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Spark II

Manual

APCO Aviation
Setting Future Standards

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1 Introduction

The SPARK II Harness is the result of Apco's policy of ongoing research, development and product improvement. Having realized that the market demanded a harness with maximum pilot protection without excessive weight, volume and being cumbersome, the engineers in the R&D team at Apco set about designing the SPARK II.

The SPARK II has a unique pilot protection system, combining the usual airfoam type protector with a Polystyrene side impact protector which offers the maximum protection available to a paraglider pilot today.

Apart from the state of the art Pilot Protection, the SPARK II offers other great features such as the floating seat board which is connected to the speed system to improve comfort and aerodynamics while you are accelerating, and makes it very easy to slip in and out of the harness after take-off and before landing.

The New Harness geometry gives great comfort, with perfect adjustment possibilities, while eliminating excessive webbing and straps. The adjustment straps are kept tidy with a unique system that prevents them from flapping in the wind. Two PVC back plate Battens aid in spreading the load evenly along the back, increasing comfort while reducing the amount of webbing supports required.

The SPARK II has a bottom integrated reserve with the handle on the right side of the harness, which gives both an easy accessible reserve and a well balanced harness in the air.

The clean aerodynamic form of the SPARK II reduces drag created by the pilot and Harness, giving you higher performance all round.

Harness Sizing

The SPARK II is currently available in three sizes for pilots from under 150cm up to 200cm.

Small/Medium	Up to170cm	(43102)
Large/X-Large	165 to 185cm	(43202)
XX-Large	180cm and up	(43302)

Harness Colors

The SPARK II is available in several Color combinations - here are the options:

Red	Orange	Lime	Turquoise

Disclaimer

In designing and manufacturing the SPARK II and any of its subassemblies or accessories, our aim has been to create a harness system that will allow the user to engage in the sport of paragliding in a safe and comfortable way.

However, paragliding is a high-risk activity, which may cause or result in serious injury or death. When you take it upon yourself to participate in the sport of paragliding, you accept the risk inherent therein. You may reduce the risk by receiving proper instruction and by following the basic safety requirements. The SPARK II is a sensitive device, which may easily be damaged. Before each flight, the harness should carefully be inspected for evidence of damage or wear. Any deviation from the manufacturer's specifications concerning maintenance, repair, alterations and modifications constitutes willful negligence.

It is expressly understood and agreed that by the use hereof by the buyer or any subsequent user that Apco Aviation Ltd. And/or the seller shall in no way be deemed or held liable or accountable and makes no warranty, either expressed or implied, statutory, by operation of law or otherwise, beyond that expressed herein.

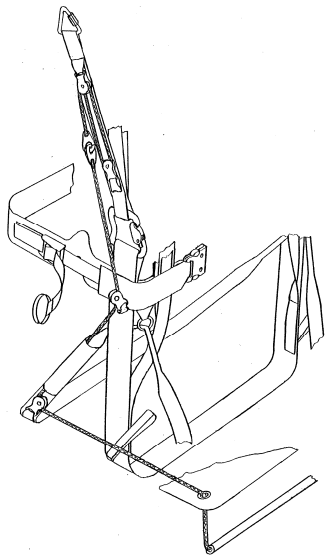
Paragliding equipment is sold with all faults and without any warranty of merchantability or fitness for any

purpose, expressed or implied. Apco Aviation Ltd. Disclaims any liability in tort for damages, direct or consequential, including personal injuries, resulting from a malfunction or from a defect in design, manufacturing, materials or workmanship, whether caused by negligence on the part of Apco Aviation Ltd. or otherwise.

By using any Paragliding equipment manufactured or sold by Apco Aviation Ltd., or allowing it to be used by others, the buyer and/or user waives any liability on the part of Apco Aviation Ltd., for personal injuries or any other damages arising from such use.

The liability of Apco Aviation Ltd. is limited to the replacement of defective parts found under examination by manufacturer to be defective in material or workmanship within 120 days after purchase, and which has not been caused by an accident, striking, improper use, alteration, tampering, excessive use, misuse or abuse.

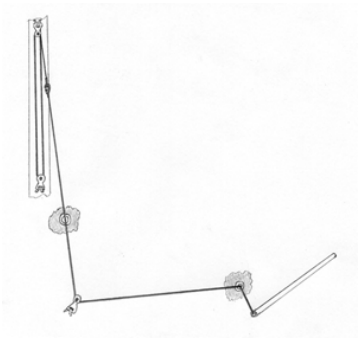
The damages of the buyer and/or user shall be deemed liquidated in the costs of replacement as above.



Speed System Assembly

The Speed system rigging and geometry on The SPARK II differs from previous Apco Harnesses, in that the SPARK II has a floating seat board , that is lifted when the speed bar is applied. This results in a more comfortable and aerodynamic position while in accelerated flight. Please observe the IMPORTANT Warnings on this page regarding the use of your speed system in flight.

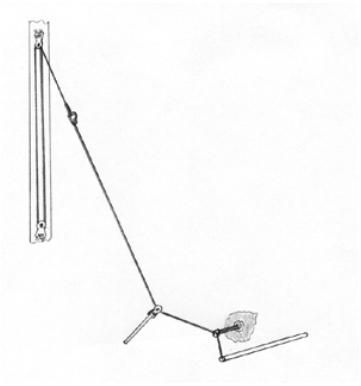
There are two different ways to rig your speed system through the SPARK II harness; This allows you to fully customize your speed system providing optimal range and ease of use. Follow the instructions and advice below to choose the best configuration for your particular needs, and to set up the speed system.



1.1 Option 1

The **Standard** (Recommended) method to rig the speed system on your SPARK II harness is as follows:

Remove the brummel hooks and toggles, then thread the accelerator cords through the grommet (eyelet) situated in the fabric at the front corners of the seat. Then pass the cords through the pulleys attached to the rear side of the seat (pulley A).Now pass the cords through the grommet (eyelet) above the pulley you have just threaded through situated in the neoprene at the sides of the SPARK II harness. Now you can rerig the toggles, attach the brummel hooks to the cord and attach it to the riser. Check the IMPORTANT Adjustment Instructions, which follow the alternative rigging instructions below.



Option 2

Using this method, the assistance given to the floating seat by the speed system is over ridden. This eliminates the problems of the brummel hooks meeting the upper pulley before the full range of the speed system can be applied. The floating seat board will still move as before, but not quite as far.

To rig your speed system with this method, The speed system can now be rigged by removing the brummel hooks and toggles then threading the cords from the speed bar, through the steel rings attached by elastic cord at the front corners of the seat board, then through the pulleys attached to the webbing at the sides of the seat (pulley B). Now you can rerig the toggles, attach the brummel hooks to the cord and attach it to the riser. Use the IMPORTANT Adjustment Instructions, which follow below.

Adding a Second Speed Bar Step

A Second Step increases your speed range by allowing you to adjust the upper (second) step much closer to the seat board, to a position where it is difficult to reach it without first applying the lower (first) step.

An additional step (bar) can be purchased from your Apco dealer.

Attach the additional step to the original step so that it hangs approximately 30cm below the upper step and then shorten the entire system according to the Adjustment Instructions below.

1.2 Adding WONDER BAR

Instead of using a main and second step it is possible and recommended to use the revolutionary WONDER BAR that contains a stirrup and a second step, all in one.

When the WONDER BAR is connected to the harness it's held in a position which allows the pilot to insert his foot into the second step easily without ever needing to take your hands off the brake. This system increases flight safety and glider speed range.

In order to connect the WONDER BAR, simply replace the regular stirrup following above instructions.

NOTE: When connecting, make sure the black loop is facing down and the red loop is facing forward.

Speed System Adjustment

It is very important to ensure that your speed system is adjusted correctly before making your first flight with your new harness, and/or after making any changes or modifications to the system.

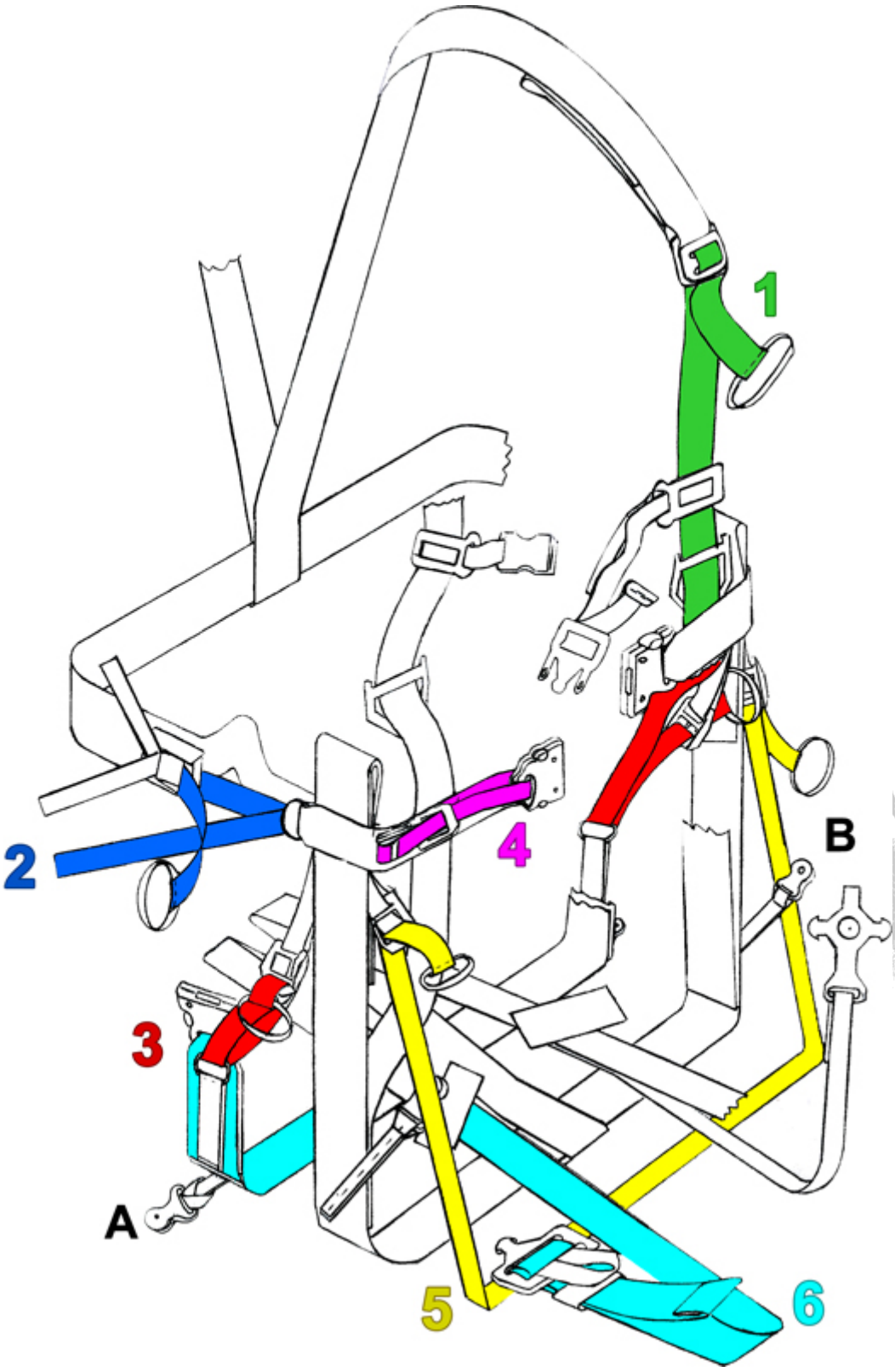
The best way to correctly adjust your speed system is to hang your harness from a suitable structure, which can support your weight. Attach your risers to the harness and sit in the harness while a friend holds the risers up to simulate a flying position. If the speed system is correctly adjusted, the speed bar will be situated approximately 10cm from the grommets (eyelets) at the front of the seat board. If you have added a second step to your speed bar, the upper bar can be situated much closer to the seat (approx. 2cm). Under no circumstances should the bar be any closer to the seat. This will cause the cords to be tightened and will permanently apply the speed system during flight. It is also very important to check that the speed system is not applied when you rotate into a standing (as for take-off and landing) position. The 2cm of space above the upper step is to avoid the problems mentioned above.

The adjustment for systems using the chain link/clamps is done by shortening or lengthening the cord at the point where it meets the speed bar, or on some gliders (Non Apco) it is done at the point where the lower cords meet the chain links/clamps. Adjust the cords so that they correspond with the specifications above.

Adjustment of Alternative 1, is normally done by moving the knot in the cord above where it emerges from the upper pulley-retaining loop in the riser. Adjust the system according to the above specifications.

Speed System Warning

Once you have set up your speed system, make sure to test it in calm conditions, and never apply the speed system while close to the ground or in turbulent conditions.


1
2
3
4
5
6
A
B

Adjustments

The paragraph/section numbering below refers to the labels in the diagram above.

The Shoulder Strap (#1) Adjusters are similar to most Apco Harnesses. These straps are best adjusted when standing with the chest and leg straps closed. Tighten the shoulder straps so that they are tight while standing upright. While in flight it is normal for these straps to be a little slack.

The Back/Side Strap (#2) Adjusters are similar to previous Apco Harnesses. They are best adjusted while the harness is suspended from a suitable structure, before the first flight is made.

The Seat Angle (#3) Adjusters are connected to the floating seat webbing, and should be adjusted while seated in the suitably suspended harness before the first flight. Make sure that moving in and out of the harness is easy and comfortable once you have adjusted these straps. This adjustment will also influence the position and weight shifting (when the seat is higher the weight shifting is more sensitive).

The Chest Strap (#4) Adjustment can be made at any time during flight or before. It can be used in any setting between its minimum and maximum, without it changing the seating position. The primary function of adjusting this strap is the **ABS** semi cross-bracing. At a wide setting there is only a little cross bracing, giving maximum weight shift capabilities, while at the tightest setting it offers maximum cross-over stability, with reduced weight-shift steering capabilities. The chest strap adjustment has a 1:2 reduction, making it easy to adjust while under tension, i.e. while flying.

The floating seat locker (#5) Adjustment can be made at any time during flight or before. It is connected to the floating seat and when tightened it will lock the pitching of the seat.

The Leg Straps (#6) are easily adjusted on the ladder lock buckles. Adjust the leg straps while standing upright in the harness, after closing both the chest strap and leg straps buckles. If the leg straps are on their longest setting and you cannot stand upright comfortably, the shoulder straps are too tight. It is preferable to have the leg straps short, and the shoulder straps longer. If the leg straps are too long, it will become difficult to rotate into a seated position after take-off.

2 Reserve Parachute

The SPARK II emergency parachute differs from previous Apco harnesses in that it is a bottom mounted system. This system has the advantage of being very easily accessible when you need it. In principle the assembly and fitting of the parachute into the harness is the same as most of the other Apco Harnesses. The installation must be done by a qualified person, and these instructions are only to serve as a guide to the proper fitting of your reserve. Remember that ultimately it is your responsibility to ensure that these instructions are followed correctly, and that your reserve will be working when you need it. After installation, it is recommended to do a test deployment while seated in the harness, suspended from a suitably strong structure. The reserve should be easy to remove from the flaps by pulling it out by the deployment handle. The Deployment Handle code is (46400). The Deployment Bag code is (44120T) and is the same as used on our EDGE and other APCO Harnesses, and some of our other products. This makes it very easy to transfer a reserve from another Apco harness or external container to the SPARK II Harness.

3 Reserve Assembly and Installation

Your harness is supplied with a deployment handle fitted in the correct way. Remove the handle by pulling it out of the elastic retainers. Attach the handle to the deployment bag (44120T) supplied with your Mayday reserve parachute. If your Reserve is not already fitted inside the deployment bag, follow the instructions for doing this on the Mayday page.

Step 1: The handle has a split ring fixed to one of its attachment loops. Thread the first (without the Split Ring) attachment loop through one of the attachment points on the deployment bag. Pass the handle through the protruding loop to form a lark Head knot as shown.

Step 2: Thread the second attachment loop through the other attachment point on the deployment bag, making sure to center the split ring on the loop, passing it through first. Use the split ring to complete the second "larks head knot" by attaching it to both the strips of the attachment loop on the other side of the attachment point. The handle should now be attached at two points to the deployment bag as shown.

If your reserve parachute is fitted / supplied in a non-Apco deployment bag, it is possible to install it into the SPARK II, provided that the deployment bag has at least one attachment point for the deployment handle. There should be no other handle fixed to the deployment bag, if there is one, it must be removed. The attachment point may be centrally located on the deployment bag. Attach the Deployment Handle to the Non-Apco Deployment Bag by simultaneously threading both the attachment loops of the handle through the attachment point on the deployment bag, and then pass the handle through both of the attachment loops to make a (double) Larks-head-knot, fixing the deployment handle to one point by both attachment loops. It is necessary to remove the split ring from the one attachment loop, since it will not be used in this case.

Step 3: Attach a #42024 Universal harness bridle to the reserve connection lop located on each shoulder strap of the harness **(THROUGH THE YELLOW WEBBING LOOP).**
Use the small connection loop of the bridle, keeping the large loop for later use.
For GMD / GMD SLT attach the built in bridle directly to the reserve connection lop of the harness using a suitable maillon, secure it with a heat shrink.

Step 4: Join the two bridles, pre attached to the harness and guide them through the Velcroed sleeve along the right side of the harness, up to the rescue pocket.

Step 5: Place the two big loops of the #42024 bridles together, attach the reserve parachute bridle to the center of the two #42024 bridles using a larks head knot.

** for MD LT/SLT connect using the maillon supplied with the MD LT/SLT **

Step 6: Neatly arrange the bridles at the connection point as on the picture

WARNING! : Tighten each bridle separately to ensure no slack is left on the bridle loops.

Preferably secure it with a heat shrink tube to keep it in place.

Step 7: insert the reserve with handle attachment side facing downwards in to the compartment above the inner cloth tongue.

WARNING! Do not place the reserve with handle attachment side facing upwards

Step 8: pull the cloth tongue in between the attachment loops of the deployment handle.

Step 9: Individually thread two pull cords through the two closing loops located on the cloth tongue (one through each loop). The pull cords must be between the attachment loops of the deployment handle.

Step 10: thread the two pull cords through the upper closing flap grommets.

Step 11: fit the deployment handle into the upper flap by pushing its ends (cable first) into the elasticized sleeves with the locking cables protruding on the other side. The webbing part of the handles should be pushed almost all the way into the elasticized sleeves (stop about 8-10mm before the opening where the cable is protruding). Pull the closing loop through the grommets and push the locking cable through it

Step 12: Carefully remove the pull cords by passing one of its ends under the locking cable and pulling it out slowly.

Step 13: neatly close the bridle sleeve (pressing the Velcro together) holding the lower flap corner and attaching it by Velcro to the top flap front end.

4 The Reserve Deployment

Once you have decided to deploy your reserve parachute, place both brake handles in your left hand. Look for the reserve handle and firmly take it with your right hand. Pull upwards and sidewards on the handle to release the two locking cables and subsequently releasing the reserve from the harness container. You will now be holding the reserve closed inside the deployment bag, hanging from the deployment handle. Look for a clear area and throw the reserve away from you and the glider.

It is preferable but not absolutely essential to throw the reserve away from the direction of rotation, and with the air stream passing you. This will speed up the deployment process.

Once the reserve has opened, neutralize your glider either by pulling it in completely, or by pulling the brakes, B or C lines to stall the glider. If you do not do this, the glider and the reserve will oppose each other and increase your sink-rate considerably, and there will be an increased chance of the two becoming entangled.

We recommend that if your glider is in a flat spin and you have the necessary height, that you try to stop the spin (i.e. Full stall, B-Stall etc.) before deploying your reserve, since there is a much greater danger of entanglement if you are in a flat spin. The fastest deployment will be if you are in a spiral.

We recommend practising the deployment of the reserve, before first use of the harness in flight.

Pilot Protection

The SPARK II has a pilot protection system, combining the usual airfoam type protector with a lexan sheet (47143) which aids in spreading the load over the absorbing area of the airfoam and a Polystyrene side impact protector which offers the maximum protection available to a paraglider pilot today.

The lexan sheet (47143)

should be inserted into the pocket on the rear side of the Airfoam (42150)

The Airfoam Protector (42150) for the SPARK II was derived from the very successful Airfoam for the Silhouette and Contour Harnesses.

Due to the floating seat board system used in the SPARK II, it is important to install the airfoam correctly, so as not to restrict the movement of the seat plate. The two velcro attachment straps must be matched perfectly with the velcro on the airfoam, leaving an open space between the airfoam and the pilot's back. Only the Airfoam (42150) specifically designed for the SPARK II should be used. It should be inserted through the main bottom zip entrance to the harness and fixed in place with the two webbing velcro tabs on the sides and one patch of velcro centrally located higher up on the back, in the upper rear section of the harness.

Note: Do not install the Airfoam protector under the webbing in the upper section of the harness.

Side Protector (46160)

Fitted by opening the zip running along the bottom of the harness, below the seat board, and connecting it to two rubber bands through the slits made in the side protector (make sure to put the rubber band through the slit from the flat side of the side protector to the round side of it). Slide the side protector to its place and close the zip running along the bottom of the harness.

Storage Space

The SPARK II has ample storage space in its rear compartment, has a large side pocket on the left hand side and some smaller additional pockets.

The Main Back Compartment

Is accessed through the top zip. This storage is most useful for articles that you will not need during your flight, i.e. your Glider Bag.

The Shoulder Pocket

Is useful for :
A Camera, Radio, or a mobile phone.

The Top Side Pockets

Are useful for items that you will need to access during your flight, i.e. Camera, Radio, Map, etc.

The Side Pocket

Is useful for items that you will need to access during your flight, i.e. Camera, Radio, Map, etc.

The Inside Pocket

Is useful for items that you will need to access during your flight, i.e. Camera, Radio, Map, etc.

5 Packing your harness

1

In order to enjoy your harness for many years please pack it according to the following instructions:

1. Open top container zip.

2. Push top cover inside the top container.

3. Put your glider upright/seated inside the harness.

4. Buckle the harness.

5. Put the harness inside the bag.

2

3

Accessories

Several Harness accessories are available for the SPARK II. If you have upgraded to SPARK II from another Apco Harness, you will be able to use your accessories from your old harness on your SPARK II. All the SPARK II accessories are compatible with Apco's previous and current harnesses.

5.1 The Foot Rest (44015).

Really useful for improving your aerodynamic shape, improving the weight shifting and taking the load off your feet.

5.2 The WONDER BAR - 2 step integrated stirrup

Instead of using a main and second step it is recommended to use the revolutionary WONDER BAR that contains a stirrup and a second step, all in one.

When the WONDER BAR is connected to the harness it's held in a position which allows the pilot to insert his foot into the second step easily without ever needing to leave the hands from the brake. This system increases safety of flight and glider speed range.

5.3 The Radio Pocket (44003).

Inside the main back compartment of the SPARK II, there is a "D"-Shaped plastic retainer, to which the radio pocket can be attached. Above it on the left shoulder, there is a neoprenne patch which can be cut to enable you to pass a connection from your speaker-mike or headset to your radio.

Inside the main back compartment of the SPARK II, there is a "D"-Shaped plastic retainer below/behind the left shoulder, to which you can attach your "***Camelback***" or similar water container.
Do not attach a ballast container in this position, it will alter the center of gravity of the harness and your sitting position will change. We recommend installing a maximum of 2kg to this point.

5.4 Flight Panel Cockpit- Top Part (80053)

The flight deck has been specially redesigned to suit all the APCO harnesses as well as undergoing a complete overhaul. It is designed to be used when flying in pod harness and also will accept zipped on ballast bag 9L at the bottom or can be integrated with zipped on emergency parachute container (instead of ballast bag)

As with all other cockpits, the top part is designed to hold flying instruments. The floor is velcroed to keep the instruments in place and the floor angle is adjustable for optimal viewing possibilities. The instruments are covered with a padded flap.

Code: 80053 - Flight Deck Top Part
Code: 80052 - Bottom Ballast Bag
Code: 20005 - Inner Ballast bag to be ordered separately, if required
Code: 80054 - Emergency parachute Front container

Inspections

These can generally be divided into two kinds, namely: - short preflight inspections, done before each flight and the more thorough inspections that are carried out periodically in order to ensure the airworthiness of the harness.

Preflight Inspections

- Paraglider is connected correctly and both carabiners secured by their locking mechanisms.
- There is no visible damage to the harness that could affect its airworthiness.
- The reserve parachute container is closed correctly with both locking cables in place.
- The deployment handle is inserted all the way into the elastic pockets.
- All pockets closed properly and all loose items tied down safely.
- Both quick lock buckles should operate and should be closed securely.
- All adjustable straps are set as you desire and symmetrical.

Periodic Inspections

The harness should be inspected for airworthiness on every reserve repack, or if there are any signs of damage or wear to the harness structure. Inspect the harness after any crash or bad landing or takeoff where it could have been damaged. Also inspect the harness after long periods of storage, or if another pilot has used the harness not directly under your supervision (you never know what it has been through). Also inspect the harness if for any other reason there may be damage to it. In any case the harness must be thoroughly inspected every 12 months as a minimum. The points to check are as follows:

All webbing and straps are inspected for damage or wear and tear and repaired or replaced if necessary. Special attention should be paid to points where wear may not be easily seen such as the inside of the carabiner hook up points and the loops of webbing holding the quick lock buckles and also the various Kamet buckles and adjusters.

All sewing, sewing patterns and sewing lines are inspected and must be intact. Should any sewing show signs of un-ravelling, wear or excess stress, it must be attended to before the next flight. A qualified person using the correct thread must carry out repairs.

Elastic retainer cords are inspected and replaced if necessary. Pay attention to the elastic sheath holding the reserve deployment handle in place. It must retain its elasticity and hold the handle properly in place.

All buckles must be in a safe working condition, including the carabiners, quick lock buckles and kamets.

The seat and back plates must be in one piece and without cracks.

All sub assemblies are in good condition. Take special care to inspect the parts that belong to the reserve container system.

Dirt can be cleaned off gently - you can use a damp rag or wash the harness with a mild soap. Make sure you remove all the sub assemblies, seat board, back plate, reserve parachute and foam padding etc. Drip-dry the harness in an open shady place.

Open the harness and inspect all interior parts, including the fabric, webbing straps, buckles, kamets, and all sewing.

If everything is found to be in an airworthy condition you can re-assemble the harness and pack the reserve, if not the necessary repairs must first be carried out before the harness can be approved and used. Remember that a seam that has started unravelling may go a long way before the next inspection!

All materials needed for repairs are obtainable through your dealer.

Maintenance and Repairs

By keeping your harness clean and airworthy you will prolong its life and retain a higher resale value, if you ever decide to upgrade it.

We have carefully selected the materials we use to provide you with a durable harness that will be able to give you years of use. By following some of the advice given below you can further extend the life of your harness and its accessories.

Follow all recommendations regarding inspections and maintenance in this manual.

Always keep the harness in a protective bag (glider bag) when not in use, and do not expose it to UV rays unnecessarily. Sunlight will weaken the materials and cause fading of colors.

Never store the harness in a wet or damp location or if it or a part of it is wet or damp. First let it dry out completely. Store it away from direct sunlight, a dark place is best.

Avoid leaving your harness exposed to the elements while not flying, pack it away or at least cover it.

Wipe away any dirt and dust regularly. Do not allow dirt to settle permanently. Use a plastic bristle brush and a mild soap to clean it if necessary.

Do not drag or pull the harness on the ground, be especially careful on rocky areas.

Use a competent launch assistant when necessary. A failed takeoff is one of the most common times to damage a harness.

If you discover any damage to the harness you should make an effort to repair it as soon as possible. Even apparently minor damage can continue tearing or unravelling, complicating the repair or even becoming dangerous.

If any of the elastic retainers which keep the shoulder and leg straps in place wear out they can easily be replaced. You can obtain these or any other spare parts from any Apco dealer.

Any repair that involves reinforcing or replacement of vital parts of the harness should be carried out by a facility recommended by Apco. Some materials on the harness will wear out sooner than others.

Thank you for your patience in reading this manual - we would like to hear your comments and criticisms as you get used to your harness. This will help us to continue developing better products for you in the future.

Take Air