

ACOUSTIC RELEASE FOR ROPELESS TRAPS (AR4RT) INSTRUCTION MANUAL



GENERAL DESCRIPTION

The AR4RT is an underwater, on-demand, acoustic release for recovery of underwater equipment. The system was developed primarily for use with fishing traps but can be used in any suitable application. The system consists of an underwater housing, a rotating release cam, and a release line retainer. The system uses a simple, low-cost acoustic receiver to provide an on-demand release capability. Using the cam, the user arms the system and deploys the equipment. At the end of the deployment, the user sends the release command and the cam rotates 180 degrees and to activate the release. For most systems, this releases a coil of line and float that are secured to the trap, and the float comes to the surface and the equipment can then be retrieved.



SYSTEM SETUP

System setup generally requires:

- Open the pressure housing.
- Activation or installation of batteries.
- Installation/Removal of the line retainer.
- Selecting the LED display orientation.
- Attachment of the system to the trap.
- Setup of the rigging that will release the line coil and float.
- Testing of the system for proper operation.

OPEN THE PRESSURE HOUSING

IMPORANT! The AR4RT receiver is connected to the endcap via the electronics so care must be taken not to pull out the endcap and electronics with excessive force and thus damage the connection to the receiver.

OPENING

To open the pressure housing, use the following steps.

1. Remove the two stainless steel screws that hold the endcap in place.
2. Remove the line retainer.
3. Place the unit in a vice, with the vice holding the cam.
4. Carefully pull on the housing directly away from the endcap until the housing slides off the endcap.
5. Rotate the housing approximately 3 turns counterclockwise while continuing to slide out and reveal the electronics and batteries.*
6. Inspect the receiver cable to make sure that it has been properly uncoiled.
7. Continue with the activation or installation of the batteries

***IMPORTANT! The rotation is to uncoil the receiver connection wire that is coiled in the end of the housing.**

ACTIVATION/INSTALLATION OF BATTERIES

IMPORANT! The AR4RT is designed to use either 3.0V Li-MnO2 AA batteries or 3.6V Li-SOCL2 AA batteries. The firmware is setup for one or the other so only replace your batteries with the same batteries that were originally supplied. Please contact us if there are any questions.

ACTIVATION

If batteries are already installed, but not activated, use the following steps.

1. Verify that compatible new AA batteries are in the battery holder.
2. Find the small tab inserted between the battery terminals and remove it.
3. Check that the unit powers up when this is removed by looking at the LED display.*

4. The LED display will initially flash a sequence of coded green flashes, and then go into sleep mode where the LED only flashes green about once every eleven seconds.**
5. Check that the O-ring and seal areas are clean, and if necessary clean and re-grease with silicone grease.
6. Reinstall the housing by sliding in while making a clockwise rotation of the endcap of about 2.5-3 turns making sure that the LED display aligns with the window in the housing and that the holes in the housing align with the holes in the end cap.***
7. Reinstall the line retainer and the screws.

INSTALLATION

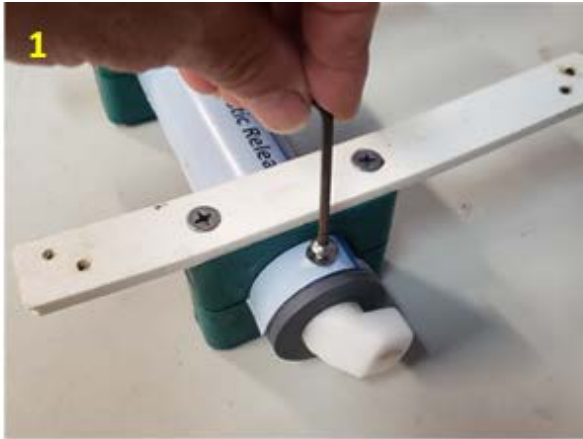
If batteries need to be installed, use the following steps.

1. Install new Xeno XLP-060F AA batteries into the battery holder.
2. Check that the unit powers up when this is removed by looking at the LED display.*
3. The LED display will initially flash a sequence of coded green flashes, and then go into sleep mode where the LED only flashes green about once every eleven seconds.**
4. Check that the O-ring and seal areas are clean, and if necessary clean and re-grease with silicone grease.
5. Reinstall the housing making sure that the LED display aligns with the window in the housing and that the holes in the housing align with the holes in the end cap.
6. Reinstall the line retainer and the screws.

***IMPORTANT! If the unit does not power up, the batteries may not be making end-to-end contact due to the grip of the battery holder. Try spinning the batteries in the holder to break the grip and pushing the batteries from the negative (spring) contact toward the positive (button) contact. The batteries can also be lubricated with a bit of Armor All or a light silicone lubricant to make them slick, so they slide more easily in the holder.**

****IMPORTANT! If the LED display is flashing red, this indicates a low battery. Follow the step above to make sure that there is good contact by the batteries. If this does not resolve the issue, check the battery voltages and replace any that have low voltage. Do not deploy a system that has a red flashing LED.**

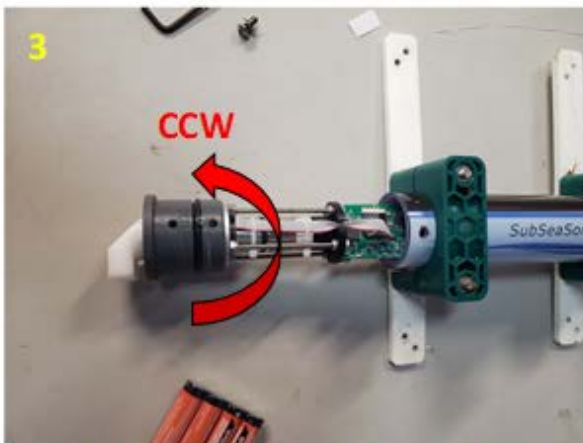
*****IMPORTANT! The endcap must be rotated in such a way that it coils up the wire that goes to the acoustic receiver so that it will not jamb and will fit properly between the end of the electronics and the far end of the pressure housing where the receiver is potted.**



1 Remove the two stainless steel screws that hold the end cap in place and remove the line retainer.



2 Place the unit in a vice, with the vice holding the cam and carefully pull off the housing just enough to get started.



3 Carefully pull on the housing directly away from the end cap while rotating CCW ~3 turns until the housing slides off the end cap.



4 If activating existing new batteries, find the small tab inserted between the battery terminals and remove it. Verify display turns on.



5 If installing new batteries, remove old batteries and dispose properly.



6 Install compatible new AA batteries into the battery holder. Verify LED turns on green and close up the unit.

INSTALLATION/REMOVAL OF THE LINE RETAINER

IMPORANT! The AR4RT can be used with or without the line retainer. In general, the system is easier to use without the line retainer. The line retainer should only be installed if it is found that the release line has a tendency to jump off the cam during deployment of the trap.

INSTALLATION

If the retainer is not already installed, use the following steps to install it.

1. Remove the endcap screw on the side of the unit where you want to install the retainer.
2. The retainer should be installed on the side opposite the direction of tension for the release line.
3. Install the retainer using the longer screw (5/8") and supplied flat washer.

REMOVAL

If the retainer is already installed, use the following steps to remove it.

1. Remove the endcap screw on the side of the unit where the retainer is installed.
2. Remove the retainer and flat washer.
3. Replace the screw using the shorter (1/2" screw supplied).

SELECTING THE LED DISPLAY ORIENTATION

IMPORANT! The AR4RT LED display can be oriented in any direction required by the mounting arrangement. The motions of the cam are all relative and thus are not fixed to a specific orientation of the unit or the LED display. However, if the line retainer is installed, then the LED display can only be oriented on the same side as the retainer, or on the opposite side to the retainer due to the location of the retainer mounting holes relative to the LED display.

ORIENT THE LED DISPLAY – LINE RETAINER NOT INSTALLED

If the line retainer is not installed, use the following steps to orient the display.

1. Locate the unit at the desired mounting location on the trap.
2. Rotate the unit until the LED display is facing the best direction for viewing.
3. Follow the steps in the subsequent section of the manual to mount the unit in this orientation.

ORIENT THE DISPLAY – LINE RETAINER INSTALLED

If the retainer is installed, use the following steps to orient the display.

1. Locate the unit at the desired mounting location on the trap.
2. Orient the unit so the line retainer is facing way from the direction of tension for the release line.

3. Determine if the display is facing the best direction, or if it needs to be rotated 180 degrees.
4. If necessary, mount the line retainer on the opposite end cap screw to rotate the display orientation 180 degrees.
5. Follow the steps in the subsequent section of the manual to mount the unit in this orientation.

ATTACHMENT OF THE RELEASE TO THE TRAP

The AR4RT has been used on a wide range of fishing traps, and each system requires some adjustment to the attachment to accommodate the different trap designs. Some key considerations for mounting are summarized below. Please feel free to contact us with any questions regarding your specific application.

ATTACHMENT HARDWARE

The housing of the AR4RT is constructed from clear schedule 40 PVC pipe. So, a standard sized pipe mounting bracket can be used to attach to the housing. While there are many varieties, we recommend using two plastic clamps, one at each end of the unit (1-1/2" Pipe Clamp Body Polypropylene Light Series; The Clamp Co.). This can then generally be attached to a secondary plate that can in turn be secured to the wire mesh or the structural frame of the trap with zip ties or cable clamps. The AR4RT unit must be secured sufficiently that the housing is not able to rotate when activated, otherwise the housing will turn, and the cam will not, and no release will occur.

ATTACHMENT LOCATION AND ORIENTATION

There are two basic attachment locations that have generally been used successfully. These are either horizontal or vertical. In the vertical configuration, the AR4RT is generally secured to a vertical wall of the trap. This can be on the inside of the wall or the outside. Inside is preferred for protecting the unit from impact during handling and may allow better stacking of traps. Outside provides easier access to the unit.

In the horizontal configuration, the AR4RT is generally secured to the top of the trap with the cam end aligned with one of the vertical walls. Again, mounting inside is preferred for protecting the unit from impact during handling, and may allow better stacking of traps. Outside is generally not recommended for this orientation but may be possible in some cases.

IMPORTANT! In either of these orientations, it is critical that the unit be mounted such that the release line leads with the proper angle to the cam. The angle to the cam must be oriented above the perpendicular, otherwise the release loop may not slip off the cam. This is one of the most common causes of release failure. Make sure that the attachment location and orientation are such that the release line pulls at a slight vertical angle (~5 degrees) from the perpendicular to the cam.



Vertical installation on a lobster trap with the AR4RT inside the trap.



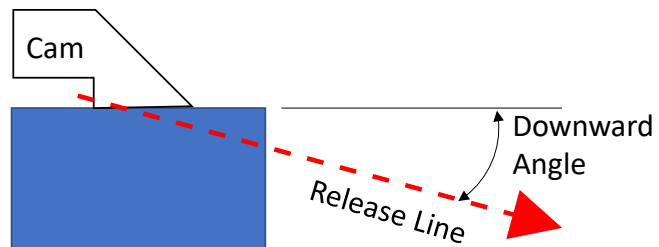
Vertical installation on a Guardian mini-sled with AR4RT in the protected corner.

Correct Configuration



Correct configuration of the release line lead relative to the cam

Incorrect Configuration



Incorrect configuration of the release line lead relative to the cam

RIGGING

Rigging of the release system is critical to the successful operation of the system. While many different configurations are possible, the system has been tested with configurations that are known to perform reliably, and these should serve as at least a starting point for the rigging configuration for any trap.

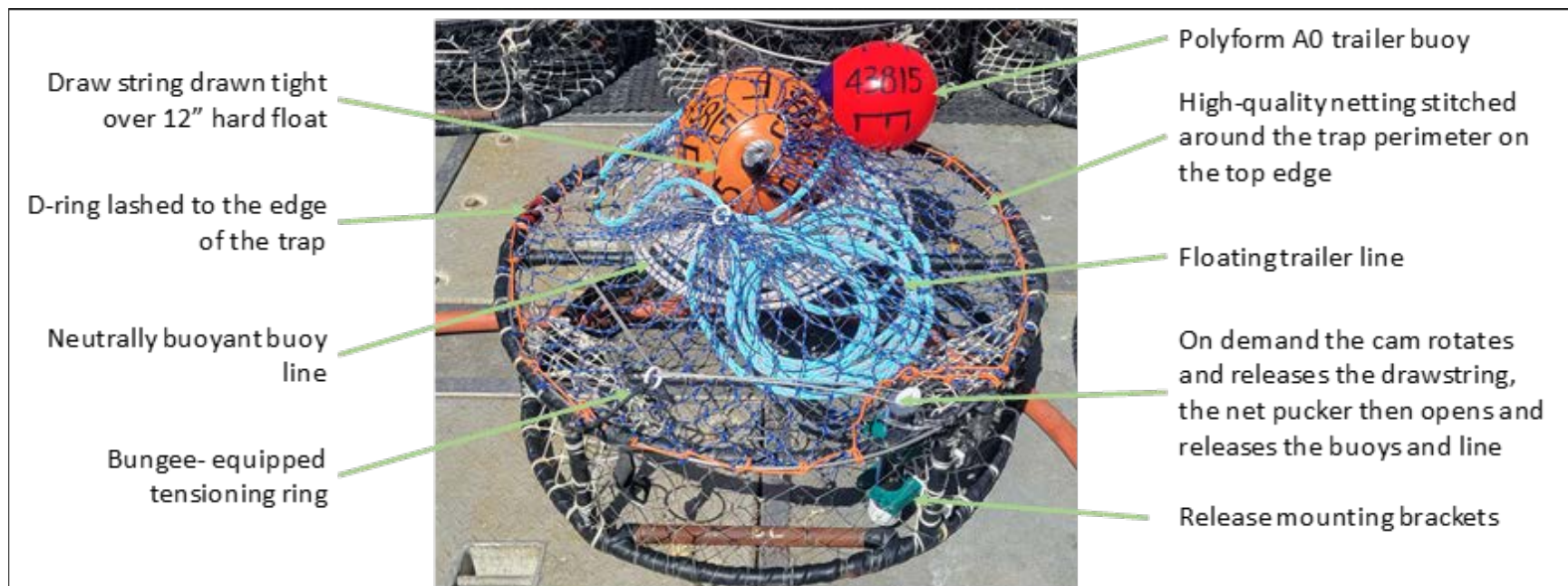
The recommended rigging arrangement works with a coiled trap line and float. The trap line must be coiled cleanly to minimize the possibility of tangles after release. The float can be secured inside the line handling system or can be pinned through a small round thimble embedded in the line. The system can use a single float, or main float with trailer.

A common rigging system for shallow water is the Pinpoint System. In this system, the release rigging consists of a bungee cord, the release line, and a degradable link. The release line is made into a loop and secured to the middle of the bungee using a degradable cotton cord linkage. The release line should be made of a small diameter, slippery material such as 1/8" diameter dyneema line. The bungee cord should be a smooth rubber (polyurethane or EPDM) that will hold up in saltwater (e.g., McMaster Carr <https://www.mcmaster.com/3097T53-3097T531/>). The bungee cord is secured to the top of the trap at its ends using either the supplied hooks (bent over to keep them from coming off), or large zip ties. The release line is then led through the float loop, under a central hold down point (either an installed D-ring or just a wire section of the trap), and on to the release cam. The release line and the bungee together thus form a three-point tie-down system for the trap line coil. In this way, when the cam releases the release line loop, the buoyancy of the float pulls the release line through the central hold down point, and the bungee snaps back out of the way, releasing both the float and the coil.

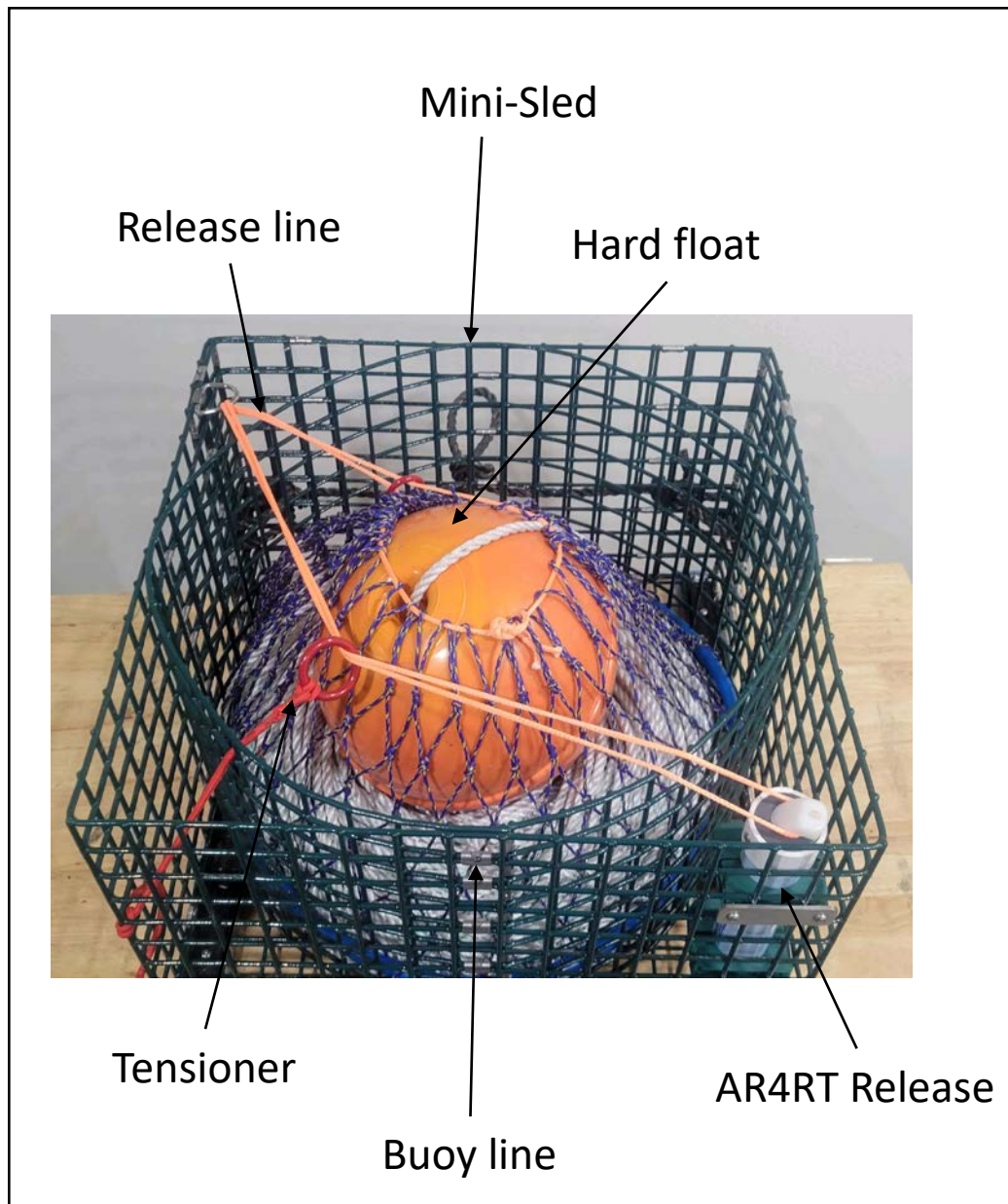
The AR4RT is also commonly used with the Guardian Ropeless retrofit and sled systems (<https://guardianropeless.com/>). In these systems, the line coil is secured inside a mesh drawstring system. The buoy may also be inside the drawstring system or on the outside. The opening of the system is controlled by a release line that routes to the AR4RT cam. This allows the line and buoy to be held securely until the release is activated. The retrofit Guardian is generally installed on top of a fishing trap, while the sled is generally used in line with a string of traps and connected to the string by a groundline. More information can be found at the Guardian website listed above.



Pinpoint rigging system on a spiny lobster trap



Guardian retrofit rigged on a Dungeness crab trap.



Guardian mini sled rigging for use with strings of traps.

TESTING

When using the release for the first time or on a new type of trap, we strongly recommend the following testing steps:

1. Test on land.
2. Test in shallow water or pier-side.
3. Test under expected conditions with a safety line and float.

Following all of these steps and trying out the system multiple times during each step is critical to successful operation under real fishing conditions. Experience has shown that following these testing steps significantly reduced the probability of gear loss.

IMPORANT! Failure to adequately test the system prior to actual use can increase the probability of lost gear.

OPERATION

Operation of the AR4RT can be performed either directly with the deck unit or via the Trap Timer App.

MANUAL OPERATION WITH THE DECK UNIT

POWER UP DECK UNIT AND MAIN MENU

1. Turn the power switch on.
2. Make sure the transducer is in the water.
3. Hold the middle control switch down toward "(S)" until the display shows "MENU FOLLOWS".

OPTION 1: SELECT NEW UNIT ID

1. Toggle the right control switch down once to "(N)" so the display shows "Select unit ID".
2. Toggle the right control switch up once to "(A)" so the display shows "New unit ID".
3. To input a new unit ID, toggle the right control switch up once to "(A)".
4. Toggle/hold the left control switch up to "(I)" to increase the current digit.
5. Toggle the left control switch down to "(D)" to move to the next digit.
6. When all digits completed, toggle the right control switch up once to "(A)" to accept the unit ID.
7. Toggle the right control switch up once to "(A)" to store the unit ID or to "(N)" not to store.

OPTION 2: SELECT STORED UNIT ID

1. Toggle the right control switch down once to "(N)" so the display shows "Select unit ID".
2. Toggle the right control switch up once to "(A)" so the display shows "New unit ID".
3. To input a new unit ID, toggle the right control switch up once to "(A)".
4. To select from you list of saved unit IDs, toggle the right control switch down once to "(N)".
5. Toggle/hold the left control switch up to "(I)" to scroll up or "(D)" to scroll down through your saved unit IDs.
6. Toggle the right control switch up once to "(A)" to accept the unit ID.

SELECT THE RELEASE ACTION

1. Toggle the right control switch down twice to "(N)" so the display shows "Select Action".
2. Toggle the right control switch up once to "(A)" so the display shows the current action.
3. Toggle the right control switch down to "(N)" until the display shows "Release (No Ping)".
4. Toggle the right control switch up once to "(A)" to accept the action.

TRANSMIT THE RELEASE ACTION

1. Toggle the right control switch down three times to "(N)" so the display shows "Transmit Once".
2. Toggle the right control switch up once to "(A)" to accept the transmit once.
3. When the display indicates "(R) for RELEASE", toggle the center control switch up once to (R) to confirm the transmit.
4. The red LED on the deck unit should go through a series of bursts that indicate the transmission is occurring
5. When completed, make sure to remove the transducer from the water.

AUTOMATIC OPERATION WITH THE TRAP TIMER APP

POWER UP DECK UNIT AND MAIN MENU

1. Turn the power switch on.
2. Make sure the transducer is in the water.
3. Hold the middle control switch down toward “(S)” until the display shows “MENU FOLLOWS”.

START TABLET AND APP

1. Power up the tablet.
2. Start the Trap Timer app.
3. Verify in the settings that the app is set to the AR4RT acoustic release option.

DEPLOY THE TRAP

1. Prep that trap and deploy it to the target location.
2. In the Trap Timer app, click the “Set” button at the top.
3. Select the trap ID from the list, or type in the trap ID number.
4. Verify the deployment.

RETRIEVE THE TRAP

1. Arrive within acoustic range of the trap
2. In the Trap Timer app, click the “Haul” button at the top, or click on the trap icon and click “Haul” in the popup window.*
3. The app will automatically transmit the release code for that trap.
4. Verify that the buoy comes to the surface and then click verify in the app.

***IMPORTANT! When using the Trap Timer app, clicking the “Haul” button will automatically select the trap that is closest to the boat. If several traps are in close proximity to the boat, it is better to click on the icon for the specific trap that you want to retrieve so that the wrong trap is not inadvertently triggered.**