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for certification

Kitto

Manual



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WARNING

This is not a training manual. It is extremely dangerous to yourself and others to use this product without first completing a flying course given by a qualified instructor.

Apco Aviation's products are carefully manufactured and inspected by the factory. Please use the product only as described in this manual. Do not make any changes to the product.

AS WITH ANY SPORT - WITHOUT TAKING THE APPROPRIATE PRECAUTIONS, PARAGLIDING CAN BE DANGEROUS.

1 DISCLAIMER OF LIABILITY

Taking into consideration the inherent risk in paragliding or hang gliding, (free flying and motorized), it must be expressly understood that the manufacturer and seller do not assume any responsibility for accidents, losses and direct or indirect damage following the use or misuse of this product.

APCO Aviation Ltd. is engaged in the manufacture and sale of hang gliding, paragliding, motorized Para/hang gliding and emergency parachute equipment.

This equipment should be used under proper conditions and after proper instruction from a qualified instructor. APCO Aviation Ltd. has no control over the use of this equipment and a person using this equipment assumes all risks of damage or injury.

APCO Aviation Ltd. disclaims any liability or responsibility for injuries or damages resulting from the use of this equipment.

The equipment is designed to perform in the frame of the required certification.

2 INTRODUCTION

The Kitto is a lightweight, seat-board-free pod harness intended of solo free flight use. It is especially useful for XC flying, Hike and Fly, Vol-bivouac, and travel, but is great for general flying, and no compromise comfort, safety or durability was made. Weighing in at 2.7kg including the Lexan sheet, the Kitto is light, but in line with APCO's tradition, it does not compromise whatsoever on durability, safety or comfort.

The origin of the name “*Kitto*”, or “*きっと*” is a Japanese word which translates to: ‘certainty’ or ‘without fail’.

Certainty is exactly what Kitto will give you – both in your flight decisions as well as trust in your equipment.

The Kitto harness is designed to give the maximum amount of feedback from the wing. The airfoam creates a semi-rigid base for the seat, combining the weight advantages of hammock style harness and the “talkativeness” of a seat-board harness. It will be comfortable for hours without compromises.

Kitto is protected by a combination of airfoam + Lexan – unique to APCO, providing superior protection qualities.

The reserve container and bridle arrangement are separately and neatly secured with a zipper closing system which allows for very fast, low friction opening.

The Kitto is compatible with our Flight Deck Lite, which is quick to install and remove as needed. The harness is supplied with a preinstalled three-step speed bar, and a foot bungee for ease of entry after take-off. The harness also packs small, so, when combined with a lightweight glider, will easily fit into a compact backpack such as our Light Backpack 80, and it can even be reversed into its own rear storage compartment, to keep it compact for packing.

3 TECHNICAL DATA

Kitto / Size	S/M	L/XL
Code	44310	44320
Pilot Size	165 – 185cm	180 – 205cm
Pilot Weight (Recommended Max)	95kg	120kg
Certified Max Load	120kg	120kg
Weight	2.71	2.90
Reserve container capacity	3000 - 5000 cc	3000 - 5000 cc
Certification	EN / LTF	

4 CONSTRUCTION

In line with APCO's tradition, the Kitto does not compromise whatsoever on durability, safety or comfort.

We carefully chosen materials, and where they are used on the harness using past experience to guide us, in the quest to make a lightweight yet durable harness.

We chose to use Dyneema lateral support lines rather than webbing, which reduces weight and bulk significantly.

The Airfoam protector forms and integral part of the harness support system, and the harness should not be used without it.

5 PROTECTION

The Kitto is full featured, complete with 17cm lumbar protector, which is an integral part of the seat-board-less design of the harness.

In other words, it is not recommended to fly the harness without the protector installed.

Airfoam

The pilot protection environment of the KITTO is as extensive as is possible in a lightweight pod:

A 17 [cm] Airfoam protector combining a Lexan sheet which aids in spreading the load over the absorbing area of the airfoam, offering the maximum protection available on any competition harness.

The airfoam with its energy absorbing capabilities will reduce impact in the case of an accident or bad landing. The Lexan plate will spread the load of a sharp impact (Rocks etc) over the area of the airfoam and will prevent penetration of object sharp objects (usually tree branches) through the harness.

Reserve

The Kitto's Reserve Parachute System is a result of many prototypes and deployment tests, and the end result is a system that is compact, safe and intuitive to deploy. The reserve is situated on the back of the harness, with a volume of 5.0 liters, it is large enough to accommodate a modern reserve parachute such as our MD SQ, or Mayday LT. The position of the reserve is as close as possible to the body's CG (Center of Gravity) making the harness stay compact and cohesive with the movement of the pilot, both during take-off and in the air.

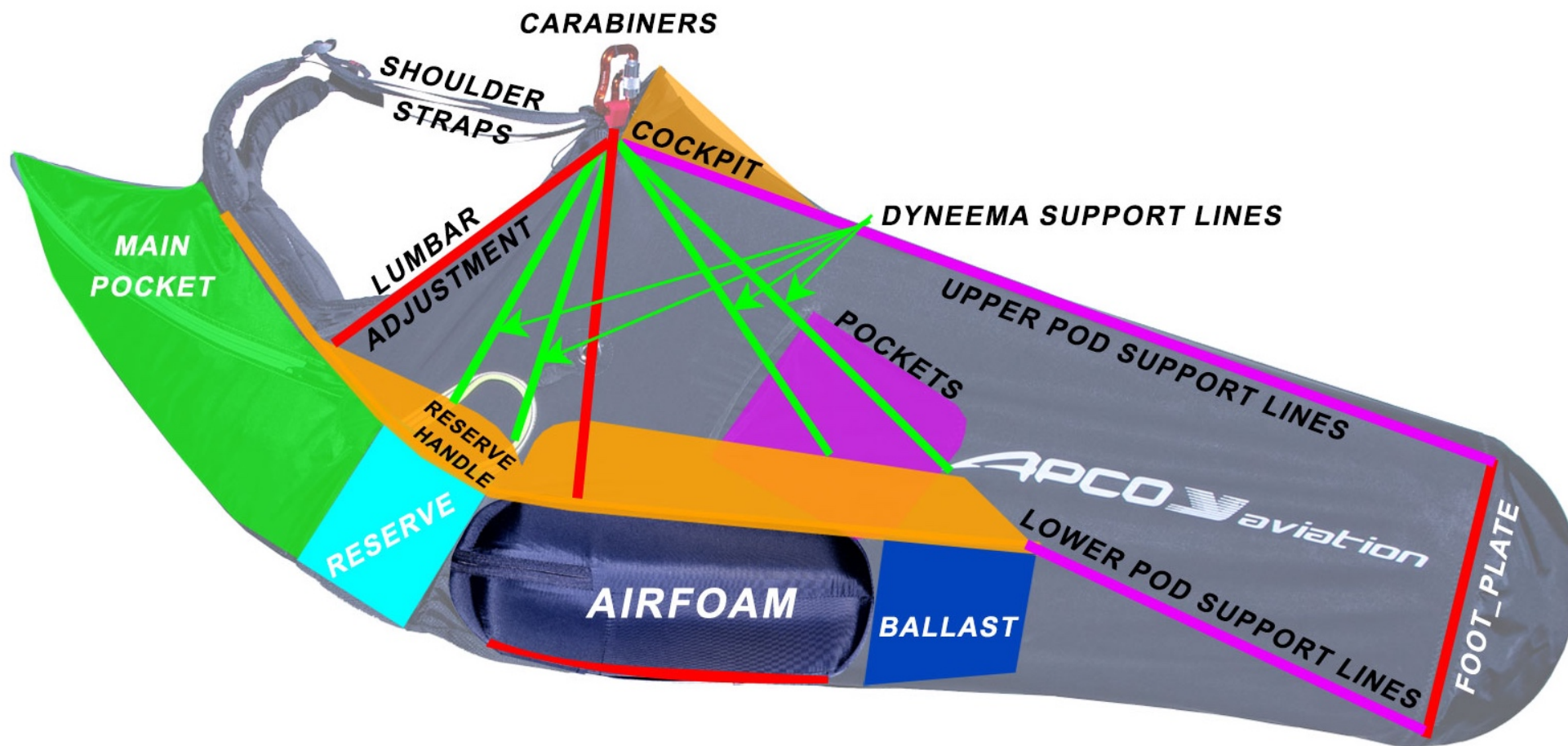
The reserve container and bridle arrangement are separately and neatly secured with a zipper closing system which allows for very fast, low friction opening.

6 PARTS & ASSEMBLY

The following parts and accessories make up the Kitto

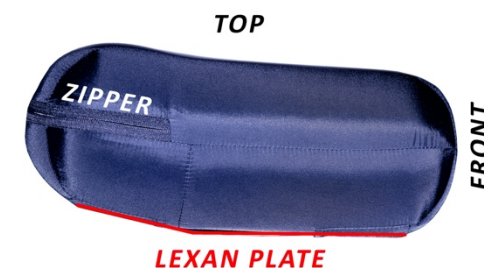
Harness, Airfoam Protector, Lexan Plate, Foot Plate, Three Step Speed Bar, Speed-Bar Bungees, Foot Bungee, Reserve Handle, Reserve Parachute in Deployment bag and optional Cockpit (flight deck). Both the Airfoam protector and the reserve parachute contribute to the comfort of the harness, and it is not recommended to fly the harness without these installed.

The following sections describe the assembly of each item.



7 AIRFOAM & LEXAN PLATE

The Airfoam protector must be installed in the correct orientation, and its zippers must be closed completely for it to function properly. There are two compartments under the seat of the harness, the forward one is a storage / ballast container, and the rear one is the airfoam container. Install the airfoam with the zipper to the rear of the harness, and the Lexan Plate at the bottom. The Lexan Plate should be slipped into the two sleeves on the bottom of the airfoam that will hold it firmly in place under the airfoam protector. The Lexan Plate distributes the load in the case of impact, and prevents point impact injuries if impact is on uneven terrain

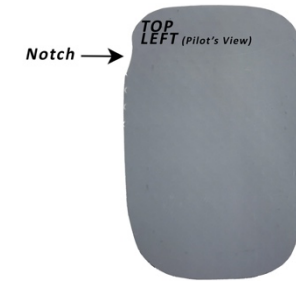


8 BALLAST POCKET

The ballast / stowage pocket is situated under the seat, in front of the Airfoam protector. It has a capacity of about 4 litres, and can be used for ballast or to pack additional items. It is a good place to store a wing packing pillow if you have one.

9 FOOT PLATE

The Polycomb foot plate at the base of the pod must be installed with the correct orientation. There is a notch cut into the plate to accommodate the zipper when it is in the zip is in the closed position. Insert the plate and close the zipper.

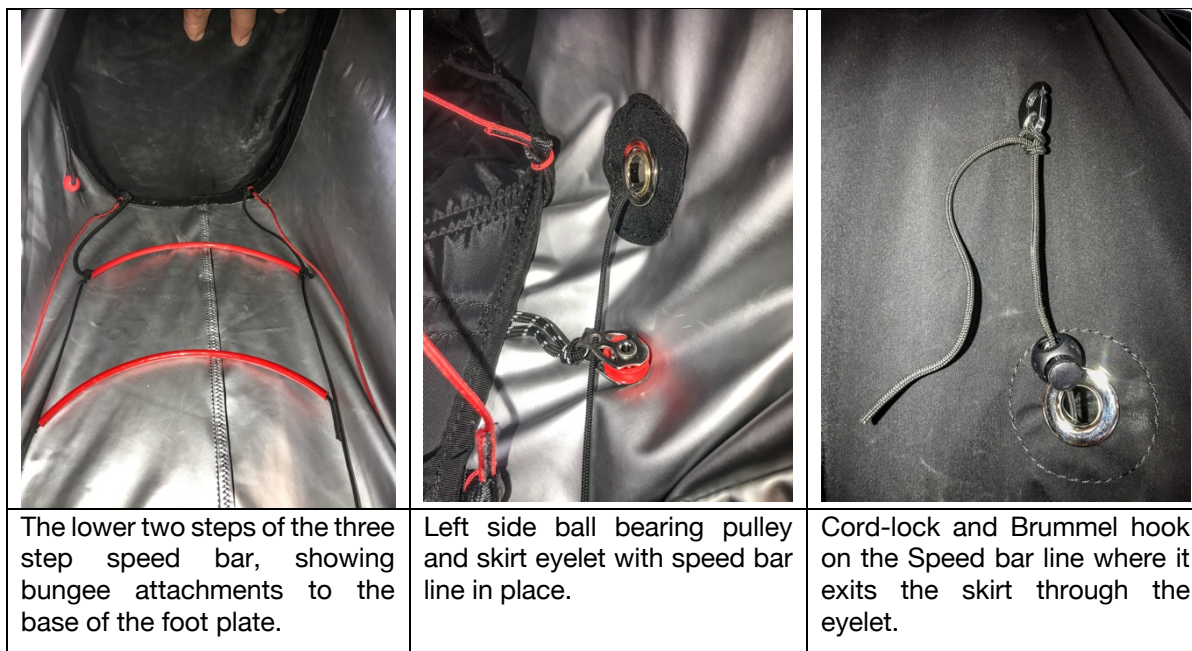


10 THREE-STEP SPEED BAR

The Kitto is supplied with a preinstalled three-step speed bar. There are two bungees installed at the base of the footplate, which are in turn attached to the first step of the speed bar. This holds the speed bar in place so that it is easily accessed during flight. The speed bar lines are routed through a single pulley near the waist of the pilot, and then exits through a eyelet in the side of the harness, followed by a cord-lock, which keeps the speed bar taught during take-off and entering the pod after take-off, and finally a Brummel hook for attaching the speed bar line to the speed system on the risers. Before the first flight in your Kitto, Adjust the speed system while seated in the harness with your gliders risers attached.

CAUTION:

ADJUSTING THE SPEED BAR TOO SHORT MAY CAUSE IT TO BE APPLIED CONTINUOUSLY DURING FLIGHT – MAKE SURE TO TEST THE ADJUSTMENT BY HANGING THE HARNESS WITH RISERS ATTACHED TO THE CHECK THE ADJUSTMENT IS CORRECT AND SAFE.



11 FOOT BUNGEE



There is a bungee attached to the inside front of the pod footplate area, with a plastic ball at its loose end. Tuck the ball into the shoelaces of your shoe. This will aid hands free entry into the pod after take-off.

12 RESERVE PARACHUTE

The Kitto is sold with the reserve handle in place, but with no reserve installed, unless specifically ordered with a reserve installed. The reserve container is compatible with reserves between 3000 and 5000cc. Repack interval according to reserve manufacturers specification. Installation and re-packing of the reserve should be done by a suitably qualified person only, using this manual as a guideline only.

INSTALLATION

Remove the reserve handle and open the zips, leaving the zip sliders in place where they were.



Attach a pair of light universal bridles (42025) to the shoulder reserve bridle attachment points using larks head knots.



Attach the two bridles to the reserve with another larks head knot by passing the bridles through the reserve bridle loop, and then passing the reserve through the loops on the two bridles.



Attach the reserve handle to the deployment bag using a larks head knot and a second larks head completed with the supplied split ring.



Place the reserve in the container with the handle attachments to the lower side as shown. In this way, the handle straps will help to open the zippers immediately. The reserve bridle should be under the reserve, and exiting into the zipped bridle sleeve, which can be closed later in the sequence.



Close the reserve container flap using the two locking loops passed through the eyelets, and locked using the yellow cables on the reserve handle. The handle straps should be routed between the two locks.



Stow the cable ends and reserve handle ends in the neoprene sleeves.



Close the two reserve container zips by running the sliders up to the locking loops (all the way), and then return them to their ends, zipping the zippers as the way.



Attach the Velcro keeper on the handle to the matching velcro tab on the side of the harness next to the speed bar exit eyelet, and finally close the bridle cover zip by bringing the zipper toggle all the way down from the shoulder to the container, and back up again to close the zip, and stow the zipper toggle in the provided pocket on the shoulder at the end of the zipper.

DEPLOYMENT

The reserve is deployed using the right hand and should be done in the following sequence:

Look, Grab, Pull, Throw. The reserve handle is attached to the reserve deployment bag, and the handle must be released when throwing the reserve.

13 FITTING

Lift the harness putting the shoulder straps on first.	Locate the “get-up” style leg straps and bring them up between your legs	Insert the corresponding buckles into the female parts next to the carabiners	Ensure they are both closed correctly	
Next, locate the loop on the left side of the pod closure, and match it with the plastic ball on the pulley on the right, next to the carabiner.	Ensure that it is free and not closed over or under any other parts.	Locate the red loop on the right side of the pod closure, and match it with the plastic ball on the left side on the eyelet near the left carabiner.	Ensure they are both closed correctly.	Finally close the plastic shoulder strap retainer buckle.

14 ADJUSTMENT

It is important to set the harness to your needs before the first flight – make use of a simulator or other safe point to suspend the harness to do this.

The harness adjustments are factory set to the most common configuration, and very little adjustments should be needed to fit the harness to you. Usually, only the pod length and lumbar adjuster may need to be set, while the fine tuning that is possible with the knotted seat and lumbar support lines need only be changed in exceptional cases. The Factory setting of the S/M size is for a person of approximately 177cm, use this as a guideline for adjusting the pod length. If you are for eg, 180cm tall, you may need to lengthen the four pod lines by 1.5cm (180-177/2). Adjust these four lines by moving the knots in the lines. Note there is a mark at the factory settings as a reference. Hang in the harness and check that the pod length is comfortable for you, and that the foot plate is at a comfortable angle for you. Do so using the shoes or boots you usually fly with.

The Lumbar adjustment slider is adjustable in flight, but should be set to your preference before flying the harness.

Leg strap adjusters

Note that both these adjustments, and the amount of / weight of items packed in the back of the harness and in the lower compartment have an effect on the angle of the pod, so try to do these settings in as close as possible a configuration as you will be flying in. Have a friend take a look or take a photo of the pod angle to ensure that it is aerodynamically correct, angled slightly down as shown at about -6° below horizontal to match the glide angle of an accelerated wing.



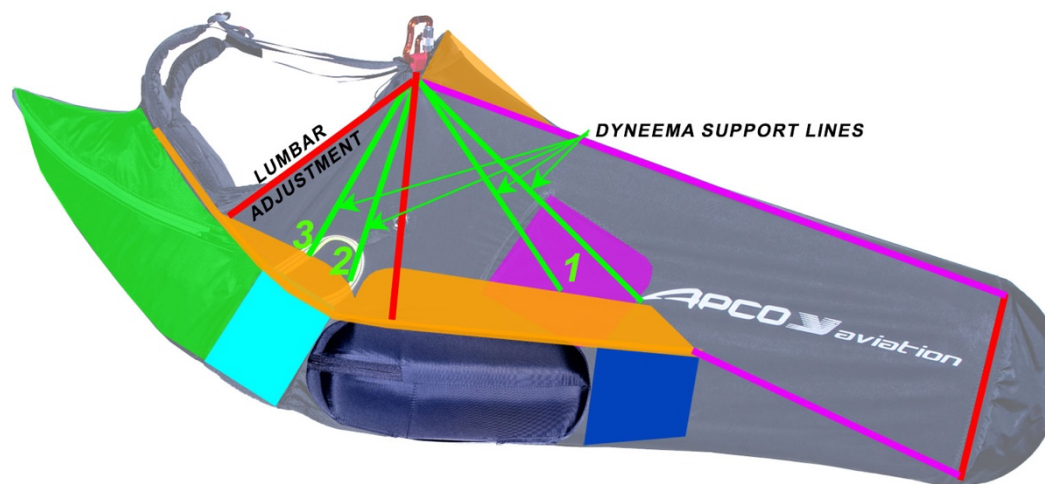
MINIMUM RECOMMENDED LENGTHS – Side Support Lines

We have become aware that shortening the Dyneema side support lines on the Kitto too much may result in damage to the airfoam container cloth / seam under the seat under high G situations. This does not represent a safety issue, but is best avoided.

Below is an illustration followed by minimum recommended lengths for each of the lines. note that the lengths are different for the S/M and the L/XL sizes
We recommend all Kitto users to measure these lines, and lengthen them if they are shorter than the recommended min length.

Line	S/M	L/XL
1	560	590
2	230	260
3	160	175

Line #1 can be measured as a loop as shown in the image below by holding the two attachment loops together and measuring to the center of the pulley. The length should then be 275 or 290 for the S/M and L/XL respectively.



15 ATTACHMENT POINTS



RISERS

There are two main hook-up points for carabiners on the harness, one on the left and one on the right, these loops are marked in red. The carabiners should be installed on these loops, and the risers in turn attached to the carabiners.

TOWING

The Kitto is suitable for towing. The tow release should be attached by larks-head knots around the main attachment loops just below the carabiners, or according to the instructions of the tow release manufacturer.

ACCESSORY ATTACHMENT

There are accessory attachment loops inside the side pockets, suitable for attaching a camera or other items you keep in the pockets.

TOWING

Attach the tow release around the main (red) hook-in points using larks-head knots directly below the Karabiners.

16 TAKE OFF, ENTRY, FLIGHT & LANDING

After takeoff, first ensure your flightpath is clear and safe before entering your legs into the pod. To enter the pod, extend the leg that had the bungee / ball tucked into the laces, and then put the other leg into the pod, then follow with the extended leg. Once in the pod, rest your feet against the foot plate, and relax your body into the harness. The speed bar will be extended inside the pod in a comfortable position to reach with one foot. Be sure to allow enough time to exit the pod before landing. To exit the pod, lift one foot out of the pod while keeping it extended with the other, then follow out with the second, and slide forward into a standing position.

PREFLIGHT CHECKLIST

- Harness is in airworthy condition
- Reserve container closed and handle in place
- All buckles and closures locked in correct sequence
- Wing attached to harness correctly
- Speed System Attached
- Cockpit attached and secured (if present)

17 COCKPIT / FLIGHT DECK

The Flight Deck is an optional accessory which can be ordered with the harness, or separately.

INSTALLATION

The Flight deck is installed into the pocket on the pod. It is attached on the top with a popper, and below with a magnet. It also has a backup loop which should be clipped into the right-hand side carabiner.

USE

The Flight deck has an inflight accessible zipped pocket, which has attachment loops inside for securing items in the pocket. There is ample space for instruments on the Velcro deck, and there are attachment loops for securing devices.

18 INSPECTION AND MAINTENANCE

INSPECTION

Apco recommends annual inspection of all its products, including the Kitto harness. This should be done by Apco or a qualified agent. More frequent inspection may be needed if the harness is used intensively, and after any incident which may have damaged the integrity of the harness. During inspection, all the webbing parts, structural cloth and seams / sewing must be inspected for wear or damage. The reserve system must be checked to ensure that the deployment is free and easy and that the zippers are not damaged. Buckles and carabiners must be checked for damage.

CLEANING

Do not use any chemicals or solvents on your harness. If the harness is exposed to salt water, disassemble all parts, rinse in fresh water and dry out of direct sunlight. Cleaning can be done with a damp cloth as and when needed. Never store your harness if it is wet or damp - dry it first. If the reserve container / reserve is wet, it must be opened, dried, and repacked by a qualified person. If the reserve is exposed to any liquid other than fresh water, it may be permanently compromised, and must be inspected by a professional before being re-packed and installed in the harness.

REPAIRS

Repairs should be carried out by a qualified person. Extra care must be taken if work is done in the area of the reserve parachute, and no sewing should be done while the reserve is in the harness, as it may be trapped in a seam.

LIFECYCLE

Although the Kitto is a durable product, and should last you for years of flying, discretion must be used, and it should be retired before it becomes unsafe for use. Disposal should be in an environmentally conscious manner in line with your country's regulations.



Take Air
from the Apco Team