OVERVIEW

This document provides the procedures to program, test and deploy the RISER TIMER BURNWIRE RELEASE (RTBR) system. The RTBR is an underwater ocean instrument that provides the ability to couple a positively buoyant payload to a negatively buoyant sacrificial anchor, and allows separation of the two at a future date and time programmed by the user. The release time can be programmed up to 5 years into the future. The "burnwire" release mechanism that separates the two parts does not actually burn anything (i.e. there is no combustion). Instead it uses the energy stored in a battery to force rapid galvanic corrosion of an Inconel wire that holds a locking pin in place supporting the load.

The overall RTBR system consists of the release itself, a programming tablet with a pre-installed programming application program, and a programming cable to connect them.

SPECIFICATIONS

Parameter	Value
Deployment Duration	5 years
Depth	150 meters
Working Load	50 kg
Length	
Tube Diameter	1.75 in.
Maximum Diameter	
Weight (Air)	
Weight (Water)	
Main Battery	2 D cell Alkaline
Burnwire Battery	2 9V Alkaline

The system is capable of re-arming but that is not presently described in this document. After actuation, the burnwire assembly and the burnwire batteries must be replaced.

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1. INCLUDED PARTS:

RISER-Timer Burnwire Release:

Attachment Point:

Instrumentation and floatation mounting point.

0.5 inch diameter hole for D Shackle or rope.

Electronics:

Used to program the recovery time

On board switch for activating deployment mode.

9V batteries for burn wire release

Alkaline D Cells allow unit to run continuously for 5+ years

Burn Wire Release:

When recovery time has been reached a wire will burn away causing the fiberglass pin, chain link, and attached weight to detached. Burn time is approximately 10-15 min.

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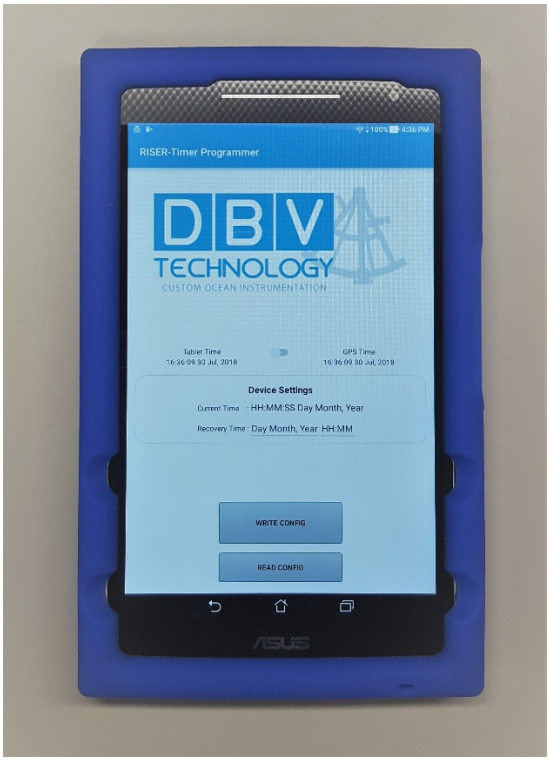
Programming Tablet:

The tablet is used to set and verify the recovery time for the instrument. Programming is done through an easy to use app called “RISER-Timer.” The tablet also provides power to the unit during programming.



Programming Cable:

This custom cable is used to interface between the recovery system and the programming tablet.

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PROGRAMMING INSTRUCTIONS:

1. Loosen and remove the screw-on fitting that holds the Burnwire release onto the main housing as shown in Figure 1.

Figure 1

2. On a flat surface, slowly pull the Burnwire release endcap away from the tube to expose the internal electronics as shown in Figure 2.

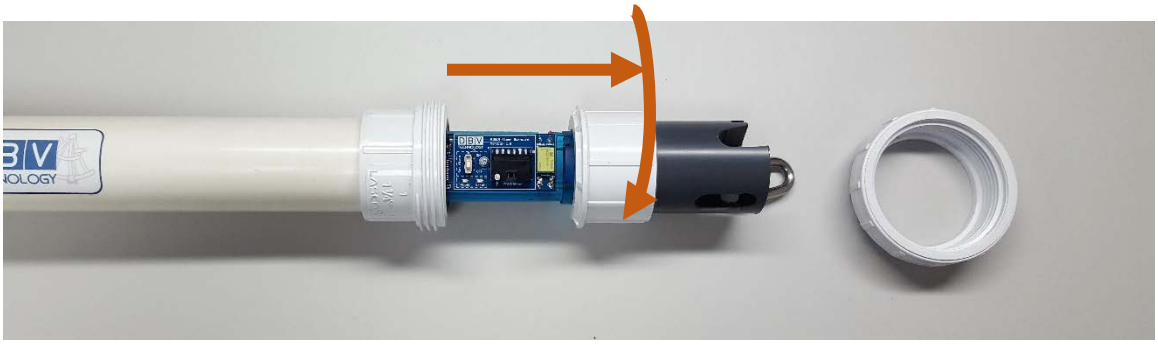

Figure 2

3. For programming, make sure that the “Set Alarm” switch on the PCB is in the “OFF” position. See Figure 3.

4. With the programming cable disconnected from the tablet, insert the programming cable so that the silver dots on the connector and header are aligned. Doing this without the tablet attached insures the electronics will not be damaged if the connector were to be inserted upside-down. See Figure 3.

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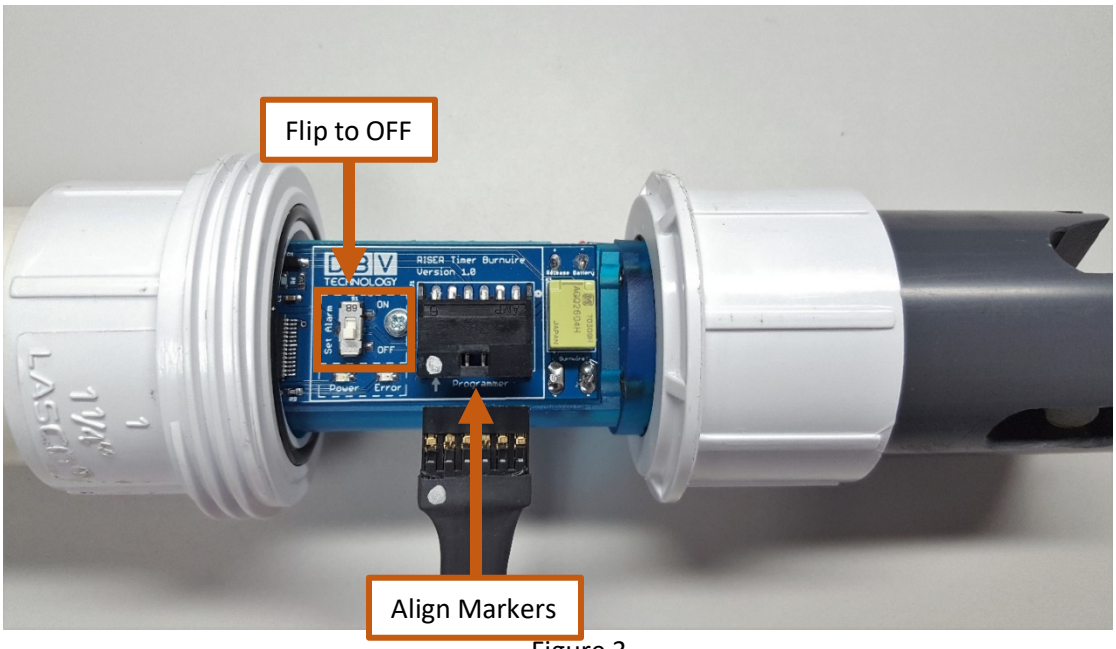

Figure 3

5. Power on the Tablet and plug the other end of the programming cable into the tablet. Notice that the "Power" LED brightens and fades three times indicating that the system is booting up. See Figure 4.

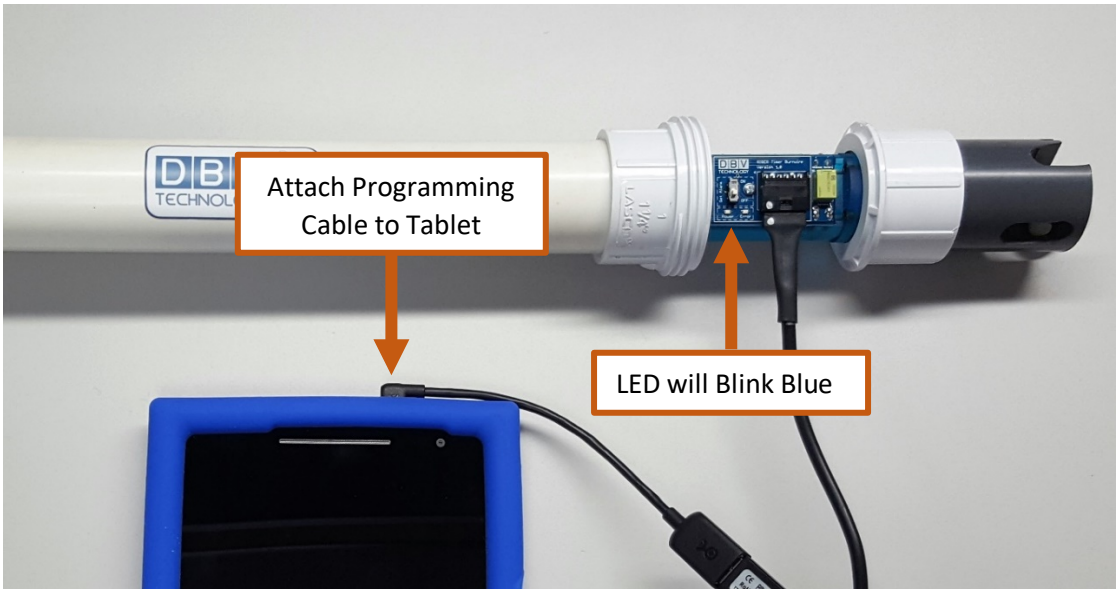

Figure 4

6. Once the LED stays off, the system is ready to receive commands from the tablet.
Note: If the "Power" LED is stuck on any time during programming, an error has occurred. To fix this, simply unplug and reconnect the programming cable from the tablet to power cycle the electronics.

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7. As shown in Figure 5, open the “RISER-Timer Programmer” App which can be found on the home screen of the tablet. Once the app is open, there will be a message asking for permission to use the programming cable. Press “OK”.

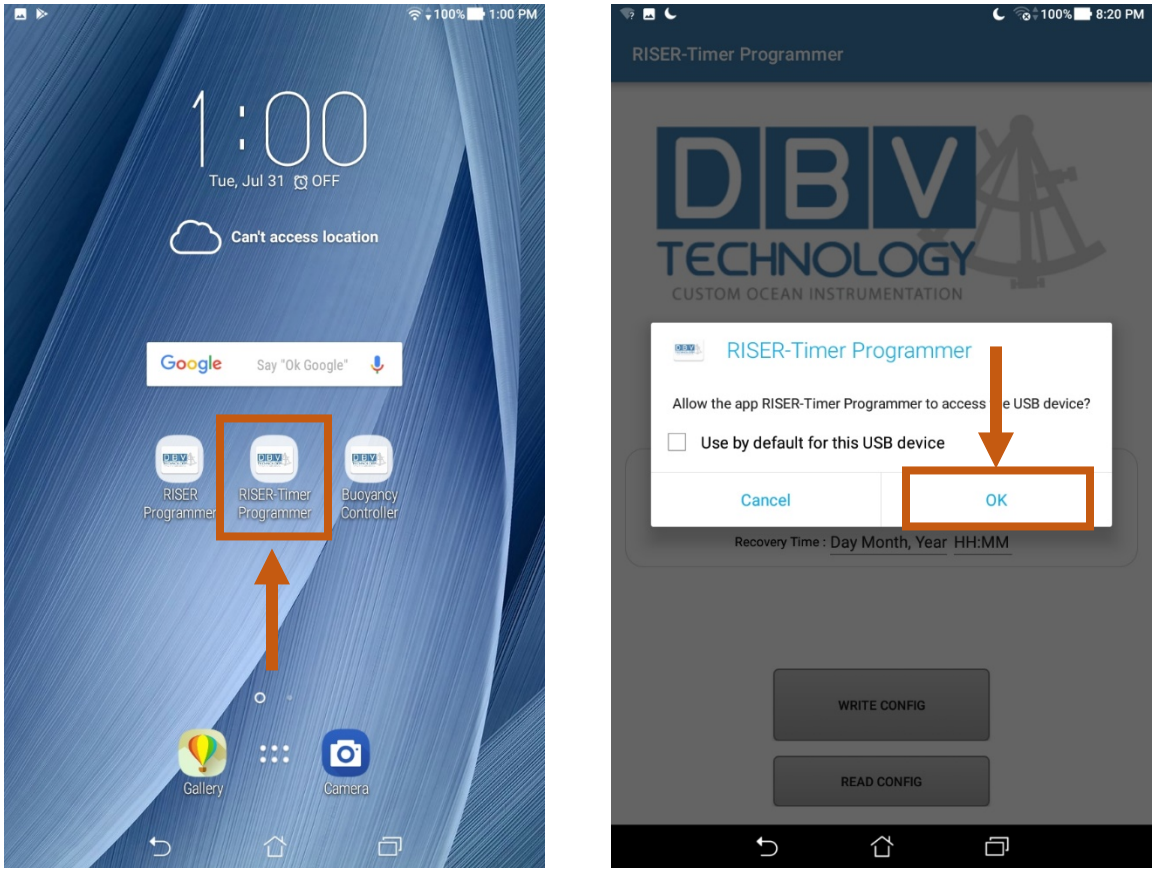

Figure 5

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8. You will now see the Programming app as shown in Figure 6 below:

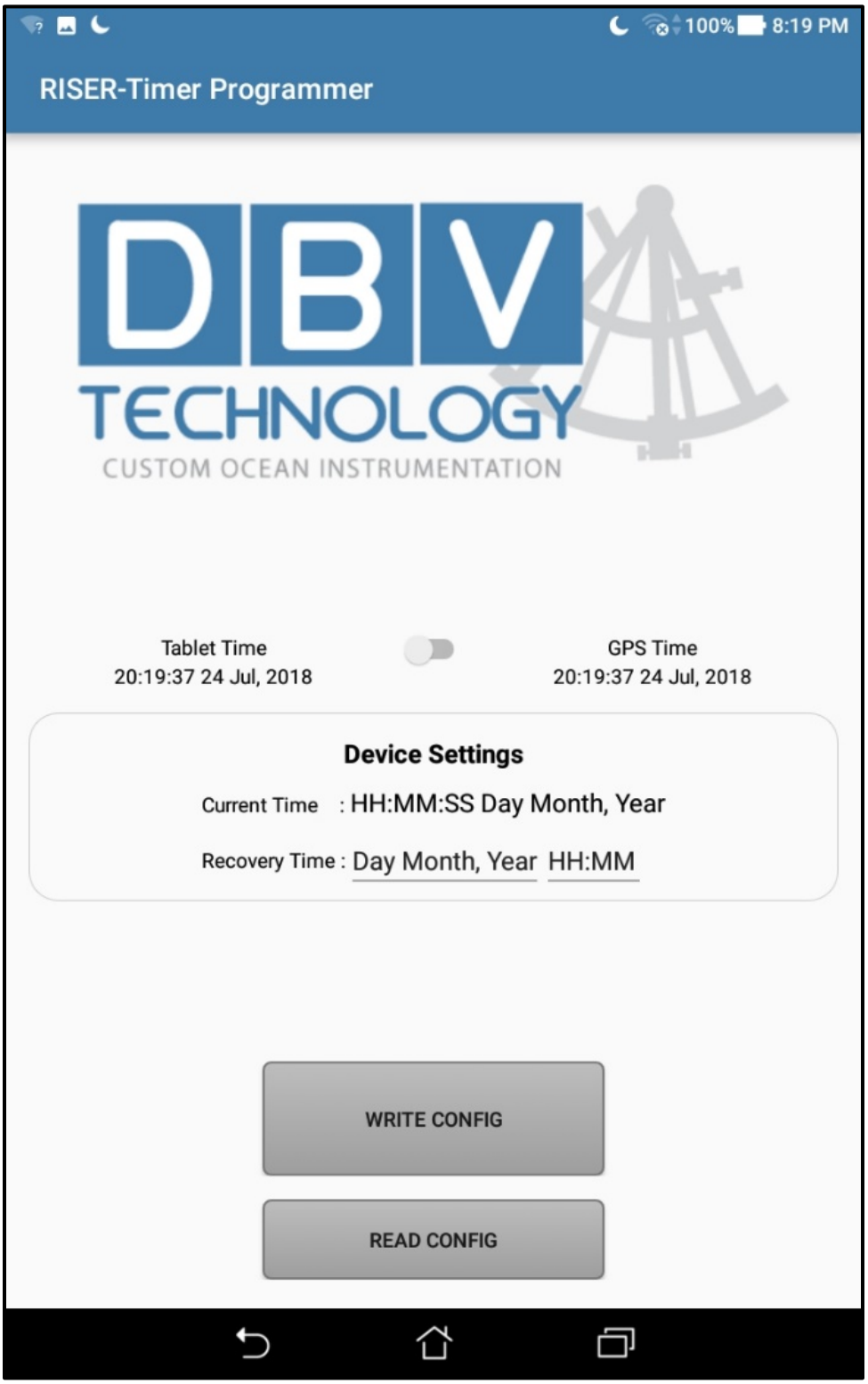

Figure 6

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The following describes the various fields in the app:

Tablet Time: Current time on the tablet based off of the internal RTC. For most accurate time, make sure the tablet is connected to the internet. (Default)

GPS Time: Current time on the tablet based off of the internal GPS module. (Can be selected using the toggle switch between GPS Time and Tablet Time)

Current Time: This is the current time according to the recovery system. This time is automatically updated to either Tablet Time or GPS Time when the system is programmed to minimize clock drift.

Recovery Time: This is the date [DAY-MONTH-YEAR] and time [HOUR-MINUTE] at which the recovery system starts burning the wire to drop the weight. The date and time are user selected by clicking on the entry fields which are underlined in the app.

Write Config: This button is used to program the instrument to the user selected recovery time.

Read Config: This button can be used to verify the current time and recovery time are set properly on the recovery device.

IMPORTANT NOTE: All time is displayed in Coordinated Universal Time (UTC). This should be taken into consideration when programming the instrument so that the time can be adjusted to the current time zone.

9. Set the desired recovery time by pressing on both the "Day, Month, Year" and "HH:MM" entry fields. Once the Recovery Time is set, Press the "WRITE CONFIG" button. The "WRITE CONFIG" button will turn green and display "WRITE SUCCESSFUL" to indicate that the system has been programmed successfully. If there are any issues programming the system, the button will turn orange and display "WRITE FAILED" or "NO RESPONSE." If either of these unsuccessful writes occur, simply try again, or disconnect the programming cable from the tablet and try again.

   Three Possible Responses from pressing WRITE CONFIG:

10. (Optional) Press "READ CONFIG" to verify that the recovery time is set. Read config will update the Current Time and Recovery Time fields.

11. Once the system is programmed to the desired settings, remove the cable from the tablet and then the device electronics.

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12. If the system is ready for deployment, flip the alarm switch to the "ON" position before sealing up the instrument. Otherwise, simply close the housing, re-secure the locking ring, and store away until deployment.

13. If it is desired to test the actuation, simply set the recovery date and time as described and switch the unit on. Observe the time on the disconnected tablet and/or another time source and at the programmed time, the system will actuate. You will observe a solid blue LED and hear a faint clicking noise. MAKE SURE TO TURN THE UNIT OFF AFTER THE TEST OR ELSE THE MAIN BATTERIES WILL DRAIN DOWN AT A HIGHER RATE.

2. DEPLOYMENT INSTRUCTIONS:

If the system has not yet been programmed, please follow the **Programming Instructions** in the previous section.

1. If the system was closed with the switch OFF, prior to attaching this recovery system to the weight, remove the locking collar and slide the electronics part way out of the tube as seen in Figure 7.

Figure 7

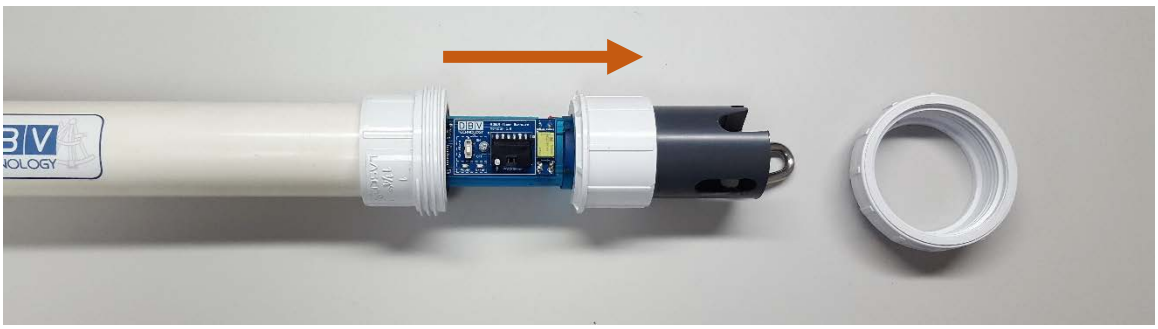

Figure 8

2. On the circuit board, locate the switch below the DBV Logo and flip to the "ON" position. This will provide power to the electronics so that the system will release the weight when the recovery time is reached.

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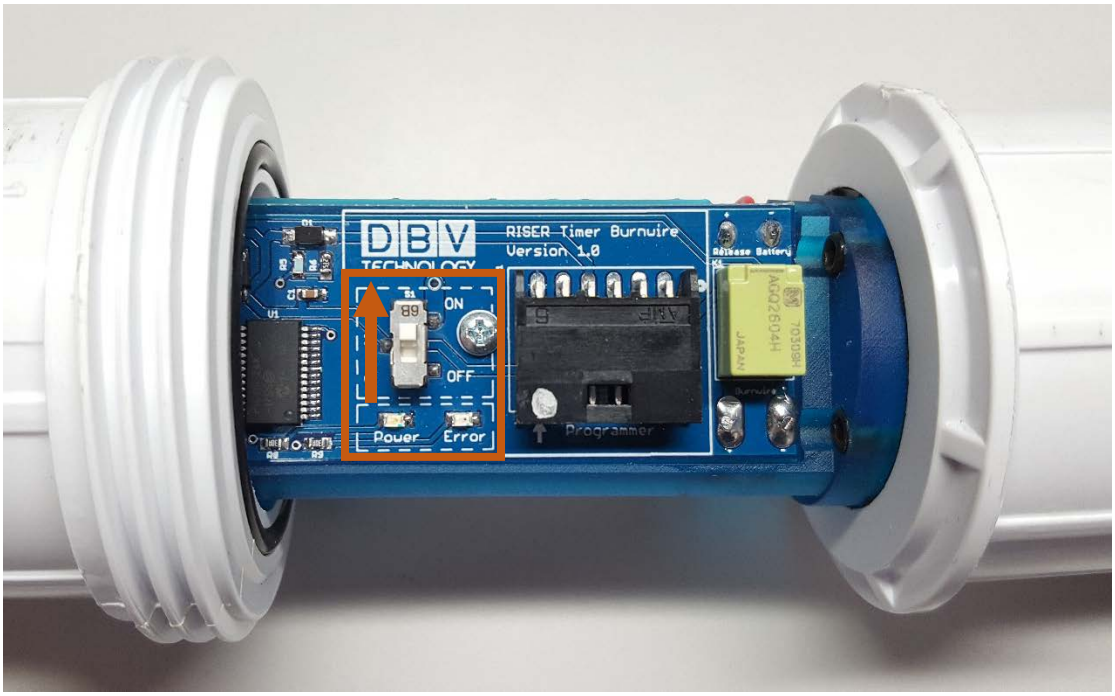

Figure 8

3. **(IMPORTANT)** Once the electronics are powered up the BLUE "Power" LED will brighten and dim three times before flashing on and off three more times indicating that the system has received power and is in the deployment mode. **This step is crucial to determining if the system will operate properly.** If the "Error" LED flashes red when the system is turned on DO NOT DEPLOY. This error indicates that the programmed alarm time is set for a time in the past and the system will not trigger the recovery process at any time in the future.

4. Once the electronics are properly set into the deployment mode, check the o-ring surface for scratches or debris. Apply a little silicon grease to the o-ring if it appears to be dry.

5. Once the o-ring is prepped, slide the electronics back into the housing and tightly secure the endcap with the lock collar. Figures 9 and 10.

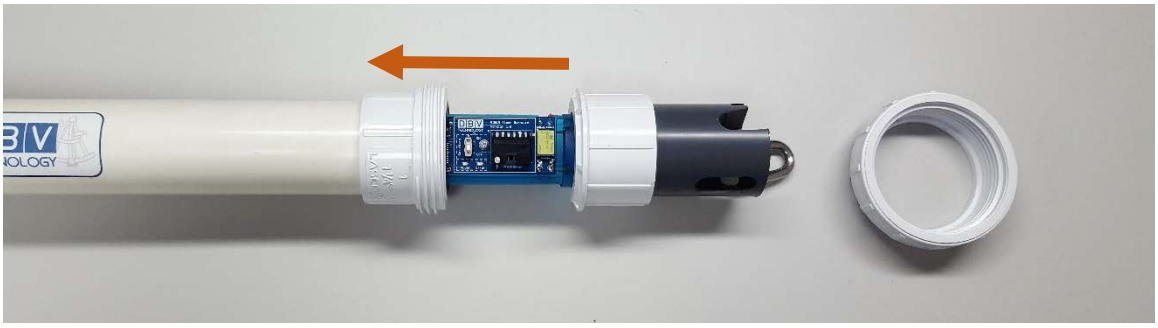

Figure 9

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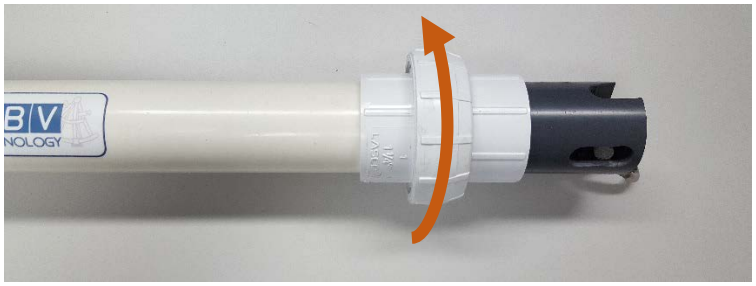

Figure 10

6. If not already done so, attach the user's instrumentation and buoyancy to the top of the recovery system via the 0.5 inch attachment point via a rope, shackle, etc. as shown in Figure 11.

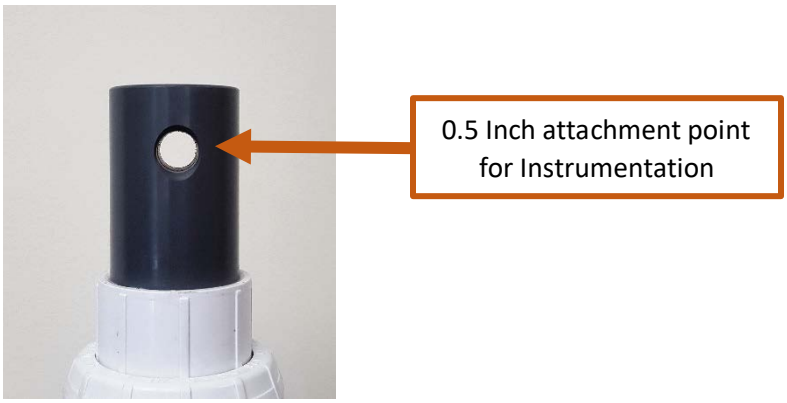

Figure 11

7. Attach the anchor weight to the chain link hanging from the release pin as shown in Figure 12.

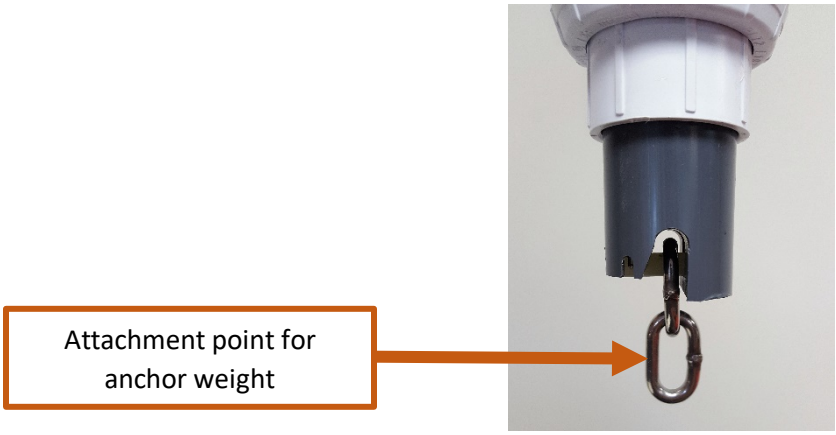

Figure 12

8. The recovery system is now ready for deployment.

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