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Printed in JAPAN

3224500031

1995.07.01

apollo computer gauge

DiveAdvisor

instruction manual



Introduction

Thank you for buying the Apollo DiveAdvisor computerized gauge. The DiveAdvisor is easy to use, and offers highly advanced functions that will help make your diving safer and more enjoyable.

Make sure you read this manual thoroughly, and follow the instructions. If there is something you don't understand, ask at the shop where you made your purchase.

DANGER, WARNING and CAUTION Indications

To ensure your safety, it is important you read and understand the manual thoroughly before using this product. Make sure you follow all warnings and cautions contained in this manual. Failure to do so could lead to an accident or decompression sickness (the bends).

The following warning and caution symbols are used in this manual, and indicate degree of danger. Explanations flagged by one of these symbols cannot prevent all possible accidents, but do permit you to use the product safely, if you properly follow instructions in this manual. Apollo cannot be held liable for any accident, onset of decompression sickness or other occurrence caused when using this product.



Indicates the possibility of a highly dangerous situation that could lead to death or serious injury.



Indicates the possibility of a dangerous situation that could lead to death or serious injury.



Indicates the possibility of a danger that could lead to a minor injury or an injury of some consequence. The symbol is also used to indicate the possibility of material damage.

Avoiding Danger

- It is extremely important that scuba divers using this product have undergone theoretical and practical training given by an internationally-recognized entity providing diving instruction. Due to safety considerations, those who have not obtained a C Card (attesting to completion of training) from an entity providing diving instruction must not use this product. (This does not apply to those using the product during training, under the supervision of an instructor attached to an entity providing diving instruction.) Amateurs lacking knowledge of basic scuba diving techniques risk serious injury or death.
- Never scuba dive alone. Always dive under the buddy system. Diving alone is extremely dangerous, and could lead to a serious injury or death.

Taking Care

- Make sure you are in good physical condition before you scuba dive. If you begin to feel cold, tired or unwell, do not overexert. Stop your dive.
- Never take alcohol or medicine (especially a nasal douche or medicine for a cold) before scuba diving. Those who are in poor physical shape or suffer from some chronic ailment should consult a doctor before considering diving.

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1. multi-level diving

a. Bends

Humans have been breathing the air in the earth's atmosphere since they were first born. When scuba diving, we merely breathe the air which is compressed to the same pressure as the pressure in the water, so the atmosphere itself does not lead to decompression sickness. What does lead to decompression sickness, then? The cause is the shift in pressure. In particular, the cause is the decompression that occurs when moving from a location of one pressure to a location of a lower pressure.

Take, for example, a single can of carbonated beverage. In carbonated beverages, a large amount of carbonated gas is dissolved by high pressure into the original liquid. When sealed, the pressure in the can does not change and the carbonated gas remains dissolved, not fizzing and emerging from the can. However, when the seal is broken, the surrounding pressure suddenly drops and only the reduced pressure portion of the carbonated gas stays dissolved while the remainder fizzes and emerges from the can.

The same phenomenon occurs when scuba diving. The liquid from carbonated beverage is comparable to blood from the body while carbonated gas can be likened to nitrogen. If a person breathes air under pressure at certain depth for a long period of time, the body absorbs nitrogen at a level that balances with the depth. If the person rapidly surfaces, the body reaches a state like the open can of carbonated beverage. Bubbles start to form in different places in the body. These bubbles interfere with the flow of blood and adversely effect the cells, causing various symptoms. This is decompression sickness.

b. Preventing decompression symptoms

The term, "recreational diving," refers to diving in a no- decompression zone. Nevertheless, pressure changes can result in decompression symptoms. For example, after completing your dive in a non-decompression zone, you might move to higher altitudes (one extreme case would be flying in an airplane), giving ample reason to assume the possibility of decompression symptoms. Take special care when considering going to higher altitudes (particularly by air) after a dive.

c. Concept and characteristics of the multi-level method

Traditionally, the dive tables of the U.S. Navy have been used for diving. These standards set the maximum depth at those depths and determine the length of time a person can dive without experiencing decompression according to the depth of the dive and length of dive time. The figures developed for diving operations (Figure 1) were generally adapted to recreational diving without consideration to changes in diving depths.

Recreational divers, however, rarely remain at the same depth for extended periods of diving. On the contrary, they generally move between various depths (Figure 2).

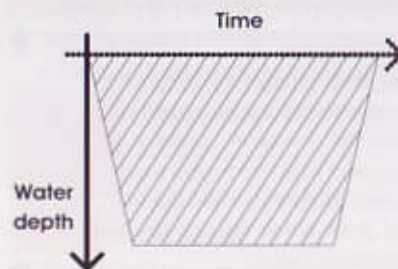


Figure 1

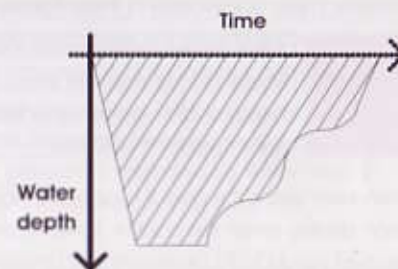


Figure 2

It has been theoretically shown by Dr. A.A. Buhlmann of Switzerland that if divers make real time calculations of the nitrogen content in their bodies and confirm that it is within no-decompression limits, their diving will be safer and more in conformity to actual diving. However, according to this theory, the no-decompression limit is different depending on the systems within the body; for example, blood, nerves, bones, internal organs and brain. It is necessary to calculate these limits repeatedly and in great detail, and to measure and compare how far each system is over the no-decompression limits. These calculations produce massive figures and require advanced computers. Micro computers with advanced functions emerged with the recent development of the semiconductor industry, making it possible to manage more processes at faster speeds even at low power. As a result, small computer gauges were developed and DiveAdvisor was born. For the multi-level method, DiveAdvisor makes computer simulations of the conditions of each system of the body based on the depth (pressure) at the time, and real time calculations are made in response to changes in water depth and even altitude changes after the dive has finished.

2. Cautions about diving using the multi-level method

Regarding the Warning and Caution Signs in This Manual

For the diver's safety, he/she should always pay strict

attention to all caution and warning items regarding safety.

Failure to obey these warnings to prevent dangerous situations

may lead to accidents and/or diving sickness.

The figures forming the standards for multi-level calculations are determined according to a large amount of data, not all of which necessarily applies to all divers. There are always individual differences between divers. DiveAdvisor is developed for recreational diving, making it possible for most divers to safely dive as long as they observe the figures. However, mere observance of these figures does not guarantee the safety of all divers.

WARNING Divers should never conduct repetitive dives that require decompression stops, push the limits for non-decompression diving, or dive in any other way that may lead to the possibility of decompression sickness.

DiveAdvisor warns the diver if he/she is in danger of decompression when the bar graph display enters the caution zone. When the bar graph enters the caution zone, the diver should try to begin surfacing immediately to ensure safety.



Caution zone

3. Before using DiveAdvisor

DiveAdvisor calculates decompression through the use of an algorithm developed by Mr. C. Randy Bhorer based on the research and theory of Dr. A.A. Buhlmann. DiveAdvisor should only be used by divers who have completed a certified scuba diving course. It should not be used by persons without scuba diving training or persons without knowledge of the possible dangers of scuba diving. Furthermore, DiveAdvisor should not be used until this instruction manual has been carefully read and understood.

WARNING The DiveAdvisor computer may be used for decompression diving; however we recommend that recreational divers stay within no decompression limits. Additionally we do not recommend DiveAdvisor be used by professional divers for decompression diving.

- Decompression calculations automatically start when there are altitude shifts. Until adjustments are made to these altitudes, decompression calculations continue.

WARNING The necessary information for safe diving is provided by a visual display warning. However, the results of the displayed decompression calculations are based on data in which water pressure is replaced by water depth. Therefore, each diver should establish a dive plan that is safe for him/herself.

- When diving becomes extremely dangerous due to reduced battery power or when the altitude exceeds the measurement range to make decompression calculations impossible, the switch to diving mode becomes impossible, serving as a warning to the diver.

WARNING DiveAdvisor is designed for use by a single diver. Never lend it to another diver.

- DiveAdvisor is a precision electronic instrument. It could become defective if subjected to strong impacts or vibrations, or stored at high or low temperatures.
- A special tool is needed to exchange batteries. Have this done at the shop where you made your purchase. Malfunction or damage thought to have resulted from battery exchange or removal of back lid by the customer him/herself is not subject to guarantee and therefore should be avoided.
- When exposed to direct sunlight, locked in a car or otherwise exposed to heat, the display becomes difficult to read. This does not indicate malfunction. However, this has a direct impact on the life of the functions, so DiveAdvisor should not be exposed to such conditions.

4. DiveAdvisor functions

a. DiveAdvisor specifications

- **Water depth measurement** :Second by second sampling
0.0 m – 99.9 m (0 ft – 328 ft)
- **Diving time measurement** :0 – 599 minutes
- **Altitude measurement** :10 – minute sampling 0 – 3000 m (0 – 9800 ft)
- **Temperature measurement** :Second by second sampling
-5 °C – +40 °C (23 °F – 104 °F)
- **Calendar function** :1995 through to 2100
- **Watch mode** :Indicates time (in minutes, hours, day, month and year).
DiveAdvisor will return automatically to watch mode 48 hours after a dive.
- **Display of possible no-decompression dive time before diving.**
- **Display of possible remaining no-decompression dive time while diving.**
- **Surfacing speed warning**

Water depth	Surfacing speed / Ascent rate warning
From 0.0 m (0 ft) – 5.9 m (19 ft)	= 8 m (26 ft) per minute
6.0 m (20 ft) – 17.9 m (59 ft)	= 12 m (39 ft) per minute
18.0 m (60 ft) –	= 16 m (52 ft) per minute
- **Display warning when shifting to decompression diving**
- **Display of depth and time when stopping decompression**
- **Total surface time display**
(Total of stop time at each stop depth and total of surface time at 8 m (26 ft) / per minute)
- **Warning against violation of decompression instructions**
- **Warning when outside of measurement range**
 - :Enter display screen blinks
 - Depth measurement of 100m (328 ft) or deeper
 - Diving time measurement of 600 minutes or more
 - When decompression stop is needed at decompression stop depths of more than 15 m (49 ft).
- **Display showing residual nitrogen in body**
 - :Indicated by bar graph and elimination time display.
- **Battery life display** :Indicated by bar graph; battery (CR3032) life about 7 years.
- **Battery change indicator** :Battery mark flashes.
- **Dive log mode** :Memory contains data for a maximum of 10 dives.
- **Time adjustment**
- **Use temperature range** : -5 °C – +40 °C (23 °F – 104 °F)

b. Introduction to DiveAdvisor functions

1. Advanced functions are easy to use

Detailed measurements can register new values every second for depth, every 10 minutes for altitude, and every minute for water temperature. Battery life about 7 years (calculated at 50 dives per year). Designed with simplicity in mind: the display is extremely easy to read. Operations are easy to understand and push buttons allow quick easy recognition.

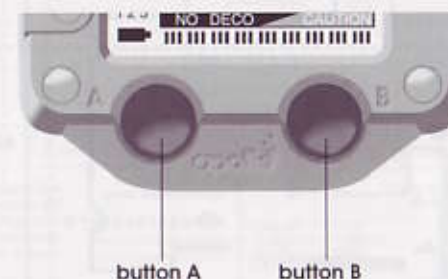
2. Excellent range of log functions

The log records a wide variety of information: date, entry time, exit time, bottom time, maximum depth, water temperature (at maximum depth and upon completion of dive), average depth, total number of dives, and data related to different cautionary messages. The memory uses the latest technology to record data on up to 10 dives, so is useful for long dive tours.

3. Ultra-new battery checker

Older battery checkers were very much subject to irregular operating conditions, i.e. temperature changes and differences in solid materials used in batteries. The innovative battery checker installed in the Apollo DiveAdvisor computerized gauge calculates the number of times used and the number of dives, counting down to give you a value not affected by extraneous factors. Battery strength is indicated by a bar graph, allowing you to verify at a glance remaining power before setting out on a long trip.

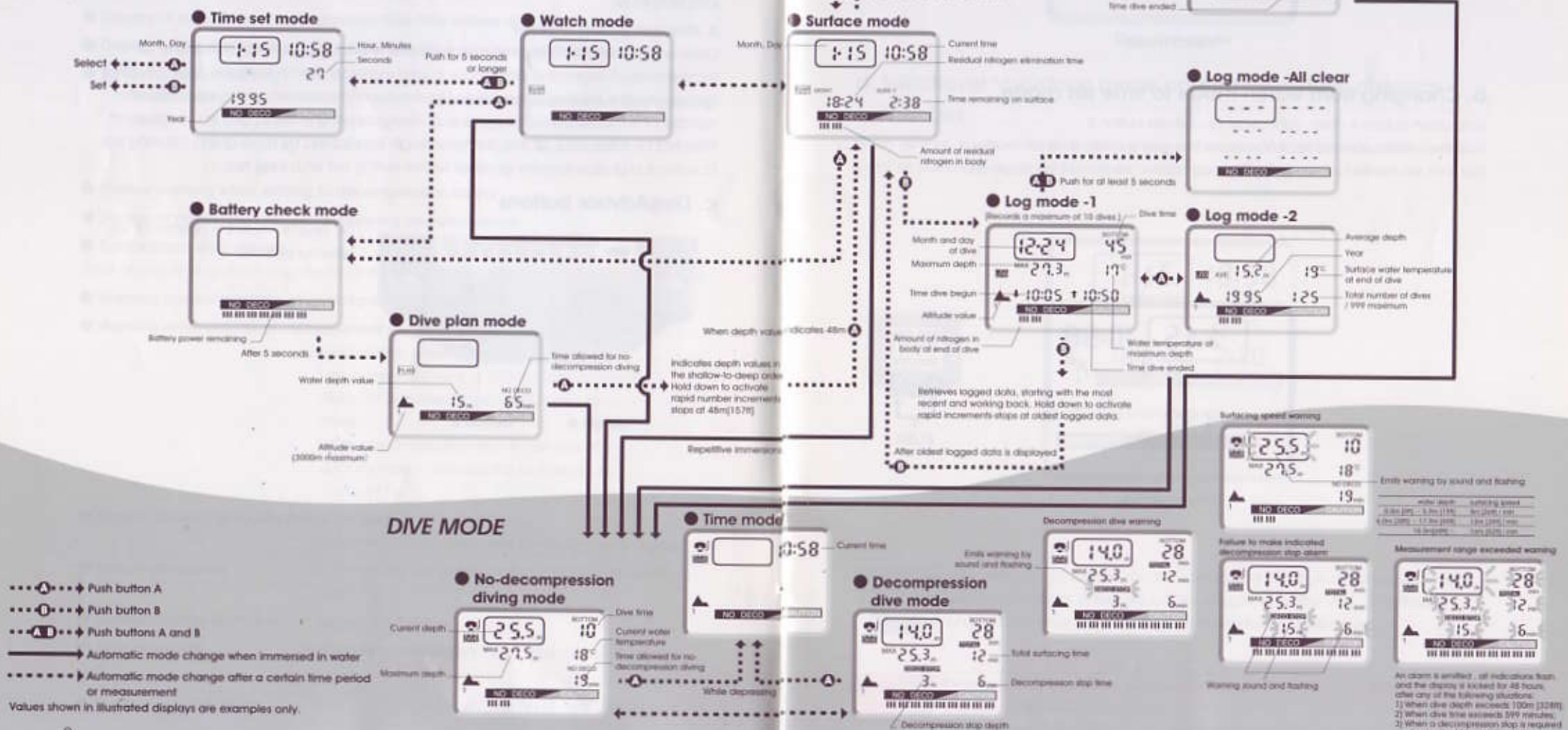
c. DiveAdvisor buttons



"A" and "B" mark the position of two selector buttons.

d. Manual and automatic mode changes

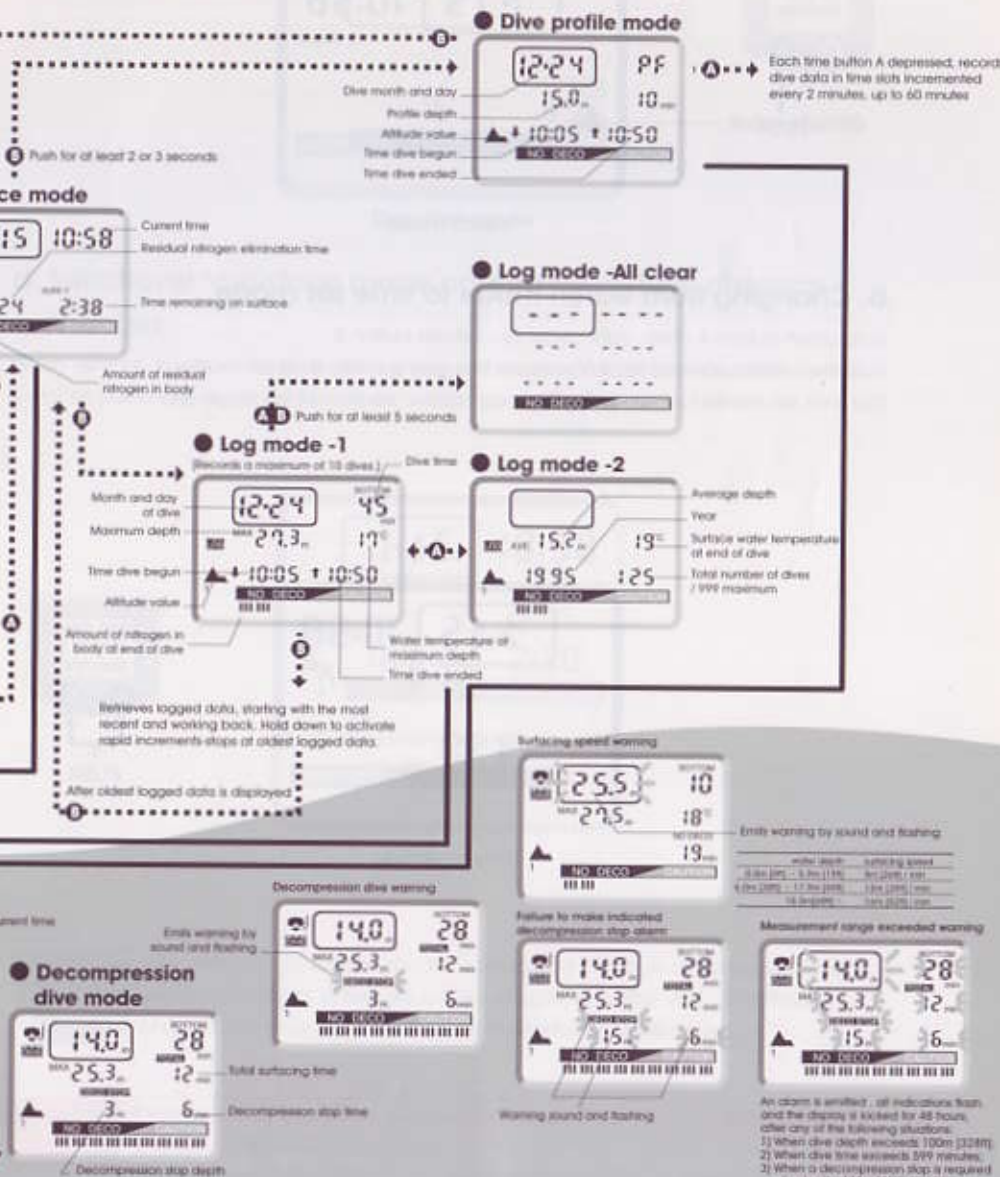
DiveAdvisor is equipped with 8 different modes. It will switch from one mode to another either through manual operation or automatically. Mode changes are prompted in 3 different ways: (1) after you push button A or B; (2) when immersed in water; and (3) after a certain period of time has passed, or after needed calculations and data displays are completed. The flow chart below illustrates mode changes.



e. Mode types

- 1) Watch mode
- 2) Battery check mode
- 3) Dive plan mode
- 4) Log mode
- 5) Dive profile mode
- 6) Dive mode
- 7) Surface mode
- 8) Time set mode

The explanatory flow chart shows paths followed when modes change.



5. Watch mode

a. Mode display

Watch mode is the mode seen normally. The display continually updates the current month, date, hour, minute and altitude value.



b. Changing from watch mode to time set mode

Hold down button A, then, right away, hold down button B.
Hold them both down at least 5 seconds. This gets you into time set mode.
(For time set mode functions, see "time set mode," section 11 on page 30.)



c. Changing from watch mode to dive plan mode

Push button A, passing through battery check mode to dive plan mode.



d. Switchover to surface mode caused by vertical distance changes

When vertical distance measurements cause a change in the altitude value, the mode switches automatically to surface mode, initiating decompression calculations.



After switching to surface mode, calculations continue until residual nitrogen in your body adapts to the altitude value achieved after vertical distance change. Time on the surface is registered for up to 48 hours.



CAUTION If you begin diving when in the watch mode, DiveAdvisor registers this change as repeated immersion.

6. Battery check mode

Mode display

You can enter battery check mode from watch mode or surface mode by pushing button A. Battery check mode uses a bar code indicator to show remaining power, and a battery mark which shows when it is definitely time to change the battery.

The bar code indicator shows up to 9 blocks, demonstrating remaining battery power:

- (1) 9 blocks indicate plenty of power;
- (2) 2 blocks or less indicate battery is low;
- (3) When no blocks are indicated, the battery mark will flash. Battery absolutely must be changed without delay. If it is not, the mark will, after time, stop flashing and remain illuminated.

Due to safety considerations, when the mark remains illuminated you cannot switch into the dive mode.

No matter what mode you are in, the battery mark will be seen, either flashing or constantly illuminated.



1) No need to change battery

2) Battery low

3) Have battery changed

Battery life approximations (calculated at 1 hour per dive)

Number of dives per year	Battery life
50	approx. 7 years
100	approx. 4 years
200	approx. 2 years
300	approx. 1.5 years

[Note] Battery life values indicated here are by no

means fixed -- estimates vary according to use and other factors.

Regard these values as approximations only.

WHAT TO DO

As soon as the indicator blocks are few in number, take the DiveAdvisor to the store where you bought it, to have the battery changed.

CAUTION

Before any dive, be sure to enter battery check mode, to check whether the battery is strong enough.

The DiveAdvisor battery must be changed with special equipment.

If anyone other than an Apollo representative removes the back cover or changes the battery, damage or some unforeseen circumstance could result.

When the battery is changed, information (logged data, total number of dives, and dive profile data) is erased, so first record all such data elsewhere.

7. Dive plan mode

a. Mode display

When in surface mode or watch mode, push switch A. Battery check mode will be displayed for 5 seconds; then DiveAdvisor moves into dive plan mode. This mode indicates the number of minutes you can do no-decompression diving, in accordance with your present altitude. Indications are for a depth range of from 9~48.0m [30~157ft], in 3m [9ft] increments.



In this example, you can dive for up to 200 minutes at a depth of 9m [30ft]. (200 minutes is the maximum value displayed, even in cases where longer dives are possible.)



In this example, you can dive for up to 105 minutes at a depth of 12m [39ft].



In this example, you can dive for up to 66 minutes at a depth of 15m [49ft].



In this example, you can dive for up to 47 minutes at a depth of 18m [59ft].



Depth values are changed by pushing button A.

There are 14 depth values: [9m / 12m / 15m / 18m / 21m / 24m / 27m / 30m / 33m / 36m / 39m / 42m / 45m / 48m] [30ft / 39ft / 49ft / 59ft / 69ft / 79ft / 89ft / 98ft / 108ft / 118ft / 128ft / 138ft / 148ft / 157ft]



If entering dive plan mode with nitrogen remaining in the body after a dive, the nitrogen content in the body at that point is indicated in the bar graph. Note that this is not the nitrogen content when diving is assumed to have taken place. Plan your dive within a time slot shorter than the maximum possible time indicated for no-decompression diving.

b. Changing display values

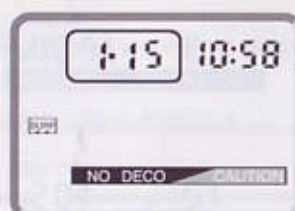
Depth values are indicated in the shallow-to-deep order. Hold down to activate rapid number increments -- maximum depth value given is 48m. When display shows 48m [157ft], and when you are on the surface, depressing button A will take you to surface mode; at all other times, depressing button A will take you to watch mode.



Dive plan mode



Surface mode



Surface mode

When in the water during dive plan mode, DiveAdvisor automatically shifts to dive mode.



Dive plan mode



Dive mode

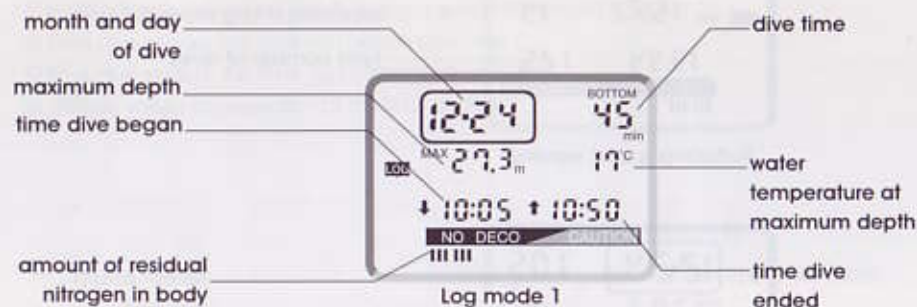
WARNING Whether a repeated dive or high-altitude dive, DiveAdvisor automatically calculates time allowed for no-decompression diving based on the nitrogen remaining in the body. For safe diving, make efforts to plan a dive that offers more leeway than the time allowed for no-decompression diving.

8. Log mode

a. Mode display

When in watch mode or surface mode, push switch B to move into log mode.

- 1) Button A lets you navigate between log mode 1 and log mode 2.
- 2) To clear all logged data, first, hold down button A, then, right away, hold down button B. Hold them both down at least 5 seconds.



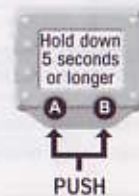
[Total number of dives]
Automatically registers the total number of dives undertaken to date, to a maximum of 999.

surface water temperature at end of dive
average depth

total number of dives



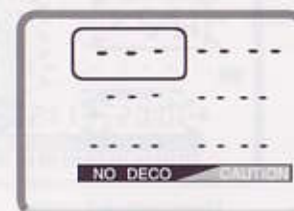
PUSH



PUSH



1) Log mode 2



2) All clear

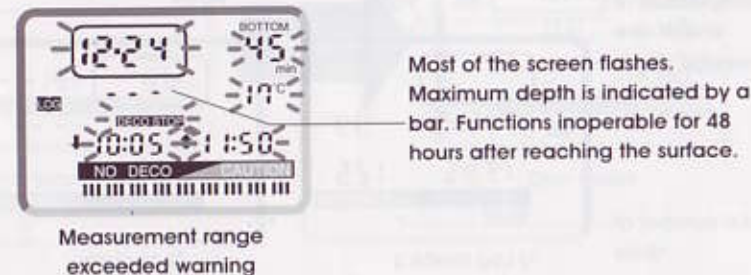
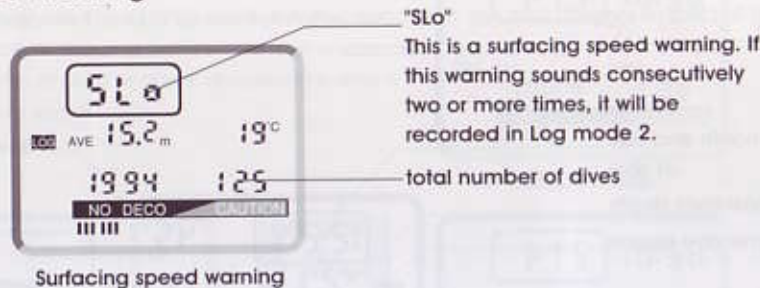


Memory can hold data on the last 10 dives. A "dive" is counted if you are under water at least 5 minutes at a depth of at least 1.5m [5ft]. Push button B to retrieve logged data, starting with the most recent and working back. Hold down button B to activate rapid increments -- the display will stop at the oldest logged data. At the oldest logged data, push button B to enter surface mode.



CAUTION When clearing the logged data with "all clear," or when having the battery changed, all logged data (including total number of dives and dive profile data) is erased, so store this information elsewhere beforehand.

b. Surfacing speed warning, failure to make indicated decompression stop alarm, and measurement range exceeded warning



Any of the above warnings indicate the risk of an accident or decompression sickness.

c. How data is logged

The dive with the highest number is the latest one. Once data for 10 dives is recorded, any subsequent dive will be placed in memory, deleting logged data for the oldest dive.



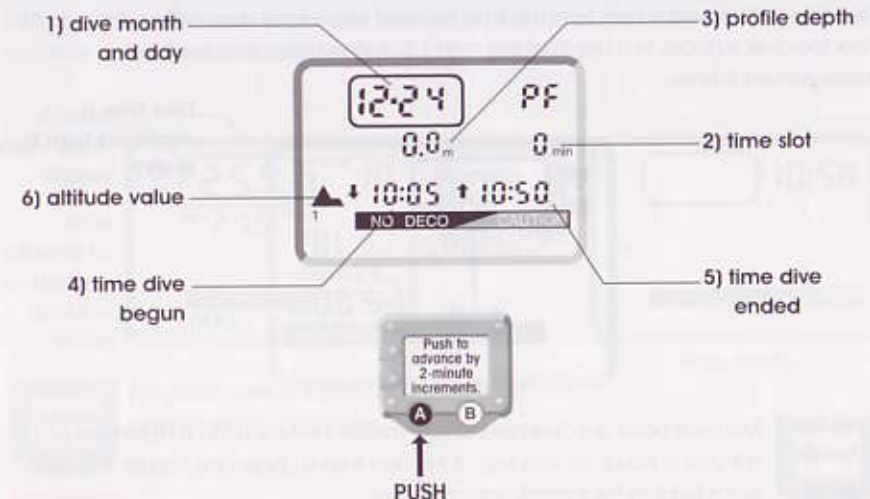
Logged data is displayed starting with data for the last dive, then working back. Any dive lasting at least 5 minutes at a depth of at least 1.5m [5ft] is instantly recorded, and available for retrieval.

9. Dive profile mode

a. Mode display

The dive profile mode displays a profile of your most recent dive. To get into dive profile mode, hold button B down for at least 3 seconds while in the watch mode or surface mode. Depress button A to scroll dive data in time slots incremented every 2 minutes, up to 60 minutes. The following data is recorded:

- 1) dive month and day: date of dive
- 2) time slots: time slots during dive, at intervals of 2 minutes
- 3) profile depth: maximum depth during a specific 2-minute time slot
- 4) time dive begun: the time you began your dive
- 5) time dive ended: the time you completed your dive
- 6) altitude value: the elevation at the time of dive



All previously recorded profile data will be deleted the next time you dive to a depth of at least 1.5m [5ft] (even when breath-hold diving), so that new data can be input. Make sure you store any needed information elsewhere beforehand.

10. Dive mode

a. Current dive depth

Dive depth is displayed in units of 0.0 m (0 ft) up to 99.9 m (328 ft). When the water depth is less than 1.5 m (5 ft), 0.0 m (0 ft) is displayed.



b. Dive time (bottom time) display

Dive time is displayed in units from the time the diver submerges deeper than 1.5 m (5 ft). After the diver surfaces to a depth of less than 1.5 m (5 ft) deep, the dive time measurement finishes.



Function: Measurements are displayed at one minute intervals up to a maximum of 599 minutes (9 hours, 59 minutes). If the dive time is under one minute, it is not recorded into the log memory as a dive.

CAUTION If 10 minutes has not passed between dives, the interval time is added to the previous dive time and dive time measurements begin again.

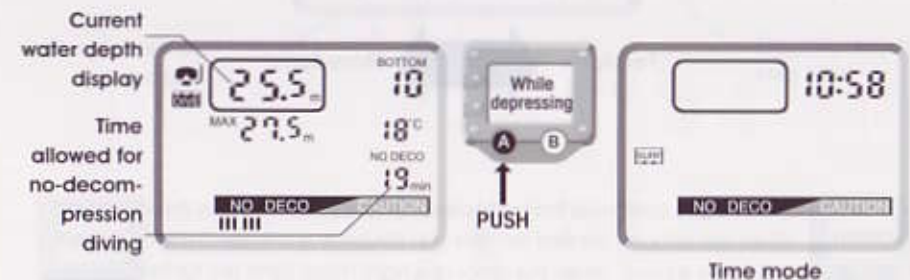
c. Maximum dive depth

For maximum dive depth, MAX and M marks are displayed.



d. Indicated time allowed for no-decompression diving

The time allowed for no-decompression diving is displayed (in minutes) just below the "NO DECO" mark, which is also displayed. To return to dive mode, first depress button A to get into time mode, then release button A.



Function: No-decompression dives at current depth are possible within 19 minutes.

CAUTION If no-decompression dive time displays 200 MIN, there is still 200 minutes or more of no-decompression dive time remaining (201 minutes or more is not displayed).

Reference	<Display>	<Actual no-decompression dive time range>
	<200MIN>	(200 minutes or more)
	<2MIN>	(2:59 - 2:00)
	<1MIN>	(1:59 - 1:00)
	<0MIN>	(0:59 - 0:00)

WARNING The indicated time allowed for no-decompression diving is the result of calculations made of the amount of residual nitrogen in your body. These calculations do not take into account such factors as the amount of air left in your tank. Always remain aware of how much air you have.

10. Dive mode

e. Bar graph display for nitrogen remaining in the body

The nitrogen content remaining in the body is displayed by bar graph.



Few lights ↔ Many lights

Display The nitrogen content in the body can be visually confirmed by the bar graph. When the nitrogen content remaining in the body is low, few lights on the bar graph are lighted. When the amount is high, many lights are lighted.

Function This enables you to confirm the nitrogen content in your body while diving or at rest and makes it possible to plan safe dives. The display continues even after finishing your dive until the nitrogen remaining in your body is eliminated.

WARNING The bar graph does not show the time for the elimination of the nitrogen remaining in the body.

The figures in the illustration are hypothetical numbers for the purpose of explaining DiveAdvisor functions. The numbers may be different when actually used.

f. Decompression dive mode

If you exceed the period allowed for a no-decompression dive, the "DECO STOP" mark flashes, all 9 blocks of the bar graph are illuminated, and the alarm sounds for 10 seconds. The display then switches to decompression dive mode, indicating decompression stop depth, the decompression stop time for that depth, and total surfacing time.

Once you have followed the instructions up to the final decompression stop, the "DECO STOP" mark, the decompression stop depth indicator and the decompression stop time indicator will disappear, and the mode will return to no-decompression diving mode.



Display This means that at 3 m, there is a need to execute a decompression stop for 6 minutes.

WARNING Decompression stops should be conducted at the instructed depths and times. However, make sure to note the amount of air remaining. Never conduct a decompression stop at a depth lower than instructed. If ocean conditions prevent you from observing the instructions for decompression depth, decompress at a depth of 1 m (3 ft) – 2 m (7 ft) deeper. In such an event, more time than usual is needed for decompression.

g. Total surface time display

When shifting to a decompression dive, the total amount of time to surface is indicated.



Total surface time



If the total surface time reads 12, it means that a total of 12 minutes is needed including decompression stops to surface from the current depth to the surface of the water.



WARNING

Total surface time indicates the total of stop time at each decompression stop point and the time to surface from the current depth to the surface of the water. Assuming correct decompression, total surface time is calculated as one minute even when it is possible to surface under one minute from the current depth. Therefore, the maximum marginal error is one minute.

h. Surfacing speed warning

Surfacing speed depends on depth, and warnings are made accordingly.

If your surfacing speed exceeds that permitted by DiveAdvisor, the current depth indicator will flash, and an alarm will sound for 5 seconds. Once you achieve a safe speed, or are within 1.5m [5ft] from the surface, the current depth display will stop flashing.

Flashes for 5 seconds.



注意

CAUTION

The fact that a surfacing speed warning was made will be recorded as part of the log's data, and displayed when the log mode is accessed. (See "Surfacing speed warning" in section b on page 17.)

Warning standard surface speed

Water depth

(Ocean water standard)

From 0.0 m (0 ft) – 5.9 m (19 ft)

6.0 m (20 ft) – 17.9 m (59 ft)

18 m (60 ft) –

Surfacing speed/

Ascent rate warning

= 8 m (26 ft) per minute

= 12 m (39 ft) per minute

= 16 m (52 ft) per minute

i. Failure to make indicated decompression stop alarm

If your current depth is less than the indicated decompression stop depth, the "DECO STOP" mark, the decompression stop time indicator and the decompression stop depth indicator will all flash, and the alarm will sound for 10 seconds.



DANGER

If these warnings are given, dive immediately to the decompression stop depth indicated. If you ignore the warnings and surface, the decompression display will continue to flash, constantly warning that you risk an onset of decompression sickness.

Warnings are given when you are in a zone shallower than the indicated decompression stop depth. These warnings will stop when you return to the indicated depth. If you fail to return to the indicated depth, warnings will continue for 5 minutes, after which the DiveAdvisor will stop functioning, remaining in the "failure to make indicated decompression stop alarm" status. Once in this status, DiveAdvisor cannot be used for 48 hours. The display will show decompression stop time and total surfacing time, but these are only value indicators. (48 hours later, DiveAdvisor will return to surface mode.)



The fact that there was a failure to make an indicated decompression stop will be recorded as part of the log's data, and displayed when the log mode is accessed. (See "failure to make indicated decompression stop alarm," in section b on page 17.)

j. Measurement range exceeded warning

In any of the following cases, you will have exceeded the range of measurement. As a result, all displays will flash, and the alarm will sound for 10 seconds.

- When dive depth exceeds the measuring range (99.9 m (328 ft) or deeper)
- When dive time exceeds 599 minutes
- When decompression stop instruction depth is 15 m (49 ft) or deeper



DANGER

Under outside measuring range warning conditions, DiveAdvisor remains flashing to warn the diver that the possibility of the decompression sickness is great.

This type of diving must be avoided.

At these times, NDL and decompression stop time are displayed, but these are only aims, not precise measurements. DiveAdvisor cannot be used for 24 hours after surfacing. The entire screen flashes during an outside measuring range warning; even if other warnings (surface speed warning, etc.) occur, the flashing makes it impossible to distinguish that warning. Accordingly, when DiveAdvisor is flashing during the outside measuring range warning, the diver should take caution and surface.

11. Surface mode

a. Mode display

The display will switch to surface mode when you rise to a depth of 1.5m or less. The display will show time on surface, the current time, residual nitrogen in your body (by bar graph), and the residual nitrogen elimination time (flagged by "DESAT").

Example showing residual nitrogen elimination time, etc.



At the moment you surface, bars are displayed.



If you remain on the surface for less than 10 minutes, DiveAdvisor will regard this as a continuation of the previous dive.

Surface time is measured for up to 48 hours.

DiveAdvisor will enter watch mode 1 minute after this 48-hour period.



Residual nitrogen in your body is calculated from the time you end your dive until completion of residual nitrogen elimination (DESAT). It is displayed by bar graph and in terms of time (residual nitrogen elimination time).

The figures in the illustration are hypothetical numbers for the purpose of explaining DiveAdvisor functions. The numbers may be different when actually used.

b. Altitude value function

DiveAdvisor measures altitude every 10 minutes, to determine your current elevation. The altitude value is required for calculations used in the dive plan mode and the dive mode. The chart below gives approximate elevations corresponding to altitude values, irrespective of which mode you are in, a change in altitude value is represented either by no mark, or by ▲. When you move above 3,000m [9800ft], the ▲ mark flashes, and this function becomes unavailable (but can be used again when you return below 3,000m [9800ft]). Measurements of any residual nitrogen in your body are stopped when you move above 3,000m [9800ft], but will continue, and will be displayed again, when you return below that level.

If for some reason the altitude cannot be measured, "Alt Err" will be displayed.

Altitude value	Altitude
no symbol displayed	approx. 0 - 800 m [0 - 2600ft]
▲ displayed	approx. 800 - 1,500 m [2600 - 4900ft]
▲ displayed	approx. 1,500 - 2,300 m [4900 - 7500ft]
▲ displayed	approx. 2,300 - 3,000 m [7500 - 9800ft]



Beyond altitude measurement range (3,000m [9800ft] or higher)



Altitude measurement function not in operation



If "Alt Err" is displayed when you are within an altitude that DiveAdvisor can register, this could indicate a malfunction. Repair by an Apollo agent may be required, so take it to the store where you bought it. When DiveAdvisor is inspected or repaired, information (logged data, total number of dives, and dive profile data) is erased, so first record all such data elsewhere. If the altitude value rises when there is no residual nitrogen in your body, DiveAdvisor automatically shifts to surface mode and begins decompression calculations. Beginning a dive at this time constitutes a repeated dive. Even at the same altitude level, slight changes in atmospheric pressure due to weather conditions may cause individual DiveAdvisor to display different altitude values. This does not mean a malfunction. However, if there is a difference of 2 or more values, this could indicate a failure.

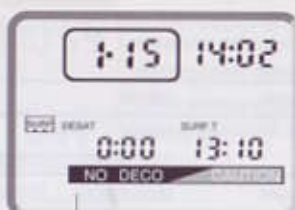
Leaving DiveAdvisor for long periods in places with high or low temperatures, at a high humidity or under other severe conditions may greatly affect the precision pressure sensor, resulting in measurement disparities. Never store under such conditions.

c. Period of time to avoid boarding aircraft

Do not board an aircraft when the residual nitrogen indication bar graph and residual nitrogen elimination time (DESAT) are displayed. When residual nitrogen is eliminated from your body, the bar graph will disappear, and the DESAT value will be shown as "0". This indicates that, as far as calculations are concerned, you can board an aircraft.



Possible to board aircraft after 25 minutes



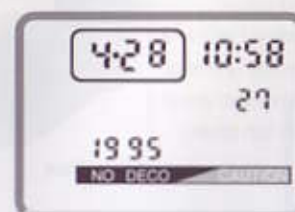
No bar graph displayed. Possible to board aircraft.

12. Time set mode

How to set time and date

Hold down button A, then, right away, hold down button B. Hold them both down at least 5 seconds. This gets you into time set mode.

Settings are made in this order: seconds, minutes, hours, year, month and day. Follow the procedures set out below.



When no need to make a change

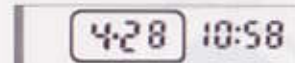
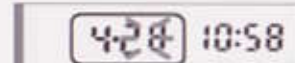
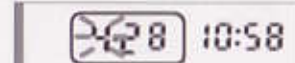
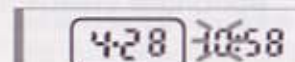
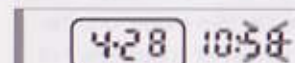
Move on, by making the next item flash (see below).

When you want to make a change

[Step 1] Each time you push button A, you advance to the next item, making it flash. Stop at the one you want to change (see phases illustrated in order at left).

[Step 2] Push button B to change the flashing number. (If you hold down the button, numbers will advance in rapid increments.)

[Step 3] After setting the day, push button A to return to watch mode.



13. Care and maintenance

a. Cleaning

After you finish diving for the day, you must rinse DiveAdvisor well in running tap water. Make sure you clean the button areas especially well. The display unit contains plastic, so never try to remove dirt with gasoline, paint thinner, alcohol or other organic solutions, and never use decorative materials like sprays, cleansers, glue or paint, since doing so could cause discoloration and changes to the surfacing and case, damaging the waterproofing. If the water detector button areas become dirty or encrusted, clean them with a soft cloth. Do not leave the unit in a bucket of water for a long time, to remove salt or other substances, since the sensor will activate the dive mode, causing the battery to run down.



Water detector button

b. Storage

After cleaning with water, remove all moisture, then dry it completely by leaving it in a shady, well-ventilated area. Store in a cool, dry place. Never store with wet items. If you put the unit in its case while wet, the sensor will activate the dive mode, and the battery will run down. Do not leave for long periods in direct sunlight or in locations that could become hot, such as a car parked in the sun. Also avoid extremely cold places. If DiveAdvisor becomes hot or cold, leave it in cool water until the entire unit reaches the water temperature. If used when extremely hot or cold, the precision of water depth and temperature measurements will be negatively affected.

Clean with water

Dry in the shade

Rinse with running
tap water



powdered soap

paint thinner,
alcohol

neutral detergent

c. If DiveAdvisor does not return to battery save mode

If "Alt Err" are displayed for a long time and DiveAdvisor does not return to battery save mode, it may be damaged. Repairs by Apollo are necessary, so DiveAdvisor should be brought to the store where you made your purchase. Log data memory is erased during checkups and repairs. Divers should note this information in their log books in advance.



d. Battery exchange

If none of the lights on the battery indicator bar graph light up, functions may stop within two or three days, so the battery should be exchanged immediately at the store where you made your purchase.

When exchanging the battery, the log data memory is completely erased, so this information should be noted in a log book beforehand.

14. Cautions on use

DiveAdvisor is set for a healthy diver of average strength.



WARNING

It does not adjust to individual differences and changes in body conditions. Divers are responsible for making plans that give sufficient consideration to their physical / mental conditions and for observing general diving rules.

Confirm check mode before diving. Do not use if there is any abnormality or any of the following applies.



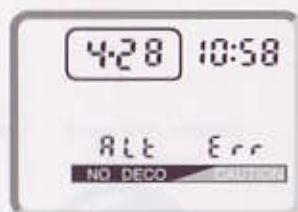
Display check/insufficient liquid crystals
(Are all the liquid crystals lighted?)



Battery check
(Is there sufficient battery power?)



Battery warning



Altitude measurement error



WARNING

The DiveAdvisor is intended for recreational and non-decompression diving. It was not designed for commercial or decompression diving. We do not recommend decompression diving. Use with care, staying well within the non-decompression zone. When a decompression stop is indicated, follow the instructions with regard to depth and time span, always verifying your remaining air pressure. Never make a decompression stop at a depth shallower than indicated. When sea conditions do not permit decompressing at the indicated depth, decompress at a depth 1 – 2m [3 – 7ft] deeper (in which case, decompression time is longer than normal).



WARNING

DiveAdvisor has not been designed to control such factors as amount of remaining air. Regularly verify remaining air using the gauge, and act accordingly.



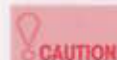
CAUTION

Never conduct pressure chamber tests using air, gas or the like, because this would cause damage.



WARNING

Use DiveAdvisor with other gauges (including a depth gauge and diver watch) as back-ups.



CAUTION

If you do not change the battery in response to flashing or illumination of the battery mark, it may leak or break. This could be extremely dangerous. Have the battery exchanged at a store, without delay. When the battery is changed, all logged data, total number of dives and dive profile data will be erased, so store this information elsewhere beforehand.

15. Types of warnings



The current depth indicator flashes, and the alarm sounds for 5 seconds.



This is a warning that you are exceeding the surfacing speed determined by DiveAdvisor's standards.

WHAT TO DO

Slow down your surfacing speed. Once you have attained a safe speed, the current depth indicator will stop flashing. If the surfacing speed warning sounds consecutively two or more times, it will be recorded in the log mode. (See page 24.)



"DECO STOP", the decompression stop time indicator and the decompression stop depth indicator all flash, and the alarm sounds for 10 seconds.



This is a warning that your current depth is shallower than the indicated decompression stop depth.

WHAT TO DO

Return immediately to the indicated decompression stop depth, and conduct a decompression stop, as indicated. (See page 25.)



The measurement range exceeded warning sounds, all screen indicators flash, and the alarm sounds for 10 seconds.



This alarm sounds when the depth measurement range (99.9m) [328ft] is exceeded, when the maximum dive time (599 minutes) is exceeded, or when decompression is required and the decompression depth is below 15m [49ft].

DANGER

Never dive in such a way.



The measurement range exceeded warning sounds, all screen indicators flash, and the alarm sounds continuously. Even if DiveAdvisor is in water, it cannot be put in dive mode, the indicators keep flashing and the alarm does not go off.



DiveAdvisor is emitting a measurement range exceeded warning, or is warning that you failed to make a required decompression stop.



Never dive in such a way.



The ▲ mark flashes.



This is a signal that your altitude exceeds the altitude measurement range (i.e. over 3,000m [9800ft]).

WHAT TO DO

The function is operable within the range of 0~3,000m [0~9800ft]. DiveAdvisor was not designed for diving at altitudes above 3,000m [9800ft].



The battery mark is illuminated.



The battery is run down, and must be changed. When this mark is displayed, you cannot change displays using buttons. Also, even if you dive you cannot get into dive mode.

WHAT TO DO

Take DiveAdvisor to the store where you bought it, to have the battery changed. When the battery is changed, information (logged data, total number of dives, and dive profile data) is erased, so first record all such data elsewhere.

16. Trouble shooting

This list is to assist in making the appropriate judgment when trouble occurs with DiveAdvisor. When trouble occurs, read this list carefully before responding. If trouble occurs that is not included on this list, it may be necessary for Apollo to conduct repairs. Repairs should be done at the store where you made your purchase. When parts are checked and repaired, information (logged data, total number of dives, and dive profile data) is erased, so first record all such data elsewhere.

Problem	Data is recorded in the dive log mode even before you use the product.
Cause	Before shipping, a chamber test was conducted to ensure product quality. The test data remains in memory.
What to do	When you wish to erase this data: while in the log mode hold down button A, then, right away, hold down button B. Hold them both down at least 5 seconds. The logged data will be cleared.
Problem	Screen becomes rainbow colored.
Cause	This is the effect of tension inside the glass resulting from temperature differences.
What to do	This is not a problem.
Problem	Display illumination is weak.
Cause	One possible cause is low temperature. Another cause could be a low battery.
What to do	If the cause is low temperature, returning DiveAdvisor to regular temperatures will solve the problem. If the battery is low, have the store where you purchased the product change the battery for you.
Problem	Does not shift to surface mode. Surface interval time is too short.
Cause	DiveAdvisor was stored with wet items after surfacing. As a result, DiveAdvisor has returned to dive mode and the post-surfacing count has stopped.
What to do	After surfacing, sufficiently dry while resting. Keep DiveAdvisor away from wet items.
Problem	The altitude value is off.
Cause	1) You are in a zone bordering two altitude values. 2) DiveAdvisor is being subjected to extreme heat.
What to do	If you are in a zone bordering two altitude values, there is no problem. If heat is the problem, cool DiveAdvisor by, for example, immersing it in cool water. If neither possible cause is the problem, the product could be damaged, so it may have to be repaired by an Apollo representative. Take it to the store where you bought it.
Problem	At a usable altitude level, the "Alt Err" display does not shut off.
Cause	Malfunction.
What to do	Repair by Apollo is needed. Have the battery exchanged at the store where you made your purchase.
Problem	At the surface of the water, the current water depth display does not return to 0.0 m.
Cause	If DiveAdvisor is stored in an extremely hot or cold place an incorrect altitude level may be displayed.
What to do	Return to room temperature. If it still does not return to 0.0 m, this may indicate a malfunction. Have repairs made at the store where you made your purchase.

Problem	DiveAdvisor is in surface mode even though the switch is not being operated.
Cause	DiveAdvisor automatically begins decompression calculations when altitude level changes.
Caution	Dives that begin under these conditions constitute a repetitive dive.
What to do	DiveAdvisor can be used in the same way as with ordinary repetitive dives.
Problem	You cannot switch manually into the log mode, dive plan mode or dive profile mode.
Cause	This can occur when, after a dive, electricity passes between 2 water detector buttons. If this is not the problem, damage is indicated.
What to do	If the water detector button area is moist, wipe it well, then try to switch into one of the modes again. If damage is indicated, the product will have to be repaired by an Apollo representative. Take it to the store where you bought it.
Problem	In dive plan mode, time allowed for no-decompression diving is indicated in the form of a bar.
Cause	This occurs when the measurement range exceeded warning has sounded, or when the ▲ mark is flashing because the altitude value is above 3,000m (9800ft).
What to do	If the measurement range exceeded warning has sounded, wait 48 hours -- DiveAdvisor functions will automatically return. If the ▲ mark is flashing, functions will return when you descend below 3,000m (9800ft).
Problem	The ▲ mark flashes.
Cause	The altitude value is above 3,000m (9800ft).
What to do	It will stop flashing when you descend below 3,000m (9800ft).
Problem	At the water surface, water depth is shown at 1.5m (5ft) or deeper.
Cause	The problem could be created when, during a period while ascending in an aircraft (or when the aircraft air pressure changes greatly), you touch or moisten two water detector buttons and change to dive mode.
What to do	It will have to be repaired by an Apollo representative. Take it to the store where you bought it.
Problem	The battery mark illuminates less than 7 years following shipment.
Cause	1) DiveAdvisor functions have been used more often than the number of times accounted for in battery life calculations. (Of particular significance would be frequent alarms, which shorten battery life.) 2) The place where you regularly store DiveAdvisor is in a zone bordering two altitude values. (Because of air pressure changes, the device often switches ON/OFF.) 3) For some reason the water sensor is activated and DiveAdvisor remains in dive mode.
What to do	If the battery mark illuminates for a reason other than one of the 3 listed above, the product could be damaged. Take it to the store where you bought it and ask that it be checked and repaired if necessary.