VR3

Multi-gas
Multi-mode
Decompression Computer

Includes *Proplanner* Decompression
Software and *Prolog* Logbook Software

Operators Manual
Product Release V1.1

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

<div style="border: 2px solid black; padding: 20px;">

Warning!!

VR3 **is an a*id* to air and mixed gas Open and Closed circuit diving. Divers undertaking any form of diving should always carry backup tables and depth/time instrumentation in the event of equipment failure.**

</div>

Introduction

The *VR3* is designed as a multi-gas, multi-mode decompression computer. *VR3* can be purchased in a variety of configurations from a simple air and Nitrox unit through to a full mixed gas open and closed circuit system. The basic options are:

- ◆ Open circuit Air and Nitrox
- ◆ Open circuit Air, Nitrox and Trimix/Heliox
- ◆ Closed circuit Nitrox
- ◆ Closed Circuit Nitrox, Trimix/Heliox

VR3 is designed to integrate with **Proplanner** decompression software and the **Prolog** dive logging system. ***VR3* is fully re-programmable in the event of upgrading between options or if new technology/physiology become available.**

Power System

VR3 uses two DL123 disposable Lithium batteries. **Use of any other battery will damage the unit and will invalidate warranty.**

BOTH batteries MUST be inserted with the + pin entering the unit first. Both batteries must be replaced at the same time.

The battery life is highly dependent on the mode of the active backlight (see page 26). Without lighting, the unit will work continuously for approximately 40 hours of diving. If the unit is turned off ('sleep' mode), the batteries keep the internal systems going for 6 months. Every week of "sleep mode" reduces the dive hours by approximately ½ hour. The on screen battery indicator will give an indication of available battery life. The battery indicator (which is an ascent rate graph while diving) is at the base of the screen. A full bar graph indicates new batteries. The batteries

should be replaced when in the yellow to white zone (less than ten hours life). At this point, the "Batt Low" alarm will show. Battery life is affected by low temperatures. These figures are approximately based on an ambient temperature of 20 degrees centigrade. The batteries may be removed after diving in order to save battery power. If this is done, the following must be understood:

♦ Never remove the batteries if you have dived within the last 24 hours.
♦ Never remove the batteries if you plan to dive with 24 hours. Removing the batteries for more than approximately 30 minutes will freeze the internal date and time and reset the decompression tissue states.
♦ Whenever you replace the batteries, you will be asked to reset the units date and time. If you are not worried about the exact date and time being displayed then this is not so important. Just allow the unit to turn off again and it will log the current time on screen (even though it will be incorrect). Not setting the true date and time will only put the logged, not the actual time and date into the logbook. **<u>All decompression calculation will still be valid even if the exact date and time are not set.</u>**

When changing batteries, no data will be lost other than the exact time. New batteries should be inserted <u>as soon as possible</u> if diving is to continue to avoid erroneous tissue calculations. Simply change the batteries and re-set the time. As with all computers if the *VR3* batteries fail on a dive, remove the batteries for <u>one hour</u> before fitting new batteries. In this event, true decompression status will now be lost for repeat dives. Do not use *VR3* as an aid for decompression for at least 24 hours.

Basic Functions

VR3 has the following basic functions:

♦ Time and date set
♦ Light mode (various light levels)
♦ Programmable safety factor
♦ Programmable Oxygen *Air Break* alarm
♦ Metric or US use
♦ Infra red PC Link for uploading and downloading of setup and dive data
♦ On screen logbook of ten dives
♦ Time to fly information
♦ Open and closed circuit modes with the ability to switch between on certain   models
♦ Ten user programmable gas switches
♦ PO$_2$, decompression violation, air break and ascent rate alarms
♦ Open circuit bailout option from closed circuit dives
♦ List of all decompression stops
♦ Total time to surface display
♦ CNS and OTU tracking
♦ Temperature

Decompression Algorithm

The *VR3* uses a derivative of the Buhlmann ZHL16 algorithm. Exactly the same adaptation is used in **Proplanner** decompression software. The new versions of both systems employ some of the latest thinking in practical microbubble avoidance and compared to standard parallel compartment models may seem to modify the dive profile. This modification takes the form of deepwater microbubble controlling decompression stops. *VR3* in certain circumstances will prompt the diver to do a short decompression stop(s) well below the bulk of the

decompression sequence. This along with the other modifications to the remaining profile helps reduce the problems associated with potential microbubble growth.

VR3 will also automatically compensate your decompression profile for cold water diving.

Micro Bubble Stop Rules

On all dives, *VR3* will prompt for deep-water micro bubble controlling stops. If in an emergency situation where the diver has to violate micro bubble stops and stop shallower, then the system will allow this without unnecessary system violation. This instance may also occur in cave diving where the exact micro bubble stop cannot be met but one close in depth can be completed. The missed (micro bubble) stop will eventually clear as the diver ascends towards the next ceiling. In other words, violation of micro bubble stops will display no alarms; violation of shallower decompression stops will cause the alarm conditions detailed later. Deep-water (micro bubble) stops are recognised by their duration (normally 1-minute) and a + next to the time also there is a lack of a DESCEND alarm if violated.

Further notes on DCI avoidance
Avoid
♦ Smoking
♦ Post dive exercise
♦ Caffeine related products
♦ Drugs and certain decongestants
♦ Fast ascent rates (greater than 10m/min)
♦ Yo-Yo dive profiles

Do
♦ Start hydrating at least 12 hours before diving and immediately after

- After an extend decompression dive, breathe oxygen at the surface for a period
- Rest after a dive
- Be conservative in your dive planning

Getting around

User interaction with the *VR3* takes three forms

- Infra red PC link
- The battery compartment
- The control switches

The Infra Red Link

VR3's infrared link can either beam directly into any PC with an inboard infra red link or via a PC's serial port to the *VR3* infra red adapter (optional). The infra red link is used to download dive data (page23) or upload gas data from `Proplanner` into *VR3*. Dives can be planned with Proplanner and the gases used within the dive plan can be automatically transferred to *VR3* and will appear on the active gas list and be available for the dive. In order to view data from stored dives, the included `Prolog` PC software is available. This generates full graphics of any dive and forms a comprehensive dive logging system.

The Battery Compartment

The batteries are standard 3-volt lithium DL123's (or similar). These are readily available at most stores. The compartment can be accessed using a coin or screwdriver. The O rings should be replaced at least every 10 battery changes or if it becomes damaged or worn. The batteries must be inserted positive (+) end first into the computer. Failure to do so will not damage the computer but it will not function until the fault has been corrected. The battery cover should be screwed in until no O ring is visible and the

thread bottoms out. A small amount of silicone grease may be applied to the thread to aid closure.

> **Batteries are available to VR3 owners
> at preferential rates.**

The Battery Indicator

At the base of the screen is a bar graph, which on the surface is a battery indicator. This aligns with 3 colour graduated boxes on the label. A full bar (green to red) is a high battery voltage (approximately 40 hours of dive time). A part full bar (yellow to green) means almost the battery life is remaining (approximately 20 dive hours), when the bar falls into the last box (white to green) you should change the battery at some point as there are less than 10 hours of dive time remaining.

The Control Switches

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

1. A short push and release of one switch. This is for all non-critical functions.
2. A push and 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 would increment or decrement by 1. In dive mode, this provides security against accidental switching to the gas change and decompression list screens.
3. A short push of both switches. Often used to switch to a new field in order to change it.
4. A long push and hold of both switches. Often used for critical functions such as switching from open to closed circuit.

5. If no switch is pushed, *VR3* turns off in 30 seconds.

For more details of where these functions are used; see the individual sections.

Power Up

VR3 can be activated by push and holding either switch. Upon power up the following screen will be displayed.

The user is then prompted to OK the screen or select OFF. An OFF will turn the unit off again and an OK will move to the next screen. On this screen at point of purchase or after, the owner can ask for their name and a phone number to be placed in memory to aid identification if lost.
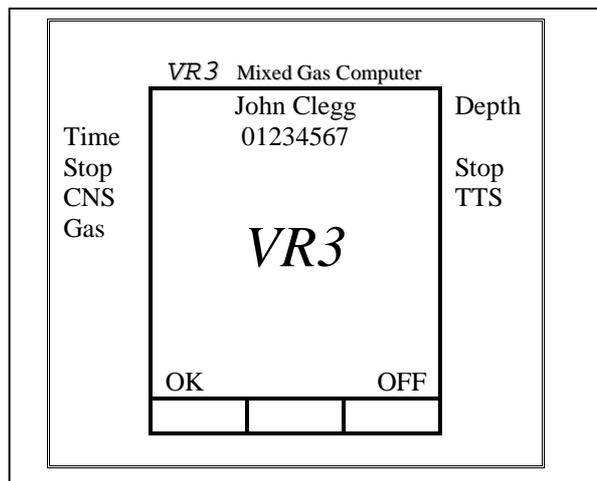
If the battery has not been replaced the next screen to display will be the MAIN screen (page 15).

Time Change Mode

This is automatically accessible if the batteries have been removed and the internal power backup has discharged (approximately 30 minutes) and displays after the power up screen. If a battery has not been changed then the time change screen is accessible from the Options Menu (OPT) under the SETUP sub menu. *VR3* is not a precision chronograph, but meets the European PREN standard for digital dive timing devices. To display the correct time it may be necessary to adjust it occasionally.

<u>Changing the time will not affect desaturation calculations.</u>

The highlighted numbers are the ones that will change when a key is pressed. UP and DOWN will increment or decrement the number (short push). A push and hold of UP

```
┌─────────────────────────────────────┐
│                                       │
│      VR3  Mixed Gas Computer          │
│      ┌──────────────────┐             │
│      │ TIME             │   Depth     │
│      │ 10:05:31         │             │
│ Time │ DATE             │   Stop      │
│ Stop │ 12:11:98         │   TTS       │
│ CNS  │                  │             │
│ Gas  │                  │             │
│      │                  │             │
│      │  L------SAVE-------L           │
│      │   ------NEXT------             │
│      │ UP           DOWN              │
│      └────┬──────┬──────┘             │
│           │      │                    │
└─────────────────────────────────────┘
```
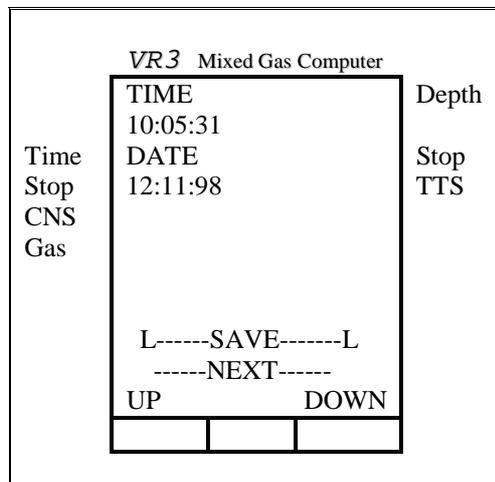
will increment the highlighted number by ten. Holding DOWN will decrement the number by ten. Both buttons together as a short push (NEXT) will move the highlight to the next field to change; it can then be changed in the same manner. A push and hold of both buttons (the L next to SAVE stands for a Long hold) will exit the screen and SAVE the changes. After a SAVE, the unit will then turn off.

Main Screen

After a power up the unit will default to the Main Screen. The Main Screen is divided into three sections; the top section is the Dive Data, the mid section is the Message Area and the bottom section is the Command Section.
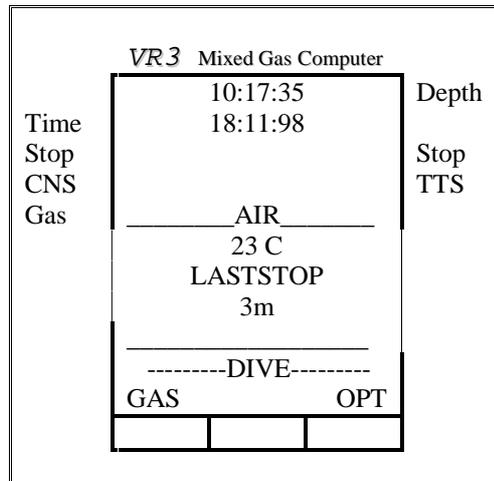
From here a GAS menu may be accessed to enable changing and setting of the required gases; an options menu (OPT) may be accessed to configure various features.

A DIVE option (short push, both switches) puts the unit into a 5 minute timer mode to allow you to start the dive, if a depth of 1.5m is not reached within 5 minutes the unit will turn off. A repeat push at anytime resets the 5 minute timer.

When in any screen, if no switches are pressed the *VR3* will turn off in 1 minute.

From this screen, a short push and release of the right switch will go to OPT. A long push of the left switch will go to the GAS option.

Note. In most cases the bottom line in the Command section is a short push of either the left or right switch according to the required function (GAS is always a long push). The next line up (DIVE) in this case is a short push of both switches. The only time a long push and hold appears on the bottom line of the command section is during dive mode or to change GAS. Long pushes normally appear on the third line up of the command section and will have an L either side of the command.

The Menu's

As mentioned all menus are accessed via the Main Screen. Lets first look at the Options menus (OPT).

The Options Menu's (OPT)

A short push from Main screen of the right hand switch

```
        VR3  Mixed Gas Computer
        OPTIONS              Depth
Time        >GASLIST
Stop          LOG           Stop
CNS          SETUP          TTS
Gas          STOPS
            FLYTIME
            PC LINK
             SIM
             EXIT
        NEXT          SEL
```
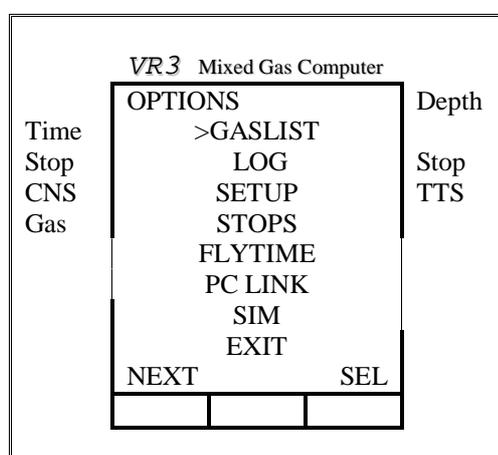
accesses the first of these menus. NEXT (short push) moves the arrow cursor (>) on to the next option. SEL selects the relevant option.

GASLIST

This option displays all ACTIVE gases and their MOD's (maximum operating depths) as a quick guide to how the computer is currently set up.

```
        VR3  Mixed Gas Computer
       ┌──────────────────┐
       │ GAS LIST         │  Depth
Time   │      AIR         │
       │    MOD 66m       │
Stop   │     NX 80        │  Stop
CNS    │    MOD 10m       │  TTS
Gas    │     NX 32        │
       │    MOD 40m       │
       │                  │
       │ EXIT        MOR  │
       └──────────────────┘
```

MOR displays the next page of gases.

Log

The logbook screen shows one dive at a time. By pressing MORE (short push, right switch) the next dive in sequence is shown. If no more dives have been logged, none are shown. The logbook stores ten on screen dives. If the PC link is purchased, dives can be downloaded to a PC and may be displayed in much more detail. The PC link can retrieve 10 hours of diving stored at 10-second intervals. When the memory in *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.

```
            VR3  Mixed Gas Computer
          LOG:1                      Depth
Time             10:08:30
Stop             17:11:98            Stop
CNS                      34miins     TTS
Gas       MAX=10m
          OTU=12



          EXIT             MOR

```

Setup

Selecting SETUP will access another range of sub-menus, which allow the diver to configure the unit. Options under SETUP will be discussed separately (page 25).

```
       VR3  Mixed Gas Computer
       SETUP              Depth
Time
Stop        UNITS=m       Stop
CNS         SAFE =10      TTS
Gas         CNS=90
            LIGHT=1
             TIME
             EXIT

       NEXT          SEL
```
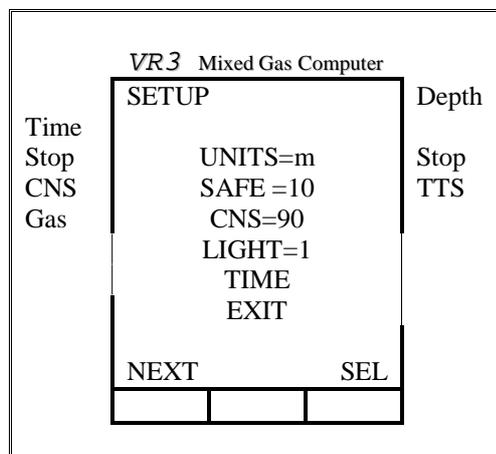
Stops

Under this item, the user has the option to select the shallowest decompression stop displayed. Obviously being a dive computer the diver always has the option to stop deeper than the displayed stop at the penalty of increasing the stop duration. Stop depth selection simply selects the shallowest stop for which decompression will be displayed. It is recommended that either 6m or 4.5m are the options used. 6m and 4.5m are preferred when using high oxygen mixtures as the PO_2 will be relatively low during the final phases of the decompression and changes in pressure by venturing too close to the surface will be kept to a minimum.

```
            VR3   Mixed Gas Computer
           STOPS                 Depth
  Time
  Stop            > 6m           Stop
  CNS             4.5m           TTS
  Gas              3m



           EXIT
```
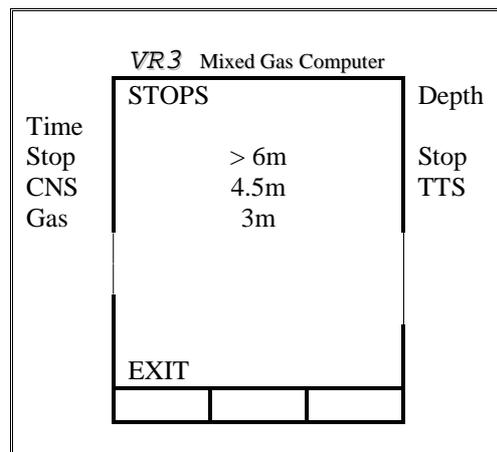
Flytime

Upon selecting Flytime from the OPTIONS menu the following is displayed and depicts when the diver may fly in a pressurised aircraft and when their tissues will be totally desaturated after a dive.

```
            VR3   Mixed Gas Computer
           ┌──────────────────────┐
           │ FLY TIME             │  Depth
   Time     │                      │
   Stop     │       FLYTIME        │  Stop
   CNS      │        12:30         │  TTS
   Gas      │       DESAT          │
            │        23:45         │
            │                      │
            │                      │
            │ EXIT                 │
           └──────────────────────┘
```
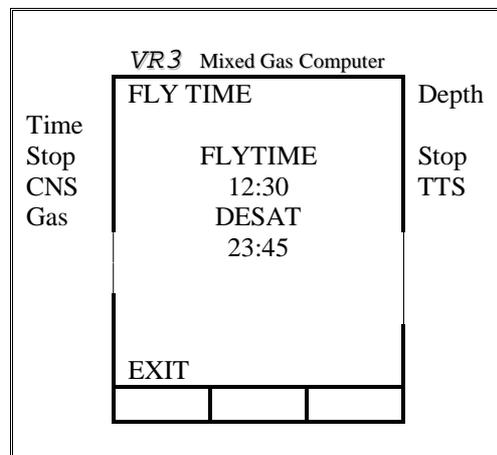
PC Link

PC Link need only be selected when using the supplied `Prolog` PC interface. Having installed the software to interface with `Prolog,` simply start the program by running the LOG.bat file. Next, select the COM port for the interface. To download a dive select option 1 (DOWNLOAD) and enter the dive you wish to download (dive numbers are allocated on *VR3*'s logbook screen). You will then be asked to put *VR3* in PC LINK. Do this and line it up with the IR port on your computer. `Prolog` will then prompt you to continue. If data is not received move it closer to the IR port. (50mm to 600mm is the optimum range dependent on your PC). *VR3*'s IR port beams out through the two holes between the switches. These holes should line up with your computer's IR port. If no link is established the screen will time out after 20 seconds.

Proplanner and Prolog

Both ***Proplanner*** decompression software and ***Prolog*** logbook software are supplied with the unit. As you upgrade *VR3,* you also receive an update of ***Proplanner*** suitable for your new qualification level.

Gas Programming

`Proplanner` not only allows you to plan backup decompression tables but will allow you to take the gases you have planned to use and upload them to *VR3*. Under O for OPTOMISE in `Proplanner,` you will find the Gas Table function. This should be a list of your favorite gases. It is important you set the MOD of each gas correctly, as when they are uploaded to *VR3* the MOD's become the gas switch alarm depths.

Planning a complete dive sequence;

➢ Run **PLAN.bat** to load *Proplanner*
➢ Update the gas table under O for OPTOMISE or G for GAS TABLE
➢ Plan a dive. If you use the AUTO mode, your favourite gases will be automatically used based on the MOD data you have entered in the Gas Table. If you change or use another gas other than that on the Gas Table, this is catered for later.
➢ Exit the dive and save it
➢ Enter G for GAS TABLE and edit the Gas Table. Check all the gases you want to upload are there. If you have modified a gas during the plan, this will be included on the list automatically. This may mean however that you have two gases with the same content but different MOD's. The one with the MOD where you want to switch is the important one. To avoid sending all gases or the wrong gases to *VR3*, simply INHIBIT the gases you don't want (space bar when on ACTIVE field). Only the USED and ACTIVE gases should be sent to avoid confusion.
➢ Save the Gas Table
➢ Enter Prolog and enter G (Gas Table). Follow the prompts and upload the gases.

Note. You do not have to use this upload function, as all programming is available on the *VR3* screens and can be done in the field.

Simulate Mode (SIM)

This mode allows you to simulate any dive profile. The left switch increases the depth and the right switch decreases the depth. All functions are available as if you were diving.

A short push of both buttons will return the unit to 0m and then it will eventually time out to the MAIN screen.

SETUP Functions

The sub menus under SETUP are broken down as follows:

```
          VR3  Mixed Gas Computer
         ┌────────────────────┐
         │ SETUP              │  Depth
  Time   │     >UNITS=m       │
  Stop   │     SAFETY =10     │  Stop
  CNS    │      CNS=90        │  TTS
  Gas    │     LIGHT =8       │
         │       TIME         │
         │       EXIT         │
         │                    │
         │ NEXT          SEL  │
         └────────────────────┘
```
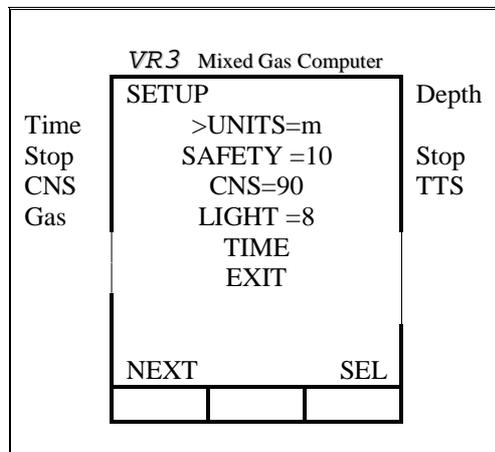
Pressing NEXT moves the cursor (>), pressing SEL will increment the number or change the value. For instance when UNITS is selected the field will change from M (meters) to FT (feet). By selecting TIME the time change display is shown as described on page 14. Selecting EXIT takes you back to the OPTIONS menu.

Safety

Pressing SEL when SAFETY has the cursor (>) next to it will increment the safety factor up to 50%.

CNS

This next option allows the user to set the alarm limit after which the *VR3* will display an Air Break warning. The Air Break warning will appear in the Message area of the dive screen and will show for 5 minutes in every 25 after the alarm limit has been met. The CNS limit follows the theoretical oxygen clock and is based on a derivative of the NOAA oxygen limits. CNS toxicity levels once built up 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. Hence in 90 minutes the CNS load will half. By pressing SEL the CNS alarm % will increment.

During the "Air Break" the diver should switch to a low FO_2 content gas (preferably air). **Whichever gas is selected on *VR3* is the gas the decompression algorithm will follow. Hence a small extension may be made to the stop time.**

Light Levels

Light levels are preset in the unit.

To save battery power VR3 has an auto light save mode when in use. When diving the light will not turn on until a switch has been depressed, it will then stay on for approximately 10 seconds.

As access to the light is by a short push, no on screen data will change nor will any menus be selected.

Gas Selection

From the MAIN screen, there is an option to select GAS. **When at the surface a long push (left switch) will enter the GAS menus. When diving this same option is also available and is protected by a long push of the same switch.**

By pressing NEXT, the next gas in the list is shown. Up to ten gases are available for selection. Simply keep pressing NEXT until the gas you require to breathe is shown. Once you are confident the correct gas is displayed then press SEL. The gas you have selected will now be displayed on the MAIN screen (or DIVE screen if you are diving) in the center.

```
        VR3   Mixed Gas Computer
                SELECT              Depth
Time            GAS:1
Stop                               Stop
CNS                                TTS
Gas              AIR

              MOD 66M
              PO2=1.60
          L----CLOSED------L
           -----ADJUST-----
NEXT                        SEL
```
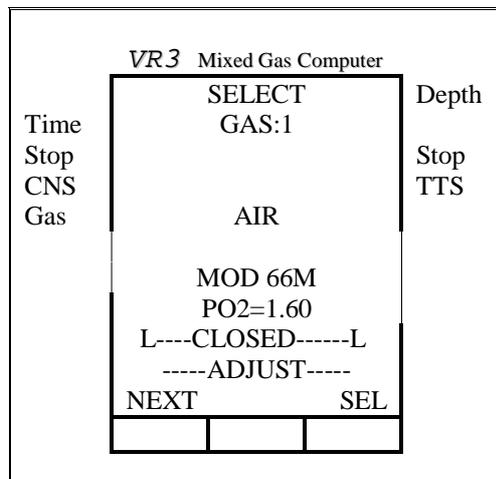
Adjusting a gas

If you are not happy with the gas displayed and wish to change any of its parameters or program a new gas, press ADJUST (both buttons, short push). By pressing ADJUST

```
         VR3   Mixed Gas Computer
                  ADJUST          Depth
  Time            GAS:1
  Stop            ACTIVE          Stop
  CNS                             TTS
  Gas
                   AIR
                 MOD 66M
                 PO2 1.6


             L------SAVE------L
               -----NEXT-----
   UP                     DOWN
```
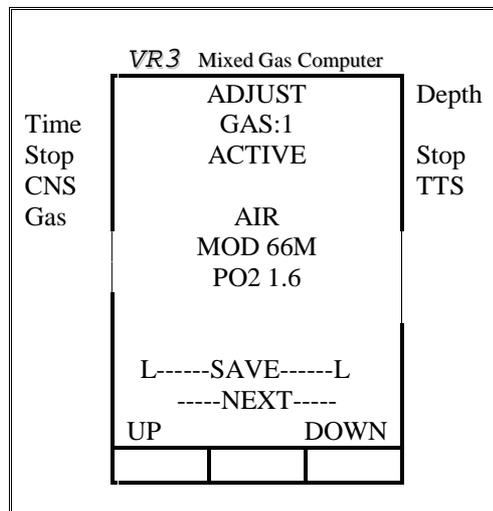
the above screen will be displayed.

Several options are available from this screen. By pressing NEXT (both buttons, short push). A new field will be highlighted. The fields available for change are:

- ➤ The gas number
- ➤ The ACTIVE /INHIBIT status
- ➤ The mix. Each component (oxygen and helium) of the mix is adjustable. Air is displayed as AIR; a Nitrox is displayed as NX then the oxygen fraction (NX 36). A

Trimix is displayed as TR then the oxygen followed by the helium content (TR18/35).

➢ The MOD is adjustable. This will recalculate and change the PO_2 accordingly. As altitude changes the PO2 will vary for the MOD (Dalton's law).

Let's look at each field in turn.

Gas number

There are ten gases available. Once the field is highlighted, the UP/DOWN keys change the number. Change the gas number until the one you want to use or modify is displayed.

```
          VR3   Mixed Gas Computer
                  SELECT          Depth
  Time            GAS:1
  Stop                            Stop
  CNS                             TTS
  Gas               AIR

                  MOD 66M
                  PO2=1.60
              L----CLOSED------L
               -----ADJUST-----
  NEXT                         SEL
```
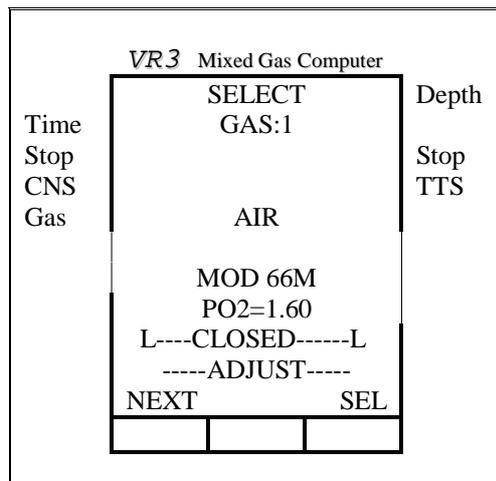
Activating a gas

When the ACTIVE/INHIBIT area is highlighted you have the ability (using the UP/DOWN keys) to allow a gas to be made ACTIVE for the dive.

The purpose of this function is that *VR3* has the ability to advise you the total decompression profile and which gas you should be breathing at what depth based on the plan you enter in this screen defined by where you set the MOD of the ACTIVE gases. Hence *VR3* will only prompt for the gases you make ACTIVE during this planning phase. **To avoid confusion during diving only make ACTIVE the gases you want to use.**

Note: If you INHIBIT a gas and you find you need it during the dive you can enter this screen underwater and ACTIVATE (or modify) the gas. Simply go to the GAS screen (only your ACTIVE gases will be shown), select ADJUST and change the gas number until the INHIBITed gas you want to change is displayed. Now it can ACTIVEd or adjusted using the fields on this screen.

Changing a mix content

Keep pressing NEXT (short push, both switches) to move the highlight and stop at the oxygen content of the gas. Now use UP/DOWN to change the mix (you may use a long push to increment/decrement by 10). Once set, move onto the helium content (using NEXT) and do the same. If helium is not required to be set leave it at zero. Pushing NEXT again will move the highlight on to the MOD (maximum operating depth). This should normally be set at a maximum calculated PO_2 of 1.6 bar for decompression gases. The PO_2 will change as the MOD is altered.

Note: Where you set the MOD is important, as this is where the *VR3* will prompt you to switch to that gas. If you do not select the MOD correctly, you can still switch

to that gas it is just that the system will not prompt until the MOD has been reached. Exceeding the MOD will give a PO$_2$ alarm. Incorrectly setting the MOD or leaving gases ACTIVE which will not be used will mean that the optimum decompression profile will not be calculated and displayed. What you actually do during the ascent and what switches you actually make will obviously be calculated, it is just that 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 ACTIVE list then the decompression profile prediction will alter to take that into account.

Setting all MOD's to 1.6 will give the best profile prediction.

Once you are happy with your gas setup for this gas, you may press NEXT again until the gas number is highlighted and 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 by pressing SAVE (both switches, long push) will save the change and exit you to the previous screen. On the previous screen, the gas you have just changed will be displayed and you will have the option to select that gas as the gas to breathe now. If you do not wish to set this gas press NEXT until the gas you require is shown. Pressing SEL makes that gas the gas you are currently breathing.

Note: Even if you select a Trimix the _VR3_ assumes you will only ever breathe air at the surface and will only start calculating for the Trimix when you descend.

Selecting Closed Circuit Operation

From the GAS SELECT screen, you also have a Closed Circuit option. Press and hold both switches. This allows the diver to select a closed circuit decompression algorithm.

Entering this mode changes to a new gas adjusting screen. In the new screen the mix content is displayed as a selection of Diluents and gives you the option to change PO_2's.

Once Closed Circuit is selected, the current PO_2 setpoint will be displayed on the dive screen.

```
         VR3   Mixed Gas Computer
                CLOSED          Depth
  Time          CIRCUIT
  Stop                          Stop
  CNS                           TTS
  Gas          PO2 = 1.4
               DILUENT
               TR 18/35


            L------OPEN------L
              -----DILU-----
  PO2                      OK
```
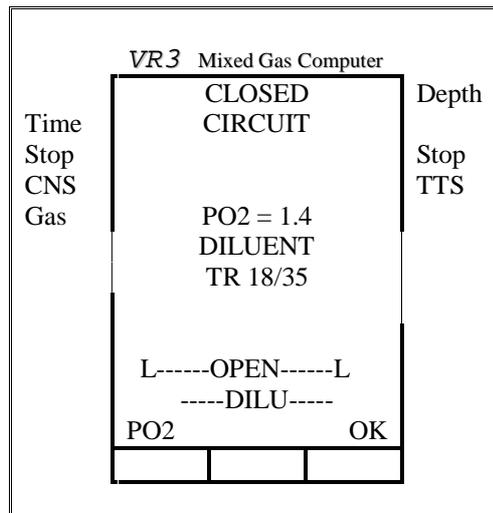
The options under this menu are:

Changing PO$_2$

By pressing the PO$_2$ switch, the PO$_2$ will increment in 0.1 bar steps. Once you have the desired PO$_2$ press OK. The unit will go back to the MAIN screen (or DIVE screen if you are diving). The PO$_2$ and the Diluent make-up will be displayed.

Note: The PO$_2$ selected is the assumed PO$_2$ that the Rebreather will maintain (its Setpoint) during the dive. This is obviously variable dependant on rate of ascent and descent and the characteristics of the machine and operator. It is strongly advised that users are conservative with their PO$_2$ selection.

Changing to Open Circuit

A long push of both buttons will re-select open circuit mode. You will then be able to select the gas you want to breathe in open circuit as before.

During a dive, the user is able to switch in and out of closed/open circuit as required in the event of a bailout being required.

Note: It is important that when planning open circuit bailouts that while setting the gases up in closed circuit mode the Diluent make-ups are also breathable in open circuit at the relevant depths.

Example

A Trimix RB dive is planned with 18/35 as the Diluent. The dive will use closed circuit Trimix throughout the dive and then switch to open circuit surface supplied oxygen at the 6m stop. The bailout is planned as carrying an open circuit 18/35 cylinder and an open circuit Nitrox 36 to give a similar, safe decompression profile if an open circuit bailout is required.

The diver simply then selects closed circuit mode on the *VR3* and programs Trimix 18/35 and Nitrox 36 and Nitrox 99 (oxygen) as the three Diluents.

In the event of an open circuit bailout, all three gases are now available as open circuit gases. Setting the MOD's correctly will automatically prompt for the correct switches.

Changing Diluents

Having selected Closed circuit mode and DILU the following screen is displayed. This is similar to the gas select screen for open circuit. By pressing NEXT, the user can scroll through the range of programmed Diluents until the one required is found. Pressing SEL returns you to the PO_2 changing screen.

```
VR3   Mixed Gas Computer
                SELECT             Depth
Time             DIL:1
Stop                               Stop
CNS                                TTS
Gas            TR 18/35

               MOD 67m
               PO2=1.40

             -----ADJUST-----
NEXT                        SEL
```
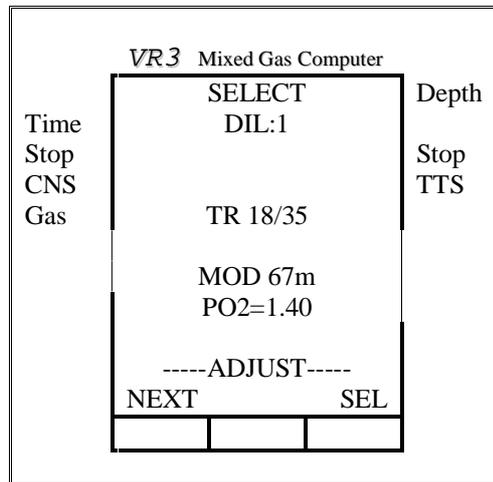
Pressing ADJUST takes you to the gas adjusting screen similar to that used in open circuit mode. Diluent content is then adjusted in the same way. The PO_2 again being a reflection of the MOD (not the Rebreather Setpoint).

```
          VR3   Mixed Gas Computer
                    ADJUST          Depth
  Time              GAS:1
  Stop              ACTIVE          Stop
  CNS                               TTS
  Gas               TR 18/35
                    MOD 67m
                    PO2 1.4


              L------SAVE------L
               -----NEXT-----
  UP                       DOWN
```
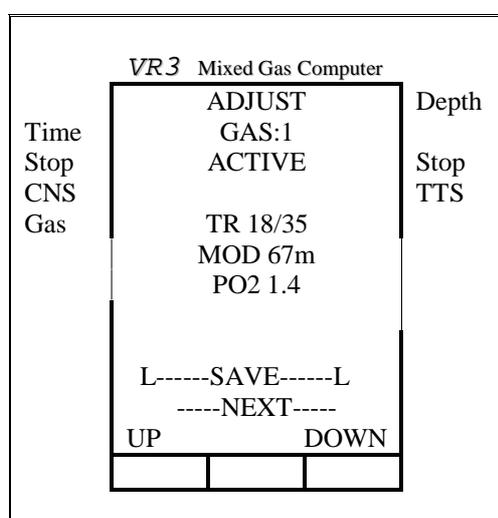
Pressing SAVE will exit you to the previous screen (SELECT). Pressing SEL again will take you back to the PO_2 change screen. A final press of OK will take you back to the MAIN or DIVE screen if you are diving. Whichever Diluent you have modified and selected will be displayed at the PO_2 Setpoint you have selected.

Note: During diving, the current depth is displayed at the top of gas select screens.

Simulate and Dive mode

Prior to entering the water *VR3* <u>must be turned on</u> and the correct gas selected. Once on it will stay on for 30 seconds. By selecting DIVE from the MAIN screen, you then have 5 minutes to attain a depth of 1.5m where the computer will start the dive. If you forget to turn it on or it switches off, simply get into the habit of doing an equipment check at 6m. If the unit is off, and you turn it on underwater after only a couple of minutes, providing you are shallower than 6m and the unit has been on within the last six hours at the current altitude you may elect to continue diving.

<u>**WARNING**</u>
<u>**Turning *VR3* on deeper than 6m will generate a USE TABLES alarm. Dependant on the extent of the violation depth and decompression information may not be relied upon.**</u>

To enter Simulate mode press SIM on the OPTIONS screen. The unit will switch to the DIVE display and a depth of around 10m will be displayed. The dive screen has the following fields:

```
           VR3   Mixed Gas Computer
                    56.1m           Depth
Time                08:28
Stop       6m                  1    Stop
CNS        11%                 11   TTS
Gas                 AIR


           _____


           _____
           GAS              DEC

```

Depth
Current depth is displayed. In SIM mode, this may vary slightly.

Time
Dive time is displayed in minutes and seconds.

Decompression details
The deepest decompression stop and time at that stop is displayed. For a list of all stops, see the DEC section later.

CNS

The next line displays CNS % on the left hand side.

TTS

The same line displays total time to surface in minutes on the right hand side. This includes ascent time and time at all decompression stops based on your ACTIVE gases list.

Gas

The next line displays the currently selected gas. When in closed circuit mode the PO_2 and make up of the Diluent is displayed here.

Message area

The next section includes three lines of Message Area. Any alarm messages will be displayed in this section.

Command Area

The bottom line features the command prompts. In SIM mode, a short push of the left-hand switch will increment the depth and a short push of the right hand switch will decrement the depth. To instantly return to 0m and end the simulation push both buttons together (short push).

During both diving and simulation, a long push of the left hand button will take you into the gas selecting and adjusting menu's described earlier. **Remember even if the listed gas is not ACTIVE you can enter the ADJUST screen and re-activate it for immediate use.**

The **DEC** function (long push, right switch) allows you to view a list of all the decompression stops required with the relevant gas switch highlighted according to the gas plan you entered. If at any point you change to or ACTIVATE a different gas, in a few moments *VR3* will modify the DEC list and re-calculate all decompression. This screen stays active for 20 seconds. Every time you push a switch, the 20

second timer starts again. Every time you push a switch and while in this screen the decompression calculations are temporarily frozen.

Once in the DEC screen, by pushing MOR several pages of stops may be accessed the last one displaying maximum depth, current PO_2, current temperature and current OTUs. A typical DEC screen might look like:

Current depth and time are also displayed at the top of the screen.

```
┌─────────────────────────────────────┐
│                                       │
│        VR3  Mixed Gas Computer        │
│       ┌──────────────────┐            │
│       │      56.1m        │   Depth    │
│  Time │      20:08        │            │
│  Stop │                   │   Stop     │
│  CNS  │ NX 50             │   TTS      │
│  Gas  │ 18m            1  │            │
│       │ 15m            2  │            │
│       │ 12m            4  │            │
│       │ NX 80             │            │
│       │ 9m             8  │            │
│       │ 6m            12  │            │
│       │ 4.5m          15  │            │
│       │ EXIT         MOR  │            │
│       ├──────┬──────┬─────┤            │
│       │      │      │     │            │
│       └──────┴──────┴─────┘            │
│                                       │
└─────────────────────────────────────┘
```

The SIM mode work on current tissue state. If you have just dived, this will be reflected in the displayed decompression.

Alarms

VR3 has several on screen alarms these are characterised by on screen messages and the flashing of the backlight

Decompression stop violation

If the diver ascends past a decompression stop to a level where the tissues may be come over pressurised then the DESCEND message 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 TABLES. After this, while *VR3* will continue to display 'best guess' decompression data it cannot be relied upon and the diver should switch to their backup manual tables.

Upon reaching the surface the MISSED STOPS warning will be stored on the logbook and the alarm will display for 24 hours. If you re-enter the water best guess decompression will still be shown but again cannot be relied on.

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 and then when it reaches 60 the calculations will start again. Dependent on the extent of your excursion you should build in extra safety for the remainder of the dive.

Deep micro bubble controlling stops do not generate violations or warnings (see page 9).

Switch

During a dive, you may notice a SWITCH message and a prompted gas other than that which you are breathing. This is *VR3* prompting you whether you wish to switch gases based on the plan you have entered. You may ignore this if you wish and carry on using the same gas. The SWITCH

message comes on when the MOD has been reached for that gas according to the gas list you entered.

PO$_2$

This alarm occurs when an open circuit gas or Diluent has exceeded 1.6 bar PO$_2$.

Airbreak

This alarm will display when the user set CNS alarm limit is exceeded (see page 26). This will continue to periodically display once it has been reached.

Ascent Rate

At the bottom of the display under the command section is an ascent rate graph which doubles as a battery indicator at the surface. The bar fills from the left. A 50% full bar equals 10m/minute (the recommended rate for all sections of the dive). A full bar equals 20m/minute or greater.

Warranty

This product carries a lifetime guarantee for bonafide manufacturing faults. This does not cover damage to the case or screen and switches during operation. Faulty units will be repaired or replaced as appropriate.

Maintenance

VR3 has no user maintainable parts other than the battery compartment O rings. Do not over grease these O rings and replace them if they become damaged or after ten battery changes. Regularly wash the unit in fresh water. If the switches become stiff, flush with fresh water.

Service

All digital depth monitoring devices will periodically need a calibration check. It is recommended that due to the potential depth of operation of *VR3* it should be sent to factory for a calibration check every three years or two hundred hours of diving which ever is the sooner.

User Feedback

The manufacturers of *VR3* welcome any feed back from customers. Please feel free to Email or fax us with any requests or suggestions. Registered users will be kept informed of upgrades.

Technical Support

For technical support visit our website on www.vr3.co.uk or call +44 (0)1202 871456. Fax: +44 (0)1202 870570.

Upgrades Planned

If you have any comments on functions you would like to see on the computer please do not hesitate to feedback to us. Some of our planned upgrades include:

- Gas mixing screens
- Active rebreather link

Specifications

Depth limit	150m (calibrated)
Time limit	9999mins and 59 seconds
Max deco stop	99 levels
Number of gases	10
Battery life	Approx. 40 diving hours
	Sleep Approx. 6 months
Dive memory	Approx. 10 hours
Record resolution	10 seconds
Logbook dives	10

Registration and Warranty Form

Name_____

Address _____

_____

_____

Email_____

Serial Number (on reverse)_____

Date Purchased_____