independence
gliders for real pilots
www.independence-world.com

Owner´s manual
Rescue system

Evo CROSS 100
Evo CROSS 120
Evo CROSS 160

Inhaltsverzeichnis

Warning

It´s not allowed to use this rescue parachute for skydiving!

According to EN 12491: Not suitable for usage at speeds above 32m/s (115km/h).

The rescue systems of the Evo Cross serie are certified according to EN 12491 (European standard) and LTF 91/09 (German type approval).

The manufacturer can not be made liable for any possible damages to persons or material damages, which may result from this rescue parachutes in any way.

1. TECHNICAL DATA

Type: Evo CROSS 100, 120, 160

Manufacturer: **Fly market GmbH & Co. KG**
Am Schönebach 3
D-87637 Eisenberg
Tel. +49-8364-9833-0

Rescue parachute	Evo Cross 100	Evo Cross 120*	Evo Cross 160*	
Weight of the parachute (kg):	1,5	1,9	2,4	
Surface (m²):	25,06	36,81	41,12	
Number of lines / panels:	16	16	20	
Length according to EN (m) (Paragliding version)	6,92	8,12	8,60	
Max. Load (kg) according to LTF:	100	120	160	
Sinkrate at max load (LTF)	4,9 m/s	4,7 m/s	5,6 m/s	
Max load (kg) According to EN (sink rate 5,5 m/s)	100 @ sink rate 4,9 m/s	120 @ sink rate 4,7 m/s	155 @ sink rate 5,5m/s	
Volumen (Milliliter) (Without bridle)	4500	5200	5700	

* available as hang gliding version.

2. Purpose

The emergency parachutes are manually-released parachutes for paraglider / hangglider pilots in an emergency situation while flying.

3. Conditions of use

Maximum speed for usage: 115 km/h (32 m/s)
Interval for repacking: 12 month, then the rescue parachute has to be repacked and this repacking has to be recorded in the "Repack and inspection log book".
Interval of inspection: 24 month, then a complete inspection of the rescue parachute is necessary. The inspection have to be recorded in the "Repack and inspection log book".
Operational lifespan of parachute: 10 years. The lifespan can be extended for 2 more years if the rescue parachute is inspected yearly during this last two years. So the total max. possible lifespan is 12 years.

4. Necessary documentation

a) Owner´s manual
b) Repack and inspection log book

5. Mode of operation

During an emergency situation while flying the pilot pulls at the release handle with a firm tug. Thereby the outer container opens and the deployment bag is released. After that the rescue parachute package (which is still packed in it´s deployment bag) have to be thrown with a dynamic move into the free air-space. That means the release handle have to be thrown away together with the deployment bag!!!

The deployment bag and the connection bridle, are designed in a way which releases the lines and canopy of the parachute not before the parachute package is thrown away.
This prevents an unintentional or too early opening of the rescue parachute. This is minimizing the danger of tangling up with the paraglider, the pilot or the reason which maybe causal for the emergency case (e.g. collision with another paraglider).
Moreover the maximum throwing speed of the deployment bag should be reached when the deployment bag leaves the pilot hand.

In general: The faster the rescue parachute package is thrown away, the quicker the parachute will open.

After the throw the depolyment bag opens and releases lines and canopy. The powerful throw and/or the airstream stretches the lines and canopy now the rescue parachutes opens.

After the rescue parachute is opened completely, you first have to check the altitude above ground.
If you have still enough height you should ty to make the paraglider unable to fly according to the doctrine, to avoid an V-position of the paraglider and the rescue parachute.
If you do not have enough height anymore, just focus on the ground and prepare yourself for the landing fall.

6. Inspection of the parachute

A parachute must be controlled by a registered packer before it is packed. After an emergency opening the parachute must be inspected by the manufacturer or a workshop which is authorized by the manufacturer. After a re-pack the rescue parachute should undergo a release test. This verifies that the opening force of the harnesscontainer or outside container is in between 2 daN and 7 daN.
A compatibility test must be performed by an authorized person if the rescue system and harness (with integrated rescue container) is mounted the first time in this combination. The compatibility must be recorded in the parachute log book.

7. Behaviour if damages are noticed

If you notice any damage at the rescue parachute, which may affect the airworthy condition of the rescue parachute, you have to send the rescue parachute for inspection/repair to the manufacturer. Also, if you are not sure about the airworthy condition in any way, you have to send the parachute to the manufacturer.
Attention: Chemicals, detergents, insects, mould stains or the like can have the same negative effects to the strength of the parts as mechanical influences.

8. Storage

Oil, grease, acid and paint should not be stored near the parachute. The storage space should be dry. Parachutes which have not been used for a long period of time should be opened and the canopy loosely rolled and stored in a bag.
Avoid unnecessary high temperature (e.g in a parking car)!

9. Maintenance

The lifespan and condition depends mainly upon how carefully you handle and maintain your parachute. Out of this reason we recommend to control the parachute regularly, at the latest if it is repacked, if there are any wears or damages.

During normal use you have to take care of the following points:

If the parachute got wet, you have to open it and dry it at a well-ventilated place as soon as possible (but avoid direct sunlight!) The fast drying is important to avoid mould stains. After the parachute is complete dry it can be repacked.

If the parachute is strained more than normal (for example: a car drove over the harness in which the parachute is placed, or it maybe is damaged by a sharp object, or any other possible damage), you have to send the parachute to the manufacturer to check it.

Avoid contact with salt water, acids or other aggressive substances!

Also avoid unnecessary exposure to sunlight, cause the UV rays may damage the molecular structure of the material.

10. Cleaning

A dirty canopy and container can be carefully cleaned with clear water and a soft sponge.
Attention: Never use detergents, chemicals, brushes or hard sponges to clean the parachute! Also a cleaning in the washing maschine is not allowed.
If the rescue parachute gets in contact with salt water, you have to wash it with fresh water. A cleaning accelerates the ageing of the system.

11. Repairs

Repair jobs have to be performed only by the manufacturer or a workshop which is certified by the manufacturer.

12. Nature and environment friendly behaviour

Please do our nature-near sport in a way which do not stress nature and environment! Do not walk beside the marked ways, don´t leave your litter, don´t make unnecessary loud noises and respect the sensitive balance in the mountains. Especially at the take-off we have to take care for the nature!

13. Environmentally compatible waste disposal

The materials of which a rescue parachute is made requires a special waste disposal. So please send disused parachutes back to us. We will care about an professional waste disposal.

14. Spare parts / changeable parts

Except the rubber bands of the inner container and sealing thread no spare part is necessary at the Evo Cross series. Only approved rubber bands with the size 30x3x1 mm or 25x3x1 mm should be used! An inexpensive purchase is possible through us.
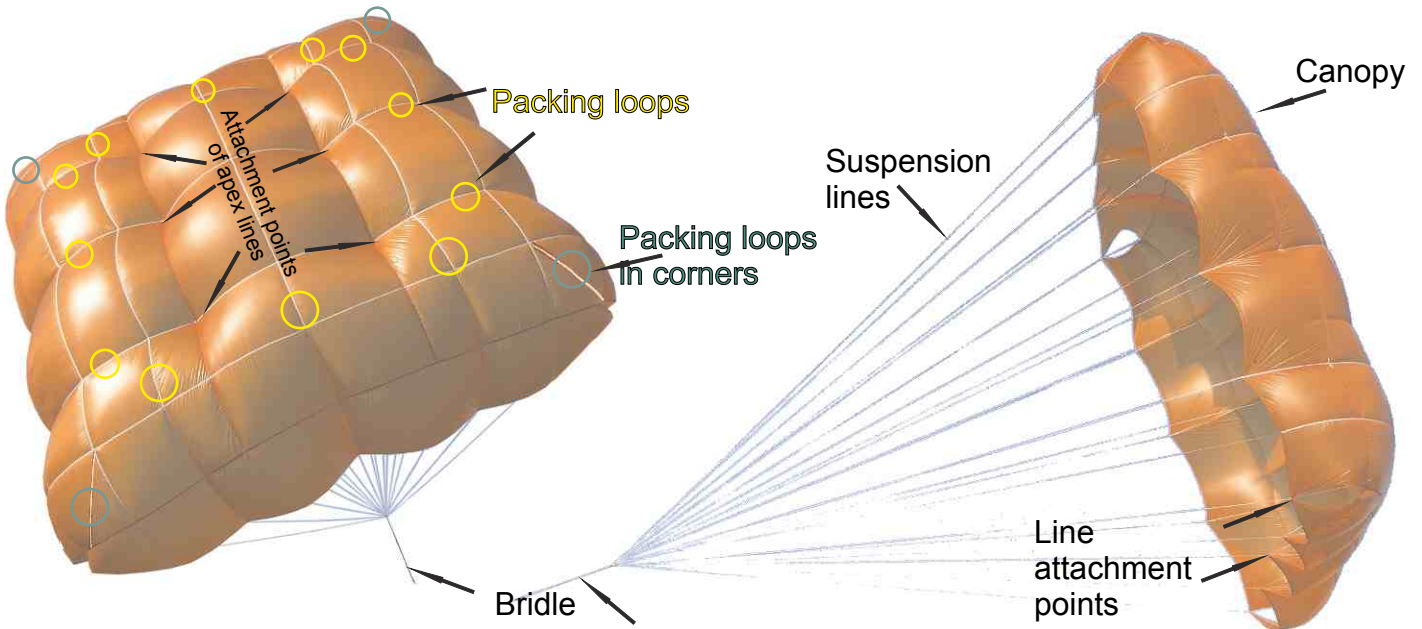
The deployment bag is except for the use of an under point 18.4. described the deployment bag part of the rescue system and may not be exchanged for an other one. If another deployment bag as described is used you will loose the type approval.

15. Structure of the parachute

The parachute structure is square and has, depending on the model 16 or 20 gores (see "technical datas")

The canopy is made of tear restistant, high strenght nylon fabric. The main seams are flat fell seams and are reinforced by a band. The lines are sewn to the canopy and reinforced with V-tapes at the canopy. The crown is pulled down by the center lines. All lines and center lines are connected to the bridle.
The bridle has a strength of more than 2400 daN. Hang gliding models only differ from paragliding models by a longer bridle.

Attachment points of apex lines

Packing loops

Packing loops in corners

Bridle

Canopy

Suspension lines

Line attachment points

Standard deployment bag:

The deployment bag is made of nylon fabric and gets closed at three points

Attachment points for release-handle

Optional deployment bag:

The deployment bag is available as an option if a smaller packing volume is needed. The construction is a hybrid of a cloverleaf and a pocket container.

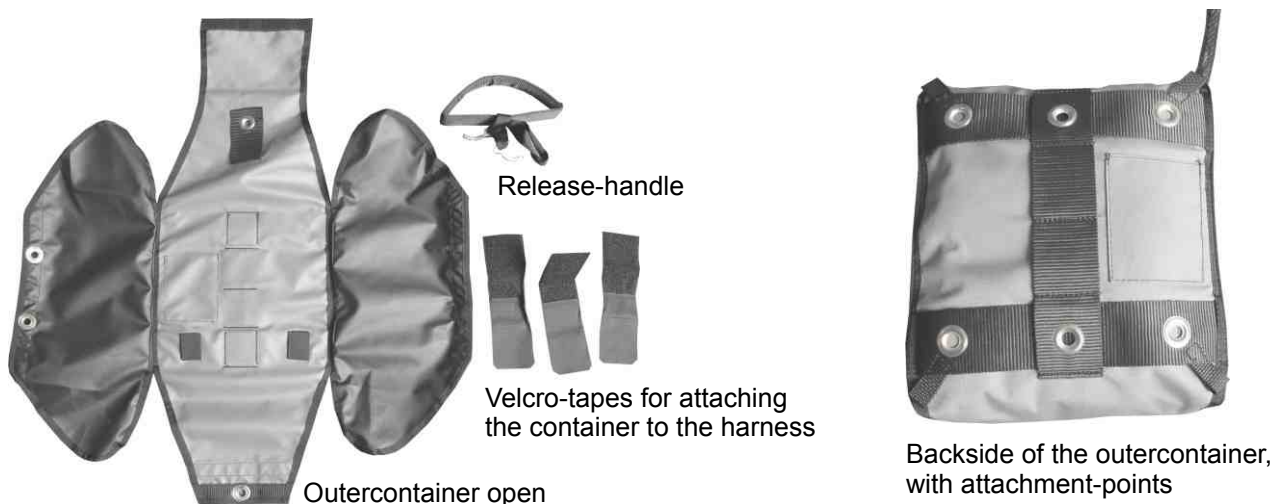
Attachment points for release-handle

On the flat side of the deployment bag are four loops. At one of these loops the release-handle of the outercontainer or the harness is to be attached.

The outercontainer is made of robust, water-repellent nylon fabric. It consists of 2 lateral flaps, the upper and lower flap, the release-handle with 2 pins, which close the container.

Release-handle

Velcro-tapes for attaching the container to the harness

Outercontainer open

Backside of the outercontainer, with attachment-points

16. Packing the parachute

1. Slide on the packing loops on a line (packing cord). The packing loops are colored to find them more easy. At the corners they are green, yellow on the sides. Slide on 3 yellow packing loops in between the green ones (Evo Cross 160: 4).

2. Separate the lines left and right the center lines (marked yellow) and check that they are not crossed and running free.

3. Separate canopy and lines to the left and right that panels marked with 1 are on top, panels no 9 (Evo Cross 160: 10) on the bottom.

4. Hook in packing cord. Bundle the lines, stretch the lines by fixing the bridle on the other end and put the canopy to the left side.

5. Place panel 9 (Evo Cross 160: panel 11) centered to the the floor and arrange panel 8 (Evo Cross 160: panel 10) to the side.

6. Arrange the upper part of panel 8 (Evo Cross 160: panel 10) to the side.

7. Arrange panel 7. (Evo Cross 160: panel 9/8)

8. Arrange panel 6 and upper part of panel 5 to the side. (Evo Cross 160: panel 7, upper part of panel 6)

9. Arrange panel 5 (corner panel) (Evo Cross 160:panel 6)

10. Arrange panel 4 and upper part to the side. (Evo Cross 160: panel 5)

11. Arrange panel 3. (Evo Cross 160: panel 4/3)

12. Arrange panel 2 and upper part of panel 1 to the side.

13. Arrange panel 1 (corner panel) and place a packing weight onto the peripery.

14. Fold the left side onto the right side.

15. Place panel 9 (Evo Cross 160: panel 11) centered to the the floor and arrange panel 8 (Evo Cross 160: panel 10) to the side.

16. Arrange the upper part of panel 8 (Evo Cross 160: panel 10) to the side.

17. Arrange panel 7. (Evo Cross 160: panel 9/8)

18. Arrange panel 6 and upper part of panel 5 to the side. (Evo Cross 160: panel 7, upper part of panel 6)

19. Arrange panel 5 (corner panel) (Evo Cross 160: panel 6)

20. Arrange panel 4 and upper part to the side. (Evo Cross 160: panel 5)

21. Arrange panel 3. (Evo Cross 160: panel 4/3)

22. Arrange panel 2 and upper part of panel 1 to the side.

23. Arrange panel 1 (corner panel) and place a packing weight onto the peripery.

24. Fold right side S-shaped. (Step 1)

Schematic illustration S-fold

Schematic Illustration S-fold

25. Fold left side S-shaped. (Step 2)

26. Remove packing cord.

Version a) pocket deployment bag (standard version):

27a. Stow top of the canopy in the deployment bag.

28 a. Fold the rest of the canopy in small S-folds and place it in front of the deployment bag.

29 a. Put the S-folded canopy in the deployment bag.

30 a. Bundle the lines in 3x3 "8-shaped" hanks. Do not bundle the last 50 cm of lines.

31 a. Close the deployment bag with the lines. First in the middle then the sides.

Attention: You have to use new rubber bands for hanks and deployment bag everytime the parachute is packed.

Version b) hybrid deployment bag (optional):

27 b. Stow top of the canopy in the deployment bag.

28 b. Fold the rest of the canopy in S-folds (stack-pack).

29 b. Bundle the lines in 3x3 "8-shaped" hanks. Do not bundle the last 70 cm of lines.

30 b. Close the deployment bag with the lines. First the long side. 1) then 2). No 2) is to be closed with the middle grommet of the remaining flap A).

31 b. Close the left and right side.

Attention: You have to use new rubber bands for hanks and deployment bag everytime the parachute is packed.

17. Mounting in an outercontainer
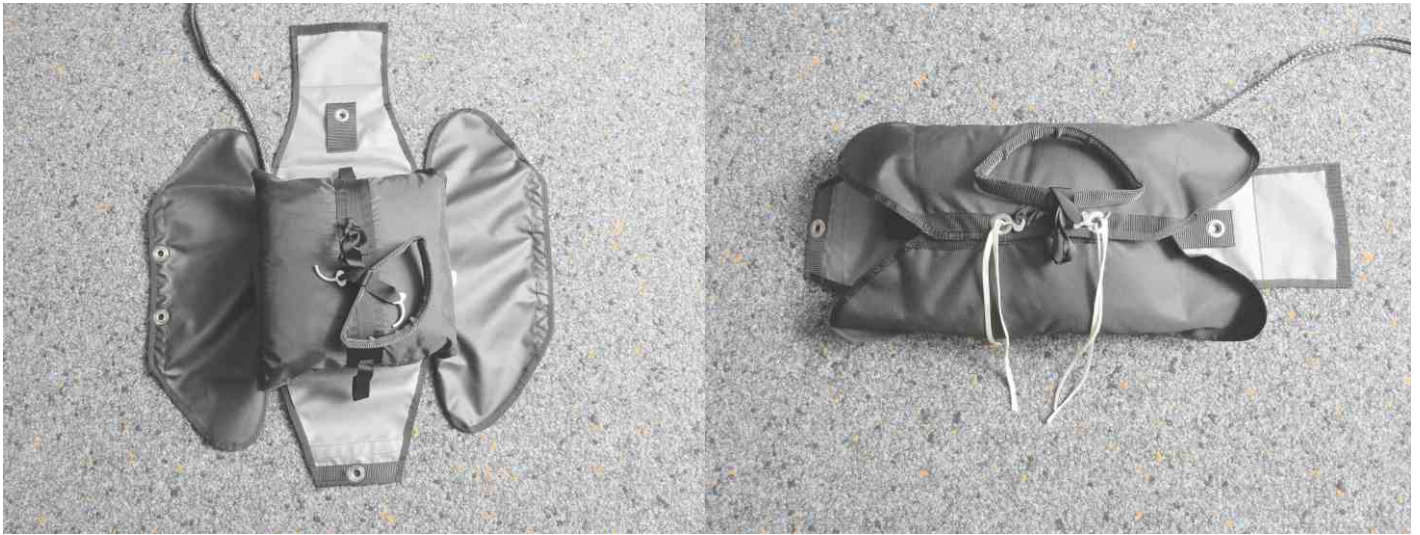
1. Connect the release handle at the loop in the middle of the deployment bag. Place the bridle at the side of the container which you prefer.

2. Close the two lateral flaps of the outercontainer with two packing-cords and closed it with the pins of the handle provisionally.

3. Close the upper and lower flap with the pins. Remove the packing cords then!

4. Close the upper flap finally. Notice the packing in the "repack and inspection log book".

5. To avoid an unintentional opening, the German type approval (LTF) prescribe a minimum release-force of 20 N. If the system does not have this minimum release-force, it is necessary to build in a predetermined breaking point (special thread). This have to define a minimum release force of 20 N.

The special thread which is used as predetermined breaking point must be put through the hole of the pin and around the loop as shown on the picture.

Both ends of this special thread are fixed with a knot and an additional seal.

To secure the pin it is only allowed to use certified material because if the strength of this material is too high the save operation of the rescue system is not guaranteed.

This thread is supplied by Fly market GmbH & Co. KG! Do **not use** other threads which may look the same!

18. Mounting / integration to a harness

18.1. harnesses without integrated rescue system container:

If the harness does not have an integrated rescue system container use one of the outercontainer which is shown at point 15.
The outercontainer shown at point 15 has got several loops, eyelets and velcro-tapes on it´s back side to attach it at the harness. The possibilities of the attachment to the harness depends on the harness. For a correct mounting on the harness please refer to the harness manual.

18.2. Usage of a frontcontainer / outercontainer of an other manufacturer:

The possible usage of a front container or of an outercontainer of an other manufacturer depends on the size and if the container is certified. If the container is too small or not certified the operating license of the rescue system expires. If it is a container of an other manufacturer you have to read the manual of the container.
For attaching the system to the harness please refer to the harness manual.

18.3. harnesses with integrated rescue container:

Almost all modern harnesses have an intergrated rescue container in which a rescue system can be placed. For the correct mounting of the rescue system in such a container please refer to the harness manual.

18. 4. Harnesses with combined deployment bag/release handle

Several harnesses are equipped with a complete release handle/deployment bag system, which is adapted optimally to the corresponding harness.

When using such a system ensure that the deployment bag is compatible to the rescue system used. Please consider:

1. The permitted volume range of the handle/deployment bag system must cover the volume of the rescue system. The volume of the rescue system is to be found under 1. Technical datas.

2. In addition make sure that the deployment bag releases the rescue system without any problem.

A deployment bag with 4 or more flaps (so called cloverleaf deployment bag) is in general compatible.

The use of a deployment bag in the shape of a pocket (so called pocket container - exemplary design see under no 15) is possible, but must be tested and certified by a LTF test laboratory separately for every rescue system model.The deployment bag which comes as standard with the Evo Cross Serie is of course compatible.
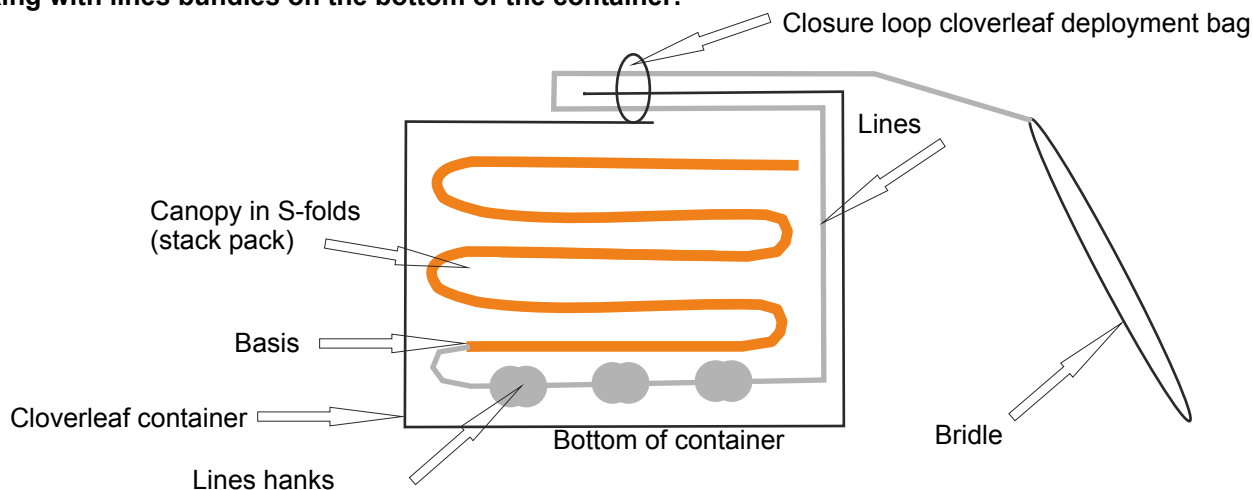
Mounting:

If the above conditions are met, the rescue system is to be packed by following No. 16 (Packing the parachute) step 1 to 26.
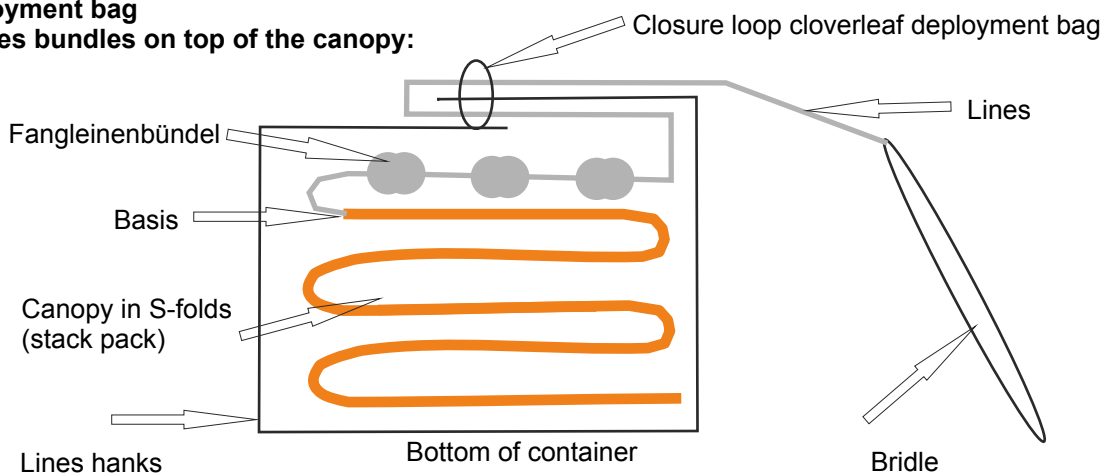
The remaining steps of stowing the rescue system in the harness specific deployment bag is shown in the manual of the harness.

If the harness manual shows a so called stack-packpacking method, this is also possible! The below imaging shows the stack-pack method only exemplary!

Cloverleaf deployment bag
packing with lines bundles on the bottom of the container:

Closure loop cloverleaf deployment bag

Lines

Canopy in S-folds
(stack pack)

Basis

Cloverleaf container

Bottom of container

Bridle

Lines hanks

Cloverleaf deployment bag
packing with lines bundles on top of the canopy:

Closure loop cloverleaf deployment bag

Lines

Fangleinenbündel

Basis

Canopy in S-folds
(stack pack)

Bottom of container

Lines hanks

Bridle

Attention:

If the parachute is mounted to a harness or a front/outer container you have to check the compatibility. This check is only allowed to be done by therefore authorizied persons. The compatibility check have to be noticed in the "Repack and inspection log book".
Beside some other points you have to take care particularly that the connection length of the release handle to the innercontainer is minimized. Therefore are three loops at the deployment bag at which the release handle can be attached. You should always try to use the shortest possible connection to ensure that the rescue parachute can be thrown as good as possible. But you also have to take care that the release out of the container is not hinderd in any way. (take care that the release pin does not block!!!). Read the manual of the harness in any way.

19. Specialities for paraglider´s winch towing

For winch towing you have to consider the instructions of the harness-, paraglider- and towing release manufacturer!
If you use a frontcontainer you have to ensure that the rescue parachute can be released in every situation.

20. Pre-flight check

In addition to a normal preflight check (see manual of the glider/harness or maybe towing device), you have to check before every take off that the rescue container is closed correctly and the release handle is placed correctly.
If the rescue parachute connection bridle is removed after every flight (for example: when you use a frontcontainer) you also have to check the correct attachment of the bridle!