# MIRAGE

HARNESS / C ONTAINER SYSTEM

Post Office Box 820 • DeLand, Florida 32721

phone: 904-740-9222 • fax: 904-740-9444

e-mail: info@miragesys.com • www.miragesys.com



# Congratulations

▼ ▼

on your purchase of a Mirage harness/container system.

The Mirage is the finest harness/container system available anywhere, and with proper care and use it will last for many years of use. It is the purpose of this manual to provide you with the information necessary to enable you to care for and use your Mirage properly. It is our hope you will enjoy your Mirage as much as we enjoyed building it for you. Should any aspect of the information contained in this manual be unclear to you, or should you have questions or concerns about your Mirage which are not addressed by this manual, you are encouraged to contact Mirage Systems Inc. at the address on the back cover of this manual prior to jumping the Mirage.



The purpose of this manual is to familiarize the Mirage owner with the function and packing procedures of the Mirage system. It is not a substitute for a course of instruction, nor does it release the user from responsibility for the use and maintenance of the system. Although packing instructions are included for the reserve parachute, note that this operation is governed by applicable laws, and may not be legally conducted by anyone other than a certificated rigger.



Mirage Systems Inc is not responsible for use of the Mirage with any parts not specifically supplied by Mirage Systems Inc. for your Mirage, nor for the use of the Mirage with any other canopies than those specifically mentioned as compatible on the system information panel beneath the reserve pin cover flap. If there are any questions about equipment compatibility, please contact Mirage Systems Inc.



## TABLE OF CONTENTS



•

User Warning
Packing Instructions for the Main Canopy
Packing Instructions for Round Reserves
Packing Instructions for Ram-Air Reserves with Freebags6
Assembling the Reserve Static Line System
Maintaining Your Mirage
The 3-Ring Release System
Replacement Parts inside back cover



## WARNING



Skydiving is a hazardous activity that can result in injury or death.

Parachutes sometimes malfunction even though they are properly designed, built, assembled, packed, maintained and used. The results of such malfunctions are sometimes serious injury or death.

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

If you are not willing to accept the risks of sport parachuting, or if you are not willing to accept the possibility that your Mirage or its components may malfunction and perhaps cause you to be injured or killed, then you should reconsider your involvement in sport parachuting.

Training and/or experience are required to lower the risk of serious bodily injury or death.

Never use the Mirage unless you have read and understand this warning, and also unless

A. you have completed a "Controlled Program of Instruction" in the use of this equipment

B. you have read and understand all appropriate flight manuals and packing instructions.

To lower the risk of death, serious bodily injury, canopy damage, container damage and hard openings, never exceed 130 kts. deployment speed.





### PACKING INSTRUCTIONS FOR THE MAIN CANOPY



#### PACKING TOOLS

- 1 Long pull-up cord
- 1 Mirage main bag and bridle
- 1 Bag spare rubber bands



#### INTRODUCTION

The Mirage harness container system is compatible with practically any ram-air main parachute that will fit into the container. This manual does not provide specific instructions for folding any of the various main canopies on the market. That information must be obtained from the manufacturer's manual for each canopy. Fold the canopy and pack it into the Mirage deployment bag according to those instructions.



1 Open the riser covers on the container. Pull the bridle line through the #4 grommet in the top of the main deployment bag so the canopy ring is all the way against the grommet on the inside of the bag. Place the packed deployment bag at the bottom of the container. Neatly tuck the risers in the side of the reserve container.

Place the packed deployment bag on top of the reserve container and neaten the unstowed portions of the suspension lines in the main pack tray, leaving the tops of the risers to the sides of the pack tray. (Figure 1)



Figure 1



**2** Lay the main bridle to the right side of the container. Seat the main bag in the pack tray (Figure 2).

# IMPORTANT: Make sure the line stows go to the bottom of the container.

Thread the pull-up cord. Use the short closing loop in the #1 flap, unless it does not allow proper tension, in which case you will need to use a longer closing loop in the secondary attachment point at the top of the main pack tray. If you use the secondary attachment point, deactivate the primary attachment by stowing the tuck-tab holding the short closing loop in the #1 flap into opposite stow, to allow clear access to the grommet in flap #1. If you are unsure about this, consult a rigger.

Close flap #2. Mate the 1" velcro on the bridle line to the 1" velcro on the main flap. Lay excess bridle line on top of the main bag. Close flap #3.

- Thread the pull-up cord through flap #4 and close (Figure 3). Mate the velcro starting at the leg strap side on the harness and work back towards the container.
- **4 8** Store excess bridle line on the hand deploy pilot chute and leave approximately 8" of bridle length. Fold the pilot chute in half and proceed to fold as in Figures 4 through 8.



Figure 2



Figure 3



Figure 4

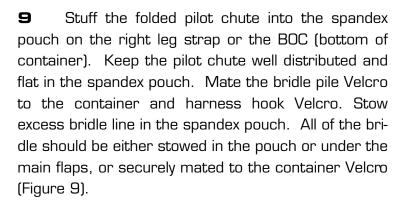




Figure 5



Figure 7



IF YOU HAVE ANY QUESTIONS, PLEASE FEEL FREE TO CONTACT MIRAGE SYSTEMS, INC.



Figure 6



Figure 8



Figure 9





## PACKING INSTRUCTIONS FOR ROUND RESERVES

•

Since only a handful of round canopies are in use today by sport parachutists, these instructions were written for ram-air canopies. Your Mirage was not designed for use with round reserves. Although previous versions of the Mirage were designed for such use, we do not recommend that you use a round reserve in your Mirage, or attempt to adapt your Mirage to accept a round reserve.

# PACKING INSTRUCTIONS FOR RAM-AIR RESERVES WITH FREE BAGS

▼

#### PARTS LIST

- 1 Reserve Pilot Chute
- 1 Mirage freebag & bridle
- 1 Square reserve canopy
- 1 Reserve Ripcord
- 1 Closing Loop

#### PACKING TOOLS

- 1 Long pull-up cord
- 1 Temporary closing pin
- 1 Bodkin closing tool
- 2 Pile velcro tabs

V

#### INTRODUCTION

The Mirage Harness and Container System is compatible with practically any ram-air reserve parachute that will fit into the container. This manual does not provide specific instructions for folding all of the various reserve canopies on the market. That information must be obtained from the owner's manual for each canopy. This section describes the procedures for packing a ram-air reserve canopy in a Mirage harness/container system. Assembly and packing of a reserve parachute may only be carried out by an FAA certificated senior or master class rigger.







**1** Attach the square reserve to the container system. Attach the steering toggles, set the deployment brakes, inspect, flake and fold the canopy according to canopy manufacturer's instructions. (Figure 10)



Figure 10

Prepare the free bag by placing the pile velcro tabs covering the hook velcro to prevent any line damage while packing. Thread the bodkin through the free bag. Thread the pull-up cord through the safely stow loop. (Figure 11)



Figure 11

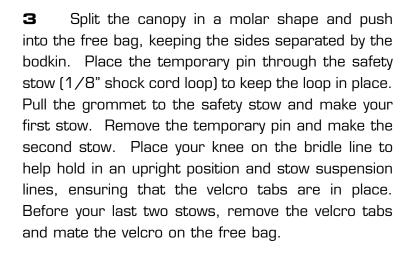
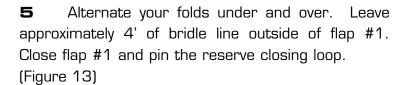




Figure 12



4 Pull the pull-up cord through the bag. Thread the pull-up cord through the reserve "through loop" leaving approximately 12" of loop and tie a bowline knot. Pull the bowline knot through the other side of the bag. Open the riser covers and flaps on the reserve container preparing it for inserting the free bag. The free bag and risers are placed in the pocket of the reserve container. Seat the reserve risers as far as possible in the reserve container. Laying them flat and side by side. Place your knee in the center of the reserve bag and seat the reserve in container. Remove all twists from the reserve bridle line. Stack the bridle line on top of the free bag in a triangle shape making alternate 45 degree angle folds to ensure an untwisted bridle line (Figure 12).



Fold the remaining 4' of bridle line and pull the pull-up cord through the triangle stacked bridle line slowly. (Figure 14)

6 Thread the pull-up cord through the pilot chute. Compress the pilot chute (marked as flap #2) with all the fabric in the spring. Close flap #3 (center flap) over reserve pilot chute and insert temporary pin. (Figure 15)



Figure 13



Figure 14



Figure 15



#### **7** Close flap #4. (Figure 16)



Figure 16

S Close flap #6 and pin with reserve ripcord pin. Remove the pull-up cord. (Figure 18)



Figure 18

- **10** Dress the container. Seal the pin. Count your packing tools and log.
- **11** The finished pack job. (Figure 19)

#### **8** Close flap #5. (Figure 17)



Figure 17



Figure 19



### ASSEMBLING THE RESERVE STATIC LINE SYSTEM

#### •

#### INTRODUCTION

The Reserve Static Line System (RSL) is optional equipment on the Mirage harness/container. If it is not installed on your Mirage, you do not need to read this section. If you would like to have the RSL installed on your Mirage, you may contact Mirage Systems at the address at the end of this manual. To properly use a system equipped with an RSL, you must be familiar with it's assembly, operation and function. You must also receive training from competent instructors prior to using such a system. It is not the intention of this manual to provide such training.

#### **V**

#### FUNCTION

The RSL system consists of a lanyard between the right main riser and the reserve ripcord. It is designed to use the mechanical force of the released main risers after a cutaway to pull the reserve ripcord. It is not guaranteed to function properly and should not be relied on to deploy your reserve.

#### •

#### OPERATION

The RSL is essentially a passive system. A release lanyard is provided to disconnect the system. Use and operation of the system should be explained by competent instructors.



#### ASSEMBLY

**1** Mate 1/2" hook and pile Velcro on the RSL lanyard. (Figure 20)



Figure 20







- 2 Insert RSL lanyard in the provided spandex pocket located behind the reserve riser at the large main riser ring. (Figure 21)
- Mate 5/8" hook Velcro to rear reserve riser.



Figure 21

4 Prior to closing flap #6, thread reserve ripcord through the RSL rings as shown in Figure 22, with the ring on the RSL lanyard between the two rings on flap #6. After closing flap #6, neatly tuck the excess lanyard under the reserve closing flap.

# PROPER CONFIGURATION OF THE RESERVE RIPCORD THROUGH THE RSL RINGS IS CRITICAL TO THE PROPER FUNCTION OF THE RSL SYSTEM!!



Figure 22

**5** Attach the snap shackle to the main riser RSL ring and inspect routing as explained above. (Figure 23)



Figure 23



#### MAINTAINING YOUR MIRAGE



#### INTRODUCTION

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



#### INSPECTING YOUR MIRAGE

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

#### PARTICULAR ATTENTION SHOULD BE GIVEN TO THESE AREAS:

- **1 Breakaway System.** Refer to the 3-Ring maintenance section in this manual for detailed information on inspecting the canopy releases.
- **Reserve System.** This includes the reserve ripcord, locking loop, pins, handle, housing, container and associated sewing. You should not attempt any repairs or modifications to any of these items unless you are a rigger. You can, however, spot little problems before they become major.
- **3 Harness.** The harness should be inspected periodically for broken stitching or frayed webbing.
- **Main Container.** Inspect the plastic stiffeners in the container flaps and replace any that are broken. Replace any grommets that are badly deformed or are pulling out of their setting.
- **Main Pilot Chute.** Check the center line (the length of nylon tape inside the pilot chute that extends from the handle to the base) of the main pilot chute. It must be firmly sewn at each end; there must be no broken stitches or torn fabric. Inspect the seam that joins the pilot chute mesh to the pilot chute fabric. If the mesh is torn or badly frayed, replace the pilot chute. If your Mirage is equipped with a collapsing main pilot chute, refer to the instructions that came with it for maintenance procedures.
- **Closing Loop.** The main container is held shut with a closing loop made of nylon suspension line sheathing. This loop is subject to wear. If it wears out and breaks, the main canopy may release prematurely and a malfunction may result. Replace the loop with a duplicate if wear is noticed.

CAUTION: Never jump a Mirage with a worn closing loop.



Velcro. Velcro tape has many applications within parachuting. Even though it can eventually wear out, there exist few materials that can compete with Velcro with regard to its flexibility, adaptability, and wide variety of possible applications. Hook Velcro often attracts dirt, bits of grass, hair and other debris. Cleaning the hook can be facilitated with the use of a fine-tooth comb. The pile section generally remains clean but the nylon fibers tend to get pulled out of place. When you find that your Velcro is losing its adhesive qualities, then the pile section should be replaced. A Mirage is equipped with a unique double Velcro riser cover system. When your riser cover Velcro is exhibiting signs of wear, and cleaning the hook section does not adequately improve adhesion, you or your rigger may carefully remove the top, original layer of Velcro. You will find a second layer, installed by the factory, ready for use beneath the first layer. If you have already used this second layer, your rigger will need to sew a new section of pile Velcro to the reserve riser cover.



#### CARING FOR YOUR MIRAGE

## YOUR MIRAGE IS MANUFACTURED MOSTLY FROM NYLON. NYLON IS VERY DURABLE, BUT IS SUSCEPTIBLE TO DAMAGE FROM SEVERAL SOURCES:

- **Sunlight.** The ultraviolet rays in sunlight quickly and permanently weaken nylon. Keep your Mirage out of direct sunlight as much as possible.
- **Acids.** Nylon is also damaged by acids. Keep your Mirage away from hangar floors, dirty car trunks and similar areas where acids may be found. If such contamination does occur, immediately and thoroughly wash the rig with plenty of warm soapy water. Until a rig can be washed, baking soda will quickly neutralize most acids. If acid damage occurs or is suspected, a rigger should thoroughly inspect your Mirage. When not in use, your Mirage should be stored in an appropriate storage bag.
- **Oils and Grease.** Most petroleum compounds do not weaken nylon; they simply stain it. Such stains should be promptly removed by a rigger using the proper petroleum solvent.
- **Water.** Water will not structurally damage your Mirage, but prolonged agitation in clear water weakens webbing or may cause some fabric and tape colors to run. Salt water may damage nylon and rust hardware if not promptly and thoroughly washed off with plenty of fresh water. Your rig will maintain its new appearance longer if it is kept dry.
- **Soil.** Soil may damage your Mirage. Brush off the soil after it has dried and gently wash with warm soapy water. Be sure that the soil is not in the housings, snaps, 3-Ring release or reserve ripcord pins or loops. Consult a rigger if your rig is heavily soiled.
- **Sand.** Fine sand will weaken and cut webbing and fabrics of all kinds. Prolonged exposure to sand will shorten the life of the entire parachute assembly.
- **Abrasion.** Nylon quickly frays if dragged over concrete or other rough surfaces. Do not drag your rig on the concrete while packing.



### THE 3-RING RELEASE SYSTEM



#### INTRODUCTION

The 3-Ring Release System was invented in 1976. It was the first practical release that allowed parachutists to jettison their main canopies in one motion by simply pulling a single handle. Not only is the 3-Ring easier to operate than previous canopy release systems, it is also more reliable.

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

The 3-Ring release system is supplied on the Mirage harness under a license agreement with 3-Ring Inc.



#### MODIFYING THE 3-RING RELEASE

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

#### THESE MODIFICATIONS (AMONG OTHERS) MAY CAUSE THE SYSTEM TO NOT WORK PROPERLY:

- Substituting risers that don't have Type 2 sheathing for the locking loop. Don't use risers that have loops made of Kevlar or solid cord.
- Not using a breakaway handle with cable with the special yellow coating. This Teflon-impregnated coating is important; other plastic coatings may cause the cables to bind in the housings or loops, making it difficult or impossible to jettison the risers.
- Using a breakaway handle with cables of the wrong length. The length of the cables is critical to insure each riser releases in the proper sequence. Replacement handles are available from Mirage Systems or your authorized dealer.



#### UNDERSTANDING THE 3-RING RELEASE SYSTEM

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

Begin by peeling the release handle from the Velcro on the harness. Peeling, rather than pulling, makes it easier to separate the handle from the webbing. Look behind the risers near the harness and observe the movement of the yellow cable as you pull the handle. When the cable clears the white loop, the release is disengaged. Now slowly pull one of the risers off the harness. As you pull, you'll notice that the white loop gets pulled through the grommet by the action of the smallest ring.





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

Because of the mechanical advantage provided by the 3-Ring design, only a force of approximately one pound on the top ring keeps the release together. That's why it's important to keep foreign matter like bits of grass and sticks out of the 3-Ring assembly. A small stick in the white loop could prevent a riser from releasing.

It is also important to understand one of the properties of the nylon components of the system. When nylon stays in the same position for a long time, it begins to conform to that position, or take a "set." If the 3-Ring release system stays assembled for too long, the nylon can become so stiff that the low drag from a malfunction (such as a streamer) won't pull the riser off the ring. The 3-Ring release system must be disassembled, flexed and inspected every month. Procedures for this are listed in the maintenance section of this chapter (Pg. 20).



#### USE OF 1-INCH (TYPE 17) RISERS

Type 17 risers (1" wide) are a high-performance piece of equipment. High-performance translates to low durability. A race car goes faster than a normal car but will not last as long. We recommend inspecting Type 17 risers frequently for wear, abrasion, cuts, burns or other damage. Change the risers between 150 and 250 jumps. If you own a Microlined canopy and the lines are ready for replacement, change the risers at the same time. Most of all, remember that these are "high-performance" components that yield low durability. If you are worried about the durability of Type 17 risers, or will not take the time to inspect them regularly, we suggest using the standard Type 8 (2") risers.



#### ASSEMBLY OF THE 3-RING RELEASE

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

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

With the rings of the riser facing toward the 2 floor, pass the middle ring on the end of the riser through the large harness ring from above. Fold it back toward the canopy and risers. (Figure 24)

Thread the smallest ring through the middle

ring in the same way, but make sure it doesn't pass

through the large ring. (Figure 25)

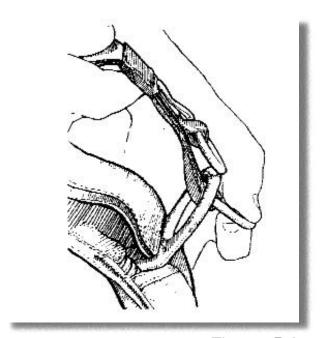


Figure 24



Figure 25



3



A Bring the white loop over the small ring only and then through the riser grommet so it pokes out the back of the riser. (Figures 26 & 27)

Continue threading the white loop through the

grommet on the end of the cable housing. The flat side of the cable housing grommet should be against

5

the riser. (Figure 28)

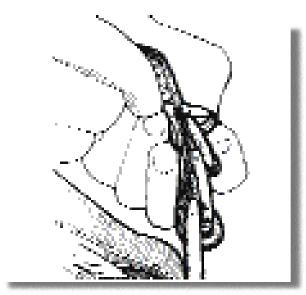


Figure 26



Figure 27



Figure 28





- Thread the yellow cable through the white loop, making sure the loop isn't twisted. Be careful with the cable so you don't bend it too sharply or kink it. Insert the free end in the fabric channel on the back of the riser. (Figures 29 31) There should be plenty of excess cable with the cutaway handle securely mated to the harness.
- **7** Repeat the above steps with the other riser.

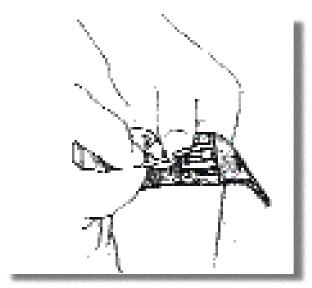


Figure 29

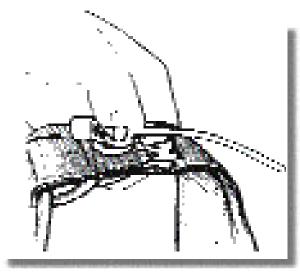


Figure 30

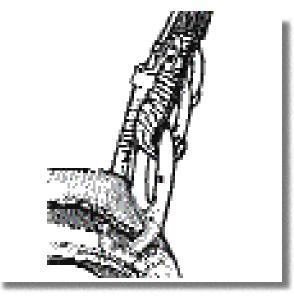


Figure 31



#### PRE-JUMP INSPECTION FOR THE 3-RING RELEASE

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

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

#### •

#### USE OF NON-FACTORY RISERS

If a Mirage is fitted with 3-Ring risers that weren't supplied by Mirage Systems, Inc., it is important that they be checked for proper configuration. The side view in Figure 32 shows a correctly built 3-Ring riser attached to the harness ring and put under moderate tension. Note the following:

- **1** The rings overlap each other and maintain metal-to-metal contact between each other.
- **2** The rings are aligned in parallel planes.
- The smallest ring is not pulled snug against the grommet; the white loop is long enough to give it some play.
- The white locking loop goes straight down through the center of the riser grommet on its way to the cable housing end fitting; it does not extend past the edge of the grommet hole and then turn back upwards towards the hole.

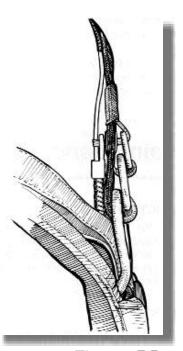


Figure 32

If your riser configuration does not match this illustration, the 3-Ring release might not function correctly. You should contact a rigger or Mirage Systems before jumping with those risers.



#### REQUIRED PERIODIC MAINTENANCE FOR THE 3-RING

The 3-Ring Release system has been in use for many years with excellent results. Although the system is as durable as the rest of the rig, it requires periodic maintenance and inspection to ensure proper operation.

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

The procedures below should be done at least every month. This is especially important if the rig has not been used for a month or more, such as during the winter. Immediate inspection is required if it has been subjected to some abuse such as a drag across the runway, a water landing or exposure to a lot of dust or sand.

It's important to maintain the system even more frequently in humid, muddy or freezing conditions. If the Mirage becomes immersed in mud or muddy water, clean the 3-Ring release system with a mild solution of soap & water. Dry all components thoroughly. Any rusted components must be replaced.

- **1** Every month operate the 3-Ring release system on the ground. Extract the cable completely from the housings and disconnect the risers.
- While the system is disassembled, closely inspect it for wear. Check the white locking loops (the ones that pass over the smallest ring and through the grommet) to be sure they are not frayed.
- Check the Velcro on the breakaway handle and main lift web to be sure it is clean and adequately holds the handle.
- 4 Check the cable ends for a smooth finish. The ends are finished at the factory to have a smooth, tapered surface. This prevents the cable from hanging up in the loop. Check the cable ends and consult a rigger or the manufacturer if a burr or "hook" is present.
- **5** Check the stitching, including that which holds the large rings to the harness.

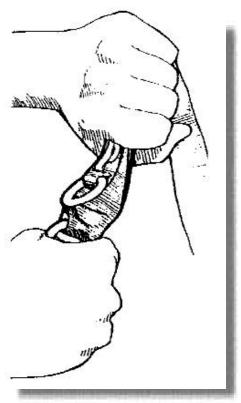


Figure 33



- Check the 3-Ring release housings for solid hand-tacking and proper stretch. The housing ends lay at the chest strap area, pull downward on these housing ends and check that they don't move downwards more than 1/2 inch. Pull the housings from the free end and expect 1-2 inches of movement.
- **7** Take each riser and vigorously twist and flex the webbing near where it passes through each ring (Figure 33). The idea is to remove any set or deformation in the webbing. Do the same thing to the white loop.
- **8** Check the housings for dents or other obstructions. Use the cable to do this.
- Clean and lubricate the release cable with a light oil such a "3-in-1" brand or silicon. Put a few drops on a paper towel and firmly wipe the cable a few times. A thin, invisible film should remain too much will attract grit and dirt, or the oil could become tacky in cold weather. Too much oil will require more force to extract the cable during a breakaway.
- 10 Inspect the fittings at the end of each housing. If one of these fittings were to come off the housing, a riser might release prematurely.
- **11** If any wear or unusual condition is found, consult Mirage Systems Inc. or a rigger before using the Mirage.
- **12** Reassemble the system. Double check it. Make sure the risers aren't reversed.

Mirage Systems Inc. appreciates any comments from users that relate to the safety, operation or maintenance of all aspects of the Mirage harness and container system. Please write to us at the address in the back of this manual.

#### REPLACEMENT PARTS



Mirage Systems Inc. supplies replacement parts for its rig at a reasonable cost. When ordering parts for your rig, include the serial number, type and date of manufacture of your Mirage so the proper items can be quickly supplied. This information is written on the label tucked under the collar beneath the reserve pin cover flap.

## NOTES:

# 

HARNESS / C ONTAINER SYSTEM

# OWNER'S MANUAL

-			
_			
_			
-			
_			
-			
-			
_			
-			
_			

#### **MIRAGE SYSTEMS INC.**

Post Office Box 820 DeLand, Florida 32721 phone: 904-740-9222

fax: 904-740-9444 info@miragesys.com www.miragesys.com