



TDC-3 user manual

by Technical Dive Computers Inc.

Victoria BC Canada



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<http://www.tdc-3.com/>

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License and usage

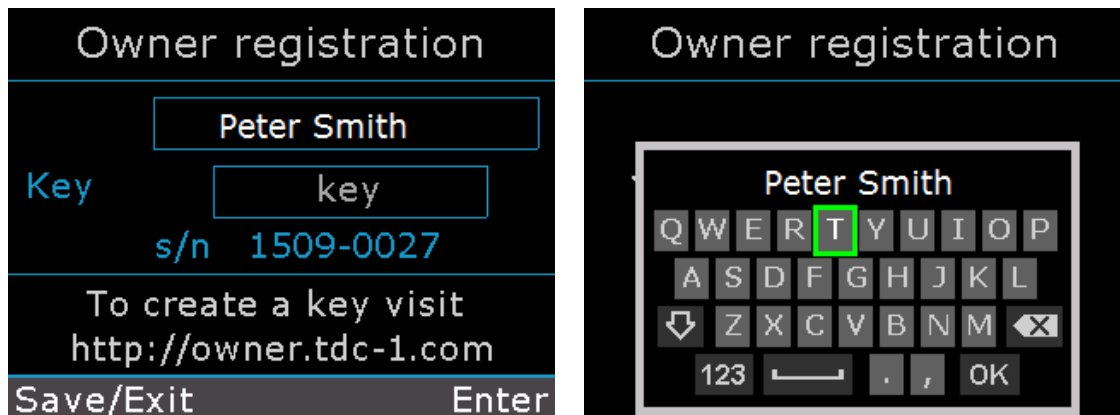
THE USE OF THE TDC-3 SOFTWARE USED IN THE TDC-3 COMPUTER IS LICENSED TO THE OWNER OF THE COMPUTER SUBJECT TO THE LICENSE AGREEMENT AND DISCLAIMER INCLUDED AT THE END OF THIS DOCUMENT. DO NOT USE THIS COMUPTER PROGRAM OR TDC-3 COMPUTER UNTIL YOU HAVE READ THE LICENSE AGREEMENT AND DISCLAIMER AND SUCH USE IS RESTRICTED AT LAW TO SUCH LIMITATIONS.

New owner registration – key entry

Please visit the web page <http://owner.tdc-3.com> to complete the purchase agreement, to register you as the owner, to mark the beginning the warranty period, and to receive a key to activate your TDC-3 dive computer.

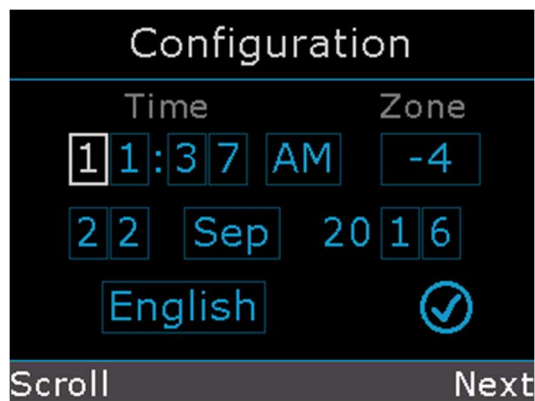
The website Owner Registration will generate a number sequence key to be entered in to the TDC-3. Use the keyboard to enter your name exactly as shown in the website registration entry. Enter the number sequence key as well.

Note: this name will be displayed in the bottom menu bar of MultiDeco TDC-3. To change a name, contact support@technicaldivecomputers.com for details.



Enter the registered name into both the TDC-3 and the web site. The website will create a number key, to be entered into the key box.

Use the taps to move around the keyboard, or left button to step.
Save each character with the right button.



Quick setup screen. Edit as needed, save with the check mark.

Introduction

This manual describes the MultiDeco TDC-3 firmware and hardware procedures for the Technical Dive Computers Inc, TDC-3 diver decompression computer.

Description

The Technical Dive Computers TDC-3 dive computer has the powerful 32 bit processor. The TDC-3 can be re-programmed with revisions supplied from the internet, via the inbuilt WiFi module. It has a bright LCD color display that is easily viewed in the water. The TDC-3 provides both buttons for menu navigation, and an inertia measurement system (taps) that converts the diver tapping input actions into scrolling motions for use in the menus and settings.

The TDC-3 EXT model option includes a Fischer cable connector for CCR pO₂ cell input signals to monitor the CCR's breathing loop pO₂ concentrations and include these in decompression calculations.

The TDC-3 includes 2 utility programs to download updates from the internet, and another to install these programs and manage the saved firmware.

The TDC-3 has two batteries, and a system to prioritize the usage that will drain one battery first. It will switch (under full load), to the other battery as needed. This allows the user to get every last drop of remaining power from a battery, or to use two weak batteries, and be sure the computer will not stop in the water.

The preferred battery is the Saft model 14500, 3.6v lithium metal type. Many of the 3.6v or 3.7v rechargeable types will work as well. It can also run on 1.5v Duracell AA type disposable batteries, but these are best left to emergency conditions only.

The TDC-3 can be used in both recreational dive environments and provides NDL information, and in full decompression dive environments and provides deco ceiling limit and time information.

Dive modes / circuits

The TDC-3 has 3 modes: Open circuit (OC), Closed circuit – fixed setpoint (CCR), and a Bottom Timer mode (BT). Future plans are to expand to include SCR and live po₂ input in CCR, and the TDC-3 has the required components for this now.

Deco models

TDC-3 uses genuine VPM-B and VPM-B/E, along with Bühlmann ZHL-16C and Gradient Factor (GF) for its decompression calculations in a complete submersible dive

decompression firmware program. This program has been designed to perform continuously updating decompression calculations for the underwater environment. TDC-3 tracks the diver's progress and conditions and tissue state, and is computing a new set of ascent limits continuously. At first the NDL limits are displayed and progressing into decompression stops and time limits. The diver is able to select a decompression model to suit the conditions or preferences.

The VPM (Varying Permeability Model) has its origins in research into micro bubbles that began in the mid 70's. More details on the VPM model history and revisions, technical references and links to its theory and methods of calculations are available here: <http://www.hhssoftware.com/v-planner/vpmdetail.php>

TDC-3 includes the VPM-B/FBO model version for use by CCR divers during bail out situations. Fast Bail Out (FBO) can reduce the required bailout mix volume requirements.

The Gradient Factor (GF) method was created by Eric Baker in the late 90's, and applies a conservatism layer onto the Bühlmann ZHL-16C calculations.

The Gradient Factor Surface (GFS) method is a combined plan. This takes a regular VPM-B plan and a ZHL-16C with a GF Hi setting only, and uses the deeper or longer parts of the ascent segments from each plan.

TDC-3 and desktop PC plans

The TDC-3 configurations are designed using many of the same model settings and conservatism levels from the desktop version of V-Planner. Gradient factor desktop plans can be created with programs such as MultiDeco for the PC / Mac / Android and iOS. This allows for the dive to be planned with the desktop MultiDeco, and then carried out exactly in the water with the TDC-3 program. The desktop plan and the results of the same dive carried out on TDC-3 will be a match, providing the diver follows the plan.

A real life diver is not likely to follow the plan so precisely, and so the runtimes will vary slightly. In any case, the diver's progress throughout the dive is tracked and the deco updated and re-calculated and the new limits shown every few seconds.

The biggest influences causing the variations between pre planned desktop and the achieved (in water) results are:

- The descent rate and crushing pressure achieved is quite critical to the VPM-B algorithms. The real life diver is not likely to match exactly the planned descent rate for the entire descent. A slower descent may actually increase the deco obligations.

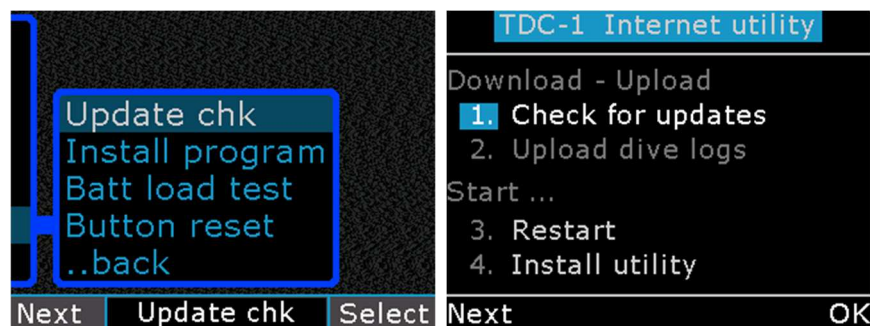
- The ascent rate achieved in the water and the precise and exact following of the decompression stops and depths will probably vary throughout the dive.
- The diver rarely follows the planned depth and planned or displayed stop times exactly.

For most dives, the diver can expect the decompression times and stops match closely and they will be within a few minutes overall. In the case when decompression stops are shown but the diver is slow to reach that stop level, then the overall runtime required for decompression will slowly extend longer while the diver remains deeper than the stops displayed and required. In all situations, the deco limits are re-computed every few seconds and the new limits shown.

Program updating / Internet utility

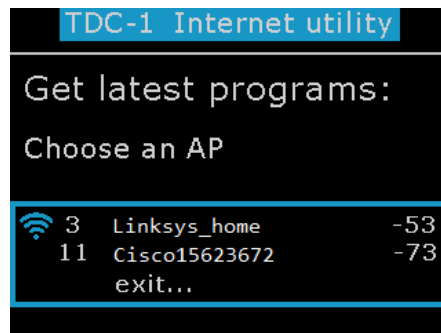
The TDC-3 program is installed and updated onto the TDC-3 via a WiFi module that is inbuilt to the computer. It can be connected to any WiFi access point, much like a smart phone. Firmware updates are sent out automatically and directly from our servers, and no user interaction is needed. There is no need for a PC / Mac or other computer to act as a go between to perform updates.

To Access the WiFi updater, from MultiDeco-TDC-3, select the menu item System -> Program -> Update Chk. This will launch the Internet update utility:



Menu -> Program -> Update chk.

1. Start the WiFi and check for updates,
2. Upload the dive logs from the computer to the users account,
3. This will return back to MultiDeco-TDC-3 and normal dive operations,
4. This will launch the Install utility that does the actual file updating.



The TDC-3 WiFi will offer up the choice of WiFi access points. Scroll with the left button, and select with the right button.

For best results, the unit should be within 20 ft / 6m of the access point. It further helps to put the device on the table and not hold the device, as that will shield the signal.

Sometimes the best connection is the home WiFi, or sometimes it's best to use tethering via a smart-phone. On a busy public site access point, the device WiFi does not complete well with other devices. It's best to use an AP when it is quiet.

The WiFi will only operate with 3.6v batteries, and one must be in good condition. If you encounter AP access fail errors, or low voltage warnings, then it needs one newer battery in better condition.



WiFi password entry:

The TDC-3 can connect to any normal 2.4Ghz WiFi access point, with any current type of WiFi security, including None, WEP, WPA, WPA2, and that includes the various keying systems. However, it cannot connect to Radius or Enterprise type security access points. Further, it does not have a web browser, and cannot do a "user sign in" process as some public / free WiFi requires.

Enter the WiFi password. Use taps in 4 directions to navigate the keyboard. The left button will step characters along lines. If the left button is held down for a second, it will auto scroll across the keyboard. The right button selects a character. When complete, select the OK.

Upper case characters are available by setting with the up arrow. Numbers and special characters are included under the 123 button.

The computer will remember about 20 passwords for next time, and it will skip this step if it can locate some matched access point saved details.

From here the screen will show updates of the AP connection and the availability of any new downloads. These will be retrieved automatically.

If an updated version of MultiDeco exists, it will be installed automatically and the TDC-3 will restart automatically with the new program version running.

Product and program support

TDC-3 Product and program support is available at

Email: support@tdc-3.com Website: <http://www.tdc-3.com>

HHS Software maintains a user support forum at (for discussion on TDC-3 issues):

<http://forums.hhssoftware.com>

Face book: [TechnicalDiveComputers](#)

Instagram: [technicaldivecomputers](#)

TDC-3 basic operation

Buttons, Tapping and menu navigation

The TDC-3 uses two buttons, and has 4 way tapping inbuilt. Either one or both methods can be used to navigate the menu system. Taps can also be disabled if you prefer to use only buttons.

These taps are measured by inertial motion sensors inside the TDC-3, and converted into a scrolling action for the menus and systems in the TDC-3.

For best results, hold the TDC-3 lightly in the palm of the hand or by the wrist strap. Tap on it briskly with the end of the index finger, or with a flick of the fingernail. Some actions require a sequence of taps (bring up the menu system), and these need to be performed as a short series of taps within a two seconds of each other.



Operating modes

The TDC-3 have two modes of operation for These are: Awake, and Sleep modes.

Awake

This mode is present when the TDC-3 is fully running with the screen functioning and tap system operating. This is the normal state anytime the TDC-3 is being used on the surface or during diving operations. The awake mode will end the surface screen time out setting expires (usually 5 minutes).

Sleep

In sleep mode, the unit is partially monitoring condition, but also preserving power. After the awake mode ends, the unit will enter Sleep mode. In sleep mode, the unit will monitor for water immersion, and will monitor for elevation changes.

However, it does not do this forever. As time passes, and it becomes obvious that it is being stored or not used, then it will go into a much slower and longer term sleep mode, to preserve more battery power. This will occur after several days of sleep usually. There is no outward indication of this change. When the device enters this mode, the buttons will cease to work, and the unit will go into “flip-flop” sleep mode.

Taps do not function in Sleep mode. Only right buttons can wake the TDC-3 for the first two days, and then the unit must be picked up and turned over and back two or three times. This change in orientation will wake the unit.

The unit can be put into Sleep mode, by double pressing the right button.

Starting the TDC-3

The TDC-3 can be started in three different ways:

- Right button – press the right button in the first days of sleep, or
- After two days, flip flop the unit orientation up/ down several times.
- Water contact – taking the TDC-3 into water, when unit has been used in the last two days.
- Removing / installing the batteries.

The tap action is available when the TDC-3 is in Awake mode only. Taps will not wake the unit.

When the TDC-3 wakes up, it will turn on the screen, show the TDC-3 logo briefly, and then enter surface mode display. It can then be configured or used as required.

If the unit senses water and depth pressure, it will commence dive mode.

If the TDC-3 fails to start in a dive, then press the right button.

The TDC-3 can also be reset and /or rebooted, clearing all prior settings – see the [Re-booting the TDC-3 firmware](#) topic.

Turning off the TDC-3

The TDC-3 will transition into Sleep mode by itself. This occurs after the TDC-3 has finished a dive, or a few minutes after the diver last used the TDC-3 menu selections. The diver can enter Sleep mode manually by double pressing the right button. The time setting for automatic transition to Sleep mode is adjusted with the configuration item - see "[Display config](#)" menu.

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TDC-3 operation

Overview

The TDC-3 design uses two main display screens – one for diving, and a second display for surface mode. Each of these displays has a menu system that comprises of configuration items and further sub menus.

The Surface display

When the TDC-3 display is blank, this indicates the TDC-3 is in Sleep mode. Bring the TDC-3 into Awake mode by pressing the right button. This should cause the TDC-3 to start and will bring up the surface display. The surface display is the main interface to the TDC-3.

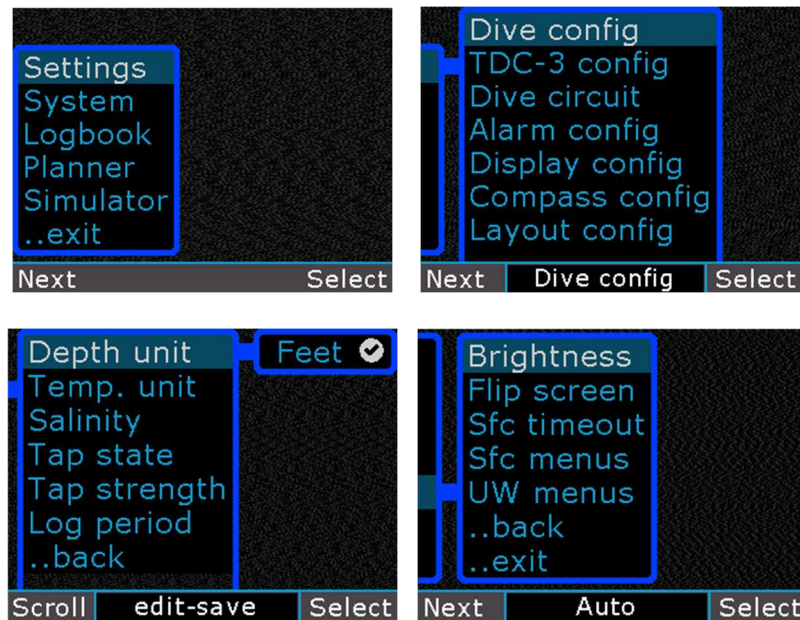


Surface display samples.

The surface display shows information such as Maximum depth and time of last dive, surface time from last dive, the current time and date, and current temperature and battery condition.

Surface Menu system

With the surface display showing, press the left button to launch the menu system. Tapping (making a vertical tap action) on the top of the unit twice will bring up the menu as well. The screen should change to show the menu selections below.



Main menu, menu settings: Scroll with a left button, select with the right button.
 The taps will also navigate in up/down left or right directions.
 Edit an item by vertical scrolling (left button).
 Save an item with the right button.

The menu screen is the main entry point into all TDC-3 settings, configurations, dive setup items and other features. The menus are navigated by a button presses, or by single tapping action. Tap at any of the four directions, top, bottom, left, right. In general the up and down taps and left button will scroll through the items or a list shown. A left or right tap, or right button, will normally select that item, or perform that action, or it can give deeper access into the menu items.

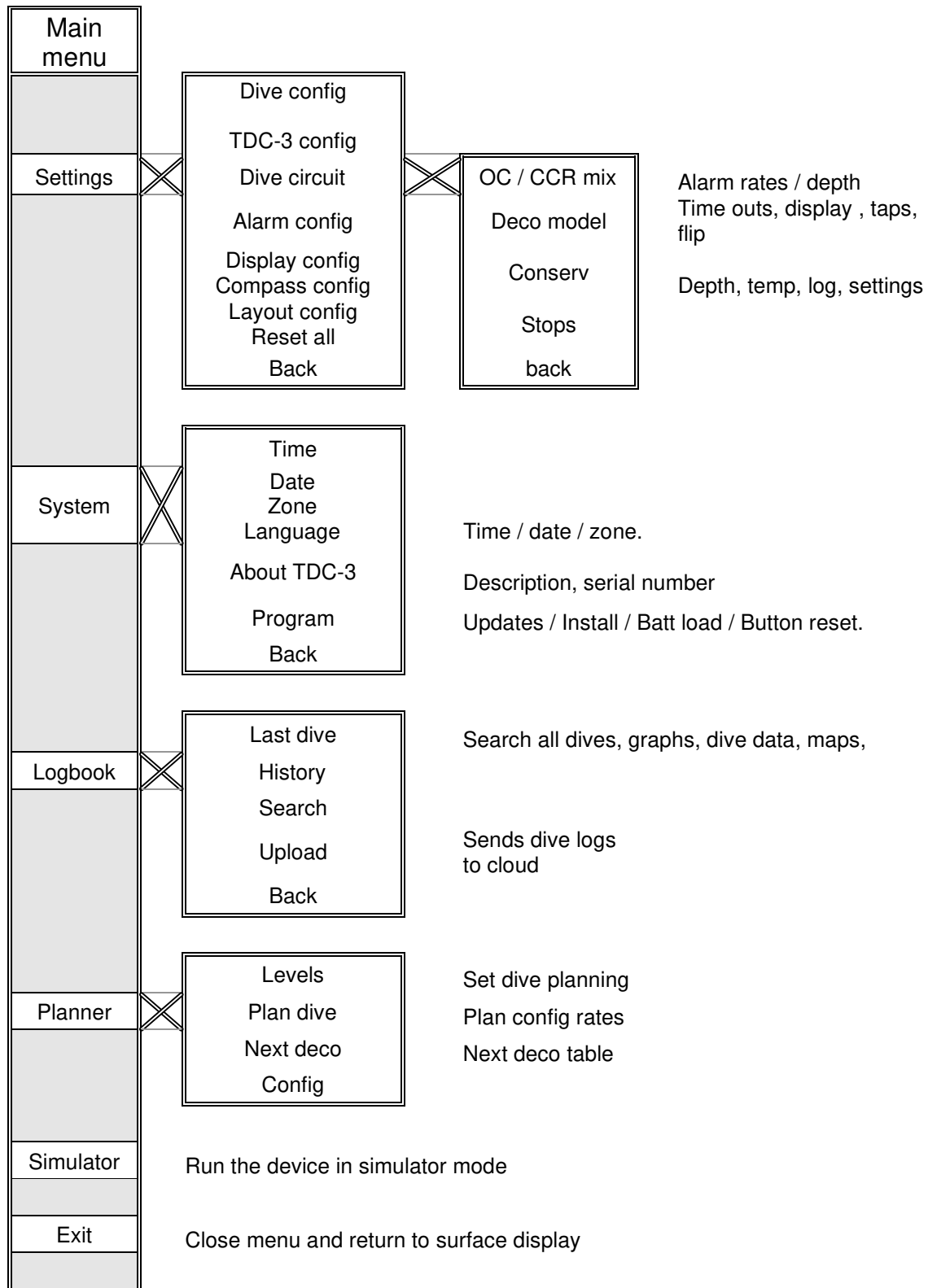
The menu system is dynamically created and only relevant items will appear in each menu list.

To exit the menus system and return to the Surface display, select EXIT menus. The TDC-3 also has a time out period (a minute or two), and the TDC-3 will leave the menu system and return to surface display automatically.

To turn off the TDC-3 in surface mode, double press the right button, or wait for 5 minutes for the device to sleep on its own. The TDC-3 continues to monitor the depth pressure sensor in Sleep mode. If a dive was commenced at this time, the TDC-3 will wake-up and commence to monitor the dive as normal.

After a few days of the Sleep mode, the TDC-3 will shutdown completely and will no longer monitor the depth sensor. The diver will need to wake the TDC-3 manually with the right button, or by performing the 'flip-flop' action. For this reason, it is most important that the diver wake-up the TDC-3 sometime during the hours or day prior to the dive.

Menu items table – surface mode



TDC-3 settings and configuration

The TDC-3 can be configured to adjust basic settings such as Imperial or Metric depth displays, and screen brightness and more. To access this screen, bring up the menu system from the surface display with 2 taps, or left button (see Surface Menu system description below). Then scroll up or down to select TDC-3 settings, then perform a left or right tap (right button) to select the item.

Settings - > TDC-3 config

Depth units

- Meter or feet.

This also sets the speed units to mpm or fpm.

Temp units

- F or C.

Salinity

Set the water salinity value. This will affect the water density used by the TDC-3 and therefore have a small affect on the indicated depth. Select from:

- Fresh: fresh water = Specific Gravity 1.000,
- Mixed: a mix of fresh and salt waters = Specific Gravity 1.010,
- Low : light salt = Specific Gravity 1.020,
- Med : medium salt = Specific Gravity 1.025 (standard seawater, 3.6% salt),
- High : high salt = Specific Gravity 1.030.
- EN13319: This will configure the depth reading to comply with the EN13319 depth indication standards. Doing this should make the depth align with other devices approved to this standard. EN13319 is based on an atmosphere with Specific Gravity 1.020 for salt water. For true depth, select a salinity value that best matches your diving environment.

Note also that the decompression calculation is not affected by any of the salinity settings. Decompression uses ambient pressure values at all times.

Tap state

Sets the tap detection state. Can be set for different modes, or turned off.

- Both, dive, surf, off

Tap strength

- Low med or high: changes the amount of tap motion energy required to register as a tap in the TDC-3. Note that the soft setting may give problems when the diver is getting into his/ her diving equipment. It can trigger the three taps to activate the menus, which leads to random selection or changes to settings. It is recommended to use the Hard setting when using the TDC-3

on a dive to avoid this situation. Divers with scooters also need to consider that vibrations from the scooter handle may trigger unwanted tap actions.

Log Period

- Set to a time period from a 1 second through to 10 seconds. This controls the time between dive log samples. This information makes up the History and Dive logs (see above for details). Dive logs cannot be turned off.

Settings -> Dive config

Dive circuit

- Select from OC (open circuit), CCR (closed circuit) or Timer (bottom timer gauge mode). Note: See the [Bottom Timer](#) topic for important details about operations in Gauge mode.

Alarm -> config

Depth max

Time limit

Dec rate

Asc rate

Set pt

O2 stop pp

ppO2 alarm

Some alarms can be silenced in the dive with an underwater menu: Alarms.

The above alarms control features as follows:

- Set a dimension to trigger this alarm. Depth, time, and Asc/Dec rates will show yellow when the limit is passed.
- The Set pt will monitor CCR pO2 dives for when the diver pO2 setting is less than the natural inspired ppO2 of the diluent.
- The O2 stop pp will select if 1.6 or 1.9 ppO2 is used for the warning limit.
- The ppO2 alarm will set if 1.4 or 1.6 ppO2 is used when descending too deep on bottom mix, to trigger that warning limit. It also sets the max pO2 warning limit for CCR with the EXT cable connected.

Display -> config:Brightness

The screen is the biggest drain on the battery, and this will occur in Auto setting. Using Dim setting is suggested to save battery life, but it may be hard to read at times.

- Select Night, Low, Med or High, Auto, or Dim. The unit has a light sensor to judge the appropriate light setting. In auto mode, it will see the proper values to view the screen at all locations.

Flip Screen

Top up or bottom up. This will cause the screen to invert and the TDC-3 can be worn upside down. The taps and buttons are reversed as well to match the inverted display. This upside down feature can be used to have the accessory pin pad always facing inboard, for use on either the left or right arms.

Sfc (surface) timeout

Controls the amount of minutes that the screen remains active (TDC-3 is in Awake mode) on the surface. This covers both the period straight after a dive, and anytime after the TDC-3 was last tapped or a button pressed on the surface. When this time expires, the TDC-3 will go into Sleep mode and the display will turn off.

Sfc (surface) menus

Controls the amount of minutes that any surface menu remains active without any user actions. After this period, the menu system will close automatically and return to the Surface display.

UW (Underwater) menus

This controls the number of seconds that the underwater menu system remains active. After this period expires, the menu system closes and the TDC-3 returns to normal dive display.

Colors

Sets the colors of text and border features for most of the screen.

Display -> Compass config:

These settings control the compass. The compass is tilt compensated, and can operate reliably in any orientation up to $\pm 90^\circ$. Compass calibration is discussed in the [Compass](#) topic.

Warning: the compass is affected greatly by local ferrous (magnetic) material. The most likely source of this problem is the batteries you install. Some batteries come with a steel casing, and are not suitable for use with a compass. If you intend to use the compass, then shop for batteries that are non-magnetic. Note that the Saft 3.6v are non-magnetic, and work just fine.

Start / Stop

Starts and stops the compass. In surface mode, the compass displays full screen and can be used to navigate like any regular surface compass. Pressing the left button will refresh the time out period. In dive mode, the compass occupies the lower right screen, and can be quickly activated through the right button.

Direction point

Enter a direction / track to draw a heading line onto the compass face. The outbound pointer heading is a green triangle, while the reciprocal return heading is a blue line.

Magnetic declination

Enter the magnetic declination for your region. This value will be added / subtracted automatically from the displayed values, to arrive at a True north compass heading. To retain a magnetic heading instead, set the declination to 0.

Display

This configures how the direction information is shown in the dive. Heading is for degrees (110°), Cardinals8 will show compass points to 8 positions (E, SE, S...), or Cardinals16 to 16 positions (ESE, SE, SSE...).

Reset

The magnetic fields vary somewhat around the world, and so the compass has to self-learn its own magnetic environment to realize the extent of the local magnetic fields. It does this automatically as you use it and rotate it.

However, if you get too close to a strong magnetic field, then the compass will record excessive high magnetic values, and no longer read out proper heading details. A reset will clear the saved memory and allow the compass to re-learn the environment again. A reset occurs when the program is rebooted too.

Display -> Layout config:

These settings control various display items, and location on screen.

CNS/Avg/Temp/TTS/GFn

- Choose the items to show in the lower right section of the screen: any 2 of CNS, Depth average, Temperature, TTS or GF Now.

If the TTS is selected, it moves from the upper left window to the lower right window. Displaying it here will show it full time and will not be interrupted with ascent rate information.

The GF Now (GFn) is a direct readout of the current GF value at this point: i.e., the actual GF value right now (not the planned GF). This can be used to measure progress, or conduct immediate ascents and know how far the ceiling has been pushed.

Timer

- Sets the location of the Timer / Stopwatch display: Select from over the top of the ppO2, CNS, temp display section, or the over the top of the Deco depth and time section.

Dil ppO2

- For CCR dives, this displays the current natural ppO2 of the diluent mix, that can be expected with a diluent loop flush. It is shown next to the dil mix details.

Display -> Timer config:

The timer can be configured as either a countdown timer, or as a regular count up stopwatch. A timer will stop and vanish when reaching zero. A stopwatch will count upwards and can be halted, resumed, or zeroed.

- Timer, or Stopwatch.

RESET All

This resets all configured settings back to default values. This includes all dive plans and decompression model config settings, alarms, and just about everything. The dive logs will remain intact. This will also restart the TDC-3's CPU. Note that this reboot is only a partial reboot. A full reboot can be achieved with the procedure described [Rebooting the TDC-3](#).

Dive configuration

A summary of the current Dive configuration and planning settings is shown on the main surface screen. This should be checked and verified before every dive, as some dive configuration items cannot be adjusted while underwater.

TDC-3 requires the following details to be set for every dive, before entering the water.

- The O₂ and He components of every mix to be used in the dive.
- For decompression mixes, the expected depth that the mix will be selected at.
- For CCR dives, the expected set point value of the mix, and an initial set point value for the descent portion from surface.

TDC-3 uses the dive configuration information to calculate and predict the NDL or decompression time limitations. The mix and set point information and proposed changes are re-computed throughout the dive. This advanced notice of intended mix and swap depths, gives the dive computer some knowledge of the divers intentions for use in the dive. The computer will calculate the remainder of the dive accordingly and present the appropriate NDL or decompression limits.

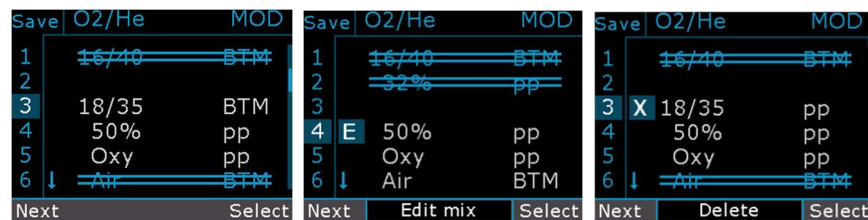
However, at all times TDC-3 uses the current in-water information (diver selected mix and diver selected set point) to calculate and display current limitations. The actual in-water conditions and the diver selections of mixes and set point will modify or override the planned dive information. The final computed ascent times and limits are a result of actual dive conditions and the elections or adjustments made underwater, plus the remainder of the intended plan. Should the diver veer off the intended plan, the then resulting computed and displayed ascent information in the dive, will also slowly change to give a plan ascent time for the actual dive carried out.

BT / OC / CCR Mix, diluent, set point.

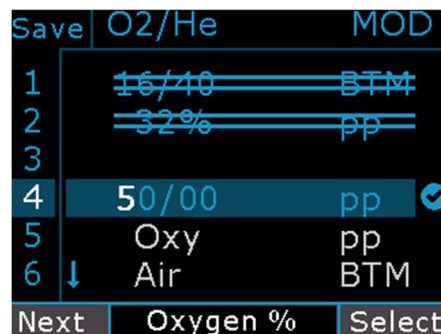
From the Main menu, select Menu -> Settings -> Dive config -> OC mix or CCR dil SP, or BT mix.

To swap to/from BT, OC or CCR mode, select Menu -> Settings -> Dive circuit.

The BT, OC mix and CCR diluent tables each allow for 10 possible selections or entries. Five items are visible at a time and the balance can be seen by scrolling the list up or down to bring the remaining mixes into view. A separate entry is required for each different mix carried. For CCR mode, any planned swaps in set point values can be entered on the same mix.



Save, edit, or remove a bottom mix or deco mix.



Edit a mix – Oxygen, Helium, and MOD / BTM / pp value.

Add a new mix

- Scroll down to find a blank row. Left tap to shift cursor highlight into the blank region. Up/down tap to select “A” for Add. The top row description bar gives the current selected action.
- Left tap / select again to reach Oxygen component selection with “Oxygen %” shown is the description bar. Up/down tap to set the O2 value.
- Left tap / select again to enter Helium component selection with “Helium %” shown is the description bar. Up/ down tap to set He Value.
- For CCR mode, left tap / select again to enter the proposed set point value of this diluent, with “SetP” shown is the description bar. Note that the set point value set by the diver during the dive, will always override this planned setting. If an OC mix is required, then set a value of 0.0.
- Left tap / select again to enter MOD (Max. operating depth) or mix swap depth data with “MOD” shown is the description bar. Tap down to reach the BTM value for the bottom mix. The next item shown is PP. For pp, TDC-3 will calculate the ascent with this mix based on a switch depth of 1.6pp O2%. Or set the actual depth into the MOD column that the diver plans to use this mix. Note that TDC-3 will never switch a mix for the diver – the diver must make all switches manually in water with menus.
- Left tap / select again to the check mark, to confirm the entry. However the entire list will only be saved after leaving the screen via the Save item/

Delete a mix

- Scroll down to the row to delete. Left tap / select into the data area.
- Up or down tap to select “X” for remove.
- Left tap / select again to cause the row to be deleted.

Disable a mix

- Scroll down to the row to delete. Left tap / select into the data area.
- Up or down tap to select “D” for disable.
- Left tap / select again to cause the row to be disabled.

Edit an existing mix

- Scroll down to the row to edit. Left tap / select into the data area.
- Up or down tap to select “E” for Edit
- Left tap / select again to reach the Oxygen component. Now follow the instructions per Add a new mix above.

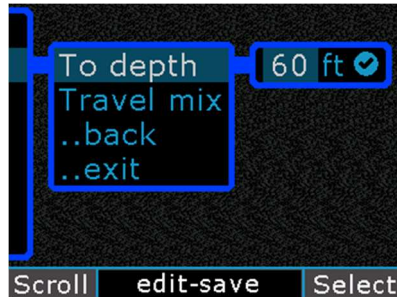
The following points are relevant to dive mixes:

- Mixes must be entered and configured on the surface prior to commencing a dive.
- The order of mixes in the list is not important, and blank lines are ignored. TDC-3 will sort the mixes based on O2 component, regardless of the order they appear in the display.
- Only one bottom mix allowed per plan, and it is required for every plan.
- The deepest mix (lowest O2% component) must be the BTM mix.
- For OC, there is an optional Travel mix entry in the OC config menu.
- No duplicate mixes allowed in OC. CCR legs can have a duplicate mix, but with different set point and MOD settings. E.g. a planned increase in set point value during deco.
- A CCR table can have both regular CCR set point legs and OC legs. Use a set point of 0.0 to obtain an OC leg in the CCR table.
- A summary of the current plan settings is available on the surface screen in the Configuration window.
- TDC-3 will check the information entered and may generate an error message describing the problems when a Save is attempted. Any errors that are found must be corrected prior to starting a dive.
- TDC-3 will start with the BTM mix selected.
- In BT mode, the mix information is used in gas tracking and alarms for ppo2 levels only, but not for decompression or stop calculations.

See the underwater menus topic below for details on making mix and set point selections during the dive.

OC Travel mix

The BT and OC diver can specify a travel mix that will be selected and set at the start of the dive. This mix must be present in the BT / OC mix table.



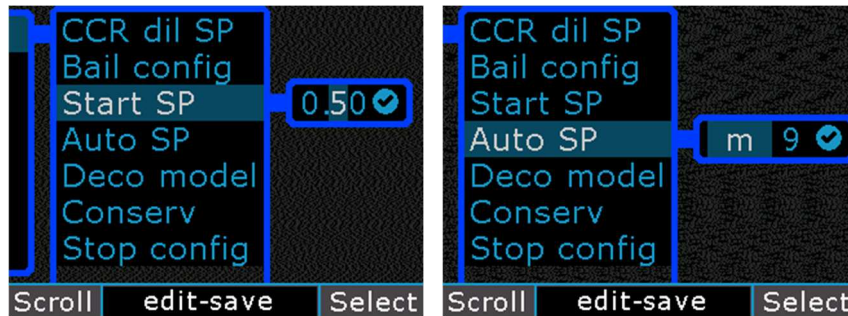
Travel mix depth / mix selection option, for OC circuit.

Conditions:

- The travel mix must have higher O₂ content than the BTM mix.
- Travel mix auto selection commences when the computer starts dive mode.
- The regular OC BTM mix will be switched back, at the specified depth.
- If the diver enters the Underwater menu for Decogas, then the automatic swap to BTM feature is disabled.
- Travel mix is optional.
- Scroll the depth all the way to Off to disable this feature.

CCR Initial setpoint

The Start setpoint specifies the initial setpoint to be used when commencing the dive in CCR mode. This Start set point value is set automatically when TDC-3 starts a new dive.



CCR starting setpoint, and Auto setpoint switch option.

A second option is the Auto setpoint switch. This can be set for a depth, or for some minutes after the dive starts. This will cause the setpoint to self adjust based on a depth or a runtime. The setpoint value will transition automatically (provided certain conditions are met) from the Start setpoint value, to the setpoint value of the BTM leg segment in the dive plan, at the appropriate depth or runtime.

The automatic setpoint switch function is subject to these conditions:

- Depth must be greater than 10m / 33ft for a timed setting,
- Proposed new set point must be a higher value than the Start setpoint,
- Any manual manipulation of the setpoint during the dive, or swapping to a bailout plan, will cancel the pending Auto switch operation.

CCR bail out plan

TDC-3 has two separate bailout plans, each with a maximum of 5 entries. These are named Bailout I and II and they appear in the Bailout config menu. Bailout plan mix and leg details are configured in the same manner as the regular dive plan legs and mixes above. Each bailout plan is a completely unique plan, with the possibility of using different mixes and model settings.



CCR bail out settings.

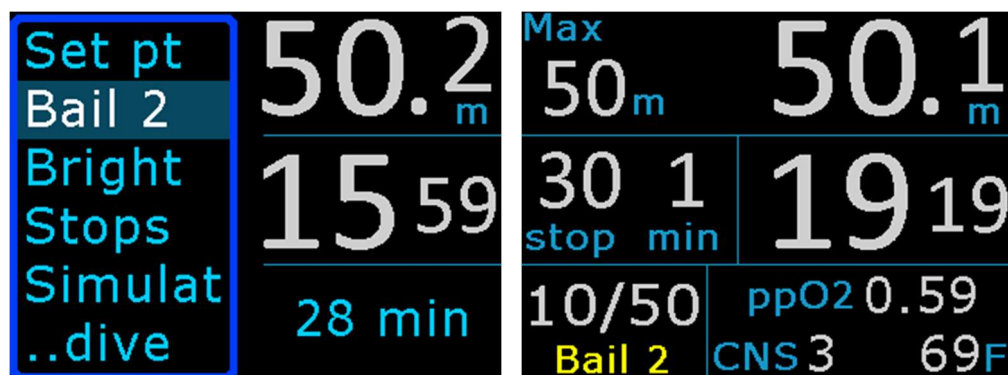
Each bailout plan has its own unique decompression model selection and conservatism settings. The bailout plans are separate plans from the main plan. Each bailout plan is calculated separately in the background, and they are ready to be switch into action through the underwater menu.

The model choices for bail out add one extra model: VPM-B/FBO, [Fast Bail Out](#) (FBO) model option is described below.

Each bail plan has its own model selection and conservatism settings.

The Bail alarm option will trigger when the TTS (Time To Surface) i.e. required decompression and ascent time combined, reaches the value set for this bail plan alarm. This can be used to estimate when the available gas supply for bail out would be used up, if this bailout was to be commenced now.

The current deco and first stop details for each bailout plan, can be previewed underwater through the [BailOut 1 or 2](#) menu item.



CCR bail out: preview deco needed, select bail 2, Bail 2 in use.

When a bailout plan is switched into action, the decompression stop depths and times will show those of the bail out plan. If the diver switches back to the main CCR plan, times and depths show those of the main plan again. A label “Bail 1” or “Bail 2” is shown in the pO2 screen during the dive, when bailout 1 or 2 is engaged.

A bail out plan is computed using this concept: “how to exit the current situation in different ways?” i.e. the divers progress is common to all three plans, with three possible solutions to take from this point onwards. See the [Bail out considerations](#) diagram on the following page.

The following points are relevant to bailout mixes:

- Bailout plans are optional.
- Bailout plans must be setup on the surface prior to commencing the dive.
- Each bailout operates independent of all other plan tables ,including model and conservatism settings.
- Alarms will trigger when that amount of decompression time is reached in the bailout plan.
- Either or both bailout plans can be used, or left empty to remove it from use.
- Bailout plans can have an entirely different set of mixes or set points from the base CCR plans.
- Bailout plan can have half a plan, that is, only the details of the early or later parts of a dive – it can have a different BTM mix from the base plan.
- Switching to bail out does not automatically imply OC. OC is determined by the type of mix entered for use in the mix table (OC = sp 0.00).
- When the bailout plan is activated underwater (or a return to the CCR plan), TDC-3 will start a new set of decompression calculations, using the current tissue gas loads, the new bailout gas details, and the current diver selected set point ppO2 values.

The diver can select a bailout plan for use when under water with the underwater menu items Bail 1 or Bail 2 (see Underwater Bailout menu for sample). The new Bailout plan is then used from this point for the remainder of the dive. The selected mix will move to the BTM item of the selected bailout plan. The initial set point (if the bailout legs are CCR) will be the current underwater setting, or OC mode if the bailout plan BTM leg is an OC leg.

The diver can return to the original CCR plan by selecting the “CCR” menu item.

VPM-B/FBO – Fast Bail Out

The VPM-B/FBO model variation (Fast Bail Out) is for the use with closed circuit diving and a bail out situation. The purpose is to help reduce the required diluent gas volume during bailout (typically a 30 to 50% reduction). A Fast Bail Out ascent will reduce the

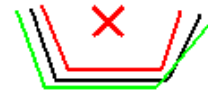
time spent at the deeper stops, and cause the decompression to expand into the shallow stops. The changed ascent shape is still calculated within the context of the VPM-B model. These ascents are aggressive and have fewer deep stops than a regular plan, but VPM-B/FBO still has more deco time than a matching raw ZHL-16 plan.

The VPM-B/FBO is available to CCR divers only, as a bail out plan model option only. The stop table and required gas volumes can be seen in the [Dive planning](#) tool.

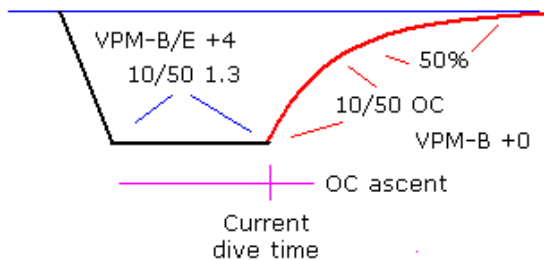
Bailout considerations



Bailout is computed from the "current" location, for all plans. The current location uses a common tissue state in all three calculations.

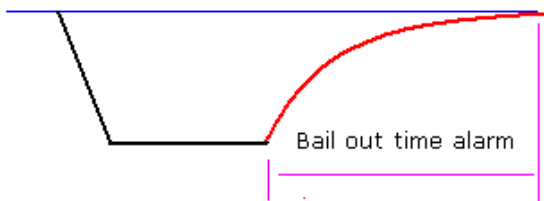


Bailout is not calculated as 3 discrete plans. The diver breathes only one mix at a time - the tissues are in one common state when switching to bail out mode.



Bailout is computed as a hybrid dive of regular SP or PO₂, with an ascent of gases from the bail out table.

Each bailout ascent has its own deco model and settings.



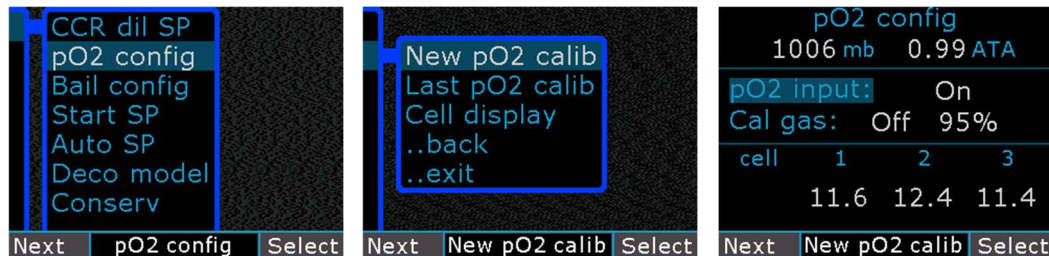
Bail out alarm is triggered on a deco time required value.

Bail out considerations.

CCR calibrations

This applies to the TDC-3 EXT model with a Fischer cable and pO2 cell inputs.

The calibrations and control menu is located under menus TDC-3 settings, Clocks/ calibrate, CCR calibrations.



pO2 config, new calibration, pO2 input on/off.

mb / ATA

Displays the ambient air pressure over the last 5 minutes, in both millibar and ATA values.

pO2 Input

Turns the pO2 input signal On/Off. For standalone CCR operation on a fixed setpoint, turn this off.

Cal gas

Select 1 gas or 2 gas calibration, and edit the high gas. The TDC-3 accepts calibrations for both a one or two gas calibration procedure. Set this to match your rebreather's O2 sensor calibration procedure. The first gas will be Air, and the second gas will be oxygen, or a high concentration of oxygen. Do not adjust input O2 % for ambient pressure as the system does this for you.

Expired

A good calibration will remain valid for 14 days, after which time, it will show as "expired".

Exit

The pO2 config screen will display the direct millivolt (mV) readings from each of the connected cell channels. The TDC-3 will accept one, two or three cell inputs, placed in any position of the three channels.

For details of in-water pO2 cell behavior and alarms, see [EXT Fischer - Alarms, warnings, beeps](#)

pO2 Calibration procedure

Select or set the calibration gas fraction of O2% that will be used in the calibration procedure. Enter an O2 value that represents the actual FO2 that the sensors will be immersed with during the calibration procedure. TDC-3 will make necessary adjustments for atmospheric pressure and elevation changes.

Warning: Good flushing technique is essential. Any variance between the value set as a mix, and the actual gas mixture that the sensors experience, will result in indication errors. That error is multiplied when the sensors are in operations at the regular 1.xx Po2 values in the water. For best results, use oxygen and follow your instructors, or rebreather's procedures carefully.

To commence a data capture, scroll up /down to the Cell mV section and highlight the appropriate calibration gas. Press Start the data sampling (can be stopped and restarted). The TDC-3 will then sample the O2 cell readings for about 15 seconds. TDC-3 will apply all corrections required for ambient air pressure during the data sampling as required. For a two gas sample, select the other gas and repeat the sampling. Samples outside range are highlighted red, while good sampling is green.

pO2 config			
1006 mb		0.99 ATA	
pO2 input:		On	
Cal gas:		Air 95%	
cell	1	2	3
Air	11.6	12.4	11.4
Next	Start sample	Start	

pO2 config			
1006 mb		0.99 ATA	
pO2 input:		On	
Cal gas:		Air 95%	
cell	1	2	3
Air	11.6	12.4	11.4
Next	Sampling..7	Stop	

pO2 config			
1006 mb		0.99 ATA	
pO2 input:		On	
Cal gas:		Air 95%	
cell	1	2	3
95%	53.8	55.8	52.8
Next	Sampling..13	Stop	

Left – ready to sample Air, middle – sampling Air, right – sampling 95%

After the sampling period completes, the data sample is tested for validity. See the [Wiring of cells](#) for details of this. A valid data point set is then saved for reference in later calculations of PO2.

If you are satisfied with the samples, then press Save to retain this calibration for 14 days.

pO2 config									
1006 mb		0.99 ATA							
pO2 input:		On							
Cal gas:		Air 95%							
cell	1	2	3						
Save	11.6	12.4	11.4						
	55.8	55.8	52.8						
Next	Save		Save						

Press Save if sample is satisfactory.

The sampling process may generate one of these errors:

"Cell mV values not in range." This occurs when the readings taken do not match the expected range of values, or are not within a range that meets the specifications of the O₂ sensor manufacturer.

"Cell readings not linear." This applies to a two gas calibration only. The Air sample reading and the high gas reading are compared to test for a linear measurement from a low to high reading. If these do not align, this error is shown.

The calibration process may be repeated as often as required, and a successful calibration is required to accept the data points for use in pO₂ calculations.

Synchronizing calibration to an automated primary controller.

On some rebreathers, the primary controller will run it's own automated calibration sequence, or may not easily allow manual flushing afterwards. For these RB's, it is suggested that you carry out the TDC-3 calibration at the same time as the RB is performing its automated sequence. Observe the raw Mv values on the TDC-3 during the automated calibration sequence, and identify the time period of highest readings. Then use that same period to begin the sample process on the TDC-3. Set the sample gas fraction O₂% to match that used by the RB during its automated process.

Active / last pO₂ calibration

The last saved sample set is shown in the Active pO₂ calibration screen - last pO₂ calib menu.

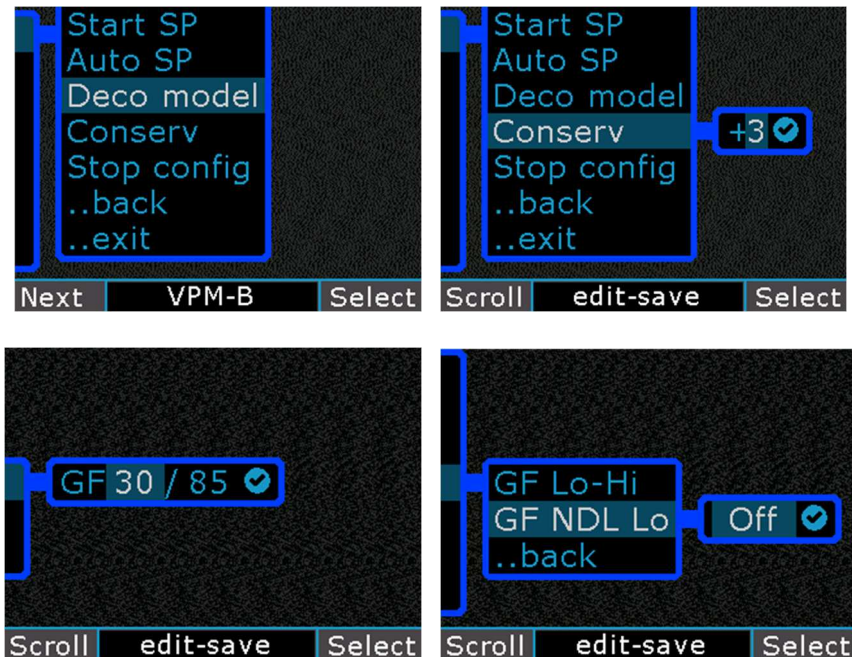
Active pO ₂ calibration			
11 Jun	95%	1006 mb	
cell	1	2	3
calib	11.6	12.4	11.4
	55.8	55.8	52.8
mV	12.0	12.4	12.0
pO ₂	0.20	0.21	0.21
Next	1006 mb	Exit	

The last saved and active sample / calibration data, and the current mV and pO₂ values. The lower mb number is the current ambient pressure.

After a successful calibration the main configuration surface screen will include the current computed pO₂ values.

Deco model and dive options

Dive settings are made under menu items “Dive config”.



Model settings menu: Model, Conservatism value, GF settings.

Deco Model

Select from either VPM-B or VPM-B/E, ZHL-C + GF or VPM-B + GFS.

Conserv

Conservatism setting on VPM is from 0 through to 5. These levels match the V-Planner / MultiDeco desktop settings.

For VPM-B + GFS, select the VPM conservatism, plus the GF Hi setting for the GFS.

For ZHL-C + GF, set the Lo and Hi gradient values. The Lo is within the range of 10 to 100, and the Hi range is 50 to 100. The Lo value cannot exceed the Hi value.

GF NDL Lo: The GF Lo can be disabled from the start of the dive which will provide NDL times based on the Hi value only, and the displayed NDL times will be more typical of standard NDL times. However, when decompression stops commence, the GF Lo value will be restored and applied to the plan and a rush of

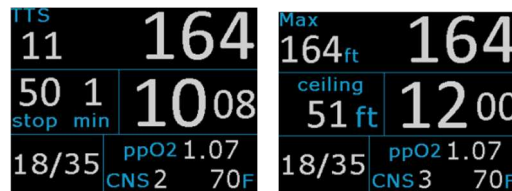
stops will appear to catch up to the previously missing GF Lo setting. This can be typically 3 or 4 levels of stops out to 6 minutes total or more.

Stop - Last Stop

Set the depth of the final decompression stop. Select from 10ft, 15ft or 20ft, 3m, 4.5m or 6m.

Stop - Type

This feature controls the method of displaying a decompression ceiling limit value, and the times required. “Levels” are regular decompression stops, spaced at 10ft or 3m intervals, with a matching time at the stop depth. A “Direct” stops show the precise deco ceiling value. This allows the diver to follow the exact deco ceiling through the ascent very closely.



Direct ceiling display: deco ceiling limit with.

In TDC-3, the “Direct” stop ceiling values have been rounded into 1m, 3ft mini steps. This gives the diver a ceiling limit that is constantly moving up at very short intervals. When the dive ceiling ascends through to 10m, 30ft, the mini stop values reduces to 0.5m, 2 ft levels. With Direct stops, only a ceiling depth limit value is shown and a time limit value is not present. As the dive progresses, and the ceiling reaches the regular Last Stop value, that Last Stop takes effect for the remainder of the dive, and displays a stop time

Stop - Safety

The TDC-3 has an inbuilt safety stop feature for NDL dives. This will show a safety stop symbol for 3 or 5 minutes, at the 15ft / 5m level at the end of a NDL dive. These conditions apply:

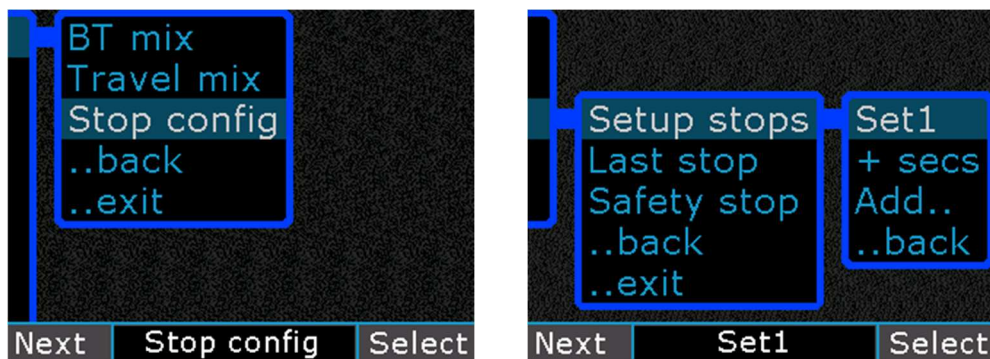
- Applies to NDL dives only, the dive must be at least 10 mins long and have passed 50ft / 15m depth.
- TDC-3- will assume the diver is ready to finish the dive, when he ascends above 18ft / 6m, and will start the safety time period then.
- If the diver then descends below 22ft / 7m, then the safety stop period is cancelled, and will reset time and await the next ascent.
- If the safety stop menu is accessed and a time selected, it will zero the timer (3 / 5 min), and start the period again.
- Safety stops are optional.

- Exceeding the safety stop ceiling, or cutting the time short, will not generate any warnings or errors.

Bottom timer (BT) mode settings

The TDC-3 bottom timer (BT) is different to any other seen before. This BT is built with the DIR diving style in mind, where the diver will specify his own set of stops and times, or insert a single stop during the dive, or can run on a simple countdown timer.

The bottom timer can be configured with a (4) sets of pre-defined stop table times. When selected in the water, the TDC-3 will display these as regular deco stops and times, and count down time as appropriate.



Enter a stop table level details.



Edit the times of each stop level. Edit the name of this table set.

NOTE: Must select the save item at the bottom, to save this table set.

+ secs

This configures the extra time added between the stop times set into the stop table. This is the extra transit time between the stops. Normal dive and deco models tables, have a

value of 0, as the transit time between stops, is inclusive in the stop times. However this option allows for the diver to add the extra time for transit, as separate from the stop time.

Notes on using Bottom Timer and stops setup.

- The BT has its own set of mixes to be entered and swapped as needed.
- The operation in BT mode will continue to track on/off gassing, and can be used in mixed combination with OC or CCR mode.
- During BT dive mode, the TDC-3 shows a screen similar to the OC mode. It will give warnings about ppO2 and other alarms. The stops appear as regular depth time limits, and the smiley limiter is displayed as well.

Notes on using Bottom Timer stops in the dive.

- During the Bottom Timer dive mode, NO decompression calculations are performed.
- When a table set is selected into use, it will start at the stop level from the list that is the current depth.
- The current stop table level time, can be reset by reselecting that table.
- A table set can be cancelled from the dive menu.
- Stop time only counts down when within 10ft/3m of the displayed stop (0 +secs), and within 5ft/1.5m when +secs is set to some value.
- Using the Insert a stop, will cancel the current stop table.

Divers are fully responsible for selecting and using the appropriate amount of decompression in Bottom Timer mode. The TDC-3 is not monitoring the underlying decompression in any way in BT mode.

Selecting a stop table in the dive

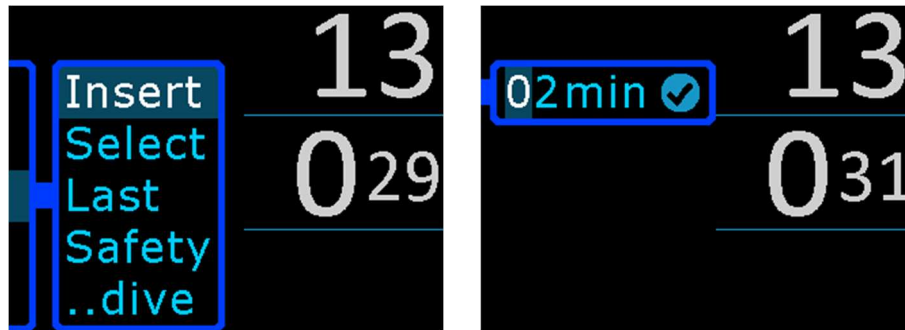
The diver can load the stop table into the ascent, during the dive from the menu.



Select a pre-made table. Stops will be created based on this table.

Inserting a single stop level

A single level stop can be inserted into the display as follows:

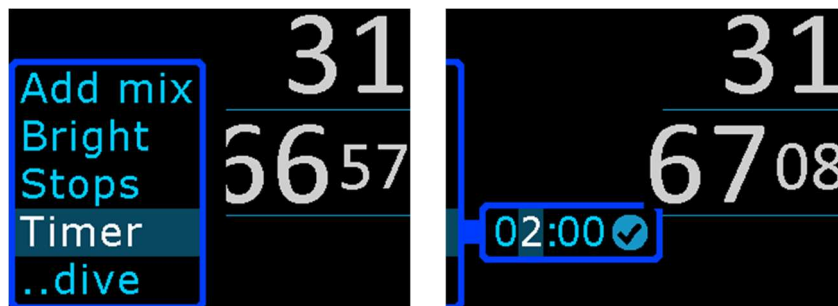


A single stop can be inserted at the current level (rounded to next 10ft/3m step)

The use of a single stop, will cancel any previous stop table selections, and visa versa. The User specified / selected stops do not affect the timer.

Setting the countdown timer / Stopwatch

A countdown timer, or count up Stopwatch, can be set in the dive as follows:



Enter a timer value.

The timer will appear as either of these (depends on Setting -> Layout->. Timer setting).



Countdown timer display – set the position in the Settings -> Layout config -> Timer.

Elevation diving in lakes and rivers

The TDC-3 will measure the air pressure at the dive site when in Awake mode or Sleep mode, provided it has been turned on in the last few days. TDC-3 will measure an average of air pressure over the five minutes before starting the dive. Divers should allow the TDC-3 to run for a few minutes before starting a dive, and this is extra important for those divers who travel to / from home / dive site, when the elevation of each is quite different.

The air pressure information is applied to the decompression calculations automatically, and the TDC-3 will display depths and decompression limits that have been corrected for the effects of the current ambient air pressure and elevation.

The current atmospheric pressure is available for viewing in the [CCR calibrations](#) menu.

Repeat dives

TDC-3 will display the surface time since the last dive during the surface display. TDC-3 tracks and computes the residual tissues loading components, and applies this to the next dive. This will result in a slightly reduced NDL time and decompression stops that accumulate more quickly on any dive that follows within a few hours. The repeat time component will be similar to conventional NDL limits and reductions of recreational diving tables. The VPM model conservative settings can have a large effect on the resulting NDL times of follow on dive.

TDC-3 does not provide any advance information or display to predict or show the diver the reduced NDL times of the subsequent dives. This information is only calculated as the dive progresses in the water.

Multi-day dives

Divers must make extra allowance for multi-day dive profiles, or other multiple dive sequences that place the diver at additional risk. In these situations, the diver should refer to their training for the appropriate additional rest or additional safety margins and decompression stops for multi-day diving, and apply these to dive plans and the limits shown by TDC-3.

Bounce and yo-yo dives

Bounce dives and yo-yo style dives (short deep exposures, or deep spikes with little or no bottom time) will add additional risk. The decompression requirements on this style of dive profile are influenced greatly by the diving procedures carried out, and the choices of breathing mixes. Problems encountered with these and other considerations of deep

bounce or yo-yo dives, and the additional times needed to clear these problems, can greatly exceed the relatively shorter displayed decompression times. Decompression obligations can accumulate at a rapid rate for very deep dives. A diver who undertakes these risky dive profiles, should apply additional safety to all plans and time limits shown.

CCR pO2 readings with Fischer cable.

This section of the manual applies to the TDC-3 EXT model only.

Overview

The TDC-3 EXT model, adds an external connector for the Fischer plug, to connect with 1 to 3 oxygen sensors from a CCR. This monitors the PO2 values on a CCR via a direct cable connection from the O2 sensors, and delivers that data to the TDC-3. These signals are processed by the TDC-3 and are converted to pO2 information for the decompression algorithm. The data is computed into an ascent calculation for producing decompression limits. See also details about [pO2 calibration](#) procedure, diving the TDC-3 EXT pO2 module and [underwater pO2 menu](#).

Warnings and limitations

Be aware and understand these points:

- The data on the pO2 cable can stop functioning without warning, at any time, thereby depriving the diver of all pO2 information.
- TDC-3 will completely stop showing all pO2 data, any time the “No Data error” is activated, or the diver selects a manual SP via “Go Sp” menu.
- TDC-3 cannot determine the satisfactory condition of an O2 sensor, and cannot detect any defective components in the rebreather systems.
- An additional and independent pO2 display is required at all times.
- TDC-3 must not be used as the authoritative or sole display of pO2 level, or other rebreather status information.
- TDC-3 cannot be used to replace a rebreather’s original equipment that controls oxygen injections or other oxygen level control systems.
- The pO2 information displayed in TDC-3 may not be accurate and it must not be used for making adjustments to the rebreather’s oxygen settings.
- A defective or old O2 sensor will generate false signals that can have deadly consequences, or give readings that lead to incorrect amounts of decompression.
- O2 sensor cells have an expiry date.
- O2 sensor cells can fail before the expiry date.
- O2 sensor cells must be validated for satisfactory signal output regularly before use, in accordance with the rebreather test procedures, or cell manufacturer procedures, or by using other established procedures and test equipment.
- A valid and accurate O2 sensor calibration procedure is required before use.
- Inaccurate sensor calibration procedures can have deadly consequences, or give readings that lead to incorrect amounts of decompression.
- TDC-3 does not have any control of the rebreather’s oxygen injection system, or any other systems or components of the rebreather.

Wiring of cells

The TDC-3 will accept any combination of one, two or three cells connected to any of the three O2 input channels. The TDC-3 will test and discover the connected components, and does not need to be configured for the number of cells or locations.

During the calibration process, the O2 cells will be tested against the cell manufacturer specifications for output voltage. TDC-3 accepts the two common cell types (11mV and 25mV in air). Cells that do not meet the Teledyne or AI specifications in air or at a corrected 1 ATA of O2, will be rejected and the calibration will fail. The allowed range for 11mV cells is 36.5 to 69.4mV at a corrected 1 ATA O2. The 25mV cell allowed range is 106.2 to 133.5mV at a corrected 1 ATA O2.

PO2 data logic

3 cell inputs

During the dive: The TDC-3 will display the highest reading cell, or 3 cells as numbers, or as bars. All three cells values can be seen via a menu item - see underwater pO2 menu.

The pO2 reading used for decompression calculations is an averaged value. The formula used will vary, depending on the quality of the three data signals received. If the 3 cells are within 10% of each other, then an average of all three is used. Beyond this, the average is gradually biased towards the two most consistent cell values. When the disagreement exceeds 25%, the extreme cell value is dropped from the average and the cell inputs are forced to a 2 cell system, but the highest cell reading remains visible. If the errors grow another 15%, then all signals are ignored and the TDC-3 is forced into manual Set Point operations.

2 cell inputs

During the dive: The TDC-3 will display the highest reading cell, or 2 cells as numbers, or as bars. Both cells values can be seen via a menu item - see underwater PO2 menu.

The PO2 reading used for decompression calculations is an averaged value from the 2 cell readings. If the 2 cells disagree by more than 25%, then both signals are ignored and the TDC-3 is forced into manual Set Point operations.

1 cell input

During the dive: The TDC-3 will display the single reading cell at all times, and it is used for the decompression pO2 value.

In all cases, the value used for decompression calculations is further dampened to reduce the strong oscillating found in pO₂ readings. The actual value used is not available underwater, but can be seen after the dive in the dive log manger. Under normal operations, it will be similar to the high pO₂ value.

pO₂ display in the dive

The pO₂ values can viewed on the main dive screen in 3 different ways, selected via the pO₂ underwater menu:

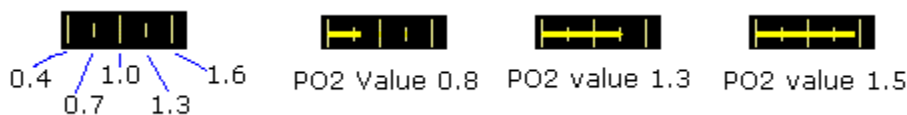
- As a single pO₂ value (1 cell), displayed as the highest cell reading.
- As a series of three pO₂ readings (3 cell). 1.25 1.23 1.24
- As a bar display (Bar), drawn over a graph background – see the diagram below.



Three ways to display PO₂ information: 3 cells, 3 bars (1.25 shown), or highest cell. These are selected via the Config setting, and the UW display menu item.

The 3 bar display is works like the gas (petrol) gauge in a car:

(E, ¼, ½, ¾, F). At the left side the pO₂ value is 0.4, the middle bar (½) is 1.00, and the high bar is 1.60. If the diver is aiming for a pO₂ of 1.00 to 1.30, then keeping the bars in the ½ to ¾ range would represent this.



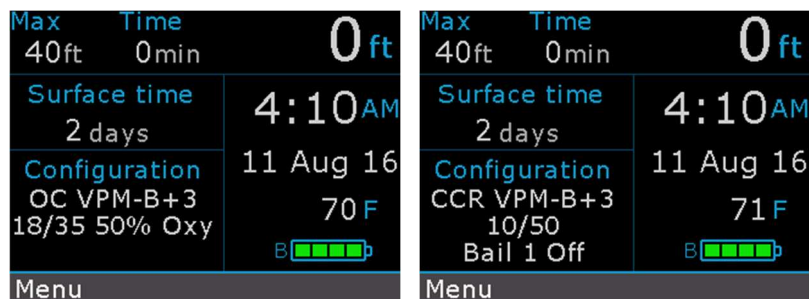
Samples of the PO₂ bar values display.

The pO₂ display option can be set under the [pO₂ config](#), and set during the dive with the underwater [Display](#) options menu.

Diving the TDC-3

Overview

Divers should review the current settings and dive configuration prior to entering the water as shown in the Configuration window on the surface screen. Many of the configuration and setup items can only be adjusted on the surface, and are not available during a dive. Any omissions may require the diver to re-surface and adjust.



The current dive plan summary selection with OC and CCR samples.

The TDC-3 should be powered up with the surface view display showing when entering the water and leaving the surface. The TDC-3 can start by itself from sleep mode when underwater, but this will depend on the last time it was used and turned on. The TDC-3 will only monitor for water pressure, if it was used in the last days. The recommended method is to have the TDC-3 awake with the screen active, prior to the dive..

When the diver climbs into his/her diving rig, the struggles and bumps can easily create inadvertent taps and cause the TDC-3 to enter menu mode. Subsequently the motion can create menu tap commands that were not intended, or change items at random. To avoid this situation, set your TDC-3 tap strength to Hard or Med. Divers with scooters also need to be aware that the vibrations from the scooter handle can trigger unwanted taps and apparent auto select of random menu items.

The conservative level setting in the Model config menu, can have a significant effect on the NDL and decompression time limits shown. To match NDL times to the typical recreational times, set the conservatism to 1 or 2. For increased decompression times, set the conservatism to higher values.

The TDC-3 can be worn on either wrist and the screen display inverted via a Display config item (flip screen).

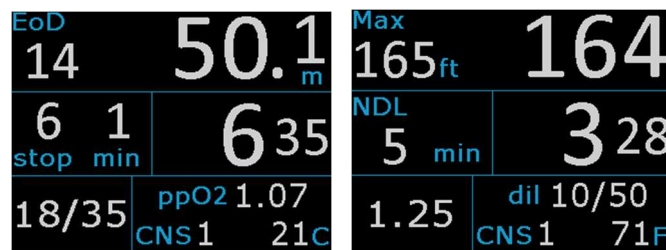
A diver will sometimes want to drop down under the surface to pick up items, before commencing the dive proper, and this would normally cause a dive record to start and end briefly in the computer. TDC-3 allows for this situation, and will compound any short surface intervals (less than 5 minutes) into a single dive record. Any brief surface

intervals during or after a dive are also compounded into a single dive record. The displayed runtimes will resume and continue where it last finished upon surfacing.

The TDC-3 will enter into dive mode automatically when passing a depth of 1.6m or 6ft deep from an Awake or Sleep state. Dive mode will stop on ascending through 0.5m / 1.5ft.

The TDC-3 will commence the dive with the dive plan's Bottom mix auto selected (BTM item). For CCR divers using a fixed setpoint, the "Start SetPoint" value is set automatically into the Setpoint field on each new dive. If the Auto Setpoint switch is activated, then this will increase the setpoint automatically at the appropriate depth or time. At all other times, the diver will need to manually adjust the setpoint to use through the remainder of the dive.

The TDC-3 will display Depth and Time throughout the dive. In OC circuit mode, the mix is shown and the expected ppo2 of the inspired mix. For CCR circuit mode, the current setpoint pO2 and diluent are shown.



OC and CCR underwater display samples

Left: 18/35 trimix mix selected in OC at 50m deep and deco stops.

Right: The CCR has a set point of 1.25 at a depth of 164m an 5 mins NDL.

Descent and ascent

TDC-3 will sense the changing depth and show an ascent or descent rate in the upper left corner. This will be in units of Meters per minute (mpm) or Feet per minute (fpm). It also shows an up or down arrow along with the value. Any rates that are less than 12 fpm / 4 mpm are not shown.



Top left window changes to show ascent / descent rates.

NDL – No decompression limit

The dive computation will run continuously, re-computing the ascent from the current position every few seconds and displaying the results. The TDC-3 starts the dive computing an NDL limit for the dive. This is displayed in the middle left window. The

NDL times are similar to many recreational dive limits in use. NDL times greater than 99 minutes are not shown and replaced with three dashes. As the dive becomes longer or deeper the NDL time will reduce to 0 minutes, and then this window will convert to display Deco Stop depths and time limitations as appropriate. At this point in the dive, decompression stops are required. The maximum depth is displayed in the top left of the display.

Decompression stop limits for ascent



A decompression stop limit of 6m for 1 minute.
EOD (end of dive), TTS (time to surface), MAX (max depth) samples.

The decompression stop information is shown in the middle left window, as a stop depth and required time at that depth. As the dive progresses, the depth and time values will increase. During the subsequent ascent, the diver will need ascend up too, and hold the depth shown in the middle left window.

The top left window will cycle through three different displays: EOD = End of Dive time. It is the sum of runtime + the TTS time. TTS = Time to Surface. This is the time required to complete all decompression stops and the ascent fragments to reach the surface. MAX = Maximum depth for the dive. When the diver is moving up or down in the water, the top left portion will display the ascent or descent rate value.

Decompression stops

When the diver is approaching the decompression zone and the displayed deco stop depth, a new smiley window display is shown in the top row. This is a scrolling graphic of the relative position of the diver to the deco stop depth.

When the diver is deeper than the required stops, a set of up arrows prompt the diver to rise up to the decompression stop level.



Left: approaching the required stop depth with up arrows,
 Middle: getting closer and the stop level and stop sign scrolls into view,
 Right: diver is positioned at the stop depth, with the stop sign centered, but a mix change warming is showing.



Correct mix now selected, and time to move onto the next stop.

As the stop level is approached, a stop sign will scroll into view and eventually center in the window as the diver reaches the displayed stop depth. The diver can monitor his/ her location with the stop sign alone by aiming to keep the sign centered in the widow.



Diver positioned at the stop depth, with the stop sign centered.

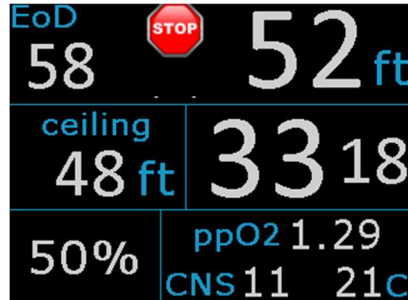
If the diver was to ascend above the required stop level, then a hard ceiling graphic lowers into view in the window. If this intrusion above the deco ceiling is excessive, then the stop sign is deleted and the flashing hard ceiling is shown and intrudes further into view. To correct this situation, the diver must descend back down to the required decompression stop level.



Diver has ascended above the decompression stop limit, and stop depth warning showing.
 The hard ceiling graphic intrudes into the picture, and replaces the stop sign.
 Diver needs to descend back to the correct deco stop level.

Direct ceilings

A “Direct” ceiling does not use the conventional stepped deco stop levels, but instead slowly decreases the ceiling limit to show the precise decompression ceiling value. This has the advantage that it allows the diver to follow the exact decompression ceiling though the ascent very closely. This will usually provide a slightly reduced overall decompression runtime, particularly on very deep dive profiles. The Direct ceiling limit will change often and by smaller amounts, and requires more attention from the diver to monitor and to follow these limits.



Direct ceiling display: deco ceiling limit shown.

For depths greater than 30ft / 10m the Direct ceiling limit is shown as a small decrements of 3ft / 1m. From 30ft / 10m up to the Last stop depth, the Direct ceiling mode will provide smaller steps of 0.5m and 1ft. When the Last stop depth is reached, the regular Last stop will take over. When a Direct Ceiling is being displayed, the individual stop times are not shown. The smiley face display is shown during direct ceilings, and is the easiest source for the diver to adjust depth with. When the deco reaches the last stop depth, the regular Stop display shows for the remainder of the required decompression.

Underwater Menus and settings

Overview

The underwater (UW) menus are activated with the left button, or two taps on the top of the case of the TDC-3. The menu system will display and various items are available, depending on the dive settings and the dive conditions. Scroll up or down the list, including items off screen, and then select the item by a right button press, or a left side tap.

These are samples of the most common menu items underwater, and the order and items may change, depending on the dive and options.



Sample OC and CCR underwater menu items.

The actual items available depend on the dive and settings (some items not shown).

After ten seconds (adjust with timeout menu), the menu system will vanish, and the regular depth and time dive display returns. If the diver selects an item and completes those choices, then the dive display returns immediately.

The Depth and time are always shown to the right of the menu, and will update accordingly. Depending on the current scrolled item, the current value may be seen in the lower right screen.

Under the water, the menu selection and scrolling is easily performed with gentle but firm tapping action with the index finger. A pinch motion with the thumb or index finger to top or bottom works well too.

The following points are relevant to diving TDC-3 and menus in all dive modes:

- TDC-3 will not switch mixes for the diver. The diver must select any mix changes underwater manually.
- TDC-3 will start the dive using the bottom mix item from the dive plan (BTM item).
- The diver can adjust the selected mix via the underwater menu items “Decogas”.
- The set point is adjusted via underwater menu item “Set Point”.

- During decompression, TDC-3 will monitor the current mix and compare these to the initial dive plan. It compares these based on the depth of the stop, and the pp or MOD settings used in the initial plan. If the diver has not selected the planned mix, the TDC-3 will flash the mix display.

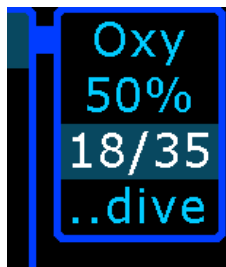
The following points apply to menus with CCR divers using a fixed setpoint:

- The initial set point value is per the Start set point value specified in the CCR mix entry table.
- TDC-3 will not adjust the set point value ever (except for the initial Auto Setpoint select). The diver must make any set point changes manually underwater.
- When the Setpoint menu is first activated, the initial value shown will be that of the planned bottom mix Setpoint (to facilitate a quick swap after descent).
- When a new diluent is selected, the current set point value remains active. Any changes required to set point under water for constant / fixed CCR, require the diver to change the set point manually.
- The diver can have TDC-3 monitor the current setpoint at various stages through the dive. See the [Alarms](#) topic for details.

Deco gas / Diluent



These menu items bring up a list of available deco and bottom mixes. Press left button or scroll up / down and right press or side tap to select a new breathing mix. Use this list to have TDC-3 change the current mix selection, and start computing the dive with this new inspired mix. Note that TDC-3 will not switch deco mixes automatically and the diver must make all selections manually through this menu item.



Deco mix or Diluent swap selection menu.
Up / down tap to scroll, left or right tap to select.
Selected item will appear in bottom left window of dive display.

After selecting a new mix underwater, the current NDL or decompression limit times are replaced with the word “WAIT” while the new result is computed and displayed.

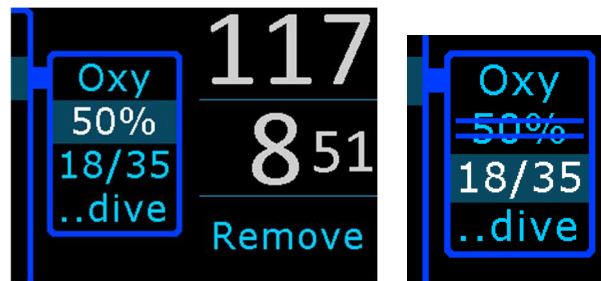
Normally this is just a few seconds, but can be up to 10 seconds for dives of 150m / 400ft or more.

These menu items are not present when only one gas is used. The items in this list are those set by the diver in the dive plan, before the dive started. This list can be modified during the dive, by removing a mix with “Lost Gas” menu, or by adding to the list with the “Add a mix” menu item.

Lost Gas

Lost gas

This menu is similar to the Deco Mix list. A lost gas is one that no longer is usable in decompression. Selecting and removing a mix here will exclude it from the current decompression calculations. The concept of this item is to allow re-planning underwater when a deco mix has become unserviceable.



Left: Mix 50% is about to be removed from the plan and the decompression calculations.

Right, after the mix has been dropped from the available deco gas mixes.

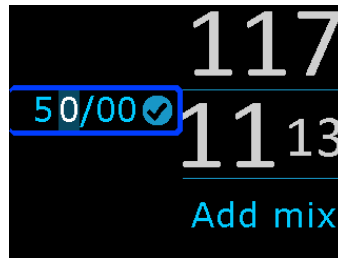
It can be restored by repeating the same procedure, or by the Add mix menu item.

Lost or excluded mixes will appear with a strike through text. As a result of excluding a mix, the required overall decompression and dive run time will lengthen. A gas can be restored to usable state by repeating this selection process, and the display above will instead say “Restore”. This menu item is not present when only one gas is used.

Add a mix

Add mix

Use this menu item to insert a new deco mix into the current dive plan and calculations. The concept of this menu item is to permit the diver to correct for omissions in the current plan. Note that the recommended method is to add deco mixes on the surface prior to entering the water.

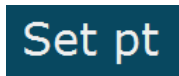


Adding a new mix: Edit: use left press, scroll up down to edit, right press to keep;
Save: right press / tap right to check mark to save.

The following limits apply to adding a new mix:

- Only deco mixes can be added i.e. the O2 component of the new mix must be greater than the current BTM mix O2 component.
- The added mix is inserted and calculated into the plan immediately.
- The new mix must be selected manually, as per the Deco mix / Diluent menu above.
- There must be a blank entry in the existing mix table. When the OC / CCR reaches 10 active legs (5 for bail out), then any attempts to add more mixes is ignored.
- Duplicate mixes are ignored.
- This procedure will restore a Lost mix, if the gas components were the same.

Set Point



For CCR dives – adjust the constant or fixed set point ppO2 to match the value in the rebreather. Scroll up down to adjust, side tap to accept. This new selection will then be used for all decompression calculations. This new value overrides any value set during dive planning. The current Set point selection is displayed in the lower left window of the dive screen.



Underwater set point adjustment.
Scroll up down tap / left button press to adjust, left right tap / right button to accept.

When this menu item is first activated on each dive, the initial value will be preset with the planned setpoint of the bottom mix. This is to allow for a quick selection to advance from the low setpoint value used in the descent, up to the regular bottom portion setpoint value. See also the [CCR Initial setpoint](#) topic.

After selecting a new set point value underwater, the current NDL or decompression limit times are replaced with the word “WAIT” until the new result is computed and displayed. Normally this is just a few seconds, but can be up to 10 seconds for dives of 150m / 400ft or more.

pO2 set

This section of the manual applies to the TDC-3 EXT with Fischer cable.

pO2 set

Display

Choose between the 3 display types – 3 cells, bars, or a 1 cell display.

Go Spt

This will terminate the pO2 input data, and commence the fixed set point decompression going forward. This choice cannot be reversed.

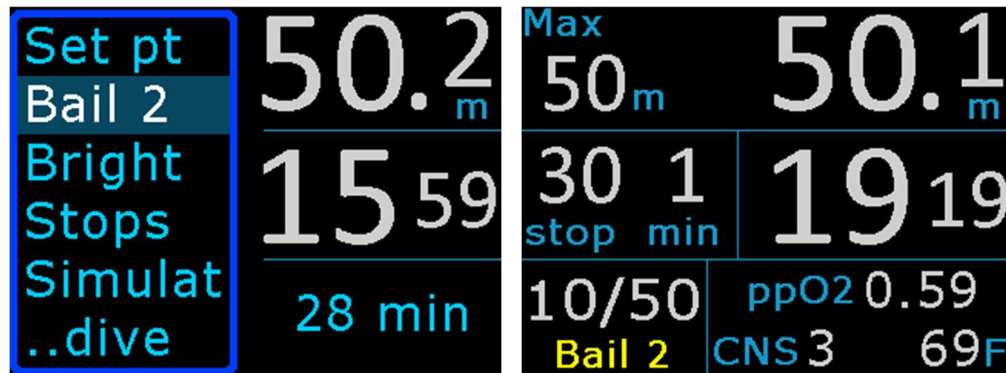
Once SP mode is selected here, TDC-3 will remain in this manual SP mode for the remainder of the dive. The initial setpoint used here, is the value entered in the dive plan mix tables. The diver must control the SP manually from this point onwards via the [Setpoint menu](#).

WARNING: When the manual setpoint is selected, all PO2 data is removed from the screen and menu system in TDC-3 – you cannot view any pO2 data! Use the rebreathers primary pO2 display to view your pO2 information from this point onwards.

Bailout 1 and 2, Back to CCR

Bail 1 Bail 2 CCR

These items allow the diver to switch from the regular CCR plan, over to a bailout out plan quickly. After a bail out plan is selected, the diver can return to the regular CCR plan with the Back to CCR item. The bailout plan items must be completed on the surface before the dive. If a bailout plan is blank, then it will not be available underwater. See the [CCR bailout](#) section for more information on bailout plans.



When scrolling the Underwater menu, the required TTS (deco time) is shown for this bailout plan.

A text label appears under the mix when bailout 1 or 2 is engaged.

Display

Bright

Options for changing screen brightness.

The brightness has five settings. Auto is the preferred setting and will adjust the screen as needed. The Dim setting will give a reduced brightness over all, but save about 50% extra battery time. The screen brightness is the biggest drain on the battery.

Set GF

Set GF

When the current dive plan is using the ZHL-C + GF decompression model, the GF settings can be adjusted during the dive. Care is required to only set GF values that are relevant to the current dive state. Once a change is made, the current plan is recomputed to the new settings. This may take a few seconds, and a “WAIT” sign is displayed.



Adjusts the ZHL-GF settings during a dive.

Ceilings

Stops Type

Controls the method of displaying a decompression ceiling limit value, and the times required. “Levels” are regular decompression stops, spaced at 10ft or 3m intervals, with a matching time at stop the depth. A “Direct” ceiling shows the precise deco ceiling value. This allows the diver to follow the exact deco ceiling through the ascent very closely. In TDC-3, the Direct ceiling values has been rounded off slightly to 1m, 3ft mini steps. When the dive ascends through 10m, 30ft, the mini steps reduces to 0.5m, 2 ft levels. With Direct ceilings, only a ceiling value is shown and a time value is not present. When the ceiling reaches the Last Stop value, the regular Last Stop takes effect, and displays a stop time.

LastStop

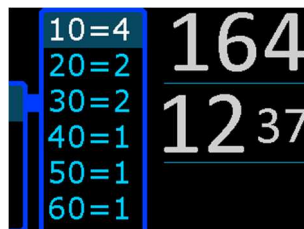
Stops Last

Set the depth of the final decompression stop. Select from 10ft, 15ft or 20ft, 3m, 4.5m or 6m.

Stop table

Stops Table

This menu item will bring up a table of individual stops and times for each stop. Note that this menu is available when there are at least two deco stop levels remaining to be carried out. Left press, or tap the top or bottom case to scroll the list. Right press, or tap to the side to exit. The stop table list will show stops down to 300ft or 90m only. Stop time shown is the individual time required at each stop, and do not show total runtime information. The total runtime can be seen in the TTS item on the regular dive screen.



10=4	164 12:37
20=2	
30=2	
40=1	
50=1	
60=1	

In this example the depths from 10 through 60 on the left, and times at each level on the right side (4 mins at 10ft).

In [Bottom timer](#) mode, the diver will specify the time of each stop, in the Stop config-> Setup stop menu.

Stop Safety

Stops Safety

The TDC-3 has an inbuilt safety stop feature for NDL dives. This will show a safety stop symbol for 3 or 5 minutes, at the 15ft / 5m level at the end of a NDL dive



. These conditions apply:

- Dive must be at least 10 mins long and have passed 50ft / 15m depth.
- TDC1- will assume the diver is ready to finish the dive, when he ascends above 18ft / 6m, and will start the time period then.

- If the diver then descends below 22ft / 7m, then the safety stop period is cancelled, and will reset time and await the next ascent.
- If the safety stop menu is accessed and a time selected, it will zero the timer (3 / 5 min), and start the period again.
- Safety stops are optional.
- Exceeding the safety stop ceiling, or cutting the time short, will not generate any warnings or errors.

Bottom Timer Stops

Insert Select Cancel

This bottom timer allows for the diver to pre-set a table of stops, to be selected in the dive, or for a single stop to be inserted at the current level. See the [Bottom Timer](#) topic for details.

Timer / Stopwatch

Timer Stopwatch

The countdown timer can be activated in all modes. The location of the timer can be set with the [Layout config](#) settings. The timer can be configured as a countdown timer, or a regular count up stopwatch with a start /stop / zero function

Alarms

Alarms

This turns the Alarm checks Off, or ON. The alarm values that trigger here must be set before the dive. See the [Alarms](#) topic for details.

Compass

Compass

This brings up the underwater compass display for navigation. See the surface [Compass](#) topic for notes of calibration and magnetic variation, heading pointers, and reset procedures. The compass can operate reliably in any attitude, up to 90° pitch or roll.

The compass can be activated through the menu, or via the right button in the dive.

If a warning becomes active while the compass is showing, then compass will be automatically terminated.



Compass heading of 280°.

Green triangle is the selected heading pointer: in this case off to the left side.

Red lines in the compass lubber line.

Blue line (not shown) is the reciprocal heading.

The compass requires a calibration procedure before use. This happens automatically while its being used. The more the unit is rotated ,and flipped, the better the heading readings become.

A question mark (?) will show if insufficient calibration data is present. To resolve this, rotate the TDC-3 around every attitude (face up, down, sideways) and the 4 basic directions. The reset menu will clear the saved data and start a new calibration.

Return to dive



Closes the underwater menus and returns to the dive display. This will also happen automatically after the value set into Display Times outs – UW menu.

After the dive

When a diver surfaces, TDC-3 will return to surface mode display. There is a five minute period where the diver can return to the water and resume the same dive. In this situation, the dive runtime resumes where it left off when last surfacing. After five minutes on the surface, and new dive log and entry will begin upon commencing the next dive.

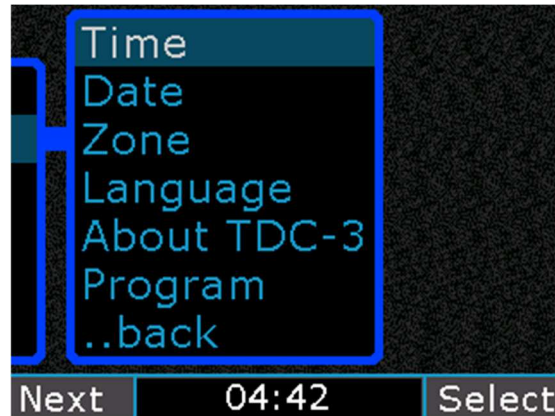
After ten minutes or so on the surface, the TDC-3 will automatically turn off the display and enter sleep mode to conserve the battery. The TDC-3 can be brought back to awake state with a right button press. The TDC-3 will continue to monitor for the start of a new dive, for a few days. After several days of no usage, the TDC-3 automatically goes into a deeper sleep mode to preserve the battery. From this state, the TDC-3 needs to be made to run with a button press to wake it up, or with a the flip-flop action.

The dive just carried out, can be reviewed with the surface menu item “[Logbook](#)” and “Last dive” or “history”. There are tables of data, and graphs of depth and temperature available. See the Logbook below.

System settings

System settings control the device functions of the TDC-3.

Time, date, zone



The Clock and language setting is under System menu.

The time and date are set into the TDC-3 with the Date / time menu item. A time zone setting should be used to adjust for daylight saving, and dive vacations to different parts of the world. This will keep the internal clocks accurate and provide proper time offsets for logs and tissues.

The time seconds value (which is not shown) is set to zero each time the Save is selected.

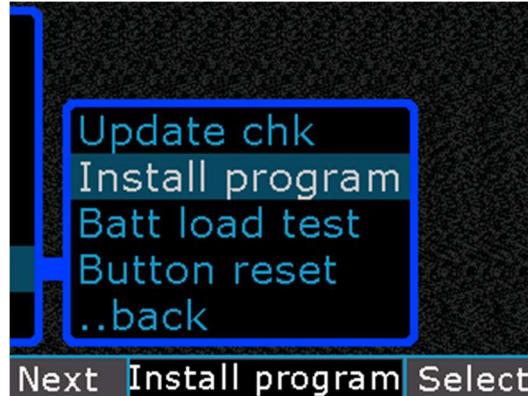
Language

The Language item will change the displayed texts into a different language. Current languages choices are English, French. Others can be added with your help. Contact [support](#) to contribute a new language conversion.

About TDC-3

Displays version regulatory, and author information.

Program



- Update Check: will start the [Internet Utility](#).
- Install program: will start the [Install Utility](#).
- Batt load test: will start the [battery load tester](#).
- Owner reset: will erase the owner information and require the TDC-3 registration process to be repeated.

Button reset (sensitivity)

The button sensitivity can be reset from this menu. When the screen prompts for presses, make 3 NORMAL presses. The device will sense how strong you prefer to press, and saves that as a threshold for future use. If you make soft presses during the sample period, it will always expect soft presses in operation.

When the device is sampling presses, wait 2 seconds between sample presses, so the device can fully stabilize.



To reset button sensitivity, make 3 normal sample presses on each side.

Beeps, flashes and alarms

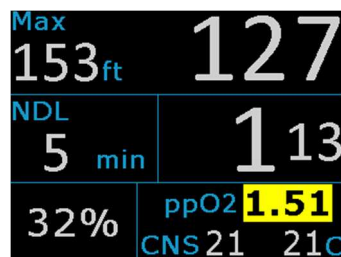
During the dive

The TDC-3 will cross check for the divers adherence to deco stops and the dive plan, and for excessive ppO2 levels. The following items are checked and various visual alarms are generated.

- Diver rises above deco ceiling: Ceiling drops into smiley window, Deco stop value flashes.
- A deco mix switch was planned, but is not yet selected by the diver – bottom left mix value flashes. This will continue until the correct mix has been selected.
- OC mode: the inspired mix exceeds 1.60 ppO2: The ppO2 will show red, and the current mix is highlighted.
- OC mode: the inspired mix exceeds 1.50 ppO2 with mixes < 40% fO2: The ppO2 will show yellow, and the current mix is highlighted.
- CCR mode: will warn when the pO2 setting is higher than the ambient pressure value.



Left: Reminder to make the deco mix swap. Right: diver ascended above deco stop level.



Left: warning of excess ppO2 level (ascend). Right: ppO2 too high (ascend).

The TDC-3 does not emit any beeps or other sounds.

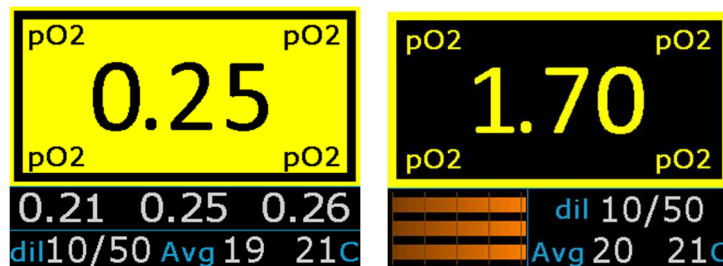
EXT Fischer - Alarms, warnings, beeps

This section of the manual applies to the TDC-3 EXT model only.

TDC-3 will monitor for high or low PO₂ values and issue warnings. The high PO₂ warning is based on the highest reading value. The low PO₂ warning is based on the value used for decompression calculations.

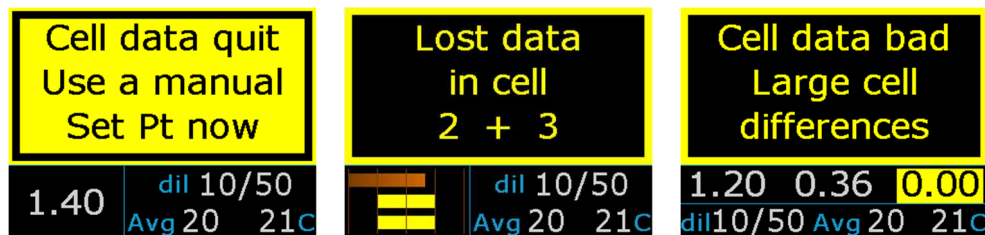
Warnings and beeps will trigger for the following conditions:

- Highest pO₂ cell reading exceeds 1.65 (for setting ppO₂ alarm = 1.6), or 1.45 (for setting ppO₂ alarm = 1.4).
- Averaged or highest pO₂ cell readings are less than 0.35,
- For a 3 cell input, pO₂ signal data becomes erratic and the data input is forced to 2 cells,
- For a 2 or 3 cell input, signal data errors or variance become unusable,
- When all data from the Fischer cable drops out, a warning is issued.
- pO₂ input is configured ON but no data was present when starting a new dive.



pO₂ is low, or high. The screen will flash with current pO₂ value.

The pO₂ high / low warning screen cannot be cleared. It will continue to flash while the extreme pO₂ condition exists. The menu system may still be accessed if required.



Left: pO₂ data is not present, or data quality has degraded to unusable.

Middle: cells 2 and 3 dropped offline, now using just cell 1.

Right: data erratic, one channel is dropped.

These warnings will flash until cleared by the diver. To clear these warnings, press any button or bring up the menu. They will also self clear, if the underlying condition

corrects itself. Clearing the error, does not correct the error – it only acknowledges the diver was informed of the error, and clears the warning screen from the view.

The “Cell data quit” warning indicates that the computer has stopped receiving or using pO₂ data. The warning will transition the TDC-3 into fixed SetPoint mode automatically. The diver MUST now control the setpoint value manually, and the underwater pO₂ value display is REMOVED. The initial SP used here will be the value entered into the dive plan mix table.

NOTE: During all warnings, the menu system can still be accessed. Two regular taps, or the menu button will bring up the menu system for selection of Bailout, or other items as required.

Switching to / from manual SP

The pO₂ data input may be turned off during a dive from the underwater menu. This will disable all external data entering into the display and decompression calculations. All pO₂ data is removed. This action cannot be reversed. The dive must then be completed in manual SP mode, with the diver adjusting the setpoint value manually via the underwater setpoint menu.



Select “Go SPt”, to turn off all pO₂ data.

SP mode will be engaged automatically any time the external cell data signal is lost, or a new dive starts when the pO₂ input was set to operating but is missing, or the signal values disagree significantly.

This warning cannot be disabled. If the TDC-3 is to be used in CCR mode but without the external cable attached, then turn the pO₂ input OFF, to prevent this warning.

Selecting cells / lost signal

The TDC-3 does not permit the diver to select cells individually for the display or decompression calculation values. The TDC-3 will always show the highest reading cell to the dive screen. The inbuilt algorithm will use an average of the most agreeable cells

for decompression calculations. It also looks for and cuts out extreme single cell readings in a multiple cell data set. If the cable should be disconnected, then the TDC-3 will wait a short time for the signals to resume, and then fall back to manual SP mode. When the signal returns, it will resume PO2 operation in this situation.

Missed deco

If the diver has surfaced with some decompression stop time still remaining to be completed, then TDC-3 will:

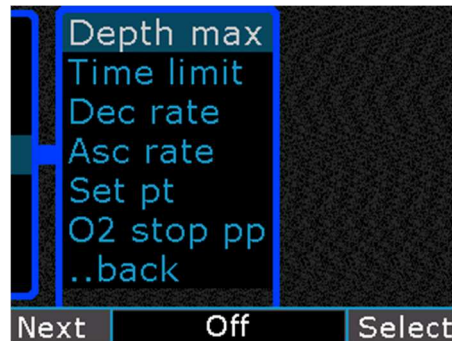
- Flash a warning message for the next 12 hours.



Missed deco stops error message will show on the surface.

It is up to the diver to decide the correct action to take, when significant deco time has been missed. Possible solutions might be, returning to the water and completing the deco, with an extra time margin. Or starting surface supplied oxygen breathing. In the worst situations, an emergency hyperbaric treatment may be the appropriate correction.

Alarm settings



Alarm settings that will trigger during the dive.

The diver can set additional alarms into the TDC-3 under menu Settings -> Alarm config. When triggered, these will cause the affected item become highlighted or flash (time, depth, ascent, decent rate).

SetPoint Alarm

This applies to CCR dives with a fixed setpoint only. It will trigger for three different situations:

- At 5 minutes into a new dive, it checks to see if the Setpoint has been adjusted from the initial descent value (only when 20m or deeper). This check is cancelled when the Auto Setpoint switch is activated and has been tripped by its settings.
- During the ascent on decompression stops, and if the dive plan has adjustments to the setpoint in ascent, then it will check for changes at the correct depths to the planned setpoints (within 0.10).
- It will monitor the current setpoint to ensure it does not exceed the ambient ATA pressure (typical during the last 2 deco stops).

O2 stop ppO2

This allow the diver to set the ppO2 at which the alarm triggers for the final stop when using 100% O2 as deco mix. The selections are a ppO2 of 1.6 or 1.9. This option is intended only for those performing O2 stops at 9m / 30ft.

The Alarms can be de-activated in the dive, with the Alarms underwater menu item.

Diver errors and decompression mistakes

Real life diving practices in decompression can sometimes include a variety of unintended and small excursions across limits or other infringements into deco zones. Also the diver rarely stays perfectly still during a deco stop to maintain the exact stop depth. Regardless of these diversions, TDC-3 is tracking the divers every move and re-calculating the results accordingly. TDC-3 will always do its best to compute the current required decompression stops. There are no lock out or “use tables” errors of any kind in TDC-3.

Small / brief deco ceiling infringements

If the diver breaks the deco ceiling by rising a small distance above the decompression ceiling limit, the diver is essentially speeding up the deco (called pushing the gradient). That is, the small increase in off gas gradients and off gas rates from the reduced ambient pressure (less depth), has sped up the deco overall.

In all cases TDC-3 is monitoring the diver's depth and computing this into the current gas loads and showing a set of limits accordingly. Short incursions into the deco zone, will not have any noticeable change on the final runtimes.

TDC-3 will warn when the diver breaks the deco stops limits, by flashing the alarm symbol, flashing the Deco stop depth and beeping. TDC-3 will continue to compute the deco as normal, taking these depth variations into the computations.

Larger deco ceiling infringements

If the diver breaks the deco ceilings by a large margin, i.e. was to rise up and miss several decompression levels, or to surface with decompression time still showing as required, then TDC-3 will still continue to compute the dive and deco stops required. If the diver can return to the required deco stop level within short time, then the diver can resume deco stops. The diver should however apply additional safety or take corrective actions for any large decompression stops mistakes.

NOTE: TDC-3 does not apply any penalties or extra time to decompression stops or runtimes for any diver decompression stop mistakes, or diving practices that infringe into the deco zone. It is up to the diver to decide if the infringement experienced, should require additional decompression time, whether to resume or even to abandon decompression altogether. When the diver has intruded excessively into the decompression zone, the information shown on TDC-3 should be treated as a guide only for the remainder of the dive, and the diver is to add an additional safety margin to the decompression stop times to adequately compensate for the deco zone infringement and diver errors.

NOTE: In these situations described above, and other areas of diving emergencies or mistakes, the diver should refer to their training for the appropriate corrective actions.

Dive planning

TDC-3 includes a dive planning tool. This can be used to generate tables of stop times for the next dive, and to see the impact of a surface interval on the next dive. The result can be written onto the divers slate as a back up table. This feature also includes gas planning and gives total volumes for all OC gas predicted for the plan.



Dive planner menu. Config items, add a new level time.

Bail 2 stop plan				
10 ft	26 min	133	Oxy	
20 ft	14 min	107	Oxy	
30 ft	16 min	93	Air	
40 ft	10 min	77	Air	
50 ft	7 min	67	Air	
60 ft	5 min	60	Air	
70 ft	4 min	55	Air	
80 ft	2 min	51	Air	

Bail 2 Mix consumed			
Oxy	25.3	CuFt	
10/50	7.2	CuFt	
Air	59.9	CuFt	

Plan result – stop depth, stop time, run time. Gas consumed result.

To plan a dive – select Plan dive. It will use the legs and times in the Level Time list and the configuration items of dec/asc rates and RMV rates.

The table result is shown on the “Next deco” screen. Scrolling downwards, the planned gas volumes are shown for each OC gas used. Gas volume does not include any reserves. The diver should adjust the rate, or apply additional volumes to include a reserve.

For CCR planning with bailout plans, the bailout plans are computed and displayed below the main CCR plan. Bailout on OC is computed as starting at the beginning of ascent. See the [Bailout considerations](#) diagrams above.

Dive planning uses the current tissue state in its calculations, and the elevation history. The stop times shown will change to reflect current conditions of surface interval, elevation and dive plan. If the diver was to follow the planned depth and time levels exactly, they could expect to see these limits displayed.

However, the in water dive calculation is based on the actual diver performance and data collected during the dive - ascent limits are calculated from actual tissue state. It will not follow this table, and divers normally do not follow the plan perfectly. Expect to see slightly different times during the dive – depending on how far the diver strays from the plan.

Operation

Add a level

Scroll to the Level Time, and then Add line, enter and scroll up/down to set a depth and a time. Scroll to the right to save the new level

Delete a level

To Delete a level Scroll to the Level Time, the item to delete, and scroll further right to the X to delete this line. There is no Edit feature – instead delete and re-enter a level.

SAC rate

The RMV rate is adjustable for bottom mix consumption and deco mix. The deco rate starts at the end of the first stop.

Asc/ Dec rate

Set the rates to use in the plan.

Calc

This starts the calculation of the plan. This can take some time to complete. The table result is shown on the “Next deco” screen.

Comparing plan times to the desktop V-Planner / MultiDeco

The dive results from TDC-3 Dive planning and the desktop V-Planner / MultiDeco plans can be made to align closely. Set the desktop program to the following configurations:

- Use the divers profile in the desktop – not Guest mode.
- Set descent at 60fpm / 18mpm and ascent at 30fpm / 9mpm
- Upload the tissue state from the TDC-3 into the desktop V-Planner / MultiDeco.
- Set the water type, elevation to match your current elevation, and check the ppO2 mix swap points match.
- CCR divers need to have ATM set points, and to check the Start set points match.
- Plans will match more closely with 30 second stop time rounding.

However, each program does some of its tasks differently, including the way it presents the first stop, and the rounding applied to ascent times. The dive and stop times will usually align within a minute or two, when the configuration and tissue states are synchronized. TDC-3 dive planning does not include any of the complex planning options of the desktop V-Planner / MultiDeco program. Close attention is required in keeping the surface interval correct in the desktop V-Planner / MultiDeco, and to making the configuration option match.

Dive simulator

TDC-3 includes a diving simulator. This can be used to learn and experience how the TDC-3 dive computer and TDC-3 will behave under water, before actually taking it on a dive. The simulator causes the TDC-3 to perform exactly as it does in the water, except that:

- The simulator always starts with a fresh (no dives) tissue state – therefore it will not consider any repeat dive components in its deco calculations.
- The simulator cannot be used for planning follow on dives from real dives.
- The simulated dives do not affect the saved tissue state after a dive – a simulated dive is a temporary condition that is independent of the current real tissue state.
- A simulated dive cannot be saved to logs and it will not show in any history or other review or surface display times.

Operation

When in simulator mode, the word “SIM” is flashed on screen during the simulated dive, along with the selected simulation speed (1x, 2x, 4x, 8x).



Dive simulator, starting from surface menu, and as seen in the dive..

Sim Auto

Select On or Off. Auto mode On will cause TDC-3 to carry out the dive, and any deco stops automatically, as per the depth and time settings below. The diver still needs to perform the deco mix swaps manually. With auto Off mode, the diver controls the depth setting throughout the dive with the Depth value, and therefore the dive runtime as well.

Depth/Time

Sets the simulator to carry out the simulated dive as per the depth and time set here. In Auto mode Off, only the depth is available and is set by the diver.

Sim Speed

This controls the speed at which the simulated runtime is performed. Set 1x for a real time dive, or set through to 8x to speed up the dive. As the dive gets deeper and a greater decompression obligation becomes necessary, the workload on the

CPU increases. For this reason, the allowable speed is reduced as the simulated dive depth increases.

Start / Stop

Starts or stops the simulated dive.

Go back / ...dive

Return to menus in surface mode, or to the simulated dive.

Simulated plans and the desktop V-Planner / MultiDeco

The dive results from TDC-3 simulator and the desktop V-Planner / Multideco plans can be made to align closely. Set the desktop program to the following configurations:

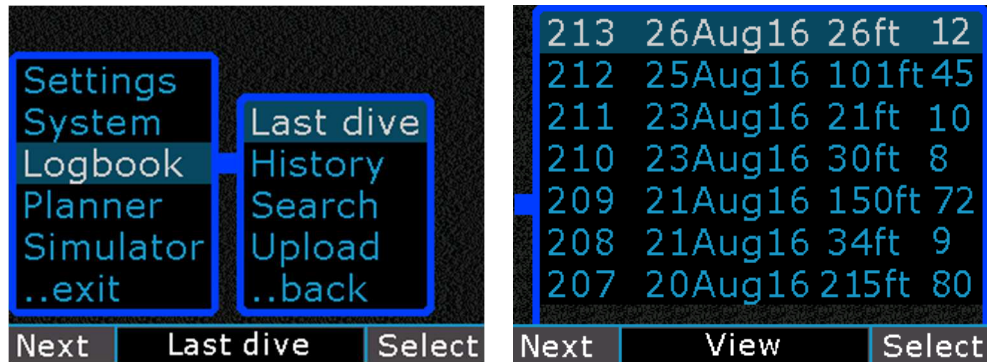
- Descend at 47fpm / 14.5mpm and ascend at 31fpm / 9.5mpm
- Use the “Guest” account, or a diver name with clean tissue state.
- Set the water type, elevation to 0 and check the ppO2 mix swap points match.
- CCR divers need to have ATM set points, and to check the Start set points match.
- Plans will match more closely with 30 second stop time rounding.

However, each program does some of its tasks differently. The MultiDeco program simulator does not change depth in perfectly straight lines – it has an inbuilt wobble to simulate real divers, and this affects crushing pressures. The MultiDeco program simulator sometimes overshoots its target or stop depth – like a real diver. In comparison, the desktop program is always a perfect cyber diver and never makes a diving mistake. The desktop V-Planner also includes code to round up the times into whole minutes so as to align the run time with a full minute boundary – the MultiDeco program does not need to do this, and so MultiDeco gets head start on deco by comparison. This rounding will also give the desktop a deeper first stop usually. The simulator when run at faster than real speeds (2x, etc) can get out of sync with the decompression calculations. A CCR dive needs to adjust the set point after leaving the surface, and the desktop needs extra data levels inserted to match up the set point changes in descent. The desktop plans have stops that are rounded up to a full minute boundary, where as the MultiDeco program is not limited to this.

These and other variances can add up to a few minutes difference between the two, and you should not expect to see a perfectly matched set of plans.

History / dive logs

The “History” menu and sub menus give access to previous dives for review, and various displays of dives and information saved into the TDC-3’s memory.



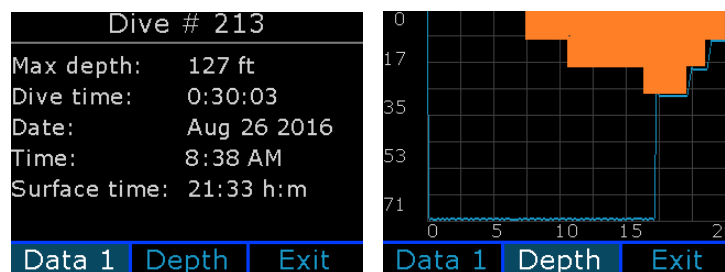
Dive history menu items and dive log summary.

The amount of data saved into the TDC-3 depends on the sample rate settings on the TDC-3 config sample rate (log period). TDC-3 saves data in a compressed format, and can typically save many hundreds of dives.

- 1 second sample rate – approx 200 hours diving,
- 5 second sample rate – approx 1,000 hours of dive data,

Note that the memory never fills up but will wrap around and it starts again, overwriting older dive information. For the dive data to be saved permanently, it should be uploaded to the PC using the MultiDeco Dive log Manager (available at: <http://www.tdc-3.com/>).

Dive Logs



List of dives carried out. Dive details, dive depth graph.

Data1 / 2/ 3 Up/down tap or Left button will cycle through details of the dive.

Depth / Deco / Temp Up/down tap or Left button will cycle through the depth graph, the deco stops graph, or the temperature graph.

Dive log search

The TDC-3 includes the ability to search through saved logs. The initial history screen will list the last 30 dives. Dives further back can be searched for, with the parameters of a dive number, a date, or by a ranges of dive numbers.



Log book search features: Dive #, Date, or a range of numbers.

Dive log Upload

The TDC-3 can upload its dives to the web. Select the Upload dives menu item to initiate this.

The procedure uses the WiFi to offload dives. Dives are sent to the TDC-3 cloud server on the web. The owner will then log onto to the server with the with the TDC-3 Dive log Manager (available at: www.tdc-3.com/download.php). The diver can then retrieve his dives into the Dive log manager, and review these as needed.

Compass display

The TDC-3 includes a digital magnetic direction sensor and uses this information to create a digital compass display. The compass can be used both in the water and on land or surface. The calibration page also allows setting of a local magnetic declination setting. The TDC-3 magnetic heading will generally be stable and consistent to within a few degrees. It is tilt compensated and able to give reliable readings at angles up to 90° pitch or roll.



Compass menu and dive display.

Green triangle is the set direction pointer – bug.

Red lines in the compass lubber line.

Blue lines (not shown) is the reciprocal heading.

For surface operation, select the TDC-3 Settings menu and then the Compass menu. For underwater operation the Compass menu appears in the [Underwater menu](#) list. It can also be started with the right button in the dive.

Calibration

The compass requires a calibration procedure to be performed before it can be used. The procedure is as follows:

- Start the TDC-3 compass (Menu ->Settings – Compass -> Start).
- Lay the TDC-3 flat on the table.
- Rotate it around through 360 degrees twice. Stop at each of the cardinal positions of North South East and West, for a few seconds each time.
- Stand the TDC-3 upright on its side.
- Roll the TDC-3 over so that each of the 4 sides of the TDC-3 has rested on the table.
- Lay the TDC-3 upside down so that it rests face down on the table.
- Return the TDC-3 to face up, and it should now show compass information.

The TDC-3 compass is in a continuous self-learning state and is testing the data for additional calibrations at all times. A specific calibration is not actually required, and the TDC-3 will do a self-calibrate by simply shifting the TDC-3 attitude around through all angles. The self-calibration procedure can be performed in the water by simply maneuvering the TDC-3 through the full range of attitudes and orientations.

The best calibrations are achieved by having the TDC-3 experience each of the maximum values possible. This requires magnetic and gravity detection in the X, Y and Z axis, and to spend a few moments at the cardinal points of each orientation.

The calibration data is lost each time the TDC-3 is re-booted or both batteries are changed.

Declination

Magnetic variation or Declination is set into the compass with the “Magnetic declination” menu item. The available range is from 45° W to 45° E. Consult a local navigation chart to determine your declination values. The variation setting could also be used to compensate for any deviation in your TDC-3. Declination values are automatically added to the heading shown.

Interference

Take care to avoid any source of magnetic disturbance when using the TDC-3 compass. This includes other magnetic compasses, the HID light, the power cable for the light, video equipment and scooters. All these will affect the heading readings, and the TDC-3 should be kept at a distance from these items.

Warning: the compass is affected greatly by local ferrous (magnetic) material. The most likely source of this problem is the batteries you install. Some batteries come with a steel casing, and are not suitable for use with a compass. If you intend to use the compass, then shop for batteries that are non-magnetic. Note that the Saft 3.6v are non-magnetic, and work just fine.

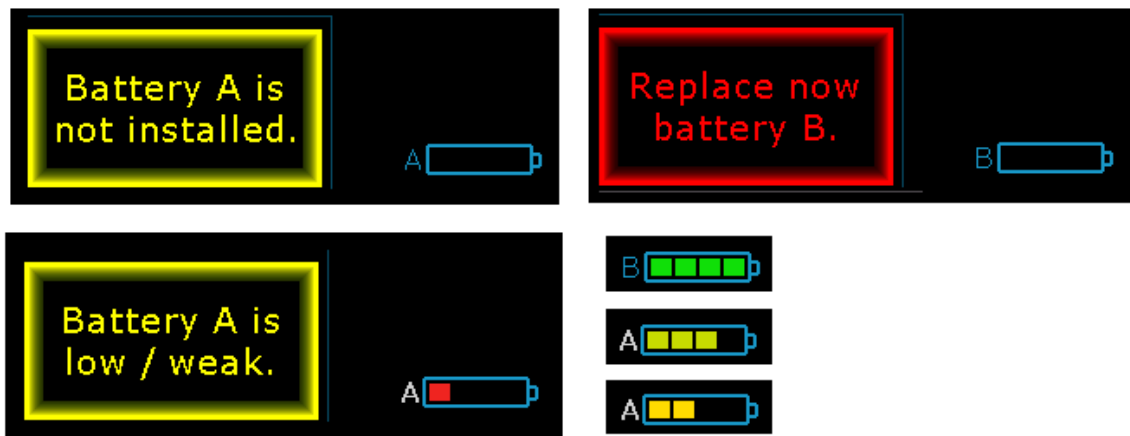
Reset

A reset will erase the saved calibration data, and cause the TDC-3 to begin learning the magnetic values again. A reset will be required any time the compass gets affected by other strong magnetic fields. A reset is recommended when travelling a significant distance, or diving in a different country.

Batteries

Description

The TDC-3 is designed to use two batteries. This gives a backup at all times, and allows the diver to get the full life from each battery. It has a circuit which includes logic to select one for battery for use, and leave the second battery in standby. The circuit will monitor battery state, and switch to the opposite battery when needed. The TDC-3 can switch the battery source under full load automatically without interruption to the operations.



Various battery state messages: The active battery is indicated with a white color letter (A/B).

The device will also run on regular 1.5v alkaline AA disposable batteries, like the Duracell brand. However the WiFi will not function on these batteries.

The computer will also work with 1.2v rechargeable batteries, but the experience is not recommended. The inbuilt error messages are scaled for 1.5v batteries and will interfere when 1.2v batteries are used.

Do not mix battery voltages. No harm will result, but the battery meter logic expects two batteries of the same voltages, and will become confused with odd sized batteries.

The battery life on 3.6v battery is about 60 to 90 hours each. However, this is dramatically affected by screen brightness. A cave or dark water, or night diver, will get a lot more life than a tropical sunny day diver.

The WiFi needs a good battery to operate, and it will select the best battery for its use. The good battery will need to make all green bars to run the WiFi.

If the WiFi keeps failing with No AP found, or has many error messages, then it will be a weak battery as the cause. If a lot of update checks are performed, then the reserve power in the unused hi battery will drain off.

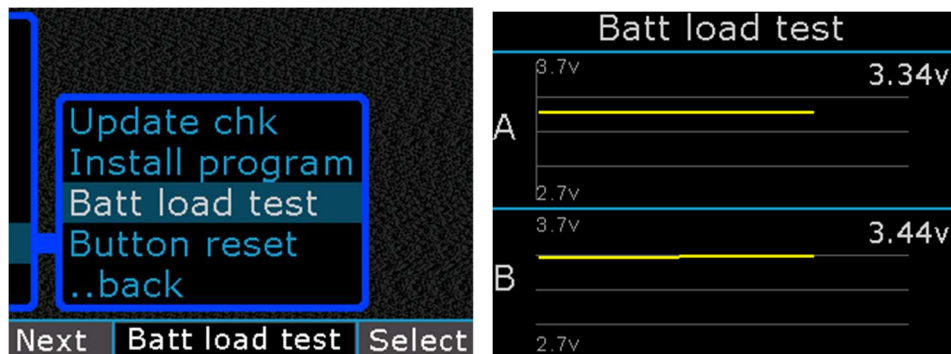
The shelf life of the TDC-3 battery is approximately a year, although that will use all the battery up. Hence for occasional use of the TDC-3 after 6 months, a new battery needs to be sourced.

The device can run with one battery only installed, and will function as usual, but without the backup.

Load testing

The TDC-3 includes an inbuilt load test for the installed batteries. It will place the non active one under simulated load, and graph the results. Both batteries must be installed to perform this test.

To run this test, select Menu -> Settings -> Program -> Batt load test.



Battery load test.

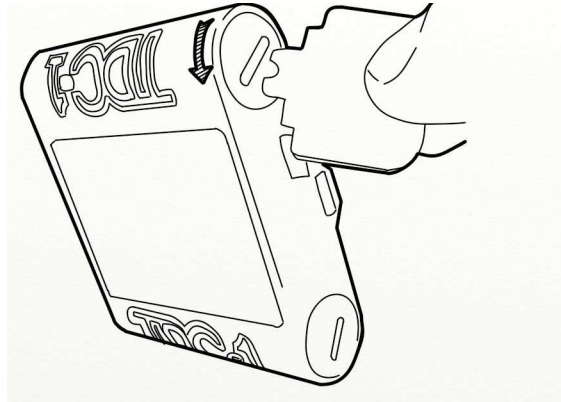
The test will show a voltage result. For 3.6v Saft batteries, they can be used down to about 2.8v, but they will decay rather quickly below 3.0v. For 1.5v alkaline battery, these can be used down to about 1.2v.

The WiFi requires 3.3v or more to operate reliably.

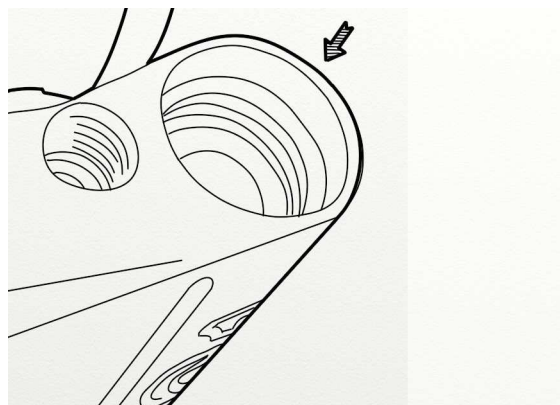
Changing batteries

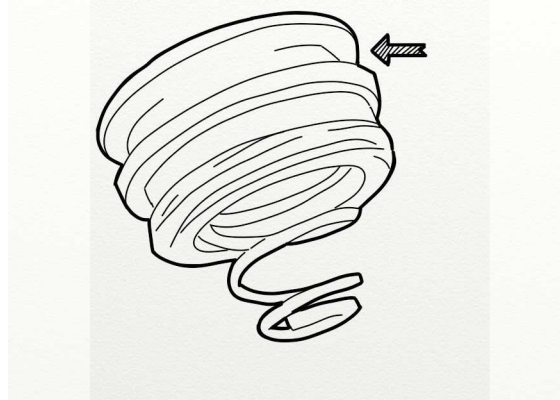
To remove and replace a battery:

- 1/ Unscrew the battery cap (to the left). Use the solid metal key provided, or a kitchen utensil. A coin is OK, but it may not fit the slot well.

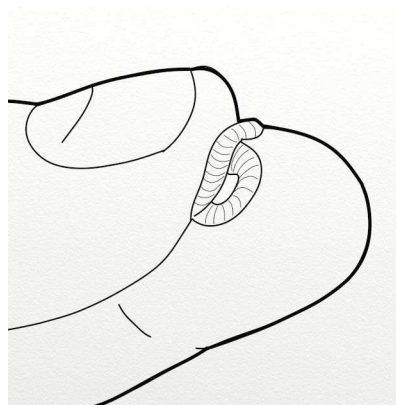
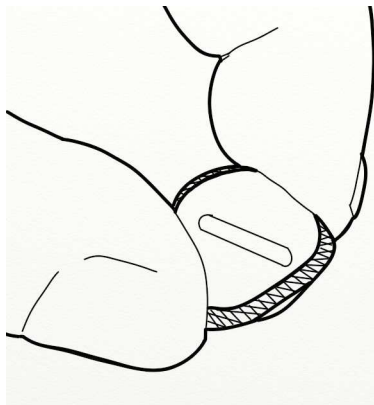


- 2/ Remove the old battery – it should slide out
- 3/ Clean the battery cap and the o-ring. If you dive in salt water, there will be a build up of calcium that must be removed. Examine the areas shown below for a white powdery substance, any debris, dust or particles. These must be removed.

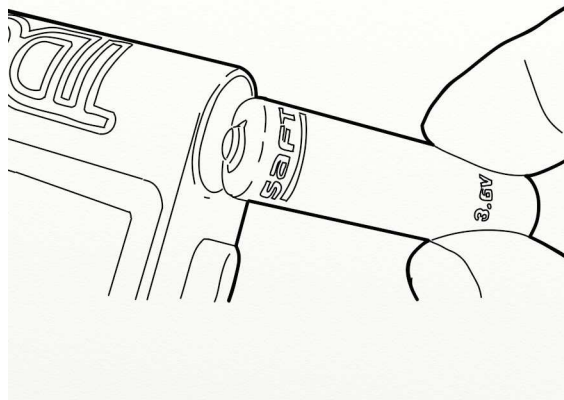




- 4/ Remove the o-ring from the battery cap to clean it, by pinching the ring between the fingers and pulling it over the rim of the cap. Roll the o-ring between the fingers, to break up the deposit from its surface.



- 5/ The battery cap and the opening in the body of the TDC-3, must be cleaned to remove all deposits of dust, debris or salt build up. To remove salt deposits, use a cleaning agent for that purpose on a soft cloth, and wipe the areas clean. Suggested cleaning fluids are the CLR (from hardware store), or other calcium dissolving chemicals that work on calcium or lime, such as coffee pot cleaners, and bath tub cleaners, or vinegar. Be careful not to allow chemical into the bottom of the TDC-3 body. Rinse the chemical away with a damp wet water cloth.
- 6/ Insert a new battery, with the positive tip in first. Clean both ends of the battery to remove all traces of skin oils or other contaminants. A little rubbing alcohol or electrical cleaning agent works well here.



- 7/ Inspect the o-ring. If you see any tears, or splits, or parts of the rubber coming off, it will leak, and must be replaced. If the o-ring has deformed and taken on a square looking shape, it is too old and must be replaced. If the o-ring is hard or inflexible, it must be replaced.



Damaged o-ring that MUST be replaced – do not use.

This device uses a metric o-ring sized 14x2mm (14mm i.d.). Do NOT try to use a US numbered o-ring – it will leak! Please use the spare o-ring provided, or get a new one from a bearing and seal supply company.

An o-ring that is soft and pliable and shows no signs of damage can be used again.

- 8/ Lubricate the o-ring. This is most important, as it helps protect the o-ring from damage when it is being installed, and allows it to seat in the proper position. Make the o-ring shiny and damp, but not wet. Any kind of simple light oil or light grease will work, such as; Silicon grease, Vaseline petroleum jelly, light machine oil. As a last resort, use some spit (saliva). Rub the a little oil / grease / lubricant and the o-ring between the fingers to get the o-ring fully lubricated.

Do NOT saturate or use a lot. Apply a little to the sealing area in the housing as well.

- Install the o-ring back onto the battery cap, into the first (top) groove.
- 9/ Insert and screw down the cap fully, so the cap is hard against the body of the TDC-3. The cap needs to be snug tight so it bottoms on the body, and makes a good electrical connection. Do not leave the cap loose in any way. The easiest method to install the cap, is to pinch the cap and TDC-3 between the forefinger and thumb, and then turn the body of the TDC-3.

Check the state of the new battery on the TDC-3 screen after it starts.

Re-booting the TDC-3 firmware

Removing the batteries will cause a re-boot and fresh start. The device will pass through a safe boot screen, where pressing a button will launch the installer program.

If you allow the safe boot to pass uninterrupted, then the unit will start the normal MultiDeco TDC-3 program.

A reboot does not affect any data. The settings, log and license details will all remain untouched.

The TDC-3 and program settings can be reset from the menu item Menu, Settings, , Reset ALL. This reset sequence will also boot the main CPU. However this is a partial reboot only. Use the reboot sequence above to achieve a complete reboot of all the TDC-3 components.

Dive logs cannot be erased. They will eventually be overwritten after hundreds of hours of dives (depending on the dive log time interval selected).

Wearing the TDC-3 / wrist band

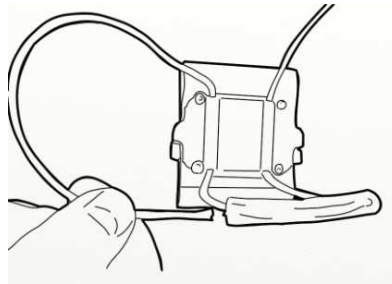
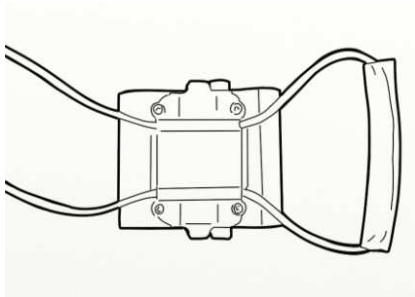
The TDC-3 has two mounting systems to use. The back plate can accommodate either mounting system.

1/ A watch band strap.

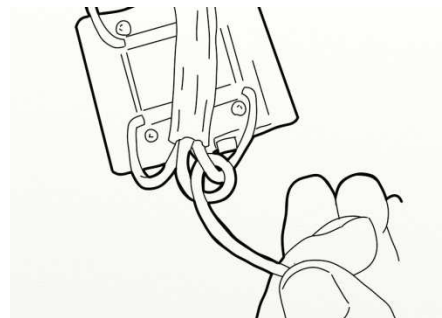
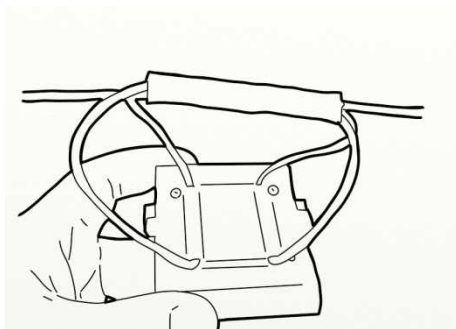
This is an accessory extra that can be purchased on the web site. This is a special made longer strap design (450mm) for use with drysuits. Also a regular Nato style wrist watch band from a shop or Amazon, will do the same job, but is might too short for some people with thick wetsuits or a drysuit.

2/ A bungee cord mount.

The slots in the back plate is designed for 3/16 inch (3mm) elastic cord. The suggested threading route is as follows:



Thread the cord as shown.



Tie a half-hitch knot to secure the cord, at each end.

Install utility

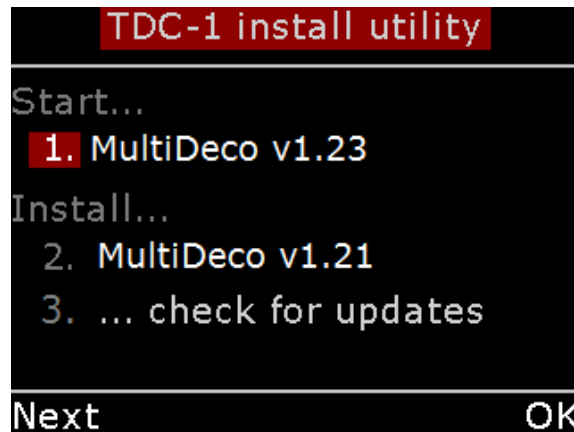
The TDC-3 has two utility programs inbuilt. The WiFi Internet utility (described at the top of this manual), and the Install utility, shown below.

To access the Install Utility:

Menu -> Program -> Install program, **or**

Remove and re-insert battery, and select Install Utility, **or**

From the Internet Utility, select Install Utility.



The TDC-3 can store several programs in its memory, and these can be selected and installed with this inbuilt utility. This allows it to go back to a previous version if needed. There is also a hardware analysis feature, if required.

This utility program will install the latest program into the TDC-3, or start the current program.

Item 1: Start - This will resume the current program.

Item 2: Install - Select this to install and run the program shown.

Item 3: Starts the Internet utility program and WiFi.

Limitations

TDC-3:

Operating temperature	0 to 45° C, 32 to 113° F
Battery life – each battery brightness	60 to 100 hours each – depending on screen
Battery life – shelf	6 to 12 months
Maximum depth reading	150m / 500ft (preliminary)
Max depth computation	650m (see max depth limit)
Max dive time – single dive	34 years
Max visible dive time	999 minutes
Elevation settings	Automatic
Dive time start depth	1.6m / 6ft
Dive time stop depth	0.5m / 1.5ft
OC mixes	10 OC legs
CCR mixes	10 CCR or OC legs
Bail out mixes	2 x 5 CCR or OC legs
Dive logging	1000 hrs @ 5 secs, 200 hrs @ 1 sec.
Depth accuracy	± 1%

Compliance / regulatory

Device emissions

FCC PART 15 CLASS B DIGITAL DEVICE VERIFICATION STATEMENTS FOR USER'S MANUAL

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.

Warning: Changes or modifications not expressly approved by the party responsible for compliance could 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.

Canada ICES-003

This device complies with Industry Canada license-exempt RSS standard(s). Operation is subject to the following two conditions:

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

Cet appareil est conforme à Industrie Canada une licence standard RSS exonérés (s). Son fonctionnement est soumis aux deux conditions suivantes:

1. Cet appareil ne doit pas provoquer d'interférences
2. Cet appareil doit accepter toute interférence reçue, y compris les interférences pouvant provoquer un fonctionnement indésirable de l'appareil.

Technical Dive Computers Inc.**TDC-3**

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, including interference that may cause undesired operation.

.....

This Class B digital apparatus complies with Canada ICES-003.

Cet appareil numérique de la classe B est conforme à la norme NMB-003 Canada.

Report of

Supplier's Declaration of Conformity (SDoC)

Per CFR 47

**Part 15, Subpart B, for Unintentional Radiators,
Sections 15.107(a) for Conducted Emissions, Class B and 15.109(a) for Radiated
Emissions, Class B**

And

**Innovation, Science and Economic Development (ISED) Canada
ICES-003**

for the

Technical Dive Computers Inc.

Model: TDC-3

Test Date(s): April 12-13, 2018

Issue Date: April 17, 2018

UST Project No: 18-0054

3505 Francis Circle Alpharetta, GA 30004

PH: 770-740-0717 Fax: 770-740-1508

www.ustech-lab.com

I certify that I am authorized to sign for the test facility and that all of the statements in this report and in the Exhibits attached hereto are true and correct to the best of my knowledge and belief:

US Tech (Agent Responsible For Test):

By:

Name: Alan Ghasiani

Title: Consulting Engineer, President

Date: April 17, 2018

Radio transmitter compliance

FCC Part 15C

The radio transmitter module contained in this device, is authorized only for use in device where the antenna may be installed such that 20cm may be maintained between the antenna and users (for example access points, routers, wireless ADSL modems, and similar equipment).

Test / approval numbers: FCC ID: YOPGS2200M.

Canada

Device Contains transmitter module IC ID: 9154A-GS2200M

Version, releases

TDC-3 inherits 10 years of development and revisions from V-Planner Live and MultiDeco, in the X1, DR5 and TDC-1 dive computers.

Aug 2018	v1.08	Initial release
Oct 2018	v3.00	minor updates
Nov 2018	v3.03	minor updates
Jan 2019	v3.05	activate compass, stopwatch added
Mar 2019	v3.08	activated GF Lo NDL mode.
Jun 2019	v3.10	TDC-3 EXT with pO2 Fischer plug.
Dec 2019	v3.12	Stability and minor updates.
Feb 2020	v3.14	Activate surface compass, minor updates.
Apr 2020	v3.15	Korean language.
Aug 2020	v3.17	German language.
May 2021	v3.22	Internal updates.
Jun 2021	v3.23	Make CCR pO2 details more visible.
Jan 2022	v3.26	Color settings, GF Now, dil ppO2 detail.

WARNING and DISCLAIMER for TDC-3

BE WARNED: This TDC-3 computer Software and firmware is experimental and may generate an incorrect profile. Any profile generated should be validated by comparison with other tables or Software.

HHS Software Corp, Technical Dive Computers Inc and the program author's, do not warrant that this program accurately reflects the Varying Permeability Model algorithms, or the Bühlmann ZHL-16-C algorithms, that it won't get you bent or dead, or that it will produce safe, reliable results. The software is itself experimental and may generate an incorrect profile. Any profile generated should be validated by comparison with other tables or Software.

There are no decompression procedures of any sort that can guarantee that DCS will NOT occur. All dives are decompression dives and the concept of a “no-decompression” dive is a misnomer. The reliance upon this program to determine when one may safely ascend to the surface or to move to any shallower depth does not ensure that decompression illness or other malady won't occur. Everyone is unique and may be affected differently by the experience of decompression. Some persons may have specific undiscovered physical conditions that make them more likely to experience decompression illness and experience more dire symptoms. There is nothing in this program to take account of such preconditions.

This dive schedule produced by this program is experimental and you use it at your own risk. Diving in general is fraught with risk, and planned decompression diving adds significantly more risk. There is absolutely no express or implied warranty or guarantee that the proper preparation of a decompression schedule, using this program and diving precisely according to that schedule will avoid symptoms of decompression sickness or other injury. Deep diving utilizing multiple gasses, including helium, or rebreathers further increases both the potential incidence of decompression illness and the morbidity of the consequences even with the proper use of the schedules produced by this program.

TDC-3 and the decompression schedules it produces are tools for experienced mixed-gas decompression divers ONLY. If you have not been properly trained in mixed-gas decompression diving by an internationally recognized technical certification agency and/or don't have a firm handle on decompression planning and mixed-gas diving, then DO NOT use this software.

HHS Software Corp, Technical Dive Computers Inc and the program authors disclaim any responsibility or liability for any indirect, punitive, special, incidental or consequential damages however they may arise from the use and application of this program to conduct and return from hyperbaric activities underwater. HHS Software Corp, Technical Dive Computers Inc or program authors specifically warn that the use of the schedules produced by this software is certain to cause injury and perhaps death to some persons who may use it to plan hyperbaric activities. The authors cannot, in

advance, determine or ascertain which users may be so affected. The payment of a license fee is for the limited purpose of allowing the user convenient access to an algorithm for decompression diving already in the public domain, without any representation or warranty as to the suitability or effectiveness of such algorithm for that or any purpose. The authors of this Software will not be held accountable for any injury caused by the use of a profile generated by this Software

LICENSE AGREEMENT

YOU SHOULD CAREFULLY READ THE FOLLOWING TERMS AND CONDITIONS BEFORE OPENING THIS MEDIA PACKAGE. OPENING THIS MEDIA PACKAGE INDICATES YOUR ACCEPTANCE OF THESE TERMS AND CONDITIONS. IF YOU DO NOT AGREE WITH THEM, YOU SHOULD PROMPTLY RETURN THE PACKAGE AND YOUR MONEY WILL BE REFUNDED.

Technical Dive Computers, TDC-3 dive computer User Agreement and Warranty

IMPORTANT NOTICE

THIS TECHNICAL DIVE COMPUTERS TDC-3 USER AGREEMENT AND WARRANTY (THIS "AGREEMENT") IS AN AGREEMENT BETWEEN YOU AND TECHNICAL DIVE COMPUTERS INC. ("TECHNICAL DIVE COMPUTERS"). YOUR USE OF THE TECHNICAL DIVE COMPUTERS TDC-3 DIVE COMPUTER IS SUBJECT TO THE TERMS AND CONDITIONS SET OUT IN THIS AGREEMENT. THIS AGREEMENT ALSO SETS OUT TECHNICAL DIVE COMPUTERS WARRANTY OF THE TDC-3, EXCLUSIONS AND LIMITATIONS OF TECHNICAL DIVE COMPUTERS LIABILITY TO YOU, PROVISIONS GOVERNING THE RESOLUTION OF DISPUTES AND CLAIMS BETWEEN YOU AND TECHNICAL DIVE COMPUTERS, AND OTHER IMPORTANT PROVISIONS. IF YOU DO NOT AGREE WITH ANY TERM OF THIS AGREEMENT, YOU MUST NOT USE THE TDC-3 AND YOU MAY RETURN THE TDC-3 TO TECHNICAL DIVE COMPUTERS OR THE AUTHORIZED TECHNICAL DIVE COMPUTERS DEALER FROM WHICH YOU PURCHASED THE TDC-3 FOR A FULL REFUND WITHIN 30 DAYS AFTER YOUR DATE OF PURCHASE. IF YOU USE THE TDC-3, YOU ARE DEEMED TO HAVE AGREED TO THIS AGREEMENT.

INCORRECT USE OF THE TDC-3 OR ITS ACCESSORIES WILL INVALIDATE YOUR WARRANTY AND CAN CAUSE PERMANENT DAMAGE TO THE TDC-3 ITS ACCESSORIES.

1. Your Risks and Responsibilities

Scuba diving, free diving and any other form of underwater diving (all of which are referred to in this Agreement as "diving") are inherently dangerous and risky activities. Even with the best training, planning and equipment, participants may be injured or may die. If you choose to participate in diving, you accept the risk of injury or death and the responsibility to take all necessary steps to reduce these risks. Without limiting the foregoing, it is your sole responsibility to:

- obtain appropriate training;
- obtain, maintain and conduct appropriate pre-dive tests and checks of appropriate diving equipment, including redundant and back-up equipment to compensate for equipment failures while diving;
- plan your dive in advance and prepare and keep with you a dive plan; - dive only within your abilities and experience and in accordance with your dive plan;
- practice safe diving techniques, including not diving alone.

You also have the responsibilities set out in sections 3, 4, 5, 6 and 10 below.

2. Technical Dive Computers and the TDC-3

When purchased by you, the TDC-3 consists of: (i) the TDC-3 Dive Computer hardware unit (the "TDC-3 Unit") encased in a protective waterproof shell, (ii) Technical Dive Computers bottom-timer software component (collectively, the "Software"), (iii) a wrist strap, bungee cord, and any other accessories that may be included. When you purchase the TDC-3, you become the owner of the TDC-3 (but not any patent or other intellectual property rights in the TDC-3, including in the Software, all of which remain the sole and exclusive property of Technical Dive Computers).

3. License to the Software

3.1. License: Subject to the provisions of this Agreement, Technical Dive Computers grants you a license to use the Software in accordance with this Agreement. Each license is non-exclusive, personal to you, non-sublicensable, restricted and limited, and subject to the provisions of this Agreement. Your Software license applies only to the specific TDC-3 Unit bearing the serial number registered by you on www.tdc-3.com, for which you can produce a valid receipt. Your Software license commences on the date on you activate the Software on www.tdc-3.com.

3.2. Restrictions and Requirements: You will not, directly or indirectly: (i) use, disclose, or provide or permit access to or use of the Software except as expressly permitted in this Agreement; (ii) copy, reproduce, translate, modify, enhance or improve the Software; (iii) create derivative works from the Software or merge, embed or combine the Software with any other software or materials; (iv) reverse engineer, disassemble, decompile, convert into human-readable form, or otherwise attempt to access or derive the source code of the Software; (v) license, sublicense, sell, resell, lend, lease, loan, rent, share, transfer, assign, pledge, publish, transmit, publicly display or perform, distribute, create any interest in, or otherwise give or make available per permit access to or use of the Software or its functionality or any results of its use to or for the benefit of any other person, and with or without charge; (vi) alter, attempt to circumvent, destroy, obscure, conceal, modify or remove any notices (including trademark and copyright notices), proprietary codes or locks, means of identification, digital rights tools or management information, or agreements on, in or in relation to the Software; or (vii) permits or assist any person to use the Software in a way that would constitute an infringement of Technical Dive Computers rights or a breach of this Agreement if done by you.

3.3. Ownership: You acknowledge and agree that Technical Dive Computers retains all rights, titles and interests (including intellectual property rights) throughout the world in, to and associated with the Software, including all copies of the Software provided to you. The Software is licensed (not sold) for limited purposes to you. The Software and related intellectual property rights are protected by intellectual property laws and treaties throughout the world. You will not acquire any right, title or interest in, to or associated with the Software pursuant to this Agreement or otherwise. Notwithstanding any other provision of this Agreement, under no circumstances will Technical Dive Computers be obligated to provide, nor will you be entitled to receive, obtain or access, any source (human readable) code for the Software. All rights not expressly granted under this Agreement are reserved to Technical Dive Computers.

3.4. Disclaimer: Technical Dive Computers is not responsible for any problems you may experience as a result of use of the Software, including death, personal injury or loss or damage to your data or other personal property.

4. Warranty

4.1. Warranty and Warranty Period: The Warranty Periods are:

4.1.1. Two (2) years for the TDC-3 Unit and Software;

4.1.2. One (1) year for parts and accessories including (but not limited to) wrist straps, bungee cords.

4.2. Remedy: In the event of any breach of the Warranty, Technical Dive Computers sole liability and obligation to you, and your sole right and remedy against Technical Dive Computers, is for Technical Dive Computers, at its option, to either: (i) repair or replace the defective component of the TDC-3; or (ii) replace the defective TDC-3 in its entirety; or (iii) refund the purchase price for the defective TDC-3. If Technical Dive Computers repairs or replaces your TDC-3, the repaired or replacement TDC-3 is subject to the Warranty for the remainder of the original Warranty Period of the repaired or replaced TDC-3 or three months from the date of repair or replacement, whichever is longer. Any part removed from a TDC-3 during repair and any TDC-3 that is replaced or for which a refund is given by Technical Dive Computers, or by a Dealer on behalf of Technical Dive Computers, under the Warranty becomes the property of Technical Dive Computers. In fulfillment of the Warranty, Technical Dive Computers and its Dealers may use parts that are new, equivalent to new or reconditioned in the repair of a TDC-3, and may provide a new, equivalent to new or reconditioned TDC-3 in replacement of another TDC-3. Neither Technical Dive Computers nor any of its Dealers will be liable to compensate you for any loss of use of the TDC-3 as a result of any warranty claim, including as a result of any delay in the repair or replacement of your TDC-3.

4.3. Warranty Limitations and Exclusions: The Warranty is subject to the following limitations and exclusions:

- The Warranty applies only if the TDC-3 Dive Computer is used while worn by a human being diving to a depth not exceeding 120 meters (400 feet). The Warranty is void in the event of any other use.
- The TDC-3 must be used in accordance with the TDC-3 User Manual. The Warranty does not apply to defects or damage caused by: (i) misuse, neglect or improper or rough handling (including punctures, bending, compressing or

dropping of the TDC-3); (ii) any use of the TDC-3 not in accordance with the TDC-3 User Manual; (iii) use of the TDC-3 with or connection of the TDC-3 to any product, accessory, software and/or service not manufactured, supplied or approved by Technical Dive Computers; (iv) normal wear and tear; (v) accidents, fire, power changes, other hazards, acts of God and other causes beyond the reasonable control of Technical Dive Computers; (vi) modification of the Software by you;

- The Warranty will be void if: (i) the TDC-3 has been opened, modified or repaired by any person other than Technical Dive Computers, with the exception of the opening of the battery compartment of the TDC-3 Dive Computer solely for the purpose of replacing the battery in accordance with the User Manual and this Agreement; (ii) the TDC-3 Dive Computer's serial number has been removed, erased, defaced or altered in any way or is illegible, as determined by Technical Dive Computers in its sole discretion; or (iii) the TDC-3 has been exposed to chemical products, including mosquito repellants.

- The Warranty does not cover loss or damage to the TDC-3 Dive Computer as a result of improper maintenance of the TDC-3 Dive Computer's O-rings, including but not limited to dry, cracked, dirty or dusty O-rings. Technical Dive Computers may agree in its sole discretion to repair such loss or damage, entirely at your cost.

- The Warranty does not cover loss or damage to the TDC-3 Dive Computer from flooding of the battery compartment that may result from incorrect closure procedure of the battery compartment/s. Technical Dive Computers may agree in its sole discretion to repair such loss or damage, entirely at your cost.

- The TDC-3 Dive Computer may be mounted to your wrist using the bungee cord provided. You acknowledge and agree that the bungee cord may break, and that the TDC-3 could become detached from the bungee cord. During the Warranty Period, Technical Dive Computers will replace broken bungee cords, but Technical Dive Computers will not be liable for any loss of the TDC-3 Dive Computer as a result of a lost, broken or defective bungee cord.

- The TDC-3 Dive Computer may be mounted to your wrist using the wrist strap provided. You acknowledge and agree that the wrist strap may break, and that the TDC-3 could become detached from the wrist strap. During the Warranty Period, Technical Dive Computers will replace broken wrist strap, but Technical Dive Computers will not be liable for any loss of the TDC-3 Dive Computer as a result of a lost, broken or defective wrist strap.

5. Replacement of TDC-3 Battery

5.1. Your Battery: The TDC-3 Dive Computer is fitted with a specific brand and model of battery (the "Battery"), details of which are contained in the TDC-3 User Manual. You may replace the Battery in your TDC-3 Dive Computer as required, in accordance with the TDC-3 User Manual and this Agreement, subject to the following:

- IT IS YOUR RESPONSIBILITY TO MONITOR BATTERY VOLTAGE AND ENSURE THE TDC-3 DIVE COMPUTER HAS ENOUGH BATTERY LIFE TO COMPLETE YOUR PLANNED DIVE. TECHNICAL DIVE COMPUTERS IS NOT RESPONSIBLE AND WILL NOT BE LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM OR IN CONNECTION WITH THE TDC-3 DIVE COMPUTER POWERING OFF AS A RESULT OF INSUFFICIENT BATTERY LIFE.

- TECHNICAL DIVE COMPUTERS WILL NOT BE RESPONSIBLE OR LIABLE FOR ANY LOSS OR DAMAGE TO THE TDC-3 DIVE COMPUTER ARISING FROM OR IN CONNECTION WITH THE REPLACEMENT OF THE BATTERY NOT IN ACCORDANCE WITH THE TDC-3 USER MANUAL, INCLUDING WITHOUT LIMITATION THE INCORRECT OR FORCEFUL INSERTION OF THE BATTERY CAP, WHICH CAN DAMAGE THE SCREW THREADS ON THE CAP OR IN THE TDC-3 UNIT. TECHNICAL DIVE COMPUTERS MAY AGREE TO REPAIR ANY SUCH DAMAGE AT TECHNICAL DIVE COMPUTERS SOLE DISCRETION, AND ENTIRELY AT YOUR COST.

- TECHNICAL DIVE COMPUTERS WILL NOT BE RESPONSIBLE OR LIABLE FOR ANY LOSS OR DAMAGE TO THE TDC-3 DIVE COMPUTER ARISING FROM OR IN CONNECTION WITH A FLOODED BATTERY COMPARTMENT, WHETHER OR NOT THE BATTERY HAS BEEN REPLACED.

- RE-CHARGING A NON-CHARGEABLE BATTERY CAN CAUSE A FIRE OR EXPLOSION. SHORTING OUT THE BATTERY CAN SIMILARLY CAUSE A FIRE OR EXPLOSION. TECHNICAL DIVE COMPUTERS WILL NOT BE RESPONSIBLE OR LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM OR IN CONNECTION WITH THE RECHARGING OR SHORTING OUT OF THE BATTERY. - CORRECT BATTERY INSERTION - A BATTERY MUST BE INSTALLED WITH THE CORRECT POS/NEG POLARITY, AS INDICATED IN THE USER MANUAL. A BATTERY FITTED WITH INCORRECT POLARITY CAN CAUSE A FIRE OR EXPLOSION. TECHNICAL DIVE COMPUTERS WILL NOT BE RESPONSIBLE OR LIABLE FOR ANY LOSS OR DAMAGE ARISING FROM OR IN CONNECTION WITH THE INCORRECT BATTERY INSERTION OF THE BATTERY.

6. Warranty Procedure

If you believe you have a warranty claim in respect of your TDC-3, please consult the online help resources available at www.tdc-3.com/contact/ or referred to in the TDC-3 User Manual before submitting your warranty claim and seeking warranty service. If you still believe you have a warranty claim, then contact the Dealer from which you purchased your TDC-3, or Technical Dive Computers at support@technicaldivecomputers.com if you purchased your TDC-3 through the Technical Dive Computers website. You are responsible for all shipping costs (including insurance)

incurred when sending your TDC-3 to Technical Dive Computers or a Dealer and returning your repaired or replacement TDC-3 to you. Before returning or sending your TDC-3 to Technical Dive Computers or a Dealer, you must remember to make back-up copies of any content or data that is installed or stored on the TDC-3, as these may be lost during repair of the TDC-3, and will not be transferred to a replacement TDC-3. Neither Technical Dive Computers nor its Dealers will be liable for any loss of, damage to or corruption of any settings, content or data that is installed or stored on the TDC-3 during repair or replacement.

7. Transfer of Your TDC-3

You may sell, give, rent or lend your TDC-3 to another person, provided that you give that person this Agreement at the same time and they agree to this Agreement. You will not sell, give, rent or lend your TDC-3, or otherwise permit any person to use your TDC-3, unless that person has agreed to this Agreement. If you purchased your TDC-3 from a Dealer, you must also give that person proof of your date of purchase of your TDC-3, without which they will not be entitled to submit a claim under the Warranty.

8. No Other Representations, Warranties, Conditions or Guarantees

TO THE MAXIMUM EXTENT PERMITTED BY LAW, THE WARRANTIES PROVIDED UNDER SECTION 4 ABOVE ARE YOUR SOLE AND EXCLUSIVE RIGHTS AND REMEDIES, AND TECHNICAL DIVE COMPUTERS SOLE AND EXCLUSIVE LIABILITIES AND OBLIGATIONS TO YOU, IN CONNECTION WITH YOUR PURCHASE AND USE OF THE TDC-3, AND ARE IN LIEU OF EVERY AND ALL OTHER REPRESENTATIONS, WARRANTIES, CONDITIONS AND GUARANTEES OF ANY NATURE OR KIND WHATSOEVER, WHETHER EXPRESS, IMPLIED OR STATUTORY, OR ARISING FROM CUSTOM OR TRADE USAGE OR BY ANY COURSE OF DEALING OR COURSE OF PERFORMANCE, INCLUDING ANY REPRESENTATIONS, WARRANTIES, CONDITIONS OR GUARANTEES OF OR RELATING TO ACCURACY; CAPACITY; COMPLETENESS; DELAYS; DURABILITY; ERRORS; FITNESS FOR A PARTICULAR PURPOSE; LACK OF NEGLIGENCE, VIRUSES OR OTHER HARMFUL COMPONENT, ERRORS, OR INTERRUPTED SERVICE; MERCHANTABILITY; NON-INFRINGEMENT; PERFORMANCE; RESULTS; SUITABILITY; QUALITY; TIMELINESS; TITLE; SIMILARITY OR WORKMANLIKE EFFORT; ALL OF WHICH ARE HEREBY DISCLAIMED BY TECHNICAL DIVE COMPUTERS TO THE FULLEST EXTENT PERMITTED BY LAW.

WITHOUT LIMITING THE GENERALITY OF THE FOREGOING, TECHNICAL DIVE COMPUTERS MAKES NO REPRESENTATION, WARRANTY, CONDITION OR GUARANTEE THAT: (A) THE TDC-3 WILL BE AVAILABLE OR WILL FUNCTION WITHOUT INTERRUPTION OR WILL BE FREE OF ERRORS OR THAT ANY ERRORS WILL BE CORRECTED; (B) DATA PROCESSED BY THE TDC-3 OR ANY SOFTWARE INSTALLED ON THE TDC-3 WILL BE ACCURATE, COMPLETE, SEQUENTIAL, OR TIMELY; (C) CERTAIN OR ANY RESULTS MAY BE OBTAINED THROUGH THE USE OF THE TDC-3; (D) THE USE OF THE TDC-3 WILL BE FREE OF ERRORS, VIRUSES, TROJAN HORSES, WORMS OR OTHER DESTRUCTIVE OR DISRUPTIVE COMPONENTS; (E) THE USE OF THE TDC-3 WILL NOT INFRINGE THE RIGHTS (INCLUDING INTELLECTUAL PROPERTY RIGHTS) OF ANY PERSON; (F) YOUR TDC-3 WILL RESEMBLE OR OPERATE IN AN IDENTICAL FASHION TO ANY OTHER TDC-3 (INCLUDING, WITHOUT LIMITATION, WITH RESPECT TO DISPLAY BRIGHTNESS, TAP SENSITIVITY, BATTERY LIFE, OR COLOUR); AND TECHNICAL DIVE COMPUTERS DISCLAIMS ANY AND ALL LIABILITY REGARDING SUCH MATTERS TO THE FULLEST EXTENT PERMITTED BY LAW.

9. Exclusion of Damages

NOTWITHSTANDING ANY OTHER PROVISION OF THIS AGREEMENT, AND EXCEPT FOR TECHNICAL DIVE COMPUTERS WARRANTY OBLIGATIONS UNDER SECTION 4 ABOVE, IN NO EVENT WILL TECHNICAL DIVE COMPUTERS BE LIABLE TO YOU OR ANY OTHER PERSON FOR ANY DIRECT, INDIRECT, INCIDENTAL, CONSEQUENTIAL, SPECIAL, PUNITIVE OR EXEMPLARY LOSS OR DAMAGE ARISING FROM, CONNECTED WITH, OR RELATING TO THE TDC-3, THE USE OF THE TDC-3, THIS AGREEMENT, THE SUBJECT MATTER OF THIS AGREEMENT, OR OTHERWISE, OR FOR LOSS OF DATA, INFORMATION, BUSINESS, MARKETS, SAVINGS, INCOME, PROFITS, USE, PRODUCTION, OR GOODWILL, ANTICIPATED OR OTHERWISE, OR ECONOMIC LOSS.

10. Personal Injury or Death

YOU AGREE THAT YOU UNDERSTAND AND ACCEPT ALL RISKS ASSOCIATED WITH DIVING, AND THAT TECHNICAL DIVE COMPUTERS IS NOT LIABLE TO YOU OR ANY OTHER PERSON, INCLUDING YOUR HEIRS, EXECUTORS OR PERSONAL REPRESENTATIVES, FOR ANY LOSS, DAMAGE, COST, EXPENSE OR CLAIM ARISING OUT OF, CAUSED BY OR RELATING TO YOUR PERSONAL INJURY OR DEATH WHILE DIVING, EVEN IF YOUR PERSONAL INJURY OR DEATH IS CAUSED, IN WHOLE OR IN PART AND DIRECTLY OR INDIRECTLY, BY THE TDC-3 OR YOUR USE OF THE TDC-3, AND REGARDLESS OF WHETHER OR NOT THE TDC-3 FUNCTIONED PROPERLY OR WAS DEFECTIVE IN ANY

WAY. YOU HEREBY IRREVOCABLY WAIVE AND RELEASE TECHNICAL DIVE COMPUTERS FROM ANY LIABILITY OR OBLIGATION TO YOU OR YOUR HEIRS, EXECUTORS OR PERSONAL REPRESENTATIVES FOR ANY LOSS, DAMAGE, COST, EXPENSE OR CLAIM ARISING OUT OF, CAUSED BY OR RELATING TO YOUR PERSONAL INJURY OR DEATH WHILE DIVING, EVEN IF YOUR PERSONAL INJURY OR DEATH IS CAUSED, IN WHOLE OR IN PART AND DIRECTLY OR INDIRECTLY, BY THE TDC-3 OR YOUR USE OF THE TDC-3, AND REGARDLESS OF WHETHER OR NOT THE TDC-3 FUNCTIONED PROPERLY OR WAS DEFECTIVE IN ANY WAY.

11. Limitation of Liability

IF NOTWITHSTANDING THE PROVISIONS OF SECTIONS 8, 9 AND 10 OF THIS AGREEMENT TECHNICAL DIVE COMPUTERS HAS ANY LIABILITY OR OBLIGATION TO YOU IN RESPECT OF ANY MATTER REFERRED TO IN THOSE SECTIONS, TECHNICAL DIVE COMPUTERS TOTAL CUMULATIVE LIABILITY TO YOU, YOUR HEIRS, EXECUTORS AND PERSONAL REPRESENTATIVES AND TO ANY OTHER PERSON ARISING FROM, CONNECTED WITH, OR RELATING TO THIS AGREEMENT, THE TDC-3, YOUR USE OF THE TDC-3 OR OTHERWISE, FROM ANY AND ALL CAUSE OR CAUSES WILL NOT, IN THE AGGREGATE, EXCEED THE PURCHASE PRICE OF THE TDC-3, AND YOU HEREBY RELEASE TECHNICAL DIVE COMPUTERS FROM ANY AND ALL OBLIGATIONS, LIABILITIES, CLAIMS OR DEMANDS IN EXCESS OF THIS LIMITATION.

12. Application of Exclusions and Limitations

SECTIONS 9, 10 AND 11 SHALL APPLY TO ALL LOSSES, DAMAGES, COSTS, EXPENSES, CLAIMS, LIABILITIES AND OBLIGATIONS REFERRED TO THEREIN, UNDER ANY THEORY OF LIABILITY (WHETHER IN CONTRACT, TORT, STRICT LIABILITY, STATUTORY LIABILITY OR ANY OTHER THEORY OR LAW OR EQUITY), REGARDLESS OF ANY NEGLIGENCE (INCLUDING GROSS NEGLIGENCE) OR OTHER FAULT OR WRONGDOING BY TECHNICAL DIVE COMPUTERS OR ANY PERSON FOR WHOM TECHNICAL DIVE COMPUTERS IS RESPONSIBLE, AND EVEN IF TECHNICAL DIVE COMPUTERS HAS BEEN ADVISED OF THE POSSIBILITY OF SUCH POTENTIAL LOSS OR DAMAGE BEING INCURRED.

13. Exception to Exclusions and Limitations

The exclusion of certain warranties and the exclusion or limitation of certain liabilities is prohibited by legislation in some jurisdictions. Such legislative limitations may apply to you.

14. References to Technical Dive Computers

In sections 8, 9, 10, 11 and 12, references to Technical Dive Computers include Technical Dive Computers past, present and future directors, officers, employees, agents, representatives, successors and assigns.

15. Interpretation

In this Agreement: (i) a reference to "this Agreement" and other similar terms refers to this Agreement as a whole, and not just to the particular provision in which those words appear; (ii) "including" means including without limitation; (iii) headings in this Agreement are for reference only and do not define, limit or enlarge the scope or meaning of this Agreement or any of its provisions; (iv) words importing the singular number only include the plural and vice versa; and (v) words importing persons include individuals, partnerships, associations, trusts, unincorporated organizations, societies, and corporations.

16. Enurement

The provisions of this Agreement will enure to the benefit of and be binding upon the Technical Dive Computers and its successors and assigns and you and your heirs, executors, personal representatives and permitted assigns. You may not assign this Agreement except with your TDC-3 in accordance with section 7 above.

17. Governing Law and Jurisdiction

This Agreement and all related matters will be governed, and construed in accordance with, the laws of British Columbia, Canada and applicable federal laws of Canada, excluding the United Nations Convention for the International Sale of Goods and any rules of private international law or the conflict of laws which would lead to the application of any other laws. Any dispute arising from, connected with, or relating to this Agreement or any related matters will be resolved by the courts of British Columbia sitting in the City of Vancouver, British Columbia, Canada and you hereby irrevocably submit and attorn to the original and exclusive jurisdiction of those courts in respect of any and all such matters.

18. Severability

If any provision of this Agreement is determined to be unenforceable or invalid for any reason, then that provision will be deemed to be severed from this Agreement and the remaining provisions will continue in full force and effect without being impaired or invalidated in any way, unless as a result of any such severance this Agreement would fail in its essential purpose.

19. Entire Agreement

This Agreement constitutes the entire agreement between Technical Dive Computers and you regarding the subject matter of this Agreement and supersedes any and all previous communications, representations, negotiations, discussions, agreements or understandings, whether oral or written, between you and Technical Dive Computers or between you and any Dealer with respect to the subject matter of this Agreement. This Agreement may be modified only by a written instrument signed by Technical Dive Computers or its successors or assigns.