QUANTUM

Nitrox Dive Computer

User's Guide

Contents

FOR YOUR SAFETY

All warnings and cautions are identified with the triangle symbol. Whenever you see a warning or a caution, read it carefully, as it may protect you from serious injury or damage to the product. Read the manual in its entirety before attempting to use the Quantum computer.

WARNING: Decompression sickness (aka, "the bends") is an inherent risk of SCUBA diving. Even if you properly follow all the instructions in this manual, and dive within the recreational limits of SCUBA diving, you still run the risk of getting decompression sickness, or some other inherent risk of SCUBA diving. Unless you are fully aware of these risks and are willing to personally accept and assume responsibility for those risks, do not use the Quantum dive computer

The Quantum, or any other dive computer, does not actually monitor changes that occur in your body as you dive. Rather, it is performing calculations using algorithms developed by leading decompression experts and backed by years of research and thousands of dives. However, these algorithms cannot account for factors like dehydration, fatigue, obesity, or poor physical conditioning. Therefore, always leave a comfortable safety margin in respect to no-decompression time and ascent speed. The computer is designed to ASSIST you in making a dive, not to CONTROL your dive.

WARNING: Using the Quantum will not prevent decompression sickness, but using it sensibly reduces this risk. You must accept that there is no device or procedure that will totally prevent the possibility of a decompression accident.

INTRODUCTION

Congratulations on the purchase of your new Quantum dive computer. As with all diving equipment, it is important to understand the features and functions of the Quantum. Before using the computer, read this manual in its entirety. Contained within this manual are illustrations to aid you in understanding the computer.

Section 1 instructs you on how to navigate through the Quantum's surface modes. Section 2 describes all the underwater displays and functions while diving with the Quantum. Lastly, Section 3 covers care & maintenance.

This manual will clearly and concisely instruct you on the use of the Quantum. However, if you have any questions on the material contained in this manual, please contact your nearest authorized dealer.

SECTION 1

Using the Quantum on the Surface

The Push Buttons

The Quantum has three buttons that allow you to access modes, change settings and switch displays. Throughout this manual, the buttons will be referred to as **MODE**, **A**, and **B** (see figure 1). The detailed function of each button is explained throughout this manual.

Figure 1. Push Buttons

The Mode Button

All the surface functions are accessed by pressing the MODE button. The Quantum has seven surface modes: TIME (time of day display), DIVE (dive settings), PLAN (plan mode), LOG (logbook memory), PROF (dive profile memory), PC (PC download) and SET (time and date settings).

Pressing the **MODE** button scrolls through the seven modes. As you scroll through the modes, the name of each mode is displayed at the bottom of the screen (see figure 2)

Figure 2.
Mode Names

In this section, each mode will be explained in the order it appears as shown in figure 2.

Time Display Mode (pre-dive)

The Quantum's default mode is the Time Display Mode (figure 3). The computer always returns to the time display after making a dive or exiting from one of the other modes, such as Plan Mode or Log Mode. If there is no button activity for several minutes while in another mode, the computer will automatically exit back to the time display.

Figure 3.
Time Display Mode

a. **Time of day**: Displayed in 12-hour or 24-hour format. The 24-hour format does not use AM and PM. For example, 15:45 is the same as 3:45 PM. Selecting the 12- or 24-hour format is explained on page 29.

b. **Seconds**: Seconds are displayed to the right of hours:minutes

c. **Date**: Displayed in month-day format.

d. Nitrox indicator: If the FO_2 for mix 1 or mix 2 has been set to 22% or higher, the Nitrox indicator will be displayed. See page 16 for more info on nitrox settings.

CAUTION: If the Nitrox indicator is flashing, it means that the Quantum has defaulted to 99% FO_2. You must reset the FO_2 to match the contents in your cylinder.

e. Altitude sector: If the Quantum detects that it is at altitude, it will display one to three altitude sector icons. The Quantum automatically adjusts for altitudes up to 19,680 ft. (6000 m). The following table lists the altitude sectors and their corresponding altitude range.

WARNING: When diving at altitude, make sure the altitude sector matches the actual elevation of the dive site, otherwise, the Quantum may display inaccurate information.

Note: When arriving at a new altitude sector, segments on the nitrogen loading bar graph may appear, even if you have not made a dive.

Sector	(none)				
Altitude Range	***Sea Level to 2624 ft (800 m)***	***2624 ft (800 m) to 5248 ft (1600 m)***	***5248 ft (1600 m) to 7872 ft (2400 m)***	***7872 ft (2400 m) to 19680 ft (6000 m)***	***Error. Icons flash above 19680 ft (6000 m)***

Backlight

To activate the backlight, press **A** or **B**. The backlight will stay on for 4 to 5 seconds.

Low Battery Indicator

When the battery power is too low for the computer to function properly, the Quantum displays a battery icon (see figure 4). When the battery icon is blinking, you can place the computer into PC Transfer Mode to download your dive profiles to a PC, but it will not enter dive mode. When the battery icon stops blinking, you cannot dive with the computer and will not be able to transfer to a personal computer.

Figure 4.
Low Battery Icon

Time Display Mode (post-dive)

After making a dive, the Time Display Mode shows additional information (figure 5):

Figure 5.
Time Display Mode
(post dive)

a. **Nitrogen Bar Graph**. The Nitrogen bar graph is a series of nine segments that graphically represent your body's residual nitrogen. During the surface interval, the Nitrogen Bar Graph starts to recede, indicating that you are off-gassing nitrogen.

b. **Oxygen Bar Graph**. The Oxygen Bar Graph is a series of eight segments that graphically represent your CNS clock. It tracks your exposure to higher partial pressures of oxygen when diving with enriched air nitrox.

c. **Desaturation Time:** Desaturation time is the amount of time it takes to release all the residual nitrogen left in your body from previous dives. Any dive made while there is still desaturation time remaining is considered a repetitive dive.

d. **Surface Interval Time:** Surface interval time is the amount of time since surfacing from a dive. It is displayed for 48 hours after the last dive.

e. **No Fly Icon:** The No Fly icon will stay on for a minimum of 12 hours after a dive. If desaturation time is greater than 12 hours, the No Fly icon will stay on until desaturation time reaches zero.

Wait-to-fly Guidelines

The Undersea and Hyperbaric Medical Society (UHMS) suggests that divers using standard air tanks and exhibiting no symptoms of decompression sickness wait 24 hours after the last dive to fly in an aircraft with a cabin pressure of 8000 feet (2438 m) or less. The two exceptions to this recommendation are:

1. Less than two hours of dive time in the last 48 hours, then wait 12 hours before flying.
2. Following a decompression stop dive, wait at least 24 hours or, if possible, 48 hours.

Both UHMS and Divers Alert Network (DAN) agree that there can never be a flying after diving rule that is guaranteed to prevent decompression sickness. Rather, there can be a guideline that represents the best estimate for a conservative surface interval for the vast majority of divers. There will always be an occasional diver whose physiological makeup or special diving circumstances will result in decompression sickness.

Dive Settings Mode

Dive Settings Mode allows you set all the parameters related to the operation of the computer during a dive. To enter the Dive Settings mode, press **MODE** until DIVE is displayed at the bottom of the screen.

Note: If the Quantum is in Gauge Mode, it will display GAGE instead of DIVE.

The buttons operate as follows:

1. Press **B** to change a setting. Press and hold **B** to rapidly scroll through the settings.
2. Press **A** to move to the next field.
3. Press **MODE** to save the settings and exit the mode.

The settings are listed below in the order that you can change them (see Figures 6 & 7). The setting that is being changed will flash.

a. **Operational Mode**: If set to DIVE, the Quantum will function as a complete dive computer and calculate no-decompression, decompression and oxygen related information. If set to GAGE, the Quantum will become a basic depth gauge and timer. If you make a dive in either DIVE or GAGE mode, you will not be able to change modes until desaturation time has reached zero. For more information on these modes, review Section 2, Diving with the Quantum.

b. **Nitrox Mix 1**: The FO_2 setting for Mix 1 may be set for Air (21%) to 50%. Please read the *Important Nitrox Note* on page 18.

c. **Nitrox Mix 2**: The FO_2 setting for Mix 2 may be set for Air (21%) to 99%. Please read the *Important Nitrox Note* on page 18.

Figure 6.
Dive Settings Mode (screen 1))

Figure 7.
Dive Settings Mode (screen 2)

d. **Maximum Operating Depth (MOD):** MOD is calculated automatically and is based on a PO_2 of 1.4 for Mix 1 and 1.6 for Mix 2.

e. **Safety Factor (SF)**: The safety factor may be set to 0, 1 or 2. When set to 0, the computer will perform calculations based on the current altitude setting. If set to 1, the calculations are made as though the computer was at one altitude sector higher. This adds in an extra level of conservatism.

f. **Profile recording interval**: The Quantum can record depth measurements every 15 or 30 seconds. If set to 15, memory capacity is cut in half.

g. **Water type**: Actual depth can differ based on the salinity of the water. If you are diving in a fresh water lake or river, set the Quantum to Fresh; if diving in seawater, set it to Sea.

h. **Depth Alarm**: If you exceed this depth, the Quantum will give you an audible warning.

i. **Depth Alarm On/Off**: Allows you to turn the Depth Alarm on or off. If set to ON, the icon will be displayed.

j. **Dive Time Alarm**: If your bottom time exceeds this setting, you will get an audible warning.

k. **Dive Time Alarm On/Off**: Allows you to turn the Dive Time Alarm on or off. If set to ON, the icon will be displayed.

IMPORTANT NITROX NOTE:

- ***If either mix is set to 22% or higher, the Quantum will default the FO_2 for that mix to 99% at midnight and display the mix as two dashes (- - %); if either mix is set to Air, it will stay set to Air indefinitely.***
- ***If mix 1 defaults to a 99% FO_2, it will be denoted by the flashing Nitrox label. This 99% default is built in to protect you from making subsequent nitrox dives with the wrong FO_2 setting. If you make a dive with the FO_2 set to 99%, an audible alarm will sound upon entering the water. Return to the surface and reset the FO_2 to the proper percentage. If you continue the dive, you will reach the PO_2 limit at about 20 feet (6 m). Again, return to the surface and reset the FO_2 to the proper percentage.***
- *If Mix 1 defaults to 99%, the no-decompression and decompression calculations will be calculated as though you were diving with normal air (79% nitrogen). Therefore, the Quantum calculates a worst-case scenario (99% Oxygen, 79% Nitrogen). At worst, the computer will be more conservative on subsequent dives.*
- *If only Mix 2 defaults to 99% (Mix 1 set to Air), you will only get an audible warning when entering the water. Upon hearing the warning, return to the surface and reset the Mix.*

Plan Mode

Plan Mode allows you to review the no-decompression time limits at various depths for the next dive. To enter Plan Mode, press the **MODE** button until PLAN is displayed at the bottom of the screen.

Note: If the Quantum is set to GAGE mode, PLAN mode is disabled.

In Plan Mode, the buttons operate as follows:

1. Press **B** to go to the next deeper depth-time combination.
2. Press **A** to go to the next shallower depth-time combination.
3. Press **MODE** to exit the mode.

In Plan Mode, the computer displays the following information (figure 8):

a. **Plan Depth**. The computer will display the plan depths in 3m/10 ft increments starting at 9m/30 ft and ending at 48m/160 ft.

Figure 8.
Plan Mode

b. **No-decompression limit (NDL)**. This is the maximum amount of time you can stay at the given depth before requiring mandatory decompression stops. If you set Mix 1 to 22% or higher and you exceed your Maximum Operating Depth (MOD), three dashes (- - -) will be displayed.

c. **Nitrox Mix 1.** You need to make sure the FO_2 accurately matches the actual breathing gas in your cylinder. (See “Dive Settings Mode” on page 15).

d. **Desaturation Time**. Only displayed on repetitive dives.

e. **Surface Time**. Only displayed on repetitive dives.

f. **Water Type.** Displays the selected water type, Sea or Fresh.

g. **Nitrogen Bar Graph**. Only displayed on repetitive dives.

h. **Oxygen Bar Graph**. Only displayed on repetitive dives.

Logbook Mode

The Quantum logs any dive that is at least 1.5m/5 ft., and has a dive time of at least three minutes. The Quantum's memory capacity is 30 hours or 60 logged dives if the sampling rate is set to 30 seconds. If the sampling rate is set to 15 seconds, the logbook capacity is cut in half to 15 hours or 30 logged dives.

When the memory is full, the newest dives will overwrite the oldest dives. The memory stays intact indefinitely, even after a battery change. It is strongly recommended, however, that you download all your dives and/or enter them into your logbook before changing the battery.

The Quantum logs more information than can be displayed on a single screen; therefore, the logbook displays two "pages" of information for each dive.

To enter the Logbook mode, press **MODE** until LOG is displayed at the bottom of the screen. Page 1 of the most recent dive is displayed.

In Logbook Mode, the buttons operate as follows:

1. Pressing **A** scrolls through the logbook pages from the most recent dive to oldest dive. e.g., 60-1 → 60-2 → 59-1 → 59-2 . . . 2-1 → 2-2 → 1-1 → 1-2.
2. Pressing and holding **A** rapidly scrolls back through the logbook pages from the most recent dive to oldest dive, e.g., 60-1 → 59-1 → 58-1 → . . . 3-1 → 2-1 → 1-1.

3. Pressing **B** scrolls forward through the logbook pages from the oldest dive to newest dive. e.g., 1-2 ➞ 1-1 ➞ 2-2 ➞ 2-1 . . . 59-2 ➞ 59-1 ➞ 60-2 ➞ 60-1.
4. Pressing and holding **B** rapidly scrolls back through the logbook pages from the most recent dive to oldest dive, e.g., 1-1➞ 2-1➞ 3-1 ➞ . . . 58-1 ➞ 59-1 ➞ 60-1.
5. Pressing **Mode** will exit Logbook Mode and go to Profile Mode.

Figure 8.
Logbook - Page 1

Figure 9.
Logbook - Page 2

Logbook Page 1 (*see figure 8*)

a. **Log Number:** This is the sequential number of the dive relative to all the other dives in memory. The higher the number, the newer the dive, i.e., dive 1 is the oldest dive in memory.

b. **Page Number:** The denotes whether page 1 or 2 is being displayed.

c. **Start time:** The time of day that the dive started. Displayed in 24-hour format.

d. **End time:** The time of day that the dive ended. Displayed in 24-hour format.

e. **Date:** The date the dive started.

f. **Dive time:** This is the total time spent below 1.5m/5 ft.

g. **Dive number:** The number of the dive made that day.

h. **NITROX indicator:** If the FO_2 was set to 22% or higher, the computer records that it was a nitrox dive.

i. **Mix Settings:** The FO_2 setting for Mix 1 and Mix 2 when dive was made.

j. **Residual nitrogen:** The residual nitrogen at the end of the dive. This is not displayed if it was a Gage Mode dive.

k. **Oxygen level:** The oxygen level at the end of the dive.

l. **Water type:** The water type setting when the dive was made.

m. **Altitude Sector:** The altitude sector when the dive started.

n. **Ascent Rate Indicator:** The fastest ascent speed recorded during the dive. If the maximum ascent rate was exceeded during the dive, the SLOW indicator will also appear.

Logbook Page 2 (*see figure 9*)

o. **Water temperature:** The temperature recorded at the maximum depth.

p. **Safety factor setting:** The safety factor setting when dive was made

q. **Average depth:** The average depth of the dive.

r. **Maximum depth:** The deepest depth reached during the dive

Recorded violations (*not shown*)

a. **Decompression:** If a decompression dive was made, the DECO label will be displayed; if the decompression stop was violated, the DECO label will flash.

b. **Fast ascent:** If the ascent rate was violated, the SLOW label will flash.

c. **PO_2 violation**: If you exceed the maximum operating depth for either mix, the PO2 label will flash.

d. **Out of range:** If a dive was made that exceeded the depth limit or at an altitude over 6000m/19,685 ft., the entire display will flash.

Profile Mode

In addition to the basic logbook data, the Quantum also records the dive depth every 15 or 30 seconds (*see Dive Settings Mode on page 15*). The Profile Mode plays back the profile so you can manually plot the dive profile. This profile information is also downloadable to a PC.

To enter the Profile Mode, press **MODE** until PROF is displayed at the bottom of the screen.

In Profile Mode, the buttons operate as follows:

1. Pressing **A** pauses the play back of the profile.
2. Pressing **B** scrolls back through the dives, e.g., 60 → 59 → 58 → . . . → 3 → 2 → 1
3. Pressing and holding **B** rapidly scrolls back through the dives.
4. Pressing **Mode** will exit Profile Mode and go to PC Transfer Mode.

Figure 10. Profile Mode

In Profile Mode, the Quantum displays the following information (*see figure 10*):

a. **Profile number:** This is the sequential number of the dive in memory.

b. **Dive time:** This is the minute display during the dive. If the profile recording was set to 30 seconds, you will see two depth readings for each minute; if set to 15 seconds, you will see four depth readings per minute.

c. **Depth:** The depth where the sampling occurred.

d. **Date:** The date the dive was made.

e. **Mix:** The mix setting used during the dive.

f. **Water Type:** The water type setting when the dive was made.

g. **NITROX indicator:** If the FO_2 was set to 22% or higher, the nitrox indicator is displayed.

PC Transfer Mode

You can download the logbook and profile data to a personal computer using the optional PC interface kit.

To enter the PC Transfer Mode, press **MODE** until PC is displayed at the bottom of the screen.

In PC Transfer Mode, the buttons operate as follows:

1. Pressing **A** has no function.
2. Pressing **B** has no function
3. Pressing **Mode** will exit PC Transfer Mode and go to Set Time Mode.

WARNING: The Quantum cannot enter Dive Mode while in PC Transfer Mode. You must exit this mode before attempting to dive. Otherwise, the computer will not perform any nitrogen or oxygen calculations, which may lead to serious injury or death.

Figure 11.
PC Transfer Mode

Set Time Mode

The Quantum records the time and date of each dive into memory; therefore, it is important to make sure that the time and date are set correctly. Remember to set the time after changing the battery or traveling to a different time zone.

To enter the Set Time Mode, press **MODE** until SET is displayed at the bottom of the screen.

The buttons operate as follows:

1. Press **B** to change a setting. Press and hold **B** to rapidly scroll through the settings.
2. Press **A** to move to the next field.
3. Press **MODE** to save the settings and exit the mode.

The settings are listed below in the order that you can change them (*see Figure 12*). The setting that is being changed will flash.

a. **Seconds**: Pressing the B button will reset the seconds to 00. If the seconds setting is 30 or higher when the button is pressed, it will also increment the minutes setting by one.

b. **Minutes.**

c. **Hours.**

d. Year.

e. Month.

f. Day.

After the time and date are set, the hours: minutes will start to flash indicating that you can toggle between the **12-hour and 24-hour format.** When set to the 24-hour format, the AM or PM label will disappear.

Figure 12.
Time Set Mode

Change Units of Measure

The Quantum allows you to change the units of measure from Imperial (feet, °F) to Metric (meters, °C), or vice versa.

1. Press **MODE** until DIVE is displayed at the bottom of the screen (Dive Settings Mode).
2. Press and hold both **A & B** for 5 to 6 seconds. An audible alarm will sound and the depth display will switch to the new metric or imperial setting.
3. Press and hold **MODE** to exit directly back to the Time display.

Section 2

Diving with the Quantum

WARNING: Never use the Quantum unless it has been with you since the first dive. Using a "clean" computer (no residual nitrogen) after you have already made a dive(s) may result in the computer allowing you more no-decompression time than you really have. In addition, never share or swap computers. Any of these practices may result in decompression sickness.

Pre-Dive Checklist

Before making a dive, it is important that you make sure you go through the following checklist:

1. Make sure the time and date is set correctly. Remember, the Quantum records the time and date of each dive into memory.
2. Check the Altitude sector and make sure it matches the altitude of the dive site.
3. Go into Dive Settings Mode (page 15) and make sure all the parameters are set correctly, including the water type, safety factor, profile recording interval, and FO_2 settings for mix 1 & mix 2.

4. Go to Plan Mode (see page 19) and review your no-decompression time limits.
5. GO DIVING.

Automatic Activation

At the top of the Quantum are two water contacts (see figure 13). When the water contacts are submerged, the computer automatically enters Dive Mode. The automatic activation features works when the Quantum is any of its surface modes except for PC Transfer Mode.

Figure 13.
Water Contacts

WARNING: The Quantum cannot enter Dive Mode while in PC Transfer Mode. You must exit PC Transfer Mode before attempting to dive. Otherwise, the computer will not perform any nitrogen or oxygen calculations, which may lead to serious injury or death.

Testing the water contacts

You can test this feature by wetting your finger and touching the water contacts. The computer should enter Dive Mode and display a 0 depth reading. If the computer doesn't go into dive mode, it is possible that the contact needs to be cleaned. You can clean the contact with warm, soapy water and a soft-bristle brush.

No-decompression Dive Mode

The Quantum has a primary dive display and an alternate display that you can access with a press of a button.

The buttons work as follows:

1. Pressing and holding **B** shows the alternate display. When the button is released, the computer switches back to the primary display.
2. To switch nitrox mixes, press and hold **A** for 3 to 4 seconds.

Note: The mix cannot be changed if it will cause the PO_2 to exceed 1.6 or if the mix is in its default setting (displayed as - -%). See page 37 for more information.

3. To activate the backlight, press any button. Pressing **MODE** will activate the backlight but not switch any displays.

Primary Display (*see figure 14*)

a. Current Depth: How deep you are at any moment during the dive.

b. No-decompression limit (NDL): The amount of time you can stay at the current depth before requiring mandatory decompression stops.

c. Dive Time: How long you have been below 5 feet (1.5 meters).

d. PO_2: The calculated PO_2 based on depth and FO_2.

e. **MIX indicator:** Which mix is currently being used.

f. **Ascent Rate:** Graphically shows your ascent speed.

g. **Nitrogen Bar Graph:** Graphically shows your body absorbing and eliminating Nitrogen. The bar graph has nine rectangular segments. When the last segment appears, you have gone beyond the no-decompression limit and now require mandatory decompression stops.

h. **Oxygen Bar Graph:** Graphically shows your exposure to an elevated partial pressure of Oxygen (PO_2). The bar graph has eight segments. When the eighth segment appears, you have reached 100% of the CNS clock.

Figure 14.
Dive Mode - Primary Display

**Press and hold for 2 to 3 seconds*

i. **Nitrox symbol:** Only displayed if FO_2 is set to 22% or higher. Does not appear if set to Air.

j. **Water Type:** Shows it the water type is set to fresh water or sea water.

Alternate Display

Pressing the **B** button shows the alternate display (figure 15):

a. **Maximum depth:** The deepest depth reached during the dive.

b. **Temperature:** The actual water temperature at that time. Since the temperature sensor is inside the computer, it may take a few minutes before you get an accurate reading.

c. **FO_2**: The FO_2 setting for Mix 1 and Mix 2.

Figure 15.
Dive Mode - Alternate Display

Safety Stop

Whenever you make a dive deeper than 10m/33ft., then ascend above 6m/20 ft., the Quantum will display a three minute safety stop countdown. Ignoring the safety stop will not penalize you, however, it is highly recommended that you perform the complete three minute safety stop before surfacing from the dive.

Figure 16.
Safety Stop Display

a. **Safety stop time:** Safety stop time is shown in min'sec. It starts at 3'00 and counts down to 0'00. If you descend below 6m/20ft., the countdown is paused until you ascend to 6m/20ft. If you descend below 10m/33ft., the safety stop will reset to 3:00 when you return to 6m/20 ft.

b. **Safety stop indicator:** Denotes that time below it is the safety stop time.

c. **Safety stop alert:** Displayed at the bottom of the screen to alert you that you should perform a safety stop.

Switching Nitrox Mixes

Note: Instructions for setting Mix 1 and Mix 2 are found on page 15 & 16.

To switch between Mix 1 to Mix 2, press **A** for 3-4 seconds. When the **A** button is initially pressed, the Quantum will show the new no-decompression limit (NDL) and PO_2 based on the mix being selected. For example, if the Quantum is set to Mix 1 and you press the **A** button, it will show the NDL and PO_2 based on Mix 2.

If the PO_2 is below 1.6, the Quantum will allow the switch to the new mix; however, if the PO_2 is 1.6 or higher, the PO_2 and **PO2** label will flash and the Quantum will not allow the switch.

If the mix is set to default (- - %), the Quantum will not allow the switch to the new mix.

Decompression Dive Mode

If you exceed the no-decompression time limit, you will be required to make mandatory decompression stops. The computer will automatically switch from No-Decompression Dive Mode to Decompression Dive Mode. In Decompression Dive Mode, the Quantum displays the following information:

a. **Decompression indicator:** This denotes that the computer is in Decompression Dive Mode

b. **Stop depth:** This is the shallowest depth to which you can ascend. DO NOT ascend above this depth until the computer displays the next shallower decompression stop, or the computer returns to No-Decompression Dive Mode.

c. **Stop time:** This is the amount of time you need to spend at the decompression stop.

Figure 16.
Decompression Dive Mode

d. **Total ascent time:** This is the total amount of time required at all the decompression stops, plus the time it takes to ascend to all the stops.

e. **DECO alert:** Displayed at the bottom of the screen to alert you that you are in Decompression Mode.

Summary of Warnings and Alarms

FO_2 Warning

If you enter the water when the computer has defaulted to a 99% FO_2, the computer will sound an audible alarm. Immediately surface and set the FO_2 to the proper Oxygen percentage.

Fast Ascent Warning

The Quantum uses a variable ascent rate. The fastest allowable rate of ascent is dependent upon the depth. The table below shows the three depth ranges and the fastest ascent allowed in each range:

Depth Range	Ascent Rate Limit
0-20 ft (0-5.9 m)	26 ft (8m) per minute
21 to 59 ft (6 to 17.9 m)	39 ft (12m) per minute
60 ft (18m) or deeper	52 ft (16m) per minute.

If you exceed the fastest allowable ascent rate, the Quantum flashes the SLOW symbol, sounds an audible alarm, and flashes the current depth. The warning will remain in effect until you slow your ascent or go shallower than 5 feet (1.5m).

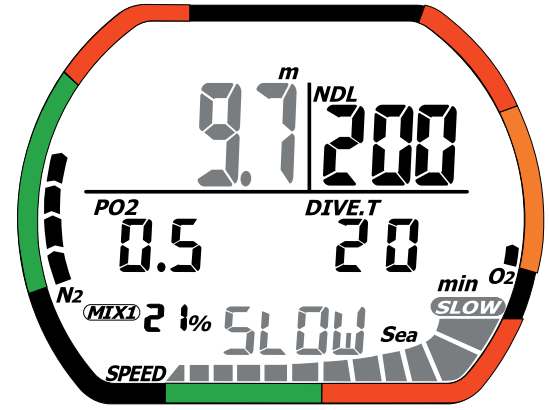


Figure 17.
Fast Ascent Warning
(grey segments flash)

PO_2 Warning

When Mix 1 reaches 1.4, the computer will sound a 3-second alarm twice and flash the PO_2 indicator, PO_2, and depth. If Mix 1 or Mix 2 reaches 1.6, the OLI graph will also flash. The alarm will continue to flash until you ascend to a safer, shallower depth.

NOTE: If the PO_2 warning activates at 20 feet, you forgot to reset the FO_2 and the computer is using the 99% default.

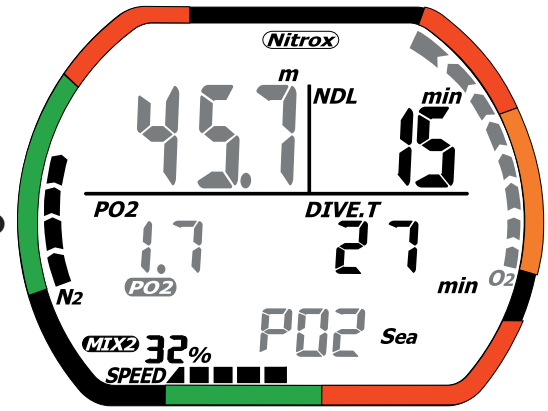


Figure 18.
PO2 Warning
(grey segments flash)

Decompression Stop Violation Warning

If you ascend shallower than the required decompression stop, the Quantum will alert you by flashing the DECO label, current depth, deco stop depth, and deco stop time. This warning will remain in effect until you descend to, or slightly deeper than, the decompression stop depth.

If you ignore the decompression stop and surface, the computer will lock out for 48 hours, five minutes after surfacing.

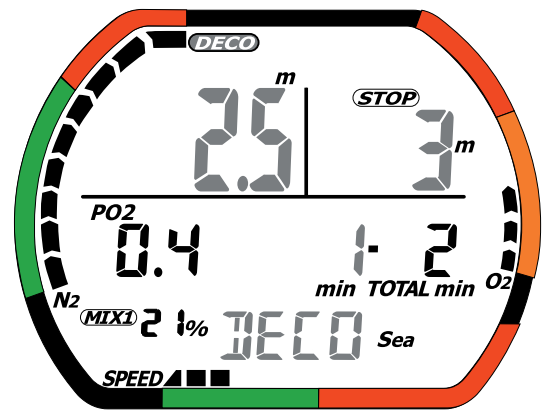


Figure 19.
Deco Stop Violation Warning
(grey segments flash)

Oxygen Limit Warning

When the next to last segment appears, the Quantum sounds an audible alarm for 3 seconds and flashes the bar graph for 10 seconds. When the last segment appears, the audible alarm will sound for three seconds, but the entire bar graph will flash until you ascend to a shallower depth and the bar graph reduces to seven segments.

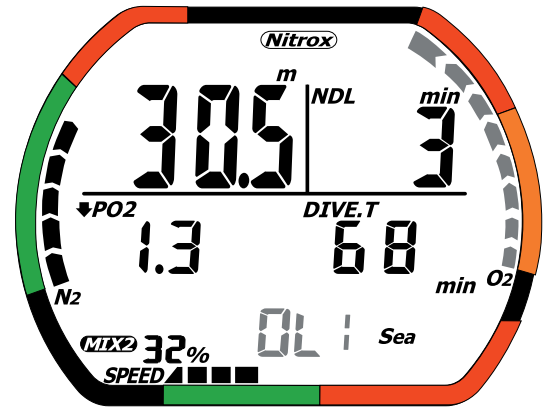


Figure 20.
Oxygen Limit (OLI) Warning
(grey segments flash)

Out-of-Range Warning

The out-of-range warning only occurs when you take the Quantum to extreme depths and/or time limits. To activate the out-of-range warning, you must exceed one of the following limits:

1. Maximum depth limit of 100m/328 ft.
2. Dive time limit of 599 minutes.
3. Deepest decompression stop of 27m/90 ft.
4. Decompression stop time of 99 minutes.
5. Total ascent time of 999 minutes.

In the extremely unlikely event that you exceed one of the limits listed above, the computer will sound an alarm, replace the depth display with dashes, and flash the entire display. The computer cannot be used for 48 hours after an out-of-range warning.

Gage Mode

If the Quantum is set to Gage Mode (see Dive Settings on page 15), the computer operates as a basic depth gauge and dive timer. It does not calculate no-decompression, decompression, or oxygen information. If you make a dive while in Gage Mode, you must wait 48 hours until you can use Dive Mode.

Gauge Mode, like Dive Mode, has a primary display and an alternate display. Pressing and holding **B** shows the alternate display. When the button is released, the computer switches back to the primary display.

To activate the backlight, press any button. Pressing **MODE** will activate the backlight but not switch any displays.

Figure 21.
Gage Mode - Primary Display

Primary display

a. **GAGE Mode indicator:** Alerts you that the Quantum is in Gage Mode.

b. **Current Depth:** How deep you are at any moment during the dive

c. **Dive Time:** The amount of time below 1.5m/5 ft.

d. **Ascent Rate:** Graphically shows your ascent speed.

e. **Water Type:** Shows if the water type is set to fresh water or sea water.

Alternate display

a. **Temperature:** The actual water temperature at that time. Since the temperature sensor is inside the computer, it may take a few minutes before you get an accurate reading.

b. **Maximum Depth:** The deepest depth reached during the dive.

Figure 22.
Gage Mode - Alternate Display

System Reset Button

On the backside of the Quantum is the System Reset Button (see Figure 23). Pressing this button erases all residual nitrogen/oxygen information, and it resets the time and date to it's default setting. This feature is primarily used by dive shop rental departments. You are strongly cautioned never to use this feature.

WARNING: All memory of nitrogen and oxygen loading is erased when you press the Reset Button. If you press the Reset Button between dives, you must wait 24 hours before diving again. Otherwise, you may increase the risk of decompression sickness.

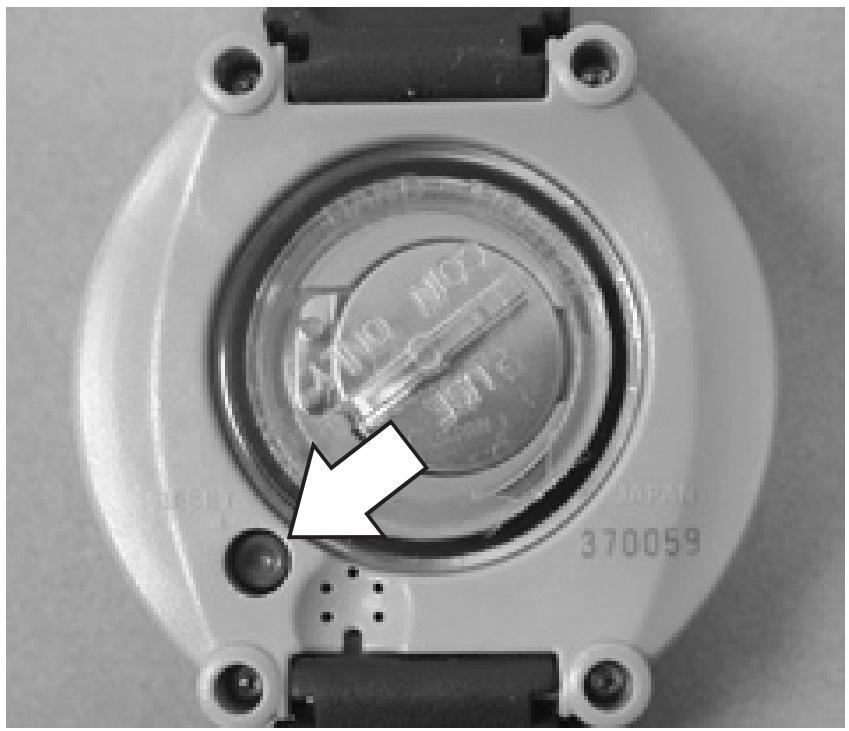


Figure 23.
System Reset Button

CARE & MAINTENANCE

The Quantum is a tough and durable instrument, but it still needs to be protected from excessive shock, extreme heat, chemical attack, and tampering.

CAUTION: Do not store the Quantum near chemicals, such as gasoline. Do not use silicone sprays or any other type of propellants near the Quantum. Do not clean the computer with alcohol or any other solvents. Exposing the Quantum to chemicals and solvents may damage the lens and case.

Care before the dive

The Quantum can withstand the normal bumps associated with SCUBA diving, however, it cannot withstand the impact of heavy objects, such as a weight belt or SCUBA cylinder. Do not leave it exposed where someone could accidentally step on it or drop something on it.

Care during the dive

The most common damage inflicted on a computer while diving is scratches in the lens. If the Quantum is worn on the wrist, you must be careful when reaching into rocky holes and crevices to avoid scratching the computer. If you have the Quantum in a gauge console, secure the gauge close to you body so the gauge doesn't get dragged over coral and rocks. It is highly recommended that you purchase a third-party gauge retainer and secure the console to your buoyancy compensator.

Care after the dive

Soak the Quantum in a warm, fresh water bath to dissolve salt crystals. Rinse thoroughly with fresh water and towel dry before final storage. Store the computer in a cool, dry and protected place. Do not store the computer in a wet or humid environment. Doing so may cause the unit to go into dive mode and prematurely drain the battery.

Changing the Battery

IMPORTANT NOTE: The Quantum will not lose its logbook memory when the battery is replaced; however, it is recommended that you record all your logbook information and upload the data to your PC (if you have the optional PC interface kit) before changing the battery.

Whenever you see the low battery symbol, you should immediately change the battery right. It is also recommended that you change the battery before any extended, multi-day dive trip.

CAUTION: Damage from improper battery replacement is not covered under warranty. It is advisable to have your authorized dealer perform the battery replacement. At the same time, the dealer can perform an inspection to make sure the computer functions properly.

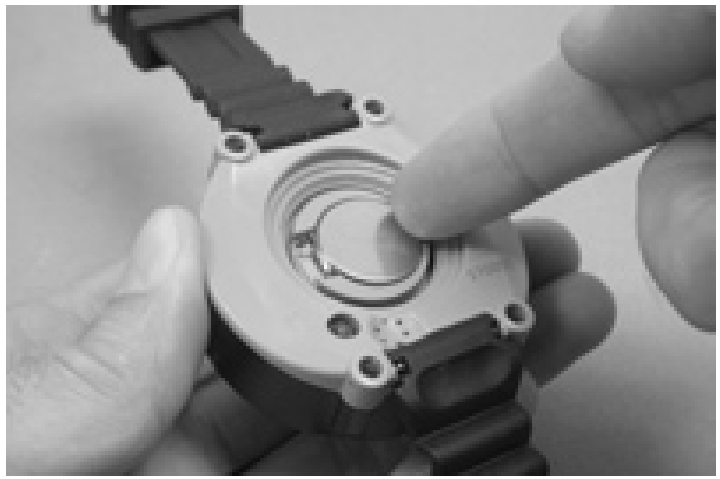
WARNING: All memory of nitrogen and oxygen loading is erased when the battery is removed. If you change the batteries between dives, you must wait 24 hours before diving again. Otherwise, you may increase the risk of decompression sickness.

Battery Removal and Replacement

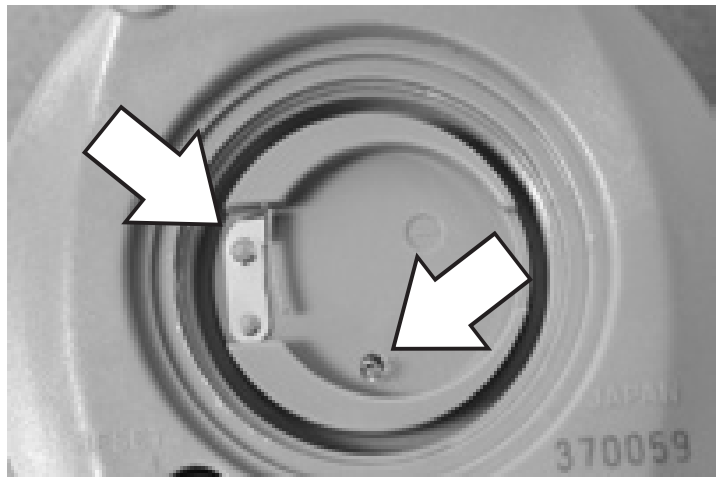
Note: Replace the battery in a dry, clean environment, taking extreme care to prevent moisture and dust from entering into the battery compartment.

1. Using a coin (never use a screwdriver), turn the battery hatch counter clockwise and remove it from the case.

2. Using your fingers, remove the O-ring from the battery hatch and discard. Do not use any tools to remove the O-ring.



3. With your finger, lift up on the edge of the battery opposite the gold contact and remove the battery.

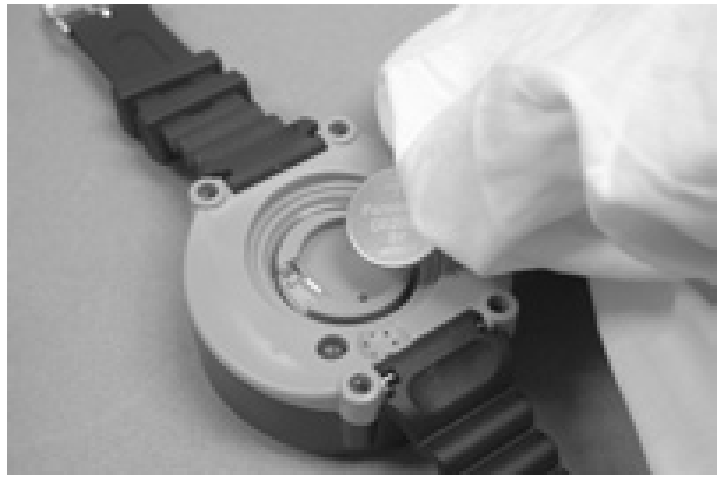


4. Inspect the gold contact and small spring contact for signs of bending, breakage or corrosion. If you find any signs of damage, return the unit to your authorized dealer and do not attempt to use it.

5. Using a clean, dry, lint-free cloth, wipe the sealing area of the battery compartment. Inspect to make sure it is completely clean and dry.

Note: It is recommended that you do not handle the new battery with bare fingers, as skin oils may impair the electrical contact. Handle the battery with a lint-free cloth or wear gloves.

6. The Quantum uses a CR2032 3v lithium coin cell battery. The new battery is installed with positive (+) side facing upward. Insert the battery at a slight angle so the edge pushes against the gold contact, then press the battery into place.



7. Lightly lubricate a new O-ring using a food-grade silicone grease, such as Dow Corning 111. This grease is available at most dive shops. Do not overlubricate. Install the new O-ring onto the battery hatch. Carefully thread the battery hatch into the case in a clockwise direction until snug. Using a coin, tighten the battery hatch until it can no longer be turned.

8. After the battery is changed, the time and date will be incorrect. Reset the time and date by following the procedures on page 28. Go through all the surface modes to make sure they are working properly. Reset the Dive Settings if necessary. Wet your finger and touch both contacts to make sure the unit goes into dive mode.

TECHNICAL SPECIFICATIONS

Accuracy

Time	Average monthly variance ±30 seconds
Depth	±3%+0.5m (±3%+2 ft.)
Temperature	±2.0°C (±4°F)

Measurement Range

Depth	Dive Mode: 0 to 99.9 msw (0 to 328 fsw) Gage Mode: 0 to 199 msw (0 to 656 fsw)
Dive Time	0-599 minutes
Altitude	0 to 6000 m (0 to 19680 ft); measured every 10 minutes
Temperature	-5 to 40°C (23 to 104°F); measured once per minute

Nitrox Settings

Mix 1	FO2: 21 to 50% in 1% increments
Mix 2	FO2: 21 to 99% in 1% increments
PO2 Limits	1.4 for Mix 1; 1.6 for Mix 2

Operational Limits

Waterproof limit	99.9 msw (328 fsw)
Operational Temperature	-5 to 40°C (23 to 104°F)

Battery

Battery Type	CR2032 (3v lithium coin cell)
Battery Life	3 years based on 50 one-hour dives per year and 10 seconds of audible alarms per dive.

Physical Dimensions

Diameter	62mm (2.44 inches)
Thickness	25mm (.98 inches)
Weight	115 g (4.1 oz)

Algorithm

Type	Modified Swiss model by Randy Bohrer
Number of Tissue Compartments	12

Apeks Marine Equipment, Ltd.
Neptune Way, Blackburn, Lancashire, England. BB1 2BT

Tel. +44 (0) 1254 69220 Fax: +44 (0) 1254 692211

E-mail: info@apeks.co.uk Website: www.apeks.co.uk