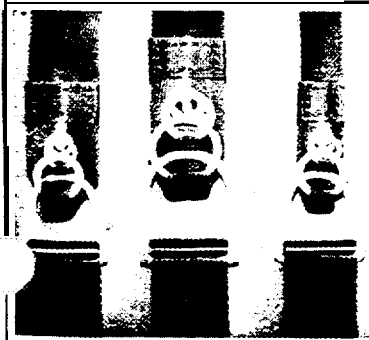


Vector II

OWNER'S MANUAL



Vector 11 Owner's Manual

Fourth Edition, January 1991
Copyright 1984-91, The Uninsured Relative Workshop, Inc.

This manual is applicable to
the Vector II bearing the serial number:

Save this manual, your **rigger** may not have an applicable manual and will need it to **service** your Vector II. This manual does not **cover** the **correct** assembly and **packing** procedures for **older** Vector **models**.

WARNING

Sport 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 are **about** 30,000 skydivers in the U.S., and these jumpers made approximately 2 **million** jumps in 1989. The Association **reported** 36 skydiving fatalities that year, meaning the probability of dying on a skydive is approximately 1 in 55,500. It also seems that the more experienced a skydiver is, the **less** likely he is to be **killed** while jumping.

Experts estimate that hundreds of people are also injured. Some of these deaths and injuries are the result of equipment **malfunctions**.

If you use your Vector II, **or** if you **allow** someone else to use it, you are acknowledging sport **parachuting's** risks and accepting the **fact** that the Vector **or** its components may malfunction.

If you are not **willing** to **accept** the risks of **sport** parachuting, **or** if you aren't willing to **accept** the **possibility** that your Vector II **or** its components may **malfunction** and perhaps **cause** you to be injured **or** killed, then you may return your Vector II for a **full refund** before it is used. Details on how to do this are **printed below**.

DISCLAIMER—NO WARRANTY

Because of the unavoidable **danger** associated with the use of this harness and **container** assembly, the **manufacturer** makes no **warranty, either expressed or implied**. The rig is **sold** with all **faults** and without any warranty of **fitness** for any purpose. 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** of the **purchase price** by **returning** the **parachute** harness and **container**, before it is used, to **manufacturer** within 30 days from the date of original **purchase** with a letter **stating** why it was returned.

Neon and fluorescent colored fabrics and tapes fade rapidly. Color brilliance may be lost within a year of manufacture. The RW Shop assumes no responsibility for this condition.

Cover photos: Mike McGowan, Rick Powell and Tom Sanders.

The Uninsured Relative Workshop, Inc., DBA
Relative Workshop

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1. Introduction

Congratulations!

By choosing the Relative Workshop Vector II, you've shown that you'll settle for nothing less than the best.

BEFORE YOU JUMP YOUR VECTOR II

Please read this manual thoroughly before assembling or **using** your Vector II, even if you've owned or jumped a Vector before. We've recently made several important changes to the rig, and you should know **about** them before going into the air.

If, after reading this manual, you still have **questions** concerning the **Vector II**, please contact us. We'll be happy to help you.

If you have any suggestions or see a **need** for **changes** in the Vector II, please let us know by calling or writing the Relative Workshop, 1645 Lexington Ave., **DeLand**, FL 32724, phone: (904) 736-7589, Fax: (904) 734-7537. We're open from Monday through Friday, from 8 am to 5 pm **Rast time**.

New Features of the Vector II

The Relative Workshop made several improvements to the Vector II **reserve system** in **September, 1988**. Vector IIs incorporating these improvements can be identified by the "Vector II" marking on the Container TSO **label** located under the pin **protector** flap of **the reserve**.

These changes include:

1. A new reserve pilot chute that features a stronger, redesigned spring and all-fabric (i.e., no mesh) construction.

Extensive aerial testing proved this new **pilot chute** enables the reserve to deploy **significantly faster** at both lower and **higher** airspeeds.

2. A different reserve flap closing sequence where the outside **bottom flap closes last**. (in previ-

ous Versions of the **vector**, the outside top flap closed last.)

This **change** makes the **reserve** Container more resistant to opening accidentally when it is rubbed against **objects** such as protrusions in **an aircraft** cabin.

3. The pin protector flaps on both the main and reserve Containers are now held shut by tongues rather than Velcro. This **change** reduces the rig's maintenance requirements since the tongues - unlike Velcro - don't require periodic replacement.

(The new, all-fabric pilot chute may be installed on previous Versions of the Vector, as well as the Sprint and WonderHog.)

RAINING REQUIRED

If you've never jumped a Vector II before, or if you're transitioning from other types of gear, be sure to 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.

This manual is not a course of instruction on how to make a parachute jump. Nor does it contain the various regulations that govern sport parachuting and related activities.

It is the responsibility of the owner to insure his Vector II is properly assembled, maintained, packed, worn and used. It is also his responsibility to seek out and obtain proper training before he uses it.

The person who inspects and packs both the main and reserve parachutes must be qualified to do so.

The owner of a Vector II should not loan it to another person without first determining that the person is fully capable of using it properly and safely.

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

The information and specifications in this manual were in effect at the time of printing. The Relative Workshop, Inc., however, reserves the right to change the Vector II at any time without notice and without incurring any Obligation.

ABOUT THE RELATIVE WORKSHOP

The Relative Workshop has been designing and building state-of-the-art skydiving rigs since 1975. We invented and patented the hand-deployed pilot chute and the 3-Ring release. We introduced innovative construction techniques that have made rigs safer, lighter and more comfortable. Many of these innovations have been adopted by the entire industry.

The Relative Workshop does more than just build rigs: We try to provide a total Solution to your equipment needs. We offer most brands of main

and reserve canopies, and we'll work to help you get the products that are best for you. We also offer jumpsuits and other accessories. We have the facilities and expert staff to assemble, pack and maintain your Vector II and its parachutes.

Finally, your satisfaction comes first. We want you to be happy with your Vector II, and we welcome your questions and comments.

DESCRIPTION OF THE VECTOR II

The Vector II is a piggyback harness and container system designed for freefall sport and military parachuting. It is available in a wide variety of Container sizes to fit practically any main or reserve canopies, either round or ram-air. It is manufactured in accordance with FAA TSO c23(b).

Main Parachute System:

The main parachute system of your custom Vector II was built for either a hand deploy, ripcord, or pull-out deployment. Refer to the applicable section pertaining to your deployment system.

The main canopy may be jettisoned from the harness by its patented 3-Ring release System, a single point system that is activated by a soft handle located on the right main lift web.

The main Container can be made compatible with KAP 3, Irving Height Finder-FT-Z, FXC AADs and SSE Sentinel MK 2000.

Reserve Parachute System:

The Vector II reserve Container can be manufactured to accept round or ram-air reserve canopies. The reserve parachute Container is held closed by a single pin. The reserve ripcord handle is made of metal and fits in a pocket on the left-hand main lift web.

The reserve system accepts two popular automatic activation devices-the SSE Sentinel MK 2000 and the FXC Model 12000.

Harness:

The harness is constructed of Type 7 and Type 8 Mil-Spec webbing and new-not **reconditioned**—hardware—

WARNING

A harness that is either too **small** or too **large** for the jumper's body **size** can affect the safety and comfort **during** a **parachute** jump. If you are in question **as** to whether your harness **fits** properly, **consult** the manufacturer **or** a **currently** rated **master rigger**.

ABOUT MODIFICATIONS

It is common for jumpers to “improve” their rigs by altering them. A high **percentage** of these alterations **cause malfunctions** or make the rig harder to use **correctly**.

Typical alterations include **conversion** to a “pull-out” **pilot chute**, changing the dimensions of the harness, changing the length of the **bridle**, **installing automatic** activation devices, and so forth.

Check with the Relative Workshop before you make any **changes** to your Vector II. It was designed and built the way it is after years of testing and **development**. There are reasons for having things the way they are—reasons that might not be apparent at first. Check with us before you **allow** any **changes** to be made; even “insignificant” alterations may have dangerous and unforeseen **effects**.

SECOND-HAND VECTORS

If you obtained your Vector 11 **second-hand** from a private **party**, be **sure** it is airworthy before using. Have a **rigger** or loft inspect it **first**.

IE you prefer, the Relative Workshop will **inspect** your second-hand Vector. **There** is a **reasonable charge** for this **service**.

If you obtain **replacement parts** from a **source** other than a Relative Workshop **dealer**, be **sure** they exactly **match** the **parts** they replace. (For **example**, be **sure** the **reserve ripcord** is long enough. If it isn't the rig might **open** prematurely.) Consult a **rigger** or loft whenever you replace any component of your Vector.

COMPONENTS

The Vector comes complete with these **components**:

Harness and **container**

Hand-deploy **main pilot chute**

Main pilot chute bridle

Main deployment bag

Main lockig loop

Vector II **reserve pilot chute**

Reserve ripcord

Reserve locking loop

Reserve pilot chute bridle

Main risers and **steering toggles**

3-Ring release handle

The Vector 11 Owner's Manual

Once you are **sure** you have these components, check to be **sure** the Containers are **sized** properly for your main and reserve canopies. Refer to the TSO label on the **pocket** of the reserve **packing data card** to determine the **size** of the **containers**. Refer to the Vector 11 compatibility **chart** to **determine** what canopies will fit in your Vector II. (You'll find the **packing data card pocket** under the **Vec.** monogram by lifting the reserve pin **protector flap**.)

If you use components that were not supplied with the harness and Container, be **sure** they have the correct dimensions and are made of the same materials. For instance, be **sure** the breakaway **cables** are of the proper length.

Replacement components for the Vector 11 are readily available from the Relative Workshop.

U.S. Federal Aviation Administration **regulations** require that the **reserve parachutes** be **inspected**, **maintained**, **assembled** and **packed** by an appropriately rated Senior or Master **Parachute Rigger**. Other countries may have similar **regulations**—

2. Assembling and Packing the Main Parachute

INTRODUCTION

The Vector II is compatible with **almost** every parachute in common use today. The Vector II is available with a variety of main Container sizes. Consult the Relative Workshop or your **dealer** to **assure** the volume of your main canopy size is compatible with your Vector II. Oversized or undersized canopy volumes may cause a **pilot-chute-in-tow** or premature opening of the main **container**. This manual does not provide specific instructions for folding all of the various main canopies on the market—that information must be obtained from the owner's manual for **each** canopy.

Since only a handful of round canopies are in use today by **sport** parachutists, these instructions were written for ram-air canopies. A **jumper** should check with a **rigger** for guidance on **packing** a round main canopy into a Vector.

ASSEMBLING THE MAIN PARACHUTE

Carefully inspect the main **parachute** for wear or manufacturing **defects**.

Attach the main **parachute** to the main risers included with the Vector II. Be sure the canopy is fac-

ing forward and that the **lines** extend from links to canopy without crossing over **each** other. Leaving the **risers** on the harness while attaching the canopy will help prevent **confusion**.

If the canopy uses Rapide links, make **sure** the **barrel** nuts completely **cover** the threads. After **hand tightening**, turn the barrel 1/4 turn with the proper sized wrench.

Attach the steering toggles to the control lines of the main canopy according to the instructions below.

WARNING

Slider bumpers must be **properly** installed to **insure** that they do not interfere with proper **slider** functioning and deployment of the canopy. **Follow** the canopy manufacturer's instructions for the correct procedures for **installation** and **securing** slider bumpers.

ATTACHING STEERING TOGGLES

The Vector II is supplied with steering **toggles** for the main canopy that are compatible with the Vector **risers**. It is important that the toggles and risers be compatible to prevent **malfunctions**.

It is also important that the toggles be located

along the steering lines so the canopy is in a true no-brake mode when the toggles are resting against the guide ring. If not, the canopy won't glide or land correctly.

Likewise, if the toggles are mounted too far down the steering lines, the canopy will be less responsive and the **jumper** might not be able to apply full **brakes** or **stall** the canopy. This **can** make it difficult to **flare** the canopy properly for landing.

These situations are likely to occur when a **main** canopy is hastily switched from one set of risers to another. If the guide rings on both sets of risers are not located the same distance **from** the connector links, the steering toggles must **be** moved to **an**-other location on the steering **line**.

It is also important to securely attach the **toggles** to the steering lines. Although some canopies may be adequately **controlled** by using the rear **risers**, a "lost" toggle **can** be hazardous in some **circumstances**, and may require a break-away and **reserve** deployment.

Toggle Installation Procedure

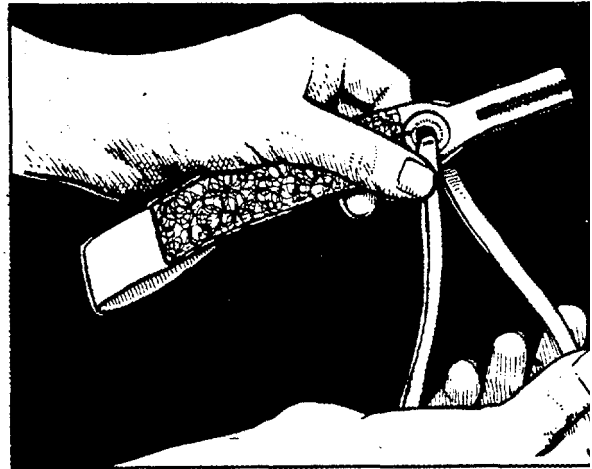
After the main canopy has been properly attached to the risers and **while** it is still laid on its side, attach the toggles to it by following these steps:

1. Starting at the tail of the canopy, **trace** the upper steering lines down to the lower steering line. The idea is to be sure the steering lines are routed correctly; they should not wrap around any **suspension** lines. The right-hand steering **line** must pass through the right-hand rear slider **grommet**, and the left-hand line must pass through the left-hand rear slider grommet.

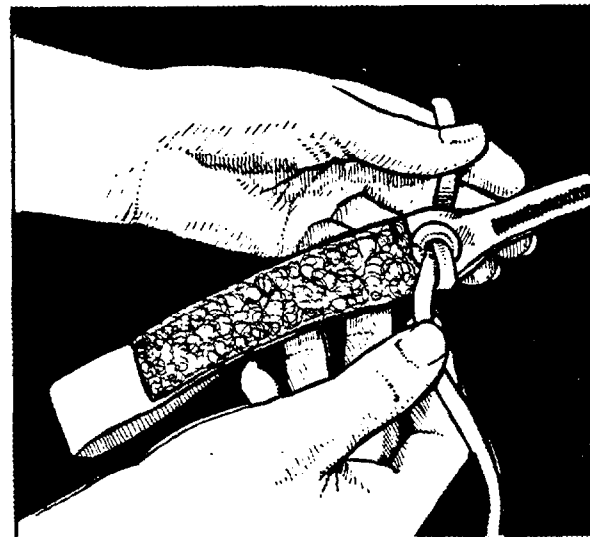
2. If the main canopy is already equipped with toggles, mark **each** steering line where it **is** knotted to the **toggle**. The purpose of this mark is to insure the new toggle is installed at exactly the same **point** on the steering line.

3. Remove one of the old toggles and pass the steering line through the keeper ring on the riser.

4. Pass the end of the steering line through the small hole in the Vector steering toggle. **Adjust** it so the mark on the steering line is approximately the same distance from the Vector toggle as it was from the old toggle.



5. Loop the running end around the toggle thread **it** through the grommet again and pull snug. Be **sure** the mark **remains** in the correct p

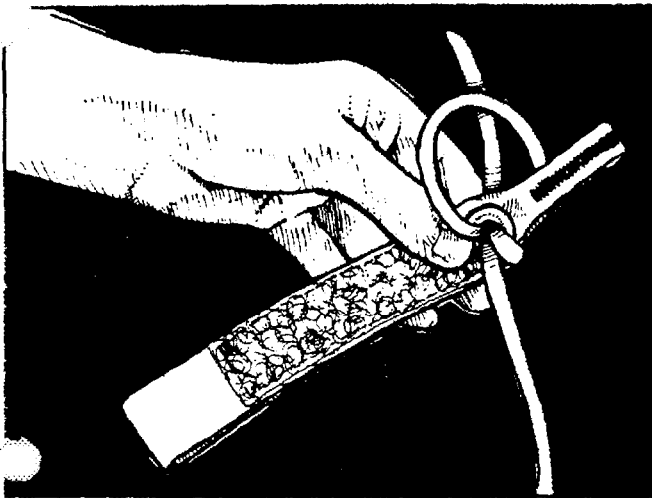


6. Loop the running end around the other of the toggle and pass it through the grommet again.

A Word About Spectra

Attaching toggles to **Spectra** steering lines sometimes requires a different method than the shown here. The **line** is **usually much** thinner than **cron** line; a toggle might **slip** off if the above method is used. Use the method described in the reserve section of this **manual**, or refer to the canopy manufacturer's instructions.

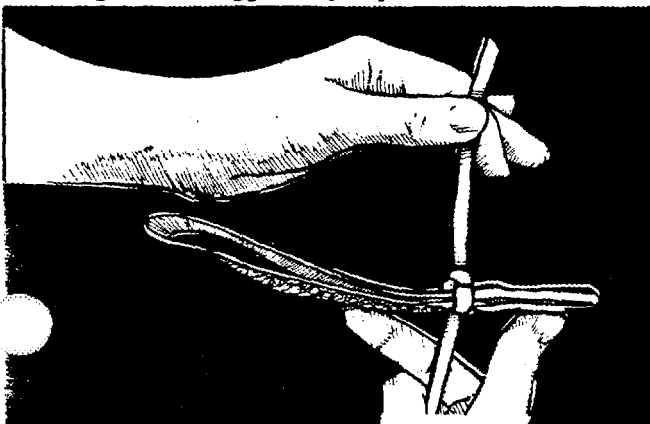
(One canopy manufacturer calls Spectra "Mil line.")



7. Grasp the line on both sides of the toggle and pull it tight. Note that the Velcro side of the toggle faces the canopy. The line does a figure 8 through the grommet and exits on the other side of the toggle. Again-check the mark to be sure it is in the right place.



8. Tie an overhand knot in the 'free end of the line and tighten it right down to the toggle. Be sure it is snug, or the toggle may slip off the line.



9. Check the canopy with the deployment brakes set and not set to be sure it is correctly configured. The canopy owner's manual contains the proper brake settings and steering line lengths; there are no standardized dimensions- Unless the lines are of proper length, the canopy may not open or fly correctly.

10. Once the measurements have been verified, tighten the overhand knot at the toggle. It is generally not a good idea to cut off the excess steering line, as you might want to adjust the toggles after the canopy has been jumped. Any excess line should be daisy-chained on itself.

11. Inspect the installation. Check to be sure the steering lines are routed correctly.

OTHER INSPECTIONS & INSTALLATIONS

Inspect the canopy installation to make sure the risers aren't reversed or twisted. Then install the deployment bag and the pilot chute to the top of the canopy. The stop ring on the bridle must lie between the grommet in the deployment bag and the pilot chute.

Inspect the 3-Ring assembly according to the instructions in the IJ-Ring chapter of this manual.

Warning: Collapsible Pilot Chutes:

Some parachute manufacturers recommend using a main deployment bag with a #8 grommet in the top of the bag and removal of the stop ring on the bridle. This allows the bag to slide down the bridle and collapse the main pilot chute. Be aware that this type of collapsible design can cause premature pilot chute wear and abrasion which is not covered under any type of warranty from the Relative Workshop.

At this time this is the only method of collapsing the main pilot chute that is recommended by the Relative Workshop. Other collapsible pilot chute designs are not recommended because they may Cause a "pilot-chute-in-tow" malfunction.

MAIN CANOPY PACKING INSTRUCTIONS

Instructions for packing specific main canopies are published by the canopy manufacturer and are

beyond the **scope** of this manual.

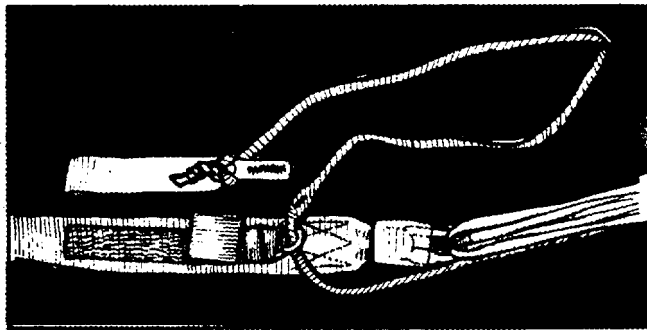
U.S. Federal Aviation Administration **regulations** require that the main parachute be **packed** only by an FAA-certificated **rigger** or the person who will use the parachute.

Setting the Deployment Brakes

Every ram-air canopy on the market today is equipped with "deployment brakes" to make it open more gently and reliably. The brakes work by keeping the tail of the canopy pulled down several **inches during** deployment. **This** prevents the **canopy** from surging forward as it inflates and begins flying.

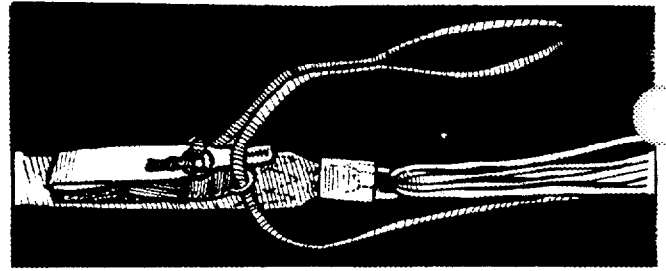
As mentioned previously, **malfunctions** and poor deployments **can result** if the brakes are not set **during packing**, or if they are set incorrectly, or **if** one or both releases before the canopy is completely **inflated** and stabilized. Combining **in-compatible** toggles and risers **can also create** the same Problems.

Not all rigs have risers that are **configured** like those shipped with the **Vector**. Different **designs** require different procedures, and a **rigger** should be consulted for the correct one.



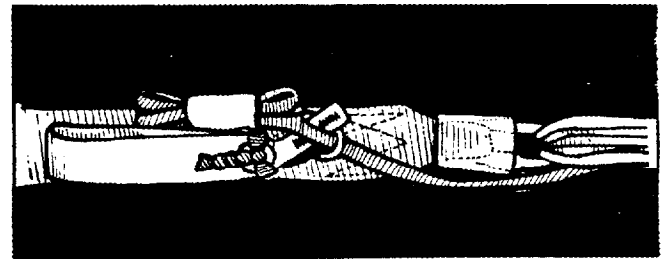
1. After the canopy **is** inspected, use the toggle to **pull** the right-hand **steering** line down until the brake loop just **passes** through the guide ring.

2. Insert the tapered end of the toggle all the way into the loop. **Pull** on the steering **line** above the guide ring to seat the toggle against the ring.

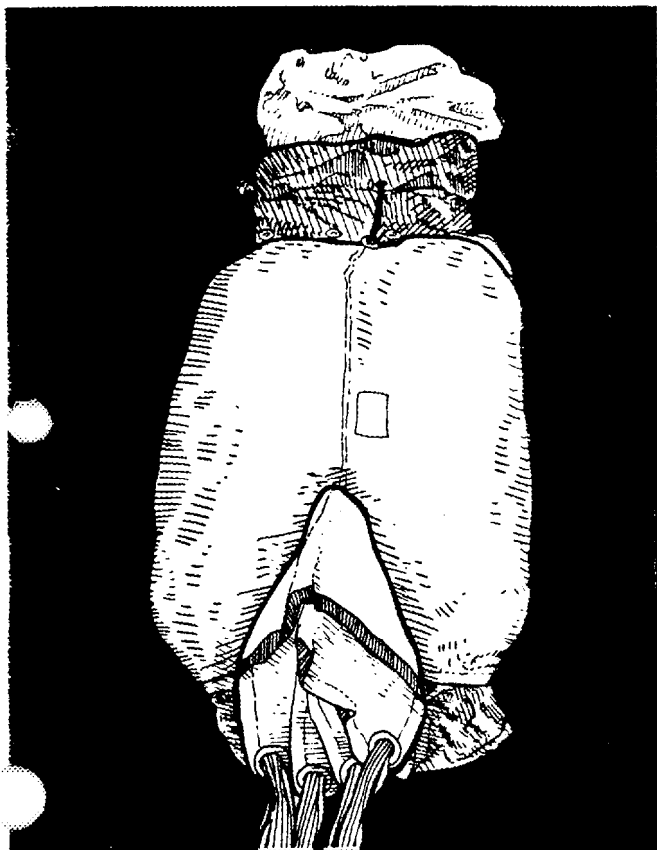


Mate the toggle Velcro **with** that on the riser. Check to be **sure** the tapered end of the toggle is completely seated in the loop. (It shouldn't be inserted past the end of the taper, or it may be **difficult** to **extract** in the air.)

3. Fold the bight of line between the toggle and loop **with 3-inch** folds and stow it in the Velcro tab **next** to the toggle.



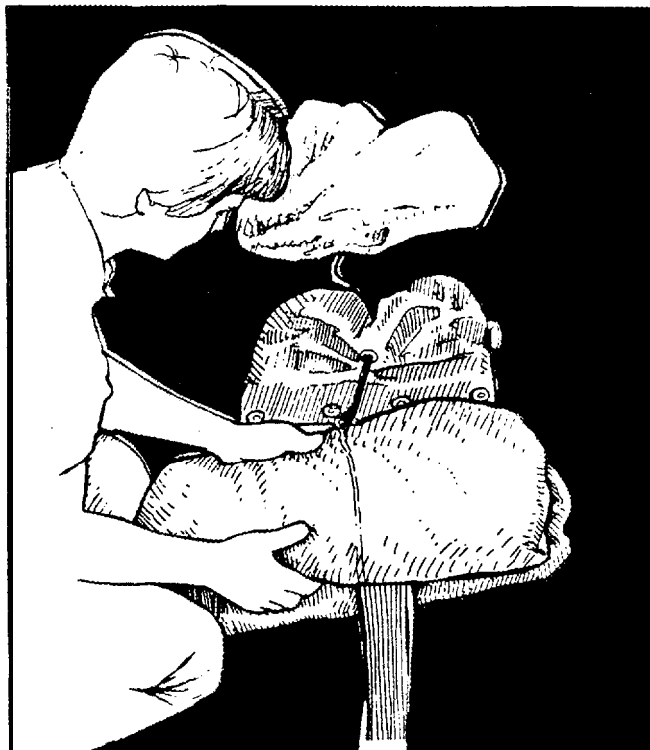
4. Repeat the procedure for the left-hand **tog-
gle**



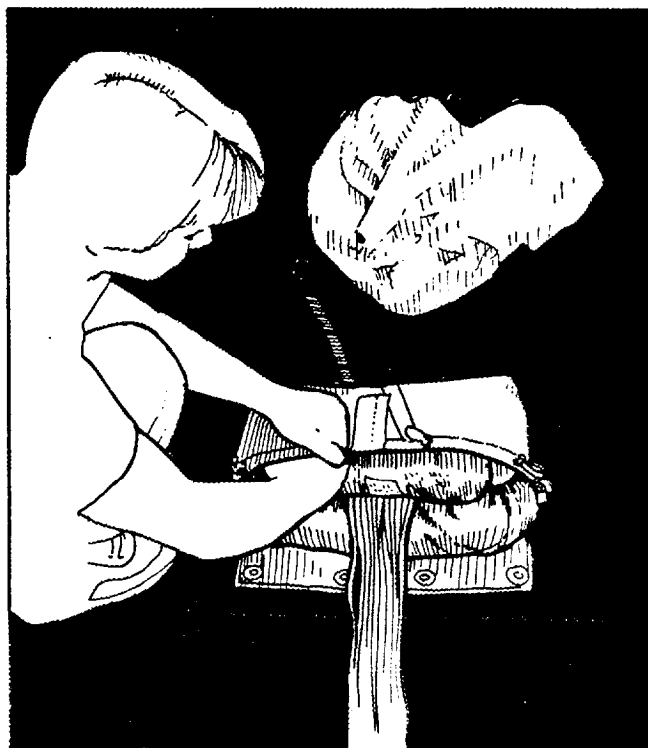
Flaking, Folding and Bagging

1. Lay out, flake and fold the canopy according to the canopy manufacturer's instructions. Be **sure** the canopy is folded as wide as possible so that it **will fill** the corners when put in the bag.

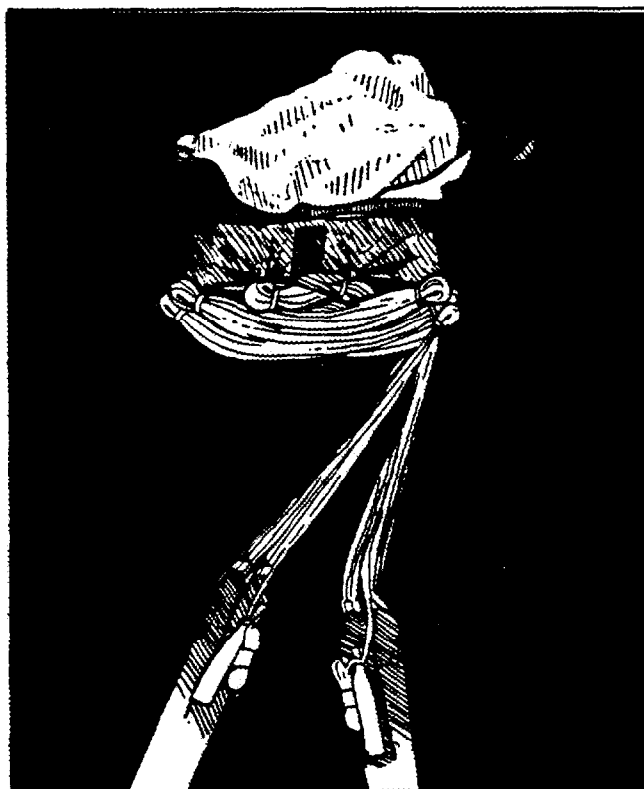
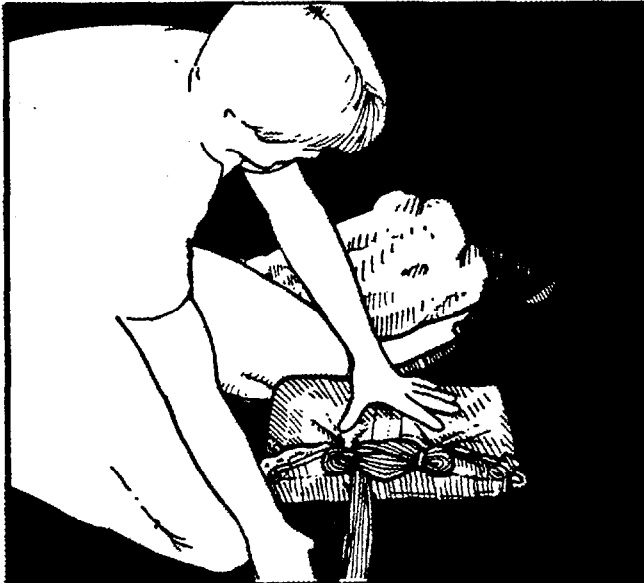
2. Stack the canopy on itself so that it is **about** the depth of the bag.



3. Slide the canopy into the **deployment** bag, being **sure** to fill the corners completely.



4. The bag is held shut by four rubber bands located across the mouth of the bag; **each** of these rubber bands pass through a grommet located along the edge of the **locking flap**. To **close** the bag, pass one of the **center** two rubber **stow** bands through its corresponding grommet and insert a 1- to 2-inch bight of lines through the stow band. Repeat this step with the other **center** stow band and grommet. Then **lock** the band and grommet at **each corner**.

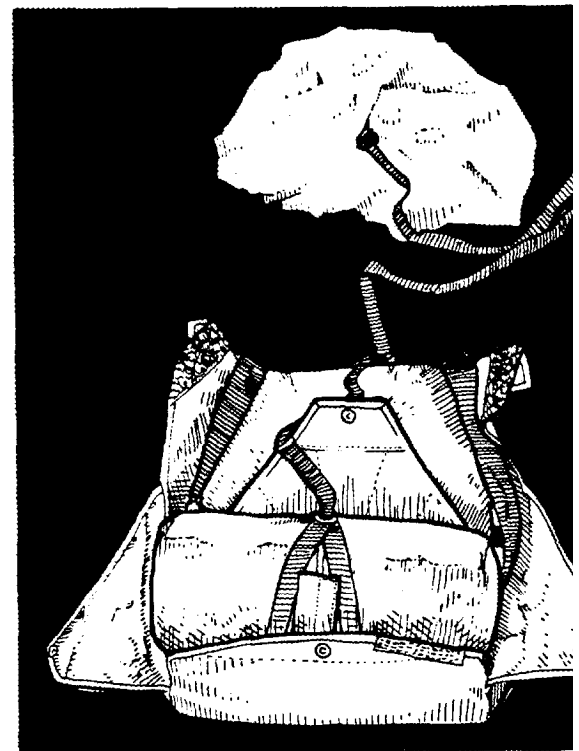


5. Stow the remainder of the lines across the bottom of the bag in the rubber bands. Keep bights of lines 1 to 2 inches long. Leave no more than 15 inches of lines unstowed between the lines and the connector links.

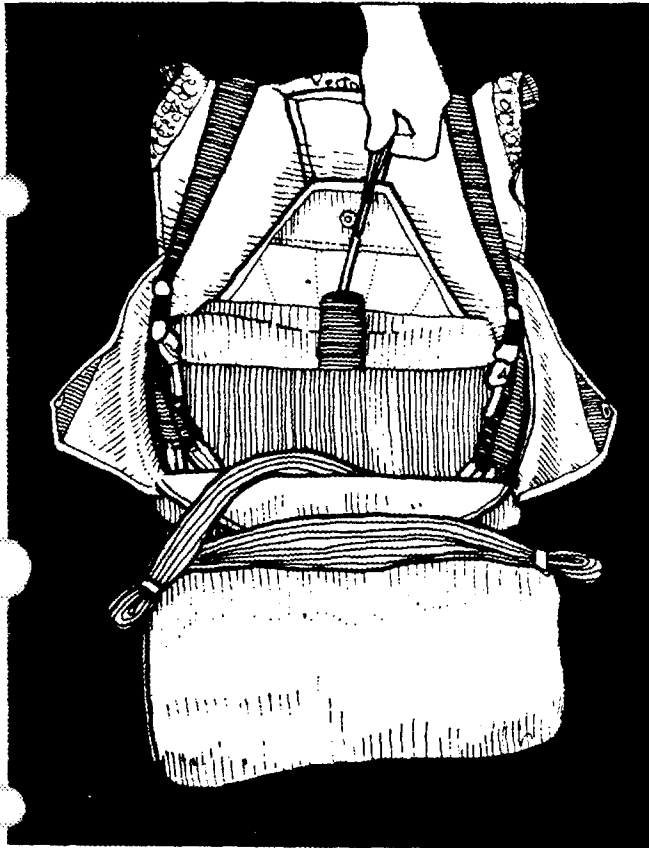
6. Pull the **pilot chute bridle** out of the bag until you seat the canopy's metal against the grommet in the bag. Push any excess fabric from the ring and grommet back into the bag with your **finger**; this prevents damage to the pilot chute fabric.

7. Use your **knees** or feet to "**walk**" on the lines, squeezing air out and distributing the bulk in the middle so it is no fatter than the **sides**.

8. Pick the bag up by its **sides** and set it in the **container** on its line stows.



9. Gently roll the bag out of the way. Follow the risers over the shoulders of the rig and down along the sides of the main container- Lay the connector iinks into the Container neatly against the sides making sure that no lines will wrap around them during canopy deployment.



10. Lay the bag down in the container with the line stows against the bottom flap. Push the top corners of the bag into the top of the main container so that the connector links are kept in place between the bag and the sides of the container- Make sure that none of the flaps are under the bag. Pull the bridle to its full length.

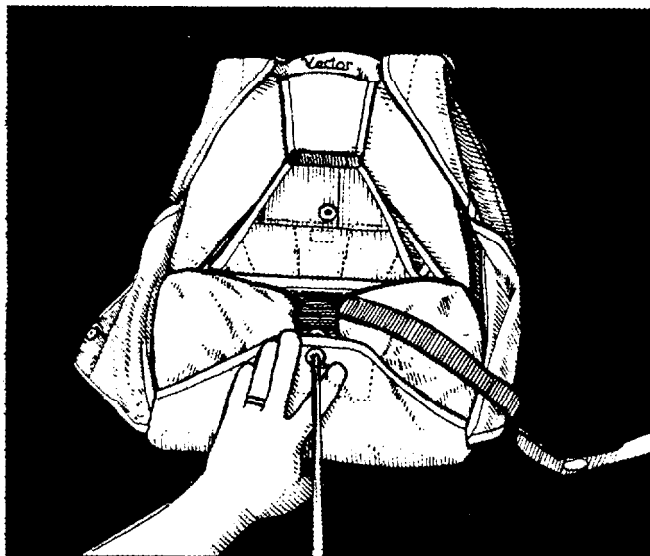
11. Kneel on the center of the bag and pull up the main Container side flaps until the bag fills the Container and is flush with the container-.



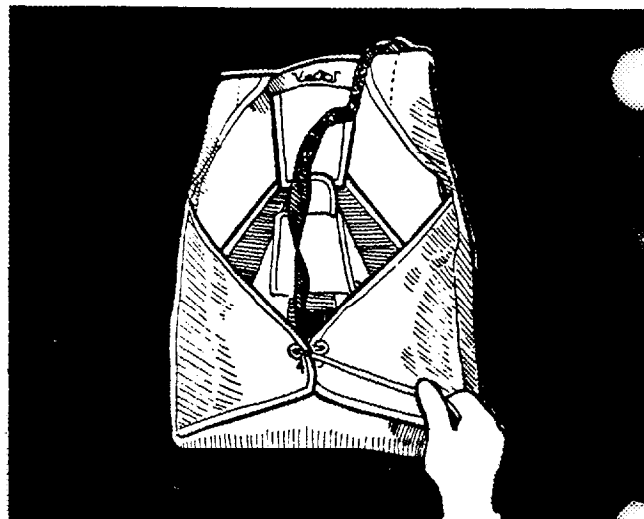
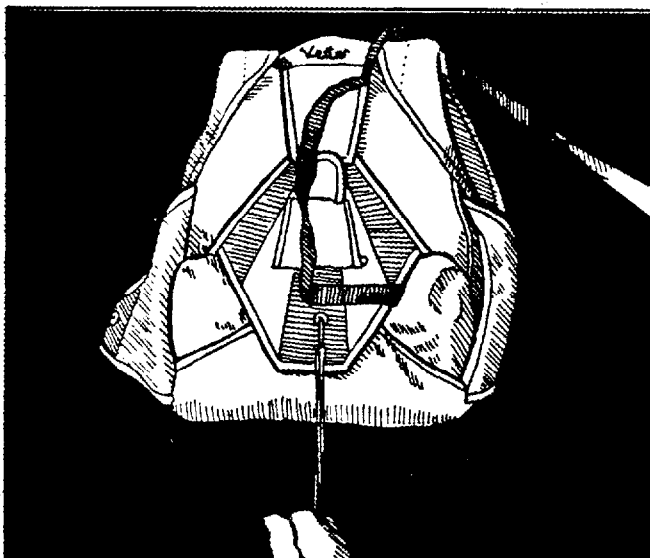
12. Close the riser covers by mating the Velcro.

Closing the Container

A. Insert a pull-up cord through the locking loop at the top of the main Container. Route the bridle to the right of the pull-up cord and out the top of the container. Thread the pull-up cord through the #1 bottom container flap grommet. Pull the pull-up cord upwards towards the top of the container. Pat the bottom of the container till the locking loop comes through the grommet. Avoid overstressing the grommet. Hold the locking loop in place with your knee.



B. Thread the pull-up cord through the #2 top flap and pull upwards again till the locking loop comes through the grommet. Place the bridle over the #2 top flap from right to left and attach the

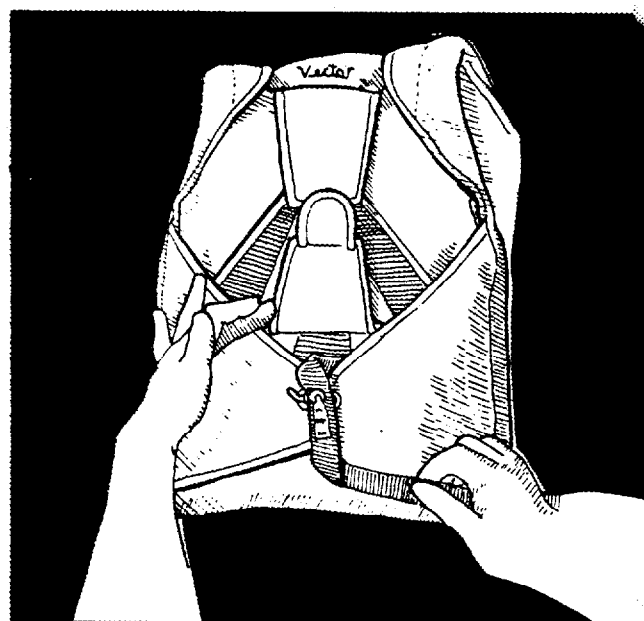


small piece of the yellow pile Velcro to the yellow hook Velcro on the flap.

C. Thread the pull-up cord through the #3 right side flap and then through the #4 left side flap using the same patting technique. (The flaps must be closed in this Order.) Insert the bridle's curved pin through the locking loop from right to left.

Note:

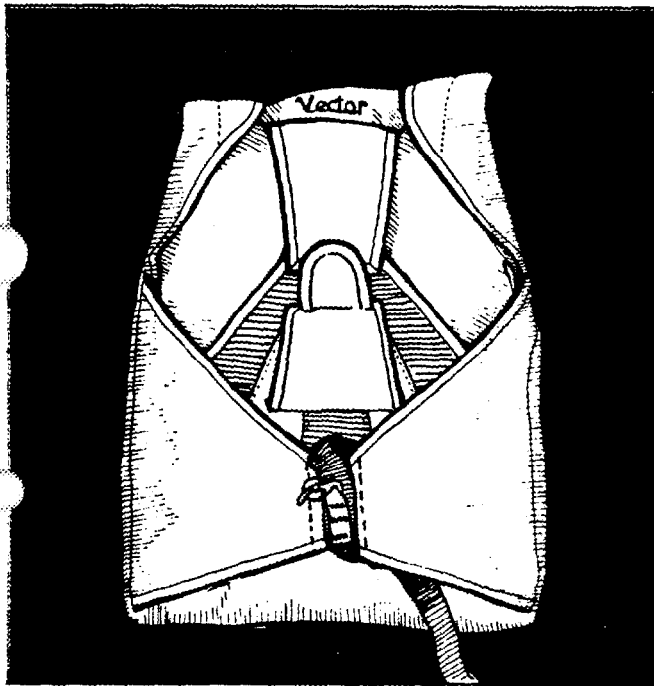
Correct bridle-routing is critical for the Vector system to function properly. The position of the pin, whether it is from right to left or vice-versa, is much less critical as it will release in all possible angles.



D. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to pass the pull-up cord under the curved pin while extracting it, as doing so will reduce wear on the loop.

E. Double check the yellow Velcro patches to be sure they are mated properly. If there isn't enough slack in the bridle to allow this, make some by gently pulling the bridle out of the main container-

F. Tuck the excess bridle under the bottom edge of the right side flap. The pile Velcro on the bridle attaches to a strip of hook Velcro located on the bottom flap under the right flap.



Remove the pull-up cord or the container won't open in freefall.

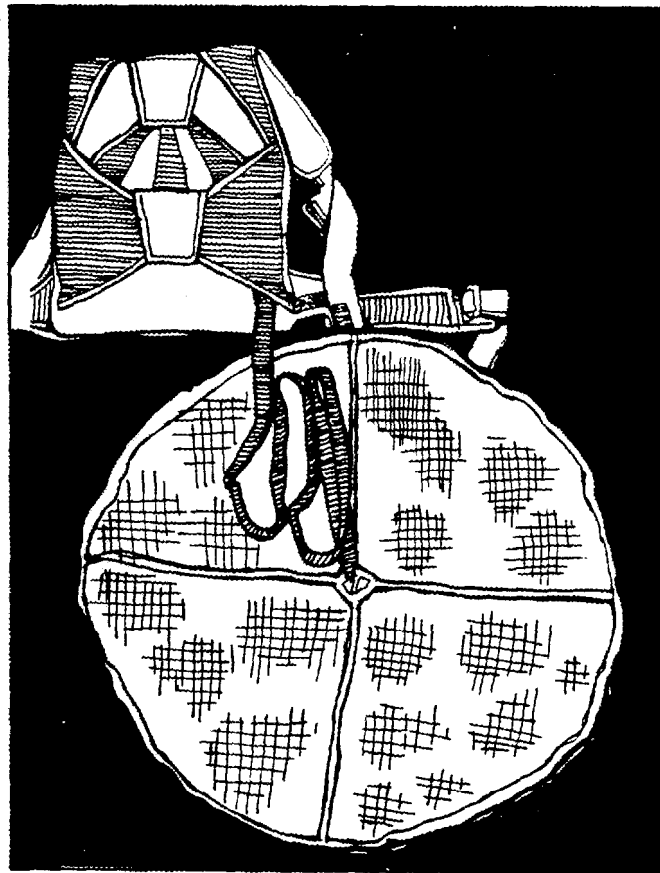
Note:

It may be necessary to adjust the length of the locking loop to make the flaps align properly. Proper alignment will allow the main pin cover flap (when closed) to barely cover the vertical stitches (which support the plastic stiffeners) on side flaps 3 & 4. The curved pin should be held firmly in place, but a force of no more than 12 pounds should extract it and open the container.

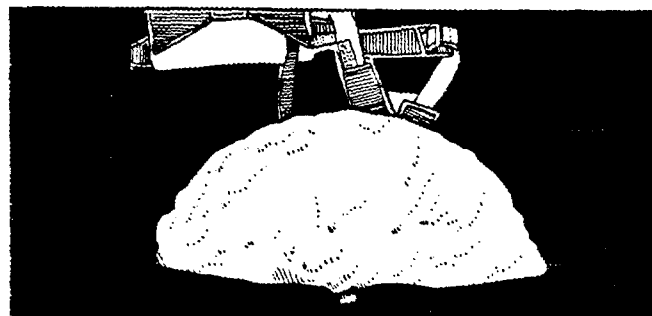
G. Check to be sure the bridle extends from the locking pin to the pilot chute without passing through the harness. Mate the Velcro on the bridle to the velcro on the #1 bottom flap; you'll have to tuck the bridle under the #3 right side flap to do this. Close the main pin cover flap and be sure it completely covers the pin and bridle.

Folding the Pilot Chute

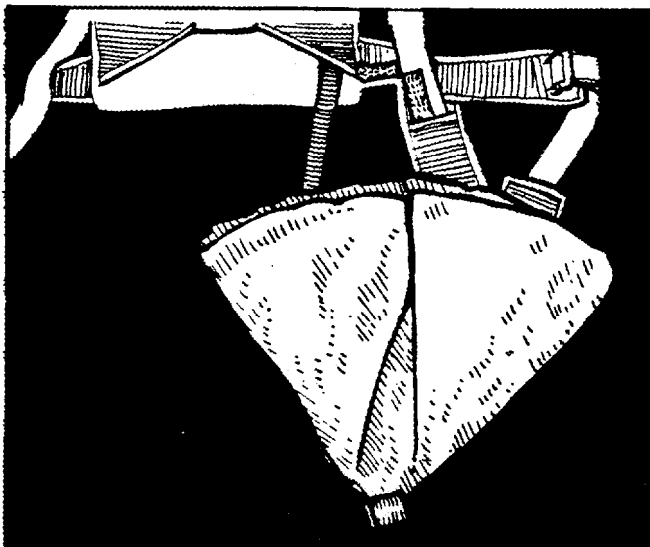
H. Lay the pilot chute out over the leg strap, mesh side up, so the edge of the circle is at the mouth of the Spandex pouch. S-fold the bridle on the half of the pilot chute over the pouch.



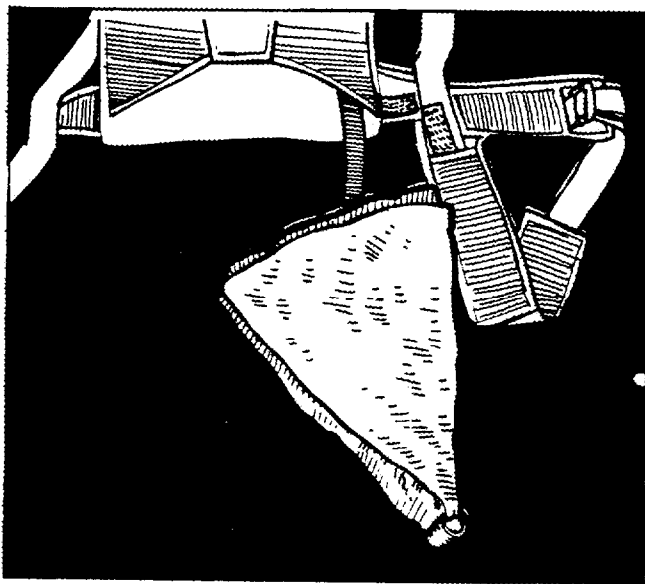
I. Fold the pilot chute in half over the bridle.



J. Bring the corners up to form a wide triangle.



K. Fold the triangle in half, forming a smaller triangle.



L Fold the triangle into thirds forming triangle.



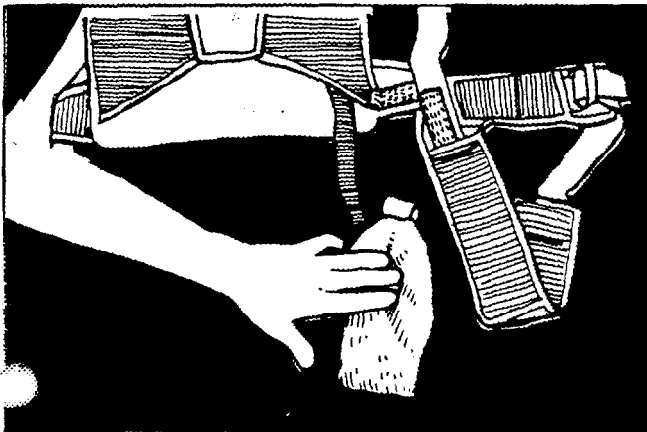
M. Fold **once** more in half, making a ve triangle.



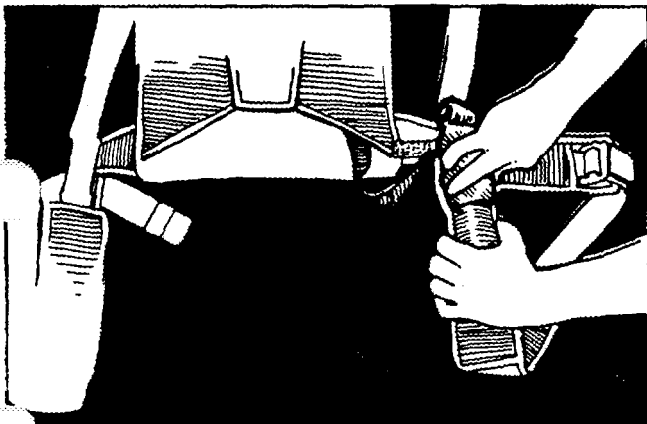
Note:

If your Vector II is set up for 'BOC' (Bottom Container mounting for hand deploy), see the following section for packing instructions.

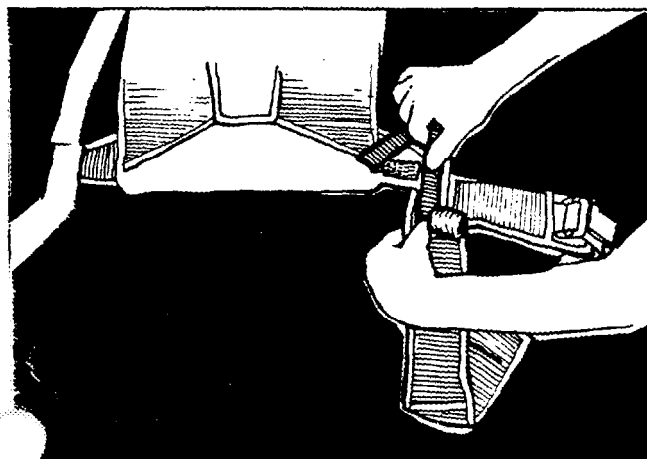
N. Fold the **pilot chute** in half so that the **handle** is even with the **skirt**.



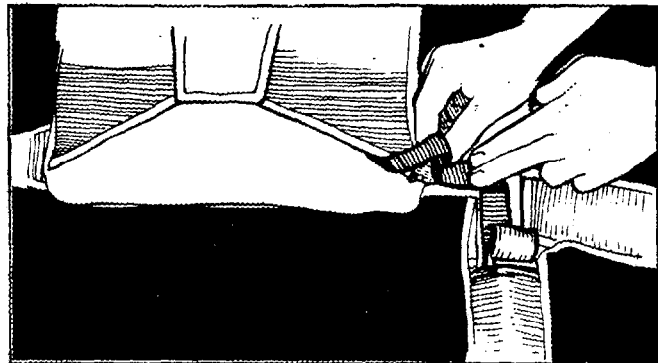
O. Stuff the folded **pilot chute** into the **Spandex pouch**, making sure only the **handle sticks out**.



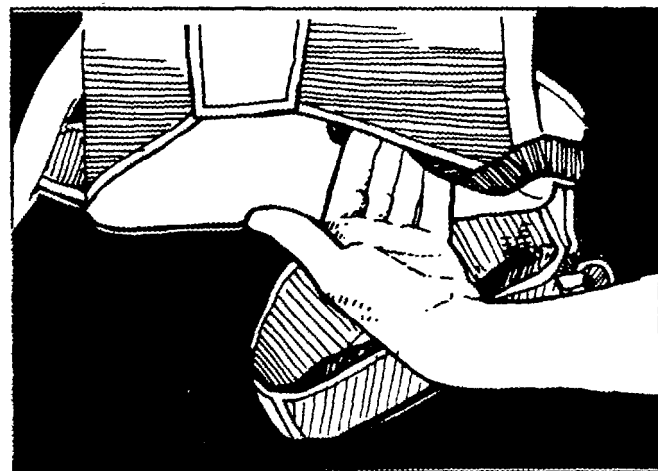
P. Mate the **velcro** on the **bridle** to that on the **harness**, starting at the **mouth of the pouch**.



Q. Fold the **bridle** over at a right angle where the **leg strap meets** the **diagonal** and continue **mat-**ing the **bridle** to the **container**.



R. If there is any extra **bridle** (there should be very little), stow it **under the right main side flap**.



WARNING

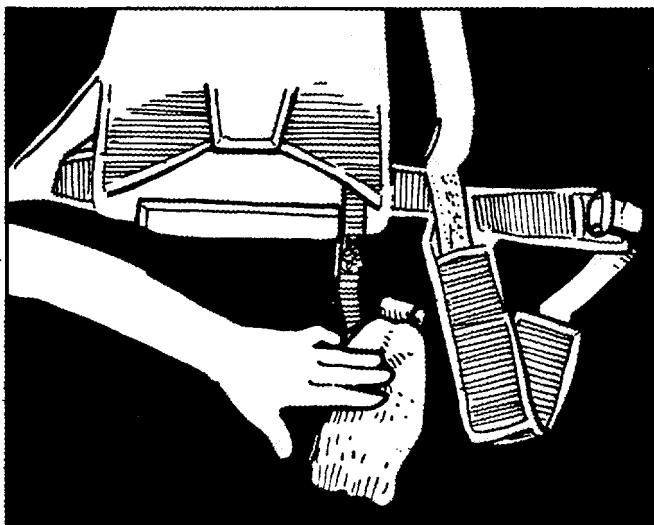
The force needed to **extract** the **cuned pin** must not exceed **12 lbs.** Adjust the length of the **locking loop** accordingly.

The **small patches of yellow Velcro** on the **bridle** and the **top Container flap** must be mated. Failure to do this may result in a **pilot-chute-in-tow** malfunction.

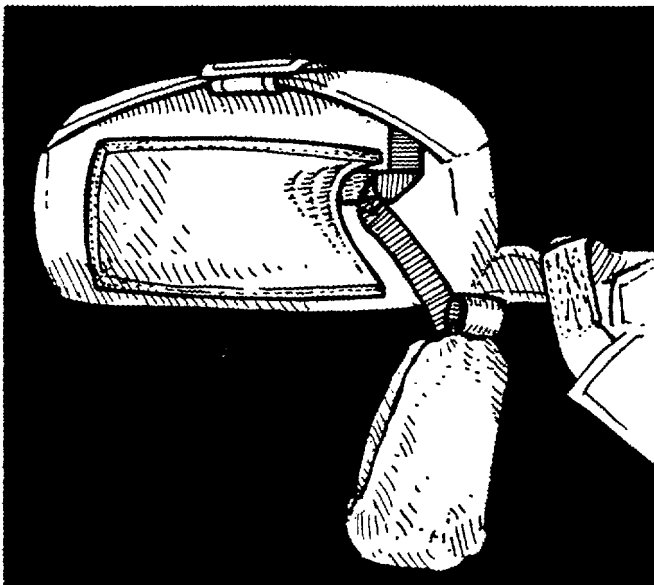
Never open the main **Container** of a **packed Vector** and **reclose** it without removing the **pilot chute** from its **pouch** and extending the **entire bridle**. Doing so increases the likelihood of **reclosing** the **Vector** incorrectly and causing a **pilot-chute-in-tow** malfunction.

Bottom of Container Mounting For Hand Deploy Pilot Chutes

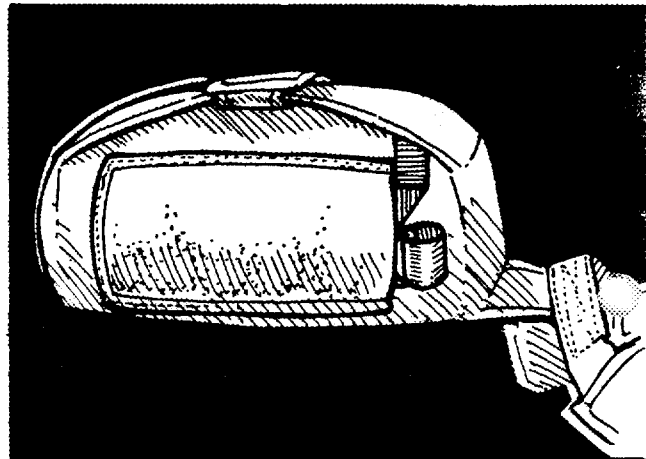
A. Fold the **pilot chute** following **steps H-N** on the previous **pages**. The **bridle** has two pieces of pile **Velcro** which are to be **mated** onto the two pieces of hook **Velcro** on the bottom main **#1 flap**. To **accomplish this**, you will have to make a **90 degree fold** in the **bridle**.



B. Before inserting the **pilot chute** into the pouch, pat the bottom of the rig to flatten-out the pouch area. Doing so will allow more room to insert the **pilot chute** and will prevent a **difficult extraction**.

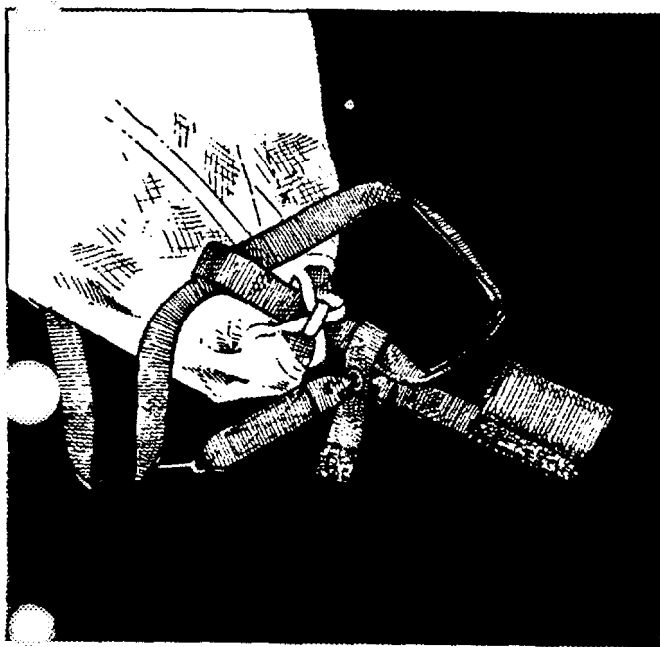


C. Insert the **pilot chute** into the pouch **until** only the **handle** is exposed. Once again, pat the pouch into a flatter shape which will **reduce** the amount of **force** necessary to **extract** the **pilot chute**.

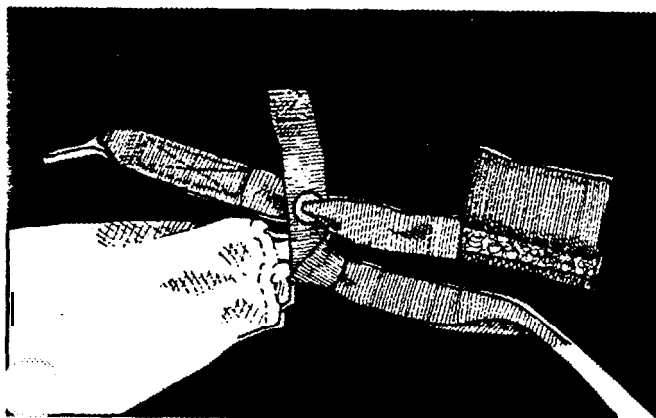


PACKING THE VECTOR II PULL-OUT DEPLOYMENT SYSTEM

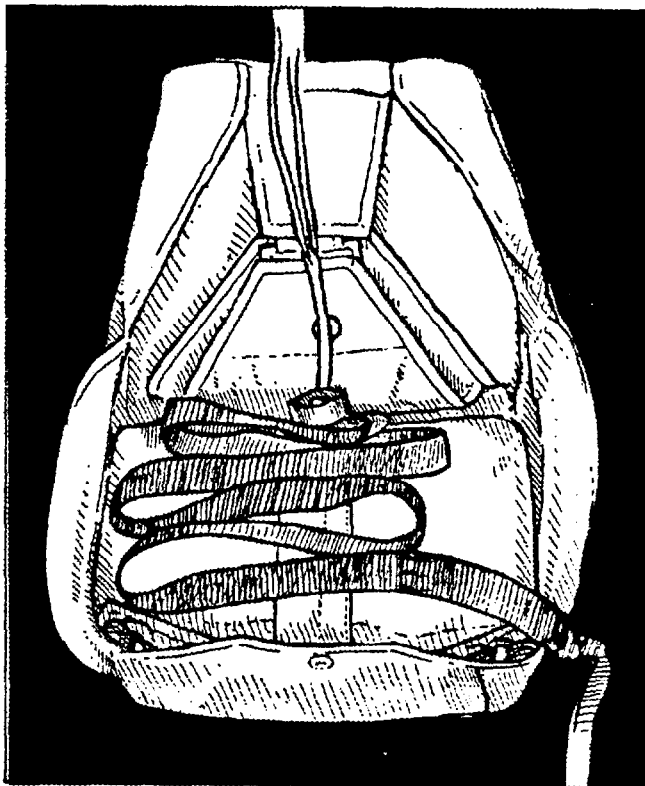
1. When a Vector 11 is to be set up with the pull-out main deployment System, the **bridle/pin** and handle setup must **first** be attached to the **pilot chute**. To do this, thread the end of the bridle with no Velcro on it through the loop on the **handle/pin** setup and then through the crossed tape and **center** line at the base of the **pilot chute**, and **finally**, back through the other end of the bridle .



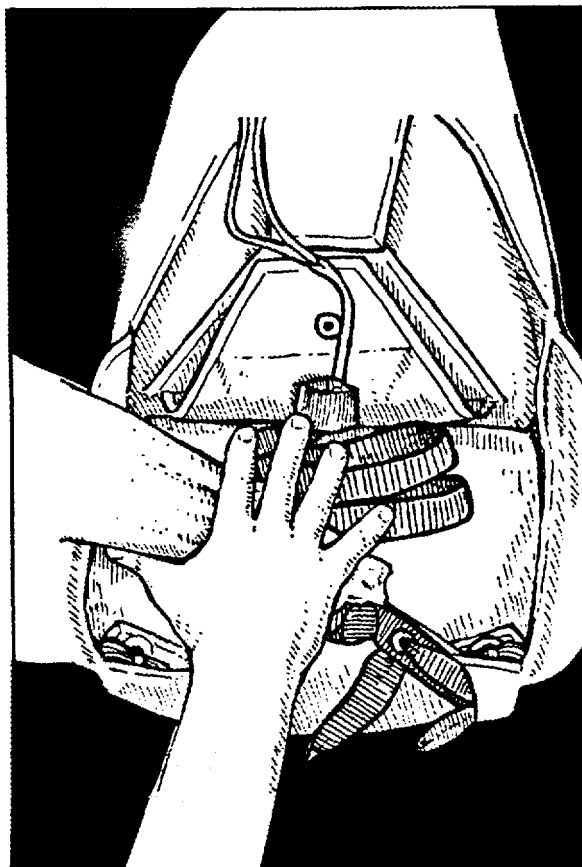
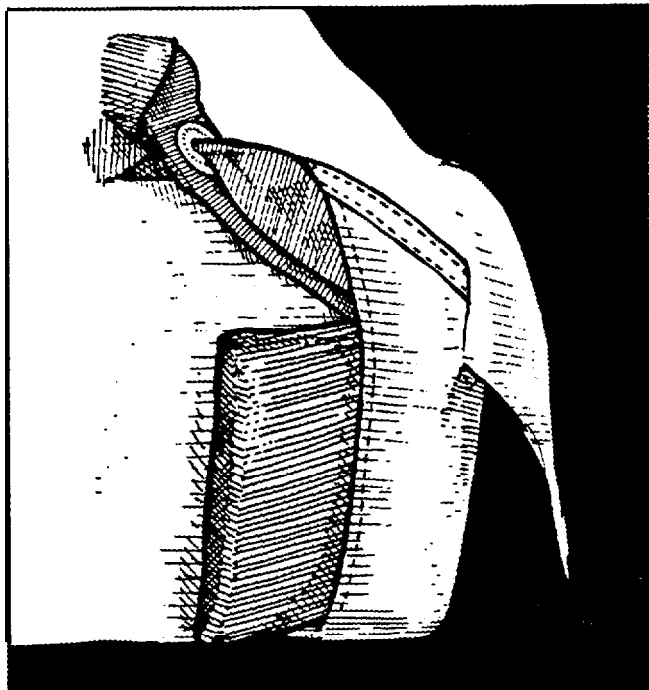
2. When tightened, the **pilot chute/handle/pin** setup should look like the **illustration** below.



3. When closing the main, place the bag in the pack tray as usual, with the lines at the bottom of the **container**. S-fold the bridle over the bag as shown below.

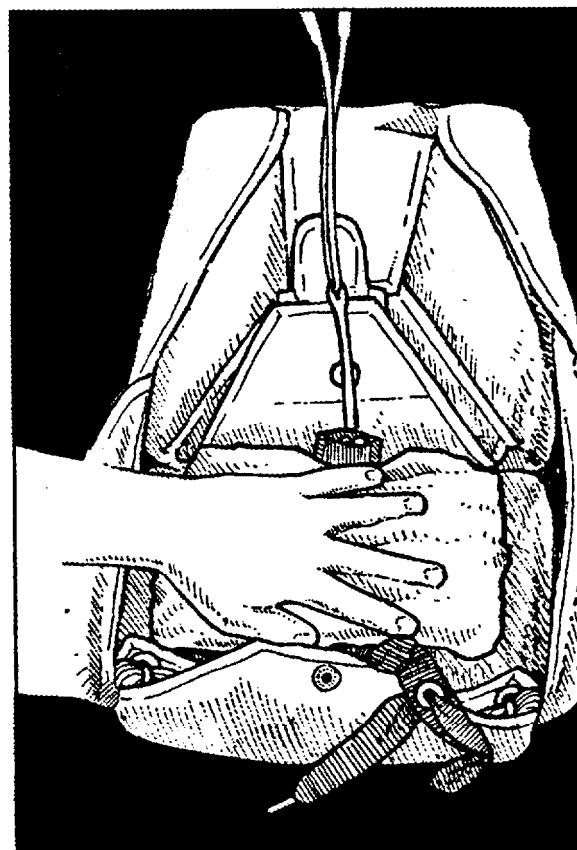


4. At the bottom right outside corner of the container is a flap. Secure the soft deployment handle to the Velcro **under** this flap, and the Velcro tab opposite the pin just above it **as** shown below.



5. Extend the pilot chute and lay the mesh section on the main bag **as** shown above at right.

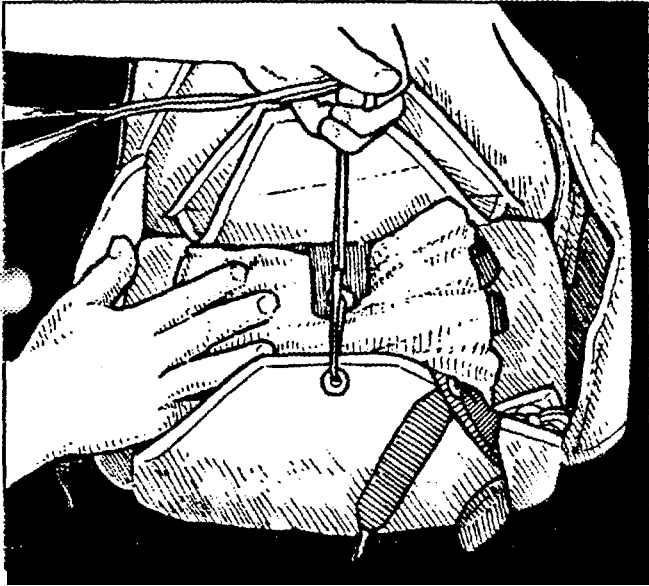
6. S-fold the stretched-out pilot chute on top of the bag so that it **fits** over the main bag, and is **centered** **as** shown at right.



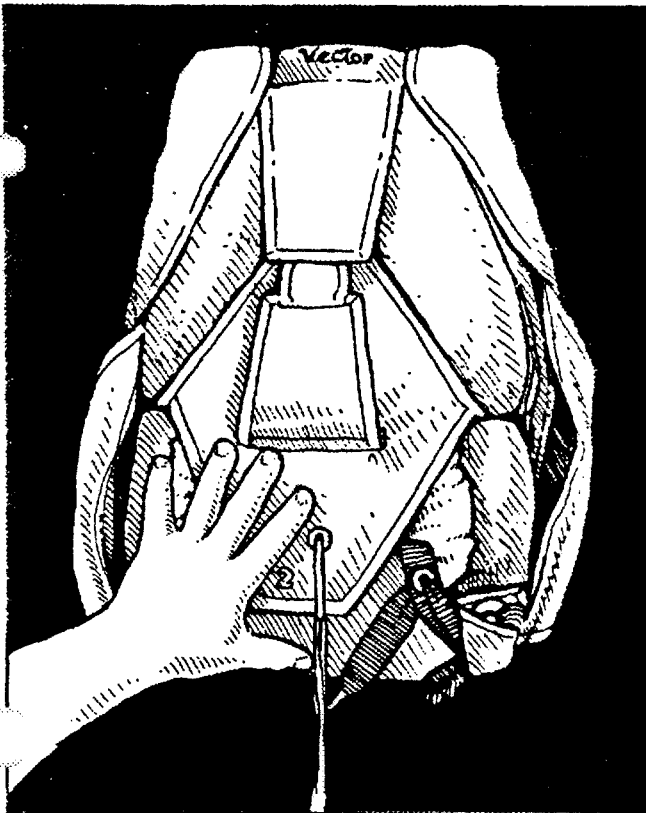
WARNING

DO NOT place pilot chute OR grommet with Velcro tab into the extreme right bottom corner of the Container. This could **cause** a hard pull, or **impossible** pull Situation if the grommet **becomes** lodged in the corner.

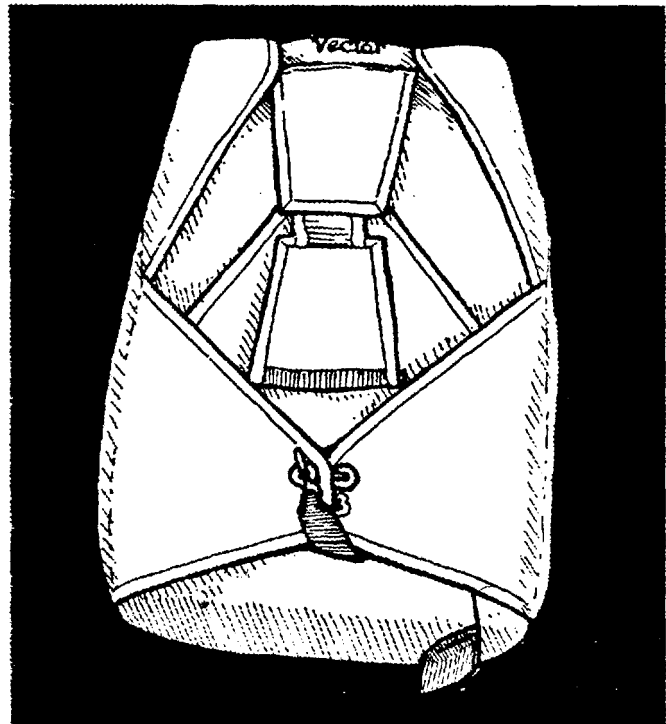
7. Thread a pull-up cord through the loop, and then through the bottom of flap #1 as shown in the illustration below, keeping the pin on the right side of the flap.



8. Close the top flap #2, again keeping the pin on the right and outside the flaps to the bottom, as shown below.



9. Close side flaps #3 and #4 and secure with the main pin as shown in the illustration below. Slowly remove the pull-up cord to prevent excess friction from damaging the locking loop. It's best to pass the pull-up cord under the pin while extracting it, as doing so will reduce wear on the loop. Close the main pin cover flap and be sure it completely covers the pin and bridle. Tuck any excess bridle under the right side flap.

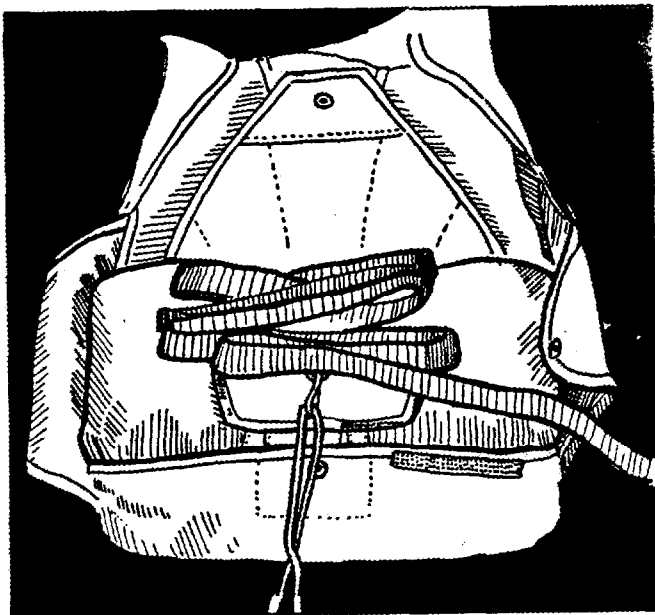


WARNING

Failure to remove pull-up cord before jumping will result in a "pilot-chute-in-tow" malfunction.

PACKING THE VECTOR II RIPCORD DEPLOYMENT SYSTEM WITH KICKER FLAP

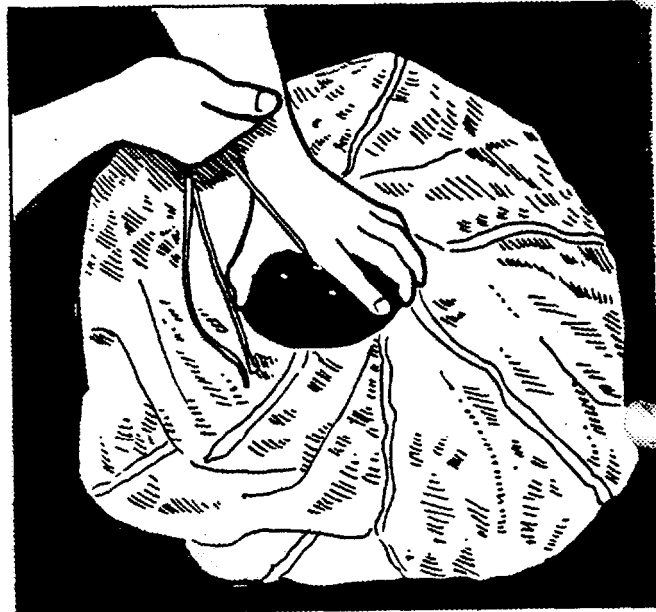
A. S-fold the **bridle** neatly on the **kicker flap**, then thread the pull-up **cord** through the loop on same flap.



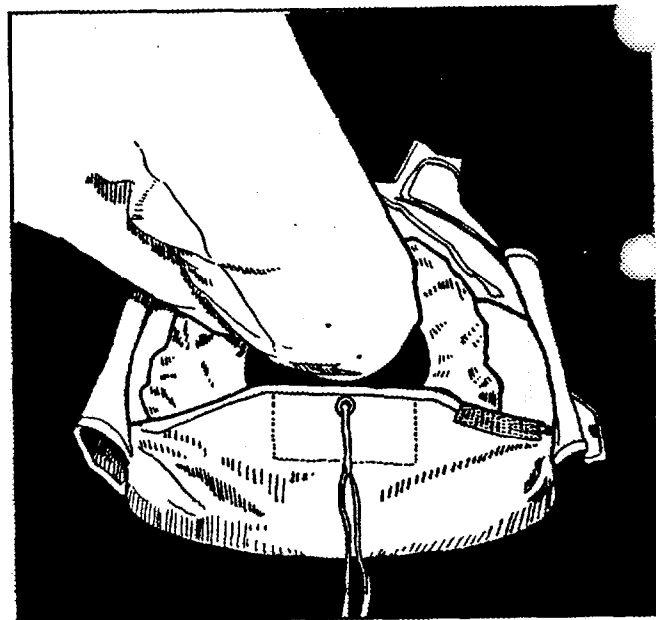
B. Thread the pull-up **cord** through the pilot chute **from** the bottom so it **comes** out of the **grommet** on the cap (top).



C. Compress the pilot chute on top of the **kicker flap**.



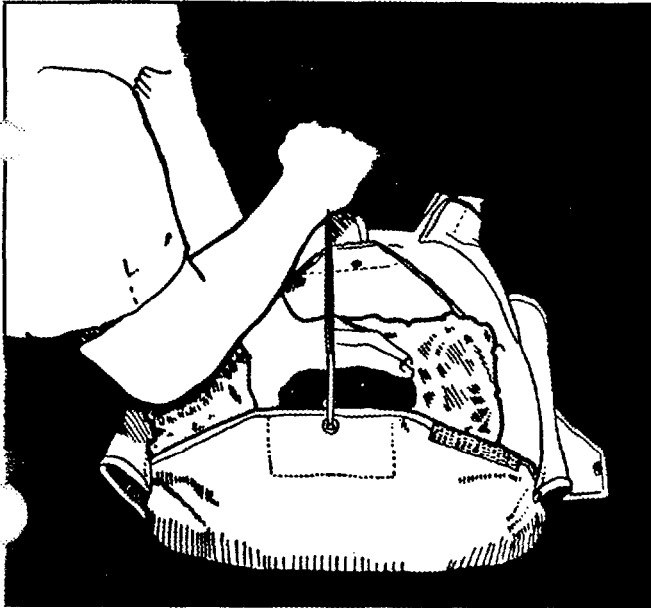
D. Use your knee to hold **pilot chute** in **place** and neatly fold the **pilot chute** material **to** within 2 inches of the **pilot chute** cap.



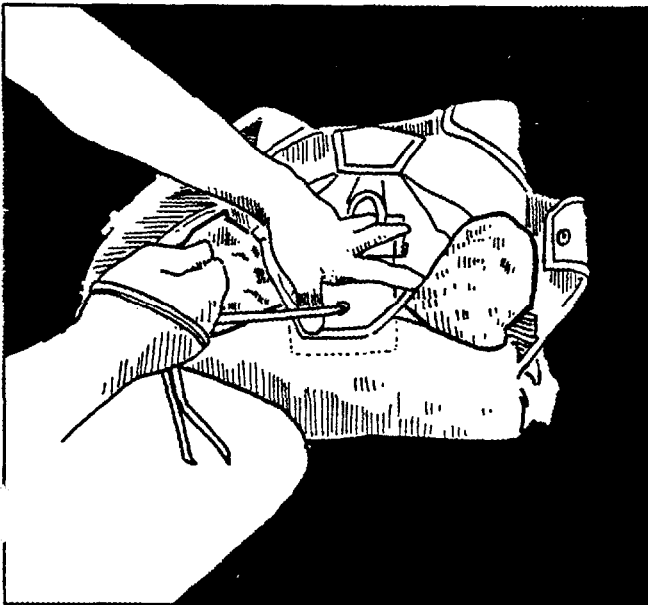
WARNING

Do not tuck pilot chute material around the sides of the bag. Doing this will inhibit pilot chute launch performance and possibly cause a dangerous pilot.... chute hesitation.

E. Keeping the pilot chute compressed, route the pull-up cord through the grommet on the bottom flap of the Container. Pull the pull-up cord upwards, towards the top of the container. Pat the bottom of the container until the locking loop comes through the grommet. Avoid over-stressing the grommet. Hold the locking loop in place with your knee.

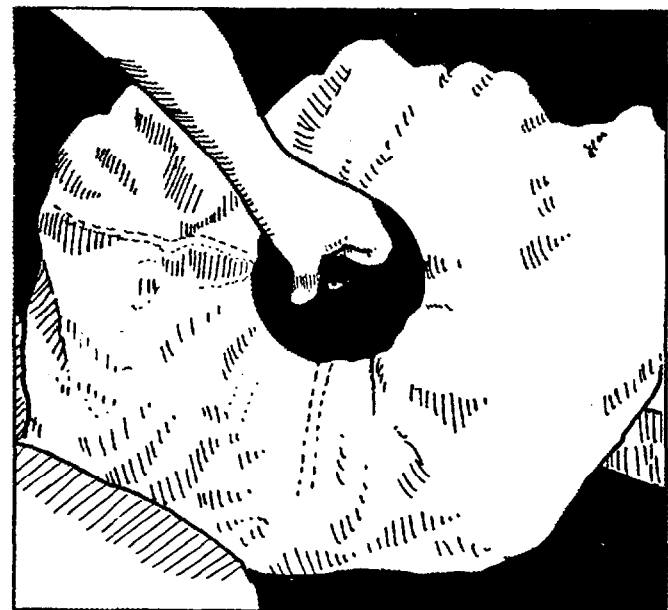
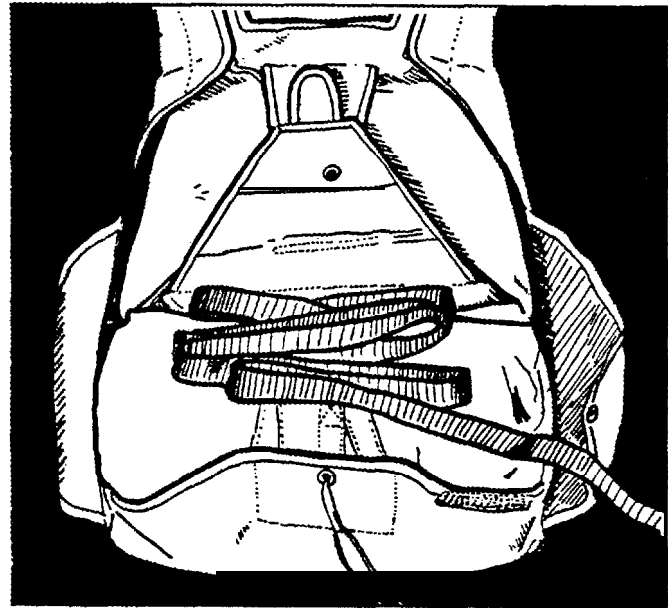


F. Route the pull-up cord through the grommet on the top flap and continue the closing procedure applicable to your system according to the instructions on page 24.



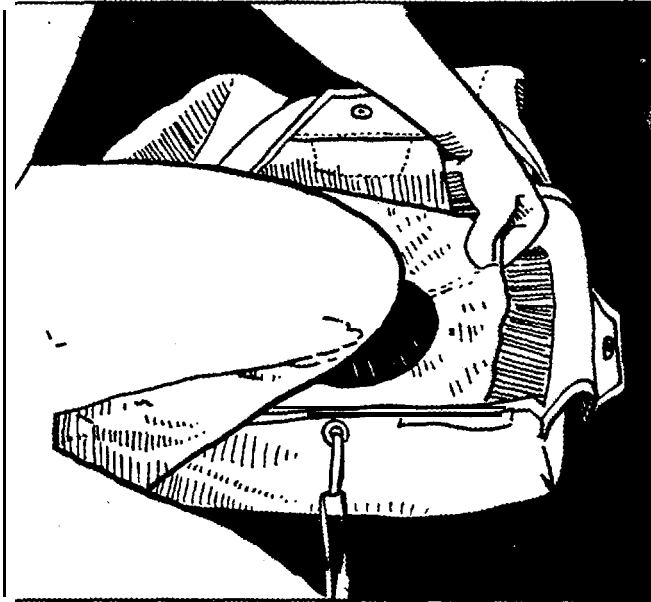
PACKING THE VECTOR II RIPCORD DEPLOYMENT SYSTEM WITHOUT KICKER FLAP

A. Insert the main ripcord into the housing. Place the bag in the pack tray as usual, with the lines at the bottom of the Container. Neatly S-fold the bridle over the bag and insert the pull-up cord through the loop on the bottom flap.

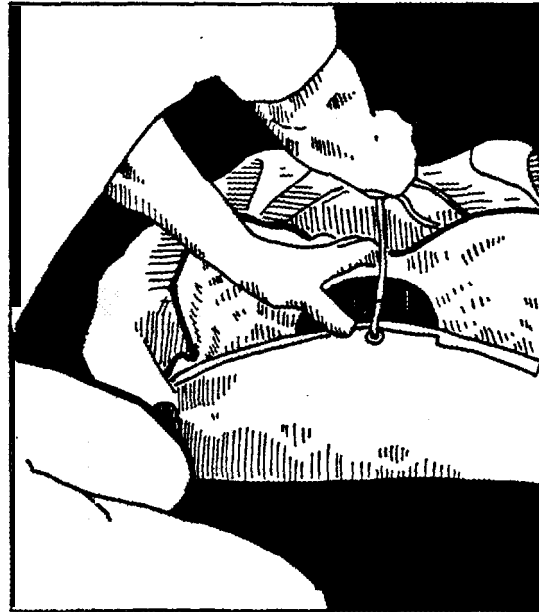


B. Center and compress the pilot chute on top of the bag.

C. Use your knee to hold **pilot chute** in **place** and **neatly** fold the **pilot chute** material to within 2 inches of the **pilot chute** cap.



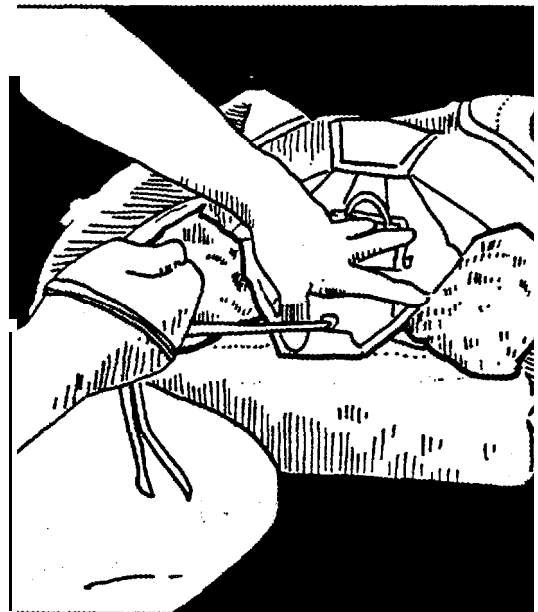
D. Keeping the **pilot chute** **compressed**, the bottom flap over the **pilot chute** cap.



E. Route the **pull-up cord** through the **on** the top flap and continue the **closing** **applicable** to your **system** according to the **tions** on page 24.

WARNING

Do not tuck pilot chute material around the sides of the bag. Doing this will inhibit pilot chute launch performance and possibly cause a dangerous pilot chute hesitation.



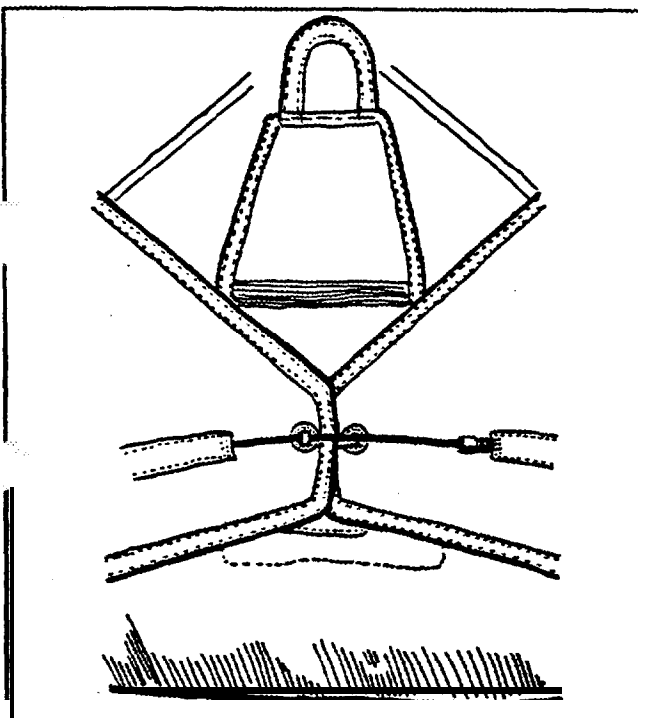
ABLE-TYPE RIPCORD CLOSURE

Close the right side flap, and then the left side flap. Insert the end of the black cable through the locking loop and then into the channel on the left side flap.

Note:

The angle at which the main ripcord housing lays on the right side flap may vary, but the flap closing order remains the same.

Slowly remove the pull-up cord to avoid burning the cable or locking loop from excess friction. Close the pin cover flap.



WARNING

REMOVE THE PULL-UP CORD OR THE CONTAINER WILL NOT OPEN.

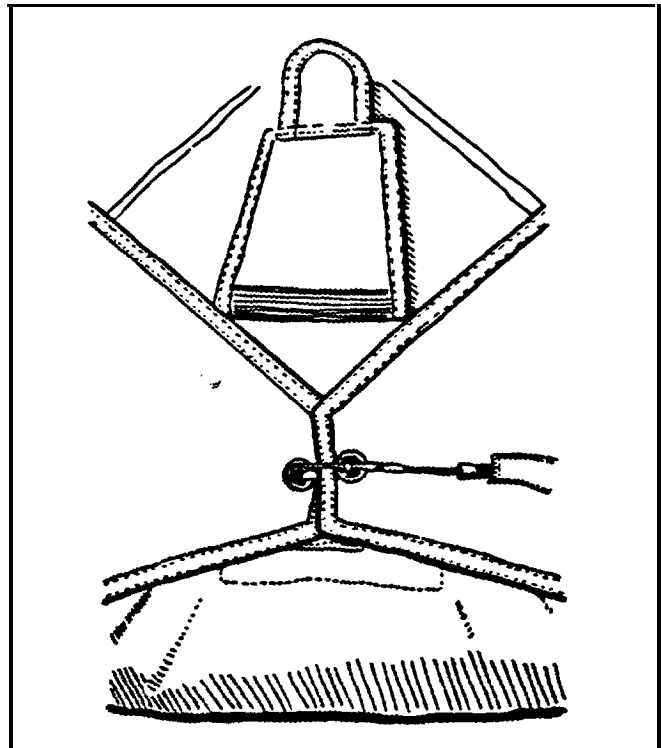
PIN-TYPE RIPCORD CLOSURE

Close the left side flap, and then the right side flap. Insert the end of the pin through the locking loop.

Note:

The angle at which the main ripcord housing lays on the right side flap may vary, but the flap closing order remains the same.

Slowly remove the pull-up cord to avoid burning the locking loop from excess friction. Close the pin cover flap.



WARNING

REMOVE THE PULL-UP CORD OR THE CONTAINER WILL NOT OPEN.

ATTENTION RIGGERS

Before packing any Vector, be sure all TSO Labels are properly in **place**. If the rig was built before warning labels **came** into use, then all TSO information will be on the label **sewn** to the packing data **card** pocket (under the Vector logo). If the rig was built after warning labels **came** into use, then all TSO information will be on the warning **label**.

If the warning label has been removed from the rig do not pack the reserve. Removal of a warning label invalidates any and all TSO **ap**-provals. if you **suspect** a warning label has been removed, check for a TSO label on the packing data **card** pocket. If there is no TSO tag on the pocket, then the warning label has **probably** been removed.

DO NOT PACK ANY RESERVE JNTO A RIG THAT HAS HAD ITS WARNING LABEL REMOVED. REMOVAL OF THE WARNING LABEL VOIDS ANY AND ALL FAA TSO AP-PROVAL.

Before installing any reserve canopy into a Vector II harness/container System, check the pack volume of the reserve canopy to be sure it is compatible with the size Container that it will be packed into.

Appendix A & B on the following pages define the Vecior II Container pack volumes and the known pack volumes of many different reserve and main canopies. ifyou are in doubt regarding the compatibility of the canopies which you are packing, call the Relative Workshop for clarification.

Appendix A

Tips on Sizing Your Vector II

This chart was designed to give you an idea which main and reserve canopies are compatible with one another in the Vector II harness/container system. If you already have a preference for a certain main and reserve canopy, then check the known pack volume in Appendix B and determine if they will fit in the same container. If not, then another main or reserve must be selected.

If you are going to be installing an FXC automatic activation device, you need to add 45 cubic inches to the pack volume of your reserve canopy.

Both Appendix A & B should serve as a reference *only* when determining which Vector II container will best fit your canopies. Many factors influence a canopy's pack volume in the Vector II including humidity, temperature, color of fabric, experience of the packer as well as the date when the parachute was manufactured.

Several years ago the industry was confronted with the 'mystery bulk condition.' It caused many of the newly manufactured canopies to increase in volume as much as 20% over canopies that were produced only a few years earlier. The industry wasn't prepared for this surprise and consequently many containers were built that were too small for their intended parachutes.

Tips

1) On your order form, give all the information about your canopies: The date of manufacture (or state that it is a new canopy), the type of suspension line, etc.

2) Whenever possible, size the container to fit the mid-range of the stated pack volume.

3) If you are a dealer ordering a Vector II, please let us know the state or country of origin of your customer. This will help us decide if the Container fit is borderline.

Example: A V5 has a main pack volume range between 425-550 cubic inches. When choosing canopies, keep in mind that a main canopy with a stated volume of 548ci may not fit. The reason

This chart shows the pack volume (in cubic inches) of the various sizes of Vector Containers. If a canopy has a packed volume within the given range, it should fit comfortably.

Size Designation	Type	Main		Reserve	
		Min.	Max.	Min.	Max.
EST-2	ET	225	260	200	240
EST-3	ET	260	320	250	300
EST-4	ET	300	360	250	300
VI-1	ET	280	350	250	280
V1-2	ET	360	420	270	350
V2-2	ET	400	480	300	390
V3-1/2	S	390	490	300	390
v4	S	390	490	330	430
V4-1/2	S	450	550	350	480
V5	S	425	550	330	430
V5-1/2	S	450	580	350	480
V8	Std.	460	580	350	500
V9	Std.	550	700	425	530
V9-1/2	Std.	550	700	515	645
V10	Std.	610	780	425	530
V10-1/4	Std.	610	780	515	645
V10-1/2	Std.	800	1000	425	680
V11	Tandem	675	960	850	960
v 1 2	Tandem	900	1100	900	1000
V13	Tandem	1050	1300	960	1100
SM STYLE	S/Std.	Wo-690		270	370
REG STYLE	S/Std.	750	900	350	420

is canopies which are the same model, produced by the same company, but are made of different colored fabrics or manufactured at different times can have a pack volume that varies quite a bit.

We have found that the pack volumes given by the canopy manufacturers are usually 5-20% less than the actual pack volumes that have been determined by the Parachute Industry Association.

If you jump in regions that have low humidity, such as Colorado or Arizona, you may need to go up one Container size for the canopies to fit properly.

For this reason the Relative Workshop reserves the right to change the Container size when we know your choice will not fit. In most instances, you will be informed of the change.

Also consider that a canopy with a pack volume at the low-end of the scale will pack easier and will be more comfortable than a canopy that is at the high-end of the scale, which will be more difficult to pack and potentially less comfortable to wear.

Note: This information is subject to change at any time without incurring any Obligation whatsoever.

MAINS

Aquilon 240	551
Aquilon 260	599
Aquilon 280	588
Astrobe 215	417
Atlantis 217	440
Avenger 214	457
Blue Track-BT 40-125	365
Blue Track-BT X-150	400
Blue Track-BT 60-175	430
Blue Track-BT 65-195	460
Blue Track-BT 80-420	N/A
Bogey 178 (6-87)	378
Bogey 220 (6-87)	474
Bogey 8-183 (6-87)	471
Challenger RW 160	400
Challenger 162	600
Challenger FW 180	450
Challenger 180	625
Challenger 108	660
Challenger RW 200	480
Challenger 208	680
Challenger 218	710
Challenger FW 220	530
Challenger 228	750
Challenger 238	785
Challenger RW 240	800
Challenger 259	825
Challenger FW 260	620
Challenger 281	860
Challenger 304	910
Challenger 310	780
Challenger 328	975
Clipper 187 (3-85)	432
Clipper 187 (4-87)	487
Cloud Delta 240	569
Cricket 147	370
Cricket 147 (6-87)	385
Cruisette 220	476
Cruisette Beta 175	369
Cruisette XL 241	554
DC-5 282	556
Evolution 140	395
Evolution 180	480
Evolution 200	510
Evolution 240	580
Excalibur 120	443
Excalibur 135	474
Excalibur 150	487
Excalibur 170	514
Excalibur 190	550
Excalibur 210 (1-89)	610
Excalibur 230	N/A
Falcon 150	351
Falcon 175	384
Falcon 195	427
Falcon 215	480
Falcon 235	518
Falcon 265	584
Falcon 300	662
Firelite 177 (4-87)	449
Firelite 177 (8-86)	410
Fury 220	496
Fury 220 (5-85)	454
Fury 220 (5-87)	538
Gemini 9-260	537
Hummingbird 137 (6-87)	381
Interceptor 180	428
Interceptor 200	476
Interceptor 225	535
Interceptor 250	504
Laser 250 (5-87)	526
Laser 5170 (3-87)	375
Laser 7-228 (4-87)	490
Laser 8-261 (4-87)	582
Laser 9-290 (4-87)	629
Lepton 202	465
Man O-War 319 (8-86)	629
Manta 288 (4-84)	621
Manta 288 (5-87)	701
Marauder	547
Maverick 200	452
Maverick	562
Mercury 7-200	411
Merlin 206	475
Meteor 213	482
Nimbus 225	537
Nimbus Beta 185	454
Nimbus XL 270	623
Para Foil 200	547
Para Foil-232	611
Para Foil-252	677
Para Foil-252	740
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3. Reserve Assembly Procedures

This chapter contains procedures for:

1. Attaching Vector II steering toggles to ram-air reserves.
2. Installing the Vector reserve lanyard (reserve line or RSL).
3. Installing automatic activation devices (AADs).

Attaching Ram-Air Reserve Steering Toggles

Study the owner's manual for the reserve canopy before attaching the toggles to the steering lines. That manual contains important information pertinent to that particular make and model of canopy.

The Vector II is supplied with steering toggles for the reserve canopy that are compatible with the Vector risers. It is important that the toggles and risers be compatible to prevent malfunctions.

It is also important that the toggles be located along the steering lines so the canopy is in a true no-brake mode when the toggles are resting against the guide ring. If not, the canopy won't glide or land correctly.

Likewise, if the toggles are mounted too far down the steering lines, the canopy will be less re-

sponsive and the jumper might not be able to apply full brakes or stall the canopy. This can make it difficult to flare the canopy properly for landing.

These situations are likely to occur when a canopy is hastily switched from one set of risers to another. If the guide rings on both sets of risers are not located the same distance from the connector links, the steering toggles must be moved to another location on the steering line.

Note:

Reference-Guide ring location on the reserve riser: The standard distance from the end of the reserve to the center of the guide ring is 4'(+/-1/4'). Most harness/container manufacturers use this distance when constructing their Systems.

Procedure

If the reserve is equipped with Dacron (polyester) steering lines, use Method A. If it is equipped with small-diameter Spectra (Microline), use Method B.

Attach the canopy to the risers following the canopy manufacturer's instructions. Double-check the orientation of the canopy and the continuity of the lines. **Insure** the links are tightened **correctly**.

Method A—Dacron Steering Lines

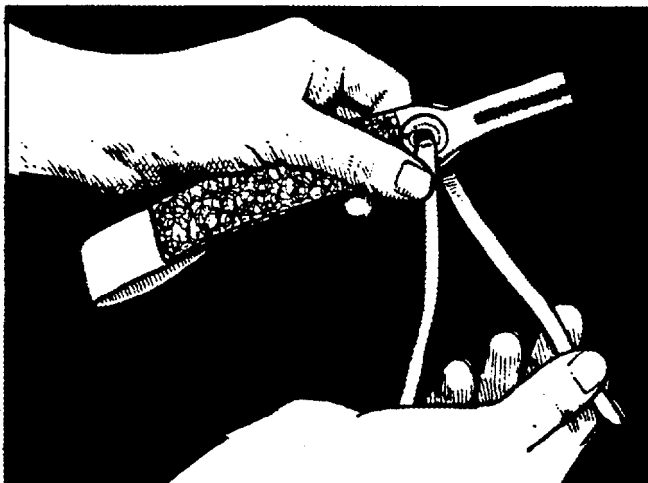
After the canopy **has been** properly attached to the **risers** and **while** it is still laid on its side, attach the toggles to it by following **these steps**:

1. Starting at the tail of the canopy, **trace** the upper steering lines down to the **lower steering line**. The idea is to be **sure** the steering lines are routed correctly; they should not wrap around any **suspension** lines. The right-hand steering line must pass through the right-hand rear slider grommet, and the left-hand line must **pass** through the left-hand rear slider grommet.

2. **Locate** the mark on the steering line that **indicates** the correct toggle location. Note: Verify that this mark is in the correct location by referring to the **reserve** canopy owner's **manual**.

3. Pass the steering line through the guide ring on the **riser**.

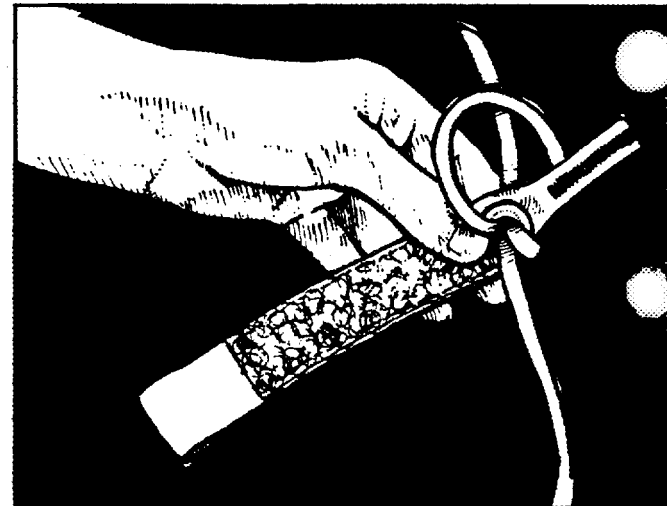
4. Pass the end of the steering line through the grommet in the Vector steering toggle, starting with the side with the Velcro pile. **Adjust** it so the mark on the steering line is **close** to the grommet but hasn't **passed** through it.



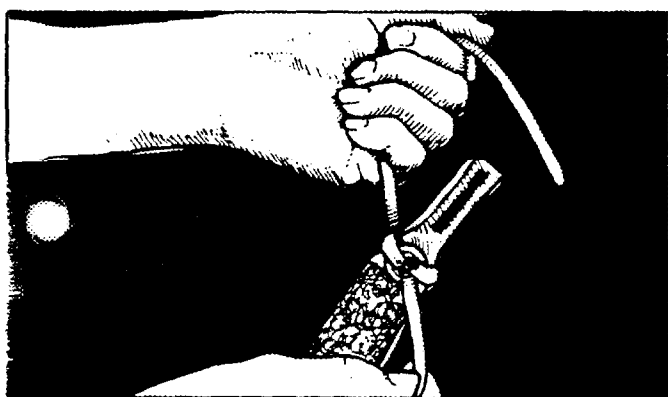
5. Loop the **running** end around the toggle and thread it through the grommet again and **pull** it **snug**. Be **sure** the mark remains in the correct **place**.



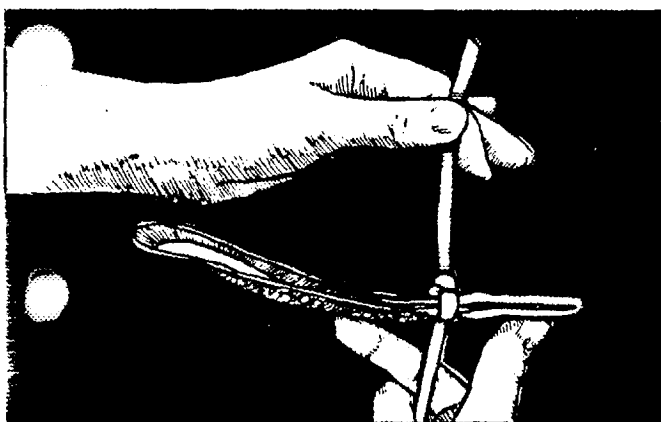
6. Loop the **running** end around the other side of the toggle and pass it through the **grommet** once again.



7. Grasp the line on both sides of the toggle and pull it tight. Note that the Velcro side of the toggle faces the canopy. The line does a "figure 8" through the grommet and exits on the other side of the toggle. Again check the mark to be sure it is in the right place.



8. Tie an overhand knot in the free end of the line and tighten it right down to the toggle. Be sure it is snug, or the toggle may slip off the line.



9. Check the canopy with the deployment brakes set and not set to be sure it is correctly configured. The canopy owner's manual contains the proper brake settings and steering line lengths; there are no standardized dimensions. Unless the lines are of proper length, the canopy may not open or fly correctly.

10. Once the measurements have been verified, tighten the overhand knot at the toggle. It is generally not a good idea to cut off the excess steering line, as you might want to adjust the toggles after the canopy has been jumped. Any excess line should be daisy-chained on itself.

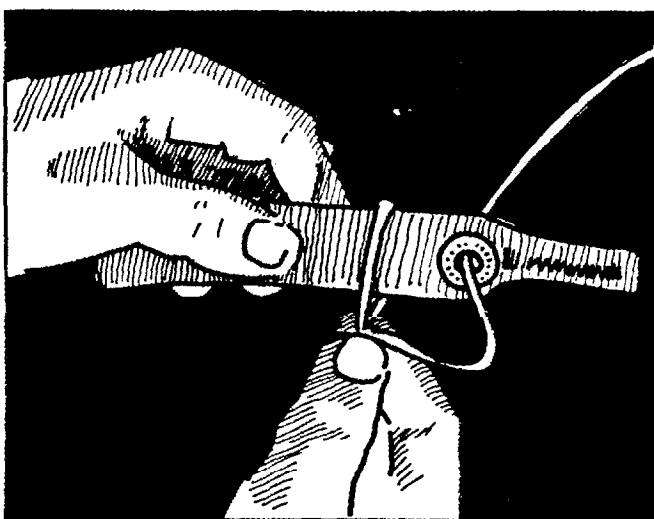
11. Inspect the installation. Check to be sure the steering lines are routed correctly.

Method B—Spectra Steering Lines

1. Starting at the tail of the canopy, trace the upper steering lines down to the lower steering line. The idea is to be sure the steering lines are routed correctly; they should not wrap around any suspension lines. The right-hand steering line must pass through the right-hand rear slider grommet, and the left-hand line must pass through the left-hand rear slider grommet.

2. Locate the mark on the steering line that indicates the correct toggle location. Note: Verify that this mark is in the correct location by referring to the reserve canopy owner's manual.

3. Route the steering lines through the guide ring on the riser. Then route it through the grommet on the toggle, starting with the side with Velcro. Wrap the steering line around the outside of the toggle, over the grommet. The mark on the steering line that indicates correct toggle position should be 1-1/4 in. (3 cm) from the side of the toggle.

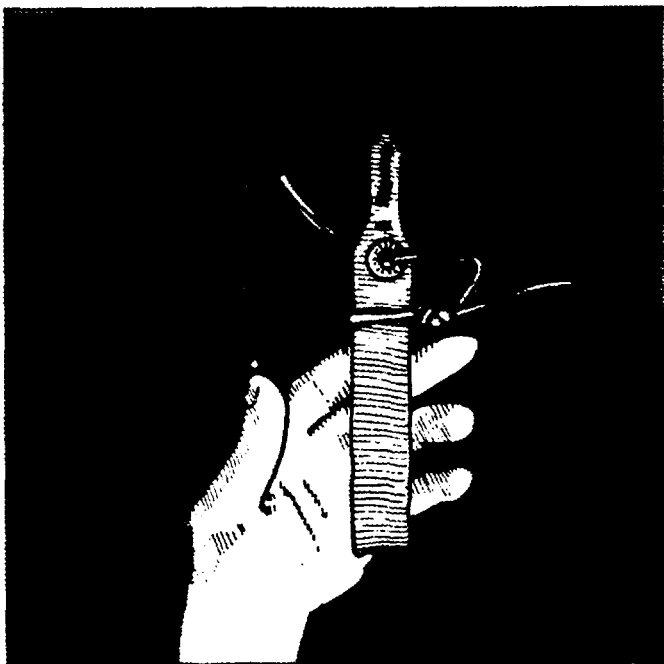


4. Slide the line off the looped end of the toggle and tie a loose overhand knot in the folded line.

5. Now slide the line back over the toggle. Adjust the knot until the mark is just outside of the knot away from the toggle. The loop should fit closely around the toggle. Tighten the knot.

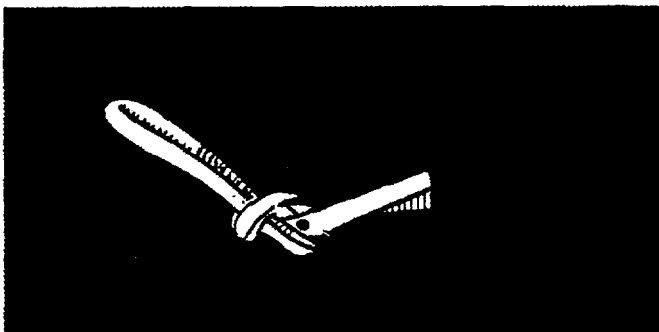
6. Pull on the steering line to draw the knot back up to the grommet. Daisy chain, finger trap or

tack the excess end of the steering line to the **tog-**
gle. Don't **cut** the extra **off**; you may wish to **adjust**
the toggle position later.



7. Repeat the procedure for the other toggle.

8. Inspect the installation. Check to be **sure** the
steering **lines** are routed **correctly**.



Installing a Reserve Lanyard (Reserve Static Line)

Installation without AAD

1. Inspect the RSL: Check that the snap shackle is operating smoothly and that the spring will retain the locking pin. Be **sure** the Velcro is clean and **sufficiently tacky** to hold the reserve lanyard. The pin should be curved **from** the eye to halfway down its length. The rest of the pin should be straight.

2. Route the RSL along its Velcro path from the right-hand riser. **Insert** the pin-end of the RSL through the guide ring on the **#5** top reserve flap. Mate the **patch** of yellow pile Velcro on the top reserve flap.

3. After threading the reserve ripcord through the housing and placing the ripcord handle into its pocket, insert the RSL pin through the loop at the end of the reserve ripcord cable.

4. **Place** the rig on a clean surface with the **backpad facing up** and walk on it with **stocking feet** or clean shoes to help expel air **from** the Container and make it flatter.

5. Replace the **temporary** pin with the reserve pin. Slip the pin **under** the pin flap protection just **below** the grommet.

6. Attach the main **parachute risers** to the **harness**.

7. **Hook** up the **reserve** lanyard shackle to the

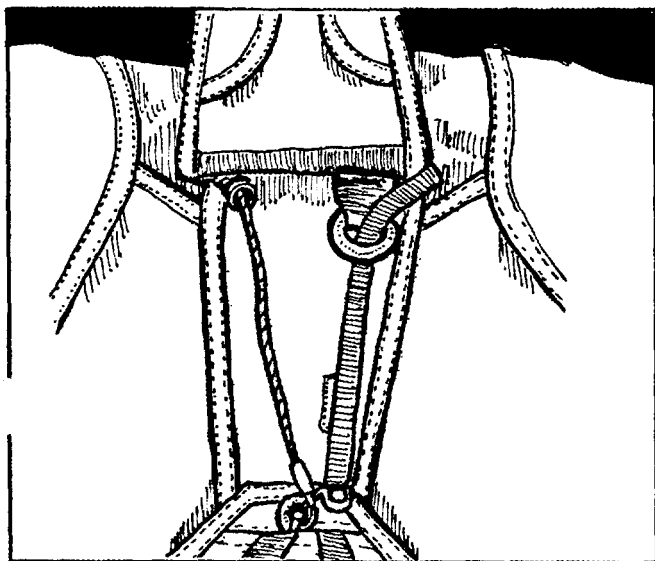
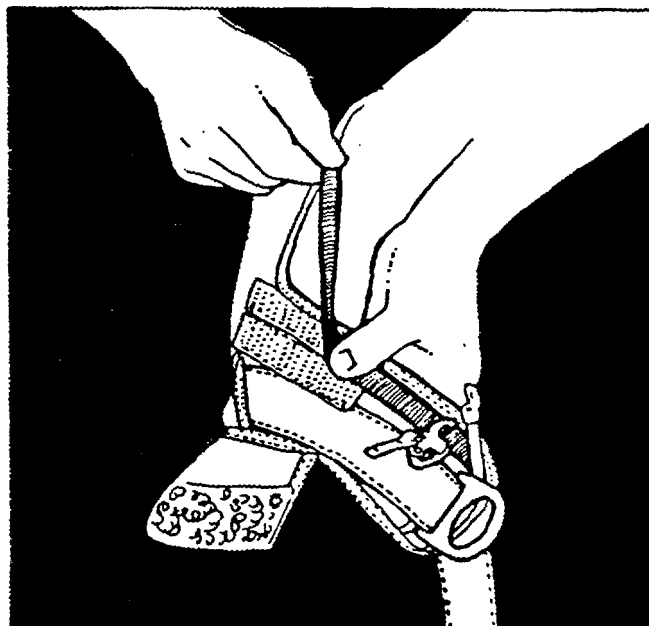
ring on the right-hand riser and mate the lanyard Velcro to that on the **comfort pad**.

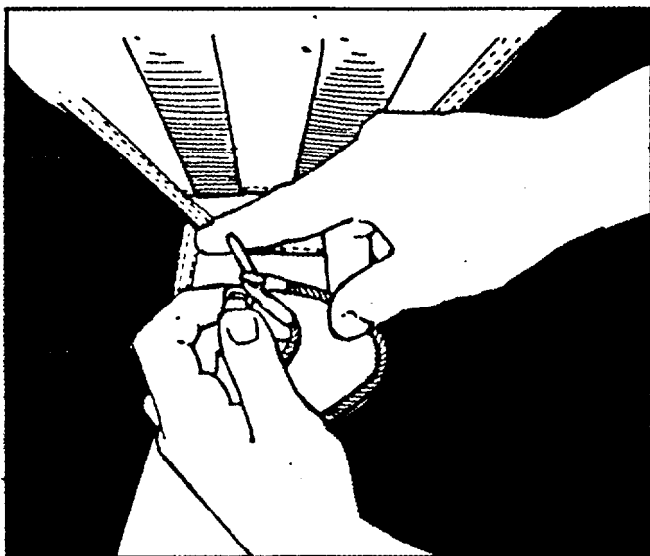
8. Dress the **container, seal, sign** and log the reserve-

9. Count your tools.

Installation with an AAD

1. Inspect the reserve lanyard. Check that the snap shackle is operating smoothly and that the spring will retain the locking pin. Be **sure** the **Velcro** is clean and **sufficiently tacky** to hold the **reserve** lanyard. The pin should be **curved** from the eye to halfway down its length. The rest of the pin should be straight.

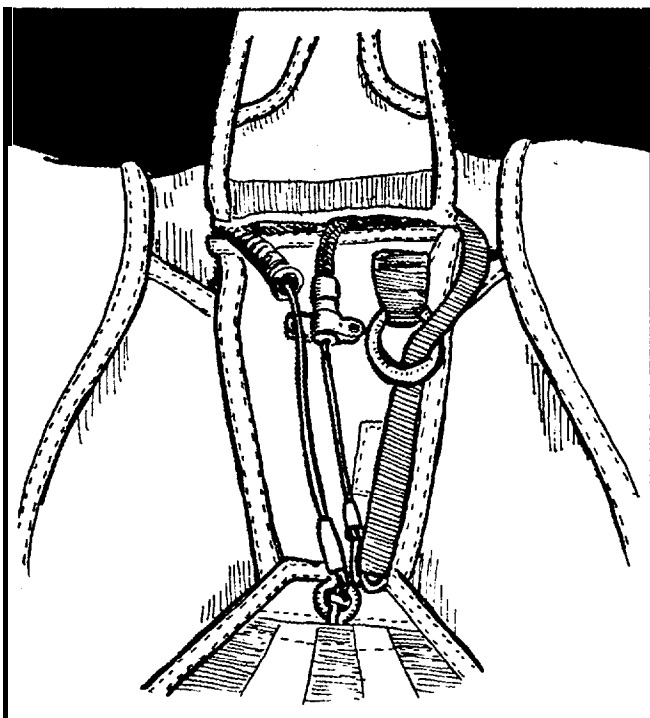




2. Route the reserve lanyard along its Velcro path from the right-hand riser. Insert the pin end of the RSL through the guide ring on the #5 top reserve flap. Mate the patch of yellow pile Velcro to the patch of hook Velcro on the top reserve flap.

3. Referring to the manual for the particular AAD, inspect the device. Make sure it is armed.

4. Thread the curved lanyard pin through the eyelet on the terminal end of the AAD cable. Note the angle of the hole in the terminal end; it must correspond to the angle of the inserted pin.

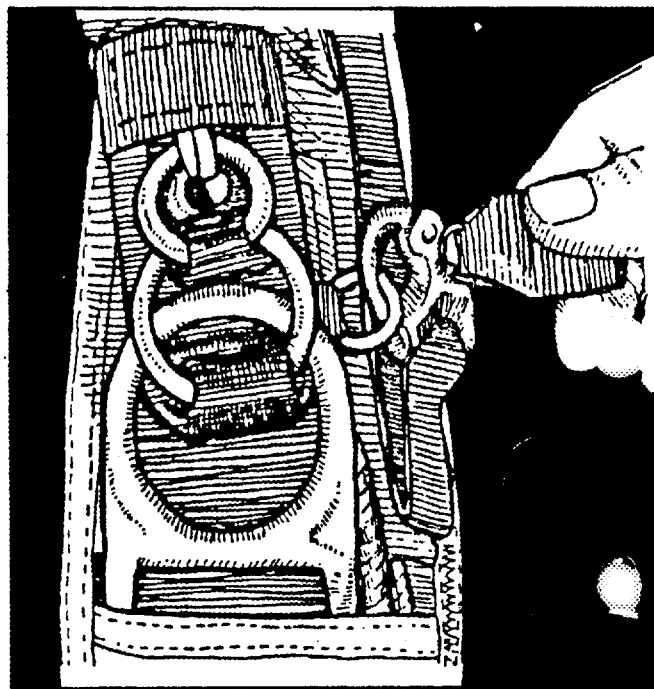


5. After threading the reserve ripcord through the housing, insert the lanyard pin through the 'p' at the end of the reserve ripcord cable. If the pins are aligned properly, the cables should run straight from the reserve pin to their housings.

6. Replace the temporary pin with the reserve pin. Slip the pin under the pin flap just below the grommet. Insert the ripcord handle into its pouch on the main lift web.

7. Attach the main parachute risers to the harness.

8. Hook up the reserve lanyard shackle to the ring on the right-hand riser and mate the lanyard Velcro to that on the comfort pad.



9. Dress the container, seal, sign and log the reserve-

10. Count your tools.

Installing Automatic Activation Devices

The FAA classifies the installation of an AAD as a major alteration. Therefore, it must be done by a Master Rigger. A Master Rigger rating is still required even if the system is already prepared by the Relative Workshop to accept the AAD.

The following AADs are approved for installation on the Vector II's reserve container: All models manufactured by FXC Corporation; and the SSE Sentinel Mk 2000.

The following AADs are approved for installation on the Vector II's main Container: All models by FXC Corporation; Irving Height Finder FF-2; KAP-3; and the SSE Sentinel Mk 2000.

Because these AADs are manufactured and serviced by companies not associated with the Relative Workshop, the owner must direct questions on calibration, use, maintenance, testing and upgrades to the AAD manufacturer. Nothing in this manual is meant to contradict any instructions or advice from the manufacturers of these devices.

An AAD is a back-up emergency device that, like any complex mechanical device, is subject to failure or malfunction. It is not a Substitute for proper training and supervision.

Both the Sentinel Mk 2000 and the FXC 12000 are delivered with installation kits that contain various brackets, screws, mounting plates and terminals to accommodate various types of parachutes

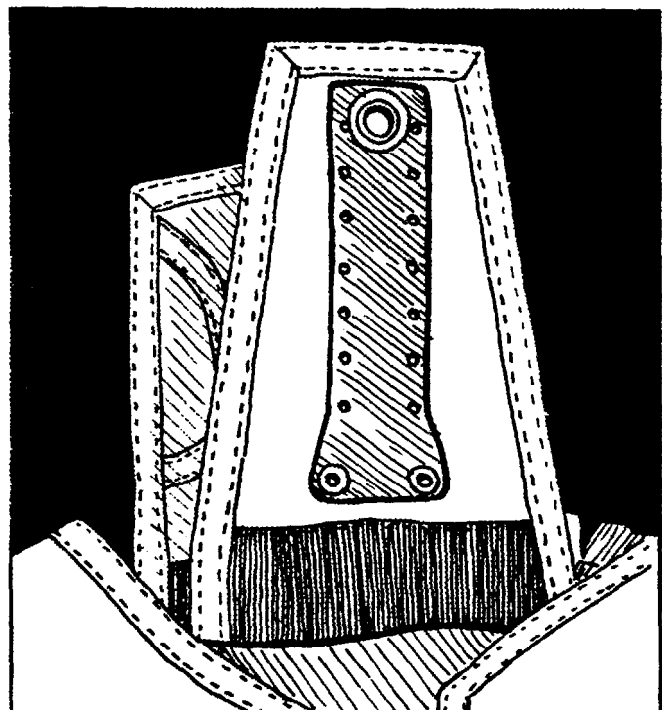
These components must be used to correctly install these devices on the Vector II.

Installing the Pin Puller Version of the SSE Sentinel Mk 2000.

1. Inspect the entire AAD assembly. Perform a calibration check to insure the pyrotechnic charge is in good shape.
2. Remove the grommet from the top reserve flap (Flap #5).
3. Position the mounting plate on the top of the top reserve flap (Flap #5) so that its larger hole is centered over the flap's grommet hole and the plate is along the center line of the flap. Use a pen or pencil to mark the two bolt holes at the other end of the plate. Use a 1/16-inch drill to drill the holes for the bolts.
4. Position the mounting plate on the underside of the top reserve flap (Flap #5) and attach with a size 0 spur grommet. (Be sure the grommet is correctly seated and there are no sharp edges that could damage the nylon locking loop.) Insert two 6-32 x 3/8 inch screws down through the cable bracket, through the flap and through the plate.

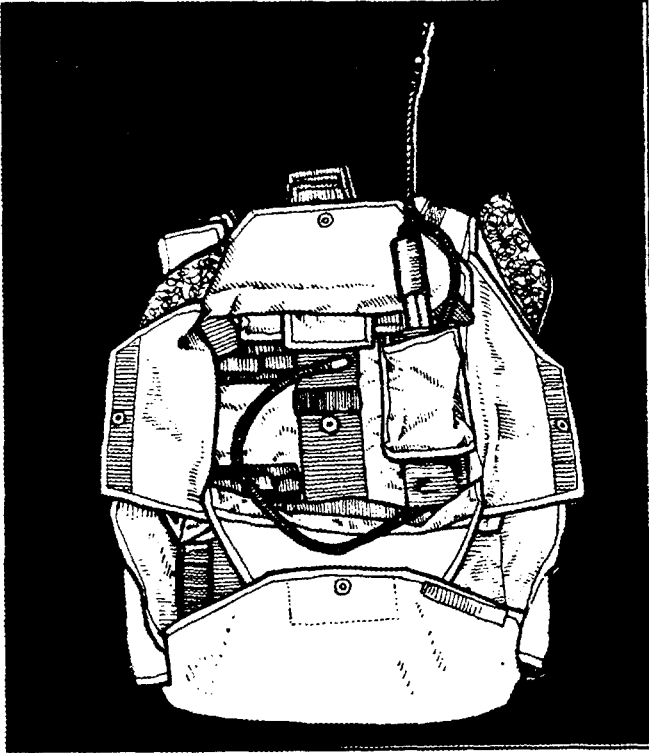
CAUTION

While the unique closing order of the outer top and bottom reserve flaps provide superior protection of the reserve ripcord pin, it does create a potential problem if the reserve locking loop is too long. An excessively long loop will allow the reserve pin to be partially exposed. This condition can exist for two reasons; either the loop is too long or the reserve canopy is too large for that particular container size. When automatic activation devices are installed, the loop length is very critical. Because the last flap which closes is not the flap upon which the AAD mounting plate is installed, an exceptionally long loop will not allow enough of the ripcord pin to secure the locking loop reliably, which could cause a possible premature opening of the reserve container.



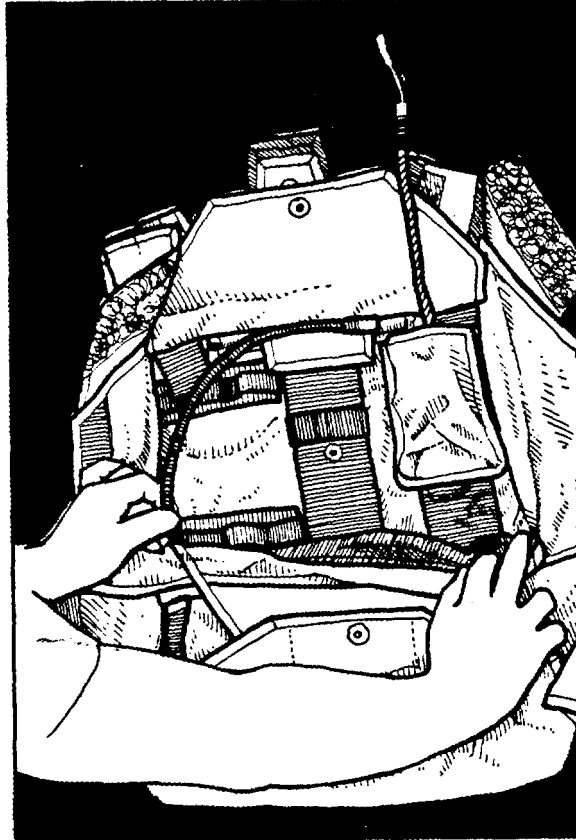
loosen the screws to secure the cable housing to the **bracket**. If the screws **protrude** from the nuts, file flush.

5. Thread the activation unit cable through the long thin Pin Puller pouch on the right-hand side of the **reserve** pack tray and out the bottom. Slide the activation unit into the pouch.

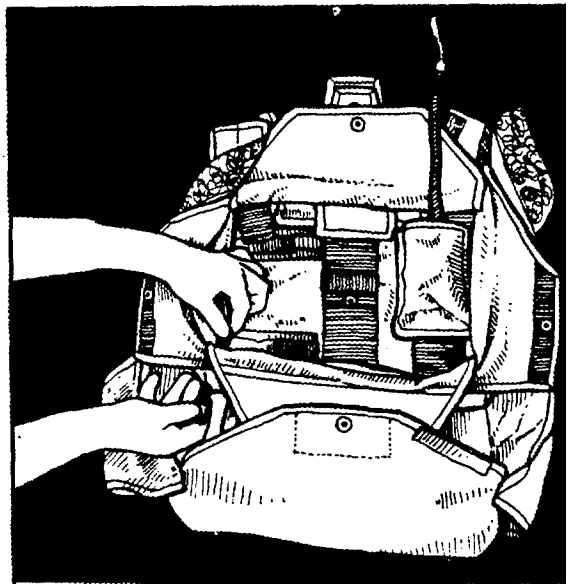
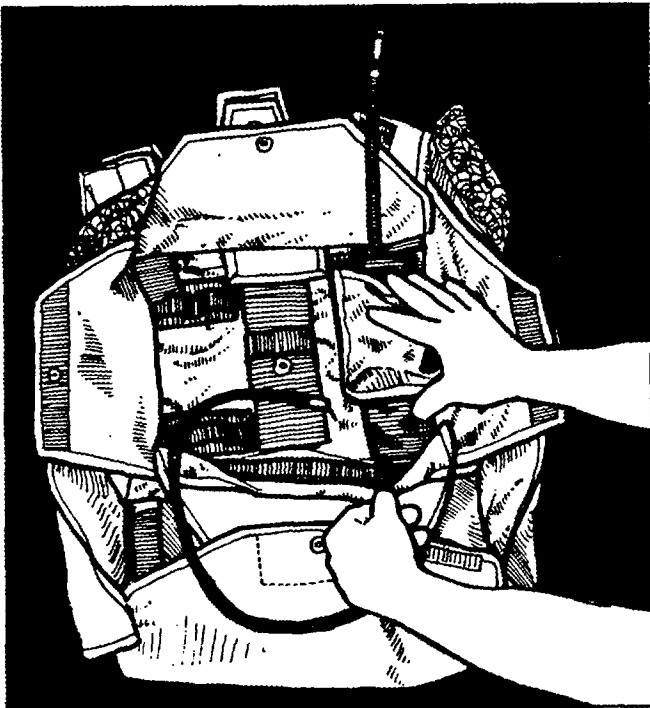


6. Pull the cable gently to seat the unit pouch and remove any **slack** in the cable.

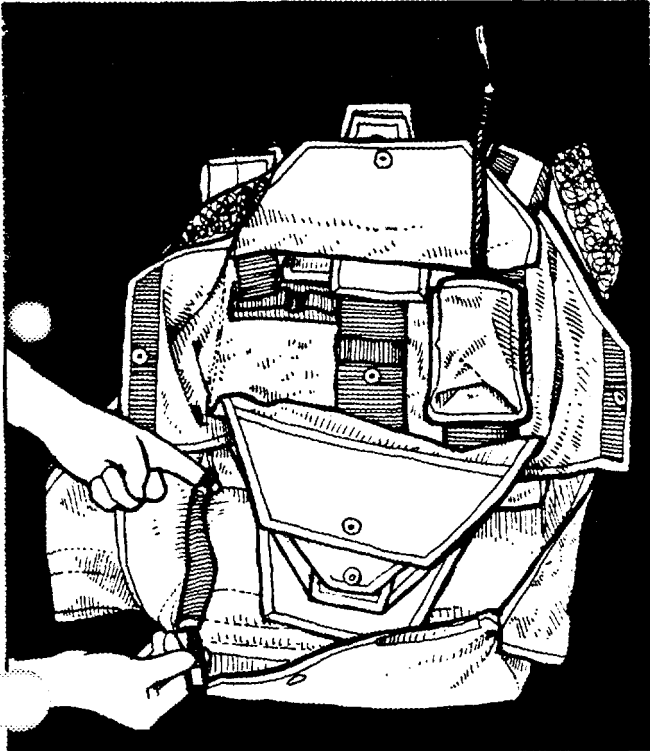
7. Thread the activation unit **carefully** right to left through the channel that **runs** along bottom of the **reserve** pack tray.



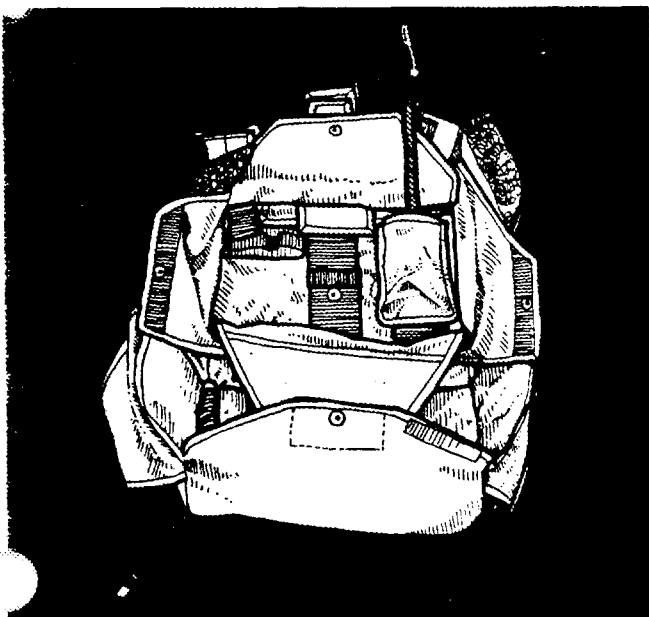
8. Route the activation unit cable through **small** hole in the bottom left-hand **corner** of the reserve pack tray.



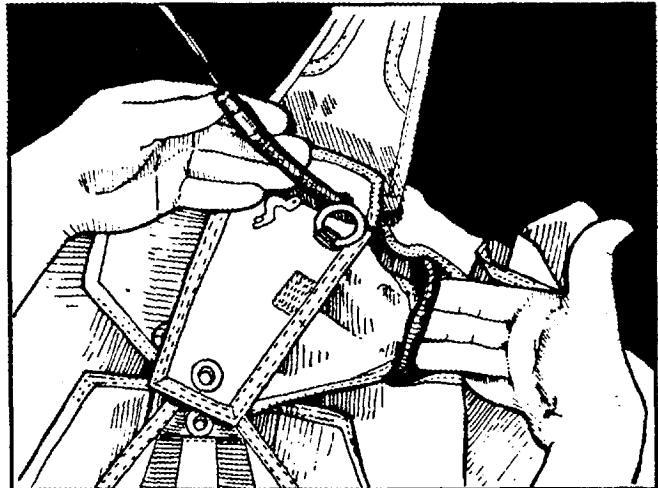
9. Thread the activation unit cable through the **channel** that runs along the left-hand side of the main pack tray.



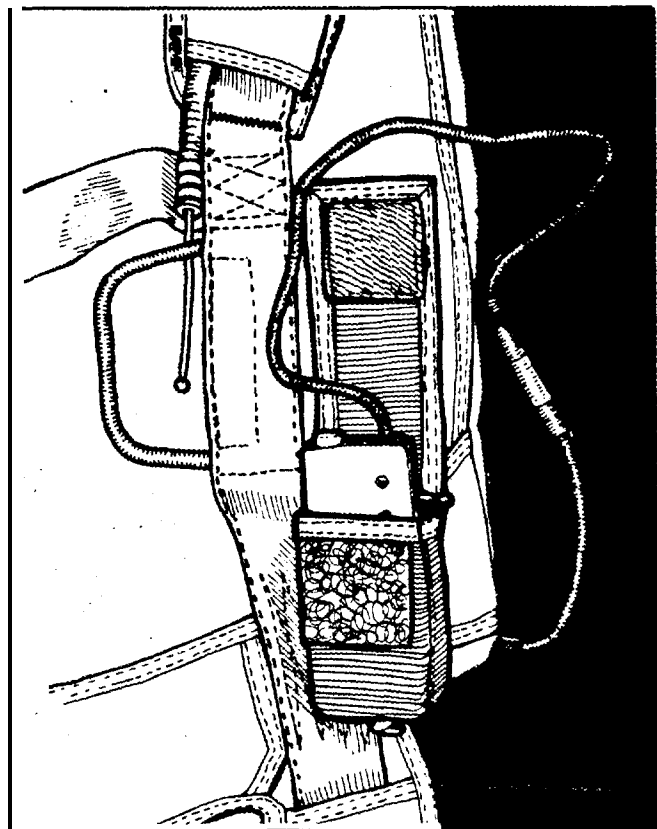
10. Route the activation unit cable through the hole in the lower left-hand **corner** of the main container- Attach the activation unit cable you have just threaded to the sensing unit cable.

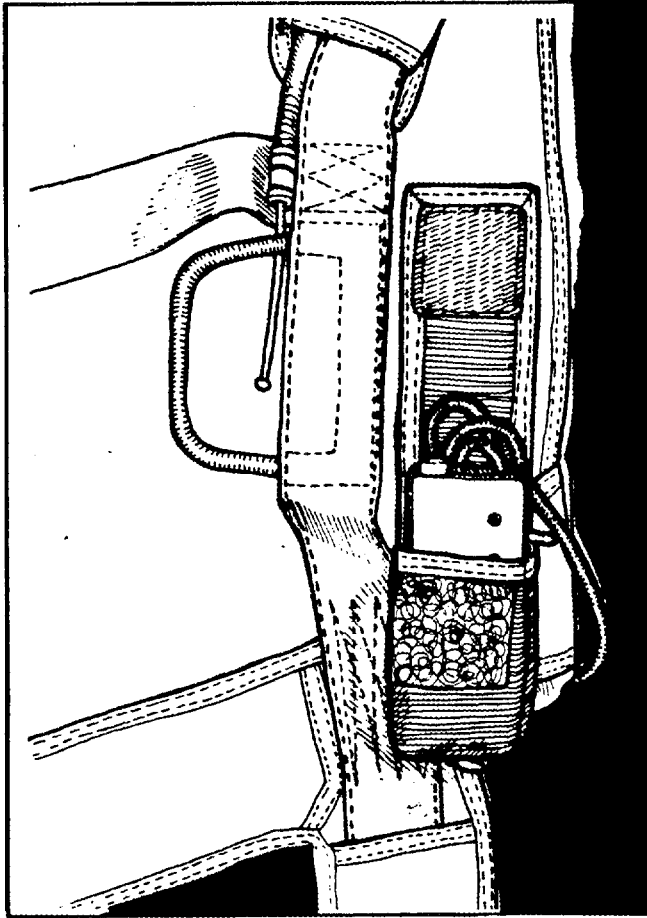


11. Thread the cable housing at the top of the activation unit from right to left through the small slot in the **container** yoke near the upper corner of the reserve pin **protector** flap.

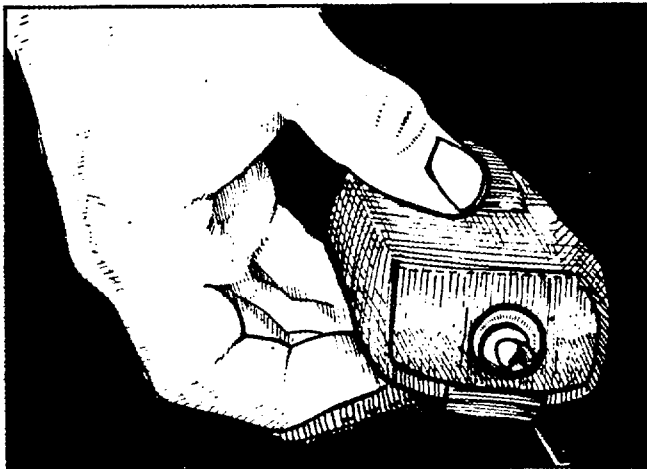


12. Using the pouch provided, mount the **sens-**
ing unit to the diagonal strap. Coil the extra cable
and **tuck** it into the pouch.

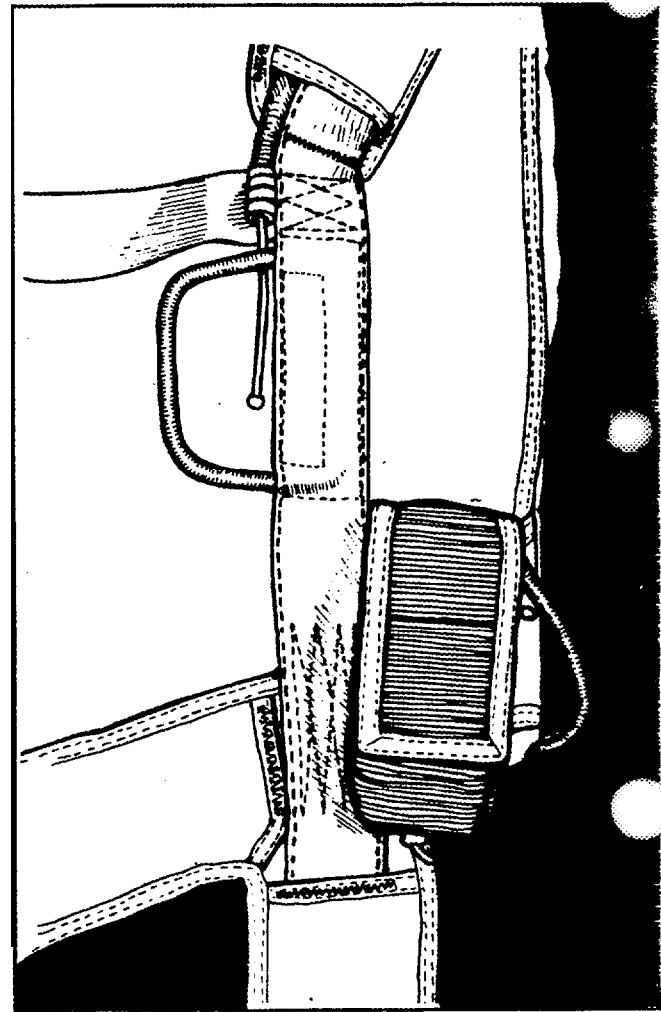




13. **Secure** the sensing unit into the pouch with a **piece** of Type 3 sheathing by **passing** one end through the grommet in the bottom of the pouch, through the hole in the bottom of the unit and back out the grommet. Then **pass** a small metal washer over both **ends** of the Type 3, snug it **up** and tie an overhand knot. Cut off the **excess** Type 3 and **sear** the **ends**.



14. **Close** the Velcro flap on the pouch.



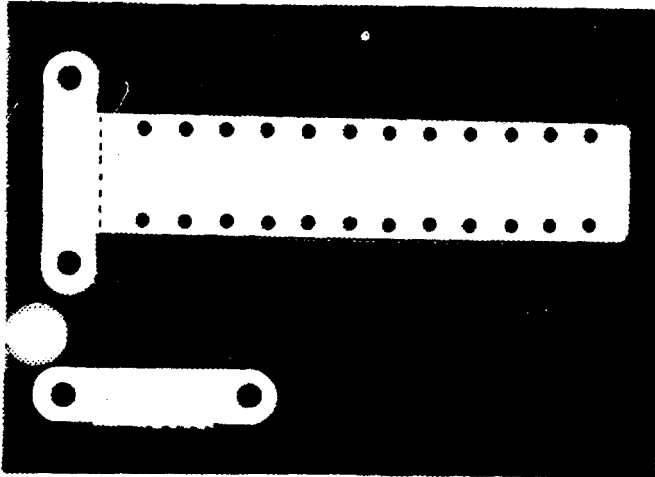
15. **Inspect** the entire assembly. Log the **inst** lation on the **packing data card** and in your **log-book**.

Attaching the FXC Model 12000 AAD

1. Installation of the FXC Model 12000 on the Vector 11 requires a small-hole terminal fitting on the activation cable. This fitting is available from either FXC or the Relative Workshop; it is not routinely provided with each Model 12000 sold.

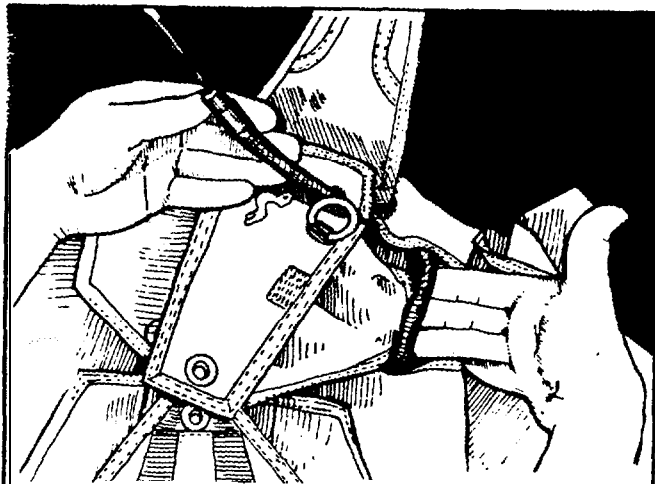
2. Inspect entire AAD assembly. Cock unit.

3. Modify the mounting plate by using a hack-saw to cut the "tail" off the T-shaped plate. (Only the crossbar of the plate will be used.) Smooth any rough edges with a file.



4. Insert activation unit into pouch on the wearer's right-hand side of the reserve container. The activation cable should extend towards the right and the sensing cable to the left.

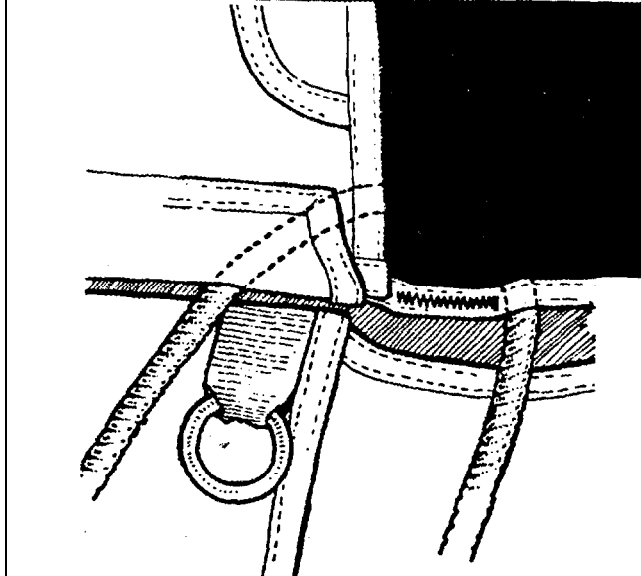
5. Route the activation cable along the right side of the pack tray. The cable end is threaded from right to left through a small slot in the con-



tainer yoke near the upper corner of the reserve pin protector flap.

Note:

If the bracket is mounted too closely to the grommet, the ripcord pin may not be completely withdrawn from the locking loop when the AAD fires and the Container will stay shut. Conversely, if the bracket is mounted too far away from the grommet, it might be impossible to seat the pin far enough into the locking loop to keep the Container securely closed.



Note:

When threading the cable housing, make sure it goes UNDER the yoke as shown in this detail. Some Vectors have been found in the field with the housing simply curved over the reserve flap.

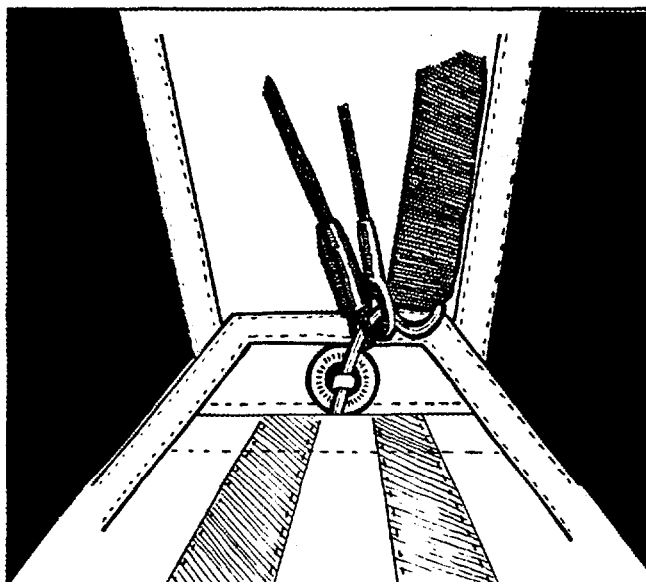
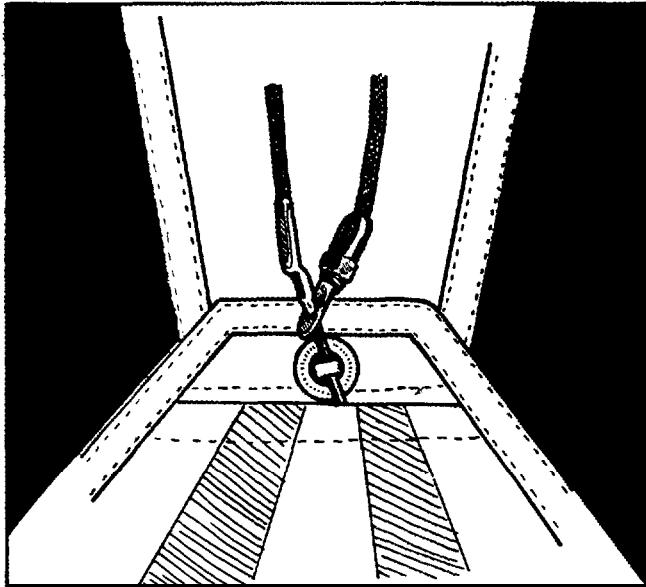
Each FXC 12000 has a unique activation cable length; no two units are exactly the same. The rigger must take that into account when he positions the bracket on the #5 flap for installation.

6. To determine the correct location for the FXC bracket, follow these steps:

A. Measuring along the center line of the reserve top flap (Flap #5), measure up 4 inches from the center of the grommet and make a mark. The lower edge of the FXC bracket will normally be mounted at this mark.

B. To determine if this particular unit can be mounted at this location, perform the following check several times and adjust the mark on the top reserve flap accordingly: Temporarily close the last two flaps by inserting the reserve closing loop through both the #5 and #6 flaps and securing with the reserve ripcord pin. Be sure the FXC terminal end fitting has first been slipped over the ripcord pin.

C. Insert the pin as far as it will go into the lock-



ing loop, but not so far that the terminal end fitting is drawn into the grommet center. This is the best position to mount the FXC bracket.

D. When a reserve static line is also sure the loop-end of the reserve ripcord FXC terminal end are not drawn into the center.

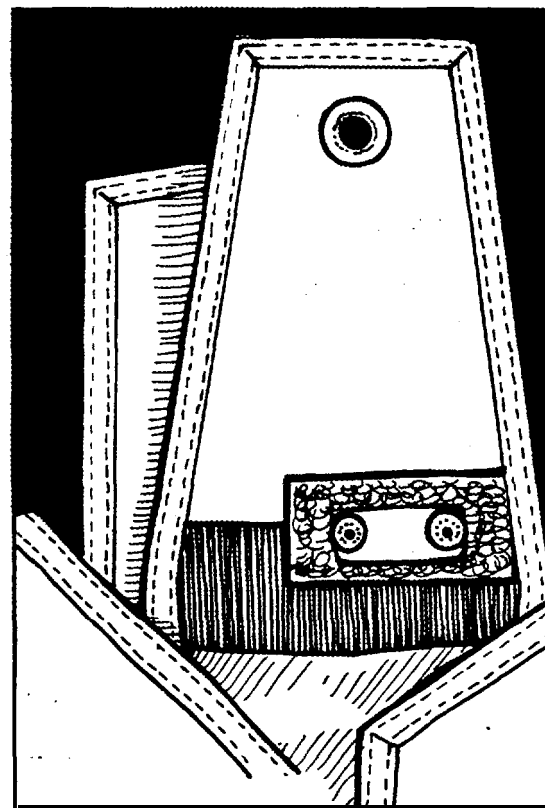
7. Place the bracket on the Center in correct position. Use a pencil or pen to mark the holes. Remove the bracket and use a 1/8 in. drill to make the holes in the top flap.

8. Position the bracket on the outside of

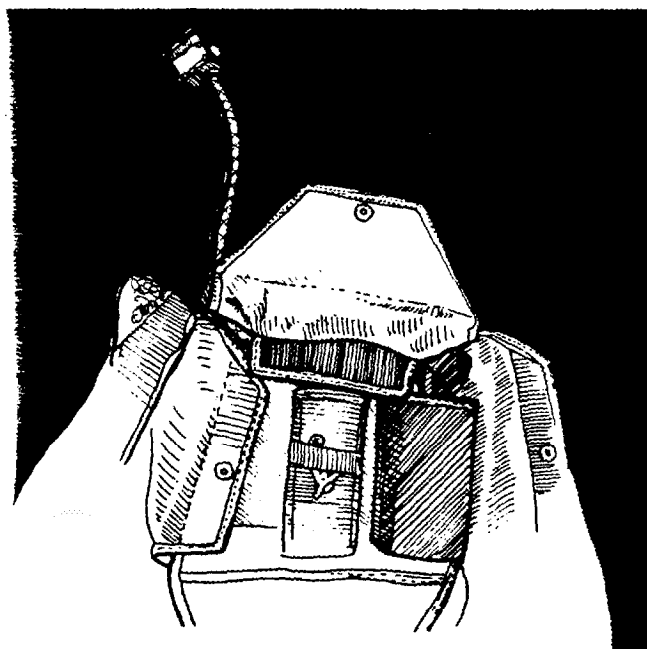
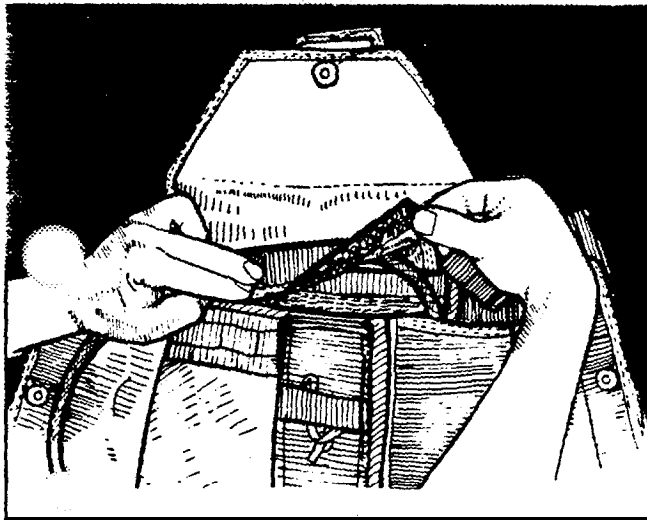
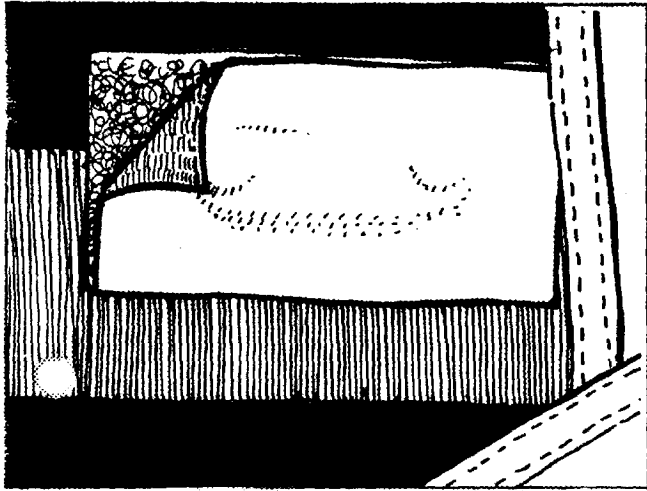
Note:

The Relative Workshop has included two pieces of Velcro, one hook, and one pile. These will be used to cover the exposed screws on the bottom reserve top flap. See installation instructions below.

reserve flap and the mounting plate on the side. Using the longer of the screws provided, insert each through the bracket, through the flap, through the pile velcro patch, and through the pile end of the cable housing into the bracket. Tighten the screws down to firmly hold the housing ends of the screws flush if necessary. Check

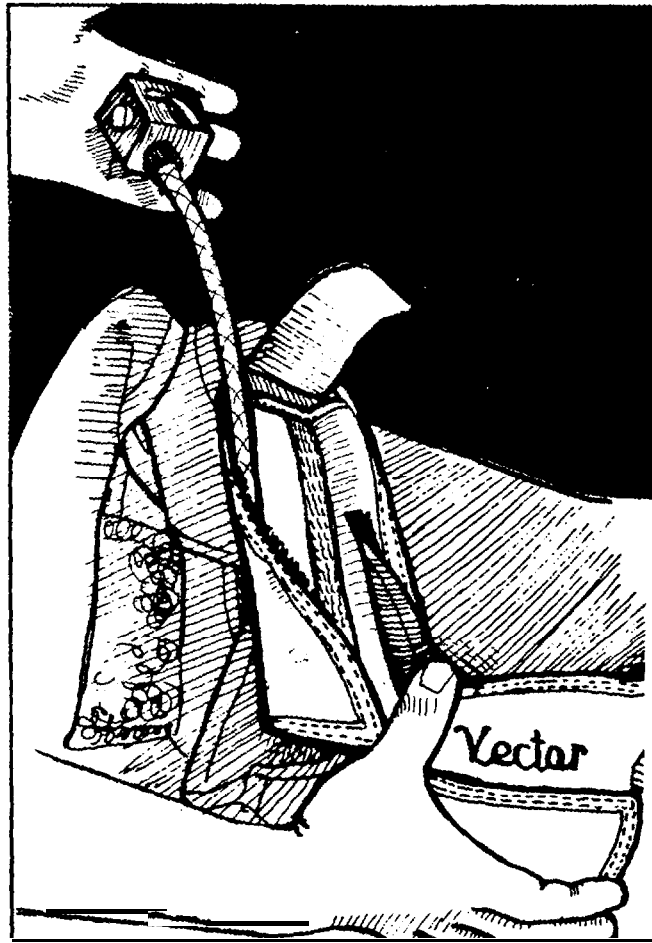


as with the hook Velcro patch as seen in the diagram.

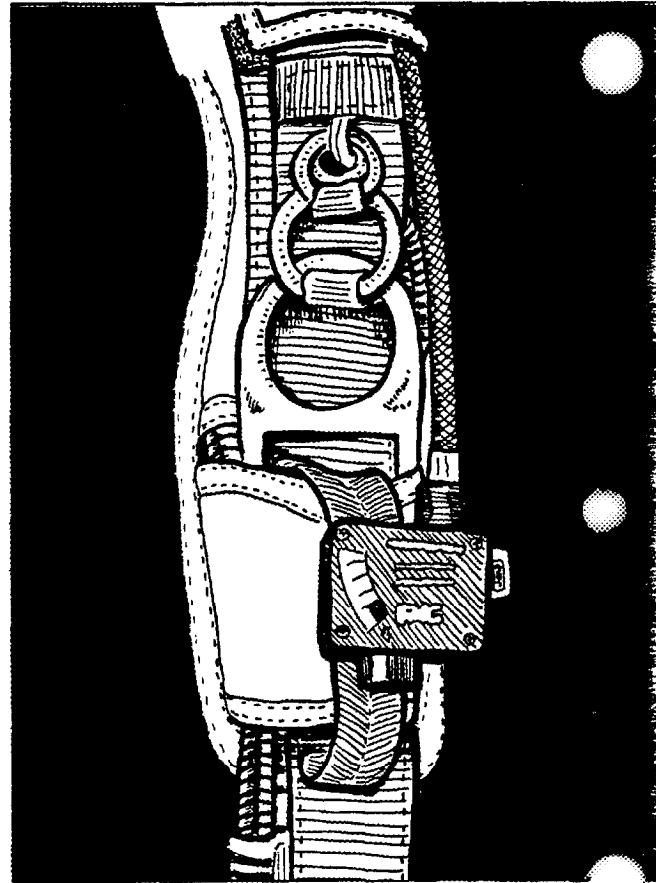
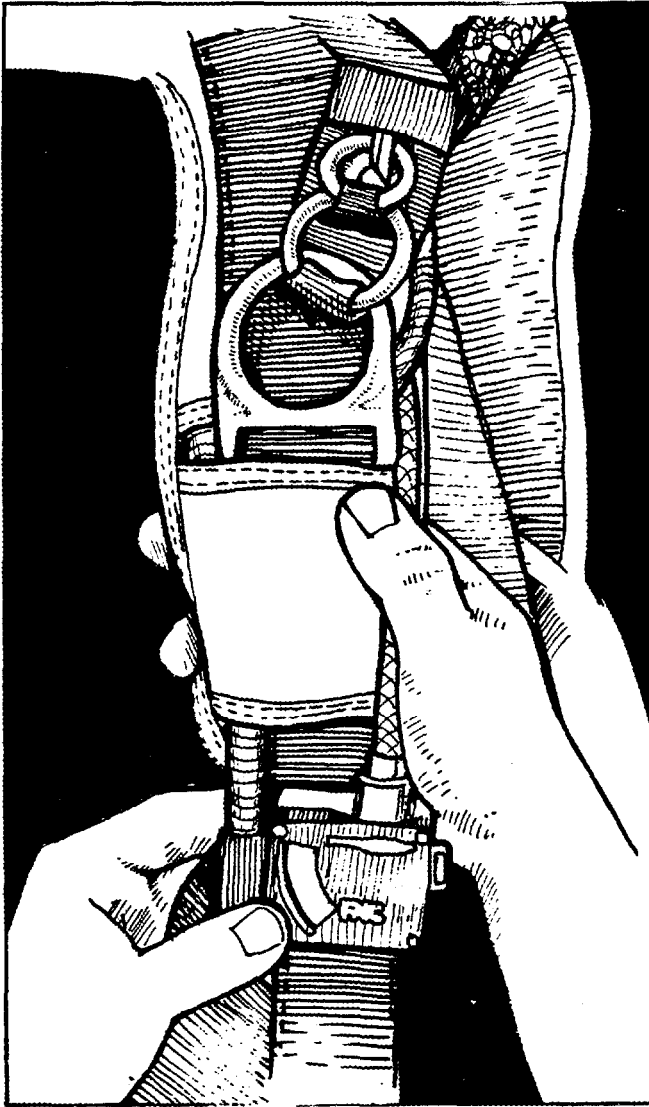


9. Route the sensing unit cable under the Velcro flap across the top of the reserve container and under the Velcro flap on the left side (where the reserve risers will be placed.) (Shown bottom, left)

10. Route the sensing unit cable under the Velcro flap on the left-hand shoulder yoke.



11. Attach the sensing unit to the Type 17 loop provided on the fabric panel below the large harness ring. Diagram shows sensing unit location on "ET" and "S" size Vectors IIs.



12. Inspect the entire assembly. Log the installation on the packing data card and in your log-book.

TESTING AADs

Because AADs are reliable only if they are properly installed and maintained, anyone who purchases a Vector with an AAD must have the unit tested by the manufacturer or an accredited testing facility at specified time intervals as outlined by the manufacturer.

4. Reserve Packing Instructions

INTRODUCTION

This chapter contains procedures for packing an **already-assembled** reserve into a **Vector II**.

If the reserve has not yet **been assembled**, see the appropriate chapter of **this manual**. It contains procedures for **installing toggles, automatic activation devices** and reserve static lines.

An **FAA Senior or Master rigger** certificate is required to pack any reserve **parachute** that will be **carried** for use in the U.S.

The reserve **flaps** are numbered **1-6** for reference. Close them in proper **sequence**.

It's mandatory to read **all** of these instructions before **starting** to pack the reserve.

The **first part** of this chapter describes **procedures** for packing **round** reserve canopies into the **Vector II** while the **second part** covers **ram-air reserves**.

Packing Instructions for Round Reserves

(Procedures for ram-air reserves begin on page 50.)

Because of the **wide variety** of reserve canopies on the **market**, this **manual** does not contain **instructions** on **inspecting, assembling** and **folding** the reserve **canopy**. The **rigger** must refer to the **pack-**

ing instructions provided by the canopy **manufacturer** for this information.

PARTS LIST FOR ROUND RESERVES

Vector II container-reserve risers compatible with the type of reserve **connector link** to be used. (L-bar or Rapide link.)

Reserve **canopy**

Vector II spring-loaded pilot chute.

Reserve bridle 60 in. long, + -1 in.

Locking loop for reserve container.

Vector reserve ripcord.

27 in. long for all **Vector** sizes (except)

30 in. long for **Vectors** with shoulder extensions

REQUIRED TOOLS

One **temporary pin with flag**

One **pull-up cord** (48 in. of 550 cord sheathing)

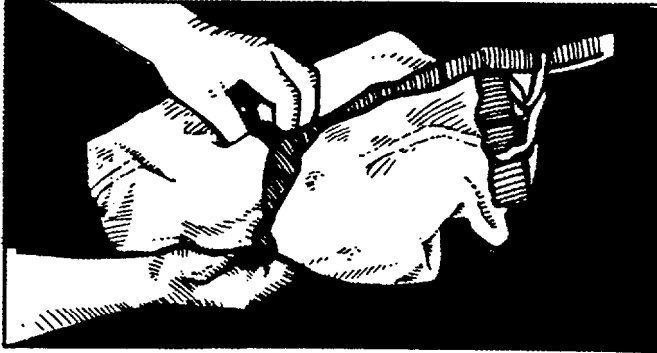
One **packing paddle**

INSPECTION

Thoroughly inspect the **ripcord, pilot chute, bridle, canopy, lines, links, risers, harness, container** and **locking loop**.

ASSEMBLY

1. Attach the canopy to the risers with the steering vents **facing** to the wearer's **rear**. If using L-bar links, make sure the reserve risers are **properly** set up and sewn **with** a horizontal **stitch** near the top to **stabilize** the L-bar. If using Rapide links, snug the barrel down till hand-tight, plus a **quarter** turn with the proper **sized** wrench. It's highly **recommended** to use Locktite to secure the screws **or** barrel.



2. Follow the canopy manufacturer's **instructions** to set up the steering System.

3. Attach the bridle to the Vector 11 reserve **pilot chute**. The larger end loop on the **bridle** is used, and it must pass through all three **pilot chute** attachment loops using a lark's **head knot**.

4. Attach the Vector 11 reserve **pilot chute** to the apex of the canopy using the bridle provided. The smaller loop of the bridle **wraps** around the apex **lines** and the larger attaches to the **pilot chute**. Do not Substitute other bridles **because** the length of this bridle is important for fast deployment. Do not Substitute another **pilot chute** for the Vector II reserve **pilot chute**.

5. Inspect the entire reserve assembly carefully, beginning with the **pilot chute** and ending with the harness.

6. Flake the reserve canopy **according** to the **manufacturer's instructions**.

7. If your reserve canopy **does** not have a diaper or other deployment **device**, fold the **skirt** up parallel to the radial **seams**, then long fold the canopy **into fifths**.

8. If **your canopy is** equipped with a **diaper or similar device**, close it **according** to the **manufacturer's instructions**.

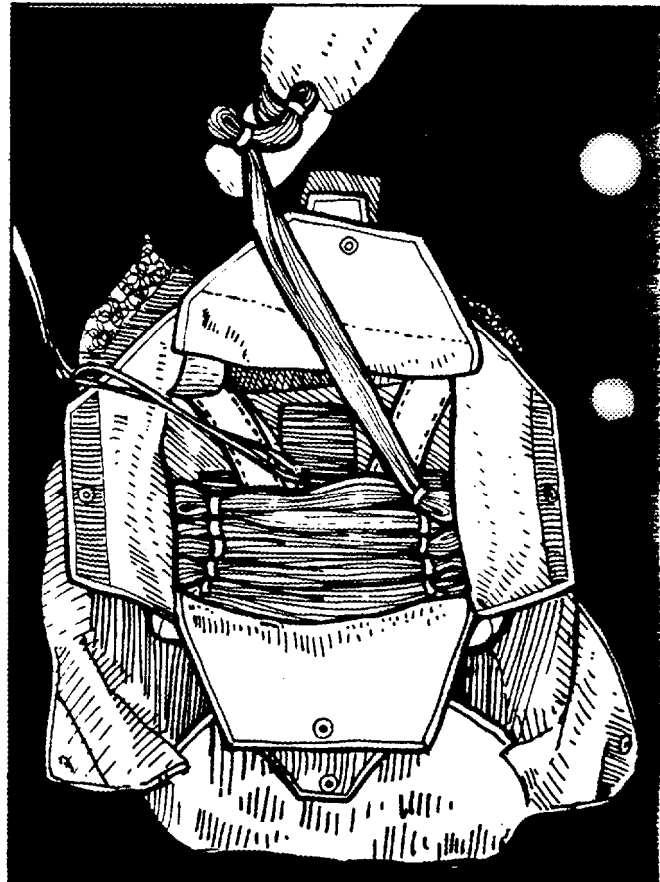
9. Now **place** the canopy in the pack tray, following one of the procedures **below**. Different **procedures** are used for different canopies, **depending** on what type of diaper is installed on the reserve-

Also, a different **packing** procedure is used if the Vector II is equipped with an FXC 12000 AAD. Follow the instructions **under** (A) or (B) on the next **page**, then continue.

A. Placing the canopy in pack trays **without** an FXC AAD

Place the **reserve** risers into the reserve container with the links lying between the **line-stow** loops and the grommet stiffener plate. Fan the riser ends out rather than stacking them on top **of each other**.

Make the **first** stow of Suspension lines at the bottom and stow the lines from left to right, **working** toward the top of the Container. Be **sure** to stow the lines the **full** width of the container-

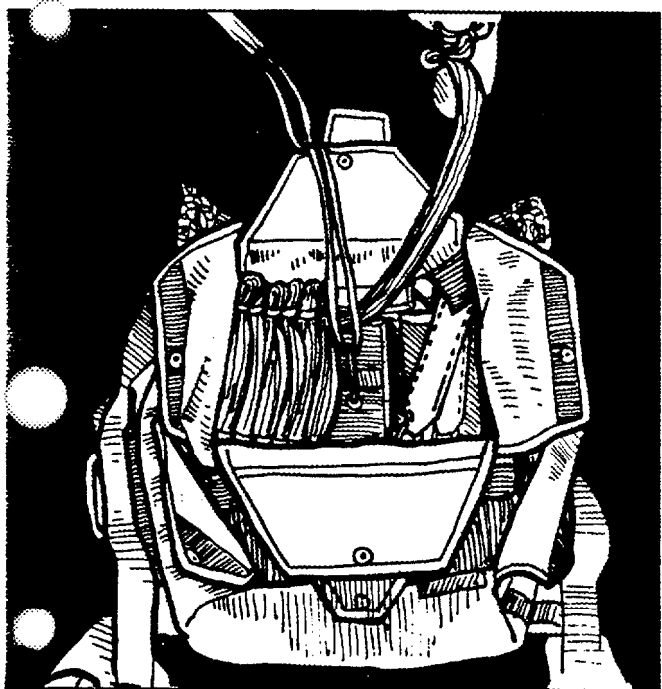


(Skip **Section B** and **continue with Step 10**.)

Placing the canopy in pack trays with an FXC AAD

Place the reserve risers into the reserve container with the left riser links lying **between** the line-stow loops and the grommet stiffener plate. The right riser links **must** be laid on top of the FXC activation unit. Fan the riser ends out rather than stacking them on top of **each** other.

Stow the **lines** vertically on the opposite side of the **FXC** power unit, starting from the outside and working toward the middle of the container-



Note: If the canopy has a diaper with **all** the **lines** stowed on it (a "**full-stowage**" diaper), then stow the **lines** on the diaper instead of stowing them in the pack tray. Then lay the diaper and lines on the opposite side of the container from the power unit.

10. Check the length of the reserve closing loop. The length from the stiffener plate to the end of the loop should measure approximately 2 to 2 1/4 inches for small canopies like the Pioneer K-XX and the National Phantom 22 canopies. **For** other canopies, the loop will have to be lengthened **accordingly**.

Two factors determine the correct loop length. **First**, it should not take an **excessive** amount of effort to **close** the last flap (**Flap #6**).

And when the container is closed, you should not be able to **compress** the pack more than 1/4 inch when you push down on the top of the **pilot chute**.

If **excessive** play in the spring has developed after the **reserve** has **been packed** for a while, unpack the reserve and shorten the loop.

CAUTION

While the unique closing order of the outer top and bottom reserve flaps provide superior protection of the reserve ripcord pin, it does create a potential problem if the reserve locking loop is too long. An **excessively** long loop will allow the reserve pin to be partially exposed. This condition can exist for two reasons; either the loop is too long or the reserve canopy is too large for that particular container size. When automatic activation devices are installed, the loop length is very critical. Because the last flap which closes is not the flap upon which the AAD mounting plate is installed, an exceptionally long loop will not allow enough of the ripcord pin to secure the locking loop reliably, which could cause a possible premature opening of the reserve container.

11. Insert the **pull-up cord** through the reserve locking loop.

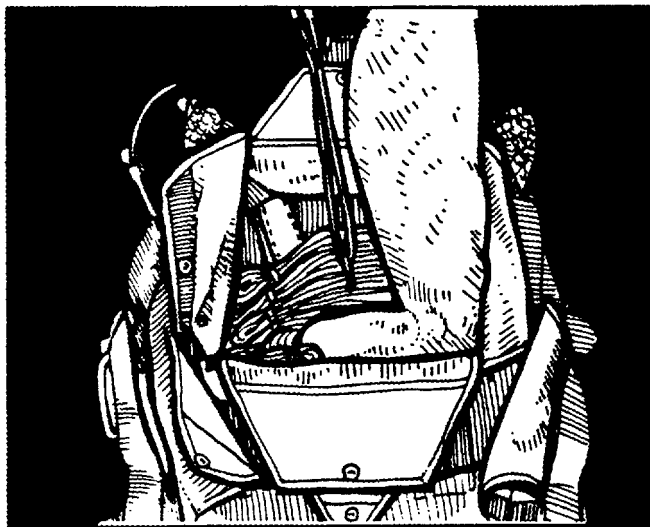
12. Fold the canopy into the container- The **location** and **configuration** of the **folds** depends on what type of round reserve is being **packed**:

A. The First Fold:

The **first** fold into the pack tray is determined by the type of diaper (if any) on the canopy. **Follow** one of the four procedures listed here:

For a canopy without a diaper, place the canopy skirt into the bottom left-hand **corner** of the container and lay the first fold of canopy from left to right **across** the bottom of the Container.

For a canopy with a two-bight diaper (such as those built by Strong Enterprises and Pioneer), place the diaper-enclosed skirt in the bottom left-band side of the container with the line stows facing towards the top (wearer's head end) of the container. Lay the first fold of the canopy from left to right across the bottom of the container-

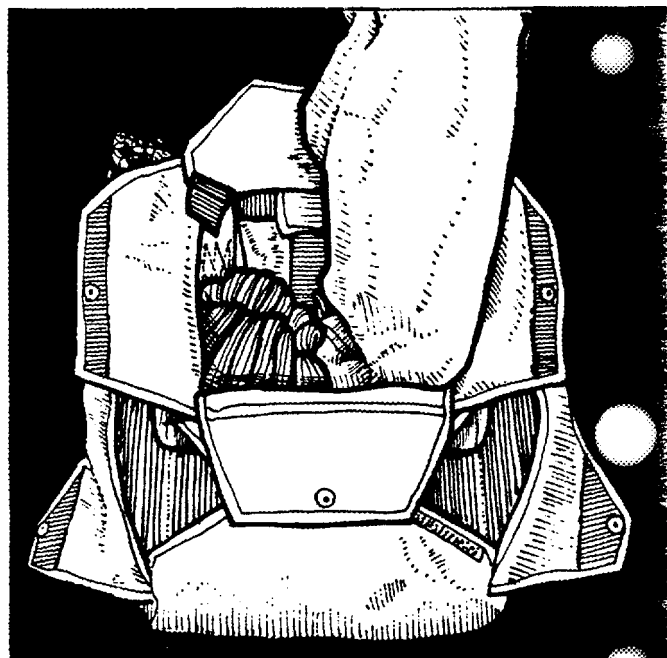


For a canopy with a full diaper on which the lines stow vertically (such as the Strong Enterprises Lopo Lite), lay the diaper-enclosed skirt in



the bottom left-band corner of the container against the dividing wall between the reserve and main containers. The stows should face up (towards the wearer's head). Lay the first fold of canopy from left to right across the bottom of the container. (See illustration below, left)

For a canopy with a Piglet-style diaper (full diaper with the lines stowed horizontally), fold the diaper-enclosed skirt lengthwise for about 1/3 of its length, and place it in the bottom left-band corner of the Container against the wall that divides the reserve and main containers. Lay the first fold of canopy from left to right across the bottom of the container-



B. The Remaining Folds:

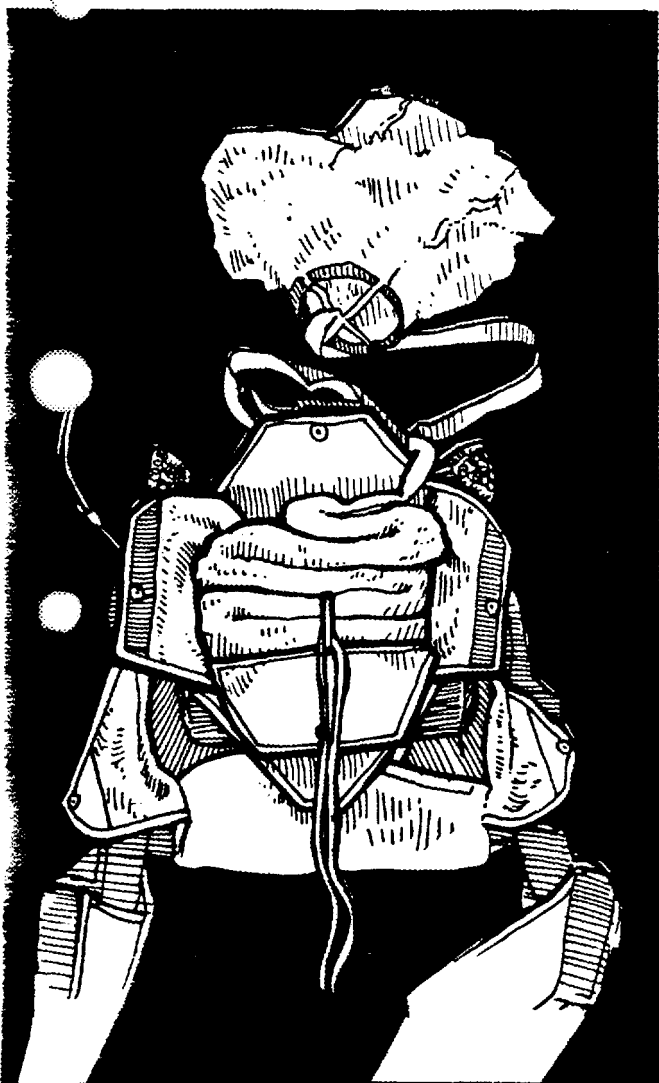
For a canopy with no diaper or a two-bight diaper, the canopy can now be S-folded into the container. Make the folds below the loop about 1 inch wider than the container. This will help fill out the sides better.

For a canopy with full diapers such as the Preserve 3 and the Featherlite, a short fold or two must be made in the container corner opposite from the skirt to even out the bulk. The next fold can then be spread out on top of the diaper to give the container its proper thickness. Then S-fold the rest of the canopy toward the top of the container, keeping each fold about two inches wider than the container-

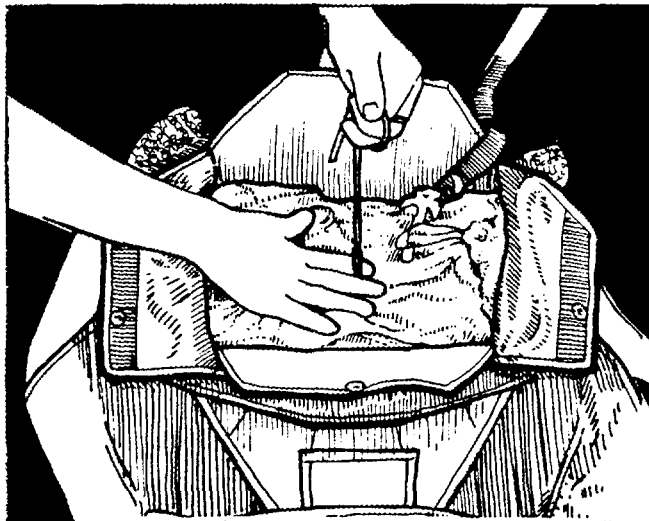
, with small canopies such as the National Phantom 22 and the Pioneer K-XX, the best appearance results **from** having no more than two folds above the **loop**.

With larger canopies, it may be **necessary** to **fold** extra canopy above the loop, as well as to lengthen the **loop**.

Make the folds above the closing loop two inches wider than the Container to fill the space under the side flaps. (See *illustration below*)

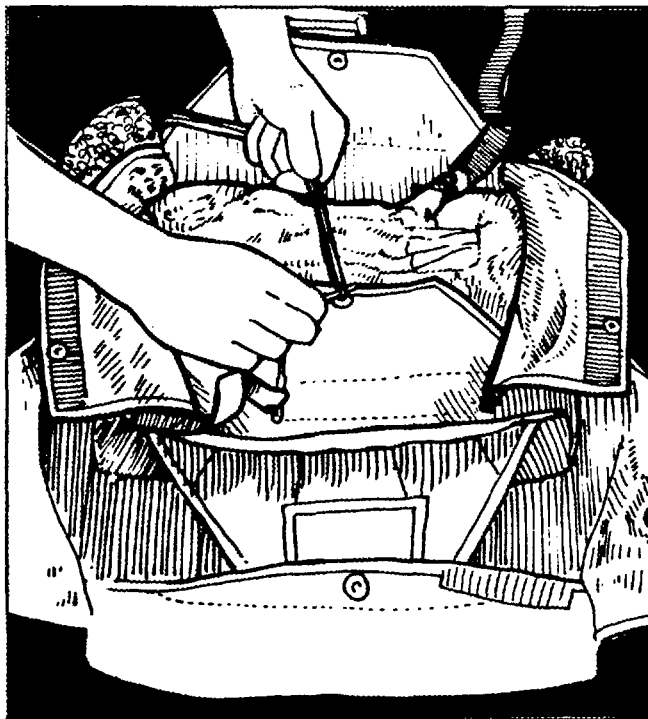


13. Route the pull-up **cord** and **locking** loop straight up through the folds in the canopy.

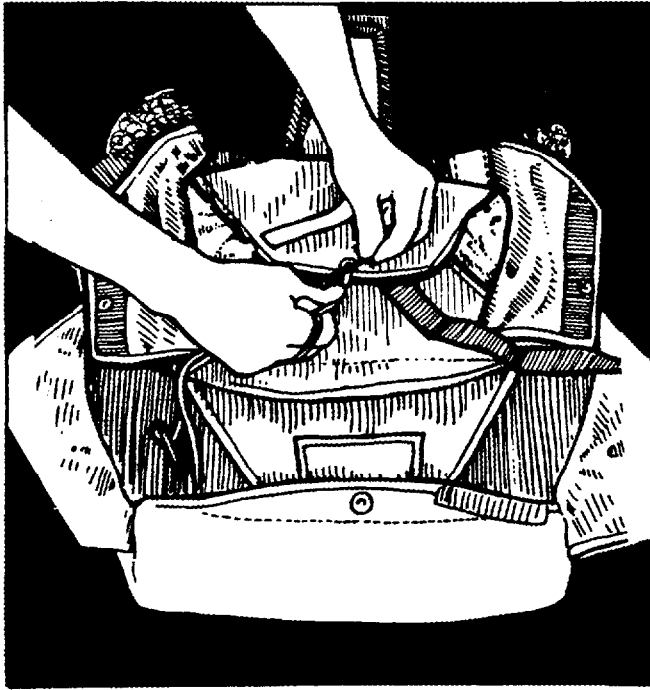


14. Close the **container** flaps by following this procedure:

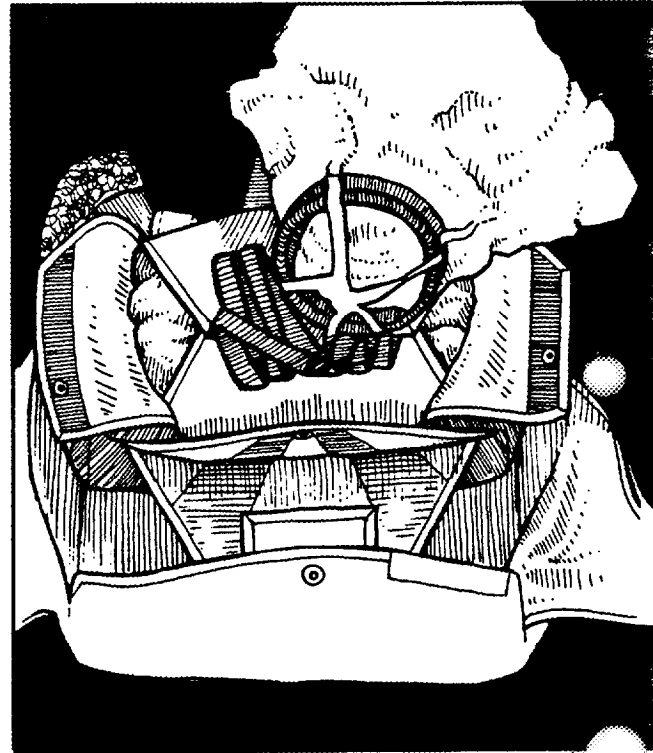
A. Close the inside bottom **kicker** flap Fit (Flap #1) and secure it with the **temporary** pin.



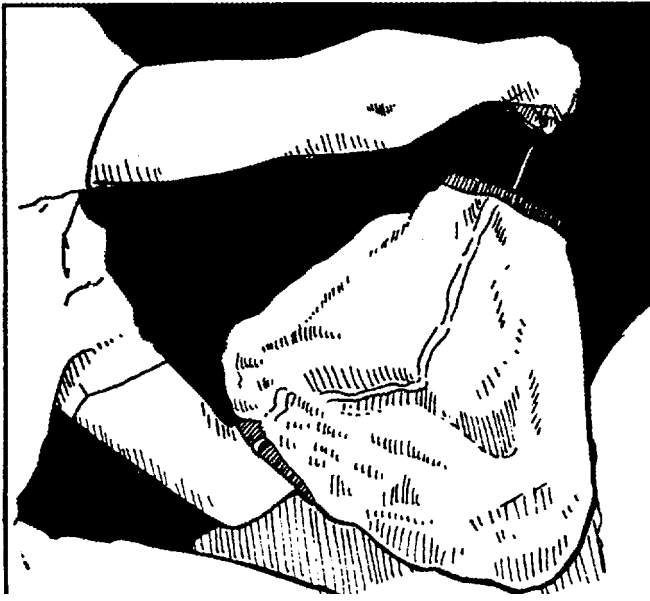
B. Route the **reserve** bridle toward the bottom right-hand side of the **container** and **close** the top **kicker flap (Flap #2)**, securing it with the **temporary** pin.



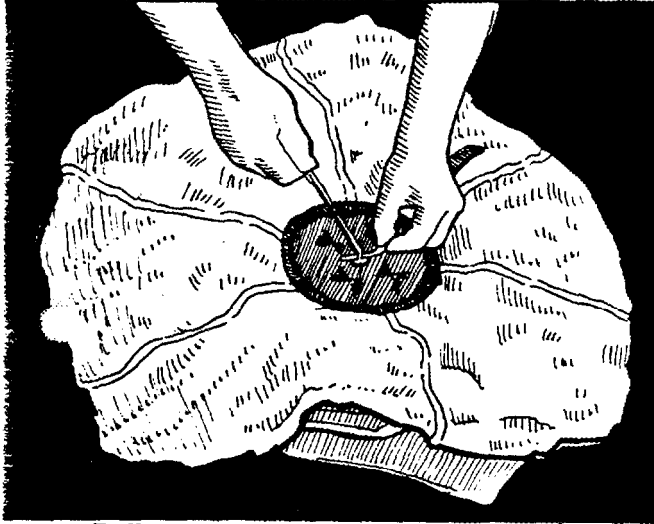
D. **S-fold** the bridle up and down on top of the two **kicker flaps**, so that it will be **under** the **base** of the **pilot chute** without fouling the closing loc



C. Thread the **pull-up cord** up through the **bottom** of the **pilot chute** and out the **top**.



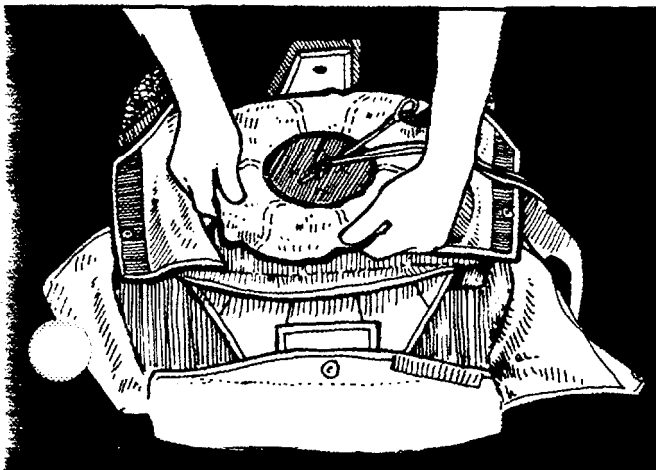
, Make **sure** the base of the **pilot chute** is **cen-**
tered over the **loop**. Then collapse the **pilot chute**
and **lock** it with the temporary pin



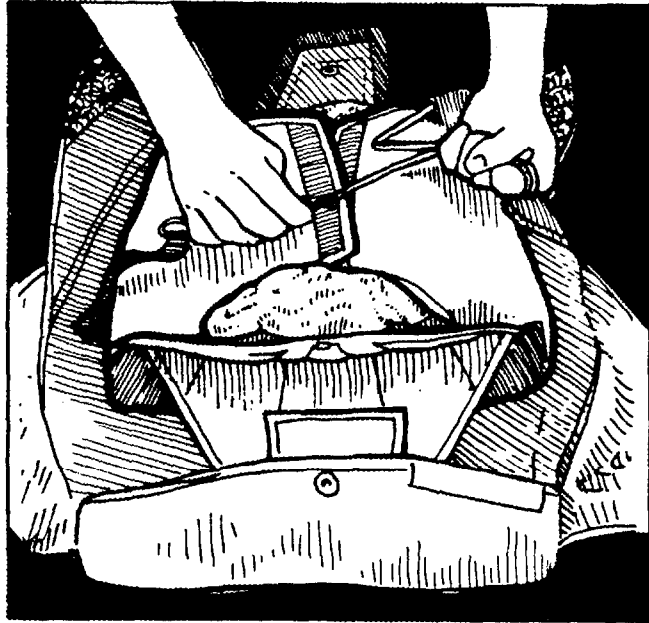
F. Pull all the canopy fabric out, away from the spring. **Folding** the fabric, rather than **stuffing** it between the **coils**, increases **pilot chute launch performance** and **reduces** the bulk of the packed canopy. After **pulling** the fabric away from the spring, check to make **sure** the **pilot chute base** is centered **under** the **crown**.

Now **fully collapse** the spring to see how **much** loop **can** be **pulled** through the top of the **pilot chute**. If you **can pull** more than **1/2 to 3/4 inch** through, the loop **is too long**. If it **is**, open the **canopy** and shorten the loop.

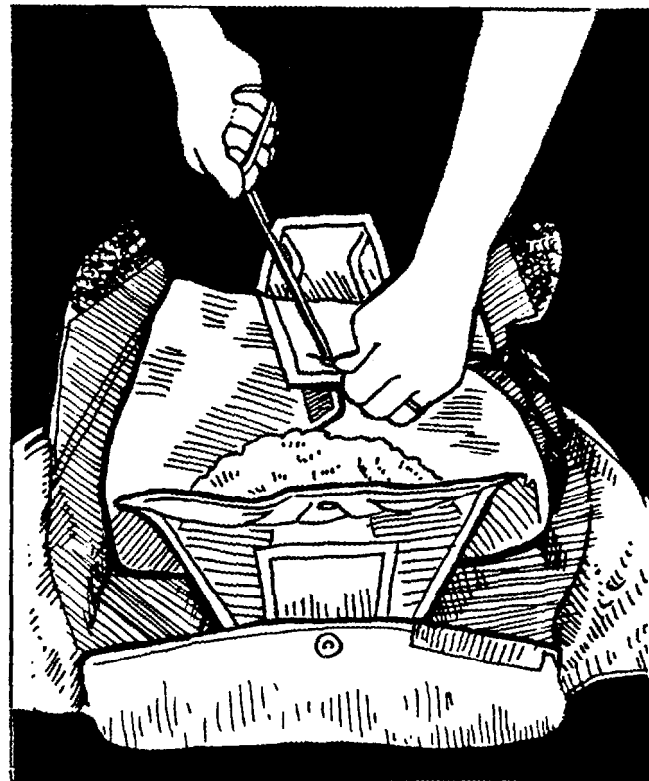
G. Lay the fabric flat all around the **pilot chute** and fold it **under** in wide folds to the **center**. **Fold** the top and bottom **under first**, then the **sides**. Keep the fabric folds of the **pilot chute** out from **under** the open **reserve flaps**.



H. Thread the pull-up cord through the side flaps (Flaps #3 right and #4 left) and **close** and **secure** with the temporary pin. Make sure that the folds in the pilot chute stay flat and **neat**.

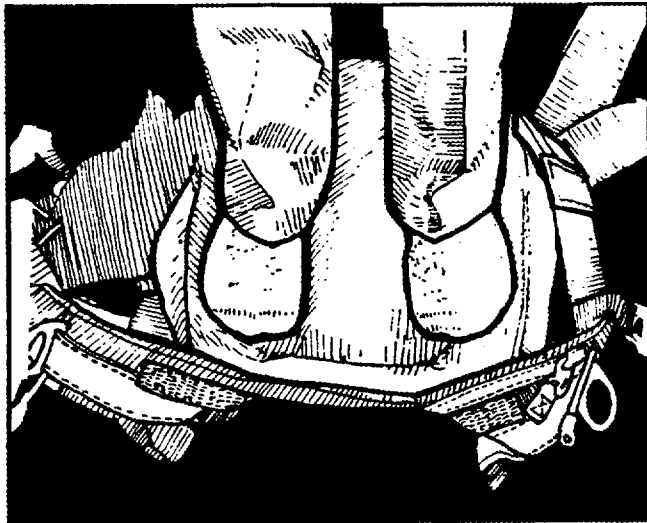


I. Thread the pull-up cord through the **reserve top flap** (Flap #5) and insert the temporary pin



J. Thread the pull-up **cord** through the bottom **center flap (Flap #6)** and insert the temporary pin. If the **force necessary** to **close** the last flaps seems **excessive**, your loop may be too short. Use a **scale** to check the **force required** to extract the pin. With the canopy **packed** properly and the **right-sized loop**, 8 to 12 lbs. of **force** should extract the pin.

15. **Place** the rig on a clean surface with the **backpad facing** up and walk on it with **stocking** feet or clean **shoes** to help expel air from the container and make it flatter.



16. Replace the temporary pin with the reserve pin. The end of the pin **slides** into the channel built into the lower flap. Remove **pull-up cord**.

17. Insert the **ripcord** handle into its **pouch** on the **main lift** web.

18. **Dress** the container, **seal**, sign and **log** the reserve. **Close** the reserve pin **protector flap**.

19. **Count** your tools.

PACKING INSTRUCTIONS FOR RAM-AIR RESERVES

Because of the wide variety of ram-air reserve canopies available today, this manual **does not contain** instructions on inspecting, assembling and flaking. For these steps, the rigger must follow the instructions provided by the canopy manufacturer.

Two packing methods are shown here. The **first** is preferred, although the **second** will also yield satisfactory results.

The procedures described here are approved by the following canopy manufacturers for use with their reserves in the Vector II: FTS, Glide Path International, National Parachute Industries, Para-Flite, Performance Designs, Precision Aerodynamics and Strong Enterprises.

See the instructions elsewhere in this manual for installing the FXC 12000 and SSE Sentinel Mk 2000.

REQUIRED TOOLS

- One temporary pin with flag
- Two pull-up cords (About 6 ft. long)
- One packing paddle
- Two 6" x 1" pile Velcro strips with flags

INITIAL ASSEMBLY

(See Reserve Assembly Chapter)

PARTS LIST

- Vector II container, with reserve risers compatible with the type of connector link, steering, and brake System.
- Ram-Air reserve canopy. (If toggles are supplied with the reserve canopy, do not use them. Replace them with Vector toggles.)
- Vector II spring-loaded pilot chute, with bridle and Vector II free bag. Two bridle lengths are acceptable, depending on canopy size:
Small: 15.5 ft., + - 0.25 ft or Medium: 18.5 ft., + - 0.25 ft.
- Stow loop for reserve bag. Small: 6 in., Medium: 75 in. + - 0.25 in.
- Locking loop for reserve container.

Reserve ripcord.

27 in. long: All Vector sizes except those with shoulder extensions (30 in. long).

Reserve steering toggles.

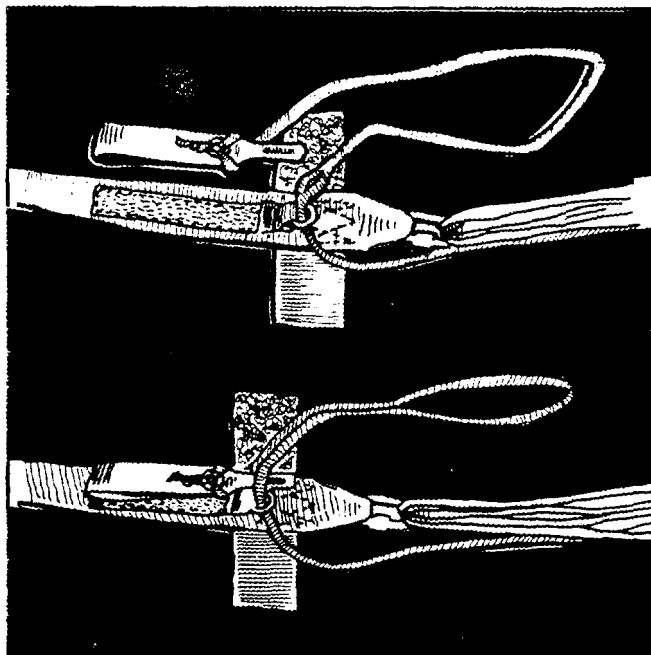
INSPECTION

Thoroughly inspect the ripcord, pilot chute, bridle, deployment bag, canopy, lines, links, risers, harness, container and locking loop.

SETTING THE BRAKES

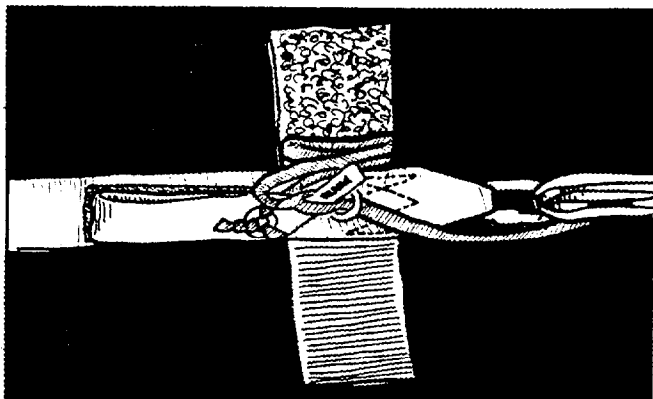
1. Open the Velcro cover on the riser. Use the toggle to pull the right-hand steering line down, until the brake loop just passes through the guide ring.

2. Insert the tapered end of the toggle all the way into the loop. Pull on the steering line above the guide ring to seat the toggle against the ring.



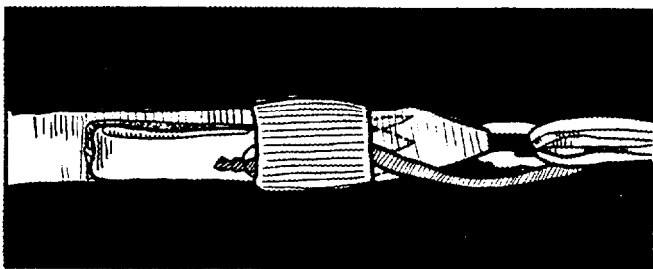
3. Mate the Velcro on the toggle with that on the riser. Check to be sure the tapered end of the toggle is completely seated in the loop. (It shouldn't be inserted past the end of the taper, or it may be difficult to extract in the air.)

4. Fold the hight of line between the toggle and the loop into 3-in. folds and lay it neatly next to the toggle.



5. Carefully close the Velcro cover to encase the stowed toggle and folded line. Be sure none of the steering line is caught between the layers of Velcro.

6. Repeat the process for the left-hand toggle.



FLAKING AND FOLDING

Follow the canopy manufacturer's instructions for:

- A. Flaking the canopy.
- B. Folding the nose and canopy.
- C. Splitting the tail
- D. Stowing the slider.
- E. Dressing the canopy.

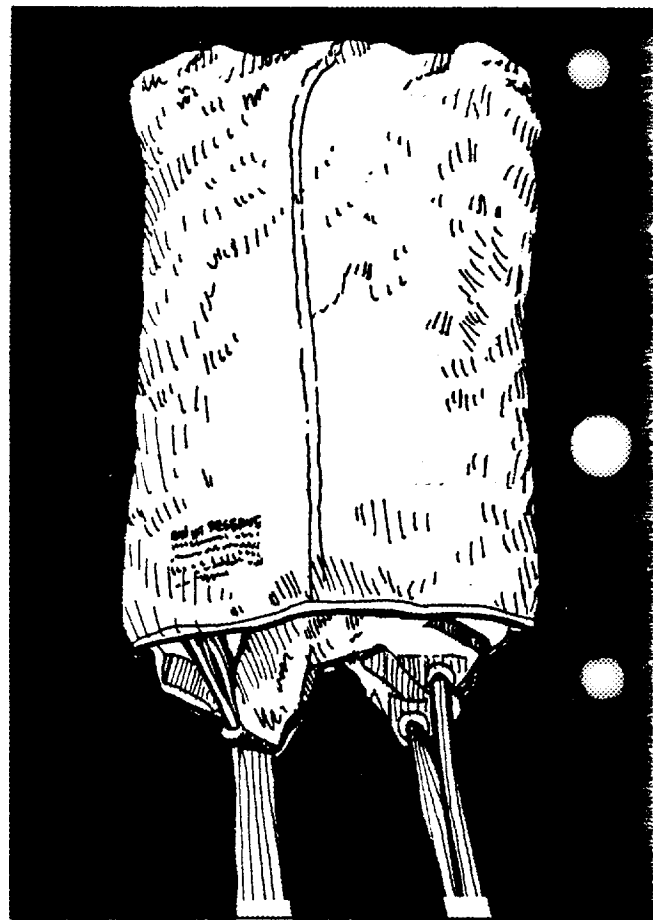
Preferred Ram-Air Packing Method

(As explained previously, there are two approved methods of packing a ram-air resewe into a Vector fin bag. See page 53 for the alternate method.)

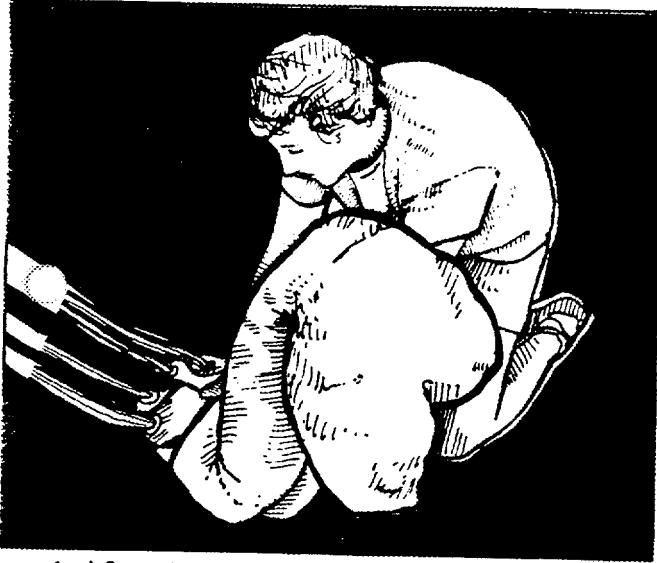
1. Prepare the free bag so it is ready for the canopy. To do this, insert one end of a pull-up cord through the grommets in the top and bottom of the bag. Tie both ends of the pull-up cord together so

the cord won't slip out of the grommets during the packing procedure. *(Note: Some riggers prefer to use a T-bar or a locking pull-up cord in place of a pull-up cord. All of these will work fine if used properly.)* The T-bar or pull-up cord will be used later to pull the locking loop up through the bagged canopy. Also at this time, attach the two 6" pile Velcro strips to the hook Velcro on the bag. This will prevent damage to the Suspension lines as they are inserted into the pouch.

2. Dress the canopy to a width 4 inches wider than the bag (2 inches on each side).



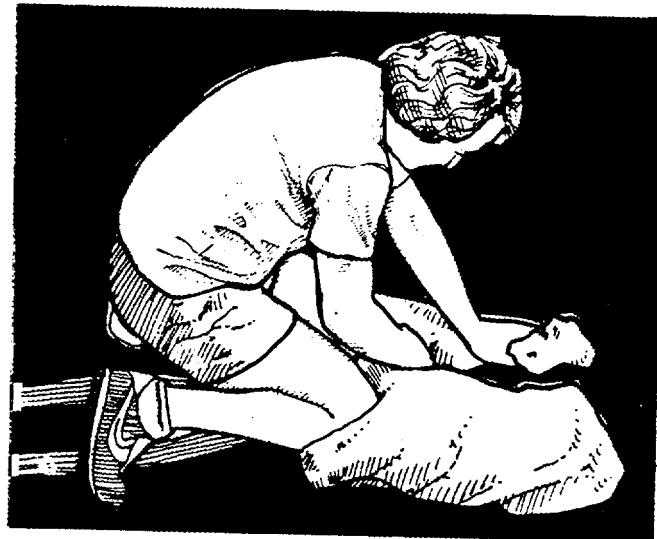
3. Stack the canopy on top of **itself**, making **each** fold no **longer** than the distance from the mouth of the bag to the grommets in the **center** of the bag.



4. After the canopy is stacked on itself, unfold the top portion into two sections or "ears."



5. Dress **each** section neatly.



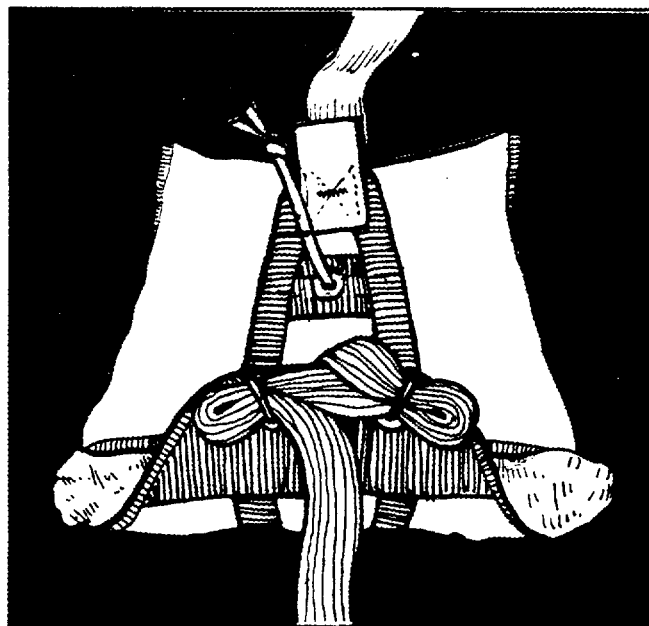
WARNING

If a Molar Strap is used during this section of packing, it must be removed after the canopy is placed into the bag.

6. Carefully **slide** the bag over the canopy, **pushing each** "ear" into the top corners of the bag, **filling** the corners evenly and leaving a tapered shape.

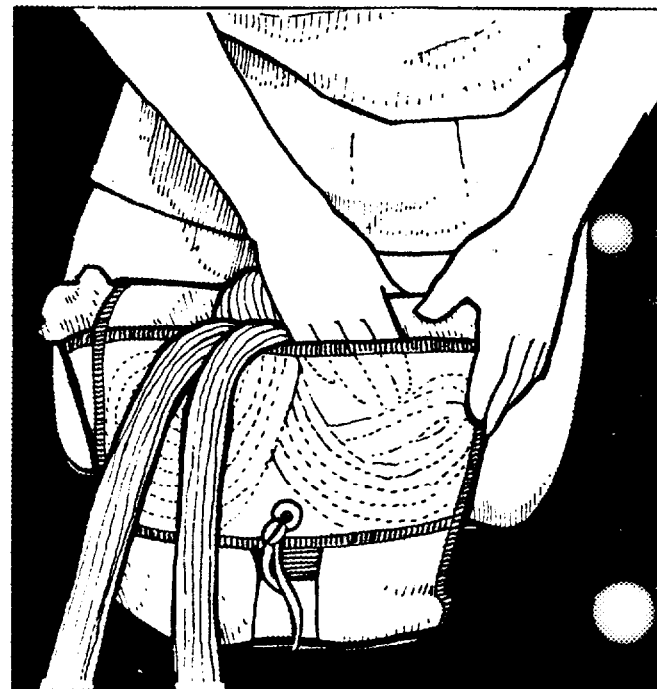


7. **Lock** the bag closed with two bights of **suspension line**. A **shock cord** "Safety Stow" is **used**, not **rubber bands**.



8. **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 **Velcro** at the mouth of the **pouch**. **Other** acceptable method of stowing the lines **which** some riggers prefer: **Stow** all the lines on top of the pouch **first**, either **S-folding** or **Figure-8 folding**, and insert the entire line group into the pouch. Remove the two **Velcro strips** from the bag.



Skip the next section titled "Alternative Method" and continue with "Part 2: Placing the bag into the Container."

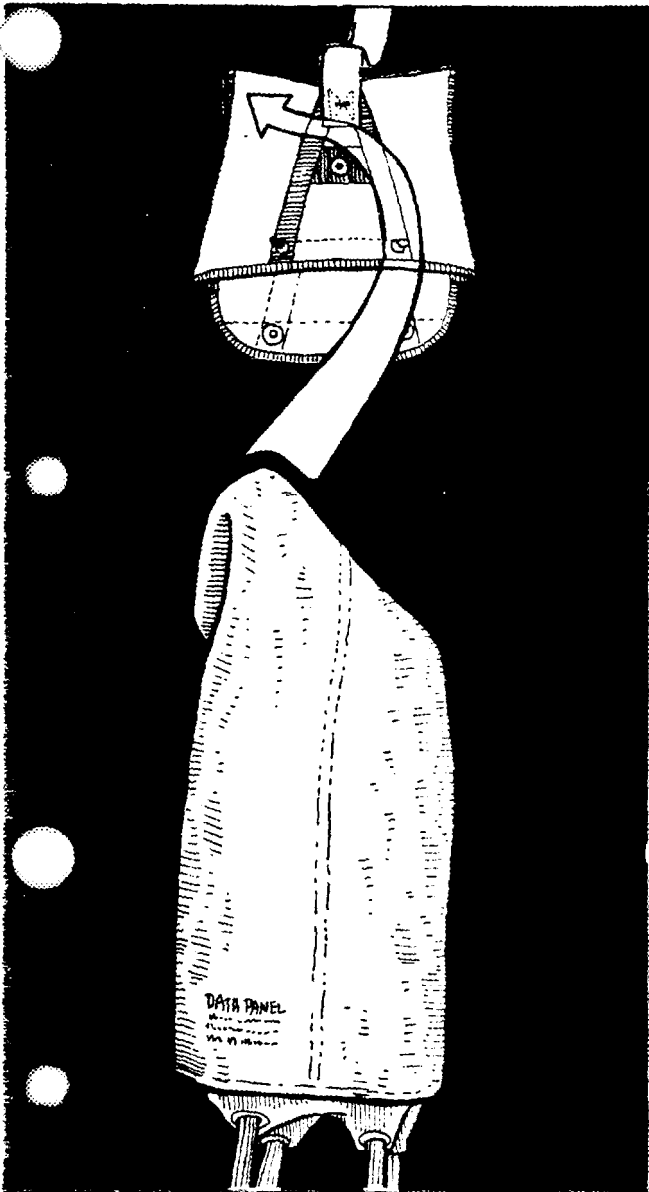
Alternative Ram-Air Packing Method

(Some riggers prefer this method over the previous when packing smaller ram-air canopies into the Vector.)

Assemble, inspect and flake the canopy according to the instructions at the beginning of this section.

1. **Facing** the top of the canopy and straddling the lines, **kneel** on the edge of the tail at the **bottom** of the canopy.

2. **Reach** underneath the canopy and fold it all back into your lap, exposing the folded nose. Spread the nose of **each cell across** the front, so it will be the first part of the canopy to take air. **Lay** the canopy back on the floor.



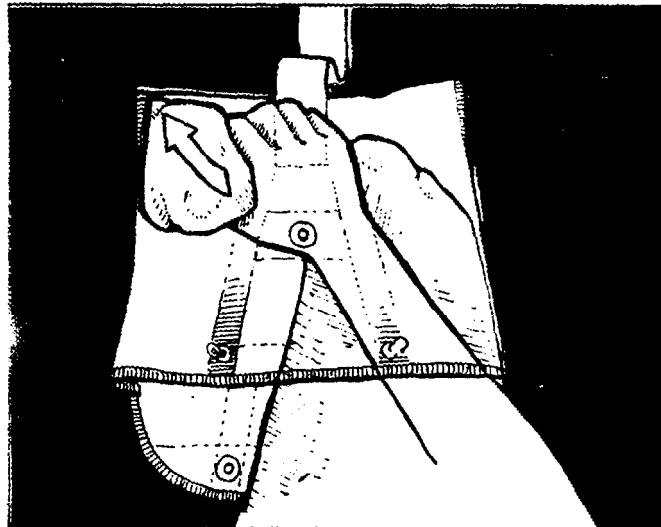
3. Grasp the top right corner of the flaked canopy and fold it **across** and **under** the left side in a 45-degree angle. Be **sure** not to cover the exposed nose. Lay the canopy back on the table.

4. Insert one end of the pull-up cord through the grommets in the top and bottom of the bag. Tie it to the other end so it won't slip out during the rest of the packing procedure. (Note: Some riggers prefer to use a T-bar or a locking pull-up cord in place of a regular pull-up cord. All of these will work fine if used properly.) The T-bar or pull-up cord will be used later to pull the locking loop up through the locked canopy.

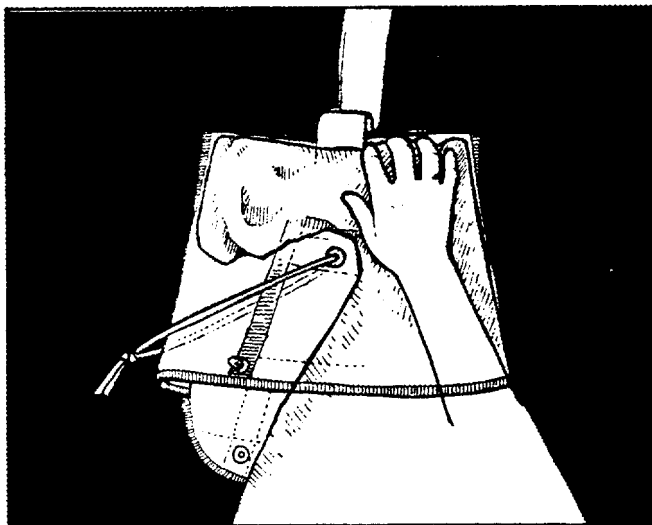
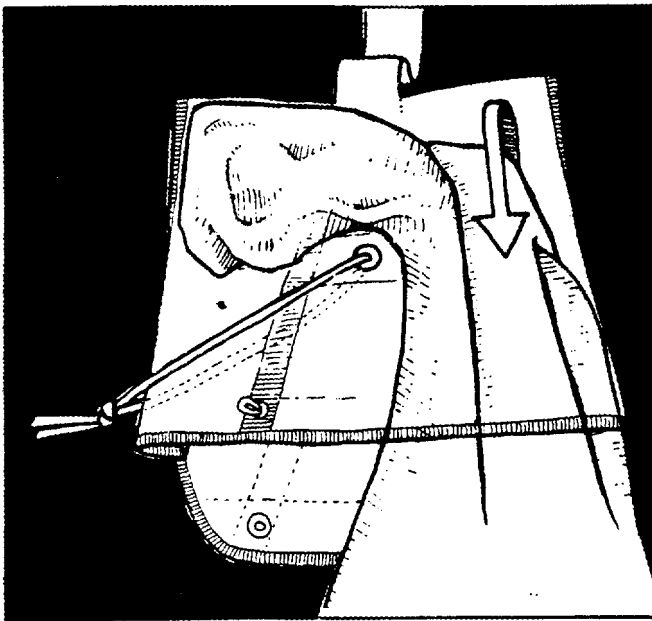
5. Kneeling as before, grasp the top left corner of the flaked canopy and going around to the right



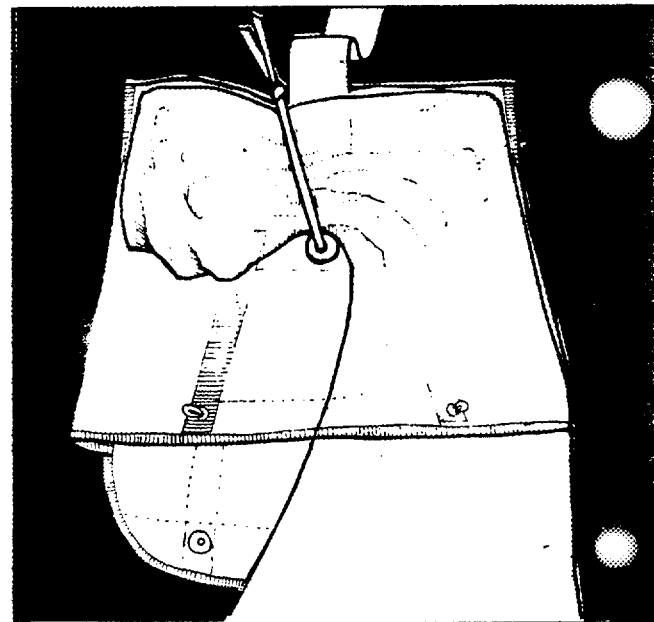
of the pull-up cord, place the corner of the canopy into the top left corner of the bag. Be **sure** to fill the corner.



6. Without pulling the left corner free, reach into the bag and over the canopy to grasp the previously folded right corner **under** the canopy. Maneuver this corner of the canopy into the top right corner of the bag. Be **sure** to fill the corner.



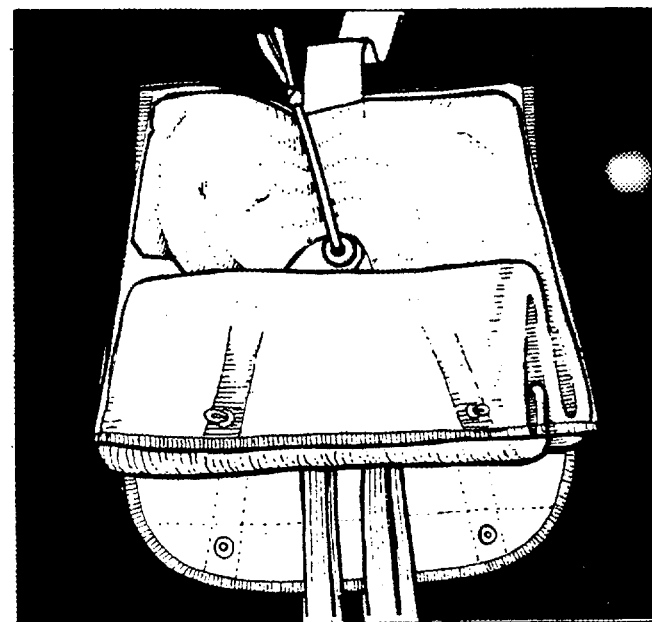
7. Retie the **pull-up cord** tightly around the top S-fold until the top and bottom grommets are no more than 1 **inch** apart. This retains the **S-fold** in the top of the bag throughout the **rest** of the **packing** procedures.



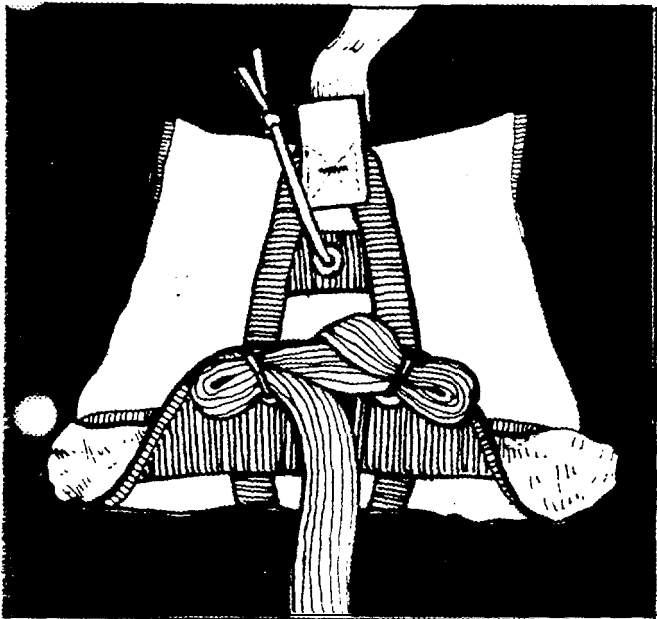
8. Dress the remaining canopy to a width 2 inches greater than the bag on **each** side.

9. **Fold** the slider and 4 inches of the bottom of the canopy toward the top of the canopy and **under** the tail.

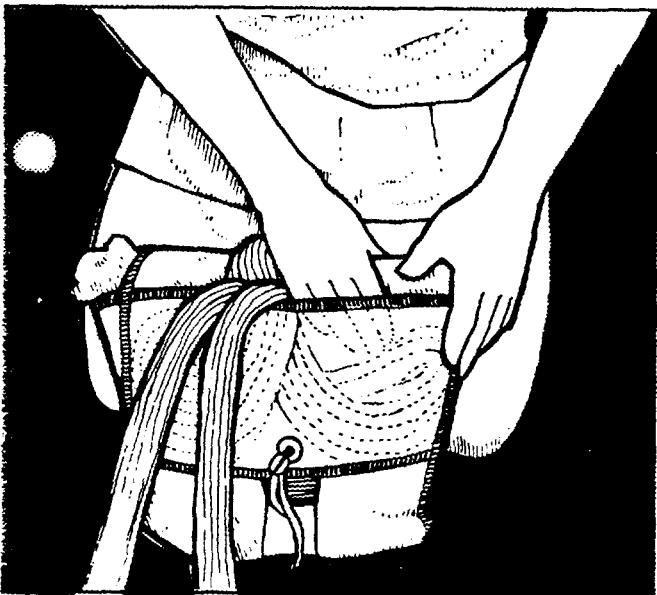
10. Making very short folds-no longer than the distance from the mouth of the bag to the **pull-up cord**-stack the canopy on top of itself. **Be** the top (**first**) fold of the canopy stays in the **bag**.



11. Carefully place the **stacked** canopy into the bag. Close the bag with the two **locking** stows. (A shock cord "Safety Stow" is used, not rubber bands.)

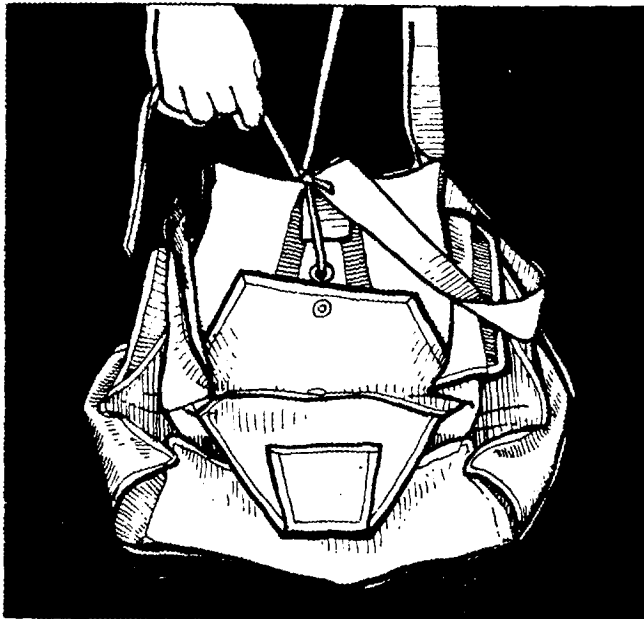


12. Stow the remainder of the suspension lines into the pouch on the underside of the bag using S-folds that extend from one side of the pouch to the other. Remove the two Velcro strips from the bag. Be sure none of the lines are trapped between the Velcro at the mouth of the pouch.



PLACING THE BAG IN THE CONTAINER

Regardless of the procedure used to pack the canopy into the free bag, use the following procedures to put the bag into the Container and close the Container.



1. Set the bagged canopy on the main Container and position the reserve risers in the reserve pack tray. Fan the links rather than stacking them on each other, placing the rear links to the outside. Be sure to place the reserve risers far enough in the pack tray so they will lie flat over the shoulders.

2. Pass the other pull-up cord through the reserve locking loop

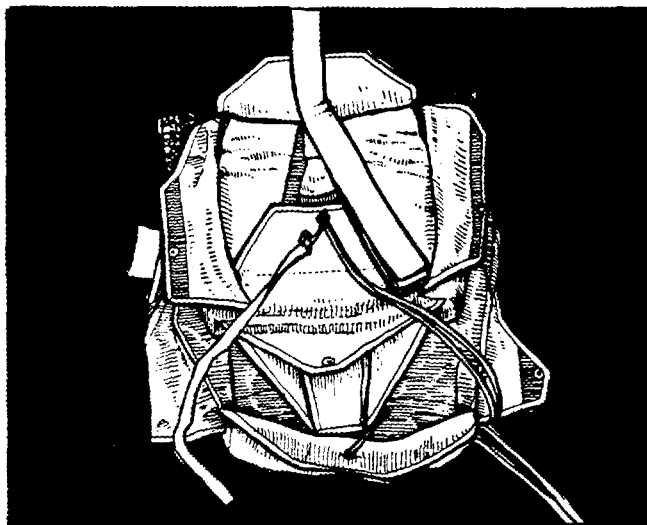
If a T-bar was passed through the bag, thread the ends of the pull-up cord through the hole in the end of the T-bar. Remove the T-bar from the bagged canopy, pulling the locking loop and pull-up cord through it.

If the pull-up cord was passed through the bag, untie it and tie the end protruding from the underside of the bag around both ends of the pull-up cord that was passed through the locking loop. Carefully pull on the other end to pull the locking loop and pull-up cord through the packed canopy. Untie the other pull-up cord and set it aside.

3. Place the bagged canopy in the pack tray, taking extra care to fill the lower corners. Then use the pull-up cord to pull the locking loop up through the bagged canopy. Secure it with a temporary locking pin.

CLOSING THE RESERVE CONTAINER

Regardless of which procedure was used to place the canopy in the bag, the same procedure is

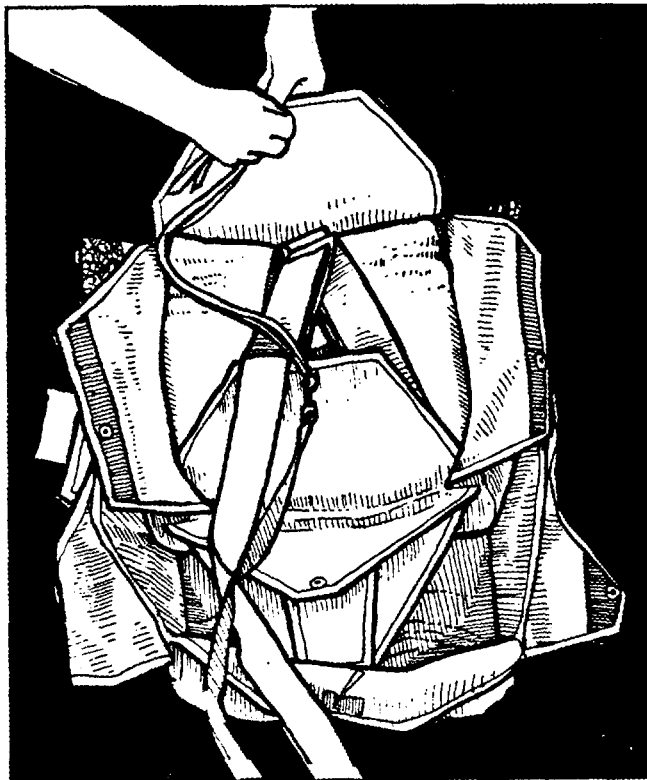


used to **close** the container-

1. Close the inside bottom **kicker flap** (Flap #1) and secure it with a temporary **locking pin**.

2. Pack the **first** third of the **bridle** in the **container** by **making** long S-folds in the bridle from the top of the bag to the bottom right-hand corner of the reserve **container** as shown. Carefully **tuck** the bottom of the S-folded **section** **under** the inside bottom **kicker flap** (Flap #1).

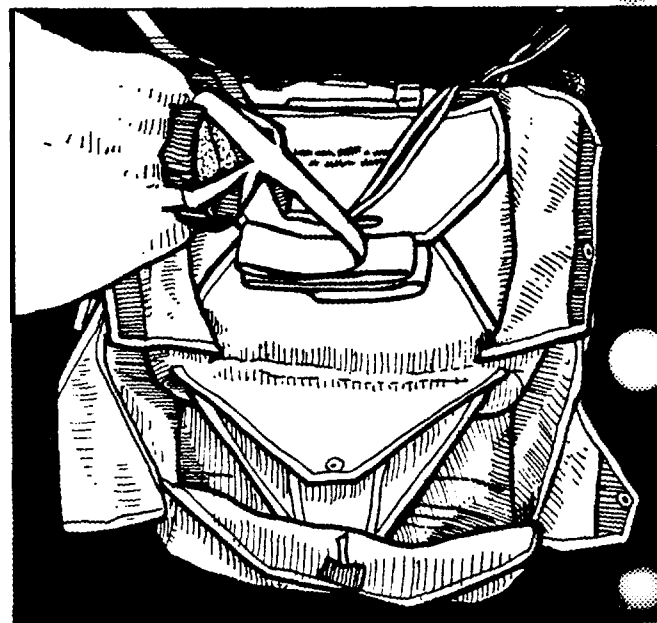
3. Repeat the above process on the left side with the **second** third of the bridle, making the S-



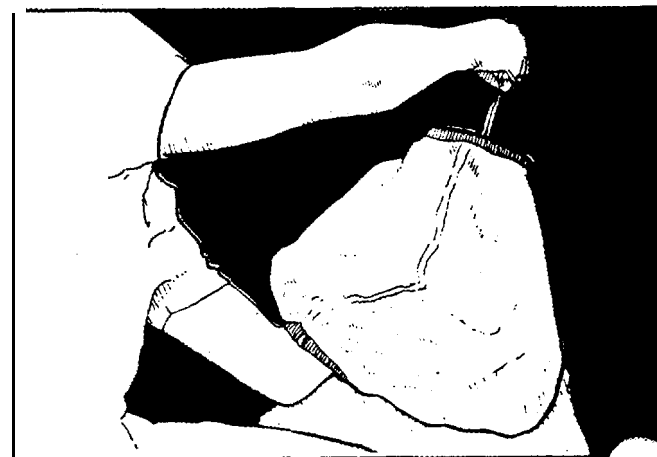
folds from the top of the bag to the lower left-hand corner of the **container** and tucking the bottom sections **under** the inside bottom **kicker flap** (Flap #1).

4. Close the inside top **kicker flap** (Flap and secure it with a temporary pin. The **bridle** should **come** out between **Flap #1** and **Flap #2**. Check the amount of free bridle extending **from** the closed flaps to the base of the **pilot chute**; there must be at least 5 feet. If there is **less** than 5 feet, reopen the flaps and restow the S-folded bridle to make the length of **free** bridle at least 5 feet, **maxi-** mum 6 feet long.

5. S-fold the length of free bridle on top of **#1** and **#2** **kicker flaps** from right to left up to the base of the **pilot chute**.

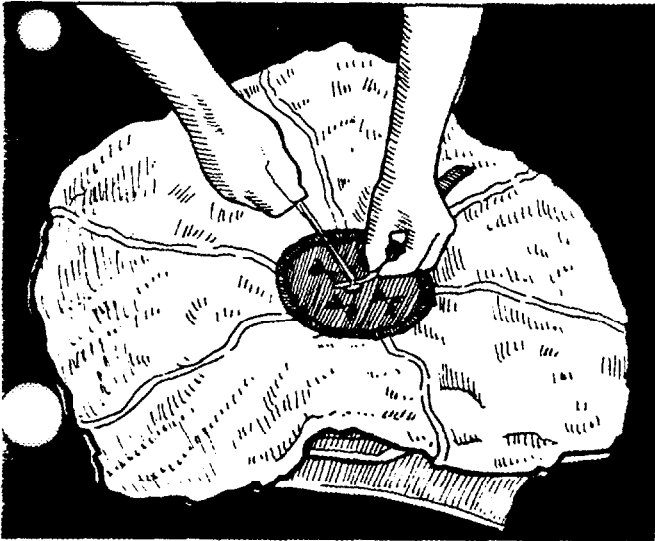


6. Thread the pull-up **cord** up through the **bot-** om of the **pilot chute** and out the top.



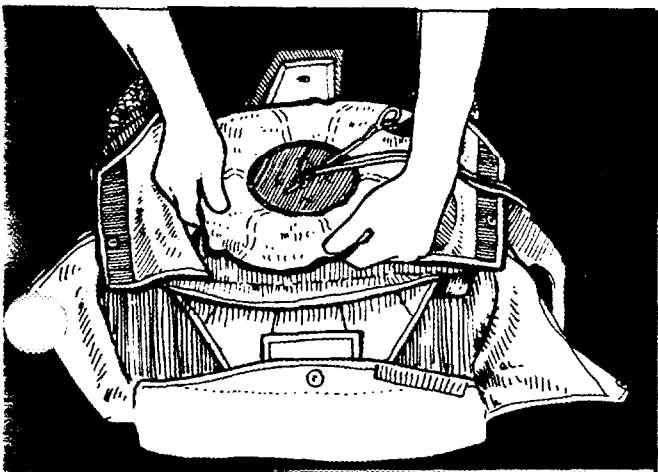
1. Make **sure** the **pilot chute** is **ceotered** over the **loop**, then compress it straight down and **lock** it with the temporary pin.

8. Pull all the canopy fabric out, away from the spring. **Folding** the fabric, rather than stuffing it between the coils, increases **pilot chute launch performance** and **reduces** the **bulk** of the **packed container**. After pulling the fabric **away** from the spring, check to make **sure** the **pilot chute base** is centered **under** the **crown**.



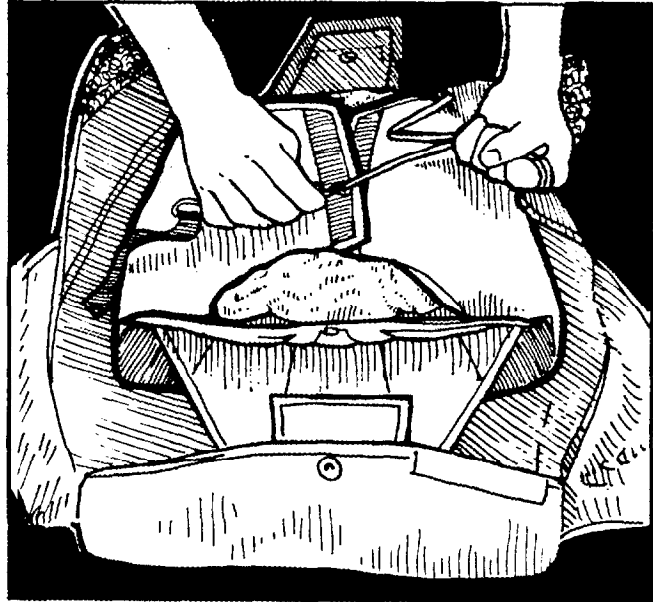
Now **fully** compress the spring to see how **much** loop **can** be pulled through the top of the **pilot chute**. If you **can** pull more than **1/2 to 3/4** inches through, the **loop** is too long. Now would be the best time to open the container and shorten the **loop**.

9. Lay the fabric **flat** all around the **pilot chute** and **fold** it **under** in wide folds to the **center**. Fold the top and bottom **first**, then the sides. Keep the



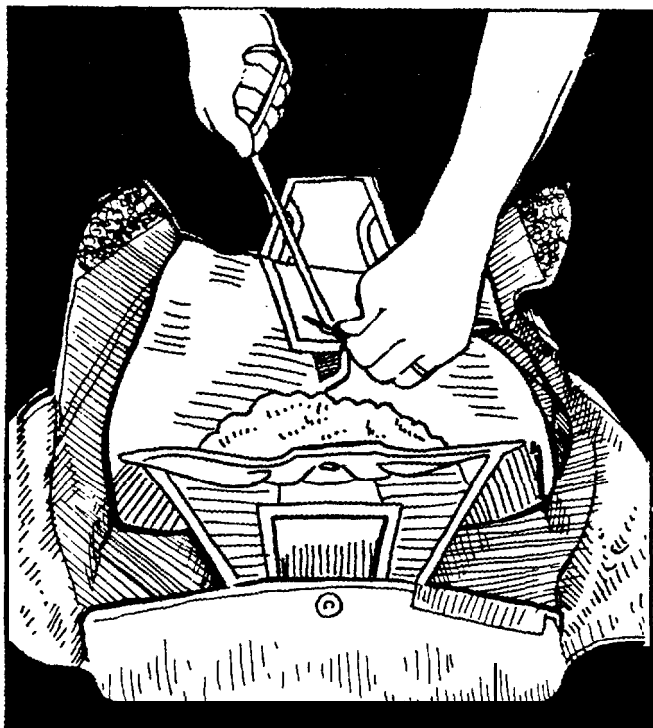
fabric folds of the **pilot chute** out **from under** the open flaps.

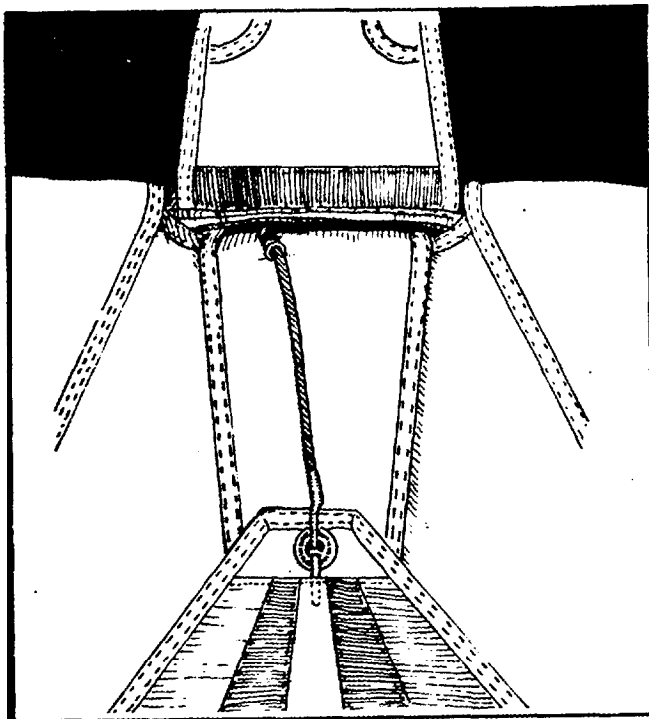
10. Thread the **pull-up cord** through the **side flaps** (Flaps #3 right and #4 left) and **close** and **se- cure** with a temporary pin. Make **sure** that the **folds** in the **pilot chute** stay **flat** and **neat**.



11. Thread the **pull-up cord** through the **reserve top flap** (Flap #5) and insert the temporary pin.

12. Thread the **pull-up cord** through the **bottom center flap** (Flap #6) and secure it with the **tempo- rary locking pin**.





13. Place the rig on a clean surface with the backpad facing up and walk on it with stocking feet or clean shoes to help expel air from the container and make it flatter.

14. Replace the temporary pin with the reserve pin. The end of the pin slides into the channel in the bottom flap.

15. Insert the ripcord handle into its pouch on the main lift web.

16. Dress the container, seal, sign and log the reserve. Close the reserve pin protector flap.

17. Count your tools.

CAUTION

If the force necessary to close the last two flaps seems excessive, the loop may be too short. Use a scale to determine how much force is needed to extract the pin; 8 to 12 pounds is correct.

5. The 3-Ring Release System

INTRODUCTION

The 3-Ring Release System was invented by the Relative Workshop in 1976. It was the **first** practical **release** that **allowed** parachutists to jettison their **main** canopies in one **motion** by simply pulling a **single** handle.

Not **only** is the 3-Ring easier to operate than previous canopy release Systems, it is also more **reliable**.

... **Once** the main is jettisoned, the **only** things left on the harness are two smooth rings that **cannot** snag a deploying reserve. Some other release systems **can** and have interfered with the deploying reserve.

MODIFYING THE 3-RING RELEASE

The great reliability of the 3-Ring **system** results from the proper functioning of every one of its individual components. Therefore, the owner should not modify the **system** in any way, nor should he **replace** genuine 3-Ring **parts** with others.

These modifications (among others) may **cause** the **system** to not work properly:

- o Substituting risers that don't have Type 2 **shock** for the locking loop. Don't use risers that have loops made of Kevlar or solid **cord**.
- o Not using a breakaway handle with **cable** with the special yellow coating. This Teflon-impregnated

coating is important; other **plastic** coatings may **cause** the **cables** to bind in the housings or **loops**, making it difficult or impossible to jettison the **risers**.

- o Using a breakaway handle with cables of the wrong length. The length of the cables is critical to **insure** each riser **releases** in the proper sequence. **Replacement handles** are available from the Relative Workshop.

The 3-Ring Release is now found on other rigs besides **Vectors** as the Relative Workshop has **licensed** its use to other manufacturers.

GETTING TO KNOW THE 3-RING

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

Begin by peeling the release handle from the Velcro on the harness. Peeling, rather than pulling, makes it easier to separate the handle from the webbing.

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

Now **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.

Each ring forms a lever with a ten-to-one mechanical advantage as it passes through the other. A force of 1,000 pounds on the large harness ring exerts a force of only 10 pounds on the white loop. (Opening shock usually totals about 1,000 pounds or 500 pounds on each riser.)

Because of the mechanical advantage provided by the 3-Ring design, only a force of approximately a pound on the top ring keeps the release together.

That's why it's important to keep foreign matter like bits of grass and sticks out of the 3-Ring assembly. A small stick in the white loop could prevent a riser from releasing.

It is also important to understand one of 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, or take 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.

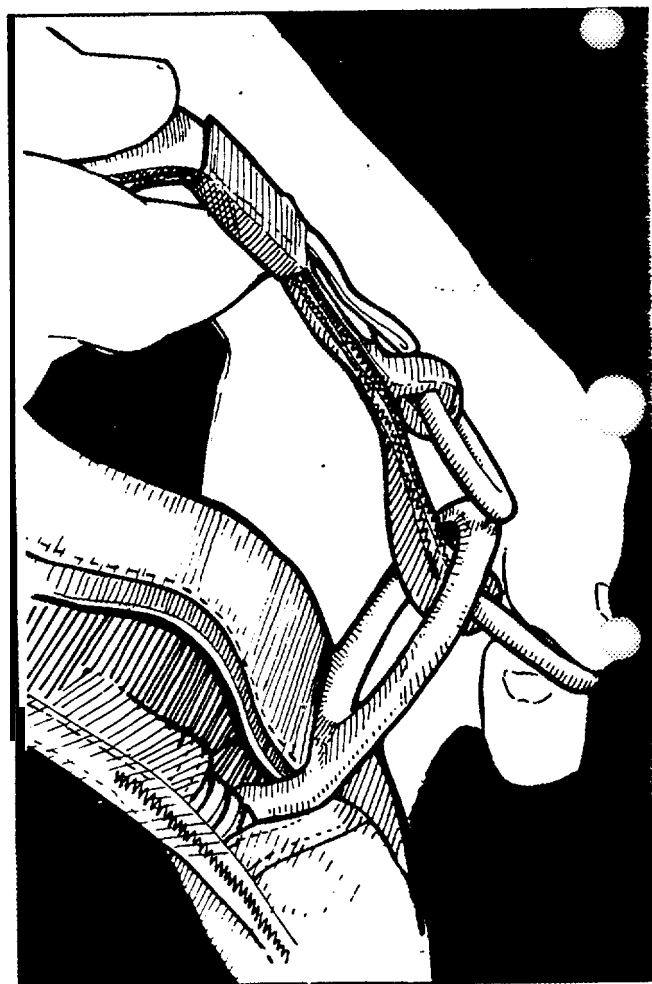
The 3-Ring release system must be disassembled, flexed and inspected every month. Procedures for this are listed in the care and maintenance chapter of the manual.

ASSEMBLY

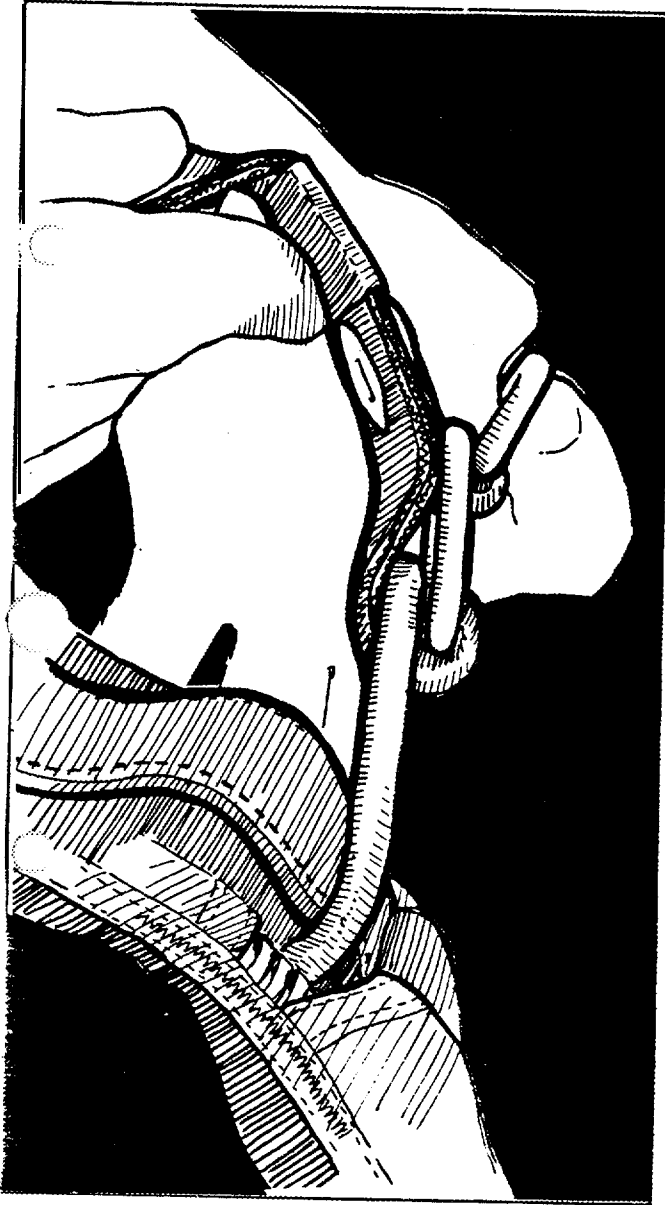
Before assembling the 3-Ring release, make sure the risers aren't twisted or reversed. Lay the Vector face down, as you would to pack it.

1. Thread each cable into its housing and stick the handle to the harness. The handle should be positioned as close to the ends of the housings as possible so that no cable is exposed.

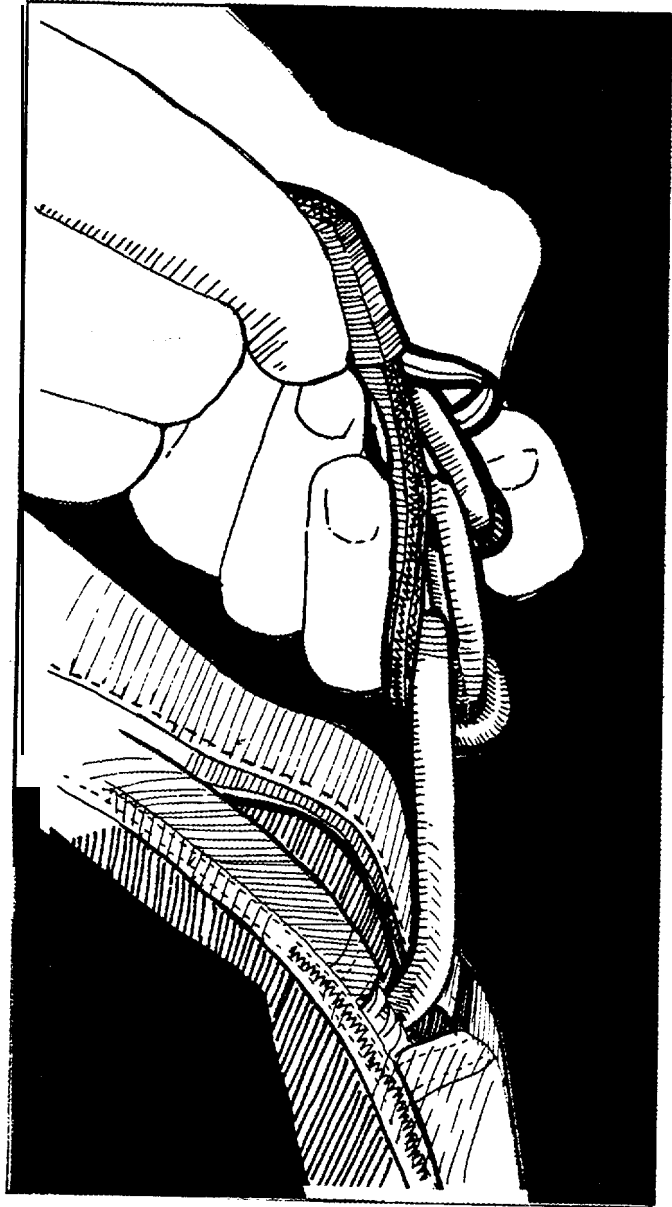
2. With the rings of the riser facing toward the floor, pass the middle ring on the end of the riser through the large harness ring from above. Fold it back toward the canopy and risers.



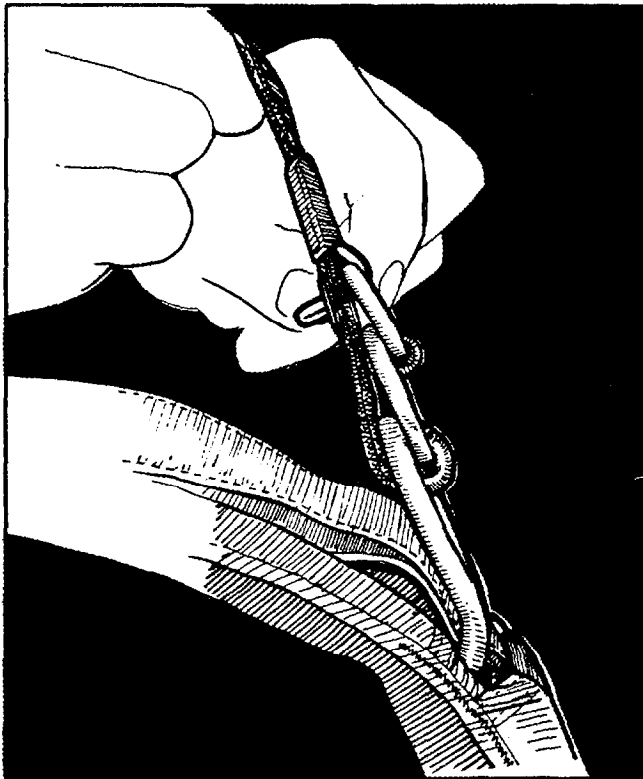
3. Thread the **smallest** ring through the middle ring in the same way, but make **sure** it doesn't pass through the large ring.



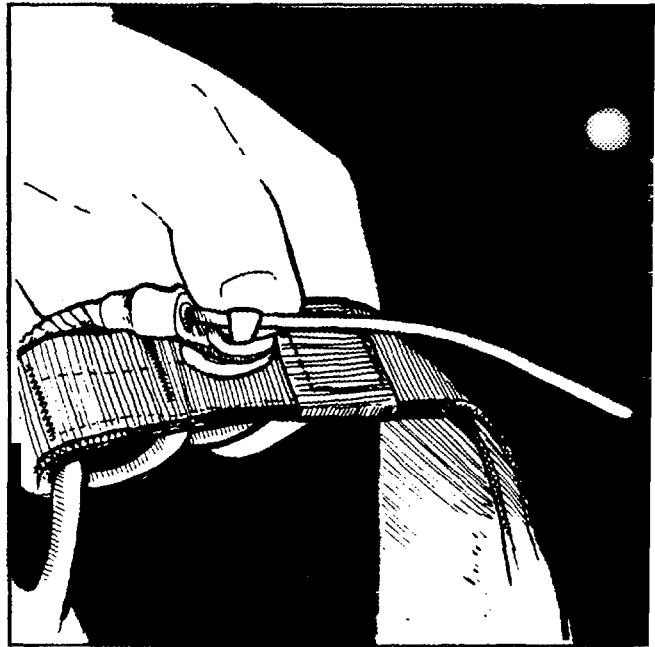
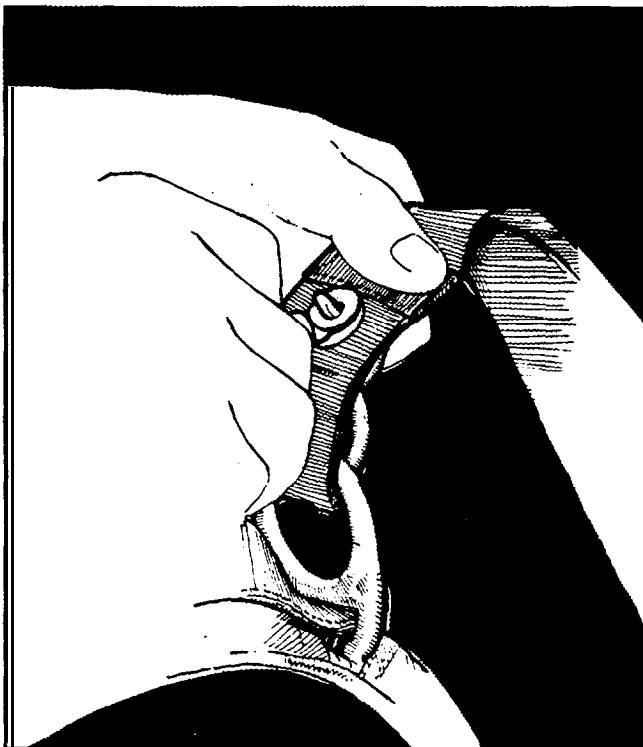
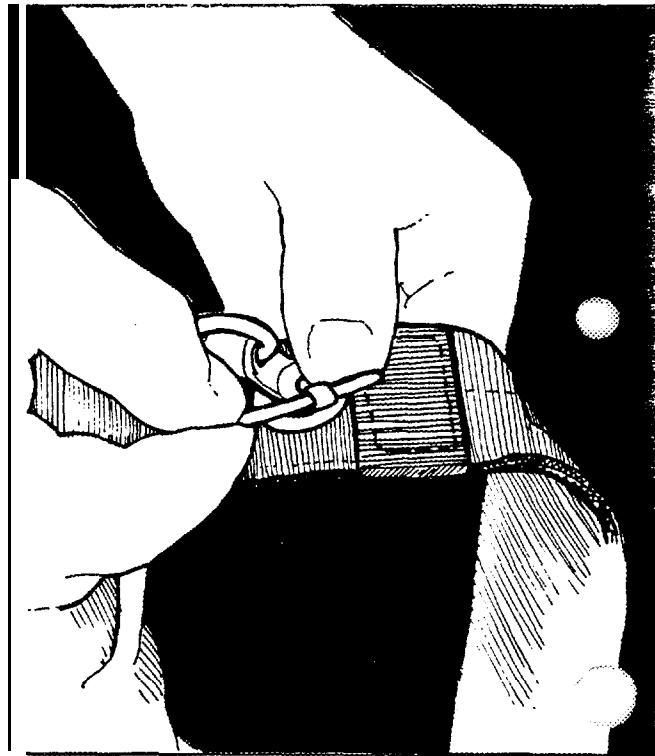
4. Bring the white loop over the **small** ring **only** and then through the riser grommet so it pokes out the back of the riser.



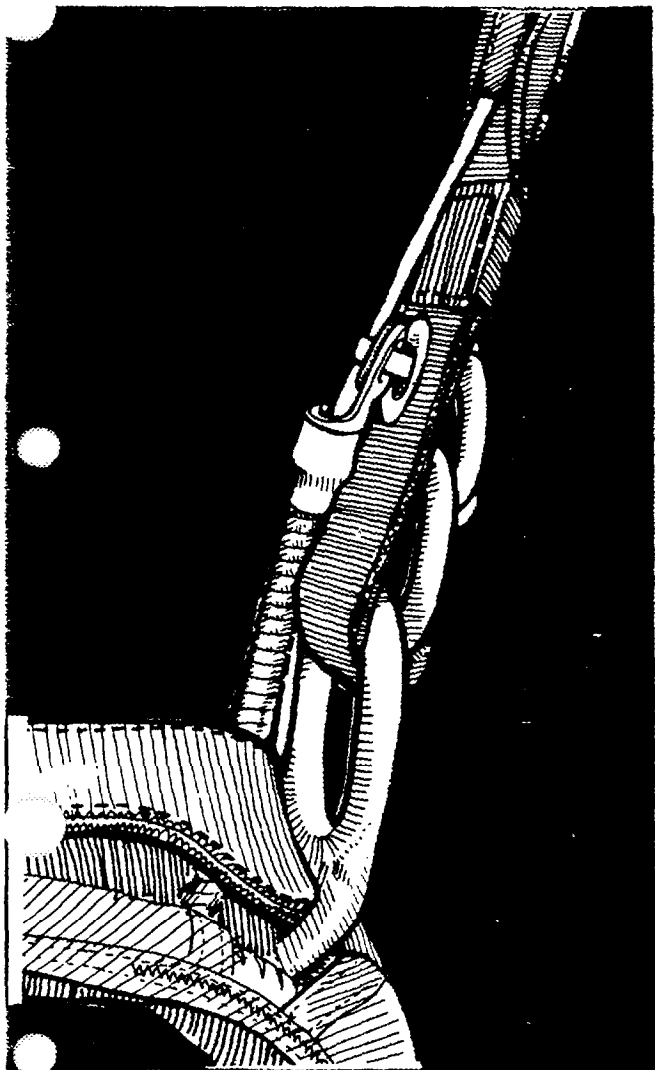
5. **Continue** threading the white loop through the **grommet** on the end of the cable housing. The flat side of the cable housing grommet should be against the riser.



6. Thread the **yellow** cable through the white loop, making sure the loop isn't twisted. Be **careful** with the cable so you don't bend it too **sharply** or kink it. Insert the free end in the **channel** on the back of the riser.



7. Repeat the above **steps** with the other **riser**.

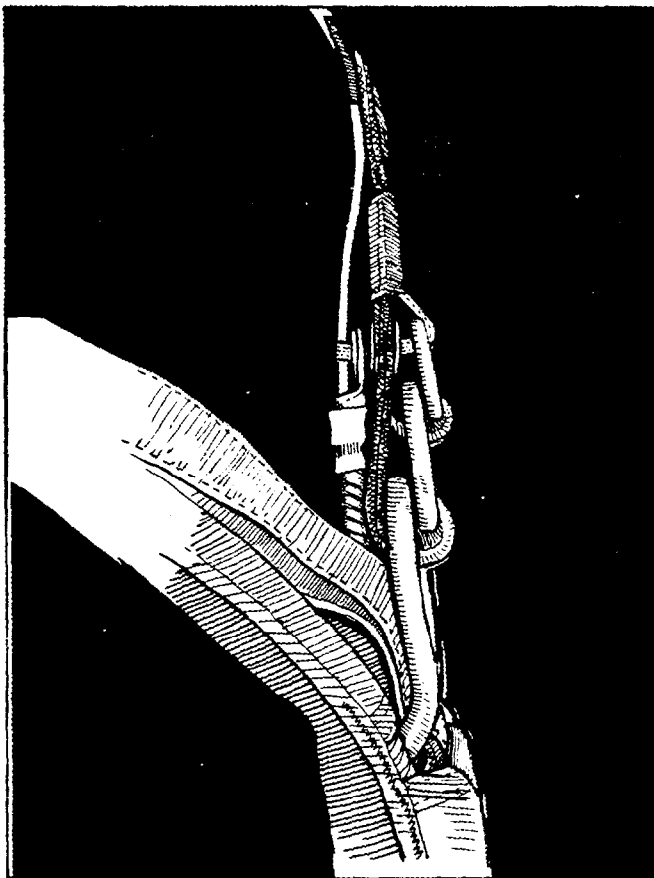


PRE-JUMP INSPECTION

Before jumping the Vector II, check the 3-Ring release system for the following:

1. Each ring passes through only one other ring.
2. The white loop passes through **only** the **small** ring.
3. The white loop passes through the grommet on the end of the **cable** housing without twisting.
4. Nothing **passes** through the white loop **except** the **yellow** cable.
5. The 3-Ring release handle is securely **stuck** to the harness, and no cable is visible between the handle and the cable housings. IE your release handle has a tendency to hide itself **under** your main lift web, undo the Velcro and **twist** the handle in a clock-wise rotation (when wearing rig) so the han-

dle will stick-out and **slightly** forward for a **better** grip.



NOTICE

If a Vector II is fitted with 3-Ring risers that weren't built by the Relative Workshop, it is important that they be checked for proper configuration. The side view above shows a correctly built 3-Ring riser attached to the harness ring and put under moderate tension. Note the following: (1) The rings overlap each other and maintain metal-to-metal contact between each other. (2) The rings are aligned in parallel planes. (3) The smallest ring is not pulled snug against the grommet; the white loop is long enough to give it some play. (4) 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. You should contact a rigger or the Relative Workshop before jumping with those risers.

6. Maintenance & Care

INTRODUCTION

Your Vector II will last longer, look **better** and **function** correctly if it **is** maintained. A Vector II actually **requires very** little maintenance unless **it is** subjected to unusual conditions such as a jump into salt water or a muddy landing.

INSPECTION

The best **approach** in maintaining your rig is to periodically spend a few minutes examining every detail on it. This **inspection** should be done at least every month. If any wear or damage is found, have it **fixed** immediately. Putting off repairs might result in a malfunction.

In addition to inspecting the rig **yourself**, ask your **rigger** to inspect the entire assembly every time the **reserve is** repacked.

Particular attention should be given to these areas:

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

2. **Reserve System.** This includes the reserve **rip-cord**, **locking** 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, spot little **problems** before they **become** major.

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

4. **Main Container.** Inspect the **plastic** stiffeners in the **container** flaps and **replace** any that are **broken**. Replace any grommets that are badly **deformed** or are pulling out of their setting.

5. **Main Pilot Chute.** Check the **center** line (the length of nylon tape inside the **pilot chute** that tends 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**.

6. **Locking Loop.** The main container is held shut with a **locking** 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 loop with a **duplicate** if wear **is** noticed.

CAUTION

Never jump a Vector **with** a worn **locking** loop.

7. Velcro tape has many applications within parachuting. Even though it **can** eventually wear out, there exist few materials that **can** compete with Velcro with regard to its **flexibility**, **adaptability**, and wide variety of possible applications.

Hook Velcro often attracts dirt, bits of grass, hair and other debris. Cleaning the hook **can** be facilitated with the use of a fine-tooth **comb**. The pile section generally remains clean but the nylon fibers tend to get pulled out of **place**. When you find that your Velcro is losing its adhesive qualities, then it should be replaced.

Although the Relative Workshop strives to find **better** alternatives to Velcro, there still remain some areas on the Vector II where nothing **else** will do, namely: The Velcro for the breakaway **handles**, **ripcord** pockets, hand deploy bridles, steering **toggles**, **reserve static** line lanyards, and riser **covers**.

CARE

Your Vector II is manufactured mostly from
 1. Nylon is **very** durable, but is **susceptible** to
 2. Damage from **several** sources:

1. **Sunlight**. The ultraviolet **rays** in sunlight quickly and permanently weaken **nylon**. Keep your Vector out of **direct** sunlight as **much** as **possible**.

2. **Acids**. Nylon is also damaged by **acids**. Keep your Vector 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 Vector.

3. **Oils and Grease**. Most Petroleum **com-**
pounds do not weaken nylon; they simply stain it. Such stains should be promptly removed by a **rigger** using the proper Petroleum solvent.

4. **Water**. Water will not structurally damage your Vector II, but prolonged agitation in **clear** water weakens webbing or may **cause** some **fabric** and tape **colors** to **run**. Salt water may **damage** **nylon** and rust hardware 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.

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

6. **Sand**. Fine sand will weaken and **cut** webbing and fabrics of all kinds. Prolonged exposure to sand will shorten the life of the entire **parachute assembly**.

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

FAA regulations require that **reserves** worn in the USA be inspected every 120 days by a **certified rigger**.

REQUIRED PERIODIC MAINTENANCE FOR THE 3-RING

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.

Generally, it **is** NOT recommended that the **risers** be attached to the harness when new and "forgotten." Like all skydiving gear, the 3-Ring Release should be carefully inspected and operated on a **regular** basis.

The procedures below should be done at least every month. This is especially important if the rig has not been used for a month or more, 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.

1. Every month 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 Velcro on the breakaway handle and main lift web to be sure it is clean and **ade-**quately 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 **down-**wards more than **1/2 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 **ob-**structions. 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 be-**come **tacky** in **cold** weather. **Too much** oil **will** re-quire more **force** to **extract** the cable **during** a breakaway.

10. Inspect the fittings at the end of **each** **hous-**ing. **If** one of **these** fittings were to **come** off the housing, a riser might release prematurely.

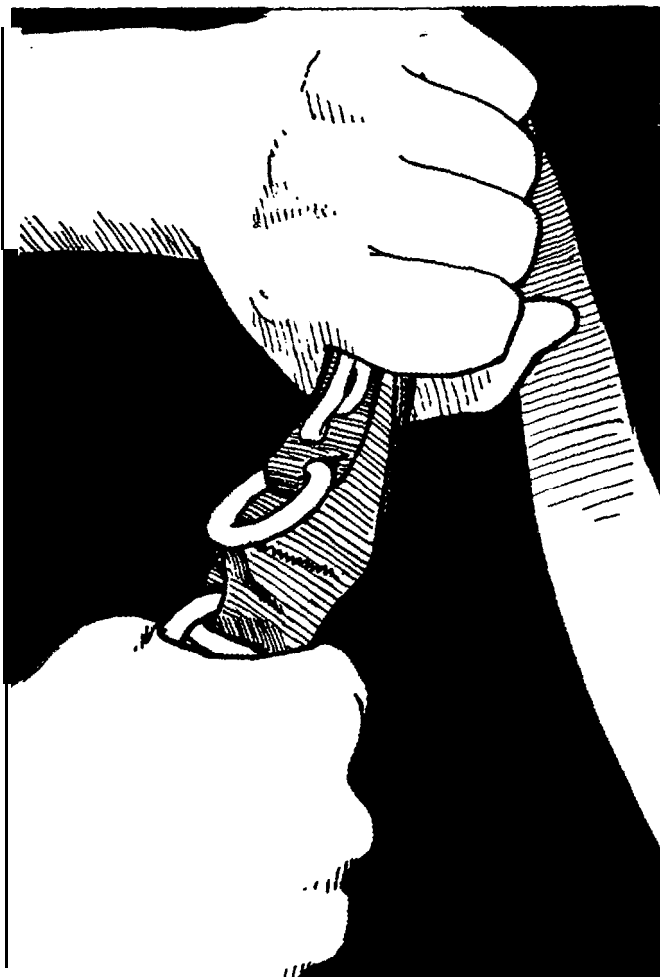
11. If any wear is found, consult the Relative Workshop **or** a **rigger** before using the **Vector**.

12. Reassemble the **system**. Double check it. Make **sure** the **risers** aren't reversed.

The Relative Workshop appreciates an- nouncements from **users** that relate to the safety, **opera-**tion **or** maintenance of the 3-Ring release.

REPLACEMENT PARTS

The Relative Workshop supplies **replac-**ement parts for its rig at a reasonable **cost**. When **orderin-**g 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 **informa-**tion is written on the label **tucked** under the collar between the top two flaps of the **reserve**.



7. How to Use the Vector II

This **chapter** provides specific procedures for using the Vector II. It is not a training syllabus.

It is the responsibility of the owner to **insure** he **knows** everything he needs to make a safe **para-** jump, including how to use his equipment. This knowledge **can** be gained **only** by personal instruction.

SUGGESTED EQUIPMENT

It is essential that a new Vector II jumper practice normal and emergency procedures on the ground before jumping the rig for the **first** time. **This** practice should be done using training aids that **duplicate** the equipment to be used in the air.

The Relative Workshop **can** provide a Vector II training **harness**. It is equipped with simulated breakaway, reserve and main deployment handles that are located in the same positions as the Vector II. If you build your own practice harness, make **sure** the main, reserve and breakaway handles are located in the same positions as on the Vector II.

PRE-JUMP EQUIPMENT CHECK

The equipment check should follow a **logical** order like top to bottom, front to back.

Starting at the front:

1. Make sure the 3-Ring **system** is assembled

properly and free of dirt or other foreign matter.

2. Check the **position** of the breakaway and **reserve** **ripcord** handles. Don't remove them from their pockets unless you **suspect** a **problem**, **because** the Velcro will wear out quickly. **Insure** the **chest** strap is not threaded through the **reserve** **ripcord** handle.

3. Check the leg **straps** to be **sure** they are threaded properly (if you step into the harness), or if they are unthreaded, make sure they are not wrapped around the main lift web but hang straight (if you **choose** to thread them up every jump.)

4. 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. Upon **checking** the pin, it should be straight and seated well into the **locking** loop with the end of the pin covered by the pin **protection** **pocket**. **Note: When asking for a pin check by another jumper, brief them on the proper procedure.**

5. Slide the reserve **ripcord** cable back and forth in its housing to be **sure** it moves freely.

6. Lift the main Container pin-protector **flap** and check the curved **locking** pin. It must be at least **halfway** through the **locking** loop. Be sure the **yellow** **Velcro** patches on the bridle and Container flap are mated.

7. Be sure the bridle is routed correctly from the **locking pin**, **under** the right-hand flap along the main **lift web** and into the **pilot chute pouch**. Routing the bridle around the leg strap will **cause** a pilot-chute-in-tow **malfunction**.

8. Check the **3-ring release** (breakaway) handle. It should be mated to the Velcro on the harness properly. No more than **1/2 inch** of **yellow** cable should be visible between the breakaway handle and the cable housings.

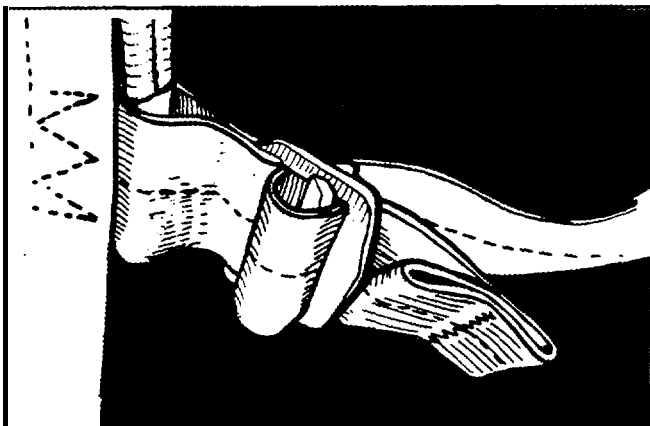
9. Calibrate and arm the AAD (if **installed**) **according** to the instructions provided by its **manufacturer**.

DONNING AND ADJUSTING THE VECTOR II

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

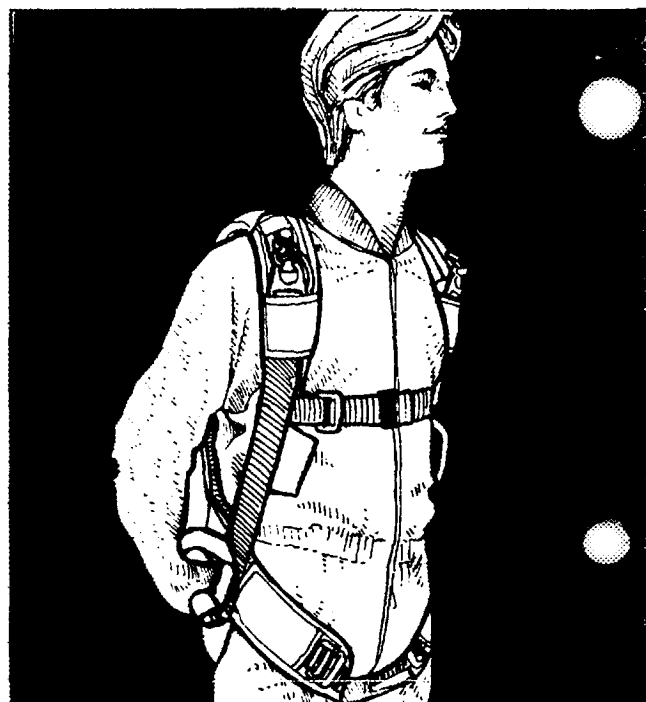
1. Pick up the Vector II by grabbing it by the main **lift web** where the 3-Rings are. Put it on as you **would** a coat.

2. Check the leg **straps** for twists before **threading** them. Be sure to route the webbing correctly, then tighten them until they are snug. **Slide** the **excess** strap through the **black** elastic keepers **pro-**



vided and then stow the excess strap in the pockets on the leg pads so they won't flop around in the air.

3. Thread the **chest strap**. (If an **altimeter** is worn on the **chest strap**, put it on now.) The strap enters the adjuster from behind (the wearer's **chest** side), around the **sliding bar**, and back through **between** the bar and the end of the adjuster. **Adjust** it



so the main **lift webs** are parallel when the **chest strap** is tight. Stow the end through the **black** elastic keeper.

An **improperly** threaded **chest strap** will not hold the **jumper** in the harness.

SUMMARY

To summarize the above adjustment **procedures**:

Always give your gear a **complete** check before putting it on your back.

Put the **packed** rig on over your jumpsuit.

Thread the **leg straps** through the adaptor or connect the Straps, **checking** that they are not twisted, and position the **comfort** pads properly.

Tighten the leg **straps** until snug.

Stand up straight and **close** the **chest strap**; it should not be cinched too tightly.

JUMPING THE VECTOR II

This **section** contains recommended procedures for operating the Vector II.

DEPLOYING THE MAIN PARACHUTE

Before a jumper uses a hand deploy System, he should first practice the procedure on the ground under an instructor's supervision. These procedures are used in the air:

1. While falling in a stable position, look at the hand deploy pilot chute handle.
2. Firmly grasp the handle with your right hand while compensating for stability with the left.
3. Extract the pilot chute from its pouch and throw it into the airstream away from your body.

It is not enough to simply release the pilot chute into the airstream; it must be thrown out and away from your body. Otherwise it may blow back into the turbulent air behind you and cause a malfunction. The motion of your arm should be parallel to the ground. If it isn't, the pilot chute and bridle may pass under your arm, possibly causing a malfunction.

Any wave-off procedure should be completed before pulling the hand deploy pilot chute. Waving off the pilot chute in hand could cause a premature pack opening and possibly a malfunction.

Many jumpers watch the pilot chute inflate and begin extracting the main canopy, then lower their heads while the main inflates.

DEPLOYING THE RESERVE PARACHUTE

This section is not a detailed course in coping with parachuting emergencies. It discusses the causes of some total and partial malfunctions and how a jumper wearing a Vector II might react to them.

Note that the procedures for dealing with malfunctions do not consider the installation of an AAD. Since it is a back-up device, the jumper should act as if it wasn't there.

Total Malfunctions

A total malfunction exists when the main canopy is still in its Container after some effort has been made to deploy the main pilot chute. The pilot chute may or may not be trailing behind the jumper.

A total malfunction may result from a variety of causes, most of which can be prevented by proper packing, maintenance and use of the Vector II.

Because the jumper is descending at a high rate of speed, he has little time to attempt to correct a total malfunction.

The reserve ripcord should be pulled using a "look, reach, pull," procedure. The ripcord should be grasped with both hands and pulled until the arms are completely extended.

When presented with a total malfunction, it is usually not prudent to jettison the risers before pulling the reserve ripcord. Doing so wastes the limited time and altitude available.

Typical total malfunctions and the experienced jumper's response include:

1. Towed pilot chute. The pilot chute is out behind the jumper, but does not extract the main canopy for some reason. (Causes include misrouting the hand deploy bridle during packing, not mating the yellow Velcro patches on the bridle and flap, and others.)

RESPONSE: Assume a flat and stable position and immediately pull the reserve ripcord. It is unlikely the jumper will be able to identify or correct the cause of a pilot chute-in-tow before impact with the ground.

2. Pilot chute hesitation. The pilot chute may become trapped in the turbulent air over a jumper's back and stay there. (Causes include not throwing a hand deploy pilot chute vigorously to the side and others.)

RESPONSE: The jumper should roll over on his side momentarily. This should blow the pilot chute off his back or out of the turbulent air. If it doesn't leave immediately, the jumper should roll back over and assume a flat and stable position and pull the reserve ripcord. Because simultaneous deployment of the main and reserve canopies can occur in this Situation causing both to malfunction, before pulling the reserve, the jumper should try all possible methods to free the main pilot chute, while maintaining altitude awareness.

3. Lost or stuck deployment handle. Jumpers will sometimes be unable to locate the deployment handle or, if they do locate it, will not be able to pull it.

RESPONSE: The jumper should look at the deployment handle. If he cannot see it or feel it, or if two hard pulls on it won't extract it from its pouch, he should assume a flat and stable position and pull his reserve.

Partial Malfunctions

A partial malfunction results when the main canopy comes out of the container and extends above the jumper but does not open correctly. Most partial malfunctions result from incorrect packing, poor body position upon deployment, or problems with the canopy itself.

Some partial malfunctions can be corrected by the jumper in the air. These might not require the use of the reserve parachute and can be landed safely. Identifying and dealing with such situations is the responsibility of the jumper.

Some jumpers delay several seconds between jettisoning their main and pulling the reserve ripcord. This allows them to achieve stability before the reserve deploys. However, such a delay can be fatal if the jumper is too close to the ground.

Some jumpers put one hand on the breakaway handle and the other on the reserve ripcord handle and then attempt to pull them both simultaneously or in rapid succession. There have been incidents, however, where this technique resulted in the reserve deploying before the risers were jettisoned—a dangerous situation.

Therefore, experience has so far shown that the "two-step" method is usually best.

RESPONSE: When presented with a partial malfunction that requires the use of the reserve, the jumper should arch his back and tuck his legs behind him. He should then look down and locate the reserve ripcord handle and the breakaway handle. Grasp the breakaway handle and peel it away from the main lift web. Look at the reserve ripcord handle. Then pull the breakaway handle down towards the knees until the arm is completely extended. Throw it away and immediately grasp the reserve ripcord with both hands and pull it until the arms are completely extended.

AAD MALFUNCTIONS

A jumper may find himself under his main canopy if his automatic activation device on the Vector 11 malfunctions, or if it was improperly calibrated, or if he has descended below the preset altitude at a high rate of speed.

If the main container is still closed, the jumper should land under the reserve canopy.

If the main container is open but the main canopy is not inflated, it should be jettisoned using the breakaway handle.

If both the reserve and main canopy are open and inflated, the jumper should respond as he was trained by his instructor. (If the main canopy is a ram-air, many instructors teach their students to jettison it and land under the reserve. Procedures for round main canopies depend on a number of factors—such as the exact type of main—that are beyond the scope of this manual.)

OTHER EMERGENCIES

A skydiver may be faced with any number of emergencies not listed here, including those he encounters while in the aircraft, during climb-out or exit, in freefall, under canopy, and during landing. As stated above, training for any and all emergencies must be provided by a currently rated instructor or parachute center.

If you need assistance or require clarification on any point in this manual, please call, write or Fax the Relative Workshop.

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Relative Workshop

MAKERS OF FINE PARACHUTE EQUIPMENT

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PRODUCT SERVICE BULLETIN

June 21, 1993

062193

Incorrectly Manufactured MS-22040

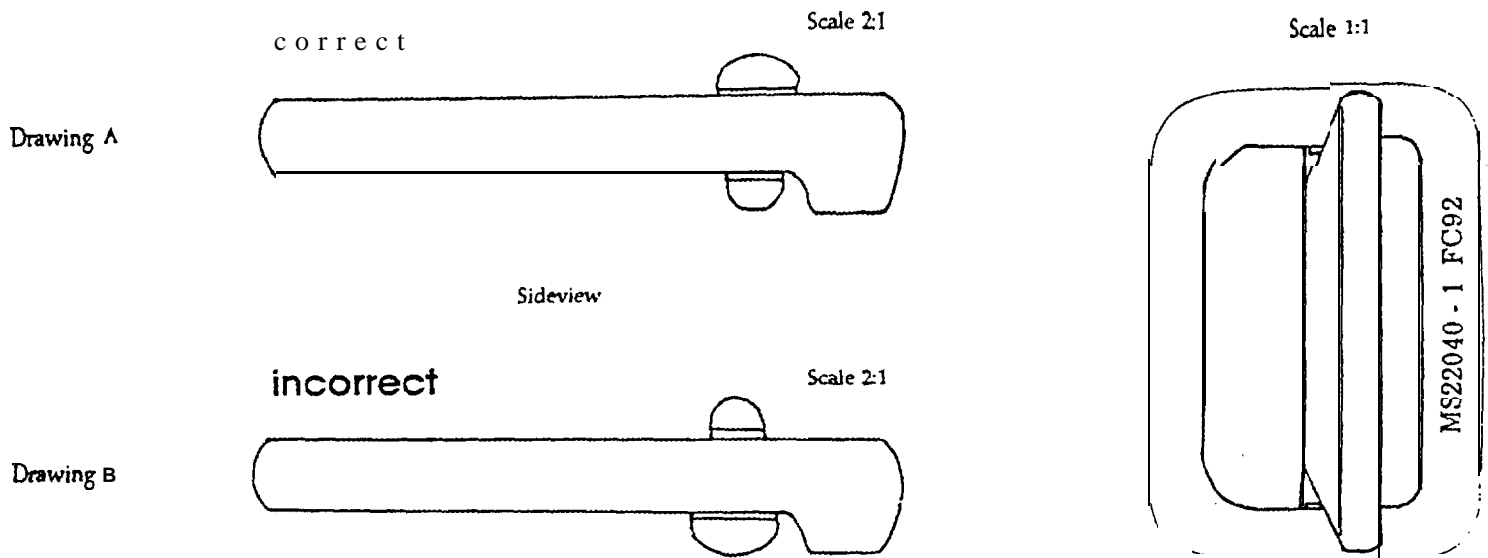
Status: Mandatory at next repack

Identification: All Vector Container Systems manufactured between April 21, 1993 and June 10, 1993

Background: One Vector Container system has been discovered in the field with this incorrectly manufactured hardware. This is not life threatening, but may allow webbing slippage; thus resulting in an uncomfortable harness.

Service Bulletin: This is a one-time inspection. Compare MS-22040 hardware against drawing A and B. If hardware is correct (drawing A), log bulletin compliance on data card. If hardware is incorrect (drawing B), notify Relative Workshop.

Where to check for this hardware: Leg straps (tandem and sport) and chest straps (tandem and tandem passenger harness).



Qualified Personnel: Senior or Master parachute rigger

Compliance Date: At next reserve repack

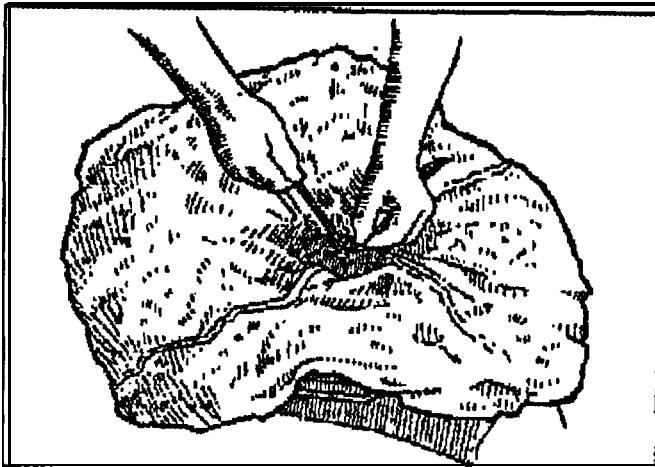
Authority: Relative Workshop

Distribution: USPA, PIA, Skydiving, Parachutists affected dealers, owners of rigs with the following serial numbers:

21732, 22860, 25063, 25692, 25898, 25905, 25906, 25909, 25911, 25912, 26202, 26204, 26220, 26253, 26642-26647, 26653-26655, 27023, 27081, 27096, 27357, 27429, 27430, 27440-27444, 27448-27452, 27458, 27546, 27595, 27764, 27766-27770, 27780, 27788, 27821, 27843, 27844, 27848-27865, 27868, 27871-27875, 27879-27900, 27906-27909, 27912-27915, 27917-27920, 27922-27944, 27947-28029, 28038-28043, 28045-28049, 28051, 28053-28066, 28068, 28069, 28075, 28079, 28080, 28082-28103, 28108-28115, 28118-28124, 28127-28135, 28137-28139, 28141, 28142, 28144, 28145, 28149, 28156, 28158-28162, 28165, 28166, 28168, 28184, 28185, 28190, 28197, 28200, 28204-28206, 28215, 28220, 28227, 28259-28263, 28276, 28297-28302, 28407, 28674.

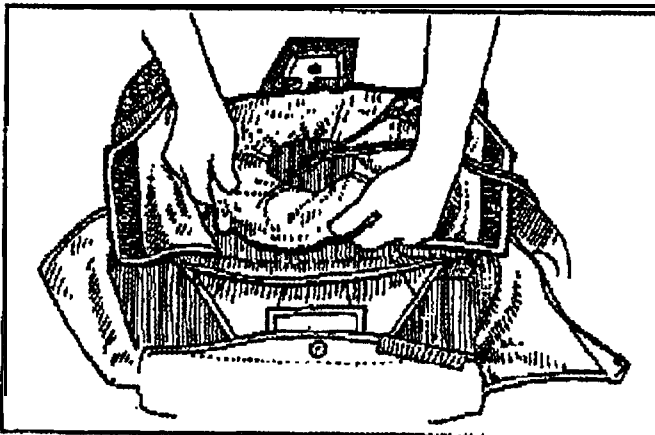
7. Make sure the pilot chute is centered over the loop, then compress it straight down and lock it with a temporary pin.

8. Pull all the canopy fabric out, away from the spring. Folding the fabric, rather than stuffing it between the coils increases pilot chute launch performance and reduces the bulk of the packed container. After pulling the fabric away from the spring, check to make sure the pilot chute base is centered under the crown.



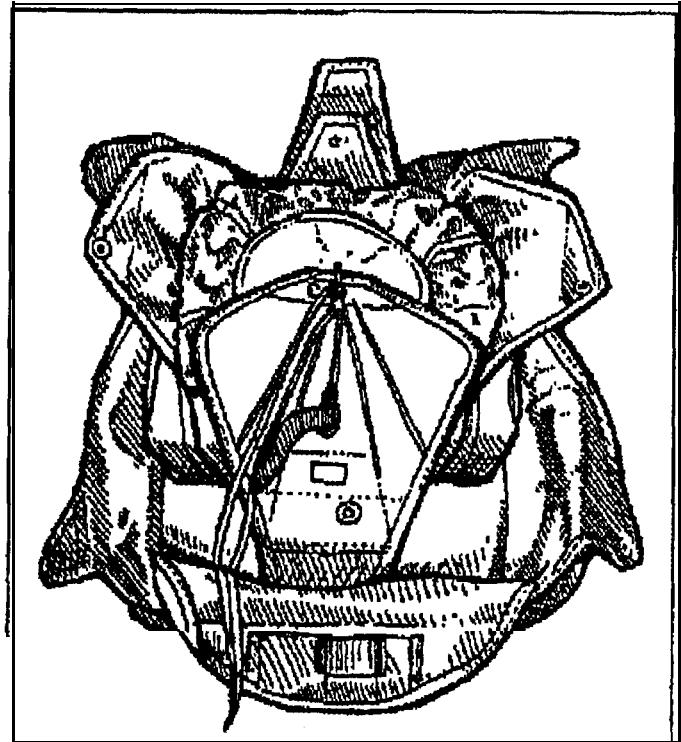
Now fully compress the spring to see how much loop can be pulled through the top of the pilot chute. If you can pull more than 1/2 to 3/4 inches through, the loop is too long. Now would be the best time to open the container and shorten the loop.

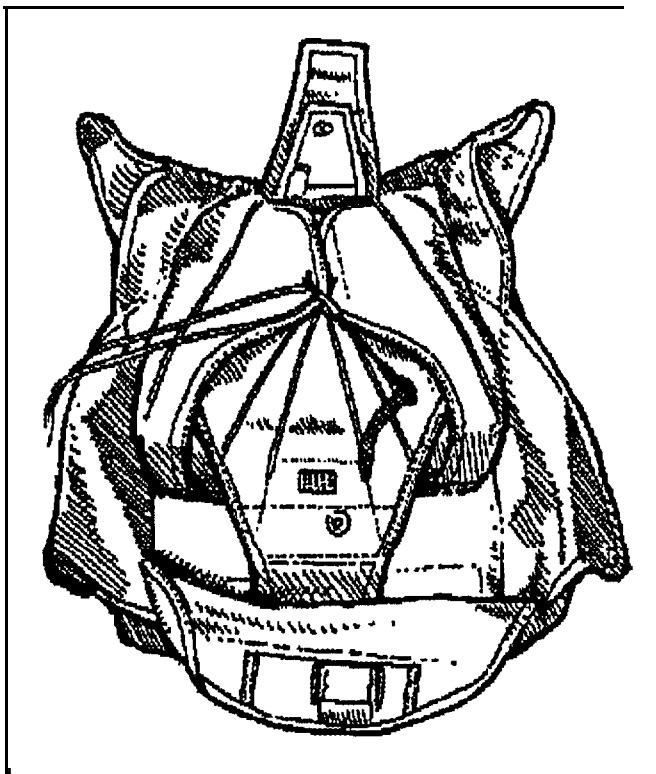
9. Lay the fabric flat all around the pilot chute and fold it under in wide folds to the center. Fold the top and bottom first, then the sides. Keep



the fabric folds of the pilot chute from under the open flaps.

10. Thread the pull up cord through the bottom center flap (Flap #3) and secure it with the temporary locking pin.



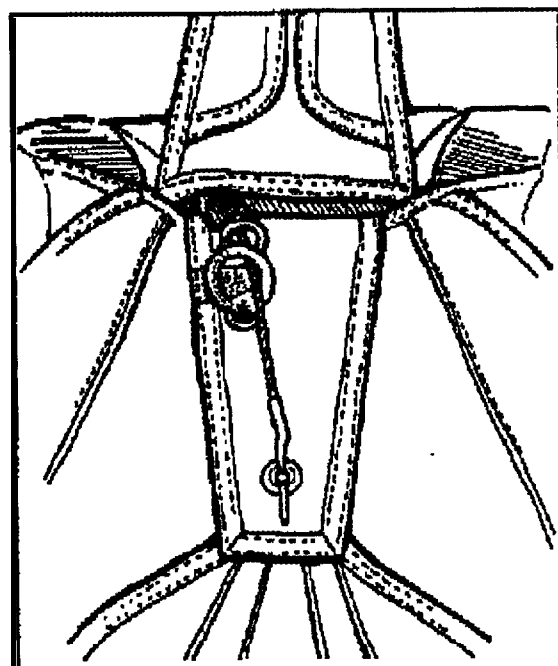


11. Thread the pull-up cord through the side flaps (Flaps #4 right and #5 left) and close and secure with a temporary pin. Make sure that the folds in the pilot chute stay flat and neat.

12. Thread the pull-up cord through the reserve top flap (Flap #6) and close and secure with the temporary pin.

13. Place the rig on a clean surface with the backpad facing up and walk on it with stocking feet or clean shoes to help expel air from the container and make it flatter.

14. Replace the temporary pin with the reserve pin.



15. Insert the ripcord handle into its pouch on the main lift web.

16. Dress the container, seal, sign and log the reserve. Close the reserve container pin protector flap.

17. Count your tools.

CAUTION

If the force necessary to close the last two flaps seems excessive, the loop may be too short. Use a scale to determine how much force is needed to extract the pin; 8 to 12 lbs is correct.

PRODUCT SERVICE BULLETIN

January 21, 1991

012191

Vector I Reserve Pilot Chute Spring 20 lb. Compression Force Test

Status: Mandatory testing at each reserve repack. Mandatory replacement with a Vector I Reserve Pilot Chute if 20 lb. compression force is not reached.

Identification: All Vector I Reserve Pilot Chutes

Background: Pilot chute springs, like all parachute equipment, eventually wear out. The Relative Workshop mandates that Vector I pilot chutes be tested to insure their airworthiness.

Pilot chute springs with less than a 20 lb. compression force might fail to function properly when improperly packed; i.e. a closing loop that is too long, or the pilot chute skirt spread out too much toward the edges of the container, so that it is frapped by the riser covers and reserve side flaps if the reserve is activated while the main container is full. Pilot chute springs with less than a 15 lb. compression force might not function well even when correctly packed.

Service Bulletin: Place the base of the Vector I pilot chute on an accurate scale as shown in Figure 1. Compress the pilot chute to within 1" of maximum compression as shown in Figure 2. A 1" spacer must be used to determine the 1" depth as shown in Figure 3. Be careful not to transfer any force through the spacer as this will cause the scale to read inaccurately high. The scale should read at least 20 lb. for the pilot chute to remain in service. If less than 20 lb. is reached or if the measurement is questionable, replace the pilot chute with a Vector II Reserve Pilot Chute.

Qualified Personnel: Testing should be performed by a Master Rigger, Senior Rigger, or Foreign Equivalent.

Compliance Date: Every reserve repack

Authority: Relative Workshop

Distribution: Parachutist, PTA, Skydiving, USPA, worldwide

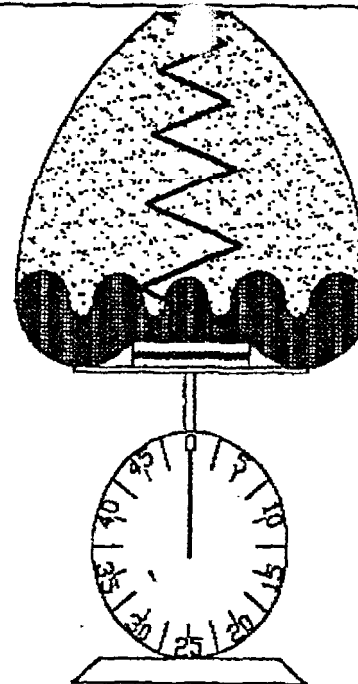


Fig. 1

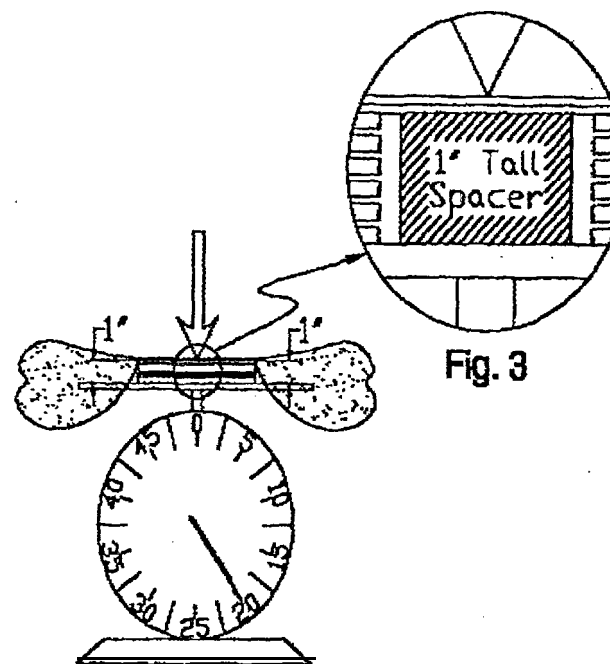


Fig. 3

Please Note: This item is placed on the web for viewing only. To print this document, please download the .pdf file.

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PIA Technical Bulletin TB-301

Parachute Industry Association Publications

March 02, 2000

Container Grommets and Small Suspension Lines

Because of two recent fatalities involving relatively small suspension lines snagging on container grommets, as well as other similar incidents not resulting in fatalities, the PIA Technical Committee recommends:

- 1) All container grommets should be inspected to ensure that they are properly set. See figure 1.
- 2) On main containers with a "main closing loop webbing anchor", users / riggers should contact the manufacturer for their current recommendations. See Figures 2 and 3.
- 3) Because of design specific issues, PIA further requests that all equipment manufacturers individually address these issues and disseminate relevant information to the field.

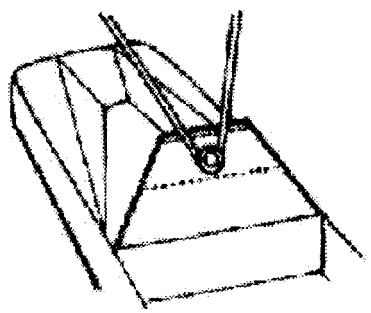


Figure 1 - Suspension-line snagged around improperly seated container flap grommet.

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2 of 2

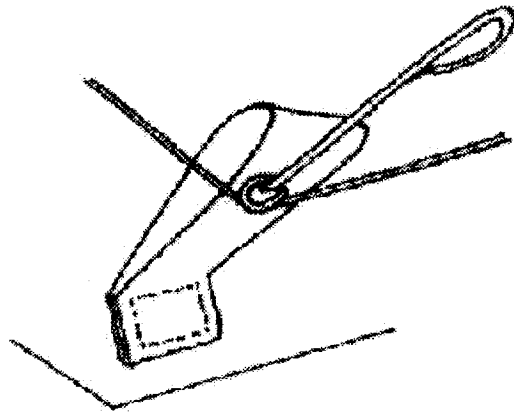


Figure 2 - Suspension line snagged around grommet on main loop anchor

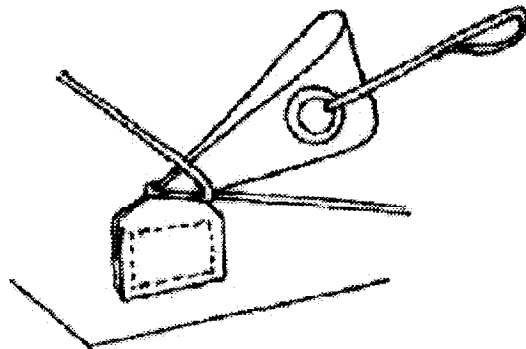


Figure 3 - Suspension line half-hitched about main loop anchor

TB-301 Container Grommets and Small Suspension Lines

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2 of 2



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PRODUCT SERVICE BULLETIN

March 2, 2000

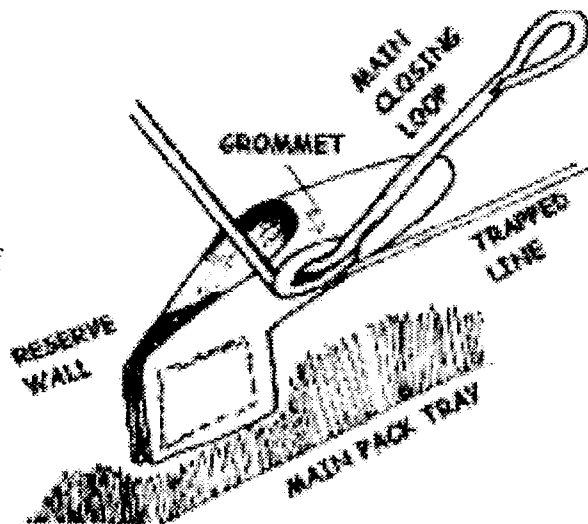
PSB #20000302

Subject: Main Container Closing Loop Retainer

Status: Mandatory

Identification: All Relative Workshop Vector 1 & 11 Harness/container Systems that have a closing loop retainer that incorporates a grommet on a Type 12 webbing extension, attached to the reserve/main Container divider wall.

Background: There have been several reported incidents where a main canopy Spectra Suspension line has snagged under the edge of the loop retainer grommet. This can result in a main canopy-in-tow malfunction, despite being Cutaway. This problem only recently surfaced due to the popular use of Spectra line on modern ram-air canopies. This type of retainer has been used extensively over the last two decades without incident when Nylon or Dacron Suspension lines were in common use. These lines were too large in diameter to snag on this grommet. Because lines can also wrap around this retainer due to improper packing or improper body position during deployment, we have elected to remove this retainer entirely.



Service Bulletin: Relative Workshop requires that this type of loop retainer be removed. Carefully cut the stitching holding the retainer to the reserve wall. Avoid damaging the reserve wall by cutting the stitches directly on the surface of the retainer. This removal can be performed without removing the reserve canopy from the pack tray.

The main closing loop will be repositioned to the bottom closing flap grommet. Cover the underside of the grommet with 1" - 1.5" wide cotton or nylon elastic material to retain the loop. Insure that the edges of the elastic material are sewn over completely to prevent a line from snagging on the corner of the new retainer. A 304 or 308 zig-zag lock stitch, or 301 straight lock stitch should be used on two sides of the elastic retainer to secure it in place.

Materials Required: Cotton Elastic Webbing, 1"-1.5" wide (MIL-W-5664), or Nylon elastic webbing equivalent. Sew with Nylon No. 69 E-thread.

Tools Required: 304 zig-zag lock stitch , or double-throw 308 zig-zag stitch, or a 301 straight lock stitch.

Qualified Personnel: Any certificated rigger may perform this work.

Compliance Date: April 1, 2000

Authority: Relative Workshop, Deland, Florida, USA

Distribution: Relative Workshop website, Parachutist & Skydiving Magazines

Placed on this web site temporarily and with Permission from Relative Workshop.



the uninsured

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IMPORTANT ANNOUNCEMENT

Re: Relative Workshop Product Service Bulletin #20000302, regarding main Container closing loop retainers on Vector I and Vector II Harness/container Systems.

Because of the amazing number of combinations of rig and canopy sizes, reports from the field indicate that implementation of the above PSB may be creating more problems than it is solving. The main Container closing loop retainer design in question was chosen because it allowed a fairly wide range of canopy sizes to be packed in the same container. Over the years this design advantage has apparently been abused to the point where canopies much smaller or much larger than the rig was designed to hold, have found their way into old Vectors. When the closing loop attachment is moved to the main Container bottom flap, these under and over sized canopies no longer fit. This means that either the main container closing pin is no longer secure, or that the main container bottom flap no longer adequately covers the line stows. Both of these problems present far more danger than the existing loop retainer.

So, for the moment at least, please disregard the PSB, and do nothing.

Background: The locking loop retainer in question has been used on Vector I and Vector II's, as well as countless copycat rigs for over 20 years. It is estimated that well over 50 million jumps have been made with this design with no fatalities attributed to a locking loop retainer (an amazing safety record), until the entanglement on an apparently properly set grommet on a Javelin. Any change we make to this extremely reliable system has an unknown, and possibly higher malfunction rate.

The entanglement in January on a Reflex did not involve the loop retainer, but an apparently improperly set grommet on one of the main Container flaps, and is therefore an entirely different problem.

While we step back and carefully look at the Situation, there are a couple of things you can do to lessen the likelihood of your experiencing this problem. First and foremost, keep your Suspension lines away from the loop retainer on deployment, by packing your risers and lines down the side of the main Container, instead of wrapping them around the bottom of the reserve container. Secondly, deploy in a stable body Position, no more than 4.5 degrees head high.

Another point must be addressed. The Javelin entanglement on a well-set grommet was only possible because of the tiny size of the Spectra line. The larger diameter of Dacron line would have made this entanglement impossible. This is just one more reason why you might consider not getting microline on your next canopy.

Finally, in light of the changes in canopy materials and design, as well as radical changes in what we do with our bodies between exit and opening, it might be time for you to upgrade your old Container system for one, like the Vector III, which is designed to deal with these changes.