Liquivision KAON

Shortened Manual

For the full version of the manual please go to:
http://liquivision.com/docs/Kaon_User_Manual.pdf

CONTENTS

IMPORTANT NOTICES

Abbreviated Manual

This manual is a shortened version of the manual for quick setup and reference. For the full detailed user's manual, please visit: http://liquivision.com/docs/KAON_User_Manual.pdf.

WARNING – DANGERS OF DIVING

Scuba diving is a dangerous sport, and can lead to injury, disability or death. Always dive within the limits of your training, skills and experience. Technical diving activities, including decompression diving, mixed gas diving, rebreather diving, wreck and cave diving, all substantially increase the risks of scuba diving.

The KAON dive computer is capable of calculating decompression requirements based on the Bühlmann ZH-L16C algorithm first published in 1990[1]. Decompression is an inexact science. It is possible to follow a decompression plan exactly and still suffer decompression sickness. Following a decompression plan does not, in any way, guarantee the avoidance of decompression sickness. The same profile that gets you out of the water safely one day may cause decompression sickness another day, and lead to temporary or permanent injury or death.

You can die while diving.

WARNING – ELECTRONICS CAN FAIL – ALWAYS CARRY BACKUP

The KAON dive computer hardware, like any electronic equipment whose components mature and age. If they fail during your dive, they can stop providing you with critical information.

You must have a plan to handle the failure of the KAON dive computer during your dive. You should carry backup instruments, including a depth gauge, submersible pressure gauge, digital bottom timer or dive watch, a compass, and have access to decompression tables. Do not risk your life on only one source of information.

WARNING – ALWAYS CHECK FOR SOFTWARE UPDATES

The KAON dive computer software likely still has bugs. We have looked for them and tried to eliminate them, but they can still appear during use. Bugs can cause the units to provide inaccurate or incomplete information, or cause the unit to reset or turn off and stop providing any information at all. You should always check for software updates (http://liquivision.com/downloads/KAONSoftwareHistory.php) and install all applicable updates, every time you prepare to use the KAON dive computer.

MENU TREE

1. Shut Off
2. Lock
3. Dive Planning
    - 3.1. Rec
        - 3.1.1. Gas
        - 3.1.2. Compute NDL
        - 3.1.3. Alarms
            - 3.1.3.1.   Alarms
            - 3.1.3.2.   Depth
            - 3.1.3.3.   Time
            - 3.1.3.4.   Ascent Rate
            - 3.1.3.5.   Descent Rate
        - 3.1.4. Your Saturation
        - 3.1.5. Simulate Dive
            - 3.1.5.1.   Depth
            - 3.1.5.2.   Time
            - 3.1.5.3.   Speed
            - 3.1.5.4.   Start
            - 3.1.5.5.   Cancel
    - 3.2. Tec
        - 3.2.1. Dive Setup
            - 3.2.1.1.   Conservatism
            - 3.2.1.2.   PO2 dive
            - 3.2.1.3.   PO2 deco
            - 3.2.1.4.   Last deco
            - 3.2.1.5.   Gases
                - 3.2.1.5.1.   Dive gas
                - 3.2.1.5.2.   Deco gas 1
                - 3.2.1.5.3.   Deco gas 2
        - 3.2.2. Compute NDL
        - 3.2.3. Runtime
            - 3.2.3.1.   Remain. SI
            - 3.2.3.2.   Add
            - 3.2.3.3.   Compute Deco
            - 3.2.3.4.   Delete All
        - 3.2.4. Alarms
            - 3.2.4.1.   Alarms
            - 3.2.4.2.   Depth
            - 3.2.4.3.   Time
            - 3.2.4.4.   Ascent Rate
            - 3.2.4.5.   Descent Rate
        - 3.2.5. Your Saturation
        - 3.2.6. Simulate Dive
            - 3.2.6.1.   Depth
            - 3.2.6.2.   Time
            - 3.2.6.3.   Speed
            - 3.2.6.4.   Start
            - 3.2.6.5.   Cancel
    - 3.3. Gauge
        - 3.3.1. Alarms
            - 3.3.1.1.   Alarms
            - 3.3.1.2.   Depth
            - 3.3.1.3.   Time
            - 3.3.1.4.   Ascent Rate
            - 3.3.1.5.   Descent Rate
        - 3.3.2. Simulate Dive
            - 3.3.2.1.   Depth
            - 3.3.2.2.   Time
            - 3.3.2.3.   Speed
            - 3.3.2.4.   Start
            - 3.3.2.5.   Cancel
4. Pre-Dive Check
5. Dive Log
6. Display Settings
    - 6.1. Brightness
    - 6.2. Auto Dim
    - 6.3. Refresh
    - 6.4. Layout
    - 6.5. Velocity
    - 6.6. Stopwatch DF
    - 6.7. Dark Mode
    - 6.8. Show Hours
    - 6.9. Simulate Dive
        - 6.9.1. Depth
        - 6.9.2. Time
        - 6.9.3. Speed
        - 6.9.4. Start
        - 6.9.5. Cancel
7. Preferences
    - 7.1. Units
    - 7.2. Log Period
    - 7.3. Tap Sens.
    - 7.4. Tap Count
    - 7.5. Min. dive
    - 7.6. Min. SI
    - 7.7. Status
    - 7.8. Battery Type
        - 7.8.1. White ER144335M
        - 7.8.2. Blue ER17335M
        - 7.8.3. Green ICR1340
    - 7.9. Battery Meter
        - 7.9.1. Symbol
        - 7.9.2. Volts
    - 7.10.   Battery Test

8. Salinity
9. Time/Date
    9.1. 12h/24h
    9.2. Time
    9.3. Date
    9.4. Year

9.5. Calibrate Time
9.6. Exit
10. Connect to PC
11. Exit

USER AGREEMENT AND WARRANTY

Please go download our user agreement and warranty: http://liquivision.com/kaon_manuals.php. You must accept the User Agreement and Warranty in order to active the software and begin using your product. If you do not, you must return your unused product within 30 days.

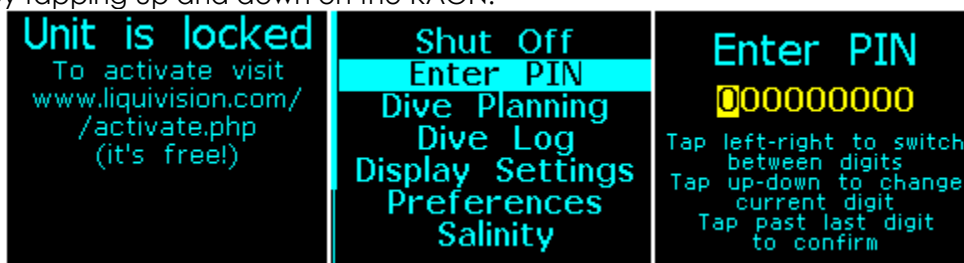## GETTING STARTED – BEFORE DIVING THE KAON

Turning the KAON on/off

To turn the unit on, simply install a new or charged battery and tap on the top three times. To turn the KAON off, select "Shut Off" from the main menu.

Register Your Unit/Activate Your Dive Software

To register your unit, you must visit: http://www.liquivision.com/activate.php. Before registration, you can navigate through your unit's menus, but it is not ready to dive. You will see the "Unit is locked" screen (below, left).

Once you enter your information and agree to our User Agreement and Warranty, you will be given a PIN number. Once you select the "Enter PIN" option you will be able to type this PIN into your unit by tapping up and down on the KAON.

Setup Time/Date & Battery Type

Once you have registered and unlocked your KAON unit, the main screen will still say "NOT Ready to Dive: Edit Your Time/Date, Battery Type". This information must be entered before the unit is dive ready. To do this, go to "date/time" on the main menu.

You will also need to set the battery to the type you are using. Please go to "preferences" and select "battery type" to select the correct battery. Battery types and names are below:

DISPOSABLE	RECHARGEABLE	
ER 17335M	LFP123A	ICR16340
1700mAh	530mAh	650mAh
Blue	White	Green

GETTING STARTED – FEATURES OF THE KAON

Battery Compartment

Color OLED Display

Front Bungee Holes

Front Strap Holes

Infra Red Aperture
(for connection to PC Interface)

Serial Number & CE Mark

MENUS

Tap 3 times on the top of your unit to enter the menus.

1 Shut Off

Tap left on this option to turn your KAON off.

2 LOCK/UNLOCK

This menu item allows you to lock all your menu settings so they cannot change accidentally, though you will still be able to tap through the menus.

To lock, just select the "LOCK" menu item and enter "123". Your KAON is now locked, and the menu item changes to "UNLOCK"

To unlock, just select "UNLOCK" and enter "123" once again.

When a unit is put in "LOCK" mode, the scrollbar will turn Red. Once you unlock, the scrollbar will turn back into green.

3 Dive Planning

This menu is devoted to planning your dive in Rec, Tec or Gauge mode. You will also be able to enter your gases, set up alarms, compute your No Deco Limit (NDL) or your ascent schedule. All modes use the Buhlmann model with ZH-L16C M-values.

3.1 Mode

3.11 Rec Mode

In Rec mode, the KAON functions as a one gas computer. The default mix is air. You can set up any mix from 21%-40% oxygen. The PO2 can only be set in Tec mode (see below).

The KAON will provide you with a NDL; the amount of times you can spend diving without incurring any decompression. If you complete your dive within the NDL period, the KAON will prompt you to perform a 3 minute safety stop at 5m/15ft. If at any time you drop out of this zone, the unit will reset the stop.

WARNING

ALWAYS dive base on sufficient gas remaining, NOT No Decompression Limit time remaining

Your KAON only provides decompression information
i.e. the amount of time you can dive with no decompression (your No Decompression Limit, NDL) or, if you exceed your NDL, the KAON will tell you your decompression plan

Your KAON does NOT provide information on "air-time remaining"
It is not connected to your tank in any way and does not provide any information about air-time remaining. You must use your submersible pressure gauge (SPG) to monitor the gas level remaining in your tank, and you should always ensure you have sufficient gas to complete your dive safely.

You should ALWAYS begin your ascent so you have sufficient gas to complete your dive
This may occur BEFORE your No Decompression Limit runs out.

3.12 Gauge Mode
In Gauge mode, the KAON acts as a bottom timer and provides information on dive depth and time. It does not keep track of your No Decompression Limit, decompression obligations or tissue saturation.

IMPORTANT NOTE ON SWITCHING TO/FROM GAUGE MODE
In Gauge Mode, surface off-gassing continues when the device is above water. Once the device is underwater, all deco calculations are suspended. When switching from Gauge Mode to Rec/Tec Mode, the deco information will no longer be accurate, since previous tissue values are used. When you switch out of Gauge Mode, you will see this warning:
Tap Left to continue.

** WARNING **
Deco information
no longer
accurate.
Previous tissue
values used.

3.13 Tec Mode
In Tec mode, the KAON allows up to three nitrox gas mixes, each from 21%-100% oxygen. The first mix will be your Dive Gas, the second and third will be Deco Gas 1 and Deco Gas 2.

In this mode the KAON assumes that you are planning to incur some decompression and allows you to control a number of additional settings. You can edit your conservatism by going to "Dive Setup", then "Conservatism". During the dive the KAON will display your NDL. If it is completed within the NDL you will be prompted for a 3 minute safety stop at 5m/15ft. If you dive beyond your NDL the KAON will calculate your decompression obligation and indicate the depth and duration of any necessary stops.

During your dive, the KAON will begin by displaying your No Decompression Limit (NDL). If you complete your dive within the NDL time, the KAON will tell you to complete a safety stop for 3 minutes at 5m/15ft. During these 3 minutes, if you drop below 6.5m/21ft, the safety stop counter will turn off and reset. It will begin again once you return to the safety stop depth of 5m/15ft.

Conservatism

Your KAON calculates No Decompression Limits (NDLs) or your decompression times based on the proven Bühlmann ZH-L16C[1] algorithm. This menu item allows you to add conservatism to the KAON decompression calculations using three pre-set levels:
Level "0" - standard Bühlmann ZH-L16C with no added conservatism (Gradient Factors 100/100)
Level "1" - Bühlmann ZH-L16C with some added conservatism (Gradient Factors 30/85)
Level "2" - Bühlmann ZH-L16C with more added conservatism (Gradient Factors 30/75)

PO2 dive

Here you can setup the maximum PO2 for your Dive Gas. This will define how deep your Dive Gas will still be considered breathable. The default (and maximum) value is 1.40. You can set it to any value between 1.0-1.40 bar, in 0.05 increments.

PO2 deco

Here you configure the maximum PO2 for your Deco Gas. This will define how deep your Deco Gas will still be considered breathable. The default (and maximum) value is 1.60. You can set it to any value between 1.0-1.6 bar, in 0.05 increments.
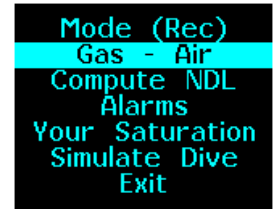
Last deco stop

Here you can set up the depth of your last decompression stop. The default value is 3m/10ft, but you can also set it to 6m/20ft, so you won't be affected as much by wave action during your last stop. Please note this will only affect the depth of you last decompression stop if you incur decompression during your dive. This will NOT affect the depth of the safety stop in a No Decompression dive (3 minutes at 5m/15ft).
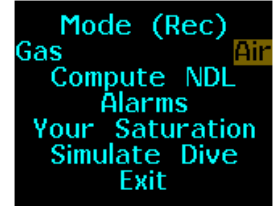
3.2 Gases (only in Rec & Tec Modes)

Here you can configure your one gas in Rec Mode, and up to three gases in Tec Mode.
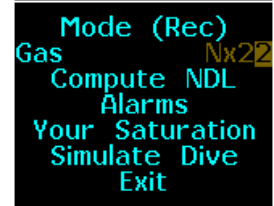
3.21 Rec Mode
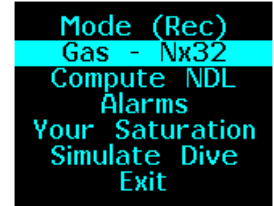
The default gas in Rec Mode is "Air":

To modify it, tap Left and the cursor will highlight the gas:

Then tap Up to increase the oxygen % to your desired value. The gas will switch from "Air" to 22%, then 23% and so on with each upward tap. The maximum value is 40%.
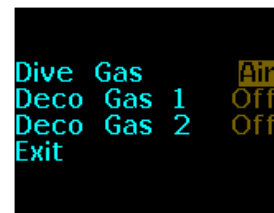
Once you have reached your desired value, say 32%, tap Left again and the value will be set.
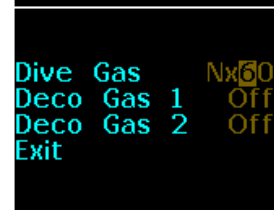
3.22 Tec Mode

The default Dive Gas in Tec mode is "Air".
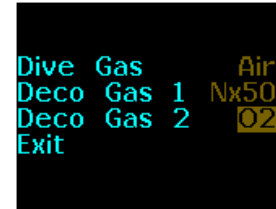The default setting for Deco Gas 1 & 2 is "Off"

In Tec-Mode you can increase oxygen% up to 100%. You can also increase it in increments of 10.

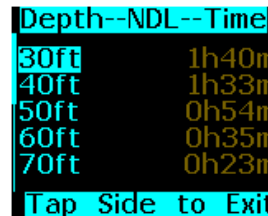By tapping into the various menu items, you could set up this sample gas setup:
Dive Gas: Air
Deco Gas 1: Nx 50
Deco Gas 2: O2

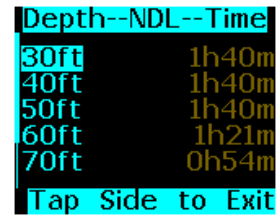### 3.3 Compute NDL (only in Rec & Tec modes)

This computes the No Decompression Limit you can expect at a given depth. The depth values can be provided in feet or metres, depending on the units you select in the Preferences menu of the KAON.

In Rec Mode, these values will only be affected by the gas you select:

In Tec mode, these values will be affected by the gases you select and the level of conservatism.

NDL on Air   **NDL on 36% Nitrox**

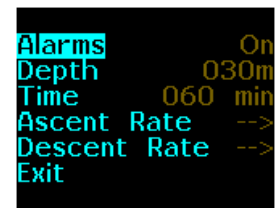### 3.4 Runtime (only in Tec mode)

In this section you can enter your dive plan and see what ascent schedule will KAON compute underwater, assuming that you follow the dive plan precisely. You can configure two types of waypoints:

- *Normal*: where you set a target Depth and a Time spent at that depth, and your KAON uses this information to create a dive plan
- *Switch*: where you set a target Depth and a Gas you want to switch to at that depth, and your KAON uses this information to create a dive plan

3.5 Alarms

Your KAON can display visual alarms when you exceed any of the following parameters:
- Maximum depth
- Maximum dive time
- Maximum ascent rate
- Maximum descent rate

When the alarm is activated for any parameter, that piece of information will start blinking on your screen for one minute. If you do not correct the situation within one minute, the parameter display will invert (i.e. it will appear as black letters on colored background) until you correct situation causing the alarm. Once you do that, the alarm will turn off.

The only exception is a time alarm. It will blink for 1 minute, after which it will go back to normal.

3.6 Your Saturation (only in Rec & Tec modes)

This menu item displays a screen with your current saturation calculated with the Bühlmann ZH-L16C algorithm. The information presented here takes into account data from dives you have actually completed.

```
CNS: 0%
OTU left: 850
Full desaturation
0h, 0min
Allowed pressure:
560mbar
approx. 4729m
```
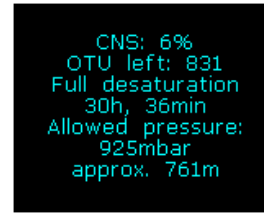
```
CNS: 6%
OTU left: 831
Full desaturation
30h, 36min
Allowed pressure:
925mbar
approx. 761m
```

Your Saturation screen after a period of no diving

Your Saturation screen after a deep dive

- Your current CNS (Central Nervous System) oxygen saturation
- OTU (Oxygen Toxicity Units) left for today
- Time to full desaturation from inert gases
- Your Allowed Pressure is a theoretical value, calculated with the Bühlmann ZH-L16C algorithm, which describes the lowest ambient pressure your body could tolerate without experiencing decompression sickness (DCS).
- The Altitude value is a translation of the allowed pressure into a theoretical maximum allowed altitude, which is based on average pressures at altitudes. As a rule of thumb, if the allowed pressure is 2400m or 8000ft, you should be able to fly on a commercial airliner, as this is the target cabin pressure. However, it is important to remember that a plane cabin can lose pressure for a variety of reasons and this could be a risk factor.

These numbers coincide with the Buhlmann algorithm. Following this information does not guarantee that you will avoid decompression sickness.

3.7 Simulate Dive

This option is here so you can experiment with ascent schedule calculations, gas switches, emergency modes, etc., without getting yourself or your KAON wet. When you enter "Simulation", it will open sub-menu asking you for depth and time of the dive, its speed and then you can select "Start".

4 Dive Log

The Dive Log keeps track of dives you did with your KAON, including their depth and temperature profiles. With use of a KAON PC Interface and related software you can download this information to your desktop or laptop.

The number of dives recorded by the Dive Log depends on the Log Period you select. The default setting is 10 seconds and on this setting you will be able to record approximately 1500 hours of dive time with one tank.
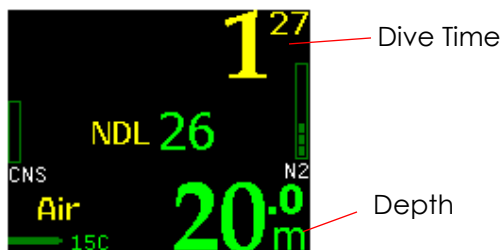
5 Connect to PC

Tap into this menu item before starting the download of your dive logs in your PC application of choice. Refer to its manual for more information.

If you tap into this item accidentally, don't worry – the wait for PC communication will time out after 30 seconds, and you will be back to main menu. Note that you don't have to select this option to update your firmware.

DIVE DISPLAYS
1 Basic Information

Dive Time

Depth

2 Battery Indicators

- If the battery icon is **yellow on the surface**, you should change your battery before beginning your next dive.
- If the battery icon is **yellow underwater**, you have enough battery life to complete your dive.
- If the battery icon is **red on the surface**, you MUST change your battery immediately.
- If the battery icon turns **red during your dive**, you should stop your dive and begin your ascent immediately, while still following proper ascent protocols (proper ascent speed, respect the Safety Stop)
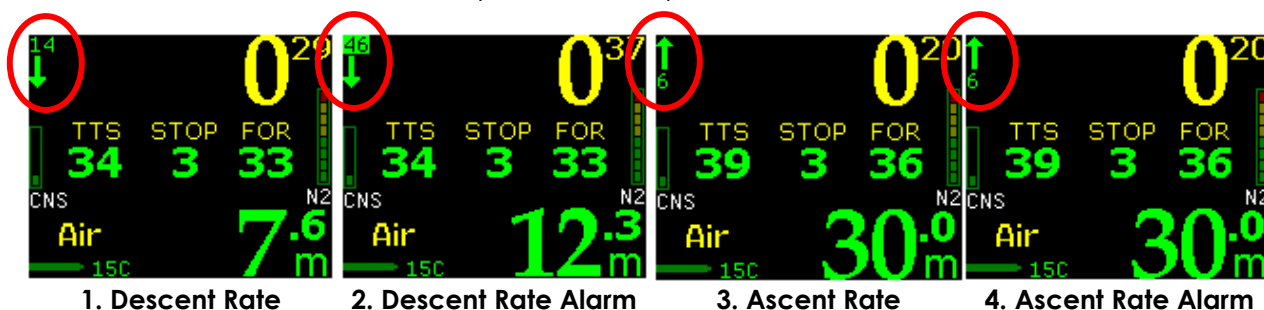
2.1 "Battery Savings" mode

In the event that your battery is very low during the dive, your KAON will go into "Battery Savings" mode. It is a mode that tries to preserve the battery as much as possible, so that the KAON keeps functioning as long as possible. This mode changes the following things:

- all the information on the display will turn green (the color that is most power-economical)
- the display brightness will be set to low

3 Ascent/Descent Indicators & Alarms

The KAON provides you with a number of graphical cues to help you manage your descent and ascent rates, based on the Alarms you have set up.

| 1. Descent Rate | 2. Descent Rate Alarm | 3. Ascent Rate | 4. Ascent Rate Alarm |

4 Decompression Stop Information

In certain modes, the KAON provides you with graphical cues to help you execute your decompression plan correctly.

The following screenshots show the deco stop information. The large "Up" arrow appears when you need to ascend to your next stop. The small "Up" arrows and starfish show that you are

arriving close to your next stop. Once the starfish shows fully in the box on your screen, it means you have reached your decompression stop depth. If you overshoot your decompression stop, i.e. ascend farther than you should, you will see small down arrows telling you to descend, and the decompression stop alarm will be activated (flashing depth).

The horizontal section in the middle of the screen is reserved for your No Decompression Limit or decompression information.

- NDL – No Decompression Limit is the maximum time you can stay at your current depth before you will incur a decompression obligation. You should NEVER exceed this time, unless you have specific training in decompression diving.

- Stop Depth/Time – These values will appear together once you reach your first/deepest decompression stop. The stop time is in minutes:seconds. If you are shallower than this stop, the depth value will blink to remind you to go deeper.

Diving within NDL Limit   **STANDARD: Deco Plan**   **GRAPHIC: Deco Plan**
                                      Showing STOP/FOR   **Showing STOP/FOR**

Deco Info Zone

STANDARD: At Stop   **STANDARD: At Stop**
Showing STOP   **Showing STOP**

5 CNS/N2 Loading

Your KAON offers a visual indicator of Central Nervous System (CNS) oxygen loading. The CNS information is being recorded and can be reviewed after your dive in the Dive Log.

Your KAON offers a visual indicator of Nitrogen (N2) loading. During the NDL (No Deco Limit) period, the N2 indicator will be green. As you exceed your NDL, the N2 indicator will add yellow and red bars. This means you have excess nitrogen that you must release through decompression. **You should not enter decompression unless you have adequate training and sufficient gas reserves to execute a decompression plan!**

6 Gas

The **gas** alarm will be displayed in the lower left corner of the screen, and it will blink when the gas you are breathing is not appropriate for some reason. The most common reason will be that you have exceeded the maximum allowable PO2 for your gas (PO2 is 1.4 in one-gas Rec mode)

The **PO2** alarm will be displayed in the lower left corner of the screen, and it will flash when you exceed the maximum allowable PO2 given the gas you are breathing. The PO2 setting is 1.4 in Rec Mode.
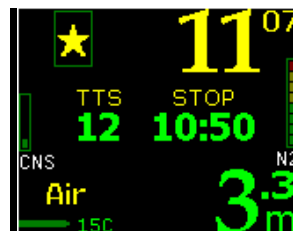
The **CNS** alarm will be displayed if you have exceeded your CNS limit. For more information on this alarm, please refer to the Oxygen loading section of the manual.

WARNING

You must change your battery immediately when the indicator turns red

Lithium batteries sustain high power for a long time, but once the power starts to drop, it does so very fast. A red battery indicator means that the battery power will drop to insufficient power within a few minutes.

---

7 TTS (Total Time to Surface) and Max Depth Display

If you turned the "Show TTS" or "Show MAX" features on in the surface Display Settings menu, you will see these values displayed on your screen. If you only selected one of them, it will appear continuously. If you selected both, they will alternate.

TTS

TTS: Your Total Time To Surface including decompression stops and assuming safe ascent rates

---

8 Exiting the water

Once you are shallower than 0.6 meters/2 feet, your KAON will go back into surface mode and offer you access to surface menus.

However, for next few minutes, it will remain in post-dive mode. You can control length of this period, in menu setting Minimum Surface Interval. This means that if you resume your dive within that period, it will be counted as continuation of previous dive, instead of a new one. This also means, that all the numbers, such as maximum depth, average depth, dive time, etc. will not be reset.

9 Last dive information

When on the surface, and not in Sleep Mode, your KAON will display information about the last dive that you have done.

Surface: time in hours and minutes since you last surfaced
Clock: current time of day
KAON Battery Icon

Last Depth: max depth of your last dive
Last Time: duration of your last dive

ALTITUDE COMPENSATION/SURFACE PRESSURE ADJUSTMENTS

Your KAON continuously tracks atmospheric pressure to determine the surface pressure at the start of your dive. When it senses a sudden change in ambient pressure, it understands that you have entered the water and that a dive is beginning.

Your KAON can generally distinguish between a sudden change in pressure caused by water entry, vs. other types of sudden changes in pressure, such as a plane taking off, or driving up a mountain.

You can always check what KAON assumes as the current surface pressure by going to the "Status" screen.

KAON PC INTERFACE

The KAON PC Interface can be used to download your dives and to update your KAON software.

- Connect the USB cable provided to your PC and to the PC Interface
- At this point, you should get a message "New Hardware Detected"
- Place the KAON unit on its side, with the PC interface aiming for the eight holes on the backplate
- The distance from the PC interface to the KAON should be 2-4 cm or 1-2 inches
- You need to install the drivers onto your PC in order to perform the update. Please see www.liquivision.com for more details.

CONTACT INFORMATION

200-3731 North Fraser Way
Burnaby, BC, Canada
V5J 5J2

(604) 299 0167
info@liquivision.ca
www.liquivision.com