



**MultiDeco-DR5**  
MD-DR5

# Multideco-DR5

User manual

heinrichs  weikamp DR5



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<http://www.multideco-dr5.com/>

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## License and usage

THE USE OF THE MULTIDECO-DR5 SOFTWARE USED IN THE DR5 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 DR5 UNTIL YOU HAVE READ THE LICENSE AGREEMENT AND DISCLAIMER AND SUCH USE IS RESTRICTED AT LAW TO SUCH LIMITATIONS.

## Introduction

This manual describes the Multideco-DR5 firmware for the HeinrichsWeikamp DR5 dive decompression computer. The DR5 comes with its own hardware user manual that describes various functions. Review the DR5 manual for descriptions of charging, the USB attachment fitting, warranty, etc.

## Description

The HeinrichsWeikamp DR5 dive computer has the powerful Atmel AVR32 processor. The DR5 can be re-programmed with any dive decompression program by the user and it has a bright color OLED display that is easily viewed in the water. The DR5 includes a Fisher cable connection and is ready for use on CCR's. The DR5 uses three buttons for controlling the computer and to navigate the menus and settings.

Multideco-DR5 uses genuine VPM-B and VPM-B/E, along with 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. Multideco-DR5 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.html>

Multideco-DR5 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-16 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.

## **Multideco-DR5 and desktop PC plans**

The Multideco-DR5 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 DecoPlanner by GUE, or the GAP software package. This allows for the dive to be planned with the desktop V-Planner, and then carried out exactly in the water with the Multideco-DR5 program. The desktop plan and the results of the same dive carried out on Multideco-DR5 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.

## Installation

The Multideco-DR5 program is installed onto the DR5 with any Windows PC, Mac or Linux computer with a USB connection. Multideco-DR5 installs by default in a demo mode of operation. This allows you to see and test the program for free. However, it will not operate in dive mode until registered.

### **Multideco-DR5 install**

The procedures for upgrade or first install of Multideco-DR5, are the same and all methods use the same process and installer utility file.

Download the latest Multideco-DR5 installer file from the web at <http://www.hhssoftware.com/multideco-dr5/download.html>

Using the Windows PC:

- Plug the DR5 USB into the PC.
- On the DR5, select USB, the DR5 should map a new drive in the Windows Explorer, usually as a drive E: or F:
- Move the contents of this zip file onto the DR5 drive. Place them in the top folder.
- Double click the **install\_md-dr5\_pc** file. This will transfer the required files.
- On the DR5, press the Exit button. Do not "eject" the drive.
- Now on the DR5, navigate to the System menu and the Firmware update, Confirm OK.

Using the Mac OSX:

- Plug the DR5 USB into the Mac.
- On the DR5, select USB, the DR5 should map a new volume in the Finder and desktop.
- Move the contents of this zip file onto the DR5. Place them in the top folder.
- Open a terminal window (Applications, Utilities, Terminal).
- Type in: `cd "/Volumes/DR5-1234/"` (replace **DR5-1234** if not correct). Press enter.
- Type in `./install_md-dr5_mac-osx.sh` Press enter. This will transfer the required files.
- On the DR5, press the Exit button. Do not "eject" the volume.
- Now on the DR5, navigate to the System menu and the Firmware update, Confirm OK.

## **Multideco-DR5 registration**

Multideco-DR5 installs by default in a demo mode of operation. This allows you to see and test the program for free. However, it will not operate in dive mode until registered.

To register your copy of Multideco-DR5, visit the web page below. You will need the serial number from your DR5 and the install code. These can be found on the DR5 menu System -> Registration.

Registration purchase web page: <http://www.multideco-dr5/reginfomulti.html>

Using the Windows PC:

- Plug the DR5 USB into the PC.
- On the DR5, select USB, the DR5 should map a new drive in the Windows Explorer, usually as a drive E: or F:
- Move the contents of this zip file onto the DR5. Place them in the top folder.
- Double click the **md-dr5\_lic\_pc.cmd** file. This will transfer the required files.
- On the DR5, press the Exit button. Do not "eject" the drive.
- The DR5 should show the message "License OK - ready to dive".

Using the Mac OSX:

- Plug the DR5 USB into the Mac.
- On the DR5, select USB, the DR5 should map a new volume in the Finder and desktop.
- Move the contents of this zip file onto the DR5. Place them in the top folder.
- Open a terminal window (Applications, Utilities, Terminal).
- Type in: **cd "/Volumes/NO NAME/"** (replace NO NAME if not correct).
- Type in **./md-dr5\_lic\_mac-osx.sh** This will transfer the required files.
- On the DR5, press the Exit button. Do not "eject" the volume.
- The DR5 should show the message "License OK - ready to dive".

## **Upgrades and replacement DR5's**

New or upgraded versions of Multideco-DR5 does not affect the settings or installed license. Your existing dive logs and settings will remain. The install process will save your last license on the PC for the next time it's required. Existing licenses can be re-sent from this link: <http://www.hhssoftware.com/multideco-dr5/lostkey.html>

If your DR5 is replaced, then a new license will be required to install Multideco-DR5. Replacement license files are available free of charge. Contact below for further details:  
Email: [support@multideco-dr5.com](mailto:support@multideco-dr5.com)

## **Product and program support**

DR5 Product and program support is divided between the hardware maker and the firmware maker of your DR5 dive computer. Hardware issues are handled by the retail outlet or shop you purchased your DR5 from, or by HeinrichsWeikamp directly. HHS Software will handle the firmware issues for Multideco-DR5.

### **HeinrichsWeikamp DR5 computer – hardware issues**

Contact your retail supplier where you purchased the DR5, or directly with HeinrichsWeikamp products at:

Email: [info@heinrichsweikamp.com](mailto:info@heinrichsweikamp.com)  
Website: <http://www.heinrichsweikamp.net/>

HeinrichsWeikamp maintains a user support forum at (for discussion on DR5 hardware issues):

<http://www.heinrichsweikamp.net/forum/index.php>

### **Multideco-DR5 – firmware issues**

Program support and help is available at:

Email: [support@multideco-dr5.com](mailto:support@multideco-dr5.com)  
Website: <http://www.multideco-dr5.com>

HHS Software maintains a user support forum at (for discussion on Multideco-DR5 issues):

<http://forums.multideco-dr5.com/>

## **DR5 basic operation**

The DR5 uses 3 buttons to on the front of the computer to start, stop and navigate the menus and settings.

### **Operating modes**

Multideco-DR5 and the DR5 have two distinct modes or states of operation for running, turned off or shutdown. These are: Awake and Shutdown modes.

#### Awake

This mode is present when the DR5 is fully running with the screen functioning. This is the normal state anytime the DR5 is being used on the surface or during diving operations.

#### Shutdown

Shutdown mode has the DR5 fully turned off and preserving the battery

### **Starting the DR5**

The DR5 can be started in two different ways:

- Press the right button.
- Water contact – taking the DR5 into water,

When the DR5 wakes up, it will turn on the screen, show the Multideco-DR5 logo briefly, and then enter surface mode display. It can then be configured or used as required.

If the battery has fully discharged, then the DR5 will remain in Shutdown mode until re-charging commences.

The DR5 can also be reset and rebooted, clearing all prior settings – see the [Re-booting the DR5 firmware](#) topic.

### **Turning off the DR5**

The DR5 will transition into Sleep mode by itself. The time this takes can be adjusted in the “[Display times](#)“ menu. This occurs after the DR5 has finished a dive, or a few minutes after the diver last used the DR5 menu selections. The diver can enter Shutdown mode manually by pressing the center button.

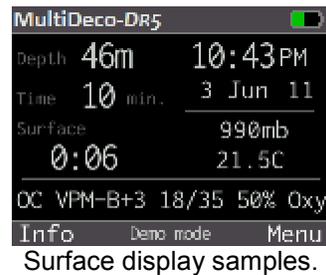
## Multideco-DR5 operation

### Overview

The Multideco-DR5 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

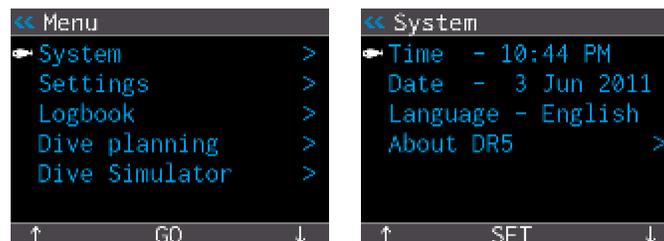
When the DR5 display is blank, this indicates the DR5 is in Shutdown mode. Bring the DR5 into Awake mode by pressing the center button. This should cause the DR5 to start and will bring up the surface display. The surface display is the main interface to the DR5 and Multideco-DR5.



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 air pressure and battery condition.

### Surface Menu system

With the surface display showing, press the right menu button to bring up the surface menu system. The screen should change to show the menu selections below.



Main menu: Scroll up or down with the left and right buttons to shift the highlight bar through the choices. Press the center button to select that item.  
To exit the menus, scroll up above the first item to the hidden Back item.

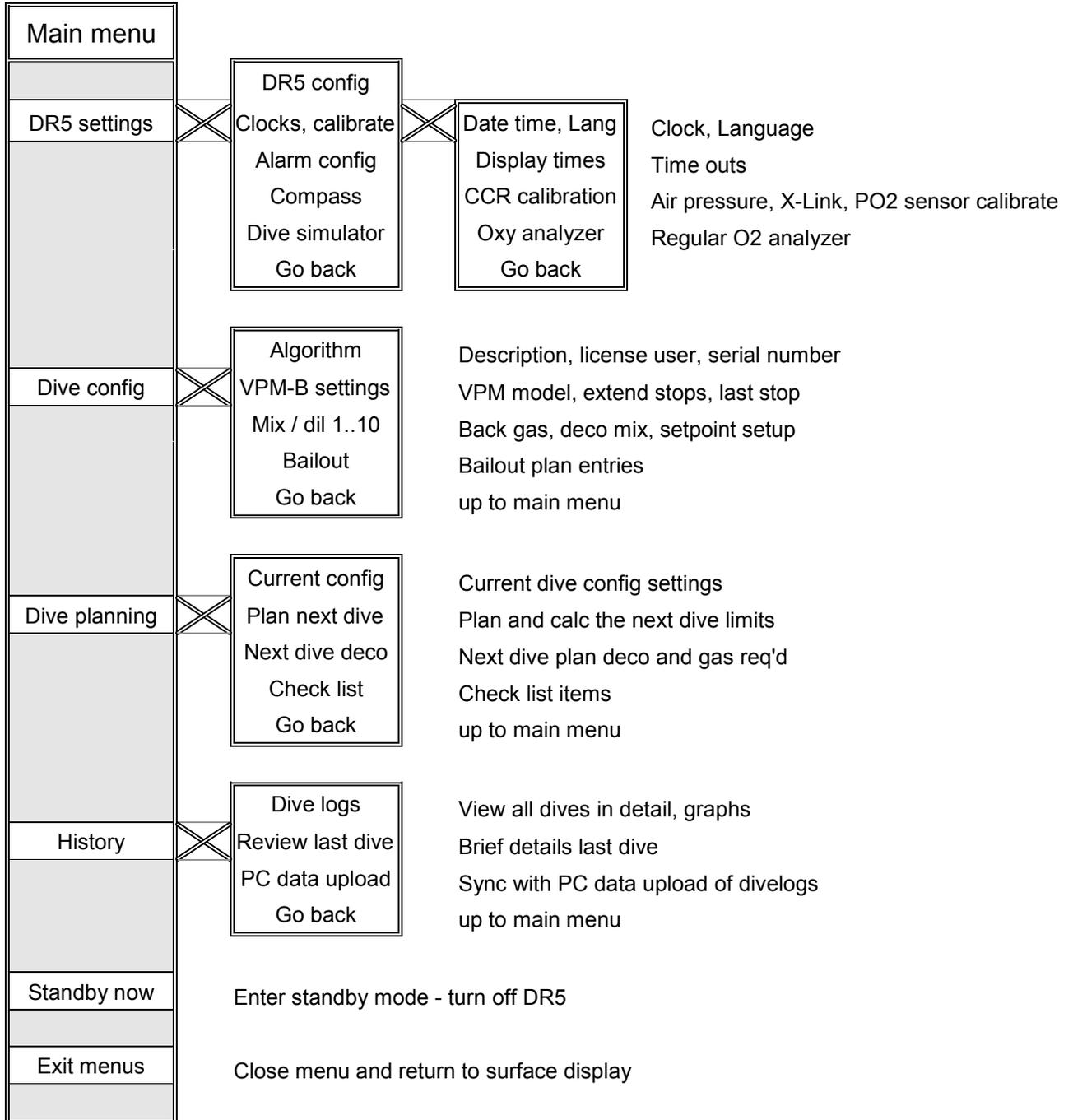
The menu screen is the main entry point into all DR5 settings, configurations, dive setup items and other features. The menus are navigated by scrolling and selecting items.

Each item in the surface menu system will have a symbol to the right of it. The “>” chevron items lead to further menu items and selections. To exit the menu, scroll upwards to above the first item where a Back option appears. The menus will also self close after a time out period. The default is one minute and this and other timeout values can be set in the “[Display timeouts](#)“ configuration

To turn off the DR5, exit the menu system and then press the center button. This will turn off the screen and reduce the CPU power used by the DR5 by placing it into Shutdown mode. The DR5 will also enter Shutdown mode automatically after a period of no activity (no button presses) from the diver. This and other timeout values can be set in the “[Display timeouts](#)“ configuration.

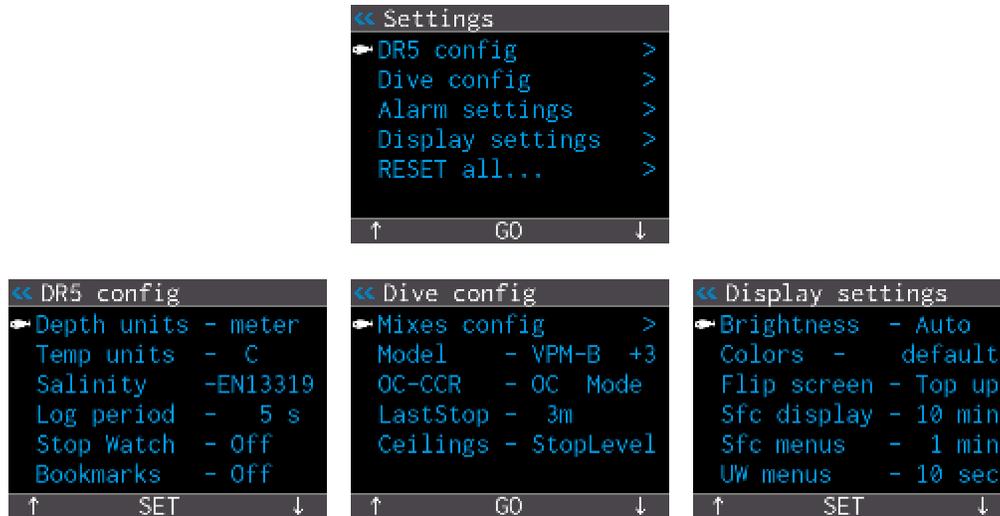
With the default settings, the DR5 will turn off the screen after 10 minutes on the surface and enter Shutdown mode. The DR5 continues to monitor the depth pressure sensor in a Shutdown mode. If a dive was commenced at this time, the DR5 will wake-up and commence to monitor the dive as normal.

**Menu items table – surface mode**



## DR5 settings and configuration

The DR5 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 3 taps (see Surface Menu system description below). Then scroll up or down to select DR5 settings, then perform a left or right tap to select, then scroll and select the “DR5 config” item.



DR5 settings under menu items “DR5 config”, and “dive config”.

### Depth units

- Meter or feet.

This also adjusts the speed units to meter per minute (mpm) or feet (fpm).

### Temp units

- Celsius C° or Fahrenheit F°.

### Salinity

Set the water salinity value. This will affect the water density used by the DR5 and therefore have a small affect on the indicated depth. Select from:

- Fresh: fresh water = Specific Gravity 1.000,
- Mix FS: a mix of fresh and salt waters = Specific Gravity 1.010,
- Light S: light salt = Specific Gravity 1.020,
- Norm S: medium salt = Specific Gravity 1.025 (standard seawater, 3.6% salt),
- High S: high salt = Specific Gravity 1.030.
- EN13319: This will configure the depth reading to comply with the EN13319 depth indication standards (v3x and v4x hardware only). 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.

### 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.

### Stopwatch

*<feature not yet active in Multideco-DR5>*

### Bookmarks

*<feature not yet active in Multideco-DR5>*

### Mixes config

This menu gives control of the breathing gas/mix and diluents settings. See the [Dive Configuration](#) section for details.

### Model

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

### Conserv

Conservatism setting on VPM – select from Nominal through to 5. These levels match the V-Planner desktop settings. For ZHL-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 must never exceed the Hi value. For VPM-B + GFS, select the VPM conservatism, plus the GF Hi setting for the GFS.

### OC-CCR

Select OC dive mode or CCR dive mode

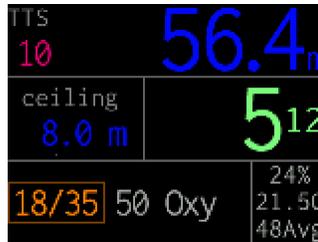
### LastStop

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

## Ceilings

- Select from Stop Level or Direct

This feature controls the method of displaying a decompression ceiling limit value, and the times required. “Stop Levels” are regular decompression stops, spaced at 10ft or 3m intervals, with a matching time at the stop depth. A “Direct” stop shows 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 smiley depth guide.

In Multideco-DR5, 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 value 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.

## Brightness

- Select Low, Med, High or Auto. The DR5 includes a light sensor to adjust the screen brightness with the Auto setting. Note: The OLED screen uses the majority of the battery power in the DR5. Setting the display to Low and selecting a dark color scheme will extend the battery life.

## Colors

Select from several built in color schemes. Default, Yellow, White, Green, Random and Upload. The random will create colors at random and change upon every startup of the DR5. The Upload allows you to set you own custom color design using the dive log manager, and to upload this to the DR5. To configure the unique colors, see the Color Set utility available at: <http://www.multideco-dr5.com/download.html>.

## Flip Screen

- Top up or bottom up. This will cause the screen to invert and the DR5 can be worn upside down. The buttons are reversed to match the inverted display. This

upside down feature can be used to have the Fisher cable connection always facing inboard, for use on either the left or right arms.

#### Sfc display

Changes the time the surface display stays active, before the computer shuts down.

#### Sfc menu

Changes the time the surface menu display stays active, before the computer returns to the surface display screen.

#### UW menu

Changes the time the underwater menu display stays active, before the computer returns to the dive display screen.

#### Alarm Settings

Adjusts various dive alarms – see [Beeps, flashes and alarms](#)

#### RESET All

This resets all configured settings back to default values. This includes all dive plans and VPM-B config settings. The dive logs will remain intact. Note that this does not perform a reboot. A full reboot can be achieved with the procedure described in [Rebooting the DR5](#).

The DR5 configuration settings can be uploaded to the Dive log manager for inspection. This allows the diver to see the current settings on the DR5, all in one screen. However, all settings must be changed in the DR5, as the ability to transfers settings from Dive log manager into the DR5 is not permitted.

## **Dive planning**

### **Elevation diving in lakes and rivers**

The DR5 will measure the air pressure at the dive site when in Standby mode or Awake mode. Multideco-DR5 will measure an average of air pressure over the five minutes before starting the dive. Divers should allow the DR5 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 DR5 will display depths and decompression limits that have been corrected for the effects of the current ambient air pressure and elevation.

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

### **Repeat dives**

Multideco-DR5 will display the surface time since the last dive during the surface display. Multideco-DR5 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.

Multideco-DR5 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 Multideco-DR5.

### **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.

## Dive configuration

A summary of the current Dive configuration and planning settings is shown in the lower part of the main surface screen. Pressing the left “Info” button will cause all the details to scroll into view in sequence. This includes bail out information and CCR pO2 cell information. This should be checked and verified before every dive, as some dive configuration items cannot be adjusted while underwater.

CCR VPM-B+3 10/50	Bail 2 - Off
Info Demo mode Menu	Info Demo mode Menu
Bail 1 VPM-FB0+2 10/50oc	StartSP 0.50 Auto Off
Info Demo mode Menu	Info Demo mode Menu
10/50oc 50%oc	pO2 ---- ---- ----
Info Demo mode Menu	Info Demo mode Menu

Pressing the Info button will scroll the current settings into view. This example has a CCR dive VPM-B at setting +3, with 10/50 dil. Bail 1 setup with VPM-B Fast Bail out and 10/50 oc and 50EAN oc. Bail 2 is not used. The starting SP is 0.50, auto swap is off, and pO2 cells are not present.

Multideco-DR5 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. This can be entered as a “pp” and the computer will decide the switch depth based on MOD.
- For CCR dives, the expected set point value of the mix, and an initial set point value for the descent portion from surface.

Multideco-DR5 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 gives the dive computer some knowledge of the diver’s intentions, and available deco mixes for use later 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 Multideco-DR5 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 diver's selection or adjustments made underwater.

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

From the Main menu, select Settings -> Dive config and then Mix config for OC mode, or Dil SetP config for CCR mode. To swap to/from OC or CCR mode, see the [OC-CCR mode setting](#).



Dive configuration: OC and CCR displays.

The 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.



Add, 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. Press center button Set to highlight into the blank region. Scroll up/down to select “A” for Add.

- Move the cursor right to reach Oxygen component selection. Scroll up/down to set the O2 value. Note that a displayed value of 99 is treated to mean 100% oxygen.
- Move the cursor right to reach the Helium component. Scroll up/ down to set the He value.
- For CCR mode, move the cursor again to enter the proposed set point value of this diluent. 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 “0.00”.
- Move the cursor right to reach and enter the MOD (Max. Operating Depth) or mix swap depth. Scroll up/down to adjust. The BTM value is for use with the bottom mix – only one BTM permitted per gas table. The next item shown is PP. For pp, Multideco-DR5 will automatically calculate the ascent with this mix based on a switch depth and MOD of 1.6pp O2%. Or you can set the actual depth manually into the MOD column that the diver plans to use this mix. Note that Multideco-DR5 will never switch a mix for the diver – the diver must make all switches manually in water with menus.
- Move the cursor to the far right side and press the center button to Apply the changes.

#### Delete a mix

- Scroll down to the row to delete. Shift the cursor into the data area.
- Up or down scroll to select “X” for remove.
- Move the cursor to the far right side and press the center button to Apply the changes.

#### Edit an existing mix

- Scroll down to the row to edit. Shift the cursor into the data area.
- Scroll up or down tap to select “E” for Edit
- Shift the cursor to reach the Oxygen component. Now follow the instructions per Add new mix above.

### **Important notes on dive mixes**

The following rules apply to dive mixes and selections:

- 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.
- Multideco-DR5 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.

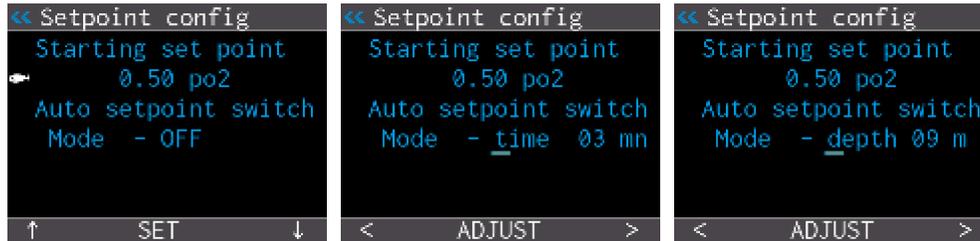
- The deepest mix (lowest O2% component) must be the BTM mix.
- No duplicate mixes allowed in OC. CCR legs can have a duplicate mix, but with different set point and MOD settings. E.g. a planned increase in set point value during deco.
- A CCR table can have both regular CCR set point legs and OC legs. Use a set point of 0.00 to obtain an OC leg in the CCR table.
- A summary of the current plan settings is available on the surface display screen by scrolling with the Info button.
- Multideco-DR5 will check the information entered and may generate an error message describing the problems. Any errors that are found must be corrected prior to starting a dive.
- Multideco-DR5 will start with the BTM mix selected.
- A travel mix for descent must be selected manually as the diver commences the dive.

See the [Underwater menus](#) topic below for details on making mix and set point selections during the dive.

Note for CCR diver with connected pO2 sensors: When the PO2 data fails / stops / is turned off / or terminates, Multideco-DR5 will fall back to the manual SetPoint values entered in these mix tables.

## CCR Initial setpoint

The Start setpoint specifies the initial setpoint to be used when commencing the dive in CCR mode. This screen appears after the Diluent mix setup is completed. This Start setpoint value is set automatically when Multideco-DR5 starts a new dive.



CCR starting setpoint, and Auto setpoint switch option.

A second option is the Auto setpoint switch. This will cause the setpoint to self adjust once, 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 an increased value from the start setpoint,
- Any manual manipulation of the setpoint during the dive, will cancel the pending Auto switch operation.

## CCR bail out plan

Multideco-DR5 has two separate bailout plans, each with a maximum of 5 entries. These are named Bailout I and II and they appear in the Dive 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.

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 scroll and select menu.

The model choices for bail out are VPM-B, VPM-B/E or VPM-B/FBO, and each can has its own conservatism settings from 0 through 5. [Fast Bail Out](#) (FBO) model option is described below.

The current deco and first stop details for each bailout plan, can be previewed underwater through the underwater scroll and select menu.

```

<< Bailout config
Bail 1 Dil SetP OC >
Bail 2 Dil SetP OC >
Bail 1 - VPM-FB0+2
Bail 2 - VPM-B +3
↑ GO ↓

<< Bail 1 Mixes
O2/He Setp MOD
1 10/50 OC BTM
2 50% OC pp
3
4
5
↑ SET ↓

```

CCR Bailout planning, CCR bail out model settings.

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 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.

*Note for pO2 connected cell users:* Bail out plan ascents are computed using a fixed SP value from the mix table entry settings (if the leg is an SP leg). The predicted times of bailout deco will reflect those settings. However, when the bailout plan is selected for use, it commences using the PO2 data applied to the SP legs (unless manually disabled / offline). As usual, if the mix selected is specified as an OC mix, then its computed as OC.

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.
- 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), Multideco-DR5 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 NDL / deco limits of a bail out plan can be previewed with the underwater scroll and select menu.

The diver can select a bailout plan for use when under water with the underwater scroll and select menu. 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” from the underwater scroll and select menu.

### **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.

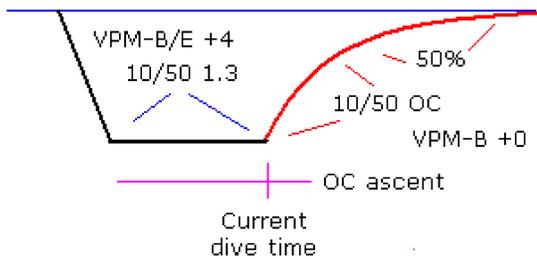
**Bailout considerations**



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

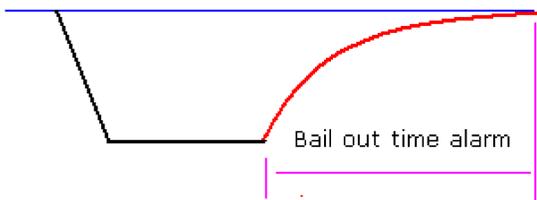


Bailout is not calculated as 3 discrete plans. The diver breaths only one mix at a time - the tissues are in one common state when switching to bail out mode.



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 pO2 cell calibrations

*This section of the manual applies to the use of pO2 cells connected via the Fisher connector to the DR5.*

### Overview

HeinrichsWeikamp DR5 includes a Fisher connector to connect to the three pO2 oxygen cells from the rebreather system, to the DR5. This provides the DR5 with a secondary or duplicate set of O2 sensor values. These signals are processed by the DR5 and are converted to pO2 information for the decompression algorithm. The data is computed into an ascent calculation for producing decompression limits.

### Warnings and limitations

Be aware and understand these points:

- External wired pO2 cells can stop functioning without warning, at any time, thereby depriving the diver of all pO2 information.
- Multideco-DR5 will completely stop showing all pO2 data, any time the “No Data error” is activated, or the diver selects a manual SP.
- Multideco-DR5 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.
- Multideco-DR5 must not be used as the authoritative or sole display of pO2 level, or other rebreather status information.
- Multideco-DR5 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 Multideco-DR5 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 manufacturers 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.
- Multideco-DR5 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 DR5 will accept any combination of one, two or three cells connected to any of the three O2 input channels. MultiDeco-DR5 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's specifications for output voltage. The DR5 accepts the only the 11mv type cell. The 25mV cell type cannot be used directly as they produce voltages that are beyond the max mV range of the DR5. However, a voltage reduction circuit can be added for the 25mv cell type.

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 DR5 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 DR5 is forced into manual Set Point operations.

### **2 cell inputs**

During the dive: The DR5 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 from the 2 cell readings. If the 2 cells disagree by more than 25%, then both signals are ignored and the DR5 is forced into manual Set Point operations.

### **1 cell input**

During the dive: The DR5 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.

### **Calibration procedure**

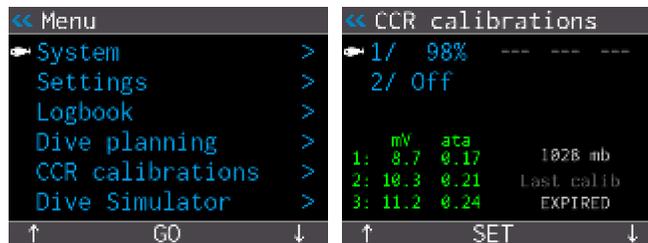
The ambient air pressure can be read from the DR5 main surface screen. For best results, allow the DR5 to run in Awake mode for 5 minutes to achieve a stable reading.

Note: The value shown is the raw ambient pressure value. This has not been corrected for the effects of elevation, temperature or humidity. This reading should align closely with a direct reading barometer.

Note: The public weather and aviation information is adjusted to give a sea level only value. When used at elevation, a correction needs to be applied.

The pressure sensor in the DR5 is designed and calibrated to measure water pressure changes and it is not the best instrument for measuring air pressure. The air pressure reading is probably accurate to  $\pm 5$ mb, and may drift further over time. A more accurate reading can be obtained using an atmospheric barometer.

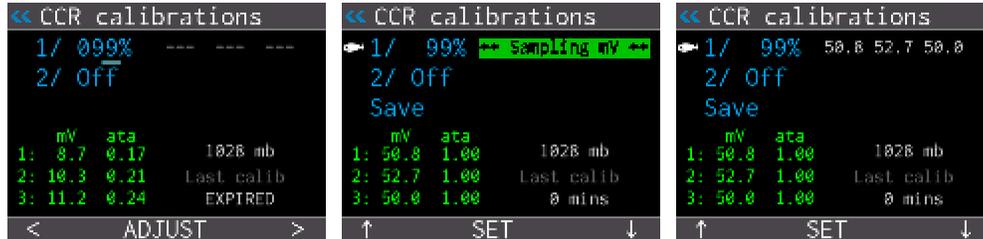
The calibrations and control menu is located under menus Settings -> CCR calibrations.



CCR calibrations. Line 1/ is the "high" O2 mix.  
Line 2/ is the "low" O2 mix used in calibrations.

The O2 calibrate screen will display the direct millivolt (mV) readings from each of the connected cell channels. The ata value initially shown is derived from the default 2:1 ratio mV:ata. After the first calibration, the ata value is computed using the last calibration ratios.

The DR5 will accept one, two or three cell inputs, placed in any position of the three channels. MultiDeco-DR5 will discover when a channel is connected or removed automatically.



1 and 2 gas calibrate screens. Sample capture in progress.  
Set the high calibration mix percentage, start calibration, and saved sample.

Select or set the calibration gas fraction of O<sub>2</sub>% that will be used in the calibration procedure. Enter an O<sub>2</sub> value that represents the actual FO<sub>2</sub> that the sensors will be immersed with during the calibration procedure. Multideco-DR5 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 pO<sub>2</sub> values in the water. For best results, use oxygen and follow your instructor or rebreather manufacturer procedures carefully.

A high fO<sub>2</sub> % test is mandatory under line 1. The line 2 can be used for a second (optional) mix test with low fO<sub>2</sub> % air or similar.

To commence a data capture, scroll up /down to the gas section and highlight the appropriate calibration gas. Move to the right until the Calibrate is shown on the center button and press it. The DR5 will then sample the O<sub>2</sub> cell readings for about 5 seconds. Multideco-DR5 will apply all corrections required for ambient air pressure during the data sampling as required.

After the sampling period completes, the data sample is tested for validity. See the [X-Link description](#) for details of this. A valid data point set is then saved for reference in later calculations of PO<sub>2</sub>.

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 O<sub>2</sub> 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.

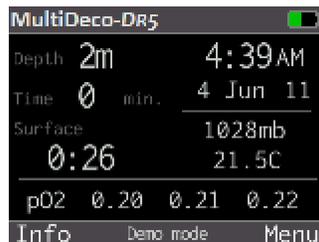
The calibration process may be repeated as often as required, and a successful calibration is required to accept the data points for use in PO<sub>2</sub> calculations. An accepted sample set is indicated by the text "Calibration OK", and the captured readings are then shown in the gas window. Note: poor flushing technique, and incorrect setting of cal mix, can and does introduce errors into PO<sub>2</sub> readings as high as 20%.

A successful calibration will remain valid for 1 week, and then a new calibration is required. The computer will fall back to fixed SP mode if a dive is started with an invalid or expired calibration record.

#### Synchronizing calibration to an automated primary controller.

On some rebreathers, the primary controller will run its own automated calibration sequence, or may not easily allow manual flushing afterwards. For these RB's, it is suggested that you carry out the DR5 calibration at the same time as the RB is performing its automated sequence. Observe the raw mV values on the DR5 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 DR5. Set the sample gas fraction O<sub>2</sub>% to match that used by the RB during its automated process.

After a successful calibration, select Save and return to the main surface screen. The pO<sub>2</sub> values will be visible by scrolling with the Info button.



Surface display with pO<sub>2</sub> cell readings.

## Diving the DR5 and Multideco-DR5

### Overview

Divers should review the current settings and dive configuration prior to entering the water by pressing the Info button and scrolling through the current settings. 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 DR5 should be powered up with the surface view display showing when entering the water and leaving the surface. The DR5 can start by itself from shutdown mode when underwater, but the recommended method is to have the DR5 fully awake with the screen active.

The conservative level setting in the Settings -> Dive config -> Model, 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 DR5 can be worn on either wrist and the screen display inverted via a configuration item (flip screen). This also allows the Fisher cable to be facing inboard from either wrist.

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. Multideco-DR5 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 DR5 will enter into dive mode automatically when passing a depth of 1.6m or 6ft deep from an Awake. If the unit is shutdown it will normally sense the dive activity within 20 seconds of submerging. Dive mode will stop on ascending through 0.5m / 1.5ft.

The DR5 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.

For CCR divers with a connected pO2 cell Fisher cable, the current highest PO2 signal will show in the mix window. PO2 mode is identified by the showing of the 3 bar gradient display and the 3 cell pO2 display. If the pO2 signal fails to start (or is missing) when first submerging, a "No PO2 data" error shows, and it must be cleared manually. A

dive that starts as a failed PO2 dive, must surface to repair the fault – repairing the fault in the dive, will not restore a PO2 mode.



OC and CCR underwater display samples.

Left: 32% EAN mix selected in OC at 28m deep and 18 mins NDL.

Middle: The CCR has a set point of 1.25 at a depth of 42m.

Right: CCR with connected cells and a pO2 values shown.

## Descent and ascent

Multideco-DR5 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 rate that is less than 12 fpm / 4 mpm is 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 DR5 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 18m for 1 minute.

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 display is replaced with an 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 smiley scrolls into view,

Right: diver is positioned at the stop depth, with the smiley centered.

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 window.



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

If the diver was to ascend above the required stop level, then a hard ceiling graphic lowers into view in the stop sign 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 rises above the decompression stop limit.

The hard ceiling graphic intrudes into the picture, and replaces the smiley.

Diver needs to descend have the smiley return.

### 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 with smiley depth guide.

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 will show for the remainder of the required decompression.

## CCR pO2 diving

*This section of the manual applies to the use of pO2 cells connected via the Fisher connector to the DR5.*

For pO2 cell calibrations see [CCR cell calibrations](#)

MultiDeco-DR5 will display the pO2 cell information in two different ways: As a moving 3 bar gradient, or a text for three cells. Both displays are available on the dive screen, with a press of the quick scroll menu button.

The 3 bar display 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 1.0, and the high bar is 1.6. If the diver is aiming for a pO2 of 1.0 to 1.3, then keeping the bars in the ½ to ¾ range would represent this.



The 3 bar display. If a channel becomes defective / lost, then it is drawn with the yellow error color

## CCR pO2 warnings

Multideco-DR5 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,
- Averaged or highest pO2 cell readings are less than 0.35,
- Averaged pO2 cell readings are lower than the natural ppO2 of the diluent ((pO2 < fO2 x ATA) while pO2 < 1.00),
- 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 un-usable,



pO2 is high, or low. 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 un-usable.  
Right: A 3 cell input, data erratic, one channel is dropped.

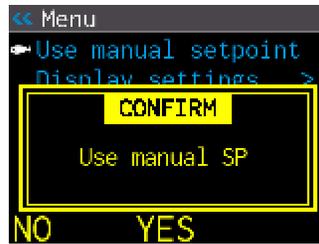
The “No PO2 data” and “data erratic” warning will flash until cleared by the diver. To clear these warnings, press the center OK button. Clearing the error, does not correct the error – it only acknowledges the diver was informed of the error, and clears the warning screen from the view.

The “No PO2 data” warning indicates that the computer has stopped receiving and calculating pO2 data. The warning will transition the DR5 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. Press the right menu button to access the menus.

### **CCR switch to a manual SP**

The pO2 data may be turned off during a dive from the underwater menu. This will disable all data from the connected O2 sensors from 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 Quick scroll menu.



Select "Use a manual SP", and confirm to turn off all pO<sub>2</sub> data.

SP mode will be engaged automatically any time the data from the O<sub>2</sub> cells signal is lost, or the signal values disagree significantly.

### **Selecting cells / lost signal**

The DR5 and Multideco-DR5 does not permit the diver to select cells individually for the display or decompression calculation values. The DR5 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 DR5 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 PO<sub>2</sub> operation in this situation.

## Underwater Menus and settings

### Overview

Multideco-DR5 uses two menu systems in the diving mode. The first method is the on screen “quick scrolling menu”. This method handles the common items like mix swaps, bail out selections, and sp adjusts. This reduces the button presses, and makes available extra information to the diver. The left button will scroll the details and shift the cursor / highlight through the available items. The center button will select that item.



Quick scrolling menu – accessed from the left button. 18/35 is current mix. When scrolling, the right text section info changes to show relevant data. For OC mixes it's the MOD, and for bail out it shows the bail plan NDL / deco time.



Quick scrolling menu – selecting new mix with center button. Changing to the mix to 50%.

The second menu system is a regular menu display, like the surface menus. The right button always accesses the regular dive menus.



Regular dive menu – accessed from the right button. The actual items available depend on the dive and settings (some items not shown).

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

The following points are relevant to diving Multideco-DR5 and menus in all dive modes:

- Multideco-DR5 will not switch mixes for the diver. The diver must select any mix changes underwater manually.
- Multideco-DR5 will start the dive using the bottom mix item from the dive plan (BTM item).
- If a descent travel gas is used, it needs to be selected by the diver after submerging.
- The diver can adjust the selected mix via the Quick scroll menu. For CCR divers, the SP, Diluent and bailout is selected this way also.
- Multideco-DR5 will monitor the current mix selection during decompression 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. It will flash the mix display if they do not agree.

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.
- Multideco-DR5 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 Multideco-DR5 monitor the current setpoint at various stages through the dive. See the [Alarms](#) topic for details.

## OC Deco Mix / Diluent selection

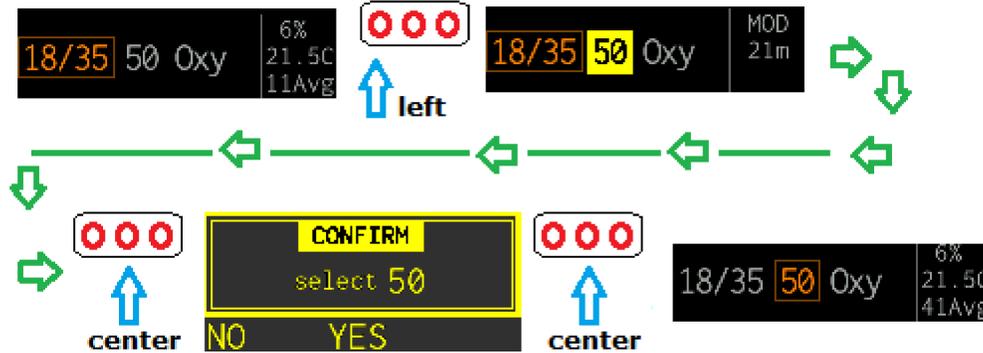
The available deco mixes are shown on the dive screen. Scroll and select one with the Quick scroll menu buttons (left and center).

The current mix selection is indicated by the box symbol.



Current mix is 18/35, with 50 and 100% deco mixes available.

Selecting a new mix is achieved by scrolling the highlight (yellow) to the desired mix, and pressing the center button. Confirm the choice with an extra press of the center button. The current mix indicator moves to the new mix.



Selecting a new mix. Highlight the mix by a scroll, then select and confirm it.

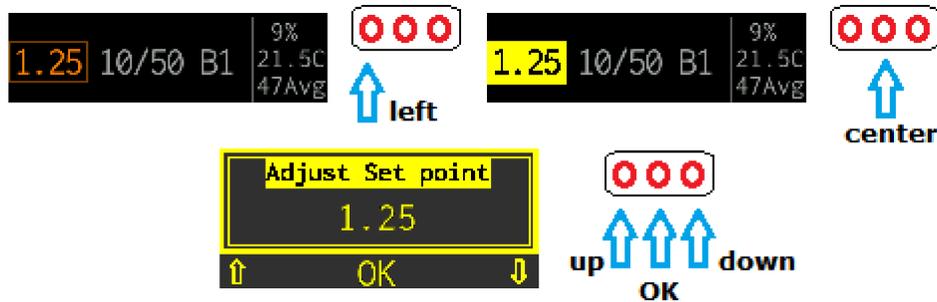
After selecting a new mix underwater, the current NDL or decompression limit times are replaced with the word “WAIT” while the new result is computed and displayed. Normally this is just a few seconds, but can be up to 5 seconds for dives of 150m / 400ft or more.

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.

## CCR SP adjust

For CCR dives – adjust the constant or fixed set point ppO<sub>2</sub> to match the value in the rebreather. 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.

The SP is adjusted as follows;



Adjusting the Set Point. Use up / down buttons, and press OK button to save.

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 5 seconds for dives of 150m / 400ft or more.

## pO2 cell display

When the external pO2 cells are connected via the Fisher cable, the Quick scroll menu will display the following:



Scroll between the various displays with external pO2 cells connected.

The values shown in this screen are the latest reading received, and will update every second. A single or twin channel input will show only those channels. If a channel has stopped sending data, or has gone offline for other reasons, it will be displayed with the value crossed out.

The diver can terminate PO2 data by selecting “Use a manual SP”. A confirmation is required. Once SP mode is selected here, Multideco-DR5 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](#).



Confirmation screen to terminate PO2 mode and assume a manual setpoint mode.

**WARNING:** When the manual setpoint is selected, all PO2 data is removed from the screen and menu system in Multideco-DR5 – you cannot view any PO2 data! Use the rebreathers primary PO2 display to view your PO2 information from this point onwards.

## **Bailout I and 2, Back to CCR**

This procedure allows the diver to switch from the regular CCR plan, over to a bailout out plan quickly. There is a confirmation page to prevent accidental entry to Bail out mode. After a bail out plan is selected, the diver can return to the regular CCR plan with the CCR item. The setup of 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.



Changing from normal CCR to Bail 1 plan.  
 Screen includes a preview (right side) of the required  
 TTS (deco) and first stop for this bailout plan.  
 A confirmation screen before switching over to the bail out plan.  
 Select Yes to accept bail out 1 plan.



Computer now running on Bail 1 plan with 10/50 oc and 50 EAN oc.

The bail out plan current limits (deco time and TTS) can be previewed by just highlighting the B1 symbol, without selecting the bail plan. Notice above how the right part of the screen says “Deco 45min 18m”. These are the current computed ceiling limits of bail 1 plan.

## **Return to CCR**

To return to CCR plan, select CCR from the Quick scroll menu.

## Lost Gas

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.



Mix 50% can be removed from the plan and the decompression calculations. It can be restored by repeating the same procedure.

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

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.



Scroll to the right, enter and edit mix detail, scroll right again to a save.

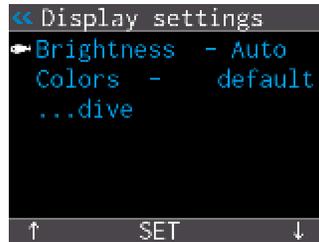
The following limits apply to adding a new mix:

- Only deco mixes can be added i.e. the O<sub>2</sub> component of the new mix must be greater than the current BTM mix O<sub>2</sub> component.
- The added mix is inserted and calculated into the plan immediately.
- The new mix must be selected manually, as per the [OC Deco Mix / Diluent selection](#) instructions 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 does not restore a Lost mix – to restore a crossed off (lost) mix, repeat the Lost Gas menu again.

## Display

Options for changing screen brightness and text colors.



The brightness has four settings. In direct sunlight, the High setting is usually needed to read the display. Underwater the Med is often enough, and Low at night or for indoors use. Setting Auto will allow the DR5 to adjust to the ambient light conditions.

## GF Adjust

When the current dive plan is using the ZHL-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.



Adjusts the ZHL-GF settings during a dive.

## Ceilings

Controls the method of displaying a decompression ceiling limit value, and the times required. “Stops” 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 Multideco-DR5, 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.

```
<< Deco stops
LastStop - 3m
Ceilings - StopLevel
Stop table >
...dive
↑ SET ↓
```

Sets the deco ceiling style.

## LastStop

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

```
<< Deco stops
LastStop - 3m
Ceilings - StopLevel
Stop table >
...dive
↑ SET ↓
```

Sets the depth for the last decompression stop.

## **Stop 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. Tap the top or bottom case to scroll the list. 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.



<< Stop table	
...dive	
3m	5
6m	3
9m	2
12m	2
↑	EXIT

Deco stops that will be required further along in this dive.

## **Stopwatch**

<feature not yet included>

## **Bookmarks**

<feature not yet included>

## **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, Multideco-DR5 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 run time resumes where it left off when last surfacing. After five minutes on the surface, and new dive log and entry will begin upon the next dive.

After ten minutes or so on the surface, the DR5 will automatically turn off the display and enter shutdown mode to conserve the battery. The DR5 can be brought back to awake state with the right button.

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

## Beeps, flashes and alarms

### During the dive



Alarm symbol – this flashes in the lower right corner of screen for all errors.

The alarm symbol will show when the diver has diverged from the planned mix swaps, or broken a deco ceiling, or other conditions that need the divers attention.

Multideco-DR5 will cross check for the divers adherence to deco stops and the dive plan. The following items are checked and various alarms or flashes 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.
- Inspired mix exceeds 1.6 ppO<sub>2</sub>: Bottom left flashes “1.6 ppO<sub>2</sub>”.



Deco ceiling violation warning, Mix swap reminder,  
1.6 ppO<sub>2</sub> warning shown when exceeding that level,

The alarm symbol – a bell, will flash for every error that occurs and remain on until the error is resolved. It is displayed on screen underneath the time.



Alarm symbol – this flashes in the lower right corner of screen for all errors.

## Missed deco

If the diver has surfaced with some decompression stop time still remaining to be completed, then Multideco-DR5 will:

- Flash an Alarm and descent missed deco message for 12 hours.



The lower right window, showing the Alarm symbols.  
These will occur when a diver surfaces without completing the decompression stop obligations.

## Alarm settings

```
<< Alarm settings
Depth      - 0m
Time       - 00:00:00
Asc speed  - 0mpm
Dec speed  - 0mpm
SetPoint   - 0n
O2 stop pp - 1.6
↑         SET         ↓
```

Alarm settings that will trigger during the dive.

The diver can set additional alarms into the DR5 under menu Settings - > Alarm settings. When triggered, these will cause the warning symbol to be shown in the lower right, with a text describing the alarm.

### Depth

Dive depth has exceeded the set depth.

### Time

Dive time has exceeded the set time.

### Asc speed

The ascent rate has exceeded the set rate.

### Dec speed

The descent rate has exceeded the set rate.

### SetPoint

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 pp

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.

## 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, Multideco-DR5 is tracking the divers every move and recalculating the results accordingly. Multideco-DR5 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 Multideco-DR5.

### 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 Multideco-DR5 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.

Multideco-DR5 will warn when the diver breaks the deco stops limits, by flashing the alarm symbol, flashing the Deco stop depth and beeping. Multideco-DR5 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 Multideco-DR5 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: Multideco-DR5 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 Multideco-DR5 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.

## Clock & time, Language



The Clock and language setting is under the Date / Time menu

The time and date are set into the DR5 with the Date / time menu item. When the DR5 first boots up, this menu is presented for setting, and again after the battery is fully discharged. All dive logs, surface times and tissues data is based on the clock settings supplied on the initial settings.

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

When the diver shifts geographic location into a new time zone, the clock should be reset to the new local time. The same applies for daylight saving changes. This will give relevant time details to all the saved logs and graphs. Note that changing the time settings will not change the displayed surface intervals. Multideco-DR5 understands that the diver may shift in time zones, and adjusts automatically for a global time applied to the tissue state and surface interval times.

The Language item will change the displayed texts into a different language. Currently English, French, German, Italian, Dutch, and Norway languages are included, with others available.

## Dive planning

Multideco-DR5 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.

The planning process and profile result, includes consideration for the tissue history and previous dives (the simulator does not).

To edit a row, select it and change the depth or time.

To add new legs, select the Add row.

To remove a leg, edit that row and set both depth and time to 0.

Plan next dive				Next dive deco			
1.	60m	40 min		Plan - stops			
Add	0m	0 min		3m	20	114	Oxy
SAC	20btm	13d	LPM	6m	12	94	Oxy
Calculate...			>	9m	9	82	50%
				12m	7	73	50%
				15m	5	66	50%
↑	ADJUST		↓	↑			↓

Dive planning the next dive.

## Dive simulator

Multideco-DR5 includes a diving simulator. This can be used to learn and experience how the DR5 dive computer and Multideco-DR5 will behave under water, before actually taking it on a dive. The simulator causes the DR5 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, as seen running a test dive.

### Start Sim, Quit Sim

Starts or stops the simulated dive.

### Mode

Select Auto or Manual. Auto mode will cause Multideco-DR5 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. On manual 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 Manual mode, 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.

### **Simulated plans and the desktop V-Planner**

The dive results from Multideco-DR5 simulator and the desktop V-Planner 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.

## Logbook / dive logs

The “Logbook” menu and sub menus give access to previous dives for review, and various displays of dives and information saved into the DR5’s memory.



Dive history logbook menu items and dive log summary.

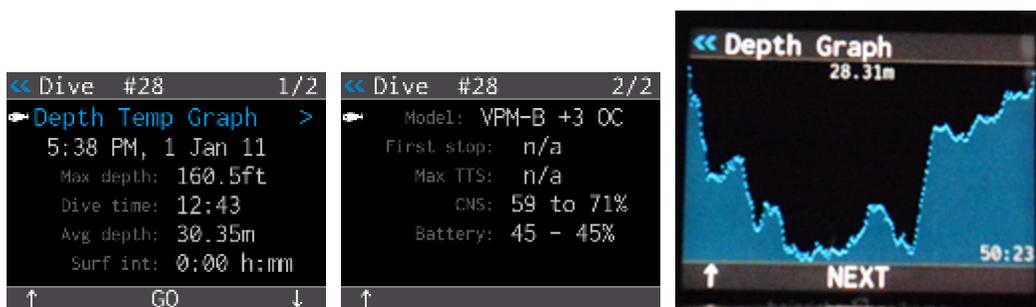
The amount of data saved into the DR5 depends on the sample rate settings on the DR5 config sample rate (log period). Multideco-DR5 saves more data than the basic DR5 and so the following memory constraints apply:

- 1 second sample rate – 30 hours of dive data
- 5 second sample rate – 154 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.multideco-dr5.com/download.html>).

## Dive Logs

This lists the dives in memory. The columns are a short summary of each dive: number, date, maximum depth, run time. This display leads to the details dive log displays.



Dive details and dive graph.

**Review last dive**

Shows some details of the last dive. A second tap will bring up the detailed log information (see above) for this latest dive.

**Export dives**

The PC / Mac data upload item is used in combination with the Multideco-DR5 Diverlog Manager on the PC or Mac. It retrieves log information from the DR5 and uploads it to the PC / Mac.

The data can then be exported from the DR5 in UDDF format, or other formats.

To prepare the DR5, plug in the USB and start the USB file system. The rest of the export procedure is performed by the Dive Log Manager

The transfer procedures require the USB cable. The transfer process is described in detail in the help files included with the Multideco-DR5 Diverlog Manager (available at: <http://www.multideco-dr5.com/download.html>).

## Battery and charging

Consult your DR5 user manual for further details of the re-charging procedures.

The DR5 has a powerful computer cpu inside – the Atmel AVR32 and this is common to expensive PDA's and modern cell phone devices. The color Oled screen will consume a lot of battery power in a short time. You can expect 25 hours or more of dive time from the DR5 on a single charge. It should easily last a week on a daily multi-dive routine.

Before diving each time, activate the DR5 and view the surface screen and check the battery condition meter.



Battery symbol: Full, half and empty.  
The empty symbol flashes.

The battery meter shows the current battery charge state. As it approaches empty, it will flash the battery symbol. At that time, less than 15 minutes remain

If the battery is depleted during a dive, then the current dive's decompression and ascent information is lost, and the DR5 will remain off until its next battery recharge. The current dive log may also be lost too.

When the DR5 is charging, or the AC power is being supplied, then Multideco-DR5 will blink the lower right red charge led light. When charge is complete, the led light becomes green.

When the battery is completely discharged, the DR5 will not restart until it is placed on re-charge. Plug in the charger and the DR5 should charge and start up to display the recharge status.

**NOTE:** The DR5 will continue to consume the battery slowly during the shutdown mode, and can consume some power when not used and it's stored in the cupboard. Therefore, it is important that the diver starts the DR5 before every diving day, and before each dive, to check the battery meter for sufficient power remaining. A DR5 that only dives occasionally will likely need a recharge before use. As a precaution, it is a good idea to recharge the computer the night before any decompression diving.

## Re-booting the DR5 firmware

Under normal operations, this procedure is not required. When the DR5 wakes up each time, it does a start sequence, but not this full reboot sequence.

When installing new software update, the DR5 will perform a full reboot at the end of the install.

Either of these methods will reboot the DR5 firmware.

### Magnet reset

Plug in the USB power to the DR5. This can be either a wall power or PC/Mac USB power. Using a strong magnet, tap it against the left button and move it away. Wait two seconds and repeat. These two taps should cause the DR5 screen to go blank, and then the reboot will commence.

### Battery reset

Loosen the battery plug two full turns (the battery plug is the upper one with the coin slot). Now tap the DR5 firmly on your hand, in the direction of the battery chamber, to cause the battery to move in the DR5. This will disconnect the power internally. Now tighten the battery plug to cause the battery to make contact internally. The DR5 should commence a reboot.

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

The DR5 and VPM program / user settings can be reset from the menu item “System -> Settings, Reset ALL”. However this is a partial reboot only. Use the reboot sequence above to achieve a complete reboot of all the DR5 components.

## Limitations

### DR5:

Operating temperature	0 to 45° C, 32 to 113° F
Battery life – single dive	40+ hours
Battery life – daily dive use	1 to 2 weeks, depending on times.
Battery life – shutdown	6 weeks
Maximum depth reading	288m / 944ft

Consult the DR5 hardware manual for further details.

### Multideco-DR5:

Max depth computation	650m (see hardware 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	134 hrs @ 5 secs, 30 hrs @ 1 sec.
Depth accuracy	± 1%

## Version, releases

Multideco-DR5 inherits 6 years of development and revisions from V-Planner Live and MultiDeco-X1.

Jul 2011	v1.00	Initial release
Dec 2011	v1.01	Added Dive Planning and Dive Log export features, unique screen color settings, minor bugs.
Jul 2012	v1.50	Added VPM-B + GFS, added Czech language.
Feb 2013	v1.51	Improve dive planning, salinity, various minor issues.

## WARNING and DISCLAIMER for Multideco-DR5

**BE WARNED:** This Multideco-DR5 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, and the program author's, do not warrant that this program accurately reflects the Varying Permeability Model 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.

Multideco-DR5 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.

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