

New Firmware

Firmware Release Date: 19th July 2013

New Firmware (embedded software) has been released for your Vision oxygen controllers and handset.

For Quick Install Instructions go to Page 11.

IMPORTANT: with thousands of users updating their firmware – we will not be able to give “one on one talk through help” to everyone within the first two weeks of release – even with extra man power we will not be able to cope. It is very easy to upload the new firmware, the new APD Communicator is also upgraded to work better with both types of USB/Serial adaptors, it’s a safe, secure process... you can do it. Please though, read this document and follow the instructions instead of phoning for help. Please don’t tie us up asking questions which are answered in this document, please free up our email and phone system for those who really need help – MP.

The last general release firmware was V02.01.04, released in January 2008, while the last hardware specific firmware, V05.00.01 was released on new “lids”, which had updated processors, in October 2012. The new firmware, V05.02.01, is suitable for upload to all “lids” and offers significant improvements on previous versions.

It is the result of many years of development, updates, improvements and testing with the software, firmware & hardware development conforming to Annex B of the soon to be released European Standard, EN14143:2013/4 and audited by Lloyds Quality Assurance’s Critical Safety Experts.

Firmware Version 05.02.00 is now available for download from the website:

<http://www.apdiving.com/downloads/software/> .

Select the language you would like to have on your Vision handset and download that language specific folder.

In the download pack, there is a new suite of PC Software to ensure compatibility with V05.02.01 firmware.

NOTE: DO NOT use your existing APD communicator to load the new firmware.

V05.02.01 is an open upgrade, suitable for all Vision lids, regardless of the decompression option chosen and regardless of the serial number, so one copy of the firmware can be uploaded to all (Vision) rebreathers. Your personal details will be retained on the handset as will the decompression status, but unlike previous firmware releases the last 7 hours of full diving information will not be retained. If you want to retain that information, simply download the Vision handset onto your PC first using your existing APD Communicator software before you upgrade either the PC software or Vision firmware.

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Changes to Code from V02 01 04 to V05 02 01

Hardware and System Key configured Firmware.

Hardware specific code (introduced in V05_01_00):

The firmware automatically identifies:

- Which Controller processors are used and applies the correct version of code and
- Which hardware components are plugged in e.g. Temp-Stik or CO₂ sensor or both:
The display is then configured to match your hardware.e.g. If you do not have a CO₂ sensor plugged in then you won't see the CO₂ sensor displays.

System Key Configuration (introduced in V05_01_00):

In the past, system keys have been used for disabling the rebreather prior to receiving training and for determining which version of decompression software is active in the Vision handset – a system key upload is a 3 second upload from the PC.

Now System keys are used to also control features within the Vision controller e.g. there are now two additional Recreational system keys.

The first two recreational levels force configurations and limitations , in terms of depth, gas, decompression and setpoint switching to reflect the reduced level of training given at the new beginner levels.

With the new firmware and appropriate system keys you will be able to switch to any of the five levels.

Note: - This is shown for your information only. You don't need to be concerned with System Keys if you are simply upgrading the firmware – whatever features you have now, is what you will get when you load the new firmware, the exception being that the list of gases has been reduced from 12 to 6 in all versions but new gases can be added at any time, on the surface or underwater.

System Key	Features
Disabled	Unit won't work until one of the diving System Keys is loaded – often used when transporting a rebreather to a student prior to the training course.
Recreational 1	19m max. depth; one diluent/bailout gas – Air; fixed conservatism decompression; Gradual setpoint only; Temp-stik must be fitted, otherwise no dive & forced calibration if calibration not done in the 6 hours before a dive.
Recreational 2	40m max. depth; two diluents/bailout gases – Air & up to 40% Nitrox; fixed conservatism decompression; Gradual setpoint only; Temp-stik must be fitted, otherwise no dive & forced calibration if calibration not done in the 6 hours before a dive.
Dive Timer	No depth limits imposed by electronics, no decompression information.
Nitrox	No depth limit imposed by electronics, 40m recommended limit but no depth warnings, 6 Nitrogen based diluents/bailout gases, user adjustable conservatism decompression.
Trimix	No depth limit imposed by electronics, 100m recommended limit but no depth warnings.

Pre-dive Mode Changes

- **Cell Integrity Test repeated:**

On switch on, if a cell is not connected it would appear as a missing cell. Previously, you would push the connectors onto the cell and then switch off and switch on again to see if the missing cell is connected. With this modification, there is no need to switch the handset off and then on again, as the cell test cycles. This allows the user to immediately confirm a fix or fault when connecting/disconnecting cells in pre-dive mode.

- **Self-Test Indicators**

- The check boxes during power on self-tests have been changed to ticks and crosses to help clarify when an item passes self-test and when it fails.

Manual Sections: 5.3 to 5.7

- **Pre-dive Prompts**

- An “Open Counterlung Pressure Relief Valve” prompt has been inserted into the pre-dive routine.
- A “Check Mushroom Valve Operation” prompt has been inserted into the pre-dive routine. The Mushroom valve check is best done when the mouthpiece hoses are removed from the Tee-pieces but unwisely is often overlooked. The Mushroom valves are the only moving mechanical parts in the breathing circuit and as we all know extremely important. When asked – “how often do you check the mushroom valves?”, my response is “only on two occasions, when I wash the rebreather through and when I don't wash the rebreather through “. You should always check the mushroom valves.

Manual Sections: 5.13 to 5.14 & 4.4

- **Diagnostic Messages**

- To aid the understanding of switch on diagnostic screens, the message "NO Master" has been replaced with "Failed Self-Test".
- During the switch on self-tests; if a cell or solenoid fault is seen by both oxygen controllers "check cells", "check solenoid" or both is shown.
- In the event of a cell being outside the acceptable range during calibration the wayward cell is now highlighted, cycling the self-test indicator screens.
- During the switch on self-tests, should there be a low battery the battery Number will now be shown instead of the Controller number.

Manual Section 5.7

Rebreathers produced since September 2012 have hardware automatic activation. When the rebreather gets wet, it switches on accessing the normal Vision Pre-dive life support capability. On this latest version of firmware there is an additional delay programmed in, so the unit has to be immersed for longer in order to activate markedly reducing the nuisance factor.

Dive Mode Changes

- **Battery Usage**

The previous version of firmware took power from both batteries during calibration and whenever the PO₂ was below 80% of setpoint.

Version 05 02 00 uses only B1 during calibration and only B1 to power the solenoid unless the PO₂ falls below 0.4 bar at which time power is taken from both batteries. This method preserves the B2 battery better, clearly at the expense of B1 but this helps ensure the reserve battery provides a suitable "parachute".

Please remember: To get optimum use from the batteries, on a low battery warning discard B1 and replace it with the B2 battery, inserting a new battery in the B2 slot. (B2 is furthest from the solenoid). ALWAYS INSERT THE NEW BATTERY IN THE B2 SLOT !

WARNING! – never simply replace B1 with a new battery. B2 is depleted slightly every dive and if not replaced there is a very real risk that B2 will not have sufficient capacity to power the B2 controller, should B2 be called on to operate. Whenever you insert a new battery, it must go in the B2 slot, the slot furthest from the solenoid.

Manual Section 1.20

- **Gradient Factor Display**

Gradient Factors (Trimix version only) are now visible when in dive mode by pressing and holding the left button for 2 secs. At this time the C2 oxygen controller's PO₂ display is shown, the same as previous versions.

Manual Section 7.6 (Screen 1)

- **mVolt display**

By holding the left button for longer, 4+ secs, the raw cell readings in mVolts are now visible

- Please note: the mVolt display has a 1 mVolt resolution, which equates approx. to a resolution of 0.02 bar. Displaying to 0.1 mV made the display cluttered and

displaying with a resolution of 0.002 bar offers little value and a very fast changing display as you breathe from it.

- The mV output from the cells is taken through an Analog to digital converter then either displayed as mVolts or as PO₂.
- On each oxygen controller, of which there are two on APD rebreathers, the PO₂ displays are a very simple calculation: the mV(output from the cell) x CF (calibration factor for that cell and for that oxygen controller) = PO₂ displayed. In all there are 6 calibration factors stored, 3 (1 for each cell) on each oxygen controller.
- This feature has been added at the request of customers. We haven't built this in previously as it is thought superfluous: the extra step of conversion to PO₂ is minor and in any case is doubled up for each cell as the calculation is done independently on two sets of hardware.

Manual Section 7.6 (Screen 2)

- **Master Controller Alert**

A double beep and Red/Green flash has been added when the Slave controller is promoted to Master.

Manual Section 9.12


- **Setpoint switch alert**



A double beep and double green flash on the HUD has been added on the high to low setpoint switch

Manual Section 9.13

- **Setpoint Change:**

A third method of changing setpoint has been added. The choices are now Manual, Auto or Gradual:

	Method	
(1)	Manual	<p>Advantage: allows you to change setpoint when you want to</p> <p>Disadvantage: occasionally you will forget to change setpoint</p> <p>When Manual setpoint change is selected the setpoint indicator is shown as:</p>  <p>To operate: Press and hold the centre button for 2 secs to change from Low setpoint to High or High to Low.</p>
(2)	Auto	<p>Advantage: the setpoint automatically changes at the best depths to eliminate spiking on descent and to optimise the PO₂ for decompression reduction.</p> <p>Disadvantage: If you dive shallower than the low to high setpoint switch depth you will have to manually change to the high setpoint. E.g. If you set the switch depth at 25m, any dives where the bottom is between 12m and 25m, where the high setpoint should be used, you would either have to change the settings prior to the dive or manually override during the dive by pressing and holding</p>

		<p>the centre button for 2 secs. With that proviso “AUTO” is the preferred method.</p> <p>To operate: Pre-select the depth where you want to change from Low to High on descent e.g. 25m and the depth where you want to change from High to Low e.g. 3m on a square profile decompression dive, but maybe 10m on a reef dive where you want to spend time in the shallows at the end of the dive where decompression may not need to be optimised.</p> <p>When Auto setpoint change is selected the setpoint indicator is shown as:</p> <p style="text-align: center;"></p> <p>At any time the diver can manually switch to the low setpoint by pressing and holding the centre button.</p>						
(3)	Gradual	<p>When Gradual setpoint change is selected, the setpoint indicator is shown as:</p> <p style="text-align: center;"></p> <p>With this setting, the setpoint will change automatically and gradually as you descend and as you ascend. It changes in 0.1 bar increments between your selections of high and low setpoint values. Suggestion: leave the setpoints on the default values of 0.7 and 1.3 .</p> <p>Disadvantage: the Gradual setpoint change method does not optimise the setpoint for minimum decompression or faster descents but it has real advantages on those dives where minimal or no decompression is required.</p> <p>Advantage: It’s a set and forget option; after you have selected it, it will be good enough for the majority of dives for many divers. It has the distinct advantage of easier buoyancy control during ascent which makes it ideal for beginners. At any time the diver can manually switch to the low setpoint by pressing and holding the centre button. If such a switch is made the letter L will be displayed next to the setpoint. Pressing and holding the middle button again will change the setpoint selection back to Gradual and the setpoint appropriate for the depth will be chosen.</p> <p>e.g. If the default setpoints of 0.7 and 1.3 are selected, the setpoint will automatically change in 0.1 increments starting at 7.1m and reaching 1.3 bar at 19.3m. 1.3 bar setpoint will then be retained until you ascend above 14.4m where it will start to decrease the setpoint in 1m increments, reaching 0.7 bar at 4.9m.</p> <table border="1" data-bbox="443 1870 906 1991"> <tr> <td>Low Setpoint</td> <td>0.7</td> <td></td> </tr> <tr> <td>High Setpoint</td> <td>1.3</td> <td></td> </tr> </table>	Low Setpoint	0.7		High Setpoint	1.3	
Low Setpoint	0.7							
High Setpoint	1.3							

		Depth (m)	Descent
			Ascent
		1	0.7
		4.9	0.7
		6.8	0.7
		7.1	0.8
		8	0.8
		8.7	0.8
		9	0.8
		9.6	0.9
		10.6	0.9
		11	0.9
		12	1
		12.5	1
		13	1
		14.4	1.1
		15	1.1
		16	1.1
		16.9	1.2
		18	1.2
		19	1.2
		19.3	1.3
		20	1.3

Note: if you change the setpoint switch method from Gradual to Manual or Gradual to Auto, the Low setpoint will be chosen. In Auto Mode, the depth will then be automatically measured and High setpoint selected if appropriate.

Manual Section 1.7

- **Open Circuit Bailout – Closed Circuit Setpoint Selection**

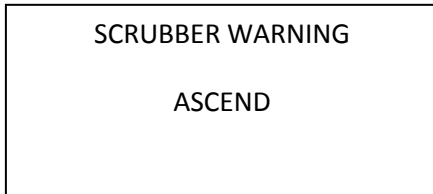
When Open Circuit mode is selected, the Closed Circuit setpoint is automatically switched to the Low setpoint making buoyancy control during open circuit ascents easier.

Manual Section 8.3.1

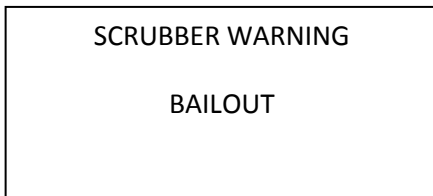
- **Backlight Brightness Control**

Backlight brightness selection is now easier to adjust by allowing the use of one direction key to find all options.

- **Scrubber Warnings.** The Scrubber Gauge/Temp-stik warnings work extremely well with Sofnolime 797. However, it has become apparent that on occasion divers ignore the warnings, so Ascend and Bailout “instructions” have been added to the warnings:
on the 1st warning -



on the 2nd warning -



Manual Section 9.8

- **Automatic Activation** – on units made since September 2012
 - Automatic activation is now software controlled with a time delay function which reduces the nuisance factor.
- **Diving without Sofnolime**
 - If a temp-stik is fitted and you descend and the temp-stik does not warm up appropriately, the warnings “Abort Dive”, “Ascend Now” are displayed along with buzzer activation and two solid red lights (one for C1 and one for C2) are shown on the HUD.
- **Calibration**
 - Oxygen Calibration is now forced if a calibration has not been done within the past 6 hours on Recreational 1 and Recreational 2 versions.
 - Flushing is now prolonged to ensure better quality calibration
- **Failed Depth Sensor**
 - Failed Depth Sensor BEFORE the dive: In the event of a pressure sensor failure, either failing low or extremely high (>300m), the buzzer sounds, solid red lights are displayed on the HUD and “Depth Sensor Failed – Dive Now Y or N?” is displayed on the handset. If Yes is selected, the unit resorts to Dive Timer mode with no depth or decompression information offered and only manual setpoint change, the same as the Classic Inspiration.
 - Bugfix from V05.02.00 included:
 - In V05.02.00 during switch on, when the atmospheric pressure was 1024 or 1025 mbar, a failed depth sensor warning was displayed in

V05.02.00 due to a coding error. This has been corrected in V05.02.01 .

- Failed Depth Sensor DURING the dive: In the event of a pressure sensor failure during the dive, either failing low or extremely high (>300m), the buzzer sounds, solid red lights are displayed on the HUD and “Depth Sensor Failed” is displayed on the handset. The alarm can be acknowledged and cancelled by pressing the right button for 2 secs, the unit resorts to Dive Timer mode with no depth or decompression information offered and only manual setpoint change, the same as the Classic Inspiration.

PC Software

New versions of APD Communicator and APD LogViewer are issued to ensure compatibility with V05_02_00 Vision firmware, the 5 denoting compatibility.

- **APD Communicator (V5.0.2.0)**
 - For compatibility, the new version of Communicator is to be used with V05.02.01 Vision Firmware.
- **APD LogViewer (V5.0.4.3)**
 - For compatibility, the new version of LogViewer is to be used with V05.02.01 Vision Firmware.

New Projection Software

- **APD Projection (V2_1_7_6)**
 - Projection improvements include screen sizing for notebooks.
 - Projection is dive planning software that comes with the DiveStore – the DiveStore is the activation dongle.

Update Instructions:

Step 1)

If you want to keep the full dive information from the last 7 hours of diving, use your existing Communicator software to download the data from the Vision lid and store the data on your PC. The log book will remember your last 48 dives.

Step 2)

Download the files from the website:

Go to <http://www.apdiving.com/downloads/software/> and select the language version you require. Enter the required registration information and download the zip file to a readily accessible location on your PC.

The zip file contains the firmware for your Vision electronics and the three APD programs, Communicator, LogViewer and Projection Dive Planner.

The firmware for your Vision electronics (**Vision_V05.02.01_English_Sport_System.ccr**) is **NOT an executable file**, so **“double clicking it” won’t work – instead go to step 3:**

Step 3) Install the new APD Communicator:

Once the files have been extracted, firstly install the APD Communicator by double-clicking on it. It simply replaces your installed program, there is no need to “uninstall” the old version. Leave the “create a desktop icon” box ticked and it will simply overwrite your old desktop icon.

Step 4) Install new batteries into both battery boxes.

Step 5) Connect your PC to the Vision lid using the Bridge Interface, NOT the DiveStore !

Step 6) Run the APD Communicator Program, by double clicking on the Desktop icon:

Step 7) Press the left button on the Vision handset, the screen should say “PCLink.”

The Two grey boxes on the APD Communicator should now have yellow rebreathers in them, if not, go into Settings and change the Com Port. Once the rebreathers are yellow then Upload the Vision ccr file to the rebreather by clicking on the large Upload button and selecting the new Vision_V05.02.01_your language_Sport_System.ccr upgrade file.

If the rebreathers remain grey, then go into Settings and select the Com port. Sometimes it is necessary to go to Control Panel / Device Manager and select com ports to see if your PC has identified the USB/serial adaptor. Then restarting the APD Communicator program is usually sufficient. If you have problems please refer to the trouble shooting guide on the Download site <http://www.apdiving.com/downloads/software/> .

Step 8) Install the APD LogViewer Program

This is backwards compatible with all previous Logfiles.

On the Download site <http://www.apdiving.com/downloads/software/>, you’ll see there are full description guides to downloading, uploading and trouble shooting as well as the guide for “Mac” owners.

Projection Software


In the zip file you will find the latest version of Projection dive planning software V2_1_7_4. It is PC software, so simply double click on it to run the install program. We suggest you copy the install file onto your DiveStore so you will have the latest version with the DiveStore dongle and this can then be installed on any PC when you travel.

This version includes the modifications to allow use on Netbook computers.

DiveStores are available from the www.apdivingdirect.com website or by contacting the factory.

Latest Instruction Manual – NOV 2012.

Quick Install Details

Step	Files in The Zip File	Type of File	Update Procedure
1	If you want to save the last 7 hours of diving from your lid 		Download your lid using your existing APD Communicator or APD DiveStore.
2	Select your language and download that folder	Folder	Save the entire folder onto your Desktop.
2	APDCommunicatorSetupSPORT_V5_0_2_0.exe	PC Application	Save to your PC and run by double clicking on the file
3	V05.02.01_English_Sport_System.ccr	APD Vision Firmware	Transfer the file to Vision lid by using new APD Communicator
4	APDLogViewerSetupSPORT_V5_0_4_3.exe	PC Application	Save the file to your PC and run by double clicking on the file
5	APDProjectionSetup_V2_1_7_4.exe	PC Application	Save the file to your PC and run by double clicking on the file
6	Update Notice (This document)	PDF	Save the file to your PC and run by double clicking on the

			file
7	User Instruction Manual Version_NOV 2012	PDF	Save the file to your PC and run by double clicking on the file