Operating and Packing Instructions

CONAR

paragliding reseue paraehute

metamorfosi Conar

PARAGLIDING EMERGENCY PARACHUTE

Model	Gores [n°]	Weight [kg]	Area [m^2]
Conar PG16	**16**	**1,68**	**22,36**
Conar PG18	**18**	**2,02**	**28,38**
Conar PG20	**20**	**2.58**	**35,11**
Conar PG22	**22**	**3.12**	**42,54**

Congratulations for choosing an outstanding product. The name ***Conar***' comes from **Con**o **A**picale **R**ientrante' the Italian for 'Reverse Apex Cone'; this patented design gives extraordinary performance to this rescue parachute.
We are pleased to include some ***metamorfosi*** stickers and a T-shirt; welcome to the club!

IDENTIFICATION

The ***metamorfosi paraglider Conar*** has a stainless steel quick link (maillon rapide) at the end of the bridle, next to the manufacturing information (date, model and size).

INTRODUCTION

The ***metamorfosi paraglider Conar*** rescue parachute is only suitable for paragliding; its design makes it unsuitable for any other purpose including Hang Gliding, Free Fall and BASE jumping.

In our opinion paraglider reserves need to be designed to open very quickly at slow speed for three reasons: pilots often fly close to the ground, ridge rotor turbulence is a major cause of collapses and, even if the accident happens at altitude, paraglider pilots try to re-inflate a collapsed paraglider and tend to deploy late their rescue.

FAST OPENING: To obtain fast opening times at paraglider speeds while maintaining a low sink rate, we used these design criteria:

a - Reduced Surface: under the same conditions a smaller parachute has a faster opening time.

b - Low Weight: the throw is easier and the lines unfold faster; the reduced inertia also helps the canopy to open quickly even at very low airspeeds.

c - Pulled Down Apex: increases the lift coefficient to compensate the reduced surface and reduces the opening time.

d - <u>Reverse Apex Cone</u>: - ***Conar*** patent – it increases stability, further reduces sink-rate by 20%, impact energy by 40% and, on average, opening time by almost 10%.
The fabric cone inside the Conar Apex forces airflow alongside the cone and then through a narrow slot. The airflow is accelerated over the upper surface creating a "Venturi Effect" which creates lift.

e - <u>Packing system</u>: the Conar has a very fast and reliable deployment. The opening sequence is controlled by the packing (which is why the Conar *must* be packed according to this owner manual). The canopy deploys in a strict order; first the central wind channel opens quickly and the folded canopy corners open next. This is so efficient that once the lines are extended, the canopy opens completely in just a few metres.

RELIABILITY: The fast opening of the Conar relies on the correct opening sequence of "bridle-lines-canopy". To reduce the risk of lines tangling or releasing prematurely they are contained in separate compartments of the deployment bag with a light nylon sock holding the lower lines (which bursts or splits on deployment). The Conar bridle comprises the lines contained in a black fabric tube and a light nylon sock. The "line-bridle" further reduces the chance of a line getting tangled and increases the elasticity of the parachute. It's length ensures that the parachute opens below the paraglider avoiding the low pressure area on the upper surface.

STRUCTURAL RESISTANCE: The Conar is a very strong, light parachute system designed specifically for paragliders. The Conar uses many sophisticated materials including High Tenacity, low porosity parachute grade fabric, Kevlar®29 seam reinforcements, Nylon® HT lines and a CE stainless steel maillon rapide.

However, the ***Conar*** emergency parachute **<u>is not suitable for free fall terminal speed</u>** (an unlikely situation while paragliding). Free fall parachutes operate at very high vertical speeds so the opening sequence is delayed to reduce shock. If the Conar was optimised for free fall use, it would not operate satisfactorily in paragliding emergencies.

EXTRACTION: although the ***metamorfosi Conar*** emergency parachute will fit a standard harness container, ***metamorfosi*** options are available: the ***metamorfosi*** oval container (attached with Velcro), the ***metamorfosi*** square container (sewn directly onto a harness side), or the ***metamorfosi*** front container which attaches to the main carabiners.

All ***metamorfosi*** containers are specially designed to deploy the parachute **only** when the handle is pulled. If the pins come out accidentally they retain the parachute (at least for a while) and have no Velcro tape to ensure a consistent release.

AGEING: Synthetic materials deteriorate with age, particularly after exposure to UV rays and moisture. The Conar has been designed with UV protection by making the protective line sheath and the optional outer containers from black-coated fabric; also, the parachute is covered with an aluminium UV protection sheet.
However **total UV protection is impossible** and we recommend that the parachute be inspected by the manufacturer periodically for premature ageing.

- - CAUTION - -

A parachute has a maximum lifespan even if it is carefully maintained. The materials age invisibly and after 10 years it will not be completely reliable and should be replaced.

A – Canopy
B – Leading Edge
C – Reverse Apex Cone
D – Suspension Lines
E – Pull down apex line
F – Suspension lines sock
G – Sheath bridle
H – Maillon rapide

OPERATING INSTRUCTIONS

We recommend having an expert rigger properly install the parachute into your harness
(it often looks much easier than it is...)

1 – ***metamorfosi*** OVAL container: attach the container to the vertical main webbing of the harness using the double Velcro tapes.

2 - ***metamorfosi*** SQUARE container: sit in the harness in normal flight position.
Position the container as shown in the picture and draw the outline.
Sew the container with a strong thread along the front seam and fix the two rear corners with rubber cords to allow some movement.

3 - ***metamorfosi*** FRONT container: attach the adjustable webbing to the main carabiners. Be careful to route the bridle to the side of your throwing hand.

To reduce the chances of accidental deployments, ***metamorfosi*** containers do not use Velcro and are designed to retain the parachute, at least for a limited amount of time, if the safety pins accidentally came out (see picture above).

4 - INTERNAL container: if your harness has an integral container, mount your ***Conar*** parachute according to the instructions of the harness manufacturer.
If possible use the original ***metamorfosi*** handle. If you have to use the handle that comes with the harness, attach it to the small loop in the deployment bag; remember that a long handle makes throwing difficult and the risk of tangling increases.
The handle must not have Velcro hooks sewn on because they could stick to the lines and prevent the deployment bag from opening.

It is important to ensure the handle can be seen during flight, and be very easy to grasp, **with your thumb**, in any situation.

After each repack it is mandatory to check the extraction while hanging in your harness: it is no use having a good parachute if you cannot get it out!

SUSPENSION POINTS

You must test your descent position before flying

It is essential to configure the rescue system so that you descend under the canopy vertically. Only by landing vertically your legs can absorb the impact with a Parachute Landing Fall. **Do not rely on the harness protection by landing on your back.**

Your harness should have parachute hang points on the shoulder straps. Use a relatively short V bridle because the parachute should open below the paraglider. If the "V bridle" is too short it could hurt your neck during the descent, but a too long one may cause opening problems. If your harness is not supplied with a "V bridle" system, ask for the ***metamorfosi*** V bridles. Connect your parachute to the parachute hang point in your harness with the maillon rapide. Block the maillon rapide with tape to prevent the bridle chafing.

SINK RATE CALCULATION

Use this formula to calculate the height of a jump equivalent to your sink rate under canopy.

- valid for ***Conar*** parachutes only -

meters = 4 x weight / gores ^{2}

Example: 80 kg hook in weight and Conar PG16

Eq. height = 4 x 80 / (16x16) = 1.25 m

For this pilot, landing under a Conar PG16 parachute will be the same as jumping from 1.25 m (almost 5 m/s).
It's important to choose the correct compromise between opening time and sink rate:
- a smaller parachute will open faster but its sink rate may be too high and you may hurt yourself.
- if your parachute is too big the landing will be smoother but, if you are not high enough, the parachute could not open in time.

With the ***Conar*** there is no need to trade sink rate for opening time: the best compromise is equivalent to a jump from 1.30 m, a sink rate that is perfectly acceptable for the average pilot. The maximum "equivalent height" for a fit athletic pilot is about 1.80 m. Excluding special cases, do not go below 1.00 m.

To test the rescue situation make your own equivalent height calculation, hang in your harness by the parachute connection on the V bridle so that your feet are at the calculated height; check your position and imagine cutting the hang strap.

- if your neck is unpleasantly forced down, your V bridle is too short.
- if you feel you'll fall backwards, the harness hang point connection is not in the correct place (move it closer to the top of your shoulders).
- if you are in a vertical position but you feel you would hurt yourself falling from that height, then the size of the parachute is too small for you.

DEPLOYMENT PROCEDURE

The decision to deploy your rescue parachute depends on the height you are flying. If you are very high perhaps you can try to regain control of the paraglider, or you can wait a few seconds for a more favourable moment with the bag in your hand but, if you are low, every second is precious! Beware of a severe spin: the centrifugal force could make you faint.
When you decide to go for the parachute, keep a cool head and execute quickly. **The way to achieve this is to practice regularly so all actions are instinctive**. The sequence is the following:

- Look at the handle.
- Grab the handle with your thumb and then grasp firmly.
- Force open the container by pushing the handle to open the container and pull out the inner bag.
- Throw the parachute forcefully towards clear space.
- Pull the c lines to use the paraglider as an extra brake without disturbing the emergency parachute.
- Prepare for landing with a parachutist landing fall (PLF).

1) - Look at the handle to be sure to grasp it first time, a second attempt could cost very precious time.

2) - Grab the handle with your thumb as this is the only sure way, particularly when flying with gloves. During each flight train by rehearsing these two first operations, being extremely careful to avoid accidental deployments!

3) - Force open the container by pushing the handle, this enables you to open the container progressively and completely with little effort.

4) - Throw the deployment bag forcefully into clear space extending the lines quickly and minimising the chance of tangles. If, for any reason, the parachute doesn't open immediately shake the bridle to help it out. If the paraglider is still flying predominantly straight, it is better to throw backwards. In case of an asymmetric tuck/collapse, you will probably go into a spin: throw the reserve in the direction of the spin and towards the outside; the centrifugal force will help your throw. If you get tangled in the paraglider, it is essential to look for clear space before throwing.

5) - Pull the C risers to stop the paraglider from flying when it re-inflates as it may compromise both stability and sink rate of the system. Hold the C's in both hands, just above the maillon, and pull down as much as possible.

6) - Prepare for the landing; get into a vertical position, and be ready for a parachutist landing fall: do not stiffen, keep your knees slightly bent with elbows tucked in and don't try to stop the fall with your hands. Be prepared to absorb the shock with your legs and don't rely on your back protection. Your sink rate will be approximately the one you calculated with the previous formula.
Take care to learn the parachutist landing fall: remember, under the canopy you will not be able to choose your landing place.

rescue parachutes are a possible chance of safety, not a guarantee…

FLY SAFELY!

PACKING DIRECTIONS

The ***metamorfosi Conar*** parachute has a very easy packing technique, which is slightly different from traditional methods.
As a quick and correct opening sequence depends on careful packing, you are recommended to get an experienced rigger to pack it **as described in this manual, using the original *metamorfosi* deployment bag**

Incorrect packing would probably cause malfunctions.
If you have to pack your ***Conar*** yourself, follow these directions
VERY CAREFULLY

The parachute should be packed every three months. As rough surfaces or jewellery could damage the lines or canopy, take off all rings, watches and bracelets so you won't damage the fabric. You will need two people, a long length of string and an area that is clean, dry and smooth such as a floor, large table or sheet.

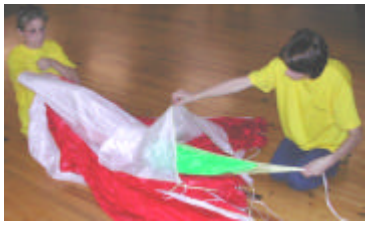
<< 1
The stretched line in the photo is attached to the pull down apex (it is made up of three or four parallel lines depending on parachute size). It keeps the apex down and holds down the vertex of the reverse apex cone.
BE CAREFUL: **the apex lines must be inside** the canopy, as shown in the picture on the left.

2 >>
Thread the "long string" through all the loops that are approximately at the middle of the Kevlar seam reinforcements at the top of the canopy. Take care to do it consecutively counting gore by gore to avoid missing one.

<<3
Make a knot to hold all the loops together.

4 >>

Position the apex <u>inside</u> the canopy by gently pulling the apex line while your assistant is helping from the top.



<< 5

Pull the black sheath right down towards the maillon rapide, then pull the light sock over it to free the lines as much as possible.

<< 6

Take two <u>consecutive</u> lines on the canopy and be sure they are free for the entire length.

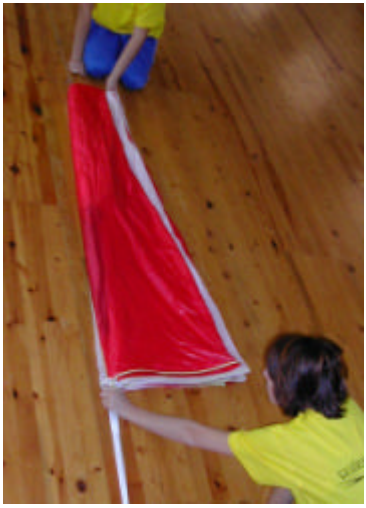
- If two consecutive lines are free, all the others will be too.
- If they are not free the bridle went through the suspension lines and you will have to untangle them: pull two consecutive lines sideways to guess where the bridle is tangled.

7 >>

Stretch back both the black sheath and the nylon sock; lay the canopy out and keep the two ends (maillon rapide and string) under light tension.

8 >>
Grasp all the suspension lines with one hand and check if all the knots are at the same height.

<< 9
Open the canopy by flaking the gores consecutively while counting them one by one. At the same time your assistant should place one hand well inside each gore and neatly lay out the upper part of the canopy from the inside.



10 >>
Repeat number 9 to get it perfect.
After flaking all the gores, the canopy should be as shown.
Count the number of gores.

<< 11
Flake half of the gores to the other side as shown.
Check that the number of gores per side are the same.

12 >>
Take one of the top gores (left or right doesn't matter) and open it to make the wind channel, as shown in the picture.

<< 13
After this operation the canopy looks like the picture.

14 >>
To increase reliability fold the sides at 45°.
This will slightly delay the opening of the corners, thus forcing the inflation through the wind channel.
The leading edge fold should be in line with the wind channel but not overlapped.

<< 15
Fold the outside edges onto the wind channel as shown, but do not overlap them otherwise you will increase the bulk.

<< 16

Fold the canopy in half along the central axis and open the mouth of the wind channel.

To do this properly you have to fold the canopy and open the mouth at the same time.

17 >>

After this operation the canopy looks as in this picture.
Note the leading edge of the wind channel is in line with the side of the canopy.

<< 18

Get the air out by pushing it towards the leading edge (on the other end there is no way out).

19 >>

Undo the knot and **remove the string** from the loops.

It's very important to use a long string so it's never forgotten.

<< 20

Fold over the top 20 cm (8") of the canopy as shown in the picture.

21 >>

Carefully fold it again so that the fabric remains evenly arranged inside the fold as shown in the picture.

<< 22

Make the first "S" fold
(make another one for the ***Conar*** 20 and 22)

23 >>

Make another "S" fold getting the forward edges in line with the leading edge and all the back edges aligned to make a rectangle.

If it is not perfect, repeat the operation from number 20 by unfolding and beginning again at the top of the canopy.

24 >>

Lay the five flap inner bag on the floor with the handle on the opposite side of the lines. Check the condition of the four rubber bands attached to the deployment bag and replace if necessary.

Do not connect the bag to the canopy with a string: it could get tangled during a deployment!

<< 25

Place the canopy onto the bag and thread the elastic string through the eyelet on the opposite fifth flap - like the picture.

26 >>

Pull the elastic string through the two side flap eyelets.

<< 27

Pass the suspension lines through the elastic string making a loop of about 3 cm (1 1/4 inches) as shown in the picture. (a small finger should be able to go inside the loop).

To avoid any chance of the lines getting tangled, the loop should face you as shown in the picture.

28 >>

For the **16 and 18** gore ***Conar*** parachutes, take **half** the length of the lines from the edge of the deployment bag to the nylon tube (for the **20 and 22** gore models take **one third** of the length) and fold the lines in a figure of eight.
Take care not to twist the lines.

<< 29

Secure the first half (first 1/3 for the ***Conar*** 20 and 22) of the suspension lines with the two lower rubber bands through the figure of eight loops as shown in the picture.

30 >>

Repeat the operation with the rest of the suspension lines up to and including the lines sock. Secure the loops with the next two rubber bands.

As the ***Conar*** 20 and 22 have longer lines which need to be divided into thirds, there are three pairs of rubber bands so you to repeat the operation once more to get to the sock.

<< 31

Take the elastic string again from the first loop on the suspension lines and pull it through the fourth flap eyelet.

32 >>
Secure the elastic string with a 3cm (1 1/4 inches) loop of suspension lines in their nylon sock (one finger test again).
To avoid possible tangling, place the new loop away from you (in the opposite direction of the first loop).

<< 33
Arrange the package so that the canopy is completely protected by the deployment bag.

34 >>
Fold the rest of the sock in a figure 8 and secure one end using the side rubber band. (replace it, if necessary).
The deployment bag is now ready to be fitted into the harness, according to the manufacturer directions.

MANDATORY WARNINGS

1

Once you have the parachute into the harness it's mandatory to check you can easily extract the deployment bag from the harness.
Hang in your harness and check the extraction!

2

The deployment bag is extremely important for parachute reliability:
use the original *metamorfosi* deployment bag

3

Your ***metamorfosi Conar*** is a paragliding rescue parachute
only if there is a maillon rapide at the end of the bridle.

MAINTENANCE

To keep your parachute in optimal condition, a minimum level of attention and maintenance is necessary by carefully unpacking, checking and repacking the parachute **every 90 days**.

Repack your parachute immediately if damp!

Regular repacking every 90 days is the best way to become familiar with the packing procedure and keep the parachute fully operational. In this manual we tried to give you as much information as possible but cannot replace experience: we still recommend that the manufacturer or an approved rigger pack the parachute.

During normal use it's important to follow some rules:

- Nylon is very sensitive to UV rays, so it's very important not to expose the parachute unnecessarily to sunlight. Be careful: a one week exposure to strong sunlight may reduce the fabric strength by approximately 25%.
- Keep the parachute in a dry and cool place to avoid mould developing.
- When packing the canopy take particular care not to enclose any leaves, twigs, insects or any kind of object that could damage the materials.
- Cleaning could be more harmful than the stain! Always handle the fabric carefully and treat the smallest area possible. Most stains can be avoided by immediately wiping the area with an absorbent cloth. Use clean lukewarm water and sponge gently. If necessary, you can use a mild neutral detergent; let it sit on the stain 3-5 minutes, sponge gently and then firmer if needed. **Never use full strength detergent**. Rinse carefully to remove any remains of detergent. **Do NOT use bleach** or any products containing bleach as it will affect the fabric strength! **Do NOT use any solvent,** such as gasoline, acetone, trichloroethylene, mineral spirits, paint thinner, petrol, etc... as they may damage the fabric or other components.
- If the parachute gets wet or damp **it must be repacked.** Hang it up in a dark room and let it drip dry and air completely before repacking.
- WARNING: if the parachute shows any sign of wear, fraying, or a cut, scratch or tear, do not use the parachute and get it checked by an expert.
- Any repair must be made by the Manufacturer.
- **Do not replace any parts with non-factory ones** (especially the deployment bag) because the correct working of the parachute system depends upon the balance between strength, dimensions, elasticity and aerodynamic characteristics of all of its parts.
- Should any problem arise, please write or call us, we are at your service.

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DISCLAIMER OF WARRANTY

It must be understood that the use of this emergency parachute is a *possible* chance of safety, not a *guarantee* of safety.

Taking into consideration the inherent risk in flying paragliders, it must be expressly understood that the Manufacturer and the Seller do not assume any responsibility for accidents, losses, direct or indirect damages following the use or misuse of the product. This parachute is provided "as is" without a warranty of any kind. All express or implied representations and warranties are hereby excluded.
It must be clearly understood that this is an emergency system designed exclusively to be used as a last chance to reduce the paraglider and pilot's sink-rate after an accident during flight. It is not suitable for any other purpose and, in particular, it is not suitable for hang gliding, free fall or base jumping. It must only be used by pilots who completely understand the characteristics and the limits of the paraglider, harness and the emergency parachute in a paragliding system.

Read this manual carefully but do not consider it exhaustive: it can't be!
We do not guarantee results and assumes no obligation or liability whatsoever in connection with the information given in this manual.

The Conar parachute is delicate and can be easily damaged or rendered ineffective by accidents, alterations, modifications, mistakes, shocks, corrosion, improper or excessive use, insufficient or improper maintenance and ageing, all of which potentially cause malfunctions for which the Manufacturer and the Seller cannot be considered responsible.
Any parachute may have a malfunction, fail to open in time or rupture at excessive speeds. Even if it opens correctly the emergency parachute may cause death or serious injuries to the pilot and other people as well as damage to property. Remember that once the parachute deploys, you will not be able to steer to control your direction.

To get a fast and reliable deployment it is extremely important to repack the parachute every 90 days, according to this manual and using the original *metamorfosi* deployment bag.

Because of normal ageing any emergency parachute has to be periodically checked by the manufacturer or an authorized rigger and, although carefully maintained, it has to be replaced every ten years.

The liability of the Seller is limited to replacement of parts found upon examination by the Manufacturer to be defective in material or workmanship, within two years from the date of manufacture and which have not been caused by accidents, tampering, ageing, alterations or mis use.
In any case, possible damages suffered by the Buyer and User shall be settled by the cost of the above mentioned replacement.
The Manufacturer and the Seller cannot in any way be considered responsible for deaths, injuries, material damage, or any kind of consequent damage.
With the purchase and/or use of the product, the Buyer and the User subscribe to the above mentioned without recourse. Any dispute or controversy falls within the jurisdiction of the Milan Court of Law in Italy.

Packing List

date	signature	date	signature	date	signature

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