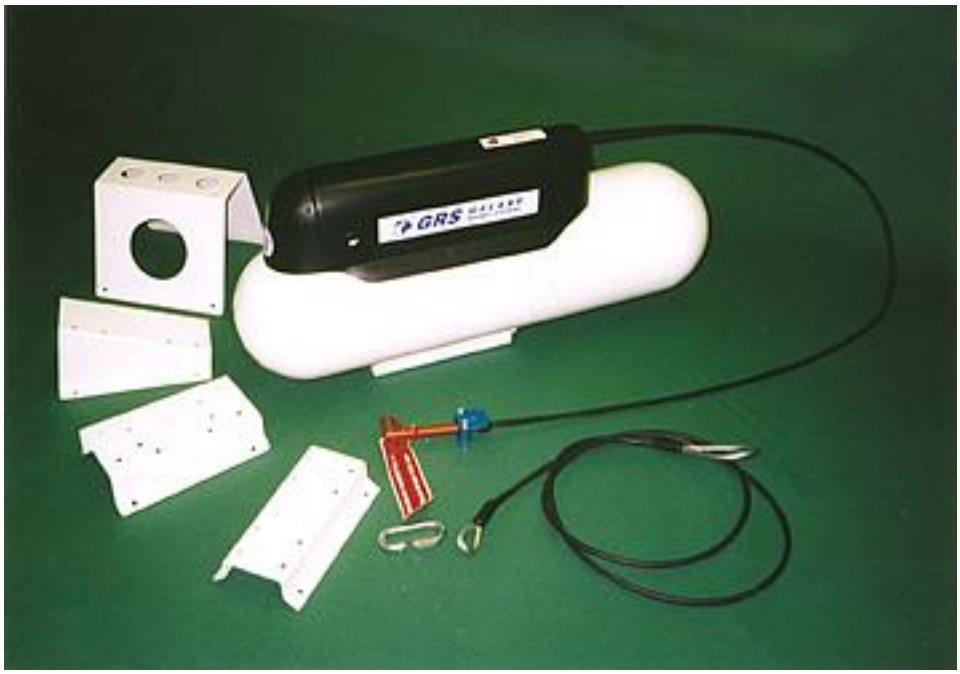
Galaxy GRS s.r.o.
of Liberec, Czech Republic,
presents the life-saving:

Galaxy GRS

Ballistic parachute rescue system



A new generation of rocket rescue parachute for light aeroplanes in dire straits.

Instruction Manual for Assembly and Use

You must follow these instructions for the system to work successfully.

04/2016

Legal notice

Unless these operating and handling instructions are adhered to, Galaxy GRS s.r.o. (Galaxy) cannot guarantee successful deployment of the GRS system and renounces any responsibility towards the safety of persons handling the GRS system, and third parties involved.

Anyone handling the GRS system must read, understand and honour the letter and intent of this manual for assembly and operation. We would like to stress a few especially important items:

1) Do not use the system in any way other than allowed by the manual.
2) Do not under any circumstance take apart the GRS system.
3) Do not disturb or remove detachable safety parts of the system, (these are red sealed, taped, wired or safe riveted) unless the installation procedure calls for it.
4) The GRS unit must be handled as a pyrotechnical device and a loaded gun. It must not be pointed towards a person. Always keep the area in the firing direction clear.
5) Do not activate the system after expiry of each 6-year service-cycle until renewed or anytime after the 30-year lifetime. Return the unit to the manufacturer for safe recycling.
6) On installation the GRS unit becomes an integral part of an airframe but it is not deregistered with aircraft deregistration. At that time the owner must notify Galaxy and follow its requirements to dispose of the unit or to release it for duty on another airframe.
7) Do not transport the system other than in the correctly labeled original transport box with the mounted steel basket on the engine. The system must be secured by the transport safety **A** of steel wire of minimum diameter **2 mm** and the transport safety **B** bolt **M5.** The launching **handle** must be secured **by the peg with the warning flag.**
8) Before dismounting a GRS unit for any reason, the user must notify Galaxy, who will nominate an approved person to check the unit for proper securing for safe and legal storage or transportation.
9) Do not store the GRS unit below 14° or above 24°C, below 35% or above 73% humidity.
10) Do not expose the system to high temperatures, hard impacts, mechanical damage, chemicals, or prolonged storage in excess humidity or a dusty environment.
11) The GRS unit must not be subjected to vibration as from engine mounts or shocks as from landing gear.
12) The GRS system must be firmly fixed to the airframe by at least four screws M6G8.
13) Where the GRS system launching handle is accessible whilst the aircraft is on the ground, the handle must be secured against incidental launching.
14) After each 6-year system operational lifetime expiry or use, the rocket engine is replaced with a new one and the canopy is aired and repacked. The guarantee is renewed upon submission of the previous.
15) Never place the GRS unit with the fire axis downward.
16) It is forbidden to fly with secured system (the peg with the warning flag must not stay inside the launching handle during flight). When receiving the aircraft from the manufacturer make sure that the transport safeties A and B have been removed, as well as the safety steel basket covering the rocket. Before flight you must remove the peg marked with a red flag with the words "Remove before flight“ from the launching handle!" In case that you forget to remove any of these safety features it is not possible to activate the system and use it for rescue .You can lose your life!

Galaxy – Liberec 11.09.2015

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1. Designation of our Product „GRS“
and important information about the GRS system

Dear Customer,

Thank you for choosing a new GRS, which we made to the highest quality of its kind.
Be assured it has undergone, on the basis of the Czech mining office delision, exacting examinations in the **Czech arms and ammunition testing station**, examinations for the transportation of explosives according to **classification of the UN**, RID, ADR, ADN, and IATA - DGR and has obtained the product type certificate with the issue **of the type certificate by the LAA ČR** on the basis of the Office for civil aviation **§81/2 no. 49/1997 of civil aviation from 03.21.1998, the German certification DULV Nr. R 21/ 01–1 Deutcher Ultraleichtflugverband e.V on 01.10.2001 BAM and certification for import and use in the USA.**

Galaxy offers you a state of the art rescue system.

The system is designed for the rescue of crew and aircraft, specifically for 1 and 2-seat light aircraft, ultralights and experimental aircraft and lately for General Aviation aircraft and unmanned aircraft. The product is certificated by LAA ČR, USA, Australia,Canada,South Africa and the DULV, BAM Germany and complies with the conditions for purchase of rocket systems in the trade net of ČR, USA and EC. The system has earned the patent certificate PV 1859-94.

Galaxy GRS s.r.o. is based in Liberec, Czech Republic.
Our local agents have the information, and the ear of the factory specialists with the knowledge, to get you the answer to any question.

If you are not satisfied with service or pricing, please contact the factory:

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Part 2. Design, Construction and Operation

2.1 Design.

The GRS system is designed for quick deployment to enable the rescue of crew and aircraft from the lowest possible height. In other systems the parachute is gradually pulled out from the top, exposing the length of the material to distortion by air currents and damage by contact with airframe or detached parts thereof. The GRS canopy is kept contained in a harness until the suspension ropes are fully extended at 15-18m above the airplane (depending on model), where it is then extracted for safe inflation. This design minimises the danger of damage to the fabric and suspension ropes during deployment. Inflation of the canopy starts in 0,4 to 0,7 seconds from activation of the system. The system is designed with reserve capacity to work even under extreme conditions.

2.2.1 In a special container or in a special sleeve

New series of parachutes is tested at speeds of 305 kph so that the safety coefficient complies with 1,5 multiple of aircraft operational limits for General Aviation.

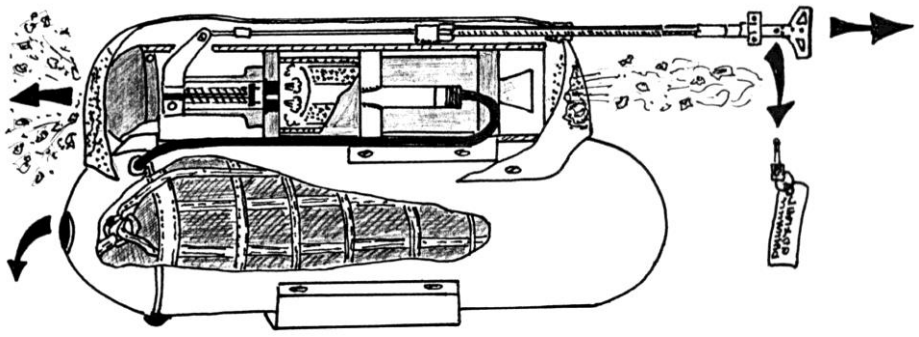
2.2 Construction.

The GRS system (hard) container is made of a dural tube with front and rear detachable laminate domes. Mounting points are provided on the lower sides of the dural tube. The canopy is folded into a harness which slides into the container. The rocket tube is mounted on top and protected by a laminate cover. The rocket engine is connected to the harness by slings and to the firing handle by a cable shielded to withstand stretching up to **120 kg.** The handle is secured against incidental firing by a safety cable.

2.3 Operation.

The system is activated mechanically by pulling the handle with a force of about 11kg.
The firing switch is displaced and two igniters are fired by a double striker which ignites the powder load which ignites the TPH (solid fuel) of the rocket engine. The rocket engine accelerates out of the rocket tube, punches through the protective covers, pulling out the inner container with the rescue parachute above the aircraft. During launch there is minimal recoil and, unlike in other systems, the flame in the launching tube is not thrown forward, but is freely released through the rear into the exhaust tube. The GRS system uses rocket thrust instead of the closed-tube shell grenade recoil design of other systems. In less than a second the parachute suspension ropes are fully extended and the parachute is pulled out of the harness. The rocket engine carries the harness onward until its fuel is exhausted when it falls back to earth under a small parachute. Depending on the model, the main canopy of the rescue system **is open and fully inflated 50-60 ft (15-18 m) in the direction of firing between 1.5–3.2 seconds** after being activated. The rocket may be aimed in any direction, the best being rearward and upwards if aircraft configuration allows.

Illustration **no. 1**



2.4 Minimum height.

You are warned that the minimum firing height of **100 ft (30 m**) for canopy without **slider** (measured **in 38mph (60km/h) in horizontal flight) and 200 ft (60 m) for canopy with slider** may not always be a safe height from which to fire the system because of rotation or tilt of the plane, when the minimum firing height may be **180-250 ft (60–80 m)**.
Just before take-off, review the scenarios according to **Part 8** that will indicate immediate activation of the GRS irrespective of height. Although the GRS system is the most up to date rescue device for crew and aircraft, Galaxy GRS cannot guarantee a safe recovery under all conditions.

2.5 Limitations.

The GRS parachute rocket rescue system is designed for rescue from the lowest possible height but it is still a compromise. The faster the parachute is opened the greater the impact on the airplane. The more this impact is reduced, the more height is needed to open the chute.
After extended testing Galaxy has arrived at the following solution:

Trikes are now built such that the wing will not easily separate from the hanging undercarriage with motor and crew. (Where a safety cable secures the wing to the undercarriage.) According to experience and measurements, the falling speed of such a unit with stalled wing will not exceed 140 km/h. We can use the GRS3 canopy up to **160 km/h**, which enables the crew rescue from the minimal height of **90–150 ft (30–50m)**, but with severe stress on opening, or the GRS4/5 canopy with slider up to a **speed of 260 km/h** with less stress on opening, but at a higher rescue height of **180-240 ft. (60–80 m).** It is always necessary for the crew to use four-point belts. **The stress on the airframe is 3.5–5.5G.**
Slower 3-axis 2-seat microlights may use the GRS3 system with reinforced canopy and **fast slider** which guarantees ability to rescue the crew at speeds up to **190 Km/h from a height of 150-250 ft. (45–75m) provided the aircraft will remain in one piece under a stress of 5.5G. In other 2-seat planes, especially with low wings,** it is necessary to use the system **GRS 5 –6 for speeds up to 260 km/h.(and 1-seat planes GRS 4–230 km/h, GRS 5–250 km/h). The new series of parachutes is tested at speeds up to 305km/h so that the safety factor 1.5 complies with operational limits of airpalns for General Aviation.** This is necessary due to the sudden speed increase in the event of failure of a wing or a critical structural member. The minimal height of use would then be **180–240 ft. (60-80m)** and the stress on opening can be **3.5 – 5.5 G.** This canopy is equipped with a **slider** to decrease the stress on opening.
Galaxy has gone to great lengths in developing the canopy slider to ensure safe canopy opening not only in high speeds, but also quick opening at minimal speeds at low height above ground. This guarantees maximal chance of crew rescue with comparatively low deceleration stress.
Another important point is packing pressure. Galaxy packs the canopy into its container under low pressure, which will not cause sticking of single canopy fields to each other as might happen when packing under high pressure. The container volume is about 10% more, but this is compensated for by quick and reliable canopy opening.

The GRS system is not a panacea for poor piloting, inexperience or flying into extreme conditions. The GRS will not make you a safer pilot. It simply provides a chance to save lives in certain hazardous circumstances. It is only part of an overall program of aviation safety, as airbags are to motorcar safety.

The firm GALAXY cannot guarantee that you will not be injured after deployment or that aircraft will not be damaged. While using a GRS unit could indeed save your life, only you are responsible for the safe operation of your aircraft. You have a GRS only for additional security in the event that your skills, planning, judgement or careful equipment maintenance have failed to avoid a hazardous situation.

When you use an emergency parachute system you may enter an unpredictable situation but the chances of saving your life are much higher than without it.
Do not even think about testing your GRS system in enclosed spaces (hangar, room) to see whether it works. The necessity to recharge the system (by returning it to the manufacturer) and the danger to your safety and the safety of your surroundings, make such a test inappropriate and dangerous!

2.6 Comparison–a parachute deployed by hand from a falling aircraft would take about **8 seconds** to fully inflate. At 140 km/h this translates to 300m or 1000ft. The GRS rescue system on the other hand needs only from **1.5 to 2.9 sec**. This comparison alone presents sufficient reason for installing the system for the safety of pilot and aircraft.

Part 3. Conditions of storage and operation

3.1 Operation of the system GRS - the system is manufactured for an operational life of **30 years** under conditions of good maintenance and checks as given in the manual delivered with the system. In the event that the system has not been fired after **6 years,** the owner is obliged to return the system to the manufacturer for service. The product is dismantled, the canopy is aired and repacked, all components are checked and the rocket motor is replaced by a new one. (the original is completely overhauled)

3.2 Storage – if the customer is not able to mount it on the aircraft immediately, the six year service cycle still applies. The system must be stored in the transport cover so that it cannot be tampered with or accidentally activated. The system must be stored in the steel transport basket and with the transport safety **A** from steel wire of **2 mm** diameter and transport safety **B, bolt M5** and **attach mouting** (peg with little flag in handle).
Do not expose the system to temperatures below -40^{0}C or above + 60^{0}C.
Optimal storage temperature is 14–24^0 C and 35–73 % humidity.
Where the aircraft environment is likely to exceed these parameters for an extended time, the unit must be dismounted and stored in a climate controlled room.

3.3 Do not expose the system to high temperatures, impacts, vibrations, mechnical tampering, contaminants, aggressive chemicals, or store it in an area of high humidity.
Respect the system like a pyrotechnical device and never point it at a person.
Do not allow anyone in the direction of firing. Treat it as you would a loaded gun.

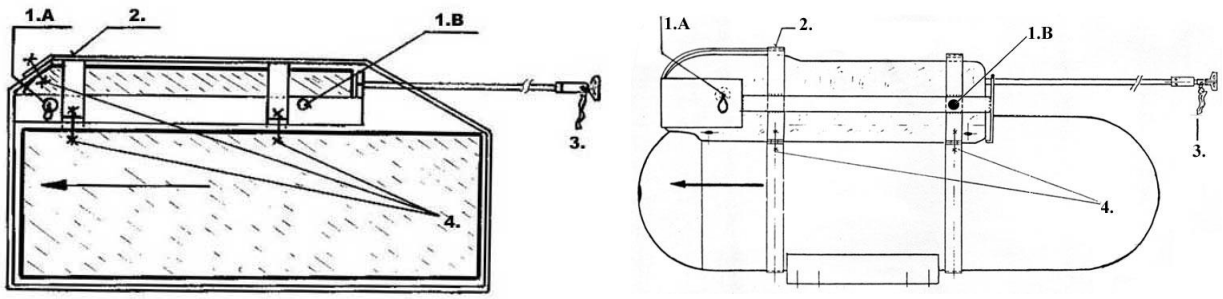
Part 4. Classification of product for transportation purpose

The Czech shipping and industrial register has issued a ruling classifying the GRS as dangerous goods of the class 1- explosive, in accordance with the International Maritime Dangerous Goods Code (IMDG CODE) under the designation UN no. 0453, classification code 1.4 G . This number is changed every year after successful re-test and paperwork.

Part 5. Packing of product and marking of product

The GRS transportation box is marked with a label valid for the year of shipment. To ship the unit in a subsequent year, you must get a new label from Galaxy and affix it over the old.

Illustration **no 2:** Typical safety devices for transpor



Transport saf1. Safety **A- of steel** wire diameter 2 mm ,**B M5 bolt**.
2. Transport steel basket.
3. Operational safety pin with little flag.
4. Transport screws 2 x M5.

You must get updated advice from the factory before shipping.

Part 6. Installing the system

6.1 Before installation the user must read and understand this manual. Failure to do this or overlooking important information while installing or maintaining the system in accordance with the instructions and advice in this manual could result in personal injury or death to you or your passangers and damage to your aircraft. If you have any questions or are unsure of any part of this manual, get advice from an agent or the factory before proceeding.
Galaxy wishes you to fully understand the proper use of the GRS for your safety and that of your passengers. Do not replace any part with a similar part you may have obtained elsewhere. The manual is explicit in the proper mounting procedures required for safe installation and in the proper use of the system. Do not under any circumstances vary from the described methods or components supplied without first getting approval from Galaxy.

6.2 Where to mount the GRS: The weight of the system may shift the center of gravity of the aircraft in an undesirable or desirable way. Before fitting, new weight and balance calculations must be made and checked against the aircraft manual for safety.
The GRS when fitted may aim in any direction, but any downward firing angle will sacrifice precious height, raising the minimum safe deployment height. Regarding the direction of fire, Galaxy philosophy is different to other similar rescue systems. The GRS unit is equipped with a very strong rocket engine which quickly pulls the complete canopy to the limit of its suspension ropes and releases it for inflation in the minimum possible time. Thus, if the rocket is launched vertically, the deployment height is effectively increased by 60ft.
Since many low-altitude emergency scenarios would pitch the aircraft steep downwards, a backward upward launching angle is a good choice where aircraft configuration allows.
Working with manufacturers, optimum mounting positions have been developed for many popular aircraft. Mounting your GPS to factory specification greatly simplifies fitting, and reduces paperwork to have the installation accepted by the Civil Aviation Authority.

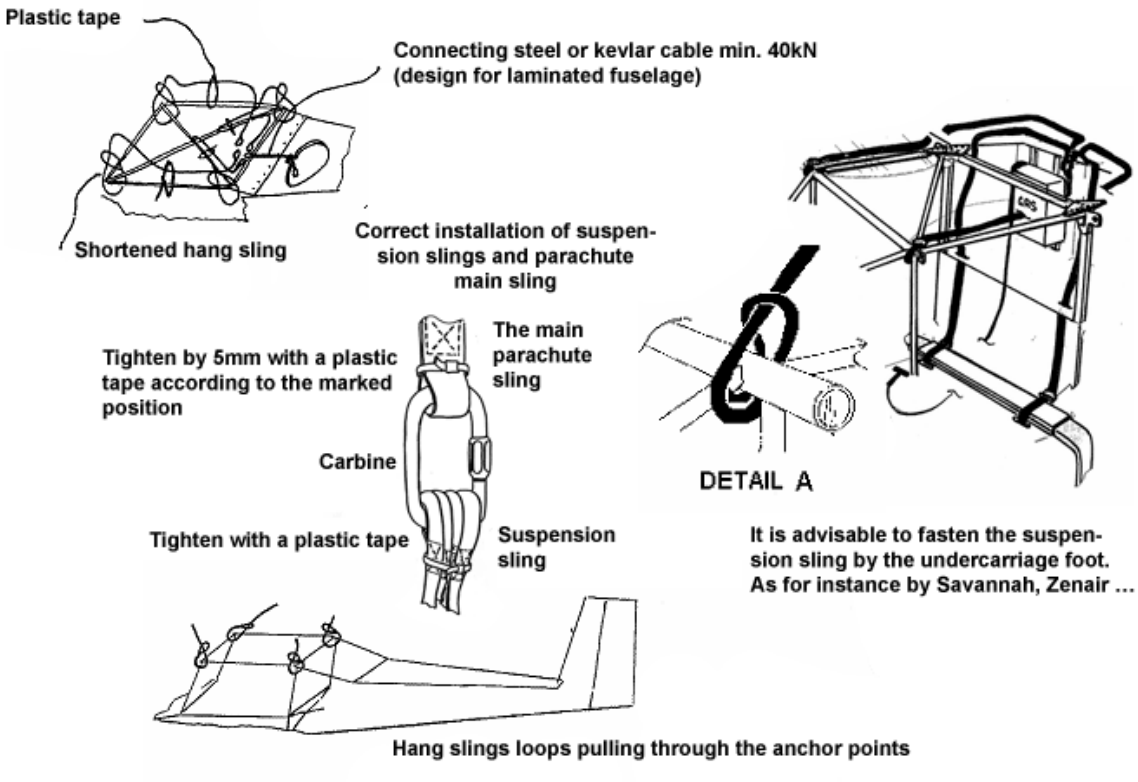
Do not install the GRS where it will be subjected to shock or vibration, like on undercarriage or engine mounts. Do not mount it pointing down.
Mount the system so that no fuel or humans will be in line behind the rocket exhaust, even where normally protected by structure.

The angle of fire must be well clear of the propeller arc .On pusher aircraft the drawn sling must be equipped with a steel cable, thick enough to not be severed by the propeller, and long enough to prevent the drawn sling to contact the propeller. Direction of deployment must avoid areas that might become obstructed by a failed wing. Mount the container firmly to a solid part of the airframe with well engineered hardware.
Observe a clear gap of at least 30 mm around the perimeter of the deployment side of the unit to avoid the rocket or inner container contacting anything on departure.
Of particular importance to installation inside an aircraft: (models **IN** or **Soft**)
Be sure that the drawn sling, leading to the hang slings on the construction of aircraft, which is usually connected with a carbiner, will not impede on the course of the rocket or inner container. The slings must be diverted (e. g. with the help of PVC tapes) a minimum **of 30 mm** from the anticipated perimeter of the course of the container and rocket. It is forbidden to put any part of the hang slings on top of the container as well!

The unextended length of the hang slings between anchor point and carbiner mounting must not hang loose. **Do not roll them up**, but double up as long as possible and fix to the construction with breakable fastenings like cable ties or adhesive tape.
Each hang sling must encircle a stable anchor point or otherwise be prevented from slipping on its mounting tube. This allows the lengths of the slings to determine the aircraft pitch in descent under canopy. It is forbidden to put any part of the hang slings on top of the container as well!

The aircraft should always descend in a more or less horizontal position:
a) A slightly nose-up descent will minimise the effect of arrival impact on the crew.
b) On the other hand, a slightly nose-down descent might allow some aerodynamic control, giving the pilot a chance to minimise airframe damage, but at a higher risk of crew injury.

Illustration no. 3



6.3 Covered exit appertures.

These specifications are crucial for the rocket to gain sufficient kinetic energy to breach the cover and safely deploy the parachute.

The rocket will break through a canvas fuselage covering on a perforated cross or tear away a patch affixed by a dry zip, but it will not break solid dacron or insufficiently perforated perimeters. Perforations must be a **maximum of 3 mm** from each other with a minimum diameter of **2 mm.** Perforations may be covered with paint or adhesive foil.

Do not perforate laminated parts – cut a hatch as allowed by the manufacturer and seal it with foil. The force to detach the cover must not be more than **15kg.** The hatch perimeter must allow **30 mm or more clearance** around unit projected area. In this case the minimum distance of container cap from foil is **20 mm.**

Break-through cockpit glazing – Specifications must be sent to Galaxy for approval, and the container cap to glazing clearance must be at least **100mm.** Alternatively, a hatch can be cut out and sealed as with a laminated structure. The direction for safe firing is **90°** to the glazing. Here we specify **GRS type IN with textile cap.** Where the sling might be damaged by remaining glazing, use the steel connecting cable **40 KN** fixed to the anchor point and the drawing sling of the parachute.

Illustration **no.4**

Note: Besides the perimeter perforation do not forget to do cross perforation where the rocket exits.

The rocket exhaust tube must protrude at least 5mm through a fabric covered fuselage.

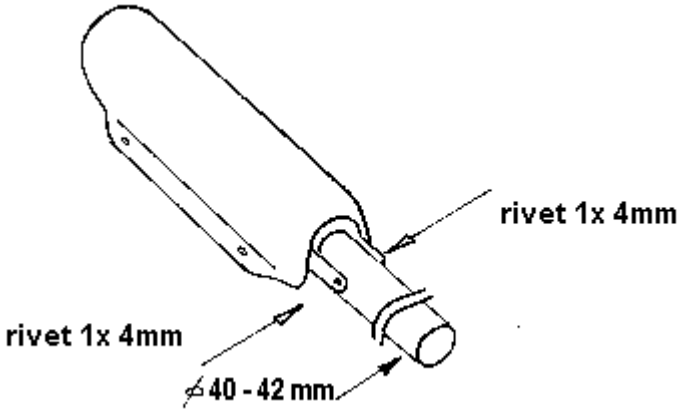
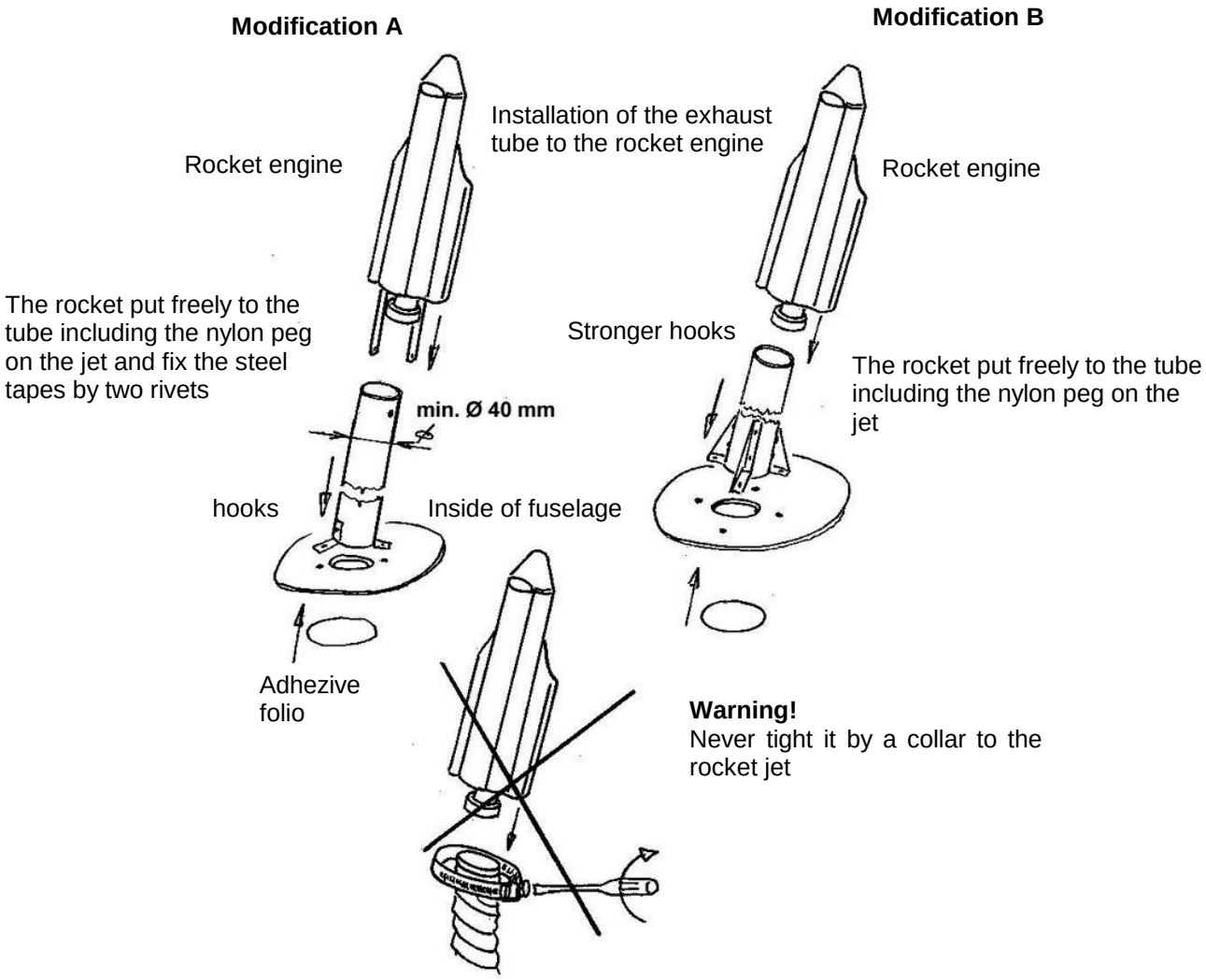


Illustration **no. 5**

During rocket firing high velocity particles are released. To protect against head or eye injury, the crew must be separated from an inside mounted GRS by a section wall, a seat rest or a custom fabric shield.

Illustration **no. 5b**

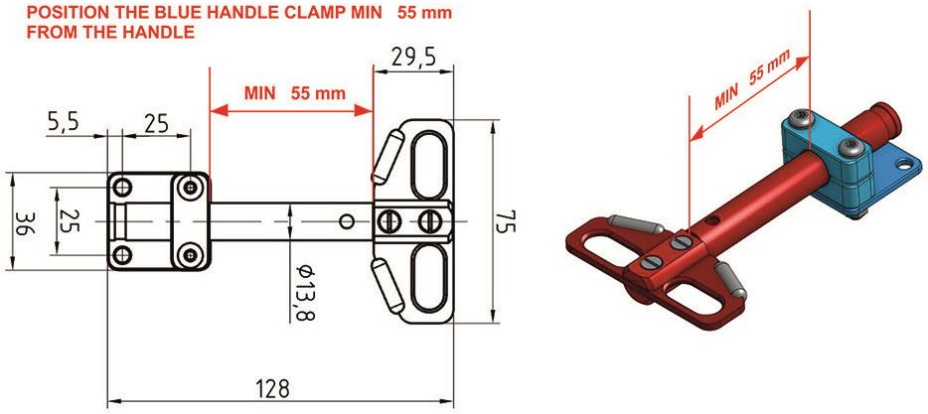


Note: This exhaust tube can be installed when the rocket is near to tank,crew....

6.4 Placement of activation handle.

Mount the activation handle so that it is visible and accessible to both members of the crew. Consider that the possible distance to the launching handle is limited by tighten seat belts. It is forbidden to make loops with the bowden – the GRS system can not be activated when the bowden is looped! The smallest bend radius should be no less than 5 cm, lead the bowden as streight as possible.

The activation handle must not be close to other controls. There must be sufficient clearance around the handle to allow easy grasping with a gloved hand. It should be placed so as to be clearly visible to the eyes of the crew, no extreme head rotation needed.For the safe activation the pull of 5-7 cmof the activation handle is enough, but we recommend a free space of ca. 30 cm for the free move of elbow. The cable in the bowden is pre-sprung in a loop which must be drawn out completely to activate the system. The bowden must be routed and mounted such as to avoid sharp bends that might increase required pulling strain or even prohibit the system from firing. Cables must be neatly fixed to avoid tangling with moving parts or crew. Nuts must be secured against loosening. The bracket of the activation handle must be firmly mounted using both screw holes. If the bracket was to come adrift on pulling the handle, the system will not be activated. **For two M5 10.9 bolts use a tightening torque 8,5 Nm.**



6.5 Safeties.

During transport the system is secured by transport **safeties A and B** (which are connected by red ribbon), **safety steel basket and the peg with the warning flag** on the launching handle.

Before system installation you must **unscrew the transport safety B. Keep the transport safety A activated** (needle in the front of the rocket). The red ribbon will inform you that the safety A is still activated during the whole process of system installation. When the installation is completed the transport safety A must be snipped and completely removed with the red ribbon. After this step the system is secured by the operating safety only - peg with the warning flag on the launching handle.

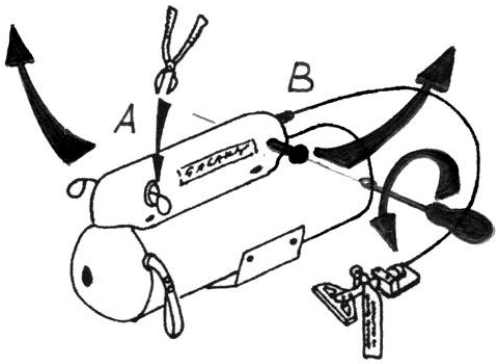
When the system is mounted on aircraft as well as the launching handle, follow the instructions on the labels and sketches in the manual, all transport safeties must be removed and stored for return shipping to us for system revision. After another final check of the installation, cut and remove the red thread securingthe safety peg, and the system is operational.

The safety peg must be removed only when the aircraft is ready for take-off, and re-inserted immediately upon completion of every flight. It is a good idea to make the safety peg the last item on your pre-flight checklist and the first on your shut-down checklist after the aircraft has come to a stop. This will avoid the danger of clothing, straps or the like catching on the release handle during aircrew boarding or disembarking or while air or ground crew are fiddling with equipment like safety belts and headsets.

Where the aircraft is left unattended with the release handle reachable, the safety peg itself must

be secured by a lock or split ring.
Bolts M6G8 used in the container installation are treated with silicon cement before installation and fitted with nylock nuts. Other bolts are fastened with Loctite 243. This product is a complex technical device and for its proper function, professional installation by a trained person is required for both initial installation and inspection.

Illustration **no. 6**



Do not remove before installation is completed.

6.6. Choosing the right GRS system for your aircraft.

Please refer to illustration no 18: Technical data chart.

1) **Choose the canopy size** according to the maximum permitted take-off weight specified for your aircraft. You may choose a unit with bigger than minimum size.

2) **Choose the maximum deployment speed,** according to these criteria:
   a) **For trikes or powered paraglider** there are these possibilities:
   A system designed for deployment at speeds up to 160 Km/h is quite adequate provided the wing remains attached.It is possible as well to use reinforced canopy to allow up to 190Km/h equipped with quick slider. These systems provide the lowest deployment height at the cost of higher stress on opening
   A GRS 5 –6 canopy with slider will allow deployment at up to 320 Km/h, which is more than expected terminal speed, but at the cost of a higher minimum deployment height.

   b) **For fixed wing aircraft** the system is chosen on wing loading. This is because a high wingload aircraft will accelerate quicker upon loss of lift or loss of a control surface. For lightly loaded craft, generally made of tube and covered in Dacron, we recommend **the new canopy with quick slider**, reinforced for up to **190 km/h**. For sleek & clean craft with high wing loadings, mostly covered in ceconite or glass fibre, you should specify GRS 4 or 5 or 6 with slider for up to **320 km/h** deployment speed.

3) Choose a type according to installation environment. Galaxy now produces 2 sizes of dural containers, 185 mm diameter, equipped with 3 basic mounts, **1(a/b), 2 or 3(a/b)**, modified as necessary. Also produced are several sizes and types of SOFT packages which may be placed into a box in the aircraft, or fixed to it by slings and loops.

I. Type: OUT for exposed installation.
An order designation example: for a trike up to 350kg maximum weight, would be:
GRS 350/160 OUT (alternative, **GRS 350/190 OUT** or **GRS 450/160 OUT**)
Then specify a holder and its placement (**holder no. 1,2,3 (a/b**)
And equipment (length of cable and bowden) See illustrations no. **7,8,10**

II. Type: IN is packed in a container with a fabric cap, suitable for enclosed installations. This is recommended where the mounting position is securely dry.
An order designation example: for a fixed wing aircraft of max weight 450 kg:

GRS 450/260 IN (alternative: **GRS 450/190 IN** or **GRS 525/240 IN**)
Then specify a holder and its placement **(holder no 1,2,3 (a/b)**
also **angle holder,** and **length** of firing bowden.
finally: **slings**, number, length and strength. See illustration no. 11.
With types I and II the holders are fixed to the containers, thereby limiting the container mounting positions. The mounting position must thus be specified with the order.

III. Type: IN"SOFT" – is designed mostly for inside installation – its inner container is made of fabric and equipped with slings for fixing into aircraft. By means of slings and buckles the outer container with canopy is fixed directly onto the fuselage frame. The "Star" version has the harness with canopy fixed to a launching pad by Velcro strips allowing for variable firing directions**.**
Other versions have fastening belts fixed with screws and selflocking nuts allowing the container installation direction to be changed by the installer.

Installation of the system OUT on the aircraft.

a) Trikes: mount with firing axis sideways (using holder no1) or slanted upward at an angle 45^0-60^0 between the propeller and the trike bearing area (using holder no 3)
See illustration no. 10

b) Fixed wing aircraft.

Tractor propeller: Aim the system backwards and upwards, and either at least 30^0 left or right outside of horizontal tail surface, or else over the vertical tail at double its height. (illustration no. 7)

Pusher propeller: Mount either in front of the propeller aimed vertically up, (illustration No. 8) or on the keel of the aircraft aimed outwards clear of the tail surfaces.

Method of installation

Many different brackets are available to mount the container to aircraft structure.
Use at least four hardened bolts, size **M6G8** with nylock nuts, spacing them as far apart as possible. Under no circumstances ever drill holes in the container.
Route the hang cable so that it will not catch on any part of the structure on being pulled taut in the direction of firing, and fix the end to a strong anchor point.
Where the system is mounted in front of the propeller, the engine must be switched off before activation of the system, or the activation handle can be wired to kill the engine when pulled.
The container may be positioned with the rocket on any side, but it is important to allow **clearance of at least 30 mm** around the perimeter on the deployment side so that the cap can move away freely for the safe exit of the rocket and inner container.
Failure to comply with this condition may result in failure of the system!
The cap is glued on with silicon sealant and the drawing sling is equipped with a rubber bush.
The system is waterproof during normal operations, but must not be exposed to prolonged rain.

Illustration no.7

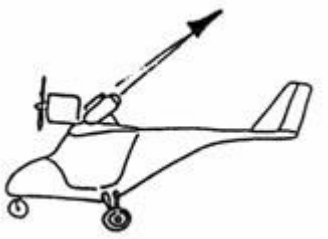


Illustration no.8-9

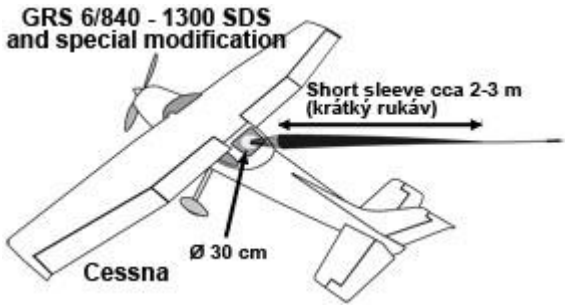
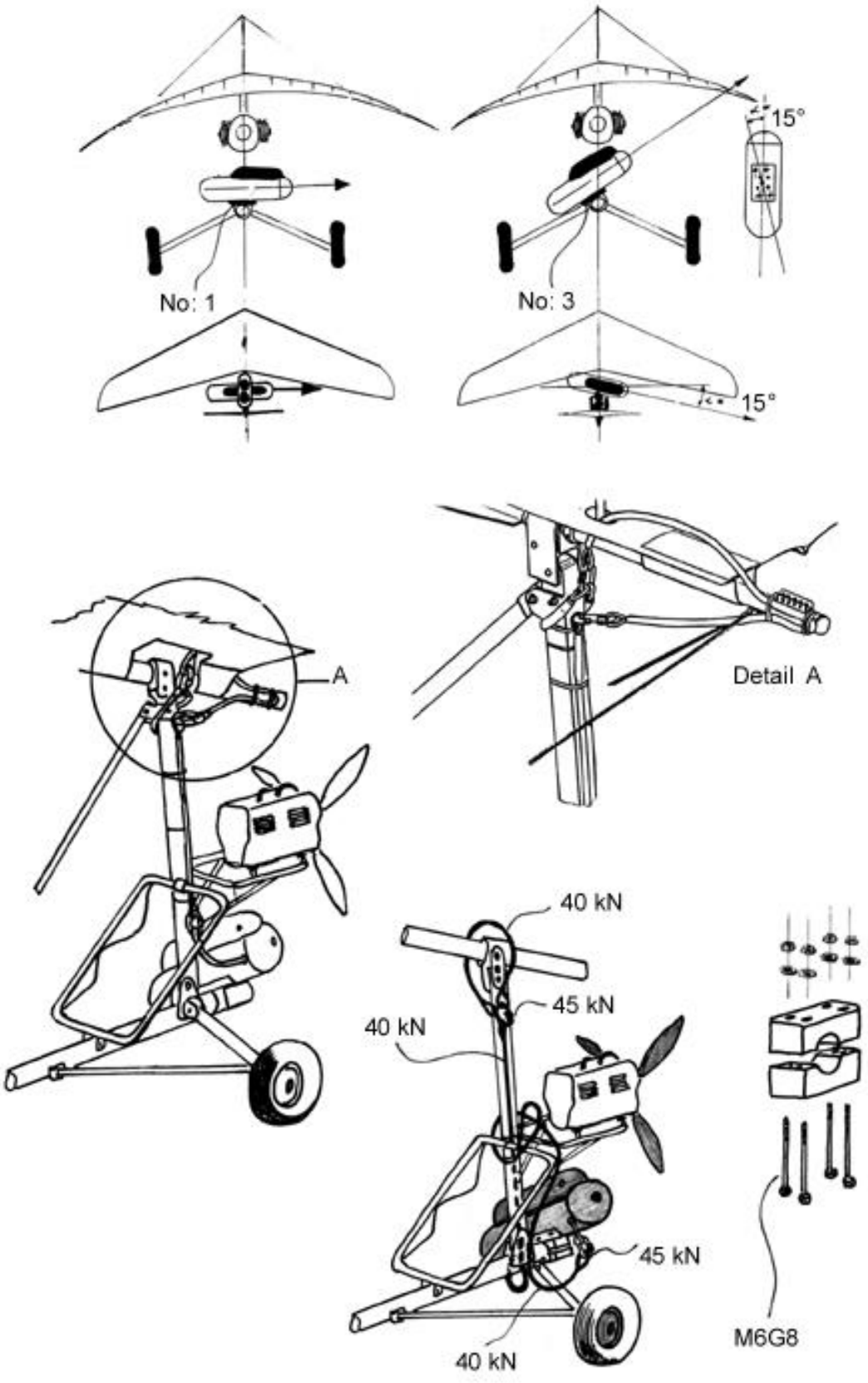


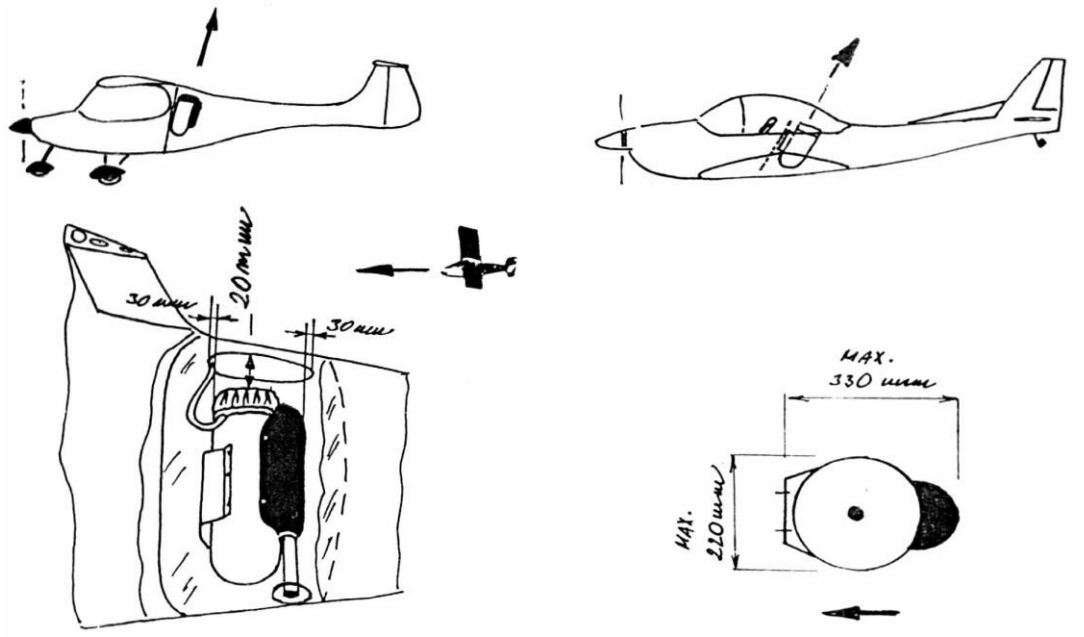
Illustration no. 10

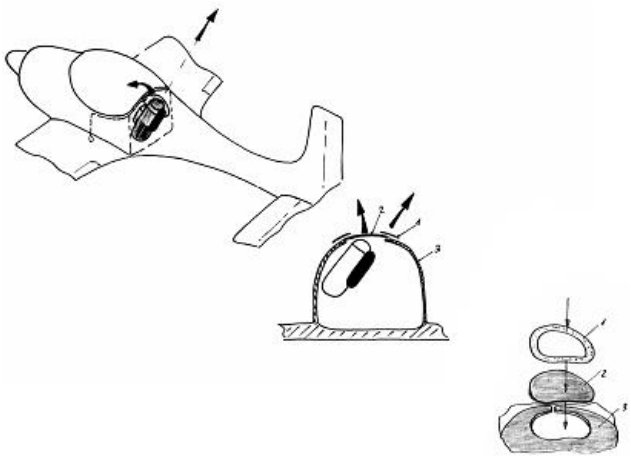


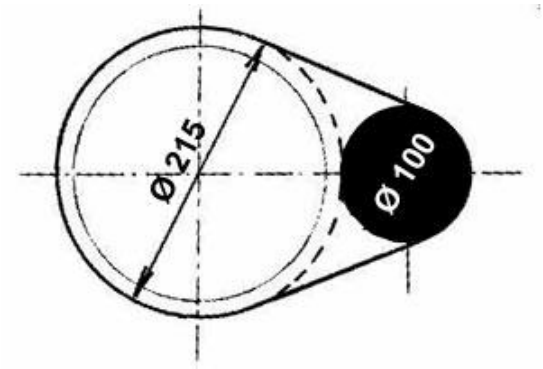
Installation of the system IN into the aircraft.

This container is equipped with a fabric cap and may only be mounted where it will remain dry. It only needs a minimum of **20 mm** clearance above the cap and around the perimeter on the deployment side. For installations deploying through **cockpit glazing or laminated fuselage see chapter 6.3.**

Illustration no. 11







Minimum dimension of the outlet

1. adhesive **small film1/2"(13mm)**
2. cut part of the fuselage
3. fuselage.

Installation of the system SOFT into the aircraft.

This system uses the same components as the OUT and IN units, but the hard outside dural container is replaced by a soft textile cover. This unit is strapped into a weatherproof compartment or box in the aircraft, suspended by slings or fixed onto a compartment wall. In the firing direction a cover must be fitted that can be easily pushed open by the rocket. (Held closed by Velcro strips or adhesive tape) Further conditions for installation of this system are the same as in the case of installation of system IN.
Exhaust from the rocket engine can be diverted outside the compartment or box.
Refer to **6.3.** - Covered exit appertures

I. **For this installation are determined modifications „B“ and „B-2“ SOFT (ill. No. 12a and 13, 13a, 13b ill. No. 6.4.5. VII),** where the container SOFT is placed on a pad and fixed by Velcro and secured by a needle. Or the SOFT container is placed on a **„L“ frame in a vertical position on a section wall and fixed by rubber tapes to the holder, variant SOFT vertical ill. No.12b, No.12c**. In both cases the rocket engine is mounted separately beside the container. After activation the engine lifts the whole container. It is the lightest GRS modification. **Note: observe the allowed angle of firing to the container SOFT ill.12b. (note the different angles of rocket engine in these modifications)**

Note: All anchor points ,visible in drawings of installation, and all installed parts of the systém must withstand in emergency landing minimum G forces of 4,5 G downward and upward, 9,0 G forward and 3,0 G sideward.
As an example see the illustration 12a, Warning 1, Warning 2 of horizontal installation behind the pilot seat where the strap with safety pin is dimensioned for these forces and the base, on which the systém is fixed, must withstand above mentioned conditions.

Modification SOFT B pack

Illustration **no. 13a**

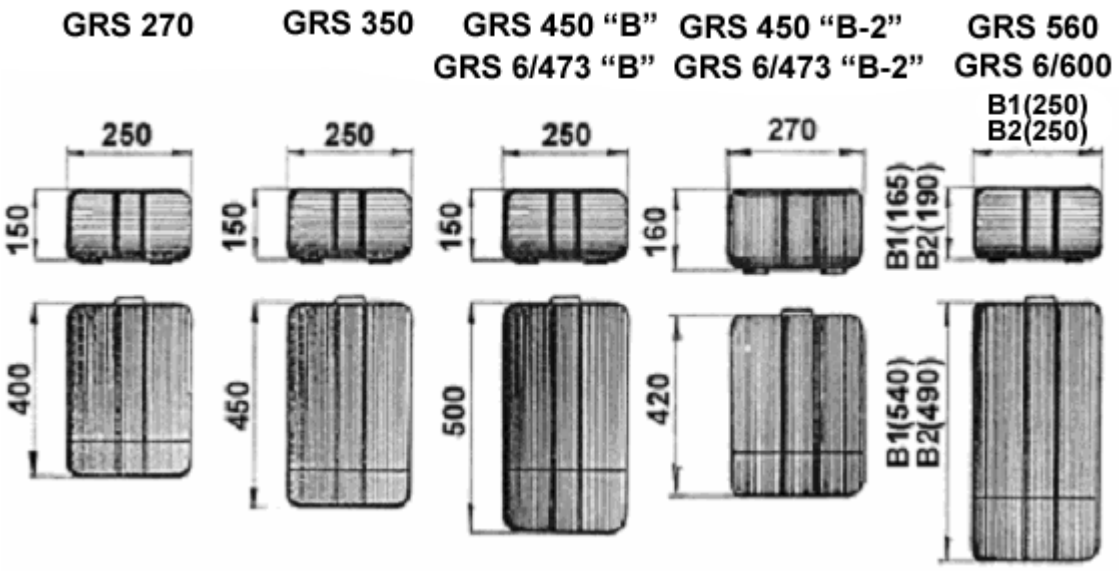


Illustration **no. 12a**

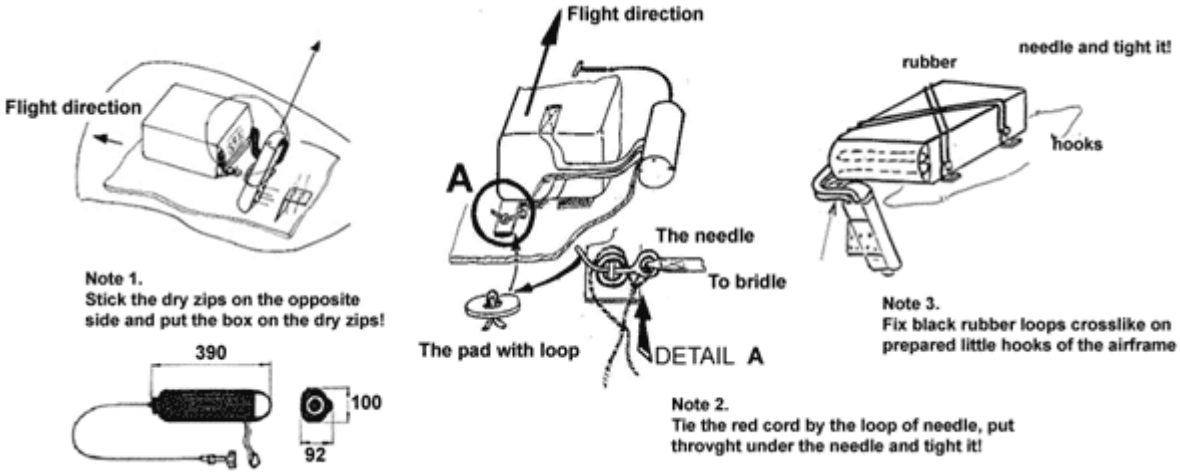
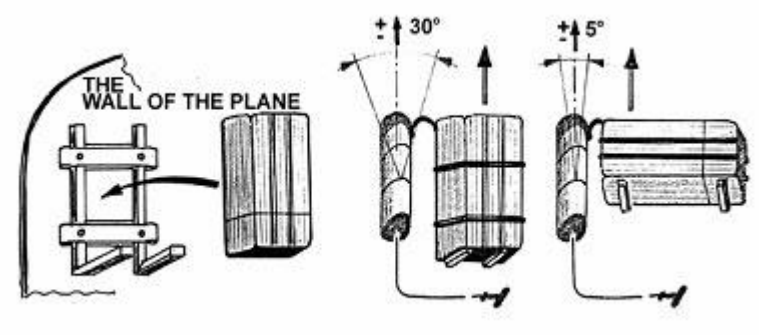


Illustration **no. 12b**



Note: For example dimensions of the modification GRS 6/473 SD Speedy

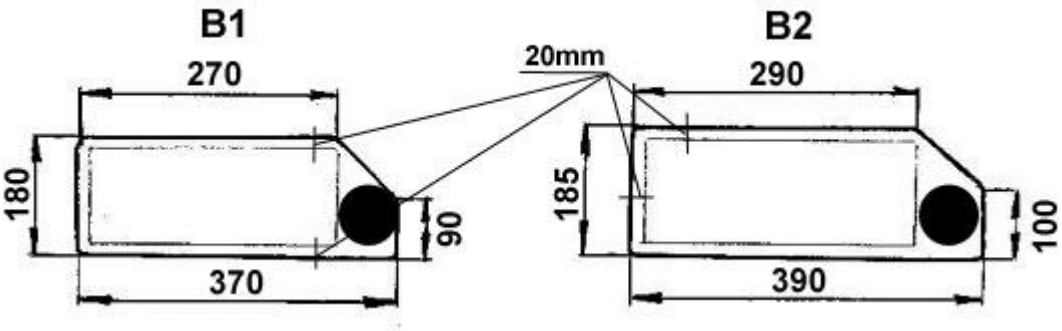
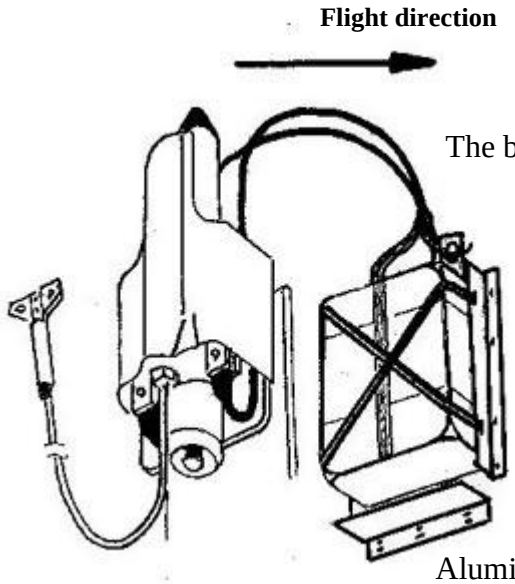


Illustration **no. 12c - vertical**

WARNING 1.!

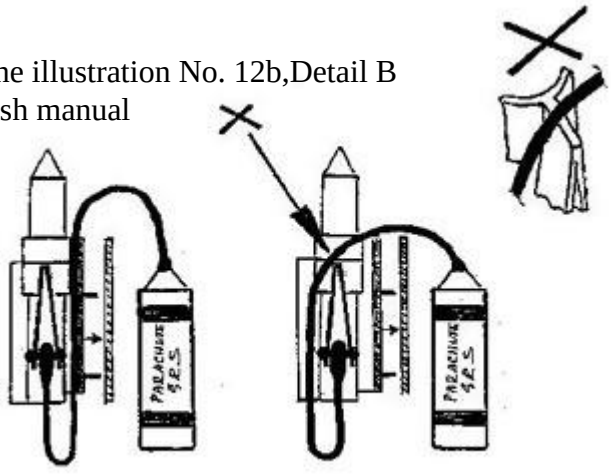
Installation of the rocket engine above or beside the parachute container.
(bolts of the rocket mount are in direction to the parachute container pad)



Note:
In case the rocket is situated close above the parachute container, the nut on the the opposite side of the mount must be protected by a smooth cover to prevent any catching of the parachute container when activated.

Correct installation

See the illustration No. 12b,Detail B
English manual



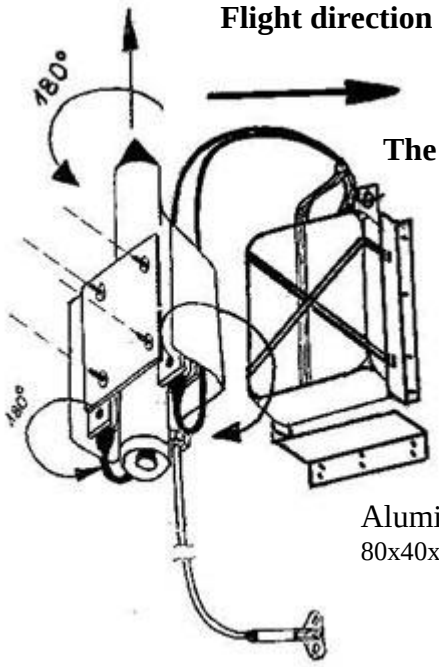
The bridle

Wrong installation
The wires of bridle cross the fork

Note:
If the aircraft is equipped with an integrated box for the systém then the upper outlet can be of the same size as the inner parachute container on condition that the outlet edges are smooth. Installation No. 14 (6.4.5) MCR

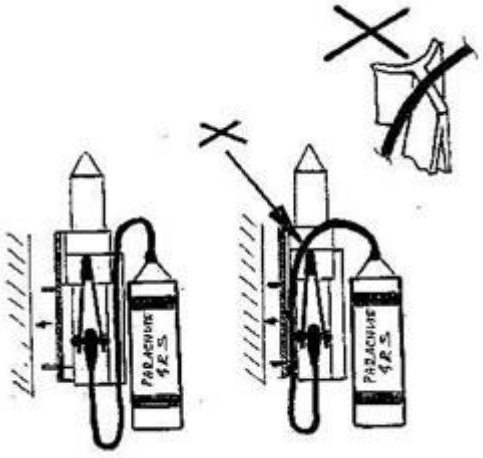
WARNING 2. !

Installation of the rocket engine turned by 180 degrees to the parachute container.
(4 bolts of the rocket mount are in direction away from the parachute container)



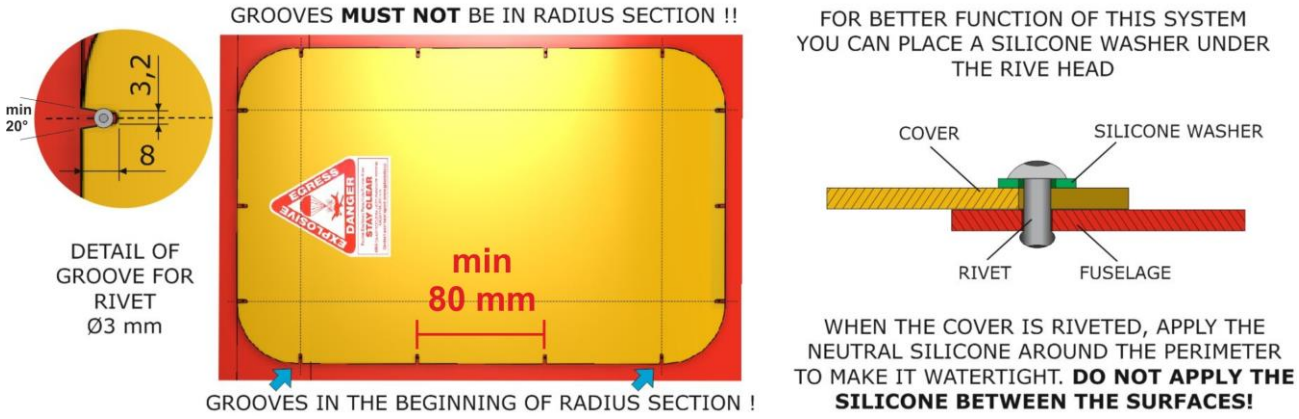
Loose two times the bolt M5 on the fork and always turn and put through the wires under the cover – see the illustration

Correct Installation

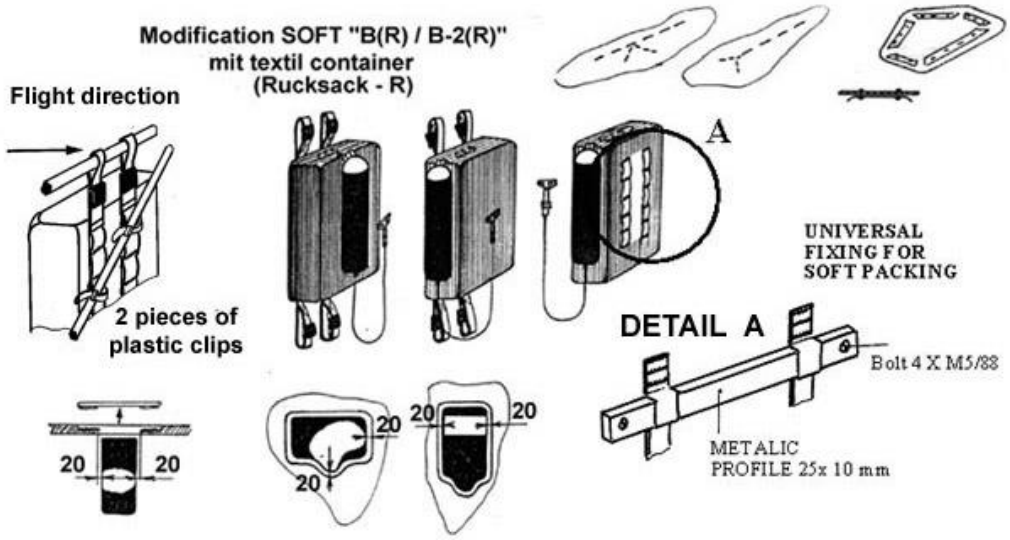


The bridle wires

II. **For installation into places without a firm pad or without a section wall, variant „ SOFT B and B-2“ placed in the outside textile container (rucksack, further indicated as „R“) can be used.** The rocket engine is fixed directly on the outside container (rucksack). After activation and lifting of the inside SOFT pack, the outside container stays in the aircraft. Variants can be ordered with the rocket placed in the middle on the front side, or on one of the the rucksack sides.



Max allowed cover resistance: by applying 25 kg static load in the place where rocket hits the cover, the 25 kg load has to release the cover in the moment of application.



By the container with rucksack (R) suspended on straps with buckles it is necessary to fix the container from the back side by at least 2 pieces of plastic clips through prepared loops to ,for instance, the diagonal construction to avoid vibrations (see the detail B).

Minimum dimension of the outlet

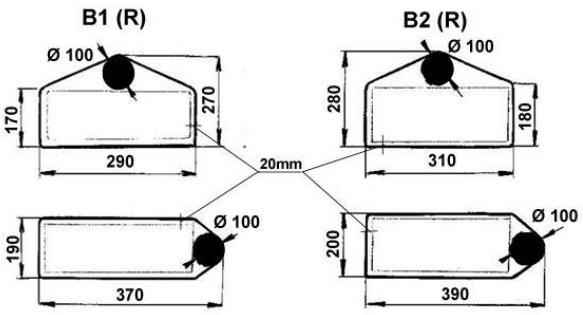


Illustration **no. 13c**

Modification GRS 6/750, GRS 6/950, GRS 6/1200, GRS 6/1300

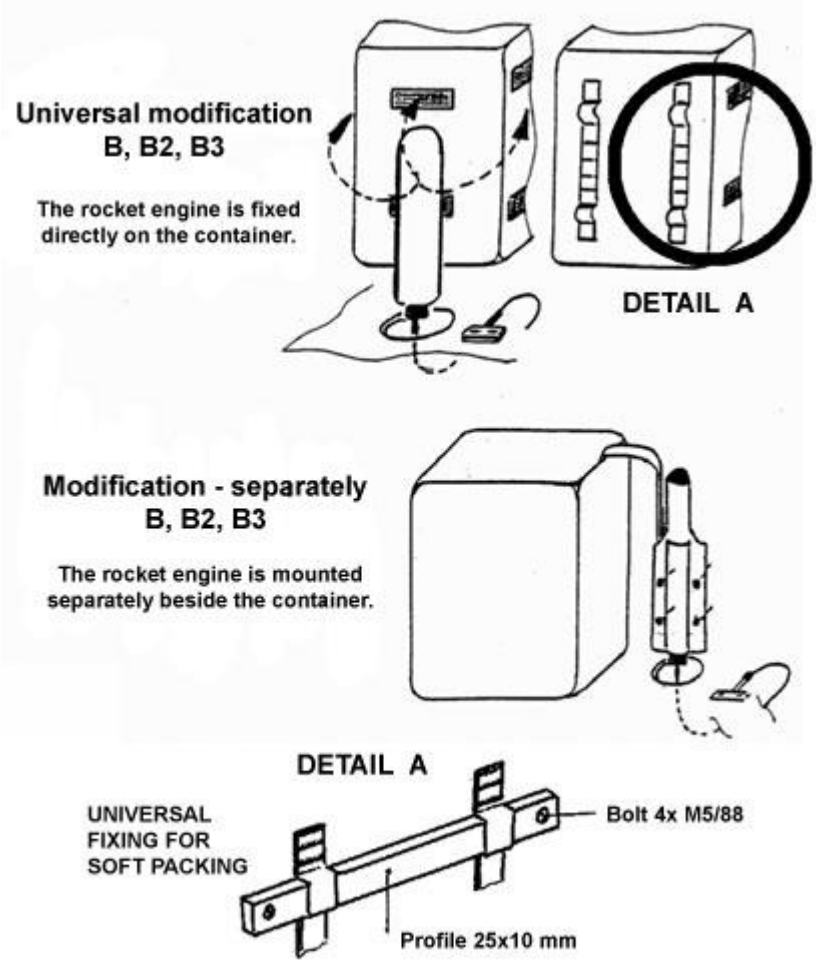
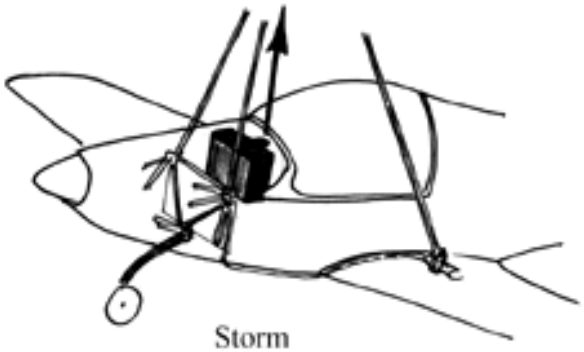
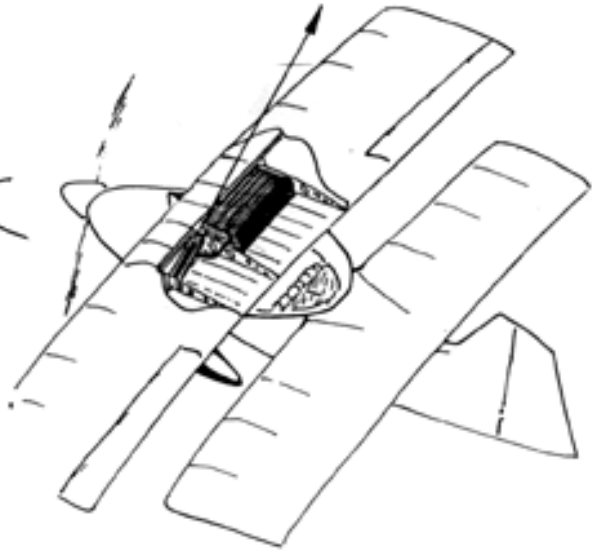


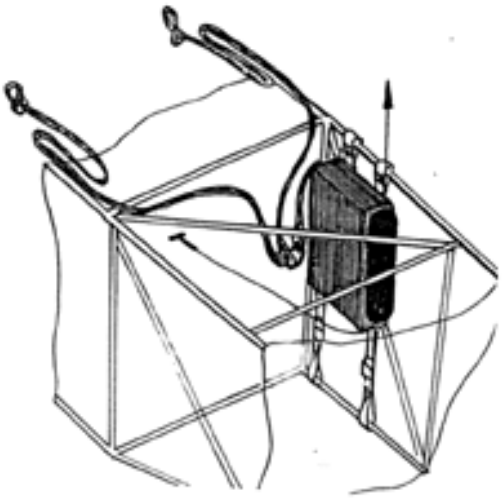
Illustration **no. 14**



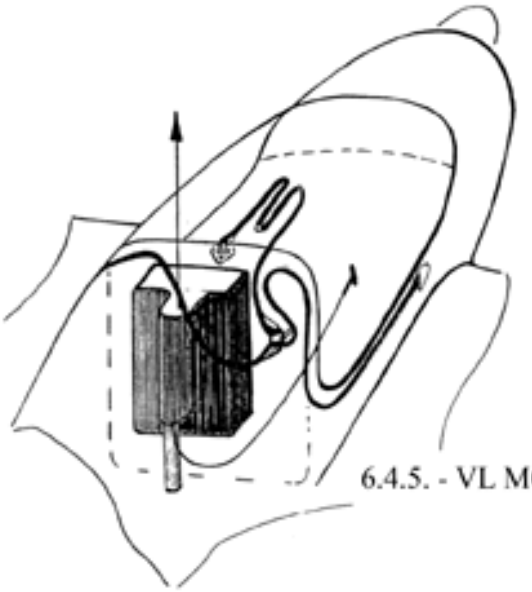
Storm

6.4.5 - V. HM-1100 Corduan

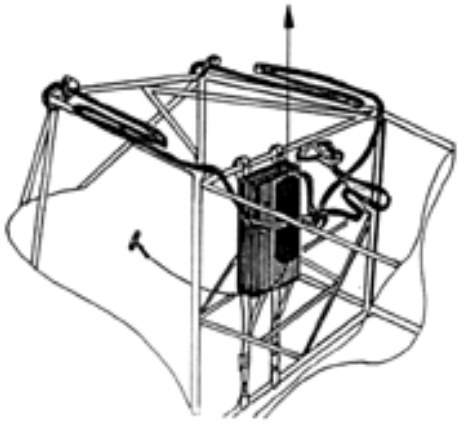




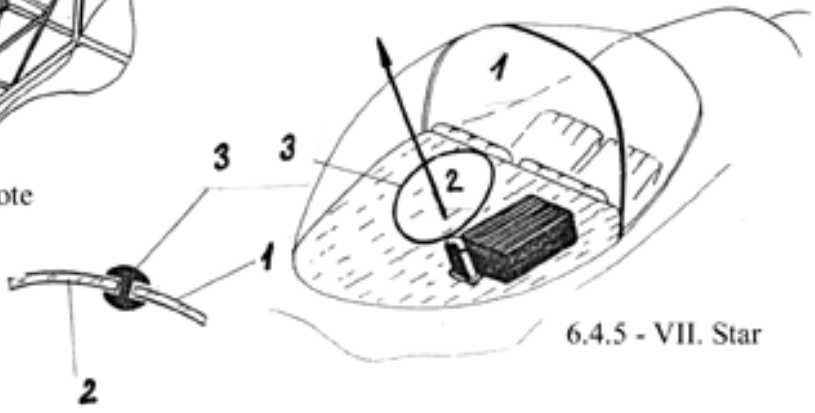
6.4.5 - IV. piper UL, Tulák, S-7 Courier



6.4.5. - VL MCR



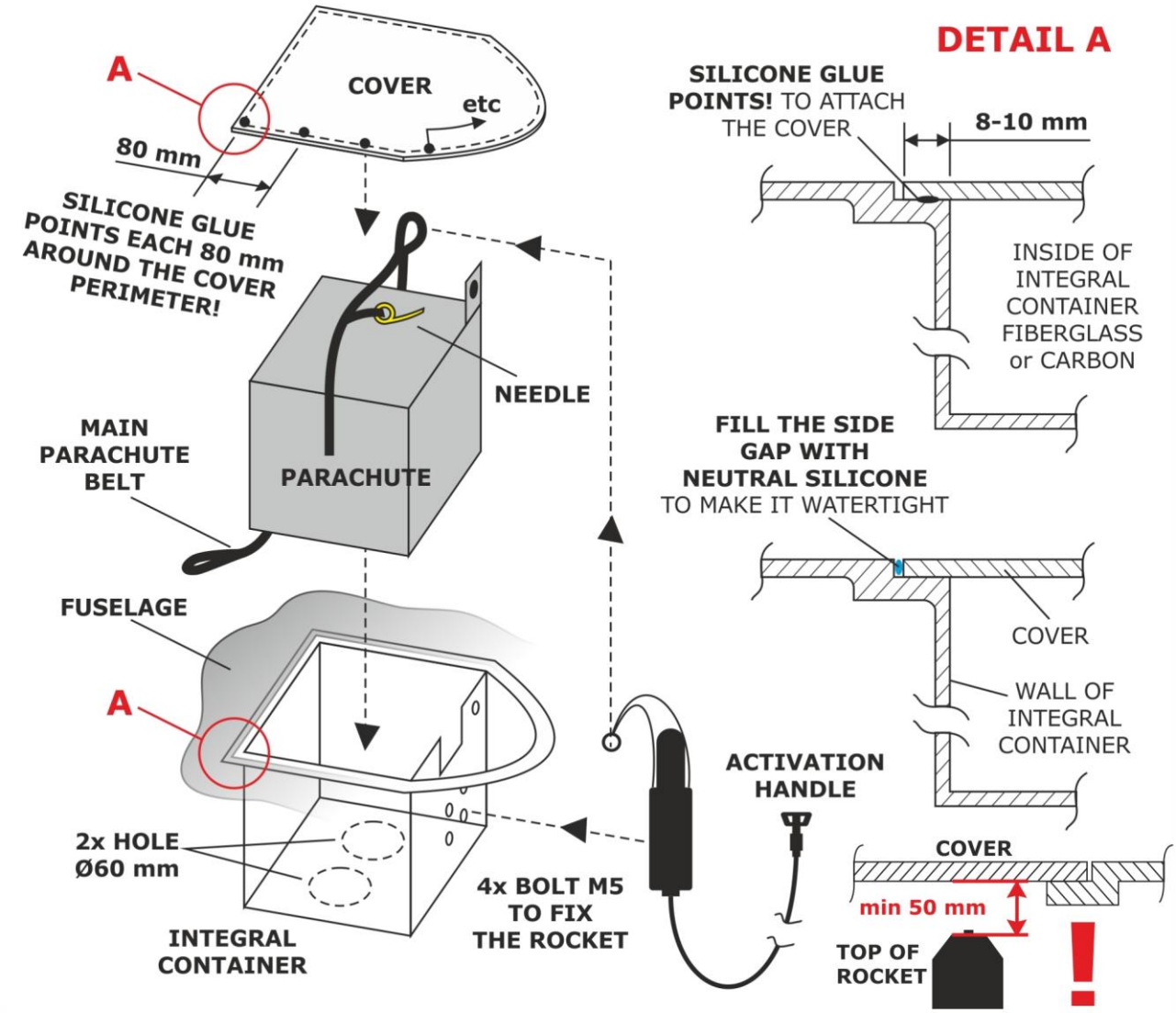
6.4.5 - III. Coyote



6.4.5 - VII. Star

Illustration **no. 14b**

Integrate container GRS



Part 7. Pre -flight preparation and safety mechanism.

7.1 Check the activation handle of the GRS system.

The red activation handle is in an easily visible place accessible from any position of the body in a single-seat cabin and by both members of the crew in two-seat aircraft.
The launching handle must be placed so as to be clearly visible to the eyes of the crew, no extreme head rotation needed. The launching handle is red and it is secured by operating safety - the peg with the warning flag with the words "Remove before flight“.
If the peg with the warning flag is not removed before flight, in critical situation can happen, that due to stress of the pilot, he will not have enough time to remove the safety peg with flag. In this case the system can not be activated and there could occur a fatal situation, resulting in the death of the flight crew!
After fastening the safety belts, before starting the engine, the pilot takes out the operational safety with the red flag, then turns the activation handle 45^0 both ways to make sure the handle to bracket sliding fit will yield when needed. Put the safety pin in a secure place like a closed pocket to be available for re-insertion after the flight. It is adviseable to secure it with a lock or to lock the cabin to guard against inadvertent firing of the system.

7.2 Check the mounting of the GRS system.

The pilot checks that the container mounting to its holder and the holder mounting to the aircraft structure is rigid and secure, all bolts are tight and welded joints sound. Then check the clearance around the GRS system and make sure that the system is correctly pointed into free space. See that the silicone rubber seal of the cap is intact.

7.3 Check the fastening straps - the pilot visualy checks the anchoring of the hang straps and carbine on the structure of aircraft and makes sure that they have not loosened up anywhere, and also that they do not interfere with moving parts.

7.4 Check for unwanted objects near GRS unit.

Check for foreign objects that might impede the free deployment of the system. (for example rain cover). These must be removed because the system would otherwise fail.

7.5 Placement of ignition switch.

Sitting in the cockpit, the pilot has to have within his reach, besides the activation handle of the GRS system, also the ignition switch of the engine. In aircraft with pusher propeller, always remind yourself that the engine must be switched off before activating the GRS. Practice emergency procedure: switch off the ignition, then move your hand to the activation handle of the GRS system.

7.6 Fire extinguisher.

Also regularly practice handling the fire extinguisher in the cockpit and from the ground. An emergency is not the time to figure out how to take the extinguisher out of its mounting, arm and operate it while flying the aircraft!
If your aircraft is not fitted with a fire extinguisher, consider getting one fitted.

Part 8. Activation of the system in a hazardous situation.

Most important: -after fastening safety belts always remember to remove the GRS safety.
- pull the handle immediately in the case of an unrecoverable situation or imminent crash irrespective of height.

8.1 Procedure in firing GRS unit.

1. Switch off the engine.
2. Jerk the activating handle hard at least 10 cm out.
3. Tighten up belts and turn off fuel. (pump, cocks) if you have time.
4. Protect your body (cover face and keep limbs close).

Shutting down the engine is important in aircraft with a pusher propeller. A propeller with a steel or carbon core might not break up completely when hitting the steel cable, and it could roll the cable, drawing sling and parachute into the propeller.
In aircraft with traction propellers it is still advised to shut down the engine, but it can be done after activation, especially if low!
When the activating handle of GRS is pulled, the wire leading to the drawing wedge of the GRS unit is stretched first and then the firing mechanism is released. Thus it is necessary to jerk the handle through the whole range of 10 cm.

8.2 After firing the system.

Once you have pulled the handle and the rocket is deployed, it will be less than two seconds before you feel the impact produced by two forces. The first force is produced by stretching of the complete system – that is the rocket, suspension lines, inner container with chute, chute lines, drawing sling and binding sling – this stretch force then pulls the inner container off the packed parachute (snatch force) – in some cases of placement of the system, snatching of upper part of the cabin glazing may result. The second force follows after the canopy has inflated. (opening shock) It will seem to you that the aircraft is pulled briefly backward. In fact the speed is only reduced. Consequently the aircraft swings in a pendulum manner until it stabilizes directly below the canopy. The aircraft starts to descend under the canopy to the ground. Some control of the aircraft may still be available assuming the control surfaces are intact. Where the engine is still running (with traction propeller) it might be possible to direct the aircraft in a certain direction, provided the aircraft descends pitched slightly down. If the engine is started again, do not forget to kill the engine and shut off the fuel before landing.
Once you have pulled the activating handle of the GRS system, the rest of your flight holds unknowns and a great adventure for you and your passenger. You are now in a situation where a proper landing and the selection of a landing spot are out of your control in most cases.

Warning:

If you should end up in power lines, do not under any circumstances touch any metal parts. Also shout this precaution to anyone attempting to help you. If a rescuer touches a metal part of the aircraft while standing on the ground, he could be electrocuted. If a high voltage power line is touching the ground, people could be electrocuted just by walking close by. Sit still and await qualified rescuers.

8.3 Effect of opening shock on aircraft and crew.

Decelleration force when the canopy opens can be in the order of **2.5–5.5 G.**
Galaxy thus recommends that the crew be equipped with 4-point safety belts.

8.4 Inflating of parachute.

The GRS deploys different to other systems using a less powerful rocket. Such rockets are not able, due to the strong airflow, to get the canopy to a safe distance from the aircraft because the canopy is snatched backward during deployment by the wind. **The GRS system reliably lofts the packed canopy in an enclosing container until the sling is fully stretched at the safe distance of 18 m, when it is controllably opened**. Instead of the cheaper brown material other producers use, Galaxy makes their canopy in bright shades of yellow or pink with white for easier spotting of the landing site in terrain**.** In this second phase the aircraft goes into the descending phase – it now falls vertically to the ground at about 6.4 m/second, arriving as if it was dropped from a height of 1.8 m. Unpredictable consequences may happen during the descent and on striking the ground because where it is not possible to control the aircraft, it could end up anywhere.
Before touchdown, tighten safety belts, pull your limbs close to your body, cover your face if possible or brace your hands against a strong support to prevent your body hurling forward onto the dashboard. If it looks as if you will fall in water, grip the seatbelt mechanism for immediate release on touchdown and open cabin doors where applicable.

Optimal descent of the aircraft is in the position of normal flight. That is why it is important to measure accurately to order the correct lenghts of binding slings.

8.5 Possible emergency scenarios.

On board fire – if a fire breaks out while the aircraft is still controllable, it may be useful to fly the airplane in such a manner that the fire is directed away from occupants. For example, if the fire is at a front-mounted engine, the aircraft should be put into a slip to direct flames away from the cockpit area.

Mid-air collision – in the crowded skies around many hubs of great aviation activity, the chance of collision with another aircraft is all-too possible. Of course, you should take all precautions to avoid such an encounter. However, if such a collision occurs, the GRS unit should be fired immediately.

Structural failure – fortunately, failures of modern aircraft airframes are extremely rare. But should a major component of the aircraft fail for whatever reason, the GRS unit may offer the only chance of saving your life. Such a failure should be of catastrophic proportions before the use of the GRS unit is advised. If the aircraft can still be controlled, and if it will remain intact until it reaches the ground, then the plane should be flown to a normal landing. If you are uncertain of structural integrity all the way to a landing, then once again, the GRS unit may be the only good choice.

Loss of aircraft control in a near miss – in some, fortunately rare situations, a near miss could result in a temporary loss of control. One example of this is an upset as a result of wing tip vortices behind other aircraft. The aircraft´s controls may still work and respond, but the turbulence may overpower the control authority. If this maneuver is relatively near to the ground, the GRS may provide the life-saving back up the pilot requires.

Pilot incapacitation – this may include situations such as a heart attack, stroke, being temporarily blinded, extreme levels of stress where a pilot ”freezes up” and cannot act properly. **In this case a passenger must activate the GRS. All passengers should be briefed on activation of the GRS.**

Fall into spin from a low altitude - a certain percentage of disasters are caused by unskilled pilots. For example if in the landing circuit upon turning the aircraft loses airspeed and enters a spin, the pilot should not try to control the spin but should **fire the GRS unit immediately.**

Engine out over hostile terrain - many pilots dread the situation where a highly reliable aircraft engine stops or falters. This should not be a reason to deploy the GRS unit unless the terrain below will not accommodate an emergency landing. If the surface is extremely rough, or poor visibility makes landing hazardous, the GRS unit is your only option.

Pilot disorientation – it is somewhat different than engine out and pilot incapacitation. Several causes are severe, for example: vertigo or spatial disorientation in which you cannot tell up from down. A pilot in rough air may get airsick and disoriented, or in bad weather, a pilot can get so lost that fuel reserves are used up, or mountainous terrain may confuse a pilot. Another situation that may happen in mountainous terrain is the closing of clouds over peaks, severe turbulence or descending currents in valleys. This situation calls for reorientation and continued flying or landing but it is easier said than done.
The use of the GRS system might be the only solution out of an impasse.

Short runway – if forced to use a very short emergency runway, the pilot should descend to a height of about 1 m and fire the GRS when about 50 m short of a safe touchdown point. The parachute will stop the aircraft in about 30 m.

Part 9. Warranty and service life.

9.1 Guarantee term is two years from the date of purchase of the GRS system. The date of purchase and production of the system is certified by Galaxy in the operational manual.

9.2 Usable service life is 30 years with a six year renewal cycle.

Provided all conditions as stated in this manual are adhered to, the GRS is commissioned for six years. Regardless of whether the system has been installed or not, the user is obliged, after the expiration of this period, to return the system to Galaxy for compulsory revision. The chute, if not damaged, is aired and repacked and the rocket engine is exchanged for a new one. Before sending the system, you must contact your dealer or Galaxy to ensure safe transportation.
The transportation must be performed adhering to all conditions for transport of goods classfied in the class 1 explosive in accordance with IMDG CODE classification 1.4G.
In the event that it is not possible to adhere to all these conditions, the user must bring the system to the manufacturer at his own risk and expense.
We therefore recommend you to keep the original transport box, including the packing material, the transport safety and the protecting transportation basket.

Mishandling can be dangerous.
Long term exposure of the GRS unit to rain, excessive vibrations, vigorous mechanical shocks, acids, agressive oils and liquids, poor treatment, mechanical tampering with individual parts of the system, sending the unit without original box and safety measures, or failing to comply with the conditions of maintenance -
may endanger the life of persons assisting in transportation.

Furthermore it is forbidden to dismantle parts of the system or to disturb the seals.

The system should be treated as a pyrotechnical device and handled like a loaded gun.

The manufacturer disclaims responsibility for the operation of of the GRS system and the use of the system is entirely at the users own risk!

Every pilot bears responsibility for his own safety and must see that the aircraft and the GRS rescue system is properly checked and used according to the manufacturer´s manual.

9.2.1 The firm recommends:

Taking photographs of all parts of the system after installation, in particular:
1) mounting of the container on the construction of the aircraft.
2) a view in which the direction the rocket and container points is clearly shown.

Have these checked by the manufacturer.

9.2.2 What the firm does not warrant.

In the event that the system has not been installed in accordance with the manual and chart, or otherwise modified, the firm does not warrant the correct functioning of the system and the safe return of the aircraft and its occupants to the ground. This situation can occur, for example, by the incorrect routing of a sling around an undesirable part of the construction, incorrect aiming of the rocket fire axis or an insufficiently prepared opening for the safe extraction of the chute and the inner container from the aircraft etc.
If the system is properly treated and the safeties removed, the rocket will fire when the activation handle is pulled, but because of the above mentioned possibilities a safe rescue cannot be guaranteed. In the event that any component is incorrect, the manufacturer will repair it or substitute it with a new one during the term of the warranty which runs from the date of purchase from the manufacturer or an authorised dealer. All replaced parts and products become the property of the company. This limited warranty does not include service to repair damage to the product resulting from accident, disaster, misuse, abuse or unauthorized modification or repair of the product. Limited warranty service may be obtained by delivering the product to an authorized dealer and providing proof of purchase date. Contact a dealer or the company for further information. Do not replace any parts and do not assume you are buying the same quality parts from another source even if the part numbers appear to be identical.
All expressed and implied warranties for this product including the warranties of merchentability and fitness for a particular purpose are hereby disclaimed. And, no warranties whether express or implied, will apply. Some states do not allow limitations on how long an implied warranty lasts, so the above limitations may not apply to you.

Use of the GRS unit is for emergency situations only. Such use is subject to mishap, injury, and even death. Since Galaxy cannot govern this use, the company hereby disclaims all liability resulting from these situations.

Part 10. Double securing against rocket firing.

GRS system, compared to other products, is secured by 5 safeties in total. Transport safeties A, B, steel transport basket, operating safety "peg with the flag" on the launching handle. Automatic safeties preventing system activation in case of fire or shock are placed inside the system and these can not be manipulated! Keep in mind that the installation must be proceeded with activated safety A - needle in the trigger thumb. Safety B - bolt M5 which holds the racket in the housing - must be unscrewed (removed) immediately after unpacking!

During the installation process, when the system is secured by the safety A (the needle) and the peg with the warning flag, launching handle can be disassembled for better handling during its installation.
Also during shipping must be secured by all safeties!

During standart operation the system is secured by the operating safety only - peg with the warning flag on the launching handle.

!!! WARNING
Without snipping and removing of transport safety needle A in the front of the rocket (right after installation) and unscrewing of transport safety B - bolt M5 in the rear of the rocket (right after unpacking) is impossible to activate the GRS system!!! In case that the transport safeties will stay activated - there could occur a fatal situation, resulting in the death of the flight crew, because during the flight the system will stay secured for activation and flight crew can not be rescued !!!

Part 11. Disposal of expired units.

The user may at any time return the system to the manufacturer, provided the above procedures are adhered to.
The manufacturer notifies the user that in the event of any damage of the system (for example due to the aircraft crash, when the system was not used) the user must equip the system with transport safety **A and B** or with the protecting steel basket directly on the aircraft. Keep the firing direction clear during this procedure.
Report the extent of the damage to the manufacturer.

In the event that it is not possible to secure the system against firing or to secure it by the protecting basket or when it is not clear in what condition the system is after a crash, contact Galaxy immediately for instructions. For these reasons, the placement of the GRS system in the airplane must be marked by a label at the point where the GRS system is located. Also the triangular warning label that came with your GRS system includes the contact - www.galaxysky.cz - where instructions for firemen and rescuers can be easily found and how to proceed professionally!
Therefore, it is important that label containing the following information is always placed on the aircraft in a place where the GRS system is located.
Do not attempt to remove or dismantle the device!

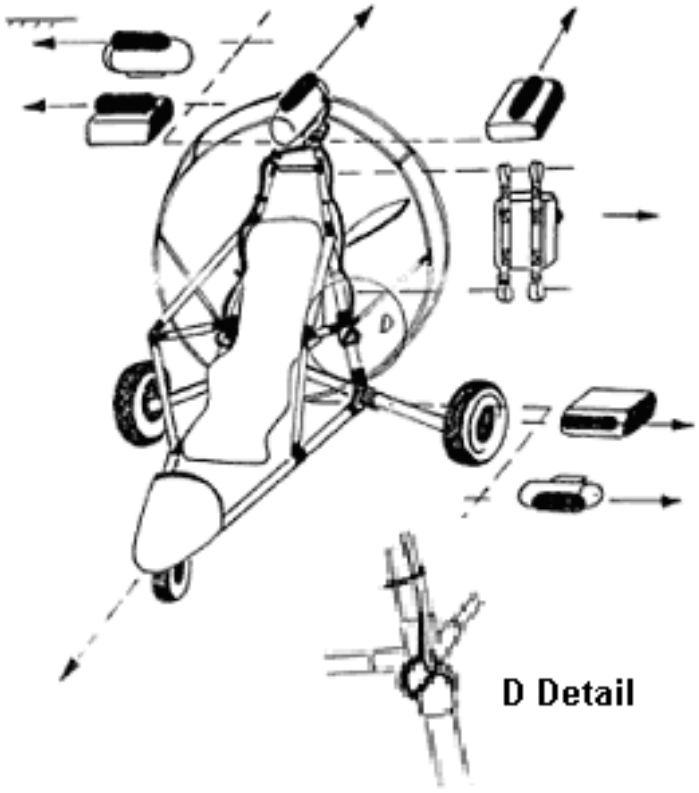
Part 12. Technical data

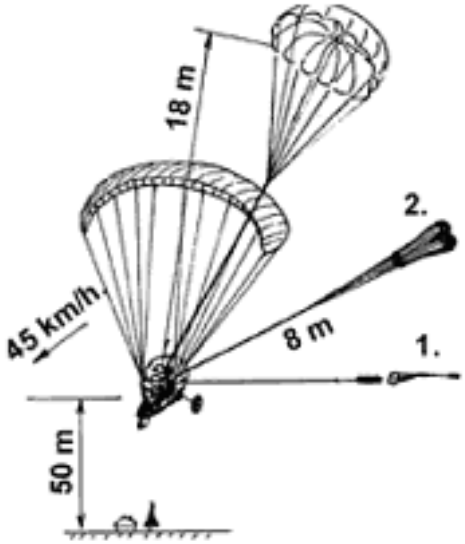
Galaxy offers a suitable rescue system for every size and type of light aircraft. When choosing the system of installation into the aircraft (OUT or IN), pay attention to the stated minimum sizes for the system placement into the aircraft fuselage according to enclosed drawings and sizes. Also refer to the illustrations for placement in the aircraft.

We produce 50 various types and sizes.

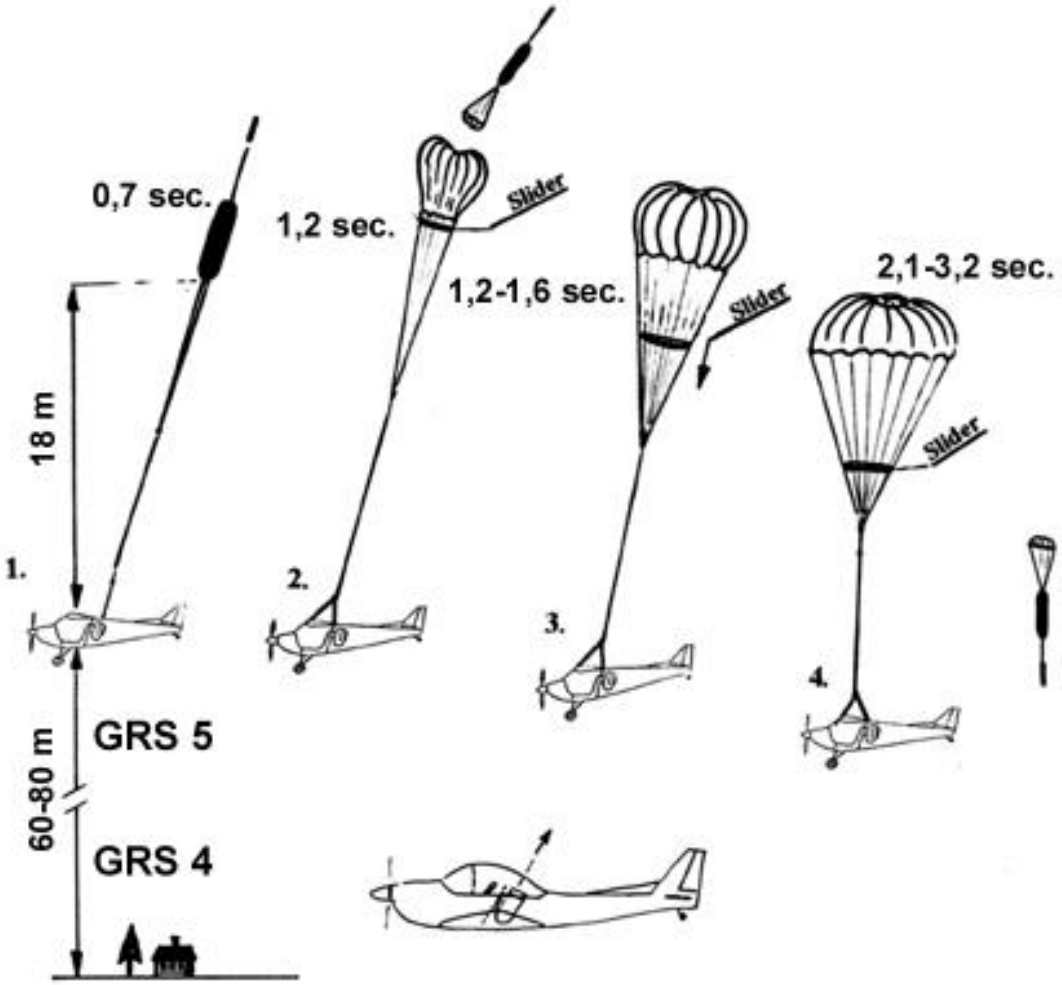
ILLUSTRATION OF OPERATION

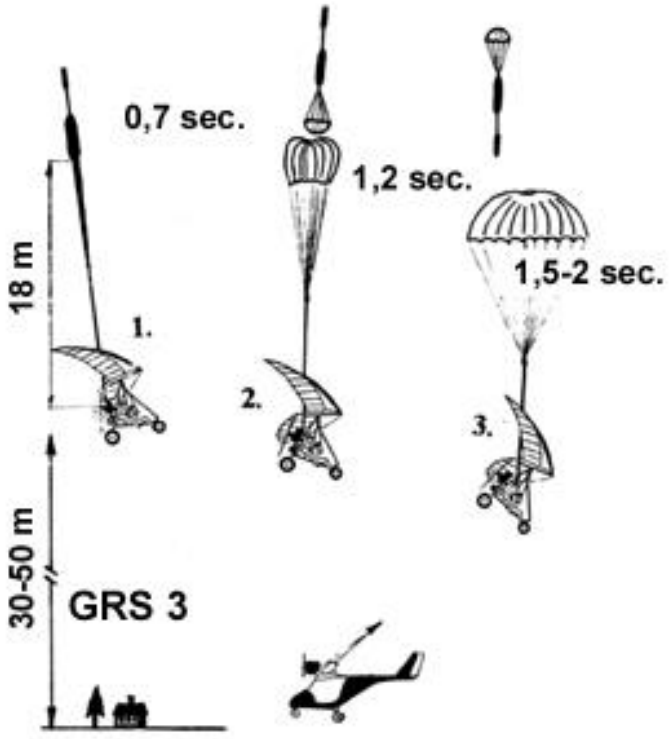
Illustration **no. 15**





Ilustration **no.16**





Types OUT and IN size and mounting bracket specifications.

Ilustration **no .17**

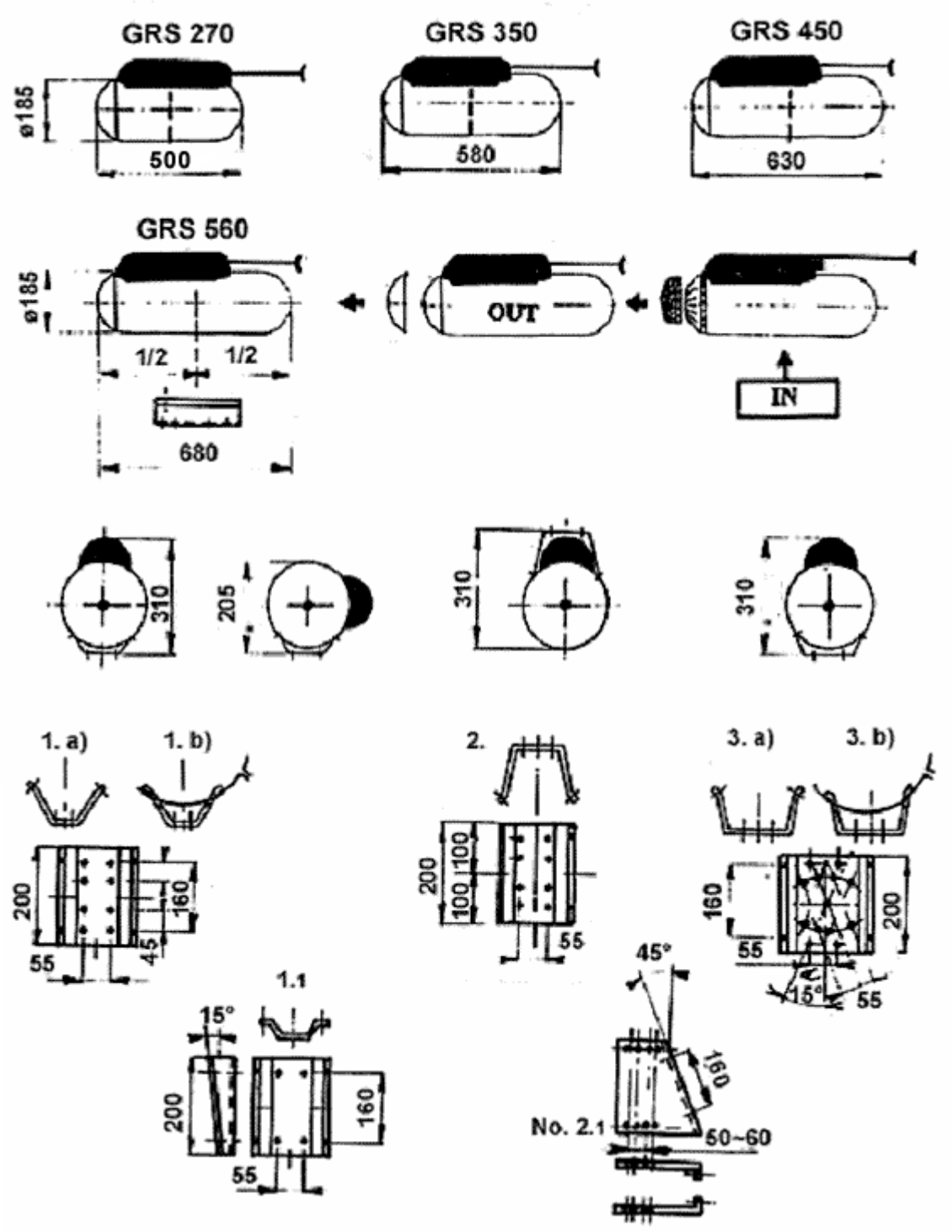
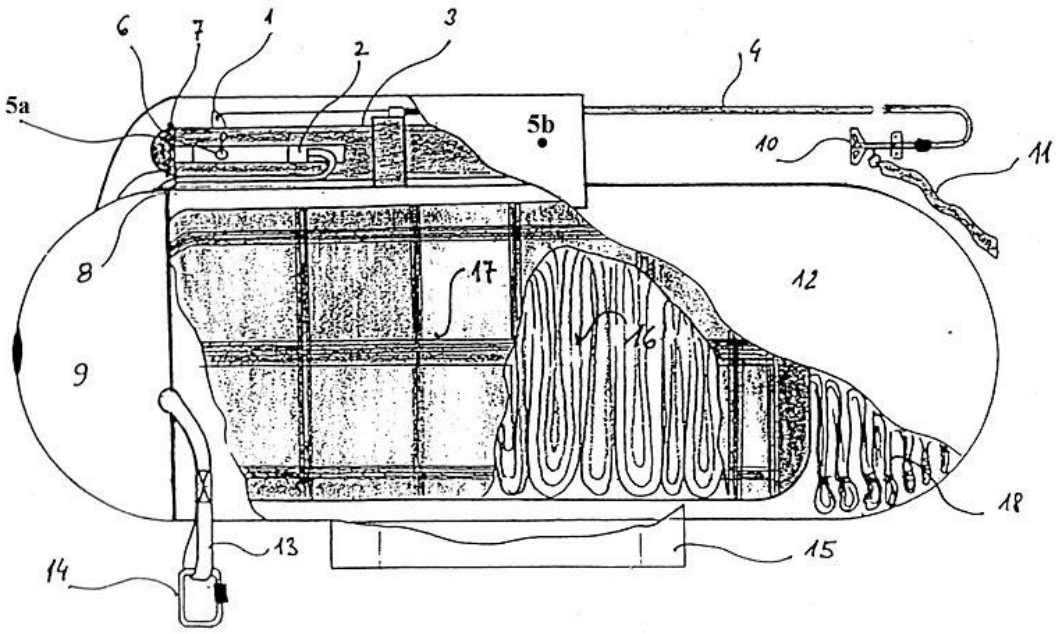


CHART – TECHNICAL DATA

Technical tables are at www.galaxysky.cz

INNER ARRANGEMENT OF THE GRS SYSTEM

Illustration **no.19**

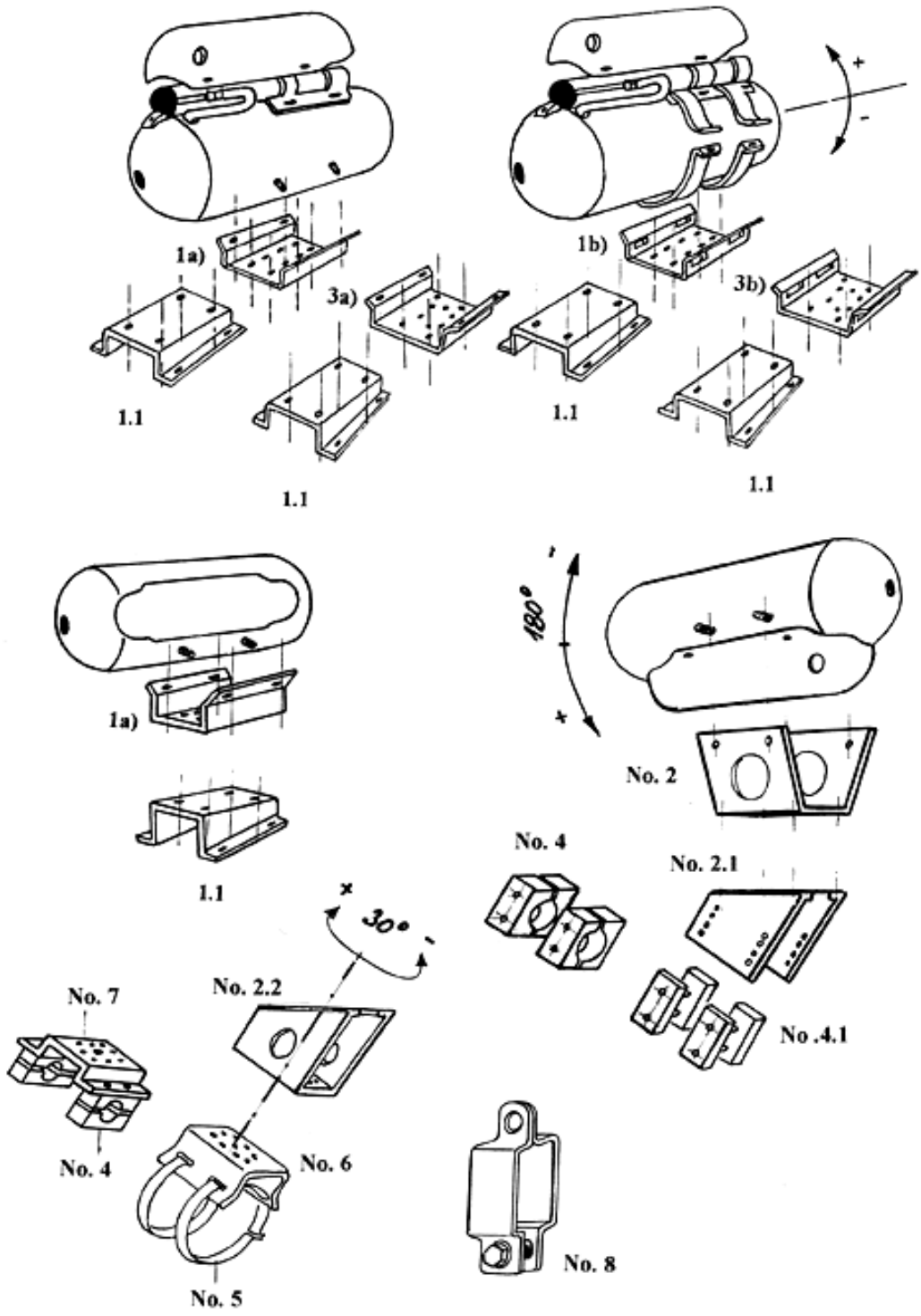


1. trigger
2. rocket engine
3. tube for rocket
4. cover of the tube bowden with a wire
5. transport safety **A,B**
6. cover of the rocket
7. secondary safety of the cover
8. primary safety of the cover
9. cover of the container
10. trigger handle
11. safety with a flag
12. outer container
13. anchoring sling 50 KN
14. carabiner 50 KN
15. holder base 3“ x 8“ (80 x 200mm)
16. parachute
17. inside container
18. lines

HOLDERS‘ MOUNTING SURVEY

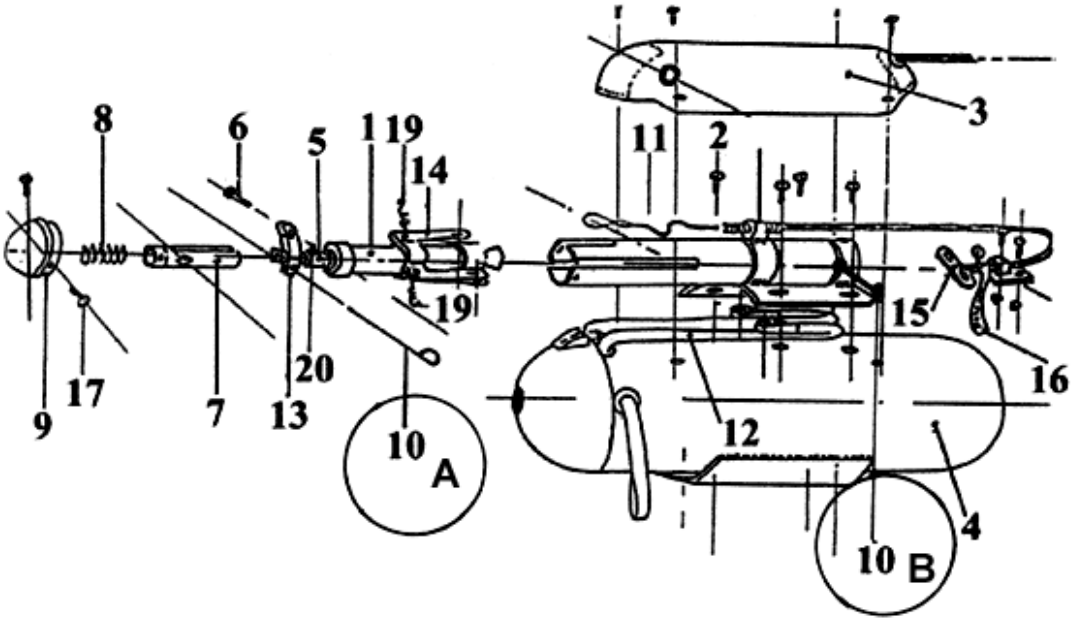
Illustration **no. 20**

270, 350, 450, 560 kg



DRIVING SYSTEM INSTALLATION SET

Illustration **no. 21**

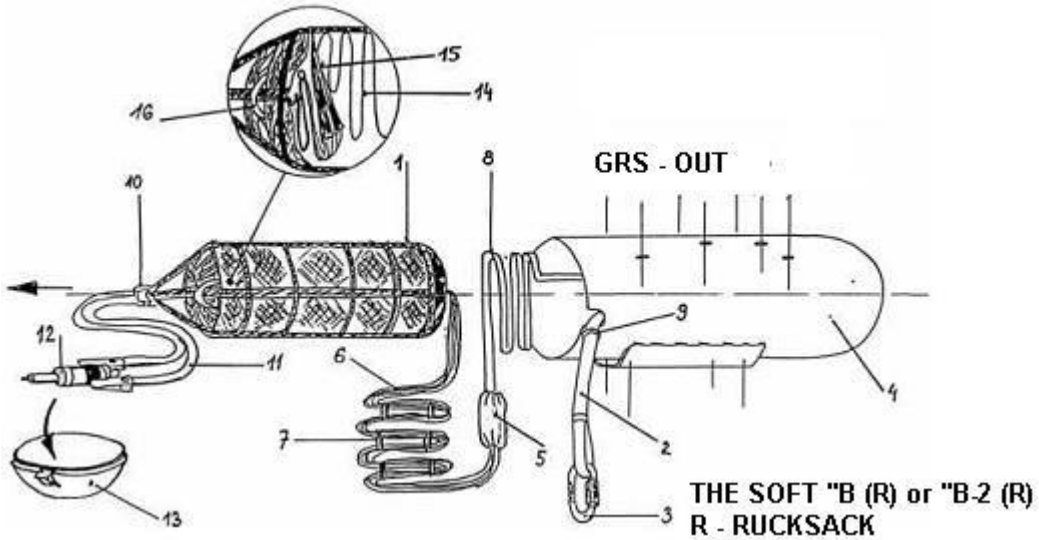


COMPLETE ASSEMBLY AND ARRANGEMENT

1. Engine VRM 1
2. Box of rocket with holder of bowden and base desk
3. Laminate cover with the opening for the safety and bowden
4. System container with canopy
5. Launching mechanism
6. Screw for the cable connection with the handle and the trigger
7. Launcher
8. Spring
9. Head of the rocket box
10. Safety needle of launching wedge A and bolt B
11. Wire of launching handle
12. Bearing slings from engine to inner container
13. Launching wedge
14. Engine hanging system for bearing slings fixing.
15. Launching mechanism handle
16. Safety peg with little flag in handle
17. Rivets to fix the rocket box
18. Holder for fixing the handle on an aircraft
19. Springs
20. Safety against engine turning

DRAWING SYSTEM INSTALLATION SET

Illustration **no. 22**



1. Inner container with canopy
2. Drawing sling – protected against UVR
3. Firm stirrup – mailone
4. Container
5. Hanging loops of chute lines
6. Chute lines
7. Springy O rings
8. Drawing sling
9. Sealing of sling
10. Mailone hanging of engine and container
11. Hanging slings of engine and container
12. Engine URM-1
13. Laminate lid
14. Canopy in inner container
15. Braking little chute of engine
16. Loop of braking chute

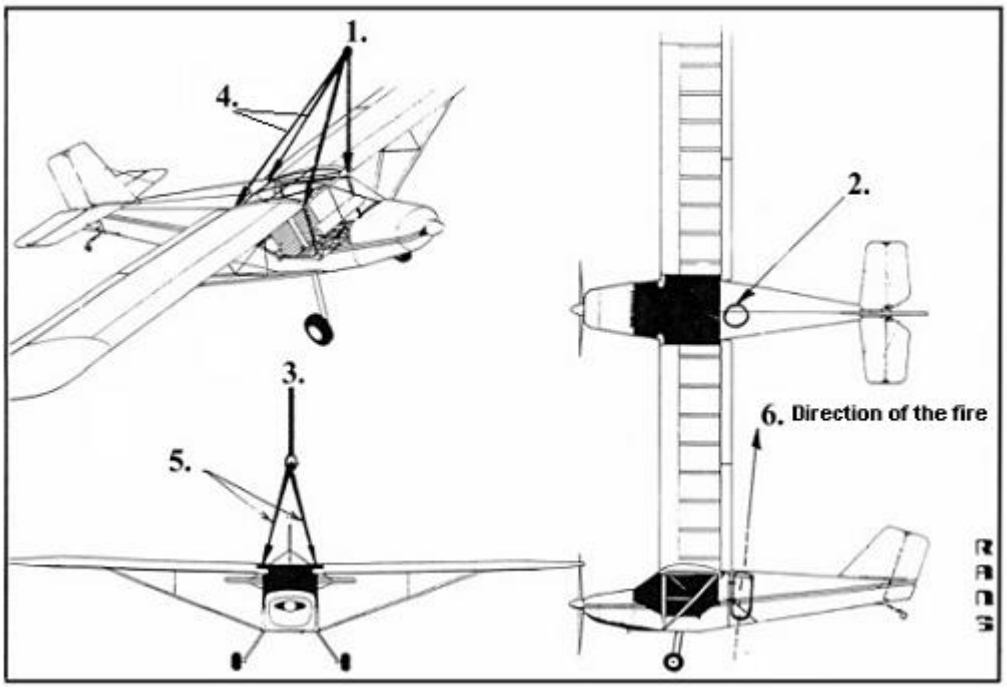
TECHNICAL DATA

of rocket engine GRS

usage: all types and sizes of rescue systems GALAXY

Maximum rocket engine pull	930 N
Stable pull of rocket engine	650 N
Max. pressure of rocket engine	17,4 MPa
Impuls of rocket engine	0,63 KNs
Temperature range	+ 60°C – 40°C
Weight of engine	2 Kg
Diameter of rocket engine	50 mm
Length of pressure part of rocket engine	200 mm

HANG SLINGS FASTENING SYSTEM



llustration **no. 23**

1. The hang points of the aircraft
2. Position of the container
3. Main Drawing sling. SEE TECHNICAL DATA AND CANOPY CHARACTERIS
4. Back stabilising slings SEE TECHNICAL DATA AND CANOPY CHARACTERIS
5. Main frontr slings SEE TECHNICAL DATA AND CANOPY CHARACTERIS

Part 13. Maintenance of system

13.1 Scheduled maintenance every six years after the end of the service life cycle.
The firm proceeds here as in the part 9.2. The user follows the instructions for sending the system to the firm.

13.2 Maintenance after damage – if the system has been submerged or you suspect water has gotten into the container, or when the container, bowden, handle, covering of rocket, drawing sling, its covering or cap sealing of the container has suffered damage, the unit must be sent immediatelly to the manufacturer for revision.
If you are unsure of the system reliability for any reason, due to impact or tampering, contact the manufacturer of the system immediately.
This also applies to separate parts like the hang rope, the hang slings and the carbines. Any damage to these or their protect covering of slings against UV may result in serious consequences.

13.3 Owners´maintenance

How to keep the GRS system on your aircraft fully workable for as long as possible.
Regularly examine the system and accessories, usually before every flight and check the overall state of the device, as mentioned above.

Especially dangerous are vibrations and their effects are unpredictable, therefore screw connections, nuts, welded parts, cap sealing with cement, slings and so on should be carefully examined. The influence of vibrations may result in the loosening of the entire GRS system on the aircraft and its slant from the planned axis of firing. This would result in the failure of the system.
Steel parts should be sprayed with silicon oil after every 50 hours for systems installed outside and once a year for system installed inside. This mainly involves the activation handle bracket case of trigger to keep it moveable and workable - see illustation.
The system itself cannot be treated because all the parts are under a laminate cover.
Thus we only check the container and cover for damage. This may result from flying stones when landing or taking off. Inform the manufacturer of any damage noticed.

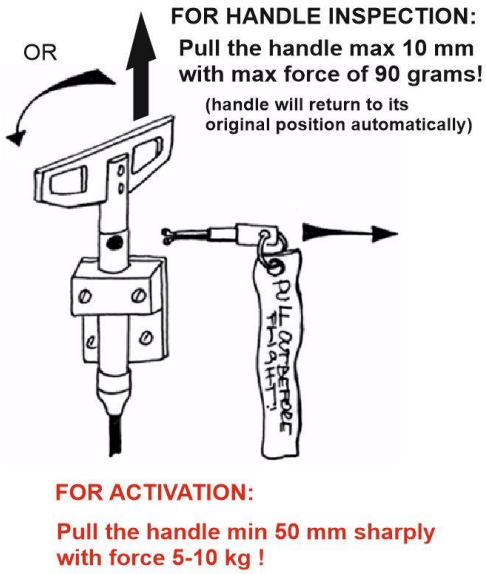
13.4 Moisture and other contaminants

As we have already mentioned, outer and inner containers protect the parachute from some forms of contamination. So we can say that the unit is protected against moisture, but it is not water proof. Heavy, frequent or prolonged rain or use of floats may cause moisture to leak into the unit, which could result in the system failure. Installation in proximity to fuel system may cause fuel or oil to get on the system, the drawing slings or inside the system. The results can be the same, i.e. the failture of the system. The simplest solution is to cover the system with a suitable covering while refueling or filling with oil (do not forget to remove it before a flight). Also flying in dry conditions limits enormously the possibility of the unit failure.

13.5 Possible corrosion in activating handle

This problem can arise during flying in frequent rain or the exposure of aircraft with open cabins to rain while hangared. Possible corrosion is removed by removing the safety pin with flag and turning the activating handle clockwise and counterclockwise approx. 45^0 . If this is possible twist the handle clockwise several times around and then the activating handle can be easily lifted from the bracket case of trigger to a height of up to 1 cm with a force of about 0,4kg. Spray the area with silicon oil. Even though the force required for firing is 11 kg and the distance for stretching the trigger mechanism about 7 cm this operation should not be performed in a hangar or a closed space but in the open air, ensuring that **nobody is allowed to stand in the axis of the possible GRS unit fire!**
If the handle cannot be removed, contact the firm immediately because if the handle cannot be moved, the system cannot be fired. This will not happen if the unit is checked regularly and occasionally treated with silicon oil.

Illustration **no. 24**



13.6 Ultraviolet degradation

UV degradation is caused by the exposure of material to sunlight. Some materials will degrade quite rapidly, such as manmade fibres and plastics.The GRS unit is thoroughly protected against UV degradation. Unlike other products, all important connections, especially sling loops, are protected against UV degradation. Sling loops and loops for anchor fixing are protected with aluminium foil because they are exposed most to the sun which penetrates into the cockpit. When parked outside the cabin should be covered.

The firm recommends that the drawing slings be returned with the unit for checking along with the unit at each scheduled six-year service.

13.7 Soiling of the GRS unit

Prolonged soiling of the GRS unit or tampering with labels are not permitted. Keep and maintain the unit according to the manual. If a label is damaged, get a new one from the manufacturer. When the aircraft was in very dusty surroundings and it is not certain whether this dust or other contaminants have penetrated under the rocket covering to such a degree that would cause the system to fail, you are recommended to have the system checked by the manufacturer.

13.8 Protection against incidental firing of the GRS unit

As already stated, it is necessarry to treat the system as you would a loaded gun and after finishing a flight to secure the system against incidental firing. Children or curious adults can cause the unit to be activated. Thus always carefully replace the safety pin with the flag into the pawl. If the cabin cannot be locked it is adviseable to secure the activating handle with a lock to prevent tampering while the aircraft is unattended.

13.9 Maintenance planning – Always contact the manufacturer.

The six-year operational life cycle ends with the expiry of the time designated on a label placed on the system container. This data is also stated in a warranty list of the GRS system. Plan ahead to have the unit serviced at a time you will not be flying. Notify the manufacturer by telephone, fax or e-mail.

When dismounting the system proceed in the same way as in installation. Both safeties must be inserted before you start dismounting the system. In the event that the transport safety has been lost, substitute it with a **steel wire of 2 mm (safety A) thick which you insert, according to the manual, into an aperture in the trigger wedge.** You bend both sides of the wire to prevent its falling-out and **screw in bolt M5 safety B. Put on the steel protecting cover. (if lost, get a new one from the manufacturer.)** Proceed in the same way with the cardboard cover, which must be labelled **”UN number”- the manufacturer will let you know the number for that year. This number classifies the device inside the cover. Attach the label Explosive – 1.4G**. In the event of six-year revision do not forget to inclose the drawing slings and other parts of the system which are necessary to be checked as well. **If you encounter any problem concerning sending the system back, ask the manufacturer for all the stickers and materials you need.**

Warning!

If you send the product from outside the Czech Republic, i.e. the state of manufacturer, it is necessary to note in the documentation of the shipment and on the package itself that the product is being sent back for a revision. If you fail to do so, Galaxy could be taxed on its import, which would be then charged to the customer.

After any activation of the system please contact GALAXY immediately.