

# Special Operations Vector

By Relative Workshop

the uninsured

**RELATIVE**  
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# CONTENTS AT A GLANCE

## SECTION 1: INTRODUCTION

CONTENTS	2
WARRANTY AND DISCLAIMER	3
INTRODUCTION	4

## SECTION 2: RESERVE CONTAINER

TOGGLE ATTACHMENT	9
RESERVE PACKING INSTRUCTIONS	13
CLOSING THE RESERVE W/ SKYHOOK	37

## SECTION 3: MAIN CONTAINER

TOGGLE ATTACHMENT	45
HAHO TOGGLE EXTENSION	49
TV3 DISK RELEASE CLOSING	53
TV3 STATIC LINE DROGUE CLOSING	61
TV3 STATIC LINE DUAL BAG CLOSING	69
SPRING LOADED PILOT CHUTE CLOSING	85
STATIC LINE PILOT CHUTE ASSIST CLOSING	91
TV3 HAND DEPLOY PILOT CHUTE CLOSING	99
STATIC LINE DUAL BAG CLOSING	105

## SECTION 4: ABOUT THE SOV

THE BOOTH 3-RING RELEASE SYSTEM	119
HOW TO USE THE SOV	125
MAINTENANCE AND CARE	129



# Special Operations Vector

## O W N E R ' S M A N U A L

### W A R N I N G

Parachuting is a hazardous activity that can result in injury or death.

Parachutes sometimes malfunction, even when they are properly designed, built, assembled, packed, maintained and used. The results of such malfunctions are sometimes serious injury or death.

The U.S. Parachute Association estimates that there about 35,000 skydivers in the USA, and these jumpers made approximately 2.2 million jumps in 2001. The association reported 35 skydiving fatalities that year, meaning the probability of dying on a skydive is approximately 1 in 64,000. Experts estimate that hundreds of people are also injured. Some of these deaths and injuries are the result of equipment malfunction.

If you use your SOV, or if you allow someone else to use it, you are acknowledging sport parachuting's risk and accepting the fact that the SOV and its components may malfunction. If you are not willing to accept the risks of sport parachuting, or if you are not willing to accept the possibility that your SOV or its components may malfunction and perhaps cause you to be injured or killed, then you may return your SOV for a full refund before it is used. Details on how to do this are printed below.

This manual is applicable to the SOV bearing the serial number:

### DISCLAIMER – NO WARRANTY

Because of the unavoidable danger associated with the use of this harness and container assembly, the manufacturer (The Uninsured Relative Workshop, Inc) makes no warranty, either expressed or implied. This rig is sold with all faults and without any warranty of fitness for any purpose. The manufacturer also disclaims any liability in tort for damages, direct or consequential, including personal injuries, resulting from a malfunction or from a defect in design, material, workmanship or manufacturing whether caused by negligence on the part of the manufacturer or otherwise.

By using this rig, or allowing it to be used by others, the buyer waives any liability for personal injuries or other damages arising from such use.

If the buyer declines to waive liability on the part of the manufacturer, buyer may obtain a full refund on the purchase price by returning the parachute harness and container, before it is used, to the manufacturer within 30 days from the date of original purchase with a letter stating why it was returned.

Take note that neon and fluorescent colored fabrics and tapes fade rapidly. Color brilliance may be lost within a year of manufacture. The Uninsured Relative Workshop, Inc assumes no responsibility for this action. Save this manual, your rigger may not have an applicable manual and will need it to service your SOV. This manual does not cover the correct assembly and packing procedures for the older Vector models.



# INTRODUCTION

## THE HISTORY BEHIND RELATIVE WORKSHOP

Over the past three decades, Relative Workshop has delivered more than 40,000 quality harness and container systems to skydivers all over the world!

In 1972, Bill Booth started Relative Workshop in a Miami garage. During the late 1970's Bill made two major contributions to the world of skydiving. First, Bill invented and patented the hand deploy pilot chute system. This contribution changed the sport forever. Bill Booth's second and maybe greatest contribution and recognition during this period came with the invention and patent of the Booth 3-Ring release system. In 1983, Bill received the prestigious Parachute Industry Association (PIA) Achievement Award. The Federation Aeronautic International (FAI) awarded Bill Booth the 1984 Gold Medal for outstanding achievement in parachute safety design, the highest award available in this field.

Relative Workshop's first harness and container system was called the Wonderhog. This rig incorporated all of the best safety improvements of its era. Not long thereafter, the Wonderhog Sprint was introduced. In 1981, the Vector was introduced and soon became the most popular rig in the world. The Vector II followed and soon enjoyed even more popularity. Since 1977, teams and individuals have been winning gold medals wearing Relative Workshop systems! The U.S. Skydiving Team at the 1981 World Meet wore the very first Vectors.

In the late 1980s and early 1990s, new freefall disciplines such as Skysurfing and Freestyle made their way into the skydiving mainstream. Freeflying entered the mainstream shortly thereafter. These new disciplines brought with them new and increased demands on skydiving equipment. In these flight attitudes, the container is subjected to direct, high-speed airflow. The need for more security such as riser protection, pin protection and bridle protection became apparent. Hence, our engineers went to work.

### Vector SOV3 - MM/TS/HH

The SOV3-MM/TS/HH systems are designed to meet the strict requirements of durability, adaptability and ease of operation set by modern Airborne units and advanced Special Operations and Reconnaissance units. In today's military environments, there is an ever-increasing demand to fulfill a large variety of missions and training requirements with a 100% reliability rate and safety record, at a cost efficient price. The answer to these demands is The Relative Workshop Special Operations Vector 3 (SOV3) platform consisting of the Multi - Mission (MM), Tandem Sigma (TS) and HAHO/HALO (HH) Solo and Cargo harness and container systems.

The extreme flexibility of the SOV3-MM/TS/HH systems allow each to be easily and quickly set up for any active insertion mission with a large variety of mission specific accessories, equipment, weapons, and personal equipment. The key to this flexibility is the customized and interchangeable side panels that hold combinations of oxygen-, radio-, cargo-, AAD-, and weapon- Interfaces. In addition to these interchangeable panels, multiple cargo and accessory attachment points on each of the SOV3 - MM/TS/HH systems allow for customized cargo packs, personal rucksacks, oxygen systems, and personal weapons.

Designed with adaptability as a priority, the SOV3-MM/TS/HH systems may also be set up for Static Line Deployment, Self-Set and Static Line Drogue Deployment, Accelerated Free Fall Student training,



The SOV3-HH is designed with state of the art cutting edge technology optimized for functionality and durability. This system is built using only the highest quality materials and workmanship. This makes the system extremely functional, very reliable and very lightweight for its class. The smooth and tight container construction with it's highly integrated protective flap system offers the best possible protection against interference and snagging in cargo net style seats and other aircraft equipment. The reserve and main containers both incorporate our balloon spring loaded pilot chute, which research and time have proven to be the best and most reliable ripcord deployment system available. The main release system incorporates the 3-Ring release, an industry standard safety feature designed and patented by Relative Workshop.

If you have any questions, comments or suggestions after reading this manual, please feel free to contact us at:

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Relative Workshop is open **Monday** through **Friday**, from **8 am** to **5 pm** EST.

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**Complete Parachute Solutions (CPS) is Relative Workshop's exclusive military equipment sales and training division.**

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## FEATURES OF THE SOV

The following is a list of features that set the SOV apart from other harness and container systems. Please feel free to contact CPS if you have any questions or need further elaboration regarding these attributes.

### \* **Yoke**

The contoured yoke brings the harness over the shoulders and curves inward over the chest, which provides the most efficient placement of the emergency handles eliminating the need for chest rings and the inherent problems associated with them. This design also prevents the harness from slipping off the shoulders, should you have narrow shoulders.

### \* **Chest Strap**

Our chest strap is designed to provide the maximum in upper harness protection while complimenting the contoured yoke and protecting the cable housings.

### \* **Back Pad**

This is the foundation of the Pro-Fit Harness. It allows maximum upper body mobility without compromising total body fit.

### \* **Housing Guides**

Our guides provide a clean channel for the housings to float upward during high load situations. These guides also make it very difficult to misroute the cutaway cables.

### \* **Cutaway Cable Housings**

Our flexible housings are the first step in preventing hard pulls during cutaways. The upward float allowance provided by these housings significantly reduces the likelihood of near impossible cutaways. Without upward float, premature loading of the riser loop is almost a certainty. This would lead to the yellow cutaway cable being pulled up and through the housing end by the loop.

### \* **External Riser Covers**

These tuck-tab riser covers utilize *the most successful* tab/pocket design on the market. Years of extensive research and development (and *thousands* of jumps) by our in-house test jumpers resulted in this superior design. It is the ultimate in riser protection.

### \* **Secondary Riser Cover**

Even in the highly unlikely event of an external cover opening during freefall, the secondary riser cover makes it virtually impossible for a riser or toggle to escape until the main pin is pulled. The SOV is the only rig on the market to offer this level of riser/toggle security.

### \* **Main Pin Protection**

The main pin cover flap is integrated into the #1 closing flap and tucks upwards into itself for maximum protection against external forces. Similar "tuck-up" systems are now being implemented in rigs around the world. Both the main and reserve pin covers are designed to conform better to the container. This ergonomic design helps eliminate protruding corners or edges that can catch on doorjamb, bulkheads or other such objects.

### \* **Reserve Pin Protection**

The reserve cover flap utilizes three tuck tabs to remain virtually immovable, without interfering with the reserve activation process.



**\* Absolute Zero Bridle Exposure**

The SOV, configured for BOC or Hand-Deploy Systems, totally eliminates bridle exposure and the need for Velcro-type fasteners on the bridle cord. SOV Tandem Systems also gain safety advantage here.

**\* Pocketed Corners**

Both the main and reserve pack trays utilize pocketed corners at the bottom of the tray. This serves to ensure optimum bag positioning during deployment, helping to protect against bag tumble or spin as it leaves the container. The corner of the main tray also serves as a pocket for the main bridle, virtually eliminating bridle exposure during freefall.

**\* Quality**

Just as is true of all of our containers, the SOV is constructed to exacting standards, using only the finest materials available. Even with nominal care, your SOV will perform faithfully for years. You don't have to look very hard to find Vectors out there with thousands of jumps on them, and lots of life left in them.

**\* Guarantee**

Relative Workshop and CPS are totally committed to you, our customer, through the quality and performance in the harness and container systems we design, build and deliver. We will back our products 100% from the day it leaves our factory. You will find our after sales service to be as comprehensive as our customers have come to expect from Relative Workshop. When you buy a SOV, you are buying with confidence in the company that has built more sport, student and tandem harness/container systems than any other harness/container manufacturer in the world. We've been here for 30 years and we will continue to be here when you need us.

**BEFORE JUMPING YOUR SOV**

Please read this manual thoroughly before assembling or using your SOV, even if you've owned or jumped a Relative Workshop Vector before. We have recently made several important changes to the rig, and you should know about them before using your rig.

**TRAINING REQUIRED**

If you have not jumped a Relative Workshop SOV before, or if you're transitioning from other types of equipment to a Relative Workshop SOV, make sure you receive instruction on its use from a certified instructor. This instruction should consist of a practice session in a suspended harness or on the ground where you practice both routine and emergency procedures.

It is the responsibility of the owner to ensure that their SOV is properly assembled, properly maintained, correctly packed and used. It is also the owner's responsibility to seek out and obtain proper training before using any skydiving equipment such as the Relative Workshop SOV.

Ensure that the Rigger who inspects and packs both the main and reserve parachutes is qualified to do so.

Finally, nothing in this manual is meant to discourage the reader from using the SOV in a reasonable and prudent way.



## COMPONENTS

### THE SOV COMES COMPLETE WITH THESE COMPONENTS:

- \* Harness and container
- \* Main Deployment System
- \* Main deployment bag
- \* Main closing loop
- \* SOV balloon reserve pilot chute
- \* Reserve bridle and free bag
- \* Reserve ripcord
- \* Main ripcord
- \* Reserve closing loop
- \* Main risers and steering toggles
- \* 3-Ring release handle (cutaway handle)
- \* The SOV Owner's Manual (on CD or hardcopy)
- \* Spring Loaded Pilot Chute
- \* Main Rip Cord

### REPLACEMENT PARTS FOR THE SOV

Replacement components for the SOV are readily available from CPS. Should you decide to use any components that were not supplied with the SOV harness and container system, make sure that they are made to the correct dimensions, exacting standards, and are made of the same materials. For example, make sure the cutaway cables are the correct length.

### **NOTE:**

The following sections address various options available with the SOV system. Familiarize yourself completely with these options if they are applicable to your system design.





# **Attaching the Toggles**

**TIE ON TOGGLE ATTACHMENT**

Once the canopy has been correctly attached to the risers and while it is still laid on its side, begin to attach the reserve steering toggles using the following steps:

Ensure the steering lines are correctly routed (i.e. they should not wrap around any suspension lines). This is accomplished by starting at the tail of the canopy. Trace the upper steering lines down to the lower steering line. Check that the right hand steering line passes through the right hand rear slider grommet and the left hand steering line passes through the left hand rear slider grommet.

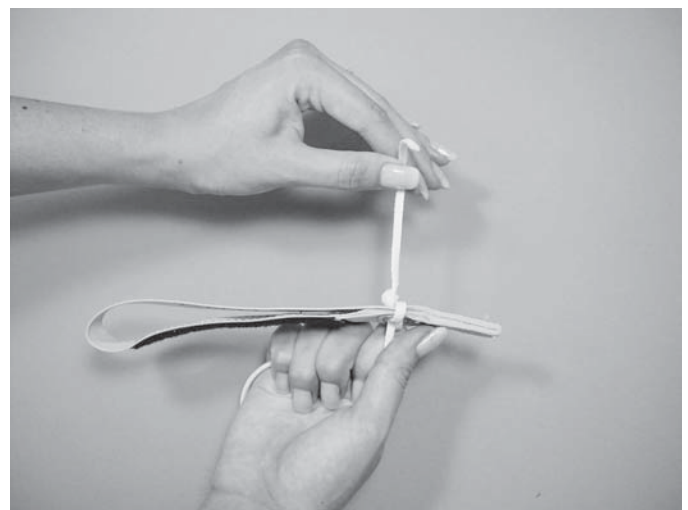
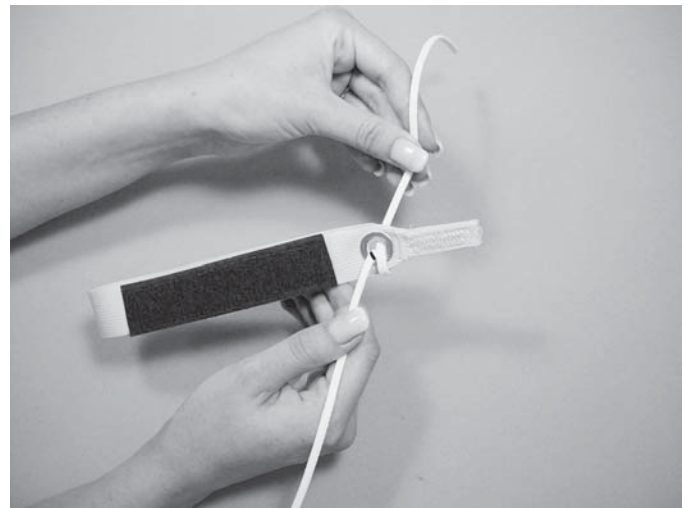
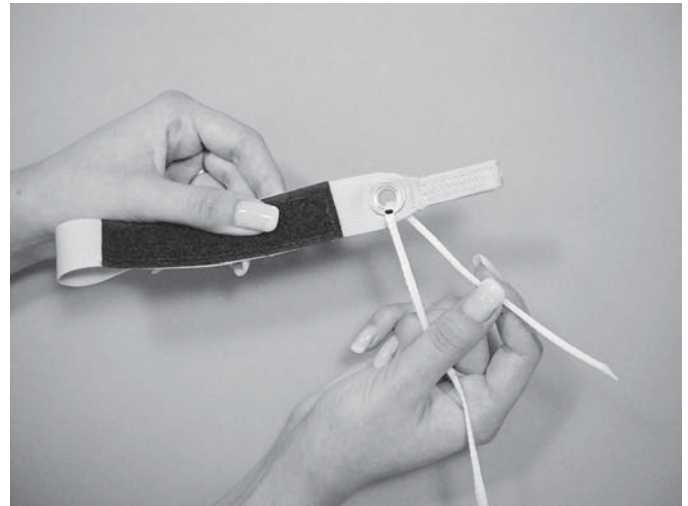
Locate the mark on the steering line that indicates the correct toggle location. Verify correct location of this mark by referring to the reserve canopy owner's manual. Thread the steering line through the guide ring that is located on the riser. Starting from the hook and loop fastener (loop side), thread the end of the steering line through the steering toggle grommet. Adjust the steering line so that the mark (on the steering line) is close to the grommet but has not passed through it.

Loop the running end of the steering line around the toggle and thread it through the grommet again. Now pull it snug. Check that the mark remains in the correct place.

Tie an overhand knot in the free end of the steering line and tighten it right down to the toggle. Ensure it is snug for now.

Check the canopy with the deployment brakes set and with both not set to be sure that it is correctly configured. The reserve canopy owner's manual contains the correct brake settings and steering line lengths. Keep in mind that there are NO standardized dimensions. Therefore, unless the lines are the correct length, the canopy may not open or fly correctly.

Verify that the brake setting measurements are correct. Tighten the overhand knot at the toggle once more. It is generally not a good idea to cut off the excess steering line, as you may want to adjust the steering toggles after the canopy has been jumped. Repeat the procedure for the other toggle. Inspect the installation. Ensure proper routing of the steering lines.



**LARKS' HEAD ATTACHMENT**

Pass steering line through grommet from bottom side.



Thread toggle tip through loop at end of steering line.



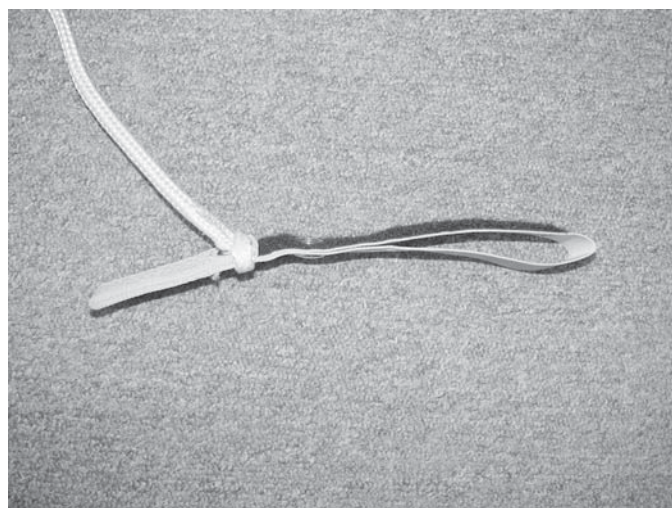
Pull steering line tight to secure Larks Head connection.



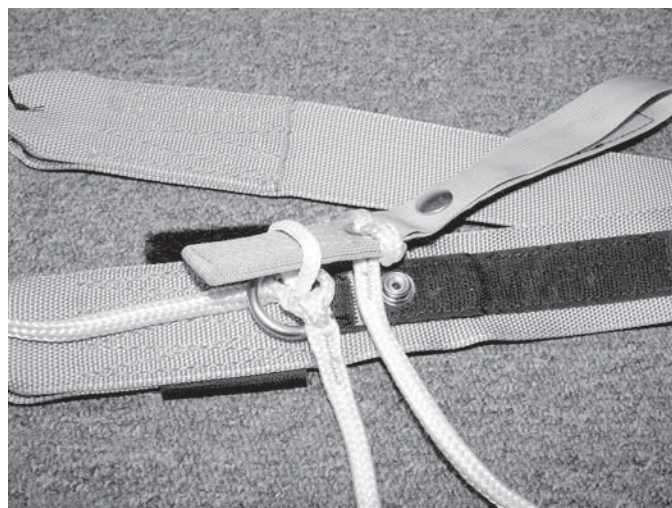


# **The Reserve Container**

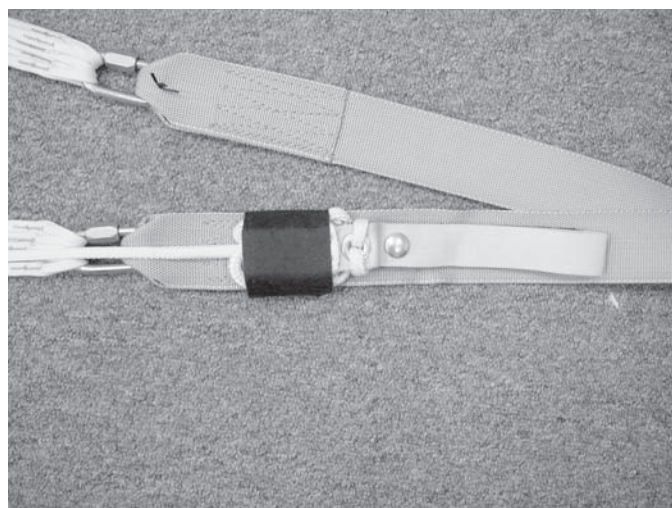
End of steering line is passed through the grommet and looped over the toggle tip.



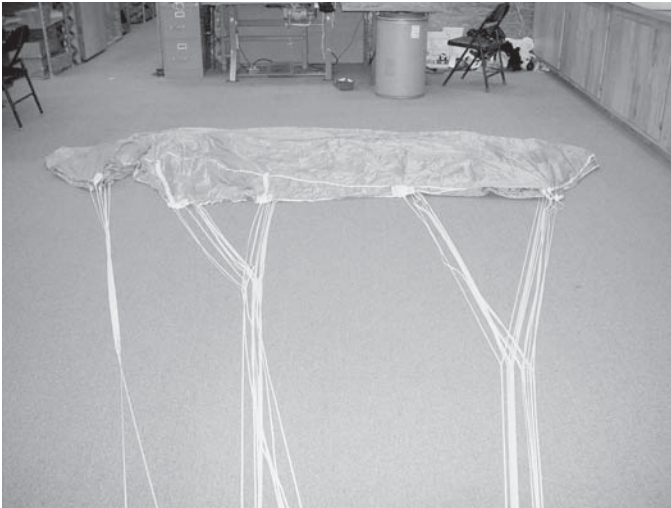
Pull steering line break setting through the guide ring. Pass the brake setting loop through the steering line cats eye and insert the toggle tip.



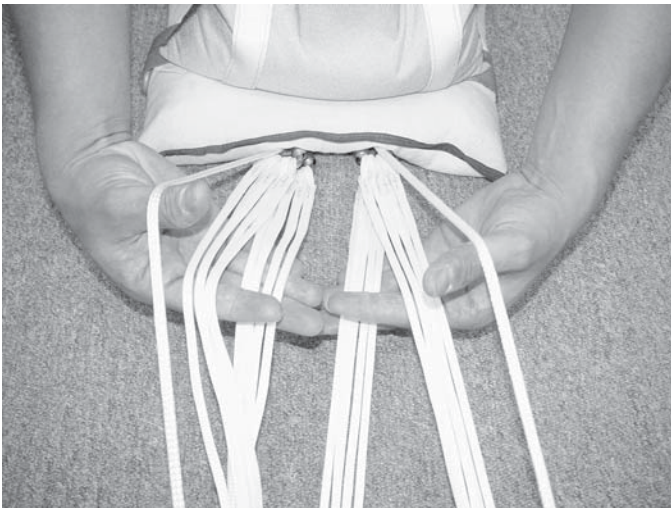
Mate the snap and the Velcro to secure the toggle. Stow the excess break line along side the toggle tip and secure with the velcro cover.



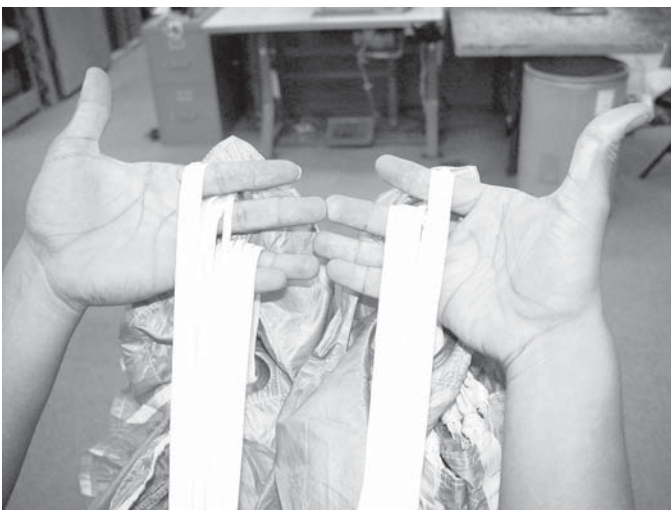




Perform a thorough inspection of all components of the reserve parachute system. Make a thorough inspection of all components of the reserve parachute - Reserve Pilot Chute, Reserve Bridle, Freebag, Reserve Canopy, lines, slider, and links. Follow the canopy manufacturer's reserve packing instructions.



Pick up the front, rear and steering line groups in the left and right groups respectively.



Walk up to the canopy keeping the line groups separated. The line groups must be clear up to the canopy. Ensure that the slider has all the lines in each line group passing through each respective slider grommet.

Flaking the Canopy: With the lines passing over the shoulder start with the end cell nearest your legs, begin flaking the nose of the canopy. Pull each cell completely out, and keep it in your hand. Then, pick up the next, taking care not to miss any until all the cells are in your hand. When you have the entire nose flaked, tuck it between your knees and hold it there. Clear the stabilizers. Flake the material between each line group out toward the stabilizers, keeping the line groups stacked together in the middle of the pack job. Clear the tail, flaking the material between each steering line toward the outside of the pack job.



Flake the leading edge of the canopy with an even number of cells to the left and the right leaving the center cell fully exposed in the middle.







Hold the lines in one hand and use your free arm to support the canopy fabric, while gently placing the canopy on the packing surface.



Place a packing weight at the base of the canopy to maintain line tension while you are flaking the canopy.



Starting at one side of the canopy, carefully lift the folds of material back towards the center of the pack job until the nose is exposed. Clear the cells to the outside of the center cell and flake this section of the nose toward the outside of the pack job.



Flake the material between the A and B lines away from the line channel in the center of the pack job. Be sure that all of the T seams to the outside of the center cell are neatly flaked. Find the bottom seams to the outside of the center cell and flake them out toward the stabilizer. Make sure the B lines are grouped together and stacked neatly on top of the A lines. Smooth out the fold between the A and B lines.



Fold the flaked A to B material in half towards the center of the pack job. Do not go beyond the line attachment points.







Repeat the previous steps to flake the material between the B and C lines. Continue flaking process for the material between the C & D lines.



Flake the material between the upper control lines toward the outside of the pack job, leaving the control lines stacked neatly on the top of the A, B, C, and D lines.



Repeat the above steps for the other side as performed previously. Make sure the line channel in the center of the pack job is clear. Note: the exposed split nose lays to each side of pack job.



Prepare the center cell material to cocoon the canopy.



Fold the Flaked tail section of the canopy under to achieve the same width as the rest of the canopy. Use the center cell material to cocoon around the tail section.



The Flaked tail section folds and center cell material are folded around the B to D material and tucked in behind the A to B material.





View of cocooned left side.



Fold the leading edge of the exposed cell openings back and parallel to the cocooned canopy.



Then fold the nose under with the fold line established at the edge of the cocooned canopy.

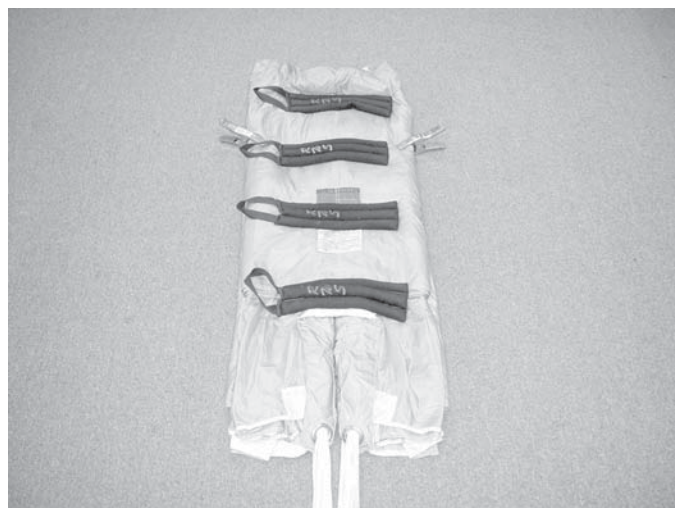




When the nose folds are complete, the leading edge should be even with the edge of the cocooned canopy.



The dressed width of the canopy should be 1 to 2 inches wider than the width of the reserve pack tray.



Prepare the reserve bag to receive the canopy





Insert locking pullup cord from top and secure with one overhand knot.



The use of packing paddles to make S-folds will help maintain line tension and precise fold lines as seen in next photo.



S-fold bottom of reserve up and on top of itself. Make sure S-fold is long enough to extend from center grommet of freebag to about 2-3 inches out of the mouth of the freebag.



Leave the packing paddles in place to prepare for the next half S-fold. Use of clamps can help to maintain control.



Pack job view after the half S-fold.



Dress center cell to the width of the pack job.







Place the reserve bag in position above the canopy.



Use a packing paddle to establish the fold line for the remaining half of the S-fold.



Both S-folds should be even at the bottom.



Remove all packing paddles.



Split the remaining part of the canopy into 2 ears. Be careful not to roll fabric in front of the leading edge.



Fold the ear under to prepare it for insertion into the reserve bag.







Insert into the reserve bag. Repeat the previous two steps for the other side of the canopy.



Use a needle fold of bridle material to secure one end of the safety stow to allow you make the first locking stow.



Locking stow should be 3" long.



Dress the pack job to the finished shape desired. 2" to 3" of canopy material protruding from the mouth of the bag will help fill the reserve container corners.

**Do not rely on the container to shape the pack job or hide poor bulk distribution!**

The bagged canopy should reflect the desired shape of the rig for best results.

It should be square at the bottom, wedge shaped in profile, and thin at the top.

When pressing down on the pack job, it should be firm at the mouth of the bag and get progressively softer as you get closer to the bridle attachment point.



Place velcro protectors on the line stow pouch.



Stow the remainder of the suspension lines into the pouch on the underside of the bag using S-folds that extend from one side of the pouch to the other. Be sure none of the lines are trapped between the hook and loop fastener at the mouth of the pouch. Remove the two hook and loop fastener strips from the bag.







If the container is equipped with a Cypres, create an indentation in the center of the pack job to accommodate the unit.



Place the risers to the sides of the reserve tray with the ends fanned to reduce bulk. Insert a pull-up cord in the reserve closing loop.



Pull the Pull-up cord through the reserve bag from the bottom and out of the top.



Pull the reserve closing loop through the reserve bag and secure with a temp pin. Ensure that no canopy material has pulled through the grommet.



Place cypress into indentation previously made, and place the lower corners of the reserve pack job into the reserve container.



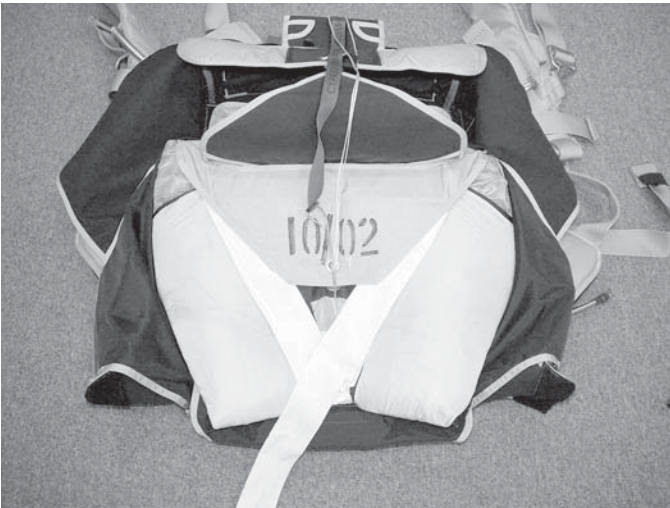
Thread the pull-up cord through the bottom kicker flap (flap #1). If equipped with a Cypres be sure to pass through the cutter before passing through flap #1.



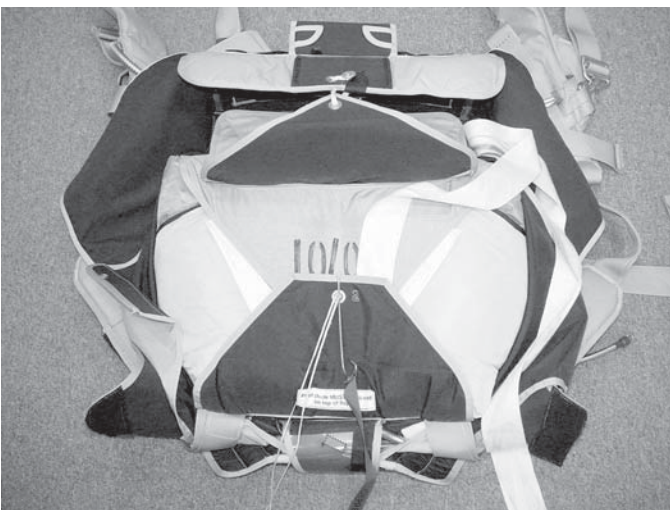




You may evaluate the length of your closing loop by the following method: Press the #1 flap firmly down while pulling with adequate force on the pull-up cord. The top of the closing loop should extend beyond the bound edge of flap #1 by a 1/4" to 1/2". This will help ensure the proper length closing loop is being used. Secure flap #1 with temp pin.



Fold the bridle vertically along both sides of the center grommet and place these folds under flap #1. Leave approximately 5' of bridle unstowed below the pilot chute.



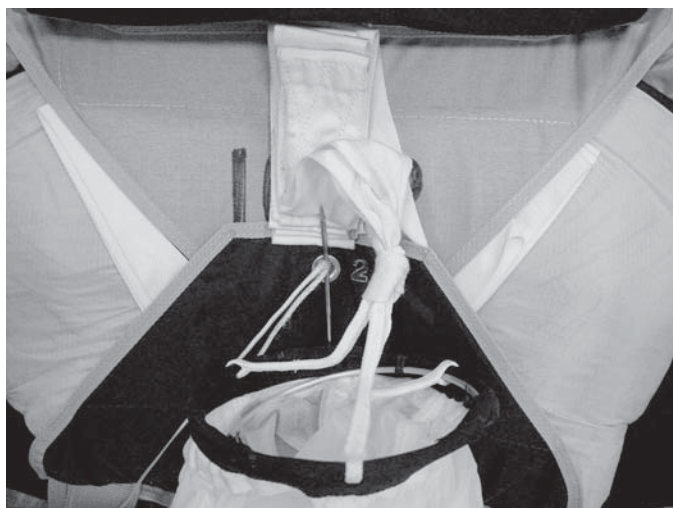
Close flap #2 and secure with temp pin.



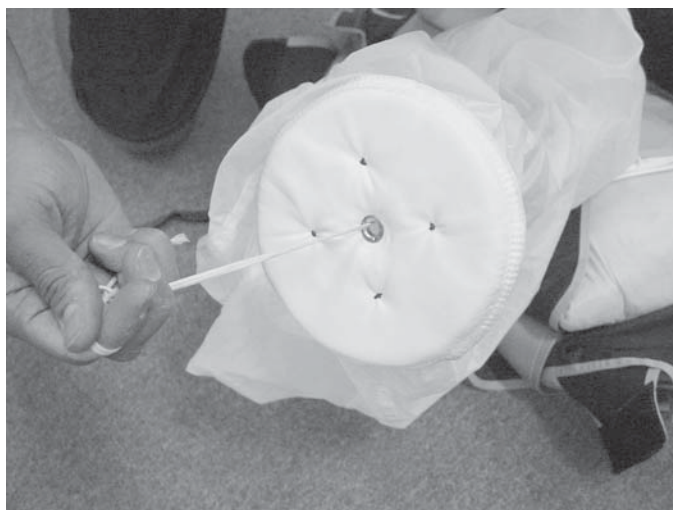
S-fold remainder of bridle horizontally, or vertically (like photo). Note: S-folding vertically will fill the depression or concave surface in center of flap #1.



Secure bridle in center with temp pin.



Pass the pull-up cord through the base of the reserve pilot chute and out the grommet in the center of the pilot chute cap. Ensure that the pull-up cord did not pass around any of the spring coils inside.







Apply tension to the pull-up cord and hold the base of the reserve pilot chute centered over the closing loop.



Compress the reserve pilot and secure with the temp pin.



Pull all of the reserve pilot chute material out of the spring coils and ensure that the pilot chute base is centered under the cap.

S-fold the pilot chute material to within 1" of the edge of the pilot chute cap. Close the center flap (flap #3) over the pilot chute and secure with the temp pin.



Repeat the S-fold for the top side of the pilot chute.



S-fold the pilot chute material in preparation for closing flap #4.

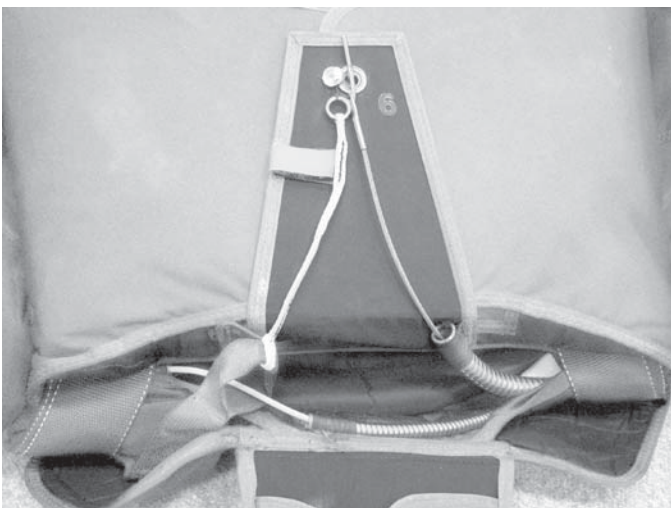




Close the reserve side flap (flap #4) and secure with the temp pin.



Repeat last 2 steps and close the reserve side flap (flap #5) and secure with the temp pin.



Close reserve flap #6 and secure with reserve pin. Carefully remove the pull-up cord. Inspect the closing loop to ensure that no damage has occurred during packing. Dress the container. Install the Rigger seal if applicable. Complete all necessary paperwork. Be sure to count all your tools when finished.







# **Closing the Reserve Container with Skyhook (Optional)**

Close flap #2, and secure with temporary pin. Make sure the remaining bridle exits the closed kicker flaps to the wearer's LEFT (Right in photos) of the #2 (upper) flap, with the flex-tab side up.

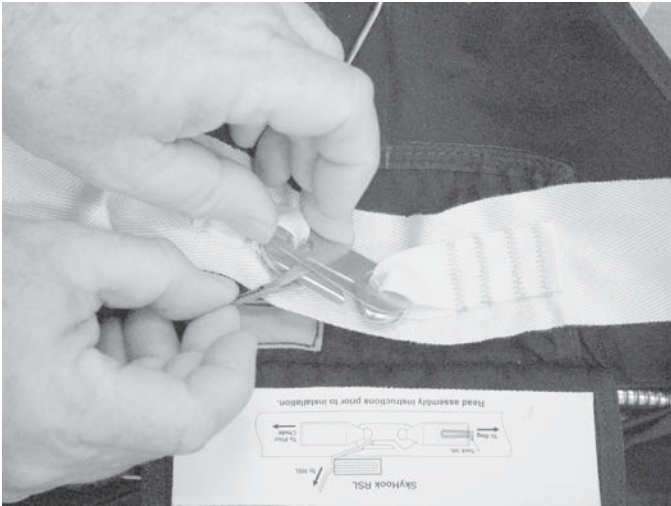


Attach the RED Skyhook lanyard to flap #2 by folding the stiffened section of the lanyard in half, and inserting it completely into the RED pocket on the flap. You may have to open the pocket a little with a pencil before inserting the flex-tab.

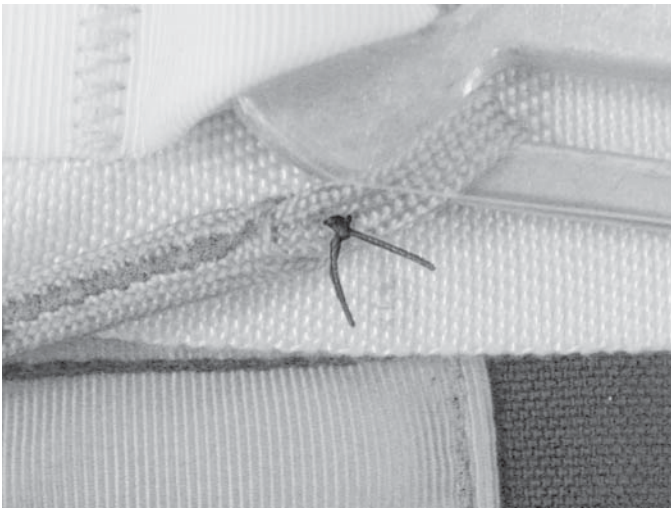


Fold the bridle over the edge of flap #2, and insert the GREEN flex-tab on the freebag bridle into the GREEN pocket on the #2 flap.





Lay the bridle over flap #2 with the Skyhook facing up. Lift the Lexan cover slightly, rotate the Skyhook enough to slip the loop on the end of the red Skyhook lanyard over the Skyhook, and rotate back into position. The Skyhook should be held firmly in place between the two pockets with less than 1/4" of play. (Note: It should take a force of 5-7 lbs. to pull the red or green flex-tab out of its pouch, at a 180 degree angle to the mouth of the pouch.)



Tack the RED Skyhook lanyard to freebag bridle with a single turn of riggers seal thread, and secure with riggers knot.



Close the Skyhook cover flap (2A) over the Skyhook assemblage, pass the reserve closing loop through its grommet.



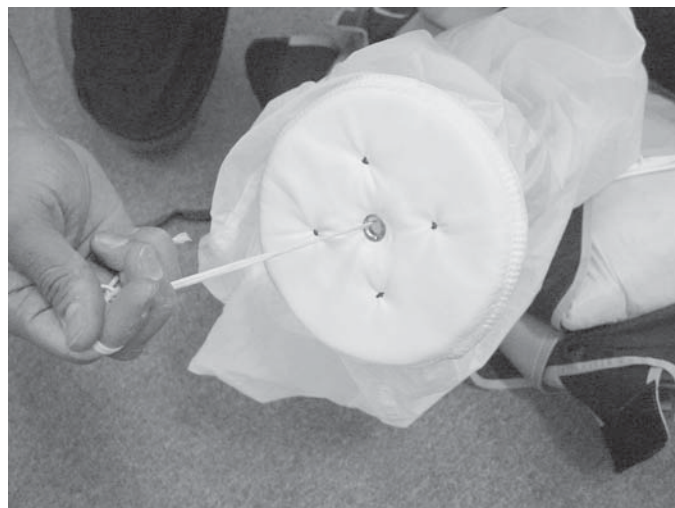
Secure with the temporary pin.



S-fold the remaining 5' of freebag bridle on top of flap 1.



Pass the pull-up cord through the base of the reserve pilot chute and out the grommet in the center of the pilot chute cap. Ensure that the pull-up cord did not pass around any of the spring coils inside.







Apply tension to the pull-up cord and hold the base of the reserve pilot chute centered over the closing loop.



Compress the reserve pilot and secure with the temp pin.



Pull all of the reserve pilot chute material out of the spring coils and ensure that the pilot chute base is centered under the cap.



S-fold the pilot chute material to within 1" of the edge of the pilot chute cap. Close the center flap (flap #3) over the pilot chute and secure with the temp pin.



Repeat the S-fold for the top side of the pilot chute.



S-fold the pilot chute material in preparation for closing flap #4.

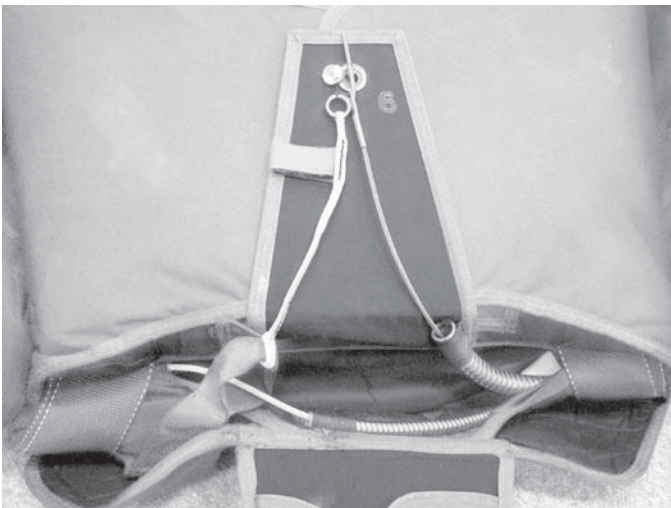




Close the reserve side flap (flap #4) and secure with the temp pin.



Repeat last 2 steps and close the reserve side flap (flap #5) and secure with the temp pin.



Close reserve flap #6 and secure with reserve pin. Carefully remove the pull-up cord. Inspect the closing loop to ensure that no damage has occurred during packing. Dress the container. Install the Rigger seal if applicable. Complete all necessary paperwork. Be sure to count all your tools when finished.







# **Attaching the Toggles**

**TIE ON TOGGLE ATTACHMENT**

Once the canopy has been correctly attached to the risers and while it is still laid on its side, begin to attach the reserve steering toggles using the following steps:

Ensure the steering lines are correctly routed (i.e. they should not wrap around any suspension lines). This is accomplished by starting at the tail of the canopy. Trace the upper steering lines down to the lower steering line. Check that the right hand steering line passes through the right hand rear slider grommet and the left hand steering line passes through the left hand rear slider grommet.

Locate the mark on the steering line that indicates the correct toggle location. Verify correct location of this mark by referring to the reserve canopy owner's manual. Thread the steering line through the guide ring that is located on the riser. Starting from the hook and loop fastener (loop side), thread the end of the steering line through the steering toggle grommet. Adjust the steering line so that the mark (on the steering line) is close to the grommet but has not passed through it.

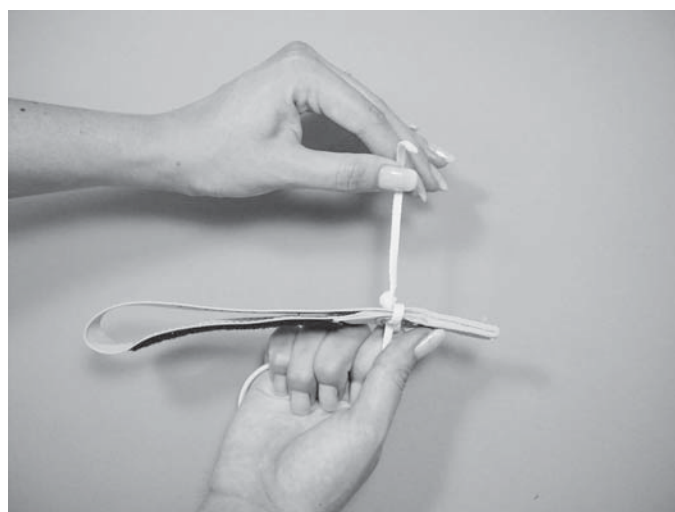
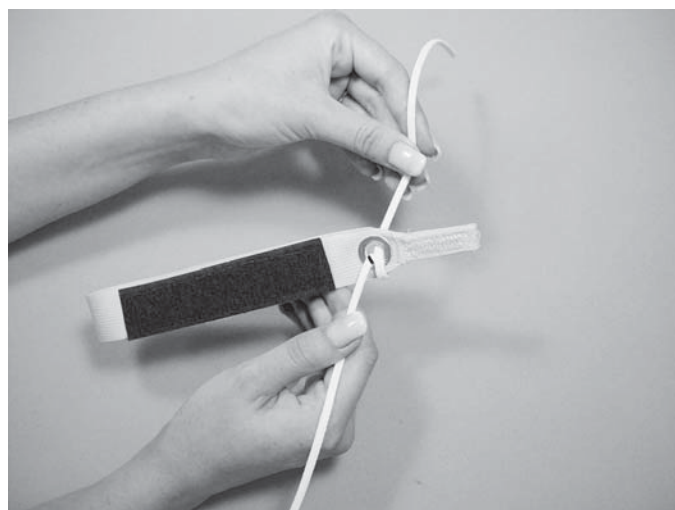
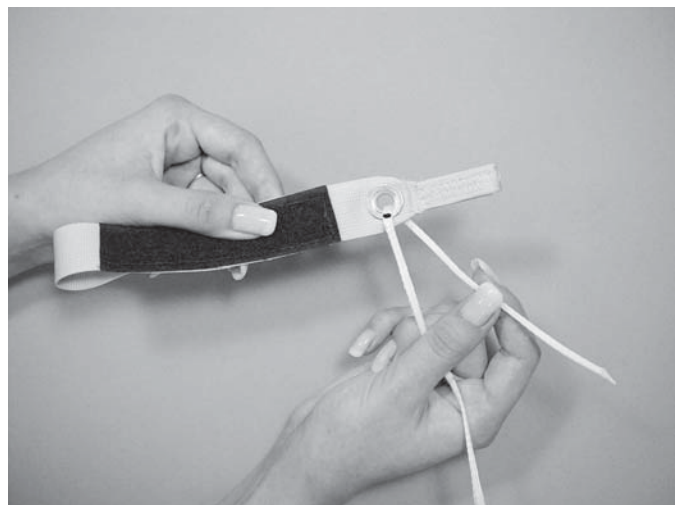
Loop the running end of the steering line around the toggle and thread it through the grommet again. Now pull it snug. Check that the mark remains in the correct place.

Tie an overhand knot in the free end of the steering line and tighten it right down to the toggle. Ensure it is snug for now.

Check the canopy with the deployment brakes set and with both not set to be sure that it is correctly configured. The reserve canopy owner's manual contains the correct brake settings and steering line lengths. Keep in mind that there are NO standardized dimensions. Therefore, unless the lines are the correct length, the canopy may not open or fly correctly.

Verify that the brake setting measurements are correct. Tighten the overhand knot at the toggle once more. It is generally not a good idea to cut off the excess steering line, as you may want to adjust the steering toggles after the canopy has been jumped. Repeat the procedure for the other toggle.

Inspect the installation. Ensure proper routing of the steering lines.



**LARKS' HEAD ATTACHMENT**

Pass steering line through grommet from bottom side.



Thread toggle tip through loop at end of steering line.



Pull steering line tight to secure Larks Head connection.

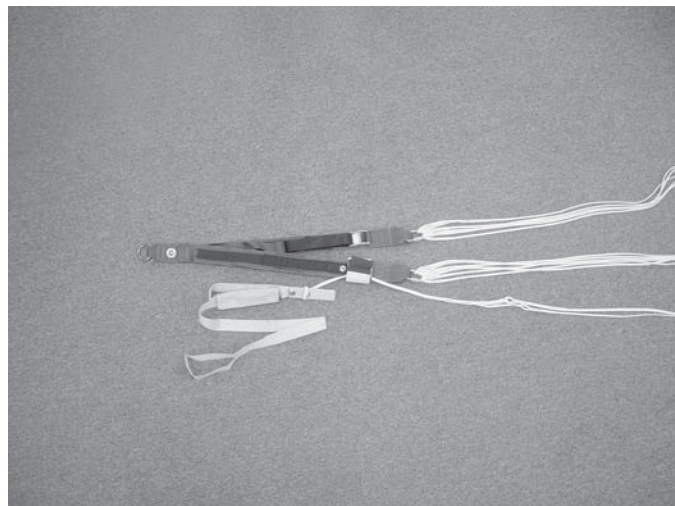




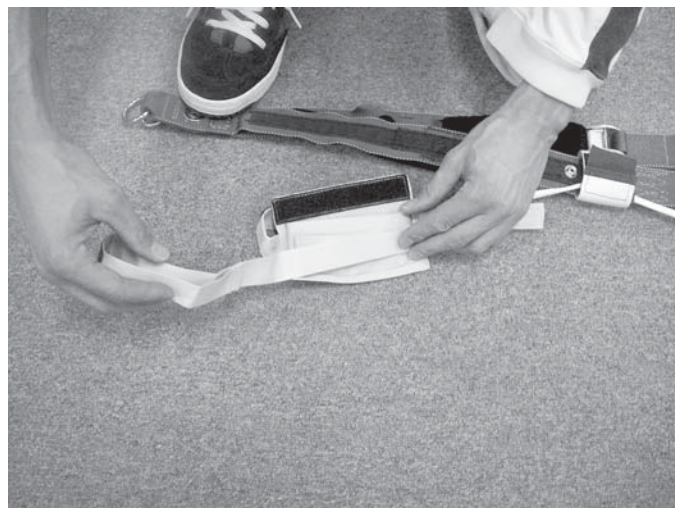


# **Parking the HAHO Toggle Extension (Optional)**

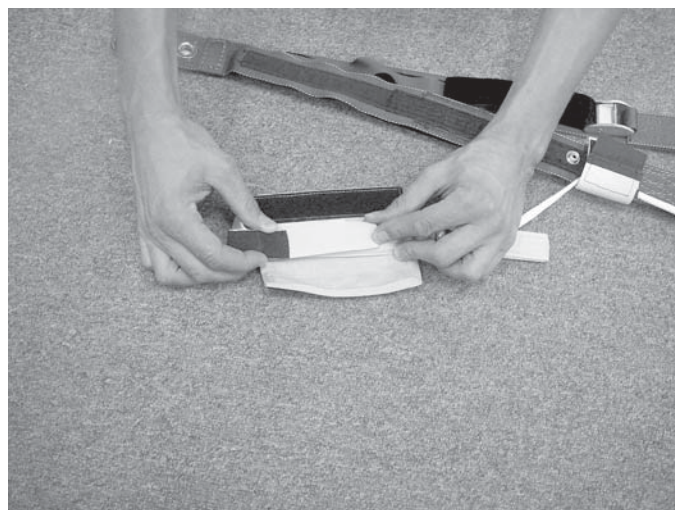
Open Velcro pouch: Before stowing the HAHO extension, lay the risers flat on the ground and open the Velcro pouch.

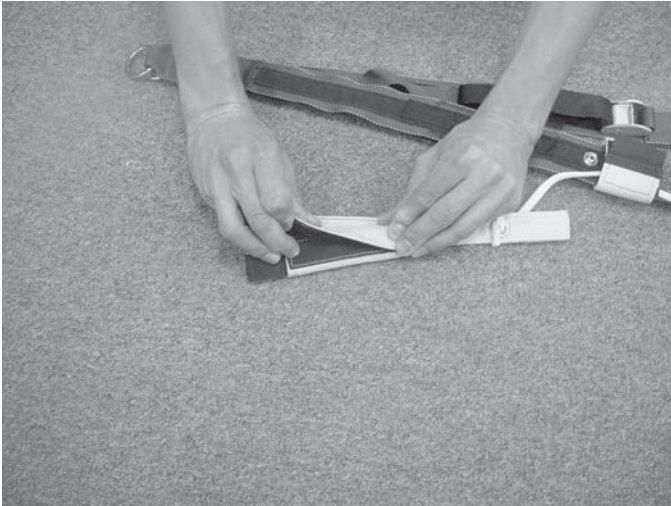


Make S-Folds: S-fold toggle extension to size of pouch.



Lay S-Folds flat: Ensure that the stiffened end of the toggle protrudes 1" from bottom of pouch.





Close the pouch: Mate the Velcro, again checking that the stiffened end of the toggle protrudes 1" from bottom of pouch.







# **TV3 Disk Release Closing Sequence (Optional)**

Pack canopy according to manufacturer's specifications. S-fold excess suspension line into the main pack tray.



Hold the main top flap out of the way to insert the main bag.

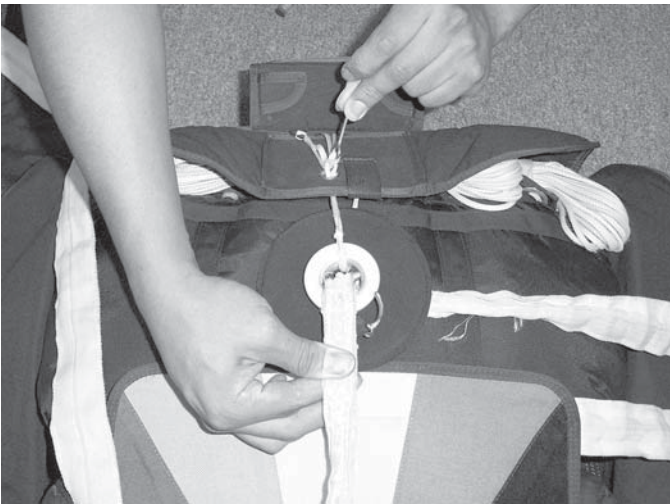


Place main bag into the main container. Rotate the main bag such that the lines are against the bottom main flap and the bridle exit point is towards the reserve container.





You may secure the disk with the main closing loop to assist in cocking the drogue.



The main loop is held in place with the main pin.



Extend the bridle to full length.



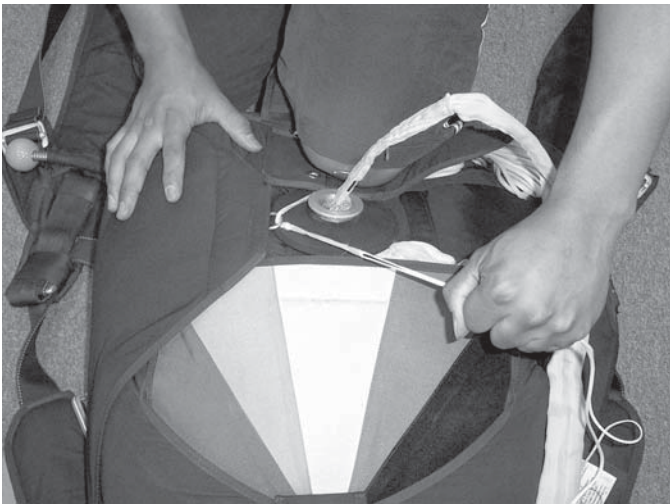
Be sure cock the drogue fully.



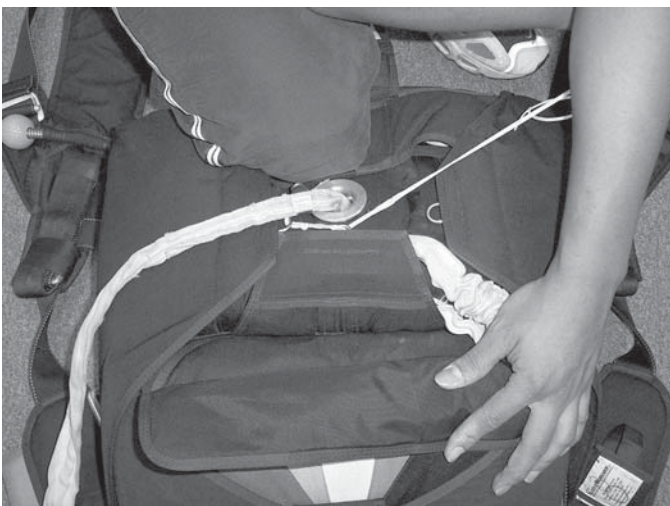




Be sure that you remove the main closing loop from the center of the disk. Place the drogue disk in the center of the pack tray. Note the orientation of the drogue bridle and ensure that the arrow on the disk faces towards the top of the rig.



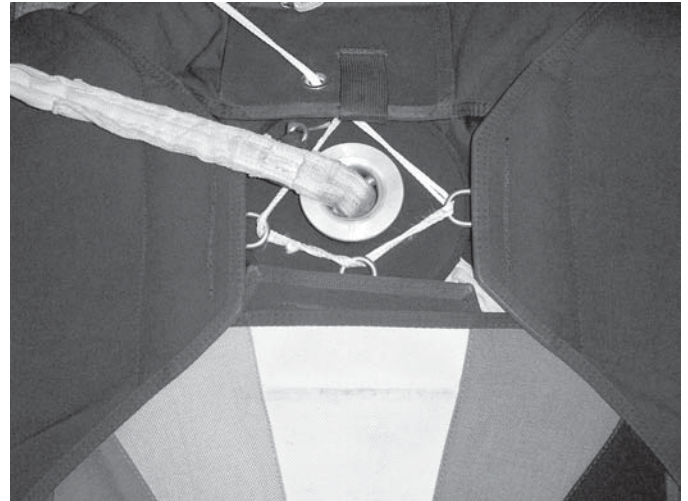
Thread a spectra main pull up cord through the main closing loop and pass the pull up cord through the right side closing flap.



Pass the pullup cord through the top main closing flap.



Pass the pullup cord through the left main closing flap and then through the bottom main flap. Ensure that the main closing loop does not pass over the drogue bridle.



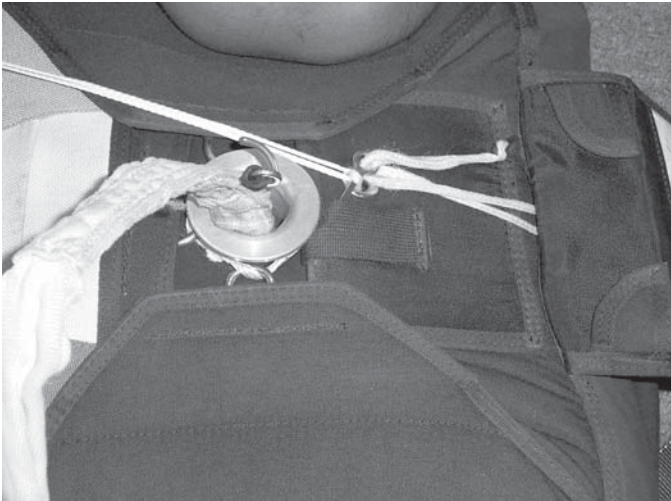
To assist in closing, you may wrap the pullup cord around a handle.



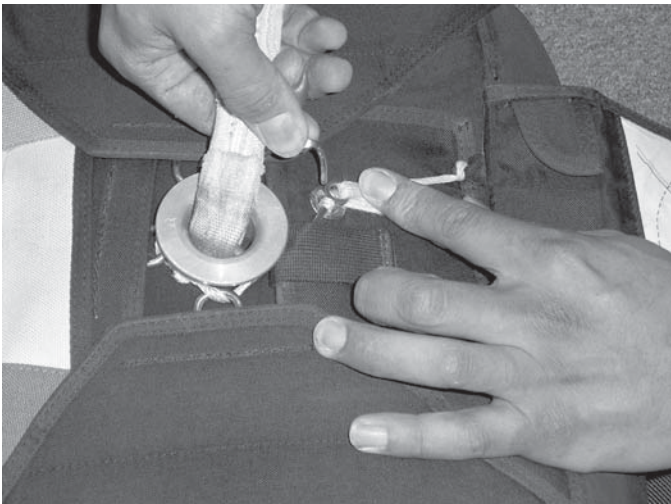
Pull the closing loop through the bottom main flap and insert the main pin.







Orient the main pin to allow the safety pin to be inserted.



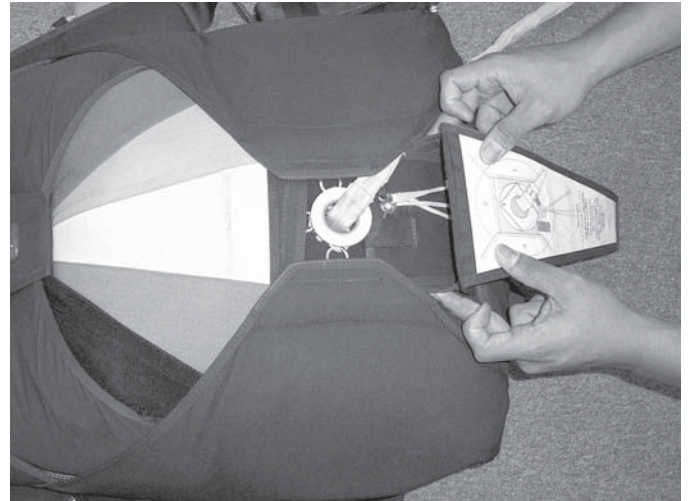
Insert the safety pin through the eye of the main pin and down through the grommet.



There should be no twists in the recoil ripcord below the main pin.



Inert the two main disk cover tuck-tabs.



Tuck the drogue bridle under the right main side flap.



Insert the end of the main disk cover into the center flap pocket.



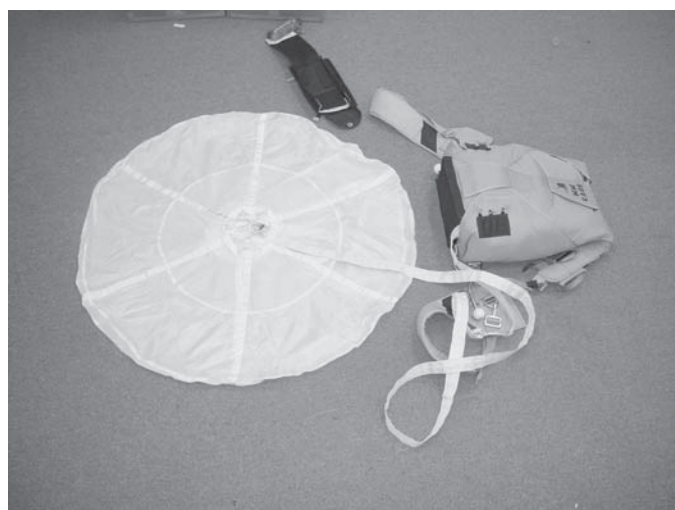


# **TV3 Static Line Drogue Main Closing (Optional)**

Close container according the Disk Release Closing chapter in this manual. Ensure that the drogue bridle is tucked under the right side main flap.

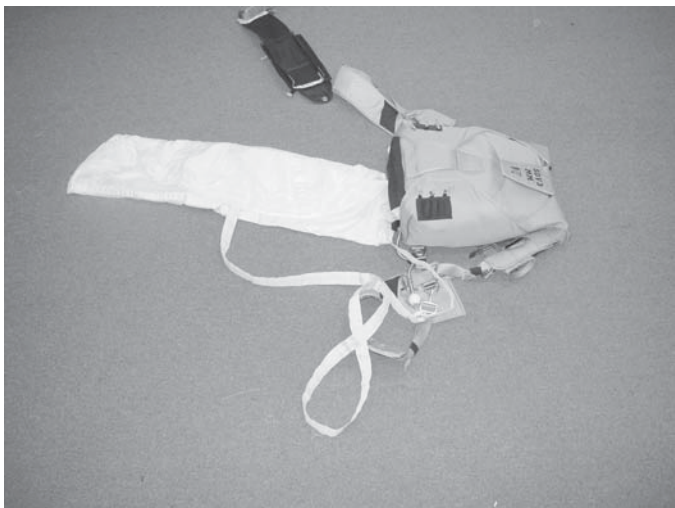


Lay out and position the drogue in preparatin for folding.



Fold one half of the drogue over the other half.





Fold the drogue in half again such that the bridle exits adjacent to the drogue handle.



Fold the remaining drogue material in thirds towards the center.



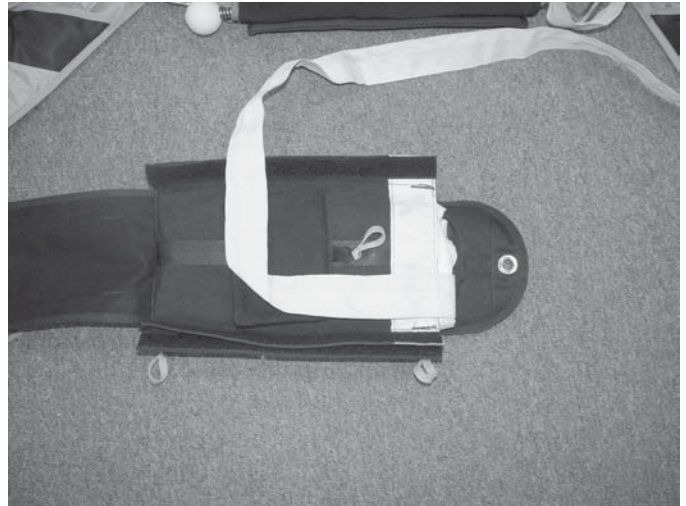
Fold or roll the drogue material again to achieve a width of 6-7 inches.



Insert the folded drogue into the static line drogue pouch. Be sure the bridle exits out the top.



Fold the drogue bridle back in preparation for closing the pouch.



Close the drogue pouch flap and secure it with the rubberband. A needle fold in the bridle and a double wrap of the rubberband are used to secure the flap.







Attach the static line drogue pouch to the bottom velcro strip on the container.



Be sure to fully mate both sides of the velcro strip.



Fold the burn protection flap over the rubberband and needle fold securing the pouch.



Fold the remaining drogue bridle from side to side against the bottom of the static line drogue pouch.



Position the bridle cover flap.



Mate the bridle cover flap velcro to secure the flap in position.







Attach the static line drogue pouch to the top velcro strip on the container. Be sure to fully mate both sides of the velcro strip.



If so equipped you may stow the static line and clip on top of the main container in either of the following methods. Double stow-banding is necessary to maintain control of static line.

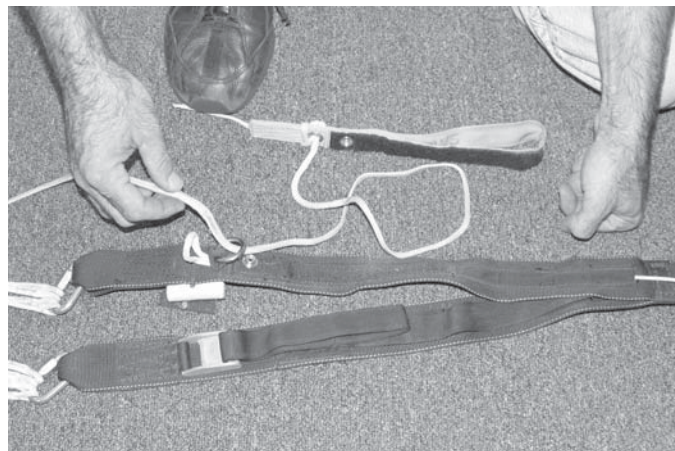




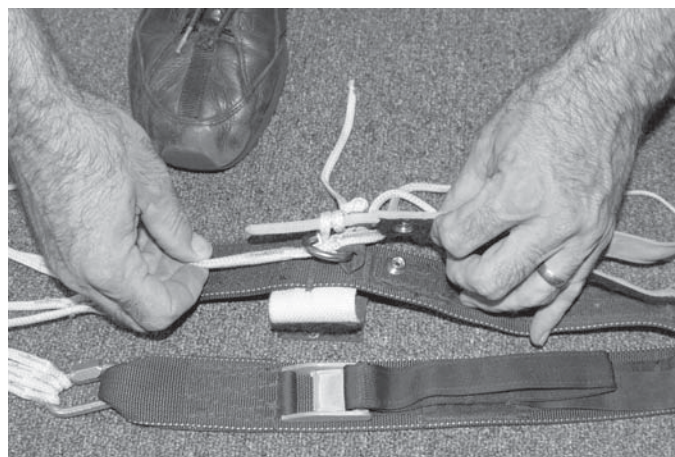


# **TV3 Dual Bag Main Closing (Optional)**

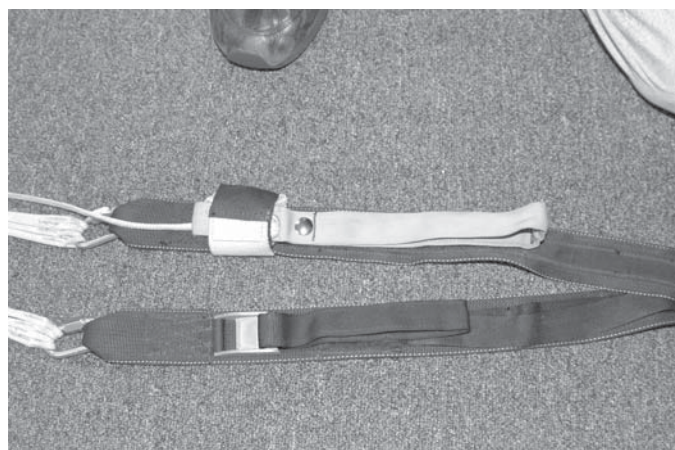
End of steering line is passed through the grommet and looped over the toggle tip.

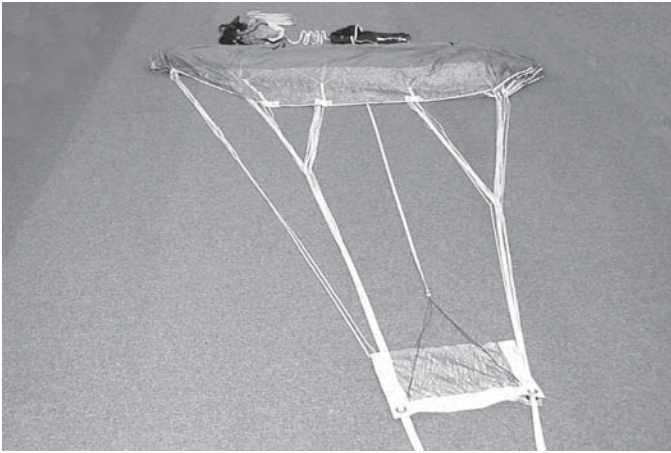


Pull steering line break setting through the guide ring. Pass the brake setting loop through the steering line cats eye and insert the toggle tip.

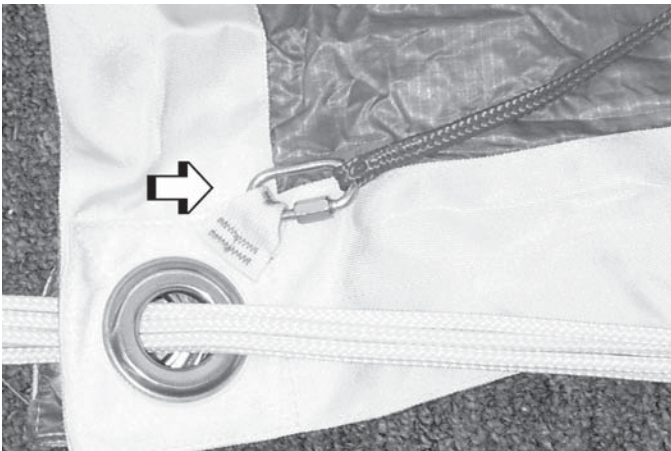


Mate the snap and the Velcro to secure the toggle. Stow the excess break line along side the toggle tip and secure with the velcro cover.

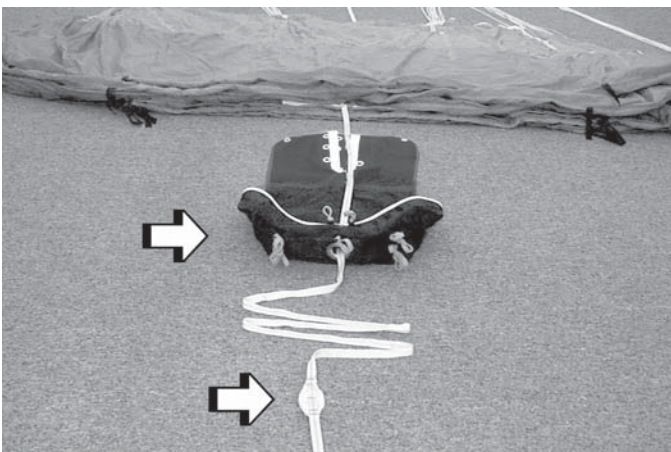




Lay the canopy out on its side as shown. The entire parachute system should be inspected for damage and excessive wear before being packed. The dual bag deployment system should also be checked to verify that it has been assembled correctly.



Verify that each of the four lower bridle lines are attached to the slider.

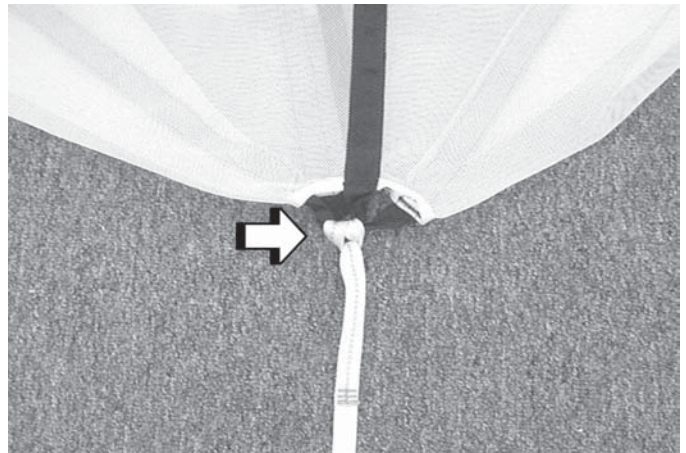


Verify that the bridle passes through the grommet at the top of the inner deployment bag, and that the inner deployment bag is located between the canopy and the bag stop on the bridle.





Verify that the bridle is attached to the pilot chute with a lark's head knot.



The static line should be attached to both webbing loops on the top of the outer deployment bag using a lark's head knot.

Thread the webbing loop at the top of the pilot chute through the grommet at the top of the outer deployment bag. Use a single piece of 80 lb. cotton breakcord to attach the webbing loop on the pilot chute to the static line.



Split the nose of the canopy in half as shown.







Roll the outside cells in toward the middle of the center cell as shown.

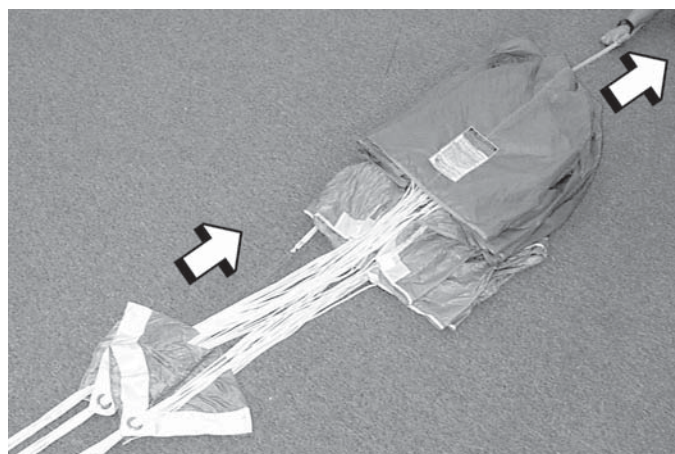
The outside cells should be rolled directly onto the center cell fabric. It is not necessary or advisable to pull the center cell out from between the rolls to expose the center cell.



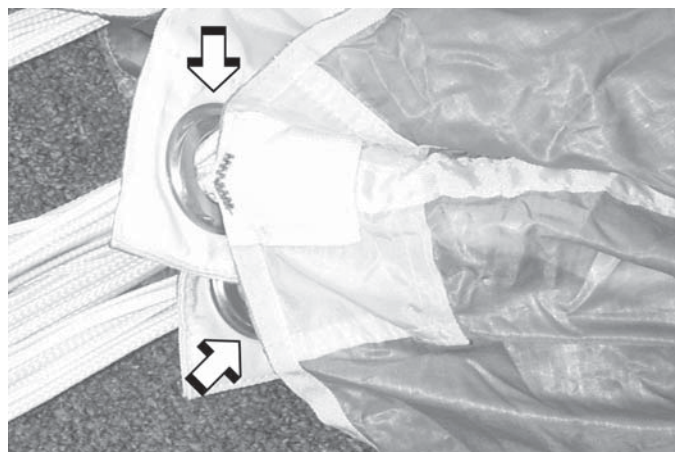
Fold the canopy using a standard side pack method, stacking the line groups on top of one another. Be sure to set the deployment brakes according to the harness and container manufacturer's instructions.



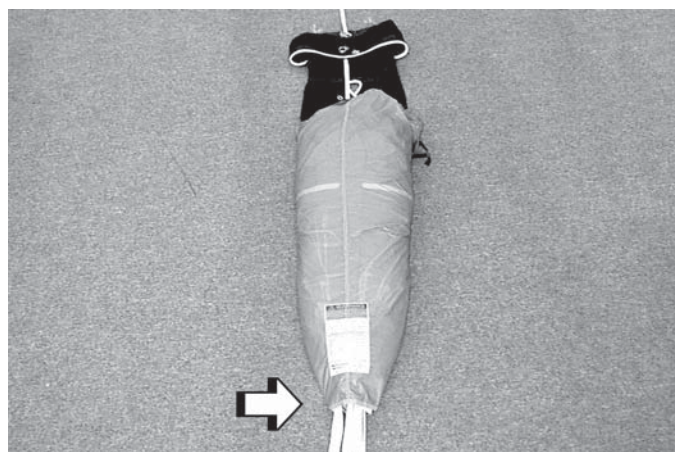
Pull the slider up against the bottom of the stabilizers by slowly pulling the bridle out through the top of the canopy.



Verify that all four slider grommets are seated firmly against the slider stops sewn into the stabilizers of the canopy.



Pull the trailing edge down to cover the slider and bottom edge of the stabilizers. Dress the canopy to the width of the inner deployment bag.



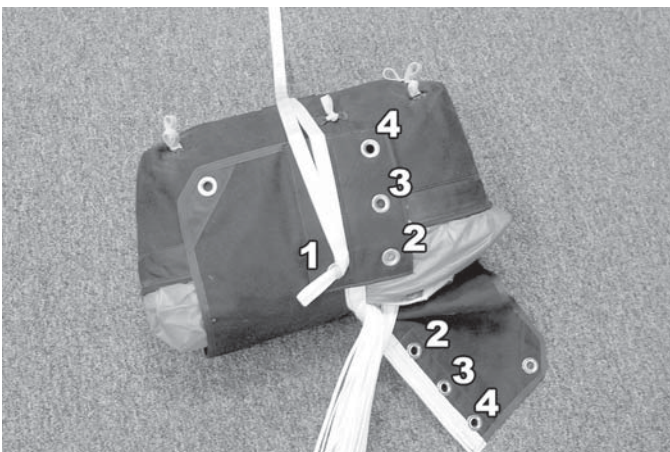
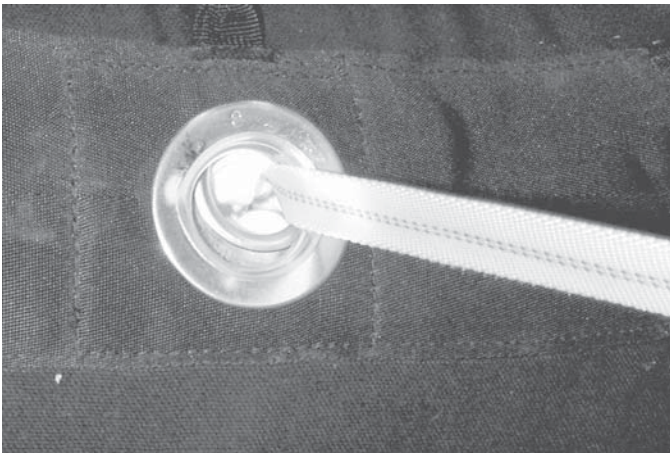




S - fold the canopy, making sure the slider grommets remain seated against the slider stops. The grommet and white cotton patch on the top skin of the canopy must remain visible when the canopy is S - folded.

**WARNING:**

When the canopy is placed in the inner deployment bag, the grommet at the top of the canopy must be placed directly against the grommet on the inner deployment bag. There must not be any fabric caught in between the two grommets. **If the grommets are not positioned together, or if fabric is left between the grommets, the canopy will be damaged during deployment.**

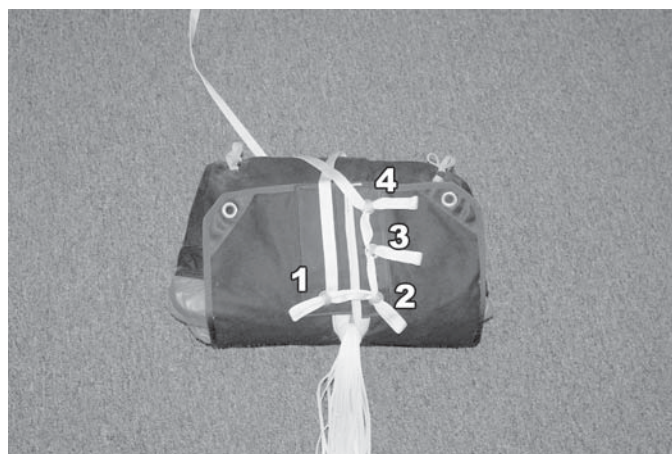


Close the inner deployment bag. Thread each elastic stow band on the bag through the grommets on the closing flaps as shown. The first four stow bands should be threaded through two grommets, one on each closing flap.

All elastic bands on the inner deployment bag should be Keener Rubber Company 2 X 3/8" (standard size) bands or equivalent.



Each elastic stow band should be secured by a 1" to 1 1/2" bight of bridle. Each band should be wrapped twice around the bight of bridle.



Secure the two grommets at the top corners of the bag.

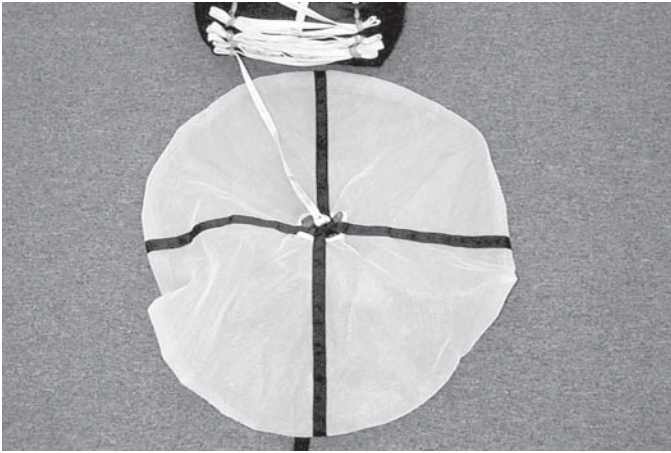


Stow the remainder of the bridle in the elastic bands at the top of the deployment bag. Leave 20" to 24" of bridle unstowed between the last elastic band and the pilot chute.





Fold the pilot chute as shown.



Stow the pilot chute on the inside of the outer deployment bag using Keener Rubber Company 2 X 3/8" (standard size) bands or equivalent. Cut rubber band in half length wise, making it 2 X 3/16".

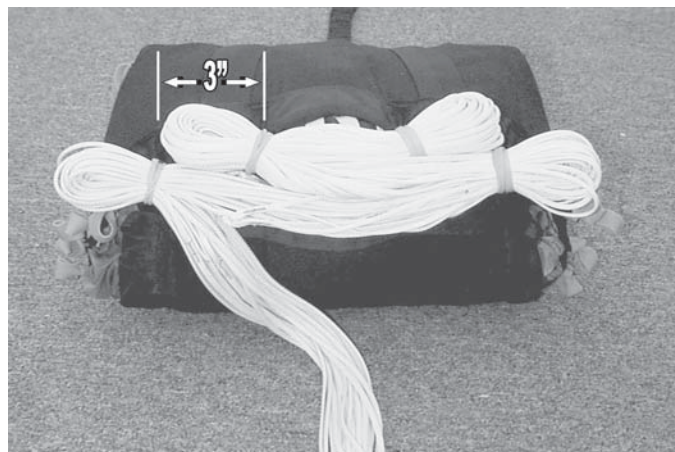
The pilot chute should remain secured to the static line as shown in second picture on page 72.



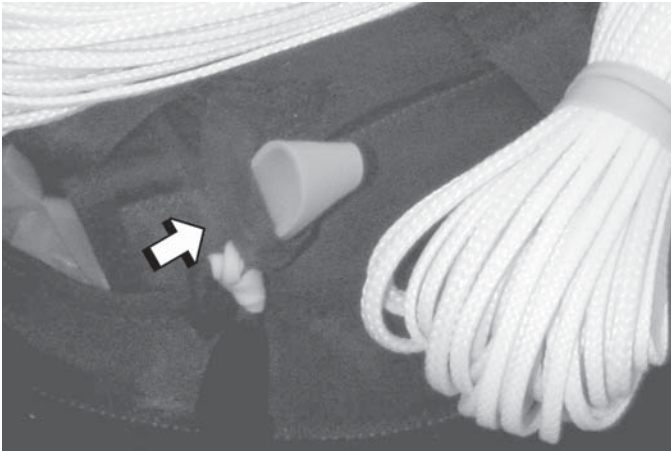
Put the inner deployment bag into the outer deployment bag. The unstowed length of bridle between the pilot chute and inner deployment bag should be neatly S - folded inside the outer deployment bag.



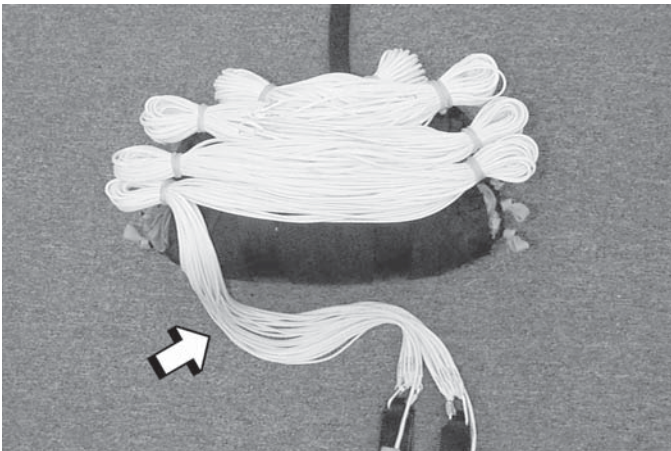
Close the outer deployment bag using Keener Rubber Company 2 X 3/4" ("tandem" size) bands or equivalent. The bights of line in the stow bands should be 2 1/2" to 3" long, and each band should be wrapped twice around the bight of line if possible.







Note: When closing the outer bag, each stow band should be passed through a webbing loop on the outer bag closing flap before being wrapped around the line bight.



Leave at least 18" of line unstowed between the last elastic band and the risers.



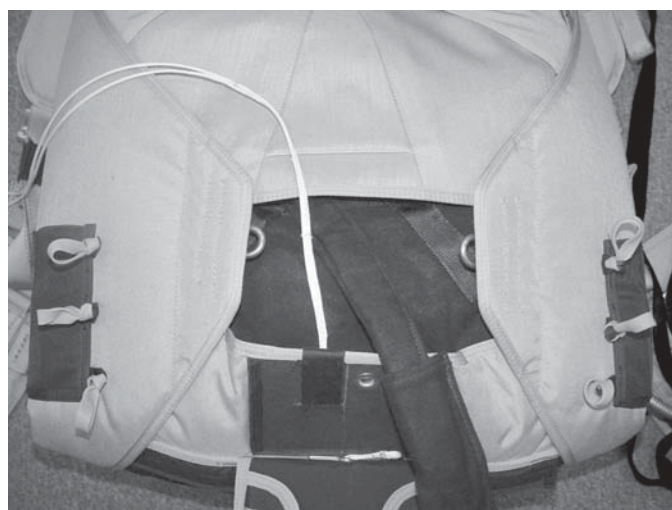
Route the main risers. Move the bag over the container without twisting the bag. Route the main risers flat against the side of the reserve container.



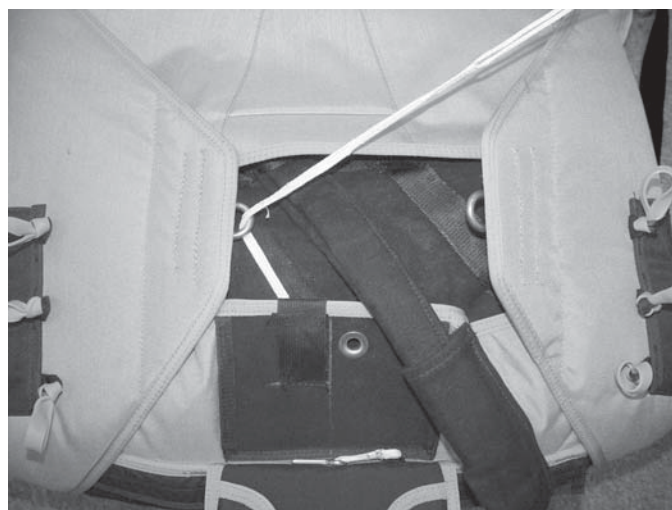
Place main bag into the main container. rotate the main bag such that the lines are against the bottom main flap and the bridle exit point is towards the reserve container. A bite of suspension line is stowed on the top upper corners of the main bag to hold the risers in the proper elevated position. The line bite should be within 3" of the connector links as shown.



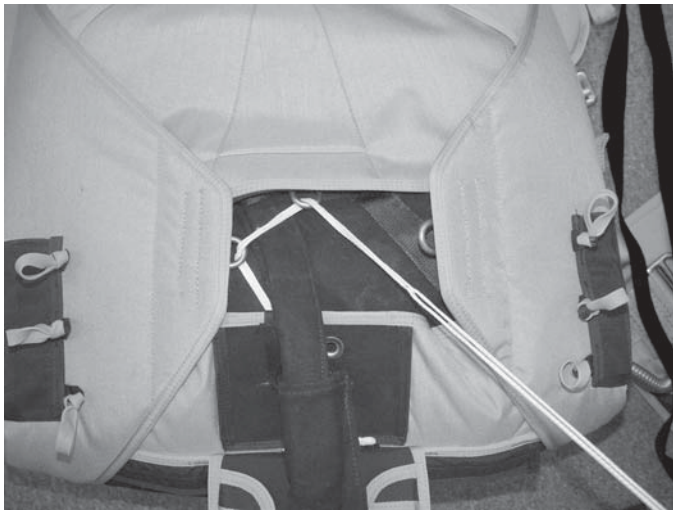
Fold the main side flaps over in preparation for closing. Insert a spectra pullup cord into the main closing loop.



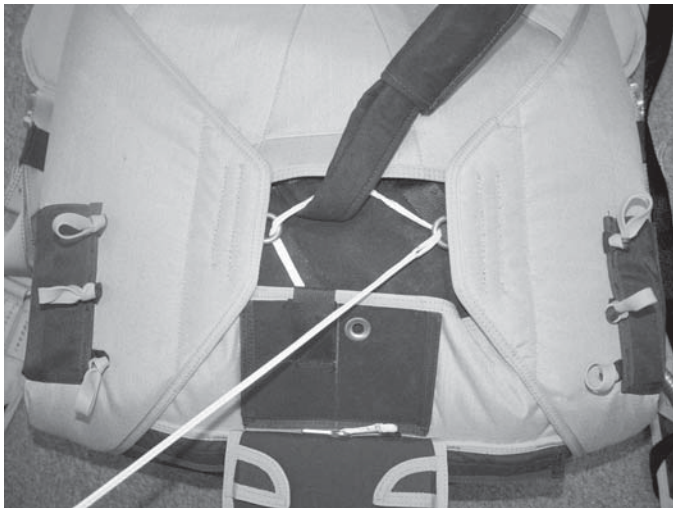
Route the pullup cord through the left side main closing flap. Loop routing is reversed due to larger bulk of double bag system.



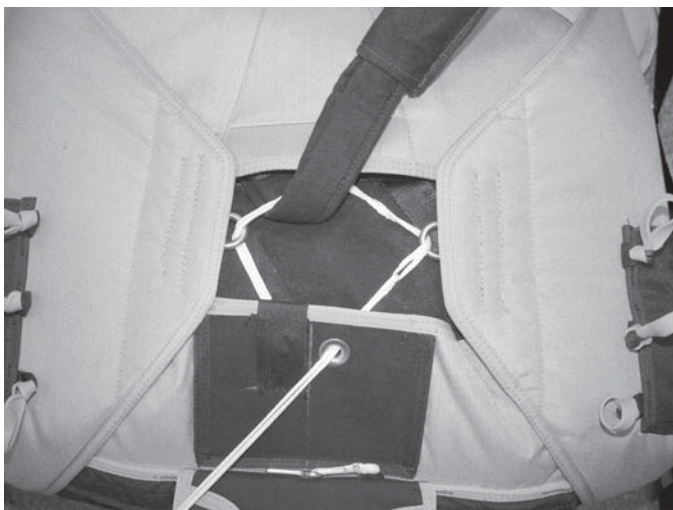




Route pullup cord through the top main closing flap.



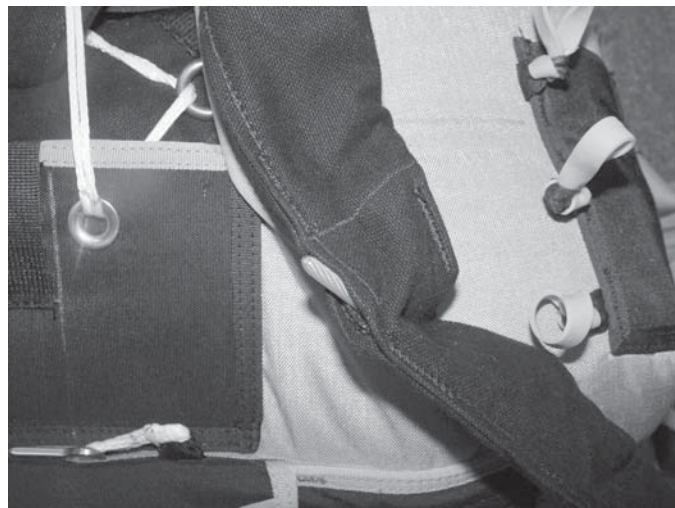
Route pullup cord through the right side main closing flap.



Route pullup cord through the bottom main closing flap. Ensure that the main closing loop does not pass over the static line bridle.



The main flex pin may be found inside the static line protector sleeve. Pull the sleeve back to expose the flex pin.



Secure the main closing loop with the main flex pin.



The static line material between the main bag and the main flex pin is stowed under the center flap.

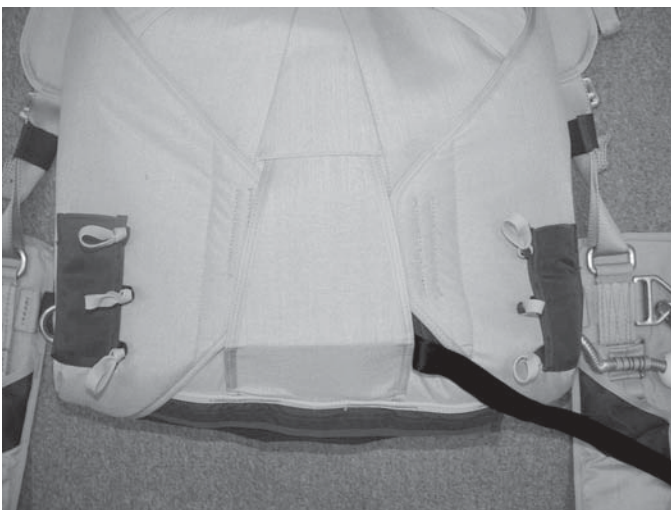




Position the center flap over the stowed bridle.



Stow the remaining length of protected bridle sleeve under the right side main closing flap.



Secure the two main disk cover tuck-tabs and insert the end of the flap in to the center flap.





Stow the remaining static line on top of the main container, double stow band the static line bites, and place the static line clip into the pocket.



A completed pack job.





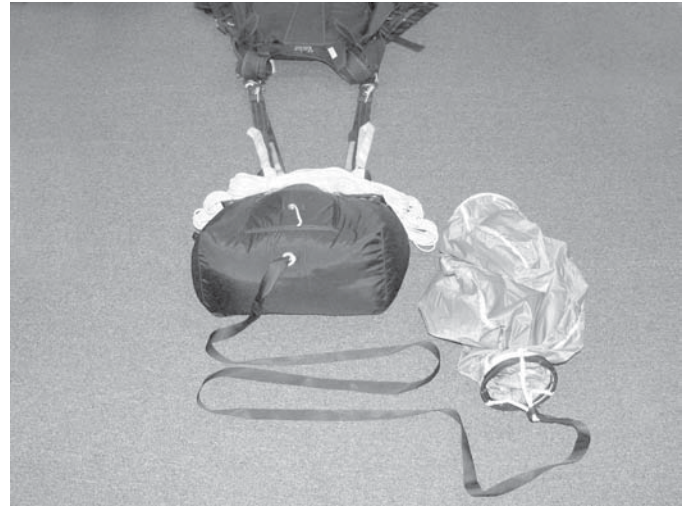
# **Closing the Main Container with Spring Loaded Pilot Chute (Optional)**

**CLOSING THE MAIN CONTAINER WITH  
SPRING LOADED PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2 03MAR2005

REV 2

Pack the main canopy according to the canopy manufacturer's instructions: Be sure to distribute the bulk of the pack job evenly within the bag.



Place the main bag into the main container. The lines should be towards the bottom main container flap.



Position and stow the main risers and suspension line. Push the bottom corners of the main bag into the container, followed by pushing the top side of the bag into the container.



**CLOSING THE MAIN CONTAINER WITH  
SPRING LOADED PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2



S-fold the bridle on top of the main bag above the closing loop.



Pull the closing loop through the pilot chute with the pull-up cord until the loop comes through the grommet. Ensure that the pull-up cord and closing loop do not pass to the outside of the spring coils.





**CLOSING THE MAIN CONTAINER WITH  
SPRING LOADED PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2 03MAR2005

REV 2

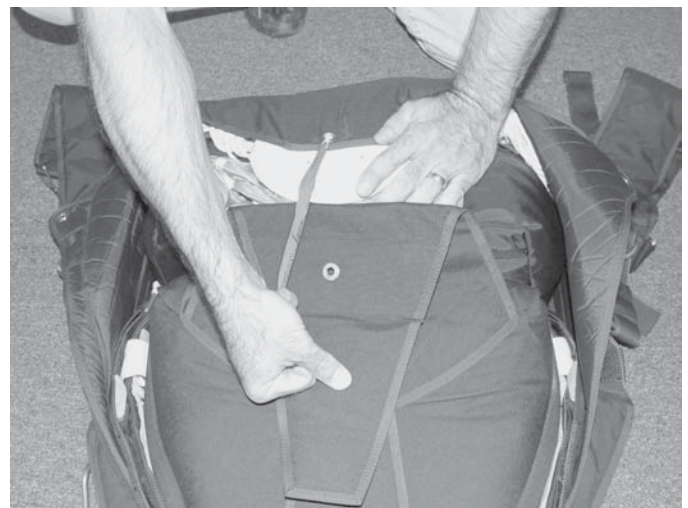
Pull directly up on the pull-up cord and compress the pilot chute down. Ensure that the base of the pilot chute is centered on the kicker plate.



Keep all pilot chute material within 2" of the pilot chute cap.



Close the bottom flap.

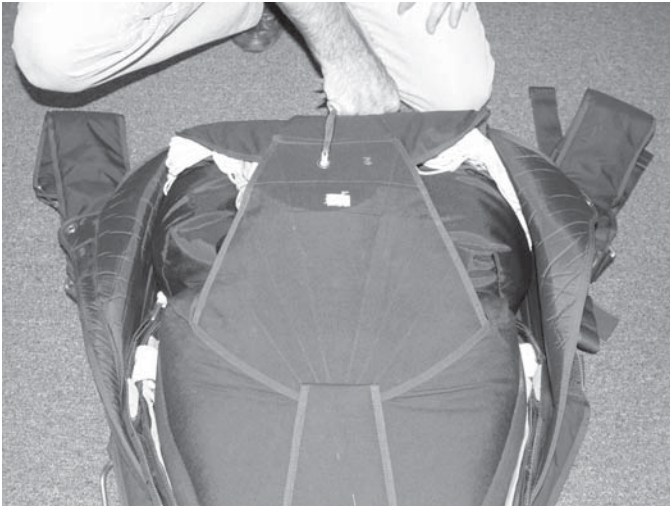


**CLOSING THE MAIN CONTAINER WITH  
SPRING LOADED PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2



Close the top flap (flap #2)



Then the right flap (flap #3)

Note: The grommet on the top flap will be offset towards the next flap in the closing sequence.



Close the left side flap (flap #4). Insert the main pin. Carefully remove the pull-up cord. Close the main pin cover flap.







**Static Line Main Closing  
Pilot Chute Assist  
(Optional)**

Divide the pilot chute assist breakaway strap into the two halves. Attach (half- hitch) the hook side of the velcro to the end of the static line.



Attach (half- hitch) the pile side of the velcro to the 3 bridle attachment points at the base of the main spring loaded pilot chute.



(Con't)





Route the main bridle through the main bag and attach to parachute bridle attachment point with a Lark's Head.



Once the assembly is complete, pack the canopy according to the canopy packing instructions.

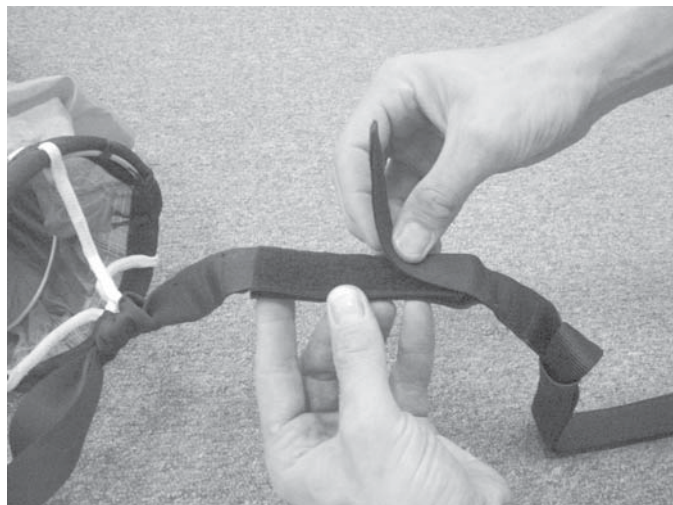


Attach the main closing loop to the loop attachment point on the main bag. The length of the closing loop should be approximately 2 inches.





Connect the static line to the base of the spring loaded pilot chute by mating the velcro of the breakaway strap firmly.



S-fold the bridle on top of the main bag. Place breakaway strap on top the S-folded bridle and rout the static line out of the main container. See 5A.



Attach a pull-up cord to the main closing loop and rout the pull-up cord through the spring loaded pilot chute. Place the pilot chute on top of the S-folded bridle on the main bag.





Compress the pilot chute and secure with the temporary closing pin.



Close top and bottom flap simultaneously. Note: It may be needed to warp the pull-up cord around a rod in order to pull flaps closed. Secure with temporary closing pin.



Close remaining flaps in the sequence indicated by the number on the flaps. Secure with flex pin on static line. Refer to 7A through 9A for stowing the static line.



Find rubber band attachment points intended for stowing the static line.

Note: Continue to 12B for alternative static line stowing method.

Make the first stow with only one fold of the static line and rubber band wrapped very tight (three wraps).



Continue stowing the static line across the main container. The second and third stow should be with a single fold as well, with rubber bands tight.



After evenly distributing and stowing the remaining static line, park the static line clip in the clip pouch. Note: Some systems are equipped with pouches on either side.







Static line should be firmly stowed to the rig when done. Please, ensure that you account for any packing tools that may have been used.





**TV3 Hand Deploy Pilot Chute  
Main Closing  
(Optional)**



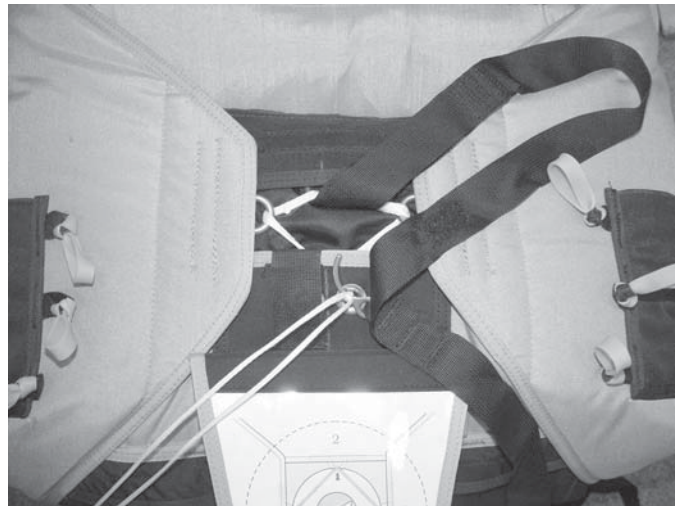
**TV3 MAIN CLOSING SEQUENCE:  
HAND DEPLOY PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2

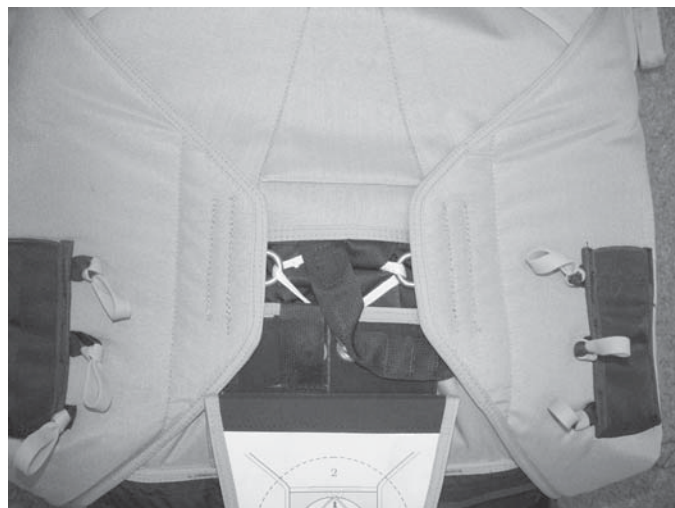
Close the main container flaps in the following order; Bottom, Right Side, Top, Left Side, Bottom. Ensure that the main closing loop does not pass over the pilot chute bridle. Secure the main closing loop with the curved main pin.



The pilot chute bridle between the main bag and the curved main pin is stowed under the center flap. Tuck the pilot chute bridle under the right side main closing flap.



Insert the two main disk cover tuck-tabs.



**TV3 MAIN CLOSING SEQUENCE:  
HAND DEPLOY PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2



Insert the end of the main disk cover into the center flap pocket.



Tuck the pilot chute bridle under the pilot chute bridle protector flap.



Position and prepare the main pilot chute for folding. Fold the pilot chute in half.



**TV3 MAIN CLOSING SEQUENCE:  
HAND DEPLOY PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2

Fold the pilot into thirds towards the center.



Fold the pilot chute in half again.



Fold or roll the pilot chute to 3-4 inches wide.





**TV3 MAIN CLOSING SEQUENCE:  
HAND DEPLOY PILOT CHUTE**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2



Insert the pilot chute into the BOC pouch which is



inside the drogue pouch.



Ensure that only the pilot chute handle sticks out of the pouch and that the bridle is fully covered.

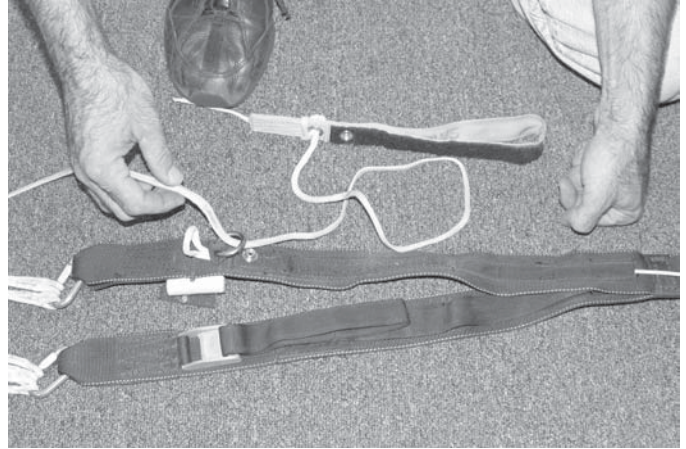




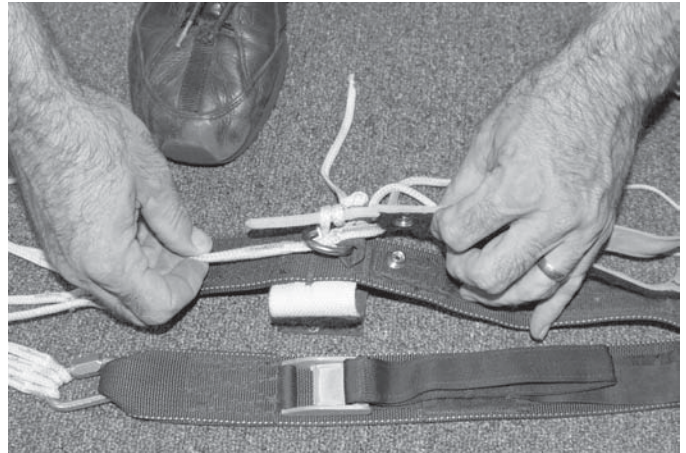


# **Dual Bag Main Closing (Optional)**

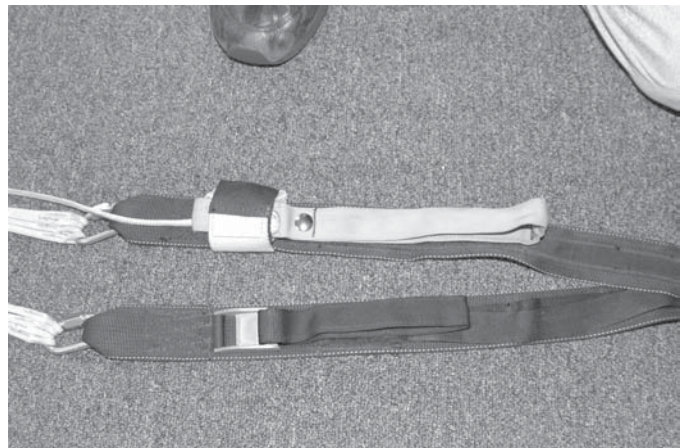
End of steering line is passed through the grommet and looped over the toggle tip.

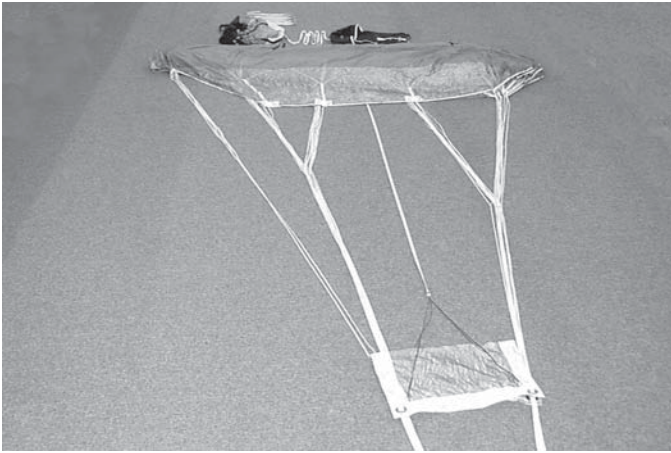


Pull steering line break setting through the guide ring. Pass the brake setting loop through the steering line cats eye and insert the toggle tip.

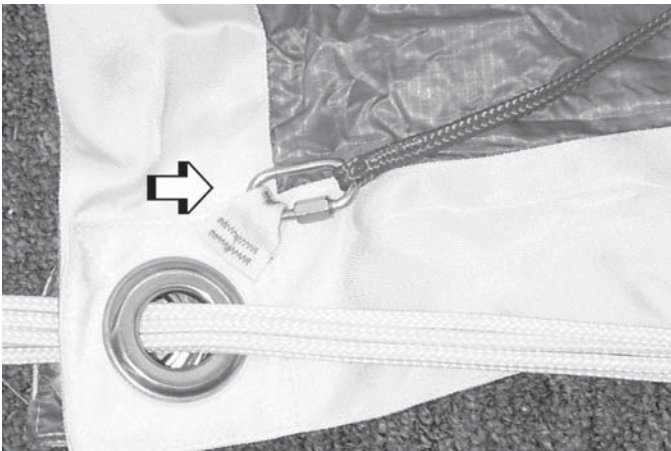


Mate the snap and the Velcro to secure the toggle. Stow the excess break line along side the toggle tip and secure with the velcro cover.

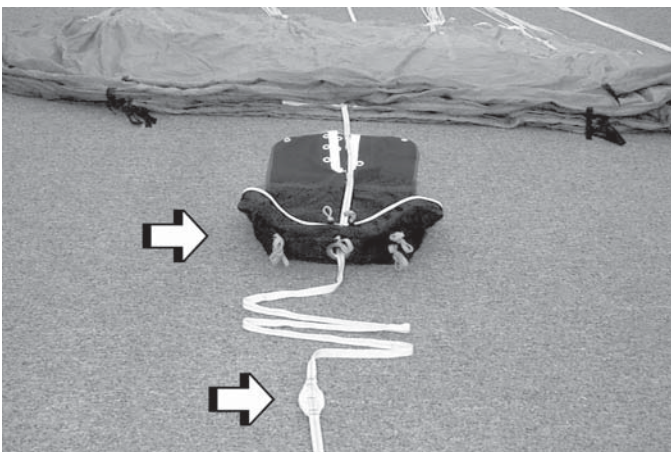




Lay the canopy out on its side as shown. The entire parachute system should be inspected for damage and excessive wear before being packed. The dual bag deployment system should also be checked to verify that it has been assembled correctly.



Verify that each of the four lower bridle lines are attached to the slider.

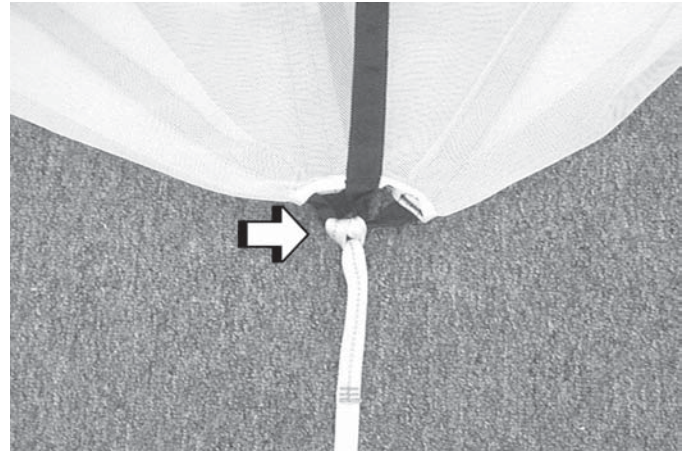


Verify that the bridle passes through the grommet at the top of the inner deployment bag, and that the inner deployment bag is located between the canopy and the bag stop on the bridle.





Verify that the bridle is attached to the pilot chute with a lark's head knot.



The static line should be attached to both webbing loops on the top of the outer deployment bag using a lark's head knot.

Thread the webbing loop at the top of the pilot chute through the grommet at the top of the outer deployment bag. Use a single piece of 80 lb. cotton breakcord to attach the webbing loop on the pilot chute to the static line.



Split the nose of the canopy in half as shown.





Roll the outside cells in toward the middle of the center cell as shown.

The outside cells should be rolled directly onto the center cell fabric. It is not necessary or advisable to pull the center cell out from between the rolls to expose the center cell.

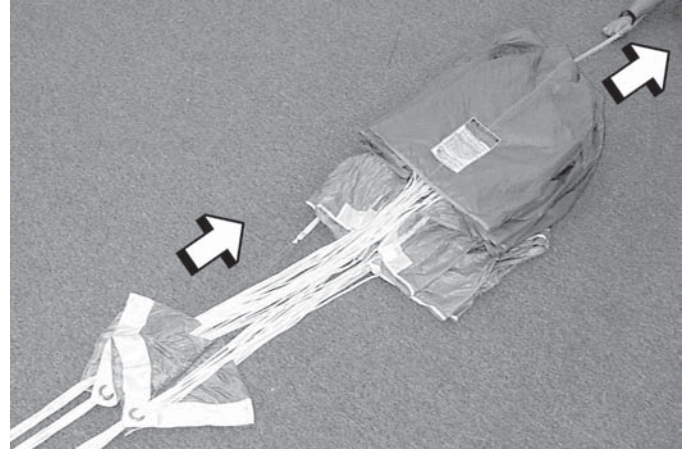


Fold the canopy using a standard side pack method, stacking the line groups on top of one another. Be sure to set the deployment brakes according to the harness and container manufacturer's instructions.

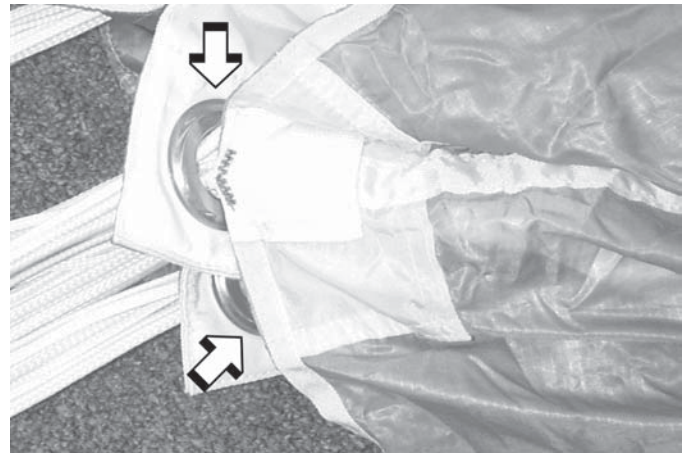




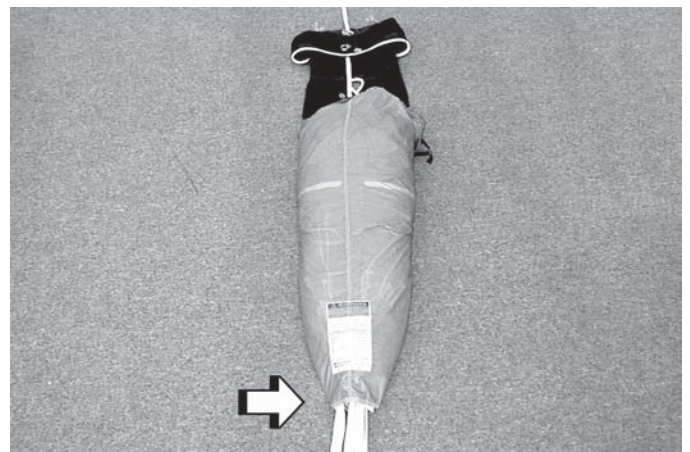
Pull the slider up against the bottom of the stabilizers by slowly pulling the bridle out through the top of the canopy.



Verify that all four slider grommets are seated firmly against the slider stops sewn into the stabilizers of the canopy.



Pull the trailing edge down to cover the slider and bottom edge of the stabilizers. Dress the canopy to the width of the inner deployment bag.

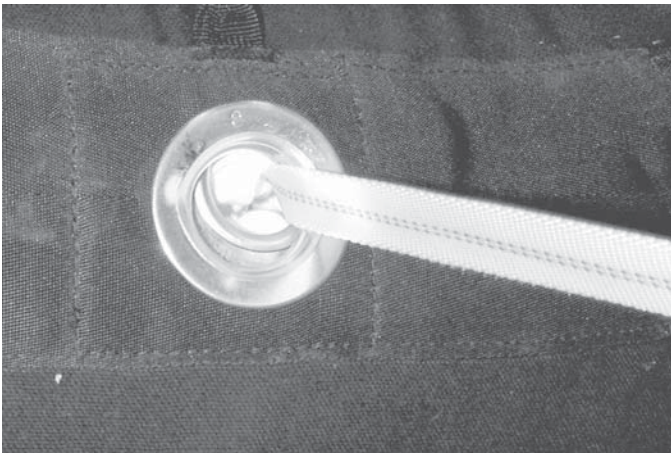




S - fold the canopy, making sure the slider grommets remain seated against the slider stops. The grommet and white cotton patch on the top skin of the canopy must remain visible when the canopy is S - folded.

**WARNING:**

When the canopy is placed in the inner deployment bag, the grommet at the top of the canopy must be placed directly against the grommet on the inner deployment bag. There must not be any fabric caught in between the two grommets. **If the grommets are not positioned together, or if fabric is left between the grommets, the canopy will be damaged during deployment.**



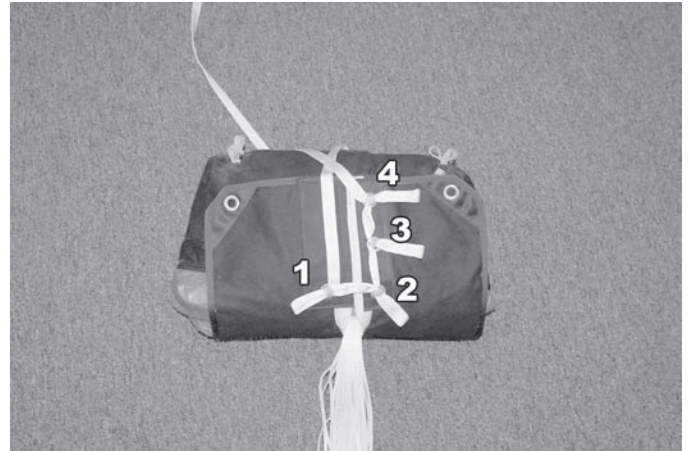
Close the inner deployment bag. Thread each elastic stow band on the bag through the grommets on the closing flaps as shown. Stow bands, represented by numbers 2, 3, and 4 in photo, should be threaded through two grommets, one on each closing flap.

All elastic bands on the inner deployment bag should be Keener Rubber Company 2 X 3/8" (standard size) bands or equivalent.

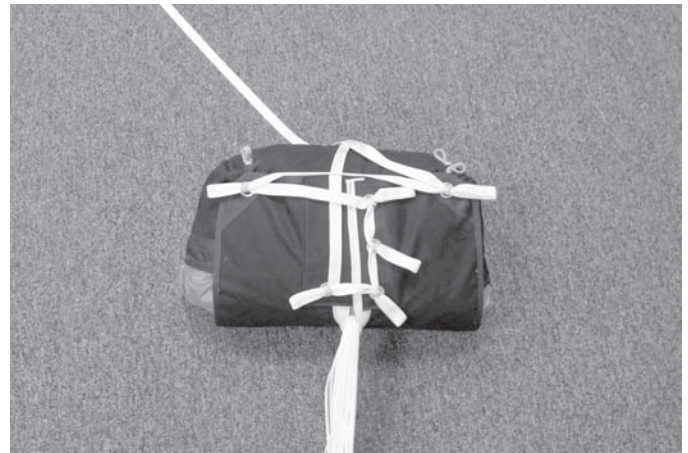




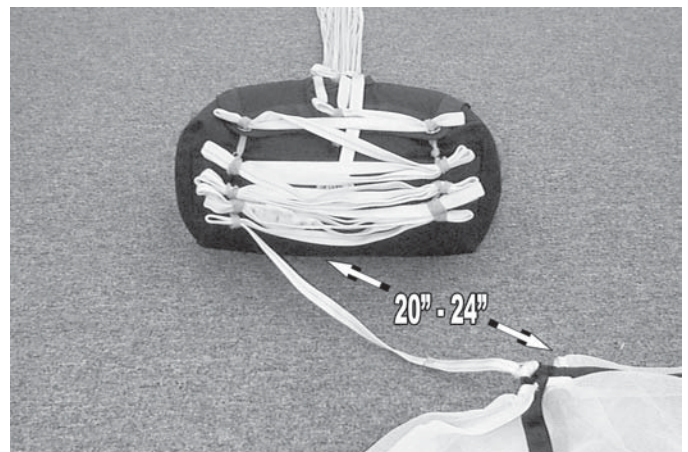
Each elastic stow band should be secured by a 1" to 1 1/2" bight of bridle. Each band should be wrapped twice around the bight of bridle.



Secure the two grommets at the top corners of the bag.



Stow the remainder of the bridle in the elastic bands at the top of the deployment bag. Leave 20" to 24" of bridle unstowed between the last elastic band and the pilot chute.



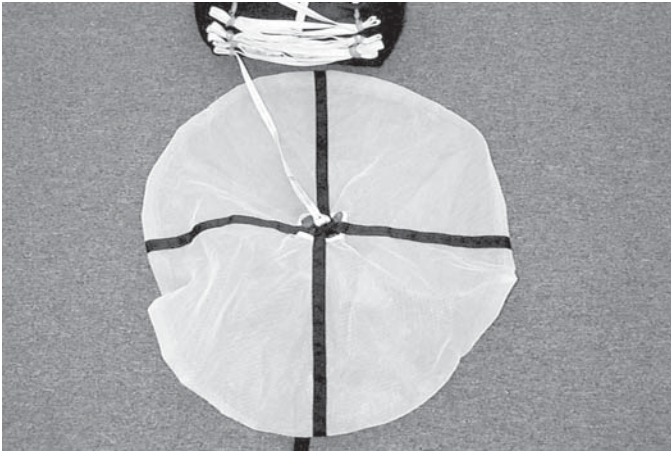
**DUAL BAG STATIC LINE MAIN CLOSING**

RWS-MAN-SOV3-MMTSHH-R2

03MAR2005

REV 2

Fold the pilot chute as shown.





Stow the pilot chute on the inside of the outer deployment bag using Keener Rubber Company 2 X 3/8" (standard size) bands or equivalent. Cut rubber band in half length wise, making it 2 X 3/16".

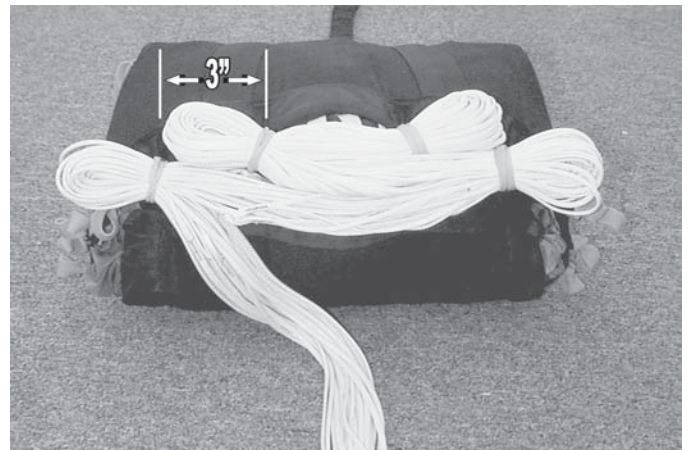
The pilot chute should remain secured to the static line as shown in Step 5.



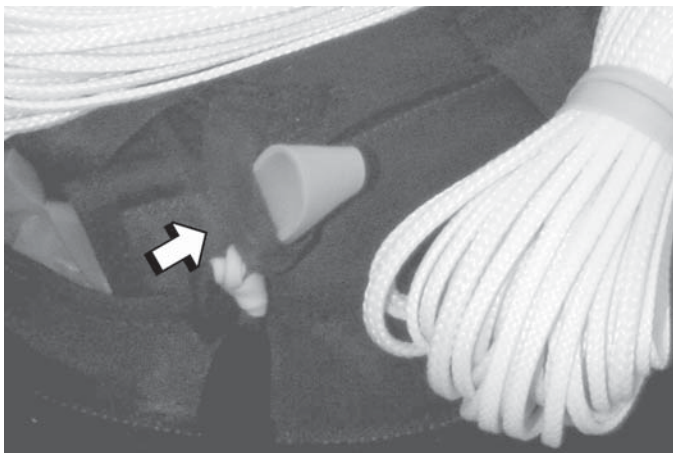
Put the inner deployment bag into the outer deployment bag. The unstowed length of bridle between the pilot chute and inner deployment bag should be neatly S - folded inside the outer deployment bag.



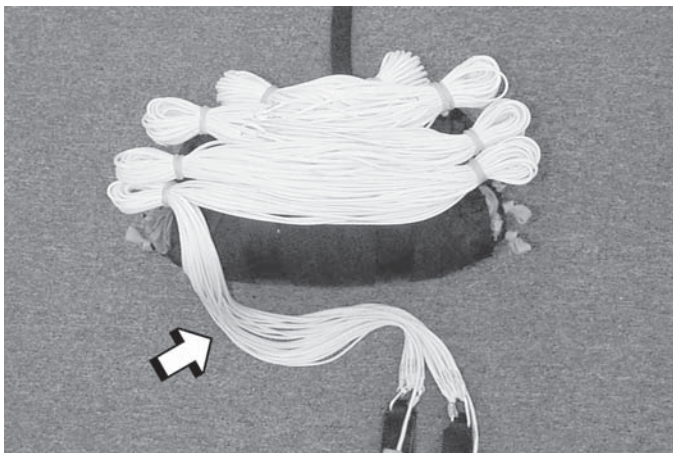
Close the outer deployment bag using Keener Rubber Company 2 X 3/4" ("tandem" size) bands or equivalent. The bights of line in the stow bands should be 2 1/2" to 3" long, and each band should be wrapped twice around the bight of line if possible.







Note: When closing the outer bag, each stow band should be passed through a webbing loop on the outer bag closing flap before being wrapped around the line bight.



Leave at least 18" of line unstowed between the last elastic band and the risers.

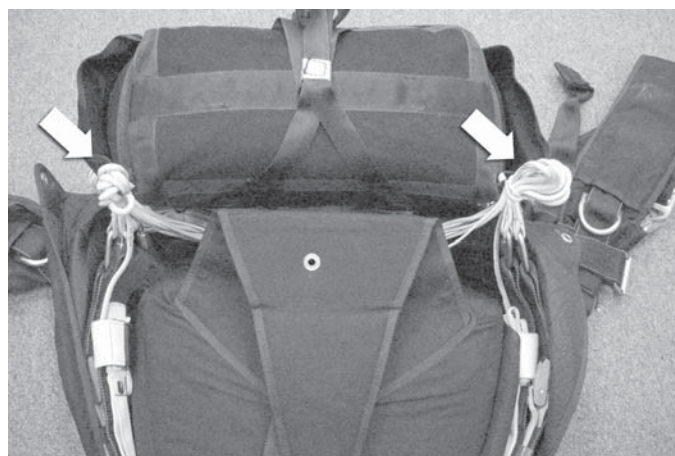


Route the main risers. Move the bag over the container without twisting the bag. Route the main risers flat against the side of the reserve container.



Place main bag and lines in main tray. Open main flaps wide and place the main bag on a 45-degree angle in the main tray with lines facing away from the reserve container. Place risers straight down along the side. Excess line should be S-folded towards the bottom. Avoid placing risers close to the back pad and under the reserve tray.

**Note:** Place one line stow from each riser on main deployment bag.

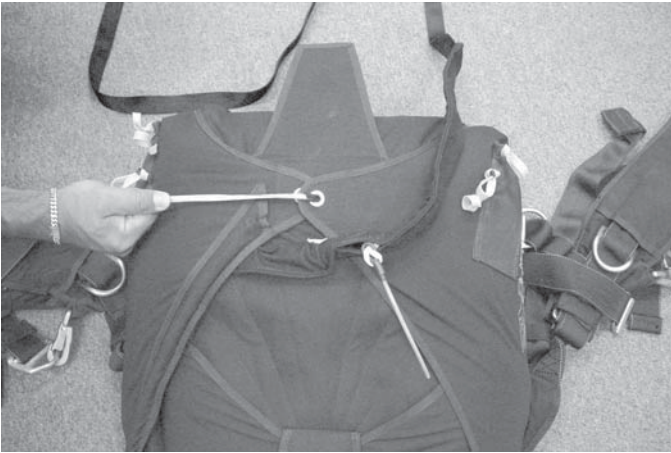


Extract the closing pin from cotton sheath. Route static line to the upper left corner of the main tray. Check main closing loop. Ensure that a tandem main closing loop is attached to the bottom flap of the main container. The length of the main closing loop should be approximately 1 and 5/8 inches. Closing main container. Close the container starting with the top flap. Pull the entire closing loop through the top flap, preferably using a closing tool. Close side flaps in the order indicated by the number stamped on the flaps.

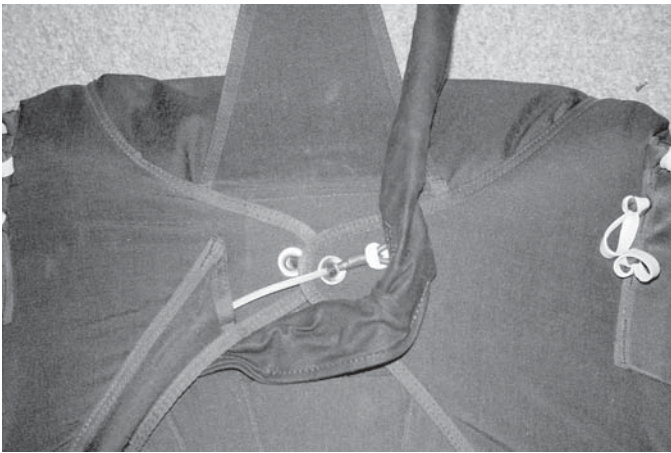
**Note:** The closing sequence of the container used in the picture is right left. Some SOV3-HH are closed in the opposite order. Therefore it is important to check the stamped numbers.







Secure with flex pin. All but the swage of the flex pin should be extracted from the static line sheath and inserted into the main closing loop. Find rubber band attachment points intended for stowing the static line.



Make the first stow with only one fold of the static line and rubber band wrapped very tight (three wraps). Continue stowing the static line across the main container. The second and third stow should be with a single fold as well, with a double wrap of the rubber bands.





After evenly distributing and stowing the remaining static line, park the static line clip in the clip pouch. Note: Some systems are equipped with pouches on either side. Static line should be firmly stowed to the rig when done.



# **The Booth 3-Ring Release System**

**INTRODUCTION**

The 3-Ring release system was invented by Relative Workshop founder Bill Booth in 1976. It was the first practical release system that allowed skydivers to jettison their main canopies by pulling a single handle. The Booth 3-Ring was not only easier to operate than previous canopy release systems, but it was also more reliable and far less expensive. The Booth 3 Ring release system is now the industry standard.

**GETTING TO KNOW THE BOOTH 3-RING**

Knowing how the Booth 3-Ring release works will help you assemble and inspect it properly.

Begin by peeling the release handle (more commonly referred to as a cutaway handle or breakaway handle) from the hook and loop fastener on the harness. Peeling upward and then down, rather than pulling straight down, makes it easier to separate the handle from the webbing.

Take a look behind the risers near the harness and observe the movement of the yellow cable as you pull the cutaway handle. When the cable clears the white loop, the release is disengaged.

Slowly pull one of the risers off the harness. As you pull, you'll notice that the white loop gets pulled through the grommet by the action of the smallest ring.

While opening shock may exceed 1,000 lbs the yellow cable never sees a force in excess of about 10lbs. This is due to the mechanics of the Booth 3-Ring release system.

Because of the tremendous mechanical advantage of the system, it is important to understand the properties of the nylon components of the system.

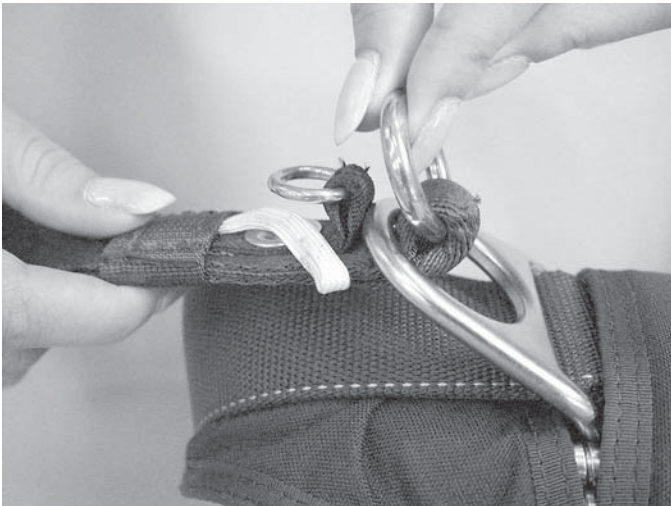
When nylon stays in the same position for a long time, it begins to conform to that position. This is sometimes referred to as a "set". If the 3-Ring release system stays assembled for too long, the nylon can become so stiff that the low drag from a malfunction (such as a streamer) won't pull the riser off the ring.

The 3-Ring release system must be disassembled, flexed and inspected every 3 months. Procedures for this are listed in the care and maintenance chapter of the manual.

A small stick or object in the white loop could prevent a riser from releasing. That is the reason why it's important to keep foreign matter, such as bits of grass and other debris out of the Booth 3-Ring assembly.







Before assembling the Booth 3-Ring release system, make sure the risers aren't twisted or reversed. Lay the SOV face down, as you would to pack it.

Thread each reserve cutaway cable into its housing and fasten the handle to the harness. The handle should be positioned as close to the ends of the housings as possible so that little or no cable is exposed.

With the rings of the riser facing toward the floor, pass the ring on the end of the riser (middle ring) through the large harness ring from above. Fold it back toward the canopy and risers.



Thread the smallest ring through the middle ring in the same way, but make sure it doesn't pass through the large ring.

**A)** Rigs without RSL: each yellow cable should extend about 6 inches (15.2 cm) past the housing ending.

**B)** Rigs with RSL: the right (RSL) side yellow cable should extend 7½ inches (19.1 cm) past the housing ending. The left (non RSL) side should extend 5½ inches (14 cm) past the housing ending.



Bring the white loop over and through the small ring only, and then through the riser grommet so it protrudes out the back of the riser.



Continue threading the white loop through the cable housing grommet on the end of the cable housing. The flat side of the cable housing grommet should be against the riser.



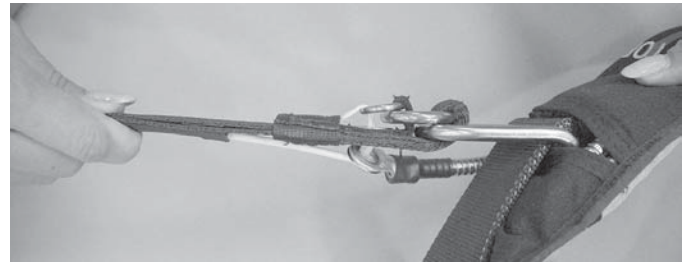
Thread the yellow cable through the white loop, making sure the loop isn't twisted. Be careful not to bend or kink the cable as you insert it through the white loop. Insert the remaining free end of the cable into the channel which is on the back of the riser.



**PRE-JUMP INSPECTION**

**Before jumping the SOV, check the Booth 3-Ring release system for the following:**

- Each ring passes through only one other ring.
- The white loop passes through only the small ring.
- The white loop passes through the grommet on the end of the cable housing without twisting.
- Nothing passes through the white loop except the yellow cutaway cable.
- The Booth 3-Ring release handle is securely fastened to the harness, and no cable is visible between the handle and the cable housings. If your release handle has a tendency to hide itself, or flip under your main lift web, undo the velcro and twist the handle in a clockwise rotation (when wearing rig) so the handle will stick out and slightly forward for a better grip.



We recommend that only Relative Workshop 3-Ring risers be used with the SOV harness/container. If a SOV is fitted with 3-Ring risers that were not built by Relative Workshop, it is important that they be checked for proper configuration. The side view above shows a correctly built Booth 3-Ring riser attached to the harness ring and put under moderate tension.

**Note the following:**

- The rings overlap each other and maintain metal-to-metal contact.
- The rings are aligned in parallel planes.
- The smallest ring is not pulled snug against the grommet; the white loop is long enough to give it some play.
- The white locking loop goes straight down through the center of the riser grommet on its way to the cable housing end fitting; it does not extend past the edge of the grommet hole and then turn back upwards towards the hole.

If your riser configuration does not match this illustration, the 3-Ring release might not function correctly, contact a rigger or Relative Workshop if you are unsure of the 3-Ring riser configuration.

**Trimming Cutaway cables to match housing length**

There are many different length cutaway cable housings on many different rigs. To accommodate these differences, cutaway handles are manufactured with over length cables. So that both risers leave at the same time during a cutaway, these cables must be cut to match the housings of the particular rig on which the handle is to be installed.

- Feed the cutaway cables all the way through both housings, and secure the handle in place. Do not hook up the risers, and make sure the long housing is not stretched out.
- Measure the cable sticking out of each housing from the end of the housing. Cut each cable at the same length, 6½" (16.5 cm) within +/- 1" (2.5 cm).

If an RSL is being used, trim the cable on the side which the RSL is attached at 7½ inches (± ½ inch) or 19.1 cm (± 1.2 cm) and cut the other cable at 5½ inches (± ½ inch) or 14 cm (± 1.2 cm). This is done to assure that the riser to which the RSL is attached will always leave last. Make sure there is 2 inches (± ¼ inches) or 5 cm (± 6 mm) differential between the lengths of the cables.





Each cable end must be finished by exposing it to a (lighter) flame for a few seconds, and then forming the softened plastic coating to a blunt point using your fingers. The finished point should completely cover the inner steel cable so that no sharp edges are exposed. **Be careful not to overheat the nylon as you could burn your fingers!** It is always a good idea to consult a rigger if you have any doubt about how to safely accomplish this procedure.

Instructions only apply to cutaway cables that have been ordered as replacement parts. New rigs come with correctly measured cutaway cables.

**Safety tip:**

If you are jumping a high performance ram air canopy, you should consider installing RWS cutaway cable housings on your risers. Doing so will allow you to cutaway more easily if you experience line twists which are severe enough to twist down into your risers.



# **How to Use the SOV**

This chapter provides specific procedures for using the SOV. It is not a training syllabus.

It is the responsibility of the owner to possess the specific knowledge required to make a safe skydive, including how to use their equipment properly. This kind of knowledge can only be gained by personal professional instruction.

## **SUGGESTED EQUIPMENT**

It is essential that someone jumping a SOV for the first time practice normal and emergency procedures on the ground. Practicing normal and emergency procedures should be performed using training aids that simulate the equipment to be used in the air.

If required, Relative Workshop can provide a SOV training harness. It is equipped with simulated cutaway handles, reserve handles and main deployment handles that are located in the same positions as the SOV. If you decide to build your own practice harness make sure the main, reserve and cutaway handles are located in the same positions as the SOV rig.

## **PRE-JUMP EQUIPMENT CHECK**

The equipment check should follow a logical order. For example: top to bottom, front to back.

Starting at the front:

- Make sure the 3-Ring system is assembled correctly and free of any dirt or other foreign matter.
- Check the position of the cutaway handle and reserve ripcord handle. Do not remove them from their pockets unless you suspect a problem, as this puts unnecessary wear and tear on the hook and loop fastener. Ensure that the chest strap is not threaded through the reserve ripcord handle.
- If you step into your harness, check the leg straps to make sure that they are threaded correctly. Should you prefer to leave them unthreaded prior to putting on your gear, make sure they are not wrapped around the main lift web but rather hang straight down.
- Open the reserve container pin protector flap by grasping the sides of the flap, and pulling straight up. Do not grasp the bottom edge of the flap. This will cause the end of the flap to curl up, becoming permanently deformed and more easily snagged. Check the pin; it should be straight and seated well into the closing loop.
- Slide the reserve ripcord cable back and forth in its housing to be sure it moves freely.
- Lift the main container pin-protector flap and check the curved closing pin. It must be at least halfway through the closing loop. Make sure that the yellow hook and loop fastener patches on the bridle cord and container flap are mated.
- Make sure the bridle is routed correctly from the closing pin, under the right-hand flap along the main lift web and into the pilot chute pouch.
- Check the 3-Ring release cutaway handle. The hook and loop should be mated correctly. No more than ½ inch (1.2cm) of yellow cable should be visible between the cutaway handle and the cable housings.
- If you have an AAD installed, make sure that you switch it on according to the instructions provided by the manufacturer.
- Routing the bridle around the leg strap will cause a pilot-chute-in-tow malfunction.





**DONNING AND ADJUSTING THE SOV**

The SOV is designed so that it fits snugly, yet comfortably, when the harness is properly adjusted.

Pick up the SOV using the main lift web close to where the 3-Rings are located. Put on your SOV in the same way you would put on a coat.

Check the leg straps for twists before threading them. Make sure you route the webbing correctly before tightening them until they are snug. Slide the excess strap through the black elastic keepers provided and then stow the excess strap in the pockets on the leg pads. This will ensure that the leg straps don't flap around in the air while you are in freefall.



Improper threading of the chest strap may result in death. Death has occurred from a skydiver falling out of the harness due to an improperly fastened chest strap.

**SUMMARY**

- To summarize the adjustment procedures:
- Always check your gear thoroughly before putting it on your back.
- Put the packed rig on over your jumpsuit.
- Thread the leg straps through the adapter or connect the straps, checking that they are not twisted, and position the comfort pads.
- Tighten the leg straps until snug.
- Stand up straight and secure the chest strap; it should not be cinched too tightly.

**JUMPING THE SOV**

**DEPLOYING THE MAIN PARACHUTE**

Before a jumper uses a hand deploy system, they should first practice the procedures on the ground under an appropriately rated instructor's supervision.

**DEPLOYING THE RESERVE PARACHUTE**

Before a jumper uses a SOV, they should first practice the reserve procedures on the ground under an appropriately rated instructor's supervision.

A skydiver may be faced with a number of emergencies including those in the aircraft, during climb out or exit, in freefall, during deployment, under canopy and landing. A currently rated instructor or parachute center must provide training for any and all emergencies before jumping a SOV.





# **Maintenance & Care**

## INTRODUCTION

The secret to extending the life of your new harness and container system is performing periodic inspections and maintenance. The inspections and maintenance that will be discussed go beyond a normal gear-check before boarding a plane. Under most circumstances, the SOV requires very little maintenance unless it is subjected to abnormal or harsh conditions. Remember, you entrust your life to the skydiving equipment you have chosen. It is your responsibility to ensure that equipment remains in optimum working order.

## INSPECTING YOUR SOV

The best approach to rig maintenance is to spend a few minutes performing a periodic, detailed inspection of the rig. The inspection should be performed at least once per month. Obviously, the more you use your equipment, the more frequently you should inspect it. If any wear or damage is found, have it fixed immediately. In addition to inspecting the rig yourself, ask your rigger to inspect the entire assembly every time the reserve is repacked. If you have ANY questions regarding the condition of your harness and container system, do not hesitate to ask a rigger or the manufacturer to take a look at it.

Gear inspections should cover ALL parts of your harness and container system, while paying particularly close attention to these areas:

- **Cutaway System**

Refer to the 3-Ring section in this chapter for detailed information on inspecting the canopy releases.

- **Reserve System**

This includes the reserve ripcord, closing loop, pins, handle, housing, container and associated sewing. You should NOT attempt any repairs or modifications to ANY of these items unless you are a rigger. You can, however, identify smaller problems before they become more severe. Some items to look for would include kinks in the reserve ripcord cable, frayed or worn closing loop, frayed stitching on the container, etc.

- **Harness**

The harness should be inspected periodically for broken stitching or frayed webbing.

- **Main Container**

Inspect the plastic stiffeners in the container flaps and have replaced any that are broken. Replace any grommets that are deformed, nicked, damaged, or that are pulling out of their setting.

- **Main Pilot Chute**

Check the centerline (the length of nylon line inside the pilot chute that extends from the handle to the base) of the main pilot chute. It must be firmly sewn at each end; there must be no broken stitches or torn fabric. Inspect the seam that joins the pilot chute mesh to the pilot chute fabric. If the mesh is torn or badly frayed, replace the pilot chute.

- **Closing Loop**

The main container is held shut with a closing loop made of nylon suspension line sheathing. This loop is subject to wear. If it wears out and breaks, the main canopy may release prematurely and a malfunction may result. Replace the closing loop upon the first sign of wear. A closing loop is a lot less expensive than some of the possible consequences of a premature opening.

- **Hook and Loop Fastener**





Hook and loop fastener have many applications within skydiving. Even though it can eventually wear out, there exist few materials that can compete against it with regard to its flexibility, adaptability, and wide variety of applications. The "hook" portion of hook and loop fastener often attracts dirt, bits of grass, hair and other debris. You can clean the hook portion using a fine-toothed comb. The "loop" section generally remains clean but the nylon fibers sometimes tend to get pulled out of place. When you find that your hook and loop fastener is losing its adhesive qualities, replace it. Again, replacing a worn hook and loop fastener is a lot less expensive than a reserve repack or purchasing a main canopy due to a dislodged cutaway handle.

## CARING FOR YOUR SOV

Your SOV is manufactured primarily from nylon. Nylon is very durable, but is still susceptible to damage from several sources:

- **Sunlight**

The ultraviolet rays in sunlight quickly and permanently weaken nylon. Keep your SOV out of direct sunlight as much as possible. Structural weakening of nylon may not be immediately noticeable. Prevention is the key.

- **Acids**

Acids damage nylon. Keep your SOV away from hangar floors, dirty car trunks and similar areas where acids may be found. If such contamination does occur, immediately and thoroughly wash the rig with plenty of warm soapy water. Until a rig can be washed, baking soda will quickly neutralize most acids. If acid damage occurs or is suspected, a rigger should thoroughly inspect your SOV. Pay attention to where you place or store your rig.

- **Oils and Grease**

Most petroleum compounds do not weaken nylon; they simply stain it. A rigger using the proper petroleum solvent should promptly remove such stains.

- **Water**

Water will not structurally damage your SOV, but prolonged agitation in fresh water weakens webbing or may cause some fabric and tape colors to bleed. Salt water may damage nylon and cause hardware to corrode if not promptly and thoroughly washed off with plenty of fresh water. Your rig will maintain its new appearance longer if it is kept dry.

- **Soil**

Soil may damage your SOV. Brush off the soil after it has dried and gently wash with warm soapy water. Be sure that the soil is not in the cable housings, Booth 3-Ring release or reserve ripcord pins or loops. Consult a rigger if your rig is heavily soiled or extremely dirty.

- **Sand**

Fine sand will weaken and cut webbing and fabrics of all types. Prolonged exposure to sand will shorten the life of the entire parachute assembly. One way to minimize the damage done by sand is to use a packing mat while packing.

- **Abrasion**

Nylon quickly frays if dragged over concrete or other rough surfaces. Do not drag your rig on the concrete while packing.



**PERIODIC MAINTENANCE FOR THE BOOTH 3-RING RELEASE SYSTEM**

The Booth 3-Ring release system has been in use for many years with excellent results. Although the system is as durable as the rest of the rig, it requires periodic maintenance and inspection to ensure proper operation.

The procedures below should be done at least every 3 months. This is especially important if the rig has not been used for an extended period, such as during the winter. Immediate inspection is required if it has been subjected to some abuse such as a drag across the runway, a water landing or exposure to a lot of dust or sand.

It's important to maintain the system even more frequently in humid, muddy or freezing conditions. If the Vector becomes immersed in mud or muddy water, clean the 3-Ring release system with a mild solution of soap and water. Any rusted components must be replaced.

**PROCEDURE FOR PERIODIC MAINTENANCE FOR THE BOOTH 3-RING RELEASE SYSTEM**

- 1.** Every 3 months operate the 3-Ring release system on the ground. Extract the cable completely from the housings and disconnect the risers.
- 2.** While the system is disassembled, closely inspect it for wear. Check the white locking loops (the ones that pass over the smallest ring and through the grommet) to be sure they are not frayed.
- 3.** Check the hook and loop fastener on the cutaway handle and main lift web to be sure it is clean and adequately holds the handle.
- 4.** Check the cable ends for a smooth finish. The ends are finished at the factory to have a smooth, tapered surface. This prevents the cable from hanging up in the loop. Check the cable ends and consult a rigger or the manufacturer if a burr or "hook" is present.
- 5.** Check the stitching, including that which holds the large rings to the harness.
- 6.** Check the 3-Ring release housings for solid hand tacking and proper stretch. The housing ends lay at the chest strap area, pull downward on these housing ends and check that they don't move downwards more than ½ inch. Pull the housings from the free end and expect 1-2 inches of movement.
- 7.** Take each riser and vigorously twist and flex the webbing near where it passes through each ring. The idea is to remove any set or deformation in the webbing. Do the same thing to the white loop.
- 8.** Check the housings for dents or other obstructions. Use the cable to do this.
- 9.** Clean and lubricate the release cable with a light oil such as "3 in 1" brand or silicon. Put a few drops on a paper towel and firmly wipe the cable a few times. A thin, invisible film should remain—too much will attract grit and dirt, or the oil could become tacky in cold weather. Too much oil will require more force to extract the cable during a breakaway.
- 10.** Inspect the fittings at the end of each housing. If one of these fittings were to come off the housing, a riser might release prematurely.



- 11.** If any wear is found, consult CPS, Relative Workshop, or a rigger before using the SOV.
- 12.** Reassemble the system. Double check it. Make sure the risers aren't reversed.

The Relative Workshop appreciates and welcomes any comments from users that relate to the safety, operation or maintenance of the 3-Ring release.

### **REPLACEMENT PARTS**

The Relative Workshop supplies replacement parts for its rig at a reasonable cost. When ordering parts for your rig, include the serial number, type and date of manufacture of your Vector so the proper items can be quickly supplied. This information is written on the lable tucked under the left hand ring cover.



