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Reflex Owner's Manual

DISCLAIMER - NO WARRANTY

Because of the unavoidable danger associated with the use of the parachute harness and container assembly, the manufacturer makes **NO WARRANTY**, either expressed or implied. The harness and container assembly is sold with all faults and without any warranty of fitness for any purpose. Manufacturer also disclaims any liability in tort of damages, direct or consequential, including personal injuries resulting from a defect in design, material or workmanship or using this harness and container assembly, or allowing it to be used by others, the buyer **WAIVES** any liability of or the manufacturer 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 assembly, before it is used, to the manufacturer within 15 days of the date of the original purchase with a letter stating why it was returned.

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 FAI/IPC Technical and Safety Subcommittee Congress research estimates that worldwide 245,162 jumpers made 4,848,025 jumps in 1992. 74 fatalities resulted that year, meaning the probability of dying on a skydive is approximately 1 in 64,091. It also seems that the more experienced a skydiver is, the less likely he/she 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 *REFLEX*, or if you allow someone else to use it, you are acknowledging sport parachuting risks and accepting the fact that the *REFLEX* 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 *REFLEX* or its components may malfunction and perhaps cause you to be injured or killed, then you may return your *REFLEX* for a full refund before it is used. Details on how to do

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1. INTRODUCTION

Congratulations on your purchase of the *REFLEX™* harness and container system. At Fliteline Systems our goal is to provide you with a quality system backed by best possible customer service which consistently meets your requirements.

TRAINING REQUIRED

If you've never jumped a *REFLEX™* 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 ensure his *REFLEX™* 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 *REFLEX™* 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 *REFLEX™* in a reasonable way.

The information and specifications in this manual were in effect at the time of printing. Fliteline Systems, Inc., however, reserves the right to change the *REFLEX™* at any time without notice and without incurring any obligation.

DESCRIPTION OF THE REFLEX

The *REFLEX™* is a modern, state of the art parachute harness/container system employing not only state of the art reserve deployment technology, but also the use of advanced aerospace composite materials in its design and construction. In addition to these features, only the finest quality construction techniques and materials

available in the industry are used in the *REFLEX™* harness/container system.

The unique single-pin externally-mounted reserve pilot chute provides a clean, quick and easy launch, even under the most adverse of conditions. Another standard benefit of this single-pin design is its fully protected reserve ripcord pin.

A new and innovative feature called *CATAPULT™* (Patent Pending) has been developed for the reserve deployment system. This feature is intended to greatly increase the odds of a reserve deployment in the event of a "horseshoe" type malfunction of the primary reserve pilot chute. However, it is not a guarantee in anyway that the reserve will deploy correctly. More on the *CATAPULT™* system can be found in the rigger information section of this manual.

Main Parachute System

The main parachute system of your custom *REFLEX™* was built for either hand deploy BOC or Leg Strap (standard harness only) 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 3-Ring release system under a license agreement with The Uninsured Relative Workshop Incorporated.

Reserve Parachute System

The reserve container will accept only ram-air reserve canopies. The *REFLEX™* is supplied with the unique "MOLAR-BAG", a free-bag which features zero thickness where the closing loop passes through it, eliminating the need for any pull-up cord when packing the canopy into it. This also prevents any of the canopy fabric from coming into contact with the closing loop. All *REFLEX™* systems are manufactured Cypress ready.

Harness

The harness is available in both articulated (ring system) and standard designs and is custom fit to the wearer.

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 an FAA Master Rigger.

Design and Testing

Design and testing of the *REFLEX™* was accomplished over a period of eighteen months, and has resulted in one of the most ***rigger friendly***

systems on the market. There is no additional sewing or tacking required to assemble the *REFLEX™* with canopies, and no special techniques are necessary to pack it. An FAA certified rigger with current skills should be able to assemble and pack the *REFLEX™* by following the instructions in this manual.

We hope you will enjoy many years of trouble free skydiving with the purchase of your *REFLEX™*. However, you must first fully understand how to operate and maintain the container in order to achieve the full benefits of the system. Please read this manual thoroughly, cover to cover before attempting to pack or use this equipment in anyway. If after you have read this manual, you find you do not understand any element, please consult a qualified rigger or a qualified instructor for operational assistance. You may also call Fliteline Systems, Inc. for any questions you may have. We will always be glad to assist in any way possible.

TECHNICAL STANDARD ORDER (TSO) CERTIFICATION

At present there are six levels of TSO Certification in use. There are systems built under TSO C23(B) in either low speed or standard category. There are systems built under TSO C23(C) in either category A, B, or C. As of 6/1/94 TSO C23(D) was implemented and TSO C23(C) was superseded.

TSO C23(C)

Parachute assemblies shall be tested to minimum limits of persons up to 115 kg (254 lbs..) fully equipped, and up to 150 knots.

TSO C23(D)

Parachute assemblies shall be tested to minimum limits of persons of up to 119.7 kg (264 lbs..) fully equipped, and up to 150 knots.

REFLEX CERTIFICATION

The *REFLEX* harness and container system is the first of its kind to be approved under FAA TSO C23(D). This assembly is limited to use by persons up to 124.7 kg (275 lbs..) fully equipped, and up to 150 knots.

Fliteline Systems increased the *REFLEX* upper weight limit during testing in order to allow heavier jumpers a certified option for a harness and container system.

To view the TSO Authorization click on the appropriate hyperlink:

[TSO Authorization Page 1](#) (figure 1-1)

[TSO Authorization Page 2](#) (figure 1-2)

RIGGER QUALIFICATIONS

In order to pack and maintain the REFLEX reserve system, the Senior or Master Rigger must possess a BACK rating endorsement to their certificate. However, since this system is dissimilar to old-style parachutes, the rigger should be checked out for this style of parachute prior to certifying the REFLEX for emergency use.

No certificated parachute rigger may:

- (e) Pack, maintain, or alter a parachute in any manner that deviates from the procedures approved by the administrator or the manufacturer of the parachute; or
- (f) Exercise the privileges of his certificate and type rating unless he understands the current manufacturer's instructions for the operation involved.

ANYONE who circumvents Fliteline Systems, Inc. instructions is in violation of Part 65.129 and is therefore performing an illegal procedure.

SECOND HAND REFLEXES

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

If you prefer, Fliteline Systems, Inc. will inspect your second-hand REFLEX. There is a nominal charge for this service.

COMPONENTS

The *REFLEX™* comes complete with these components:

- Harness and container
- Hand-deploy main pilot chute
- Main pilot chute bridle
- Main deployment bag
- Main locking loop
- *REFLEX™* reserve pilot chute and *CATAPULT™* system
- Reserve Freebag and bridle
- Reserve ripcord
- Reserve locking loop
- Reserve toggles
- Cypress ready reserve container
- Main risers and steering toggles
- 3-Ring release handle
- One extra reserve closing loop
- Reserve packing data card
- *REFLEX™* Owner's Manual

WARNING

Only the REFLEX™ reserve pilot chute may be used with the REFLEX™ harness/container system. DO NOT substitute any other pilot chute.

Only the REFLEX™ reserve molar freebag, bridle, and CATAPULT™ may be used when packing a ram-air reserve canopy into the REFLEX™ harness/container system.

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 inside of the reserve pin protector flap to determine the size of the containers. Refer to the REFLEX™ compatibility chart to determine what canopies will fit in your REFLEX™

Replacement components for the REFLEX™ are readily available from Fliteline Systems, Inc.

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

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2. ASSEMBLING AND PACKING THE MAIN PARACHUTE

INTRODUCTION

The *REFLEX™* is compatible with almost every parachute in common use today. The *REFLEX™* is available in a variety of main container sizes. Consult Fliteline Systems, Inc. or your dealer to ensure the volume of your canopy size is compatible with your *REFLEX™*. 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 the various main canopies on the market. That information must be obtained from the owner's manual for the respective canopy.

ASSEMBLY

Step 1 Lay out main parachute, flake canopy. Perform line continuity check [using canopy manufacturers instructions](#).

Step 2 With the line check complete, attach the connector links to risers in the correct manner (nose of canopy on front riser, tail on rear riser). Note that the risers are marked on the back with an L or R to designate left and right. Make sure that you have the proper riser on the appropriate side of the canopy.

Step 3 Route the steering lines through the guide ring on the rear riser.

Step 4 Route the steering line through the grommet in the main steering toggle from the bottom out the top and align the mark on the line with the grommet. Fasten the line to the toggle with what is commonly called a *Figure 2-8* knot and secure the running end with an overhand locking knot. Make sure the toggle is secure and the knot will not slip.

Step 5 Attach the risers to the harness making sure you have left on left and right on right (See 3-Ring Assembly Instructions).

Step 6 Next attach the main bag to the canopy as follows (*Figure 2-1*):

- a. Route the end of the main bridle down through the grommet in the top of the bag, through the canopy attachment point (ring or loop), then back up through the grommet.
- b. With the loop end through the grommet, pass the pilot chute through the loop and then pull the knot down through the grommet and tighten the knot around the canopy attachment point.

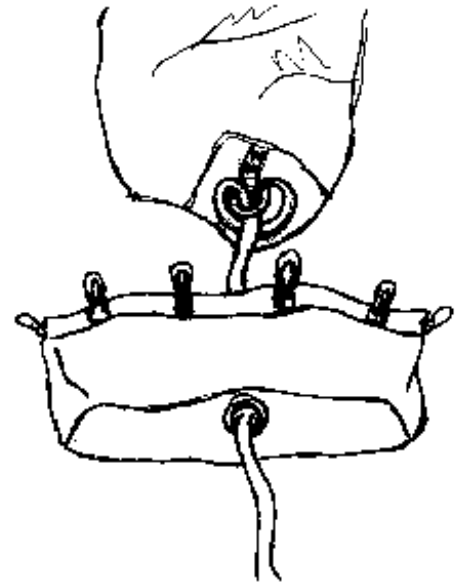


Figure 2-1

Step 7 Install the rubber bands provided on the bag.

Step 8 Set the deployment brakes on each side by pulling the control line down through the guide ring until the brake loop just passes through the guide ring (*Figure 2-2*). Insert the stiffened upper portion of the toggle through the loop and pull it back up tightly against the ring guide. "S"-fold the slack between the toggle and the brake-set, and stow it in the Velcro loop provided, then mate the Velcro on the toggle with the Velcro on the riser (*Figure 2-3*).

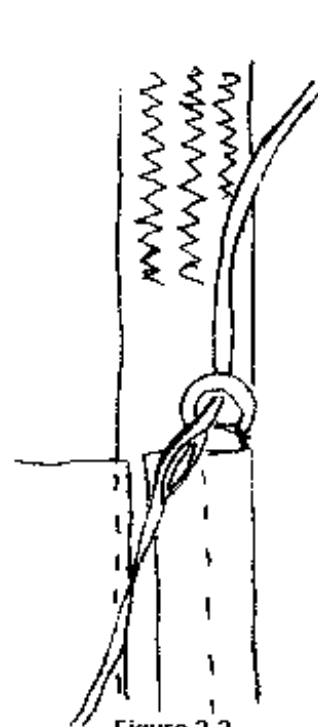


Figure 2-2



Figure 2-3

Step 9 At this point, refer to the directions by the canopy manufacturer for flaking and folding the canopy. After flaking and folding it should resemble *Figure 2-4*. (Be sure the slider is up as far as it will go against the canopy.)

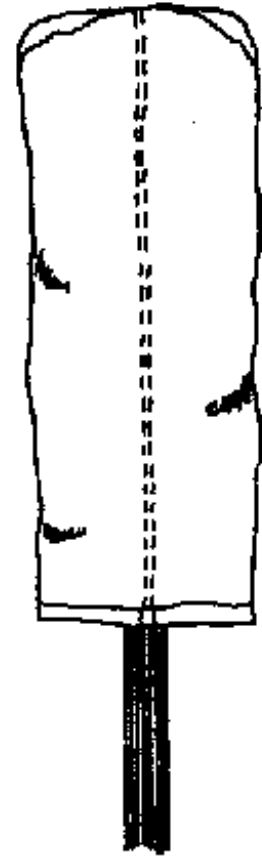


Figure 2-4

Step 10 Stack the canopy in "S" folds as shown in *Figure 2-5*, keeping the slider up against the canopy and keeping the slack out of the lines. The stacked canopy should be 3-4 inches wider than the bag.

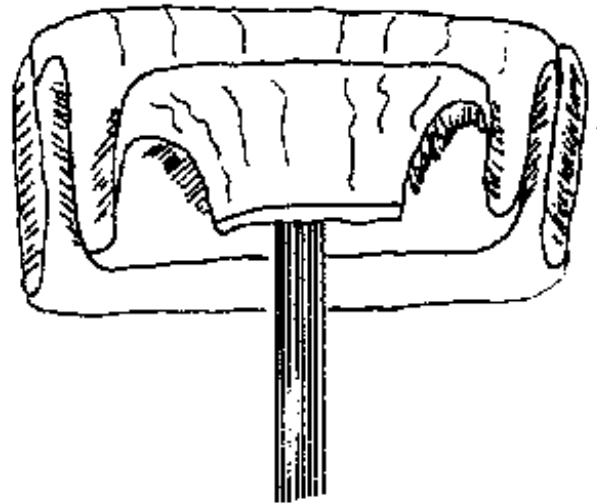


Figure 2-5

Step 11 Pull the bag down onto the canopy. Try to fill the corners and sides of the bag to distribute the bulk evenly and avoid forming a lump in the middle (*Figure 2-6*).

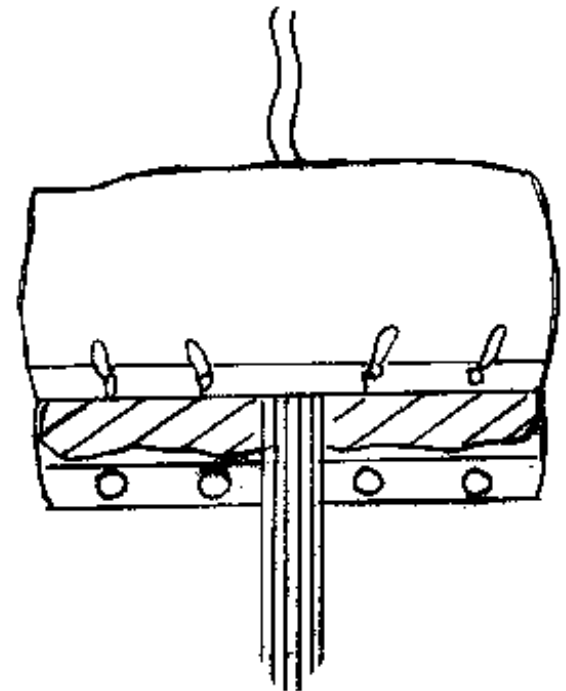


Figure 2-6

Step 12 Make locking stows using the suspension lines to close the mouth of the bag. There are four locking stows. (SEE *Figure 2-7*)

During this part of the packing procedure always make sure that the rubber bands used or the locking stows are strong and in good condition. The weight of the canopy inside the bag comes to bear on these locking stows when the canopy is lifting off the jumper's back during deployment, and a broken locking stow at this point may result in an out-of-sequence deployment.

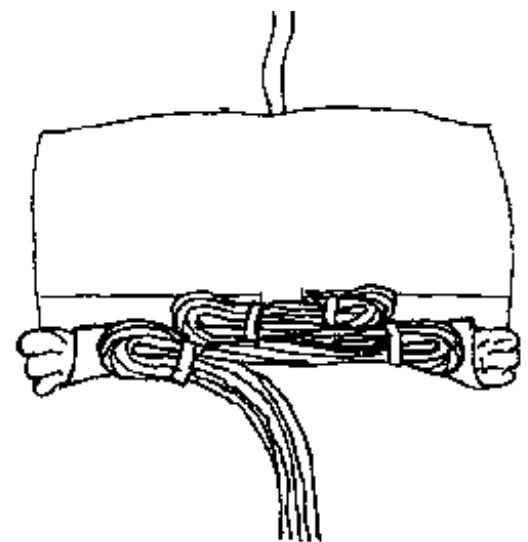


Figure 2-7

Step 13 Pull the bridle out of the top of the bag until the metal ring of the canopy is seated against the grommet of the bag. Be sure there is no canopy fabric between the ring and the grommet. Stow the lines in the locking stows. Now stow the remainder of the suspension lines across the bottom of the bag in the rubber bands at each end. Leave 12" to 15" of lines unstowed between the bag and the connector links.



Figure 2-8

Step 14 Lay the risers in the "trough" between the sides of the reserve container and the riser covers, and place the connector links in the lower corners (*Figure 2-8*). Place the bag in the container with the line stows toward the bottom. This position is important; if the line stows are toward the top, it may be more difficult for the pilot chute to extract the bag. (*Figure 2-9*)



Figure 2-9

NOTE: If your *REFLEX* is equipped with the **PULL-OUT pilot chute**, skip to **Pull-Out pilot chute**.

BOC or Throw-Out Pilot chute

Step 15 Thread the pull-up cord through the closing loop. The bridle should be routed to the upper right hand corner of the main container. Thread the pull-up cord through the #2 sub flap grommet and pull the loop through as shown in *Figure 2-10*.



Figure 2-10

Step 16 Close the right side #3 side flap, then the left side #4 flap in the same manner. Insert curved pin through loop and remove pull-up cord SLOWLY to avoid damaging loop. Insert bridle tab into pocket on the sub flap. (Figure 2-11)

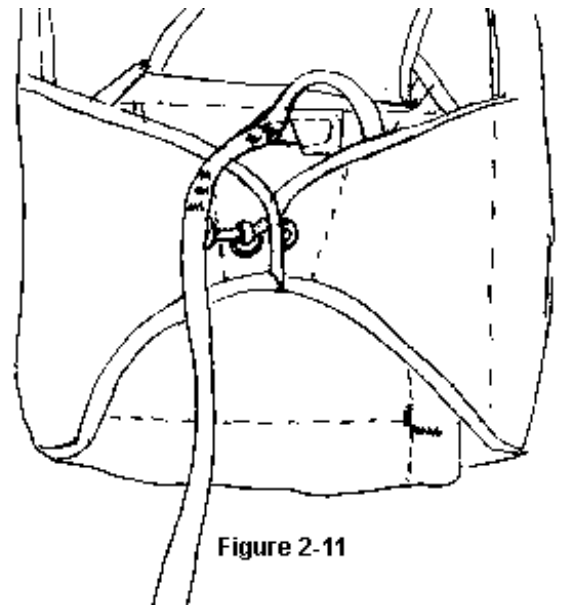


Figure 2-11

Step 17 Fold pilot chute in half as shown in Figure 2-12.



Figure 2-12

Step 18 Fold back and "S" fold bridle as shown in Figure 2-13.



Figure 2-13

Step 19 Fold pilot chute in thirds as shown in Figure 2-14.

Note: [If you have a leg strap throw-out pilot chute go to Step 23.](#)



Figure 2-14

Step 20 Fold pilot chute in half about its center and roll **TIGHTLY** in preparation to insert into the BOC pouch as shown in *Figure 2-15*.



Figure 2-15

Step 21 Stow excess bridle under bridle retaining flap as shown in *Figure 2-16*.

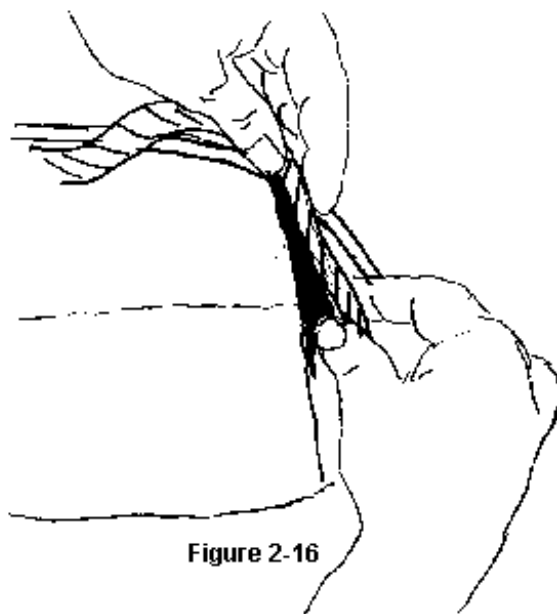


Figure 2-16

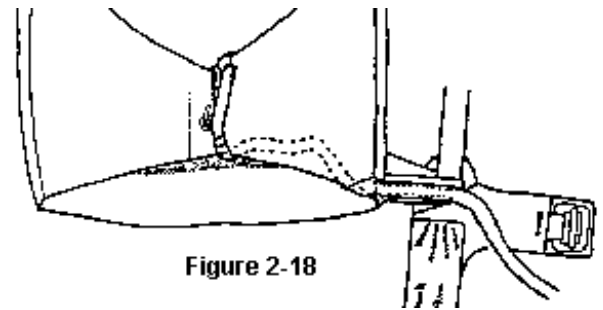
Step 22 Close pin protector flap as shown in *Figure 2-17*.

Note: [Throw-out BOC procedures go to Step 26.](#)

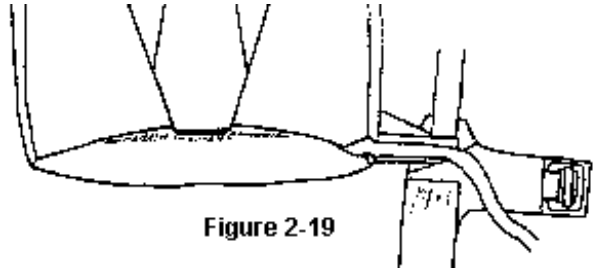


Figure 2-17

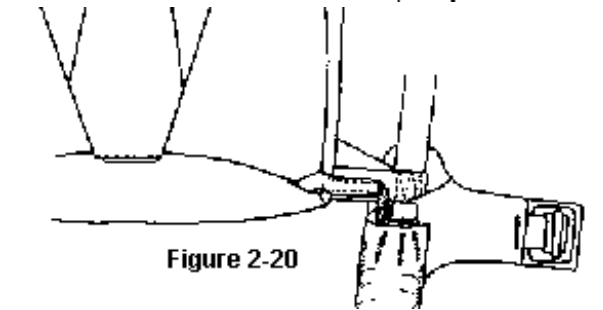
Step 23 Mate the Velcro along the lumbar strap and container side as tucking the excess the side flap as shown in *Figure 2-18*.



Step 24 Close the pin protector flap as shown in *Figure 2-19*.



Step 25 Fold pilot chute in half about its center and role TIGHTLY. Insert into the leg strap pouch as shown in *Figure 2-20*.



Step 26 Close the riser covers by inserting the tab on the reserve top flap into the pocket provided on the riser cover as shown in *Figure 2-21*.



Your fully packed and assembled *REFLEX* is shown in *Figure 2-22*.

Note: Packing procedures are completed for Throw-out style pilot chutes.



Figure 2-22

Pull-Out Pilot Chute

Step 27 Thread the pullup cord through the closing loop. Arrange the bridle in folds six to eight inches long, and lay the folded bridle across the upper part of the bag as shown in *Figure 2-23*. Be sure **NOT** to tuck these folds down between the bag and the bottom of the reserve container. To do so may retard the action of the pilot chute.

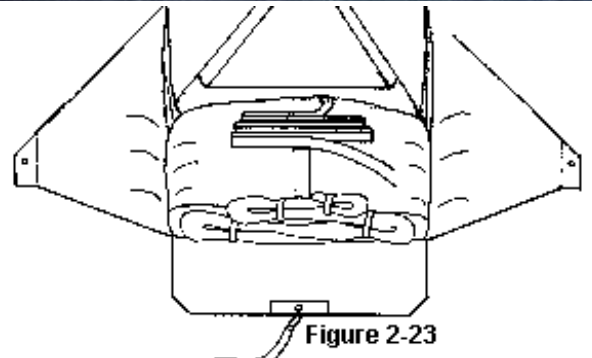


Figure 2-23

Step 28 Loosely fold the pilot chute and lay it across the bag as shown in *Figure 2-24*. **IMPORTANT!!! THE HANDLE AND PIN MUST EXIT THE CONTAINER AT THE LOWER RIGHT SIDE.**

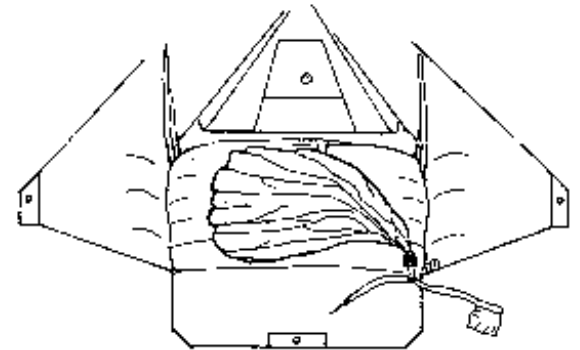


Figure 2-24

Step 29 Thread the pull-up cord through the #2 sub flap grommet and pull the loop through as shown in *Figure 2-25*.

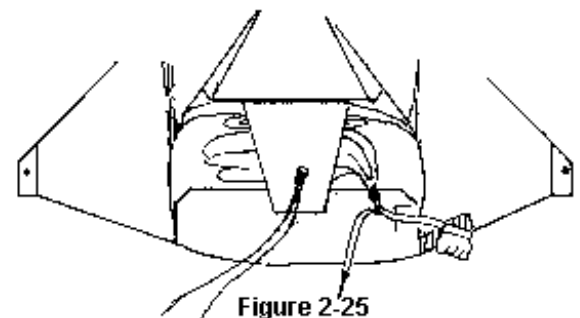


Figure 2-25

Step 30 Close the #3 right side flap, then the #4 left side flap, securing the closure pin as shown in *Figure 2-26*.

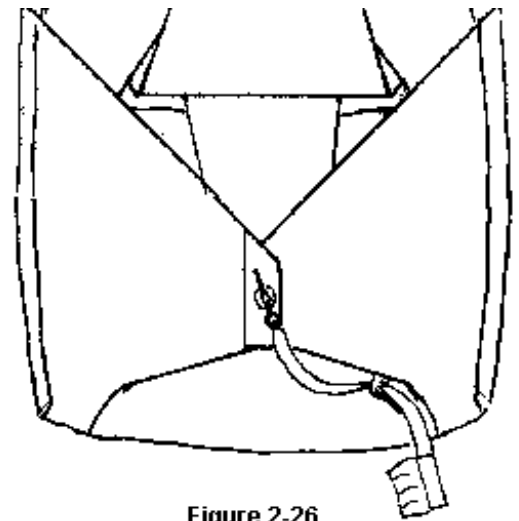


Figure 2-26

Step 31 Tuck the slack in the tape under the right side flap and mate the Velcro on the handle to the Velcro under the protective cover on the right side of the bottom flap as shown in *Figure 2-27*.

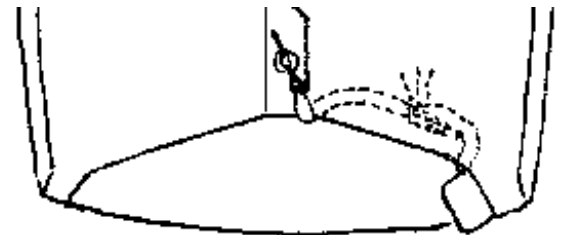


Figure 2-27

Step 32 Close the top flap protector by tucking the "tongue" underneath the flaps as shown in *Figure 2-28*.

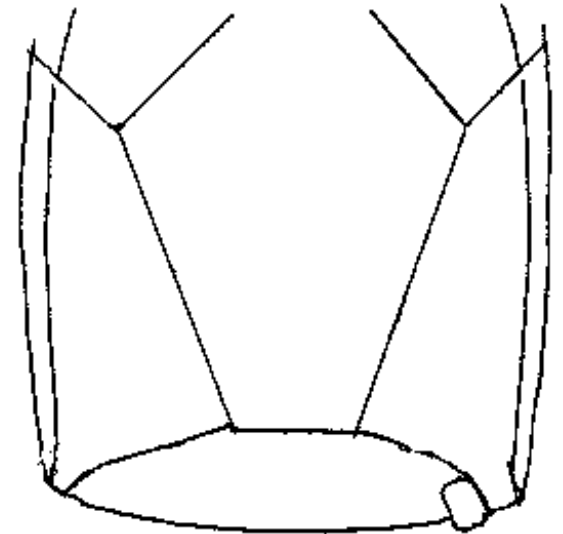


Figure 2-28

Note: Packing procedures are completed for Pull-out style pilot chutes.

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3. USER INFORMATION

DONNING, RETENTION AND ADJUSTMENT

Step 1 Inspect reserve ripcord for correct seating. Make sure cable is free in its housing.

Step 2 Ensure rigger's seal is intact and packing data card is filled in and in date.

Step 3 Ensure 3 Ring canopy releases are properly assembled and RSL is hooked up.

Step 4 Verify main deployment system routing and main closing pin seated correctly.

Step 5 With packed rig on your back thread the chest strap through the buckle located on the users right hand side.

Step 6 Snug the chest strap down so that the main lift webs run parallel down each side of your torso. Stow the excess chest strap in the elastic keeper.

Step 7 Thread both leg straps through buckles and pull tight so they are snug. Stow the excess either in the elastic keepers or the channels provided on the leg pads.

Step 8 Locate the following to familiarize yourself as to their visual and physical locations:

- Cutaway handle
- Reserve ripcord handle
- Main pilotchute handle (TOP BOC or Legstrap or POP)

Note: You should be able to easily reach and pull either type of pilot chute. It is best to practice this while lying on your stomach to ensure you can pull it.

ROUTINE MAINTENANCE

In order to ensure proper operation of your *REFLEX* you should perform the following routine maintenance on a regular basis.

Prior to jumping you should check:

- All ripcord and 3-Ring™ housings for tackings, damage or obstructions.
- Reserve ripcord pins, cables, handles and pockets for proper seating, wear and damage.
- Main deployment activation devices

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(pull-out or throw-out) for wear and placement. Also check the routing of throw-out bridles for twists, mis-routing, etc.

- Main risers routed smoothly over the shoulder and the main riser covers closed properly.
- 3-Ring™ release mechanism assembled properly and excess cable stowed properly.
- All flaps tucked in.

120 DAY MAINTENANCE

Your rigger should thoroughly inspect your *REFLEX™* at every repack cycle to ensure that all components are in airworthy condition.

These areas should include:

- Reserve pilotchute, *CATAPULT™* pilotchute, reserve bridle and molar deployment bag.
- Reserve canopy and lines.
- Reserve connector links tight.
- Ripcord pockets secure.
- Main pilot chute and bridle.
- Harness and container in good airworthy condition.

Articulated (ringed) systems: Inspect the inside of the chafing strips on all webbing junctions attached to the ring (left and right) for excessive wear. The inside should look shiny and smooth and may be discolored from the hardware finish. If the chafing strips are cut or frayed or show excessive wear, the rig should be grounded and returned to Fliteline Systems, Inc. for inspection.

3-RING™ RELEASE MAINTENANCE

The following procedure should be done at the beginning of each weekend or every 25 jumps, whichever comes first. If the rig is subjected to unusual abuse, such as exposure to excessive dust or sand, or if it is dragged, it should be inspected immediately.

Step 1 OPERATE THE RELEASE SYSTEM ON THE GROUND. Pull the release cable completely free of the housing and disconnect the risers.

Step 2 While the system is disassembled, closely inspect it for wear.

- a. Check the nylon loops on the risers to be sure they are not frayed.
- b. Check the Velcro® on the release handle and harness to ensure that it will adequately hold the

handle.

c. Check the stitching, including that which holds the harness hardware to the main lift web and the hand tackings that hold the cable housings in place.

Step 3 VIGOROUSLY TWIST AND FLEX the webbing on each side where it passes through the release hardware. The idea is to remove any set or deformation in the webbing. Failure to do this might result in a hesitation when the release is activated with a low-drag malfunction such as a streamer or baglock.

Step 4 Check the inside of the fabric release housing for cuts or other damage. (This is very unlikely unless the rig was smashed in a car door or suffered similar abuse).

Step 5 Clean and lubricate the release cable with a silicone spray. Spray on a paper towel and firmly wipe the cable a few times. A THIN invisible film should remain - too much will attract grit or dirt. Failure to do this could result in a higher-than-normal activation force on the release handle during breakaway.

Step 6 Reassemble the system properly, in accordance with the instructions given in this manual. double check it and do a continuity check to make sure the canopy is straight and the risers are not reversed.

Step 7 IF ANY WEAR OR UNUSUAL CONDITION IS FOUND, CONSULT THE MANUFACTURER OR QUALIFIED PERSONNEL IMMEDIATELY!

Step 8 Regular, careful and thorough compliance with this maintenance procedure will prolong the life of the 3-Ring release system, and help to ensure its proper operation during breakaways.

MAJOR ALTERATIONS

Fliteline Systems, Inc. Does NOT authorize major alterations to the *REFLEX™*. Any major alterations such as harness size changes must be made by the manufacturer or a qualified Master Rigger. Contact Fliteline Systems, Inc. for a qualified Master Rigger in your area.

WASHING THE HARNESS/CONTAINER SYSTEM

Step 1 Disassemble both main and reserve canopies from the harness.

Step 2 Remove all ripcords, closing loops, data cards, hook knives, altimeters, etc.

Step 3 Remove AAD if so equipped.

Step 4 Allow rig to soak in a solution of mild laundry soap and warm water for up to 1 hour.

Caution: NO BLEACHES OR SOLVENTS are to be used as they could cause unseen structural deterioration of the assembly.

Step 5 Using a soft plastic bristle brush scrub the entire assembly clean.

Step 6 Thoroughly rinse and flush all soap from the rig.

Step 7 Allow at least 2 days to dry in a warm place away from direct sunlight.

End of Procedure.

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4. DEPLOYMENT

Main Deployment

Note: When deploying the main parachute be sure that you are flat and stable.

Step 1 Reach back to your main deployment handle and get a firm grasp on it.

Step 2 Pull the handle out of its pouch and throw it out to the right hand side as hard as possible.

Step 3 Go back to your stable position.

Jettisoning the Main parachute

Step 1 Grasp the cutaway pillow located on the right hand side of you harness.

Step 2 Unpeel the Velcro and pull sharply downward.

Step 3 Make sure the handle is fully extracted.

Reserve Deployment

Step 1 Grasp the reserve ripcord handle located on the left hand side of your harness.

Step 2 Pull handle out of the pocket.

Step 3 Pull down sharply on the ripcord handle making sure it is full extracted.

End of Procedure.

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5. RIGGER INFORMATION

TOOLS REQUIRED

- Pull up cord (At least 40" long)
- One (1) Tee Bodkin
- One (1) Soft Bodkin (AAD Installation only)
- One (1) Packing paddle
- Two (2) Velcro Flags (For covering Hook Velcro during packing process)

WARNING

The use of positive leverage closing devices (i.e.; "T Bars") is expressly forbidden as they will cause permanent damage to the reserve operating system and cannot be used during the loop adjustment phase anyway.

Deployment Type

There are currently 5 different canopy deployment methods in common use. Of these, only TYPE 5 is approved for use in the Fliteline Systems, Inc. REFLEX™ harness/container system. The description and example is a follows:

TYPE 5:

Free Bag: Canopy stowed in bag and lines stowed on/in bag.

Example: Swift, Raven, Amigo

LIMITS OF DAMAGE AND WEBBING WEAR

Minor scuffing is permissible if no individual fiber bundles are cut or torn. If any fiber bundles are damaged in this manner on any load bearing webbing the rig is to be grounded and returned to the factory for evaluation and repair/replacement of the damaged part.

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ORANGE WARNING LABEL PLACARD DATA

As part of the manufacturers requirements, the ORANGE WARNING! LABEL located on the lower external back pad **MUST BE** filled in by the Rigger assembling and packing the REFLEX™ (See example *Figure 5-1*). **FAILURE TO DO SO WILL RESULT IN THE TSO BEING NULL AND VOID!**



1. PROPER TRAINING AND/OR EXPERIENCE ARE REQUIRED TO LOWER THE RISK OF SERIOUS INJURY OR DEATH.
NEVER USE THIS EQUIPMENT UNLESS YOU HAVE
 - A/ READ AND UNDERSTAND THIS WARNING LABEL AND COMPLETED A "CONTROLLED PROGRAM OF INSTRUCTION"
 - OR
 - B/ READ AND UNDERSTAND THIS WARNING LABEL AND APPROPRIATE OWNERS FLIGHT MANUALS, PACKING INSTRUCTIONS AND COMPLETED AT LEAST 100 RAM AIR PARACHUTE JUMPS.
2. LOWER THE RISK OF DEATH SERIOUS INJURY, CANOPY DAMAGE AND SEVERE HARD OPENINGS BY NEVER EXCEEDING THE LIMITS SHOWN BELOW.

	RESERVE		MAIN
MAXIMUM DEPLOYMENT SPEED:	KTS	KTS	
MAXIMUM GROSS WEIGHT (JUMPER + CLOTHING + EQUIPMENT):	LBS	LBS	
MANUFACTURER:			
CANOPY TYPE:			

- REFER TO OWNERS MANUAL FOR PLACARD INFORMATION AND COMPATIBILITY LIMITATIONS
- FILL IN DATA PANEL WITH A WATERPROOF PEN
- CHANGE DATA ON LABEL IF A DIFFERENT CANOPY IS INSTALLED
- • • REMOVAL OF THIS LABEL VOIDS THE TSO • • •

INDUSTRY WEIGHT/DEPLOYMENT SPEED LIMITATIONS

The following data, [Table I, Industry Weight/Deployment Speed Limitations](#), covers only current production parachutes and only those manufacturers who placard their products. For those canopies not listed, it is suggested that you contact the canopy manufacturer directly or Fliteline Systems, Inc. for a current update to this list. This information will enable the Rigger to comply with these requirements. We find that a PILOT ultra fine point permanent marker MODEL SC-UF or equivalent works best.

Please note that there may be instances where one model canopy may have TWO DIFFERENT placard limitations; one as a reserve and one as a main. An example of this is the Precision Super Raven 4 canopy.

As a reserve it is limited to 254 lbs. maximum gross weight. However as a main it is placarded at 288 lbs. Make sure that you, the Rigger, mark the correct space with the right category information.

THE CATAPULT™ HORSESHOE MALFUNCTION EXTRACTION SYSTEM

The CATAPULT™ System was designed and developed by Fliteline Systems, Inc. as a more reliable and consistent method of reserve freebag extraction during a "Horseshoe" type malfunction of the primary reserve pilot chute. Extensive testing has shown that the CATAPULT™ secondary reserve pilot chute affords enough drag to extract and lift off the reserve deployment bag in a variety of situations. However, this does not in any way guarantee that a clean deployment will take place. Rather that it may decrease the odds of

the bag remaining in the reserve pack tray until there is insufficient time for an orderly deployment.

Note: Installation of the *CATAPULT* secondary pilot chute is optional.

The *CATAPULT*[™] System functions extremely well under normal operating conditions with the reserve free bag being "Turbo Boosted" from the pack tray for clean deployment of the reserve parachute.

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6. Reserve Packing Instructions

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TOOLS REQUIRED

- Pull up cord (At least 40" long)
- One (1) Tee Bodkin
- One (1) Packing paddle
- Two (2) Velcro Flags (For covering Hook Velcro during packing process)

COMPONENTS

The *REFLEX™* comes complete with these components:

- Harness and container
- Hand-deploy main pilot chute
- Main pilot chute bridle
- Main deployment bag
- Main locking loop
- *REFLEX™* reserve pilot chute and *CATAPULT™* system
- Reserve molar bag and bridle
- Reserve ripcord
- Reserve locking loop
- Reserve toggles
- Cypress ready reserve container
- Main risers and steering toggles
- 3-Ring release handle
- One extra reserve closing loop
- Reserve packing data card
- *REFLEX™* 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 inside of the reserve pin protector flap to determine the size of the containers. Refer to the *REFLEX™* compatibility chart to determine what canopies will fit in your *REFLEX™*.

If you use main parachute 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 *REFLEX™* are readily available from Fliteline Systems, Inc.

WARNING

The use of positive leverage closing devices (ie; "T Bars") is expressly forbidden as they will cause permanent damage to the reserve operating system and cannot be used during the loop adjustment phase anyway.

WARNING

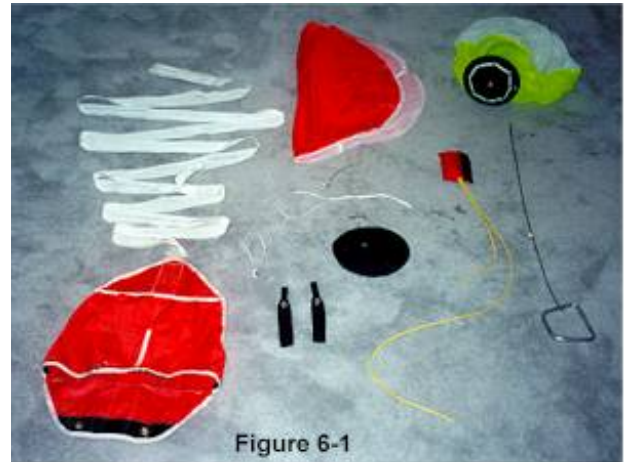
Only the *REFLEX™* reserve pilot chute may be used with the *REFLEX™* harness/container system. DO NOT substitute any other pilot chute.

Only the *REFLEX™* reserve molar freebag, bridle, and *CATAPULT™* may be used when packing a ram-air reserve canopy into the *REFLEX™* harness/container system.

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

RESERVE PACKING PROCEDURE

Step 1 Ensure all necessary parts are available prior to proceeding as depicted in *Figure 6-1*.



Step 2 Assemble primary reserve pilot chute using a "Larks Head" knot as shown in *Figures 6-2* and *6-3*.



Step 3 Assemble CATAPULT™ pilot chute on to bridle using a "Larks Head" knot as shown in *Figure 6-4*.

Note: Use of the Catapult is optional. Skip this step if the Catapult will not be utilized.



Figure 6-4

The completed assembly is shown in *Figure 6-5*.



Figure 6-5

Step 4 Insert the closing loop through the outer grommet in the primary pilot chute cap as shown in *Figure 6-6*.

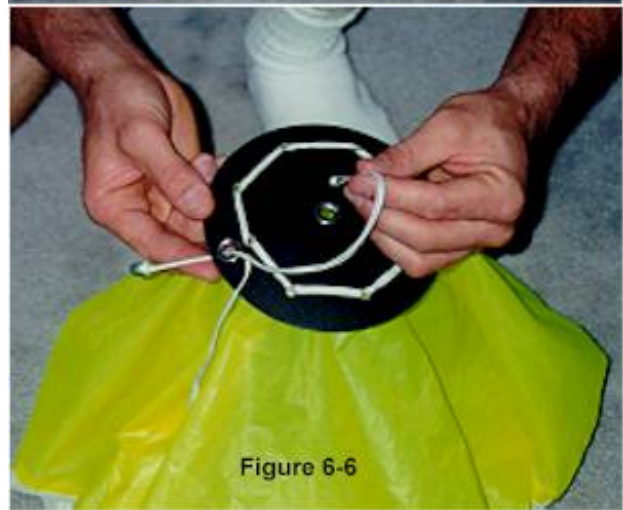
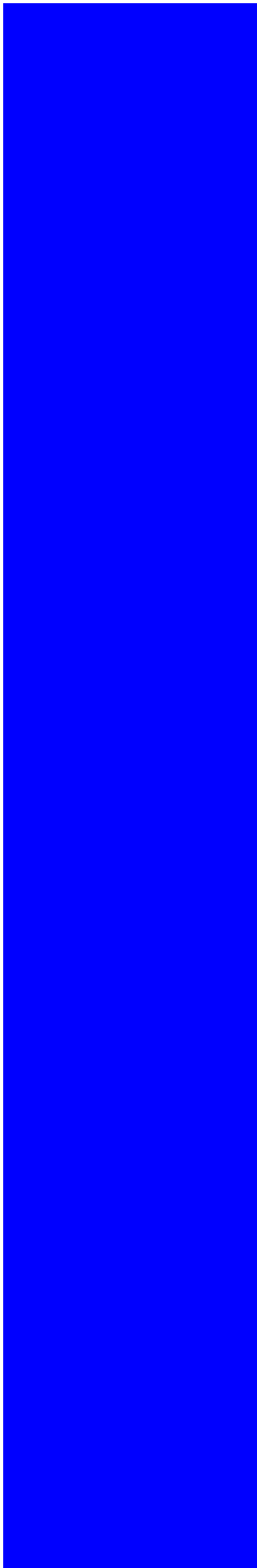


Figure 6-6

Step 5 Insert closing loop down through center grommet in cap as shown in *Figure 6-7*.

Important Note:

Ensure that the entire finger trap section is fully inserted below the level of the grommet. This must be done in order to allow the finger trap free movement during the closing phase. Failure to adhere to this procedure can cause loop damage and even breakage at the finger trap as tension is applied during the loop tightening process.



Step 6 Insert closing loop free end through aperture in outer cap as shown in *Figure 6-8*.

Note: When installing outer cap onto primary reserve pilot chute be sure to keep closing loop free end directly opposite outer grommet.

Step 7 Make sure two (2) to four (4) inches of closing loop free end extends through outer cap as shown in *Figure 6-9*.

Step 8 Set the deployment brakes and stow excess control line as shown in *Figure 6-10*.

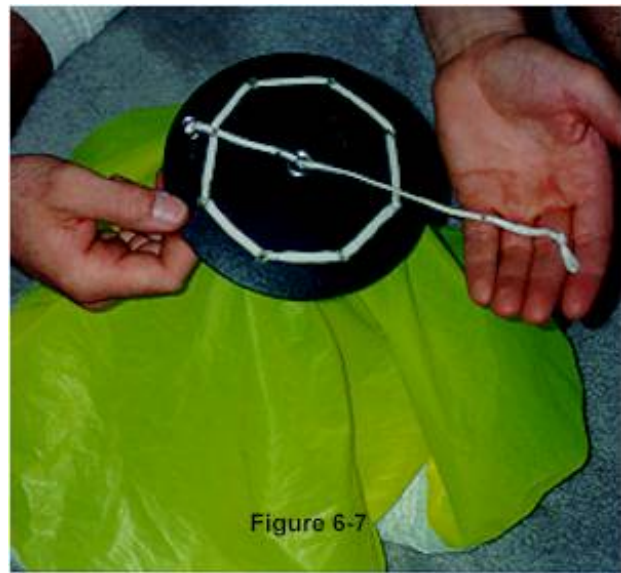


Figure 6-7

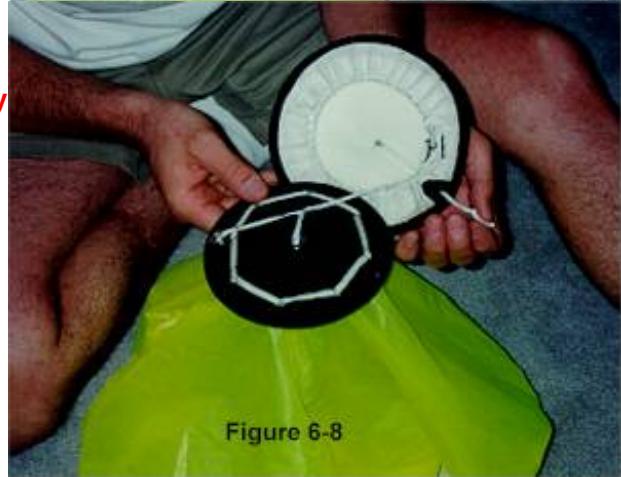


Figure 6-8



Figure 6-9

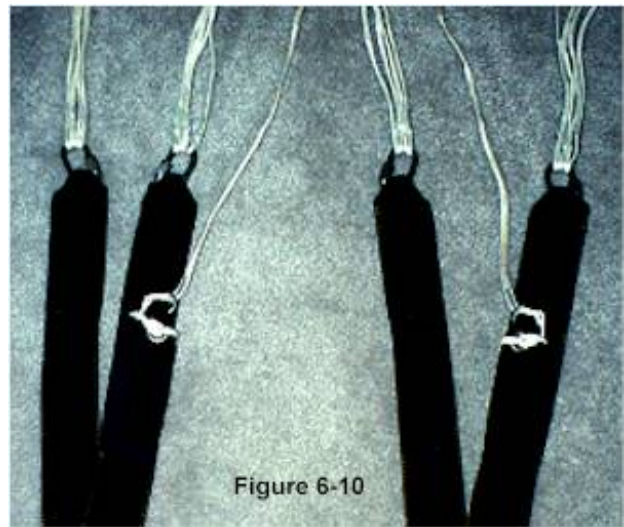
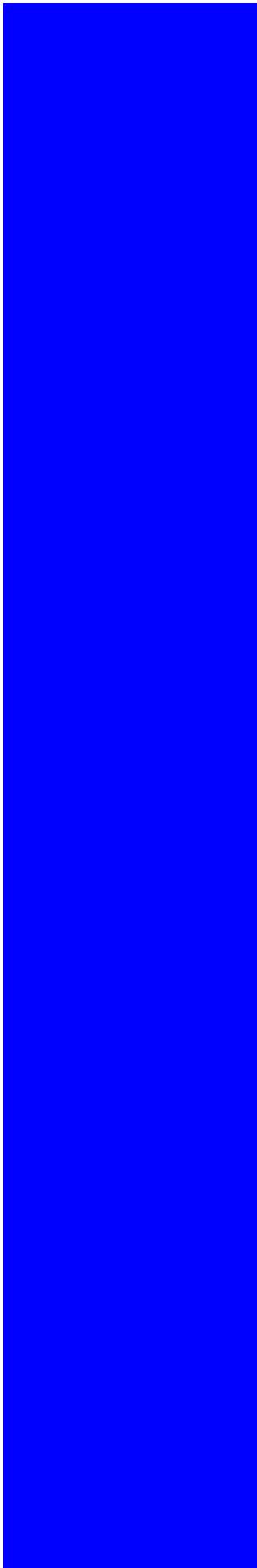


Figure 6-10

Step 9 Pack canopy according to the manufacturers' instructions. When the canopy is ready for insertion into the deployment bag refer to *Figure 6-11*.



Figure 6-11

Step 10 "S Fold" the canopy as shown in *Figure 6-12*.



Figure 6-12

Step 11 Form the Molar "Ears" to be inserted in the deployment bag as shown in *Figure 6-13*. Carefully stuff the reserve canopy into the molar bag.

Note: Make sure sufficient canopy is pushed into the upper areas of the deployment bag to ensure an even sided "Well" is created for the pilot chute to sit in.



Figure 6-13

Step 12 Close the locking stows as shown in *Figure 6-14*. Make stows approximately 1 1/2 inches long.



Figure 6-14

Step 13 Stow the remaining line in the line stow pouch as shown in *Figure 6-15*.

Note: Make sure the hook Velcro is covered during this operation to avoid snagging the suspension lines.



Figure 6-15

Step 14 Thread the Ripcord through the housing at this time (Install the RSL if used. Refer to RSL Installation instructions in section 8). (*Figure 6-16*)

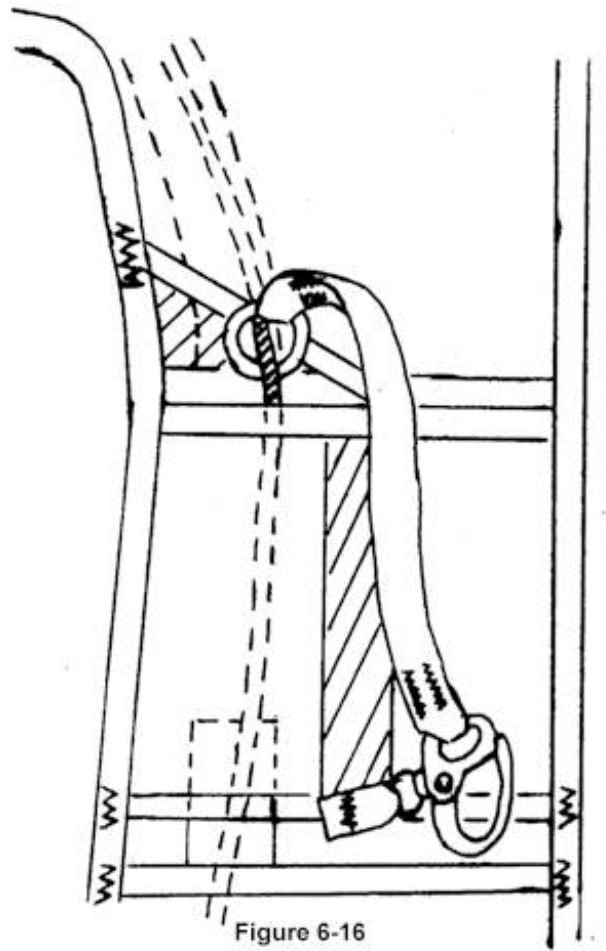


Figure 6-16

Step 15 Insert "Tee Bodkin" through the grommet in the pack tray and lay the risers in their tracks. Close the tuck tabs of the riser covers. (*Figure 6-17*)

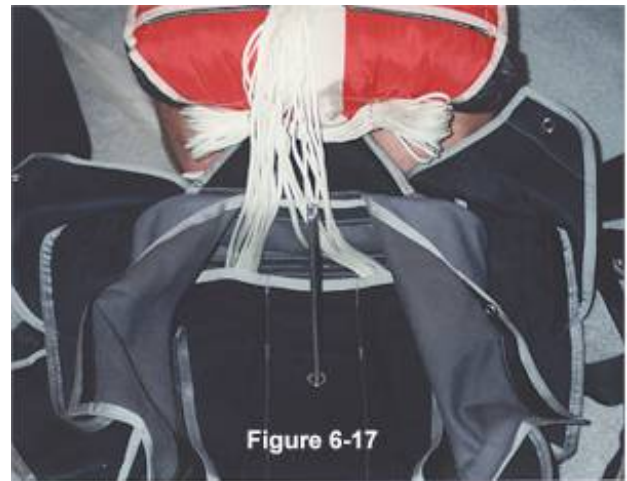
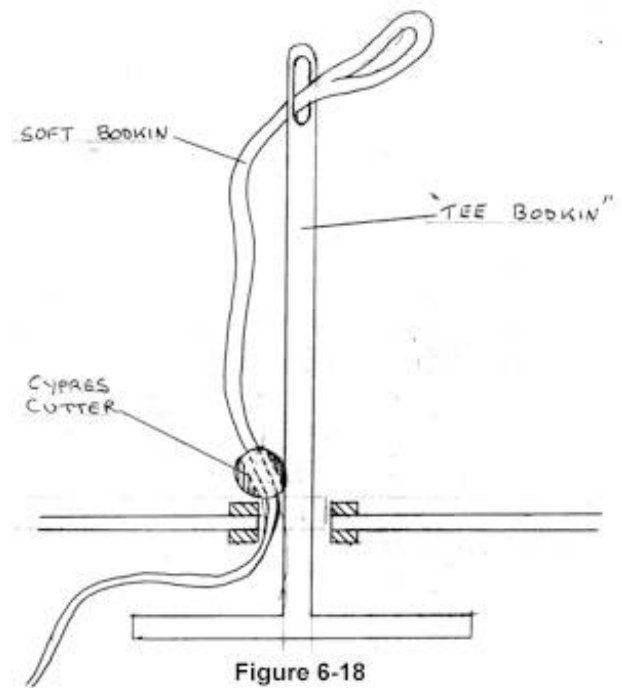


Figure 6-17

Note: If installing authorized AAD use soft Bodkin as shown in *Figure 6-18*.



Step 16 Place the deployment bag in the pack tray and work it into the lower corners.

Step 17 "S Fold" the bridle up to the CATAPULT™ pilot chute as shown in Figure 6-19.

Note: If the Catapult is not installed utilize excess bridle to fill the void under the staging flap. Proceed with Step 20.



Step 18 Fold the CATAPULT™ pilot chute in thirds as shown in Figure 6-20.



Step 19 Fold the *CATAPULT*[™] back towards the center in thirds as shown in *Figure 6-21*.



Figure 6-21

Step 20 Close the #1 reserve sub flap over the *CATAPULT*[™] pilot chute or excess bridle as shown in *Figure 6-22*.



Figure 6-22

Step 21 "V" fold the bridle from the reserve container upper corner down to the container center as shown in *Figure 6-22.5*.

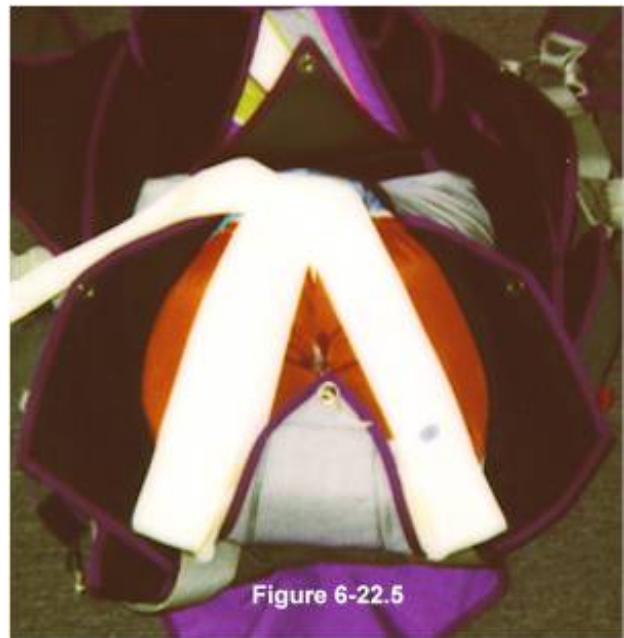


Figure 6-22.5

Step 22 Turn the primary reserve pilot chute over and compress the spring to expose the loop. Insert a pull-up cord through the loop. (Figure 6-23)

Note: Make sure a loop approximately six (6) to eight (8) inches long is showing. This will help during closing later on.



Figure 6-23

Step 23 close the #2 and #3 side flaps, then the #4 top flap as shown in Figure 6-24. Stow the bridle as shown being sure to keep the folds within the #5 flap outer edges.



Figure 6-24

Step 24 Close the #5 top flap and insert the pull-up cord through the Bodkin leaving about six (6) inches of bridle exposed. (*Figure 6-25*)

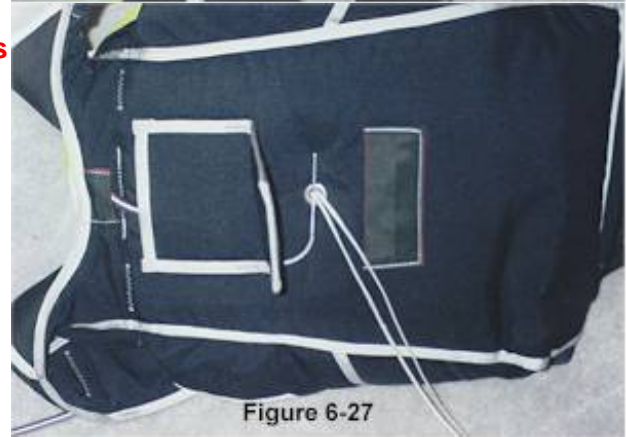


Step 25 Turn the rig over and pull the "Tee Bodkin" and pull-up cord through (*Figure 3-26*). Insert the pin as shown in *Figure 6-27*.



Note: Seat the pin as deep as it will go. This is to avoid bending it if too much pressure is applied during the closing process.

Step 26 Remove the pull-up cord and turn the rig back over.



Step 27 Center the primary reserve pilot chute and route the closing loop out over the lower right hand corner. Compress the pilot chute to within two (2) inches of full compression and snug it down using the adjustable loop. (*Figure 6-28*)



Step 28 Stuff the fabric up under the cap and between the coils of the spring. Try to fill all the space beneath the cap. (*Figure 6-29*)



Step 29 Cinch the loop tight using a series of short, sharp jerks. (*Figure 6-30*)

WARNING

It is not recommended that a long continuous pull is used as this may bend the pin and possibly damage other parts of the system.



Step 30 Seat the pin to its normal position and correct alignment with the ripcord housing. Seal the pin per **FAR Part 65**.



Step 31 Insert the excess loop up under the cap as shown in *Figure 6-31*. This will allow for field adjustments to be made **only by the Rigger who packed it.**

End of Procedure.

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7. CYPRES INSTALLATION

The *REFLEX™* harness/container system comes equipped Cypres™ ready. For installation, please follow the installation procedure.

CYPRES INSTALLATION PROCEDURE

Step 1 Install the Cypres processing unit in the elastic pouch provided on the reserve container vertical wall.

Step 2 Thread the control unit through the channel provided on the reserve pack tray (Located under the left hand reserve riser cover).

Step 3 Pull plenty of cable slack through the channel. Thread the control unit through the gap provided under the top hinge area of the #1 reserve sub flap. (Figure 7-1)

Step 4 Turn the rig over and pull the rigger access tabs on the pin protector door out from their pockets. (Figure 7-2)

Step 5 Insert one (1) or two (2) fingers up through the aperture cut in the back pad. Push the control unit out through the back pad aperture using your fingers as a guide.

Step 6 Insert the control unit in the clear plastic pocket located on the back pad.

Step 7 Remove all slack from the cable right back to the processing unit on the reserve vertical wall. Reinsert the rigger access tabs on the pin protector door.

Step 8 Thread the cutter through its channel located in the center of the reserve pack tray and insert it into its mounting elastic.

Step 9 Remove any slack cable from the system by coiling (not folding or crimping in anyway) it in the pouch provided on the processor pocket.

Step 10 Double check your installation to ensure proper orientation of all the Cypres components.

End of Procedure.

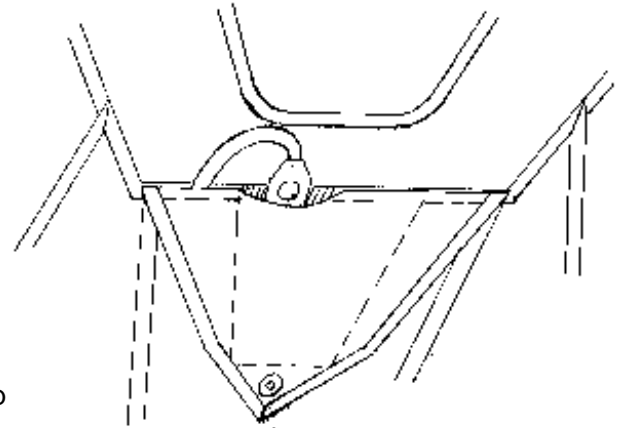


Figure 7-1

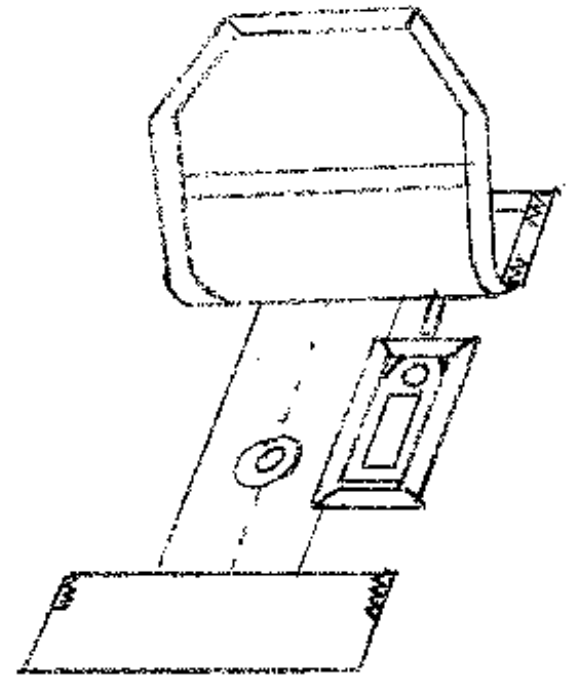


Figure 7-2

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8. RESERVE STATIC LINE LANYARD SYSTEM (RSL)

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CONCEPT

The basic concept of the Reserve Static Line Lanyard or RSL system is that a lanyard is attached from the left main riser to a pin with a ring through which the reserve ripcord is routed. Upon jettisoning a malfunctioned main canopy, the lanyard automatically pulls the cable which pulls the pin of the reserve ripcord. This results in activation of the reserve with a minimum loss of altitude. Through the use of the RSL system, a greater degree of safety is realized. **IT MUST BE STRESSED HOWEVER, THAT THE RSL IS SIMPLY A BACKUP TO MANUAL ACTIVATION OF THE RESERVE DEPLOYMENT SEQUENCE.**

In the event of a malfunction, the jumper must still manually pull the ripcord even though the RSL may activate the reserve faster. There have been instances where the RSL has been disconnected and the jumper relied on the RSL for activation. They relied on it all the way to impact.

RSL INSTALLATION PROCEDURE

The Fliteline Systems *REFLEX*TM RSL System must be installed by a rigger during the packing of the reserve since the reserve ripcord **MUST** pass through the ring on the end of the lanyard prior to closing and sealing the reserve. The following steps **MUST** be followed to install the *REFLEX*TM RSL System.

Step 1 The ring end of the lanyard is installed first. Mate the Velcro on the lanyard with the ring to the Velcro pathway on the left shoulder area. Route the ripcord cable/pin assembly through the lower housing and then through the ring on the lanyard (*Figure 8-1*). Now route the ripcord cable/pin assembly through the upper housing and out to the back pad area under the pin protector flap.

Step 2 Make sure the loose end of the lanyard with the snap shackle is not routed under or through any housings or hardware. Attach the shackle to the RSL attach ring on the left main riser. It is imperative that the lanyard has a direct route from the cable guide ring to the ring on the left riser. Failure to do so results in fatal

consequences.

End of Procedure.

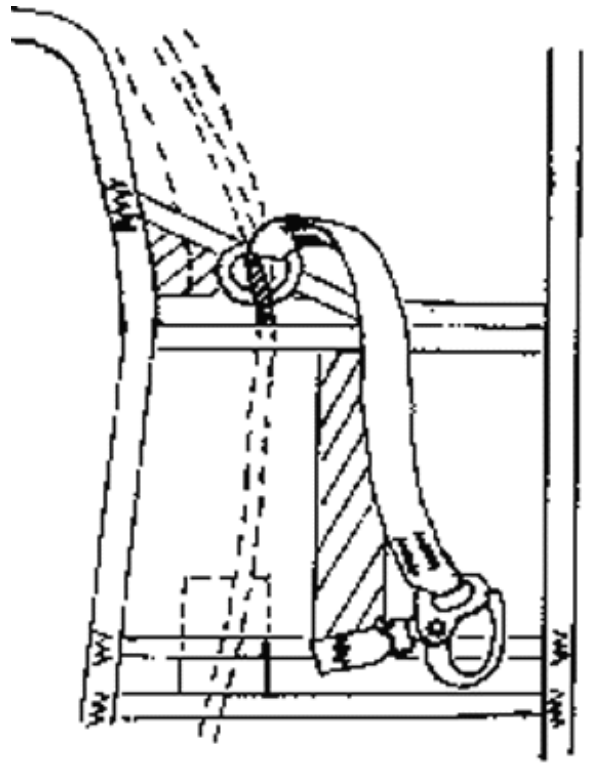


Figure 8-1

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Catapult System

CONTENTS OF Catapult System

Deployment Sequence

History of Square Reserve

Design Improvements

How the Catapult Works

Reserve Deployment System

The CATAPULT® ([patent number 5722619](#)) is a new and innovative feature designed to improve the overall safety of parachuting. The inventor, Mick Cottle, developed the idea after a near fatal incident involving a total malfunction of his main. Jumping a pull-out system at the time, Mick experienced a floating pud. He fired his reserve and ended up with a "horseshoe" malfunction of his reserve as a result of the primary reserve pilot chute becoming entangled with the main bridle. After beating the reserve container with his elbows for several seconds, he finally ended up open under his main at approximately 500 feet.

Deployment Sequence

The sequence shown below was captured by inducing a "horseshoe" malfunction of the reserve. The primary test jumper was assisted in this sequence by a secondary jumper. The reserve container was rigged with a primary reserve pilot chute that could be deployed with a pull-out located on the back of the reserve container. The primary reserve pilot chute contained no spring for the test sequence. Note: This sequence was filmed with the main container unopened. Total time from induced horseshoe to reserve deployment: 3 seconds.

Seq 1



Seq 2



Seq 3



Seq 4



Catapult Seq 1: The secondary jumper has just deployed the primary reserve pilot chute and is inducing a "horseshoe" malfunction by holding the primary reserve pilot chute on the leg of the primary test jumper. The reserve bridle is beginning to deploy.

Seq 2: The Catapult has been extracted from the reserve container by the bridle. It has cleared the burble and has just extracted the reserve free bag and parachute from the reserve container.

Seq 3: The Catapult continues to extract the reserve free bag and parachute from the reserve container.

Seq 4: The Catapult successfully deployed the reserve parachute. The Catapult, reserve free bag, and bridle have released from the reserve parachute. The reserve parachute is beginning to deploy.

History

In 1978 Paraflite Inc. introduced the first square reserve parachute to the skydiving market. It was called the Safety Flyer.



Along with this new reserve canopy technology also came a new reserve deployment technology known as the free bag system. It consisted then, much as it does today, of 3 major components. A deployment bag, pilot chute and a unique bridle some 12 to 15 feet in length and some 2 inches wide. The bag is not physically attached to the canopy so that when the deployment sequence reaches the point that the canopy emerges from the bag, the bag, bridle and pilot chute disconnects itself from the canopy. This was done to allow the canopy to fully deploy in the event of a "horseshoe" type malfunction.

System Function and Design Improvements

Under normal operating conditions the free bag assembly will deploy a reserve canopy in much the same way as a main canopy with the exception that the aforementioned deployment assembly will separate from the canopy as inflation occurs. In the event the reserve pilot chute snags or hangs up on either the jumper or his/her equipment, the bridle is supposed to generate enough drag to extract the bagged canopy and let the lines unstow allowing a deployment to take place.

Unfortunately, the bridle does not always manage to extract the bagged canopy in a timely manner. In some cases the bagged canopy isn't extracted at all.

In the mid 1980's some manufacturers were putting assister pockets on their bridles in an effort to effect more drag. This approach has had some limited success.

The Catapult system was conceived and built to overcome this drag

problem. It is the end result of many hundreds of hours of design and testing based on several skydivers actual horseshoe horror situations including the designers own personal experience which, in fact, was one of the major motivating factors behind the Catapult.

How the Catapult Reserve Extraction System Works

The Catapult system uses the 3 primary components of the original free bag system coupled with a unique new addition. The additional component is a 27" ZP springless pilot chute attached 4 feet up from the reserve free bag (see graphic above). The overall length of the bridle is 12 feet from reserve free bag to primary reserve pilot chute. The 4 feet attachment point was chosen after careful review of several horseshoe scenarios. It was determined that under most horseshoe conditions in which the primary reserve pilot chute and/or part of the reserve bridle was entangled, the 4 foot attachment point would usually be situated below the apex of the snagged pilot chute bridle thus allowing for some launch pull force to occur before the bridle reached a static state (i.e.; no more movement away from the jumper). Another reason for the location is to allow the Catapult to clear most burble areas of the jumper. The Catapult pilot chute is also attached to the bridle at its base rather than having the bridle route through the center line area. This feature allows the Catapult pilot chute to swivel and orient itself upright under almost all conditions.

The Reflex Reserve Deployment System

The Reflex reserve deployment system utilizes a 14 inch free length high tension spring (powder coated for greater resistance to corrosion) and a 30 inch ZP canopy as its pilot chute. The single pin external design of this pilot chute, coupled with the Catapult system, ensures consistent quick, clean reserve deployments.

Unlike other single pin external pilot chute designs, the Reflex also makes use of modern day high impact aircraft composites in its cap design. The Reflex also utilizes a molar type free bag ensuring that no reserve canopy material or lines ever come into contact with the closing loop.

The Reflex reserve container design is Velcro and hesitator loop free. Its friction staged system ensures optimum deployment performance. Its built in pack tray riser covers allow the reserve risers to remain completely isolated from the deploying free bag assembly. All Reflex systems come Cypres ready from the factory. The Cypres installation, including built in channels, was designed into the Reflex, not retrofitted.

For further information about the Catapult please feel free to contact us at 909-245-8828 or fax at 909-245-8825.

Questions or comments site? webmaster@fliteline.com

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