Operating instructions

Rescue systems

- steerable -

valid for

Type	**Testnumber**
Houston 125	EP 226.2018
Houston 160	EP 227.2018

Norm: EN 12491 and LTF 35/03

Revision 0
Effective from: Production year 2018
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Thank you for your confidence!

Thank you for choosing a MAC PARA product!
These operating and packing instructions provide important information on how to use your rescue system. Please read this manual carefully before installation! It has been written to serve as a comprehensive guide for the proper handling of your reserve parachute. If you have any questions related to the use of this rescue system, please contact MAC PARA directly. If you need professional packing or repair service, please contact your local dealer or MAC PARA.

For more information about this and other MAC PARA products, please visit www.macpara.com. We wish you great flights and always safe landings.

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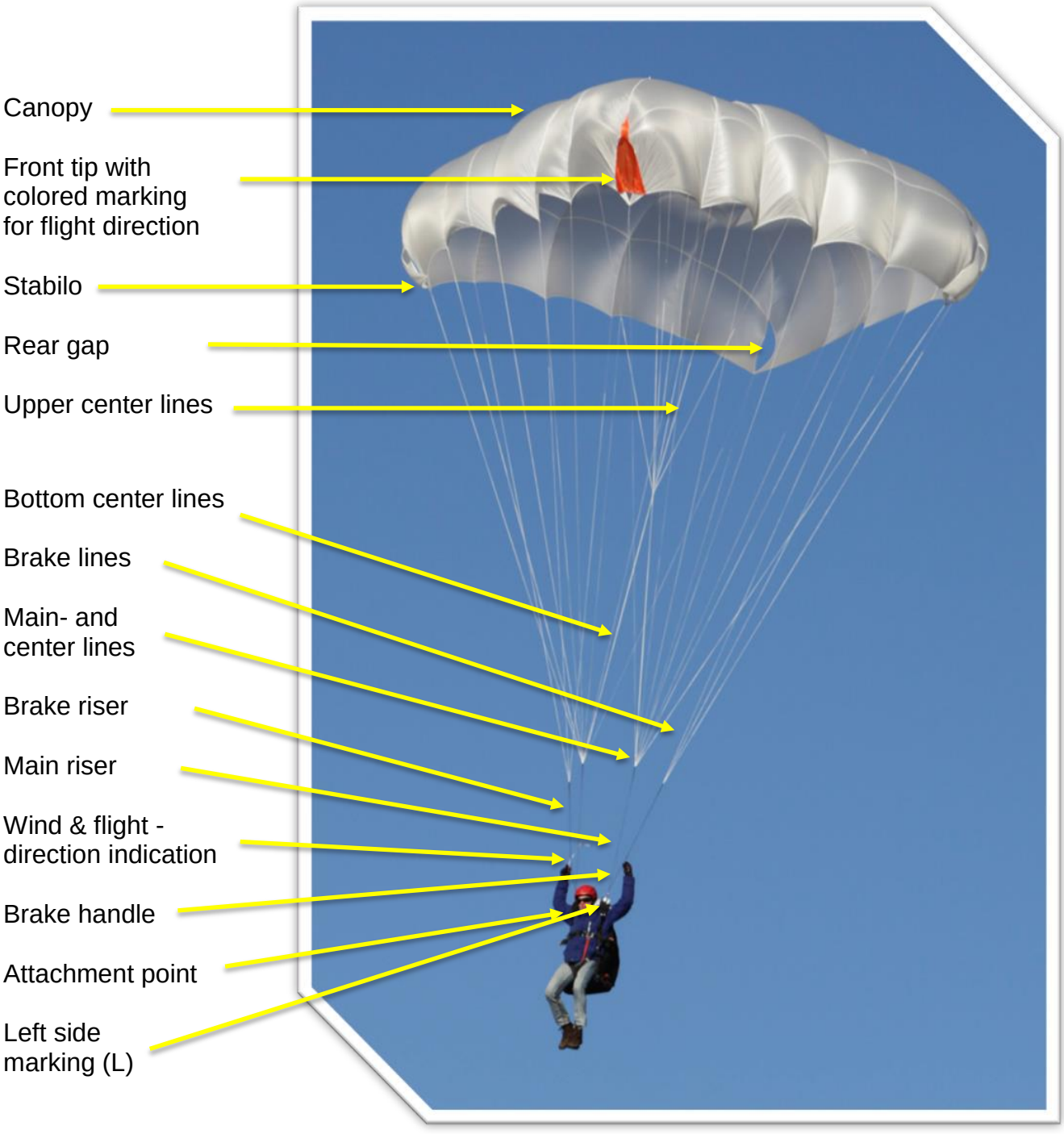
1. Overall illustration



2. Safety instructions

This reserve parachute must not be used for skydiving!

The Houston rescue system is certified according to the german and european standards LTF 35/03 and EN 12491. The use of this rescue system is at your own risk. The manufacturer cannot be held liable for any personal injury or material damage related to the use of this reserve system.

The correct installation of the reserve parachute on the harness is essential and a compatibility test must be conducted by a competent person. Only a properly installed rescue system will function as intended and thus contribute to safety.

3. Technical data

Houston	**125**	**160**
Surface	30,7 m²	41,0 m²
Line length incl. risers	6,86 - 7,22 m	6,86 - 7,25 m
Centre line length incl. risers	7,27 - 7,37 m	7,37 - 7,47 m
Number of lines/panels	18/16	22/20
Number of centre lines	5/2	8/2
Overall length	8,25 m	8,50 m
Max. load EN/LTF	125 kg	160 kg
Min. recommended load	60 kg	80 kg
Sink rate at max. load	4,5 m/s	4,8 m/s
Volume in ccm	4700	5300
Type certificate no.	EP 226.2018	EP 227.2018
Weight	1,39 kg	1,78 kg

Manufacturer:

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4. Intended use

Manually deployed emergency parachute for single seat and tandem paragliders.

5. Operating limits

- **Maximum operating speed:** 115 km/h (32 m/s)
- **Packing interval:** 12 months; subsequently, re-packing is required and must be documented in the packing and inspection record
- **Inspection interval:** We recommend a full inspection of the rescue system every 24 months; re-inspections must be documented in the packing and inspection record
- **Permissible operating time:** 10 years; subsequently up to 12 years when re-inspected yearly

6. Required documents

- Operating instructions
- Packing and inspection record
- The enclosed engineering specifications for this air sports equipment is part of these operating instructions

7. Mode of operation

In the case of an emergency situation during flight, deploy the reserve parachute by pulling the release handle with a firm and quick motion. This causes the outer container to open and the parachute (still packed inside the inner container) is deployed into the airstream. The release handle is thereby thrown away together with the reserve system!

The inner container is constructed in such a way that it releases the suspension lines and the canopy with a little time lag. This way, unintended early opening is prevented and the risk of the lines becoming tangled with the glider, the pilot or another object

or person (e.g. in the case of a crash with another pilot) is minimised. Moreover, the inner container must gain enough speed after release to provide for a fast opening of the emergency parachute.
In general, the quicker you throw the reserve system, the faster can its canopy unfold and open.
After the inner container has been deployed, the suspension lines are released from their separate compartment. The canopy is released only after the suspension lines are fully stretched. The long lines concept of the Houston in combination with its special packing method considerabley reduces the risk of the rescue system and the glider becoming tangled after deployment.
The Houston is designed in such a way that its forward movement, that is significantly responsible for a low sink rate, can be used to steer into a specific direction so that obstacles can be avoided. However, in the case of insuffient altitude, only the ground should be kept in view and one should prepare for landing.

8. Specific characteristics of the Houston rescue system

8.1 Reserve parachute

The Houston is a steerable rescue system, but its constructive characteristics are significantly different from those of Rogallo reserve systems.
The Houston has been designed to feature **long lines** since the most likely reason for a failed opening of the reserve parachute is that it becomes tangled with the main glider. Rescue systems with short lines are particularly prone to this kind of failed openings.
The Houston does **without pre-deceleration**. Thanks to a special shape and trim of the canopy, the typical pre-deceleration of steerable reserve parachutes is unnecessary and the system remains very simple in operation, while being a lot less error-prone. The trim is adjusted so that there is a short stall phase immediately after opening during which rotational energy is instantly reduced in an emergency situation. Subsequently, the Houston automatically switches over to a slight, very stable and pendulum-free forward movement.

The lines of the Houston are **clearly asymmetric in legth** so that the base panels do not exactly overlap as usual when packing the canopy but are a bit staggered. This fanned-out pattern allows for better air inflow after the release and thus leads to an increased opening speed, particularly if the pilot is rotating at high speed in an emergency situation.

The Houston features **two separate suspension points**, each of them connected to two risers. One of the risers is equipped with a brake loop that can be used to steer the reserve parachute.

The Houston reserve (not the tandem version) possesses a **safety connection** (red) that connects the suspension points with each other. In the case of a failure or faulty installation on the harness of one of the suspension points, the reserve parachute still remains at least partly functional. The **safety connection** is no mandatory design specification and could therefore also be dismounted without losing the type certificate. You might want to remove the **safety connection**, e.g., if installation on a specific harness is not possible otherwise. Moreover, the safety connection makes it easier to untangle twisted lines (e.g., after rescue system deployment and inadvertent separation from the harness whereby the risers are twisted).

We want to explicitly point out that an additional safety and backup feature is lost with the removal of the **safety connection**!

A Coloured marking at the front canopy corner of the Houston indicate the flight direction. When packing the reserve system, the markings also serve as helpful reference points.

8.2 Inner container

The **inner container** has been developed on the G-Force Trainer and is the result of 5 years of experience with rescue system deployements under centrifugal force. These are its most important characteristics:

Flat construction design, but not necessarily with the least possible volume

Tests have shown that the container can be pulled out of the harness' rescue compartment much easier and with less effort than cube-like shaped containers, sometimes even if they have a smaller volume.

Also, the flat container deforms much more when it is pulled out by the pilot in upward direction. It bends up so that the risk of getting caught in the harness is reduced as far as possible and the reserve parachute can be deployed with considerably less effort.

Tapered shape with rounded edges

The tests have also shown that pulling out the first third of the container requires the most effort. Accordingly, the likelihood of the inner container getting stuck inside the harness is highest during the first phase of deployment. The inner container of the Houston is thus designed to have a very low profile without rough edges in the front area so that the risk of getting caught in the harness is minimised. However, it must be noted that problems associated with deployment are also significantly influenced by harness design.

No dangerous gaps on the surface of the closed container

The container of the Houston has been designed in such a way that the line bundles cannot get outside the closed container. There are currently many systems in the market that cannot guarantee this. Especially the popular lover leaf style containers are prone to this. When the line bundles exit the container too early during deployment, this can lead to dangerous situations. The closed Houston container does not have any gaps on the surface so that its functionality is guaranteed even under high centrifugal forces and in extreme conditions.

Redundant container lock

The container with the line bundles is double-locked for improved operational safety and to prevent an early and thus uncontrolled opening of the rescue system.
This is a further measure to avoid the entangling of the reserve in the paraglider lines as it contributes to a defined deployment after the release.

Fabric-coated rubber bands

If the container is locked using packing rubber bands or rubber bands without protection, there is a risk of early breakage as they are often not strong enough – especially at high centrifugal forces – and might thus release the lines or the canopy from the inner container too early or the reserve parachute might even remain inside the harness while only the container is pulled out of the compartment.

Therefore, the inner container of the Houston is equipped with fabric-coated rubber bands with a diameter of 3 mm. The rubber bands can be easily replaced when necessary due to aging.

Offset release shackle at the inner container

Rescue system deployments on the G-Force Trainer showed that the intuitive pulling direction of a pilot in a stressful situation is often upward, as with the handbrake of a car. However, this direction is disadvantageous to pull the reserve parachute out of the harness and it increases the release force significantly. The release shackle at the inner container of the Houston is designed in such a way that the release force remains low even in this „worst case“ so that the reserve system can be pulled out of the harness reliably and fast.

Seperate canopy lock

The rescue system container of the Houston is designed in such a way that it first releases the lines and the canopy is released only after they are fully stretched. This provides for a defined canopy opening and further reduces the risk of an entangling of the reserve in the paraglider lines in SAT-like rotations.

URGENT RECOMMENDATION

Today, also some harness manufacturers offer containers suitable for their harnesses. The Houston has been certified in combination with its inner container and many of the container’s details contribute to an optimal performance of the system. Tests showed that the DC container performs significantly better in many aspects than the container that comes with a harness. 5 years of experience with

rescue system deployments on the **G-Force Trainer** (a centrifugal force simulator) have been incorporated into the development of the container. We therefore urgently recommed the use of the original DC inner container and to let the release handle be attached to it by an authorised specialist if necessary. Should sewings be required, you can contact MAC PARAfor assistance. We are offering this extra service as the interfaces of the different components are not standardized in paragliding. A careful adjustment of all components in addition to the obligatory compatibility test thus optimises your system significatly!

WARNING (according EN certification rules)

Use of this parachute with any alternative inner container: the speed of opening and opening shock test has been completed using the inner container supplied.

Use of any other inner container may produce different results (including failure)

8.3 Constructive characteristics

Diagonal suspension and flight direction

The diagonal „diamond“ configuration is one of the main innovations that make the originally non-steerable concept of a cruciform canopy steerable. Due to the diagonal flight direction, the calculative aspect ratio increases from 1 (square) to 2 (diagonal square). As the Houston has a defined forward movement, the low sink rates are not only influenced by the drag coefficient but, similar to a wing, also to the lift coefficient. The higher aspect ratio that results from the diamond configuartion is essential for the resulting flight and gliding qualities. The diagonal suspension also makes it possible to attach the brake lines at two edges of the rescue system canopy.

The canopy trim and the airspeed of up to 15 km/h result in a glide ratio of approx. 1:1,5. That means that, e.g. from an altitude of 500 m, the pilot already has the possibility to specifically approach an area of approx. 1,7 km^2 for landing. At lower altitudes, at least an avoidance of obstacles remains possible. At higher altitudes, it is even possible to get from the ridge down into the valley or to approach a safe landing spot.

Twist for steerable rescue systems

Due to the design specifications for paragliding rescue systems and the current pilot training rules, rescue systems for PG and HG are not certified for free fall and free fall of the pilot must not occur in any phase of the deployment process. It is legally prohibited to first separate from the main glider that is sometimes necessary to open the rescue parachute, e.g. with BASE or skydive systems. The systems have a very low tendency to twist.

Accordingly, the only possibility in paragliding is to throw the inner container package more or less uncontrolled into the airspace. Due to the system characteristics, rotations of the container prior to opening cannot be completely avoided such that steerable rescue systems sometimes open twisted.

When twisted, the Houston performs like a conventional cruciform canopy except with increased forward movement, higher pendulum stablity and a reduced sink rate.

Untwisting

Steerable systems have the characteristic that due to the air drag the main glider is always on the opposite side of flight direction. If the main glider still has open surface, a twist (of at least 180°) is system-inherent and usually unavoidable. The pilot flies backwards.

Generally, the twist has no negative influence on sink rate or pendulum stability and can – other than a twist of the paraglider – be regarded as non-critical with the Houston.

However, the advantages of a steerable rescue system can only be fully utilised if the main glider is completely disconnected in some kind of way. An uncontrolled partially open surface of the main glider can never improve the characteristics of the rescue system concept. This applies also to all non-steerable systems. If the main glider is disconnected, even multiple twists can be quickly and easily untwisted with the right technique. By means of quick shear leg movements in upright position (slow in one direction, quick in the other), the pilot rotates approx. 90° per stroke in the desired direction. This is a standard technique in skydive training and should be practised hanging on the rescue system suspension of the harness. **Attention:** Keep in mind

the direction of rotation! Look up to the rescue parachute while untwisting and check whether the right stroke direction has been chosen. If necessary, change the spinning direction by changing the stroke direction of your legs.

No „downplane“ tendency immediately after the opening

By contrast to Rogallo rescue systems, the Houston does not exhibit a „downplane“ tendency toward the main glider. The term describes a constellation where the main glider and the rescue parachute create lift in different directions and thus lead to a very high sink rate.

The “downplane“ effect can sometimes be observed in Rogallos if they open with their tip down. Although the Rogallo opens very fast, the opening is sometimes followed by a long downplane phase with high sink rates until the Rogallo straightens up and reduces the sink rate.

The “downplane“ tendency can lead to severe injuries, particularly in the case of deployments at low altitudes.

To avoid the “downplane“ effect by design, the Houston has a special trim that leads to a strong S-shape in the cross section of the parachute. As tests have shown, this causes a righting momentum that reliably keeps the main glider out of the window where a “downplane“ constellation can arise in the first place.

When the Houston opens, a short sink phase effectively avoids the “downplane“ effect. This happens by canopy design, at the optimal timing in an emergency and without the pilot’s intervention. After a short stall phase, the canopy reliably changes into a steady, pendulum stable flight phase with very low sink rates.

8.4 Flight behaviour

Turns

The Houston can be steered via the brake handles at the rear risers. This is most effective for turning if one side is rapidly pulled down as far as it will go. After approx. 5 seconds, the brake can be released for a short moment to re-accelerate to full speed and then be pulled again all the way to one side. By this method, the canopy turns fastest to make corrections of your flight direction.

Fly Back

By simultaneously pulling down both brake handles as far as possible, the canopy can be brought into a „fly back“ position in which the rescue parachute flies backwards until the brake handles are released again.

Side Slip

By holding one branke handle pulled down for a longer time, the Houston can also be brought into a „side slip“ position. The rescue system then pushes stable via one of the two lateral corners. The side slip can position can be left by counter-braking and reasing. The side slip can be helpful to avoid obstacles or to turn upwind close to the ground. Pulling the brake too far down or too rapidly does not lead to a stall which is very important for pilot safety, especially in stressful situations.

Approach for a landing

The test flights have shown that it is best to land the Houston rescue system when approach and landing are unbraked. Trim speed is adjusted in such a way that the lowest possible sink rate for the concept is achieved. Even without pilot intervention or reaction, this results in optimal conditions for an injury-free landing.

No stall possible

The steering forces of the Houston are relatively high and the system reacts much slower to directional changes than a paraglider. There is no risk of a stall, even in the case of impulsive an severe steering with the brake handles.

Forward speed reduces risk of injury

The human body is most vulnerable to injury when the velocity vector is directed towards the spine and the impact area is at right angles to that axis.

A forward speed in combination with considerably lower sink rates is thus always associated with a lower risk of injury than an impact at right angle and higher vertical speed, even if forward speed is increased by tailwind.

Lower sink rates allow for more time to react

The low sink rate gives the pilot more time to prepare for landing.

We thus recommend the following course of action after rescue system deployment:

1) *Pull handle, remove inside container from harness or outside container, throw the container down, direction legs. Check after 5 seconds if the canopy has opened proper.*
2) *Orientation* – check for flight direction (red tip) and altitude
3) *Adjust the flight direction*

   In case of an imminent collision with an obstacle, immediaely change the flight direction by pulling one brake handle (whatever side). Try also when the system is twisted.
4) *Reel in or separate the main glider (optional)*

   Separation can be achieved by:
   a. a rapid separation carabiner
   b. unhooking the risers from standard carabiners (a separation system for speed pedals is highly recommended)
   c. using a knife to cut through the risers or main lines in case of emergency; material damage is always better than personal injury – a cutting knife should therefore always be an essential part of a pilot's standard equipment!
5) *Check the flight direction*

   Re-adjust the flight direction if necessary
6) *Untwist*
7) *Approach a landing spot*

   In the remaining time, approach the nearest area in which a safe, injury-free landing seems possible.

   Under no circumstances, attempt to cross power supply lines or other obstacles at low altitude if the intended landing area is behind the obstacle!

8) *Align the canopy upwind if possible*

   If you are aligned upwind above an obstacle and sink towards it due to strong headwind, veer and use the tailwind to try and find a more suitable landing area.

9) *Landing*

   Release the brake at a minimum altitude of 20 m and land unbraked without flaring (also if you are landing with tailwind). An exception is if you try to initiate a side slip to avoid an obstacle. In this case, pull one of the brakes all the way down to one side until landing.

10) *Inform the rescue services*

    Since very often search operations are initiated by observers after rescue system deployments, we highly recommend to contact the police or the rescue immediately after landing even if there is no personal injury.

Summary

The Houston provides many options for a safe landing after rescue sytem deployment.

However, the most important measure in an emergency situation is **DEPLOY!!! It is never too late for the rescue parachute. As long as there is a chance to deploy, it is ALWAYS the better alternative!**

If your altitude is too low, keep watching the ground and prepare for landing.

With the Houston, you are provided with the largest possible passive safety a rescue system can currently offer!

You have purchased a rescue system you can always rely on. It went through a large number of on-flight tests that far exceed the regulatory requirements.

The tests were conducted almost exclusively above ground and thus under real-life conditions, they included all available sizes and there were no injuries.

Therefore, never wait too long to deploy your rescue system in a problematic situation during flight.

9. Maintenance, Cleaning

The Houston rescue sytem by MAC PARAhas been designed for heavy-duty use and to withstand extreme conditions. Accordingly, we have selected only especially durable high strength quality materials. However, durability strongly depends on the care and maintenance by the pilot.

Soiled canopies and containers can be cleaned using clear tap water.

Attention: Acid marks or mould spots might affect the strength of the parachute. Rescue parachutes that are soiled in that way must be sent to the manufacturer for a check-over and possibly a repair. Never weing or brush the wet canopy!

Particular attention should be paid to the following points:

- Do not expose the packed rescue system to large variations in temperature and provide for sufficient air circulation to avoid the formation of condensate.
- Avoid unnnecessary exposure to the sun (UV radiation).
- Unpack the wet or damp canopy and let it dry at room temperature or outside in a shady place.
- After salt water exposure, immediately rinse the canopy thoroughly with fresh water.
- Clean all components only with fresh water and if needed using neutral soap; never use chemicals containing solvents!

10. Storage

Oils, greases, acids and dyes must not be stored in close proximity to the rescue system. Store in a well-ventilated, dry room. Rescue systems that are not used for a long time should be stored unpacked.

11. Packing and inspection intervals

The rescue system must be aired and re-packed according to valid packing instructions every twelve months to guarantee its reliable and fast opening at any time. If the rescue system was exposed to wet conditions, moisture or extreme heat, it must be re-packed immediately.

If the rescue system has been deployed in an emergency situation or during a safety training, it has to be re-checked by the manufaturer or by an authorised service centre. It must also be thoroughly inspected by a competent person after every larger stress exposure (e.g. a tree landing).

12. What to do when damage is detected

When damage is detected during inspection, the rescue system must be sent in to MAC PARAfor repair. This also applies to damages whose effects on airworhiness cannot be unambiguously determined. In either case, the manufacturer must be involved in the repair process!

13. Repairs

Generally, repairs at emergency parachutes must never be carried out Grundsätzlich dürfen Reparaturen an Rettungsschirmen nie selber ausgeführt werden. Repaired seams can have significant influence on material strength. Damages must be assessed in each individual case. Therefore, only the manufacturer or an authorised service centre after consultation with the manufacturer may carry out repairs using original materials. Manufacturer-approved repair instructions must be enclosed in the packing and inspection record after the repair has been carried out and have to be handed on as part of the rescue system in the case of relase.

The preparation of repair instructions by the manufacturer is subject to a fee. In the case of non-compliance with the suggested repair procedure, airworthiness according to EN or LTF expires automatically.

Acis marks and stains as well as rips and chafes may affect the stability of the components. Such damages must be inspected and, if necessary, repaired by the manufacturer or by an authorised service centre.
We recommend to regularly check the rescue system for signs of wear and to let MAC PARAor an authorised service centre repair it if necessary before the next use.

14. Checkup and packing preparations

Before packing, hang up the canopy so that it does not touch the ground for at least 6 hours in a well-ventilated room without direct UV exposure. If the canopy got wet, please make sure that the suspension lines, that have become considerably heavier due to the moisture, are unburdened and cannot stretch. Do not use heating radiators for drying!
If possible, packing should be carried out on a packing table or at least on a clean, antistatic underlay. As a packing aid, you need a piece of cord or a parachute line of 50 cm length and the possibility to put the canopy under tension between the harness respectively the suspension points and the packing loop. We recommend to attach an elastic cord with carabiner to the packing loop at the apex of the canopy. Several small bags with lead scrap or sand can be used for weighing down the canopy which makes packing easier and reduces the packing volume. All rubber bands must be replaced by new ones when re-packing. Original rubber bands can be purchased at MAC PARA.
We strongly recommend to let your rescue system be packed by a competent person.
The packer must inspect the canopy for possible damage. If the rescue system has to be re-packed after an emergency deployment, a prior check-over by the manufacturer or an authorised service centre is cumpulsory.

15. Packing

Packing the Houston is described in the separate packing instructions. Make sure to read the most recent valid version of the instructions. It is available for download in multiple languages on www.macpara.com.

16. Installation on the harness

If your harness is not equipped with an integrated rescue system container, you can install the Houston on the harness using a suitable outer container. Volume and shape of the outer container should thereby be similar to the inner container. First, connect the risers of the rescue system with the suspension points of the harness using either screw-on shackles with sufficient breaking strength (e.g., item no. Be31) or „**Soft Links**“ (usually made of Dyneema). Depending on the harness design, the rescue system can alternatively also be attached to the main carabiner. When using **Soft Links**, it is very important to consider the respective installation instructions by the manufacturer according to which the rescue system can be installed either at the side or at the chest strap of the harness by means of screw chain links (e.g., item no. Be29) and the webbings at the outer container.

Follow the instructions from your harness manual and attach the rescue system container at the suspension points as described. Make sure to check the container for a firm and secure fit. Also, it should not interfere with moving parts such as a speed system, webbings running through, etc.

17. Placement inside a harness rescue system container

Follow the instructions from your harness manual to place your rescue system inside the container. Additionally, the following ponints must be strictly adhered to:

- Only use the original release handle that is delivered with the harness. Other release handles must not be used as they do not guarantee faultless operation.
- The container must have a suitable volume.

- When using an inner container with asymmetric attachment loop, it must be placed inside the harness container in such a way that the attachment loop remains as close as possible to the release handle and that the rescue system does not get twisted during deployment.
- When placing the rescue system insude the harness container, it is absolutely necessary to make sure the connection between release handle and safety splint is shorter than the connection between release handle and inner container
- Install the release handle at the intended position in such a way that the connecting line is not under tension and the safety splint is not pulled out of the closing loop
- After each packing, a test deployment must be carried out to ensure the proper operation of the rescue system! Deployment from the flying position must be possible without any difficulty and according to the specifications of the manufacturer.

18. Compatibility test

Each new combination of a rescue system and a harness must be tested for compatibility in a k-test by an authorised person after the first packing.

Deployment from the flying position must be possible without any difficulty and according to the specifications of the manufacturer. The release force should thereby not exceed 70 N and the inner container should deploy easily from the integrated or externally attached outer harness container.

The tester has to confirm test execution in the packing and inspection record.

Tests and deployments during trainings on the G-Force Trainer showed that deployments under centrifugal force can sometimes lead to considerably higher release forces and coordination problems of the pilot. Complementary to the k-test, we thus recommend to test the individual combination of harness and rescue system in the course of a training under centrifugal force (4,0 - 5,0 g).

Moreover, we highly recommend to check the pilot position and harness adjustment at the suspension points of the rescue system. Independent of the type of rescue

system used, a deployment might lead to a very unfavourable and critical pilot position, particularly if the harness is equipped with a „Get-Up“ system and if the suspension points for the rescue system are located very far back on the harness (behind the shoulder straps).

We thus recommend to use a harness with conventional 3-clasp system (redundant „fail-safe“ constructions are considerably more reliable) where the suspension points for the rescue system are located not so far back (on the shoulder straps and not behind them).

19. Transport

Take care that the rescue system is not exposed to extreme heat during transport (e.g., in the boot of a car in the summer). Also, it should always be handled with care (keep it clean, do not put any sharp or heavy items onto it, etc.). When packing it into the paraglider pack sack, be careful not to damage the rescue system with buckles or other items and to not accidentally open the release handle.

20. Pre-flight checklist

In addition to the standard pre-flight check (see paraglider / harness operating instructions, possibly winch etc.), also the correct closure of the rescue system container and the proper fit of the release handle have to be checked prior to each takeoff.

If the rescue system connecting line is unhinged after each flight (e.g., when using a front container system), the pre-flight check has to also include the correct attachment of the risers!

Attention: The Houston features two separate suspension points. Each of them must be connected to one side and in flight direction.

21. Specifics for paraglider winch launch

For winch launching, please pay attention to the harness, paraglider and winch manufacturers' provisions! When using a front container, it must be ensured that rescue system deployment is possible at any time.

22. Flying by the seaside

Using the rescue system at the seaside or in saline air for a longer period may cause premature material ageing. Under such conditions, the rescue system should be checked and inspected for airworthiness more frequently.

23. Environmentally responsible disposal

Please ensure environmentally sound disposal at the end of the operating period. If you return the product to MAC PARA, we will be glad to provide for proper disposal.

24. Environment and nature-friendly behaviour

Finally, please enjoy our amazing sport in such a way that nature and environment are treated with care!

Please stay on the marked paths, do not leave any litter, avoid unnecessary noise and respect the sensible balances in the mountains' ecosystem. Consideration for nature is important not only at the launch at landing areas!

25. Certificates

AIR TURQUOISE SA | PARA-TEST.COM
Route du Pré-au-Comte 8 • CH-1844 Villeneuve • +41 (0)21 965 65 65

Test laboratory for paragliders, paraglider harnesses
and paraglider reserve parachutes

paragliding by air turquoise

Emergency parachute inspection certificate

Inspection certificate number: **EP_226.2018**

Manufacturer data

Manufacturer name:	**Mac Para Technology**
Representative:	**Peter Receke**
Street:	**Televizni 2615 - Tesla area**
Post code / Place:	**756 61 Roznov pod Radhostem**
Country:	**Czech Republic**

Sample data

Name:	**Houston**	Size:	**125**
Steerable	**Yes**	Maximum weight in flight [1] [kg]:	**125**
Weight [2] [kg]	**1.375**	volume packed [cm³]:	**4700**
Serial number flight:	**DC125-0002**	Date of reception:	**29.06.2016**
Serial number strength:	**DC125-0001**	Date of reception:	**29.06.2016**

Test report summary	Results	Place	Date
Speed of opening,descent rate and stability test 71.5.1.1	**POSITIVE**	Villeneuve	**06.12.2016**
Strength test / opening chock 71.5.1.2	**POSITIVE**	Illarsaz	**29.06.2016**
Steerable parachute flight test 71.5.1.3	**POSITIVE**	Villeneuve	**06.12.2016**
Inner container strength test 71.5.1.4 [3]	**POSITIVE**	Villeneuve	**12.01.2017**
Riser/bridle strength test 71.5.1.5 [4]	**POSITIVE**	Villeneuve	**13.02.2017**

Issue data

Place of declaration:	**Villeneuve**
Date of issue:	**22.05.2018**
Managing director:	**Alain Zoller**

Singature:

This signature approve the validity of the test reports 71.5.1.1, 71.5.1.2, 71.5.1.3, 71.5.1.4 and 71.5.1.5 (Only if test report are applicable).

Air Turquoise SA has thoroughly tested the sample of emergency parachute mentioned above and certifies its conformity with the following standards : **EN 12491:2001 and LTF NFL II 91/09 chapter 6 Paraglider rescue systems, LTF Ref chapter: 6.1.1 to 6.1.19, except 6.1.10**

[1] Total weight in flight exclude weight of paraglider, also called payload - [2] Weight of the emergency parachute - [3] and [4] this item can be use for several models.

This inspection certificate confirms that the above sample identified by its serial number and only this is in conforms with the standards.

The inspection certificate contain the tests mentioned above and it is complete with the test report number: 71.5.1.1, 71.5.1.2 and 71.5.1.3 only if steerable. 71.5.1.4 and 71.5.1.5 are also included, they can be tested independently.

RE | Rev 13 | 20.01.2017 ISO 71.5.1

MAC PARA

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Test laboratory for paragliders, paraglider harnesses
and paraglider reserve parachutes

paragliding by air turquoise

Emergency parachute inspection certificate

Inspection certificate number: **EP_227.2018**

Manufacturer data

Manufacturer name:	**Mac Para Technology**
Representative:	**Peter Receke**
Street:	**Televizni 2615 - Tesla area**
Post code / Place:	**756 61 Roznov pod Radhostem**
Country:	**Czech Republic**

Sample data

Name:	**Houston**	Size:	**160**
Steerable	**Yes**	Maximum weight in flight [1] [kg]:	**160**
Weight [2] [kg]	**1.778**	volume packed [cm^3]:	**5300**
Serial number flight:	**DC160-002**	Date of reception:	**07.12.2016**
Serial number strength:	**DC160-001**	Date of reception:	**07.12.2016**

Test report summary	Results	Place	Date
Speed of opening,descent rate and stability test 71.5.1.1	**POSITIVE**	Villeneuve	**07.02.2017**
Strength test / opening chock 71.5.1.2	**POSITIVE**	Illarsaz	**08.12.2016**
Steerable parachute flight test 71.5.1.3	**POSITIVE**	Villeneuve	**07.02.2017**
Inner container strength test 71.5.1.4 [3]	**POSITIVE**	Villeneuve	**12.01.2017**
Riser/bridle strength test 71.5.1.5 [4]	**POSITIVE**	Villeneuve	**13.02.2017**

Issue data

Place of declaration:	**Villeneuve**
Date of issue:	**22.05.2018**
Managing director:	**Alain Zoller**

Signature:

This signature approve the validity of the test reports 71.5.1.1, 71.5.1.2, 71.5.1.3, 71.5.1.4 and 71.5.1.5 (Only if test report are applicable).

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