

USER MANUAL

V 3.0 EN – 2019#40



SQR series

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1. INTRODUCTION

Many thanks for choosing the SQR 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 - throwing your reserve. Please read through this user guide carefully before taking the product into the air, and take the time to become thoroughly familiar with the characteristics of your SQR reserve.

You can certainly maximise the reliability of your reserve system if you

- ▶ regularly repack it as described in this manual,
- ▶ deploy the reserve according to the instructions for your harness,
- ▶ maintain and look after your reserve, and the rest of your flying equipment, as described in this manual.

The actual version of this manual can be downloaded on www.companion.aero/manual.

We wish you safe flights and happy landings!

The Companion Team

www.companion.aero

2. REGISTRATION AND THE MYCOMPANION ACCOUNT

Register your product so that you can benefit from the comprehensive services of the **myCompanion** Online Account:

- ▶ An email packing reminder makes sure you do not forget your annual repack date.
- ▶ The legal warranty period of your country gains an additional year.
- ▶ You have access to all the relevant information about your product, can direct your questions to Companion Support and will receive important product updates.
- ▶ You can also record your repacks online and always retrieve your packing record online as a PDF.
- ▶ 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 is automatically updated and confirmed by email.

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. You can also do this directly on our website www.companion.aero/register.

3. GENERAL ADVICE ABOUT FLYING SPORT

Taking part in flying 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 a flight takes place. Before every flight, all items of flying equipment must be checked for damage and airworthiness.



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

4. INTENDED USE AND SAFETY REGULATIONS

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



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

4.1 Packing and inspection requirements

Every **12 Months** the reserve must 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 must have a periodic inspection and this event entered (online) in the packing and inspection record.

4.2 Additional packing and inspection conditions

Whenever the reserve has been exposed to sand, dampness, water or other external threats, a repack must be considered, or the packing interval shortened.



If the reserve has been strongly compressed when packed in order to achieve minimum volume, we recommend a reduced repack 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 (www.companion.aero/register).

4.3 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 timespan.

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 dealers 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.

4.4 Water and seawater

After a landing in water the reserve should be repacked, but only after it has completely dried out in the fresh air. For best drying hang up your reserve upside down in a symmetric state. If any part of the reserve is not completely dry (canopy or lines), the complete device can shrink asymmetrically! Never use a heat source to speed up the drying process.

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



If seawater has not been rinsed away within 36 hours, the reserve must be declared NON-AIRWORTHY AND DANGEROUS – not flown again!

4.5 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 test.

Your reserve should be sent for a factory inspection whenever any of the following situations apply:

- ▶ 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, any repair should be done by the manufacturer.

5. DESIGN FEATURES

5.1 SQR – Square Round: the best of two worlds

The Hybrid SQR founds a new generation of reserve parachutes, which combines the advantages of a classic round canopy with those of the cross parachute. An innovative and forward-looking technology has been so created.

The SQR was a fundamental redevelopment, specifically intended to meet the needs of pilots and packers alike. Countless computer simulations and in-practice tests were an essential part of this exhaustive development process.

Advantages of the SQR in brief:

- ▶ Improved opening behaviour as a result of comprehensive practical testing.
- ▶ Low sink values and high pendulum stability (swing resistance) thanks to an aerodynamically optimised canopy with Air-Jets.
- ▶ Low weight as the result of careful choice of materials.
- ▶ Straightforward and reliable packing – similar to a round canopy – with comparatively fewer lines for easy sorting, with useful coloured packing aids.
- ▶ No directional tracking in flight.
- ▶ Tested for water landings! A mix of low-shrink materials means that full functioning is guaranteed – even after a water landing.
- ▶ Certified to both EN 12491:2015 and LTF NFL II 91/09 flight standards.

5.2 Structural details

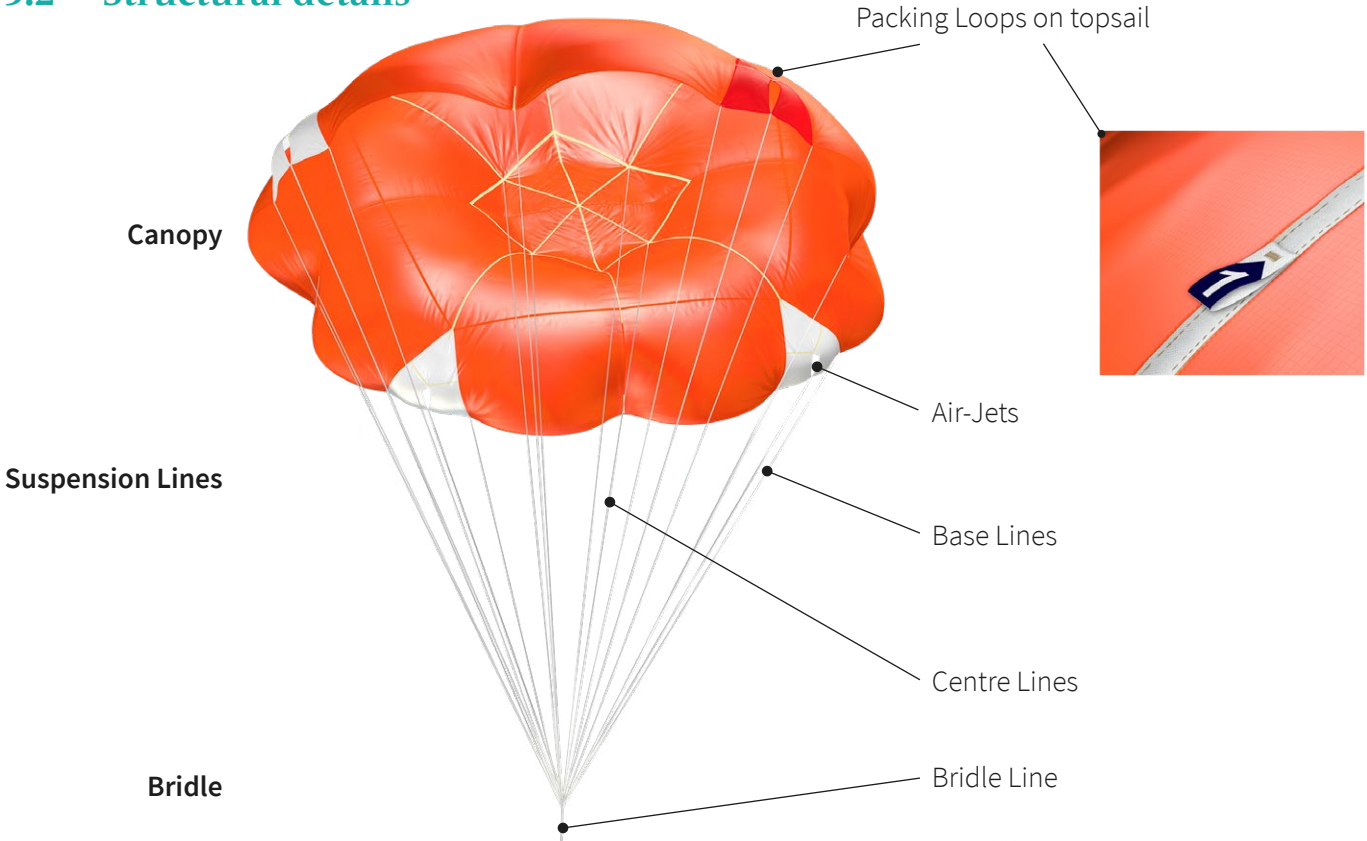


Fig 1 – Structural view from below

BRIDLE

At one end this connects the reserve to the harness, at the other to the canopy 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.

Both groups are made from different materials of different diameters, so they are easier to separate and sort. In addition, the lines on the **left** and **right** sides, as well as in the **centre**, are coloured differently, 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: ideally at the four corners, to provide active aerodynamic stability.

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

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

5.3 Hangglider swivel



Fig 2 – Swivel device fitted to the SQR Hangglider version

SQR Hangglider versions come with a swivel included in the bridle (connection line). This item is tested and certified up to 5000 kg breaking load. The swivel effectively prevents a spinning wing from twisting the parachute suspension lines. This is an essential safety factor!

The SQR Hangglider versions have the swivel device fitted at the factory. A later inclusion 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 be connected **also directly** to the hangglider harness by a suitable connector link (minimum breaking load 2500kg).

6. INSTALLING THE RESERVE

We recommend that installing a reserve in a harness be done by a qualified organisation.

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** - See details in chapter 7.

Every reserve/harness/container combination has its own characteristics. It is essential that both pilot and packer have confidence in the system and its ability to function correctly. Only so can reliable functioning be assured.

There are various possibilities for combining the reserve with a 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 a harness or external container is described in the manufacturer's manual for the relevant harness/container.

6.1 Installing with an integrated inner container

Modern harnesses mostly 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 comply** to the certified packing volume of the reserve! The reserve's certified packing volume is shown on the certification label of every SQR reserve.



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 in a different inner container could lead to 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 how to do this. A look at the Companion online video about packing and folding to size is strongly recommended:

<https://youtu.be/f6M1KMbGZ70>.



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

6.2 Installing in the SQR inner container

The 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). Which 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.



The reserve handle to inner container connecting line, should never be under tension, until the reserve is released from the harness compartment. This line must have enough free length, to allow the reserve handle to first activate the release system (e.g. pull out the release pins), before pulling the inner container! A compatibility test is mandatory!

Attachment loops for the reserve handle



Harness connection attachment point

Certification label

Fig 3 – SQR inner container

The certified reserve compartment volume of the harness (see manufacturer's manual), **must comply** to the certified packing volume of the reserve! The reserve's certified packing volume is shown on the certification label of every SQR reserve.



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

6.3 Installing in an external (e.g. front) container

There are scenarios, where an external container could be the best solution to install a reserve, like:

- ▶ your harness is using external container system, like some hike and fly gears,
- ▶ 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 more favourable for the pilot (e.g. quicker deployment time, or by 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 will be used to install the reserve into the external container. Please refer to the manufacturer's manual for the right procedure.

If using an external container, it could be necessary to remove/reattach the container to the harness

before/after each flight! Refer to the users manual of the container manufacturer and the connected harness system.



Make sure your external container is securely and correctly connected to the harness assembly. If not, you risk an opening malfunction!

The certified reserve compartment volume of the external container (see manufacturer's manual), **must comply** to the certified packing volume of the reserve! The reserve's certified packing volume is shown on the certification label of every SQR reserve.



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 in a different container could lead to different results!

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



The reserve handle to inner container connecting line, should never be under tension, until the reserve is released from the external container. This line must have enough free length, to allow the reserve handle to first activate the release system (e.g. pull out the release pins), before pulling the inner container! Understanding is everything! A compatibility test is mandatory!

If the packed Companion reserve has to be taken from the SQR inner container, sometimes a partial or full repack of the reserve is 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. A look at the Companion online video about packing and folding to size is strongly recommended:

<https://youtu.be/f6M1KMbGZ70>.



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

6.4 Avoiding canopy damage in the harness /container compartment



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. Direct contact of the reserve canopy with rough surfaces like velcro or sharp details (e.g. cut and melted v-connection line ends in the compartment) can scour, scratch and weaken the canopy fabric.



Fig 4 – Velcro damage on canopy fabric

6.5 Connecting the reserve to the harness/external container

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.

6.5.1 Metal connector link

For connecting the reserve to the harness a suitable connector link (commonly referred as quick link or maillon) with a minimum breaking load (MBL) of 2500kg 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 be used to secure the bridle/webbing loop positions against fraying / slipping around the quick link.



An incorrectly fitted or secured connector link can cause weakening or complete failure of the harness/reserve connection, in the case of a real reserve deployment.

6.5.2 Direct looping

A direct **loop-in-loop** connection of the reserve bridle to harness V-connection is permissible for ADVANCE harnesses, provided that basic precautions such as centred, tight loops have been achieved. In addition the correct loop contact, it must be secured using the supplied neoprene protection to ensure that no loop slipping occurs (fraying hazard!).

These findings are based on an extensive test series from 2017, which Companion carried out with the cooperation of ADVANCE, the German rope manufacturer Edelrid and the PMA (Paraglider Manufacturers Association). Testing was carried out using the most common combination of materials,

for example those of ADVANCE harnesses connected to Companion reserves. The strength figures achieved and documented, lay clearly above those specified by standard requirements.



Incorrect looping technique can cause weakening or complete failure of harness connection line and/or reserve bridle in the case of a real reserve deployment.

We cannot make a general statement about the strength of direct looping connections when applied to other harness brands combined with Companion reserves.

7. 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. The pilot sits in a normal flying position in the harness hanging by its carabiners. Anything else is inadequate!

A satisfactory test requires that the reserve is released by the pilot in this situation! A safe reserve release requires that the force needed is between 4 and 8 daN. If you are not sure about your test result, or have other queries, please ask a qualified person.

7.1 Compatibility test advice

The mystique surrounding the parachute rigger's profession has been handed down from military life. This is no-mistake territory, for good reason, aviation regulations are "written in blood"!

Provided you arrange suitable harness hanging facilities – two rope loops over a tree branch or tie beam, or the use of a harness hanger – a compatibility test is not difficult or inconvenient. It simply proves that you, the pilot, can successfully pull your reserve out of its stowage while in flight. It is also an important rehearsal of your first and most important action in an emergency situation.

It is not difficult to put the inner container back in its place. The compatibility test does not check the inner container's opening behaviour, but you can practice the pull and the throwing motion as deploying a reserve.

Simulated throwing is part of a training exercise. This test only requires you to pull the reserve out of its stowage as if in flight.

Provided you also have the short pieces of packing line for closing the harness compartment or front container, you can do it yourself – easily. Always have them in your harness pocket in case your compartment opens by mistake (on a mountain, perhaps).

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



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

7.2 Compatibility test issues

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

- ▶ **Reserve volume does not conform to the certified volume range** of the container/harness compartment, e.g. the reserve is too large or small to safely suit into the compartment/container. The reserve's 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, alignment, folded to wrong shape etc. Please follow the harness/inner container instructions!
- ▶ The correct pilot technique is not used - the reserve cannot be freed. Practice makes perfect.

- ▶ Ergonomic issues - like pilot's arm length, range of motion, etc. - can play a decisive role in the success of reserve release. Small people with short arms can sometimes have difficulties when it comes to releasing a reserve. It is therefore important that the same pilot who will fly with the equipment makes the compatibility test! It can also help in these problem cases if various harnesses and different flying positions are explored, in search of a solution for the compatibility test. External container is also an alternative. Three-way compatibility is the goal: pilot(he/she)/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.

8. USING THE RESERVE

8.1 Preflight check

For maximal safety the following general checks should be carried out before every flight, in addition to the normal before-takeoff checks:

- ▶ Reserve handle correctly in place on the harness/external container,
- ▶ No visible damage that could affect airworthiness,
- ▶ Reserve compartment correctly closed/external (e.g. front) 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

8.2 Releasing and throwing the reserve

In a real emergency, stick to the following steps:

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



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 back) pull works at best on most systems. Find out and remember – practise the compatibility test!

- ▶ Throw the reserve away from you outwards, as hard as possible, and don't forget to let go!

Minimal elapsed reserve release time is the first priority in most real emergency situations!



DO NOT HESITATE, time is crucial! Most real emergency reserve throws are near to the ground!

Emergency situations near the ground can become critical very quickly. If high g-loads and rotation or airspeeds build up, reserve-throwing becomes much more challenging! The best strategy to avoid such a situation, is to react before high g-loads and critical speeds build up. An **instant reserve-throw** is the best decision, if you are low over the ground.

The direction of the throw shouldn't be towards the paraglider and its many lines (even if that's where you hope to soon see the reserve as parachute). **Throw the reserve outwards**, not into the centre of the rotational movement. Centrifugal forces will help you to stretch the lines quicker, if you throw outwards, and the risk of the reserve getting caught by the paraglider's lines is much lower.

If the thrown reserve stretches the suspension lines with **residual momentum**, the reserve canopy will open faster! **Throw as hard as you can!** In emergency situations with lower tangential speeds, a high residual momentum can speed up the opening sequence a lot.

8.3 Disabling the paraglider and descending

After the reserve opens you have a short time window (typically 3-5 seconds), when the paraglider is unloaded. If the paraglider regains airflow and airspeed, and wants to fly again, you may be faced with an increasingly difficult handling problem. Control forces become higher and the chance of a line twist rises.



It is strongly recommended that the pilot IMMEDIATELY does what he can to disable the paraglider's desire to fly!

The best tactic is to **wind in both brakes with symmetric wraps**, until the wing is completely stalled. As many wraps as it takes. This allows the reserve to stabilise itself in a vertical flightpath with a minimum of aerodynamic disturbances, all of which would encourage unhelpful behaviours such as swinging, scissoring, downplaning or acquiring high tracking speeds.



Design trends for improving both paraglider and reserve performance raises the significance of these combined problem behaviours. It is becoming increasingly important to allow only one of them to fly (at all).

While a reserve's performance and behaviour are important, **disabling the paraglider's** attempts to fly is also very important – **right down to the landing**. The previous paragraph describes the simplest way to prevent the paraglider trying to fly, and any lift force from it would encourage an opposite reaction from the efficient SQR, resulting in pendulum or scissoring – a tug of war with each flying device racing each other to the ground. Assuming the paraglider has been successfully disabled by symmetric brake wraps, the pilot should be aware of the dangers of abandoning this situation before the ground is reached. If the brakes are released before touchdown, the paraglider

can encourage severe swing activity as the 2-wing combination tries to find a new compromise. This upset will include a higher rate of descent, and this situation massively raises the risk of landing injury.

8.4 Landing

Landing technique

To minimise the risk of injury as you hit the ground, the pilot should adopt the **Parachute Landing Fall** (PLF) technique where possible. The basics: legs and feet together – not locked; slightly bent, with modest bracing. 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 there; use your harness as a swimming float!

Actions after landing

After landing you may have to control/collect 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 another suitable example.

An unsuitable inner container compromises the airworthiness of your flying equipment!

8.5 After landing checks

After any deployment a check and correct repack is definitely necessary! If the possibility of damage to your reserve system cannot be ruled out a complete inspection and check must be carried out before the reserve can be packed again. If there is any doubt you should contact a qualified person.

9. PACKING

9.1 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 check out our online packing video: <https://youtu.be/f6M1KMbGZ70>.



Every 12 Months the reserve must be opened, aired and repacked!



If the reserve has been strongly compressed when packed in order to achieve minimum volume, we recommend a reduced repack interval of 6 months!

9.2 Sorting the lines, preparing the canopy



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. A correct result has all lines running directly from canopy edge to bridle. There must be no looping through (and resulting twisting).

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 all the assisting items you will need: 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 assisting items are present, with none left inside the packed reserve (accessory checklist)!

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



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

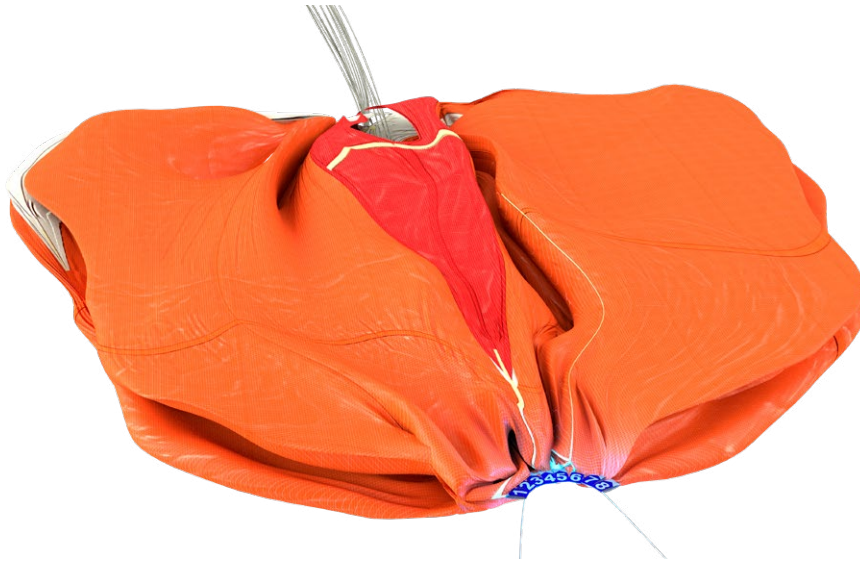


Fig 6 – Packing line and blue loops, red panel on top

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.

9.3 Verifying the layout

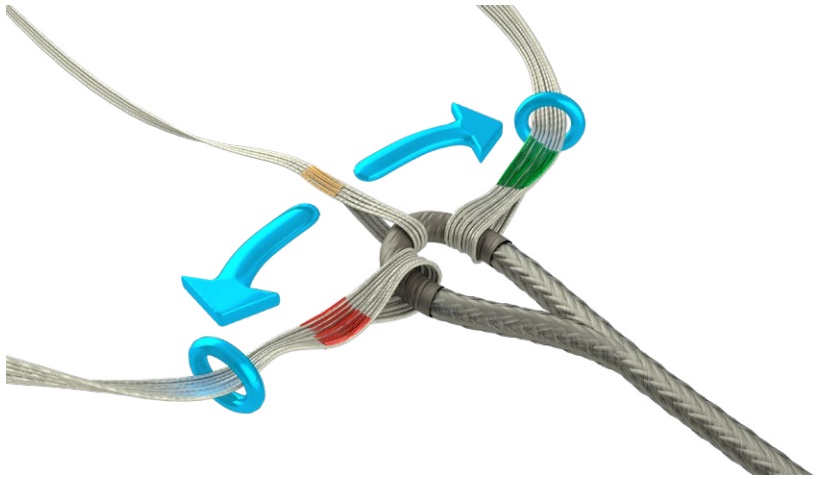


Fig 7 – Left and right suspension lines at the connection line (bridle), centre lines in the middle

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.

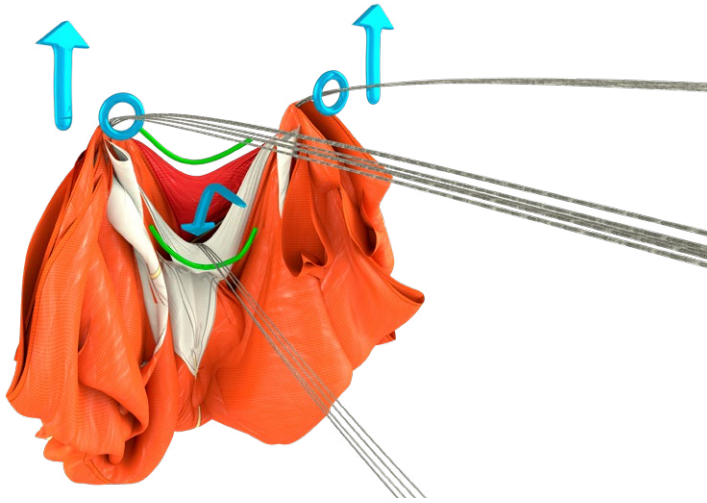


Fig 8 – Left suspension lines, centre lines and right suspension lines at the canopy: red corner (panel) on top

Give the canopy a shake when you reach it, the result should look like shown on 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.



Any other arrangement than shown on Fig 8 is strictly forbidden, and might lead to line-overs or twists! These are dangerous malfunctions and could prevent canopy opening. They must be avoided!

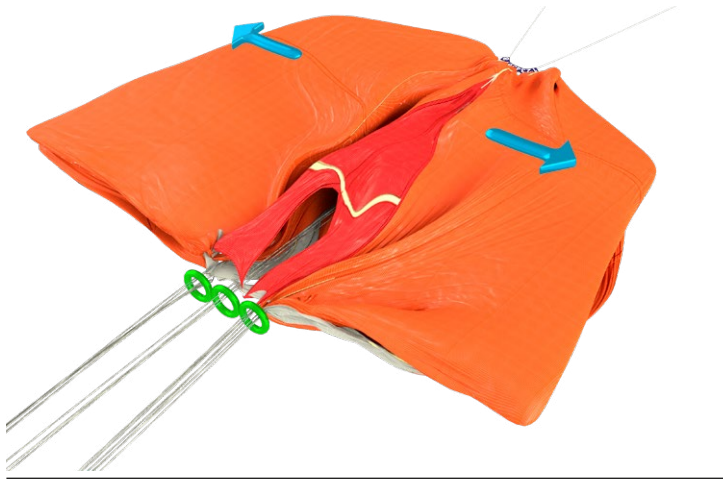


Fig 9 – Ready to begin

Arrange the canopy as shown on Fig 9 with the **red panels** at the top, and lay it on a clean and 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. 1 to 2 kilos load is enough!



The bridle should always be tensioned. Take particular care that the bridle does not tangle with or go through the suspension lines! This would encourage 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.

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 necessary.

9.4 Folding 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 be symmetrically consequent, make no mistakes!

Confirm 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). Then there follow 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 – First, all the right side over the left, then folding can begin



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



Fig 12 – Pull out the top and bottom corners for a flat result



Fig 13 – Bottom edges in a straight line

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. It is worth recommending, 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 12).

If you clamp the bottom edge corners (1. on Fig 12) 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 13).

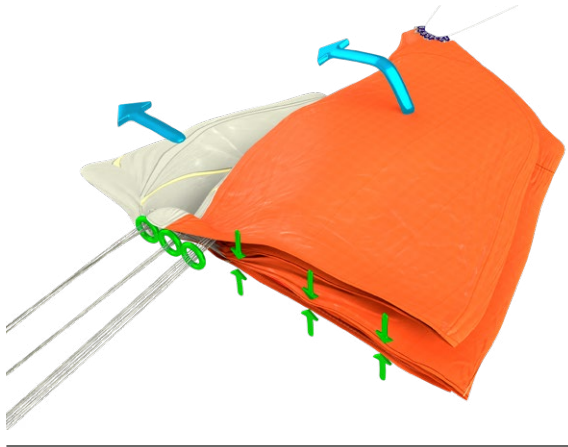


Fig 14 – Prepared side fixed in place;
left side now on top

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.



Fig 15 – Middle of the canopy bulging out

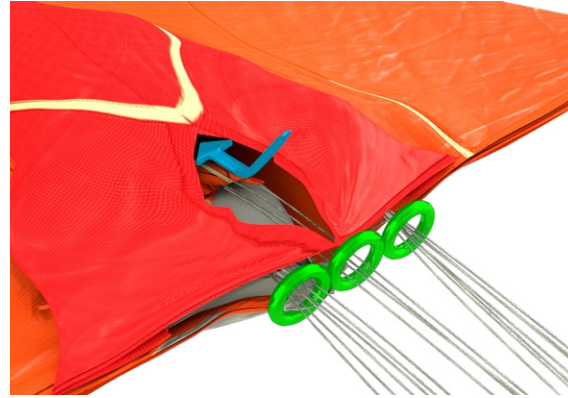


Fig 16 – Corrected canopy and centred lines

The gathered canopy apex makes a square pocket between the centre lines. Sometimes this pokes/bulges out of the centre during the folding process (Fig 15). This pocket should be pushed back between the centre lines towards the packing loops, at the top-centre of the canopy (Fig 16).

The centre line length/tension is carefully tuned for each model, in respect of packing easiness, construction, ageing and opening safety.



Depending on your model, you have to strain (1-2kg) your centre lines, to push back the canopy centre above the bottom edge (Fig 16). This could result, that the canopy surface between the centre attachment point and the packing loops has less 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 16).

9.5 Matching the inner container width



Fig 17 – 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. Using the SQR container with about 22 cm width, will result around 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, will make a vertical concertina shape to fit the width of the inner container.

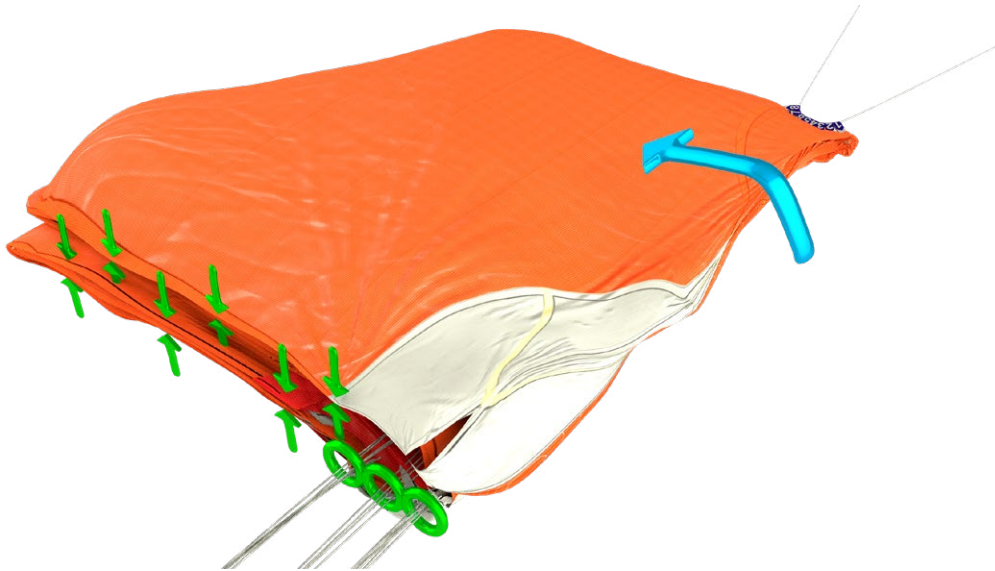


Fig 18 – Right side will go underneath – folded on top first

We start with the side, that will go underneath when the S-folds are finished! First fold the entire right side over the left (again) keeping it as undisturbed as possible, bearing in mind that the central width is now our reference – not the wing centreline.

As shown on Fig 19 the right side will go eventually underneath, but you can symmetrically change the sides, 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 19) 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 20). You can check out the online packing video if you are stuck on this step: <https://youtu.be/f6M1KMbGZ70>.

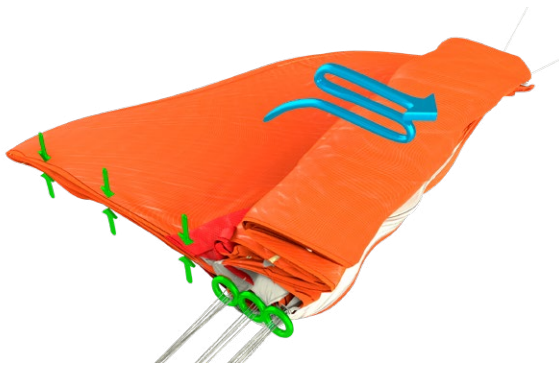


Fig 19 – S-folding the lower side on top



Fig 20 – Rotating the folded package and sliding it underneath

Below shows the result (3 S-folds under): the red dot is the position of the reserve centreline, it should look as shown on Fig 21.



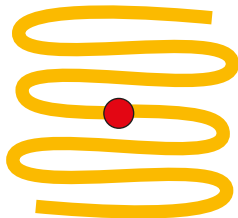


Fig 21 – Ready for the left side to be folded on top



Fig 22 – S-folds complete

Now fold the remaining side on top – 3 S-folds as shown on Fig 22 and below.



9.6 Matching the inner container length

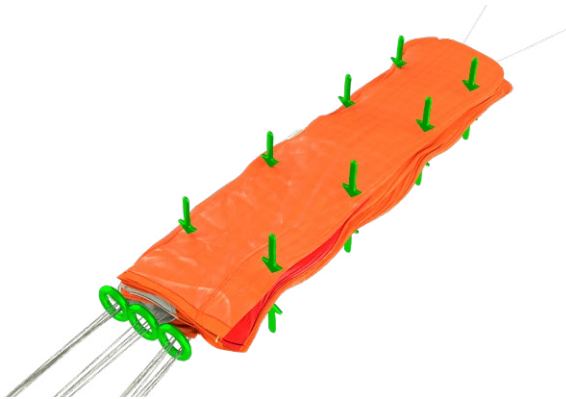


Fig 23 – Adapting to the container length for the remaining folds



Fig 24 – 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 23).

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 23). **Remove the packing line from the packing loops!** Fig 24 shows the final result. Check that all your packing equipment is present. Do not leave anything inside the canopy (accessory checklist)!



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

9.7 Putting the folded reserve into the inner container

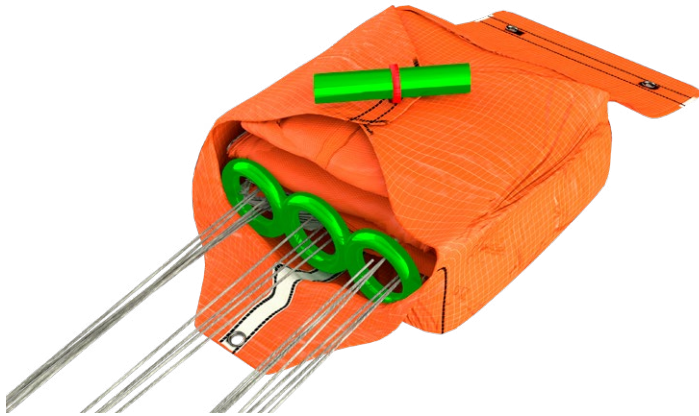


Fig 25 – Folded canopy in the inner container

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.

9.8 Stowing the lines



Fig 26 – Lines, pins (turnposts) and figures of eight

Release the bridle tension.



Take particular 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).

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



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 27 – Figures of eight

The lines are stowed/secured in three groups. The table above gives the number of turns past each pins (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 eights are required!

After a group is completed, its bundle ends are secured with rubber bands. Please ask your manufacturer or your dealer about suitable bands. Do not use old or perished bands.



Each repacking must use new rubber bands!

9.9 Closing the inner container

When bundles have been stowed you should have around 90 cms 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).



Fig 28 – Line bundles in the container, ready to close the last flap



Fig 29 – 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).



Fig 30 – 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 cms / 2-3 finger widths (Fig 30).



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).



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

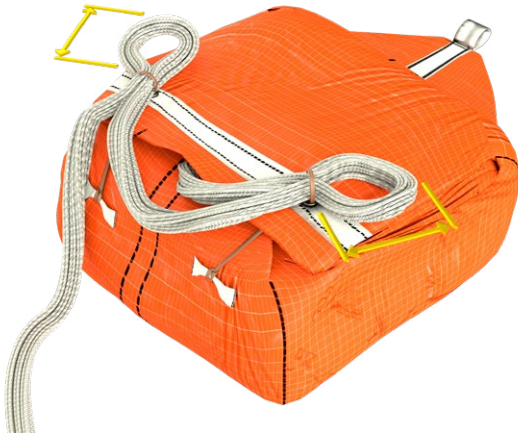


Fig 31 – Line loops to close the securing container cover

Close the securing container cover of the SQR inner container, by two line loops of the same size (5-6 cms / 2-3 finger widths) as the previous 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 their instructions in the corresponding users manual. Other closure line length may be applied.



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



Each repacking must use new container closing elastics!

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Fig 32 – 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.



To confirm that the reserve has been correctly installed, a compatibility test is absolutely essential in case of a new installation or if any element of the complete harness/container/reserve system has been changed! See chapter 7!

10. PERIODIC INSPECTION

Every **24 Months** the SQR reserve must have a periodic inspection and this event 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.

10.1 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.

Work your way around the canopy, panel by panel, inspecting all the surface until you come to the centre. Look carefully at the area around the packing loops.

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

10.2 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 that all sewing are complete and seams are in good order. Check the line loops (especially the inner side) for external wear, fraying and damage!

10.3 Checking the bridle

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

Check for the presence of the certification label 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 handglider version has a swivel built into the bridle. Check the swivel for condition. If the swivel is bent, cracked, damaged or does not rotate freely, it **must** be changed by the manufacturer.

10.4 Checking the connector link or direct looping between reserve and harness/external container

Please refer to the chapter „6.5 Connecting the reserve to the harness/external container“ for detailed information about the connection methods allowed between the reserve and the harness/external container.

A metal connector link (quick link / Maillon Rapide) must be checked for its condition. If the link is deformed, cracked or damaged it **MUST** be replaced. Check if the link has sufficient strength (MBL of 2500kg), 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 both harness connection line and reserve bridle must show no signs of slippage, friction, heating, fraying and melting.

After a reserve deployment or re-connection (e.g. packing), it is imperative that the connection between reserve and harness/external container to be re-checked!



Any damage found during a periodic check must be repaired! To make sure that the correct materials and techniques are used, every repair should be done by the manufacturer!

11. TECHNICAL DATA

Model		SQR Light 80	SQR 100	SQR Light 100	SQR 120	SQR Light 120	SQR 140	SQR 160 (PG&HG)	SQR 220
Surface area	m ²	20.3	25.4	25.4	32.4	32.4	37.8	42.0	61.9
Minimum load	kg	50	50	50	60	60	80	90	130
Maximum load	kg	80	100	100	120	120	140	160	220
Sink rate at max. load	m/s	5.4	5.4	5.4	5.4	5.4	5.4	5.3	5.2
Weight	g	842	1258	973	1534	1171	1707	1927	2357
Packed volume	l	1.8 – 2.8	3.0 – 5.2	2.5 – 3.5	3.5 – 5.6	2.8 – 4.0	3.7 – 5.9	4.0 – 6.5	6.0 – 9.4
Total length	mm	6360	6760	6760	7550	7550	8260	8390	10210
Steerable		No	No	No	No	No	No	No	No
Certification		EN 12491:2015 LTF 91/09	EN 12491:2001 LTF 91/09	EN 12491:2001 LTF 91/09	EN 12491:2001 LTF 91/09	EN 12491:2001 LTF 91/09	EN 12491:2015 LTF 91/09	EN 12491:2001 LTF 91/09	EN 12491:2001 LTF 91/09
Certified for hangglider		–	–	–	–	–	–	Yes	–

12. 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 at all times, 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 re-packed. The same applies if the reserve has been stored in an unsuitable environment.

13. SUPPORT AND SPARE PARTS

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

14. ENVIRONMENT AND RECYCLING

Ecological aspects were taken into account during development and manufacture of Companion products, for example choice of materials and cutting for minimum 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 recycling facility, as plastics.

Thank you for your interest!

15. SOMETHING TO THINK ABOUT!

Many pilots do not give their reserve a moment's thought. Often they have no idea what device is "hidden" in their harness. The reserve is not repacked frequently within the required time interval, or it is just too old anyway.

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

We wish you safe flights and happy landings!

The Companion Team

www.companion.aero

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