# S-4U RESCUE PARACHUTE PACKING

1. GENERAL	3
1.1. PACKING ARRANGEMENT AND RULES	3
1.2. PARACHUTE PACKING ACCESSORIES	4
1.2. GETTING PARACHUTE READY FOR PACKING.	5
2. S-4U RESCUE PARACHUTE PACKING	6
2.1. GENERAL	6
2.2. I STAGE OF PACKING. VISUAL INSPECTION OF PARACHUTE EQUIPMENT AND PREPARING	
CANOPY FOR PACKING	6
2.2. PREPARING CANOPY FOR PACKING	7
2.3. MAIN CANOPY PACKING	9
II STAGE OF PACKING. MAIN CANOPY LEAFING	9
LINES INSPECTION	9
III STEP. PULLING DEPLOYMENT BAG ONTO CANOPY. PACKING MAIN CANOPY LINES AND CANO	ЭРҮ
TOP INTO DEPLOYMENT BAG.	11
CHECK-UP OF THE THIRD PACKING STEP	12
2.4. IV STEP. PACKING MAIN CANOPY IN THE BAG INTO PARACHUTE CONTAINER	13
PUTTING THE DEPLOYMENT BAG WITH CANOPY AND PART OF RISERS ONTO THE PARACHUTE	
CONTAINER.	13
CHECK-UP OF THE FOURTH PACKING STEP	13
V STEP. PACKING OF PILOT CHUTE. TIGHTENING OF THE PARACHUTE CONTAINER FLAPS	13
2.5. PILOT CHUTE PACKING	14
2.6. CLOSING PARACHUTE CONTAINER	14
2.7. VI STEP. AUTOMATIC ACTIVATION DEVICE MOUNTING ONTO PARACHUTE CONTAINER	15
INSPECTION OF THE SIXTH PACKING STEP	17
2.8. VII STEP. ADJUSTMENT OF SUSPENSION HARNESS. MAKING RECORDS IN DOCUMENTATION	٧.
SEALING	17
SUSPENSION HARNESS ADJUSTMENT TO PILOT'S HEIGHT	17
INSPECTION OF THE PARACHUTE SYSTEM PACKING	19
2.9. COMPLETION OF DOCUMENTATION	20
2.10. PREFLIGHT PARACHUTE PREPARATION. PARACHUTE FLIGHT READINESS INSPECTION	20
2.11. SPUTTING PARACHUTE INTO AIRPLANE	20
2.12. POST-FLIGHT PARACHUTE INSPECTION	21
2.13. PARACHUTE ASSEMBLING AFTER LANDING	21
2.14. RULES OF PARACHUTES STORAGE AND USE. PARACHUTE TRANSPORTATION	22
2.15. PARACHUTE STORAGE	22
2.16. RULES OF MAINTANING PARACHUTE DOCUMENTATION	23
3. PARACHUTE AUTOMATIC ACTIVATION DEVICES KAP-3 AND PPK-U	24
3.1. BRIEF TECHNICAL CHARACTERISTICS OF KAP-3 AND PPK-U DEVICES	24
Tolerable limits of device triggering in terms of time	25
Altitude tolerances of device triggering	26
Altitude and time setting on scales of life-saving security devices.	27
3.2. AAD SCHEDULED MAINTENANCE	28
Maintenance Schedule No. 1	28
Maintenance Schedule No. 2	28
AAD troubleshooting at operator facilities	29
Failures that should be eliminated by manufacturer	30

### **1. GENERAL**

#### 1.1. PACKING ARRANGEMENT AND RULES

Parachute packing is carried out in accordance with the specific parachute type manual in the rooms specially intended for that purpose, equipped with packing tables (table dimensions: length- 9 m [30 ft], width- 1.2 m [4 ft], height- 1 m [3.3 ft]. Table surface is to be smooth and thoroughly polished). It is allowed to pack parachutes outdoors in the specially intended and equipped areas or on the starting line (under propitious weather conditions). Before packing, the area is to be covered with field packing cloths overlapped, not to leave any open space between. If packing is carried out on field cloth, its dryness, absence of dirt, possible chemical contamination and mould are to be checked up. Cloths are to be laid on dry clean surface (without chemical pollution). When laying a number of cloths in a row, it is necessary to place them overlapped. It is forbidden to lay parachutes directly on the ground or dirty floor.

Beginning parachute jumpers pack parachutes within a group. Every parachute is packed stage-by-stage by two persons with a mandatory quality inspection on each stage completion by a paradrop instructor, who is to perform packing along with his group. Proceed with the next step only after previous step has been accomplished and checked on all parachutes in the group. Instructor, while inspecting the packing process, is to continue his persistent observation of work until the whole parachute group sis done.

An owner after his (or her) parachute is packed (a person to be dropped with this particular parachute) fills in the passport and signs in the column "Rigger", and instructor, who checks up the packing, in the column "Supervisor". Packing of a parachute is invalid without the supervisor's signature. Such a parachute is subject to repacking.

Experienced parachute jumpers pack their parachutes on their own under supervision of group inspector.

# 1.2. PARACHUTE PACKING ACCESSORIES

Following accessories are used for parachute packing (Fig. 1):

Depending on particular parachute type the appropriate set of accessories is prepared



Fig. 1 Parachute packing accessories

1. Field cloth 13x1 meter [43x3.3 ft]

2. Transportation bag for storage and carrying the packing accessories.

3. Weights (3-5 pcs.), 450x70 mm [18x2.8"].

4. Metal spikes for fastening cloth to the ground.

5. Packing ruler 450 x 34 x 6 mm [18 x  $1.3 \times 0.26$ "] for tucking parachute container flaps during packing. Ruler must be polished with its edges thoroughly rounded-off.

6. Hook for packing lines, made of steel wire. Hook must be polished with sharp edges removed.

7. Auxiliary steel wire pins with a cable loop on one end. Pins are intended for the preliminary grommet cottering on the parachute container cones while packing a parachute. Pins must be polished.

8. Fork for the bridle line packing.

9. Packing frame to pack lines into deployment bag cells. Frame is to be smooth with its edges thoroughly rounded-off.

10. Ties for tightening parachute container flaps while packing a parachute. It is recommended that nylon cord ShKP-90 or silk cord No.15 (50 kg [110 lb] strong) 1 m [40"] long is used.

11. Cotton threads No. 30 or 40 for D-ring pins locking and sealing.

12. Linen thread, 15 kg [33 lb] strong, for the transportation bag sealing.

13. Sealing pliers and seals to lock and seal D-ring pins and a transportation bag.

14. Wooden insert 105 x 90 x 32 mm [ $4.1 \times 3.5 \times 1.3''$ ] with a cord to provide room for automatic parachute activating device while packing. The insert must be smooth with its edges rounded-off.

15. Cotton twisted yarn No. 65/6/3 (ShChB-125 cord core in one plying) to lock the flexible pin of PPK-U device.

# 1.2. GETTING PARACHUTE READY FOR PACKING.

1. Prepare area for packing.

2. Thoroughly inspect a parachute before packing, make sure all parts of a parachute system are available and operable.

Parachute inspection and packing is performed by two persons: a rigger (responsible for packing) and an assistant.

Blemishes found are to be rectified either by replacing faulty parts with spare ones or by repairing them at the parachute owner facilities.

Parachute parts overhaul and replacement are to be performed according to the Instruction No. 008-62 on military repairs of paradrop materiel.

If defects are found, which exceed the limits of military repairs, the parachute is to be sent to manufacturer.

## Documentation checking

If a parachute lacks for passport (or an approved duplicate), its usage must be discontinued.

# 2. S-4U RESCUE PARACHUTE PACKING

## 2.1. GENERAL

Parachute is to be inspected and packed as described in S-4U Parachute System Technical Manual. It should be packed by a pilot in charge and packing inspection should be performed by a Para rescue officer.

Parachute packing is valid for 3 months.

Parachute packing is divided into following stages:

I. Parachute visual inspection and canopy preparation for packing.

Installing accessories into an intermediate base of parachute container.

Depending on the mission a parachute will be used in, the below listed components are to be packed:

a) MLAS-1-OB boat or PSN-1 raft and handheld emergency food reserve NAZ;

b) MLAS-1-OB boat or PSN-1 raft, and R-855UM radio;

- c) MLAS-1-OB boat or PSN-1 raft;
- d) NAZ handheld emergency food reserve;

e) R-855UM radio.

II. Main canopy packing.

III. Pulling deployment bag over a canopy. Packing main canopy suspension lines into deployment bag cells and packing canopy top into the deployment bag.

IV. Packing the deployment bag with main canopy into the parachute container.

V. Pilot chute packing. Tightening the parachute container flaps.

VI. Installation of safety automatic activation device (AAD) into a parachute container.

VII. Suspension harness adjustment. Completion of documentation.

# 2.2. I STAGE OF PACKING. VISUAL INSPECTION OF PARACHUTE EQUIPMENT AND PREPARING CANOPY FOR PACKING

# 2.2.1. CHECK AVAILABILITY AND INTACTNESS OF ALL PARACHUTE SYSTEM PARTS AND

stretch the parachute system to its full length and check:

- canopy for defects, grease stains, dryness;
- lines for restraint, abrasion, strain;
- **suspension harness** for torn straps, damaged stitches on straps and D-ring pocket. Metal partsclean from dirt, check for easy opening. Check condition of leg strap cramps.

## Check TP lock operability

Inspect TP lock for:

- corrosion on lock parts;
- bends of lock buckles;
- lever spring operation- close the lock cover and make sure studs are inserted on their full length to the apertures in the lock case;

- check spring safety arrester operation by closing and opening the safety arrester latch;
- insert all the buckles into the lock and check, if all movable locking dents fit into their places not protruding out of the case;
- check spring operation, which throws off the lock cover. For this purpose put the safety arrester latch onto the lock cover and clasp the levers. Lock cover should raise and release the buckles.

**Check up OSK-D lock** for reliable buckle blocking by simultaneously pressing the slider buttons with the safety arrester closed (red warning mark is covered by the safety arrester button). By doing so the buttons of the safety arrester and the slider shall not move. Check up the lock functioning with the safety arrester open (the safety arrester button moves upwards, red warning mark is open). In this case the lock slider should move easily, and buckle should separate from the lock case.

When inspecting the **split buckle** check reliability of the buckle pin locking.

**Parachute container with a cushion and a hose**- check flaps for abrasions, stains; check their dryness. Check intactness of grommets, cones, automatic actuation device flap and mounting plate. Check attachment reliability of parachute container springs, their intactness and strain. Check intactness of D-ring hose, reliability of its sewing.

**Check D-ring** for cable threads ruptures; inspect cable splicing, soldering of pins; check pins for bends, burrs and corrosion.

**Inspect canopy deployment bag** for defects of cloth, reinforcement bands, and line cells; check attachment of line cells. Safety pockets, apertures, cover bridle, absence of stitch ruptures.

- Bridle line - inspect loops embedment areas.

- Pilot chute- inspect canopy, lines and a thimble.

- **PPK-U** (device type: PPK-U-240A- hose length 240 mm [9.5"], clevis of A type, length of flexible pin halyard 2 m [6.6 ft]).

## 2.2. PREPARING CANOPY FOR PACKING

- Install a D-ring.

- Place a special insert to the parachute container pocket for the safety device.

- Lay out suspension harness, sorting risers in pairs (left and right ones: 1 & 3 and 2 & 4). Suspension harness should be laid out on the table as is it were put on a man facing canopy.

- A strap with a D-ring pocket should be placed on the left side facing the table surface. Risers should be sorted in pairs, with split buckles lacing inside. The correctly placed suspension harness has its back risers (1 and 4) on top.

- Disconnect springs of parachute and remove cushion.

If a parachute is packed without rescue boat (raft, NAZ food reserve, radio unit), lock the false bottom.



Fig. 2. Connecting canopy to suspension harness.

If suspension harness risers were disconnected in the process of training drops, connect both buckles of left and right risers correspondingly with the riser release locks of suspension harness (left ones- 1 and 2, right ones- 3 and 4).



Fig. 3. Connecting buckles

Connecting is to be performed as follows:

- insert the lock buckle into a milled groove in a lock body;
- shift the slider into the extreme upper position (Fig. 3) and release slider buttons;
- shut the safety arrester by shifting arrester button into the lowermost position until red warning mark is covered,
- put the blocking gear onto lock slider so that the blocking clevis aperture would align with the safety arrester button.

#### 2.3. MAIN CANOPY PACKING

## **II STAGE OF PACKING. MAIN CANOPY LEAFING**

Packing begins with the 14-th line, marked with orange sleeve. The 15-th line is laid onto the 14-th one; the cloth between them is spread leftwards. Left side of the canopy is leafed up to the 22nd line. The bundle of guiding line cords 22a (guiding line is green) is placed into appropriate cloth, and the guiding line thimble- onto corresponding mark on canopy; flaps are stretched out. Canopy is further packed up to the 28th line. Then the right half of the canopy is leafed: the 13th line is put onto the 14th one from above, cloth between them is spread rightwards; canopy is leafed up to the 7th line. The thimble of guiding line #7 is placed into the cloth between lines #7 and #8 on the corresponding mark. Canopy is further leafed up to the 28th line. After leafing is completed, if the packing is correct, the 14th line is in the bottom and the 28th red line is on top; the uppermost cloth has a stamp.

The leafed canopy is rolled up along its full length into three parts, starting from the right side, so that canopy edge width would match the width of the bottom part of the canopy deployment bag.



#### LINES INSPECTION

Untwist and inspect lines. Parachute container with the suspension harness is put so that suspension harness is under parachute container, as if it were put on a man; parachute container is placed with its flaps upwards, suspension harness risers are put in pairs (left and right ones) with back risers on top.

Make sure lines easily part to the left and the right groups and the canopy being packed- into the left and the right parts. For that purpose put aside the left and the right group of risers. Along the full canopy length up to its edge lines should easily part into bundles without crossing between bundles and without twisting. Guiding lines should cross each other (the cloth, to which the left line #22a is fastened, is located in the right part of packed canopy and the right line cloth is located in the left part).

Check canopy parting into upper and lower parts. The lower (forward) risers remain on the ground, while upper ones go up and canopy lines parting into upper and lower bundles is checked. If packing is correct, all the upper canopy part should go up, along the full length up to canopy edge the lines are to be easily parted into bundles, without twisting between the bundles; guiding line #22a, connected with the lower riser of left group, should remain with the upper bundle of lines. It is necessary to raise a little the two inner red coloured lines of the suspension harness upper risers and bring them together to the lower canopy edge. These lines should be located side by side on top, and the cloth with the stamp should be on top of the right side.

After check-up risers are brought together; lines go into one common bundle, they are shaken and stretched into a line on the ground. Canopy edge is straightened. Excess of line length (stretching in the process of operation) should be run to the split buckles of suspension harness. Remove slack of guiding lines to risers, having previously checked the position of guiding line thimbles on the corresponding marker. Guiding rings are to be put under rubber belt-loops.

It is forbidden to turn parachute container upside-down after line inspection. In this case the lines are to be re-inspected once again.



Layout of packed canopy lines

Lines inspection

#### CHECK-UP OF THE SECOND STEP OF PACKING

Paradrop instructor checks correct canopy leafing and inspects lines.

# III STEP. PULLING DEPLOYMENT BAG ONTO CANOPY. PACKING MAIN CANOPY LINES AND CANOPY TOP INTO DEPLOYMENT BAG.

# PUTTING THE DEPLOYMENT BAG ONTO CANOPY

Deployment bag is pulled by the bag skirt (with cells turned upwards) up to a mark in the canopy bottom. Canopy is embraced using constringent belt with two rubber cells, which are let through the bag grommet and fixed using packing ruler. Lower bag part with cells is stretched out and packing frame inserted.



Putting deployment bag onto a canopy

Fixing canopy using constringent band

#### PACKING LINES INTO DEPLOYMENT BAG CELLS

Deployment bag is closed with an apron by drawing removable rubber cells through apron grommets. Rubber cells are locked with suspension lines in a certain order. The first bundle of lines should be gripped at the marked area. The slack of the lines between the bundle fixing the first (right binary) cell and the edge of the canopy is hidden into deployment bag under an apron. The next bundle of lines, gripped at the marked area, is put into the left binary cell. The lines fixed between cells should have a little slack. The slack of the lines between cells fixing the deployment bag and between the first fixing bundle and the edge of the canopy is necessary for preventing a premature opening of a deployment bag, when canopy is deployed. Next the right unary and left unary cells are fixed.

After the deployment bag has been closed, fix constringent belt cells and pack suspension lines into deployment bag cells starting from the left up to the marks (60 cm [24"] from risers). Any omissions of rubber cells, slack of lines in bundles, lines twisting, projection of bundles from rubber cells for more than 3-4 cm [1.2-1.6"] or sagging (slack) of lines after packing for more than 20 cm [7.8"] are inadmissible. In the process of packing lines the deployment bag with canopy should not be moved around packing table. When packing, lines should be pulled towards deployment bag together with suspension harness. Pack S-folded canopy top into deployment bag, tighten it and remove tightening cord into deployment bag. Remove packing frame.



Fig. 4. Succession of lines packing into deployment bag cells

# CHECK-UP OF THE THIRD PACKING STEP

Check correct line packing into cells without cell omission, fixing of all lines in cells, absence of line snagging into other bundles, absence of their twisting and essential slack of line bundles and individual lines. Line bundles should not protrude from rubber cells for more than 3-4 cm [1.2-1.6"]. Protective pockets are pulled onto line bundles fixing the bag and cells of constringent belt.

Make sure packing frame is removed and bag top tightened. Packed lines are covered with protective cover.

12

# 2.4. IV STEP. PACKING MAIN CANOPY IN THE BAG INTO PARACHUTE CONTAINER.

# PUTTING THE DEPLOYMENT BAG WITH CANOPY AND PART OF RISERS ONTO THE PARACHUTE CONTAINER.

Parachute container flaps are stretched aside. Part of risers and the remaining length of lines are packed into the bottom of parachute container. Put deployment bag with main canopy with its basis towards the main parachute container flap, and then pack it into container shifting leftwards and rightwards to fill container sides (fig. 5). After packing is completed, canopy top with a bridle line and pilot chute should be placed on the side of the main parachute container flap.

Stretch pilot chute to its full length, untwine the lines.



Fig. 5 Putting canopy in the deployment bag onto parachute container

## CHECK-UP OF THE FOURTH PACKING STEP

Check correct placement of deployment bag with canopy onto container. Inspect pilot chute lines.

# V STEP. PACKING OF PILOT CHUTE. TIGHTENING OF THE PARACHUTE CONTAINER FLAPS.



Fix side flaps of parachute container onto the first cones of the butt-end flap using auxiliary pins. Stretch main parachute container flap and its apron.

# 2.5. PILOT CHUTE PACKING

Leaf pilot chute so that line pocket is on top with four breadths of cloth from each side. Pack the part of pilot chute line length into a line pocket.



Bridle line is inserted into pockets, sewed to reinforcing bands of deployment bag.

The right and the left canopy halves are bound; the canopy then is rolled to its edge and brought onto the main flap apron. The remainder of line length is packed S-folded onto apron, and apron is rolled.



# 2.6. CLOSING PARACHUTE CONTAINER

All parachute container flaps are fixed using D-ring pins onto butt-end flap cones. (In case of packing without rescue boat, flaps are fixed onto the second cones).

Insert parachute container flaps. Side flaps are to be inserted under a pilot chute.



# 2.7. VI STEP. AUTOMATIC ACTIVATION DEVICE MOUNTING ONTO PARACHUTE CONTAINER

# Mount PPK-U-240A on parachute container in the following way:

- inspect the device, arm and set time to 2 seconds and altitude to 2000 m [6562 ft];
- fix the flexible pin by driving a single core of ShChB-125 cord through holes in device bushing, flexible pin eye and halyard loop; knot ends of a thread;



• fix the device hose on the parachute container plate using bayonet pin, having previously adjusted the slack of the device extracting mechanism cable within 10-15 mm [0.4-0.6"] limits (by turning nut with bayonet pin on its thread);



Fig. 6. Adjusting the extracting mechanism cable slack



- install the automatic activation device into its pocket;
- fix the device and its hose using special fastening bands.

<u>Insert AAD clevis</u> under the D-ring pin. Cables of D-ring and AAD should not be twisted. Make sure slack of AAD cable is 10-15 mm [0.4-0.6"]). Flexible pin halyard is packed into the device flap. Halyard end with catch lock is brought out of the pocket and fixed on parachute container.



Fig. 7. Safety device clevis mounting under the first pin of D-ring

# Fasten parachute container springs

Check the parachute container spring pendant attachment to the loops of main and side flaps.

After parachute packing fasten the second ends of parachute container springs to the loops on the parachute container bottom. Fix all parachute container spring pendants by compressing them.

Fix risers using flaps of a soft seat back flaps

## INSPECTION OF THE SIXTH PACKING STEP

Check correct closure of parachute container flaps.

Check safety automatic activation device mounting. Check amount of AAD cable slack and reliability of parachute container springs attachment to parachute container flaps.



2.8. VII STEP. ADJUSTMENT OF SUSPENSION HARNESS. MAKING RECORDS IN DOCUMENTATION. SEALING.



Fig. 8. Sealing the parachute container locking device

The lower pin of D-ring cable is fixed by cotton thread (No. 30 or No. 40) and seal is installed specifying the date of packing, signed by paradrop instructor that inspected the process of packing.

## SUSPENSION HARNESS ADJUSTMENT TO PILOT'S HEIGHT

Suspension harness is adjusted to the same clothing that will be used in flight. Adjustment is carried out in sitting position with subsequent check when standing upright.

Suspension harness is adjusted to the size and height by altering length of its specific parts:

- chest strap- by pulling through the rectangular buckles on the main strap;
- waist strap- using two rectangular buckles;
- risers- by moving rectangular buckles. At normal adjustment buckles are located just below clavicles.

After adjustment risers are fastened using soft seat back flaps;

• leg straps- by shifting the band through rectangular buckles.

Suspension harness is adjusted as follows:

- set the back cross-piece to the extreme upward position and adjust the chest strap length so that the TP lock body is to be placed at the level of solar plexus; (perimeter of shoulder straps and chest strap should be less than perimeter of the pectoral arch), fasten the back with fixing bands on the main strap, gather the excess of the back lower part length and fasten with tightening bands.
- eliminate the waist strap slack using two rectangular buckles so that it would be comfortable to sit on the main strap; at the same time the slack of shoulder straps is to be fully retracted into the waist strap, and shoulder straps should snugly fit on shoulders; (re-adjust length of waist strap when altering the length of chest strap);
- leg strap should be adjusted by moving strap through the buckles of leg straps.

Properly adjusted suspension harness should sit snugly on pilot's body without restricting his movements. It ensures uniform load distribution at the moment of parachute deployment, eliminates possibility of catching on the projecting aircraft parts and equipment, secures pilot from falling out of suspension harness at the moment of parachute deployment.

Each pilot must know the location of buckles of waist and leg straps and rings on the fastening bands relative to marking figures, which correspond to proper adjustment to his size and height in different clothing. Later on the suspension harness adjustment accuracy could be checked with marking figures.

Incorrect suspension harness adjustment may result in men's falling out of it at the moment of parachute deployment at high speed. The reasons of falling out may be:

- slacks in shoulder and waist straps with suspension harness lock located below the chest level; shoulder and chest strap perimeters exceed the perimeter of human pectoral arch;
- failure to put movable seat back cross-piece into its upper utmost position; shoulder and chest strap perimeters exceed the perimeter of human pectoral arch;
- movable seat back cross-piece is not secured to shoulder straps, so it can shift down increasing shoulder and chest strap perimeter.

# FLYING WITH MALADJUSTED SUSPENSION HARNESS IS FORBIDDEN.

## PUTTING ON THE SUSPENSION HARNESS

Take suspension harness by the main strap near the places, where risers fork, and after having made sure its parts are located properly, pass hands into appropriate windows, comprised by the main strap and shoulder straps: first the left one (on the side of D-ring), then the right one. Fasten suspension harness using buckles in TP lock in the following order: close the lock cover, then the safety arrester catch. Insert the right shoulder strap buckle, which makes the chest lintel, into the lock until a characteristic click. Insert the buckle of left leg strap into the lock, having run it previously through the left leg strap clevis. Insert the right leg strap buckle in the same order. Having closed the suspension harness lock, check correct position of TP lock pins in the lock body (make sure by feel that none of locking pins protrudes out of the lock body).

Check locking reliability by sharply jerking each buckle in the lock.

### INSPECTION OF THE PARACHUTE SYSTEM PACKING.

Completely packed parachute system is checked for:

- correct closure of parachute container flaps, correct position of D-ring pins, safety device clip attachment, amount of slack in the extracting mechanism cable, correct seal installation;
- correct AAD altitude and time setting, correct AAD installation in parachute container (on plate, binding of hose) and device body in pocket, correct flexible pin fixing and halyard packing;
- accurate and correct parachute container flaps insertion (side flaps should not appear over pilot chute);
- correct and reliable fastening of parachute container springs;
- correct D-ring installation (ring cable slack should be removed to the pocket);
- correct risers' packing into parachute container (neither stretched nor twisted) and their fastening on the seat back of suspension harness;
- sealing.

#### 2.9. COMPLETION OF DOCUMENTATION

Parachute packing record is made in the appropriate column of the parachute passport. The parachute rigger's signature is approved by a supervisor's signature after packing is checked and accepted.

#### 2.10. PREFLIGHT PARACHUTE PREPARATION. PARACHUTE FLIGHT READINESS INSPECTION.

Parachutes used in flights should be always kept in good operable condition. Irrespective of that parachutes should be thoroughly inspected on the eve of flying day. Having received a parachute at the beginning of flying day, pilot must inspect it.

Before use it is necessary to:

Unfasten the protective flap, inspect the D-ring pins, and ascertain availability of seal and repacking term. Check the AAD installation:

correct AAD clevis attachment to deployment device cable; device installation in parachute container, device body insertion into a pocket, correct halyard packing and flexible pin fixing. Close protective and AAD flaps after inspection.

Check parachute container (rubber) springs fastening to parachute container loops, insertion of parachute container flaps.

Correct packing of risers into parachute container (neither stretched nor twisted).

Make sure there are neither greasy nor other stains of unknown origin; check for absence of wet areas.

Check suspension harness for intactness. Check condition of TP lock (closure reliability and easy opening). Check OSK-D locks for closure reliability. The reliably closed lock has its safety arrester button below and the slider covered; lock slider shall not move when pressing and moving its buttons down. Check intactness of catch locks.

Check intactness of D-ring pocket and flexible hose.

Check suspension harness adjustment to height, reliability of seat back fastening to the main suspension harness strap and to the shoulder straps using bands, and correct fastening of risers by seat back flaps.

## 2.11. SPUTTING PARACHUTE INTO AIRPLANE

Make sure there are no foreign articles and dirt in a seat bowl. Put a parachute into a seat bowl. Fasten the ADD halyard (do not allow big halyard slack). Check suspension harness lock closure.

Before taking a seat in airplane cockpit, check correct fastening of ADD halyard. After putting parachute on, check the correct location of TP lock dents by pulling and jerking sharply every buckle in the lock and make sure they are connected reliably.

### 2.12. POST-FLIGHT PARACHUTE INSPECTION

After flying, depending on mission, parachutes are left on board or removed by crew to parachute storage facilities.

After flying is over unfasten the ADD halyard, fix catch lock on parachute container, check the suspension harness lock closure.

Thoroughly examine: external parachute condition; absence of damage, greasy stains, other chemicals and mould on parachute container and suspension harness. Wet parachutes should be ventilated and dried.

If any failure found, parachute cannot be admitted to further use in flights and is to be deployed and repaired.

#### 2.13. PARACHUTE ASSEMBLING AFTER LANDING

After landing pilot shall free himself from suspension harness, collect and pack parachute into transportation bag. For this purpose, seize the parachute canopy by its pole part, stretch to full length, shake up and pack according to the transportation bag size (twist it).

Keep the folded canopy on the lap, gathering its lines into a sliding loop.

Pack parachute to the bag afterwards in the following order: put parachute container in the middle of a bag, suspension harness being placed on one side, and canopy, canopy deployment bag and lines on the other. The latter are to be covered by the parachute container main flap. Then close the bag cover and fasten all turnstiles.



Parachute Canopy Deployment bag container ines

### 2.14. RULES OF PARACHUTES STORAGE AND USE. PARACHUTE TRANSPORTATION

Parachutes should be transported in parachute bags only. It is prohibited to put any objects on parachutes, to put parachutes on the ground, take them by risers, tread on parachute by feet during taking place in a cockpit, take parachute out of seat bowl without having unfastened the ADD halyard.

It is prohibited to transport parachutes together with paint, fuel, oil and substances that might evolve active gas.

## 2.15. PARACHUTE STORAGE

Parachutes are stored in a dry well ventilated facilities, in specially designed cases or on stand shelves in one row by height.

Parachutes are to be stored at least 0.5 m [20"] from walls and ceiling, 1 m [40"] from heating devices and at least 0.2 m [8"] from the floor to the lower stand shelf.

Parachutes can be stored in storage facilities in a packed condition. In this case, the parachute container springs should be unfastened.

Air relative humidity (RH) in storage facility shall be 40 to 80% and temperature 0...+30°C [32...86°F].

If RH in storage facilities exceeds 80%, parachutes should be dried out and repacked more often, than is specified in the Operation Manual.

High humidity creates conditions for stronger fixation of folds and canopy fabric caking for the parachute stored in packed condition. Temperature below freezing causes congelation and failure to deploy a parachute.

Stored parachutes shall not be exposed to direct sunbeams.

# It is forbidden to store parachutes close to metal parts, paint, fuel and lubricants, and materials evolving aggressive gas.

In summer time it is acceptable to store rescue parachutes in aircraft cockpits. They are to be placed on seats completely prepared for flying. In winter if parachutes are temporarily stored in non-heated facilities or aircraft cockpits, they are to be inspected more thoroughly.

# 2.16. RULES OF MAINTANING PARACHUTE DOCUMENTATION

Parachute passport is its main document. In course of parachute storage and use all changes made in parachute are to be recorded into passport, including specified service life, number of drops, surnames of the persons responsible for the parachute, dates of periodical inspections, drying, repacking and repairs according to actual maintenance schedule.

The senior paradrop instructor files the passport. Persons, who carried out parachute maintenance works, should make appropriate records in passport.

All entries are to be made with ink, clearly with no marks or erasures. Erroneous entries are to be neatly crossed out and correct entries are to be made instead, proved with a paradrop organization chief signature.

If any passport section is complete, the sequel on the spare form is to be started, where the total records on parachute usage from the main passport should be transferred (number of drops and repacks). Passport sequel is an enclosure of the main one and has no legal force of an official document without it.

Parachute packing entries are to display what kind of packing was parachute subject to: parachute container or for storage. If parachute was dried or ventilated before packing, it is necessary to note that parachute was dried before making packing entry.

# 3. PARACHUTE AUTOMATIC ACTIVATION DEVICES KAP-3 AND PPK-U

AADs are intended for automatic parachute container opening or for putting in action other devices within the preset period of time or at specified altitude.

Feature	Unit of	ADD Type	
reature	Measurement	KAP-3	PPK-U
Triggering interval	S	2 - 5	2 - 5
Triggering altitude	km [ft]	0.5 - 4	0.3 – 8
		[1640 - 13123]	[984 - 26247]
Range of temperatures of the	°C [°E]	-50 +50	-60 +60
guaranteed normal operation		[-58 122]	[-76 140]
Springs exertion of device in the	kaf [lb]	28	28
armed state	kgi [ib]	[62]	[62]
Timer work interval	S	0.8 - 1.2	0.8 - 1.2
Flexible pin shall not allow			
mechanism operation when moving	mm [in]	5 [0.2"]	5 [0.2″]
back-and-forth within			
Working stroke of extracting cable	mm [in]	70±2.5 [2.8"±0.1"]	70±2.5 [2.8″±0.1″]
Weight of device	ka [lb]	less than 0.950	less than 0.950
(without spare parts)	kg [ib]	[2.1]	[2.1]
Triggering number, guaranteed by	_	500	500
manufacturer	_	300	300

# 3.1. Brief technical characteristics of KAP-3 and PPK-U devices



Fig. 89. Parachute semi-automat PPK-U

1- device case; 2- altitude scale; 3- time scale; 4- flexible pin; 5- tube; 6- hose; 7- bayonet pin; 8- loop; 9- special nut; 10- cable; 11- flexible pin halyard

Parachute AADs are only security means when performing jumps with manual parachute deployment and parachute deployment delay.

Timer	AAD type		
setting, s	КАР-З	PPK-U	
2	1.7 - 2.3	1.7 - 2.3	
2.5	-	2.1 - 2.9	
3	2.5 - 3.5	2.5 - 3.5	
4	3.4 - 4.6	3.4 - 4.6	
5	4.3 - 5.7	4.3 - 5.7	

Tolerable limits of devic	e triggering	in terms	of time
---------------------------	--------------	----------	---------

Altitude	Permissible triggering limits,		
scale,	m [feet]		
km [feet]	KAP-3	PPK-U	
0.3 [984]		300-350	
		[984-1148]	
0 5 [1640]	500-700	500-750	
0.3 [1040]	[1640-2297]	[1640-2461]	
0 7 [2207]		660-990	
0.7 [2277]		[2165-3248]	
1 [2201]	950-1250	950-1300	
1 [3201]	[3117-4101]	[3117-4265]	
1 5 [4021]		1430-1820	
1.5 [4721]		[4692-5971]	
2 [6562]	1950-2250	1900-2350	
2 [0502]	[6398-7382]	[6234-7710]	
2 5 [8202]		2350-2900	
2.3 [0202]		[7710-9514]	
2 [0042]	2900-3300	2850-3400	
5 [7043]	[9514-10827]	[9350-11155]	
3 5 [11/83]		3300-3950	
5.5 [11405]		[10827-12959]	
1 [12122]	3900-4300	3800-4450	
4 [13123]	[12795-14108]	[12467-14600]	
5 [16404]		4600-5650	
5 [10404]		[15092-18537]	
6 [19685]		5400-6850	
0 [17003]		[17717-22474]	
8 [26247]		7100-9150	
0 [20247]		[23294-30020]	

Altitude tolerances of device triggering

Notes:

1. Altitude tolerances of aneroid triggering are given with 100 m [328 ft] allowance. For example, "500 m" marking corresponds to 600 m [1969 ft] altitude.

2. In operation it is sufficient to calibrate PPK-U device at 0.3, 3 and 8 km graduations.

Maximum elevation of flying area above the sea level	From 0 to 1000 m [03281 ft]	From 1001 to 2000 m [32826562 ft]	From 2001 to 3000 m [62639843 ft]
Device altitude setting	2000 m [3282 ft]	3000 m [9843 ft]	4000 m [13123 ft]
Timer setting	Regardless of elevation: for jet planes and helicopters-2 s; for piston airplanes- 3 s.		

Altitude and time setting on scales of life-saving security devices.

AAD altitude settings for training parachutes depending on atmospheric pressure at airfield level and at landing site in order to obtain true parachute deployment altitude 500 m [1641 ft]

Pressure at ground level,	Altitude scale setting,
mm of Hg [mbar]	m [ft]
More than 760 [1013]	500 [1460]
740 - 760 [987-1013]	750 [2461]
720 - 740 [960-987]	1000 [3281]
685 - 720 [913-960]	1500 [4921]
640 - 685 [853-913]	2000 [6562]
605 - 640 [807-853]	2500 [8202]
565 - 605 [753-807]	3000 [9843]
530 - 565 [707-753]	3500 [11483]
500 - 530 [667-707]	4000 [13123]

# 3.2. AAD Scheduled Maintenance

Every 100 triggering, but no less than once every 6 months, AADs shall be subject to maintenance according to Maintenance Schedule No. 1. Record of maintenance is made in the device passport.

No less than once a year maintenance is carried out according to Maintenance Schedule No. 2. Record of maintenance is made in the passport of device.

### Maintenance Schedule No. 1

1. Check AAD external appearance. Inspect mechanism through the inspection openings and make sure it is free of dirt.

2. Dismantle, inspect, wash, dry, lubricate and reassemble the extracting mechanism.

3. Check operation of extracting mechanism and timer.

4. Check precise device triggering by altitude and time settings.

## Maintenance Schedule No. 2

1. Check AAD external appearance. Inspect mechanism through the inspection openings and make sure it is free of dirt.

2. Dismantle the extracting mechanism, open the device, remove timer from casing without further disassembling; inspect, clean, wash, dry and lubricate the extracting mechanism and timer. Reassemble and adjust the device.

3. Check operation of extracting mechanism and timer.

4. Check precise device triggering by altitude and time settings.

5. Seal the device after completion of maintenance.

Maintenance technique is expounded in Technical Description Manual and Operating Manual.

Failure	Reason	Remedy
Cable threads rupture	Cable lashing in the moment of extracting gear triggering or wear thereof	Replace with new cable from the spares kit
Rupture of hose braiding	Wear	Replace with new hose from the spares kit
Flexible hose buckling	Impact with special nut or cable is too short	as above
Fracture of extracting mechanism loop; multiple nicks on special nut, building a cold-hardening; loop and nut shape distortion	Wear	Replace with new parts from the spare parts kit
Stretching, bending, fracture or contortion of flexible pin	Jerk of flexible pin aside, impact against object board	Replace with new pin
«Slipping» of mechanism	Flexible pin thickness reducing due to wear	as above
Cap and nut loosening	Impact effects of extracting mechanism	Tighten nuts using wrenches, supplied with the device
Lock-nut is loose	as above	Tighten using wrench, supplied with the device
Device cover play in respect to the casing		Tighten cover screws using screwdriver having previously covered the screw thread with BF-4 glue
Pollution of the unit	Ingress of dirt, sand or water into the unit	Perform device maintenance according to instructions in Section 4 of Technical Description Manual and Operating Manual (1972). Discontinue device operation and overhaul it if necessary.

# AAD troubleshooting at operator facilities

Failures that should b	be eliminated	by manufacturer
------------------------	---------------	-----------------

Failure	Reason	Remedy
Scale time error	Shrinkage of working springs	Adjust the timer mechanism according to Chapter 6 of Operation Manual (1972).
Jamming of leading and blocking	Ingress of foreign particles between	Dismantle and thoroughly clean the
levers	lever working plane and the plate	entire unit mechanism
When altitude scale is set to 0.3, the blocking lever hits against aneroid stop	Aneroid leakage	Discontinue device operation and overhaul
Timer mechanism «slipping» occurs when flexible pin is rotated or bent	Stop wear	as above
Altitude scale error	Loose stop pressing into the upper aneroid centre; aneroid shrinkage	as above
Pointer returns to its initial position too slowly or stops	Jamming in the return mechanism of the device	as above