VR3
divecomputer

OperatorsManual

Multi gas, multi mode
decompression computer

Warning!
Failure to read and understand this instruction manual in full may result in mis-use of the equipment, injury or even death.

Warning!

The VR3 is an aid to air and nitrox open and closed circuit diving. When undertaking any form of diving, divers should always carry backup tables and depth/time instrumentation in case of equipment failure.

Software Upgrades

Visit www.vr3.co.uk for information on recent software upgrades which may supersede certain sections of this manual

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introduction

The VR3 is designed as a air/nitrox, multi-mode decompression computer. It can be purchased in four configurations.

- Open Circuit Air/Nitrox
- Open and Closed Circuit Air/Nitrox
- Open Circuit Air/Nitrox/Trimix
- Open and Closed Circuit Air/Nitrox/Trimix

In all configurations, semi-closed circuit mode is available as a purchasable option together with the hardware to connect the VR3 to a semi-closed circuit rebreather.

The VR3 is designed to integrate with both the Proplanner decompression software and the Prolog dive logging system. It is fully re-programmable should you choose to upgrade from one configuration to another or when new technology or features are introduced.

power system

The VR3 uses one AA disposable battery. Alkaline, Lithium and rechargeable batteries between 1.5 and 3.6v can be used. Use of any other battery will damage the unit and will invalidate the warranty.

The battery must be inserted with the + end entering the unit first. Check the battery spring is in the cap before inserting battery.

The battery life is highly dependent on the operating mode of the active backlight (see pages 18 and 25). Without lighting, the unit will work continuously for approximately 100 hours diving. If the unit is turned off ('sleep' mode), the battery keeps the internal systems going for 1 year. Every week of "sleep mode" reduces the available dive hours by approximately 2 hours. These figures are approximate based on an ambient temperature of 20°C. Battery life is also affected by low temperatures.

The battery voltage is displayed on the front screen. At 1.2v, the "Battery Low" warning will show. Batteries should be changed at 1.2v. Lithium batteries have a faster discharge curve than standard cells and although they last many hours longer, will discharge quickly towards the end of their life.

Units are shipped with the battery installed. It is recommended that a battery is left in at all times, unless you intend to store the unit for more than three

months. Remove battey for long term storage. Refitting the battery will require you to reset the gases and some setup information.

changing the battery

When changing the battery ensure the VR3 is switched off (blank screen).

Whenever possible change the battery before the existing one goes flat. If the battery is allowed to go flat then all stored data such as the gas list and logbook will be lost.

To change the battery, turn the unit on and then let it turn itself off automatically before inserting the new battery.

When changing the battery, in order not to lose data and to avoid erroneous tissue calculations, the new battery should be inserted within 3 minutes. Do not use the unit as an aid for decompression for at least 24 hours if changing the battery takes longer than 3 minutes and the unit resets. A reset is characterised by loss of your gaslist and dive logs.

When changing the battery, if the the VR3 appears to “lock” in a screen, simply leave it for two minutes (with the battery in) and it will automatically reset.

If the battery goes completely flat, or if on changing the battery the screen appears to freeze, put a new battery in and screw in the cap until the screen just flashes. Stop screwing in the cap and allow the unit to turn on and go into the clock screen. After a short time it will turn off (the backup battery is now charged) and you may continue screwing in the cap.

basic functions

The VR3 has the following basic functions:

- Time and date.
- Light mode (various light functions).
- Programmable safety factor.
- Metric or imperial use.
- Infra-red PC Link for uploading and downloading of setup and dive data.
- On screen logbook of 100 dives.
- Time to fly information.
- Open and closed circuit modes.
- Open circuit bailout option from closed circuit dives.
- Gas switches programmable above and below water.
- PO_2, decompression violation, air break and ascent rate warnings.
- List of all decompression stops.
- Total time to surface display.
- CNS and OTU tracking.
- Temperature reading.

decompression algorithm

The VR3 uses a derivative of the Buhlmann ZHL 16 algorithm. Exactly the same adaptation is used in the Proplanner decompression software.

The new versions of both systems employ some of the latest thinking in practical microbubble avoidance. This may seem to modify the dive profile compared with standard parallel compartment models. The modification takes the form of deepwater microbubble controlling decompression stops. In certain circumstances the VR3 will prompt you to do a short decompression stop, or stops, well below the bulk of the decompression sequence. Along with the other modifications to the remaining profile, this helps to reduce the problems associated with potential microbubble growth.

On all decompression dives, the VR3 will prompt for deep-water micro bubble controlling stops of 2 minutes in duration. Deep-water (microbubble) stops are recognised by their duration (normally two minutes) and a + next to the time. It is vital that microbubble stops are conducted correctly for a safe decompression.

Should a microbubble stop be missed, a “use table” message will appear. The decompression displayed, although very close to the required duration, may be in error. If this occurs consult backup tables and add additional safety stops as required. While continued diving is possible on the VR3, the decompression displayed may not be exactly that required. “Use tables” will show for 24 hours.

avoiding decompression illness

Don’t:

- Smoke
- Exercise post dive
- Take drinks containing caffeine
- Take drugs and certain decongestants
- Use fast ascent rates (greater than 10m/min)
- Do yo-yo or saw tooth dive profiles
- Allow yourself to become dehydrated

Do:

- Drink plenty of water at least 12 hours before diving and immediately after
- Breathe oxygen at the surface after extended decompression dives
- Rest after a dive
- Be conservative in your dive planning

user interaction

User interaction with the VR3 takes three forms:

- Infra-red PC link
- Battery compartment
- Control switches

infra red pc link

The VR3's infra-red link is used to either download dive data (page 27) into a PC or upload gas data into the VR3. The infra red signal beams from the bottom right hand corner of the VR3's screen. (On older models, the signal beams from the middle ot the top of the screen under the VR3 logo.)

Dives can be planned using Proplanner. The gases used within the dive plan can then be automatically transferred to the VR3. They will appear on the active gas list and be available for the dive.

You may also generate sets of gases for uploading into the VR3 using Prolog Windows software.

You can use Prolog to store and view dives on your PC. Prolog is a comprehensive dive logging system with full graphics.

For full instructions on Prolog see the onscreen manual. or refer to the FAQ's on our website www.vr3.co.uk

battery compartment

The battery is a standard 1.5 - 3.6v AA style (or similar) which is widely available. The battery compartment is accessed using a dedicated battery tool. The O rings should be replaced after a maximum of 10 battery changes or if they become damaged or worn. The O ring is an N70, 18 x 2mm standard Nitrile O ring.

The battery must be inserted positive + end first into the computer. Failure to do so will not damage the computer but it will not function. The battery cap should be screwed in until no O ring is visible and the thread bottoms out. Keep the thread clean as this provides the system earth.

control switches

The VR3 has two slide switches on the front. All functions are accessed via these switches. There are four modes of operation:

1. A short push and release of one switch - this is used for all non-critical functions.

2. A push and long hold of one switch. The switch is held until the screen changes. In certain modes such as clock setting, a hold will increment or decrement the number by 10. A short push increments or decrements by 1. In dive mode this provides security against accidental switching to the Gas Change and Decompression screens.

3. Shown as < > with the option between the arrows, a short push of both switches - often used to switch to a new field in order to change it.

4. Shown as **< >** with the option between the arrows,a long push and hold of both switches - often used for critical functions such as switching from open to closed circuit.

On the surface, if no switch is pushed the VR3 will turn itself off after 30 seconds to save power. To avoid this, a short push on both switches in the home screen will activate the legend “dive now” and give you five minutes operation in between switch pushes. This is especially useful when you are learning how to use your VR3 and also when you are downloading dives.

For more details of switch use, please refer to the relevant sections of the manual.

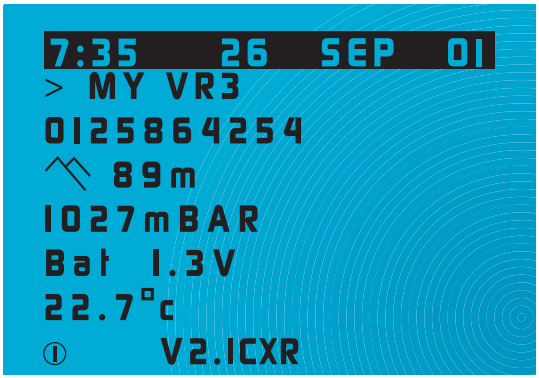
power up

The VR3 is activated by pushing and holding either switch.

You will then be prompted to ⏻ power up(left switch). If the battery has not just been replaced the next screen to be displayed will be the home screen (page 14).

If the batteries have just been changed the time change screen may be displayed, (page 13).

It is not necessary to power up the VR3 before you dive. It will automatically turn on at an absolute pressure of approximately 1.3 bar. If you intend to dive shallower than a pressure of 1.3 bar, use the “dive now” feature, which is activated by a short press of both switches in the home screen. When “dive now” is showing the screen will stay on for 5 minutes between switch pushes.



power up screen

Below the time and date on the power up screen are two lines available for personal security information programming (see page 31). Also shown are altitude atmospheric pressure, battery voltage, temperature and, on the bottom line, the current version of software installed in the VR3. In the power up screen a short push of the right switch toggles between a clock and tissue loading display.

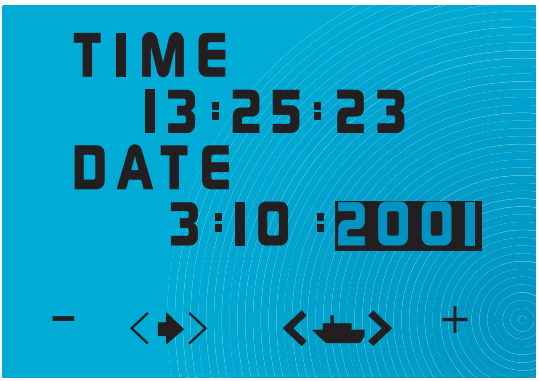
time change screen

This is automatically displayed if the battery has been removed and the internal power backup has discharged (approximately 5-10 minutes).

If a battery has not just been changed, then the time change screen is accessible from the Options Menu ☰ under the SETUP sub menu. The VR3 is not a precision chronograph, but it does meet the European PREN standard for digital dive timing devices. You may need to adjust it occasionally in order to display the correct time.

Changing the time will **not** affect desaturation calculations.

The highlighted numbers are those which will change when a key is pressed. + and - will increment or decrement the number (short push). A push and hold of + will increment the highlighted number by 10. Holding - will decrement the number by 10. Pushing both buttons together (short push), ➡ , will move the highlight to the next field to change; it can then be changed in the same manner. Pushing and holding both switches ⟨⛴⟩ will exit the screen and SAVE the changes. After a SAVE, the unit will then turn off.



time change screen

home screen

After a power up the unit will default to the Home screen. This shows date, time, current gas and has a command section at the bottom.

Repeated long holds of both switches flip the screen through 360 degrees.

home screen

The gas list - (long hold, left switch) - may be accessed from this screen; this enables you to set and change the gases you need (see page 32). You can also go into an options menu - (long hold, right switch) - in order to configure various features.

The “DiveNow” option (short push, both switches) puts the unit into a five minute timer mode . The words “DiveNow” will appear on the screen. This function is also useful when you are programming the VR3 before dives or when using the VR3 with Prolog. On the surface in any screen, without activating “Dive Now”, the VR3 will turn off after 30 seconds if no switch is pushed. A push of either switch at any time resets the timer. Unless diving at less than 1.3m absolute of water pressure (3m at sea level), it is not necessary to activate dive mode manually as the VR3 will automatically switch on at an absolute pressure of 1.3 bar.

home screen

On the bottom line in the Command section a short push of either the left or right switch will change between functions.

A short press of the left switch will toggle between gas and DVo (Dive modes menu) options. A short push of the right switch will toggle between the OPTIONS menu and the O_2 icon if you have purchased the PIN to activate the I/O connector for use with an external oxygen sensor.

The Gas Calculator screen (page 61) is also available via the right switch if you have purchased this feature.

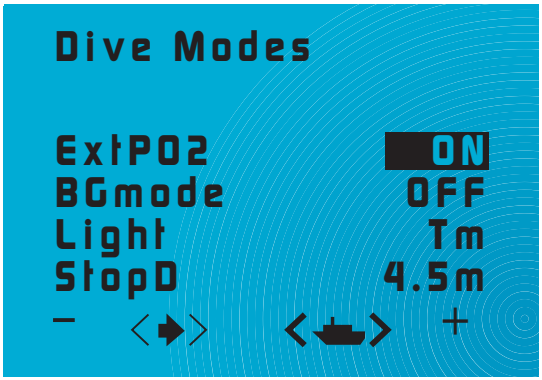
Once a function is shown a long push will activate it.

the menus

The features of the VR3 are contained in 3 major menus:

- Dive modes menu
- Options menu
- Gas list

dive modes



dive modes screen

The Dive Modes (DVo) screen is accessible by a long push of the left switch from either the Home Screen or the Dive Screen when DVo is displayed. (If the gas bottle icon is displayed in the bottom left corner of the screen, a short push of the left switch will bring up DVo.)

The screen allows the diver to get quick access to a number of useful controllable features. In the screen, a short push of both switches will move the highlight from one feature to the next, a short push of either the left - or right + switch will change the setting.

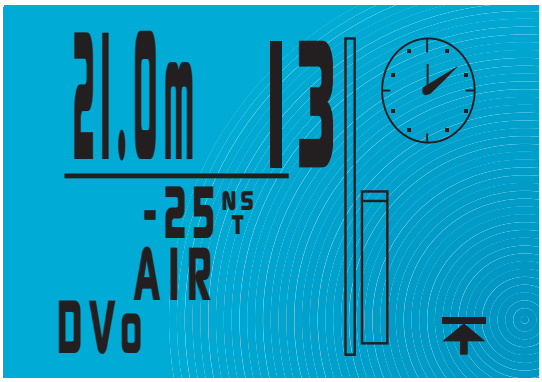
If you do not have a particular feature enabled, the highlight will not land on it.

ext po2

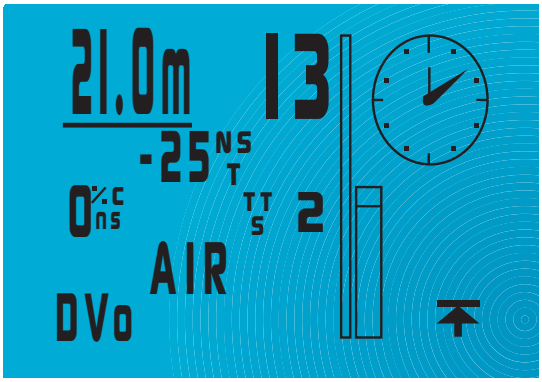
Switches the external rebreather sensor ON and OFF. This feature is enabled when you purchase one of our rebreather linking cables and the relevant software to allow you to track real time decompression via an external oxygen cell.

big graphics (bg) mode

You have the option to purchase this feature to allow you to double the size of the depth and time digits in the Dive Screen. Note that CNS% and Time to Surface (TTS) information will not appear on the Dive Screen while Big Graphics Mode is ON. Your No Stop Time (NST) remains visible, as do your decompression ceiling and time at stop, if you are carrying out a decompression dive.



dive screen big graphics



dive screen regular graphics

light

Switch between five screen backlight modes

Tm .....Light on for 10 seconds at the surface or underwater
DTm..... Light on for 10 seconds underwater
On..... Light always on at the surface and underwater
DOn..... Light off at the surface, light on underwater
OFF..... Light always off.

The DVo backlight settings are separate from the light settings in the setup menu. Whichever light option you choose in either menu will over-ride any previous settings in either menu. Practically, you will find that you use the DVo menu more as this screen is accessible during a dive.

stops

Switch between 3 optional final decompression stop depths, 3m, 4.5m and 6m.

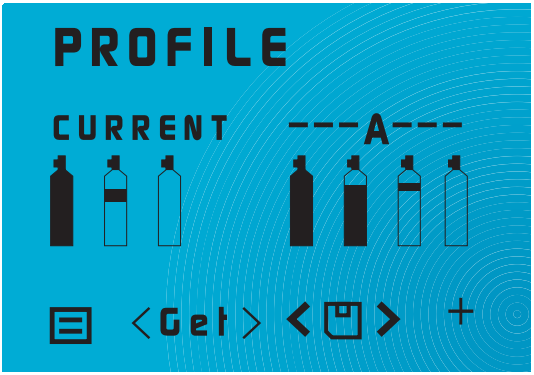
options menu

From Home screen a long push on the right hand switch when ☰ is displayed accesses the Options menu. A short push of the left switch ↓ moves the highlight downwards. A long push on the left switch ↓ moves the highlight upwards. A short push on the right switch ✓ confirms your selection and takes you into your chosen screen. A short push on both switches <⛴> returns you to the Home screen.

options menu screen

The following pages take you through each of these options in turn.

profile

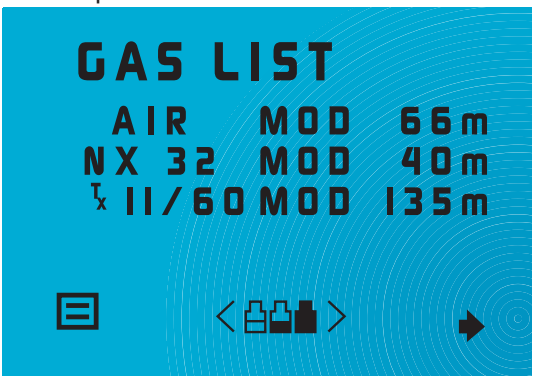


profile screen

Go into the gas menu and set up your first set of gases. Now exit back to the main screen. Go to the OPTIONS menu, select PROFILE and use the + button to pick a profile memory into which you want it saved (A,B or C). Press SAVE. That set of gases is saved into the profile you selected. You can then repeat the process to setup PROFILES B and C. To restore any of the saved profiles, go to the PROFILE menu and use + to bring up the profile you want (A,B.C). A short push of both switches < Get > programs the set of gases in the selected profile into your VR3.

gaslist

This option displays all ON gases and their maximum operating depths (MOD's). It acts as a guide as to how the computer is currently set up. ▤ returns you to the options menu. ➡ takes you to the next page of gases. <🔒🔒> takes you to the profile screen.



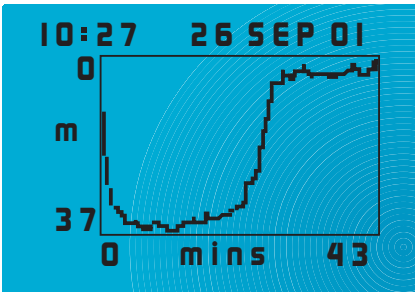
gaslist screen

log

The logbook screen shows one dive at a time. By pressing ➧ (short push, right switch) the next dive in the sequence will be displayed. A long push jumps 10. If no more dives have been logged, none are shown.

The logbook stores 100 on-screen dives. If the PC link is purchased, dives can be downloaded to a PC and can be displayed in much more detail. The VR3 can store 22 hours of diving for downloading, stored at 10-second intervals. When the memory in the VR3 is full, it simply overwrites and starts again. If long, detailed dives are logged, they should be downloaded as soon as possible to avoid losing them.

log screen 1



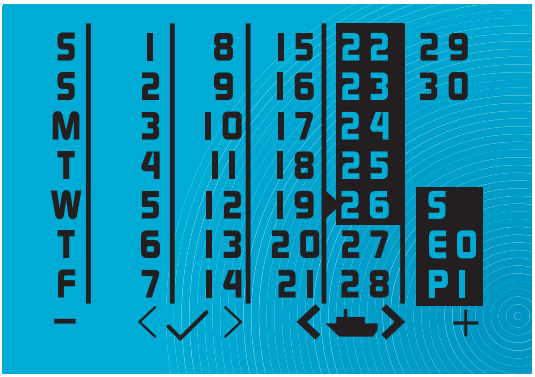
log screen 2

The logbook screen shows depth, time and surface interval information as well as accumulated OTUs (oxygen tolerance units). The maximum OTUs earned in any 24 hour period should not exceed 300.

The VR3 has a second log screen in which a graphic profile of the dive is shown. Once this function is activated, it is accessible by ⟨⛰⟩ (long push both switches). Once in the graphic profile screen a short push of the right swich goes to the graph of the next logged dive; a short push of the left switch exits the screen.

calendar

From the logbook, a long push on the left switch takes you into calendar mode. A short push on + or - moves the marker back and forward one day. A long push moves 30 days. Days with dives are highlighted. Pressing < ✓ > goes to the activity screen. < > takes you back to the home screen.



calendar screen

In the activity screen, < > moves between fields. **+** sets the activity in the calendar, (e.g. F=FLY DAY), **-** removes an activity.

activity screen 1

To set an alarm highlight ALARM OFF, then set the time using + and -. Use ‹ › to move from hours to minutes. When the time on that date is reached, the unit will automatically turn on.

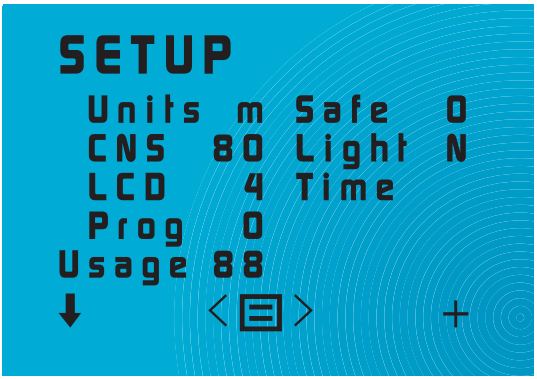
activity screen 2

When you are reading a calendar day on which a dive has taken place, Log Book will be displayed in the Activity Screen. When Log Book appears in the screen and is highlighted, you will see in the bottom right hand corner, where a short push will take you back to the logbook. returns you to the calendar screen.

activity screen 3

setup

Selecting SETUP will access another range of sub-menus, which allow the diver to configure the unit.



setup screen

Pressing ↓ moves the highlight. Pressing **+** increments the number or changes the value. For example, when UNITS is selected, the field will change from m (metres) to ft (feet). By selecting TIME, the time change display is shown as described on page 13. Selecting <⊟> takes you back to the OPTIONS menu.

Safe
Pressing + when the highlight is on SAFE will increment the safety factor by 10%, up to a maximum of 50%. Every 10% increase adds 2% to the inert gas content of the gas selected.

CNS
This option allows the user to set the CNS % level at which the VR3 will display an Air Break warning. By pressing + the CNS warning % will increment.

The warning will appear in the Message area (top right) of the dive screen and will show for five minutes in every 30 minutes after the limit has been reached. (see also pages 47 and 48).

During the “Air Break” the diver should switch to a low PO_2 content gas (preferably air) at that depth.

The CNS calculation follows the theoretical oxygen clock and is based on a derivative of the NOAA oxygen limits. Once built up, CNS toxicity levels will only reduce once the PO_2 has fallen below 0.5 bar. At the surface, when breathing air, a 90 minute oxygen half time will be assumed – in other words, every 90 minutes the CNS load will halve.

Whichever gas is selected on the VR3 will be the gas which the decompression algorithm will follow. A small extension may therefore be made to the stop time during an Air Break.

Light
T..... Light on for 10 seconds at the surface or underwater
Y..... Light always on at the surface and underwater
D..... Light off at the surface, light on underwater
N..... Light always off
d..... Light on for 10 seconds underwater.

The DVo backlight settings are separate from the light settings in the setup menu. Whichever light option you choose in either menu will over-ride any previous settings in either menu. Practically, you will find that you use the DVo menu more as the screen is accessible during a dive.

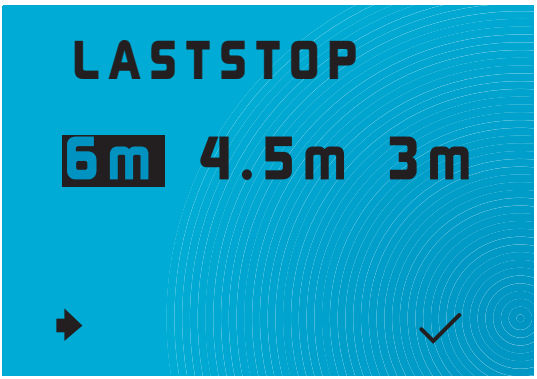
LCD
This is the screen contrast control. A second screen is accessed by a short push on the right switch + . Increase the number to make the screen darker. Reduce the number to make the screen brighter.

Time - Sets system clock. (see page 13)

Prog - DO NOT ENTER THIS FEATURE unless programming via the website. If you access this accidentally, enter NO. If the unit freezes simply remove the battery for ten minutes to reset it.

Usage - Is an indication of total dive hours carried out on your VR3.

stops



stops screen

In this screen you can select your shallowest decompression stop. No matter which depth you choose, you always have the option of stopping deeper than the depth displayed.

fly time

Having selected Flytime from the options menu, the screen below will be displayed. It shows when you may fly in a pressurised aircraft and when your tissues will be totally desaturated after a dive.

fly time screen

pc link

PC link needs only to be selected when using the Prolog PC interface.

You should have received a CD of our Prolog logbook software free with your VR3. This contains sample dives for you to view. When you purchase the C5 Prolog kit you will receive the software, connection hardware and a PIN to unlock your VR3's downloading capability. The kit also includes Proplanner desktop decompression software.

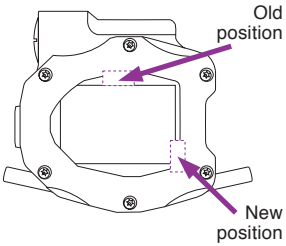
There is a DOS version of Prolog available with Proplanner (go to PLAN.BAT, select the Com port then option 1 and follow the prompts.) But this has been superseded by the newer Windows-based software on the Prolog CDRom. Guidance notes are supplied with the CD and there is also an on screen help menu to guide the user.

With the VR3 in PC link mode, you will see FULL = 0. Do not change this feature.

Making the connection

To make the connection to your PC, place an infra red link close to the bottom right hand corner of the glass screen*. This is where the VR3's infra red signal beams out. Delta P Technology sell a serial infra red link which can be plugged directly into the serial 9 pin port on your PC or connected to the serial port or USB port using an extension cable. (If you use an extension cable, make sure it has no crossovers.)

Beware of using the built-in infra red port on your laptop PC as this emits signals which will cause the VR3 to reset and you will loose all your log and gas list information.



If you cannot make the connection, it may be:

a. because you have not purchased and keyed in the PIN to activate your VR3's downloading capability.....

b. because you have selected the wrong com port on your PC.....

c. because the infra red link is not close enough to the VR3.

You can use PC link to upload a gas list from Prolog or Proplanner to the VR3, although you do not have to use PC software to create a gas list. (page 32).

(* on older VR3's the signal beams out from the top of the glass).

simulate

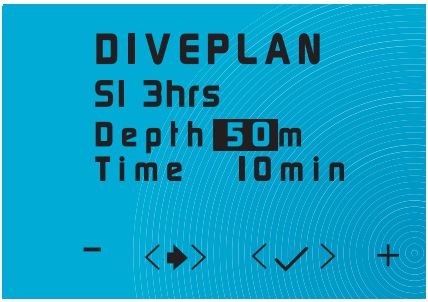
See section on diving for detailed operation.

dive plan

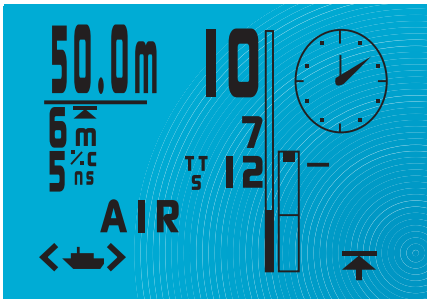
Having set your gases, entering Diveplan allows you to enter depth and time and calculate a set of backup tables. < ➧ > moves between fields. + and - adjust the number in the highlighted field. Selecting ✓ will display a dive screen. ⤒ will show page after page of decompression stops as in normal Dive mode.

You can also factor surface intervals into the plan so that you can predict a series of dives.

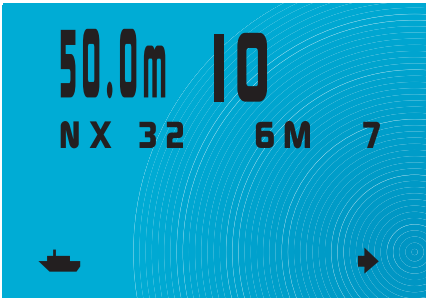
In dive plan mode it may take a few seconds for TTS to update and show accurate decompression.



dive plan screen



dive plan screen 2



dive plan screen 3

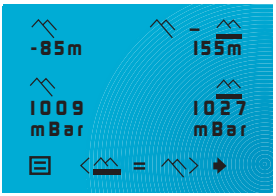
language

Several languages are available now and others are planned. Please see our website for regular updates.

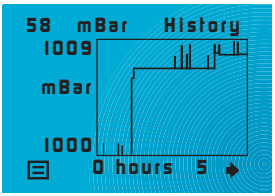
altitude

The altitude screen is just an information screen to show altitude relative to a previously set point. It is useful when calibrating a rebreather prior to diving and deciding what backup tables to use at altitude. but the setting has no relation to decompression calculations. As soon as you switch the VR3 on at altitude it automatically reads the ambient pressure and uses this to calculate depth and decompression obligation during dives at altitude. Anything you set in the altitude screen has no bearing on this.

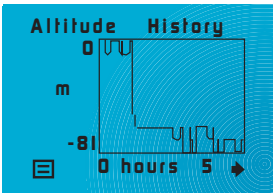
If you go to altitude to dive you should switch on your VR3 in the dry before you go diving and allow it to switch itself off again. This will enable the VR3 to read and record the new ambient pressure so that dive depth readings will be accurate.



altitude screen 1



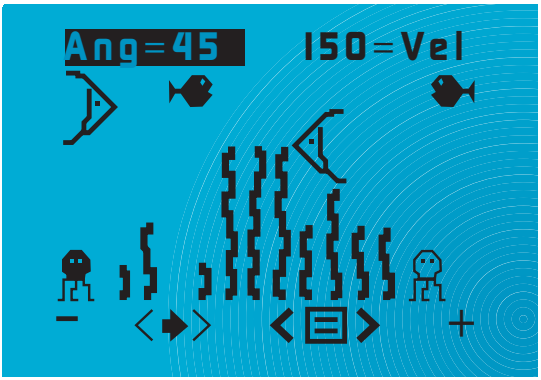
altitude screen 2



altitude screen 3

On altitude screen 1 there are four readings. The top left is current altitude based on 1000 millibar as a reference. Bottom left is current millibar pressure. If you do a short press of both switches then the bottom right displays the 'saved' current atmospheric pressure. The top right also records the current atmospheric pressure and logs it as zero metres/feet. Now if you climb or descend in altitude you can see the height change with reference to the zero you have set.

➧ moves you to history graphs of pressure vs time and altitude vs time.
⊟ exits to the OPTIONS menu.



games screen

Games can be displayed on land and are also available underwater at 10 metres and shallower (if no warnings are in force.) To gain access to the games underwater push ⤒ then ➡ to the last decompression screen. Then press ❮🯅❯ to get into the game.

Currently the Octopus Game is supplied with your VR3. New games will be released from time to time via our website www.vr3.co.uk

The Octopus Game
The game works like this:-

The aim is to try to hit the white octopus with a squirt of ink from the black octopus. The white octopus will explode when he is hit and you will then get a summary of your score.

In the game screen short pushes of both switches will move you between Ang (angle), Vel (velocity) and Fire modes. When you are in Fire mode a jet of ink will squirt from the black octopus and, if your angle and velocity are correct you will hit the white octopus. If not, you need to adjust the angle and velocity settings and this you can do in Ang or Vel mode, by a short push of either the right hand + or left hand - switch. (A long push will increment or decrement the setting by 10.)

While you are firing you will see Tide appear. This is a random setting; the strength and direction of the tide will change from game to game just so that it does not all become too easy!

pin num

Each VR3 has a unique serial number. This is found on line 4 of the PIN NUM screen and is also provided on a sticker at the back of this manual.

All units are shipped as open circuit Nitrox. To activate your purchased level, enter the 16 digit PIN found in the rear of this manual.

To purchase an upgrade to a new level, or activate a new feature, contact your dealer. You will need to give them the serial number of your VR3. They will then give you the appropriate PIN. Enter this and the new level or feature will be activated. The PINs are keyed in using the switches and are logged in on the bottom line of the screen. A long hold of either switch will move the number highlighted by 8. Each number is hexadecimal (base 16) 0-9 and A-F. You can also use the PIN to change your security information. Each time a PIN is entered the cursor jumps to the top line to allow you to change your security information.

When keying in each digit or letter move forwards using the + key. **Do not move backwards using the - key**, except to correct, as this may cause previously entered numbers to change.

After the PIN has been installed the bottom line of the screen will revert to 16 zeros. A key benefit of purchasing a VR3 is the security and “trackability” offered by the PIN system. Do not keep the PINs with your computer but keep them in a safe place and write to us and register ownership when you buy the computer. You can do this via the website or by using the form at the rear of this manual.

The advantages of doing this are:

- If you lose your PIN, we can only reissue it to you if we have you listed as the owner.
- Without the PIN, the personal details in the Pin Num screen can not be changed so if your computer is ever lost or stolen, you can notify us and we can look out for it in the event that it ever comes in to us for repair or upgrade.
- If you should ever sell on your computer, you will need to give the new owner the PINs so that the personal information can be changed.

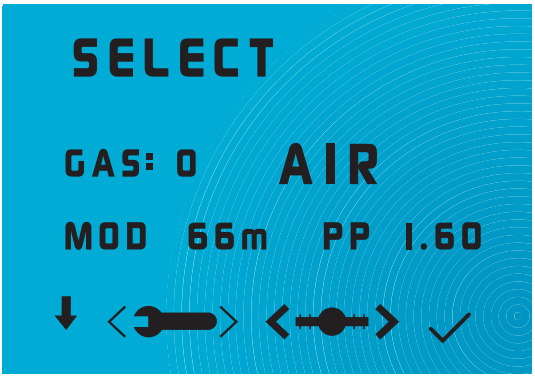
Once a PIN has been installed in a VR3 it does not “fall out”, even if the unit powers down and resets itself.

gas list

selecting gases

From the Home and Dive screens, there is an option to select GAS with a short push of the left switch.

A long push (left switch) will open the GAS menus and take you into the select screen.



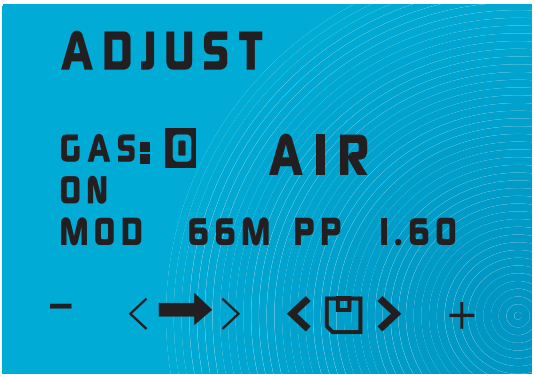
gas select screen

Pressing ↓ displays the next gas in the ON list. Up to 10 gases are available for selection. Simply keep pressing ↓ until the gas you wish to breathe at the start of the dive is displayed. Once you are confident that the correct gas is indicated, press ✓ . The chosen gas will now be displayed in the centre of the Home screen (or the DIVE screen if you are diving).

Only turn ON the gases you intend to breathe on the dive. In closed circuit mode, only turn on the gas to be used in closed circuit. Bailout gases should be in the list but turned OFF until needed.

adjusting gases

If you are not happy with the gas displayed and wish to change any of its parametres, or program a new gas, press  (both switches, short push). This displays the ADJUST screen.



gas adjust screen

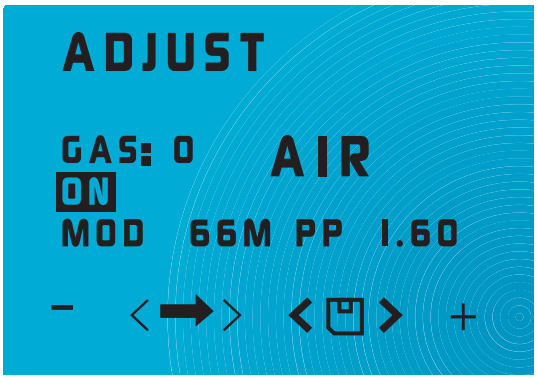
Several options are now available. By pressing  (both switches, short push) a new field will be highlighted. The fields available for change are:

- The gas number (0 to 9)
- On (active) or off (inactive).
- The oxygen and helium levels in the mix. Air is displayed as AIR. (Gas 0 is AIR and cannot be changed.) Nitrox is displayed as NX followed by the oxygen fraction, (e.g. NX36). A Trimix is displayed as TX then the oxygen content followed by the helium content (TX 18/35).
- The MOD: As you change the MOD the PP (PO_2) will adjust accordingly. As altitude changes the PO_2 will vary for the MOD (Dalton's law).

10 gases are available. Once the field is highlighted, the - and + keys change the gas number. Change the gas number until the one you want to use, or modify, is displayed.

If you turn all gases OFF you will not be able to exit this screen.

activating gases



gas adjust screen

When the ON/OFF area is highlighted, by using the +/- keys you can turn a gas ON for the dive.

The VR3 is able to advise you of the total decompression profile, as well as which gas you should be breathing at which depth. This is based on the MOD setting of the ON gases. The VR3 will only prompt for the gases you turn ON. To avoid confusion during diving, only turn ON the gases you actually want to use.

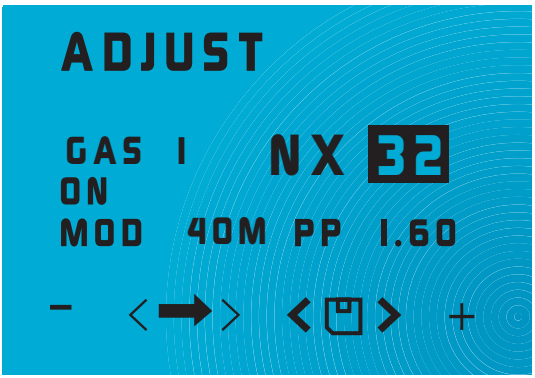
If you need to use a gas that is turned OFF or a gas that is not in your gas list, you will be able to come to this screen when underwater and turn ON the gas or set a new one.

To do this, simply go to the GAS SELECT screen (where only your ON gases will be shown), select and change the gas number until the inhibited gas is displayed. It can now either be switched ON or the fields adjusted to set a new gas.

When closed circuit diving do not turn on your open circuit bailout gases as this will give a false decompression look ahead. Only turn them on as you need them.

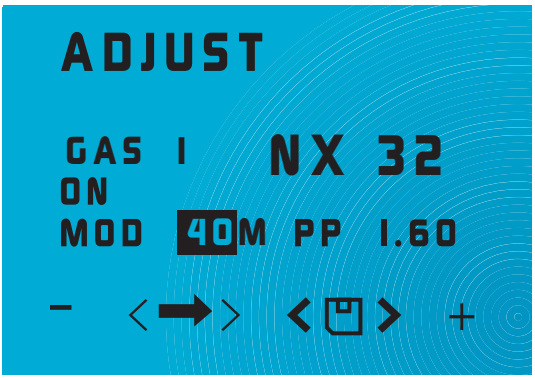
changing gases

Keep pressing <➡> (short push, both switches) to move the highlight and stop at the oxygen content of the gas. Now use +/- to change the mix (you may use a long push to increment/decrement by 10).



gas adjust screen

Pushing <➡> again will move the highlight to the MOD.The PO_2 will change as the MOD is altered. Do not exceed a maximum PO_2 of 1.6 bar for decompression gases.



gas adjust screen

The MOD setting is important as this is the depth at which the VR3 will prompt you to switch to that gas. If you mistakenly set the MOD shallower than the depth you want to switch at, you can still switch but the VR3 will not prompt you to switch until the MOD you set has been reached. Switching to a decompression gas too deep will trigger a $P0_2$ warning. Incorrectly setting the MOD, or leaving gases ON which will not be used, means that the optimum decompression profile will not be calculated or displayed. What you actually do during the ascent, and the switches you make, will still be factored into the calculation but the on-screen prediction may not be the most efficient profile.

If at any point during the dive you modify a gas content on the ON list, the decompression profile prediction will alter to take this into account.

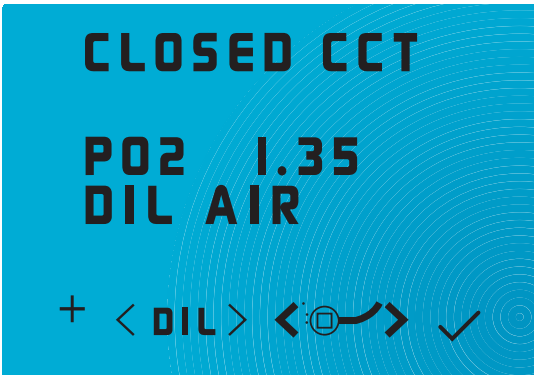
Once you are happy with the setup for this gas, press ➡ again until the gas number is highlighted then move to the next gas and change it. The gas you have just left will automatically be saved. If you are only changing one gas then pressing ❮ 💾 ❯ (both switches, long push) will save the change and take you back to the previous screen where the gas you have just changed will be displayed. You will have the option to select that gas as the gas on which to begin your dive. If you do not wish to select this gas press ⬇ until the gas you require is shown. Pressing ✓ will confirm your selection.

Even if you select a Trimix, the VR3 assumes you will only ever breathe air at the surface. It will only start calculating for the Trimix when you descend.

selecting closed circuit gases

If you have purchased the closed circuit upgrade for your VR3, in the GAS SELECT screen you have a closed circuit option  Press and hold both switches. This allows the selection of a closed circuit decompression algorithm.

Entering this mode opens a CLOSED CCT gas adjusting screen. In this screen the gas mix you have selected is displayed as a diluent (DIL) and a selectable PO_2 setpoint is shown.



PO_2 select screen

By pressing + (short push left switch) the $P0_2$ will increment in steps of 0.05 bar. Once you have the desired $P0_2$, press ✓ (short push right switch). Go back to the Home screen (or Dive screen if you are diving). The $P0_2$ and the diluent will be displayed.

You can preset two different $P0_2$ setpoints and switch between them during your dive. To do this, re-enter the $P0_2$ screen, select another $P0_2$ and exit again. During your dive a long push on + will enable you to toggle between the two setpoints.

The VR3 assumes that the $P0_2$ selected is the $P0_2$ that the rebreather will maintain as its setpoint during the dive and it will calculate decompression based on this and the diluent set. Your $P0_2$ can change, especially on ascent and descent, and depending on the characteristics of the rebreather and its operator. You are strongly advised to be conservative with your $P0_2$ selection.

If you are diving and see a $P0_2$ displayed which is higher than the selected setpoint, this is because you are at a depth where the diluent $P0_2$ exceeds your setpoint.

moving from closed to open circuit

From the CLOSED CCT adjust screen, a long push of both switches will select open circuit mode  , where you can select the gas you want to breathe in open circuit, in the event of a bailout being required.

It is important that diluents are also breathable in Open Circuit at the relevant depths.

Example
A Trimix rebreather dive is planned with 18/35 as the diluent. The diver will use closed circuit Trimix throughout and then switch to open circuit surface-supplied oxygen at the 6m stop. In the event that an open circuit bailout is required the diver plans to carry an 18/35 cylinder and a Nitrox 36 cylinder. 18/35, Nitrox 36 and oxygen are selected as the three gases. The Nitrox 36 and oxygen remain OFF leaving Trimix 18/35 as the only ON gas. This will be seen as the DIL when the diver chooses the CLOSED CCT screen. In the CLOSED CCT screen the diver selects a $P0_2$ of 0.7 for the start of the dive, then exits and re-enters the screen to select a second $P0_2$ setpoint of 1.3 which can then be switched to at depth.

If the diver were to leave 36 and 0_2 ON then they would be factored into the decompression prediction. Having said this, even if they were left ON accidentally the actual decompression would still be based on the gas selected as the DIL. In other words the prediction would be wrong but the actual decompression would be correct.

In the event of an Open Circuit bailout becoming necessary all three gases are now available as Open Circuit gases but must be turned ON to obtain an accurate prediction. Setting the MODs correctly will automatically trigger prompts for the correct gas switches as the diver ascends.

changing diluent

If the required diluent is not displayed, in the PO_2 select screen press <DIL> (short push, both switches) to get to the gas select screen. This is similar to the gas select screen for Open Circuit. Once there, by pressing ↓ you can scroll through the range of programmed diluents until the one required is found. Pressing ✓ confirms your selected diluent and returns you to the PO_2 SELECT screen.

diluent select screen

Pressing <🔧> takes you to the ADJUST screen similar to that used in Open Circuit mode. The diluent content is then adjusted in the same way, the PO_2 again being a reflection of the MOD (NOT the Rebreather Setpoint).

Pressing SAVE <💾> will take you back to the SELECT screen. Pressing ✓ will take you back to the PO_2 CHANGE screen and a press of ✓ again will take you back to the Home or DIVE screen (if you are diving). Whichever diluent you have modified and chosen will be displayed as well as the PO_2 setpoint you have selected.

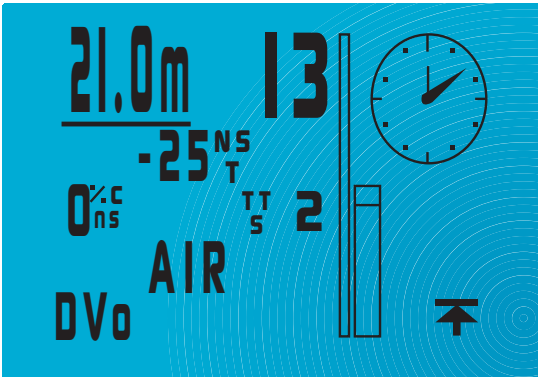
While diving, the current depth is displayed at the top of the gas select screen.

The diluent select screen is also used to choose the calibration gas. Press <CAL> to make the selected gas the calibration gas for the oxygen sensor

dive mode and simulate mode

It is not necessary to turn the VR3 on before you dive as it will automatically turn on at an absolute pressure of approximately 1.3 bar. Alternatively if the early part of your dive will be very shallow you can go to the home screen where a short press of both switches will bring up the legend "dive now" and the VR3 will stay on for 5 minutes without any switches being pushed.

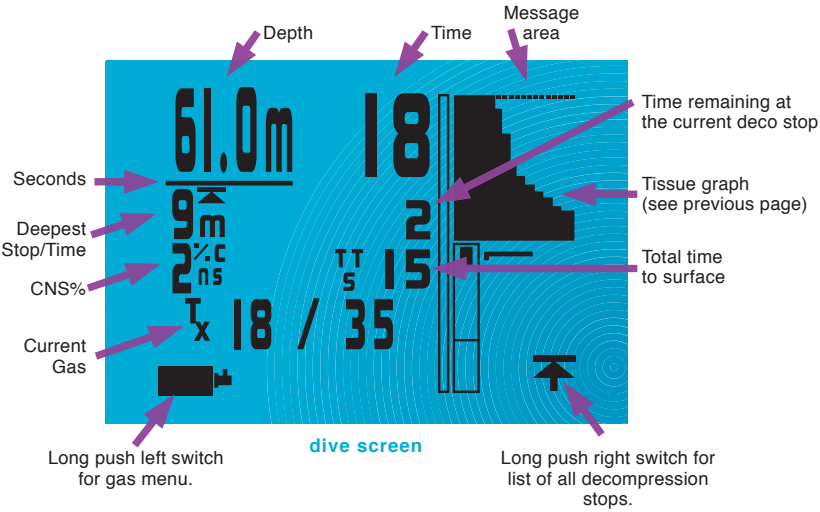
To enter simulate mode choose simulate in the ☰ options menu. The unit will switch to the DIVE display and a depth of around 10m will be displayed. Short pushes of the left and right switches will increment or decrement the depth. To exit a simulated dive do a long hold of both switches or ascend to zero depth.



no stop dive screen

In this screen the diver is breathing air at 21 metres, his bottom time is 13 minutes and he has 25 minutes left at this depth (no stop time NST) before he will need to do compulsory decompression stops. His time to surface TTS is 2 minutes at a rate of 10 metres per minute not including safety stops.

A clock is displayed in the top right hand corner. This can be changed to a tissue graph and back again by a short push of both switches. The tissue graph shows 16 columns, one for each of the theoretical tissue compartments on which the VR3's decompression algorithm is based. Fast tissue compartments are on the left of the graph, slow compartments on the right, (see screen on next page).



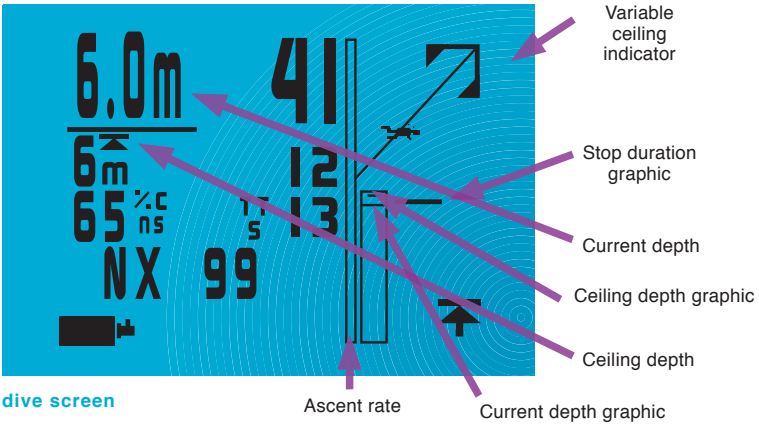
In this screen the diver is at 61 metres, he has a bottom time of 18 minutes and has decompression stops to carry out. His current ceiling is 9 metres where he must remain for 2 minutes before ascending to carry out the rest of his decompression, details of which he could see if he did a long push on the right switch ⤒ .

The moving line below the current depth and time reading shows the time elapsing in seconds.

The 3rd line in the screen displays the CNS% accumulated so far and the total time to surface TTS in minutes. The TTS includes ascent time and time at all decompression stops based on the diver switching to all the ON gases in his gas list at the MOD selected for each gas. If the diver had planned to switch to a deco gas on ascent but subsequently does not switch the time shown will remain the same but the minutes will take longer to elapse.

If you are rebreather diving, do not turn your bailout gases ON as they will be used in the prediction. However if you do leave them on but you do not switch to them you will just be held at each stop longer than the prediction.

The 4th line shows the current gas being used.



dive screen

the diver on the line

In this screen the variable ceiling indicator, (also known as the diver on the line) is displayed. The indicator appears only when you are within 3m of a decompression ceiling. It shows the proximity of the next deco stop. When the diver is at the surface the decompression ceiling has been reached. This feature allows you to do a continous decompression rather than a stepped one by ascending slowly and keeping the diver around the middle of the line.

The indicator is not displayed when a warning is in force, eg. gas switch, ascent rate or air break.

graphics

Ascent rate
Close to the middle of the screen is a vertical ascent rate bargraph.The bar fills from the bottom. A 50% full bar equals 10m/minute (the recommended rate for all sections of the dive). A full bar equals 20m/minute or greater. The icon appears at the top right of the screen when the recommended rate is being exceeded

Stop duration - Lines of pixels representing length of time at each stop.
Ceiling depth - Bottom of block shows depth at which deco starts.
Current depth - Line representing current depth.

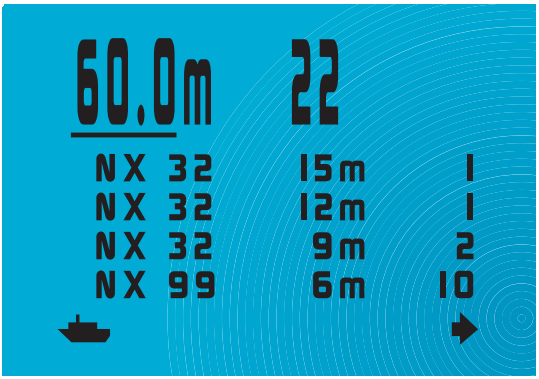
command area

The bottom line features the command prompts.

During both diving and simulation, a long push of the left hand switch when the gas bottle icon is displayed will take you into the menus for selecting and adjusting the gas which were described earlier. Remember that even if the listed gas is not ON, you can enter the ADJUST screen by a further long push of the left hand switch and re-activate it for immediate use.

A long push of the left switch when DVo is displayed will take you straight from the Dive (or Simulate) screen into the Dive Modes screen allowing you to adjust settings there, (see page 16).

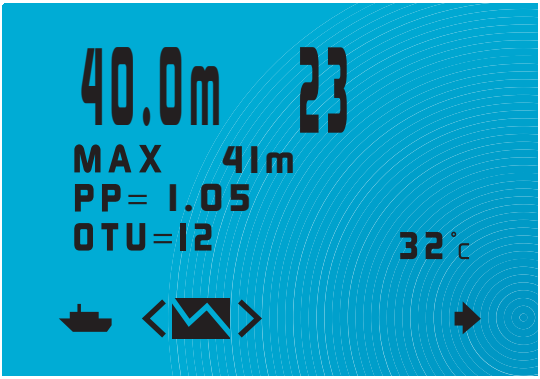
A long push of the right switch when is displayed will take you into screens showing your required decompression stops if you are in decompression,



deco stop screen

then a second dive screen (following page) showing:

- Current depth and bottom time.
- Maximum dive depth.
- Maximum $P0_2$.
- OTU's accumulated.
- Current temperature.



second dive screen

Temperature is only recorded in this screen. It is not recorded in the post dive log.

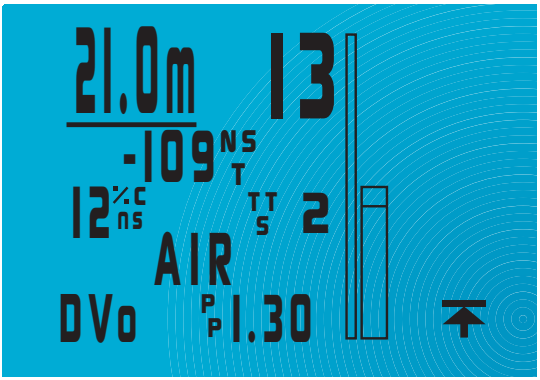
In these screens a further push on the right switch ➧ moves to the next page of stops. A long push on the left switch ⛴ returns you to the first dive screen.

You will see 〈🗻〉 in the second dive screen. A long hold on both switches will take you to a graph showing your current dive profile.

If at any point you change to a different gas, in a few moments the VR3 will modify the decompression list and re-calculate all decompression. The decompression screen stays inactive for 20 seconds. Every time you push a switch whilst in this screen the 20 second timer starts again and the decompression calculations are temporarily frozen.

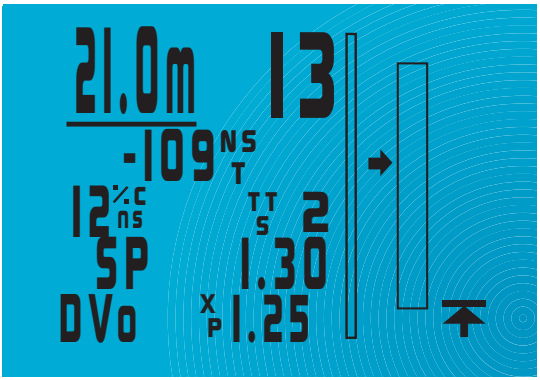
The SIM (and Diveplan) modes work on current tissue state. If you have just dived this will be reflected in the displayed decompression.

closed circuit dive screens



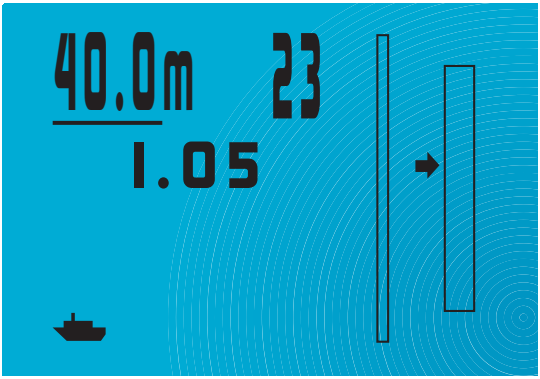
closed circuit dive screen with XO_2 off

In closed circuit mode with the external sensor XO_2 set to OFF the PO_2 setpoint is displayed on the bottom line.



closed circuit dive screen with XO_2 on

In closed circuit mode with an external cell connected and XO_2 set to ON a short push of the left switch briefly displays the set point on line 4 instead of the diluent and a short push of the right switch displays a PO_2 bargraph. The actual PO_2 is shown on the bottom line.



$P0_2$ screen

In closed circuit rebreather mode a long push on the right switch when O_2 is displayed takes you into a PO_2 screen where current depth and time are also displayed.

warnings

The VR3 displays warnings in the form of on-screen messages and the backlight flashing.

Warning messages appear in the top right section of the dive screen.

Warning	Meaning
	Descend, you have violated a decompression ceiling.
	Ascend, your PO_2 is at a dangerously high level and you have no alternative active gas to switch to.
	Slow down, your ascent rate is greater than 10m/min.
USE Table	Decompression has been violated on current dive, or previous dive within 24 hours.
Missed stops	Shown upon reaching the surface after a dive where a decompression stop has not been completed.(see section below).
Violated stops	Shown upon reaching the surface after a dive where a decompression ceiling has been breached for longer than 1 minute, but all required estimated stops have subsequently been carried out as advised by the VR3 in USE TABLES mode.
	Gas Switch warning. Switch to another gas in the gas list you have set.
	Air Break warning. Repeats for 5 mins every 30 minutes while CNS % is above the level you have chosen in the Setup screen limit.

Rebreather related warnings

XP Fail	PO_2 sensor reading at 0 - your external sensor is not showing any reading. The cell has failed or is not connected.
X Check	Your FO_2 is dangerously low i.e. the PO_2 is low compared to the diluent at depth, for instance air diluent at 10m should read a minimum of 0.42 and no less.
Check FO_2	FO_2, depth and gas type do not match up. For instance if you are at the surface and have air in the counterlung and the FO_2 is less than 21%. This would indicate a possible calibration error.

decompression stop violation

If you ascend past a decompression stop to a level where the tissues may become over-pressurised, then the down arrow ↓ message appears and a 60 second timer display starts to count down. If the warning is ignored, after 60 seconds a message will appear which says USE TABLE. Once this message appears the VR3 will continue to display 'best guess' decompression data. This means that the decompression displayed may be in error because of the missed stop and that you should consult back up tables and add additional safety stops as required. But your VR3 will continue to track.

If you temporarily break a decompression ceiling and get back to the correct depth within 60 seconds the timer will start to count up again. When it reaches 60 the decompression calculations will restart. Depending on the extent of your excursion you should build in extra safety for the remainder of the dive.

MISSED STOPS warnings will be stored on the logbook and the warning will be displayed for 24 hours on the home screen. The VR3 will not lock you out. If you re-enter the water, best-guess decompression will still be shown but should not be relied upon.

switch

During a dive, while ascending or descending you may notice a SWITCH  message in the top right hand corner of the screen and a prompt for a gas other than that which you are breathing.

This is the VR3 asking whether you wish to switch gases based on the plan you have entered and/or the gases you have switched on. The SWITCH message comes on when the MOD you entered for that gas has been reached. You may ignore this if you wish and carry on using the same gas.

airbreak

This warning will be displayed when the user set CNS warning limit is exceeded. This will continue to be displayed for five minutes every thirty minutes thereafter, (see also pages 24 and 47).

rebreather and analyser links

The VR3 can be fitted with a remote oxygen cell to permit
a) surface use as an oxygen analyser
b) underwater use with a semi-closed rebreather
c) surface and underwater use with a closed circuit rebreather

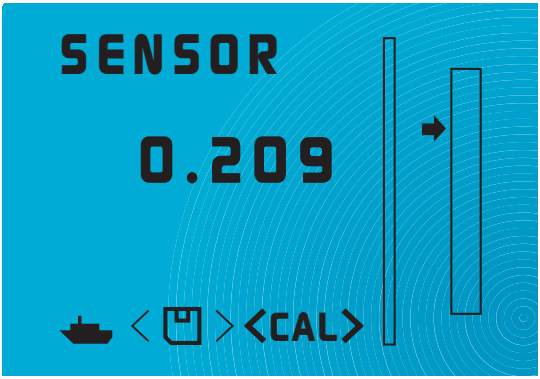
To use the VR3 with an external oxygen cell the appropriate cable and PIN must be purchased. See our website www.vr3.co.uk for details.

calibration with analyser (oc VR3)

- Connect the sensor cable to the VR3's I/O port.
- Ensure the R17 oxygen sensor cell is installed on the pin connector.
- You can calibrate the analyzer either in ambient air or by inserting the cell in a cylinder connection kit and attaching the connection kit to an air cylinder.

If you choose the latter method remember that excessive flow will increase the partial pressure and give you a false reading. This also applies when you are analyzing a gas, (see below).To ascertain the correct flow rate to use, attach the connection kit to an air cylinder and increase the flow gradually until the sensor reading changes, then decrease the flow until the reading comes back down and becomes stable. That is the correct flow rate to use in future.

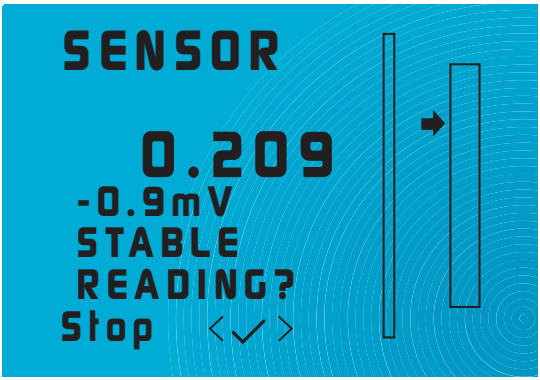
- Switch on your VR3
- Select Dive Now (short push on both switches) to keep the VR3 active for 5 minutes
- Analyser calibration is normally carried out in air and on Open Circuit VR3s air is automatically set as the only CAL gas.
- Cycle to the O_2 option in the bottom right hand corner of the screen by a short push on the right-hand switch
- Then a long push on the right-hand switch takes you in to the SENSOR screen, where you will see the current oxygen reading expressed as a decimal (for example .209 = 20.9%), the latest O_2 percentage saved and a PO2 bar graph.



sensor screen

The PO_2 bar graph has no digits but the bottom of the bar is zero and the top 2.0. The small arrow to the left of the bar represents the VR3's internal PO_2 set point. This graph is also available in DIVE and SIM modes.

➤ A long push on both switches takes you into CAL (calibration) mode.



calibration screen

➤ If you are using an Open Circuit VR3 you will see a reading and a measurement of the oxygen sensor cell output (in millivolts mV). When the reading on this screen is stable, a short push of both switches will calibrate the sensor (at .209 if using AIR as the CAL gas). Your VR3 is now calibrated. A short push of both switches will save the reading.

➤ A short push on the left switch will return you to the Dive Now screen.

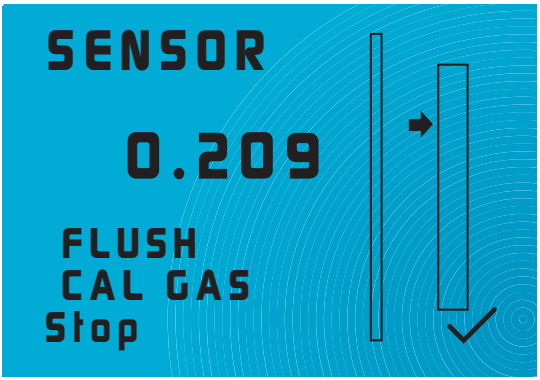
When saving you may be shown a WARNING CELL LOW or a WARNING CELL HIGH message. This refers to the mV output of your Oxygen Sensor Cell and may indicate that you have the wrong type of cell connected, that your cell needs replacing or the wrong CAL gas has been selected.

calibration with analyser (cc VR3)

Special Procedure for Closed Circuit VR3s

➤To select the calibration gas you will use (usually air or oxygen),

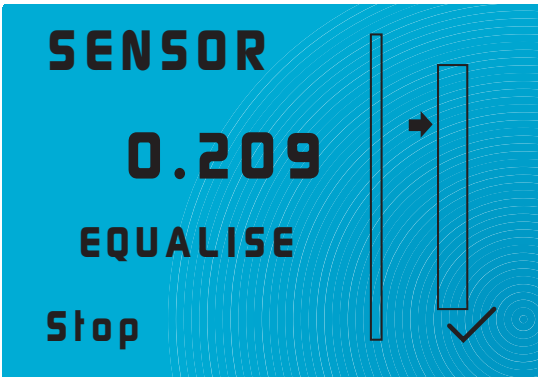
- o a long push on the left switch will take you into your Gas Select screen
- o make sure you are in Closed Circuit Mode and you see CLOSED CCT at the top of your screen
- o if not, go to Closed Circuit mode by a long push on both switches
- o a short push of both switches takes you into the SELECT screen
- o a further short push of both switches takes you into the ADJUST screen
- o move the cursor to select your chosen calibration gas in your gas list and switch it ON
- o a long push of both switches will save NX 99 as your diluent
- o Save it as the calibration gas (CAL) by a further long push on both switches.
- o CAL GAS will appear on the screen
- o Then a short push on the right-hand switch will confirm and a further short push on the right-hand switch will take you back to the Dive Now screen.
- o A long push on both switches takes you into CAL (calibration) mode.



cc calibration screen 1

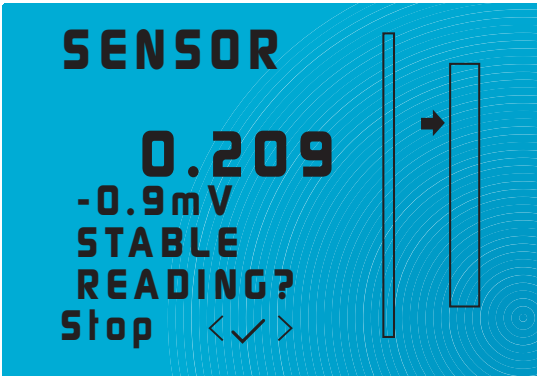
- o you will see the instruction FLUSH CAL GAS (ignore this if you are calibrating in ambient air and do a short push on the right switch).
- o If calibrating using the cylinder connection kit, open the cylinder valve until you hear a gentle hiss, (see caveat concerning flow rate, above)

- Once the reading is stable a short push on the right switch accepts it and takes you into the EQUALISE screen (which, again, if calibrating in ambient air you ignore).



cc calibration screen 2

- If using the cylinder connection kit, stop the flow of gas from the cylinder and allow the reading to stabilize.
- Once the reading is again stable a short push on the right switch accepts it
- You will then be back in the SENSOR screen where you will see a reading and a measurement of the oxygen sensor cell output (measure in millivolts mV).



cc calibration screen 3

- When the reading is stable a short push of both switches saves the calibration in the centre of the screen.
- Your VR3 is now calibrated. A short push on the left switch returns you to the Dive Now screen.

analysing a gas

- Connect the sensor cable with oxygen sensor cell attached to the VR3's I/O port,
- place the cell in the cylinder connection kit and
- attach the connection kit to the cylinder to be analysed.
- Switch on your VR3
- Select Dive Now (short push on both switches) to keep the VR3 active for 5 minutes
- Cycle to the O_2 option by a short push on the right-hand switch
- When you see O_2 in the bottom right hand corner of the screen, a long push on the right-hand switch will take you into the SENSOR screen, where you will see the current oxygen reading expressed as a decimal (for example .209 = 20.9%), the latest O_2 reading saved and a PO_2 bar graph.
- Open the cylinder valve until you hear a gentle hiss. The O_2 reading will start to move.
- When the reading is stable, a further short push of both switches saves the analysis, you will see a saved icon next to the saved analysis and the GAS icon will appear in the bottom right-hand corner of the screen.
- A short push on the right-hand switch will take you into the Gas Adjust screen
- The gas number will be highlighted and you can change that number to place your analysed gas into any position in the gas list you wish.
- Short pushes of both switches will move the cursor on the screen until the analysis (2^{nd} line up) is highlighted.
- You will then see a TRANSFER O_2 icon in the bottom right hand corner of the screen.
- A short push of the right-hand switch will transfer your analysed gas to the designated position in the gas list.
- Then a long push of both switches saves it.
- You will need to make the gas active to use it.

If the analysed gas is the same as the gas already occupying the designated position in the gas list then the transfer icon and Save O_2 icon will not appear. (There is no need to transfer what is already there!)

For oxygen analysis at altitude, simply set the analyser to 20.8 to 21% in atmospheric air.

semi closed rebreather link

Calibration.
Calibrate as per the analyser instructions.

Operation.
If you are diving an open circuit VR3 with semi-closed software then with XO_2 set to off the unit works as a fixed FO_2 (open circuit decompression based on your gaslist) computer.

To turn the external cell on simply do a short push of the left switch in the home or dive screens until the DVo icon is displayed. A long push of the left switch accesses that function. Now you can turn the external cell on and off using the + and – keys. A long push of both switches returns you to the home or dive screen.

With XO_2 set to on the home screen will display the current mix based on the cell reading and preceded by an X (i.e X Nx30 for Nitrox 30) to denote the eXternal reading is being used. The dive screen will display a similar wording. The external FO_2 will now be used in decompression calculations.

Although actual decompression will be based on the external FO_2 reading, the look ahead TTS will be based on the ON gas selected in your gas list. So that the prediction will be as close as possible to actual decompression the ON gas should be set as your anticipated FO_2 calculated using the semi-closed equation.

Warnings
An XFAIL warning will appear if the PO_2 sensed by the external cell falls below 0.16 bar. An XCHECK warning will show if the PO_2 of the external call is sensing less that the PO_2 of the diluent selected at the depth. Example. If you have air set as a diluent (or semi-closed gas) and you are at 10 metres and the external cell is reading less that 0.42 PO_2 (air PO_2 at 10m), then the warning will show. This is useful when a flow orifice has failed in a semi-closed rebreather or PO_2 injection has ceased in a closed circuit unit.

If you are running the VR3 in fully closed mode and the rebreather electronics fail but you still have the external cell functioning correctly, putting the VR3 in open circuit mode with the external cell set to on will give you a semi-closed decompression based on the external cell readings.

Any bailout gases must be set to OFF in the gas list and only switched ON in the event of a bailout.

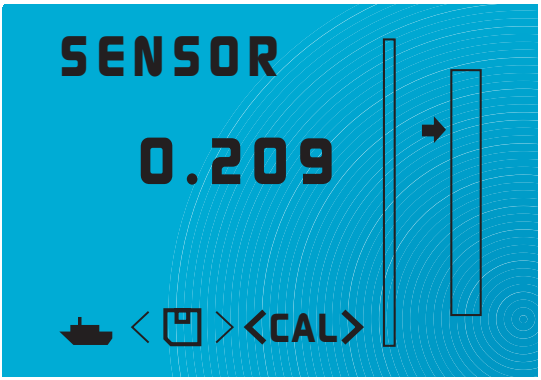
closed circuit rebreather link

Calibration

- Connect the sensor cable to the VR3's I/O port.
- Ensure the correct oxygen sensor cell is installed in the sensor holder,
- Install the sensor cell in your rebreather.
- Switch on your VR3
- Select Dive Now (short push of both switches) to keep the VR3 active for 5 minutes
- A long push on the left switch will take you into Gas Select screen
- Make sure you are in Closed Circuit Mode and you see CLOSED CCT at the top of your screen
- If not go to Closed Circuit mode by a long push on both switches
- A short push of both switches takes you into the ADJUST screen
- Move the cursor to select NX 99 in your gas list and switch it ON
- A long push of both switches will save NX 99 as your diluent
- Save it as the calibration gas (CAL) by a further long push on both switches.
- CAL GAS will appear on the screen
- Then a short push on the right-hand switch will confirm and
- a further short push on the right-hand switch will take you back to the Dive Now screen.

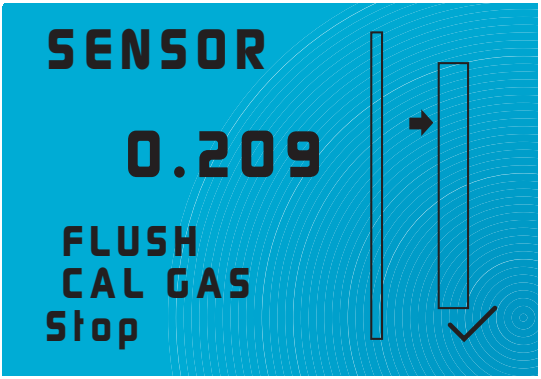
Remember, AFTER calibrating, to set the diluent setting back to the actual dive diluent!

- In the Dive Now screen, cycle to the O_2 option by a short push on the right-hand switch
- Then a long push on the right-hand switch takes you in to the SENSOR screen, where you will see the current oxygen reading expressed as a decimal (for example .209 = 20.9%) and a bar graph.



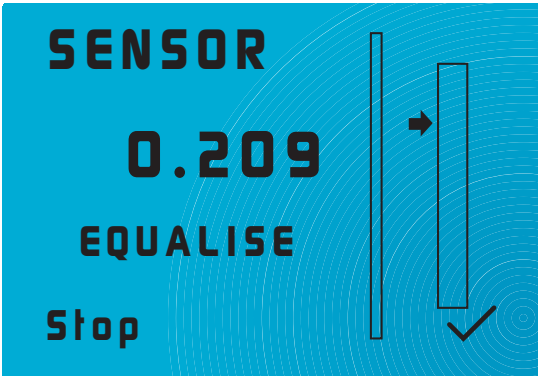
sensor screen

- A long push on both switches takes you into CAL (calibration) mode.
- You will see the instruction FLUSH CAL GAS



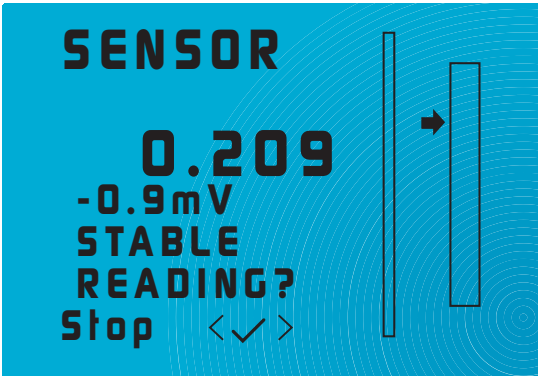
cc calibration screen 1

- Completely flood the rebreather loop with oxygen, (usually achieved by flushing and emptying the loop with pure oxygen three times), then equalize the counterlung to ambient pressure.)
- A short push on the right switch takes you into the EQUALISE screen



cc calibration screen 2

- Once the reading is again stable a short push on the right switch accepts it and takes you into a SENSOR screen where you will see the reading and a measurement of the oxygen sensor cell output (measured in millivolts mV).



cc calibration screen 3

- If the reading on this screen is stable, a short push of both switches will save it
- Your VR3 is now calibrated

If you have difficulty with this process, it is possible that the rebreather has not been properly calibrated. To test this, follow the manufacturer's recommended calibration procedure. For example:-

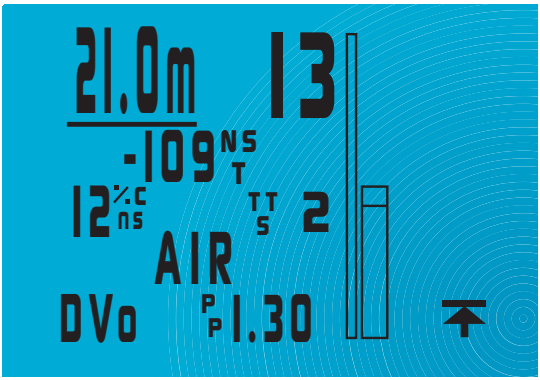
- If the rebreather has an auto-cal system you may need to set the rebreathers atmospheric pressure, especialy at altitude.
- Fill the rebreather completely with oxygen with the loop closed
- Then evacuate the loop, allowing no air in at any time
- Repeat this three times
- After the last fill make sure the loop is at ambient pressure by momentarily opening and closing the mouth piece or pulling the counter-lung dump cord
- Read the rebreather displays
- If they are at 1.0 Bar PO_2, the rebreather is correctly calibrated
- If not, repeat the calibration process

You may get a cell stuck message while calibrating with the counterlungs full of oxygen. If so, you may need to add a breath of air to the loop to allow auto calibration to take place.

- Fill and evacuate the rebreather one more time with oxygen and the displays should read 1.0 Bar
- Now try calibrating the VR3 again

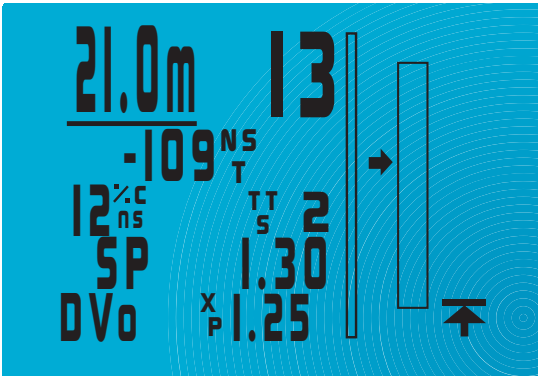
Operation.
While diving, momentarily pushing the right hand switch will show the DVo screen, where you can select XO_2 ON or OFF.

On the dive screen (with XO_2 OFF), the display shows PP followed by the VR3's setpoint.



closed circuit dive screen with $X0_2$ off

With XO_2 set to OFF, if the PO_2 of the diluent at the dive depth exceeds the VR3 setpoint then the diluent PO_2 will be displayed and used in the decompression calculation.



closed circuit dive screen with $X0_2$ on

With XO_2 ON the display shows XP followed by the PO_2 reading from the cell. If an error occurs with the cable or the PO_2 drops to zero the display will show XP FAIL.

In closed circuit mode with an external cell connected and XO_2 set to ON a short push of the left switch briefly displays the set point on line 4 instead of the diluent and a short push of the right switch displays a $P0_2$ bargraph. The $P0_2$ shown on the bottom line is the external sensor PO_2 and is used for decompression.

If the external sensor PO_2 appears in error simply turn XO_2 OFF to return to using internal setpoint decompression calculations. To practice using this, enter the SIM mode of the VR3.

calibration at altitude

Because the rebreather works on absolute pressure the calibration gas in the VR3 must be adjusted to allow for altitude pressure.

Example: If you are at an altitude pressure of 850mb. go to the GAS menu and adjust one of the gases for the following;

Actual calibration gas % X $\frac{\text{Current atmospheric pressure at altitude}}{1000\text{mb}}$

Therefore if 99% is used for a calibration gas at 850mb altitude;

$$99 \times \frac{850}{1000} = 84\%$$

Therefore instead of setting 99% as the calibration gas, set it to 84% and then do a flush routine as described earlier. This involves evacuating the breathing loop without adding any air, then flooding the unit with oxygen and evacuating again.

Repeat this three times. Now with the loop full of oxygen equalise the pressure in the loop with the outside pressure. Now calibrate the unit. The calibrate screen also shows a PO_2 bar graph which is available in DIVE and SIM modes.

IMPORTANT. After calibrating set the diluent back to the actual dive gas.

oxygen sensors

Galvanic oxygen sensors and their connection systems are affected by many environmental conditions and this must be taken into account when using an oxygen analyser or rebreather.

These conditions include;

1. Temperature
2. Moisture
3. Electrical noise (proximity of power sources and RF interference)
4. Connector corrosion.
5. Flow rate (hence partial pressure)

Therefore, it is not unusual to notice small 'drifts' while calibrating or using the units. While an ideal calibration in air should read between 20.8% and 21% oxygen, it is not unusual to see momentary shifts due to the above.

Many oxygen cells, if unused for a period, appear to benefit from a flow of an oxygen enriched gas prior to calibration and use.

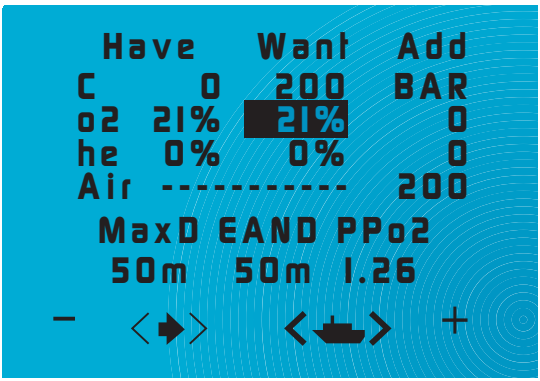
To use the VR3 in analyser mode the Delta P 'cylinder connection kit' and I/O cable must also be purchased. Cylinder connection systems such as the Vandagraph unit are also applicable.

The standard Teledyne cell recommended for use with the VR3's analyser cable is the R17 with a 3.5 mini jack connection system. Care must be taken to ensure that the cable end connector is correctly inserted all the way into the cell and does not disconnect during use. Occasionally corrosion may occur on both the cable end and cell connector and it may be necessary to rotate the connector in the cell to clean off any build-up. The symptoms of the presence of corrosion can be an incorrect (unstable) reading after calibration or seen as a moving FO_2 as the connector is rotated.

The cell used with the rebreather links is the R22 with a molex connector.

gas calculator mode

VR3 owners can purchase Gas Calculator Mode, which is activated by installing a new PIN. When this mode is enabled, you can gain access to it via a new icon ±÷ in the bottom right corner of the Home Screen. To find the new icon, do short pushes of the right switch until the icon is displayed. A long push of the right switch will bring up the Gas Calculator screen



gas calculator screen

This mode allows you to program gas fills. To find out what gases you need to add to adjust a gas mix, enter your current cylinder fill in the HAVE column and the gas mixture you need in WANT. The ADD BAR column will automatically show the fill pressures to add. If you are filling an empty cylinder, leave the HAVE column at O (zero). You can also define the WANT column by changing the MaxD (maximum depth), EAND (Equivalent Narcotic Depth) and PPO_2 settings.

A short push of both switches will move the highlight from one field to the next and a short push of either the left – or right + switch will change the highlighted number by 1. A long push of – or + will increase the number by 10. A long push of both switches will return you to the Home Screen.

key to icons

	DECO STOP		SAVE
	ADJUST		OK
	GAS SELECT		OPTIONS MENU
	PROFILES / GASES		BOTH SHORT
	DIVE NOW		BOTH LONG
	HP CONTENTS		ALTITUDE
	CLOSED CCT		BASE ALTITUDE
	OPEN CCT		SWITCH GAS
	HOME / DIVE		ASCEND HIGH PO_2
	NEXT		GAS CALCULATOR
	MINUS		POWER ON
	STOP		DOWN
	AIR BREAK		GRAPH
	PLUS		CALENDAR
FO2	FRACTION OF O2	PO2	PARTIAL PRESSURE OF 02

warranty and service

Warranty
This product carries a one year guarantee from date of purchase for bonafide manufacturing faults. This does not cover damage to the case or screen and switches during operation. Keep your proof of purchase to submit in the event of warranty repair. Faulty VR3's will be repaired or replaced as appropriate.

Maintenance
The VR3 has no parts which require maintenance by the user other than the battery compartment O rings. Do not over-grease these. Replace them if they become damaged or after ten battery changes. Regularly wash the VR3 in clea n water. If the switches become stiff, flush them with fresh water. You can use a little engineering oil (not grease as this may clog the pockets). Keep the battery compartment thread clean.

Service
All digital depth monitoring devices need a calibration check from time to time. Due to the potential depth of operation of the VR3 it is recommended that you return it to the factory for this check every three years (or two hundred hours of diving whichever is the sooner).

User Feedback
As manufacturers of the VR3 we welcome any feed back from our customers. Please feel free to Email or fax us with any requests or suggestions. Registered users will be kept informed of upgrades.

Suggestions
For technical support visit our website on www.VR3.co.uk or email us at: support@vr3.co.uk

Planned Upgrades
If you have any comments on functions you would like to see included on the computer, please do not hesitate to let us know.

Please see our website for new features and options www.VR3.co.uk

specifications

Depth limit	150m (calibrated)
Time limit	9999 mins and 59 seconds
Max deco stop	99 levels
Number of gases	10
Battery life	Approx. 100 diving hours Sleep Approx. 1 year
Dive memory	Approx. 22 hours
Record resolution	10 seconds
Logbook dives	100

Serial number (Sn=) and PINS:

1. _____

2. _____

3. _____

4. _____

To access all dive features, the PIN must be entered in the Pin number screen. This also allows programming of security information. (see page 31)

registration and warranty form

Name.....

Address.....

.....

Email.....

Serial Number (line 4 Pin Num screen) .....

Date Purchased.....

Registration details can also be sent to us by email to:
support@vr3.co.uk