SMELTS

# USER MANUAL

For SMELTS Lift-Raft™
Models Equipped With
*EdgeTech* Acoustics

EdgeTech
*The Leader in Underwater Technology*

Covered models include LR-13-E | LRT-13-E | LR-26-E | LR-50-E | LR-60-E | LR-80-E | LR-160-E

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# *IMPORTANT - READ BEFORE USE*

This system stores high-pressure air and is designed to operate in a harsh subsea environment. Incorrect use, poor maintenance, or skipping procedures can lead to equipment failure, loss of gear, or personal injury. This is not a "plug and play" product. It requires attention, routine checks, and proper handling.

**You are expected to read and understand this manual before using the system. Do not rely on assumptions or prior experience with other equipment. The Lift-Raft™ operates differently than traditional gear, and misuse will result in poor performance or failure. If something is unclear, do not proceed until it is understood.**

Proper service, care, and storage are critical to safe and reliable operation. This includes maintaining cylinder pressure, inspecting seals and air lines, monitoring corrosion protection (including the sacrificial anode), and keeping all components clean and in good condition. Neglecting maintenance will reduce performance and can cause the system to fail during recovery.

Use the system only within its intended limits, including depth, lift capacity, and operating conditions. Always perform pre-deployment checks and follow the procedures in this manual. Failure to follow these steps increases the risk of lost gear and unsafe conditions on deck during recovery.

If the system is damaged, not functioning as expected, or has not been properly maintained, do not use it. Repair or service the unit before deployment.

***IN SHORT: if this manual is not followed, the system may not work as intended.***

***Skip this manual and the ocean will gladly keep your equipment.***

# Table of Contents

# Quick Start Guide

This section provides the **minimum** required steps to safely operate the SMELTS Lift-Raft™. It is not a replacement for this manual; users are expected to read the full manual for complete instructions, safety information, and maintenance requirements.

## *Before Setting*

- Ensure batteries are charged (do not allow charge to drop below ~85%)
- Verify air pressure is adequate (full tank = 3000psi, do not allow to go below 500 psi)
- Check all air connections & make sure bleeder screws are shut tight
- Confirm tank valves are open (green ring visible)
- Ensure electrical connections are secure and vent plug is installed in acoustic module
- Secure lift bag to unit properly
- Perform a test status and release on deck to confirm operation

## *During Operation*

- Send a status command before recovery to confirm battery level and system readiness
- Maintain communication range, battery charge, and tank pressure during operation.

## *After Hauling*

- Deflate lift bag using check valves
- Inspect system for damage or wear
- Prepare unit for next deployment (See *Before Setting*)

## *Charging & Storage*

- Always remove vent plug before charging
- Always reinstall vent plug before deployment
- Always Charge batteries regularly during storage
- Check DIN connections and install caps if tanks are removed
- Do not store lift bags in direct sunlight

## *Maintenance Requirements*

- Have tanks professionally inspected annually
- Monitor & replace sacrificial zinc anodes as needed
- Replace DIN o-rings periodically (Keep spares available)
- Keep air system protected from contamination (use DIN caps when tanks are removed)
- Always return units for service with all components installed

# Introduction

## *Purpose*

This manual provides instructions for the safe use, handling, and maintenance of SMELTS Lift-Raft™ systems. It is intended to help users understand the system components, prepare the unit for deployment, operate the system using acoustic commands, and properly recover, service, and store the gear. This manual applies to all Lift-Raft™ models, which share a common design and operating method.

## *System overview*

The SMELTS Lift-Raft™ is a subsea recovery device used to raise fishing gear to the surface without a fixed rope or buoy. The system rests on the seafloor and consists of a structural cage, high-pressure air cylinders, a valve, a lift bag, and an acoustic control module. When deployed, the lift bag is deflated and the system remains inactive. A vessel sends an acoustic signal to the unit, which activates communication and allows the operator to send commands.

When a release command is received, the system opens the valve and directs compressed air from the cylinders into the lift bag. As the lift bag inflates, it generates buoyant force and lifts the unit and attached gear to the surface. After recovery, the lift bag is deflated and the system can be reset for reuse. The system operates without any physical connection to the surface and relies entirely on acoustic communication.

SMELTS offers multiple Lift-Raft™ models designed for different depths and lifting requirements. All models use the same release mechanism and user interface but vary in tank size, lift capacity, and operating depth. Each model is designed to maximize the number of recoveries per air fill and minimize time to surface within its intended depth range.

## *Intended Use*

The SMELTS Lift-Raft™ is intended for use in commercial fishing, research, and subsea recovery applications where gear must be deployed without a persistent vertical line or buoy. The system is designed for use in regulated areas where traditional gear is restricted, as well as in general applications where remote recovery is required.

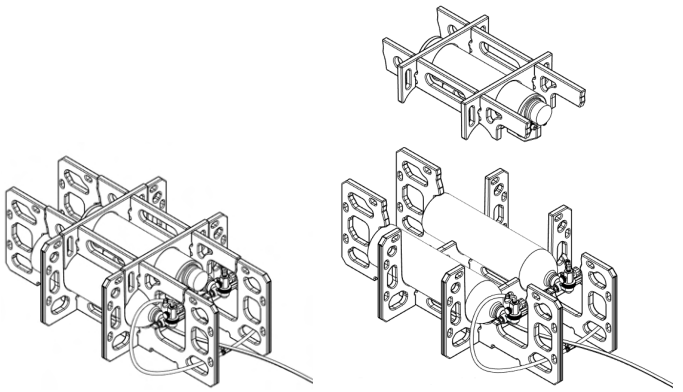
The system should be deployed within the recommended depth range for the selected model and used with compatible fishing gear or subsea equipment. It may also be used in a hybrid configuration with a surface buoy for training or familiarization. Proper operation requires the use of compatible acoustic communication equipment and adherence to the procedures outlined in this manual.

# System Components

## *Lift-Raft™ Assembly Overview*

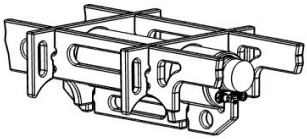
The Lift-Raft™ is a compact subsea recovery unit that integrates all components required for remote lifting. The system consists of a structural cage, internal HDPE core, lift bag, high-pressure air cylinders, valve system, and acoustic module. Components are arranged to protect critical systems while allowing access for service and inspection.

The lift bag is mounted externally and provides buoyant force during recovery. Compressed air from one or two high-pressure cylinders is released through the valve system to inflate the bag. The sealed acoustic module receives commands and controls operation, powered by the onboard battery. Models are configured with different tank sizes, valve orifice sizes, lift bag capacities, and inflation protocols to perform across varying depths and conditions.

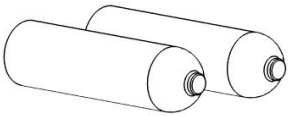


## *Component Breakdown*

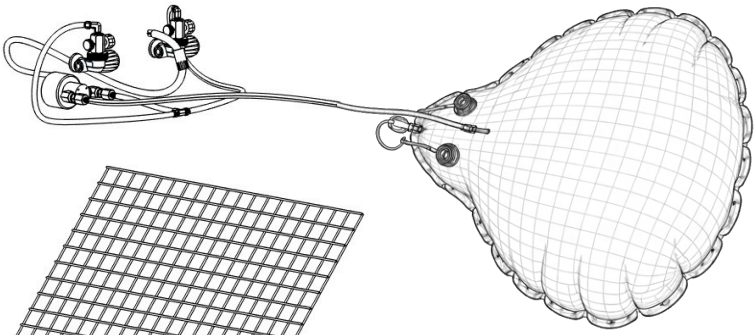
**1. Acoustic Module**
*Houses acoustics, electronic components, & batteries.*

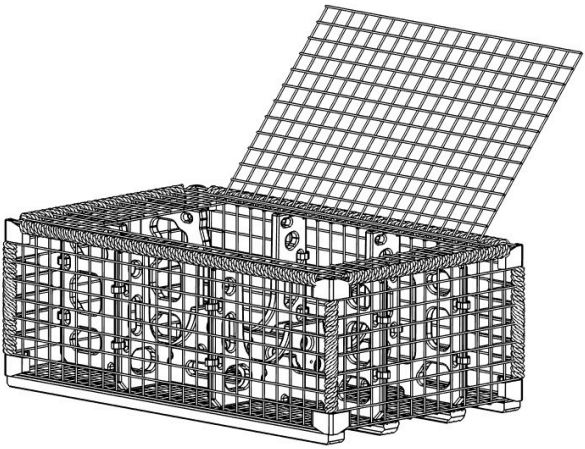


**2. Tanks**
*High-Pressure cylinders supply air pressure to Lift-Bag*



**3. Valve & High-Pressure Hoses**
release air from tanks





**4. Lift-Bag**
*Provides Buoyant force for ascent*

**5. Structural Cage & HDPE Core**
10-Gauge mesh frame supported by HDPE core wing components

## *Acoustic System Overview*

### Important Information

SMELTS Lift-Raft™ systems utilize third-party acoustic equipment, including the EdgeTech 5112 acoustic release. Operation, setup, and configuration of this equipment are covered in the manufacturer's documentation.

This manual provides guidance specific to operating SMELTS Lift-Raft™ systems using acoustic commands. For full instructions on setup, pairing, and configuration of the acoustic system, refer to the manufacturer's manuals in the appendix.

***EdgeTech - 5112 Manual - 0022081***

***EdgeTech - TrapTracker Manual - 0027334***

### Operational Considerations

Acoustic communication performance may vary based on environmental conditions, including depth, noise, and vessel position. Delayed or repeated commands may be required in some cases.

For instructions on how to perform a pre-deployment acoustic check, see the page titled ***Verifying Acoustic Function*** in the ***Operation - Setting/Deploying*** section. For instructions on how to acoustically haul/retrieve gear, see the page titled ***Acoustic Commands*** in the ***Operation - Hauling/Retrieving section.***

SMELTS Lift-Raft™ systems can be operated using one of the following acoustic configurations:

- **Deckbox (Portable System)**
  A portable acoustic unit connected to a mobile device via Bluetooth. Control is performed through the EdgeTech TrapTracker application.
- **In-Hull System (Fixed Installation)**
  A permanently mounted version of the deckbox system installed within the vessel. Operation is identical to the portable system and uses the same application.
- **MFD + Directional Transceiver**
  A fully integrated system using a marine multi-function display (MFD) paired with a compatible acoustic transceiver. Operation is performed through the display interface and may differ from the TrapTracker application.

All configurations perform the same core functions but may differ in setup and user interface.

Regardless of system configuration, Lift-Raft™ operation follows the same sequence:

1. **Establish connection to the acoustic system**
2. **Select or identify the deployed unit**
3. **Send a *Status* command to confirm system readiness**
4. **Send a *Release/Haul* command to initiate recovery**

Successful communication is required before attempting recovery. If no response is received, do not proceed with release.

# Safety Information

## *General Safety Information*

The Lift-Raft™ is a subsea system that operates using stored energy and remote activation. Once deployed, the unit cannot be physically controlled until recovery. Improper use or lack of understanding of system behavior can result in loss of gear or unsafe conditions.

Users must be aware that system response depends on battery condition, air supply, and environmental conditions. If the system does not respond as expected, recovery may not be possible. Do not deploy the system unless its condition and function are fully understood.

## *High-Pressure Air Hazards*

The system uses compressed air stored at high pressure. Sudden release of this energy can cause rapid movement or component failure. Damaged or improperly sealed components may leak or fail, reducing lifting performance or preventing recovery.

## *Deployment & Recovery Hazards*

The system generates upward force during activation, causing rapid movement of the unit and attached gear. Keep clear during release and ascent. During recovery, shifting loads may create unstable conditions on deck and increase risk of injury or equipment damage.

## *Electrical & Battery Hazards*

Low or improperly maintained batteries may prevent system operation. Charge batteries regularly and avoid dropping below recommended levels. Always remove the vent plug before charging and reinstall it before deployment. Failure to reinstall the vent plug will result in water intrusion and system damage. Inspect electrical components before use.

**Failure to follow the procedures in this manual will result in reduced performance, possible equipment failure, or loss of gear. If the system is not properly maintained, prepared, and operated, it should not be deployed.**

# Storage & Maintenance Instructions

Most system failures are caused by improper maintenance or storage. Proper care of the Lift-Raft™ is required to ensure reliable operation and prevent loss of gear.

## *General Storage recommendations*

The Lift-Raft™ should be stored in a clean, dry environment when not in use. After recovery, the unit should be rinsed with fresh water to remove salt, debris, and biological buildup. Allow the system to dry before storage.

Units may be stored with tanks installed or removed. If tanks are removed, protective caps must be installed on all DIN connections to prevent contaminants from entering the air system. Contamination can lead to valve malfunction or restricted airflow, which may prevent proper lift-bag inflation.

For long-term storage, batteries must be maintained with periodic charging. Batteries should not be left uncharged for extended periods, as this may result in loss of function or reduced performance. Refer to the ***Battery Charging*** section for instructions.

Lift bags should be stored out of direct sunlight. Prolonged UV exposure will degrade the material over time, reducing strength and shortening service life.

## *Corrosion Prevention*

The Lift-Raft™ is designed for long-term subsea use and includes corrosion-resistant materials and sacrificial zinc anodes. These anodes protect critical metal components by corroding in place of more important parts such as tanks, valves, and fittings.

Anodes must be inspected regularly and replaced as they wear. If the anode is depleted, corrosion will begin affecting critical components, which can lead to system failure.



*Left: Zinc anode bonded to tanks & valve. Right: Endcap Zinc anode, which protects bulkhead connector & vent.*

All metal components are bonded to the anode system. Damage to coatings or bonding paths may reduce corrosion protection and should be addressed during inspection.

## *Cylinder & Air System Maintenance*

The air system is critical to proper operation. Cylinders must be maintained within their rated pressure range and visually inspected on a regular basis. Annual visual inspection (VIP) of all cylinders is required to ensure safe operation and system reliability. Cylinders that are not inspected regularly may develop corrosion or damage that can lead to failure, pressure loss, or unsafe conditions.

Due to the subsea use of this system, cylinders are exposed to conditions beyond typical scuba applications. When cylinders are inspected and certified through SMELTS, additional steps are taken to improve longevity and reliability. These include cleaning procedures to remove internal and external contaminants, inspection of air pathways, and reapplication of a zinc-based coating to protect against corrosion. This process is designed specifically for the operating environment of the Lift-Raft™ and is recommended over standard inspection methods.

All air connections must remain clean and properly sealed. Contaminants entering the system can affect valve performance and airflow, reducing lift capability or preventing deployment. DIN connections should be kept clean, and O-rings should be inspected and replaced periodically to maintain proper sealing. Damaged or worn seals may result in air leaks or pressure loss over time.

Never overfill cylinders beyond their rated pressure. Over-pressurization may damage components and reduce system reliability.

## *Seal & Component Inspection*

The Lift-Raft™ relies on properly sealed air connections to maintain pressure and ensure reliable lift-bag inflation. Small leaks can significantly reduce performance or prevent recovery. Routine inspection and cleaning of sealing surfaces will help maintain system pressure and ensure consistent operation.

The DIN O-ring is the most common source of leakage, as it is exposed during tank changes. Dirt, debris, or damage to the O-ring can allow air to escape from the system. The O-ring should be inspected and wiped clean before tank installation. Even small contaminants can cause a leak.

Lift-bag check valves are designed to release excess air once the bag is fully inflated. If debris is present on the valve seat, air may escape during inflation, reducing lift performance. If leakage is observed at the check valves, the sealing surfaces should be cleaned to restore proper function.

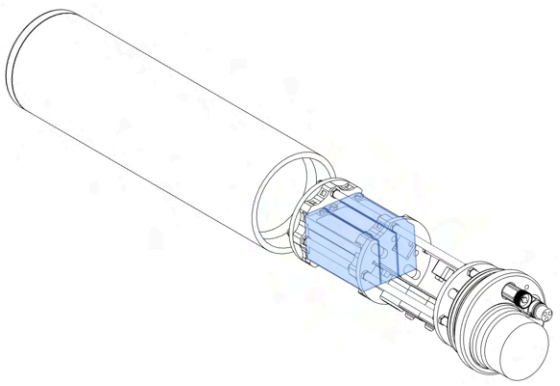
The DIN assembly includes a pressure gauge and bleeder screw. The gauge should be inspected for damage or leakage, and the bleeder screw should operate freely. Improper sealing at this location may result in pressure loss.

Air hoses and valve fittings use tapered connections to create a seal when properly tightened. These components are not frequently adjusted by the user, but should be visually inspected for damage, looseness, or wear. Leaks at these connections may reduce system performance.

## *Battery Charging*

### Charging the Batteries

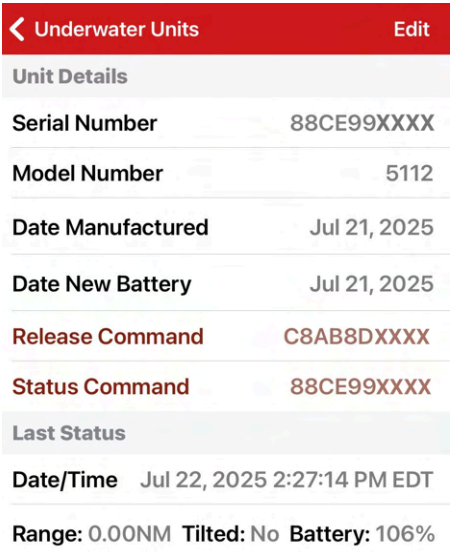
SMELTS Lift-Rafts are equipped with AGM batteries housed within the acoustic vessel to power critical acoustic and pneumatic components. To ensure optimal performance and reliability, batteries must be charged and maintained. This section outlines the recommended charging procedures, guidelines, and safety precautions required to keep batteries in peak condition and to prevent operational failures.



*Battery cell highlighted in exploded view of EdgeTech acoustic vessel.*

### Checking Battery Voltage

SMELTS Lift-Rafts with EdgeTech acoustics operate at 18V DC. Battery percentage can be checked using either the ***Status*** command in the EdgeTech TrapTracker app, or by checking the voltage reading on the battery charger while the charger is **unplugged from a 120v power source** (if the charger remains plugged into a 120V power source, voltage reading will reflect charging operation, not actual battery voltage).




*EdgeTech TrapTracker App being used to check battery percentage after a successful status command.*


Checking Battery voltage using battery charger - NOTE: Battery charger is **UNPLUGGED** & vent plug has been **REMOVED**

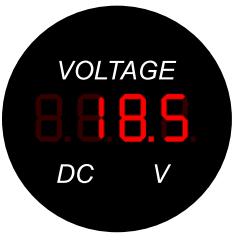
**Service Recommendations**

SMELTS Lift-Rafts operate using precision acoustic technology which requires consistent power levels to operate reliably. To ensure gear functions properly, SMELTS recommends charging batteries consistently to maintain a high voltage level:

- **Check battery voltage using the status command before hauling to ensure proper, reliable operation.**

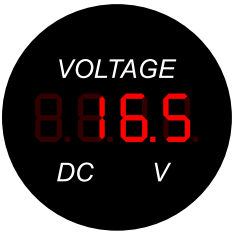
**DO NOT ALLOW BATTERY VOLTAGE TO FALL BELOW 16V (85% CHARGE). FREQUENT DEEP DISCHARGING CAN LEAD TO SULFATION, WHICH PREVENTS BATTERIES FROM HOLDING CHARGE.**

Batteries that have sustained multiple deep discharges may have trouble maintaining a full charge, ultimately preventing the unit from operating at an optimal performance level.



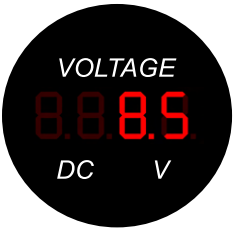

## <18V

Maintaining the batteries at 18V +/-0.5V will ensure long battery life & reliable operation.



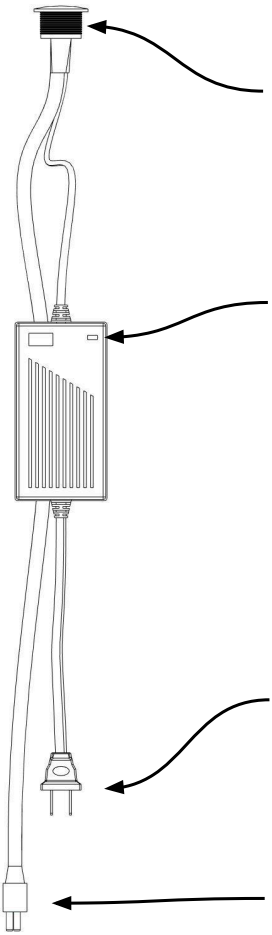

## 16V - 17.5V

SMELTS Recommends charging batteries in the 16V - 17.5V range to prevent damage to batteries & equipment failure.




## >16V

Batteries that have gone below 16V are at risk of losing battery life. Attempting to haul a Lift-Raft with such a battery level can be unsuccessful.



**Voltage Display**

The voltage display shows the battery voltage of the unit when the unit is unplugged from a 120V power source.

**LED Status Indicator**

The battery charger features an LED indicator light which shows the status of the charging operation.

*A BLINKING RED LIGHT INDICATES BATTERIES ARE STILL CHARGING.*

*A SOLID GREEN LIGHT INDICATES BATTERIES HAVE FINISHED CHARGING.*

**120V Plug**

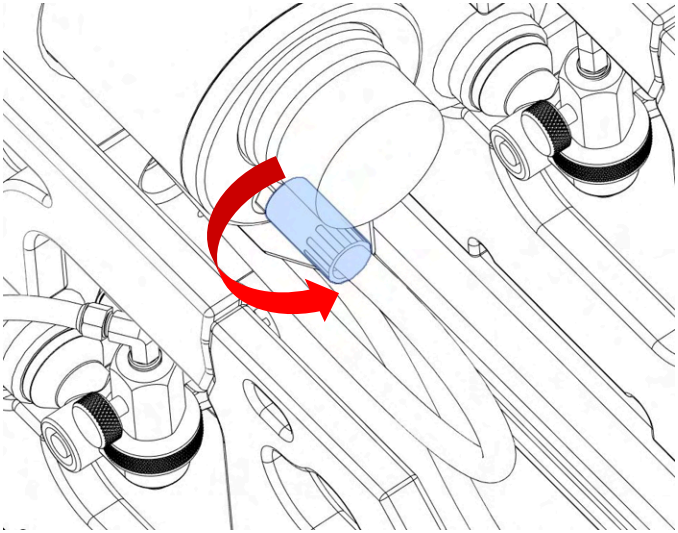
The Battery Charger must be plugged into a 120V power source to charge the battery.

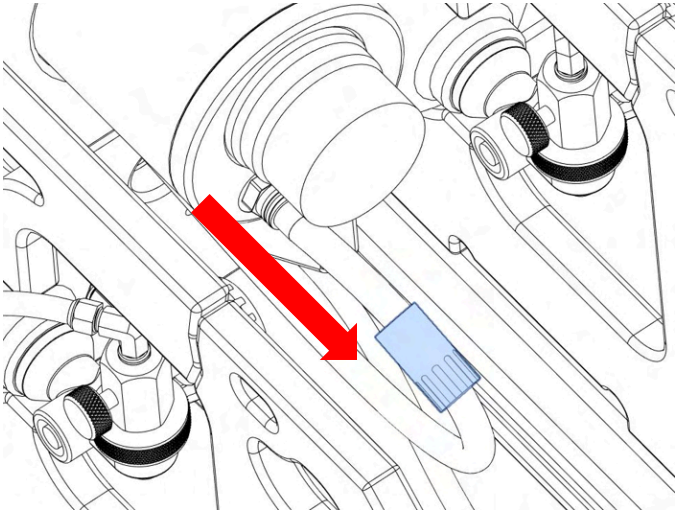
**3-Pin Connector**

EdgeTech units use a 3-pin connector on the vessel's bulkhead to actuate the valve & charge the battery.

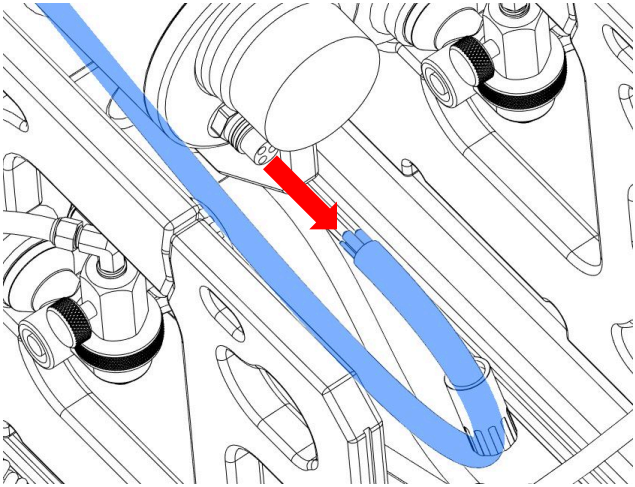
## Battery Charging Instructions

1. **Unscrew the plastic collar on the valve connector and slide the collar down the cable.**

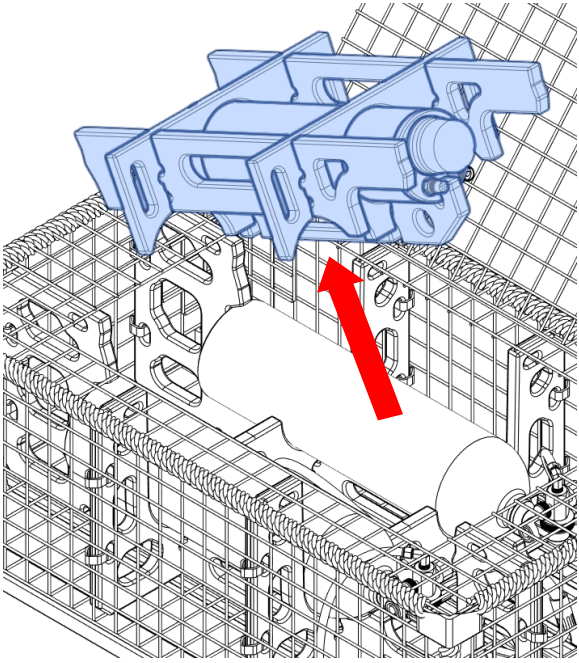




2. **Disconnect the 3-pin valve cable connector from the module.**

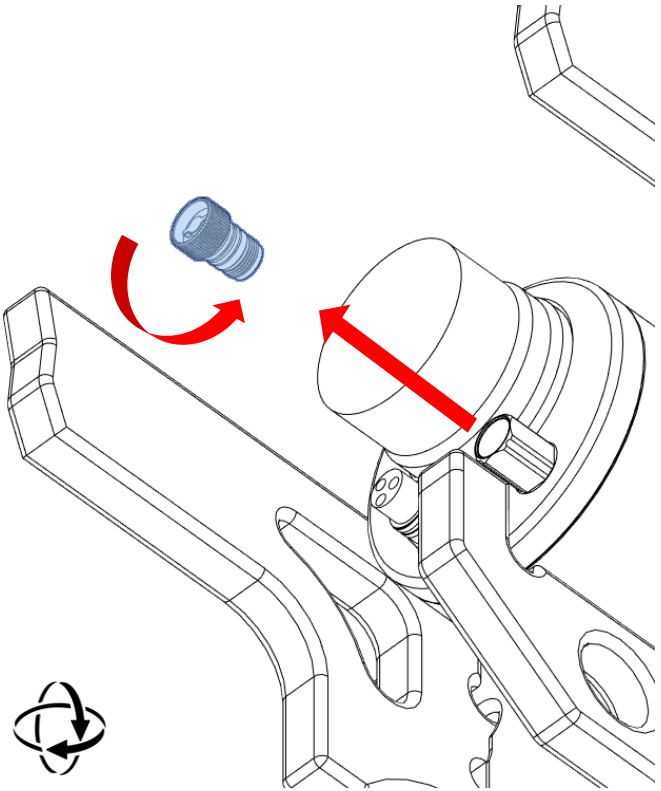


3. **Remove the acoustic module assembly, and place it in a secure location, ready for charging.**



4. **Unscrew and remove the vent plug from the module <u>BY HAND</u>, and put the plug in a safe spot.**

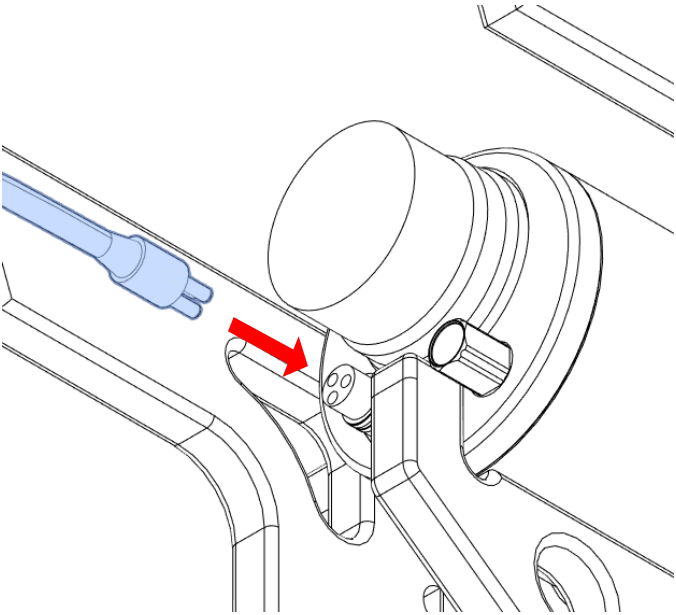
**DO NOT LOSE THIS PLUG!** Failure to re-insert the plug into the vessel before a deployment will cause **CATASTROPHIC EQUIPMENT FAILURE!**



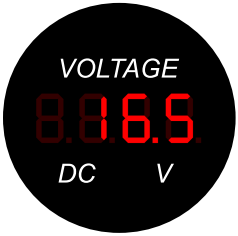
***Remove ONLY the vent cap as shown in image, NOT the entire vent assembly.***

AGM Batteries can release gasses such as oxygen and hydrogen when charging. The removal of this cap allows these gasses to escape the vessel, preventing unwanted pressurization.

5. **Connect the male end of the 3-pin connector on the charger to the female connector on the module.**



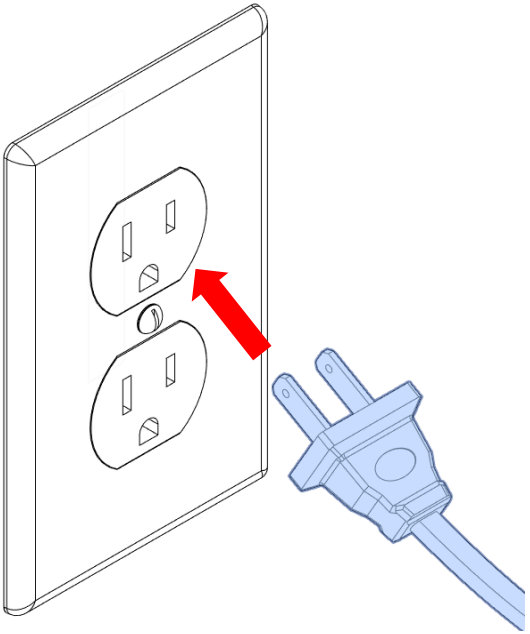
*The battery voltage can be checked before charging using the digital voltmeter on the charger.*



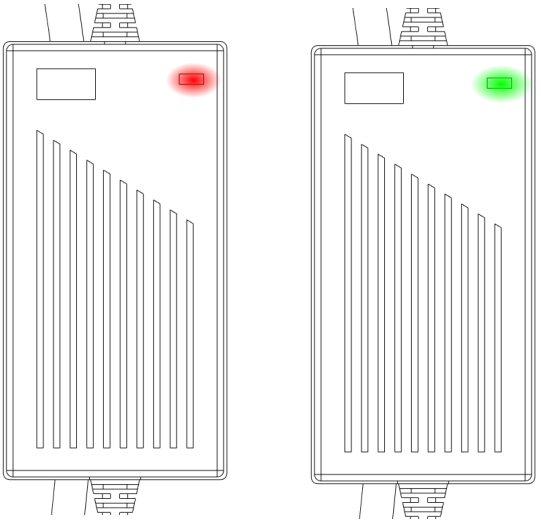

*Charging the battery MORE FREQUENTLY to REDUCE the chance of a deep discharge will help EXTEND BATTERY LIFE.*

**FREQUENT DEEP DISCHARGES GOING BELOW 85% BATTERY LIFE (~16V) CAN INCREASE THE CHANCES OF SULFATION, PREVENTING BATTERIES FROM HOLDING PROPER CHARGE.**

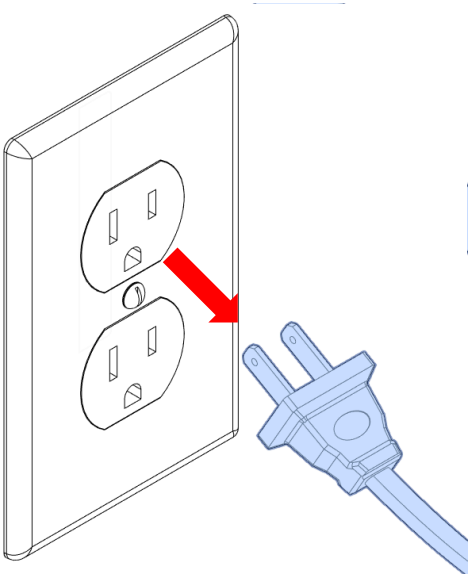
**6. Plug the charger into any 120V AC power source.**

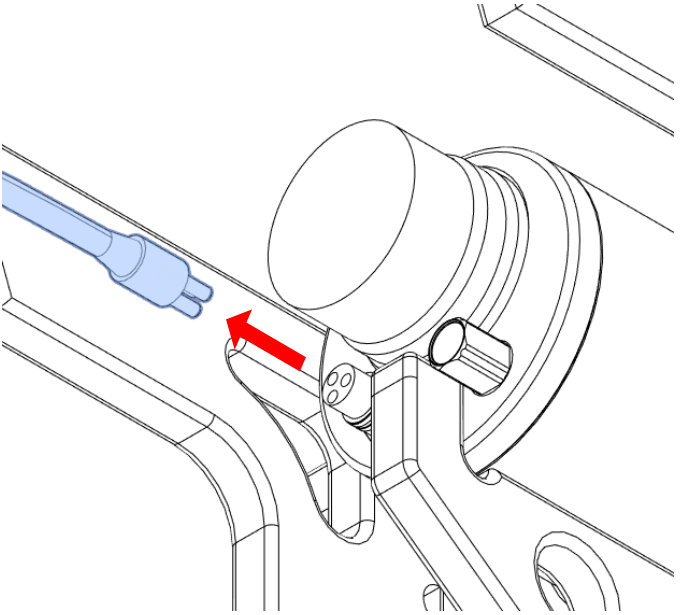


*While the battery is changing, the status light will blink red. A solid green light indicates that the battery is fully charged.*



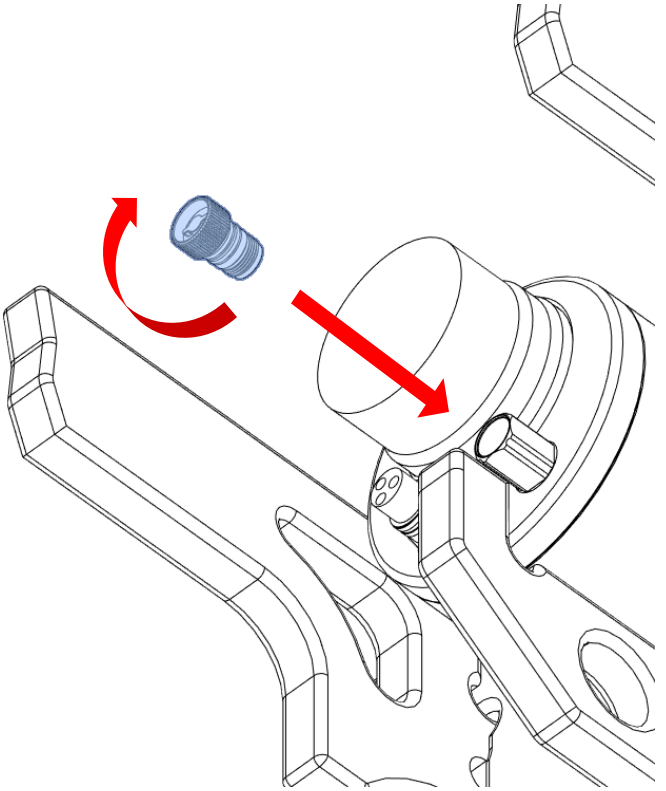
7. **When the battery has finished charging, unplug the charger from the 120V AC power source, and disconnect the charger from the module.**





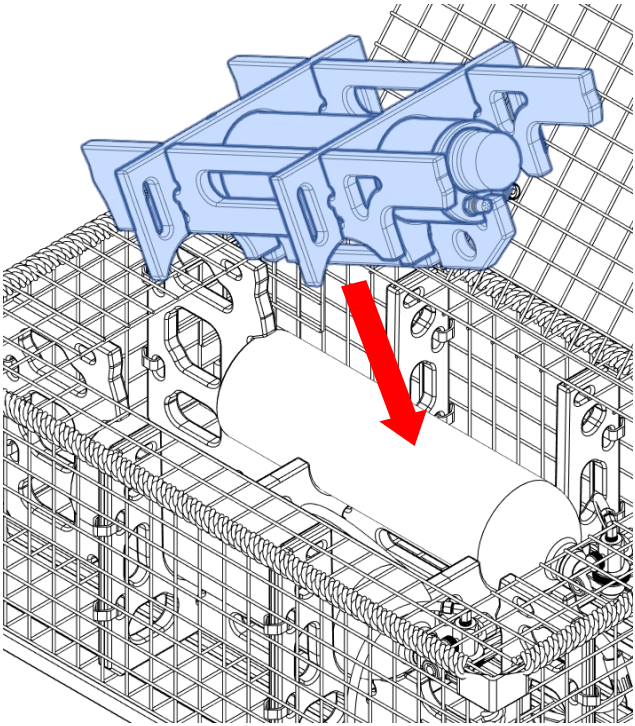
8. **Re-install the vent plug, tightening it firmly <u>BY HAND</u>.**

Failure to re-insert the plug into the vessel before a deployment will cause **CATASTROPHIC EQUIPMENT FAILURE!**

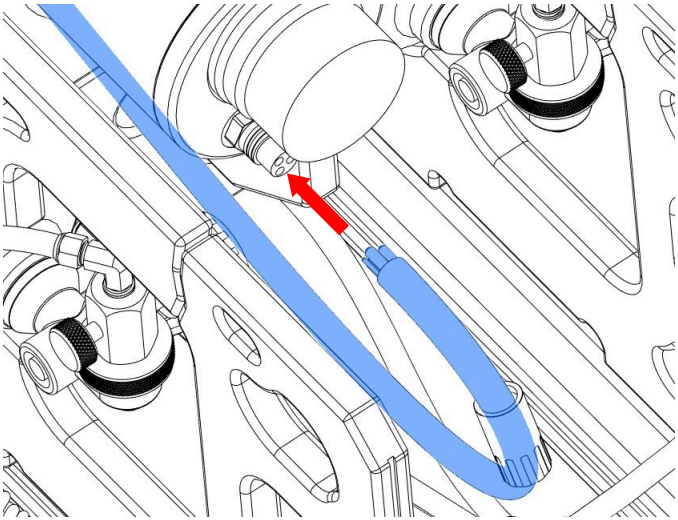


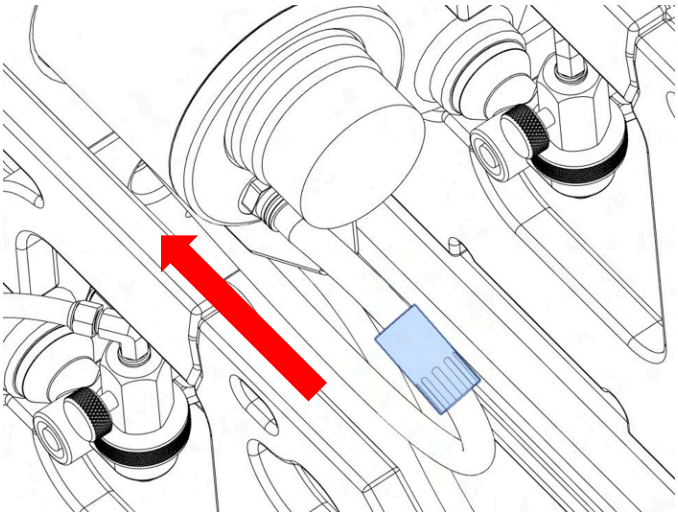
**ENSURE THE VENT CAP IS TIGHTENED FULLY. DO NOT USE PLIERS/GRIPS TO TIGHTEN CAP TO AVOID DAMAGE.**

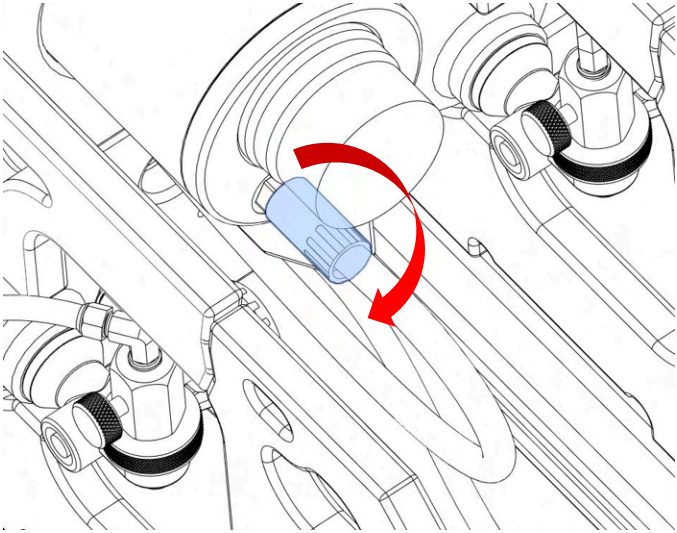
9. **Re-install the acoustic module assembly into the Lift-Raft.**



10. **Reconnect the 3-pin valve cable connector to the module and screw the plastic collar back onto the valve connector**







Failure to follow these instructions can result in battery damage, electric shock, personal injury, or catastrophic equipment failure. Always charge AGM batteries in a well-ventilated area using only the manufacturer approved charger. Do not overcharge, short-circuit, or expose to an open flame/intense heat. Keep terminals clean, and regularly inspect systems for damage

# Operation - Setting/Deploying

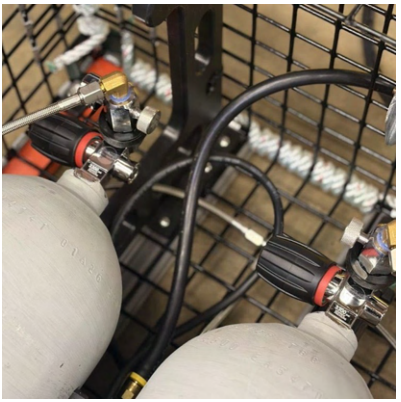
## *Replacing Cylinders & Checking Pressure*

**High-pressure cylinders must be handled with care at all times. Avoid dropping or impacting the tanks, especially at the valve. When opening a cylinder, always do so slowly and in a controlled manner. This allows any leaks or damage to be identified safely before full pressure is applied.**

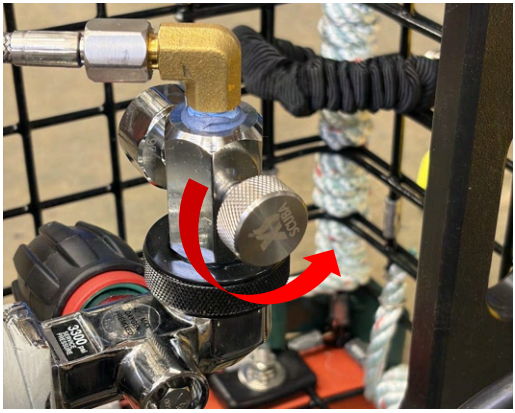
### Removing Cylinders

1. **Before removing cylinders, remove the acoustic module assembly (steps 1-3 in the *Battery Charging* section).**

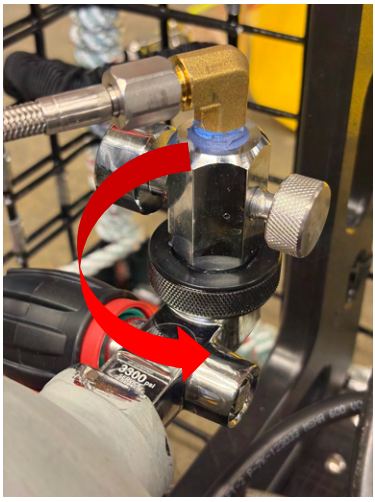
2. **Close the valve(s) on the cylinder(s) using the handwheel. The indicator ring will show red when closed and green when open. If two cylinders are installed, both must be fully closed.**



3. **Once the valves are closed, open the bleeder screw on the DIN assembly to release pressure from the air lines. The bleeder screw only needs to be cracked open—do not fully remove it.**



4. **After pressure has been released, loosen the DIN tightening collar by hand and disconnect the DIN and hose assembly from the cylinder(s). Ensure the DIN O-ring remains clean and undamaged during removal.**

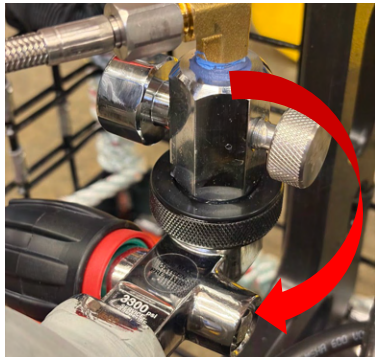


5. **The cylinders can then be removed from the unit for filling.**


## Installing Cylinders

6. **Install the filled cylinders into the unit and ensure they are properly seated.**

7. **Inspect the DIN O-rings and valve interfaces to ensure they are clean and free of debris. Thread the DIN collar into the cylinder valve and tighten by hand until snug.**



8. **Close (tighten) the bleeder screw fully. Slowly open the cylinder valve(s), allowing pressure to build gradually in the system.**

9. **Reinstall the acoustic module assembly (steps 9-10 in the *Battery Charging* section)**

**Checking Pressure**

Verify cylinder pressure using the gauge on the DIN assembly / valve body. Ensure pressure is within the acceptable operating range before deployment.

If pressure is low, or if any leaks are observed during pressurization, do not deploy the system until the issue is resolved.

## *Packing Lift Bag*

A properly packed lift bag is critical to reliable operation. A tightly packed, properly secured bag improves inflation performance and helps maintain clear acoustic communication. Before packing, ensure the bag is fully deflated and the tether is not tangled around the inflation hose. Lay the bag flat on top of the unit in a clean, untwisted orientation.

### Securing the Bag With Gear Ties

Once folded, the bag should be tightly secured to the unit using gear ties. Attach the ties across the bag and loop them once through the mesh to hold the bag in place. **Only a single loop** should be used - multiple loops may restrict the bag and prevent proper inflation, causing air to escape through the relief valves.

For larger bags, gear ties should be positioned along the sides of the folded bag (typically two per side) to keep the bag aligned and secured to the unit.

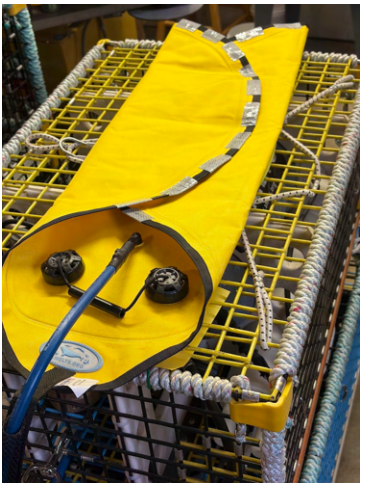
### Important Considerations

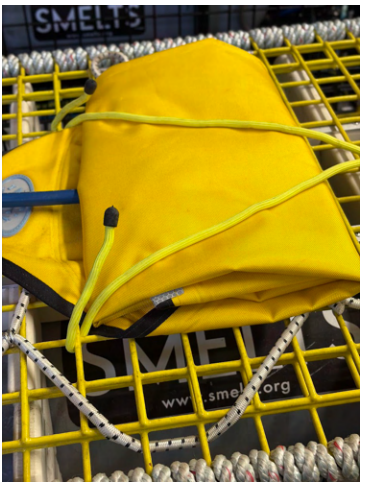
- Pack the bag tightly and keep it compact
- Keep the bag positioned away from the acoustic module's transducer when possible
- Ensure relief valves are covered and clean
- Avoid over-tightening or restricting the bag

Proper packing will improve inflation behavior, reduce delays during ascent, and increase overall system reliability.

**For 80lb, 185lb, and 250lb Lift Bags**

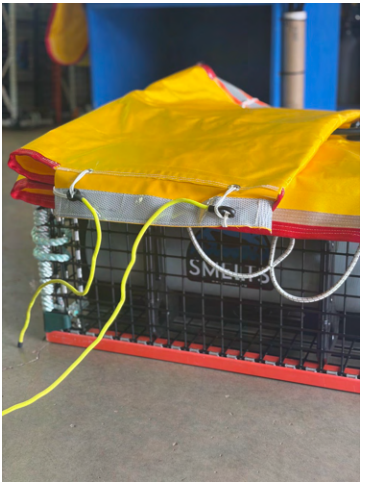
These bags should be laid flat, with the sides folded inward to create a compact shape. The bag should then be folded from top to bottom into a tight, compact bundle. Ensure the pressure relief valves are covered and protected during folding to prevent contamination, then secure the bag with the gear ties.





**For 500lb Bags (7', 8', 10')**

Larger bags should be folded flat using an accordion-style method along their length. This allows the bag to remain organized and deploy evenly during inflation. Keep folds consistent and avoid bunching or twisting.



## *Rigging / Attachment to Gear*

SMELTS Lift-Raft™ units are supplied with a factory-installed bridle and dogbone for attachment to fishing gear. This is the recommended connection point for all applications.

The bridle is located on the rear of the unit. Gear should be attached at this location to ensure proper orientation during deployment and ascent. The front of the unit contains the lift bag and associated components, and should remain unobstructed to allow proper inflation and operation.

The bridle attachment points are reinforced and represent the strongest structural connection on the unit. Use of alternative attachment points is not recommended, as this may affect performance or lead to damage.

Ensure all connections are secure and free of tangles prior to deployment.

## *Pre-Deployment Checks*

Before deploying the Lift-Raft™, verify that the system is fully prepared and ready for operation. This check confirms that all critical systems are functioning and reduces the risk of failed recovery.

- **Battery**
  Ensure the battery is adequately charged. Low battery levels may prevent communication or release. *(See **Battery Charging** section for details)*

- **Electrical System**
  Ensure all electrical connections are secure and that the vent plug is properly installed in the acoustic module. Failure to install the vent plug will result in water intrusion and system damage.

- **Cylinder Pressure**
  Verify that cylinder pressure is within the acceptable range. Full tanks are approximately 3000 psi. Do not deploy with pressure below 500 psi. *(See **Replacing Cylinders & Checking Pressure** section)*

- **Air System**
  Check all air connections for proper sealing. Ensure the bleeder screw is fully tightened and that there are no visible signs of leaks or damage. *(See **Cylinder & Air System Maintenance** and **Seal Inspection** sections)*

- **Tank Valves**
  Confirm that all tank valves are fully open (green indicator visible). Closed valves will prevent lift bag inflation.

- **Lift Bag**
  Ensure the lift bag is fully deflated, properly packed, and securely attached to the unit. (See Packing Lift Bag section)

- **Rigging / Attachment**
  Confirm that the unit is properly attached to gear using the factory-installed bridle and that all connections are secure.

Once all checks are complete, proceed to **Acoustic Function Check** before deploying the system.

## *Verifying Acoustic Function*

Verifying acoustic function before deployment confirms that communication, control, and system response are working as expected. This step reduces the risk of failed recovery.

**System Capability Note**

A full on-deck acoustic function check requires a system capable of operating with a **dunking transducer**.

- **Deckbox systems with a dunking transducer** can perform a full test on deck
- **In-hull systems** may not be able to perform a full on-deck test without a dunking transducer
- **MFD + directional transceiver systems** typically cannot perform on-deck testing

If a full test cannot be performed, users should at minimum confirm system readiness through status communication once deployed.

## On-Deck Function Check

When using a deckbox with a dunking transducer, a full function check can be performed prior to deployment.

1. **Power on the acoustic system and connect to the control device**
2. **Select or enter the unit to be tested**
3. **Send a *Status* command**
    a. **Confirm battery level is acceptable**
    b. **Confirm tilt sensor response is accurate (tilted vs not tilted)**
4. **Send a *Release* command**
    a. **Confirm valve actuation and inflation behavior**
    b. **Observe lift bag inflation**

During inflation:

- Verify the lift bag expands properly
- Ensure the bag is not restricted by packing or ties
- If the bag does not inflate and air is venting through relief valves, the bag may be secured too tightly

The unit may be manually tilted during testing to confirm proper tilt sensor response and inflation behavior.

For in-depth instructions on connecting acoustic systems with devices, and performing dry tests, please refer to the EdgeTech User's Manual in the appendix: ***EdgeTech - 5112 Manual 0022081***.

# Operation - Hauling/Retrieving

## *Acoustic Commands*

SMELTS Lift-Raft™ systems are operated using acoustic commands through a compatible control system (e.g., TrapTracker application or MFD interface). The specific interface and configuration are covered in the manufacturer's documentation.

This section describes the command sequence and expected behavior when operating SMELTS Lift-Raft™ systems.

### Command Sequence

Lift-Raft™ operation follows a consistent sequence:

1. **Connect to acoustic system**
2. **Select or identify the deployed unit**
3. **Send a *Status* command to confirm system readiness**
4. **Send a *Deploy* command when setting gear (if applicable)**
5. **Send a *Recover / Haul* command to initiate retrieval**

The **Recover / Haul** command performs the same function as a release command and will activate the lift-bag inflation system.

For in-depth instructions on setting, statusing, and hauling gear, please refer to the EdgeTech User's Manuals in the appendix: ***EdgeTech - 5112 Manual 0022081***, ***EdgeTech - TrapTracker Manual - 0027334***

**Command Functions**

- **Status**
  Confirms communication with the unit and reports system data (battery, tilt, etc.)
- **Deploy (Set)**
  Marks the deployed gear location within the system (TrapTracker only)
- **Recover / Haul**
  Initiates the inflation protocol and begins ascent

**Operational Differences**

SMELTS Lift-Raft™ systems do not operate like traditional stowed rope acoustic releases. Instead of releasing a stored line, the system:

- Activates a valve
- Releases compressed air
- Inflates a lift bag to generate buoyancy

This results in a delayed and staged ascent, rather than an immediate surface response.

Refer to the ***Inflation Protocol*** section for detailed behavior.

**Expected Behavior**

- A response should be received after sending a Status command
- The unit may not immediately surface after a Recover command
- Inflation may occur in stages before ascent begins
- Delays are normal depending on depth and configuration

## *Inflation Protocol*

SMELTS Lift-Rafts™ equipped with EdgeTech acoustics use a tilt-based inflation strategy. The acoustic module houses a tilt sensor that is capable of detecting when the unit has tilted relative to its "flat" position.

Once the unit is acoustically hauled or "Released", the logic onboard will first check the position of the tilt sensor and identify if the unit is sitting flat or on its side/top. If the unit has landed upright and the tilt sensor does not detect any tilt, the valve will open for a set amount of time to inflate the lift bag, close, and check the reading on the tilt sensor again. If the tilt sensor still does not read any tilt after the first inflation cycle (the lift bag is not providing enough buoyancy to begin the ascent), the valve will open back up for that same set interval, and re-check the position of the tilt sensor. Once the ascent begins and the tilt sensor reads a tilted position, the valve will open one last time for the set interval, close, and send an acoustic response which will be read by the deckbox.

If the unit has landed tilted, such as on its side/upside down, the valve will open for a single, longer period, which should provide the lift bag with enough air to begin ascent.

SMELTS uses 3 inflation protocols (Version 27269, 26930, 25666) which cover the complete range of deployment depths. These protocols were designed to work with the different lift-bag options, tank capacities, and valve orifice sizes available on the Lift-Raft™ models.

**The unit must operate with its designed inflation protocol. Each Lift-Raft™ is configured for optimal performance, and swapping acoustic modules, valves, or lift bags between models may result in slow ascent, reduced efficiency, or failure. SMELTS is not responsible for issues caused by improper configuration. If operation is uncertain, do not deploy—refer to the troubleshooting guide or contact SMELTS.**

Descriptions of Version behavior

**Version 27269 "2 Second"**

No initial tilt detected (unit lands flat)

- Valve will open for **2 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **5 seconds**

Initial tilt detected (unit lands tilted)

- Valve will open for only **5 seconds** without re-checking tilt status

**Version 26930 "Version 6/5 Second"**

No initial tilt detected (unit lands flat)

- Valve will open for **5 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **5 seconds**

Initial tilt detected (unit lands tilted)

- Valve will open for only **10 seconds** without re-checking tilt status

**Version 25666 "Version 11+"**

Version 25666 (Version 11+) possesses the unique ability to allow the user to change the inflation protocol times using a jumper pin located on the acoustic control board. This version provides 4 options for inflation times, allowing the amount of time the valve opens (and therefore the amount of air released into the lift-bag) to be adjusted based on conditions, lift bag size, and air capacity.

SMELTS recommends leaving the jumper in place, and using the pre-installed inflation protocol. Changes to the inflation protocol without an understanding of its function & importance can lead to slow ascent, reduced efficiency, or failure. Contact SMELTS directly for more information on changing inflation times.

**Version 25666**

***CONFIGURATION A*** - No initial tilt detected (unit lands flat)

- Valve will open for **60 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **60 seconds**

***CONFIGURATION B*** - No initial tilt detected (unit lands flat)

- Valve will open for **45 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **45 seconds**

***CONFIGURATION C*** - No initial tilt detected (unit lands flat)

- Valve will open for **30 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **30 seconds**

***CONFIGURATION D*** - No initial tilt detected (unit lands flat)

- Valve will open for **15 seconds**, close for 2 seconds while checking for tilt, and continue opening and closing for up to 6 cycles until tilt is identified
- Once tilt is identified, or valve is beginning it's 6th and final cycle, unit will open valve for **15 seconds**

**CONFIGURATION A, B, C, & D** - Initial tilt detected (unit lands tilted)

- Valve will open for only **120 seconds** without re-checking tilt status

**Delayed ascent or staged inflation is normal behavior.**

The time required for the unit to begin ascent and reach the surface may vary depending on configuration and conditions. Delays between release and ascent are normal, especially in deeper deployments or when the unit lands flat. Inflation behavior is influenced by lift bag size, available tank pressure, valve orifice size, and the selected inflation protocol. Units may inflate in stages before sufficient buoyancy is achieved. Slower ascent or delayed surfacing does not necessarily indicate a malfunction if the system is operating within its designed parameters.

## *Recovery*

After the release command is sent, the unit will ascend to the surface. Time to surface will vary depending on depth, configuration, and inflation behavior. The unit may not surface immediately and may rise in stages.

Once at the surface, the lift bag will be visible and supporting the unit and attached gear. Maintain visual contact with the unit and approach slowly.

*500lb lift bag surfaced*

Use appropriate handling methods to bring the unit onboard. Be aware that the system may still be under tension from the lift bag and attached gear. Avoid sudden movements or pulling against the system during recovery.

# Operation - Retrieval/Resetting

## *Safe Retrieval Practices*

Once the unit has been brought to the vessel, handle the Lift-Raft™ and attached gear in a controlled manner. Harvesters familiar with hauling gear may use standard methods (e.g., haulers), but care should be taken to ensure smooth, controlled movement of both the unit and lift bag. Sudden pulling, jerking, or uneven loading should be avoided, as shifting forces may affect stability on deck.

Maintain awareness of the lift bag and its position during handling. The lift bag may contain air pressure and can move unexpectedly as the system is brought onboard. Ensure the unit is placed in a stable position before proceeding with further handling.

Take care to prevent contact between the lift bag and sharp edges or pointed components of the vessel or gear. Puncture or abrasion of the lift bag will reduce performance and may lead to failure during future deployments.

Operators using alternative hauling methods should ensure that the system is recovered in a way that maintains control of the load and avoids damage to the unit and lift bag.

## *Deflating Lift Bag*

The lift bag must be fully deflated before handling, storage, or redeployment. Residual air in the bag can make handling difficult and prevent proper packing.

Air is released through the pressure relief valve(s) located on the lift bag. Deflation can be performed by pulling the relief cord and allowing air to escape while compressing the bag. Applying steady pressure to the bag will help remove trapped air.

For larger lift bags, additional air may remain after initial deflation. In these cases, the pressure relief valve may be unscrewed to allow faster and more complete air release. If removed, ensure the valve is secured (or tied off, if applicable) to prevent loss. Once most of the air is removed and the bag is folded back into position, reinstall the valve and use the relief cord to release any remaining air.

The lift bag should be packed immediately after deflation to prevent air from re-entering the system. Ensure the bag is fully collapsed and properly secured before redeployment.

Take care not to damage the lift bag during deflation or packing.

## *Redeployment Preparation*

After recovery, the unit should be reset and prepared before redeployment.

- Inspect the system for damage or wear
- Verify cylinder pressure and battery condition
- Ensure the lift bag is fully deflated, properly packed, and secured
- Confirm all connections are secure

Refer to the ***Pre-Deployment Check*** section for full verification before setting gear.

# Troubleshooting

This section covers common issues that can be diagnosed in the field. Many problems can be resolved by verifying system setup, communication, and packing.

## *Acoustic Communication Issues*

**Q: I cannot get the unit to respond to acoustic commands. What should I check?**

**A: Start with the following, in order:**

1. **Verify command inputs**
   Ensure the correct acoustic serial number, release command, and system type (5112) are entered.
2. **Check transducer positioning**
   Acoustic communication has a directional pattern (similar to a hemisphere).
   - Ensure the transducer is aimed toward the unit
   - Avoid obstruction from the vessel (e.g., keel interference)
   - Reposition if needed
3. **Understand dry testing limitations**
   Acoustic systems perform significantly better in water. During dry testing:
   - Keep transducers very close (within ~1 ft)
   - Align them directly facing each other
   - Expect weaker and less reliable communication

4. **Check battery voltage**
   Low battery may allow communication attempts but prevent response.
   - Verify voltage using the charger
   - Recharge if needed

**Q: I do not hear any clicking from the transducer or cannot connect to the deckbox.**

**A:**

- Ensure the transducer is properly connected to the deckbox
- Check deckbox power and battery condition
- Confirm Bluetooth pairing is active

If no clicking is heard, the system may not be transmitting.

## *Incomplete Inflation*

**Q: The unit is inflating strangely or using too much air on deck.**

**A: This is usually due to misunderstanding normal behavior.**

EdgeTech Lift-Raft™ systems use a **tilt-based inflation protocol**. If the unit is not tilted during testing:

- The system will continue cycling inflation
- This may appear as excessive air usage

During testing, manually tilt the unit to simulate ascent and confirm proper function.

**Q: The lift bag is not fully inflated when it reaches the surface.**

**A: This may be normal depending on conditions.**

Inflation behavior depends on:

- Tank pressure
- Lift bag size
- Depth
- Inflation protocol

In some cases (especially with large bags and lower pressure), the unit may achieve sufficient buoyancy before the bag is fully inflated.

**Q: The bag is not inflating properly or air is escaping during inflation.**

**A: Check the following:**

- **Bag packing**
  If the bag is tied too tightly, it may not expand and air will vent through relief valves
- **Check valve cleanliness**
  Dirt or debris may prevent proper sealing
- **Cylinder pressure**
  Ensure pressure is above minimum operating range

## *Failed Haul*

**Q: I sent a haul/recover command, but the unit did not surface.**

**A: First confirm whether communication was successful. If not, refer to Acoustic Communication Issues.**

If communication was successful but no surfacing occurred, check:

> **Could low air pressure prevent recovery?**
>
> **A: Yes.**
>
> If cylinder pressure is too low, the bag may inflate but not generate enough buoyant force to lift the gear.

**Q: Could battery level affect recovery?**

**A: Yes.**

The battery may support acoustic communication but fail when higher power is required to actuate the valve.

**Q: Could improper bag packing cause failure?**

**A: Yes.**

If the bag is secured too tightly:

- It may not expand
- Air may vent through relief valves
- The unit will not generate lift

**Q: Could setup issues prevent inflation entirely?**

**A: Yes. Check:**

- Tank valves are open
- Valve cable is properly connected
- System passed pre-deployment check

In these cases, the unit may acknowledge commands but fail to actuate.

# Appendix

SMELTS Lift-Raft™ systems utilize third-party acoustic equipment. Setup, pairing, and configuration of these systems are covered in the manufacturer's documentation.

Refer to the following resources:

***EdgeTech - 5112 Manual - 0022081***

Current Revision at the time of writing - REVISION J

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***EdgeTech - TrapTracker Manual - 0027334***

Current Revision at the time of writing - REVISION B

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Covered models include LR-13-E | LRT-13-E | LR-26-E | LR-50-E | LR-60-E | LR-80-E | LR-160-E

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