times include decompression calculation. While it is highly unlikely that the following bottom times are confronted by open-circuit divers, it is important to warn you of their possibility.

The same limits are used in the Suunto Dive Planner and so repetitive dives will be checked while planning a dive because a dive plan must be created in any case.

Table 5.2. Possible decompression dive times

Gas mix	O ₂ /He%	Depth	Bottom time	Ceiling	First deep-stop
Tx	20/35	60 m	250 min	33 m	46 m
Tx	15/50	80 m	260 min	50 m	65 m
Tx	12/60	100 m	120 min	61 m	80 m
Tx	10/60	120 m	90 min	73 m	96 m

Descent at the rate of 10 m/min is included in the time. The times allow for a safe ascent using the bottom gas all the way to the surface without exceeding tissue pressures.

If a diver violates these limits, the dive computer goes to an error mode and the rest of the dive must be conducted using the diveplan on the slate.

Omitted decompression

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

Once in the permanent Error mode, only the Er warning is shown in the center window. The dive computer will not show times for ascent or stops. However, all the other displays will function as before to provide information for ascent. You should immediately follow through the decompression schedule in your backup plan.

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

5.8. Wireless transmission

The HeO₂ can be used together with a wireless cylinder pressure transmitter that easily attaches to the high-pressure port of the regulator. By using the transmitter, you can benefit from receiving cylinder pressure data direct to your wrist.

In order to use the transmitter, the wireless integration needs to be enabled in your Suunto HeO₂ settings. To enable or disable the wireless integration refer to *Section 5.9.7. Setting the tank pressure.*

5.8.1. Installing the wireless transmitter

When purchasing the Suunto HeO₂, we strongly recommend that you have your Suunto representative attach the transmitter to the first stage of your regulator.

However, if you decide to attach it yourself, do the following:

1. Remove the high pressure (HP) port plug on the first stage of your regulator using an appropriate tool.
2. Thread the high pressure transmitter of the Suunto into the HP port of your regulator with your fingers. DO NOT OVERTIGHTEN! Maximum torque is 6 Nm/4.4 lbsft or 53 lbsin. The seal is based on a static O-ring, not force!
3. Attach the regulator to the scuba cylinder and slowly open the valve. Check for leaks by submerging the regulator first stage in water. If leaks are detected, check the condition of the O-ring and sealing surfaces.

5.8.2. Pairing and code selection

In order to receive wireless data, the transmitter and the Suunto HeO₂ need to be paired. During the pairing procedure, the transmitter and dive computer select a common transmission code.

The transmitter is activated when the pressure exceeds 15bar/218 psi and it then starts sending pressure data together with a code number. During the pairing procedure, the Suunto HeO₂ stores the code number and starts displaying pressure values that are received with that code. This coding procedure inhibits data mix-up from other divers also using a Suunto HeO₂ transmitter.

When there is no stored code, the Suunto HeO₂ displays "cd:--" and receives data with lowered sensitivity from a very short distance only. By taking the Suunto HeO₂ close to the transmitter, it will store the received code and start receiving with full sensitivity and display data received with this code only. The code is stored until you reset it manually.

To pair the transmitter and the Suunto HeO₂ dive computer:

1. Make sure that the transmitter is properly attached to the regulator's HP port and that the regulator is properly attached to the cylinder.

2. Ensure that the Suunto HeLO₂ is turned on, and that the wireless integration is enabled in the Suunto HeLO₂ settings (HP set ON, see *Section 5.9.8. Setting the HP code*). The HeLO₂ should display "cd:--" in the lower left corner of the alternative display.
3. Slowly open the cylinder valve fully and pressurize the regulator. The transmitter starts transmitting when the pressure exceeds 15 bar/218 psi.
4. Take the Suunto HeLO₂ wrist unit close to the transmitter. The unit will then quickly display the selected code number and then start displaying the transmitted cylinder pressure. The wireless transmitter indicator is displayed every time the Suunto receives a valid signal.

WARNING

If there are several divers using Suunto HeLO₂ with wireless transmission, always ensure that each diver is using a different code before starting the dive.

You can manually change the transmitter's code by reducing the pressure to less than 10 bar/145 psi and then immediately (within 10-12 seconds) increasing the pressure to above 15 bar/220 psi.

*Reset the transmitter's code manually, see *Section 5.9.8. Setting the HP code*.*

The transmitter will then select a new code. The Suunto HeLO₂ must be in "cd:--" mode to pair on the new code. This procedure can be used if, for example, your dive buddy has the same code and you need to change it.

NOTE

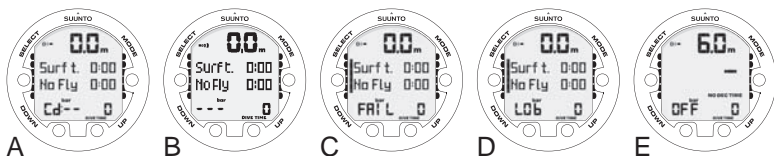
In order to save battery energy, the transmitter shuts off if the pressure remains unchanged for more than 10 minutes, and it will continue transmitting with the saved code when any pressure change is measured.

5.8.3. Transmitting data

After the pairing procedure, the Suunto HeLO₂ will receive cylinder pressure data from the transmitter. The pressure is displayed in either bars or psi, depending on the unit selected. Any time the Suunto HeLO₂ receives an appropriate signal it flashes the wireless transmitter indicator in the display's lower left corner.

Table 5.3. Pressure transmission related displays

Display	Indication	Figure
Cd:--	Set Code. No code stored, Suunto HeLO ₂ ready for pairing with transmitter.	A
--	Pressure reading over 360 bar/5220 psi.	B
FAIL	Pressure reading has not been updated for more than one minute. The latest valid pressure reading is displayed intermittently. After five minutes, "FAIL" is displayed intermittently with "---". Transmitter is out of range, in power saving mode or on another channel. Activate the transmitter by breathing off the regulator, and recode the wrist unit if necessary.	C
LOb	Pressure transmitter battery voltage is low. The pressure reading is displayed intermittently. Change the transmitter battery!	D
OFF	Pairing has not been conducted between the dive computer and the transmitter before start of dive. No cylinder data available.	E

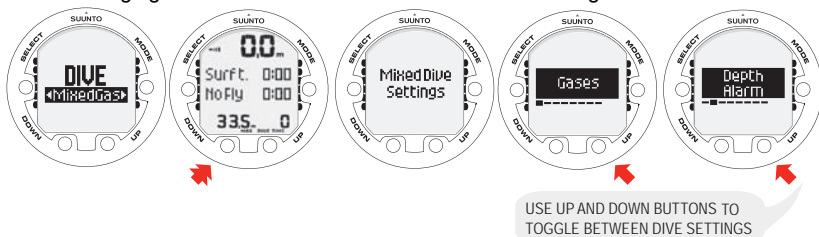


5.9. MIXED GAS DIVE mode settings

Suunto Helo₂ 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 (MIXED GAS, GAUGE), so that, for example, gas mix settings are only available in the MIXED GAS submode.

With Suunto Helo₂, most of the settings are planned with the Suunto Dive Planner and downloaded to the dive computer. If necessary, they can be changed manually.

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



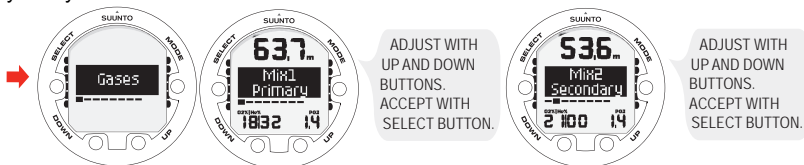
USE UP AND DOWN BUTTONS TO TOGGLE BETWEEN DIVE SETTINGS

NOTE

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

5.9.1. Setting the gases

If set to the MIXED GAS mode, the correct oxygen and helium percentages of the gas in your cylinders (and additional gases) must always be entered into the dive computer to ensure correct tissue and oxygen calculation. In addition, the oxygen partial pressure limit must be set. You can either modify the dive plan with the Suunto Dive Planner or enter the correct values directly into the dive computer after analyzing the gas mixes in your cylinders.



When in the MIXED GAS setting mode, the equivalent maximum operating depth, based on the chosen setting, is also displayed.

After entering values for MIX1, you can set additional mixes, MIX2 - MIX8, similarly. You can set them to "PRIMARY", "SECONDARY" or "OFF". MIX 1 is always set as a primary gas.

In order to minimize the risk of error during a dive, it is highly recommended that the mixes are set in the proper order. This means that as the mix number rises, so does oxygen content, and this is the order they are usually used during the dive. Before a dive, only enable the mixes you actually have available and remember to check the set values to make sure they are correct.

The ASC time is calculated based on the assumption that you start the ascent profile immediately and all the PRIMARY gases are changed as soon as their maximum operating depth allows it. That is, using the gases that are set as primary, the most optimal ascent schedule for the moment is calculated.

To see the most pessimistic ascent schedule, that is, a schedule for the situation when gases are not changed at all, you can set the gases as secondary and the time it takes to finish the decompression using the current breathing gas is shown as the ASC time.

Showing the most pessimistic ascent schedule during a long dive can easily result in the ascent time no longer fitting the reserved field and the dive computer displays "---" (max. 199 min).

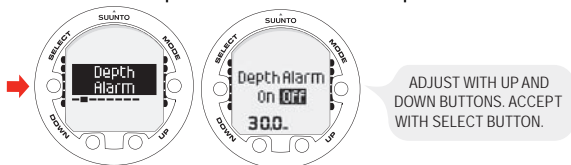
NOTE

While setting the gases, notice that the calculated maximum operating depth is displayed in the upper field. You cannot change to this gas before you have ascended above this depth.

The default oxygen percentage (O₂%) setting is 21% (air) and oxygen partial pressure (PO₂) setting 1.4 bar.

5.9.2. Setting the depth alarm

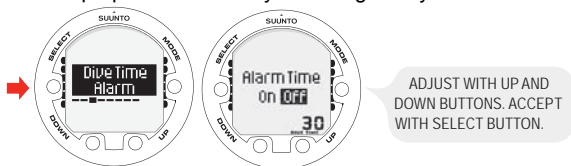
You can set a depth alarm in the dive computer.



The depth alarm is factory-set to 50 m/160 ft, but you can adjust it according to your personal preference, or switch it off altogether. The depth range can be set from 3 m to 120 m/10 ft to 394 ft.

5.9.3. Setting the dive-time alarm

The Suunto HeO₂ has a dive-time alarm setting which, when activated, can be used for several purposes to add to your diving safety.

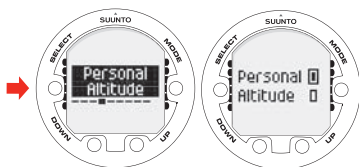


NOTE

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

5.9.4. Setting the personal/altitude adjustments

The current Altitude and Personal Adjustment settings are displayed in the startup screen when entering the DIVE mode. If the mode does not match the altitude or personal conditions (see Section 5.10.4. *Diving at altitude* and Section 5.10.5. *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 or aggressiveness.

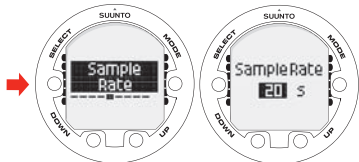


ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

5.9.5. Setting the sample rate

The sample rate controls how often the depth, time, tank pressure, and water temperature is stored in the memory.

You can set the dive profile sample rate to 10, 20, 30, or 60 seconds. The factory default setting is 20 seconds.

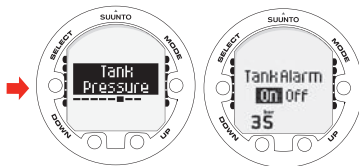


ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

5.9.6. Setting the tank pressure alarm

The tank pressure alarm can be set "ON" or "OFF" and in the range of 10 - 200 bar. The alarm is the secondary cylinder pressure alarm point. The alarm is activated when the tank pressure drops below the set limit. You can acknowledge this alarm.

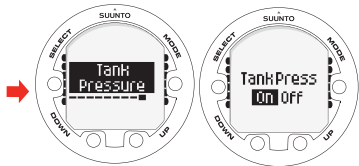
The 50 bar alarm, however, is fixed and cannot be changed. You cannot acknowledge this alarm.



ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

5.9.7. Setting the tank pressure

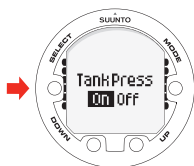
The wireless transmission can be set "ON" or "OFF" depending whether the wireless pressure transmitter is used or not. No cylinder pressure-related data is shown, nor data reception made, when this selection is "OFF".



ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

5.9.8. Setting the HP code

The HP Code setting allows you to verify the selected code and to erase the stored code. It also enables re-pairing if necessary.



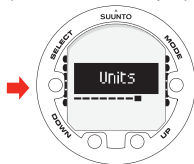
SELECT TANK PRESSURE ON.



ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

5.9.9. Setting the units

Use Unit Settings to choose between metric (meters/celsius/bar) and imperial (feet/fahrenheit/psi) units.



ADJUST WITH UP AND DOWN BUTTONS. ACCEPT WITH SELECT BUTTON.

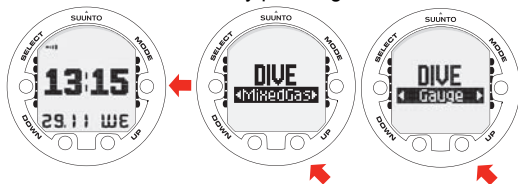
5.10. Activation and pre-checks

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.

5.10.1. Accessing DIVE mode

The Suunto HelO₂ has two diving modes: MIXED GAS mode for diving with gas mixes and GAUGE mode for use as a bottom timer.

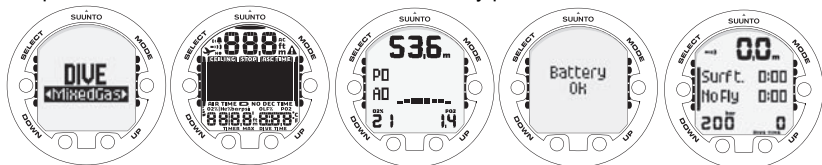
The chosen dive mode is displayed when the DIVE mode is accessed, and you can toggle between the submodes by pressing the UP/DOWN buttons.



5.10.2. 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 etc.**

After activation, all graphical display elements are turned on, and the backlight and the beep are activated. A few seconds later the battery power indicator is shown.



At this time, perform your pre-checks, making sure that:

- the instrument operates in the correct mode and provides a complete display (MIXED GAS/GAUGE mode)
- the battery level is ok

- 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 alarm beeps

If the optional wireless pressure transmitter is used ensure that:

- the pressure transmitter has been properly attached and the cylinder valve is open
- the transmitter and the wrist unit have been properly paired on a suitable code
- the pressure transmitter is working (wireless transmitter indicator blinks, cylinder pressure is displayed), and that there is no low battery warning displayed
- you have enough gas for your planned dive. You should also check the pressure reading against your back-up pressure gauge

And, if set to MIXED GAS mode, make sure that:

- the oxygen partial pressure limits are set correctly

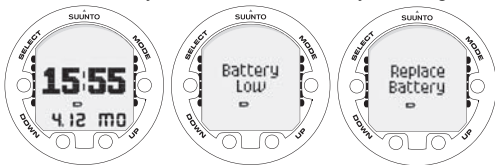
For more information on the MIXED GAS mode, refer to *Section 6.2. Diving in MIXED GAS mode*.

The dive computer is now ready for diving.

5.10.3. Battery power indication

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.



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.

The optional wireless pressure transmitter sends out a low battery (LOb) warning when its battery voltage is getting low. This is shown intermittently instead of the pressure reading. When you get this warning, the pressure transmitter's battery needs to be replaced.

5.10.4. 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	Altitude range
A0	0 - 300 m / 0 - 1000 ft
A1	300 - 1500 m / 1000 - 5000 ft

Alt. adjustment value	Altitude range
A2	1500 - 3000 m / 5000 - 10 000 ft

NOTE *Section 5.9.4. Setting the personal/altitude adjustments 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 hours before diving.*

5.10.5. 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. The five-step Personal Adjustment setting is available if a more conservative or aggressive dive plan is desired.

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. For very experienced divers willing to take high personal risks and full responsibility of their own condition, two negative values of the personal adjustments, P-2 and P-1, exist. 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	Condition	Desired tables
P-2	Ideal conditions, excellent physical fitness, highly experienced with a lot of dives in the near past	Progressively less conservative
P-1	Ideal conditions, good physical fitness, well experienced with dives in the near past	
P0	Ideal conditions	Default

Personal adjustment value	Condition	Desired tables
P1	Some risk factors or conditions exist	Progressively more conservative
P2	Several risk factors or conditions exist	

WARNING

Personal adjustment setting P0 – P-2 causes a high risk of DCI, or other personal injury, and death.

5.11. Safety Stops

Safety Stops are widely considered good diving practice for recreational and technical 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 HelO₂ displays two different types of Safety Stops: Recommended Safety Stop and Mandatory Safety Stop.

5.11.1. 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 6 - 3 m/10 ft - 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.



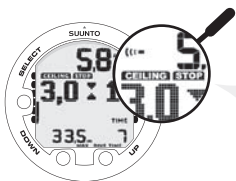
NOTE

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.

5.11.2. Mandatory Safety Stops

When the ascent rate exceeds 10 m/33 ft per minute continuously for more than 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 appears 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. You should wait until the Mandatory Safety Stop warning disappears. The total length of the Mandatory Safety Stop time depends on the seriousness of the ascent rate violation.



WHEN CEILING AND STOP ARE DISPLAYED, MAKE A ONE MINUTE MANDATORY SAFETY STOP IN THE DEPTH ZONE BETWEEN 6 M AND 3 M.

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.



WHEN CEILING AND STOP ARE DISPLAYED, IMMEDIATELY (WITHIN 3 MINUTES) DESCEND TO OR BELOW CEILING.

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.

5.12. Deep stops

The most significant factor limiting the ascent is the ceiling depth. It is the maximum depth a diver can ascend to before tissue pressures have decreased low enough. In addition, separate safety stops are used. Their purpose is to increase the safety margin even if decreasing the tissue pressures does not require them. Such stops are safety stop when surfacing and deep stops.

According to UHMS, deep stops are stops that occur deeper than the traditional decompression model suggests. The purpose of deep stops is to slow down a long continuous ascent and minimize microbubble formation and excitation.

While the Suunto Technical RGBM model is based on M-values, the use of deep stops brings the model closer to the full RGBM model. The way of implementing deep stops is conducted by Dr. Bruce Wienke.

If deep stop is broken it does not cause the dive computer to go into error mode. However there is penalty applied to the following decompressions.



DURING DESCENT, YOU ARE SHOWN THAT A DEEPSTOP IS NEEDED AT THE DEPTH OF 25 M.



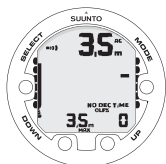
DURING ASCENT, YOU ARE ADVISED TO MAKE A DEEPSTOP AT 25 M FOR THE DURATION SHOWN BY THE TIMER (42 SEC. REMAINING).

6. DIVING

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

6.1. Diving-related information

In this section, we look at how to make the most of the dive computer when diving with gas mixes. To activate MIXED GAS DIVE mode, please see *Section 5.10.1. Accessing DIVE mode*.



DIVE HAS JUST BEGUN AND AVAILABLE NO-DECOMPRESSION TIME IS OVER 199 MINUTES SO NO VALUE IS DISPLAYED.

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.

NOTE

The default fields shown on your dive computer in diving mode are the ones you select while in surface mode.

6.1.1. Basic dive data

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

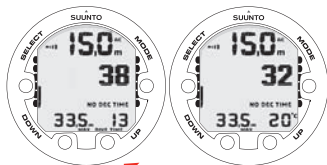
- your present depth in meters/feet
- the available no-decompression time in minutes as NO DEC TIME
- the ascent rate presented as a bar graph on the right side



DIVE DISPLAY - PRESENT DEPTH IS 15 M, MAX DEPTH OF DIVE IS 33.5 M AND NO-DECOMPRESSION STOP TIME LIMIT IS 38 MIN. ELAPSED DIVE TIME IS 13 MIN.

Alternative displays, by pressing the UP/DOWN buttons, show:

- the elapsed dive time in minutes, shown as DIVE TIME
- the water temperature in °C/°F
- the maximum depth during this dive in meters/feet, indicated as MAX
- the current time, shown as TIME



UP BUTTON TOGGLES BETWEEN DIVE TIME AND WATER TEMPERATURE.

In addition, with the optional wireless transmission enabled:

- the cylinder pressure in bar (or psi) displayed in the lower left corner
- the cylinder pressure graphically displayed on the left side

6.1.2. Bookmark

It is possible to record bookmarks in the profile memory during a dive. These bookmarks are displayed when scrolling the profile memory on the display. The bookmarks will also be shown as annotations in the downloadable Suunto Dive Manager PC software.

The bookmark logs the depth, time, water temperature, and tank pressure when available. To make a bookmark in the profile memory during a dive, press the SELECT button. A brief confirmation will be given.



6.1.3. Ascent rate indicator

The ascent rate is shown graphically along the right hand side. When the maximum allowed ascent rate is exceeded, the lower segments start to blink with the top segment staying solid, indicating that the maximum ascent rate has been exceeded continuously or that the current ascent rate is significantly above the allowed rate.



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). Continuous ascent rate violations will result in Mandatory Safety Stops. When Recommended Deep Stop is enabled, the length is indicated in seconds.

6.1.4. Safety Stops

A 3 minute Recommended Safety Stop is prompted after every dive to over 10m.

6.1.5. Decompression dives

When your NO DEC TIME becomes zero, your dive becomes a decompression dive so 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.

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 time needed at the deep 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:

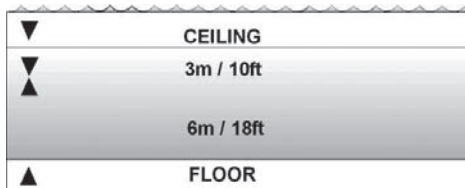
- *remain at depth*
- *ascend slower than 10 m/33 ft per minute*
- *make your decompression stop deeper than at the ceiling*
- *do not use optimal decompression gas*

These factors will also increase the amount of gas 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 1.2 m/4 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



The depth of the ceiling and floor will depend on your dive profile. The ceiling depth will be fairly shallow when you enter the decompression mode, but if you remain at depth, it will move downward and the ascent time will increase. Likewise, the floor and ceiling may change 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 make sure that the waves do not lift you above the ceiling. Suunto recommends that decompression takes place deeper than 4 m/13 ft, even if the indicated ceiling is shallower.

NOTE

It will take more time and more gas 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 and an upward pointing arrow indicate that you are below the floor. The ceiling depth is shown on the left side, and the minimum total ascent time on the right side, of the center window. Below is an example of a decompression dive above Deep Stops, below the floor.



UPWARD POINTING ARROW, BLINKING ASC TIME AND AN ALARM TELL YOU TO ASCEND. MINIMUM TOTAL ASCENT TIME INCLUDING MANDATORY SAFETY STOP IS 15 MINUTES. CEILING IS AT 3 M.

Display above the floor

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



UPWARD POINTING ARROW HAS DISAPPEARED AND ASC TIME LABEL HAS STOPPED BLINKING, MEANING YOU ARE IN THE DECOMPRESSION RANGE.

Decompression will now begin, but is very slow. You should therefore 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.

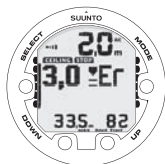


TWO ARROWS POINT AT EACH OTHER "HOUR GLASS": YOU ARE IN THE OPTIMUM CEILING ZONE AT 3 M. AND YOUR MINIMUM ASCENT TIME IS 15 MINUTES.

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 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.



DECOMPRESSION DIVE, ABOVE CEILING.
NOTE DOWNWARD POINTING ARROW, ER WARNING
AND 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 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. (See *Section 5.7. Error conditions*).

6.2. Diving in MIXED GAS mode

MIXED GAS mode is the first dive mode available in Suunto HelO₂. The mode is used when diving with air or with oxygen- or helium-enriched gas mixes.

6.2.1. Before diving in MIXED GAS mode

If set to the MIXED GAS mode, the correct oxygen and helium percentage of the gas in your cylinders must always be entered into the computer to ensure correct inert gas and oxygen calculations. The dive computer adjusts its mathematical inert gas and oxygen calculation models accordingly. The dive computer will not accept fractional percentage values of oxygen and helium concentration. Do not round up fractional percentages. For example, 31.8% oxygen should be entered as 31%. Rounding up will cause inert gas percentages to be understated and will affect decompression calculations. If you want to adjust the computer to provide more conservative calculations, use the personal adjustment feature to affect decompression calculations, or reduce the PO₂ setting to affect oxygen exposure according to the entered O₂% and PO₂ values. Calculations based on nitrox use result in longer no-decompression times and shallower maximum depths than diving with air.

As a safety precaution, the oxygen calculations in the computer are made with an oxygen percentage of 1% + set O₂% .

When the dive computer is set in MIXED GAS mode, the Dive Planning mode calculates using the O₂% and PO₂ values that are currently in the computer.

To set the nitrox, trimix and/or heliox mixes, refer to *Section 5.9.1. Setting the gases*.

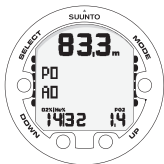
Default gas mix settings

In MIXED GAS mode, the Suunto HelO₂ allows you to set 1 – 8 gas mixes containing 8 – 99% oxygen and 0 – 92% helium.

In the MIXED GAS mode, the default setting is standard air (21% O₂ and 0% He). It remains in this setting until the O₂% is adjusted to any other percentage of oxygen (8% – 99%). The default setting for maximum oxygen partial pressure is 1.4 bar, however you are able to set it in the range of 0.5 - 1.6 bar.

6.2.2. Oxygen and helium displays

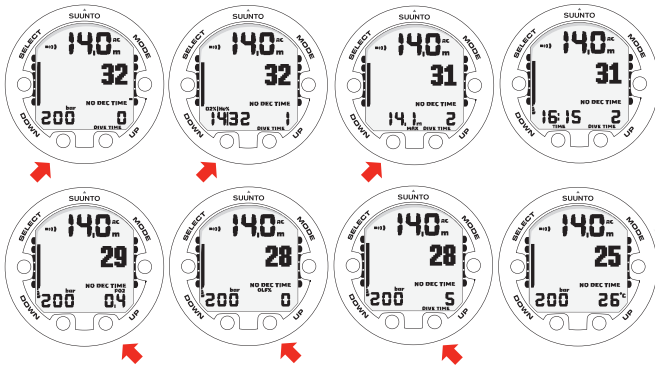
When MIXED GAS mode is activated, the display will show the information in the figure below. In MIXED GAS mode, the maximum operational depth is calculated based on set O₂%, He% and PO₂ values.



MIXED GAS DIVE MODE ACTIVATION, MAXIMUM OPERATIONAL DEPTH BASED ON SET O₂% (14%), HE₂% (32%), AND PO₂ (1.4) IS 83.3 M.

If set to MIXED GAS mode, the Suunto HelO₂ will additionally show on the alternative display:

- the oxygen percentage, labeled O₂%
- the helium percentage, labeled He%
- the set oxygen partial pressure limit, labeled PO₂
- the current oxygen toxicity exposure, labeled OLF
- maximum depth
- current time
- water temperature
- dive time
- tank pressure



DOWN BUTTON TOGGLES BETWEEN O₂, HE, MAXIMUM DEPTH, TANK PRESSURE AND CURRENT TIME.

UP BUTTON TOGGLES BETWEEN PO₂, OLF, DIVE TIME AND WATER TEMPERATURE.

6.2.3. Oxygen limit fraction (OLF)

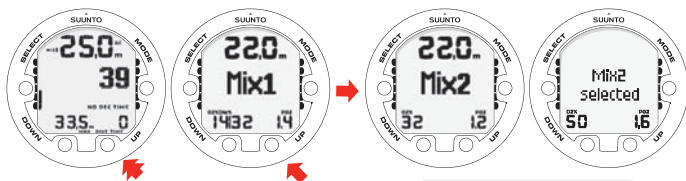
If set to MIXED GAS mode, in addition to tracking the diver's exposure to inert gas, the instrument tracks the exposure to oxygen. These calculations are treated as entirely separate functions.

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) 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*.

6.2.4. Gas change and multiple breathing gas mixes

The Suunto HelO₂ allows gas changes to enabled gas mixes during the dive. When the maximum operating depth allows for a gas change, the dive computer prompts you to change the gas. When PO₂ permits better decompression gas to be used, the dive computer prompts it automatically if it is set as primary. Gas changes are made by following the procedure below:



CHANGING GAS MIX. SCROLL THROUGH ENABLED MIXES BY PRESSING THE UP OR DOWN BUTTONS. SELECT NEW MIX BY PRESSING THE SELECT BUTTON.

NOTE

Mix number, O₂%, He% and PO₂ for the mixes are shown when scrolling. If the set PO₂ limit is exceeded, it will be shown with the PO₂ value blinking. The dive computer does not allow you to change to a gas whose set PO₂ is exceeded. In such a case, the mix is shown but cannot be selected. If the PO₂ is less than 0.18 bar, the dive computer gives an alarm.

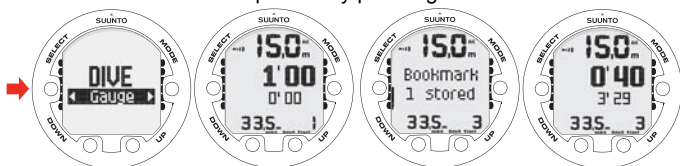
NOTE

If no button is pressed in 15 seconds, the dive computer will go back to the dive display without changing the gas mix. Upon ascent, the computer prompts you to change gas when the PO₂ level you have set for the next mix allows a gas change. The prompt is an audible 3 beeps and the current O₂ or O₂: He mix starts to blink.

6.3. Diving in GAUGE mode

If set to GAUGE mode, the dive computer can be used as a bottom timer.

In the GAUGE mode, the total dive time is always displayed in minutes in the lower right corner. In addition, a Dive Timer in the center window displays time in minutes and seconds. The center window Dive Timer is activated at the start of the dive and it can be reset during the dive and used as a stopwatch by pressing the SELECT button.



BY PRESSING THE SELECT BUTTON DURING A DIVE, A BOOKMARK IS WRITTEN IN THE PROFILE MEMORY, THE DIVE TIMER IS RESET, AND THE PREVIOUSLY-TIMED INTERVAL IS DISPLAYED BELOW.

Tank pressure (if enabled) is also displayed during the dive.

NOTE

The GAUGE 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 (48 h) has counted down.

7. AFTER DIVING

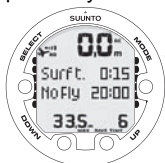
Once back at the surface, Suunto HelO₂ continues to provide post-dive safety information and alarms. Calculations to enable repetitive dive planning also help to maximize diver safety.

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 DIVING display to be replaced by the SURFACE display:



IT IS 15 MINUTES SINCE YOU SURFACED FROM A 6-MINUTE DIVE. THE PRESENT DEPTH IS 0.0 M. THE AIRPLANE SYMBOL AND NO-FLY VALUE INDICATE THAT YOU SHOULD NOT FLY FOR 20 HOURS.

Or, in the alternative displays, the following information will be shown:

- maximum depth of last dive in meters/feet
- dive time of last dive in minutes, shown as DIVE TIME
- the current time, shown as TIME
- the current temperature in °C/°F

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

- the oxygen percentage labeled O₂%
- the helium percentage labeled He%
- the oxygen partial pressure labeled PO₂
- 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, etc.

If you start a new dive with less than 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 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. Repetitive dive planning

The Suunto HelO₂ includes a dive planner that allows you to review the no-decompression limits on a subsequent dive, taking the residual nitrogen loading of previous dives into consideration. The dive plan mode is not meant for technical dive planning which the Suunto Dive Planner PC software is meant for. However, the dive plan mode can be used to plan short recreational dives.

The PC software takes the residual inert gas of the previous dives into consideration when the dive profile is downloaded from the dive computer. It is also possible to check how the planned air consumption corresponded to the actual air consumption. The Dive Planning mode is explained in *Section 7.5.1. Dive Planning mode (PLANnodec)*.

7.4. Flying after diving

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

The no-fly time is always at least 12 hours, or equivalent to the so-called desaturation time (if longer than 12 hours). For desaturation times lower than 70 minutes, no no-fly time is given.

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 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

7.5. PLAN mode

The PLAN mode includes a dive planner (PLANnodec).

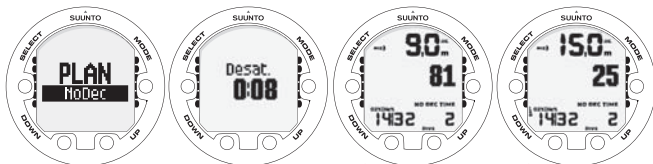


7.5.1. Dive Planning mode (PLANnodec)

The Dive Planning mode displays no-decompression times for a new dive, taking into account the effects of previous dives. No-decompression times are calculated by using the bottom gas.

When entering the PLANnodec mode, the display first briefly shows the remaining desaturation time and no-decompression time at the depth of 9 m/30 ft before going into plan mode.

By pressing the UP/DOWN buttons, you can scroll the no-decompression limits in 3 m/10 ft increments ending at 45 m/150 ft. No-decompression limits longer than 99min are displayed as “-”.



WHEN ENTERING THE PLANNODEC MODE THE DISPLAY FIRST BRIEFLY SHOWS THE REMAINING DESATURATION TIME BEFORE GOING INTO PLAN MODE. USE UP AND DOWN BUTTONS TO SCROLL DIFFERENT NO-DECOMPRESSION LIMITS. NO-DECOMPRESSION LIMITS LONGER THAN 99 MINUTES ARE DISPLAYED AS “-”.

The Planning mode takes into account the following information from previous dives:

- any calculated residual inert gas
- all dive history for the past four days

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

You can exit the planning mode by pressing the MODE button.

NOTE *The Planning mode is disabled in GAUGE mode and in Error mode (see Section 5.7. Error conditions). The planning mode calculates no-decompression times for MIX1 only. If an additional mix is enabled in the MIXED GAS mode, it does not affect the calculations in PLANNoDec mode.*

Higher Altitude and conservative Personal Adjustment settings will shorten the no-decompression time limits. These limits at different Altitude and Personal Adjustment setting selections are explained in Section 5.10.4. *Diving at altitude* and in Section 5.10.5. *Personal adjustments*

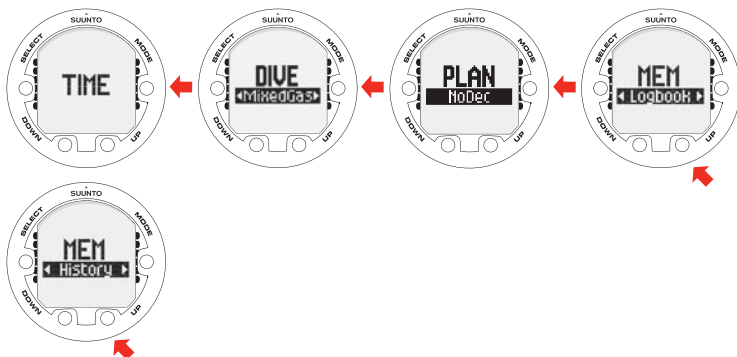
Dive numbering shown during dive planning

Dives belong to the same repetitive dive series if the instrument was still counting down the no-fly time at the beginning of the dive.

The surface interval must be at least 5 minutes for a dive to be considered a repetitive dive. Otherwise, it is considered a continuation of the same dive. The dive number will not change and the dive time will continue where it left off. (See also Section 7.2. *Dive numbering*).

7.6. MEMORY mode

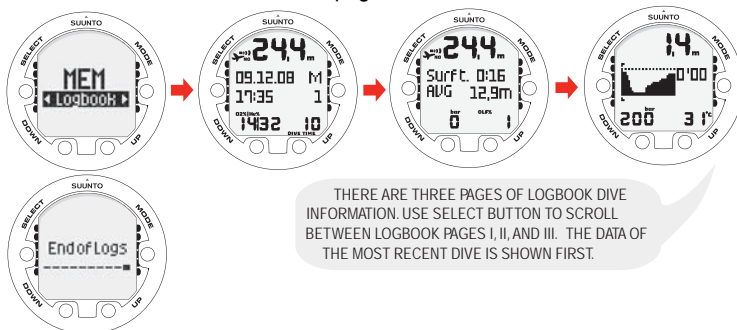
The memory options include a dive logbook (MEMLogbook) and dive history (MEMHistory).



The dive time and date are registered in the Logbook memory. Always check before diving that the time and date are correctly set, especially after traveling between different time zones.

7.6.1. Dive logbook (MEMLogbook)

The Suunto HelO₂ has a very sophisticated, high capacity Logbook and Profile Memory. The data is recorded in the profile memory based on the selected sample rate. The END OF LOGS text is displayed between the oldest and most recent dive. The following information will be shown on three pages:



Page I, main display

- maximum depth
- date of dive
- type of dive (MIXED GAS, GAUGE)
- dive start time
- dive number
- oxygen percentage for Mix used in the beginning of the dive
- helium percentage for Mix used in the beginning of the dive
- dive time

Page II

- maximum depth
- surface time after previous dive
- average depth
- warnings
- consumed tank pressure

- OLF percentage of MIXED GAS dive

Page III

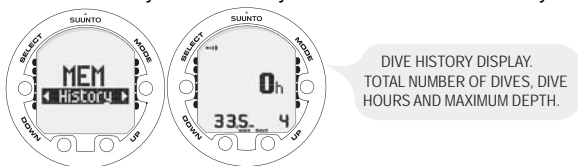
- scrolling
- dive profile (temperature, depth, tank pressure, gases)

NOTE *The memory will retain approximately the last 42 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.*

7.6.2. Dive history

The dive history is a summary of all the dives recorded by the dive computer.



7.7. Suunto Dive Planner (SDP)

Suunto Dive Planner is an essential part of your dive. It is used for creating dive plans.

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.*

Start creating a dive plan by defining the maximum depth and bottom time. Next, plan travel, bottom and decompression gases. Based on the gases, the Dive Planner calculates the decompression schedule, gas change and decompression depths. After the decompression schedule is ready, the needed gas volume for the dive is calculated based on the Surface Air Consumption (SAC) rate that can be checked from Suunto Dive Manager.

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

After you finish planning your dive with Suunto Dive Planner, download the gases, settings and alarms into your dive computer. You can use your Suunto HeIO₂ to fine-tune the settings and gases manually.

Always use alternative dive planning methods, such as dive tables, when you plan the dive. After planning your dive, analyze your dive gases and if they differ substantially from the planned gases, replan your dive. Also check the lost gas scenarios in case your decompression gases are altered during a dive, for example, due to a lost cylinder or a broken valve.

NOTE

For emergency ascents, always print out the dive plan from Suunto Dive Planner. It ensures that you have a valid decompression schedule at hand in an unlikely event that the dive computer malfunctions.

For more information about the warnings, such as Isobaric Counterdiffusion (ICD), and settings in Suunto Dive Planner, refer to Suunto Dive Planner Help.

7.8. Suunto Dive Manager (SDM)

Suunto Dive Manager (SDM) is optional PC software that greatly enhances the functionality of your Suunto HeLO₂.

With the SDM software, you can download dive data from your dive computer to your PC. You can then view and organize all the data recorded with your Suunto HeLO₂. You can also transfer dive profiles to Suunto Dive Planner, print copies of your dive profiles and upload your dive logs to share with your friends at SuuntoSports.com.

You can always download the latest version of Suunto Dive Manager from www.suunto.com. Please check for updates regularly as new features are constantly being developed.

The following data is transferred to your PC:

- 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 and helium percentage settings and maximum OLF (in MIXED GASmode)
- tissue calculation data
- real-time water temperature
- real-time tank pressure (with optional wireless transmitter in use)
- additional dive information (e.g. SLOW and Mandatory Safety Stop violations, Diver Attention Symbol, Bookmark, Surfaced Mark, Decompression Stop Mark, Ceiling Error Mark)
- dive computer serial number
- personal information (30 characters)
- tank pressure consumption (with optional wireless transmitter in use)

Using SDM, you are able to enter setup options such as:

- input a personal, 30-character field into the Suunto HeLO₂
- reset the Dive History's maximum depth to zero

It is also possible to manually add comments, multimedia and other personal information to the PC-based dive data files.

7.9. www.suuntosports.com and Suunto Diving World at www.suunto.com/diving

When you have dived and transferred your dive data to your Suunto Dive Manager, you can share your best experiences with other diving enthusiasts at SuuntoSports.com. It's a free and open Internet community where you can compare your underwater experiences with other Suunto users and learn from each other.

SuuntoSports.com includes three sections.

In My Suunto you can register your dive computer and manage your membership profile. The section also contains a personal event calendar.

The Communities section is meeting a place for smaller groups of SuuntoSports.com members. Here you can create and manage your own communities and search for others. All communities have a home page that lists the latest group activities. Community members can also use group-specific bulletin boards and calendars, create their own link lists and group activities. All registered SuuntoSports.com users automatically become members of the 'World of Suunto Sports' community.

The Sport forums include sport-specific news, bulletin boards, event calendars, ranking lists and discussions. You can also exchange experiences and read travel reports written by other members.

To learn more about SuuntoSports.com's functions and activities, visit the site, try them and, if necessary, use the site Help. The Help is available on the right side of the bar that divides the screen.

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.

• 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 the biennial 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, etc. 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

WHAT CAN I DO TO MY SUUNTO DIVING COMPUTER MYSELF?

NOTE

It is advisable to contact an authorized Suunto service, distributor or retailer for any repairs. Batteries and straps can be replaced by the user when the change is made in a proper manner to avoid any leakage of water into the battery compartment or computer. Original battery replacement and strap kits must be used.

Batteries can be changed by the user in all diving computers except Stinger, D4, D6 and D9.

Instructions for changing batteries and straps can be found in the user manuals or at www.suunto.com and the user videos there.

WHAT ARE ORIGINAL SUUNTO ACCESSORIES?

Original Suunto accessories are only distributed through Suunto's worldwide network of authorized Suunto distributors and retailers.

Original Suunto accessories are tested to be compatible with Suunto products and can be used safely.

NOTE

Damage caused by non-original accessories will not be covered by warranty.

HOW TO GET MORE INFORMATION

You can find service & warranty information in these pages by searching the FAQs.

If you do not find the answer in the FAQs, you can also send a support request. To be able to send a support request you have to register in the system. REGISTER NOW.

You can also contact our European help desk by telephone at +358 2 284 1160. The cost of the call is that of a normal call to Finland. The call center is open Mon-Fri, 24h/day. The service is provided in English all the time. Other languages - French, German, Swedish, Japanese, Spanish and Finnish – are only provided during local business hours. Call center professionals can answer customer questions regarding diving products, outdoor products and compasses.

HOW DO I KNOW IF MY SUUNTO PRODUCT IS COVERED BY WARRANTY?

You can check the proof of purchase, which has to be 2 years or less. You can also check the serial number of your unit.

Does repairing my Suunto product extend the warranty?

As far as the national laws permit, repairing the product does not extend or otherwise affect the warranty period. However, part(s) repaired or replacement product(s) provided during the warranty period will be warranted for the remainder of the original warranty period or for three (3) months from the date of repair or replacement, whichever is longer.

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

CAUTION *When the battery is changed, all nitrogen and oxygen uptake data is lost. Therefore, the no-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.*

All history and profile data, as well as the altitude, personal, and alarm settings, will remain in the dive computer memory after the battery change. However, the clock time and time alarm settings are lost. In the MIXED GAS mode, the gas mix settings also revert back to default settings (MIX1 21% O₂, 0% He, 1.4 bar PO₂).

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. Thoroughly rinse and dry the computer.
2. 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.
3. Remove the ring.
4. 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.
5. Remove the O-ring and the battery retainer.
6. Carefully remove the battery. Do not damage the electrical contacts or the sealing surface.
7. Check for any traces of flooding, particularly between the beeper and the lid, or for any other damage. In case of a leak or any other damage, bring the dive computer to an authorized SUUNTO dealer or distributor for check and repair.
8. Check the condition of the O-ring; a defective O-ring may indicate sealing or other problems. Dispose the old O-ring, even if it seems to be in good condition.
9. Check that the battery compartment, battery holder and lid are clean. Clean with soft cloth if necessary.
10. Reinstall the battery retainer in its correct position.

11. 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.
12. 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.
13. 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!
14. Turn the locking ring counterclockwise with your free thumb and fingers until it snaps into its locked position.
15. 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.

CAUTION

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

Securing Ring

Battery Compartment Lid with buzzer

O-Ring



HeO₂

Battery

Battery Retainer



9.4. Wireless transmitter battery replacement

NOTE

It is advisable to contact an authorized Suunto representative for transmitter battery replacement. It is imperative that the change is made in a proper manner to avoid any leakage of water into the transmitter.

CAUTION

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

9.4.1. Transmitter battery kit

The transmitter battery kit includes a 3.0 V CR ½ AA 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 metal surfaces of the battery with your bare fingers.

9.4.2. Required tools

- A Phillips-head screwdriver
- Soft cloth for cleaning

9.4.3. Replacing the transmitter battery

To change the transmitter battery:

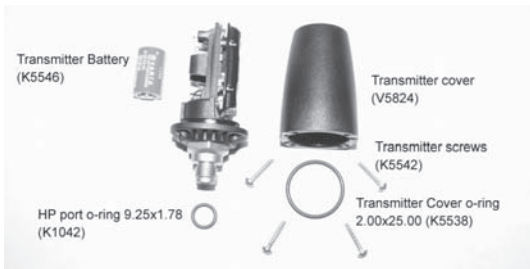
1. Remove the transmitter from the regulator HP port.
2. Unscrew and remove the four Phillips screws on the back of the transmitter.
3. Pull off the transmitter cover.
4. Carefully remove the o-ring. Be careful not to damage the sealing surfaces.
5. Carefully remove the battery. Do not touch the electrical contacts or the circuit board. Check for any traces of leakage, or for any other damage. If there is a leak or any other damage, take the transmitter to an authorized Suunto representative or distributor for checking and repair.
6. Check the condition of the O-ring. A defective O-ring may indicate sealing or other problems. Dispose of the old O-ring, even if it seems to be in good condition
7. Check that the O-ring groove and the sealing surface of the cover are clean. Clean them with a soft cloth if necessary.
8. Gently insert the new battery into the battery compartment. Check the polarity of the battery. The "+" mark should point toward the top of the compartment and the "-" mark towards the bottom.

NOTE

It is imperative that you wait at least 30 seconds before re-installing the transmitter battery.

When the battery is re-installed, the transmitter sends an overpressure ("---") signal on code 12 for 10 seconds, after which it goes to normal operation, and shuts down after 5 minutes.

9. Check that the new lubricated O-ring is in good condition. Put it in the right position in the O-ring groove. Be very careful not to get any dirt on the O-ring or its sealing surfaces.
10. Carefully put the transmitter cover into place. Note that the cover will only fit in one position. Match the three slots on the inside of the cover with the three ledges below the battery.
11. Screw the four screws back into place.



Wireless transmitter parts. The code stands for spare part order number.

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

Transmitter:

- Max. diameter: 40 mm/1.57 in
- Length: 80 mm/3.15 in
- Weight: 118 g/4.16 oz
- Rated working pressure: 300 bar/4000 psi, maximum allowed pressure 360 bar/5,000 psi
- Display resolution: 1 bar/1 psi

Depth gauge:

- Temperature compensated pressure sensor
- Fresh water calibrated (calibrated in compliance with EN 13319)
- Maximum depth of operation: 120 m/393 ft (complying with EN 13319)
- Accuracy: $\pm 1\%$ of full scale or better from 0 to 120 m/394 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 m from 100 to 150 m/1 ft from 0 to 492 ft

Temperature display:

- Resolution: 1°C/1°F
- Display range: -20 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 MIXED GAS mode:

- Oxygen %: 8 - 99
- Helium %: 0 - 92
- Oxygen partial pressure display: 0.0 - 3.0 bar.
- Oxygen Limit Fraction: 0 - 200% with 1% resolution

Logbook/dive profile memory:

- Recording interval: 20 seconds adjustable (10,20,30,60s).
- Memory capacity: approximately 80 hours of diving with 20 second recording interval
- Depth resolution: 0.3 m/1 ft

Operating conditions:

- Operating 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 Technical 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

- Helium halftimes: 1, 2, 3.5, 7.5, 15, 30, 45, 90, 181 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
- Battery storage time (shelf life): Up to three years
- Replacement: Every three years, or more often depending on dive activity
- Life expectancy at 20°C/68°F:
 - 100 dives/year → 1 year

Transmitter:

- One 3V lithium battery: 1/2AA (K5546) and O-ring 2.00 mm x 2.00 mm (K5538)
- 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 (e.g. temperature/cold conditions). Below 10°C/50°F the expected battery lifetime is about 50-75% of that at 20°C/68°F
- The use of the backlight and audible alarms
- The quality of the battery. (Some lithium batteries may exhaust unexpectedly, which cannot be tested in advance)
- The time the dive computer has been stored until it gets to the customer. (The battery is installed 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 Technical RGBM decompression model

Suunto's decompression model development originates from the 1980s when Suunto implemented Bühlmann's model based on M-values in Suunto SME. Since then research and development has been ongoing with the help of external and internal experts. In the late 1990s Suunto implemented Dr. Bruce Wienke's RGBM bubble model to work with the M model. The first commercial products with the feature were Vyper and Stinger. With these products the improvement of diver safety was significant.

Now Suunto has taken another leap in decompression modeling by introducing Suunto Technical RGBM decompression model with He tissues.

Suunto Technical RGBM model is a modified version of the M-value model. Calculation of the M-value model can be found in common dive literature. Modifications have been made to have the model follow RGBM theory as closely as possible. The modifications have been conducted with the help of Dr. Bruce Wienke. Functionality of Suunto Technical RGBM has been validated and verified to the depth of 120 m/393 ft with hundreds of test dives both in the field and in laboratory. The algorithm should not be used in deeper depths than the verified depth.

Suunto technical algorithm models the human body by using nine tissue groups. In theory the model is accurate if there are more tissue groups, but using more than nine tissue groups has no practical significance.

Tissue calculation aims to model the amount of nitrogen (N_2) and helium (He) saturated in tissues. On-gassing and off-gassing of saturated gas is modelled using the ideal gas equation. In practice this means that the total pressure of the nitrogen and helium tissues can be higher than the total pressure of the breathing gas, even without any exposure to pressure. For example, when a diver dives an air dive soon after a demanding trimix dive, the residual pressure of helium combined with a high nitrogen content cause the diver a decompression obligation very fast.

10.2.2. Diver safety and Suunto Technical RGBM model

Because any decompression model is purely theoretical and does not monitor the actual body of a diver, no decompression model can guarantee the absence of DCI. Suunto Technical RGBM model has many features that reduce the risk of DCI. The Suunto Technical RGBM algorithm adapts its predictions of both the effects of microbubble build-up and adverse dive profiles in the current dive series. The pattern and speed of decompression is adjusted according to the microbubble influence. The adjustment is also applied to the maximum combined nitrogen and helium overpressure in each theoretical tissue group. To add diver safety, off-gassing is also slowed down compared to on-gassing and the amount of slowing down depends on the tissue group.

Experimentally it has been shown that the body adapts to decompression to some degree when diving is constant and frequent. Two personal adjustment settings (P-1 and P-2) are available for divers who dive constantly and are ready to accept greater personal risk.

CAUTION

Always use the same personal and altitude adjustment settings for the actual dive than for the planning. Increasing the personal adjustment setting from the planned setting as well as increasing the altitude adjustment setting can lead to longer decompression times deeper and thus to larger required gas volume. You can run out of breathing gas underwater if the personal adjustment setting has been changed after dive planning.

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
- for recreational scuba diving, the recommended upper limit of 1.4 bar PO_2 is used as a default
- the CNS % limits up to 1.6 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

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 $O_2\%$ 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
- audible alarms are given and the actual PO_2 value blinks when it exceeds the preset limit
- in dive planning, the maximum depth according to the $O_2\%$ and maximum PO_2 selected

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11.2. Trademark

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11.3. Patent notice

This product is protected by the following patents and patent applications: US 5,845,235 and US11/152,075. Other patents have been applied for.

12. DISCLAIMERS

12.1. User's responsibility

This instrument is intended for recreational use only. Suunto HelO₂ must not be used for obtaining measurements that require professional or industrial precision.

12.2. CE

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

FIOH, Topeliuksenkatu 41 a A, FI-00250 Helsinki, Finland, notified body no.0430, has EC type-examined this type of personal protective equipment.

EN 250 Respiratory equipment - Open circuit self-contained compressed air diving apparatus – Requirements, testing, marking.

EN 13319 "Diving accessories – Depth gauges and combined depth and time measuring devices – Functional and safety requirements, test methods" is a European diving depth gauge standard. The Suunto is designed to comply with this standard.

13. SUUNTO LIMITED WARRANTY FOR SUUNTO DIVING COMPUTERS AND SUUNTO DIVING COMPUTER ACCESSORIES

This Limited Warranty is valid as of January 1st, 2007.

Suunto Oy ("Suunto") provides this limited warranty to those who have purchased the Suunto Diving computer and/or Suunto diving computer accessories ("Product").

Suunto warrants that during the Warranty Period Suunto or a Suunto Authorized Service Center will, at its sole discretion, remedy defects in materials or workmanship free of charge either by a) repairing the Product or the parts, or b) replacing the Product or the parts, or c) refunding the purchase price of the Product, subject to the terms and conditions of this Limited Warranty. Your mandatory legal rights under your applicable national laws relating to the sale of consumer products are not affected by this Limited Warranty.

This Limited Warranty is only valid and enforceable in the country in which you purchased the Product, provided that Suunto has intended the Product for sale in that country. If, however, you purchased the Product in a member state of the European Union, Iceland, Norway, Switzerland or Turkey, and Suunto originally intended the Product for sale in one of these countries, this Limited Warranty is valid and enforceable in all of these countries. The warranty service may be limited due to the possible country-specific elements in the Products.

In countries outside the European Union, Iceland, Norway, Switzerland or Turkey, subject to your agreement to pay a service fee and compensation for the possible shipment costs incurred by Suunto or a Suunto Authorized Service Centre, you can have warranty service other than in the country in which you purchased the Product. Any spare parts will be provided free of charge in this case.

Warranty Period

The Warranty Period starts at the date of retail purchase by the original end-user purchaser. The Product may consist of several different parts, and the different parts may be covered by a different warranty period (hereinafter "Warranty Period"). The different Warranty Periods are:

- a. Two (2) years for the diving computers;
- b. One (1) year for the consumable parts and accessories, including (but not limited to) chargeable batteries, chargers, docking stations, straps, cables and hoses (whether included in the diving computer sales package or sold separately).

To the extent your national laws permit, the Warranty Period will not be extended or renewed or otherwise affected due to subsequent resale, Suunto authorized repair or replacement of the Product. However, part(s) repaired or replaced during the Warranty Period will be warranted for the remainder of the original Warranty Period or for three (3) months from the date of repair or replacement, whichever is longer.

Exclusions and Limitations

This Limited Warranty does not cover:

1. a) normal wear and tear, b) defects caused by rough handling (including, without limitation, defects caused by sharp items, by bending, compressing or dropping, etc.), or c) defects or damage caused by misuse of the Product, including use that is contrary to the instructions provided by Suunto (e.g. as set out in the Product's user guide and/instruction manual), and/or e) other acts beyond the reasonable control of Suunto;
2. user manuals or any third-party software (even if packed or sold with the Suunto hardware), settings, content or data, whether included or downloaded in the Product, or whether included during installation, assembly, shipping or at any other time in the delivery chain or otherwise and in any way acquired by you;
3. defects or alleged defects caused by the fact that the Product was used with, or connected to, any product, accessory, software and/or service not manufactured or supplied by Suunto, or was used otherwise than for its intended use;
4. replaceable batteries.

This Limited Warranty is not enforceable if:

1. the Product has been opened, modified or repaired by anyone other than Suunto or a Suunto Authorized Service Centre;
2. the Product has been repaired using unauthorized spare parts;
3. the Product's serial number has been removed, erased, defaced, altered or made illegible in any way - and this shall be determined at the sole discretion of Suunto;
4. the Product has been exposed to influence from chemical products 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

Please access and review the online help resources available at www.suunto.com / customer service or referred to in the Product manual before seeking warranty service.

If a claim under this Limited Warranty appears to be necessary, please contact your local authorized Suunto retailer – for contact information please visit the Suunto website www.suunto.com or call a Suunto Help Desk (national or premium rates may apply) for further details on how to make a claim. You will then be advised on how to bring your Product for warranty service. Should you wish to return the Product by shipping it to your local authorized Suunto retailer, please use prepaid freight. When making a claim under this Limited Warranty you are required to include your name and address, proof of purchase and/or service registration card (Suunto warranty registration at www.suunto.com is considered adequate for this purpose), as required in your country, which clearly indicates the serial number, name and address of the seller, the date and place of purchase, and the product type. The claim will be honored and the Product repaired or replaced at no charge and returned in a reasonable amount of time. This shall be determined at the sole discretion of Suunto or a Suunto Authorized Service Center. If the Product is found not to be covered by the terms and conditions of this Limited Warranty, Suunto or a Suunto Authorized Service Centre reserve the right to charge a handling fee.

Any claim under this Limited Warranty is subject to you notifying Suunto or a Suunto Authorized Service center of the alleged defect within a reasonable time of it having come to your attention, and in any event no later than before the expiry of the Warranty Period.

Other important notices

Please remember to take backup copies of all important content and data stored in your Product because content and data may be lost during repair or replacement of the Product. Suunto or a Suunto Authorized Service Centre is not responsible for any damage or loss of any kind whatsoever resulting from loss of, damage to, or corruption of content or data during repair or replacement of the Product.

When the Product or a part is replaced, any replaced item becomes the property of Suunto. If a refund is given, the Product for which the refund is given must be returned to a Suunto Authorized Service Centre as it becomes the property of Suunto and/or Suunto Authorized Service Centre.

When repairing or replacing the Product, Suunto or a Suunto Authorized Service Centre may use products or parts that are new, equivalent to new or re-conditioned.

Limitation of Liability

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FROM THE PURCHASE OR USE OF THE PRODUCT OR ARISING FROM BREACH OF THE WARRANTY, BREACH OF CONTRACT, NEGLIGENCE, STRICT TORT, OR ANY OTHER LEGAL OR EQUITABLE THEORY, EVEN IF SUUNTO KNEW OF THE LIKELIHOOD OF SUCH DAMAGES. SUUNTO SHALL NOT BE LIABLE FOR DELAY IN RENDERING SERVICE UNDER THE LIMITED WARRANTY, OR LOSS OF USE DURING THE TIME THE PRODUCT IS BEING REPAIRED.

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.
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.
He%	Helium percentage or helium fraction in the breathing gas.
Heliox	A breathing gas mix of helium and oxygen.
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.
PFO	Abbreviation for patent foramen ovale. It is a form of congenital heart defect that enables blood flow between the left and right atria via the interatrial septum.
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.
Technical dive	A dive made with two or more breathing gas mixes.
Tissue group	Theoretical concept used to model bodily tissues for the construction of decompression tables or calculations.
Trimix	A breathing gas mix of helium, oxygen and nitrogen.
UHMS	Abbreviation for Undersea and Hyperbaric Medical Society.
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.

CUSTOMER SERVICE CONTACTS

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TWO YEAR WARRANTY

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

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

Suunto's dive computers and wristop computers can be registered online at www.suunto.com.

Model of
Dive Computer

Serial
number:

| | | | | | | | | |

| | | | | | | | | |

| | | | | | | | | |

| | | | | | | | | |

Date of purchase

Place of purchase/Store name

Store City _____ Store Country _____

Store stamp with date of purchase

--

Name _____

Address _____

City _____ Country _____

Telephone _____ E-mail _____

Signature _____

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