



# QUICK RESERVE



Performance Variable e.K.  
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## Quick Reserve Description

Type	Quick Reserve Canopy – Rectangular
Number of Cells	7
Production Technique	I-Beam Chord Wise
Manufacturer (LBA.G.0139 / JAR-21 G)	Performance Variable, Germany
Suspension Line Links	Stainless-steel Mini Link or Soft Links
Canopy Material	Nylon 0-3cfm Fabric (F-111)
Suspension Lines	Spectra/Micro & Dacron Lines
TSO by DAeC 1995 & LBA 2001 as NAA	FAA TSO & JTTSO – C23d # LBA.0.40.014/05 by NAA

### Deployment System

This parachute has been tested using a free bag deployment system. No other deployment method has been tested, nor is any other method authorized by the manufacturer.

## Technical Specifications

Type	Size	Span	Chord	Volume	Weight	Exit Weight	Lines Micro & Spectra
	ft <sup>2</sup>	ft.	ft.	in <sup>3</sup>	lbs.	lbs.	
Quick 113	113	15.52	7.28	190	4.3	115	725
Quick 135	135	17.38	7.74	224	4.7	136	725
Quick 150	150	18.37	8.14	249	5.3	154	725
Quick 180	180	20.14	8.96	338	6.2	181	725
Quick 220	220	22.08	9.81	364	7.3	220	725
Quick 250	250	23.81	10.50	415	7.5	253	725



U.S. Department  
of Transportation  
**Federal Aviation  
Administration**

**AIRCRAFT CERTIFICATION STAFF**  
c/o American Embassy  
27, Boulevard du Regent  
B-1000 Brussels, Belgium

March 18, 2002

In reply refer to: GE/vk/03/18/02: 0025-02

Mr. Steffen Engel  
Luftfahrt-Bundesamt  
Postfach 3054  
D-38020 Braunschweig  
Germany

Luftfahrt-Bundesamt Eingang
25. MRZ. 2002
M4

Dear Mr. Engel:

This letter refers to Performance Variable e.K. letter dated February 5, 2002, by which they made application for Technical Standard Order (TSO) design approval. This letter also acknowledges receipt of Performance Variable e.K. Statement of Conformance dated February 5, 2002 and of LBA letter Ref. M425-40.014/05supp150202, dated February 15, 2002, certifying in accordance with FAR 21.617, that the personal parachutes listed below comply with the requirements of TSO C23d, as designated in FAR 21.305(b).

Based on the LBA certification and receipt of the required data, we hereby accept Performance Variable e.K., TSO design approval to include the personal parachutes listed below for manufacture at Performance Variable e.K., located at Flugplatz Düren, D-66798 Wallerfangen, Germany.

<u>Type</u>	<u>Description</u>
P/N Omega (XXS,XS,S,M,L,XL)	Personal parachutes
P/N Quick (120, 135, 150, 180, 220)	

This letter of TSO design approval, together with the LBA Certificate of Airworthiness for Export, will authorize Performance Variable e.K., to identify the personal parachutes with the TSO marking requirements described in FAR 21.607(d) and in TSO C23d and is issued in accordance with FAR 21.617, governing issuance of TSO design approval for import appliances. Each item must be accompanied by a Certificate of Airworthiness for Export issued by the LBA or a duly authorized designee/organization (FAR 21.502(a)).

Any deviations from the established design approval should be accomplished in accordance with FAR 21.609. The request for approval to deviate, together with all pertinent data, should be submitted to the Federal Aviation Administration (FAA) through the LBA and should contain information to show that the particular deviation is compensated for by factors or design features providing an equivalent level of safety.



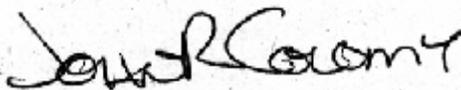
The following statement must be furnished with each manufactured unit: "The conditions and tests required for TSO approval of this article are minimum performance standards. It is the responsibility of those desiring to install this article either on or within a specific type or class of aircraft to determine that the aircraft installation conditions are within the TSO standards. If not within the TSO standards, the article may be installed only if further evaluation by the applicant documents an acceptable installation and is approved by the Administrator."

A letter of TSO design approval issued under FAR 21.617 is not transferable and is effective until surrendered, withdrawn or otherwise terminated by the FAA (FAR 21.621).

The FAA may, upon notice, withdraw the letter of TSO design approval of any manufacturer who identifies with a TSO marking any article not meeting the performance standards of the applicable TSO (FAR 21.619). The LBA airworthiness certification is essential to the determination that the item meets the performance standards of the applicable TSO.

If there are any questions, please feel free to have your staff contact Gregory A. Edwards, (Tel.: 322.508.2714).

Sincerely,



John R. Colomy  
Manager, Aircraft Certification Staff  
FAA-Brussels

Reference: GE/vk/03/18/02: 0025-02



**BUNDESREPUBLIK DEUTSCHLAND**  
**LUFTFAHRT-BUNDESAMT**



a member of

**JOINT AVIATION AUTHORITIES**

**JOINT TECHNICAL STANDARD ORDER (JTSO) AUTHORISATION**

Pursuant to the National Regulations for the time being in force and subject to the conditions specified below, the National Aviation Authority Luftfahrt-Bundesamt in accordance with the JAA Procedures for JTSO Authorisation hereby grants

***Performance Variable***

Flugplatz Düren

D-44798 Wallerfangen-Düren  
LBA.G.0139

a JTSO AUTHORISATION  
No. LBA.O.40.014/05 JTSO

according to JAR-21, Subpart O and JAR-TSO,  
JTSO-C23d

for

Personnel Parachute Omega ( ) / Quick ( )

DDP Omega/Quick Rev. 0 or subsequent revisions

**CONDITIONS:**

1. The JTSO Authorisation Holder is only authorised to identify an article with this JTSO marking whilst remaining in compliance with the conditions for the issue of this Authorisation.
2. This AUTHORISATION shall remain valid until surrendered, withdrawn or otherwise terminated.

Date of issue: 03/15/2001

Signed: 

Gömermann





BUNDESREPUBLIK DEUTSCHLAND  
LUFTFAHRT-BUNDESAMT



Mitglied der  
a member of the

JOINT AVIATION AUTHORITIES

**GENEHMIGUNGSURKUNDE**  
APPROVAL CERTIFICATE

**Genehmigungsnummer: LBA.G.0139**

Unter Berücksichtigung der zur Zeit gültigen Rechtsvorschriften und abhängig von der Einhaltung der nachfolgend aufgeführten Bedingungen genehmigt das Luftfahrt-Bundesamt den Betrieb  
Pursuant to the National Regulations for the time being in force and subject to the conditions specified below, the Luftfahrt-Bundesamt hereby certifies

**Performance Variable e. K.**  
**Flugplatz Saarlouis Düren**  
**66798 Wallerfangen**

als **Herstellungsbetrieb gemäß JAR-21 Abschnitt G.**  
as a Production Organisation according to JAR-21 Subpart G.

**Bedingungen:**  
Conditions:

1. Diese Genehmigung ist beschränkt auf den beistehend festgelegten Genehmigungsumfang, und  
This approval is limited to that specified in the enclosed Terms of Approval, and
2. Diese Genehmigung erfordert die Einhaltung der in dem genehmigten Herstellungsbetriebshandbuch festgelegten Verfahren, und  
This approval requires compliance with the procedures specified in the Production Organisation Exposition, and
3. Diese Genehmigung ist gültig, solange der genehmigte Herstellungsbetrieb die Vorschriften der JAR-21 Abschnitt G erfüllt.  
This approval is valid whilst the approved production organisation remains in compliance with JAR-21 Subpart G.
4. Abhängig von der Erfüllung der vorstehenden Bedingungen bleibt diese Genehmigung bis zu dem im Genehmigungsumfang festgelegten Ablaufdatum gültig, es sei denn, sie wird vorzeitig zurückgegeben, einseitig außer Kraft gesetzt oder widerrufen bzw. zurückgenommen.  
Subject to compliance with the foregoing conditions, this approval shall remain valid until the termination date specified in the Terms of Approval unless the approval has previously been surrendered, suspended or revoked.

Braunschweig, den 15.03.2001  
Place, Date

Im Auftrag  
pp

Unterschrift  
Signature

(Samek)



## Statement of Compliance

The policies contained herein comply with the JAR Aviation Part 21.

## Disclaimer - No Warranty

Because of the unavoidable danger associated with the use of this parachute, the manufacturer makes no warranty, either express or implied. It is sold with all faults and without any warranty of fitness for any purpose.

The manufacturer also disclaims any liability in tort for damages, direct or consequential, including personal injuries resulting from a defect in design, material, workmanship or manufacturing whether caused by negligence on the part of the manufacturer or otherwise.

By using this parachute assembly, or allowing it to be used by others, the user waives any liability of the manufacturer for personal injuries or other damages arising from such use.

If the buyer declines to waive liability on the part of the manufacturer, buyer may obtain a full refund of the purchase price by returning the parachute before it is used to the manufacturer within 15 days from the date of the original purchase with a letter stating why it was returned.

## WARNING!

Each time you use this parachute you risk serious bodily injury or death. You can substantially reduce this risk by: **(1)** assuring every component of the parachute system has been assembled and packed in strict compliance with the manufacturer's instructions, **(2)** by obtaining proper instruction in the use of the rest of your equipment, and **(3)** by operating each component of the system in strict compliance with the owner's manual and safe parachuting practices.

However, parachute systems sometimes fail to operate properly—even when properly assembled, packed and operated—so you risk serious injury and death each time you use the system.



## About this Manual

It is beyond the scope of this manual to teach you how to deploy, fly, land or maintain this parachute. The U.S. Parachute Association publishes recommended procedures on learning to jump and using skydiving equipment. We urge you to learn and follow these procedures. We also recommend you obtain instruction from a competent USPA-rated instructor before using this parachute for the first time

Other countries have similar organizations. If you are not in the USA, get instructions from a competent instructor who is rated by your country's organization.

Jumping this parachute without first receiving thorough and personal instruction increases the risk of serious injury or death.

Sport parachuting technology and procedures continue to develop rapidly. Although reasonable care has been made in the preparation of this manual, PV cautions that it may contain information that may be incorrect or behind current, *state-of-the-art* parachute use.

For these reasons, we urge you to work closely with qualified experts (**riggers and instructors**) to help you inspect, assemble, pack, use and maintain this parachute. We also welcome your comments, positive and negative, about our products.

## Read Before Assembly or Use

Since parachutes are manufactured and inspected by people, **there is always a possibility this parachute contains defects as a result of human error**. Therefore, the entire parachute system—main and reserve canopies, harness, container, and other components—must be thoroughly inspected before its first use and before each subsequent use.

Parachutes get weaker over time for a number of reasons. They receive wear during packing, deployment and landing. Exposure to many agents, including sunlight, heat and household chemicals, significantly weakens parachutes. The damage may or may not be obvious.

To help minimize the risk of parachute failure and possible serious injury or death, the entire parachute system should be thoroughly inspected at least every 120 days or 50 jumps, whichever comes first. It should be immediately inspected if at any time it is exposed to a degrading element or unusually hard opening or any time damage may be suspected.

Date: 01.07.2004 Revision: 0	Manual QUICK US 	 PERFORMANCE VARIABLE <small>German Flight Technology</small>
Page: 10		

Remember that some chemicals will continue to degrade the parachute long after initial exposure. Regular and thorough inspections are necessary to insure the structural integrity, reliability and flight characteristics of the system are maintained.

Always know the entire life history of every part of your parachute system. That way you will know no part has been exposed to an element that may seriously weaken or damage it.

## *Picking the Right Canopy*

It is important for your safety and enjoyment that you match your canopy with your ability and weight. PV canopies are built in several models that span a wide range of canopy surface area. Any canopy's descent rate and forward speed increases as the weight it is carrying—the so-called exit weight—increases. The canopy also becomes more responsive as forward speed increases. It also reacts more radically when it is stalled or turned.

Because of these aerodynamic facts, it is unsafe to put too much weight under any particular canopy. Safe and comfortable landings will be difficult to obtain, even for experienced jumpers under ideal conditions. Less experienced jumpers will have even a harder time and be at greater risk.

Determining the **wing loading** of the parachute you intend to jump or buy is a good guide to match your weight to a particular canopy.

Wing loading is easily calculated by dividing the total **exit weight** in pounds by the surface area of the canopy in square feet. Total exit weight is the weight of the jumper plus all his clothing and gear, including the main parachute itself.

The surface area of PV canopies is printed on the data panel, on the center cell rib or on the center cell top surface near the tail. (Be sure to actually check the data panel—canopies of different sizes may look the same.)

A typical ready-to-jump sport piggyback (rig and both canopies) weighs 20 to 30 lbs. Add this, plus the weight of your jumpsuit, clothing and accessories to your body weight to get the total suspended weight.

For example, a jumper who weighs 165 lbs. wearing his jumpsuit and who jumps a packed rig that weighs 25 lbs. would have an exit weight of 190 lbs.



Here is an example of how to calculate the wing loading of a **210 ft<sup>2</sup>** canopy and the jumper used in the example before:

$$190 \text{ lbs.} : 210 \text{ ft}^2 = 0.9 \text{ lbs} / \text{ft}^2$$

**Calculate the wing loading now for the Quick canopy you intend to jump.**

**If this figure** is **below 0.7 lbs/ft<sup>2</sup>**, the parachute will be relatively docile and easy to lead. It will also have reduced penetration into the wind and **reduced inflation pressure** in the entire canopy. The profile will not be as rigid as it should be. A figure **below 0.7 lbs/ft<sup>2</sup>** is as **dangerous** as a figure **above 1.2 lbs/ft<sup>2</sup>!**

**If this figure** is **between 0.7 and 1.0 lbs/ft<sup>2</sup>**, the canopy will turn fast and have a higher air-speed. It will require skill to land well in many weather conditions or at higher altitudes. Be sure your skill level is up to the demands of these situations. The inflation pressure is increased, and the canopy profile is more rigid!

**If this figure** is **between 1.0 and 1.2 lbs/ft<sup>2</sup>**, the canopy will fly very fast, turn very fast and have a very high descent rate. It will be very difficult to land in confined areas. A high skill level will be required to get an acceptable landing, even under ideal conditions. These 7-cell reserves should not be used with wing loading in excess of 1.0 lbs/ft<sup>2</sup>, unless the jumper has a great deal of experience (300 jumps minimum) with similar main parachutes at this wing loading. He/she must realize the risk involved in these circumstances.

**If the wing loading** is **greater than 1.2 lbs/ft<sup>2</sup>**, you are exposing yourself to a **dangerous situation**. Turn rates, forward speed and rate of descent will all be very high. Control range may be very short with stalls happening very abruptly with little warning. Normal landing techniques may not work. Extra airspeed on final approach may be required to get enough flare to stop your rate of descent. A front riser approach or hook turn may be required, either of which are **very dangerous especially under turbulent conditions**.

**PV** does not recommend that anyone jump a Quick canopy that will result in the wing loading exceeding **1.2 lbs/ft<sup>2</sup>**.

**The best average wing loading for expert skydivers on a Quick is 1.1 lbs/ft<sup>2</sup>.**



## Flight Characteristics

Even if you are familiar with ram-air parachutes, including PV canopies, your new reserve parachute may handle differently.

In the event of a deployment of your ram-air reserve, check your altitude. If there is sufficient altitude, prepare your canopy for flight as follows:

- ◆ First release the brakes by putting your hands through the toggles and pulling down on both toggles simultaneously and vigorously.
- ◆ If necessary at this point, the slider may be pumped down by pulling both toggles down to your waist and holding them there for a few seconds and then raising them back up. If any cells are closed, this action should open them. You may have to repeat this two or three times.
- ◆ Again, perform the above procedures only if there is sufficient altitude. It is better to make a smooth flared landing with collapsed end cells than to land while pumping the toggles to clear them.
- ◆ Next look for the best landing area you are sure you can reach. Keep in mind that your reserve may not glide as far as your main parachute. In addition, your opening altitude is probably lower than normal under your reserve. The sooner you select the landing area the more places you will have to choose from. Immediately turn toward your intended landing area.
- ◆ If there is enough extra altitude after reaching the landing area, try some practice flares in the air. Note the control range and how the canopy stalls. It is much better to flare too little than too much. If you flare too much, you may stall the canopy and hit the ground unusually hard.
- ◆ Set up your final approach to landing higher than normal. Avoid turns close to the ground. Remember—this canopy probably flies very differently than the one you are used to. It may lose a lot more altitude in a turn than you expect.
- ◆ Always fly a conservative approach for a first-time landing on any canopy. Try to land into the wind. However, it is more important not to be turning on landing.
- ◆ If you do not have enough time under the canopy to get familiar with how it flares, do not try to flare it. Instead land at half brakes and do a good PLF (parachute landing fall).



## Inspection Instructions

Your PV reserve must be inspected thoroughly before it is assembled and at every repack. This inspection should be performed with even more care and attention when first assembled and after a deployment.

An FAA-certified rigger must inspect your new PV reserve and determine its compatibility with your rig.

Here is the PV recommended procedure for inspecting your reserve canopy. Consult the owner's manual and the Maintenance and Inspection Manual for your rig and other components for instructions on inspecting them.

The permeability of the fabric is very important. As the permeability increases, the canopy will open more slowly and flight performance will deteriorate. The rate of descent will increase and the forward speed will decrease. The ability of the canopy to flare to a soft landing will decrease.

## Permeability Check

To insure the canopy remains in compliance with TSO requirements and to insure the canopy is safe to use, PV has established an average permeability limit of 6cfm for the top and bottom fabric.

Fabric permeability does not change while the canopy is packed. It changes as a result of use and handling. That's why it's important to maintain a complete history of the parachute.

**Fabric permeability must be tested if any of the following events occur:**

- ◆ The canopy is completely submerged in water.
- ◆ 25 jumps have been made on the canopy since it was new or last certified.
- ◆ The canopy has been repacked 40 times since it was new.
- ◆ Flight performance appears to be substandard.
- ◆ There are other reasons to believe the fabric porosity may exceed specifications.

The Performance Variable factory is equipped to perform permeability testing. It is recommended that any canopy needing such testing be returned to the factory.



## Visual Inspection

It's best to inspect your reserve in a careful, systematic way. We recommend the following, starting at the top of the canopy and working down to the risers:

- 1) Top Surface:** Spread the canopy out on its bottom surface and inspect the top surface starting at the front of the left end cell. Check half of the cell from nose to tail. Then check the other half going from tail to nose. Repeat this pattern until all the cells top surfaces are inspected. Look for rips, stains or failed seams.
- 2) Bottom Surface:** Turn the canopy over and spread it out to inspect the bottom surface. Again, inspect half of the cells at a time, as on the top. Check for rips, stains and failed seams. Look very closely at the line attachments. Even slight damage is cause for rejection in these areas. Line attachments must be completely free of any damage or defects.
- 3) Inspect each rib** from leading edge to trailing edge by looking inside each cell. Pay extra attention to the line attachment points.
- 4) Lay the canopy on one side,** stacking each loaded rib on top of the others. Check that all lines in each line group are the same length and that the trim differential between each line group is correct for this reserve. Check the condition of the stabilizers and slider stops on the stabilizer.
- 5) Suspension lines:** Check the full length of each line for damage and wear. Look for fraying at all cascades and where each line attaches to the connector link. Check that all lines are sewn and that the stitching is good. Check the continuity and routing of each line.
- 6) Slider:** Be sure the fabric isn't torn and that the grommets are undamaged, have no sharp edges and are securely attached to the slider. Be sure every suspension line and both steering lines pass through the proper grommet on the slider.
- 7) Risers:** Be sure the connector link barrels have not moved and the slider stops are properly positioned. No substitutes are authorized for PV slider stops.
- 8) The toggles** must be installed correctly and match the guide ring and Velcro on the risers. PV canopies come with brake settings and toggle tie-on marks set for PIA standard riser/brake dimensions. This standard calls for 4" (10.2 cm) from the top of the riser to the top of the brake-setting ring. If the risers are more than 1" (2.5 cm) different from this standard, the canopy must be modified. This modification may only be done by a master rigger and must be reported to PV. In addition, any changes must be marked on the canopy's data panel.
- 9) The rest of the assembly:** Follow the instructions in the rig manufacturer's owner's manual to inspect the rest of your parachute system.



## Assembly Instructions

Your new Performance Variable reserve canopy must be assembled and packed into your parachute system by an FAA-certified rigger. Before you begin, be sure the risers, toggles, free bag, pilot chute, harness, container and other items are compatible with your Performance Variable reserve canopy and each other.

### Attaching to Risers

When assembling a Performance Variable canopy onto risers with reserve mini-links, it is important that the following directions be followed precisely.

The connector links supplied by Performance Variable for use with their reserve canopies are of the highest quality and carefully inspected and tested. It is important that no substitute links be used. Other links may look similar, or even identical, to those supplied by Performance Variable, but any substitute could be considerably weaker than the original.

There are two different size links available from Performance Variable for use on reserves. They are number 4 and number 5 stainless links. Number 4 links are used for minimum pack volume and weight. In cases where the riser volume is too large to fit properly on a number 4 link, number 5 links should be used. Be sure to use the correct link bumpers. The number 4-link bumpers will not work on number 5 links. All links on a canopy should be the same size. Do not mix sizes on a canopy, and only use links obtained from Performance Variable.

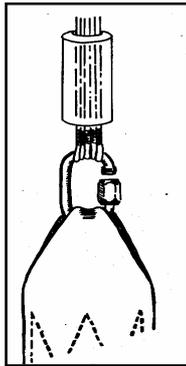
When properly installed, reserve mini-links start to bend at 2500 lbs. and fail at about 3400 lbs., making them much stronger than most sport risers. If improperly installed, however, mini-links will fail at as little as 250 lbs.

If these directions are followed correctly, and only parts supplied by Performance Variable are used, these mini-links will provide excellent service.

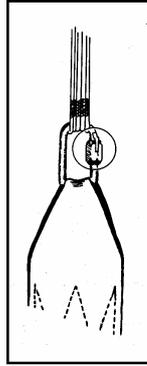
- 1) Remove all grease and dirt from links, using a solvent that will leave no residue. Trichlorethylene or any electrical contact cleaner is recommended.
- 2) Inspect the link carefully. Check for nicks, burrs or any sign of bending or stress. Check to be sure the barrel will screw down at least  $2\frac{3}{4}$  turns from first engagement with no resistance.
- 3) Neatly fold risers to the width of the inside of the link. Slide link onto riser. Leave barrel open.



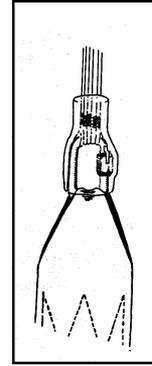
4) Slide slider stops over line groups and install lines on links as shown. Tighten barrel only lightly finger tight—don't snug down the barrels yet.



Plastic slider stops



Small match mark



Tack slider stops



Webbing Stops

5) Perform a thorough line check at this point, making absolutely sure that the canopy is straight. After the links are tightened with locking compound (LOctite, Permanex or True-lock), it will be very difficult to correct any errors.

6) When you are sure the canopy is straight, unscrew the barrel and put one drop of locking compound on the threads. Immediately tighten finger tight, and torque to 30 inch/lbs. To accurately gauge this, place a 5-lb. (2.27-kg) weight on a wrench, 6 inches (15.2 cm) from the link. When the wrench is horizontal and the barrel no longer turns, the link is fully tightened. Never tighten more than 30 inch/lbs. Clean off any excess thread lock with a clean, dry rag. Do not use water or solvents.

7) Make a small match mark along the barrel and the link as shown. This mark will serve as an easy method to check for tightness. If the match mark remains intact, then the barrel is still in place. If the upper and lower parts of the mark become mis-aligned, then the barrel has shifted. Should this happen, the link must be immediately disassembled, cleaned and inspected. If no damage has occurred, the riser/link/line assembly may be reattached according to steps 1 through 5.

8) When the match mark is dry, slide slider stops over links until the lower edge of the rubber tubing touches the top of the riser as shown. These stops are important in that they help keep the lines in the correct position on the link.

Without these stops, the links could fail due to improper/uneven loading. The stops must be tacked to the link with two turns of doubled seal thread. If webbing stops are supplied, install them the same way.

9) Periodic Maintenance: The links should not be checked for tightness with a wrench. Instead, use the match mark. If the mark stays in alignment, then the links are properly tightened. If not, follow the steps in #7.

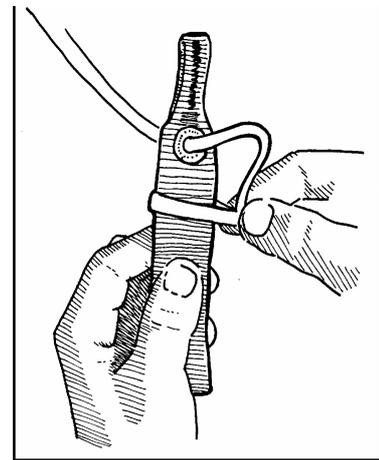


## Attaching Toggles

Attach the steering toggles according to the rig manufacturer's instructions. If such instructions haven't been provided, follow these procedures:

Make sure the steering line goes through the grommet of the slider.

Route the steering line through the guide ring on the riser. Then route it through the grommet in the toggle, starting from the side with Velcro. Pull the toggle through the finger-trap loop and tighten.



Factory finished toggle loop



## Maintenance & Repairs

Repairs may be classified three ways:

- 1) **Minor repairs** may be done by a Senior Rigger.
- 2) **Major repairs** require a Master Rigger.
- 3) **Factory repairs** may be performed only by the Performance Variable factory.

Small snags and holes smaller than 1/8" square (one rip-stop box) located further than 10" from the closest line attachment may be left unrepaired as long as there is no more than one in any 10" circle. A maximum of three such snags per cell is allowed. Rip-stop tape is not authorized for use on Performance Variable reserves. If the damage is enough to warrant a repair, a sewn repair must be done.

Any hole or tear up to 10" in length may be repaired by a senior rigger as long as the closest area of the completed repair is at least 1" from the nearest seam and at least 5" from the nearest tape or line attachment.

Any line damage is a major repair. Lines may be replaced by a master rigger. However, it is recommended that these repairs be sent back to the factory. All replacement lines must come from the Performance Variable factory.

Master riggers may perform any repairs that do not involve taking apart any bar-tacks on the canopy. Special bar-tack patterns are used that are not normally found in the field. **In addition, removal and replacement of these stitch patterns usually weakens the fabric to the point that it is necessary to replace portions of panels.** The original templates are needed to complete this correctly.

Reserves may only be repaired using certified materials. Under-strength thread and fabric is frequently found in the field. One way to be sure your materials are up to Performance Variable standards is to purchase them directly from Performance Variable.



## Canopy Care & Use

- 1) Avoid dragging any part of the canopy across the ground.
- 2) Do not leave the canopy exposed to the sun any longer than is absolutely necessary.
- 3) Do not wash the canopy. Doing so will reduce the performance of the parachute and void the TSO. If it is necessary to remove grease spots, mineral spirits may be used on small areas.
- 4) Have your Performance Variable reserve inspected and maintained by a licensed rigger in compliance with FAR Part 105.43.
- 5) Store your parachute in a cool, dry place in a container through which light will not pass. This will prevent the permanent ultraviolet light from sunlight and other sources.

Certain other agents—notably acids—will quickly cause great damage to your parachute. Do not store your parachute where it might come into contact with such substances. For example, automobile trunks contaminated long ago with battery acid have destroyed many parachutes.

### Operating Limitations

For landing safety, the NAA/LBA has given Performance Variable the authority to lower the legal weight limitations for each canopy model. The chart on page 1 (Technical Specifications) shows the maximum weight limitations for each canopy model.

Exceeding these limitations is both unsafe and a violation of the FAA and NAA/LBA regulations.

### Use

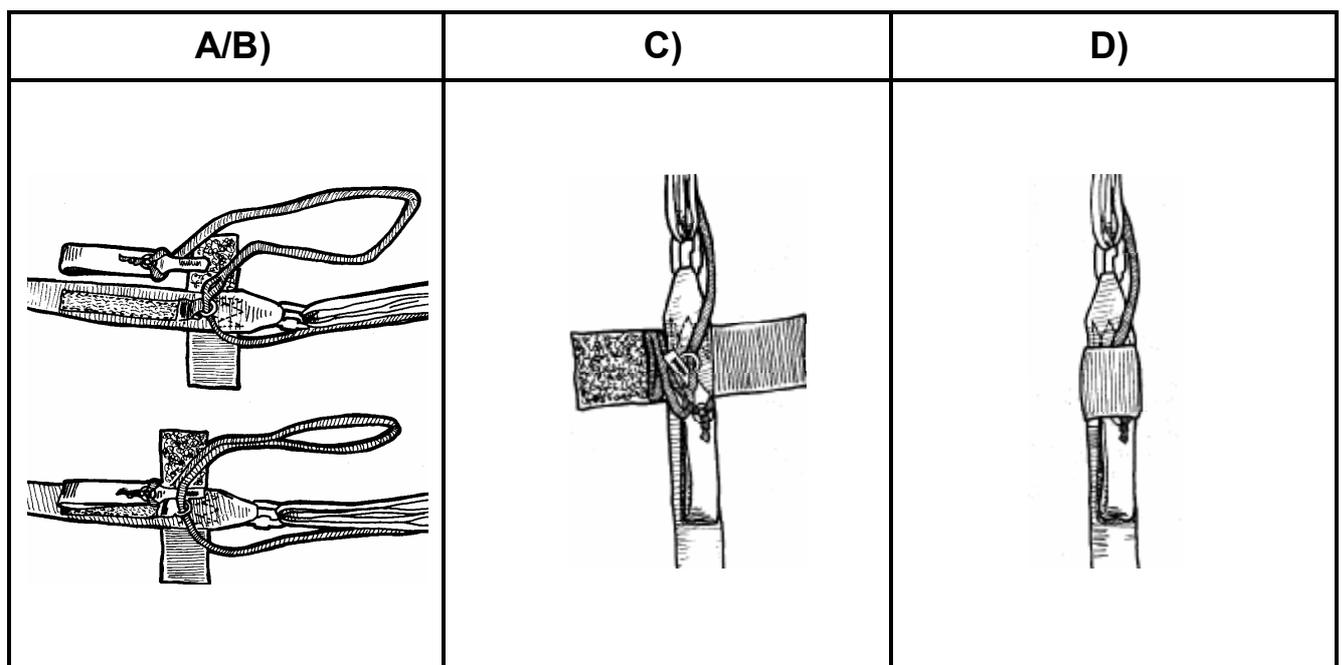
Although it is not always possible in emergency situations, it is desirable to have good body position for deployment of any parachute canopy. It is considered ideal to be sitting up head high with shoulders level during deployment. There should be no stalls below 500 feet. Turns below two hundred feet should be gentle.



## Packing the Reserve

### Setting the Brakes

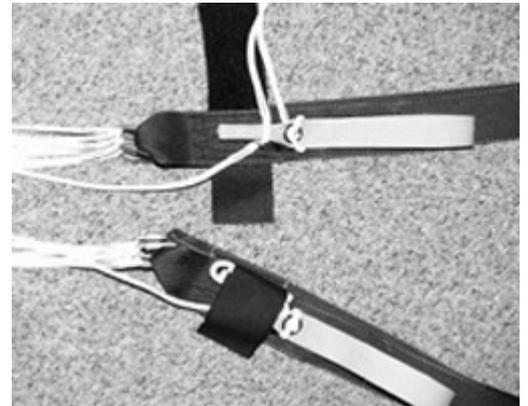
- A)** Open the Velcro cover on the riser. Use the toggle to pull the right-hand steering line down until the brake loop just passes through the guide ring.
- B)** Insert the tapered end of the toggle all the way into the loop. Pull on the steering line above the guide ring to seat the toggle against the ring.
- C)** Fold the bight of the line between the toggle and the loop in 3-inch folds and lay it neatly next to the toggle.
- D)** Carefully close the Velcro cover to encase the stowed toggle and folded line. Be sure none of the steering line is caught between the layers of Velcro. Repeat the process for the left-hand toggle.



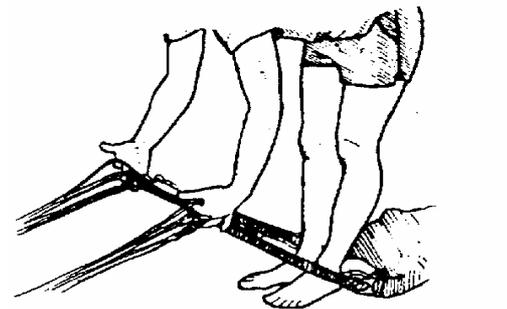


## Packing the Reserve

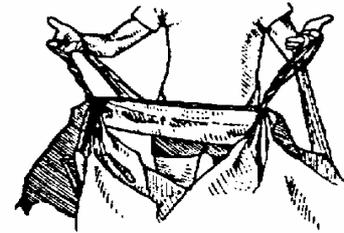
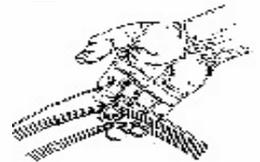
**#1)** After performing, set the brakes as shown on page 15a.



**#2)** Crouch next to the risers and face your canopy. Slip the fingers of your left hand between the left-hand risers and between the left-hand steering line and the risers. Do the same with your right hand. The idea is to have each line group and each steering line separated. Grasp the lines as shown. Be sure there are no twists in the risers. Start moving up the lines, allowing them to slide between your fingers. Push the slider ahead until you reach the bottom of the canopy.



At this point, it's possible to determine if your canopy and lines aren't straight. If there are twists in the lines, this means your rig did a "loop" through your risers at some point. To fix this, drop the lines, stretch the canopy and lines out again, and straighten the entanglement out. Do a line check again to make sure you have done it correctly.



**#3)** The nose openings should be facing the rig and the tail should be farthest from the rig. If the reverse is true, double check to be sure the rig is container-side up (the back pad is on the ground). If the rig is positioned correctly and the canopy is not oriented as described above, then the canopy was attached to the harness backwards!

Starting with the end cell nearest your legs, flake the entire nose with one hand as shown. Pull each cell completely out, and keep it in your hand. Then pick up the next, taking care not to miss any until all of them are in your hand. When you have the entire nose flaked, tuck it between your knees and hold it there.





**#4** Since there is a lot of fabric between the A and B line attachment points, it is easy to separate the two line groups: Look down inside the first small S-fold of the stabilizer and find the "extra" bunch of fabric. Now make the rest of the canopy into S-folds like the stabilizers: Put your hand in between the A and B lines on one side (near where they pass their own grommet) and pull them out to the side. This will give the cells on one side the correct type of flaking. Now repeat the process with the other A and B groups, pulling the fold out to the other side.



**#5** Now that you've pulled out the canopy between the A and B line groups, do the same thing between the B and C lines. Pull the fold of fabric between the two groups out to each side.



**#6** Now find the D line group, the group of lines nearest the tail (not the steering lines—they are attached at the trailing edge). Pull the left-hand steering lines off to the left (to get them out of the way). Follow the stabilizer down to the D lines and pick up all the D lines on the left side. The Quick is a 7-cell canopy, so you should have four lines. All lines in your hand should go through the same grommet. If they don't, you've picked up a wrong line.

Now that you are holding only the correct D lines, you may let go of the steering lines. Take the whole D-line group on one side and pull it out gently. Fold the D-line group in with one motion to put a real fold in the fabric between the C and D lines. Do the same thing on the other side.





**#7** Split the nose 3 by 3 and grasp the lower 3 T-seams at the leading edge in your right hand. Grasp the 7 T-seams directly above the A lines with your left hand. Pull tension against the rig to be sure the A-lines are straight, and then fold the lower 3 leading edge parts back under the canopy so the A-line path is on the far right as you look from the canopy top toward the rig.

The upper three leading edge parts are now facing to the right.



**#8** Hold down the canopy at the A-line path, find the 7 T-seams directly above the B-line path and fold to the right. Place the B/C-line group on top of the A-lines. The material between the A and B lines should now be in a fold to your left of the A/B line paths.



**#9** Hold down the canopy at the B-line path and grab the 7 T-seams directly on top of the C-line path. Fold the C-lines to the right past the B-line path as far as possible, then bring them back and lay the C-lines on top of the B-lines. This results in the canopy fabric between the B and C-lines being folded on the right side of the canopy and the C-lines are directly on top of the B-lines. Straighten this fold as necessary.

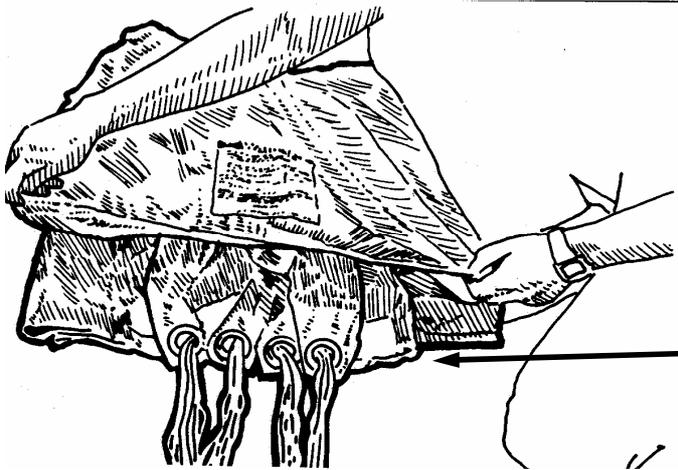


**#10** Now grasp the steering lines where they attach to the tail, pull the entire tail out and drop it straight down. Split the tail at the center cell and half flake the tail so there are five folds on each side from the bottom up. Lay the center cell of tail on top. It should be spread out to the same width as the rest of the folded canopy. Make sure that the nose of the canopy is still split 3 by 3 to the left and to the right.





**#11** Pull up the slider by grabbing the tapes around its center and walking from the connector links to the base of the folded canopy.



**#12** Clear the stabilizers A to B, B to C and C to D. Now fold the stabilizers in a 45° angle back to the center of the canopy. Grab the suspension-line bundle with your right hand under the canopy base. Place your left hand 2" above the slider grommets and S-fold the entire base of the canopy backwards as shown.



**#13** Grasp the tail at each edge of the center cell and pull down until it's even with the lower edge of the folded canopy. Raise the center cell of the tail 6 inches and inspect the D lines and steering lines. Make sure all lines are taut. Dress the center of the tail by spreading out the top center panel to the width of the rest of the canopy underneath and secure it with both knees.





**#14/15** Tuck the center cell panel around the canopy (free-bag width), working from bottom to top and making sure not to cover the leading edge.



**#14**



**#15**

**#16** Fold the lower upper part of the reserve with an 6" S-fold towards the base of the canopy.



**#17** Secure the entire pack with both hands.





**#18** Kneeling on this fold carefully split the top half of the canopy into two halves. Starting from the bottom to top and using a kneading motion, mold the halves into two equal “ears.”

Expose the center cell nose and open it like a blossom.



**#19** Push the rest of the center cell material into the second S-fold. Make sure that the center cell is still exposed and fully open.



**#20** Squeeze the remaining air out of the ears and make them as small as possible.



## **! Attention !**

Now follow the harness and container manufacturer's instructions for putting the reserve canopy into the free-bag.

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Thanks again for choosing our product!

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