SHEARWATER

# PERDIX 3




## OPERATING INSTRUCTIONS

POWERFUL | SIMPLE | RELIABLE

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# DANGER

This computer is capable of calculating deco stop requirements. These calculations are at best a guess of real physiological decompression requirements. Dives requiring staged decompression are substantially more risky than dives that stay well within no-stop limits.

Diving with rebreathers and/or diving mixed gases and/or performing staged decompression dives and/or diving in overhead environments greatly increases the risk associated with scuba diving.

**YOU REALLY ARE RISKING YOUR LIFE WITH THIS ACTIVITY.**

# ! WARNING

This computer has bugs. Although we haven't found them all yet, they are there. It is certain that there are things that this computer does that either we didn't think about, or planned for it to do something different. Never risk your life on only one source of information. Use a second computer or tables. If you choose to make riskier dives, obtain the proper training and work up to them slowly to gain experience.

This computer will fail. It is not whether it will fail but when it will fail. Do not depend on it. Always have a plan for how to handle failures. Automatic systems are no substitute for knowledge and training.

No technology will keep you alive. Knowledge, skill, and practiced procedures are your best defense (except for not doing the dive, of course).

# Conventions Used in this Manual

These conventions are used to highlight important information:



**INFORMATION**

Information boxes contain useful information about dive computer functions.



**CAUTION**

Caution boxes contain important instructions for operating the Perdix.



**WARNING**

Warning boxes contain critical information that may affect safety.




# 1. Introduction

The Shearwater Perdix 3 is an advanced dive computer for all types of diving.

Please take the time to read this manual. Your safety may depend on your ability to read and understand the computer's displays.

Diving involves risk and education is your best tool for managing this risk.

Do not use this manual as a substitute for proper dive training and never dive beyond your training. What you don't know can hurt you.

## 1.1. Features

- Vivid full color 2.4” AMOLED display
- Rugged titanium bezel and buttons
- Crush proof to 260m / 860ft
- 7 independently configurable diving modes
- 3 customizable layouts for every dive mode
- Up to 5 customizable gases in SCUBA mode
- Any combination of Oxygen, Nitrogen and Helium (Air, Nitrox,Trimix)
- Full decompression and CCR Support
- Bühlmann ZHL-16C with gradient factors
- No lockout for violating deco stops
- CNS Tracking
- Quick NDL and full decompression planner built in
- Simultaneous wireless pressure monitoring of up to 4 cylinders
- Sidemount support
- Automatic location logging (with Swift GPS)
- Gas density tracking
- Tilt compensated digital compass with multiple display options
- Dedicated Freedive Mode
- Customizable vibration alerts
- High-speed depth sampling
- Bluetooth Dive log uploading
- Free firmware updates

## 1.2. Notes on this manual

This manual contains cross-references between sections to make it easier to navigate.

Underlined text indicates the presence of a link to another section.

**Do not change any settings on the Perdix without understanding the consequence of the change.**

This manual is not a substitute for proper training.

**Firmware Version: V39**

This manual corresponds to firmware version V39.

Feature changes may have been made since this release and might not be documented here.

**Check the release notes on Shearwater.com for a complete list of changes since the last release.**

# 1.3. Modes Covered by this Manual

This manual provides operating instructions for the Perdix 3 in seven Dive Modes:

- Single Gas Air 

- Single Gas Nitrox 

- 3 Gas Nitrox (3 GasNx) 

- Open Circuit Technical (OC Tec) 

- Closed Circuit / Bail Out (CC/BO) 

- Gauge 

- Freedive 


Some features of the Perdix 3 only apply to certain dive modes. Look for the corresponding mode icons throughout the manual to help distinguish which features are available in the various modes.

If not otherwise indicated, features described are applicable in all dive modes.

Change the Dive Mode from the Dive Settings menu. See details on page 142.

# 2. Basic Operation

## 2.1. Turning On

To turn the Perdix on, press both buttons together.




**Auto-on**
The Perdix will automatically turn on when submerged underwater. This is based on pressure increase and not on the presence of water. When auto-on is activated, the Perdix will enter the last configured dive mode.

**Do Not Rely On The Auto-On Feature**

This feature is supplied as a backup for when the operator forgets to turn on the Perdix.

Shearwater recommends turning the dive computer on manually before each dive to confirm proper operation and to double check battery status and setup.

**Auto-on Details**
The Perdix turns on automatically when the absolute pressure is greater than 1100 millibar (mbar).

For reference, normal sea level pressure is 1013 mbar and 1 mbar of pressure corresponds to approximately 1 cm (0.4”) of water. So, when at sea level, the Perdix will automatically turn on and enter dive mode when about 0.9 m (3 ft) underwater.

If at higher altitude, then the Perdix auto-on will occur at a deeper depth. For example, when at 2000 m (6500 ft) altitude the atmospheric pressure is only about 800 mbar. Therefore, at this altitude the Perdix must be submerged underwater by 300 mbar to reach an absolute pressure of 1100 mbar. This means the auto-on occurs at about 3 m (10 ft) underwater when at an altitude of 2000 m.

## 2.2. Customizable Splash Screen

After turning on, the Perdix 3 Splash Screen is displayed for 2 seconds.

Customizable start up text can be added using the Dive Shearwater app.

The image itself can also be customized using the Dive Shearwater App.

If custom text or a custom image is used, the splash screen will be displayed for 1 minute. It can be skipped with any button press.

Note that the computer will revert to the standard splash screen on a firmware update. The custom splash screen will then need to be reloaded.

See the section on Firmware update and Log Downloads on page 167 for details.

## 2.3. Buttons

Two titanium piezo-electric buttons are used to change settings and view menus.

All Perdix 3 operations are simple single button presses.




Don't worry about remembering all the button rules below. Button hints make using the Perdix 3 easy.

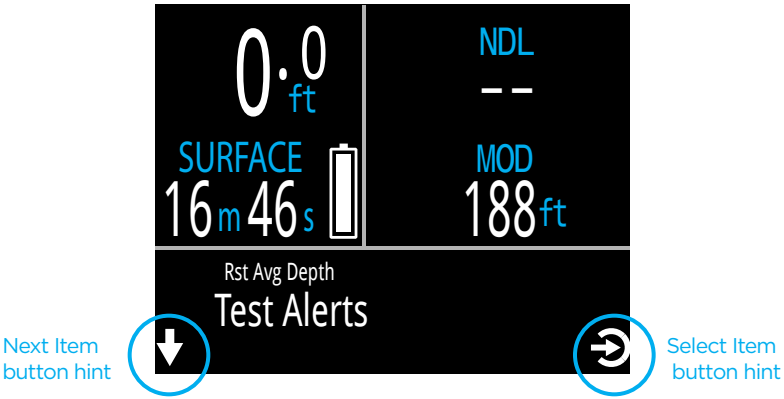
| **MENU (Left) button** | |
|---|---|
| From main screen | Brings up menu |
| In a menu | Moves to the next menu item |
| Editing a setting | Changes the setting's value |

| **SELECT (Left) button** | |
|---|---|
| From main screen | Steps through info screens |
| In a menu | Performs command or starts editing |
| Editing a setting | Saves the setting's value |

**BOTH BUTTONS**
When Perdix 3 is off pressing MENU and SELECT at the same time will turn the Perdix 3 on. No other operation requires pressing both buttons at the same time.

## 2.4. Button Hints

When in a menu, button hints indicate the function of each button.

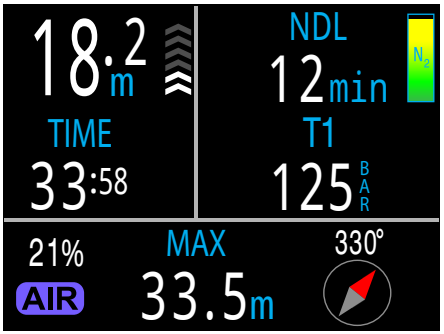



**Button Hint Icons:**

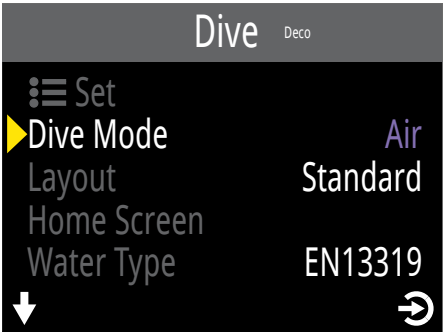
UP
DOWN
NEXT
PREVIOUS
SELECT
BACK
HOME
CANCEL
SAVE

# 2.5. Changing between Modes

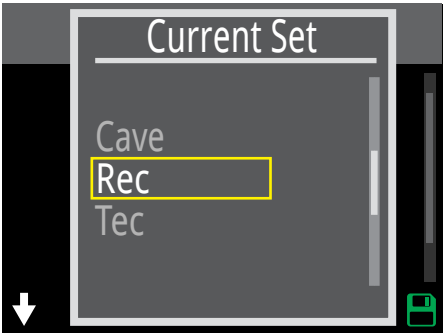
By default the Perdix 3 is set to Air Mode.




*Default Air Mode*




*Dive Settings Menu*




*Setting Set Selection Menu*

This computer has 7 dive modes optimized for different types of diving. This manual covers operation in all diving modes. Switch betweens modes in the dive settings menu. See details on page 142.

The mode indicator in the bottom left of the screen shows which mode the computer is currently in.

Each mode and layout is independently customizable. Unless otherwise stated, the settings and configuration in each mode will not change when moving between modes.

To make life easier, up to three setting sets can be programmed to quickly change all computer settings with one action. This is especially useful if you often switch between configurations or types of diving. Read more about setting sets on page 143.

## Mode Selection

The different modes of this computer are designed to fit the needs of different types of divers. If you're just starting out on your diving adventure, we recommend keeping things simple.

If you're diving a single tank with air in it (21% O2), we recommend you use the Air mode. If diving a single tank of nitrox, we recommend Nitrox mode.

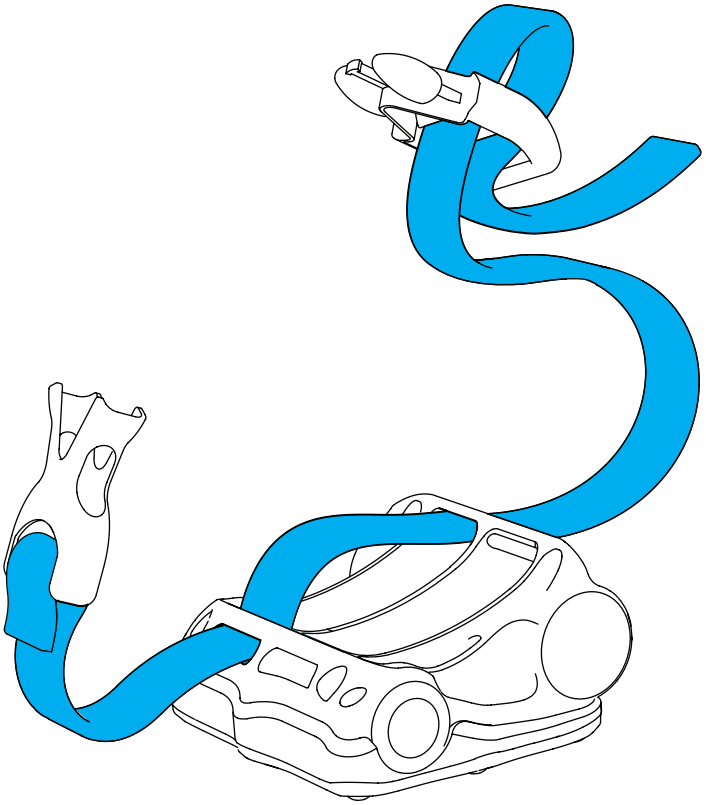
The more advanced modes are more complicated, with more rules that you need to be aware of.

# 3. Mounting Options

The Perdix includes mounting points for either two elastic straps or two bungee chords.

## 3.1. Elastic Straps

Install the elastic straps as shown in the image below. The buckles feature a locking mechanism to prevent them from inadvertently loosening. Press the tab to allow the buckle to slide freely on the straps.
Strap width is 3/4” (19mm).

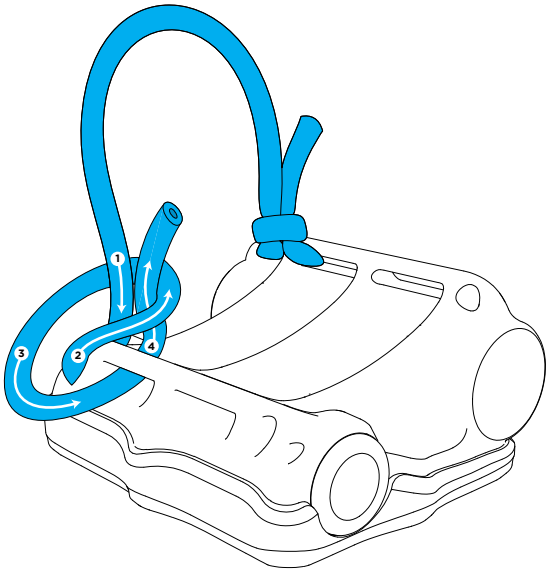


*Install straps and buckles as shown*

# 3.2. Shock Cord

Bungee or shock cord can be installed in many ways on the Perdix. The Perdix's holes are sized for 3/16" cord.

Shearwater recommends the knot shown below. This knot has the nice feature of creating loops that stay wide open while donning the Perdix and the knots will not pull free under high load.




When using bungee or shock cord, always create two independent loops so that a single break will not result in a lost dive computer.

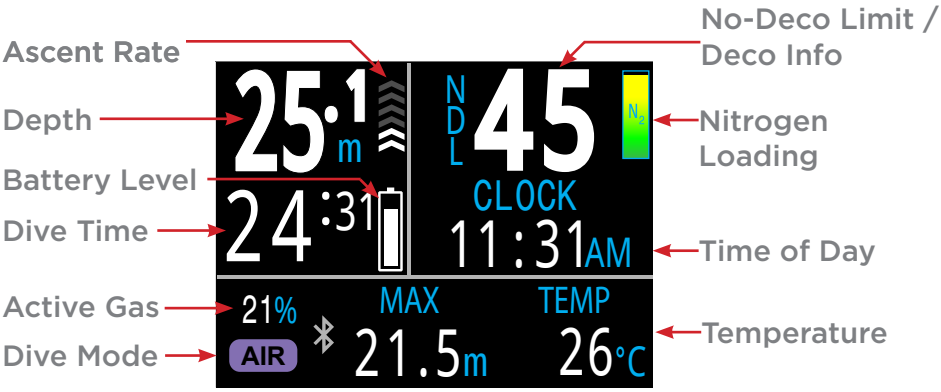
# 4. Dive Mode Interface

## 4.1. Default Dive Setup

The Perdix 3 come pre-configured for recreational diving.

The default dive mode is single gas air displayed with the “Big” screen layout.

As a quick reference, a diagram of the default display while diving is shown below.




*AIR Mode Default Display*

Many attributes of this default display are shared with the other dive modes. The following sections go into detail about each screen element.

See the Single Gas Example Dive on page 66 for a walk through of how this screen changes through all phases of a dive.

# 4.2. Dive Mode Differentiation

Each dive mode is designed to best suit a particular type of diving.

**Air**
Designed for use during recreational, air only, no-decompression diving activities.
- Air (21% oxygen) only, not switchable underwater

**Nitrox (Single Gas)**
Designed for use during recreational, Nitrox, no-decompression diving activities.
- Single Gas Nitrox up to 40% oxygen
- No gas switching underwater

**3 GasNx (Three Gas Mode)**
Designed for introductory technical diving activities including diving involving planned decompression.
- Three programmable gases, switchable underwater
- Nitrox up to 100%

**OC Tec**
Designed for open circuit technical diving activities including planned decompression.
- Full Trimix
- No Safety stops

**CC/BO**
Designed for use with a closed circuit rebreather.
- Fast switching from closed circuit to open circuit (BO) operating modes.

**Gauge**
Gauge Mode turns the Perdix 3 into a simple depth and time display with a dedicated layout (bottom timer). See details on page 86.
- No tissue tracking
- No decompression information

**Freedive**
Optimized for use while freediving. See page 88.

# 4.3. Main Screen Layout

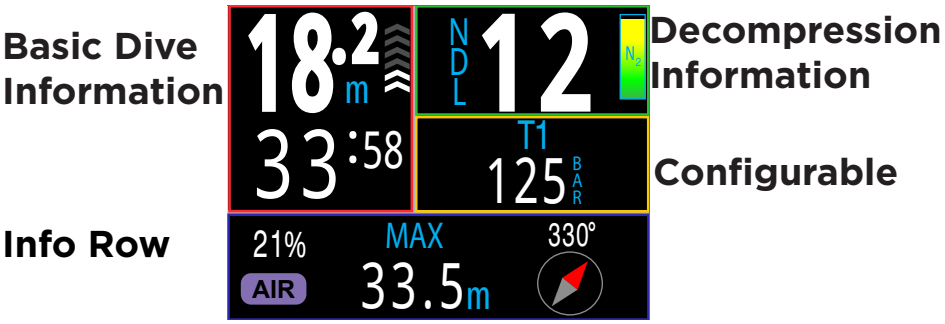
The Perdix 3 has three different screen layouts available in every dive mode, **Big, Standard** and **Tec**.

There are 7 available dive modes: on page 144.

## Big layout and Standard Layout

The Big and Standard screen layouts are similar with the Big layout providing depth and NDL in a larger font size.
In these layouts the dive screen is divided into four sections:

Basic dive info, decompression info, the Info Row, and an extra configurable slot.




*Screen Sections in Big and Standard Modes*

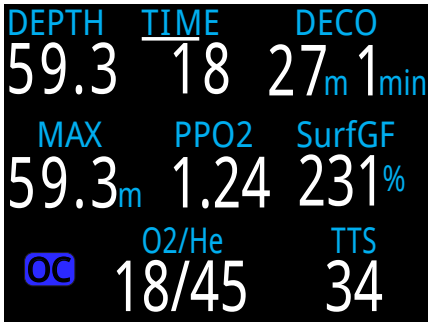
The Basic Dive Info section and the Decompression Info section content are reserved for the most critical information and are fixed. Pressing the right (SELECT) button scrolls through additional data in the Info row.

Both the Info row and the configurable slot can be extensively customized. Read more about Configurable Positions on page 27.

The Big screen layout is the default layout for Air and Nitrox dive modes, but any layout can be used in any dive mode.

## Tec layout

The Tec layout was designed to display the maximum amount of information for technical divers. On the Perdix 3 the Tec layout is the default for OC Tec and CC/BO Modes, but it is available in all dive modes.




**Top Row**
Depth, Time & Deco Stops

**Center Row**
Configurable

**Bottom Row**
Configurable

The Top row content is reserved for depth, time, and decompression information and is fixed.

The Centre row contents can be configured to display the data that the user feels is most important. The entire center row is configurable.

The bottom row is also extensively configurable with only the current dive mode on the left hand side being fixed. Pressing the Select (right) button scrolls through additional data in the bottom row, temporarily obscuring this information. See the Info Screens section on page 34 for more information on info rows and configuration options.

# 4.4. Standard & Big Layout Descriptions

Screen element behavior is largely the same in all dive modes. This section covers screen elements while referencing the Standard and Big layouts. Detailed descriptions of elements unique to the Tec layout can be found in the next section.

## Basic Dive Info Area

The Basic Dive Info Area shows depth, dive time, ascent rate, and state of battery charge (when at the surface).

### Depth

The depth is shown in the top left. In Big and Standard layouts depth is displayed with one decimal place of resolution in meters and half a foot of resolution in feet.

Note: If the depth shows a Flashing Red zero, ERR, or shows at depth at the surface, then the depth sensor needs service.

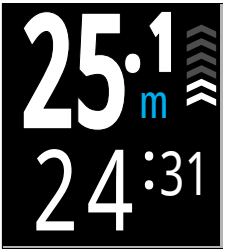
### Dive Time

Dive time displays in minutes and seconds. It begins and ends counting automatically when diving.

### Surface Interval

When on the surface, the dive time is replaced by the surface interval in hours and minutes. Beyond 96 hours(4 days), it displays in days.

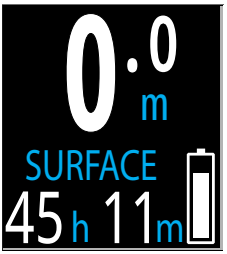
> The surface interval resets when decompression tissues are cleared.




*Depth in Meters and Dive Time*




*Depth in Feet and Dive Time*




*Surface interval and battery symbol*

**Ascent Rate Display**
Displays current ascent rate graphically.

1 arrow per 3 meters per minute (mpm) or 10 feet per minute (fpm) of ascent rate.



WHITE when less than 9 mpm / 30 fpm (1 to 3 arrows)



**YELLOW** when greater than 9 mpm / 30 fpm and less than 18 mpm / 60 fpm (4 or 5 arrows)



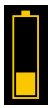
**FLASHING RED** when greater than 18 mpm / 60 fpm (6 arrows)

Note: Deco calculations assume 10 mpm (33 fpm) ascent rate.

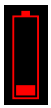
**Battery Icon**
The battery icon is shown on the surface but disappears when diving. If low or critical then the battery icon will appear while diving.



WHITE when battery charge is OK



**YELLOW** when battery needs to be replaced.



**RED** when battery must be replaced immediately.

Due to variations in battery chemistry, battery indicator (fuel gauge) accuracy differs between different battery types. See Battery Types on page 170 for details.

## Decompression Info Area

The decompression info area on the top right of the display is used to show multiple information types throughout the dive. At the beginning of the dive it displays NDL. If NDL is exceeded, it displays decompression information, and when approaching the surface and not in decompression, it shows the safety stop or count-up timer.

### No Decompression Limit (NDL)

The time remaining, in minutes, at the current depth until decompression stops will be necessary.




Displays in Yellow when the NDL is less than the low NDL limit (Default 5 minutes).




### Deco Stop Depth and Time

Once NDL = 0 minutes, mandatory decompression is required. The NDL will be replaced by the shallowest depth to which you can ascend and how long to hold that stop.




*NDL = 0 minutes Decompression Stops Required*

By default the Perdix uses a 3m (10ft) last deco stop depth. You may perform your last deco stop deeper if you wish - deco calculations will remain accurate. If you choose to do this, depending on your breathing gas, the predicted time-to-surface may be shorter than the actual TTS since off-gassing may occur slower than the algorithm expects. There is also an option to set the last stop to 6m (20ft).

See Decompression Stops on page 60 for details.

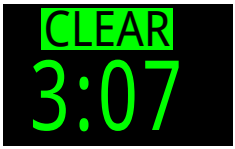
**Safety Stop**
Appears in the place of the NDL and counts down automatically when in the safety stop range.




Safety stops are only available in recreational modes and may be turned off, set to fixed times of 3, 4, or 5 minutes, set to adapt based on dive conditions, or be set to count up from zero.

See Safety Stops on page 58 for details.

**Deco Clear Counter**
In OC Tec and CC/BO mode, the deco clear counter appears in the DECO box and counts up from zero to show for how long your decompression has been clear.




**Nitrogen Loading bar Graph**
The nitrogen bar graph is scaled such that it is full once decompression stops will be needed.




On ascent, it gives a much better indication of decompression stress and the risk of decompression sickness than NDL does.

On the surface, the Nitrogen Loading bar Graph shows the residual nitrogen from the previous dive.

**Important!**

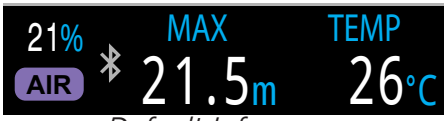
All decompression information including Deco Stops, NDL, and Time to surface are predictions that assume:

- Ascent rate of 10mpm / 33fpm
- Decompression stops will be followed
- All programmed gases will be used as appropriate

Read more about Decompression Information Accuracy on page 64.

## Configurable Info Row

The Home Screen is the default display for the bottom row, also known as the info row. Information in the center and right positions can be customized.




*Default Info row*

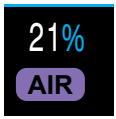
### Mode Indicator

The mode indicator is shown in the bottom left of the screen at all times.

### Active Gas

If the active gas is not assigned to one of the custom positions, it will be displayed above the mode indicator.

In Air, Nitrox, and 3GasNX modes, the percentage of oxygen in the breathing gas is displayed.




In OC Tec and CC/BO modes, the fraction of oxygen and fraction of helium are displayed. The example shows 18% Oxygen and 50% helium in the active breathing mix.



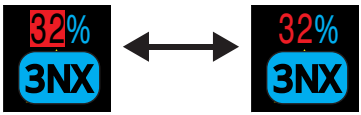

In CC/BO mode, the active gas refers to the diluent gas.

The gas will display in yellow if a better gas is available.

The gas will display in flashing red if the MOD of the gas has been exceeded.

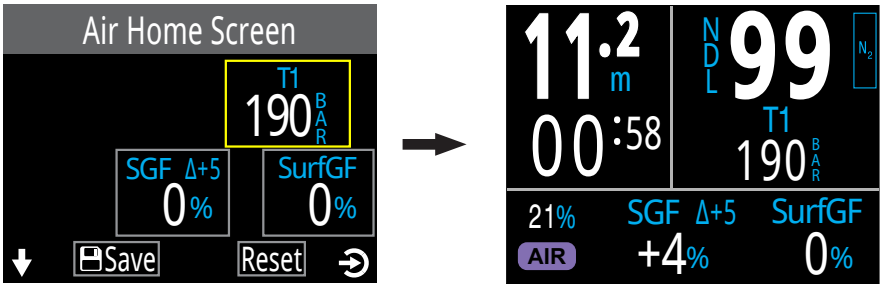



*Better Gas available*




*Gas displayed in flashing red when MOD has been exceeded*

**Configurable Positions**
Many possible configurations can be set for the three configurable positions of Standard and Big modes.




Every Dive mode has its own home screen customization options and settings. For example, if you customize your home screen in Air mode, that same custom configuration will not be present when you put your computer in Nitrox mode.

See details for how to change the screen configuration in Edit Home screen on page 145.

All configuration options are listed in the Screen Element Descriptions on page 36.

# 4.5. Tec Layout Descriptions

Screen element behavior is largely the same in all dive modes. This section covers screen elements while referencing Tec layout. Detailed descriptions of elements unique to the Big and Standard layouts can be found in the previous section.

## The Top Row

The top row shows depth, dive time, ascent rate, decompression information and battery status.




**Depth**
Displayed in feet or meters.

In feet, depth displays with no decimal places. In meters, depth displays with one decimal place up to 99.9m.

Note: If the depth shows a Flashing Red zero or shows a depth at the surface, then the depth sensor needs service.

**Ascent Rate Display**
Shows how fast you are currently ascending.

1 arrow per 3 meters per minute (mpm) or 10 feet per minute (fpm) of ascent rate.
Decompression calculations assume 10mpm (33fpm) ascent rate.



WHITE when less than 9 mpm / 30 fpm (1 to 3 arrows)



**YELLOW** when greater than 9 mpm / 30 fpm and less than 18 mpm / 60 fpm (4 or 5 arrows)



**FLASHING RED** when greater than 18 mpm / 60 fpm (6 arrows)

### Dive Time



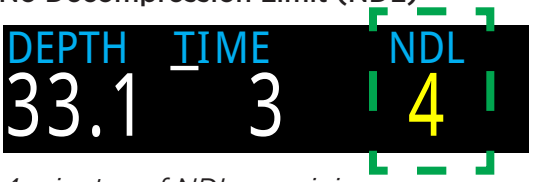




The first “TIME” item, on the left of the top row, is the length of the current dive in minutes.

Seconds display as a bar drawn below the word “Time.” It takes 15 seconds to underline each character in the word. The seconds bar is only displayed when diving.

### No Decompression Limit (NDL)




*4 minutes of NDL remaining*

NDL appears on the right hand side of the top row. It appears in yellow when the NDL is less than the low NDL limit (Default 5 minutes).

### Decompression Stop Depth and Time




*Stop at 27 meters for 1 minutes*

Once NDL reaches zero, decompression information will appear on the right hand side of the top row.

The next decompression stop depth is shown in the current units (feet or meters). This is the shallowest depth to which you can ascend. The last item on the right in the top row is how long in minutes to hold the stop.

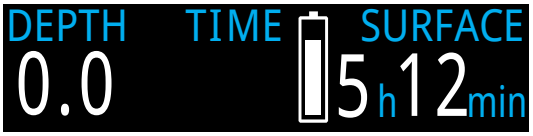
Decompression information will **Flash Red** if you ascend shallower than the current stop.




*Decompression Stop Violated*

By default the Perdix 3 uses a 3m (10ft) last deco stop depth. You may perform your last deco stop deeper if you wish - deco calculations will remain accurate. If you choose to do this, depending on your breathing gas, the predicted time-to-surface may be shorter than the actual TTS since off-gassing may occur slower than the algorithm expects. There is also an option to set the last stop to 6m (20ft).

**Surface Interval**
When on the surface, decompression stop depth and time are replaced by a surface interval display showing the hours and minutes since the end of your last dive.




*2 hour and 15 minute surface interval*

Above 4 days, the surface interval is displayed in days.

The surface interval is reset when the decompression tissues are cleared. See the Decompression Tissue Loading section on page 172 for more information.

**Deco Clear Counter**
When deco clears the STOP DEPTH and TIME are replaced by a counter that begins counting up from 0.



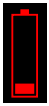

**Battery Icon**
The default behavior is that the battery icon is shown on the surface but disappears when diving. If low or critical then the battery icon will appear while diving.



WHITE when battery charge is OK



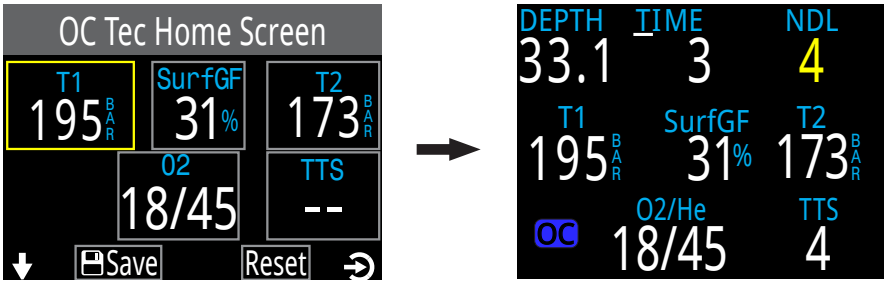
**YELLOW** when battery needs to be replaced.



**RED** when battery must be replaced immediately.

## Center Row and Bottom Row

In the Tec layout, all three slots in the center row and two slots in the bottom row are configurable in most dive modes. Each slot can accommodate one, two, or three pieces of data.




For detailed descriptions of each screen element, see page 36.

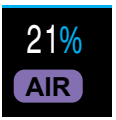
In the OC Tec Mode the center row displays gas PPO2 by default. The center slot in the middle row has fewer configuration options because it is slightly narrower than the others.

In CC/BO mode the center slot displays the currently selected rebreather setpoint by default. However, all three slots can still be customized if you wish to move your setpoint to a different location.

**Mode Indicator**
The mode indicator is shown in the bottom left of the screen at all times.

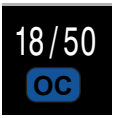
OC = Open Circuit
CC = Closed Circuit
BO = Bailout

**Active Gas**
If the active gas is not assigned to one of the custom positions, it will be displayed above the mode indicator.




In Air, Nitrox, and 3GasNX modes, the percentage of oxygen in the breathing gas is displayed.

In OC Tec mode, the fraction of oxygen and fraction of helium are displayed.




In CC/BO mode, the active gas refers to the diluent gas.

The gas will display in yellow if a better gas is available.

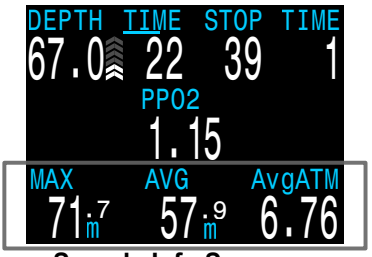
The gas will display in flashing red if the MOD of the gas has been exceeded.




**Additional Information**
The bottom row is also used to show additional information.

Only the bottom row changes during a dive, so critical information contained on the Top and Center Rows is always available.

Additional information that can be displayed on the bottom row includes:



**Sample Info Screen**

**Info Screens:**
Shows additional dive information.

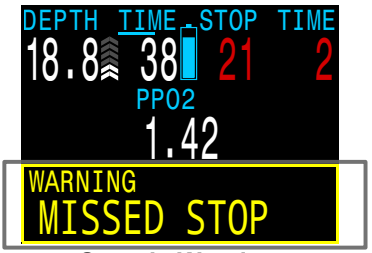
Press SELECT (right button) to step through info screens.



**Sample Menu**

**Menus:**
Allows changing settings.
Press MENU (left button) to enter menus.

**Warnings:**
Provide important alerts.
Press any button to clear a warning.



**Sample Warning**

# 4.6. Info Screens

Info screens provide more information than is available on the main screen.

From the main screen, the SELECT (right) button steps through info screens.

When all info screens have been viewed, pressing SELECT again will return to the main screen.

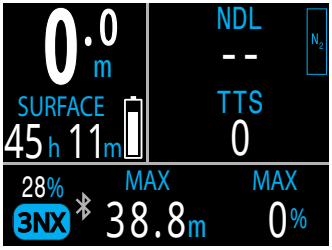
Info screens also automatically time-out after 10 seconds, returning to the home screen.

Note that the Compass, Tissues and AI Info screens do not automatically time out when active.

Pressing the MENU (left) button will return to the home screen at any time.

Although these screens are generally representative of the Perdix 3 display, info screen content varies for each mode. For example, decompression related info screens are not available in gauge mode.

The next section gives detailed descriptions of the data elements shown on the info screens.




Return to Main Screen by:

- Pressing MENU button
- Stepping past last screen
- Waiting 10 Seconds (most screens)




Surface only




If enabled

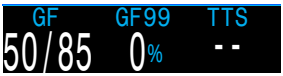



If enabled













Press the SELECT button (right), to step through Info Screens









# 4.7. Screen Element Descriptions

This section covers the meaning of the different screen elements that appear across all dive modes as an info screen and as configurable options. Unless other wise stated, each element appears as an info screen and is available as a customizable element.

## Last Dive Info Screen




Maximum depth and dive time from the last dive. Only available at the surface as an info screen

## Air Integration

Only available if AI feature is turned on. The contents of the AI info screen will automatically adapt to the current setup. Some examples include:




T1 Only



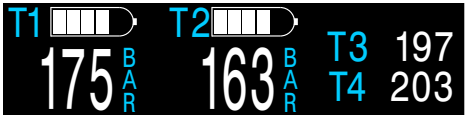

T1 & GTR/SAC




T1 & T2



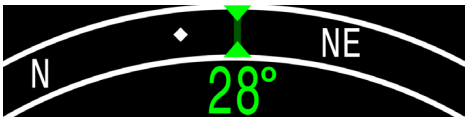

T1, T2 & GTR/SAC




T1, T2, T3, & T4

More information on AI features, limitations, and individual displays can be found in the Air Integration (AI) section on page 98.

## Compass Info Screen




Marked headings appear in green while reciprocal headings are shown in red. Green arrows point in the direction of your mark when off course by 5˚ or more.

The compass info row will not time out and is only available when compass feature is turned on.

See the Compass section on page 96 for more information.

## Mini Compass




A small compass that can be displayed at all times. The red arrow always points toward north.
Only available as a custom display.

## Heading

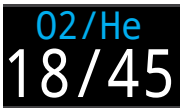



Displays the compass heading in degrees.
Only available as a custom display.

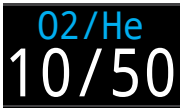
## Active Gas



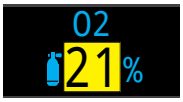

In Air, Nitrox, and 3Gas NX modes, the percentage of oxygen in the breathing gas is displayed.




In OC Tec mode, both the fraction of oxygen and the fraction of helium are displayed.




In CC/BO mode, the active gas refers to the diluent gas.







Active gas displays in yellow when a better gas is available.

## Maximum Depth




The maximum depth of the current dive. When not diving, displays the maximum depth of the last dive.

## Average Depth



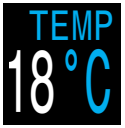

Displays the average depth of the current dive, updated once per second. When not diving, displays the average depth of the last dive.

## Average Atmospheres




The average depth of the current dive, measured in absolute atmospheres (i.e. a value of 1.0 at sea level). When not diving, shows the average of the last dive.

## Temperature




The current temperature in degrees Fahrenheit or degrees Celsius as configured in Display Setup)

## Maximum Operating Depth (MOD)




Only available as a custom display.

In OC modes, MOD is the maximum allowable depth of the current breathing gas as determined by PPO2 limits.

In CC mode, MOD is the maximum depth of the diluent.

Displays in **Flashing Red** when exceeded.

Read more about PPO2 Limits on page 147.

## Partial Pressure of Oxygen (PPO2)




In CC mode, displays in Flashing Red when less than 0.40 or greater than 1.6 by default.




In OC mode, displays in Flashing Red when less than 0.19 or greater than 1.65 by default.

## Diluent PPO2 CC




Only displayed in CC mode. Displays in **Flashing Red** when the partial pressure of the diluent is less than 0.19 or greater than 1.65.




When performing a manual diluent flush, you can check this value to see what the expected PPO2 will be at the current depth.

## Fraction of Inspired O2 (FiO2) CC




Only displayed in CC mode.
The fraction of the breathing gas composed of O2.
This value is independent of pressure.

## CC Internal Setpoint CC




The high and low internal set points are color coded. The high setpoint is shown in green and the low setpoint is shown in Magenta.

## CNS Toxicity Percentage




Central Nervous System oxygen toxicity loading percentage. Turns **Yellow** when greater than 90%. Turns **Red** when greater than 150%.




The CNS percentage is calculated continuously, even when on the surface and turned off. When deco tissues are reset, the CNS will also be reset.

The CNS value (short for Central Nervous System Oxygen Toxicity) is a measure of how long you have been exposed to elevated partial pressures of oxygen (PPO2) as a percentage of a maximum allowable exposure. As PPO2 goes up, the maximum allowable exposure time goes down. The table we use is from the NOAA Diving Manual (Fourth Edition). The computer linearly interpolates between these points and extrapolates beyond them when necessary. Above a PPO2 of 1.65 ATA, the CNS rate increases at a fixed rate of 1% every 4 seconds.

During a dive the CNS never decreases. When back at the surface, a half-life of elimination of 90 minutes is used. So for example, if at the end of the dive the CNS was 80%, then 90 minutes later it will be 40%. In 90 more minutes it will be 20%, etc. Typically after about 6 half-life times (9 hours), everything is back close to equilibrium (0%).

## Rate




Numerical rate of ascent or descent. Same colour rules as ascent indicator.
Available as a custom display only.

### Time To Surface (TTS)




The time-to-surface in minutes. This is the current time to ascend to the surface including the ascent plus all required deco stops.

### @+5




“At plus 5” is the TTS if remaining at the current depth for 5 more minutes. This can be used as a measure of how fast you are on-gassing or off-gassing.

### Δ+5




The predicted change in TTS if you were to stay at the current depth for 5 more minutes.

A positive “Delta plus 5” indicates that you are on-gassing the leading tissue while a negative number indicates that you are off-gassing the leading tissue.

### Ceiling




The current decompression ceiling not rounded to the next deeper stop increment. (i.e. not a multiple of 10ft or 3m)

### Conservatism




The deco conservatism value. The default model included with the Perdix 3 is Bühlmann ZHL-16C with Gradient Factors. The low and high gradient factors control the conservatism of the Bühlmann GF algorithm. See page 62 for more information.

## GF99




The current gradient factor as a percentage (i.e. super-saturation percent gradient)

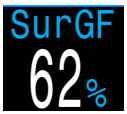
0% means the leading tissue super-saturation is equal to ambient pressure. Displays “On Gas” when tissue tension is less than the inspired inert gas pressure.

100% means the leading tissue super-saturation is equal to the original M-Value limit in the Bühlmann ZHL-16C model.

GF99 is displayed in **Yellow** when the current gradient factor modified M-Value (GF High) is exceeded.

GF99 is displayed in **Red** when 100% (un-modified M-Value) is exceeded.

## SurfGF




The surfacing gradient factor expected if the diver instantaneously surfaced.

SurfGF colour is based on the current GF (GF99). If the current GF is greater than GF High, SurfGF will be displayed in **Yellow**. If the current gradient factor is greater than 100%, SurfGF will be displayed in **Red.**

## SurfGF Δ+5




The change in SurfGF if you were to stay at the current depth for 5 more minutes. Only available as a configurable display.

This feature is similar to Δ+5. A positive number indicates that you are on-gassing the leading tissue while a negative number indicates that you are off-gassing the leading tissue.

## End of Dive (EOD)

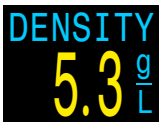



This is similar to TTS but is expressed as a time of day.

The time of day at which you can expect to surface if you depart immediately, ascend at 10mpm or 33fpm, change gases when prompted, and perform all decompression stops as directed.

## Gas Density Display







The Gas Density display is only available as a customizable display and is not available in the info row.

For open circuit diving, the gas density display turns yellow at 6.3 grams per liter. No other warnings are generated.

For closed circuit diving, the gas density display turns yellow at 5.2 grams per liter and red at 6.3 grams per liter. No other warnings are generated.

Gas density is an approximation based on the diluent gas and loop PPO2.

You may be surprised at how shallow gas density warning colors appear.

Read more about why we chose these levels starting on page 66 here (recommendations on page 73):

Anthony, T.G and Mitchell, S.J. Respiratory physiology of rebreatherdiving. In: Pollock NW, Sellers SH, Godfrey JM, eds. Rebreathers and Scientific Diving. Proceedings of NPS/NOAA/DAN/AAUS June 16-19, 2015 Workshop. Durham, NC; 2016.

## Pressure




The pressure in millibars. Two values are shown, the surface (surf) pressure and the current (now) pressure.

Note that typical pressure at sea level is 1013 millibar, although it may vary with the weather (barometric pressure). For example, surface pressure may be as low as 980 millibar in a low pressure system, or as high as 1040 millibar in a high pressure system.

For this reason, the PPO2 displayed on the surface may not exactly match the FO2 (fraction of O2), although the displayed PPO2 is still correct.

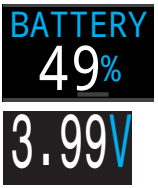
The surface pressure is set based on the lowest pressure the dive computer sees in the 10 minutes prior to the start of a dive. Therefore, altitude is automatically accounted for and no special altitude setting is required.

## Time of Day




Displays a clock a 12 or 24 hour format. Time format can be changed in the clock settings menu.

## Battery




The Perdix 3's battery level expressed as a percentage or voltage. Displays in **Yellow** when the battery is low and needs replacement. Displays in **Flashing Red** when the battery is critically low and must be replaced as soon as possible.

## Stopwatch




The Stopwatch is only available as a customizable display. It is not available in the info row.

When the stopwatch is displayed, start, stop, and reset menu options appear in the top level computer menu.

The stopwatch has a 10 millisecond resolution and will run for up to 24 hours in the background, even if the Perdix is “turned off”.

When non-zero, the stopwatch can be reset. If running when reset, it continues running, counting up again from 0. If stopped when reset, then it is set to 0 and remains stopped.

## Pressure (mBar Now & mBar SURF)




The pressure in millibars. Two values are shown, the surface (surf) pressure and the current (now) pressure.

Note that typical pressure at sea level is 1013 millibar, although it may vary with the weather (barometric pressure). For example, surface pressure may be as low as 980 millibar in a low pressure system, or as high as 1040 millibar in a high pressure system.

For this reason, the PPO2 displayed on the surface may not exactly match the FO2 (fraction of O2), although the displayed PPO2 is still correct.

The surface pressure is set based on the lowest pressure the dive computer sees in the 10 minutes prior to the start of a dive. Therefore, altitude is automatically accounted for and no special altitude setting is required.

## Tissues bar Graph




The tissues bar graph shows the tissue compartment inert gas tissue tensions based on the Bühlmann ZHL-16C model.

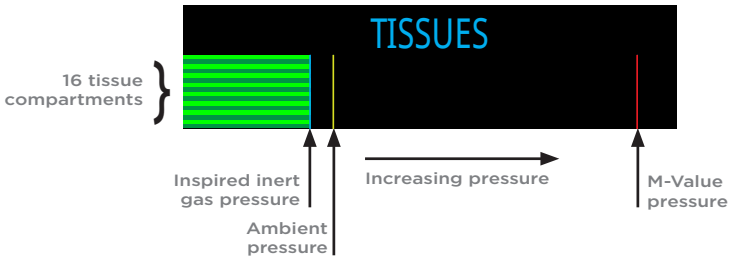
The fastest tissue compartment is shown on the top, and the slowest on the bottom. Each bar is the combined sum of the nitrogen and helium inert gas tensions. Pressure increases to the right.

The vertical cyan line shows the inert gas inspired pressure. The yellow line is the ambient pressure. The red line is the ZHL-16C M-Value pressure.

Tissues that are supersaturated above ambient pressure are shown in yellow, and tissues that are supersaturated above the M-Value are shown in red.

Note that the scale for each tissue compartment is different. The reason the bars are scaled in this way is so that the tissues tensions can be visualized in terms of risk (i.e. how close they are as a percentage to Bühlmann's original super-saturation limits). Also, this scale changes with depth, since the M-Value line also changes with depth.

## Sample Tissue Bar Graphs



## Sample Tissue bar Graphs




On surface (sat. with air)
Note: Gas is 79% $N_2$ (21% $O_2$, or Air)




After descent




On-gassing




Deep stop

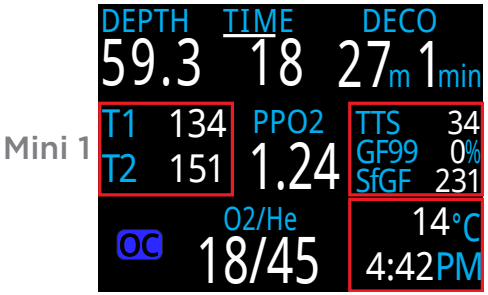



Last deco stop
Note: Gas is now 50% $O_2$ and 50% $N_2$

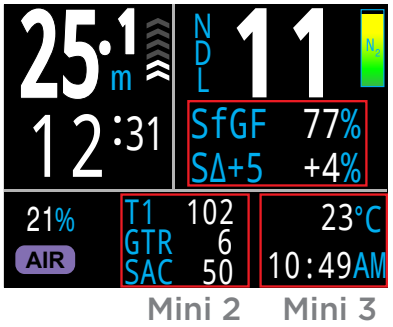
# 4.8. Mini Displays

Mini displays provide more options for data customization at the expense of font size.

There are 3 configurable mini displays that are independently customizable in every mode. Display can hold 2 or 3 pieces of information. In the Tec layout Mini displays are not available in the center position of the middle row due to width constraints.




Details about how to customize the mini displays can be found on page 145




Up to 9 customizable fields can be displayed simultaneously with fully populated Mini Displays, in Big and Standard layouts and up to 13 customizable fields can be displayed simultaneously in Tec layout.

Managed improperly, this can be an overwhelming amount of information. Care should be taken not to distract from the information that is most important to the type of diving you're doing.

# 4.9. Notifications

This section describes the different types of notifications the computer may present the diver.

See the List of important primary notifications that a diver may encounter on page 55 .

## Color Coding

Color coding of text draws attention to problems or unsafe situations.

WHITE text indicates normal conditions by default.

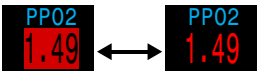
Note that this normal condition color can be selected in the Settings > Display > Colors menu.

**YELLOW** is used for warnings that are not immediately dangerous but should be addressed.




*Sample warning - a better gas is available*

**FLASHING RED** is used for critical warnings that could be life threatening if not immediately addressed.




*Sample critical warning - Continuing to breathe this gas could be fatal*

### Color blind users

The warning or critical warning states can be determined without the use of color.

**Warnings** display on a solid inverted background.

Warning

Doesn't flash

**Critical Warnings** flash between inverted and normal text.

Warning ⟷ Warning

Flashes

## Types of Notifications

There are two types of notifications displayed by this dive computer. Primary notifications and persistent notifications.

### Primary Notifications

There are three types of primary notifications: Dive Events, Warnings, and Errors.

#### Dive Events

Alert the user of non-critical dive events.

No specific action is required on the part of the diver.




Dive Events time out after 4 seconds or can be cleared by pressing any button.

#### Warnings

Alert the user to critical safety information.

The cause of warnings could be life threathening if not immediately addressed.




Warnings can only be cleared manually by the user. Press any button to acknowledge and clear a warning.

For some critical conditions, the alert indicator will persist on screen until the warning condition abates.



#### Errors

Alert the user to system errors.




Errors represent unexpected system behavior. Contact Shearwater if you experience a system error.

## Persistent Notifications

When the computer detects a dangerous situation, such as high PPO2, a warning is triggered. The large primary warning can be dismissed, but the alert indicator will persist until the condition that caused the warning is resolved.

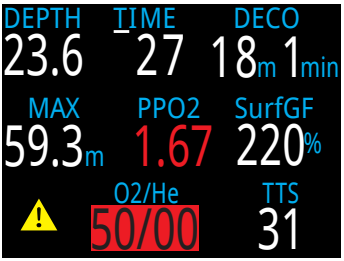


Pressing the menu button while the alert icon is present will display the warnings overlay which lists all of the current persistent alerts in order of priority.




Pressing the menu button a second time brings up the main menu as normal.

In addition, to the warning indicator, the value associated with the dangerous condition will be highlighted in red and flash until the dangerous situation is resolved.




### Limitations Of Alarms

All alarm systems share common weaknesses.

They can alarm when no error condition exists (false positive). Or they can fail to alarm when a real error condition occurs (false negative).

Respond to alarms if you see them, but NEVER depend on them. Your judgment, education, and experience are your best defenses. Have a plan for failures, build experience slowly, and dive within your experience.

## Vibration Alerts

In addition to visual notifications, the Perdix 3 has vibration alerts to help quickly notify the diver of warnings and dive events.

If turned on, attention vibration alerts occur when a safety stop starts, pauses, or is completed. Vibration alerts also occur any time a primary notification is triggered and every 10 seconds until warnings are acknowledged.

There are some persistent conditions, such as low PPO2 that will cause vibration to continue until the condition is resolved.

The vibration alert can be toggled on or off in the Settings > Utilities menu as described in Utilities on page 157.

A Test Vibration tool is also available in the Dive tools menu and should be used regularly before diving to ensure the vibrator is functioning properly.

**Vibration is Battery Dependant**

Vibration Alerts are only available when using a 1.5V Lithium or 3.7V Rechargeable Li-ion battery.

**Caution**

Although vibration alerts are very useful, never rely on them for your safety. Electromechanical devices can and will eventually fail.

Always be proactively aware of your depth, no-decompression limit, gas supply, and other critical dive data. You are ultimately responsible for your own safety.

# 4.10. Customizable Alerts

In addition to automatic warnings indicating potentially dangerous situations, the Perdix 3 has customizable alerts for maximum depth, maximum dive time, and minimum no-decompression limit.

These alerts can be configured for each dive mode in the Dive Settings menu. See page 146 for Alerts Setup.

### Depth Alert

By default the depth alert is set to 40 meters.

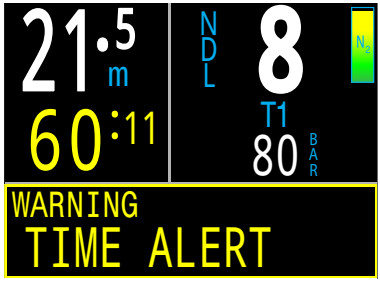



In addition to the Primary notification which can be dismissed, the depth value will turn yellow when deeper than the Alert value.

The depth alert will reset if the depth goes 2m shallower than the alert depth.

### Time Alert

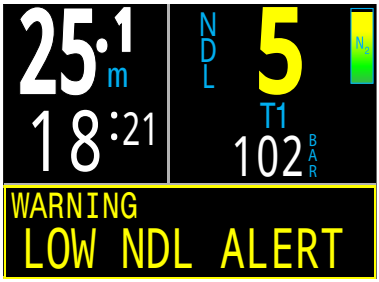
By default the dive time alert is set to 60 minutes, but is turned off.




In addition to the Primary notification which can be dismissed, the dive time value will turn yellow when greater than the Alert value.

The time alert will only fire once per dive.

### Low NDL Alert




By default the low NDL alert is set to 5 minutes.

In addition to the Primary notification which can be dismissed, the NDL value will turn yellow when at or below the Alert value.

The NDL alert will reset if the NDL goes above the NDL alert value by 3 minutes.

Example: If NDL Alert value is 5 minutes, The NDL Alert will reset once NDL reaches 8 minutes.

### Limitations of Alarms

All alarm systems share common weaknesses.

They can alarm when no error condition exists (false positive). Or they can fail to alarm when a real error condition occurs (false negative).

Respond to alarms if you see them, but NEVER depend on them. Your judgment, education, and experience are your best defenses. Have a plan for failures, build experience slowly, and dive within your experience.

# 4.11. List of primary notifications

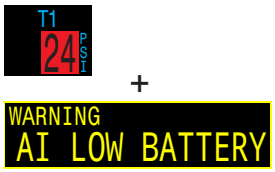
The following table lists primary notifications you may see, their meaning, and steps to take to solve any problems.

If multiple warnings are triggered simultaneously, the notification with the highest priority will be displayed. Clear that notification by pressing any button to see the next notification.

> ***Contact Shearwater***
>
> The subsequent list of notifications is not exhaustive. Please contact Shearwater if you experience any unexpected errors: info@shearwater.com

| Display | Meaning | Action to take |
|---|---|---|
|  | The PPO2 is below the limit set in the PPO2 limits menu. | **Change your breathing gas to one safe for the current depth.** |
|  | The PPO2 is above the limit set in the PPO2 limits menu. | **Change your breathing gas to one safe for the current depth.** |
|  | A required decompression stop was violated. | **Descend deeper than the currently displayed stop depth. Monitor for symptoms of DCS. Use extra conservatism for future repetitive dives.** |
|  | The ascent was sustained as faster than 10m/min (33ft/min) | **Use a slow ascent rate. Monitor for symptoms of DCS. Use extra conservatism for future repetitive dives.** |

| Display | Meaning | Action to take |
|---|---|---|
|  | The internal battery is low. | **Replace the battery.** |
|  | The decompression tissue inert gas loading has been set to default levels. | **Plan repetitive dives accordingly.** |
|  | Central Nervous System (CNS) toxicity clock exceeded 150% | **Switch to a gas with a lower PPO2 or ascend shallower (decompression ceiling allowing)** |
|  | Central Nervous System (CNS) toxicity clock exceeded 90% | **Switch to a gas with a lower PPO2 or ascend shallower (decompression ceiling allowing)** |
|  | NDL is less than low NDL alert value. (Only if alert active) | **Ascend soon to avoid decompression obligation.** |
|  | Depth is deeper than depth alert value. (Only if alert active) | **Ascend above depth limit.** |
|  | Dive time has surpassed time alert value. (Only if alert active) | **End dive safely.** |
|  | No communications for 30 to 90 seconds. | **See the Transmitter Connection Issues section on page 118 for more information.** |
|  | No communications for 90+ seconds. | **See the Transmitter Connection Issues section on page 118 for more information.** |

| Display | Meaning | Action to take |
|---|---|---|
|  | Low transmitter battery. | **Replace the transmitter battery.** |
|  | Tank pressure has fallen below the critical pressure. | **Be aware that gas is running low. Begin to end your dive and perform a controlled ascent to the surface.** |
|  | GTR is not available when on the surface. | **None. GTR will display during a dive.** |
|  | GTR is not available when on the surface. | **None. After a few minutes, enough data has been collected for display.** |
|  | The computer has reset to recover from an unexpected software condition. | **If this occurs more than once over a long period, please report to Shearwater Research Inc.** |
|  | This reset shows up after a software update. This is the normal event that shows the computer has been rebooted after the software update. | **N/A** |
|  | Firmware update failed, possibly due to a communications error or corrupted file. | **Try the firmware upgrade again. Contact Shearwater if problem persists.** |

# 5. Safety and Decompression Stops

Safety and decompression stops are pauses inserted into the ascent to the surface in order to reduce the risk of decompression illness (DCI). There are no Safety Stops in technical diving modes.

## 5.1. Safety Stops

A safety stop is an optional stop added to all dives before surfacing. Safety stops can be set to fixed times of 3, 4, or 5 minutes, set to adapt based on dive conditions, or turned off completely. See Deco Menu on page 149 for more info.

The Perdix 3 does not do “deep safety stops”. That is, there are no extra stops added around 15m to 18m (50ft to 60ft) when ascending from a no-deco dive.

Safety stops behave as follows:

**Automatic Countdown**
Once the depth exceeds 11m (35ft), a safety stop requirement will be triggered. A counter will appear in place of NDL and begin counting down when depth becomes shallower than 6m (20ft ). Countdown will continue while the depth remains in the range of 2.4m to 8.3m (7ft to 27ft).



*Safety Stop Counting Down*

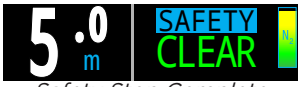
**Countdown Paused**
If the depth goes outside of the range 2.4m to 8.3m (7ft to 27ft), then the countdown pauses, and the remaining time displays in yellow.



*Safety Stop Paused*

### Safety Stop Complete

When the countdown reaches zero, the display changes to “Clear” and you are now clear to ascend to the surface.




*Safety Stop Complete*

### Countdown Reset

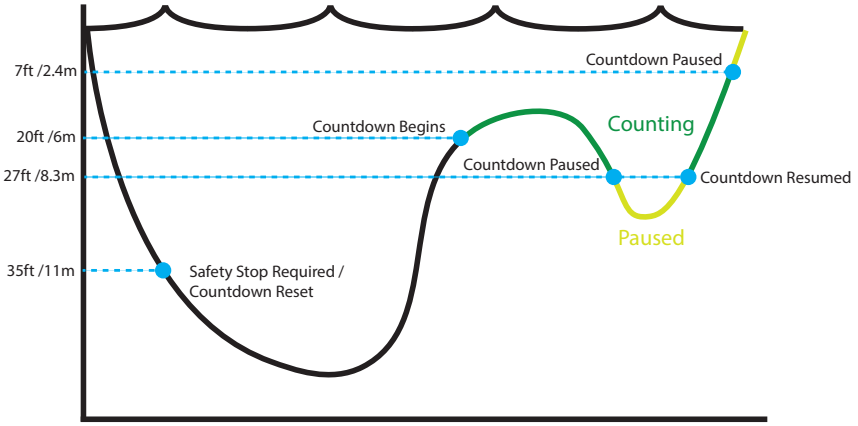
The countdown will reset if the depth once again exceeds 11m (35ft).

**No Lockout for omitting**

There is no lock-out or other penalty for omitting a safety stop, as they are optional.

If you ascend to the surface before the safety stop countdown finishes, the safety stop will appear paused, but this will disappear once the dive ends.

We recommend performing safety stops as planned as they offer a reduction in risk of DCI and take little time.




*Safety Stop Thresholds - Not to scale*

# 5.2. Decompression Stops

Decompression stops are mandatory stops that must be followed in order to reduce the risk of decompression illness (DCI)

**Do not dive beyond your training**

Only perform decompression diving if you have received proper training to do so.

Diving with any type of overhead ceiling, whether in a cave or shipwreck, or from a decompression requirement, adds significant risk. Have a plan to handle failures and never rely solely on a single source of information.

Decompression stops occur at fixed 10ft (3m) intervals.

Decompression stops display as follows:

**Replaces NDL Display**
Once the NDL reaches zero, deco stop information will begin to populate the top right side of the display.




*Deco Stop Required - Tec layout*

**Deco Stop Violation**
If you ascend shallower than your current stop, the decompression information will **flash red**.




*Descend to Deco Stop*

Significant decompression stop violations will result in a “MISSED STOP” notification. Press any button to clear this notification.




**Deco Stops Complete**

By default, the safety stop counter is enabled in recreational modes and the deco clear counter is enabled in technical modes. Once all decompression stops are complete, the Deco Clear counter will begin counting up from zero.







If the Deco Clear Counter is turned off, the display will say “Clear”.

**No Lockout for violating deco stops**

There is no lock-out or other penalty for violating decompression stops.

Shearwater’s policy is to provide clear warnings that the decompression scheduled was violated, to allow you to make decisions based on your training.

This may include contacting your dive insurance provider, contacting the nearest recompression chamber, or performing first aid based on your training.

# 6. Decompression and Gradient Factors

The basic decompression algorithm used by this computer is Bühlmann ZHL-16C. It has been modified by the use of Gradient Factors that were developed by Erik Baker. We have used his ideas to create our own code to implement it. We would like to give credit to Erik for his work in education about decompression algorithms, but he is in no way responsible for the code we have written.

The computer implements Gradient Factors creating varied levels of conservatism. The levels of conservatism are pairs of number like 50/70. For a more detailed explanation of their meaning, please refer to Erik Baker's excellent articles: "Clearing Up The Confusion About Deep Stops" and "Understanding M-values". The articles are readily available on the web. You might also want to search for "Gradient Factors" on the web.

The default conservatism of the system depends on the dive mode.

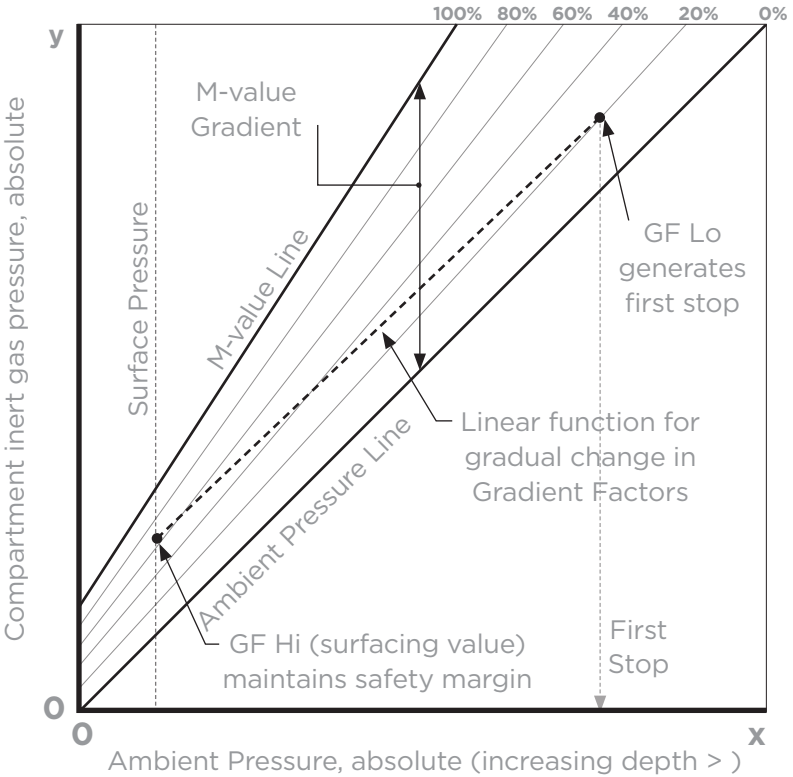
For Rec modes the default conservatism setting is medium (50/85).

For OC Tec and CC/BO modes where some decompression is presumed, the default is a more conservative 50/70. The system provides several settings that are more aggressive than the default.

**Do not edit GF values until you understand the effects.**

Graph from Erik Baker's "Clearing Up The Confusion About Deep Stops"

Pressure Graph: Gradient Factors




- A Gradient Factor is simply a decimal fraction (or percentage) of the M-value Gradient.
- Gradient Factors (GF) are defined from 0% to 100%.
- A Gradient Factor of 0% represents the ambient pressure line.
- A Gradient Factor of 100% represents the M-value line.
- Gradient Factors modify the original M-value equations for conservatism within the decompression zone.
- The lower Gradient Factor value (GF Lo) determines the depth of the first stop. Used to generate deep stops to the depth of the "deepest possible deco stop"
- The higher Gradient Factor value (GF Hi) determines the surfacing tissue supersaturation.

# 6.1. Decompression Information Accuracy

Decompression information displayed by this computer, including NDL, stop depth, stop time, and TTS are predictions. These values are continuously recalculated and will change with changing conditions. The accuracy of these predictions is dependent on several assumptions made by the decompression algorithm. It is important to understand these assumptions to ensure accurate decompression predictions.

It is assumed that the diver's ascent rate is 10m/min (33ft/min). Ascending significantly faster or slower than this will impact decompression obligations. It is also assumed that the diver is carrying and plans to use every gas that is currently turned on. Leaving gases that are not expected to be used turned on will result in inaccurate time to surface, decompression stop and decompression time information being displayed.

On ascent, it is assumed that the diver will perform decompression stops using the gas with the highest PPO2 below the OC Deco PPO2 value (default 1.61). If there is a better gas available, the current gas will be displayed in yellow, indicating that a gas change is expected. The decompression prediction displayed always assumes that the best gas will be used. Even if the switch to a better gas has not been completed yet, decompression predictions will be displayed as if the switch is about to occur in the next 5 seconds.

Divers can encounter longer than expected decompression stops as well as inaccurate time to surface predictions if they fail to switch to a better gas when prompted by the computer.

**Example:** A diver on a decompression dive to 40m/131ft for 40 minutes with GF settings of 45/85 has two gases programmed into their computer and turned on: 21/00 & 99/00. The diver's decompression schedule will be calculated based on breathing 21% oxygen for the descent, bottom and ascent phases of the dive until the diver ascends to 6m/20ft. At 6m/20ft the PPO2 of the 99/00 mix is 1.606 (less than 1.61), so it is the best decompression gas available.

Decompression information for the remaining stops will be calculated and displayed assuming the diver is going to switch to this better gas. This dive profile indicates these stops would be 8 minutes at 6m/20ft and 12 minutes at 3m/10ft. If the diver never makes the switch to 99/00, the computer will not allow them to surface until adequate off-gassing has occurred, but it will continue to assume the diver is about to make the gas switch and the decompression times given will be grossly inaccurate. The 6m/20ft stop will take 19 minutes to clear and the 3m/10ft stop will take 38 minutes to clear. That is a total time to surface difference of 37 minutes.

In a lost gas scenario or in the event a diver forgets to turn off a gas they are not carrying before a dive, gases can be turned off during the dive in Main menu -> Edit Gases.

# 7. Example Dives

## 7.1. Single Gas Example Dive

This is an example of displays that might be seen on a simple no-decompression dive in a single gas mode (Air or Nitrox) using the Big Layout.

**1. Pre-Dive -** This is the surface screen immediately before descending. At the surface, the battery is shown to be about 75% full. Air is the selected breathing gas. Maximum depth from the previous dive is displayed.

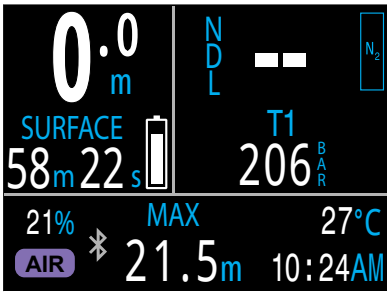
**2. Descent -** As we pass through 11 meters, NDL shows 99 minutes, the maximum no decompression limit that the computer will display during a dive.

**3. Max Depth -** The NDL starts to show smaller numbers as depth increases. The 3rd screen shows that we will go into deco in 8 minutes. The safety stop counter has automatically increased to 5 minutes because the computer knows this is a deep dive.

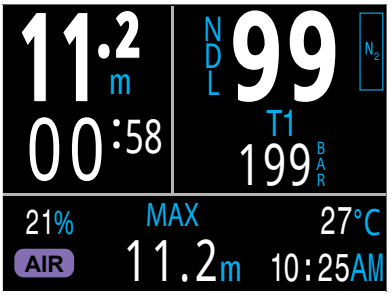
**4. Low NDL -** When the NDL goes below 5 minutes, it turns yellow indicating that we should begin making our ascent to avoid a decompression obligation.

**5. Ascent -** As we ascend our NDL begins increasing again, indicating that we can stay a bit longer at this shallower depth. The ascent rate indicator shows that we are ascending at about 6 mpm or 22 fpm.

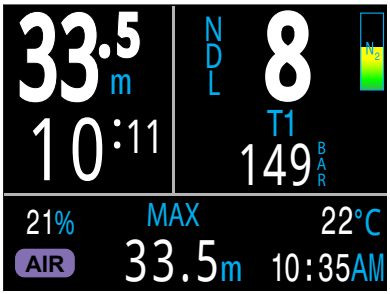
**6. Safety Stop -** When we ascend shallower than 6m, the safety stop counter will begin counting down. In this case the safety stop setting has been set to Adapt, and because of our deep profile, the countdown began at 5 minutes. A “Complete” indicator will inform us when the safety stop has been completed.



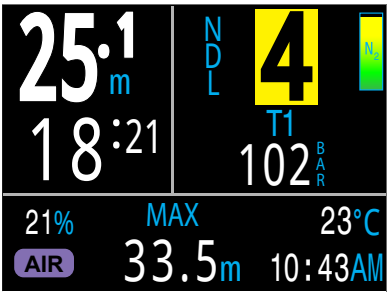

*1. Pre-Dive*



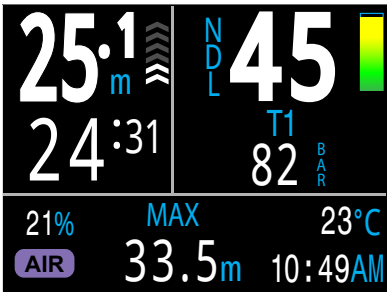

*2. Descent*



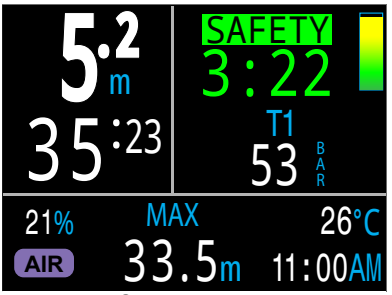

*3. Max Depth*




*4. Low NDL*




*5. Ascent*




*6. Safety Stop*

Although safety stops are not mandatory, when gas supplies permit, the best practice is to perform a safety stop on every dive.

# 7.2. Multi-Gas Example Dive

This is an example of displays that might be seen on a multi-gas decompression dive in 3GasNX Mode using the Standard layout.

Max Depth: 40 meters Bottom Gas: 28% $O_2$
Bottom Time: 20 minutes Deco Gas: 50% $O_2$

**1. Gas Setup -** Best practices include checking your gas list before each dive. This screen is available in the Gases section of the Settings menu when in 3GasNX mode. All gases that are turned on will be used to calculate the decompression schedule. Turn off gases you are not carrying. The depth to the right of each gas is its MOD governed by the bottom and deco PPO2 limits.

**2. Verify Decompression Settings -** It is also prudent to ensure all other settings are correct before starting every dive. In addition to checking gases, we recommend verifying values in the Deco Setup menu.

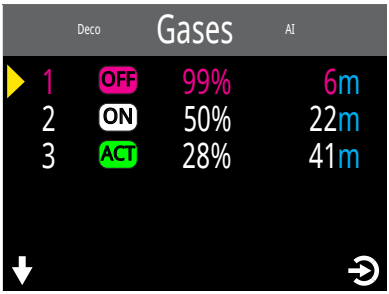
**3. Plan Dive -** Use the decompression planner found in Dive Tools to check the total runtime, decompression scheduled and gas requirements for the dive with current settings.

The on-board deco planner is limited in functionality, so for complex dives we recommend using desktop or smartphone dive planning software.

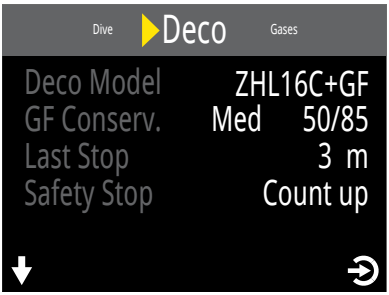
**4. Pre-Dive -** Prior to beginning the dive we can see the active gas is currently set to 28% Nitrox and our battery is about three quarters charged.

**5. Descent -** As we descend our dive time begins counting and our NDL changes from zero to 99.

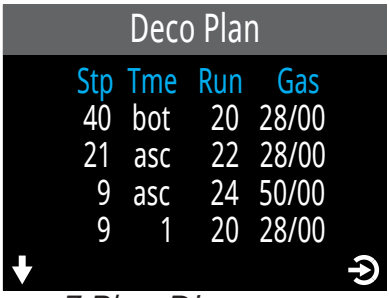
(Continued on next page)



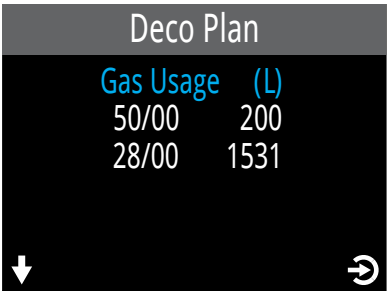

*1. Gas Setup*



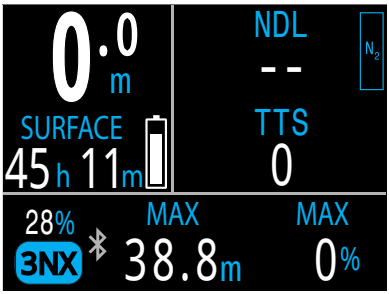

*2.Verify Deco Settings*



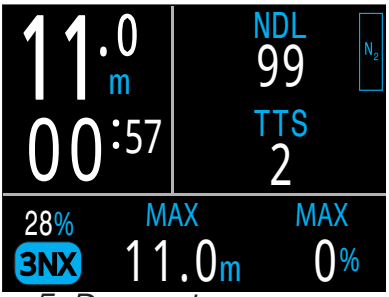

*3.Plan Dive - Deco Scheduled*




*3.Plan Dive - Gas Requirement*




*4. Pre-Dive*




*5. Descent*

# Multi-Gas Example Dive (cont.)

**6. Max depth -** Once NDL hits 0, deco stops will be needed. Stop requirements display in place of the Safety Stop information.

**7. Ascent -** It is safe to ascend to 6 meters. 2 minutes must be spent at that deco stop. While ascending, the bar graph to the right of the depth shows the ascent rate. Two chevrons indicate an ascent rate of 6 mpm in this example. All decompression predictions are made assuming an ascent rate of 10 meters per minute.

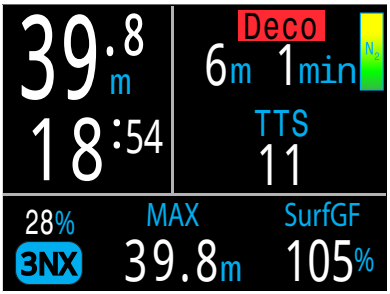
**8. Gas Change -** All decompression predictions are made assuming you will switch to the best available gas on ascent. At 21m, the breathing gas turns yellow indicating that a better breathing gas is available. If the switch is not made, deco stop and time information will be inaccurate.

**9. At Deco Stop -** Stay at the prescribed deco stop depth until the computer indicates it's time to move the next stop for optimal tissue off-gassing.

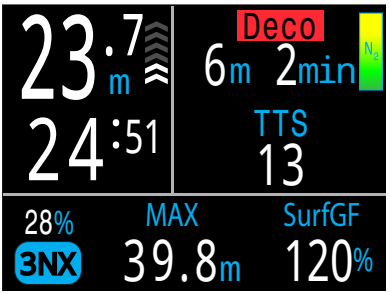
**10. Missed Deco Stop -** If you ascend shallower than the decompression ceiling the Deco information will flash red. If you fail to descend, a missed deco stop warning will be triggered. Acknowledge and clear the primary notification by pressing any button. Re-descend deeper than the stop depth to clear the flashing text.

**11. Deco Clear -** In 3GasNX, once all decompression obligation has been cleared, the safety stop will begin if active. In this case deco clear counter begins counting up from zero.

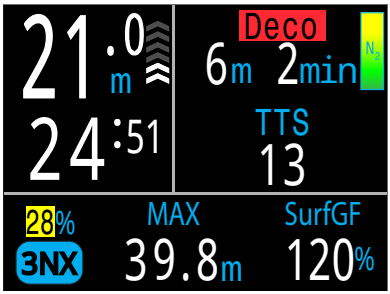
End of example.



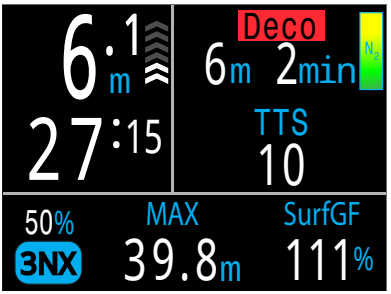

*6. Max Depth*



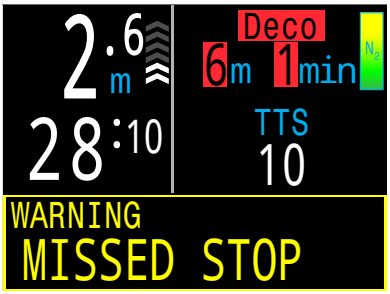

*7. Ascent*



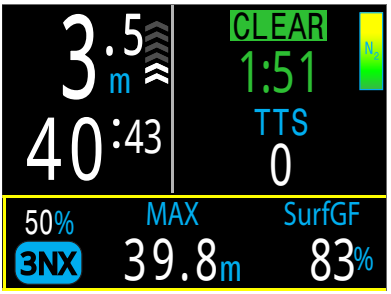

*8. Gas Change*




*9. At Deco Stop*




*10. Missed Deco Stop*




*11. Deco Clear*

# 7.3. Simple OC Tec Example Dive

This is an example of displays that might be seen on a simple decompression dive in OC Tec Mode using the Tec layout.

**1. Set Up Gases** - Best practices include checking your gas lists before each dive. This screen is available in the Settings menu. This dive only involves air. Turn off all gases you do not plan to use on the dive.

**2. Verify Settings** - It is also prudent to ensure all other settings are correct before starting the dive. Not all settings can be modified underwater.

**3. Plan Dive** - Use a deco planner to check the total runtime, decompression schedule and gas quantity needed.

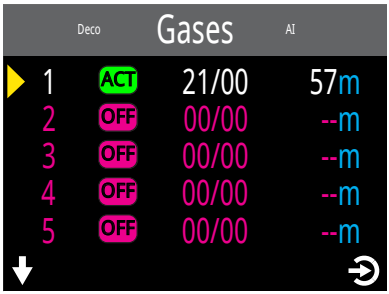
The on-board deco planner is limited in functionality. For complex dives we recommend planning using desktop or smartphone dive planning software.

**4. Pre-Dive** - This is the surface screen immediately before descending. It shows the computer is in OC Tec mode and that 21% O2 is selected.

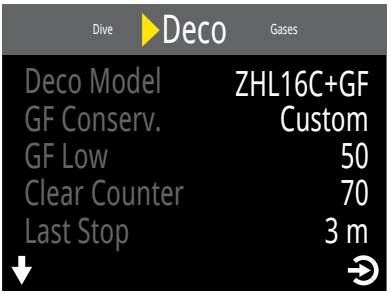
**5. Descent** - As we pass through 10 meters, the time-to-surface (TTS) shows one minute. This shows that the computer is expecting the diver to ascend at approximately 10 meters per minute or 33 feet per minute. Decompression predictions are based on this ascent rate.

**6. NDL Decreasing** - The no-decompression limit (NDL) starts off showing 99, but then starts to show a smaller number as the depth increases. This screen shows that we will go into deco in 8 minutes.

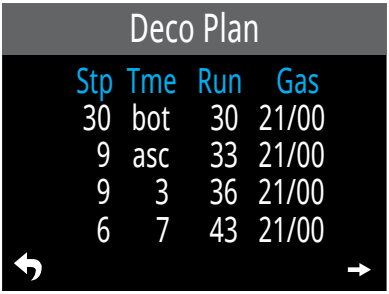
(Continued on next page)



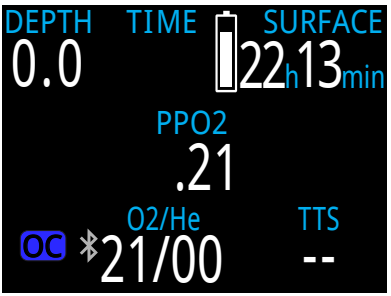

*1. Set Up Gases*



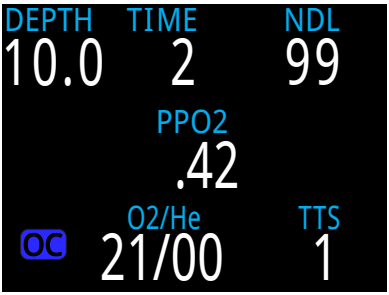

*2. Verify Settings*



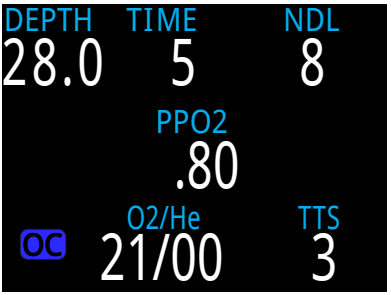

*3. Plan Dive*




*4. Pre-Dive*




*5. Descent*




*6. NDL Decreasing*

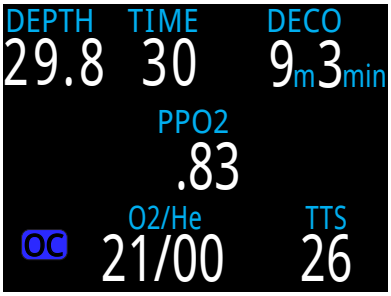
**7. Max Depth** - We now have a decompression requirement. Our first stop is at 9 meters and we will need to remain there for up to 3 minutes. Although stops are shown in minutes, the computer will calculate and change the ceiling in real time and the stop may be less than a minute.

Time to surface (TTS) now indicates it will take 26 minutes to ascend to the surface following the currently calculated decompression schedule.

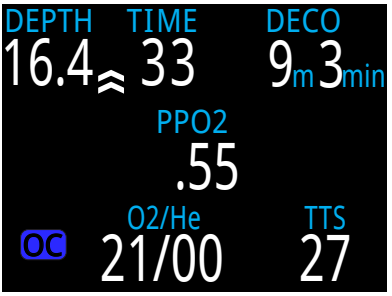
**8. Ascent** - As we ascend, the ascent rate indicator shows two chevrons, or about 6 mpm / 20 fpm. This is slower than the 10 mpm / 33 fpm that decompression calculations assume. As a result of this slow ascent, early decompression stops may clear before we arrive.

**9. Missed Stop** - When we go shallower than our 9 meter stop, the deco stop information starts to flash red. Significant stop violations will result in a missed deco stop notification.

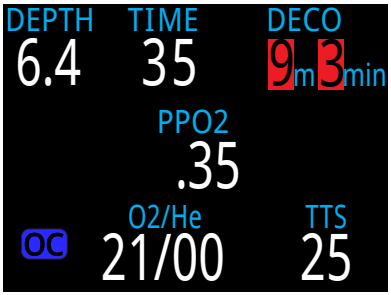
**10. Deco Clear** - When we clear the last stop, the stop depth and time is replaced by the Deco clear counter that begins counting up from zero. We also see an NDL of 99 minutes again. Once we surface, the depth will return to 0 and a minute later when the computer comes out of dive mode, the NDL goes to 0 as well.



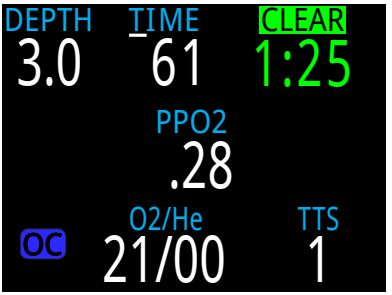

*7. Max Depth*




*8. Ascent*




*9. Missed Stop*




*10. Deco Clear*

***No safety stop countdown in technical dive modes***

It is widely believed that additional time spent at the last decompression stop reduces the overall risk of decompression sickness.

The decision not to include a safety stop countdown in technical dive modes is an acknowledgment that technical divers plan decompression ahead of their dives to manage decompression risk with this in mind.

The deco clear counter is a useful tool to aid divers in padding their final decompression stop for additional conservatism.

# 7.4. Complex OC Tec Example Dive

This is an example of displays that might be seen on a multi-gas trimix decompression dive in OC Tec Mode.

Max Depth: 60 meters Bottom Gas: Trimix (18/45)
Bottom Time: 20 minutes Deco Gases: 50% & 99% O2

**1. Gas Setup** - Best practices include checking your gas list before each dive. This screen is available in the Settings menu. All gases that are turned on will be used to calculate the decompression schedule. Make sure to turn off gases you are not carrying or planning to use.

**2. Verify Settings** - It is also prudent to ensure all other settings are correct before starting every dive. In addition to checking gases, we recommend verifying the settings on all settings menu pages.

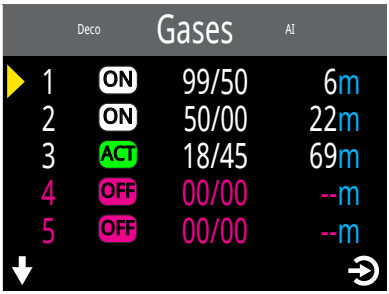
**3. Plan Dive** - Use the Deco Planner found in Dive Tools to check the total runtime, decompression scheduled and gas requirements for the dive.

We recommend using desktop or smart phone dive planning software for complex dives. The on-board deco planner is an effective tool for confirming computer settings produce a plan that meet your expectations.

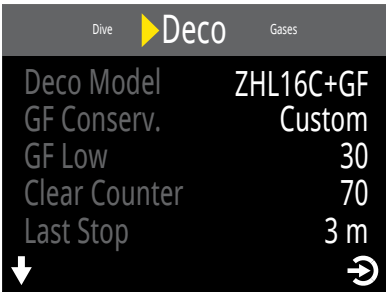
**4. Pre-Dive** - Prior to beginning the dive we can see our active gas is currently 18/45, and our battery is in a good state of charge. In the Tech layout, the decimal in the depth display indicates that meters are the selected units.

**5. Descent** - As we descend our dive time begins counting up, PPO2 increases, and the displayed NDL falls.

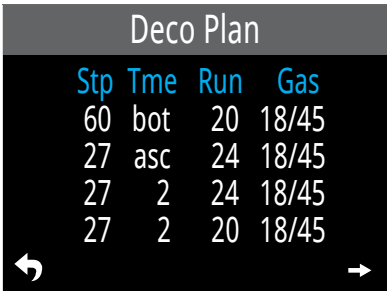
(Continued on next page)



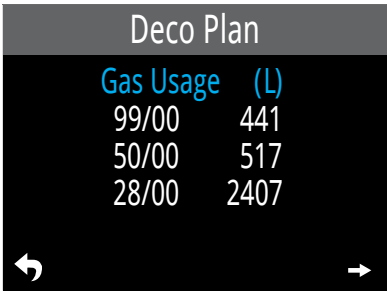

*1. Gas Setup*



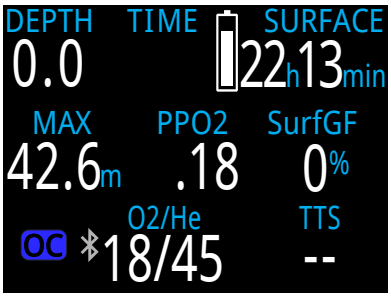

*2. Verify Deco Settings*



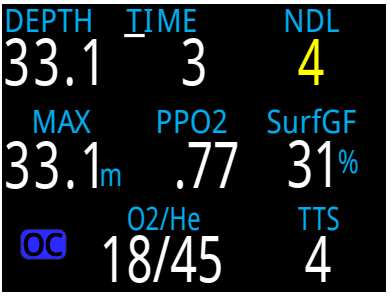

*3. Plan Dive - Deco Scheduled*




*3. Plan Dive - Gas Requirement*




*4. Pre-Dive*




*5. Descent*

**6. Max depth** - Once NDL hits 0, deco stops are needed. Stop requirements are now displayed in the top right of the screen. TTS has increased to include deco stop time. Surface GF is well above 100%.

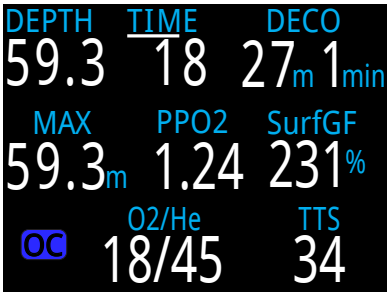
**7. Ascent** - It is safe to ascend to 27 meters. 1 minute must be spent at that deco stop. The bar graph to the right of the depth shows the ascent rate (~10 mpm). All decompression predictions are made assuming an ascent rate of 10 meters per minute.

**8. Gas Change** - All decompression predictions are made assuming you will switch to the best available gas on ascent. At the 21m stop, the breathing gas turns yellow indicating that a better breathing gas is available. If the switch is not made, tissue loading will be calculated using the active gas, but predicted deco stop and time calculations assume the switch will occur within the next 5 seconds.
Available gases can be added or subtracted during the dive in the Dive Tools > Edit Gases menu.

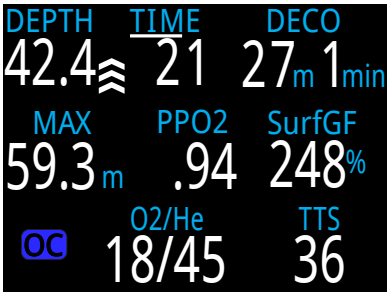
**9. High PPO2** - After the switch to 50% O2, the diver has descended a couple meters, their inspired PPO2 has risen above the default warning value, and the high PPO2 warning has been triggered. Any button press will clear the primary notification, but for PPO2 warnings, the computer will continue to vibrate to get the divers attention until the PPO2 warning condition has been resolved.

**10. Missed Deco Stop** - The diver has ascended shallower than the decompression ceiling. Deco information flashes red and after a short time a missed deco stop warning is triggered. Clear the warning and stop the vibration alert by pressing any button. Re-descend deeper than the stop depth to clear the flashing text.

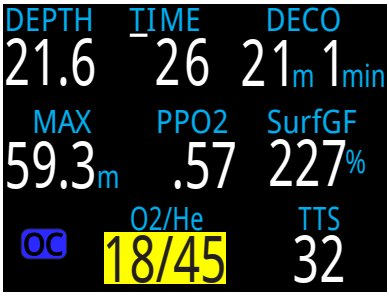
**11. Deco Clear** - Once all decompression obligation has been cleared, the deco clear counter begins counting up from zero.



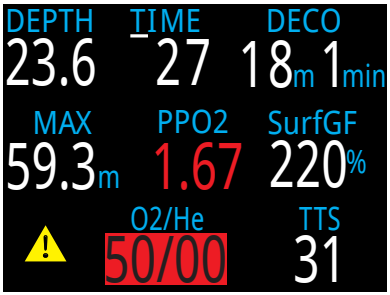

*6. Max Depth*



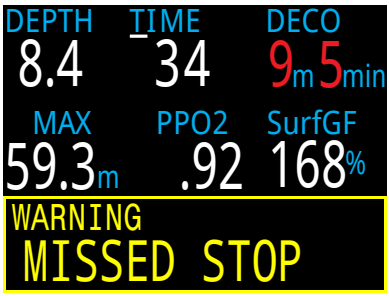

*7. Ascent*



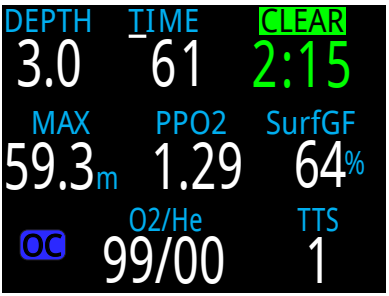

*8. Gas Change*




*9.High PPO2*




*10. Missed Stop*




*11.Deco Clear*

# 7.5. CC Example Dive

This is an example of displays that might be seen on a multi-gas decompression dive in CC/BO Mode.

| | |
|---|---|
| Max Depth: 90 meters | Diluent Gas: Trimix (10/50) |
| Bottom Time: 20 minutes | Bailout Gases: 14/55, 21%, 50% |

**1. CC Gas Setup** - Best practices include checking your gas lists before each dive. Gas setup screens are available in the Settings menu in CC mode. For this dive the only diluent gas is Trimix 10/50.
(10% O2, 50% He, 40% N2)

**2. BO Gas Setup** - Several bail out gases are required for this dive. If we switch to BO mode, we can also use the Dive Tools > Edit Gas menu to edit, turn on, or turn off the bailout gases.

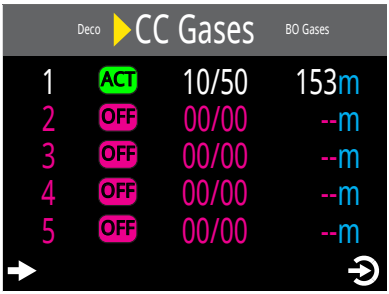
We will verify we are carrying sufficient bailout gas when we plan the dive.

**3. Verify Settings** - It is prudent to ensure all other settings are correct before starting every dive. For advanced technical dives, it is especially important to double check the values on every screen of the settings menu.

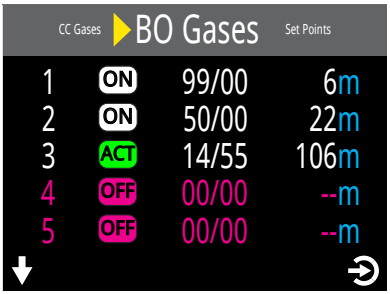
**4. Plan Dive** - Use the dive planner found in Dive Tools to check the total runtime, decompression schedules and bailout gas requirements for the dive.

For closed circuit dives, two decompression schedules will be generated. A primary schedule for closed circuit deco, and a bailout decompression schedule.

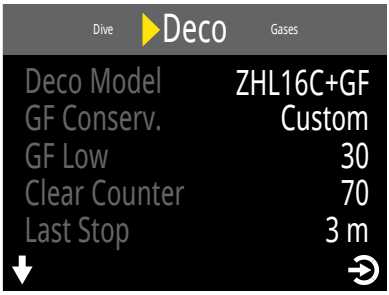
The on-board deco planner is limited in functionality, so for complex dives we recommend using desktop or smart phone dive planning software. Using the on-board planner to double check your dive plan is an effective way of confirming decompression settings.
(Continued on next page)



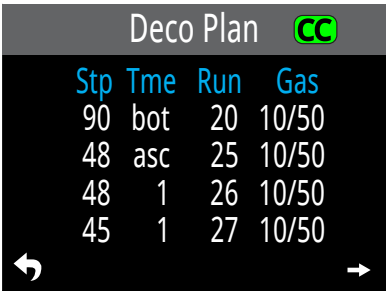

*1. CC Gas Setup*



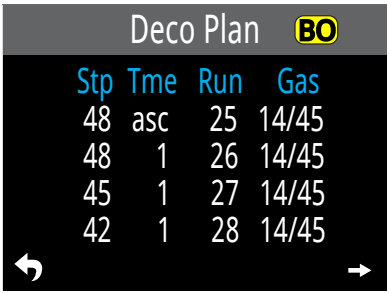

*2. OC Gas Setup*



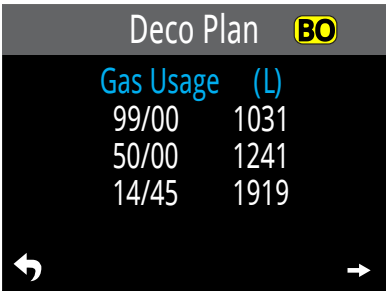

*3. Verify Deco Settings*




*4. Plan Dive - CC Scheduled*




*4. Plan Dive - BO Scheduled*




*4. Plan Dive - Bailout Gas Requirement*

# CC Example Dive (cont.)

**Note on Hypoxic Diluents**

Hypoxic diluents such as 10/50 in this example require special training since they can be deadly near the surface.

**5. Pre-Dive** - Prior to beginning the dive we can see from the mode indicator that we are in CC mode. Our active diluent gas is set to 10/50, our set point is 0.7, and the Perdix 3's battery is sufficiently charged. The diuent is red indicating it's PPO2 is dangerously low at the surface.

**6. Diluent Check** - Pressing the right button a few times brings up the diluent PPO2. The red indicates the diluent is unsafe to breathe directly.

This information can be viewed at any time to check what the expected PPO2 will be when flushing with diluent at depth.

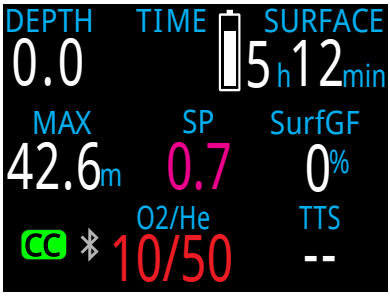
**7. Automatic Set point Switch** - The optional auto set point switch was enabled with a depth setting of 15m. So as we descend past 15m, the set point automatically switches from 0.7 to 1.3.

**8. Decreasing NDL** - As we descend deeper, the NDL decreases. The TTS shows it will take 5 minutes to ascend to the surface at 10m/min (33ft/min).

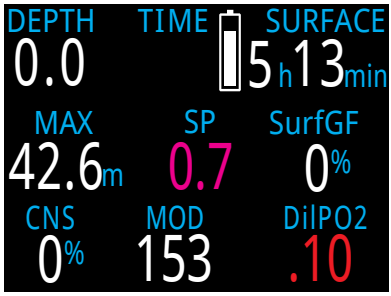
**9. Bottom Time** - We have completed the bottom time. The TTS indicates we have almost 1.5 hours of decompression to do. Our decompression stop information has replaced NDL. The first stop will be at 45m for 1 minute.

**10. Ascending to the First Stop** - Here we are ascending at 3m/min. This is slower than the expected 10m/min ascent rate. This slow ascent has caused the TTS to rise, as most tissues are still on-gassing.

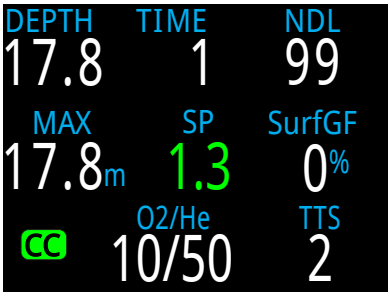
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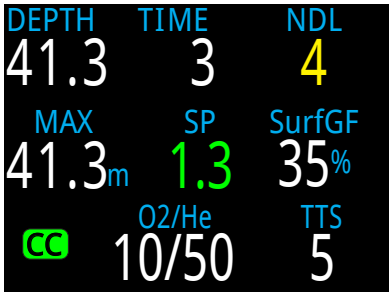

*5. Pre-Dive*



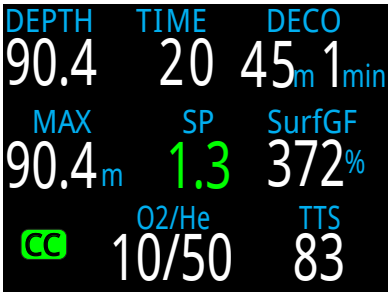

*6. Diluent Check*



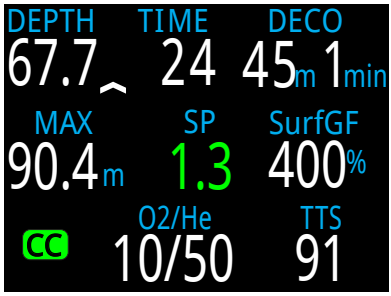

*7. Automatic Set point Switch*




*8. Decreasing NDL*




*9. Bottom Time*




*10. Ascending to First Stop*

# CC Example Dive (cont.)

**11. First Deco Stop** - The slow ascent has caused the first stop to clear before we reached it. This often happens with slow ascents.

**12. A Problem Has developed** - There is a problem with the O2 readings on the rebreather controller and the decision has been made to bail out. After physically switching the BOV or mouthpiece, the computer needs to be set to BO mode for proper deco calculations.

**13. Bailout** - Press the left (MENU) button until it brings up “CC -> BO”. Pressing the right (SELECT) button makes the change.

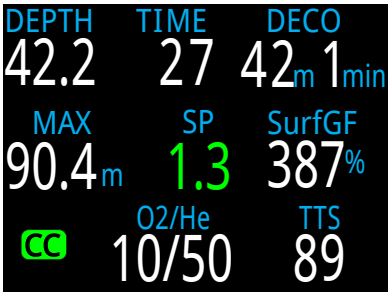
Note the Dive Mode indicator has changed to BO to indicate the bailout condition and the set point has disappeared from the info row. The best BO gas was automatically selected, and the deco schedule has been adjusted based on all of the available BO gases.

**14. Gas Switch Required** - We are now at 21m, having completed a few more deco stops. The gas is now displaying in yellow, indicating a better gas is available.

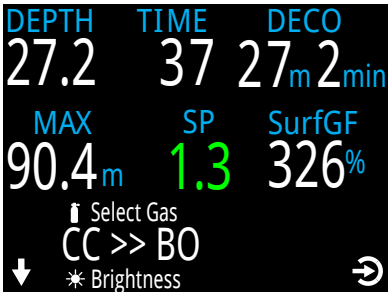
**15. Gas Switch** - Pressing the left (MENU) button brings up the “SELECT GAS” option in the main menu. The best available gas will be the initial selection when entering the gas select menu, just press SELECT one more time to make it the active gas.

**16. Deco Clear** - Follow the deco stops until they have all cleared and the Deco Clear Counter begins counting up from zero.

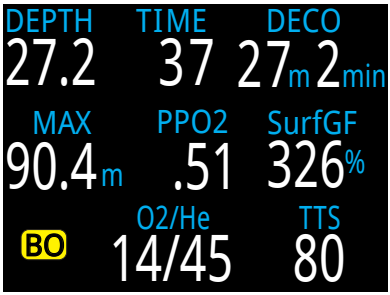
End of example.



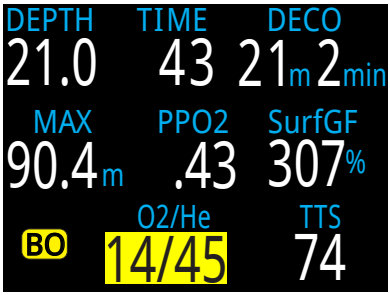

*11. First Deco Stop*



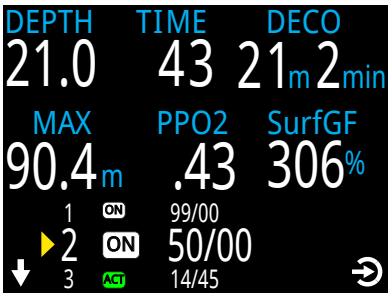

*12. A problem has developed*



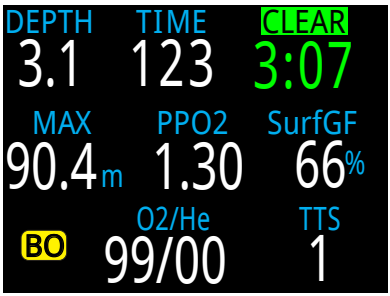

*13. Bailout*




*14. Gas Switch Required*



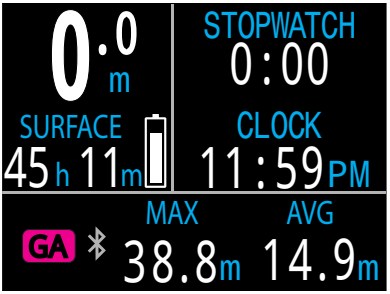

*15. Gas Switch*



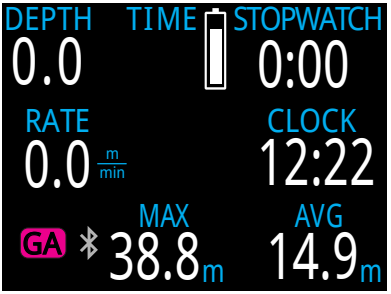

*16. Deco Clear*

# 8. Gauge Mode

Gauge Mode turns the Perdix 3 into a simple depth and time display (a.k.a. a bottom timer).




*Gauge Mode - Standard / Big Layout*




*Gauge Mode - Tec Layout*

Since decompression tissues are not tracked in Gauge Mode, changing to or from Gauge Mode resets the deco tissues.
`

Change to Gauge Mode in the Settings > Dive > Dive Mode. See page 142.

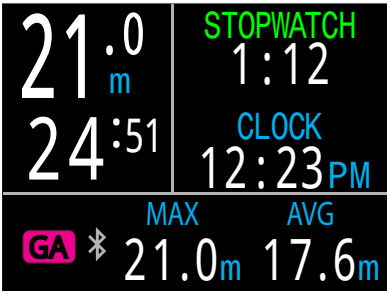
Gauge mode can be used in either layout. Since decompression information is not required, the stopwatch permanently takes the upper right position in all modes.

**Stopwatch**
When diving, starting or stopping the Stopwatch is the first menu option.

When running, the word "Stopwatch" displays in green. Once stopped the word "Stopwatch" displays in red.

When non-zero, the stopwatch can be reset. Reset behavior depends on state:

- If running when reset, it continues running, counting up again from 0.
- If stopped when reset, then it is set to 0 and remains stopped.







**Resettable Average Depth**
During a dive, the average depth can be reset.

While on the surface, the MAX and AVG values display the maximum and average depth of the last dive. The AVG depth displayed on the surface is for the entire dive, regardless of whether the reset average depth option was used. The dive log also records the average depth for the entire dive.

# 9. Freedive Mode

Freedive Mode optimizes the Perdix 3 for freediving.

Although many of the basic functions of the computer are the same as in other dive modes, Freedive Mode has several unique features that are covered in this section.

Since decompression tissues are not tracked in Freedive Mode, changing to or from Freedive Mode resets the deco tissues.

Free Dive Mode features:

- High Speed depth sampling - 4 samples / second
- Fully customizable vibration alerts
- Freedive focused Info screens
- Quick Log Tagging



**WARNING**

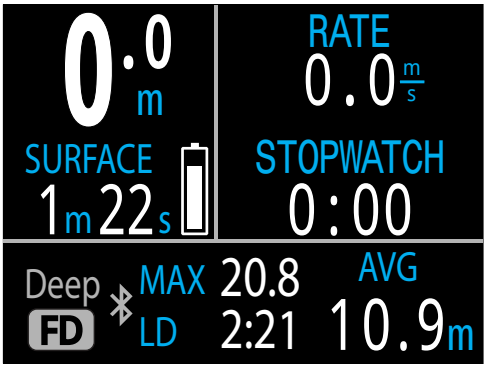
Breath-hold diving involves risks that are not obvious. Do not engage in these activities without proper training as well as a complete understanding and acceptance of the risks.

This manual is not a substitute for professional training.

# 9.1. Default Freediving Layout

By default, Freedive Mode uses the Big layout. It shares most features with the other dive modes but has a few unique characteristics.

- Active Freediving Set shown above Mode Indicator.
- Last dive time and max depth on home screen
- Ascent / descent shown in feet per second (fps) or meters per second (mps) instead of fpm / mpm.




In Freedive Mode, the top right position is permanently occupied by the descent / ascent rate which is displayed in m/s or ft /s. Other information slots are extensively configurable.

By default the bottom row shows last dive time in minutes and seconds (LD), as well as maximum and average depth in the configured units.

Some screen elements are unique to Freedive mode. These will be covered in the next section.

## 9.2. Freediving Info Screens

Freedive Mode has a unique info screen sequence which can be seen on the next page.

Max and average descent and ascent screens are only available in freediving mode (in either fps or mps).

These values can also be added to the home screen in Freedive Mode.



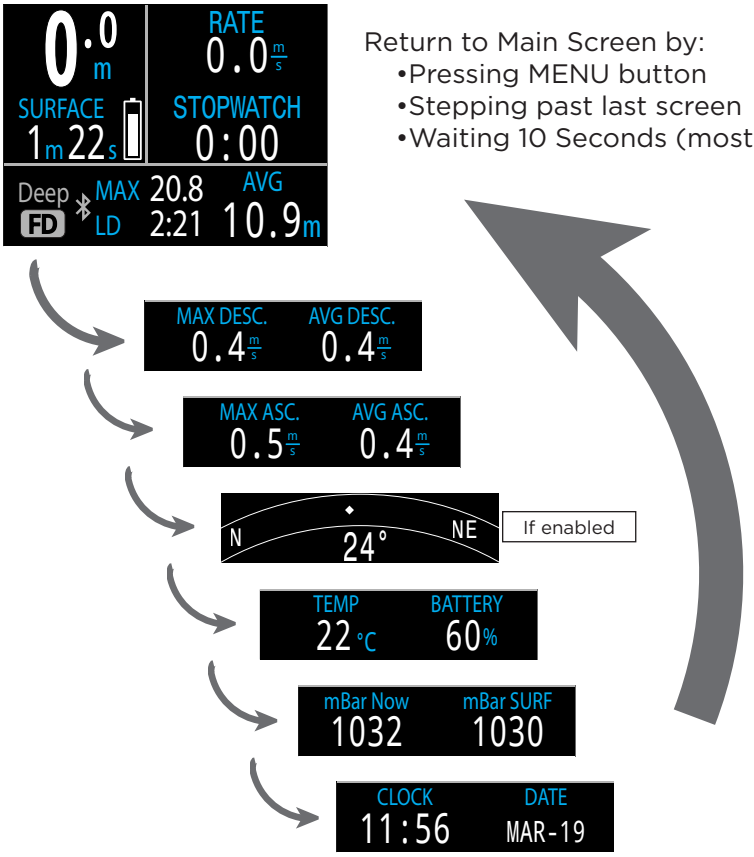

## 9.3. Freediving Sets

A freedive set is a collection of settings customized for a specific type of freediving.

The Perdix 3 supports 3 independently customizable sets. For each set, the user can customize the alerts activated during a dive as well as a handful of settings that will often change between activities. Fresh water in a pool vs salt water in the ocean for example.

See how to Edit Freedive (FD) Sets on page 122.

Freedive Mode info screen sequence:




Return to Main Screen by:

- Pressing MENU button
- Stepping past last screen
- Waiting 10 Seconds (most screens)

Press the FUNC button (right), to step through Info Screens

**Freediving Alerts**
Customizable in each set, these alerts are useful for notifying the diver of different phases of a freedive.

Freediving alerts differ from normal alerts in several ways.
- Only appear for 4 seconds.
- Come in 3 colors depending on urgency.
- Fully customizable within a set.
- Each has a customizable depth or time as a triggering condition.

**Freediving alert types:**

Info - Appears in blue.




Caution - Appears in yellow. Offending triggering condition also turns yellow.




Danger - Appears in Red. Offending triggering condition also turns red.




Depth Alerts:
Notify 1, Notify 2, Warn Depth, and Max Depth all trigger when their respective depth thresholds have been exceeded on decent.

Ascent Alert:
Asc. Notify indicates when a depth threshold has been exceeded on ascent.

Time Alerts:
Notify Time, Warn Time, Max Time, and Surf Time all trigger when time thresholds have been exceeded on a dive or in the case of Surf Time, after the diver has been at the surface for a defined amount of time.

Repeat Alerts:
Depth Repeat, Time Repeat, and Surf Repeat differ from simple depth and time alerts in that they are repeatedly triggered at the user-defined interval.

For example, Time Repeat will vibrate every 15 seconds while diving. This gives the diver a non-visual indication of the passage of time.

All of the freediving alerts are listed in the table below:

| *Freediving Alert* | *Trigger Condition* | *Alert Type* |
|---|---|---|
| *Notify 1* | *Depth* | *Info* |
| *Notify 2* | *Depth* | *Info* |
| *Warn Depth* | *Depth* | *Caution* |
| *Max Depth.* | *Depth* | *Danger* |
| *Asc. Notify* | *Depth* | *Info* |
| *Notify Time* | *Time* | *Info* |
| *Warn Time* | *Time* | *Caution* |
| *Max Time* | *Time* | *Danger* |
| *Surf Time 1* | *Time* | *Info* |
| *Surf Time 2* | *Time* | *Info* |
| *Depth Repeat* | *Depth* | *Info* |
| *Time Repeat* | *Time* | *Info* |
| *Surf Repeat* | *Time* | *Info* |



Regularly test your alerts with the Test Alerts function described on page 139 to ensure they are working and you can feel them through your exposure suit.

**Freediving Settings:**
Customizable freediving settings include:

- Water Type
- Dive Start Depth
- Dive End Depth
- Dive Start Delay
- Dive End Delay

These settings will very depending on the location and the type of freediving (ex. dynamic apnea vs. free immersion). So, customizing them within a set, makes it much easier to move between freediving activities without needing to define each setting individually every time.

Note that delays are added back to / removed from dive statistics once the dive is underway. Depth and time information will be the same regardless of the start / end delays and depths.

This Page has been left intentionally blank.

# 10. Compass

The Perdix contains a tilt-compensated digital compass.




## Compass Features

- 1° resolution
- ±5° accuracy
- High-speed refresh rate
- User set heading marker with reciprocal
- True North (declination) adjustment
- Tilt compensation ±45°

## Viewing the Compass

When enabled, the compass is viewed by pressing the SELECT (right) button once. Press SELECT again to continue on to view the regular info screens.

Unlike the regular info screens, the compass never times out back to the main screen. Press MENU (left) button to return to the main screen.

### Marking a Heading

To mark a heading, when viewing the compass press the MENU (left) button. This brings up the “Exit/ Mark” menu. Press the SELECT (right) button to mark the heading.




The marked heading is shown with a green arrow. When within 35° of the heading, the degrees display turns green.




The reciprocal heading (180° from marked heading) is shown with a red arrow. When within 35° of the reciprocal heading, the degrees display turns red.



When more than 5° off the marked heading, a green arrow shows the direction back to the marked heading.




Also, the offset degrees to the heading are displayed (43° in the example image). This offset is useful when navigating patterns. For example, a box pattern requires turns at 90° intervals, while a triangle pattern requires 120° turns.

### Compass Limitations

**Calibration** - The digital compass needs occasional calibration. This can be done in the **Settings ➡ Compass** menu. See details on page 157.

**Battery Changes -** When the battery is changed, the compass requires calibration.

**Interference -** Since a compass operates by reading the Earth's magnetic field, the compass heading is affected by anything that distorts that field or creates its own. Steel objects and electric motors or cabling (e.g. from dive lights) should be kept at a distance. Being close to or inside a shipwreck may also affect the compass.

**Magnetic declination** (also called magnetic variation) is the difference between magnetic and True North. This can be compensated in the Compass Setup menu using the Declination setting. The magnetic declination varies around the world, so will need to be readjusted when traveling.

**Magnetic inclination** (or magnetic dip) is how much the Earth's magnetic field points up or down. The compass automatically compensates for this angle. However, near the poles, the inclination angle can exceed 80° (i.e. the magnetic field points almost directly up or down), in which case the specified accuracy may not be met.

# 11. Air Integration (AI)

The Perdix 3 is equipped with 4-transmitter air integration capability. This section covers operation of the AI feature.

### AI Features

- Simultaneous wireless pressure monitoring of up to 4 tanks.
- Units in psi or bar.
- Gas Time Remaining (GTR) and Surface Air Consumption (SAC) rate based on one tank.
- Sidemount support for SAC, GTR, and Redundant Time Remaining (RTR)
- Sidemount Tank Switch Notifications
- Logging of pressure, GTR and SAC
- Reserve and critical gas pressure warnings.
- Dive start and end location logging (with Swift GPS)

## 11.1. What is AI?

AI stands for Air Integration. On the Perdix 3, this refers to a system that uses wireless transmitters to measure the gas pressure in a SCUBA tank and transmit this information to the Perdix 3 dive computer for display and logging.




*Shearwater Swift Wireless Transmitter*

Data is transmitted using low-frequency (38kHz) radio frequency communications. A receiver in the Perdix 3 accepts this data and formats it for display.

The communication is one-way. The transmitter sends data to the Perdix 3, but the dive computer does not send any data to the transmitter.

### *Important EN 250 Certification Notes*

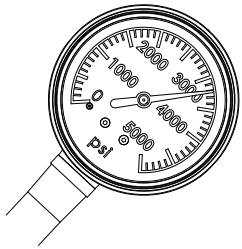
The European EN 250 standard specifies minimum requirements for self-contained open-circuit compressed air underwater breathing apparatus and their sub-assemblies to ensure a minimum level of safe operation of the apparatus down to a maximum depth of 50 m.

Testing and validation of the Perdix 3 wireless air integration system for the EN 250 standard was only performed with the Shearwater Swift transmitter. Therefore, the Swift transmitter is the only officially compatible wireless pressure measurement accessory certified for use with the Perdix 3.

Under EN 250, the Perdix 3's air integration system is certified for use with air only to a maximum depth of 50 meters. Products marked EN 250 are intended for air use only. Products marked EN 13949 are intended for use with gases containing more than 22% oxygen and must not be used for air.

### *Use a backup analog SPG*

Always use a backup analog submersible pressure gauge as a redundant source of gas pressure information.



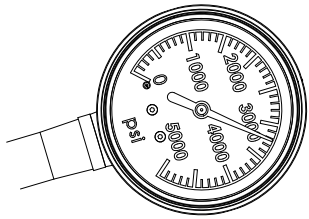
# 11.2. Basic AI Setup

This section will get you started with the basics of AI on the Perdix 3. Advanced setup and detailed descriptions will be covered in later sections.

## Install the Transmitter

Before using the AI system, you will need to install one or more transmitters on a scuba tank first stage regulator.

The transmitter must be installed on a first stage port labeled “HP” (high pressure). Use a first stage regulator with at least two HP ports, so that a backup analog submersible pressure gauge (SPG) can be used.



*A backup SPG is recommended*

Position the transmitter such that it is on the same side of your body as you wear your Perdix 3 handset. Range is limited to approximately 1 m (3 ft).

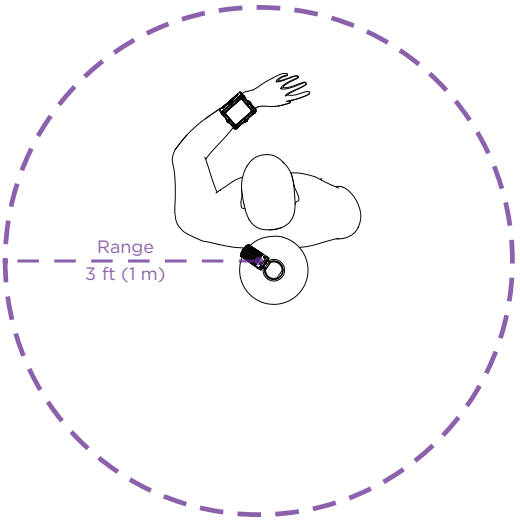
A high-pressure hose may be used to relocate the transmitter for better reception or convenience. Use hoses rated for a working pressure of 300 bar (4500 psi) or higher.

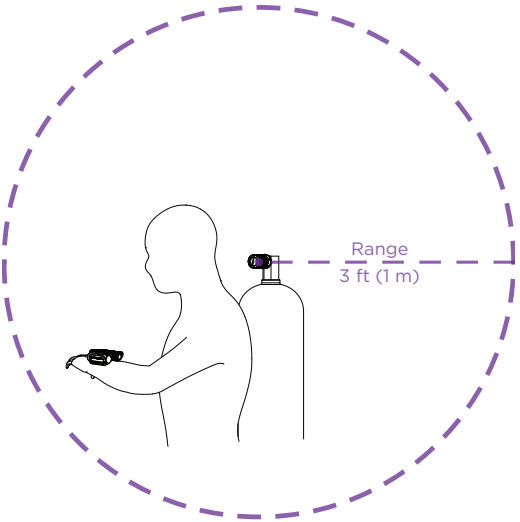
**Some transmitters require a wrench (11/16” or 17mm) to tighten or loosen**

Avoid hand tightening or loosening unless otherwise specified by the transmitter manufacturer, as this may damage the transmitter.



The Shearwater Swift transmitter can be installed without tools.




## Install transmitter on 1st stage HP port

*Install transmitter on the same side of your body as the handset. Range is approximately 3 feet (1 m).*

## Turn on the Transmitter

Turn on the transmitter by opening the tank valve. The transmitter will automatically wake up when it detects pressure.

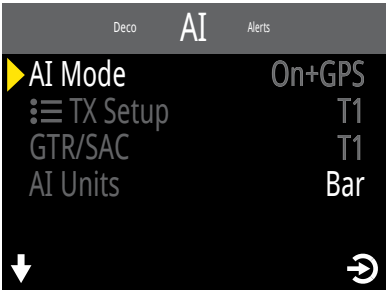
Pressure data is transmitted approximately every 5 seconds.

## Turn off the Transmitter

To turn off the transmitter, close the tank valve and purge the second stage regulator to drain pressure from the hoses. The transmitter will automatically power down after 2 minutes of no applied pressure.

## Enable AI on the Perdix 3

On the Perdix 3, navigate to **Settings** > **AI** Setup. Change the **AI Mode** setting to **On + GPS** or **On no GPS.**




The AI system on the Perdix 3 takes very little additional power. However, when **AI Mode** is set to **Off**, the AI sub-system is completely powered down.

Note that AI is never on when the Perdix 3 is turned off.

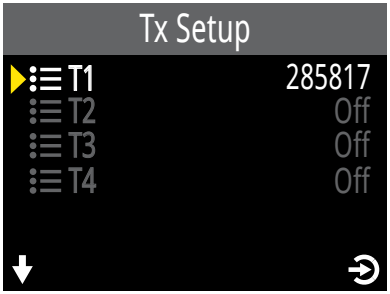
More information can be found in the AI Settings section on page 153.

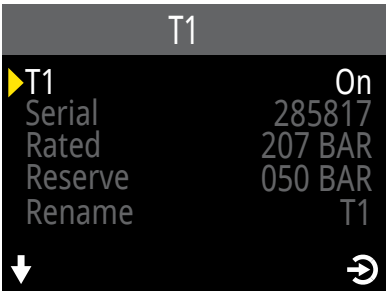
## Pair the Transmitter

Each transmitter has a unique serial number etched on its body. All communications are coded with this number so that the source of each pressure reading can be identified.




Pair the transmitter by going to the **Tx Setup** menu option, and selecting T1. Turn on T1, then enter the 6-digit transmitter serial number into the **T1 Serial #** setting. You only need to set this once, as it will be permanently saved in the settings memory.

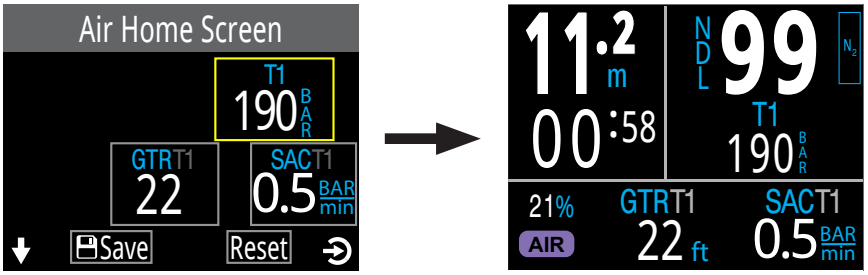


## Add an AI display to the home screen

AI information is automatically displayed as an info screen when the AI feature is enabled, however, the main screen will not show AI information until manually added.

Add AI to the home screen in the Settings > Dive > Edit Home screen menu.




The display can be customized extensively to show a wide variety of information.

Find more information about how to set up the home screen in the Edit Home screen section on page 145.



## Check that your tank valve is open

Always take a few breaths from your regulator or purge your regulator's second stage while monitoring your tank pressure for a full 10-15 seconds prior to entering the water to ensure your tank valve is turned on.

If the first stage regulator is charged but the tank valve has been closed, the breathing gas available to the diver will decrease rapidly and within a few breaths the diver will face an "out of air" situation. Unlike an analog gauge, the air pressure reported on the Perdix 3 will only update every 5 seconds, so the pressure reported by the Perdix 3 must be monitored for longer than that (we suggest 10-15 seconds) to ensure the tank valve is open.

Including a regulator purge test followed by 10-15 seconds of air pressure monitoring before entering the water as part of your pre-dive safety check is a good way to mitigate this risk.

# 11.3. AI Displays

This section describes the display field types that are used to display AI information. The display types are:

1) Tank Pressure
2) SAC
3) GTR
4) RTR (sidemount only)
5) AI combination display




*Tank Pressure*




*Gas Time Remaining*




*Surface Air Consumption*




*Redundant Time Remaining*

These displays can be viewed in two ways:
1) Added to a customizable zone on the home screen
2) Most can be viewed on the AI info screen.

## Renaming Transmitters

Transmitter titles can be customized in the transmitter setup menu. This makes it easier to keep track of which transmitter is reporting which cylinder pressure.

Each transmitter title has 2 characters that apply to all AI displays. The following options are available.

First Character: T, B, D, E, G, I, L, O, R, or S
Second Character: 1, 2, 3, or 4




*4-tank sidemount configuration*

Renaming is for display purposes only. There is no relationship between a transmitter title and gas fraction for decompression calculation purposes.

## Tank Pressure Display

The pressure displays are the most fundamental AI displays, showing pressure in the current units (psi or bar).




*bar Display*




*psi Display*

Low Pressure warnings:




*Reserve Pressure*




*Critical Pressure*

Reserve Pressure thresholds can be managed in the AI Setup Menu. See details on page 153.

No Communication Warnings:




*No communication for 30 to 90 seconds*




*No communication for more than 90 seconds*

Low Transmitter Battery Warnings:




*Transmitter battery should be replaced soon*




*Transmitter battery should be replaced immediately*

## SAC Display

The Surface Air Consumption (SAC) display shows the average rate of pressure change over the last two minutes, normalized to as if at 1 ATA pressure. Depending on the current units setting, SAC is either displayed in psi/minute or bar/minute.







SAC can be displayed for a single tank, or for a sidemount configuration of two tanks of identical volume.

> Note that SAC in pressure per minute is NOT transferable between tanks of different sizes.

The title indicates which transmitter is being used for the SAC calculations in a dark gray font. “SM” indicates that Sidemount SAC is selected.

The tank(s) included in the SAC calculation are selected in the AI Settings menu (page 153).

During the first few minutes of a dive the SAC value is not available, while the initial data is being collected for averaging calculations. The SAC display will show “wait” during this time.




> **On surface, SAC is average from last dive**
>
> The average SAC from your last dive is shown when on the surface. When a dive ends, you may notice the SAC value suddenly changes. This is because the SAC display changes from showing the SAC over the last two minutes (when in dive mode) to showing the average SAC for the whole dive.

## GTR Display

The Gas Time Remaining display shows the time, in minutes, that you could stay at the current depth until a direct ascent to the surface at a speed of 33 feet/min (10 m/min) would result in surfacing with the reserve gas pressure remaining.










The value is displayed in yellow when less than or equal to 5 minutes. The value is displayed in red when less than or equal to 2 minutes.

GTR can only be based on a single tank or when sidemount is selected, with 2 tanks of identical volume.

The title indicates which transmitter is being used for the GTR calculations in a dark gray font. “SM” indicates that Sidemount GTR is selected.

When on the surface, the GTR displays “---”. **GTR is not shown when decompression stops are needed, and will display “deco”.**

SAC data from the first 30 seconds of each dive is discarded. It then takes an additional few minutes to calculate the average SAC. Therefore, for the first few minutes of each dive, the GTR will display “wait”, until enough data has been collected to begin making GTR predictions.

More information on how GTR is calculated can be found in the GTR calculations section on page 116.

*No GTR on surface*







*At start of dive, wait for data to stabilize*

## RTR Display (Sidemount Only)




The Redundant Time Remaining (RTR) display indicates how much gas time remains if calculated only using the pressure of the sidemount tank with less pressure (i.e. all gas in the higher pressure tank was lost).

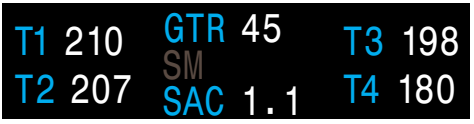
All of the same rules apply to RTR as they do to GTR and it is calculated in exactly the same way.

The title indicates the tank that is currently being used for the RTR calculation in dark grey.

## AI Combination Displays

AI combination displays automatically populate the AI info row to pack more information into the limited available space. The format of the AI combinations is based on AI settings. Some examples are given below. This is not an exhaustive list of the possible displays.

See the Home screen Layout menu section on page 145 to learn how to place AI displays on your home screen.

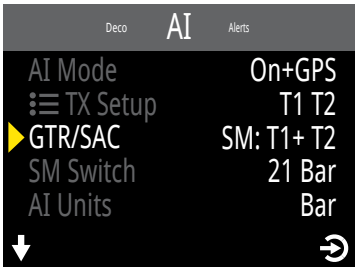
| AI Setting | Display |
|---|---|
| Tx Setup T1<br>GTR Mode T1 |  |
| Tx Setup T1 T2<br>GTR Mode SM:T1+T2 |  |
| Tx Setup T1 T2 T3 T4<br>GTR Mode SM:T1+T2 |  |

# 11.4. Sidemount AI

The Perdix 3 offers some features that make gas tracking more convenient while sidemount diving. These include:

- Sidemount tank switch notifications
- Sidemount SAC calculations
- Sidemount GTR and RTR

All sidemount features are enabled in the AI setup menu by setting the GTR Mode option to the desired SM combination.



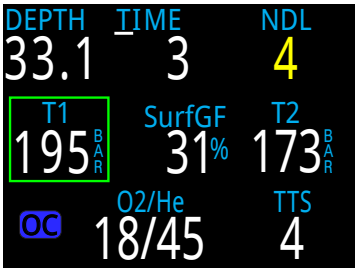

**Use Identical Tanks For Sidemount**

Sidemount features were designed assuming the sidemount tanks are of identical volume. This removes the need to enter tank volumes into the computer, simplifying the user interface and reducing the chances of input errors.

Do not use sidemount AI features with tanks of differing volumes.

## Sidemount Tank Switch Notifications

When the sidemount feature is enabled switch notifications will appear as a green box highlighting the label of the tank you should be breathing from. This provides a subtle reminder to switch tanks when the difference between tank pressures rises above the SM Switch setting.




The switch notification setting has a range of 7 bar - 69 bar or 100 psi - 999 psi.

## Sidemount SAC and GTR

Sidemount SAC and GTR are calculated the same way as single tank SAC and GTR except the tank pressures are pooled prior to each calculation. Essentially the two tanks are treated as one large tank.

Sidemount SAC and GTR calculations are dependent on the assumption that both sidemount tanks are of identical volume.

Note that SAC rate is not transferable between tanks of differing volumes. You must convert SAC to RMV for comparing gas consumption across different tank configurations.

For the purposes of RMV calculations using sidemount SAC, follow the same procedure outlined for a single tank in the SAC calculations section on page 114, but add all of the relevant tank attributes together as if you were using a single large tank.

Total volume = $\text{Volume}_{\text{Tank 1}} + \text{Volume}_{\text{Tank 2}}$

Total rated pressure = $\text{Rated pressure}_{\text{Tank 1}} + \text{Rated pressure}_{\text{Tank 2}}$

## 11.5. Using Multiple Transmitters

When using multiple transmitters, best reception reliability will be attained by using transmitters with different transmission intervals or by using transmitters with active collision avoidance such as the Shearwater Swift Transmitter.

When two transmitters of the same transmission interval are used, the potential exists for their communication timing to become synchronized. When this occurs, data dropouts may result and could last up to 20 minutes or more.

Legacy Shearwater transmitters of different colors have different transmit timing. This reduces communication collisions that could potentially cause a loss of connection.

When using more than two transmitters, Shearwater recommends using the Swift transmitter which actively 'listens' for other transmitters in the vicinity and dynamically alters transmit timing to avoid interference.

There is no defined upper limit to the number of Swift transmitters that can be run concurrently. For more details, see the Swift Operating Instructions Manual.

**Using Multiple Transmitters With The Same Transmission Interval May Result in Lost Comms**

When using more than one transmitter, use transmitters with adaptive collision avoidance or legacy transmitters of different colors to prevent interference (see above).

# 11.6. SAC calculations

Surface Air Consumption (SAC) is the **rate of change of tank pressure**, normalized as if at 1 atmosphere of pressure. The units are either PSI/minute or Bar/minute.

The Perdix AI calculates SAC averaged over the last two minutes. The data from the first 30 seconds of a dive are discarded to ignore the extra gas that is typically used during this time (inflating BCD, wing, or dry suit).

## SAC vs RMV

Since SAC is simply based on rate of tank pressure change, the calculations do not need to know the tank size. However, this means that the SAC is NOT transferable to tanks of a different size.

Contrast this to respiratory minute volume (RMV) which is the volume of gas that lungs experience per minute, measured in L/min or Cuft/min. The RMV describes personal breathing rate, and is therefore independent of tank size.

## Why SAC instead of RMV?

Since RMV has the desirable property of being transferable between tanks of different sizes, it seems to be the better choice on which to base GTR calculations. However, the main drawback of using RMV is that it requires setting up tank size correctly for each tank. Such setup is easy to forget and is also easy to setup incorrectly.

SAC has the property of not requiring any setup, making it the simplest and most reliable choice. The drawback is that it is not transferable between tanks of different sizes.

## SAC Formula

The SAC is calculated as follows:

$$SAC = \frac{\frac{P_{tank}(t_1) - P_{tank}(t_2)}{t_2 - t_1}}{P_{amb,ATA}}$$

$P_{tank}(t) = Tank\ pressure\ at\ time\ t\ [PSI] or\ [Bar]$
$t = Time\ [minutes]$
$P_{amb,ATA} = Ambient\ pressure\ [ATA]$

The time samples are taken 2 minutes apart, and $P_{amb,ATA}$ is the average ambient pressure (i.e. depth) over this time frame.

Since the Perdix AI displays and logs SAC, the formula for calculating RMV from SAC is useful. Knowing a diver's RMV can help with planning dives using tanks of various sizes.

## Calculating RMV from SAC - Imperial units

In the imperial system, tank sizes are described using two values; capacity in Cuft at a rated pressure in PSI.

For example, a common tank size is 80 Cuft at 3000 PSI.

To convert SAC in [PSI/minute] to RMV in [Cuft/minute], calculate how many Cuft are stored per PSI, then multiply this by the SAC to get RMV.

For example, a SAC of 23 PSI/min with an 80 Cuft 3000 PSI tank would be an RMV of (23 x (80/3000)) = 0.61 Cuft/min.

## Calculating RMV from SAC - Metric units

In the metric system, tank sizes are described using a single number, the tank's physical size in liters [L]. This is how much gas could be stored at a pressure of 1 Bar, so effectively the units of tank size are [L/Bar].

When using metric units, multiply the SAC by tank size.

For example, a SAC of 2.1 Bar/min with a 10 L tank would be an RMV of (2.1 x 10) = 21 L/min.

# 11.7. GTR calculations

Gas Time Remaining (GTR) is the time in minutes that can be spent at the current depth until a direct ascent to the surface at a rate of 10 m/min (33 feet/min) would result in surfacing with the reserve pressure. This is calculated using the current SAC value.

Safety stops and decompression stops are not considered by the GTR calculations.

To calculate GTR, start with the known tank pressure, $P_{tank}$. The remaining gas pressure, $P_{remaining}$, is determined by subtracting off the reserve pressure and the pressure used for the ascent.

$$P_{remaining} = P_{tank} - P_{reserve} - P_{ascent} \quad \text{, all tank pressures in [psi] or [bar]}$$

Knowing $P_{remaining}$, divide this by the SAC adjusted to the current ambient pressure to get GTR in minutes.

$$GTR = P_{remaining} / (SAC \times P_{amb,ATA})$$

## Why aren't safety stops included?

Safety stops aren't included to simplify the meaning of GTR, and make it consistent across operating modes that do not include safety stops.

Managing enough gas for a safety stop is quite simple, especially since they require a relatively small amount of gas. For example, consider if your SAC was 1.4 bar/min (20 psi/min). At a depth of 4.5m/15ft, the pressure is 1.45 ATA. So a 3 minute safety stop would use 1.4 x 1.45 x 3 = 6.1 bar (87 psi) of gas. This small amount of gas is easy to factor into the reserve pressure setting.

## Why is GTR limited to no deco?

Currently, Shearwater does not believe that GTR is the proper tool for decompression dives, especially those involving multiple gases. This isn't to say AI in general

is not a good fit for all technical diving, but the GTR function becomes increasingly complex to manage and understand when multiple gases are used.

Overall, the required complexity of menus and setup burden on the user would result in a system prone to mistakes and accidental misuse, and not fitting with Shearwater's design philosophies.

Gas management is an incredibly important and also complex activity, especially for technical diving. Education, training, and planning are critical for proper gas management for technical dives. Shearwater feels that a convenience feature such as GTR is not a good application of technology in this case, as its complexity and potential for misuse would outweigh its utility.

## No compensation for ideal gas law deviations

Note that all SAC and GTR calculations assume that the ideal gas law is valid. This is a good approximation up to about 207 bar (3000 psi). Above this pressure, the change in gas compressibility as pressure increases becomes a noticeable factor. This is mainly an issue for European divers using 300 bar cylinders. The end result is early in the dive, when pressures are above 207 bar/3000 psi, the SAC is over-estimated, resulting in under-estimation of GTR (although this is the good way to err, as it is more conservative). As the dive progresses and pressure drops, this problem rectifies itself and the numbers become more accurate.

# 11.8. Transmitter Connection Issues

If you are seeing “No Comms” errors, follow these steps:

**If the “No Comms” is persistent:**

- Check that the proper serial number is entered into the AI Setup Transmitter Setup menu.
- Ensure the Transmitter battery is not dead.
- Ensure the transmitter is turned on, by connecting it to a first stage and turning on the tank valve. Applying high pressure > 3.5 bar (50 psi) is the only way to turn on the transmitter.

  The indicator light on a Swift transmitter will flash to indicate it is transmitting.

  All compatible transmitters will power off after 2 minutes of no pressure.
- Bring the handset within range (1m / 3ft) of the transmitter. Having the transmitter too close (less than5 cm / 2 inches) can also cause communication loss.

**If the “No Comms” is intermittent:**

- Search for sources of radio frequency (RF) interference, such as HID lights, scooters, suit heaters, or photo flashes. Try eliminating such sources to see if this solves the connection problem.

- Check the distance from transmitter to handset. If range related dropouts are occurring during diving, locating the transmitter on short length of high pressure hose is possible to decrease the transmitter to handset distance.

- If more than one legacy or compatible third party transmitter is in range of the computer, ensure that they have different transmit timings (grey vs. yellow coloured transmitters), to minimize interference. This is not usually a source of problems with Shearwater Swift transmitters.

# 12. Menus

Menus perform actions and allow settings to be changed.

If no buttons are pushed for 10 seconds, the menu system will time-out, returning to the main screen. Anything that had been previously saved will be retained. Anything that was in the middle of editing will be discarded.

The main Perdix 3 menu can be accessed using the left (MENU) button from the main screen.




Main menu items differ by mode, as well as at the surface versus on a dive. The most commonly used menu items are placed first in the main menu to reduce button presses.

In the following section each item will be covered in detail.

***Adaptive Menus***

Only menus necessary for the current mode are shown. This keeps operation simple, prevents mistakes, and reduces button presses.

# 12.1. Main Menu Descriptions

## Turn Off

The “Turn Off” item puts the computer to sleep. While sleeping, the screen is blank, but the tissue contents are maintained for repetitive diving. The “Turn Off” menu item will not appear during a dive. It will also not appear after a dive until the end dive delay time (60s) has expired to allow for a continuation dive.




## End Dive

This menu item will replace Turn Off when on the surface and still in dive mode.

The Perdix 3 will automatically exit dive mode once 1 minute has been spent at the surface. Use this menu command to exit dive mode sooner.




## Start Stopwatch / Stop Stopwatch

This menu item only appears when the stopwatch has been added to the main screen. It is always available in gauge mode.



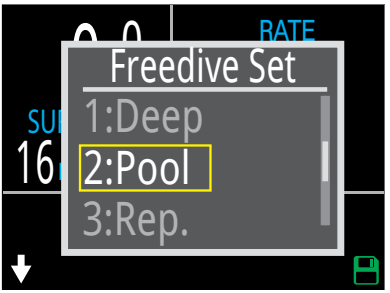

## Reset Stopwatch

This menu item only appears when the stopwatch is not zero. If the stopwatch is running, it will reset to zero and keep running.

## Change Freedive (FD) Set

Use this menu item to change between freedive sets.




## Edit Freedive (FD) Set

Use this menu item to edit the current freedive set.



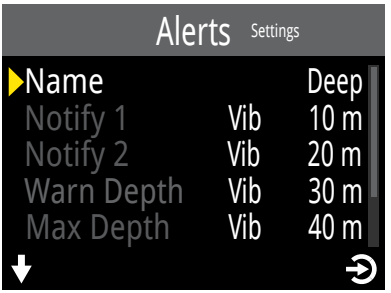

A freedive set is a collection of settings customized for a specific type of freediving.

**Name**
Allows the user to rename the freediving set from a list of 12 options. The set name appears next to the Freediving mode indicator when at the surface.




Default freediving sets are:
- Deep
- Pool
- Repetitive (Rep.)

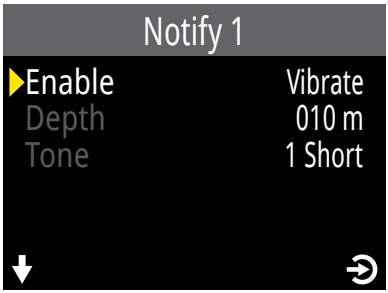
**Freediving Alerts**
The freediving alert settings for the current Freedive Set can be defined here.




Freediving alerts are triggered by depth or time which can be edited if you click int into the Alert settings menu.

In addition to configuring the depth or time trigger for alerts, each alert can be set to Vibrate, Visual Only, or Off.

The vibration pattern can also be customized for each alert in this menu.




All Freediving alerts appear on the screen for 4 seconds or until they are cleared. Additionally each alert can have a custom vibration notification assigned to them.

**Freediving alert types:**

Info - Appears in blue

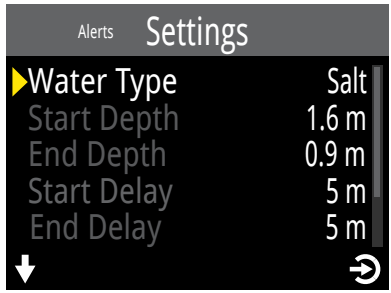
Warning - Appears in yellow

Danger - Appears in Red




| *Freediving Alert* | *Trigger Condition* | *Alert Type* |
|---|---|---|
| *Notify 1* | *Depth* | *Info* |
| *Notify 2* | *Depth* | *Info* |
| *Warn Depth* | *Depth* | *Caution* |
| *Max Depth.* | *Depth* | *Danger* |
| *Asc. Notify* | *Depth* | *Info* |
| *Notify Time* | *Time* | *Info* |
| *Warn Time* | *Time* | *Caution* |
| *Max Time* | *Time* | *Danger* |
| *Surf Time 1* | *Time* | *Info* |
| *Surf Time 2* | *Time* | *Info* |
| *Depth Repeat* | *Depth* | *Info* |
| *Time Repeat* | *Time* | *Info* |
| *Surf Repeat* | *Time* | *Info* |

### Freedive Set Settings




**Water Type**
Salt or fresh water. This setting affects depth readings because salt water is more dense.

**Start Depth**
The depth threshold for beginning a dive.

**End Depth**
The depth threshold for ending a dive.

**Start Delay**
The amount of time after crossing the start depth threshold before a dive is begun. Once a dive does begin, the length of the delay is added to the dive time to maintain accuracy.

**End Delay**
The amount of time after crossing the end depth threshold before a dive ends. Once a dive ends, the length of the delay is subtracted from the dive time to maintain accuracy.

**Min Dive Time**
The minimum amount of time below the start depth threshold before a dive is recorded in the log.

## Brightness




The display brightness has four fixed brightness settings plus an Auto mode.

The fixed options are:

- Cave: Longest battery life.
- Low: Second longest battery life.
- Med: Best mix of battery life and readability.
- High: Easiest readability, especially in bright sunlight.

Auto will use the light sensor to determine the brightness of the display. The more ambient light there is, the brighter the display will get. At depth, or in dark water, very little brightness is needed to see the display.

The Auto setting works well in most situations.

The brightness of the display is the major determinant of battery life. Up to 80% of the power consumption is to power the display. When a low battery alert occurs, the display brightness is automatically reduced to extend battery life.

## Setpoint Switch CC




This menu is only available in CC mode.

For closed circuit diving the Perdix 3 operates in internal PPO2 mode. This mode is used to calculate decompression for an unconnected rebreather.

The setpoint switch menu is used to switch between the low (default 0.7) and high (default 1.3) setpoints. These setpoints can be changed in the mode setup menu to approximate the rebreather setpoint.

During a dive the “Switch Setpoint” menu item will be the first item displayed, since the “Turn Off” displays are disabled when diving.

Pressing SELECT when this menu is displayed changes the PPO2 setpoint from the low setpoint to the high setpoint or vice-versa. To redefine the PPO2 value of a setpoint during a dive, use the Dive Tools menu.

This menu item performs a manual switching of PPO2 setpoint. The Perdix 3 can be setup to automatically perform setpoint switches at programmable depths in the Settings > Setpoints menu. When auto setpoint switches are enabled, this menu item is still available to provide manual control.

## Select Gas 3NX OC CC BO







This menu item allows you to pick a gas from the gases you have created. The selected gas will be used either as the breathing gas in open circuit and bailout modes, or the diluent in closed circuit mode.

From left to right, each gas shows gas number, on or off, the fraction of oxygen then the fraction of helium.

Gases are always sorted from most to least oxygen content.

Use the left (Next) button to increment to the desired gas, then press the right (Select) button to select that gas.

“Act” will appear next to the currently active gas. This is the gas being used for tissue compartment updating.

A gas that is off will be shown in **Magenta**, but can still be selected. It will be turned on automatically if it is selected.

Gases that are turned off are not used in decompression calculations. All gases that are turned on will be used in decompression calculations as appropriate. See the Decompression Information Accuracy section on page 64 for more information.

If you increment past the number of gases available, the display will fall back out of the “Select Gas” menu.

**Gases will not turn off automatically**

Selecting a new gas will turn that gas on if it is off, but gases will never turn off automatically.

It is important to turn off all gases you do not plan to use on the dive in the Define Gas menu to ensure you receive accurate decompression information.

## Radio Station Gases




For closed circuit mode, the system maintains two sets of gases - one for open circuit (bail out), and one for closed circuit.

The way they operate is very similar to the way car radios work with AM and FM stations.

When you are listening to an FM station and you push a station selection button, it will take you to another FM station. If you add a new station, it will be an FM station.

Similarly, if you are in the AM mode, adding or deleting a station would add or delete an AM station.

With radio station gases, when you are in open circuit, adding, deleting or selecting a gas will refer to an open circuit gas. Just like the FM stations are selected when your radio is in FM mode, the closed circuit gases are available in the closed circuit mode. When you switch to open circuit, the gases available will be open circuit gases.

## Switch to CC/BO CC BO

This menu item is only available in CC/BO mode.




Depending on the current computer setting, this selection will show as either “Switch CC > BO” or “Switch BO > CC”.

Pressing the right (SELECT) button will change the mode for decompression calculations. When switching to Bail Out while diving, the most appropriate Bail Out gas will become the breathing gas for calculations.

At this point, the diver may want to switch to a different gas, but since the diver may have other things to deal with, the computer will make a “best guess” of which gas the diver would choose.

# 12.2. Dive Tools




All of the Dive Tools menus are available both on the surface and when diving.

Values edited in Dive Tools can also be accessed in the Systems Setup menu, but the Settings menu is not available when diving.

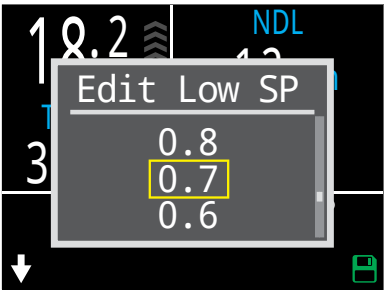
Pressing the right (SELECT) button will enter the Dive Tools sub-menu.

## Edit Low Setpoint CC




This item allows you to edit the low setpoint value.

Press the right (Edit) button to open the edit display. Press the left (Change) button to increment the setpoint.




Values from 0.4 to 1.5 are allowed. Incrementing past 1.5 returns the value to 0.4. Press the right (Save) button to lock in a new low setpoint.

## Edit High Setpoint CC

Works in exactly the same way as the Edit Low Setpoint function above.

## Edit Gases 3NX OC CC BO




The define gas function allows you to set up 5 gases in Closed Circuit and 5 gases in Open Circuit. You must be in Open Circuit mode to edit open circuit gases, and you must be in Closed Circuit to edit closed circuit diluents. For each gas, you can select the percentage of oxygen and, in Oc Tec, CC and BO modes, helium in the gas. The remainder is assumed to be nitrogen.

Pushing the right (Select) button presents the function to define gas number 1.

The left (Next) button increments to the next gas.




Press the right (Edit) button to edit a gas.

The first option is to toggle the gas on, off, or active as indicated by the yellow box.




Continuing along, the gas contents are edited one digit at a time. The yellow box shows the digit being edited.




Each push of the left (Change) button increments the digit being edited. When the digit reaches 9, it will roll over to 0.

Pushing the right button (Next) will lock in the current digit, and move on to the next digit.

A helpful indicator of what the MOD of the gas is being edited is included on each row.

Pushing the right (Save) button on the last digit will finish editing that gas, and bring you back to the gas number.
You can continue to increment through the gases pressing the left (Next) button.

The “ACT” denotes the active gas. If you turn off the active gas the system will automatically switch the next on the list to active.

Setting any gas to 00/00 will automatically turn it off.

The computer will display all gas entries available to allow you to enter new gases.

Pressing MENU one more time when the last gas is displayed will return you to the “Define Gas” menu item.



**Turn off gases you are not carrying**

The decompression algorithm assumes that the diver is carrying and plans to use every gas that is currently turned on. Leaving gases that are not expected to be used turned on will result in inaccurate time to surface, decompression stop and decompression time information being displayed.



**OC Tec and Bailout modes share gases**

The OC Tec and Bailout gas lists are one and the same. It’s important to review the gases you have turned on before every dive, especially if you often use your dive computer for both open and closed circuit diving.

## Edit GF



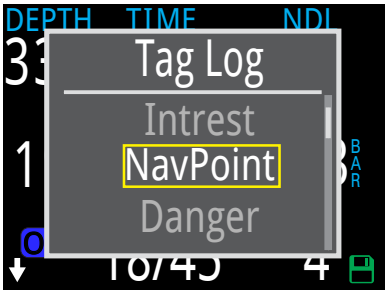




The conservatism settings (GF High and GF Low) can be edited in the Dive Tools menu. While diving, only the GF High value can be edited. This allows changing the surfacing conservatism during a dive. For example, if you worked much harder on the bottom segment than expected, you may wish to add conservatism by reducing the GF High setting.

## Tag Log




The tag log feature is useful for marking a point of interest in the dive log for later review. These tags will appear in the dive log when uploaded to your phone or personal computer.

Basic tag titles are available from the tag log pop-up to help distinguish tags.

The tag log pop-up will time out after 10 seconds.

## Deco Planner




**Introduction**

- Calculates decompression profiles for simple dives.
- Calculates gas consumption based on RMV
- Can be used both on the surface and during a dive.

The Perdix 3 also contains a separate quick NDL Planner that can also be found in the Dive Tools menu.

**Setup**

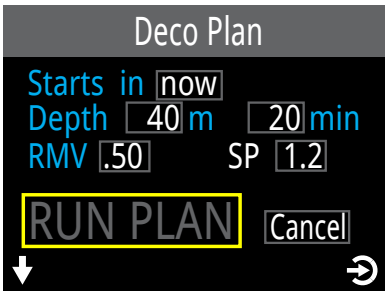
The planner uses the current gases programmed in the current dive mode, as well as the current conservatism (GF low/high) settings.

**When used at the Surface**

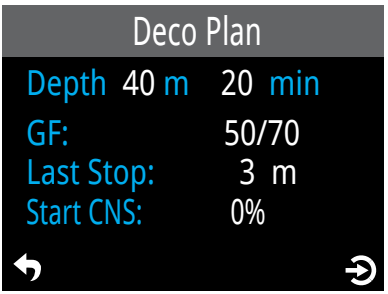
Enter the dive bottom depth, bottom time, respiratory minute volume (RMV) and PPO2 (closed-circuit only).

Note: Residual tissue loading (and CNS%) from recent dives will be used in calculating the profile.

When the correct values are entered, confirm decompression settings and starting CNS, then select “Plan”.




*Enter dive details*




*Press Plan when ready*

**When used during a dive**
Computes the decompression profile assuming the ascent will begin immediately. There are no settings to enter. (RMV is last used value).

### Deco Planner Limitations

The Perdix 3's Deco Planner is intended for simple dives.

Multi-level dives are not supported.

The Deco Planner does not provide thorough validation of the profile. For example, it does not check for nitrogen narcosis limitations, gas usage limitations, or CNS percentage violations.

The user is responsible for ensuring a safe profile is followed.

### Important!

The Perdix 3's Deco Planner makes the following assumptions:

- Descent rate is 18m/min (60ft/min) and the ascent rate is 10m/min (33ft/min).
- The gas in use at any time will be the gas with the highest PPO2 within the PPO2 limits.
- The planner will use the configured last stop depth.
- The RMV is the same during the bottom phase of the dive as it is while traveling and during deco.

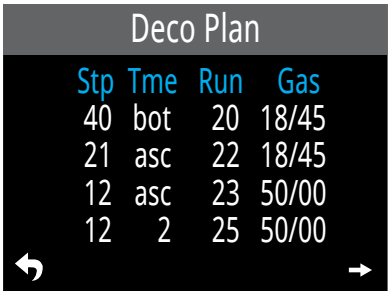
Read more about PPO2 Limits on page 147.

**Result Screens**

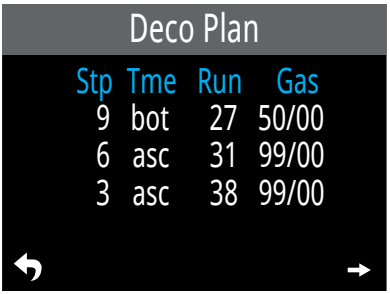
The results are given in tables showing:

| | | |
|---|---|---|
| Stp: | Stop Depth | In meters or feet |
| Tme | Stop Time | In minutes |
| Run | Run Time | In minutes |
| Gas | Gas Used | %O2 |
| Qty | Quantity Used | In liters or Cuft |

The first few rows will show the bottom time (bot) and the ascent time (asc) to ascend to the first stop. Multiple initial ascent legs may be shown if gas switches are needed.



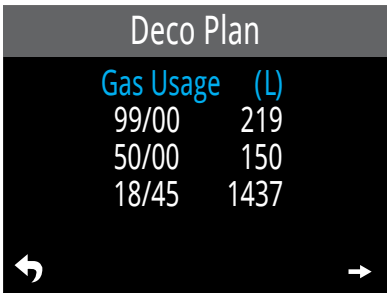

*Open circuit deco plan page 1*



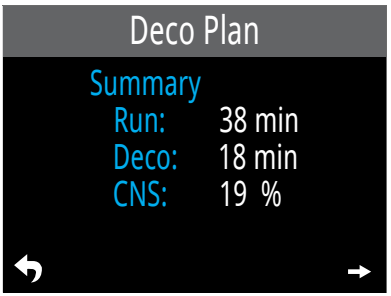

*Open circuit deco plan page 2*

If more than 2 stops are needed, the results will be split onto several screens.

After the last page of the deco schedule, gas usage and deco summary screens show the expected quantity of each gas used for the dive, the total dive time, the time spent on deco and final CNS%.

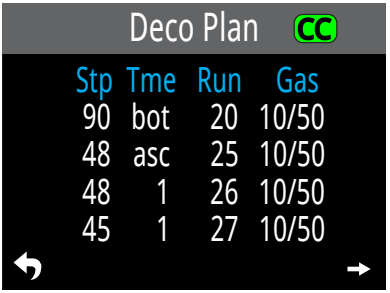



*Open circuit gas usage summary*

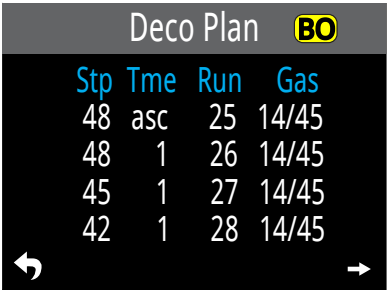



*Open circuit deco summary*

For closed circuit plans, a bailout plan based on the programmed bailout gases will automatically be generated after the closed circuit deco summary.

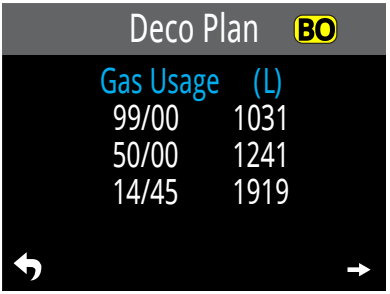



*Closed circuit deco plan page 1*

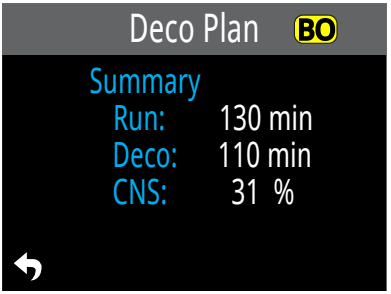



*Bailout deco plan page 1*

A bailout gas usage and deco summary will also be generated.

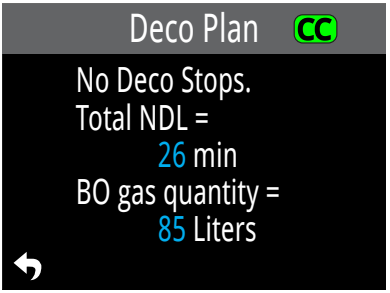



*Bailout gas usage summary*




*Bailout deco summary*

If no decompression is required, no table will be shown. Instead, the total No-Decompression-Limit (NDL) time in minutes, at the given bottom depth will be reported. Also, the gas quantity required to surface (bailout in CC) will be reported.




*No decompression required*

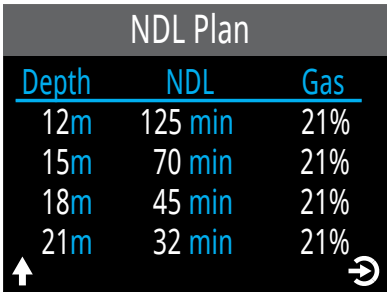
## NDL Planner

The No-Decompression Limit (NDL) Planner is a quick way to determine how much bottom time is available until mandatory decompression stops would be required.

A surface interval duration from none up to 1 day can be applied to account for expected off-gassing.

The results are a list of depths, along with the NDL time at that depth and the best of the programmed gases to use at that depth. Only programmed gases are used.



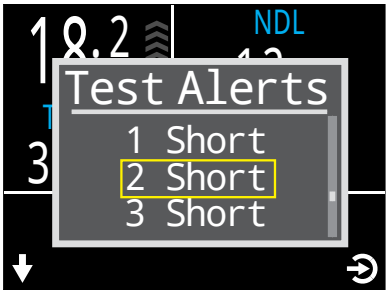

## Reset Average Depth




This feature is useful if you would like to get a sense of the average depth of a particular phase of a dive, such as the bottom, or deco phase. Reset Average Depth is available in every dive mode.

## Test Alerts




The Test Alerts pop-up provides a quick way to ensure your alerts are working and that you are able to feel them through your exposure suit.

The Test Alerts pop-up should be used regularly if you use vibration notifications.

Note, this feature only tests the different alerts that may occur during a dive. Which alert activates in each Warning, Info, or Error situation is not customizable with the exception of in freedive mode. See details on page 122.

**Caution**

Although vibration and auditory alerts are very useful, never rely on them for your safety. Electromechanical devices can and will eventually fail.

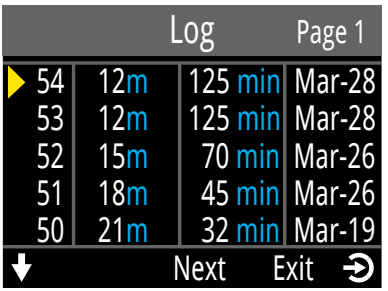
Always be proactively aware of your depth, no-decompression limit, gas supply, and other critical dive data. You are ultimately responsible for your own safety.

# 12.3. Dive Log




Use the Dive Log menu to review logs stored on the Perdix 3. Up to 1000 hours of detailed logs can be stored at the default sampling rate of 10 seconds.

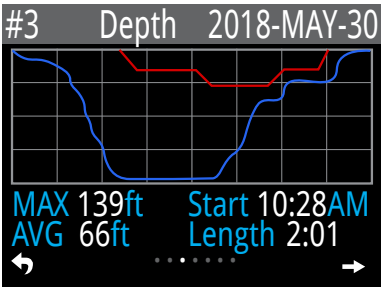
The Dive Log menu is only available when on the surface.




The first page of the log shows a list of all of your dives.

Select a dive (Right button) to pan through dive detail screens.

The profile of the dive is plotted in blue, with decompression stops plotted in red. The following information is displayed by scrolling through the dive log screens:




- Maximum and Average depth
- Dive number
- Date (dd-mon-yyyy)
- Start - Time of day dive started
- End - Time of day dive ended
- Length of dive in minutes
- Minimum, maximum, and average temperature
- Dive mode (Air, Nitrox, etc.)
- Surface interval preceding the dive
- Recorded Surface Pressure at the beginning of the dive
- Gradient factor settings used
- Start and end CNS
- Start and end pressure for up to 4 AI transmitters
- Average surface air consumption rate

**Edit Log**

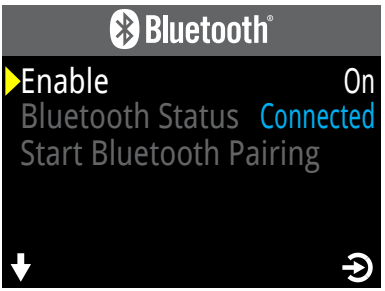
Scrolling past all screens of an individual log brings up the Edit Log page where the dive log can be deleted.

# 12.4. Bluetooth




The Bluetooth menu allows you to enable or disable bluetooth, check connection status or pair to a new device. This menu is also availibe within system settings.

Enter Bluetooth pairing mode on your personal computer or mobile device, then select Start Bluetooth Pairing from the Bluetooth settings menu on the dive computer.




Once the Perdix 3 is paired to your mobile phone or computer it will remember the device and automatically connect when it comes into range in the future.

If you have automatic dive downloads enabled on the mobile or desktop app, the dive computer will automatically backup your dives as soon as you open the app while the computer is in range.

For More information see Firmware update and Log Download on page 167.

# 13. Settings Reference

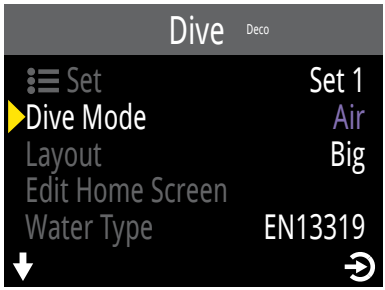



Settings contains configuration settings together in a convenient format for updating the configuration before a dive.

Settings cannot be accessed during a dive.

## 13.1. Dive Settings Menu

The first menu item within the settings menu is the Dive Settings Menu. This menu item also conveniently shows the current dive mode.




The Layout and home screen settings in the Dive Settings Menu are isolated to the Dive Mode in which they were set.

So, if you customize your layout and home screen, for Air, then switch to OC Tec, when you switch back, your original Air settings will be preserved.

## Setting Sets

Setting sets provide a convenient way to quickly change all settings on your dive computer when changing between configurations or types of diving.

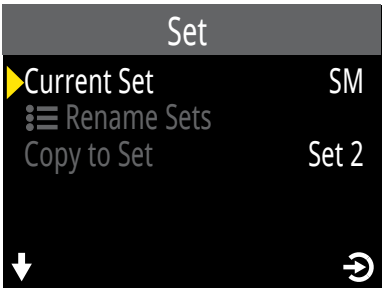
Each of the three setting set slots retains a custom configuration for every setting on the computer. For example, the “Air” and “Nitrox” modes could both be configured for sidemount diving in one set with specific transmitters programmed and your preferred display configuration. Another set can then be used for single tank backmount diving.

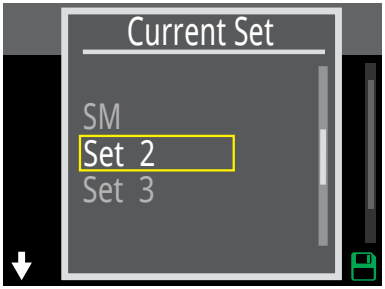
Each set can be renamed to make it easier to quickly choose the correct set for the dive you are doing.

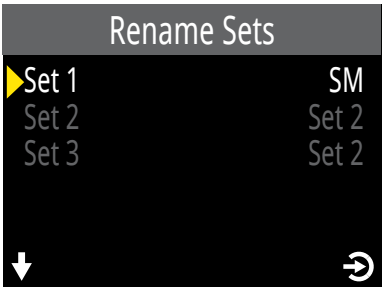
You can easily copy sets if you want to make a similar sets with only subtle changes.

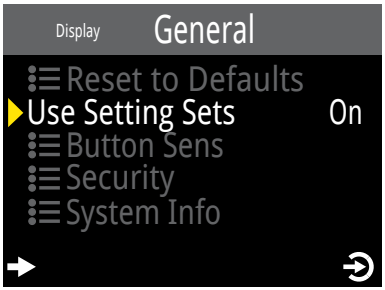
Setting sets must be enabled in the Settings > General menu before they will be visible in the Dive Settings menu.

Additionally, each setting set can be reset to defaults independently in the Settings > General > Defaults > Reset Settings menu.

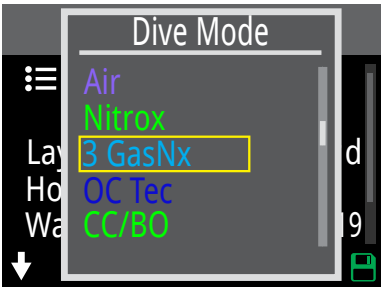


## Dive Mode



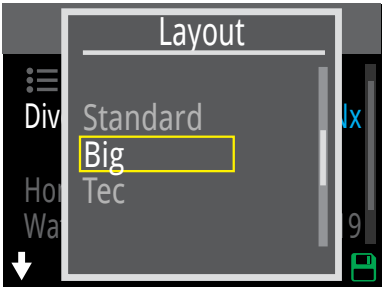

There are 7 available dive modes:

- Air (default)
- Nitrox
- 3 GasNX
- OC Tec
- CC/BO
- Gauge
  (e.g. bottom timer mode)
- Freedive

When changing to or from Gauge or Freedive Mode, the decompression tissues are cleared. This is because when in these modes the Perdix 3 does not know what gas you are breathing, and therefore cannot track inert gas loading. Plan repetitive dives accordingly.

For more information on which mode to choose, see Dive Mode Differentiation on page 19.

## Layout




The Layout menu item in the dive settings menu is used to select between the 3 available layouts: Big, Standard, & Tec.

Like all of the other settings in the dive settings menu, this option is isolated to the dive mode in which it was set.

Every layout is available in every dive mode.

Main Screen Layout on page 20 for details about the different layout options.

## Edit Home screen

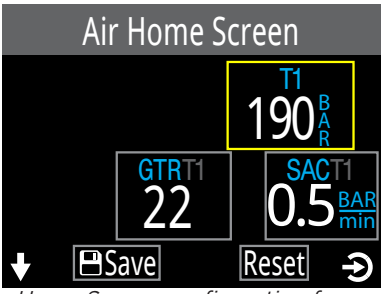
This option is used to customize the display.

SELECT the desired slot to bring up the list of options. Use the arrows to scroll through the available options. Press SELECT again to choose an option.

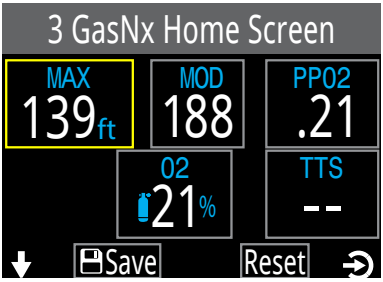
The Standard and Big layouts allow for 3 configurable positions. The Tec layout allows for 5 configurable positions.

For Mini Displays pick the number of elements (2 or 3) you would like, then proceed to select which information you would like displayed in each position.

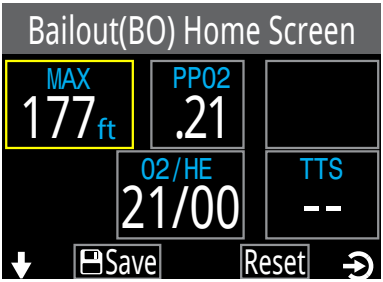
In CC/BO mode there is a separate Home screen menu item for each CC and BO. This allows you to optimize your bailout screen layout in advance, minimizing button pushes during an emergency.



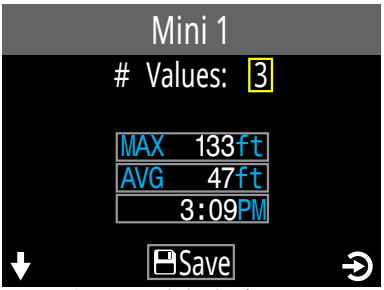

*Home Screen configuration for Standard and Big Layouts*




*Home Screen configuration for Tec Layout*



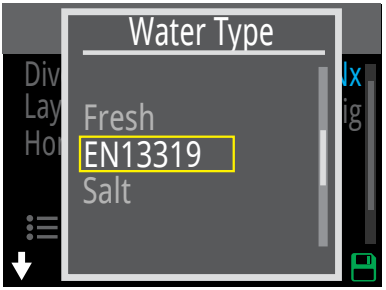

*Home Screen configuration for Tec Layout - Bailout*




*Home Screen Mini Display configuration*

## Water Type

Water type (salinity) affects how the measured pressure is converted to depth. Settings:



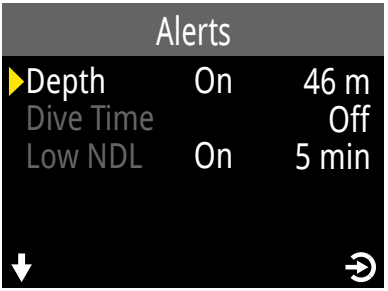

- Fresh
- EN13319
- Salt

Density of freshwater and saltwater differ by about 3%. Saltwater, being denser, will display a shallower depth for the same measured pressure versus the Fresh setting.

The EN13319 value is between Fresh and Salt. It is from the European CE standard for dive computers, and is the Perdix 3's default value.

## Alerts

This page is used to set up custom dive alerts for Maximum Depth, Time, and Ascent rate. Notifications will be triggered when these values are exceeded. Alerts settings are isolated to the mode in which they were set.

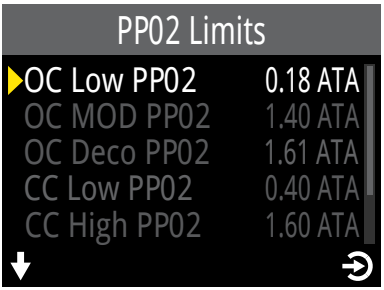



See Customizable Alerts on page 53 for more information on how these alerts are displayed.

## PPO2 Limits

This section allows changing of PPO2 limits.

All values are in absolute atmospheres [ATA] of pressure. (1 ATA = 1.013 bar)




**WARNING**

Do not change these values unless you fully understand the effect.

**Bottom gas vs deco gas assumptions**
When not in deco:
The least oxygen rich mix that is turned on and all mixes with 40% O2 are assumed to be bottom gases. All other gases are assumed to be deco gases.

When in deco:
Only the least oxygen rich mix is assumed to be a bottom gas. All other gases are assumed to be deco gases.

**OC Low PPO2**
For all OC gases, PPO2 and the active gas display will flash red when the active gas is less than this value. (Default 0.18)

**OC MOD PPO2**
This is the maximum allowable PPO2 during the bottom phase of the dive - **M**aximum **O**perating **D**epth. (Default 1.4)

For all OC bottom gases, PPO2 will turn yellow when within 0.03 of OC MOD PPO2.

Also for all OC bottom gases, PPO2 and the active gas display will flash red when PPO2 is more than 0.03 greater than OC MOD PPO2.

MODs of bottom gases are determined with this value.

Note: BO Mode never uses OC MOD PPO2

**OC Deco PPO2**
All decompression predictions (Deco schedule and TTS) assume that the gas used for decompression at a given depth will be the gas with the highest PPO2 less than or equal to this value. (Default 1.61)

Suggested gas switches (when the current gas is displayed in yellow) are determined by this value. If you change this value, please be sure you understand its effect.

For example, if lowered to 1.50, then a switch to oxygen (99/00) will not be assumed at 6m/20ft.

PPO2 of all deco gases display in yellow when within 0.03 of OC DECO PPO2.

For all OC deco gases, PPO2 and the active gas flash red when PPO2 is more than 0.03 greater than OC DECO PPO2.

MODs of deco gases are determined with this value.

**CC Low PPO2**
PPO2 displays in flashing red when less than this value. (Default 0.40)

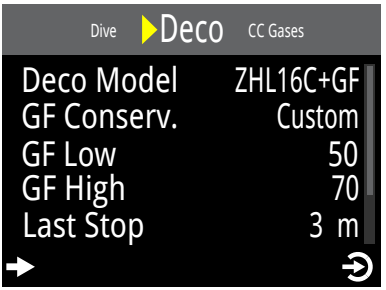
**CC High PPO2**
PPO2 displays in flashing red when greater than this value. (Default 1.60)

**Reset Limits**
Resets all PPO2 limits for this dive mode back to defaults.

**Note:** In both OC and CC mode, a “Low PPO2” or “High PPO2” alert is displayed when the limits are violated for more than 30 seconds.

# 13.2. Deco Settings Menu

The Deco Settings Menu provides options for adjusting the decompression algorithm.




Air, Nitrox, and 3GasNX share a set of gradient factors so switching between them will retain the same gradient factors. Similarly, OC Tec and CC/ BO share a set of gradient factors.

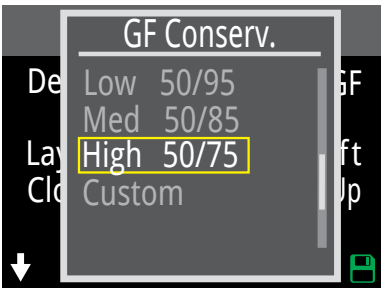
## Deco Model

This will just show ZHL16C+GF indicating that the Bühlmann ZHL-16 with gradient factors model is being used.

## GF Conserv.

3 preset conservatism levels are available. In order of increasing conservatism:

- Low (50/95)
- Med (50/85)
- High (50/75)




Medium conservatism is the default setting for recreational modes.

A custom GF option is also available in every dive mode. When Custom is selected, fields for editing GF Low and GF High will appear in the Deco Menu.

OC Tec and CC/BO modes have a custom default of 50/70.

For a more detailed explanation of the GF algorithm and the meaning of GF Low and GF High, please refer to Erik Baker's excellent articles: **Clearing Up The Confusion About "Deep Stops"** and **Understanding M-values**. The articles are readily available on the web.

Also see Decompression and Gradient Factors on page 62.

## Last Stop

Use this setting to identify where you plan to do your last decompression stop. The choices are 3m/10ft and 6m/20ft.

This setting makes TTS predictions more accurate by calculating according to planned last stop depth. It does not affect real time decompression calculations.

Rate of decompression is related to the partial pressure of inspired inert gas. If breathing a high fraction of inert gas, the last stop depth may make a significant difference to required decompression time. If breathing pure O2, last stop will depth make no difference as the fraction of inspired inert gas is zero.

The last stop setting has no impact on safety stops. These are governed by the logic described in Safety Stops on page 58.

## Safety Stops

The Safety Stop setting is only present in recreational modes. It can be set to the following values:

- Off
- 3 minutes
- 4 minutes
- 5 minutes
- Adapt
- Count Up

When using the Adapt setting, a 3 minute safety stop will be used, unless the dive exceeds 30m (100ft) or the NDL falls below 5 minutes, in which case a 5 minute safety stop is used.

Read more about Safety Stops on page 58.

### Clear Counter

The Clear Counter setting is only available in OC Tec and CC/BO Dive Modes.

By default, the clear counter will count up from zero once decompression obligation has been cleared in OC Tec and CC/BO modes. It can be turned off here.

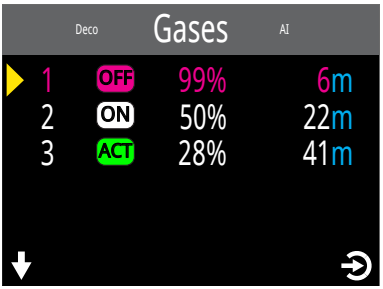
Read more about Decompression Stops on page 60

## 13.3. Gases

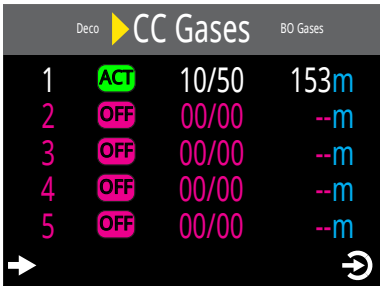
The Perdix 3 supports 3 programmable gases in 3GasNX, and 5 programmable gases in OC Tec, CC, and BO dive modes.

This setting is the same as the Edit Gases item found in the main menu, but is conveniently located here along with the other dive settings.

For a description of how to set each gas, see the Edit Gases section on page 131.

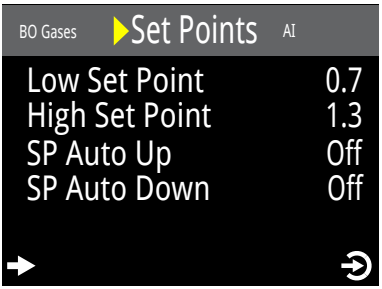



In CC/BO mode, both the CC diluent and BO open circuit gas lists are directly accessible, eliminating the need to toggle between the two operating modes to check gases from the Edit Gases option in the main menu.




Note that OC Tec mode and BO mode share the same gas list. Editing one will edit the other.

# 13.4. Set Points CC

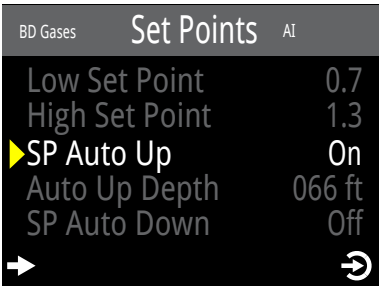



This menu item is only available in CC/BO mode

## High & Low Set points

Like the Set Points selection in the main menu, this menu allows you to edit your High and Low set points.

## Auto Set Point switch




**SP Auto Up** and **SP Auto Down** are also available in this menu to set up automatic set point switching. They can be configured to auto switch up only, down only, both, or neither.

Use **SP Auto Up** to set whether the up switch occurs automatically or manually.

If **SP Auto Up** is set to “On”, use **Auto Up Depth** to set the depth at which the auto switch occurs.

The menu options are the same for the down set point switch.

Example:

| | | |
|---|---|---|
| **Up:** | 0.7 > 1.3 | Auto Up Depth = 21m |
| **Down:** | 1.3 > 0.7 | Auto Down Depth = 5m |

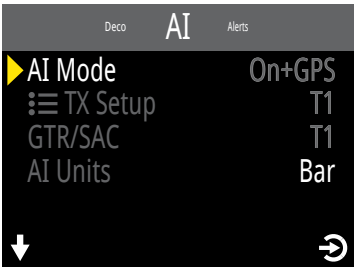
The dive starts at the 0.7 set point. As you descend past 21 m, the set point switches “up” to 1.3.

You finish your bottom time, then begin ascending. When you ascend above 5m, it switches “down” to 0.7.

When a switch is set to “Auto”, you can always manually override the setting at any time during the dive.

The automatic switches only occur when crossing the specified depth. Say for example, the switch up depth is set to 15m. You start the dive on the low set point, then as you descend past 15m, the set point automatically switches up to high. If at 24m you then manually switch back to the low set point, the set point will remain low. If you ascend shallower than 15m then re-descend deeper than 15m again, the automatic set point switch will occur again. The Perdix 3 enforces a 6m (20ft) gap between switch up and switch down depths to prevent rapid automatic switching between set points for small depth changes. The values 0.7 and 1.3 are shown as examples only. Other values for the low and high set point can be adjusted in the Set Points menu.

## 13.5. AI




All AI settings must be configured on the surface before a dive, since the settings menu is not accessible during a dive

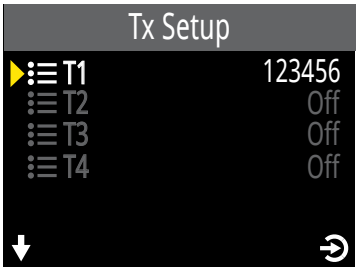
### AI Mode

AI Mode is used to easily enable or disable AI.

| AI Mode Setting | Description |
|---|---|
| Off | AI sub-system is completely powered down and consumes no power. |
| On no GPS | AI is enabled. Entry and exit locations will not be recorded. |
| On + GPS | AI is enabled. Entry and exit locations will be recorded if a Swift GPS transmitter is in range. |

When on, AI slightly increases power consumption. However, there is significantly less impact than on previous generation Shearwater computers.

## TX Setup

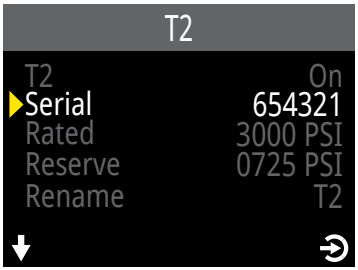



The Transmitter setup (TX) menu is used to set up individual transmitters. Currently active transmitters are shown next to TX in the top level AI menu.

Up to 4 transmitters can be configured in this menu. Select a transmitter to modify its attributes.

> ***Set AI Mode to OFF when AI not in use***
>
> Leaving AI enabled when not in use will negatively impact battery life when in dive mode. When a paired transmitter is not communicating, the Perdix goes into a higher power scan state. This increases power consumption to about 25% higher than with AI off. Once communications are established, power drops to about 10% higher than with AI off.
>
> Note, AI is never active in watch mode. There is no need to turn AI off when wearing the Perdix as a watch.

**Transmitter On/ Off**
Turn off transmitters that are not currently in use.




**Serial Number Setup**
Every transmitter has a unique 6-digit serial number. This number is etched onto the side of the transmitter.

Enter the serial number to pair the transmitter to T1. This number only needs to be entered once. Like all settings, it is stored in permanent memory. Transmitter settings are saved across all dive modes in the current setting set.



**Reserve Pressure**
Enter the reserve pressure.

The valid range is 28 to 137 bar (400 to 2000 PSI).

The reserve pressure setting is used for:
1) Low pressure warnings
2) Gas Time Remaining (GTR) calculations

A **"Reserve Pressure"** warning will be generated when the cylinder pressure falls below this setting.

A **"Critical Pressure"** warning will be generated when the cylinder pressure falls below the larger of 21 bar (300 PSI) or half the reserve pressure.

For example, if reserve pressure is set to 48 BAR, the critical warning will occur at 24 BAR (48/2). If the reserve pressure is set to 27 BAR, the critical warning will occur at 21 BAR.

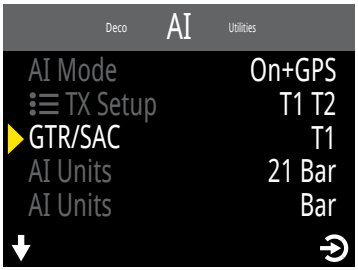
**Rename**
Allows the changing of the transmitters title as it appears on menus and screens throughout the dive computer. Two characters can be customized per cylinder. The options are:

First Character: D, E, G, I, L, O, R, S, or T.

Second Character: 1,2,3, or 4.

The reason for limiting the characters to this set is to balance having useful options in every language with reducing button presses by keeping the list short.

## GTR/SAC




Gas Time Remaining (GTR) is the time in minutes that can be spent at the current depth and SAC rate until a direct ascent to the surface at a rate of 10 m/min (33 feet/min) would result in surfacing with the reserve pressure. The SAC rate is averaged over the last two minutes of diving for calculating GTR.

GTR/SAC is only based on one cylinder, or on two cylinders in sidemount configuration. Note that for sidemount the cylinders must be of identical volume for SAC to be accurate.

The GTR/SAC setting is also used for identifying sidemount mode. Selecting the SM option here will enable cylinder switch notifications.

| GTR/SAC Setting | Description |
|---|---|
| Off | GTR is disabled. SAC is also disabled. |
| T1, T2, T3, or T4 | Selected Transmitter is used for GTR and SAC calculations. |
| SM:T1+T2 (Or similar) | Combined SAC for selected transmitters will be calculated and used for GTR. Sidemount switch notifications will be enabled. |

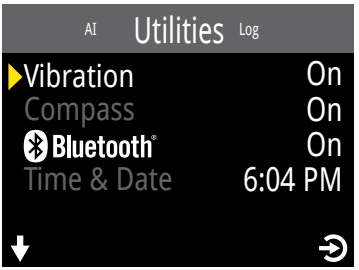
Read about AI Displays on page 106.

Read more about Sidemount AI on page 111.

Read more about SAC calculations on page 114.

Read more about GTR calculations on page 116.

# 13.6. Utilities



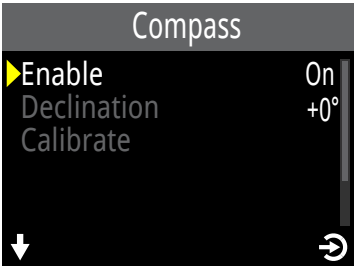

The utilities menu provides access to less often used settings. The most important aspect of each settings is visible as you scroll by. The contents of each sub menu is described below.

## Vibration

This is the universal vibration toggle for the dive computer.

# 13.7. Compass

## Enable




Disabling the compass will prevent it from being displayed in the info row. The display refresh rate can be reduced when the compass is not displayed on the screen, so disabling the compass allows a slight power savings (about 10%).

## Declination

In most places, a compass does not point towards True North, but rather to Magnetic North. The difference in angle between these two directions is called the magnetic declination (also called magnetic variation), and varies around the world. The declination in your location can be found on maps or by searching on-line.

This setting can be set from -99° to +99°.

If you only need to match an uncompensated compass, or your navigation is all based on relative directions, then this setting is not necessary and can be left at 0°.

## Calibrate

Calibration of the compass may be needed if the accuracy drifts over time or if a permanent magnet or ferromagnetic metal (e.g. iron or nickel) object is mounted very close to the Perdix 3. To be calibrated out, such an object must be mounted with the Perdix 3 so that it moves along with the Perdix 3 Display.

Compare the Perdix 3 with a known good compass or fixed references to determine if calibration is needed. If comparing against fixed references, remember to consider the local deviation between Magnetic North and True North (declination).

Calibration is typically not needed when traveling to different locations. The adjustment needed then is the declination.

When calibrating, rotate the Perdix 3 smoothly through as many 3D twists and turns as possible in 15 seconds. Keep metal and magnetic objects away during calibration. The calibration can also be reset back to the factory values. After calibration, it is recommended to compare the compass accuracy with a known good compass or fixed references.

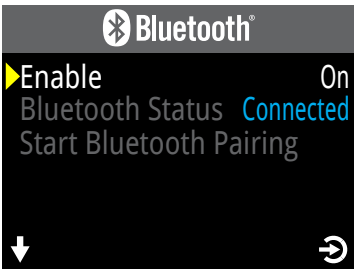
### Tips for a good compass calibration

- Stay away from metal objects. For example, wrist watches, metal desks, boat decks, desktop computers, etc. can all interfere with the Earth's magnetic field.
- Rotate to as many 3D positions as possible. Upside down, sideways, on edge, etc.
- Compare with another compass (not a smart phone as those are terrible) to check your calibration.

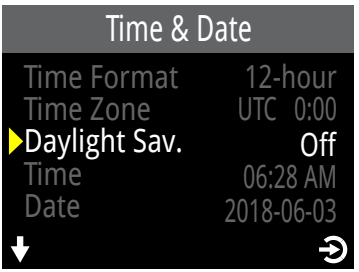
# 13.8. Bluetooth Settings

This is the same Bluetooth menu that can be accessed from the top level menu.

For more information see Bluetooth on page 141.




# 13.9. Time & Date




## Time Format

There are two available options for time format:

- 12-hours
- 24-hours

## Time

Time on the Perdix 3 is set here.

## Date

Date on the Perdix 3 is set here.

## Time Zone

Setting the time zone can make it easier to adjust the time while traveling. Consult the table on the following page to find the UTC time for the location nearest you.

## Daylight Savings

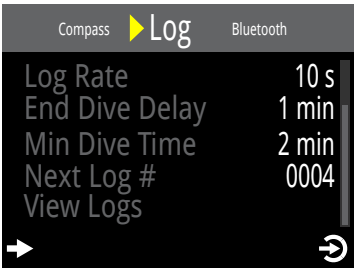
Simply adds one hour to the time.

## UTC Example Values

| *UTC Time Zone* | *Location* |
|---|---|
| *+13:00* | *Tonga* |
| *+12:00* | *Auckland* |
| *+11:00* | *Solomon Islands* |
| *+10:00* | *Sydney* |
| *+9:00* | *Tokyo* |
| *+8:30* | *North Korea* |
| *+8:00* | *China* |
| *+7:00* | *Bangkok* |
| *+6:00* | *Dhaka* |
| *+5:45* | *Nepal* |
| *+5:30* | *Mumbai* |
| *+5:00* | *Karachi* |
| *+4:30* | *Kabul* |
| *+4:00* | *Seychelles* |
| *+3:30* | *Tehran* |

| *UTC Time Zone* | *Location* |
|---|---|
| *+3:00* | *Istanbul* |
| *+2:00* | *Cape Town* |
| *+1:00* | *Paris* |
| *0:00* | *London* |
| *-1:00* | *Azores* |
| *-3:00* | *Rio de Janeiro* |
| *-4:00* | *Halifax* |
| *-5:00* | *New York* |
| *-6:00* | *Mexico City* |
| *-7:00* | *Denver* |
| *-8:00* | *Los Angeles* |
| *-9:00* | *Anchorage* |
| *-10:00* | *French Polynesia* |
| *-11:00* | *American Samoa* |

# 13.10. Log




## Log Rate

Sets how often dive samples are added to the Perdix's log. More samples will give a higher resolution dive log at the expense of log memory.

Default log rate in Freediving mode is 1 second. 10 seconds in every other mode.

Maximum log rate in Freedive Mode is 1/4 second.
Maximum log rate in all other modes is 2 seconds.

## End Dive delay

Sets the time to wait after surfacing before ending the current dive.

This value can be set from 10 seconds to 10 minutes.
Default is 10 seconds.

This value can be set to a longer time if you want brief surface intervals connected together into one dive. Some instructors use a longer end dive delay when teaching courses. Alternatively, a shorter time can be used to exit dive mode more quickly upon surfacing.

## Min Dive Time

Sets the minimum length of a dive below which no log will be recorded.

## Next Log #

This feature allows you to edit the next dive log number This is useful if you want the dive computer log numbers to match your lifetime dive count.

## View Logs

A simple shortcut to the dive log list.

## Delete All

Deletes all of the Logs.

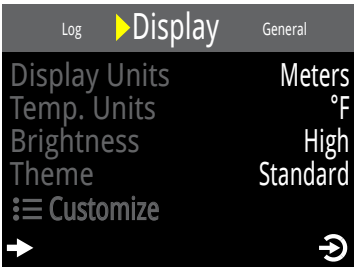
Deleted Logs can be restored by using the Restore all feature.

## Restore All

Restores all deleted Logs.

# 13.11. Display

Depth and temperature units are displayed in the display settings menu option.




## Depth Units

Configurable to Feet or Meters.

## Temp. Units

Configurable to ˚F or ˚C.

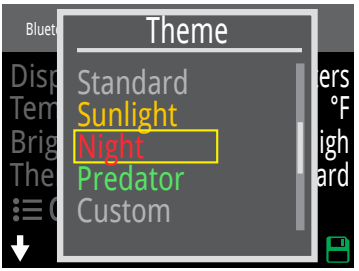
## Brightness

This setting does the same thing as the Brightness option in the top level menu.

Read more about brightness options on page 163.

## Colors

Perdix 3 display colors can be changed for added contrast or visual appeal.



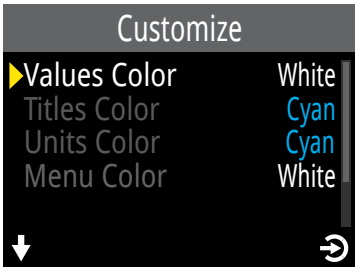

**Theme**
4 preset color themes are available:

- Standard
- Sunlight
- Night
- Predator

Themes apply presets that quickly change the overall look of the Perdix 3 UI.

In addition to these preset themes, the Perdix 3's color scheme can be extensively customized. Choose the "Standard" theme option to reset the colours to defaults.

## Customize Colors



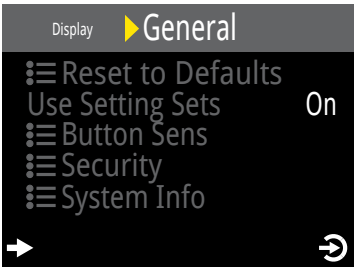

Values, Titles, Units, Menu text, and Watch Face colors can all be customized from this menu.

14 color options are available.

**Color Options:**

- White
- Red
- Green
- Blue
- Cyan
- Magenta
- Yellow
- Orange
- Pink
- Lime
- Pastel Green
- Grapefruit
- Ice
- Violet

# 13.12. General




## Reset to Defaults

This menu allows you to reset all user changed options to factory settings and / or clear the tissues on the Perdix 3. A reset to defaults cannot be reversed.

The user is given the option to reset the settings for the current set or for all sets.

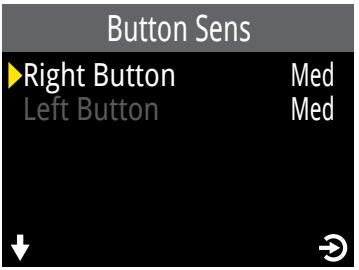
**Note:** This will not delete dive logs, or reset dive log numbers.

## Use Setting Sets

Change this setting to “On” to enable setting sets in the Dive Settings menu.

Read more about setting sets on page 143.

## Button Sensitivity




This menu allows some fine tuning of button sensitivity. This can be useful to adjust downward if you often experience accidental button presses.

## Security

This feature is in place to protect personal information that may be stored on the dive computer. It allows the user to set a pin to view logs or establish a new Bluetooth connection. Note that if the pin is forgotten, the dive computer log must be erased to unlock the log.

This pin is not required to use the dive computer

## System Info

The System Info section lists the computer's serial number as well as other technical information you may be asked to provide to tech support for troubleshooting purposes.

## Regulatory Info

The Regulatory Info section lists required regulatory disclosures and certification numbers.

# 14. Firmware update and Log Downloads

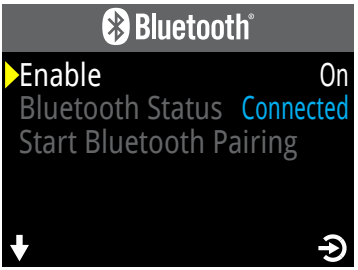
The Perdix 3 can connect to Dive Shearwater as well as Shearwater Clould Mobile and Shearwater cloud desktop for log downloads and firmware updates.

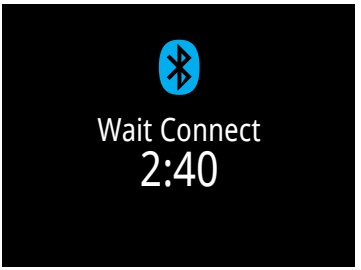
The Perdix 3 is designed to be paired once. Simply leave Bluetooth on and it will automatically connect to Dive Shearwater whenever the app is open and in range.

## Pairing Instructions

To pair your Perdix 3, enable Bluetooth and select “Start Bluetooth Pairing” from Settings > Utilities > Bluetooth.

The dive computer will begin a count down as it waits for the mobile phone and personal computer to connect.



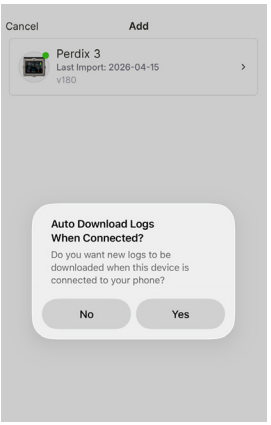




1. Open Dive Shearwater on your mobile device.
2. Go to the Connect screen.
3. Tap Add Device.
4. Tap Connect once “Perdix 3” appears on the screen.
5. Both the Perdix 3 and the App will show a 6-digit code.
6. If they match, choose confirm on both the Perdix 3 and in the App.

## Download Dives

Once you connect for the first time the app will ask if you want new dives to be downloaded to the app automatically.

If you choose not to do this you will have the ability to select the dives you would like to download from a list.



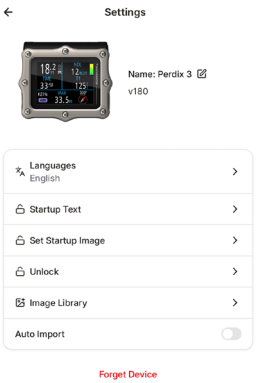

*Dive Shearwater Connect Tab*

## Update Start-up Text

Start-Up text appears at the top of the start up splash screen when the Perdix 3 is turned on. It's a great place to put your name and phone number so your computer can be more easily returned if mis-placed.

## Update Start-up Image

Here you can also change the startup image that appears when the Perdix 3 turns on to help better differentiate your dive computer.




*Dive Shearwater Device Settings Tab*

If you choose to customize the start-up text or start-up image, the default splash screen timeout will be increased to one minute so a finder of a lost dive computer has time to read the information. Press any button to skip past the splash screen.

# 15. Changing the Battery

A large coin or washer is required to change the battery

## Remove the battery cap

Insert the coin or washer into the battery cap slot. Unscrew by turning counter clockwise until the battery cap is free. Be sure to store the battery cap in a clean dry space.

## Exchange the battery

Remove the existing battery by tilting the Perdix computer. Insert the new battery positive contact first. A small diagram on the bottom of the Perdix shows the proper orientation.

## Accepted battery types

The Shearwater Perdix can accept a wide variety of AA sized batteries. The Perdix can accept any AA sized (or 14500 size) battery that outputs a voltage between 0.9V and 4.3V.

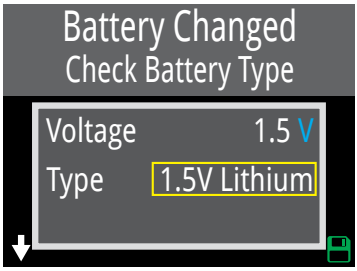
## Reinstalling the battery cap

It is **very important that the battery cap O-rings are clear of dust or debris**. Carefully inspect the O-rings for any debris or damage and gently clean. It is recommended that the battery cap's O-ring is lubricated on a regular basis with an O-ring lubricant compatible with Buna-N (Nitrile) O-rings. Lubricating helps ensure that the O-ring seats properly and does not twist or bunch.

Insert the battery cap into the Perdix and compress the battery contact springs. While the springs are compressed rotate the battery cap clockwise to engage the threads. Be sure not to cross thread the battery cap's threads. Tighten the battery cap until snug and the Perdix powers on. Do not over tighten the battery cap.

NOTE: Battery cap O-rings are Type 112 Buna-N 70 durometer.

# 15.1. Battery Types




After changing the battery, a screen will prompt for the battery type to be entered.

**Having the battery type set correctly is important so that the Perdix will give low battery warnings at the proper voltage levels.**

The Perdix 3 can accept most AA sized (14500 size) batteries that output a voltage between 0.9V and 4.3V. However, some batteries are better than others.

- Not all batteries support vibration.
- Battery types that support the fuel gauge feature will give more warning before the computer dies.
- Some battery types perform better in cold water.

**Shearwater recommends using Energizer Ultimate Lithium batteries for best performance.**

Supported battery types:

| Battery Type | Approx. Battery Life | Vibration Support | Fuel Gauge | Cold water Performance |
|---|---|---|---|---|
| 1.5V Lithium **Recommended** | 60 hours | Yes | Yes | Very Good |
| 1.5V Alkaline | 45 hours | No | Yes | Ok |
| 1.2V NiMh Rechargeable | 30 hours | No | No | Poor |
| 3.6V Saft LS14500 | 130 hours | No | No | Poor |
| 3.7V Li-Ion Rechargeable | 35 hours | Yes | Yes | Good |

*Battery life is based on medium brightness.*

Alkaline batteries are especially prone to leaking. This is a leading cause of dive computer failure. **Alkaline batteries are not recommended**.

## 15.2. Behavior on Battery Change

### Settings

All settings are retained permanently. No loss of settings occurs when changing the battery.

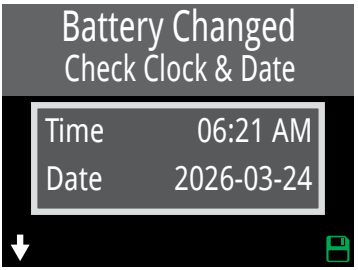
### Clock

The clock (time and date) is saved to permanent memory every 16 seconds when the Perdix is on, and every 5 minutes when off. When the battery is removed, the clock stops running. Once the battery is replaced, the clock is restored to the last saved value (so it is best to remove the battery while the Perdix is on for lowest error).

Quick battery changes will not require any adjustment, but the time should be corrected if the battery is removed for more than a few minutes.

Expected clock drift is about 4 minutes per month. If there is higher drift, it is likely due to clock stoppage during battery changes.

The clock is also updated every time the dive computer is connected to Dive Shearwater, Shearwater Cloud Desktop, or the Shearwater Cloud Mobile apps.




*After replacing the battery a screen appears for quick adjustments to the time*

## Decompression Tissue Loading

The battery may be safely changed between repetitive dives.

Like the clock, the decompression tissue loading is saved every 16 seconds to permanent memory when on, and every 5 minutes when off.

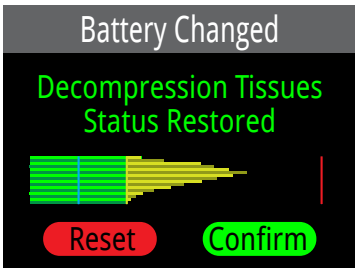
When the battery is removed the tissues remain stored in the permanent memory and are restored once the battery is replaced, allowing for battery changes between repetitive dives. However, the Perdix does not know for how long the battery was removed, so no surface interval adjustment is applied for the time that the battery is removed.

For quick battery changes, the un-powered time interval is not significant. However, if the battery is removed shortly after a dive and then remains out for a long period, residual tissue loading will remain when the battery is replaced.

If at the time of battery replacement any tissue is below saturated with air at the current pressure, then that tissue is brought up to being saturated with air. This might happen after a decompression dive that used 100% O2, where the faster tissues are often completely depleted of inert gas loading. Bringing such tissues back up to saturated with air after a battery change is the most conservative approach.

When deco tissues are reset:

- Inert gas tissue loadings are set to saturated with air at current atmospheric pressure
- CNS Oxygen Toxicity set to 0%
- Surface Interval time set to 0



# 16. Storage and Maintenance

The Perdix dive computer should be stored dry and clean.

**Do not allow salt deposits to build up** on the dive computer. Rinse the computer with fresh water to remove salt and other contaminants.

Use of any dive computer in a chlorinated pool for extended periods is not recommended. Chlorine is known to damage depth sensors over time. Always soak your dive computer in fresh water immediately after use in a chlorinated pool to extend the life of your depth sensor.

**Do not wash under high pressure** jets of water as it may cause damage to the depth sensor.

**Do not use detergents or other cleaning chemicals** as they may damage the dive computer. Allow to dry naturally before storing.

Store the dive computer **out of direct sunlight** in a cool, dry and dust free environment. Avoid exposure to direct ultra-violet radiation and radiant heat.

# 17. Servicing

There are no user serviceable parts inside the Perdix 3. Do not tighten or remove any faceplate screws.

Clean with water ONLY. Any solvents may damage the Perdix 3 dive computer.

Service of the Shearwater Perdix 3 may only be done at Shearwater Research, or by any of our authorized service centers.

Contact Info@shearwater.com for service requests.

Shearwater recommends service of all dive computers every 2 years by an authorized service center.

**Evidence of tampering will void your warranty.**

# 18. Perdix 3 Specifications

| Specification | Perdix Model |
|---|---|
| **Operating Modes** | Air<br>Nitrox<br>3 Gas NX<br>OC Tec<br>CC/BO<br>Gauge<br>Freedive |
| **Display** | Full color 2.4" AMOLED |
| **Pressure (depth) sensor** | Piezo-resistive |
| **Accuracy** | Meets EN 13319 for depth accuracy to 150 m. From 150 m to maximum operating depth, accuracy of depth measurement is ±2 m. |
| **Maximum Operating Depth** | 260 m of sea water (~27 bar) |
| **Surface Pressure Range** | 500 mBar to 1040 mBar |
| **Depth of dive start** | 1.6 m of sea water |
| **Depth of dive end** | 0.9 m of sea water |
| **Operating Temperature Range** | +4º C to +32º C |
| **Short-Term (hours) Temperature Range** | -10º C to +50º C |
| **Long-Term Storage Temperature Range** | +5º C to +20º C |
| **Battery** | AA Size, 0.9 V to 4.3 V<br>User replaceable |
| **Battery Operating Life (Display Medium Brightness)** | 40 Hours (AA 1.5 V Alkaline)<br>60 Hours (L91 Photo Lithium) |
| **Communications** | Bluetooth Low Energy (4.0) |
| **Compass Resolution** | 1° |
| **Compass Accuracy** | ±5° |
| **Compass Tilt Compensation** | Yes, over ±45° pitch and roll |
| **Dive Log Capacity** | Approximately 1000 hours |
| **Battery cap o-ring** | Dual o-rings. Size: AS568-112<br>Material: Nitrile Durometer: 70A |
| **Wrist Attachment** | 2 x 3/4" Elastic Straps with Buckles, or 2 x Bungee Cord (3/16" diameter cord) |
| **Weight** | 152 g |
| **Size (W X L X H)** | 81mm X 71mm X 38mm |

# 19. Perdix 3 Models

This manual is applicable to Perdix 3 model 13501. The model / part number can be found on the Regulatory Information screen of the Setting Menu (Settings> Ganeral > System info ).

# 20. Regulatory Information

## Contact Information

Shearwater Research Headquarters
10200 Shellbridge Way
Richmond, BC
V6X 2W7
T: +1 604.669.9958
E: info@shearwater.com

Authorized Representative in the European Union:
24hour-AR
Van Nelleweg 1
3044 BC Rotterdam
The Netherlands
compliance@24hour-ar.com

EU Type examination conducted by:
SGS Fimko Oy Ltd.
Takomotie 8
FI-00380 Helsinki
Finland
Notified Body No. 0598.

Shearwater's EU Declaration(s) of Conformity is/are available at shearwater.com/pages/certifications

## Electromagnetic Compatibility

**USA (FCC)**
Supplier's Declaration of Conformity (SDoC) - Responsible Party:
Violette Engineering Corporation
313 Park Avenue Suite 300
Falls Church, VA 22046
Info@Violetteengineering.com

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.

NOTE:
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.

Changes or modifications not expressly approved by the party responsible for compliance could void the user's authority to operate the equipment.

**Canada (ISED)**
This Class B digital apparatus complies with Canadian ICES-003.
Cet appareil numérique de la classe B est conforme à la norme NMB-003 du Canada.

## Radio (Bluetooth communications)

This device contains a Bluetooth wireless communication interface that operates at 2.4 GHz at a maximum transmit power of 6.31 mW (+8 dBm).

**USA (FCC)**
This device contains transmitter module FCC ID: SQG-BL54L15U

Canada (ISED)
This device contains licence-exempt transmitter(s)/receiver(s) that comply with Innovation, Science and Economic Development Canada's licence-exempt RSS(s). Operation is subject to the following two conditions:
(1) this device may not cause interference; and
(2) this device must accept any interference, including interference that may cause undesired operation of the device.

Le présent appareil contient des émetteurs/récepteurs exempts de licence qui sont conformes aux CNR d'Innovation, Sciences et Développement économique Canada applicables aux appareils radio exempts de licence. L'exploitation est autorisée aux deux conditions suivantes :
(1) l'appareil ne doit pas produire de brouillage;
(2) l'appareil doit accepter tout brouillage, y compris le brouillage pouvant provoquer un fonctionnement indésirable de l'appareil.

This device contains transmitter module IC: 3147A-BL54L15U

**European Union**
This device conforms with Directive 2014/53/EU on Radio Equipment (RED).

**Japan (MIC)**
当該機器には電波法に基づく、技術基準適合証明等を受けた特定無線設備を装着している
Translation: This equipment contains specified radio equipment that has been certified to the Technical Regulation Conformity Certification under the Radio Law.




**South Korea (KC)**




## RF Exposure

Caution: Exposure to Radio Frequency Radiation

**USA**
This product complies with the FCC RF exposure limit set forth for an uncontrolled environment and is safe for intended operation as described in this manual. Further RF exposure reduction can be achieved if the product is kept as far as possible from the user body or is set to a lower output power if such function is available.

This device meets the SAR exemption if the minimum separation distance is < 5mm assuming an antenna with a max gain of 2.32dBi. Therefore, SAR testing is not required for this module.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

**Canada**
The installer of this radio equipment must ensure that the antenna is located or pointed such that it does not emit RF field in excess of Health Canada limits for the general population; consult Safety Code 6, obtainable from Health Canada's website.

Attention: Exposition aux rayonnements radioélectriques.
L'installateur de cet équipement radio doit s'assurer que l'antenne est située ou orientée de manière à ne pas émettre de champ RF dépassant les limites fixées par Santé Canada pour la population générale ; consultez le Code de sécurité 6, disponible sur le site Web de Santé Canada.

## Environmental and RoHS

This device conforms with Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (recast) (RoHS).

## Personal Protective Equipment

• This device conforms with Regulation (EU) 2016/425 on Personal Protective Equipment (PPE)
• This device is certified under EN 250:2014 to a depth of 50 m. While the EN 250:2014 certification is valid up to 50 m, Shearwater's specified maximum operating depth for this product is 260 m.
• High pressure gas sensing components are in conformity with EN250:2014 – respiratory equipment -open-circuit self-contained compressed air diving apparatus – requirements, testing and marking – clause 6.11.1 Pressure Indicator. Pressure indication is designed to protect a trained diver from the risk of drowning.
• EN 250:2014 is the standard describing certain minimum performance requirements for SCUBA regulators to be used with air only sold in EU. A component of self-contained breathing apparatus as defined by EN250:2014 is: Pressure Indicator, for use with air only. Products marked EN250 are intended for air use only. Products marked EN 13949 are intended for use with gases containing more than 22% oxygen and must not be used for air.
• The air used must comply with EN 12021. EN 12021 is a standard that specifies the allowable contaminates and component gases that make up compressed air. This is the equivalent of the USA Compressed Gas Association's Grade E air. Both standards allow very small amounts of contaminants that are not harmful to breathe but can cause a problem if present in systems using gases with a high percentage of oxygen.
• Depth and time measurements conform with EN 13319:2000 - Diving Accessories - depth gauges and combined depth and time monitoring devices.

**WARNING: Transmitters marked EN 250 are certified for use with air only. Transmitters marked EN 13949 are certified for use with Nitrox only.**

CE