

ROTOR OWNER'S MANUAL

1/2005

Thank you for purchasing a Rotor Harness. Please read these instructions and tips carefully before flying in your new Rotor Harness.

Overview

The Rotor line of harnesses are designed to be comfortable, close fitting, reduce drag and increase your performance. We have measured more than a twenty five foot-per minute reduction in sink rate at best glide speed between the Rotor and a conventional pod harness.

VULTO Parachute Packing Instructions

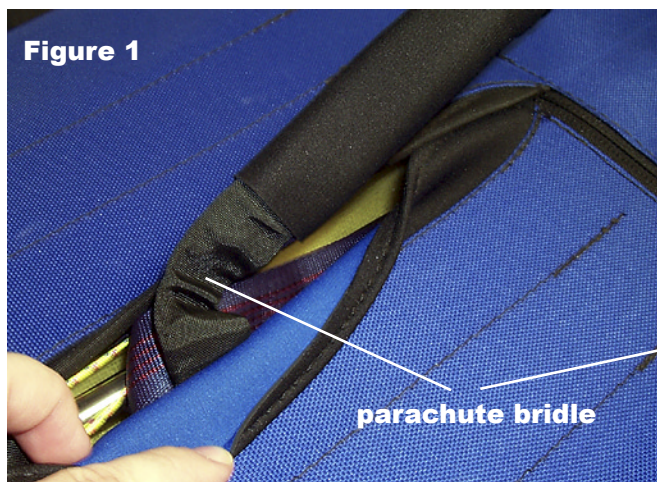
WARNING: We strongly recommend the use of a chute no larger in pack size than a LARA 250 GOLD (LARA 175, LARA 175 GOLD) or equivalent. Use of a parachute larger in pack size could make the deployment difficult, or in the case of a very large chute, impossible. The Vulto was designed for the needs of competition type flying where optimal fit and streamlining take precedence, and as such has more precise requirements for reserve chute installation than a more general purpose type of harness.

Bridle Routing

Partially unzip the large # 10 zipper pull to gain access to the parachute container on the right side of the harness.

There are two possible parachute attachment points on the VULTO; one is to the carabiner (figure 1) and the other is to the two inch internal webbing located forward of the harness main slider.

We highly recommend that you attach the parachute bridle to the carabiner. This is the safer method of attachment because the bridle is further from your neck, and because the glider will be suspended from the parachute via your carabiner, rather than from the back of your harness.



The images to the left show the bridle being routed up from the base of the mains, inside the neoprene sheath, and exiting at the top of the mains, with chute bridle attaching to the carabiner.

Stow The Bridle

Neatly lay the remaining bridle into the internal pocket of the parachute container that extends into the harness body. (Figure 2) This is important to prevent the bridle from interfering with the deployment, and to keep the chute from becoming too tightly wedged into the harness.

Attach The Deployment Handle

Larks head the deployment handle to the parachute deployment bag. On a Free Flight deployment bag attach the deployment handle to the center (short) loop on the bag. Cut off the brightly colored handle and heat seal the edges. (Figure 3)



Install The Parachute

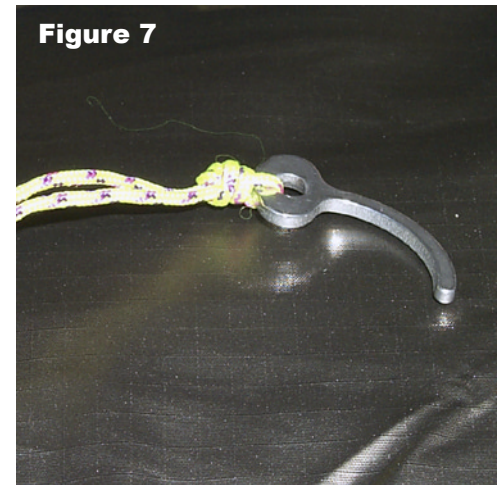
With the harness laying flat with the mains upwards (as it would be while you are flying) place the parachute in the harness with the deployment handle attachment point facing downward and outward. (Figure 4)

Firmly push the parachute into the four flap container inside the harness. Use the bungees included with the harness to close the container with the deployment handle pins. Use the two ends of this string to go through the grommet on the bottom flap first, then the side flap, and finally the grommet of the top flap of the internal container. Engage the pin through the bungee. Repeat this process on the other side of the container. (Figure 5)



Stow the Handle

Carefully seal all the Velcro surfaces and then REMOVE THE ZIPPER PULL. Seal the 2 inch Velcro on the deployment handle over the raw end of the zipper. (Figure 6)



Test The Installation

WARNING: It is extremely important that you test deploy the parachute while hanging in a simulator. You want to be sure you can deploy the parachute with your *left* hand.

Note: the parachute is much easier to deploy with your right hand and that should be your first choice in an emergency. So, if you can deploy it with your left hand, you are all set.

The best motion is to grasp the handle and pull sharply down and then laterally to the left. The tighter the harness fit, and the larger the parachute, the higher the force required to get the parachute out of the harness.

You want to be sure that the pins will clear the bungees. If you are unable to pull the pins out of the bungees after pulling the deployment handle, you can shorten the pin strings one inch by putting an overhand knot in them. (Figure 7)

WARNING: Because the outer shell of the harness is separate from the inner harness body, it is important that the pin strings not be too short. Movement in flight could cause the pins to release without pulling the deployment handle!

If you are unable to deploy it with your left hand, it is usually due to one or more of the following.

- Parachute is too large
- Deployment handle attachment was packed to the outside of the harness
- Harness fit is too tight (foam can be removed from left side to reduce the tension as a last resort)
- Zipper pull was not removed
- Incompatible deployment bag, parachute, or both

Zipper Reinstallation

After a practice deployment it will be necessary to reinstall the number 10 zipper pull. Facing the parachute container with the harness laying flat on a table, and starting at the end of the zipper closest to the center of the harness, fold the two zipper ends downwards until they are pointing at you. With the zipper pull portion facing you, work the two ends of the zipper into the zipper pull. This takes a bit of patience your first few times. Push the zipper pull onto the zipper as you pull the zipper edges down through the pull. Try to keep the ends of the zipper even in this process. (Figure 8a-8d)

Note: If you find it impossible to do, take a sharp pair of scissors and trim the last tooth off the zipper on each side and try again. Also be sure that you do not have the pull backwards or upside down.

The pull on the zipper will be on the inside of the harness after you have installed it. Slide the pull about a foot down the zipper.



Rotor Kick Ass Internal Chute

(The following applies to Rotor KickAss Internal (behind legs) parachute container)

- Use a compact parachute (like LARA Gold 250 or LARA Gold 175)
- Make sure that the Velcro on the top and bottom of the parachute container DOES NOT cause a lip (must be flush with the top and bottom mylar surfaces inside the container)
- Parachute handle attachment must be on the BOTTOM of the container
- Make deployment handle attachment as short as possible so that it will reach Velcro on harness attachment point, but no longer. Too long a handle can foul a parachute deployment.
- Be sure that pulling the handle will clear the pins after packing.

Putting on the harness

We find it easiest to put the harness on like a coat.

WARNING: Be sure that you put your arms through the shoulder straps, not just the neoprene gap seal.

Reach down between your legs and grasp the leg loop buckle; attach both sides. Fasten the small chest buckle over the chest pad. Zip the center zipper down to about your navel. Do not zip the zipper too low as this could damage it when the harness spreads open on takeoff or landing.

Shorten the leg loops so that they are easy to attach, but not overly loose. The shorter they are, the more flare authority you will have.

The shoulder straps are adjustable, and you can add or take out foam blocks in the boot to get the proper fit in length and the CG in the right place. Do not over loosen the shoulder straps or you will damage the neoprene gap seal at the neck of the harness. Everyone is built a bit differently. It takes some time to break in the harness and get it adjusted properly.

WARNING: Be sure you are holding the base tube with your left hand when you zip up the harness as it is common to inadvertently engage the pitch adjustment lever above your butt and the harness will pitch head down to the limit of the adjustment. If you are not holding the base tube you can rotate forward enough to strike it with your face!

The butt lever is used for small adjustments in your head up or down attitude while prone.

To raise your pitch attitude, do a push up on the base tube and then bump the "butt lever" mounted in the back plate. To lower your pitch attitude, push the "butt lever" and lower yourself to the base tube. Release the lever when you are at the pitch attitude you desire.

Shorten the adjustment of the front perlon pitch rope until it stops you at the furthest head down position you will use when flying. Usually fifteen degrees head down from level is enough. Shortening the rope in this way will give you more head up adjustment, and make the harness safer in a crash.

Getting upright for landing

The slider at the base of the main support strap is connected to the boot of the harness by two lines. Pushing on the boot will pull the slider aft. The butt lever and the slider functions are not connected to one another. To get upright for landing, unzip the harness with the puller on the left side of the harness center zipper. Drop your knees out of the harness and do a pushup on the base tube. You will feel the slider go forward and the harness will pitch up. When the slider is in the forward position the harness will be inclined at about 45 degrees. This is the best position for landing. Because the Rotor has a back plate, it is not possible to get in a straight upright position.

Drogue Parachutes

The Rotor has a drogue parachute pocket. Be sure to read the drogue parachute instructions before using any type of drogue parachute with this harness.

Inspection

Before each flight: inspect the steel bar attached to the bottom of the main support strap and be sure it is straight. If it is bent do not fly in the harness until you have replaced the bar.

Before each flight: be sure that the harness main support strap slider is being pulled to the full aft position by the line attached to the boot of the harness above your heels. To adjust the slider position rope, simply lengthen or shorten the rope that is attached to the tabs above the heel position in the boot. Over tightening the rope will cause unwanted wrinkles in the boot area of the harness. If the rope is too loose the slider will not be pulled to the full aft position on the slider bar, making the harness structurally weaker.



WARNING: The harness was designed to have the main support strap slider in the full aft position on the slider bar during flight, or the full forward position on the bar during landing. The bar is considerably weaker when the slider is in the middle. High G load maneuvering with the slider in the middle of the bar in an extreme case could cause the bar to bend or fail.

WARNING: The Rotor harness is a competition class, streamlined harness and SHOULD NOT BE USED FOR HIGH G LOAD MANUVERS OR AEROBATICS.

Before each flight: check the parachute lock pins to be sure they are secure in the bungees

Before each flight: inspect the nuts and bolts connecting the slider bar to the back plate to be sure they are secure.

Before each flight: inspect the mains for any signs of excessive wear or UV exposure.

Maintenance

Lubricate the zippers with silicone spray whenever the zipper becomes difficult to pull. A light application is all that is required. Too much silicone will attract and hold dirt to the zipper and wear the zipper out prematurely.

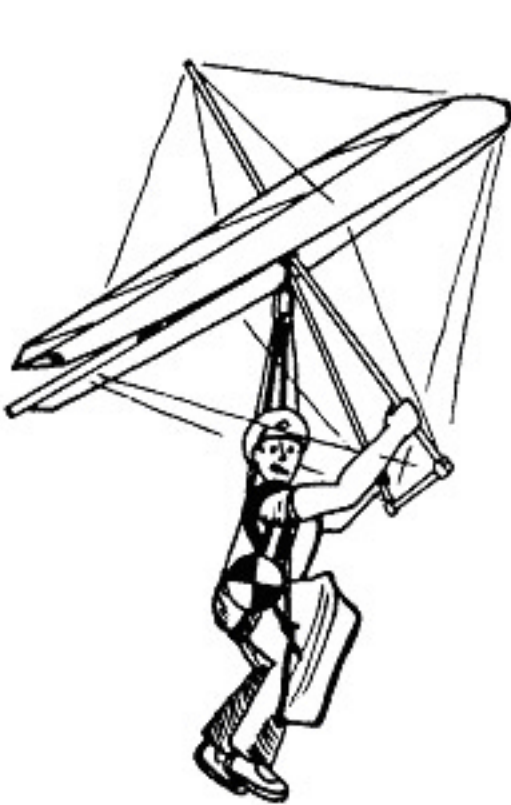
Keep your harness out of the sun as much as possible. Excessive exposure to UV will cause the harness cloth to fade and lose strength. It may also cause excessive shrinkage.

Avoid using any harsh chemical solvents or cleaners to clean the harness. We recommend the use of mild soap or water based cleaners (such as Simple Green).

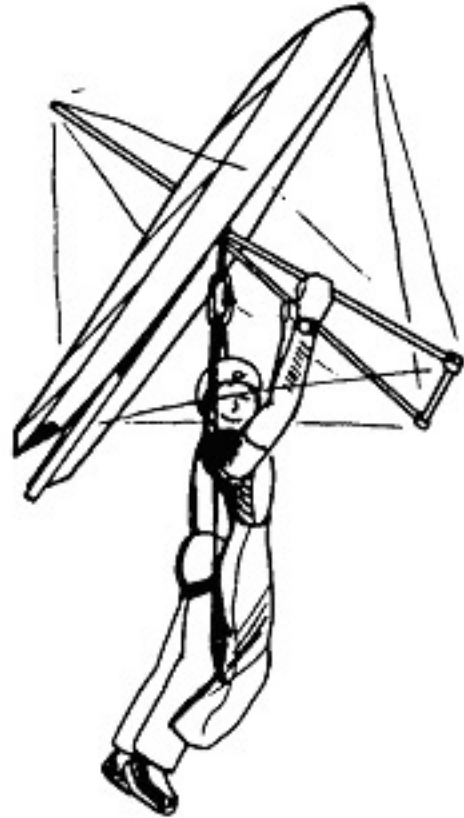
If the harness becomes wet or soaked, make sure to open up or disassemble the harness as much as necessary to prevent mold or mildew formation inside the harness, and corrosion on any of the metal surfaces.

Leg Loop Length

The adjustment of the leg loop length has a direct impact on your flare authority. In the diagram below you can see that the lower you hang in the upright position, the further behind the downtubes you are due to the rake in the control frame. In most harnesses it is pointless to have any more slack than absolutely necessary. Some harness makers use an adjustable leg loop buckle that can loosen up in flight. If the pilot forgets to snug them up before going upright, they find themselves six to ten inches too low. It is very easy to actually feel the difference in flare authority in one inch, so imagine the difference ten inches will make! Landing with too much slack in your leg loops is much more difficult.



Leg loops too long



Shorter leg loops give better flare

Harness Type

Soft back harnesses are generally easier to land with than harnesses with back plates. Most of the harnesses with back plates will not allow you to get in a full upright position for landing. If you are accustomed to being inclined 45 degrees forward during your approach and landing, this forward tilt actually increases your flare authority. This is because your shoulders are further forward relative to your downtubes by more than a foot! The problem comes when a pilot tries to climb up the down tubes to get into a more upright position.

To climb the downtubes in a harness with a back plate requires that you exert a lot of force on the downtubes in a downwards direction and grip them very tightly. The tighter you grip the downtubes, the less control feel you will have. Also if the apex of the control frame is aft of the hang loop, and you hang from the downtubes high enough, the nose of the glider will actually pitch up, making it difficult to maintain adequate speed on final.

Single Suspension

There should be a line that goes from the carabiner to the front of the harness to limit the travel of the harness in the head down direction. The harness should be adjusted to go about 15 degrees head down, and no further. There have been a number of avoidable face and neck injuries because there was no limit to how far the harness could pitch head down.

Hang Height

The closer you hang to the base tube when prone the better your control authority will be. Many pilots confuse prone hang height with upright hang height. What you want is the lowest prone hang height your elbows can tolerate, and the highest upright hang height for flare authority. If you are adjusting your prone hang height higher off the base tube so you are higher when upright, shorten your leg loops or if that doesn't do it for you, get a different harness.

Transition From Prone

There are many schools of thought on when to transition from prone to upright. Generally, the most conservative time is during the downwind leg of your approach so you are in the landing position early, and can focus on the task at hand. Some pilots like to have one hand on a downtube and keep one on the base tube until short final, and still others do the transition just before it is time to flare. One thing that is clear is that if you do your transition on final, close to the ground, and miss a downtube, the glider will generally turn. The severity of the turn will be determined by the speed you have when you miss it, and the bar pressure of the glider you are flying. It is best to do the transition near trim speed where the glider will fly hands off, as there is a much lower risk of losing control.

Flying Upright

Most pilots spend a very small amount of airtime in the upright position. This is not too smart when you realize that all the time spent closest to the ground is in the launch / landing phase of the flight, upright. Get into the upright position when soaring. Do roll reversals, thermal that way, spend some of your airtime getting very comfortable in the most important flying position.

Fly often, and fly the best glider for your skills. Remember that aviation is dangerous, so please fly carefully.

If you have any questions about the procedures described please consult your dealer or Wills Wing.

Please Fly Safely,

Wills Wing Inc.

www.willswing.com