

SERIAL #

SST/Racer[®]

OWNERS MANUAL

*Racer/2K3™, Racer/Elite™, SST/Racer, Racer/Trainer,
Racer/Tandem, Racer/Tactical, AngelFire/Nighthawk Reserve*

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GENERAL

INTRODUCTION

Congratulations on the purchase of your new Racer, Racer Trainer or Racer Tandem System. As you put jumps on your new rig and get to know it, you will come to realize that you have purchased the most exquisite piece of parachute equipment that money can buy. We are sure that it is the most thoroughly engineered harness and container system available. Note our attention to details such as our use of type 13 webbing, the only webbing approved for use with all parachute hardware. The new 2K3™ features magnetic riser covers and Anti-Line-Strip main and reserve deployment bags. We've paid attention to important details like our High Drag Pilotchutes, but many features of the Racer will escape your first glance.

We started building SSTs when the idea of “piggy-back” meant literally snapping a reserve to your back above the main container. We developed and were the first to employ the hot knifed single piece construction technique now used by all of the other manufacturers. Now after 46 years and 45,000 Racers, our basic design hasn't had to change much. It was ahead of its time when it was conceived and it still is. So while other manufacturers have had to undergo recalls and major design changes in an effort to “get it right” the Racer has endured. Even our competitors have said of the Racer, “Sherman got it right the first time”.

When you examine current production Racers, you will find the basic workings of the rig haven't changed. We've just made it simpler and more attractive! Today's Racer is a refined version of the most time-proven design in parachuting. We did get it right the first time.

As parachutes got smaller, we introduced the Power Racer - the smallest, lightest rig in the world. The Racer harness and container system fits more like a tailored coat than a hiker's backpack. The Racer offers more deployment options and more sizes than any other container system.

Only the Racer offers the superior Pop-Top reserve system, and we still make Racers for the jumper who demands gear from the cutting edge of skydiving technology.

This manual introduces you to your new Racer/2K3, Classic Racer, TRAINER or Racer Tandem. You must read this manual before taking to the air with it. So leave yourself plenty of time between getting the rig and making the first jump on it. Use this manual to help familiarize yourself with the system. You can get thousands of jumps from a well maintained Racer, so there's no need to rush to the first one.

WARNING

IT IS ASSUMED THAT INTENTIONALLY JUMPING FROM AN AIRPLANE IN FLIGHT OR FROM A FIXED OBJECT IS DANGEROUS TO LIFE AND LIMB. PARACHUTES DO NOT ALWAYS WORK AS DESIRED. WHEN YOU TAKE IT UPON YOURSELF TO PARTICIPATE IN PARACHUTE JUMPING, YOU ACCEPT THE FACT THAT NO MATTER HOW CAREFUL YOU ARE, OR HOW GOOD YOUR EQUIPMENT IS, YOU CAN BE SERIOUSLY OR FATALLY INJURED.

WARNING—NO WARRANTIES

DISCLAIMER

It is expressly understood and agreed between the seller and the buyer and any subsequent user of the Racer, all or in part, the manufacturer and seller shall in no way be deemed or held liable or accountable for any failure or damages resulting from failure of the Racer. Use of the Racer for any purpose shall constitute waiver to the manufacturer and seller for any damages to person or property directly or indirectly caused by said use. The Racer is sold

purpose, and the manufacturer neither implies or expresses any warranties or guarantees of the Racer. Use of this rig for any purpose constitutes agreement between the buyer or user and the seller according to the terms herein. If the buyer refuses the terms of this agreement, he must return the unused Racer to the manufacturer with 10 days of receipt of the Racer with a letter stating why the Racer was returned along with the original invoice showing purchase price.

ABOUT THE MANUAL

We have tried to write this eighth edition of the Racer Owners Manual, for all models. However, it is only current for the serial number shown on the first page. The data contained herein was current at the time of this writing, but the sport advances rapidly. Some of this information may not be true now or especially as time goes on. We reserve the right to change the Racer and its procedures without notice. Prudence requires that you contact us for information on updates if you are using this manual as a guide to service a later generation Racer. Additionally, you may view our most recent version at our Internet site www.jumpshack.com or www.plab-sinc.com

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DATE OF MANUFACTURER / SERIAL NUMBER

The serial number on the data label is also the date of manufacture. The first two digits of the this number denote the week of manufacture. The second two digits denote the year. The last two digits denote the sequence of rig that week. For example, Serial Number 081501 would indicate a February, 2015 date of manufacture, and the first rig built that week.

Prior to February 2009, five-digit serial numbers were used. Then, the first two digits indicated the week of manufacture, the third digit indicated the year, and the last two digits denoted the sequence of rig in that week. One would have to know which decade the rig was manufactured in, however. Now that PLI is in its fifth decade, making Racers, we figured it was time to simplify the code by adding a sixth digit.

Caution: This manual is serial numbered corresponding to the Racer with which it was shipped. Technical information in this manual refers only to the Racer of that same serial number.

Record the information from the data plate now, along with the colors of your Racer, in case your gear becomes lost or stolen. Also record the serial numbers and colors of your main and reserve parachutes. Keep the record some place other than your equipment bag.

If you have any question regarding the Racer, this manual, or the procedures described in the manual, contact:

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OPERATIONAL LIMITATIONS

TECHNICAL DATA

The Racer harness and container system has been certificated in the Standard Category by the Federal Aviation Administration (FAA) under Technical Standard Order (TSO) C-23(b). This TSO refers to National Aircraft Standard (NAS) 804 published in September, 1949. The Tandem is Certified under TSO-C23(c). This TSO refers to AS-8015a published September 30, 1982. To meet these requirements, the manufacturer must submit the design in drawings to the FAA Engineering District Office. The FAA then inspects and certifies the manufacturing facility and approves the quality control of the manufacturing process as described in the manufacturer's manual.

The FAA further assures that the manufacturer will trace and inspect each piece of fabric and hardware he uses during the manufacturing process of the equipment.

Under TSO C-23(b), equipment can be tested to Standard Category (sometimes called High Speed) or Low Speed Category. The Racer has been tested to the Standard Category which certifies it to a shock load of 5,000 pounds. The rig may be assembled with a Low Speed Category reserve canopy, but then the entire system becomes certificated in the Low Speed Category. (Later installation of a Standard Category canopy restores the system to the Standard Category, of course.) Regulations require the rigger to identify the system as Low Speed Category in the appropriate manner when he installs a reserve from that category. Standard Category requires no markings. Canopies certificated under TSO C-23(c), and later revisions may be assembled into the Racer line of containers providing the assembling rigger has complied with FAA regulations and policy. Performance limitations of the installed canopy should be placarded, in the manner required by the TSO document, for the user's information. The Tandem certified under TSO C23(c) must conform to AS-8015a. The test weight and speed specified in AS-8015a Category B is 300 Lbs. @

175 KTS. The Racer Tandem system has been tested to 600 LBS. @ 175 KTS.

Many reserve and main canopies will fit well into your Racer, but some won't. Results of packing the wrong-sized canopy into your Racer range from difficulty in packing to a likelihood of either a premature pack opening or total pack closure, depending on whether the parachute canopy is too small or too big. FAA Advisory Circular (AC) 105-2, paragraph 5.B(6) states guidelines for component interchangeability, but we've made the decision even easier. The Parachute Industry Association and PLI have each published a list of canopy volumes. They tell you the cubic inches required for your container and which size Racer you should choose for a specific canopy. If you don't find your canopy listed, call the canopy manufacturer or PLI to find your canopy's volume. Don't guess; it's unnecessary and dangerous.

MODIFYING YOUR RACER

Although the Federal Aviation Regulations technically allow alterations to some parts of the assembly by designated personnel, the Racer is such an integral system, we don't recommend it. Virtually nothing on the Racer works completely independent of the reserve system. We've tested the entire system as a unit, and it should stay that way.

If you think you can improve something, we welcome your comments. It's valuable input from the field that made the Racer the great rig it is. We are continually testing new ideas on the Racer, and we may have already considered yours. What we have already learned could save you from finding out the hard way.

COMPATIBILITY

Look at the system data information plate under the reserve pin inspection flap to determine the size of the main and reserve containers. Check that information against published PLI canopy volume

charts. If there is a problem, give us a call. We make in excess of 200 different container sizes/combinations on 12 different harness sizes, so there is no reason that your canopies shouldn't fit the containers or the harness not fit your body.

Pin Space & Line Stow Change in Reserve Free Bag

Effective September 1, 1999, PLI changed the pin spacing on the SRP (Small Reserve Pilotchute) equipped Racers from 2 inches to 4 inches. This change makes the ripcord pins easier to insert and reduces the overall number of ripcord types that must be stocked.

This change requires the Free Bag to be changed accordingly. Therefore, we will be providing Free Bags for the 11" wide format (formally the "Thin-line"), and the 12" wide format (formerly the "Square Back"), which can be used for either the 4 inch dia. or the 6 inch dia. pilotchute with 3 grommets in the top surface. It is apparent while packing the reserve which two of these grommets to use. Simply select the grommets that most closely match the reserve side flaps. Always begin the alignment by matching the grommet closest to the wearers' neck.

Additionally, this change eliminated the line stow pouch on the 9" wide (formally the "Power Racer") containers. This pocket has been eliminated for some years on the Military rigs and the Tandem rigs and some specialty rigs. The pouch was phased out completely in favor of the Anti-Line-Strip Speed Bag which uses rubber band stows.

PLI testing has shown that rubberband stows, properly located, are more reliable than the stow pouch and the "Bungee Stow" locking stow method. All Free Bags produced for the past 18 years have had the ability to use rubber band locking stows in place of the "Safety Stow" and is now recommend across the board.

AngelFire Reserve:

Parachute Labs makes a full line of reserve parachutes for sport and military use. The AngelFire Reserve is certificated under TSO C23d. The AF Reserve is limited to use in Aircraft under 180MPH. Sizes 97 through 226 are limited to use with less than 254 pounds. Sizes 246 through 300 are limited to use up to 330 pounds. Limitations are placarded on the individual canopy. They should be used in containers of appropriate cubic inch capacity. See Canopy Owners Manual.

The NightHawk is a heavily reinforced 7-Cell Reserve intended for military use.

The BlackHawk is reinforced 9-Cell Reserve intended for military use where longer glide is required.

The TD3, TD 4 and TD 5 are Tandem Reserves. The TD 3 is limited to 338 pounds. The TD4 and TD 5 are limited to 600 pounds.

OPERATIONAL CHARACTERISTICS

GENERAL DESCRIPTION

The harness and container are designed and built as an integrated system for reasons of function, safety, and comfort. The components of the harness and container system are made from nylon and polyaramid fabrics manufactured to U.S. military specifications and new (not reconditioned) Mil-Spec hardware.

All Racer models feature a pre-sized, one-piece, nylon harness. Every Racer employs the Pop-Top reserve container and a one-pin main container. The Tandem is equipped with a drogue stowage compartment that must be opened before the main container can be opened.

The comfort pads will not absorb water, perspiration, or hold dirt. The padding was chosen for its light weight and durability. Although it won't keep you afloat, it provides some flotation for the system. Both the main and reserve containers fit snugly around the canopies to keep them in place until the anchored pilot chute extracts them in the proper sequence. This metering effect maximizes the reliability of the canopies by preventing one part of the system from deploying ahead of another which should go first.

The main and reserve containers hinge together for greater comfort. The Pop-Top reserve rides just below the shoulders on the shoulder blades, and the main container rests in the small of the wearer's back. When the wearer moves, so does the Racer. This "hugging" ability of the Racer keeps the mass of the rig closer to the center of gravity of the wearer, and improves stability and handling. The wedge shape of the whole system improves the aerodynamic profile and facilitates exits from small doors.

THE MAIN SYSTEM

The main parachute canopy may be deployed in any of five ways, depending on the main deployment configuration:

1. Ripcord Deployment

A stainless steel ripcord handle located on the wearer's right front releases a retaining pin when pulled. Pulling this single pin releases a cloth closing loop, and the container opens from the spring tension of the pilot chute. The pilot chute springs from the container into the air stream and initiates the deployment of the main parachute, if proper body position is utilized.

2. Pullout Hand Deployment

A soft handle located on the bottom right corner of the main container connects to a ripcord pin and the base of a springless pilot chute. As the handle is pushed down, the ripcord releases a cloth closing loop allowing the container to open. The pull action then extracts the pilot chute by its base. The wearer must manually throw the pilot chute into the clear airstream to his side and release it. The pilot chute then deploys the main parachute.

3. Throw-out Hand Deployment

A plastic handle at the top of the wearer's right leg strap connects directly to the apex of a limp pilot chute in a leg-strap pouch. The wearer extracts the pilot chute from its pouch and manually launches it into the clear airstream next to him. When the pilot chute has inflated and applied a load to its seven-foot bridle, it extracts a curved pin on the bridle from the cloth closing loop, and opens the container. The pilot chute then continues to deploy the main parachute. This pilot chute may also be stowed and deployed from a Bottom of Container mounted in a Spandex pouch.

4. Automatic Activation

In this configuration, a preset sensing unit determines the altitude and air speed, and activates the ripcord pin (in the ripcord deployment configuration) when the desired descent air speed and altitude coincide. The Racer accepts several automatic activation devices (AADs) on the market for use on the main parachute system.

5. Static-line Deployment

Direct Bag:

This is a wearer-passive deployment controlled by a jumpmaster. A static line is attached at one end to the airplane and at the other to a ripcord pin and the main parachute deployment bag. The bag attaches to the top of the main canopy with breakcord. Loading the static line first extracts the main ripcord from the cloth closing loop, then extracts the main parachute bag. When the system fully loads, the breakcord detaches and releases the deployment bag from the canopy.

Pilotchute Assist:

Same as above except that the canopy end of the static line is attached to the main pilot chute with Velcro or Breakcord. Loading the static line first extracts the main ripcord from the cloth closing loop, then extracts the main pilot chute and bag. When the system fully loads, the breakcord or Velcro detaches and releases the pilot chute and bag from the static line. The pilot chute and bag stay with the canopy.

THE RESERVE SYSTEM

The reserve parachute uses the patented Pop-Top pilot chute. It's the only reserve system where the pilot chute is externally mounted—so it doesn't need to push container flaps out of the way to get open—and the ripcord pins are protected between the reserve container and the wearer's back. The Pop-Top system enables the highest launch of the low-volume MA-1 pilot chute spring when the reserve has been properly assembled and packed.

THE RACER RESERVE PARACHUTE SYSTEM MUST BE USED WITH AN APPROVED PILOT CHUTE.

There are three ways to deploy the Racer reserve:

1. Ripcord Deployment

The stainless steel trapezoidal ripcord handle is shaped to invite a left-handed thumb hook and thrust type activation while accepting an across the chest right-handed grip and pull type activation. A combination of both or a two-handed activation is recommended. The handle is mounted on the wearer's left main lift web and activates two ripcord pins when pulled. These pins release the two cloth clos-

ing loops that route through the pack, over the pilot chute, and back through the pack. Releasing the cloth closing loop allows the pilot chute to launch into the airstream and deploy the reserve.

2. Reserve Lanyard

This system comes as optional equipment on the SST/Trainer and is used to back-up the above system after the wearer has separated from the main parachute canopy. The 2-piece reserve ripcord housing is joined by means of the ripcord cable running through it. A cross connector lanyard crosses from its shackle on the right riser, routes under the top section of the reserve ripcord and housing, and then shackles to the left riser. After both of the risers separate from the harness, the lanyard slides along the housing to a dynamic topmost point of suspension. The lanyard separates the housings from each other or AAD housing clamp. When all tolerance is taken from the ripcord/housing system, the ripcord pins are extracted, and the lanyard slides free over the remainder of the housing and the ripcord. The spring-loaded pilot chute launches and deploys the reserve canopy.

NOTE: The attachment of a springless pilot chute, w/bridle, to the apex of the main canopy of static line systems is required to positively assure the activation of the Main/Reserve Interlock. The force required to pull the ripcord is the same as the force required to activate the interlock. Adequate force may not be generated, during a streamer (high speed/low drag) malfunction, when utilizing a direct bag static line system w/o the springless pilot chute.

What You Should Know About Reserve Static Lines (RSLs)

The purpose of an RSL is to provide an automatic link from the cutaway main canopy to the reserve activation. To do this the cutaway canopy must generate a drag force capable of pulling the reserve ripcord.

All means available must be employed to maximize and utilize this drag force. One of the best ways to maximize the drag of a malfunctioned canopy is with a "Cross Connector". When the "Stevens" sys-

tem was first incorporated, tests showed that a canopy with one side cutaway doesn't always have enough drag to pull the reserve ripcord (22 lbs.+ 5 lbs. for the seal = 27 lbs.). That's right, you could easily end up with less than a square foot of effective drag surface. Those tests were done with round canopies. There is no reason to believe that a square canopy would do any better - quite to the contrary. The original "Stevens System" had the cross - connectors at the top of each riser, at the links. That location required two connectors, one front and one rear, to prevent elongation and resultant loss of drag of the main canopy. This configuration is not acceptable on a piggy back as the cross - connectors can and do catch under the reserve container. Presently we are enlightened enough to realize that cross connectors placed at the base of the riser near the attachment point to the harness, will preclude these problems.

The Racer employs such a cross - connector, with "Quick Releases" on both sides. Its routing takes it from the left riser, under the top half of the exposed ripcord housing, over (outside) the top or yoke flap, then to the right riser. The excess lanyard is concealed under the top "lip" of the pop-top and the respective sides of the yoke flap. Velcro is provided under the edges of the yoke flap to mate with Velcro on the cross - connector itself, thus preventing escape of any critical amount of lanyard in freefall. After, and only after BOTH risers have separated from the harness does the cross - connector load the reserve ripcord pins, pulling them and activating the reserve.

Other solutions to this problem have no cross - connector, only a direct link or "static line" to the ripcord pin. We call that type "Side Sensitive", that is, it activates the reserve when the side to which it is connected has enough drag to release from the harness and pull the pin.

We trouble shoot the mechanics of parachute equipment operation with the "What if scenario". What if? On a single sided/side sensitive system one riser releases before the other, or that one side hangs up. The canopy goes into streamer and fails to generate enough drag to pull the pin, or the reverse. The other side hangs up instead. The pin is pulled and the reserve pilot chute entangles with the yet unre-

leased side of the canopy. Both of these scenarios have happened with tragic results on single sided systems.

Experience has shown us that all of the single handle cutaway systems in use today release unevenly. Try as we may, (we being the designer and manufacturers), no one has developed a reliable method to perform this feat to date. Additionally, prudence tells us that we MUST assume a possibility of a release hang up. As much as 40 pounds of force has been required to release some poorly maintained riser release systems. This is after the cable has been pulled.

The entanglement scenario is prevented with the two pin (LOR), one to each riser, system. However, it retains the, "one side attached without enough drag to pull the pin", problem.

The cross - connector system is "what if'd" with the accidental reserve activation at exactly the wrong time during the main deployment sequence. Some say, and we acknowledge that this rare occurrence would put the reserve over your head with the main inflated and in tow behind the reserve. OK! What if that does happen? We have a good canopy over our heads and plenty of time to disconnect either side of the cross - connector and cutaway the main. No panic! This means that the proper emergency procedure for a total or pilotchute in tow is to simply pull the ripcord. Do not pull the cutaway handle first, for a total or pilotchute in tow. After the reserve is out, disconnect the snap shackle and evaluate the situation before cutting away.

Suppose someone routes the cross - connector improperly under the top reserve flap. No one would do that you say! We did it in a test! No problem, we simply pulled the quick release and separation was complete. Later analysis identified that in that situation all one must do is pull the reserve ripcord. Then we have not only separation; but, a deploying reserve. Additionally, an AAD would provide the ripcord pulling chore.

Cross - connectors have been accused of being at fault by snagging a helmet (namely the motorcycle helmet - which was not designed with skydiving in mind), or other encumbrance. We submit that it is the fault of the helmet design and not the RSL. Helmets and all other pieces of extraneous parachute

equipment, shouldn't have edges that snag. On the Racer the choice is yours, single sided, or cross - connected, or none (see your Owners Manual). If you decide to do CRW on the way down and want to disconnect your RSL. Simply release one or both of the snap shackles and go for it.

3. Automatic Activation

Racers are compatible with virtually all AAD's currently available on the market. The way most AAD's work is, that when the desired altitude and descent coincide, a preset altitude/velocity sensing device fires a pyrotechnic charge into a combustion cylinder and activates a cutter or a piston, depending on the type of device. Then, either the cloth closing loops are cut or the ripcord pins are pushed by the device. Racers can also be configured to work with mechanical AAD's that pull the main ripcord when packed with a spring loaded main pilot chute.

Finally, AADs have both failed to operate when needed and operated before the desired altitude. Whether from fault of the device or user error, AADs should be considered unreliable and used with caution. Nonetheless, Parachute Labs strongly recommends the use of an AAD.

AAD SET-UP NOTIFICATION

Your new Racer has been equipped with a kit to accept the installation of a 2-pin CYPRES or Vigil

AAD unit. All rigs built after 1997 are equipped with a Spectra Quick Loop, appropriate for current production AAD cutters.

THE MAIN CANOPY RELEASE SYSTEM

3-Ring Release System—Two rings on the riser acting as force reduction levers retained by a locking loop, which serves as a force reduction pulley, transmit the load of the opening and suspension to a larger ring on the harness. A handle attached to the main lift web pulls two cables that release the left and right side ring locking loop simultaneously, if the 3-Ring System and risers have been properly maintained. After the breakaway, only the large rings remain. Before using the Racer with the above release, consult an appropriately rated instructor.

Racers are equipped with orange-colored FEP Teflon coated cables that do not require oiling. If you have yellow Lolon cables on your cutaway handle, they must be oiled once every month to prevent undue friction and increased cutaway pull force (hard cutaways). The best lubricant is sewing machine oil or 3-in-1 oil. Apply with a clean rag, leaving a light sheen.

INSPECTION INSTRUCTIONS

CYCLIC INSPECTIONS

The Federal Aviation Administration requires that all parachute systems in use for emergency circumstances be inspected every 180 days. This inspection process is well known and generally thought of as a canopy inspection only. Such is not the case. The harness and container and its accessories, such as the pilot chutes, bridles, bags, and cables, must be thoroughly examined and certified as airworthy at the same time. You, as the user of this equipment, should be familiar with and check these items more frequently such as every time you pack or jump it. All Racers should be inspected for: Broken or frayed fibers on webbing, cables, container fabric, tapes, locking loops, and housings; broken tacking; severe discoloration or fading (and indication of possible sun light damage); grommet distortion; bent ripcord pins; worn velcro; broken stiffeners; broken stitching; and a general look at the overall appearance.

PRE-JUMP INSPECTION

The “jumpmaster check” should be performed before every jump by another person who is familiar with the equipment you are using. It should be performed in the following manner. “Hands on”, beginning at the front of the wearer at the leg straps and proceed up the front of the wearer to the shoulders then to the rear of the wearer at the top of the shoulders and down to the bottom of the rig. Observe for: properly threaded and routed leg straps, properly threaded and routed main lift webs, securely seated ripcord and cutaway handles, properly threaded and routed chest strap, proper and secure assembly of the riser releases, proper routing of the risers, proper seating of the reserve pilot chute, proper seating of the main ripcord pin, proper routing of the throw-out bridle if so equipped, proper routing of the pull out lanyard if so equipped, housing to cable clearance of the main ripcord cable if so equipped, and back to the leg straps for assurance of proper routing.

MAINTENANCE/REPAIR

PERSONNEL QUALIFICATIONS

The FAA states that minor repairs may be done by a Senior Rigger and major repairs must be done by a Master Rigger. They further define minor repairs as anything that does not affect the airworthiness of the equipment, and major repairs as anything that does affect the airworthiness. This regulation/policy is subjective and open to discussion. You as the owner, and your rigger, should discuss the required repair and make the best decision you can. If there is still some question call us.

For use other than inside the USA the Rigger should be certified by the National Agency or Military Organization responsible for rigger certification

MAINTENANCE PROCEDURES

Your new rig is designed so as not to require any routine maintenance except for the 3-Ring system. It must be disconnected and the following procedure performed as indicated.

1. With a nylon brush remove any cadmium oxide deposits on the webbing where it contacts the rings. Racers with stainless steel rings will not have any metal deposits. At the same time, flex the webbing assuring that it is soft and supple. This step may be performed during the Inspection cycle.
2. If your Racer is equipped with a yellow cutaway cable you should with “3 in 1” oil or equivalent wipe a light coat onto the release cable. This process should result in a clean well oiled cable. **This should be done monthly!** If your Racer is equipped with a red or orange Teflon coated cable it is not necessary to lubricate it.

MAIN CLOSING LOOP REPLACEMENT & ADJUSTMENT

The main closing loop is constructed of Type 5 Nylon Cord Sheathing. The running end is finger trapped back into itself at about one (1") inch past the center. The finger trap is drawn out of the end of itself and the ends are drawn even. By selecting the Type 5 sheathing we avoid the requirement of a washer to retain the knot behind the grommet.

The location of the knot, and ultimately the length of the “Thru Loop”, is determined by trial and error. With the loop adequately long to allow for a first time closing, close the main and pin the loop leaving the pull-up cord in place. Now take a grip on the pull up cord and pull it with one hand while the other hand presses down on the top main flap. Determine the amount of loop exposed between the pull-up cord and the grommet, then release the pull-up cord. Open the top flap and unthread the pull-up cord from it. In order to access the knot of the “Thru Loop”, saddle bag the rig as described in the section of the owners manual about Closing the Main.

Leave the pull-up cord in place through the grommets of the side and bottom flaps. Pull the cut end of the “Thru Loop” away from the retaining grommet exposing the knot. Relocate the knot the same distance determined above. Close the container and repeat as necessary.

Note: Loops which are too long can increase the frequency of accidental activation of the main, and loops which are too short can cause hard pulls. Both cases should be avoided.

REPAIR PROCEDURES

The best guide for the execution of general repairs to be performed on parachutes is “The Parachute Manual” by Poynter.

Tacking, one of the most commonly required repairs on any rig should be replaced with waxed nylon 5

cord in the same manner as originally manufactured.

Current production Racers have magnetic riser covers. On vintage Racers that need Velcro replacement, the Velcro pile should be replaced as required using a Fed. Std. 751 Type 301 stitch with a 2 inch over stitch.

Velcro Hook should be cleaned and only replaced if necessary. Use “Type B” hook. Attach in the same manner as the pile.

Stain removal should be performed with a non-detergent soap with a dry suds and a light nylon brush. A non-volatile, non-corrosive dry cleaning solvent also works well. We use “Picrin”.

Any broken or frayed fibers should be replaced, distorted grommets should be reformed or replaced, discolored or faded fabric should be tested and replaced if necessary, bent ripcord pins straightened

or replaced, broken stiffeners replaced, and broken stitches replaced.

AngelFire & Tandem Reserve:

When performing periodic inspection to AngelFire or Tandem Reserves the relative line lengths should be noted. A differential from specification of more than one inch should be cause for rejection and subsequent correction before return to service. Any broken fibers or threads should be repaired or replaced. Stains must be identified and documented. They should be removed if possible without damaging the fabric. Generally only acidic entities are harmful to nylon therefore a pH test is an appropriate method of determining if a stain is harmful.

ASSEMBLY

PERSONNEL QUALIFICATIONS

Only a currently FAA licensed rigger or equilvent may assemble, inspect, pack, and certify the reserve of a Racer as airworthy. Riggers are required to have *this* manual available to them while servicing this system. Per the FAA regulations you must be familiar with any type of reserve parachute you wish to certify. The main canopy and its accessories may be assembled and packed by you or a licensed rigger.

PARTS LIST

**The harness and container
Main pilot chute & Bridle
Main deployment bag
Main risers
2 Sets of Snap Toggles
3-Ring Release Handle
Reserve ripcord
Reserve pilot chute w/hat
Quick Loop
Pull-up cord
Reserve Packing data card
Main cloth closing loop
Reserve deployment bag and bridle**
OPTIONS:
**Cross Connector/Reserve Lanyard
AAD
Main ripcord
Spring loaded main pilot chute**

Note: Only U.S. Military Specification R-1832 rubber stow bands (Keener brand), may be used on Parachute Labs Products. They are available through PLI. These should be pre-assembled to the deployment bags, both main and reserve, in the provided stow band retainers.

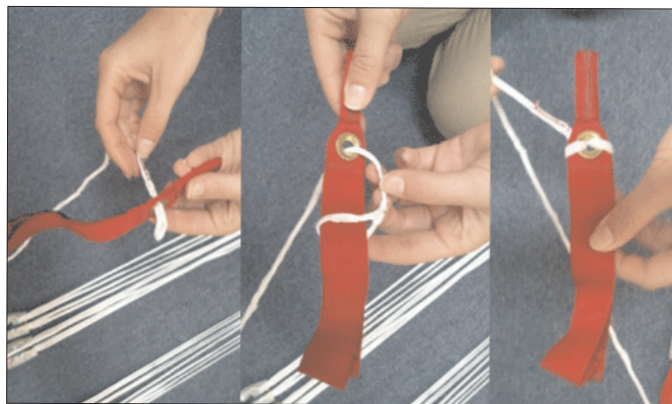
RESERVE ASSEMBLY

A. Connect the canopy to the reserve risers. When assembling a new SST, you have the choice of using L-bar or Rapide links. The risers come from PLI ready to accept Rapide type links.

The PIA (Parachute Industry Assoc.) urges riggers to install round canopies on four risers to help the performance of the canopy. To install L-Bar links on Racer reserve risers carefully add type 8 or 12 buffer webbing between the link and the riser webbing.

For Rapide links, turn under the edge of the riser webbing to buffer itself and install the links. Turn the barrel nuts until snug plus one-quarter turn.

B. Parachute Labs recommends a fingertrapped and sewn loop at the end of the steering line. Insert the running end of the steering line down through the guide ring, through the grommet of the steering toggle entering from the back side and then around the toggle to form a larks head knot .



C. On round canopies, thread the bridle through the radial tapes at the base of the pilot chute, then thread the other end through the loop provided in the bridle and pull it tight. Route the other end of the bridle through the apex vent lines, making sure to catch all of them, then bring the loop over the top of the pilot chute and back down to the apex. Secure the bridle loop to itself with one turn doubled of waxed nylon 5-cord, so it slides freely on the apex.
THE BRIDLE MUST NOT RESTRICT OR

CHOKE THE APEX. IT MUST SLIDE FREELY SO AS TO ALLOW SELF CENTERING. On square canopies only the pilot chute to bridle need be assembled. The procedure is the same as for round canopies.

TANDEM CANOPY ASSEMBLY

All Tandem canopies should have a rubber stow band attached to the line attachment point of one of the inboard “B” lines. The center of the slider should be stowed in this retainer during packing. The purpose of this retainer is to prevent the slider from coming down the lines prematurely. It is a good idea to do this to any canopy.

RSL ASSEMBLY

Install the reserve static line system at this time.



Note: To preclude the possibility of inadvertently routing the static line under the top reserve flap we recommend that the reserve be packed and sealed before taking the following steps.

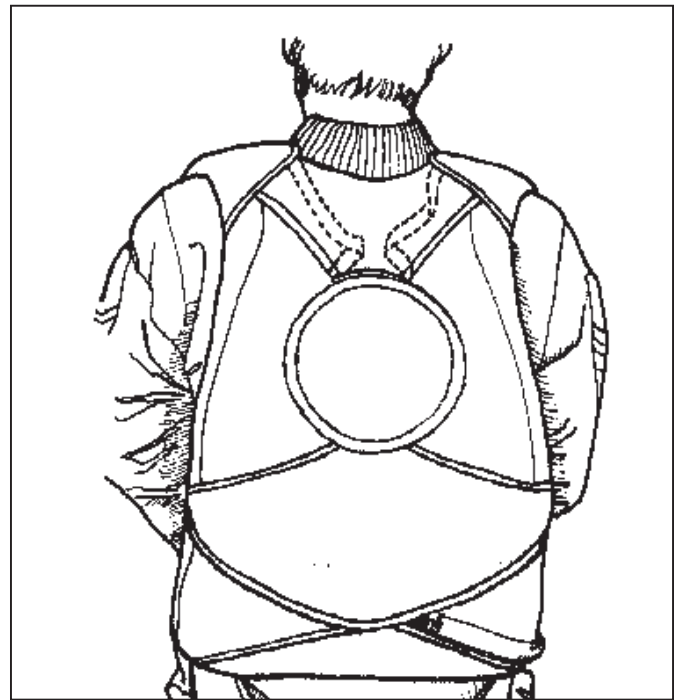
A. Pass one end under the top half of the reserve ripcord housing, BUT NOT UNDER THE RESERVE RISERS OR THE TOP FLAP OF THE RESERVE CONTAINER.

B. Connect the shackle to the small ring located on the side of the riser.

C. Repeat for the other side.



D. Stow the reserve static line in the channel over the wearer’s shoulder and mate the velcro on the yoke or top flap.

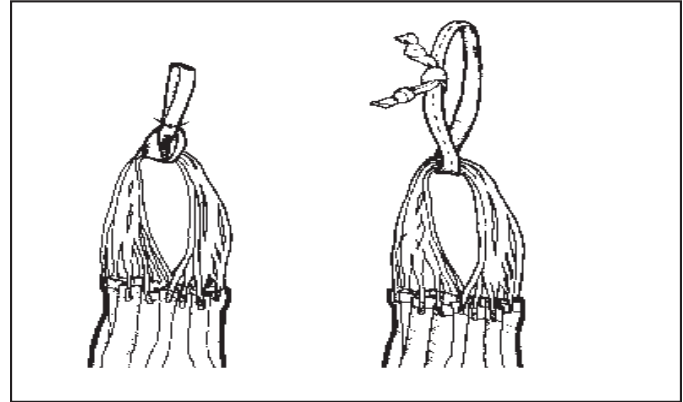


INSTRUCTION FOR CHANGING FROM STATIC LINE TO PILOT CHUTE WITHOUT UNPACKING THE BAG.

E. Attach the loop of 9/16 tubular provided to the apex of a round canopy or the bridle attachment point of a square canopy by looping it through and tacking the loop, with one turn of waxed nylon 5 cord doubled, so that it does not choke the vent lines on a round canopy. Local manufacture of this item can be accomplished by making a loop, on the vent lines, which has strength equal to the strength of a pilot chute bridle and length adequate to pass through the bag grommet to the break cord tie location on the trainer bag, about 12" circumference.



NOTE: This loop must float on the vent lines.



MAIN ASSEMBLY

1. Install the elastic stow bands on the deployment bag. For most canopies you will need one elastic band for each locking stow and from two to four on each side of the bag. NOTE: DUE TO THE VARIETY OF LINE DIAMETERS AND SUBSEQUENT STOW BULK, ELASTIC STOW BANDS ARE NO LONGER SUPPLIED BY CONTAINER MANUFACTURERS. THEY SHOULD BE SUPPLIED WITH YOUR CANOPY.
2. Current production Racers come with the bridle sewn to the bag. Pass the kill-line through the PCA ring, open the noose at the end of the kill line and pass the bag, bridle and pilotchute assembly through it to form a Larks Head knot around the PCA ring. Pass the limiting line through the PCA ring and repeat this process.
3. For main deployment bags with a #5 grommet on the end of the bag, thread the main pilot chute bridle through the grommet at the top center of the bag with the stow bands on the outside. The mouth of the bag faces away from the pilot chute. Thread the bridle through the PCA ring on the top of the parachute (or through the apex lines of a round parachute), then back through the grommet and over the pilot chute from the top. When you finish, the pilot chute bridle loop will have returned once more through the grommet and be tightly secured around the canopy's load-bearing point (or apex loop).
4. Lay the container face-down on a packing mat with the packed reserve container toward the main canopy. Attach the risers to the container by looping

the bottom riser ring through the main harness ring and then the small riser ring through it, bringing the cloth locking loop over and through the small ring and then through the grommet in the riser. The loop is then routed through the terminal eyelet in the adjacent housing whereby the release cable is then threaded through the loop. No less than 6 inches of cable should extend beyond the loop and eyelet. This excess cable is then stowed in the cloth channel provided in the back of the riser.

5. Install the canopy on the risers making sure nothing is twisted and the line rotation is correct. If you don't completely understand how to do this, consult a rigger. Don't guess, or you may find yourself under a canopy going backwards or worse!

The Type XIII risers have been designed to accept connector links similar to the #6 Mallion Rapide link. If you wish to install your canopy on the older

type L-bar links, add a buffer and sew it in with a U shaped pattern against the link channel to prevent the link from twisting while it's loading. Type VIII risers will accept #4 or #5 links or soft links. Type 17, 1" risers accept the #3.5 Rapide link or soft links.

6. Install the steering toggles at this time (See RESERVE ASSEMBLY Paragraph B). Consult your Canopy owners manual for proper location and subsequent adjustment.

7. Insert a closing loop into the retainer provided in the main container tray next to the bottom center of the reserve partition (if one is not already installed from the factory).

NOTE: WHEN REPLACING THE MAIN LOOPS DO SO WITH GUTTED TYPE 5 NYLON CORD, OR THE EQUIVALENT.

RESERVE PACKING INSTRUCTIONS

GENERAL

There are many types of reserves on the market, and the Racer will accept most of them. PLI has developed specific packing instructions for each type. It's the rigger's responsibility to use the appropriate method for any reserve he packs, and to pack according to the harness and container manufacturer's instructions if there is a difference in the methods described by the canopy manufacturers instructions.

CRITICAL POINTS

Compatibility—Make sure the canopy you're packing is the right size for the Racer it's connected to. Even if it was in there before, someone else's mistake will become yours when you sign the packing data card.

Closing loop length—A too-short closing loop results in a dangerously hard pull. One that's too long makes the pilot chute hat look messy and can snag protrusions on the airplane.

Pilot chute closing loop assembly—You must use the specified materials to assemble the pilot chute, closing loop, and hat. Total malfunctions of the reserve could result from the wrong tacking cords.

Clear channel for the loops—Visually inspect the completed pack job from the back and the front (backpad) of the container. Make sure that no lines, canopy, or pilot chute material can hinder the closing loops' passage through the container.

RECOMMENDED TOOLS

This Manual

Line Separator (Round Reserve Only)

Tension Device (Round Reserve Only)

Shot bags (optional)

(2) T Bodkins, PLI Part Number 2003

(2) 500# Spectra pull-up cords 36" long

(2) Wooden Packing Paddles

(1) Aluminum Packing paddle or fid

(If pilotchute hat is not already attached)

Ruler or template for marking pilot chute

A pen or soft lead pencil for marking

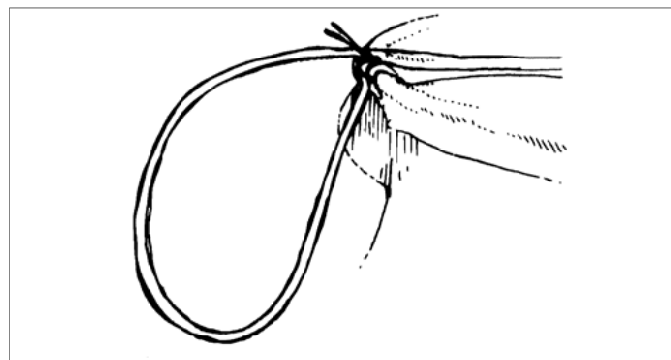
Large sewing needle (for tacking)

5 cord nylon waxed for tacking

PART ONE: PREPARATION

1. Count your tools.
2. Inspect the canopy according to the manufacturer's instructions.
3. Read instructions and review.

PILOT CHUTE, CLOSING LOOP



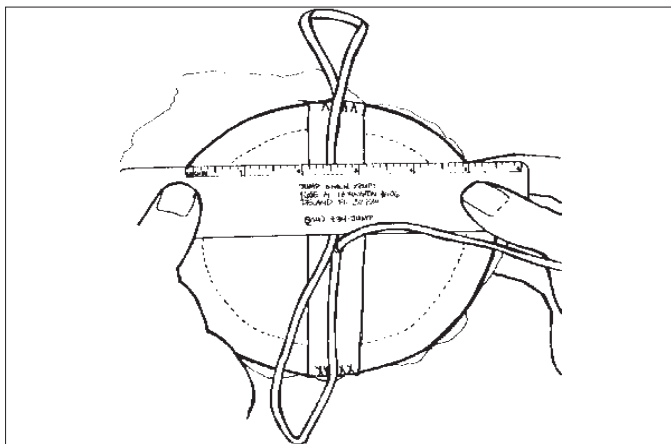
(QUICK LOOP) & HAT

A. While seated, place the pilot chute between your legs with the top facing up. Rotate the swage to the eleven o'clock position.

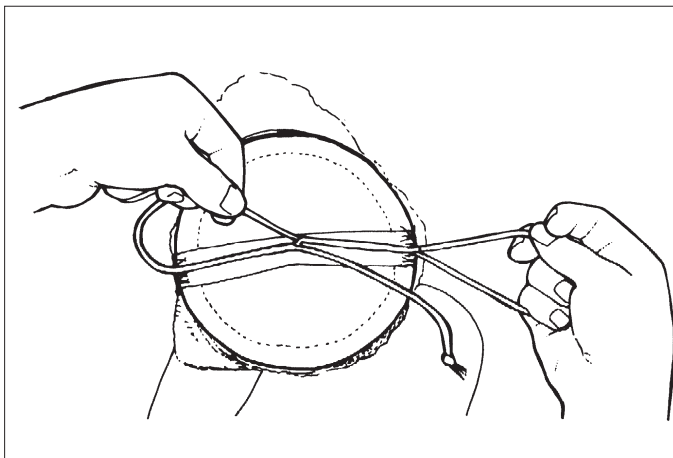
B. Lay one end of the Type 4 (square weave) tape over the edge of the pilot chute, **loop side up**, at the twelve o'clock position. An equal amount of tape should hang over the edge at the six o'clock position.

C. Whip stitch each end of the Type 4 to the pilot chute spring across the width of the tape and back. The stitches should pass through the tape from the underside of the cap, through the parapack fabric of the pilot chute cap, around the spring, and through the parapack pilot chute fabric and tape at the top. Care should be taken not to catch any pilot chute

canopy fabric in these stitches. Tack the parapack around the spring with each whip stitch. Do not sew through the Spectra loop. The running end must be able to slide freely in the finger trap. Sew only through the Type 4 Square Weave. D. Center the loop across the top of the cap by plac-



ing a ruler across the cap at the ten and two o'clock position, perpendicular to the loop. The loop must

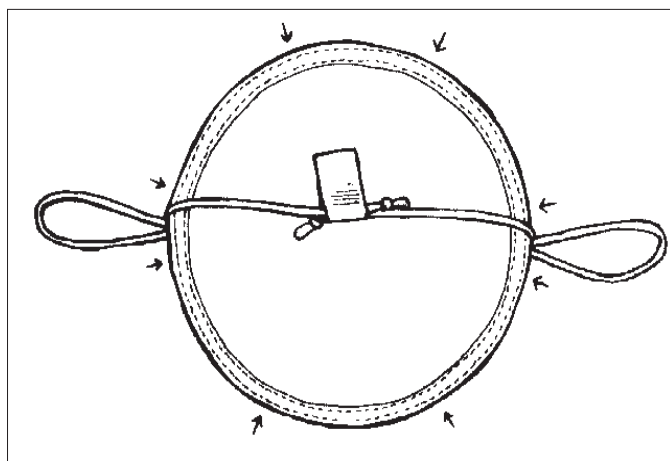


be centered exactly, or the pilot chute will “tip” after the finished pack job has settled. Experience has taught us to use a ruler or better still, prepare a template made from poster board. It should be 6 inches in diameter with notches at the 12 and 6 o'clock position for marking the location of the loop on the top of the pilot chute (or 4” for the SRP pilotchute). Take a moment to evaluate the operation of the quick loop. Each running (free), end adjusts the length of the loop on the opposite end. After the closing of the reserve container, the running ends are pulled until the pilot chute seats

snugly into a depression on the back of the container.

These procedures assure that every SST has the right loop length for a good pack job and an easy ripcord pull. The Spectra loop doesn't stretch and allows the ripcord to slide easily, even when the pilot chute is pulled firmly down onto the container. E. Lay the hat on the top of the pilot chute, and thread the closing loops through the small holes provided in the Type 4 valance. Each free end determines the length of the loop on the opposite side of the hat.

F. Tack the pilot chute hat with waxed nylon 5-cord at ten points for the 6-inch pilotchute, and eight points for the 4-inch pilotchute as follows:



Fold the parapack pilot chute top over the spring. Insert the needle through the folded over edge, around the spring, through the top of the Type 4 valance very close to where it joins the binding tape of the hat. Return through the Type 4 near where the tacking exited and tie the two ends very tightly, using a surgeon's and locking knot.

G. Temporarily tie or tape the running ends of the quick loop together over the top of the hat to keep them out of the way while closing the container. 4. For round canopies, and the BASER and SST CHEST MOUNT RESERVE, layout, inspect, record, flake, and fold the reserve canopy according to the manufacturer's instructions. 5. For all but bagged canopies insert the bodkins up through the two grommets in the ripcord stiffener plate.

PART TWO: PACKING

NOTE: Several industry studies have shown that deployment diapers increase reliability and reduce damage to round reserves. PLI recommends the use of a FULL diaper on round parachute canopies and no longer provides facility for packing round canopies without full diapers.

There are essentially five methods for packing/deploying reserve canopies; they are:

TYPE I: Canopy-first deployment no diaper or deployment device. All lines stow in the container. Examples: 24' T-10A, Navy Conical, early Security, Strong, and Pioneer Lopus. No longer supported by current production. Available by special request only.

TYPE II: Two-bight diaper. Two locking stows from one-half of the lines secure a wrap around the skirt of the canopy until full line stretch is achieved. The rest of the lines stow in the container.

Examples: Strong and Security Lopus, Steinthal Nimbus, Pioneer K-series, early G.Q. Security SAC. No longer supported by current production. Available by special request only.

TYPE III: (Piglet/Phantom) diaper. All lines stow perpendicular to the radial seams at the bottom of the canopy. Sometimes an extra fold of canopy also goes into the diaper.

Examples: Featherlite, Piglet, Phantom.

TYPE IV: Handbury diaper. All lines stow parallel to the radial seams. Generally, three full stows of lines secure a wrap around the skirt.

Examples: Later SAC, later Strong 26' and Lopo Light and Preserve. Hobbit ram-air or any ram-air converted under AC 105-2.

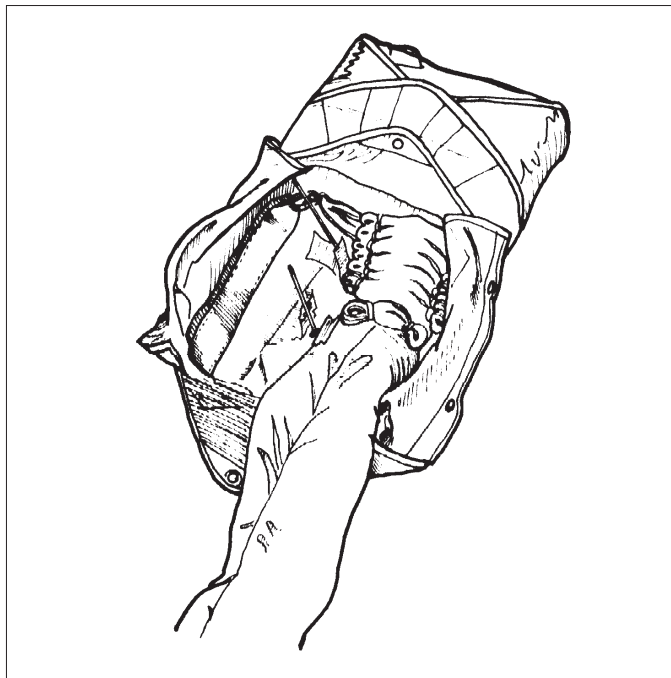
TYPE V: Free Bag Ram Air. Canopy packed into an untethered deployment bag with lines stowed in or on the bag. Examples: AngelFire, PD, Optimum, Raven, Smart

RISER PLACEMENT

Lay the reserve risers flat along the harness as it passes over the shoulder then follow the side walls of the container down to the bottom corners then fold along the 90 degree bend and follow the vertical partition. Tacking is not necessary for systems with long risers.

PACKING TYPE I & II

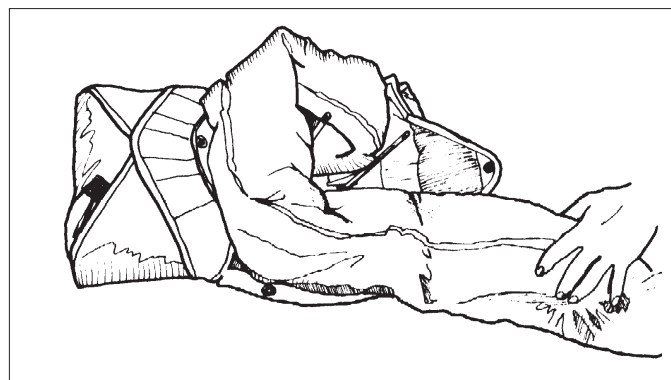
PLI recommends that any reserve which would normally fall into the Type I or Type II category be modified to a Type III or Type IV full diaper configuration. AC 105-2 provides authority for such



modification.

PACKING TYPE III

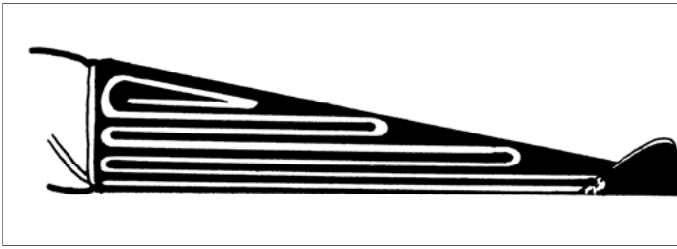
1. Stow the lines on the diaper according to the can-



opy manufacturer's instructions.

2. Place the diaper in the bottom left corner of the container just as it lay on the packing table. You may fold the lines near the center over onto the other lines to make the bundle as wide as the left side of the container.

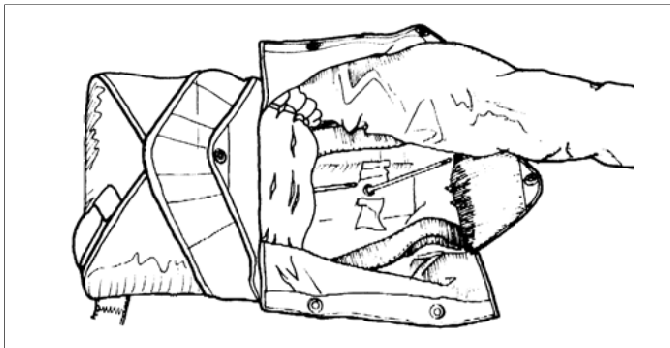
3. Fold the canopy back over the top of the diaper and across the bottom of the container to the other side. Fill the left-side corner before you cross over.



tom center area below the pilot chute. If it is properly filled it will relieve stress lines and depression after closing.

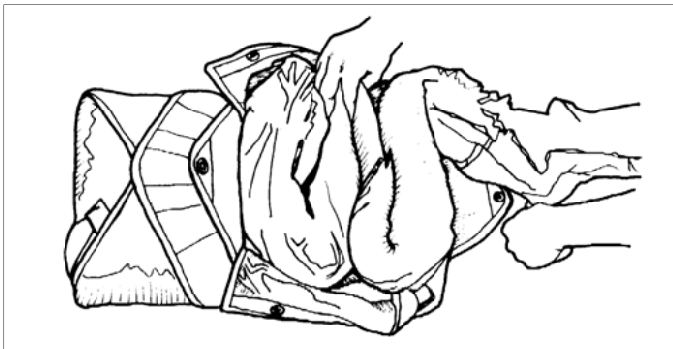
4. Fold the remainder of the canopy in the right side of the container. Starting with a long fold and stowing progressively shorter folds each time forms the wedge shape of the container without bumps. Keep the canopy fabric at least one inch away from the top of the container or it will work out before the next repack.

Note: The diaper may be flipped placing the skirt at



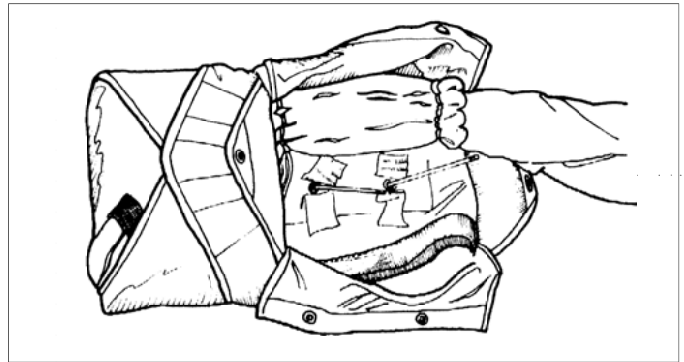
the top of the container and the lines down to accommodate different size canopies/containers. The important thing is that no twists be placed in the canopy during container installation.

MOVE TO PART THREE!



PACKING TYPE IV

1. Stow the lines in the diaper according to the can-



opy manufacturer's instructions.

2. You may lay the diaper in horizontally across the bottom of the container and make a 90 degree fold toward the top of the container.

Then you may make a series of stack folds with decreasing length to follow the taper of the container. At a point about two thirds to the apex make another 90 degree fold back across the container between the bodkins and another 90 degree fold to vertical and finish with decreasing length stack folds. Or you may stow the remainder of the canopy by "S" folding back and forth from right to left. You may also lay the diaper in vertically on the left side and continue packing as in TYPE III.

MOVE TO PART THREE!

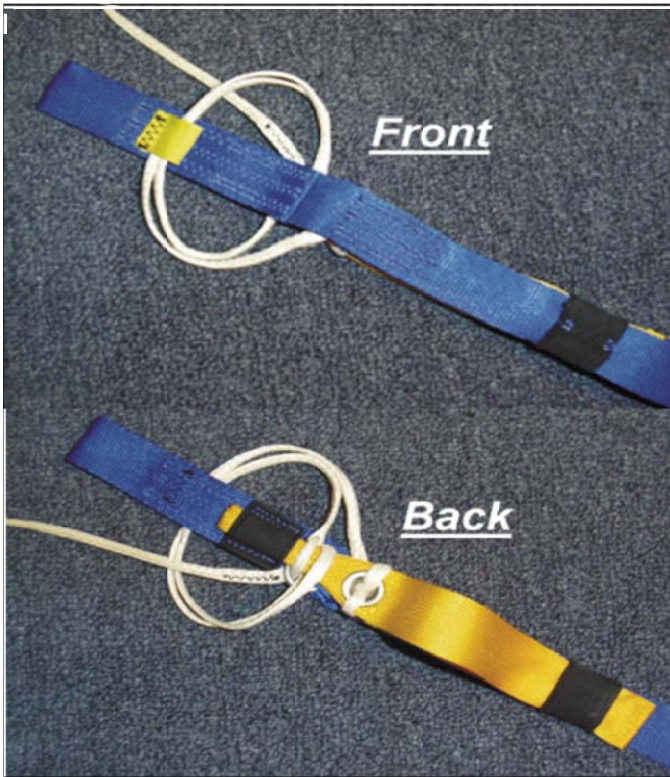
PACKING TYPE V

(Except Diapered Ram-Airs, see Type IV)

Assemble, inspect, and check line rotation according to the manufacturer's instructions and/or Chapter 9.3 of the Parachute Manual by Dan Poynter. The methods described in the following passage do not preclude the use of the method described in earlier editions of the SST Owners Manual.

SETTING BRAKES (Ram Air only):

- A. Pull the steering line through the guide ring mounted on the riser down to the eyelet provided in the steering line and insert nose of toggle.
- B. Fold the excess in half and insert through the Type 3 loop provided on the front side of the rear riser. Loop around nose of toggle and stow nose of toggle in its keeper. See illustration.



BAG PREP AND CANOPY FOLDING

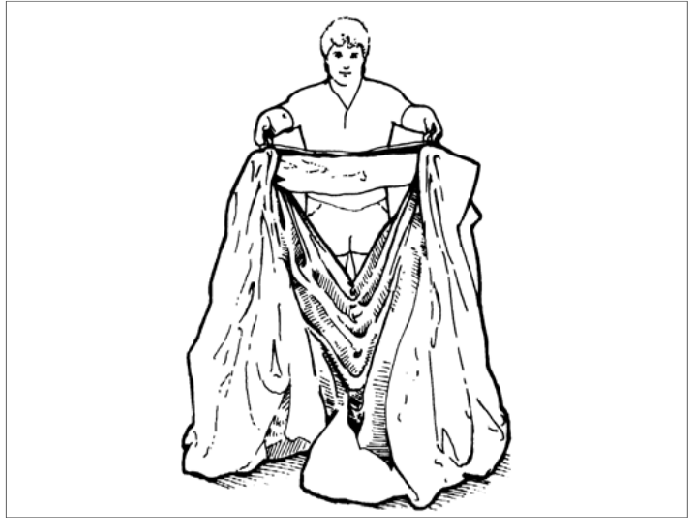
A. Set the bag near the top of the canopy with a he-



mostat through the bottom grommet, clamping the buffer tab in the “up position” to keep a clear channel for the bodkin and closing loop.

B. Separate the four line groups below the slider and walk the slider up toward the canopy while lift-

ing the canopy off the floor. Seat the slider grommets against the slider stops.



PRO PACKING:

C. Hold all the lines in one hand while standing, and organize the nose. It should now face the container. With “HANDS ON” trace and clear the perimeter of the canopy pulling all stabilizers toward the outside of the bundle.

NOTE: This process is similar to the flaking of a round canopy and must be done with care as panels not cleared could cause a malfunction.

D. Place the center tab of the tail under your thumb as shown



E. Sweep your forearm under the nose of the canopy and lay it on the floor. The bundle will spread out widely, but neatly.



F. Kneel at the top of the canopy facing the container. Draw the canopy toward you while at the same time narrowing the bundle. Keep tension on the lines at all times.



G. Pull the center tab of the tail to the top exposing

the air channel.



H. Dress the panels between the A/B, B/C and C/D lines. Fold these panels in half to narrow the pack job. Dress the tail, stacking all chord seams neatly



over the center line (air channel) and neatly lay all stabilizer and tail fabric to the outside. Repeat with other half of tail back to the center. Stow the slider in a rubber band if called for.

I. Return the center tail tab to the bottom center of the bundle. Where the stabilizers attach to the main



M. Optionally, weights can be used to control the fabric. Create a molar shape with exaggerated “ears”.



body of the canopy. “Cocoon” the canopy to the width of the bag.

NOTE: Care must be taken during the cocooning process so as not to disturb the air channel and lines of the canopy.

J. Splay each section of the nose outward from the



PLACING CANOPY INTO BAG:



center so it takes air quickly during deployment.

K. S- fold the canopy back over itself using your hands or packing paddles.

L. Fold the canopy so that it is the same length and thickness as the container .

A. Face away from the container and kneel on the packed canopy to keep it under control. Shape the

bundle to resemble the bag, prepare the bag and install the canopy into it.

Discussion: *The SST line of reserve containers are available with three different distances between the bottom grommet and the vertical partition. Obviously, on containers with only 1 inch available in this area, it is required to place the center cell of the canopy under the pilot chute. On containers with 2*



or 3 inches available in this area the rigger has the option, depending upon canopy bulk, to place the center cell of the canopy below the bottom grommet, as above. The decision, on this choice, is made based upon appearance as function is not affected.

B. Orient the bag so that the rubber bands are on the upper flap and the slotted flap comes up from the bottom.

C. Close the bottom flap of the bag by threading one of the rubber stow bands through the mating slot and place a line bight which reaches to the edge of the bag through the stow band. Repeat for the other side.

D. Align the rubber band flap and the slotted flap and stow the remainder of the lines in the rubber

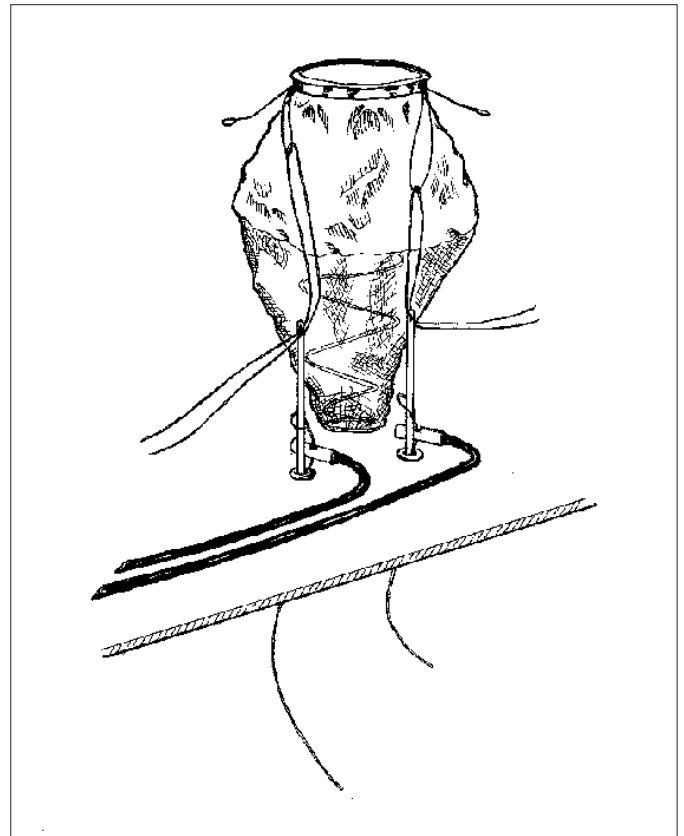


stow bands located beginning on the bag closing flap. The stows should be equal to the width of the bag.

Note: If your rig is equipped with an AAD the following procedure will make it easier to pack.

Racer/Cypres Closing Diagram

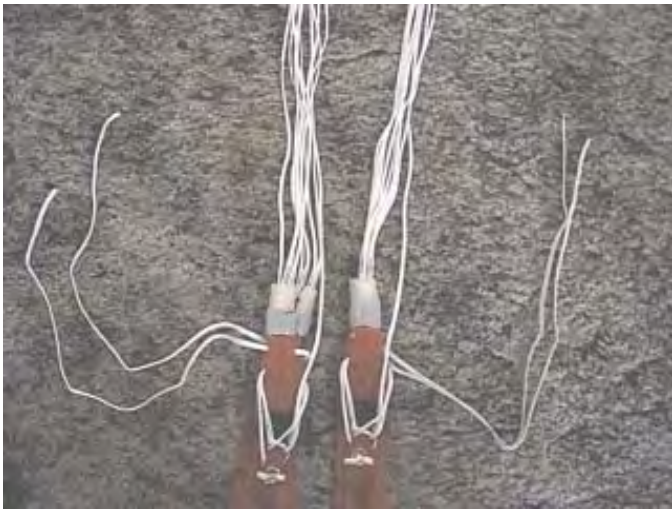
The Diagram below shows the routing of the AAD pull-up cords around the bodkin, through the cutter, and through the grommets in the backpad of the Racer. The deployment bag with canopy has been deliberately omitted for clarity. The bodkins



can be used in the normal fashion in this way. When the quick loops with their pull up cords are pulled through the pack, the bodkins are set aside. Pull on the Cypres pull up cords that have been “pre-loaded” through the cutters. This will pull the “regular” pull up cords back inside the reserve container, through the Cypres cutters, and outside again. Easy as Cake!

Prior to placing the bag into the container route the reserve risers into the tray and along the side of the container placing the connector links at the bottom corner of container. You may route Type IIa pull-up cords through the top of each riser to later facili-

tate pulling the risers down into the corners of the container. These pull up cords will be routed out of the bottom corners of the container.



- E. Close second bottom container flap over side flaps and bodkin. Spread side flaps open to the bottom bodkin
- F. Tuck yoke of bag under bag at top of container.
- G. Maintain a good division of the canopy



PLACING BAG INTO CONTAINER:

- A. Thread a "T" handle bodkin through the lower grommet in the reserve tray.
- B. Place the bag, on the bodkin allowing it to pass through the bag between the buffers held by the hemostat. Remove the hemostat and allow the bodkin to emerge through the grommet on the top surface of the bag.
- C. Tuck lower corners of bag into lower corners of container being careful not to disturb the line stows.



- D. Close the bottom inner container flap over the bodkin. Close the two bottom side flaps over the bodkin in either order.



throughout the pack job by pressing down into the center of the bag.

Thread another bodkin through the top grommet in the reserve pack tray and the top grommets of the bag. *TIP: Maintain the depression in the center of the bag between the two grommets with your knee*
STOWING BRIDLE:



1. Lay bridle down over side flap to establish length of fold.
2. Make another fold on top of the previous fold.
3. Tuck folds under side flap.
4. Smooth folds of bridle with packing paddle.

5. Make a 90 degree fold in bridle at top of container and route across to the opposite side.
6. Without twisting the bridle make another 90 degree fold and tuck it under side flap with packing paddle.
7. Repeat folding procedure from previous side and tuck folded bridle under this side flap while making another 90 degree fold back to the center of the container. Do not tuck bridle into lower corners of container.

GO TO PART THREE.

PART THREE: **CLOSING THE CONTAINER**



- A.** Place the top two grommets of the left (or right) reserve closing flap over the top bodkin. The bridle should exit the container between the bodkins. Repeat with the other side.



Thread the bodkin through the top closing flap.



C. Lengthen the Quick Loop on the pilot chute at least four inches on the bottom and three inches on the top (more or less depending on thickness of container). Thread a pull-up cord through each loop.

D. Tuck the remaining six inches of reserve pilot chute bridle into the depression formed between the two bodkins. Compress the pack job one more time, maintaining the division of the “ears” of the canopy.

E. Set the pilot chute on the folded bridle.

F. Thread the pull-up cords through the bodkins.

G. Compress the pilot chute to the container. Holding it compressed, flip the rig over onto its back.



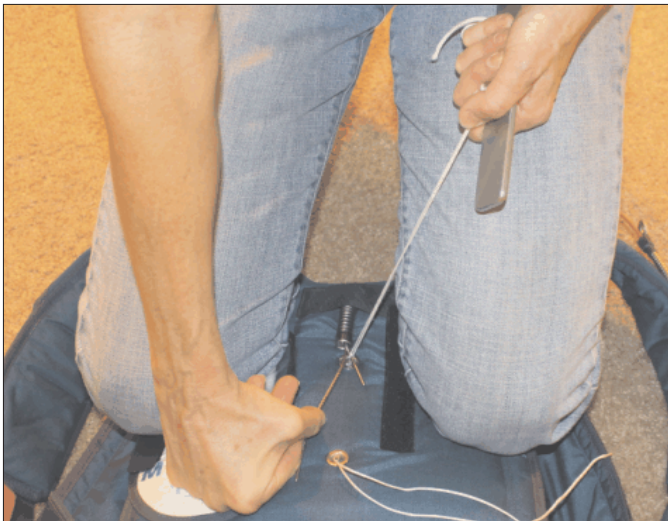
Keep control of the pilotchute by kneeling on either side of the grommets in the backpack.



Note: This is your opportunity to seat the pilot chute and adjust the pull force. The Racers' "Quick loop" system is designed to give the rigger the ability to do both of these things. Remember 22 lbs to move the pins is all that is required.



H. Slowly pull the bodkins with their respective pull-up cords through the rig. Make sure no pilot chute or reserve canopy fabric comes through with the pull-up cords.



I. Remove the bodkins and pull the closing loops the rest of the way through the grommets, starting with the top one, secure them with the ripcord pins.
J. Turn the container back over and un-tape or untie the running ends of the quick loop.
K. Push the pilot chute down into position and take the slack out of the quick loop by pulling on the opposite running end with a metal packing fid. You will have to repeat this step several times until all the slack is out.



The best way to shorten the lower loop is to pull on the running end of the Quick Loop while standing and squeezing the pilot chute between your legs.



C. Tuck all but 1/16" into area below hat so that it can be easily retrieved at the next inspection.

D. Insert packing paddle into opening provided in the bottom corner of the container and run it along the vertical partition shaping and smoothing as you go.

DRESSING THE CONTAINER

A. Use the metal packing fid to tuck the Type 4 (square weave) valance under the pilot chute hat.



B. Using hemostats or tweezers grip the running end of the Quick Loop about 1/4 inch back from edge of hat and push slack through hole in hat valance into area between top of pilot chute and bottom of hat.



E. Remove any slack in the reserve risers by pulling on the Type IIa pullup cords. Then remove the pull-up cords.

F. Using the packing fid, tuck in the bottom corners of the vertical partition. Use this opportunity to shape the sides of the container.



G. Form the edges of the container so that the pilotchute is effectively sitting in a concave depression.



Seal the container, fill out the data card, and log.

COUNT YOUR TOOLS!



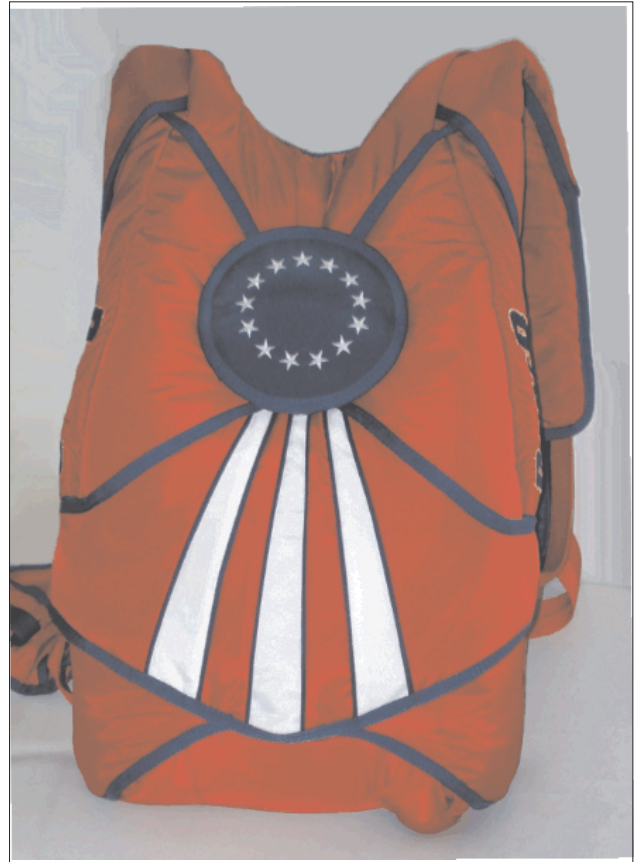
Racer 2K3



The flap closing sequence of the Racer 2K3 is:
1) bottom, 2) top, 3) side (either), 4) side.

Your Racer 2K3 can be configured for Pull-out or
Throw-out pilotchute or BOTH!

Classic Racer or Racer Elite



The flap closing sequence of the Classic Racer or
Racer Elite is 1) bottom, 2) side (either), 3) side,
4) top.

Your Classic Racer can be configured for Pull-out
or Throw-out pilotchute or BOTH!

MAIN PACKING INSTRUCTIONS

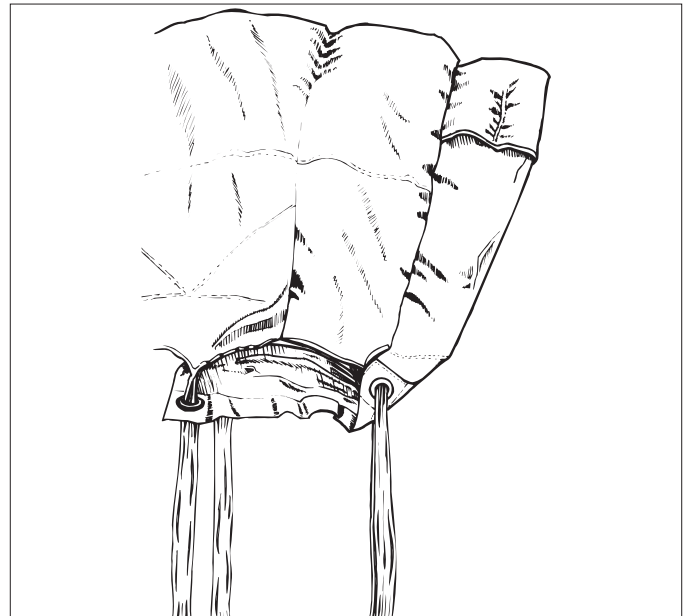
Refer to the manufacturer's instructions for laying out, inspecting and folding the canopy, and otherwise preparing it to put into the bag. If you can't find suitable instructions, consult your rigger or call PLI. **Note:** The square canopy packing instructions found in the Type V reserve canopy packing instructions of this manual may be used for all PLI canopies and at your discretion for other main canopies.

SETTING BRAKES

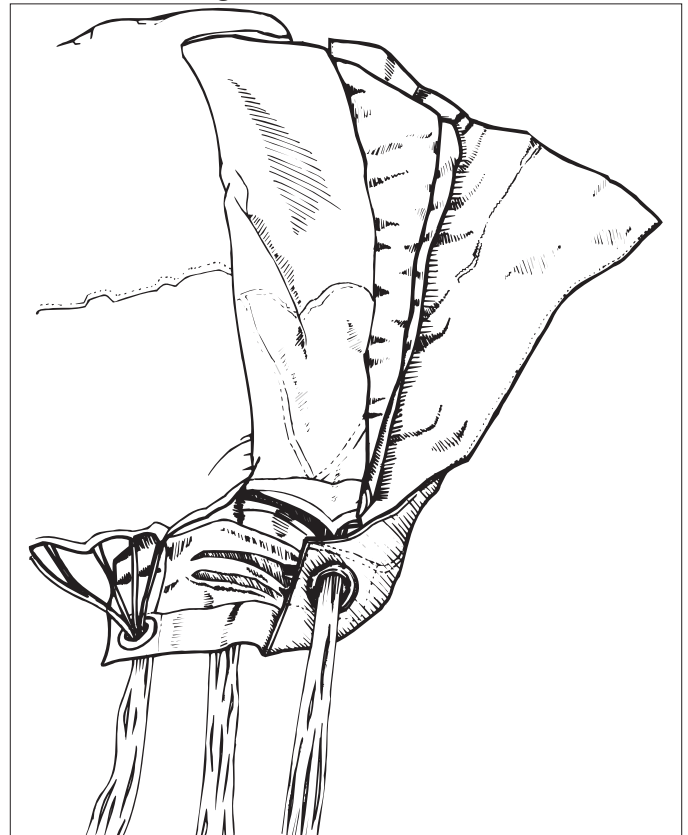
Refer to the brake setting instructions in the Type V Reserve packing instructions.

FLAG SLIDER INSTRUCTIONS

If your canopy is equipped with a flag slider, pull the slider up to the stops in the same manner you would for a non-flagged slider. Continue to pull the flag portion up towards the top of the canopy until the flag is straight and the grommets are against their stops. The pockets of the flag should be pointing out or exposed. Fold the canopy using the procedure you are most comfortable with, PRO or Side packing. Roll or fold the nose and make the A to B Fold if you are side packing. Next wrap the flag around the rolled nose as shown. Continue folding the canopy in the manner you are most comfortable.



NOTE: The purpose of the flag is to cover the nose during deployment and for the pockets on the flag to inflate and hold the flag in place covering the nose and slowing inflation.

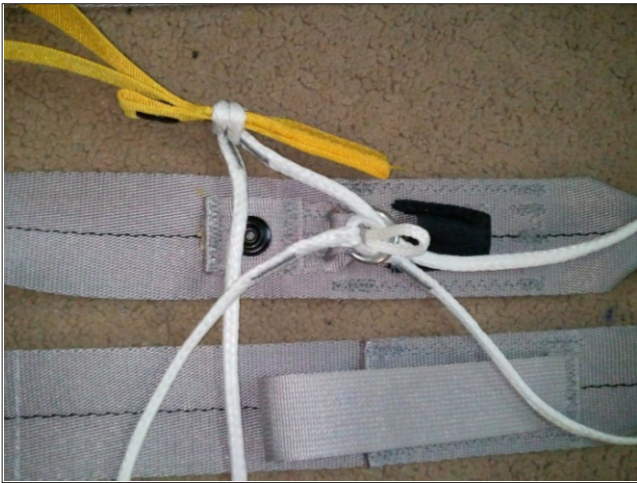


SETTING BRAKES USING INTERMEDIARY LOOP

The purpose of an intermediary loop on a riser is to reduce the amount of load on the brake eye and the toggle, when suspending heavy loads.

To set the brake, place the intermediary loop below the guide ring and pull the brake eye below the guide ring.

Put the intermediary loop through the brake eye.



Insert the nose of the toggle through the intermediary loop.

The excess brake line is routed either through the loop formed at the top of the riser or the Type 3 Tape loop provided on the front of the rear riser. If soft links are present do not route through the riser. Use the Type 3 Tape loop.



Loop the folded end of the brake line sideways around the toggle.



Insert the nose of the toggle into its keeper.





Remove the Pull-up cord. FAILURE TO REMOVE THE PULL-UP-CORD WILL PREVENT THE CONTAINER FROM OPENING AND RESULT IN A PILOT-CHUTE-IN-TOW MALFUNCTION.

FOLDING THE THROW-OUT PILOT CHUTE

A. Remove any twists from the bridle. Lay the pilot chute mesh-side-up and S-fold the bridle radially over the half of the pilot chute closest to the bridle's entry.

B. S-Fold the bridle radially over the half of the pilot chute closest to the bridle's entry.

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

D. Take the corners of the semi-circle and fold one over the other into thirds.

E. Fold the pie-shape into thirds again.

F. Fold the new thin pie shape in half to make it even thinner. Insert the pilotchute into the pouch with only the handle sticking out.

G. Tuck remaining bridle under the bridle protector flap and side flap.

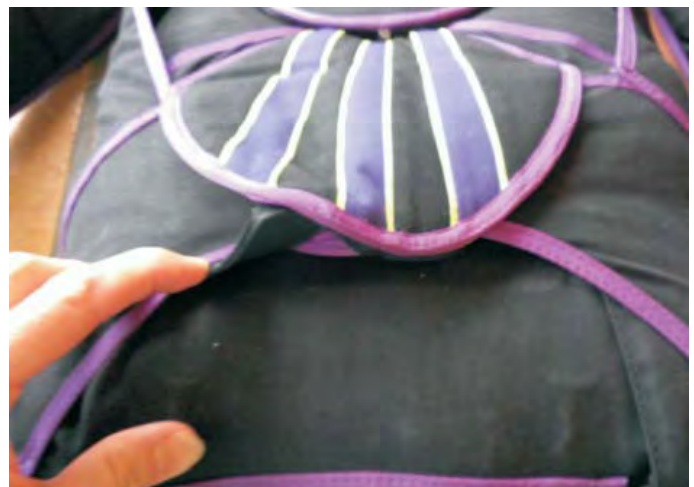
Note: See Tandem Drogue & Bridle section for tips on cocking Pull Out & Throw Out Pilot Chutes.

G. Flatten out the bundle, and make sure nothing but the handle of the pilot chute sticks out of the pouch.

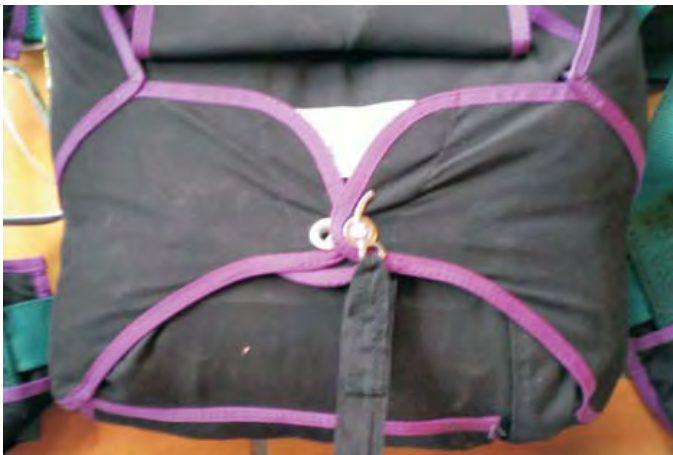


6. The bridle can be routed out from under the right or left side flaps..

7. Mate the small velcro strips on the pilot chute bridle just above the curved pin. **FAILURE TO MATE THE VELCRO STRIPS CAN RESULT IN A PILOT-CHUTE-IN-TOW MALFUNCTION.**



H. For 2K3, tuck the "Walrus Teeth" on the main pin protector flap under side and top flaps.



FOR PULL-OUT

A. Insert pull-up cord through closing loop. Pull closing loop through bottom flap grommet and pin .

B. Insert the pull-out handle in its keepers or under bridle protector flap mated to Velcro (in the case of alternate pillow style handle).



C. Route bridle and base of pilot chute under right side flap. Close right side flap followed by left side flap and pin again.



S-fold the pilot chute bridle across the top of the container, and lay (stuff) the pilot chute in the top center of the bag (THE DEPRESSION CREATED BY THE CLOSING LOOP MAKES AN EXCELLENT RECESS FOR STOWING THE PILOT CHUTE) with the base coming out of the right-hand bottom corner.

E. Close top flap.

F. Insert the closing pin on the lanyard through the closing loop so that it is oriented straight up and down.

G. Check to see that the velcro on the lanyard is mated to the velcro on the pilot chute retainer. This is to assure enough slack movement of the lanyard to be able to pull the pin without moving the pilot chute.



H. Stow any excess lanyard under the right side flap.



Remove the Pull-up cord. **FAILURE TO REMOVE THE PULL-UP-CORD WILL PREVENT THE CONTAINER FROM OPENING.**

For Classic Racer and Elite, tuck Walrus Teeth tabs under TOP FLAP ONLY.

Note: See Tandem Drogue & Bridle section for tips on collapsing and cocking Pull Out & Throw Out Pilot Chutes.

Always have your Racer checked by someone competent after you put it on.

FOR RIPCORD

A. Thread the ripcord through its housing, and place the handle in its pocket.

B. Thread the pull-up cord through the closing loop.

C. S-fold the pilot chute bridle neatly on top of the bag.

D. Compress the pilot chute and hold it under the center of the bottom flap grommet. Insert pin.

E. Thread the pull-up cord through the bottom, left, and right container flap grommets. Pull the closing loop through as you go, holding the pilot chute in place on the top center of the bag under the center of the bottom flap grommet.

F. Insert pin.

G. Thread pull-up cord through top grommet and close top flap.

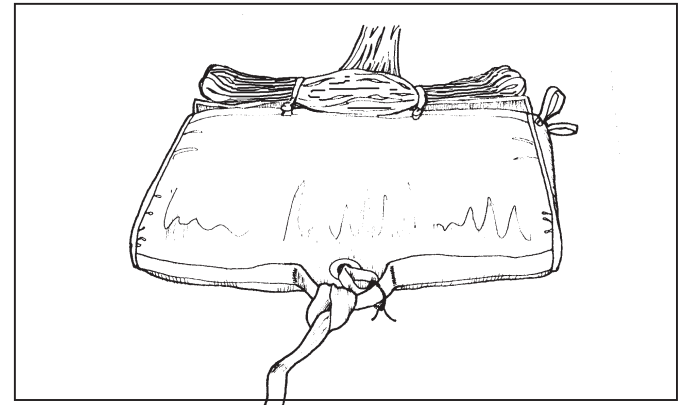
H. Remove pin and reinsert above top flap. Remove the pull-up cord. **FAILURE TO REMOVE THE PULL-UP-CORD WILL RESULT IN A TOTAL MALFUNCTION OF THE MAIN CONTAINER.**

NOTE: IT SHOULD REQUIRE NO MORE THAN 15 POUNDS TO EXTRACT THE PIN FROM THE LOOP AFTER THE CANOPY IS PACKED.

Always have your Racer checked by someone competent after you put it on.

FOR STATIC LINE

A. Attach the static line to the top of the deployment bag by looping it through itself around the type 8 bag bridle.



B. Thread the canopy's bridle intermediary loop (the 9/16 tubular loop from the assembly section) from the inside of the bag through the grommet in the top of the bag.

C. Tie it to the same webbing used in step "A", but not to the static line itself, with two turns of 1/4" Type 1 (80#) cotton break-cord.

NOTE: For conversion to pilot chute deployment simply unthread the static line. Then thread on the pilot chute bridle, but with the pilot chute bridle you MUST encompass the 9/16 tubular loop bridle intermediary where the break cord is. There is no need to remove the break cord as it will be needed the next time the rig is used for static line. To convert back to static line simply remove the pilot chute bridle and loop the static line onto the bag bridle of type 8 but DO NOT encompass the 9/16 tubular loop bridle intermediary as it MUST be allowed to separate when the break cord is activated.

D. Route the static line out the top of the container on the side opposite the door of the jump ship. (A right-side jump door usually calls for a left-side static line routing.)

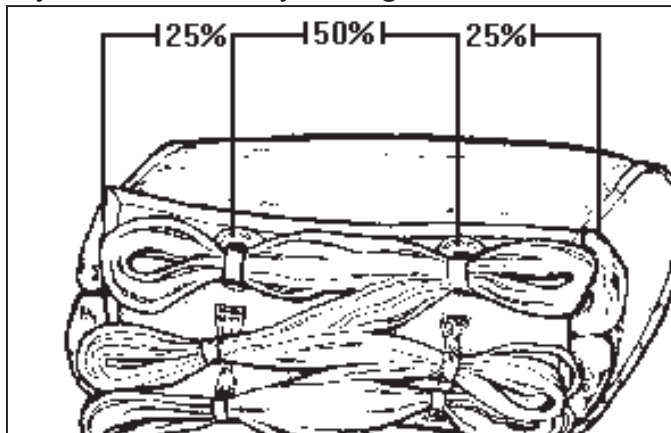
E. Close container as you would for a ripcord rig. Insert static line curved pin.

F. Remove the pull-up cord. **FAILURE TO REMOVE THE PULL-UP-CORD MAY RESULT IN A STUDENT-IN-TOW OR SEVERE CONTAINER DAMAGE.**

G. Stow the static line in the compartment provided in the elastic stow bands.

PLACING CANOPY INTO BAG

1. Dress the canopy slightly wider than the bag.
2. Stack the canopy into a bundle the height and width of the bag, and insert it into the bag. **MAKE SURE TO FILL THE CORNERS.**
3. Thread one of the two center locking elastic stow bands through its mating slot. Take a bight of canopy lines 25% of the bag width long, and wrap the stow band around it. Repeat with the other center locking stow.
4. Pull the pilot chute bridle or kill line of the collapsible pilotchute out of the top of the bag until the load-bearing ring on the top of the canopy seats against the grommet on the top of the bag. Clear out any extra fabric with your finger.



5. Stow the rest of the lines in bights 25% the width of the bag long into the stow bands on the bottom flap of the bag. Leave 8" to 15" of lines unstowed.

PLACING BAG INTO CONTAINER

1. Set the bag in the tray of the container with the lines facing toward the bottom of the rig.

2. Tuck the bights of the line stows under the boxing of each corner of the main container.



The flap closing sequence for the **Racer 2K3** is:

- 1) bottom, 2) top, 3) side, (either) 4) side
- The flap closing sequence for the **Classic Racer** or **Racer Elite** is: 1) bottom, 2) side, (either) 3) side, top.

FOR THROW-OUT

3. Thread the pull-up cord through the closing loop.
4. Close the bottom flap to the closing loop, thread the pull-up cord through the top flap and pull it closed to the bottom flap.
5. Next thread the pull-up cord through the side flap grommets and pull the closing loop through them and pin the loop.





NOTE: The first stow in the rubber band of the static line should be doubled or tripled to prevent the prop blast from prematurely blowing the pin out and allowing an open container.

DRESSING THE CONTAINER

A. After closing the top flap the rig is set up on its side. With your thumb hold the main risers against the bottom side of the over the shoulder part of the harness. Place the risers in the riser covers and mate the magnets. For the Elite, route the risers over the outside edge of the shoulder and begin closing the riser cover at the mid-flap working your way to the top of the shoulder.

B. Pull the side (Epaulet) flap over the top of the riser cover and mate the magnets.

Setting Brakes on the FireBolt Tandem

The outer steering line from the wingtips goes to the yellow (turn) toggle.
The inner steering line goes to the red (flare) toggle.
Prevent these from getting twisted for easier inspection and packing.

Pull the intermediary loop on the riser through (below) the guide ring.
Pull the outside steering line down below the guide ring. Insert the intermediary loop through the brake eye of the outside steering line.

The intermediary loop DOES NOT go through the ring on the red flare toggle. The outer steering line should travel freely through the ring on the red flare toggle.

Pull up on both steering lines to eliminate slack and to check that brakes have been set properly. Excess steering line can be stowed in the Velcro or by looping it through the top of the riser and around the nose of the toggle. The nose of the toggle is then inserted into the elastic keeper on the riser.

To release the brakes, pull down on the yellow toggles only OR on both red and yellow toggles. If the brakes are set properly it should not make any difference whether you pull one or both sets.

When the yellow toggles are pulled, only the wingtips are pulled down. When the red toggles are pulled the center and the tips of the tail are pulled down. Flare using both red and yellow toggles.



Tandem Drogue & Main Container Closing

Cock the drogue/main pilotchute if your system is so equipped. Pull the excess “kill line” up into the canopy. “S” fold the main canopy into the main deployment bag and insert the deployment bag into the main container as described and shown in the Main Packing Instructions.

Closing The Main Container

It is important to position the bag squarely into the container, filling out the bottom corners of the container tray. This will prevent the bag from “floating” out of the tray in the event of a premature main container opening.

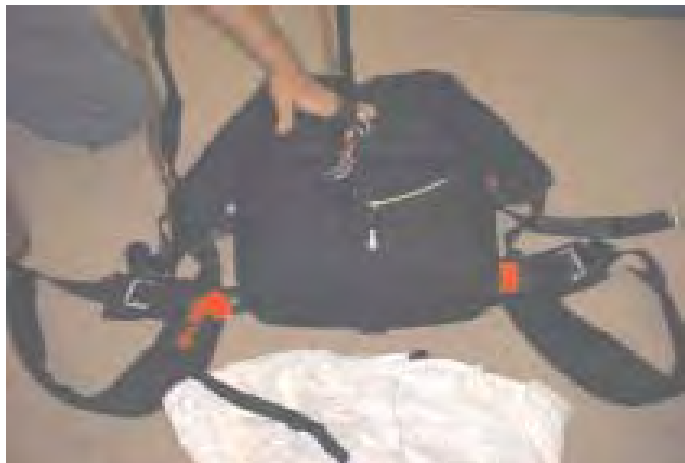
Note: The main container bottom flap is fitted with two closing grommets. The one located closest to the outside edge is assembled into a triangular shaped addition to the standard bottom closing flap. This grommet is used for the first level closing as follows.

First Level Closing

Insert your pull-up cord through the “Thru Loop” located in the tray of the container.



Bring the pull-up cord up and over the top of the main bag and through the grommet located in the top main flap.



Route the pull up cord through the first grommet in



the bottom main flap and close that flap to the top flap.

Close the side flaps over this same grommet.

Pin the closing loop with the flexible pin on the bridle. Mate the Velcro on the bridle to ensure proper pin movement during pin extraction and stow under the side flap.

Bridle Release Assembly

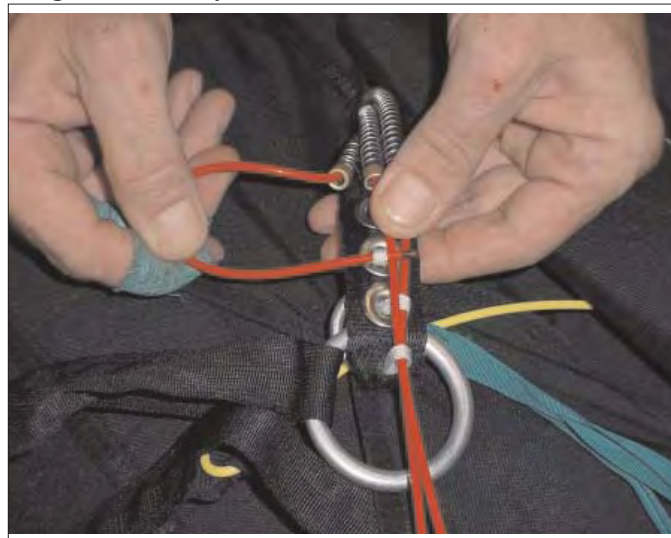
Note: There are three grommets on the bridle retainer support harness, or drogue riser. The top grommet accommodates the THIRD drogue release mechanism. The small ring with the attached loop threads through this top grommet, and is retained by the third cable of the cutaway handle. The small ring should be pre-assembled to the bridle retainer harness.



With the large ring facing the reserve container, and the bridle portion facing the main container, begin to assemble the 3-Ring drogue release. Insert the middle-size ring through the large ring, again facing the reserve container. Insert the small ring through the middle ring and fold it into position to receive the closing loop.

The double-ended loop should be pre-assembled to one of the two remaining drogue release cables (either the primary OR the secondary release cable). One end of the double-ended loop is inserted through one of the two open grommets on the bridle retainer harness or drogue riser.

Route the double-ended loop over or through the small ring, depending on which end you are starting from, and through the remaining grommet where it is pinned with the last drogue release cable. Each cable should go through ONE loop of the 3-Ring release system, then all three cables can be routed through the Guide Loop at the top of the drogue riser. The Guide Loop is not a functional part of the drogue release system.



The drogue release cable ends should be inserted into the channel of the bridle, above the large ring.



Part of the excess bridle length, between the first main pin and to a point about eight inches from the base of the large ring, must be stowed in the hesitator loop rubber band provided on the top main sub-flap. Double the rubber band over this portion of the bridle. Some slack (about eight inches) must exist between the base of the 3-Ring system and the “S” folded portion of the bridle, to allow the bridle to “sit up” out of the container during drogue fall. This step is critical to prevent accidental activation of the main pin during droguefall.



Push entire assembly down toward the backpad as far as it will go comfortably. “S” fold the remaining bridle from side to side on top of the compartment that you have just pushed the 3-Ring assembly into. Leave the second (curved) pin out, to lock the mid-flap.

Second Level Closing

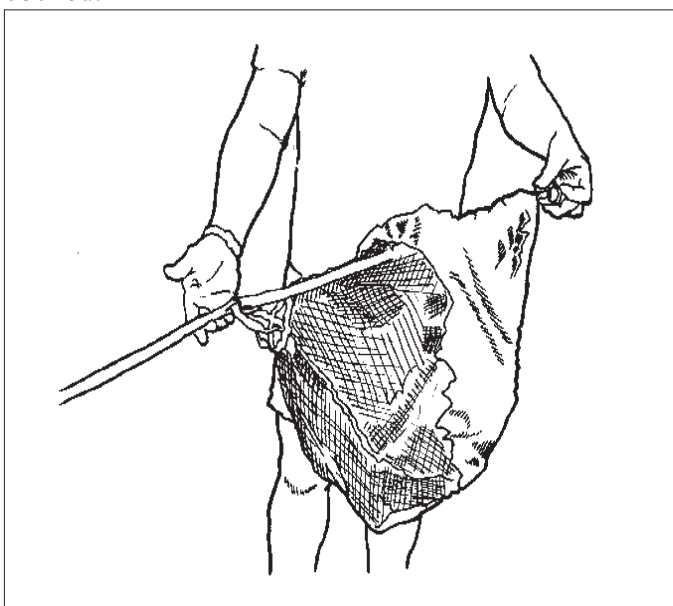
Close the midflap as you would a standard Racer with throw-out pilotchute, and pin it with the curved pin.



Tuck the bridle under the right side flap edge and to the pouch provided.



Double check the drogue centerline to verify it has been “cocked,” if so equipped. The apex of the pilotchute should be about even with the skirt when cocked.



The easiest way to cock the PLI collapsible pull out or throw out pilotchute

Attaching the PC/bridle/bag to the canopy:

1. Collapse the PC. Route the kill line through the attachment ring or loop on the top of the canopy. Open the “noose” formed in the end of the kill line by the long finger trap, and thread the PC/bridle/bag

through it. Close the noose, and draw it up tight against the ring/loop.

2. Route the limiting line through the ring/loop in the same manner, passing the PC/bridle/bag through it's loop, and tighten it against the ring/loop.

Do not attempt to put both the kill line and limiting line onto the ring/loop simultaneously, or to put the limiting line on first. This can result in the kill line cutting through the limiting line.

Packing:

1. Leave the PC collapsed. Remove any twists between the bag and the canopy. Stack the canopy in the normal manner, and place it into the bag.

2. Pull the kill line out of the gap where the bridle is sewn to the bag. Simultaneously, reach inside the bag with the other hand, making sure the kill line is pulled out all the way, and no canopy fabric is caught between the attachment ring and the #0 grommet in the bag. Lay the limiting line in a loop over the top of the canopy inside the bag.

3. Continue packing in the normal manner, closing the bag with the locking stows, and stowing the rest of the lines.

4. Place the bag into the container, then place a foot on the bag, while grasping the hackey (or the top of the PC in the case of a pull out) with one hand and the bridle with the other. Pull on the hackey, drawing the kill line into the bridle. The PC is now cocked, and can be checked by giving it a sharp tug through the air, watching it catch air.

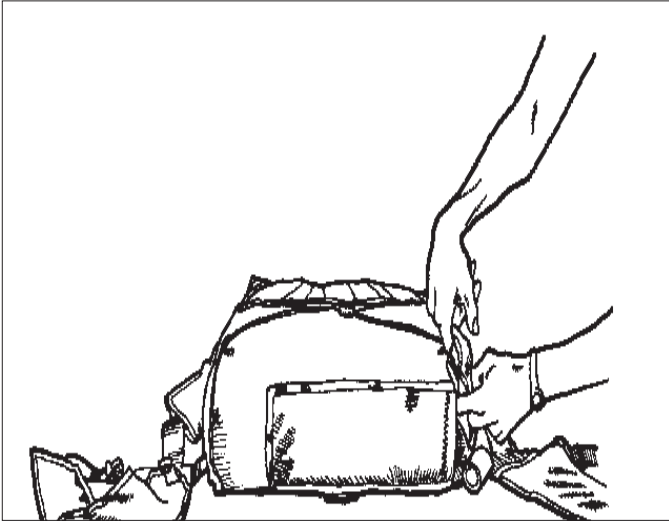
5. Continue closing the rig in the normal manner.

For Tandem:

Proceed as above, except rather than cocking the drogue by pulling on the handle on top, grasp the kill line where it exits the top of the bridle, and pull all excess kill line up and out of the bridle, and into the drogue canopy. This excess kill line is there to compensate for bridle stretch during drogue fall, and must be pulled into the drogue, so that when the drogue is deployed, it is free to be drawn into the stretched portion of the bridle, between the drogue and the large ring on the bridle.

Note: It is necessary to pull the excess “Kill Line” up into the drogue canopy. This will prevent premature failure of the “Kill Line”

Fold the drogue/pilotchute into 1/8 pie sections, and insert it into the spandex pouch on the bottom of the container. Dress the bridle to assure that none is exposed.



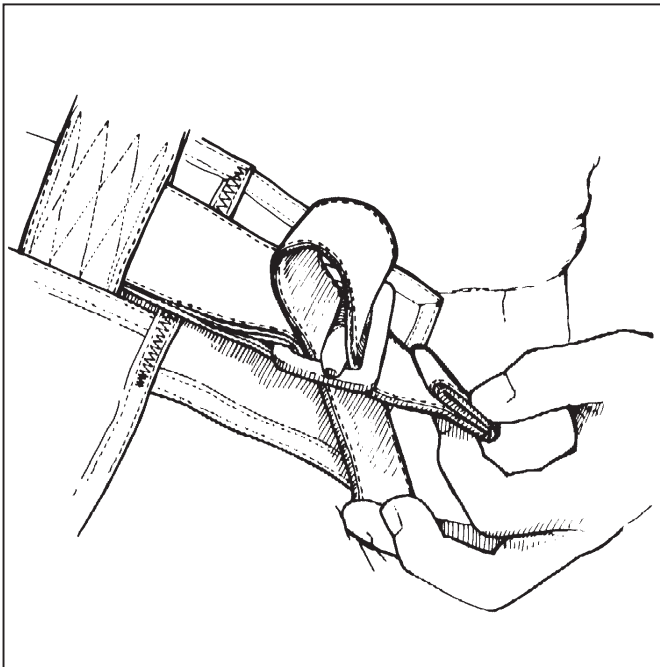
DONNING THE RACER

Before donning your Racer you should check the reserve ripcord pins, make sure that the seal is intact, the pins are properly seated and there are no foreign materials in the housing.

1. Grasp the Racer by the harness at one of the canopy release points, and put it on your back like a coat. Check for twists in the main lift webs (front straps) and leg straps.
2. Hook up the leg straps:

WITH THREAD THROUGH LEG STRAPS

- A. Check the leg strap for twists as you pass it under your leg.
- B. Bring it through the friction adapter from the side against your leg and over the sliding bar.
- C. Continue over the sliding bar and back through the friction adapter.



MIS-THREADING THE LEG STRAP THROUGH THE FRICTION ADAPTER MAY CAUSE YOU TO FALL OUT THE BOTTOM OF THE HARNESS.

- D. Repeat with the other leg strap. Tighten the free ends until snug, and stow them away.

WITH B-12 LEG STRAP SNAPS

- A. Check the leg strap for twists as you pass it under your leg.
- B. Snap the hook onto the V-ring. It should “clink” when it closes the snap.
- C. Repeat with the other leg strap. Tighten the free ends until snug, and stow them away.

3. Locate the chest strap, and thread it like the leg straps.

MIS-THREADING THE CHEST STRAP MIGHT CAUSE YOU TO FALL FROM THE HARNESS.

Pull the free end until the main lift webs are parallel. Place the free end in the elastic keeper.

Should your system be equipped with adjustable horizontals, bend at waist, setting rig so it is comfortable on your back. Tighten horizontal free ends at container base until it fits snugly. Stow free ends under elastic keepers. Owners of pull-out systems should take special note of proper stowing, as an unstowed horizontal might be mistaken for a pull-out handle. Repeat adjustment until comfortable fit is obtained.

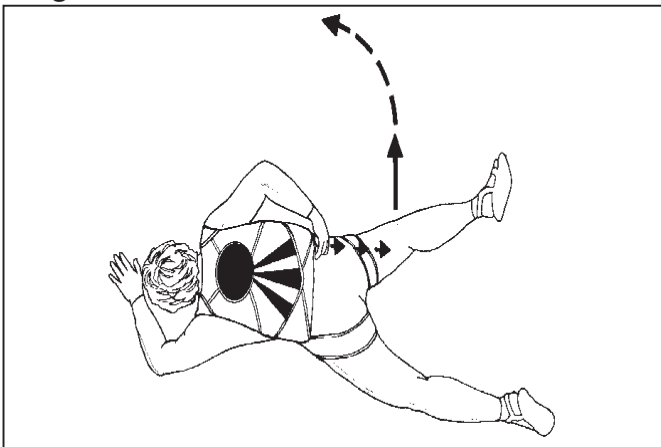
FAMILIARIZATION

Now that you have learned how your rig works (OPERATIONAL CHARACTERISTICS), the environment wherein it works best (OPERATIONAL LIMITATIONS), how to assemble and pack it (ASSEMBLY, RESERVE PACKING INSTRUCTIONS, MAIN PACKING INSTRUCTIONS), and how to put it on (DONNING THE) it is time to learn how to use it. This manual is not intended to provide a curriculum on Skydiving, you *MUST* have completed an approved (by your national Aero club) course before you even think about taking to the air by yourself. But now that your new rig is packed and you have it on let's get familiar with it. There are three handles that you may have occasion to pull. They are the main, the cut-away and the reserve. Let's talk about the main first.

MAIN ACTIVATION

PULL-OUT

To learn about the activation of the pull-out, lay on your chest in a skydiving arch, locate the pull-out handle on the bottom right corner of the rig with your right hand while your left hand compensates for level fall. Don't bother looking. You can't see it and you will need to be looking at traffic and altitude while you are actually skydiving. Insert your two center fingers between the two retainers of the handle and remove the handle. While gripping the handle thrust downward by extending your arm straight down along the side of your body.



This action will open the pack and allow you to put the pilot chute into the air stream to the right of your head while you simultaneously look up over your head to watch the deployment. **KEEP YOUR SHOULDERS LEVEL TO THE GROUND TO PROVIDE FOR EVEN LINE DEPLOYMENT.**

This procedure should be practiced on the ground until you are comfortable and automatic with it. Additionally, with a friend to hold the pull-out handle, practice losing the handle and relocating it while laying on your chest. Have the friend hold the handle so as to simulate where it might be trailing behind you out of its retainers. It could be anywhere so have the friend move it through its complete range of travel while you locate it. The procedure for locating the handle is simple. With your left hand on the reserve ripcord and your eyes on the ground, reach behind you to the center of the main container and trace the lanyard from the closing pin to the handle, grip it and pull as described above.

THROW-OUT

To learn the use of a throw-out lay on your chest in a skydiving arch with the rig on. Locate the plastic cylindrical handle at the top of the right leg pad with your right hand while your left hand compensates for level fall. Don't bother to look for the handle. You probably can't see it and you should be looking at traffic and altitude in an actual skydive. Grip the handle and extract the pilot chute from its pouch and toss it vigorously into the air stream beside your body. Then look up over your head to watch the deployment. As you look up your body will come to vertical placing you in a sitting position for the opening. You must not allow the pilot chute to be released in front of your arm as that will wrap the bridle around your arm. Make sure that the pilot chute is released between your body and your arm. To assure that this occurs release the pilot chute before you look up. **KEEP YOUR SHOULDERS LEVEL TO THE GROUND TO PROVIDE FOR EVEN LINE DEPLOYMENT.**

RIPCORD

Lay on your chest on a flat surface and assume a skydiving arch. Without breaking the arch look down at the handle and insert the thumb of your right hand into the loop of the handle while compensating for level fall with your left hand. Thrust your arm forward and down then look up over your head to observe the deployment. Be sure to hold on to the handle as they are expensive and could hurt someone on the ground if you drop it.

CUTAWAY ACTIVATION

This familiarization should take place in a suspended harness. Locate the red pillow type handle on your right main lift web below your chest strap. Peel the handle off the velcro and thrust the handle down and away.

Students using the “Stevens System” should keep their head forward and down to prevent the cross connector from hitting their head, additionally they should select helmets that do not have a “snagable” edge which might catch a suspension line, riser, or cross connector.

You might want to locate and grip your reserve handle before activating the cutaway but don't take it out of the pocket until your main has released.

Students should be additionally trained to release both sides of the cross connector, from the main risers, upon confirmation of a fully inflated and functioning canopy over their head. That canopy will hopefully be the main. However, if an AAD misfire occurred at precisely the wrong moment or the re-

serve were activated in any manner at that critical time, it could be the reserve canopy. By deactivating the cross connector, the main, which would be inflated and trailing behind the reserve, could be cutaway safely. This deactivation procedure would also prepare the main for cutaway, during ground drag, after landing.

RESERVE ACTIVATION

In a skydiving arch, with your chest on a flat surface locate the metal handle on your left main lift web below the chest strap. Insert your left thumb into the bottom curve of the handle while simultaneously gripping the vertical portion of the handle with your right hand. With both hands thrust down and away to the limit of your reach. You might want to leave your elbows extended as much as possible during the gripping phase, while looking up to keep from going head down. Experienced jumpers can bring their knees up for some additional compensation but newer jumpers must be cautious with this maneuver, it can cause a back loop. Pulling the reserve ripcord should be additionally practiced while in the suspended harness. A good time to practice both the cutaway and reserve pull is at the end of the certification cycle. The reserve must be inspected every 180 days, and that is a good time to experience how much effort is required to operate the handles of your Racer.

Racer™ PERMANENT HISTORY RECORD

Container Serial #	Date of Mfg.	Rsv. Canopy Serial #	Date of MFG.
Main Canopy Serial #	Date of Mfg.	Main Color	Rsv. Color

Repair Record and Misc. Data

This page provides for you a place to keep a permanent history record of your container and canopy. You as the owner of this parachute system should provide this manual to your rigger at the inspection/repack interval and they should fill out this page in addition to the Packing Data Card in order to maintain a permanent history record of your system. If your Packing Data Card is ever lost this page will act as a backup document.

Inspection and Repack Record				
Date	Location	Rigger	Certificate No.	Remarks