

# Manual for mounting and use



## RESCUE BALLISTIC PARACHUTE SYSTEMS SERIES MAGNUM



**User of this system is obliged to get acquainted with this manual !**

Read please this manual attentively and whole and only before you begin either to handle in any way the rescue system, or you board an aircraft with the system MAGNUM built in!  
In the manual you will be informed how to manipulate with the system safely, in order not to menace the life of you, or of your surroundings and how to install it to work properly.  
Last but not least you will get to know how and in which situations to use it, for rescuing your life.

## **IMPORTANT WARNING!**

The firm Stratos 07 retains the right to revoke the guarantee for the faultless function of the system MAGNUM and revokes any responsibility for the safety and danger of persons manipulating with the system MAGNUM and third persons in case that the undermentioned directions for operation and manipulation with the rescue parachute rocket system are not observed!

Before the manipulation with the rescue system MAGNUM is everybody obliged to get acquainted with the enclosed manual for mounting and operation! Except for reminders given in the manual is the owner of the rescue system obliged to respect especially important undermentioned warnings!

## **WHAT IS FORBIDDEN**

- 1) Any other manipulation with the rescue system than that given in the manual is forbidden
- 2) It is not allowed to dismantle and otherwise to disassemble the rescue system MAGNUM under any circumstances!
- 3) Dismantleable parts of the rescue system are sealed with red paint, by Logtit (a safety glue for connecting materials), by a safety wire, that must not be damaged!
- 4) Before the mounting it is forbidden to aim on persons in the neighbourhood or on the own body and it is necessary to handle the rescue system MAGNUM as a pyrotechnic device, similarly as a released weapon! It is forbidden to any person to move in the direction of the shoot!
- 5) It is forbidden to operate the rescue system after the lapse of 6 years or after the usable time lapse marked out on the producer label and after the service time lapse of 18 years at rescue systems with a slider and after 15 years without a slider; in this time it is necessary to make the system control and the change of given parts at the producer!
- 6) Should an aircraft be taken out of evidence is the operator of the rescue system MAGNUM obliged to inform of it the producer, who will take necessary steps to liquidate the rescue system or to put the rescue system MAGNUM again into circulation.
- 7) It is forbidden to transport the rescue system in another way than in the original transport box. The handle must be safely locked with a small lock with a warning pennon!
- 8) Of any transport of the rescue system MAGNUM e.g. to a control is the user of the system obliged to inform in advance the producer.
- 9) It is forbidden to store the rescue system MAGNUM at other temperature than 14-24 °C and by the air humidity 35-73%.
- 10) It is forbidden to expose the rescue system Magnum to high temperatures, heavy bumps, mechanical damages, acids, aggressive chemicals, long-lasting storage in high humidity or in dusty environment.
- 11) It is forbidden to mount the rescue system MAGNUM on the vibrating aircraft parts as motor beds or aircraft landing gear!
- 12) a) The rescue system MAGNUM (metal sheet or laminate container) has to be mounted to the frame of the aircraft min. by four screws M6 G in order to allow not its unplanned release, or activation. Used nuts must be self-protecting, or safeguarded by loctit.  
b) The system Softpack is mounted to the frame of the aircraft by a parachute line of the strenght min. 150 kg. To two strips of webbing sewed to the container. But its weight must rest on the prepared bearing. The rocket carrier is clamped appropriate to the rocket type by four provided screws (M6 G8) / it is not valid for rocket carrier welded to the container, or revolving, that are clamped in another way by the producer.

- 13) In the aircraft, or sports flying means, must be the starting handle of the rescue system MAGNUM out of the fly time provided by a lock, or be in another way safeguarded against an accidental start! If safeguarded it must be always provided by the warning pennon delivered by the producer!
- 14) After the lapse of the 6-years service life is the original rocket motor refilled, or changed for another one - minor repaired or for a new one. The canopy is unpacked, controlled, aired and repacked. The whole rescue system is put to the revision and brought to a perfect state and released into the operation. The rescue system with the slider for the time of another 6 years, without the slider for the time of 5 years. The user is obligated to show at the revision or after using of the system the guarantee certificate which he got at the purchase. It is forbidden to activate unprofessionally the rocket motor before the dispatch, or to interfere in it, or to dismantle it. He could menace your and your neighbourhoods life!
- 15) It is forbidden to place the rescue system MAGNUM with its shot axis aiming down.

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## **PART 1. SPECIFICATION OF THE RESCUE SYSTEM MAGNUM AND FURTHER IMPORTANT INFORMATION**

Dear customer,

we congratulate you on the purchase of your new rescue system MAGNUM. You did choose a product which, as we believe, reaches the highest quality of its own and which passed on the basis of the decision of the **Český báňský úřad (Czech Mining Office)** demanding tests 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, and IATA-DGR and got the certification of the type product by the issue of the **Type Certificate LAA ČR** on the basis of authorization of the Office for civil aviation §81 section 2 Civil Aviation Act No 49/1997 Dig. of 21.3.1998, the **German Certification DULV No. R 21/01 – 1 Deutscher Ultraleichtflugverband** of 10.1.2001 and DAEC. Further **The Certification for Import and Use in the USA.**

The rescue system MAGNUM got the certification by the **German State Office BAM.**

The firm STRATOS 07 offers you a rescue system of a new generation, that is activated by a rocket motor. The system is intended for the rescue of the crew incl. the aircraft. Rescue systems MAGNUM are intended for 1-2 seats hang-gliders, motor-paragliding, ultralight aircrafts, ultralight gliders, the class experimental and S LSA. The product is certificated at LAA CZ, USA, DULV and DAEC Germany, Ssec of the French Association UL and fulfills the requirements for sale of rocket systems.

The firm STRATOS 07 has its seat in Prague, Czech Republic. The staff is at your disposal in full-time work load prepared to answer your questions connected with the installation and questions of technical nature concerning the rescue systems MAGNUM.

Business hours: Mo – Fr from 9,00 AM – 4,00PM

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## **PART 2. USE OF THE RESCUE SYSTEM**

**Rescue systems MAGNUM give you a chance of rescue in crisis fly-situations even at a low altitude. It is rewarding to use them nearly in every critical situation!**

### **2.1 Situations when it is possible to use the rescue system MAGNUM:**

- 1) Engine failure over a rugged terrain: where it is not possible to land safely. You must activate the rescue system MAGNUM in time with respect to its technical parameters especially with regard to the producer-defined minimal altitude of use! ( In case you have time before the landing, switch off all electric circuits and close the main fuel pipe, or change over to the tank with less fuel!)
  
- 2) Loss of aircraft control: a) because of a technical defect b) loss of piloting control during bad weather conditions c) loss of piloting control on other reasons. You must activate the rescue system MAGNUM in time with respect to its technical parameters and to the minimal altitude of use! Pay attention to strong wind! After the landing leave immediately the aircraft! ( In case you have time before landing, switch off all electric circuits and close the main fuel pipe , or change over to the tank with less fuel!)
  
- 3) On pilots health problems of a nature not allowing him to continue the flight safely (heart attack etc.)  
In such a situation does the activation of MAGNUM the pilot, or the fellow traveller, who has to be informed of the rescue system function before the flight! The resolution of the activation must be reached in the shortest time, but if it is possible with respect to the choice of a safe landing place! This situation justifies apart from other things the location of the main activation lever on a place easily available from both seats, or the installation of two activation levers, especially at the arrangement of the pilots, when they are sitting one behind the other! ( In case you have time before the landing, switch off all electric circuits and close the main fuel pipe, or change over to the tank with less fuel!)
  
- 4) The loss of the pilots orientation because of bad meteorological conditions, threatening of a crash with an obstacle, during reduced visibility, the fuel quantity does not make it possible to reach a safe landing place.  
If it is possible to activate the rescue system over such an area where there are on the earth no obstacles as electric lines, buildings, rocks, etc.  
Do keep the minimal recommended altitude for activation of your MAGNUM. Attention, in bad weather and during reduced visibility may be your estimates very distorted! This is double valid for flying in winter in a snow-covered landscape! (In case you have time before landing, switch off all electric circuits and close the main fuel pipe, or change over to the tank with less fuel!)
  
- 5) Mechanic defect makes impossible safe continuing of the flight and a safe landing. With the system MAGNUM are registered rescues with the propeller destruction, engine failure after the start in a low altitude, engine failure in a low altitude over the town build-up area, steering system locking, loose of steering flaps , loose of wings during the fly into the turbulence area behind a strong fighter or bomber, by loose of lifting surfaces due to the flying through areas with a strong turbulence at high speed, by aircraft fall due to emergence of strong icing, etc.

In all these and similar cases were the crews rescued due to their immediate decision to activate the rescue system MAGNUM. Think of it, in cases of aerodynamic violation of your aircraft and especially of its asymmetrical nature could come such a flight mode, when the centrifugal forces would prevent during the fall any your movement of arms and so as well the activation of the rescue system! ( In case you have time before landing, switch off all electric circuits and close the main fuel pipe, or change over to the tank with less fuel!)

**There are much more situations, when you could successfully use the rescue system MAGNUM. But it is possible to apply on them the above-mentioned instructions.**

## **2.2. Duties of the owner and the pilot of an aircraft provided with the rescue system MAGNUM:**

The owner or the pilot has to read completely this manual before the mounting of MAGNUM on the aircraft, or before the flight with an aircraft mounted with the rescue system MAGNUM! Of the function of the rescue system must be informed the fellow passenger as well! For the information of the fellow passenger is responsible the pilot.

**Attention! Disregard of the instructions mentioned in this manual could cost you your life!**

## **PART 3. INFORMATION OF THE RESCUE SYSTEM MAGNUM, DESCRIPTION OF ITS FUNCTION**

The rescue systems of the series MAGNUM are designed in order to let their construction to secure a correct function with a reserve and to give the largest opportunity for the rescue without any consequence.

The parachute canopies are lifted as to the type by specially designed and tuned rocket engine. Burning time moves from 0.5 – 0.6 s (according to the type of the rocket engine of the rescue system and the relevant ambient temperature in the time of its use). The rocket engine is placed in the rocket case, After its activation by the activity handle is the movement mechanically transported by a Bowden cable on a percussive device, which activates two percussion caps and they the load in the rocket box. By influence of the load burning comes to the production of gas, that escapes under a high pressure from the rocket box out, the rocket moving takes place in the direction out of the aircraft. The rocket breaks the specially adjusted hole coat in the aircraft cover. The rocket has a cutting point enabling the breaking through softer materials. The gases come out, the rocket pulling cable releases the cap of the parachute container. Out from the container is pulled the parachute protected by the sliding sleere. After its lifting takes place the pushing back of the sliding sleere and the canopy load.

Canopies of the rescue systems MAGNUM are designed to be filled in the shortest possible time, but with maximum possible impact muffling during the canopy load It is necessary to know, that rescue systems designed for higher speed need a longer time to open. They must open continuously and gradually to secure a gradual speed lowering and a possibly smallest over- gravity (dynamic impact).

### **3.1. Types of system designs**

- 1) MAGNUM systems are supplied in the design, when they are impressed into a duralumin cylindrical container covered by a coat, with the rocket case fastened firmly on it, or with a moving rocket case with this it is possible to aim to the sides. The container is fastened to the aircraft by two stainless strips and a stainless universal prismatic support with four screws M-8.
- 2) In the system design Softpack is the parachute placed in a cloth container. This has

on the back part two, on several places quilted straps that enable to stick it to the aircraft in various places of the strap, convenient to the frame of every aircraft where it should be mounted. The container must be fastened on every side minimally on two places in whole minimally on four places and it by a safety strip, a belt or a line each of min. strength 100 kg. They must be carefully secured against the loosening!

The Softpack should lie on an underlay as to do not extremely strain its suspensions. The case with the rocket is fastened by four screws M-5 to the firm structure of the aircraft. The connection between the parachute and the rocket is secured by a steel hauling cable shaped as "V". Thus is the rocket cable connected with the pull cable of the parachute with a silencer by a screwing strength snap-hook. The activation handle is connected with the rocket motor launcher by a high strength Bowden cable with Teflon surface inside. A Bowden cable of such construction secures smooth running of the cable inside and prevent enough the accidental launching of the system because of its unwilling load (caused by outside strength, a step, etc....)

3) The system placed in a laminate container is designed for float seaplanes. The rocket case is flexible and is anchored on the back side of the container.

### **3.2. MAGNUM rescue system launching**

Before the flight during the pre-start operations and the whole time of the flight must be the rescue system released! Do not forget to remove from the activity handle the lock or the locking pin!

Through pulling the activity handle comes to its releasing from the safety handle catch. Follows the free safety running of approx. 3-5cm. During the continuation of pulling grows moderate resistance till maximal strength of 12 kg. The motion transported by the Bowden cable to the launch winds up a mechanic chiming device. When it reaches the top dead center, is the chiming spring maximum compressed, starts the firing pin that activates ignition of two primers and they start the ignition of the power ignition and the burning of the firm fuel. The whole device is designed to work reliably, to be most simple and without unnecessary structural complications. After the rocket motor launch nothing falls from it (excepted the plastic limiting fitting piece and the rubber coat of the rocket case, protecting the rocket from the water). The reverse impact on the rocket case is minimal, it is not necessary to install any steps to deflect the gases from the rocket motor. The combustion curve of the rocket motor is designed to pull out to parachute most quickly and with a sufficient reserve. The rescue system MAGNUM is constructed so, that the gradual pull out of the canopy by the rocket motor is accelerated by the effect of aerodynamic forces during the aircraft motion. This construction helps to a more quick pulling out and unrolling of the parachute.

The canopy hidden in the canopy cover is by the rocket motor briskly pulled out of the aircraft together with the lines and the suspension cable. The canopy cover stripes back from the canopy in the direction of the pole hole and over it, as to load the canopy smoothly and symmetrically and this as well at low as at high speeds. This construction prevents chaotic canopy filling and prevents its damage. It eliminates its damage during the pulling out of the aircraft at the activation and reduces the excessive impact at its opening, restricts asymmetric filling of the canopy.

At some parachute types is the excessive overload at its opening reduced by a slider.

After the burn-up remains the rocket motor hanging on the canopy. The surrounding is not threatened by the falling rocket. The canopy damage influenced by the heating up of the rocket prevents the overlapping of the rocket by the canopy cover, which comes shortly after the rocket motor burn-up, respectively in the time interval, when the whole set is stretched and into the canopy began to flow the air. The canopy cover is made from a material with increased heat resistance.

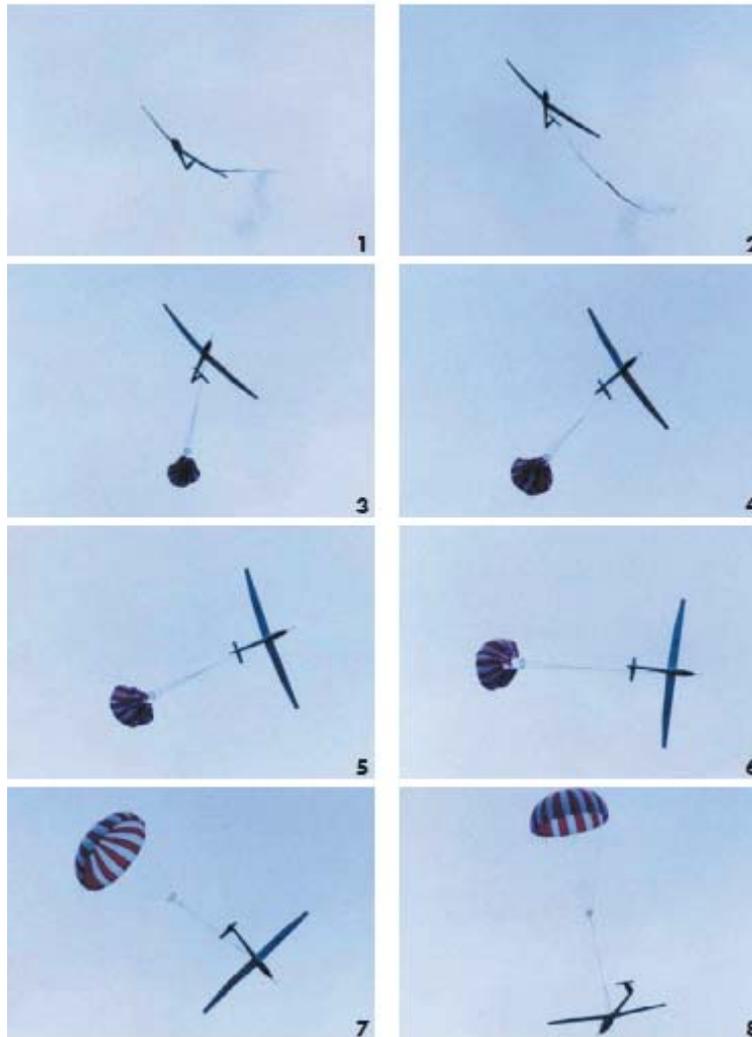
The land proof of the function of RS MAGNUM 300





The parachute canopy load is done gradually to prevent during the opening the action of such strengths that could damage the aircraft. To the deceleration of the fall comes by the influence of gradual filling of the canopy. It gradually extends its volume and by the aerodynamic force influence comes gradually to the under-speed and to the minimization of the impact at its opening. It is important that every aircraft point, where the canopy is fastened, shows the minimal strength of 5 G! (5<sup>th</sup> multiple of the maximal aircraft mass).

### Practical flight examination of the rescue system MAGNUM 450 SSP



### 3.3 Minimal effective altitude for the use of the rescue systems MAGNUM

Rescue systems MAGNUM 450, MAGNUM 250, ... etc., where are used parachutes without a slider with a middle line, are designed for aircrafts with a low maximal speed. They open very quickly and are effective at rescuing even from very low altitude.

But it is necessary to be aware, that the rescue success in low altitude will always depend on your horizontal and vertical speed in the moment of the use of your rescue system.

Parachutes designed for higher speeds, especially these without the middle line, for max. speed of 260km/h, 300km/h and higher, will open longer and so, as to slow down gradually the aircraft fall from the high speed and not to exceed permissible multiples of the resistance for the anchorage points in the aircraft, in order not to allow their destruction or tearing out of them.

It is necessary to bear in mind, that in the critical situations you need to activate the rescue system in time. In many critical situations comes very quickly to an altitude loss and steep speed growing. These factors lessen very radically the chance of rescue. It is recommended to activate the rescue system in the altitudes more than 200m over the earth! But even in lesser

highs may the rescue system MAGNUM save your life. There are registered rescues with the system MAGNUM even from very low altitudes. Attention! By the activating in altitudes under 200m over the ground is mostly the swing stabilization after the parachute opening not absolute and the crew might be threatened by the collision with the earth. Also the canopy may be not totally loaded and may not sufficiently reduce the fall.

But as to existing many years experience it is necessary to observe, that the rescue system MAGNUM may work even at very low altitudes and so rescue human lives. In necessity it is recommended to activate the rescue system MAGNUM even in under-limit altitudes. Even than it offers a considerable rescue chance!

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

The rescue systems MAGNUM are produced for aircrafts of various weights and for various maximal speeds. The ideal choice should be such, that its parameters could fit into the flight technical conditions of the aircraft on which it should be installed. It is necessary to install the rescue system for a slow aircraft for the speed limit and weight corresponding to the technical parameters of just this aircraft. It is not recommended to install rescue systems, that are constructed for outstanding higher maximum speed and weight than shows the aircraft, where the rescue system should be installed. Important is the choice of the container as well. Here it depends on the choice of the installation place of the rescue system in the aircraft. On the choice suitability and the manner of building-in of the right rescue system it is necessary to consult the producer or the authorized dealer of the firm Stratos 07.

## **Rescue systems**

### **Parachute rescue systems for UL**

						
<b>Magnum</b>	<a href="#">250</a>	<a href="#">300 Softpack</a>	300	450	<a href="#">450 Speed</a>	<a href="#">450 Speed Softpack</a>
Max. perm. loading (kg)	250	300	300	450	475	475
Max. perm. loading (lbs)	552	662	662	993	1050	1050
Weight of system (kg)	8	7	8,5	12,5	13	10,5
Weight of system (lbs)	17,6	15,4	18,7	27,6	28,7	23,1
V max. (km/h)	150	222	222	150	260	260
V max. (mph)	94	138	138	94	162	162
Dimensions (mm)	can. 510x185	280x280x150	can. 510x185	can.560x200	can.560x200	420x275x160
Dimensions (inch)	can. 20x7.3	11x11x5.9	can. 20x7.3	can. 22x7.9	can. 22x7.9	16.5x10.8x6.3
Opening time at max. speed/s	3	3	3	2,8	3	3
Max. overload kN	1,2	1,5	1,5	2,25	2,37	3,2
Descend in m/s with max. allowed load	4,5	5,5	5,5	5,5	6,2	6,2
Slider	no	yes	yes	no	yes	yes
Container art	duralumin	cloth	duralumin	duralumin	duralumin	cloth
<b>Canopy</b>						
Size (m2)	66	66	66	102	102	102
Size (sq.ft)	711	711	711	1098	1098	1098
Repacking period (years)	5	6	6	5	6	6

<b>Balistic device</b>						
Rocket type	Magnum 450	Magnum 450	Magnum 450	Magnum 450	Magnum 450	Magnum 450
Mechanical dual ignition						
Total thrust pulse at 20°C	0,303 kNS					
Burning time at 20°C	0,57 ± 0,03	0,6	0,6	0,6	0,6	0,6

						
<b>Magnum</b>	<u>501 Light Speed Soft</u>					
Max. perm. loading (kg)	475					
Max. perm. loading (lbs)	1050					
Weight of system (kg)	9,65					
Weight of system (lbs)	21,3					
V max. (km/h)	300					
V max. (mph)	187					
Dimensions (mm)	360x245x200					
Dimensions (inch)	14.2x9.7x7.9					
Opening time at max. speed/s	3					
Max. overload kN	2,37					
Descend in m/s with max. allowed load	7					
Slider	yes					
Container art	cloth					
<b>Canopy</b>						
Size (m2)	86					
Size (sq.ft)	926					
Repacking period (years)	6					
<b>Balistic device</b>						
Rocket type	Magnum 450					
Mechanical dual ignition						
Total thrust pulse at 20°C	0,303 kNS					
Burning time at 20°C	0,6					

## All plane recovery systems for experimental aircraft

						
<b>Magnum</b>	<u>601</u>	650	620	800	1200	1220
Max. perm. loading (kg)	759	600	620	800	1200	1200
Max. perm. loading (lbs)	1673	1325	1367	1764	2646	2646
V max. km/h.	320	250	300	250	250	250
V max. mph	198,8	156	187	156	156	156
System weight (kg)	13	17	17	19,5	33	33
System weight (lbs)	28,7	37,4	37,4	43	72,8	72,8
Dimensions (mm)	430x250x210	270x195x610	245x205x430	2 pcs. 501 M	3 pcs. 501 M	2 pcs. 601 M
Dimensions (inch)	16.8x9.8x8,2	10.5x7.6x23.8	9.5x8x16.77	2 pcs. 501 M	3 pcs. 501 M	2 pcs. 601 M
Opening time at max. speed/s	3	3	3	3	3,2	3

Max. overload kN	3,381	3,1	3,1	3,5	6,0	6,0
Descend in m/s with max. allowed load	7	5,5	6,3	6,7	7	6,5
Slider	yes	yes	yes	yes	yes	yes
Container art	cloth	cloth	cloth	cloth	cloth	cloth
<b>Canopy</b>						
Size (m2)	130	150	150	172	258	260
Size (sq.ft)	1387	1615	1615	1852	2777	2799
Repacking period (years)	6	6	6	6	6	6
<b>Balistic device</b>						
Rocket type	Magnum 600	Magnum 600	Magnum 600	Magnum 600	Magnum 1000	Magnum 1000
Mechanical dual ignition						
Total thrust pulse at 20°C	0,539 kNS	0,464 kNS	0,464 kNS	0,464 kNS	0,539 kNS	0,539 kNS
Burning time at 20°C	0,86	0,86 ± 0,03	0,86	0,86	0,86	0,86

<b>Magnum</b>	1800	<u>2000</u>	2500
Max. perm. loading (kg)	1800	1900	2500
Max. perm. loading (lbs)	3968	4189	5512
V max. km/h.	260	250	250
V max. mph	162	155	155
System weight (kg)	38	48	65
System weight (lbs)	84	105	143
Dimensions (mm)	3 pcs.M 601	3 pcs. M 620	4 pcs. M 620
Dimensions (inch)	3 pcs. M 601	3 pcs.M 620	4 pcs.M 620
Opening time at max. speed/s	3,5	3,5	4
Max. overload kN	9,0	9,5	12,5
Descend in m/s with max. allowed load	7	6,5	6,8
Slider	yes	yes	yes
Container art	cloth	cloth	cloth
Size (m2)	390	450	600
Size (sq.ft)	4198	4844	6458
Repacking period (years)	6	6	6
Rocket type	Magnum 1500	Magnum 1500	Magnum 1500
Total thrust pulse at 20°C	0,702 kNs	0,702 kNs	0,702 kNs
Burning time at 20°C	0,88 ± 0,04	0,88	1,4

## All plane recovery systems for S - LSA aircraft category

						
<b>Magnum</b>	<a href="#">450 SP</a>	<a href="#">450 SSP</a>	<a href="#">450 SP-L</a>	<a href="#">601 S-LSA</a>	<a href="#">601 S-LSA-L</a>	
Max. perm. loading (kg)	500	500	500	607	607	
Max. perm. loading (lbs)	1102	1102	1102	1338	1338	
V max. km/h.	160	160	160	290	290	
V max. mph	99,4	99,4	99,4	180,2	180,2	
System weight (kg)	13	10,5	10,9	13	13,4	
System weight (lbs)	28,7	23,1	24	28,7	29,5	
Dimensions (mm)	Ø206+52x587	280x165x410	520x310x200	430x200x250	520x310x200	
Dimensions (inch)		10.9x6,4x16	20.5x12.2x7.9	16.9x9.9x8.3	20.5x12.2x7.9	
Opening time at max. speed/s	3	3	3	3	3	
Max. overload kN	2,37	2,37	2,37	3,381	3,381	
Descend in m/s with max. allowed load	6,2	6,2	6,2	7	7	
Slider	yes	yes	yes	yes	yes	
Container art	duralumin	cloth	laminated	cloth	laminated	
<b>Canopy</b>						
Size (m2)	102	102	102	130	130	
Size (sq.ft)	1098	1098	1098	1387	1387	
Repacking period (years)	6	6	6	6	6	
<b>Balistic device</b>						
Rocket type	Magnum 450	Magnum 450	Magnum 450	Magnum 600	Magnum 600	
Mechanical dual ignition						
Total thrust pulse at 20°C	0,303 kNs	0,303 kNs	0,303 kNs	0,539 kNS	0,539 kNS	
Burning time at 20°C	0,6	0,6	0,6	0,86	0,86	

The firm Stratos 07 produces rescue systems MAGNUM verified by years and practice. At their activation the rocket briskly breaks the hole prepared for this purpose in the aircraft and with a sufficient power reserve pulls out very quickly and gradually the whole parachute. During this process is the canopy protected by the canopy cover before the damage, that could come after a possible contact with the hole in the aircraft or with aircraft wreckage. The canopy cover secures gradual and symmetric loading of the canopy by the air. Every rescue system is constructed in order to open in a shortest time and to prevent the impact to imperil either the aircraft construction firmness or the crew.

Rescue systems MAGNUM are closed into various containers:

1) cylindrical metal sheet container



2) boxlike laminate container



3) softpack (fabric container)



The rocket pull rope (the connecting cable) is made in such a way, that the rocket motor opens during the activation the container lid or the softpack flap by its tug. It frees the folded parachute, which is very quickly pulled outside of the aircraft, where it is opened.

### **3.5.Activation of the rescue system Magnum:**

The released activation handle of the rescue system is grasped and pulled linearly with the pipe-similar anchorage.

The handle should be installed in the aircraft so, that the pilot will pull towards himself! The pulled handle is loosened from the bed of the safety springy picket. Follows 3-5cm of dead movement. After it grows the reaction till the strength of about 8 kg – max. 12 kg. With the pull of the handle comes to the motion of the cord in the Bowden, which has a Teflon slide surface. The cord is on the other end anchored on the percussive rocket mechanism. In the moment, when the percussive mechanism comes to the top dead centre by the cord pull influence and the spring of the firing pin is compressed to the maximum, is the compressed spring released. The spring with the firing pin starts by two hammers two incendiary cartridges. They activate the ignition of the fuse igniter, that initiates burning of the firm fuel. The gases coming from the rocket by a carefully trimmed nozzle, drive the rocket forward. It leaves the rocket box and with the cord, that is fastened by its back part, pulls the parachute out of the aircraft, to let it spread out as to fulfil its function. The time of burning depends on

the used rocket motor type and the temperature of the surrounding. The firm has at the present time to its disposal 9 rocket types and we are able to tune up effectively every from them for any of the used parachute types. The time-performance curve is trimmed. The burning time by various rocket types may be from 0,5 to 1,6 s. The rocket motors with a longer burning time show a high output and have larger dimensions. They are used for pull out of very large parachutes, or of more parachutes together.

The reverse impact evolving from the first gas jolt, by the rocket igniting into the rocket case bottom is adequate and responds to the rocket case construction and anchorage. There is no need to lead the gases outside the aircraft. But it is necessary to bear in mind the contiguity of the fuel tank or the fuel line, the thorough protecting of them is necessary! The rocket hauling cable releases the container and after making a hole in the aircraft ( by some installations it is not necessary - see the mounting outside of the aircraft) the rocket pulls out gradually the canopy protected by the canopy cover outside of the aircraft. Gradually are released the lines, the suspension cable is stretching, the canopy cover comes down and the parachute is filled. By rescue systems appointed for aircraft with higher speeds is the loading craft softened by the slider. The loading craft could reach short-time values approaching till 5G. All these phases proceed very quickly.

The rescue system shot must aim to this aircraft side, where the propellers blades move in the upward direction. If it is possible, we shoot the rescue system horizontally perpendicularly to the flight direction. By such an aiming of the shot we lose minimum of the altitude and the aircraft suspended on the parachute stabilizes very quickly! So is eliminated significantly the swing!

### **3.6.Limited minimal altitude**

Limited minimal altitude real for rescue at present types of the rescue system MAGNUM is 200m over the earth. But it depends always of the vertical and horizontal speed coefficient! There are recorded even rescues from such altitudes as 80m and lesser. It is necessary to become aware of the fact, that a parachute constructed for a higher speed will open longer, than one appointed for a lesser speed. The same goes for rescue systems for higher mass. The more is the rescue system appointed for a higher mass, the longer it will open. The flight path, which must the rocket with the parachute cover with a large and of more weighting parachute as well as the loading of a large canopy area takes more time than it is by lesser rescue systems. During the projecting of the rescue system MAGNUM used the firm the experience of the army specialists and of the producer of ejector seats for chase aeroplanes. In the beginning there was a very important cooperation with the parachute testing laboratory of the Czechoslovak Republic Army, with its cooperation were developed our first products. The rescue systems are constructed and produced with the great care and with accent on faultless quality and functionality even in the maximal possible extend of critical situations possibly coming during the flight. We find the solution for the ballistic service individually for the rescue system type. By the canopies designed for high speeds is softened the opening impact to the minimal possible extent to prevent the damage of the aircraft structure and the following injury of the crew. By the design of new rescue systems help many years of experience with development of new materials suitable for rescue systems use. It means the parachute fabric, edgings, parachute lines, suspension cables, threads, etc. In the rocket motors construction we use new, unique constructions, which importantly raise the reliability of the rescue systems MAGNUM. A very important and demanding component is the parachute folding and its correct pressing into the container. During the production is used the multistage control. The firm is the bearer of the ISO certification.

From all knowledge up to now with the use of the rescue system MAGNUM follows, that it is necessary to solve the critical situation arising during the flight immediately!

The reason is not to let us come under the limit altitude over the earth necessary for the opening of the rescue system and as well the aircraft not to come over the maximal designed speed of the rescue system. With overstepping of these limits the rescue system could be ineffective.

(Under the influence of the great loading strength could be the anchorage points in the aircraft destroyed or the parachute could be damaged.)

**WARNING!**

The rescue systems MAGNUM produced in the present time are designed for use till the maximum altitude of 4 500m a.s.l.!

The rescue systems Magnum increase the safety of your flying.

If you use it in time, you have a great chance to rescue your life. But we cannot guarantee that you would not be injured, or that your aircraft will not be damaged.

This will always depend in what altitude and at what speed and in which meteorological conditions you will activate your rescue system and on what terrain you will land. To raise your chance of the rescue is certainly better to choose a ballistic rescue system than any other system, that is activated e.g. by the hand releasing of the canopy as it is at the pilot parachute – chair-shut, where you have to do a lot of operations before you leave the aircraft and after the jump out you wait till you are enough far away to open the parachute safely. Regardless of the fact, that in such a situation is the aircraft destroyed. By use of the rescue system MAGNUM in time, is mostly the aircraft after a control and setting of the coat of the aircraft into the original state after the disruption by the mooring ropes during a short time in a fit state for a flight.

## **PART 4. STORAGE AND OPERATION REQUIREMENTS**

### **4.1.Operation requirements – controls**

The service life of the rescue systems MAGNUM is given for the time of 18 years for parachutes with a slider and 15 years by parachutes without a slider. That is for MAGNUM 250 and 450. It is necessary during this time after every 6 years, or 5 years to make a revision. You have to put the system into the original transit packaging, certified for this art of transport and forward it back to the producer or your dealer for the revision.

By the revision is the whole system packed out, it gets an airing and a thorough control is done. The rocket motor will be dismantled, important parts securing the perfect operation of the engine are overworked. Possibly will be the engine changed for another one after a minor repair, or for a new one.

In the parachute, if necessary, will be changed important parts, if they have been in any way damaged.

The customer has after this control at his disposal a functional rescue system, for the time marked out on the product label.

### **IMPORTANT WARNING TO THE SERVICE TIME !!!**

After the service time expiration is the user obliged to send the rescue system to the producer for liquidation!

**Before the expedition of the rescue system MAGNUM for the minor repair please contact us!**

#### **4.2.Art of packing**

The art of packing of the rocket motor is in accordance with the method approved by the proof laboratory No.1087 of the society IMET Ltd. accredited by the state and of the certificate Nr. IMET 4042.

The box 250 x 140 x 400 mm (inside dimension )

The cage 250 x 140 x 400 mm (outside dimension)

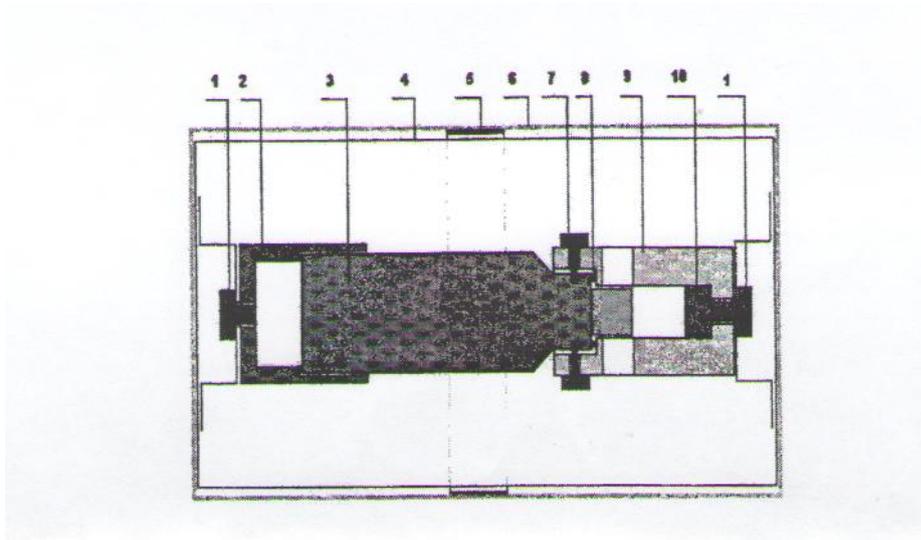
#### **The box label:**

**u** 4G/Y 16/S/06  
**n** CZ/STRATOS-IMET 4042

VZOR MAGNUM 450	
Exporter:	Importer:
UN 0453 ROCKETS, LINE-THROWING	
BRUTTO: 9,0 kg NETTO: 1,10 kg EXPLO: 0,35 kg	
Odesílatel:	Příjemce:
UN 0453 RAKETY PRO TAŽENÍ LAN	
BRUTTO: 9,0 kg NETTO: 1,10 kg EXPLO: 0,35 kg	

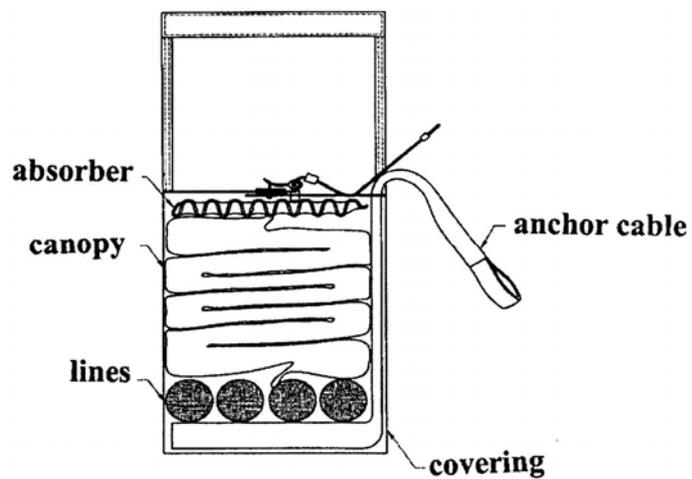


**Packing RM of the series MAGNUM**



Name	plannumber	notice
Installation screw		1
Bottom support	8.00.40	2
Rocket motor		3
Safety cage – assembly	8.00.20	4
Steel strip		5
Paperboard covering	8.00.10	6
Eliminator screw		7
Sealing rubber O ring		8
Draw eliminator – assembly	8.00.50	9
Absorbing layer		10

**Packing softpack**



### **4.3.Storage and operation requirements**

The system, if not mounted on the UL aircraft has to be stored in the original covering ( a paperboard box with an expanded plastic bushing) in which it is delivered by the producer, always secured, on a dry place, where the temperature does not exceed 40°C. The product is classified as an explosive object class T2 (according to the Decree CBU a.174/1992 Dig. „ Of Pyrotechnic Products and Manipulation with them“).

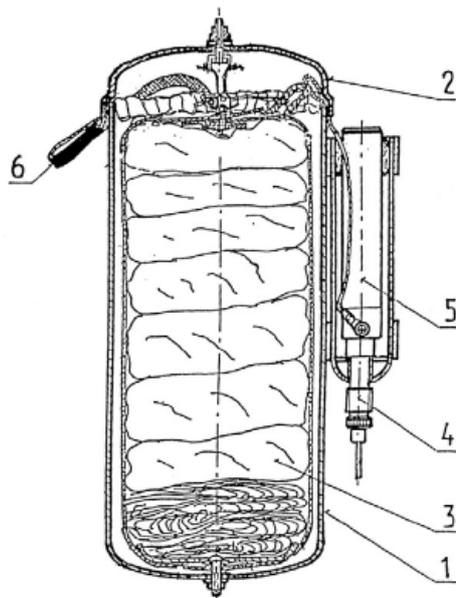
Any manipulation, e.g. disassembly and following assembling of any system part and especially of its pyrotechnic part is inadmissible – that means **FORBIDDEN !!!**

In case of any unauthorized intervention into the rescue system the producer does take no product function guarantee.

Therefore contact please immediately the producer in case of detection of any system damage. The system does not require any special maintenance during the 5 resp. 6 years of the service time till the next minor repair. The user has only to keep the instructions of the producer, after the flight to control the system again and to **SECURE** it, wipe it and remove of it deposited dirt, it means dust, oil, fuel rests, event. to secure it by a cover before the rain and sunlight rays, in order to not let the temperature exceed 50°C.

### **AIR RESCUE SYSTEM MAGNUM 450**

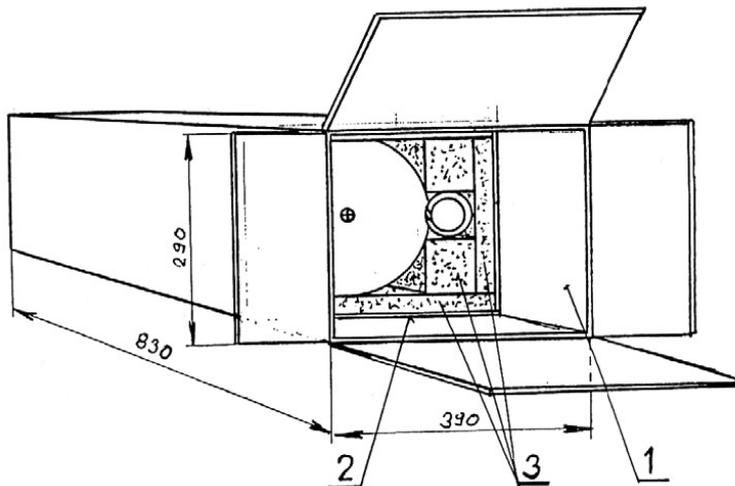
- 1) Parachute container
- 2) Front cover of the parachute container
- 3) Parachute
- 4) Firing device
- 5) Pull up rocket motor
- 6) Anchor cable



## **TRANSPORT AND STORAGE COVER FOR 450 MAGNUM**

- 1/ External cardboard of five layers paperboard
- 2/ Inner card-board of five layers paperboard
- 3/ Insert of expanded plastic

The cover is done of two paper cardboards pushed one in another. The inner cardboard is surrounded on the sides by 30mm thick expanded plastic panels, against a motion is the deposited product protected by two prisms of identical material. From both tops is the product protected the same way (expanded plastic thick 30mm). The space opening between the external and inner cardboard on the top side after closing of the expanded plastic front side is used for deposit of the attachments.



The same cover is used for the transport of the rescue systems type softpack.

## **PART 5. RESCUE SYSTEM MOUNTING**

It is essential that the user, or the person installing the rescue system Magnum, reads at first the whole handbook of the attached manual or you can reach it on the internet address: [www.stratos07.cz](http://www.stratos07.cz) !

**By any lack of clarity call, write to the producer or to your authorized dealer!**  
**Attention! Incorrect manipulation with the rescue system could cost your life!**  
**Never manipulate with the rescue system aiming at you or other persons in your surrounding! Avoid manipulation with the rescue system near of inflammable or explosive materials!**

**For mounting use only original service parts, or materials given for it in the manual.**

### **5.1 Choice of the rescue system MAGNUM location in the aircraft**

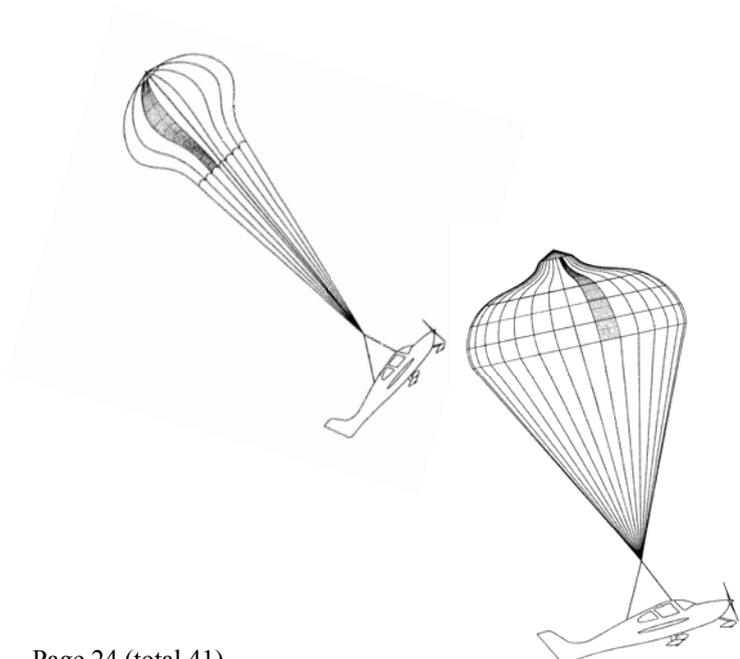
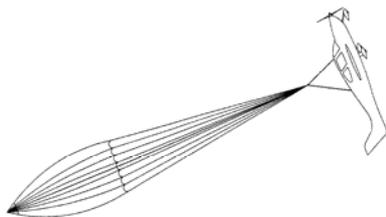
It was verified, that by use of the rescue system during the horizontal flight comes to the smallest altitude loss if the shot is done to the side. As most shots of rescue systems were done approximately in this position, we may say, that the shot done to the side at the range of  $0^\circ$  till  $45^\circ$  upwards is optimal. It is necessary to bear in mind the position of the aircraft stabilization rudder and the elevator.

The installation with respect the direction of the propeller rotation:

The direction of the rescue system shot must be taken in this direction, where the propeller blades move up!

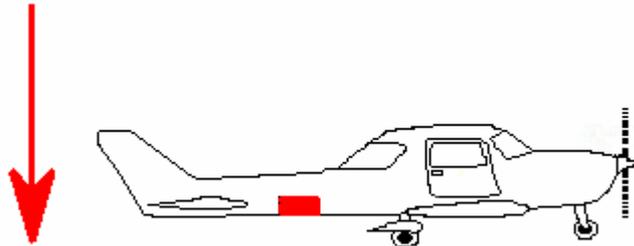
It is not recommended to aim the shot under the aircraft, it leads to a large altitude loss and a longer calming of the swing of the aircraft hanging under the parachute.

If the shot is taken vertically upwards, may during a horizontal flight, when the rescue system is activated, arrive the situation, when the aircraft would be in the beginning swing over the level of the filled canopy. Of course, it depends always on the given situation with the actual aircraft position when the rescue system was activated.

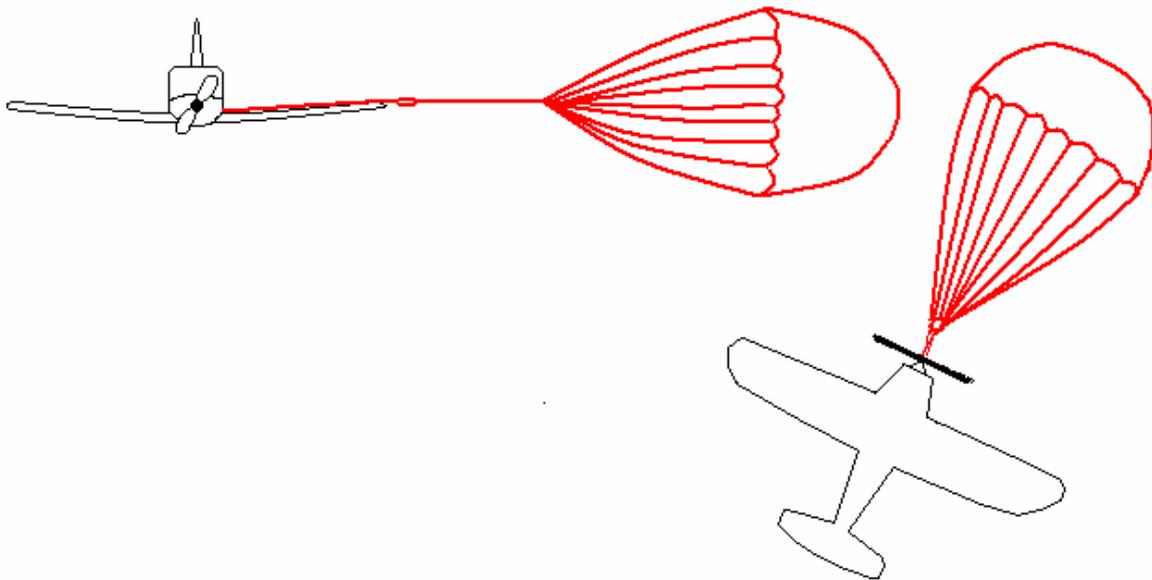


## **5.2 Influence of the mass centre change on the rescue system mounting**

It is necessary to respect the rescue system mass, which could by its placement on the aircraft significantly change its mass centre!



If the shot is taken vertically upwards during a horizontal flight it comes to a very tedious stabilization of the swing and to an excessive altitude loss. The real activation altitude is much higher than at the installation when the shot is taken to the side.



If the shot is taken to the side, the canopy is filling already in the horizontal position and the aircraft hanging under it describes moderate circles and is very quickly stabilized. The altitude loss is smaller than by the shot aiming vertically upwards.

### **5.3 Where the rescue mounting is not allowed**

It is not allowed to mount the rescue system on strong vibrating aircraft parts. The landing gear, the motor bed etc.

Further on - near of the fuel tank, or of the fuel line. A fireproof bulkhead might be the solution.

#### **Attention:**

1. The rocket motor must be placed as not to threaten the crew!
2. The suspension cables must be conducted in such a way as to prevent that the crew is
3. threatened when they tighten during the parachute opening!

#### **Important:**

- Into covered structures, where it is possible to secure the rescue system of the weather effect, it is recommended to install the version MAGNUM in the design Softpack. For installations where the rescue systems are open to the weather effect, must be chosen the rescue system types in metal sheet or laminate container.
- The suspension of the aircraft under the parachute must be in the position of stability, that means in four, event. in three points so, that the aircraft will contact the earth at first by the landing gear wheels. At lowplanes it is recommended to adjust the suspension so, that the first contact with the earth will be by the end of the main wing and after it gradually with the landing gear wheels. This „rolling“ reduces considerably the landing.
- The suspension straps (cables) , that cannot be stocked extended, have to be piled laying-up in the direction of the aircraft motion so they would not get stuck. The piled strap has to be secured and will be fastened to the struction best by a thinner tightening electric tape.

## **PART 6. RECOMMENDED ARTS OF INSTALLING RESCUE SYSTEMS INTO VARIOUS AIRCRAFT TYPES**

### **Important warning**

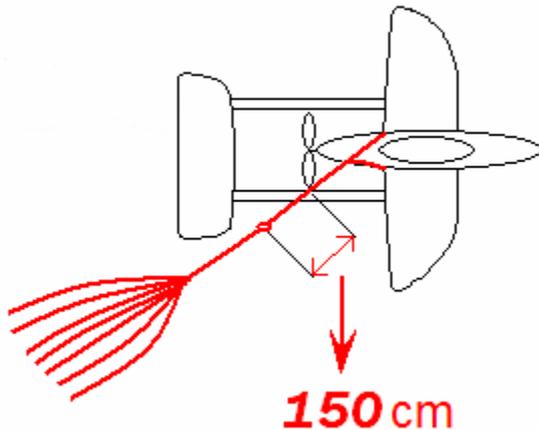
The firm STRATOS 07 guarantees for the faultless function of its rescue systems in the frame of works and gaurantee conditions. For the right installation and ancorage of the rescue system to the right anchoring points, that meet the resistence limits given of the producer of the rescue system, has the responsibility the design engineer, the aircraft producer, who makes the installing, eventually the owner of the aircraft. (Every one of the ancorage points must have the minimum resistence of 5G!)

All installations should be realized after a consultation with the producer, or authorized dealer!

Following arts of installation have only a recommending nature. Particular concrete installations may differ.

By aircraft with a propeller with forsing arrangement is absolutely essential to have the suspending cable of steel or Kevlar of minimum resistence 6G. Its minimal length must be

such as to overlap, if extended, at last minimum 1,5 m the most remote part of the propeller disc. The installation of this suspending cable type is recommended as well for other aircraft types!

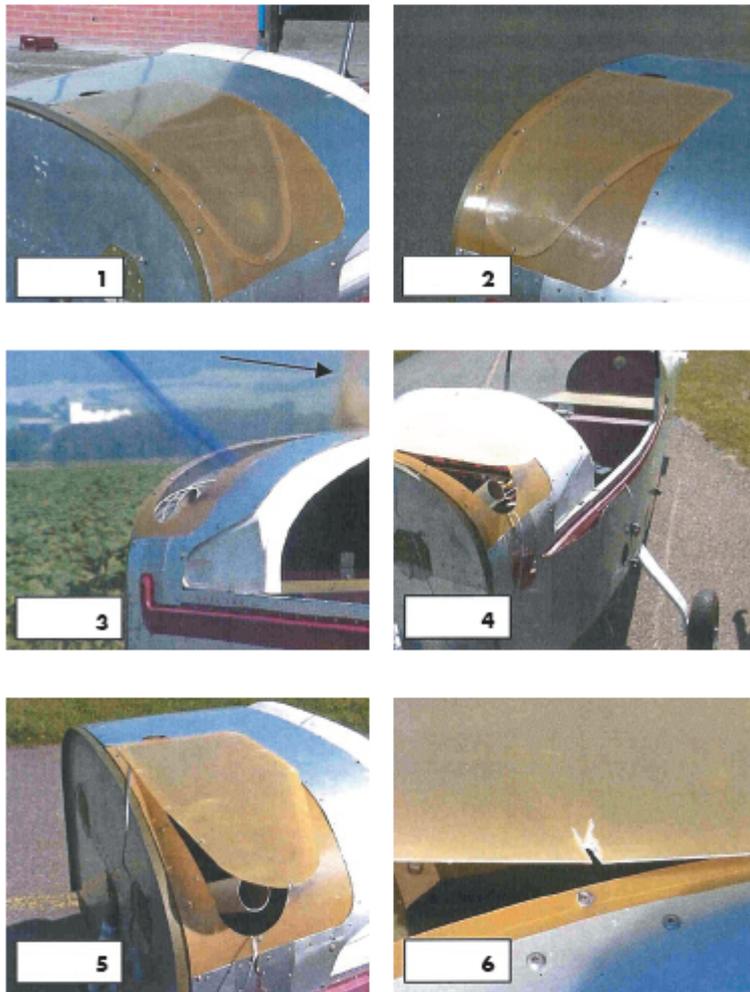


Important – the structure of the piercing hole into the cover for the pull-out of the rescue system by closed aircraft structures.

The place given in the cover for the piercing of the rocket with the parachute must be prepared so as to brake the pull-out of the rescue system with minimum resistance. The hole for the rescue systems determined for UL must have a minimum diameter 18cm, for S-LSA Type MAGNUM 601 min. 24cm. The aircraft cover is recommended to provide with a softening in the form of a circle, cross etc. The resistance acting on the rocket motor by breaking of the piercing hole of the type:

- M-250 should not exceed the strength of 1 kg
- M-450 should not exceed the strength of 3 kg
- M-600 should not exceed the strength of 6 kg
- M-1000 should not exceed the strength of 10 kg
- M-1500 should not exceed the strength of 10 kg

**The variant of the rocket engine piercing through the aircraft cover - laminated construction**



**The variant of the rocket engine piercing through the aircraft cover - metal construction**



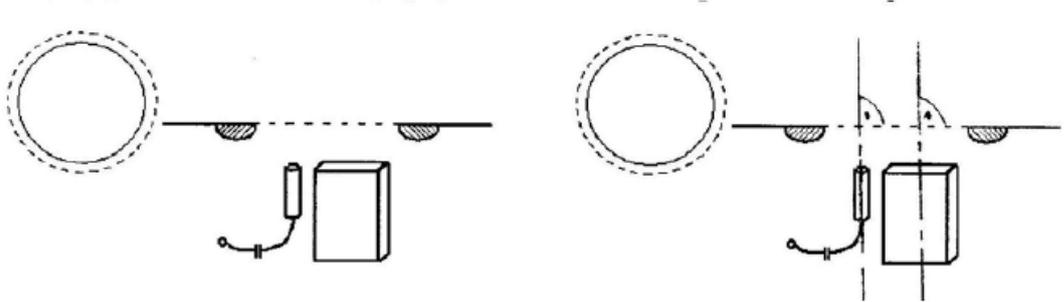
**Mounting rivet detail**



Attention! Nor the hole crimps nor parts of it must be sharp and must be adjusted so as to do no harm to the rescue system during the piercing of the hole! Direction of the shot must be taken in the axe of softpack vertically to the piercing hole for parachute deployment. It is necessary to rastem rocket container by four screw M-6, which are secured by nuts M6. Two holes in the roceket container mounting area (rectangular plate welded on the cylindrical body of the rocket container) are pre-drilled by the rescue system producer. Other two holes to the rocket container mounting area should be variably drilled by the assembler on his own to tack the rocket container to the airplane construction the best way and as firmly as possible.

Piercing through the aircraft cover or another adequately detachable joint:

Softpack Rescue system mounting in the aircraft:



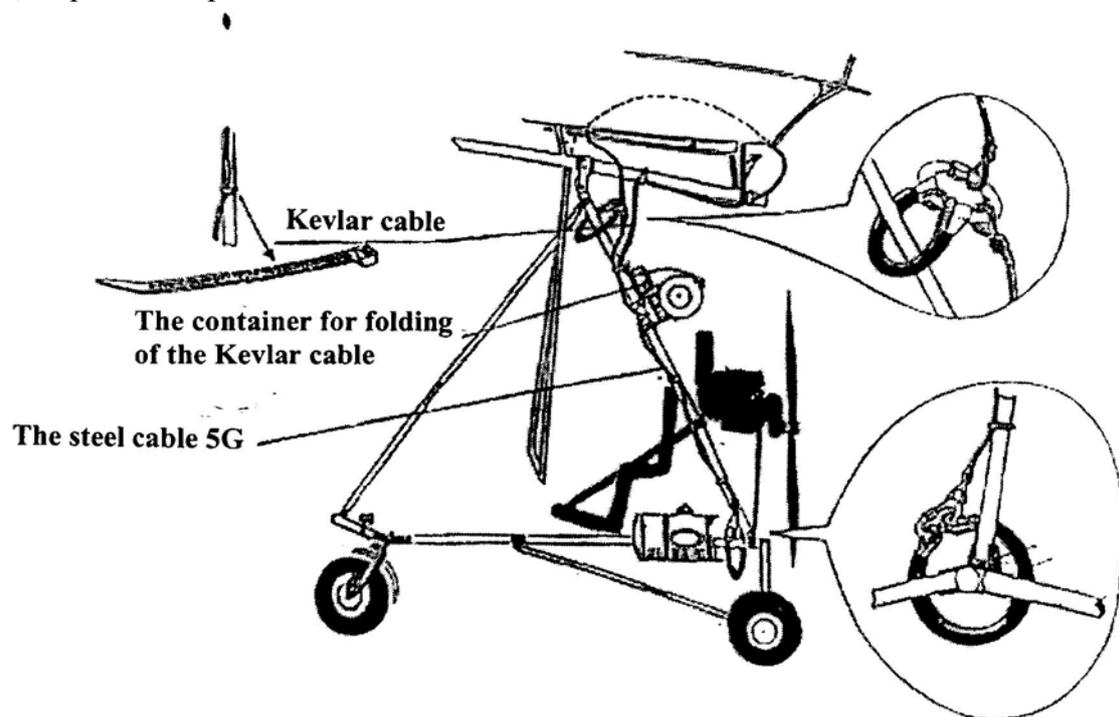
## 6.1 Aircraft types and rescue system location

### a) Motor suspension gliders (Motor hang-gliders), motor three-wheeler for paragliding

For these types of air sporting devices (ASD), that have mostly tubular construction, is used mostly the rescue system in a metal sheet container, as MAGNUM 250, MAGNUM 300 for one-seat aircraft, or MAGNUM 450, 450 SP for the two-seats.

The rescue system must be placed in such a way as to aim out of the propeller disc and out of the carrying surface ADS. The shot direction is recommended to aim to the side perpendicularly to the flight direction a little upwards on this aircraft side, where the propeller blades rotate in the upward direction!

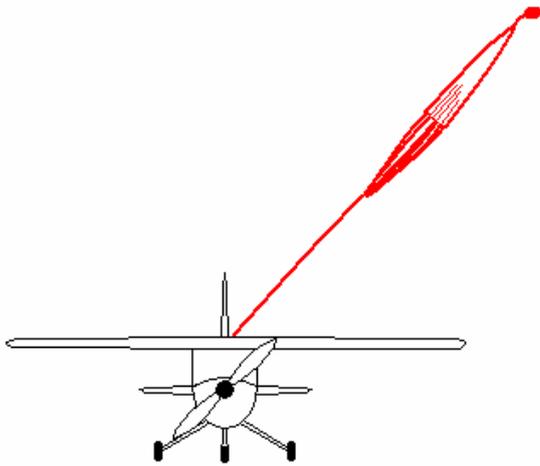
The anchoring of the suspension cable is in the same place, as the anchoring of the suspension glider or the gliding parachute. The anchoring of the suspension cable into the three-wheeler for motor paragliding must be in two points of the main suspension, with help of a suspension cable shaped as „V“ which delivers the firm. As the structure is in case of opening of the parachute exposed to another extreme dynamic stress in the place of the anchoring of the wing, e.g. by the torsion of the suspension glider on the structure of the three-wheeler, their separation could happen. Therefore it is necessary to lead protecting cables into the landing gear, resp. into the pilot seats. The resistance of each cable min. 5 G!



THE MOUNTING OF THE AIR RESCUE SYSTEM ON A MOTOR GLIDING PARACHUTE OF A CLASSIC TUBULAR CONSTRUCTION. THE CABLE OF MINIMAL RESISTENCE 5 G INHIBITS THE SEPARATION OF THE CREW FROM THE AIRCRAFT AFTER THE DESTRUCTION!

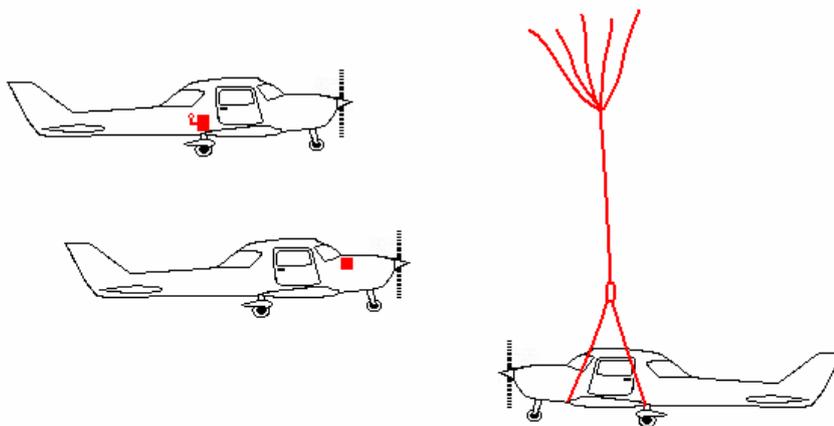
### **b) Installation of the rescue system Magnum into the high-wing monoplane**

The shot direction should aim possibly perpendicularly to the fly direction to the side approx. 45° upwards. The aircraft will be fastened to the parachute by four, resp. three binding ropes into places given by the constructor of the aircraft. This should be on the same places, where the wing spars are fastened. If the condition, that the carrying power of every knot must be min. 5G is not fulfilled, must these suspensions be interconnected with the landing gear, or saved in another proper way! The cables must be led under the aircraft cover so that they would not be damaged! It is recommended to fasten them to the structure best by a thinner tightening electric tape. The suspension cables that should be pulled during the activation through the aircraft cover must have a steel structure. This design is a guarantee of a minimal cable damage by the fault of sharp-edged parts of the slashed sheet metal, or laminate cover. The steel cable comes better through the material. The aircraft cover must be in these places softened, or adapted in another way for a smooth slackening of the cable. Possible is as well the variant of the installation of Kevlar cables, but with regard of their physical aspects is this possibility less suitable. This material is ageing and with the time its strength lessens. It must be, according to the recommendation of the producer, in given time intervals changed.



### **c) Installation of the rescue system Magnum into the low-wing plane**

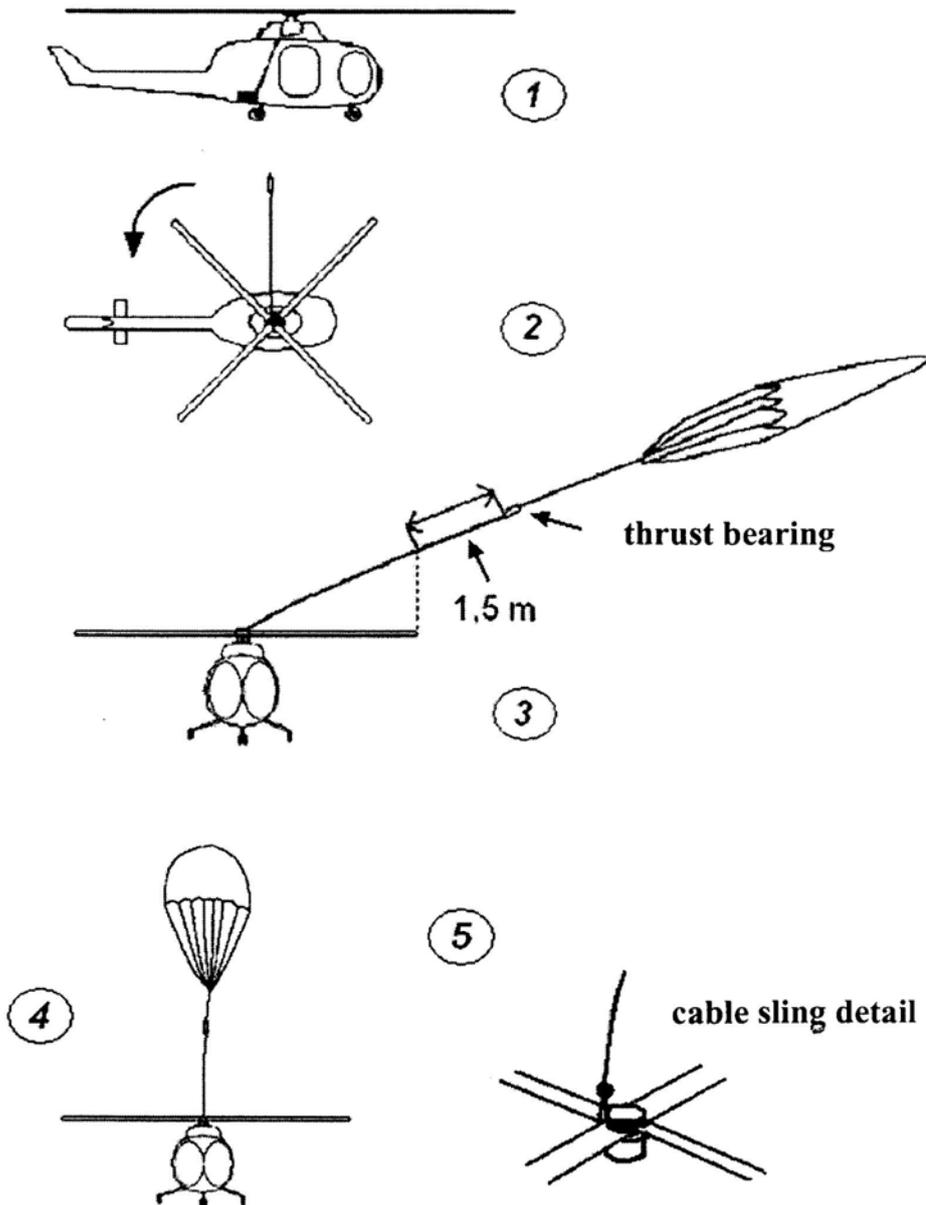
The rescue system must be fastened to resistant aeroplane parts. The Softpack parachute container will be attached by lents or lines at least in four points by quilted fastening straps.



**d) Installation of the rescue system MAGNUM into the autogyro and the helicopter**

The rescue system is shot horizontally to the side perpendicularly to the flight direction on the side where the rotor blades rotate backwards.

The main cable anchorage is led into the rescue system through the cockpit outer plating to the rotor axis, round which it makes a sling. The cable must be of steel or KEVLAR of the resistance at least 6G. The cable length must be at least 2m longer than the rotor diameter. Every installation must be consulted with the firm and approved.



## **6.2 Location of the launching handle of the rescue system Magnum**

- On the handle must reach both pilots
- For the arrangement of pilots sitting one after the other supplies the firm doubled launching for every pilot separately.
- The launching handle must be located so, that both pilots will perceive it during the flight by their peripheral seeing! Such a location speeds up greatly the rescue system activation!
- Never locate the activation handle out of your visual field in such places as behind your head, on the floor etc.

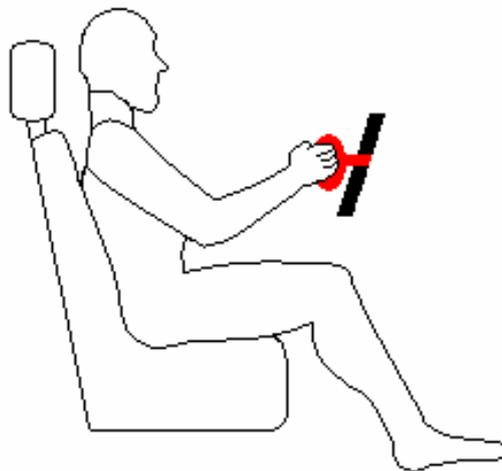
At the accident may be the centrifugal power so strong, that it would be over your powers to reach it on such a place.

From the physiological view has the man the largest strength by banded arms, sitting and in the area round of his lap.

By the pilot sitting arrangement one beside another it seems to be the best proved the location on the instrument board between both pilots. The handle must be within reach by the hand from the sitting position with the neck leaned in the seat.

ATTENTION! It must be easily accessible, graspable, not near another adjusting element of similar form, to avoid a confusion and an unintended launching of the rescue system!

- The activation launching Bowden must be after every cc 15cm attached to the aircraft structure, the curve band must be of the largest possible diameter, it must not be violated by a fracture! The smallest permissible Bowden curve is 20cm!
- The handle holder must be anchored to a resistant aircraft construction element.
- ATTENTION! Before the flight unlock the rescue system! Immediately after the flight do lock it!



## **PART 7. OPERATIONS BEFORE THE FLIGHT, THE RESCUE SYSTEM ACTIVATION**

### **7.1. Operations before the flight**

- 1) The control of the rescue system anchorage incl. the rocket and the activation handle
- 2) The control of the cable anchorage to the aircraft, it must be not slack
- 3) If nothing does prevent the parachute to be smoothly pulled out of the aircraft
- 4) To unlock the activation handle.

### **7.2. How and when to activate the rescue system**

- A) In critical situations activate the rescue system immediately regardless to the flight altitude and terrain character over which you are ( e.g. an unavoidable collision resolve by the activation of the system MAGNUM as soon as possible, in the moment before it comes – sufficiently ahead of it!)
- B) Ideal action:
  1. Switch off the ignition
  2. Strongly pull the activation handle
  3. Protect with the hands your face, the hands and feet together (the position „roll into a ball“), firm up the whole body!

ATTENTION! It is necessary to fix oneself in this position especially:

- a) by the opening of the parachute!
  - b) by the landing!
  4. After the parachute opening shut up the fuel pipe (if there is enough time for it)
  5. Before the shock fasten the safety belt!
- C) In the case of really extreme distress pull at first the activation handle and then immediately switch off the ignition and the fuel pipe.
  - D) The right operations is necessary to train in beforehand.

### **7.3. How does perceive the crew the activating process**

After the activation is heard the rocket motor ignition followed by the sound of leaking gases by the motor nozzle. After it comes gradual retarding of the movement ending by a gentle pulling. It shows that the parachute is loaded. There may follow several swings with a stabilization trend. (Everything depends on the situation, circumstances of the proceeding rescue, on the position and on the altitude. By the activation in a larger altitude you have got a larger chance for the stabilization of the swings and for a smooth landing on the earth.) The touch with the earth should be such as if you would be unsuccessful by a smooth landing. It depends on the character of the terrain where you are landing.

**Stopping of the motor** is important in order to prevent the conflict of the suspension cable with the rotating propeller and this especially by aircraft with the propeller in pushing arrangement.

**Closing of the fuel feed is necessary to prevent a start of the fire!**

! A vital notice: When you pull the activation handle it begins with a lesser resistance. The handle gets loose from the safety position fixed by a flexible picket. It follows a free approximately 5cm long going of the safety cable. Then grows slowly the resistance by the influence of the starting spring stretching. In the moment, when the spring is maximally compressed, gets the percussive device in the upper position loose and strikes two percussion caps, that activate the rocket motor of the rescue system.

#### **7.4 How to behave after the landing**

1) It is necessary to leave the aircraft without delay and this with regard to the health of the crew – possible injuries.

- reasons: a) in windy weather may the loaded parachute be the cause of aircraft dragging. (by pulling of several parachute lines, that are beside one another pours the parachute out and gets calm)
- b) after a harder landing, when e.g. the landing did not happen on the landing gear, may start a fault, may come to the fuel tank damage and to the fire danger.

Attention! a) after the landing on a hill side always step out in the direction up the hill!

- b) after a landing on an electric line neither do touch further wires nor step out on the earth. Call for help, secure the switch off of the electric current on the line and then you may come down!

#### **7.5 How large powers do influence the aircraft and the crew after the development of the parachute**

In maximal speed, for which are the parachutes designed, may the short-time overload get till the value of 5G. Therefore every point, where are fastened the guy cables into the aircraft, must have the minimum strength of 5G! Use only cables and snap hooks delivered by the producer, or recommended by him!

The aircraft should be hanged on the parachute so as to fall to the ground, after the touch with the earth, on the wheels of the landing gear, because they will soften the fall. Appropriate is the position to be moderately inclined forwards, because of the stabilization during the descent on the parachute. This reality is necessary to regard with the choice of the length of suspending cable harness.

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

a) Engine failure over a terrain, where it is not possible to land safely from the gliding flight. Do not hesitate and activate the rescue system in time with the regard to the safe stabilization and so that the meeting with the earth would come after calming of the swings. Do not hesitate with the activation in cases when you are not sure, that you will overcome some obstacle by the gliding flight, or that you will not surely reach the area chosen for the landing!

b) Loss of orientation

- 1) In good weather is the fuel at the end and in the reach is no appropriate area for emergency landing
- 2) Sudden worsening of weather conditions when during the flight VFR is the visibility reduced under an acceptable limit and it could come to a collision with an obstacle.
- 3) Loss of the notion of the aircraft flight position. It may come after the flying into a cloud or the fog. The situation of sudden worsening of meteorological conditions.

**In these situations activate your rescue system immediately!!!**

Be careful in situations, when you are in a strong updraft. In these cases you must at first get out of it and then use the rescue system.

c) Short landing path

If there's no way out and if there threatens on the end of the path some obstacle and the flying up is not possible or safe, you may activate the rescue system in the ground flight near over the earth approximately max. till 1m. But it is necessary to go on in the landing after the firing of the rescue system and to become the aircraft quickly to the earth. In such a situation begins the parachute to brake in the moment, when the wheels touch the earth.

d) Mechanical defect

If a mechanical defect makes impossible the aircraft control or safe landing, there is a reason for the activation of the rescue system MAGNUM. If it is possible choose a propriate terrain for the parachute landing with regard to the high voltage line, the buiding development, the wood, the wind direction, etc.

e) Collision during the flight

Activate your rescue system if possible in the time before it inevitably comes! Here it applies, the earlier you react, the higher will be the chance for rescuing your life! Fractions of a second may decide!

f) Piloting control mistake

To dangerous piloting control mistakes, that may you endanger, comes mostly in small altitudes. The loss of speed, the corcscrew spin, the fall down plane etc.

In such situations you have to react without delay! Even from a small altitude you have a chance to be rescued! Remember, that even a piloting control mistake in a larger altitude may be for you dangerous. Such a transit from a corcscrew spin to a spiral and a spiral itself may be for you dangerous by the sharp speed rise to such a limit, that your rescue system could be inefficient. The altitude lessens in such situations very quickly.

Activate therefore your rescue system as soon as possible!

g) Pilots disability to control the aircraft

It may be health problems as heart attac, injury of the pilot, loss of consciousness ... If it is possible he may activate the rescue system by himself, or his fellow passenger, who must be informed of the rescue system function and use before the flight!

h) Fire on the aircraft deck

It is important to stop the oxygen supply to the flame and also of the material which burns, it is of the fuel. In case you can not immediatelly safely land, activate the rescue system. So you can come on the earth and from the reach of the flames more quick. In case, that it burns in the area of the motor space, or somewhere after the fuel-lock on the line to the motor, lock the fuel supply, let the motor run, open the supply of the mixture feed (open the throttle) to consume the fuel from its line and to stop the burning!

Even because of such situations are favourable cables of steel or of Kevlar. These materials resist the flames more, than e.g. cables on the base of nylon, etc...

## **PART 8. GUARANTEE AND CONSUMPTION TIME**

**The guarantee term** is prolonged from the obligatory six month according to the Trade law to two guarantee years from the time of the system Magnum purchase. The date of purchase and of the produce is marked in the working handbook and confirmed by the producer.

**The service life**. The use of the product without re-packing of the parachute and change of the motor is normally planned on the time of 5 years at parachutes without the slider Magnum 250 and 450, at the others with a slider on six years if are satisfied all conditions for the system service following from this handbook. Regardless, if the system was used or not, is the user obliged to send the system for the obligatory revision to the producer. During this revision is the system controlled, the parachute, if not damaged, is aired and newly repacked, the rocket motor is minor repaired or changed for another one. It is necessary before sending the system to the producer to contact your dealer or the producer, to secure a safe transport of the product to the producer.!!! Before sending of, always inform the producer. The transport is necessary to secure in such a way as to keep all conditions for the transfer of products of the class 1 – explosives in accordance to IMDG CODE with the classification 1.4 G. **If it is not possible to keep it, the user must deliver the system personally at his own expenses and risk. We recommend therefore to keep and preserve the original transport packing, after the product receipt of the producer, incl. the lining, or to get from the dealer or the producer a new one.**

**The service life of the product** is by the 5-years revision cycles 15 years and by the 6-years revision cycles 18 years. The producer reserves for him that all conditions put in this handbook be satisfied.

After expiring of the maximal service life time it is possible to extend longer the service life of the product. The producer decides as to the actual condition of the product, under which circumstances may be the product further pursued. In the case of definitive end of the service life will be the product liquidated by the firm.

!!!The firm forbids!!!

By metal sheet and laminate containers a longtime exposure of the rescue system MAGNUM to rain and environment humidity, the design Softpack must be kept only in dry environment, they must be secured of excessive vibrations, brisk mechanical shocks, cauterization by acids, aggressive oils and fluids, maltreatment, mechanical damages of singular system parts caused by delivery without the original packing and without security guarantee ( this may cause a disaster situation during the delivery of the product and to **threat the life of the person participating on the transport.**

Hereafter is forbidden to dismantle single parts of the system and to damage the lead seals. It is necessary to treat the system like a pyrotechnic device and to behave to your surroundings when manipulating with it as with a weapon at safety or with a released one! The principles of safe handling with the rescue system satisfy, please, especially with a great accent when mounting and maintaining the system!

!!! The producer does not assume responsibility of incorrect manipulation with the product MAGNUM, and the use of the system MAGNUM is solely on the own risk of the user or pilot!!!

**Every operation guarantee of the producer to the owner (operator) is out of any question. Every pilot bears the responsibility of his safety and he must as well care for the proper control of the aircraft and the rescue system MAGNUM and its use according to the handbook of the producer.**

**The firm advises:** After the system mounting put into the aircraft plan its place and all parts that are connected with the system mounting. The piercing hole in the aircraft given for the rescue system must be constructed as to be purposeful. The container anchoring to the structure of the aircraft, the aiming of the rocket through the hole of the aircraft. Take a photo of the building-in. From the photo must be evident, if to the shot do not prevent structure components of the aircraft and if it is properly anchored. Your building-in consult please with your dealer or directly with the producer.

**What the firm does not guarantee:** If the system is mounted in contradiction with the handbook, layout, or is otherwise adapted, the firm does not guarantee its faultless function. A special reference is necessary to take to the proper place of the suspension cables. During the activation must the cables not threaten the crew, get stuck on the structure. They must not be damaged during the suspension. Be careful, that all loops of the binding ends are properly tight and secured! A slack of the suspension cable sloop may be after the tightening seriously disturbed, or even burnt down!

It is forbidden to dismount, no matter how, the parts of the rescue system and to use non-original pieces. Such a manipulation could be for your life perilous. The firm does not take guarantee for the product in which have been done unprofessional operations! Do not change any parts and do not assume, that you may buy from another source parts of the same quality. **The rescue system MAGNUM is designed only for solving of emergency situations. The use of the rescue system has near to the peril arising from an unlucky coincidence, with the resulting injury or death. The firm STRATOS 07 may have no influence on it and resigns therefore on all obligations coming from such situations.**

### **Securing against discharge**

The system Magnum is secured by a fuse in the form of a central lock. Remember, that the mounting is done with a locked lock. The same goes for the transport and any other manipulation!

Except for the time, when the aircraft flies, is engaged in take-off or landing, must be the rescue system secured by the supplied lock with a warning pennon.

## **PART 9. CHARGE DISPOSAL METHOD**

The producer does not assume, that by a due maintenance of the system it could come to a failure of it during its consumer service life. The ignition system of the starting primers is doubled. The motor production is done at a noted producer. As well the canopy as other system parts are produced after in years advanced, well tried theories and after the praxis experience, and they are continuously verified.

! The producer warns the user, that by any system damage (by the influence e.g. of the aircraft crash, by which the system was not used), is the user obliged to provide the system by a fuse. Nobody is allowed to move in the direction of the rocket shot!

**It is necessarily urgent to report immediately to the producer of the damage art of the rescue system and follow his advises, so that the health and the lifes would not be imperilled.**

Especially in the case, when it is not possible to secure the system against the blast by a transport fuse, or if it is not quite clear, in what state is the system after the crash, it is necessary to contact without delay the producer! On that reason must be the place and the

location of the system indicated by a label on the aircraft on the place, where the system MAGNUM is to be found. Indicated must be the place of the rocket motor piercing through the fuselage, resp. through the aircraft outer plating!

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

## **PART 10. TECHNICAL PARAMETERS**

Study please the schedules and the devices. For any dimension and type of the aircraft till the maximum mass of 2,5 tonnes or a Rogallo you will find an appropriate rescue system, which you may use. The firm STRATOS 07 offers you a long series of possible solutions for various aircraft types. We recommend to consult every building-in with the producer or with the authorized dealer!

Technical rocket parameters – see the main schedule – Rescue systems

## **PART 11. MAINTENANCE OF THE RESCUE SYSTEM MAGNUM**

### **Maintenance – by the owner or operator of the system MAGNUM**

In the frame of the fore-flight setup it is absolutely essential to control all places, where the rescue system is attached and its technical state, if it was mechanically or in another way not harmed. The rescue system is necessary to storage in dry environment and to secure before UV radiation, radiant heat, chemicals! Pay attention if all screw-driven junctures and clamps are properly tightened. Especially the anchorage of the rocket case with the rocket motor! Pay a due care to the anchorage of the rescue system activation handle, attaching of the parachute to the aircraft structure and the tightening of carrying cable nooses and of the rescue system snap hooks! Attention! By the swift pulling during the activation could be by the friction seriously damaged the released noose of the suspension cable and so lose its strength! Therefore do tighten firmly the cable nooses and secure them by the electric tape, or similarly!

### **Revision and maintenance of the rescue system after 5, respectively 6 working years**

It means the control of the rescue system after passing of 5, or of 6 years service time (as to the rescue system type).

The firm makes operations, that are described in the chapter of regular controls.

### **What is necessary to bear in mind by the maintenance of the rescue system!**

- 1) The anchorage of the rescue system in all points – as above mentioned
- 2) The protection against humidity and other contamination:

The rescue systems in metal sheet, or laminate container are humidity-resistant. If they are exposed to influence of rain or other long lasting influence of humidity it could come to their damage and endanger the right function.

Attention! As well the metal sheet as the laminate container, incl. other parachute parts must not come to touch with petroleum products. This is valid of course as well for the rescue systems structure Softpack!

The Bowden, that goes from the activation handle to the rocket, has inside a silicone cover, so is the friction of the cord minimal and it does need no maintenance. Pay attention that the Bowden should not be mechanically damaged and its curves should be gentle. In case it was

harmed, the change by the producer is necessary. As a harm of the Bowden is considered as well an evident break on the outer safety spiral cord guiding.

3) Mechanical parts damages of :

- the container
- the cables
- the Bowden
- the rocket case

**What to do with a damaged parachute** – after the parachute dip in the water, or the suspicion that water leaked into the container, destruction of the container, Bowden, handle, engine cowl, damage of the pull-out belt, its packing or of the closeness of the container cover must be the rescue system immediately transported to the producer for the revision. If you are not sure of the reliability of the system for any reason, immediately inform the producer!

!! Warning – this is valid not only for the very rescue system, but as well for its parts, as the suspension cable, suspension belts and the snap hooks. Any damage of them or damage of their packing, that protects e.g. the belts before UV radiation or before direct damage of them, could result in serious consequences.

## **Maintenance**

### **How to keep the rescue system in a fully functional state**

It is obvious to inspect routinely the system with the accessories before every flight and so control the whole equipment state, as above mentioned.

A special care must be given to all junctures. To the nuts, closing of the cover by the cement, the state of the belts etc. By the vibrations could come to the whole system loosening, to its failure. It is unnecessary to take care of anything on the own system except the control of its state. It is maintenance-free. We control possible damages of its parts, especially of the metal sheet container. Damages may emerge from stone fragments flying off during the landing or departure, from oil products leak, from over-humidity etc.

### **Humidity and other contamination**

The metal sheet or laminate container secures the parachute against humidity, but it is not waterproof. Strong rain, frequent raining, a longtime exposure to rain, may cause the humidity penetration into the system and its failure. In case you have any doubts, if it did not come to any harm of the rescue system by the humidity or oil products, dispatch it for a control to the producer!

**Material degradation by ultraviolet radiation** goes on with the exposure of the materials to the sun radiation. By materials as are artificial fibres proceeds this process very quickly.

It is necessary after the end of the five- or six-years cycle of the rescue system use to dispatch it for a control to the firm as well with the suspending belts.

### **Soiling of the rescue system MAGNUM**

Of any soiling of the rescue system Magnum or of the lead seal damage it is necessary to inform the producer. He determines, how to go on in order to secure the functionality of the rescue system. In most cases a control at the producer will be necessary.

### **Securing before an accidental activation of the rescue system MAGNUM**

It is necessary to treat the system as a loaded weapon and to secure it always after the fly end against an accidental launching. Danger of the rescue system unintended activation threatens by the children, by unauthorized persons, by wrong manipulation. Therefore always insert carefully the lock with the pennon into the catch, so that could not come to an accidental activation!

### **Planning of the maintenance – always do contact the producer!!!**

The periodical service time of the system ends after passing of the time marked on the label that is placed on the container and on the system rocket. This data is written as well in the guarantee certificate of the system MAGNUM.

!!! By dismounting of the rescue system go on as by its mounting. The activation handle must be secured before you begin with the dismounting! We lay the rescue system into the cardboard, that **you have deposited (if not, require the producer for delivery). On the cover place the sign Explosive and 1,4 G. If you meet some problems with the despatching of the rescue system back, it is necessary to contact the producer, who will give you all desirable information.**

! Warning!

If you send a product from a region outside of the Czech Republic, it means the state of the producer, it is necessary to mention in the documents of the packet and on the packet, that it is a return of the product for a revision. If you would not do it, could the firm STRATOS 07 get a payer of the customs duty, which would be successively charged to you.

! Request of the firm !

By whatever system activating immediately contact the firm STRATOS 07!

Thank you very much!