STRATOS 07 S.R.O.

Magnum

Ballistic rescue parachute systems series Magnum

Installation and user's manual

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STRATOS 07 S.R.O.

Update / mutation	Made by	Date

User of this system shall become fully familiar with this manual!

Read this manual thoroughly before you begin to handle the rescue system for any reason or you board an aircraft with the MAGNUM system built it.

This manual describes how to use the rescue system safely in a way that does not endanger you or your surroundings as well as how to install the system so it works properly.

You will also be informed in which situations and how to use the rescue system to save your life.

PROHIBITED USE

1) Any manipulation of the rescue system other than that mentioned in the manual is prohibited.

2) It is prohibited to disassemble the MAGNUM rescue system under any circumstances.

3) Parts of the rescue system that are sealed with red tamper paint, by Loctite (a safety glue for connecting materials), or by safety wire. This security must not be disassembled nor damaged.

4) It is forbidden before installation, to aim at persons in the vicinity or at oneself. It is necessary to handle the MAGNUM rescue system as a pyrotechnic device or as a weapon with the safety off! It is prohibited for any person to be in the direction of the firing.

5) It is prohibited to put in service the rescue system after 15 years without a slider and after 18 years with the slider. Furthermore, it is prohibited to put the rescue system in service after a time period of 5 years of the date stamped on the production label until next factory check or overhaul of required parts for systems without a slider or 6 years with the slider.

6) Should an aircraft be removed from registry, the owner of the MAGNUM rescue system must inform the manufacturer, who will take the required steps to dispose of the rescue system or use parts of the MAGNUM rescue system again in their production.

7) It is prohibited to transport the rescue system in any container other than in the original transport case. The handle must be securely locked with a small lock with a warning flag!

8) The owner of the MAGNUM rescue system shall notify the manufacturer before any transport, e.g. transporting the system to the manufacturer for overhaul or inspection.

9) It is prohibited to store the MAGNUM rescue system at temperatures outside 14-24 ^{o}C and in humidity outside of 35-73%.

10) It is prohibited to expose the Magnum rescue system to high temperatures, heavy shocks, mechanical abuse and damage, acids, aggressive chemicals, long-lasting storage in high humidity or dusty environments.

11) It is prohibited to mount the MAGNUM rescue system on vibrating aircraft parts such as engine mounts or aircraft landing gear.

12) a) The MAGNUM rescue system (sheet metal or fiberglass container) has to be mounted to the frame of the aircraft with at least four M6 G8 bolts supplied from the manufacturer in order to prevent inadvertent activation and or loosen.

b) The Softpack system is mounted to the frame of an aircraft by a parachute line at least 150 kg strength and then to two straps sewed to the container. Its weight must rest on the base. The rocket system mounting is mounted with the four supplied M6 G8 bolts. This is not applicable to rocket systems welded to the container, or revolving mount which are attached permanently by the manufacturer.

13) When mounted in airplanes, ultralights, or microlights, the activation handle of the Magnum rescue system must be secured by a safety lock or pin or be in some way safeguarded against an accidental activation. Whenever the system is safeguarded, it must always have the warning pennant supplied by the manufacturer visible on the safety pin.

14) After the lapse of the 6-years of the service life, the original rocket motor is repacked, exchanged for another one - rebuilt or exchanged for a new one. The canopy is unpacked, cleaned and repacked. The whole rescue system is rebuilt, checked, and released into the operation for another 6 years or 5 years for systems without the slider. After activation, or when sending the unit for overhaul, the user must provide the Warranty Certificate which was received at the time of purchase. It is prohibited to activate the rocket motor before the shipping or to dismantle it. It could pose a risk to you and/or your surroundings.

15) It is forbidden to mount the MAGNUM rescue system in a way which would aim it down towards Earth.

IMPORTANT WARNING!

Stratos 07 reserves the right to void the warranty of the proper function of the system MAGNUM and is not responsible for the safety of persons handling and operating the system MAGNUM and third persons, if the following operating instructions and prescribed manipulation of the rescue parachute rocket system is not observed! All persons handling the MAGNUM rescue system must be acquainted with the enclosed installation and operational manual by reading the enclosed installation and operational manual.

The owner and operator of the rescue system must conform to all warnings and procedures mentioned below and all warnings and procedures in the manual.

Contents

Dealers

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and hanggliding)
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email: extreme-style@yandex.ru

Specification and other important information

Dear customer,

congratulations on the purchase of your new MAGNUM rescue system. You have chosen a product which reaches the highest quality of the products in this field. It received the certification of the product type by the issue of the ***Type Certificate LAA ČR*** *on the basis of authorization of the Civil Aviation Administration §81 section 2 Civil Aviation Act No 49/1997, the* ***German Certification DULV Deutscher Ultraleichtflugverband*** *and certification DAEC. Furthermore, meet requirements of the* ***ASTM*** *and are certified* ***for Import and Use in the USA.***

Products of the Magnum series has passed the Certification of the ***Český báňský úřad (Czech Mining Office)*** *tested in the* ***Státní Česká zkušebna zbraní a střeliva (State Czech Testing Department of Weapons and Ammunition),*** *tests for explosive transport according to* ***UNO Classification*** *– RID, ADR,ADN, iMDG-Code and iATA-DGR.*

The company STRATOS 07 offers a rescue system of a new generation which is activated by a rocket. The system is intended for the rescue of the crew and aircraft. The MAGNUM Rescue systems is intended for 1-2 seats hang-gliders, powered-paragliding, ultralight, gyroplanes and helicopters.

STRATOS 07 is based in Prague, Czech Republic. Our staff is ready to assist you and answer your questions regarding the installation or questions of technical nature concerning the rescue systems MAGNUM.

STRATOS 07 S.R.O.

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Use of the rescue system

MAGNUM rescue systems provide rescue and protection from life threatening situations even at a low height above ground. It is strongly recommended to use it in every critical situation where there is a doubt about a safe landing.

2.1 Situations in which it is possible to use the MAGNUM rescue system

1. Engine failure over a rough or mountainous terrain

In places where it is not possible to land safely by gliding you should activate the MAGNUM rescue system as soon as possible with respect to technical limitations especially with regard to the manufacturer defined minimum deployment altitude. It is recommended not to hesitate with the activation of the system so as to allow the aircraft to stabilize from swinging. (If time permits before landing, switch off all electric circuits and close the main fuel valve, or change over to the tank with less fuel!)

2. Technical problem or mechanical failure not permitting the continuation of the flight and a safe landing.

There are documented cases of successful activations of the Magnum system due to propeller failure, engine failure after take-off at low altitude, engine failure above a populated area at low altitude, jammed controls, loss of control surfaces, total separation of a wing due to wake turbulence, loss of lift due to icing conditions, etc. The crew was always saved due to a quick decision to activate the system immediately. If possible, choose to activate the system away from power lines, populated areas, or woods and take into account wind and altitude. Do not forget, that due to centrifugal forces created by loss lift on one wing or other abnormal aerodynamic condition, you might not be able to reach the activation handle with ease. (If time allows, turn off electrical power and shut off the fuel supply or switch to the tank with less fuel.)

3. Medical condition or injury that do not allow the pilot to land safely, (heart attack etc.)

In such a situation the activation of the MAGNUM system is performed by the pilot or a passenger who has to be informed about the rescue system function and activation before the flight! The decision to activate the system must be made in the shortest time, but if possible taking into account the choice of a safe landing place! This situation justifies the importance to locate the activation handle in a place which is easily accessible from both seats or the installation of two activation handles, in cases where two pilots are sitting in a row behind each other. (If time allows, turn off electrical power and shut off the fuel supply or switch to the tank with less fuel.)

4. Pilot errors posing immediate danger

These errors occur mainly at low altitudes. The loss of airspeed, spin, stall, etc. You must react immediately because there is a good chance for a successful outcome and safe landing. You must remember that even a pilot error at high altitude could pose a significant threat e.g. the transition from a spin to a spiral could pose a risk because the rapid increase of airspeed could make the system ineffective. The altitude loss is very rapid and the need for fast activation is essential. (If time allows, turn off electrical power and shut off the fuel supply or switch to the tank with less fuel.)

5. Short landing distance

If it is apparent that there is a risk of a collision with an obstacle at the end of the runway and go-around is not possible, it is possible to activate the MAGNUM system during a low pass even at 1m above the runway. It is necessary to continue the landing maneuver and the parachute will slow down the plane at the time of touchdown.

6. In-flight collision

In case of such situation, the right time to activate the rescue system would be before the collision and it is imperative that the crew reacts immediately. If, for example, a part of the aircraft is damaged and unable to fly with cockpit or the part which houses the rescue system, the Magnum system is the only way that will bring the crew safely to the ground. (If time allows, turn off electrical power and shut off the fuel supply or switch to the tank with less fuel.)

7. Inflight fire

It is important to try to limit the supply of oxygen and other flammable substances from the fire. In many cases this could be oil, fuel, electrical or a combination of these. In cases where you are not able to perform an immediate, safe, emergency landing, you should activate the rescue system. This would give you a chance to land and get out of the aircraft.

In case of fire in the engine compartment or somewhere between the fuel tanks and the engine, turn off the fuel supply, open the throttle and let the remaining in the lines get used.

Due to situations such as this, it is important that the mounting cables should be made of steel or aramid as compared to nylon or other similar materials.

8. <u>Loss of situational awareness due to meteorological conditions, sudden change of weather where continuing operation poses a serious risk for the crew and fuel starvation due to diversion or inability to reach the destination or alternate airport</u>

If the situation allows, activate the rescue system away from power lines, populated areas, rocks or mountains. Follow the guidelines for minimum deployment altitude. Be aware of the illusions created in bad weather; this is especially important in winter landscape. Strong wind has to be taken into consideration as well. Leave the aircraft immediately after landing. (If time allows, turn off electrical power and shut off the fuel supply or switch to the tank with less fuel.)

There are many more emergency situations, in which you could successfully use the MAGNUM rescue system. You can apply the same common sense guidelines as in the above-mentioned examples.

2.2 Responsibility of the owner and the pilot of an aircraft equipped with the MAGNUM rescue system

The owner or the pilot shall familiarize themselves with this manual before the installation of the MAGNUM system into the aircraft or before flying with an aircraft equipped with the MAGNUM rescue system; the passenger must be familiarized with the function of the rescue system as well. The pilot is responsible for informing the passenger about the function and operation of the system.

Information about the system, and function description

The MAGNUM rescue system series is designed in a way to provide a fault free operation and the highest success rate during an emergency, without serious consequences.

The parachute canopy is ejected by a tuned and custom designed rocket. The time needed for its deployment ranges from 0.6 – 1.2 s (depending on the type of the rocket the rescue system uses and the relevant ambient temperature at the time of its deployment). The rocket is located in the rocket housing. After the activation handle is pulled, the movement is mechanically transposed by cable to an ignition device, which activates two igniters in the rocket combustion chamber. Through combustion, gases expand, and escape under high pressure from the combustion chamber through a nozzle which propels the rocket out of the aircraft.. The rocket has a sharp tip enabling it to break through a specially designed softer cover materials. As the rocket is propelled, it pulls a cable which opens the parachute container. The parachute is protected by a sleeve which is pulled out of

the casing. After the parachute assembly is ejected, the sleeve rolls back and the parachute canopy opens.

The parachute of the MAGNUM rescue systems are designed to fully open in the shortest possible time, but with increased damping during the canopy deployment. It is important to know that that rescue systems designed for higher speeds need a longer time to open to allow a deceleration which minimizes shock loading caused by the increased dynamic forces.

3.1 Types of system designs

1) MAGNUM systems are comprised of a parachute pressed into a cylindrical **duralumin container** and capped with a cover with the rocket housing integrated onto it, or with a separate position-able rocket housing which may be aimed off to the side. The container is fastened to the aircraft with two stainless steel straps and a stainless steel prismatic support with four M-6 bolts.

2) The **Softpack** system of designs has the parachute placed in a fabric container. On the back, there are two quilted straps in addition to numerous other quilted straps to enable it to be mounted in various places on the aircraft frame. The container must be fastened in at least two points on each side (for a total of at least 4 points) with a safety strap, belt, or line with a minimum strength of 100kg; they must be carefully secured in a way to prevent any loosening.
The Softpack should be supported so as not to unduly stress the straps. The rocket housing is secured by four M-5 bolts to a firm structure of the aircraft. The rocket is connected to the parachute by a steel, cable bent into a “V”. The cable is connected to the parachute risers with a locking carabineer. The activation handle is connected to the rocket assembly by a high strength teflon lined Bowden cable (sleeved pull-cable). A Bowden cable of this design ensures a smooth transition of activation force and prevents inadvertent activation of the system (caused by outside force, a step, etc....)

3) The systems designed with a **fiberglass container** are for float planes. The rocket housing is flexible and is anchored to the back side of the container.

3.2 MAGNUM rescue system activation

During the pre-flight operations and during the entire flight, the rescue system must be armed! Do not forget to remove the safety pin or lock from the activation handle!

Pulling the activation handle releases it from the handle catch; an additional 3-5cm of pull is required to pull through the safety length. As the cable is pulled, the resistance will increase up to a maximum of 12 kg of force. The force transferred by the pull cable winds up a mechanical device. When the mechanism reaches top dead center and the internal spring exerts a maximum force, it is released, and the firing pin sets off two igniters which initiate the combustion of solid fuel in the combustion chamber of the rocket. The device is designed to work reliably and be simple. After activation, nothing but the plastic spacers and the

protective jacket of the rocket housing which protects the rocket from water detaches from the system.

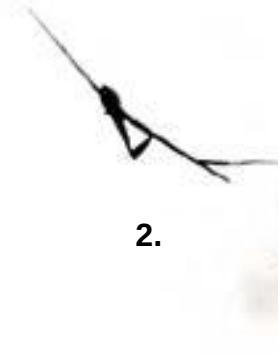
Land based operation testing of the RS MAGNUM 300

The impact of the rocket exhaust on the rocket housing is minimal; therefore it is not necessary to install devices to deflect the gases from the rocket. The combustion profile of the rocket motor is designed to pull the parachute as quick as possible and with sufficient reserve.

The MAGNUM rescue system is designed so that the extraction of the parachute by the rocket is accelerated due to aerodynamic forces resulting from aircraft motion. This design helps to quicken the extraction and deployment of the parachute.

The parachute hidden in the parachute sleeve is briskly pulled out and away of the aircraft with its connecting chord by the rocket. The parachute sleeve slides back from the canopy in the direction of the apex vent, ensuring the canopy is smoothly and symmetrically loaded at low or high speeds.

This design prevents the canopy from an uncontrolled fill which would damage the canopy. Additionally, the design eliminates potential damage while being extracted out of the aircraft, reduces excessive forces incurred during deployment, and it restricts asymmetric filling of the canopy. Some types of parachute have a slider to help reduce possible overloading. After the rocket burn is finished, it remains hanging on the canopy. There is no threat posed by the rocket or by it falling to the ground. The canopy is protected from rocket heat damage by the parachute sleeve, which then covers the rocket shortly after the burn is complete; respectively, this happens after the parachute is deployed and air is filling the canopy. The canopy sleeve is made from a heat resistant material.



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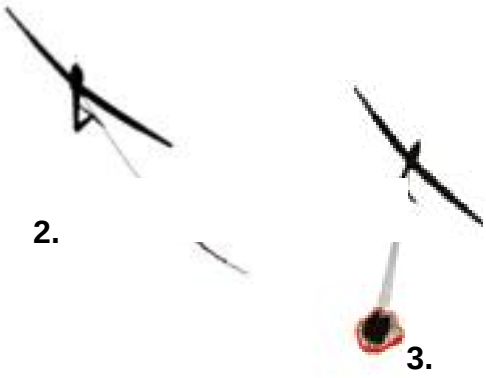

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3.

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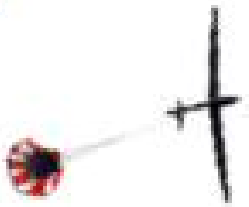
The parachute canopy is filled gradually to decelerate the aircraft and prevent sudden forces which could damage the aircraft.

It is important that every aircraft point where the parachute is fixed to the air frame, has at least a strength of 5,5G!



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Practical flight testing of the MAGNUM 450 SSP rescue system

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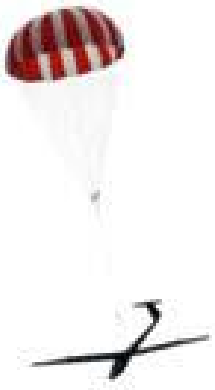

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3.3 Minimum effective altitude for the use of the MAGNUM rescue systems

Systems MAGNUM 450, MAGNUM 250, etc., which are not equipped with sliders with a center cable are designed for aircraft with low operating speeds. These rescue systems are designed to open very quickly and to be effective at rescuing even from very low altitude.

Nonetheless, it is necessary to be aware that the success of low altitude recovery will always depend on your horizontal and vertical speeds at the moment of activation.

Parachutes designed for higher operating speeds, especially those without the center cable, are intended for max. speeds of 260km/h, 300km/h and higher. These systems will be slower to open to safely and gradually slow the aircraft from high speeds without exceeding the loadings approved for the anchor points of the aircraft.

It is necessary to bear in mind, that in critical situations you must activate the rescue system as soon as practicable. In many critical situations, altitude is lost very quickly, while airspeed increases. These factors dramatically lessen the chance of rescue. It is recommended to activate the rescue system at heights greater than 200m above ground! Even at lesser heights, the MAGNUM rescue system may save your life; there are documented rescues with the MAGNUM system even from very low altitudes.

Caution! By activating at heights under 200m above ground, the swinging oscillation of the aircraft may not have stabilized and the crew may be injured by collision with terrain. Additionally, the canopy may be not be fully loaded so as to properly reduce the speed of fall.

Referring to numerous years of experience, it is key to note that the MAGNUM rescue system may work even at very low altitudes and save human lives. In emergencies, it is recommended to activate the MAGNUM rescue system even at altitudes which are below limits; even this option offers a considerable chance of rescue!

3.4. Which type of RS MAGNUM is to be installed in which aircraft

The MAGNUM rescue systems are designed for aircraft of various weights and various maximum speeds. The ideal choice shall be such that its parameters fit in the flight and technical envelope of the aircraft to which it should be installed. For slow aircraft, the rescue system should be selected based on the weight corresponding to the technical parameters of that aircraft. It is not recommended to install rescue systems which are designed for significantly higher maximum speeds and weights than the installation aircraft specifies. Depending on the choice of mounting location, the selection of container is important as well. For the suitable system selection and mounting locations, please contact the manufacturer or authorized Stratos 07 dealer.

Magnum rescue systems are packed into various containers:

Duralumin cylindrical container

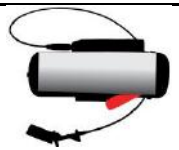
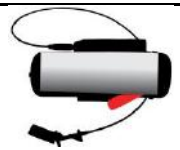
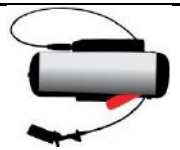
Softpack (Fabric Container)

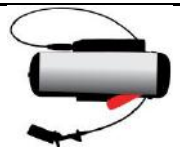
Fiberglass Container

Softpack (Fabric Container)

BALLISTIC RESCUE PARACHUTE SYSTEMS

Rescue parachute systems for UL

							
MAGNUM		**250**	**250 Softpack**	**300**	**300 Softpack**	**450**	**450 Softpack**
Maximum permitted load	kg	300	300	325	325	442 / 450	442 / 450
Maximum speed	km/h (MPH)	150	150	220	220	150 / 160	150 / 160
Rescue system weight (including rocket)	kg	8	6,8	9,15	7,75	11,4	9,95
Dimensions l **x** w **x** h	mm	Ø185+60x 455	280x170x250	Ø185+60x 530	270x160x280 210x140x450	Ø204+60x535	280x160x390 240x200x380 200x195x450
Opening time at max. speed	sec	3	3	3	3	2,8	2,8
Minimum safe deployment altitude (AGL) during horizontal flight	m / km/h	80/60	80/60	80/60	80/60	80/60	80/60
Max. overload with max. load	kN	15	15	18	18	22	22
Descent with max. load	m/s	7	7	6,8	6,8	6,3	6,3
Slider	-	no	no	yes	yes	no	no
Container type	-	duralumin	cloth	duralumin	cloth	duralumin	cloth
Canopy							
Area	sqm	65	65	66	66	102	102
Repack interval	rok	5	5	6	6	5	5
Ballistic device							
Rocket engine type	-	Magnum 450	Magnum 450 (Magnum 250)	Magnum 450	Magnum 450	Magnum 450	Magnum 450
Total impulse at 20°C	kNS	0,303	0,303 (0,11)	0,303	0,303	0,303	0,303
Activation	-	Mechanical					
Burn time at 20°C in sec.	s	0,57 ± 0,03	0,57 ± 0,03 (0,36 ± 0,03)	0,57 ± 0,03	0,57 ± 0,03	0,57 ± 0,03	0,57 ± 0,03
Certified by	-	DULV	DULV	DAeC	DAeC	DULV / LAA	DULV / LAA

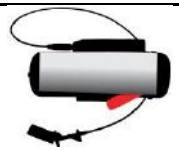
						
MAGNUM		**450 Speed**		**450 Speed Softpack**		**501**
Maximum permitted load	kg	475	450	475	450	475
Maximum speed	km/h (MPH)	260	260	260	260	300
Rescue system weight (including rocket)	kg	13		11		9,2
Dimensions l **x** w **x** h	mm	Ø206+60x587		280x160x410 200x190x480		240x190x350 280x160x385 410x170x240
Opening time at max. speed	sec	3		3		3
Minimum safe deployment altitude (AGL) during horizontal flight	m / km/h	80/100		80/100		180/100
Max. overload with max. load	kN	25,5		25,5		25,6
Descent with max. load	m/s	7,2		7,2		7,3
Slider	-	yes		yes		yes
Container type	-	duralumin		cloth		cloth
Canopy						
Area	sqm	102		102		86
Repack interval	rok	6		6		6
Ballistic device						
Rocket engine type		Magnum 450		Magnum 450		Magnum 450
Total impulse at 20°C	kNS	0,303		0,303		0,303
Activation	-	Mechanical				
Burn time at 20°C in sec.	s	0,57± 0,03		0,57 ± 0,03		0,57 ± 0,03
Certified by	-	DULV	LAA	DULV	LAA	DULV

Rescue parachute systems for experimental

										
MAGNUM		**601**	**650**	**800**	**901**	**1200**	**1201**	**1401**	**1220**	**1800**
Maximum permitted load	kg	760	600	800	950	1200	1230	1400	1200	1800
Maximum speed	km/h	320	250	250	320	250	250	250	250	260
Rescue system weight (including rocket)	kg	12,4	17	18,5	18	28	22	25	24	35
Dimensions l **x** w **x** h	mm	245x195x430 250x170x490 200x195x510 410x180x280	270x195x610	2 pcs. M 501	240x280x510	3 pcs M 501	300x260x550	260x300x547	2 pcs M 601	3 pcs M601
Opening time at max. speed	s	3	3	3	8	3,2	5	**	3	3,5
Max. overload with max. load	kN	30	31	35	-	60	63,5	**	60	90
Descent with max. load	m/s	7	5,5	6,7	7,2	7	7,8	**	6,5	7
Slider	-	yes	yes	yes	yes	yes	yes	Yes	yes	yes
Container type	-	cloth	cloth	cloth	cloth	cloth	cloth	cloth	cloth	cloth
Canopy										
Area	m²	130	150	172	206	258	252		260	390
Repack interval	rok	6	6	6	6	6	6	6	6	6
Ballistic device										
Rocket engine type		Magnum 600	Magnum 600	Magnum 600	Magnum 1000 (Magnum 1500)*	Magnum 1000	Magnum 1000 (Magnum 1500)*	Magnum 1500	Magnum 1000	Magnum 1500
Total impulse at 20°C	kNS	0,464	0,464	0,464	0,539 (0,702)	0,539	0,539 (0,702)	0,702	0,539	0,702
Activation	-			Mechanical						
Burn time at 20°C in sec.	s	0,86 ± 0,03	0,86 ± 0,03	0,86 ± 0,03	0,86 ± 0,03 (0,88 ± 0,04)	0,86± 0,03	0,86 ± 0,03 (0,88 ± 0,04)	0,88 ± 0,04	0,86± 0,03	0,88 ± 0,04

** depends on particular installation ** not measured yet*

Rescue parachute systems for aircraft category S-LSA

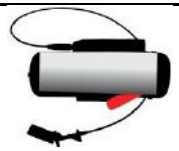
						
MAGNUM		**450 Speed**	**450 Speed Softpack**	**450 SP-L**	**601 S-LSA**	**601 S-LSA-L**
Maximum permitted load	kg	500	500	500	608	608
Maximum speed	km/h	210	210	210	291*	291*
Rescue system weight (including rocket)	kg	13	11	11,8	12,4	13,4
Dimensions l **x** w **x** h	mm	Ø206+60x587	280x160x410 200x190x480	520x310x200	245x195x430 250x170x490 200x195x510 410x180x280	520x310x200
Opening time at max. speed	s	3	3	3	3	3
Max. overload with max. load	kN	25,5	25,5	25,5	33,81	33,81
Descent with max. load	m/s	7,2	7,2	7,2	7	7
Slider	-	yes	yes	yes	yes	yes
Container type	-	duralumin	cloth	laminated (PE/ABS)	cloth	laminated (PE/ABS)
Canopy						
Area	m²	102	102	102	130	130
Repack interval	rok	6	6	6	6	6
Ballistic device						
Rocket engine type		Magnum 450	Magnum 450	Magnum 450	Magnum 600	Magnum 600
Total impulse at 20°C	kNS	0,303	0,303	0,303	0,464	0,464
Activation	-	Mechanical				
Burn time at 20°C in sec.		0,57 ± 0,03	0,57 ± 0,03	0,57 ± 0,03	0,86 ± 0,03	0,86 ± 0,03
Certified by		ASTM –F 2316-03	ASTM –F 2316-03	ASTM –F 2316-03	ASTM –F 2316-08	ASTM –F 2316-08

***** *exact value 290,9 km/h*

Rescue parachute for Paragliding and Hang-gliding

PLUS		25	31	34	35	48	66
Maximum permitted load	kg	90	100	125	100	150	300
Descent with max. load	m/s	5,5	5,5	5,5	5,5	5,5	5,5
Maximum speed	km/h	150	150	150	150	150	150
Rescue system weight	kg	2,7	3,2	3,2	3,4	4	4,9
Dimensions l **x** w **x** h	mm	200x280x80	210x290x80	220x300x90	210x290x80	240x320x100	260x340x110
Canopy							
Area	m²	25	31	34	35	48	66
Repack interval	month	6	6	6	6	6	6
Certified by		LAA	LAA	SHV	DULV	LAA	LAA

Rescue parachute for Paragliding and Hang-gliding with rocket engine activated

						
MAGNUM		**140**	**250 container**	**250 softpack**	**450**	**450 softpack**
Maximum permitted load	kg	140	300	300	442	442
Descent with max. load	m/s	6,5	7	7	6,3	6,3
Maximum speed	km/h	140	150	150	150	150
Rescue system weight	kg	3,7	8,95	6,8	11,4	9,95
Dimensions l **x** w **x** h	mm	390x220x100	Ø185+60x 455	390x260x170	Ø204+60x535	280x160x390 240x200x380 200x195x450
Container type	-	cloth	duralumin	textile	duralumin	cloth
Canopy						
Area	m²	34	66	66	102	102
Repack interval	rok	5	5	5	5	5
Ballistic device						
Rocket engine type	-	Magnum 250	Magnum 450	Magnum 450 (Magnum 250)	Magnum 450	Magnum 450
Total impulse at 20°C	kNS	0,05	0,303	0,303 (0,05)	0,303	0,303
Activation	-	Mechanical				
Burn time at 20°C in sec.	s	0,42 ± 0,03	0,57 ± 0,03	0,57 ± 0,03 0,42 ± 0,03	0,57 ± 0,03	0,57 ± 0,03
Certified by	-	DULV	DULV	DULV	DULV	DULV

3.5 Activation of the Magnum rescue system

The armed (no locking pin) handle is pulled linearly from its tubular housing. The handle shall be installed in a way that the pilot pulls the handle towards himself! Pulling the handle releases it from the safety spring pin housing. There will be approximately 3-5 cm of movement during which nothing happens followed by a resistance which will increase to about 8 kg. This motion pulls a Teflon lined Bowden cable which is connected to the rocket ignition mechanism. At the moment of the ignition mechanism coming to its top dead center, the spring of the firing pin is compressed to its maximum and then released. The firing pin's hammer activates two incendiary cartridges which ignite the solid fuel of the rocket.

The exhaust gases from the rocket pass through a nozzle which accelerates the exhaust and thrusts the rocket forward. The rocket leaves its housing and pulls the parachute out, away from the aircraft with a cord that is attached to it. The time of the burn depends on the rocket used and the ambient temperature. Currently, the supplier has 7 rockets which we are able to select from to tune for a specific parachute type by trimming the thrust curve. The burn time of the rocket may be from 0.5 to 1s. The rocket motors with a longer burn times require a high output and therefore have larger dimensions. These rockets are used to deploy very large parachutes or multiple parachutes.

The effects of the rocket launch on the housing have been considered in the design and there is no need to vent the gases nor reinforce the anchor points. It is necessary to be aware of the proximity to the fuel tank or fuel lines; thorough protection is required! The rocket penetrates the skin of the aircraft (not necessary in some installations- refer to external mounting option) and it pulls a cable which opens the container and gradually pulls out the canopy which is protected by the canopy sleeve. Gradually, the risers and suspension lines are unfolded, stretched, and the canopy is filled.

Rescue systems designed for aircraft with higher speeds have a slider integrated to help soften the loading which may have momentary peaks at 5Gs; all these steps proceed very quickly.

The rescue system must be aimed off to the side of the aircraft where the propellers blades move in the upward direction. If it is possible, it is best to aim the rescue system horizontally, perpendicularly to the direction of flight. By aiming off to the side, a minimum loss of altitude in incurred and the aircraft oscillations are stabilized faster thereby significantly eliminating the aircraft from swinging!

3.6 Specifications of the Magnum Rescue system

The minimum deployment altitude for safe rescue is 200m over the surface of the earth. Nonetheless, keep in mind that the success for a low altitude recovery will always depend on your horizontal and vertical speed at the moment of activation. Even so, there are documented rescues from heights as low as 80m. It is important to understand that a parachute designed for deployment at higher speeds will take longer to open compared to one designed for lower speeds. The same applies for rescue systems designed for higher masses; the higher the designed load, the longer it will take to open. Additionally a higher specification rescue systems will require the rocket to pull a heavier, larger parachute over a longer distance which will inevitably require more time than a smaller system; the canopy will also take longer to fill.

During the design of the MAGNUM rescue system, the experience of military specialists and manufacturers of ejection seats for fighter aircraft were heavily consulted. At the start, there was a very close cooperation with the parachute testing laboratory of the Czechoslovak Army, with whom, the first products were developed. The rescue systems are constructed and produced with the great care and utmost attention to quality and flawless functionality through even the most challenging situations that could arise in flight.

The ballistic system is fitted specifically for each type of rescue system. The canopies for high speeds are designed so as to soften the opening shock to the maximum extent possible to prevent damage to the aircraft structure and injury of the crew. The design of new rescue systems is aided by many years of experience in developing and integrating new materials suitable for use in the rescue systems; specifically, parachute fabric, edgings, parachute lines, suspension cables, threads, etc. The rocket motors are new, unique designs, which raise the reliability of the rescue systems MAGNUM through the simplicity of their design. A very important and demanding step in the assembly of the system is in the packing, folding and pressing of the parachute into the container.

During the assembly, multiple control steps are implemented; the company holds ISO 9001 certification.

Reviewing the past use of the MAGNUM rescue system, it is clear that it is necessary to solve critical situations during the flight immediately!

The reason is so as to be above the minimum deployment height and below the maximum airspeed of the rescue system. By exceeding these limitations, the rescue system could become ineffective.(Under high loading situations, the anchorage points in the aircraft or parachute could be damaged.)

1.

2.

Practical testing of the MAGNUM 501 rescue system – dropping test

3.

The rescue systems Magnum increase the safety of your flying.

In the timely use of the rescue system, you have a great chance to save your life, but we don't guarantee that you will not be injured or that your aircraft will not be damaged.

This will always depends at what altitude and at what speed the system was deployed at and in what meteorological conditions and terrain you will land in. To improve your chance of rescue it is certainly better to choose a ballistic rescue system over any other system that is activated e.g. by hand releasing the canopy as with the pilot parachute or chair chutes, where you have numerous steps to perform before you leave the aircraft, then wait until you are clear of the aircraft to deploy your canopy. Regardless of the fact, in such situations, the aircraft is destroyed. By using the MAGNUM rescue system in time, the aircraft will most likely incur minimal damage, and will be fit to fly after a service.

!WARNING!

The MAGNUM rescue systems currently produced are designed for use up to 4 500 m amsl.

4.1 Operation requirements – controls

The service life of MAGNUM rescue systems is 18 years for parachutes with a slider and 15 years for parachutes without a slider such as the for MAGNUM 250 and 450. Regardless, it is necessary to have the system sent for service every 5 or 6 years depending on the prescribed service interval for your particular rescue system. The system must be shipped in the original shipping container which is certified for transport and sent back to the manufacturer or authorized dealer.

During the service, the system is unpacked, aired out and thoroughly inspected. The rocket motor will be disassembled, inspected, and components needing service will be reworked or replaced with new components; eventually, if needed, the entire rocket may be replaced.

The parachute will also be inspected and components needing service will be replaced or reworked.

After this servicing, the customer has a certified, functioning rescue system until the next manufacturer mandated service interval.

A) The shipping labels:

LABELS:

u
n

4G/Y 16/S/YY
CZ/STRATOS-IMET 4042

Exporter	**Importer**
UN 0453 **ROCKETS, LINE THROWING**	
BRUTTO: kg NETTO: kg EXPLO: kg	
Odesílatel	**Příjemce**
UN 0453 **RAKETY PRO TAŽENÍ LAN**	
BRUTTO: kg NETTO: kg EXPLO: kg	

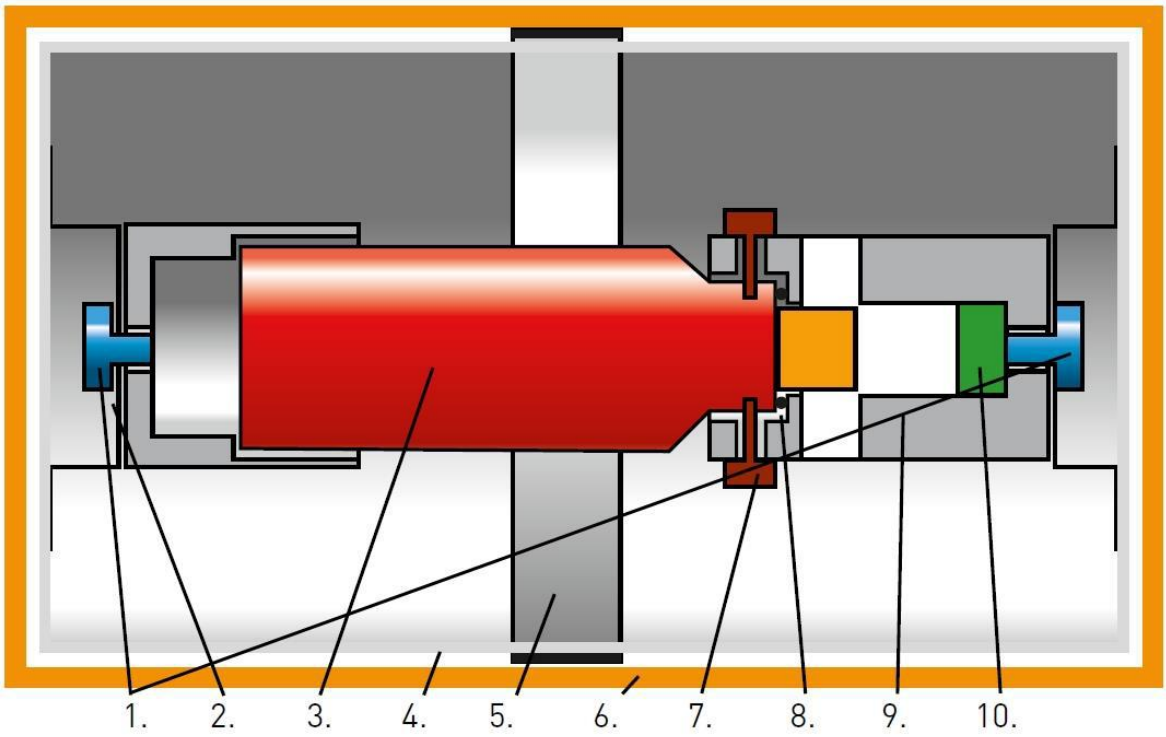
4.2 Packing method

The rocket motor packing method described is in accordance with the methods approved by certified testing laboratory No.1087 of the IMET Ltd group, certificate Nr. IMET 4042.

Box: 250 x 140 x 400 mm (inner dimensions)

Cage: 250 x 140 x 400 mm (outside dimensions)

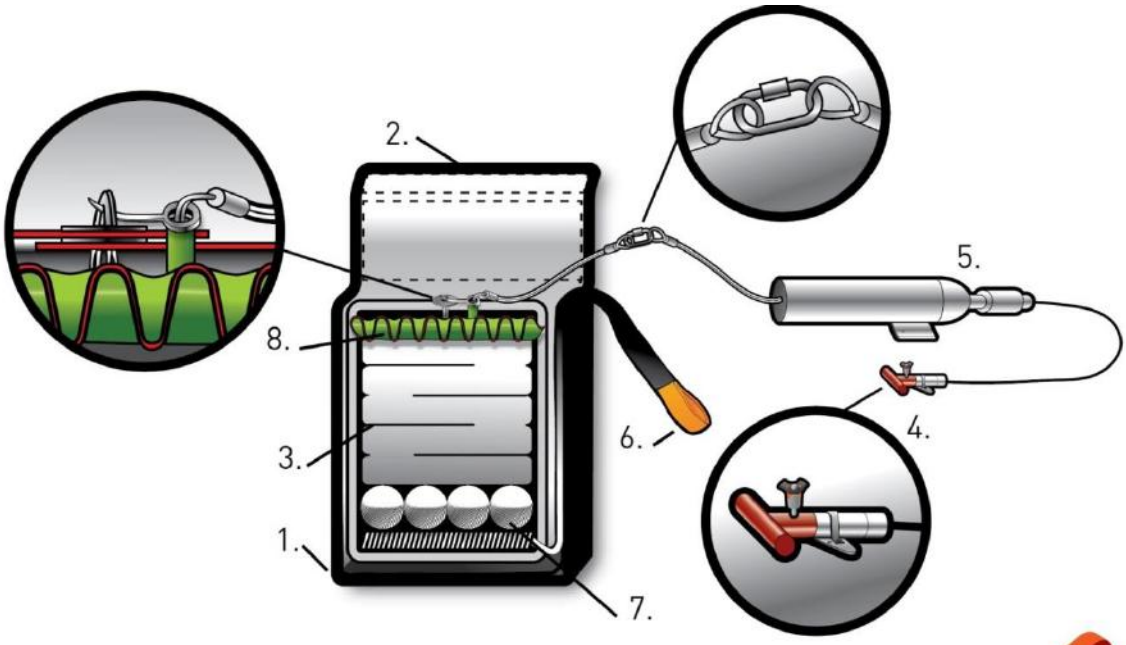
IMPORTANT WARNING ABOUT THE DISPOSAL !!!
After the service life expires, the user must send the rescue system to the manufacturer for proper disposal!



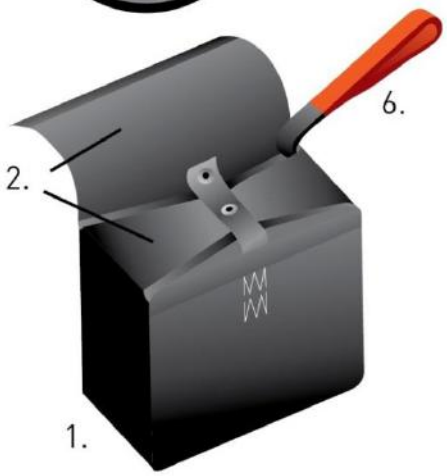
Packing MAGNUM series Rockets Motors

1. ***Installation screw***
2. ***Bottom support***
3. ***Rocket motor***
4. ***Safety cage – assembly***
5. ***Steel strap***
6. ***Cardboard***
7. ***Eliminator screw (M6)***
8. ***Rubber O-ring seal***
9. ***Draw eliminator – assembly***
10. ***Dampening layer***

!Before shipping the MAGNUM rescue system for the minor repair, please contact us!



1. ***softpack container***
2. ***softpack flap***
3. ***parachute***
4. ***activation handle***
5. ***rocket***
6. ***anchoring strap***
7. ***suspension lines***
8. ***shock absorber***

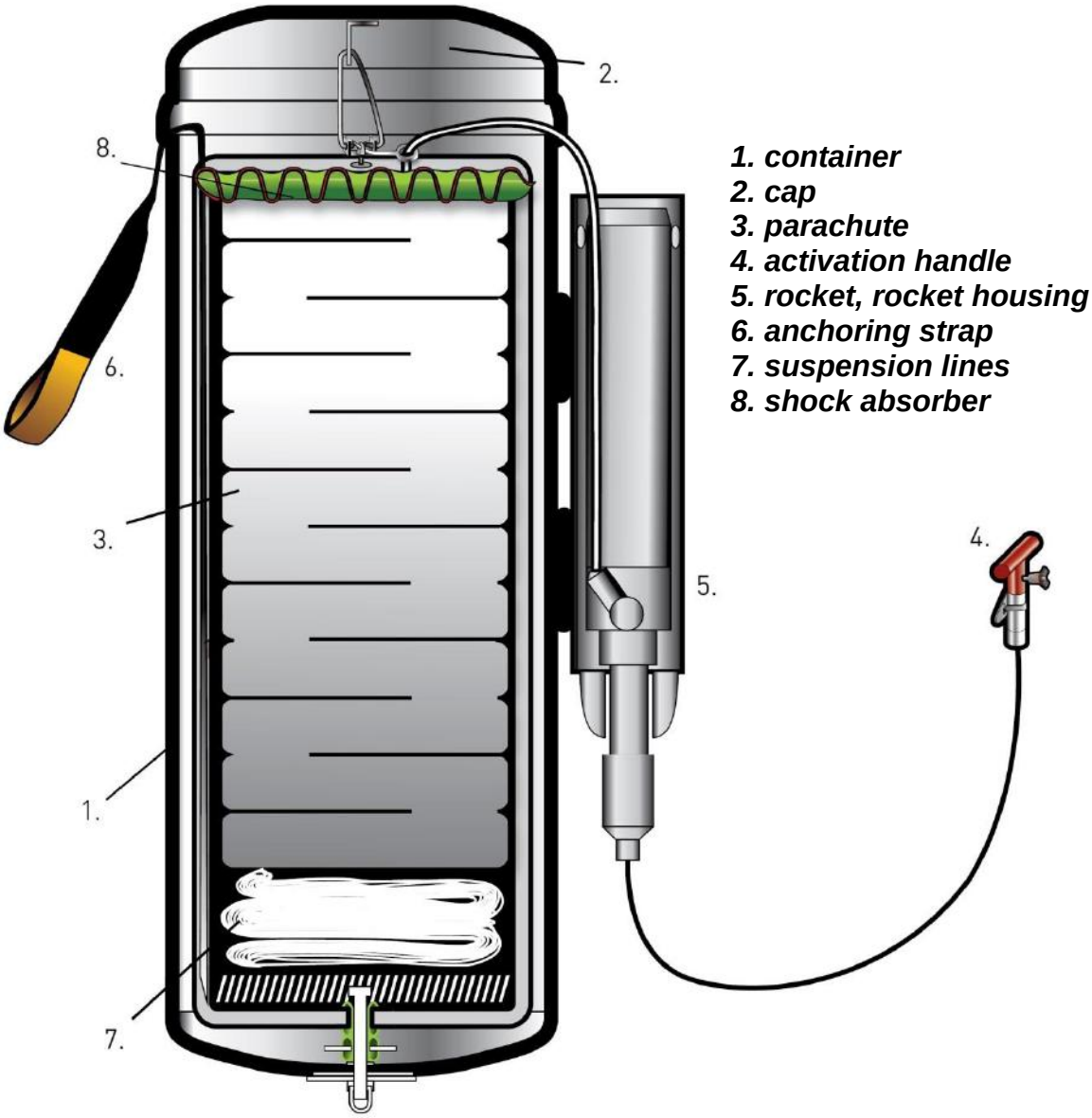


4.3 Storage and operation requirements

The system, when not mounted on the UL aircraft has to be stored in the original packaging (cardboard box with an expanded plastic bushing) in which it is delivered by the manufacturer, always secured, in a dry place (daily relative humidity 35- 73%), where the temperature does not exceed 40^{o}C.

Any manipulation, e.g.disassembly and following an assembly of any system part and especially of its pyrotechnic part is not permitted – that means **FORBIDDEN!!!**

In case of any unauthorized intervention into the rescue system the manufacturer does not take any responsibility in the consequences. Therefore please contact the manufacturer immediately in case of detection of any system damage or tampering.



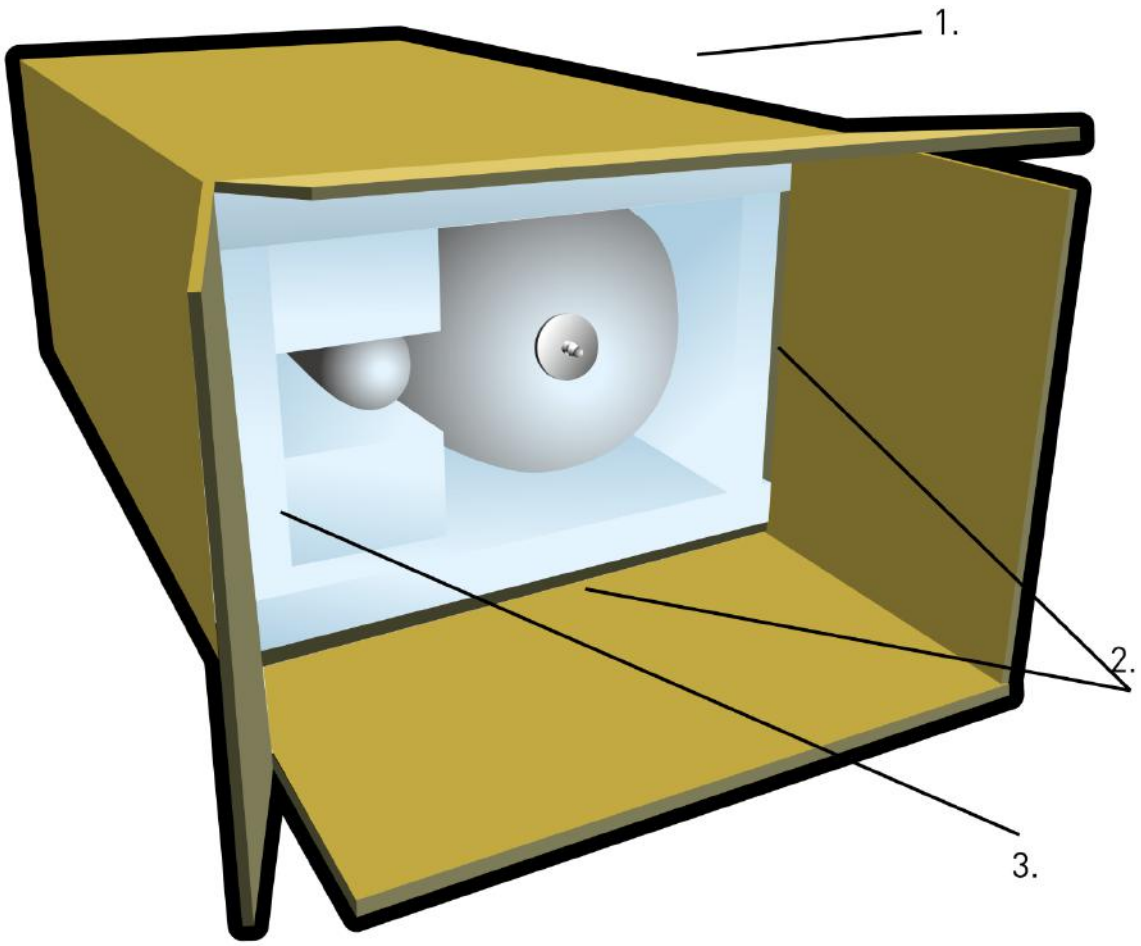
1. container
2. cap
3. parachute
4. activation handle
5. rocket, rocket housing
6. anchoring strap
7. suspension lines
8. shock absorber

The system does not require any special maintenance between the respective 5 or 6 year service intervals. The user should follow the manufacturer's instructions for proper use and storage, mainly to SECURE the system after landing, keep it clean, dry and free of dirt, oil, and fuel. It is also advised to keep it from continued direct exposure to sunlight, and not to exceed temperatures of 50° C.

Transport and storage cover

The shipping container is composed of two boxes, one fitting into the other. The inner box is lined on the sides with 30mm thick foam panels. To prevent movement of the side panels, two foam spacer inserts are placed inside. The top and bottom of the box are protected in a similar way. After closing the inner box, the space between inner and outer box is used for attachments and accessories.

1. External, 5 layer cardboard box
2. Inner, 5 layer cardboard box
3. Styrofoam inserts.



It is essential that the user or the person installing the Magnum rescue system reads the entire manual; it may also be found online at: **www.stratos07.cz**

When in doubt, please call or write to the manufacturer or your authorized dealer.

Warning! Incorrect operation or handling of the rescue system can cause injury or death!

When handling the rescue system, do not aim at yourself or other people around you! Avoid handling the rescue system near flammable or explosive materials! For installation, only use original service parts or parts defined in the manual.

5.1 Installation location for the MAGNUM rescue system

It has been verified through tests during horizontal flight, that by firing the parachute off to the side, minimum altitude is lost. Because most documented activations have been in a similar flight attitude, it can be assumed that the optimal position would be to aim the rescue system to the side, and up from 0° to 45°. It is important to consider the position of the aircraft stabilization rudder and the elevator.

Installation position with respect to the direction of the propeller rotation:

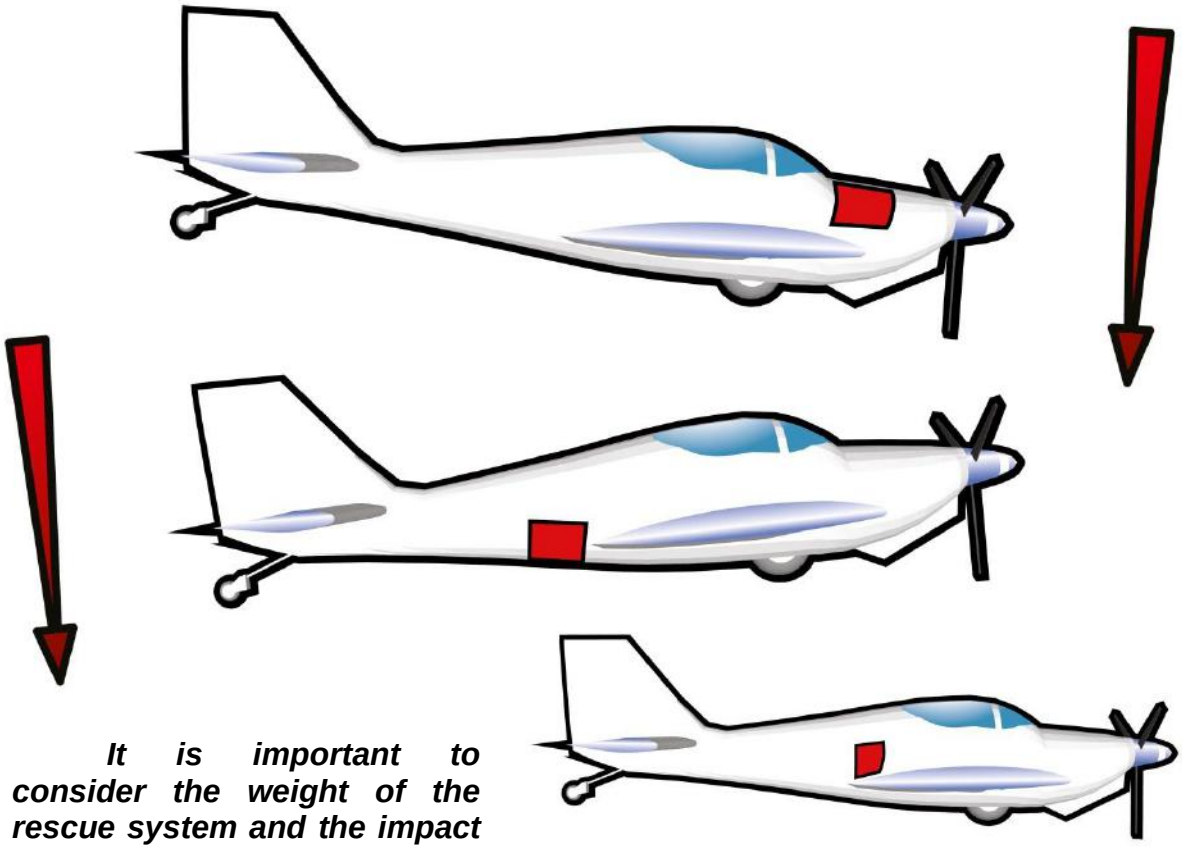
The rescue system must be shot out to the side of the aircraft where the propeller blades move up!

It is not recommended to aim the system below the aircraft because it will allow for a large altitude loss and it will take longer for the aircraft to stabilize.

If the system is aimed vertically and activated during horizontal flight, it may be possible for the aircraft to swing up above the level of the canopy, but this highly depends on the aircraft position and attitude when the rescue system is activated.

Land based operation testing of the RS MAGNUM 450 SSP

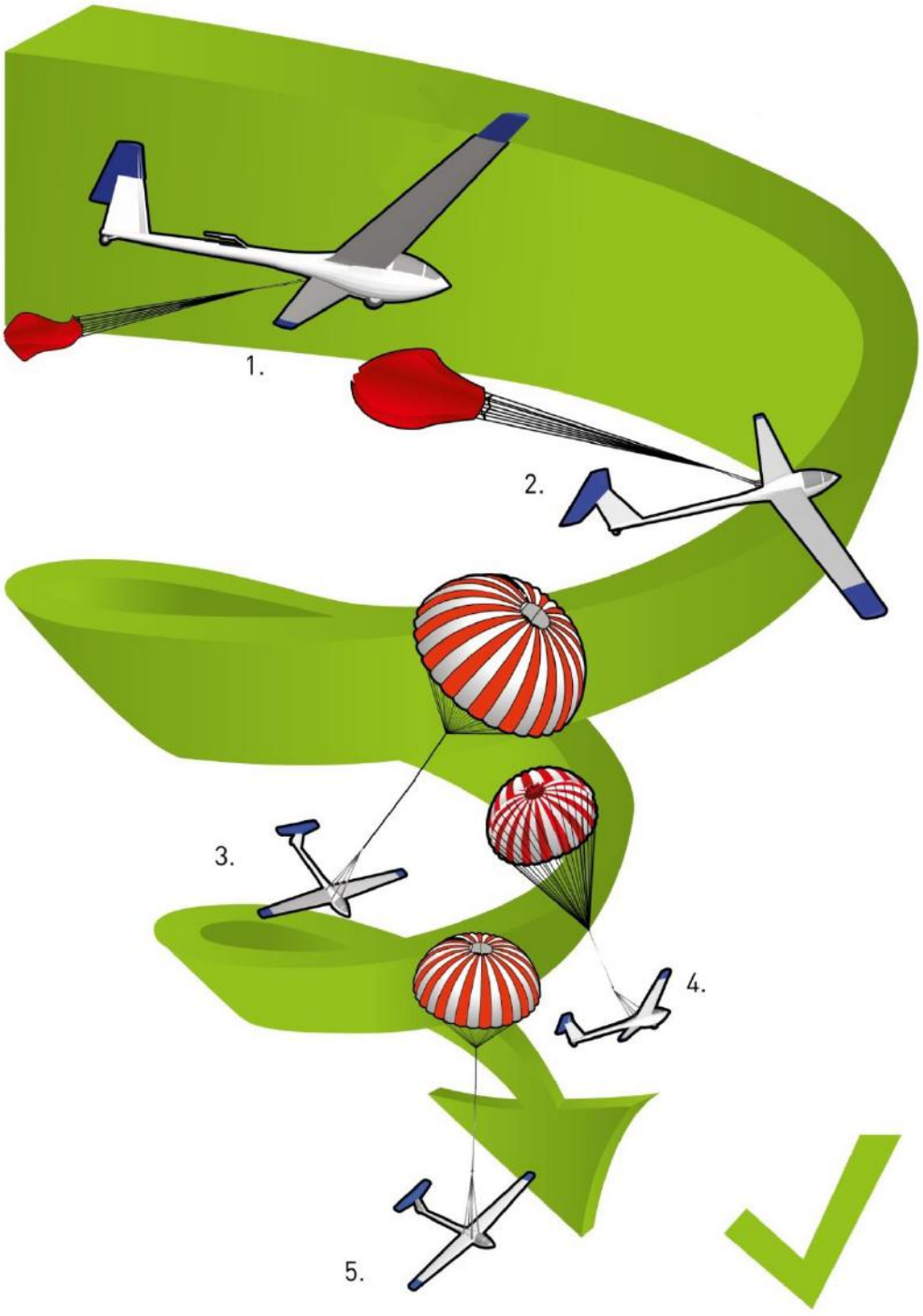
5.2 Influence of changes in center of gravity on the rescue system mounting



It is important to consider the weight of the rescue system and the impact of its placement on the location of the center of gravity of the airplane.

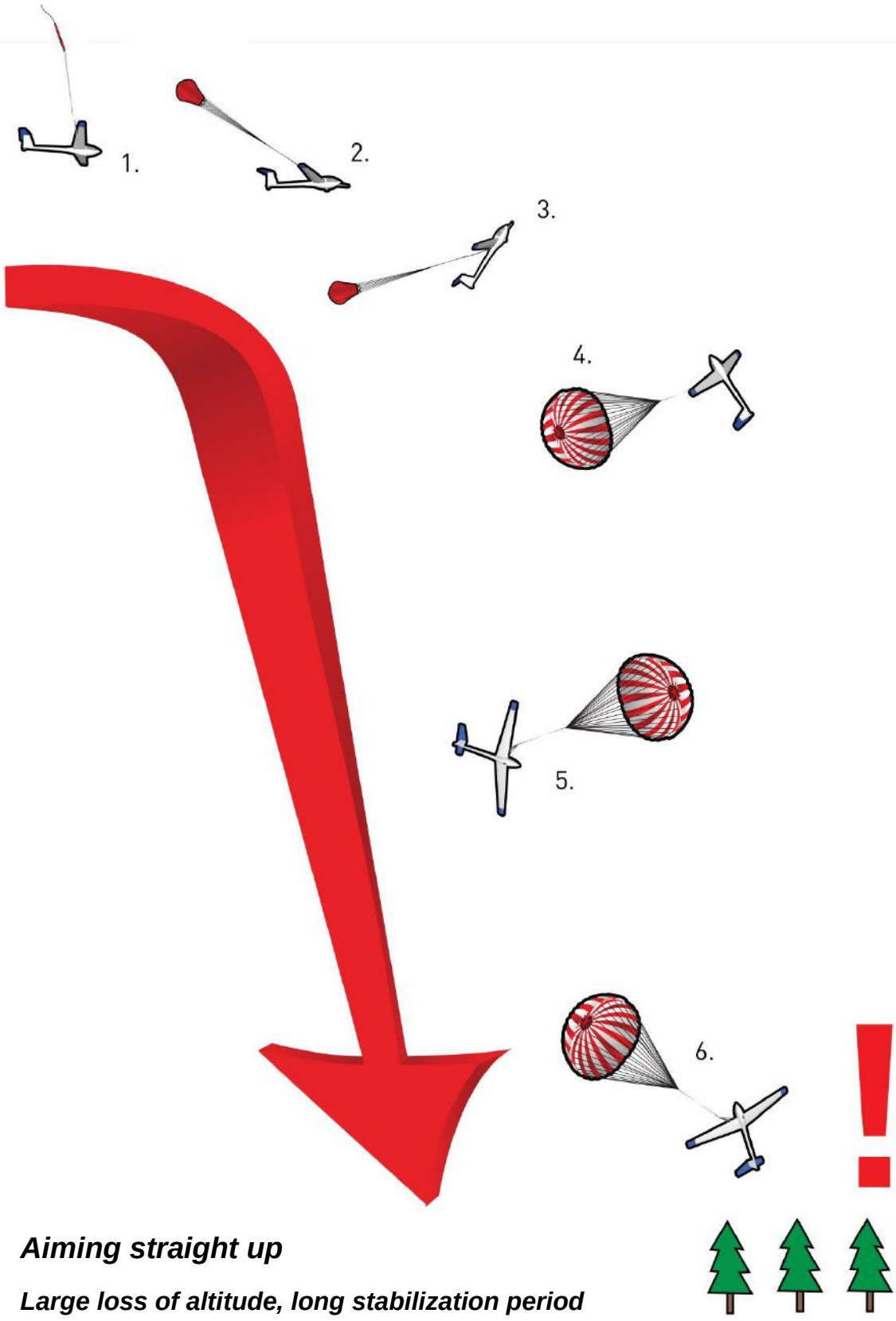
If the rescue system is aimed upward and activated during horizontal flight, there will be an excessive loss of altitude and the plane will swing excessively, taking longer to stabilize. Therefore, the actual minimum activation altitude is much higher than when installed to shoot off to the side.

When the system is aimed to the side, the canopy will begin to fill and pull the plane into a gentle circle and stabilize it very quickly. The altitude loss is less than by aiming vertically upward



Aiming to the side

Small loss of altitude, quick stabilization



Aiming straight up

Large loss of altitude, long stabilization period

5.3 Where not to mount the rescue system

It is not allowed to mount the rescue system on aircraft parts which strongly vibrate (landing gear, motor mount, etc.) or near fuel tanks or fuel lines; a fireproof bulkhead may be the solution.

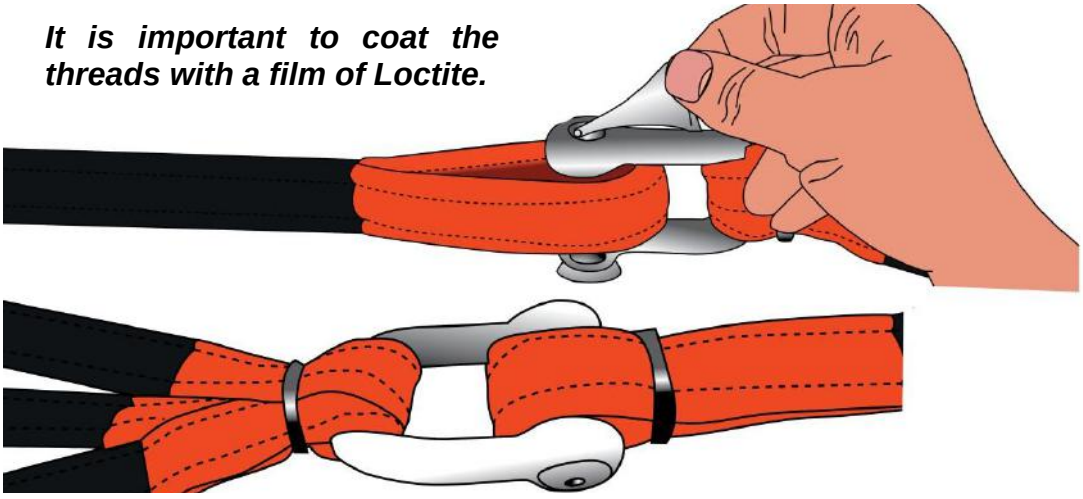
!Warning!
The rocket motor must be positioned so as not to threaten the crew!
The suspension cables must be routed in such a way so that when tightened during parachute activation, they do not injure the crew.

Important:

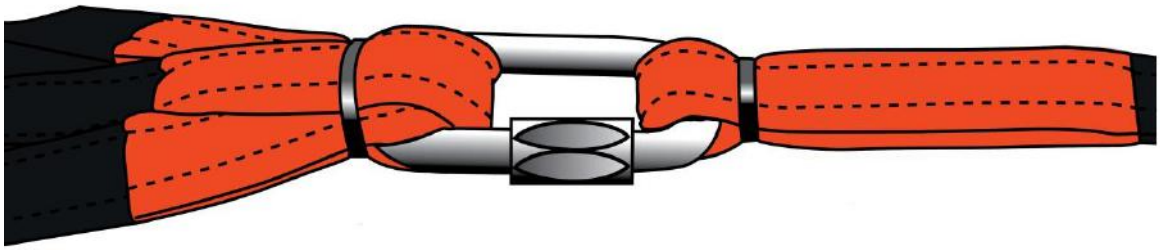
- In installations where the rescue system is mounted internally and out from wind and weather, it is recommended to install the MAGNUM softpack version. For installations where the rescue system is mounted externally and open to wind and weather, the duralumin or fiberglass container rescue systems should be used.
- The aircraft suspension points must be in a stable configuration so that the landing gear contacts the ground first; this requires at least 3, preferably 4 anchorage points. For low wing aircraft, it is recommended to adjust the suspension such that the wing tip makes first contact with the earth and then gradually the landing gear. This rolling considerably reduces the landing impact.
- The suspension straps (cables), cannot be stored in tension, they must be layered into a neat pile in the direction of the parachute ejection in a manner that does not tangle or get caught. The layered straps should then be held together with a weaker cable tie.

Installation of suspension straps and lines in a carabiner (shackle)

It is important to coat the threads with a film of Loctite.



The eyelets of the suspension straps are then secured with cable ties.



The secured straps must be routed so that they do not tangle, form knots or get caught.

The complete instructions for how to install the suspension straps into the carabiners (shackles) can be found on **www.stratos07.cz**

Emergency engine stop

Use of this switch is mandatory due to regulations in some countries. Install and carry out his controls according instructions supplied by the manufacturer.
Its 100% functionality must be assured even in adverse environmental conditions (water, dust, temperature).

Recommended installation for various aircraft

IMPORTANT WARNING

STRATOS 07 guarantees the proper function of its rescue systems described in various applications and conditions. The installation technician, aircraft manufacturer and the aircraft operator are responsible for the proper installation and anchorage of the rescue system (to attach points with at least 6 Gs strength).

All installations should be performed after consulting the aircraft manufacturer or authorized dealer.

The following illustrations are solely for recommendation of the general procedure. Specific cases will vary.

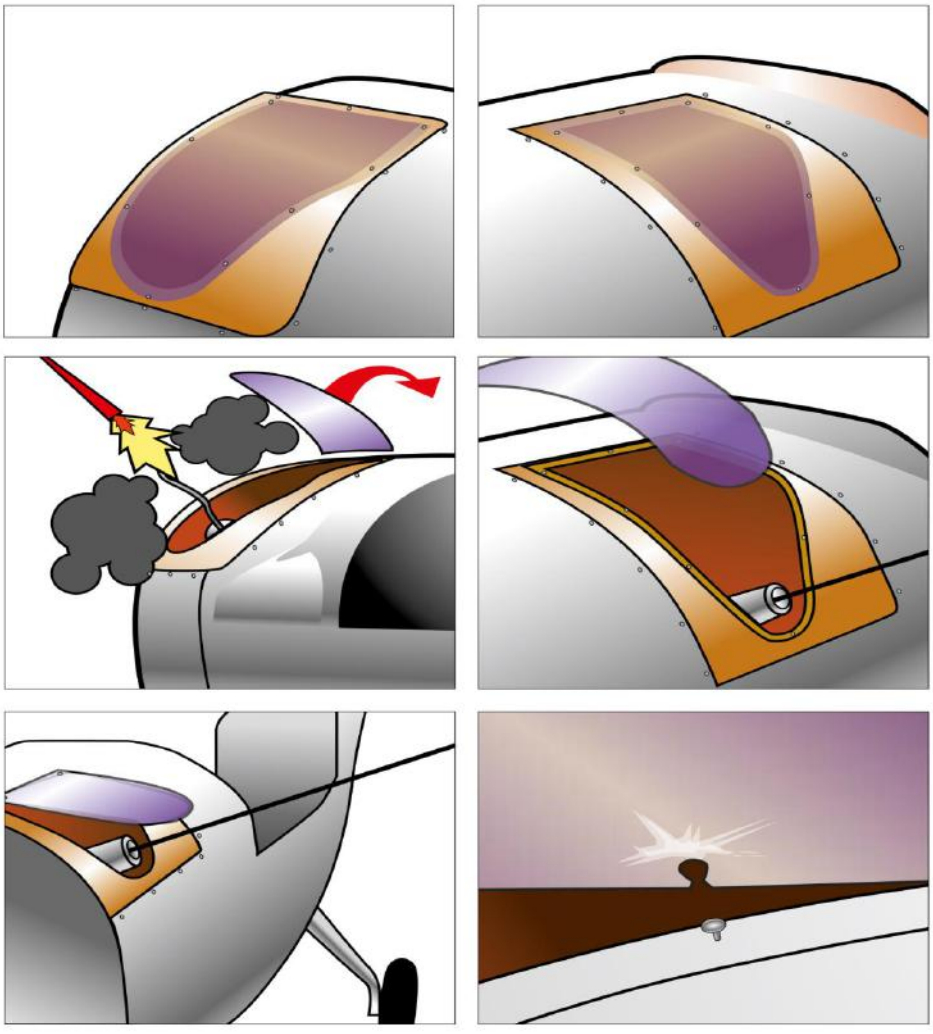
The configuration of the ejection for internally mounted aircraft rescue systems.

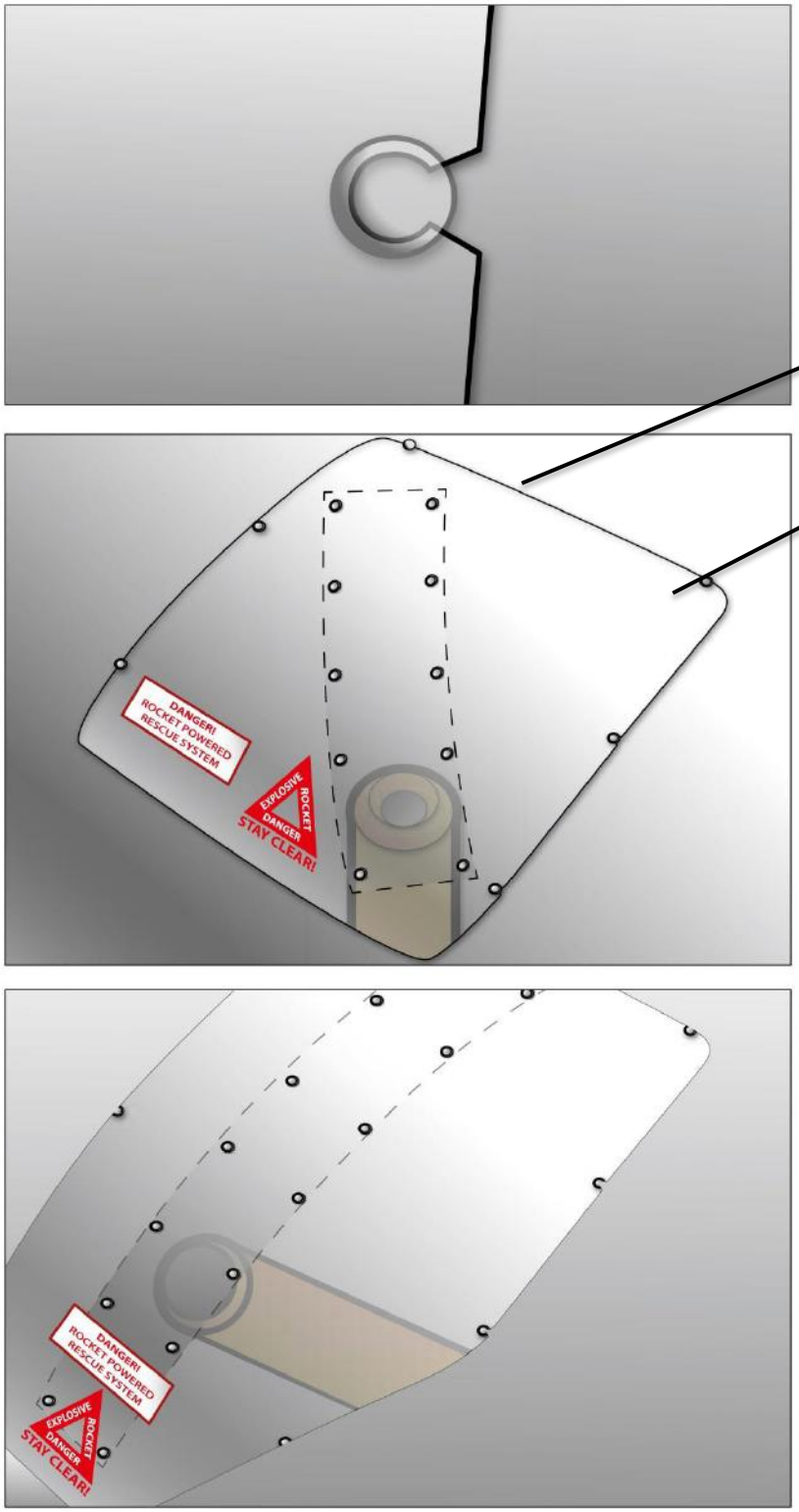
The location of the cover must be such that the deployment of the rescue system is not compromised. UL rescue systems must have at least a 18cm diameter hole, and at least 24cm for the S-LSA Type MAGNUM 601. Monocoque aircraft should have an area weakened by scoring a circle, cross, etc to aid the rocket in penetrating the aircraft skin.

The maximum resistance acting on the rocket motor in skin penetration varies per rocket:

M-250	should not exceed resistance of more than	1 kg
M-450	should not exceed resistance of more than	3 kg
M-600	should not exceed resistance of more than	6 kg
M-1000	should not exceed resistance of more than	10 kg
M-1500	should not exceed resistance of more than	10 kg

The demonstration of rocket piercing through the aircraft cover - laminated construction



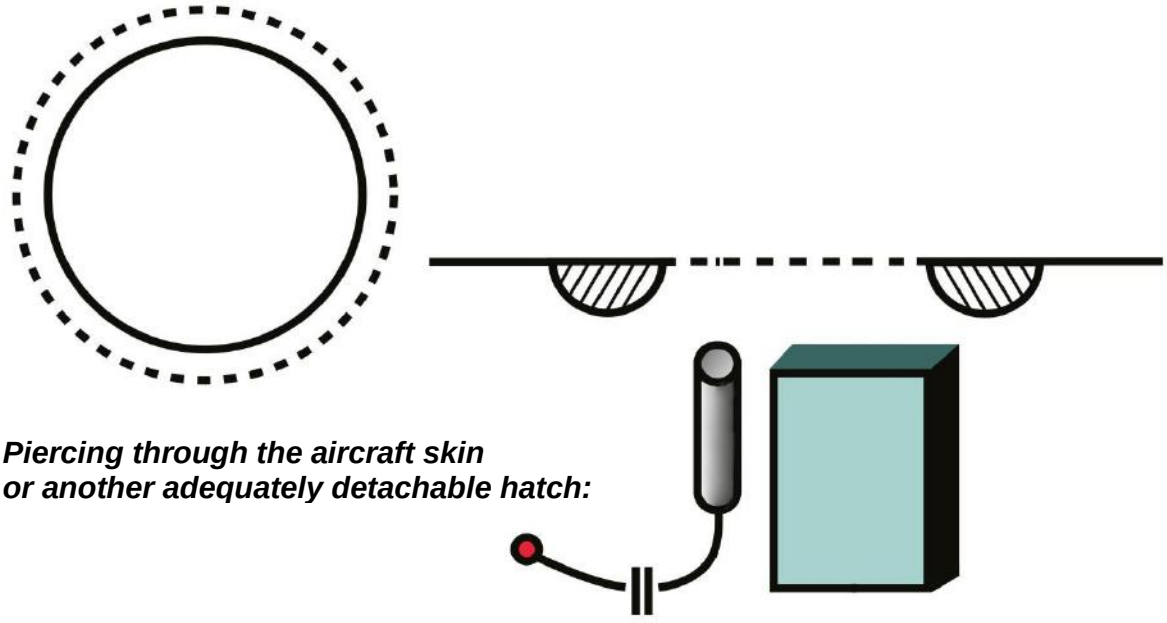


Steel reinforcement of sheet metal

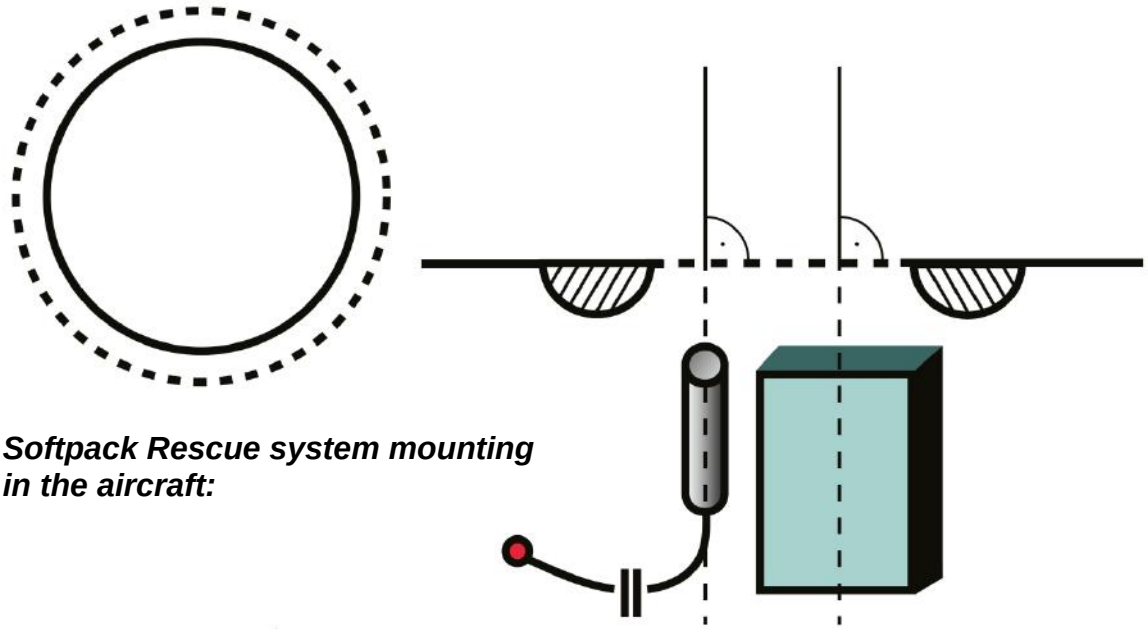
Duralumin plate

!Danger! The edges of the opening for the rescue system nor any other component must not be sharp! Sharp edges will damage the rescue system. The rocket and softpack axis must be perpendicular to the exit surface.

The rocket housing must be fastened with four M-6 bolts, and secured via M6 nuts. The two holes in the housing mount plate (rectangular plate welded to the cylindrical body of the housing) are pre-drilled by manufacturer of the rescue system. The other two holes shall be drilled into the mount plate as required to secure the housing in the best manner.



Piercing through the aircraft skin or another adequately detachable hatch:



Softpack Rescue system mounting in the aircraft:

6.1 Aircraft types and rescue system location

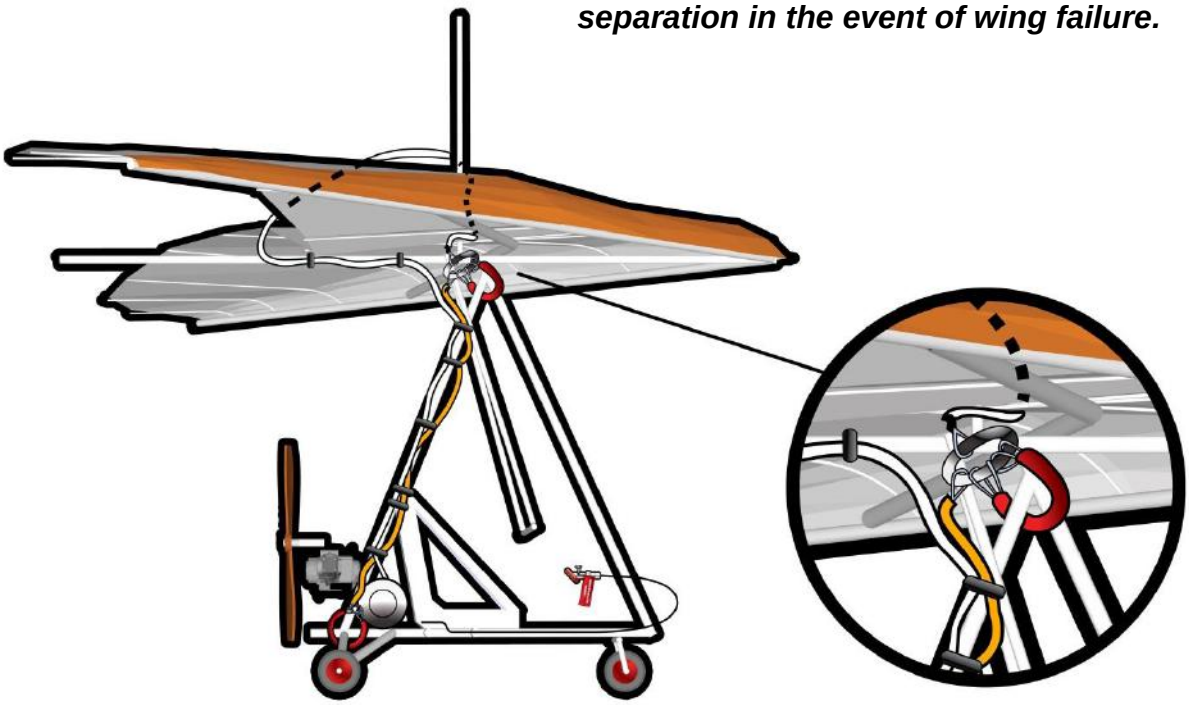
Powered hang-gliders, ultralight trike

This type of light sport aircraft have mostly tubular construction, which is best suited for rescue systems with a steel container such as MAGNUM 250, MAGNUM 300 for one-seat aircraft, or MAGNUM 450, 450 SP for two seaters.

The rescue system must be aimed away from the propeller disk and away from the wing. The rescue system should be aimed to the side, where the propeller blade rotates in the up direction, perpendicular to the direction of flight, and slightly upward.

The suspension straps should be anchored to the same point as the glider wing or parachute canopy suspension point. For UL trikes, the suspension straps must be anchored in two points along the main attachment of the lifting surface for the particular aircraft. This can be done with a “V” strap which is supplied by the rescue system manufacturer. Due to possible dynamic stresses generated at the point of wing attachment, a failure of this component would lead to a separation and compromise the structure of the rescue system. Therefore, it is imperative to have additional anchor points along the landing gear, respectively, the pilot’s seat, which can sustain loads of 5.5G.

Installation of the rescue system on a classic tubular UL trike. A strap with a minimum 6G rating protects from a separation in the event of wing failure.

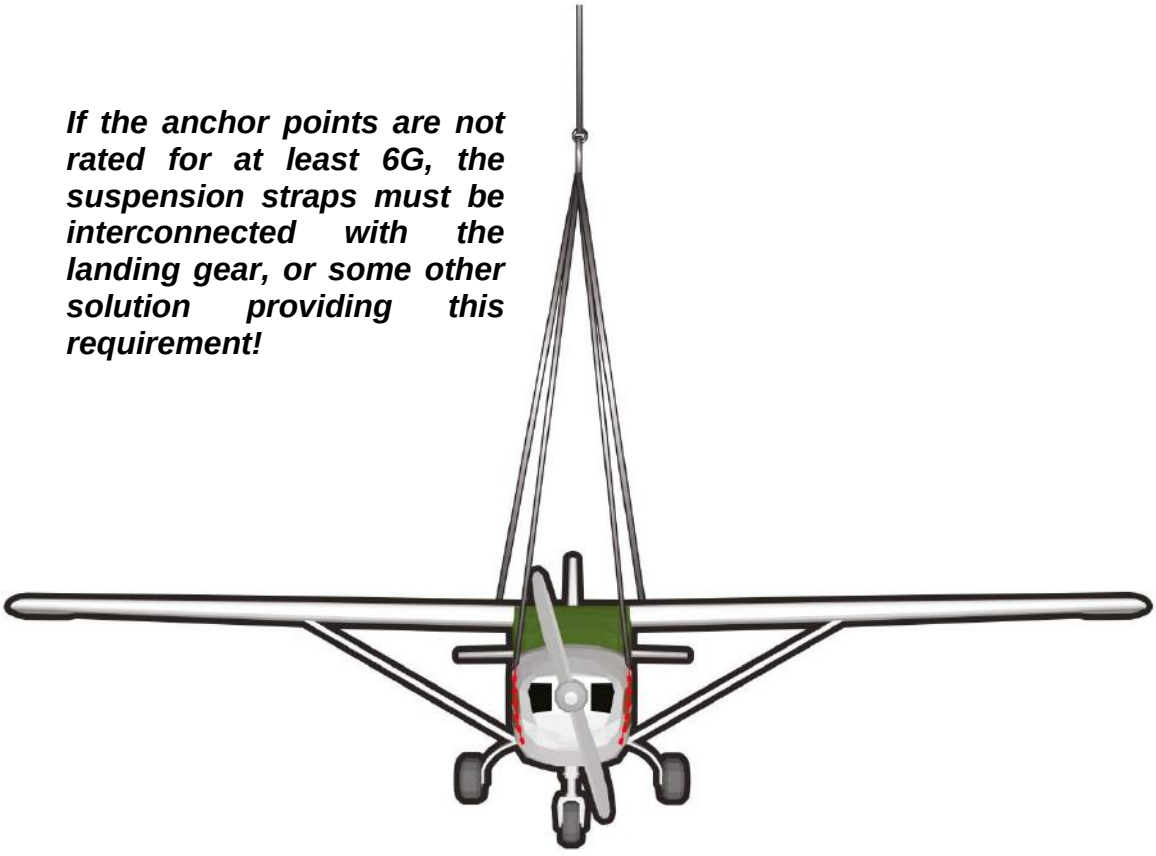


The rescue system shall be aimed perpendicular to the direction of flight, to the side, approx. 45^{o} upward. The aircraft must be fastened to the parachute by at least 3 or 4 suspension straps to anchor points approved by the manufacturer of the aircraft; this will most likely be where the wing spars are fastened. If the anchor points are not rated for at least 6G, the suspension straps must be interconnected with the landing gear, or some other solution providing this requirement. The straps must be routed under the aircraft skin so that they will not be damaged! It is recommended to fasten them to the structure with a thin electrical tape. The suspension cables which are going to be pulled be pulled through the aircraft skin must be made of steel. This is to ensure minimal cable damage due to sharp edges of the ripped sheet metal or fiberglass cover; the steel cable also cuts through the material better.

The aircraft skin must be weakened in a way that the straps can tighten into position without problem. It is possible to use Kevlar straps, but due to the fact that they weaken as they age, this possibility is less convenient. If used the straps must be replaced according to the recommendation of the manufacturer.

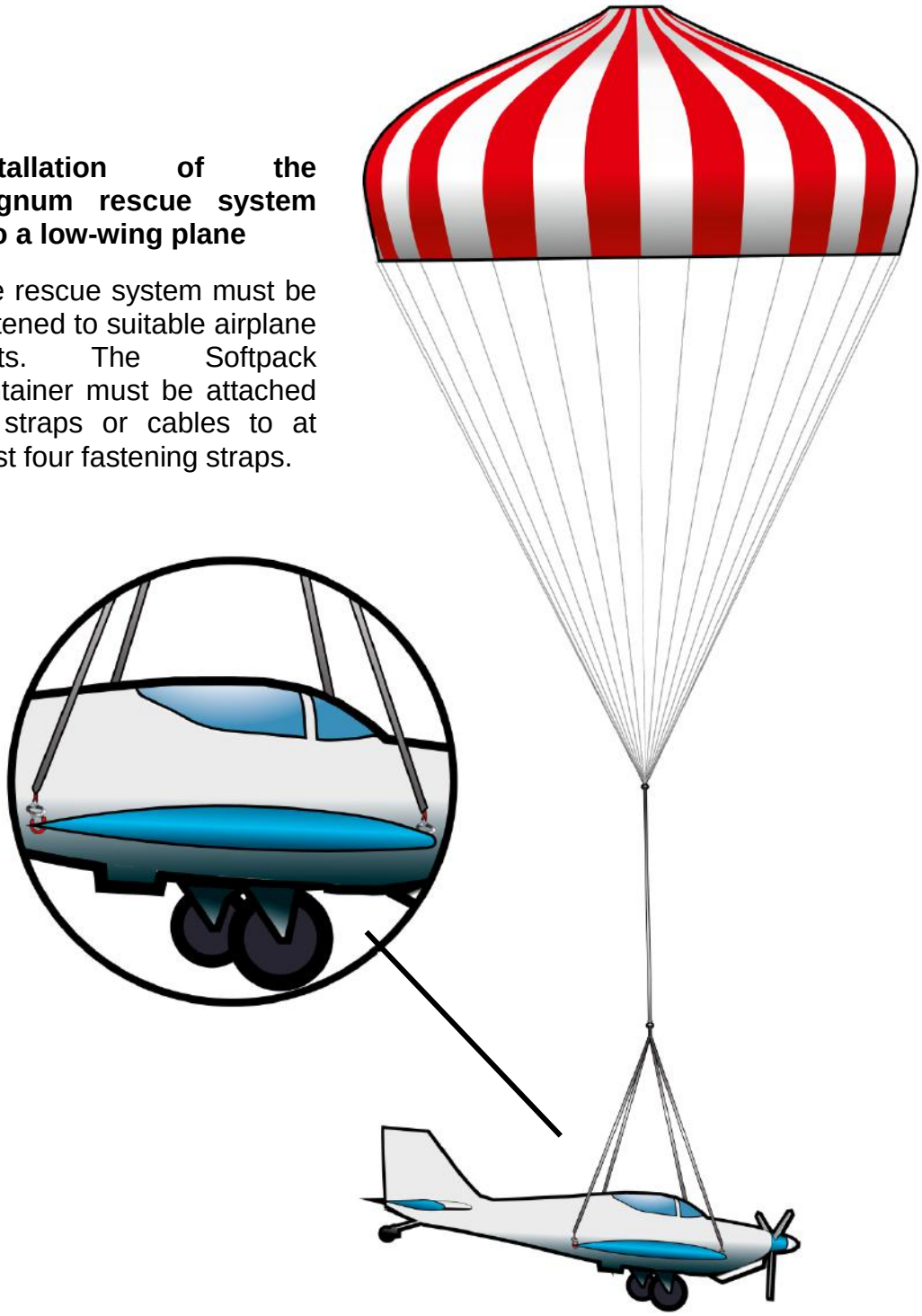
In the where the anchor points are not rated for at least 5.5G loading, the suspension straps must be interconnected to the landing gear or other appropriate point.

If the anchor points are not rated for at least 6G, the suspension straps must be interconnected with the landing gear, or some other solution providing this requirement!



Installation of the Magnum rescue system into a low-wing plane

The rescue system must be fastened to suitable airplane parts. The Softpack container must be attached by straps or cables to at least four fastening straps.



Installation of the MAGNUM rescue system into gyroplanes and helicopters

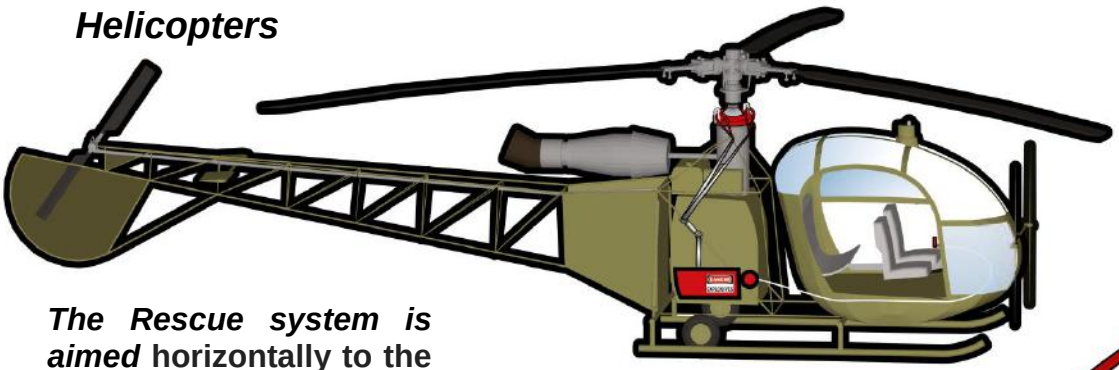
The rescue system should be aimed perpendicular to the direction of flight, on the side where the rotor blades rotate backwards.

The main anchor cable is led to the rescue system through the cockpit outer surface to the rotor axis, around which it makes a sling. The cable must be made of steel or KEVLAR with at least a 6G rating. The cable must extend at least 2m past the tip of the rotor blades.

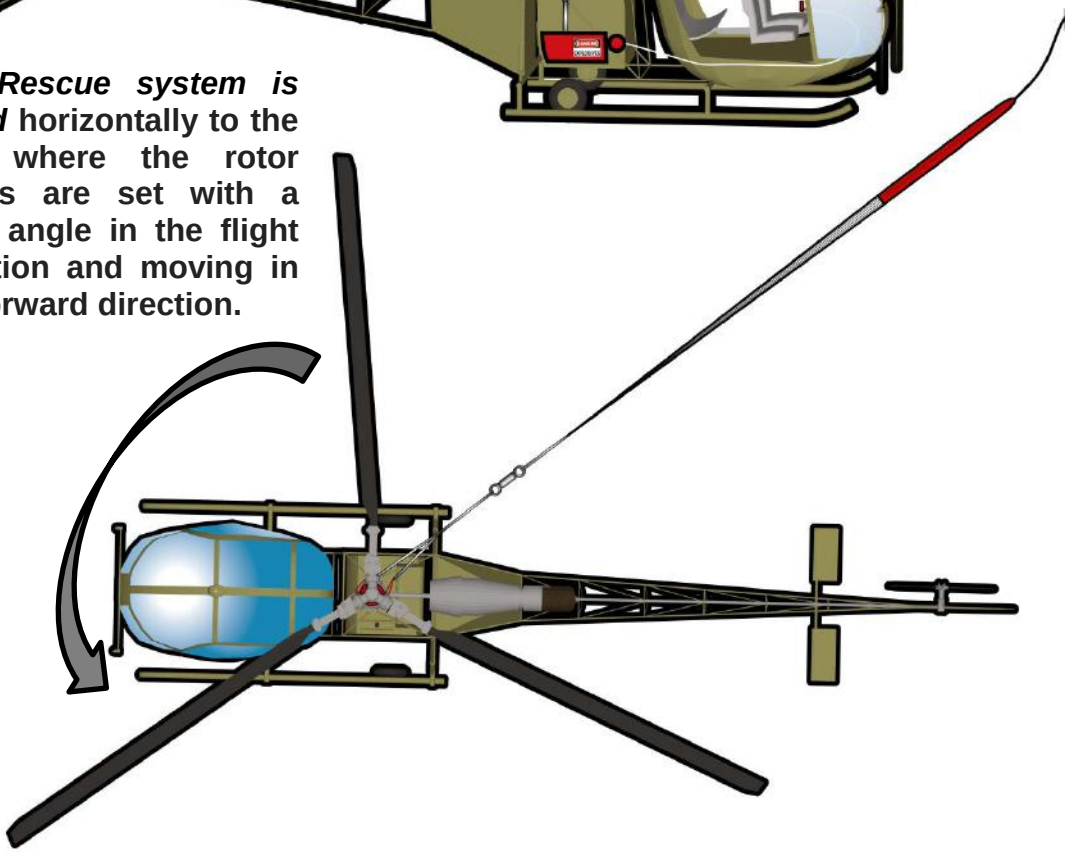
There are two possible solutions for the installation of the recovery system (see below).

Each installation must be reviewed and approved by the aircraft manufacturer!

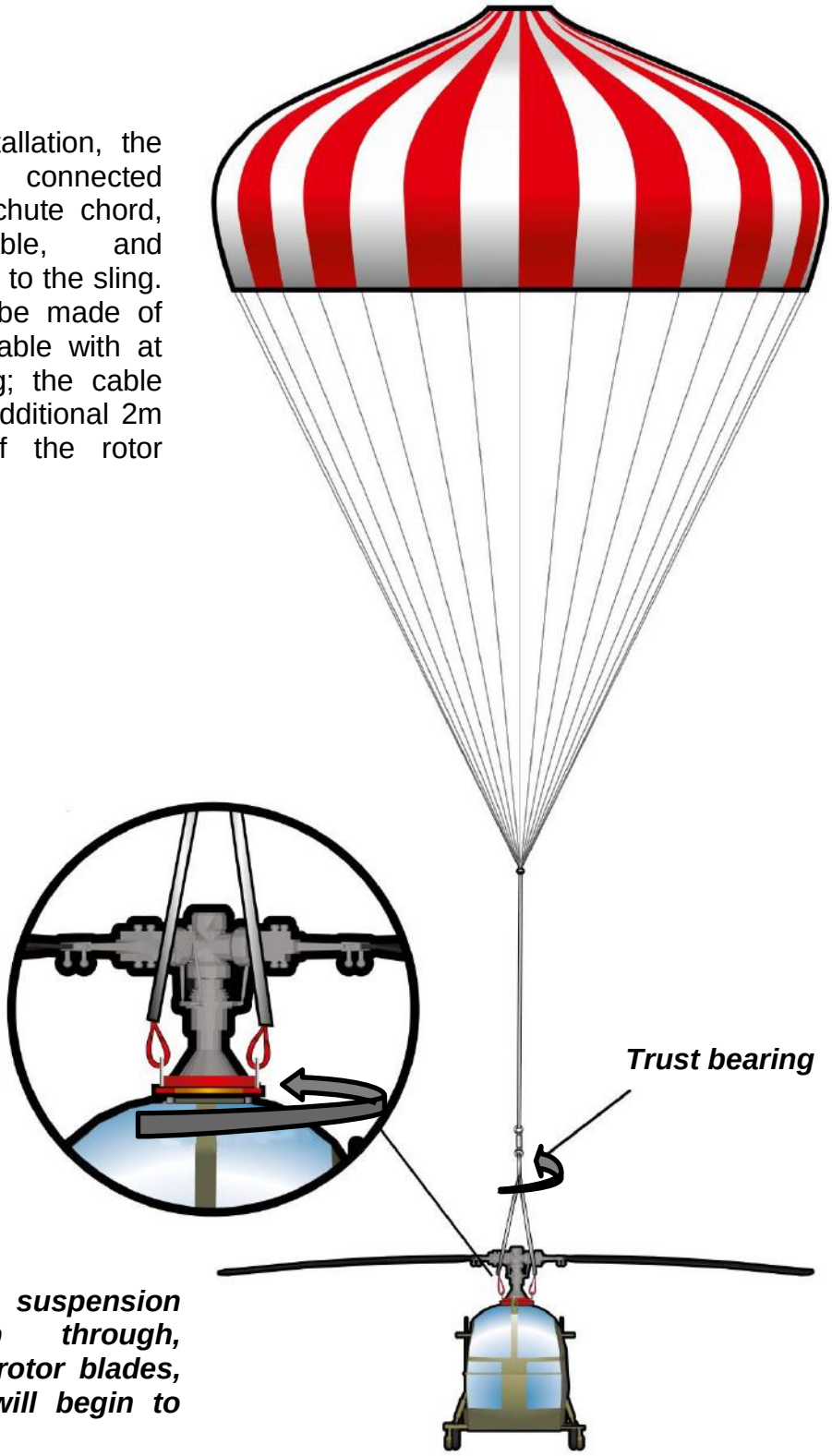
Helicopters



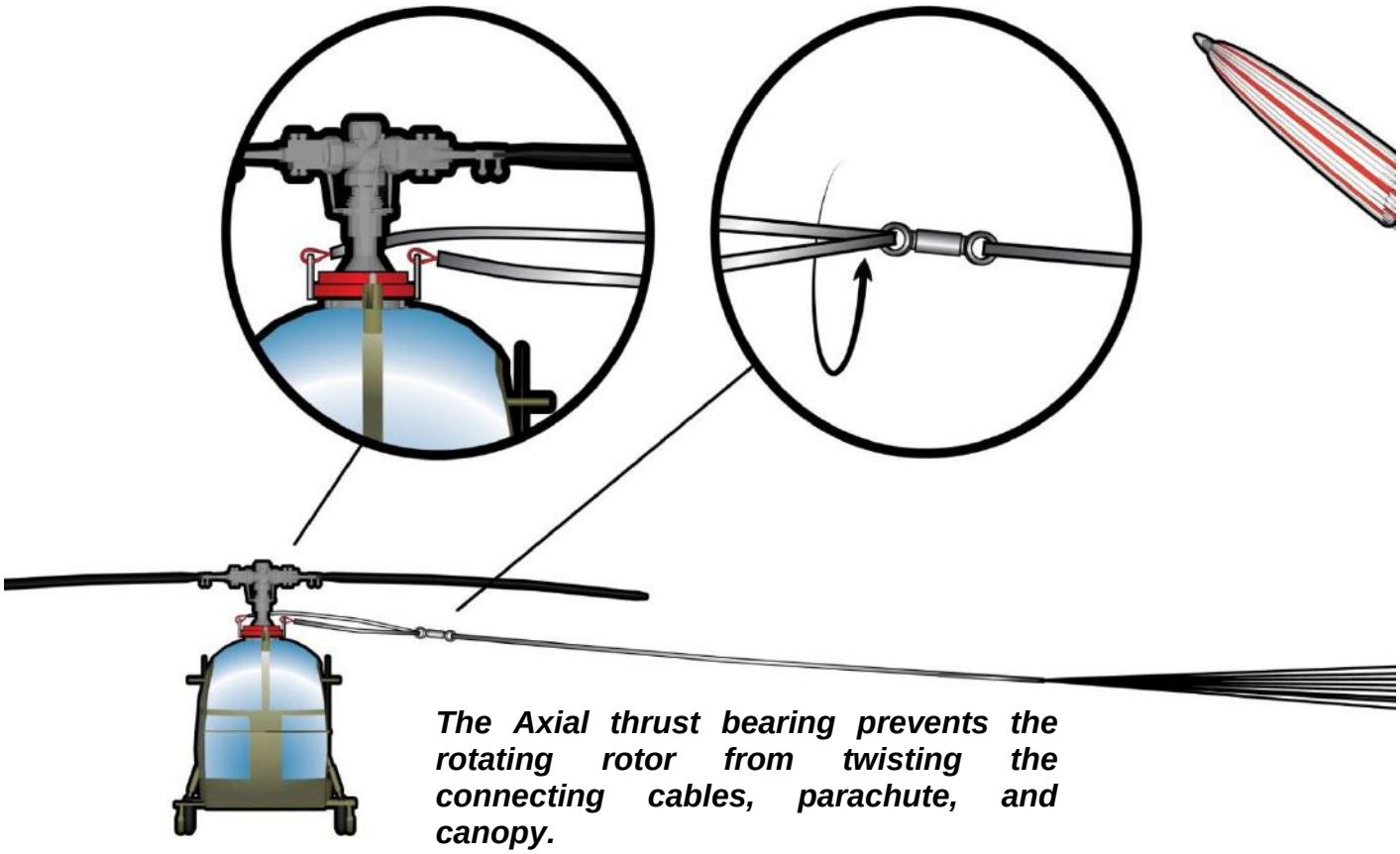
The Rescue system is aimed **horizontally to the side where the rotor blades are set with a pitch angle in the flight direction and moving in the forward direction.**



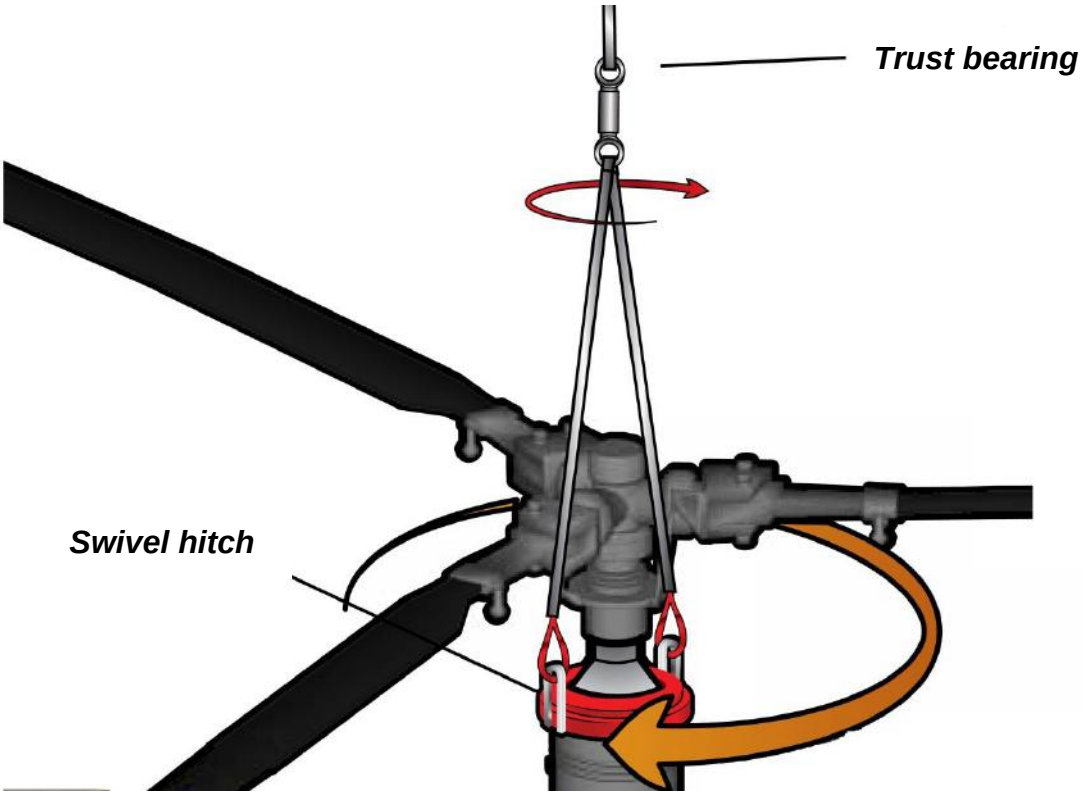
In this installation, the parachute is connected through the parachute chord, connecting cable, and suspension straps to the sling. The cable must be made of steel or Kevlar cable with at least a 6G rating; the cable must extend an additional 2m past the tips of the rotor blades.

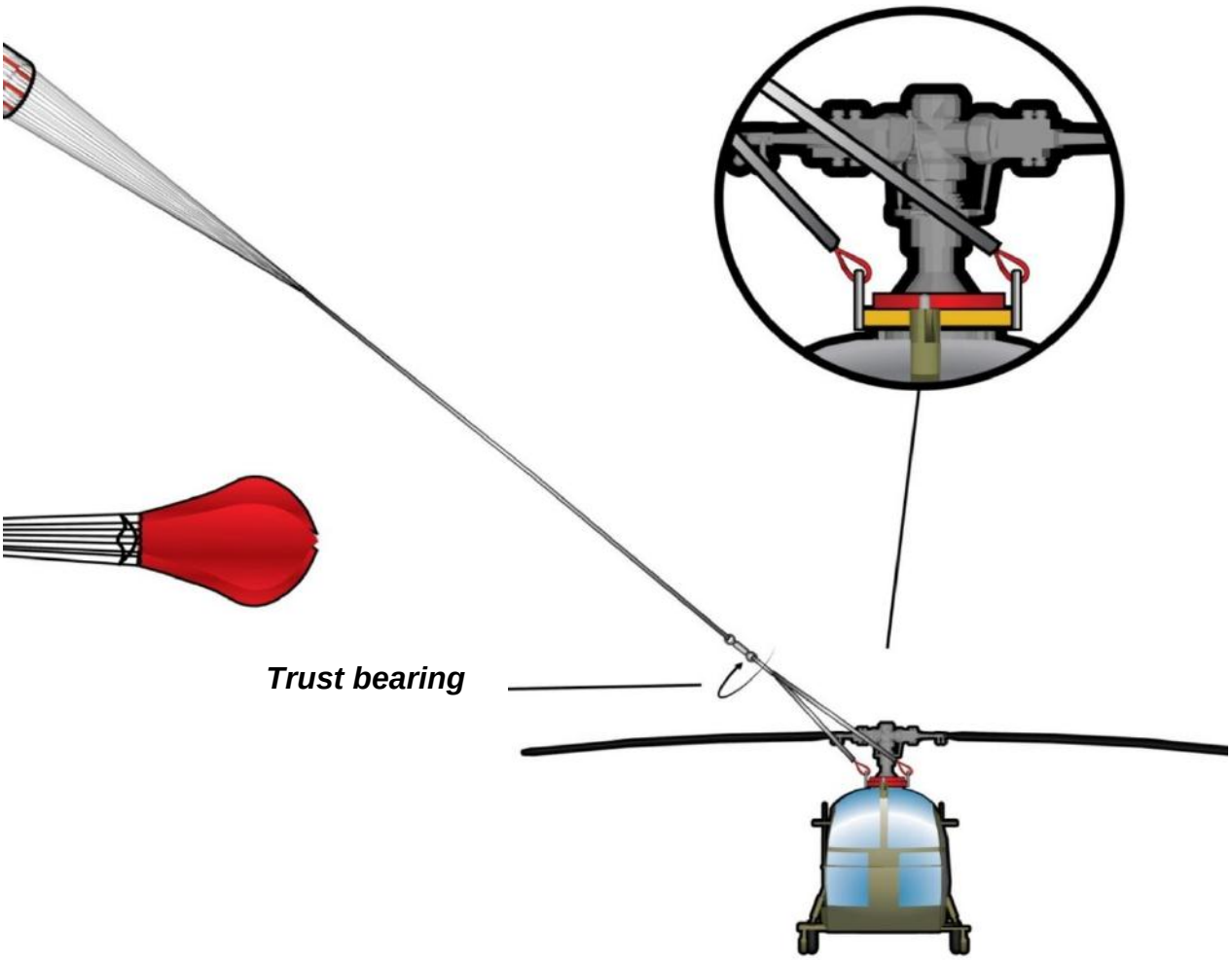


After the suspension straps slip through, between the rotor blades, the canopy will begin to fill.

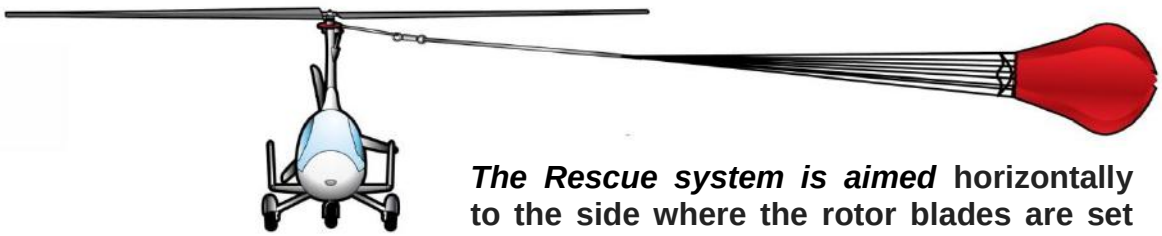


The Axial thrust bearing prevents the rotating rotor from twisting the connecting cables, parachute, and canopy.

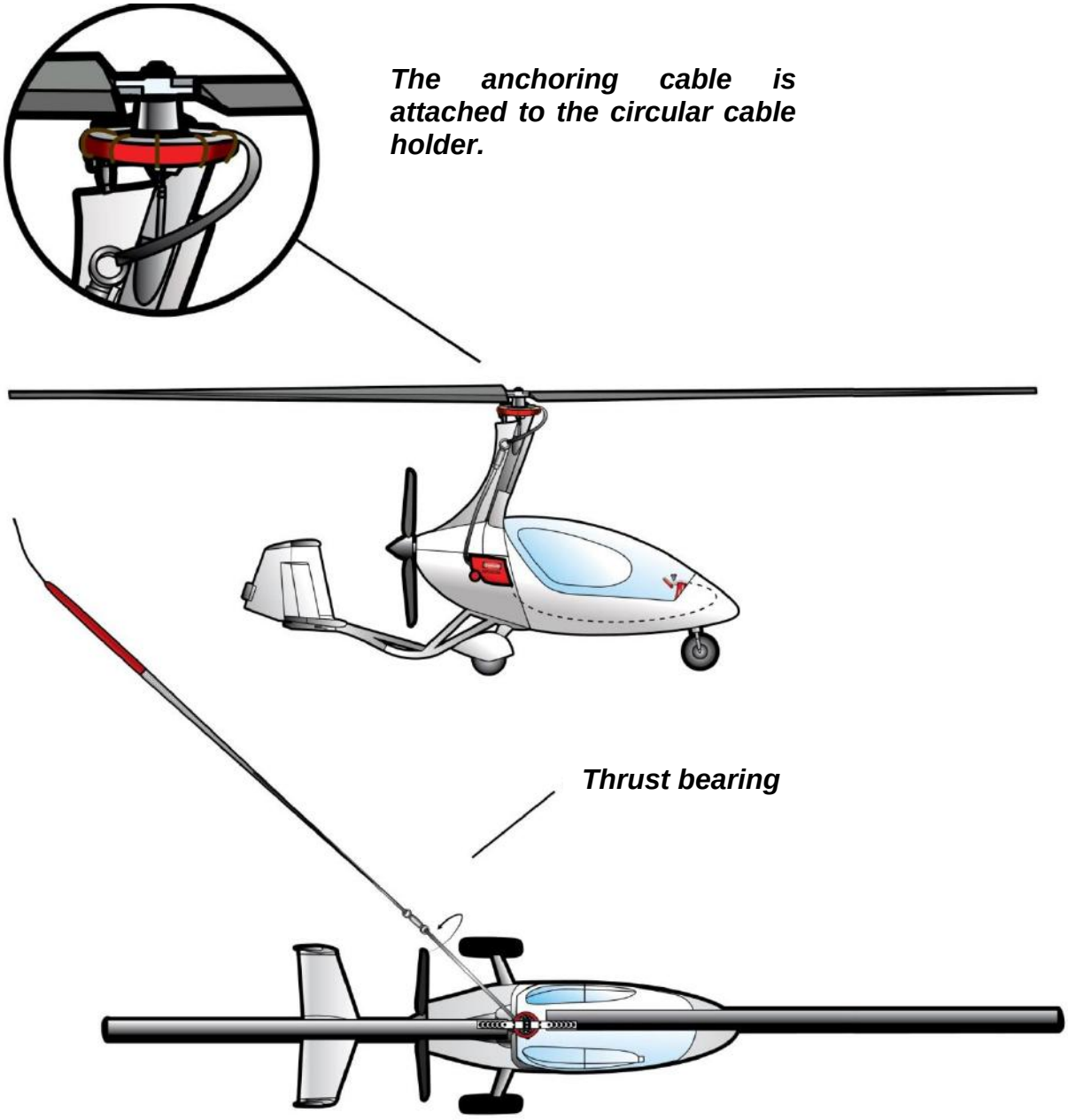


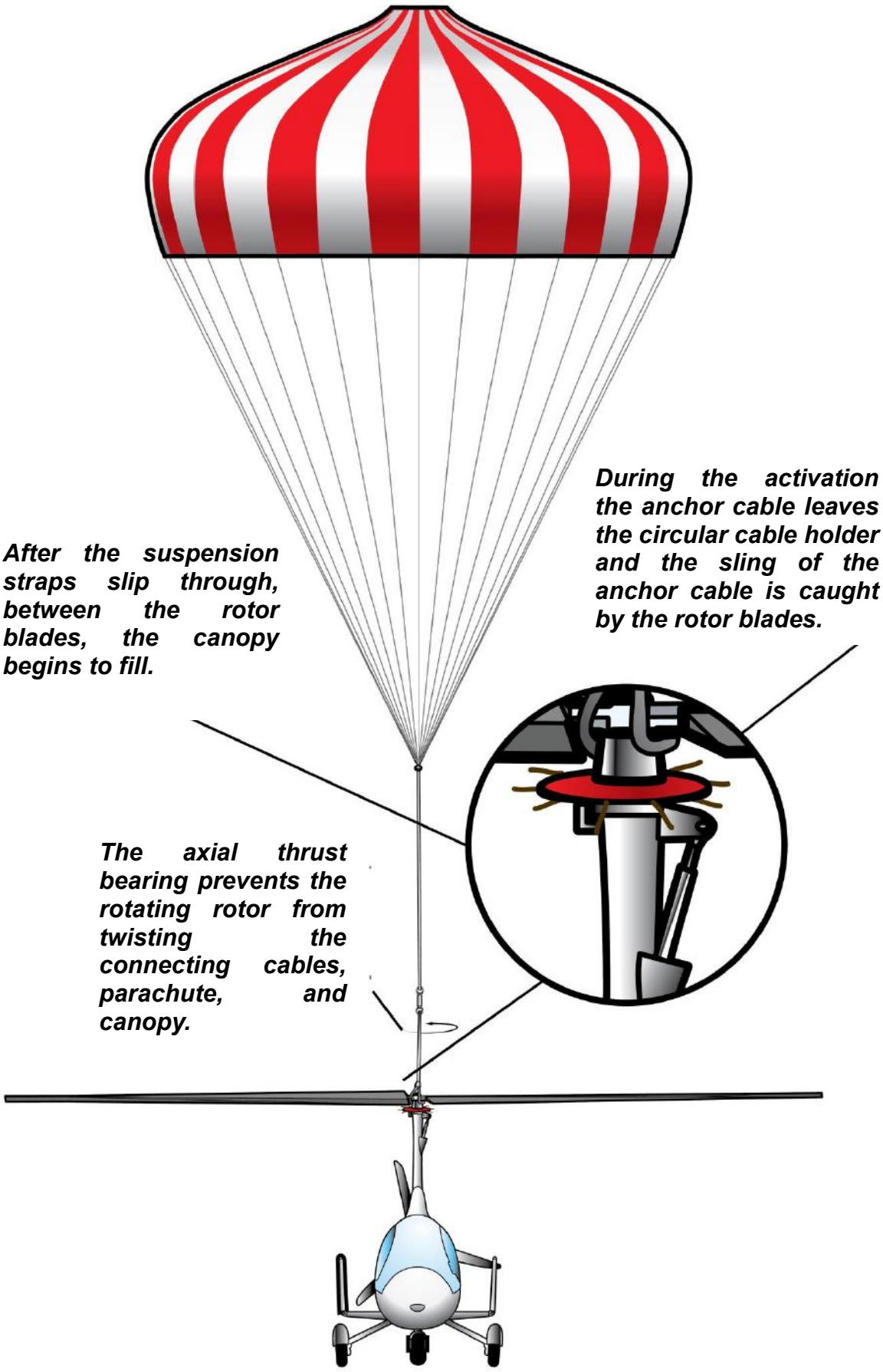


Gyroplanes



The Rescue system is aimed **horizontally to the side where the rotor blades are set with a pitch angle in the flight direction and moving in the forward direction.**


The anchoring cable is attached to the circular cable holder.
Thrust bearing


After the suspension straps slip through, between the rotor blades, the canopy begins to fill.
During the activation the anchor cable leaves the circular cable holder and the sling of the anchor cable is caught by the rotor blades.
The axial thrust bearing prevents the rotating rotor from twisting the connecting cables, parachute, and canopy.

6.2 Location of the Magnum rescue system activation handle

- The handle must be within the reach of both pilots
- There must be two activation handles in cases where the two pilots are sitting in a row behind each other.
- The activation handle must be located so that both pilots see it during the flight with their peripheral vision! This location helps quicken the reaction time to activate the rescue system!
- Do not install the activation handle out of your visual field or in an inaccessible area such as behind your head, on the floor, etc. During an accident, the centrifugal forces may be so high that it would not be possible to reach the handle.

From a physiological point of view, one has the most strength with bent arms around one's lap in the seated position. With the pilots sitting side-by-side, the best location for the handle would be on the instrument panel between both pilots. The handle must be within reach of the hand from a seated position with the neck and back firmly placed against the seat.

!Warning!

- **The activation handle must be easily accessible and away from any control features which may have a similar shape or appearance to prevent inadvertent activation.**
- **The Bowden cable must be secured every 15cm (approx.) to the aircraft structure, while ensuring as large a bend radius as possible without kinks cracks or sharp bends; the minimum bend radius is 20cm!**
- **The handle must be mounted to a solid structure of the aircraft**

!Warning!

Before a flight, remove the pin and activate the rescue system! Immediately after the flight place the pin in and secure it!

Preflight operations, rescue system activation

7.1 Preflight tasks

1) **Inspect the fixations of the rescue system, including the activation handle and rocket**
2) **Inspect the fixation of the straps- there shouldn't be any slack.**
3) **Check that nothing hampers the deployment of the parachute from the aircraft.**
4) **Arm the activation handle**

7.2 How and when to activate the rescue system

A. In critical situations, activate the rescue system immediately, regardless of the flight altitude and terrain over which you are (e.g. in a situation of unavoidable collision, activate the MAGNUM system as soon as possible, in the moment before it comes – sufficiently ahead of it!)

B. Ideal sequence

1. Switch off ignition
2. Pull the activation handle strongly
3. Protect your face with your hands, put your hands and feet together (i.e. „roll into a ball"), firm up your whole body!

CAUTION! It is necessary to get into this position especially:

- During the opening of the parachute!
- During the landing!

4. After the parachute opens, shutoff the fuel supply (if there is enough time for it)
5. Before the landing and impact, tighten your seat belts!

C. In the case of a very immediate risk, pull the activation handle first and then immediately switch off the ignition and fuel flow.

D. It is important to practice and simulate this beforehand as on the simulator

7.3 What does the crew experience during the activation sequence

After the activation, the rocket ignites and ejects, producing a hissing sound as gases escape through the nozzle. Next, the aircraft begins to decelerate at which point there is a gentle jerk as the canopy fully inflates. The aircraft may swing but with a stabilizing tendency. The exact sequence depends on the situation, circumstances of the activation, the position and the altitude. By activating from a higher altitude, your aircraft will have more time to stabilize from the swings and you will have a smoother landing.

Depending on the terrain where you land, your landing will be of equivalent magnitude as hard or a poor landing.

It is important to **stop the aircraft's engine** to prevent the suspension cables from getting caught with the rotating propeller. This is especially valid for aircraft with a pusher configuration.

Closing the fuel valve is necessary to prevent a fire!

IMPORTANT NOTICE:

The activation handle does not have much resistance. The handle becomes loose from the safety position fixed by a flexible pin. Subsequently, there will be approximately 5cm of safety slack in the cable. Next, the resistance will increase due to compression of the hammer spring. When the spring is compressed to the maximum, the hammer is released and hits the ignition which activates the rocket motor of the rescue system.

7.4 After landing procedure

Taking into account the physical condition of the crew and possible injuries, it is necessary to leave the aircraft as quickly as possible.

A) In windy weather the aircraft may be dragged by an inflated canopy. By pulling several parachute lines that are beside one another, you can empty the canopy and minimize the dragging.

B) After a harder landing, when (e.g. not landing on the landing gear) damage to the fuel tanks combined with electrical shorts may pose a fire threat.

C) After landing on the surface of the water exit the aircraft promptly and prior to its sinking. Warning! You can entangle yourself in the parachute while swimming.

D) Before landing, release the cabin door.

Warning!

a) After landing on a hill side, always exit up-hill!

b) After crash landing in power lines do not touch any wires or step out of the aircraft. Call for help; as soon as the electric current is off, you may exit the aircraft.

7.5 Forces the crew is subjected to during opening of the canopy

At maximum approved speed of the rescue system, the forces will momentarily peak at 5.5G. For this reason, every reason, every attachment point must have a minimum strength of 5.5G! Only use cables, straps, and carbiners provided or approved by the rescue system manufacturer.

The aircraft should be hung on the parachute so as it falls to the ground, the wheels will make first contact, this will soften the fall. Best is to have the aircraft slightly nose down to help with the stability and decent of the parachute; this must be taken into consideration when choosing the length of the suspension lines

7.6 Situations in which it is possible to use successfully the rescue system

1. **Engine failure**

over rough or mountainous terrain, where it is not possible to land safely from by gliding. Do not hesitate and activate the rescue system as soon as possible to ensure maximum time for stabilization of swings. Do not hesitate to activate in cases where you are not sure that you will overcome an obstacle by gliding or that you are not sure to reach the area chosen for the landing!

2. **Mechanical failure**

resulting in loss of control or inability to safely land would be valid reasons to activate the MAGNUM rescue system. If possible, choose a suitable location for landing that takes into account near-by power lines, populated areas, forest, and direction of wind.

3. **Medical condition or injury of pilot**

this could be in relation to a heart-attack, loss of consciousness, or disabling injury to the pilot. It is possible for the passenger to activate the rescue system. The passenger must be instructed on the function and operation of the safety system prior to flight.

4. **Pilot Error**

which can be dangerous usually occur at low altitudes. For this reason, you must act immediately; even at low altitudes, there is a chance for a positive outcome.

5. **Short landing**

If it is not possible to avoid an obstruction at the end of the runway by going around, you may activate the rescue system just above ground (min 1m). None-the-less, it is important to continue with the landing and get the plane on the ground as soon as possible. In this scenario, the parachute will start to brake approximately when the wheels touch down.

6. **In-flight collision**

If possible, activate your rescue system before an unavoidable collision happens! In this situation, the sooner you activate your rescue system, the better your chances of survival; split seconds can make a difference!

7. In-flight fire

It is important to try to limit the supply of oxygen and other flammable substances to the fire. In cases where you are not able to perform an immediate, safe, emergency landing, you should activate the rescue system. This would give you a chance to land and get out of the aircraft.

8. Loss of situational awareness due to meteorological conditions, sudden change of weather where continuing operation poses a serious risk for the crew and fuel starvation due to diversion or inability to reach the destination or alternate airport.

Follow the guidelines for minimum deployment altitude. Warning, during poor weather, your visibility and depth perception may be hindered; this is even more so during winter in a snow covered environment.

!IMPORTANT WARNING!

IN THESE SITUATIONS, ACTIVATE YOUR RESCUE SYSTEM WITHOUT DELAY!!!

Be careful of the situation where you would be in strong updrafts. In these situations, it is best to first get away from the updraft, and then activate the rescue system.

Warranty and time limitations

Warranty period

Warranty period is two years from the date of purchase. The date of manufacture and of the purchase is marked in the original manual and certified by the manufacturer.

Service life

This product is designed to serve without the need to re-pack the parachute or replace the motor for a period of 5 years if not equipped with slider (Magnum 250 and 450) and 6 years if equipped, so long as if all the conditions presented in this manual are fulfilled. Regardless, if the system was used or not, the user must send the system for service to the manufacturer at the specified intervals. During this servicing, the system is inspected, the parachute, if not damaged, is aired and repacked, the rocket motor is repaired or replaced.

Before sending the system to the manufacturer, please contact your dealer or manufacturer to arrange for a safe transport of the product to the manufacturer!!!

!!!Before sending the rescue system, always inform the manufacturer!!!

The shipment must be arranged to meet all conditions required for the transport of class 1explosives in accordance to IMDG CODE with the classification 1.4 G.

If it is not possible to notify the supplier and arrange a shipment, the user must personally deliver the system at his own expenses and risk. We recommend to keep and preserve the original transport packaging, incl. the foam inserts, or to order a new set from the dealer or the manufacturer.

The life cycle of the product with 5-year service interval is 15 years and for the 6-year service interval product, 18 years.

The manufacturer reserves the right to satisfy all request for conditions described in this manual!!!

After the expiration of the maximum service life of the product, it is possible to extend the service life of the product. It is the manufacturer's decision to evaluate the actual condition of the product, and under which circumstances the product could be used further. If the rescue system is at the end of its service life, it will be disposed of by the manufacturer.

MANDATORY REQUIREMENTS !!!

It is prohibited to expose the fiberglass or duralumin MAGNUM rescue system to rain and humidity for extended periods of time. The Softpack design must only be kept in dry environments, and secured away from excessive vibrations, sudden shocks, contact with acids, aggressive oils, and fluids. The system should be protected from improper handling, mechanical damages of parts. It is forbidden to ship the product without the original packaging and safety system (not heeding this may cause an accident during the delivery of the product and **threatens the life of the courier.**

Furthermore, it is forbidden to dismantle individual components of the system or to damage the lead tamper seals. It is important to treat the system as a pyrotechnic device and to handle it as if it were a weapon with its safety deactivated! Be especially sure to maintain the safety guidelines during installation and servicing!

The manufacturer is not responsible for incorrect handling of the MAGNUM product, and the use of the MAGNUM system is solely at the risk of the user or pilot.

All guarantees of the manufacturer to the owner (or operator) is void. Every pilot is responsible for his safety and must take care to ensure that the aircraft and MAGNUM rescue system have been properly checked and used according to the manufacturer's instructions.

The manufacturer's tips:

After installing the system, insert a drawing or schematics of the location of the rescue system and all parts related to the installation of the system to the aircraft. The location where the rescue system penetrates the skin of the aircraft shall secure a positive and successful function of the rescue system. After mounting the container to the aircraft, the rocket must be aimed at the designated skin structure. See figures.

From the pictures, it must be clear if there is anything in the path of the rocket and the mounting location. Consult with a dealer or manufacturer your intended place of installation.

Warranty items not covered by the manufacturer

If the installation is done not in accordance with the manual, or is modified in any way, the manufacturer does not guarantee its function. Special consideration is necessary for the proper placement of the suspension straps. When the rescue system is activated, the straps must not endanger the crew, or get caught in the structure; their integrity must not be threatened when under tension. Take care, that all loops and ends of straps are properly secured and tight! During the activation process, slack in the suspension strap which is being taken up may damage the cable.

It is forbidden to dismantle in anyway the parts of the rescue system and to use non- original pieces. Such activities could endanger your life. The manufacturer does not guarantee product where non-authorized servicing has been performed! Do not change any parts and do not assume that you can buy the same quality parts from other suppliers.

The MAGNUM rescue system is intended only to assist in emergency situations. The use of the rescue system is intended for unexpected situations which can result in death or severe injury. Company STRATOS 07 may have no influence on the outcome and therefore from all obligations coming from such situations.

Securing the rescue system

The Magnum system is secured with a central locking pin. Remember, that the installation is done with a locking pin secured in the lock; the same applies when shipping or handling the rescue system.

The only time when the system should be armed (unlocked) is during take-off, landing and flight.

The manufacturer does not expect that the absence of servicing of the rescue system within the service interval would cause a system failure. The ignition system is provided with a back-up(fail-operational system); the engine is produced by a brand name manufacturer. In addition, the canopy, and other supplied components are the product of years of design experience, testing and real life experience

MANUFACTURER'S WARNING!

After any damage to the system (e.g. due to crash where system was not activated), requires the user to secure the rescue system with a safety pin. Additionally, no one is allowed to position themselves in the path of the rocket!

It is essential to contact the manufacturer immediately after an accident and follow the instructions of the manufacturer so as not to risk anyone's life**.**

This is especially essential in case where it is not possible to secure the system against launch with a safety pin or if the condition of the rescue system is not known. In these cases it is necessary to contact he manufacturer immediately. For these reasons, the location of the rescue system must be placarded with a label on the aircraft in the area where the MAGNUM system can be found. Additionally, the area where the rocket motor pierces through the fuselage, resp. through the aircraft outer skin must also be properly labeled!

!!! Do not manipulate with the device!!!

Technical specifications

Please consult the tables and recommendations in this manual. There is a suitable rescue system for every type and size of aircraft up to 2.5 Tons; STRATOS 07 offers numerous solutions for a variety of aircraft types. We recommend to consult with the manufacturer or with the authorized dealer of the aircraft prior to installation!

Specifications of the rocket – see the main schedule – Rescue systems

Maintenance of the Magnum rescue system

1. Maintenance and the responsibilities of the owner or operator of the MAGNUM system

During the pre-flight inspection, it is essential to inspect all the attachment areas of the rescue system, its general condition, and check for any damage.

It is important to store the rescue system in a dry environment and to keep out of direct UV light, radiant heat, and chemicals. Inspect all fasteners and attachments to make sure they are properly tightened; inspect that the rocket housing and rocket motor is properly secured! Pay special attention to how the activation handle is secured, how the parachute is secured to the aircraft structure, and that straps are tight and secure with carabiners locked!

Warning! The quick tensioning of the suspension strap during activation may cause the strap to be damaged by wear if the knot is not properly tightened. For this reason, ensure that all knots are properly tightened and secured with electrical tape or other means.

2. Service and maintenance of the rescue system after 5, respectively 6 working years

This servicing is understood as the inspection of the rescue system after 5 or 6 years (depending on the type of system). The manufacturer performs service on the rescue system as described in the operations chapter.

1. The mounting of the rescue system in all points – as above-mentioned

2. Protection against humidity and other contamination:

Although the duralumin and fiberglass casings are resistant to humidity, prolonged exposure to rain or humidity may damage the system and prevent it from operating as intended.

Warning! The duralumin and fiberglass containers, in addition to other parachute parts must not come in contact with petroleum products; this applies to the Softpack system as well.

The Bowden cable, which connects the activation handle to the rocket, is lined with silicone to reduce friction and reduce required maintenance.

Inspect the Bowden cable for kinks, sharp bends, and other damage. If the cable is damaged, it shall be replaced. Even small kinks or cracks in the sleeve of the Bowden cable warrant its replacement.

3. Mechanical parts damages of :

- The container
- The cables
- The Bowden cable
- The rocket housing

What to do with a damaged parachute?

The rescue system must be immediately returned to the manufacturer for service for the following reasons: after being in contact with water, suspicion that water has entered the container, destruction or damage to the container, bowden cable, handle, rocket housing, or securing straps, compromised seal on the cap.

If you question the reliability of the system for any reason, contact the manufacturer immediately!

!!! Warning !!!

These instructions are not valid only for the rescue system, but as well for its parts, such as the suspension cable, suspension straps and the carabiners. Any damage to them or their protective packing, e.g. the UV radiation cover belts, could result in serious consequences.

How to keep the rescue system functioning properly

It is required that the rescue system shall be inspected prior to every flight as described above.

Special care must be given to all joining surfaces (fasteners, properly sealed cover, strap condition etc. Vibrations may loosen the system parts causing its failure. It is not necessary to check the rescue system itself; inspecting the condition is sufficient; it is maintenance free. We inspect signs of possible damage, its parts and especially the duralumin container. Damage may occur from stones flying off during landing or departure, petroleum leaks, high humidity etc.

- ***Humidity and other contamination***

Duralumin or laminate containers protect the parachute against humidity, but these are not waterproof. Strong rain, frequent rain, or long exposure to rain may cause humidity to enter the case and cause it from functioning properly. Be careful when refueling so as not to contaminate the rescue system with fuel which could cause the system to function improperly. If you suspect the rescue system may have been contaminated by fuel or petroleum products or if you suspect that the water has been in the casing, send the product to the manufacturer for inspection.

- ***Material degradation due to ultraviolet radiation***

Material degradation is caused by exposure to direct sunlight. Non-natural materials are more susceptible to these processes and this happens in shorter period of time. The result of this is also negative and causes the system to function improperly. For this reason, it is important to send suspension straps for the 5 or 6 year inspection check also.

- ***Soiling of the MAGNUM rescue system***

In the event that the rescue system is soiled or that the tamper seals are broken, the manufacturer must be contacted. The manufacturer will review how to go about ensuring that the safety system is functional. In most cases the manufacturer will need to inspect the system at their facilities.

- ***Prevention of an accidental activation of the MAGNUM rescue system***

It is necessary to treat the system as a loaded weapon and to secure it after landing to prevent an accidental activation. The activation of the system is especially likely around children, unauthorized personnel or improper movement. For these reasons, it is important to insert the locking pin upon landing.

- ***When scheduling the maintenance – always contact the manufacturer!***

The expiration of the service interval is after the date stamped on the rocket housing. This date is also written in the warranty certificate of the MAGNUM system.

!!! The un-installation of the rescue system is the reverse process of installation. The activation handle must be secured before you begin to uninstall! The rescue system is inserted into the original cardboard, that you have kept (if not, order a new one from the manufacturer).

Place the stickers on the shipping box as per section 4.1 of this manual. If you have any problems sending the rescue system back, please contact the manufacturer for additional information and assistance.

! Important note !

If you are sending the product from outside of the Czech Republic, (country of manufacture) you must include in the shipping documentation that the system is being returned for service. If you do not state this, STRATOS 07 may be charged a customs tax which would then be passed on to you.

!!! Warning !!!

The user must send the product back to the manufacturer after the life cycle (15 or 18 years) of the product. The manufacturer will carry out its delaboration and arrange fuel disposal in accordance with applicable law!

Manufacturer will send RS back to the customer after this operation.

! Manufacturer's request !

Please immediately contact STRATOS 07 if the system is activated!!

Thank you!

STRATOS 07 S.R.O.

WARRANTY CERTIFICATE

STRATOS 07 S.R.O.

The product was made according to the approved design documentation with a registered patent. The manufacturer guaranties the proper function and flawless operation for 5 or 6 years and the manufacturer may extend the warranty period for another 5 or 6 years.

The warranty does not cover:

- **Flaws caused by improper use.**
- **Flaws caused by unprofessional manipulation, or modification(s) of the product.**
- **Flaws caused by improper handling and manipulation which is not in line with the product design.**
- **If the damage was caused by the transportation.**
- **Due to improper storage.**

When claiming the warranty service or repair it is necessary to present the warranty certificate with the date of purchase with the signature and the dealers stamp.
The warranty period extends for the time the product was in the service or repair.
The warranty information is also on sticker label on the container.

Type: **MAGNUM**

Serial number:

Date of issue:

Signature + stamp:

Next service date I	Next service date II	Next service date III
Service I completed on	Service II completed on	Service III completed on

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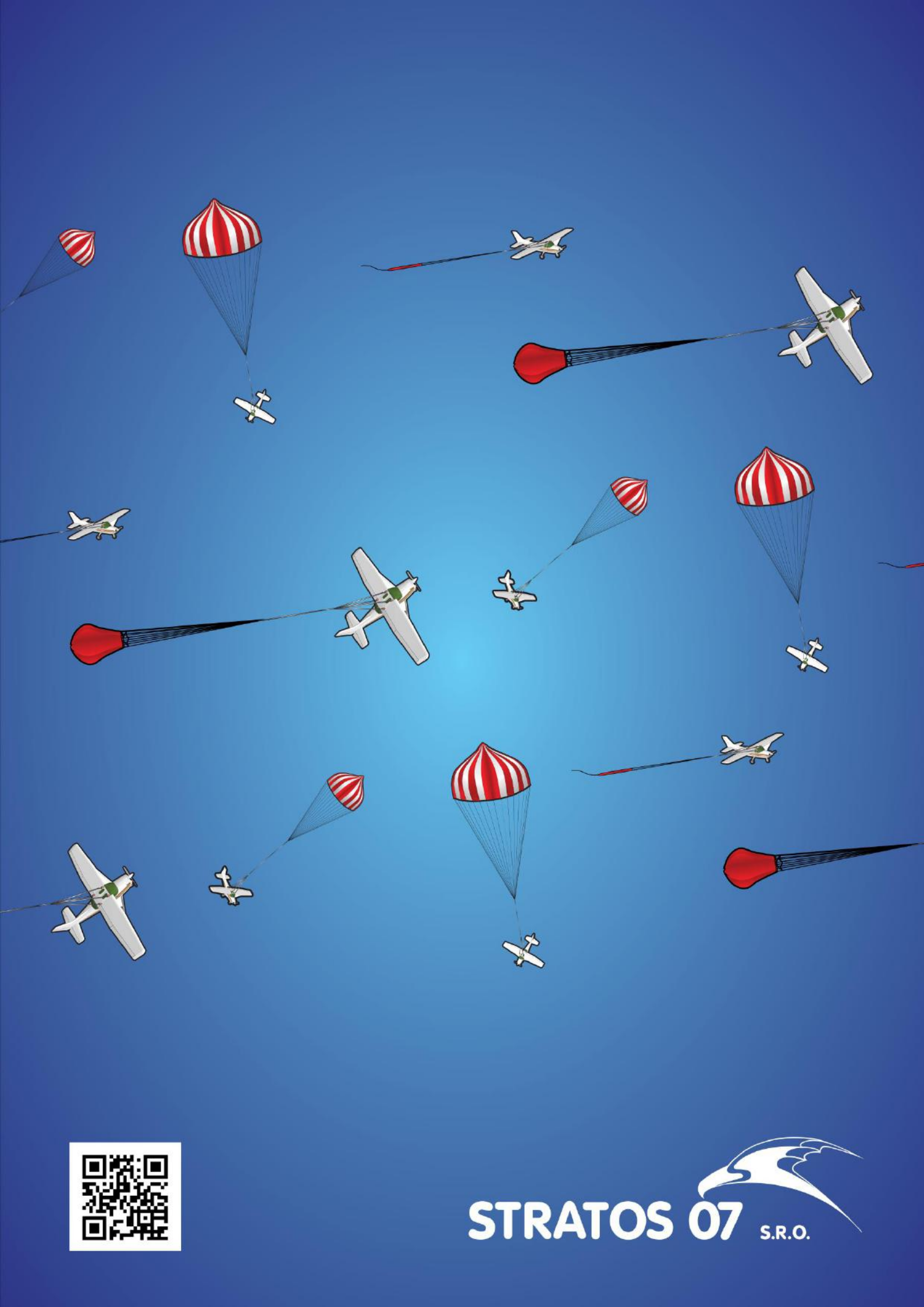

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