Ascent™ by vemco

AR/AR2 USER GUIDE

VERSION 1.4

MARCH 15, 2019

Requires the use of the latest VUE software

vemco

DOC-5830-05

IMPORTANT SAFETY INFORMATION

At VEMCO, we make every effort to ensure all of our products are as safe as possible. However, some hazards are unavoidable when deploying equipment underwater.

IMPORTANT

Throughout this document, **read all warnings and cautions** before proceeding with next steps in procedures and using the product.

Your safety is important to us, so please read this list of cautions carefully, and follow the directions below.

Case Pressurization

If a case leaks underwater, the inside pressure will increase to match the pressure at that depth. This extra pressure will release as the unit is brought to the surface; however, if the leak is small, that pressure release will be very slow. This will result in the case still being highly pressurized at the surface.

Such a case can fly apart with explosive energy and represents a serious safety hazard.

Battery Breach

Lithium batteries contain chemicals that represent a serious health hazard – particularly when combined with water.

Most VEMCO receivers and acoustic releases use this type of battery. A battery breach can occur if a VEMCO receiver or acoustic release becomes damaged and water gets into the internals.

In addition, the reaction of the released chemicals with water in the sealed case can lead to case pressurization, which could be explosive.

Safety Features

VEMCO receivers and acoustic releases that are designed to be deployed at depth may be equipped with a pressure release that will activate when internal pressure reaches a certain level above external pressure. This mechanism can fail if a receiver or acoustic release has been damaged or if the release is blocked or fouled.

More details regarding specific receivers or acoustic releases can be found in the corresponding user manual.

IMPORTANT SAFETY INFORMATION

What to Do?

1. **Employ safety procedures** required by the country or state in which you are working.
2. **Always use** protective clothing, gloves and glasses, and work in a well-ventilated area.
3. Treat any receiver or acoustic release pulled from the water as if it has the *potential* to be pressurized or contain a breached battery. Point it away from yourself and others.
4. If a receiver or acoustic release shows any **signs of internal pressure or breach**, do NOT attempt to open it. Handle it very gently and store it in an isolated location, then call VEMCO Customer Support (see section **9.2** for contact information).

   Such signs may include:
   - Popped or bulging pressure release
   - Air or water seeping from seams
   - Signs of internal water (e.g. sloshing sound)
   - Excess weight
   - Signs of physical damage

If a receiver or acoustic release shows **signs of damage or heavy biofouling**, handle with extreme caution, and use all necessary protective equipment.

Summary of Manual

This manual is intended to provide VEMCO users with the information they require to use the **ASCENT Acoustic Release (ASCENT-AR/AR2)**. VEMCO highly recommends that the user fully read the manual before using the equipment or the VUE software.

Section 1: Introduction

Getting to know the ASCENT-AR

Section 2: Getting started

Testing the ASCENT-AR before deployment

Section 3: Communication

How to use VUE with an ASCENT-AR

Section 4: Deployment

Important points to consider in a deployment plan and the most common attachment method

Section 5: Maintenance

How to care for the ASCENT-AR, including replacing the battery, and how to prepare it for storage

Section 6: Additional Information

Additional information about the ASCENT-AR that is good to know but not mandatory for basic operations

Section 7: Common Questions

Answers to frequently asked questions related to using the ASCENT-AR

Section 8: Troubleshooting

Solutions to common issues that may arise

Section 9: Appendices

For the latest versions of user manuals and software, visit www.vemco.com.

Table of Contents

WARNING

If the ASCENT-AR/AR2 is not used in the manner specified in this manual, then the manufacturer's warranty protection may be voided.

© (2018) AMIRIX Systems Inc. All rights reserved. The information contained herein includes information which is confidential and proprietary to AMIRIX Systems Inc. and may not be used or disclosed without prior written consent of AMIRIX Systems Inc.

The *Bluetooth*® word mark and logos are owned by the Bluetooth SIG, Inc. and any use of such marks by AMIRIX Systems Inc. is under license. Other trademarks and trade names are those of their respective owners.

1 Introduction

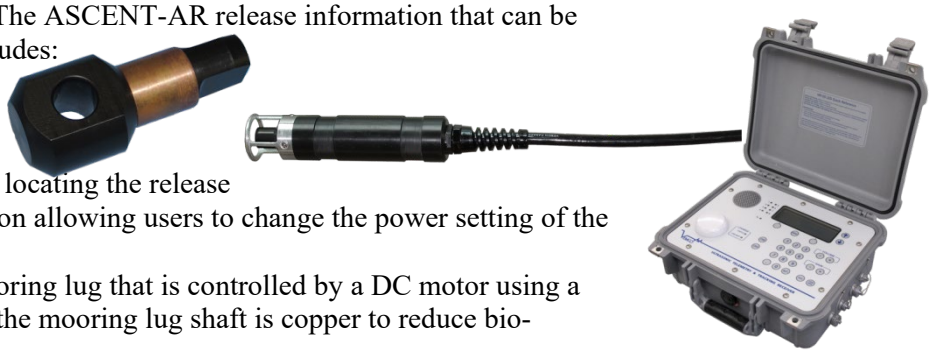
1.1 System Overview

The ASCENT – Acoustic Release (ASCENT-AR / ASCENT-AR2) is a submersible, single-channel acoustic release capable staying under water for up to five years. The ASCENT-AR acoustically communicates with a VR100-200 receiver, and separating from its mooring after an acoustic release command is received and verified.

The ASCENT-AR is housed in a corrosion resistant cylindrical plastic high pressure case (AR and AR2 shown at right). The case incorporates an integral hydrophone at one end of the case and a replaceable mooring lug at the other end. The ASCENT-AR has the ability to:

- Communicate with VUE software through a Bluetooth connection
- Quickly and reliably release from its mooring lug (typically within a few seconds)
- Easily re-arm the release mechanism
- Allow easy attachment of floatation to exterior casing for buoyancy
- Can respond to a VR100-200 without entering a specific serial number or location
- Communicate additional status information to the VR100-200 and make changes to select receive and transmit operations while deployed, such as power settings
- Report release status and activate the release through the VR100-200 acoustic communication
- Report range and depth information as the unit is rising to the surface

The ASCENT-AR communicates to the surface through our VR100-200 active tracking receiver. It is compatible with all VR100-200 models sold since January 2013. Customers will require a transponding hydrophone to attach to the VR100. The ASCENT-AR release information that can be accessed through the VR100-200 includes:

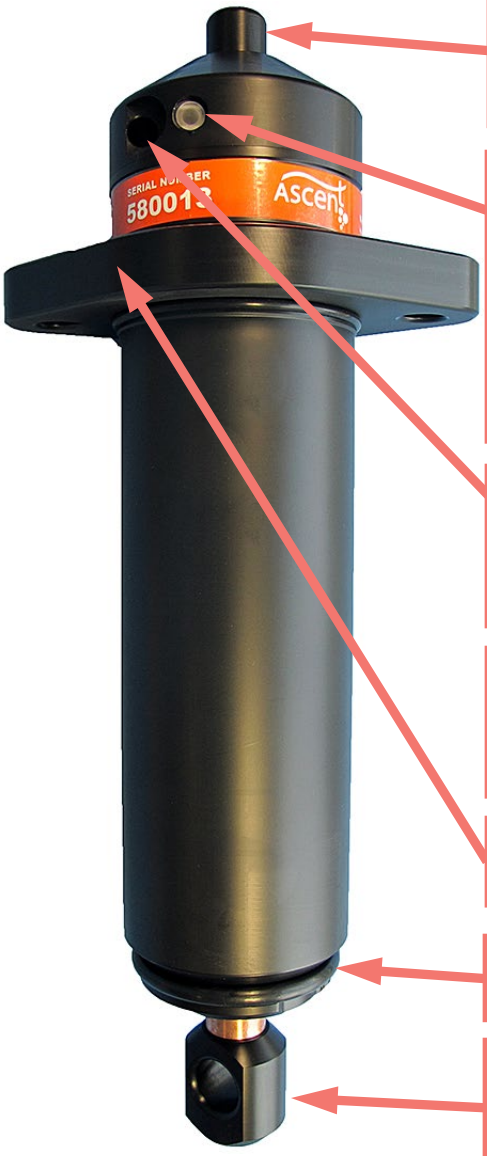


- Unit health
- Tilt, depth and temperature
- Battery life and memory usage
- Release range which will aid in locating the release
- Built in Transmitter configuration allowing users to change the power setting of the transmitter
- The release mechanism is a mooring lug that is controlled by a DC motor using a titanium shaft. The exterior of the mooring lug shaft is copper to reduce bio-fouling.

1.2 ASCENT-AR / ASCENT-AR2 Case

The ASCENT-AR / ASCENT-AR2 is housed in the black plastic high pressure case. The case consists of an outer cylinder that is removed to install the D (**AR**) or DD-cell (**AR2**) Lithium battery, the endcap which houses the hydrophone and connects to the metal internal casing, and the mooring lug that separates from the case to allow the release to rise to the surface. When the outer cylinder is removed, the internal casing protecting the electronics can be seen. The case dimensions are found in section 9.3.

A crucial part of the release is the hydrophone, located at the top. The hydrophone is similar to a microphone – it "listens" for sounds and transfers them to the electronics inside the release. This ability to both listen and broadcast allows the ASCENT–AR to communicate with a VR100-200 through a transponding hydrophone. Like all hydrophones, the ASCENT-AR hydrophone is a sensitive piece of equipment. Avoid striking the hydrophone or allowing any object to impact it as damage may occur that would prevent the release from communicating with the VR100-200.



Hydrophone: the release "microphone/speaker" and most delicate part.

Do not bump the hydrophone or the release may be damaged and unable to communicate.

Status Light (LED)/Release Valve: The light flashes red or green to indicate the release status. Section 6.2 has the full description.

The Release Valve will open *if* the internal pressure is greater than the external pressure (see section 8.2.2). ***Never cover this valve.***

2 red flashes every 5 sec = Active Mode

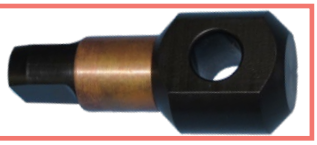
Bluetooth Activator Hole: Place the narrow end of the Bluetooth Activator in here to prepare for communication. Section 3.3 has more information on the Bluetooth Activator.

Pressure Sensor: Used to measure depth. Measurements are stored in memory and reported to VR100-200 during acoustic communication.

Float Attachment Bracket: contains two 9/16" holes for attaching a floatation device.

Retaining O-ring: Holds the Retaining Pin in place.

Mooring Lug: This hole is used to secure the release to its mooring. The mooring lug is left behind when the acoustic release occurs.



The ASCENT-AR is shipped closed. The case only needs to be opened to power the unit. Because the ASCENT-AR is often shipped with the battery installed but not connected, the first task is usually to open the case and either connect or install the battery. The only other time the case needs to be opened is when replacing the battery or preparing the unit for long-term storage. Connecting the battery is explained in Section 2, along with opening and closing the release case. Replacing the battery is explained in Section 5.1.

WARNING

The ASCENT-AR pressure case and seal have a maximum static depth rating of **500 meters** (730 psi). Physical shocks to the release, such as bumping into a solid object, when it is at any depth can result in a considerably higher pressure on the casing than just the depth pressure and water may enter the ASCENT-AR case. If the O-rings or their mating surfaces are dirty or damaged, then water may also enter the release case. If you are suspicious that water has entered the release, then follow the suggestions in section 8.2.2 for troubleshooting a pressurized case.

ASCENT-AR / AR2 Quick Facts	
Dimensions	**AR**: 401 mm (15.63") x 81 mm (3.2") diameter **AR2**: 465 mm (18.29") x 81 mm (3.2") diameter
Weight	**AR**: 2350 g in air; 500 g in water **AR2**: 2746 g in air, 812 g in water
Release Frequency	81.0 kHz
Battery Life	Approximately 28 (**AR** w D-cell) or 60 months (**AR2** w DD-cell)
Memory	16 MB or 32 MB
Built-in Temperature Sensor	Accuracy: ±0.5°C Resolution: 0.1°C
Built-in Depth Sensor	Accuracy: ±1.5°C* Resolution: 1 m
Operating temperature	-5°C to +40 °C; Water *must not freeze*.
Maximum Depth	500 meters (730 psi)
Software	**Latest** VEMCO User Environment (VUE) software
Communication	In air: *Bluetooth* communication with VUE software In water: Acoustic communication with a VR100-200 using a transponding hydrophone

*Reported depth sensor accuracy assumes constant seawater density of 1025 kg/m^3

2 Getting Started

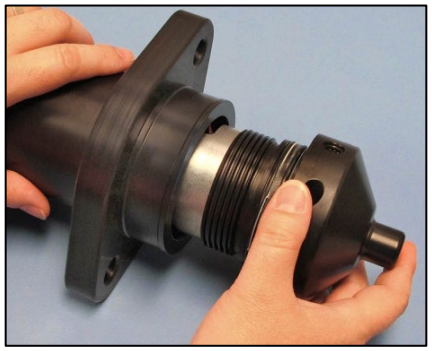
After the ASCENT-AR has been removed from the packaging and inspected for any damage that may have occurred during shipping, power and test the unit to ensure you can communicate with the release and it is working properly. The ASCENT-AR was shipped with the batteries installed but NOT connected.

ASCENT-AR is shipped with the battery installed but **NOT connected**.

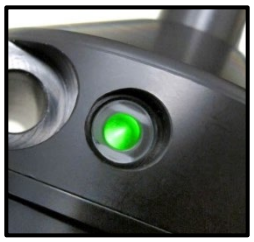
2.1 Connect Battery

STEP 1

Open the ASCENT-AR case as described in section 5.1.1. You'll find two batteries in the Metal Internal Casing. The smaller battery operates the release motor and is already connected. The D or DD-cell Lithium battery powers all other operations in the ASCENT-AR and is usually shipped unconnected within the release.

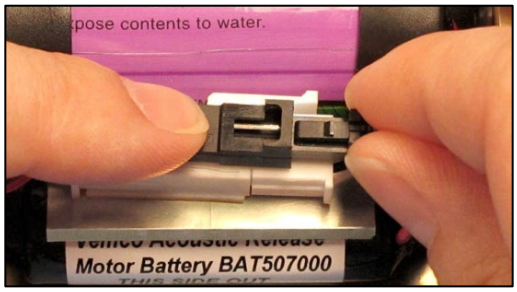


STEP 2



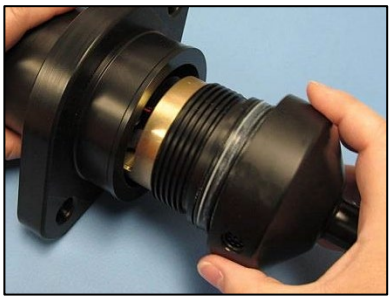
Position the release so you can see the Status Light.

Connect the two battery connector halves together until a "click" is heard and the ASCENT-AR release's light begins flashing. Watch for a long green light to indicate the self-tests were successful. If you see the long red light followed by more flashes, then contact VEMCO for instructions.



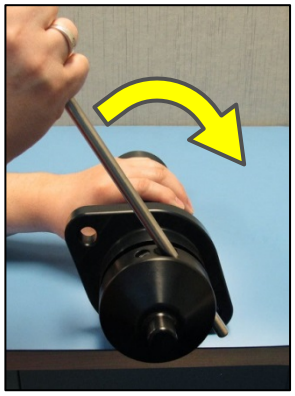
STEP 3

Close the release case by following the instructions in section 5.1.4



WARNING

Do not over-tighten the case pieces together or they may be damaged.



2.2 Testing

Before deploying the ASCENT-AR, it is wise to test it with the VR100-200 receiver to verify that it is operating properly. This test also creates a VRL file containing all the configuration information for this release – handy to keep as a record of the configuration.

Tests can, and should, be done in both air and water.

2.2.1 In-Air Test

Perform air tests away from electrical noise sources such as motors, PC screens, or fluorescent lights.

1. Communicate using the transponding hydrophone and VR100-200 (details about using the VR100-200 are found in the VR100 related user manuals).
    a. Connect the transponding hydrophone to the hydrophone connector on the VR100-200
    b. Place the caged end of the hydrophone within 15 cm (6") of the hydrophone on the ASCENT-AR.
    c. Turn on the VR100-200.
    d. Select "Transpond" in the main screen.
    e. Select "Scan" and wait for the ASCENT-AR serial number to appear on the screen.
    f. Select the ASCENT-AR.
    g. Select "Status…" from the menu (press "1" on keypad).
    h. Select "Get Range" (press "1" on keypad). This establishes communication between the ASCENT-AR and the VR100-200 and reduces the "talk time" necessary to communicate.
    i. Press the "MENU" button twice to move back to the Transponding menu.
    j. Select "Acoustic Release" (#3)
    k. Select "Status" to view the ASCENT-AR status. It should report "ready" at this stage. Press MENU to go back to the menu.
    l. Select "Activate" and enter the 5-digit activation code when prompted. Select the right selection button ("Activate") again.
    m. Wait while the mooring lug is ejected from the release; status is reported as "Opening" during this phase.

```
ASCENT:000001 170m
Enter the code:
      00000
              Activate
```

Find more transponding features in the VR100 user manual addendum.

Reset the mooring lug for another acoustic release (see section 4.4

2. Re-arming Acoustic Release). **NOTE:** The acoustic communication between the VR100-200 and the ASCENT-AR must time-out (be dormant for more than 10 minutes) in order for the release to report the ready state again.

2.2.2 In-Water Test

Tests performed in water are almost identical to the in-air test explained above. The only difference is that the equipment does not need to be as close in water as it does in air. In-water tests are often performed to establish an ideal range for the release in the environment in which they are moored.

3 VUE Communication

The ASCENT-AR uses either *Bluetooth* or acoustic communication, depending on the nature of the communication. *Bluetooth* communication occurs in air between the ASCENT-AR and VUE software. It is with VUE that data is offloaded and memory is erased. Acoustic communication occurs through water while the ASCENT-AR is deployed and requires a VR100-200 receiver with a transponding hydrophone attached. The detailed instructions for using a VR100-200 with a release are located in the VR100-200 Transponding manual. This section details how to communicate with the ASCENT-AR using VUE software and a *Bluetooth* connection.

NOTE:
Due to *Bluetooth* characteristics in water, the ASCENT-AR must communicate with the *Bluetooth* USB adapter ***through air*** (typical range is 10 meters).

3.1 Installing the VUE software

VUE software is used to communicate with the ASCENT-AR receiver, allowing studies to be setup and data to be offloaded. The software requires either Windows VISTA, Windows 7, 8, or 10.

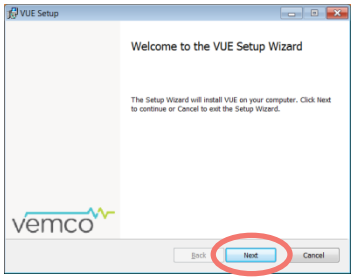
NOTE: A *Bluetooth* USB adapter is required for operation with the ASCENT-AR receivers because they use *Bluetooth* communication. See section 3.2 for details.

STEP 1

Follow the link in the VUE email you received. VUE is also available at www.vemco.com/downloads.

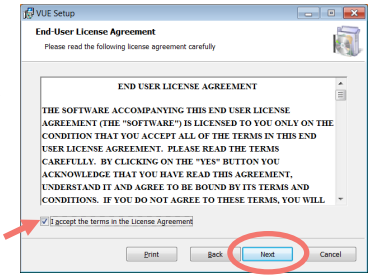
STEP 2

Click “Next” when the Install Shield Wizard begins.



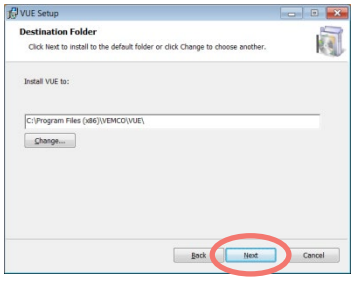
STEP 3

Read the license agreement and select “I accept” and “Next” if you agree to the terms.



STEP 4

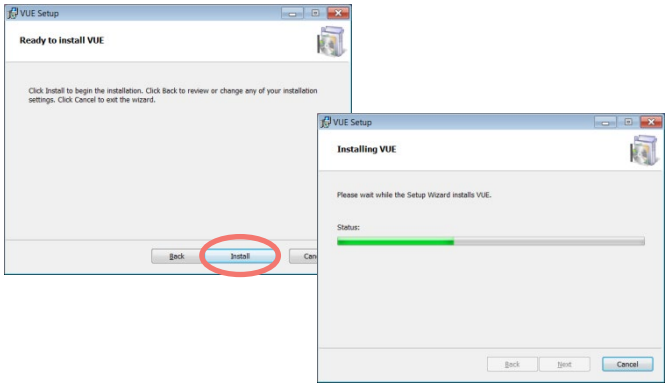
Click “Next” to install VUE in the folder shown, or click “Change” to select a different folder.



STEP 5

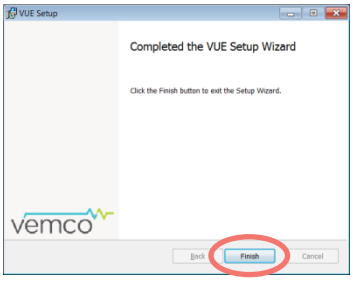
Click the "Install" button and wait while the VUE software is installed.

Click "Next" when it becomes enabled.



STEP 6

Click "Finished" to exit the setup wizard.



3.2 Connecting with Bluetooth

There are two ways to connect your PC or laptop through Bluetooth for communication with your receiver. Use the method that suits the equipment you have.

3.2.1 Using INTERNAL Bluetooth

There are a number of Windows Operating Systems (OS) PCs, laptops, and tablets equipped with **internal Bluetooth** capable of communicating with VEMCO receivers through the VUE software.

> **IMPORTANT:** If you want to use the internal Bluetooth, **DO NOT INSERT** the VEMCO supplied Bluetooth adapter into your device, and follow the steps below.

1. Open VUE software (latest version available from http://vemco.com/downloads).
2. Observe the Bluetooth icon at the bottom of the window. In most cases, it will look like the Bluetooth icon shown at right, indicating that you're ready to communicate with VEMCO Bluetooth equipment, like an ASCENT-AR. If VUE is not able to perform Bluetooth communication, you will see a **red "X"** through the icon.

NOTE: Communication difficulties may occasionally occur when the red "X" is not present. If this happens, follow the suggestions in the Bluetooth Troubleshooting Guide available on our website.

3. Connect to the receiver. Instructions are found in the receiver's user manual. If a Bluetooth connection cannot be established with the receiver, try using the VEMCO-supplied Bluetooth USB adapter as described in the next section.

3.2.2 Using the EXTERNAL Bluetooth Adapter

If your computer does NOT have internal Bluetooth capability, use the VEMCO-supplied USB Bluetooth adapter, as described here.

Attach the Bluetooth adapter (may not be as shown) to any USB port on your computer.

> **If you are using Windows Vista**, then you must install VUE 2.1.3 or greater for the proper adapter drivers. Windows 7 and greater have the necessary drivers installed.

3.3 Activate Wireless feature

The *Bluetooth* feature in the ASCENT-AR must be activated before the VUE software will be able to find and connect to the release. Activation requires a specially designed Bluetooth Activator.

The Bluetooth Activator is a stepped cylinder made of black plastic material. A strong magnet is contained in the smaller end of the Bluetooth Activator and should be kept away from any magnetically sensitive materials. An orange float is attached to the Bluetooth Activator for easier handling and locating of the activator. This activator functions with other VEMCO receivers that use a Bluetooth Activator, such as the VR2W and the VR4-UWM.

BLUETOOTH ACTIVATOR

WARNING

The Bluetooth Activator contains a **strong magnet**. Do not put it near magnet-sensitive materials, such as CRT computer monitors or magnetic stripes, as they could be seriously damaged.

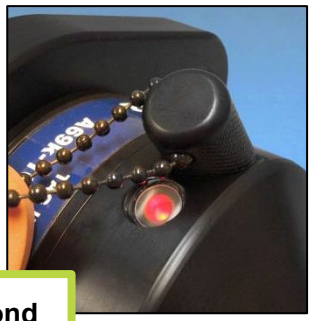
STEP 1

Slide the smaller end of the Bluetooth Activator in the Bluetooth Activator Hole on the ASCENT-AR, near the hydrophone.

STEP 2

Wait until the ASCENT-AR's LED begins flashing a bright, long, steady, red flash once a second. The wait time is less than five seconds.

Remove the Bluetooth Activator.



Bright, red flash every second

The flash pattern in the ASCENT-AR indicates the mode (state) the release is in at the time. A bright, long red flash once a second indicates that the ASCENT-AR is now ready for wireless communication but is not yet in communication with VUE.

The Bluetooth Activator can be removed from the ASCENT-AR once the light is flashing.

TIP

The ASCENT-AR must be **within 10 meters** (32 feet) of the operating *Bluetooth*® USB adapter.

3.4 Establish *Bluetooth* communication

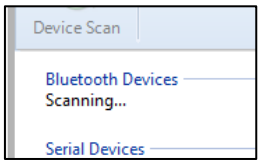
After the ASCENT-AR has been activated (section 3.3), it is ready for wireless communication with the VUE software. The ASCENT-AR must be within communication range of the *Bluetooth* USB adapter, which is typically 10 meters (32 feet) but can vary based on physical and wireless obstructions/interference. Due to *Bluetooth*® wireless technology characteristics in water, the ASCENT-AR must communicate to the *Bluetooth*® USB adapter through air.

ASCENT-AR communication range:

10 meters (32 feet) through air from *Bluetooth*® USB adapter.

STEP 1

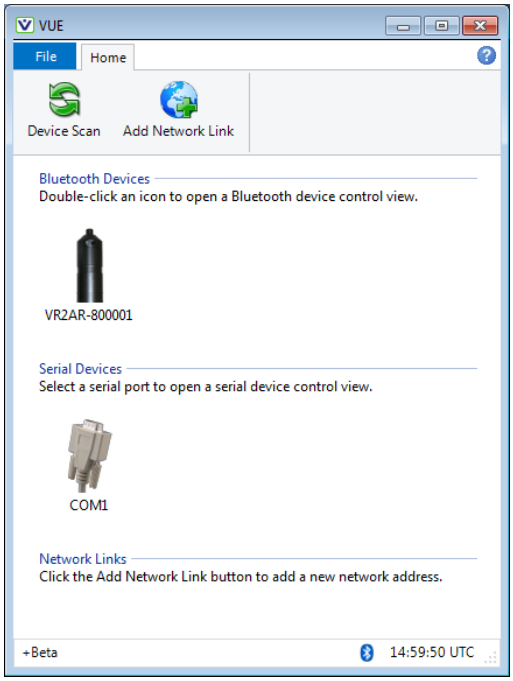
Open the VUE software. The software will scan for any active devices within communication range.



Wait while the software searches for the release.

TIP: If VUE can't find your release(s), try again. It's not uncommon for a Bluetooth scan to miss devices, especially if other wireless devices are in the area.

When the software finds the release, the ASCENT icon will be displayed in the "Bluetooth Devices" section of the Home tab with the release serial number for identification. It will display all *Bluetooth*® activated devices (LED is flashing bright, long, steady, red flashes) within communication range, which is approximately 10 meters.



If wireless communication has not been activated on the ASCENT then activate communication (section 3.3) and click "Device Scan" on the software's Home tab.

Wait while the software searches for devices.

All *Bluetooth*® activated VEMCO release within communication range will be displayed when a Device Scan is performed.

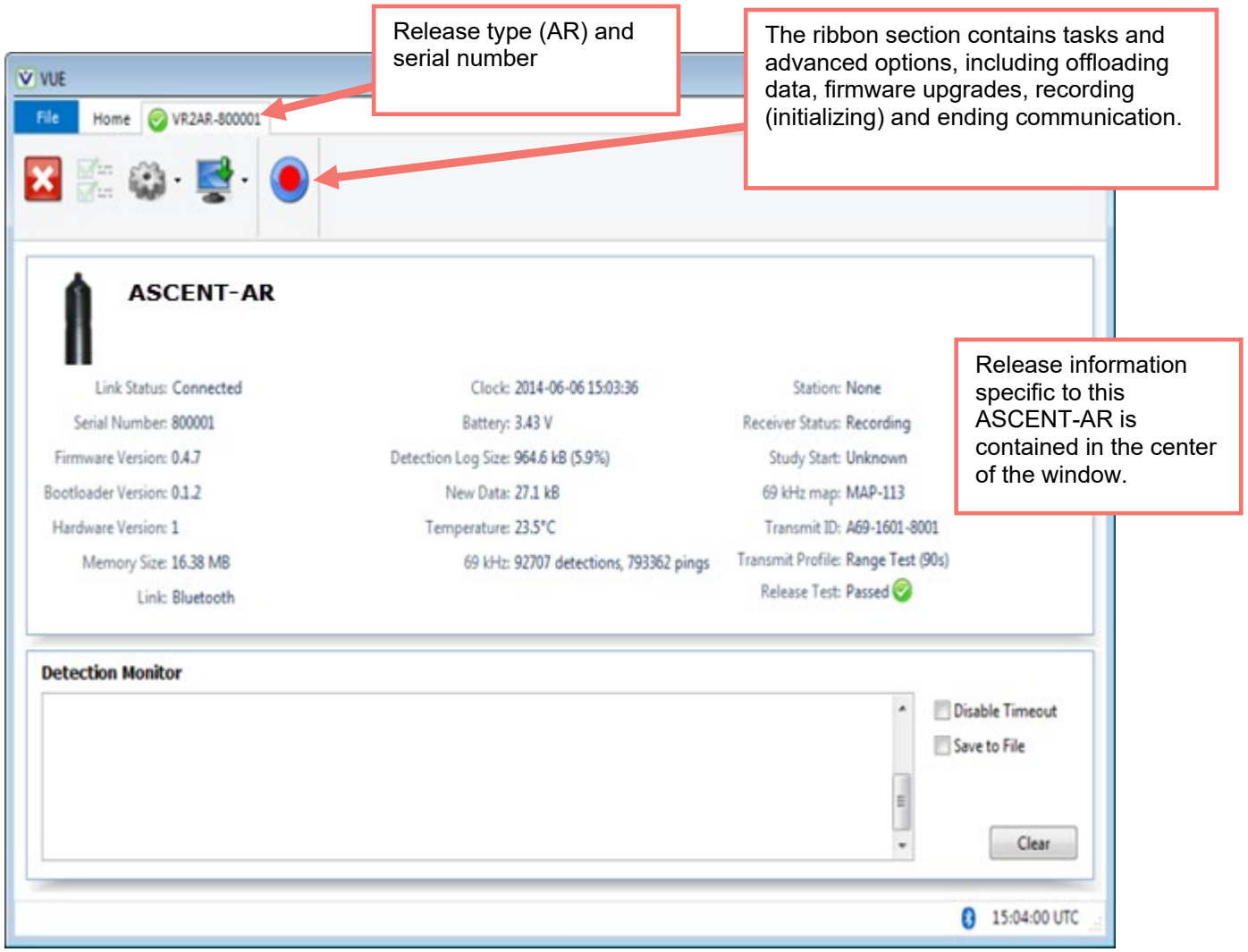
STEP 2

Double-click on the release icon of the desired ASCENT-AR (serial number is listed under the icon) and wait while communication is established. You'll know communication was successfully established when information pertaining to this release is displayed and the release LED is on continuously. The "Link Status" in the VUE window also changes to "Connected".

TIP: VUE can communicate with up to seven wireless devices simultaneously.

3.4.1 The Receiver Tab

Each release currently in communication with VUE has a tab at the top of the VUE window. This tab identifies the type and serial number of the release. Click on a tab to bring it to the front of all the tabs, making this release information visible.



CAUTION: Verify the release you are communicating with is **the intended unit**, particularly before initializing and erasing memory, or data could be lost. Communication can occur with any ASCENT-AR with *Bluetooth*® wireless technology activated within a 10 meter range (typical range in air).

3.5 Select Logging Options

The ASCENT-AR has two options for logging diagnostic information: Normal Diagnostics Mode and Fast Diagnostics Mode.[1]

Normal Diagnostics Mode (always active)

By default, diagnostic data are logged (recorded) once per hour in the ASCENT-AR memory. Normal Diagnostics Mode is always active and includes the following data:

- Tilt (instantaneous sample)
- Temperature (instantaneous sample)
- Average noise (Average of 60 samples @ 1 sample/minute)
- Depth (instantaneous sample)

Fast Diagnostics Mode (optional)

Diagnostic data are collected more frequently in Fast Diagnostics Mode. This mode is recommended for range testing and system performance troubleshooting. It can be activated to optionally run in parallel with Normal Diagnostics Mode for a period of 14 days.

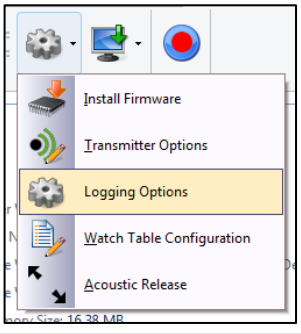
In Fast Diagnostics Mode, diagnostic data are logged once per minute in the ASCENT-AR memory. This mode stays active for 14 days following activation. The following instantaneous samples are collected and logged every minute:

- Tilt
- Termperature
- Noise
- Depth

To activate Fast Diagnostic Mode, follow the steps below.

STEP 1

Click the gear shaped icon in the VUE ribbon and select Logging Options to open the *Logging Options* dialogue box.



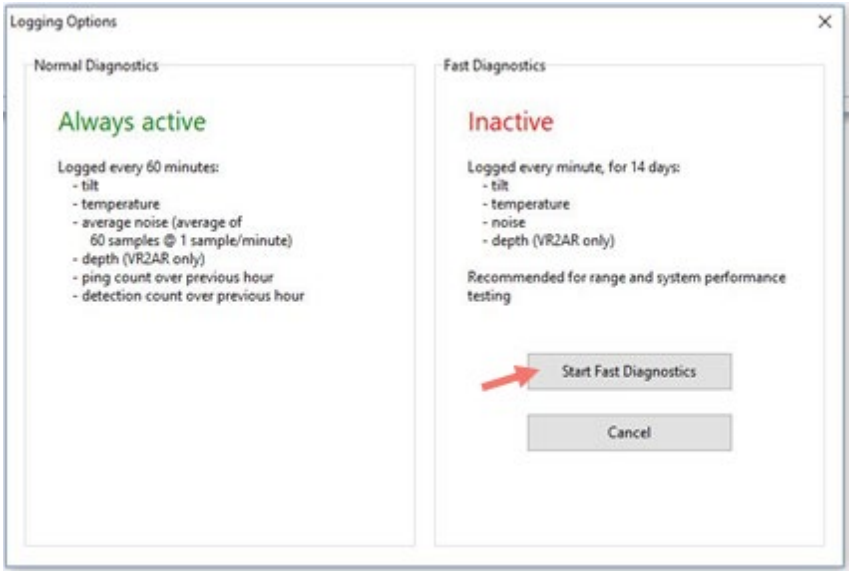
[1] This section describes ASCENT-AR logging options for receivers using firmware version 5.0.1 or later and VUE version 2.6.0 or later. Earlier firmware and software versions will show different sensor logging options for the ASCENT-AR.

STEP 2

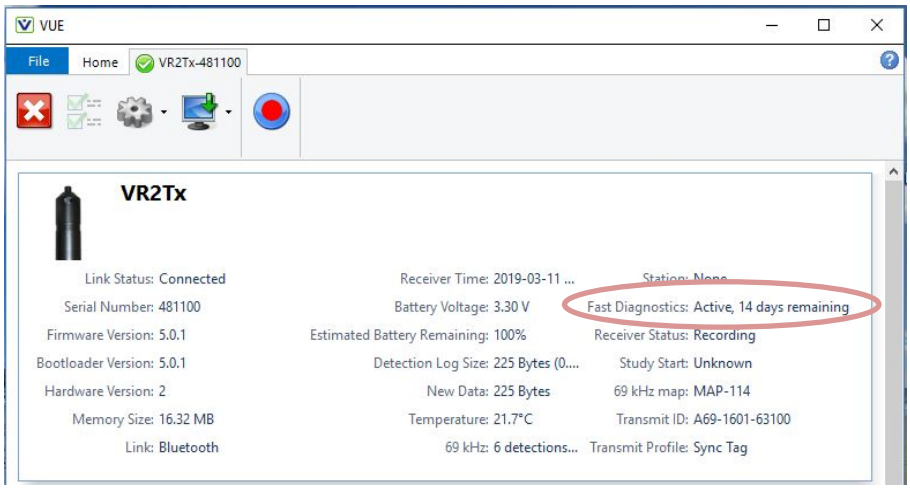
To activate Fast Diagnostics Mode, click Start Fast Diagnostics. Once this mode is activated, the ASCENT-AR will collect tilt, temperature, noise, and depth data every minute for the next 14 days.

Each 14-day usage of Fast Diagnostics Mode will consume 0.24 MB (1.49% of 16 MB or 0.74% of 32 MB) of ASCENT-AR memory.

The ASCENT-AR will continue to log Normal Diagnostics records while Fast Diagnostics Mode is enabled.

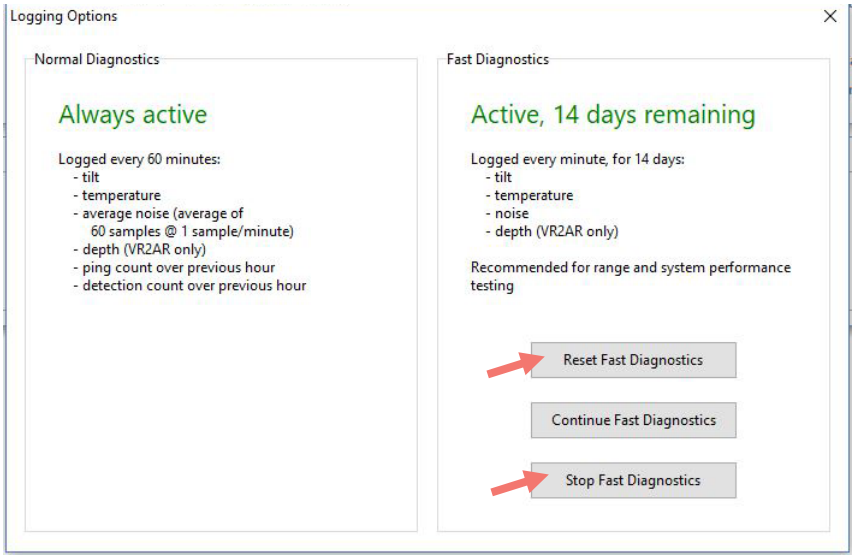


To check whether Fast Diagnostics Mode is running, go to the receiver status tab and find the Fast Diagnostics field. The status of Fast Diagnostics (Active or Inactive) is reported along with the time remaining if Fast Diagnostics is active.



To stop or reset Fast Diagnostics Mode, repeat Step 1 above (click the gear shaped icon in the VUE ribbon and select *Logging Options* to open the Logging Options dialogue box). Click Reset Fast Diagnostics to restart Fast Diagnostics Mode for another 14 days. Click Stop Fast Diagnostics to stop Fast Diagnostics Mode.

To cancel out of the Logging Options window without making any changes, click Continue Fast Diagnostics.

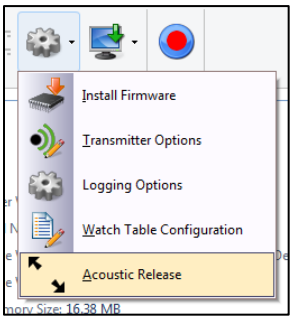


3.6 Acoustic Release in VUE

The mooring lug on the ASCENT-AR can be released while the release is in *Bluetooth* communication with VUE. Under the gear shaped Device Options, select Acoustic Release. A window will open requiring you to confirm the release before the command will be sent to the release.

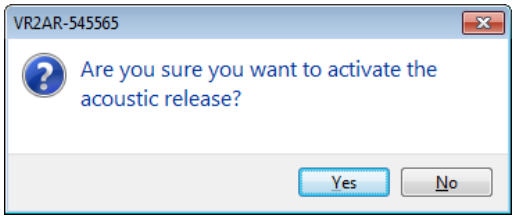
STEP 1

Click the gear shaped icon in the VUE ribbon and select Acoustic Release.



STEP 2

Select “Yes” to continue with the release.



Remember: The mooring lug must be re-armed before another release can occur. Instructions are found in section 4.4.

3.7 Logging mode

The default operating mode of the ASCENT-AR is to log sensor parameters, even while connected to VUE software. The ASCENT-AR enters Logging Mode when any of the following events occur:

- The battery is installed
- A Logging study is started in the VUE software
- *Bluetooth* communication is closed while logging is paused

Bluetooth communication can close when any of the following events occur:

- The ASCENT-AR is not within *Bluetooth* range for 10 minutes
- The Receiver tab in VUE software is closed by the user (red square with white "X").
- User commands from VUE have been inactive for 30 minutes (unless option is disabled; section 7.1.5)
- VUE is closed

These events were chosen so that an ASCENT-AR would always be deployed in Logging Mode. The only way the ASCENT-AR wouldn't be in Logging Mode is if the memory was full or the battery was removed (see section 5.1).

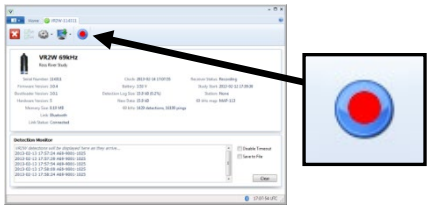
3.7.1 Start Logging

Setting up a study allows you to enter information in the ASCENT-AR that will aid you in identifying its deployment location and even a description of the study, such as the study's title or other information. This information is stored in the ASCENT-AR and offloaded with the data. It can be very useful when data is being organized in VUE.

Always backup previously offloaded data ***before*** initializing a new study. Internal memory is erased.

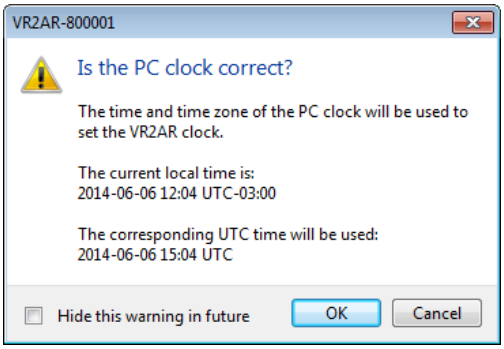
STEP 1

Click the red and blue "Start Recording" button found in the receiver tab's ribbon. This button is not available if communication between release and VUE is not present.



STEP 2

Review the PC clock time listed in the dialogue box that opens. The release will be set to UTC time based on the current time of the PC so the PC time and the UTC offset must be correct. If the time or UTC offset are not correct, then click "Cancel" and make the necessary corrections before returning to start the study. If the time and UTC offset are correct, then click the "OK" button to continue.

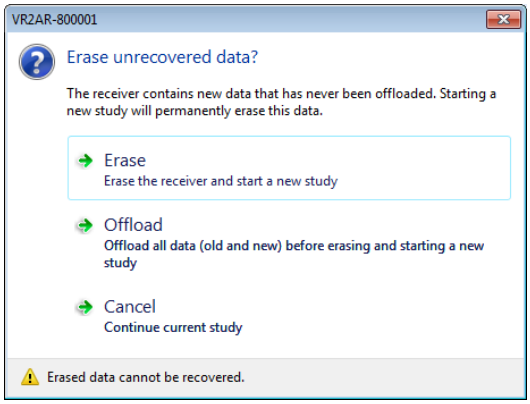


CAUTION: It is vital that the PC clock be correctly set to your local time, including time zone, ***before the AR is initialized***.

STEP 3

Select one of the three options displayed.

- **ERASE:** when the data stored in the ASCENT-AR has already been offloaded and you wish to erase the data and begin a new study.
- **OFFLOAD:** when the sensor data has not been offloaded from the ASCENT-AR, or if there is any uncertainty about the data being offloaded.
- **CANCEL**: when you wish to continue the logging that is currently running in the ASCENT-AR release. No changes to the study will be made.



CAUTION: Verify the release you are communicating with is **the intended unit**, particularly before initializing and erasing memory files, or data could be lost. Communication can occur with any ASCENT-AR, VR2AR or VR2W with *Bluetooth*® wireless technology activated within a 10 meter range.

WARNING

Initializing the ASCENT-AR will erase the release's memory. ***Retrieve all logs before the ASCENT-AR is initialized.***

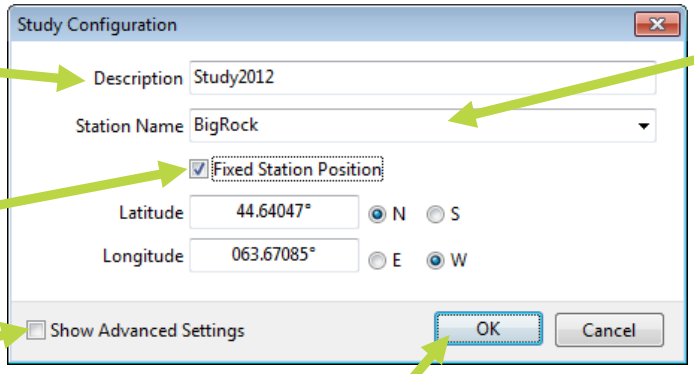
STEP 4

Enter a description of the study in the Study Configuration window. The station name is optional and can be selected from a list of existing stations (if a database is open) or by simply typing in the "Station Name" line to create a new station. If this station is a fixed position, then click a check mark in the "Fixed Station Position" box and enter the latitude and Longitude. If the fixed location information is already entered for an existing station, then the lat/long data will appear as soon as the station name is selected from the drop-down list.

Enter a description/title for this study.

Select Fix Station to enter lat/long location of AR

Advanced Settings includes changing the map and blanking interval.



Select or enter a station name.

Create a new station by entering the name in the Station Name line.

Choose unique station names for each deployment location.

Click OK to put the AR in Recorder Mode and begin the study.

How do I know the ASCENT-AR is logging?

Watch the red Status Light. Two quick, bright red flashes every 5 seconds indicate the ASCENT-AR is in Logging Mode.

3.8 Offload Data

After data has been collected by an ASCENT-AR, either during testing while in air or while in the water, that data must be offloaded to be accessed and viewed. Data can only be offloaded from the ASCENT-AR while it is in communication with VUE software through *Bluetooth*®. Follow the steps below to offload data.

STEP 1

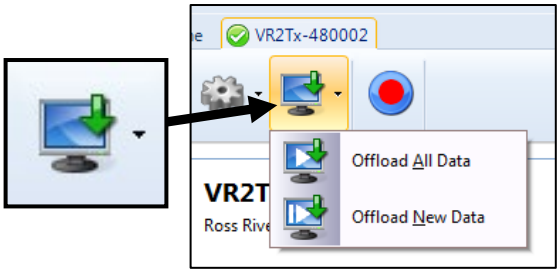
Activate the wireless feature on the ASCENT-AR release (see section 3.3)

STEP 2

Establish communication between the ASCENT-AR and the VUE software (see section 3.4).

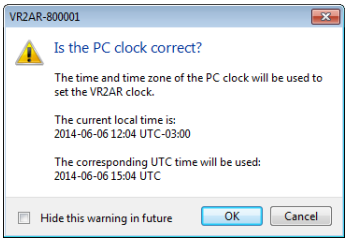
STEP 3

Click the "Offload data" icon in VUE's receiver ribbon and choose to either offload all the data stored in the ASCENT-AR, which will duplicate any data already offloaded during this study, or offload just the data that was stored since the last offload was performed.



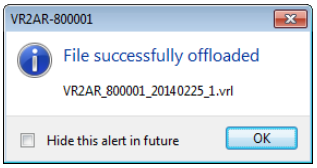
STEP 4

Verify that the PC clock is correct. If it is, then click "OK" to continue. If not, then correct the PC clock time and return to VUE to offload the data.



STEP 5

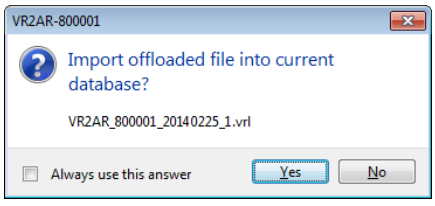
Wait while the data is offloaded. Progress is shown at the bottom of the VUE window.



The name of the file created is displayed when the data has successfully been offloaded.

If a database is open in VUE when data is about to be offloaded, an additional dialog box appears asking if the offloaded data should be imported directly into the open database. If "NO" is selected, then the file(s) will be saved to the directory and in the format selected in the Offload tab of the *Options* window (see VUE manual for details) and will not be imported to the database. The created file choices are:

- VRL files only
- VRL files and CSV file
- VRL files and legacy VR2 files



The offloaded data will be stored in the selected file type(s) and location regardless of if the data is directly imported in to the VUE database or not.

If a database is not open when data is offloaded, then the data will automatically be saved in the file format(s) and directory selected in the *Options* window.

3.9 Disconnect communication with release

Click the “Close View” button (red box with white X) to disconnect the communication between the ASCENT-AR and VUE software. A window will appear to confirm that you want to close the ASCENT-AR View window.

When the communication is disconnected, the ASCENT-AR resumes recording with the last study that was initialized. Ending communication does not re-initialize the release.

4 Deployment

How the ASCENT-AR is deployed is driven by the environment it is being deployed in and the type of study being performed. Some important points to keep in mind when designing a deployment plan for your ASCENT-AR are explained here. The common method for attaching an ASCENT-AR to a mooring line is also given, along with the dimensions of the ASCENT-AR cases.

4.1 Deployment Facts/Tips

4.1.1 Mooring

The ASCENT-AR is moored in many configurations often reflecting the bathymetry and oceanographic/weather conditions. A simple mooring design generally works well. In rougher conditions, heavier weights and mooring lines are usually required. A buoyancy of 7 - 14 kg (15 - 30 lbs.) is recommended to raise the ASCENT-AR when no biofouling has occurred – adjust this as needed for your payload and deployment location conditions. The floatation must be suitable for the depth at which it will be deployed.

Ensure the ASCENT-AR's hydrophone is unblocked (e.g. position a buoy a few feet above the hydrophone to allow an unobstructed view of the surface) and free of any biofouling. In high flow locations, you may consider using hydro dynamically shaped buoys and low profile anchors.

For the best horizontal range and acoustic communication, mount the ASCENT-AR in a vertical position with the hydrophone pointing up to the surface.

CAUTION: The hydrophone must be kept ***free of mooring lines and obstructions***. Objects around the hydrophone will adversely affect the detection range of the ASCENT-AR release.

Attach the ASCENT-AR's float attachment bracket to a floatation device capable of withstanding pressure since it will be submerged. Hard skinned floatation devices are recommended.

Connect the Mooring Lug to a weight. For typical deployments, we recommend using 36 – 68 kg (80 – 150 lbs.) weight with 7 – 14 kg (15 – 30 lbs.) floatation. Modifications may be require depending on your payload and deployment situations.

During deployment, always lift the weight section separately. Never lift the weight in air by attaching to the ASCENT-AR.

Never lift the weight in air by attaching to the ASCENT-AR. ***Always lift the weight section separately.***

Always check the tilt of the release after it is deployed to verify it is vertical with the hydrophone pointing up (0-11°). This is done using a VR100-200 and a transponding hydrophone. Details are found in the VR100 Acoustic Communication manual.

4.1.2 Biofouling

Some customers use a rubber shrink tape, such as DAFLEX ST250 Cold Shrink Tape, available from Digikey (W211-ND), to prevent biofouling on the ASCENT-AR. It can be used to cover the release body (Do not cover the hydrophone) and does not leave a glue residue when removed. Another option is to use an antifouling paint, such as Interlux Micron CSC.

When using antifouling paint, consult the manufacturer's safety data sheet and follow their recommended handling procedure (safety glasses, gloves, etc.)

NOTE:

Keep the hydrophone uncovered to prevent acoustic dampening.

Never cover the Status Light/Release Valve

The release valve *must* be able to pop open if needed and must not be blocked by tape or paint.

4.2 Mooring Line Attachment

A common method used to attach an ASCENT-AR to a mooring line is to thread the rope through one of the holes in the float attachment bracket, wrap it around the circumference of the release, and up through the other hole in the float attachment bracket, as shown below. A minimum rope size of 3/8" diameter nylon rope is suggested.

Pass a shackle through the mooring lug and use the 3/8" diameter (minimum) rope through the shackle.

3/8" diameter nylon rope

(Suggested minimum)

4.3 Acoustic Release

More VR100-200 commands are found in the VR100 Acoustic Communication manual.

The ASCENT-AR release mechanism is a push-off pin that is controlled by a DC motor using a titanium shaft. The exterior of the shaft is copper to reduce bio-fouling. Follow the steps listed below to release the mooring lug and allow the ASCENT-AR to rise to the surface.

1. Connect the transponding hydrophone to the hydrophone connector on the VR100-200 receiver (first connector).
2. Turn on the VR100-200.
3. Select "Transpond" in the main screen.
4. Select "Auto Scan" and wait while the VR100-200 listens for the units in the area to respond.
5. Select "View" to see the list of units found.
6. Select the desired ASCENT-AR from the list by either moving through the list using the direction arrow buttons and then pressing the right selection button (under "Select" on the display), or by pressing the associated number on the keypad.
7. Select "Status…" from the menu (press "1" on keypad).
8. *[optional]* Select "Get Health" (press "1" on keypad). This establishes communication between the ASCENT-AR and the VR100-200 and reduces the "talk time" necessary to communicate.
9. Press the "MENU" button twice to move back to the Transponding menu.
10. Select "Acoustic Release" (#3)
11. Select "Arm" (#2) from the menu and wait for the status to change to "Armed".
    NOTE: An ASCENT-AR with firmware 1.2.5 and up does not require this arming step. Just proceed to the Activate step described next.

```
1 Status
2 Arm
3 Activate
                Select
```

12. Select "Activate" (#3) to send the release command.
13. After reading the confirmation screen, select "Activate" again. The status is reported as "Opening" until the motor in the ASCENT-AR has completed its task, at which time the status changes to "Open." With the proper amount of buoyancy attached to the ASCENT-AR, it should be rising to the surface.
14. Press "Menu" to go back a screen and then select "Status" (#1). The current status is reported and refreshing the information (select "Resend") allows you to view the progress to the surface.

```
A-AR:000001     150m
Status: Open
Depth: 0m          ↓
                Resend
```

If you need to release the mooring lug while in *Bluetooth* communication, see section 3.6.

4.4 Re-arming Acoustic Release

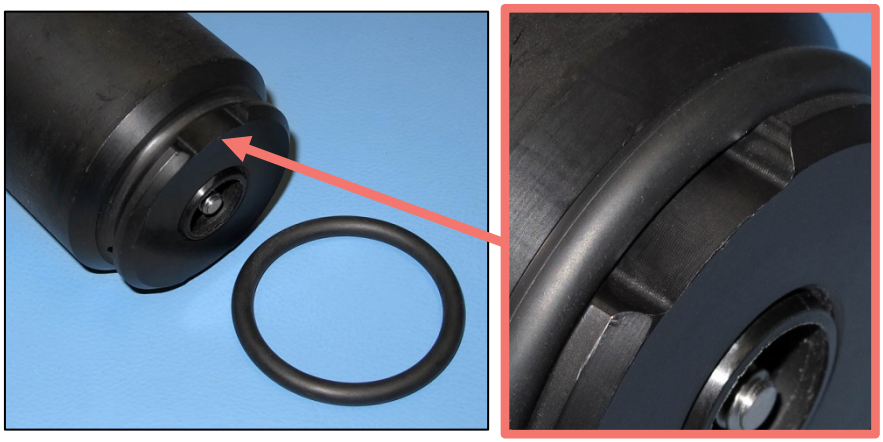
The mooring lug in the end of the ASCENT-AR must be installed before the ASCENT-AR is deployed. Mooring lug replacements are available from VEMCO.

Follow the steps below to install a mooring lug in an ASCENT-AR:

STEP 1

Remove the thick Retaining O-ring from the end of the ASCENT-AR. There are two flat sections next to the O-ring. Use either flat spot to aid in gripping the O-ring and removing it.

Place the O-ring in a safe location for use later. Replacements are available from VEMCO.

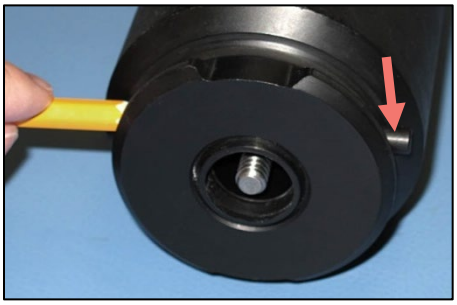


STEP 2

Locate one end of the retaining pin. The ends can be seen inside the O-ring groove.

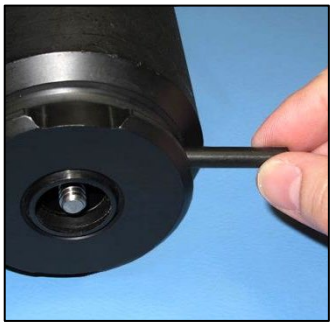
STEP 3

Use a thin item, such as a pen or pencil, to push one of the retaining pin into the ASCENT-AR case and cause the other end of the pin to exit the case.



STEP 4

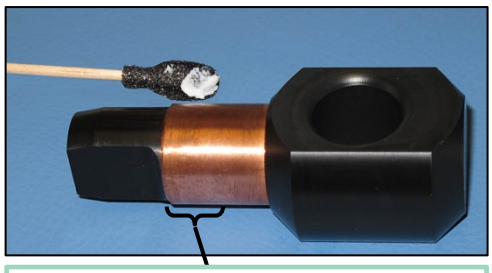
Remove the retaining pin completely from the ASCENT-AR case and set it in a safe location for use later.



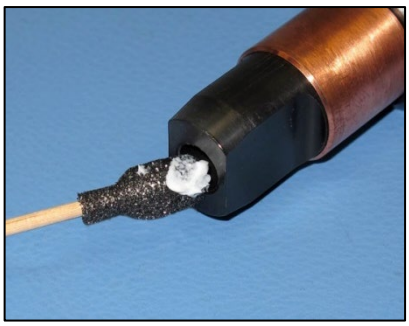
If your mooring lug has a line (rope, cable, etc.) already attached, then slide the Retaining O-ring over the mooring lug and along the line until it is out of the way.

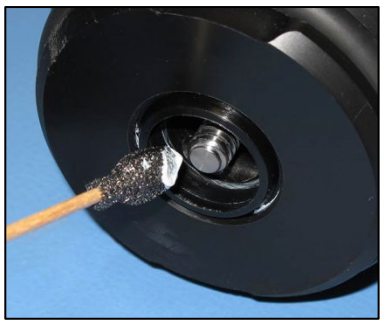
STEP 5

RECOMMENDED: Spread a *thin* coat of **Molykote 55 O-ring grease** around the copper sleeve and inside the threaded hole on the mooring lug. Also spread a thin coat around the threaded rod inside the ASCENT-AR and on the seal at the lip of the hole. **Always wear protective gloves when handling O-ring grease!**



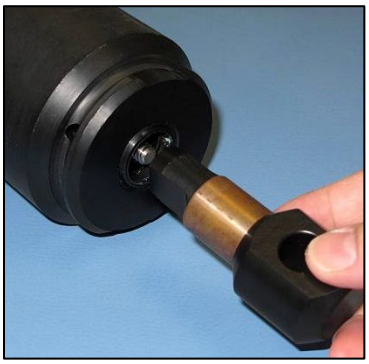
Grease only this half of copper sleeve





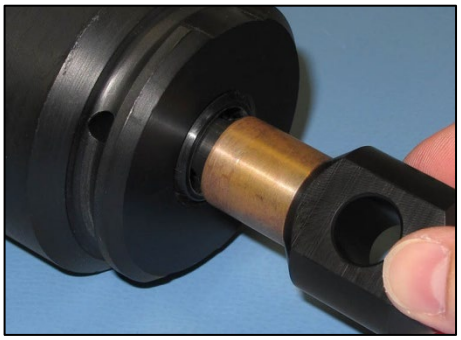
STEP 6

Insert the threaded end of the mooring lug (shown below on right) onto the threaded rod in the end of the ASCENT-AR.



STEP 7

Turn the mooring lug clockwise to thread it onto the rod in the ASCENT-AR. Stop when the lug stops and don't over tighten.



STEP 8

Insert the retaining pin into the case until it stops but keep pressure on the pin.

Turn the mooring lug counterclockwise slightly until the pin slides farther into the case.

Center the pin within the case so neither end is protruding.

WARNING

The pin prevents the lug from turning during release. Failure to install this pin would **result in the lug not releasing**.

STEP 9

Slide the Retaining O-ring over the Mooring Lug and slip one side of the O-ring into the groove.

DO NOT grease the retaining O-ring.

STEP 10

Push the Retaining O-ring over the edge of the case so it sits in the groove.

Check the circumference of the case to verify the O-ring is securely in the groove.

5 Maintenance

5.1 Main Battery Replacement

Replacing the main battery (D or DD-cell) in the ASCENT-AR requires four basic steps:

1. Opening the case (section 5.1.1)
2. Removing the battery (section 5.1.2)
3. Inserting the battery (section 5.1.3)
4. Closing the case (section 5.1.4)

NOTE: The process is the same for the AR or AR2.

5.1.1 Open the ASCENT-AR Case

A steel rod is necessary to properly open and close the ASCENT-AR case. Every shipment of new ASCENT-AR includes a steel rod.

STEP 1

Make sure there is ***absolutely no water*** on or near the ASCENT-AR case. Water, even in a small quantity, can damage the ASCENT-AR internal circuits beyond repair. If the ASCENT-AR is attached to a wet rope, remove the release from the rope before opening the case.

This also means the electronics cannot be exposed to a ***sudden change in temperature and humidity*** that will cause condensation to develop on the electronics and destroy the release.

WARNING

It is vitally important that the electronics inside the release case ***do not come in contact with any water*** or the release will be damaged. For this reason, VEMCO recommends the ASCENT-AR be opened in a controlled environment and *not* in the field or on the deck of a boat.

STEP 2

Place the ASCENT-AR on a clean, flat surface so the hydrophone is hanging over the edge but the float attachment bracket is still on the surface. DO NOT let the release fall off the surface.

TIP: A non-slip surface, such as a rubber mat, helps keep the ASCENT-AR in place while opening it.

STEP 3

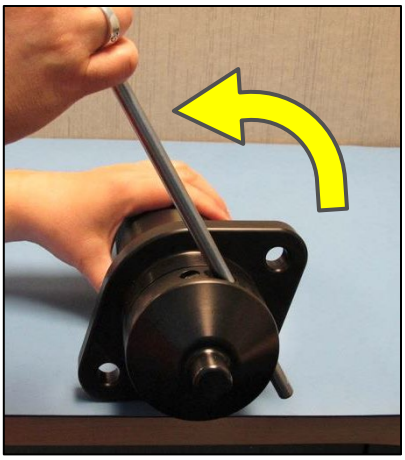
Hold the body of the ASCENT-AR securely in place. A strap wrench on the body of the ASCENT-AR can help with gripping the release.

Insert the steel rod into the Bluetooth Activator Hole on the end of the release and hold on to the rod – it can slide right through the hole and potentially damage something below. Make sure the rod is fully inserted into the hole – damage may occur to the Bluetooth Activator Hole if the rod is partially inserted.

Apply pressure to the rod to turn it in a counter-clockwise direction (when facing the hydrophone).

Continue to rotate the rod, and therefore the end-cap, until turning become easier.

NOTE: The Float attachment bracket may rotate on the case.



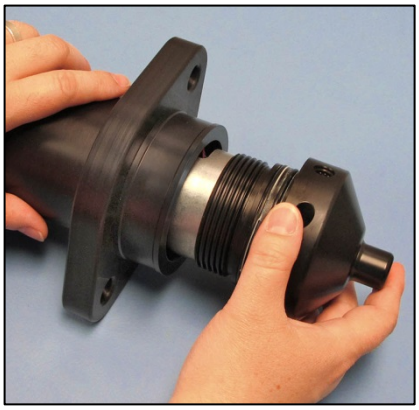
STEP 4

Remove the steel rod from the ASCENT-AR case and set it aside.

Continue by hand twisting the end-cap in a counter-clockwise direction until the end-cap and outer cylinder separate.

STEP 5

Slide the end-cap and cylinder apart until the end has cleared the cylinder. Be very careful not to damage the threads on the end-cap or the ASCENT-AR won't close and seal properly.



WARNING

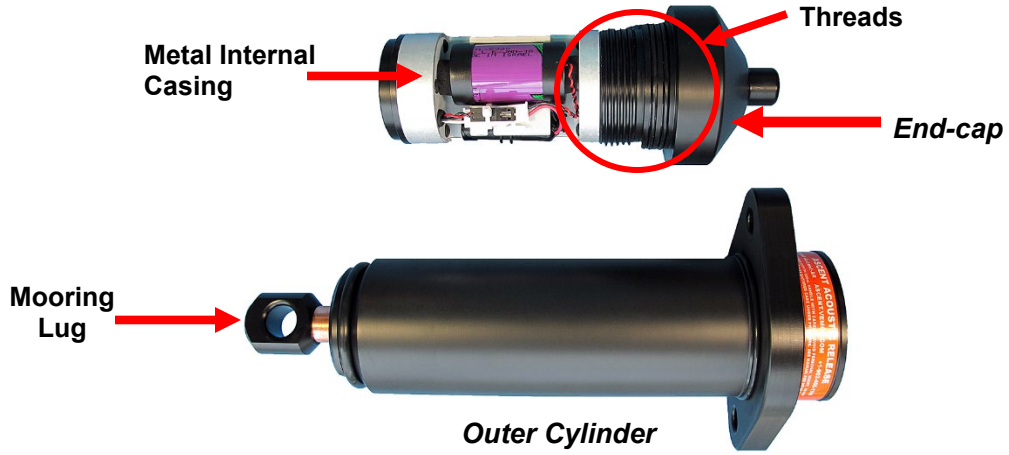
DO NOT impact the threads on the end-cap or they will dent and prevent the ASCENT-AR case from closing. See section 8.2.1 for tips on thread care.

WARNING

The internal casing surrounding the electronics is not waterproof. Water, even condensation from a humid environment, will enter the case and damage the electronics.

STEP 6

Place the outer cylinder and internal casing/end-cap on a stable surface and prevent them from rolling – particularly the internal casing/end-cap (AR model shown).



5.1.2 Disconnecting and Removing Battery

STEP 1

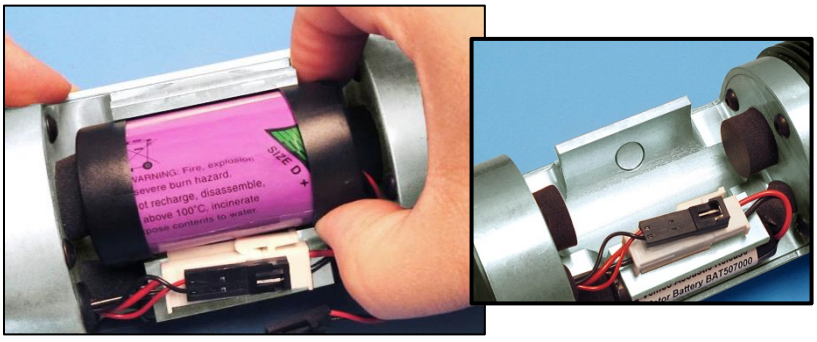
Open the case as explained in the previous section and set the Outer Cylinder aside (AR model shown).

STEP 2

Press the release lever on the battery connector and pull the connector apart. The connector is small and a small flat screw driver may be helpful.

STEP 3

Grip one end of the battery and lift it out of the battery compartment (VR2AR shown).



Do not disconnect the AA battery.

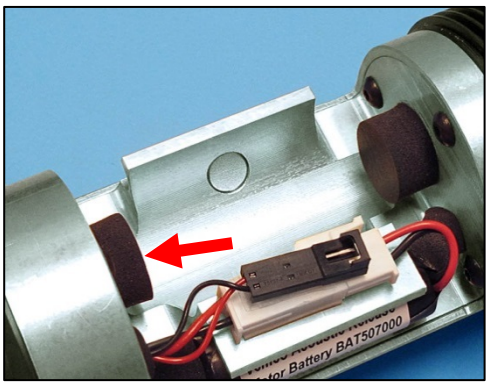
5.1.3 Install Battery

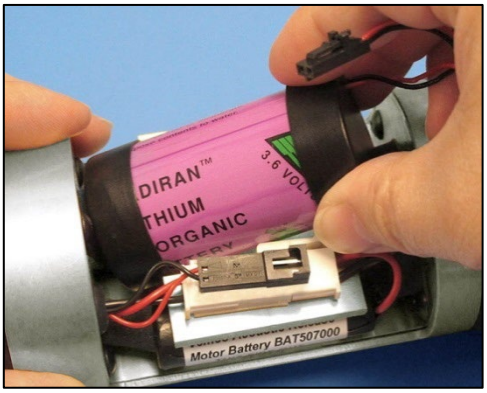
With the case open, you can install the new battery. If there is a used battery in the release, use the instructions found in Section 5.1.2 to remove the battery before inserting the new one. Some ASCENT-ARs are shipped with the battery inside the release but not connected. If this is the case for your release, then move to Step 2 in the instructions below to power your ASCENT-AR.

STEP 1

Slide the wireless end of the Lithium D/DD-cell battery against the foam pad closest to the flat end of the release and inside the battery compartment (see arrow in photo below and left, AR model shown).

Press the wired end of the battery down into the battery compartment.

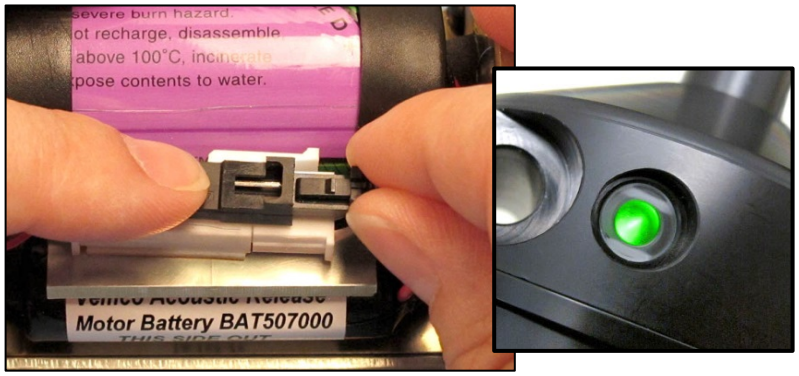




STEP 2

Position the release so you can see the Status Light.

Connect the two battery connector halves together until a “click” is heard and the ASCENT-AR release light begins flashing. Watch for a long green light to indicate that the self-tests were successful. If you see the long red light followed by more flashes, then contact VEMCO for instructions.



NOTE: If the ASCENT-AR was in logging mode (i.e. as Study had been initialized; see section 3.7) when the battery was disconnected, then it will immediately return to logging sensor data after the battery has been replaced. Settings are not lost when the power is disconnected.

5.1.4 Close the ASCENT-AR Case

Before deploying or storing an ASCENT-AR, the case must be properly closed and sealed to prevent damage to the electronics. Even humidity in the air can, over time, cause damage to the electronics so it's very important to keep the case sealed with a functioning desiccant pack inside. Important information about storing a ASCENT-AR is found in section 5.3.

STEP 1

Make sure the serial number around the outer cylinder matches the serial number on the internal casing. This is particularly important when more than one ASCENT-AR is open at the same time.

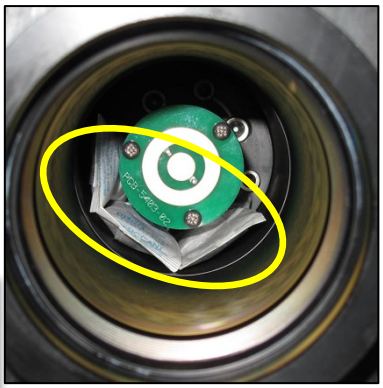
STEP 2

If this is the first time closing the ASCENT-AR case, then make a visual inspection of the O-rings and the O-ring surface inside the outer cylinder to be sure they are still clean, properly greased, undamaged, and debris free. Details are found in section 5.2.

If the ASCENT-AR has previously been deployed, then follow the O-ring inspection/replacement instructions in section 5.2 to improve the seal in the case before continuing.

STEP 3

Hold the release in an upright position and place three new desiccant packs (if the existing packs have been used during a deployment) in the bottom of the Outer Cylinder, **past the green/gold connection plate**. This is to prevent the desiccant packs from being *pinched* when screwing the top back on (see Steps 4 and 5).



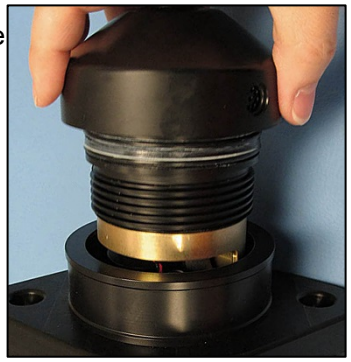
Desiccant packs have been included in the bottom of the ASCENT-AR to reduce the occurrence of condensation in the ASCENT-AR. Three of these packs should remain in the case during storage and deployment.

We recommend that you replace the desiccant pack with each deployment and with each battery replacement cycle.

More information on the availability and usage of these packs is located on our website, www.vemco.com.

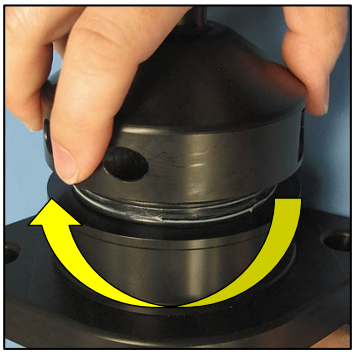
STEP 4

Hold the release in an upright position and slide the internal casing into the Outer Cylinder, flat end first, until the first threads are inside the outer cylinder.
Ensure that the O-rings remain properly seated in their grooves as the end-cap is moved into the outer cylinder.



STEP 5

Hold the release in an upright position and turn the end-cap in a *clockwise* direction (when looking at the hydrophone) until it becomes too hard to turn.



STEP 6

Place the ASCENT-AR **on its side** a clean, flat surface so the hydrophone is hanging over the edge but the float attachment bracket is still on the surface. DO NOT let the release fall off the surface.

TIP: A non-slip surface, such as a rubber mat, helps keep the ASCENT-AR in place while closing it.

STEP 7

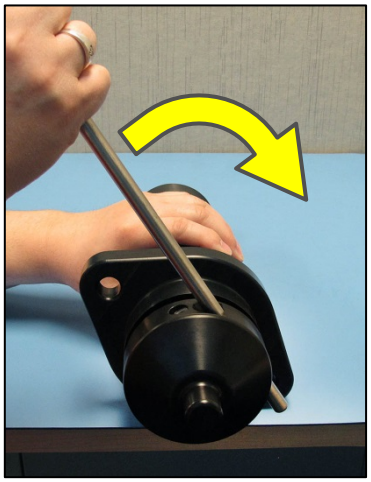
Insert the steel rod into the Bluetooth Activator Hole and hold on to the rod – it could slide through the case and potentially damage something below. Make sure the rod is fully inserted or damage may occur to the Bluetooth Activator Hole.
Hold the body of the ASCENT-AR securely in place. A strap wrench on the body of the ASCENT-AR can help with gripping the release.

Apply pressure to the rod so it turns in a clockwise direction when you are facing the hydrophone.

Continue moving the rod until the end cap touches the edge of the outer cylinder. Don't over-tighten the case pieces together or they may be damaged.

Remove the steel rod from the ASCENT-AR case.

NOTE: The Float attachment bracket may rotate on the case.



WARNING

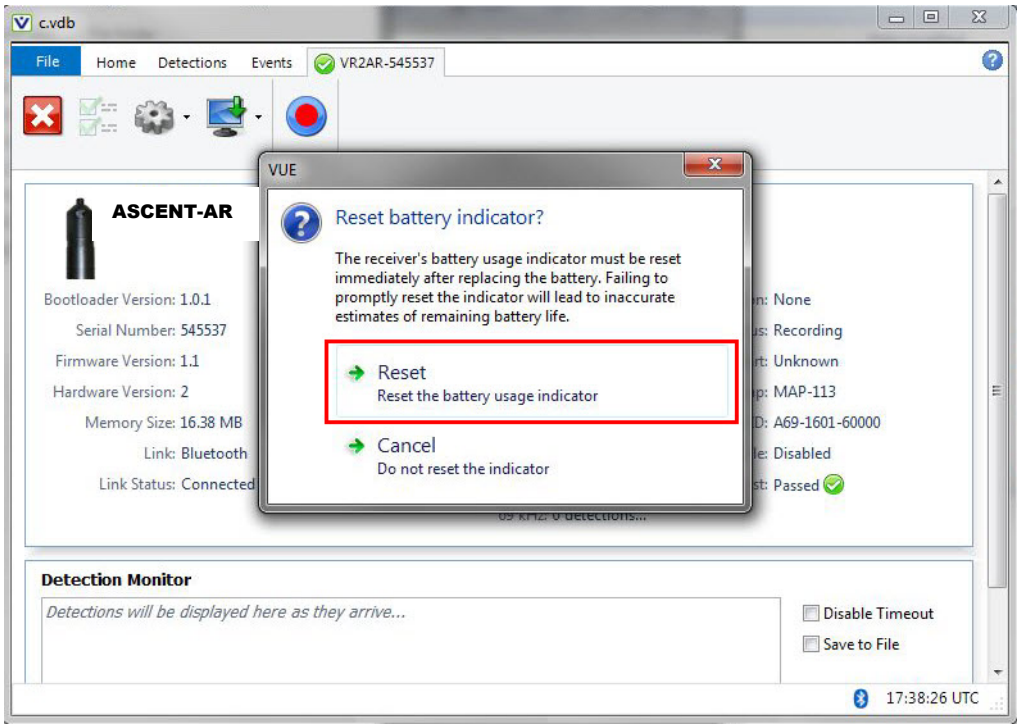
Do not over-tighten the case pieces together or they may be damaged.

5.1.5 Resetting the Battery Usage Indicator

Whenever you replace a battery, you must connect your release to the VUE software, and reset the **Battery Usage Indicator (BUI)**.

To connect the release to VUE software, see steps at sections 3.3 Activate Wireless feature and 3.4 Establish *Bluetooth* communication.

Once VUE has connected to the ASCENT-AR, it will determine if a BUI reset is required, and display the following dialog box.



To reset the BUI, click **Reset**. The reset dialog box disappears, and the release and VUE software are now synchronized with a new date for battery replacement.

Your release is now ready for use.

5.2 O-ring Care

O-rings located in the end-cap of the ASCENT-AR case are crucial to the watertight seal of the release. Each time an O-ring is disturbed, for any reason, it ***must*** be checked before the unit is sealed again. Something as simple as a stray hair could be the difference between a successful study and a damaged release.

Just as the O-rings are vital to a good seal, so are the O-ring surfaces. These surfaces hold the O-ring in position and must also be clean and damage free or the ASCENT-AR case could flood with water.

Improper care of the O-rings and their mating surfaces can result in water leaking into the release casing, destroying the electronics.

Each time an O-ring is disturbed, for any reason, it **must be checked** before the unit is sealed again.

5.2.1 Remove O-rings

The O-rings must be removed from their grooves to allow the O-rings and the grooves to be inspected and cleaned. Do not use a sharp object, which may damage the groove surface, when removing the O-rings.

Do not use a sharp object near O-ring surfaces. The surface could be damaged.

1. Use a lint-free cloth to grip two points on the O-ring with your thumb and finger, approximately 5 cm apart. It's best to start with the O-ring farthest from the case threads.
2. Pull your thumb and finger towards each other while maintaining your grip on the O-ring. This requires pressure against the O-ring and should produce a loop of exposed O-ring.
3. Grab the exposed O-ring and pull it away from the end cap, so it moves along the body of the release.
4. Repeat Steps 1 -3 for the other O-ring.
5. Clean any O-ring grease on the internal casing.

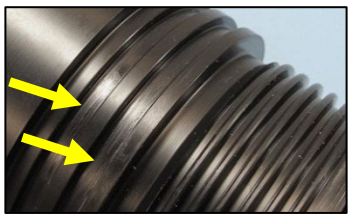
5.2.2 Clean O-ring Surfaces

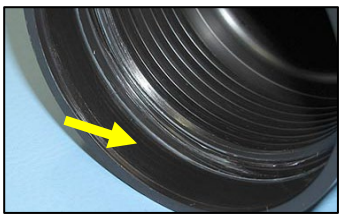
The O-ring surfaces must be clear of all debris and dirt. Any debris could cause water to enter the case and destroy the release.

An O-ring surface is any surface the O-ring touches. The ASCENT-AR has three, the two grooves the O-rings sit in and the smooth area inside the Outer Cylinder that sits between the threads and the end of the cylinder.

O-Ring Surfaces

An O-ring surface is any surface the O-ring touches. The ASCENT-AR has three, the two grooves between the threads and the LED on the end cap and the first flat section inside the Outer Cylinder (2 cm).



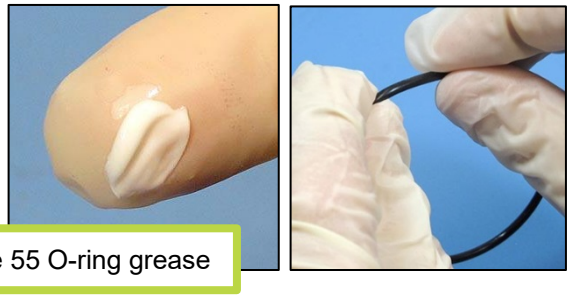


It is vital that all O-ring surfaces are clean and damage free or water may work its way inside the case and destroy the electronics within the ASCENT-AR. **Always wear protective gloves when handling O-ring grease!**

1. Use a lint-free cloth to clean the old grease and any debris from the O-rings and the O-ring surfaces. A lint-free swab is very helpful for cleaning inside the grooves.
2. Inspect the **O-ring surfaces** for any scratches or debris – use a magnifying glass and a bright light. Scratches in the O-ring groove would allow water to bypass the O-ring, potentially flooding the release and destroying the internal electronics. If you find debris (dirt, dust, hair, etc.) inside a groove, then use a lint-free swab to remove it. If you find a scratch in any of the O-ring surfaces, then contact our Support department.

CAUTION: O-rings can stretch with continued handling. We advise that undamaged O-rings not be used for more than three deployments.

3. Inspect the **O-rings** for debris and for any damage. If there is any question about the condition of an O-ring, we recommend it be replaced rather than risk damage to the release and therefore your data. O-rings can be purchased from VEMCO or locally. The replacement O-rings must be PARKER #2-145 O-RING, 70 Bn NITRILE.
4. Use your **gloved** fingers to evenly spread O-ring grease (we suggest Molykote 55) over the entire surface of the O-ring until the O-ring is slippery but doesn't have clumps of grease on it. Too much grease can cause an O-ring to "pop" out of the groove while the case is being closed, giving little protection from water entering the ASCENT-A



Molykote 55 O-ring grease

5. While you have grease on your glove, spread a very thin layer of the grease – enough to make the area appear shinny – around the O-ring surface on the inside of the Outer Cylinder (the smooth area between the threads and the end of the case). You shouldn't be able to see grease globs or streaks. This thin layer of grease will make screwing the two pieces together again much easier and will also help to create a better seal.

5.2.3 Install O-ring

Now that the O-rings and O-ring surfaces are clean and prepared, we're ready to install the new O-rings into the case. **Always wear protective gloves when handling O-ring grease!**

1. Slowly move one of the O-rings along the body of the ASCENT-AR to the end cap and carefully lift it over the threads.
2. Push the O-ring into the first O-ring groove and check the circumference of the release to make sure the entire O-ring is in the groove.
3. Slowly move the second O-ring over the ASCENT-AR's body, over the threads, and into the remaining groove. Check that it's entirely in the groove.
4. Clean any grease that may have gotten on the body of the release.
5. Place the release on a clean surface so the O-rings remain debris and damage free.

5.3 Storage

When a release will not be deployed for an extended period of time, remove the D or DD-cell battery from the release (section 5.1.2) to stop the ASCENT-AR from logging. Storing the ASCENT-AR with a depleted battery can negatively impact the release functionality.

Be sure to store the ASCENT-AR in a safe location where the case will not be damaged. Also, be sure the temperature of the release during storage does not exceed the operating temperature specified in section 9.3.

Do not disconnect the AA battery.

It is strongly suggested that the ASCENT-AR not be initialized prior to storage (Do not erase data) and a backup of all offloaded data is made immediately.

6 Additional Information

6.1 Flash Memory

The ASCENT-AR uses 16 MB of non-volatile Flash Memory (memory that can retain stored information even when not powered). The ASCENT-AR will stop logging sensor data once the memory is full.

6.2 Status Light Flashes

The **Status Light (LED)** on the side of the ASCENT-AR case flashes based on the task being performed or the status of the release. The flashes can be interpreted using the table below.

Status Light Flash meanings	
LED Flashes	**Interpretation of Flashes**
No flashes	Battery is disconnected or has depleted
Two quick **red** flashes every 5 seconds	Logging mode (recording sensor data)
Two quick **red** flashes every 10 seconds	Memory full
Continuous long **red** flashes (1 per second)	Ready for *Bluetooth* wireless technology communication
Red light on constantly	Communicating with VUE software using *Bluetooth* wireless technology

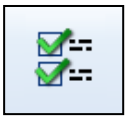
The Status Light (LED) on an ASCENT-AR flashes either **red** or **green**. Generally, the **red** flashes are related to the unit's status. Just after the ASCENT-AR is powered, it performs a self-test and flashes both the **green** and **red** lights at the same time, making the light look more of an **orange** colour.

After these "**orange**" flashes, you will see either:

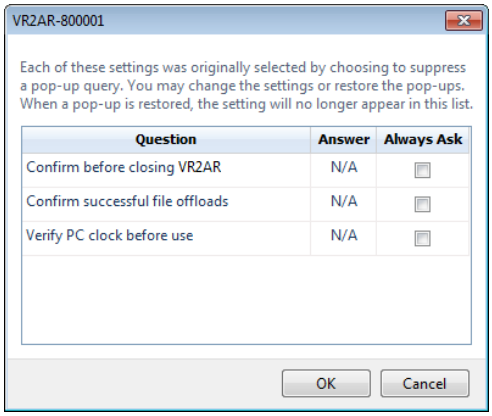
- a very long **green** light to indicate the tests passed and all is well, or
- a long **red** light to indicate there was a problem.

If you see the long **red** light followed by more flashes, then contact VEMCO for instructions.

6.3 Set Local options



The local options feature (icon shown at right) allows you to change which suppressed pop-up queries are visible. This feature is only enabled on the ribbon if there are queries that have been suppressed. To enable a query, select "Always Ask" and that query will be enabled the next time that feature is used. For example, if "Confirm before closing ASCENT-AR is selected, then a query will open the next time *Bluetooth* communication with an ASCENT-AR is closed.



Changing an action is also possible in the Control Setting window, without enabling the query. For example, if "No" was selected when the "Import offloaded files into database" was disabled and you now want to import the data without being queried each time, then click the drop-down menu next to the answer and select "Yes" from the list.

Be sure to select "OK" to apply the changes.

6.4 Batteries

The ASCENT-Acoustic Release is powered by:

- **AR** – a "D" size 3.6 Volt Lithium battery with a connector attached – the Tadiran TL-5930/F
- **AR2** – a "DD" size 3.6 Volt Lithium battery with a connector attached – Tadiran TL-5937/V

and a Tadiran TLM-1550 4 Volt AA Lithium battery. Specifications for all batteries are found in Appendices 9.3 and 9.4.

The **D/DD-cell** battery powers the functions related to transmitting, receiving, and storing data. Most of the battery related information in this manual relates to the D/DD-cell battery.

The **AA battery** powers the release motor and contains enough power to allow more than 100 releases, depending on the amount of resistance given the motor due to biofouling. The AA battery should never need to be removed and should not be disconnected at any time.

Do not disconnect the AA battery.

An important feature of these lithium batteries is their voltage discharge characteristics. These batteries provide a consistent voltage for most of the life of the battery. This characteristic allows the release to operate at the necessary voltage levels longer than a battery with a more gradual voltage fall-off.

The ASCENT-AR/AR2 is usually shipped with the batteries inside the unit but **not connected** – the ASCENT-AR/AR2 is not shipped powered. The D/DD-cell battery life is consumed from the time the battery is connected so always disconnect the battery when the release is not being used for an extended period of time. This battery must be connected before the ASCENT-AR/AR2 can be initialized.

Lithium metal D/DD-cell batteries are classified as **Dangerous Goods** and must be handled according to UN Recommendations on the Transport of Dangerous Goods (UN3090 for batteries alone; UN3091 for batteries contained in equipment or packed with it). See the MSDS from the battery company for more information.

6.4.1 Battery Life

A new Lithium battery will last approximately 14 months (D-cell) / 60 months (DD-cell) in an ASCENT-AR (AR2). The AA Lithium battery is dedicated to motor operation during the release process and can perform more than 100 releases (number can vary based on amount of biofouling on the Mooring Lug connection to the ASCENT-AR/AR2.

Approximate Battery Life Consumption

D-cell: 14 months
DD-cell: 60 months
AA cell: 100+ releases

Larger amounts of the D/DD-cell's battery life are consumed while the ASCENT-AR/AR2 is ready for *Bluetooth* communication or is communicating with the PC than during the normal operation. For this reason, the ASCENT-AR/AR2 exits *Bluetooth* mode as soon as the **Receiver** tab in the VUE software is closed (section 3.9). If the tab is left open for 30 minutes, the PC will automatically terminate the *Bluetooth* link and the release will enter the lower power consuming Logging mode. This auto-disconnect feature, which conserves battery life, will only occur if "Automatically close inactive release connections" is enabled in the *Devices* section (tab) of the *Options* window in VUE (see VUE manual for details).
If the study is not continuing (i.e. the last download of data for this study has occurred), then remove the larger D/DD-cell battery and store it separately. The used battery may be marked with the amount of life used for future reference or use. The smaller AA battery should not be disconnected or removed.

NOTE

Battery life is consumed from the time the battery is ***installed***, even if the ASCENT-AR/AR2 is idle.

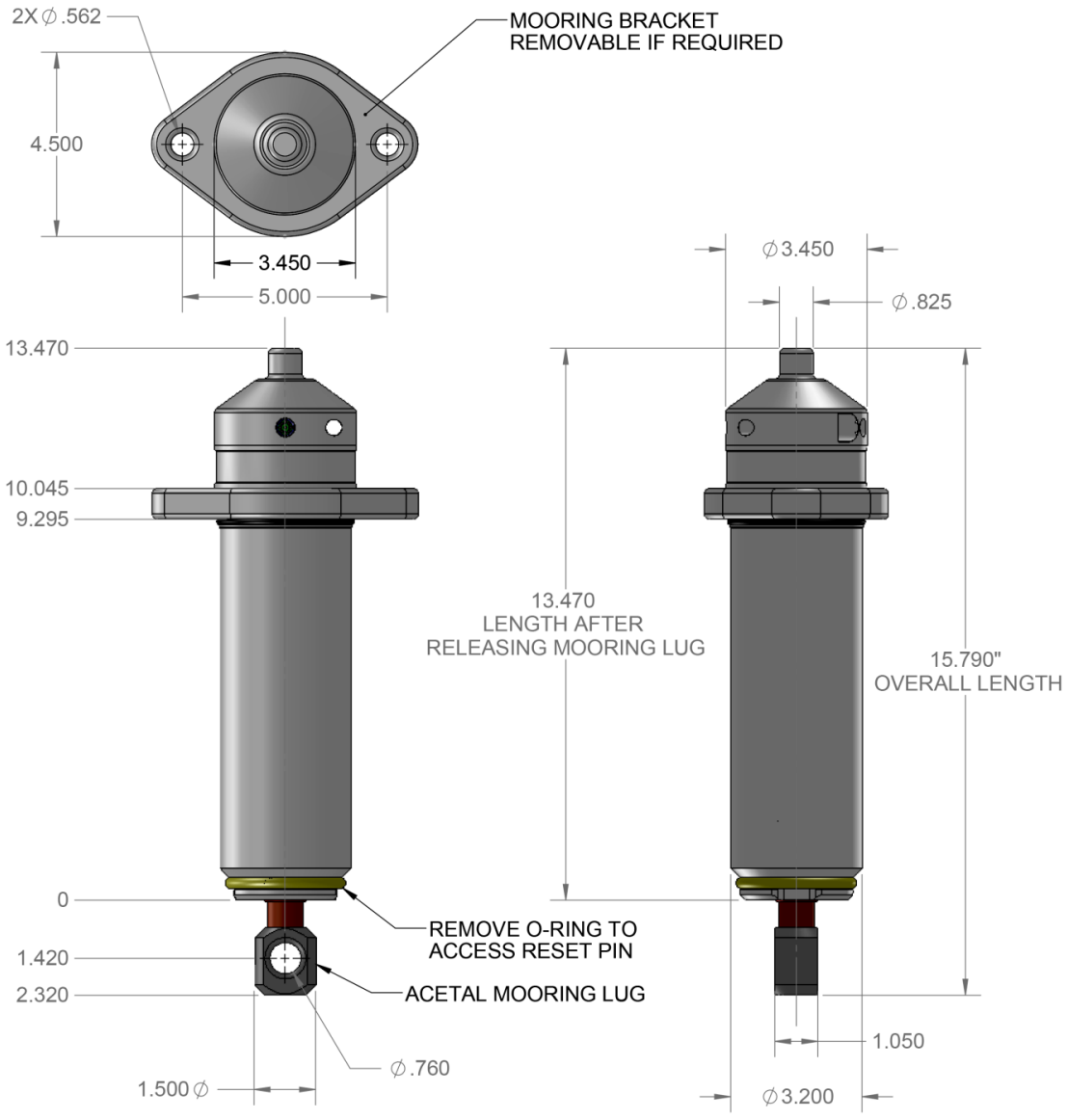
NOTE

Always remove the D/DD-cell battery when the release is not in use for an extended period of time.

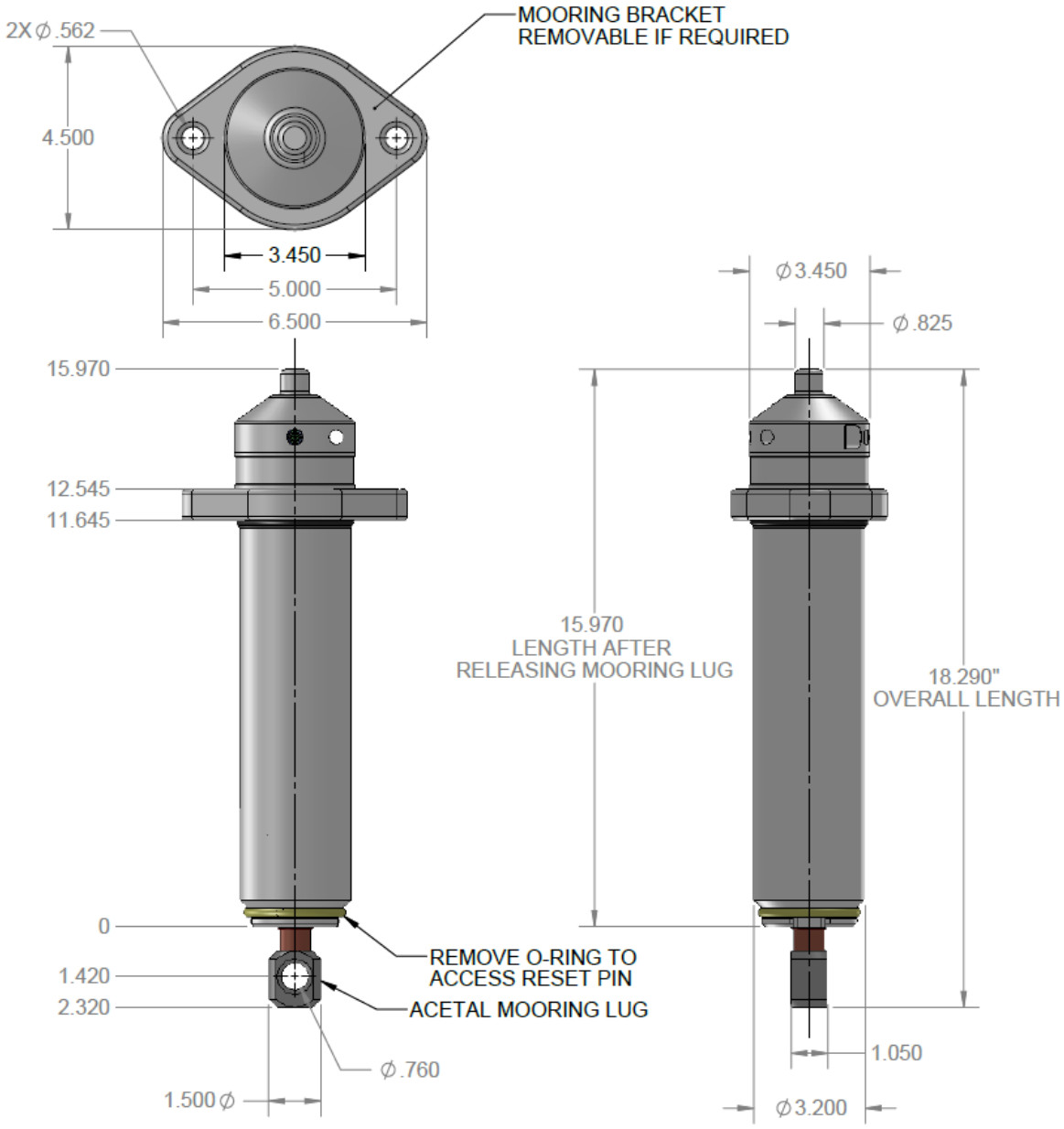
6.5 Case External Dimensions

The dimensions of the ASCENT-AR/ASCENT-AR2 cases can be useful when designing a mooring plan or mooring equipment. The dimensions, in **inches**, of the cases are shown in the drawing below.

6.5.1 ASCENT-AR



6.5.2 ASCENT-AR2



6.6 Update Firmware

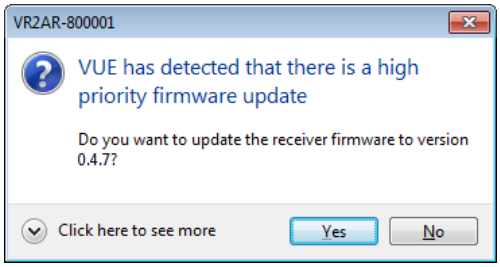
Firmware refers to the internal software that operates an ASCENT-AR. It is not to be confused with VUE, the PC software used to communicate with the release. Firmware updates are rare and will occur to either deal with a hardware change or occasionally for a significant addition to functionality. VUE 2.0.7 and greater has the ability to alert you if there is a new firmware update (feature can be disabled in the "Releases" tab of the *Options* window – see VUE manual).

How to Update Firmware Using Automated Notification:

If when you establish communication with the ASCENT-AR (see section 3.3) you receive a message indicating VUE has detected there is a firmware update, then use the instructions below to update your firmware. To learn what caused the firmware upgrade, use the "Click here to see more" option in the notice window. **NOTE:** The windows shown throughout the steps that follow display "VR2AR" receiver name, but the process and screens are the same for the ASCENT products.

STEP 1

Decide if this is the right time to update the ASCENT firmware by answering the following questions:



1. Does the ASCENT's battery have enough power to perform an update? If there is any doubt, then replace the battery before proceeding.

   The ASCENT could be damaged if power fails during the update.

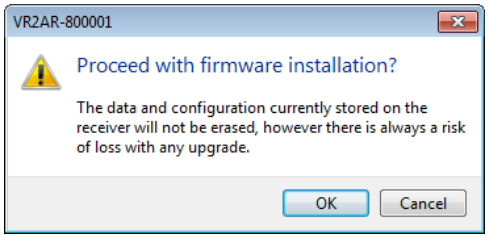
2. Has all the data been offloaded from the ASCENT? Updating should not erase the data, but please take the precaution of offloading all data before updating.

If you answered "No" to either of these questions, then click the "No" button in the notice window and either replace the battery (see section 5.1) or offload the data (see section 3.5), or both if necessary. The notice window will appear again the next time you connect to this ASCENT, or use the instructions for manually updating the firmware found in the next section.

If you answered "Yes" to both of these questions, then click the "Yes" button and continue with these instructions.

STEP 2

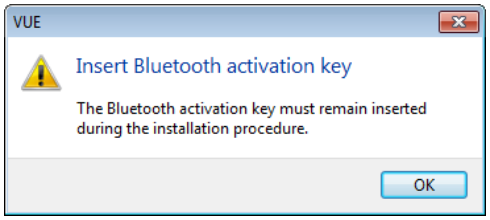
Assuming all data has been offloaded from the ASCENT and is safely stored on your PC, click "OK" to acknowledge this warning and continue.



STEP 3

Verify that the Bluetooth Activator is still in the release, or place it in the release if it had been removed. This is important as the ASCENT will require it to be in place to re-establish communication during the procedure.

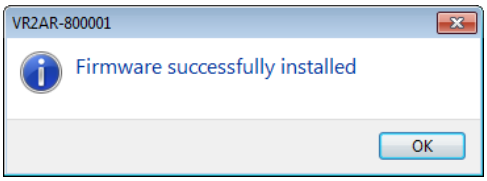
Keep Bluetooth Activator in ASCENT!

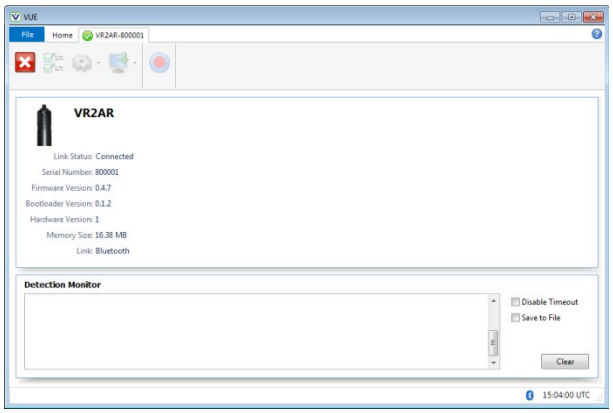


STEP 4

Wait while the firmware is loaded into the ASCENT. The status of the update is shown at the bottom of the screen.

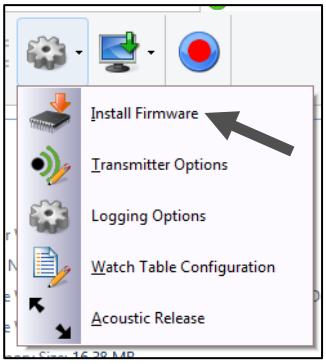
Click “OK” when the firmware is installed (see below).





How to Update Firmware Using Manual Procedure

If the automatic notification doesn’t appear, then you can manually update the firmware. Before beginning, use Step 1 in the previous section to prepare for the update. Once the preparations are completed, select “Install Firmware” on the ASCENT-AR tab. A window titled “Select Firmware File” will appear. Select the most recent firmware file that matches your model of ASCENT-AR. VUE software will not let you install a firmware file for the incorrect model type. Click the “Open” button to continue. The rest of the procedure matches the instructions found in Steps 2 – 5 in the automated notification section.



7 Common Questions

7.1 VUE related questions

7.1.1 What is initialization?

Initialization, which is also referred to as starting a study, is an important step required to configure your release correctly. During initialization, you can input the station name (location) where the ASCENT-AR will be deployed, and set the release clock based on your computer clock. The release clock is always updated based on your PC clock during the initialization process. This information will be resident with the ASCENT-AR and will be available during offload, regardless of whether you use the same computer or not. Initialization also erases the release memory so be sure to offload data from your release *before* initializing it. When data is offloaded from a release, the VRL file created contains information about how the release was initialized.

WARNING

Offload your data first!
Initializing a release will ERASE all data!

If the ASCENT-AR is deployed without being initialized, the release will log sensor values but will not necessarily have the correct clock settings.

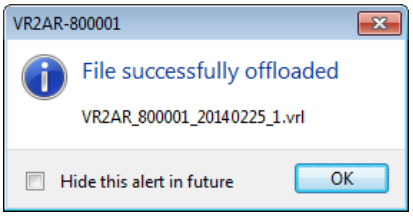
7.1.2 What Date/Time format is my sensor data stored in the release and displayed in VUE?

All sensor data and events are stored in UTC (Coordinated Universal Time). UTC time is calculated by your PC and stored in your ASCENT-AR during initialization. Provided your computer time and the Time Zone settings are correct and match, i.e. your computer time is correct for the time zone you have selected, then your data will be stored in the correct UTC format at the time of initialization and data offload.

In VUE, your data is also stored in UTC format in the database. You can choose to display your data in UTC, your local time or in a different time zone. It is important to know that regardless of whatever display format you choose VUE maintains the detection data in UTC.

7.1.3 What does the "Hide this alert in future" mean?

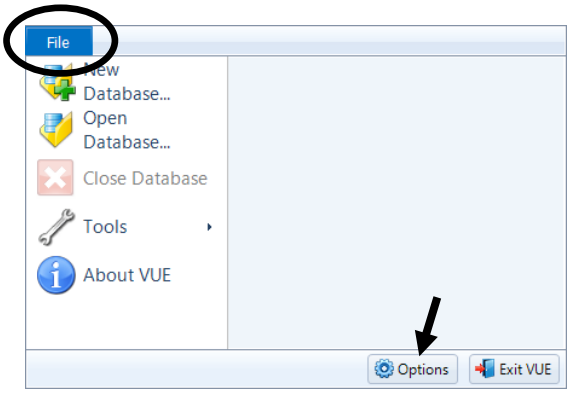
There are a number of pop-up windows that appear while using the VUE software. These windows are wonderful when you're just learning the software or when you've been away from it for an extended period of time, but they can be very annoying when you're in the middle of a study. A number of these pop-up windows have a selection box in the bottom left corner that say something along the lines of "Hide this alert in future." Selecting this option means that this window will not appear the next time the task is performed. The pop-up windows can be returned by altering the local options or selecting "Restore All Hidden Dialogs" in the *Options* window (see section 6.3). All hidden dialogs are restored automatically if one week elapses without VUE being opened.



NOTE: The screenshot shown at right displays the "VR2AR" receiver name, but the pop-up window are the same for the ASCENT products.

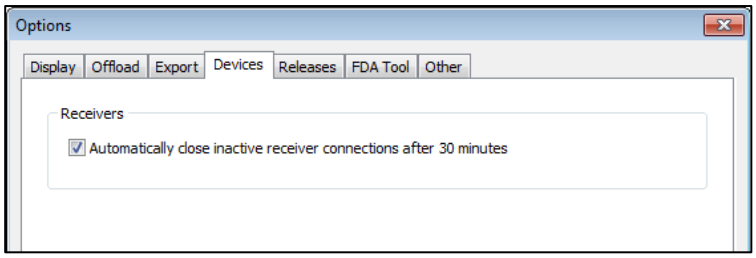
7.1.4 How do I open the *Options* window?

The *Options* window is accessed by selecting the *File* menu (circled in picture at right) and clicking the "Options" button at the bottom of the menu box (see arrow in picture at right). The *Options* window contains the following tabs: Display, Offload, Export, Devices, and Other. These are described in detail in the VUE manual.



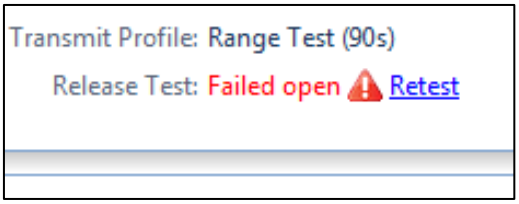
7.1.5 I don't want VUE to disconnect from the ASCENT-AR after 30 inactive minutes. How do I change that?

When no user activity occurs between VUE and an ASCENT-AR for 30 minutes, VUE will disconnect the Bluetooth connection to conserve the release battery. If you do not want this to occur, open the *Options* window (section 7.1.4); select the Devices tab and un-check the "Automatically close inactive release connections after 30 minutes."

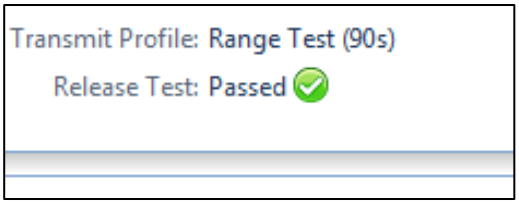


7.1.6 What is the Release Test?

The Release Test is performed by the ASCENT-AR to verify that the case is closed. If the case is not completely closed, the "Failed open" warning will appear in the information listed in the Receiver tab. An open case, even if it only slightly open, will prevent the mooring lug from being deployed and provides a high risk of allowing water to enter the case and damage the release.



Clear a failed Release Test by securely closing the case and then click "Retest" while the ASCENT-AR is in communication with VUE. The Release Test should change to "Passed".



7.2 ASCENT-AR related questions

7.2.1 How much range can I expect?

Acoustic range depends on so many factors that it is difficult to estimate without knowledge of the environment and prior experience with telemetry. Range depends on transmission power, signal absorption, line of sight, reflection/refraction, multipath and environmental noise (man-made & natural), and the receiving quality of the release/hydrophone. Typically areas that have clear water, sand or silt flat bottoms and low current exhibit the greatest ranges. Conversely, areas with turbid water, complex rocky bottom topography and high current exhibit low ranges. In all cases, extreme weather events and periods of high wind (waves) may significantly reduce range.

In most cases greater transmission power output (dB) results in greater range. For example, in good conditions the ASCENT-AR should yield ranges of 800-1200 m. There are some exceptions where high power and a reflective and low noise environment may cause detection breakdowns.

7.2.2 How long will my ASCENT-AR battery last?

The ASCENT-AR will typically last 14 months on a “D-cell” (AR) and 60 months on a “DD-cell” Tadiran lithium battery (AR2). An estimation of the remaining battery life is available when acoustically communicating with the ASCENT-AR through the VR100-200.

TIP: Write the installation date on the battery so you know how long the battery has been in use.

The AA Lithium battery only powers the release motor and should never need to be removed or disconnected from the ASCENT-AR.

7.2.3 Does release orientation matter?

The ASCENT-AR must be orientated with the hydrophone looking upwards for communication with the VR100-200. Also, releases are commonly moored closer to the seafloor than the surface to minimize the effect of surface noise and conditions.

8 Troubleshooting

8.1 VUE related troubleshooting

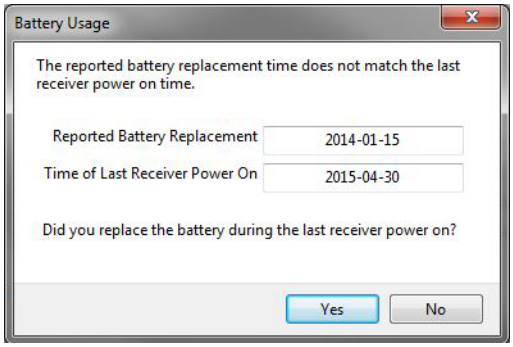
8.1.1 I cannot connect to my ASCENT-AR

First confirm that your *Bluetooth* connection between VUE and your ASCENT-AR is functional. If this *Bluetooth* connection is functioning correctly, try replacing the DD-cell battery in the ASCENT-AR with a new battery. If you are still unable to communicate with the unit, please contact VEMCO to receive RMA information and send the unit back to VEMCO for assessment/repair.

8.1.2 I see a Battery Usage Indicator reset warning in VUE

The VUE software and the firmware in your release have a battery replacement date feature that needs to be synchronized.

You have connected your release to VUE, and see the following dialog box:



You may have done one of the following:

1. You replaced a battery without connecting the release to VUE and resetting the Battery Usage Indicator (BUI).

2. You did not connect to VUE after having a “Power OFF” and “Power ON” event.

   If you have replaced the battery: Click **Yes**. A confirmation dialog box appears.

Click **Yes**. The reset dialog box disappears, and the release and VUE software are now synchronized with a new date for battery replacement.

If you did NOT replace the battery: If you had not connected to VUE after having a "Power OFF" and "Power ON" event, and your current battery is still good, click **No**. The reset dialog box disappears, and the release and VUE software are now synchronized with a new date for battery replacement.

Your release is now ready for use.

8.2 ASCENT-AR case related troubleshooting

8.2.1 The threads have been damaged

It's very important that the threads on the end-cap are not dented or the outer cylinder will not thread onto the end-cap properly. If the threads on the end-cap are slightly dented, use a sharp knife, such as an X-Acto knife, to remove the deformed plastic until the sides of the thread are smooth and below the normal line of the thread. It is important that there is nothing sticking out of the thread to damage the thread on the outer cylinder or prevent the case from closing.

8.2.2 I think the case might be pressurized

When handled correctly, the ASCENT-AR pressure case and seal have a static depth rating of 500 meters (730 psi). If the release experiences a pressure greater than this, then water may enter the case. NOTE: Physical shocks to the release, such as bumping into a solid object, when it is at any depth can result in a considerably higher pressure on the casing than just the depth pressure. Also, if the O-rings or their mating surfaces are dirty or damaged, then water may enter the release case.

If water enters the release case under high pressure and the Release Valve was unable to open and equalize the pressures, then some water and compressed air may still be in the case when it is returned to the surface. This can be identified by its increased weight and a sloshing sound when the case is moved. The ASCENT-AR case will also be very difficult to open, if at all possible. If you are suspicious there is compressed air in the release case, then check for air or water leaking from seam in the case where the end-cap and outer cylinder meet.

To check for...	Do this
water leakage	dry the seam completely and watch for drops of water around the seam
air leakage	spread soapy water around the seam and watch for bubbles indicating air escaping

If air and/or water are found leaking from the release case, do not attempt to remove the end-cap. Instead, place the release in a safe place and cover it with a protective layer of towels, tarpaulins, etc. until the leaking stops. If water is still in the case after the air and/or water have finished leaking from the case, then attempt to open the case with the steel rod kit. If it will open, do so very slowly to

allow the compressed air to escape. If the case will not open using the steel rods, then it is under a greater pressure than will allow the case to open. Contact VEMCO for further instructions.

When the pressure has been released from the ASCENT-AR case, carefully unscrew the end-cap from the outer cylinder (section 5.1.1). Use fresh water to rinse the internal parts of the ASCENT-AR while avoiding skin contact with any battery electrolyte that may have escaped from the battery.

Do not attempt to re-use the ASCENT-AR after water has been inside the case. The internal casing protecting the electronics is not waterproof and the electronics have been destroyed by contact with water.

9 Appendices

9.1 Cleaning Instructions

Clean the ASCENT-AR with a damp cloth and mild detergent. Do not use solvents. Do not use a scraper or abrasive cleaner on the LED window or the seal surfaces.

9.2 Contact Information

VEMCO

20 Angus Morton Drive
Bedford, Nova Scotia
Canada B4B 0L9

Phone: +1-902-450-1700
Fax: +1-902-450-1704

Web Site: www.vemco.com

9.3 ASCENT-AR Specifications

Dimensions **AR**	Length: 401 mm, 342 mm without release lug Diameter: 81 mm Float attachment bracket width: 165 mm		
Weight **AR**	2350 g in air, 500 g in water		
Receive Frequency	81.0 kHz		
Operating temperature	-5°C to +40 °C; Water in which ASCENT-AR is deployed *must not freeze*.		
Shipping & storage temperature	-5°C to +50°C		
Battery **AR** (single battery or "D") Common to AR/AR2	1 - Tadiran **TL-5930/F** Lithium Inorganic battery or equivalent, 3.6 Volts • Nominal capacity @ 4 mA, to 2 V 19 Ah • Rated voltage 3.6 V • Maximum recommended continuous current 230 mA • Maximum pulse current capability 500 mA • Weight 93 g (3.28 oz) • Li metal content approx. 5 g U.L. Component Recognition, MH 12193 1 - 4V Lithium AA cell battery (for release motor only)		
Rx battery Life	Approximately 28 months (using Tadiran **TL-5930/F**)		
AR battery life	> 100 releases per battery		
Maximum depth	500 meters (730 psi)		
Ingress Protection	IPX8 to rated depth		
Receive Frequency	69.0 kHz		
Storage / Memory	16 MB or 32 MB Flash memory		
Communication	Acoustic via VR100 and Bluetooth®		
Bluetooth wireless certifications	ASCENT-AR version:	Hardware ID: < 3	Hardware ID: ≥ 3
	Bluetooth ID:	B012394	D028756
	FCC ID:	ED9LMX9838	A8TBM78ABCDEFGH
	Industry Canada ID:	IC-1520A-LMX9838	12246A-BM78SPPS5M2
Mooring / Attachment	2 x 14 mm mooring holes (mooring bracket, top),1 x 19 mm (release lug, bottom)		
Software	**Latest** VEMCO User Environment (VUE) software		
Maximum test load	1000 lbs		
Max. **safe** working load*	250 lbs		
Maximum release load	250 lbs		

**** Safe Working Load (SWL)** sometimes stated as the Normal Working Load (NWL), is the maximum safe force that a piece of equipment, lifting device or accessory can exert to lift, suspend, or lower, a given mass without fear of breaking.*

WARNING: The ASCENT-AR pressure case and seal have a **static depth rating of 500 meters** (730 psi). Physical shocks to the receiver, such as bumping into a solid object, when it is at any depth can result in a considerably higher pressure on the casing than just the depth pressure and water may enter the ASCENT-AR case. If the O-rings or their mating surfaces are dirty or damaged, then water may also enter the receiver case. If you are suspicious that water has entered the receiver, then follow the suggestions in the Appendix for troubleshooting a pressurized case.

9.4 Ascent AR2 Specifications

Dimensions **AR2**	Length: 465 mm, 406 mm without release lug Diameter: 81 mm Float attachment bracket width: 165 mm		
Weight **AR2**	2746 g in air, 812 g in water		
Receive Frequency	81.0 kHz		
Operating temperature	-5°C to +40 °C; Water in which ASCENT-AR is deployed *must not freeze*.		
Shipping & storage temperature	-5°C to +50°C		
Battery **AR2** (double battery or "DD") Common to AR/AR2	1 - Tadiran **TL-5937/V** Lithium Inorganic battery or equivalent, 3.6 Volts • Nominal capacity @ 10 mA, to 2 V 35 Ah • Rated voltage 3.6 V • Maximum recommended continuous current 450 mA • Maximum pulse current capability 1000 mA • Weight 190 g (6.702 oz) • Li metal content approx. 10 g U.L. Component Recognition, MH 12193 1 - 4V Lithium AA cell battery (for release motor only)		
Rx battery Life	Approximately 60 months (using Tadiran **TL-5937/V**)		
AR battery life	> 100 releases per battery		
Maximum depth	500 meters (730 psi)		
Ingress Protection	IPX8 to rated depth		
Receive Frequency	69.0 kHz		
Storage / Memory	16 MB or 32 MB Flash memory		
Communication	Acoustic via VR100 and Bluetooth®		
Bluetooth wireless certifications	ASCENT-AR2 version:	Hardware ID: < 3	Hardware ID: ≥ 3
	Bluetooth ID:	B012394	D028756
	FCC ID:	ED9LMX9838	A8TBM78ABCDEFGH
	Industry Canada ID:	IC-1520A-LMX9838	12246A-BM78SPPS5M2
Mooring / Attachment	2 x 14 mm mooring holes (mooring bracket, top),1 x 19 mm (release lug, bottom)		
Software	**Latest** VEMCO User Environment (VUE) software		
Maximum test load	1000 lbs		
Max. **safe** working load*	250 lbs		
Maximum release load	250 lbs		

**** Safe Working Load (SWL)** sometimes stated as the Normal Working Load (NWL), is the maximum safe force that a piece of equipment, lifting device or accessory can exert to lift, suspend, or lower, a given mass without fear of breaking.*

WARNING: The ASCENT-AR2 pressure case and seal have a **static depth rating of 500 meters** (730 psi). Physical shocks to the receiver, such as bumping into a solid object, when it is at any depth can result in a considerably higher pressure on the casing than just the depth pressure and water may enter the ASCENT-AR case. If the O-rings or their mating surfaces are dirty or damaged, then water may also enter the receiver case. If you are suspicious that water has entered the receiver, then follow the suggestions in the Appendix for troubleshooting a pressurized case.

9.5 Warranty and Disclaimer

AMIRIX Systems Inc.
Warranty and Disclaimer

WARRANTY
AMIRIX Systems Inc., doing business under its trade name VEMCO, provides a one (1) year warranty period for the Product from date of shipment.

VEMCO warrants that on the date of shipment all Products manufactured by VEMCO are free from defects in material and workmanship under normal use and service. This warranty applies to the components necessary for equipment upgrades, i.e. the VR1/VR2 to VR2W upgrade. With respect to transmitter products, while VEMCO is able to predict battery life with some certainty, VEMCO cannot guarantee that these Products will remain functional while submerged for extended periods of time. This warranty does not apply to any equipment, materials or design supplied by Buyer or a third party; re-battery services provided by VEMCO; Products for which VEMCO has not received payment; problems that results from: external causes such as accident, abuse, misuse; servicing not authorized by VEMCO; usage not in accordance with Product instructions; failure to follow the Product instructions or failure to perform preventative maintenance; usage of accessories, parts or components not supplied by VEMCO.

This warranty shall survive delivery only on the conditions and subject to the limitations set forth below.

NOTICE PERIODS
To receive a warranty remedy for a Product, Buyer must contact VEMCO's Customer Support Department during the warranty period to receive the Return Material Authorization ("RMA") instructions. Each defective Product returned for warranty remedy must be shipped at the Buyer's expense according to the RMA instructions and must include reasonable proof that the claimed defect is due to a matter embraced within the warranty set forth above and that such defect did not result from any act or omission of Buyer, including but not limited to any failure to operate and maintain the Product in accordance with VEMCO's applicable written instructions.

REMEDY
VEMCO's liability, and the Buyer's exclusive remedy under this warranty, as to a defect in material or workmanship, is limited to the repair of such defect in the accessory, equipment or part in which the defect appears or, at VEMCO's option, to the replacement of such accessory, equipment or part with a similar item free from defect. As to any item repaired by VEMCO or furnished as a replacement by VEMCO, VEMCO's liability and the Buyer's exclusive remedy to the repair or replacement of such item for any further defect in material or workmanship, provided VEMCO receives written notice at Halifax, Nova Scotia, of such further defect from BUYER within ninety (90) days after the repaired or replaced item is shipped to BUYER and provided that BUYER returns same to VEMCO as provided under "Notice Periods".

RETURNED ITEMS
All repairs, replacements and corrections described above shall be performed by VEMCO at its plant at Halifax, Nova Scotia, or at such other place as may be mutually agreeable, and with reasonable care and dispatch in order that the Product, accessory, equipment or part will not be kept out of service longer than necessary. Return to BUYER of a repaired, replacement, or corrected accessory, equipment, part or Product shall be at VEMCO's expense. Title to and risk of loss of the Product, accessory, equipment, or part returned to VEMCO pursuant hereto shall at all times remain with the BUYER, except that title to a returned accessory, equipment, part, or Product shall pass to VEMCO concurrently with shipment to BUYER of any item furnished by VEMCO to BUYER as a replacement therefore. VEMCO shall have only such responsibility for any Product, accessory, equipment, or part owned by the BUYER and in the possession of VEMCO as is chargeable by law to a bailee for hire, but shall not be chargeable for loss of use thereof.

WEAR AND TEAR
Normal wear and tear and the need for regular maintenance shall not constitute a defect under this warranty.

DISCLAIMER AND RELEASE
THE WARRANTIES, OBLIGATIONS AND LIABILITIES OF VEMCO AND THE REMEDIES OF BUYER SET FORTH HEREIN ARE EXCLUSIVE AND IN SUBSTITUTION FOR, AND BUYER HEREBY WAIVES AND RENOUNCES, ALL OTHER WARRANTIES AND OBLIGATIONS OF VEMCO AND ANY ASSIGNEE OF VEMCO AND ALL RIGHTS, CLAIMS AND REMEDIES OF BUYER AGAINST VEMCO, EXPRESS OR IMPLIED, ARISING BY LAW OR OTHERWISE, WITH RESPECT TO ANY NON-PERFORMANCE OR DEFECT IN THE PRODUCT OR IN ANY OTHER THING DELIVERED UNDER THIS AGREEMENT, INCLUDING BUT NOT LIMITED TO:

(A) ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE;
(B) ANY IMPLIED WARRANTY ARISING OUT OF COURSE OF PERFORMANCE, COURSE OF DEALING OR USAGE OF TRADE;
(C) ANY OBLIGATION, LIABILITY, CLAIM OR REMEDY IN TORT, WHETHER OR NOT ARISING FROM THE NEGLIGENCE OF VEMCO OR ANY ASSIGNEE OF VEMCO, ACTUAL OR IMPUTED;
(D) ANY OBLIGATION, LIABILITY, RIGHT, CLAIM, OR REMEDY FOR LOSS OF OR DAMAGE TO THE PRODUCT, FOR LOSS OF USE, REVENUE, OR PROFIT WITH RESPECT TO THE PRODUCT; OR FOR ANY OTHER DIRECT, INCIDENTAL OR CONSEQUENTIAL DAMAGES; AND
(E) VEMCO MAKES NO REPRESENTATION THAT THE PRODUCT WILL NOT INFRINGE ANY PATENT OR OTHER RIGHTS OF ANY PERSON AND BUYER AGREES TO INDEMNIFY VEMCO AND HOLD VEMCO HARMLESS FROM ANY AND ALL CLAIMS AND LIABILITIES WITH RESPECT TO SAME TOGETHER WITH ANY CLAIMS AND LIABILITIES WITH RESPECT TO ANY INFRINGEMENT OF ANY PATENT OR OTHER RIGHTS OF ANY PERSON ARISING AS A RESULT OF BUYER'S PRODUCTS, TECHNOLOGY, ACTIVITIES, OR OTHERWISE.

LICENSE AGREEMENT
VEMCO grants to the Buyer a limited, personal license, with no right to sub-license, to use the Intellectual Property ("IP") and Embedded Software in the manner set out in the Documentation. The Embedded Software and IP are not sold to Buyer. All property rights, including Intellectual Property Rights, remain with VEMCO. All rights related to the Embedded Software not expressly licensed to the Buyer are reserved to VEMCO. BUYER shall not permit any person other than BUYER and its employees to use or make use of the Embedded Software and/or IP. BUYER shall not, and shall not permit any third party to, modify, adapt, translate, reverse engineer, decompile, disassemble, or create derivative works based on the Embedded Software and/or IP. This license is assigned to the Product with which you have acquired the Embedded Software and/or IP. If the Product purchased is a Transmitter product, be advised that the license life is equal to the operational life.

EXPORT
Products and associated materials supplied or licensed hereunder may be subject to various export laws and regulations. It is the responsibility or BUYER to comply with such laws and regulations.

NEGOTIATED AGREEMENT
It is fully understood by the parties that the price of the Product and other mutual agreements of the parties set forth in this agreement were arrived at in consideration of this warranty, SPECIFICALLY INCLUDING THE WAIVER, RELEASE AND RENUNCIATION BY BUYER SET FORTH ABOVE (DISCLAIMER AND RELEASE).

9.6 Glossary

***Bluetooth* wireless technology:** A technology based on the *Bluetooth* standard which provides for fast wireless communication in air, typically over a 10 meter range.

***Bluetooth* USB Adapter:** This is a physical device that attaches to the PC USB port and enables your PC to communicate wirelessly to the ASCENT-AR.

Firmware: A computer program that is contained as a read-only memory in a hardware device. This program controls the hardware device and may be able to be upgraded, depending on the design of the product. The ASCENT-AR firmware can be upgraded if there is a design change.

MSDS/SDS: Material Safety Data Sheet/Safety Data Sheet are summary documents that provide information about the hazards of a product and advice about safety precautions. SDSs are usually written by the manufacturer or supplier of the product.

Offloading: Retrieving data from a VEMCO release and storing it in a VRL file.

Safe Working Load (SWL): Sometimes stated as the Normal Working Load (NWL), is the maximum safe force that a piece of lifting equipment, lifting device or accessory can exert to lift, suspend, or lower, a given mass without fear of breaking.

Station Name: Name for a specific deployment location including lat and long parameters.

UTC: Co-ordinated Universal Time is a worldwide standard for time, sometimes referred to as Greenwich Mean Time. VUE configures VEMCO release in UTC time.

VRL files: Binary file format for VEMCO data logs read from VEMCO release.

VUE: VEMCO User Environment PC software from VEMCO.

VUE Database: A collection of imported VRL files. VRL files are all that is needed to recreate a database or to create other databases.

9.7 Index