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mares Puck 4
Dive Computer

mares Puck 4 Dive Computer Instruction Manual

Contents

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mares Puck 4 Dive Computer

Specifications

- Model: Puck 4 Dive Computer
- Manufacturer: Mares S.p.A.
- Features: Nitrox support, Altimeter, Alarms, Gas switching, Deep/Deco/Safety stops

Product Usage Instructions

Safety Warnings and Disclaimer
It is important to understand and adhere to the safety warnings provided in the manual. Always use additional dive equipment like a depth gauge and pressure gauge alongside the dive computer. Do not dive if the display is unclear or unusual. Avoid using the dive computer in conditions that hinder its visibility.

Understanding the Dive Computer:
The Puck 4 Dive Computer provides detailed information during your dive, including ascent rate, MOD/ppO2 levels, CNS%, missed decompression stops, low battery warnings, and more. Familiarize yourself with the displayed data before diving.

Gas Management
If you are using multiple gas mixtures, ensure you set them up correctly in the computer. You can switch gases during the dive, but be cautious when submerging below the MOD after a gas switch.

Dive Violation Induced Bottom Timer Mode:
Understand how the dive computer handles violations and how it transitions into bottom timer mode in case of violations.

Technical Information and Maintenance
Refer to the manual for technical details and maintenance instructions. Learn how to replace the battery when needed to ensure proper functioning of the device.

Frequently Asked Questions (FAQ)

- **Q: Can the Puck 4 Dive Computer prevent decompression sickness?**

  A: The dive computer cannot guarantee prevention of decompression sickness. It is important to follow proper dive procedures and guidelines to minimize risks.

- **Q: How can I switch between gas mixtures during a dive?**

  A: To switch gases, follow the instructions provided in the manual for setting up and executing gas switches safely.

- **Q: What should I do if I encounter a low battery warning?**

  A: If you receive a low battery warning, plan your dive accordingly and replace the battery as soon as possible following the maintenance instructions.

IMPORTANT WARNINGS

- No part of this document may be reproduced, stored in a retrieval system, or transmitted in any form without the written permission of Mares S.p.A.
- Mares adopts a policy of continuing improvement, and therefore reserves the right to make changes and enhancements to any of the products described in this manual without notice.
- Under no circumstances shall Mares be held responsible for any loss or damage sustained by third parties deriving from the use of this instrument.

WARNING
A dive computer is an electronic instrument and as such it is not immune to failure. To protect yourself against the unlikely event of a failure, in addition to the dive computer, also use a depth gauge, a submersible pressure gauge, a timer or watch, and dive tables.

WARNING
Do not dive if the display appears unusual or unclear.

WARNING
The dive computer must not be used in conditions that preclude its use (e.g.: low or no visibility, making it impossible to read the gauge).

WARNING
The dive computer cannot ensure against possible decompression sickness.

DISCLAIMER
This manual describes how to operate an instrument and it describes the information provided by the instrument during a dive.
Neither this manual nor the instrument are a substitute for dive training, common sense and good diving practices. How the information provided by the instrument is interpreted and put to use by the diver is not the responsibility of Mares. Read the manual carefully and make sure you understand completely how the instrument works and the information it provides during a dive, including information on depth, time, decompression obligations and all warnings and alarms. Unless you fully understand how the instrument works and the information it displays and unless you accept full responsibility for using this instrument, do not dive with it.

WARNING
In particular, unless you fully understand the implications of certain features, you should not use them.

PART I INTRODUCTION

GLOSSARY

- AIR: Air dive
- AVG: Average depth, calculated from the beginning of the dive.
- CNS: Central Nervous System. CNS% is used to quantify toxic effects of oxygen.
- DTIME: Dive time, the whole time spent below a depth of 1.2m/4ft.
- DESAT: Desaturation time. The time needed for the body to eliminate the nitrogen taken up during diving.
- Gas switching: The act of changing from one breathing gas to another.
- GF: Gradient factor
- Gradient Factor: Reduction of Bühlmann's original value of maximum tolerated inert gas pressure.
- Max depth: Maximum depth attained during the dive.
- MOD: Maximum Operating Depth. This is the depth at which the partial pressure of oxygen (ppO2) reaches the maximum allowed level (ppO2max). Diving deeper than the MOD will expose the diver to unsafe ppO2 levels.
- Multigas: Refers to a dive in which more than one breathing gas is used.
- Nitrox: A breathing mix made of oxygen and nitrogen, with the oxygen concentration being 21% or higher.
- No deco time: This is the time that you can stay at the current depth and still make a direct ascent to the surface without having to perform mandatory decompression stops.
- NO-FLY: Minimum amount of time the diver should wait before taking a plane.
- O2: Oxygen.
- O2%: Oxygen concentration used by the computer in all calculations.
- ppO2: Partial pressure of oxygen. This is the pressure of the oxygen in the breathing mix. It is a function of depth and oxygen concentration. A ppO2 higher than 1.6bar is considered dangerous.
- ppO2max: The maximum allowed value for ppO2. Together with the oxygen concentration it defines the MOD.
- S. I.: Surface interval, the time that has elapsed since the end of the dive.
- Switch depth: The depth at which the diver plans to switch to a higher oxygen concentration mix while using the multigas option.
- TTS: Time To Surface, the time it takes to perform the ascent from your current depth to the surface in a decompression dive, including all decompression stops.

OPERATING MODES

The functions of the Puck 4 computer can be grouped into two categories, each corresponding to a specific mode of operation:

- surface mode: Puck 4 is dry on the surface. You can change settings, review your logbook, use the dive planner, see remaining desaturation after a dive, download to smart phone and much more;
- dive mode: Puck 4 monitors depth, time, temperature and performs all decompression calculations; dive mode itself can be broken down into 4 sub categories:
  - pre-dive (Puck 4 is on the surface but actively monitoring ambient pressure, so that it can begin to calculate a dive the instant it is submerged below 1.2m/4ft);
  - dive;
  - surfacing (Puck 4 is on the surface at the end of a dive; dive time calculation is halted but if the diver submerges within three minutes the dive is resumed including the time spent on the surface);
  - post-dive (after the three minutes of surfacing mode, Puck 4 closes the logbook and reverts to a display

showing desaturation time, no-fly time and surface interval; this lasts until the desaturation and the no-fly time both have been reduced to zero).

USER-REPLACEABLE BATTERY

Puck 4 uses a CR2450 user-replaceable battery. See section 7.2.1 for instructions on how to replace it. Good quality batteries should suffice for more than 100 dives, depending on the usage of the backlight and the temperature of the water. Diving in cold water, usage of the backlight and of the beeper increases battery consumption.

The display alerts you of the status of the battery. The three possible situations are described as follows:

- battery symbol not visible in the pre-dive and dive display: the remaining battery charge is adequate for diving;

- steady battery symbol on the display (dive and pre-dive): there is enough charge for a few more dives, but you should consider replacing the battery at the next opportunity;

- blinking battery symbol on the display: the battery is too weak for diving. If this happens during a dive, you must not perform any more dives before replacing the battery.

If you see the blinking battery symbol on the surface, be aware that Puck 4 will not function as a dive computer and will not turn on if submerged.

The level of the battery charge can also be found on the "INFO" page (see section 2.4).

COMMUNICATING VIA BLUETOOTH

Puck 4 can communicate via low power bluetooth and the apps MARES or MySSI directly to a smartphone to transfer logbook information or to perform firmware upgrades.

To initiate a bluetooth connection, select BLUETOOTH (BLE) from the main menu, then start the Mares or MySSI app on your smartphone and follow the instructions.

BUTTON OPERATION

Puck 4 has only one button, which allows you to access menus and change settings while in surface mode and access alternate information during the dive, all in a very simple and intuitive manner. On the surface, press the button to change menu or value of a setting, and press and hold to enter a menu or confirm a setting. To exit a menu, press the button to advance until you see bACK on the display, then press and hold the button.
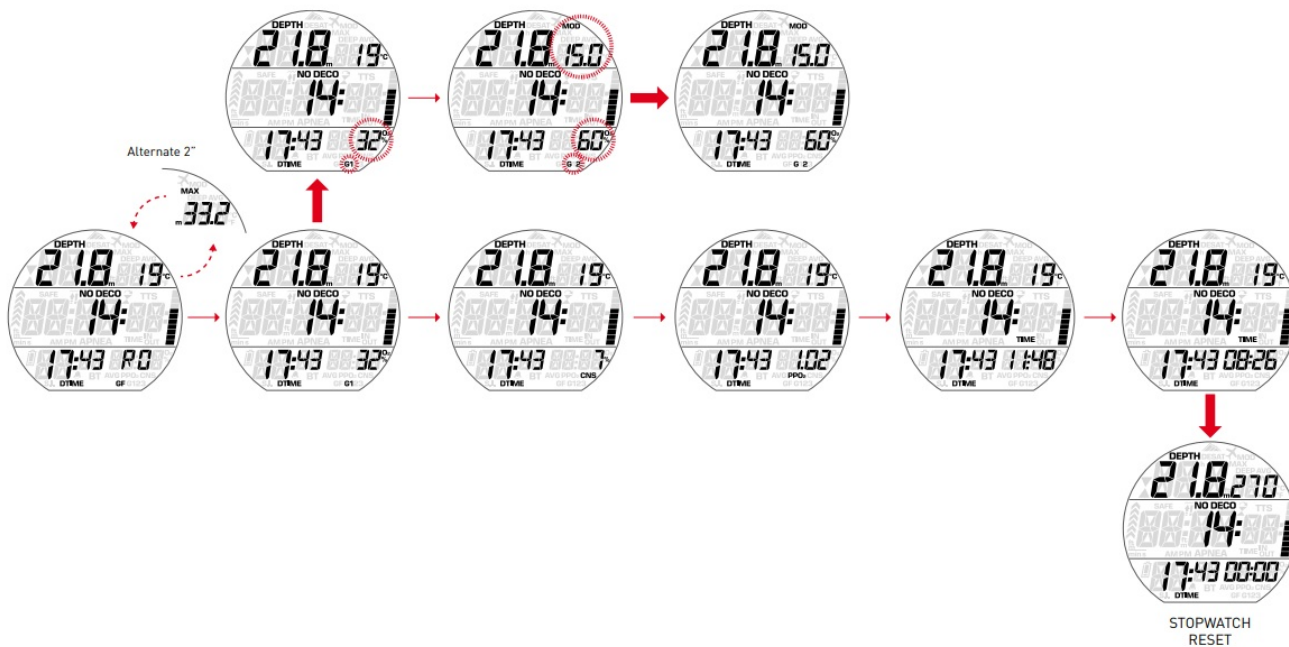

During the dive, press the button to access alternate information on the display and press and hold the button to activate the backlight.

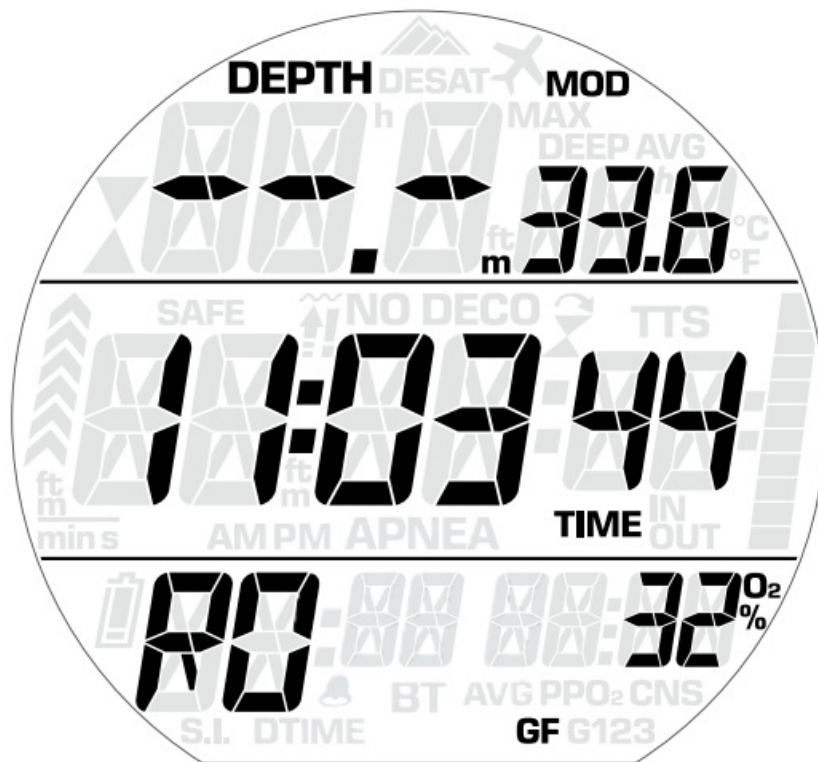An overview of the button function both in surface mode and during a dive is presented here below.
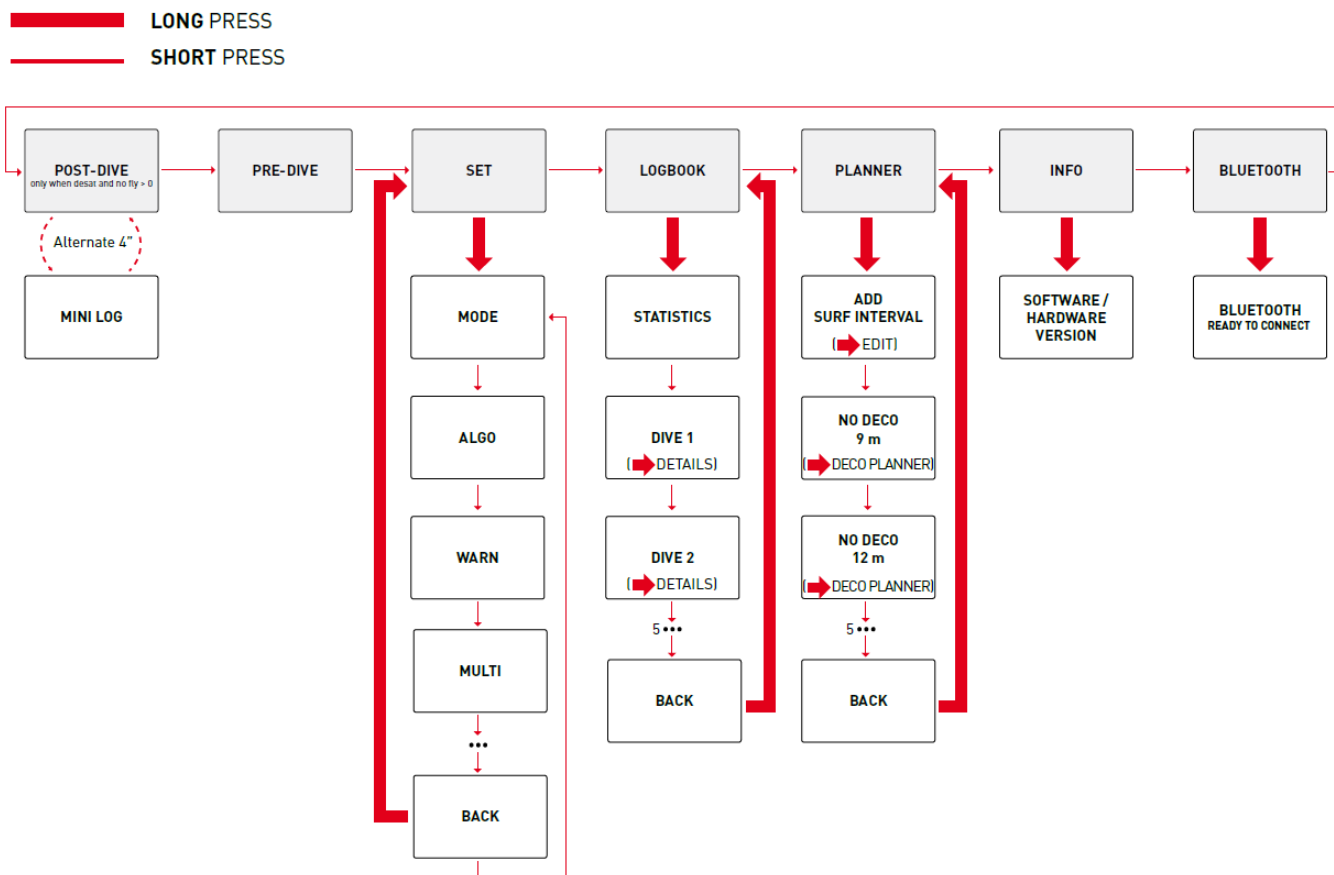
MENUS AND SETTINGS

Puck 4 always switches on in pre-dive mode.

From here, pressing the button allows you to scroll through the following sequence of menus:

- SET – section 2.1
- LOGBOOK (LOG) – section 2.2
- PLANNER (PLAN) – section 2.3
- INFO – section 2.4
- BLUETOOTH (BLE) – section 2.5

SET

MENU	Description
SET	
MODE	Allows you to choose between air, nitrox, and bottom timer mode.
ALGORITHM	Allows you to set gradient factors, personalization levels, and more.
WARNINGS	Allows you to define and activate certain warnings individually.
MULTIGAS	Allows you to define parameters relating to multigas dives.
WATER	Allows you to choose between salt and fresh water.
DEEP STOP	Allows you to activate or deactivate the visualization of deep stops.
ERASE DESAT	Allows you to reset the inert gas saturation to zero, thereby erasing the effects of a previous dive. This is only for people who plan to lend their computer to another diver who has not performed a dive within the last 24 hours.
ALL SILENT	Allows you to silence the dive computer.
ASCENT VIOLATION	Allows you to turn off the dive violation due to uncontrolled ascent. This is for dive instructors only, who may find themselves in such a situation because of their teaching requirements.
SURFACING MODE	Allows you to set the time interval after surfacing before the dive is closed.
BACKLIGHT	Allows you to set the duration of the backlight between 2 and 12 seconds. The default setting is 6 seconds.
UNITS	Allows you to choose between metric (m, °C) and imperial (ft, °F) units.
CLOCK	Allows you to set the time and date.

MODE

In this menu you define the type of gas you will be breathing during the dive (AIR or NItROX). You can also set Puck 4 to BOTTOM TIMER (BT), in which case Puck 4 will show only time, depth and temperature: it will not carry out any decompression calculation and it will not show any warnings and alarms.

Press the button to scroll through the options, then press and hold the button to activate it. AIR is the equivalent of setting NItROX to 21% and a ppO2max of 1.4bar.

When selecting NItROX, you are taken to a submenu in which you can define the percentage of oxygen in the mixture (O2%) and the maximum value of oxygen partial pressure (ppO2max) for up to three breathing mixes. The maximum possible value for the ppO2max is 1.6bar. Most training agencies recommend not to exceed a value of 1.4bar.

Once inside this menu, press the button to change the O2%, and watch how this affects the maximum operating depth (MOD). Then press and hold the button to move on to the ppO2max and press the button to change the value, again noticing how this affects the MOD. Press and hold the button to save and exit the menu. At this point

the screen will show G2 OFF. Press and hold to exit the menu or press and release to switch to G2 ON to set a decompression gas. See chapter 5 for more information about this.
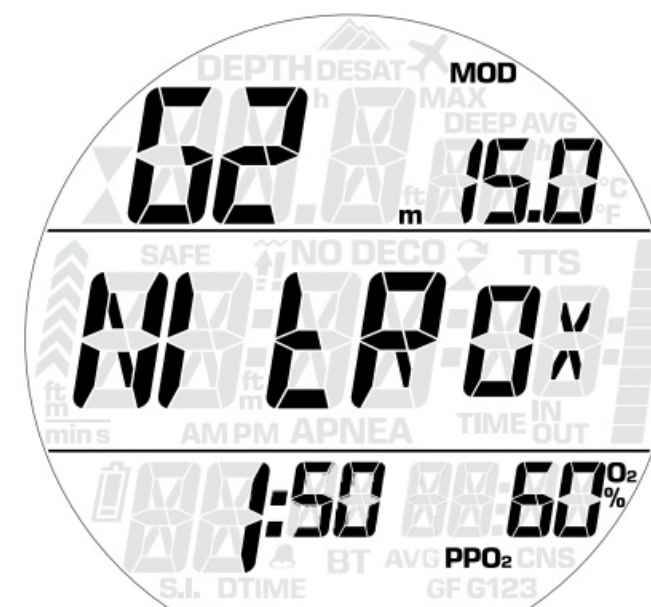
WARNING

- Diving with Nitrox may only be attempted by experienced divers after proper training from an internationally recognized agency.
- Before every dive and after changing the tank, you must make sure that the set oxygen concentration in Puck 4 corresponds to the oxygen concentration in the tank. Setting the wrong oxygen concentration can lead to serious injury or death.

ALGORITHM (ALGO)

Puck 4 employs the unmodified Bühlmann ZH-L16C algorithm with gradient factors. Gradient factors are used to lower the maximum tolerated inert gas pressure in the tissues with respect to Bühlmann's original values. This results in less nitrogen in the body at the end of the dive, which under normal circumstances makes the dive safer. Gradient factors are expressed in pairs: the first value, also called GF low, represents the reduction of the original Bühlmann value that defines the beginning of the final ascent (relevant only in decompression dives); the second value, also called GF high, represents the reduction of the original Bühlmann value that defines the residual nitrogen at the surface at the end of a dive. As an example GF 50/85 will get you to the surface with a 15% lower gradient factor with respect to Bühlmann's original maximum tolerated inert gas pressure and, if this was a decompression dive, your first decompression stop would have been at a depth such that you would not have exceeded 50% of the gradient factor with respect to Bühlmann's original value at that depth.
For more information about gradient factors, please refer to **www.mares.com/sports/diving/gradientfactor**

MAIN GF (MAIN)
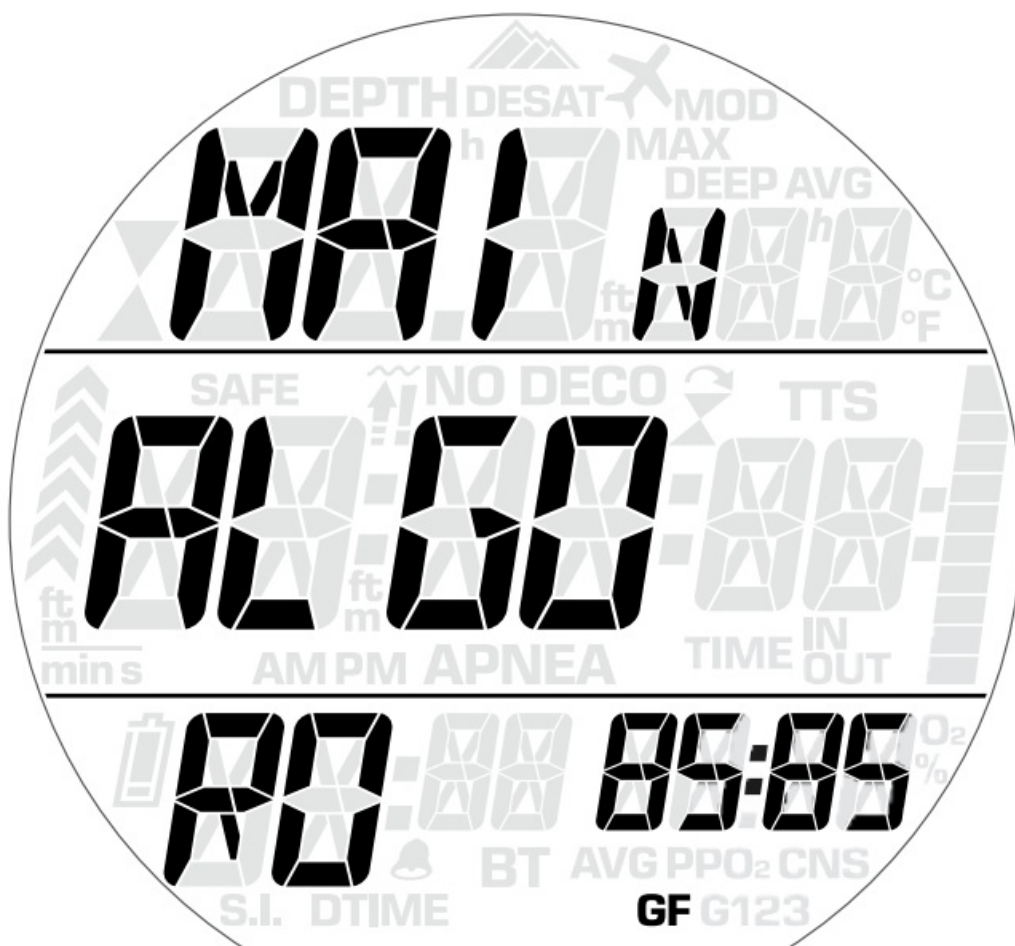
This is where you set the conservatism level of the ZH-L16C algorithm via gradient factors. We use Bühlmann's original values reduced by 15% as a starting point, and you can make the algorithm more conservative from there. There are four predefined sets of gradient factors with increasing conservatism from R0 (85/85) to R3 (50/60). You can also enter the GF low and GF high values directly via the CUStOM setting. The default value is R0 (85/85).

REPETITIVE DIVES (REP)

The original Bühlmann algorithm assumes normal offgassing of inert gas via diffusion after a dive. This seems to work well for most people and indeed most dive computers available today compute repetitive dives like this. There is evidence however that some people produce bubbles after a dive, or produce more bubbles than others, and these bubbles though harmless slow down the offgassing process. Surface intervals of three hours or longer are known to dissipate most if not all bubbles. Puck 4 allows you to account for this by applying an additional conservatism to repetitive dives, reducing both gradient factor values by 8 upon surfacing from a dive and then increasing it again by 1 every 15 minutes of surface interval. When setting REP to ON you will have recovered the full gradient factor values after a two-hour surface interval. Any dive started before such surface interval will carry an automatic additional gradient factor reduction. If you set the value to OFF, the GF values are not modified during a surface interval.

MULTIDAY (M-dAY)
Increasing inert gas load on your tissues over several days of diving has effects that are not fully understood and are different from person to person. Most dive computers available today do not account for this and compute simple inert gas off-gassing by diffusion. Puck 4 allows you to increase the conservatism automatically for each day of diving with less than 24-hours of surface interval by reducing both gradient factor values by 2 on the second day, an additional 2 on the third day and an additional 2 on the fourth day up to a maximum of 6.

WARNINGS (WARN)

1. **MAX DEPTH**

    Puck 4 allows you to set an alarm at a depth independent of the MOD. The default value is OFF. You can set it between 10m / 30ft and up to just shy of the MOD, in 1m / 5ft increments. Upon reaching the defined depth an alarm similar in behaviour to the MOD alarm (section 3.3.2) is triggered.

2. **DIVE TIME**

    Puck 4 allows you to set a time alarm, triggering also a warning at half of the set time limit. The default value is OFF. You can set the value between 20 and 90 minutes in 2-minute increments. Upon reaching half of the set limit, the dive time will blink until you hit the button to acknowledge it. Upon reaching the set time limit, the dive time again blinks until you hit the button to acknowledge it.

3. **NO DECO**

    When this is set to ON, a warning will alert you when the NO STOP time reaches 2 minutes.

4. **ENTERING DECO**

    When this is set to ON, a warning will alert you when a mandatory decompression stop has been calculated by Puck 4.

MULTIGAS

1. **PREDICTIVE (PR.dICt)**

    When set to ON, Puck 4 will consider all gases in the decompression calculation, with switches carried out at the MOD of each gas. When set to OFF, the decompression calculation will consider the currently breathed gas only. See Section 5 for more information about the PR.dICt feature.

    The default value is ON.

2. **SWITCH BELOW MOD (bELOW)**

    When set to ON, Puck 4 will allow a switch to a gas at a depth deeper than the MOD of the gas (resulting in an immediate MOD alarm).

    The default value is ON.

WATER

You can set the computer to FRESH water, SALt water or EN13319 calibration, depending on where you intend to dive. Setting the wrong water type entails an error in depth measurement of maximum 3% (i.e. at a depth of 30m/100ft, a computer set to salt water will show 29m/97ft in fresh water whereas a computer set to fresh water will show 31m/103ft in salt water). Note that this does not affect the proper functioning of the computer, since the computer performs all of the calculations based purely on pressure measurements. EN13319 corresponds to a water density of 1.0197kg/l and it is used in European Norm 13319.

DEEP STOP
Puck 4 calculates a deep stop for air and nitrox dives only. The depth is defined as that at which the 5th compartment (27-minute half time) switches from ongassing to offgassing. Stopping at this depth during an ascent allows the first four tissues to off-gas at a relatively high ambient pressure (theoretically preventing microbubble formation) without causing excessive nitrogen uptake in the other tissues. The deep stop, when calculated, is shown in the top right corner of the display, next to the current depth. The deep stop is optional, not carrying it out does not introduce any penalties and its duration is NOT included in the total ascent time.
This menu allows you turn off the calculation and display of the deep stop. The default setting is OFF.

ERASE DESAT
Puck 4 allows you to reset the desaturation in the computer. Any tissue saturation information from a recent dive will be reset to zero and the computer treats the next dive as a non-repetitive dive. This is useful when the computer is loaned to another diver who has not dived in the last 24 hours.

WARNING
Diving after having reset the desaturation is extremely dangerous and is very likely to cause serious injury or death. Do not reset the desaturation unless you have a valid reason to do so.

Once inside the menu, you must enter the security code once you decide to proceed with the reset. The security code is 1234.

After entering the security code you will get a confirmation of the successful completion of the operation.

ALL SILENT
In this menu you can disable audible alarms.

WARNING

Disabling audible alarms can lead you into potentially dangerous situation and could result in serious injury or death.

ASCENT VIOLATION

If the ascent rate exceeds 120% of the allowed value over a depth change of more than 20m/66ft, due to the potential of harmful bubble formation, Puck 4 locks the computer for 24 hours in order to prevent you from diving again. In this menu, you have the option to disable the locking up of the computer in the event of an uncontrolled ascent.

WARNING

- An uncontrolled ascent increases your risk of decompression sickness (DCS)
- This feature is intended for very experienced divers only, such as dive instructors, who take full responsibility for the consequences of turning off this function.

SURFACING MODE (SURF)

In this menu you can set the duration of the interval from the moment you reach the surface to when the dive computer closes the dive. During this interval you can submerge again and resume the dive. This menu allows you to change the default 3-minute interval to any value between 1 minute and 45 minutes.

1. **BACKLIGHT (LIGHt)**

   This menu allows you to set the duration of the backlight between 2 and 12 seconds. Default setting is 6 seconds. You can also change the intensity from LOW to HIGH. In HIGH the energy consumption is higher and the battery will last less.

2. **UNITS**

   You can choose between metric (depth in meters, temperature in °C) and imperial (depth in feet, temperature in °F).

3. **CLOCK**

   This menu allows you to set the time format, time and date.

4. **LOGBOOK (LOG)**

   Puck 4 can record the profiles of over 100 hours of diving, at a sampling rate of 5 seconds. The information can be transferred to a Smartphone (Mares or MySSI app, via bluetooth). In addition, Puck 4 can show most of the information directly on the display. Upon entering the logbook you will see StAtS. Entering this menu will show the deepest depth, longest dive time and lowest temperature recorded, in addition to the total number of dives and total number of dive hours.

   Pressing the button from StAtS will show a summary of all dives in memory, starting with the most recent. For each dive additional information is available by pressing and holding the button.

   To exit the logbook, press the button to scroll until you see bACK on the display, then press and hold the button.

DIVE PLANNER (PLAN)

This function allows you to plan your next dive. In case you dived recently, you can enter an additional surface interval in 15-minute increments between now and when you intend to dive: the residual nitrogen load will be adapted accordingly. Puck 4 will consider all active gases and set gradient factors, listed for reference at the bottom of the screen. Then press and hold the button to enter the planner and press the button to scroll through the no decompression limits for all depths, in 3m / 10ft increments, up to the MOD for the gas in use. Press and

hold the button to see what would happen if for a given depth you extended your dive time beyond the no decompression limit. Press the button to increase your
dive time and see what your corresponding decompression obligation would be. Press the button to scroll until you see bACK on the display, then press and hold the button to go back one level.

INFO
This submenu provides various information about the hardware and software of your Puck 4.

BLUETOOTH (BLE)
This menu starts the bluetooth connection to a smart device via the MARES or MySSI app.

PART II 3. DIVING WITH PUCK 4

A FEW WORDS ABOUT NITROX
Nitrox is the term used to describe breathing gases made of oxygen-nitrogen mixes with an oxygen percentage higher than 21% (air). Because Nitrox contains less nitrogen than air, there is less nitrogen loading on the diver's body at the same depth as compared to breathing air.
However, the increase in oxygen concentration in Nitrox implies an increase in oxygen partial pressure in the breathing mix at the same depth. At higher than atmospheric partial pressures, oxygen can have toxic effects on the human body. These can be lumped into two categories:

- Sudden effects due to oxygen partial pressure over 1.4bar. These are not related to the length of the exposure to high partial pressure oxygen, and can vary in terms of the exact level of partial pressure they happen at. It is commonly accepted that partial pressures up to 1.4bar are tolerable, and several training agencies advocate maximum oxygen partial pressures up to 1.6bar.

- Long exposure effects to oxygen partial pressures over 0.5bar due to repeated and/or long dives. These can affect the central nervous system, cause damage to lungs or to other vital organs.

Puck 4 keeps you safe with respect to these two effects in the following ways (as long as it is set to either AIR or NITROX):

- Against sudden effects: Puck 4 has an MOD alarm set for a user-defined ppO2max. As you enter the oxygen concentration for the dive, Puck 4 shows you the corresponding MOD for the defined ppO2max. The default value of ppO2max from the factory is 1.4bar. This can be adjusted to your preference between 1.2 and 1.6bar. Please refer to section 2.1.1 for more information on how to change this setting. If Puck 4 is set to AIR, the ppO2max is set to 1.4bar by default.

- Against long exposure effects: Puck 4 "tracks" the exposure by means of the CNS % (Central Nervous System). At levels of 100% and higher there is risk of long exposure effects, and consequently Puck 4 will activate an alarm when this level of CNS% is reached. Puck 4 also warns you when the CNS level reaches 75%. Note that the CNS% is independent of the value of ppO2max set by the user.

ALTITUDE
Atmospheric pressure is a function of altitude and of weather conditions. This is an important aspect to consider for diving, because the atmospheric pressure surrounding you has an influence on uptake and subsequent release of nitrogen. Above a certain altitude, the decompression algorithm has to change in order to account for the effect of the change in atmospheric pressure. Puck 4 automatically adapts the algorithm by sensing the ambient pressure every 20 seconds even when it is turned off.

NOTE
We do not recommend diving at altitudes above 3700m / 12100ft. If you do, set Puck 4 to BOTTOM TIMER and

find appropriate altitude dive tables.

ALARMS

Puck 4 can alert you of potentially dangerous situations. There are five different alarms:

- Ascent rate alarm;
- Exceeding a safe ppO2/MOD;
- CNS =75%;
- Missed decompression stop;
- Low battery during the dive.

WARNING

When in bottom timer mode, all warnings and all alarms are OFF aside for the low battery alarm.

NOTE

- Alarms are both visual and audible, as described in detail below.
- Ascent rate alarm has priority over other alarms if they are triggered simultaneously.

ASCENT RATE

As soon as depth decreases Puck 4 activates the ascent rate control algorithm and displays the calculated value both numerically and graphically.

WARNING

A rapid ascent increases the risk of decompression sickness.

If Puck 4 determines an ascent rate higher than set limits, the fast ascent alarm is triggered: an audible alarm goes off, and the message SLOW is displayed on the screen.
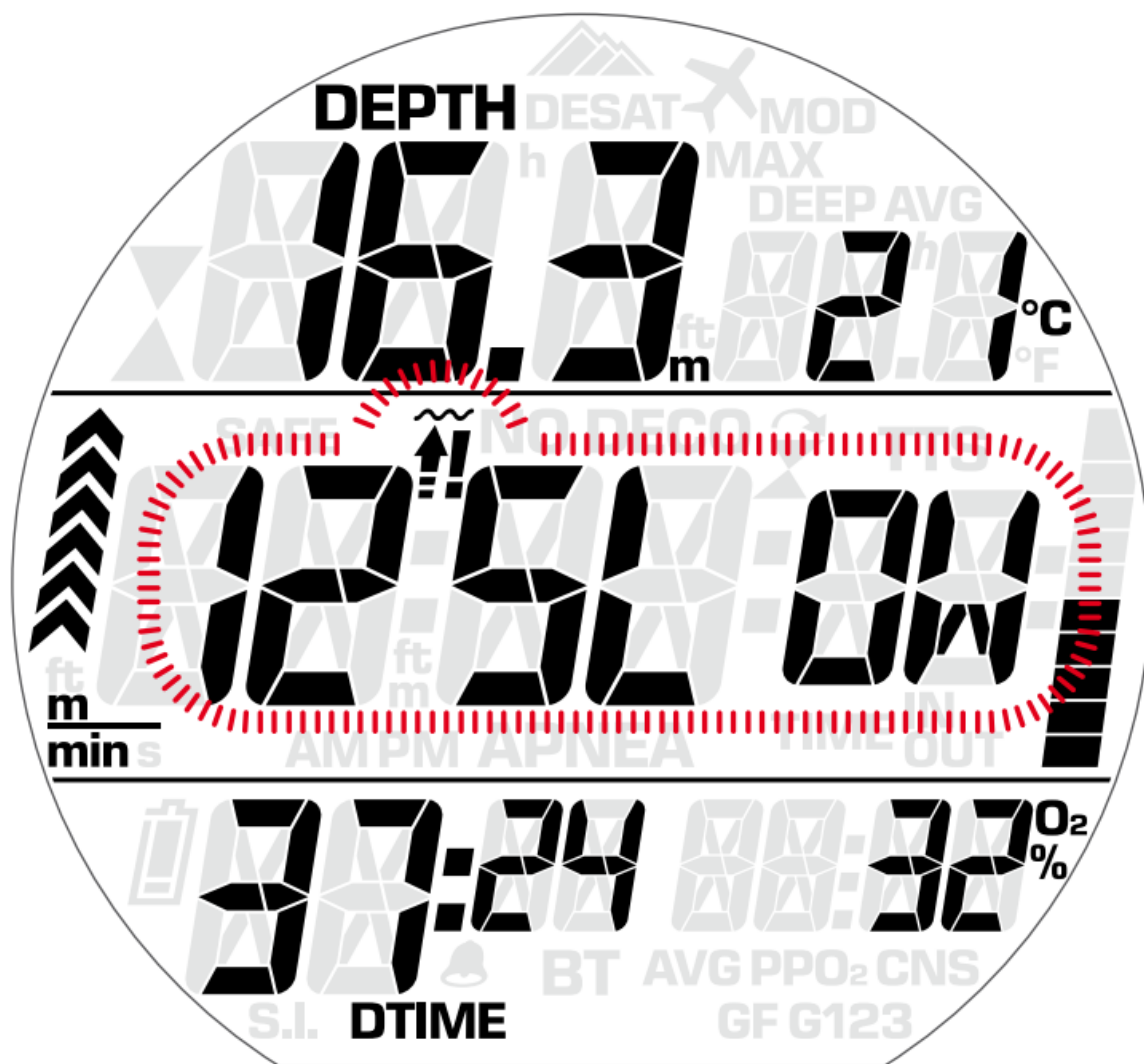
This persists until the ascent rate is reduced to below the pertinent limit. The limits are dependent on the current depth as follow:

Depth in m	Speed in m/min	Depth in feet	Speed in ft/min
> 50 m	20	> 165 ft	60
30 – 50 m	15	100 – 165 ft	45
10 – 30 m	10	30 – 100 ft	30
< 10m	5	< 30ft	15

WARNING
If the ascent rate exceeds 120% of the allowed value over a depth change of more than 20m/66ft, Puck 4 locks the computer for 24 hours in order to prevent you from diving again. You can disable this function in the menu ASCENT VIOLATION. This should only be done by highly experienced divers, who take full responsibility for the consequences of this action.

MOD/ppO2

WARNING

- The MOD should not be exceeded. Disregarding the alarm can lead to serious injury or death.
- Exceeding a ppO2 of 1.6bar can lead to sudden convulsions resulting in serious injury or death.

When the diver reaches a depth at which the ppO2 of the inspired gas exceeds the maximum limit entered in the corresponding setting (from 1.2 to 1.6bar), an audible alarm goes off, the depth starts blinking and the MOD is shown next to it.
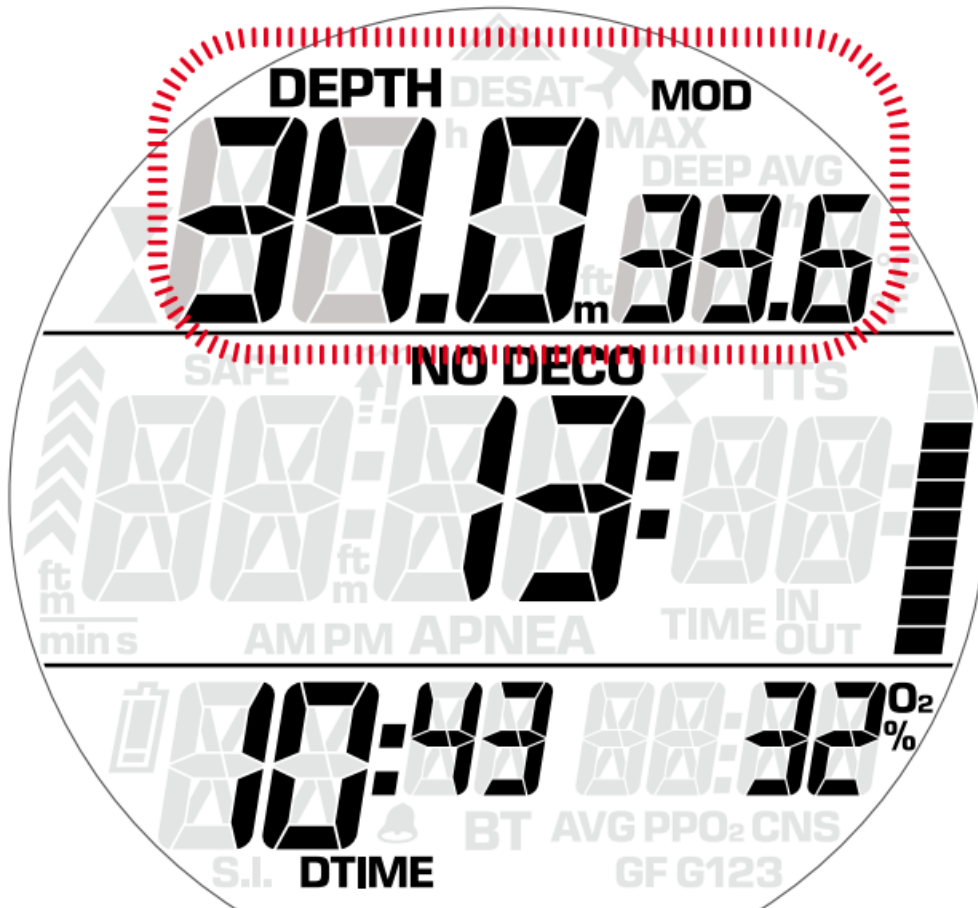
This persists until the situation has been corrected.
While the alarm is active you can call up a gas switch, but the top row will continue showing the blinking depth and MOD until the situation has been corrected.

WARNING
When the MOD alarm is triggered, ascend immediately until the alarm stops. Failure to do so could result in serious injury or death.

CNS = 75%

WARNING
When the CNS reaches 100% there is danger of oxygen toxicity. Puck 4 starts alerting you when you reach 75%.

Oxygen toxicity exposure is tracked on Puck 4 by means of the CNS% based on currently accepted recommendations for exposure limits. This toxicity is expressed as a percentage value which ranges from 0% to 100%. When the value exceeds 75%, the CNS value starts blinking and becomes the default field in the lower right corner. If you press the button to view any other value, it will remain for 4s only, and then return to the CNS value.
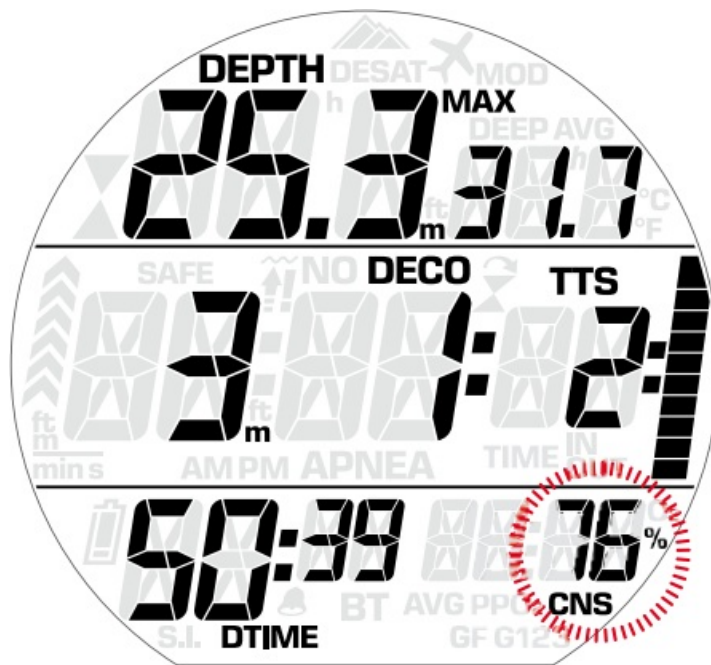
If the oxygen toxicity level reaches 75%, ascend to shallower depth to decrease oxygen loading and consider terminating the dive.
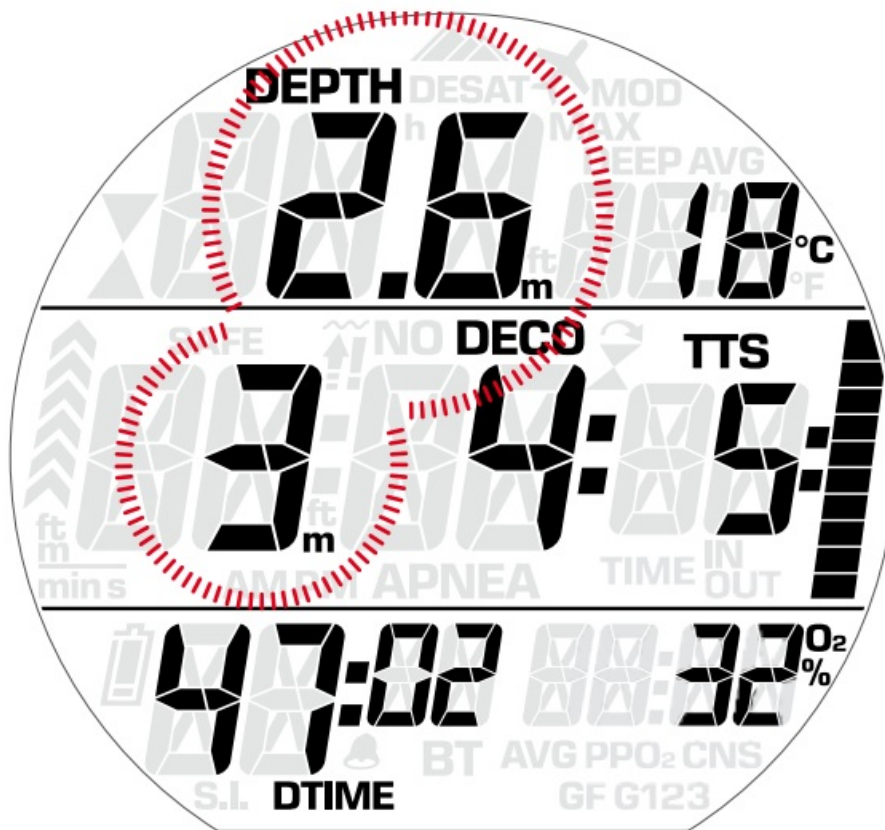
WARNING
Diving with oxygen toxicity at levels of 75% or greater may put you into a potentially hazardous situation, which could result in serious injury or death.

MISSED DECOMPRESSION STOP

WARNING
Violating a mandatory decompression obligation may result in serious injury or death.

If you ascend above the decompression stop depth by more than 0.3m (1ft), an audible alarm goes off and the depth starts blinking together with the depth of the missed deco stop. This alarm remains active until you return to the correct depth.
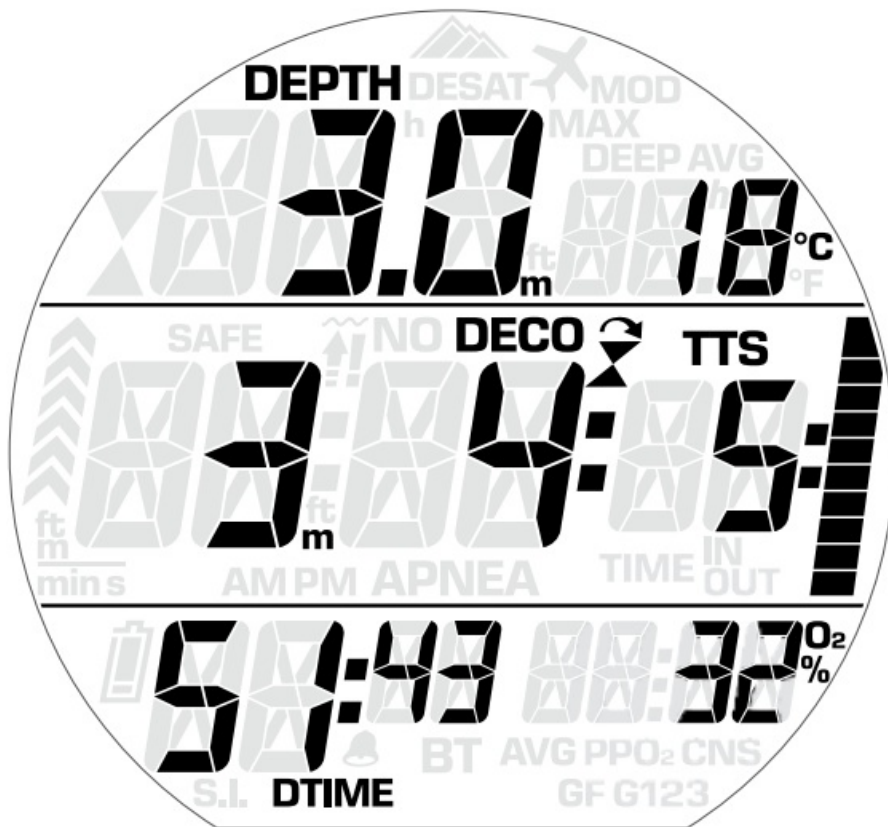
WARNING
Never ascend above the displayed decompression stop depth.

MISSED DECO STOP MODE
If the stop depth is exceeded by less than 1m (3ft) for more than three minutes or by more than 1m (3ft) for more than 1 minute, Puck 4 considers this a dive violation and the display will show the missed decompression symbol
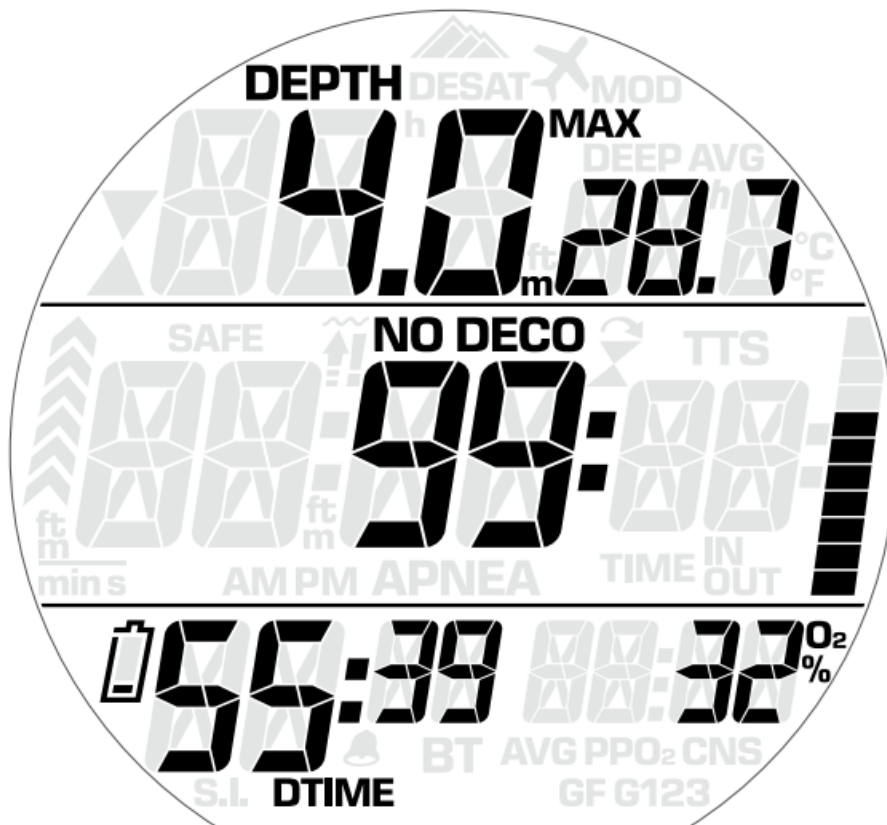

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In this case, if the diver attempts a repetitive dive after surfacing, Puck 4 will function only as a depth gauge and timer (bottom timer mode), and it will display the missed deco stop

violation symbol .

LOW BATTERY
If Puck 4 detects that the battery power level is safe for diving but without much reserve left, it will show the steady empty battery symbol on the display.

If the symbol starts blinking during a dive you must replace the battery before diving again.

DISPLAY INFORMATION
Turning on Puck 4 puts it in PRE-DIVE: this ensures that monitoring of the dive starts as soon as a depth of 1.2m/4ft is reached. If you start the dive without putting Puck 4 into pre-dive mode, Puck 4 will switch into dive mode automatically but with a delay of up to 20 seconds from immersion.
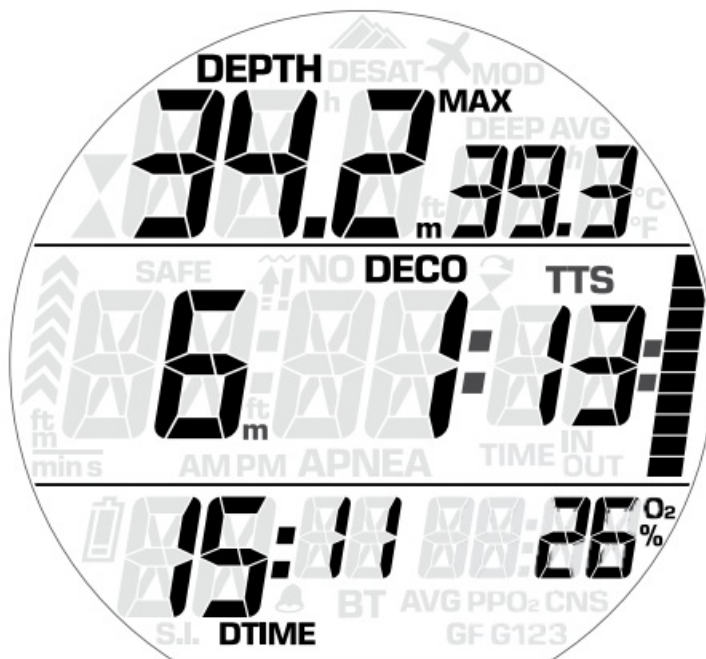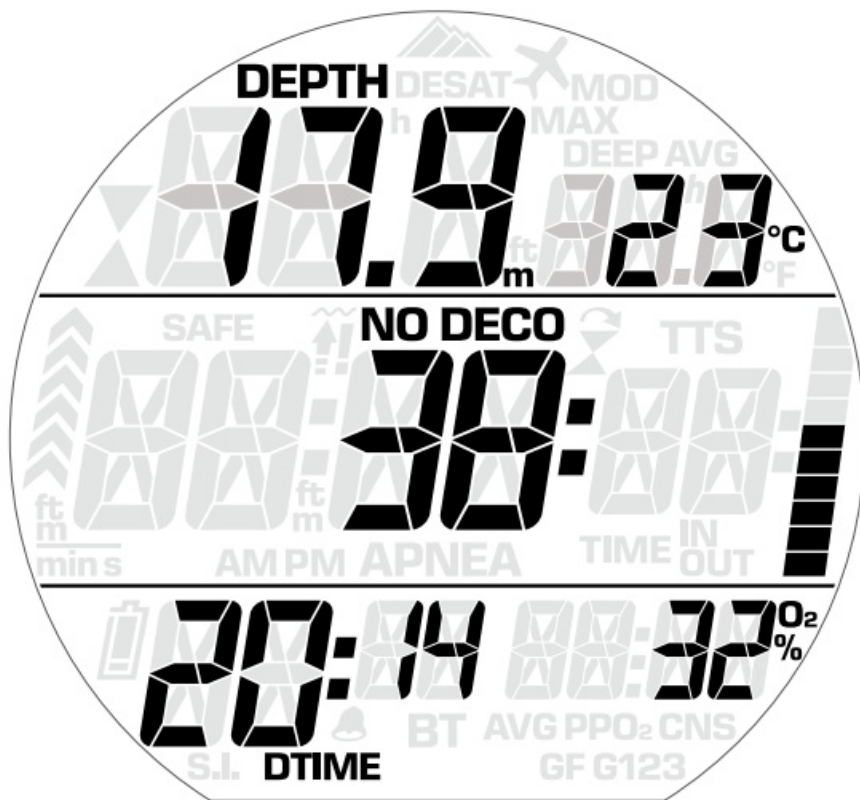
NOTE

- If you remain in pre-dive for longer than 10 minutes without pressing any button, Puck 4 will turn off.
- It is recommended to put Puck 4 into pre-dive before submerging. Not doing so can lead to a delay of up to 20s in Puck 4 monitoring the dive.

The PRE-DIVE display shows the active GF values, the active gas and its MOD.
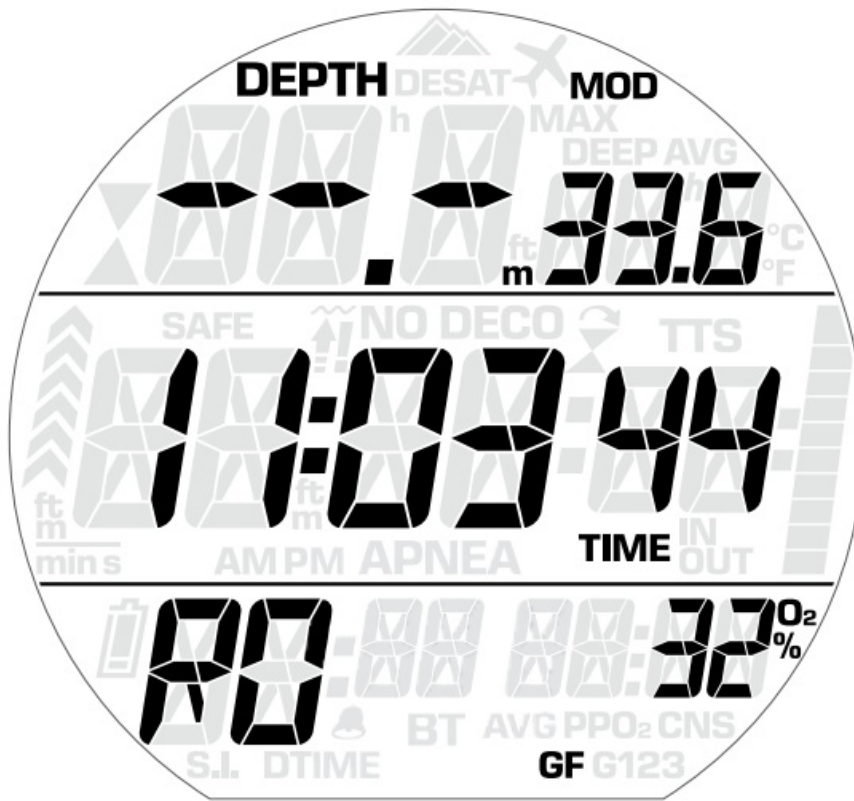
During a dive the following information is shown:

- current depth
- temperature and max depth alternating every 2 seconds
- no deco time (depth of deepest stop, time at deepest stop and total ascent time in case of decompression dives)
- dive time
- nitrogen bar graph via ten segments at the right edge of the display
- oxygen concentration of the active gas
- ascent speed: in case of an ascent, the value in m/min or ft/min is displayed to the left in the center row. Graphically it is displayed via six segments at the left edge of the display.

Pressing the button modifies the field in the bottom right corner in the following sequence:

- O2% (Nitrox only)
- CNS (Nitrox only)
- ppO2 (Nitrox only)
- time of day
- stopwatch
- main GF

NOTE
if you set Puck 4 to AIR, the information on CNS and ppO2 are not displayed in order to simplify the display. The

CNS value is however calculated in the background and both the CNS alarm and MOD alarm are triggered if the circumstances require it. If you are diving air but would anyway like to see the CNS and ppO2, set Puck 4 to Nitrox 21%.

NOTE

- The main GF are shown as R0, R1, R2 or R3. Only in case of custom setting are the actual GF low/GF high values shown.
- If REP (2.1.2.2) and/or M-day (2.1.2.3) are turned on, the letter M is added to the main GF definition (as in "modified") for as long as the main GFs values are affected by the setting.

DETAILED DESCRIPTION OF DISPLAYED DATA

The depth is given in 10cm resolution until 99.9meters, after which it is given in 1m resolution. When the depth is displayed in feet, the resolution is always 1 foot. At a depth shallower than 1.2m/4ft, the display shows —. Maximum possible depth is 150m/492ft.

The dive time is displayed in minutes. If during the dive you ascend to the surface, the time spent on the surface will only be counted if you descend again below 1.2m/4ft within 3 minutes. This allows for brief periods of orientation. While on the surface, the time will not show as progressing but it is running in the background. As soon as you submerge, the time will resume, including the time spent on the surface.

The no deco time is calculated in real time and updated continuously. Maximum displayed no deco time is 99 minutes. If you remain at depth beyond a no deco time of zero minutes, you will enter into decompression: you can no longer make a direct ascent to the surface and Puck 4 displays a MANDATORY decompression stop. Instead of a no deco time, it shows you the depth of the deepest stop, the time at the deepest stop, and the total ascent time (TTS – Time To Surface), which includes each decompression stop and the time required to travel the vertical distance to the surface at the allowed rate. TTS does NOT include the duration of deep stops.

Deep stops are NOT mandatory so you can skip them without incurring any penalty in the decompression calculation.

Nitrogen saturation in the leading tissue is represented graphically with segments to the right of the center row. It represents nitrogen supersaturation (any amount in excess of the equilibrium state at the surface) in the leading tissue. The segments light up gradually from 1 to 10.

The more segments you see, the closer to the no deco limits you are. As you enter a situation of mandatory decompression stop, all ten segments will be lit.

During a surface interval, the segments will gradually turn off as Puck 4 tracks the offgassing of your tissues.

Ascent rate: in presence of a depth change in excess of 80cm / 3ft, Puck 4 calculates the corresponding ascent speed and displays it both numerically and via the segments to the left of the center row. Each segment represents 20% of the allowed limit described in section 3.3.1.

The stopwatch can be reset by pressing and holding the button when the stopwatch is displayed. This will also set a bookmark in the dive profile memory.

DEEP, DECO AND SAFETY STOPS

DEEP stops are generated as you approach the no deco limit. DEEP stops are NOT mandatory but rather suggestions which attempt to minimize bubble production by offgassing some nitrogen at high ambient pressure. Deep stops are shown to the right of the current depth.

DECO stops are generated progressively as you stay at depth beyond the no deco time. DECO stops are MANDATORY As you approach the depth of a stop, the duration of the stop is gradually reduced. The duration itself is always shown in minutes, and is calculated as a function of the pressure gradient achieved at the stop depth itself. Hence the farther you are from the exact depth of the stop, the longer it will take for each minute to tick off.

A SAFETY stop is generated as soon as the depth of the dive exceeds 10m / 33ft. It has a duration of 3 minutes and it is carried out between depths of 6m / 20ft and 3m / 10ft at the end of a dive prior to surfacing. Such stop is NOT mandatory but HIGHLY RECOMMENDED. A safety stop is always shown as a 3-minute countdown in minutes and seconds.

WARNING

During all dives, perform a safety stop between 3 and 5 meters/10 and 15 feet for 3 minutes, even if no decompression stop is required.

AFTER THE DIVE

Upon returning to the surface, Puck 4 first goes into the so-called surfacing mode. This mode allows you to resume your dive after a brief period of orientation.

If you submerge again before the countdown is over, the dive time will resume from where it left off, including the time spent on the surface. If you do not submerge before the end of the countdown, Puck 4 considers the dive finished, records the data to the logbook and reverts to the so-called post-dive mode.

The post-dive screen shows two sets of information, alternating in 4s intervals. One contains:

- The remaining desaturation time (DESAT): this is calculated by the decompression model in the computer. Any dive started while there is remaining desaturation on your computer is considered a repetitive dive, meaning that Puck 4 accounts for the pre-existing nitrogen load in your body.

- The no-fly time ✈ : this is the time during which an exposure to the reduced pressure inside the cabin of an airplane could cause decompression sickness. Puck 4 employs, as recommended by NOAA, DAN and other agencies, a standard 12-hour (no-deco non-repetitive dives) or 24-hour (deco and repetitive dives) countdown.

The DESAT TIME could be shorter than the NO-FLY TIME, which would imply that you cannot fly although you are desaturated. This is simply the consequence of the desaturation time being calculated by the algorithm based on the actual dive profile, while the no-fly time is an accepted standard in the diving industry. Since the real effect of flying after diving has never been fully investigated, this approach fits with our philosophy.
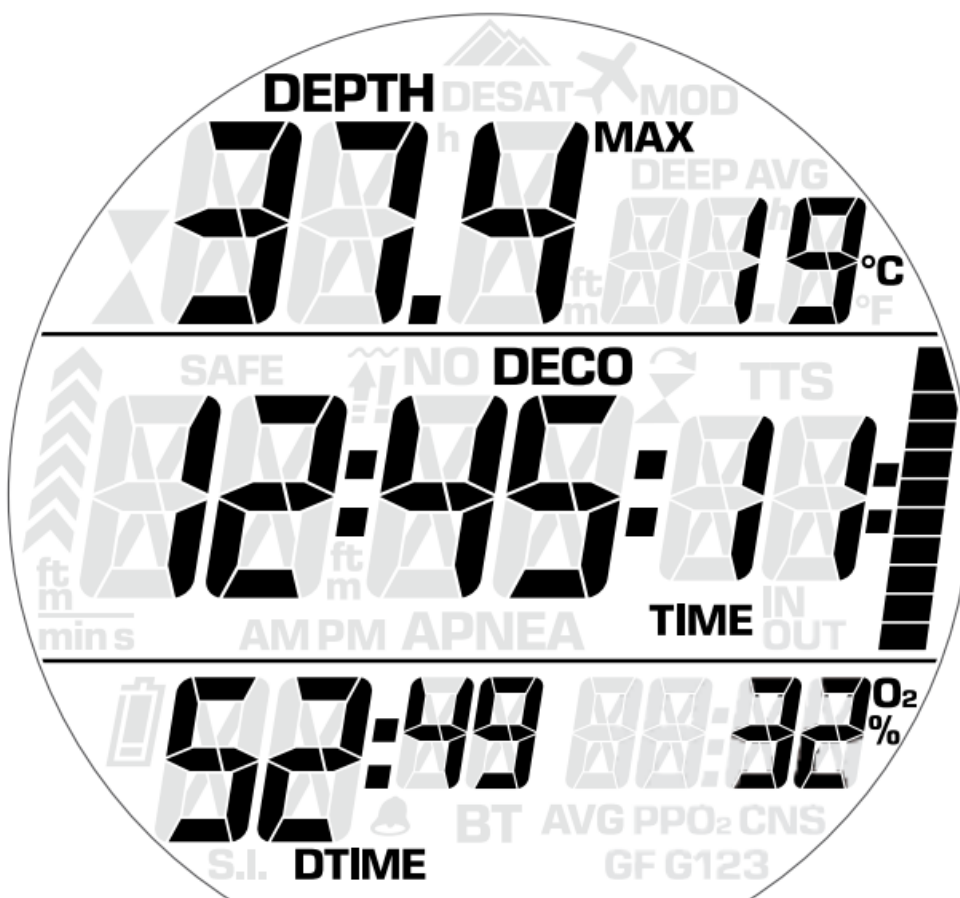
WARNING

Flying while Puck 4 displays ✈ can result in serious injury or death.

– The surface interval (S. I.): this is displayed from the moment the dive is closed for as long as there is remaining desaturation or no-fly time on the computer.
– CNS: this allows you to track how the CNS load from the previous dive is gradually reduced during the surface interval.

– In case of a dive violation, the corresponding symbol ( ) is shown.

In addition, the bar graph shows the calculated nitrogen load in the leading tissue. You can use this to gauge your progress in getting rid of nitrogen as the surface interval grows. Puck 4 continues to perform decompression-related calculations (nitrogen release), for as long as there is desaturation time left.
The other contains a condensed log of the last dive: maximum depth, lowest temperature, dive time and set O2%.

DIVING WITH MORE THAN ONE GAS MIXTURE

WARNING

- Diving with more than one gas mixture represents a much higher risk than diving with a single gas mixture, and mistakes by the diver may lead to serious injury or death.
- During dives with more than one gas mixture, always make sure you are breathing from the tank that you intend to breathe from. Breathing from a high oxygen concentration mix at the wrong depth can kill you instantly.
- Mark all your regulators and tanks so that you cannot confuse them under any circumstance.
- Before each dive and after changing a tank, ensure that each gas mixture is set to the correct value for the corresponding tank.

Puck 4 enables you to use up to three gas mixtures during the dive (air and Nitrox only). The three mixtures are labeled G1, G2 and G3 and must be in ascending order of oxygen content, i.e. G1 has the lowest oxygen concentration, G2 an intermediate value, and G3 has the highest oxygen concentration of the three. Two or more tanks can also be set to the same oxygen concentration. If you are diving with only two mixtures, you will be utilizing tanks G1 and G2.

Puck 4 can be set to consider all active gases in the decompression calculation, or it can be set to consider only the gas currently in use. In the first case (PR.dICt = ON in 2.1.4.1), when you switch gas when prompted to do so during an ascent, you will not see a change in the decompression calculation: Puck 4 considered that you were going to switch gas and already considered the effect of this on the decompression. In the second case (PR.dICt = OFF in 2.1.4.1) you will see a reduction in the total ascent time as you switch to a gas with higher oxygen content and Puck 4 considers this for the decompression calculation.

NOTE
You can set all the gases to the same oxygen percentage.

SETTING MORE THAN ONE GAS
The characteristics of the gases must be entered in the computer before the dive. It will then be your responsibility to tell Puck 4 which gas is currently being used during the various phases of the dive.

NOTE

- If you dive using just one gas, select G1 and deselect the other two.

- For dives with two gases, select G1 and G2 and deselect the third.

- When enabling G2 and G3, you must first define G2 and then G3.

- You cannot activate G3 without first having activated G2.

- G2 cannot have an oxygen percentage higher than G3.

- If you set G2 to OFF, G3 will automatically be set to OFF also.

- The MOD for G2 and G3 is the switch depth for the corresponding gas. This is what Puck 4 uses for its calculation, alarms and suggested switch points.

To use multiple gases, you will need to enable the gases and set the oxygen percentage and the ppO2max for each one. This is done in the same way as for G1, with the difference that for G2 and G3 you can turn a gas ON or OFF. Keep in mind that the MOD for G2 and G3 is the depth at which Puck 4 will prompt you to perform the gas switch (see section 5.2 below). To enable G2 press the button from the G2 OFF display to reach the G2 ON display, which shows also the oxygen concentration, ppO2 and MOD. Proceed as you would for G1 until you get to the G3 OFF screen. Either press and hold the button if you have finished setting gases, or press the button to advance to the G3 ON display and setting of G3.

NOTE

- When setting an oxygen concentration of 80% or higher, Puck 4 automatically sets the ppO2max to 1.6 bar.
- For gases with oxygen concentration 80% or higher, the ppO2 can be set between 1.6 bar and 1.8 bar.

WARNING
A ppO2 higher than 1.6 bar is dangerous and can result in injury or death.

SWITCHING GAS
Puck 4 always begins the dive with G1, which has the lowest percentage of oxygen. When during the ascent you reach the depth corresponding to the MOD of G2, Puck 4 sounds an audible signal and the oxygen concentration of G1 starts to blink in the lower right corner.
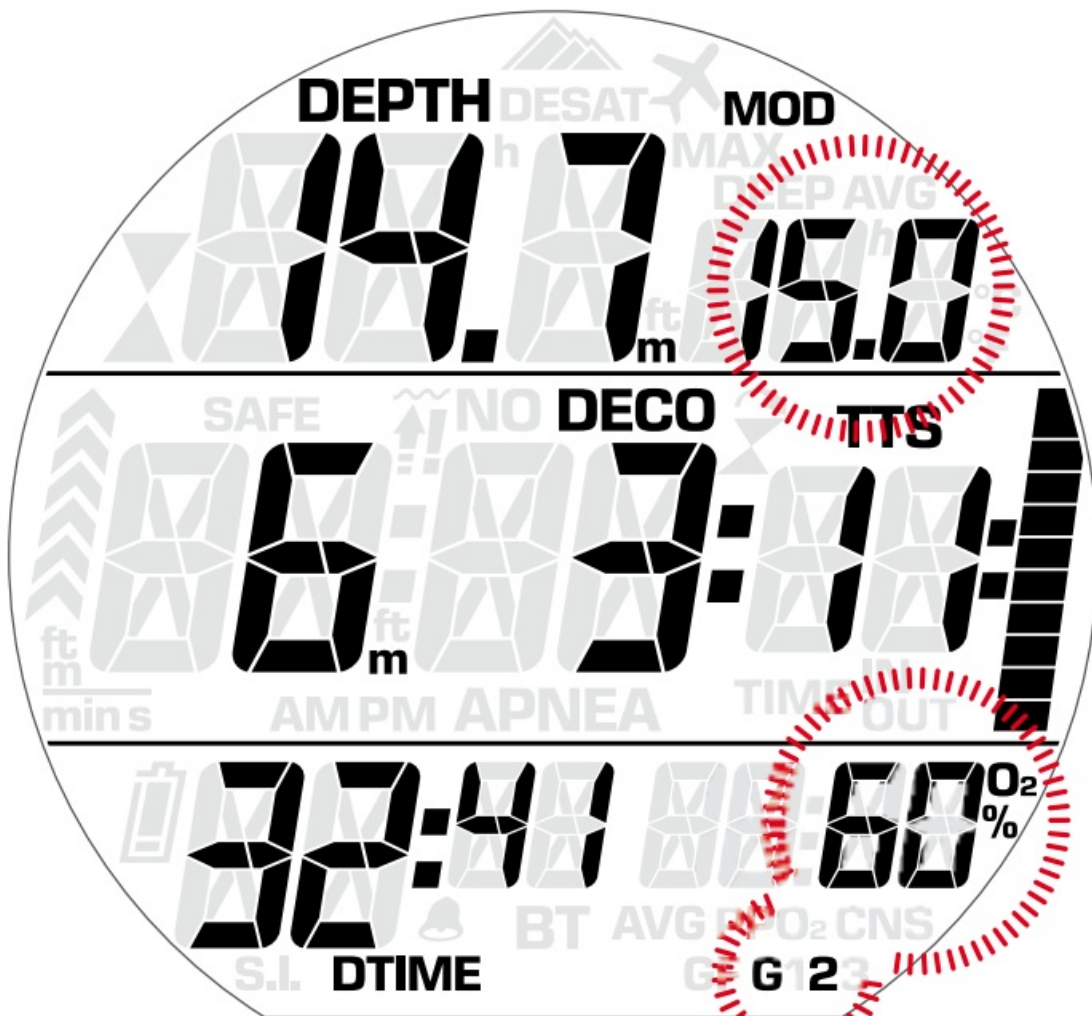
Press the button while this indication is blinking to initiate the gas switch: the oxygen percentage of G2 starts to blink in lieu of that of G1, and in the top right corner the MOD of G2 is displayed, also blinking.
Press and hold the button to confirm the switch to G2: the set oxygen concentration will be displayed steadily in the lower right corner of the screen: if PR.dICt is set to ON, the decompression calculation will not change; if PR.dICt is set to OFF, within 20 seconds of having switched gas, the decompression calculation will be updated to reflect the change in gas.

NOTE
If PR.dICt is set to ON and you don't switch gas when prompted to do so, the decompression calculation will change to reflect the exclusion of G2 from its calculation; if you then drop below the MOD of G2, the decompression calculation will change again to reflect the reinclusion of G2.

If you press the button (as opposed to pressing and holding it) while G2 is blinking, the next available gas in the list will be displayed instead. This will be G1 or G3 (if set), depending on the depth and whether you allowed the switch below MOD (section 2.1.4.2).

NOTE

- The automatic blinking of the oxygen concentration of G1 lasts only for 20 seconds. You can however initiate the gas switch at any time by pressing and holding the button when the oxygen concentration is displayed in the lower right corner.
- The same process is repeated when you approach the MOD for G3 with G2 blinking instead of G1.
- If you have set G1, G2 and G3 and have not switched from G1 to G2, once you reach the MOD for G3 the oxygen concentration of G1 will again blink to alert you of the possibility of switching gas.

SPECIAL SITUATIONS

SWITCHING BACK TO A GAS MIXTURE WITH LOWER OXYGEN CONCENTRATION

There may be situations in which you have to switch back to a gas with lower oxygen concentration than what you are currently breathing. This can happen for instance if you want to descend deeper than the MOD for the current gas, or if for instance you have run out of gas in G3 during the decompression. To do so, simply press the button until the oxygen concentration is displayed in the lower right corner, then press and hold the button to initiate the gas switch. From here on the procedure is the same as described in 5.2.

SUBMERGING BELOW THE MOD AFTER A GAS SWITCH

If after having switched to a gas mixture with a higher oxygen concentration you inadvertently drop again below the MOD for that mixture, the MOD alarm will immediately go off. Either switch back to a gas mixture suited for that depth, or ascend above the MOD for the gas mixture you are breathing from.

BOTTOM TIMER MODE

When Puck 4 is set to BOTTOM TIMER (BT) mode, it will only monitor depth, time, and temperature, and will not carry out any decompression calculation. You can only switch to bottom timer mode if the computer is completely desaturated. Alarms are limited to ascent rate, low battery and, if set by the user, max depth and dive time.

WARNING

Dives in bottom timer mode are performed at your own risk. After a dive in bottom timer mode you must wait at least 24 hours before diving using a decompression computer.

During a dive in bottom timer mode, the following information is displayed:

- current depth
- average depth
- dive time
- temperature alternating with max depth every 2 seconds
- stopwatch
- in case of an ascent: ascent speed (in m/min or ft/min).

Pressing and holding the button resets both the stopwatch and the average depth.

DIVE VIOLATION INDUCED BOTTOM TIMER MODE

The following violations can occur during an Air or Nitrox dive:

- Ascent violation.

- Missed deco stop violation.

In case of a violation, Puck 4 will restrict the use for 24 hours, and will only allow operation in Bottom Timer mode, continuously displaying the violation symbols

TAKING CARE OF PUCK 4

TECHNICAL INFORMATION

Operating altitude

- with decompression – sea level to approximately 3700m/12100ft
- without decompression (gauge mode) – at any altitude

Decompression model: Bühlmann ZH-L16C with gradient factors (16 tissues)

Depth measurement:

- Max displayed depth: 150m/492ft
- Resolution: 0.1m until 99.9m and 1m at depth deeper than 100m. Resolution in ft is always 1ft
- Temperature compensation of the measurement between -10 °C to +50 °C / 14 °F to 122 °F
- Accuracy from 0 to 150m/492ft: 1% ±0.2m/1ft

Temperature measurement

- Measurement range: -10 °C to +50 °C / 14 °F to 122 °F
- Resolution: 1 °C / 1 °F
- Accuracy: ± 2 °C / ± 4 °F
- Clock: quartz clock, time, date, dive time display up to 99 minutes
- Oxygen concentration: adjustable between 21% and 99%, ppO2max range between 1.2 and 1.6bar up to 79% O2, then 1.6 – 1.8 bar.
- Logbook memory: over 100 hours of dive profile at 5-second sampling rate
- Operating temperature: -10 °C to +50 °C / 14 °F to 122 °F
- Storage temperature: -20 to 70 °C / -4 to 158 °F
- Display:
  - Diagonal: 39 mm / 1 1/2″
  - Mineral glass
- Power supply:

- CR2450 user-replaceable battery
- battery life: over 100 dives. Actual battery duration depends on the usage of the backlight and the water temperature.

Bluetooth:
EU
This device is in compliance with the essential requirements and other relevant provisions of RED Directive (2014/53/EU).

FCC Warnings

- Model: PUCK4 FCC ID: 2AIKSPUCK4

This device complies with part 15 of the FCC Rules. Operation is subject to the following two conditions:

1. This device may not cause harmful interference, and
2. This device must accept any interference received, including interference that may cause undesired operation.

This equipment has been tested and found to comply with the limits for a Class B digital device, pursuant to part 15 of the FCC Rules. These limits are designed to provide reasonable protection against harmful interference in a residential installation.
This equipment generates, uses and can radiate radio frequency energy and, if not installed and used in accordance with the instructions, may cause harmful interference to radio communications. However, there is no guarantee that interference will not occur in a particular installation. If this equipment does cause harmful interference to radio or television reception, which can be determined by turning the equipment off and on, the user is encouraged to try to correct the interference by one or more of the following measures:

- Reorient or relocate the receiving antenna.
- Increase the separation between the equipment and receiver.
- Connect the equipment into an outlet on a circuit different from that to which the receiver is connected.
- Consult the dealer or an experienced radio/TV technician for help.
- Responsible party's contact located in the United States: Head USA – dba as Mares Diving a division of Head USA, Congress Corporate Plaza II 902 Clint Moore Road Suite 208, 33487 Boca Raton, Florida.
  www.mares.com

MAINTENANCE
The depth accuracy should be verified every two years. Aside from that, Puck 4 is virtually maintenance free. All you need to do is rinse it carefully with fresh water after each dive (avoid any chemical products) and charge the battery when needed. To avoid possible problems with your Puck 4, the following recommendations will help assure years of trouble free service:

- avoid dropping or jarring your Puck 4;
- do not expose Puck 4 to intense, direct sunlight;
- do not store Puck 4 in a sealed container, always ensure free ventilation.

NOTE
If you notice signs of moisture on the inner wall of the glass, take your Puck 4 immediately to an authorized Mares service center.

WARNING
The mineral glass is not exempt from scratches resulting from improper use.

WARNING
Do not blow compressed air onto Puck 4, because it could damage the pressure sensor area.

REPLACING THE BATTERY IN PUCK 4
Replacing the battery is a delicate operation, and requires close attention. We suggest that you visit an authorized Mares center. Mares declines all responsibility for any damage caused by replacing the battery.

NOTE
Do not discard the old battery in the environment. Mares adopts a policy of respect for the environment, and urges use of the appropriate separated waste collection service.

- Unscrew the cover of the battery vane by using a coin that best fits into the slot. Remove the cover, remove the battery and insert the new battery paying close attention to the polarity.
- Inspect the O-ring carefully, checking for any signs of damage, tearing or warping. If necessary, replace it with a new O-ring.
- Put the cover back in place and turn clockwise while pressing down until it's tight, without forcing too much.

NOTE
The battery compartment is sealed from the electronics, so that in case of a flooding of the battery compartment the dive computer is unharmed. In such event, you will need to rinse the compartment with fresh water, dry it thoroughly, replace the o-ring and put in a new battery.

WARNING
Mares reserves the right to refuse to provide service under the warranty if the maintenance instructions are not followed.

WARRANTY

Mares products are guaranteed for a period of two years subject to the following limitations and conditions:
The warranty is non-transferable and applies strictly to the original purchaser.
Mares products are warranted free from defects in materials and workmanship: components that, upon technical inspection, are found to be defective, will be replaced free of charge.
Mares S.p.A. declines all responsibility for accidents of any kind that result from tampering or incorrect use of its products.
Any products returned for overhaul or repairs under warranty, or for any other reason, must be forwarded exclusively via the vendor and accompanied with a proof of purchase slip. Products travel at the risk of the sender.

WARRANTY EXCLUSIONS
Damage caused by water seepage resulting from improper use (e.g. dirty seal, battery compartment closed incorrectly, etc.).
Rupture or scratching of the case, glass or strap as a result of violent impact or blows.
Damage resulting from excessive exposure to elevated or low temperatures.
Damage caused by the use of compressed air to clean the dive computer.

HOW TO FIND THE PRODUCT SERIAL NUMBER AND ELECTRONIC ID
The serial number is laser-engraved on fthe back side of Puck 4, in front of the front attachment point of the strap.
To see the electronic ID, enter the INFO menu.
Both serial number and electronic ID can be found on the warranty card inside the box and also on the label outside the box.

DISPOSAL OF THE DEVICE

Dispose of this device as electronic waste. Do not throw it away with regular rubbish.
If you prefer, you can return the device to your local Mares dealer.

Mares S.p.A. – Salita Bonsen, 4 – 16035 RAPALLO – ITALY – Tel. +39 01852011 – Fax +39 0185201470
www.mares.com
2016/425: **www.mares.com/declarations**

Documents / Resources

mares Puck 4 Dive Computer [pdf] Instruction Manual
Puck 4, Puck 4 Dive Computer, Puck 4, Dive Computer, Computer

References

- **mares.com**
- **mares.com/declarations**
- **mares.com/sports/diving/gradientfactor**
- **User Manual**