

# TERN



## Operating Instructions



Powerful • Simple • Reliable



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## Conventions Used in this Manual

These conventions are used to highlight important information:



### INFORMATION

Information boxes contain useful tips for getting the most out of your Tern.



### CAUTION

Caution boxes contain important instructions on operating the Tern.



### WARNING

Warning boxes contain critical information that may affect your personal safety.



# 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).



## Features

- Vivid full color 1.3" AMOLED display
- Stainless steel bezel.
- Crush proof to 120m / 390ft
- Air, Single-gas Nitrox, and multi-gas Nitrox modes
- Up to 3 customizable gases up to 100% oxygen
- Simplified recreational diving modes
- 2 customizable layouts for every dive mode
- Bühlmann ZHL-16C with gradient factors
- Full decompression support
- No lockout for violating no-decompression limit
- No lockout for violating deco stops
- Quick NDL and full decompression planner built in
- CNS Tracking
- Gas density tracking
- Dedicated Freedive Mode
- Customizable vibration alerts
- Programmable depth sampling
- 3 watch faces available in 15 colors
- Bluetooth Dive log uploading to Shearwater Cloud
- Free firmware updates

## 1. Introduction

The Shearwater Tern is a dive computer for beginner to expert divers.

Please take the time to read this manual. Your safety may depend on your ability to read and understand the Tern 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. 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 your Tern without understanding the consequence of the change.** If you are unsure, consult the appropriate section of the manual for reference.

This manual is not a substitute for proper training.



### Firmware Version: V25


This manual corresponds to firmware version V25.

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

Check the release notes on [Shearwater.com](http://Shearwater.com) for a complete list of changes since the last release.

## 1.2. Modes Covered by this Manual

This manual provides operating instructions for the Tern in Watch Mode as well as five Dive Modes:

- Air 
- Nitrox 
- 3 GasNx 
- Gauge 
- Freedive 

Some features of the Tern 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.

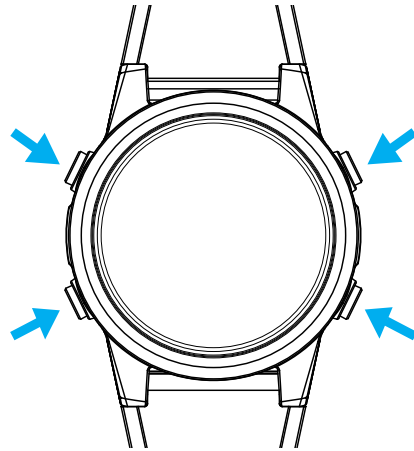
Change the Dive Mode from the Dive Settings menu.  
See details on page 48.



## 2. Basic Operation

### 2.1. Turning On

To turn the Tern On, press any button.



#### Auto-on

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

#### Auto-on Details

The Tern automatically powers on and enters dive mode 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 Tern will automatically power on and enter dive mode when about 0.9 m (3 ft) underwater.

If at higher altitude, automatic power 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 Tern 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.



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

This feature is supplied as a backup for when you forget to turn on your Tern or forget to place it in dive mode.

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



## 2.2. Buttons

All Tern operations are simple single button presses.



No need to remember all the button rules below. Button hints make using the Tern easy.

### MENU Button (Lower Left)

From the main screen > Brings up the menu  
In a menu > Moves down to the next menu item

### INFO Button (Lower Right)

From the main screen > Cycles through info screens  
In a menu > Exits back to the previous menu or main screen

### LIGHT button (Upper Left)

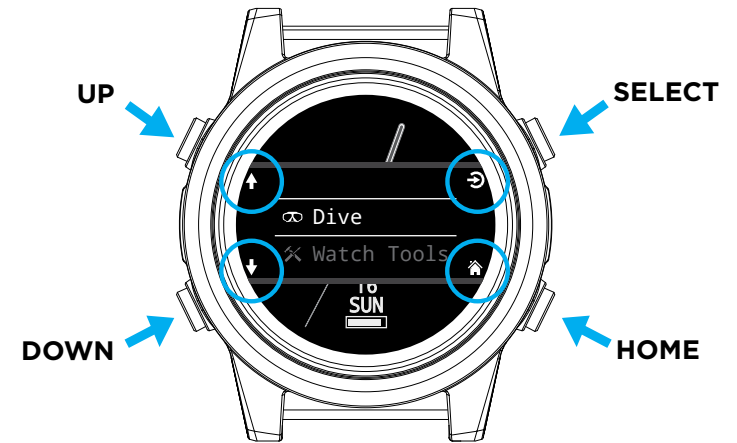
From the main screen > Cycles brightness levels  
In a menu > Moves up to the next menu item

### FUNCTION Button (Upper Right)

From the main screen > Configurable shortcut  
In a menu > Selects menu item

### Button Hints

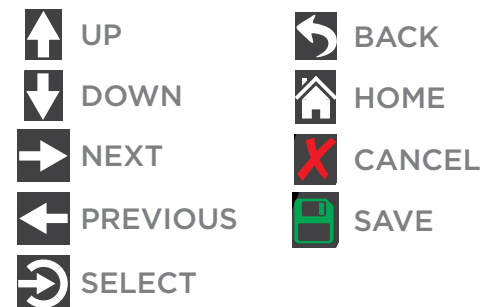
When in a menu, button hints label each button:



In the example above, the hints tell us:

- Use LIGHT to move up a menu item
- Use MENU to move down a menu item
- Use FUNC to select a menu item
- Use INFO to go back to the home screen

### Button Hint Icons:





## 2.3. Changing between Modes

The two primary modes are Watch Mode and Dive Mode. Watch Mode is only available at the surface.

### Switching to Dive Mode

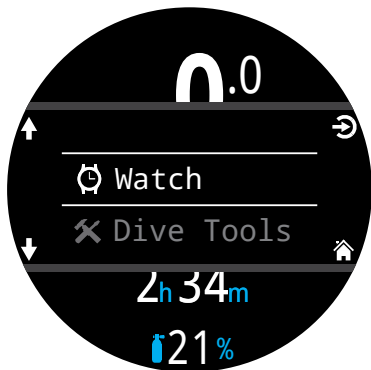


To change from Watch Mode to Dive Mode manually, press the Menu button and select Dive from the main menu.

Dive Mode will automatically be triggered when a dive starts.

Changing dive modes is covered on [page 48](#).

### Switching to Watch Mode



To change from Dive Mode to Watch Mode, press the Menu button and select Watch from the main menu.

By default, the Tern will not automatically revert back to Watch Mode. This behavior can be modified in the display [Timeouts menu](#). See [page 56](#).

## 2.4. Owner Information Screen



Upon entering Dive Mode, the owner information screen will be displayed for 15 seconds or until any button is pressed.

Owner and contact information can be changed in the [User Info menu](#) ([page 58](#)).

This display also confirms the current alert notification settings and tests the alerts. Alert notification settings can be changed in the top-level [Alerts menu](#) ([page 51](#)).

## 2.5. Function Button



The function (upper right) button is a customizable shortcut that makes accessing your most used functions on the Tern a little easier.

The function button can be customized independently for every mode of operation.

For Watch Mode, the function button can be customized in [Settings > Watch](#).

For each dive mode, the function button can be customized in [Settings > Dive](#).





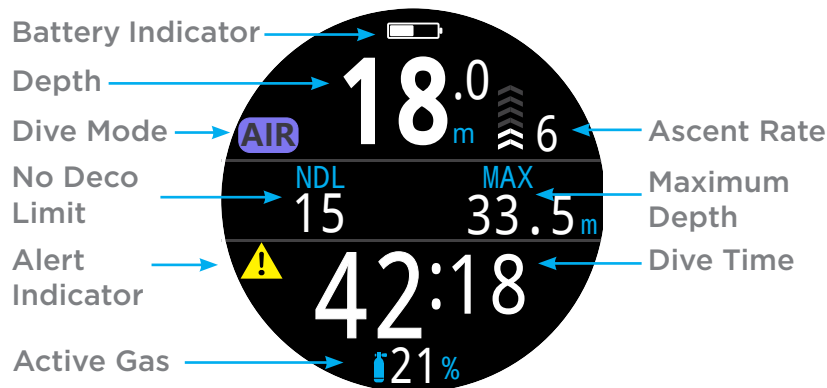
## 3. Dive Mode Interface

### 3.1. Default Dive Setup

The Tern comes pre-configured for recreational diving.

The default dive mode for the Tern is a simple Air only mode.

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



*AIR mode with Big screen layout*

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

See the [AIR mode Example Dive on page 28](#) for a walk through of how this screen changes through all phases of a dive.

### 3.2. 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.

- Simple Set-up
- Air (21% oxygen) only
- No gas switching 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 use during advanced diving activities including light technical diving involving planned decompression.

- Three programmable gases
- Support for gas switching
- Nitrox up to 100%
- Edit gas mixes underwater

#### Gauge

Gauge Mode is a simple depth and time display (a.k.a. a bottom timer). See [page 31](#).

- No tissue tracking
- No decompression information

#### Freedive

Optimized for use while freediving. See [page 32](#).

- Freediving sets.

Change the Dive Mode from the Dive Settings menu. See details on page 48.

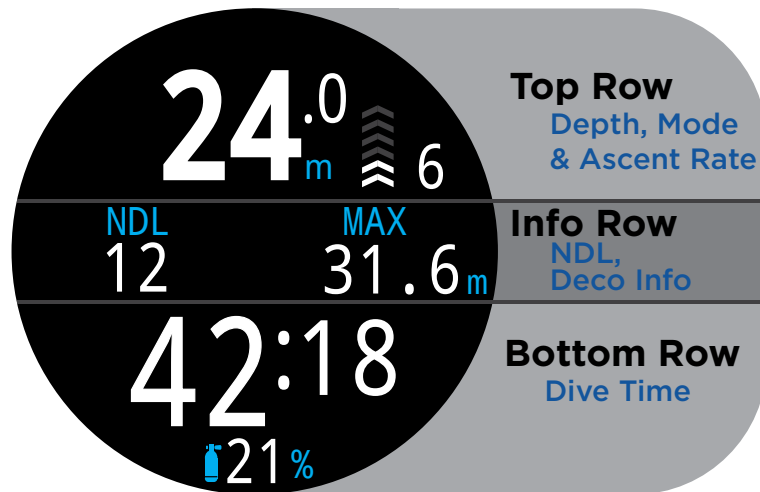


### 3.3. Main Screen Layout

The Tern has two different screen layouts available in every dive mode, **Big** and **Standard**.

Change the Screen layout from the Dive Settings Menu. See details on page 48.

#### Big layout



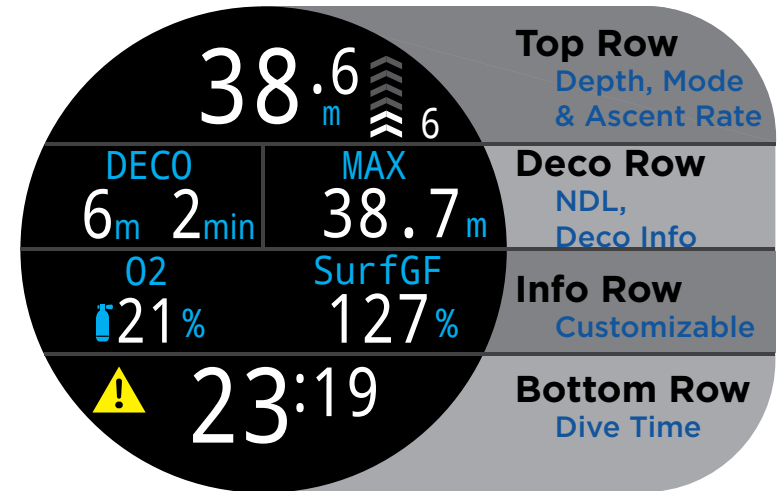
The Big screen layout provides the largest font size at the expense of on screen information.

The top and bottom row contents are reserved for the most critical information and are fixed, while pressing the INFO button scrolls through additional data in the Info row.

In the Big screen layout, the right Info row slot displays maximum depth by default but can be customized. Read more about [Home Screen Customization on page 20](#).

The Big screen layout is the default layout for all dive modes.

#### Standard layout



The Standard screen layout has four rows and provides the most information on the screen, though with a smaller font size.

The Top, Bottom, and Deco row content are reserved for the most critical information and are fixed, while pressing the INFO button scrolls through additional data in the Info row.

In the Standard screen layout, the right Deco row slot displays maximum depth by default but can be customized.

The Info row can also be customized with up to three pieces of information. Read more about [Home Screen Customization on page 20](#).



## 3.4. Detailed Descriptions

### The Top Row

The top row shows depth, ascent rate, battery and mode information.



#### Depth

Displayed to one decimal place in feet or meters.






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 graphically and numerically.

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 10mpm (33fpm) ascent rate.

### Freedive Mode Ascent / Descent Rate Display <sup>FD</sup>

Freedivers ascend much faster than SCUBA divers. So, ascent rate in Freedive Mode is measured in feet per second (fps) or meters per second (mps) rather than feet per minute or meters per minute.



In Freedive Mode, 1 arrow per 1 fps / 0.3 mps.



Descent rate is displayed in addition to ascent rate in Freedive Mode.

Read more about [Freedive Mode](#) on page 32.

### 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 charged.



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

### Dive Mode Indicator

The dive mode indicator is only shown at the surface.



Air



Nitrox (Single Gas)



3 GasNx (Three Gas Mode)



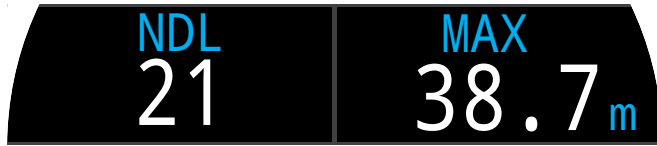
Gauge Mode



Freedive Mode



## The Deco Row



The Deco Row is only shown in the Standard layout, however, the Deco row information described in this section is shown on the first page of the info row in the Big layout.

### 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 or equal to 5 minutes.

### Deco Stop Depth and Time

Once Mandatory decompression is required, NDL will be replaced by decompression information.



The shallowest depth to which you can ascend and how long to hold that stop.

By default the Tern uses a 3m (10ft) last deco stop depth. When in decompression, 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). This does not affect no-deco safety stops.

See the [Decompression Stops](#) section on page 25 for details.

## Safety Stop Counter



The safety stop counter replaces NDL and counts down automatically when the diver ascends into safety stop range. The counter will display “CLEAR” when the safety stop has been completed.



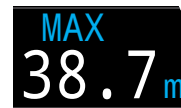
Safety stops may be turned off, set to fixed times of 3, 4, or 5 minutes, set to adapt based on dive conditions, or be set to count up from zero.

### Count-up



When decompression diving, the safety stop will begin once all decompression obligation has been cleared. See the [Safety Stops](#) section on page 24 for details.

## Maximum Depth



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

The right deco row box can be customized in every dive mode. See [Home Screen Customization](#) on page 20 for details.



### 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 and Gradient Factors](#) on page 26.



## The Info Row

The Info row is the center row in the Big layout and the third row in the Standard layout. Info row information is customizable. See [Home Screen Customization on page 20](#) for details.

In the Big layout, the Info row shows decompression information as described in [The Deco Row section on page 12](#). Maximum depth is the default value in the right position. Only the right position value can be customized in the Big layout.



*Default Info row in Big layout*

The Info row in the Standard layout can be customized with one two or three pieces of custom information.



*Default Info row in Standard layout*

Pressing the info (bottom right) button will scroll through info screens and show additional information during a dive. [See the Info Screens section on page 15](#) for details.

## Active Gas

By default, the left position in the Standard layout shows the currently selected breathing gas.



The percentage of oxygen in the breathing gas is displayed.

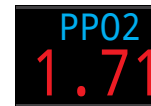


The active gas will display in yellow if a better gas is available. (3 GasNx mode only)

## Partial Pressure of Oxygen (PPO2)



The default in the right position is partial pressure of oxygen. This is the fraction of oxygen in the breathing gas multiplied by the ambient pressure in atmospheres. Note that it is normal for PPO2 to be below 0.21 when above sea level at the surface.



PPO2 displays in **Flashing Red** when outside customizable PPO2 limits.

[Read more about PPO2 Limits on page 52.](#)



## The Bottom Row



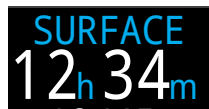
Bottom Row, AIR Mode on a dive

### Dive Time



The current length of the dive in minutes and seconds

### Surface Interval



When on the surface, the Dive Time is replaced by a surface interval display.

Shows the minutes and seconds since the end of your last dive.

Above one hour, the surface interval is displayed in hours and minutes. Above 4 days, the surface interval is displayed in days.



The surface interval resets when decompression tissues are cleared.

## Alternate Active Gas Location

When the info row is not displaying the active breathing gas, this value is displayed in the bottom row at the very bottom of the computer display.

### Notification Setting Icon

Indicates what notifications are turned on. Only available at the surface.



Vibrate



Silent Mode

### Alert Indicator



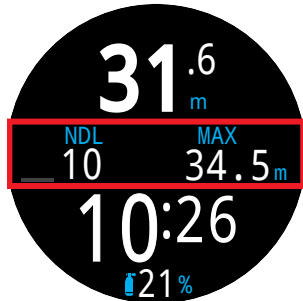
Indicates there is a persistent warning condition.

When the computer detects a dangerous situation, such as high PPO<sub>2</sub>, a warning is triggered. The large primary warning can be dismissed, but for some situations this alert icon will persist until the condition that caused the warning is resolved. See the [Alerts](#) section on page 22 for more information.

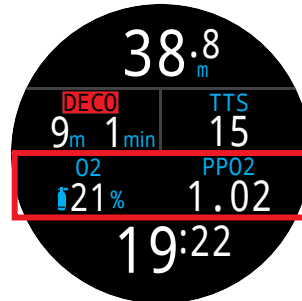


### 3.5. Info Screens

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



Big layout Info row location



Standard layout Info row location

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

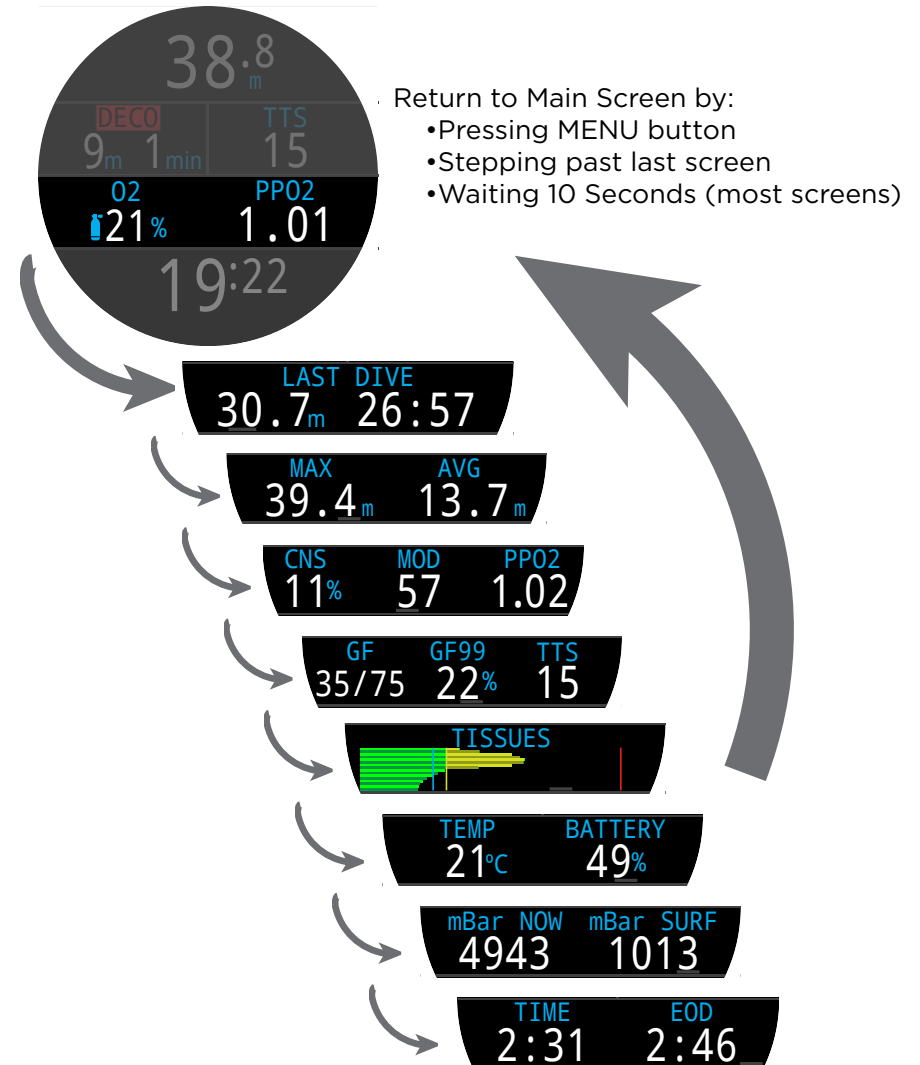
When all info screens have been viewed, pressing INFO again will return to the main screen.

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

Info screens also automatically time-out after 10 seconds, returning to the home screen. This prevents critical NDL and DECO information from being hidden for an extended period.

When using the Standard layout, the Tissues Info screen will not automatically time out.

Note that although these screens are generally representative of the Tern display, info screen content varies for each mode. For example, decompression related info screens are not available in gauge mode.



- Return to Main Screen by:
- Pressing MENU button
  - Stepping past last screen
  - Waiting 10 Seconds (most screens)

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



### 3.6. Info Screen Descriptions

#### Last Dive Info



Maximum depth and dive time from the last dive. Only available at the surface.

#### 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.

#### Maximum Operating Depth

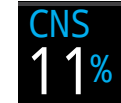


MOD is the maximum allowable depth of the current breathing gas in the currently selected depth units as determined by PPO2 limits.

Displays in **Flashing Red** when exceeded.

[Read more about PPO2 Limits on page 52.](#)

#### CNS Toxicity Percentage



Central Nervous System oxygen toxicity loading percentage. Turns **Red** when greater than 100%.



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%).





## Gradient Factor

GF  
35/75

The deco conservatism value when the deco model is set to GF. The low and high gradient factors control the conservatism of the Bühlmann GF algorithm. See “Clearing up the Confusion About Deep Stops” by Erik Baker for more information.

## GF99

GF99  
22%

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.

## Time-To-Surface (TTS)

TTS  
15

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

## Temperature

TEMP  
21°C

The current temperature in degrees Celsius or degrees Fahrenheit. Temperature units can be set in the Display settings menu.

## Battery

BATTERY  
49%

The Tern’s remaining battery level expressed as a percentage.

Displays in yellow when battery is low and needs to be recharged. Displays in red when battery is critically low and must be recharged immediately.

## Pressure

mBar NOW mBar SURF  
4943 1013

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, in a low pressure system surface pressure may be as low as 980 millibar, 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 Tern 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.

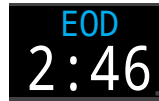


## Time



In a 12 or 24 hour format. Time format can be changed in the watch settings menu.

## End of Dive Time (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.



## Tissues Bar Graph



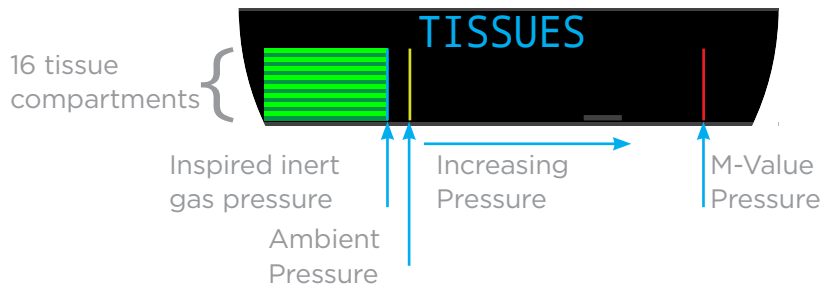
The tissues bar graph shows the tissue compartment inert gas tissue tensions based on the Bühlmann ZHL-16C model.

The fastest tissue compartment is shown on the top, and the slowest on the bottom. 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



On surface (sat. with air)  
Note: Gas is 79% N<sub>2</sub> (21% O<sub>2</sub>, or Air)



Immediately after descent



On Gassing



Deep Stop



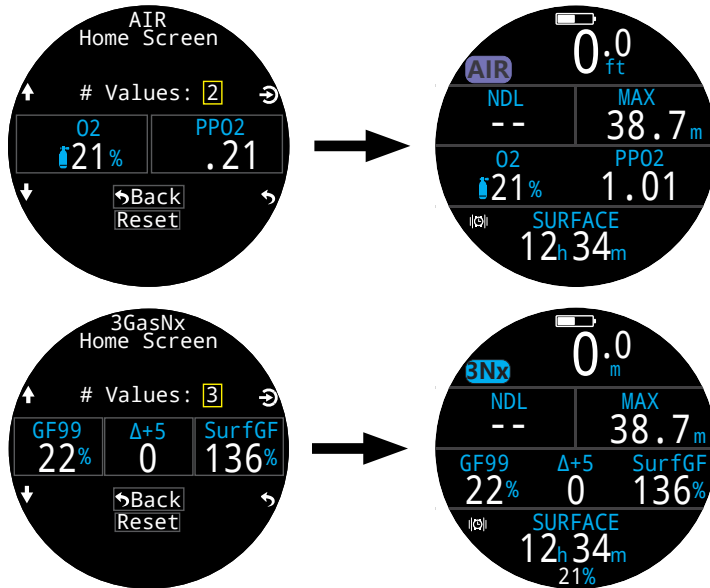
Last deco Stop  
Note: Gas is now 50% O<sub>2</sub> and 50% N<sub>2</sub>



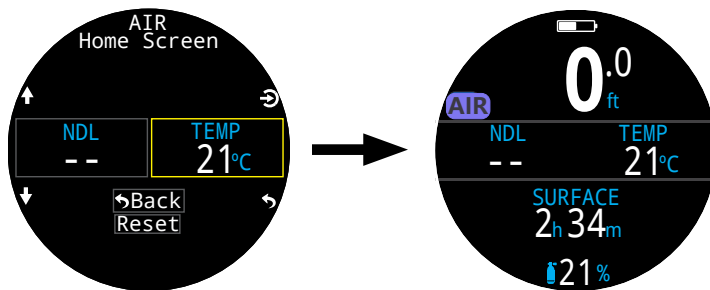
### 3.7. Home Screen Customization

In the Standard layout, the Home screen (first page) Info Row is customizable with 1, 2 or 3 items.

Each Dive Mode's home screen can be customized independently.



The right slot of the Info Row in the Big layout, and the right Deco Row slot in standard mode are also customizable.



Details about how to customize the Home screen can be found on page 49.

### Home Screen Customization Options

Option	Info Display	Option	Info Display
Current Gas	O2 21%	Time of Day	TIME 2:31
PPO2	PPO2 1.02	Date	DATE MAY-30
CNS %	CNS 11%	Stopwatch	STOPWATCH 4:57
MOD	MOD 57	End of Dive	EOD 2:46
Gas Density	Density 1.3 g/L	t@Max Depth	t@MAX 12:14
Deco Consvr	GF 35/75	Temperature	TEMP 21°C
GF99	GF99 22%	Battery %	BATTERY 49%
Ceiling	CEIL 8	mBar Now	mBar NOW 4943
@+5	@+5 20	mBar Surf	mBar SURF 1013
Δ+5	Δ+5 0	NDL	NDL 20
Tissues	TISSUES	Max Depth	MAX 31.6m
Surf. GF	SurfGF 136%	Avg. Depth	AVG 13.3m
TTS	TTS 14		



## Home screen only info displays

Some advanced info displays are only available as custom home screen options and not in the info rows.

### Surface GF



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**.

### Ceiling



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

### @+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.

## Gas Density Display



The current gas density based on the current active gas and ambient pressure.



The gas density display turns yellow at 6.3 grams per liter. No other warnings are generated.

If you are a technical diver, you may be surprised at how shallow this warning colour appears.

Read more about why we chose this warning level 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.](#)



## 3.8. Alerts

This section describes the different types of alerts and how the diver is notified of them.

For a list of the alerts a diver may encounter see [Warnings and Information Displays on page 64](#).

### Types of alerts

#### 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 threatening 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.



## 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 alert - Continuing to breathe this gas could be fatal



### Color blind users

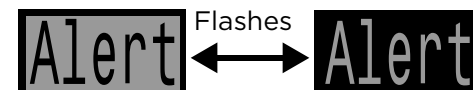
The warning or critical alert states can be determined without the use of color.

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



Doesn't flash.

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



Flashes





## Persistent Alerts

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.

## Vibration Alerts

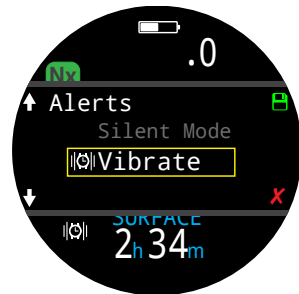
In addition to visual notifications, the Tern has vibration alerts to help quickly notify the diver of warnings, errors and dive events.

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

The alert notifications settings can be changed in Main menu > Alerts.

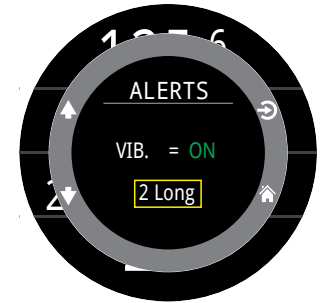
It's important the diver is aware of what type of alert notification they can expect on a dive. The currently selected alert notifications are shown on:

- The owners information screen
- The surface screen



If you do not like vibrating alerts, they are easily silenced.

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



**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.

**Limitations Of Alerts**

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).

So respond to these 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. 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).

### 4.1. 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 Settings.

The Tern 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 always behave as follows:

#### Safety Stop Required

Once the depth exceeds 11m (35ft), a safety stop will be required. An alert will occur when in the safety stop depth range, shallower than 6m (20ft).



#### Automatic Countdown

Countdown begins once the 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).



#### 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 Complete

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



#### Countdown Reset

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

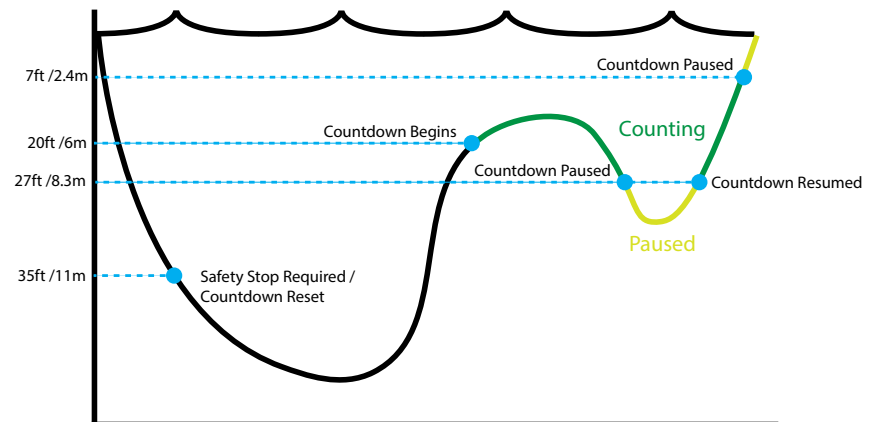


#### No Lockout for omitting

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





## 4.2. 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

Once the NDL reaches zero, deco stop information will replace it on the left side of the Deco Row in the Standard layout, or the left side of the info row home screen in the Big layout.



On the Tern, the deco stop label appears in **red** because a deco obligation is an emergency condition in recreational diving.

#### Deco Stops Required

An alert will indicate when Deco Stops are required. This must be cleared manually.



#### Deco Stop Violation

If you ascend shallower than a deco stop, but remain deeper than your current ceiling, stop info will display in **yellow**.

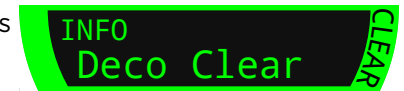


If you ascend shallower than your current ceiling, the display will **flash red**. Significant stop violations will result in a "MISSED STOP" alert.



#### Deco Stops Complete

Once all decompression stops are complete, the safety stop will begin counting down, or, if enabled, the Deco Clear counter will begin counting up from zero.



If safety stops are 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.

The 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.



## 5. 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.

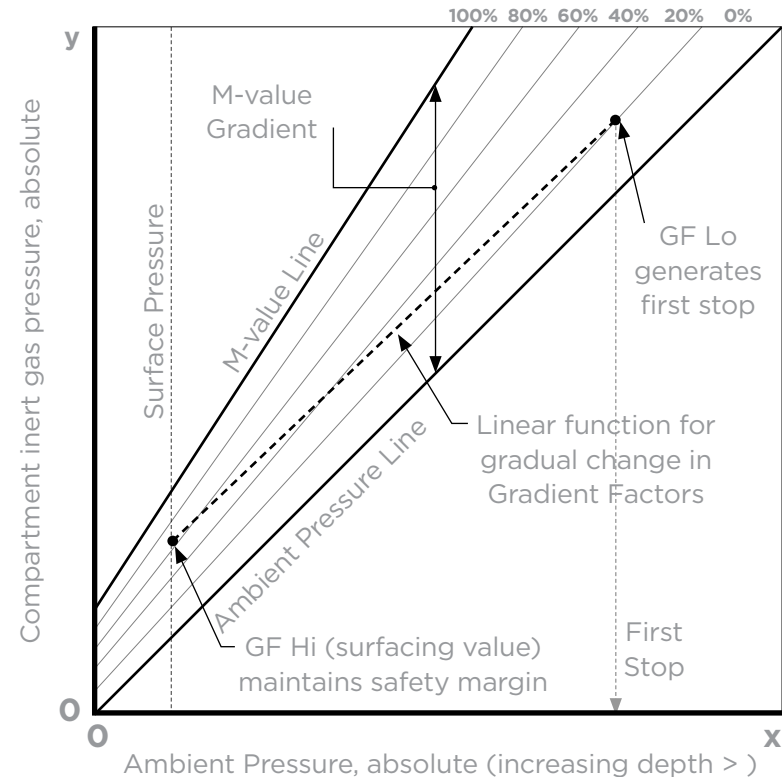
The computer implements Gradient Factors creating varied levels of conservatism. The levels of conservatism are pairs of numbers like 30/70. For a more detailed explanation of their meaning, please refer to Erik Baker's excellent articles: "Clearing Up The Confusion About Deep Stops" and "Understanding 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 in all dive modes is medium (40/85).

The system provides settings that are more aggressive and more conservative 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.



## 5.1. 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% & 99%. 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% 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%, 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.

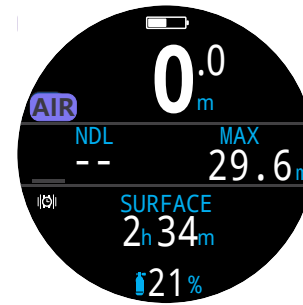


## 6. Example Dives

### 6.1. AIR mode Example Dive

This is an example of displays that might be seen on a simple no-decompression dive in AIR Mode using the Big layout configuration.

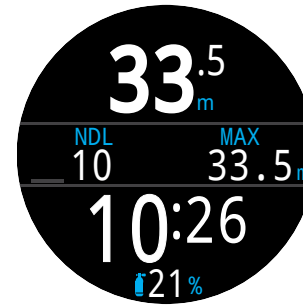
1. Pre-Dive - This is the surface screen immediately before descending. At the surface, the AIR icon is visible, the battery is shown to be about half full, and the alerts are set to vibrate. At the surface maximum depth indicates the maximum depth reached on the previous dive.
2. Descent - As we pass through 9 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.
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 we are prompted to perform a safety stop. 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 CLEAR indicator will inform us when the safety stop has been completed.



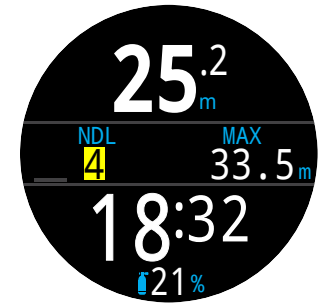
1. Pre-Dive



2. Descent



3. Max Depth



4. Low NDL



5. Ascent



6. Safety Stop



Although safety stops are not mandatory, gas supply permitting, best practice is to perform a safety stop on every dive.



## 6.2.3 GasNx mode Example

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

Max Depth: 40 meters	Bottom Gas: 21% O <sub>2</sub>
Bottom Time: 20 minutes	Deco Gas: 50% O <sub>2</sub> , 99% O <sub>2</sub>

1. Gas Setup - Best practices include checking your gas list before each dive. This screen is available in the Nitrox Gases section of the System Setup menu. All gases that are turned on will be used to calculate the decompression schedule. Turn off gases you are not carrying. Note that the MOD displayed on this screen will only impact the bottom gas (21% O<sub>2</sub>). Deco gases are governed by Deco PPO<sub>2</sub>.

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.

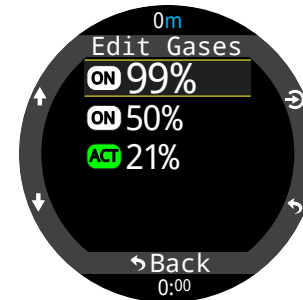
3. Plan Dive - Use the decompression planner found in Dive Setup to check the total runtime, decompression scheduled and gas requirements for the dive with current settings.

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

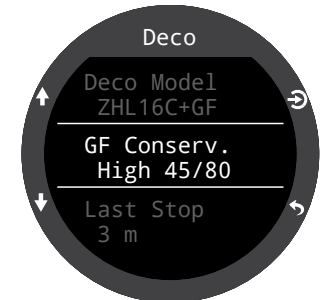
4. Pre-Dive - Prior to beginning the dive we can see the active gas is currently set to 21% Nitrox and our battery is about half charged.

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

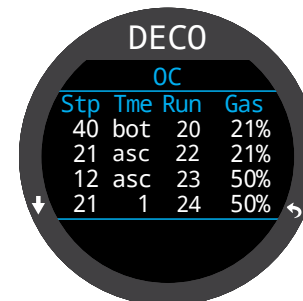
(Continued on next page)



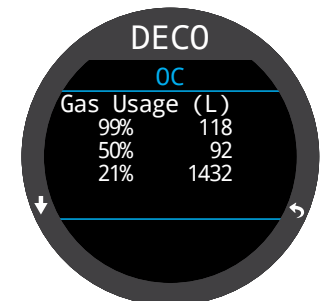
1.OC Gas Setup



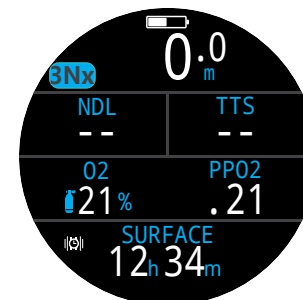
2.Verify Deco Settings



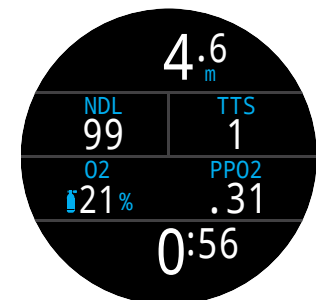
3.Plan Dive - Deco Scheduled



3.Plan Dive - Gas Requirement



4. Pre-Dive



5. Descent



### 3 GasNx mode Example (cont.)

6. Max depth - Once NDL hits 0, deco stops will be needed. Stop requirements display in place of the NDL. TTS has increased to include deco stop time.

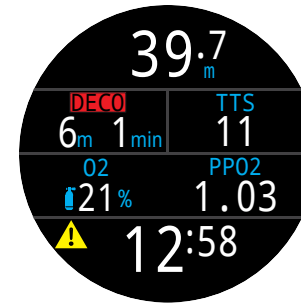
7. Ascent - It is safe to ascend to 12 meters. 1 minute must be spent at that deco stop. While ascending, the bar graph to the right of the depth shows the ascent rate (10 mpm). All decompression predictions are made assuming an ascent rate of 10 meters per minute.

8. Gas Change - All decompression predictions are made assuming you will switch to the best available gas on ascent. At 21m, the breathing gas turns yellow indicating that a better breathing gas is available. In this case 50%. If the switch is not made, deco stop and time information will be inaccurate.

9. 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 warning by pressing any button. Re-descend deeper than the stop depth to clear the flashing text.

10. Deco Clear - Once all decompression obligation has been cleared, the safety stop will begin counting down.

End of example.



6. Max Depth



7. Ascent



8. Gas Change



9. Missed Deco Stop



10. Deco Clear



### 6.3. Gauge Mode

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

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

By default, gauge mode is displayed in “Big” layout with the Max depth and Stopwatch shown in the info row.

Change to the Standard layout configuration for additional on screen information and increased customizability.

[Learn about home screen customization options on page 20.](#)

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.

Gauge Mode Features:

- Resettable average depth
- Stopwatch

(These features are available in all modes)



*Big layout - Default Gauge Mode configuration.*



*Standard layout - Alternate Gauge Mode configuration.*



## 7. Freedive Mode

Freedive Mode optimizes the Tern 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.

## 7.1. 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 beside 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.



Like other dive modes, in Freedive Mode, the right home screen slot can be customized in the Big Layout.





## 7.2. Freediving Info Screens

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

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.



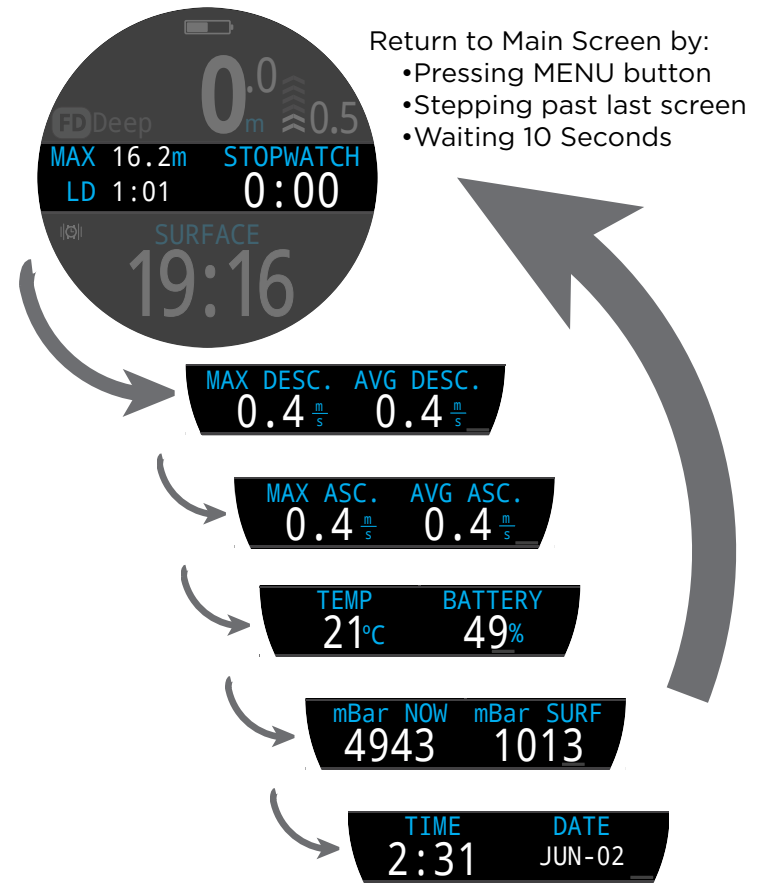
## 7.3. Freediving Sets

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

The Tern 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 Sets on page 45.

Freedive Mode info screen sequence:



Press the INFO button (bottom 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:

<i>Freediving Alert</i>	<i>Trigger Condition</i>	<i>Alert Type</i>
<i>Notify 1</i>	<i>Depth</i>	<i>Info</i>
<i>Notify 2</i>	<i>Depth</i>	<i>Info</i>
<i>Warn Depth</i>	<i>Depth</i>	<i>Caution</i>
<i>Max Depth.</i>	<i>Depth</i>	<i>Danger</i>
<i>Asc. Notify</i>	<i>Depth</i>	<i>Info</i>
<i>Notify Time</i>	<i>Time</i>	<i>Info</i>
<i>Warn Time</i>	<i>Time</i>	<i>Caution</i>
<i>Max Time</i>	<i>Time</i>	<i>Danger</i>
<i>Surf Time 1</i>	<i>Time</i>	<i>Info</i>
<i>Surf Time 2</i>	<i>Time</i>	<i>Info</i>
<i>Depth Repeat</i>	<i>Depth</i>	<i>Info</i>
<i>Time Repeat</i>	<i>Time</i>	<i>Info</i>
<i>Surf Repeat</i>	<i>Time</i>	<i>Info</i>



Regularly test your alerts with the Test Alert tool described on page 36 to ensure they are working and you can hear/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

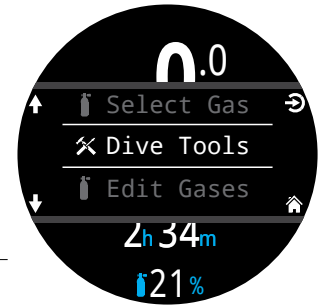
These settings will vary depending on the location and the type of freediving (ex. dynamic apnea vs. free immersion). So, customizing them within a set, makes it much easier to move between freediving activities without needing to define each setting individually every time.

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.

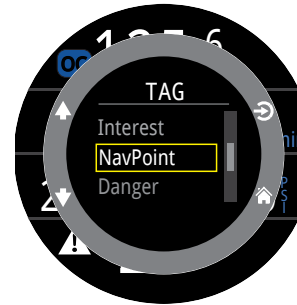
## 8. Dive Tools

The Dive Tools can be found in the main menu of every dive mode and can be accessed both at the surface and while diving.

Stopwatch functionality is covered on page 40 in the Watch Tools section.



### 8.1. 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.

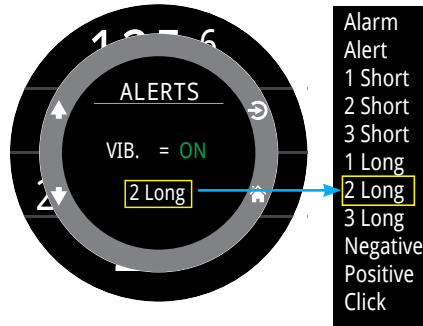
### 8.2. Reset Average Depth

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.



## 8.3. 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.



Use the up and down arrows to select an alert and press select to test it.

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 [Freediving Alerts](#) (page 34).

### 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.

## 8.4. Deco Planner

### Introduction

- Calculates decompression profiles for simple dives.
- Calculates gas consumption based on RMV

The Terns deco planner is best suited to decompression diving. For no-decompression diving, use the quick NDL Planner described on the previous page.

### Setup

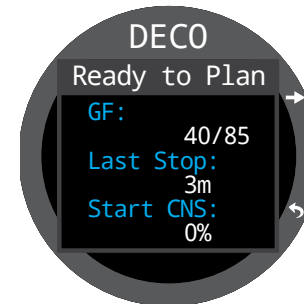
The planner uses the current gases programmed into the Tern in the current dive mode, as well as the current GF low/high settings.

### When used on the surface



Enter the expected surface interval, bottom depth, bottom time, respiratory minute volume (RMV).

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



When the correct values are entered, select "Run Plan" and confirm decompression settings and starting CNS.



**Important!**

The Terns 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 52.](#)

**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)

**Limitations**

The Tern 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.

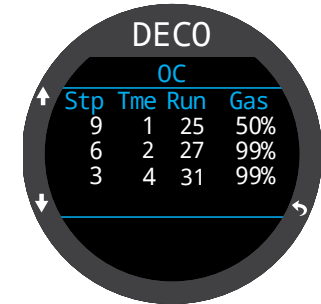
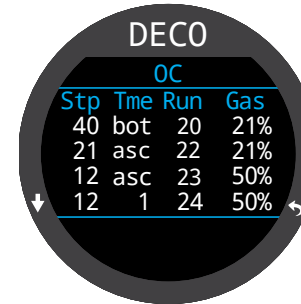
**Results Screens**

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

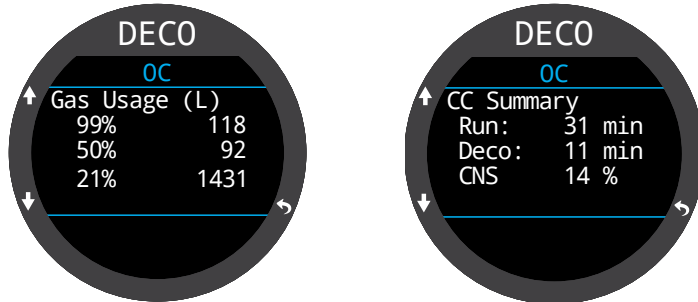
The first few rows will show the bottom time (bot) and the ascent legs (asc) to ascend to the first stop. Multiple ascent legs may be shown if gas switches are needed

If more than 2 stops are needed, the results will be split onto several screens. Scroll down to step through the screens.

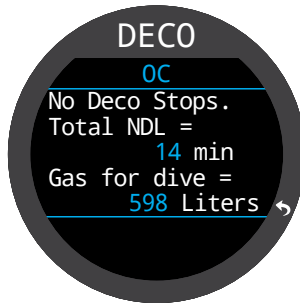




A Gas Usage screen gives a total gas consumption report and a dive summary screen shows the total dive time, the time spent on deco and final CNS% after the last page of the decompression schedule.



If no decompression is required, no table will be shown. Instead, the total No-Decompression-Limit (NDL) time in minutes, at the given maximum depth will be reported.

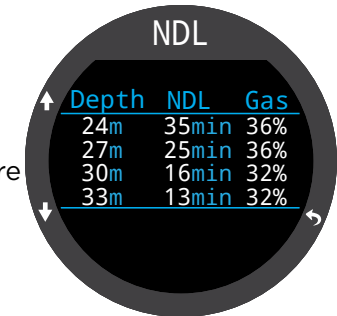


## 8.5. NDL Planner

The No-Decompression Limit (NDL) Planner is a quick way to determine how much bottom time is available without the need for decompression stops.

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.





## 9. Watch Mode

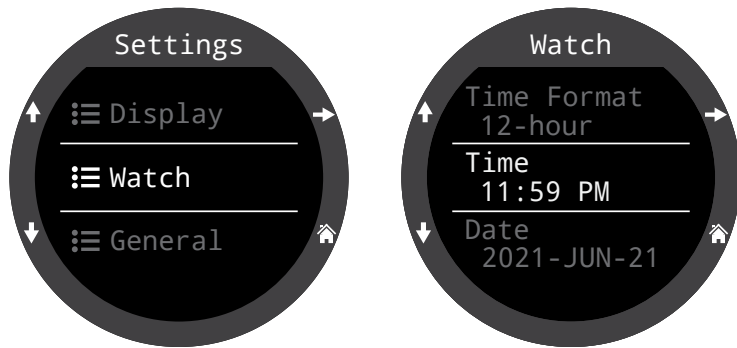
In Watch Mode, the Tern's screen will always remain on for ease of use.

The Tern can be configured to automatically turn off to preserve battery either if it detects no motion, or if it detects no button presses.

For more information about timeout options, see [Timeouts on page 56](#).

### 9.1. Date And Time

On the Tern, the date, time and other watch settings can be set in the Settings > Watch menu.



Details about Watch settings can be found in the Watch section of the Settings Menu Reference on page 57.

Editing time resets stopwatch and timers. Alarms are not affected.

### 9.2. Watch Tools



All of the basic watch features can be found in the Watch Tools menu.

The watch tools can be accessed from the main menu in Watch Mode.

This section covers the details of the watch tools.

#### Alarms

Two independent alarms can be set.



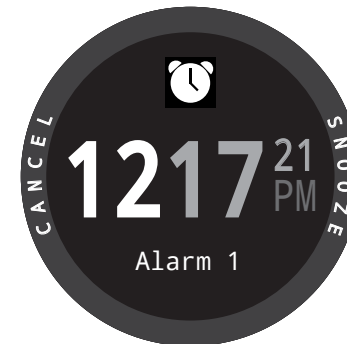
Each alarm can be scheduled to go off:

- Once
- Everyday
- Weekdays
- Weekends

Each alarm has 4 notification options:

- Vibrating
- Visual Only

Alarms do not share notification settings with dive mode alerts



When an alarm is triggered, press either left button to cancel the alarm or either right button to snooze the alarm.

Snooze duration can be set in the Alarms Menu.



## Timer

The Tern's timer can be edited to count down up to 10 hours.

Press EDIT (bottom left button) to modify the countdown length, or the notification type.



Timer Before Start



Edit Timer

The countdown time and notification setting for the timer are shown in gray at the bottom of the timer screen.



Timer Running



Timer DONE

Press the “+1” to add 1 minute to the countdown.

Press any button to Dismiss the DONE Notification.

The timer will run in the background and the DONE notification will sound even if the watch is “turned off”.

## Stopwatch

The Stopwatch is universal throughout the Tern. A stopwatch started in Watch Mode will continue in any diving mode until it is stopped.



While running, the word “Stopwatch” appears in Green.



When stopped, the word “Stopwatch” appears in Red.

The stopwatch appears on the home screen by default in gauge and Freedive Mode, but any dive mode can be customized to include it.



Stopwatch appears by default in freediving and gauge mode.



Stopwatch can be added to home screen in any mode.

The stopwatch has a 10 millisecond resolution and will run for up to 24 hours in the background, even if the Tern 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.





## Flashlight

The flashlight simply turns the Tern screen on full brightness to provide an emergency source of light. It is only useful in the darkest of rooms or caves.

## Watch Faces

Three watch faces are available for the Tern: Analog, Digital and Orbits.

The active watch face can be selected in the Watch Tools menu, or by default, it can be toggled by the function button in Watch Mode.

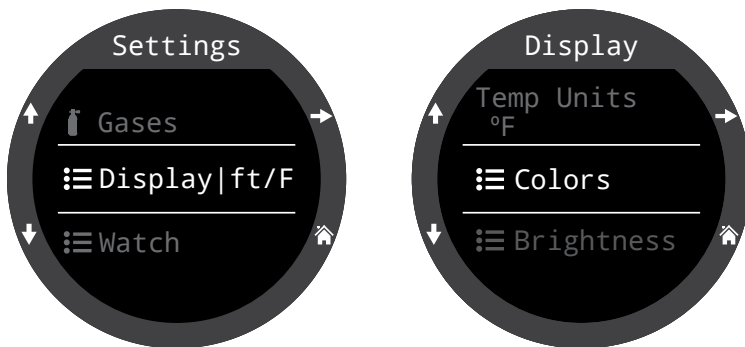
Each watch face can be displayed with various amounts of information.

Information levels can be quickly toggled by pressing the Info button.

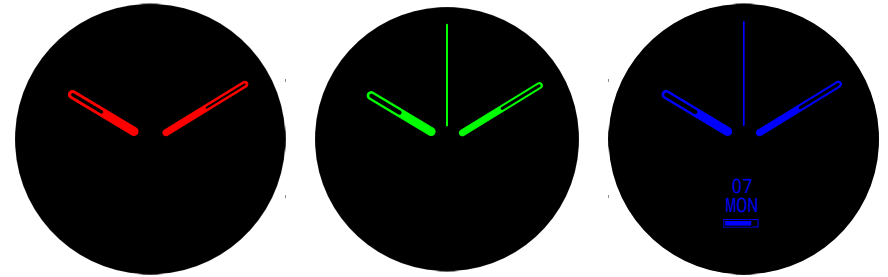
## 9.3. Watch Face Colors

15 different watch face colors are available allowing over 100 possible watch face appearances.

Watch face colors can be selected in Settings > Display > Colors.



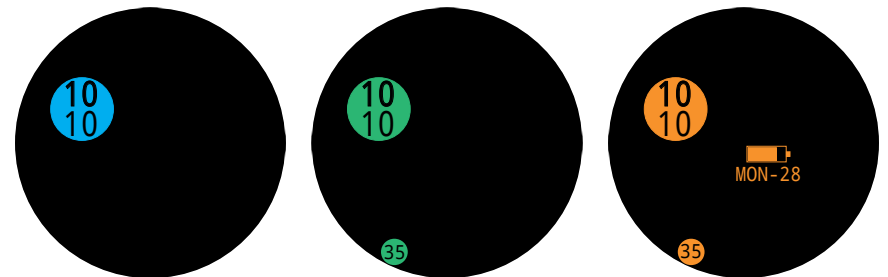
### Analog



### Digital



### Orbits



Over 100 possible watch face appearances can be created by selecting the watch face, information level, and watch face color.



## 10. Menus

Menus perform actions and allow settings to be changed.

All menus show button hints allowing easy navigation.

If no buttons are pushed for 1 minute, 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.



### Adaptive Menus

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

### 10.1. Main Menu

All Tern menus can be accessed from the main menu which can be brought up on any home screen by pressing the menu button.

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



Main menu items are listed to the right by mode in the order they appear. In the following section each item will be covered in detail.

Note: Items in blue cells are only available at the surface.

Menu items by mode:

WATCH	AIR	NITROX
Dive	Watch	Watch
Watch Tools	Dive Tools	Edit Gas
Alerts	Alerts	Dive Tools
Log	Log	Alerts
Bluetooth	Bluetooth	Log
Settings	Settings	Bluetooth
Off	Off	Settings
Home	Home	Off
		Home

3 GASNX	GAUGE	FREEDIVE
Watch	Watch	Watch
Select Gas	Dive Tools	Change FD Set
Dive Tools	Alerts	Edit FD Set
Edit Gases	Log	Dive Tools
Alerts	Bluetooth	Alerts
Log	Settings	Log
Bluetooth	Off	Bluetooth
Settings	Home	Settings
Off		Off
Home		Home



## Dive / Watch



Toggles between the selected Dive Mode and Watch Mode.

Only available at the surface.

## Watch Tools

Only available in Watch Mode.

All of the basic watch features including:

- Alarms
- Timer
- Stopwatch
- Flashlight
- Watch Face Selection

See [Watch Tools details on page 39](#).

## Dive Tools

Available in all dive modes both at the surface **and** during a dive.

Dive tools include:

- Stopwatch
- Tag Log
- Dive Plan
- NDL Plan
- Reset Average Depth
- Test Alerts

Not all tools are available in every mode. For example the dive planners are not available in Freedive Mode.

See [Dive Tools details on page 37](#).

## Select Gas **3Nx**

This menu item allows you to pick a gas from the gases you have created in 3GasNx mode.

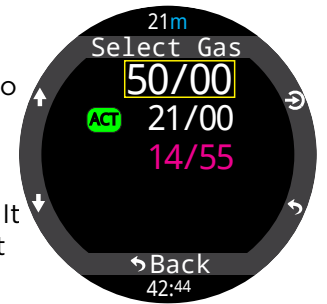
Gases are always sorted from most to least oxygen content.

Scroll up and down to select the desired diluent/gas, then press the SELECT button to select that diluent/gas.

An 'ACT' symbol will appear next to the currently active gas.

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 programmed but turned off are not used in decompression calculations during a dive or in the dive planner.



### 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 are not carrying and plan to use on the dive in the Edit Gas menu to ensure you receive accurate decompression information.



## Edit Gases Nx

The Edit Gases function allows you to set up 3 gases When in 3GasNX mode.

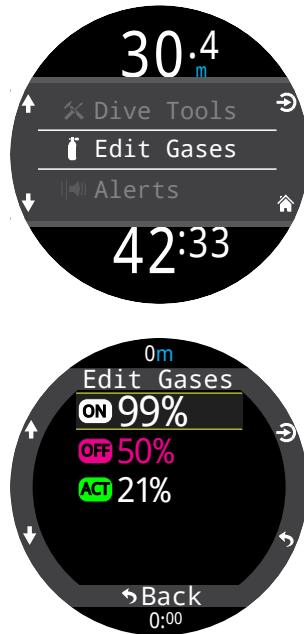
You must be in 3 GasNX mode to edit gases for that mode.

For each gas, you can turn the gas on and off and select the percentage of oxygen in the gas. The remainder is assumed to be nitrogen.

Scroll through the gas list using the arrow keys and select the gas you wish to edit. The gas contents are edited one digit at a time. The yellow box shows the digit being edited.

The Edit Gases menu is available both at the surface and while on a dive. Note that changing the gases you have turned on during a dive will impact decompression schedule and TTS.

**Note:** The “Act” denotes the active gas. You cannot delete the active gas. If you try, it will generate an error. You can edit it, but cannot set the O2 to 00%.



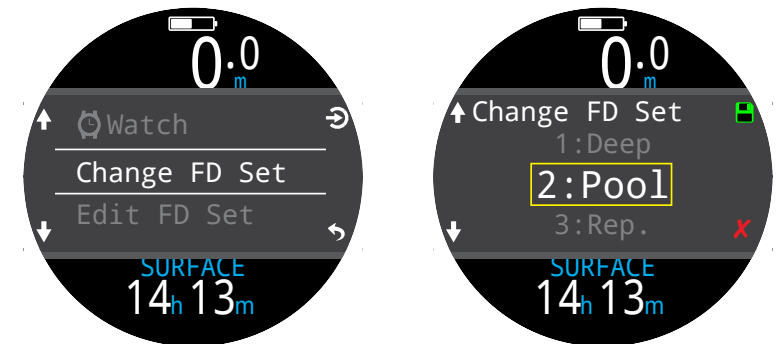
## Edit Gas Nx

The Edit Gas menu is only available when in Nitrox mode and allows you to set your breathing gas. This menu is available at the surface and while on a dive.

Note that changing your breathing gas mid-dive will only affect tissue loading moving forward. If the computer was programmed with a more oxygen rich mix than you were actually breathing, the NDL and any other decompression information will be inaccurate. If you don't have a secondary computer, you should follow your training to end the dive safely and monitor for signs of decompression sickness.

## Change Freedive (FD) Set FD

Use this menu item to change between freedive sets.



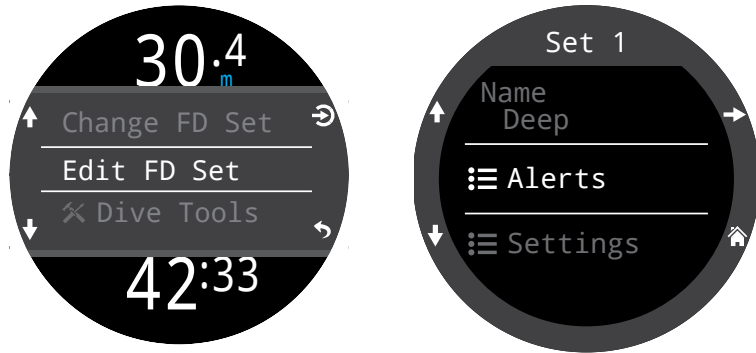
### Turn off gases you are not carrying

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.



## Edit Freedive (FD) Set FD

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. A FD Set Name can be up to four characters in length and 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.

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.

Regularly test your alerts with the Test Alert tool described on page 36 to ensure they are working and you can feel them through your exposure suit.

### 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



## 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.

## Alerts

Available in all modes both at the surface and while diving.

Use this menu to set how the Tern will notify the user of an alert.

There are 2 modes:

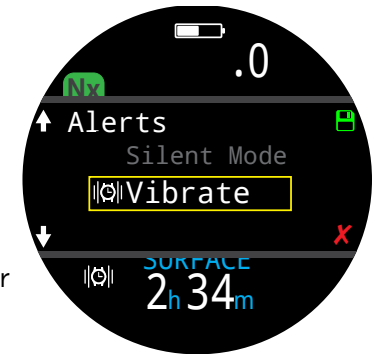
- Silent Mode (no alerts)
- Vibrate

The current alert notification setting icon is shown next to “Alerts” in the main menu.

This setting is an override that applies to alerts in every dive mode.

The way dive events and warnings are communicated can be set up independently for each dive mode. [See the Dive Settings “Alerts” section on page 51 to customize these alerts.](#)

Note: timers, and alarms have their own notification settings for each individual timer/alarm and are not impacted by this setting.





## Log

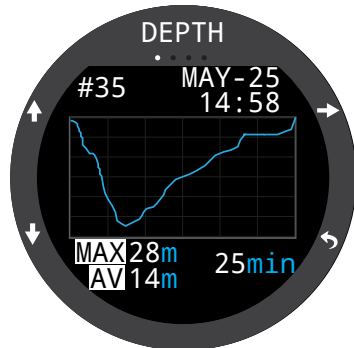
The on-board log can store about 400 hours of dive logs at the default 10 second log rate of the computer in OC Rec mode.



Scroll up and down on the first page of the log to see a list of all of your dives.

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

Scroll up and down inside the dive detail screens to change the dive.



Log contents:

- Dive Number
- Dive Date and Time
- Max Depth
- Average Depth
- Dive Time
- Temperature Graph
- Dive Mode
- Surface interval
- Surface pressure
- Deco Settings
- Start & end CNS

## Log Options

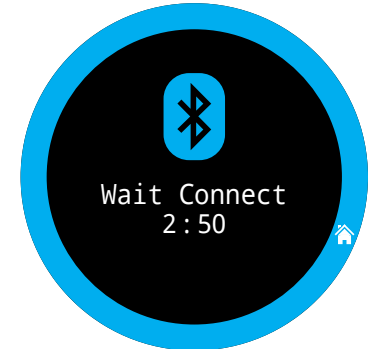
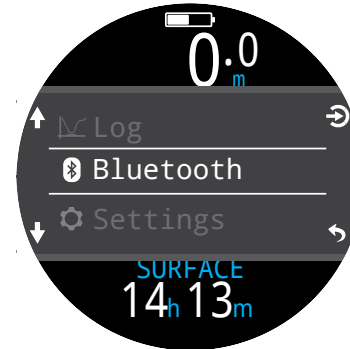
The Log options menu allows you to set the next log number to match your lifetime dive count.

From here you can also delete and restore deleted logs.

## Bluetooth

Bluetooth is used for both firmware uploading and dive log downloading.

Use this option to initialize Bluetooth on your dive computer.



## Off

The “Off” item puts the computer to sleep. While sleeping, the screen is blank, but the tissue contents are maintained for repetitive diving.

The “Off” menu item will not appear during a dive in any mode. It will also not appear after a dive until the dive End Dive Delay Time has expired or the dive has been ended manually to allow for a continuation dive.

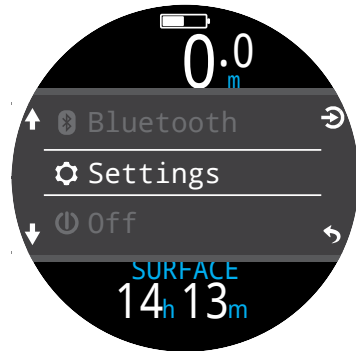
## End Dive

The “End Dive” menu item allows you to manually end the dive before the End Dive Delay has expire. This is useful if you have set a particularly long End Dive Delay and want to access the surface only features of the Tern quickly following a dive.



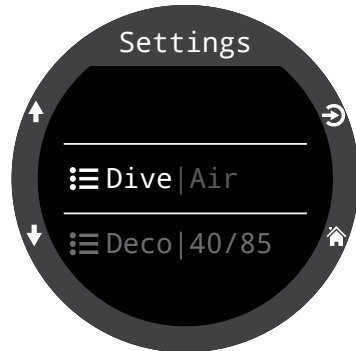
# 11. Settings Reference

The Settings menu can be accessed from the Tern's main menu when at the surface.



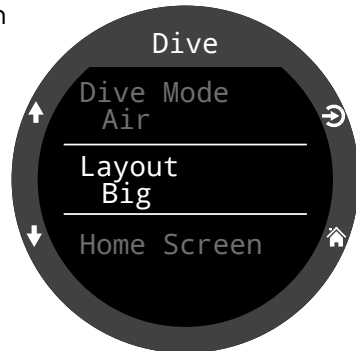
## 11.1. Dive Settings Menu

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



All of the settings in the Dive Settings Menu are isolated to the Dive Mode in which they were set.

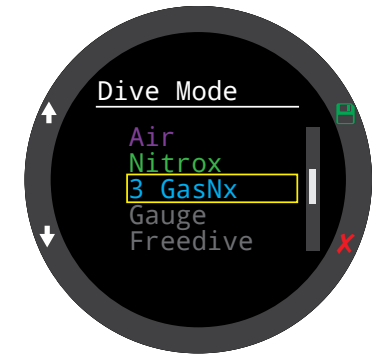
So, if you customize your layout, home screen, and function button for AIR mode, then switch to 3 GasNX, when you switch back, your original Air mode settings will be preserved.



## Dive Mode

There are 5 available dive modes:

- AIR
- Nitrox
- 3 GasNX
- Gauge
- Freedive

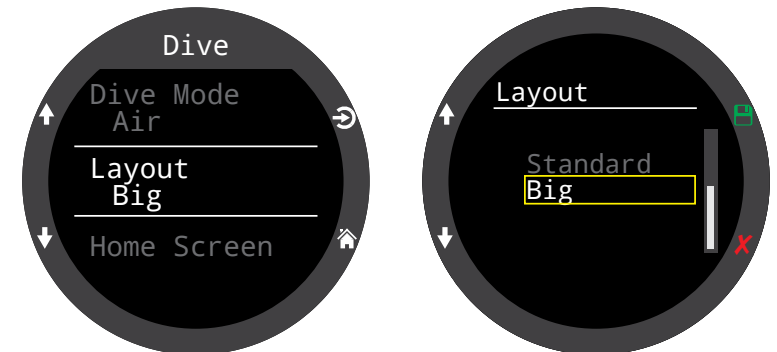


When changing to or from Gauge or Freedive Mode, the decompression tissues are cleared. This is because when in these modes the Tern does not know what gas you are breathing, and therefore cannot track inert gas loading. Plan repetitive dives accordingly.

For more information on which mode to choose, see [Dive Mode Differentiation on page 9](#).

## Layout

The Layout menu item in the dive settings menu is used to select between the 2 available layouts: Big & Standard.



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

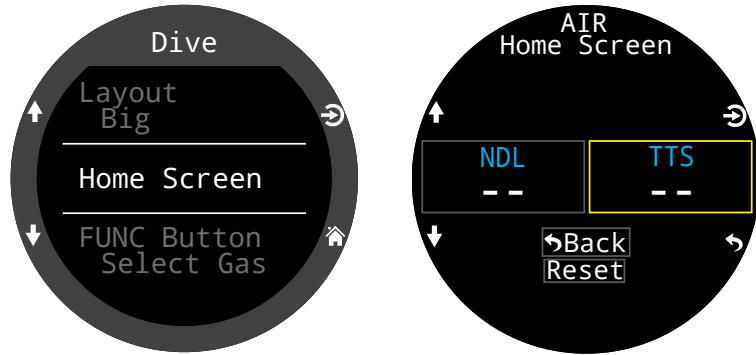
See the [Main Screen Layout](#) section on page 10 for details about the different dive modes.





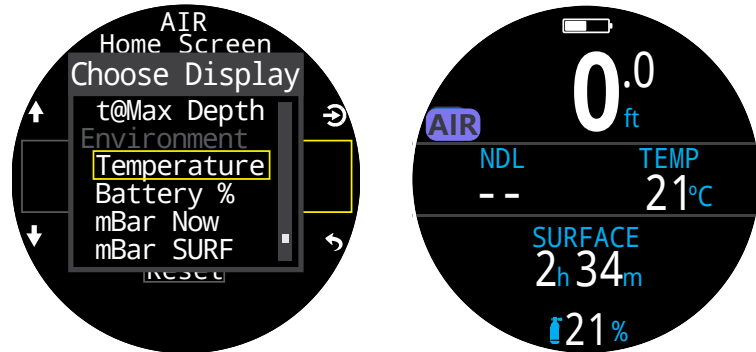
## Home screen

This option is used to customize the Info row on the Home screen.



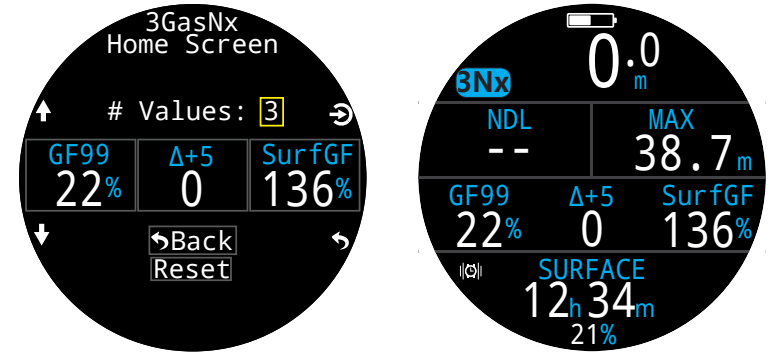
The Big layout allows for customization of the right info row slot only because the left slot is taken by NDL which cannot be permanently obscured.

SELECT the right 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 layout allows customization of the entire first page of the Info row.

Pick the number of elements you would like in the info row, then proceed to select which information you would like displayed in each position.



A complete list of Home Screen Customization options can be found on page 20.

## Top-Right Disp

The right Deco row slot of the standard layout can also be customized like the Info row Home Screen.

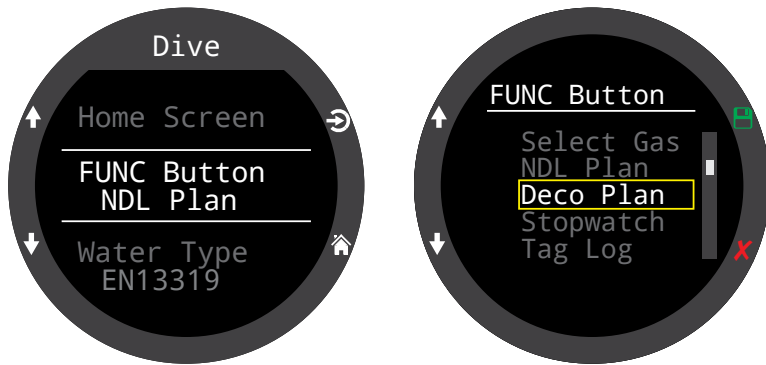
All of the same customization options are available for this location.



## FUNC Button

The function button (top right button) can be customized in every mode to act as a shortcut to your most commonly used tool.

Use the FUNC Button menu item in dive settings to choose the function button shortcut.



Some options are only available in specific dive modes. Look for the corresponding mode icon indicating which mode each option is available in. No mode icons indicate the option is available in all dive modes.

In dive modes the FUNC button options are:

FUNC Setting	Description	
Edit Gas	Opens the Edit Gas Menu	Nx
Select Gas	Opens the gas select menu	3Nx
Deco Plan	Opens Dive planner	AIR Nx 3Nx
NDL Plan	Opens the NDL Planner	AIR Nx 3Nx
Stopwatch	Opens the Stopwatch pop-up	
Tag Log	Opens Tag Log pop-up	
Rst Av Depth	Resets average depth	GA
No Action	No shortcut assigned	



## 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 Tern's default value.

## 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.

## Log Rate

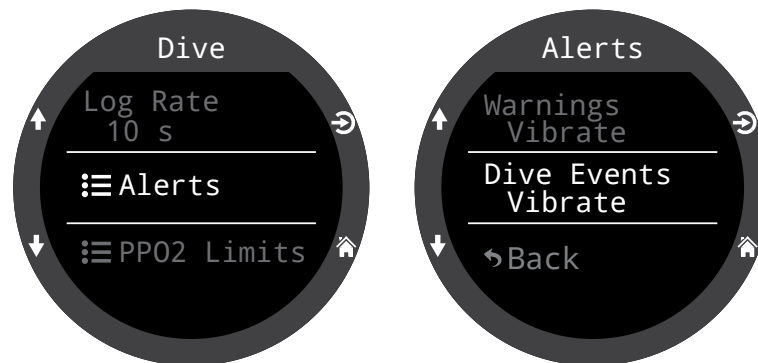
Sets how often dive samples are added to the Tern's log. More samples will give a higher resolution dive log at the expense of log memory.

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.

## Alerts

These settings allow you to modify your notification settings for warnings and dive events independently.



Note this is different from the top-level alerts menu. Those settings override these settings.

Like other attributes in the Dive Settings Menu, these alert settings are specific to the dive mode in which they were set.

Dive Events can be set to Visual only, Vibrate or be turned off.

Warnings can be set to Visual only or vibrate. Warnings cannot be turned off.

For more information on the different types of alerts see the Alerts section on page 22.

For a list of alerts you might encounter see Warnings and Information Displays on page 64.



## PPO2 Limits

This section allows changing of PPO2 limits.



### WARNING

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

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

### Bottom gas vs deco gas assumptions

When not in deco:

The least oxygen rich mix that is turned on and all mixes with 40% O<sub>2</sub> or less 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 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 - **Maximum Operating Depth**. (Default 1.4)

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

Also for all 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.

## 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.

### Reset Limits

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

**Note:** A “Low PPO2” or “High PPO2” alert is displayed when the limits are violated for more than 30 seconds.

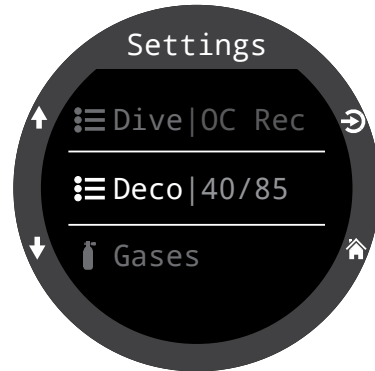


## 11.2. Deco Menu

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

Shown to the right of this item are the currently selected GF factors.

Like the Dive Settings Menu, any settings changed in this menu will only apply to the Dive Mode you are currently in.



### Deco Model

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

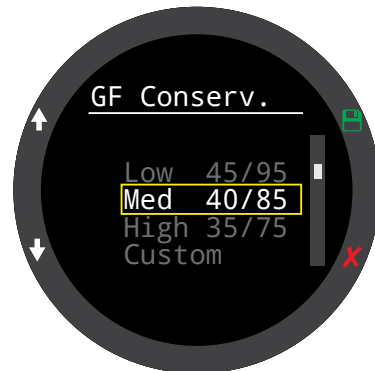


### GF Conserv.

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

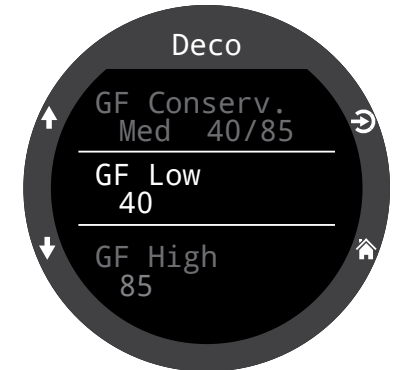
- Low (45/95)
- Med (40/85)
- High (35/75)

Medium conservatism is the default setting for all dive 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.



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 the [Decompression and Gradient Factors](#) section on page 26.

### 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 O<sub>2</sub>, last stop will depth make no difference as the fraction of inspired inert gas is zero.

This setting has no impact on safety stops. These are governed by the logic described in the [Safety Stops](#) section on page 24.



## Safety Stops

The Safety Stop setting 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.

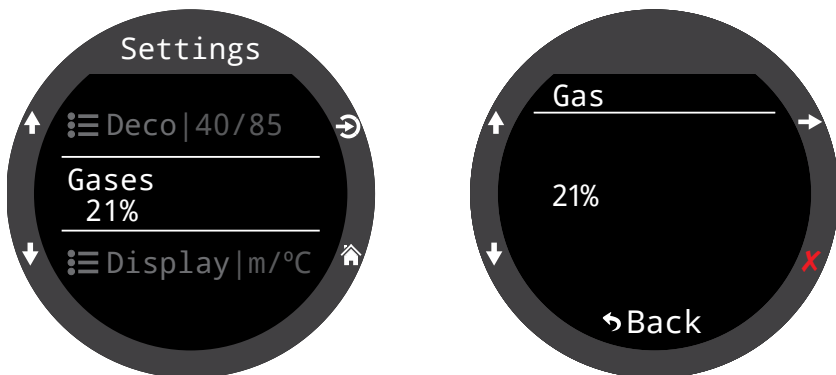
[Read more about Safety Stops on page 24.](#)

## 11.3. Gas / Gases

### Nitrox Mode **Nx**

In Nitrox mode, the currently active gas is conveniently displayed in the settings menu.

This setting is the same as the Edit Gas item found in the main menu. The Nitrox mode can be programmed with any oxygen fraction between 21% and 40%.

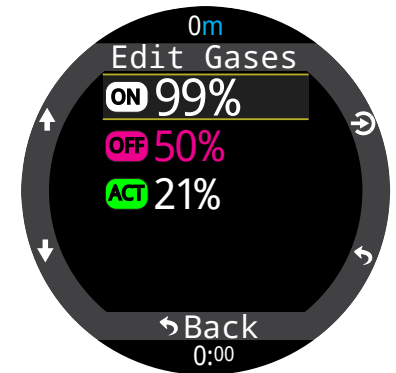
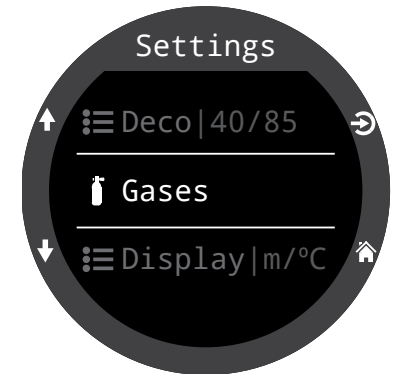


### 3 GasNX **3Nx**

The Tern supports 3 programmable gases in 3GasNX dive mode.

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

[See the Edit Gases section on page 44 for more information.](#)





## 11.4. Display

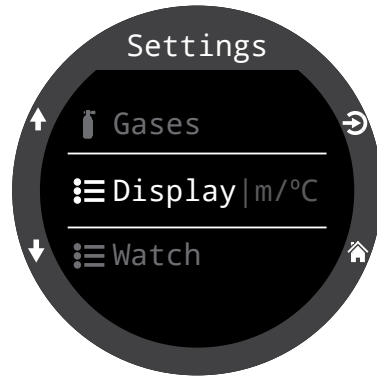
Depth and temperature units are displayed in the display settings menu option.

### Depth Units

Configurable to Feet or Meters.

### Temp. Units

Configurable to °F or °C.



### Colors

Tern display colors can be changed for added contrast or visual appeal.

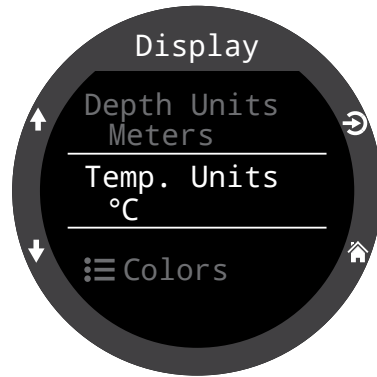
#### Themes

4 preset color themes are available:

- Standard
- Sunlight
- Night
- Predator

Themes apply presets that quickly change the overall look of the Tern user interface.

In addition to these preset themes, the Tern's color scheme can be extensively customized. Choose the "Standard" theme option to reset the colours to defaults.



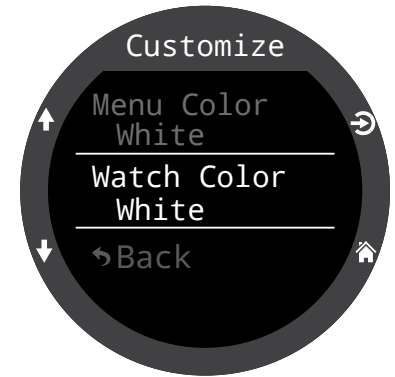
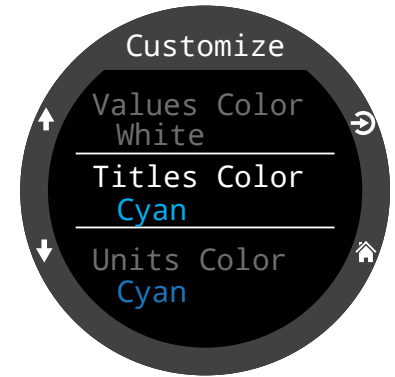
## Customize Colors

Values, Titles, Units, Menu text, and Watch Face colors can all be customized from this menu.

15 color options are available.

### Color Options:

- White
- Red
- Green
- Blue
- Cyan
- Magenta
- Yellow
- Orange
- Pink
- Lime
- Pastel Green
- Grapefruit
- Ice
- Violet
- Purple





## Brightness

### Brightness

This setting does the same thing as the LIGHT (top right) Tern button

Screen brightness can be set to one of four fixed levels.

Options:

**Dim:** Made specifically for cave conditions.

**Low:** Second longest battery life.

**Med:** Best mix of battery life and readability.

**High:** Easiest readability, especially in bright sunlight.

### # Levels

This setting defines how many brightness levels are cycled through when pressing the LIGHT button. It also effects how many brightness levels are visible in the Brightness menu setting above.

### Include Off

This setting determines if OFF is available as an option when the LIGHT button is pressed.

The battery life of the Tern is dramatically improved when “Off”. This is a convenient feature if you forget your Tern charger at home and are being judicious with battery consumption.



## Timeouts

Advanced options for reducing power consumption.

### Dive Timeout

Defines action upon dive mode timeout.

Options:

- to off
- to watch

### Dive Timeout

Defines timeout delay for dive mode.

Options:

- 5 min
- 10 min
- 15 min

### Watch Timeout

Defines criteria for watch timeout to off.

Options:

- No motion
- No button presses

### Watch Timeout

Defines timeout delay for watch mode.

Options:

- 15 s
- 30 s
- 1 min
- 5 min
- 10 min
- 20 min





## 11.5. Watch

### Time Format

There are two available options for time format:

- 12-hours
- 24-hours

### Time

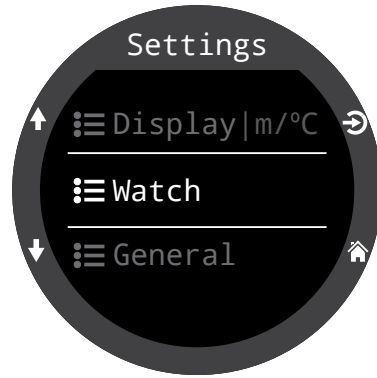
Time on the Tern is set here.

### Date

Date on the Tern is set here.

### Time Zone

Setting the time zone can make it easier to adjust the time while traveling. Consult the table below to find the UTC time for the location nearest you.



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

## Daylight Savings

Simply adds one hour to the time without needing to change the timezone.

## FUNC Button

Set the Function button shortcut for Watch Mode.

### FUNC button options

The function button has different options that can be independently set for each mode. In Watch Mode, there are eight function button options.

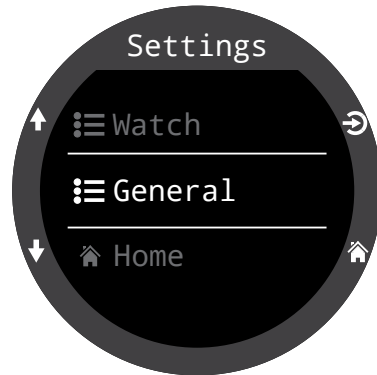
FUNC Setting	Description
Watch Face (Default)	Cycles the watch face between Digital, Analog, and Orbits.
Flashlight	Turns on the flashlight function
Alarms	Brings up the alarms menu
Stopwatch	Opens the Stopwatch pop-up
Timer	Opens the timer pop-up
Turn Off	Turns Tern Off
No Action	No shortcut assigned



## 11.6. General

### User Info

Use this menu to change the information presented on the Owner Info screen.



### Battery

#### Quick Charge

When enabled Quick charge charges the watch a little bit faster. However, not all USB ports supply sufficient current for quick charge.

Quick Charge is disabled by default. If you've enabled quick charge and you're having problems charging your Tern, disabling quick charge may help.

### Defaults

This will reset all user changed options to factory settings and / or clear the tissues on the Tern. A reset to defaults cannot be reversed.

**Note:** This will not delete dive logs, or reset dive log numbers.

### 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.



## 12. Firmware Update and Log Download

It is important to keep the firmware on your dive computer up to date. In addition to new features and improvements, firmware updates address important bug fixes.

There are two ways to update the firmware on your Tern:

- 1) With Shearwater Cloud Desktop
- 2) With Shearwater Cloud Mobile



Upgrading the firmware resets decompression tissue loading. Plan repetitive dives accordingly.



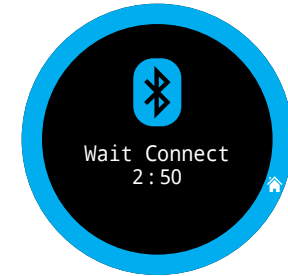
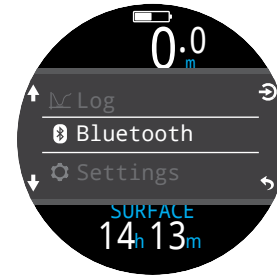
During the update process, the screen may flicker or go blank for a few seconds

### 12.1. Shearwater Cloud Desktop

Ensure you have the most recent version of Shearwater Cloud Desktop. [You can get it here.](#)

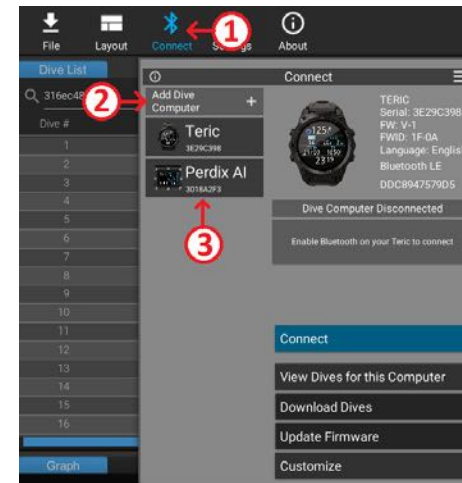
#### Connect to Shearwater Cloud Desktop

On your Tern, start Bluetooth by selecting the Bluetooth menu item from the main menu.



In Shearwater Cloud Desktop:

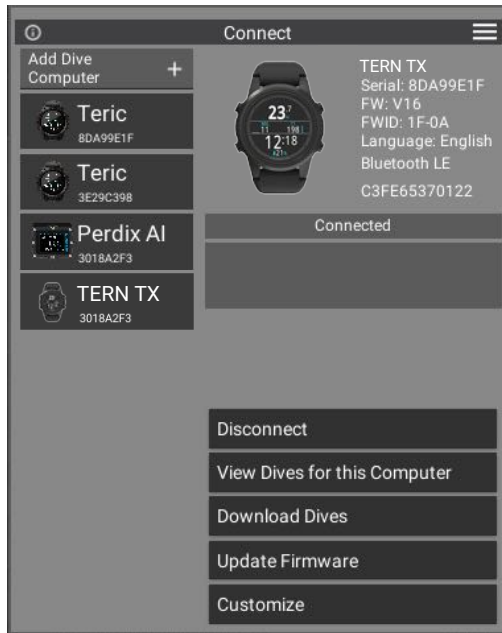
1. Click the connect icon to open the connect tab.
2. Scan for Dive Computer
3. Once you've connected the computer once, use the Tern tab to connect faster next time



Shearwater Cloud Desktop Connect Tab



Once the Tern is connected, the connect tab will show a picture of the dive computer.



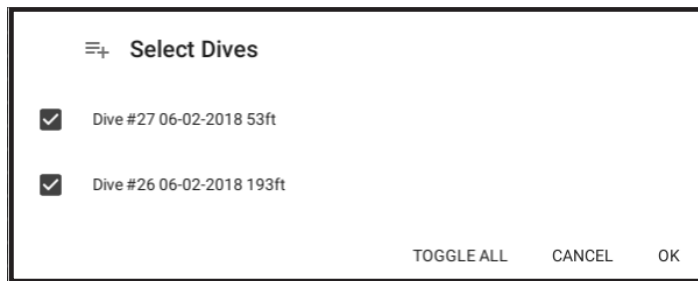
Shearwater Cloud Desktop Connect Tab

### Download Dives

Select “Download Dives” from the connect tab.

A list of dives will be generated. You can un-select any dive logs you don’t want to download, then press OK.

Shearwater Cloud Desktop will transfer the dives to your computer.



Select the dives you wish to download and press OK

### Update Firmware

Select “Update Firmware” from the connect tab.

Shearwater Cloud Desktop will automatically select the latest available firmware.

The Tern screen will display a progress indicator while receiving the firmware. The Personal Computer will read “Firmware successfully sent to the computer” on completion.

Firmware updates can take up to 15 minutes.

### Change Language

After connecting to your dive computer, select “Customize” from the connect tab and select language. Choose the language you would like and select “Install”.

The Tern Supports the following languages:

<b>English</b>	<b>German</b>
<b>Japanese</b>	<b>Italian</b>
<b>Spanish</b>	<b>Russian</b>
<b>Korean</b>	<b>French</b>
<b>Polish</b>	<b>Portuguese</b>
<b>Simplified Chinese</b>	<b>Traditional Chinese</b>



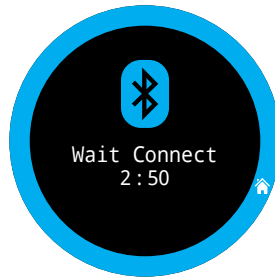
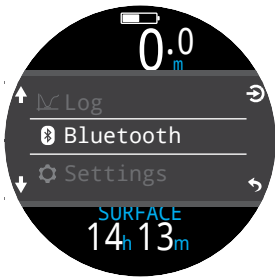
## 12.2. Shearwater Cloud Mobile

Ensure you have the most recent version of Shearwater Cloud Mobile.

Download it from [Google Play](#) or the [Apple App Store](#).

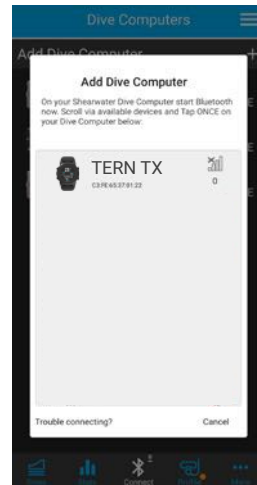
### Connect to Shearwater Cloud Mobile

On your Tern, start Bluetooth by selecting the Bluetooth menu item from the main menu.



On Shearwater cloud mobile:

1. Press the connect icon at the bottom of the screen
2. Select “Add Dive Computer” and then select your Tern from the list of Bluetooth devices.

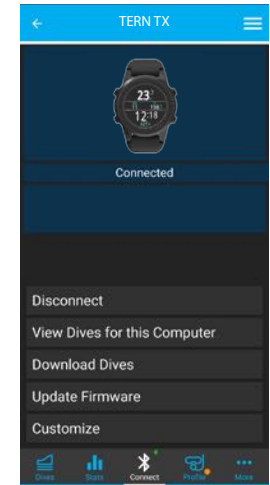


### Download Dives

Select “Download Dives”

A list of dives will be generated and you can un-select any dive logs you don’t want to download, then press OK.

Shearwater Cloud will transfer the dives to your smart phone.



### Update Firmware

Once the Tern is connected to Shearwater cloud mobile, select “Update Firmware” from the connect tab.

Shearwater Cloud mobile will automatically select the latest available firmware.

The Tern screen will display a progress indicator while receiving the firmware. The mobile app will read “Firmware successfully sent to the computer” on completion.

Firmware updates can take up to 15 minutes.

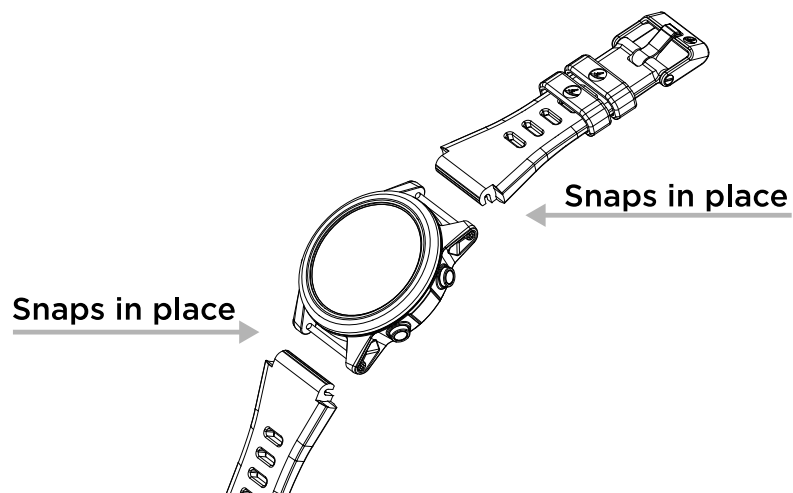
### Change Language

After connecting to your dive computer, select “Customize” from the connect tab and select language. Choose the language you would like and select “Install”.



## 13. Tern Strap

The included Tern strap is a durable, stretchy silicone designed to grip a wet suit without sliding around. The Tern's strap features a robust quick disconnect that makes changing the strap easy.



The Tern comes with two lengths of straps designed to fit a wide range of wrist sizes and wetsuit configurations without an extender.

For drysuit diving, Shearwater recommends using the optional elastic webbing strap accessory. Switching to and from the elastic strap is fast and simple, and is the best option to compensate for drysuit compression at depth.

The Tern is compatible with most 22mm off the shelf straps for additional customizability.

## 14. Charging

The Shearwater Tern charges wirelessly when mounted on the included charger and on some third party wireless Qi compliant chargers.

The screen will not turn on during charging to preserve the long term health of the screen and battery, but pressing any button will wake up the Tern so the time can be viewed.

The SUN button will adjust the screen brightness and the OFF button will turn the screen off.

Dive Mode functions are not available while the Tern is charging.

### Battery Care

Lithium-ion batteries, such as the one in the Tern, can be damaged if completely discharged. The Tern has internal protection which disconnects the battery before complete discharge occurs. However, a small amount of self-discharge still occurs, which can lead to complete discharge and subsequently battery damage if stored for long periods without recharging.

To prevent damage to the battery please do the following:

- 1) Fully charge the Tern prior to storage
- 2) Top up the Tern battery every 3 months

### Charging time

The Tern can be charged with any USB wall power adapter or with a computer. Charging time is approximately 1.5 hours with Quick Charge enabled, and 3-4 hours without.



## Behavior on Dead battery

### Settings

All settings are retained permanently. No loss of settings occurs if the battery dies.

### Clock

The clock (time and date) data will be lost if the Tern experiences a total loss of power.

Once the battery is charged, you will need to update the Clock and Date in the Settings > Watch Menu.

The Tern uses a highly accurate quartz crystal for time keeping. Expected drift is about 1 minute per month. If you notice drift, it is easily corrected in the Settings > Watch menu.

### Decompression tissue loading

If the battery dies between repetitive dives the decompression tissue loading will be lost.

Plan repetitive diving accordingly.

When deco tissues are reset, the following are also reset:

- Inert gas tissue loadings set to saturated with air at current atmospheric pressure
- CNS Oxygen Toxicity set to 0%
- Surface Interval time set to 0



# 15. Troubleshooting

Follow these guidelines to help solve problems with the Tern.

## 15.1. Warnings and Information Displays

The following table lists warnings and errors and information alerts you may see, their meaning, and steps to take to solve any problems.

The highest priority notification is listed first. If multiple alerts occur simultaneously, the error with the highest priority will be displayed. Clear that error by pressing the INFO button to see the next error.

See the [Alerts section on page 22](#) for more information.



### Contact Shearwater



The subsequent list of warnings, errors and notifications is not exhaustive. Please contact Shearwater if you experience any unexpected errors: [info@shearwater.com](mailto: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.
	The internal battery is low.	Recharge 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)

+





Display	Meaning	Action to take
	Decompression stops are required.	Perform decompression stops as directed.
	NDL is less than 5 minutes.	Ascend soon to avoid decompression obligation.



## 16. Storage and Maintenance

The Tern dive computer and transmitter should be stored dry and clean.

**Do not allow salt deposits to build up** on your dive computer. Rinse your computer with fresh water to remove salt and other contaminants.

**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 and transmitter **out of direct sunlight** in a cool, dry and dust free environment. Avoid exposure to direct ultra-violet radiation and radiant heat.

### 16.1. AMOLED Burn In

One of our favorite features of the Tern is the high-contrast OLED screen. Unfortunately a trade-off with any OLED is the risk of burn in over time.

Burn in refers to a ghostly image that remains on the screen when the same screen content is displayed for a long time. We employ techniques to try and prevent burn in, but given the nature of a dive computer display, some burn in is inevitable.

Burn in is more likely when you use your Tern as a daily wear watch due to increased screen on time.

#### Things You Can Do To Reduce Burn In

- Reduce screen brightness
- Adjust timeouts to turn off the display sooner
- Remove info from the watch display

## 17. Servicing

There are no user serviceable parts inside the Tern. Do not tighten or remove the faceplate screws. Clean with water **ONLY**. Any solvents may damage the Tern dive computer.

Service of the Shearwater Tern may only be done at Shearwater Research, or by any of our authorized service centers.

Contact [Info@shearwater.com](mailto:Info@shearwater.com) for service requests.

**Evidence of tampering will void your warranty!**

## 18. Glossary

**NDL** - No Decompression Limit. The time, in minutes, that can be spent at the current depth until mandatory decompression stops will be required.

**O<sub>2</sub>** - Oxygen gas.

**OC** - Open circuit. Scuba diving where gas is exhaled into the water (i.e. most diving).

**PPO<sub>2</sub>** - Partial Pressure of Oxygen, sometimes PPO2.



## 19. Tern Specifications

Specification	Tern
<b>Operating Modes</b>	Air Nitrox 3 Gas Nitrox Gauge Freedive
<b>Decompression Model</b>	Bühlmann ZHL-16C with GF
<b>Display</b>	Full Color, Round 1.3" AMOLED
<b>Pressure (depth) sensor</b>	Piezo-resistive
<b>Calibrated Range</b>	0.3 Bar to 12 Bar
<b>Accuracy</b>	Meets EN 13319 for depth accuracy
<b>Crush Depth Limit</b>	120 msw / 394 fsw
<b>Surface Pressure Range</b>	500 mBar to 1040 mBar
<b>Depth of dive start</b>	1.6m (adjustable in Freedive Mode)
<b>Depth of dive end</b>	0.9m (adjustable in Freedive Mode)
<b>Operating Temperature Range</b>	-10°C to +50°C
<b>Long-Term Storage Temperature Range</b>	+5°C to +25°C
<b>Recommended Charging Temperature Range</b>	+15°C to +25°C Charging outside this range may reduce the life of the battery or result in charging being paused to protect the battery
<b>Battery</b>	Rechargeable Lithium Ion battery

## Tern Specifications (cont.)

<b>Battery Operating Life</b>	20 hours diving (medium brightness). 6 months in Standby
<b>Communications</b>	Bluetooth Low Energy
<b>Dive Log Capacity</b>	Over 400 hour detailed log at 10s logging frequency.  750 dive basic log
<b>Wrist Attachment</b>	22mm width silicone watchband.
<b>Weight</b>	100g
<b>Size (W X L X H)</b>	50mm x 50mm x 16mm



## 20. Regulatory Information

### A) USA-Federal Communications Commission (FCC)

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 UNDESIRE OPERATION.

Changes to or modification of this equipment are not authorized, doing so may void the user's authority to operate this equipment.

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

### Caution: Exposure to Radio Frequency Radiation.

This device must not be co-located or operating in conjunction with any other antenna or transmitter.

Tern Dive Computer Contains TX FCC ID: **2AA9B05**

### B) Canada - Industry Canada (IC)

This device complies with RSS 210 of Industry Canada.

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 this device.

L'utilisation de ce dispositif est autorisée seulement aux conditions suivantes :

- (1) il ne doit pas produire d'interférence, et
- (2) l'utilisateur du dispositif doit être prêt à accepter toute interférence radioélectrique reçue, même si celle-ci est susceptible de compromettre le fonctionnement du dispositif.

### Caution: Exposure to Radio Frequency Radiation.

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](#).

Tern Dive Computer Contains TX IC: **I2208A-05**

### C) EU and UK Conformance Statements

- Depth and time measurements conform with EN 13319:2000 - Diving Accessories - depth gauges and combined depth and time monitoring devices
- Electronic instruments are in compliance with:
  - ETSI EN 301 489-1, v2.2.3: 2019 Electromagnetic compatibility (EMC) standard for radio equipment and services; Part 1: Common technical requirements.
  - ETSI 301 489-17 V3.2.4:2020 ElectroMagnetic Compatibility (EMC) standard for radio equipment and services; Part 17: Specific conditions for Broadband Data Transmission Systems.
  - EN 55035:2017/A11:2020 Electromagnetic compatibility of multimedia equipment. Immunity requirements.
  - EN 55032:2015 + A11:2020 Electromagnetic compatibility of multimedia equipment. Emission requirements.
  - DIRECTIVE 2011/65/EU Restriction of the use of certain hazardous substances in electrical and electronic equipment (ROHS)
- Declarations of Conformity are available at: <https://www.shearwater.com/iso-9001-2015-certified/>

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## 21. Contact

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