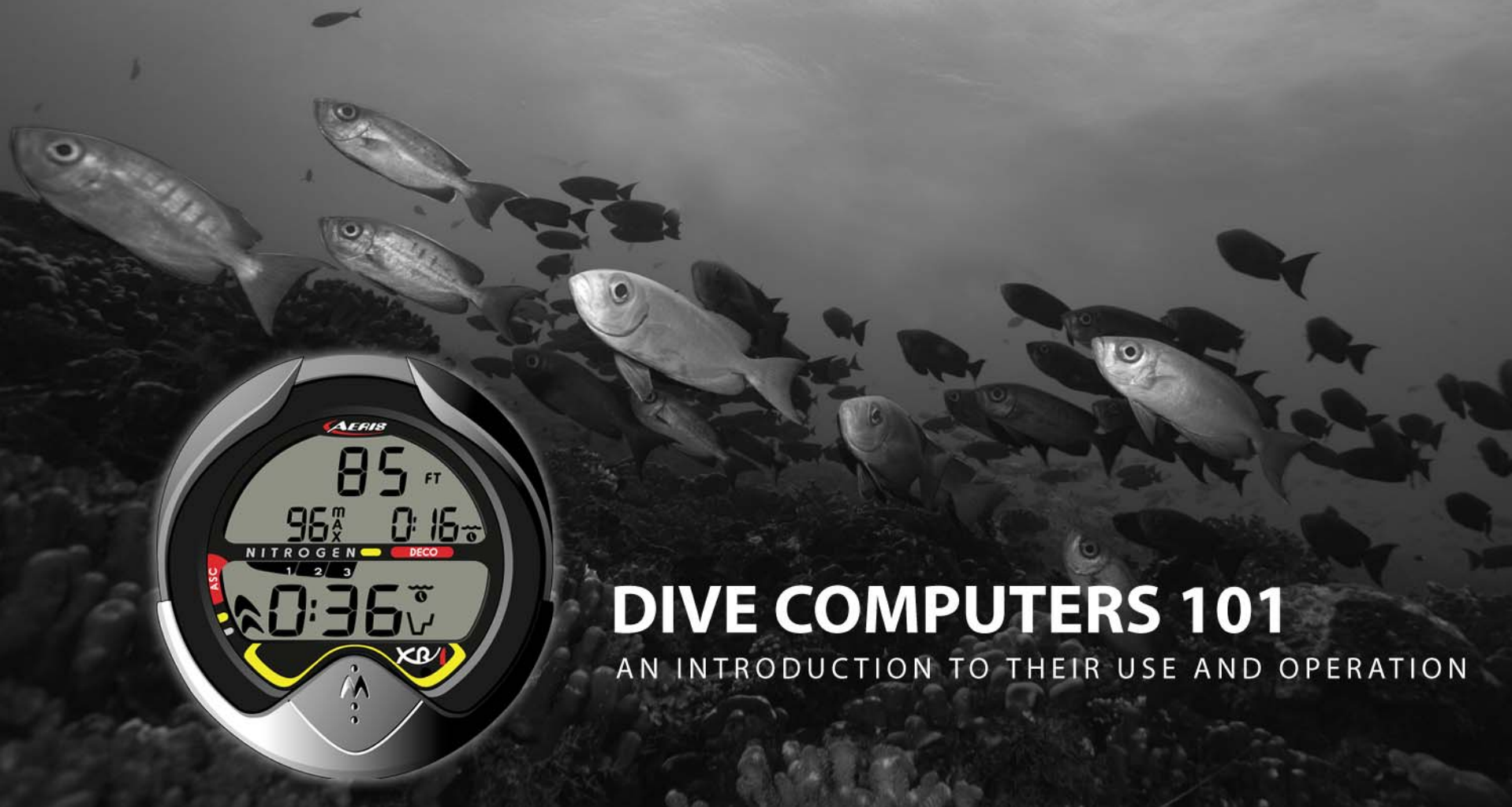


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DIVE COMPUTERS 101

AN INTRODUCTION TO THEIR USE AND OPERATION

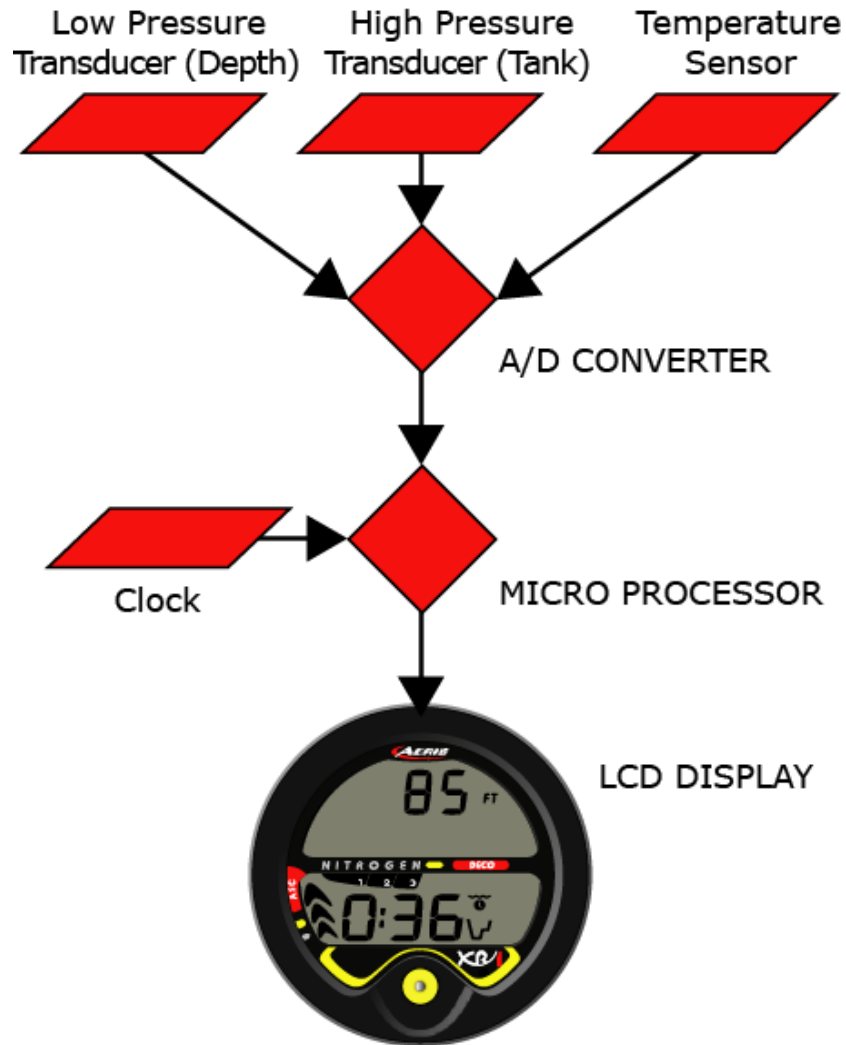
A vertical rectangular image on the left side of the slide showing an underwater scene. In the foreground, there is a large, light-colored fish, possibly a snapper, swimming towards the left. Below it, there is a dark, textured area that appears to be coral or a rocky seabed. In the background, several smaller, darker fish are visible, swimming in the open water. The overall lighting is somewhat dim, typical of an underwater environment.

DIVE COMPUTERS 101

- Dive Computers 101 is designed to provide divers with the theory, operation and benefits of multilevel diving with AERIS Dive Computers.
- **OBJECTIVES:**
 - *Have A basic understanding of how Dive Computers work*
 - *Understand the advantages of Dive Computers vs. dive tables*
 - *Understand the pre-dive setup, planning, underwater operation and post-dive features of a Dive Computer*
 - *Determine which Dive Computer features will best suit your type of diving*

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HOW A DIVE COMPUTER WORKS



- Sensors send data to the Analog to Digital (A/D) Converter.
- A/D Converter changes analog data to digital signals.
- The Micro Processor calculates the data and presents it to the diver via the LCD Display.

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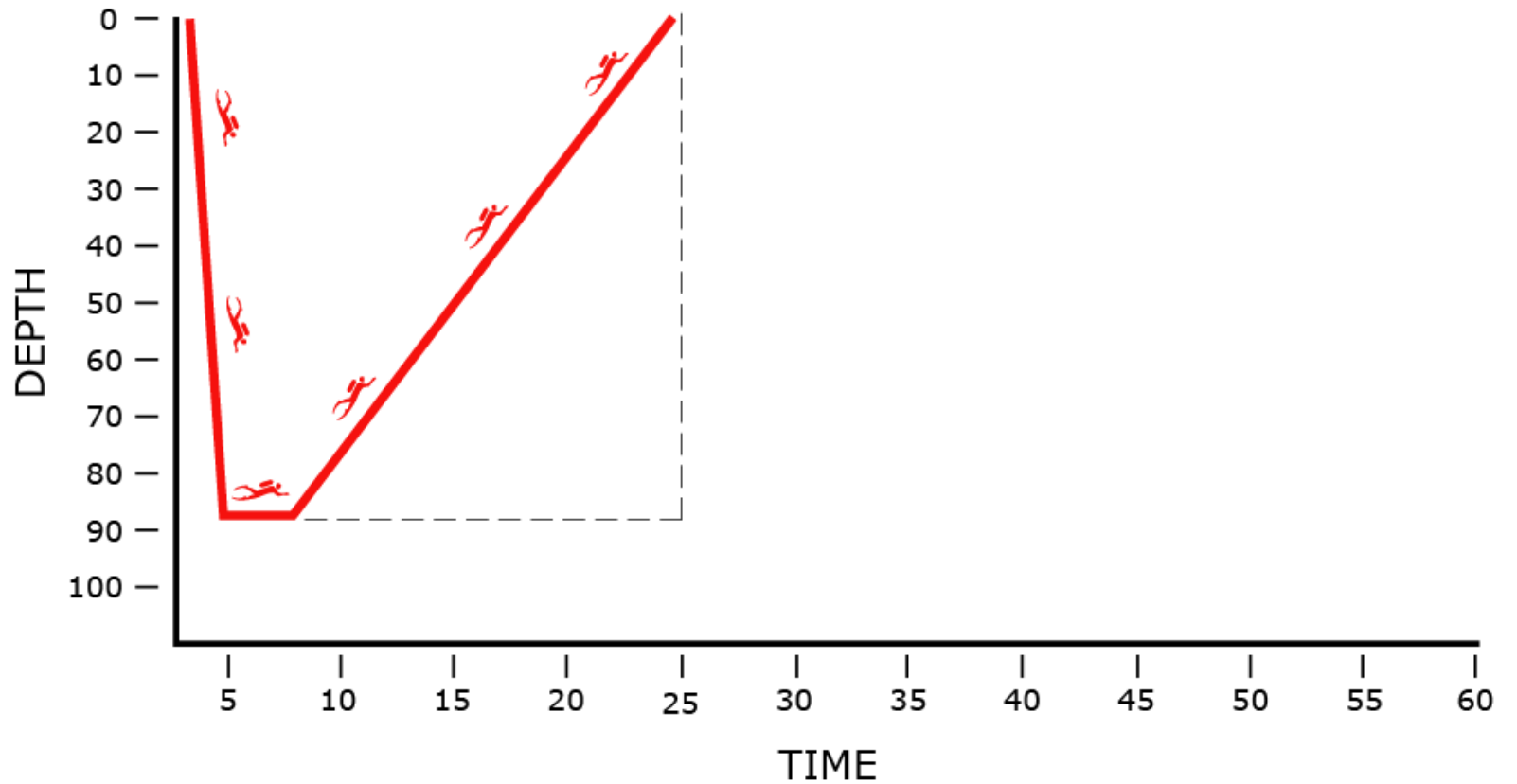
COMPUTERS vs. TABLES

- When using basic dive tables, the profile is based on the maximum depth reached for the total time of the dive. As an example: a diver performs a dive for a total time of 24 minutes and the deepest part of the dive was 88 feet. On every recreational dive table the depth will be rounded up to the next highest, in this case 90 feet. Even if the diver only spent 2 minutes of their dive at 88 feet and the rest of their dive at 30 feet the entire profile charts at 90 feet on a dive table.

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COMPUTERS vs. TABLES



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COMPUTERS vs. TABLES

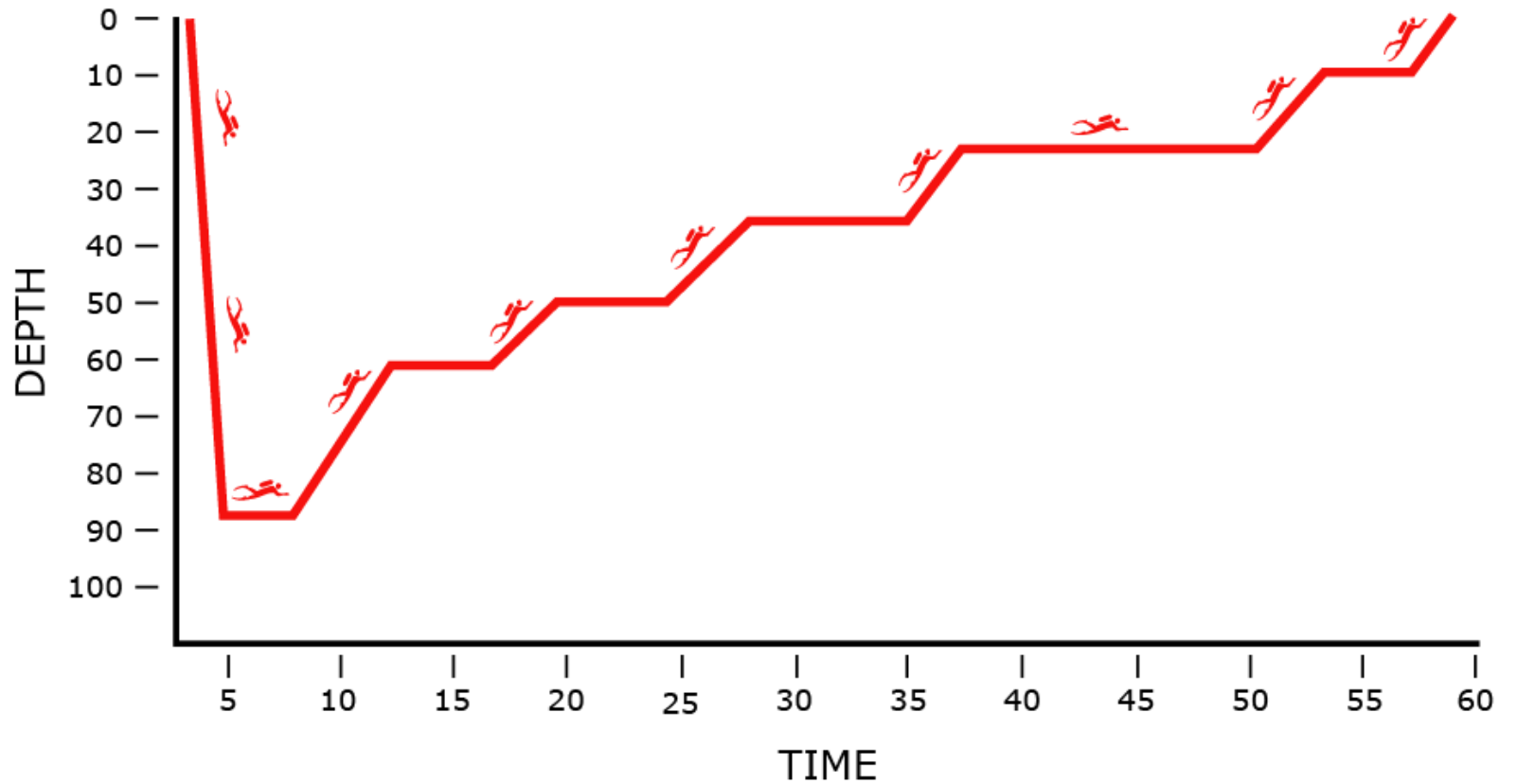
- Diving Computers calculate a more accurate profile. They use the same (or similar) algorithms as the tables and simply perform those same calculations several times a second. Going back to the previous example, a Dive Computer would take into account that only 2 minutes were spent at 88 feet. It adjusts the no decompression dive time remaining, thus allowing additional bottom time.



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COMPUTERS vs. TABLES



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COMPUTERS vs. TABLES

- When used properly, diving computers are very safe. Because they automatically read the exact depth and duration at every point of the dive they can potentially reduce diver error. They also automatically time surface intervals as soon as a diver surfaces. Again, providing more accurate information which can benefit on repetitive dives. Over the course of a dive vacation a computer can safely add hours of available bottom time.

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DIVE COMPUTER THEORY

- **OBJECTIVES:**

- *Have A basic understanding of the Decompression Model utilized by AERIS Dive Computers*
- *Have a basic understanding of Tissue Compartments and how they are graphically represented on an AERIS Dive Computer*

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DECOMPRESSION MODEL

- Decompression theory can be trusted only as far as it has been demonstrated by actual test dive data. In 1987 Diving Science and Technology (DSAT) conducted a unique series of experiments. Commissioned by the Professional Association of Diving Instructors (PADI), these Doppler ultrasound monitored human experiments conducted by Dr. Michael Powell produced the most comprehensive data set that exists for recreational divers to this day. These data were used to validate the PADI Recreational Dive Planner and are the basis of the algorithm used in all AERIS Dive Computers.

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A vertical black and white photograph of an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Below it, there is a dense field of coral or sea anemones. In the background, several smaller fish are visible, swimming in the same direction. The water is clear, and the lighting is soft, creating a serene underwater atmosphere.

DECOMPRESSION MODEL

- The programs within an AERIS Dive Computer simulate the absorption of nitrogen into the body by using a mathematical model. This model is merely a way to apply a limited set of data to a large range of experiences. The Dive Computer model is based upon the latest research and experiments in decompression theory.

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DECOMPRESSION MODEL

- Still, using an AERIS Dive Computer, just as using the dive tables, is no guarantee of avoiding decompression sickness.
- Every diver's physiology is different, and can even vary from day to day. No machine can predict how your body will react to a particular dive profile.

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MULTIPLE TISSUE TRACKING

- An AERIS Dive Computer tracks twelve tissue compartments with halftimes ranging from 5 to 480 minutes. The Tissue Loading (Nitrogen) Bar Graph provided on most AERIS Dive Computers always displays the controlling compartment that is the only one important at that time.
- Think of the Tissue Loading (Nitrogen) Bar Graph as twelve separate transparent displays laid on top of one another. The tissue compartment that has filled up fastest is the only one the viewer can see from the top.

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MULTIPLE TISSUE TRACKING

- At any particular point, one tissue compartment may be absorbing nitrogen, while another that was previously higher may be off-gassing.
- **NOTE:** This feature of the Decompression Model is the basis of multilevel diving, one of the most important contributions that an AERIS Dive Computer offers you.

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Diving with the XR-1



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FEATURES & DISPLAYS

- **OBJECTIVES:**

- *Be able to identify numeric and graphic displays of the XR-1*
- *Understand the function of the Control Button*
- *Identify and understand the information presented via bar graphs*
- *Identify and understand low battery power condition displays*

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FULL DISPLAY



- Each numeric and graphic display represents a unique piece of information. It is imperative that you understand the formats, ranges, and values of the information represented to avoid any possible misunderstanding that could result in error.

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CONTROL BUTTON



- The Control Button allows you to select display options and access specific information when you want to see it.
- It is also used to enter settings.

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TISSUE LOADING BAR GRAPH



- The Nitrogen Tissue Loading Bar Graph represents tissue loading of nitrogen, showing your relative no decompression or decompression status.
- The Tissue Loading Bar Graph offers you a convenient way to consistently monitor how close you are coming to the No Decompression Limit.

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TISSUE LOADING BAR GRAPH



- As your depth and elapsed dive time increase, segments will add to the Graph, and as you ascend to shallower depths, the Bar Graph will begin to recede, indicating that additional no decompression time is allowed for multilevel diving.

AERIS®

TISSUE LOADING BAR GRAPH



- The Tissue Loading Bar Graph monitors 12 different nitrogen compartments simultaneously and displays the one that is in control of your dive. It is divided into a No Decompression (normal) zone, a Caution zone (also No Decompression), and a Decompression (danger) zone.

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TISSUE LOADING BAR GRAPH



- Use the No Decompression Caution Zone as a visual reference to place a wider margin of protection between you and the No Decompression Limit.
- AERIS suggests that the Tissue Loading Bar Graph should always be in the No Decompression zone when leaving the water.

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TISSUE LOADING BAR GRAPH

- While you cannot provide a guarantee against the occurrence of decompression sickness, you may choose your own personal zone of caution based upon age, physique, excessive weight, etc., to reduce the statistical risk.

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VARIABLE ASCENT RATE INDICATOR



- Most AERIS Dive Computers are configured with a VARI or Variable Ascent Rate Indicator (bar graph) that shows how fast you are ascending.
- The VARI provides a visual representation of ascent speed (i.e., an ascent speedometer).

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VARIABLE ASCENT RATE INDICATOR



- When you exceed the maximum ascent rate allowed for the depth you are at, the bar graph will enter the Alarm (Too Fast) Zone.
- You will be alerted by all segments of the bar graph flashing which will stop when your ascent rate is slowed.

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VARIABLE ASCENT RATE INDICATOR



- The segments of the Variable Ascent Rate Indicator represent two sets of speeds which change at a reference Depth of 60 FT (18 M).

DEEPER THAN 60 FT (18 M)

- 0 SEGMENTS = 0-20 FPM (0-6 MPM)
- 1 SEGMENT = 21-50 FPM (6.5-15 MPM)
- 2 SEGMENTS = 51-60 FPM (15.5-18 MPM)
- 3 SEGMENTS = > 60 FPM (> 18 MPM)

SHALLOWER THAN 60 FT (18 M)

- 0 SEGMENTS = 0-10 FPM (0-3 MPM)
- 1 SEGMENT = 11-25 FPM (3.5-7.5 MPM)
- 2 SEGMENTS = 26-30 FPM (8-9 MPM)
- 3 SEGMENTS = > 30 FPM (> 9 MPM)

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DEPTH DISPLAYS



- During a dive, the Current Depth display indicates depths from 0 to 330 FT (99.9 M) in 1 FT (0.1 M) increments.

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DEPTH DISPLAYS



- By accessing alternate Main Dive Displays, the Maximum Depth reached during that dive will be displayed in the center/left portion of the display.

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DEPTH DISPLAYS



- During a Decompression Dive, the required Ceiling Stop Depth is displayed in the center of the screen.

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TIME DISPLAYS



- The Main Time display is located in the lower portion of the display and a second time display is located in the center/right.
- Both displays are identified by a clock icon. Time of Day can be set for 12 hour format (AM/PM) or 24 hour format.

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TIME DISPLAYS



- Time displays are shown in hour:minute format (i.e., 1:16 represents 1 hour and 16 minutes, not 116 minutes!).

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NO DECOMPRESSION DIVE TIME REMAINING

- No decompression Dive Time Remaining is the maximum amount of time that you can stay at your present depth before entering a decompression situation.
- It is calculated based on the amount of nitrogen absorbed by hypothetical tissue compartments. The rates each of these compartments absorb and release nitrogen is mathematically modeled and compared against a maximum allowable nitrogen level.

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NO DECOMPRESSION DIVE TIME REMAINING



- Whichever one is closest to this maximum level is the controlling compartment for that depth.
- Its resulting value will be displayed numerically along with the No Decompression Dive icon and graphically as the Tissue Loading Bar Graph.

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NO DECOMPRESSION DIVE TIME REMAINING



- The Dive Computer constantly monitors no decompression status and oxygen exposure.
- The Dive Time Remaining display will indicate the time that is more critical for you at that particular moment (i.e.; whichever time is the least amount available).

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POWER SUPPLY

- The XR-1 utilizes one (1) CR 2450 Lithium cell that should provide 300 hours of continuous, or 50 activation periods, of operation.
- If you conduct 1 dive each time the unit is activated, you should obtain approximately 50 dives.
- If you conduct 3 dives each time the unit is activated, you should obtain approximately 150 dives.

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POWER SUPPLY



- A Battery Indicator provides an indication of battery condition.
- When power is sufficient for normal unit operation, the Indicator will be displayed during Surface Mode. The Indicator will not be displayed during Dive Mode(s).

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POWER SUPPLY



- When 75% of the Rated Power has been consumed, the lower bar of the Battery Indicator (only segment) will be displayed, and the outline of the Indicator will flash once per second as a warning that the Battery is to be replaced prior to conducting any further dives.

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POWER SUPPLY



- Upon decreasing to a voltage level that will no longer sustain proper operation, the Indicator will flash 5 times followed by shutdown of the unit.
- If a Low Battery condition exists when the unit is activated (by pressing the button), the graphic bAT and the Battery Indicator will appear flashing for 5 seconds followed by shutdown of the unit.

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POWER SUPPLY

- If the unit did not display a Low Battery Condition 'prior to' entering the Dive Mode, and a Low Battery Condition occurs during the dive, there will be sufficient battery power to maintain unit operation for the remainder of 'that dive'. The Battery Indicator will then appear after the dive upon entry into Surface Mode.

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EXERCISES



- Identify the following Display components:
 - Control Button*
 - Variable Ascent Rate Indicator*
 - Tissue Loading Bar Graph*
 - Icon – Max Depth (Log Mode)*
 - Icon – Temperature*
 - Icon – Dive Number*
 - Icon – Max Depth (Dive Mode)*
 - Icon – Descend Arrow/Decompression Ceiling/Ascend Arrow*
 - Icon – Log Mode*
 - Icon – Depth Units*
 - Icon – Time*
 - Battery Status Indicator*
 - Icon – Operating Mode*

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EXERCISES



Identify the following Display components:

- a. Control Button
- b. Variable Ascent Rate Indicator
- c. Tissue Loading Bar Graph
- d. Icon – Max Depth (Log Mode)
- e. Icon – Temperature
- f. Icon – Dive Number
- g. Icon – Max Depth (Dive Mode)
- h. Icon – Descend Arrow/Decompression Ceiling/Ascend Arrow
- i. Icon – Log Mode
- j. Icon – Depth Units
- k. Icon – Time
- l. Battery Status Indicator
- m. Icon – Operating Mode

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ACTIVATION & SETUP

- **OBJECTIVES:**

- *Understand how to manually activate the Dive Computer*
- *Understand how to access the Serial Number and Firmware Revision*
- *Understand the XR-1's calibration and operation at high altitude*
- *Understand the information displayed during the Surface Sequence*
- *Access Set Mode and modify personal settings*

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ACTIVATION



- To Manually Activate the XR-1, press and release the Button.
- Upon manual activation, the unit will enter Diagnostic Mode, displaying all segments of the LCD as 8's, followed by dashes (- -), then a countdown from 9 to 0.
- Diagnostic Mode checks the display and Battery voltage to ensure that everything is within tolerance and functioning properly.

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ACTIVATION



- When the button is held depressed and the Diagnostic countdown reaches 00, a Serial Number screen appears displaying the unit's Serial Number and firmware code Revision Number as long as the button is held depressed. Upon releasing the button, the unit shuts Off.

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ACTIVATION

- After manual activation, it will also check the ambient barometric pressure, and calibrate its present depth as zero. At elevations of 2,000 feet (610 meters) or higher, it will recalibrate itself to measure depth at that higher Altitude.

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ALTITUDE COMPENSATION

- Atmospheric pressure decreases as Altitude increases above sea level. Weather systems and ambient temperature also affect barometric pressures. Consequently, depth reading instruments that do not compensate for the decrease in ambient pressure indicate depth readings shallower than the depth they are actually at.

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ALTITUDE COMPENSATION

- The XR-1 automatically compensates for decreased ambient pressures for Altitudes between 2,000 (610 meters) and 14,000 feet (4,270 meters). Its program contains a high altitude algorithm that reduces no decompression and oxygen exposure limits to add a larger zone of caution.
- The XR-1 senses ambient pressure when it is activated, every 15 minutes while it is activated, or every 30 minutes when it is not activated.

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ALTITUDE COMPENSATION

- At an Altitude of 2,000 feet (610 meters), it will automatically recalibrate itself to measure depth in feet of fresh water rather than feet of sea water. It will then readjust the no decompression and oxygen limits at additional intervals of 1,000 feet (305 meters). Therefore, when returning to lower Altitudes, diving should not be conducted until the unit automatically clears of any residual nitrogen and oxygen loading and resets to operate at the new lower Altitude.

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SURFACE SEQUENCE

- While on the surface, the unit will automatically scroll through a Sequence of displays including:
 - *Surface Mode*
 - *Fly Mode*
 - *DeSat Mode*
 - *Plan Mode*
- As the Surface Sequence is scrolling, you can use the button to access Log Mode and Set Mode.

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SURFACE MODE



- Surface Mode, identified by the Surface Time icon, follows Diagnostic Mode after Activation.
- Information includes Dive Number (0 if no dive made yet), Temperature (and icon), Time of Day (with icon), the Battery Indicator, and Surface Time (with flashing colon).

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SURFACE MODE



- The XR-1 will also automatically activate by Wet Contact (only if Wet Activation is set ON).
- If no dive is made within 2 hours after initial activation, the unit will automatically deactivate. If the wet contacts are still bridged, the unit will reactivate and display the H2O graphic.

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A vertical black and white photograph of an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Behind it, several smaller, darker fish are visible. The background shows a sandy or rocky seabed with some coral or rock formations.

SET MODE

- After gaining access to Set Mode, settings can be made in sequence one after the other, or you can access a specific item that you want to set, bypassing others.
- If the button is not pressed during a 2 minute period while in the Set Mode, the unit will revert to Surface Mode and resume the Surface Sequence scroll.

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SET MODE ACCESS & TIMING

- To access Set Mode while the Surface Sequence is scrolling, depress the button for 2 seconds.
- Upon entry into Set Mode, the Set Units of Measure screen will be displayed with the Set Point flashing.
- To make modifications to settings, momentarily press and release the button.
- Depress the button for 2 seconds to accept the Set Point displayed and advance to the next Set Mode screen.

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SET: UNITS OF MEASURE



- Factory set for Imperial, Units of can also be set for Metric.

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SET: UNITS OF MEASURE



- Press/release the button (less than 2 seconds) to toggle between Imperial (FT and F) and Metric (M and C) units.
- Depress the button for 2 seconds to accept the Units Set Point and advance to Set Hour Format.

AERIS®

SET: HOUR FORMAT



- Factory set for 12 Hour (12: AM to 11: PM), the Hour Format can also be set for 24 Hour (0: to 23: hours).
- After having set and accepted Units, the Set Hour Format screen appears with the Set Point flashing.

AERIS®

SET: HOUR FORMAT



- Press/release the button (less than 2 seconds) to toggle between 12 and 24.
- Depress the button for 2 seconds to accept the Set Point and advance to Set Time.

AERIS®

SET: TIME



- Set for factory local time, the Time can be set to values between 0:00 and 12:59 (AM/PM) or 0:00 and 23:59.
- After having set and accepted Hour Format, the Set Time screen appears with the Hour Set Point flashing.

AERIS®

SET: TIME



- Press/release the button repeatedly (less than 2 seconds each time) to advance the Hour Set Point in increments of 1 Hour per press of the button.
- Depress the button for 2 seconds to accept the Hour Set Point, the Minutes Set Point flashes.

AERIS®

SET: TIME



- Press/release the button repeatedly (less than 2 seconds each time) to advance the Minute Set Point in increments of 1 Minute per press of the button.
- Depress the button for 2 seconds to accept the Minute Set Point and advance to Set Date.

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SET: DATE



- Set for factory local date, the Year, Month and Date may be set.
- After having set and accepted Time settings, the Set Date screen appears with the Year Set Point flashing.

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SET: DATE



- Press/release the button repeatedly (less than 2 seconds each time) to advance the Year Set Point.
- Depress the button for 2 seconds to accept the Year Set Point, the Month Set Point flashes.

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SET: DATE



- Press/release the button repeatedly (less than 2 seconds each time) to advance the Month Set Point.
- Depress the button for 2 seconds to accept the Month Set Point, the Day Set Point flashes.

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SET: DATE



- Press/release the button repeatedly (less than 2 seconds each time) to advance the Day Set Point.
- Depress the button for 2 seconds to accept the Day Set Point and advance to Set Gauge Mode.

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SET: GAUGE MODE



- Factory set for OFF, Digital Gauge Mode can also be set ON for use as a digital depth gauge and timer (no dive computer functions).
- After having set and accepted Time settings, the Set Gauge screen appears with the Set Point flashing.

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SET: GAUGE MODE



- Press/release the button (less than 2 seconds) to toggle between ON and OFF.
- Depress the button for 2 seconds to accept the Gauge Set Point and advance to Set Wet Activation.

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SET: WET ACTIVATION



- Factory set for ON, Wet Activation can also be set OFF (disabled) to prevent inadvertent activation during travel or storage.
- When set ON, the XR-1 will automatically Activate and enter Dive Mode upon immersion in water.

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SET: WET ACTIVATION



- Press/release the button (less than 2 seconds) to toggle between ON and OFF.
- Depress the button for 2 seconds to accept the Set Point.

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PC COUNTDOWN



- The PC Countdown is not a setting or user function. It is included in the Set Menu for access by factory personnel when calibrating the XR-1 prior to shipment.
- Depress the button for 2 seconds to accept the Set Point and return to Surface Mode.

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EXERCISES

- Manually activate the XR-1
- Access Set Mode and make the following modifications:
 - *Set Units: Imperial*
 - *Set Hour Format: 12*
 - *Set Time: Actual*
 - *Set Date: Actual*
 - *Set Gauge: OFF*
 - *Set Wet Activation: ON*

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PRE-DIVE PLANNING

- **OBJECTIVES:**
 - *Perform pre-dive planning*

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PRE-DIVE PLANNING



- The Pre Dive Planning Sequence™ (PDPS), which appears after Surface Mode prior to the first dive of a new activation period, provides a sequence of theoretical dive times available for depths ranging from 30 FT (9 M) to 190 FT (57 M) in 10 FT (3 M) increments.

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PRE-DIVE PLANNING

- No decompression times (limits), or NDLs, are only displayed for depths where there is at least 3 minutes of theoretical dive time available at the depth, taking into account a descent rate of 60 feet (18 meters) per minute.
- The PDPS should be reviewed prior to every dive to help you plan your dive as required to avoid exceeding no decompression or oxygen exposure limits.

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PRE-DIVE PLANNING



- For repetitive dives, the PDPS indicates adjusted dive times that are available for the next dive, based on residual nitrogen or oxygen accumulation (whichever is in control) following the last dive and surface interval. It appears after the SAT screen in the scrolling Surface Sequence (SURF > FLY > SAT > PDPS).

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EXERCISES

- Plan a dive to 100 feet
- What is the no-deco time allowed?



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DIVE MODES

- **OBJECTIVES:**

- *Understand the underwater use of the control button*
- *Understand the inform provided on Dive Mode displays*
- *Understand how to establish a personal level of conservatism by monitoring the Tissue Loading Bar Graph*
- *Understand the function and information displayed during a no-decompression Safety Stop*

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CONTROL OF DISPLAYS

- During No Decompression conditions, various displays of information (up to 4) are available. Each provides Depth, Dive Time Remaining, and additional information. The intent of this feature is to allow the diver to select which information is on display at any given time during the dive. The screens can be changed from one display to another as often as desired by pressing and releasing the button momentarily (< 2 seconds).

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CONTROL OF DISPLAYS

- During conditions in which cautionary type information is displayed (e.g., Decompression, High PO₂, High O₂, etc.), there is a Main Display of important information relevant to the specific condition. Other screens of information can be accessed, which automatically revert to the Main Display after 3 seconds.

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NO-DECO DIVE MODE



- The XR-1 will automatically enter the No Decompression Dive Mode when you descend to 5 FT (1.5 M).
- **NO-DECO DIVE MAIN DISPLAY #1**
Information includes: Current Depth, Dive Time Remaining (and Mode icon), and the applicable bar graphs.

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NO-DECO DIVE MODE



- Press/release the button 1 time (< 2 seconds) to change the screen to No Deco Dive Main Display #2.
- **NO-DECO DIVE MAIN DISPLAY #2**
Information includes: Current Depth, Maximum Depth for that dive (and icon), Elapsed Dive Time (and icon), Dive Time Remaining (and Mode icon), and the applicable bar graphs.

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NO-DECO DIVE MODE



- Press/release the button 1 time (< 2 seconds) to change the screen to No Deco Dive Main Display #3.
- **NO-DECO DIVE MAIN DISPLAY #3**
Information includes: Current Depth, Temperature, Time of Day, Dive Time Remaining (and Mode icon), and the applicable bar graphs.

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NO-DECO DIVE MODE



- Press/release the button 1 time (< 2 seconds) to return to No Deco Dive Main Display #1.

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ASCENDING TO THE SURFACE

- While ascending to shallower depths, the segments that have filled up the Tissue Loading Bar Graph will begin to recede, offering a graphic representation of your multilevel diving capability.
- By 'backing off' on the bar graph (maintaining fewer segments), you can establish a personal level of conservatism and margin of protection.

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ASCENDING TO THE SURFACE

- If you entered Decompression Mode, you must not complete your ascent until the Tissue Loading Bar Graph is at least inside the No Decompression Zone.
- You should make every effort to complete all of your ascents with the Tissue Loading Bar Graph inside the No Decompression Zone.

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ASCENDING TO THE SURFACE

- While you cannot provide a guarantee against the occurrence of decompression sickness, you may choose your personal zone of caution based upon your individual age, physique, excessive weight, training, experience, etc. to reduce the statistical risk.



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NO-DECO SAFETY STOP



- Upon ascending to 20 FT (6 M) on any No Decompression dive in which Depth exceeded 30 FT (9 M), a Safety Stop screen will appear displaying a Stop at 15 FT (4.5 M) with a 3 minute Countdown Timer.
- A safety stop made between 10 and 20 FT (3 and 6 M) is strongly recommended as a standard procedure before completing your ascent.

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NO-DECO SAFETY STOP

- The Safety Stop will be displayed until the countdown times out, or another descent is made below 30 FT (10 M), or the diver surfaces.
- There is no Penalty for surfacing prior to completing the Safety Stop.

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A vertical rectangular image on the left side of the slide showing an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Below it, there is a dark, textured seabed with coral or rocks. In the background, several smaller, darker fish are swimming. The water is slightly hazy, suggesting an underwater environment.

UNEXPECTED LOSS OF INFORMATION

- If your XR-1 stops working for any reason, it is important that you have anticipated this possibility and are prepared for it. This is an important reason for not pushing the No Decompression and Oxygen Accumulation Limits, and a critical reason to avoid entering Decompression.
- If you dive in situations where your trip would be ruined or your Safety would be jeopardized by losing the use of your XR-1, a backup instrument system is highly recommended.

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EXERCISES



- **NO-DECO DIVE MAIN DISPLAY #1**
- Fill in the display using the following information:
 - *Depth: 85 Feet*
 - *Dive Time Remaining: 36 Minutes*
 - *Tissue Loading Bar Graph: 5 segments*
 - *Variable Ascent Rate Indicator: 2 segments*

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EXERCISES



- **NO-DECO DIVE MAIN DISPLAY #2**
- Fill in the display using the following information:
 - *Depth: 85 Feet*
 - *Dive Time Remaining: 36 Minutes*
 - *Tissue Loading Bar Graph: 5 segments*
 - *Variable Ascent Rate Indicator: 2 segments*
 - *Maximum Depth: 95 Feet*
 - *Elapsed Dive Time: 16 Minutes*

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EXERCISES



- **NO-DECO DIVE MAIN DISPLAY #3**
- Fill in the display using the following information:
 - *Depth: 85 Feet*
 - *Dive Time Remaining: 36 Minutes*
 - *Tissue Loading Bar Graph: 5 segments*
 - *Variable Ascent Rate Indicator: 2 segments*
 - *Temperature: 82 degrees F*
 - *Time of Day: 9:25*

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POST DIVE MODES

- **OBJECTIVES:**

- *Understand the information displayed in Post-Dive Surface Mode*
- *Understand the information displayed, additional information available and operation during the Transition Period*
- *Understand the information displayed, additional information available and operation following the Transition Period*
- *Understand the Time to Fly and Desaturation Time Displays*
- *Conduct Pre-Dive Planning for a repetitive dive*
- *Access and understand the information displayed in Log Mode*
- *Understand the information displayed and operation after two hours on the surface*

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POST DIVE SURFACE MODE



- When you ascend to 2 FT (0.6 M) or shallower, the XR-1 will enter Surface Mode and begin counting Surface Interval.

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TRANSITION PERIOD



- The first 10 minutes is, in affect, a Transition Period during which time the following information is displayed:
 - *Number of that dive (during that activation period)*
 - *Temperature (ambient)*
 - *Time of Day and icon*
 - *Battery icon*
 - *Surface Interval time (colon flashing) and icon (flashing)*
 - *Tissue Loading Bar Graph*

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TRANSITION PERIOD



- During the Transition Period, Log Mode can be accessed. No other modes (e.g., PDPS, Fly, DeSat, Set) are accessible.
- To view the Log for that dive during the transition period, press/release the button (less than 2 seconds).

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TRANSITION PERIOD

- If you descend during the 10 minute Transition Period, time underwater will be considered a continuation of that dive. The time at the surface (if less than 10 minutes) will not be added as Elapsed Dive Time.

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A vertical rectangular image on the left side of the slide showing an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Behind it, several smaller, darker fish are visible. The background is a dark, textured surface, likely coral or a rocky seabed, with some light filtering through from above.

AFTER THE TRANSITION PERIOD

- Once 10 minutes have elapsed, the Surface Mode icon and Surface Interval time display colon stop flashing indicating that the Dive and Transition Period are completed, and a subsequent descent will be considered a new dive.
- For the remainder of the first 2 hours after surfacing, information will continue to be displayed as the Surface Sequence, scrolling through the Surface Mode > Fly > Sat > Plan screens.
- You will also have full access to Log and Set modes.

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TIME TO FLY / DESAT



- The Time to Fly and DeSat Timers begin counting down 10 minutes after surfacing from a dive (after the Transition Period).
- The FLY countdown always begins at 23:50 (hr:min) and the DeSat countdown at 23:50 (maximum).
- If a Violation occurred during the dive a single dash (-) will appear instead of the letters FLY. DeSat time will not be displayed.

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TIME TO FLY / DESAT

- The Time to Fly counter is provided to assist you with deciding when enough surface time has elapsed to fly (or travel to higher elevations).
- After a Surface Interval of 12 hours, you may choose to fly (or travel to higher elevations), provided that your dive profile(s) did not enter decompression.
- If your diving involved decompression or a repetitive multi-day profile, it is strongly recommended that you wait a full 24 hours after your last dive to add a greater degree of protection.

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PRE-DIVE PLANNING



- After a dive, the PDPS provides 'adjusted' No Decompression Limits based on residual nitrogen calculated to be remaining from that dive and previous dives in the same series.

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LOG MODE

- The XR-1 will store up to 12 dives in its Log for viewing. Once the Log is full (12 dives), each subsequent dive will then overwrite the oldest dive stored in the Log. It is therefore suggested that you transfer the Log's data to your log book at the end of each day of diving.
- Log data will not be lost when the battery is removed/replaced, however, factory service and calibration will delete the data.

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LOG MODE

- The first dive conducted each time the unit is Activated will be #1, therefore there may be multiple #1 dives in the Log.
- Each dive has 3 Log screens - Dive Identifier (Preview), Dive Data, and O2 Data (if a Nitrox dive). Dives are displayed in a reverse sequence that starts with the dive most recently recorded, back to the oldest one stored. The most recent dive will always be the first shown in the sequence.

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ACCESSING LOG MODE



- Press/release the button momentarily (< 2 seconds) while the unit is scrolling through the Surface Sequence.
- The first screen (Dive Preview/Identifier) of the most recent dive conducted will appear displaying:
 - *Log Mode icon*
 - *Dive Number (for that activation period)*
 - *Time of Day, that the dive started*

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ACCESSING LOG MODE



- While viewing the Preview screen, press/release the button momentarily to view the second screen.
- Information includes:
 - *Log Mode icon*
 - *Maximum Depth*
 - *Minimum temperature*
 - *Surface Interval - prior to that dive*
 - *Elapsed Dive Time*
 - *VARI - showing the maximum ascent rate*
 - *TLBG - showing tissue nitrogen loading at the time you surfaced at the end of the dive. The segment that reflects the maximum loading during the dive will appear flashing.*

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2 HOURS AFTER THE DIVE



- Two hours after the last dive, the Surface Sequence will no longer be displayed. The Time to Fly and DeSat countdown screens will be displayed alternately for 3 seconds each until they count down to 0:00 or another dive is made.

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2 HOURS AFTER THE DIVE



- To access other modes or enter settings, press/release the button to reactivate the Surface Sequence.
- The unit will again revert to the Time to Fly and Desaturation countdowns after 2 hours, if the button is not pressed.
- Surface Interval Times greater than 9:59 (hr:min) will be displayed only as Hours 10-, 11-, 12-, etc.

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WET CONTACTS



- If the graphic H2O appears during the Surface Mode, Fly Mode, or Desaturation Mode, it is an indication that the wet activation contacts are bridged (still wet) and the unit must be rinsed in fresh water and thoroughly dried.

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WET CONTACTS

- The contacts are located in the button stem and back of the case.
- Once the unit is dry, the graphic H2O will disappear from the display.
- If the unit is not cleaned and dried prior to the countdowns reaching 0:00 (hr:min), or making another dive, it will shut off then automatically reactivate.
- The graphic H2O would then appear in place of Dive Number when Surface Mode is displayed during the Surface Sequence.
- If no dive is made after activation, the unit would shut off after 2 hours, then automatically reactivate again if wet, repeating the action until cleaned and dried.

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EXERCISES

- Access the Log Book and identify the following for the most recent dive:
 - *Dive Number*
 - *Time of Day*
 - *Maximum Depth*
 - *Elapsed Dive Time*
 - *Surface Interval*

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ADVANCED FUNCTIONS

- **OBJECTIVES:**

- *Understand the information displayed in Decompression Dive Mode*
- *Understand how to manage a Decompression Dive*
- *Understand the situations that may result in the Dive Computer entering Violation Mode*
- *Understand the information displayed and procedures for Violation Mode situations*

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A vertical black and white photograph of an underwater scene. In the foreground, a large fish is swimming towards the left. Below it, there is a dense field of coral or sea anemones. In the background, several smaller fish are visible, swimming in the open water. The lighting is soft, creating a serene underwater atmosphere.

DECOMPRESSION

- AERIS Dive Computers are sophisticated instruments designed with capabilities that go beyond the range of recreational diving. They can help you to avoid and, if necessary, manage decompression.

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DECOMPRESSION DIVE MODE



- Upon entering Decompression Mode, the Mode icon will change from No Deco to Deco.
- The UP Arrow and Deco Bar will flash if you are greater than 10 FT (3 M) deeper than the Required Stop Depth.
- Once you are within 10 FT (3 M) of, and below, the required Stop Depth, both Arrows and the Bar appear solid.

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TOTAL ASCENT TIME



- Total Ascent Time includes Stop Times required at all required decompression ceilings and vertical Ascent Time calculated at 60 FPM (18 MPM) for depths deeper than 60 FT (18 M), and 30 FPM (9 MPM) per minute for depths of 60 FT (18 M) and shallower.

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MANAGING DECOMPRESSION



- To fulfill your decompression obligation, you should make a safe controlled ascent to a depth slightly deeper than, or equal to, the Required Ceiling Stop Depth indicated and decompress for the Stop Time indicated.

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MANAGING DECOMPRESSION



- You should stay slightly deeper than the required stop depth indicated until the next shallower stop depth appears.
- Then, you can slowly ascend to, but not shallower than, that indicated ceiling stop depth.

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MANAGING DECOMPRESSION

- The amount of decompression Credit Time that you receive is dependent on Depth, with slightly less Credit given the deeper you are. You should stay slightly deeper than the Required Stop Depth indicated until the next shallower Stop Depth appears. Then, you can slowly ascend to, but not shallower than that indicated ceiling Stop Depth.
- While in Decompression Mode, Alternate Displays can be accessed that will automatically revert to the Main (Default) Display after 3 seconds.

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VIOLATION DIVE MODES

- All AERIS Dive Computers enter Violation Mode when a situation totally exceeds its capacity to predict an ascent procedure.
- When you exceed certain limits, AERIS Dive Computers alert you with visual and audible (select models) warnings and operate in special Violation Modes.
- Entering Violation Mode, will result in loss of all decompression and oxygen monitoring functions for 24 hours after that dive.

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VIOLATION DIVE MODES

- Three conditions cause AERIS Dive Computers to enter Violation Mode:
 - *Staying above a required Deco Stop Depth for more than 5 minutes.*
 - *Your decompression requires a Ceiling Stop Depth greater than 60 FT (21 M).*
 - *You exceed the maximum operating depth of 330 FT (99 M).*

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VIOLATION DIVE MODES

- The XR-1 would then operate with limited functions in Violation Gauge Mode during the remainder of that dive and for 24 hours after surfacing.
- Violation Gauge Mode turns the XR-1 into a digital instrument without any decompression or oxygen monitoring functions.
- Only Current Depth, Max Depth, Elapsed Dive Time, and the Variable Ascent Rate Indicator will be displayed. The TLBG and O2BG will both flash as a warning of this condition.

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VIOLATION DIVE MODES

- While in Violation Modes, the Alternate Displays previously described for Deco Dive Mode can be accessed.
- Alternate Displays will automatically revert to the Main (Default) Display after 3 seconds unless the button is pressed to view another Alternate Display.

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RESET (CLEAR) FEATURE



- The XR-1 is configured with a RESET feature that allows data to be cleared, including Nitrogen and Oxygen calculations and Log Mode entries.
- **WARNING:** Reset after a dive and subsequent use for a repetitive dive conducted by the same diver could result in serious injury or death.

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EXCERCISES



- **DECO DIVE MAIN DISPLAY #1**
- Fill in the display using the following information:
 - *Depth: 21 Feet*
 - *Total Ascent Time: 9 Minutes*
 - *Decompression Ceiling: 20 Feet*
 - *Decompression Stop Time: 2 Minutes*
 - *Tissue Loading Bar Graph: 8 segments*
 - *O2 Accumulation Bar Graph: 3 segments*

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MAINTENANCE

- **OBJECTIVES:**

- *Describe care and cleaning procedures*
- *Identify inspection and service interval*
- *Understand basic practices for battery replacement*
- *Understand the procedure for pre-dive inspection of the Dive Computer*

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CARE AND CLEANING

- Protect your XR-1 from shock, excessive temperatures, chemical attack, and tampering. Protect the lens against scratches with a transparent Instrument Lens Protector. Small scratches will naturally disappear underwater.
- Soak and rinse the XR-1 in fresh water at the end of each day of diving, and check to ensure that the areas around the low pressure (depth) sensor and button are free of debris or obstructions.

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CARE AND CLEANING

- To dissolve salt crystals, use lukewarm water or a 50% white vinegar/50% fresh water bath. After removal from the bath, place the unit under gently running water and towel dry before storing.
- Transport your unit cool, dry, and protected.

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INSPECTIONS AND SERVICE

- Your XR-1 should be inspected annually by an Authorized AERIS Dealer who will perform a factory prescribed function check and inspection for damage or wear. To keep the 2 year limited warranty in effect, this inspection must be completed one year after purchase (+/- 30 days).
- AERIS recommends that you continue to have this inspection performed every year to ensure it is working properly. The costs of annual inspections are not covered under the terms of the 2 year limited warranty.

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BATTERY REPLACEMENT

- The Battery Compartment should only be opened in a dry and clean environment with extreme care taken to prevent the entrance of moisture or dust.
- To prevent formation of moisture in the Battery Compartment, it is recommended that the Battery be changed in an environment equivalent to the local outdoor temperature and humidity (e.g., do not change the Battery in an air conditioned environment, then take it outside during a hot sunny day).

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BATTERY REPLACEMENT

- **NOTE:** If the old battery can be removed and the new inserted within 8 seconds, nitrogen and oxygen calculations and settings will be retained for repetitive dives.



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INSPECTION

- Activate the unit and watch carefully as it performs a full diagnostic and battery check, and enters Surface Mode.
- Observe the LCD display to ensure it is consistently clear and sharp in contrast throughout the screen.
- **WARNING:** If there are any portions of the display missing or appearing dim, or if a low battery condition is indicated, return your XR-1 to an Authorized AERIS Dealer for complete evaluation before attempting to use it.

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A vertical black and white photograph of an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Behind it, several smaller, darker fish are visible. The bottom of the frame shows a dark, textured seabed, likely coral or rocks. The water surface is visible at the top, showing ripples and light reflections.

EXERCISES

- How often should the Dive Computer be inspected by an Authorized AERIS Dealer?
- How long do you have to change a battery between dives to retain nitrogen and oxygen calculations for repetitive dives?
- What should you do if you notice a problem with the Dive Computer during your pre-dive inspection?

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SAFETY GUIDELINES

- Read and understand the Operating Manual for your specific model Dive Computer prior to diving with the unit.
- AERIS Dive Computers are intended for use by recreational divers who have successfully completed a recognized course in SCUBA diving, and have knowledge of the potential risks and hazards of SCUBA diving.

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SAFETY GUIDELINES

- If you do not fully understand how to use the Dive Computer, or if you have any questions, you should seek instruction in its use from your Authorized AERIS Dealer before diving with it.
- During activation and diagnostics, if any display or function varies from the information presented in the Operating Manual, return the unit to an Authorized AERIS Dealer for inspection.
- If a low battery condition is indicated, AERIS strongly recommends that you do not dive until the battery is replaced.

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A vertical rectangular image on the left side of the slide showing an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Below it, there is a dark, textured coral reef. In the background, several smaller, darker fish are swimming. The water is clear and blue.

SAFETY GUIDELINES

- The Pre-Dive Planning Sequence provides predicted times for subsequent dives. You may actually have *less time available* than indicated because of breathing gas quantity and consumption, or oxygen accumulation.
- AERIS strongly recommends that you review the Pre-Dive Planning Sequence prior to every dive to help you plan your dive as required to avoid exceeding no decompression or oxygen exposure.

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SAFETY GUIDELINES

- To reduce your risk of exposure to decompression sickness, oxygen toxicity, and the effects of excessive ascent rates, you should keep each of the bar graphs (if available) in normal zones throughout your dives.
- Never share or exchange a Dive Computer with another diver, or use another Dive Computer for a repetitive dive.

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SAFETY GUIDELINES

- It should not be considered that the capabilities built into AERIS Dive Computers provide any implied approval or consent from AERIS for individuals to exceed the defined limits of recreational dive profiles, as agreed on by all internationally recognized training agencies.

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SAFETY GUIDELINES

- Always plan each dive.
- Always limit your dive to the level of your training and experience.
- Always make your deepest dive first.
- Always make the deepest part of every dive first.

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SAFETY GUIDELINES

- Check your Dive Computer often during the dive.
- Do a safety stop on every dive.
- Allow an adequate surface interval between each dive.
- Allow adequate surface intervals between each day of diving (within 12 hours or until your computer clears).

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SAFETY GUIDELINES

- Special training, equipment and support are necessary for diving deeper than the maximum recommended depth limit for recreational diving, generally agreed to be 130 FT (39 M) by most diving instruction authorities.
- Decompression diving, or diving deeper than 130 FT (39 M), will greatly increase your risk of decompression sickness.

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SAFETY GUIDELINES

- Decompression diving is inherently hazardous and greatly increases your risk of decompression sickness, even when performed according to the Dive Computer's calculations.
- Using a Dive Computer, just as dive tables, is no guarantee of avoiding decompression sickness.

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A vertical black and white photograph of an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Below it, there is a dense field of coral or sea anemones. In the background, several smaller fish are visible, swimming in the open water. The overall scene is dimly lit, typical of an underwater environment.

SAFETY GUIDELINES

- In 1990 the Undersea and Hyperbaric Medical Society (UHMS) published a set of guidelines aimed at minimizing the possibility of decompression sickness due to flying too soon after diving.
- The UHMS suggests that divers using standard air cylinders and exhibiting no symptoms of decompression sickness wait 24 hours after their last dive to fly in aircraft with cabin pressures up to 8,000 feet (2,440 meters).

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A vertical black and white photograph of an underwater scene. In the foreground, a large fish is swimming towards the left. In the background, several smaller fish are visible, and the bottom of the frame shows a coral reef structure.

SAFETY GUIDELINES

- The exceptions to this recommendation are:
- If a diver had less than 2 hours total accumulated dive time in the last 48 hours, then a 12 hour surface interval before flying is recommended.
- Following any dive that required a decompression stop, flying should be delayed for at least 24 hours, and if possible, for 48 hours.

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SAFETY GUIDELINES

- Since the 1990 UHMS guidelines were introduced, data from Diver's Alert Network (DAN) was introduced that resulted in DAN's position that "A minimum surface interval of only 12 hours would be required in order to be reasonably assured a diver will remain symptom free upon ascent to altitude in a commercial jet liner with cabin pressures up to 8,000 feet (2,440 meters).

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SAFETY GUIDELINES

- Divers who plan to make daily, multiple dives for several days, or make dives that require decompression stops, should take special precautions and wait for an extended surface interval beyond 12 hours before flight"

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SAFETY GUIDELINES

- Both the UHMS and DAN agree that “There can never be a flying after diving rule that is guaranteed to prevent decompression sickness completely. 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 the bends.”

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SAFETY GUIDELINES

- To reduce the risk of developing decompression sickness after a single no decompression dive, current guidelines suggest waiting 12 hours prior to exposure to atmospheric pressures equivalent to 1,000 feet (305 meters) above sea level, or greater.
- When repetitive dives are conducting during the same day, or period of days, it is suggested that the interval be increased to a minimum of 24 hours. Land travel to higher elevations after diving must also be considered as an exposure to altitude.

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A vertical black and white photograph of an underwater scene. In the foreground, a large, light-colored fish is swimming towards the left. Below it, there is a dense field of coral or sea anemones. In the background, several smaller, darker fish are visible, swimming in the same direction. The water surface is visible at the top of the frame, showing some ripples.

SUMMARY

- Remember that technology is no substitute for common sense, and a Dive Computer only provides the person using it with data, not the knowledge to use it.
- Remember also that the Dive Computer does not actually measure and test the composition of your body tissue and blood.

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ADVANCED Dive Computer MODELS

- AERIS Personal Dive Computers have always been the cornerstone of our innovative product line. AERIS pioneered many features and design elements now considered industry standards in digital instrumentation design and technology.
- The following is an overview of additional AERIS Dive Computer models. It is intended to provide you with an understanding of the basic differences between various types of Dive Computers.

AERIS®

XR-2



- The next model in the XR line features the following feature enhancements:
- Air and Nitrox Modes
- Audible Alarm with Flashing Red LED Warning Light
- Backlighting
- Optional ACI PC Interface with Detailed Dive Log and Settings Upload

AERIS®

XR-2



- 24 Dive On-Unit Log Book
- 2 Button Operation for ease of navigating display and set modes
- Set Max Depth, Elapsed Dive Time and Tissue Loading Bar Graph Alarms
- Set Backlight Duration
- Set PC Interface Sampling Rate

AERIS®

ATMOS ai



- In addition to the features of the XR-2, the ATMOS ai offers the following enhancements:
- Air Integration displays digital cylinder pressure
- Dive Time Remaining Display incorporates Air Time Remaining and provides a 'real' number in minutes, considering Air Time Remaining, Nitrogen and Oxygen absorption, and automatically displays whichever allows less time.
- "Turn-Around" Pressure Alarm

AERIS®

elite T3



- In addition to the features of the ATMOS ai, the elite T3 offers the following enhancements:
- Wireless Air Integration – compatible with up to 3 wireless transmitters
- 3 Mix - Nitrox 21-100%
- **Buddy Pressure Check™**
- Alpha Numeric Display
- Adjustable Safety Stop
- Conservative Factor Setting
- Free-Dive Mode
- 512K Download Memory



AERIS®

epic



- The epic packs all of the features of the elite T3 in a wrist watch that is equally at home when worn with a wetsuit or a three-piece suit.
- Advanced Digital Watch functions including Alternate Time Zone, Stopwatch, Lap Timer, Daily Alarm, and Countdown Timer



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DIVE COMPUTERS 101

AN INTRODUCTION TO THEIR USE AND OPERATION