LIGHTNING PM

USER MANUAL

8/25 Rev. 0.1

APCO AVIATION

CONTENTS:

WARNING

THIS IS NOT A TRAINING MANUAL. IT IS EXTREMELY DANGEROUS TO YOURSELF AND OTHERS TO ATTEMPT 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.

DO NOT ATTACH RESERVE PARACHUTE CONTAINER OR BRIDLES DIRECTLY ON TO THE HARNESS.

1 DISCLAIMER OF LIABILITY

Taking into consideration the inherent risk in paragliding (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 paragliding, motorized paragliding 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 Lightning PM is a low hang point light weight paramotor harness.
Its key feature is a sliding/variable main hang point that introduces increased comfort during takeoff, flight and landing. One of the benefits to this feature is wider seat height and depth adjustment range, making it compatible with a wider range of pilots.
The lightning PM harness is constructed using lightweight Dyneema high load webbings and durable nylon body, making it one the lightest paramotor harnesses.

The Lightning PM harness was designed to be adjustable in key areas of the geometry:

- Seat height
- Seat depth
- Lower back
- Upper back

General adjustment options:

- Front strap
- Leg straps
- Shoulder straps
- Chest strap
- Mid back to frame straps

Multiple adjustment options and extra seat and back padding incorporated into the design, enable pilots ranging from S to XL size to enjoy the comfort of the Lightning PM harness during both short and long flights.

3 TECHNICAL DATA

Code	43700
Pilot height	155 – 195 cm
Max pilot weight	120 kg
Weight incl. seat board	1.67 kg
Main webbing material	Dyneema/Polyester
Main body material	Nylon Ripstop

4 CONSTRUCTION

In line with APCO's tradition, the Lightning PM does not compromise whatsoever on durability, safety or comfort.
The materials have been carefully chosen using past experience to guide us, in the quest to make a very lightweight yet durable harness.
High load Dyneema webbing constructs the main cage and the secondary backup circuit.
The body is made of durable ripstop nylon. Metal parts are made from Aluminium/Stainless steel/Lightweight metal alloy.

5 SAFETY

The Lightning PM harness has several built in and optional safety features:

Reserve Container
The Lightning PM harness does not have built in reserve parachute attachment points. DO NOT directly attach any bridles or reserve container to any of the attachment points on the harness.

The safety webbing cage incorporated into the harness design will keep the pilot attached to the wing in a case of a frame or harness component failure. This backup webbing circuit was designed to address the following cases:

- Main hang point – main sliding webbing failure
- Main hang point - secondary webbing on/or maillon failure
- Top back to frame attachment webbing failure
- Harness main body fabric rapture
- Frame arms failure
- Main arms bow shackle failure

6 PARTS & ASSEMBLY

1. Top shoulder strap with slider (to frame attachment)
2. Mid back straps (to frame attachment)
3. Main hang point straps (to swing arms shackle)
4. Upper back straps (adjustable)
5. Lower back straps (adjustable)
6. Front strap adjuster
7. Front strap
8. Front buckle strap
9. Right leg buckle strap
10. Left leg buckle strap
11. Bottom shoulder bungee straps (to frame , adjustable)
12. Seat height strap (adjustable)
13. Back Velcro (adjustable)
14. Leg straps (adjustable)
15. Back foam pocket + harness ID
16. Side pocket attachment zipper
17. Seat speed system pulley (removable)
18. Top speed system pulley (to arm)
19. Speedbar stowing magnets
20. Chest strap (adjustable)
21. Safety straps (harness to main carabiner)
22. Side bungee cord
23. Seat stow D-ring
24. Side pocket (optional)
25. Seat extension cushion


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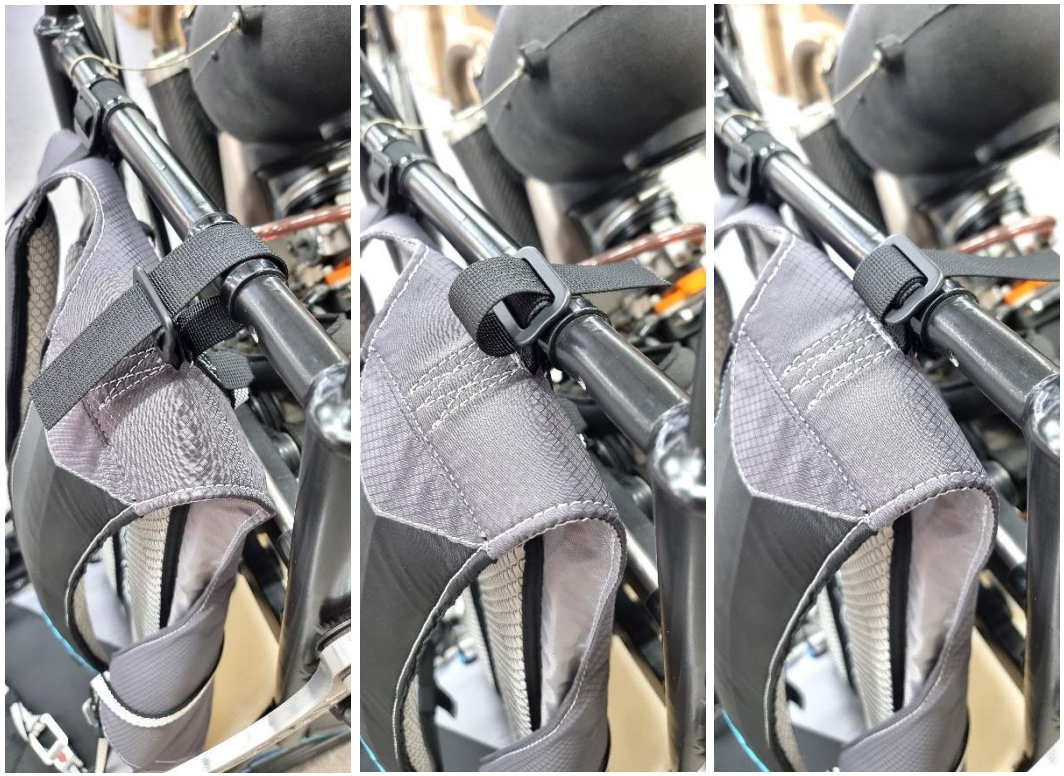
6.1 Harness installation

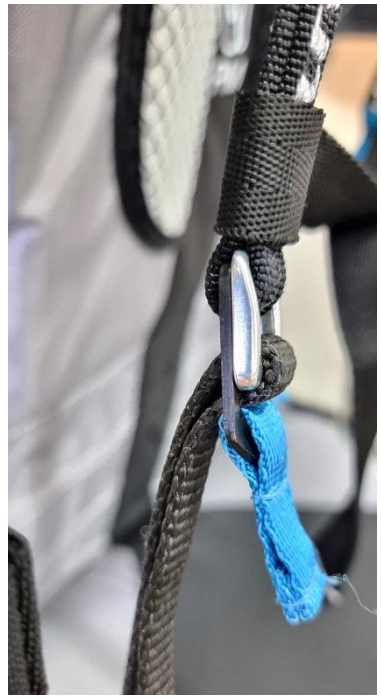
The Lightning PM should fit almost all low hang point frames with stainless steel bow shackle hang points on the arms.
The Harness is equipped with single top back attachment point but is adjustable to compensate for top hang height. Due to the large variety of frames and attachment methods available today, we recommend following the specific frame manufacturer's instructions for correct fitting and adjustment of the harness to the frame, or use your dealer's assistance.
It is highly recommended to use deep and wide bow shackles on the arms for optimal operation and longevity of the main sliding Dyneema webbing. (right item in the photo)

1. Attach the **Top shoulder straps with the slider (1)** to the dedicated point on your frame. Run the loose strap through the slider and then run the strap through again to lock the position. It is possible to use the loop with the slider by itself without the additional stitched strap if you want to run a hang offset bar like some frames use.

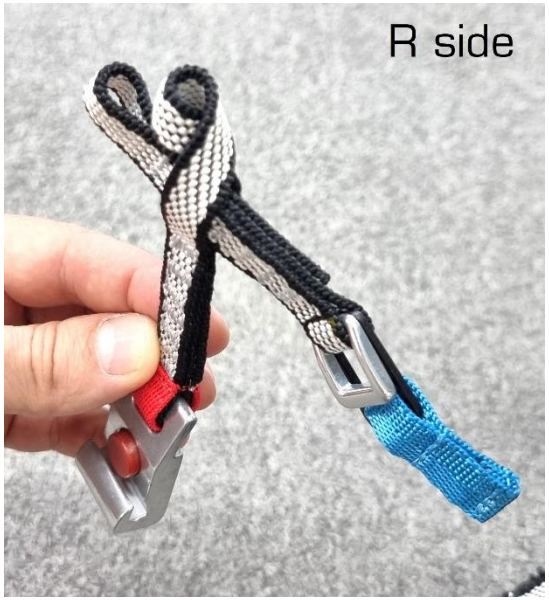


2. Install the **Mid back straps (2)** to the frame using the slider. Leave enough slack in the loop wrapped around the frame to allow free vertical movement of the loop. The length of the strap from frame to harness should be set as advised by the paramotor manufacturer or your own preference.

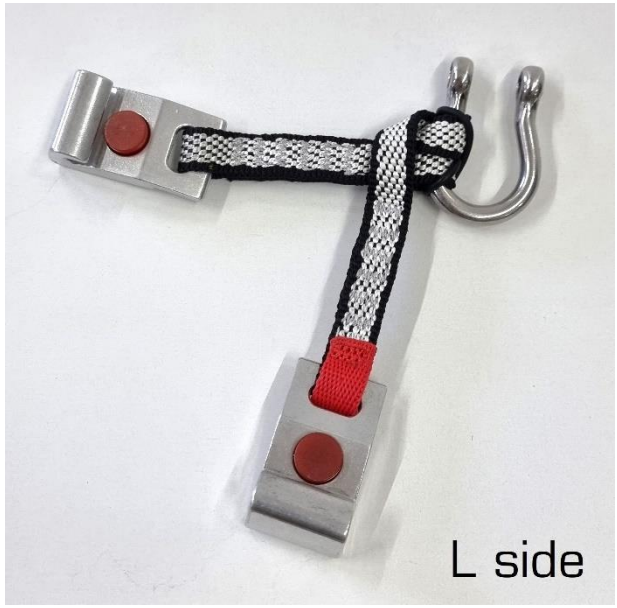
3. Install the **Bottom shoulder bungee straps (11)** by wrapping one end around an anchoring point on the frame. It is possible to make double wrap around the frame if the leftover slack appears to be too long. Run the other end through the buckle on each respective side of the harness shoulder pads.



4. Run the **Front strap adjuster (6)** on the right through the **Right leg buckle strap (9)** and install on Right side arm bow shackle. A rubber O-Ring may be used to secure the two loops in the bow shackle.

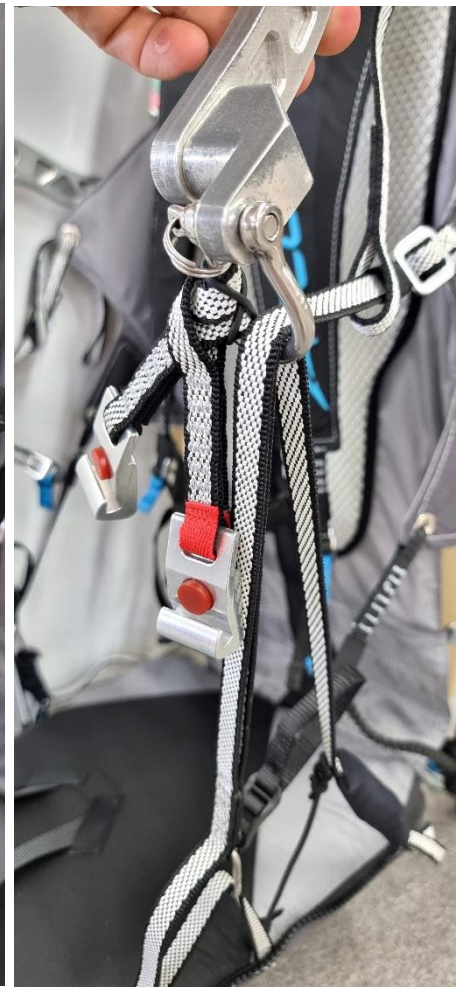


5. Repeat the same for the Left side using **Front buckle strap (8)** running through **Left leg buckle strap (10)**.



6. Install the **Main hang point straps (3)** on the bow shackles attached to the arms followed up by the **Upper back straps (4)** running on top of the main hang point webbing on the same bow shackle. Close and secure lock the bow shackle. Repeat the process on the opposite side. Check that 4 straps are installed in each bow shackle (R and L).



7. Run **Front strap (7)** through **Front strap adjuster (6)**. The front strap entire assembly can be installed in a mirrored direction both from left to right or from right to left to accommodate both R and L handed pilots.

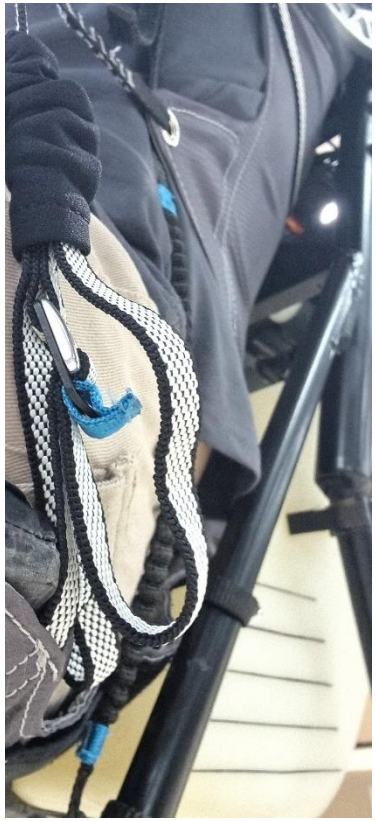
8. Locate the **Safety straps (21)** and attach the free loop to the main carabiner on the R and the L side respectively.

9. The **Seat extension cushion (25)** was designed for L-XL size pilots and allows comfortable sitting when the herness Velcro is fully open. Open the seat padding compartment Velcro and locate the opposite Velcro strap. Attach the cushion to the base Velcro and reattach the seat cover top Velcro to the cushion Velcro strap as in the photos below while stretching the top seat cover Velcro to stick further under the seat board.




6.2 Adjustment

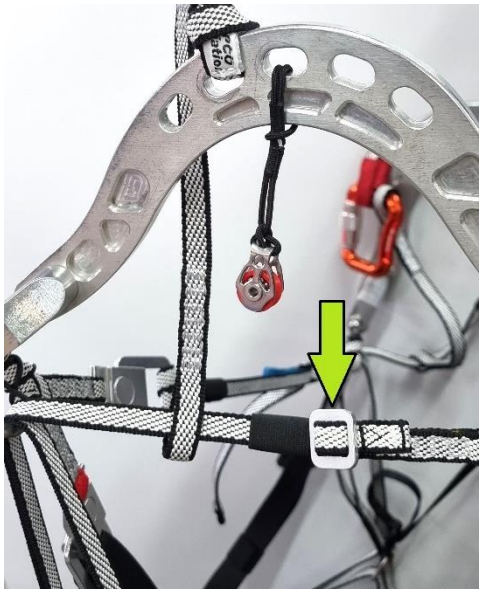
1. Once the harness is correctly attached to the frame, wear the paramotor on your back and adjust the main shoulder straps.
2. Do an Initial hang check.
3. Adjust the **Seat height strap (12)** for best comfort. The seating height should be set to a position where the frame arms do not cause discomfort under the pilots' arms. The adjustment is much easier when no load is applied on the seat. Mid air adjustment is practically not possible. Reinstall neoprene sleeve after adjustment.



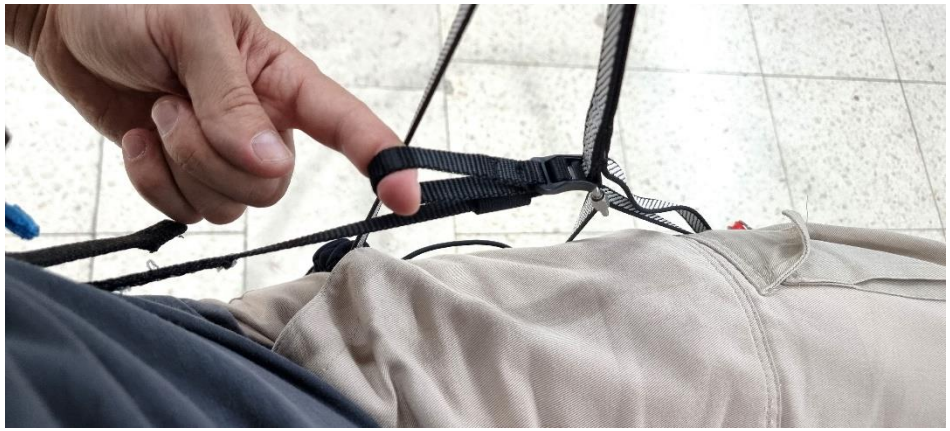
4. After the seat height has been set, adjust the **Back Velcro (13)**. When set correctly, the pilot should be comfortably seated inside the harness while the lower back harness fabric is slightly under tension and not feeling like gently sliding forward off the seat. You might set the seat higher or lower and readjust the back Velcro to make the seat longer or shorter (back lower or higher) to achieve the most comfortable balanced sitting position.

5. Do an additional hang check, checking the frame / thrust angle with the tank at least half full, and wearing roughly your flying gear to ensure perfect balance. Make sure that the frame hang angle is optimal.
   Refer to your paramotor/frame manual for the recommended hang check angle.

6. Adjust the **Upper back straps (4)** while slightly raising your legs and sitting deeper in the harness. Adjust the strap on the slider until its slightly tensioned. This should allow the upper back strap to accommodate various seat angles without becoming too tight on loose.

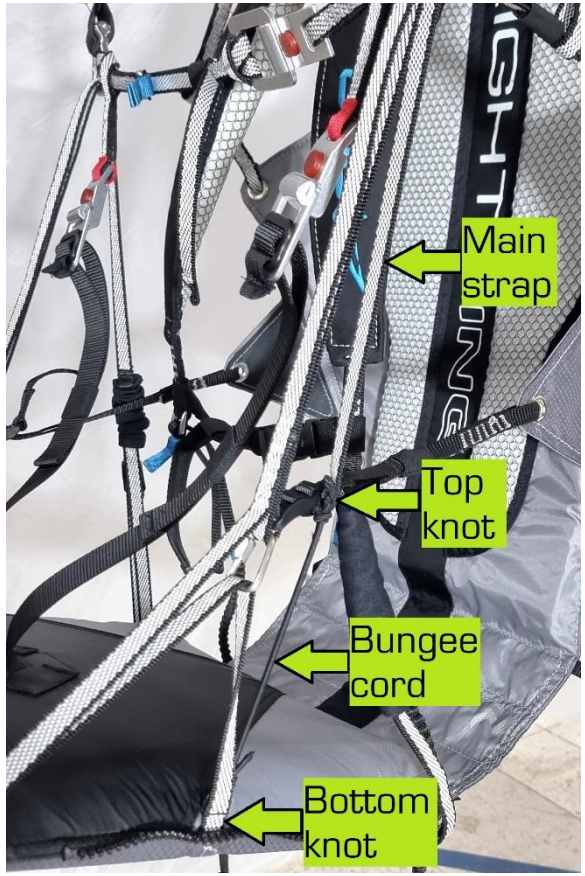


7. The adjustment of the **Lower back strap (5)** should achieve a balance point between comfortable lower back support and not being pushed forward on the seat too much.



8. The **Leg straps (14)** optimal adjustment allows easier sliding into the harness after take-off and unrestricted leg movement in flight for weight shift freedom.
9. The main front strap has two basic functions. It acts as a safety and as a restriction strap. It can limit the weight shift authority of the arms and limit the lateral force on the arms induced by the risers. Adjust this strap as advised by the paramotor manufacturer or your own preference.
10. Practice getting in and out of the seated position, make sure the transition is easy both ways, and adjust before flight if needed.

11. The **Side bungee cord (22)** functions as a tensioner for the **Main hang point straps (3)** when they are unloaded. It pulls the strap downward towards the seat to keep it in tension and in place inside the bow shackle. They help eliminate loose straps and confusion by keeping the harness straps in order. The user should manually adjust it according to his individual seat height final adjustment.
To adjust it correctly please set the seat in a takeoff running position behind your legs and check if the **Main hang point straps (3)** are under tension like in the following photo:



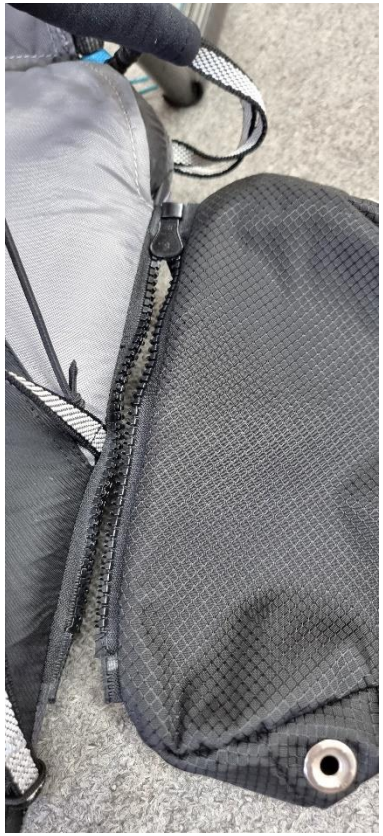
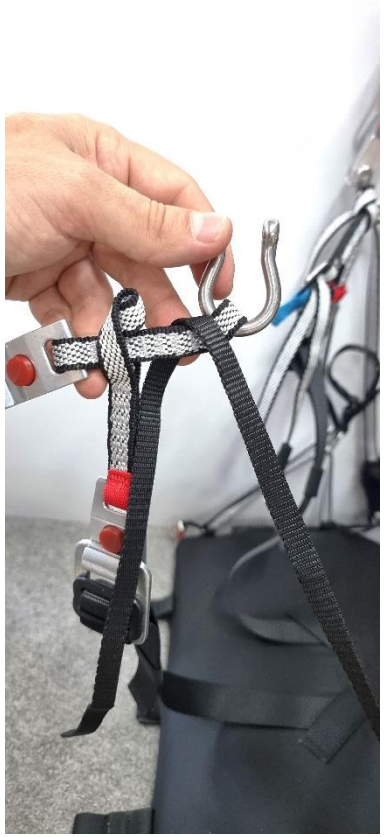
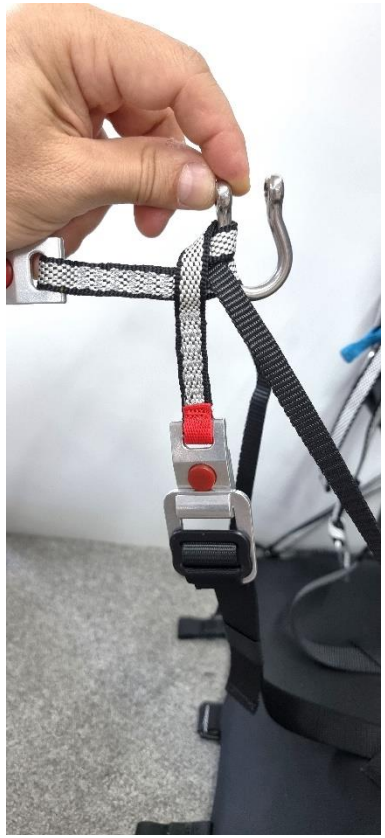
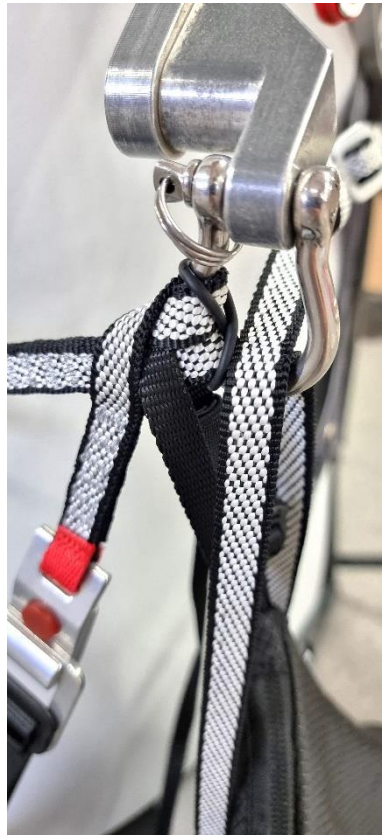
If the Main strap is still loose, undo the top or the bottom bungee cord knots and make the cord shorter.
Find a balance point between the bungee cord tension when in sitting position and the standing position. It should not be extremely tensioned in sitting position and not loose when in standing/running position.

6.3 Side Pocket

The Lightning PM is compatible with the zipped-on Side Pocket (Code: 80057).
It can be installed on the left, right or on both sides.
Run the pocket strap end through the marked point or attach straight to the swing arm tip if possible. **Please do not attach** the pocket strap to the swing arm bow shackle. Main hang point straps (3) must move freely inside the bow shackle. Adjust the pocket strap while seated in the harness only. Check both following seated positions and readjust the pocket strap if it becomes too tense.

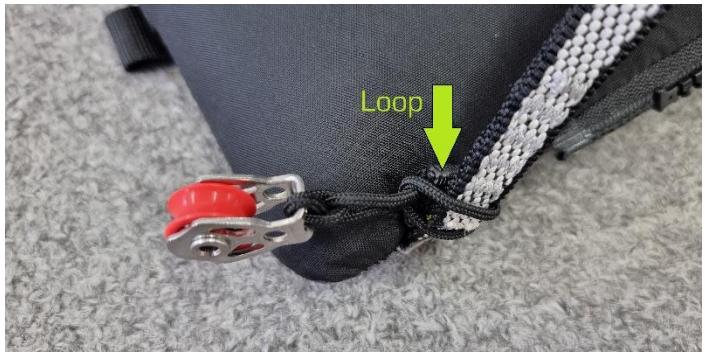
1. Fully seated inside the harness with your knees raised a bit.
2. Sliding off the seat like preparing to landing.

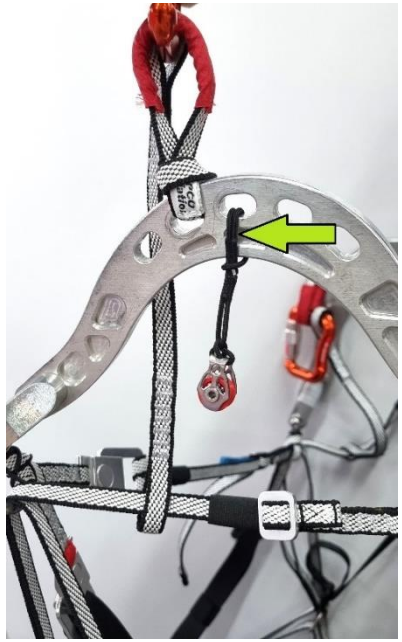
Refer to the installation procedure in the photos below (from left to right).


6.4 Speed System

The Lightning PM is compatible with the Ball Bearing Pulley Assembly (Code: 43107D).
The Pullies are supplied in pairs, one for each side and total 2 pairs per harness (short + long).
The bottom pulley is installed by inserting one end through the small black loop stitched to the front webbing, wrapping it around the webbing and running the pulley through its own loop. The upper pulley does not have a default installation point on the harness and you may install it on an optimal point depending on your frame, for example on the arms.





Optimal installation of the pullies allows the speed system line to run without cutting or grinding any strap or fabric during operation and the top pulley should be installed on the same vertical axis as the paraglider's riser.

The Lightning PM harness is compatible with the WonderBar (Code: 43135)
To install the WonderBar, remove the Brummel hooks and chord locks from the ends of the lines. Ensure to install the bar the correct way up. Route the speed system lines through the bottom front pulleys, then through the top pullies. Put the chord locks back on the lines, followed by the Brummel hooks. The Chord locks are used to keep the speed system away from the ground and your legs for the takeoff. You can also raise it again before landing if time / conditions allow. Do a hang check and adjust the length of the Speed system to ensure enough free travel before engaging the speed system so that the speed system is not engaged when in a standing position or while seated during normal flight. Refer to the instructions of your wing for advice on how best to use the speed bar.
Do not use the speed system in turbulence or at low altitudes above ground.

CAUTION:
ADJUSTING THE SPEED BAR TOO SHORT MAY CAUSE IT TO BE CONSTANTLY ENGAGED DURING FLIGHT – MAKE SURE TO HANG THE HARNESS WITH RISERS ATTACHED TO ENSURE THE ADJUSTMENT IS SAFE AND CORRECT.

7 USE

7.1 Closing the harness

The preferred method to put the paramotor on your back varies from pilot to pilot. The recommended way to wear the Lightning PM harness is by placing the paramotor on a bench if possible or by getting into the harness by wearing the shoulder straps on the ground first and then standing up.

1. Close the **Chest strap (20)** and adjust it to your liking.
2. Buckle up the **Leg straps (14)** while making sure to latch on to the correct buckle marked with red.

3. Close the **Front strap (7)** and adjust.
4. Check that the speed bar (if installed) is stowed by the magnets and the chord locks.

7.2 Attaching the Glider Risers

As the wing is not attached directly to the harness, and there are many different setups on the market which are outside the scope of this manual, it should be attached to the main carabiners according to the frame manufacturer's instructions.

7.3 Pre-flight

Do a thorough Pre-flight check:

- Harness is in airworthy condition, and attached correctly to the frame – ensure attachments are in good condition.
- Motor is in airworthy condition (follow motor/frame manufacturers checklist)
- Reserve container closed and handle in place (if present)
- All buckles and closures locked in correct sequence
- Wing attached to frame correctly
- Harness to frame connectors secured and in good condition
- Speed System attached, and not interfering.
- Pocket zippers incl. connection zippers closed

7.4 Take off, Flight and Landing

After takeoff, ensure your flightpath is clear and safe with sufficient height before sitting into the harness. To sit into the harness, lift and bend your knees and slide into the seat.
During flight it is also possible to steer using weight shift. For enhanced weight shift authority, release the front strap slightly using the adjuster (DO NOT UNBUCKLE) and release the leg straps slightly using the adjusting loop and slide (DO NOT UNBUCKLE

7.5 Seat stow D-ring

The front plastic D-ring was designed to allow seat stowage when the harness is not in use or while transferring. Use your own preferable method of connecting it to the frame for example a Velcro belt or a small bungee cord with hooks. (photo for illustration)

8 INSPECTION AND MAINTENANCE

INSPECTION

Apco recommends annual inspection of all its products, including the Lightning PM 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 webbings and structure must be inspected for wear. Buckles and carabiners must be checked for damage. **Check the main hang point sliding Dyneema webbing every couple of flights for signs of excessive wear and tear.**
Check all adjustable straps for signs of wear and tear in the adjustable buckle area.
Consult your local dealer or contact APCO directly may any question arise or for general consulting using and inspecting the harness.

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 in wet or damp place. If the reserve container / reserve parachute got wet, it must be opened, dried, and repacked by a qualified person. If the reserve parachute 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 used in flight.

REPAIRS

Repairs should be carried out by a qualified person or manufacturer.

LIFECYCLE

The Lightning PM harness is a durable product, and should last for years of flying. With that said, discretion must be used and it should be retired before it becomes unsafe for use.
Consult your local dealer or contact APCO directly may any question arise or for general consulting using and inspecting the harness.

ENVIRONMENT

Paramotor flying can disturb people and wildlife, make sure not to fly in restricted areas such a s nature reserves, or other areas where sensitive wildlife may occur. Also take care not to disturb people, be considerate to others.

APCO wishes you many hours of enjoyable flying.

Take Air!

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