Kangook Paramotors USER GUIDE

JANUARY 2020

V.3.0

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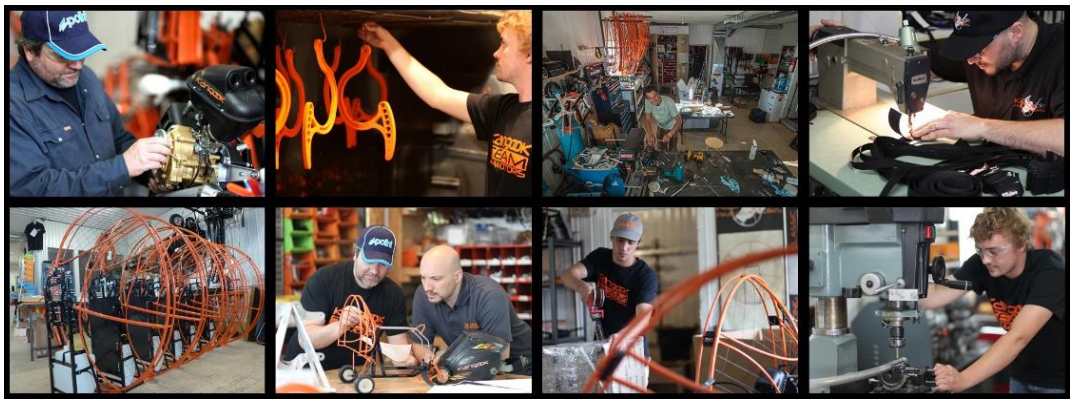
Introduction

To Begin we would first like to thank you for purchasing a **Kangook paramotor**. We hope that our pursuit and desire for aviation innovation will make you (re)discover the joy of a fun **safe motorised flight**.

Since 2008 we have been involved in the design, development and manufacturing of a **wide** range of modular products.

Our paramotor / powered paragliders (PPG)~~s~~ are entirely manufactured in **Canada** with a continuous focus on premium quality and detailed product development.



In this guide you will find all the information concerning the attachment systems, the paramotor components, and the precautions to take before enjoying your first flight. However this document does not replace the training you receive at a paramotor training centre or your local dealer's advice.

Please note that some details or images shown in this guide could be different than those corresponding to your equipment.

If you have any question or comments, do not hesitate to contact us at:

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Warning Notice

This manual must be read carefully before using your Kangook product.

Flying a Paramotor has it's risks but is not dangerous if you respect the following instructions. That is why our 3 year warranty does not cover accidents, injuries or death.

The regulations concerning the operation of Paramotors / Powered Paragliders (PPG) will differ according to your home country. It is up to you to be informed about local licence requirements (if any), laws, rules and regulations.

Always perform a preflight check of your aircraft before you take to the sky. You are the pilot in command. All decisions to fly are yours alone. If your paramotor aircraft equipment is not working properly do not fly until you correct the issue. You make the choice to go up in the air but you have no choice about coming down.

1. Motors and Multi-fit Systems

The unique advantage of the *Kangook* range of products is its frame modularity. Indeed, most engines will fit on our frames thanks to our Multifit system.

The chart below describes the main connection templates for the most common paramotor engines found on the next page.

Engine	Vittorazi		Polini			Cors-Air
Details	Atom 80	Moster 185 Plus	Thor 130	Thor 200	Thor 250	Black Bull
Displacement	78cc	185cc	125cc	193cc	244cc	235cc
Power	16hp @ 9500 rpm	25hp @ 7800 rpm	21.5hp @8800 rpm	30hp @ 7400 rpm	36hp @ 7500 rpm	35hp @ 8000 rpm
Maximum RPM	9800 rpm	8600 rpm	8800 rpm	8100 rpm	8000 rpm	8000 rpm
Pull Start	Yes	3S Soft Starter System	Using 'Flash Starter'	Using 'Flash Starter'	Using 'Flash Starter'	Using 'Easy Start'
Electric Start Option	No	Yes	No	Yes	Yes	Yes
Maximum Thrust	52kg | 125cm propeller 55kg | 130cm propeller	72kg | 125cm propeller 77kg | 130cm propeller	67kg | 130cm propeller	80kg | 130cm propeller	90kg | 130cm propeller	63kg | 125cm propeller
Reduction Unit	Helical teeth with oil Reduction ratio: 1 / 3.8	Belt | Reduction ratio 1 / 2.68; 1 / 2.87	Helical teeth in oil bath Reduction ratio: 1 / 3.43	Helical teeth in oil bath Reduction ratio: 1 / 2.8	Helical teeth in oil bath Reduction ratio: 1 / 2.8	Belt reduction Reduction ratio 1 / 3
Drive Type	Mechical (Direct)	Belt	Mechical (Direct)	Mechical (Direct)	Mechical (Direct)	Belt
Propeller Rotation	Clockwise	Counter clockwise	Clockwise	Clockwise	Clockwise	Counter clockwise
Cooling	Forced Air	Forced Air	Forced air	Forced air	Engine coolant	Forced Air
Clutch	Adjustable centrifugal	Centrifugal	Centrifugal in oil bath	Centrifugal in oil bath	Centrifugal in oil bath	None
Oil Type using unleaded gasoline	Synthetic oil 1.5%	Synthetic oil 1.5%	Sythetic oil 2%	Sythetic oil 2%	Sythetic oil 2%	Sythetic oil 2.5%
Fuel Consumption @ 30kg static thrust	2.6L to 2.8L/hr	3.0L/hr	2.9L/hr	2.9L/hr	2.9L/hr	3.7L/hr
Exhaust Pipe	Decible killer chamber	Decible killer chamber				
Weight	10.5kg	14.2kg	13.8kg	17.5kg	18.0kg without cooling system	16.7kg

For more information, please visit the following manufacturers websites:

vittorazi.com | polinithor.com | corsairmotors.com

2. The Cage System

Kangook Paramotors produce cages made up of 2 or 3 identical sections and a foot section. The assembly of the cage on the frame is easy and can be made in three steps.

Note: The cage sections are delivered with the connectors and the velcro straps already in position.

To carry out this assembly, you need:

- 1 Kangook frame
- 3 cage sections (supplied with connectors and Velcro straps)
- 1 foot section
-

There are four steps:

1. Foot section assembly
2. Right section assembly
3. Left section assembly
4. Top section assembly

Step 1 : Connecting the Foot section

Frame without foot attachment

Foot attachment

Foot attachment inserted into the Frame

Step 2 : Connecting the Right Cage section

1 : Insert the right section in the foot section.

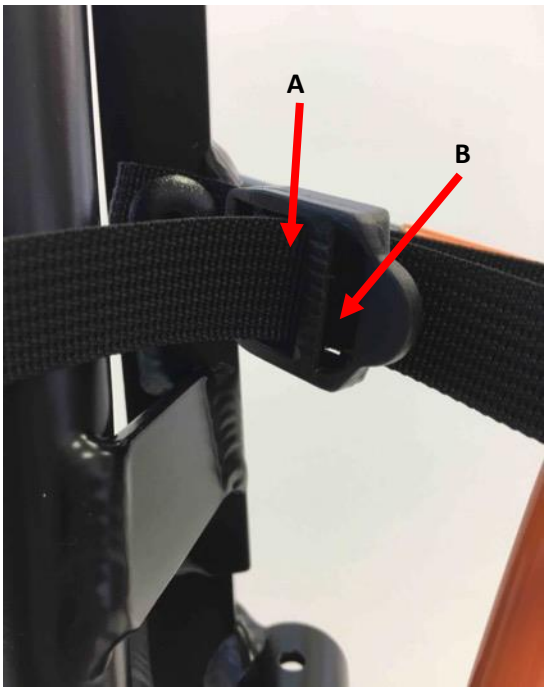
2 : Then, put the velcro strap and tighten it.

3 : Push on the center of the cage section in order to insert it in the frame.

4 : You should hear 'click' once the section in position.

Step 2 : Connecting the Right Cage section continued

5 : Then, pass the frame strap through the cage section hole.



6 : Insert the strap into A.

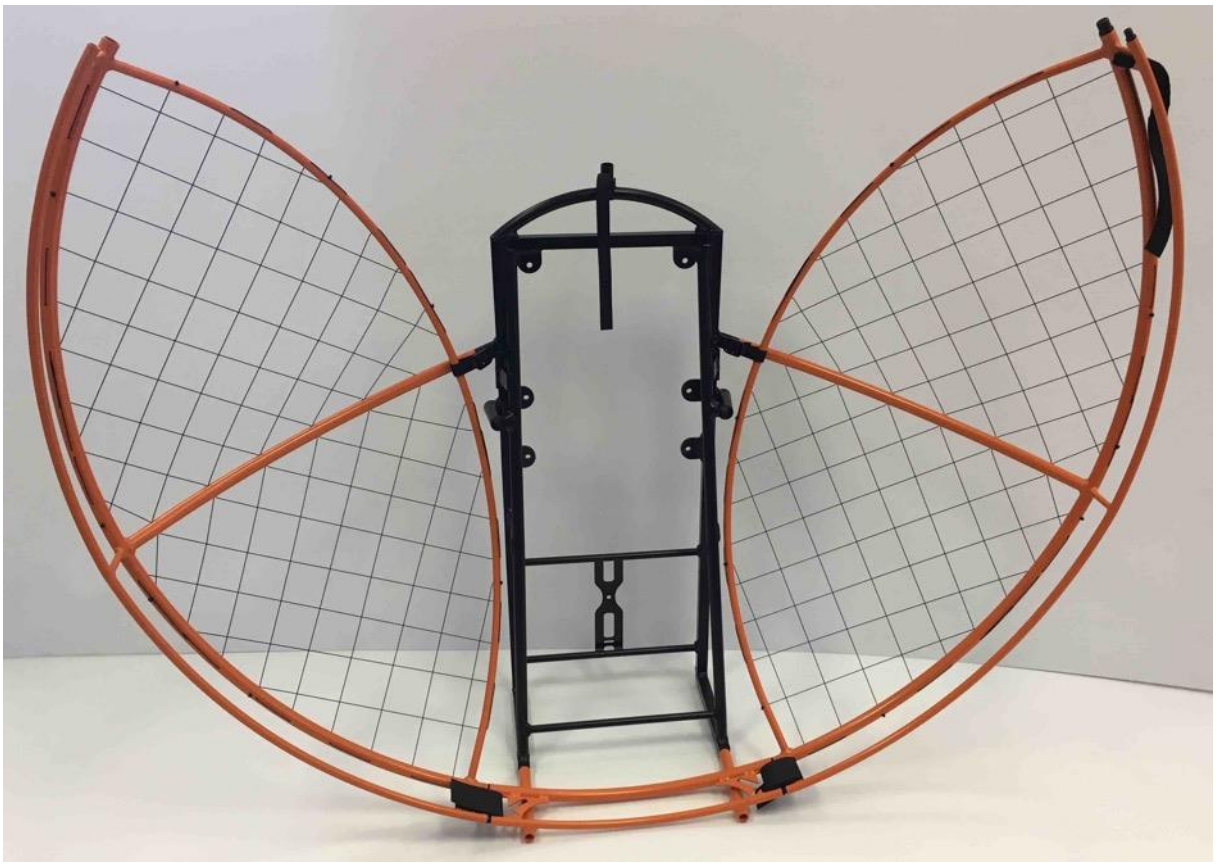
7 : Then, insert through the buckle and pass the strap into B.

8 : Finally, tighten the strap and any cut excess. Be sure to leave at least 5cm.

Step 3 : Connecting the Left Cage section

Attach the left cage section using the same process as for the right side.

Your setup should appear as follows:



1 : Left and right cage sections attached to the foot and the frame.

Step 4 : Connecting the Top Cage section

1 : *Insert the cage section into the top of the frame.*

2 : Insert the top cage section in the top right and left ones and attach the Velcro straps as shown

3 : Attach the frame strap as shown.

4 : Final result should look like this including the foot and 3 cage section.

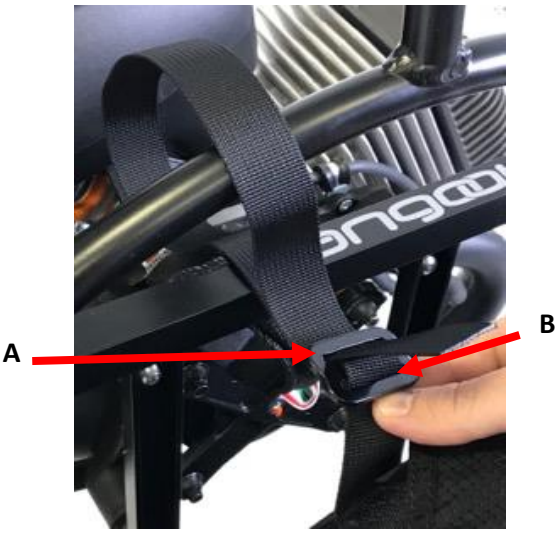
3. Harness and Frame System

Kangook Paramotor frames have been specially designed to use the all features of the Sup'Air El Comfort harness. This system accommodates the full range of options when choosing one of the 7different attachment systems offered by *Kangook*.

The following steps must be done on both sides of the frame.

1 : Kangook Komfort harness.

2 : Place the harness against the frame and pass the strap under the hoop.



3 : Loop back around the hoop and insert the strap into A.

4 : Insert the strap into B without tightening it (see picture 4).

5 : Leave a loop as shown above. This will be tightened up afterwards.

6 : Pass the strap into A again (keep the previous loop).

7 : You should now have two different loops.

8 : As in step 4 tighten the loop snug against the frame.ame.

9 : Get rid of the previous loop by pulling the strap of the other loop.

10 : Keep pulling until there is only one loop left.

11 : Then, pull the strap in order to get rid of this second loop.

12

13 : Pull the surplus strap under the hoop.

14 : Then through the designed compartment.

15 : Tie a knot.

16 : Finish by covering it.

To finish, assure yourself that the harness is well set by checking that it is fixed by:

- 2 straps on the top
- 2 straps on the sides
- 2 straps on the bottom (carrying straps)

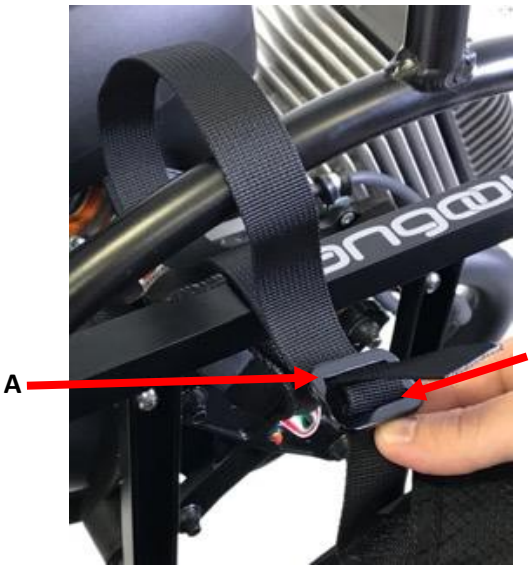
a. Split Leg Harness

The Split Leg Harness can also be used on your Kangook Frame. The main benefits are its lightness as well as the freedom of movements it during the take-off and landing phases of your flight. Perform the following three steps on both sides of the harness. Step 1 differs according to the type of harness (Low Hook-In or High Hook-In).

<u>Step 1</u>: Fix the harness on the hoop. This is for a Low Hook-In.

1 : Put the buckle on the strap (positioned in the front) as shown. Stuff the second strap in the back of the harness or leave 5cm and cut it.

2 : Set up the harness against the frame and pass the strap under the hoop.



3 : Loop back around the hoop and insert the strap into A.

4 : Insert the strap into B without tightening it (see picture 4)

5 : Leave a loop as shown above. This will allow a better tightness afterwards.

6 : Pass the strap into A again (keep the previous loop).

7 : You should now have two different loops.

8 : Then, tighten the picture 4 loop in order to press the harness against the frame.

9 : Get rid of the previous loop by pulling the strap of the other loop.

10 : Keep pulling until there is only one loop left.

11 : Now pull the strap in order to get rid of this second loop.

12

13 : Get the strap surplus under the hoop.

14 : If necessary, tie and cover the surplus strap in the following manner.

<u>Step 1</u>: High Hook – In Attachment : Fix the harness on the hoop

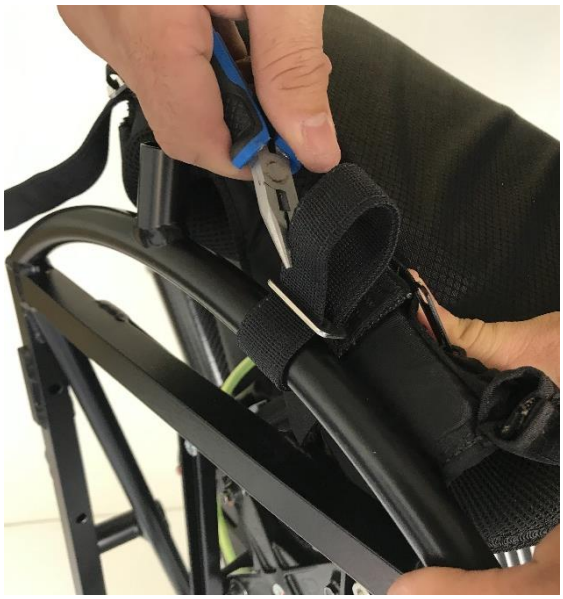
1 : Place the harness as shown.

2 : Put the upper straps under the hoop.

3 : Pull the strap through the first buckle. Do not over tighten.

4 : Pull the strap through the second buckle, do not over tighten.

5 : Using pliers, pull the end of the strap.



6 : Tighten the first buckle as much as possible.

7 : Tighten the strap snug to the fram and then rotate the harness forward.

Step 2 : Fix the portage strap

1 : Identify the portage strap (red arrow).

2 : Unfasten the quick release buckle then attach it on the bottom of the frame.

3 : Fasten the portage strap.

Step 3 : Fix the retaining strap

1 : Identify the retaining strap (green arrow).

2: Unfasten the quick release buckle then attach it at the specified location.

3 : Fasten the quick release buckle.

Final result of a Split Leg harness attached to the frame:

4. Arms and Frame System

In order to adapt to each pilot's flying style and needs, Kangook offers six basic types of attachment arms. These include the (1) Fixed J-Bar in either aluminum or stainless steel, (2) the Low Swing arm, (3) the Intermediate Swing Arm, (4) the High Swing Arm, (5) the Kobra Fixed Arm and the (6) Swan Neck Arm in either Tubular, CNC Painted or the CNC Deluxe option.

a. Fixed J-Bar

Characteristics:

This is the most widely used and the simplest arm attachment system. However, as arms are fixed, the pilot feels less movements of wing than with swing arms.

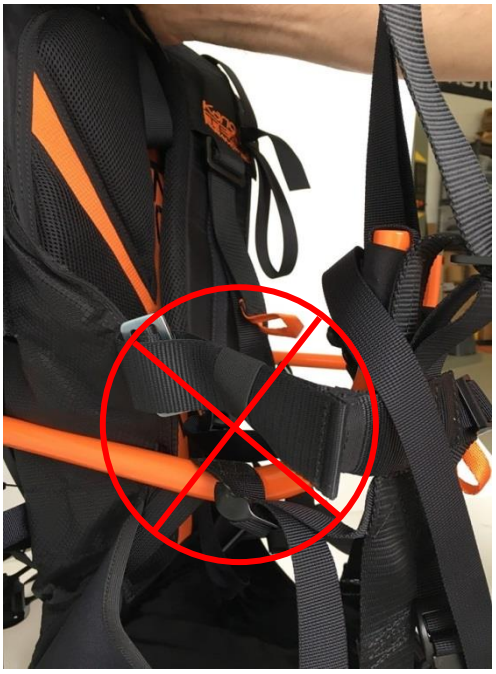
Kit and tools needed :

- 2 bars
- 2 carabiners
- 2 shackles
- 2 rivets (size 3/16)
- A riveting machine

Assembly:

Step 1: Fix the J-bars to the harness

1: Pass the bar between the two straps.



Be careful! Do not pass the bar under the two straps.

2: Put the bar into the strap opening.

3: Place the rivet as shown and then set it with the riveting machine.

Proceed in the same way for the second bar.

Step 2: Fix the J-bars to the frame

Fix the bars on the frame by means of shackles.

Your setup should look like this.

Step 3: Perform a Hang test

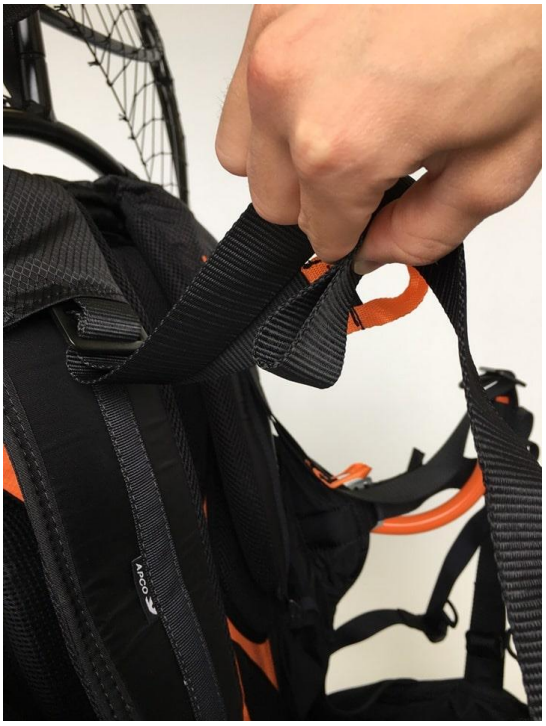
For this step, it will be necessary to use a winch in order to carry out a hang test. Proceed in the same way on both sides.

1: To adjust the straps to the right length, remove that buckle.

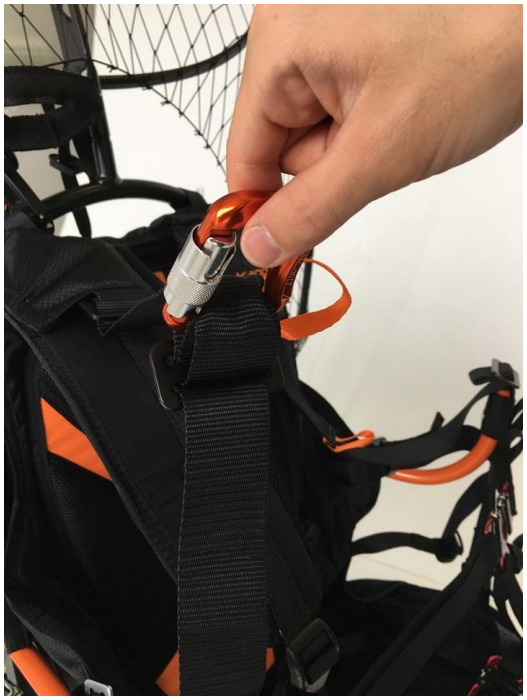
2: Adjust those two straps to calibrate the paramotor.

Reminder: the plane of rotation of the propeller must be tilted between 5 and 10 degrees.

3: Once the definitive position of the buckle is chosen, mark it. Then, remove the carabiner and the buckle.



4: Replace the buckle on the mark in the opposite direction: it must be downwards.



Finally, reposition the carabiner in the following manner.

b. Low Swing Arms

Characteristics:

This attachment system gives the pilot a complete feeling of wing movements, very similar to paraglider (free flight). The arms articulation provides for weight shift to aid in turns.

Kit needed :

- 2 low swing arms
- 2 carabiners
- 2 aluminium connectors (1 large and 1 small)
- 4 shackles
- 2 buckles + 2 rivets
- 2 blocking straps
- 2 connecting straps (Apco)

Tools needed :

- Drill
- Staged drill bit (1/4" – 3/4")
- 13/64" drill bit
- 13 mm spanner
- 6 mm Allen key

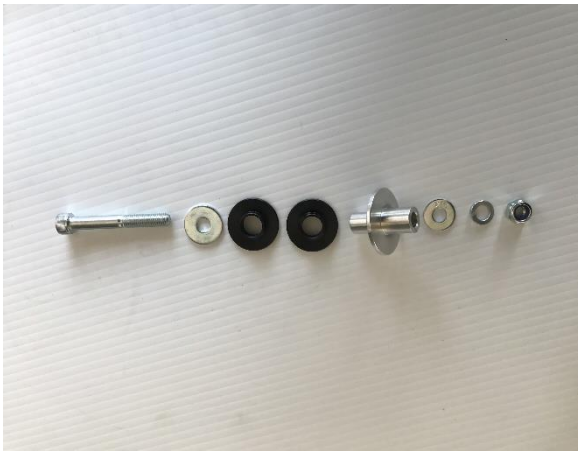
Assembly :

<u>Step 1</u>: Enlarge pre-drilled holes

<u>Step 2</u>: Drill the bottom of the frame

<u>Step 3</u>: Kangook Komfort Harness and Low Swing Arm connection

Be careful, this step is only intended for Kangook Komfort harness users. Split Leg harness users must refer to page 31.

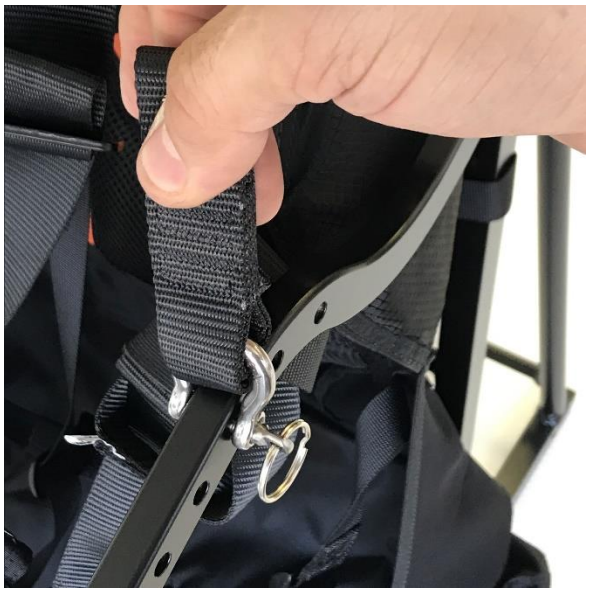


1 : Make sure that the components of the connector are set in the right order (picture).

2 : Position the arm as in the picture.

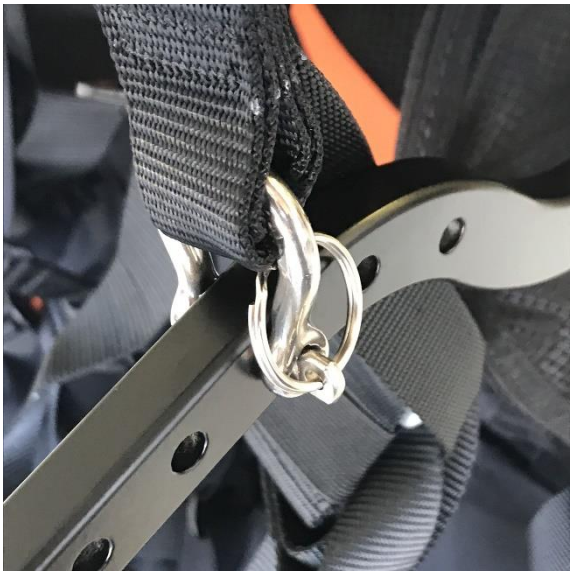
Important : For engines with a belt drive the small connector must be placed on the left side of the chassis (pilot point of view). The large connector must be placed on the right side. For engines with a mechanical/direct drive do the opposite.

3 : Tighten with the 13 mm spanner and the 6 mm Allen key. Do it on both sides.



4 : Hook the connecting strap to the arm thanks to a shackle.

The position of the shackle depends on several factors (pilot's weight, motor's thrust…), therefore, it is necessary to carry out a hang test to set it.



5 : For more safety, pass the buckle through the shackle (optional).

6 : Identify the buckle A as above (red arrow).

7 : In A, pass a shackle and the buckle of the blocking strap

8 : Place the arm in the shackle and screw it.

9 : Then, pull the other end of the blocking strap in the first buckle, in the bottom of the frame.

10 : Pull the strap through the second buckle.

11 : Pull the strap through the first buckle again.

12 : Clip onthe carabiner and adjust the blocking strap.

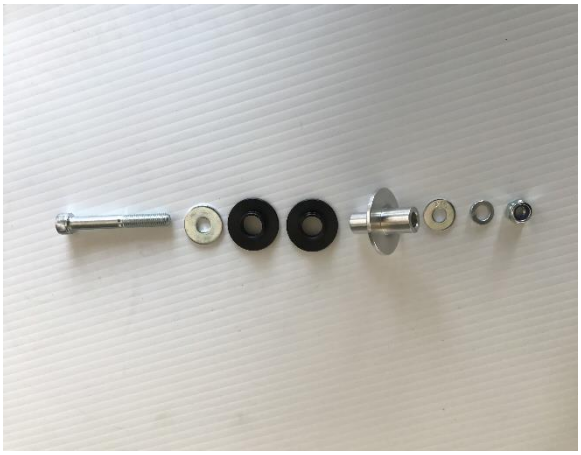
13 : Once the blocking strap adjusted,leave 5cm and cut the surplus.

14 : Finally, you can remove the buckle shown on the picture, useless with this type of arms.

Repeat Step 3 for the other Low Swing Arm.

<u>Step 3:</u> Harness and swan neck arms connection (for Split Leg High Hook-In).

Be careful, this step is only intended for Split Leg harness users. Kangook Komfort harness users must refer to page 27.



1 : Make sure that the components of the connector are set in the right order (picture).

2 : Position the arm as in the picture.

*Note**: for engines with belts, the small connector must be placed on the left side of the chassis (pilot point of view). The large connector must be placed on the right side.***

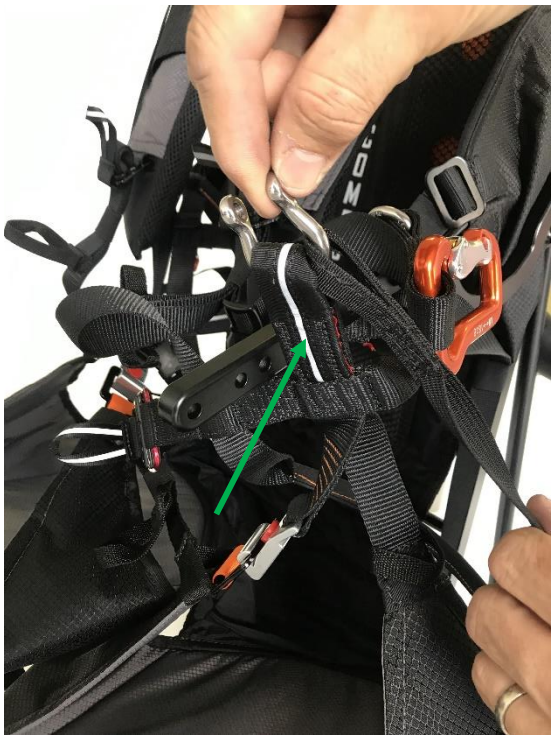
3 : Tighten with the 13 mm spanner and the 6 mm Allen key. Do it on both sides.

4 : Identify the strap as on the picture (red arrow).

5 : Clip the carabiner in the upper buckle. In the lower buckle, connect to the shackle which is fixed to the arm.

The position of the shackle depends on several factors (pilot's weight, motor's thrust…), therefore, it is necessary to carry out a hang test to set it.

6 : Pass the blocking strap through a shackle.



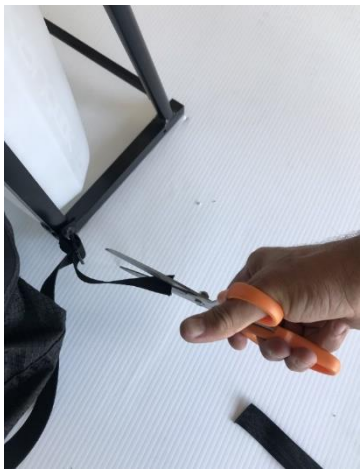
7 : Then, pass the shackle in the buckle as shown (green arrow).

8 : Fix the shackle at the end of the arm, in the last drilling (blue arrow).

6 : Pass the other end of the blocking strap through the first buckle in the bottom of the frame.

7 : Pass the strap through the second buckle.

8 : Pass the strap through the first buckle again.



9 : Once the strap adjusted, cut the surplus.

10 : Final result.

Repeat Step 3 on the other side of the harness

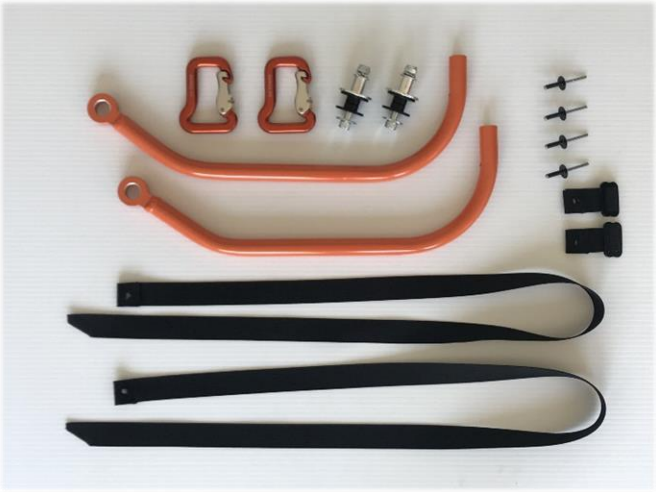
c. Intermediate Swing Arms

Characteristics :

This attachment system gives the pilot a good feeling of wing movements, but the weight shift is not so efficient than with a direct attachment on low swing arms.

Kit needed :

- 2 arms
- 2 carabiners
- 2 connectors (identical)
- 4 rivets
- 2 buckles
- 2 blocking straps



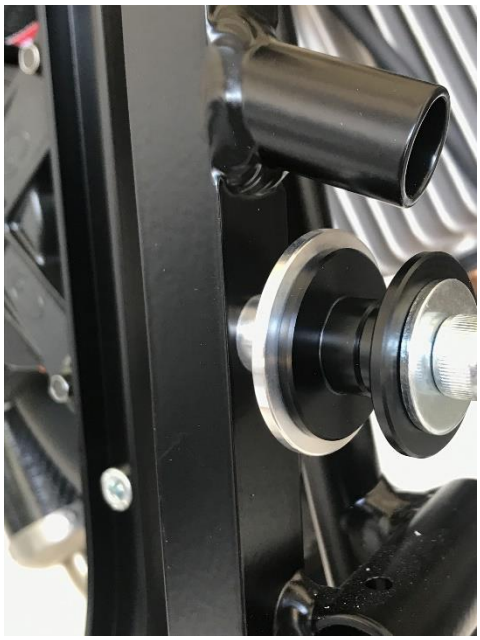
Tools needed :

- Drill
- Staged drill bit (1/4" – 3/4")
- 13/64" drill bit
- 13 mm spanner
- 6 mm Allen key

Step 1 : Enlarge pre-drilled holes

1 : Identify the drilling situated below the cage connector.

2 : Use the staged drill bit to enlarge the drilling.



3 : Keep on drilling until you are able to insert the connector. Repeat the step on the other side of the frame.

<u>Step 2</u> : Drill the bottom of the frame as shown

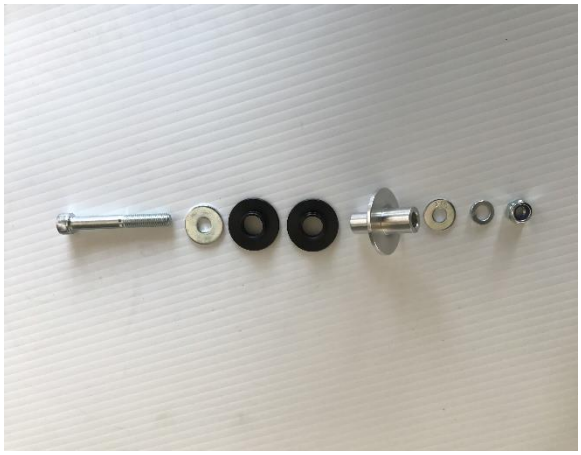
1 : Make a mark 2 cm above the bottom of the frame. Use the 13/64" drill bit to pierce only the first surface of the bar. ***It is useless to fully drill the bar.***

2 : Set the buckle and the rivet, then rivet them.

3 : Make sure you obtained the correct result (see picture).
Repeat the step on the other side.

<u>Step 3</u> : Kangook Komfort Harness and Intermediate Swing Arm connection

Note: this step is only intended for Kangook Komfort harness users. Split Leg harness users must refer to page 41.



1 : Make sure that the connector components are set in the correct order (see picture).

2 : Position the arm as shown, then attach with the spanner and the Allen key.

3 : Set the arm on the harness as shown.
Important : take care to pass the arm between the two straps (red arrows).

4 : Put the end of the arm in the designed compartment, then position the blocking strap (blue arrow) and fix using a rivet.

5 : Rivet.

6 : Pass the other end of the blocking strap through the first buckle in the bottom of the frame.

7 : Pass the strap through the second buckle.

8 : Pass the strap through the first buckle again.

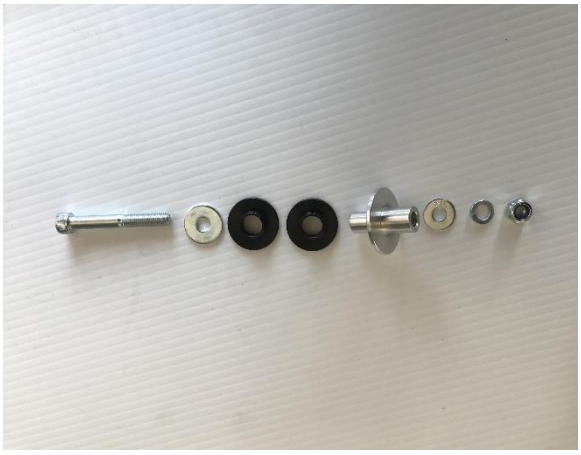
9 : Make sure the strap tension is correct when the arm is in a horizontal position.

10 : Once the strap adjusted, leave at least 5cm and cut the surplus.

11 : To calibrate the paramotor, adjust the straps thanks to the two buckles (green arrows). For more information about calibration, refer to page 23 (Hang test).

<u>Step 3</u> : Split Leg High Hook-in Harness and Intermediate Swing Arm connection

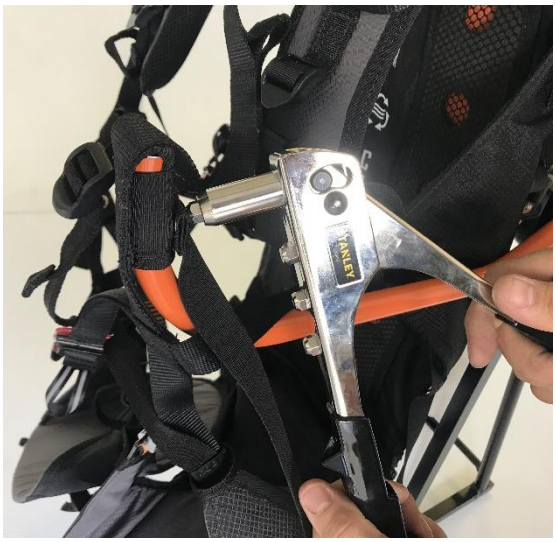
Be careful, this step is only intended for Split Leg harness users. Kangook Komfort harness users must refer to page 38.



1 : Make sure that the components of the connector are set in the right order (see picture).

2 : Position the arm as on the picture, then attach with the spanner and the Allen key.

3 : Position the arm as shown. Put the end of the arm in the designed slot. Take care to pass under the strap shown by the green arrow. Position the blocking strap and add a rivet to fix the whole.



4 : Rivet as shown.

6 : Pass the other end of the bottom strap through the first buckle at the bottom of the frame.

7 : Pass the strap through the second buckle.

8 : Pass the strap through the first buckle again.

10 : Once the strap is adjustedleave 5cm and remove the surplus.

10 : Identify the buckle shown by the blue arrow aobve and clip to the carabiner. Adjust the strap to the metal buckle (red arrow as shown above.

d. Swan Neck Arms

Characteristics :

This attachment system provides the pilot a good feel of wing movements, very similar to high swing arms. The wing attachment is a bit lower than with high swing arms.

Kit needed :

- 2 carabiners
- 2 swan neck arms (CNC)
- 4 shackles (*Wichard 1243*)
- 2 aluminium connectors (left and right)
- 2 connecting straps

Tools needed :

- Drill
- Staged drill bit (1/4" – 3/4")
- 13mm spanner
- 6mm Allen key

Step 1: Enlarge pre-drilled holes

Enlarge the pre-drilled holes (located just above the cage connectors) on the frame with the staged drill bit.

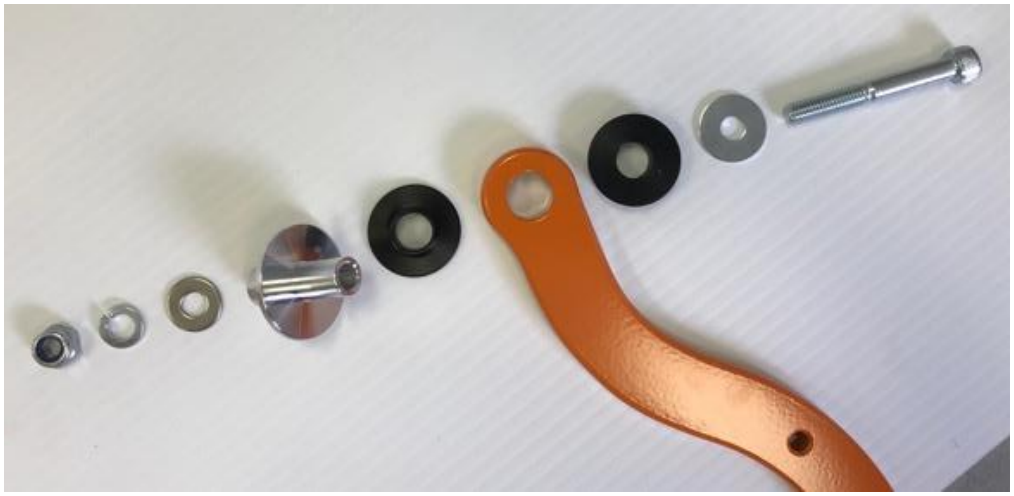
Carry on until the connectors can fit in.

Result: Be careful to attach the, left and right connectors based on the counter balance requirement for your specific engine type. Direct drive motors pull to the left while belt drive motors pull to the right.:

This picture shows the correct assembly for a belt drive engine.

Step 2: Swan Neck Arm assembly

Assemble the left swan neck arm following the pictures. Do the same for the right one.



1.

2.

3.

4.

5.

Step 3: Harness and Swan Neck Arm connection

Connect the harness to the left and right swan neck arms.

Step 4: Connecting straps

1 : If present, remove the metal buckle shown above.

2 : Use the 1 inch strap for the next steps.

3 : Insert the shackle as shown on this picture.

4 : Connect the previous shackle to the top of the swan neck arm (adjustment depend on the weight and comfort of the pilot).

5 : To be safer, get the ring inside the shackle to prevent undesired loosening (pictures 5 and 6).

6.

Connect the straps the same way on both sides.

1 : First, prepare the connection strap as shown above.

2 : Identify the horizontal strap with the metal buckle.

3 :Make a buckle loop with the connecting strap around the horizontal strap.

4 : The end result should look like this

5 : Connect the shackle with the swan neck armand (adjustt depending on the weight of the pilot).

Step 5: Carrying straps

Carrying straps are attached on both sides of the frame.

1 : Identify the carrying strap and pass it under the horizontal strap.

2 : Pass the previous strap under the lowest bar of the frame.

3 : Loop back around the frame and insert the strap into A.

4 : Pull the strap in order to tighten it around the frame.

5 : Insert the strap into B.

6 : Finally, insert it into A again.

7 : Cut cut the extra strap at the front of the harness.

8 : Heat seal the end of the strap.

9 : Attach the strap located at the middle of the harness to the back of the frame.

5. Pre-flight check

Harness

- Pouches properly closed
- Straps and aluminium buckles are properly attached
- The top and bottom of the harness are attached to the arms.

Frame and cage

- Cage sections are attached by central straps.
- All velcro straps are snug and wrapped in place.
- Proper distance between the propeller and the cage. Use 120cm Propeller for 132cm cage and 125cm or 130cm propeller for 146cm cage.
- Check netting tension (if applicable).
- Check Shackle pins and starter pulley

Motor

- Check the rubber mounts for both the Motor supports and exhaust system
- Check that the Muffler has no cracks or leaks and for proper , spring tension
- Gas tank has no leaks and the cap is closed
- Check hoses for leaks and not slack near the exhaust
- Carburetor and airbox firmly attached to the frame
- Spark plug is properly screwed into the motor and that the sparkplug resistor cover is firmly attached
- Propeller and axle screw check Ensure they are not loose and when running that there is no unusual sound when rotating.

- Check that the propeller lading edges and r tips are in good condition
- Gas handle: easy to squeeze closed tol the slow position. Ensure the stop button (kill switch) is functional.
- Ensure the Cruise control off (if one is used)

Accessories

- Rescue parachute container is closed and that straps are correclty routed and attached to the frame. Ensure any accessorie are properly connected to the harness (quick links)
- Speed bar fixed to the harness

6. Checklist

First check :

- Weather : Will it rain ? Will the wind speed increase or be gusty above 20km/hr ?
- Flight plan : for long distances consider letting a friend know where you are
- Airspace authorization (NOTAM) : Is it legal to fly in your chose airspace ?

Final Checklist before take-off:

The wing inspection is crucial. Check the upper and bottom surface areas and that the lines are not damaged. Ensure the , risers are in good condition. A preinflation of the wing is important in order to ensure none of the lines is incorrectly positioned or twisted.

Before take-off, engine on and breaks in hand, final checks:

- Leg straps fastened, correctly tightened
- Chest strap fastened
- Main quick links / carabiners closed and properly closed
- Front risers in hand, no twist
- Break toggles in hand. No knots nor tangled lines. Lines pass directly through the pulley system.
- Helmet fastened
- Flight instruments (radio, GPS, altimeter) fastened and secured
- Radio on, volume tested
- Avoid engine exhause from blowing on the wing prior to takeoff.

Confirm wind strength and direction using the windsock:

- Ensure the Take-off area and and sky are clear of traffic

START YOUR MOTOR, RUN AND ENJOY YOUR FLIGHT!