FOR MODEL NUMBERS MD1500 / MD1501 / MD1502

OWNER'S MANUAL

RATIS™ INFLATABLE LPU

DO NOT REMOVE PRIOR TO SALE

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RATIS™ LPU INTRODUCTION

OVERVIEW

This manual provides instructions and guidelines for safely using and maintaining the Mustang Survival Ratis™ Inflatable Life Preserver Unit (LPU). The Ratis™ LPU is a lightweight tactical LPU for military and law enforcement and is designed to easily attach to an armor carrier with MOLLE (carrier not included). It can also be worn with a stand-alone harness (included), designed for users with a chest size of 36-52″.

The Ratis™ LPU is low profile, does not impede user function, and minimizes interference with accessories mounted to the chest. It uses an ultra-lightweight, unsupported film as the inflatable gas chamber and weighs approximately one pound. When inflated, it provides over 40 lbs of buoyancy at the water surface and will turn most unconscious users face-up to reduce the risk of drowning.

This manual is applicable to the MD1500 (Ratis™ LPU with electronic inflator), MD1501 (Ratis™ LPU with automatic inflator), and MD1502 (Ratis™ LPU with manual inflator). These inflators are discussed in further detail in the manual.

WARNINGS AND CAUTIONS

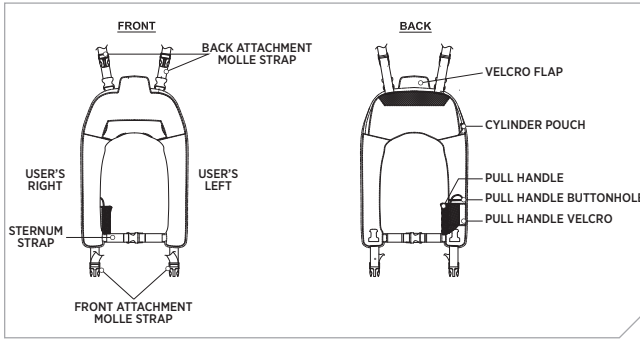
- Customers are advised not to perform alterations or modifications to the Ratis™ LPU or its subassembly components, other than as described in this manual, without prior approval of Mustang Survival. Unauthorized modifications will void any and all warranty claims with the Ratis™ LPU."
- It is recommended each user complete in-water testing with full load-out to validate that the Ratis™ LPU is safe to use. In-water performance will vary based on user size, carrier, attachment method, and kit.
- The Ratis™ LPU should not be constrained so as to prevent the bladder from expanding normally. It should not be inflated in a small space. Do not wear clothing or equipment over the Ratis™ LPU. If strapping (including a sling) is placed over the Ratis™, it may impede inflation. The Ratis™ LPU may be compatible with a sling or other interfering equipment but requires in-water validation.
- When using the Ratis™ LPU in temperatures below freezing, fully discharging the CO_2 cylinder may not provide adequate inflation; use the oral inflator to top-up the LPU.
- For optimal flotation, the Ratis™ LPU must be secured tightly to the armor carrier. The attachment method should be validated with in-water testing prior to use.
- After each inflation, the Ratis™ LPU must be rearmed, leak tested, and fully deflated before repacking.
- When repacking, take care not to damage the bladder film when fastening zippers or inserting the cylinder.
- If the Ratis™ LPU has been orally inflated, subsequent automatic inflation could over-pressurize and damage it.
- To avoid accidental inflation, do not allow water to contact the hydrostatic inflator.
- Always check the inflator status to ensure inflator is armed, ready for use, and is not past its expiry date.
- The automatic inflator (provided with the MD1501) must be immersed under four inches of water, for up to five seconds, to trigger automatic inflation. Due to the inflator position, if an unconscious user falls face-down into the water and is not submerged the unit will not automatically inflate.

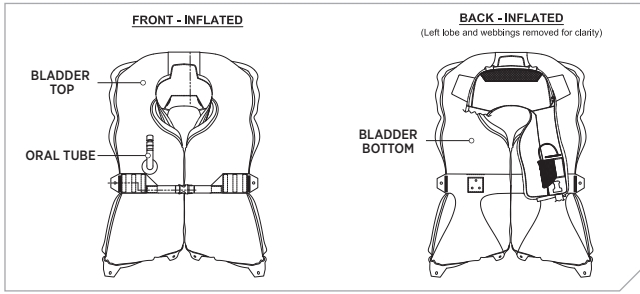
READINESS CHECKLIST

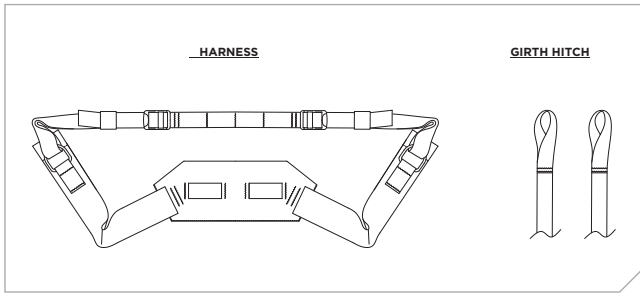
NOTE: PERFORM BEFORE EACH USE

- ☐ No visible holes, tears, or excessive wear.
- ☐ Ensure minimal residual air remains inside the bladder. If residual air is inside the unit, the MD1501 may not inflate.
- ☐ Manual pull handle is fastened.
- ☐ The inflator status has been checked.
- ☐ The inflator access zipper is closed.
- ☐ Top Velcro tab is fastened to prevent breakout zippers from accidentally disengaging.
- ☐ Zipper ends are tucked in at the bottom of the lobes.
- ☐ Buckles are fastened, including sternum strap.

PRODUCT OVERVIEW





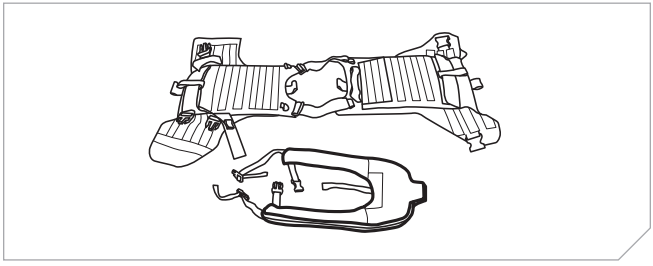


INTEGRATION WITH ARMOR CARRIER

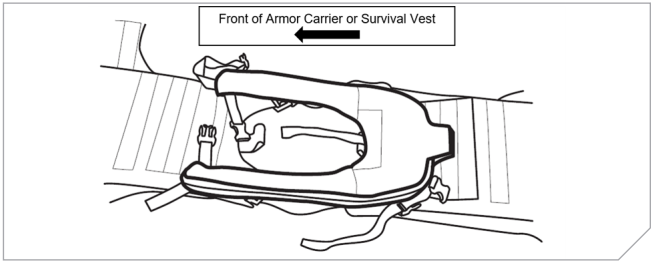
WARNING: SUITABLE ANCHOR POINTS MUST BE USED, AS OUTLINED BELOW. FOR OPTIMAL FLOTATION, THE RATIS™ LPU MUST BE SECURED TIGHTLY AGAINST THE VEST. ENSURE RATIS™ LPU IS PROPERLY PACKED AND INFLATOR IS ARMED AND READY PRIOR TO ATTACHMENT.

RATIS™ LPU PLACEMENT ON ARMOR CARRIER

1. Place the armor carrier and the Ratis™ LPU on a flat surface (the armor carrier may be placed on the body to help determine appropriate placement).



2. Place the Ratis™ LPU on top of the armor carrier. The two lobes are placed on the front of the carrier.



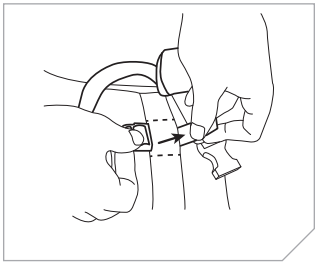
STANDARD ARMOR CARRIER FRONT ATTACHMENT

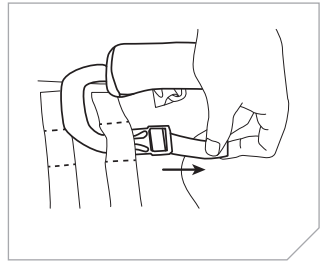
NOTE: TO ATTACH THE RATIS™ LPU USING THE GIRTH HITCHES PROVIDED, SKIP TO THE "**GIRTH HITCH ARMOR CARRIER FRONT ATTACHMENT**" SECTION.

1. Loop one of the male buckle straps of the front lobe through a MOLLE slot on the front of the carrier.

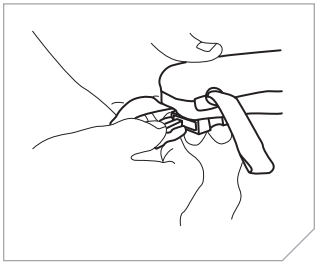
TIP: DEPENDING ON THE MOLLE, THE WEBBING TAIL MAY BE INSERTED THROUGH THE MOLLE FIRST, AND THE MALE SIDE OF THE BUCKLE PULLED THROUGH (IT IS EASIER TO FEED THE MALE BUCKLE THROUGH THE MOLLE STARTING WITH THE END WITHOUT CLIPS). THIS MAY BE EASIER THAN RETHREADING THE BUCKLE.

NOTE: THE MOLLE ATTACHMENT POINT AFFECTS PERFORMANCE. ATTACHING TO THE TOP ROW OF FRONT MOLLE ON MOST ARMOR CARRIERS WILL PROVIDE MOST USERS SELF-RIGHTING, BUT LOWERING THE ATTACHMENT POINT WILL IMPROVE SELF-RIGHTING AND TORSO ANGLE. IT IS RECOMMENDED THAT ATTACHMENT CONFIGURATIONS ARE PERFORMANCE TESTED IN-WATER BEFORE FIELD USE.

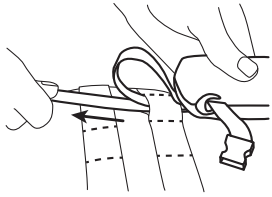




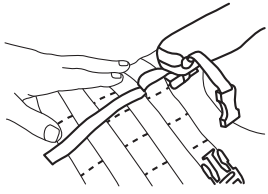
2. Pull the male buckle all the way through the MOLLE slot.
3. Clip the male buckle to the female buckle under the inflatable lobe. Ensure there are no twists in the webbing.



4. Feed the buckle webbing through the same MOLLE slot.

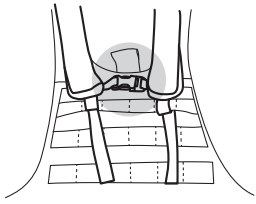


5. Pull the strap tight so the inflatable is securely attached in place. The tighter this connection, the better the performance. Any slack in this connection allows the inflatable chamber to separate from the body/armor carrier in the inflated condition.



6. Repeat steps 1 – 5 for the other front lobe.

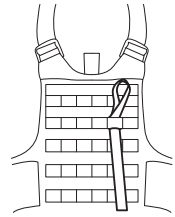
7. **IMPORTANT!** Close the sternum strap in front of the inflatable. This holds the bladder lobes together in the inflated condition. If it is not fastened, self-righting performance will be negatively affected.



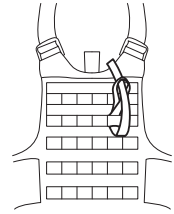
GIRTH HITCH ARMOR CARRIER FRONT ATTACHMENT

NOTE: THE SELF-RIGHTING AND FLOTATION PERFORMANCE OF THE RATIS™ LPU IS REDUCED WHEN USING THE GIRTH HITCHES AS THEY WILL NOT FASTEN THE RATIS™ LPU AS TIGHTLY TO THE ARMOR CARRIER AS THE WEBBING SEWN TO THE RATIS™ LPU ITSELF. IF USING GIRTH HITCH ATTACHMENTS, CONDUCT IN-WATER TESTING TO VALIDATE PERFORMANCE.

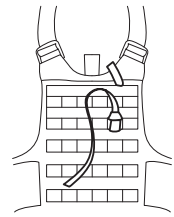
1. Feed girth hitch through attachment location. Webbing loop to be at top.



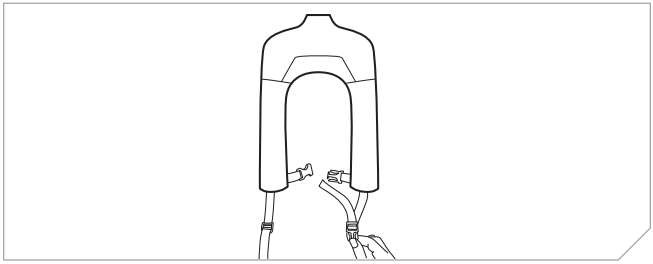
2. Feed webbing tail through webbing loop.



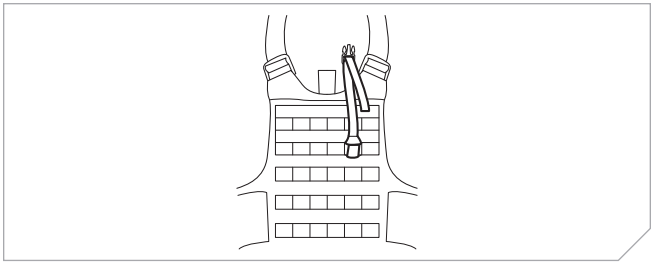
3. Cinch tight.



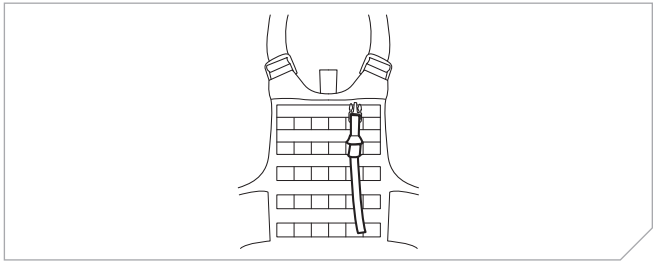
4. Remove male buckle from webbing strap attached to the Ratis™ LPU body.



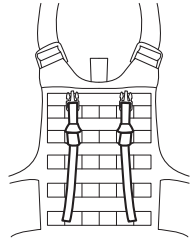
5. Feed the male buckle onto the girth hitch webbing as shown.



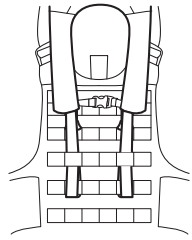
6. Route webbing tail through attachment.



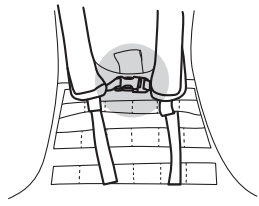
7. Complete Step 1 – Step 6 for second girth hitch



8. Clip to unit. Confirm webbing will not loosen. Stow excess webbing tails as necessary.

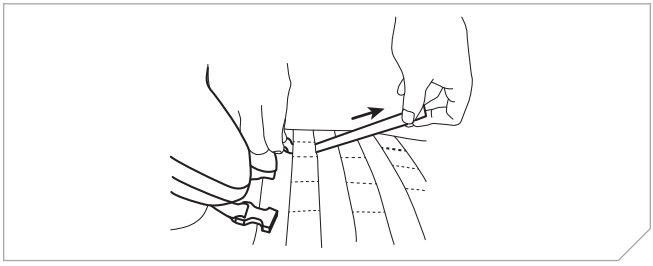


9. **IMPORTANT!** Close the sternum strap in front of the inflatable. This holds the bladder lobes together in the inflated condition. If it is not fastened, self-righting performance will be negatively affected.



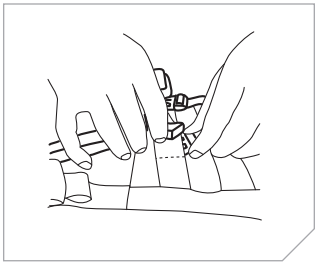
STANDARD ARMOR CARRIER BACK ATTACHMENT

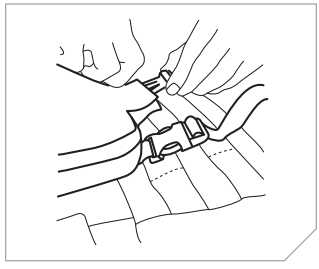
1. Loop one of the buckle straps through the back of the armor carrier MOLLE.



2. Pull the male buckle all the way through the MOLLE slot.

TIP: DEPENDING ON THE MOLLE, THE WEBBING TAIL MAY BE INSERTED THROUGH THE MOLLE FIRST, AND THE MALE SIDE OF THE BUCKLE PULLED THROUGH (IT IS EASIER TO FEED THE MALE BUCKLE THROUGH THE MOLLE STARTING WITH THE END WITHOUT CLIPS). THIS MAY BE EASIER THAN RETHREADING THE BUCKLE.

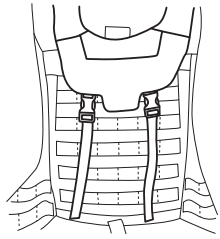




3. Clip the male buckle to the female buckle on the back.

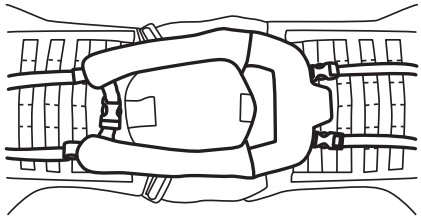
4. Pull the strap tight so the inflatable is securely attached in place.

5. Repeat steps 1 - 4 for the other back buckle.

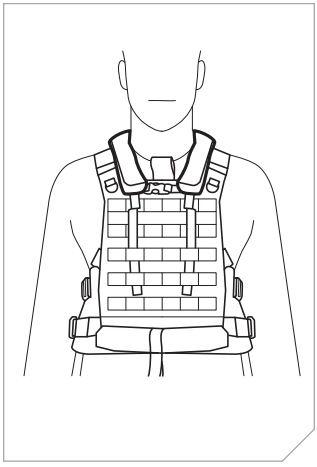


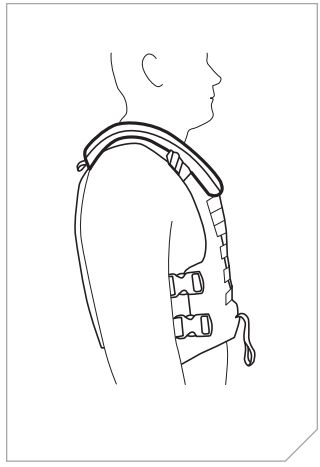
CONFIRM FIT

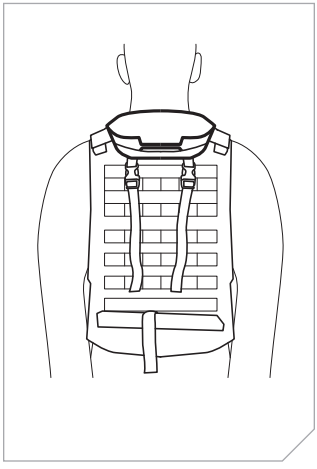
1. Inspect and confirm that all Ratis™ LPU straps are tightly attached to the armor carrier. The collar of the Ratis™ LPU should be close to the neckline of the user for optimal performance. Stow all straps if necessary.



2. Check fit. The Ratis™ LPU should be snug against the armor carrier with webbing straps tightened. The seam joining the lobe fabric panel and the back fabric panel should be approximately in-line with the back of the neck. If the Ratis™ LPU is set too far back on the body, the neck hole will not properly fit in the inflated condition.



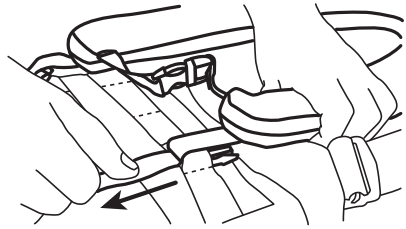




NOTE: EXACT ATTACHMENT LOCATIONS WILL VARY BETWEEN DIFFERENT ARMOR CARRIERS AND KIT SET-UP. IN ALL CASES, THE ARMOR CARRIER MUST BE ATTACHED SNUGLY TO THE USER. IF THE CARRIER IS LOOSE, THE RATIS™ LPU MAY RIDE UP AND OVER THE HEAD OF THE USER WHEN INFLATED.

REMOVAL FROM THE ARMOR CARRIER

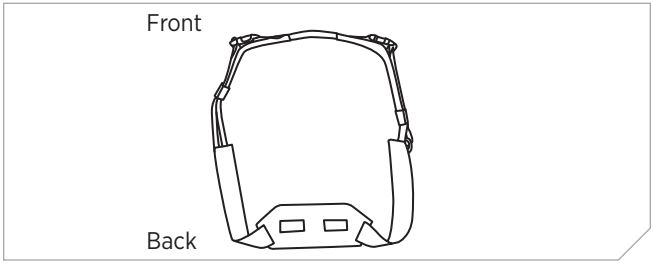
To remove the Ratis™ LPU from the carrier, unbuckle all straps and pull buckles through the MOLLE slots.



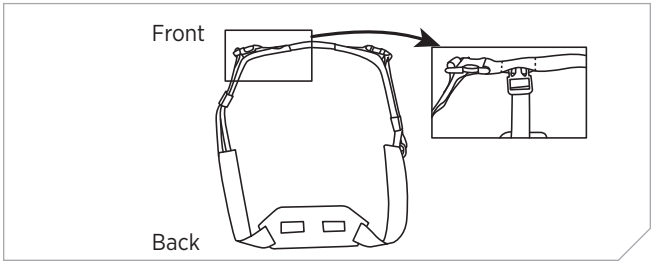
INTEGRATION WITH STAND ALONE CHEST HARNESS

STANDARD HARNESS ATTACHMENT

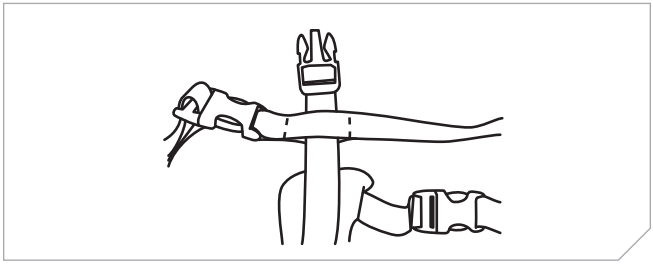
1. Orient the harness and identify the front and back.



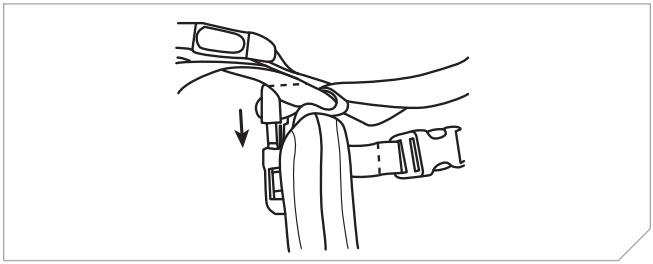
2. Loop one of the male buckle straps of the front lobe through the front harness slot.



3. Feed the buckle all the way through the harness slot.



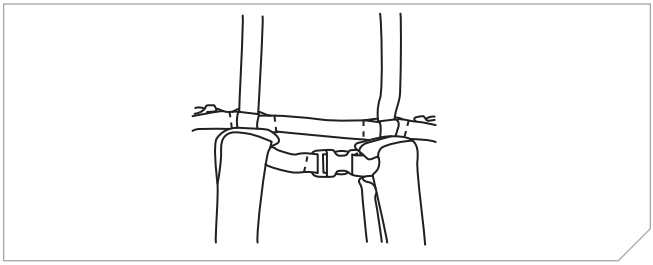
4. Clip the male buckle to the female buckle under the inflatable lobe.



5. Feed the buckle strap back through the slot (optional).

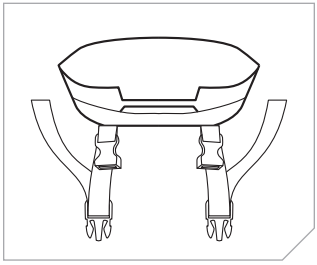
6. Pull the strap tight so the inflatable is securely attached in place.

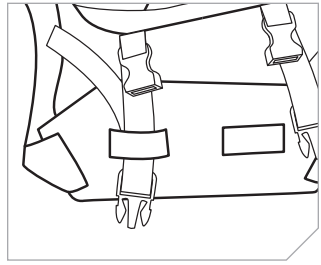
7. Repeat steps 2 – 6 for the other front lobe



8. IMPORTANT! Close the sternum strap in front of the inflatable. This holds the bladder lobes together in the inflated condition. If it is not fastened, self-righting performance will be negatively affected.

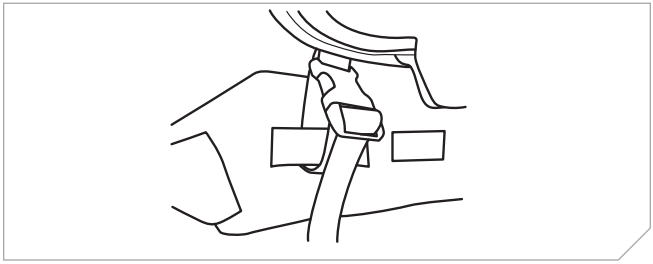
9. Loop one of the back male buckle straps the through the back harness slots.



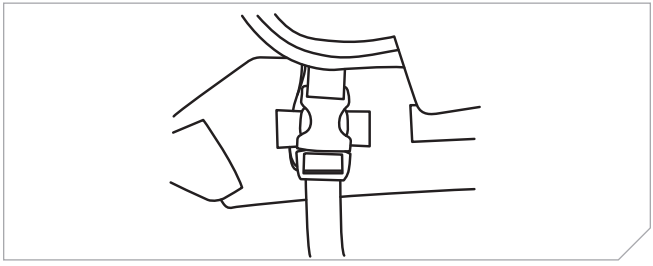


10. Pull the buckle all the way through the slot.

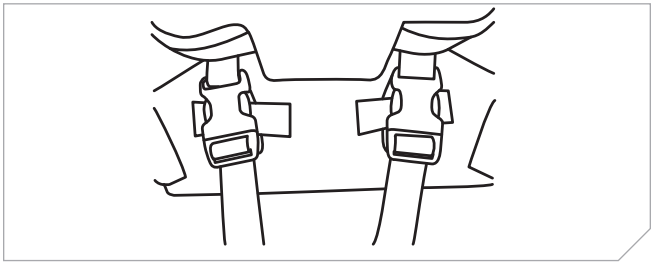
11. Clip the male buckle to the female buckle on the back.



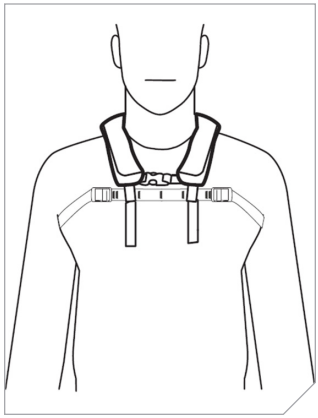
12. Pull the strap tight so the Ratis™ LPU is securely attached in place.

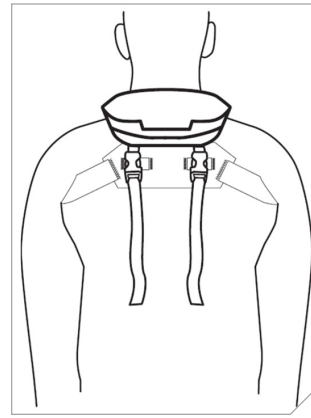


13. Repeat steps 9 – 12 for the other back buckle.



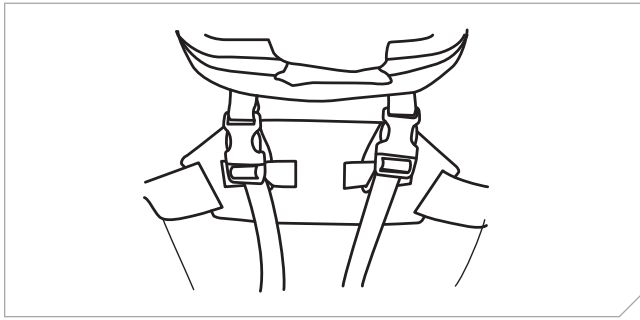
14. Inspect and confirm that all Ratis™ LPU straps are tightly attached to the harness and that no webbing or attachments are twisted. The harness should sit flat against the back. The collar of the Ratis™ LPU should be close to the neckline of the user for optimal performance.





REMOVAL FROM HARNESS

To remove the Ratis™ LPU from the carrier, unbuckle all straps and pull buckles through the MOLLE slots.

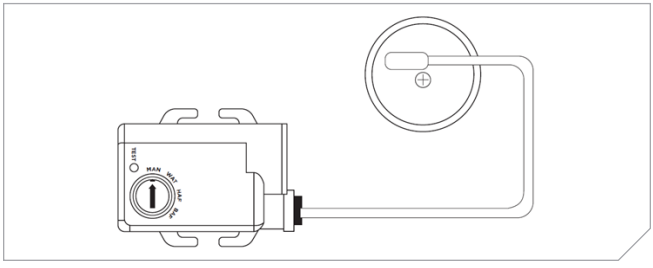


INFLATION AND DEFLATION

INFLATION

Confirm which inflator is attached to the Ratis™ LPU. Note that the MD1500 is supplied with the Hammar electronic inflator, the MD1501 is supplied with the Hammar automatic inflator, and the MD1502 is supplied with the Hammar manual inflator. However, these inflators are interchangeable and sold separately (see ACCESSORIES), and the user can switch between inflator types.

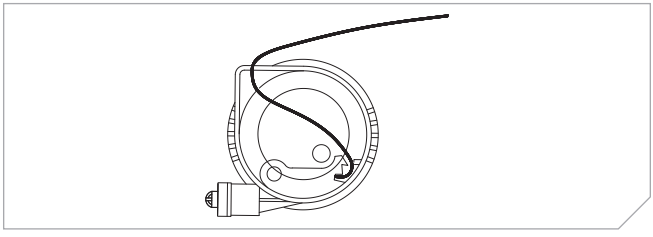
Hammar Electronic Inflator (included with MD1500 and sold separately)



The Hammar Electronic Inflator is a battery-powered electronic inflator that can activate at various water depths or submersion times defined by a selector switch. A manual pull handle can also activate the inflator. The inflator electronics are connected to a gas cylinder by a cable. When the inflation conditions defined by the selector switch are met, the inflator sends an electrical signal through the cable to ignite an explosive charge at the cylinder to release the gas.

Before use, always check the status of the inflator by setting the dial to “test mode”. See the Hammar Electronic Inflator manual for further details on arming the inflator, testing the inflator, and what modes are included.

Hammar Automatic Inflator (included with MD1501 and sold separately)



When the Hammar Automatic Inflator is submerged under more than approximately four inches of water, the hydrostatic inlet valve opens, allowing water contact with the water-sensitive element. The element releases a stainless steel coil spring, driving a needle into the end of the gas cylinder, puncturing it and allowing the gas to fill the Ratis™ LPU. The Ratis™ LPU should fully inflate within five seconds.

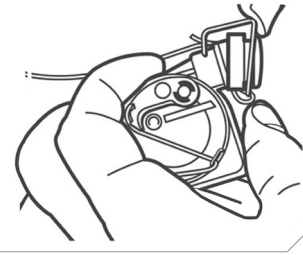
Before use, always check the status of the inflator by ensuring the visual indicator is green and that the inflator cap has not expired.

Hammar Automatic Inflator conversion to manual
(with MA7219 conversion cap)

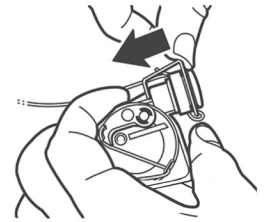
Under special circumstances, such as wading or at other times when complete manual control of inflation of the LPU is required, the MD1501 can be converted from automatic inflation to manual inflation. The LPU may be changed back to automatic inflation by removing the conversion cap.

The conversion cap requires an armed MD1501 and an MA7219 conversion cap. To use the cap, follow the steps below:

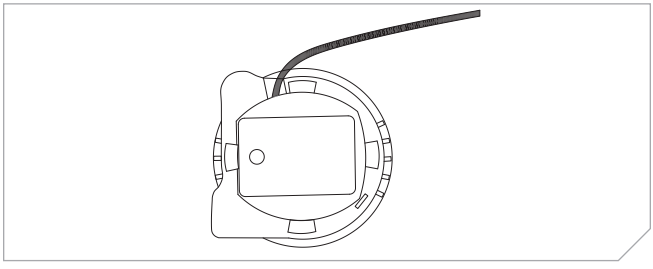
1. Position the conversion cap over the hydrostatic water inlet valve.



2. Secure the conversion cap to the hydrostatic water inlet by applying pressure to the cap at the metal clip until it locks in place.



Hammar Manual Inflator
(included with MD1502 and sold separately)



The Hammar Manual Inflator will activate only when it is engaged by the manual pull cord.

Before use, always check the status of the inflator by ensuring the visual indicator is green and that the inflator cap has not expired.

WARNING: IF THE RATIS™ LPU IS EQUIPPED WITH A MANUAL INFLATOR, IT MUST BE MANUALLY ACTIVATED BY THE USER WITH THE PULL HANDLE; IT DOES NOT AUTOMATICALLY INFLATE UPON SUBMERSION.

CAUTION: IF THE RATIS™ LPU HAS BEEN ORALLY INFLATED, INFLATION TRIGGERED BY ANY OF THE THREE INFLATION SYSTEMS COULD OVER-PRESSURIZE AND DAMAGE THE UNIT.

CAUTION: WHEN USING THE RATIS™ LPU IN TEMPERATURES BELOW FREEZING, FULLY DISCHARGING THE CO_2 CYLINDER MAY NOT PROVIDE ADEQUATE INFLATION; USE THE ORAL INFLATOR TO TOP-UP THE LPU.

CAUTION: DO NOT CONSTRAIN THE RATIS™ LPU SO AS TO PREVENT THE BLADDER FROM EXPANDING. DO NOT INFLATE IN A SMALL SPACE. DO NOT WEAR CLOTHING OR EQUIPMENT OVER THE RATIS™ LPU. IF STRAPPING (INCLUDING A SLING) IS PLACED OVER THE RATIS™, IT MAY IMPEDE INFLATION.

ORAL INFLATION

A properly armed Ratis™ LPU will inflate without oral inflation. However, when top-up inflation or total inflation is required, the Ratis™ LPU can be inflated orally.

When the Ratis™ LPU is inflated from the inflation cylinder, the carbon dioxide escapes through the bladder film over time. A reduction of pressure is apparent several hours after inflation. Therefore, oral top-up inflation may be required during prolonged immersion.

To orally inflate an un-inflated and packed Ratis™, follow all steps below. If the Ratis™ LPU is broken out and requires oral top-up only, Step 1 can be skipped:

1. Locate the zipper flap tab behind the head. Separate the hook and loop tab and separate both breakout zippers. Open the right lobe.
2. Locate the oral inflation valve. Unscrew locking mechanism.
3. Depress the valve and blow into the tube until the Ratis™ LPU is fully inflated.
4. Lock the oral valve.

DEFLATION

1. To deflate the Ratis™, locate the oral inflation tube on the right side of the bladder and unscrew the locking mechanism on the valve. Depress the valve.
2. Gently squeeze the Ratis™ LPU until fully deflated, ensuring all gas is removed. To avoid damage, do not wring or twist the film, or press it against any hard or sharp object as this may cause damage.
3. Lock the oral valve.

PACKING

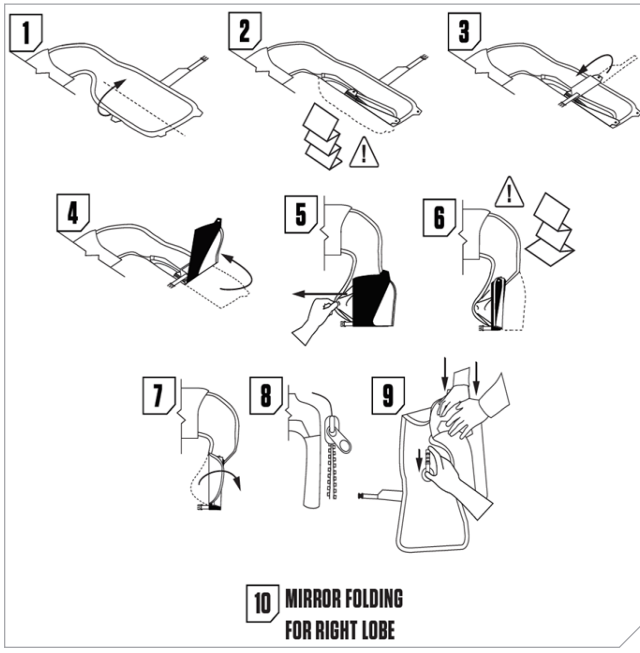
WARNING: AFTER EACH INFLATION, THE RATIS™ LPU MUST BE REARMED, LEAK TESTED, AND FULLY DEFLATED BEFORE REPACKING.

1. Place the Ratis™ LPU on a flat surface.
2. Retrieve the packing zipper sliders from the zipper slider pocket.

3. Use the zipper sliders to join the breakout zippers. Start by threading the curved side of the zipper slider onto both sides of the zipper tape.
4. Grasp the zipper tape so that both sides are aligned evenly. Pull the slider down to join the zipper. Join both zipper coils and close each approximately three inches.

5. Close the Velcro flap on the top of the Ratis™. This prevents the zippers from opening.
6. Locate the front attachment buckle (underneath bladder). This is used as a landmark for folding the bladder.

NOTE: THE USER'S LEFT LOBE HAS PACKING PICTOGRAMS ON THE BLADDER ATTACHMENT PANELS THAT MAY BE USED FOR REFERENCE. THESE PICTOGRAMS ARE SHOWN HERE. THE RIGHT LOBE OPERATIONS ARE MIRRORED.



7. Starting with the wearer's left lobe, fold the inside of the bladder lobe towards the outside. Pull taut so the fold edge is over top of the inside edge of the front attachment buckle.

8. Gather the inside lobe on top of the front attachment buckle with 4 accordion folds. Evenly distribute the folds so that each fold is approximately 1/4 of the total width of the folded section.

TIP: THIS ALLOWS THE INSIDE LOBE TO BE WRAPPED OVER TOP OF THE REST OF THE BLADDER. THIS IMPROVES BREAKOUT AND PERFORMANCE.

9. Fold the male sternum strap over towards the inside of the Ratis™. Align the inside edge of the box stitch with the inside edge of the front attachment buckle. Route the buckle strap under the inside piece of the cover.

10. Fold the inside of the bottom of lobe over so that the fold edge is in-line with the inside of the front attachment buckle.

11. Fold the bottom of the lobe upwards. Pull taut.

TIP: BY KEEPING THE FOLDS TIGHT OVER THE FRONT ATTACHMENT BUCKLE, THE LATER STEP OF SIPPING THE LOBE CLOSED IS EASIER.

12. Pull free the inside of the lobe. Do not pull so hard as to disturb the alignment of the sternum strap.

13. Fold the bladder into the cover with four accordion folds. The inside edge of the folds should be aligned with the vertical seam in the cover.

14. Wrap the inside of the lobe over top and align its edge with the zipper tape.
15. Fold the cover over the bladder while holding the folded bladder inside the cover, close the breakout zipper. Keep inside bladder edge aligned with lower zipper tape. Completely close the zipper until the slider is detached from the zipper tape.

WARNING: DO NOT CATCH THE FILM IN THE ZIPPER TEETH. THIS MAY DAMAGE THE BLADDER.

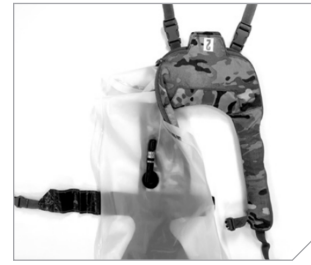

16. Tuck in end of zipper tape.


17. Before folding the second lobe, all excess air must be removed.

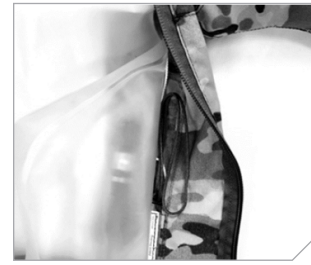
BEFORE PACKING THE SECOND LOBE, ALL EXCESS AIR MUST BE REMOVED.

WARNING: EXCESS AIR MAY PREVENT AUTOMATIC INFLATION OF THE MD1501. AIR SHOULD BE EVACUATED BY A LOW-PRESSURE VACUUM (HAMMAR RECOMMENDS MAXIMUM 2.9 PSIG). IF A VACUUM IS NOT AVAILABLE, A TWO-PERSON SYSTEM IS RECOMMENDED TO PUSH ALL AIR TO THE ORAL VALVE FOR REMOVAL.

18. Lock oral valve once the air is evacuated.
19. Align the base of the oral tube with the label on the inside of the cover.



20. For MD1500 and MD1501, fold the manual pull cord and tuck it under the bladder. The MD1502 pull cord is shorter and does not require folding as shown.



21. Mirror steps shown in Steps 7-16.
22. Flip over and open access pouch to stow zipper pulls.

23. Stow zipper pulls. Confirm the MD150X is armed and there is no excess air in the bladder.

24. Close access pouch.

RE-ARMING THE RATIS™ INFLATABLE LPU

RE-ARM KITS

Re-arm kits are sold separately. The following model numbers are the re-arm kits for the Ratis™ LPU. To check what inflator you have or need, see INFLATION.

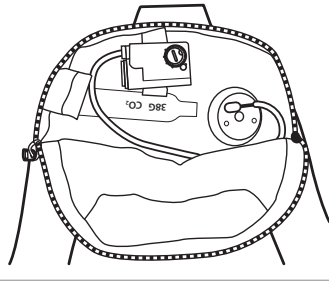
RE-ARMING THE HAMMAR ELECTRONIC INFLATOR (WITH MA1510)

NOTE: REFER TO HAMMAR ELECTRONIC INFLATOR INSTRUCTION MANUAL FOR SETTINGS, FUNCTIONS, CARE, AND MAINTENANCE.

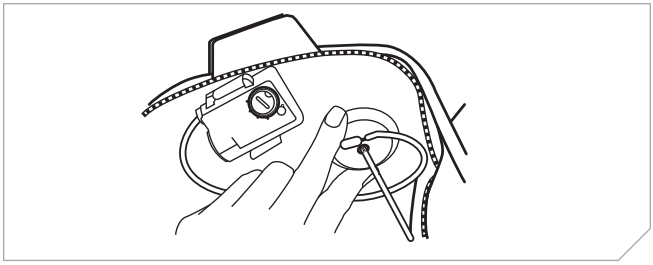
WARNING: WHEN INSTALLING THE INFLATOR CAP, TAKE CARE NOT TO PRESS THE CYLINDER ASSEMBLY OR OTHER COMPONENT INTO THE BLADDER AS THIS CAN CAUSE DAMAGE.

1. Place the Ratis™ LPU on a flat surface.

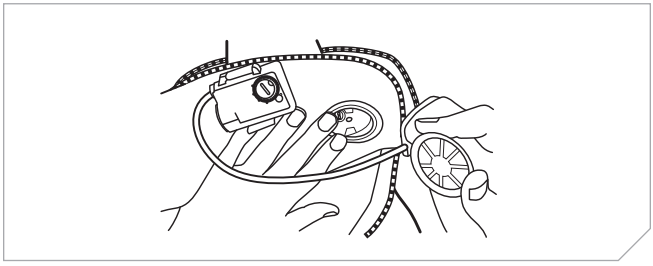
2. Un-zip the cylinder pouch to access the inflator.



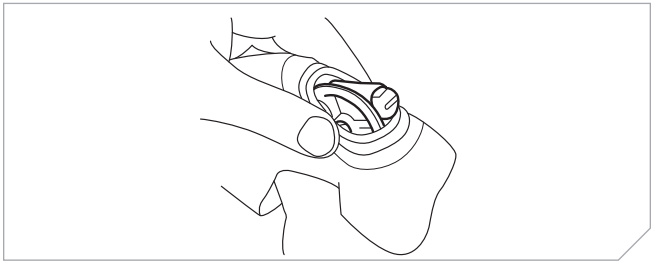
3. While holding the cylinder through the bladder, unscrew the Hammar inflator cap from the cylinder assembly.



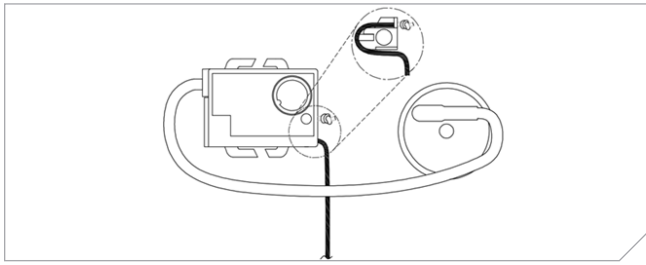
4. Remove the cap from the cylinder assembly.



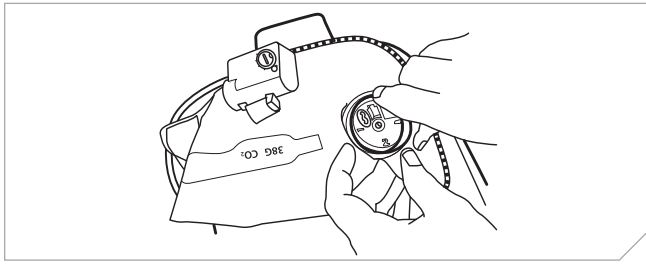
5. Pinch to fold the sealing ring to allow the removal of the cylinder assembly. Visually check the sealing ring for any damage.

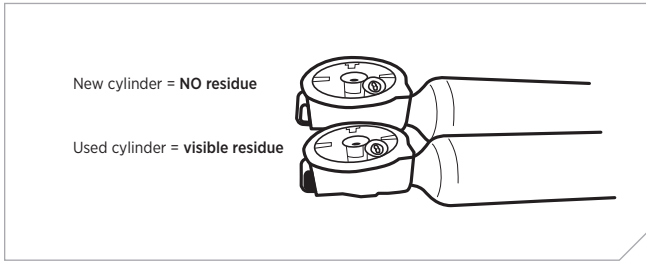


6. Ensure the black pull handle cord tab is inserted in the inflator. If it is not, route the tab underneath the green cable, then route the pull handle cord around the perimeter groove in the plastic tab and insert back into the electronic inflator. The tab should click into place. Significant resistance indicates that the cord is not routed correctly

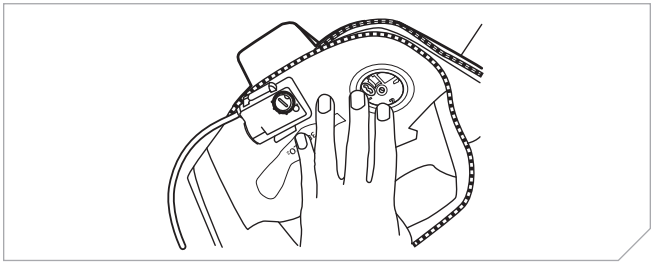


7. Carefully insert the new cylinder assembly into the bladder.

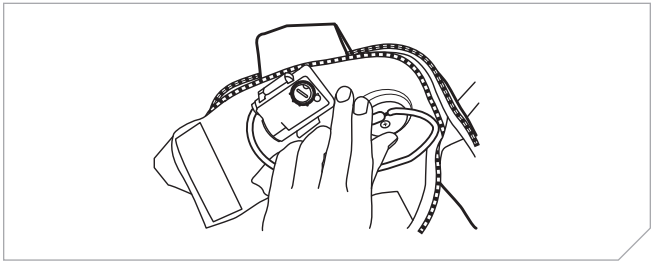




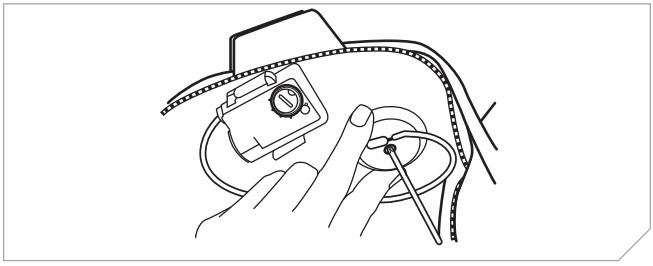
8. Align the cylinder with the location image on the bladder and make sure the sealing ring rests on the cylinder assembly and does not capture extra folds of the bladder film .



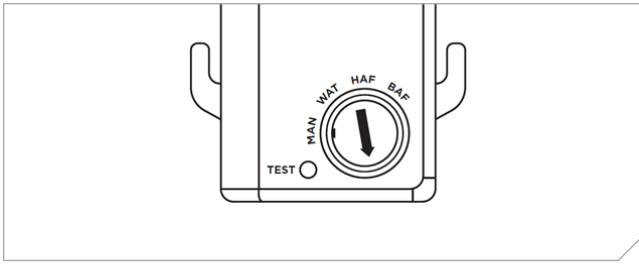
9. Align the inflator cap and place the inflator cap on top of the cylinder assembly.



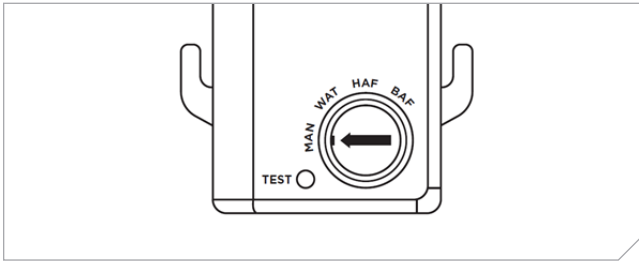
10. While holding the cylinder through the bladder, screw the Hammar inflator cap to the cylinder assembly to close the circuit.



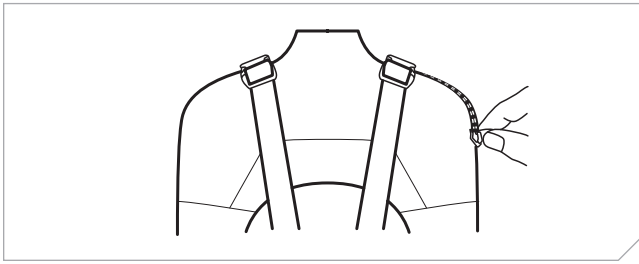
11. Turn the Mode Selector on the inflator to the 'Test' position to check that the circuit is closed.
    - A red light indicates the circuit is still open and the cylinder will not inflate the device.
    - A green light guarantees a good connection.
    - See Hammar Electronic Inflator Manual for more information.



12. Turn the Mode Selector to the desired position, based on the inflatable requirements. See Hammar Electronic Inflator Manual for more information.



13. Close the cylinder pouch.



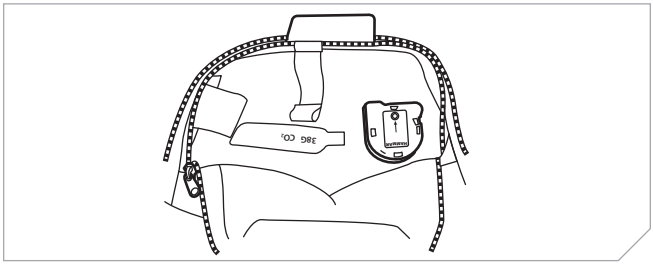
14. To test for leakage, inflate the Ratis™ LPU using the oral inflator tube (see ORAL INFLATION, p. 23). To avoid damage do not use a compressor (the maximum pressure should not exceed 0.8 psi). Leave inflated for two hours at 0.6 psi (firm to touch). There should be no significant drop in pressure over this time period.
15. Deflate and repack the Ratis™ LPU (see PACKING, p. 24).

RE-ARMING THE HAMMAR AUTOMATIC INFLATOR (WITH MA1511) OR HAMMAR MANUAL INFLATOR (WITH MA1512)

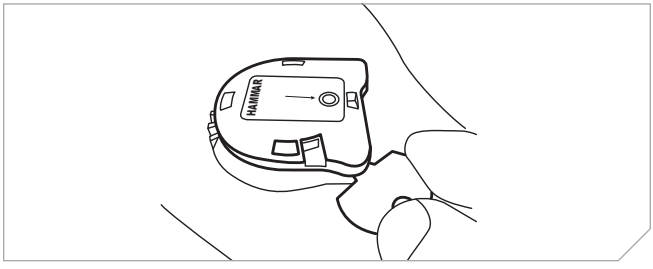
WARNING: WHEN INSTALLING THE INFLATOR CAP, TAKE CARE NOT TO PRESS THE CYLINDER ASSEMBLY OR OTHER COMPONENT INTO THE BLADDER AS THIS CAN CAUSE DAMAGE.

NOTE: HAMMAR MANUAL INFLATOR SHOWN. HAMMAR AUTOMATIC INFLATOR FOLLOWS THE SAME STEPS.

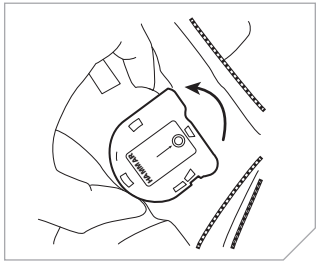
1. Place the Ratis™ LPU on a flat surface.
2. Un-zip the cylinder pouch to access the inflator.

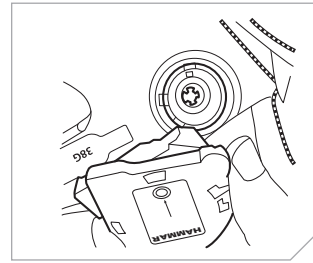


3. While holding the cylinder through the bladder, use the Hammar Key and insert it between the yellow inflator cap and the black locking ring. Turn the key counter clockwise, which will cause the black portion of the cap to rotate counter-clockwise.

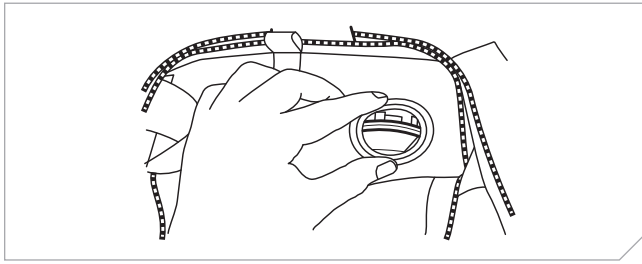


4. Keep turning the locking ring counter-clockwise and remove the cap from the cylinder assembly. The used inflator cap can be scrapped.

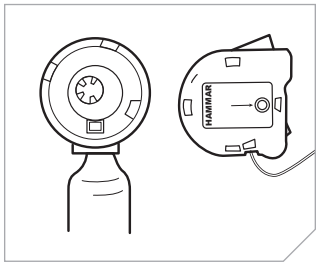


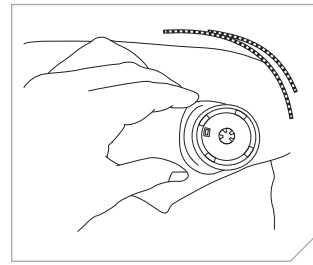


5. Pinch to fold the sealing ring, to allow the removal of the cylinder assembly. Visually check the sealing ring for any damage.

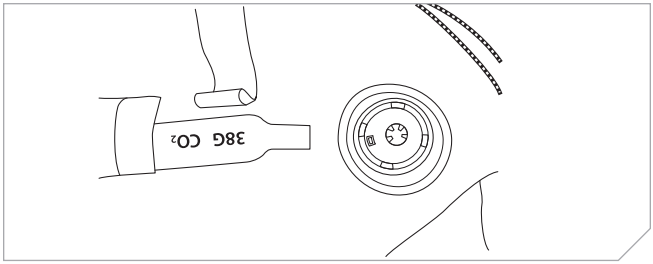


6. Confirm the indicators on the new cylinder assembly and inflator are green and carefully insert the new cylinder assembly into the bladder.

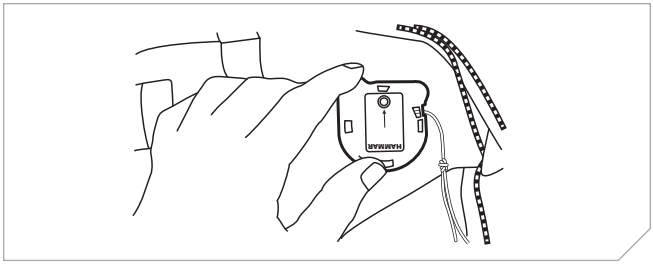




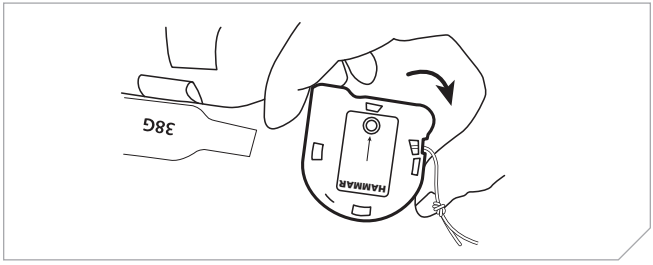
7. Align the cylinder with the location image on the bladder and make sure the sealing ring rests on the cylinder assembly and does not capture extra folds of the bladder film.



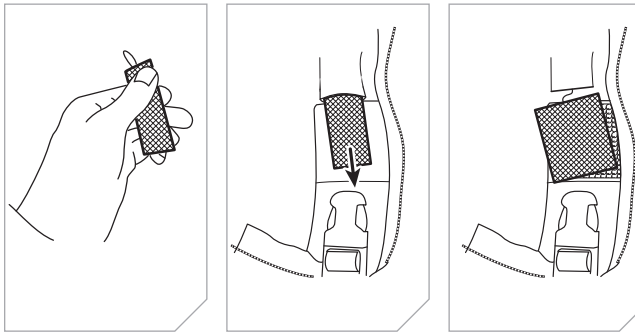
8. Place the new inflator on top of the cylinder assembly.



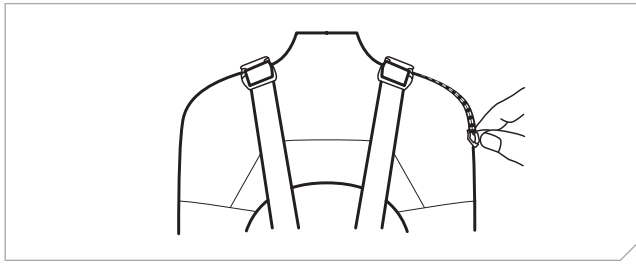
9. Press down on the inflator and turn the locking ring clockwise until it is locked in place.



10. Fold the pull handle of the new inflator in half, pass it through the buttonhole of the left lobe, and attach it to the Velcro patch.



11. Close the cylinder pouch zipper.



12. To test for leakage, inflate the Ratis™ LPU using the oral inflator tube (see ORAL INFLATION, p. 23). To avoid damage do not use a compressor (the maximum pressure should not exceed 0.8 psi). Leave inflated for two hours at 0.6 psi (firm to touch). There should be no significant drop in pressure over this time period.
13. Deflate and repack the Ratis™ LPU (see PACKING, p. 24).

CARE AND MAINTENANCE

Before each use, review the Readiness Checklist:
See WARNINGS AND CAUTIONS (p. 3).

After each use, deflate, re-arm, and repack the Ratis™.
See DEFLATION, PACKING, AND RE-ARMING sections.

LEAK TESTING

Perform the following tests every 180 days, or more frequently if exposed to potential damage or used in extreme conditions.

TESTING FOR LEAKS

1. Orally inflate the LPU until it is firm to the touch, and let it stand for two hours—a leaking unit will not hold its firmness.
2. If the unit is leaking, take it to a service department for evaluation and/or servicing.

TESTING THE ORAL INFLATION VALVE

1. Fully inflate the LPU using the oral inflator, then hold the valve under water.
2. If bubbles appear, deflate and retest. If the leak persists, take the LPU to a Mustang dealer for evaluation and/or servicing.

CAUTION: TO AVOID ACCIDENTAL INFLATION, DO NOT ALLOW WATER TO CONTACT THE HYDROSTATIC INFLATOR.

GENERAL TESTS AND INSPECTIONS

Record the following tests in permanent ink on the Ratis™ LPU or in a separate maintenance log.

The following tests and inspections should occur annually, after each inflation, or whenever the integrity of the unit is in doubt.

1. Visually inspect all components for dirt or corrosion, and clean or replace as necessary.
2. Visually inspect the unit for damage or excessive abrasion, wear, fabric tears, or contamination. Particular attention must be paid to the stitching, straps, and hardware.
3. Test for leaks.
4. Test the oral inflation valve.
5. Ensure the inflator status is good (see INFLATION).

TESTING THE INFLATORS AND RATIS™ LPU PERFORMANCE

NOTE: A FULLY ARMED UNIT WITH A RE-ARM KIT IS REQUIRED FOR THIS TEST.

1. Don the Ratis™ LPU.
2. If the Ratis™ LPU is equipped with a:
   a. Hammar Electronic Inflator, enter the water so that the conditions of the activation mode are met.
   b. Hammar Automatic Inflator, enter the water so the inflator is at least four inches below the water surface.
   c. Hammar Manual Inflator, enter the water and inflate it by jerking firmly downward on the beaded manual inflation handle.
3. The Ratis™ LPU should fully inflate within five seconds
4. Ensure the Ratis™ LPU floats the user with the mouth above the surface of the water, and experiment with different leg positions to become familiar with changes in buoyancy and/or flotation characteristics. Ensure the Ratis™ LPU will turn the user face-up if the user relaxes in a face-down position.
5. Exit the water, remove the Ratis™, and completely deflate it – see DEFLATION.
6. Let the Ratis™ LPU dry thoroughly, then re-arm and repack it – see RE-ARMING and PACKING.

WARNING: IF IN DOUBT ABOUT THE INSPECTION AND SERVICING OF THE UNIT IN ACCORDANCE WITH THESE INSTRUCTIONS, OR OF ANY TEST OR INSPECTION RESULTS, TAKE THE UNIT IN FOR PROFESSIONAL SERVICING OR CONTACT MUSTANG SURVIVAL.

CLEANING AND STORAGE

1. Hand wash or sponge down the unit in warm, soapy water.
2. Rinse the unit and inflator with clean water, using a clean cloth.
3. Hang the unit to dry on a plastic coat hanger.
4. Always store the unit in a warm, dry place out of direct sunlight.

NOTE: TO AVOID ACCIDENTAL AUTO-INFLATION WHEN CLEANING THE RATIS™ LPU, DO NOT SUBMERGE IT IN WATER OR SPRAY LIQUID ON THE INFLATOR.

CAUTION: DO NOT DRY CLEAN THE RATIS™ LPU.

ACCESSORIES AND RELATED PRODUCTS

STYLE	DESCRIPTION
MD1500	RATIS™ INFLATABLE LPU WITH HAMMAR ELECTRONIC INFLATOR
MD1501	RATIS™ INFLATABLE LPU WITH HAMMAR AUTOMATIC INFLATOR
MD1502	RATIS™ INFLATABLE LPU WITH HAMMAR MANUAL INFLATOR
MA1505	RATIS™ INFLATABLE LPU CHEST HARNESS
MA1506	RATIS™ INFLATABLE LPU REPLACEMENT (W/O INFLATOR, CYL., OR HARNESS)
MA1507	RATIS™ INFLATABLE LPU REPLACEMENT PARTS KIT
MA1508	HAMMAR ELECTRONIC INFLATOR (WITHOUT CYLINDER)
MA1509	HAMMAR ELECTRONIC INFLATOR PROGRAM AND PROGRAMMING CABLE
MA1510	RATIS™ INFLATABLE LPU ELECTRONIC INFLATOR RE-ARM KIT (CYL. AND BODY)
MA1511	RATIS™ INFLATABLE LPU HAMMAR AUTOMATIC INFLATOR RE-ARM KIT
MA1512	RATIS™ INFLATABLE LPU HAMMAR MANUAL RE-ARM KIT
MA7219	HAMMAR MANUAL CONVERSION KIT

MUSTANG ENGINEERED

For 50 years Mustang Survival has been engineering high-performance marine gear for military, coast guard, and rescue personnel. With a focus on applied research and field-testing, we're committed to the protection and enhancement of those who push themselves to extremes. We build gear that saves lives and fuels exploration.

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