Deutsch
English
Français

Operating Manual

Smart PRO
Smart COM

UWATEC®

SWISS MADE BY UWATEC AG

Safety considerations

You must carefully read and understand this entire manual before using your new computer.

WARNING

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

Guidelines for the use of your UWATEC dive computer:

The following guidelines are derived from the latest medical research and the recommendations of the American Academy of Underwater Sciences for diving with diving computers. Following these guidelines will greatly increase your safety while diving, but cannot guarantee that decompression sickness or oxygen toxicity will not occur.

- This computer is designed for dives with Nitrox (to a max.100% O_2) and compressed air (21%O_2) only. Do not use the computer for dives made with other mixed gases.
- It is absolutely necessary to check the set mixture before each dive and to compare it to the gas mixture currently used. Always remember: setting an incorrect mixture carries an inherent risk of decompression sickness and/or oxygen toxicity! Maximum deviation from the measured mixture must not exceed 1% O_2. An incorrect gas mixture can be lethal!
- Only use this computer with open circuit breathing systems. The computer must be set for a determined gas mixture.
- Only use this computer for diving with an independent breathing apparatus. The computer is not designed for long term exposures with Nitrox.
- Always observe the visual and audible alarm signals of the computer. Avoid situations of increased risk which are marked with a warning sign in this operating manual.
- If the ascent arrow appears, start to ascend.
- If the flashing ascent arrow appears, start to ascend immediately.
- This computer has a ppO_2 warning, the default limits of which are set at 1.4 bar ppO_2max. This limit can be adjusted via SmartTRAK. An alteration of the ppO_2max to higher than 1.6 bar is dangerous and we do not recommend this.
- Frequently check the "oxygen clock" (CNS O_2), especially in the range higher than 1.4 bar ppO_2. Ascend and finish the dive if the CNS O_2 exceeds 75%.
- Never dive deeper than the Maximum Operating Depth (MOD) pertinent to the gas mixture in use.
- Always check the diving limits considering the oxygen content and standard sports diving procedures (decompression sickness, oxygen toxicity).
- In accordance with the recommended maximum diving limit of all instructional agencies, do not dive deeper than 40 metres/130 feet.
- The danger of nitrogen narcosis has to be taken into consideration. The computer gives no warning about this.
- On all dives, with or without dive computer, make a safety stop for at least 3 minutes at 5 metres (15 feet).
- All divers using dive computers to plan dives and indicate or determine decompression status must use their own computer, which they take with them on all dives.
- If the computer fails at any time during the dive, the dive must be terminated, and appropriate surfacing procedures (including a slow ascent and a 3 to 5 minute safety stop at 5 metres /15 ft) should be initiated immediately.
- Comply with the ascent rate and carry out any decompression stop required. If the computer should fail for any reason, you must ascend at a rate of 10m (30 feet) per minute or less.
- On any given dive, both divers in a buddy pair must follow the most conservative dive computer for that particular dive.
- Never dive without a buddy. The computer does not substitute for a dive buddy.
- Only make dives that are appropriate to your level of dive training. A dive computer does not increase your knowledge of diving.
- Always dive with back-up instruments. Make sure that you always use back-up instrumentation including a depth gauge, submersible pressure gauge, digital bottom timer or dive watch, and have access to decompression tables whenever diving with a dive computer.

- Avoid repeated ascents and descents (yo yo diving).
- Avoid repeated heavy workload while at depth.
- Plan the dives to be shorter if they are made in cold water.
- After finishing the decompression or at the end of a no-stop dive, the final stage of the ascent should be as slow as possible.
- You MUST be familiar with all signs and symptoms of decompression sickness before using this computer! Seek IMMEDIATE treatment for decompression sickness should any of these signs or symptoms occur after a dive! There is a direct correlation between the effectiveness of treatment and the delay between the onset of symptoms and the treatment for decompression sickness.
- Only dive with Nitrox after you have been thoroughly instructed by a recognised institution.

Repetitive dives

- Do not start your next dive before your CNS O_2% status has dropped below 40%.
- Diving with Nitrox: make sure your surface interval is long enough (just like diving with compressed air). Plan for a minimum surface interval of two hours. Oxygen, too, needs sufficient time to leave the body.
- Match gas mixture to the intended dive.
- Do not attempt a repetitive dive if the microbubble warning is visible on the display.
- Plan a day without diving once a week.
- If you have to change computers, wait at least 48 hours before carrying out your next dive.

Altitude and diving

- Do not dive at altitudes higher than 4000 m (13000 ft).
- After a dive do not rise to altitudes that the computer prohibits via the flashing altitude segments (see page 21).

Flying after diving

- After diving, wait at least 24 hours prior to flying.

CE

The Smart PRO and Smart COM dive instruments are personal protective equipment in compliance with the essential safety requirements of the European Union directive 89/686/EEC. RINA SpA, Via Corsica 12, I-16128 Genoa, notified body no. 0474, have certified their conformity with the European Standard EN 13319:2000 and, limited to Smart COM with the European Standard EN 250:2000.

EN250:2000 Respiratory equipment - Open-circuit self contained compressed air diving apparatus - Requirements, testing, marking (pressure gauge test).

EN13319:2000 Diving accessories - Depth gauges and combined depth and time measuring devices - Functional and safety requirements, test methods. Any information on decompression obligation displayed by equipment covered by this standard is explicitly excluded from its scope.

Introduction

Congratulations on purchasing a Smart PRO or Smart COM dive computer and welcome to UWATEC. From now on you will enjoy the assistance of the most extraordinary dive computer - equipped with UWATEC's most innovative technology - while diving.
This operating manual provides full information on the operation and functions of UWATEC Smart PRO and Smart COM dive computers. To make this manual easier to read we will use the term „Smart" as an abbreviation for „UWATEC Smart PRO diving computer" and „UWATEC Smart COM diving computer" throughout this booklet. Information which is valid only for Smart COM is marked with „COM".
We thank you for choosing Smart and we hope you will enjoy safe dives in the future! Further information on UWATEC Smart dive computers and other products by UWATEC can be found on our web page at www.uwatec.com.

Safety considerations
Dive computers provide divers with data; they, however, do not provide the knowledge how this data should be understood and applied. Dive computers cannot replace common sense! You must therefore carefully read and understand this entire manual before using your Smart.

Important remarks concerning signal words and symbols

This operating manual makes use of the following icons to indicate especially important comments:

Remarks  Information and tips which are important for optimal use of the functions of Smart.

Danger!

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

The following symbols are used in the operating manual:

 Flashing display

-> Page reference e.g. ->10

COM Information valid only for Smart COM

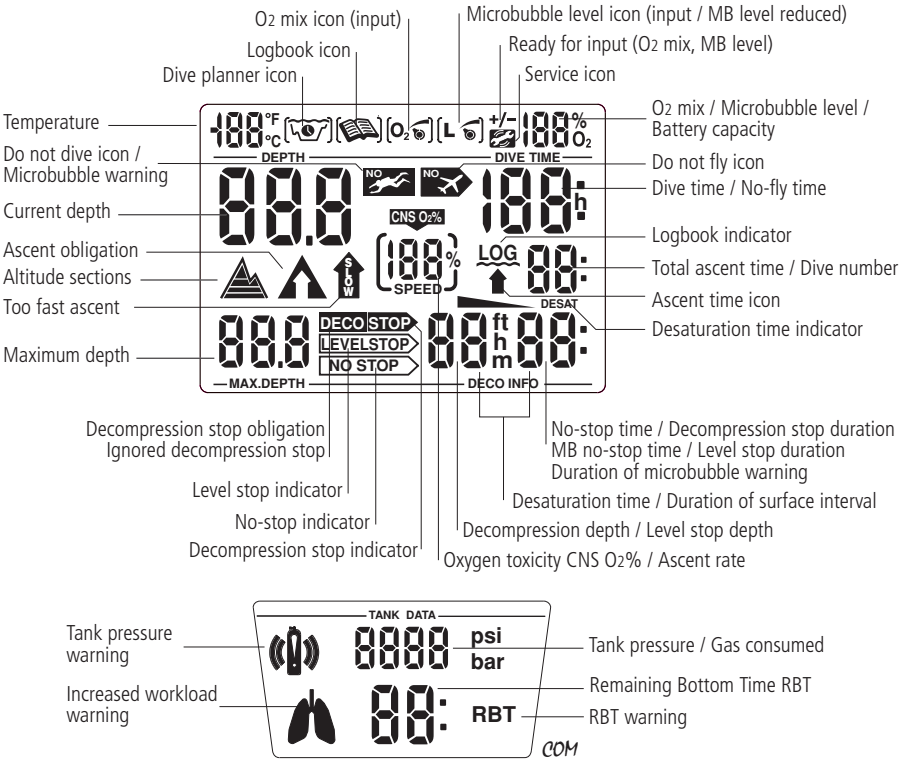
Audible signals

4 sec Audible attention signal

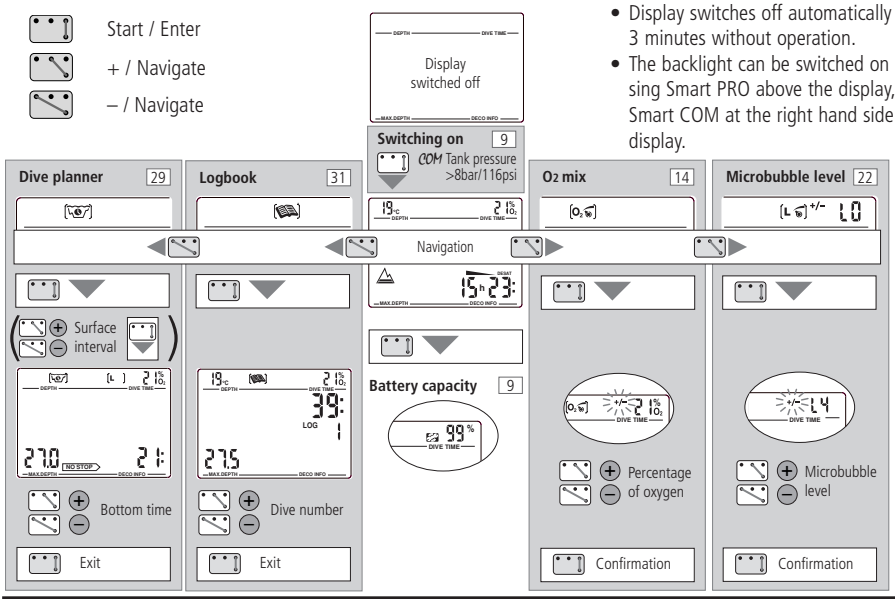
Audible alarm signal

Instructions for manual input

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



Operating scheme



- Display switches off automatically after 3 minutes without operation.
- The backlight can be switched on by pressing Smart PRO above the display, and Smart COM at the right hand side of the display.

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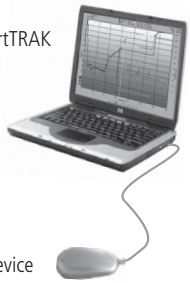
II System and operation

1 System description

Smart COM

Smart displays all important dive and decompression data. Smart has a data memory which stores the dive data. The data can be transmitted with an infrared interface (IrDA) and SmartTRAK software to a Windows® personal computer. SmartTRAK CD software is included with the Smart package. Infrared interfaces are available in PC stores. A list of recommended interfaces is available on the UWATEC homepage (www.uwatec.com).

Smart PRO



2 Operation

On page 5 you will find an operating schematic.

2.1 Operating elements

Smart has 4 operating contacts B, E, +, – on the outside of the housing. For manual operation, touch base contact B and any one of the other three contacts above the display with moistened fingers ("bridging" contacts).

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

Contact E
Enter contact. It serves to switch on Smart and to confirm or enter the displayed value. It is therefore comparable to the ENTER or RETURN key of a keyboard.

+ / – Contacts
These allow to navigate between menus and, once inside a menu, to increase or decrease the indicated value.

2.2 SmartTRAK

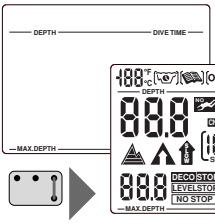
With SmartTRAK you can transfer dive data to a personal computer and graphically display the data. The following settings may be changed with SmartTRAK:

• Unit system	metric/imperial
• Audible attention signal suppression	selective
• Gauge mode	on / off
• Depth alarm	5 - 100 m (20 - 330 feet)
• Backlight illumination duration	2-12 sec.
• Maximum partial pressure of oxygen (ppO_2 max)	1-1.95 bar
• Time limit to reset the O_2 % mix to air	no reset / 1 - 48 hrs.
• COM Minimum reserve pressure at the end of the dive (basis for RBT calculation)	20 – 120 bar (300 - 1750 psi)
• COM Tank pressure alarm	50 - 200 bar (750 - 2900 psi)
• COM Workload sensitivity	25 steps

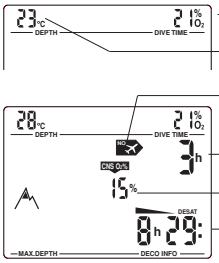
The following data may be recalled with SmartTRAK:

- Number of past dives ✓
- Total duration of past dives ✓
- Atmospheric pressure ✓
- Dive profile ✓
- Logbook ✓
- Temperature curve ✓
- COM Workload curve ✓
- Alarms and attention messages ✓

2.3 Switching on the display



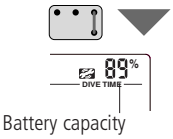
- automatically, on submerging in water or when adaptation to atmospheric pressure is necessary;
- manually by bridging contacts on housing (B-E).
- COM on opening the tank valve (if connected) (Tank pressure ≥ 8 bar / 116 psi).
  - When Smart is in state of rest no information is displayed but the atmospheric pressure is continuously monitored. If a higher altitude range is detected, Smart switches on for 3 minutes automatically -> 21.
  - Smart switches on by bridging the contacts B and E. All segments light up for 5 seconds.



Afterwards the display shows the selected O_2 mix, the temperature and in certain circumstances an altitude range (-> 21). Smart COM displays the tank pressure also.

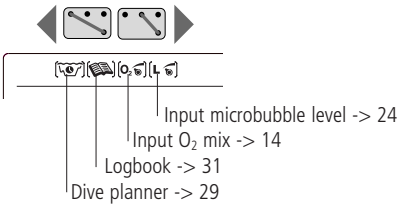
If there is a remaining saturation from the last dive or from a change of altitude, Smart also displays the <do not fly> time, the <do not fly> icon, the current altitude range and the prohibited altitude range (->20).

2.4 Checking the battery capacity



After switching on Smart you can check the battery capacity by bridging contacts B and E. The remaining capacity is displayed for 3 seconds as a percentage. If the value reaches 0%, the battery warning gets activated (-> 13) and the battery has to be replaced by an authorised SCUBAPRO UWATEC dealer. For a 7-day diving vacation Smart uses between 2 – 5 % of its battery capacity.

2.5 Selection and activation of user functions



At the surface you can select the dive planner, the logbook and the functions to enter the O_2% mix and the microbubble level by bridging the contacts + and B or – and B.

After the selection of the desired function you can activate and deactivate it by bridging the contacts B and E.

Details to the user functions are to be found on the pages mentioned above.

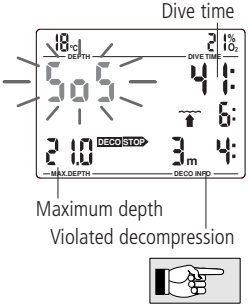
2.6 Active backlight

The display of Smart can be illuminated both on the surface and underwater. The backlight can be switched on by pressing Smart PRO above the display, and Smart COM at the right hand side of the display. The light will turn off automatically after 8 seconds or after the time selected via SmartTRAK. The backlight can only be activated if the computer display is on.

2.7 Switching off the display

- automatically after 3 minutes without operation on the surface.
- COM at the surface: automatically after 3 minutes without a reduction of tank pressure. The display switches on again after starting to breathe from the tank.

3 SOS mode



Activation: automatic
If the diver remains above a depth of 0,8 m (3 feet) for more than three minutes without observing a prescribed decompression, the computer switches into SOS mode after the dive and displays <SOS> instead of the depth. The computer is locked from use for the next 24 hours. The display shows the most important information of the dive. Desaturation is further calculated including microbubbles in the tissues. Diving is again possible after 24 hours, but the SOS mode can influence the calculations of Smart for three days after the incident due to the possible presence of microbubbles.

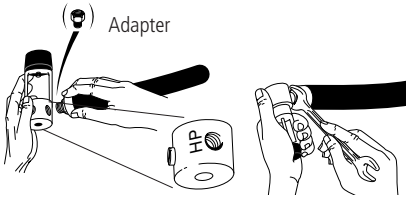
If a diver using Smart experiences a diving accident resulting in decompression sickness, the dive can be analysed by means of the infrared interface and SmartTRAK software.

WARNING

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

4 COM Setting up Smart COM

4.1 Mounting the high pressure hose to the first stage



The high pressure hose is mounted on the high pressure outlet (HP outlet) of the first stage of the regulator.

1. Mount the high pressure hose on the HP outlet.
   If the threads do not match, you can obtain an adapter from your diving retailer.

2. Tighten the connection with a matching wrench.

1 Terminology / Symbols

The information on the display of Smart varies depending on the kind of dive and the dive phase.

For information about diving with microbubble levels (MB levels) see chapter IV (-> 22).

1.1 General terminology / Display during no-stop phase

Oxygen toxicity
CNS O2%

Ascent rate
(Only while ascending)

Current depth
In metres (feet)

Temperature

O2% Mix
Selected oxygen fraction

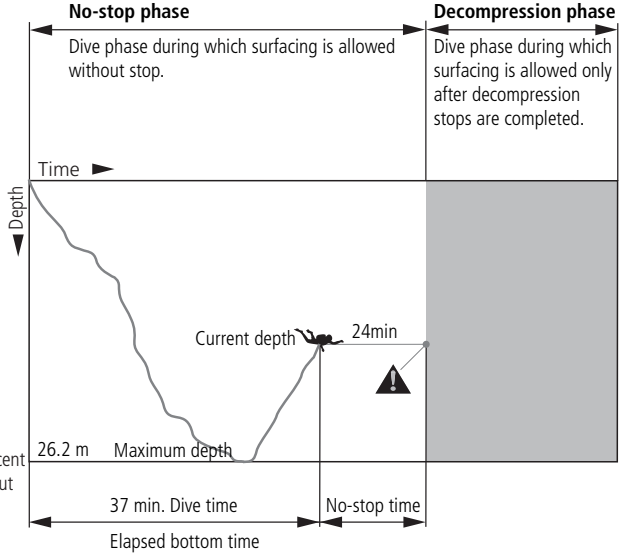
Dive time
Duration of the dive (min)

No-stop time
Remaining time at a given depth during which ascent is allowed without decompression stop (min)

Maximum depth
Maximum depth reached during the dive.

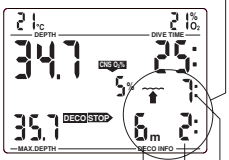
Tank pressure

Remaining Bottom Time, RBT



1.2 Display during decompression phase / Remaining Bottom Time (RBT)

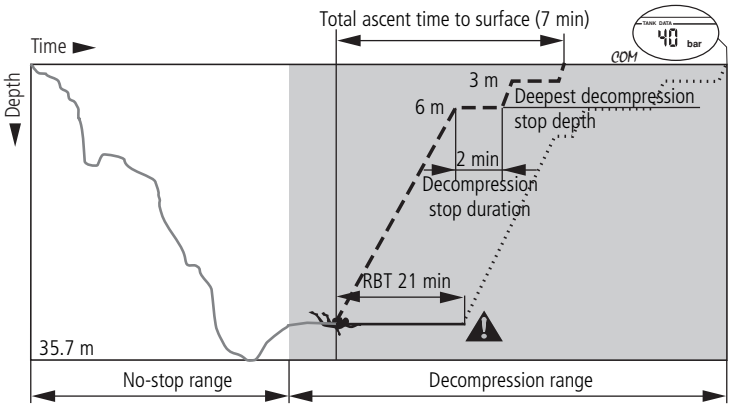
Decompression stop
All required decompression stops must be observed.

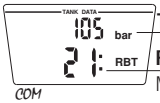


Decompression stop depth
Deepest stage is displayed.

Decompression stop duration
Prescribed duration of the decompression stop at the displayed decompression stage (minutes).

Total ascent time
Including decompression stops in minutes.





Tank pressure

Remaining Bottom Time, RBT
Maximum remaining time at current depth including all decompression obligations (minutes).

1.3 Nitrox information (O_2 information)

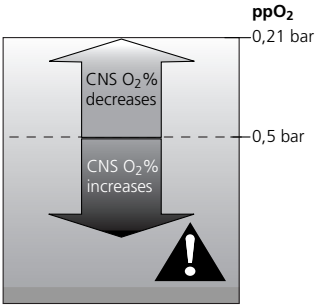
For dives with compressed air in normal recreational diving, nitrogen is the decisive gas for the decompression calculations. When diving with Nitrox, the risk of oxygen toxicity rises with the increase of the fraction of oxygen and the increase of depth and can limit dive time and the maximum depth. Smart includes this in the calculations and displays the necessary information:

<O_2% MIX> Fraction of oxygen: the fraction of oxygen in the Nitrox mixture can be set between 21% (normal compressed air) and 100% in 1% increments. Your selected mix will be the basis for all calculations.

ppO_2 max Maximum allowed partial pressure of oxygen: the higher the fraction of oxygen in the mixture, the shallower the dive depth at which this value of the partial pressure of oxygen is reached. The depth at which ppO_2 max. is reached is called Maximum Operating Depth (MOD). Default setting is 1.4 bar, but it can be set by means of SmartTRAK between 1.0 and 1.95 bar. Smart does not display the entered ppO_2 limit, but warns the diver audibly and visually once the depth is reached at which the ppO_2 reaches the maximum allowed value.

The CNS O_2% value/alarm is not influenced by the selected ppO_2max. setting.

<CNS O_2> Oxygen toxicity: With the increased percentage of oxygen, the oxygen in the tissues (especially in the central nervous system (CNS)) becomes important. If the partial pressure of oxygen rises above 0.5 bar, the CNS O_2 value increases, if the partial pressure of oxygen is below 0.5 bar, the CNS O_2 value decreases. The closer the CNS O_2 value is to 100%, the closer the limit where symptoms can occur -> 17.



WARNING

Nitrox diving may only be attempted by experienced divers after proper training from an internationally recognized agency.

2 Attention messages and alarms

Smart draws the diver's attention to certain situations and warns the diver of unsafe diving practices. Attention messages and alarms are always visual and audible under water, only visual at the surface except the decompression alarm.

The audible attention messages (but not the alarms) can be switched off selectively with SmartTRAK.

WARNING

2.1 Attention messages

Attention messages are communicated to the diver visually by symbols, letters or flashing figures. In addition, two short audible sequences can be heard (in an interval of 4 seconds) in two different frequencies under water.

•)) 4 sec •)) (can be switched off)

Attention messages come up in the following situations (more information can be found on the listed pages):

	Page
• Maximum Operating Depth / max. ppO_2 is reached	16
• Set maximum depth is reached	15
• Oxygen toxicity reaches 75%	17
• No-stop time = 2 minutes	18
• Prohibited altitude* (surface mode)	21
• Entering decompression when diving with L0	19
• *COM* Remaining Bottom Time <3 minutes	18
• *COM* Tank pressure has reached set warning level	17
• *COM* Increased workload	17

Diving with microbubble levels (L1-L5):

• MB no-stop time = 0	24
• MB level stop ignored	25
• MB level reduced	25
• Entering decompression when diving with MB level L1-L5	25

* without audible attention beep

2.2 Alarms

Serious injury or death may result from failing to immediately respond to alarms given by Smart.

Alarms are given to the diver visually by flashing symbols, letters or figures. In addition, an audible sequence in one frequency can be heard during the whole duration of the alarm.

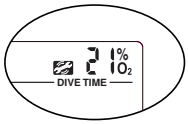
•)•)•)•) •)•)•)•) •)•)•)•) •)•)•)•) (can not be switched off)

An alarm occurs in the following situations (more information can be found on the listed pages):

	Page
• Oxygen toxicity reaches 100%	17
• Ignored decompression	19
• *COM* Remaining Bottom Time = 0	18
• Exceeding the prescribed ascent rate (Particular scale of beeps, ->16)	16
• Low battery alarm**	see below

Low battery alarm**

The service symbol appears if the battery capacity reaches 0%.



Take the unit to your authorised SCUBAPRO UWATEC retailer.

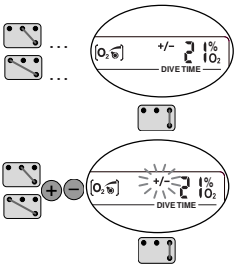
**without audible alarm

3 Preparation for the dive

3.1 Setting the gas mixture

WARNING

Before every dive and after changing the tank, make sure that the setting of the gas mixture corresponds to the current mixture used. An incorrect setting causes Smart to miscalculate this particular dive. If the fraction of oxygen is set too low this can lead to oxygen poisoning without warning. If the value is set too high decompression sickness may occur. Inaccuracies in the calculations are carried over to repetitive dives.



To set the gas mixture, Smart must be in user mode.

1. Bridge contacts B and + or B and – until the symbol for the setting of the O_2 mixture appears.
2. Confirm that you wish to change the displayed oxygen fraction by bridging B and E.
3. Change the oxygen fraction in increments of 1% by bridging contacts B and + to increase or B and – to decrease (21-100%).
4. Confirm the selected percentage with B and E.

WARNING

Without confirmation the display will disappear after 3 minutes and your entries will not be accepted.

The time to reset the O_2 % mix to air can be set with SmartTRAK between 1 and 48 hours or to "no reset" (default).

3.2 Setting the MB level

See chapter IV, -> 24.

3.3 COM Additional preparation for the dive with Smart COM

The following description of the preparation of a dive is based on the assumption that the high pressure hose is correctly mounted on the HP outlet and Smart COM is connected with the HP hose (-> 10).

WARNING

If the high pressure hose is not correctly mounted, it will not perform properly and serious injury or death may result.

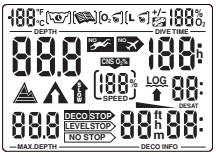
1. Mount the regulator together with the high pressure hose on the tank.

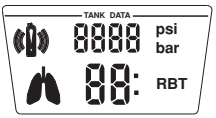
WARNING

2. If present, check the reserve valve of your tank, the reserve valve must be open.

3. Open the valve and check the tank pressure (after approx. 10 sec.). If the pressure is insufficient, change the tank.

3.4 Inspection





COM

Make an inspection before each dive:

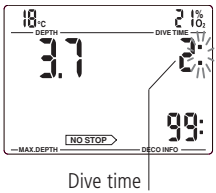
1. Switch on Smart (B-E).
2. Check the test display: are all the elements of the display activated? Use Smart only if all elements of the display are activated.
3. COM Check the connections and instruments for leaks. Never dive with leaky equipment!

4 Functions during the dive

4.1 Immersion

After immersion, starting at a depth of about 0.8 m (3 ft), all diving functions are monitored, i.e. depth and dive time displayed, maximum depth stored, saturation of tissues calculated, no-stop time or decompression prognosis determined, ascent rate controlled and displayed and the correctness of the decompression procedure supervised. In addition, Smart COM also shows the tank pressure and about 2 minutes into the dive the Remaining Bottom Time (RBT) is displayed.

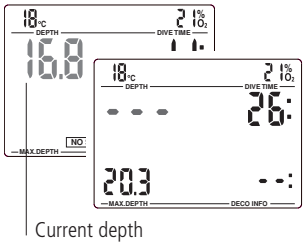
4.2 Dive time



The whole time spent below a depth of 0.8m (3 feet) is displayed as dive time in minutes. The time above 0.8m (3 feet) is counted as dive time only if the diver descends again below 0.8m (3 feet) within 5 minutes.
While the dive time is running, the colons on the right of the figures are flashing in one second intervals. Maximum dive time displayed is 199 minutes.

If a dive lasts longer than 199 minutes the dive time display starts again at 0 minutes.

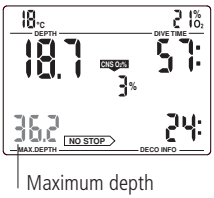
4.3 Current depth



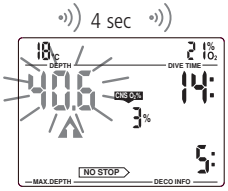
Current depth is given in 10 cm increments (1 foot). At a diving depth of less than 0.8 m (3 ft) the display shows <– – –>.

Depth measurement is based on freshwater. Therefore, Smart shows a slightly greater depth when diving in salt water, depending on the salinity of the water. No calculation however is affected.

4.4 Maximum depth



Maximum depth is only displayed if it exceeds the current depth by more than 1 m (3 feet) (maximum indicator function).

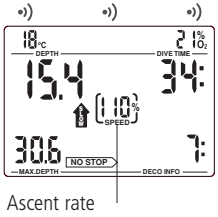


WARNING

Set maximum depth reached
If the maximum depth set with SmartTRAK has been reached (default 40m/130 feet), the current depth will flash and the ascent arrow will be displayed.

Ascend until the ascent arrow disappears.

4.5 Ascent rate



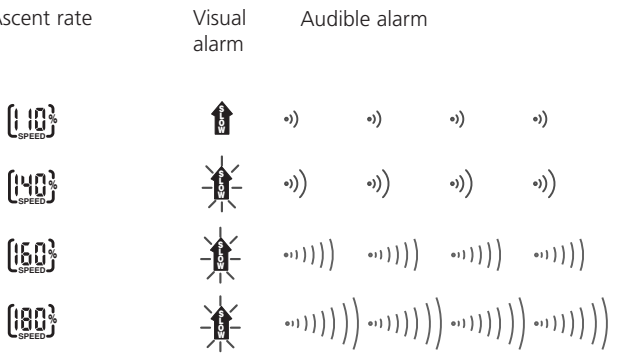
Optimal ascent rate varies depending on depth between 7 and 20 m/min (23 and 67 ft/min). It is displayed as a percent of the reference variable ascent rate. If the ascent rate is greater than 100% of the set value, the black arrow <SLOW> appears. If the ascent rate exceeds 140%, the arrow starts flashing. Smart provides an audible alarm if the ascent rate is 110% or greater. The intensity of the alarm increases in direct proportion to the degree that the prescribed ascent rate is exceeded.

WARNING

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

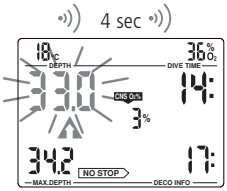
- In case of an improper ascent Smart may require a decompression stop even within the no-stop phase because of the danger of microbubbles formation.
- The decompression duration necessary for the prevention of microbubbles can increase massively if the ascent rate is exceeded.
- From great depth a slow ascent may cause heightened saturation of tissues and an extension of both decompression duration and total ascent time. At shallow depth, a slow ascent may shorten the decompression duration.
- Display of the ascent rate has the priority over <CNS O_2>.

WARNING



Excessive ascent rates for longer periods are entered in the logbook.

4.6 Partial pressure of oxygen ($ppO_{2\,max}$) / Maximum Operating Depth (MOD)



The maximum partial pressure of oxygen $ppO_{2\,max}$ (default 1.4 bar) determines the Maximum Operating Depth (MOD). Diving deeper than the MOD will expose the diver to oxygen partial pressures higher than the set maximum level.

The $ppO_{2\,max}$ can be set by means of SmartTRAK between 1.0 and 1.95 bar. The set value and the information about the current ppO_2 are not displayed.

WARNING

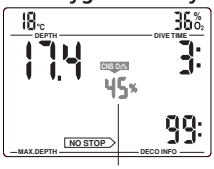
The MOD is a function of $ppO_{2\,max}$ and the mixture used. If during the dive the MOD is reached or exceeded Smart sends an audible attention message, the ascent arrow appears and the current depth display starts flashing.

Ascend to a shallower depth in order to diminish the danger of oxygen poisoning.

WARNING

- The MOD should not be exceeded. Disregarding the warning can lead to oxygen poisoning.
- $ppO_{2\,max}$ should not be set higher than 1.6 bar

4.7 Oxygen toxicity (CNS O_2%)



Oxygen toxicity

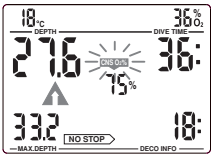
Smart calculates oxygen toxicity from depth values, time and the gas mixture and displays it in the location of the ascent rate. The toxicity is expressed in 1% increments of a maximum tolerated value (O_2 clock). The symbol <CNS O_2> is displayed together with the percentage.

WARNING

An audible attention signal goes off if oxygen toxicity reaches 75%. The symbol <CNS O_2> flashes and the ascent arrow appears.

Ascend to shallower depth to decrease oxygen loading.

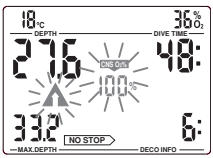
4 sec



WARNING

When oxygen toxicity reaches 100%, an audible alarm goes off every 4 seconds. <CNS O_2>, the precentage value and the ascent arrow flash.
Danger of oxygen toxicity!

Start ascent at once.



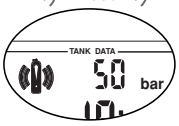
- During an ascent and if the CNS O_2% value does not increase anymore (due to a lower partial pressure of oxygen), the audible warning is suppressed.
- During the ascent, the display of the oxygen toxicity is replaced by the ascent rate. If the ascent is stopped, the display changes back to the indication of the CNS value.

4.8 COM Tank pressure

Tank pressure is indicated in the lower display.

The tank pressure is also used for the calculation of the remaining bottom time (RBT) and the workload.

4 sec



WARNING

When the tank pressure reaches the set warning pressure (SmartTRAK) an audible alarm goes off and the tank symbol is shown.
Default value of the warning pressure: 100 bar (1450 psi).

Do not dive any deeper. Start to ascend soon.

4 sec

WARNING

In case of increased workload, Smart COM displays a lung symbol in the lower display and an audible attention message occurs.

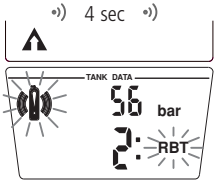
In order to prevent additional saturation, reduce exertion, relax and breathe more slowly.

4.9 COM Remaining Bottom Time (RBT)

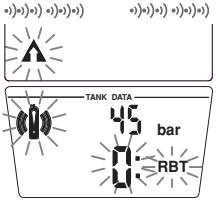
RBT is the time left at the current depth until the point of time when the ascent must be started. The RBT is shown in the lower display. The RBT is calculated on the basis of the current tank pressure, breathing rate, the temperature, and the dive data so far recorded. The RBT is based on the assumption that the tank pressure should amount to the set pressure (default 40 bar/600 psi) at the end of the dive. Alterations can be made with SmartTRAK. A graphic representation of RBT is on page 11.

WARNING

Never allow the RBT to go below three minutes. If the RBT goes below three minutes there is a danger of insufficient supply of gas mixture for the ascent as well as an increased risk of decompression sickness, and serious injury or death may result!
Correct calculation of RBT when using a reserve or "J" type valve is possible only if the reserve function of the valve is in the open (down) position during the dive.



RBT < 3 minutes



RBT = 0 minutes

WARNING

If the RBT drops below three minutes, an audible attention signal is activated, the ascent arrow is displayed and the tank icon and RBT start flashing.

Start ascent immediately.

WARNING

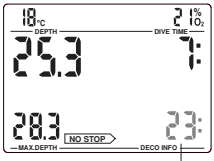
The RBT value should never reach <0:>. With RBT=0 the remaining tank reserve may not be sufficient for the ascent.

When the last minute has passed (RBT=0) an audible alarm is activated every 4 seconds. The RBT, the ascent arrow and the tank icon start flashing. The audible alarm on exceeding the RBT is suppressed at depths less than 6.5 m (21 ft) if Smart COM is in the no-stop phase.

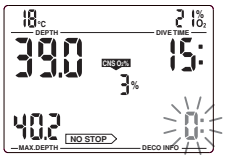
Start ascent at once

4.10 Decompression information

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



No-stop time



- No-stop display <99:> means remaining time of 99 minutes or more.
- No-stop time is calculated on line and influenced by the current workload and current water temperature.

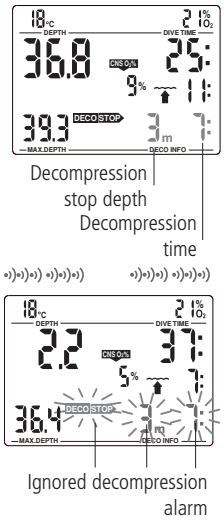
WARNING

If no-stop time drops below 3 minutes, an audible attention signal is activated and the no-stop value begins to flash. If no-stop time is less than 1 minute, the no-stop display shows the flashing value "0".
In order to prevent a decompression dive, ascend slowly until the no-stop time is 5 minutes or more.

WARNING

Dives that require decompression stops are not recommended.

Decompression values



On entering the decompression phase, the arrow NO STOP disappears, the arrow DECOSTOP appears and an attention beep goes off. Right beside the arrow, the deepest decompression stage in metres (feet) is displayed. Next to the decompression stop depth, the decompression stop duration of the displayed stage appears in minutes. The display <3m 7:> means that a decompression stop of 7 minutes at a depth of 3m has to be made. When a decompression stop has been finished, the next higher decompression stop is displayed. When all decompression stops have been made, the arrow DECOSTOP extinguishes and the arrow NO STOP reappears. The indication of time on the lower right shows the no-stop time again.

WARNING

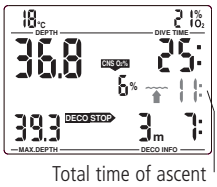
The decompression alarm is activated if the decompression stop is ignored. The arrow DECOSTOP , the decompression stop duration and decompression stop depth begin to flash and an audible alarm goes off.

Due to the formation of microbubbles, decompression can increase massively if a decompression stop is ignored. When the surface is reached during the decompression alarm, the arrow DECOSTOP , the decompression stop duration and decompression depth continue flashing, in order to point to the risk of a decompression accident. The SOS mode is activated 3 minutes after the dive if corrective action is not taken (-> 10).

If the total (cumulative) duration of the decompression alarm is longer than one minute, it is entered in the logbook.

Descend to the prescribed decompression stop depth immediately!

Total time of ascent



As soon as decompression stops are necessary Smart shows the total time of ascent. This includes the ascent time from the current depth to the surface and all decompression stop obligations.

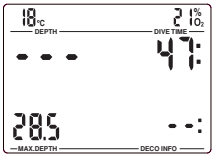
The total time of ascent is calculated on the basis of the prescribed ascent rate and a normal workload. Total time of ascent can be subject to change if the ascent rate is not ideal (100%) or if Smart COM detects a higher workload.

WARNING

On all dives with Smart, make a safety stop for at least three minutes at a depth of 5 m (15 feet).

5 Functions at the surface

5.1 End of a dive



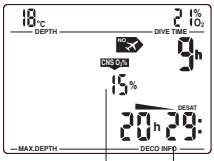
After reaching the surface (<0.8 m/3 ft) Smart remains in dive mode for 5 minutes. The delay allows for surfacing for a short period for orientation.

After 5 minutes the dive is closed and it is entered into the logbook.

WARNING

For the calculations of the desaturation and no-fly time it is assumed that the diver breathes air while on the surface.

5.2 Desaturation time



Oxygen toxicity

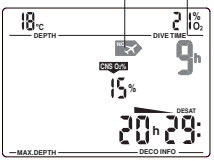
Desaturation time

After the dive has been closed DESAT , desaturation time in hours and minutes and, if available, oxygen toxicity is displayed. Desaturation time is determined either by oxygen toxicity, nitrogen saturation or the regression of microbubbles, depending on which requires the longer time. Oxygen toxicity (<CNS O_2>) is displayed and adjusted until the value becomes 0%.
Desaturation time is indicated until the next dive or until it reaches zero.
The display is switched off to save energy three minutes after the last manipulation is made. The calculations are nevertheless continued in the background.

5.3 No-fly time

No-fly time

Do not fly icon

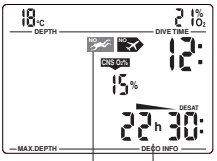


The <no-fly time> is indicated beside the icon <do not fly>. <No-fly time> is the time in hours that should pass before a flight and is displayed and adjusted until the value becomes 0 hours.

WARNING

Flying while Smart displays <do not fly> may lead to serious injury or death from decompression sickness.

5.4 Microbubble warning



Microbubble warning

Desaturation time

Through repetitive dives microbubbles accumulate in the lungs if the surface interval is not long enough. Ignoring decompression stops or ascending at an excessive ascent rate can also lead to microbubbles in tissues. In order to reduce the risk of decompression sickness for repetitive dives, the surface interval should be planned long enough. If Smart calculates that the formation of microbubbles occurs during the surface interval, it will advise a diver to extend the surface interval via the microbubble warning. The duration of the microbubble warning is visible by entering the dive planner -> 29.

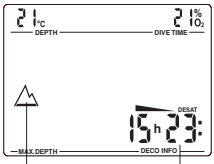
WARNING

If the <microbubble warning (NO DIVE)> is visible during the surface interval, the diver should not undertake another dive.

If the dive is made in spite of the microbubble warning, the diver must cope with a clearly shorter no-stop time or an extension of decompression. Also, the duration of the microbubble warning at the end of the dive can increase considerably.

6 Diving in mountain lakes

6.1 Altitude ranges



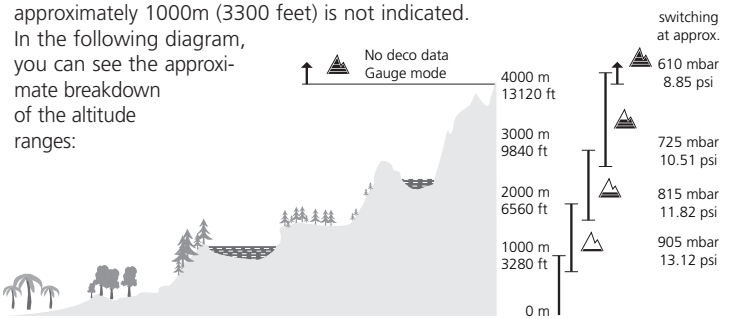
Altitude range 1

Desaturation time
Adaptation time

Altitude ranges

1 2 3 4

Smart measures the atmospheric pressure every 60 seconds even while the display is switched off. If the computer detects a sufficient increase in altitude, it switches on automatically and indicates the new altitude range (1-4) and the desaturation time. Desaturation time indicated at this moment refers to adaptation time at this altitude. If the dive starts within this adaptation time, Smart treats it as a repetitive dive, since the body is offgassing.
Altitude is divided into five ranges, which are influenced by barometric pressure. That is why the defined altitude ranges overlap on their fringes. If a mountain lake is reached, the altitude range is indicated at the surface, in the logbook and in the dive planner by a stylised mountain filled with one or more of 4 segments representing the 4 ranges (1-4). Sea level to an altitude of approximately 1000m (3300 feet) is not indicated.
In the following diagram, you can see the approximate breakdown of the altitude ranges:



6.2 Prohibited altitude

WARNING Smart shows via flashing altitude segments while at the surface to which altitude the diver may not rise.

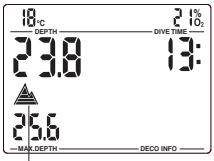
Ascent to altitude range 3 and 4 prohibited.
Max. allowed altitude: 2650 m (8694 ft).

Max. altitude:	850 m / 2790 ft	1650 m / 5413 ft	2650 m / 8694 ft	4000 m / 13120 ft

The ascent prohibition can also be displayed together with an altitude range

Example: you are at 1200 m (3937 ft) (altitude range 1) and you may ascend to range 2 only (2650 m / 8694 feet). You may not rise to the altitude range 3 or 4.

6.3 Decompression dives in mountain lakes



Altitude range 4:
- no deco data
- COM no RBT

In order to assure optimal decompression even at higher altitudes, the 3m (10 ft) decompression stage is divided into a 4 m (13 ft) stage and a 2 m (7 ft) stage in altitude ranges 1, 2 and 3. The prescribed decompression stop depths are, in sequence, 2m / 4m / 6m / 9m… (7 ft / 13 ft / 20 ft / 30 ft…).

If atmospheric pressure is below 620 mbar (8.99 psi) (altitude higher than 4100 m / 13450 ft above sea level), no decompression data is calculated and displayed (automatic gauge mode).
In addition RBT (COM) and the dive planner are not available anymore. The oxygen toxicity and the tank pressure (COM) are still indicated.

COM

IV Diving with microbubble levels (MB)

The following chapter deals with the characteristics of diving with microbubble levels (MB levels). For general information about displays and features of diving with Smart see chapter III.

Microbubbles are tiny bubbles that can build up inside a diver's body during any dive and normally dissipate naturally during an ascent and on the surface after a dive. Dives within no-stop time and observance of decompression stops do not prevent the formation of microbubbles in the venous blood circulation.

Dangerous microbubbles are those migrating into the arterial circulation. The reasons for the migration from the venous blood circulation to the arterial circulation can be a great many microbubbles collecting in the lungs. UWATEC has equipped Smart dive computers with a new technology to protect from microbubbles.

The diver chooses – according to his/her needs – an MB level and influences through it the level of protection from microbubbles. Diving with MB levels requires additional ascent stops (level stops), the ascent is slowed down and the body gets more time to desaturate. This works contrary to the formation of the microbubbles and increases the safety.

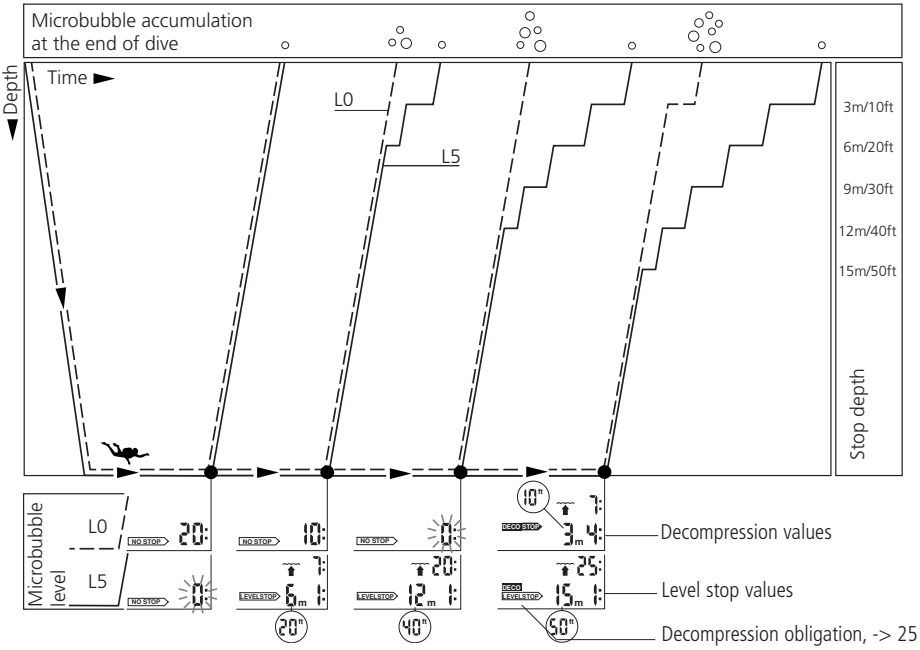
Smart features **6 microbubble levels** (L0-L5). Level L0 corresponds to UWATEC's well-known decompression model ZH-L8 ADT and does not require level stops due to microbubble formation. Levels L1 to L5 offer additional protection from microbubble formation with level L5 offering the highest protection.

Similar to the display of information during decompression dives or dives within no-stop time, Smart displays depth and duration of the first level stop as well as the total time of ascent as soon as the MB no-stop time has run out. As the MB no-stop time is shorter than the ordinary no-stop time a diver will be required to carry out a stop (level stop) sooner than a diver using level L0.

If a diver ignores a required level stop, Smart will change over to a lower MB level and the dive can not be completed with the initially chosen MB level. For example, if a diver sets level L4 on Smart prior to the dive and during the dive ignores the stops recommended Smart will automatically adjust the setting to level L3 or lower.

1 Comparison of dives with MB level L0 and MB level L5

When two Smarts are used simultaneously, one unit is set for example to MB level L5, the other to L0, the no-stop time will be shortened and level stops will be required before the diver has the obligation of a decompression stop. These additional level stops help dissipate the microbubbles.

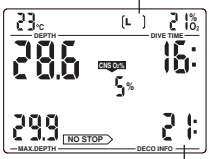


2 Terminology IV

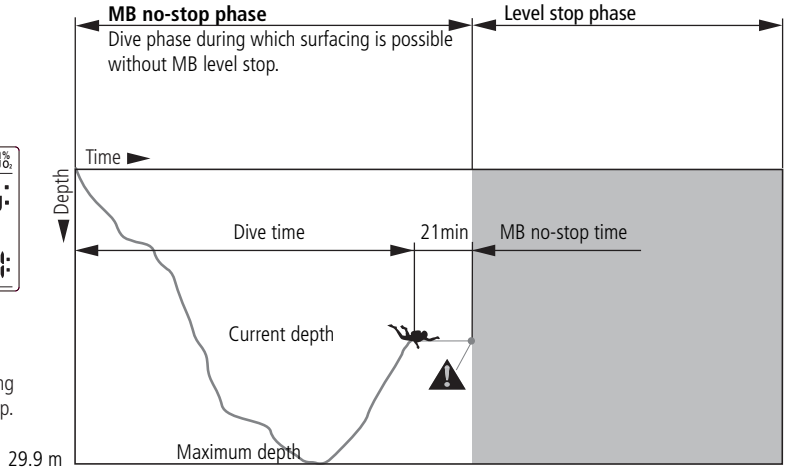
This chapter will exclusively deal with terminology and display features used while diving with MB levels. All other features are described in chapter III (->11).

2.1 Display during microbubble (MB) no-stop phase

An **MB level** between L1 and L5 was chosen.

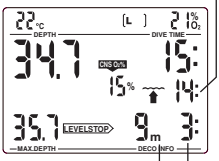


MB no-stop time
Remaining time at a respective depth allowing ascent without level stop.



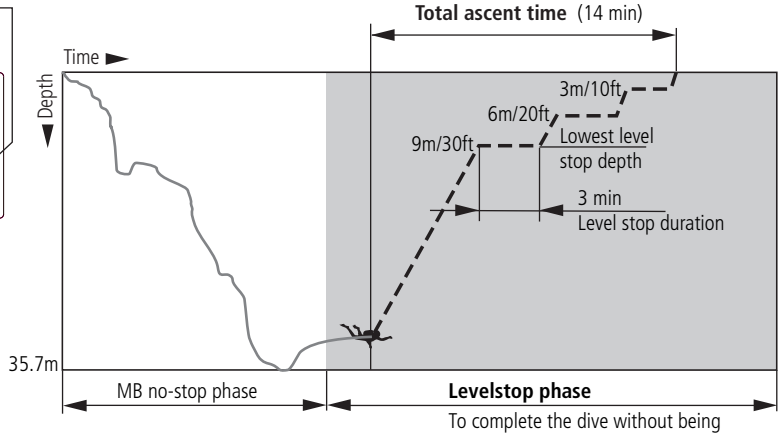
2.2 Display during level stop phase

Total ascent time
including level stops



Level stop depth
The deepest level stop depth is displayed.

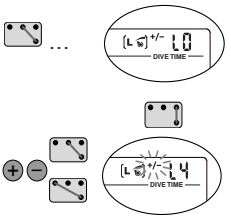
Level stop duration
The duration of a level stop at a given level stop depth is displayed.



To complete the dive without being reduced to a lower MB level all requested level stops must be observed.

3 Preparation for a dive with microbubble levels (MB levels)

3.1 Setting the MB level



To change the MB level Smart must be in user mode.

1. Bridge contacts B and + or B and – until until the symbol for MB levels appears.
2. Confirm that you wish to change the displayed MB level by bridging B and E.
3. Change MB level by bridging contacts B and + or B and – .
4. Confirm with B and E the selected MB level.

Without confirmation the display will disappear after 3 minutes and your entries will not be accepted.

Smart will display the [L] symbol to confirm that an MB level beyond L0 (L1-L5) has been chosen. If however a level stop is ignored, the new MB level is permanently shown (-> 25).

MB levels have an influence on the dive planner.

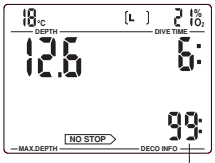
4 Functions during the dive with microbubble levels

4.1 Level stop information

Microbubble (MB) no-stop time

While diving with MB levels L1 to L5 Smart will display the MB no-stop time instead of the ordinary no-stop time. Within the MB no-stop time no level stops are required.

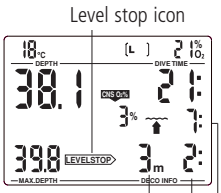
The arrow NO STOP and the MB level symbol [L] are visible. The remaining MB no-stop time is shown in minutes.



MB no-stop time

- Information and alarms for MB no-stop time and ordinary no-stop time are the same (->18).
- Regardless of the MB level, we generally recommend to perform a slow ascent during the last few metres / feet.

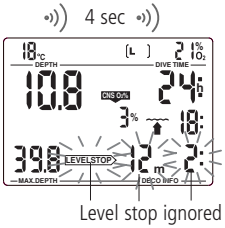
Level stop



On entering the level stop phase, the arrow NO STOP disappears and the arrow LEVELSTOP appears. The LEVELSTOP arrow flashes for 8 seconds and an audible attention beep goes off. To complete the dive without being reduced to a lower MB level, all requested level stops must be observed.

To the right of the LEVELSTOP arrow, the deepest level stop is displayed in metres/feet. The display <3m 2:> (<10ft 2:>) means that a level stop of 2 minutes at a depth of 3 metres (10ft) has to be observed.

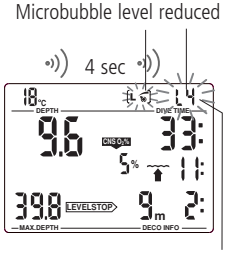
When a level stop obligation is finished, the next higher level stop – if present – is displayed. When all level stops have been observed, the arrow LEVELSTOP extinguishes and the arrow NO STOP reappears. The indication of time on the lower right shows the MB no-stop time again.



WARNING

The attention message "**Level stop ignored**" is activated if the requested level stop is not observed. An attention beep* goes off, the arrow LEVELSTOP, the depth and duration of the ignored level stop begin flashing.

To complete the dive without being reduced to a lower MB level, you must descend to the prescribed depth immediately!



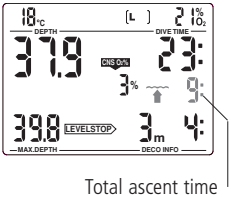
WARNING

The warning "**Microbubble level reduced**" is activated if the diver ascends more than 1.5m (5ft) above the required level stop. Smart then reduces the MB level, an attention beep* goes off and the new MB level will flash until the end of the dive. The level stop for the reduced MB level is now displayed.

To complete the dive without being further reduced to an even lower MB level the new level stop must be observed.

* Attention beeps can be suppressed via SmartTRAK.

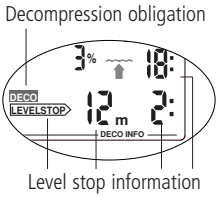
4.2 Total time of ascent



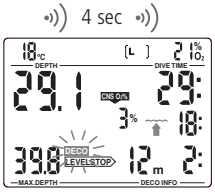
Smart displays the level stop information and the total time of ascent. This includes the time of ascent as well as all level stops.

The total time of ascent is calculated on the basis of the prescribed ascent rate and a normal workload. Total time of ascent can be subject to change if the ascent rate is not ideal (100%) or if Smart COM detects a higher workload.

4.3 Decompression obligation



Smart calculates and displays level stops to reduce microbubble formation, but it also calculates the diver's decompression data. If decompression stops become obligatory, the DECO symbol will be displayed. The total ascent time will now also contain a decompression stop.

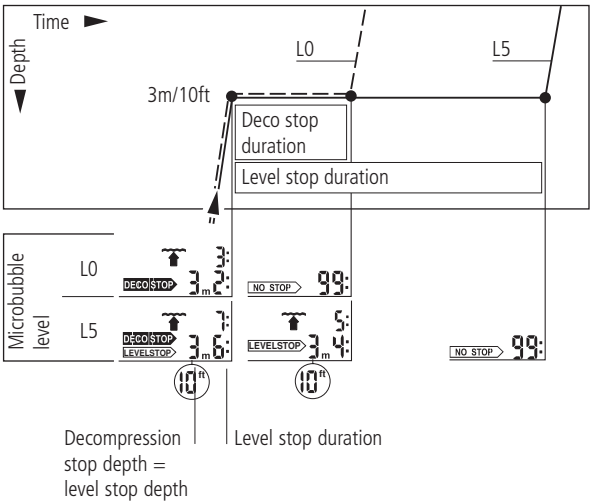


WARNING

You are close to entering decompression:
At the beginning of a decompression phase an attention beep goes off and the DECO symbol flashes for 8 seconds.

In order to prevent a dive with long decompression stops it is recommended that you ascend a few metres/feet on seeing this message.

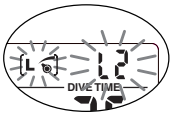
4.4 Level stop and deco stop



When the level stop depth equals the depth of the first obligatory decompression stop and if you are within 1.5m/5feet of the stop depth itself, Smart shows **DECOSTOP** and LEVELSTOP. The indicated duration refers to level stop duration.

Since level stops are more restrictive than decompression stops, when all decompression obligations have been observed the display changes from **DECOSTOP** LEVELSTOP to LEVELSTOP only.

5 Complete a dive with MB levels



A dive with MB levels is completed the same way as a dive without MB levels (L0) (-> 20), save for the following exceptions:

If the MB level has been reduced during the dive, Smart will display a flashing MB level symbol and the current MB level for five minutes after reaching the surface. The dive is then completed and Smart changes to user mode with the MB level switching back to the original MB setting.

Repetitive dives and microbubble levels: if during a dive a level stop is being ignored and the diver starts another descent shortly afterwards, Smart might immediately request level stops. To complete the dive with the initially set MB level all level stops must be observed.

V Gauge mode

Gauge mode is provided for those who prefer to utilize their own tables (technical diving) or for those who go freediving in addition to scuba diving.

WARNING

Dives in gauge mode are performed at your own risk!

When in gauge mode, the Smart will only display time and depth information, however nitrogen tissue loading and oxygen exposure will be calculated just as they would be during a regular SCUBA dive. It is consequently very important that even when using the Smart in gauge mode, the correct value of your oxygen percentage is set -> 14.
Because the dive computer has residual nitrogen information after having been utilized in gauge mode, it is ready for use as a regular computer at any time after switching it back to computer mode.

WARNING

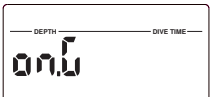
Setting an incorrect mixture carries an inherent risk of decompression sickness and/or oxygen toxicity! An incorrect gas mixture can be lethal!
Even before a dive in gauge mode, make sure that the set gas mixture corresponds to the gas mixture currently used.

WARNING

- If you are diving trimix or any mix other than oxygen/nitrogen with an oxygen percentage of 21% or higher, input the correct percentage value for the oxygen. The computer will track oxygen exposure correctly and exaggerate the nitrogen loading.
- If you are diving trimix or any mix with a percentage of oxygen lower than 21%, set the computer to 21% oxygen. The computer will exaggerate both the oxygen exposure and the nitrogen loading.

Enabling the gauge mode (Switching back to the regular dive computer mode)

"write"



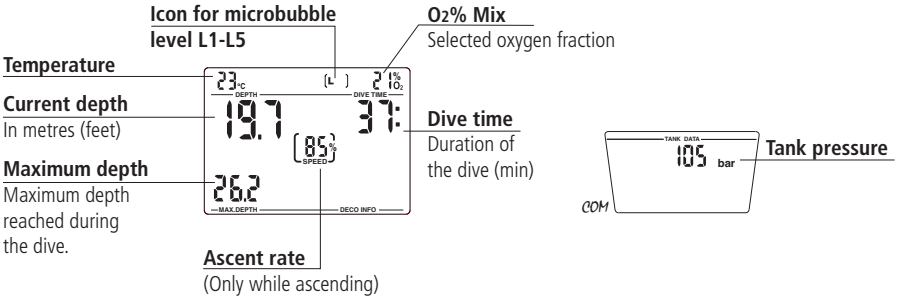
To use the Smart in gauge mode, you must first enable the computer via SmartTRAK and the infrared interface.
Choose "Dive Computer Settings" under the "Options" pop-up window in SmartTRAK. Once the "Dive Computer Settings" dialog box opens, the PC will first "read" the existing settings in the dive computer. Click on "ON" ("OFF" to switch back to the regular dive computer mode) under "Gauge Mode", then click on the right icon in the top row to "write" the changes to the dive computer. The dive computer will now show "OnG" on the display.

Diving in gauge mode

WARNING

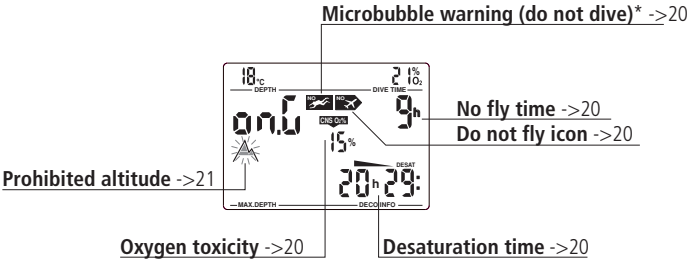
In gauge mode oxygen toxicity is not displayed, but it is calculated in the background based on the set oxygen mixture. When the calculated value reaches 75% and 100%, an attention beep and an alarm go off, respectively.

The following information is displayed in gauge mode:



After diving in gauge mode

After a dive in gauge mode the display shows the following information based on the preset O_2 mixture:



* The duration of the microbubble warning is visible by entering the dive planner -> 29.

Diving after violating the dive computer

If the computer has been violated by not respecting a mandatory decompression stop, for instance, the computer will lock out for 24 hours. Gauge mode will not be available during the entire lock-out time.

Smart is equipped with a dive planner which allows the planning of no-stop dives with freely determinable surface intervals.

Basis of the planning:

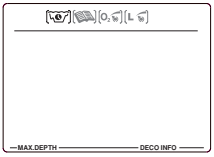
- selected fraction of oxygen (O_2% Mix)
- selected microbubble level
- water temperature of the most recent dive
- altitude range (if any)
- status of saturation at the time the dive planner is selected
- assuming a normal workload of the diver and observance of the prescribed ascent rates.

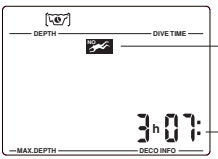
WARNING

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

1 Planning a no-stop dive

With the contacts B and – or B and – you can select the dive planner at the surface.



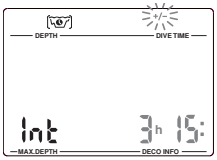


Microbubble warning (Do not dive)

Duration of the warning

The microbubble warning and its duration are displayed if Smart detects an increased risk due to the accumulation of microbubbles.

Enter the dive planner with B and E.

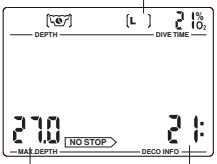


Input of the surface interval

The input window for the time interval is displayed if there was a remaining desaturation (DESAT) before the dive planner has been selected. This surface interval between now and the beginning of the dive can be changed with the contacts B and + or B and – in steps of 15 minutes.

If a microbubble warning (no dive) and its duration has been displayed, Smart proposes this time – rounded up to the next 15 minutes – as surface interval. If the proposed interval is shortened, the microbubble warning appears.

Icon for microbubble level L1-L5



Depth

No-stop time or MB no-stop time

With B and E you confirm the displayed interval (if applicable), then Smart starts scrolling the no-stop times. The no-stop times are displayed in 3 metre increments (10 ft) and are displayed for every increment for about 3 seconds. The process starts at 3 metre (10 feet).

[L] If a microbubble level has been selected (L1 to 5), Smart shows the microbubble no-stop time instead of the no-stop time.

Depths deeper than the MOD for the selected gas (O_2 mix) are not displayed.

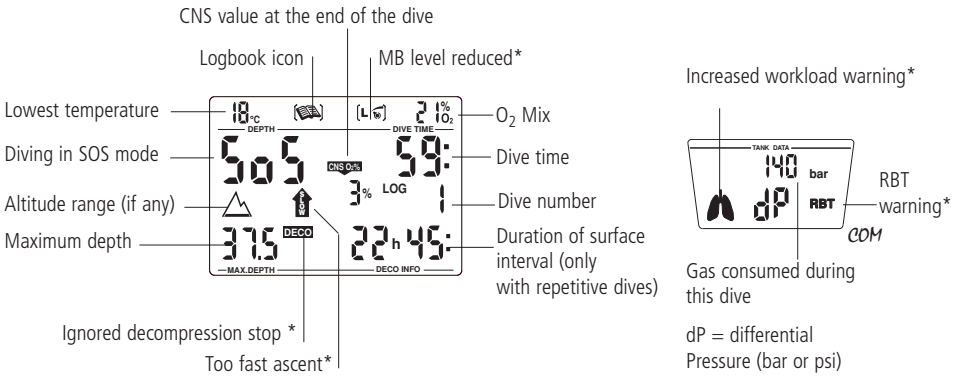
On page 20 you will find further information and safety considerations regarding the microbubble warning.

2 Leaving the dive planner

With the contacts B and E (1-2 sec.) you can exit the dive planner. This also occurs after three minutes without operation.

1 Survey

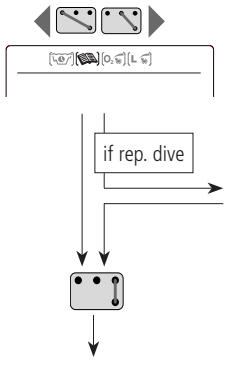
A dive is entered in the logbook if the dive time is longer than 2 minutes. Smart PRO records dive profiles of about 100 hours of diving and Smart COM records the profiles of about 50 hours. This information can be transferred to a PC with the standard infrared interface (IrDA) and the Windows® software SmartTRAK. Up to 99 dives can be displayed directly on the dive computer.
The following information of the dive is displayed:



*Alarms during the dive

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

2 Operation



With the contacts B and + or B and – you can select the logbook. With B and E you enter the logbook.

If there was a remaining desaturation time (DESAT) before selecting the logbook, the time since the last dive (surface interval) is displayed.

With B and E you get the most recent dive displayed (LOG 1).

Each bridging of B and + or B and – causes a jump to the next older or more recent dive. Upon continuous bridging of the contacts all dives are displayed successively.

With the contacts B and E you can exit the logbook.
The logbook closes automatically after 3 minutes without operation.

VIII Appendix

1 Technical information

Operating altitude: with decompression information: sea level up to approx. 4000 m (13120ft); w/o decompression, w/o RBT information: usable in gauge mode (at any altitude)

Max. displayed depth: 120m (395 ft), resolution between 0.8 m and 99.9 m: 0.1 m, >99.9 m: 1m The resolution in feet is always 1 foot

WARNING

- Do not dive deeper than the limits given by the chosen fraction of oxygen (nitrogen narcosis, oxygen toxicity).
- Never dive deeper than your training qualification (experience) allows you.
- Always observe local dive depth restrictions.

Decompression calculation depth range: 0.8 to 120m (3 to 395 ft)

Maximum environment pressure: 13 bar (189 psi)

High pressure connection: COM Maximum working pressure: 300 bar (4350 psi)

Clock: Quartz timer, display up to 199 minutes

O_2% Mix: Adjustable between 21%O_2 (compressed air) and 100% O_2

Operating temperature: -10° to +50°C (14°F to 122°F)

Power supply: Special battery UWATEC LR07

Life of the battery: 500 to 1000 dives, depending on the quantity of dives per year and the use of the backlight.

2 Maintenance

COM The tank pressure gauge and the parts of Smart COM used to measure the tank pressure should be serviced by an authorized SCUBAPRO UWATEC dealer every second year or after 200 dives (whichever comes first). Aside from that your Smart is virtually maintenance free. All you need to do is to rinse it carefully with fresh water after each use and to have the batteries changed when needed. To avoid possible problems with your Smart, the following recommendations will help assure that it will give you years of trouble free service:

WARNING

- Avoid dropping or jarring your Smart.
- Do not allow your Smart to be exposed to direct, intense sunlight.
- Rinse your Smart thoroughly with fresh water after each dive.
- **Do not store your Smart in a sealed container; make sure there is free ventilation.**
- If there are problems with operating the contacts, use soapy water to clean Smart and dry it thoroughly. The surface of your Smart housing can be treated with silicone grease. Do not apply grease to the water contacts!
- Do not clean Smart with liquids containing solvent (apart from water).

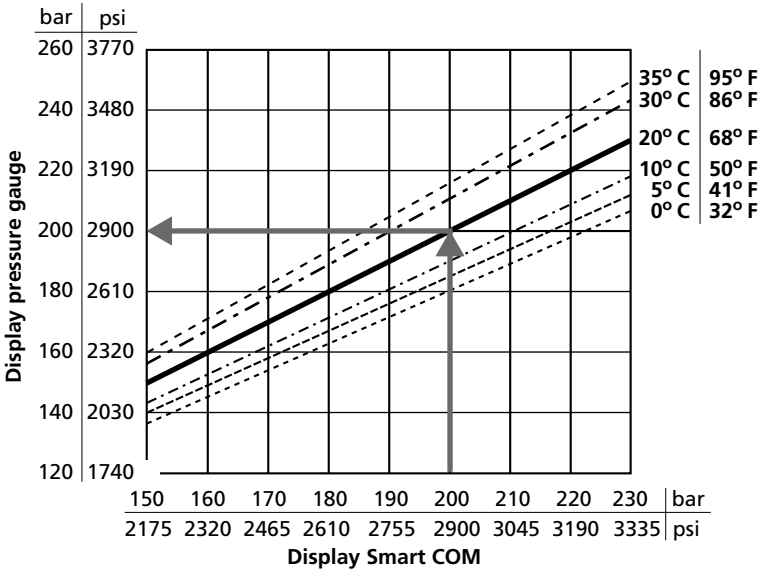
WARNING

Take the dive computer to an authorised SCUBAPRO UWATEC dealer in order to change the batteries. The battery replacement is carried out by a SCUBAPRO UWATEC subsidiary. Smart is checked for its technical integrity at the same time. Do not attempt to have the batteries changed by anyone other than an authorised SCUBAPRO UWATEC dealer.

3 COM Conversion of tank pressure

Tank pressure indicated in the lower display may differ from the information given by a manometer/ pressure gauge. Smart COM displays pressure always converted to a temperature of 20°C / 68°F, whereas the mechanical pressure gauge displays the current pressure influenced by temperature.

The figure allows you to compare the information given by a conventional pressure gauge and by Smart COM at six different temperatures.



4 Warranty

The warranty only covers dive computers which have been bought from an authorised SCUBAPRO UWATEC retailer.
The warranty is given for a period of two years.
Repairs or replacements during the warranty period do not increase the warranty period.
In order to put forward a warranty claim: send the dive computer together with a dated receipt of the purchase to your authorised retailer or an authorised servicing point.

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

Excluded are faults or defects due to:

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

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