User Manual
Automatic Activation Device

MPAAD

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HEAD I

1. Introduction

MPAAD is a result of several years of development, research, and tests. This device combines in itself the latest electronic technologies and components. Its development prioritized higher reliability and resistance as well as the satisfaction of current parachuting requirements. It also aimed at setting standards for the third generation of automatic activation devices. The location of the entire device in a compact, duralumin case without outer connecting cables principally excludes any possible mechanical damage and simultaneously markedly enhances resistance against electromagnetic interferences. MPAAD is a modern, electronic, micro processor-controlled securing device that does not require any special maintenance and that features several additional functions. The device can be arbitrarily set as EXPERT, BEGINNER or TANDEM.

2. Designation

The device is designed for all types of parachute jumps, including the following:

RW, CRW, FREEFLY, FREESTYLE, SIT-FLYING, SKYSURFING, jumps with a CAMERA, PRECISION LANDING, INDIVIDUAL ACROBATICS, AFF, TANDEMS and BEGINNERS.

CAUTION:

- **The device is not designed for jumps from firm structures – BASE JUMPS!**
- **The device is not designed for PARAGLIDING, PARASCENDING or PARASAILING!**
- **The device is not designed for the primary opening of the parachute!**
- **The device is not designed for jumps into water!**
- **The device must not be used if the display signals any error state!**

“Ecological disposal of this equipment is secured within the collective RETELA system”.

HEAD II

Description

1. Function

The primary function of the device is to cut the closing loop of reserve parachute to initiate a process of opening the reserve parachute. If the parachutist is in free fall at a dangerous height, opening the reserve parachute avoiding the impact of parachutist on the ground.
The limit values of activation are different depending on the specific adjustment of the device; i.e. EXPERT, BEGINNER, and TANDEM. The height of activation means the highest admissible height when activation can take place. The device can be started at any height between the activation height and the ground, if a fall rate has been exceeded. Activation at a lower height than the activation height is possible, for instance, after a low release. A height lock indicates the height that has to be overcome in order to unlock the device. If this height has not been reached, but activation conditions have been met, the device will not be activated.

EXPERT

Activation takes place if the height above the ground is less than 270m and the fall rate is greater than 35 $m.s^{-1}$. The height lock is 450m.

BEGINNER

Activation takes place if the height above the ground is less than 270m and the fall rate is greater than 20 $m.s^{-1}$. The height lock is 450m.

TANDEM

Activation takes place if the height above the ground is less than 560m and the fall rate is greater than 35 $m.s^{-1}$. The height lock is 900m.

2. Additional functions

The device has a built-in real-time clock that runs continuously if there is a battery in the device. When starting the device, the condition of the battery is indicated in percents of remaining capacity. No other adjustment procedures apart from the device's start-up have to be made prior to the first jump. If a landing surface is situated lower or higher than a start point, this difference can be set on the device (± 600 m). A qualified person may change the adjustment of the device to the TANDEM, EXPERT or BEGINNER setting according to the user's requirements. The qualified person can also set the time of the standby mode to 1 to 19 hours. Detailed data from the previous jump are stored in the device memory. The device operates as a 'black box'. Such details can be retrieved if needed by the qualified person. The data are automatically rewritten after each jump.

3. User Menu

The user can access a simple menu where he can view the following data:

The height of opening during the previous jump.
Total number of jumps.
Remaining battery capacity in percents.
Battery voltage in volts.
Device manufacturing number.
Controlling firmware version.

4. Main parts

All of the device parts are contained in a flat, metal case that is divided in three compartments. The upper one contains a microprocessor, a real-time clock, supporting electric circuits, a barometric pressure sensor with a display and two buttons. The lower compartment contains a battery. The middle compartment contains a cutter. The battery and the cutter can be replaced.

5. Location of the device

The device is located under the lower part of the container of the reserve parachute. Its control buttons and display can be accessed through a window on the rear side of the packing. The closing loop of the reserve parachute goes through the hole in the central device part where the cutter is placed as well. MPAAD fills up the area that is naturally created in the between-the-blade part of the packing of the reserve parachute by pulling the closing loop through a padding plate.

HEAD III

Technical data

Size (mm):	100 x 62 x 20 mm
Weight (g):	ca 250 g
Volume (ccm)	124 ccm
Battery:	Special lithium batteries
Battery service life	Up to 4 years or 300 flying hours
Range of application (m)	- 600 up to + 10000 m (AGL)
Activation height (m)	< 270 m Expert < 270 m Beginner < 560 m Tandem
Activation rate (m/s)	> 35 $m.s^{-1}$ Expert > 20 $m.s^{-1}$ Beginner > 35 $m.s^{-1}$ Tandem
Height lock (m)	450 m Expert 450 m Beginner 900 m Tandem
Accuracy: (%)	± 7 %
Temperature range (ºC)	- 20 ºC up to +60 ºC
Stand-by mode (h)	Can be set to 1-19 hours at hourly intervals
Landing outside airport	Can be set to ± 600 m
Device service life	15 years

HEAD IV

Control

1. Deactivated device

The display is empty and whenever the left or right button is pressed, intentionally or by accident, the display indicates **[OFF]**.

2. Device activation

The device is started by pressing the buttons of the so-called activation sequence several times. First release both buttons. Press the left button and keep it pressed **(o)**. After three seconds, the display will show number one **[1]**. Press the right button **(>)** three times in a row and release it. After each pressing the display will show a growing row of numbers **[12]**, **[123]** and **[1234]. Once numeral** 4 has appeared on the display, release the left control button **(o).** This activation sequence is then complete. The whole sequence must not last longer than ten seconds. If a mistake is made the whole procedure must be repeated.

The display shows **[ON]** briefly and then it images the remaining capacity of the battery ranging from **[100%]** to **[0%]**. Subsequently, automatic calibration takes place and **[CAL]** appears on the display**. Afterwards, the machine switches to a stand-by mode.**

During the activation procedure, MPAAD checks the battery, cutter and electronics.

3. Device deactivation

Turn off the device in the same way in which you activated it – i.e. by means of the activation sequence. The display shows **[OFF]**. If you forget to turn the device off, it turns off automatically once the time of the stand-by mode has been fulfilled. The device can be turned off during the stand-by and jump modes.

4. Calibration

Calibration is carried out to set a zero height for the landing surface. It is started when activating the device and then automatically after each jump. When **[CAL]** appears on the display**,** the device measures a current pressure and sets it as a height zero value**. Therefore, you should always activate the device only in the area of the landing surface. If the values fluctuate badly during the measurement of pressure, an error is shown on the display. The device has to be deactivated.**
If you land outside an airport and find yourself at a markedly lower or higher height on your way back ± 30 m (± 100 ft) from landing ground, turn out the device.
If you are in doubt, proceed in the same way to be on the safe side!
The device turn on again, when will you be on the landing ground,

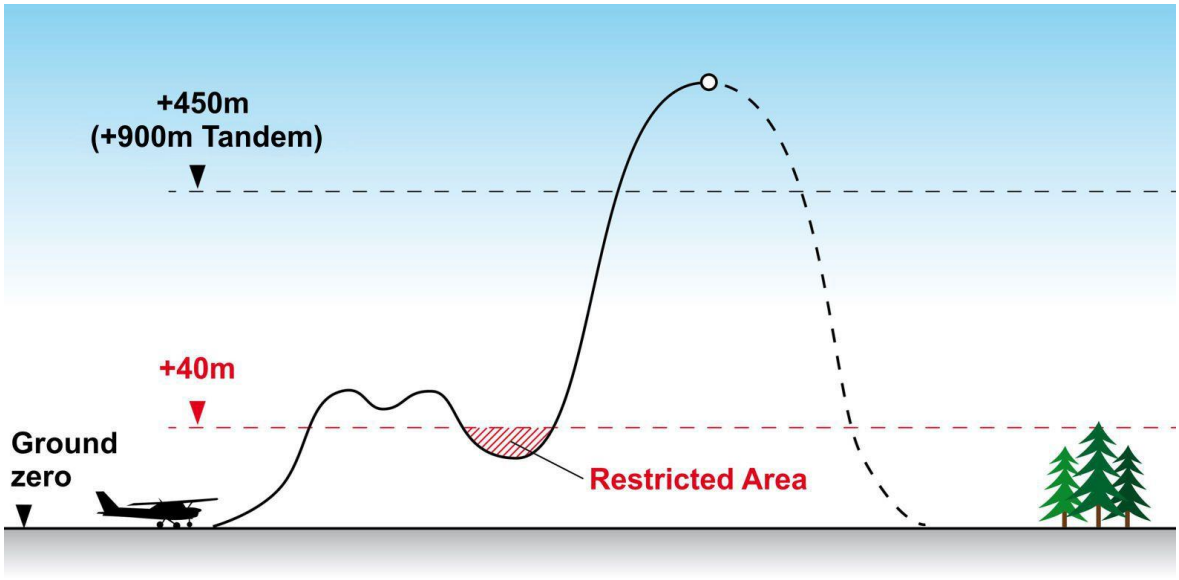
5. Stand-by mode

When in the stand-by mode, the device is on the ground. Pressure and a possible airplane start are checked regularly. This mode starts as soon as the calibration is completed. The display shows a time countdown until the automatic turning off of the machine. For instance, the display shows time information **[14:00]** with a flickering second-indicating colon in the middle. This indicates the introduction of the device into the stand-by mode for fourteen hours after which the device turns off automatically. All the time the display will continue to show the time remaining to the turn off, for instance, **[14:00], [13:59], [13:58], ……, [00:01], [00:00]**.

If the device is set to a different mode than EXPERT, this is indicated on the display.
The TANDEM adjustment is indicated by letter **‚t' in the far-right** display field, for instance, **[14:00t].**
The BEGINNER adjustment is indicated by letter **‚b', for instance, [14:00b].**
When the EXPERT adjustment is used, the far-right display field is empty.

6. Jump mode

Just a while after an airplane's start the device automatically changes to a jump mode. The display stops imaging time and shows a current reached height above the ground (AGL). For basic mode is the jump landing area at the same altitude as the starting point. The device requires for the aircraft to ascend up to at least 40 m (130 ft) in order for correct start detection and to remain above this altitude until the skydiver's jump. AGL below 40 m (130 ft) is called a restricted area.

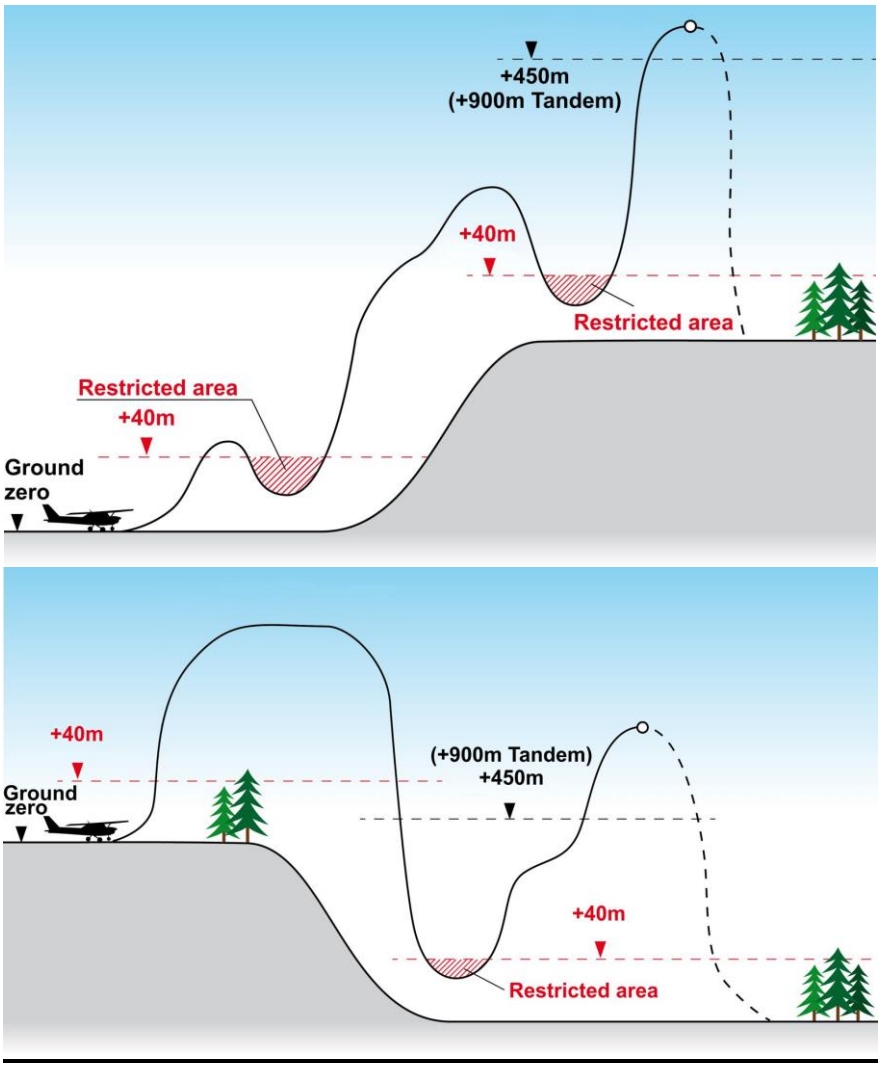


After landing a calibration sequence takes place and the device automatically switches back to a standby mode.

Note:
Just a look at the display can check not only the mode in which the device is operating but also the time remaining to an automatic turn off as well as the proper function of the device.

7. Adjustment during a jump outside an airport

If the landing surface is located higher or lower than the starting place, the device has to be adjusted to a correct value as follows:
If the device is on, turn it off. Activate the device by means of the activation sequence. As soon as the display begins to read **[ON], press the right button (>)** and keep it pressed until the display starts to show **[SEt]**. By pressing the right button or keeping it pressed adjust the required height of the landing ground (±600 m). Confirm your selection by pressing the left button **(o)**. Once the calibration has been completed, the device switches to a stand-by mode. The display shows, in turns, a time countdown and a set height, for instance, **[14:00] …[+ 120] … [14:00]**.



After planned landing on the landing ground outside an airport using the re-calibration of the landing ground height, the device turns off automatically! The display is empty and when pressing on the button the **[OFF]** sign becomes displayed**.** Prior to the next jump, be it on the original or a new landing ground, turn on the device again.

8. User Menu

To enter the User Menu press the right button **(>)** and keep it pressed for about 4 seconds. The display will show **[-01-].** Release the button and the display will show the height of opening. If you keep on pressing the button, you will start going through the menu. Press the left button **(o)** to leave the menu. After a while the menu will deactivate itself.

Menu beginning

[-01-]	**[888o]**	opening height during the last jump
[-02-]	**[888J]**	total number of jumps
[-03-]	**[88%]**	remaining battery capacity in percents
[-04-]	**[3.65v]**	battery voltage in volts
[-05-]	**[888d]**	battery age in days
[-06-]	**[41b8]**	device manufacturing number
[-07-]	**[01.00]**	controlling firmware version

Menu end

9. Error statuses

The device must not be used if the display signals any error state!

If during the self-inspection after the machine switching on or during the operation, the display indicates error**[E**xxx **],** it is necessary to perform tasks as per the table below:

Error indication	Error description	Troubleshooting
E001, E010	Calibration error. The scope of measured pressures is too high or the calibration value is out of the operation limits.	Switch off the machine and on, the calibration will be completed again. In case of reoccurred error do not use the machine! Contact your dealer, distributor or manufacturer.
E002, E020	The cutter error. The cutter is defective or activated.	Replace the cutter.
E004, E040	Faulty battery. Low voltage.	Replace the battery.

After removing the defect, perform the inspection by switching the device on. The machine display must not indicate any error state.

If it displays **[F**xx **]** (failure) t**he device must be sent to the manufacturer for inspection**. In such case, the device is blocked and cannot be switched off.

HEAD V

Assembly

The structure of MPAAD is new and differs from the structure applied to the most frequently used devices. Therefore, it does not allow for the use of available assembly components built in a majority of currently used parachute sets. However, completed tests proved that minor adjustments make MPAAD suitable for mounting into most currently used parachute sets.

Note:
The presentation of the MPAAD device for the leading foreign manufacturer of parachute equipment has not yet taken place. The manufacturer's agreement is required for the mounting of a MPAAD device into a parachute system.

HEAD VI

Maintenance

1. Special maintenance

The device does not require any special maintenance. The device performs continual automatic checks (battery, internal circuits, cutter).

2. Proper function check

The user can easily check the proper operation of the MPAAD device by looking at the display.

- The real-time clock must correctly count down the time (stand-by mode).
- The height on the device display must correspond with the height at the altimeter (jump-down mode).

Note:
Even a more thorough device check is relatively simple. However, it requires a certain level of knowledge. Therefore, it can be completed only by a person trained by the manufacturer.

3. Battery replacement

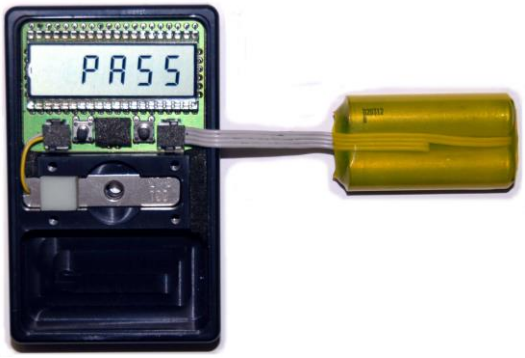
The battery can be replaced only by a duly informed parachute technician or by a technician trained by the manufacturer!
The disconnecting and connecting of connectors should be limited only to the necessary replacement of the battery! Unnecessary repeated disconnecting may result in the deterioration of the electrical parameters of the connectors.

Battery replacement procedure:

- Turn off the device.
- Unscrew all four screws and uncover the cap.
  Screw out four screws carefully to not damage the thread or the screw itself, than remove the cap. There are special screws for dismounting of the body cap, which shell be screwed out by a spanner (no.2) - plug in its longer part into the slot of the screw head. Shorter part of the spanner (no.2) is colored in red purposely to beware before plug in to the screw head slot, what can make damage of the screw.
- Carefully disconnect the battery.
- Push the both buttons and hold them about 15 sec (it is to unload inside capacitors).
- Connect new battery (see Battery assembly procedure)

Battery assembly procedure:

- Gently press the battery contact among the contacts in the device.



- Fold the cable so that it makes a right angle.

- Turn the battery cells by 90° to insert the battery into the device body, the inscriptions on the battery facing up. Once the battery has been installed, accommodate the cable in the through on the right, in the central part of the body.

- After connecting the new battery, all segments of LCD display will light up and notice **[PASS]** will appear after a while.
- Make switch-on device sequence.
- On LCD display will appear notice **[run].**
- Hold the right button until notice **[clr]** appears.
- Make switch-on device sequence.
- The device is turned off.

By this way, the counters of battery energy are set up on 100%.
Number of jumps and days from switch-on is set up on 0.

CAUTION:
If you make switch-on device sequence at the moment, when the notice **[run]** is on display, the energy counters and other data will be kept – they will not be deleted.

The indicator of battery score can show 100% - 0%. The device is functional in this whole range. If the battery lifetime is off, you will see **[0%]** on the display and the device is not able to be switched-on. Generally considered, that if it is possible to switch-on the device, the battery capacity is sufficient.

The device is not able to recognize, that the battery was really changed in a new one!!!
If you delete the energy counters, but do not change the battery, the device will be commonly functional, but in case of need to shoot the pyro cartridge – there might not be enough energy!!!

- Return a cap and tighten screws carefully to not damage the thread or the screw. Again use the spanner (no.2) and pull in its longer part into the screw head slot. Shorter red colored part of the spanner is not determined to pull it in, because of damage!
- Check the device by turning it on.

4. Cutter replacement

Its replacement can be carried out only by a duly informed parachute technician or by a technician trained by the manufacturer!
If activated, a new spare cutter will be provided free of charge (only postage will be charged). This will apply only if the manufacturer is then sent a report (by fax, e-mail, post) giving details about the respective circumstances (see the form **MPAAD – Activation Report**).

Cutter replacement procedure:

- Remove the damping cube from the flexible material from the machine central part, carefully remove the cutter and disconnect the connector.

- Gently press the connector of the new cutter into the counterpart piece placed in the upper left part of the device body.

- Place the cutter into the central part of the device so that its whole height sinks in the groove.

- Lead the cable to the groove on the partition. The surface under the conductor is provided with glued on elastic rubber to insulate the cable. Return the damping cube from flexible material on the cutter.

- Once the cutter has been replaced, check the operation of the device by turning it on.

5. Device adjustment changes

A qualified person may change the adjustment of the device to TANDEM, EXPERT or BEGINNER and to set the time of the stand-by mode from 1 to 19 hours.

HEAD VII

Principles

- **Always turn on the device only in the area of the landing ground, i.e. not in the airplane.**
- If you land outside an airport and find yourself at a markedly lower or higher height on your way back ± 30 m (± 100 ft) from landing ground, turn out the device.
- For transport always turn out the device.
- The cabin of the parachute airplane must be connected to the surrounding pressure.
- After taking off, the airplane must not descend below the height of the landing ground +40m (+130ft).
- If the positive re-calibration of the landing ground is applied, the airplane must not descend below the height of the landing ground +40m (+130ft) if it has already overcome the same height.
- When re-calibration is used, the height lock is used with regard to the height of the landing ground, not of the start-up ground.
- If parachute jumps are interrupted, it is necessary to observe a descent speed lower than an activation speed or to turn off the device while landing.
- When replacing the batteries and activating the automatic activation device repeatedly, it is always necessary to check the proper adjustment of the device; i.e. Expert, Beginner or Tandem. If the respective adjustment does not correspond with a requirement, it must be re-selected.
- **The device must not be used if the display signals any error state!**

HEAD VIII

Service life and warranty conditions

The anticipated service life of the device is 15 years.

Damage or shortcomings that have been demonstrably caused by the manufacturer will be repaired free of charge within a period of two years from the date of sale.
A warranty-covered repair, if any, does not extend the time of the warranty period.
Warranty does not apply to damage caused by force majeur or other causes, including but not limited to an accident, impact, improper use, unauthorized modifications, handling, misuse, etc.

CAUTION:
MPAAD is the automatic activation device! It is not designed to be used as a primary means for parachute opening.
The different use of the MPAAD device than is described in the operation manual may lead to its wrong function.
The device must not be used if the display signals any error state!
Considering a certain risk level that is an integral part of sport parachuting, no other requirements – especially, in particular those concerning breakdown after parachutist accidents – cannot be accepted.

HEAD IX

Caution

The proper function of the container is secured only by the reserve pilot chutes PV – 038 or PV – 055.
The minimal buoyancy force of these pilot chutes are 180 N.
The upper diameter PV – 038 of the firm part of the pilot chute is 70 mm, while the lower diameter of the conical spring is 140 mm.
The upper diameter PV – 055 of the firm part of the pilot chute is 120 mm, while the lower diameter of the conical spring is 140 mm.

The application of other types of reserve pilot chutes is subject to the approval of the manufacturer of the container.

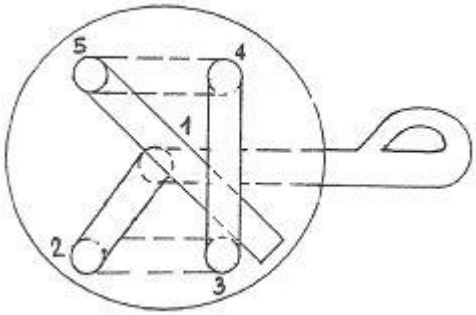
The Reserve Pilot Chute PV – 038 or PV – 055

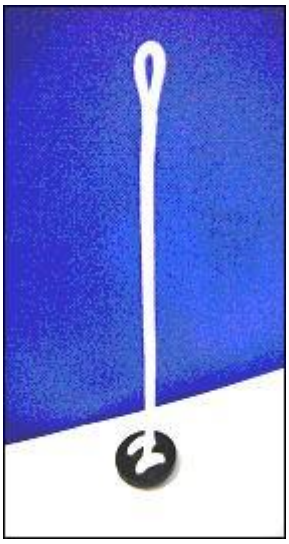
The size of the device is 100 x 62 x 20 mm.

Placing the MPAAD automatic activation device into a container

The MPAAD automatic activation device can be stored only in a container designed for this purpose.

Leading the cord (closing loop) through the pad:





1. Lead the cord through the pad center (1).
2. Then lead the cord to the openings marked with numbers 2, 3, 4, 5.
3. Lead the cord running through the center to a sign that informs the packing staff about the precise length.
4. Take the end of the cord pulled from the opening No. 5 and needle it in between the cord running between the openings No. 3 and 4.
5. Let the cord end stick out by ca 15 mm.
6. The cord that has been led along its entire length as described above is fixed by friction, which prevents its shifting.
7. In the area between the openings 2 – 3 and 4 – 5 the cord creates the surface with which the pad aligns onto the body of the pyro cartridge.

Completing

The device must be completed by an authorized person. First, insert the cord and the pad into the device. The cord is inserted into the pad in a unique way and therefore it is not necessary to secure its ends with a knot. (Cord installation procedure – picture 1).

Put the device into the pocket sown onto the back padded piece, the display facing the translucent plastic plate. Lead the cord through the opening in the pocket and then take it through the bushing pressed onto the bottom of the container of the reserve parachute. Stabilise the device inside the pocket and the container is then ready for packing.

The reserve parachute can be packed only by a person with valid authorization. Once the reserve parachute has been packed, the function of the device has to be checked.

MPAAD – Activation Report

1. Date of making the Activation Report: _____

Person who recorded the report: _____

Telephone number: _____

2. Details about the sportsman for whom the activation was completed.

Name: _____ Telephone number: _____

Height / weight: _____ Number of jumps: _____

Parachuting practice in years: _____ Number of jumps in the last 12 months: _____

3. Equipment details:

Container type: _____ Production date: _____

Container material:
(Cross out the appropriate) Cordura / Parapack / Uzaron / Patrik / Padnis

Main parachute type and size / number of jumps: _____

Production date: _____

Reserve parachute type and size: _____

Production date: _____

Applied system of main parachute opening: ◯ hand-held parachute ◯ manual control

◯ parachute lanyard ◯ other

4. MPAAD

Adjustment: ◯ Expert ◯ Beginner ◯ Tandem

Production date: _____

Production number: _____

Date of installation in a bag: _____
Place of installation: _____

Installed by: _____

Pyro cartridge production number: _____

Was the loop cut through?: yes no
(cross out the appropriate)

5. Airplane details:

Airplane type: _____ With or without doors: _____

Did the airplane have a pressure cabin and was it used? _____

Did the airplane descend before ascending from the departure aerodrome?_____

Did the airplane ascend slowly after the start? _____

Maximal reached height before the respective parachutist's drop_____

Jump height: _____

Pilot's name and telephone number:_____

6. Activation details:

Date and time: _____

Airport (country / city): _____
Where was MPAAD activated:

◯ On the ground	◯ During flight	◯ During main parachute opening
◯ During free fall	◯ In ascend	◯ After main parachute opening
◯ In airplane	◯ In descend	◯ During reserve parachute opening

Parachutist's position in the airplane: _____

Estimated activation height: _____

Air temperature on the ground: _____

How much time did MPAAD need to activate? _____

How many jumps with MPAAD were completed before MPAAD was activated? _____

Was it switched on at theairport?_____

If not, where was it turned on? _____

Has the MPAAD been outside the airport - except for the time when it was in the airplane or under the canopy – since the time of its activation?

_____

The main parachute opened:

◯ Quickly ◯ normally ◯ slowly ◯ very slowly

◯ No, the main parachute did not open

When the main parachute open, the parachutist was

◯ In a stable position	◯ In start	◯ Flying headlong
◯ On his back	◯ On his side	◯ Was rotating
◯ Was not stable	◯ Combination of all of the above	

Please describe the accident in your own words, giving as many details as possible:

_____

_____

Intentionally not applied.

2014

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