

# **Technical Description and Direction for Use of the WP 370 Reserve Parachute**

## **Instructions for Packing and Use No. P – 004 – 05**



4 th Issue

In Jevíčko, 03/2015

### List of Changes

In case of necessity to change or amend this manual, the holder will be notified by means of changes approved by the user. New (corrected) sheets will be enclosed to such changes. The holder of the manual is obliged to record all obtained changes into the List of Changes and replace out-of-date sheets with valid sheets. Changed or amended texts will be marked with a vertical line along the side, they will be further marked with a number and issue date of the change at the bottom of the page.

Sequence no. of the Change	Chapter	Nos. of sheets with referred change	Issue Date Of New Sheets	No. of the Bulletin with issued changes	Approval bulletin date	Date of Execution Signature

## **WARNING!**

- 1. Training and experience are required to reduce and eliminate the risk of serious or fatal injuries.**

**Never use this equipment unless**

**A - you have read and understood this warning label  
and you have also completed a required training course  
necessary for the use of this parachute.**

**Or**

**B - Unless you have read and understood all relevant flight  
manuals for tandem systems and packing instructions and you  
have performed at least 100 jumps with a tandem parachute.**

- 2. In order to eliminate the risk of a serious injury, death, destruction  
or damage of the canopy, it is strongly recommended not to exceed  
the following limits: load and speed at the parachute opening - see  
tactical and technical parameters (Chart no. 1)**

**MarS a.s.**

**Okružní II 239**

**569 43 Jevíčko**

**CZECH REPUBLIC**

## CONTENTS

### **CHAPTER I.**

#### The WP 370 Parachute Technical Description

1. Specification
2. Tactical and Technical Parameters
3. Design
4. Warranty
5. Parachute Life
6. Operational Conditions
7. Packing Period
8. Use of the Parachute
9. Functions of the Parachute
10. Parts of the Parachute System
11. Technical Description of the Parachute

### **CHAPTER II.**

#### Packing Instructions

### **CHAPTER III.**

#### Instructions for the Parachute Use

1. Preparation of the Parachute before Jumps
2. Opening of the Parachute

### **CHAPTER IV.**

#### Instructions for the parachute storage and transportation

1. Storage Parameters
2. Transportation of Parachutes

## CHAPTER I.

### *The technical description of the WP 370 reserve parachute*

#### 1. Specification

The WP 370 canopy is designed as a reserve parachute for tandem-arranged containers.

#### 2. Tactical and technical parameters

Basic parameters

<i>Reserve parachute model</i>	<i>area [sq.ft]</i>	<i>Max .canopy load [lb/kg]</i>	<i>Canopy weight [ lb/kg]</i>	<i>Volume [cm<sup>3</sup>/cu.in]</i>	<i>Max. opening speed [km.h<sup>-1</sup>]</i>
<b>WP 370</b>	370	500/227	13,45/6,10	14.027/855,9	324

Chart no. 1

#### 3. Design

The parachute is manufactured in a standard design. Upon customer' s request, the following modifications are available:

- various colour designs.

#### **4. Warranty**

- a) Lasts 2 years on condition that repairs and replacements of used parts are carried out, storage conditions are maintained and regular inspections are performed
- b) Begins with the date of the shipment of the parachute – shipment must take place not later than 24 months since the production date
- c) During warranty period the manufacturer will not accept claims in the cases as follows:
  - Damage of canopy parts while the product functions reliably
  - Damage of a canopy part caused by the use
  - Violation of conditions of packing, storage and maintenance of the parachute
  - Missing parachute log book or its improper records
  - Failure to follow the instructions of this technical description
  - Any unskilled handling with the parachute or container/harness

#### **5. Parachute Life**

Maximum parachute life is 20 years.

#### **6. Operational Conditions**

The parachute functions are guaranteed on the condition that the environment temperature ranges from  $-40^{\circ}\text{C}$  to  $+93,3^{\circ}\text{C}$  and relative humidity corresponds with these temperatures.

#### **7. Length of Packing period**

Before its use, the parachute can be stored for 180 days in maximum. Exceptions are limited and can be issued by the manufacturer.

#### **8. Use of the Parachute**

The parachute is designed for the use in tandem-arranged parachute sets as the reserve tandem parachute. The parachute is connected to the harness with mailon type rapid links. The harness connected to the reserve parachute should have four risers, the back risers should be equipped with brakes and equipment for the storage of steering loops.

## 9. Functions of the Parachute

The reserve parachute is used in case of the main canopy malfunction. In case of a malfunction of the main canopy, **the main canopy must be cut away and the rescue parachute used after the cutaway.**

The parachute is initiated by the parachutist as follows:

- a) Pull the reserve parachute release out of the parachute container flexible hose.

The reserve parachute flaps are released, the spring pilot chute is ejected into air and pulls the deployment bag with the canopy out of the container. The lines stored in the deployment bag are unlaced and the canopy is pulled out. The canopy cells begin to inflate. At the moment of the slider's move to risers, the canopy is fully functional.

Then unbrake the parachute by pulling the steering loops out and the parachute becomes steerable.

- b) Or by the Reserve static line (RSL) during the main canopy cutaway. The reserve static line is activated by the parachutist by pulling out the main canopy cutaway release due to the release of the harness risers from the harness by disconnecting the three-ring system. The connecting line is attached to the right riser with a snap hook. Due to the disconnected canopy strength, the connecting line and the ring create tension on the release cable, which is pulled out of the reserve parachute closing line ring and opens the reserve parachute container flaps, the spring pilot chute is ejected into air and the deployment bag with the canopy is pulled out of the container. The lines stored in the deployment bag are unlaced and the canopy is pulled out. The canopy cells begin to inflate. At the moment of the slider's move to risers, the canopy is fully functional. Then unbrake the parachute by pulling the steering loops and the parachute becomes steerable.
- c) By the ball-shaped handle on the Reserve static line-T. The reserve parachute can be opened by this handle, which is fixed to the RSL-T webbing. By a vertical pull from the body, first the reserve static line is disconnected from the main canopy right riser, second the main canopy left riser is cut away and opens the reserve parachute container.

## 10. Parts of the Parachute

The parachute contains the following main parts:

10.1. Reserve pilot chute (PV-055)	1 piece
10.2. Free bag (VV-042)	1 piece
10.3. Canopy with lines (V-113)	1 piece
10.4. Rapid links	4 pcs
10.5. Slider	1 piece
10.6. Steering loops (RP-010)	2 pcs

## 11. The Technical Description of the Parachute

### 11.1. The PV-055 reserve pilot chute



The chute pulls the reserve canopy and lines out of the parachute container. It is made of PAD fabric and net. The bottom is reinforced with duralumin sheet.

The chute PV-055 for AAD Tandem: m2, CYPRES, VIGIL is equipped with a coiled spring with the minimal ejection strength of 180 N.

### 11.2. The VV-042 free bag



The bag is designed for the storage of the stowed canopy and lines. The connecting line, which assures the connection of the bag with the pilot chute, is sewn to the bag top. The bag is made of polyamide fabric and strengthened with 20, 25 and 43-cm-wide webbings. The connecting webbing is 5.25 m long and 50 mm wide and assures that the bag is pulled out also in a case of a collapse or the pilot chute becomes caught up.

### 11.3. The V-113 canopy with lines

The canopy is made of polyamide fabric of low permeability. It has 9 cells each consisting of two parts - chambers. The strength from line loops is distributed to the canopy due to webbings that are 13 and 20cm wide. Other canopy stressed parts are strengthened with a 13-mm webbing, the trailing edge is strengthened with a 15-mm webbing. The canopy near risers is untied into two rows of lines on the front strap and into one row of lines on the back strap. The back strap line is divided at the canopy.



#### 11.4. Rapid links



Four rapid links are a way of terminating suspension lines and connecting the canopy to the harness. The link minimal strength is guaranteed to 10 kN.

#### 11.5. Slider



The rectangular-shaped slider is made of polyamide fabric and its edge is reinforced with a 43-cm-wide webbing. Four stainless steel grommets (with inner diameter of 26 mm) are pressed in all four corners.

#### 11.6. The RP-010 Reserve parachute steering loops



The loops are designed to steer the parachute, steering lines are attached to them. The RP-010 steering loops are made of a 25-mm wide strap. An “0”-sized grommet is pressed on the reinforced part, which connects the steering line. The steering line is threaded through the grommet.

## CHAPTER II.

### *Instructions for the Parachute Packing*

The parachute is packed by an authorized person (packer) who records a proper packing into the logbook.

It is recommended to use a packing set with tools that makes the packing easier.

Fix the system harness to the packing pad edge and spread the canopy on it as shown in Fig. 1. If the lines are twisted, first untwist them. Pull the slider down to the risers. Perform an inspection of all the important canopy parts. Then insert the cable with a pin into the flexible hose on the harness side and insert the handle into the pocket for the reserve parachute release.

Fig.1



Fold each part of the canopy in such a manner that suspension lines remain extended. Then smooth carefully front and back canopy parts. Each group of suspension lines must remain stretched all the time – see previous paragraph.

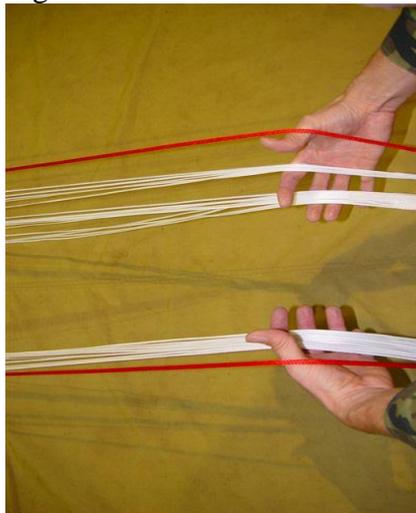
Tie the fast links on reserve parachute straps with a packing line.  
If you do so, lines will remain stretched and tight evenly during the packing.

Fig.2



Check suspension lines in the direction from harness straps up to the attachment of the suspension lines to the canopy – as shown in Fig.no. 3 and 4. Insert your left hand fingers between single left straps and between the left steering line and straps. Repeat this with your right hand in such a manner that each group of lines and each steering line remain in the empty space between two fingers. Stand yourself between the groups of right and left straps and hold the lines as shown in the picture. Check that the lines are not twisted. Start lifting up the lines while they are sliding among your fingers. Move the lines in front of you until you reach the bottom canopy edge.

Fig.3



As soon as you reach the canopy edge, stretch out your hands as much as the slider allows. Shake with the canopy several times in order to align single canopy cells.

If the canopy is aligned, there will be four clearly differential groups of lines (A, B, C, D) leading up to the stabilizers, where no lines cross one another or remain twisted. The aim is to get suspension lines aligned with the edges of single suspension profiles.

Fig.4



After the lines are checked, put suspension lines into one joint group. Now approach one side outside of the lines, move the lines into one hand in such a manner that the left and right sides of the parachute are hanging at the same height.

It is not necessary to hold each group of lines separately among your fingers because lines are already checked (and they are not twisted). The parachute should look like the one in the picture. All the lines are to be held stretched while the leading edge should be directed towards the harness.

The slider touches stabilizer stops, which must be at the same height.

Fig.5



“Flake” single cells of the parachute leading edge. “Flake” the whole leading edge with one hand as shown in the picture - begin from the cell chamber that is nearest your legs. Stretch out the cell chambers and hold in your hands. After you stretch another one, put this cell chamber to the previous one, be careful so that you will not let any pulled out cell chambers slip before you hold fast all the cells in your hand.

Pull out and fold side stabilizers. Set the centre (by moving the hand down in the direction between the two front rings – exactly one half of all the lines will remain on one side, the other half will be on the other side). Let the middle cell hang and at the same time divide all the remaining cells on one side to the left and right sides. Release stabilizers. With regards to the centrally positioned group including all the lines, pull out all the stabilization areas step by step until you create an irregular shape, which looks like flower petals from the top. Check if the lines around the slider stop on the stabilizer are not twisted.

Find the A line group on one canopy side. If you hold the canopy in front of you as you are doing at the moment, A lines form the front group of lines that pass through the front slider grommets (the part nearest to you).

As there is a lot of fabric between the points of attachment of lines A and B, it is easy to differentiate both line groups.

Look down inside the small S-shaped fold on the stabilizer and find excess fabric.

On one side, insert your hand between lines A and B (near the place where they pass through their own ring) and stretch out your hands to the sides.

The cells will be flaked properly on one side. Now repeat the same procedure for the other group of lines A and B and pull out the folds to the other side.

As you have pulled out the canopy between the line groups A and B, do the same between the lines C and D. Pull out the fabric fold between both groups outside to both sides. If you look down between the stabilizer folds, the flaked folds should look aligned as shown in the picture.

Now find the D group positioned nearest the trailing edge. (Not the steering line, these ones are attached directly at the trailing edge).

Pull out the left steering lines to the left side (so that they do not get into the way). Proceed downwards along the stabilizer to the D line group and hold the D lines on the left side.

Now you should be holding 5 lines.

All the lines in your hand should pass through the same ring. If not, you are holding a wrong line.

Now while you are holding only the D lines, separate them from steering lines. On one side, grasp all the D line group and pull it out carefully.

Fold the D line group with one move in such a manner that a fabric fold is created between the lines C and D. Repeat the same step on the other side.

The next step is to check whether the stabilizers and their slider stops are in the proper position outside the suspension lines.

If the stabilizer (or its slider stop) lies under the line, the canopy could possibly become damaged.

The canopy stowed in the above mentioned way should look like the one in the next picture.

Fig.6



Now move your hand down and grasp the trailing edge at the very centre, where an identification sign is sewn on. Lift the trailing edge and place it to the slider stops and hold it there with the hand with the same hand you are holding the lines.

Put your free hand under the canopy carefully. Swing slightly the canopy so that the lines remain stretched and place it slowly on the pad in such a manner that the canopy remains symmetrically divided.

Refold the canopy lying on the pad one fold by another fold and finish with the canopy precisely stowed on the pad - see the following picture.

Fig.7



Move the prepared slider down to the stabilizer stops and fold carefully. Pay special attention to the slider position during the folding of the canopy. Fold the stabilizers and fold the canopy trailing edge up to its leading edge in such a manner that the trailing edge cells remain open and the stowed canopy's width is a little larger than the container, out of which it will be opened.

Fig.8



Move up to the canopy side and put one hand under the canopy edge, where the slider is placed. Put the other hand up a little bit further and make an S-fold.

Fig.9



Pay attention to the slider, which should be at the top touching the stabilizers and prevent its move down along the lines.

Now put one hand on the created S-fold and with your free hand, pull the middle part of the canopy trailing edge over this S-fold.

Fig.10



Align the trailing edge in such a manner that its bottom part covers the bottom parts of stops on stabilizers with rings.

Then make another S-fold in the opposite direction.

Fig.11



At this moment a neat and compact parcel should be created. Try to make folds in such a manner that the final shape of the parcel is a little bit larger than the container. Now prepare the container under the stowed canopy.

Then put the middle canopy cell in front of you, fold the middle canopy cell and divide the stowed canopy into two identical parts – as shown in the picture. First smooth and fold the left half canopy cells.

Fig.12



Insert such stowed cells into the left part of the prepared container. Proceed in the same way with the folding and storage of the right canopy cells.

Fig. 13



After the canopy is stored in the reserve container, finish the placing of the canopy in such a manner that the container ideally fills the room in the reserve container.

Fig.14



Close the reserve container with a group of suspension lines.

Fig.15



Put the remaining suspension line length into the pouch on the container bottom part as shown in the picture.

Fig.16



Unfasten the packing webbing that ties the reserve parachute straps.

Fig.17



Put the folded canopy with stowed suspension lines into the reserve container.

Fig.18



See the Technical description of the Container/Harness no. P-005-05 to check the closing of the container.

## CHAPTER III.

### *Instructions for the Use of the Parachute*

#### **1. Preparation of the parachute before jump**

Before jumps the parachutist is to check the position of the release cable pin in the closing line loop, as well as the position of the release handle, the correct connection of the RSL-T and entirety of the sealing thread and parachute packing date.

The release cable must be straightthrough both in the flexible hose and in steel handle opening in order to prevent any undesired reserve parachute opening.

#### **2. Opening of the parachute**

The reserve parachute is used in case of a main canopy malfunction. **If the main canopy fails to function, it must be cut away first, only after the cutaway of the main canopy, use the reserve parachute.** The parachute is activated by the parachutist by pulling the reserve parachute release out of the flexible hose on the parachute container or by using the RSL-T during the main canopy cutaway and/or by a ball-shaped handle attached to the RSL-T. Parachute container flaps become released, the spring pilot chute is ejected into air and pulls the deployment bag with the canopy out of the container. Lines become unlaced out of the storage space on the deployment bag and the canopy is pulled out of the bag. The canopy starts inflating and at the moment when the slider moves down to the risers, the canopy becomes fully functional.

After this step, unbrake the parachute by pulling the steering loops, and then you can concentrate on the parachute steering.









**2015**

MarS a.s., Okružní II 239, 569 43 Jevíčko, THE CZECH REPUBLIC

phone: +420 461 353 841; fax: +420 461 353 861

<http://www.marsjev.com>, e-mail: [mars@marsjev.cz](mailto:mars@marsjev.cz)