MANUAL RESERVE - PRIME - SQR PRIME

Product Manual

Version 17.11.2021

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1. INTRODUCTION

Many thanks for choosing a Companion reserve parachute system. We are confident that you will be satisfied with this product in every respect.

The current manual contains all the important details about packing, storage, care, maintenance and – if necessary – deploying your reserve. Please read it carefully before taking the product into the air, and thoroughly familiarise yourself with the characteristics of your SQR Prime reserve.

You can maximise the reliability of your reserve system if you

- regularly repack it as described in this manual,
- install the reserve according to the instructions and perform a compatibility check,
- maintain and look after your reserve, and the rest of your flying equipment, as described in this manual.

We wish you safe flights and happy landings!

The Companion Team

1.1. Registration and the myCompanion Account

Register your product to benefit from the comprehensive services of the myCompanion Online Account:

- Email reminders to ensure you do not forget your annual repack date.
- A one-year warranty extension beyond the statutory warranty period.
- Access all the relevant information about your product, online support and important product updates.
- Record your repacks online and download your packing record as a PDF.

Register your product and activate your myCompanion account by scanning the QR-Code on the certification label or the back of the Quick-Guide Booklet.

By scanning the QR-Code on the product certification label or on the back of the Quick-Guide Booklet, you and your packer can easily refer to successful compatibility checks, inspections or repairs. As soon as a new packing entry has been made, your packing history will be automatically updated and confirmed by email.

Product registration

1.2. Environment and recycling

We always consider the ecological aspects of the development and production of Companion products in our choice of materials, and by cutting to minimise waste. A Companion reserve system consists mainly of man-made fibres with a Polyamide, Polyurethane and Polyethylene base. They do not need special disposal treatments. At the end of its life, you can dispose of your reserve in a normal plastics recycling facility.

1.3. Something to think about!

Many pilots do not give their reserve a moment's thought. They may have no idea what device is "hidden" in their harness. The reserve is not repacked frequently at the required time intervals, or it is too old.

We would like to encourage our customers to get to know their reserve and have confidence in it. Although seldom seen, the reserve is an important part of every paraglider pilot's safety-management system.

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2. GENERAL SECURITY ADVICE

Taking part in an aerial sport requires appropriate training and a satisfactory understanding of the relevant equipment, as well as the necessary insurance and licensing. A pilot must be capable of correctly assessing the weather conditions before flying. Before every flight, all items of flying equipment must be checked for damage and airworthiness.

Warning	Every pilot assumes full responsibility for all risks associated with the sport, including injury or death. Neither the manufacturer nor the seller of a reserve parachute can be held responsible for, or guarantee the safety of, the pilot.

3. INTENDED USE AND SAFETY REGULATIONS

3.1. Intended use

This reserve parachute system was specifically developed as a hand-deployed reserve parachute for paragliding, paramotoring and hanggliding. Its use is not permitted in conjunction with other aerial activities such as parachuting, skydiving or base jumping. The SQR reserve system is certified according to EN 12491 and LTF NFL II 91/09 standards.

Warning	Do not deploy a SQR Prime reserve at airspeeds exceeding 32 m/s (115 km/h)!

The flight standard for rescue systems EN 12491:2015 specifies the two opening speeds 40 m/s or 60 m/s for the load test. Although the SQR Prime was successfully tested at 50 m/s during the load test, it still belongs to the 40 m/s class, in which a maximum deployment speed of 115 km/h is defined, taking measurement uncertainty into account. However it has structural strength (energy absorption capability) that is more than 50% higher than required by the standard certification with 40 m/s.

3.2. Packing and inspection requirements

Every **12 months** the reserve should be opened, aired and repacked. This packing event should be noted (online) in the reserve packing and inspection record.

Every **24 months** the SQR reserve should have a periodic inspection and this event entered (online) in the packing and inspection record.

3.3. Additional packing and inspection conditions

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If the reserve gets damp or is exposed to sand, water or other hazards, a repack must be considered or the packing interval shortened.

Warning	If the packed reserve has been tightly compressed to minimise volume, we recommend a reduced repacking interval of 6 months.

If you are uncertain about the effects of these factors please contact a qualified organisation. To review your repacks, packing intervals, inspection and repair history you can refer to the online record that was automatically set up at product registration.

Online record

3.4. Service time, entry into service and extension

The expected service time of a reserve is **10 years**. Even if the reserve has never been used, it must be replaced after this time span.

The **official service time** of a reserve starts when it is **first installed**, known as the **Entry into Service date**. This date must be noted on the certification label on the bridle, by whoever installs the reserve. The 10-year service time, and the dates for the repacking schedule all refer to this Entry into Service date.

Dealer repack exception: if a reserve remains in a dealer's possession for more than a year he must air and repack it before sale to a customer. If the reserve remains in the dealer's possession for 2 years it is deemed to have entered service on this 2-year date.

Two-year extension: at the end of the 10 years' service time, a two-year service time extension can be granted by the manufacturer. This must be arranged online, see more information on our website. The work requires a comprehensive factory inspection and measurement of the reserve. If satisfactory, a two-year service time extension will be granted and documented.

3.5. Water and salt water

In the event of a water-landing, do not repack the reserve until it has completely dried in the air. The best way to dry your reserve is to hang it upside down, symmetrically. If the reserve is incompletely dried (canopy or lines), it may shrink asymmetrically. Never use a heat source to speed up the drying process.

Salt water: if any part of the reserve gets wet with salt water, the whole reserve must be rinsed several times in fresh water, then dried.

Warning	If salt water is not rinsed off within 36 hours, the reserve must be declared NON-AIRWORTHY AND DANGEROUS – not flown again!

3.6. Other special conditions

If a canopy shows signs of mildew or mould, its strength can be affected. It must be sent to a dealer or the manufacturer for inspection and testing.
Your reserve should be sent for a factory inspection whenever any of the following situations apply:

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- 20 deployments or
- 40 repacks or
- A deployment at, close to or above the maximum certified deployment airspeed (115 km/h – 32 m/s – 71 mph)

A factory inspection should only be carried out by a certified organisation. Your local dealer can advise on this subject.

To be sure that the correct materials and techniques are used, all repairs should be done by the manufacturer.

4. DESIGN FEATURES

4.1. Square Round Technology (SQR)

The unique Square Round technology heralds a new generation of reserve parachutes, merging the advantages of the classic round canopy and the cross canopy into an innovative and forward-looking product.

The SQR has been developed and adapted to the needs of pilots and packers. Countless computer simulations and in-practice tests were an essential part of the exhaustive development process.

Advantages of the SQR in brief:

- Improved opening behaviour as a result of comprehensive practical testing.
- Low sink rates and high pendulum stability (swing resistance) thanks to an aerodynamically optimised canopy with Air Jets.
- Low weight thanks to careful choice of materials.
- Straightforward and reliable packing – similar to a round canopy – with comparatively fewer lines for easy sorting, and useful coloured packing aids.
- No directional tracking in flight.
- Tested for water landings! Thanks to a mix of low-shrinkage materials, functionality is fully guaranteed even after a water landing.
- Certified to both EN 12491 and LTF NFL II 91/09 flight standards.

4.2. Structural Design

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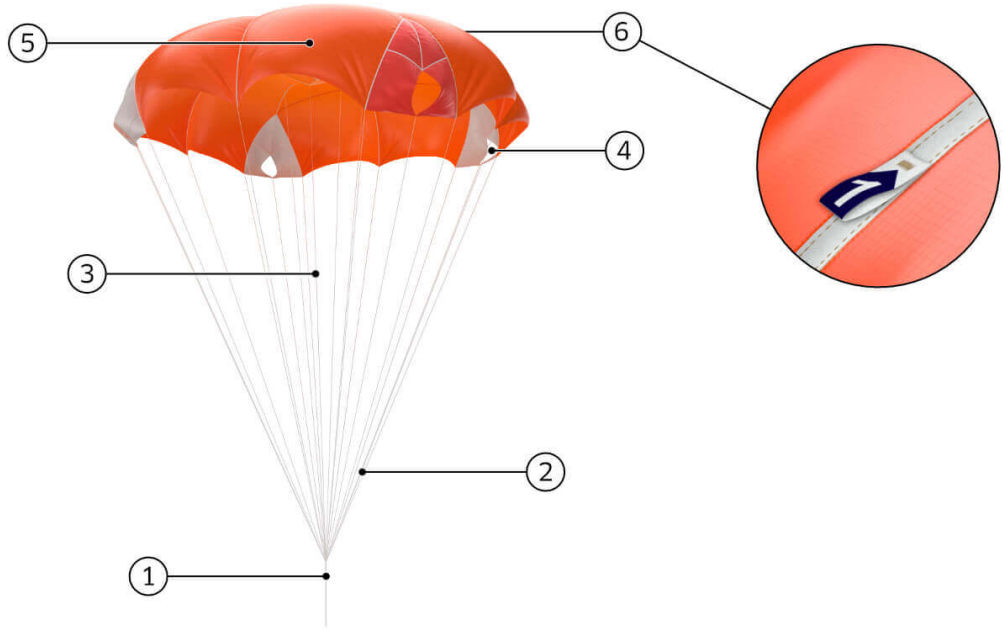

Fig. 1 Structural view from below

1. Bridle
2. Base lines
3. Centre lines
4. Air-Jets
5. Canopy
6. Packing loops

BRIDLE

One end connects to the harness, the other to the reserve canopy suspension lines.

SUSPENSION LINES

The suspension lines can be divided into two main groups:

Base lines (all the same length to simplify packing) connect the bridle to the edge of the canopy.

Centre lines connect the bridle to near the middle of the canopy.

The two groups are made from different materials of different diameters, to make them easier to separate and sort. In addition, the lines on the left and right sides, as well as in the centre , are different colours to make them easier to separate.

CANOPY

Main canopy: made up of different panels with one red corner panel, to make packing and sorting easier.

Reinforcing tapes: at the edge of the canopy and specially chosen places on the canopy surface.

Air Jets: at the four corners to provide active aerodynamic stability.

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Packing loops: coloured blue and numbered – on the canopy top surface (see Fig 1).

Coloured line attachment tapes: red , green and white - these distribute the load to the canopy edge, and also act as sorting and packing aids.

4.3. Hangglider versions

Fig. 2 Swivel device fitted to the SQR Hangglider version

Hangglider versions of the SQR have a swivel in the bridle (connection line). The swivel has been tested and certified up to 5,000 kg breaking load. The swivel effectively prevents a spinning wing from twisting the parachute suspension lines. It is an essential safety factor.

The swivel is factory-fitted to hangglider versions of the SQR. Retrofitting of a swivel is not permitted. If a reserve does not have a built-in swivel, it is a paraglider version. Conversion for use with a hangglider is not permitted.

To maximise safety against a carabiner or other equipment failure, we recommend that the reserve should also be connected directly to the hangglider harness by a suitable connector link (minimum breaking load 2,500kg).

5. INSTALLING THE RESERVE

We recommend the installation of a reserve in a harness should be done by a qualified person.

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If any part of a harness/container/reserve combination is new or has been changed, the correct installation and deployment of the harness/container/reserve combination **must** be proven by a test deployment, also known as a **Compatibility Test** – See details in chapter 7.

Every reserve/harness/container combination has its own peculiarities. It is essential for pilots and packers to familiarise themselves with the system and how it works. This is the only way to ensure reliable functioning.

There are different ways to combine the rescue parachute with the harness or external container. Please ask an experienced person if you are unsure about the best solution for your harness/reserve container system. Correct installation of the reserve in the harness or external container is described in the manufacturer's manual for the relevant harness/container.

5.1. With an integrated inner container

Most modern harnesses have their own **integrated inner container** to install a reserve. For some harness manufacturers, the use of the integrated container is obligatory. If your harness has an integrated container, this is the recommended fitting method.

The certified reserve compartment volume of the harness (see manufacturer's manual), must be compatible with the certified packing volume of the reserve. The certified packing volume is shown on the certification label of every SQR reserve.

Warning	Measurement of opening speed and the shock test parameters required during certification were carried out using the original SQR inner container as delivered from the factory. A deployment with a different inner container could have different results.

If installing into an integrated inner container, the reserve should be **removed** from the factory-delivered inner container. Depending on your configuration, sometimes a partial or full repack of the reserve is required so that it matches the shape/size of the integrated container to be used.

The packing section (Chapter 9) of the manual gives detailed instructions on how to do this. We strongly recommend you watch the Companion online video about packing and folding to size.

Video packing instruction

Warning	To confirm that the reserve has been correctly installed, a compatibility test is absolutely essential after a new installation or if any element of the harness/container/reserve system has been changed.

5.2. With a SQR inner container

SQR reserves are delivered from the factory in the **SQR inner container**. If your harness does not have its own inner container for the reserve compartment, or the manufacturer allows the use of third party inner containers, you should use the **SQR inner container**, as supplied from the factory.

Take care to choose the correct inner container attachment loop. There is a choice of two loops for attaching the reserve handle (see Fig 3). The correct one to use depends on the length of line from the handle and the shape and position of your harness reserve compartment. Please follow the advice in your harness manual.

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Fig. 3 SQR inner container

Warning The line connecting the reserve handle to the inner container should never be under tension until the reserve is pulled out of the harness compartment. There must be sufficient travel for the rescue handle to pull out the release pins first before pulling the inner container. A compatibility test is mandatory!

The certified reserve compartment volume of the harness (see manufacturer's manual) must be compatible with the certified packing volume of the reserve. The certified packing volume is shown on the certification label of every SQR reserve.

Warning To confirm that the reserve has been correctly installed, a compatibility test must be carried out after a new installation or if any element of the harness/container/reserve system has been changed.

5.3. With an external (e.g. front) container

In some situations an external container could be the best way to install a reserve. For instance:

- Your harness does not have a rescue compartment, as is the case with some Hike&Fly harnesses,
- You do not want to use the reserve compartment of your harness for the reserve,
- The reserve size is not compatible with the certified harness compartment volume,
- You carry a second reserve as backup, in an external container,
- Ergonomic issues, e.g. you could not reach the reserve handle of the harness,
- Front container placement of the reserve is preferred by the pilot (e.g. quicker deployment time, or by

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habit),
- Paramotors, trikes and older harnesses may not have a built in reserve compartment at all.

Depending on the construction of the external container, in most cases the SQR inner container should be used to install the reserve into the external container. Please refer to the manufacturer's manual for the correct procedure.

If using an external container, it might be necessary to remove/reattach the container to the harness before/after each flight. Refer to the container manufacturer's user manual and the connected harness system.

Warning	Make sure your external container is securely and correctly connected to the harness assembly, otherwise you risk an opening malfunction.

The certified reserve compartment volume of the external container (see manufacturer's manual), must be compatible with the certified packing volume of the reserve. The certified packing volume is shown on the certification label of every SQR reserve.

Warning	Measurement of opening speed and the shock test parameters required during certification were carried out using the original SQR inner container as delivered from the factory. A deployment using a different container could lead to different results.

Take care to choose the correct inner container attachment loop, if using the SQR inner container. There is a choice of two loops for attaching the reserve handle (see Fig 3). The correct one to use depends on the length of line from the handle and the shape and position of your harness reserve compartment.

Warning	The line connecting the reserve handle to the inner container should never be under tension until the reserve is released from the external container. There must be sufficient travel for the rescue handle to pull out the release pins first, before pulling the inner container. A compatibility test is mandatory!

If the packed Companion reserve has to be removed from the SQR inner container, a partial or full repack of the reserve may be required so that it matches the shape/size of the container to be used.

The packing section (Chapter 9) of the manual gives detailed instructions how to do this. We strongly recommend you watch the Companion online video about packing and folding to size:

Packing video

Warning	To confirm that the reserve has been correctly installed, a compatibility test is essential after a new installation or if any element of the harness/container/reserve system has been changed.

5.4. Avoiding canopy damage

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When fitting the reserve into the harness, make sure that the inner container is neatly closed, so that the reserve fabric is completely protected from abrasion.

Warning — Direct contact of the reserve canopy fabric with sharp objects or rough materials such as velcro or cut strap ends can rub, scratch and weaken the canopy fabric.

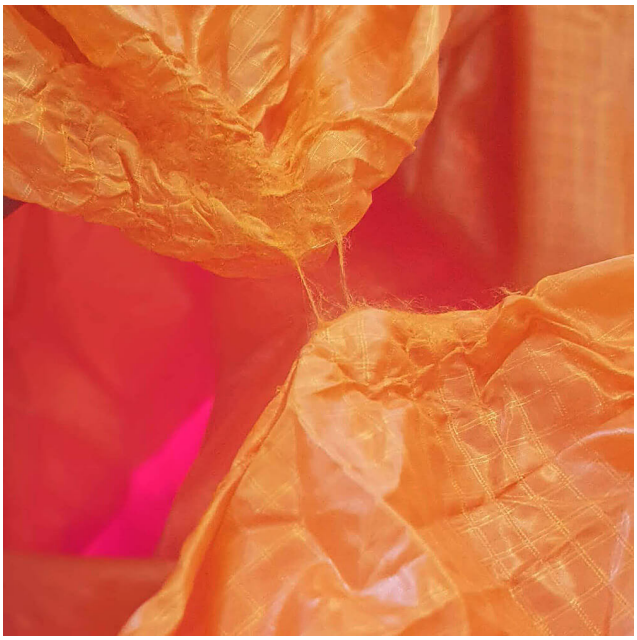

Fig. 4 — Velcro damage on canopy fabric

5.5. Connecting the reserve

This is a vitally important single-point connection. Your life may depend on it – literally! There are two accepted ways to connect a reserve to a harness/external container.

Connecting with a metal connector link

For connecting the reserve to the harness a suitable connector link (commonly referred to as a quick link or maillon) with a minimum breaking load (MBL) of 2,500 kg must be used. We recommend the stainless steel Maillon Rapide (MRNI) products from Peguet. This connecting link must be correctly closed in accordance with the manufacturer's instructions, and an O-ring or the supplied neoprene cover used to secure the bridle/webbing loop positions to prevent fraying/slipping around the quick link.

Warning — In the event of a reserve deployment, an incorrectly fitted or secured connector link can weaken or cause complete failure of the harness/reserve connection.

Direct looping

A direct loop-in-loop connection of the reserve bridle and harness V-connection is permitted for ADVANCE harnesses as long as the loop is centred and tightened. In addition to the correct looping, the loop knot must be

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secured with the supplied neoprene cover to prevent slipping (risk of fraying).

These findings are based on the results of an extensive series of tests carried out in 2017. Companion, together with ADVANCE, the German rope manufacturer Edelrid and the PMA (Paraglider Manufacturers Association), extensively tested the connection between ADVANCE harnesses and Companion reserves. The measured and documented strengths were far above the requirements of the standard.

Warning — In the event of a reserve deployment, incorrect looping technique can weaken or cause complete failure of the harness/reserve connection.

We cannot make a general statement about the strength of direct looping connections when using harnesses from other manufacturers.

6. COMPATIBILITY TEST

If any part of a harness/container/reserve combination is new or has been changed, the correct installation and deployment of the harness/container/reserve combination **must** be proven by a test release, also known as a **Compatibility Test**.

The harness/container/reserve combination should be tested in as realistic a situation as possible, with the pilot sitting in a normal flying position in the harness hanging by its carabiners.

To pass the test, the reserve has to be successfully deployed by the pilot in this situation. The force required for a safe reserve release should be between 4 and 8 kg. If you are unsure about your test result or have other queries, please ask a qualified person.

6.1. Compatibility test advice

The compatibility test means errors can be spotted and rectified before it is too late. This is no-mistake territory: aviation regulations are “written in blood” for good reason!

A compatibility test is not difficult or costly. You need to hang your harness – you can use two rope loops over a tree branch or beam, or a dedicated harness hanger. The test is simply to ensure that you, the pilot, can successfully pull your reserve out of the reserve compartment while in flight.

The compatibility test does not check the opening behaviour of the inner container. It tests how the reserve parachute is pulled out of the reserve compartment, and the throwing motion can be practised as part of the exercise.

If you have short pieces of packing line to hand for re-closing the harness compartment or front container afterwards, you can do a compatibility test yourself, easily. It is a good idea to always keep packing lines in your harness pocket in case your compartment opens by mistake.

Discovering you cannot extract your reserve when you need it is vastly more inconvenient than performing a compatibility test – and practice makes perfect.

Warning — A successful compatibility test builds pilot confidence in his/her reserve system.

6.2. Compatibility test issues

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The following factors can prevent a successful reserve release and result in a failed test:

- **Reserve volume does not match the certified volume range of the container/harness compartment** : the reserve is too large or too small for the compartment/container. The certified packing volume is shown on the certification label of every SQR reserve. The permitted reserve volumes for your harness/container will be stated in the user guide/manual for this equipment.
- **The reserve has been stowed incorrectly in the compartment – wrong direction or alignment, folded to wrong shape** etc. Please follow the harness/inner container instructions.
- Incorrect pilot technique – the reserve cannot be freed. Practice makes perfect.
- Ergonomic issues such as pilot's arm length, range of motion, etc. can affect the success of a reserve release. Small people with short arms can sometimes have difficulties releasing a reserve. It is therefore important that the compatibility test is carried out by the individual pilot who will be flying with the equipment. It can be worth exploring different harnesses and different flying positions, or consider an external container. Three-way compatibility is the goal: pilot/harness/reserve!
- Under high g-loads (> 3g, e.g. in a spiral) reserve-throwing becomes more challenging. For training, this situation can be simulated with the G-Force Trainer.

7. USING THE RESERVE

7.1. Pre-flight check

To maximise safety, the following should be checked before each flight in addition to the general pre-flight check:

- Reserve handle correctly in place on the harness/external container,
- No visible damage that could affect airworthiness,
- Reserve compartment correctly closed or external container closed and secured to the harness.
- As soon as practical after take-off, it is recommended that you put a hand on your release handle. This reminds you where it is, and mentally rehearses the first part of the throwing sequence.

7.2. Releasing and throwing the reserve

In an emergency, follow these steps:

- **Grasp** the reserve handle with your hand,
- **Pull** it firmly in the correct direction **(sideways/upwards)** to release the pins (or other release system) and pull the inner container completely out of its compartment or container.

Warning

The ideal pull direction varies with the construction of the harness or external container in combination with your reserve and the attachment point used on the inner container. A direct sideways (not upwards, forwards or backwards) pull works best on most systems. Find out and remember – practise the compatibility test!

- **THROW THE RESERVE OUTWARDS AWAY FROM YOU AS FORCEFULLY AS POSSIBLE, AND DON'T FORGET TO LET GO!**

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Achieving the fastest possible deployment is the priority in most emergency situations!

Warning	DO NOT HESITATE, time is crucial! Most real-life emergency reserve throws are near the ground.

Emergency situations near the ground can become critical very quickly. If high g-loads and rotation or airspeed build up, throwing the reserve becomes much more difficult. It is best to react before high g-loads and critical speeds build up. An **immediate reserve-throw** is the best decision if you are low over the ground.

Throw the reserve outwards. Do not throw towards the paraglider and its lines (even if that's where you hope to see it take its parachute form), or into the centre of the rotational movement. By throwing it outwards, the centrifugal force will help the reserve to open, and at the same time reduce the risk of the reserve getting caught in the paraglider's lines.

Throw as hard as you can! If the reserve **stretches** the suspension lines with **force** when thrown, the canopy will open faster. In an emergency, a high release force can speed up the opening process considerably.

7.3. Descending

After the reserve opens there is a short time window (typically 3-5 seconds) when the paraglider is unloaded. If the paraglider is allowed to fly again and regains airspeed, it becomes increasingly difficult to control it. The forces increase and the risk of a line twist, and the resulting loss of canopy control, increases.

Warning	It is strongly recommended that the pilot IMMEDIATELY does what he or she can to stop the paraglider from flying!

The best way to do this is to **wind in both brakes with symmetrical wraps** until the wing is completely stalled. This helps to stabilise the system and minimises the risk of oscillations, scissoring, down-planing or lateral drifting.

Warning	Design trends for improving paraglider and reserve performance also increases the risk of problem behaviours. It is very important to allow only the reserve or the paraglider to fly, not both.

While a reserve's performance and behaviour are important, **stopping the paraglider from flying, all the way down to the landing,** is also very important. The previous paragraph describes the simplest way to prevent the paraglider from flying. If the paraglider is allowed to start flying again, any force from it would elicit a counter-reaction in the SQR, resulting in oscillations or scissoring. Once the paraglider has been successfully disabled by symmetrical brake wraps, the pilot should ensure it remains disabled all the way to the ground. If the brakes are released before touchdown, the interaction of the paraglider with the reserve can cause severe oscillations. Oscillations cause greater sink rates and increase the risk of injury on landing.

7.4. Landing

Landing technique

To minimise the risk of injury as you hit the ground, the pilot should adopt the Parachute Landing Fall (PLF) position where possible. The basics: legs and feet together – knees not locked; slightly bent, with modest bracing.

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Feet aligned 90 degrees to the ground track (whether backwards or forwards). Don't look down or anticipate touchdown; look at the horizon – let the ground hit you, crumple and roll progressively – feet, knees, hips, back, shoulders.

Water landing

If you land in water you must be aware that the air in the harness protector will try to float and may turn you head down. Get out of the harness immediately. You can use it as a swimming float.

Actions after landing

After landing you may have to control/pull in your reserve by pulling the centre lines. Strong wind can keep the reserve inflated and drag you over the ground, causing injury.

Don't forget to look for your inner container, and collect it. Without it you cannot pack the reserve again. If you do lose it, contact the reserve or harness manufacturer for a compatible replacement. An incompatible inner container compromises the airworthiness of your flying equipment.

7.5. Checks after deployment

After any deployment, a check and repack is mandatory. If there is any possibility that your reserve system has been damaged, a complete inspection and check must be carried out before the reserve is packed again. If there is any doubt you should contact a qualified person.

8. REPACKING

8.1. General information

- In this chapter, we will describe the methods, procedures and practices used to pack or re-pack your SQR reserve.
- Alternatively you can watch our online packing video: https://youtu.be/f6M1KMbGZ70.

Warning	Every 12 months the reserve should be opened, aired and repacked.
Warning	If the reserve has been tightly compressed to minimise packed volume, we recommend a reduced repacking interval of 6 months.

Packing video

8.2. Sorting the lines, preparing the canopy

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Fig. 5 Loose canopy prepared for airing

Airing 24 Hours

Pull or shake the lines apart and shake out the canopy so it lies open and loose. It's best if the canopy is allowed to air for 24 hours before being repacked (see Fig 5).

Checking the lines

The lines should be checked for twists, loop-throughs or line-overs and these corrected. The lines should run straight from the canopy edge to the bridle with no looping through.

Arranging the canopy

Arrange the canopy so that the separated red panel is on top. The axis of symmetry for folding runs down the centre of this panel and its opposite **white** corner.

Find the blue, numbered packing loops near the top of the upper surface of the canopy.

Packing aids

Before continuing, check that you have all the accessories you will need to pack the reserve: means of securing the bridle, packing line for the loops, inner container, line holder, weights, clamps, etc. When the packing is finished it is important to check that all these assisting items are accounted for, with none left inside the packed reserve (use an accessory checklist).

The list depends on the individual packer and experience, skill, technique etc., but **new elastic bands** in two different sizes will be required for securing lines and container.

Warning Always use NEW elastic bands, at each repack. Never recycle them!

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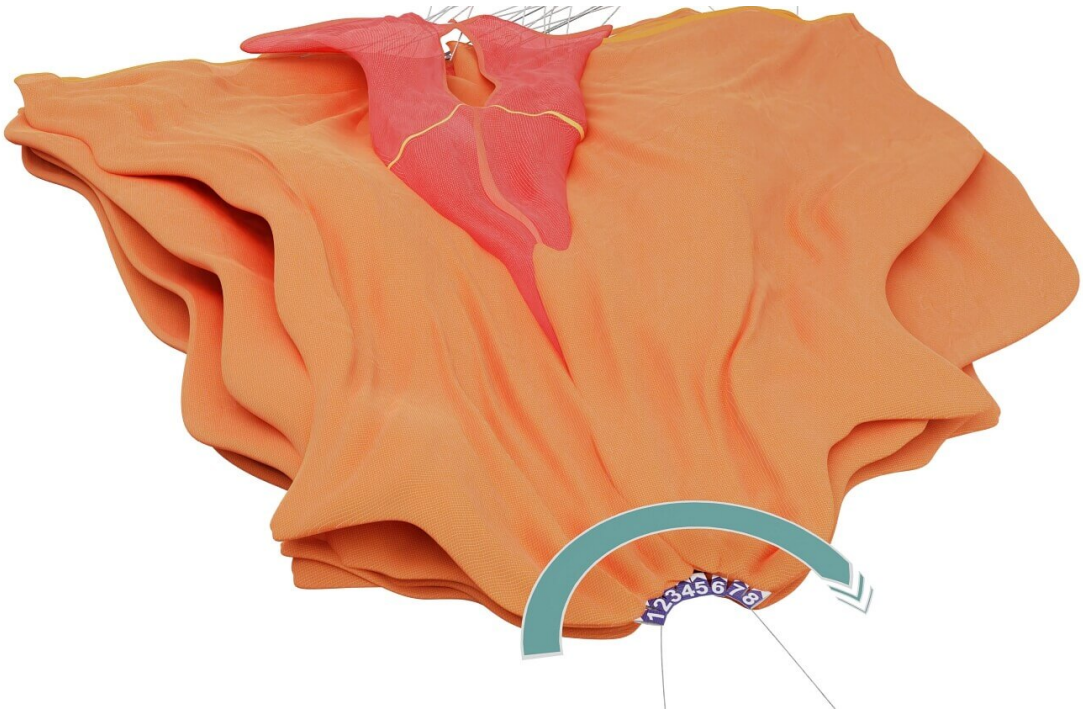

Fig. 6 Packing line and blue loops, red panel on top

Use of packing loops

Thread a packing line through the blue packing loops in their number order. The first loop is above the red panel (see Fig 6).

Check that all the packing loops have been threaded in the correct order: 1 to 8 (SQR 100, SQR 120) or 1 to 12 (SQR 140, SQR 160, SQR 220). Pull up the line and fasten in a loop; do not tension the line yet.

8.3. Verifying the layout

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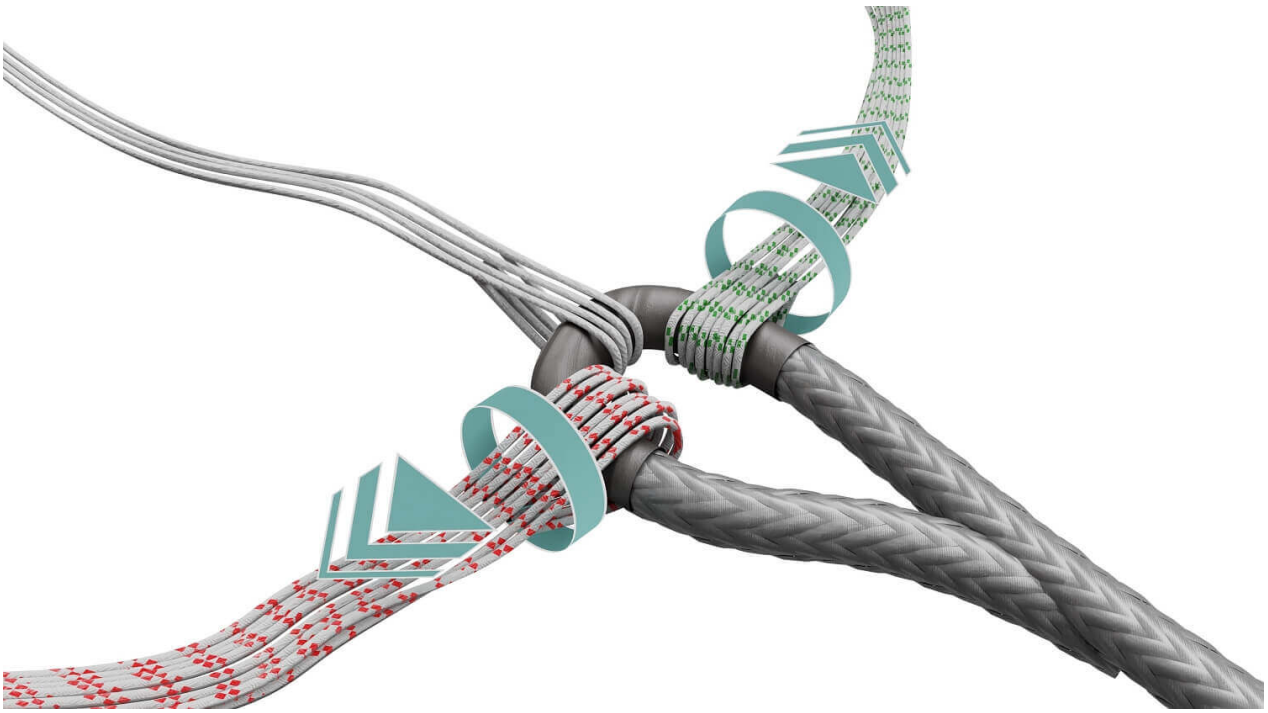

Fig. 7 Left and right suspension lines at the connection line (bridle), centre lines in the middle

Secure the end of the bridle to a fixed object. Take the suspension lines, red left, green right in the corresponding hands, and walk them up to the canopy, keeping them under some tension and separating them as you go. Run the lines through your fingers to check for knots, damage or foreign objects.

Fig. 8 Left suspension lines, centre lines and right suspension lines at the canopy: red corner (panel) on top

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Give the canopy a shake when you reach it. The result should look like Fig 8. The red suspension lines at the canopy seams should be on the left, the green suspension lines should be on the right. Between your hands you now have two Air Jet panels – red on top, **white** underneath. The centre lines must go to the middle of the canopy, between the suspension lines and the two Air Jet panels.

Warning — Any arrangement other than that shown in Fig 8 is incorrect, and could result in line-overs or twists. These are dangerous malfunctions and could prevent canopy opening. They must be avoided!

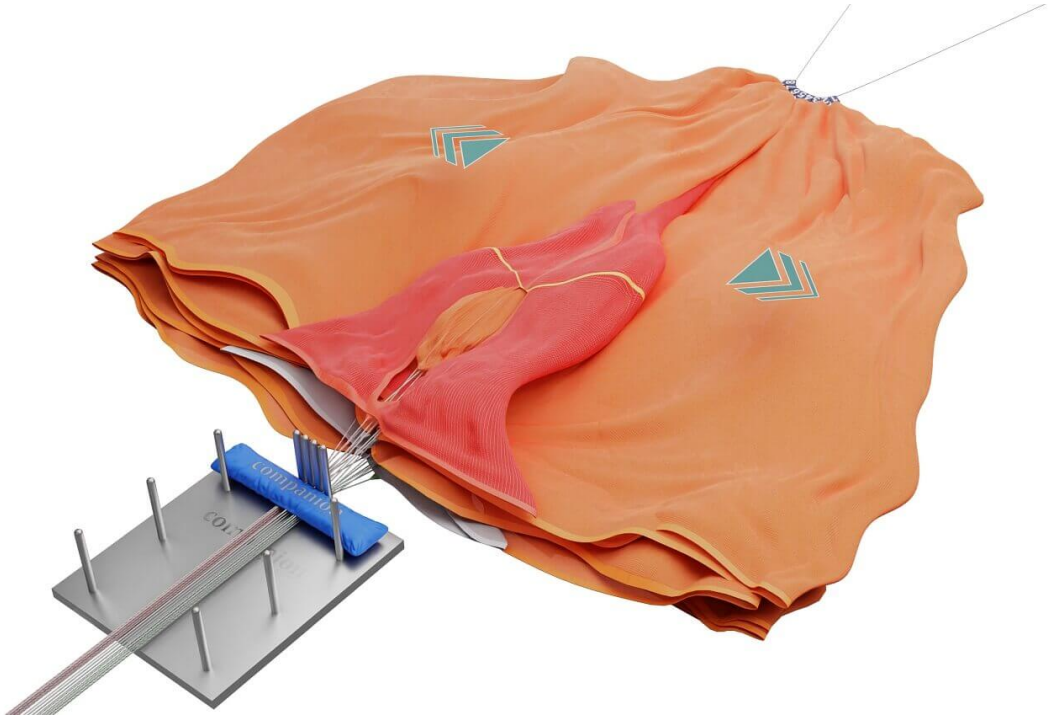

Fig. 9 — Ready to begin

Arrange the canopy as shown in Fig 9 with the red panels at the top, and lay it on a clean, flat packing surface; a long packing table is perfect. When laid out correctly for packing the suspension lines will run parallel from the bridle. The red line attachment tape lies at the top of the red lines; and the opposite green attachment tape on the canopy edge will be at the bottom of the green lines.

Without disturbing this layout the suspension lines can now go in the respective left and right slots of a line holder (the centre lines go in the middle).

Take the packing loop line, and attach the end to another fixed object. This packing line should be lightly tensioned to keep the whole canopy/line system straight and in order. A load of 1 to 2 kg is enough.

Warning — The bridle should always be tensioned. Take particular care that the bridle does not tangle with or go through the suspension lines. This could cause line-overs.

If you have to pack outdoors, a large sheet (as used by skydivers and base jumpers) will prevent packing dust, grass and grit into your reserve.

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The use of packing aids such as a line holder, packing clamps, packing rods (for straight folds) and/or packing weights can make packing safer, faster, easier and neater, but they are not essential.

8.4. Sorting the canopy

First, fold all panels from the right side over, on top of the left ones. The routine described here begins with right over left. You can reverse the direction protocol if you wish – but keep to the sequence.

Check that the green line attachment tape is at the bottom of the stack; this is now the starting point.

Start with the white, divided small panel which is on top. Fold it back to its own side (Fig 10). Follow with two large orange panels, then two short white ones, another two orange and finally the first (right) side of the short red panel (Fig 11).

Fig. 10 Place the right side over the left, then folding can begin

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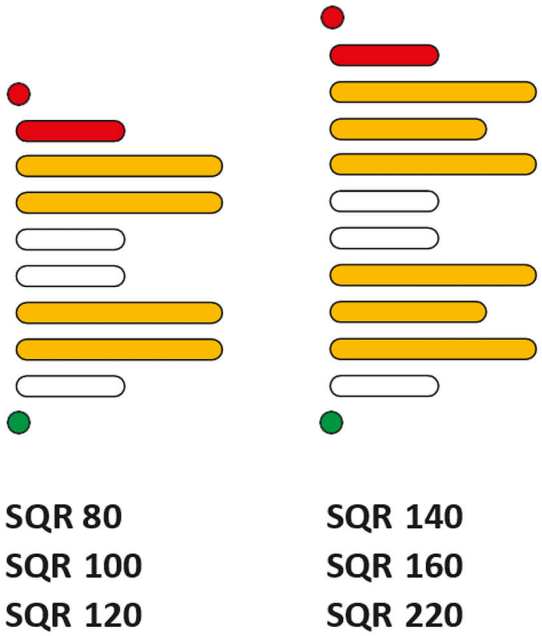

Fig. 11 Colour sequences of SQR sizes. Text refers to 100/120 sizes

8.5. Folding the canopy

In this chapter we introduce two certified folding methods for the SQR reserve systems:

Method A - The simple S-folding method

Due to variations in container widths, folding habits and packing experience, we have introduced this folding method which makes packing a little easier.

Method B - The triple S-folding method

This folding method was developed when the first SQR products were introduced. It is a reliable folding method that has proven itself over the years.

The difference between the methods is in the initial folding of the side panels and the main S-folding process when matching up with the inner container width.

Warning Choose whichever method you like – it is best to use the one you can do most confidently and safely

8.5.1. Folding method A – The simple S-folding method

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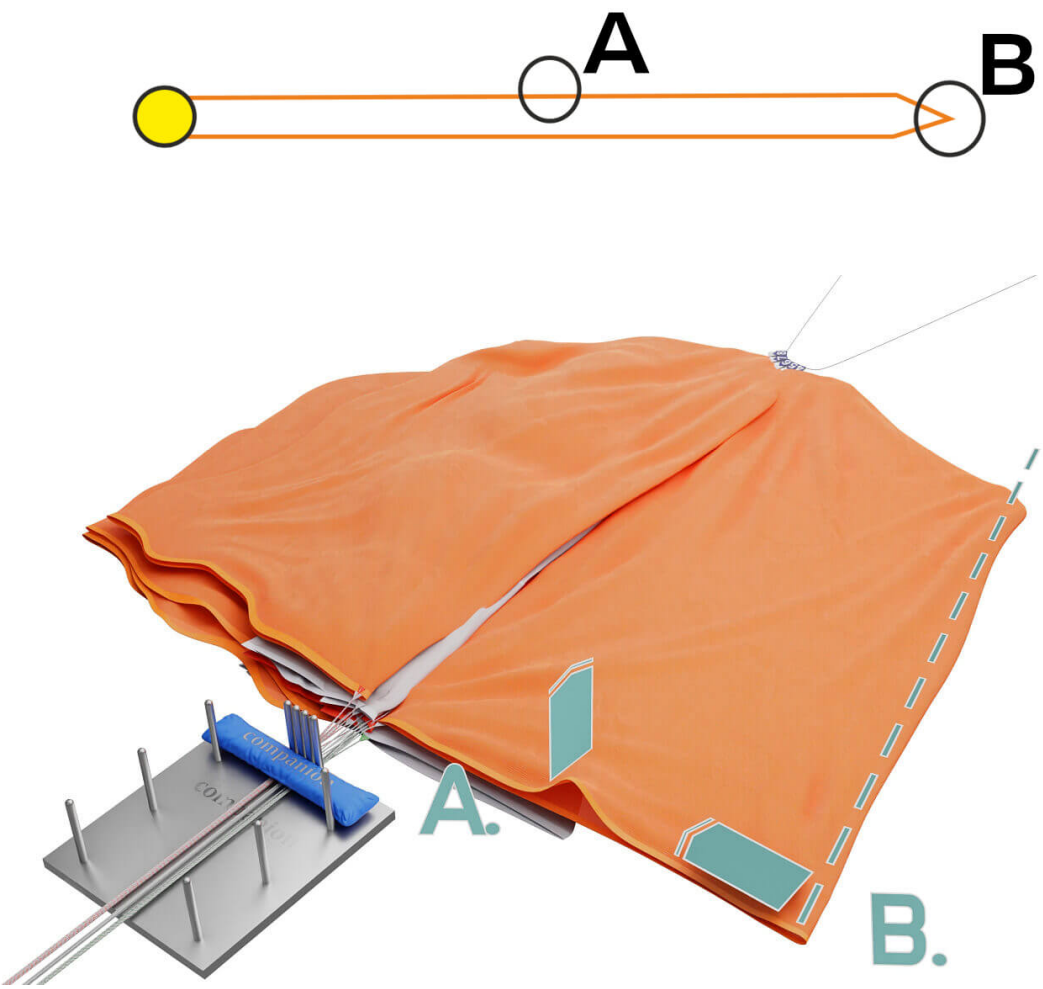

Fig. 12 Pull out the first orange layer and hold it at points A and B

When you lay each panel out make sure the lines stay in the centre (line holder) and that the folded panels are pulled flat. First lay out the bottom white layer (Air Jet) to full length, and then pull out the first orange layer neatly. Grab the top layer around the middle with one hand (Point A on Fig 12), and grab the panel midpoint at the end with the other hand (Point B on Fig 12).

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Fig. 13 Pull in the midpoint (B) to the lines

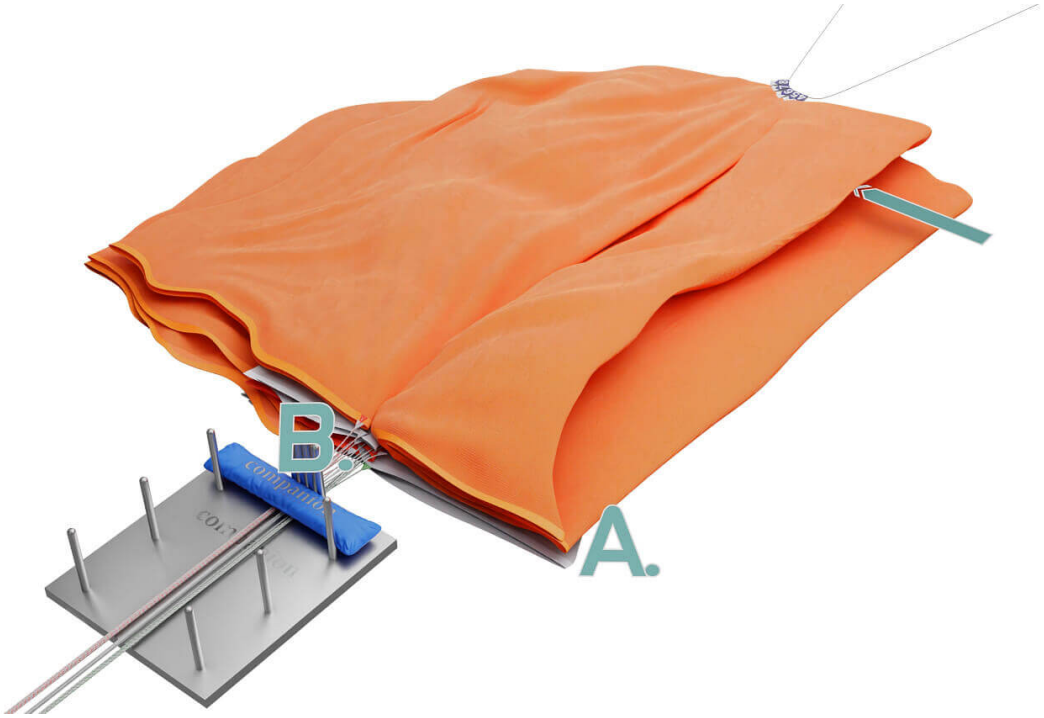

Fig. 14 Fold the top half over

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Fig. 15 Fold the whole panel in the middle

Pull in the midpoint of the panel (B) to the lines between the layers and fold the top half onto the bottom half of the panel, effectively folding the whole panel in the middle.

Fig. 16 Pull out the white layers (Air Jets) neatly

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Fig. 17 The red layer (Air Jet) goes on top

Repeat the process for all the orange panels on this side.

Warning Do not fold the white and red (Air Jet) panels in the middle, just flatten them out neatly.

The first half of the canopy is finished when one red panel (Air Jet) lies flat on top. Make sure the panels lie neatly one on the other, and that the bottom edges make a straight line.

Repeat the same procedure for the other side, without disturbing the prepared side underneath. To hold the prepared side together, you can use packing weights or packing clamps.

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Fig. 18 Middle of the canopy bulging out

Fig. 19 Corrected canopy and centred lines

The gathered canopy apex makes a square pocket between the centre lines. Sometimes this bulges out of the centre during the folding process (Fig 18). This pocket should be pushed back between the centre lines towards the packing loops, at the top-centre of the canopy (Fig 19).

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The length/tension of the centre line is carefully set for each model, taking into account construction, ageing, opening behaviour and packing characteristics.

Warning — Depending on the model, you may need to apply a load of 1-2kg to your centre lines to push the canopy centre back (Fig 19). As a result, the canopy surface between the central suspension point and the packing loops may lose tension.

The centre line attachment points should lie alongside the middle of the canopy. If a centre line has been pulled to the side – between panels – move it back to the middle by holding the centre lines together at the canopy edge and/or through the Air Jet opening (Fig 40).

Matching the inner container width

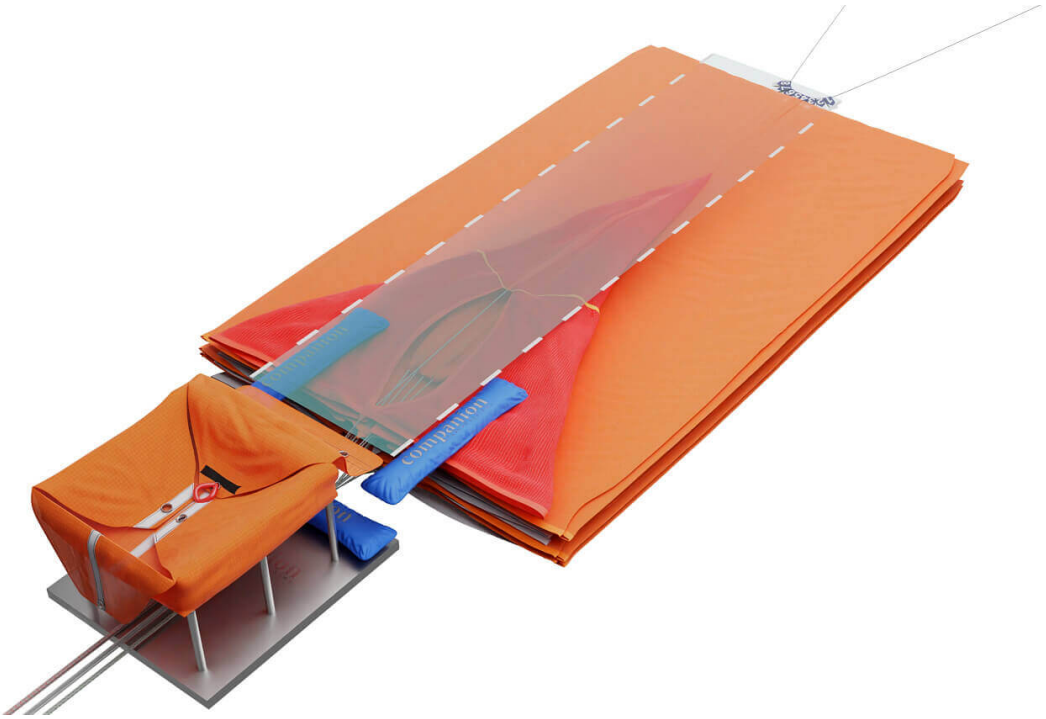

Fig. 20 Matching the inner container width

Check that the bottom edges of the canopy form a straight line. Divide the edge into three sections for folding points, where the middle section is the width of your container.

Start with the side that will go underneath. On the right side grab all the layers at the first folding point and fold the canopy under itself. The folding should look like Fig 44. Bear in mind that the central width is now our reference – not the canopy centre-line.

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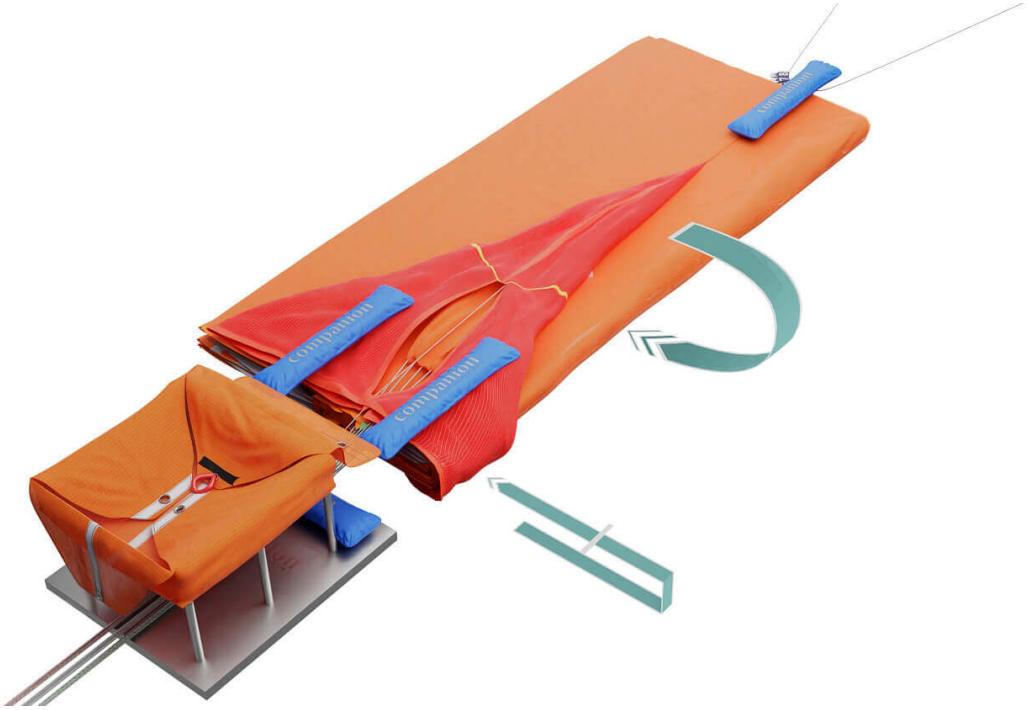

Fig. 21 Folding the right side under

Fig. 22 Folding layout with one side folded

Now fold the remaining side on top. Grab all the layers at the folding point and fold the canopy over itself. The final shape of the canopy now should look like Fig 48.

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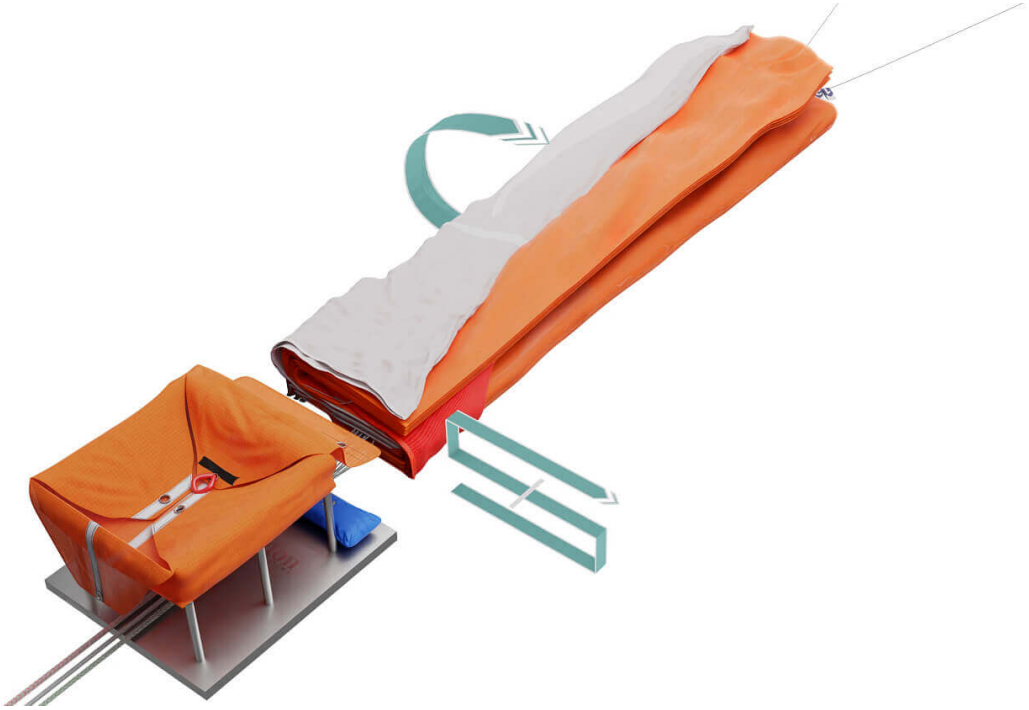


Fig. 23 Folding the left side over

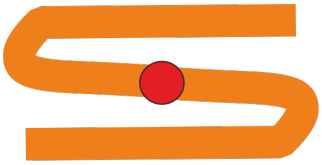
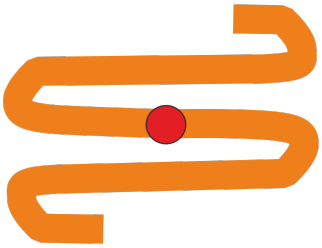


Fig. 24 Folding layout with both sides folded

Warning Note that if you have a narrower container, S-fold the last, smaller parts over, and under on each side, as shown in Fig 25.



Info Folding layout with narrower container

Matching the inner container length

The canopy is now ready to go into the container. Measure the S-fold length required from the canopy edge upwards (Fig 26).

Start at the lowest fold and lift the same length of bundle over, sliding the remaining canopy towards you. Do this

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carefully, so as not to ruin your previous work. Packing clamps or weights at the fold lines will help (Fig 26). **Remove the packing line from the packing loops.** Fig 27 shows the final result. Check that all your packing equipment is present. Do not leave anything inside the canopy (refer to your accessory checklist).

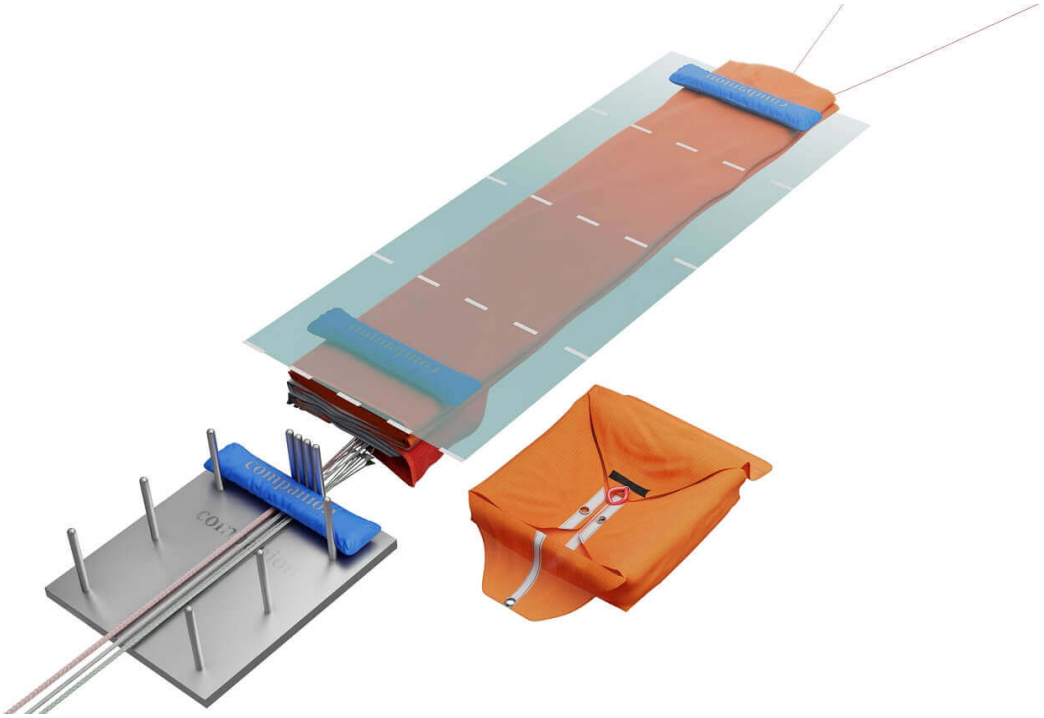

Fig. 25 Adapting to the container length for the remaining folds

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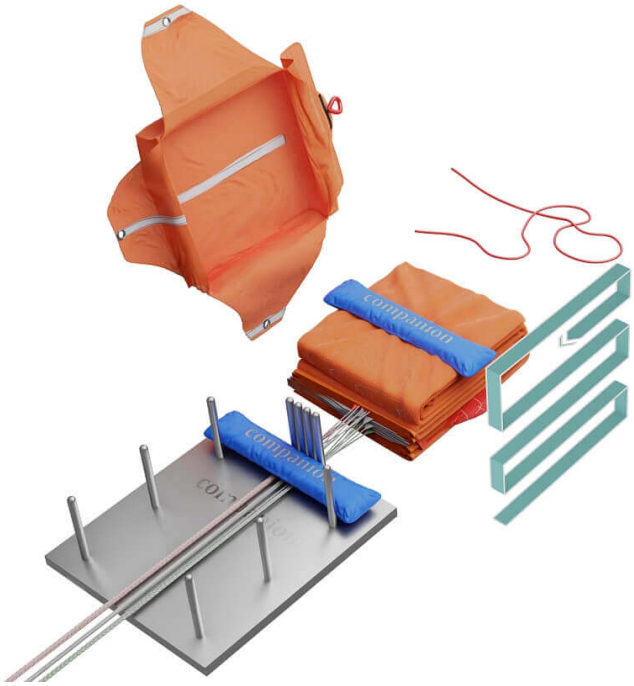

Fig. 26 Upwards S-folds to match the container length. Remove the packing line.

Warning Do not forget to remove your packing line. A forgotten line will result in an opening malfunction and could be fatal.

Putting the folded reserve into the inner container

Flip the inner container and place it on the top of the folded reserve, upside down. Then flip the whole package and pull up the container flaps to make a neat and firm package. Hold the folded canopy edge while doing this, to keep it in shape. Keep the correct sequence when closing the flaps (see label/manual). You can use a suitable object for holding the container flaps temporarily closed. The edges and the lines will be on top of the bundle.

Warning Note that you will have to twist the bridle and the lines back into the right position after you have secured the container flaps.

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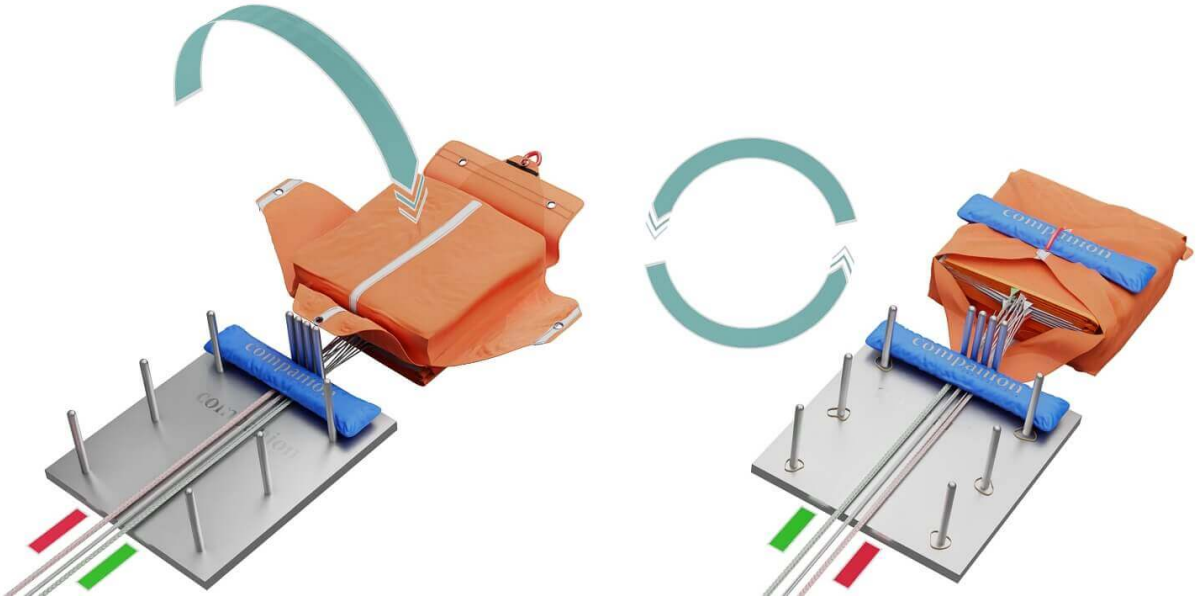

Fig. 27 Flip the container and pull on to the package

8.5.2. Folding method B – The triple S-folding method

Fig. 28 Bottom edges in a straight line

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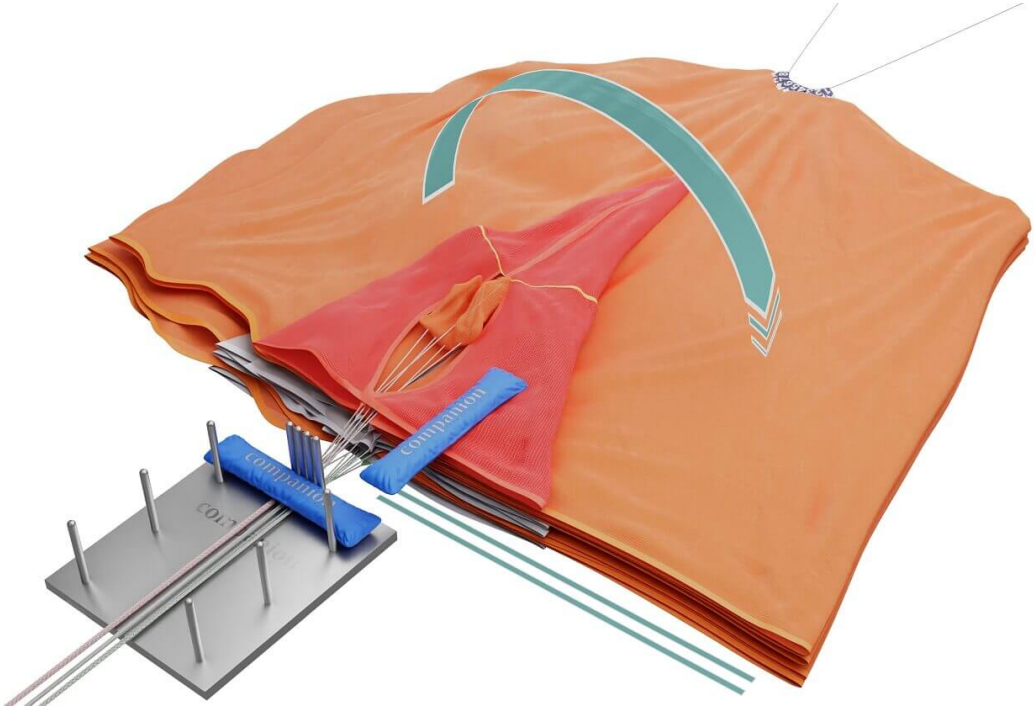

Fig. 29 Pull out the top and bottom corners for a flat result

When you lay each panel out make sure the lines stay in the centre (line holder) and that the folded panels are pulled flat. Make sure the panels lie neatly one on the other, and that the bottom edges make a straight line. We recommend that you first hold a bottom corner of each panel in position (1.), then pull out the top corner (2.) for a flat result (Fig 29).

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If you hold the bottom corners (Fig 29/1) of the already flattened panels with the fingers from one hand, you can avoid mixing up the panel order and will get a neater, ordered bottom edge (Fig 30).

Fig. 30 Prepared side fixed in place; left side now on top

Repeat the same procedure for the other side, without disturbing the prepared side underneath.

To hold the prepared side together, you can use packing weights or packing clamps.

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Fig. 31 Middle of the canopy bulging out

Fig. 32 Corrected canopy and centred lines

The gathered canopy apex makes a square pocket between the centre lines. Sometimes this bulges out of the centre during the folding process (Fig 32). This pocket should be pushed back between the centre lines towards the packing loops, at the top-centre of the canopy (Fig 33).

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The length/tension of the centre line is carefully set for each model, taking into account construction, ageing, opening behaviour and packing characteristics.

Warning Depending on the model, you may need to apply a load of 1-2kg to your centre lines to push the canopy centre back above the bottom edge (Fig 33). As a result, the canopy surface between the centre attachment point and the packing loops may lose tension.

The centre line attachment points should lie alongside the middle of the canopy. If a centre line has been pulled to the side – between panels – move it back to the middle by holding the centre lines together at the canopy edge and/or through the Air Jet opening (Fig 33).

Matching the inner container width

Fig. 33 Adapting to the inner container width

Check that the bottom edges of the canopy form a straight line. The width of the prepared canopy should be symmetrically divided by the width of the container, starting from the central width as a basis. With the 22cm wide SQR container there will be 7 container widths (3 container widths either side of a middle width). The central width will remain in place, while 3 S-folds below and 3 S-folds over the central width, to make a vertical concertina shape that fits the width of the inner container.

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Fig. 34 Right side will go underneath – folded on top first

We start with the side that will be on the bottom when the S-folds are finished. First fold the entire right side over the left (again) disturbing it as little as possible, bearing in mind that the central width is now our reference – not the canopy centre-line.

If folded as shown in Fig 36, the right side will end up underneath, but you can do it the other way around as long as the end result is symmetrically correct. The next step is easier if you have a helper or clamps/weights or you have enough practice.

(Fig 36): S-fold the right side on top of the central width, then rotate and slide this section underneath the central width, keeping it in shape (Fig 37). Watch the online packing video to help with this step: https://youtu.be/f6M1KMbGZ70.

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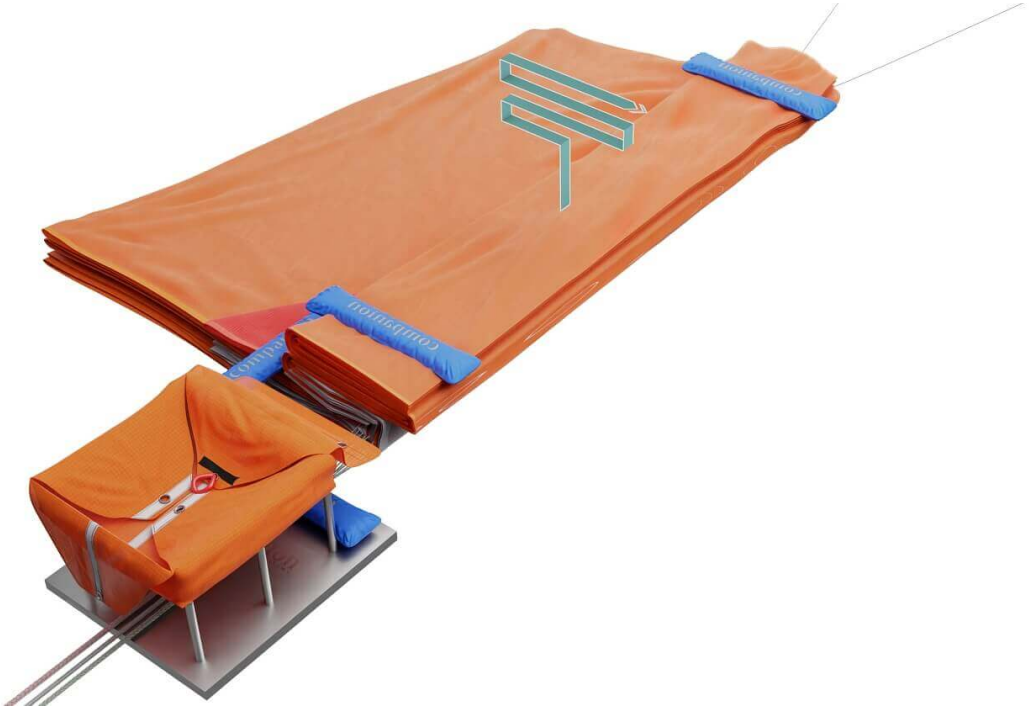

Fig. 35 S-folding the lower side on top

Fig. 36 Rotating the folded package and sliding it underneath

The diagram below shows the result (3 S-folds under): the red dot is the position of the reserve centre-line. It should look as shown in Fig 38.

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Fig. 37 Ready for the left side to be folded on top

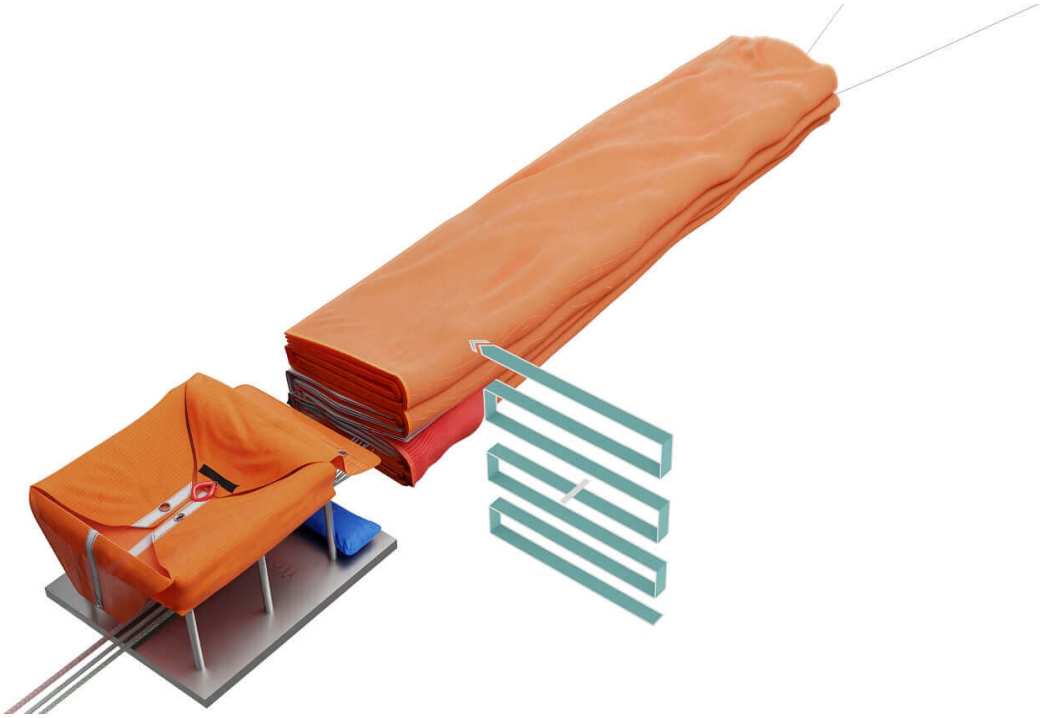

Fig. 38 S-folds complete

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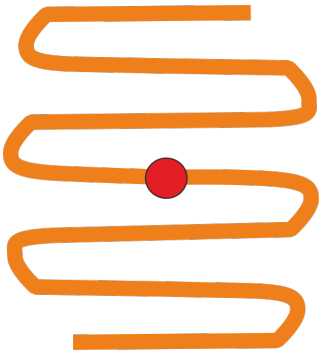
Now fold the remaining side on top – 3 S-folds as shown in Fig 39 and below.



Matching the inner container length

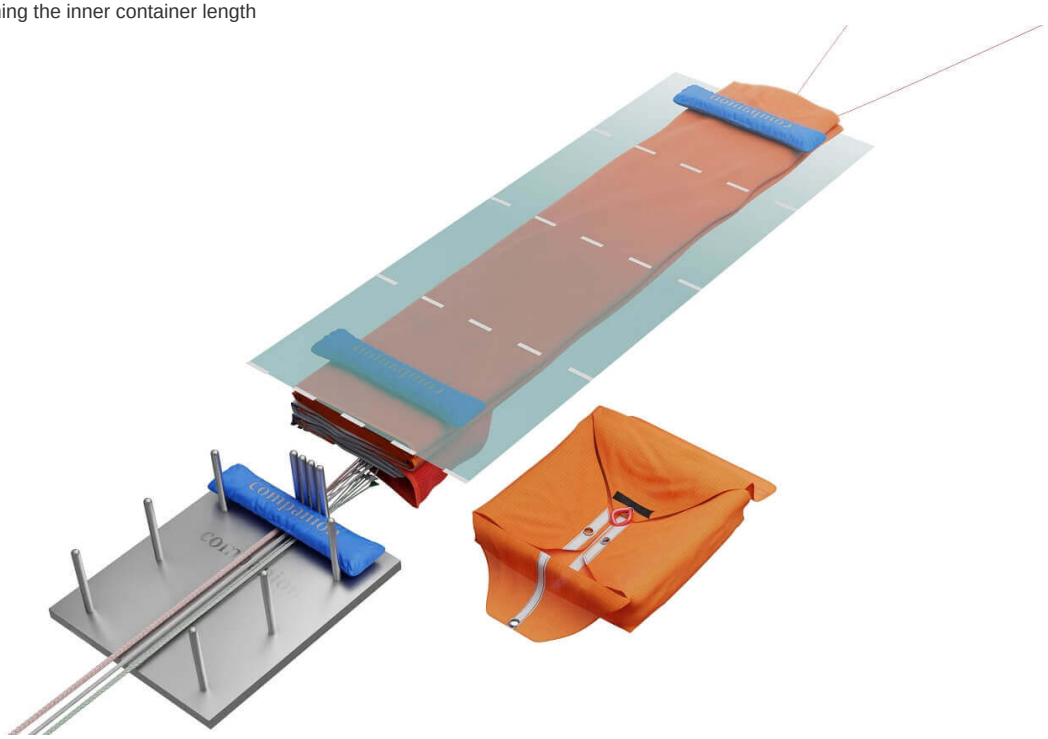


Fig. 39 Adapting to the container length for the remaining folds

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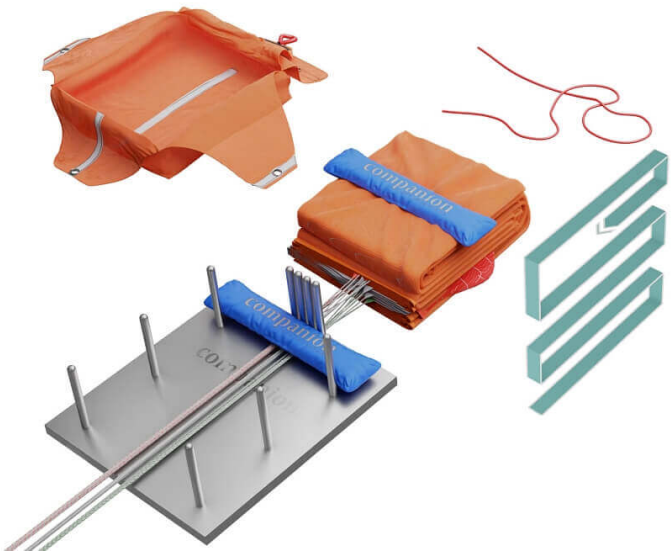

Fig. 40 Upwards S-folds to match the container length. Remove the packing line!

The canopy is now ready to go into the container. Measure the S-fold length required from the canopy edge upwards (Fig 40).

Start at the lowest fold and lift the same length of bundle over, sliding the remaining canopy towards you. Do this carefully, so as not to ruin your previous work. Packing clamps or weights at the fold lines will help (Fig 40). **Remove the packing line from the packing loops.** Fig 41 shows the final result. Check that all your packing equipment is present. Do not leave anything inside the canopy (refer to your accessory checklist).

Warning Do not forget to remove your packing line. A forgotten line will result in an opening malfunction and could be fatal.

Putting the folded reserve into the inner container

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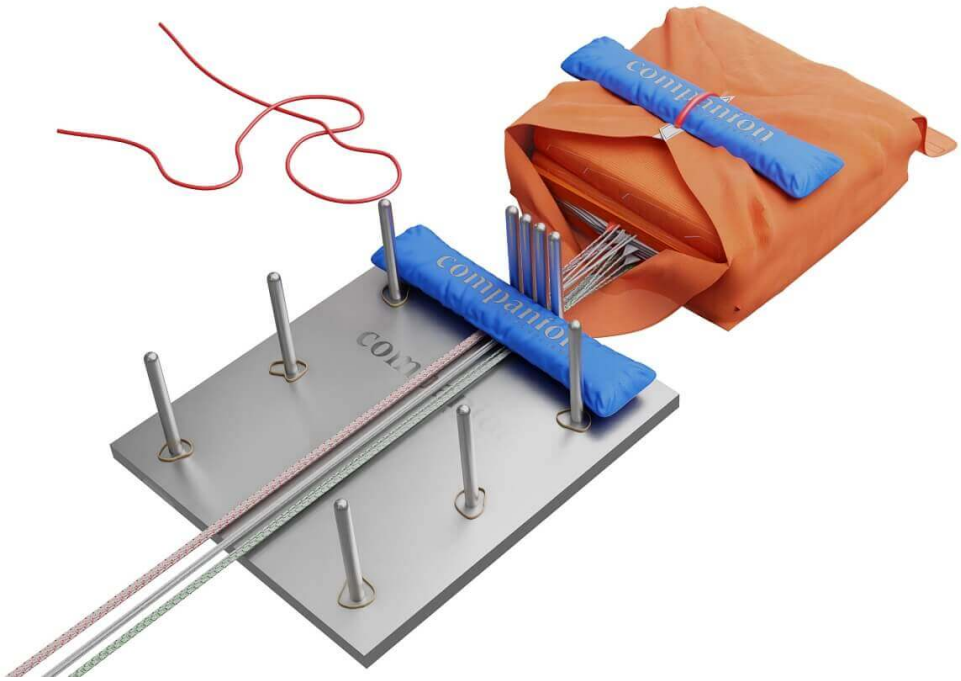

Fig. 41 Folded canopy in the inner container

Lay the folded canopy into the container (Fig 25). Pull up the flaps to make a neat and firm package. Hold the folded canopy edge while doing this, to keep it in shape. Keep the correct sequence when closing the flaps (see label/manual). You can use a suitable object for holding the container flaps temporarily closed.

8.6. Stowing the lines

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Fig. 42 Lines, pins (turnposts) and figures of eight

Release the bridle tension.

Warning Take care that the bridle does not tangle with or go through the suspension lines.

To stow the suspension lines it is easiest to use a board with correctly spaced pins/posts. The pins should be set at a lateral distance equivalent to the width of the inner container, e.g. approximately 20 cm for the SQR inner container (see Fig 26).

Wind the lines around the pins in a simple figure-of-eight fashion as shown above. Fig 26 shows a right turn around the right-hand post first, followed by a left turn around the next point. The initial direction is your choice, but a consistent figure of eight pattern (Fig 27) should be followed.

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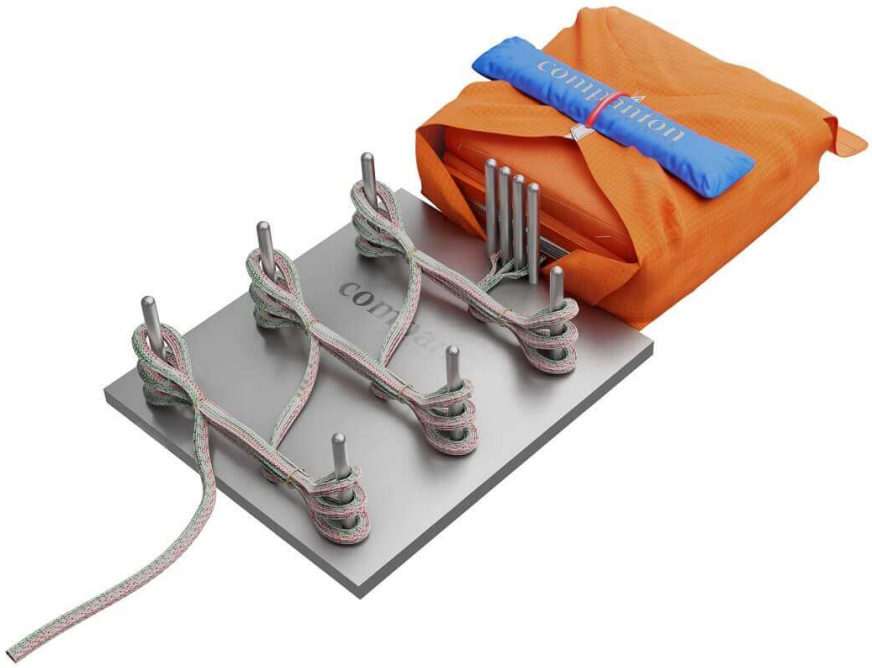

SQR 80	SQR 100	SQR 120	SQR 140	SQR 160	SQR 220
3 – 3	3 – 3	3 – 3	4 – 4	4 – 4	5 – 5
2 – 2	3 – 2	3 – 3	3 – 3	4 – 3	5 – 4
2 – 2	2 –2	3 – 3	3 – 3	3 – 3	4 – 4

Fig. 43 Figures of eight

Stow/secure the lines in three groups. The table above gives the number of turns round each pin (6 pins/3 groups) for each reserve model (at 20 cm post spacing), calculated so that the same length of closure line remains.
Consistent figures of eight are required.
After a group is completed, its bundle ends should be secured with rubber bands. Ask your manufacturer or dealer about suitable bands. Do not use old or perished bands.

Warning Each repacking must use new rubber bands!

8.7. Closing the inner container

When the bundles have been stowed you should have around 90 cm of lines remaining, for closing the SQR inner container. If you have to use a different inner container, follow the instructions provided by its manufacturer. The same reserve folding principles apply, but the dimensions may have to be adjusted, and the closure line length required may be different.

To continue: lay the line bundles on top of the folded canopy (Fig. 28).

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Fig. 44 Line bundles in the container, ready to close the last flap

Fig. 45 Closing the last container flap

Close the last container flap and secure it with a line loop through the **red** bungee (elastic rope) (Fig 29).

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Fig. 46 Line bundles arranged, checking the diameter of the closure loop

Arrange the line bundles under the container flaps. They should lay neatly inside the container. The closure line loop in the red bungee should have a length of 5-6 cm / 2-3 finger widths.

Warning A significant deviation from this loop size can prevent opening. A long loop can get blocked, a short one can open unintentionally (inside the harness or before throwing).

Warning Test the bungee tension by picking up the pack by the lines. The loop should release under this load. Adjust if necessary.

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Fig. 47 Line loops to close the securing container cover

Close the cover of the SQR inner container using two line loops of the same size (5-6 cm / 2-3 finger widths) as the final one inside (Fig 31). Different elastic bands are used for this, and they are first pulled through the eyelets on the cover. Other containers may have a different closure system – follow the instructions in the corresponding user manual. They may require different closure line lengths.

Warning The two closing elastic bands used on the SQR inner container are larger and thicker than those used for the line bundles. Test the elastics under tension by picking up the pack by the lines. The loops should release under this load.

Warning Use new container-closing elastics every time you repack your reserve

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Fig. 48 Reserve packing complete

Your SQR reserve has now been repacked, and is ready to go in the harness (Fig 32).

For the installation procedure see chapter 6. **If you disconnected the reserve for packing, don't forget to reconnect it.**

Enter the date (online) in your pack and inspection record.

Warning To confirm that the reserve has been correctly installed, a compatibility test is essential after a new installation or if any element of the harness/container/reserve system has been changed. See chapter 7.

9. INSPECTION & SUPPORT

9.1. Periodic inspection

Every **24 months** the SQR reserve must have a periodic inspection and this event should be entered (online) in the packing and inspection record.

This periodic check/inspection is a visual procedure. It should be carried out by a trained person in a clean, well-lit place.

9.1.1. Checking the canopy surface

Spread the canopy out – ideally after a 24-hour airing – and begin by working round the canopy edge. Inspect the fabric for tears, blemishes, stains, burns, abrasion or damaged seams. If the canopy shows signs of rot/mildew the fabric strength could be affected. The reserve must be sent to the manufacturer for a factory check.

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Work your way around the canopy, panel by panel, inspecting the entire surface until you come to the centre. Carefully check the area around the packing loops.

Look closely at the suspension line attachment points. The attachments must show no sign of damage or flaw.

9.1.2. Checking the lines

Secure the bridle and work your way up each suspension and centre line. Check the whole length for damage and abrasion, and check that all sewing is complete and the seams in good order. Check the line loops (especially the inner side) for signs of wear, fraying or damage.

9.1.3. Checking the bridle

Inspect the bridle for damage and abrasion, external wear and fraying.

Check the certification label is attached to the bridle line. Confirm the serial number and the Entry into Service date. Check that you don't exceed the maximum allowed service time of the reserve (see chapter 4.3).

The SQR handgglider version has a swivel built into the bridle. Check the condition of the swivel. If the swivel is bent, cracked, damaged or does not rotate freely, it **must** be changed by the manufacturer.

9.1.4. Checking the connector link

Please refer to the chapter "Connecting the reserve to the harness/external container" for detailed information about the connection methods allowed between the reserve and the harness/external container.

The condition of the metal connector (quick link/Maillon Rapide) must be checked. If the link is deformed, cracked or damaged it **must** be replaced. Check if the link has sufficient strength (MBL of 2,500kg), and that the connecting link is tightened according to the specification of the link manufacturer.

In the case of a direct loop-in-loop connection, the harness connection line and reserve bridle must show no signs of slippage, friction, heating, fraying or melting.

After a reserve deployment or reconnection (e.g. packing), it is imperative that the connection between reserve and harness/external container is rechecked.

Warning	Any damage found during a periodic check must be repaired. To ensure that the correct materials and techniques are used, all repairs should be done by the manufacturer.

9.2. Storing

The reserve should always be kept in a cool, dry, dark place. Oil, paint, solvents, acids and other harmful substances should not be stored close to the reserve.

To maintain product lifespan avoid unnecessary exposure to direct sunlight, heat and humidity. For maximum operating safety over its whole lifetime, always handle and look after your SQR reserve carefully.

This recommendation applies whether the reserve is installed in a harness or is stored separately.

If you plan not to use your reserve for a long time, we recommend that you unpack it and keep it loosely rolled up in a well ventilated space.

After a long storage (packed or loose) the canopy should be aired for 24 hours before being repacked. The same applies if the reserve has been stored in an unsuitable environment.

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9.3. Support

If your local specialist cannot answer your questions or does not have an original spare part, please contact us at support@companion.aero.

10. TECHNICAL DATA

SQR Prime		100	120	140
Area	m2	27.8	34.8	40.0
Minimum load	kg	65	80	90
Max. TOW	kg	100	120	140
Sink rate at Max. TOW	m/s	5.0	5.2	5.2
Weight reserve	g	1307	1588	1758
Packing volume	l	3.0 - 5.3	3.5 - 5.7	3.7 - 6.0
Total length	mm	7110	7980	8400
Steerable		-	-	-
Certification		EN/LTF	EN/LTF	EN/LTF

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