



ICARUS

tenax 4

tenax 4

Edition 1 / 03.2016

English

## THANK YOU!

We would like to thank you for having chosen one of our products, and we invite you to read this important document, the User Manual for the harness. Please pay special attention to the two most important paragraphs, regarding:

### **Insertion of the reserve parachute.**

The reserve parachute is a piece of equipment that may save your life. It must be inserted so that it works correctly when it is required, whether this happens in two days time, or two years from now.

### **Adjusting the harness.**

The harness forms the connection between the pilot and the paraglider, and it is an essential component in optimizing performance and the pleasure of flying. A bad harness that is well adjusted may enable you to fly well, but a good harness that is badly adjusted may put you off flying altogether.

We are confident that this harness will give you great comfort, control, performance and enjoyment in flight. We are conscious of the fact that reading an instruction manual is not an exciting experience. However, please remember that this product is not a citrus juicer or a mobile phone, and that correct use of the harness helps reduce the risk of flying accidents. This manual contains all the information necessary to assemble, adjust, fly and store your harness. Thorough knowledge of your equipment will improve your personal safety and your level of flying.

*Team Woody Valley*

---

## SAFETY NOTE

*By the purchase of Woody Valley equipment, you are responsible for being a certified hang-gliding pilot and you accept all risks inherent with hang-gliding activities including injury and death. Improper use or misuse of equipment greatly increases these risks. In no case shall Woody Valley or Woody Valley equipment resellers be held liable for personal or third party injuries or damages under any circumstances. If any aspect of the use of our equipment remains unclear, please contact your local reseller or Woody Valley directly.*

---

# INDEX

<b>1- GENERAL INFORMATION .....</b>	<b>1</b>
1.1- CONCEPT.....	2
<b>2- BEFORE USING .....</b>	<b>2</b>
2.1- BACK PLATE.....	2
2.2- EMERGENCY PARACHUTE .....	4
2.2.1- <i>Connecting the emergency parachute deployment handle to the deployment bag .....</i>	<i>4</i>
2.2.2- <i>Connecting the reserve parachute to the harness.....</i>	<i>5</i>
2.2.3- <i>Inserting the emergency parachute .....</i>	<i>6</i>
2.3- DROGUE CHUTE .....	8
2.4- REAR STORAGE POCKET AND TAIL-CONE FOOTREST.....	9
<b>3- ADJUSTMENTS .....</b>	<b>11</b>
3.1- CHANGING POSITION DURING FLIGHT .....	11
3.1.1- <i>Standard .....</i>	<i>11</i>
3.1.2- <i>Friction MR .....</i>	<i>13</i>
3.1.3- <i>Inside trim system .....</i>	<i>13</i>
3.1.4- <i>PTS trim system.....</i>	<i>14</i>
3.2- HARNESS ADJUSTMENT SYSTEMS .....	16
3.2.1- <i>Length adjustment: shoulder pads and foot rests .....</i>	<i>16</i>
3.2.2- <i>Leg strap adjustment .....</i>	<i>17</i>
3.2.3- <i>Hang strap.....</i>	<i>18</i>

<b>4- FLYING WITH THE TENAX 4</b> .....	<b>18</b>
4.1- PRE-FLIGHT CHECKS .....	18
4.2- HOW TO PUT ON THE TENAX 4 HARNESS .....	19
4.3- LAUNCH .....	20
4.3.1- <i>Tow launching</i> .....	21
4.4- DURING FLIGHT .....	22
4.5- LANDING .....	22
4.6- WATER BLADDER .....	22
<b>5- PACKING THE HARNESS</b> .....	<b>23</b>
<b>6- CHARACTERISTICS AND ASSEMBLY OF REPLACEABLE PARTS</b> .....	<b>24</b>
6.1- LEXAN PROTECTION.....	24
6.2- MAIN ZIP .....	25
<b>7- MAINTENANCE AND REPAIR</b> .....	<b>26</b>

## 1- GENERAL INFORMATION



The equipment should contain:

- ✓ *Harness*
- ✓ *Rucksack*
- ✓ *Hang strap karabiner*
- ✓ *Emergency parachute deployment handle*
- ✓ *2 spare elastic loops for fastening the emergency parachute*
- ✓ *Deployment handle for the drogue chute*

The spare parts available are:

- ✓ *End of board protection in Lexan*
- ✓ *MAIN ZIP and sliders*

## ***1.1- Concept***

TENAX 4 is a product that was developed entirely by Woody Valley in order to meet the requirements of hang glider pilots worldwide. This hang glider harness was made in cooperation with the world's finest hang glider pilots. Its low drag and its characteristic geometry enhance flight performance. TENAX 4 was designed for maximum comfort and ease of use. Its attractive, aerodynamic design makes it smart and distinctive. A very high level of comfort that you will appreciate especially on long flights has been achieved with the new ergonomic, enlarged shape back board.

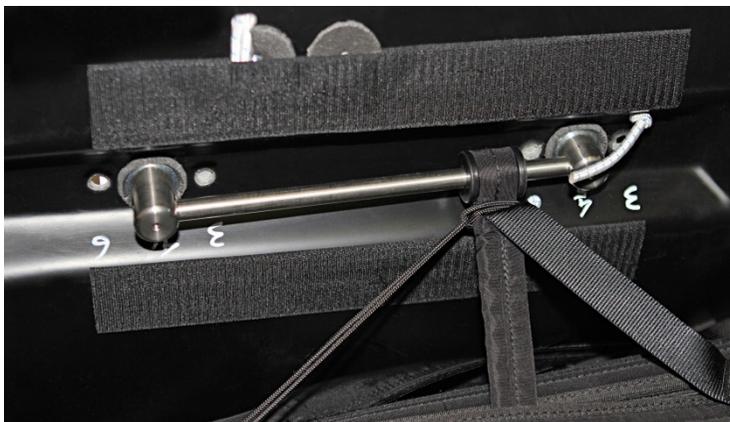
## **2- BEFORE USING**

Woody Valley supplies TENAX 4 completely assembled, except for the emergency parachute. However, we shall explain how to assemble and disassemble some important parts of the harness that require regular inspection for wear. We strongly advise you to seek help from a qualified professional hang glider pilot, such as your instructor. Above all, great care and attention must be dedicated to inserting the emergency parachute correctly into the harness. Only after this has been done should the pilot adjust the harness for comfort.

### ***2.1- Back plate***

It is important to be able to remove and reassemble the harness' back plate, both to check wear, and for the various modes of adjustment that can be performed on the plate. Remember that the back board is already installed by the manufacturer and is adjusted based on pilot height, according to an ergonomic standard generally suited for most pilots.

To remove the back plate, open the zip of the dorsal storage pocket, and then open the other zip inside. Pull out the two plate fixing straps from the plastic buckles, and then pull the plate upwards in order to remove it from the two Velcro strips that hold it to the harness. Unhook the safety strap on the snap-hook with the ring nut and slide off the safety belt of the main hook from the slit.



Simply follow the above directions in the opposite order to re-install the back board, complying with the middle of the last piece where the hook runs. In case of any doubt or uncertainties we recommend that you contact a qualified professional hang glider operator for help, for example your instructor.

## **ATTENTION**

***Remember to hook the safety strap on the snap-hook with the ring nut.***

### ***2.2- Emergency parachute***

The emergency parachute container is located on the right-hand side of the harness. The container is large enough for most emergency parachutes on the market. The emergency parachute must be fastened to the harness before it is inserted into the harness container. The parachute bridle has a large central red loop, reinforced with a covering in Cordura 500.

#### **2.2.1- Connecting the emergency parachute deployment handle to the deployment bag**

TENAX 4 is supplied complete with the emergency parachute deployment handle. It is important to remember that this handle must be used and no other.

The black loop attached to the handle itself should be passed into the loop on the deployment bag, and then the entire handle should be passed through its own loop and pulled tight. For easier extraction, the loop attached to the deployment bag should be positioned laterally with respect to the centre of the reserve parachute. If your deployment bag does not have this loop, please contact the retailer from whom you purchased the reserve parachute.



## 2.2.2- Connecting the reserve parachute to the harness

The reserve parachute bridle is passed through the loop at the end of the harness reserve parachute bridle. The reserve parachute itself is then passed through the large loop in the reserve parachute bridle. This connects the two bridles. The loops should be pulled as tight as possible to avoid any chance of dangerous friction developing between the two bridles during the shock caused when the reserve parachute opens. To ensure that the link between the two bridles remains tight, remember to fasten the knot using the Velcro strip on the harness reserve parachute bridle.



### 2.2.3- Inserting the emergency parachute

Insert the parachute into the container so that the deployment handle is in view, facing outwards, and with the loop connecting the handle to the deployment bag facing upwards.



Insert a thin cord (1 or 2 mm diameter) into each elastic loop which will be used to close the housing. Using the cords, pull the elastic loops through the two smaller eyes, choosing those that best suit the size of your emergency parachute. Follow the order of closing the various flaps as shown in the photos below.



Push the metal pins on the deployment handle into the elastic loops. After this operation, the thin cord must be removed. This is very important. Remove the cord slowly and carefully in order not to damage the elastic loops by creating excessive friction. After completing this, the handle should be inserted below the elastic cover. Position the final cover flap so that it fits closely and covers the Velcro on the deployment handle.





## **ATTENTION:**

*Each new combination of reserve parachute and harness that is assembled for the first time must be inspected to verify that it can be effectively deployed. Checks should be carried out by hanging in a flight simulator. Deployment of the emergency chute must be perfectly possible from the normal flying position. In case of any doubt or uncertainties we recommend that you contact an official reseller of the harness or the reserve chute or a flight instructor.*

### **2.3- Drogue chute**

The container built into the braking parachute is on the opposite side as the one where the reserve parachute is positioned. If you ordered the braking parachute together with the harness you will find it already inserted and secured. The system is a gravity deployment system. If you already have your own braking parachute, secure it to the strap predisposed near the container with a small snap-hook with a ring nut.



Fasten the included handle to the apex of the cap using a cat's paw knot. Carefully bend the cables and the parachute cap back, observing the dimensions of the internal pocket. Put the folded parachute in the pocket, allowing the handle to protrude which will lock everything into place with the Velcro. Put the outside flap inside the handle and then inside the pocket containing the parachute.



This system enables you to pull out your drogue chute and hold it in your hand during your approach to the landing field, launching it precisely at the desired moment.

#### **ATTENTION:**

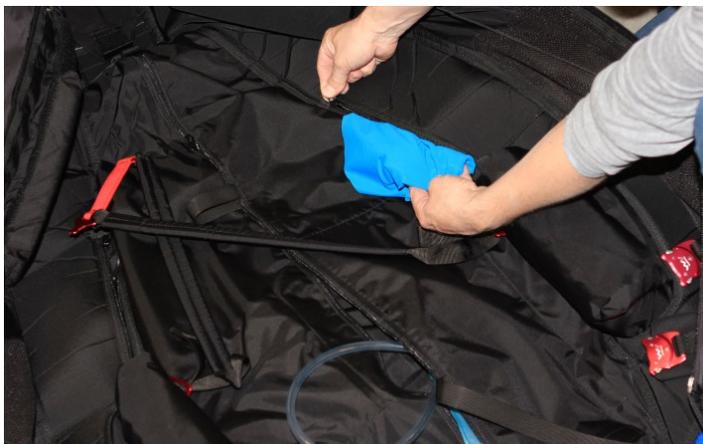
- Ensure that you do not release the drogue chute in front of the hang glider's control bar
- Before deploying the drogue chute, slide your legs out of the harness so that you are ready for landing
- Test parachute deployment at least once before doing so in-flight.

#### **2.4- Rear storage pocket and tail-cone footrest**

Arrange all the hang glider's protective padding pieces into the removable plastic tail-cone footrest. Place the hang-glider cover and the harness rucksack into the large dorsal pocket behind the pilot's back. In this pocket there is also room for a water bladder and sundry personal items. If the hang glider cover is very large, place it in the area between hips and feet. It is important to fold everything neatly in order to

create the minimum possible volume. This makes it easier to close the harness' main zip, both on the ground and in the air. Use the two straps positioned outside the dorsal pocket to reduce its volume once packed. Another two large pockets are provided with zips inside the harness. When correctly filled, they help maintain the TENAX 4 harness' aerodynamic shape.

Remember to close all the pocket zips before launch.



## 3- ADJUSTMENTS

TENAX 4 provides many methods of adjusting the harness in order to enable the pilot to fly in the optimum position. A little time is necessary to locate this optimum position, but once it has been found, flying comfort is exceptionally good.

Before making any form of adjustment, the emergency parachute must be installed.

The best way to locate the optimum position is to simulate the flying position by hanging the harness from a suitable fixed point, after having inserted all the material that you normally have in the harness during flight into the back pocket.

### **ATTENTION:**

- After every adjustment, try out the harness on the ground first, and then in the air

### ***3.1- Changing position during flight***

Woody Valley offers four possible flight set up systems for TENAX 4

#### **3.1.1- Standard**

The Standard system is implemented by means of the main hang strap, which slides on a pre-tensioned cord that is built into the back plate. Flight position can be changed by means of a light vertical push or pull on the hang-glider's control bar. The friction generated by the nylon grommet that slides on the 100 mm static cord ensures that the pilot remains in the position reached, without having to use any other fastening systems. If you wish to increase the angle of incidence and you are already close to the speedbar, as well as acting on the speedbar, it may be useful to fold your knees powerfully in order to move your centre of gravity as far forwards as possible. The harness is made to measure, and the centre of gravity is calculated according to pilot height. To take account of differences in centre of gravity caused by different body conformation, the centre of gravity can be adjusted by moving the two stop-clamps that limit the range over which the hang

strap can slide on the cord. There are six adjustment holes, and your harness is adjusted to a central position. Remember that the setting installed by the manufacturer is suitable for the vast majority of pilots.



If the harness tends to be nose-high:

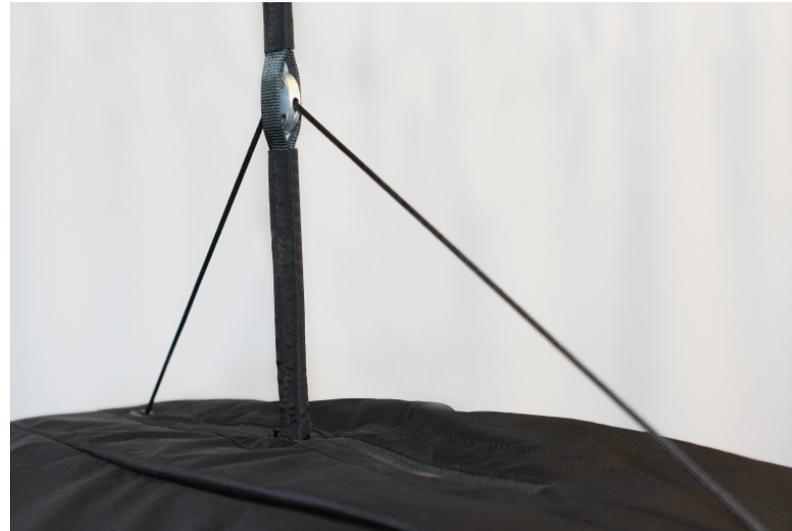
move the front stop-clamp back one hole. If this is not enough, move the second stop-clamp back one hole as well e.

If the harness tends to be tilted nose-down:

move the front stop-clamp forward one hole. If this is not enough, move the second stop-clamp forwards

### 3.1.2- Friction MR

This system is very similar to the Standard system, with an additional static 4 mm cord which runs in the cleat sewn at the centre of the bridge, and which increases harness stability. It is adjusted in the same way as the Standard system; changing the length of the cord changes the friction resistance to changes in angle of attack. Don't adjust the 4 mm cord too short, because this can prevent harness movement.



### 3.1.3- Inside trim system

This method of changing the angle of attack is implemented by exerting pressure on the lever fixed to the back plate, inside the harness, using pressure from your buttocks. The hang strap runs on a steel bar. The front cord that limits hang strap movement makes it possible to vary the angle of attack. The length of the travel-limiting cord can be adjusted, which changes the position of the knot near the trim system inside the harness. The cord must not be too short, in order to prevent the possibility of finding yourself in too vertical a position and too far from the control bar immediately after launch. By pressing the lever, the harness tilts downwards from the initial position, by about 25 cm. To return to the previous position, you have to push away from the speed-bar while exerting pressure on the lever in order to tighten the travel-limiting

cord. Like the other systems, this also permits stable intermediate positions. The hook is held in a rear position by a cord fixed near the feet. During landing, when pushing on the stanchions, the hook runs forward, piling the harness in the rear. We recommend not filling the internal pocket at the rear too much in order to favour sliding forward of the hook in the final flight phase.



### 3.1.4- PTS trim system

This option has been designed and tested in races and in planned distanced flights and is therefore ideal for expert pilots for safer, easier management of medium and high speeds.

A cord is applied to the conventional standard WOODY system. This cord enters into the front part of the harness by means of the main snap-hook, going over the shoulders, then passing in a jam cleat.

The TENAX 4 with PTS is adjusted slightly off-centre so as to facilitate correct placement of the main hook, which will stay fully retracted for the entire duration of the flight. The jam clean is activated by means of a cord which leads to the foot rest cone and then, slightly pressing with feet on the cone, LOCKS the pre-set incidence.

To lower the incidence, simply loosen pressure on the cone. The head will lower without great effort and, once the desired angle has been reached, the position is locked by pressing again on the foot rest cone.

To raise incidence, simply slightly lever the speed bar with arms, loosen pressure on the foot rest so that the front cord is called back by the elastic band and then lock the position by pressing again on the foot rest cone.

Mastering the PTS system may require some custom adjustments and some hours of flight testing.



## 3.2- Harness adjustment systems

### 3.2.1- Length adjustment: shoulder pads and foot rests

The new TENAX 4 board shoulder and back area is extremely tapered and clean. To maintain this feature, the shoulder pad straps must stay shortened, at the end-of-travel position or moved very little. Length adjustment is carried out by removing foot rest shims, which are 5 cm in total, as needed.





### 3.2.2- Leg strap adjustment

The leg straps should be shortened symmetrically as much as possible, using the double-aperture buckle. Ensuring that the leg-straps are tight helps maintain a vertical position when landing, during the final flare.

Leg straps have to be adjusted carefully, because they should not be taut when the pilot is in flying position in the harness.



### **3.2.3- Hang strap**

The hang strap is provided by the manufacturer, with a standard length suitable for most hang gliders in which the distance between control bar and the hook-in point is about 120 cm. Any personal adaptations can be obtained by replacing the main hook on the hang glider or on the harness.

## **4- FLYING WITH THE TENAX 4**

### **4.1- Pre-flight checks**

For maximum safety, use a complete and consistent system of pre-flight checks and repeat the same mental sequence every flight.

Check that:

- All buckles are fastened. Take great care in conditions of snow or ice. Always clean snow and ice from buckles before fastening them;
- The emergency parachute deployment handle is correctly fixed in position, with the pins correctly inserted;
- All pockets and zips are closed;
- The harness is properly hooked into the hang glider, and the karabiner is correctly locked by means of the locking collar.

## 4.2- How to put on the TENAX 4 harness

Place your arms in the shoulder-straps, secure the two buckles on the abdomen, taking care to properly pass the leg straps in between the legs. Close the buckle on the chest, then close the zip starting from the top downward and secure the Velcro strip limiting slider movement.



TENAX 4 is a harness that should feel tight, so that in flight, it becomes your “second skin.” We recommend using appropriate garments, avoiding excessively bulky boots, jackets or trousers. The parts of the body that are exposed to the cold are those parts that emerge from the harness, and it is for these parts that you should provide sufficient cover and protection to prevent the loss of body heat. The harness itself is sufficiently padded to ensure that the rest of the body will remain comfortable even when the air temperature is very low. We also recommend wearing garments without any buckles, buttons or other projecting components that could cause discomfort when they are subject to pressure due to contact with the body, and that could also impede closing the main zip after launch.

### **4.3- Launch**

After launch, you will immediately find yourself in the normal flight position. Put your feet into the harness, taking care to keep the glider under control during the operation. Then close the main zip. This should be performed by tensing your body inside the harness, lifting your hips slightly, and closing the zip with one single pull on the cord on the right-hand side of the harness, as shown in the photo. This will completely close the lower part of the main zip. To finish closure of the main zip, use the top zipper.



## **ATTENTION:**

- After launch, think first about maintaining complete control of the hang glider, and only then begin the operation of closing the main zip
- Close the lower zip in a single movement, extending your arm completely
- Don't wind the cord for closing the lower zip around your hand

### **4.3.1- Tow launching**

There are two pairs of webbing loops for tow launches. There is a pair at shoulder-strap level, suitable for aero-towing. The second pair is about 25 cm lower, in a position corresponding to the centre of gravity, and these are suitable for winch launching. For further details, refer to the instructions supplied with your towing hook, or seek the assistance of a qualified tow launch instructor at your flying club.



#### **4.4- During flight**

The best aerodynamic performance is obtained by flying with the horizontal axis of the harness parallel as close as possible to glide angle. Therefore, in the case of high-speed glides, start by modifying the tilt angle of the harness in accordance with the speed that you wish to reach. Then change the angle of attack of the glider itself.

Flying at length with the head lower than the feet can become very tiring. We suggest flying for certain periods with the head higher than the feet. This will enable you to rest your arms and back muscles, and your reserves of strength and energy will last for longer.

#### **4.5- Landing**

Open the main zip before approach. In the final phase raise up decisively on the speed-bar and move your hands to the stanchions always maintaining the hang glider's balance. In your first flights with TENAX 4 we recommend trying the landing procedure while you are still flying at a height to become familiar with the operation: open the main zip, lever decisively on the speed-bar and lift yourself with your hands on stanchions in position for final stopping. BE CAREFUL not to lose control of the speed of your hang glider.

#### **4.6- Water bladder**

TENAX 4 is specifically made for use with a water bladder. Slide the water bladder into the container as shown in the photo, located in the rear storage pocket.



## 5- PACKING THE HARNESS

We recommend following these tips to pack the harness in the rucksack: the rucksack has been designed to hold all sizes of TENAX 4 and to have a compact shape for transport. Leave the cone in its housing and use it as a carrier for tools or accessories. Fold the harness at the end of the board and re-close the main zip 40-50 cm. Insert the lower part of the rucksack and close the zip halfway from both sides. Arrange the helmet and clothing in the top part, then completely close the zip.



## 6- CHARACTERISTICS AND ASSEMBLY OF REPLACEABLE PARTS

### ***6.1- Lexan protection***

This component in Lexan prevents wear when the harness is folded inside the rucsac. It also improves the harness' aerodynamic profile in flight. The Lexan protective piece is located towards the end of the back plate, and it is easy to replace. Slide the component into the pockets as shown in the photo.



## 6.2- Main zip

The main zip is assembled with Velcro and therefore can be replaced. Only sliders can be replaced because it is secured with Velcro only at the end part.



## 7- MAINTENANCE AND REPAIR

Check the harness after every impact, bad landing or launch, or in the case that there are signs of damage or excessive wear.

We recommend having the harness checked by your retailer every two years. Every 30 hours' flight, check the cord on which the main bridle slides for wear, particularly where it enters the grommets in the back plate, and the parts in which it is in contact with the bridle slider.

To prevent unnecessary wear and deterioration of the harness, it is important to avoid its scraping against the ground, rocks or abrasive surfaces. Do not expose the harness unnecessarily to UV radiation (sunlight) outside normal flying activities. Wherever possible, protect the harness from humidity and heat. Store all your paragliding equipment in a cool, dry place, and never put it away while damp or wet.

Keep your harness as clean as possible by regularly cleaning off dirt with a plastic bristle brush and/or a damp cloth. If the harness gets exceptionally dirty, wash it with water and a mild soap. Allow the harness to dry naturally in a well-ventilated area away from direct sunlight.

If your reserve parachute ever gets wet (e.g. in a water landing) you must remove it from the harness, dry it and repack it before putting it back in the container.

Repairs and replacement of harness components cannot be performed by the user, but exclusively by the manufacturer or staff authorized by the manufacturer. The manufacturer and authorized service staff alone can use materials and techniques ensuring correct product functionality and its complete conformity to product certification.

The harness can be washed using a tepid solution of water and mild soap.

Zip fasteners should be kept clean and lubricated with silicone spray.

In the case of making any request to an official retailer or Woody Valley for maintenance operations, please quote the complete identification number shown on the silver label in the rear pocket.

We hope that you enjoy great flights and happy landings with TENAX 4 !

---

Every effort has been made to ensure that the information contained in this manual is correct, but please remember that it has been produced for guidance only. This owner's manual is subject to change without prior notice. Please check at [www.woodyvalley.com](http://www.woodyvalley.com) for the latest information regarding the TENAX 4 harness.

Latest update: MARCH 2016